

# **PART 1**

## **SERVICE MANUAL**

**FOR**

**MARK VII and XK 120**

**MODELS**

**JAGUAR CARS LIMITED, COVENTRY, ENGLAND**

## **FOREWORD**

This Service Manual has been prepared with the object of assisting all Jaguar Distributors and Dealers in the major servicing, dismantling and reassembling of Mark VII and XK 120 cars and their components. The manual may also be purchased by anyone interested in the contents either direct from Jaguar Cars Limited, Coventry, or from a Jaguar Distributor or Dealer.

Facing this foreword is a General Index to Sections and each of these sections is, as far as possible, complete in itself without reference to any other section. Each section commences with its own index to contents and index to plates. The pages of each individual section are numbered consecutively from 1 with the page number prefixed by the section reference. The section title is printed in bold type at the top of each page, together with a sub-title and these indicate the subject matter dealt with on that particular page.

Where information of a service nature is required which is not covered by this Manual enquiries should be addressed to The Service Department, Jaguar Cars Limited, Coventry, quoting where applicable the chassis number of the car concerned.

### **SCREW THREADS**

It should be noted that both American and British screw threads are in use on the Mark VII and XK 120 models and therefore care should be taken to identify the type of thread when replacing nuts and bolts or when using threading equipment.

### **NOTE**

Throughout this Manual reference to right hand and left hand is made assuming the driver to be seated in the car and facing forward.

# JAGUAR

**XK 120 · XK 140 · XK 150 · XK 150'S'  
AND  
Mk. VII · Mk. VIII · Mk. IX MODELS**

## SERVICE MANUAL

*Jaguar Cars Limited reserve the right to make changes in design, or to make additions to or improvements upon their products without incurring any obligation to install the same on vehicles previously built.*



ISSUED BY  
JAGUAR CARS LIMITED, COVENTRY, ENGLAND

This service manual has been compiled from the following publications.

Jaguar Mark VII and XK 120 Models – Service Manual  
Wilmot Breeden Mark VII – Door Lock Supplement  
Borg Warner Automatic Transmission – Service Manual  
Laycock de Normanville Overdrive Unit – Service Manual  
Jaguar Mark VIII Model – Service Manual Supplement  
Jaguar XK 140 Model – Service Manual Supplement  
Jaguar Mark IX Model – Service Manual Supplement  
Jaguar XK 150 & XK 150'S' Models – Service Manual Supplement  
Jaguar and Lucas – Wiring Diagrams

# INDEX TO SECTIONS

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CONTAINED AT THE BEGINNING OF EACH OF THE ABOVE SECTIONS IS A SEPARATE INDEX FOR BOTH THE CONTENTS AND PLATES IN THAT PARTICULAR SECTION.

# OPERATING AND MAINTENANCE

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

### ENGINE NUMBERS

(Stamped on right-hand side of cylinder block above the pressure oil filter. Also on front end of cylinder head casting)

MK. VII

XK 120

A.1001 ONWARDS

W.1001 ONWARDS

Suffix /7 or /8 of Engine Number denotes Compression Ratio

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned, and in the order shown:—

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## SPECIFICATION (MARK VII MODEL)

**GENERAL.** The chassis, engine, gearbox and body numbers are given on a plate under the bonnet to the rear of the engine. The appropriate numbers are stamped directly on the components as follows:—

**Chassis Number.** Stamped on the chassis left-hand side member above rear engine mounting bracket.

**Engine Number.** Stamped on the right-hand side of cylinder block above the pressure oil filter. Also on front end of cylinder head casting.

**Gearbox Number.** Stamped on a small "shoulder" at the top of the rear left-hand side of the gearbox casing, and also on the rim of the core plug aperture in the top cover.

**Body Number.** Embossed on a small plate attached to the left-hand of scuttle dash under bonnet.

Always quote the chassis number when communicating with the Factory in regard to a particular car.

**ENGINE.** General:

Type	..	..	..	..	..	..	..	..	..	Twin Overhead Camshaft
Bore	..	..	..	..	..	..	..	..	..	3.2677" ( 83 mm.)
Stroke	..	..	..	..	..	..	..	..	..	4.1732" (106 mm.)
Number of Cylinders	..	..	..	..	..	..	..	..	..	6
Capacity	..	..	..	..	..	..	..	..	..	3442 c.c. (210 cu. ins.)
R.A.C. Rating	..	..	..	..	..	..	..	..	..	25.6 h.p.
Maximum B.H.P.	..	..	..	..	..	..	..	..	..	160 @ 5200 r.p.m.
Compression Ratio	..	..	..	..	..	..	..	..	..	8 : 1 or 7 : 1

**Cylinder Block.** Cast integral with crankcase in high grade chrome iron with full length water jacket.

**Cylinder Head.** High tensile aluminium alloy casting with hemispherical combustion chambers. The valve seats are high strength alloy iron shrunk direct into the head.

**Camshafts.** Twin overhead camshafts running in an oil bath operating the valves direct through floating tappets. Each shaft is carried in four steel-backed precision bearings.

**Crankshaft.** Steel forging with integral counterweights carried in seven steel-backed precision bearings, 2 $\frac{3}{4}$ " diameter, and fitted with torsional vibration damper at the front end.

**Valves.** Directly operated by the twin overhead camshafts. The exhaust valve is of special high quality steel which has a high strength at high temperatures to resist burning.

**Pistons.** Aluminium alloy pistons with fully floating gudgeon pins and steel connecting rods, with thin steel shell bearings. Pressure feed lubrication to the gudgeon pins. Two compression rings and one oil scraper ring are fitted, the top ring being hard chromium plated.

**Timing Gear.** Driven by two-stage duplex chains with automatic tensioning of the lower chain, and a manual adjustment for the upper chain.

**Ignition.** Coil and distributor with built-in centrifugal advance mechanism, also over-riding vacuum control operated from the carburetter. Micrometer hand adjustment for variations in octane ratings of fuel. Champion sparking plugs NA.8 for 8 : 1 compression ratio engines ; Champion L.10S for 7 : 1 compression ratio engines.

**Carburetters.** Twin S.U. with thermo-electric auxiliary starting carburetter incorporated. Air silencer with felt cleaning element connected to carburetters by elbow manifold. Carburetters fitted with hydraulic piston dampers.

**Lubrication System.** Full pressure lubrication. A gear type pump in the oil sump draws the oil through a suction filter and passes it through a full-flow pressure filter to the main oil line in the cylinder block from which are fed the main bearings and connecting rod bearings, gudgeon pin bearings and also the front chain gear. A separate feed from the main line goes to the cylinder head to lubricate the camshafts, tappets and valve gear.

**Cooling System.** Water is circulated by a centrifugal pump and a quick warm up from cold is assisted by a by-pass thermostat mounted on the water outlet pipe. The water is passed through a gallery cast on the side of the block and equally distributed to each cylinder head, passing out into the gallery around the induction pipe, ensuring maximum cooling of the head and an even induction temperature. A restricted water flow to the block ensures a quick warm up and preserves the cylinders from corrosion wear.

**Fuel System.** Two individual S.U. electric pumps draw petrol through separate pipe lines from twin tanks mounted in each of the rear wings to the main feed line and carburetters. A two-way switch controlled from the instrument board changes over to either tank as required. Petrol tank capacity: 9 gallons right hand (O/S); 8 gallons left hand (N/S).

**Clutch.** A flexible dry single plate 10" Borg & Beck clutch is fitted.

**Gearbox.** Single helical four forward speeds and reverse with synchromesh on top, third and second; short centrally disposed gear lever with remote control. Gearbox oil capacity, 2½ pints (1.4 litres), measured by dipstick.

**GEARBOX RATIOS**

Top	..	..	..	1 : 1	Second	..	..	..	1.982 : 1
Third	..	..	..	1.367 : 1	First	..	..	..	3.375 : 1
				Reverse	..	..	..	..	3.375 : 1

**Transmission.** Divided propeller shaft supported at the centre by a flexibly mounted bearing. Lubricating nipples fitted to needle bearing universal joints and spline.

**Rear Axle.** Hypoid spiral bevel, semi-floating with offset pinion shaft. Rear axle capacity, 3½ pints (2.0 litres). Ratio, 4.27 : 1.

**Steering.** Burman recirculating ball worm and nut. Left or right-hand steering optional. 18" steering wheel adjustable for reach.

**Suspension (Front).** Independent, incorporating transverse wishbones supported on rubber-bonded bushes and long torsion bars. Control by telescopic hydraulic shock absorbers and anti-roll torsion bar.

**Suspension (Rear).** Long silico-manganese semi-elliptic springs fitted with rubber-bushed shackles and totally enclosed in full length gaiters provided with grease nipples. Control by Girling PV.7 hydraulic shock absorbers.

**Brakes.** Girling "Autostatic" fully hydraulic self-adjusting system, assisted by a vacuum servo motor. The front brakes have two trailing shoes which minimise braking variations due to changes in friction characteristics and ensures a retention of balance under all braking conditions. Drums: 12" diameter, 2¼" wide; central hand brake lever situated between the front seats operates the rear brakes through a separate mechanical linkage.

**Wheels and Tyres.** Tapered disc steel wheels with wide rims for a five-stud mounting. Wheels fitted with detachable chromium plated centre discs. Tyres: Dunlop "Super Comfort," 6.70 x 16". The spare wheel is carried inside the rear boot.

**Chassis Frame.** Box section with cruciform centre bracing giving immense strength and rigidity.

**Jacking.** An easy-lift jack, supplied with tool kit, fits into sockets in chassis front dumb irons to raise front wheels, and into sockets under the side of the chassis frame for the rear wheels. The rear jacking sockets are situated approximately one foot forward of the rear wheels below the rear doors.

**Electrical.** Lucas de Luxe throughout with compensated voltage control: 12 volt ventilated dynamo and 64 amps. capacity battery with 10-hour discharge. Built-in head lamps and wing lamps. Two fog lights, reverse lights and twin interior rear lights with extra door-controlled interior illumination. Twin blended-note horns, twin bladed screen wiper, cigar lighter, electric direction indicators, built-in provision for a Radiomobile car radio.

**Air Conditioning Installation.** Fitted as standard equipment and provides air conditioning of body interior, demisting and defrosting of windscreen.

**Coachwork.** Rigid all-steel body, sound insulated throughout. Upholstered throughout in finest quality Vaumol leather hide over Dunlopillo covered spring cases. Flat floor is thickly carpeted over felt underlay. Front bucket seats adjustable for height and reach. Heavily padded folding central arm rest and padded head and shoulder rests in rear compartment. Garnish rails and instrument panels are of fine quality polished figured walnut. Press button door handles. Large cubby lockers, one fitted with lock and key. Ventilator windows in front and rear compartments. The jack and wheel brace are carried adjacent to the spare wheel at the right-hand side (O/S) of the luggage compartment. Tools, grease gun, spare sparking plug and lamp bulbs carried in hinged containers mounted in front doors. Unusually large luggage accommodation is provided.

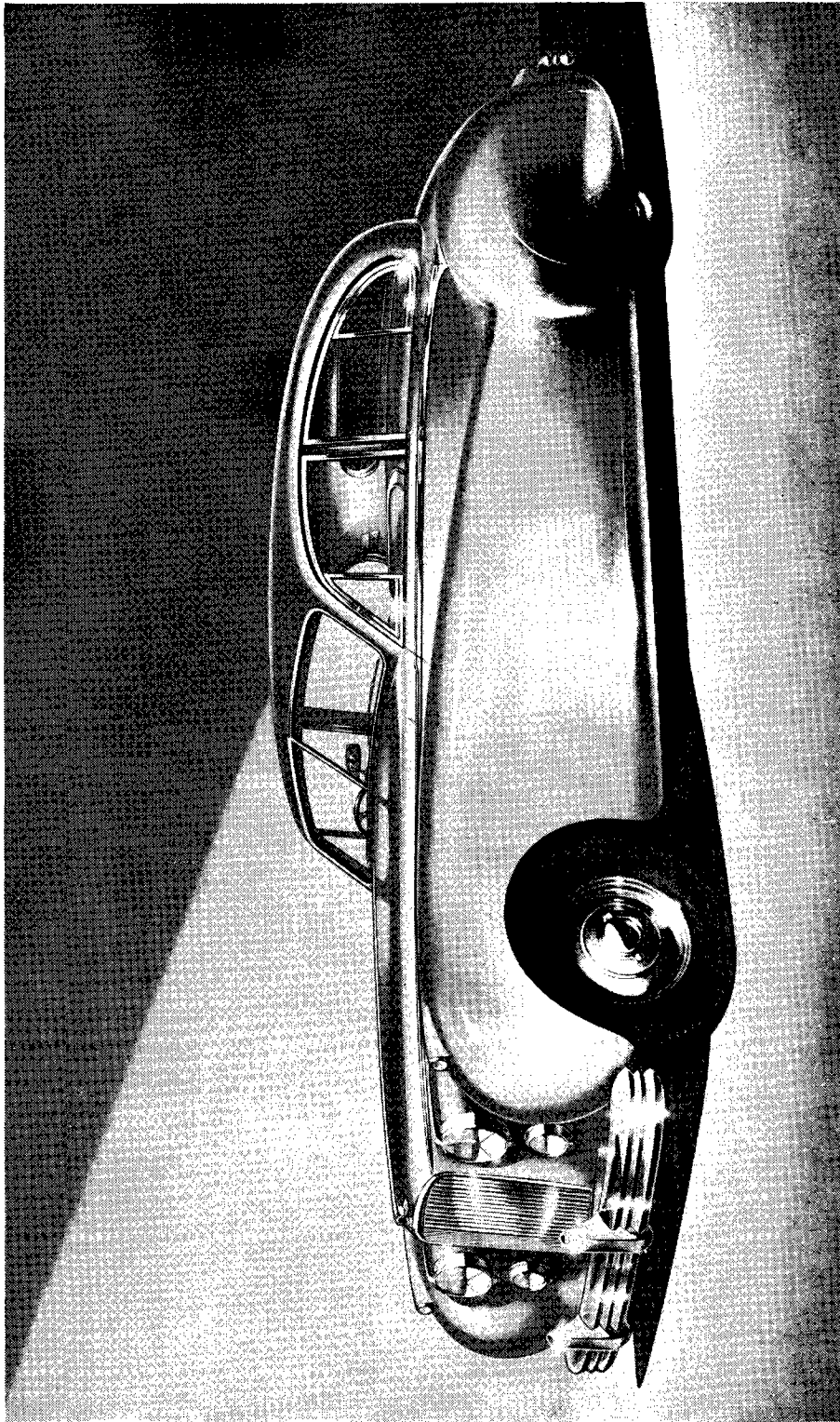


PLATE A.1. MARK VII SALOON.

## GENERAL DATA

Wheel Base	..	..	..	..	..	..	..	10' 0" (3.048 metres)
Track, Front	..	..	..	..	..	..	..	4' 8" (1.422 metres)
Track, Rear	..	..	..	..	..	..	..	4' 9½" (1.460 metres)
Length (Overall)	..	..	..	..	..	..	..	16' 4½" (4.991 metres) with overriders 16' (4.876 metres) without overriders
Width	..	..	..	..	..	..	..	6' 1" (1.867 metres)
Height	..	..	..	..	..	..	..	5' 3" (1.575 metres)
Turning Circle	..	..	..	..	..	..	..	36' (10.67 metres)
Ground Clearance	..	..	..	..	..	..	..	7½" (190 mm.)
Weight (Dry)	..	..	..	..	..	..	..	33 cwt. (3696 lbs.) (1676.4 kgs.)

## PERFORMANCE

Piston Area. Sq. ins./ton	..	..	..	..	..	..	..	30.5
Brake Lining Area. Sq. ins./ton	..	..	..	..	..	..	..	125½
Top Gear m.p.h. at 1000 r.p.m.	..	..	..	..	..	..	..	19.35
Top Gear m.p.h. at 2500 ft./min. piston speed	..	..	..	..	..	..	..	69
Litres per ton-mile dry..	..	..	..	..	..	..	..	3274

## INSTRUMENTS AND CONTROLS

## INSTRUMENTS

(Refer to Plate A.2)

**Ammeter.** Records the flow of current into or out of the battery. Since compensated voltage control is incorporated the flow of current is adjusted to the state of charge of the battery; thus when the battery is fully charged the dynamo provides only a small output, and therefore little charge is registered on the ammeter whereas when the battery is low a continuous high charge is shown. Positive charge is shown on the left-hand side of the ammeter scale: discharge is on the right-hand side.

**Air Conditioning Equipment Control.** The knob marked "FAN" situated on the extreme left of the instrument panel, when pulled out, switches on the air conditioning motor, and will only operate when the ignition is switched on. The control knob for the "HOT or COLD" air is also on the left of the panel turn anti-clockwise for heat as marked by indication arrow, and clockwise for cold.

**Ignition Warning Light.** A red warning light situated on the left of the ammeter lights up and records "IGN." when the engine is switched "ON" and the engine is not running, or when the engine is running at a speed insufficient to charge the battery. The latter circumstances are not harmful, but always switch "OFF" when the engine is not running.

**Head Lamp Warning Light.** A red warning light is situated in the speedometer and lights up when the head lamps are in the full beam position and is automatically extinguished when the lamps are in the dipped beam position.

**Oil Pressure and Water Temperature Gauge.** The oil pressure gauge records the oil pressure being delivered by the oil pump to the engine. It does not record the quantity of oil in the sump. The minimum pressure at maintained high r.p.m. when hot should not be less than 40 lbs. per square inch. The water temperature gauge records the temperature of the coolant by means of a bulb screwed into the thermostat housing which is connected to the gauge by a capillary tube.

**Petrol Gauge.** Records the quantity of petrol in the fuel tank in use. To obtain reading for opposite tank operate fuel changeover switch on instrument panel. Readings will only be obtained when the ignition is switched "ON". **Note.** Rotate switch clockwise for left tank, anti-clockwise for right tank.

**Revolution Counter and Clock.** Records the speed of the engine in revolutions per minute. The built-in electric clock is operated from the battery. The clock hands may be adjusted by pushing up the stem winder and rotating clockwise. Starting is accomplished in the same manner.

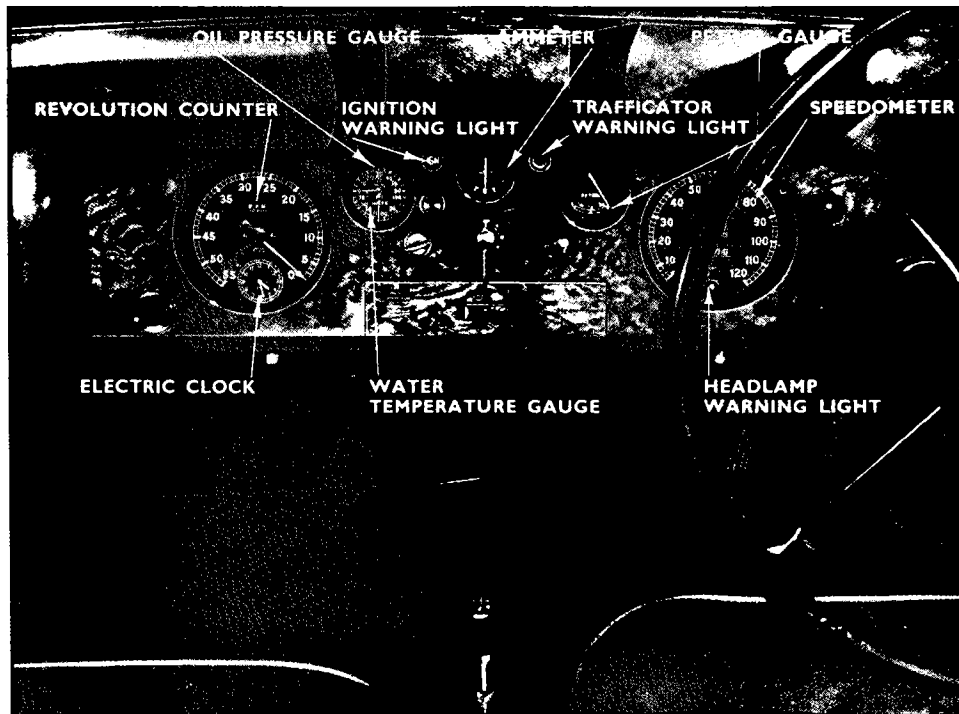


PLATE A.2. INSTRUMENTS (Mark VII).

**Speedometer.** Records the vehicle speed in miles per hour, total mileage and trip mileage (kilometres on certain export models). The trip figures may be set to zero by pushing the knob under the fascia upwards and rotating anti-clockwise.

**Trafficator Warning Light.** An amber warning light situated to the right of the ammeter lights up and records "T.R.F." when the trafficators are switched "ON". Trafficators only operate when the ignition is switched "ON".

### FOOT CONTROLS

(Refer to Plate A.3)

**Accelerator.** The pedal on the right. Controls the speed of the engine.

**Brake.** The centre pedal. Operates the brakes on all four wheels.

**Clutch.** The pedal on the left. Connects and disconnects the engine and the transmission. Never drive with the foot resting on the pedal and do not keep the pedal depressed for long periods in traffic. Never coast the car with gear engaged and clutch depressed.

**Head Lamp Dipper.** Situated on the toe boards to the left of the clutch pedal and operated by foot. The switch is of the changeover type and if the head lamps are in full beam position a single pressure on the control will switch the lamps to the dipped beam position and they will remain so until another single pressure switches them to the full beam position again.

### HAND CONTROLS

(Refer to Plate A.3)

**Air Conditioning Controls.** Operation as described in previous paragraph under heading "Instruments and Controls". When the air conditioning motor is switched "ON" air may be circulated through the car body, if desired, and will be circulated over the windscreen interior. This air will either be hot or cold depending on the setting of the "HOT-COLD" control knob. It should be observed that the motor will only function when the ignition is switched on.

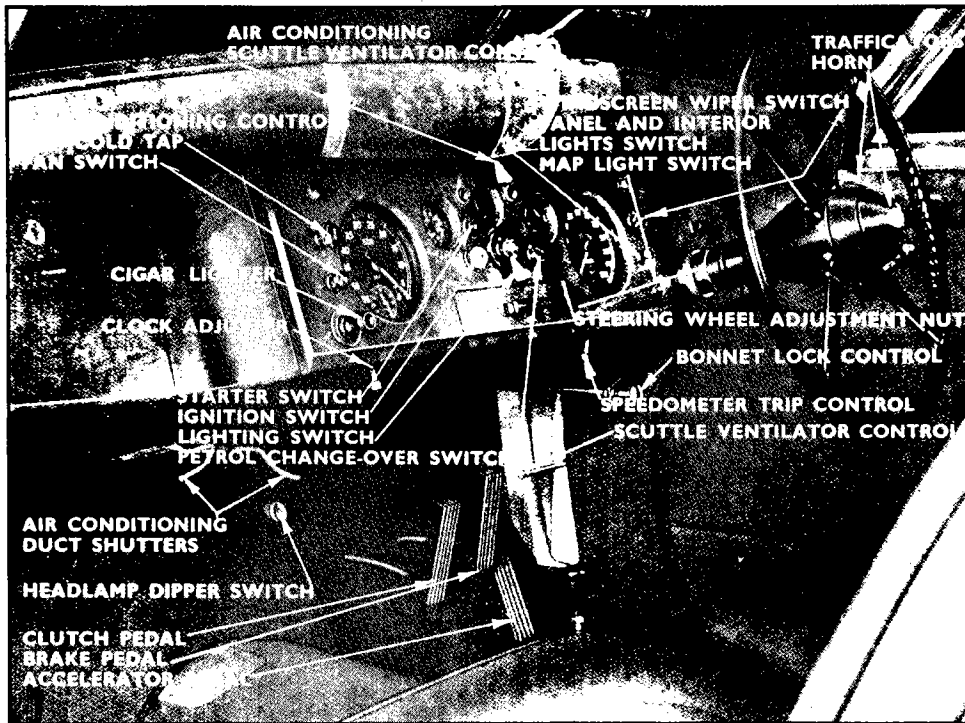


PLATE A.3. FOOT AND HAND CONTROLS (Mark VII).

**Bonnet Lock Control.** The bonnet lock is controlled from the driving compartment. To open bonnet pull the control knob situated below the right-hand glove box. This will release the bonnet, which will now be retained by the safety catch. Insert fingers under the nose of the bonnet and lift the safety catch (which is attached to the bonnet), when the bonnet may be raised and retained in the open position by the automatic action of the springs and cantilever brackets at the rear of the bonnet, or on later cars by inserting the bonnet prop in the bracket on left-hand wing. The bonnet is self-locking when pushed down firmly into the closed position. (See Plates A.3 and A.4.)

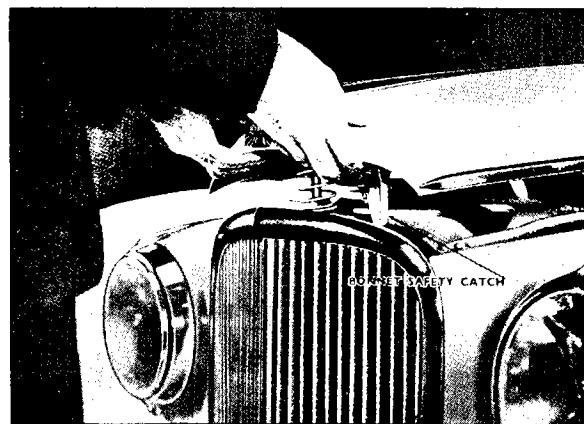
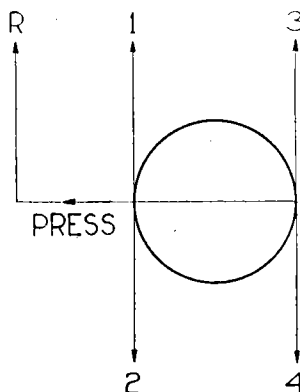


PLATE A.4. BONNET SAFETY CATCH (Mark VII).

**Fog Lamp Switch.** The fog lamps are operated by the main lighting switch in the centre of the instrument panel. Turn the switch clockwise to the position marked "F"; this switches the head lamps "OFF" and the fog lamps "ON".

**Gear Lever.** Centrally situated and with gear positions indicated on the control knob. Press lever to left against spring for reverse. Always engage neutral and release the clutch when the car is at rest. (See Plate A.5.)



GEAR POSITIONS

PLATE A.5.

**Hand Brake Lever.** Positioned between the two front seats immediately behind the change-speed lever. The hand brake operates mechanically on the rear wheels only, and is provided for parking, driving away on a hill, and when at standstill in traffic. To apply the brake pull the lever back and the trigger will automatically engage with the ratchet. To release, press down the knob, and push the lever forward, making sure that the brake is in the fully "OFF" position.

**Horn Switch.** Situated in the centre of the steering wheel, it operates the twin horns when depressed.

**Ignition Switch.** The key provided operates the switch when inserted and turned clockwise. Never leave the ignition switch on when the engine has stopped: a reminder of such circumstances is provided by the ignition warning light which will then light up and record "IGN."

**Interior Light and Panel Light Switch.** Situated on extreme right centre of the fascia board. Pull out the knob for illumination of the instrument panel. Rotate slightly clockwise, and pull out again to switch on the interior lights.

**Map Light.** Control switch at bottom right-hand corner of fascia board.

**Petrol Switch.** Situated above and between the ammeter and petrol gauge is the petrol switch for the changeover of fuel supply from main tank (O/S) to reserve tank (N/S) and vice versa. The petrol gauge will register the quantity of petrol in the tank which is in use at the time of reading.

**Side, Head and Fog Lamp Switch.** From "OFF" can be rotated clockwise into three position, giving in the first location, side and tail; in the second location, head, side and tail; and the third position, side, tail and fog lamps.

**Starter Switch.** Press the switch, with the ignition switched on, to start the engine. Release the switch immediately the engine fires and never operate the starter when the engine is running. The starter only operates when the ignition is switched on.

**Trafficators.** Operated by the knob situated at the top of the steering wheel centre. Normally the trafficators are self-cancelling when the wheel is centralised after turning a corner. When only a slight turn is made it may be necessary to cancel the trafficators manually by returning the control knob to the central position. When the trafficator arms are up the warning lamp on the facia lights up and records "T.R.F." On cars for certain countries trafficators are replaced by flashing side and tail lights and operation is as described above.

**Windscreen Wipers.** The wipers are set in motion and parked after use by the operation of the switch situated at the top right-hand corner of the facia board.

Do not endeavour to move the wiper blades across the windscreen by hand.

## ACCESSORIES

**Arm Rests.** A folding centre arm rest is provided in the centre of the rear squab. Pull forwards and downwards if required.

**Brake Light.** Twin combined tail and brake lights are provided, situated in the lower rear quarter body panels. The brake light is automatically illuminated on application of the foot brake, and gives clear warning to following traffic.

**Cigar Lighter (Early Type).** Fitted to the facia board. Press the holder into the socket against the spring pressure for approximately five to seven seconds and extract for use. Do not press in longer or the element may burn out.

**Cigar Lighter (Later Type).** Fitted to the facia board. Thermostatically controlled. To operate, press holder into socket and remove hand. Holder will return to extended position in socket on reaching required temperature. Do not hold lighter in "pressed in" position.

**Door Locks.** Doors may be opened from outside by pressing the button situated in the door handles. The driver's door may be locked with the ignition key by inserting the key in the button and rotating clockwise. To open the doors from inside the car, press the trigger situated in the top of the interior handles.

Doors may be locked from inside the car by rotating the small catches or rotating locking catches with doors open and then closing doors.

Rear doors are fitted with children's safety catches which, when operated, prevent doors being opened from inside the car.

To operate: Open rear doors, move small lever situated on door shut panel at rear end of door above door lock inwards. Close door, which can then only be opened by operating exterior press button.

**Seat Adjustment.** Front seats are adjustable for reach and height. To adjust for reach, push down the lock bar situated above the inside seat runner and slide into the required position. Release the lock bar and slide until the mechanism engages with a click.

To adjust for height, rotate the handle situated on the front face of the seat cushion until the seat is in the required position.

**Steering Wheel Adjustment.** Turn the knurled ring at the base of the steering wheel hub in a clockwise direction when the steering wheel may be slid into the desired position. Tighten up the knurled ring to lock the steering wheel.

**Spare Wheel Compartment.** The spare wheel is housed in the rear boot in a specially built-in "well" and firmly fixed in an upright position. Jack and wheel brace are also contained in this compartment.

**Door Step Light.** Illumination of the front door step is automatic. A switch incorporated in the front door pillars operates when the door is opened and switches on the map light on the facia panel, and automatically switches it off when the door is closed.

**No Draught Ventilation.** All doors are fitted with no draught ventilation windows incorporating quick locking catches.

Operation: To open the window, release the locking catch and set the window to the desired position. It will be observed that initial opening of the front window gives extraction of air from the body. When the window is opened further, air is forced into the body due to the angle of the ventilator and forward motion of the car. It should be observed that using the no draught ventilation windows as extractors (that is, partially open) has, to a minor degree, the effect of demisting the windscreen.

**Petrol Fillers.** Two petrol fillers are provided, one situated on the right side (O/S) above the rear wings and one on the left side (N/S) on a similar position. The petrol filler cover lids are fitted with locks opened by the keys provided. The petrol filler caps are attached to the filler cover and open and close automatically with the lid.



**Rear Boot.** To raise the lid, unlock with the keys provided, and turn both handles outwards and downwards. The lid can now be raised and supported in position by the telescopic strut situated at the right-hand side. To locate boot lid in open position, raise to highest position and return on to locking catch. To close, lift lid and then lower. Ample accommodation for luggage is provided in the large rear locker. The spare wheel is also housed in this compartment with jack and wheel brace easily accessible.

**Rear Boot Light.** The rear boot compartment is illuminated by a lamp incorporated in the rear number plate lighting unit, which is automatically switched on with the side lamps.

**Reverse Light.** The reverse light is automatically brought into operation when reverse gear is engaged, and the side lights are switched on.

**Roof Slide.** To open the sliding roof, turn the chromium plated locking handle anti-clockwise, pull to the required position and turn handle clockwise to lock slide in this location.

**Tool Compartment.** The tool kit, consisting of pliers, screwdriver, adjustable spanner and a wide range of open-ended and box spanners, gauges, bleeder tube, etc., also spare bulbs and sparking plugs, are all neatly stowed in two made-to-measure containers situated in each of the two front door casings.

Access to any tool is easy and instantaneous by simply pressing the button catch and opening the lid of the self-supporting tool container.

**Two-pin Plug Socket.** Situated under the bonnet between the voltage regulator and the battery is a two-pin plug, which may be used to "trickle charge" the battery or to illuminate an inspection lamp.

**Scuttle Ventilators.** Additional cool fresh air ventilation of the interior of the body can be obtained by opening one or both of the scuttle ventilators by operating the levers which protrude from the scuttle ventilator apertures on the inside of the scuttle side casings. (See Plate A.3.)

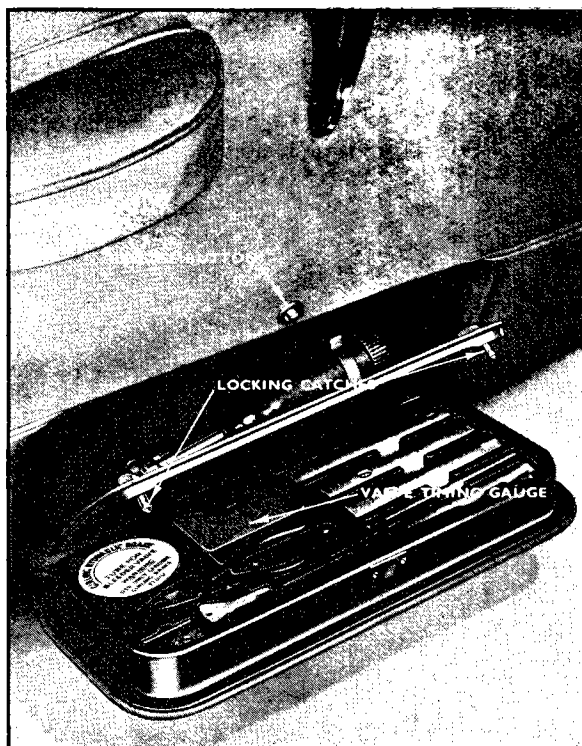


PLATE A.6. TOOL COMPARTMENT (Mark VII).

## STARTING AND DRIVING

**STARTING.** (a) Before starting the engine the new owner should be familiar with the location and function of the instruments and controls. (See page A.7.)

(b) Ensure that the water level in the radiator and the oil level in the sump are correct. Check for sufficient petrol in the tanks.

(c) Place the gear lever in the neutral position and check that the hand brake is applied. Switch on the ignition and press the starter. Release the starter as soon as the engine fires—this is important.

(d) It is not necessary to use any manual choke control when starting from cold, since the auxiliary starting carburetter is entirely automatic and controls the mixture strength without assistance from the driver. The starter carburetter automatically cuts out when the temperature of the water in the cylinder head reaches 35°C.

(e) Do not operate the engine at high r.p.m. when first started, but allow time for the engine to warm up and the oil to circulate freely. A thermostat is fitted to assist in rapid warm up. In very cold weather run the engine at 1,500 r.p.m. with the car stationary until a rise in temperature is indicated on the temperature gauge.

**DRIVING.** (a) Careful adherence to the instruction given in Section B—“Maintenance” regarding “running in” will be amply repaid by obtaining the best performance and utmost satisfaction from the car.

(b) The habit should be formed of reading the oil pressure gauge, water temperature gauge and ammeter occasionally as a check on the correct functioning of the car. Should an abnormal reading be obtained an investigation should be made immediately.

(c) Always start from rest in first or second gear: on a hill always use first gear. To start in a higher gear will cause excessive clutch slip and premature wear. Never drive with a foot resting on the clutch pedal and do not keep the clutch pedal depressed for long periods in traffic.

(d) The synchromesh gearbox provides a synchronised change into second, third and top. When changing gear the movement should be slow and deliberate.

When changing down a smoother gear change will be obtained if the accelerator is left depressed to provide the higher engine speed suitable to the lower gear. Always fully depress the clutch pedal when changing gear.

(e) Gear changing may be slightly stiff on a new car but this will disappear as the gearbox becomes run in.

(f) Always apply the foot brake progressively; fierce and sudden application is bad for the car and tyres. The hand brake is for use when parking the car, when driving away on a hill and when at a standstill in traffic.

**SPECIFICATION**  
**(XK 120 MODELS)**

**GENERAL.** The chassis, engine gearbox and body numbers are given on a plate fixed to the scuttle under the bonnet. The appropriate numbers are stamped directly on the components as follows:

- Chassis Number.** Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes.
- Engine Number.** Stamped on the right-hand side of the cylinder block above the pressure oil filter. Also on front end of cylinder head casting.
- Gearbox Number.** Stamped on a small "shoulder" at the top of the rear left-hand side of the gearbox casing, and also on the rim of the core plug aperture in the top cover.
- Body Number.** Embossed on a small plate attached to the left-hand side of the scuttle under the bonnet.

Always quote the chassis number when communicating with the Factory in regard to a particular car.

<b>ENGINE.</b>	General:	
Type	.. .. .	Twin Overhead Camshaft
Bore	.. .. .	3.2677" (83 mm.)
Stroke	.. .. .	4.1732" (106 mm.)
Number of Cylinders	.. .. .	6
Capacity	.. .. .	3442 cc. (210 cu. ins.)
R.A.C. Rating	.. .. .	25.6 h.p.
Maximum B.H.P.	.. .. .	160 @ 5200 r.p.m.
Compression Ratio	.. .. .	8 : 1 or 7 : 1

**Cylinder Block.** Cast integral with the crankcase in high grade chrome iron with full length water jacket.

**Cylinder Head.** High tensile aluminium alloy casting with hemispherical combustion chambers. The valve seats are high strength alloy iron shrunk direct into the head.

**Camshafts.** Twin overhead camshafts running in an oil bath operating the valves direct through floating tappets. Each shaft is carried in four steel-backed precision bearings.

**Crankshaft.** Steel forging with integral counterweights carried in seven steel-backed precision bearings, 2 3/4" diameter, and fitted with torsional vibration damper at the front end.

**Valves.** Directly operated by the twin overhead camshafts. The exhaust valve is of special high quality steel which has a high strength at high temperatures to resist burning.

**Pistons.** Aluminium alloy pistons with fully floating gudgeon pins and steel connecting rods, with thin steel shell bearings. Pressure feed lubrication to the gudgeon pins. Two compression rings and one oil scraper ring are fitted, the top ring being hard chromium plated.

**Timing Gear.** Driven by two-stage duplex roller chains with automatic tensioning of the lower chain and a manual adjustment for the upper chain.

**Ignition.** Coil and distributor with built-in centrifugal advance mechanism, also overriding vacuum control operated from the carburetter. Micrometer hand adjustment for variations in octane ratings of fuel. Champion sparking plugs NA.8 for 8 : 1 compression ratio engines; Champion L.10S for 7 : 1 compression ratio engines.

**Carburetters.** Twin horizontal S.U. with thermo-electric auxiliary starting carburetter incorporated. Fitted with air cleaners. Carburetters are fitted with hydraulic piston dampers.

**Lubrication System.** Full pressure lubrication. A gear type pump in the oil sump draws the oil through a suction filter and passes it through a full-flow pressure filter to the main oil line in the cylinder block from which are fed the main bearings and connecting rod bearings, gudgeon pin bearings and also the front chain gear. A separate feed from this main line goes to the cylinder head to lubricate the camshafts, tappets and valve gear.

**Cooling System.** Water is circulated by a centrifugal pump and a quick warm up from cold is assisted by a by-pass thermostat mounted on the water outlet pipe. The water is passed through a gallery cast on the side of the block and equally distributed to each cylinder head, passing out into the gallery around the induction pipe, ensuring maximum cooling of the head and an even induction temperature. A restricted water flow to the block ensures a quick warm up and preserves the cylinders from corrosion wear.

**Fuel Supply.** By a large capacity S.U. electric pump from a 15 gallon rear tank, petrol filler cap concealed and fitted with lock and key. (An auxiliary 10 gallon tank is available to special order.)

**Clutch.** A flexible dry single plate 10" Borg & Beck clutch is fitted.

**Gearbox.** Single helical, four forward speeds and reverse, with synchromesh on top, third and second; short centrally disposed gear lever with remote control. Gearbox oil capacity,  $2\frac{1}{2}$  pints (1.4 litres), measured by dipstick.

#### GEARBOX RATIOS

Top	..	..	..	1 : 1	Second	..	..	..	1.982 : 1
Third	..	..	..	1.367 : 1	First	..	..	..	3.375 : 1
				Reverse	..	..	..	..	3.375 : 1

**Transmission.** Hardy Spicer propeller shaft with lubricating nipples fitted to needle bearing universal joints.

**Rear Axle.** Hypoid spiral bevel, semi-floating with offset pinion shaft. Axle ratios: 3.643 : 1 Standard ; 3.27 : 1 High. Later cars: 3.77 : 1 Standard ; 3.31 : 1 High.

**Steering.** Burman recirculating ball worm and nut. Left or right-hand steering available. Steering wheel, 17"; adjustable for reach.

**Brakes.** Lockheed hydraulic brakes operating on all four wheels. Front brakes are the two leading shoe type. 12" diameter alloy iron drums. Central fly-off hand brake operates mechanically on rear wheels only through entirely separate mechanism.

**Front Brake Air Scoops.** To prevent the possibility of dirt or water getting into the front brakes through the air scoops two blanking plates are issued with each car, to be fitted when considered necessary, in place of the normal stone guard.

The brake air scoops are fitted to avoid the possibility of brake fade when cars are driven at maximum speed and the brakes are used to the maximum degree.

It is suggested that the blanking plates should be fitted where the cars are operated only at reasonable speeds and where dirty road conditions or persistently wet weather exist.

**Wheels and Tyres.** Pressed steel wheels with detachable chrome plated nave plates and five stud mounting for each wheel. Tyres: Dunlop "Road Speed" 6.00 x 16"; spare wheel carried in compartment at rear.

**Chassis Frame.** Straight plane steel box section frame of immense strength; torsional rigidity ensured by large box section cross members.

**Jacking.** A central jack socket on each side of the car raises both wheels simultaneously with the minimum of effort by means of a special easy-lift jack.

**Electrical Equipment.** Lucas de Luxe throughout: 12 volt, 64 amp. capacity, 10-hour discharge, twin batteries with constant voltage controlled ventilated dynamo. Flush head lamps and wing lamps, stop light, reverse light, twin rear lights, panel light, twin blended-note horns, twin blade screen wiper, cigar lighter, starter motor, vacuum and centrifugal automatic ignition advance. Fixed Head Coupe fitted with twin interior lights and flasher indicators. Built-in provision for Radiomobile car radio on Fixed Head Coupe Model.

**Suspension.** Independent front suspension incorporating transverse wishbones and long torsion bars with telescopic type hydraulic shock absorbers. Rear suspension by long silico-manganese steel half elliptic springs controlled by Girling PV.7 hydraulic shock absorbers.

**Instruments.** 5" diameter 140 m.p.h. speedometer, 5" diameter revolution counter, ammeter, oil pressure gauge, water thermometer gauge, petrol gauge with warning light, electric clock.

**Coachwork—Super Sports Model.** Aerodynamic two-seater body upholstered throughout in finest quality leather hides; floor is thickly carpeted over felt underlay. Instrument panel and garnish rails finished in first quality leather hide, capacious pockets in doors. Ample accommodation is provided in a capacious rear locker, provided with an automatic light.

**Seating:** Divided seat and squab, folding forward for access to hood and battery, seats adjustable for reach. A tonneau cover is provided.

**Hood:** Finest quality mohair material, concealed behind seats when folded, fitted with unbreakable rear light. Detachable side screens stored in tray in the hood compartment.

**Coachwork—Fixed Head Coupe Model.** Aerodynamic two-seater body upholstered throughout in finest quality Vaumol leather hide. Floor thickly carpeted over felt underlay. Instrument panel and garnish rails are of fine quality figured walnut. Cubby locker on passenger side of instrument panel. Ventilator windows at front of door lights and in rear quarters. Ample luggage accommodation in rear locker, provided with automatic light. Manually operated scuttle ventilators provide cool air in car when required.

**Air Conditioning Installation.** Fitted as standard on later Super Sports cars, provides recirculated air conditioning of body interior. Fitted as standard on Fixed Head Coupe Model, provides recirculated air conditioning of body interior, demisting and defrosting of windscreen.

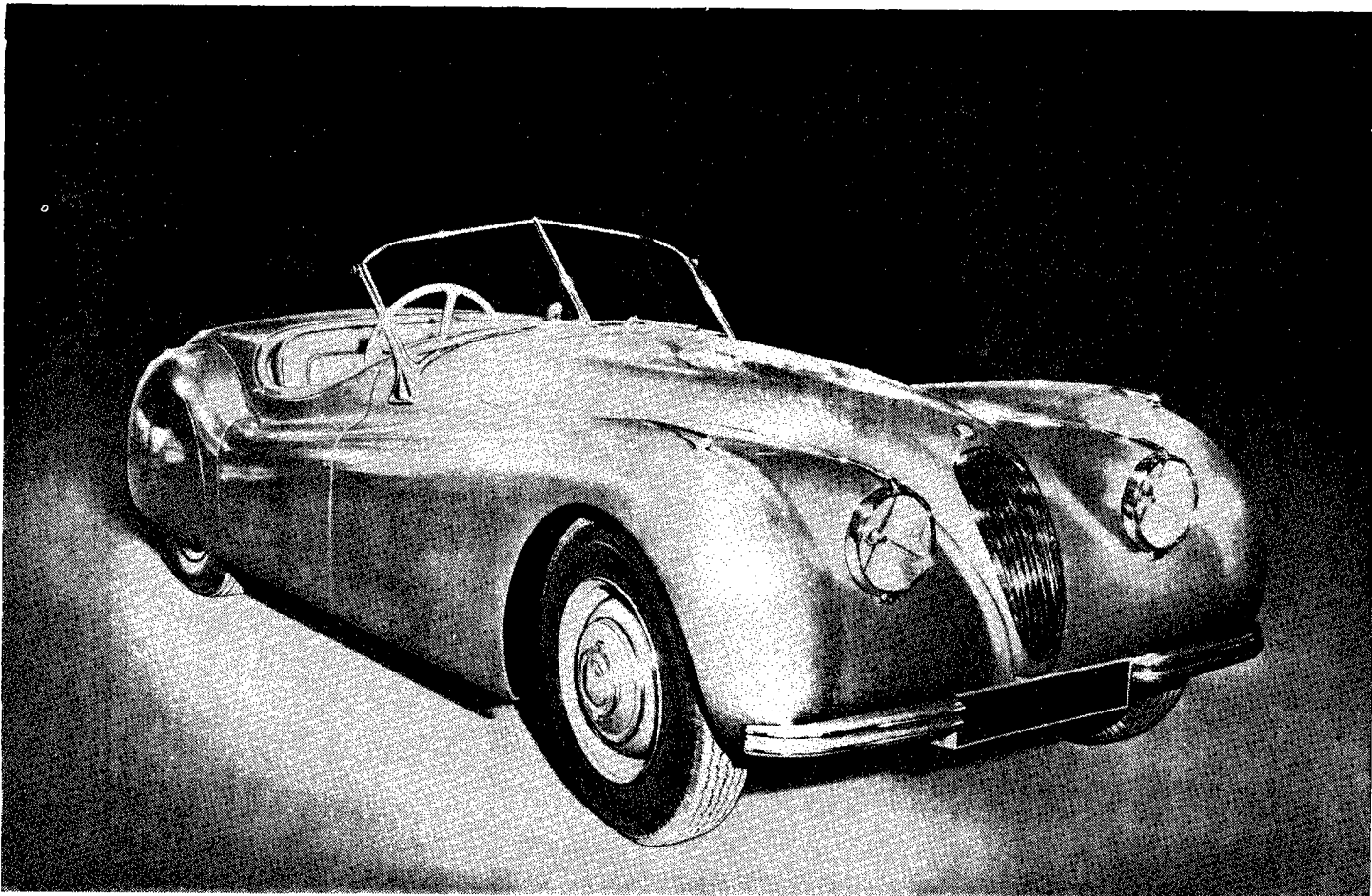


PLATE A.7. XK 120 SUPER SPORTS MODEL.

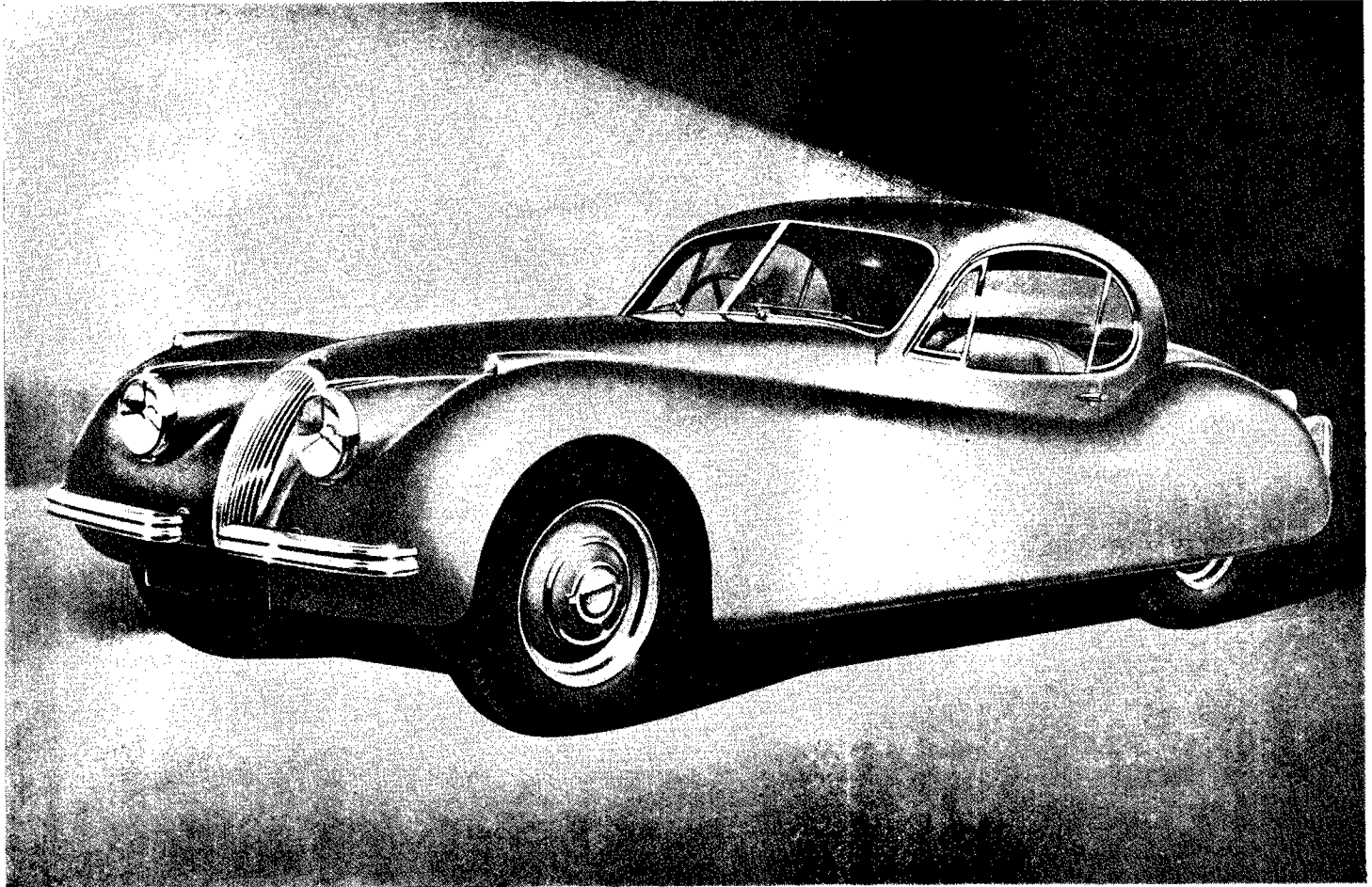


PLATE A.8. XK 120 FIXED HEAD COUPE MODEL.

**GENERAL DATA**

Wheel Base .. .. .	8' 6" (2.591 metres)
Track, Front .. .. .	4' 3" (1.295 metres)
Track, Rear .. .. .	4' 2" (1.270 metres)
Super Sports—Length (Overall) .. .. .	14' 5½" (4.406 metres)
Width .. .. .	5' 2" (1.575 metres)
Height .. .. .	4' 4½" (1.333 metres)
Fixed Head Coupe—Length (Overall) .. .. .	14' 5½" (4.406 metres)
Width .. .. .	5' 2" (1.575 metres)
Height .. .. .	4' 5" (1.346 metres)
Turning Circle .. .. .	31' (9.45 metres)
Ground Clearance .. .. .	7⅛" (181 mm.)
Super Sports—Weight (Dry) .. .. .	24.5 cwts. (2744 lbs.) (1245 kgs.)
Fixed Head Coupe—Weight (Dry) .. .. .	25.5 cwts. (2856 lbs.) (1295 kgs.)

PERFORMANCE

	3.64 Axle Ratio	3.27 Axle Ratio
Piston Area. Sq. ins. ton .. .. .	41.2	41.2
Brake Lining Area. Sq. ins./ton .. .. .	169	169
Top Gear m.p.h. at 1000 r.p.m. .. .. .	22	24.5
Top Gear m.p.h. at 2500 ft./min. piston speed ..	79	88
Litres per ton-mile dry .. .. .	3830	3830

INSTRUMENTS AND CONTROLS

INSTRUMENTS

(Refer to Plate A.9, Super Sports, and Plate A.10, Fixed Head Coupe)

**Ammeter.** Records the flow of current into or out of the battery. Since compensated voltage is incorporated the flow of current is adjusted to the state of charge of the battery; thus when the battery is fully charged the dynamo provides only a small output and therefore little charge is registered on the ammeter, whereas when the battery is low a continuous high charge is shown.

**Head Lamp Warning Light.** An orange warning light is situated in the speedometer and lights up when the head lamps are in the full beam position and is automatically extinguished when the lamps are in the dipped beam position.

**Ignition Warning Light.** A red warning light situated immediately below the lamp switch lights up and records "IGN." when the ignition is switched "ON" and the engine is not running or when the engine is running at a speed insufficient to charge the battery. The latter circumstances are not harmful but always switch "OFF" when the engine is not running.

**Oil Pressure and Water Temperature Gauge.** The oil pressure gauge records the oil pressure being delivered by the oil pump to the engine; it does not record the quantity of oil in the sump. When the engine is cold a high oil pressure will be recorded and as the oil becomes warm the pressure will drop. The minimum pressure at maintained high r.p.m. when hot should not be less than 40 lbs. per sq. inch.

The water temperature gauge records the temperature of the coolant by means of a bulb screwed into the thermostat housing, which is connected to the gauge by a capillary tube.

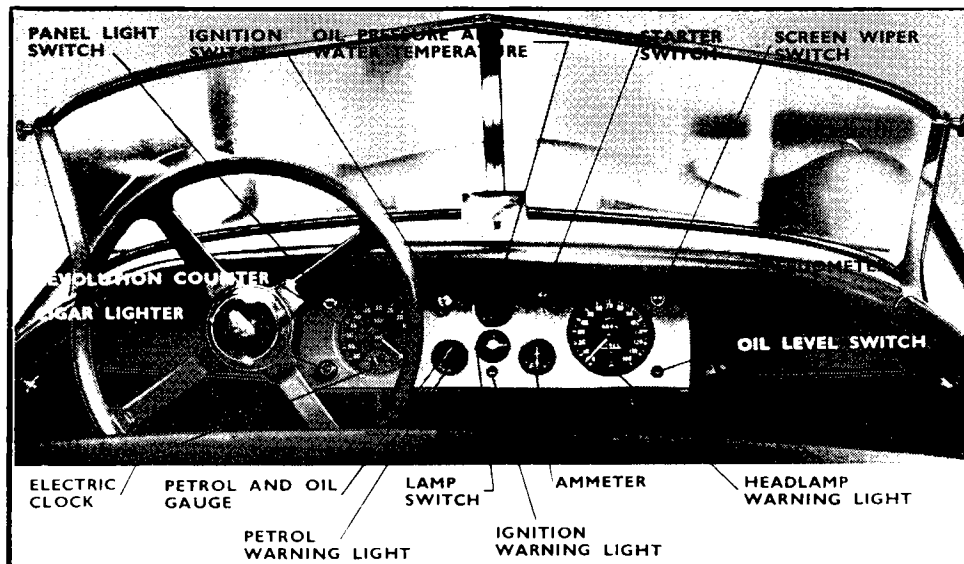


PLATE A.9. INSTRUMENTS (Super Sports).

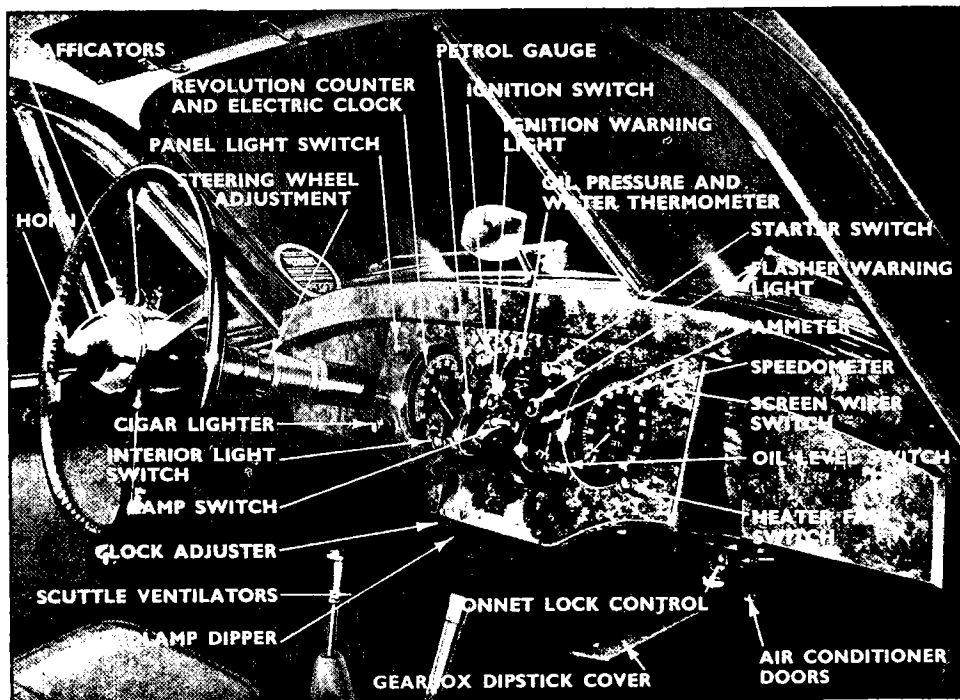


PLATE A.10. INSTRUMENTS AND CONTROLS (F.H. Coupe).

**Petrol and Oil Level Gauge.** Records the quantity of petrol in the supply tank. Readings will only be obtained when the ignition is switched "ON". By pressing the oil level switch, situated at the lower right hand of the facia board, the gauge records the approximate quantity of oil in the engine sump.

**Petrol Level Warning Light.** A red light is situated in the petrol gauge and lights up intermittently when the petrol level in the tank becomes low. When the petrol is almost exhausted the warning lamp operates continuously.

**Revolution Counter and Clock.** Records the speed of the engine in revolutions per minute. The built-in electric clock is powered by the battery. The clock hands may be adjusted by pushing up the stem winder and rotating clockwise. Starting is accomplished in the same manner.

**Speedometer.** Records the vehicle speed in miles per hour, total mileage and trip mileage. (Kilometres on certain export models.) The trip figures may be set to zero by pushing the knob under the facia upwards and rotating anti-clockwise.

**Trafficator Warning Light—Fixed Head Coupe Model.** An amber light, situated to the right of the lamp switch, lights up and records "T.R.F." when the trafficators are in use. Trafficators only operate when the ignition is switched "ON".



### FOOT CONTROLS

(Refer to Plate A.11, Super Sports, and A.10, Fixed Head Coupe)

**Accelerator.** The pedal on the right. Controls the speed of the engine.

**Brake.** The centre pedal. Operates the brakes on all four wheels.

**Clutch.** The pedal on the left. Connects and disconnects the engine and the transmission. Never drive with a foot resting on the pedal and do not keep the pedal depressed for long periods in traffic. Never coast the car with gear engaged and clutch depressed.

**Head Lamp Dipper.** Situated on the toe boards and operated by foot. The switch is of the changeover type and if the head lamps are in the full beam position a single pressure on the control will switch the lamps to the dipped beam position and they will remain so until another single pressure switches them to the full beam position again.

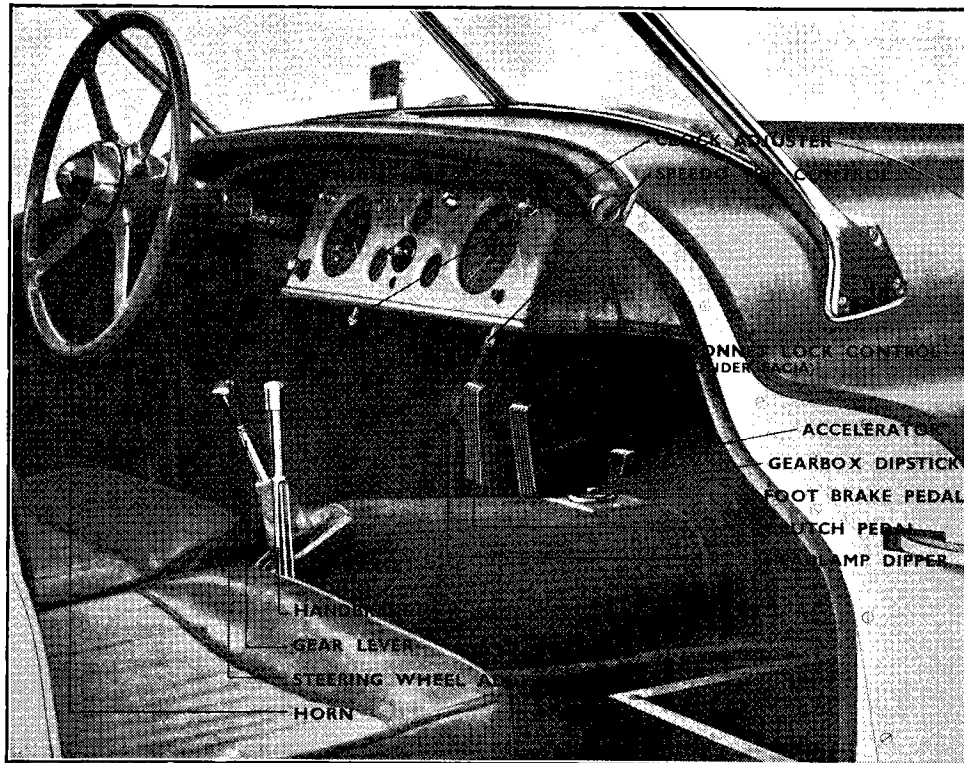


PLATE A.11. CONTROLS (Super Sports).

### HAND CONTROLS

(Refer to Plates A.9 and A.11, Super Sports, and Plate A.10, Fixed Head Coupe)

**Air Conditioner Equipment Controls.** On the Fixed Head Coupe the rheostat switch for the air conditioner motor is situated at the lower extreme right-hand side of the facia panel.

On the Super Sports the switch is situated on the facia panel forward of the steering wheel.

The motor switch knob is "OFF" when rotated fully anti-clockwise. Rotation clockwise switches on the motor at its maximum speed; further rotation clockwise brings the rheostat into operation and the motor speed progressively falls until the knob reaches the end of its travel.

Observe that the motor switch is wired through the ignition switch and will be automatically switched off with the ignition.

The control knob for the hot water supply to the air conditioner unit is situated on the scuttle to the rear of the engine and is accessible when the bonnet is raised. Rotate knob clockwise for cold and anti-clockwise for hot.

**Bonnet Lock Control.** The bonnet lock is controlled from the driving compartment. To open the bonnet, pull the control knob situated at the right hand under the facia. This will release the bonnet which will now be retained by the safety catch. Insert the fingers under the nose of the bonnet and pull the safety catch, which is attached to the bonnet, forward, when the bonnet may be raised and retained in the open position by the support strut. The bonnet is self-locking when pushed down firmly into the closed position.

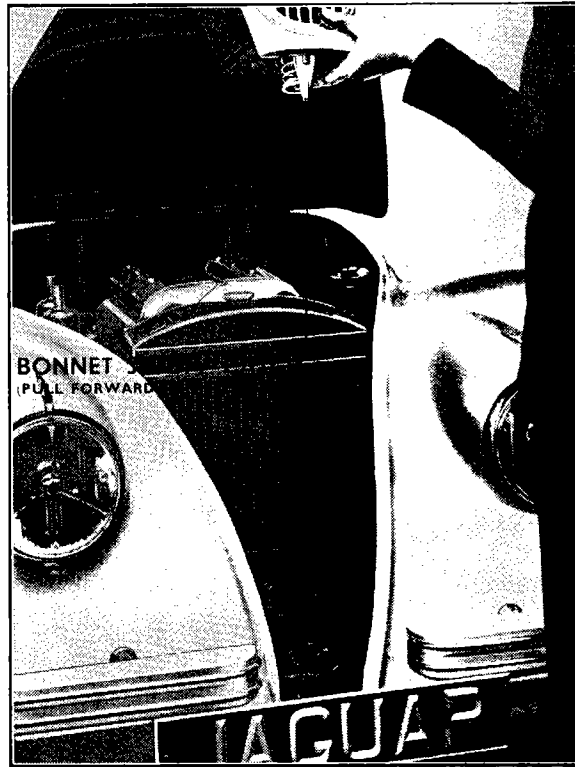
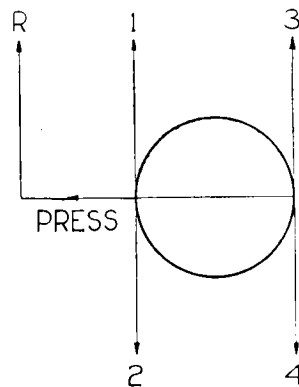


PLATE A.12. BONNET SAFETY CATCH (XK 120).

**Gear Lever.** Centrally situated and with gear positions indicated on the control knob. Always engage neutral and release the clutch when the car is at rest.



GEAR POSITIONS

PLATE A.13.

**Hand Brake Lever.** Positioned beside the gear lever. The hand brake operates mechanically on the rear wheels only and is provided for parking, driving away on a hill and when at a standstill in traffic. To apply the brake, pull the lever back and press down the thimble when the ratchet will engage. The hand brake is released by pulling back the lever when it will fly off.

**Horn Switch.** Situated in the centre of the steering wheel, it operates the twin horns when depressed.

**Ignition Switch.** The key provided operates the switch when inserted and turned clockwise. Never leave the ignition switched on when the engine has stopped; a reminder of such circumstances is provided by the ignition warning light which will then light up and record "IGN."

**Interior Light Switch—Fixed Head Coupe Model.** Operate the switch to illuminate the car interior by the twin lights fitted in the rear quarters.

**Lamp Switch.** From "OFF" can be rotated clockwise into two positions, giving in the first location side and tail, and in the second location head, side and tail.

**Oil Level Switch.** Operation of the switch obtains a reading on the petrol and oil level gauge indicating the quantity of oil in the engine sump. A true reading will only be obtained when the car is standing at rest on level ground. A positive check on the readings shown on the gauge may be obtained with the dipstick fitted to the left-hand rear of the cylinder block.

**Panel Light Switch.** Operate the switch when it is desired to read the instruments in darkness. The panel lights only operate when the side lamps are switched on.

**Starter Switch.** Press the switch, with the ignition switched on, to start the engine. Release the switch immediately the engine fires and never operate the starter when the engine is running. The starter only operates when the ignition is switched on.

**Trafficators—Fixed Head Coupe Model.** Operated by the knob situated at the top of the steering wheel centre. Normally the trafficators are self-cancelling when the wheel is centralised after turning a corner. When only a slight turn is made it may be necessary to cancel the trafficators manually by returning the control knob to the central position. When in use the warning lamp on the facia lights up intermittently and records "T.R.F." Operation of the trafficator switch causes bulbs in the side and stop lamps on the side selected to flash intermittently.

**Windscreen Wipers.** The wipers are set in motion and parked following use by operation of the switch. Do not endeavour to move the wiper blades across the windscreen by hand.

## ACCESSORIES

**Brake Lights.** Twin combined tail and brake lights are provided situated in the rear wings. The latter automatically light up when the foot brake is applied.

**Cigar Lighter (Early Type).** Fitted to the facia board. Press holder into the socket against the spring pressure for approximately five to seven seconds and extract for use. Do not press in longer than stated or the element may burn out.

**Cigar Lighter (Later Type).** Fitted to the facia board. Thermostatically controlled. To operate, press holder into socket and remove hand. Holder will return to extended position in socket on reaching required temperature. Do not hold lighter in "pressed in" position.

**Door Locks—Super Sports Model.** To open the door, pull upwards the leather cable situated inside the doors. Doors may be locked by rotating the interior door locking catches and then closing doors.

**Door Locks—Fixed Head Coupe Model.** Doors may be opened from outside by rotating the exterior door handles; from inside by rotating the interior door handles. Both doors may be locked by rotating the ignition key in the locking barrel of the exterior door handles.

**Petrol Filler.** The petrol filler is situated in a recess above the left-hand rear wing, and is provided with a cover. This cover is unlocked with the key provided.

**Reverse Light.** The reverse light is automatically brought into operation when reverse gear is engaged and the side lights are switched on.

**Rear Boot Light.** The rear boot is automatically illuminated by a lamp in the lid when opened, with the side lights switched on.

**Seat Adjustment.** Both seats are adjustable for reach. Push the lock bar, situated beside the inside runner, towards the outside of the car and slide into the required position. Release the lock bar and slide until the mechanism engages with a click.

**Scuttle Ventilators.** Additional cool fresh air ventilation of the car interior may be obtained by opening one or both scuttle ventilators by operating the levers which protrude from the ventilator apertures on the inside of the scuttle side casings. (Not fitted to early Super Sports cars.)

**Steering Wheel Adjustment.** Rotate the knurled ring at the base of the steering wheel hub in a clockwise direction when the steering wheel may be slid into the desired position. Tighten up the knurled ring to lock the steering wheel.

**No Draught Ventilation—Fixed Head Coupe Model.** No draught ventilator windows, incorporating quick locking catches, are fitted to the front end of the door lights and to the rear quarters.

**Tool Compartment.** The tools are carried in a container on the left-hand side of the rear boot. The jack, wheel brace and jack ratchet handle are stowed in the spare wheel compartment. Grease gun stowed in clips under bonnet. Tool roll stowed in boot compartment forward of petrol filler cowl.

## STARTING AND DRIVING

**STARTING.** (a) Before starting the engine the new owner should be familiar with the location and function of the instruments and controls. (See Page A.18.)

(b) Ensure that the water level in the radiator and the oil level in the sump are correct. Check for sufficient petrol in the tanks.

(c) Place the gear lever in the neutral position and check that the hand brake is applied. Switch on the ignition and press the starter. Release the starter as soon as the engine fires—this is important.

(d) It is not necessary to use any manual choke control when starting from cold, since the auxiliary starting carburetter is entirely automatic and controls the mixture strength without assistance from the driver. The starting carburetter automatically cuts out when the temperature of the water in the cylinder head reaches 35°C.

(e) Do not operate the engine at high r.p.m. when first started, but allow time for the engine to warm up and the oil to circulate freely. A thermostat is fitted to assist in rapid warm up. In very cold weather run the engine at 1,500 r.p.m. with the car stationary until a rise in temperature is indicated on the temperature gauge.

**DRIVING.** (a) Careful adherence to the instructions given in Section B—"Maintenance" regarding "running in" will be amply repaid by obtaining the best performance and utmost satisfaction from the car.

(b) The habit should be formed of reading the oil pressure gauge, water temperature gauge and ammeter occasionally as a check on the correct functioning of the car. Should an abnormal reading be obtained an investigation should be made immediately.

(c) Always start from rest in first or second gear; on a hill always use first gear. To start in a higher gear will cause excessive clutch slip and premature wear. Never drive with a foot resting on the clutch pedal and do not keep the clutch pedal depressed for long periods in traffic.

(d) The synchromesh gearbox provides a synchronised change into second, third, and top. When changing gear, the movement should be slow and deliberate.

When changing down, a smoother gear change will be obtained if the accelerator is left depressed to provide the higher engine speed suitable to the lower gear. Always fully depress the clutch pedal when changing gear.

(e) Gear changing may be slightly stiff on a new car but this will disappear as the gearbox becomes run in.

(f) Always apply the foot brake progressively; fierce and sudden application is bad for the car and tyres. The hand brake is for use when parking the car, when driving away on a hill and when at a standstill in traffic.

**GENERAL.** The following lubricants are the latest recommendations and in some instances it will be found that an alternative lubricant is recommended for a particular application in addition to that given in the various sections of this Manual.

**RECOMMENDED LUBRICANTS**

Component	Vacuum	Wakefield	Shell	Esso	Price's
Engine—Summer .. .. .	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30
Winter .. .. .	Mobiloil Arctic	Castrolite	Single Shell	Essolube 20	Energol 20
Tropical .. .. .	Mobiloil B.B.	Castrol X.X.L.	Triple Shell	Essolube 40	Energol 40
Gearbox .. .. .	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30
Carburettor Hydraulic Piston					
Dampers .. .. .					
Distributor .. .. .					
Oil Can Lubrication .. .. .					
Rear Axle .. .. .	Mobilube G.X.90	Castrol Hypoy	Spirax 90 E.P.	Expee Compound 90	Energol Hypoid 90
<b>MARK VII:</b> Steering Gear .. .. .	Mobilube C	Castrol D	Spirax 140 E.P.	Gear Oil 140 (Heavy)	Energol 140
Propeller Shaft Needle Bearings ..					
<b>XK 120:</b> Steering Gear .. .. .					
Steering Idle Lever .. .. .					
Propeller Shaft Needle Bearings ..					
Wheel Bearings .. .. .	Mobilgrease No. 5	Castrol W.B.	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.
Water Pump .. .. .	Mobilgrease No. 4 or 5	Castrol Medium or W.B.	Retinax R.B. or A	Esso Grease or Esso High Temp. Grease	Belmoline C or H.M.P.
Fan .. .. .					
Propeller Shaft Spline .. .. .					
All Chassis Nipples .. .. .					
Upper Cylinder Lubrication ..	Mobil Upperlube	Castrollo	Donax U	Essomix	Energol U.C.L.

**Brake Supply Tank. Mark VII**—Use only genuine Girling Crimson Hydraulic Brake Fluid.

**XK 120**—Use only genuine Lockheed Orange Hydraulic Brake Fluid.

**Rear Shock Absorbers.** Use only Girling Piston Type Thin Oil.

**Clutch Operation Supply Tank.** Mark VII Chassis No. 710001 (less 03, 05, 06, 09) and subsequent R.H.D.; 730051 and subsequent L.H.D.

Use only genuine Girling Crimson Hydraulic Brake Fluid.

**FILL UP DATA**  
(MARK VII MODEL)

	British Imperial	U.S.	Litres
Engine Sump .. .. .	21 pints	25 pints	12 litres
Engine Total .. .. .	24 pints	28 pints	13.5 litres
Gearbox .. .. .	2½ pints	3 pints	1.4 litres
Rear Axle .. .. .	3½ pints	4.2 pints	2 litres
Cooling System .. .. .	22 pints	27.5 pints	13 litres
Petrol Tank, left hand (N/S) .. .. .	8 gallons	9.5 gallons	36.5 litres
Petrol Tank, right hand (O/S) .. .. .	9 gallons	11 gallons	41 litres
Total Petrol Capacity .. .. .	17 gallons	20.5 gallons	77.5 litres

**Engine Oil Level.** When topping up engine oil note that the following quantity of oil is required to raise the level from the low to the high level markings:—

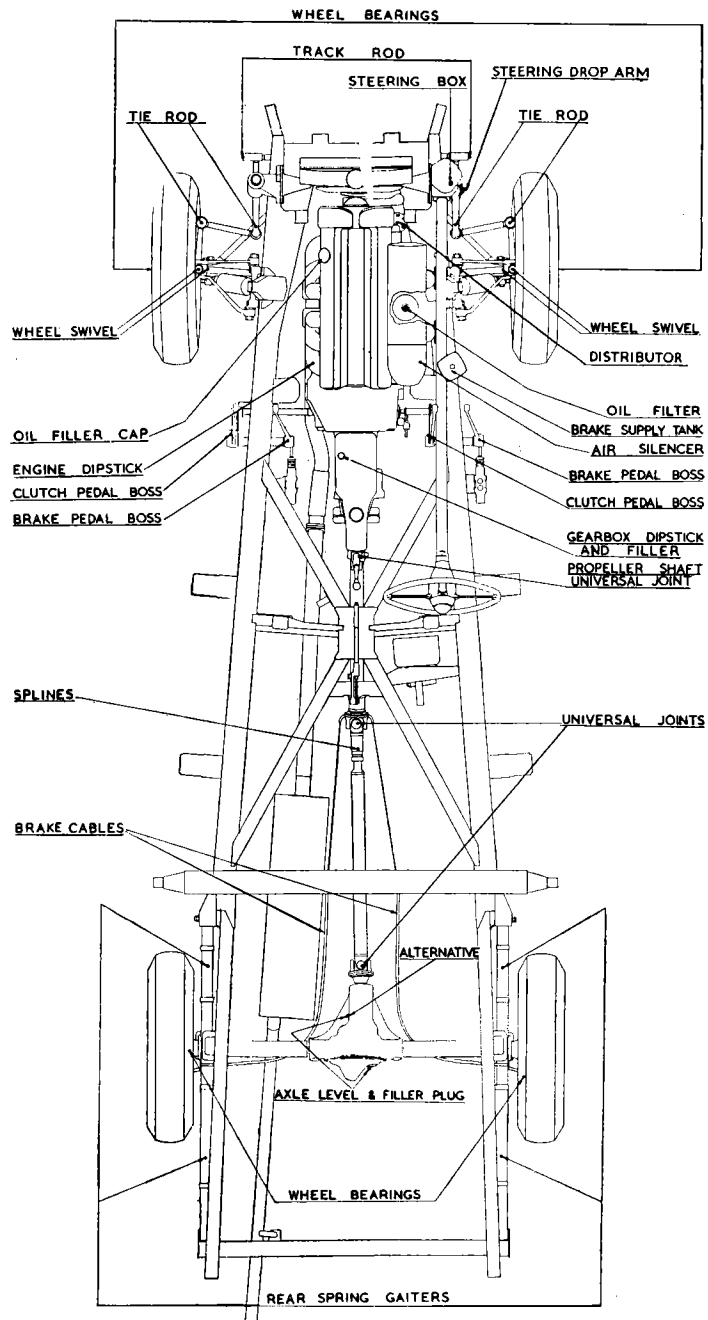
4 Imperial pints — 5 U.S. pints — 2 litres.

(XK 120 MODELS)

	British Imperial	U.S.	Litres
Flat Base Sump—Engine, Sump .. .. .	24 pints	28 pints	13.5 litres
Engine, Total .. .. .	29 pints	34 pints	16.5 litres
Stepped Base Sump—Engine, Sump .. .. .	21 pints	25 pints	12 litres
Engine, Total .. .. .	24 pints	28 pints	13.5 litres
Gearbox .. .. .	2½ pints	3 pints	1.4 litres
Rear Axle .. .. .	3½ pints	4.2 pints	2 litres
Cooling System .. .. .	25½ pints	29.8 pints	14.5 litres
Petrol Tank .. .. .	15 gallons	17.5 gallons	68 litres

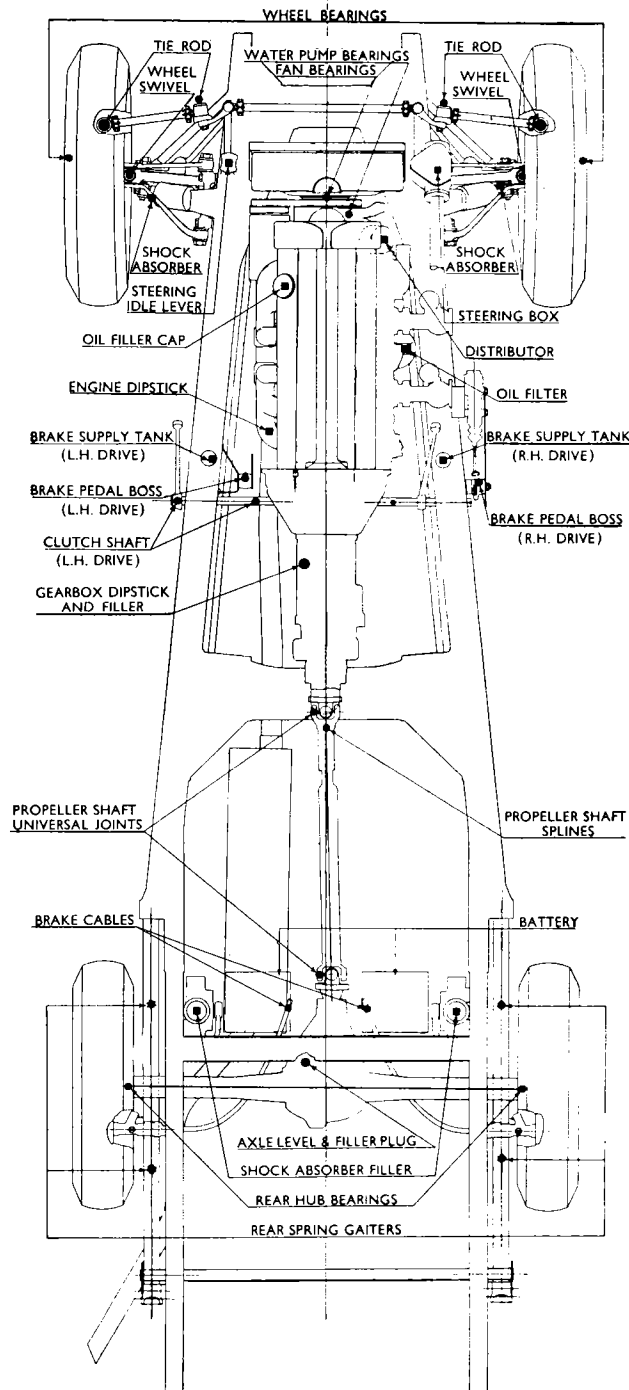
**TYRE PRESSURES**

	Front	Rear
<b>MARK VII MODEL</b> .. .. .	23 lbs. per sq. in., Cold (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. in., Cold (1.8 kg./cm. <sup>2</sup> )
For fast driving when comfort is not of primary importance use .. .. .	25 lbs. per sq. in., Cold (1.8 kg./cm. <sup>2</sup> )	27 lbs. per sq. in., Cold (1.9 kg./cm. <sup>2</sup> )
<b>XK 120 MODELS</b> .. .. .	25 lbs. per sq. in., Cold (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. in., Cold (1.8 kg./cm. <sup>2</sup> )
For fast driving when comfort is not of primary importance use .. .. .	35 lbs. per sq. in., Cold (2.5 kg./cm. <sup>2</sup> )	35 lbs. per sq. in., Cold (2.5 kg./cm. <sup>2</sup> )



JAGUAR MK VII MAINTENANCE CHART

PLATE A.14.



JAGUAR XK 120 MAINTENANCE CHART

PLATE A.15.



## SUMMARY OF MAINTENANCE

(a) After the first 500 miles (800 kilometres) have the Free Service carried out. See Service Voucher issued with car.

**Daily.** Check engine oil level, check radiator water level.

**Weekly.** Check tyre pressures.

(b) Every month or at 2,500 miles (4,000 kilometres):

1. Check and top up battery.
2. Drain and refill sump. Clean oil filter element.
3. **Mark VII:** Top up steering box, gearbox and rear axle.  
**XK 120:** Top up steering box, idle lever housing, gearbox and rear axle.
4. Lubricate all nipples (excluding hubs).
5. Lubricate carburetter dash pot chambers.
6. Lubricate distributor and adjust contact points.
7. Check and reset carburetter slow running.
8. Check and top up brake hydraulic supply tank (and clutch operation Mark VII model).
9. Adjust brakes.
10. Check and adjust clutch pedal free travel.
11. Change over road wheels diagonally from front to rear.

(c) Every 5,000 miles (8,000 kilometres):

1. Carry out 2,500 miles service (b).
2. Clean, test and adjust sparking plugs.
3. Clean carburetter filters.
4. Lubricate all wheel bearing nipples.
5. Check and adjust fan belt.
6. Renew oil filter element.
7. Carry out oil can lubrication.
8. **Mark VII:** Clean air silencer element. **XK 120:** Wash air cleaner elements.

(d) Every 10,000 miles (16,000 kilometres):

1. Carry out 2,500 miles service (b) and 5,000 miles service (c).
2. Drain and refill gearbox.
3. Drain and refill rear axle.
4. Check wheel bearings and adjust if necessary.
5. Clean out brakes and examine liners.
6. Clean and top up rear shock absorbers.
7. Clean fuel pump filters.
8. Check and tighten all chassis and body nuts, screws and bolts.

The number of grease nipples and their location is as follows:—

## . (MARK VII MODEL)

2 Nipples.	Steering track rod.	1 Nipple.	Fan bearings.
2 Nipples.	Steering tie rod (right hand).	1 Nipple.	Water pump bearings.
2 Nipples.	Steering tie rod (left hand).	2 Nipples.	Hand brake cables.
1 Nipple.	Steering drop arm fulcrum (later cars).	4 Nipples.	Rear spring gaiters.
2 Nipples.	Wheel swivel (right hand).	1 Nipple.	Universal joint (front propeller shaft).
2 Nipples.	Wheel swivel (left hand).	2 Nipples.	Universal joints (rear propeller shaft).
1 Nipple.	Foot brake pedal boss.	1 Nipple.	Splines (rear propeller shaft).
1 Nipple.	Clutch pedal boss.	4 Nipples.	Road wheel bearings.

## (XK 120 MODELS)

2 Nipples.	Steering tie rod (right hand).	1 Nipple.	Water pump bearing.
2 Nipples.	Steering tie rod (left hand).	2 Nipples.	Hand brake cables.
1 Nipple.	Wheel swivel (right hand).	4 Nipples.	Rear spring gaiters.
1 Nipple.	Wheel swivel (left hand).	2 Nipples.	Universal joints (propeller shaft).
1 Nipple.	Foot brake pedal boss.	1 Nipple.	Splines (propeller shaft).
1 Nipple.	Fan bearings.	4 Nipples.	Road wheel bearings.

**FREE SERVICE**

**GENERAL.** It is of the utmost importance that the Free Service, due at 500 miles (800 kilometres), is carried out in a thorough manner.

**PROCEDURE.** Issued with each new car when it leaves the Factory is a Service Voucher which entitles the owner to obtain the service specified, with a charge for labour, from any Jaguar Distributor or Dealer on presentation of the Voucher.

Normally the owner will approach the Jaguar Dealer from whom the car was purchased and it is a condition of the Sales Agreement that the Service will be carried out and the labour charges accepted by the Dealer.

Should the owner not reside in the vicinity of the original supplier, or be temporarily absent when the Service is required, the Voucher may be accepted by the nearest authorised Jaguar Dealer. In this case the Dealer carrying out the Service should make no labour charge to the owner, but send the completed Voucher, together with an account to cover labour expended, to the original supplier of the car. In all cases lubricants should be charged to the owner.

**FREE SERVICE VOUCHER.** Set out overleaf is a copy of the Free Service Voucher.

FOR MARK VII MODEL

Valid only if Car has been purchased from authorised Jaguar Dealer.

Chassis No. FREE SERVICE on completion of 500 miles (800 kilometres).

Jaguar Service Voucher

Owner's name and address: Car purchased from:

\*Presentation of this Voucher to any authorised Jaguar Dealer entitles the above-mentioned owner to free service as detailed below:—

- 1. General test of car and making of any necessary minor adjustments.
2. Drain sump, clean oil filter and refill with new oil. Drain gearbox and refill with new oil. Drain rear axle and refill with new oil.
3. Lubricate chassis throughout, covering steering joint (11) nipples, water pump and fan bearing (2) nipples, brake pedal and clutch pedal shaft (2) nipples, propeller shaft (4) nipples, hand brake cable (2) nipples, rear spring gaiter (4) nipples and road wheel bearing (4) nipples. Top up steering box oil level.
4. Check all hydraulic brake pipe unions, level of fluid in hydraulic brake supply tank and adjust rear brakes.
5. Tighten rear axle U bolts, front suspension mounting bolts and bumper mounting bolts.
6. Check tyre pressures, check steering track and wheel bearing adjustment. Check tightness of steering column universal joint bolts.
7. Check and adjust clutch pedal free travel.
8. Remove throttle restrictor from accelerator pedal.
9. Tune up engine. Remove and clean carburetter filters. Clean and set sparking plugs and distributor points. Top up carburetter piston spindle chambers with engine oil. Set carburetters.
10. Test and top up battery. Check wiring and dynamo output.
11. Generally check over body for squeaks and rattles and tighten up where necessary.

I hereby acknowledge that the above work has been carried out to my satisfaction by:—

Date Signature of Owner, (Name of Dealer)

Oil and grease are chargeable to the owner.

\*This Voucher is valid only if presented to the Jaguar Dealer by whom the car was supplied. Should the owner not reside in the vicinity of the original supplier, or is temporarily absent when service is required the Voucher will be accepted by the nearest authorised Jaguar Dealer.

FOR XK 120 MODEL

Valid only if Car has been purchased from authorised Jaguar Dealer.

Chassis No. FREE SERVICE on completion of 500 miles (800 kilometres).

Jaguar Service Voucher

Owner's name and address: Car purchased from:

\*Presentation of this Voucher to any authorised Jaguar Dealer entitles the above-mentioned owner to free service as detailed below:—

- 1. General test of car and making of any necessary minor adjustments.
2. Drain sump, clean oil filter and refill with new oil. Drain gearbox and refill with new oil. Drain rear axle and refill with new oil.
3. Lubricate chassis throughout, covering steering joint (6) nipples, water pump and fan bearing (2) nipples, brake pedal and clutch pedal shaft (2) nipples, propeller shaft (3) nipples, hand brake cable (2) nipples, rear spring gaiter (4) nipples and road wheel bearing (4) nipples. Top up steering box and idle lever housing oil level.
4. Check all hydraulic brake pipe unions, level of fluid in hydraulic brake supply tank and adjust rear brakes.
5. Tighten rear axle U bolts, front suspension mounting bolts and bumper mounting bolts.
6. Check tyre pressures, check steering track and wheel bearing adjustment. Check tightness of steering column universal joint bolts.
7. Check and adjust clutch pedal free travel.
8. Remove throttle restrictor from accelerator pedal.
9. Tune up engine. Remove and clean carburetter filters. Clean and set sparking plugs and distributor points. Top up carburetter piston spindle chambers with engine oil. Set carburetters.
10. Test and top up battery. Check wiring and dynamo output.
11. Generally check over body for squeaks and rattles and tighten up where necessary.

I hereby acknowledge that the above work has been carried out to my satisfaction by:—

Date Signature of Owner, (Name of Dealer)

Oil and grease are chargeable to the owner.

\*This Voucher is valid only if presented to the Jaguar Dealer by whom the car was supplied. Should the owner not reside in the vicinity of the original supplier, or is temporarily absent when service is required, the Voucher will be accepted by the nearest authorised Jaguar Dealer.

# ENGINE

## MARK VII and XK 120 MODELS

### ENGINE NUMBERS

(Stamped on right-hand side of cylinder block above pressure oil filter and on front end of cylinder head casting)

MK. VII	XK 120
A.1001 ONWARDS	W.1001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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Remove and Refit	- - - - -	Page B.21
Dismantle and Reassemble	- - - - -	Page B.25
Overhaul (Engine removed from Chassis)	- - - - -	Page B.33
Components—Remove and Refit (Engine fitted to Chassis)	- - - - -	Page B.47
Tuning	- - - - -	Page B.63

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Performance Data .. .. .		B. 6
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**Mark VII XK 120**

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**GENERAL.** The Jaguar XK engine is fitted to the Mark VII model and to the XK 120 models. Some slight differences will be noticed between engines fitted to the different models, but these have only been incorporated to enable the engine to be accommodated in the different chassis.

The XK engine is a six cylinder twin overhead camshaft unit with the cylinder block and crankcase forming an integral unit extending down to the crankshaft centre line. The detachable aluminium alloy cylinder head has machined hemispherical combustion chambers. The camshafts, located on the cylinder head, each run in four steel-backed white-metal bearings, and the forged steel crankshaft is supported in seven steel-backed white-metal main bearings.

The following brief specification, together with the exploded views shown on Plates B.7, B.8 and B.9, will give a picture of the general design and build-up of the engine.

**Pistons.** Light aluminium alloy tin-plated pistons are used with fully-floating gudgeon pins. Two compression rings and one slotted oil scraper ring are fitted, the upper ring being hard chrome plated.

**Valves.** Overhead, operated by twin overhead camshafts.

**Timing Gear.** Upper and lower Duplex chains with automatic tensioning device on lower chain and eccentric adjustment on upper chain.

**Ignition.** Coil ignition. Distributor with built-in centrifugal advance mechanism; also vacuum control operated off front carburetter. Manual micrometer advance and retard adjustment at distributor.

**Carburetters.** Twin S.U. with thermo-electric auxiliary starting carburetter incorporated. Air cleaner connected to carburetters.

**Lubrication System.** A gear type pump in the oil sump draws the oil through a floating suction filter and passes it through a full-flow pressure filter to the main oil line in the cylinder block from which are fed the main bearings and connecting rod bearings, gudgeon pin bearings and also the front chain gear. A separate feed from this main line goes to the cylinder head to lubricate the camshafts, tappets and valve gear.

**Cooling System.** Water is circulated by a centrifugal pump and a quick warm-up from cold is assisted by a by-pass thermostat. The water is passed through a gallery cast on the side of the block and equally distributed to each cylinder head, passing out into the gallery around the induction pipe, ensuring maximum cooling of the head and an even induction temperature. A restricted water flow to the block ensures a quick warm-up and preserves the cylinders from corrosion wear.

**GENERAL DATA**

		3½ Litre
Type .. .. .		Twin O.H.C.
Number of Cylinders .. .. .		6
R.A.C. Rating .. .. .		25.6 h.p.
Brake Horse Power: 8 to 1 Compression Ratio .. .. .		160 at 5,200 r.p.m.
7 to 1 Compression Ratio .. .. .		150 at 5,200 r.p.m.
Maximum Torque .. .. .		195 lb. ft. at 2,500 r.p.m.
Compression Ratio .. .. .		7 : 1 or 8 : 1
Bore .. .. .		3.2677" (83 mm.)
Stroke .. .. .		4.1732" (106 mm.)
Firing Order .. .. .		1 . 5 . 3 . 6 . 2 . 4
Cylinder Capacity (Piston Displacement) .. .. .		3442 c.c. (210 cu. ins.)



## PERFORMANCE DATA

The following tables show the relationship between engine revolutions per minute to vehicle speed in miles per hour and kilometres per hour for the various gear ratios.

It is recommended that engine revolutions in excess of the following limit should not be maintained for long periods:—

5,000 r.p.m.

## MARK VII MODEL

AXLE RATIO 4.27 : 1

Kilometres per hour	Miles per hour	First and Reverse 14.41	Second 8.46	Third 5.84	Top 4.27
16	10	1,748	1,026	709	518
32	20	3,496	2,052	1,418	1,036
48	30	5,244	3,078	2,127	1,554
64	40		4,104	2,836	2,072
80	50		5,130	3,545	2,590
96	60			4,254	3,108
112	70			4,963	3,626
128	80			5,672	4,144
144	90				4,662
160	100				5,180

## XK 120 MODELS

E.N.V. AXLE. 3.64 : 1 RATIO (Standard)

Kilos. per hour	Miles per hour	First and Reverse 12.29	Second 7.22	Third 4.98	Top 3.64	True r.p.m. in top, allowing for changes in tyre radius (Dunlop Road Speed 16 × 6.00) due to effect of centrifugal force. Tyres at 35 lbs. sq. in. (2.46 kg./cm. <sup>2</sup> ).
16	10	1,526	896	618	452	
32	20	3,052	1,792	1,236	904	
48	30	4,578	2,688	1,854	1,356	
64	40		3,584	2,472	1,808	
80	50		4,480	3,090	2,260	2,243
96	60		5,376	3,708	2,712	2,678
112	70			4,326	3,164	3,105
128	80			4,944	3,616	3,524
144	90			5,562	4,068	3,933
160	100				4,520	4,332
176	110				4,972	4,720
192	120				5,424	5,096

E.N.V. AXLE. 3.27 : 1 RATIO (High)

Kilos. per hour	Miles per hour	First and Reverse 11.04	Second 6.48	Third 4.47	Top 3.27	True r.p.m. in top, allowing for changes in tyre radius (Dunlop Road Speed 16 x 6.00) due to effect of centrifugal force. Tyres at 35 lbs. sq. in. (2.46 kg./cm. <sup>2</sup> ).
16	10	1,371	805	555	406	
32	20	2,742	1,610	1,110	812	
48	30	4,113	2,415	1,665	1,218	
64	40	5,484	3,220	2,220	1,624	1,619
80	50		4,025	2,775	2,030	2,015
96	60		4,830	3,330	2,436	2,405
112	70		5,635	3,885	2,842	2,789
128	80			4,440	3,248	3,165
144	90			4,995	3,654	3,533
160	100			5,550	4,060	3,891
176	110				4,466	4,240
192	120				4,872	4,578
208	130				5,278	4,904
224	140				5,684	5,219

SALISBURY AXLE. 3.77 : 1 RATIO (Standard)

Kilos. per hour	Miles per hour	First and Reverse 12.72	Second 7.47	Third 5.15	Top 3.77	True r.p.m. in top, allowing for changes in tyre radius (Dunlop Road Speed 16 x 6.00) due to effect of centrifugal force. Tyres at 35 lbs. sq. in. (2.46 kg./cm. <sup>2</sup> ).
16	10	1,579	928	639	468	
32	20	3,158	1,856	1,278	936	
48	30	4,737	2,784	1,917	1,404	
64	40		3,712	2,556	1,872	
80	50		4,640	3,195	2,340	2,323
96	60		5,568	3,834	2,808	2,774
112	70			4,473	3,276	3,217
128	80			5,112	3,744	3,651
144	90			5,751	4,212	4,075
160	100				4,680	4,488
176	110				5,148	4,890
192	120				5,616	5,279

## SALISBURY AXLE. 3.31 : 1 (High)

Kilos per hour	Miles per hour	First and Reverse 11.17	Second 6.56	Third 4.52	Top 3.31	True r.p.m. in top, allowing for changes in tyre radius. (Dunlop Road Speed 16 × 6.00 due to effect of centrifugal force. Tyres at 35 lbs. sq. in. (2.46 kg./cm. <sup>2</sup> ).
16	10	1,339	815	561	411	
32	20	2,798	1,630	1,122	822	
48	30	4,197	2,445	1,683	1,233	
64	40	5,596	3,260	2,244	1,644	1,638
80	50		4,075	2,805	2,055	2,039
96	60		4,890	3,366	2,466	2,434
112	70		5,705	3,927	2,877	2,822
128	80			4,488	3,288	3,203
144	90			5,049	3,699	3,575
160	100			5,610	4,110	3,938
176	110				4,521	4,291
192	120				4,932	4,633
208	130				5,343	4,963
224	140				5,754	5,282

**NOTE.** The recognition features of the two types of axle fitted to the XK 120 models are as follows:—

**E.N.V. Axle.** Differential unit bolted to the front of axle casing. Dipstick and filler plug situated at top left-hand of pinion shaft housing.

**Salisbury Axle.** Differential unit non-detachable. Filler plug situated in the cover at the rear of axle casing.

## ENGINE MAINTENANCE

Attention to the following points of maintenance will be amply repaid by satisfactory operation of the engine and will materially add to the life of the unit.

**AIR CLEANER. Mark VII Model.** Every 5,000 miles (8,000 kilometres) or more frequently in dusty conditions, remove the element and holding it vertically gently tap the fins. Every 15,000 miles (24,000 kilometres) renew the element.

**XK 120 Super Sports Model.** Every 5,000 miles (8,000 kilometres) or more frequently in dusty conditions, remove the air cleaners from the carburetters and thoroughly rinse in petrol. Before refitting, wet the gauze with engine oil.

**XK 120 Fixed Head Coupe Model.** Every 5,000 miles (8,000 kilometres) or more frequently in dusty conditions, remove the air cleaner from the forward side of the radiator and thoroughly rinse in petrol. Before refitting, wet the gauze with engine oil.

**CARBURETTER AND FUEL PUMP FILTERS.** The Mark VII model is fitted with two individual petrol pumps situated on the right-hand side of the rear chassis cross member. The XK 120 model is fitted with a single petrol pump situated on the rear of the central chassis member.

Every 5,000 miles (8,000 kilometres) remove and clean the filters situated at the float chamber unions. (Plate B.31.)

Every 10,000 miles (16,000 kilometres) clean the filter(s) situated in the base of the petrol pump(s).

As the petrol pumps are below petrol tank level the following procedure is recommended to avoid draining the tank.

Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank. Unscrew the inlet union (the lower one of the two unions) from the petrol pump and attach the end of the tube over the petrol pipe as soon as it is detached.

Remove the six cheese-headed screws and withdraw base plate to gain access to the filter.

**CARBURETTOR DASH POT CHAMBERS.** Every 2,500 miles (4,000 kilometres) unscrew the hydraulic damper caps from the tops of the dash pots and remove dampers. Fill the piston spindle chambers with the recommended grade of engine oil.

Absence of oil will cause weakness of mixture on acceleration and poor performance.

**DISTRIBUTOR.** Every 2,500 miles (4,000 kilometres) remove the distributor cover and replenish the oil well with one or two teaspoonsful of engine oil; this lubricates the automatic advance mechanism and the distributor shaft. Lightly smear the cam and contact breaker pivot with grease (Mobilgrease No. 2 or an equivalent grease). Lift off rotor arm and apply a few drops of thin machine oil at top of shaft to lubricate the cam bearing. It is not necessary to remove the exposed screw since it is either drilled or affords a clearance to permit passage of oil.

Check contact breaker point gap and adjust if necessary to .012" (.31 mm.).

Every 5,000 miles (8,000 kilometres) examine contact breaker points and if burned or blackened clean with a very fine carborundum stone or emery cloth, then wipe with petrol-moistened cloth.

**FAN BEARINGS.** Every 2,500 miles (4,000 kilometres) sparingly lubricate bearings through nipple provided, using the recommended lubricant.

**FAN BELT.** Every 5,000 miles (8,000 kilometres) check the tension of the fan belt and adjust if necessary. Adjustment is effected by loosening the dynamo adjusting bolt and both mounting bolts and pulling the dynamo outwards by hand pressure until the belt tension is sufficient. The correct tension is when the belt can be deflected  $\frac{1}{2}$ " each side of the normal position, half-way between the crankshaft and fan pulleys. Undue tension will cause heavy wear of the belt, pulleys, fan and dynamo bearings.

**OIL FILTER.** Every 2,500 miles (4,000 kilometres), when the engine oil is changed, thoroughly rinse the oil filter element in petrol.

Renew the element every 5,000 miles (8,000 kilometres).

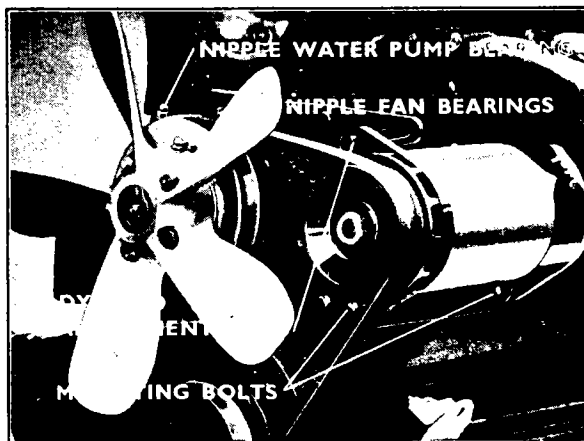


PLATE B.1. FAN BELT ADJUSTMENT.

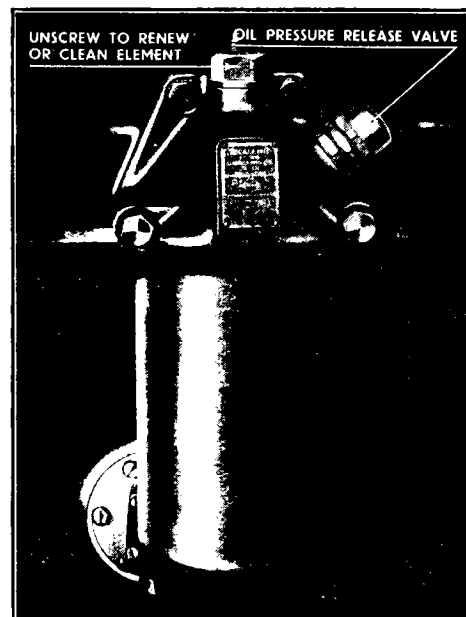


PLATE B.2. OIL FILTER ASSEMBLY.

**OIL SUMP.** Every 2,500 miles (4,000 kilometres) drain and refill the sump. New and reconditioned engines should have the oil changed initially at 500 miles (800 kilometres). See Service Voucher. It is advantageous to carry out draining at the end of a run when the oil is hot and consequently more fluid.

**SPARKING PLUGS.** Every 3,000 miles (5,000 kilometres) remove, clean and test the plugs, using plug testing and cleaning equipment. Adjust gaps to .022" (.56 mm.).  
Every 10,000 miles renew sparking plugs with the recommended type.

**THROTTLE LINKAGE.** Every 5,000 miles (8,000 kilometres) lubricate all joints with engine oil.

**WATER PUMP.** Every 2,500 miles (4,000 kilometres) lubricate the water pump bearing sparingly through the nipple provided, using the recommended lubricants. (Plate B.1.)

**GENERAL.** Every 5,000 miles (8,000 kilometres) check over all the engine nuts, set screws and connections, tightening where necessary. Clean down engine; check for oil leaks and rectify as necessary.

**RECOMMENDED LUBRICANTS**

Component	Vacuum	Wakefield	Shell	Esso	Price's	S.A.E. Viscosity
Engine	Summer .. .. .	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30
	32° F.-90° F.					30
	Winter .. .. .	Mobiloil Arctic	Castrolite	Single Shell	Essolube 20	Energol 20
Below 32° F.						20
Tropical .. .. .	Mobiloil B.B.	Castrol X.X.L.	Triple Shell	Essolube 40	Energol 40	40
Above 90° F.						
Carburettor Hydraulic Piston Dampers .. .. .	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30	30
Distributor .. .. .						
Oil Can Lubrication .. .. .						
Water Pump .. .. .	Mobilgrease No. 5	Castrol W.B.	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.	
Fan .. .. .						
Upper Cylinder Lubrication	Mobil Upperlube	Castrollo	Donax U	Essomix	Energol U.C.L.	

	Mark VII	XK 120
Engine: Sump capacity .. .. .	21 pints	Stepped 21 pints      Flat 24 pints
Total capacity .. .. .	24 pints	base sump, 24 pints    base sump, 29 pints
Cooling system .. .. .	22 pints	25½ pints

1 imperial pint—1.2 U.S. pints—.57 litres.

**RUNNING-IN INSTRUCTIONS**

Only if the following important recommendations are observed will the high performance and continued good running of which the Jaguar is capable be obtained.

**THROTTLE RESTRICTOR.** To prevent cars being run at an excessive speed during their early life it has been considered advisable to restrict the throttle opening by the fitting of a stop on the underside of the accelerator pedal. This stop is secured to the pedal by a set screw which is in turn locked by a wire and lead seal. The stop is to be removed at the time the free service is carried out, that is, after the first 500 miles (800 kilometres).

(1) During the first 500 miles (800 kilometres), while the throttle restrictor is fitted, do not over-stress the engine. Use the gears so that the engine runs under light load with the minimum of throttle opening.

(2) Between 500 and 1,000 miles (800 to 1,500 kilometres) do not exceed 2,500 r.p.m.

(3) Between 1,000 and 2,000 miles (1,500 to 3,000 kilometres) do not exceed 3,000 r.p.m.

Continue to drive without over-stressing the engine. The use of an approved brand of upper cylinder lubricant is recommended during the running-in period.

On all new cars leaving the Factory a label giving these recommendations is affixed to the windscreen so that the driver is aware of the instructions.

**FROST PRECAUTIONS  
(MARK VII MODEL)**

During the winter months it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers.

If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine.

Drain the radiator while the car is standing on level ground. Turn the air conditioner "Hot/Cold" control on the centre fascia to the "Hot" position, that is, anti-clockwise. Operate remote control of radiator drain tap

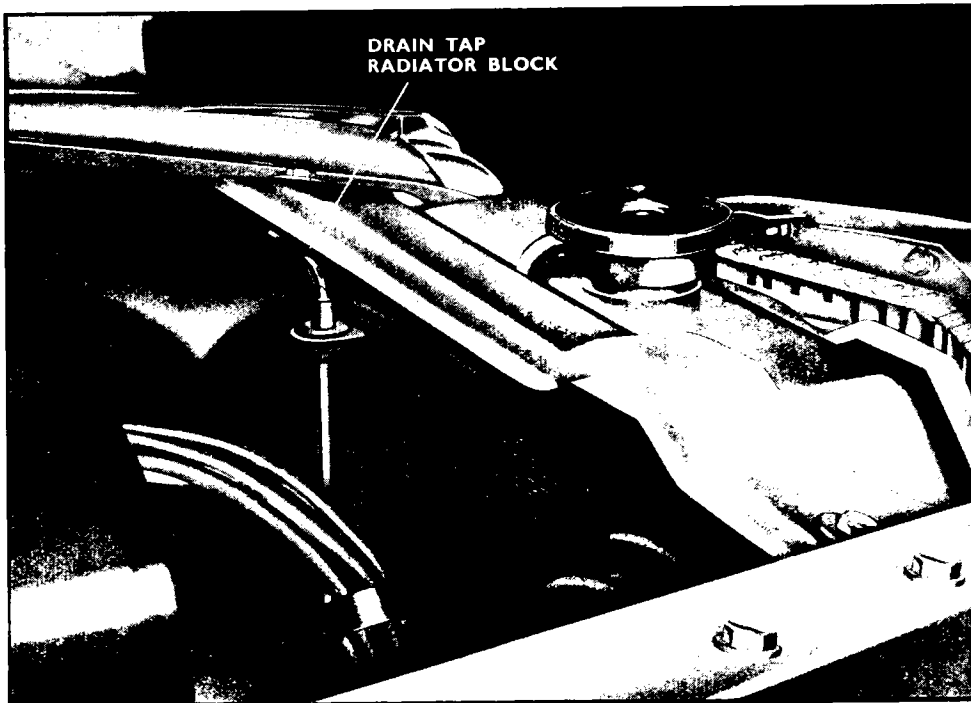


PLATE B.3. DRAIN TAP. RADIATOR (Mark VII).

situated at the top left-hand side of the radiator block (Plate B.3) and open the engine drain tap situated at the left-hand rear of the cylinder block. (Plate B.5.)

On early cars fitted with a bleeder valve in the front face of the heater radiator on the scuttle, it is necessary to unscrew the valve to prevent an air lock occurring and water remaining in the heater system.

When water has ceased to flow, run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system completely.

**(XK 120 MODELS)**

During the winter months it is recommended that an approved anti-freeze solution should be added to the cooling water in the proportions recommended by the appropriate manufacturers.

If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine. Drain the radiator while the car is standing on level ground by opening the drain tap situated at the front of the radiator block, and the engine by opening the tap at the left-hand rear of the cylinder block. (Plates B.4 and B.5.)

When water has ceased to flow, run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system completely.

**Note.** On cars fitted with air conditioners note that draining the radiator and cylinder block does NOT drain the heater unit.

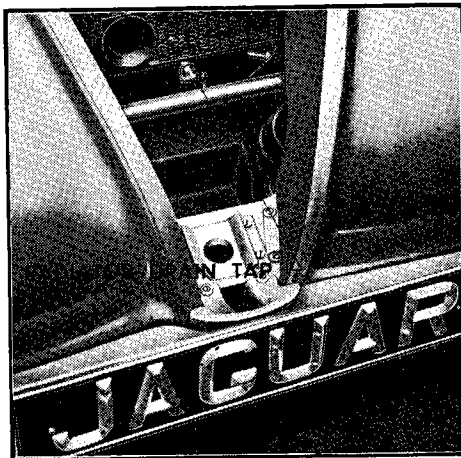


PLATE B.4. DRAIN TAP. RADIATOR (XK 120).

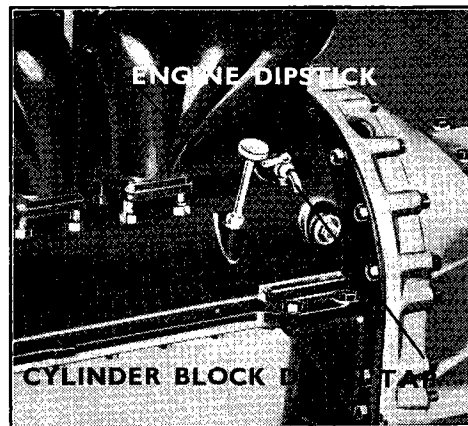
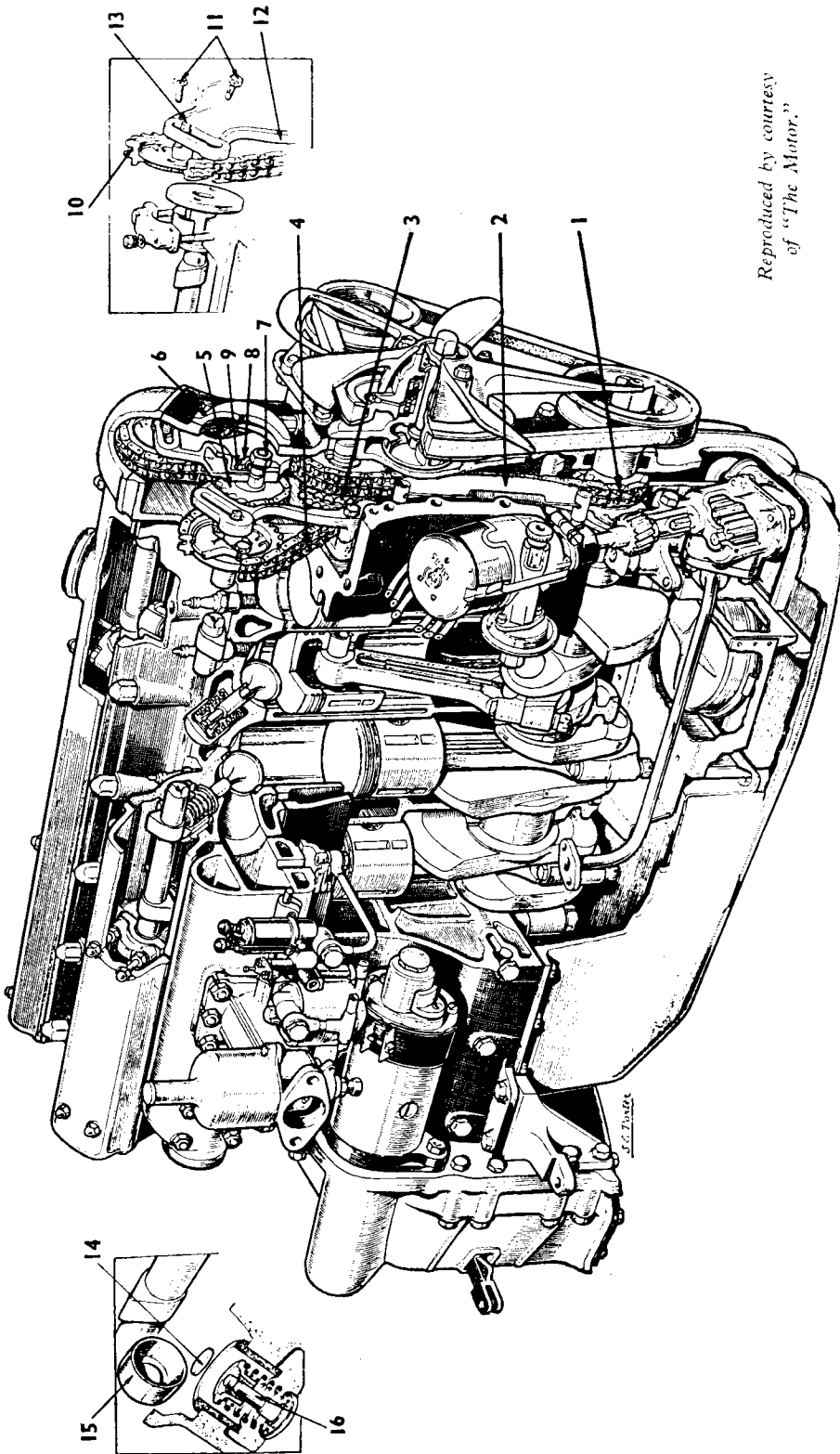


PLATE B.5. DRAIN TAP. ENGINE.



Reproduced by courtesy  
of "The Motor,"

PLATE B.6. ENGINE (Sectioned view).

Bottom Timing Chain .. .. .	1	Lock Nut for Serrated Plate .. .. .	7	Mounting Bracket, Front .. .. .	12
Chain Tensioner .. .. .	2	Serrated Adjuster Plate .. .. .	8	Guide Pin .. .. .	13
Intermediate Sprocket .. .. .	3	Locking Plunger .. .. .	9	Adjusting Pad .. .. .	14
Top Timing Chain .. .. .	4	Camshaft Sprocket .. .. .	10	Tappet .. .. .	15
Idler Sprocket .. .. .	5	Set Screws for Camshaft Sprocket .. .. .	11	Valve .. .. .	16
Breather Housing.. .. .	6				



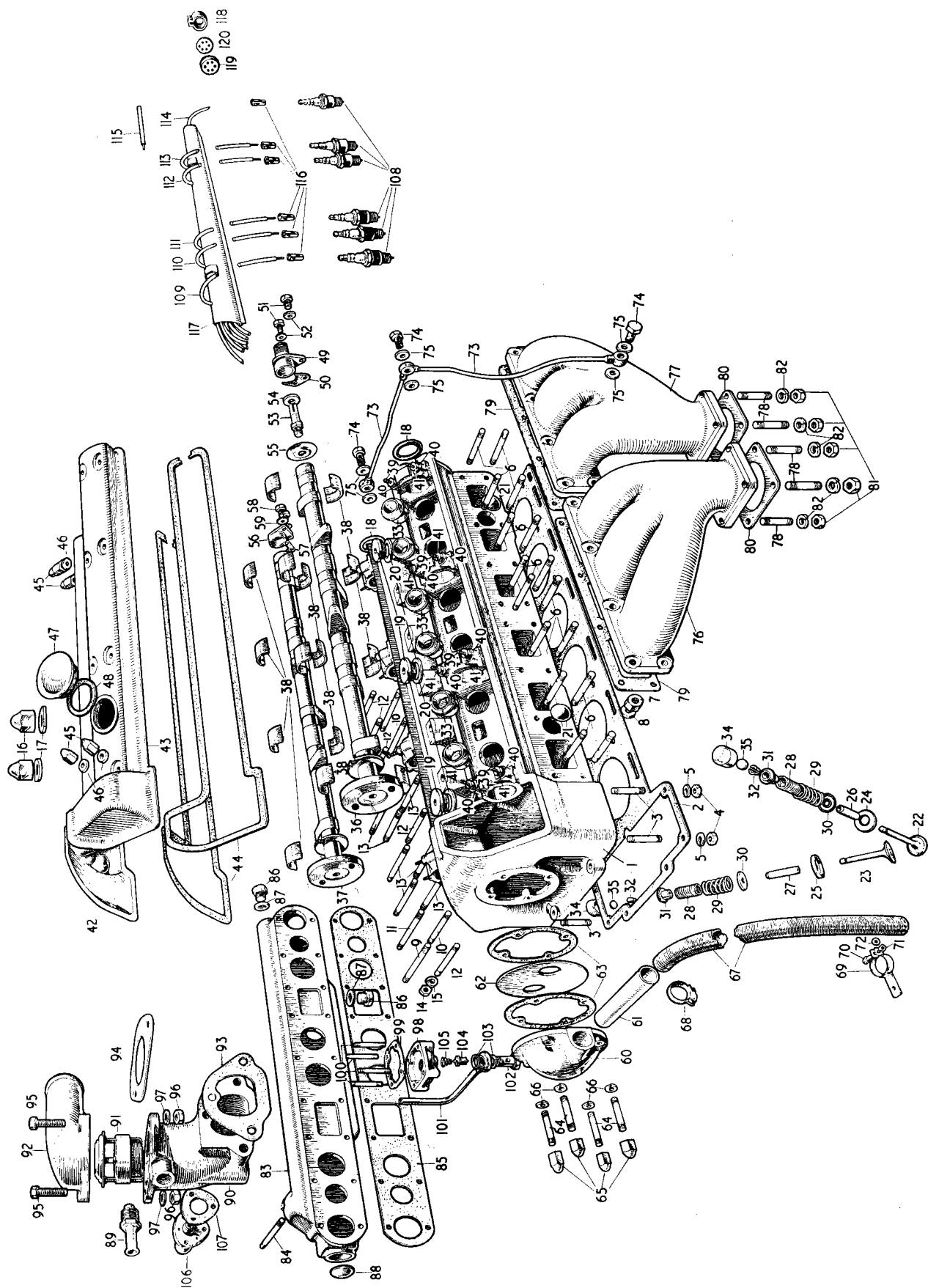


PLATE B.7. CYLINDER HEAD (Exploded view).

INDEX TO PLATE B.7

Cylinder Head	1	Nut, securing Bearing Caps	41	Nut, securing Exhaust Pipes to Manifolds	81
Gasket, between Head and Block	2	Cover for Camshaft, Right Hand	42	Washer, Spring, under Nuts	82
Stud, on underside front end of Head	3	Cover for Camshaft, Left Hand	43	Inlet Manifold	83
Nut, on Studs	4	Gasket, between Covers and Head	44	Stud, in Manifold, for attachment of Water Outlet Housing	84
Washer, Spring, under Nuts	5	Nut, Dome, securing Covers	45	Gasket, for Inlet Manifold	85
Stud, on Head, for Exhaust Manifolds	6	Washer (Copper) under Dome Nuts	46	Plug, in Inlet Manifold	86
Nut, on Studs	7	Cap, Filler, on Left Hand Camshaft Cover	47	Washer (Copper) on Plugs	87
Washer, Spring, under Nuts	8	Washer, Jointing, on Filler Cap	48	Plug, Core, in Inlet Manifold	88
Stud, for Inlet Manifold (Water Housing attachment)	9	Rev. Counter Adapter	49	Nozzle, on Inlet Manifold, for Brake Servo Connection	89
Stud, for Inlet Manifold and Heater Pipe attachment	10	Gasket for Rev. Counter Adapter	50	Water Outlet and Thermostat Housing	90
Stud, Long, for Inlet Manifold	11	Screw, Set, securing Adapter	51	Thermostat in Housing	91
Stud, Short, for Inlet Manifold	12	Washer (Copper) on Setscrews	52	Elbow at top of Housing	92
Stud, Medium, for Inlet Manifold	13	Shaft for Rev. Counter Adapter	53	Gasket, between Housing and Inlet Manifold	93
Nut, for Inlet Manifold Studs	14	Seal, Oil, on Shaft	54	Gasket, between Elbow and Housing	94
Washer, Spring, under Nuts	15	Thrower, Oil, on Shaft	55	Bolt, securing Elbow to Housing	95
Nut, Dome, securing Cylinder Head to Block	16	Flanged Sealing Plug	56	Nut on Bolts	96
Washer 'D' under Cylinder Head Dome Nuts	17	Gasket for Sealing Plug	57	Washer, Shakeproof, under Nuts	97
Ring, Seal, rear end, between Head and Cam Covers	18	Screw, Set, securing Sealing Plug	58	Flange for Starting Pipe	98
Plug, Core (Headed) on top of Cylinder Head	19	Washer (Copper) on Setscrews	59	Gasket, for Starting Pipe Flange	99
Washer (Copper) under Headed Core Plug	20	Front Cover and Breather Housing	60	Stud, for Starting Pipe Flange	100
Plug, Core, for Exhaust face of Cylinder Head	21	Pipe for Breather	61	Starting Pipe	101
Valve, Inlet	22	Baffle, behind Front Cover	62	Bolt, Banjo, securing Pipe to Flange	102
Valve, Exhaust	23	Gasket, front and rear of Baffle	63	Washer (Copper) at each side of Banjo	103
Insert for Inlet Valves	24	Stud, in Cylinder Head, for Front Cover	64	Anti-Blow-Back Valve in Banjo Bolt	104
Insert for Exhaust Valves	25	Nut, Dome, securing Front Cover	65	Spring on Anti-Blow-Back Valve	105
Guide for Inlet Valves	26	Washer, Spring, under Dome Nuts	66	Thermostat for Carburettor on Water Outlet Housing	106
Guide for Exhaust Valves	27	Flexible Breather Pipe for Front Cover	67	Gasket for Thermostat	107
Spring, Inner	28	Clip (Griptite No. 25) securing Flexible Pipe to Tube in Front Cover	68	Sparkling Plug	108
Spring, Outer	29	Clip, securing Flexible Pipe to Wing	69	Lead, H.T. No. 1	109
Seat for Springs	30	Screw, Set, securing Clips to Flexible Pipe	70	Lead, H.T. No. 2	110
Collar at top of Valve Stems	31	Nut on Setscrews	71	Lead, H.T. No. 3	111
Cotter	32	Washer, Shakeproof, under Nuts	72	Lead, H.T. No. 4	112
Guide for Tappets	33	Oil Pipe from Cylinder Block to Head	73	Lead, H.T. No. 5	113
Tappet	34	Bolt, Union, securing Oil Pipe to Head and Block	74	Lead, H.T. No. 6	114
Pad, Adjusting	35	Washer (Copper) on Union Screws	75	Lead, H.T. to Coil	115
Camshaft, Exhaust	36	Exhaust Manifold, Front	76	Terminal for Sparking Plug Leads	116
Camshaft, Inlet	37	Exhaust Manifold, Rear	77	Conduit for H.T. Leads	117
Bearing for Camshafts	38	Stud, in Manifold Flanges, for attachment of Exhaust Pipes	78	Clip for H.T. Leads around Spacer	118
Stud, in Head, securing Camshaft Bearing Caps and Covers	39	Gasket for Exhaust Manifolds	79	Fibre Spacer for H.T. Leads (Thick)	119
Washer 'D' top of Bearing Caps	40	Gasket for Outlet Flanges	80	Fibre Spacer for H.T. Leads (Thin)	120

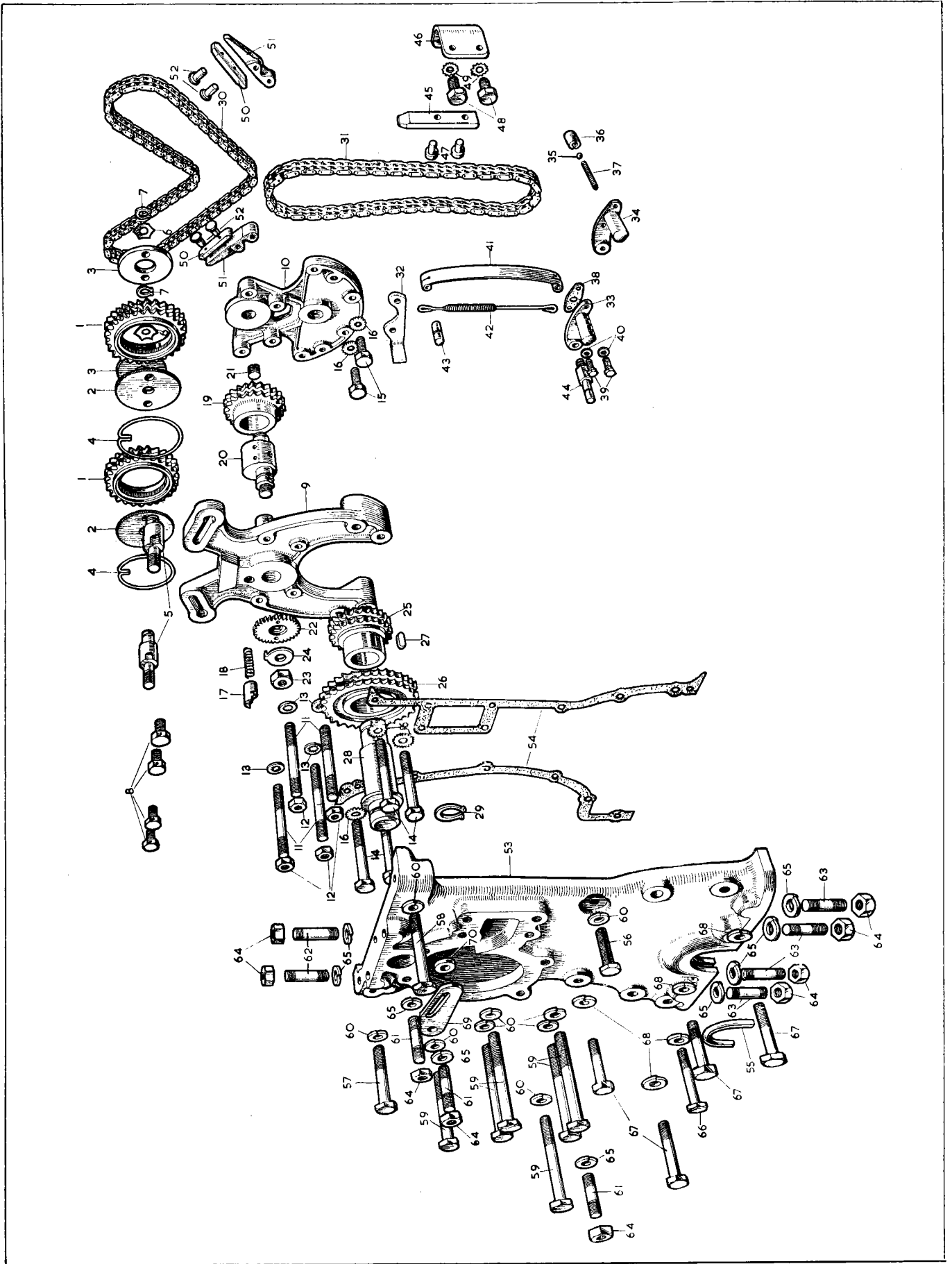


PLATE B.8. TIMING GEAR (Exploded view).

INDEX TO PLATE B.8

Sprocket for Camshaft	..	..	1	Spring behind Ball	..	..	37
Plate, Adjusting, in Cam Sprockets	..	..	2	Gasket, between Oil Spray Bracket and Cylinder Block	..	..	38
Plate, Clamping, in Cam Sprockets	..	..	3	Screw, Set, securing Oil Spray Bracket to Block	..	..	39
Circlip, retaining Clamping Plates	..	..	4	Washer, Shakeproof, on Setscrews	..	..	40
Pin, Guide, through Clamping Plates	..	..	5	Timing Chain Tensioner	..	..	41
Washer, Star, on Guide Pin	..	..	6	Spring for Chain Tensioner	..	..	42
Circlip, securing Guide Pin	..	..	7	Pin, securing Spring Tensioner	..	..	43
Screw, Set, securing Sprocket Assembly to Camshafts	..	..	8	Pin, securing Spring and Tensioner to Oil Spray Bracket	..	..	44
Mounting Bracket, Front	..	..	9	Vibration Damper for Timing Chain	..	..	45
Mounting Bracket, Rear	..	..	10	Bracket Mounting Vibration Damper	..	..	46
Stud, in Rear Bracket	..	..	11	Rivet, securing Vibration Damper to Bracket	..	..	47
Nut, on Studs	..	..	12	Screw, Set, securing Mounting Bracket	..	..	48
Washer, Shakeproof, under Nuts	..	..	13	Washer, Shakeproof, on Setscrews	..	..	49
Bolt (Long) securing Brackets to Cylinder Block	..	..	14	Damper for Upper Timing Chain	..	..	50
Bolt (Short) securing Brackets to Cylinder Block	..	..	15	Carrier for Upper Dampers	..	..	51
Washer, Shakeproof, on Bolts	..	..	16	Rivet, securing Dampers to Carriers	..	..	52
Pin, Plunger, in Front Bracket, locking Adjusting Plate	..	..	17	Front Timing Cover	..	..	53
Spring in Plunger	..	..	18	Gasket, between Timing Cover and Cylinder Block	..	..	54
Idle Sprocket (21 Teeth)	..	..	19	Seal, Oil, between Timing Cover and Oil Sump	..	..	55
Eccentric Shaft through Idle Sprocket	..	..	20	Bolt, securing Timing Cover to Block	..	..	56
Plug (Screwed) in end of Eccentric Shaft	..	..	21	Bolt, securing Timing Cover to Block	..	..	57
Adjusting Plate on Eccentric Shaft	..	..	22	Bolt, securing Dynamo Adjusting Link and Timing Cover to Block	..	..	58
Nut, securing Adjusting Plate	..	..	23	Bolt, securing Water Pump and Timing Cover to Block	..	..	59
Washer, locking Nut	..	..	24	Washer, Spring, on Bolts	..	..	60
Intermediate Sprocket (20 Teeth)	..	..	25	Stud, in Front Cover, for attachment of Water Pump	..	..	61
Intermediate Sprocket (28 Teeth)	..	..	26	Stud, Front Cover to Cylinder Block	..	..	62
Key, locking Intermediate Sprocket	..	..	27	Stud, Front Cover to Oil Sump	..	..	63
Shaft, holding Intermediate Sprockets	..	..	28	Nut on Studs	..	..	64
Circlip, securing Shaft	..	..	29	Washer, Spring, under Nuts	..	..	65
Timing Chain, Top	..	..	30	Bolt, securing Front Cover to Cylinder Block	..	..	66
Timing Chain, Bottom	..	..	31	Bolt, securing Front Cover to Cylinder Block	..	..	67
Guide Bracket for Chain Tensioner	..	..	32	Washer, Spring, on Bolts	..	..	68
Oil Spray Bracket (early type)	..	..	33	Link, Adjusting Dynamo	..	..	69
Oil Spray Bracket (later type)	..	..	34	Piece, Distance, behind Adjusting Link	..	..	70
Ball for Oil Spray Valve	..	..	35				
Seat for Ball	..	..	36				

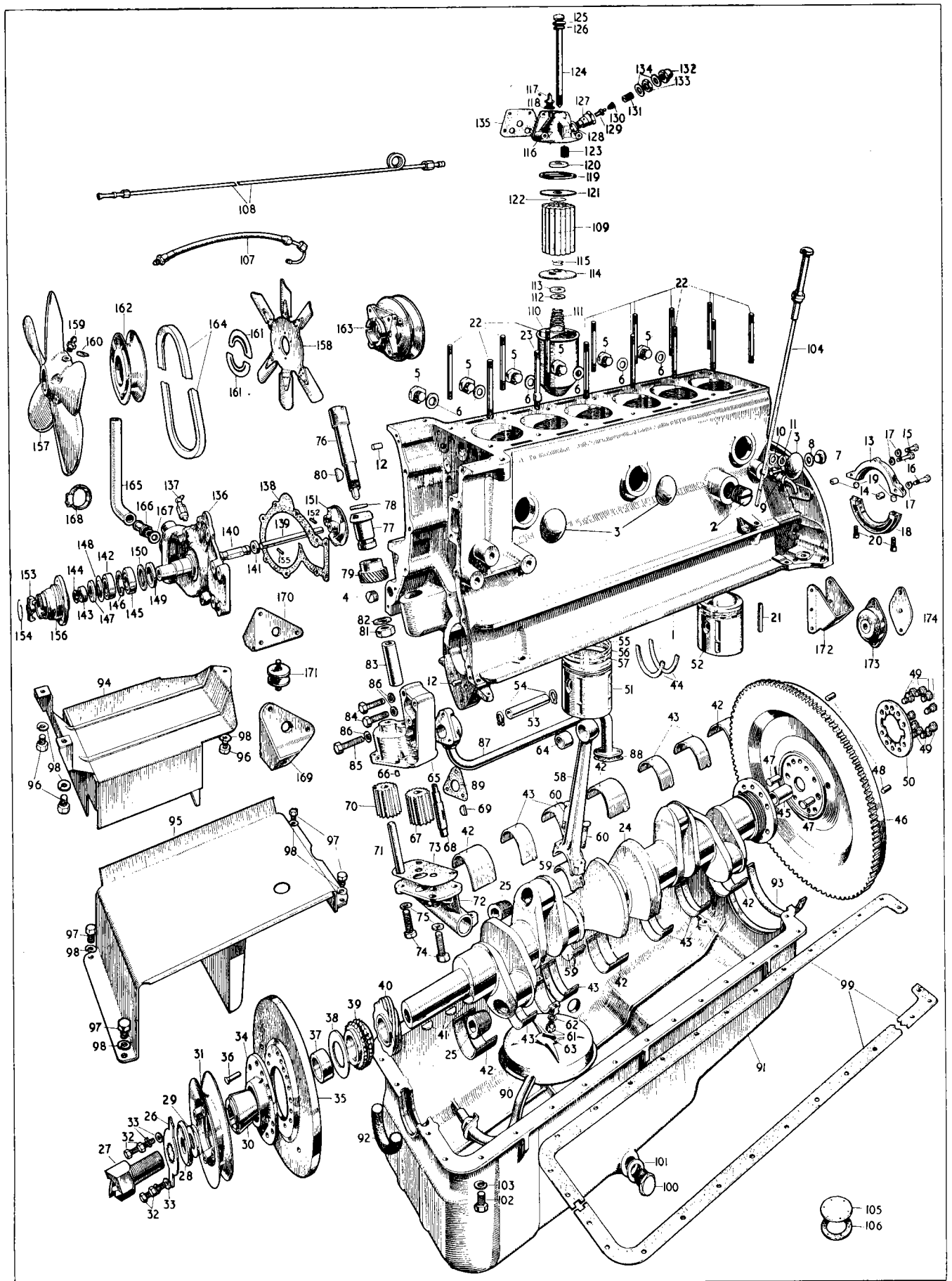


PLATE B.9. CYLINDER BLOCK, CRANKSHAFT AND PISTON ARRANGEMENT (Exploded view).

## INDEX TO PLATE B.9

Cylinder Block .. .. .	1	Screw, Set, securing Flywheel to Crankshaft .. ..	49
Plug, on left hand side of Block, sealing aperture for Heater Element .. .. .	2	Plate, locking Setscrews .. .. .	50
Plug, Core, on left hand and right hand sides of Block	3	Piston, complete .. .. .	51
Plug, in front end of Oil Gallery ( $\frac{3}{8}$ " A.N.F.) .. ..	4	Piston, complete .. .. .	52
Plug, in side of Oil Gallery ( $\frac{1}{2}$ " A.N.F.) .. .. .	5	Pin, Gudgeon .. .. .	53
Washer, Copper, on Oil Gallery Plugs .. .. .	6	Circlip .. .. .	54
Plug in rear end of Oil Gallery ( $\frac{7}{8}$ " A.N.F.) .. ..	7	Ring, Pressure, Upper .. .. .	55
Washer, Copper, on rear Plug .. .. .	8	Ring, Pressure, Lower .. .. .	56
Tap, Water Drain, in left hand side of Block .. ..	9	Ring, Scraper .. .. .	57
Washer (Copper) on Water Drain Tap .. .. .	10	Connecting Rod .. .. .	58
Washer (Fibre) on Water Drain Tap .. .. .	11	Bearing, Big End .. .. .	59
Dowel on front face of Block .. .. .	12	Bolt, securing Caps to Connecting Rods .. ..	60
Cover on rear face of Cylinder Block .. .. .	13	Nut on Bolt .. .. .	61
Dowel, Ring, between Rear Cover and Block .. ..	14	Washer under Nuts .. .. .	62
Bolt, Centre, securing Rear Cover to Block .. ..	15	Pin, Split, locking Nuts .. .. .	63
Bolt, Outer, securing Rear Cover to Block .. ..	16	Bearing, Small End .. .. .	64
Washer, Spring, on Bolts .. .. .	17	Body only .. .. .	65
Ring, Sealing, on Rear Cover .. .. .	18	Dowel in Pump Body .. .. .	66
Dowel, Ring, between Sealing Ring and Rear Cover	19	Gear, Driving .. .. .	67
Screw, Cap, securing Sealing Ring to Rear Cover ..	20	Spindle for Driving Gear .. .. .	68
Tube, Drain, in Rear Bearing Cap .. .. .	21	Key, locking Driving Gear on Spindle .. .. .	69
Stud, securing Cylinder Head .. .. .	22	Gear, Driven .. .. .	70
Stud, Dowel, securing Cylinder Head .. .. .	23	Spindle for Driven Gear .. .. .	71
Crankshaft .. .. .	24	Cover at bottom of Pump Body .. .. .	72
Plug, Screwed, for Crankshaft Journals .. .. .	25	Gasket between Cover and Pump Body .. ..	73
Washer, locking Starter Jaw .. .. .	26	Bolt securing Cover to Pump Body .. .. .	74
Jaw, Starter .. .. .	27	Washer, Shakeproof, on Bolts .. .. .	75
Washer, behind Starter Jaw .. .. .	28	Shaft, Drive, between Distributor and Coupling Shaft	76
Shim, Packing, behind Washer .. .. .	29	Bush on Drive Shaft .. .. .	77
Cone, Split, between Damper Centre and Crankshaft	30	Washer on Drive Shaft (Top of Bush) .. .. .	78
Pulley, Fan .. .. .	31	Gear, Helical, driving Oil Pump and Distributor ..	79
Bolt, securing Fan Pulley to Damper Centre .. ..	32	Key (Woodruff No. 50) locking Helical Gear on Drive Shaft .. .. .	80
Washer, Shakeproof, on Bolts .. .. .	33	Nut on bottom of Drive Shaft .. .. .	81
Centre for Damper .. .. .	34	Washer, Special, Locking Nut .. .. .	82
Damper .. .. .	35	Shaft, coupling Driving Gear and Drive Shaft .. ..	83
Rivet, securing Damper to Centre .. .. .	36	Bolt, securing Oil Pump to Bearing Cap .. .. .	84
Piece, Distance .. .. .	37	Bolt, securing Oil Pump to Bearing Cap .. .. .	85
Thrower, Oil .. .. .	38	Washer, Shakeproof, on Bolts .. .. .	86
Gear, Timing .. .. .	39	Oil Delivery Pipe from Pump .. .. .	87
Gear for Oil Pump Drive .. .. .	40	Gasket, under Flange of Oil Pipe .. .. .	88
Key (Woodruff 90) .. .. .	41	Gasket, between Elbow and Oil Pump .. .. .	89
Bearing, Main, Front, Centre and Rear .. .. .	42	Floating Suction Filter for Oil Sump .. .. .	90
Bearing, Main, Intermediate .. .. .	43	Oil Sump .. .. .	91
Washer, Thrust, bottom of Centre Bearing Cap ..	44	Seal (Asbestos) at front end of Sump .. .. .	92
Bush, in rear end of Crankshaft, for Constant Pinion Shaft .. .. .	45	Seal (Cork Rubber) at rear end of Sump .. .. .	93
Flywheel .. .. .	46	Tray for Oil Sump, Front .. .. .	94
Dowel in centre of Flywheel .. .. .	47	Tray for Oil Sump, Rear .. .. .	95
Dowel on outer face of Flywheel .. .. .	48	Screw, Set, securing Front Tray to Bearing Caps ..	96
		Screw, Set, securing Rear Tray to Sump .. .. .	97
		Washer, Shakeproof, on Setscrews .. .. .	98

# ENGINE

## INDEX TO PLATE B.9 (contd.)

Gasket, between Oil Sump and Cylinder Block .. .. .	99	Greaser, Hydraulic, on Pump Body .. .. .	137
Plug, Drain, at bottom of Oil Sump .. .. .	100	Gasket, between Pump and Cylinder Block .. .. .	138
Washer on Drain Plug .. .. .	101	Spindle .. .. .	139
Screw, Set, securing Oil Sump to Cylinder Block .. .. .	102	Bush for Spindle .. .. .	140
Washer, Spring, on Setscrews .. .. .	103	Seal for Spindle .. .. .	141
Dipstick Assembly for Oil Sump .. .. .	104	Bearing, Ball, Front (Hoffman S.9) .. .. .	142
Blanking Plate on side of Oil Sump .. .. .	105	Collar for Front Bearing .. .. .	143
Gasket for Blanking Plate .. .. .	106	Circlip, on Pump Body, retaining Front Bearing .. .. .	144
Flexible Oil Pipe .. .. .	107	Bearing, Ball, Rear (Hoffman S.10) .. .. .	145
Oil Pipe to Gauge .. .. .	108	Circlip, in Fan Hub, retaining Rear Bearing .. .. .	146
Element .. .. .	109	Washer (Felt) Front .. .. .	147
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Body for Relief Valve .. .. .	127	By-Pass Water Hose .. .. .	165
Washer (Copper) between Body and Filter Head .. .. .	128	Adapter, in Water Pump and Outlet Elbow for By-Pass Hose .. .. .	166
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## ENGINE. TO REMOVE AND REFIT (MARK VII MODEL)

- GENERAL.** The engine and gearbox unit is removed as one assembly by lowering the rear of the assembly and removing it forwards and upwards.
- REMOVE BONNET.** Release bonnet fastener and open bonnet. Support while removing four set bolts from the two hinges at rear and lift bonnet clear.
- REMOVE RADIATOR GRILLE.** Remove the two set screws and plain washers securing the radiator grille to the tie panel at the top of the radiator. From underneath the car remove the two set screws and plain washers securing the grille brackets to the radiator frame. Remove the grille, noting the packing washers fitted between the bottom grille brackets and the radiator frame.
- REMOVE TIE PANEL AND SUPPORTING CHANNEL.** Remove the three set screws and plain washers securing the tie panel to the supporting channel. Remove tie panel complete with bonnet release cable and place on wing. Remove the set screw and plain washer securing the support channel to each wing valance, and remove channel.
- REMOVE RADIATOR BLOCK.** Drain radiator by operating the remote control at top rear of radiator header tank. Slacken the top and bottom hose clips and disconnect hoses. Remove the four set screws securing the radiator block to the vertical members of the radiator frame. The radiator block can now be removed by lifting it upwards, taking care not to foul the fan blades.

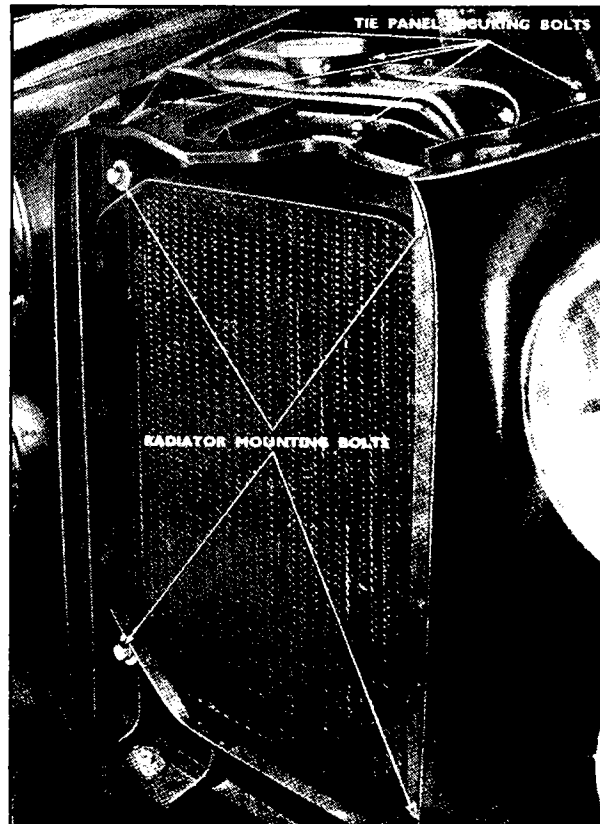


PLATE B.10. RADIATOR. REMOVAL (Mark VII).



**REPOSITION DYNAMO.** Disconnect battery lead. Disconnect dynamo leads, slack adjustment bolts and clamp up dynamo as near as possible to engine.

**REMOVE AIR SILENCER AND MANIFOLD.** Remove the two set screws passing through the silencer steady brackets into the inlet manifold casting. Remove silencer. Withdraw two bolts securing air silencer manifold to carburetter flanges. Remove manifold.

**DISCONNECT ENGINE CONNECTION.** Disconnect throttle linkage at rear flexible joint. Disconnect petrol feed pipe from carburetters. Disconnect wire to self-starting carburetter solenoid. Disconnect electrical connections from starter motor. Disconnect thermometer bulb from water uptake manifold and tie clear. Care must be exercised not to twist the capillary tube to gauge or fracture may occur. Disconnect oil pressure gauge pipe. Disconnect vacuum pipe from inlet manifold. Disconnect two heater pipes from rear of engine. Disconnect revolution counter cable from rear of camshaft. Disconnect front exhaust pipe at exhaust manifold flanges. Remove oil filter unit from engine. Disconnect engine breather pipe from housing on front of cylinder head.

**DISCONNECT GEARBOX CONNECTIONS.** Remove gearbox and bell housing cover. Remove change-speed lever. Disconnect electrical connections to reverse switch at bayonet junction sleeves. Disconnect speedometer cable and place clear. Disconnect front end of propeller shaft at gearbox coupling.

**DISCONNECT SWAY BAR BRACKETS.** Disconnect sway bar support brackets at frame, but do not remove bar from suspension fixing points.

**DISCONNECT CLUTCH LINKAGE.** Disconnect flexible hydraulic pipe from clutch operating cylinder, insert wooden plug in end of pipe to prevent loss of fluid and tie pipe to some convenient part of chassis clear of engine unit.

**Note.** System will require bleeding on reassembly.

On early models having the mechanical clutch linkage the following paragraph is applicable in place of the above:

Disconnect two bolts from plate on bell housing, two bolts from plate on frame, two bolts from keeper plate holding shaft to inner (bell housing) ball, two split pins from operating linkage and remove short shaft complete.

**REMOVE ENGINE.** Place sling around engine and take weight on pulley blocks prior to disconnecting engine mountings. Remove both front engine mountings where bolted to crankcase (three bolts per side) and remove mounting rubbers (one nut per side) from chassis mounting plates. Note that the earth lead is connected to one of the right-hand (off-side) mounting bolts. Disconnect rear engine mounting rubbers where bolted to chassis plates (two bolts per side), leaving mounting rubbers attached to bell housing brackets. Note number and disposition of packing plates, if fitted, between mounting rubbers and chassis plates.

Lift engine from chassis. When lifting engine note that the sling must be arranged to tilt the engine to the rear, and care must be taken to avoid damage to the revolution counter drive adapter.

**REFIT.** Refitting is the reverse of the removal procedure.

## **ENGINE. TO REMOVE AND REFIT (XK 120 MODELS)**

**REMOVE BONNET.** Raise bonnet, unscrew the four set screws securing each rear bracket to the scuttle and remove bonnet.

**REMOVE RADIATOR.** Drain the radiator by opening the drain tap at the front of the radiator. Disconnect the thermostat housing from the radiator header tank by removing the two nuts and shakeproof washers. Note gasket between housing and header tank.

Slacken the bottom hose clip from the radiator stub pipe and detach hose.

Detach the right-hand felt-covered support plate at the forward side of the radiator by removing the three set screws securing the strip to the wing valance.

Remove the metal plate adjacent to the radiator drain tap by unscrewing the three drive screws.

Detach the radiator tie rods from the brackets on the header tank by removing the two nuts, bolts and shakeproof washers.

Disconnect the radiator securing rods from the brackets on the sides of the radiator by removing the two nuts and shakeproof washers.

Withdraw the radiator upwards, turning the fan blades to avoid fouling the stub pipe on the bottom tank.

Note the packing rubbers between the bottom of the radiator and the mounting brackets.

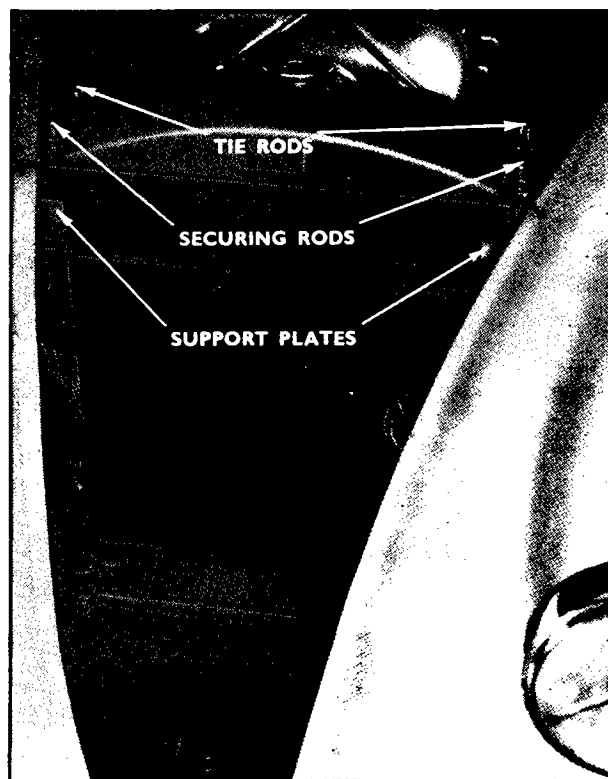


PLATE B.11. RADIATOR REMOVAL (XK 120).

#### REMOVE DYNAMO.

Disconnect the battery positive lead. Remove the connections from the dynamo noting that the yellow wire is connected to terminal "D" (large terminal) and the yellow with green wire to terminal "F" (small terminal). Remove the adjusting bolt situated at top of dynamo and push dynamo towards engine to release fan belt tension. Remove the two mounting bolts and nuts underneath the dynamo, disengage fan belt, and lift out dynamo.

#### REMOVE AIR CLEANERS.

On the Super Sports model remove two set screws securing each air cleaner to the carburetter flanges. Note the gasket between the cleaner and carburetter flange.

On the Fixed Head Coupe model disconnect the air cleaner hoses from the carburetter flanges.

- REMOVE CARBURETTER CONNECTIONS.** Disconnect the petrol pipe to carburetters at the flexible pipe union. Disconnect the electrical connections to the starter carburetter and remove clip from rear of inlet manifold.
- DISCONNECT THROTTLE CONNECTION.** Slacken the two bolts and nuts securing the rear clamp, slide clamp forward and withdraw accelerator rod.
- DISCONNECT OIL GAUGE PIPE.** Disconnect the oil gauge pipe from oil filter at the flexible pipe union.
- DISCONNECT STARTER LEAD AND EARTH STRAP.** Disconnect the electrical lead from the terminal on the starter end plate. Remove the earth strap from the top fixing bolt of the starter.
- REMOVE THERMOMETER BULB.** Remove the thermometer bulb from thermostat housing by unscrewing the hexagon union nut. Withdraw bulb and place clear.
- REMOVE OIL LEVEL WIRE.** Remove the electrical wire from the gauge unit on the right-hand side of sump, if fitted.
- REMOVE BREATHER PIPE.** Slacken the clip securing breather pipe to the housing on the front of cylinder head. Remove pipe and place clear.
- DISCONNECT REVOLUTION COUNTER CABLE.** Unscrew the knurled nut from the revolution counter cable from the adapter at the rear of the left-hand camshaft.
- DISCONNECT EXHAUST PIPES.** Unscrew the four nuts securing each exhaust down pipe to the exhaust manifold flanges.
- DISCONNECT TORQUE ARM.** From the chassis side member opposite to the steering column remove the set screw and washer securing the torque arm to the mounting on the chassis frame.
- DISCONNECT HEATER PIPES.** If the car is fitted with a heater disconnect the hoses from the inlet manifold and the metal pipe at the rear of engine.
- DISCONNECT IGNITION WIRES.** On the Fixed Head Coupe model disconnect the two low tension wires from the coil and one wire from the distributor. Remove the wiring harness clips from the inlet manifold.
- REMOVE GEAR LEVER.** Remove the seats, carpets and floor boards.  
Remove the split pin and nut securing the gear lever to bracket. Remove bolt and withdraw lever, noting the packing washers between lever and bracket.
- DISCONNECT SPEEDOMETER CABLE.** Unscrew the knurled nut securing the cable to the speedometer drive housing in gearbox rear cover. Disconnect cable clip from bottom of clutch housing.
- DISCONNECT PROPELLER SHAFT.** Mark the propeller shaft and gearbox flange in relation to each other. Remove the four split pins and nuts and bolts and slide front coupling of propeller shaft along splines.

**DISCONNECT REVERSE LIGHT WIRES.** Remove the two grub screws securing the electrical wires to the switch on the top cover of gearbox. Remove wires from switch and also from clip.

**DISCONNECT CLUTCH PEDAL SHAFT.** Remove the split pin and clevis pin securing the adjusting rod to the clutch pedal shaft lever. Remove the pinch bolt securing the pedal stem to the top of clutch pedal and withdraw stem. Remove the pinch bolt securing the clutch pedal to shaft. Withdraw clutch pedal shaft through the chassis frame until the inner end of shaft is well clear of bearing housing in the side of clutch housing. Note that the clutch pedal is keyed to the pedal shaft.

**DISCONNECT ENGINE MOUNTINGS.** Place sling around engine with one end at front of sump and the other as far back as possible, and take weight prior to disconnecting engine mountings. Remove the four bolts and nuts securing the platform under gearbox extension to the rear mounting.

Remove the two nuts securing each end of the bearer plate to the front mountings. Note the earth strap at left-hand side.

**REMOVE ENGINE.** To remove the engine it will be necessary to withdraw engine forward until the rear of gearbox is clear of rear mounting, and then tilt engine and gearbox up at the front.

**REFIT.** Refitting is the reverse of the removal procedure.

### ENGINE. TO DISMANTLE (MARK VII AND XK 120 MODELS)

**GENERAL.** The following instructions apply when the engine components are moved in the following sequence and with the engine unit removed from the chassis. Dismantling of sub-assemblies and the removal of individual components when the engine is in the chassis frame are dealt with in detail in subsequent paragraphs.

All references made in this section to the top or bottom of the engine assume the engine to be in the normal upright position. References to the left or right-hand side assume the engine to be upright and looking from the rear.

**REMOVE STARTER.** Unscrew the two bolts and nuts securing starter to clutch housing and withdraw starter. Note earth strap.

**REMOVE GEARBOX.** Remove the pressed steel cover plate from the bottom of clutch housing. Remove the set screws and bolts and nuts securing the clutch housing to engine and withdraw gearbox unit. The gearbox must be supported during this operation in order to avoid straining the clutch driven plate and constant pinion shaft.

**REMOVE CYLINDER HEAD.** Disconnect distributor vacuum feed pipe from front carburetter. Remove high tension leads from sparking plugs and lead carrier from cylinder head studs. Remove sparking plugs. Disconnect both camshaft oil feed pipes from rear of cylinder head. Remove eight dome nuts from each camshaft cover and lift off covers.

Remove four nuts securing breather housing and withdraw housing, observing position of baffle plate with oil drain aperture at the bottom. Release tension on camshaft chain by slackening nut on eccentric idler sprocket shaft, depressing the spring-loaded stop peg and rotating serrated adjuster plate clockwise. Anti-clockwise rotation of the serrated adjuster viewed from the front of the engine tightens the chain.

Break locking wire on two set screws securing chain wheels to respective camshaft. Remove set screws and withdraw chain wheel with chain in position.

The two camshaft chain wheels may now be slid up the support brackets and retained in this position by nuts fitted to the guide pins. (The  $\frac{3}{8}$ " A.N.F. nuts securing the exhaust pipes to the exhaust manifold flanges can be used for this purpose.) Slacken fourteen cylinder head dome nuts and six nuts securing the front of the cylinder head a part of a turn at a time in the order shown on Plate B.12 until the nuts become free.

Lift off cylinder head complete with exhaust manifold, inlet manifolds and carburettors. Remove and scrap cylinder head gasket.

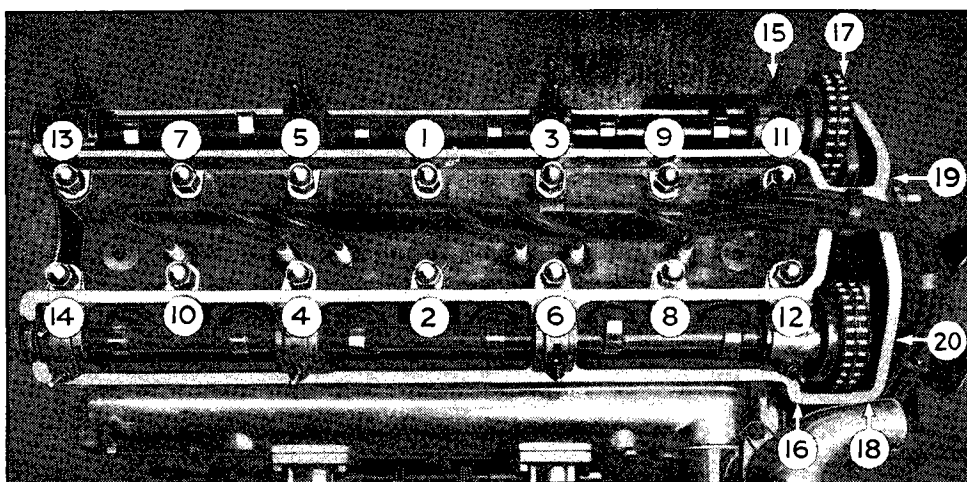


PLATE B.12. CYLINDER HEAD NUTS  
(Sequence for slackening or tightening).

**REMOVE OIL FILTER.**

Unscrew the four set screws securing the oil filter to cylinder block and remove filter. Note the copper washers under set screw heads and gasket between filter and cylinder block.

**REMOVE DISTRIBUTOR.**

Spring back clips and remove cover complete with high tension leads. Slacken the clamp plate bolt and withdraw distributor. Remove set screw and remove clamp plate. Note cork seal in recess at top of hole for distributor.

**REMOVE FAN.**  
(Five-bladed Type.)

Slacken the dynamo adjusting link bolt and release fan belt tension. Remove the fan and fan pulley from the hub by unscrewing the five set screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley.

**REMOVE WATER PUMP.**

Unscrew the six set screws and three nuts, and remove the water pump from the timing cover. Note the gasket between the pump and timing cover.

**REMOVE SUMP.**

Drain sump by removing the hexagon plug and washer from the left-hand side of the sump. Remove the twenty-six set screws securing the sump to the crankcase and the four nuts securing the sump to the timing cover. The sump can now be removed.

**REMOVE FLOATING SUCTION FILTER AND OIL TRAY.**

Remove split pin and withdraw floating filter from oil pump extension. Unscrew the three set screws securing the oil tray to the front and centre main bearing caps and remove tray.

**REMOVE PISTONS AND CONNECTING RODS.**

As the pistons will not pass the crankshaft it will be necessary to withdraw the pistons and connecting rods from the top. The connecting rod bolts may, however, have to be removed to enable the big end to pass through the bore. Proceed as follows:—

Remove the split pins from the connecting rod bolt nuts and unscrew nuts. Remove the connecting rod cap, noting that the corresponding cylinder numbers on the connecting rod and cap are together.

Remove the connecting rod bolts and withdraw the piston and connecting rod from top of cylinder block.

**Note.** Split skirt pistons **MUST** be fitted with the split opposite to the thrust side, that is, with the split on the left-hand or exhaust side of the engine. On initial assembly the cylinder number on the big end of the connecting rod is also on this side.

On initial assembly solid skirt pistons are fitted so that the cylinder number on the big end of the connecting rod is on the left-hand or exhaust side of the engine.

**REMOVE CLUTCH AND FLYWHEEL.** Unscrew the set screws securing the flange of clutch cover to flywheel and remove clutch assembly. Note the balance marks "B" stamped on the clutch cover and on the periphery of the flywheel. (Plate B.13.)

Knock back the tabs of locking plate securing the flywheel bolts. Unscrew the flywheel bolts and remove the locking plate. Remove flywheel from crankshaft flange.

**REMOVE TIMING COVER. (MK. VII.)** Remove the set screws securing the timing cover to front face of cylinder block, noting the distance piece behind the dynamo adjusting link. Remove the timing cover, noting that the cover is located to the cylinder block by two dowels.

**REMOVE TIMING COVER. (XK 120.)** Unscrew the four nuts securing the engine bearer plate to the timing cover and remove bearer plate.

Remove the set screws securing the timing cover to front face of cylinder block. Remove the timing cover, noting that the cover is located to the cylinder block by two dowels.

**REMOVE TIMING GEAR ASSEMBLY.** Remove the bottom chain tensioner blade by detaching blade and spring from the guide pin in the oil spray bracket.

Unscrew the two set screws securing the chain tensioner guide bracket and rear mounting bracket to the cylinder block. Unscrew the four long set screws securing the mounting brackets to the cylinder block.

The timing gear assembly can now be removed.

**REMOVE OIL PUMP AND DELIVERY PIPE.** Remove the delivery pipe from the oil pump and bottom face of the crankcase, noting the gasket at each end. Remove the oil pump from the front main bearing cap, noting that the two top bolts are dowel bolts. Remove coupling shaft from squared end of distributor and oil pump drive shaft.

**REMOVE DISTRIBUTOR DRIVE GEAR.** Knock back the tab washer securing the distributor drive gear nut and remove nut and washer. Tap the squared end of the distributor drive shaft through the gear, noting that the gear is keyed to the shaft. Remove the gear and thrust washer and withdraw drive shaft.

**REMOVE CRANKSHAFT.** Knock back the tab washers securing the main bearing cap bolts. Unscrew bolts and remove main bearing caps, noting the corresponding numbers stamped on the caps and bottom face of crankcase and the thrust washers fitted to recesses in the centre main bearing caps.

Remove the bottom half oil return thread cover from the top half by unscrewing the two Allen screws. Note that the two halves are located by hollow dowels.

The crankshaft can now be lifted out from the crankcase.

## ENGINE. TO ASSEMBLE (MARK VII AND XK 120 MODELS)

**GENERAL.** All references in this section to the top or bottom of the engine assume the engine to be upright, irrespective of the position of the unit when the reference is made. References to the left or right-hand side assume the engine to be upright and looking from the rear.

**FIT DISTRIBUTOR DRIVE SHAFT BUSH.** If a new bush is to be fitted, press the bush into the bore of the lug at front of cylinder block with the oil hole in the bush in line with the hole at the rear of the bore. The flange of bush is fitted to the bottom of the lug.

Ream the bush in position to a diameter of  $\frac{3}{4}$ "  $\begin{matrix} +.0005" \\ -.00025" \end{matrix}$  (19.05 mm.  $\begin{matrix} +.012 \\ -.006 \end{matrix}$  mm.)

**FIT CRANKSHAFT.** Fit the main bearing shells to the top half of the main line in the cylinder block. Lay the crankshaft in the bearing shells. Fit the bottom half of the oil return thread cover to the top half which is bolted to the cylinder block behind the rear main bearing. The two halves are located by hollow dowels and secured with Allen screws.

Fit the centre main bearing cap with a thrust washer, white metal side outwards, to the recess in each side of cap. Tighten down the cap and check the crankshaft end float, which should be .004" to .006" (.10 to .15 mm.). The thrust washers are supplied in two thicknesses, standard and .004" (.10 mm.) oversize (part numbers C.2316 and C.2316/1 respectively), and should be selected to bring the end float within the permissible limits.

**Note.** The oversize thrust washers are stamped  $+.004$ " on the steel face.

Fit the main bearing caps with the numbers stamped on the caps mating with the corresponding numbers stamped on the bottom face of the crankcase. Note that the main bearing caps are also marked "FRONT".

Fit the main bearing cap bolts and tab washers and tighten to a torque of 1,000 lbs. ins. (11.5 kg/m.).

The tab washers for the rear main bearing bolts are longer than the remainder and the plain ends should be tapped down around the bolt hole bosses.

Test the crankshaft for free rotation.

**FIT PISTONS AND CONNECTING RODS.** Turn the engine on its side. Remove the connecting rod caps and fit the pistons and connecting rods to their respective bores from the top of the cylinder block, using a suitable piston ring compressor. The cylinder number is stamped on the connecting rod and cap, No. 1 cylinder being at rear.

Semi-split skirt pistons MUST be fitted with the split opposite the thrust side, that is, with the split on the left-hand or exhaust side of the engine.

Solid skirt pistons should be fitted to the bores so that the numbers on the connecting rod and caps are on the left-hand side of the engine.

Fit the connecting rod caps to the connecting rods with the corresponding numbers together. Fit the plain washers and castellated nuts and tighten to a torque of 450 lbs. ins. (5.1 kg/m.). Secure nuts with split pins.

**FIT CRANKSHAFT GEAR AND SPROCKET.** Fit the timing gear oil spray bracket and gasket to front face of cylinder block and secure with two set screws.

Fit Woodruff key and drive on crankshaft gear with widest part of boss to the rear.

Fit Woodruff key and drive on crankshaft sprocket. Fit oil thrower washer and distance piece.

**FIT DISTRIBUTOR AND OIL PUMP DRIVE GEAR.** Turn engine until Nos. 1 and 6 pistons are on T.D.C.  
Fit the distributor drive shaft to the bush on front face of the cylinder block with the offset slot in the top of shaft parallel to the centre line of the cylinder block. Fit the thrust washer and drive gear to the drive shaft, noting the gear is keyed to the shaft.

Fit the pegged tab washer with the peg in the keyway of the drive gear.

Fully tighten nut and secure with tab washer. Check end float of shaft which should be .006 to .011 (.15 to .30 mm.).

**FIT OIL PUMP AND DELIVERY PIPE.** Fit the coupling shaft between the squared end of the distributor drive shaft and the driving gear of the oil pump. Secure the oil pump to the front main bearing cap, noting that the two top bolts are dowel bolts.

Fit the oil delivery pipe from the oil pump to the bottom face of the crankcase with a gasket at each end.

**FIT OIL TRAY AND FLOATING SUCTION FILTER.**

Fit oil tray to front and centre main bearing caps with three set screws and shakeproof washers. Insert the end of the floating filter pipe into the extension of the oil pump bottom plate with the ears of the plate on pipe one each side of the lug. Align annular groove around pipe with the hole in the extension and secure the split pin.

**TO ASSEMBLE TIMING GEAR.** Fit the eccentric shaft to the hole in front mounting bracket. Insert the spring and locking plunger for the serrated plate to the right-hand hole in the front mounting bracket. (Early engines—two springs and plungers.) Fit serrated plate and secure with shakeproof washer and nut. Fit idler sprocket (21 teeth) to the eccentric shaft.

Fit the two intermediate sprockets (20 and 28 teeth) to their shaft with the larger sprocket forward and press the shaft through lower central hole in rear mounting bracket. Secure with circlip at rear of bracket.

Fit the top timing chain (shorter chain) to the small intermediate sprocket and the bottom timing chain (longer chain) to the large intermediate sprocket.

Fit the guide bracket for chain tensioner to the bottom of rear mounting bracket with two screwdriver slotted set screws and shakeproof washers.

Loop the top run of upper timing chain under the idler sprocket and offer up the front mounting bracket to the rear mounting bracket with the two chain dampers interposed between the brackets.

Pass the four securing bolts through the holes in the brackets and chain dampers, noting that shakeproof washers are fitted under the bolt heads. Secure the two mounting brackets together with four stud nuts and shakeproof washers.

**FIT TIMING GEAR.** Turn the engine upside down. Fit the chain damper and bracket to the front face of the cylinder block with two set screws and shakeproof washers.

Turn the timing gear assembly upside down and offer it up to the cylinder block. Loop the bottom timing chain over the crankshaft sprocket and secure the mounting brackets to the front face of the cylinder block with the four long securing bolts and the two set screws retaining the chain tensioner guide bracket. Do not fully tighten the guide bracket set screws until the four main securing bolts are tight.

Fit the timing chain tensioner with one end of the blade over the guide pin in the oil spray bracket and the other against the inside face of the tensioner guide bracket. Ensure that the tensioner spring is properly located in the pin grooves at each end, and the tensioner blade is in line with the run of the chain.

**FIT TIMING COVER.** Fit the semi-circular oil seal to the recess in the bottom face of timing cover, ensuring that seal is well bedded in its groove and that the ends are flush with the joint face of the cover.

Fit the timing cover gasket with good quality jointing compound and secure the timing cover to the front face of the cylinder block with the securing bolts. Do not forget to fit the dynamo adjusting link and distance piece, with the distance piece interposed between the link and the timing cover.

**FIT OIL SUMP.** Fit the sump gasket to the bottom face of the crankcase and the cork seal to the groove in the oil return thread cover. Fit the semi-circular oil seal to the recess at the front end of the sump, ensuring that the seal is well bedded in its groove and that the ends are flush with the joint face of the sump.

Fit the sump to the crankcase and secure with the twenty-six set screws, four nuts and spring washers.

**FIT FLYWHEEL AND CLUTCH.** Turn the engine upright. Check that the crankshaft flange and the holes for the flywheel bolts and dowels are free from burrs.

Turn the engine until Nos. 1 and 6 pistons are on T.D.C. and fit the flywheel to the crankshaft flange so that the "B" stamped on the periphery of the flywheel is at approximately the B.D.C. position when the dowel and bolt holes are in line. (This will ensure that the balance mark "B" on the flywheel is in line with the balance mark on the crankshaft which is a group of letters stamped on the crank throw just forward of the rear main journal.)



Tap the two mushroom-headed dowels into position, fit the locking plate and flywheel securing set screws. Tighten the set screws to a torque of 800 lbs. ins. (9.2 kg/m.) and secure with the locking plate tabs. Assemble the clutch driven plate to the flywheel, noting that one side of the plate is marked "Flywheel Side". Centralise the driven plate by means of a dummy shaft which fits the splined bore of the driven plate and the spigot bush in the crankshaft. (A constant pinion shaft may be used for this purpose.) Fit clutch cover assembly so that the "B" stamped adjacent to one of the dowel holes coincides with the "B" stamped on the periphery of the flywheel. Secure the clutch assembly with the six set screws and spring washers, tightening the screws a turn at a time by diagonal selection. Remove the dummy shaft.

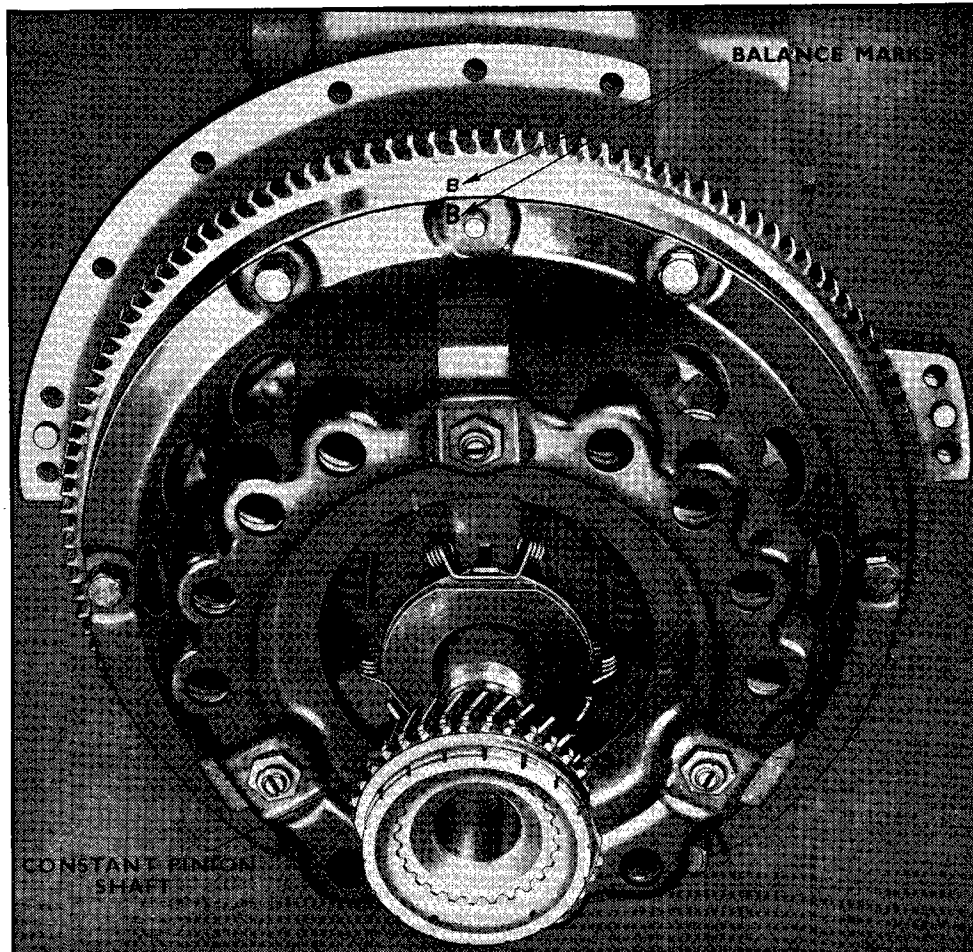


PLATE B.13. CLUTCH AND FLYWHEEL BALANCE MARKS.

**FIT CYLINDER HEAD.** Before refitting the cylinder head it is important to observe that if the camshafts are out of phase with piston position fouling may take place between inlet valves and pistons. It is, therefore, essential to adhere to the following procedure before fitting the cylinder head:—

Turn the camshafts, one at a time, until the keyways cut in the front flange of the shafts are vertical to the camshaft housing face and accurately position by engaging valve timing gauge. Key of gauge locates in keyway of camshaft and bottom face of gauge with face of camshaft housing on cylinder head. (Plate B.20.)

Turn No. 6 (front) piston to top dead centre position with the widest portion of the distributor drive shaft offset towards the cylinder block. Line up the arrow on the flywheel with the datum line cut on the cylinder block, which will exactly position No. 6 piston at top dead centre. (Plate B.17.)

Do NOT turn the engine over until the camshaft sprockets have been connected to the camshafts. Fit the two camshaft sprockets complete with adjuster plates and circlips to the top timing chain and enter the guide pins in the slots in the front mounting bracket. Temporarily retain the guide pins in the innermost position with two nuts. (The  $\frac{3}{8}$ " A.N.F. nuts securing the exhaust pipes to exhaust manifold flanges can be used for this purpose.) Lightly smear both sides of the cylinder head gasket with jointing compound.

Fit the cylinder head gasket, taking care that the side marked "TOP" is uppermost. Fit the cylinder head complete with manifolds and carburetters to the cylinder block. (Note that the second cylinder head stud from the front on the left-hand side is a dowel stud.)

Fit the sparking plug lead conduit to the 3rd and 6th stud on the right-hand side. Fit plain washers to these and the two front stud positions and "D" washers to the remaining studs. Tighten the fourteen large cylinder head dome nuts a part of a turn at a time to a torque of 650 lbs. ins. (7.5 kg./m.) in the order shown in Plate B.12. Also tighten the six nuts securing the front end of the cylinder head.

**Note.** When tightening down the cylinder head nuts it is advisable to place a thin steel plate between the flat edge of the "D" washers and the cylinder head to avoid damage to the head by the sharp corners of the washers.

**VALVE TIMING.** Check that No. 6 (front) piston is exactly in the T.D.C. position with the widest side of the distributor drive shaft offset towards the cylinder block.

It is important to tension the timing chain before attempting to check or set the valve timing. Proceed as follows:—

Through the breather aperture in the front of the cylinder head slacken the lock nut securing the serrated plate. (Plate B.18.)

With the camshaft sprocket on the flanges of the camshafts, tension chain by pressing locking plunger inwards and rotating serrated plate by two holes in an anti-clockwise direction. Turn the engine each way slightly and recheck the chain tension.

With the correct tension there should be slight flexibility on both outer sides of the chain below the camshaft sprockets, that is, the chain must not be dead tight. Release locking plunger and securely tighten lock nut. Tap the camshaft sprockets off the flanges of the camshafts.

Accurately position the camshaft with the valve timing gauge, and check that the T.D.C. marks are in exact alignment. (Plates B.20 and B.17.)

Withdraw the circlips retaining the adjusting plates to the camshaft sprockets and pull the adjusting plates forward until the serrations disengage. Replace the sprockets on to the flanges of camshafts and align the two holes in the adjuster plate with the two tapped holes in each camshaft flange. Engage the serrations of the adjuster plates with the serrations of the sprockets.

**Note.** It is most important that the holes are in exact alignment, otherwise when the set screws are fitted the camshafts will be moved out of position. If difficulty is experienced in aligning the holes exactly, the adjuster plates should be turned through 180°, which, due to the construction of the plate, will facilitate alignment. Fit the circlips to the sprockets and one set screw to the accessible hole in each adjuster plate. Turn the engine until the other two holes are accessible and fit the two remaining set screws.

Recheck timing, using the valve timing gauge. Secure the four set screws for camshaft sprockets with new lock wire.

Check the top timing chain tension and readjust if necessary.

**FIT CYLINDER HEAD OIL FEED PIPE AND OIL FILTER.** Fit the cylinder head oil feed pipe from the tapped hole in the main oil gallery to the two tapped holes in the rear of the cylinder head. Secure the pipe with the three banjo bolts with a "Corro" washer fitted to both sides of each banjo.

**Important Note.** Early engines were fitted with banjo bolts which had an annular groove around the shank. These bolts fitted into banjos which had a plain internal bore.

Later engines have banjo bolts with no annular groove, which fit into banjos in which an annular groove is machined.

It is, therefore, most important that the latest type banjo bolts (Part No. C.5846) are not fitted to pipes with early type banjos (Part No. C.2333), otherwise the oil supply to the camshafts will be cut off or greatly restricted.

Fit the oil filter to the cylinder block with the four set screws and copper washers, noting that the clip for the carburettor overflow pipes is fitted to the top left-hand bolt. A new gasket must always be fitted between the filter and cylinder block.

**FIT CRANKSHAFT DAMPER AND PULLEY.** Fit a Woodruff key to the crankshaft and to the split cone which secures the crankshaft damper. Fit the split cone to the crankshaft with widest end towards the timing cover. Fit the damper and pulley to the cone and secure with the flat washer chamfered side outwards and starter jaw. Retain the starter jaw with the locking washer and secure with two set screws. Secure set screws with the tabs at each end of the locking washer.

**FIT WATER PUMP AND FAN.** Fit the water pump to the timing cover with a new gasket and secure with six bolts, three nuts and spring washers. In the case of a five-bladed type of fan, do not assemble the fan and pulley to the water pump until the pump has been fitted to the timing cover.

**FIT FAN. (Five-bladed Type.)** Fit the fan and pulley to the fan hub with the five set screws, ensuring that the tab washer fitted under the fan greaser is engaged with the slot in the front face of the pulley.

**FIT DYNAMO AND FAN BELT.** Slacken the set screw securing the dynamo adjusting link to the timing cover and swing link upwards.

Fit the fan belt to crankshaft and fan pulleys. Offer up dynamo and engage fan belt with pulley. Secure dynamo with the two mounting bolts and the adjusting set screw. Before finally tightening, adjust fan belt tension by pulling dynamo outwards until the belt can be flexed approximately  $\frac{1}{2}$ " (12 mm.) either way in the middle of vertical run. Tighten adjusting set screw and the two dynamo mounting bolts. **Note.** Undue tension will create heavy wear of belt, pulleys, fan and dynamo bearings.

**FIT DISTRIBUTOR AND SPARKING PLUGS.** Fit cork oil seal to the recess at the top of the hole for the distributor. Secure the distributor clamping plate to the cylinder block with the set screw. Slacken the clamping plate bolt. Turn the engine until No. 6 piston (front) is  $5^\circ$  before T.D.C. (two flywheel teeth approx.) on the compression stroke, that is, with the valves on No. 1 cylinder (rear) "rocking". The slot in distributor drive shaft should now be parallel, with the widest part of distributor shaft drive offset, to the centre line of the cylinder block.

Set the distributor micrometer adjustment in the centre of the scale.

Engage the distributor with the drive shaft when the rotor arm should be pointing forward, that is, opposite No. 6 cylinder segment in the distributor cover. Rotate the distributor slightly until the contact breaker points are just breaking and tighten clamp plate bolt. (Make final ignition timing adjustment on road test.)

Fit the vacuum advance pipe from the distributor to the union underneath the front carburettor.

Fit the distributor cover and secure with the two spring clips. Fit the sparking plugs with new copper washers and attach high tension leads.

**FIT CAMSHAFT COVERS.** Fit each camshaft cover to the cylinder head using a new gasket. Fit the eight copper washers and dome nuts to the cover retaining studs but do not tighten fully.

Fit the revolution counter adapter and flanged plug to the rear of left-hand and right-hand camshaft covers respectively with the rubber sealing rings seated in the recesses provided. Fit two new half gaskets to the lower halves of the adapter and sealing plug and secure with the set screws and copper washers. Tighten fully the dome nuts securing the camshaft covers.

**FIT FRONT BEARER PLATE. (XK 120.)** Fit the front bearer plate to the four studs protruding through the timing cover and secure with four nuts and spring washers.

**FIT STARTER.** Fit the starter motor to the clutch housing with the two bolts, nuts and spring washers. (Fit the earth strap under the head of the top bolt, ensuring that the face of the starter bolt hole boss is clean.)

**FIT GEARBOX.** Fit the gearbox and clutch housing to the rear of the crankcase with nine set screws and shakeproof washers.

Fit the support brackets to each side, at the bottom face of the crankcase with two bolts, nuts and spring washers, and to the clutch housing with three bolts, nuts and shakeproof washers. (On the Mark VII model the rear engine mounting on each side is also secured with these three bolts.)

**ENGINE. TO OVERHAUL**

The dismantling of components when the engine is fitted to the chassis is dealt with in subsequent pages bearing the sub-titles "Components. To Remove and Refit" and the following comments assume the engine unit to be removed and completely dismantled as described in "Engine. To Dismantle and Reassemble". (Page B.25.)

Thoroughly clean and degrease all parts, preferably by immersing in a degreaser. The importance of absolute cleanliness during examination and subsequent rebuilding cannot be over-stressed. Use only genuine factory spares.

**CAMSHAFTS.** It is unlikely, except after very high mileages, to find wear in the camshafts and camshaft bearings. The camshaft bearings are of the precision shell type and under no circumstances should these be hand scraped or the bearing caps filed. Undersize bearings are not supplied.

**Camshaft Data:**

Number of journals	.. .. .	Four per shaft
Journal diameter	.. .. .	1.0" —.001" (25.4 mm. —.025 mm.) — .0005" (— .013 mm.)
Journal length	.. .. .	1 <sup>5</sup> / <sub>16</sub> " (33.34 mm.) 1 <sup>1</sup> / <sub>2</sub> " (38.1 mm.) Front journal
Thrust taken	.. .. .	Front end
Number of bearings	.. .. .	Four per shaft (eight half bearings)
Type of bearing	.. .. .	White metal steel-backed shell
Diameter clearance	.. .. .	.0005" to .002" (.013 to .05 mm.)
Permissible end float	.. .. .	.0045" to .008" (.11 to .20 mm.)
Tightening torque—Bearing cap nuts..	.. .. .	175 lbs. ins. (2.0 kg/m.)

**CARBURETTERS.** Reconditioned carburetters are available from S.U. agents. For the overseas agents of the S.U. Carburetter Co. Ltd., see Section Q. Detailed servicing instructions are, however, given in Section C, "Carburetters and Fuel System".

**CLUTCH.** Factory reconditioned clutch assemblies are available on an exchange basis and it is recommended that this service be utilised whenever overhauls are undertaken. Detail servicing instructions are, however, given in Section E, "Clutch and Flywheel". If a reconditioned assembly is not fitted, ensure that the driven plate friction lining is not worn and is free from grease or oil. Examine driven plate damper springs and pressure plate springs for fatigue or breakage. Replace graphite release bearing if damaged or worn.

**CONNECTING RODS.** If connecting rods have been in use for a very high mileage, or if bearing failure has been experienced, it is desirable to renew the rod(s) owing to the possibility that they may have fatigued.

The connecting rods fitted to an engine should not vary one with another by more than 2 drams (3.5 grammes), and the alignment checked on an approved connecting rod alignment jig. Correct any misalignment as necessary. The big end bearings are of the precision shell type and under no circumstances should these be hand scraped or the bearing caps filed.

The small ends are fitted with steel-backed phosphor bronze bushes which are a press fit in the connecting rod. After fitting, the bush should be reamed or honed to a diameter of .875" to .8752" (22.225 to 22.23 mm.). Always use new connecting bolts and nuts at overhauls.

**Connecting Rod Data:**

Length, centre to centre .. .. .	7.75" (196.85 mm.)
Big end—Bearing type .. .. .	White metal, steel-backed shell
Bore for big end bearing .. .. .	2.2335" to 2.233" (56.73 to 56.72 mm.)
Big end—Width .. .. .	1 <sup>3</sup> / <sub>16</sub> " —.006" (30.16 —.15 mm.) — .008" (— .20 mm.)
Big end—Diameter clearance .. .. .	.001" to .0025" (.03 to .06 mm.)
Con rod—End clearance .. .. .	.006" to .0087" (.15 to .22 mm.)
Bore for small end bush .. .. .	1.000" ±.0005" (25.4 ±.013 mm.)
Small end bush—Type .. .. .	Phosphor bronze—steel backed
Small end—Width .. .. .	1 <sup>5</sup> / <sub>16</sub> " (27.4 mm.)
Small end bush—Bore diameter .. .. .	.875" to .8752" (22.225 to 22.23 mm.)
Tightening torque—Con rod bolts .. .. .	450 lbs. ins. (5.1 kg/m.)

**CRANKSHAFT.** Regrinding of the crankshaft journals is generally recommended when wear or ovality in excess of .003" (.08 mm.) is found. Factory reconditioned crankshafts are available on an exchange basis, subject to the existing crankshaft being fit for satisfactory reconditioning, with undersize main and big end bearings —.020" (.51 mm.), —.030" (.76 mm.) and —.040" (1.02 mm.).

Grinding beyond the limits of .040" (1.02 mm.) is not recommended and under such circumstances a new crankshaft should be obtained.

New crankshaft thrust washers should be fitted, these being in two halves located in recesses in the centre main bearing cap.

Ensure that oil passages in the crankshaft are clear and perfectly clean before assembly.

**Crankshaft Data:**

Number of main bearings .. .. .	Seven
Main bearing—Type .. .. .	White metal, steel-backed shell
Journal diameter .. .. .	2.75" to 2.7495" (69.85 to 69.84 mm.)
Journal length:	
Front .. .. .	1 <sup>11</sup> / <sub>16</sub> " ±.005" (42.86 ±.13 mm.)
Centre .. .. .	1 <sup>3</sup> / <sub>4</sub> " +.0005" (44.45 +.013 mm.) +.001" (+.025 mm.)
Rear .. .. .	1 <sup>7</sup> / <sub>8</sub> " (47.63 mm.)
Intermediate .. .. .	1 <sup>7</sup> / <sub>32</sub> " ±.002" (30.96 ±.05 mm.)
Thrust taken .. .. .	Centre bearing thrust washers
Thrust washer—Thicknesses .. .. .	.091" to .093" (2.31 to 2.36 mm.) .095" to .097" (2.41 to 2.46 mm.)
End clearance .. .. .	.004" to .006" (.10 to .15 mm.)
Main bearing—Length:	
Front .. .. .	1 <sup>1</sup> / <sub>2</sub> " ±.005" (38.1 ±.13 mm.)
Centre .. .. .	1 <sup>1</sup> / <sub>2</sub> " ±.005" (38.1 ±.13 mm.)
Rear .. .. .	1 <sup>1</sup> / <sub>2</sub> " ±.005" (38.1 ±.13 mm.)
Intermediate .. .. .	1" ±.005" (25.4 ±.13 mm.)
Diameter clearance .. .. .	.0015" to .003" (.04 to .08 mm.)

Crankpin—Diameter	.. .. .	2.086" +.0006" (52.98 ±.015 mm.)
		— .0000" (— .00 mm.)
Length	.. .. .	1 <sup>3</sup> / <sub>16</sub> " +.0007" (30.16 +.018 mm.)
		— .0002" (— .006 mm.)
Regrind undersize	.. .. .	.020" (.51 mm.)
		.030" (.76 mm.)
		.040" (1.02 mm.)
Minimum diameter for regrind	.. .. .	— .040" (1.02 mm.)
Tightening torque—Main bearing bolts	.. .. .	1,000 lb. ins. (11.5 kg/m.)

**CRANKSHAFT DAMPER.** Examine for wear on pulley flanges and deterioration of the damper rubber. If wear is noticeable, renew the assembly.

**CYLINDER BLOCK.** Check the top face of the cylinder block for truth. Check that the main bearing caps have not been filed and that the bores for the main bearings are in alignment. If the caps have been filed or if there is misalignment of the bearing housings the caps must be remachined and the bearing housings line bored.

Reboring is normally recommended when the bore wear exceeds .006" (.15 mm.). Reboring beyond the limit of .030" (.76 mm.) is not recommended and when the bores will not clean out at .030" (.76 mm.) liners and standard size pistons should be fitted.

Liners, standard pistons and the following oversize pistons are available: +.005" (.13 mm.), +.010" (.25 mm.), +.015" (.38 mm.), +.020" (.51 mm.) and +.030" (.76 mm.).

Following reboring the blanking plugs in the main oil gallery should be removed and the cylinder block oilways and the crankcase interior thoroughly cleaned. After cleaning, paint the crankcase interior with heat and oil resisting paint.

**Cylinder Block Data:**

Material	.. .. .	Chromium iron
Cylinder bores—Nominal	.. .. .	83 mm. (3.2677")
Maximum rebore size	.. .. .	+ .030" (.76 mm.)
Bore size for fitting liners	.. .. .	3.392" to 3.391" (86.16 to 86.13 mm.)
Outside diameter of liner	.. .. .	3.3945" to 3.3955" (86.22 to 86.25 mm.)
Interference fit	.. .. .	.0025" to .0045" (.06 to .11 mm.)
Overall length of liner (when fitted)	.. .. .	6 <sup>31</sup> / <sub>32</sub> " (17.7 cm.)
Outside diameter of lead-in	.. .. .	3.390" to 3.391" (86.1 to 86.13 mm.)
Size of bore honed after assembly into block—		
Nominal	.. .. .	83 mm. (3.2677")
Main line bore for main bearings	.. .. .	2.9165" +.0005" (74.08 +.013 mm.)
		— .0000" (— .000 mm.)

**CYLINDER HEAD.** Check the bottom face of the cylinder head for truth. Remove all traces of carbon and deposits from the combustion chambers and the induction and exhaust ports. Remove any pitting from the valve seats using valve seat grinding equipment.

If it is required to replace valve guides, valve seat inserts or tappet guides, only the special replacements parts should be used and fitted in accordance with the instructions given in the appropriate paragraphs of this section sub-title.

**Cylinder Head Data:**

Material	.. .. .	Aluminium alloy
Valve seat angle—Inlet	.. .. .	30°
Exhaust	.. .. .	45°
Valve seat width—Inlet	.. .. .	<sup>3</sup> / <sub>32</sub> " (2.4 mm.) nominal
Exhaust	.. .. .	<sup>5</sup> / <sub>32</sub> " (4.0 mm.) nominal
Port size—Inlet	.. .. .	1 <sup>3</sup> / <sub>8</sub> " diameter (34.9 mm.)
Exhaust	.. .. .	1 <sup>1</sup> / <sub>4</sub> " diameter (31.75 mm.)
Tightening torque—Cylinder head nuts	.. .. .	650 lb. ins. (7.5 kg/m.)

**DYNAMO AND DISTRIBUTOR.** Factory reconditioned dynamos and distributors are available on an exchange basis and it is recommended that this service is utilised. Detailed servicing instructions are, however, given in Section P, "Electrical".

**FAN BELT AND PULLEYS.** Examine the fan belt for wear or deterioration and renew if necessary. Examine the crankshaft, fan and dynamo pulleys for signs of wear and renew if necessary. The drive should be taken on the "V" faces of the pulleys, therefore, renew any pulleys in which a new fan belt bottoms.

If a new pulley and hub (integral) is to be fitted with the six-bladed type of fan, the fan should be bolted to the hub, with a clean front bearing fitted, and statically balanced as an assembly by mounting on a mandril and setting up on parallel knife edges.

Balancing is effected by varying the position of the semi-circular balance piece(s) which are retained by the set screws securing the fan to the fan hub. (Plate B.25.)

**FLYWHEEL.** If the starter gear is badly worn a new flywheel should be used, since the starter gear teeth are integral with the flywheel, and in this case it will be necessary to balance the flywheel and clutch as an assembly. Examine the porous bronze bush fitted to the spigot of the crankshaft boss and if this shows signs of wear withdraw the bush which is a press fit in the spigot.

If a new flywheel is being fitted, check the flywheel and clutch balance as an assembly by mounting on a mandril and setting up on parallel knife edges. Mark the relative position of clutch and flywheel. If necessary, remove the clutch, and drill  $\frac{3}{8}$ " (9.5 mm.) balance holes not more than  $\frac{1}{2}$ " (12.7 mm.) deep in the flywheel on the same pitch circle as the clutch cover dowels.

Tightening torque—Flywheel bolts .. .. . 800 lb. ins. (9.2 kg/m.)

**FUEL PUMP.** Factory reconditioned fuel pumps are available on an exchange basis and it is recommended that this service be utilised. Detail servicing instructions are, however, given in Section C, "Carburettors and Fuel System".

**GUDGEON PINS.** Pistons are supplied complete with gudgeon pins which have been selectively assembled and are, therefore, not interchangeable one with another.

Gudgeon pins fitted to "Brico" semi-split skirt pistons are a light tap fit in the piston and a palm push fit in the connecting rod bush at 68° F. (20° C.).

Gudgeon pins fitted to "Aerolite" solid skirt pistons are a palm push fit in the piston and a thumb push fit in the connecting rod bush at 68° F. (20° C.).

Removal and refitting should be effected by immersing the piston, gudgeon pin and connecting rod little end in a bath of warm oil. When the piston and little end have reached a sufficient temperature the gudgeon pin can be moved into position. Location of the gudgeon pin is maintained by circlips in the piston. Always use new circlips on assembly.

When assembling engine, centralise small end of connecting rod between gudgeon pin bosses in piston and ensure that connecting rod mates up with crankshaft journal without any horizontal pressure being exerted on the rod.

**Gudgeon Pin Data:**

	"Aerolite"	"Brico"
Type .. .. .	Fully floating	Fully floating
Length .. .. .	2.850" $\pm$ .005" (72.39 $\pm$ .13 mm.) +.000" (+.00 mm.)	2.845" to 2.840" (72.26 to 72.14 mm.)
Inner diameter .. .. .	$\frac{37}{64}$ " $\pm$ .008" (14.68 $\pm$ .20 mm.) $\pm$ .000" ( $\pm$ .00 mm.)	$\frac{5}{8}$ " (15.87 mm.)
Outer diameter .. .. .	.87510" to .87485" (22.227 to 22.221 mm.)	.8752" to .8750" (22.230 to 22.225 mm.)

**LUBRICATING SYSTEM.** When overhauling the engine, the blanking plugs should be removed from the main oil gallery and all the cylinder block oilways thoroughly cleaned. The oil filter should also be dismantled and cleaned and a new element fitted.

Examine the oil pump for wear and, if necessary, fit a reconditioned oil pump or renew the worn parts. The diameter clearance between the sides of the gears and the pump body should be .0045" to .007" (.11 to .18 mm.). The end clearance between the gears and the bottom face of the pump body, without the gasket, should be .0015" to .0035" (.04 to .09 mm.).

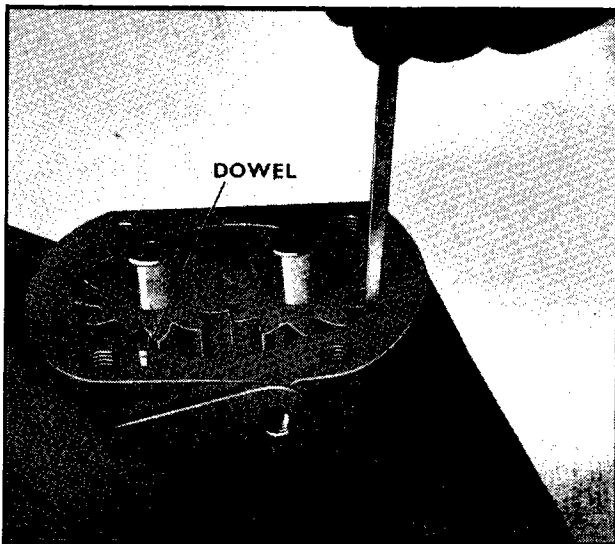


PLATE B.14. OIL PUMP GEARS  
(Checking diametrical clearance).

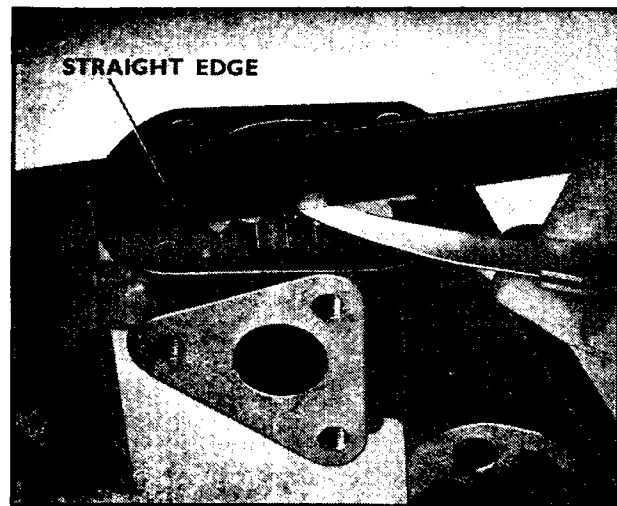


PLATE B.15. OIL PUMP GEARS  
(Checking end clearance).

Normal oil pressure—40-45 lb. per sq. in. at 2,000 r.p.m. at normal running temperature.

**Lubricating System Data:**

Type .. .. .	Forced feed
Oil pressure (hot) .. .. .	40-45 lb./sq. in. at 2,000 r.p.m. at normal running temperature
Oil pump—Type.. .. .	Gear, floating pick-up
Oil pump gears—Diameter clearance.. .. .	.0045" to .007" (.11 to .18 mm.)
End clearance (without gasket) .. .. .	.0015" to .0035" (.04 to .09 mm.)
Oil pressure release valve spring:	
Free length .. .. .	2 <sup>3</sup> / <sub>32</sub> " (53.18 mm.)
Fitted length .. .. .	1.5" (38.1 mm.)
Diameter of wire, 18 s.w.g. .. .. .	.048" (1.22 mm.)
Number of free coils .. .. .	14



**PISTON AND PISTON RINGS.** Either "Brico" or "Aerolite" 7 : 1 (flat crown) or 8 : 1 (domed crown) compression ratio pistons are fitted. The suffix 7 or 8 after the engine number indicates the compression ratio.

"Brico" pistons are of the semi-split oval skirt type with fully floating gudgeon pins retained by circlips and are interchangeable in sets with the "Aerolite" type.

"Aerolite" pistons are of the solid oval skirt type with fully floating gudgeon pins retained by circlips and are interchangeable in sets with the "Brico" type.

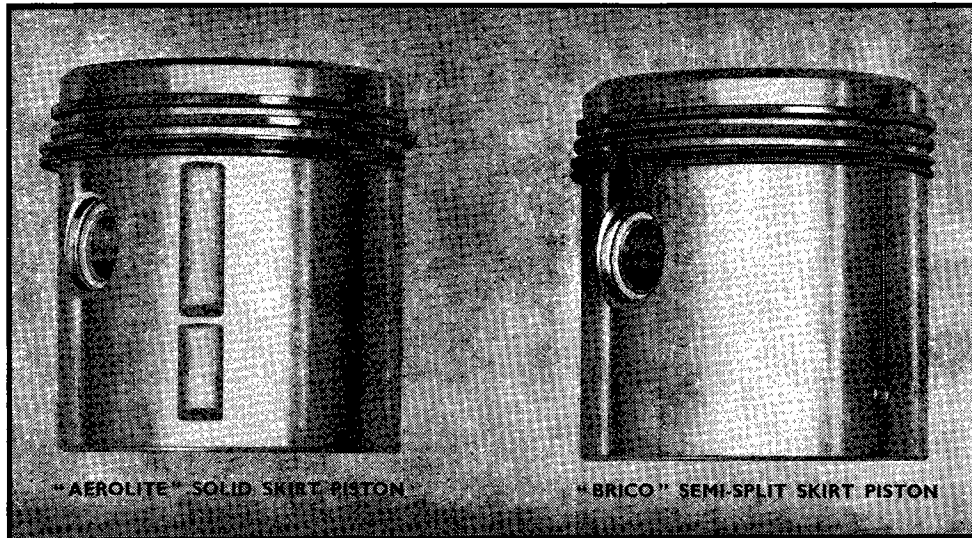


PLATE B.16. PISTON TYPES  
(7 to 1 compression ratio pistons illustrated).

The pistons fitted to an engine should not vary one with another by more than 2 drams (3.5 grammes).

The following selective piston sizes are available from standard size stock. When ordering standard size pistons the identification letter of the selective size required should be clearly stated. Standard size pistons are stamped on the crown with the identification letter and the cylinder block is also stamped on the top face adjacent to the bores.

Grade Identification Letter:	For cylinder bore size:
F .. .. .	3.2673" to 3.2676" (82.989 to 82.997 mm.)
G .. .. .	3.2677" to 3.2680" (82.999 to 83.007 mm.)
H .. .. .	3.2681" to 3.2684" (83.009 to 83.017 mm.)
J .. .. .	3.2685" to 3.2688" (83.020 to 83.027 mm.)
K .. .. .	3.2689" to 3.2692" (83.030 to 83.037 mm.)

Pistons are available in the following oversizes: +.005 (.13 mm.), +.010" (.25 mm.), +.015" (.38 mm.), +.020" (.51 mm.), +.030" (.76 mm.).

**Piston and Piston Ring Data:**

Make .. .. .	“Brico”	“Aerolite”
Type .. .. .	Semi-split skirt	Solid skirt
Piston:		
Skirt clearance .. ..	.0015" to .0021" (.04 to .05 mm.) (Measured at bottom of skirt at 90° to gudgeon pin axis)	.001" to .0016" (.025 to .04 mm.) (Measured at bottom of skirt at 90° to gudgeon pin axis)
Gudgeon pin bore .. ..	.875" ±.0001" (22.225 ±.0025 mm.)	.875" +.0003" (22.225 +.007 mm.) +.00005" (+.001 mm.)
Compression height:		
7 : 1 Compression Ratio ..	1.695" (43.05 mm.)	1.695" (43.05 mm.)
8 : 1 Compression Ratio ..	2.168" (55.07 mm.)	2.168" (55.07 mm.)
Piston rings—Number:		
Compression .. .. .	2	2
Scraper .. .. .	1	1
Piston rings—Width:		
Compression .. .. .	.0777" to .0787" (1.97 to 2.00 mm.)	.0777" to .0787" (1.97 to 2.00 mm.)
Scraper .. .. .	.155" to .156" (3.94 to 3.96 mm.)	.155" to .156" (3.94 to 3.96 mm.)
Piston rings—Thickness:		
Compression .. .. .	.124" to .130" (3.15 to 3.30 mm.)	.124" to .130" (3.15 to 3.30 mm.)
Scraper .. .. .	.119" to .127" (3.02 to 3.23 mm.)	.119" to .127" (3.02 to 3.23 mm.)
Piston rings—Side clearance in groove:		
Compression .. .. .	.001" to .003" (.02 to .07 mm.)	.001" to .003" (.02 to .07 mm.)
Scraper .. .. .	.001" to .003" (.02 to .07 mm.)	.001" to .003" (.02 to .07 mm.)
Piston rings—Gap when fitted to cylinder bore:		
Compression .. .. .	.015" to .020" (.38 to .51 mm.)	.015" to .020" (.38 to .51 mm.)
Scraper .. .. .	.011" to .016" (.28 to .41 mm.)	.011" to .016" (.28 to .41 mm.)

**SPARKING PLUGS.** It is recommended that new sparking plugs be fitted at overhauls. The recommended types are Champion N.A.8. for 8 : 1 compression ratio engines and Champion L.10S for 7 : 1 compression ratio engines. Gap setting—.022" (.56 mm.). If existing plugs are used these should be cleaned by sand blasting and testing on plug cleaning and testing equipment.

**STARTER MOTOR.** Factory reconditioned starters are available on an exchange basis and it is recommended that this service is utilised. Detailed servicing instructions are, however, given in Section P, “Electrical”.

**TAPPETS AND TAPPET GUIDES.** Examine the tappets and tappet guides for signs of wear. The diameter clearance between the tappet and tappet guide should be .0005" to .0022" (.01 to .56 mm.).  
If it is required to replace worn tappet guides, only the recommended replacement parts should be used and fitted in accordance with the instructions given below.

**ADJUSTING PADS.** Examine adjusting pads for signs of indentation. Renew if necessary with appropriate size when making valve clearance adjustment on reassembly.

Adjusting pads are available in a range of thicknesses rising in .001" (.03 mm.) sizes from .085" to .103" (2.16 to 2.61 mm.) and are etched on the surface with the letter “A” to “S”, each letter indicating an increase in size of .001" (.03 mm.)

**TAPPET GUIDE REPLACEMENT.** If it is required to replace the tappet guides the following parts must be used and fitted in accordance with the instructions given below.

Replacement tappet guides .. .. . C.7262

(1) Remove old tappet guide by boring out until guide collapses. Take care not to damage the bore for the guide in cylinder head.

- (2) Carefully measure diameter of tappet guide bore in cylinder head at room temperature of 68° F. (20° C.).
- (3) Grind down the 1.643" (41.73 mm.) outside diameter of tappet guide to a diameter of .003" (.08 mm.) larger than the tappet guide bore dimension, that is, to give an interference fit of .003" (.08 mm.).
- (4) Also grind off the same amount from the reduced diameter at the bottom of tappet guide. The reduction in diameter from the adjacent diameter should be .0032" to .0042" (.08 to .11 mm.).
- (5) Heat the cylinder head in an oven for one hour from cold at a temperature of 450° F. (232° C.).
- (6) Fit tappet guide, ensuring that the lip at top of guide beds evenly in the recess.
- (7) After fitting, ream tappet guide bore to a diameter of  $1\frac{3}{8}'' +.0007''$  (34.925 +.018 mm.)  
 $-.0002''$  (-.005 mm.)

**Note.** It is essential that, when reamed, the tappet guide bore is concentric with the bore of the valve guide.

**Tappet, Tappet Guide and Adjusting Pad Data:**

Tappet—Material .. .. .	Cast iron (chilled)
Outside diameter .. .. .	1.375" $-.0015''$ (34.925 $-.038$ mm.) $-.00075''$ ( $-.019$ mm.)
Diameter clearance .. .. .	.0005" to .0022" (.01 to .56 mm.)
Tappet guide—Material .. .. .	Cast iron
Inside diameter .. .. .	1.355" to 1.357" (34.42 to 34.48 mm.) (Ream to $1\frac{3}{8}'' +.0007''$ (34.925 +.018 mm.) $-.0002''$ ( $-.005$ mm.) (when fitted to cylinder head)
Interference (shrink) fit in head .. .. .	.0023" to .0037" (.06 to .09 mm.)
	<b>XK 120</b> <b>Mark VII</b>
Tappet clearance (cold)—Inlet .. .. .	.006" (.15 mm.)                      .004" (.10 mm.)
Exhaust .. .. .	.008" (.20 mm.)                      .006" (.15 mm.)
Tappet adjusting pads—Thickness .. .. .	.085" to .103" (2.16 to 2.61 mm.) in .001" (.03 mm.) steps etched "A" to "S"

**TIMING GEAR.** If the chains show signs of stretching or wear, new ones should be fitted. If the chains are renewed it is essential also to replace the crankshaft and camshaft sprockets and the chain tensioner. If a new chain is fitted to worn sprockets, or vice versa, rapid wear of all components in the assembly will occur. Always renew the tensioner blade and spring.

When new parts are fitted to the timing gear it is necessary after reassembly to reset the valve timing as described on page B.41.

**Timing Chains and Sprockets Data:**

	Top Chain	Bottom Chain
Type .. .. .	Duplex Flat Back	Duplex Flat Back
Pitch .. .. .	$\frac{3}{8}''$ (9.5 mm.)	$\frac{3}{8}''$ (9.5 mm.)
Number of pitches .. .. .	100	82
Crankshaft sprocket—Teeth .. .. .	21	
Intermediate sprocket, outer—Teeth .. .. .	28	
Intermediate sprocket, inner—Teeth .. .. .	20	
Camshaft sprocket—Teeth .. .. .	30	
Idler sprocket .. .. .	21	

**THERMOSTAT.** Factory reconditioned thermostats are available on an exchange basis and it is recommended that a new unit is fitted when overhauls are undertaken.

**Thermostat Data:**

	XK 120		Mark VII	
	Smith's	Smith's	Smith's	British Thermostat
Commences to open .. .. .	60°-63° C.	70°-75° C.	70°-75° C.	
Fully open .. .. .	80° C.	90° C.	78° C.	
Valve lift .. .. .	$\frac{3}{8}$ " (9.5 mm.)	$\frac{3}{8}$ " (9.5 mm.)	$\frac{3}{8}$ " (9.5 mm.)	

**Note.** On the Mark VII model the Smith's thermostat is fitted to engines numbered A.1001-2000 and to A.6001 and onwards. The British Thermostat type is fitted to engines numbered A.2001-6000.

**VALVE TIMING.**

Turn the engine so that No. 6 (front) piston is exactly in the T.D.C. position (Plate B.17) on compression stroke, that is, with the distributor rotor arm opposite No. 6 cylinder segment.

It is important to tension the timing chain before attempting to check or set the valve timing. Proceed as follows:

Through the breather aperture in the front of the cylinder head slacken the lock nut securing the serrated plate. (Plate B.18.)

Tension chain by pressing locking plunger inwards and rotating serrated plate by two holes in an anti-clockwise direction. Turn the engine each way slightly and recheck the chain tension. With the correct tension there should be slight flexibility on both outer sides of the chain below the camshaft sprockets, that is, the chain must not be dead tight. Release locking plunger and securely tighten lock nut.

Remove the locking wire from the set screws securing the camshaft sprockets. Note the positions of the inaccessible set screws and turn engine until they can be removed. Remove the set screw from each sprocket and turn engine back to the T.D.C. position with No. 6 firing and remove the remaining screws. Tap the camshaft sprockets off the flanges of the camshafts.

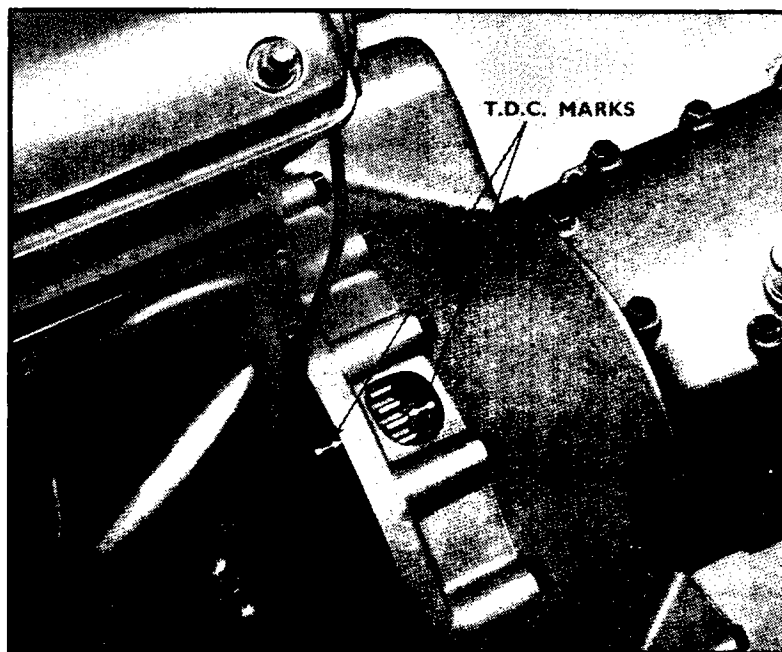


PLATE B.17. TOP DEAD CENTRE MARKS. NUMBERS 1 AND 6 PISTONS.

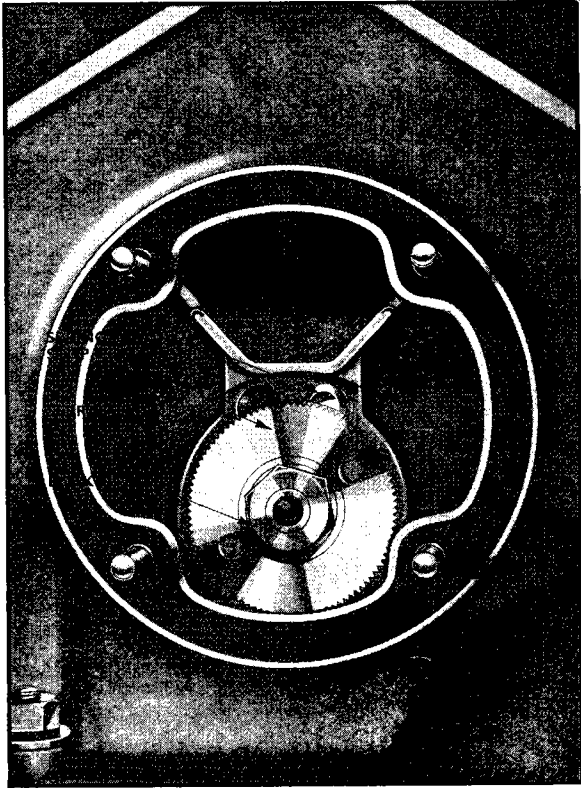


PLATE B.18. TOP TIMING CHAIN ADJUSTER PLATE.

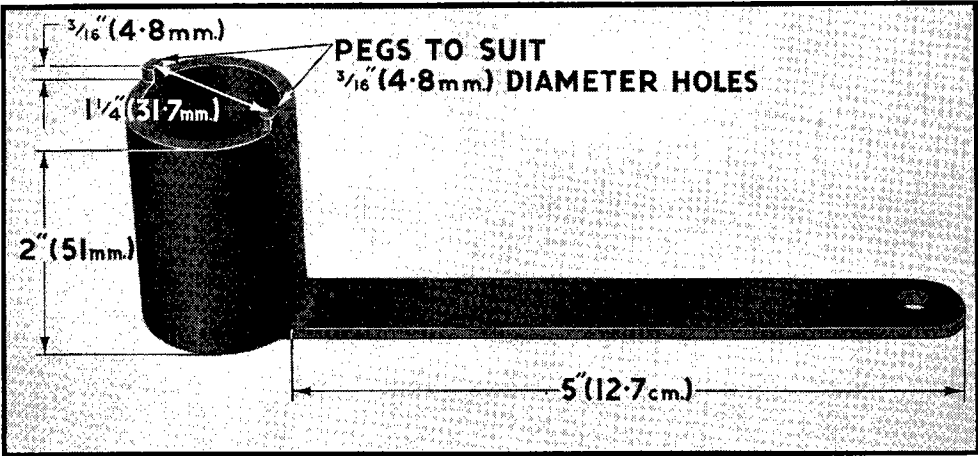


PLATE B.19. TOP TIMING CHAIN ADJUSTING TOOL (Manufacture locally).

Accurately position the camshafts with the valve timing gauge, and check that the T.D.C. marks are in exact alignment. (Plates B.20 and B.17.)



PLATE B.20. VALVE TIMING GAUGE IN POSITION  
(Ensure that gauge is seated at points indicated by arrows).

Withdraw the circlips retaining the adjusting plates to the camshaft sprockets and press the adjusting plates forward until the serrations disengage. Replace the sprockets on the flanges of camshafts and align the two holes in the adjuster plate with the two tapped holes in each camshaft flange. Engage the serrations of the adjuster plates with the serrations of the sprockets.

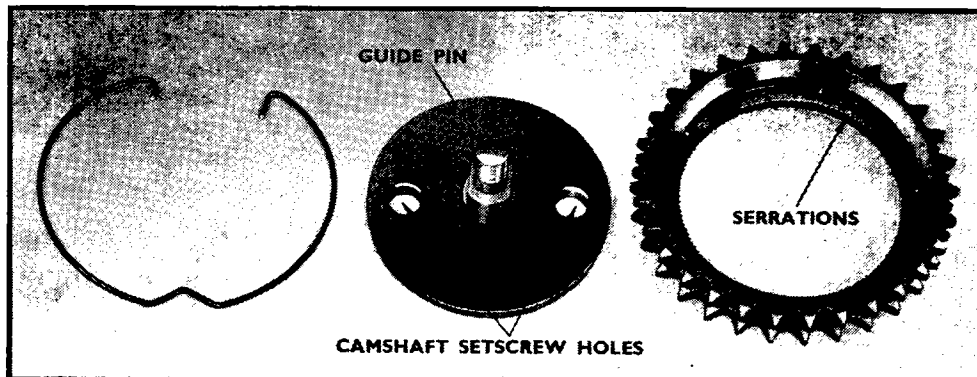


PLATE B.21. CIRCLIP, ADJUSTER PLATE AND CAMSHAFT SPROCKET.

**Note.** It is most important that the holes are in exact alignment, otherwise when the set screws are fitted, the camshafts will be moved out of position. If difficulty is experienced in aligning the holes exactly, the adjuster plates should be turned through 180°, which due to the construction of the plate will facilitate alignment. Fit the circlips to the sprockets and one set screw to the accessible hole in each adjuster plate. Turn the engine until the other two holes are accessible and fit the two remaining set screws.

Recheck timing, using the valve timing gauge. Secure the four set screws for camshaft sprockets with new lock wire.

Check the top timing chain tension and readjust if necessary.

<b>Valve Timing Data:</b>	<b>XK 120</b>	<b>Mark VII</b>
Inlet valve opens .. .. .	15° B.T.D.C.	10° B.T.D.C.
Inlet valve closes .. .. .	57° A.B.D.C.	50° A.B.D.C.
Exhaust valve opens .. .. .	57° B.B.D.C.	57° B.B.D.C.
Exhaust valve closes .. .. .	15° A.T.D.C.	15° A.T.D.C.
	(With special valve timing clearance of .010" (.25 mm.) inlet and exhaust)	

**VALVES.** Examine valves for signs of pitting and unevenness. Reface valves with valve grinding equipment.

Valve seat angle .. .. .	Inlet, 30°	Exhaust, 45°
--------------------------	------------	--------------

Renew valves on which the stem wear exceeds .003" (.08 mm.). Valve stem clearance in valve guide—.002" to .004" (.05 to .10 mm.).

**VALVE SPRINGS.** Test the valve spring for pressure, either by comparison with the figures given in the valve spring data or by comparison with a new valve spring.

To test against a new valve spring, insert both valve springs end to end between the jaws of a vice or under a press with a flat metal plate interposed between the two springs. Apply load to compress springs partly and measure their comparative lengths.

<b>Valve and Valve Spring Data:</b>		
Valves—Material.	Inlet .. .. .	Silicon chrome steel
	Exhaust .. .. .	Austenitic steel
Valve head diameter.	Inlet .. .. .	1 3/4" ±.005" (44.45 ±.01 mm.)
	Exhaust .. .. .	1 7/16" ±.0005" (36.51 ±.01 mm.)
Valve stem diameter.	Inlet and exhaust .. .. .	5/16" —.0025" (7.94 —.06 mm.) — .0035" (— .09 mm.)
Valve—Total length.	Inlet .. .. .	4 1/8" +.000" (104.77 +.00 mm.) — .010" (— .25 mm.)
	Exhaust .. .. .	4 1/64" ±.005" (101.99 ±.12 mm.)
Valve lift .. .. .		5/16" (7.94 mm.)
Valve seat angle.	Inlet .. .. .	30°
	Exhaust .. .. .	45°
Valve spring—Free length.	Inner .. .. .	1.515" (38.48 mm.)
	Outer .. .. .	1.775" (45.08 mm.)
Valve spring—Fitted length:		
(Valve closed).	Inner .. .. .	1 7/32" (30.96 mm.)
	Outer .. .. .	1 5/16" (33.34 mm.)
(Valve open).	Inner .. .. .	29/32" (23.01 mm.)
	Outer .. .. .	1" (25.4 mm.)

Valve spring—Fitted load:			
(Valve closed).	Inner	.. .. .	20 +1.5 lbs. (9.07 +.68 kg.) —0.0 lbs. (—0.0 kg.)
	Outer	.. .. .	36 +1.5 lbs. (16.33 +.68 kg.) —0.0 lbs. (—0.00 kg.)
(Valve open).	Inner	.. .. .	42 lbs. (19.05 kg.)
	Outer	.. .. .	60 lbs. (27.22 kg.)
Valve spring—Solid length (max.).	Inner	.. .. .	.832" (21.13 mm.)
	Outer	.. .. .	.896" (22.76 mm.)
Number of free coils.	Inner	.. .. .	6
	Outer	.. .. .	5
Diameter of wire.	Inner, 12 s.w.g.	.. .. .	.104" (2.64 mm.)
	Outer, 10 s.w.g.	.. .. .	.128" (3.25 mm.)

**VALVE GUIDES.** Examine valve guides for evidence of wear in bore. Valve stem clearance in valve guide—.002" to .004" (.05 to .10 mm.). The inlet and exhaust guides are of different length, the inlet guide being the shorter.

**Replacement.** If it is required to replace worn valve guides, the following replacement parts must be used and fitted in accordance with the instructions given below:—

		Part Number
Replacement valve guide—Inlet	.. .. .	C.7260
Exhaust	.. .. .	C.7261

- (1) Press out, or drive out with a piloted drift, the old valve guide from top of cylinder head.
- (2) Ream valve guide hole in cylinder head to a diameter of .505" +.0005" (12.83 mm. +.012 mm.)  
—0.0002" (—0.005 mm.)
- (3) Heat cylinder head by immersing in boiling water for 30 minutes.
- (4) Coat valve guide with graphite grease and drive in with a piloted drift from the combustion chamber end. The correct fitted position of both inlet and exhaust guide is with the top of the guide (chamfered end)  $\frac{5}{16}$ " (7.94 mm.) above the spot facing for the valve spring seat.

**VALVE SEAT INSERTS.** The valve seat on the insert should be refaced by using valve seat grinding equipment. Valve seat angle: Inlet, 30°; Exhaust, 45°.

**Replacement.** If it is required to replace valve seat inserts the following replacement parts must be used and fitted in accordance with the instructions given below:—

		Part Number
Replacement valve seat insert—Inlet	.. .. .	C.7258
Exhaust	.. .. .	C.7259

- (1) Remove old valve seat insert by boring out until insert collapses. Take care not to damage the recess for insert in the cylinder head.
- (2) Carefully measure diameter of insert recess in cylinder head at room temperature 68° F. (20° C.).
- (3) Grind down outside diameter of insert to a diameter of .003" (.08 mm.) larger than the recess dimension, that is, to give an interference fit of .003" (.08 mm.).
- (4) Heat the cylinder head in an oven for one hour from cold at a temperature of 450° F. (232° C.).
- (5) Fit insert, ensuring that it beds evenly in its recess.
- (6) After the valve seat insert has been fitted the following instructions should be carried out to ensure that the tappet clearance can be obtained within the range of the adjusting pads, that is, .085" to .103" (2.16 to 2.61 mm.).



(a) Assemble the camshafts to the cylinder head. Fit the appropriate valve to the insert in question and, with the valve seat faces touching, check the distance between the top of valve stem and the **back** of the cam. This should be .320" (8.13 mm.) **plus** the appropriate tappet clearance. (The figure of .320" (8.13 mm.) includes an allowance for an adjusting pad thickness of .095" (2.41 mm.) to .097" (2.46 mm.) which will, if necessary, permit the fitting of thicker or thinner adjusting pads when making the final tappet clearance adjustment.)

				<b>Mark VII</b>	<b>XK 120</b>
Tappet clearance.	Inlet	..	..	.004" (.10 mm.)	.006" (.15 mm.)
	Exhaust	..	..	.006" (.15 mm.)	.008" (.20 mm.)

(b) If the distance is greater than the figure of .320" (8.13 mm.), plus the appropriate tappet clearance, grind the valve seat of the insert with suitable valve grinding equipment until the correct distance is obtained.

**Example.** Assume that the valve insert in question is a Mark VII exhaust and the distance between the top of the valve stem and the back of the cam is found to be .344" (8.74 mm.).

Adding the Mark VII exhaust tappet clearance of .006" (.15 mm.) to .320" (8.13 mm.) equals .326" (8.28 mm.) In this case the valve seat of the insert will have to be ground down to reduce the distance between the top of valve stem and the back of the cam by .018" (.46 mm.), that is, .344" minus .326" (8.74 minus 8.28 mm.)

(c) After assembling the cylinder head, check and adjust tappet clearances in the normal manner.

**Valve Guide and Valve Seat Insert Data:**

Valve guides—Material	..	..	..	..	Cast iron
Valve guide—Length.	Inlet	..	..	..	1 <sup>13</sup> / <sub>16</sub> " (46.04 mm.)
	Exhaust	..	..	..	2 <sup>9</sup> / <sub>16</sub> " (58.74 mm.)
Valve guide—Inside diameter	..	..	..	..	<sup>5</sup> / <sub>16</sub> " ±.0005" (7.94 ±.01 mm.)
	Interference fit in head	..	..	..	.0005" to .0022" (.013 to .055 mm.)
Valve seat inserts—Material	..	..	..	..	Cast iron (centrifugally cast)
	Inside diameter.	Inlet	..	..	1 <sup>3</sup> / <sub>8</sub> " ±.001" (34.92 ±.025 mm.)
		Exhaust	..	..	1 <sup>1</sup> / <sub>4</sub> " ±.001" (31.75 ±.025 mm.)
	Interference (shrink) fit in head				.0023" to .0037" (.057 to .094 mm.)

**WATER PUMP.**

Factory reconditioned water pumps are available on an exchange basis and it is recommended that this service is utilised when an overhaul is being undertaken. Detailed servicing instructions are, however, given in Section D, "Cooling System".

**RECON-DITIONED UNITS.**

Reference has been made in the preceding paragraphs to factory reconditioned units. The following assemblies are available, reconditioned to manufacturers' standards, on an exchange basis:

Connecting Rods	Distributors	Starter Motors
Clutch Units	Dynamos	Thermostats
Clutch Plates	Fuel Pumps	Water Pumps
Crankshafts	Oil Pumps	

**COMPONENTS. TO REMOVE AND REFIT**

The preceding paragraphs have referred to operations carried out when the engine is removed from the chassis frame and the following instructions deal with the servicing of individual engine components when the engine is fitted to the car.

**BREATHER. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Slacken the clip securing the flexible pipe to the breather housing extension and remove pipe. Remove the four dome nuts and spring washers securing breather housing to front face of the cylinder head. Remove the breather housing and baffle plate, noting the gaskets fitted one to each side of the plate. To remove the flexible pipe detach the securing clips and remove pipe.

**REFIT.** Refitting is the reverse of the above procedure, but when replacing the baffle plate it should be so positioned that the two holes are vertical, that is, **not** in line with breather extension pipe.

**CAMSHAFTS AND BEARINGS. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE CAMSHAFT COVER.** Remove the eight dome nuts and copper washers securing the cover of the camshaft to be removed, and lift off cover.

In the case of the left-hand (exhaust) camshaft, unscrew the end of the revolution counter cable from the adapter at the rear of the cylinder head.

Remove the revolution counter adapter and flanged sealing plug from left-hand and right-hand side of the cylinder head respectively. (Note the copper washers under the set screw heads and the half gaskets between the adapter and plug and the cylinder head.) Remove the circular rubber sealing rings.

**REMOVE CAMSHAFT.** Break the wire locking the camshaft sprocket adjuster plate set screws. If the camshaft is to be refitted, mark the relative position of camshaft sprocket and camshaft.

Turn the engine until No. 6 (front) piston is on T.D.C. on the compression stroke (T.D.C. marks on flywheel and cylinder block—Plate B.17), that is, with the distributor rotor opposite No. 6 cylinder segment.

Note the position of the inaccessible adjuster plate set screw and turn engine until it can be removed. Remove set screw and turn engine back to the T.D.C. position with No. 6 firing and remove the remaining screw.

Tap the camshaft sprocket off the camshaft flange and engage the guide pin in the slot of the bracket. Secure guide pin in the innermost position with a  $\frac{3}{8}$ " A.N.F. nut (one of the nuts securing the exhaust pipe to the exhaust flange can be used for this purpose).

Release the eight nuts securing the camshaft bearing caps a turn at a time. Remove the nuts, spring washer and "D" washer from the bearing studs. Remove the bearing caps, noting that the caps and cylinder head are marked with corresponding numbers. Also note that the bearing caps are located to the lower bearing housings with hollow dowels.

The camshaft can now be lifted out from the cylinder head.

**REMOVE CAMSHAFT BEARINGS.** The camshaft bearing shells can now be removed from the bearing caps and bearing housing in the cylinder head. If the same bearing shells are to be replaced they should be refitted to their respective housings.

**REFIT.** Refitting is the reverse of the removal instructions, but it is important to observe the following points.

**Refit Camshaft.** Check that No. 6 (front) piston is still on T.D.C. on the compression stroke. Fit the camshaft with the keyway in the thrust flange, at the rear of the front bearing journal, vertical to the bearing housing face. Fit the camshaft bearing caps and tighten the stud nuts evenly a turn at a time to a torque of 175 lbs. ins. (2.0 kg./m.).

**Refit Camshaft Sprockets.** It is important to tension the timing chain before attempting to check or set the valve timing. Proceed as follows:—

Through the breather aperture in the front of the cylinder head slacken the lock nut securing the serrated plate. (Plate B.18.)

With the camshaft sprocket on the flanges of the camshafts, tension chain by pressing locking plunger inwards and rotating serrated plate by two holes in an anti-clockwise direction. Turn the engine each way slightly and recheck the chain tension.

With the correct tension there should be slight flexibility on both outer sides of the chain below the camshaft sprockets, that is, the chain must not be dead tight. Release locking plunger and securely tighten lock nut. Tap the camshaft sprockets off the flanges of the camshafts.

Accurately position the camshaft with the valve timing gauge, and check that the T.D.C. marks are in exact alignment. (Plates B.20 and B.17.)

Offer up the camshaft sprocket to the camshaft flange and check if the set screws holes in the adjuster plate are in exact alignment with the tapped holes in the camshaft flange. If so, the securing set screws can be fitted. If the holes are not in exact alignment, it will be necessary to remove the circlip retaining the adjuster plate in the sprocket, withdraw adjuster plate forward until the serrations disengage, and turn the plate through 180° which due to its construction will facilitate alignment.

### CONNECTING ROD BEARINGS. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

#### REMOVE SUMP.

Remove sump as described on page B.57 for the Mark VII model and page B.58 for the XK 120 models.

#### REMOVE OIL TRAY.

Unscrew the three set screws securing the oil tray to the front and centre main bearing caps and remove tray.

#### REMOVE BEARINGS.

Withdraw split pins and remove bearing cap nuts and plain washers. Withdraw bearing caps, noting that the cap and rod are numbered to ensure correct mating. (Plate B.22.) Lift out bearing shell from cap. Lift connecting rod off crankpin and withdraw bearing shell.

#### REFIT.

Refitting is the reverse of the removal procedure.

The connecting rod and cap must be fitted with the cylinder numbers together and to the left-hand side of the engine. (Plate B.22.)

The bearings are of the precision shell type and under no circumstances must they be hand scraped or the bearing caps filed. Tighten the connecting rod cap nuts to a torque of 450 lbs. ins. (5.25 kg/m.).

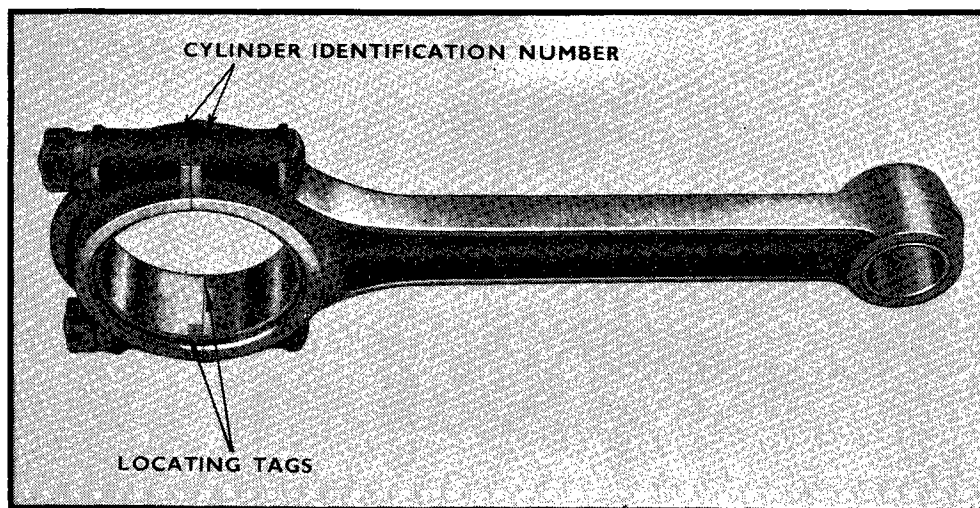


PLATE B.22. CONNECTING ROD AND BEARINGS.

## CRANKSHAFT DAMPER AND PULLEY. TO REMOVE AND REFIT. (MARK VII AND XK 120 MODELS)

**GENERAL.** The crankshaft damper and the crankshaft pulley are balanced as an assembly and should therefore not be separated.

**REMOVAL.** The crankshaft damper and pulley can be removed from the engine without removing the radiator block by working from underneath the car. It may, however, be found more convenient to remove the radiator to gain access to the damper and pulley. For the radiator removal procedure see page B58. for the Mark VII model and page B.59 for the XK 120 models.

**REMOVE FAN BELT.** Slacken the front mounting bolt underneath the dynamo. Remove the rear mounting bolt and nut and the dynamo adjusting set screw. Slacken the set screw securing the dynamo adjusting link and swing link upwards.

Swing the rear of dynamo outwards until the fan belt can be removed from the pulley. Temporarily retain the dynamo by refitting the mounting bolt and adjusting set screw.

Remove belt from crankshaft pulley and withdraw over fan.

**REMOVE CRANKSHAFT DAMPER.** Remove the locking washer securing the starter jaw by knocking back the tabs and unscrewing the two set screws. Unscrew the starter jaw and remove the flat washer. Insert two levers behind the crankshaft damper and ease damper off split cone on crankshaft (a sharp tap on the end of the split cone will assist removal).

**REFIT.** Refitting is the reverse of the removal procedure.

## CYLINDER HEAD. TO REMOVE (MARK VII AND XK 120 MODELS)

**DISCONNECT ENGINE CONNECTIONS.** Disconnect battery lead. Drain cooling system by opening radiator drain tap and cylinder block drain tap. Conserve water if anti-freeze is in use.

Remove air cleaner(s). Disconnect throttle linkage at flexible coupling at bulkhead and remove throttle linkage return spring. Disconnect distributor vacuum feed pipe from front carburetter. Disconnect leads from self-starting carburetter solenoid and solenoid feed lead from clip at rear of Induction manifold. Disconnect petrol feed pipe at float chamber unions. Disconnect revolution counter cable from rear of left-hand camshaft. Disconnect top water hose from front of inlet manifold.

Remove high tension leads from sparking plugs and lead carrier from cylinder head studs. Remove sparking plugs. Disconnect engine breather pipe from breather housing. Disconnect both exhaust down pipes from manifolds. Disconnect both camshaft oil feed pipes from rear of cylinder head.

On the Mark VII model disconnect brake servo pipe from underneath inlet manifold.

On cars fitted with an air conditioner remove hose from inlet manifold connection.

**REMOVE CYLINDER HEAD.** Remove eight dome nuts from each camshaft cover and lift off covers. Remove four nuts securing breather housing and withdraw housing, observing position of baffle plate, with the two holes vertical. Release tension on camshaft chain by slackening nut on eccentric idler sprocket shaft, depressing spring-loaded stop peg and rotating serrated adjuster plate clockwise. Anti-clockwise rotation of the serrated adjuster, viewed from the front of the engine, tightens the chain.

Break locking wire on two set screws securing camshaft sprockets to respective camshafts. Mark relationship of sprocket and camshaft to facilitate assembly, remove set screws and withdraw sprockets with chain in position. (Do not disturb the circlip retaining chain wheel to the adjuster plate to avoid necessity of valve timing on assembly.)

The two camshaft sprockets may now be slid up the support brackets and retained in this position by nuts fitted to the guide pins. (The nuts securing the exhaust pipes to the exhaust manifold flanges can be used for this purpose.) Remove fourteen cylinder head dome nuts and six nuts securing the front of the cylinder head

In the order shown in Plate B.12. Slacken the nuts a part of a turn at a time until they become free.

Lift off cylinder head complete with exhaust manifolds, inlet manifolds and carburetters. Remove and scrap cylinder head gasket.

### **CYLINDER HEAD. TO REFIT (MARK VII AND XK 120 MODELS)**

When all valve clearances have been correctly set refit exhaust manifolds and induction manifold complete with carburetters.

Before refitting the cylinder head it is important to observe that, if the camshafts are out of phase with piston position, fouling may take place between inlet valves and pistons. It is, therefore, essential to adhere to the following procedure before fitting the cylinder head:—

Turn the camshafts, one at a time, until the keyways cut in the front flange of the shafts are vertical to the camshaft housing face and accurately position by engaging valve timing gauge. (Plate B.20.) Key of gauge locates in keyway of camshaft and bottom face of gauge with face of camshaft housing on cylinder head.

Turn No. 6 (front) piston to firing position on top dead centre. A timing hole is provided in the clutch bell housing at a point immediately below the left-hand camshaft. Line up the arrow on the flywheel with the datum line cut on the cylinder block which will position No. 6 piston at top dead centre. (Plate B.17.) Remove distributor cover and check that rotor arm is opposite No. 6 cylinder segment.

Refit the cylinder head, using a new cylinder head gasket fitted side marked "TOP" upwards and lightly smeared with jointing compound. When tightening cylinder head nuts it is recommended that a torque spanner should be used and the fourteen large dome nuts tightened a part of a turn at a time to a torque setting of 650 lbs. ins. (7.5 kg./m.) in the order shown in Plate B.12.

It is important to tension the timing chain before attempting to check or set the valve timing. Proceed as follows:—

Through the breather aperture in the front of the cylinder head slacken the lock nut securing the serrated plate. (Plate B.18.)

With the camshaft sprocket on the flanges of the camshafts, tension chain by pressing locking plunger inwards and rotating serrated plate by two holes in an anti-clockwise direction. Turn the engine each way slightly and recheck the chain tension.

With the correct tension there should be slight flexibility on both outer sides of the chain below the camshaft sprockets, that is, the chain must not be dead tight. Release locking plunger and securely tighten lock nut. Tap the camshaft sprockets off the flanges of the camshafts.

Accurately position the camshaft with the valve timing gauge, and check that the T.D.C. marks are in exact alignment. (Plates B.20 and B.17.)

Offer up the camshaft sprockets to the camshaft flanges and check if the set screw holes in the adjuster plates are in exact alignment with the tapped holes in the camshaft flanges. If so, the securing set screws can be fitted. If the holes are not in exact alignment it will be necessary to remove the circlip retaining the adjuster plate in the sprocket, withdraw adjuster plate forward until the serrations disengage and turn the plate through 180° which due to its construction will facilitate alignment.

Finally secure the camshaft sprocket set screws with new locking wire.

### **DECARBONISE AND GRIND VALVES (MARK VII AND XK 120 MODELS)**

#### **REMOVE CYLINDER HEAD.**

Remove the cylinder head as described on page B.49.

#### **REMOVE VALVES.**

With the cylinder head on the bench remove inlet manifold complete with carburetters and both exhaust manifolds.

Remove four bearing caps from each camshaft and lift out camshafts (note mating marks on bearing caps).

Remove twelve floating tappets and adjusting pads situated between tappets and valve stems. Lay out the tappets and pads in order, to ensure that they can be replaced in their original guides.

Obtain a block of wood the approximate size of the combustion chambers and place this under the valve heads in No. 1 cylinder. (Plate B.23.) Press down the valve collars and extract the split cotters. Remove collars, valves springs, and spring seats. Repeat for the remaining five cylinders. Valves are numbered and must be replaced in original locations, No. 1 cylinder being at the rear, that is, the flywheel end.

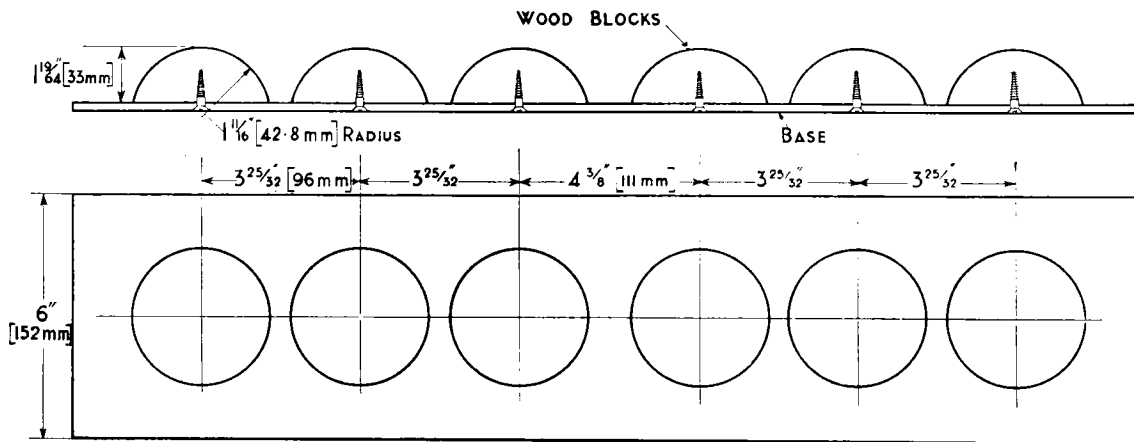


PLATE B.23. COMBUSTION CHAMBER BLOCKS  
(For valve removal and refitting).

**DECARBONISE AND GRIND VALVES.** Remove all traces of carbon from the combustion chambers and deposits from carburetter ports, exhaust ports and induction passages. The cylinder head is of aluminium alloy and great care should be exercised not to damage this with scrapers or sharp pointed tools.

Use worn emery cloth and paraffin only. Thoroughly clean the water passages in the cylinder head. Clean the carbon deposits from the piston crowns and ensure that the top face of the cylinder block is quite clean, particularly round the cylinder head studs. Remove any pitting in valve seats, using valve seat grinding equipment. Reface the valves, if necessary, using valve grinding equipment; grind the valves to the seats, using a suction valve grinding tool. Valve seat angle: Exhaust, 45°; Inlet, 30°.

Clean the sparking plugs by sandblasting and set gaps to .022" (.56 mm.). (If possible, use approved plug cleaning and testing equipment.) Clean and adjust distributor contact breaker points to .012" (.31 mm.).

**ADJUSTING VALVE CLEARANCES.** Thoroughly clean all traces of valve grinding compound from cylinder head and valve gear. Assemble valves in head and replace camshafts. Obtain and record all valve clearances by using a feeler gauge between the back of each cam and the appropriate valve tappet. Correct clearances are:—

				Mark VII	XK 120
Inlet	..	..	..	.004" (.10 mm.)	.006" (.15 mm.)
Exhaust	..	..	..	.006" (.15 mm.)	.008" (.20 mm.)

Adjusting pads are available rising in .001" (.03 mm.) sizes from .085" to .103" (2.16 to 2.61 mm.) and are acid etched on the surface with the letters "A" to "S", each letter indicating an increase in size of .001" (.03 mm.).

Should any valve clearance require correction, remove the appropriate camshaft, valve tappet and adjusting pad. Observe the letter etched on the existing adjusting pad, and should the recorded clearance for this valve, obtained previously, have shown, say, .002" (.05 mm.) excessive clearance, select a new adjusting pad bearing a letter two higher than that removed. If the recorded clearance was, say, .002" (.05 mm.) less than recommended clearance, then the new adjusting pad should bear a letter two lower than the original pad.

As an example, assume that No. 1 inlet valve clearance of an XK 120 engine is tested and recorded as .009" (.23 mm.). On removal of adjusting pad, if this is etched with the letter "D", then substitution with a pad bearing the letter "G" will correct the clearance for No. 1 inlet valve.

**Note.** If the condition is encountered that, with the minimum adjusting pad fitted—.085" (2.16 mm.)—the valve clearance is found to be too small, it is permissible to grind the end of the valve stem to enable the correct clearance to be obtained. The valve stem should be ground on valve refacing equipment and not more than .005" (.13 mm.) removed. After refitting the valve assembly, ensure that the adjusting pad is seated on top of the valve stem and not bottoming in the recess in the valve spring collar.

**REFIT  
CYLINDER  
HEAD.**

Before attempting to refit the cylinder head, refer to the instructions detailed on page B.50. This is important, as if the camshafts are out of phase with the piston position fouling may take place between the inlet valves and pistons.

**DISTRIBUTOR. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Disconnect battery positive lead. Spring back clips and remove distributor cover.

Disconnect low tension wire from terminal on distributor body. Disconnect vacuum pipe by unscrewing union nut from vacuum advance unit. Slacken the distributor clamp plate pinch bolt and withdraw distributor from cylinder block.

**REFIT.** Refitting is the reverse of the removal procedure, but it will be necessary to reset the ignition timing as follows:—

Set micrometer adjustment to the centre of scale. Connect the low tension wire to terminal on distributor body. Fit the distributor to cylinder block with the vacuum advance unit facing to rear of engine. Rotate rotor arm until offset of driving dog engages with the offset in distributor drive shaft.

Turn engine until rotor arm is opposite the No. 6 cylinder (front) segment in the distributor cover, and the top dead centre arrow on the flywheel is 5° (two flywheel teeth approx.) before the arrow on the cylinder block.

Rotate the distributor body until the contact breaker points are just breaking and tighten distributor clamp plate pinch bolt. Fit distributor cover and connect up vacuum advance pipe.

Make final ignition setting on road test.

**DYNAMO. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Disconnect the battery positive lead. Remove the connections from the dynamo, noting that the yellow wire is connected to terminal "D" (large terminal) and the yellow with green wire to terminal "F" (small terminal). Remove the adjusting set screw situated at top of dynamo and push dynamo towards engine to release fan belt tension. Remove the two mounting bolts and nuts underneath the dynamo, disengage fan belt and lift out dynamo.

**REFIT.** Refitting is the reverse of the above procedure. After the fan belt has been fitted, adjust tension by pulling the dynamo outwards until the belt can be flexed  $\frac{1}{2}$ " (12 mm.) either way in the middle of the vertical run.

**EXHAUST MANIFOLD. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Disconnect the two exhaust down pipes from the exhaust manifolds by removing the four nuts and spring washers at each flange. Note the two flange gaskets.

Detach the exhaust manifolds from the cylinder head by removing the eight nuts and spring washers from each manifold flange. Note the two manifold gaskets.

**REFIT.** Refitting is the reverse of the above procedure.

### FAN. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE RADIATOR.** Remove radiator as described on page B.58 for the Mark VII model and page B.59 for the XK 120 model.

**REMOVE FAN. (Five-bladed Type.)** Slacken the dynamo adjusting link bolt and release fan belt tension. Remove the fan and fan pulley from the hub by unscrewing the five set screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley.

**REMOVE FAN. (Six-bladed Type.)** Before removing the set screws securing the fan to the hub mark the positions of the semi-circular balance weight relative to the fan and fan hub (on initial assembly the ends of the balance weights and fan are marked with centre punch, and a small hole is drilled through the balance weights, fan and fan hub to assist reassembly).

Remove the fan from the hub by unscrewing the four set screws fitted with shakeproof washers.

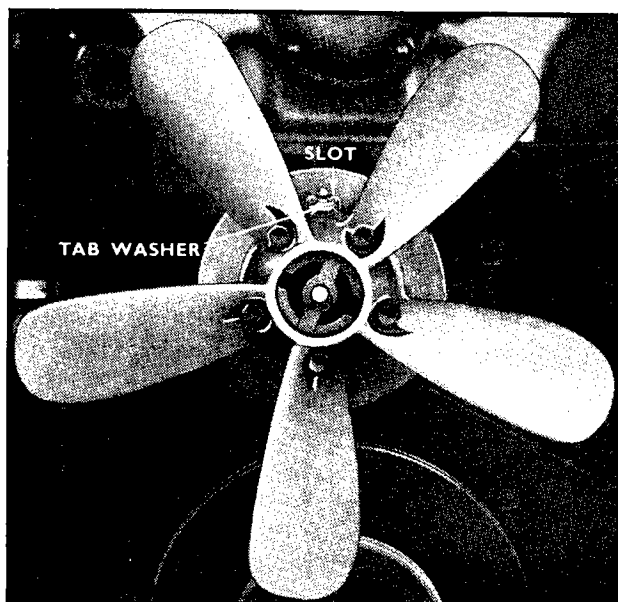


PLATE B.24. FAN. FIVE-BLADED TYPE.

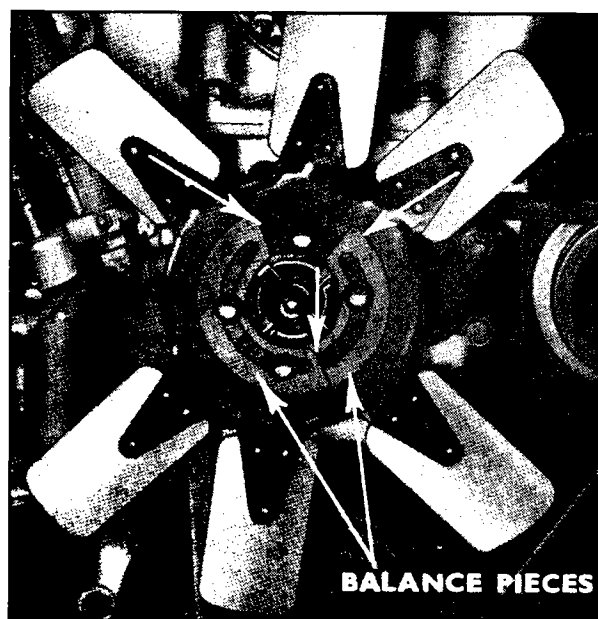


PLATE B.25. FAN. SIX-BLADED TYPE  
(Balance piece location marks indicated by arrows.)

**REFIT.** Refitting is the reverse of the above procedure. In the case of the six-bladed type of fan, due regard should be paid to the above removal notes in order to preserve the balance of the assembly.

### FAN BELT. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Slacken the front mounting bolt underneath the dynamo. Remove the rear mounting bolt and nut and the dynamo adjusting set screw. Slacken the set screw securing the dynamo adjusting link and swing link upwards. (Plate B.1.)



## ENGINE

## COMPONENTS. TO REMOVE AND REFIT

Swing the rear of dynamo outwards until the fan belt can be removed from the pulley. Temporarily retain the dynamo by refitting the mounting bolt and adjusting set screw.

Remove belt from crankshaft pulley and withdraw over fan.

**REFIT.** Refitting is the reverse of the above procedure, but it is important that the belt is not stretched over the pulleys other than by hand. If a tool is used to lever the belt on or off the endless cords in the belt may be broken.

### FAN BELT. TO ADJUST (MARK VII AND XK 120 MODELS)

**SLACKEN DYNAMO MOUNTINGS.** Slacken the two dynamo bolts and nuts underneath the dynamo and the adjusting set screw passing through the dynamo link. (Plate B.1.)

**ADJUST BELT TENSION.** Pull dynamo outwards until the belt can be flexed approximately  $\frac{1}{2}$ " (12 mm.) either way in the middle of the vertical run. Tighten adjusting set screw, and the two dynamo mounting bolts.

**Note.** Undue tension will create heavy wear of belt, pulleys, fan and dynamo bearings.

### INLET MANIFOLD. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** The induction ports of the inlet manifold are surrounded by water jackets which form an integral part of the engine cooling system. The cross flow of water from the cylinder head passes through the water jackets and returns to the radiator header tank from the front end of the manifold.

**REMOVE AIR CLEANER AND MANIFOLD.** Remove the air cleaner by removing the two set screws securing the brackets to the inlet manifold, and lift off cleaner from manifold. Remove air cleaner manifold by unscrewing the two set screws securing the manifold to each carburetter flange.

**REMOVE CARBURETTERS.** Unscrew the distributor vacuum pipe union from underneath the front carburetter. Disconnect the flexible petrol feed pipe. Disconnect wires from the starting carburetter solenoid. Disconnect the starting carburetter to manifold feed pipe from the manifold. Disconnect throttle linkage at rear flexible joint. Release float chamber overflow pipes from clip on pressure oil filter. Release throttle return spring from starter motor. Remove eight carburetter to manifold nuts and withdraw carburetters.

**REMOVE MANIFOLD CONNECTIONS.** Drain the radiator by operating the remote control on the top left-hand side of radiator. Remove the top water hose, by-pass hose and thermometer bulb from the thermostat housing. Take care when removing the union nut securing thermometer bulb not to twist the capillary tube. The thermometer bulb is provided with two flats to enable the bulb to be held against rotation.

Remove the air conditioner hose and vacuum servo hose from the underside of the manifold.

**REMOVE MANIFOLD.** Remove the eighteen nuts securing the manifold to the cylinder head and withdraw manifold from studs. Note that the top nut of the three nuts securing the thermostat housing need not be removed.

**REFIT.** Refitting is the reverse of the removal procedure. Always fit a new gasket between the manifold and the cylinder head.

### INLET MANIFOLD. TO REMOVE AND REFIT (XK 120 MODELS)

**GENERAL.** The induction ports of the inlet manifold are surrounded by water jackets which form an integral part of the engine cooling system. The cross flow of water from the cylinder head passes through the water jackets and returns to the radiator header tank from the front end of the manifold.

**REMOVE AIR CLEANERS.** On the Super Sports model remove the two set screws securing the air cleaners to each carburetter flange.

On the Fixed Head Coupe model remove the air cleaner hoses from the carburetter flanges.

**REMOVE CARBURETTERS.** Unscrew the distributor vacuum pipe union from underneath the front carburetter. Disconnect the flexible petrol feed pipe. Disconnect wires from the starting carburetter solenoid. Disconnect the starting carburetter to manifold feed pipe from the manifold. Disconnect throttle linkage at rear flexible joint. Release float chamber overflow pipes from clip on pressure oil filter. Release throttle return spring from starter motor. Remove eight carburetter to manifold nuts and withdraw carburetters.

**REMOVE MANIFOLD CONNECTIONS.** Drain the radiator by opening the tap at the front of the radiator. Remove the top water hose from the water outlet elbow at the front of the manifold.

If an air conditioner is fitted remove the hose from the rear of the manifold.

**REMOVE MANIFOLD.** Remove the eighteen nuts securing the manifold to the cylinder head and withdraw manifold from studs. Note that the top nut of the three nuts securing the water outlet elbow need not be removed.

**REFIT.** Refitting is the reverse of the removal procedure. Always fit a new gasket between the manifold and the cylinder head.

### MOUNTINGS—FRONT AND REAR. TO REMOVE AND REFIT (MARK VII MODEL)

**LOCATION.** The front engine mountings are situated between the mounting brackets bolted to each front side of the cylinder block, and the brackets on the chassis frame. The rear mountings are situated between the mounting brackets bolted to the clutch housing and the brackets on the chassis frame.

**REMOVE FRONT MOUNTINGS.** **Remove Radiator.** Remove radiator as described on page B.58.  
**Remove Mountings.** Remove the nuts and washers from each end of engine mounting studs. Take the weight of the engine under front of sump with a suitable packing interposed to distribute the load. Raise the engine slightly until the engine mountings can be removed.

**REMOVE REAR MOUNTINGS.** Take the weight of the engine under the rear of sump with a suitable packing interposed to distribute the load. Remove the set screw and washers from the inside of each rear mounting bracket. Remove the two bolts and nuts securing each mounting to the chassis frame brackets. Raise the rear of the engine slightly and remove mountings.

**REFIT.** Refitting is the reverse of the above procedure. Do not omit to refit the earth strap to the left-hand rear mounting bracket.

### MOUNTINGS—FRONT AND REAR. TO REMOVE AND REFIT (XK 120 MODELS)

**LOCATION.** The front engine mountings are situated between the engine bearer plate and the brackets on the chassis frame. The rear engine mounting is situated between the gearbox extension platform and the bracket on the centre cross member of the chassis frame.

**REMOVE FRONT MOUNTINGS.** **Remove Radiator.** Remove radiator as described on page B.59.  
**Remove Mountings.** Take the weight of engine under the front of sump with a suitable packing interposed to distribute the load. Remove the two nuts securing each end of the bearer plate to the mountings.

Remove the two bolts and nuts securing each mounting to the brackets on chassis frame. Raise the front of the engine slightly and remove mountings. On right-hand drive cars note the packing plates fitted under the right-hand engine mounting.

**REMOVE REAR MOUNTING.** Take the weight of the power unit under the gearbox with a suitable packing interposed to distribute the load.

Remove the four bolts and nuts securing the platform under the gearbox extension to the mounting. Remove the three bolts and nuts securing the mounting to the bracket on the front of centre cross member. (Fixed Head Coupe model—two nuts.)

Remove the set screw securing the torque arm to the mounting on the chassis frame. The torque arm is situated just forward of the clutch housing and on the opposite side to the steering column.

Raise the gearbox sufficiently to enable the mounting to be removed from cross member bracket.

**REFIT.** Refitting is the reverse of the removal procedure.

### **OIL FILTER ASSEMBLY. TO REMOVE AND REFIT** (MARK VII AND XK 120 MODELS)

**REMOVE.** Disconnect the oil gauge union from the top of the oil filter. Remove the four set screws and copper washers securing the oil filter to the cylinder block and lift out filter assembly. (Plate B.2.)

Note the gasket fitted between the filter head and the face on the cylinder block.

**REFIT.** Refitting is the reverse of the above procedure, but it is important that a new gasket be fitted between the filter head and cylinder block.

### **OIL FILTER ELEMENT. TO REMOVE AND REFIT** (MARK VII AND XK 120 MODELS)

**REMOVE.** Clean off the outside of the filter. Slacken bolt situated on top of body securing canister to body. Withdraw canister, complete with element, downwards. (Plate B.2.)

**REFIT.** Refitting is the reverse of the above procedure. Renew the rubber sealing ring on top of the canister if this is distorted or damaged.

It has been found that with low quality fuels certain fractions remain unburned and contaminate the oil, inducing a tendency to sludge formation, which has the effect of blocking the oil filter element. It is important, therefore, to clean the element by thoroughly rinsing in petrol every 2,500 miles (4,000 kilometres), and renew the element every 5,000 miles (8,000 kilometres). Before replacing the element, wipe out the canister with a non-fluffy cloth, ensuring that none of the fibres of the cloth remain behind.

### **OIL PRESSURE. TO ADJUST** (MARK VII AND XK 120 MODELS)

**LOCATION.** The oil pressure release valve assembly is incorporated in the oil filter assembly body.

**ADJUSTMENT.** Remove dome nut and washer. Adjustment is carried out at the screw now disclosed, which can be rotated when the lock nut is released. Rotating clockwise increases and anti-clockwise decreases the pressure. (Plate B.2.) A satisfactory oil pressure is between 40 and 45 lbs. per square inch at 2,000 r.p.m. when the engine is at normal operating temperature. It is important to note that, due to the setting of the by-pass valve incorporated in the body of the filter assembly, blockage of the oil filter element will cause a fall in oil pressure and the possibility of a fluctuating reading on the oil pressure gauge. Service the element at the recommended intervals. (Page B.9.)

**Note.** A dirty or partially choked oil filter element will be indicated by an oil pressure drop of 5-10 lbs. per square inch.

### OIL PRESSURE RELEASE VALVE. TO REMOVE, DISMANTLE AND REFIT (MARK VII AND XK 120 MODELS)

- REMOVE.** Unscrew the hexagon head of the release valve assembly, which is situated next to the filter body, until the assembly can be withdrawn.
- DISMANTLE.** Grip the assembly by the hexagon head, unscrew the dome nut and release the lock nut. Unscrew the adjuster and withdraw adjuster, spring and valve. (Plate B.9.)
- REFIT.** Refitting is the reverse of the above procedure. Ensure that the copper washer is fitted between the assembly and the filter body. Two copper washers should also be fitted, one on either side of the locknut.

### OIL PUMP. TO REMOVE, DISMANTLE REASSEMBLE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE SUMP.** Remove sump as described on page B.57 for the Mark VII model and on page B.58 for the XK 120 model.

**REMOVE OIL PUMP.** Detach the floating suction filter from the oil pump bottom cover by removing the split pin.

Remove the oil tray by unscrewing the three set screws from the front and centre main bearing caps.

Detach the oil delivery pipe from rear of pump body by removing the three set screws and washers. Note gasket between oil pipe flange and pump body.

Remove the three set screws and washers securing the pump body to the front main bearing cap. Note that the two top set screws are dowel screws. (Plate B.27.) The oil pump and coupling shaft can now be removed.

**DISMANTLE.** Remove the bottom cover from oil pump body by removing the four set screws and washers. Note the gasket between the cover and body, and the small dowel in the bottom face of the body.

Withdraw the driving and driven gears from the pump body.

**REASSEMBLE.** Reassembly is the reverse of the above procedure. The clearance (a) between the ends of the gears and the bottom face of the pump body should be .0015" to .0035" (.04 to .09 mm.); (b) around the gears, that is, between the gear teeth and pump body should be .0045" to .007" (.11 to .18 mm.). (Plates B.15 and B.14.)

A new gasket should always be fitted between the bottom cover and the pump body.

**REFIT.** Refitting is the reverse of the removal procedure. Do not omit to fit the coupling shaft between the squared ends of the oil pump driving gear and the distributor drive shaft. Fit a new gasket between the oil delivery pipe flange and the pump body.

### OIL SUMP. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Drain sump by removing the hexagon plug and washer from the left-hand side of the sump. Remove the cover plate from the front end of the clutch housing by removing the set screws. Disconnect the anti-roll bar by detaching the brackets from the chassis frame.

Remove the twenty-six set screws securing the sump to the crankcase and the four nuts securing the sump to the timing cover. The sump can now be removed.

**REFIT.** Refitting is the reverse of the removal instructions. Always fit a new sump gasket and new front and rear seals when refitting the sump.

### OIL SUMP. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE.** Drain sump by removing the hexagon plug and washer from the left-hand side of the sump. Remove the cover plate from the bottom of the clutch housing by removing the seven set screws.

Disconnect the battery positive terminal and disconnect the wire from oil level unit in the right-hand side of the sump. Remove the twenty-six set screws securing the sump to the crankcase and the four nuts securing the sump to the timing cover. The sump can now be removed.

**REFIT.** Refitting is the reverse of the removal instructions. Always fit a new sump gasket and new front and rear seals when refitting the sump.

### PISTONS AND CONNECTING RODS. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** As the pistons will not pass the crankshaft it will be necessary to withdraw the pistons and connecting rods from the top. The connecting rod bolts may, however, have to be removed to enable the big end to pass through the bore. Proceed as follows:—

**REMOVE CYLINDER HEAD.** Remove cylinder head as described on page B.49.

**REMOVE SUMP.** Remove sump as described on page B.57 for the Mark VII model and on page B.58 for the XK 120 models.

**REMOVE OIL TRAY.** Unscrew the three set screws securing the oil tray to the front and centre main bearing caps and remove tray.

**REMOVE PISTON AND CONNECTING ROD.** Remove the split pins from the connecting rod bolt nuts and unscrew nuts. Remove the connecting rod cap, noting that the corresponding cylinder numbers on the connecting rod and cap are together. Remove the connecting rod bolts and withdraw the piston and connecting rod from the top of cylinder block.

**Note.** Split skirt pistons **must** be fitted with the split opposite to the thrust side, that is, with the split on the left-hand or exhaust side of the engine.

On initial assembly, solid skirt pistons are fitted so that the cylinder number on the big end of the connecting rod is on the left-hand or exhaust side of the engine.

**REFIT.** Refitting is the reverse of the above procedure.

Pistons and connecting rods must be fitted to their respective cylinders (piston and connecting rods are stamped with their cylinder number, No. 1 being at the rear) and the same way round in the bore.

Split skirt pistons **must** be fitted with split on the left-hand or exhaust side of the engine, when the cylinder number on connecting rod and cap should also be on this side.

Tighten the big end nuts of the connecting rod to a torque of 450 lb. ins. (5.1 kg/m.).

### RADIATOR BLOCK. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE RADIATOR GRILLE.** Remove the two set screws and plain washers securing the radiator grille to the tie panel at the top of the radiator. From underneath the car remove the two set screws and plain washers securing the grille brackets to the radiator frame. Remove the grille, noting the packing washers fitted between the bottom grille brackets and the radiator frame.

**REMOVE TIE PANEL AND SUPPORTING CHANNEL.**

Remove the three set screws and plain washers securing the tie panel to the supporting channel. Remove tie panel complete with bonnet release cable and place on wing.  
Remove the set screws and plain washers securing the support channel to each wing valance and remove channel.

**REMOVE RADIATOR BLOCK.**

Drain radiator by operating the remote control at top rear of radiator header tank.  
Slacken the top and bottom hose clips, and disconnect hoses.

Remove the four set screws securing the radiator block to the vertical members of the radiator frame. The radiator block can now be removed by lifting it upwards, taking care not to foul the fan blades.

**REFIT.**

Refitting is the reverse of the above procedure.

**RADIATOR BLOCK. TO REMOVE AND REFIT  
(XK 120 MODELS)**

**REMOVE.**

Raise and support the bonnet. Drain the radiator by opening the drain tap at the front of the radiator.

Disconnect the thermostat housing from the radiator header tank by removing the two nuts and shakeproof washers. Note gasket between housing and header tank.

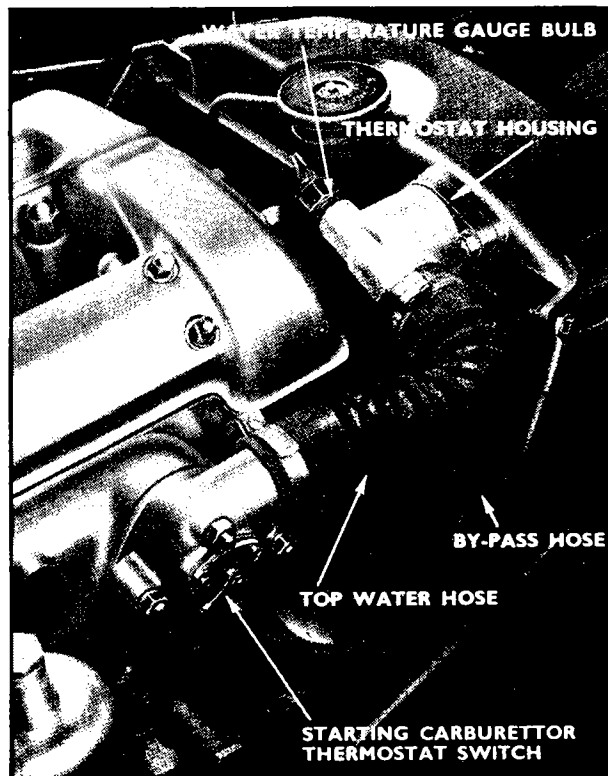


PLATE B.26. THERMOSTAT HOUSING. REMOVAL (XK 120).

Slacken the bottom hose clip from the radiator stub pipe and detach hose.

Detach the right-hand felt-covered support plate at the forward side of the radiator by removing the three set screws securing the strip to the wing valance.

Remove the metal plate adjacent to the radiator drain tap by unscrewing the three drive screws.

Detach the radiator tie rods from the brackets on the header tank by removing the two nuts, bolts and shakeproof washers.

Disconnect the radiator securing rods from the brackets on the sides of the radiator by removing the two nuts and shakeproof washers.

Withdraw the radiator upwards, turning the fan blades to avoid fouling the stub pipe on the bottom tank.

Note the packing rubbers between the bottom of the radiator and the mounting brackets.

**REFIT.** Refitting is the reverse of the above procedure.

### **STARTER MOTOR. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

**REMOVE.** Disconnect battery positive lead. Remove the starter lead from the terminal on the end plate. Remove the two securing bolts, nuts and spring washers, and withdraw starter.

**REFIT.** Refitting is the reverse of the above procedure. Do not omit to refit the earth strap to the top securing bolt.

### **TIMING CHAINS, SPROCKETS AND TENSIONERS. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

**GENERAL.** If it is required to gain access to the lower timing chain tensioner only, the timing cover can be removed as described in the following paragraphs, but without removing the cylinder head. It will, however, be necessary to withdraw the four studs securing the timing cover to the front of the cylinder head. When replacing the timing cover care must be taken not to damage the cylinder head gasket.

In order to remove the timing chains, idler and intermediate sprockets it will first be necessary to remove the timing gear and mounting brackets as an assembly. The procedure is as follows:—

**REMOVE RADIATOR.** Remove radiator as described on page B.58 for the Mark VII model and on page B.59 for the XK 120 model.

**REMOVE DYNAMO.** Disconnect the battery positive lead. Remove the connections from the dynamo, noting that the yellow wire is connected to terminal "D" (large terminal) and the yellow with green wire to terminal "F" (small terminal). Remove the adjusting bolt situated at top of dynamo and push dynamo towards engine to release fan belt tension. Remove the two mounting bolts and nuts underneath the dynamo, disengage fan belt, and lift out dynamo.

**REMOVE FAN.  
(Five-bladed  
Type.)** Remove the fan and fan pulley from the hub by unscrewing the five set screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley.

**REMOVE WATER PUMP.** Detach hose connections from water pump. Unscrew the six set screws and three nuts, and remove the water pump from the timing cover. Note the gasket between the pump and timing cover.

**REMOVE CYLINDER HEAD.** Remove cylinder head as described on page B.49.

**REMOVE  
CRANKSHAFT  
PULLEY AND  
DAMPER.**

Remove the locking washer securing the starter jaw by knocking back the tabs and unscrewing the two set screws. Unscrew the starter jaw and remove the flat washer. Withdraw the pulley and damper complete from the split cone on the crankshaft (a sharp tap on the end of the split cone will assist the removal of the pulley).

**REMOVE  
SUMP.**

Remove sump as described on page B.57 for the Mark VII model and on page B.58 for the XK 120 model.

**REMOVE  
TIMING  
COVER.  
(MARK VII.)**

Remove the set screws securing the timing cover to front face of cylinder block, noting the distance piece behind the dynamo adjusting link. Remove the timing cover, noting that the cover is located to the cylinder block by two dowels.

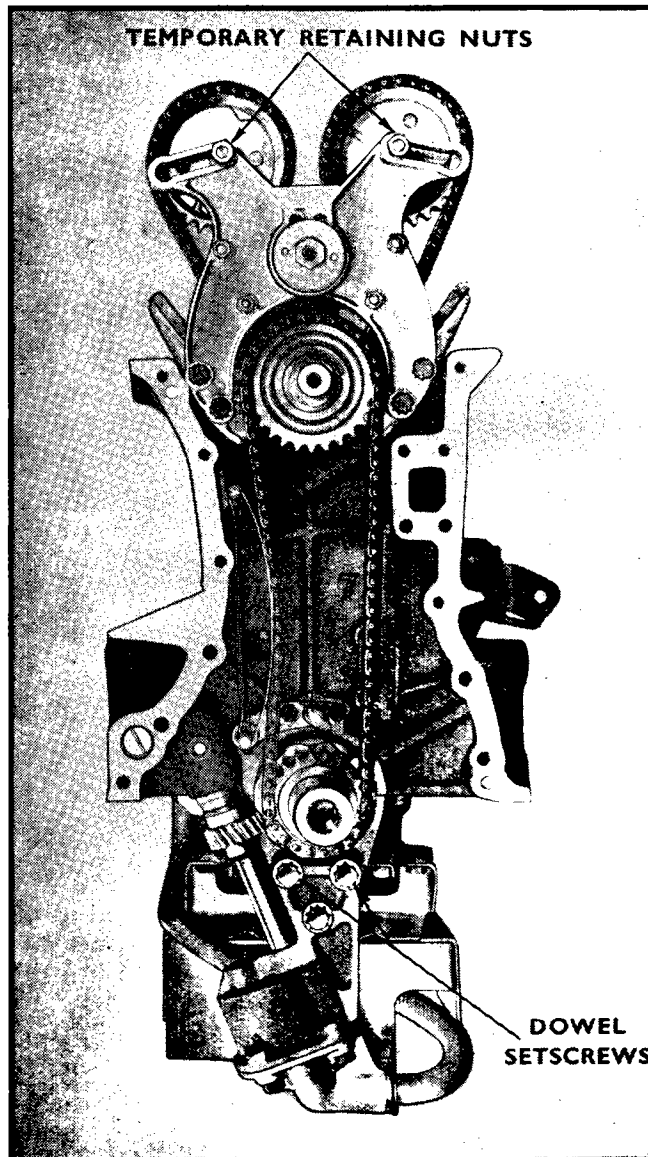


PLATE B.27. TIMING GEAR AND OIL PUMP (General view).



## ENGINE

## COMPONENTS. TO REMOVE AND REFIT

### REMOVE TIMING COVER. (XK 120.)

As the front engine bearer plate is secured to the timing cover it will be necessary to support the front of the engine before any attempt is made to remove the cover.

Unscrew the four nuts securing the engine bearer plate to the timing cover, and the two nuts securing each end of the plate to the front engine mountings. Remove bearer plate. Remove the set screws securing the timing cover to front face of cylinder block, noting the distance piece behind the dynamo adjusting link. Remove the timing cover, noting that the cover is located to the cylinder block by two dowels.

### REMOVE TIMING GEAR ASSEMBLY.

Remove the bottom chain tensioner blade by detaching blade and spring from the guide pins.

Unscrew the set screws securing the chain tensioner guide bracket and rear mounting bracket to the cylinder block, and unscrew the four long set screws securing the mounting brackets to the cylinder block.

The timing gear assembly can now be removed.

### DISMANTLE TIMING GEAR ASSEMBLY.

Remove the nut and serrated washer from the front end of the idler shaft, and withdraw the plunger and spring.

Remove the four nuts securing the front mounting bracket to the rear bracket and the two nuts retaining the camshaft sprocket guide pins. Withdraw the front bracket from the studs.

Remove the bottom timing chain from the large intermediate sprocket.

Remove the two camshaft sprockets and disengage the top timing chain from the small intermediate sprocket.

To remove the intermediate sprockets, remove the circlip from the end of the shaft in the mounting bracket. Press the shaft out of the bracket, and withdraw sprockets from shaft.

To separate the two intermediate sprockets, press the boss of the small sprocket from the bore of the large sprocket, noting that they are keyed together.

### REFIT.

Refitting is the reverse of the above procedure, but special attention should be given to the procedure for refitting the cylinder head and setting the valve timing as described on pages B.50 and B.41.

## WATER PUMP. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

### REMOVE RADIATOR.

As described on Page B.58 for the Mark VII model and on Page B.59 for the XK 120 model.

### REMOVE FAN. (Five-bladed type.)

Slacken the dynamo adjusting link bolt and release fan belt tension. Remove the fan and fan pulley from the hub by unscrewing the five set-screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley.

### REMOVE WATER PUMP.

Detach hose connections from water pump. Unscrew the six set-screws and three nuts, and remove the water pump from the timing cover. Note the gasket between the pump and timing cover.

### REFIT.

Refitting is the reverse of the removal procedure. Always fit a new gasket between the water pump and timing cover.

## ENGINE TUNING

## (MARK VII AND XK 120 MODELS)

**GENERAL.** It must be realised that engine tuning cannot be carried out in a haphazard manner and satisfactory results will not be obtained unless each component is dealt with thoroughly and in sequence. The following operations carried out systematically in the order shown will produce satisfactory results.

Before commencing any engine adjustment run the engine until the normal operating temperature is recorded on the water temperature gauge. Quick warm-up of the engine should be checked, indicating that the water cooling system thermostat is operating correctly. If the engine runs too cool, ignition setting and performance will be affected. Normal running temperature approximately 70° C. Check that all compressions are even (a compression gauge should be used for this check) and approximate to the figures given below. If one or more compressions are weak it will most probably be due to poor valve seatings, when the cylinder head must be removed and the valves and valve seats refaced and reground.

**COMPRESSION PRESSURES.**

	Mark VII	XK 120
7 to 1 compression ratio ..	110 lbs. per sq. in. (7.73 kg./cm <sup>2</sup> .)	105 lbs. per sq. in. (7.38 kg./cm <sup>2</sup> .)
8 to 1 compression ratio ..	120 lbs. per sq. in. (8.44 kg./cm <sup>2</sup> .)	120 lbs. per sq. in. (8.44 kg./cm <sup>2</sup> .)

At cranking speed, water outlet temperature at 70° C. and all sparking plugs removed. Note that compression pressures can vary with the viscosity of the engine oil.

**Note.** When taking compression pressures ensure that the ignition switch is "off" ; turn the engine over by operating the push button on the starter solenoid switch attached to the scuttle.

**BATTERY.** Check the battery electrolyte level and top up as necessary with distilled water to bring the level to the top of the separators. Test that the battery is in a satisfactory state of charge. Check that the battery connections, and earth connection, are clean and tight.

**DISTRIBUTOR.** Remove distributor cover and check carbon brush, rotor arm and segments. Wipe out the interior of the cover with a dry rag. Check free operation of centrifugal advance mechanism and lubricate with thin oil. Place a spot of thin oil on the top of the distributor spindle.

Clean and adjust contact breaker points to .012" (.31 mm.). Place a smear of light grease on cam and a spot of oil on contact breaker rocker pivot (Plate B.28).

Refit cover and check tightness of all H.T. and L.T. connections on distributor and coil. Check over insulation of wires and cables for faults. Check correct operation of vacuum advance mechanism with engine running.

**SPARKING PLUGS.** Champion NA.8 sparking plugs are used with 8 : 1 compression ratio engines and L.10S with 7 : 1 compression ratio engines. Plugs should be cleaned by sand blasting, points set to .022" (.56 mm.) and tested, using plug cleaning and testing equipment. Clean porcelain insulators. Do not replace the sparking plugs until the valve clearances have been adjusted to facilitate turning the engine. New copper/asbestos washers should be fitted when replacing plugs.

**VALVE CLEARANCES.** Remove the camshaft covers and check. Accurately adjust the tappet clearances to :—

	Mark VII	XK 120
Inlet .. .. .	.004" (.10 mm.)	.006" (.15 mm.)
Exhaust .. .. .	.006" (.15 mm.)	.008" (.20 mm.)

To obtain accurate settings each valve should be checked with the tappet on the back of the cam.

**PETROL PUMP.** Test operation of S.U. electric pump/s. Remove filter at base of pump body, clean and replace.

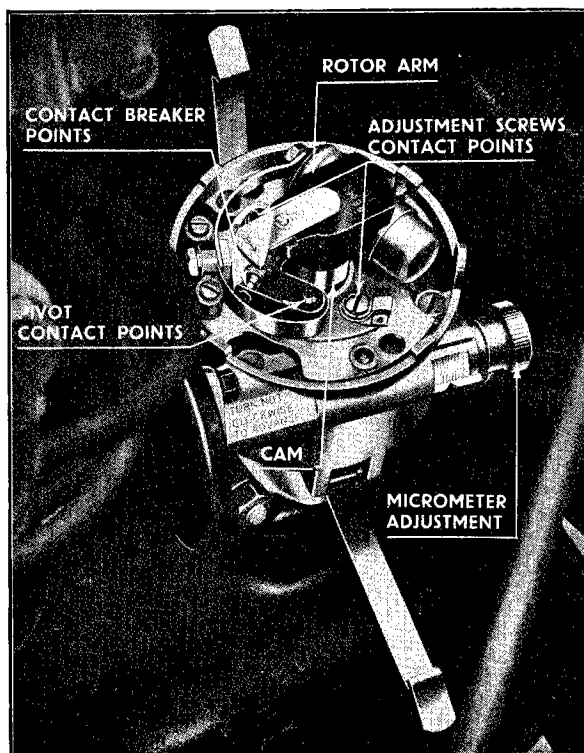


PLATE B.28. DISTRIBUTOR.

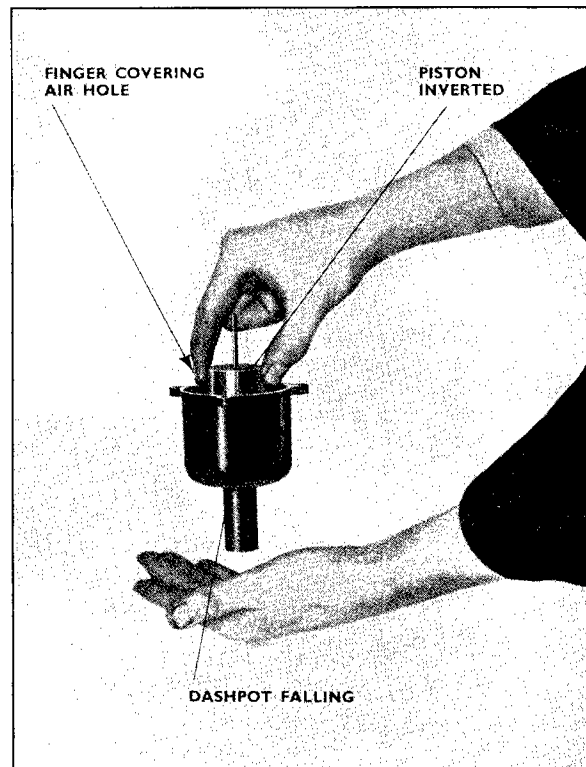


PLATE B.29. TESTING PISTON FIT IN DASHPOT

**CARBU-  
RETTERS.**

Remove air silencer (and air silencer manifold). Test free operation of pistons by lifting with finger and noting clean drop. Remove dashpots and pistons, check that correct jet needles are fitted.

**Carburetter Needles.**

				<b>Mark VII</b>	<b>XK 120</b>
Standard	..	..	..	SM	RF
Weak	..	..	..	SK	RG

Observe that the needle should be fitted with the shoulder of the needle boss flush with the base of the piston ; reposition if necessary. Check the fit of the piston in the dashpot. This is not measured mechanically, but by an air leak between the large diameter of the piston and the dashpot interior.

Hold the piston upside down in the right hand with a finger covering the small air hole. With the left hand push the dashpot on to the piston as far as it will go. When the left hand is removed the dashpot will fall until clear of the piston, this time should be between four and five seconds. Check that the jet is correctly centred to the jet needle. It must be understood that the needle has a very fine working clearance in the jet and yet must not touch the jet. If centralising is required release the jet securing nut. Remove cap nut and rotate the jet adjusting screw to its top position. Replace the piston with needle correctly fitted and feel if the piston is perfectly free by lifting it up with the finger. Tighten jet securing nut. It may be necessary to slacken the securing nut several times before the piston falls perfectly freely. When this has been done bring the jet adjusting screw back to its original position.

Wipe out dashpot, piston and spindle and refit. Do not use metal polish. Fill to the top of the hollow piston chamber with the recommended grade of engine oil. Absence of oil will cause weakness of mixture on acceleration and poor performance, the oil level must therefore be checked at 2,500 (4,500 kilometres) mile intervals.

Remove carburetter petrol pipe unions at float chambers. Remove and clean petrol filters. Check that the level of fuel in the jets is correct. The level of fuel in the float chamber, and therefore, the level in the jet, is controlled by the angle to which the forked float lever is set. Hold the float chamber cover inverted and press the forked lever downwards with the finger above the hinged end, thus ensuring that the needle is in the closed position. If the petrol level is correct a  $\frac{1}{2}$ " (12.5 mm.) round bar will just slide between the lever and the spigot on the lid. If the lever does not touch this bar at the same time as it holds the needle on the seating, adjustment must be made by bending the lever at the point where the fork meets the straight shank. Reassemble and refit. Lubricate throttle controls and linkage, check free operation and full travel. Check for air leaks at carburetter flanges and mounting bolts for tightness.

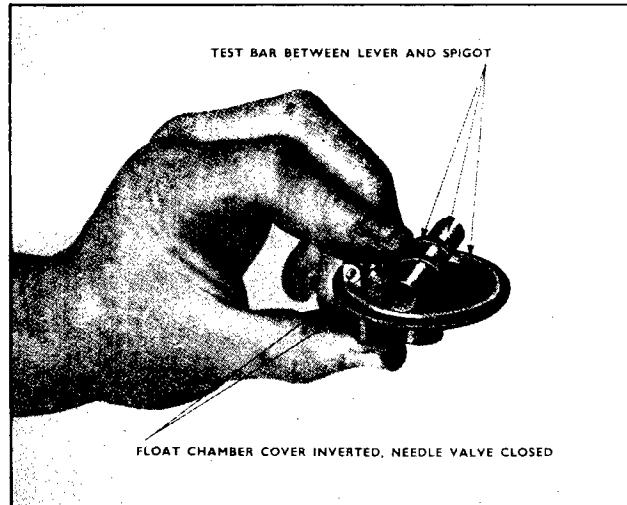


PLATE B.30. SETTING PETROL LEVEL.

### IGNITION TIMING.

It is necessary to set the ignition timing correctly at the distributor before tuning the carburetters, since if retarded or advanced too far the setting of the carburetters will be affected.

**CARBURETTER TUNING.** When the ignition has been correctly set check that both carburetters are sucking equally by placing one end of a rubber tube in the intake and listening at the other end so that the suction can be heard. Slacken one clamp bolt on the universally jointed connection between the throttle spindles. Rotate the throttle adjusting screws until the carburetters are synchronised, that is, are sucking equally, and the engine is idling at approximately 500 r.p.m. Tighten the clamp bolt. Before carrying out the instructions which follow, it is desirable to ensure that the mixture strength of both carburetters is approximately correct.

It may therefore be desirable to screw the jet adjusting screws upwards (clockwise) as far as they will go and then rotate them downwards (anti-clockwise) two and one half turns, ensuring that the jets are not sticking and are following the movement of the adjusting screws.

Next check the mixture strength by starting the engine and raising the lifting pin of the **front carburetter**. Lift the piston approximately  $\frac{1}{4}$ " (6.0 mm.) when, if:—

- (a) The engine speed increases and the engine continues to run at increased speed this indicates that the mixture strength of the **rear carburetter** is too rich.
- (b) The engine speed increases and the engine then stops, this indicates that the mixture strength of the **rear carburetter** is too weak.
- (c) The engine speed increases momentarily and then decreases but the engine continues to run somewhat bumpily, then the mixture strength of the **rear carburetter** is correct.

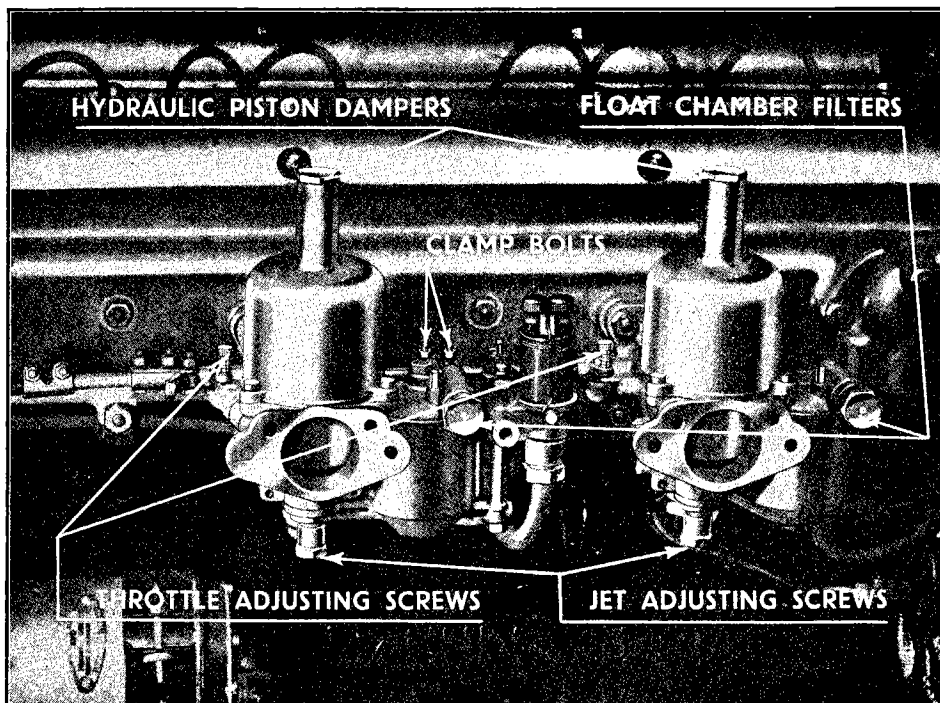


PLATE B.31. CARBURETTERS.

Repeat the operation, lifting the rear carburetter piston and testing the mixture setting of the front carburetter. To adjust the mixture strength, remove the dome nut covering the jet and to enrich the mixture rotate the jet adjusting screw in an anti-clockwise direction, that is, downwards. To weaken the mixture, rotate the jet adjusting screw clockwise, that is, upwards. Ensure that the jet is not sticking and is following the movement of the adjusting screw. Always replace the dome nuts after adjustment.

Some slight adjustment of the slow running, to maintain this at 500 r.p.m. may be necessary following alteration of the mixture strength, in which case ensure that the two throttle adjusting screws are rotated by an exactly equal amount or the adjustments previously made will be upset.

Note that it is essential to make final adjustments (on the road) with the air silencer (and manifold) fitted.

**STARTING CARBURETTER.** Test operation of thermostatically operated starter carburetter by shorting carburetter thermostat connection in water uptake manifold to earth and flicking throttle open when engine should run at approximately 1,000 r.p.m. without excessive hunting. The mixture setting of the starter carburetter is adjusted by rotating the hexagon nut surrounding the primer valve. Turning the hexagon nut clockwise weakens, anti-clockwise enriches the starting mixture.

If difficult starting from cold is experienced in the form of the engine starting but failing to keep running, indicating a weak starting mixture, test with the engine cold and adjust the mixture setting by turning the hexagon nut in an anti-clockwise direction until the engine runs steadily without hunting. The self-starting carburetter should cut out at 35° C. A full description of the carburetters and starting carburetter will be found in Section C—"Carburetters and Fuel System".



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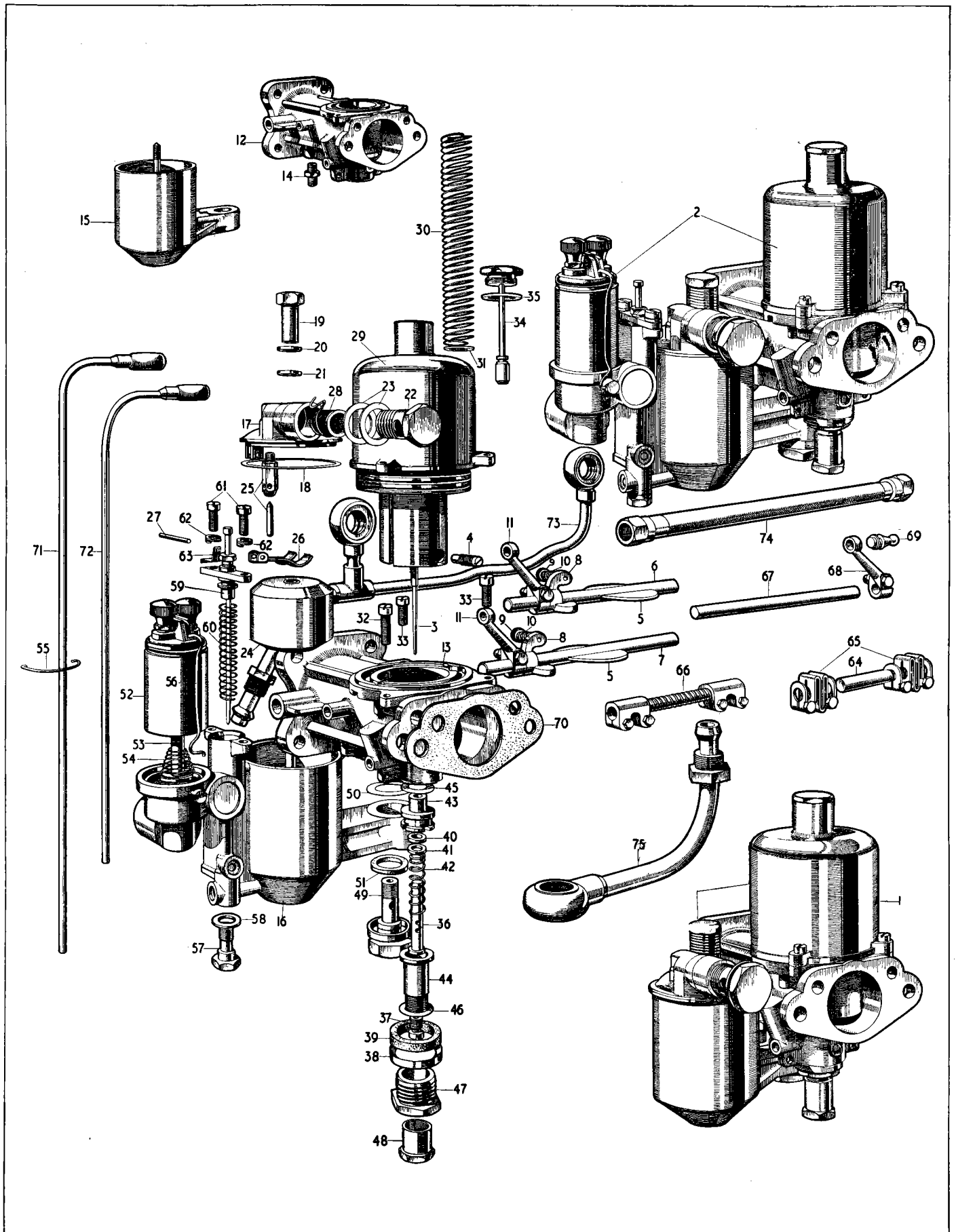


PLATE C.1. CARBURETTORS (Exploded view).

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**(MARK VII AND XK 120 MODELS)**

**GENERAL.** Twin S.U. carburetters, type H.6, incorporating an automatic auxiliary starting carburetter, are used on both models.

The action of the carburetter is as follows: The area of the air intake and the orifice of the fuel jet are automatically varied by means of a sliding piston to which is attached a tapered jet needle. The piston is raised and lowered by variations in depression governed by engine speed and throttle butterfly opening. This depression operates on the piston through a drilling passing from the atmosphere side of the throttle butterfly through the body of the carburetter and dashpot to the top of the piston. When the piston is raised, a larger area is available for the entry of air, and also, since the tapered needle rises with the piston, more fuel is allowed to pass through the jet. The piston and tapered needle, in conjunction with the jet, are proportioned to provide the correct mixture at all speeds and loads.

On the Mark VII model the carburetters are fed by one of a pair of large capacity S.U. electric pumps, type P.P.31/L.C.S., situated on the right-hand side of the rear chassis cross-member, drawing through separate pipe lines from twin tanks mounted in each of the rear wings. The quantity of petrol in the tanks is indicated by an electric gauge situated on the fascia board. A petrol change-over switch enables either tank (and therefore petrol pump) to be used, the gauge recording the level of petrol in the tank in use.

On the XK 120 model the carburetters are fed by a single large capacity S.U. electric pump, type P.P.31/L.C.S., situated on the rear of the chassis central cross-member at the right-hand side, drawing from a 15-gallon tank located at the rear of the chassis frame. The quantity of petrol in the tank is indicated by an electric gauge situated on the fascia board.

The petrol gauge is operated by the petrol tank unit, consisting of a float supported by the petrol level in the tank which rises and falls with variations of fuel level. The float arm operates on an electrical resistance which in turn registers on the petrol gauge.

On the XK 120 model a petrol level warning light fitted to the petrol gauge is also operated by the petrol tank unit. When the petrol level falls to approximately one-quarter full the float arm commences to contact the feed to the warning light situated in the petrol gauge, which consequently lights up intermittently. As the level of petrol falls below this point the contact becomes permanent and the warning light operates continuously.

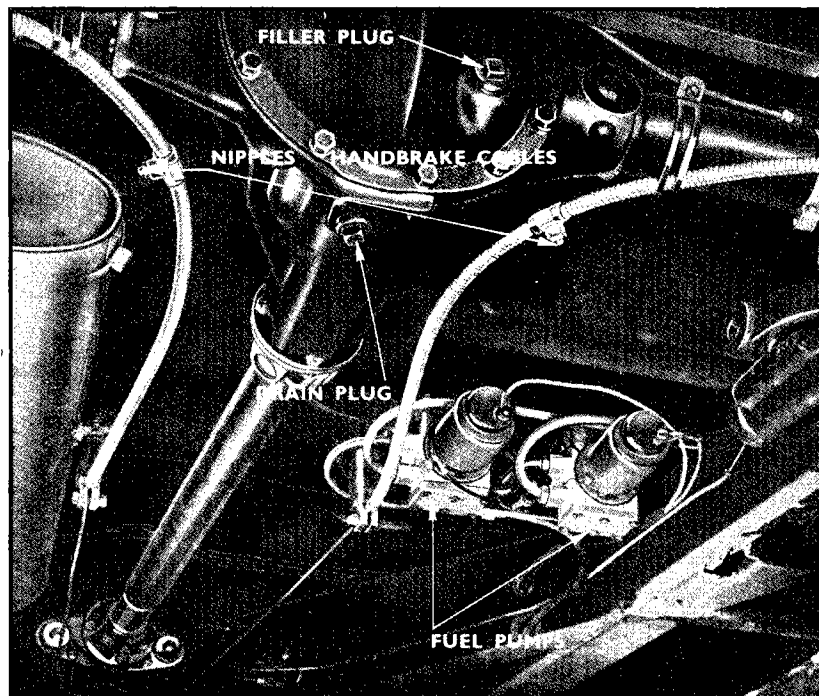


PLATE C.2. PETROL PUMP. LOCATION (Mark VII).

**MAINTENANCE.**

Routine carburettor maintenance is confined to cleaning the petrol filters situated in the float chamber caps, checking that the auxiliary starting carburettor electrical connections are clean and tight and the addition of oil after removing the piston damper by unscrewing the caps on top of the dashpots.

To these carburettors, which have hydraulic piston dampers, add the recommended grade of engine oil until the hollow piston spindle is filled. Observe that lack of oil will cause weakness of mixture on snap throttle openings and consequent falling off in performance. Occasionally the carburettors should be removed and dismantled for thorough cleaning. In view of the very fine tolerances to which the working parts are machined, metal polish or other abrasives must under no circumstances be used to clean these working parts. The fit of the piston in the dashpot chamber is not measured mechanically but by air leak between the large diameter of the piston and the dashpot interior. To check the fit, hold the piston upside down in the right hand with a finger covering the small air hole. With the left hand push the dashpot on to the piston as far as it will go. When the left hand is removed the dashpot will fall until clear of the piston; the time taken for this fall should be between four and five seconds.

Test operation of S.U. electric pump(s), situated on the Mark VII on the right-hand side of the rear chassis cross-member; and on the XK 120 on the rear of the chassis central cross-member on the right-hand side. Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank. Pass the tube over the end of the suction nipple (lower pipe) as soon as it is detached to avoid loss of petrol. Remove filter by withdrawing six cheese-headed screws securing base plate. Clean filter and replace. Check that petrol pump electrical connections are clean and tight. Situated at the base of the petrol tank is a well, sealed by a hexagon bung, which may be used to drain the contents of the tank. Contained in this well is a gauze strainer through which all petrol is drawn.

The hexagon bung should be removed occasionally and the sediment drained from the petrol tank. The gauze strainer should be cleaned before refitting. The only maintenance required to the petrol gauge and tank unit is to ensure that all connections are clean and tight.

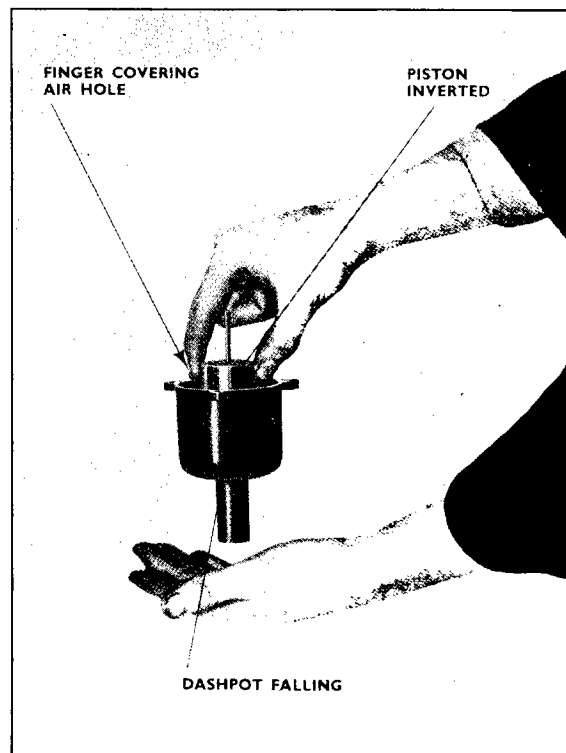


PLATE C.3. TESTING PISTON FIT IN DASHPOT.

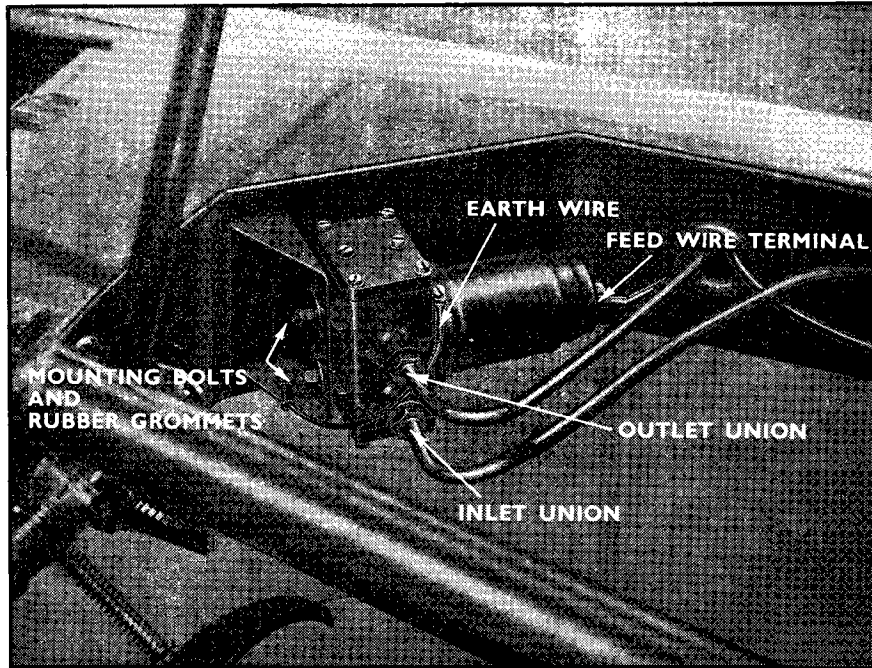


PLATE C.4. PETROL PUMP. LOCATION (XK 120).

**FUEL SYSTEM DATA**

	Mark VII	XK 120
Petrol Tank(s). Total capacity .. .. .	17 gallons (9 gallons, right-hand side) (8 gallons, left-hand side)	15 gallons (with optional auxiliary tank, 25 gallons)
Petrol measured by .. .. .	Electrical Gauge	Electrical Gauge
Petrol Pump. Make .. .. .	S.U.	S.U.
Operation .. .. .	Electrical	Electrical
Type .. .. .	P.P.31/L.C.S.	P.P.31/L.C.S.

**CARBURETTORS**

	S.U. Twin	S.U. Twin
Make .. .. .	H.6	H.6
Type .. .. .	S.M.	R.F.
Needle Size. Standard .. .. .	S.K.	R.G.
Weak .. .. .	.100"	.100"
Jet Size .. .. .	435/8	435/8
Starting Carburettor Needle Size .. .. .		

**Note.** The jet needle size is stamped on the parallel portion at the top of the needle, either on the side or top face. The starting carburettor needle size is stamped with the large number (e.g., 435) on the shoulder at the top of the needle and with the small number (e.g., 8) on the parallel portion of the needle.

**CARBURETTORS. TO REMOVE AND REFIT**

(MARK VII AND XK 120 MODELS)

**REMOVE AIR  
SILENCER AND  
MANIFOLD.  
(MARK VII)**

Remove the two set bolts passing through the silencer steady brackets into the inlet manifold casting. Remove silencer. Withdraw two bolts securing air silencer manifold to carburetter flanges. Remove manifold.

**REMOVE AIR  
CLEANERS.  
(XK 120)**

On the Super Sports withdraw the four bolts securing air cleaners to carburetter flanges. Remove air cleaners. On the Fixed Head Coupe remove the air cleaner hoses from carburetter flanges.

**REMOVE  
CARBURETTORS.**

Disconnect distributor vacuum feed pipe from front carburetter by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect both leads from starting carburetter solenoid and solenoid feed lead from clip at rear of inlet manifold. Unscrew auxiliary starting carburetter feed pipe union from inlet manifold. Disconnect throttle linkage at rear flexible joint. Release overflow pipes from clip on pressure oil filter. Remove eight carburetter flange nuts and withdraw carburetters.

**REFITTING.**

Refitting is the reverse of the above procedure. Always fit new carburetter flange joints on assembly.

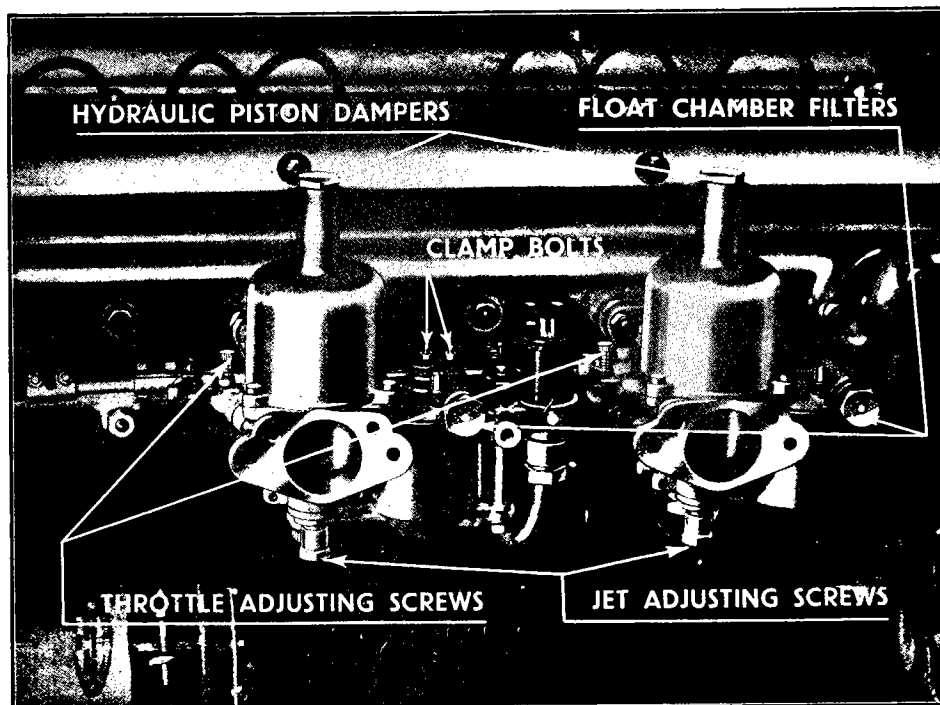


PLATE C.5. CARBURETTORS.

**CARBURETTORS. TO DISMANTLE AND REASSEMBLE****(MARK VII AND XK 120 MODELS)**

**DISMANTLE.** Unscrew caps on top of dashpots. Observe hydraulic piston dampers attached to caps. (Refer to Plate C.1.) Withdraw three screws securing each dashpot to carburettor body and remove dashpots and pistons. (Care must be exercised not to bend the needle which is attached to the piston.) Remove screw at base of piston and withdraw needle. Note that needle should be fitted with lip of shoulder flush with base of piston. Remove petrol feed pipe from float chamber covers. Observe gauze filter thimble located in float chamber cap and two fibre washers fitted in front and behind petrol feed pipe union. Remove hexagon nut under carburettor body retaining float chamber and remove float chamber. Withdraw set screw passing through float chamber cap, remove overflow pipes and withdraw cap and float now disclosed. Dismantle needle valve assembly fitted to float chamber cap by withdrawing pin from fork and unscrewing valve assembly.

To dismantle jet assembly remove the cap nut at base of jet followed by the jet screw and jet securing nut when the jet can be removed, together with top and bottom bearings. Observe disposition of plastic, cork, copper and brass washers. The auxiliary starting carburettor solenoid can be removed by releasing spring retaining clips. (On later cars fitted with a bakelite cover over the solenoid terminals it will be necessary to remove the screw at the top of the retaining clip and release clip to enable the solenoid to be removed.) Remove two set screws to withdraw the auxiliary starting carburettor jet needle.

**REASSEMBLE.** Reassembly is the reverse of the above procedure. If the jet has been disturbed, recentring should be carried out as follows:—

Remove cap nut at base of jet and rotate the jet adjusting screw upwards (clockwise) as far as it will go to position jet at its highest point. Ensure that the jet parts are assembled in the correct position and release the jet securing nut. (Plate C.1.) Fit the dashpot and piston with needle correctly fitted. Unscrew cap and remove hydraulic piston damper. Raise and lower the piston to centralise the jet with the jet needle and finally tighten the securing nut. It may be necessary to slacken the jet securing nut several times before the piston falls perfectly freely. When the jet has been centred correctly bring the jet adjusting screw back to its original position and fit the cap nut.

**CARBURETTOR HYDRAULIC PISTON DAMPER  
DESCRIPTION AND MAINTENANCE****(MARK VII AND XK 120 MODELS)**

**DESCRIPTION.** Attached to the cap, situated on top of the dashpots, is a short rod on the bottom end of which is mounted a small valve. The piston spindle is hollow and the rod and valve are contained in the spindle. When the level of oil is correct, that is, to the top of the hollow piston spindle, the valve is immersed in oil. It will thus be seen that on acceleration and snap throttle openings a slightly enriched mixture is obtained due to the control exerted on the piston by the hydraulic damper preventing the piston from rising with undue quickness.

**MAINTENANCE.** The only attention necessary is at 2,500 miles (4,000 kilometres) intervals to remove the caps on top of the dashpots and add the recommended grade of engine oil until the hollow piston spindles are filled. Replace the caps and dampers. Absence of oil will be indicated by poor acceleration, loss of power and spitting back through the carburettors on rapid opening of the throttle.

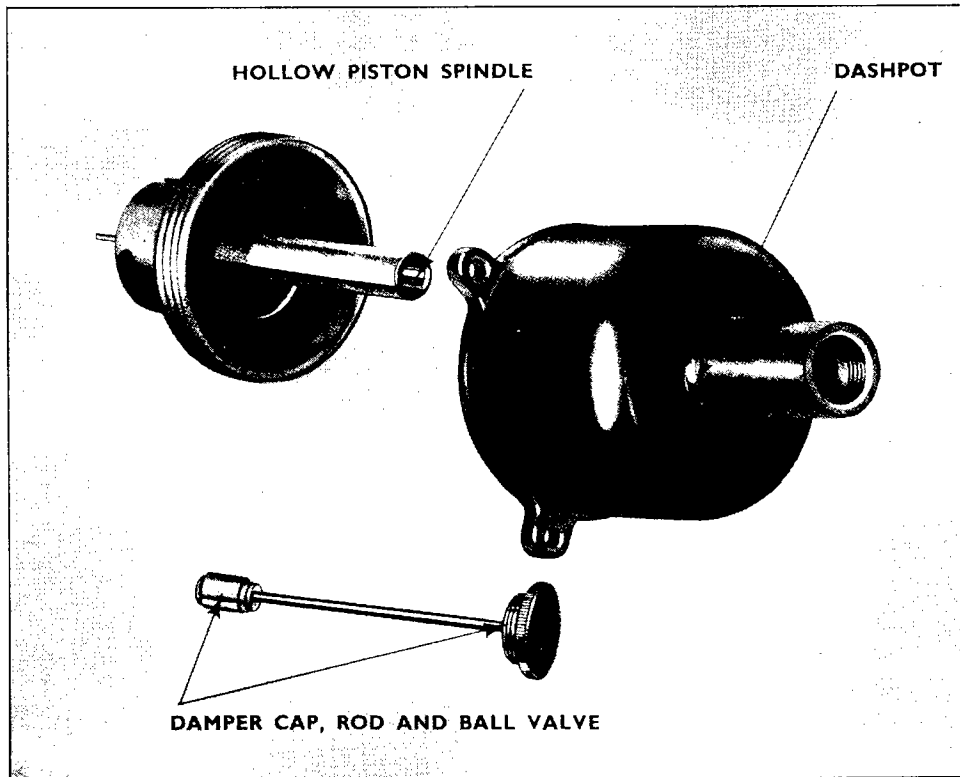


PLATE C.6. HYDRAULIC PISTON DAMPER.

### CARBURETTER JET. TO CENTRE (MARK VII AND XK 120 MODELS)

#### REMOVE AIR SILENCER AND MANIFOLD. (MARK VII.)

Remove two set screws passing through the silencer steady brackets into the intake manifold casting. Remove silencer. Withdraw two bolts securing air silencer manifold to carburetter flanges. Remove manifold.

#### REMOVE AIR CLEANERS. (XK 120.)

On the Super Sports withdraw four bolts securing air cleaners to carburetter flanges. Remove air cleaners. On the Fixed Head Coupe remove the air cleaner hoses from the carburetter flanges.

#### GENERAL.

Should it be necessary to remove the jet, this can be done by unscrewing the jet securing nut. It must be understood that the needle has a very fine working clearance in the jet and yet must not touch the jet. When assembling it is therefore necessary to carefully centre the jet to the needle, which is done as follows:—

#### TO CENTRE.

Remove cap nuts at base of jet and rotate the jet adjusting screw upwards (clockwise) as far as it will go to position jet at its highest point. Ensure that the jet parts are assembled in the correct position and release the jet securing nut. (Plate C.1.) Fit the dashpot and piston with needle correctly fitted. Unscrew cap and remove hydraulic piston damper. Raise and lower the piston to centralise the jet with the jet needle and finally tighten the securing nut. It may be necessary to slacken the jet securing nut several times before the piston falls perfectly freely. When the jet has been centred correctly bring the jet adjusting screw back to its original position and fit the cap nut. Experience shows that a very large percentage of carburettors that are returned for correction have had the jet removed and not centred correctly to the needle. Care is necessary when removing the piston not to bend the needle, since a bent needle will bind on the jet and thus cause the piston to stick.



## CARBURETTERS. TO TUNE AND SYNCHRONISE

(MARK VII AND XK 120 MODELS)

**GENERAL.** It is useless to attempt carburetter tuning until the cylinder compressions, valve clearances, sparking plug gaps and contact breaker point gaps have been checked and a general tune up has been carried out. See "Engine Tuning," Section B.

**TUNING.** Only two adjustments are provided at the carburetters: (1) The throttle adjusting screws (See Plate C.5.) governing idling speed and (2) the jet adjusting screws governing mixture strength. Correct setting of the mixture strength at idling speed ensures that the carburetters are correctly adjusted throughout their entire range.

Ensure that both needles are correctly located in the pistons, that is, with the shoulder of the needles flush with the base of the pistons. Check over the carburetters and ensure that pistons are free in the dashpots, petrol filters clean and hydraulic piston dampers topped up with the recommended grade of engine oil. Lubricate throttle controls and check free operation and full travel.

Run the engine until normal operating temperature is reached and check that both carburetters are sucking equally by placing one end of a rubber tube in the intake and listening at the other end so that the suction can be heard.

Slacken one clamp bolt on the universally jointed connection between the throttle spindles. Rotate the throttle adjusting screws until the carburetters are synchronised, that is, are sucking equally, and the engine is idling at approximately 500 r.p.m. Tighten the clamp bolt. Before carrying out the instructions which follow it is desirable to ensure that the mixture strength of both carburetters is approximately correct.

It may, therefore, be desirable to screw the jet adjusting screws upwards (clockwise) as far as they will go and then rotate them downwards (anti-clockwise) two and one-half turns, ensuring that the jets are not sticking and are following the movement of the adjusting screws.

Next check the mixture strength by starting the engine and operate the piston lifting pin of the front carburetter and so lift the piston approximately  $\frac{1}{4}$ " (6.0 mm.) when, if:—

(a) The engine speed increases and the engine continues to run at increased speed, this indicates that the mixture strength of the rear carburetter is too rich.

(b) The engine speed increases and the engine then stops, this indicates that the mixture strength of the rear carburetter is too weak.

(c) The engine speed increases momentarily and then decreases but the engine continues to run somewhat bumpily, then the strength mixture of the rear carburetter is correct.

Repeat the operation lifting the rear carburetter piston and testing the mixture setting of the front carburetter.

To adjust the mixture strength remove the dome nut covering the jet and to enrich the mixture rotate the jet adjusting screw in an anti-clockwise direction, that is, downwards. To weaken the mixture rotate the jet adjusting screw clockwise, that is, upwards. Ensure that the jet is not sticking and is following the movement of the adjusting screw. Always replace the dome nuts after adjustment.

Some slight adjustment of the slow running, to maintain this at 500 r.p.m., may now be necessary following alteration of the mixture strength, in which case ensure that the two throttle adjusting screws are rotated by an exactly equal amount or the adjustments previously made will be upset.

Note that it is essential to road test and make final adjustments with the air cleaner(s) fitted.

### CARBURETTER AIR CLEANER. TO REMOVE, SERVICE AND REFIT (MARK VII MODEL)

#### DRY AIR CLEANER

- REMOVE.** Remove the two set screws passing through the steady brackets into the inlet manifold casting. Remove air cleaner.
- SERVICE.** To dismantle unscrew wing nut at forward end of cleaner, remove end cap and withdraw element.
- Every 5,000 miles (8,000 kilometres) clean the element by holding element in a vertical position and gently tap fins.
- Every 15,000 miles (24,000 kilometres) replace the element.
- REFIT.** Assembly and refitting is the reverse of the above procedure. Ensure that the felt pad is seated in the end cap before refitting.

#### OIL BATH AIR CLEANER

- REMOVE.** Slacken the clip underneath the air cleaner and lift off cleaner from air cleaner manifold.
- SERVICE.** Unscrew the wing nut and remove the top cover. Lift out filter element, and wash element by swishing up and down in a bowl of paraffin and allow to drain thoroughly. Empty oil from the oil base and clean out the accumulated sludge. Fill oil base with engine oil to the level indicated. Replace filter element and top cover, ensuring that the gaskets are clean and in good condition. It is unnecessary to reoil the filter element as this is done automatically when the car is driven.
- The periods at which the above procedure must be carried out will vary according to the particular conditions under which the cleaner operates. For Export territories where dust is prevalent once every 1,000 miles may be necessary; as a general rule 2,500 miles can be taken as a safe guide to the proper cleaning period.
- REFIT.** Refitting is the reverse of the removal procedure.

### CARBURETTER AIR CLEANERS. TO REMOVE, SERVICE AND REFIT (XK 120 MODELS)

- REMOVE.** On the Super Sports withdraw four bolts securing air cleaners to carburetter flanges, and remove air cleaners.  
On the Fixed Head Coupe raise bonnet, slacken clip securing hose to air cleaner at front of radiator and remove air cleaner.
- SERVICE.** Every 5,000 miles (8,000 kilometres) or more frequently in dusty conditions remove the air cleaner(s) and thoroughly rinse in petrol. Before refitting, wet gauze with engine oil.
- REFIT.** Refitting is the reverse of the removal procedure.

### CARBURETTER PETROL LEVEL. TO CHECK AND RESET (MARK VII AND XK 120 MODELS)

- GENERAL.** The level of fuel in the float chamber and, therefore, the level in the jet, is controlled by the angle to which the forked float lever is set.
- CHECKING AND RESETTING.** Remove the float chamber cover and holding this inverted press the forked float lever downwards with the finger above the hinged end, thus ensuring that the needle valve is in the closed position. If the petrol level is correct a  $\frac{1}{8}$ " (12.7 mm.) round bar will just slide between the lever and the spigot on the lid. If the lever does not touch this bar at

the same time as it holds the needle on the seating, adjustment must be made by bending the lever. (Plate C.7.)

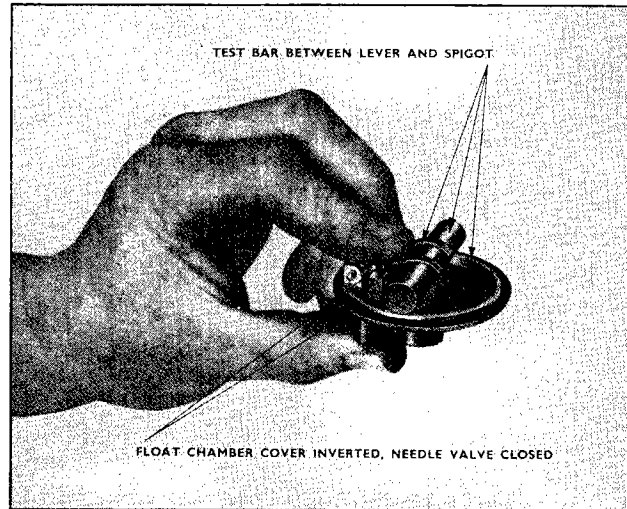


PLATE C.7. SETTING PETROL LEVEL.

## STARTING CARBURETTER. DESCRIPTION AND ADJUSTMENT (MARK VII AND XK 120 MODELS)

**GENERAL.** On early cars the auxiliary starting carburetter is integral with the float chamber of the rear carburetter, as illustrated in this section.

On later cars the auxiliary starting carburetter is a separate unit attached to the front carburetter, but the internal parts and the principle of operation are the same.

**OPERATION.** This consists of an auxiliary jet (C) controlled by a tapered needle (Q), and fed from the main float chamber (A).

Fuel emerging from this jet passes upwards between the shank (D) of the needle and the bore formed in the body through which this passes. Air at the same time enters through the passage (P) and mixes with the jet discharge. The emulsion thus formed is mixed with a further supply of air which passes downwards between a clearance provided between the disc (N) fixed to the needle shank (D) and the core surrounding this disc. The assembly comprising the disc and needle can move vertically and is normally spring loaded upwards by means of the spring (E). The mixture thus formed passes between valve (H) and its seating, and is drawn through the tube (O) into the induction passage of the engine. It will thus be seen that an additional amount of mixture is drawn directly into the induction passage irrespective of the main throttle position, and serves to provide the starting mixture, and also to enrich the mixture generally, so long as the device is in action. The movable parts (N) and (D) are normally held in the position shown in the diagram, thus when the engine is first started and the suction created in the induction passage by means of the starter is low, a rich mixture will be provided since the tapered needle (Q) will be withdrawn from the jet.

Immediately the engine starts a high degree of suction will be obtained in the induction pipe and consequently a strong flow through the auxiliary carburetter. The high velocity of air passing between the disc (N) and the bore surrounding this will be sufficient to draw the assembly downwards against the action of the spring and the needle (Q) will therefore enter the jet (C) to a greater extent and diminish the effective orifice of this: thus under these conditions only a moderate enrichment will be provided. In this way an excess of petrol, which will otherwise be obtained under these conditions, will be avoided. Immediately the throttle is opened however, the induction pipe depression will be diminished and thus the velocity of air past the disc will fall and so permit the assembly to rise again and provide a greater discharge from the jet. The valve (H) is held off its seating by means of a solenoid (J) which raises the iron core (I) to which the valve disc is attached, thus so long as a current is flowing through the solenoid this valve will be opened and the auxiliary carburetter will be in action.

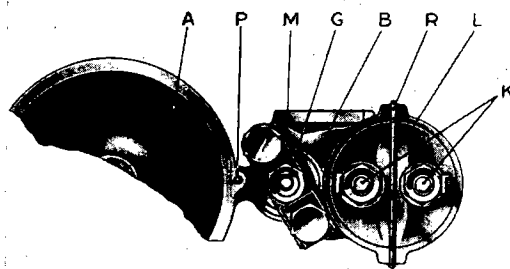
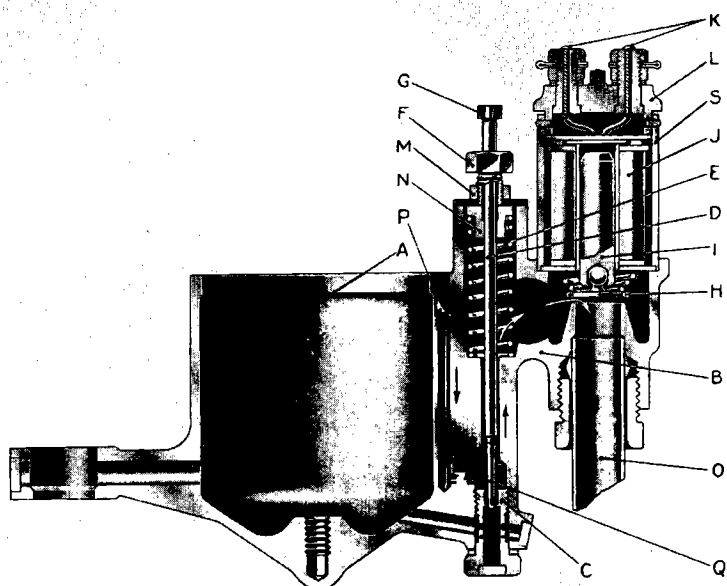


PLATE C.8. STARTING CARBURETTER.

**ELECTRICAL CONNECTIONS.**

The current is provided for the solenoid in the following manner:—One lead is taken from the ignition switch to one of the terminals (K) and the other terminal is connected to a thermostatic switch situated in the water outlet pipe from the cylinder head. This switch is so arranged that when the engine is cold a circuit is provided from the terminal (K) to earth. Immediately the water attains a temperature predetermined by the setting of the thermostat, the points will open and no return circuit will then be provided. The circuit through the solenoid thus having been broken, the core (I) will be released and valve (H) will return to its seating, thus putting the whole device out of action.

**ADJUSTMENT.** The only adjustment provided consists in setting the stop screw (F) which limits the movement of the needle (D). Screwing this down (clockwise) weakens, screwing it up (anti-clockwise) strengthens the idling mixture. The engine having been allowed to attain its normal working temperature, the auxiliary carburettor should be brought into action by short-circuiting the thermostatic switch. A convenient means of doing this is to make contact between the terminal in the centre of the switch and the body of the switch by means of a screwdriver. Having done this, the throttle should be momentarily flicked open, thus releasing the valve (H) and bringing the auxiliary carburettor into action. The stop screw should now be adjusted upwards to an extent just short of that which will make the engine run evenly; in other words, the engine should be given the strongest mixture possible, upon which it will fire on all its cylinders.

If on the next occasion upon which the engine is started from cold difficulty is experienced, the engine firing but failing to keep running, the stop screw should be unscrewed by a further amount of about half a turn.

### STARTING CARBURETTER THERMOSTATIC SWITCH TO REMOVE AND REFIT

(MARK VII AND XK 120 MODELS)

**REMOVAL.**

Detach starting carburettor wire from switch in water jacket at front of inlet manifold. Remove three screws and withdraw switch.

**REFITTING.**

Clean the joint faces of the switch and manifold to obtain a good earth before refitting, which is the reverse of the above procedure.

PETROL PUMP. DESCRIPTION AND SERVICING

(MARK VII AND XK 120 MODELS)

**GENERAL.** Two S.U. pumps, type L.C.S. (large capacity single), are fitted on the Mark VII and one on the XK 120. These pumps are gravity fed from the fuel tanks. Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank. Pass the tube over the end of the suction nipple (lower pipe) as soon as it is detached to avoid loss of petrol.

**DESCRIPTION.** The pump consists of three main assemblies: the body, the magnet and the contact breaker. The body "A" is an aluminium die casting, to which is attached by 2 B.A. screws two rectangular lids ("B" the upper and "C" the lower), the lower of which retains the filter. The upper lid gives access to the cage "D" for the outlet valve "E" and, when this cage is unscrewed, also to the inlet valve "E" and, when this cage is unscrewed, also to the inlet valve "F". These inlet and outlet valves are thin brass discs and should be assembled smooth side downwards—the outlet valve can be extracted (rarely necessary) after the spring circlip has been detached, and care should be taken not to unduly distort this circlip or the correct valve lift may be affected. A  $\frac{3}{8}$ " (9.5 mm.) diameter hole connects the space between the valves to the pumping chamber, which is a shallow depression in one face of the body casting. This space contains the diaphragm unit "J", which is clamped on its rim between the magnet housing "K" and the main body "A".

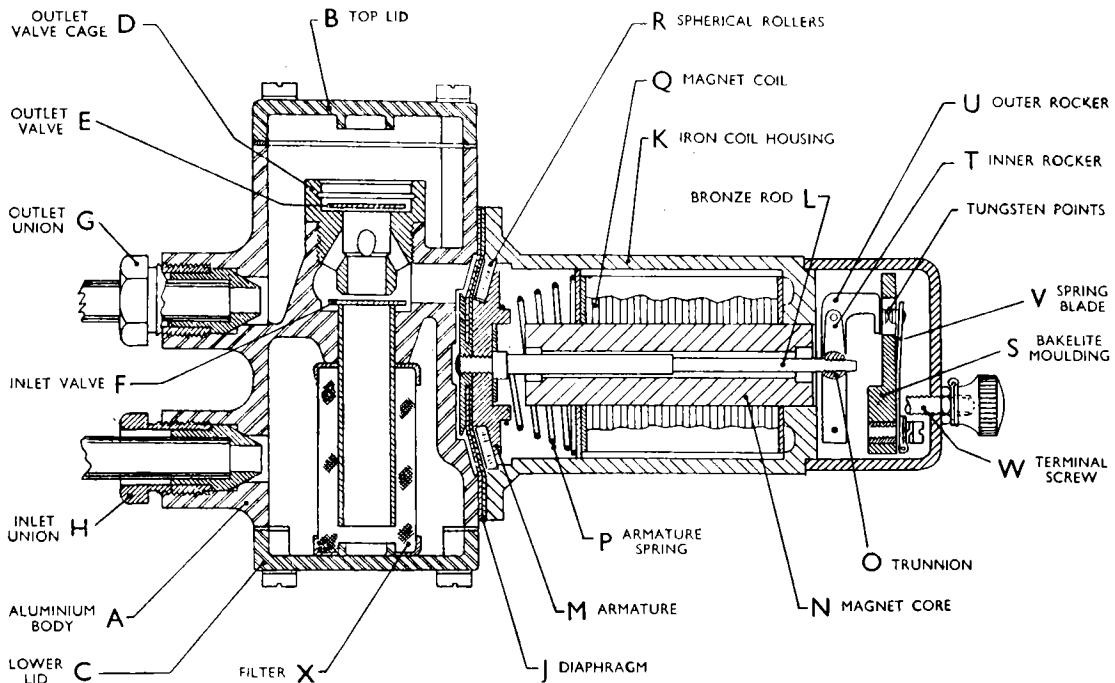


PLATE C.9. PETROL PUMP (Section view).

A bronze rod "L" is screwed to the centre of the armature "M", to which the diaphragm is also fastened, and passes through the magnet core "N" to the trunnion "O" in the contact breaker, which is positioned at the far end. An armature spring "P" is interposed between the armature and the end of the magnet coil.

The magnet consists of a cast-iron housing "K", having an iron magnet core "N" on which is wound a coil of copper wire "Q" which energises the magnet. Between the magnet housing "K" and the armature "M" are fitted eleven spherical-edged brass rollers "R". These locate the armature centrally within the magnet and allow absolute freedom of movement in a longitudinal direction.

The contact breaker consists of a small bakelite moulding "S", carrying two rockers, an inner rocker "T" and an outer rocker "U", which are both hinged to the moulding at one end and are connected together at the top end by two small springs arranged to give a "throw-over" action. A trunnion bearing "O" is fitted into the centre of the inner rocker and the bronze rod "L" connected to the armature is screwed into this.

The outer rocker is fitted with a tungsten point on a spring blade "V". This blade is connected to one end of the coil and the other coil end is connected to the terminal screw "W".

A short length of flexible wire connects the outer rocker to one of the screws which holds the bakelite moulding on to the magnet housing, in order to ensure a good earth.

The action of the pump is as follows:—

When the pump is at rest the outer rocker lies in the outer position and the tungsten points are in contact. The current passes from the terminal, through the coil, back to the blade, through the points and to earth, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it, and sucking petrol through the suction valve into the pumping chamber. When the armature has advanced nearly to the end of its stroke, the "throw-over" mechanism operates, and the outer rocker flies back, separating the points and breaking the circuit. The spring "P" then pushes the armature and the diaphragm back, forcing petrol through the delivery valve at a rate determined by the requirements of the engine. As soon as the armature gets near the end of this stroke, the "throw-over" mechanism again operates, the points again make contact, and the cycle of operations is repeated.

The spring blade rests against a small projection on the bakelite moulding and it should be set so that when the points are in contact it is deflected back from the moulding. The width of the gap at the points is approximately .030" (.76 mm.), and is best measured by holding the spring blade in contact with the pedestal when a .030" (.76 mm.) feeler should just pass between the white rollers and the cast-iron body.

**SERVICING.** Since specialised knowledge is required to service the pump it is recommended that advantage be taken of the factory reconditioned unit exchange scheme available for the S.U. pump, in preference to servicing the original unit.

If the magnet is removed from the body for any reason care should be taken that the rollers "R" do not drop out. If the armature and centre rod have been unscrewed it will be necessary to reset these. In order to do this the spring blade which carries the contact must be swung to one side. The armature should be screwed in as far as possible and should then be screwed back gradually and pressed in and out until it is found that when it is pushed in slowly but firmly (not jerkily) the "throw-over" mechanism operates. It should then be unscrewed two-thirds of a turn. The six screws which hold the magnet to the body may now be screwed into place, but before tightening these down it is essential that the diaphragm should be stretched to the outermost position. This is most easily done by inserting a matchstick behind one of the white fibre rollers on the outer rocker and thus holding the points in contact. If a current is then passed through the pump the magnet will be energised and will pull the armature forward, and while it is in this position the screws should be tightened. (Whilst this diaphragm-stretching operation can be done quite effectively by the matchstick method, there is available a special but simple "Agent's Repair" tool. This is a flat steel wedge, which is inserted under the trunnion "O" in the centre of the inner rocker in order to stretch the diaphragm to its outermost position before tightening the six flange screws.)

In the event of trouble, first disconnect the petrol delivery pipe at the carburetter flexible pipe. If the pump then works, the most likely cause of the trouble is a sticking needle in the float-chamber of the carburetter. Should the pump not work, disconnect the lead from the terminal and strike against the body of the pump to see if it sparks and therefore if any current is available in the wire. If the current is there, remove the bakelite cover and touch the terminal with the lead. If the pump does not operate and the points are in contact and a spark cannot be struck off the terminal, it is probable that there is some dirt on the points. These may be cleaned by inserting a piece of card between them, pinching them together and sliding the card backwards and forwards.

If, when the wire is connected to the terminal and the tickler of the carburetter is depressed, the points fail to break, it is possible that there is either an obstruction in the suction pipe, which should be cleaned by blowing down it with a tyre pump, or something in the pump itself which is preventing a correct movement. This may be due either to the diaphragm having stiffened or may be due to foreign matter in the roller assembly which supports the diaphragm and, therefore, the diaphragm should be removed, the whole assembly cleaned and reassembled in accordance with the instructions given above.

If the pump becomes noisy, look for an air leak on the suction side. The simplest way to check for this is to

disconnect the petrol pipe from the carburettor and allow the pump to pump petrol into a pint can. If the end of the pipe is then submerged in the petrol and bubbles come through, there must be an air leak, and it must be found and cured.

If the pump keeps on beating without delivering any petrol, it is possible that a piece of dirt is lodged under one of the valves. This can be remedied by removing the top lid and unscrewing the valve cage in order to examine both valves. A choked filter or an obstruction on the suction side will make the pump get very hot and eventually cause a failure. Also make sure that the six flange screws clamping the diaphragm are tight.

### PETROL PUMP. TO REMOVE AND REFIT

(MARK VII AND XK 120 MODELS)

**GENERAL.** Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank.

**REMOVAL.** Disconnect suction pipe union ; this is the lower pipe, and attach the rubber tubing to the nipple as soon as it is detached to avoid loss of petrol. Disconnect delivery pipe union; this is the upper pipe. Disconnect electric feed wire from terminal on bakelite cover. Disconnect earth wire from pump body. Remove two securing nuts and withdraw pump.

**REFIT.** Refitting is the reverse of the foregoing procedure. Observe rubber grommets fitted to mounting bolts. It is essential that these are fitted and that they are in sound condition or pump operation noise will be transferred to the chassis frame.

### PETROL TANK. TO REMOVE AND REFIT

(MARK VII MODEL)

**DISCONNECT TANK CONNECTIONS.** The operation described is the same for both left and right-hand petrol tanks, but to obtain access to the right-hand (offside) petrol tank the spare wheel and wheel-brace must first be removed.

Raise car on lift, remove drain bung and drain tank into clean receptacle. Lower car. Remove relevant boot side casing. Disconnect petrol feed pipe union from rear of tank. Disconnect hose clip retaining petrol filler hose and ease hose off petrol tank. (If difficulty is encountered in withdrawing the hose from the tank, open hinged petrol filler cover and remove four screws securing filler to body shell. With the filler pipe free the hose can now readily be disengaged from the tank.) Disconnect petrol vent pipe by easing off rubber tubing. Disconnect wire from petrol tank gauge unit.

**REMOVAL.** Remove two bolts passing through petrol tank fixing lugs, one at each end of tank. Lift out tank through boot aperture.

**REFITTING.** Refitting is the reverse of the above procedure.

### PETROL TANK. TO REMOVE AND REFIT

(XK 120 MODELS)

**DISCONNECT TANK CONNECTIONS.** Raise car on lift, remove drain bung and drain tank into clean receptacle. Remove carpet from boot floor. Remove coach screws securing right-hand (offside) boot floor board and lift out floor board. Remove screws securing petrol filler pipe guard to left-hand (nearside) boot side casing, and screws securing left-hand floor board. Slide floor board, complete with petrol filler pipe guard towards centre of boot, tilt slightly forwards and withdraw through boot aperture.

Disconnect petrol vent pipe by easing off rubber tubing. Disconnect two wires from petrol tank gauge unit. Disconnect petrol feed pipe from front right-hand (offside) side of petrol tank.

**REMOVAL.** Remove the two straps under petrol tank by removing two nuts and two locknuts on each strap. Lower tank away from car.

**REFITTING.** Refitting is the reverse of the above procedure.

### **PETROL TANK FILLER HOSE. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

**REMOVAL.  
(MARK VII.)** The operation described is the same for both left and right-hand petrol tanks, but to obtain access to the right-hand (offside) petrol tank the spare wheel and wheel-brace must first be removed.

Remove relevant boot side casing. Remove hose clips securing hose to petrol tank. Open hinged petrol filler cover and withdraw four screws securing petrol filler to body shell. Remove filler and hose through hinged cover aperture.

**REMOVAL.  
(XK 120.)** Remove screws securing petrol filler pipe guard and remove guard. Remove clips securing hose to petrol tank. Slide hose well up filler neck until free of tank. Bend hose and withdraw. If necessary, grease or soap applied to the filler neck will facilitate sliding of the hose.

**REFITTING.** Refitting is the reverse of the above procedure.

### **PETROL TANK GAUGE UNIT. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

**REMOVAL.  
(MARK VII.)** The operation described is the same for both left and right-hand petrol tanks, but to obtain access to the right-hand (offside) petrol tank the spare wheel and wheel-brace must first be removed. Drain relevant petrol tank.

Remove relevant boot side casing. Disconnect petrol gauge wire from tank unit. Remove six screws and withdraw tank unit. Care must be taken not to bend the float lever or the calibration will be upset, giving a false reading on the gauge.

**REMOVAL.  
(XK 120.)** Remove carpet from boot floor. Remove screws securing right-hand (offside) boot floor board and lift out floor board. Remove screws securing petrol filler pipe guard to left-hand (nearside) boot side casing, and screws securing left-hand floor board. Slide floor board complete with petrol filler pipe guard towards centre of boot, tilt slightly forwards and withdraw through boot aperture. Disconnect two wires from petrol tank gauge unit. Remove screws securing gauge unit to tank and remove unit.

**REFITTING.** Refitting is the reverse of the above procedure. Ensure that jointing washer between unit and tank is in sound condition. If there is any apparent damage fit a new washer, using jointing compound sparingly applied.

### **PETROL GAUGE. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

**REMOVE  
CENTRE FACIA.  
(MARK VII.)** Remove the two drive screws securing dash casing to centre facia panel. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side securing lower edge of facia to support brackets. Remove two



thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly, and remove centre facia.

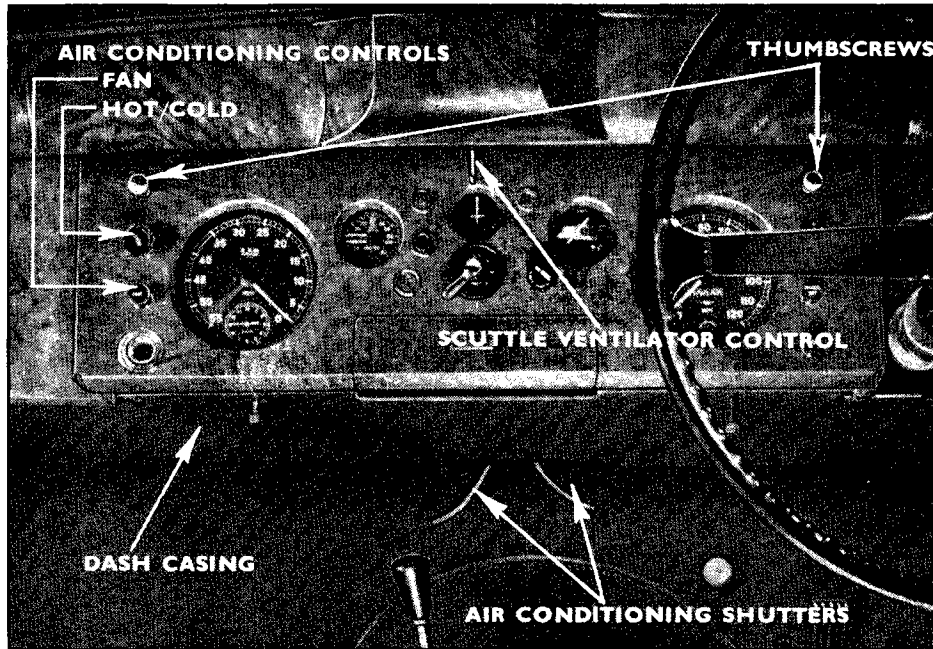


PLATE C.10. CENTRE FACIA. REMOVAL (Mark VII).

**REMOVE CENTRE FACIA. (XK 120.)**

Remove drive screws securing instrument panel casing and release casing. Remove two nuts each side of instrument panel securing panel to facia structure. Withdraw instrument panel from rest of facia.

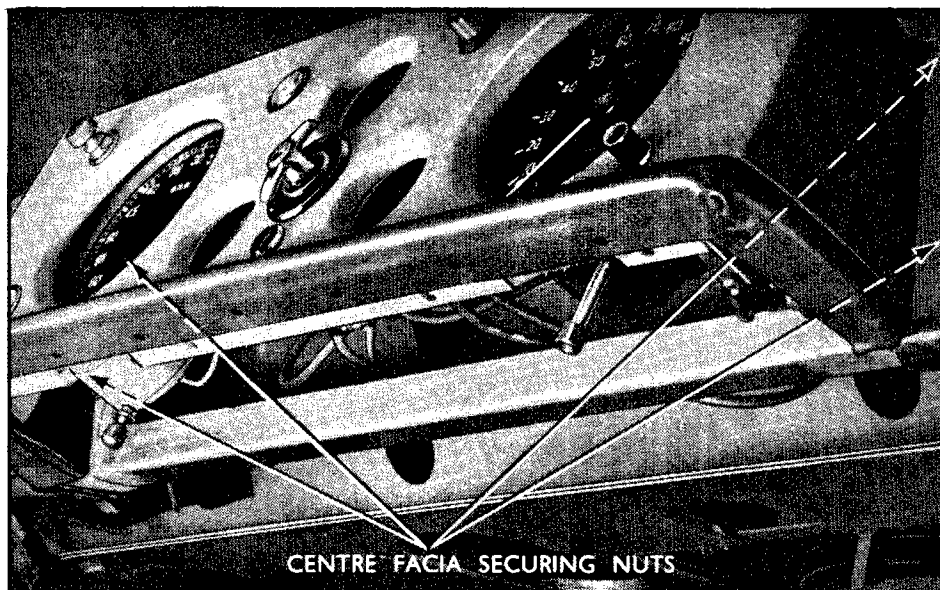


PLATE C.11. CENTRE FACIA. REMOVAL (XK 120).

**REMOVE GAUGE.**

Remove two screws securing gauge to instrument carrier, draw gauge away from carrier, release wiring, and remove gauge.

**REFIT.**

Refitting is the reverse of the above procedure.

**PETROL GAUGE AND TANK UNIT. TO SERVICE  
(MARK VII AND XK 120 MODELS)****GENERAL.**

The petrol gauge is connected to the tank unit by a single wire. The following methods may be used to check the system and trace any faults that have developed. In all cases first check that all wiring connections are clean and tight.

**SERVICING.**

To check the wire connecting gauge to tank unit for an earth, disconnect the wire from tank unit, switch on ignition, when the gauge should register "Full".

If the gauge does not register "Full" when the wire is disconnected from the tank unit disconnect the wire from the gauge also, when, if the gauge now registers "Full", the wire is faulty and must be repaired or replaced. If, with the wire from the tank unit disconnected from the gauge, a reading other than "Full" is recorded, the gauge is faulty and must be replaced.

To check the wire connecting gauge to tank unit for an open circuit, disconnect the wire from the tank unit, switch on the ignition and earth the wire, when the gauge should read "Empty". If the gauge does not register "Empty" earth the gauge terminal normally connected to the tank unit, when, if the gauge now registers "Empty", the wiring is faulty and must be repaired or replaced. If, with the terminal normally connected to the tank element earthed, the gauge gives a reading other than "Empty" the gauge is faulty and must be replaced.

When the petrol tank unit has been removed care should be taken to ensure that when refitting the float is free to rise and fall without obstruction from the tank. This may be tested with the tank unit replaced and the cover plate removed by gently moving the fingers contacting the resistance through their full travel. If there is interference, bend the float arm until clearance is effected. It will be realised that the float arm may be bent vertically and thus calibrate the gauge to the contents of the petrol tank. When the tank is empty (or full), if the gauge does not show a reading of "Empty" (or "Full"), the float arm should be bent until the correct conditions are obtained.

# COOLING SYSTEM

## MARK VII and XK 120 MODELS

### ENGINE NUMBERS

(Stamped on right-hand side of cylinder block above pressure oil filter, and on front end of cylinder head casting)

MK. VII  
A.1001 ONWARDS

XK 120  
W.1001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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D.10	Thermostat .. .. .	— D.13
D.11	Water Pump. Drilling a New Spindle .. .. .	D.14
D.12	Centre Facia. Removal .. .. .	D.16 —
D.13	Centre Facia. Removal .. .. .	— D.16

**DESCRIPTION****(MARK VII AND XK 120 MODELS)**

**GENERAL.** Water is circulated from the base of the radiator block via the water pump through the cylinder block and head water passages, and returned to the radiator header tank via the inlet manifold water jacket. To ensure a quick warm-up from cold, a thermostat is incorporated in the system which by-passes water back to the engine until a sufficient operating temperature is reached when the thermostat valve opens and normal circulation through the radiator block is obtained.

A spring loaded valve is incorporated in the radiator filler cap which has the effect of raising the boiling point of the coolant which is of especial value when operating the car in hot climates and at high altitudes. An overflow pipe is fitted in the radiator filler neck which discharges at the left-hand side of the block.

To ensure an adequate flow of air through the cooling element of the radiator block a fan is mounted on the water pump spindle boss and is driven by an adjustable "V" belt from the crankshaft pulley.

**MAINTENANCE****(MARK VII AND XK 120 MODELS)**

**DRAINING THE SYSTEM.** Drain the system whilst the car is standing on level ground. Turn the air conditioner hot/cold control on the centre facia to the hot position, that is, anti-clockwise. Operate remote control of radiator drain tap situated at the top left-hand side of the radiator block (Plate D.1) and open the engine drain tap situated at the left-hand rear of the cylinder block (Plate D.2).

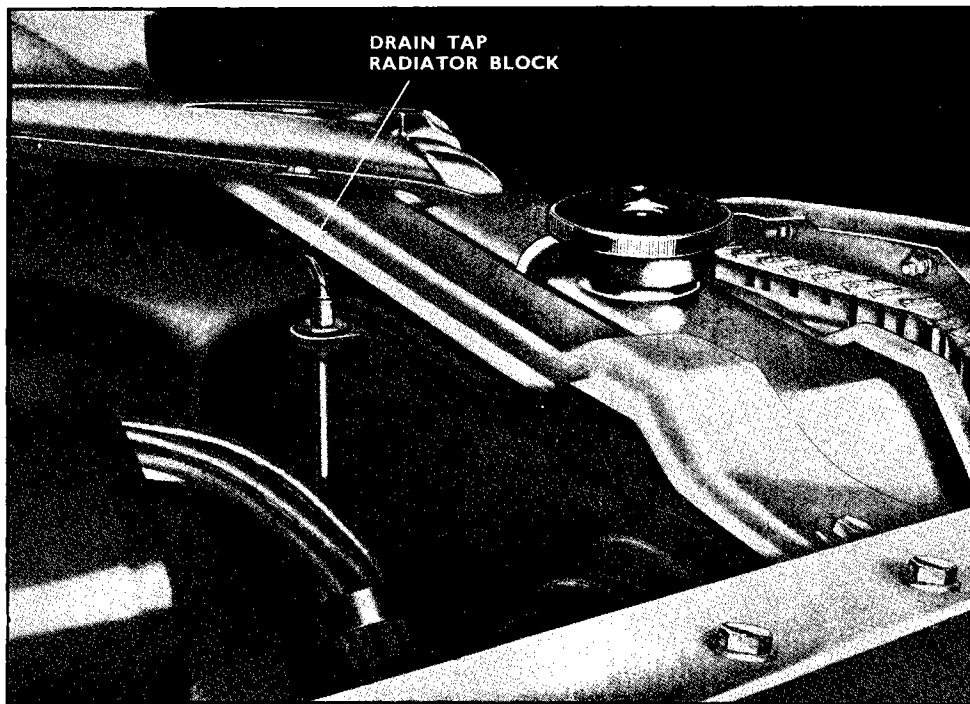


PLATE D.1. DRAIN TAP. RADIATOR (Mark VII).

**DRAINING THE SYSTEM.** Drain the system by opening the tap situated at the front of the radiator block (Plate D.3) and the engine drain tap situated at the left-hand rear of the cylinder block (Plate D.2).

**FILLING THE SYSTEM.** Ensure that the radiator block and cylinder block drain taps are closed. Fill the system with water which is as nearly neutral (soft) as possible. Open the air conditioner hot/cold control by rotating to the hot position, that is, anti-clockwise, and slacken the outlet hose clip on front face of heater radiator. Run the engine for a few minutes to allow the water to

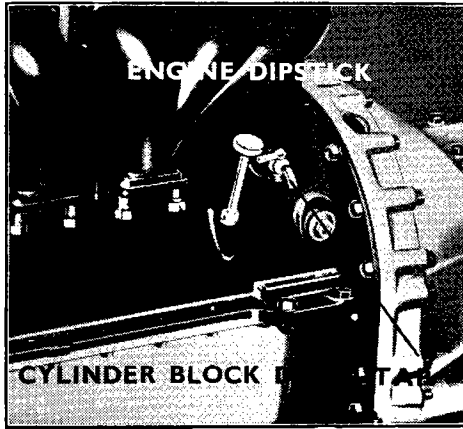
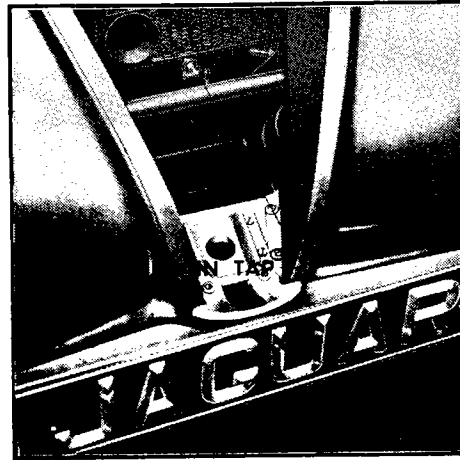


PLATE D.2. DRAIN TAP. ENGINE.

PLATE D.3. DRAIN TAP. RADIATOR  
(XK 120).

circulate through the air conditioner, until water flows from outlet hose, and then tighten hose clip. Top up the radiator, if necessary, the correct level being when the coolant just reaches the bottom of the filler neck. On early Mark VII cars a bleeder valve is fitted in the front face of the heater radiator on the scuttle. This valve should be closed before filling the system with water and then opened whilst running the engine to release air from the system. This valve should be allowed to remain open until water commences to flow from the valve, which will indicate that all air has been released. Tighten the valve and check that the radiator is topped up to the correct level.

**CLEANING.** The entire cooling system should occasionally be flushed out to remove sediment. To do this, open the radiator block and cylinder block drain taps and insert a water hose into the radiator filler neck. Allow the water to flow through the system, with the engine running at 1,000 r.p.m. to cause circulation, until the water runs clear.

**CARE OF THE SYSTEM.** Since deposits in the water will in time cause fouling of the surfaces of the cooling system with consequent impaired efficiency, it is desirable to retard this tendency as much as possible by using water as nearly neutral (soft) as is available. One of the approved brands of water inhibitor may be used with advantage to obviate the creation of deposits in the system. Every 2,500 miles (4,000 kilometres) apply grease sparingly through the nipples provided to lubricate the water pump spindle bearing and the fan bearings. Every 5,000 miles (8,000 kilometres) check the tension of the fan belt and adjust, if necessary. Occasionally check all water hose connections, joint of the water pump, inlet manifold and drain taps to ensure that these are tight and free from leaks.

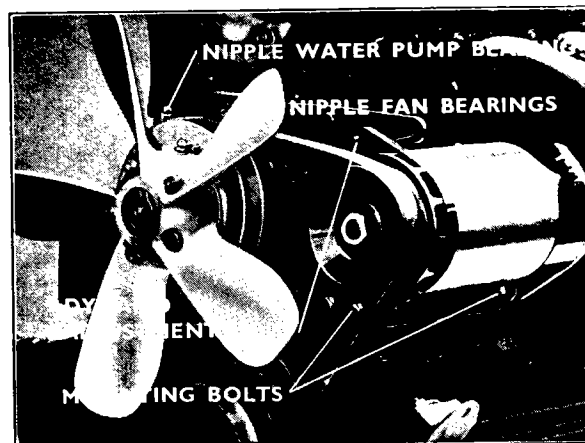


PLATE D.4. NIPPLES, WATER PUMP AND FAN.

**FROST PRECAUTIONS****(MARK VII MODEL)**

During the winter months it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers. If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine.

Drain the radiator while the car is standing on level ground. Turn the air conditioner hot/cold control on the centre fascia to the hot position, that is, anti-clockwise. Operate remote control of radiator drain tap situated at the top left-hand side of the radiator block (Plate D.1) and open the engine drain tap situated at the left-hand rear of the cylinder block (Plate D.2). On early cars fitted with a bleeder valve in the front face of the heater radiator on the scuttle, it is necessary to unscrew the valve to prevent an air lock occurring and water remaining in the heater system.

When water has ceased to flow, run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system completely.

**FROST PRECAUTIONS****(XK 120 MODELS)**

During the winter months it is recommended that an approved anti-freeze solution should be added to the cooling water in the proportions recommended by the appropriate manufacturer.

If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine. Drain the radiator while the car is standing on level ground by opening the drain tap situated at the front of the radiator block, and the engine by opening the tap at the left-hand rear of the cylinder block.

When water has ceased to flow, run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system complete.

**Note.** On cars fitted with air conditioners note that draining the radiator and cylinder block does NOT drain the heater unit.

**ANTI-FREEZE****(MARK VII AND XK 120 MODELS)**

Before adding anti-freeze solution the cooling system should be cleaned by flushing as described above. The cylinder head gaskets must be in good condition and cylinder head pulled down correctly, since if the solution leaks into the crankcase a mixture will be formed with the engine oil likely to cause blocking of oil ways with consequent damage to working parts. Check tightness of all water hose connections, water pump and manifold joints. Measure the recommended proportion of water and anti-freeze solution in a separate container and fill the system from this container, rather than add the solution direct to the cooling system, to ensure satisfactory mixing. If topping up is necessary during the period in which anti-freeze solution is in use, this topping up must be carried out using anti-freeze solution or the degree of protection provided may be lost. Topping up with water will dilute the mixture possibly to an extent where damage by frost will occur.



## COOLING SYSTEM DATA

		Mark VII.	XK. 120.
Total Capacity		22 pints 27.5 U.S. pints 13 litres	25½ pints 29.8 U.S. pints 14.5 litres
Radiator Core	Type	Film	Film
Water Pump	Type Drive	Centrifugal Fan Belt	Centrifugal Fan Belt
Fan Belt.	Angle of "V"	32°	32°

## RADIATOR FLOW FIGURES

1 lb. per sq. in.	16 gallons per minute	22 gallons per minute
1.5 lb. " " "	24.9 " " "	30 " " "
2 lb. " " "	30.1 " " "	35.5 " " "
2.5 lb. " " "	35 " " "	40.9 " " "
3 lb. " " "	38.9 " " "	44.9 " " "
3.5 lb. " " "	42.9 " " "	49.5 " " "
4 lb. " " "	46 " " "	
4.5 lb. " " "	49 " " "	

(Water at 62°F. (17° C.))

1 lb. per square inch = 0.070 kg./cm.<sup>2</sup>

1 gallon (Imperial) = 4.55 litres

1 Imperial gallon = 1.2 U.S. gallons

**FAN. TO REMOVE AND REFIT.  
(MARK VII AND XK 120 MODELS)**

**REMOVE RADIATOR.**

As described on page D.9 for the Mark VII model, and page D.10 for the XK 120 models.

**REMOVE FAN.  
Five-bladed Type.**

(Plate D.5).

Slacken the dynamo adjusting link bolt and release fan belt tension. Remove the fan and fan pulley from the hub by unscrewing the five set screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley

**REMOVE FAN.  
Six-bladed Type.**

(Plate D.6).

Before removing the set screws securing the fan to the hub, mark the positions of the semi-circular balance piece(s) relative to the fan and fan hub. (On initial assembly the ends of the balance piece(s) and fan are marked with a centre punch, and a small hole is drilled through the balance piece(s), fan and fan hub, to assist reassembly. Plate D.6.)

Remove the fan from the hub by unscrewing the four set screws fitted with shakeproof washers.

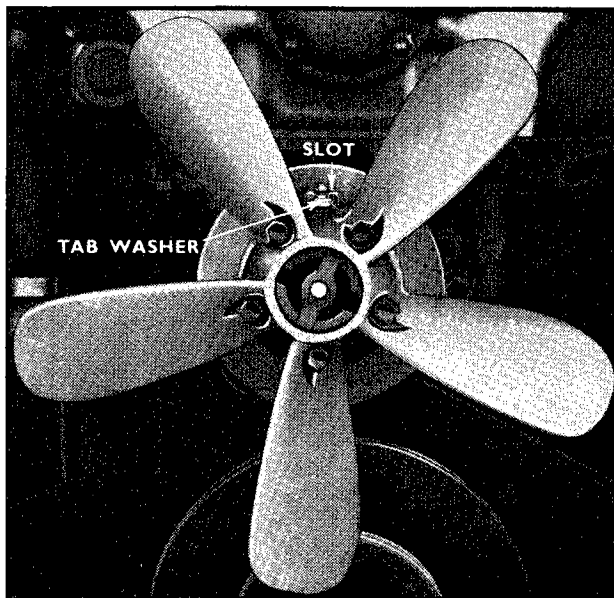


PLATE D.5. FAN. FIVE-BLADED TYPE.

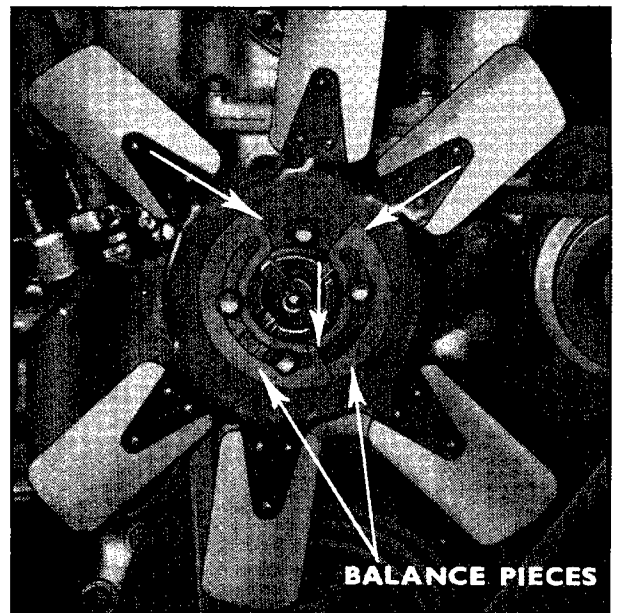


PLATE D.6. FAN. SIX-BLADED TYPE.

**REFIT.**

Refitting is the reverse of the above procedure. In the case of the six-bladed type of fan, due regard should be paid to the above removal notes, in order to preserve the balance of the assembly.

If a new six-bladed fan and/or fan hub are to be fitted, the fan should be bolted to the hub (with a clean front bearing fitted) and statically balanced as an assembly by mounting on a mandril and setting up on parallel knife edges. Balancing is effected by varying the position of the semi-circular balance piece(s) which are retained by set screws securing the fan to the fan hub.

### FAN BELT. TO ADJUST (MARK VII AND XK 120 MODELS)

#### SLACKEN DYNAMO MOUNTINGS.

Slacken the two dynamo bolts and nuts underneath the dynamo and the adjusting set screw passing through the dynamo link. (Plate D.4.)

#### ADJUST BELT TENSION.

Pull dynamo outwards until the belt can be flexed approximately  $\frac{1}{2}$ " (12 mm.) either way in the middle of the vertical run. Tighten adjusting set screw and the two dynamo mounting bolts.

**Note.** Undue tension will create heavy wear of belt, pulleys, fan and dynamo bearings.

### FAN BELT. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

#### REMOVE.

Slacken the front mounting bolt underneath the dynamo. Remove rear mounting bolt and nut and the dynamo adjusting set screw. Slacken the set screw securing the dynamo adjusting link and swing link upwards. (Plate D.4.)

Swing the rear of dynamo outwards until the fan belt can be removed from the pulley. Temporarily retain the dynamo by refitting the mounting bolt and adjusting set screw.

Remove belt from crankshaft pulley and withdraw over fan.

#### REFIT.

Refitting is the reverse of the above procedure, but it is important that the belt is not stretched over the pulleys other than by hand. If a tool is used to lever the belt on or off, the endless cords in the belt may be broken.

### RADIATOR BLOCK. TO REMOVE AND REFIT (MARK VII MODEL)

#### REMOVE RADIATOR GRILLE.

Remove the two set screws and plain washers securing the radiator grille to the tie panel at the top of the radiator. From underneath the car remove the two set screws and plain washers securing the grille brackets to the radiator frame. Remove the grille, noting the packing washers fitted between the bottom grille brackets and the radiator frame.

#### REMOVE TIE PANEL AND SUPPORTING CHANNEL.

Remove the three set screws and plain washers securing the tie panel to the supporting channel. Remove tie panel complete with bonnet release cable and place on wing.

Remove the set screw and plain washer securing the support channel to each wing valance and remove channel.

#### REMOVE RADIATOR BLOCK.

Drain radiator by operating the remote control at top rear of radiator header tank. Slacken the top and bottom hose clips and disconnect hoses. Remove the four set screws securing the radiator block to the vertical members of the radiator frame. The radiator block can now be removed by lifting it upwards, taking care not to foul the fan blades.

(Plate D.7.)

#### REFIT.

Refitting is the reverse of the above procedure.

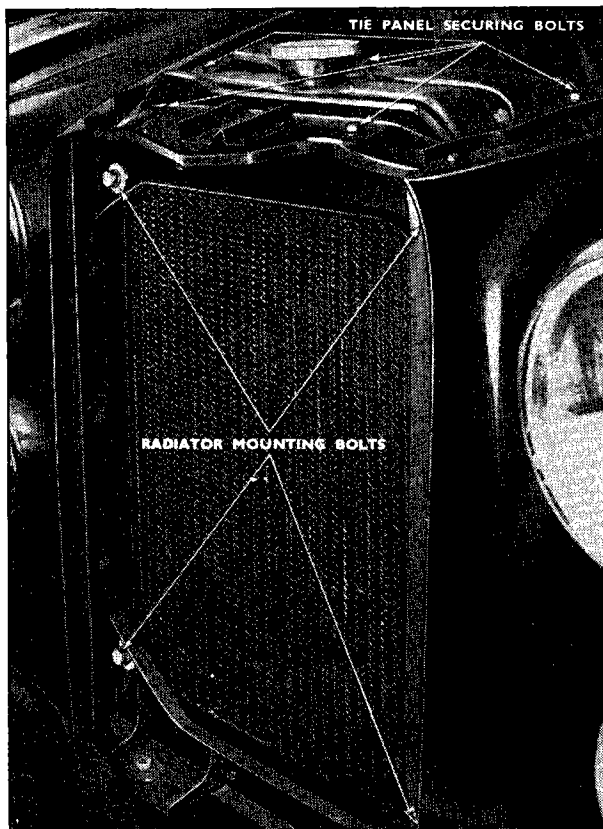


PLATE D.7. RADIATOR. REMOVAL (Mark VII).

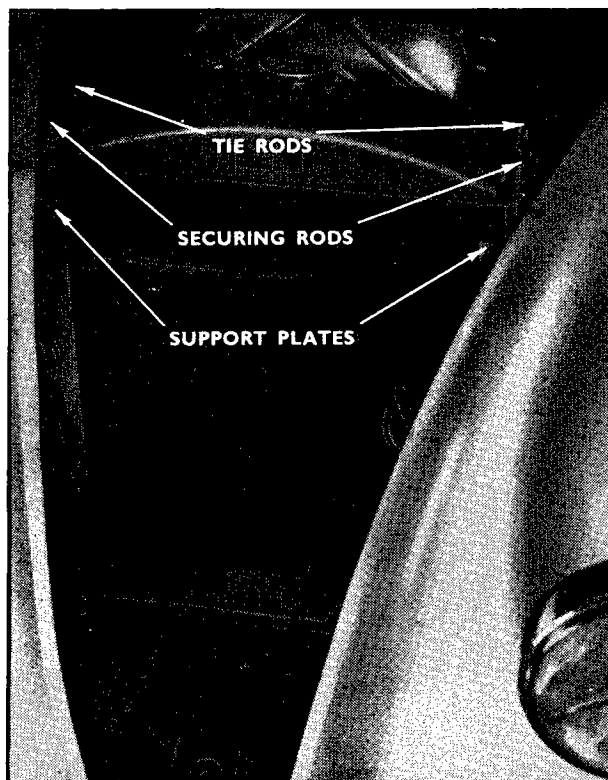


PLATE D.8. RADIATOR. REMOVAL (XK 120).

### RADIATOR BLOCK. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE.** Drain the radiator by opening the drain tap at the front of the radiator.

Disconnect the thermostat housing from the radiator header tank by removing the two nuts and shakeproof washers. Note gasket between housing and header tank.

Slacken the bottom hose clip from the radiator stub pipe and detach hose.

Detach the right-hand felt covered support plate at the forward side of the radiator by removing the three set screws securing the plate to the wing valance. (Plate D.8.)

Remove the metal plate adjacent to the radiator drain tap by unscrewing the three drive screws. Detach the radiator tie rods from the brackets on the header tank by removing the two nuts, bolts and shakeproof washers.

Disconnect the radiator securing rods from the brackets on the sides of the radiator by removing the two nuts and shakeproof washers.

Withdraw the radiator upwards, turning the fan blades to avoid fouling the stub pipe on the bottom tank. Note the packing rubbers between the bottom of the radiator and the mounting brackets.

**REFIT.** Refitting is the reverse of the above procedure.

## THERMOSTAT. REMOVE, CHECK AND REFIT (MARK VII MODEL)

**REMOVE.**  
(Refer to  
Plate D.9.)

Drain the radiator by operating the remote control of the drain tap situated at the top left-hand side of the radiator block.

**From Engine Number A.1001—A.2000, A.6001 and onwards.**

Slacken the clip and remove the top water hose from the elbow pipe at the top of the thermostat housing.

Remove the elbow pipe from the thermostat housing by unscrewing the two bolts and nuts, and lift out thermostat. Note the gasket between the elbow pipe and thermostat housing.

**From Engine Number A.2001—A.6000.**

Slacken the clips and remove the top water hose and by-pass hose from the thermostat housing.

Remove the water temperature bulb from the bottom of the thermostat housing by holding the flats on bulb and unscrewing union nut. It is necessary to exercise care not to twist the capillary tube during removal or fracture may occur. Disconnect the wire from the starting carburettor thermostat terminal. Remove the three nuts securing the thermostat housing to the inlet manifold, and withdraw housing. Remove the two bolts and nuts securing the water outlet elbow to the thermostat housing and lift off elbow. Remove the set screw and copper washer from the side of thermostat housing and withdraw thermostat from housing.

**CHECK.**

Thoroughly clean the thermostat and check that the small hole in the valve is clear.

Check the thermostat for correct operation by immersing in a container of cold water together with a thermo-

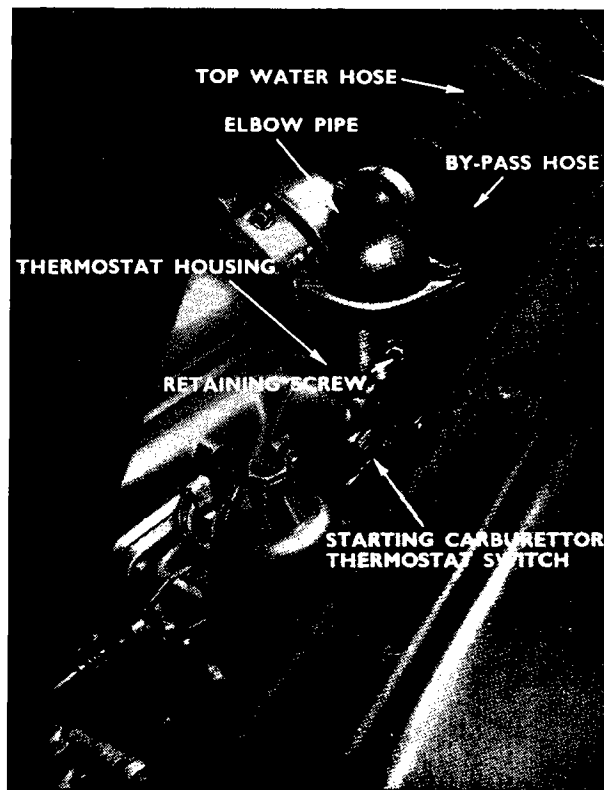


PLATE D.9. THERMOSTAT (Mark VII).

meter and stirrer. Heat the water, keeping it well stirred, and observe if the characteristics of the thermostat are in agreement with the following data.

	Smiths.	British Thermostat.
Commences to open :	70°—75°C.	70°—75°C.
Fully open :	90°C.	78°C.
Valve lift :	$\frac{3}{8}$ " (9.5 mm.)	$\frac{3}{8}$ " (9.5 mm.)

**Note.** The two types of thermostat can be distinguished by the fact that the British Thermostat type has a domed valve housing and is retained in its housing by a set screw.

**REFIT.** Refitting is the reverse of the removal procedure.

**From Engine Number A.1001—A.2000, A.6001 and onwards.**

Always fit a new gasket between the elbow pipe and the thermostat housing.

**From Engine Number A.2001—A.6000.**

Ensure that the locating hole for the set screw in the dome of thermostat is in line with tapped hole in the housing before fitting set screw.

Always fit a new gasket between the elbow pipe and thermostat housing, and between the thermostat housing and the inlet manifold.

### **THERMOSTAT. REMOVE, CHECK AND REFIT (XK 120 MODELS)**

**REMOVE.** Drain the radiator by opening the tap situated at the front of the radiator block.  
(Refer to Plate 10.)

Unscrew the two nuts securing the thermostat housing to the radiator header tank. Remove housing and lift out thermostat. Note the gasket between the thermostat housing and the radiator.

**CHECK.** Thoroughly clean the thermostat and check that the small hole in the valve is clear.

Check the thermostat for correct operation by immersing in a container of cold water together with a thermometer and stirrer. Heat the water, keeping it well stirred, and observe if the characteristics of the thermostat are in agreement with the following data.

Commences to open	60°—63°C.
Fully open	80°C.
Valve lift	$\frac{3}{8}$ " (9.5 mm.)

**REFIT.** Refitting is the reverse of the removal procedure. Always fit a new gasket between the thermostat housing and the radiator header tank.

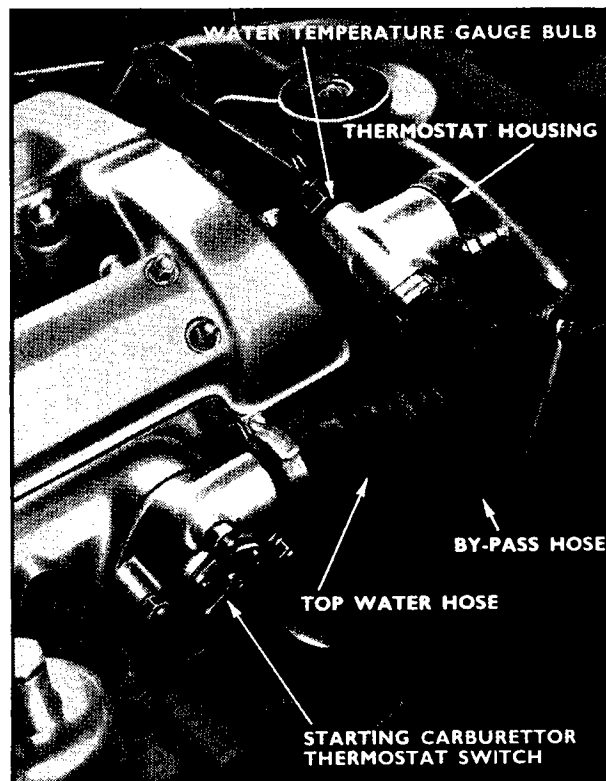


PLATE D.10. THERMOSTAT (XK 120).

### WATER PUMP. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

#### REMOVE RADIATOR.

As described on page D.9 for the Mark VII model, and on page D.10 for the XK 120 models.

#### REMOVE FAN. Five-bladed Type.

(Plate D.5).

Slacken the dynamo adjusting link bolt and release fan belt tension. Remove the fan and fan pulley from the hub, by unscrewing the five set screws fitted with shakeproof washers. Note the tab washer under the fan greaser which engages with a slot in fan pulley

#### REMOVE WATER PUMP.

Detach hose connections from water pump. Unscrew the six set screws and three nuts, and remove the water pump from the timing cover. Note the gasket between the pump and timing cover.

#### REFIT.

Refitting is the reverse of the removal procedure. Adjust fan belt as described on page D.9.

### WATER PUMP. TO DISMANTLE AND REASSEMBLE (MARK VII AND XK 120 MODELS)

**DISMANTLE.** Remove the large wire circlip securing the driving dog to the fan hub. Drive out the Mills pin securing the driving dog to spindle, and withdraw the driving dog.

Withdraw the impellor and spindle from the pump body. From inside the fan hub at the front end, remove the circlip and front bearing collar. Withdraw the fan hub complete from the spindle housing. To remove the fan bearings, withdraw the felt seal and seal disc from the rear end of the hub. Withdraw rear bearing with a suitable bearing extractor. Remove circlip retaining the front bearing and withdraw the front bearing, seal disc and felt seal.

**REASSEMBLE.** **Fit spindle bush.** If a new bush is to be fitted, press bush into water pump body with the flat on the bush in line with the greaser hole. The end of the bush should be flush with the bottom of spindle seal recess. Ream the bush to a diameter of  $.377''$  (9.57 mm.)

**Fit spindle seal.** Fit the spindle seal to the recess in the pump body with the seal spring facing towards the impellor.

**Assemble Fan Hub.** Fit the smaller felt seal into the fan hub, after soaking the seal in oil. Fit the seal disc with the concave side towards felt.

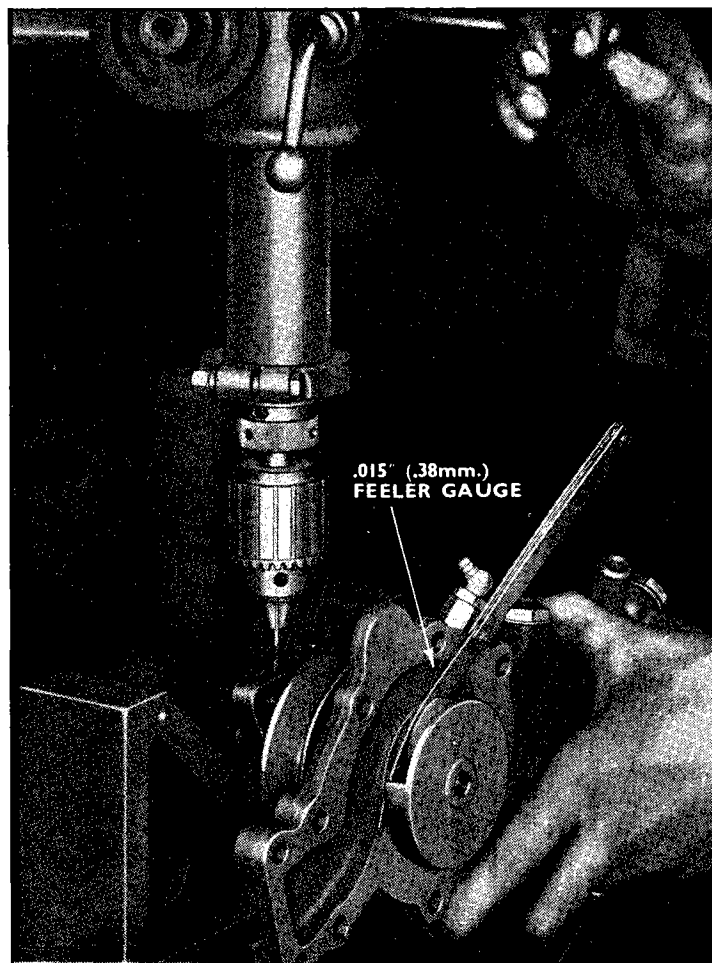


PLATE D.11. WATER PUMP. DRILLING A NEW SPINDLE.



Press the smaller bearing into the hub and retain with circlip.

Pack the fan hub with the recommended grease, and press the larger bearing into the hub. Fit seal with the convex side towards the bearing. After soaking the larger felt seal in oil, fit seal into hub.

Press the fan hub on to the spindle bush housing as far as possible. Fit the front bearing collar, with the chamfered side inwards, into the end of the fan hub and secure with the small circlip to the end of the spindle bush housing.

**Fit Spindle and Impellor.** Examine the spindle for signs of wear at the point of contact of the water pump seal, and renew if necessary. Fit the impellor to the spindle so that the holes for the Mills pins are in line. Fit a new Mills pin andpeen over. Pass the spindle through the spindle bush.

Fit the driving dog to the front end of the spindle and secure with a new Mills pin. Secure the driving dog to the fan hub with the large wire circlip.

**To Fit New Spindle.** If a new water pump spindle is being fitted it will be necessary to drill a hole for the Mills pin securing the driving dog to spindle. This operation should be carried out in the following manner:—

Fit the impellor to the spindle and pass through the spindle bush. Engage the driving dog and secure to fan hub with the wire circlip. Position the spindle in the driving dog so that a piece of .015" (.38 mm.) feeler strip can be inserted between the impellor vanes and the chamfered part of the water pump body. With the feeler strip in position, drill a  $\frac{1}{8}$ " (3.17 mm.) hole through the spindle, using the existing hole in the driving dog as a guide. (Plate D.11.)

Remove feeler strip and wire circlip. Fit a new Mills pin and replace circlip.

Do not assemble the five-bladed type of fan to the water pump until the pump has been fitted to the timing cover.

## WATER TEMPERATURE GAUGE. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** The water temperature gauge fitted to the facial panel is connected to a bulb screwed into the water thermostat housing by a capillary tube which is an integral part of the gauge and bulb. The gauge, capillary tube and bulb are serviced only as an assembly.

**REMOVE CENTRE FACIA. (MARK VII.)** Remove the drive screws securing dash casing and remove casing. Remove seven control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly, and remove centre facia. (Plate D.12.)

**REMOVE CENTRE FACIA. (XK 120.)** Disconnect battery positive lead. Remove drive screws securing dash casing and release casing. Remove two nuts (Fixed Head Coupé, two set screws) each side of instrument panel securing panel to facia structure. Withdraw instrument panel from rest of facia. (Plate D.13.)

**REMOVE GAUGE ASSEMBLY.** Drain the radiator. On the Mark VII model by operating the remote control at the top left-hand side of the radiator, and on the XK 120 model by opening the tap at the front of the radiator. Remove water temperature bulb from thermostat housing holding flats on bulb and unscrewing union nut. It is necessary to exercise care not to twist the capillary tube during removal or fracture may occur. Release capillary tube from the clips on wing valance and scuttle. Remove grommet supporting capillary tube in scuttle. Disconnect the oil gauge pipe at the pressure gauge and at the flexible pipe from the pressure oil filter. Withdraw oil gauge pipe through hole in scuttle. Remove the two screws securing the gauge to instrument panel. Withdraw gauge complete with capillary tube and bulb into car.

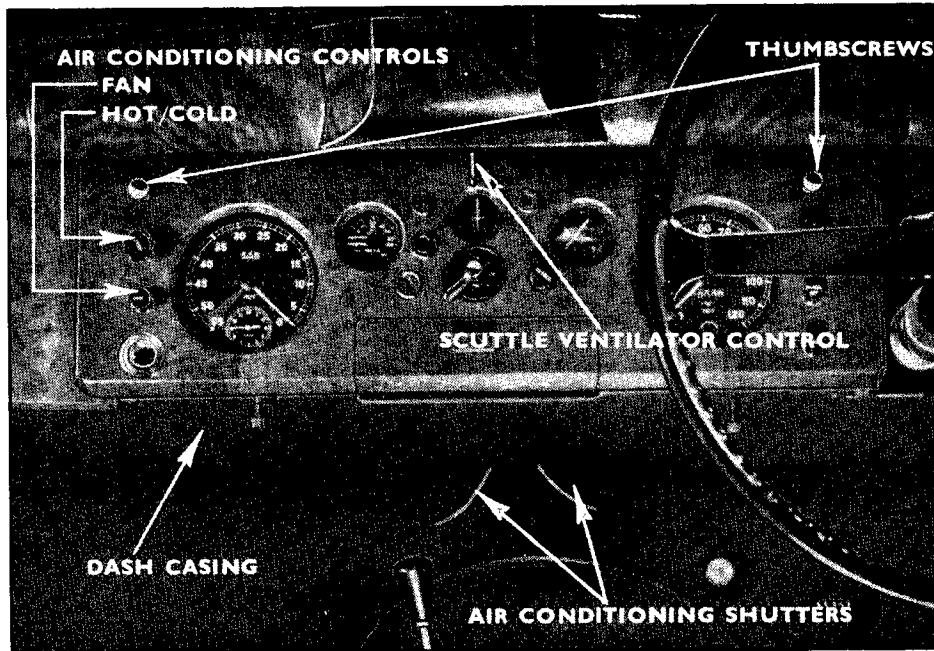


PLATE D.12. CENTRE FACIA. REMOVAL (Mark VII).

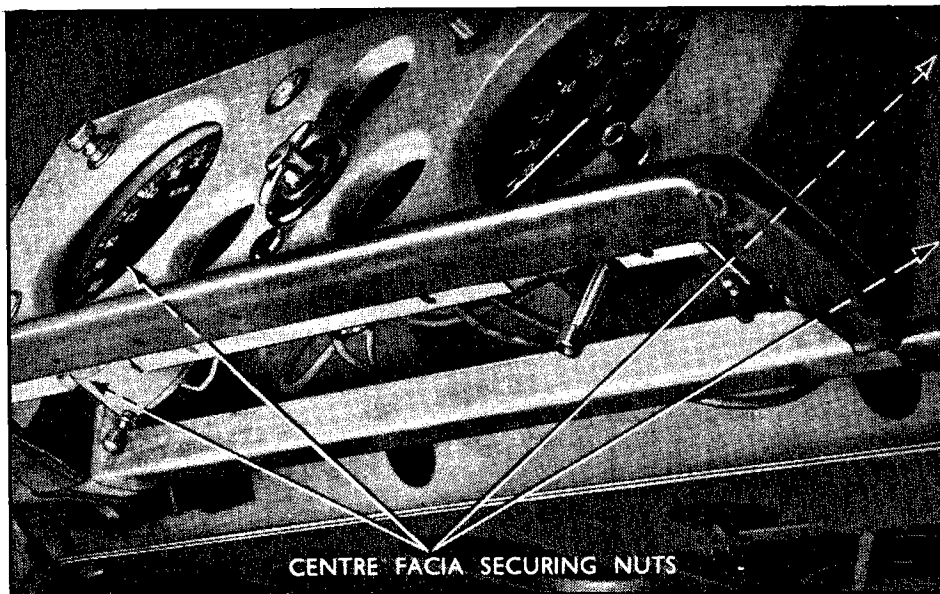


PLATE D.13. CENTRE FACIA. REMOVAL (XK 120).

**WATER JACKET CORE PLUGS. TO SERVICE  
(MARK VII AND XK 120 MODELS)**

**REMOVAL.** Core plugs are fitted to the water jackets of the cylinder block and may be removed by striking the centre of the plug using a hammer and punch. This will cause the core plugs to assume a concave shape when they will free and can be removed.

**FITTING.** When fitting replacement core plugs ensure that the lip of the core plug aperture in the block is quite clean and free from burrs and tap in the replacement core plug gently. Continue to tap the convex face of the core plug until the plug is secure.

# CLUTCH AND FLYWHEEL

## MARK VII and XK 120 MODELS

### ENGINE NUMBERS

(Stamped on right-hand side of cylinder block above pressure oil filter, and on front end of cylinder head casting)

MK. VII  
A.1001 ONWARDS

XK 120  
W.1001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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## DESCRIPTION, OPERATION AND ADJUSTMENT

### (MARK VII AND XK 120 MODELS)

**DESCRIPTION.** The clutch is of the single dry plate type consisting of a driven plate assembly, a cover assembly and a graphite release bearing assembly. A 10" model, Type 10A6-G, is used on both the Mark VII and XK 120. The driven plate assembly is of the flexible centre type in which a splined hub (15) is indirectly attached to a disc (14) and transmits the power and overrun through a number of coil springs held in position by shrouds. Two facings are riveted to the disc.

The cover assembly consists of a pressed steel cover (1) and a cast-iron pressure plate (2) loaded by thrust springs (3). Mounted on the pressure plate are three release levers (8) which pivot on floating pins (9) retained by eyebolts (10). Adjustment nuts (12) are screwed on the eyebolts and secured by staking. Struts (13) are interposed between lugs on the pressure plate and the outer ends of the release levers. Anti-rattle springs (11) load the release levers and retainer springs (7) connect the release levers to a release lever plate (4). The release bearing consists of a graphite bearing (5) shrunk into a metal cup (6), the cup being located by the operating forks and release bearing retainer springs. Observe that under no circumstances should the release bearing be lubricated.

**OPERATION.** Operation on the XK 120 model is through a mechanical linkage, but on the Mark VII model hydraulic operation is utilised.

This system consists of:—

1. Master cylinder mounted inside the right-hand (offside) chassis frame side member on right-hand drive cars, and outside the left-hand (nearside) chassis frame side member on left-hand drive cars, operated by the clutch pedal.
2. Supply tank, capacity  $\frac{1}{2}$  pint (.29 litres) of Girling Crimson Hydraulic Brake Fluid, mounted adjacent to brake supply tank under bonnet.
3. Clutch withdrawal hydraulic operating cylinder connected to the clutch shaft lever by an adjustable link and to the master cylinder by piping.

**ADJUSTMENT.** The adjustment nuts (12) are correctly set and locked when the clutch is assembled and should not be altered unless the clutch has been dismantled and new parts fitted. The only adjustment necessary throughout the life of the driven plate facings is to restore periodically the free movement of the pedal before the release bearing comes into contact with the release lever plate and commences to release the clutch.

As the driven plate facings wear, the pressure plate moves closer to the flywheel and the outer ends of the release levers travel further towards the gearbox and decrease the release bearing clearance or free pedal movement.

#### Mark VII

To ensure the necessary free movement of  $\frac{1}{16}$ " (1.6 mm.), there must be  $1\frac{1}{4}$ " (31 mm.) free movement at the clutch pedal pad. It is also necessary to ensure that 1" (25 mm.) clearance exists between the clutch pedal and the engine side of the toe board, in order that the hydraulic master cylinder plunger may return fully.

The level of fluid in the supply tank must not be allowed to fall more than  $\frac{3}{4}$ " (18 mm.) from the top of the supply tank.

**Note.** On early Mark VII cars normal mechanical linkage was fitted for the clutch operation. On these cars the adjustment is the same as for the XK 120 model.

#### XK 120

To ensure the necessary free movement referred to above a clearance of not less than  $\frac{1}{16}$ " (1.6 mm.) must be provided, this being measured in practice as 1" (25.0 mm.) free or unloaded movement at the pedal pad.

## CLUTCH DATA

	<b>Mark VII</b>	<b>XK 120</b>
Make .. .. .	Borg and Beck	Borg and Beck
Model .. .. .	10A6-G	10A6-G
Outside Diameter .. .. .	9 $\frac{7}{8}$ " (250.83 mm.)	9 $\frac{7}{8}$ " (250.83 mm.)
Type .. .. .	Dry Single Plate	Dry Single Plate
Clutch Release Bearing .. .. .	Graphite	Graphite
Operation .. .. .	Hydraulic	Mechanical
Clutch Thrust Spring—Number .. .. .	12	12
Colour .. .. .	Cream	Yellow
Assembled Load .. .. .	125 lb.	140 lb.
Driven Plate—Type .. .. .	Borglite	Borglite
Driven Plate Damper Springs—Number .. .. .	8	8
Colour .. .. .	4 Light Grey and Violet 4 Maroon and Light Green	Red

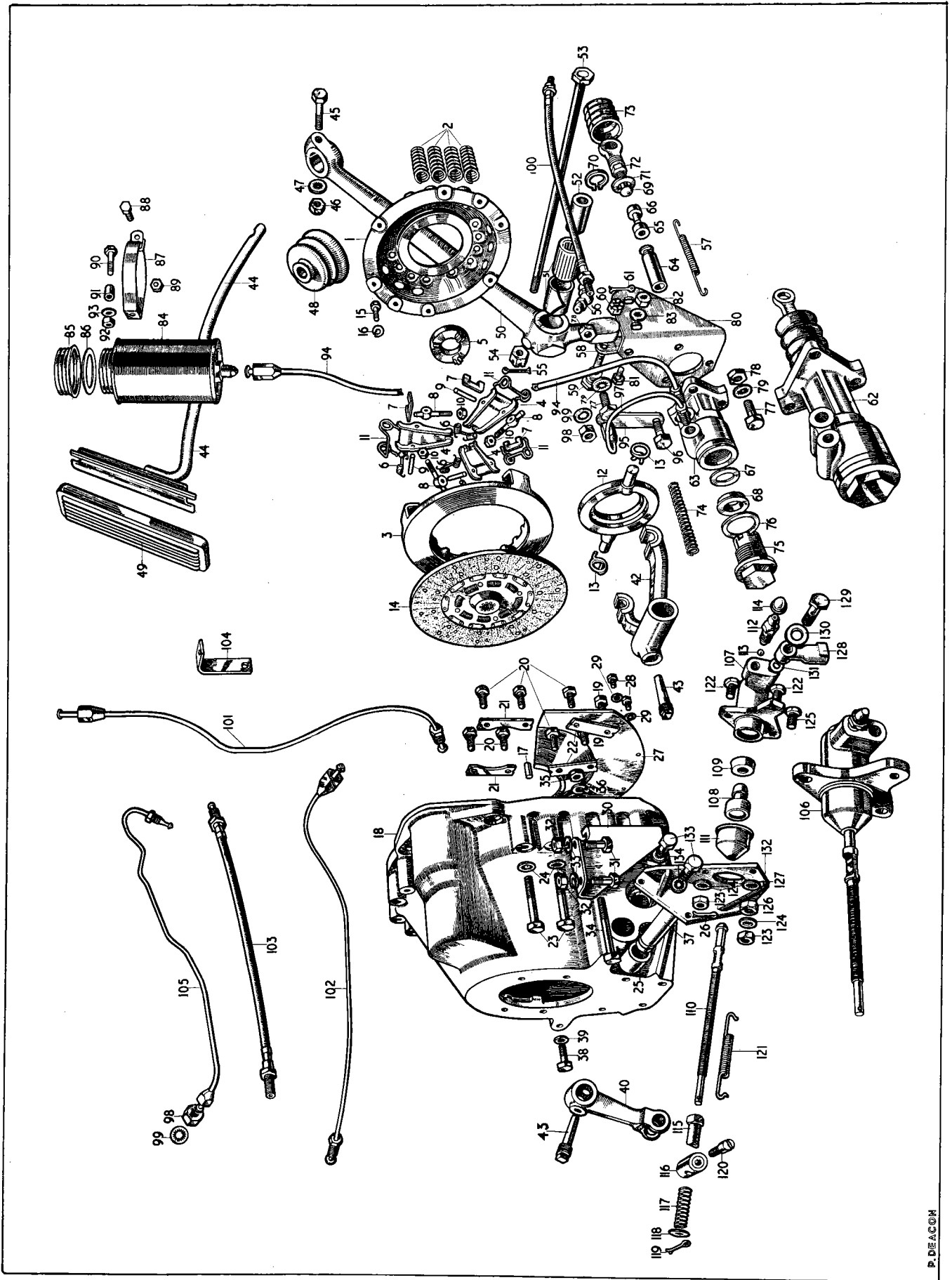


PLATE E.1. CLUTCH AND HOUSING (Mark VII).



INDEX TO PLATE E.1

1	Cover only	1	Draught Excluder on Pedal Stem	48	Bracket on Master Cylinder for High Pressure Pipe	95
2	Spring, Thrust	2	Pad (Rubber) on Stem Plate	49	Pipe	96
3	Plate, Pressure	3	Clutch Pedal	50	Bolt, securing Bracket to Master Cylinder	97
4	Lever, Release	4	Bearing, Roller, in Clutch Pedal Boss	51	High Pressure Pipe from Master Cylinder to Bracket	98
5	Plate, Release Lever	5	Cleeve on Roller Bearing	52	Nut, securing High Pressure Pipe to Bracket on Master Cylinder	99
6	Retainer, Release Lever	6	Shaft, supporting Clutch Pedal	53	Washer, Shakeproof, under Nut	100
7	Strut, Release Lever	7	Nut, Slotted, securing Pedal to Shaft	54	High Pressure Hose from Bracket to Slave Cylinder (Girling H.3670/D)	101
8	Eyebolt, Release Lever	8	Pin, Split, retaining Nut	55	Low Pressure Pipe from Supply Tank to Master Cylinder	102
9	Pin through Eyebolt	9	Nipple, Grease, in Pedal Boss (Tec. NA.5790)	56	High Pressure Pipe from Master Cylinder to Bracket on Chassis Frame	103
10	Nut on Eyebolt	10	Spring, Return	57	High Pressure Hose from Pipe to Bracket on Clutch Housing (Girling 497124)	104
11	Spring, Anti-rattle	11	Anchor for Return Spring	58	Pipe	105
12	Release Bearing and Cup Assembly	12	Pin, Fulcrum, connecting Pedal to Master Cylinder	59	High Pressure Pipe from Hose to Slave Cylinder	106
13	Retainer for Release Bearing	13	Nut on Fulcrum Pin	60	Slave Cylinder at Right-hand Side of Clutch Housing (Girling 495356)	107
14	Driven Plate Assembly	14	Pin, Split, retaining Nut	61	Body only for Slave Cylinder	108
15	Bolt, securing Clutch Unit to Flywheel	15	Master Cylinder for Clutch Operating (Girling H.4007)	62	Piston	109
16	Washer, Spring, on Bolt	16	Body only	63	Seal	110
17	Dowel	17	Plunger	64	Rod, Push	111
18	Clutch Housing	18	Seal on Plunger	65	Boot (Rubber)	112
19	Screw, Set, securing Clutch Housing to Gear-box	19	Retainer for Seal in end of Plunger	66	Screw, Bleed	113
20	Screw, Set, securing Clutch Housing to Gear-box	20	Shim in Body under Recuperating Seal	67	Ball (Steel) under Bleed Screw	114
21	Plate, locking Set Screws inside Clutch Housing	21	Seal, Recuperating	68	Cap, Dust, on Bleed Screw	115
22	Plate, locking Set Screws inside Clutch Housing	22	Rod, Push	69	Nut, Adjusting, on Push Rod	116
23	Bolt, securing Clutch Housing to Cylinder Block	23	Circlip, retaining Push Rod in Body	70	Trunnion on Push Rod	117
24	Washer, Shakeproof, on Bolt	24	Washer, Retaining, on Push Rod	71	Spring, tensioning Adjusting Nut	118
25	Bush in Clutch Housing for Operation Shaft	25	Nut, Lock, on Push Rod	72	Washer, Plain, behind Spring	119
26	Pin, Split, in Drain Hole at bottom of Clutch Housing	26	Boot (Rubber) over Push Rod and end of Body Spring, Return, inside Plunger	73	Pin in Trunnion, anchoring Return Spring	120
27	Cover Plate for Clutch Housing	27	Cover, End	74	Spring, Return, between Trunnion and Mounting Bracket	121
28	Screw, Set, securing Cover Plate	28	Bolt, securing Master Cylinder to Mounting Bracket	75	Bolt, securing Slave Cylinder to Mounting Bracket	122
29	Washer, Shakeproof, on Set Screws	29	Nut on Bolts	76	Nut on Bolts	123
30	Support Bracket, Right-hand	30	Washer, Shakeproof, under Nuts	77	Washer, Shakeproof, under Nuts	124
31	Bolt, securing Support Bracket to Cylinder Block	31	Bracket, mounting Master Cylinder	78	Bolt, securing Slave Cylinder to Mounting Bracket	125
32	Nut on Bolts	32	Screw, Set, securing Mounting Bracket	79	Nut on Bolts	126
33	Bolt, securing Support Bracket to Cylinder Block	33	Nut on Set Screw	80	Washer, Shakeproof, under Nuts	127
34	Nut on Bolts	34	Washer, Shakeproof, under Nut	81	Bolt, securing Slave Cylinder to Mounting Bracket	128
35	Washer, Spring, under Nuts	35	Supply Tank (less Clip) (Girling 4050404)	82	Nut on Bolt	129
36	Clutch Operating Shaft	36	Cap for Supply Tank	83	Washer, Shakeproof, under Nut	130
37	Bolt for Clutch Shaft Location	37	Washer, Jointing, inside Cap	84	Gasket on Banjo Bolt	131
38	Washer, Spring, on Bolt	38	Clip, securing Supply Tank to Scuttle (Girling H.1509)	85	Gasket on Banjo Bolt	132
39	Lever on Clutch Shaft	39	Screw, Set, clamping Clip to Supply Tank	86	Bracket, mounting Slave Cylinder	133
40	Clutch Operation Fork	40	Nut on Set Screw	87	Washer, Shakeproof, on Set Screws	134
41	Pin (Tapered), locating Lever and Fork on Pedal Stem and Plate Assembly	41	Clutch Housing	88		
42	Bolt, securing Stem to Clutch Pedal	42	Screw, Set, clamping Clip to Supply Tank	89		
43	Nut on Bolt	43	Nut on Set Screw	90		
44	Washer, Shakeproof, under Nut	44	Bolt, securing Clip to Scuttle	91		
45		45	Piece, Distance, on Bolt	92		
46		46	Nut on Bolt	93		
47		47	Washer, Shakeproof, under Nut	94		
			Low Pressure Pipe from Supply Tank to Master Cylinder			

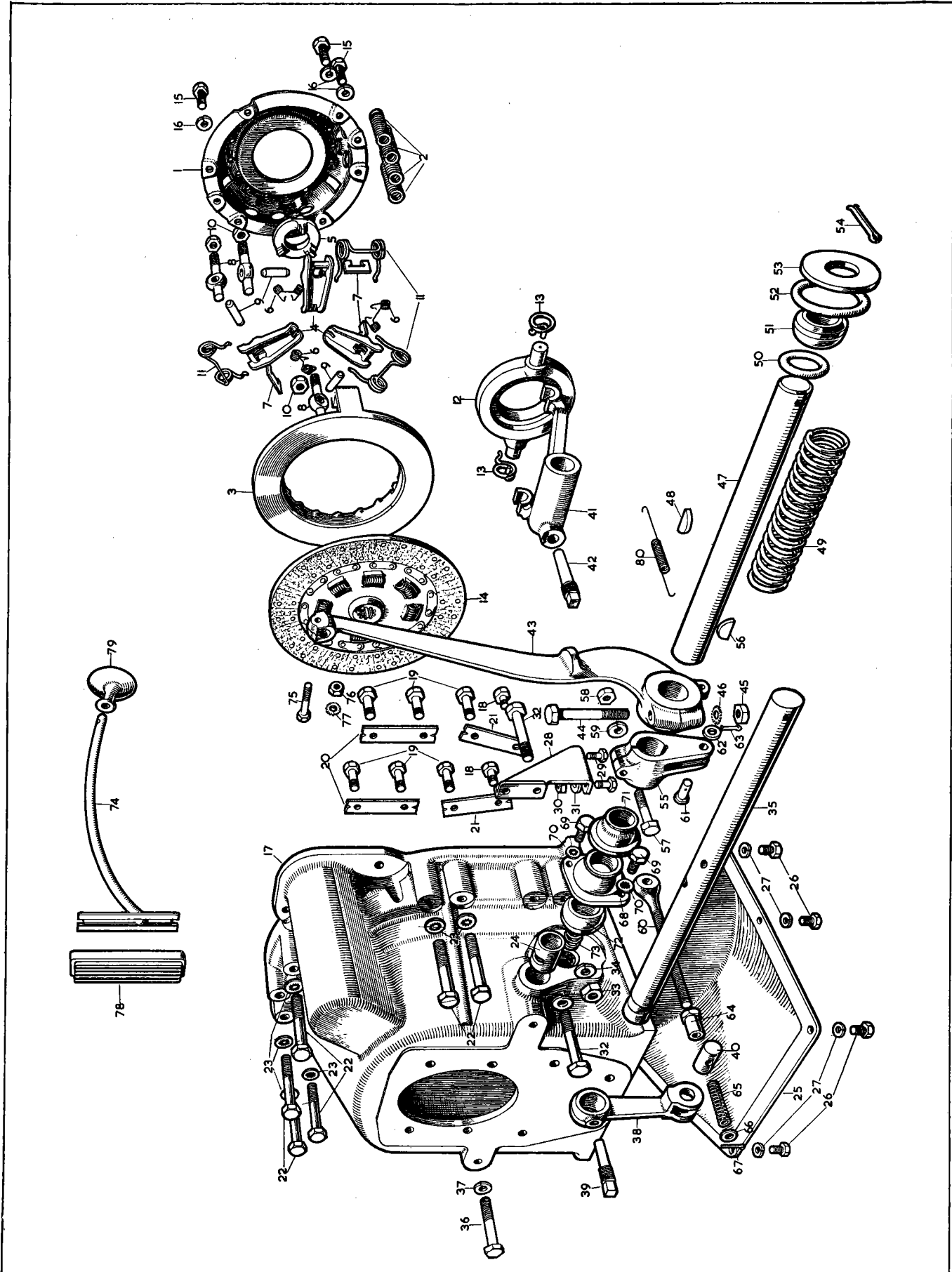


PLATE E.2. CLUTCH AND HOUSING (XK 120).

INDEX TO PLATE E.2

Cover only	1	Pin (Tapered), locating Fork on Operating Shaft	42
Spring, Thrust	2	Clutch Pedal	43
Plate, Pressure	3	Bolt, securing Clutch Pedal to Shaft	44
Lever, Release	4	Nut on Bolt	45
Plate, Release Lever	5	Washer, Shakeproof, under Nut	46
Retainer, Release Lever	6	Shaft, supporting Clutch Pedal	47
Strut, Release Lever	7	Key (Woodruff 90), locating Pedal on Shaft	48
Eyebolt, Release Lever	8	Spring (Outer) on shaft	49
Pin, through Eyebolt	9	Ring, Sealing (Small), adjacent to Outer Spring	50
Nut on Eyebolt	10	Bearing (Spherical) on Shaft, adjacent to Sealing Ring	51
Spring, Anti-rattle	11	Ring, Sealing (Large), adjacent to Spherical Bearing	52
Release Bearing and Cup Assembly	12	Washer at end of Shaft	53
Retainer for Release Bearing	13	Pin, Split, holding Outer Spring under compression	54
Driven Plate Assembly	14	Lever on Clutch Pedal Shaft	55
Screw, Set, securing Clutch Unit to Flywheel	15	Key (Woodruff 90), locating Lever on Shaft	56
Washer, Spring, on Set Screws	16	Bolt, securing Lever to Shaft	57
Clutch Housing	17	Nut on Bolt	58
Screw, Set, securing Clutch Housing to Gearbox	18	Washer, Spring, under Nut	59
Screw, Set, securing Clutch Housing to Gearbox	19	Adjusting Rod, between Lever on Pedal and Lever on Clutch Shaft	60
Plate, locking Set Screws inside Clutch Housing	20	Pin, Clevis, securing Adjusting Rod to Lever on Pedal Shaft	61
Plate, locking Set Screws inside Clutch Housing	21	Washer (Plain) on Clevis Pin	62
Bolt, securing Clutch Housing to Cylinder Block	22	Pin, Split, retaining Clevis Pin in Lever	63
Washer, Shakeproof, on Bolts	23	Nut, Barrel, on Adjusting Rod	64
Bush in Clutch Housing for Operating Shaft	24	Spring on Adjusting Rod	65
Cover Plate for Clutch Housing	25	Washer (Plain) on Adjusting Rod at end of Spring	66
Screw, Set, securing Cover Plate	26	Pin, Split, retaining Spring on Adjusting Rod	67
Washer, Spring, on Set Screws	27	Bearing Housing on Clutch Housing	68
Support Bracket, Right-hand	28	Screw, Set, securing Bearing Housing	69
Bolt, securing Support Bracket to Cylinder Block	29	Washer, Shakeproof, on Set Screws	70
Nut on Bolts	30	Gaiter on Pedal Shaft over Bearing Housing	71
Washer, Spring, under Nuts	31	Bearing (Spherical) inside Housing	72
Bolt, securing Support Bracket to Cylinder Block	32	Spring (Inner), adjacent to Spherical Bearing	73
Nut on Bolts	33	Pedal Stem and Plate Assembly	74
Washer, Spring, under Nuts	34	Bolt, securing Stem to Pedal Shaft	75
Clutch Operating Shaft	35	Nut on Bolt	76
Blot for Clutch Shaft Location	36	Washer, Shakeproof, under Nut	77
Washer, Spring, on Bolt	37	Pad (Rubber) on Stem Plate	78
Lever on Clutch Shaft	38	Draught Excluder on Pedal Stem	79
Pin (Tapered), locating Lever on Shaft	39	Spring, Return, for Clutch Pedal	80
Trunnion in Fork of Lever	40		
Clutch Operating Fork	41		

## CLUTCH ASSEMBLY. TO REMOVE AND REFIT (MARK VII MODEL)

- GENERAL.** The engine and gearbox unit is removed as one assembly by lowering the rear of the assembly and removing it forwards and upwards, as described in the following paragraphs.
- REMOVE BONNET.** Release bonnet fastener and open bonnet. Support while removing four set bolts from the two hinges at rear and lift bonnet clear.
- DRAIN COOLING SYSTEM.** Drain radiator block and engine by operating remote control of radiator drain tap situated at the top left side of the radiator block and opening tap at the left-hand rear of the cylinder block. If anti-freeze mixture is in use conserve water. Disconnect top and bottom water hoses.
- REMOVE RADIATOR GRILLE.** Remove two bolts at top and two bolts at bottom and lift grille clear.
- REMOVE RADIATOR BLOCK.** Remove three set screws securing tie panel to support channel. Remove tie panel complete with bonnet release cable. Remove upper support bracket by withdrawing two set bolts and lifting clear. Remove four bolts holding block to support frame. Withdraw radiator block upwards clear of car, at the same time slowly rotating the fan in order to avoid damage due to blades interfering with bottom outlet pipe.
- REPOSITION DYNAMO.** Disconnect battery lead. Disconnect dynamo leads, slack adjustment bolts and clamp up dynamo as near as possible to engine.
- REMOVE AIR SILENCER AND MANIFOLD.** Remove the two set bolts passing through the silencer steady brackets into the inlet manifold casting. Remove silencer. Withdraw two bolts securing air silencer manifold to carburetter flanges. Remove manifold.
- DISCONNECT ENGINE CONNECTIONS.** Disconnect throttle linkage at rear flexible joint. Disconnect petrol feed pipe from carburetters. Disconnect wire to self-starting carburetter solenoid. Disconnect electrical connections from starter motor. Disconnect thermometer bulb from water uptake manifold and tie clear. Care must be exercised not to twist the capillary tube to gauge or fracture may occur. Disconnect oil pressure gauge pipe. Disconnect vacuum pipe from inlet manifold. Disconnect two heater pipes from rear of engine. Disconnect revolution counter cable from rear of camshaft. Disconnect front exhaust pipe at joint with intermediate pipe. Remove oil filter unit from engine.
- DISCONNECT GEARBOX CONNECTIONS.** Remove gearbox carpet and cover. Remove change speed lever. Disconnect electrical connections to reverse switch and bayonet junction sleeves. Disconnect speedometer cable and place clear. Disconnect front end of propeller shaft at gearbox coupling.
- DISCONNECT SWAY BAR BRACKETS.** Disconnect sway bar support brackets at frame, but do not remove bar from suspension fixing points.
- DISCONNECT CLUTCH LINKAGE.** Disconnect flexible hydraulic pipe from clutch operating cylinder, insert wooden plug in end of pipe to prevent loss of fluid and tie pipe to some convenient part of chassis, clear of engine unit. **Note.** System will require bleeding on reassembly.

On early models having the mechanical clutch linkage the following paragraph is applicable in place of the above:

Disconnect two bolts from plate on bell housing, two bolts from plate on frame, two bolts from keeper plate holding shaft to inner (bell housing) ball, two split pins from operating linkage and remove short shaft complete.

**REMOVE ENGINE.** Place sling around engine and take weight on pulley blocks prior to disconnecting engine mountings. Remove both front engine mountings where bolted to crankcase (three bolts per side) and remove mounting rubbers (one nut per side) from chassis mounting plates. Note that the earth lead is connected to one of the right-hand (offside) mounting bolts. Disconnect rear engine mounting rubbers where bolted to chassis plates (two bolts per side), leaving mounting rubbers attached to bell housing brackets. Note number and disposition of packing plates, if fitted, between mounting rubbers and chassis plates.

Lift engine complete with gearbox from frame. When lifting engine note that the sling must be arranged to tilt the engine to the rear, and care must be taken to avoid damage to the revolution counter drive adapter.

**REMOVE GEARBOX.** Remove the pressed steel cover plate from the bottom front of clutch housing. Remove clutch bell housing mounting bolts and withdraw gearbox and bell housing to rear. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly.

**REMOVE CLUTCH.** See Page E.12.

## CLUTCH ASSEMBLY. TO REMOVE AND REFIT

(XK 120 MODELS)

**GENERAL.** To remove the clutch assembly the gearbox is removed from the engine when the floor boards have been removed and the rear of the engine supported. Removal of the gearbox gives access to the clutch.

(Alternatively, the engine and gearbox can be removed as a unit, and the gearbox and clutch bell housing subsequently detached from the engine.)

**REMOVE FLOOR BOARDS.** Remove both seats and floor carpets and place clear of car. Remove gear lever knob and locknut. Remove the gearbox carpets and cover. Remove floor boards. If desired, remove propeller shaft tunnel; this is not essential but gives better access to the propeller shaft coupling.

**DISCONNECT GEARBOX CONNECTIONS.** Disconnect reverse light wires from switch on remote control. Disconnect speedometer cable and tie clear. Remove four bolts from front end of propeller shaft at gearbox coupling and slide front section of shaft rearwards to limit of splines to clear gearbox coupling flange.

**DISCONNECT CLUTCH LINKAGE.** Remove the split pin and clevis pin securing the adjusting rod to the clutch pedal shaft lever. Remove the pinch bolt securing the pedal stem to the top of clutch pedal and withdraw stem. Remove the pinch bolt securing the clutch pedal to shaft. Withdraw clutch pedal shaft through the chassis frame until the inner end of shaft is well clear of bearing housing in the side of clutch housing.

**Note** that the clutch pedal is keyed to the pedal shaft.

**REMOVE REAR GEARBOX MOUNTING.** Support rear of engine on jack with a suitable packing interposed to distribute the load. Remove the four bolts and nuts securing the platform under the gearbox extension to the mounting. Remove the three bolts and nuts securing the mounting to the bracket on the front of centre cross-member. (Fixed Head Coupe—two nuts.) Remove the set screw securing the torque arm to the mounting on the chassis frame.

The torque arm is situated just forward of the clutch housing and on the opposite side to the steering column. Raise the gearbox sufficiently to enable the mounting to be removed from the cross-member bracket.

**REMOVE GEARBOX.** Remove six set bolts securing cover plate to underside of bell housing and remove plate. Remove clutch bell housing bolts and withdraw gearbox and bell housing to rear over cross-member. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly.

**REMOVE CLUTCH.**

See below.

**(MARK VII AND XK 120 MODELS)****REMOVE CLUTCH ASSEMBLY.**

Fit three  $\frac{1}{4}$ " (6.4 mm.) distance pieces, one between each of the three release levers and the clutch cover to reduce thrust spring pressure and thus assist removal of the clutch assembly from the flywheel. Slacken the clutch mounting screws a turn at a time by diagonal selection until the thrust spring pressure is released. Remove the set screws and withdraw the complete clutch assembly from the flywheel. Remove the driven plate assembly. Observe that the clutch and flywheel are balanced as an assembly and located by dowels in this position. This location is indicated by a balance mark "B" inscribed on the clutch and flywheel. (Plate E.4.) Remove withdrawal bearing.

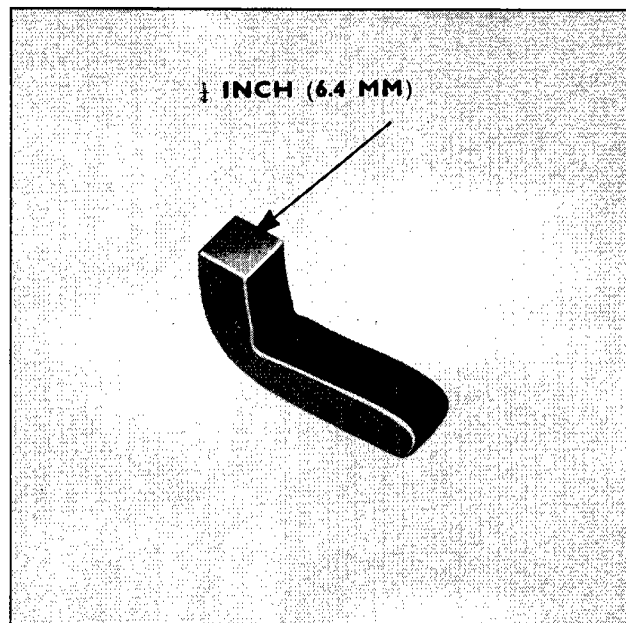


PLATE E.3. RELEASE LEVER DISTANCE PIECE.

**REFIT CLUTCH ASSEMBLY.**

If a new clutch unit and/or flywheel is to be fitted it will first be necessary to balance the clutch and flywheel as an assembly and clearly mark their relationship in the balanced position, as described on Page E.21. (Plate E.12.) Assemble the driven plate to the flywheel, taking care to place larger chamfered spline end of the hub towards the gearbox, that is, the rear of the vehicle. Centralise the driven plate by means of a dummy shaft which fits the splined bore of the driven plate hub and the spigot bearing in the flywheel. (A constant pinion shaft may be used for this purpose.) Fit the three  $\frac{1}{4}$ " (6.4 mm.) distance pieces between release levers and clutch cover. Fit the cover assembly to the flywheel by means of the holding screws, tightening them a turn at a time by diagonal selection. Ensure that the clutch is assembled in the balanced position relative to the flywheel by observing that the balance marks "B" coincide and that the flywheel dowels locate in the clutch housing holes. Do not remove the dummy shaft until all the set screws are securely tightened. Remove the dummy shaft. Remove lock wire and check tightness of taper lock bolt retaining release bearing operating fork to shaft. Tighten if necessary and lock with new wire. Refit withdrawal bearing. Finally remove  $\frac{1}{4}$ " (6.4 mm.) distance pieces.

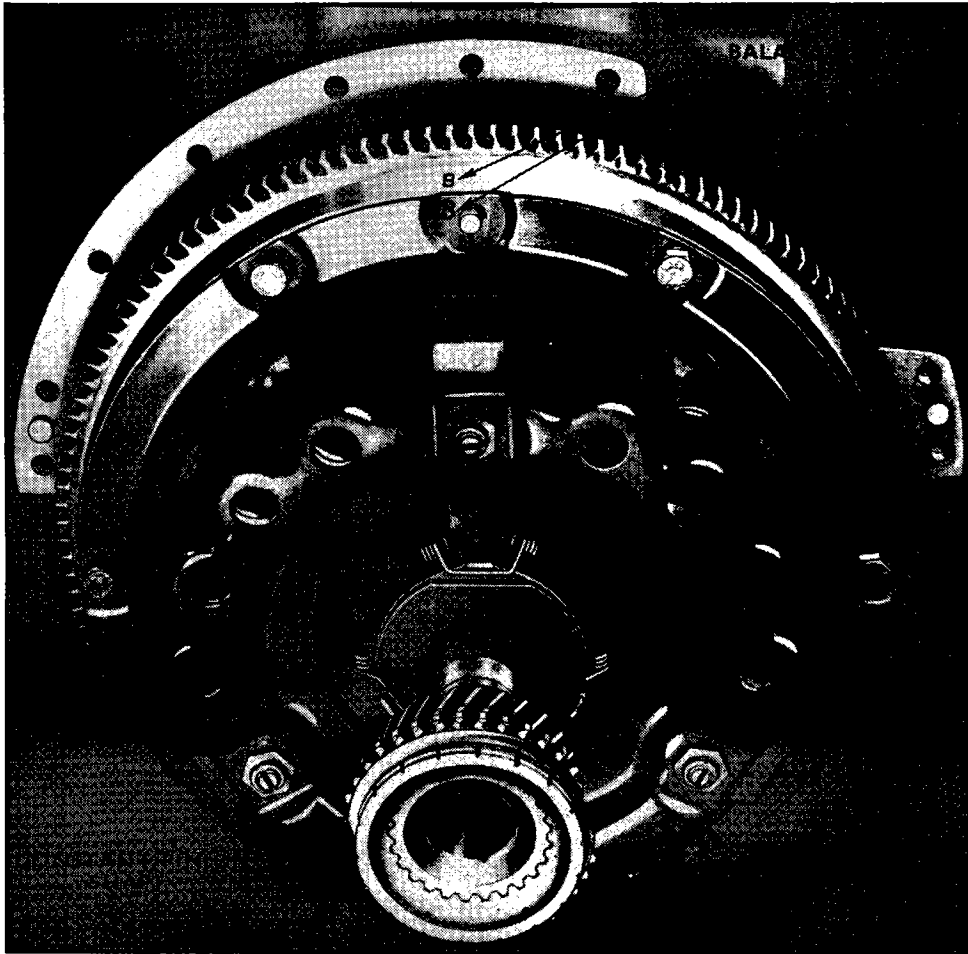


PLATE E.4. CLUTCH AND FLYWHEEL. BALANCE MARKS.

**REFIT  
GEARBOX.  
(MARK VII.)**

Fit the gearbox and clutch bell housing unit to the engine. The weight of the gearbox must be supported during refitting in order to avoid strain on the shaft and distortion of the driven plate assembly.

**REFIT ENGINE  
AND GEAR-  
BOX UNIT.  
(MARK VII.)**

Refitting is the reverse of the operations for removal, paying particular attention to the correct replacement of the requisite number of packing plates, if fitted, between the mounting rubbers and chassis plates. Bleed hydraulic clutch operating system.

**REFIT GEAR-  
BOX UNIT.  
(XK 120.)**

Refitting is the reverse of the operations for removal.

INDEX TO PLATE E.5. CLUTCH AND FLYWHEEL

Cover .. .. .	1	Eyebolts .. .. .	10
Pressure Plate .. .. .	2	Anti-rattle Springs .. .. .	11
Thrust Springs .. .. .	3	Adjustment Nuts .. .. .	12
Release Lever Plate .. .. .	4	Struts .. .. .	13
Release Bearing (Graphite) .. .. .	5	Clutch Plate Disc .. .. .	14
Release Bearing Cup .. .. .	6	Clutch Plate Splined Hub .. .. .	15
Release Lever Plate Retaining Spring .. .. .	7	Clutch Plate Damper Assembly .. .. .	16
Release Levers .. .. .	8	Clutch Plate Facing .. .. .	17
Release Lever Floating Pins .. .. .	9	Clutch Plate Facing Rivet .. .. .	18

CLUTCH ASSEMBLY. TO DISMANTLE AND REASSEMBLE  
(MARK VII AND XK 120 MODELS)

**GENERAL.** Factory reconditioned clutch assemblies are available on an exchange basis and it is recommended that this service is utilised in preference to overhauling the existing unit.

**DISMANTLE.** Suitably mark the following parts in such a manner that they can be reassembled in the same relative positions to each other in order to preserve the balance and adjustment:—  
(Refer to Plate E.5.)

Cover (1), lugs on the pressure plate (2), and the release levers (8). Detach the release lever plate (4) from the retainer springs (7) and place the cover assembly on the bed of a press with the pressure plate (2) resting on blocks, so arranged that the cover is free to move downwards when pressure is applied. Place a block across the top of the cover resting on the spring bosses and compress the cover by means of the ram; while holding it under compression, remove the adjustment nuts (12) and slowly release the pressure until the load of the thrust springs is relieved. Scrap the adjustment nuts. Remove the cover from the pressure plate and collect the thrust springs. Remove each release lever (8) by holding the lever and eyebolt (10) between fingers and thumb so that the plain end of the lever and the threaded end of the eyebolt are as close together as possible, keeping the eyebolt pin (9) in position in the lever. Lift the strut (13) over the ridge on the lever and remove the eyebolt from the pressure plate.

**ASSEMBLE.** Before assembly thoroughly clean all parts and renew those which show appreciable wear. A very slight smear of grease should be applied to the release lever pins (9), contact faces of the struts (13), eyebolt seats in the clutch cover (1), drive lug sides on the pressure plate (2), and the plain end of the eyebolts (10).

Assemble one release lever (8), eyebolt (10) and eyebolt pin (9), holding the threaded end of the eyebolt and the inner end of the release lever as close together as possible. With the other hand insert the strut (13) in the slots in the pressure plate sufficiently to allow the plain end of the eyebolt to be inserted in the hole in the pressure plate.

Move the strut upwards into the slots in the pressure plate lug, over the ridge on the short end of the lever and drop it into the groove formed in the latter. Fit the remaining levers in a similar manner. Place the pressure plate (2) on blocks on the end of the press and arrange the thrust springs (3) in a vertical position on the plate, seating them on the bosses provided. Lay the cover over the assembled parts, ensuring that the anti-rattle springs(11) are in position, that the tops of the thrust springs are directly under the seats in the cover and that the machined portions of the pressure plate lugs are under the slots through which they have to pass. Place the block across the cover resting on the spring bosses, and compress the cover by means of the ram, guiding the eyebolts and pressure plate lugs through their respective holes. Always use new adjusting nuts on assembly. Screw the adjusting nuts (12) temporarily on to the eyebolts (10) and observe that they will subsequently be secured by staking when the release levers have been correctly set (see "Adjusting Release Levers.") Operate the clutch a few times by means of the ram to ensure that the working parts have settled in their correct positions. Remove the clutch from the press and connect the release lever plate (4) to the retainer springs (7). Remove lock wire and check tightness of taper lock bolt retaining release bearing operating fork to shaft. Tighten if necessary and lock with new wire. When carrying out adjustment, the release levers should be set by using the gauge plate Borg and Beck Part. No. CG.14322.



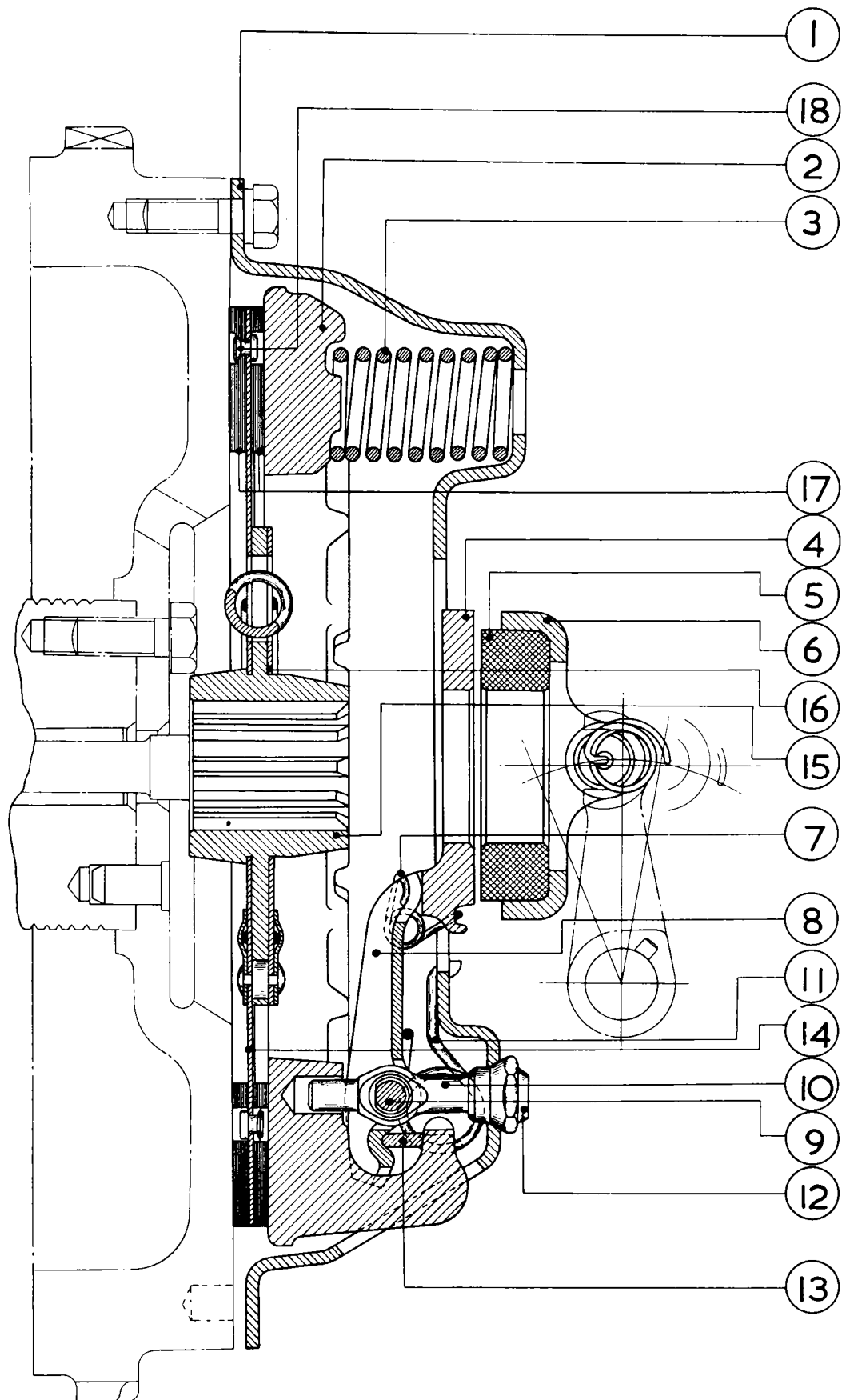


PLATE E.5. CLUTCH (Sectioned View).

**ADJUSTING  
RELEASE  
LEVERS.**

Assemble the gauge plate to the flywheel in the position normally occupied by the driven plate, and mount the cover assembly on the flywheel, tightening the holding screws a turn at a time by diagonal selection and ensuring that the gauge plate is correctly centred with the three machined lugs directly under the release levers (8). After the cover assembly has been fitted to the flywheel, place a short straight edge across the centre boss and the bearing surface of one release lever, then turn the adjusting nut (12) until the lever is exactly the same height as the gauge plate boss. Repeat for the other levers. Secure adjusting nuts by staking. Slacken the holding screws a turn at a time by diagonal selection, then remove the screws and the clutch from the flywheel. Remove the gauge plate. If the special gauge plates mentioned above are not available the levers can be adjusted satisfactorily by clamping the cover assembly, with driven plate in position, to a flat surface and the adjustment checked by means of a clock gauge recording on the release lever plate. The clutch should be released and the driven plate turned through 90° during this operation to counteract for any lack of parallelism in the plate and to ensure that the release levers are in plane with each other.

### CLUTCH PEDAL. TO ADJUST (HYDRAULIC OPERATION) (MARK VII MODEL)

**ADJUSTMENT.** Adjustment is made at the adjustable push rod situated between the hydraulic operating cylinder and the lever on the clutch shaft situated on the right-hand (offside) side of the clutch bell housing on both left and right-hand drive cars. To adjust, slacken locknut behind brass nut, hold push rod with spanner on the flats provided and rotate the brass adjuster nut in the required direction to give  $1\frac{1}{4}$ " (31 mm.) free movement at the clutch pedal pad. Ensure that the brass adjuster nut is located correctly on the cam action slot and tighten locknut. Note that clockwise rotation of the adjuster nut will reduce pedal free travel; anti-clockwise rotation will increase free travel and that each half turn of the adjuster nut brings it into position with the cam location.

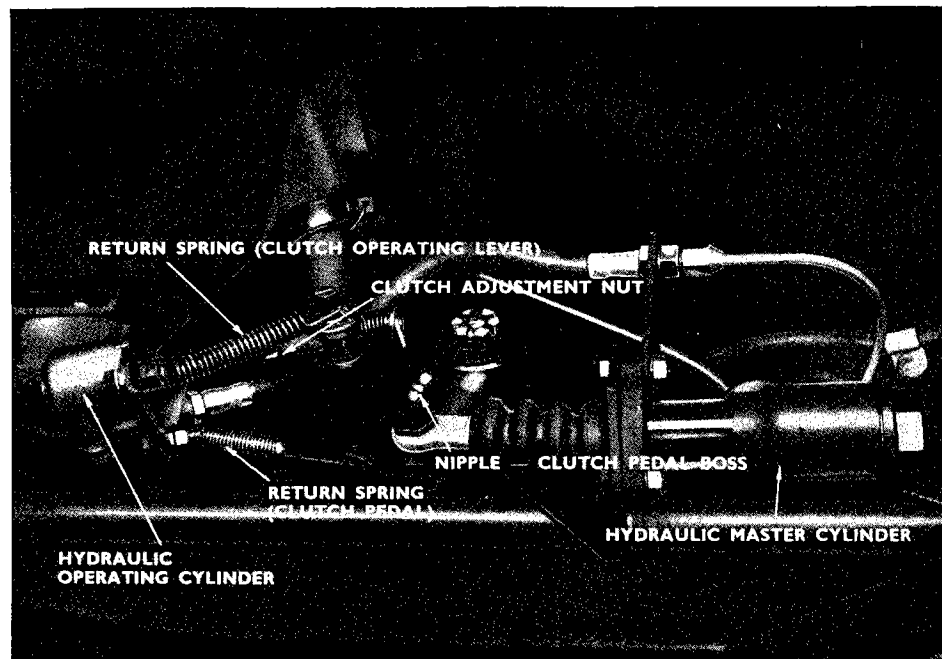


PLATE E.6. CLUTCH PEDAL ADJUSTMENT. HYDRAULIC OPERATION (Mark VII).

## SETTING OF CLUTCH PEDAL POSITION RELATIVE TO MASTER CYLINDER (MARK VII MODEL)

**ADJUSTMENT.** Adjustment is carried out at the eccentric pin at the base of the clutch pedal which bears against the master cylinder push rod. To adjust, slack back eccentric pin to give clearance on master cylinder push rod, set clutch pedal pad in line laterally with brake pedal pad and adjust eccentric pin so that it contacts but does not depress the master cylinder push rod.

Having made the above adjustments, check that 1" (25 mm.) clearance exists between the clutch pedal and the engine side of the toe board.

## CLUTCH. TO BLEED HYDRAULIC SYSTEM (MARK VII MODEL)

Top up supply tank with Girling Crimson Brake Fluid. Remove rubber dust cap from bleed nipple on operating cylinder at right-hand (offside) side of clutch bell housing and fit rubber bleed tube, allowing this to hang in a clean container or glass jar. Unscrew the nipple about three-quarters of a turn and operate the clutch pedal its full travel a few times, allowing two or three seconds between each stroke. Pumping must be continued until the fluid is entirely free of air, care being taken to see that the reservoir is replenished frequently during this operation, for should it be allowed to empty more air will enter. After expelling all traces of air, hold clutch pedal in depressed position, tighten nipple and replace rubber dust excluder.

## CLUTCH PEDAL. TO ADJUST (MECHANICAL LINKAGE) (MARK VII MODEL)

**GENERAL.** On the early models fitted with mechanical clutch operation linkage the following method of adjustment obtains.

**ADJUSTMENT.** Adjustment is carried out at the brass nut fitted to the clutch operating rod. (Plate E.7.) Clockwise rotation of the nut reduces pedal free travel; anti-clockwise rotation increases pedal free travel. Rotate the brass adjuster nut in the required direction to give 1" (25 mm.) free or unloaded movement at the clutch pedal pad. Ensure that the brass adjuster nut is located correctly on the cam action slot. Note that each half turn of the adjuster nut brings it into position with the cam location.

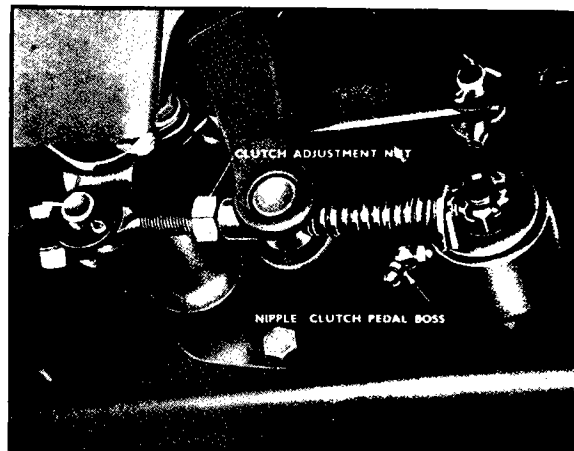


PLATE E.7. CLUTCH PEDAL ADJUSTMENT.  
MECHANICAL LINKAGE (Mark VII).

## CLUTCH PEDAL TO ADJUST (XK 120 MODELS)

**ADJUSTMENT.** Adjustment is carried out at the brass nut fitted to the clutch operating rod. (Plate E.8.) Clockwise rotation of the nut will reduce pedal free travel; anti-clockwise rotation increases pedal free travel. Rotate the adjuster nut until there is 1" (25 mm.) free or unloaded movement at the clutch pedal pad. The nut is retained in this position by the tension of the spring fitted to the operating rod.

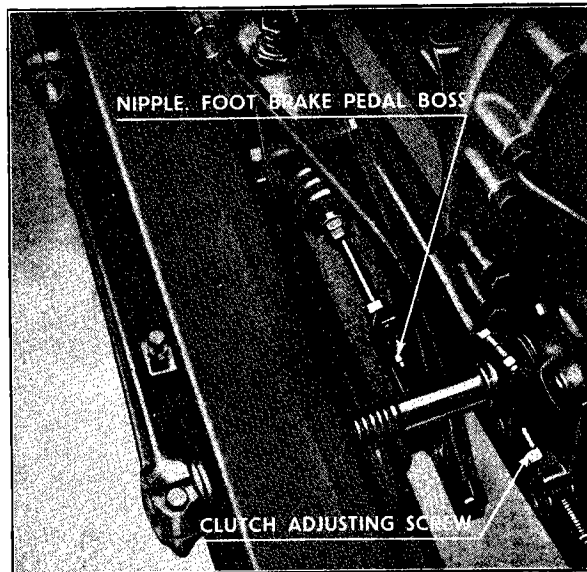


PLATE E.8. CLUTCH PEDAL ADJUSTMENT (XK 120).

## CLUTCH OPERATING MASTER CYLINDER. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Unscrew the union nuts securing the two hydraulic pipes to the top of the master cylinder. Plug ends of pipes to avoid loss of fluid. Remove the eccentric pin connecting the master cylinder push rod to the bottom end of clutch pedal and release pedal return spring. Remove the three bolts and nuts securing the master cylinder to the mounting bracket and withdraw cylinder.

**REFIT.** Refitting is the reverse of the above procedure. It will be necessary to bleed the system when all connections have been attached. (See Page E.17.)

When the master cylinder is refitted it is necessary to check that the stroke of the master cylinder push rod when operated is  $1\frac{1}{2}$ " (38 mm.). The stroke can be reset by moving the master cylinder support bracket by means of the slotted holes, and resetting the eccentric pin as described under "Setting of Clutch Pedal Relative to Master Cylinder". (Page E.17.)

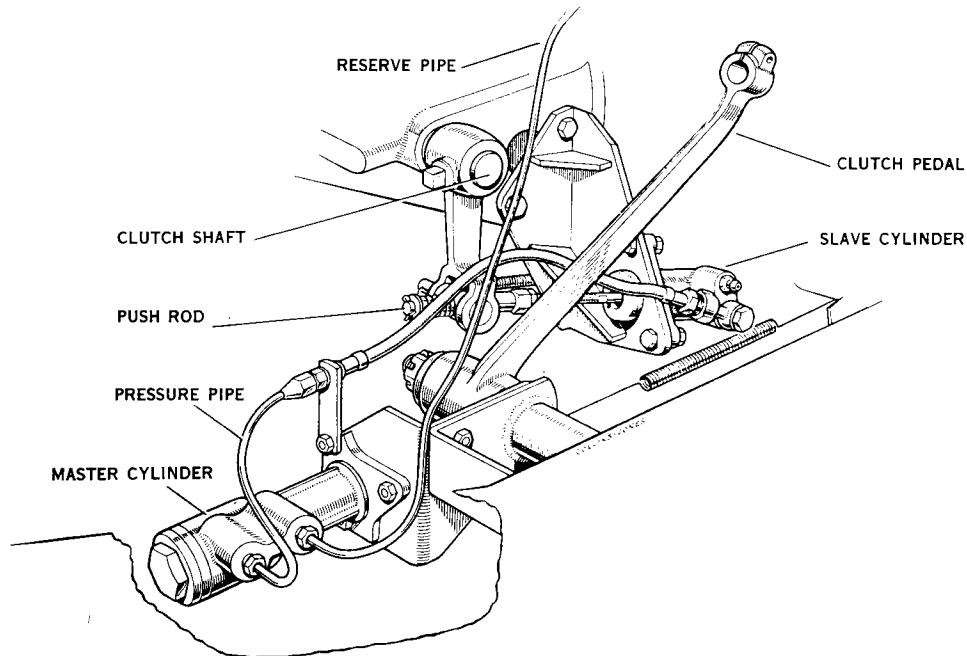


PLATE E.9. CLUTCH HYDRAULIC OPERATING SYSTEM (Mark VII).  
(Right-Hand Drive illustrated)

**CLUTCH OPERATING MASTER CYLINDER  
TO DISMANTLE AND REASSEMBLE  
(MARK VII MODEL).**

**GENERAL.**  
(Refer to Plate E.10).

The assembly consists of a cast iron body, with a highly finished bore, into which is assembled a plunger return spring (fitting inside the end cap and the body of the plunger) a polished steel plunger, a recuperating seal, a steel shim, an end seal and a steel seal retainer. A screwed end cap which is machined on the inside, supports the recuperating seal.

The plunger is operated by a push rod with a hardened rounded end which engages the concave end of the seal retainer, and is retained in the cylinder by a dished washer and a circlip.

Always exercise extreme cleanliness when dealing with any part of the hydraulic system.

**DISMANTLE.** Prepare a clean space (free from oil, grease, dirt, etc.) upon which to work, and lay the parts. Unscrew the end cap and gasket, and withdraw the plunger return spring, pull back the rubber boot and remove the circlip with pliers, then withdraw the push rod.

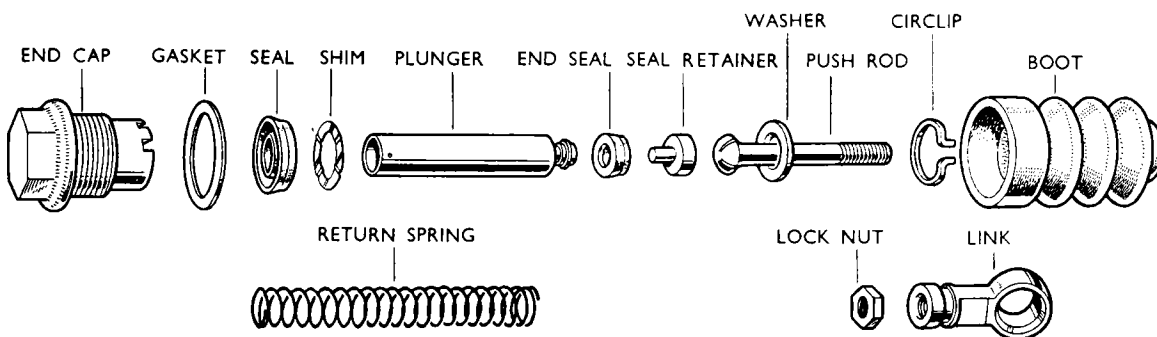


PLATE E.10. MASTER CYLINDER. Exploded view (Mark VII).

Push the plunger out from the pressure end and detach the seal retainer and end seal and remove the recuperating seal and shim from the body.

Carefully examine all components and replace any that appear worn or damaged. It is especially important to renew any seals which appear distorted or lack resilience.

Never allow petrol, paraffin or trichlorethelene to contact hydraulic parts.

**REASSEMBLE.** Thoroughly clean all parts with clean Girling brake fluid, which must not be used again. The rubber seals and the plunger should be smeared with clean fluid immediately before assembly.

Insert the steel shim into the pressure end of the cylinder against the shoulder formed inside. Replace the recuperating seal with the back of the seal towards the shim.

Fit the end seal to the plunger with the lip of seal first facing away from the concave end of the seal retainer, which fits next. Insert the plunger (open end first) into the cylinder from the push rod end, easing the end seal carefully into the bore.

(The lips of both seals will then be facing towards the pressure or end cap end of the cylinder).

Insert the push rod assembly round end first, into the bore and replace the washer and circlip. Pack the boot with Girling rubber grease No. 3 (red) and stretch over the end with the smaller aperture seating in the collar.

Insert the plunger return spring in the other end. Replace the end cap and gasket and tighten firmly.

**CLUTCH OPERATING SLAVE CYLINDER  
TO DISMANTLE AND REASSEMBLE**

(MARK VII MODEL).

**GENERAL.**  
(Refer to Plate E.11).

The slave cylinder is fitted to the clutch bell housing by three bolts. It consists of a body containing a piston, a rubber seal, a push rod and a rubber dust cover protecting the open end. A bleed screw is also fitted.

Always observe the strictest cleanliness when dealing with any part of the hydraulic system.

**DISMANTLING.** It is not necessary to remove the cylinder from its mounting to take out the piston and seal. Disconnect the push rod from the clutch shaft lever and remove dust cover followed by push rod, piston and seal in that order.

Examine the parts and replace any that are worn or damaged. Particularly examine the seal and renew if distorted or lacking resiliency.

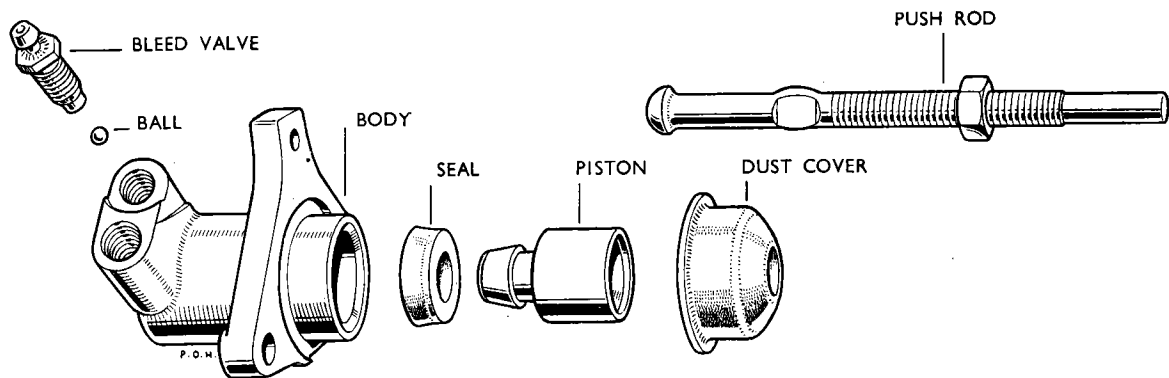


PLATE E.11. SLAVE CYLINDER. Exploded view (Mark VII).

**ASSEMBLING.** Fit the seal with the back to the piston and located over the shoulder. Smear the seal and the piston with clean Girling crimson brake fluid and carefully insert into the cylinder—seal first. Replace rubber dust cover and reconnect the push rod to the clutch shaft lever.

Top up the supply tank and bleed the clutch system as described on page E.17. Check clutch pedal adjustment and adjust, if necessary, as described on page E.16.

## FLYWHEEL. TO REMOVE, SERVICE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** Obtain access to the clutch unit as described on Page E.10 (Mark VII) and Page E.11 (XK 120). Remove clutch as described on Page E.12.

**REMOVE FLYWHEEL.** Release the tab washers and remove the ten flywheel mounting bolts. Removal of the mounting bolts and tab washers will disclose two mushroom-headed dowels passing through the flywheel into the crankshaft boss. Using two levers on opposite sides of the flywheel remove the flywheel, care being taken not to damage the crankshaft boss or drop the flywheel during final release.

Exercising care not to damage the bush, a  $\frac{7}{16}$ " (11.0 mm.) round bar may be fitted through the flywheel into the crankshaft spigot and used with advantage to support the flywheel during removal.

**SERVICE.** If the starter gear is badly worn a new flywheel should be used since the starter gear teeth are integral with the flywheel, and in this case it will be necessary to balance the flywheel and clutch as an assembly. Examine the porous bronze bush fitted to the spigot of the crankshaft boss and if this shows signs of wear withdraw the bush which is a press fit in the spigot.

**BALANCE.** Check the flywheel and clutch balance as an assembly by mounting on a mandril and setting up on parallel knife edges. Mark the relative position of clutch and flywheel. If necessary, remove the clutch, and drill  $\frac{3}{8}$ " (9.5 mm.) balance holes not more than  $\frac{1}{2}$ " (12.7 mm.) deep in the flywheel on the same pitch circle as the clutch cover dowels. (Plate E.12.)

**REFIT FLYWHEEL.** Check that the crankshaft flange and the holes for the flywheel bolts and dowels are free from burrs.

Turn the engine until Nos. 1 and 6 pistons are on T.D.C. and fit the flywheel to the crankshaft flange so that the "B" stamped on the periphery of the flywheel is at approximately the B.D.C. position, when the dowel and bolt holes are in line. (This will ensure that the balance mark "B" on the flywheel is in line with the balance mark on the crankshaft, which is a group of letters stamped on the crank web just forward of the rear main journal.)

Tap the two mushroom-headed dowels into position, fit the locking plate and flywheel securing set screws. Tighten the set screws to a torque of 800 lbs./ins. (9.2 kg./m.) and secure with the locking plate tabs.

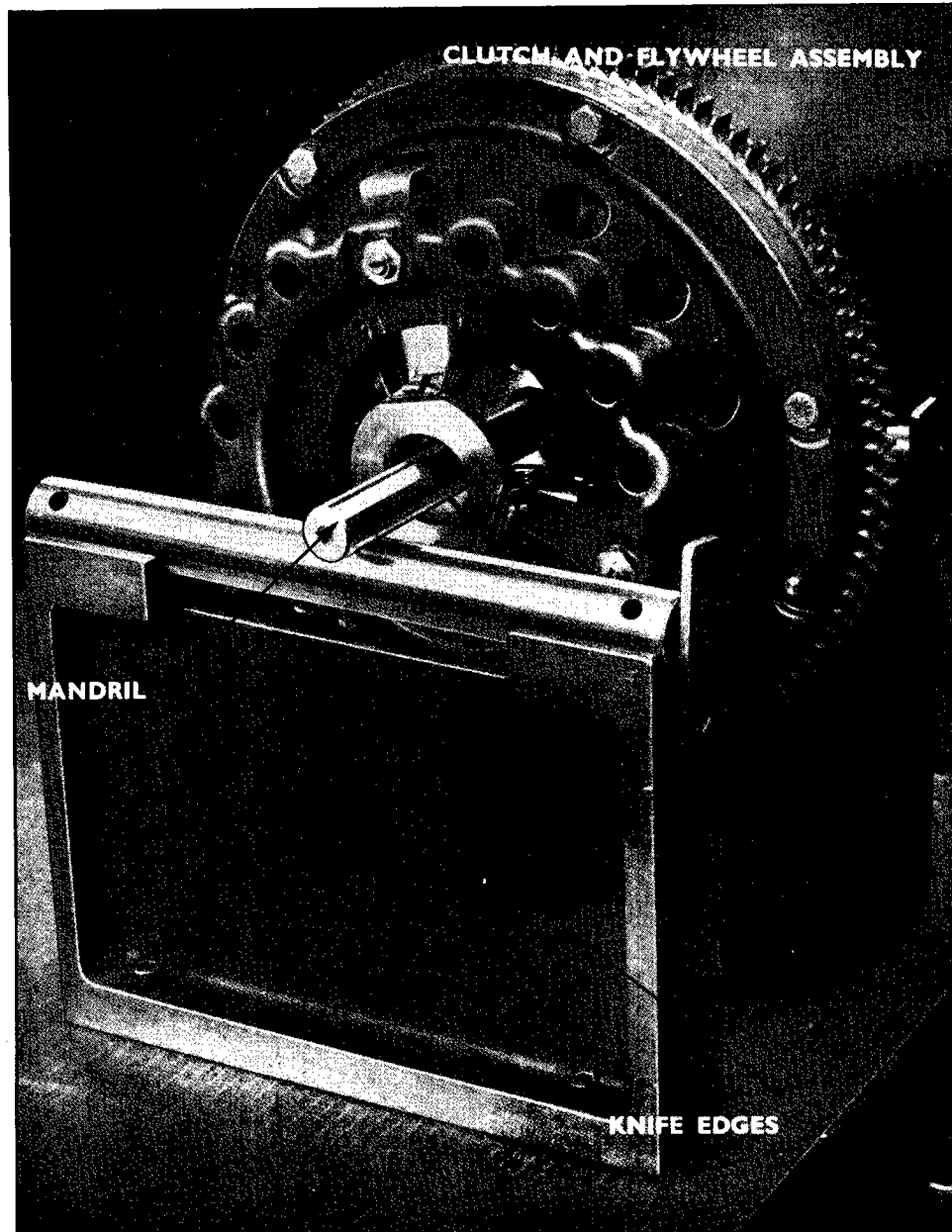


PLATE E.12. CLUTCH AND FLYWHEEL BALANCING.



# **GEARBOX**

## **MARK VII and XK 120 MODELS**

### **GEARBOX NUMBERS**

(Stamped on a small shoulder at the top of the rear left-hand side of the gearbox casing and on the rim of the core plug aperture in the top cover. The gearbox number is also given on a plate fixed to the scuttle under the bonnet.)

#### **EARLY MARK VII AND XK 120 MODELS**

##### **S.H. or J.H. Series**

(Gearbox number prefixed by S.H. or J.H.)

#### **LATER MARK VII AND XK 120 MODELS**

##### **S.L. or J.L. Series**

(Gearbox number prefixed by S.L. or J.L.)

#### **NOTE**

The contents and illustrations of this section apply specifically to the S.H. and J.H. Series gearbox units. The S.L. and J.L. gearbox units are similar in construction to the S.H. and J.H. units except for no rear extension and bearing (see Plate F.8) being fitted. With the S.L. and J.L. design a shorter mainshaft is used and the rear cover is directly attached to the rear face of the gearbox casing.

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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F.17	Top Cover. Rear View .. .. .	F.29

**(MARK VII AND XK 120 MODELS)**

**GENERAL.** Four types of gearboxes are fitted to the Mark VII and XK 120 models, that is, Series S.H., J.H., S.L. and J.L. For further details and the interchangeability of the four types of gearbox units, refer to the paragraphs under the headings "Series S.H. and J.H." and "Series S.L. and Series J.L." below.

The main differences between the S.H. and J.H. Series and the S.L. and J.L. Series gearboxes are that the latter series have a shorter mainshaft and no rear extension and bearing, the rear end cover being directly attached to the rear face of the gearbox casing. On cars fitted with S.L. or J.L. gearboxes a longer propeller shaft (Mark VII longer front propeller shaft) and a speedometer cable of different length are used.

**DESCRIPTION.** The constant mesh gears, that is, second, third and top, have single helical teeth. All constant mesh gears are brought into engagement by synchronising dog clutches of the toothed type. The internally toothed members slide on synchronising sleeves which are splined to the mainshaft; these members are combined with internal cones for the synchro-mesh mechanism, the corresponding external cones and external dogs being formed on the gear wheels. First and reverse gears are of straight tooth form, the reverse wheel being bushed and mounted on a short shaft situated to the offside (right hand) and slightly above the countershaft. Selection of the gears is by rods and forks operated by a lever mounted on an extension of the gearbox cover.

**SERIES S.H. AND SERIES J.H.** On early Mark VII and XK 120 cars (refer to Note on page F.1) two types of gearboxes are used, that is, Series S.H. and Series J.H., which are fully interchangeable as units, but on which many internal parts are not interchangeable. The serial number of the box is prefixed by either S.H. or J.H., thus identifying the type of box to be dealt with. The series and serial number will be found stamped on a boss situated at the nearside (left hand) rear at the top of the gearbox case and on the rim of the core plug aperture in the top cover. The number is also given on a plate fixed to the scuttle.

The difference between the two types of box is in the construction of the constant pinion shaft and countershaft gears, the constant pinion shaft wheel being dogged to the shaft on Series S.H. and integral with the shaft on J.H. On Series J.H. the countershaft gears consist of 1st speed and integral splined sleeve on which are mounted second, third and constant mesh gears. On Series S.H. the countershaft gears, first, second, third and constant mesh are a cluster gear.

**Note.**—S.H. and J.H. Series gearbox units are not interchangeable with S.L. and J.L. Series.

**SERIES S.L. AND SERIES J.L.** On later Mark VII and XK 120 cars (refer to Note on page F.1) two types of gearboxes are fitted, that is, Series S.L. and Series J.L. In these series Mark VII gearboxes are not interchangeable with XK 120 gearboxes as units; the rear cover of the XK 120 unit incorporating the gearbox rear mounting platform. The serial number of the box is prefixed by either S.L. or J.L., thus identifying the type of box to be dealt with. The series and serial number will be found stamped on a boss situated at the nearside (left hand) rear at the top of the gearbox case and on the rim of the core plug aperture in the top cover. The number is also given on a plate fixed to the scuttle.

**Note.** S.L. and J.L. Series gearbox units are not interchangeable with S.H. and J.H. Series.

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) check the level of oil in the gearbox by means of the dipstick when the car is standing on level ground. Access is gained to the dipstick through the inspection plate situated in front of the gear lever. If necessary, top up through the dipstick hole with the recommended grade of oil.

Every 10,000 miles (16,000 kilometres) drain, flush out with flushing oil and refill the gearbox with the recommended grade of oil. The drain plug is situated at the base of the gearbox. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

## RECOMMENDED LUBRICANTS

Vacuum	Wakefield	Shell	Esso	Price's	S.A.E. Viscosity
Mobiloil A	Castrol XL	Double Shell	Essolube 30	Energol 30	30

Gearbox Capacity  $2\frac{1}{2}$  pints (1.4 litres.)

## DATA

(SERIES S.H. AND J.H.)

Type	..	..	..	..	..	..	..	Synchromesh 2nd, 3rd and Top
Gearbox Ratios. Top Speed	..	..	..	..	..	..	..	1 : 1
Third Speed	..	..	..	..	..	..	..	1.367 : 1
Second Speed	..	..	..	..	..	..	..	1.982 : 1
First Speed	..	..	..	..	..	..	..	3.375 : 1
Reverse	..	..	..	..	..	..	..	3.375 : 1
Bearings—Clutch Shaft. In Crank Flange	..	..	..	..	..	..	..	Porous Bronze Bush
In Gearbox Casing (Ball)	..	..	..	..	..	..	..	Hoffman 340K
Main Shaft. Front	..	..	..	..	..	..	..	Roller
Intermediate (Roller)	..	..	..	..	..	..	..	Hoffman RMS.12 $\frac{1}{2}$ L
(Ball)	..	..	..	..	..	..	..	Hoffman MS.12 $\frac{1}{2}$ K
Rear. (Ball)	..	..	..	..	..	..	..	Hoffman MS.12
2nd Speed Gear on Mainshaft	..	..	..	..	..	..	..	Needle Rollers
3rd Speed Gear on Mainshaft	..	..	..	..	..	..	..	Needle Rollers
Countershaft. Front	..	..	..	..	..	..	..	Needle Rollers
Rear	..	..	..	..	..	..	..	Needle Rollers
Reverse Shaft	..	..	..	..	..	..	..	Stationary
Reverse Gear	..	..	..	..	..	..	..	Phosphor Bronze Bush
Fit of Bushed Reverse Gear on Shaft	..	..	..	..	..	..	..	.0014"—.0024" (.04 mm.—.06 mm.)
Countershaft End Float	..	..	..	..	..	..	..	.002"—.004" (.05 mm.—.10 mm.)
Mainshaft End Float	..	..	..	..	..	..	..	.002"—.006" (.05 mm.—.15 mm.)
Second Gear End Float on Mainshaft	..	..	..	..	..	..	..	.002"—.004" (.05 mm.—.10 mm.)
Third Gear End Float on Mainshaft	..	..	..	..	..	..	..	.002"—.004" (.05 mm.—.10 mm.)
Oil Capacity	..	..	..	..	..	..	..	$2\frac{1}{2}$ Pints (1.4 litres)

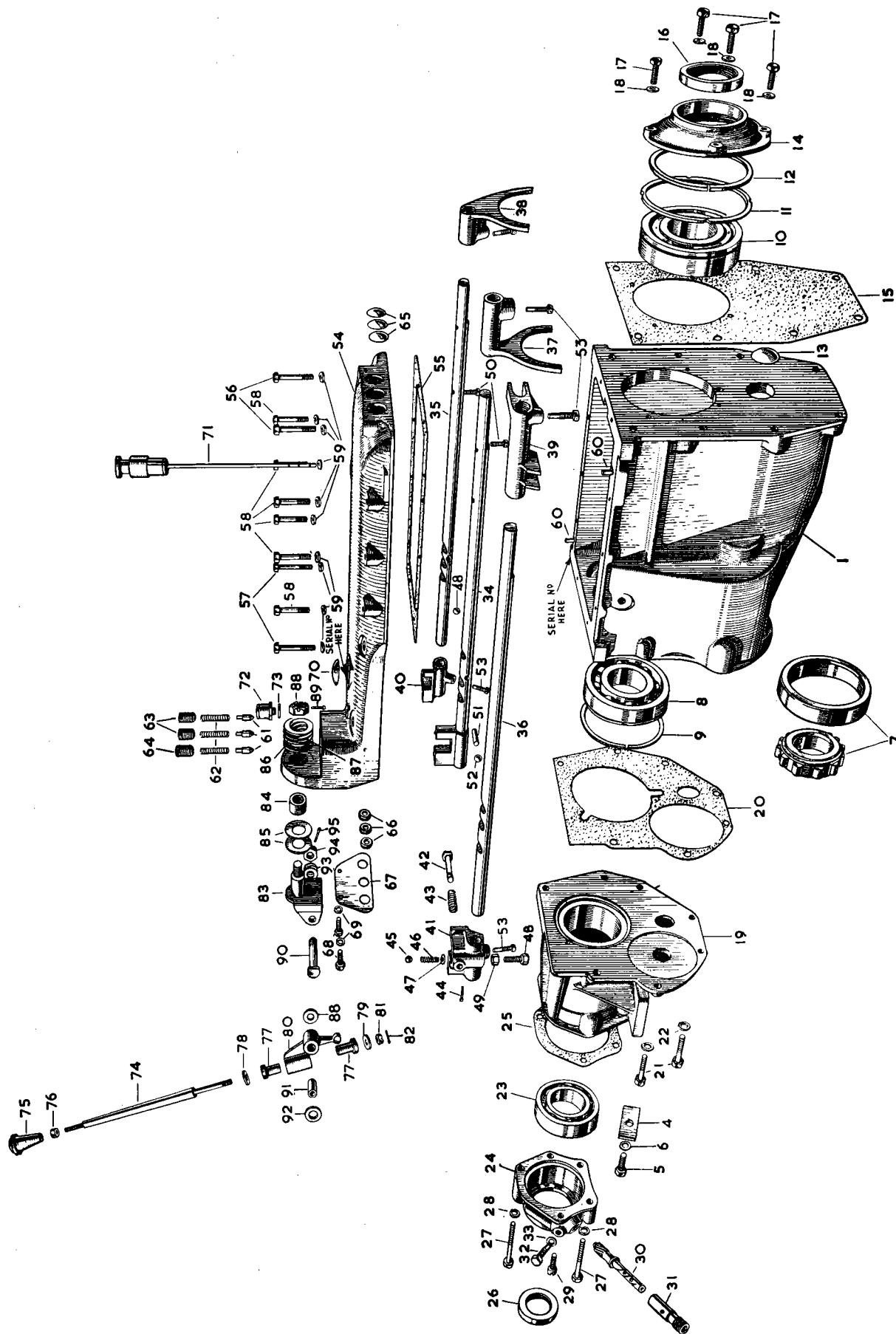


PLATE F.1. TOP COVER AND CASING (S.H. and J.H. Series)

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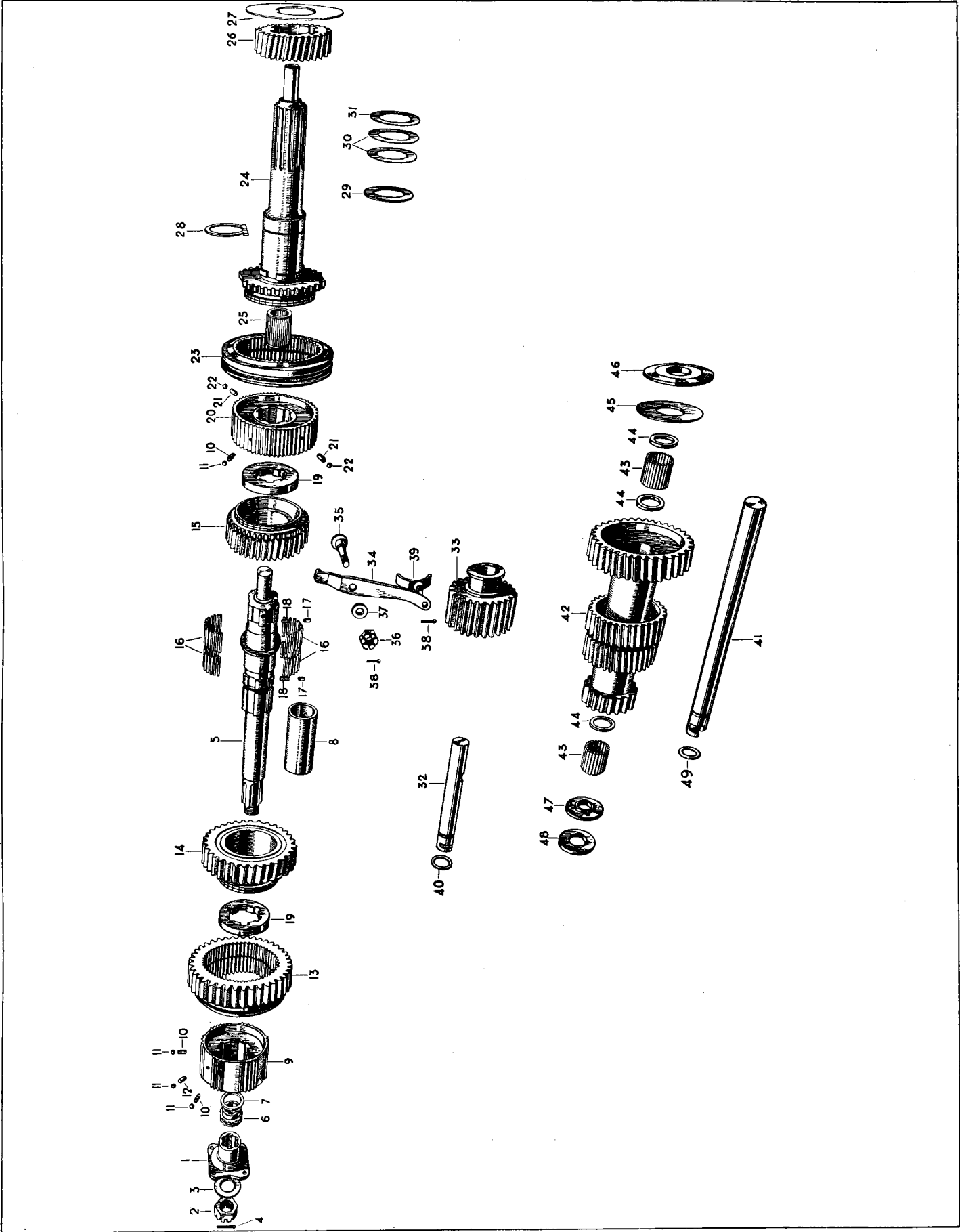


PLATE F.2. GEARS (S.H. Series).



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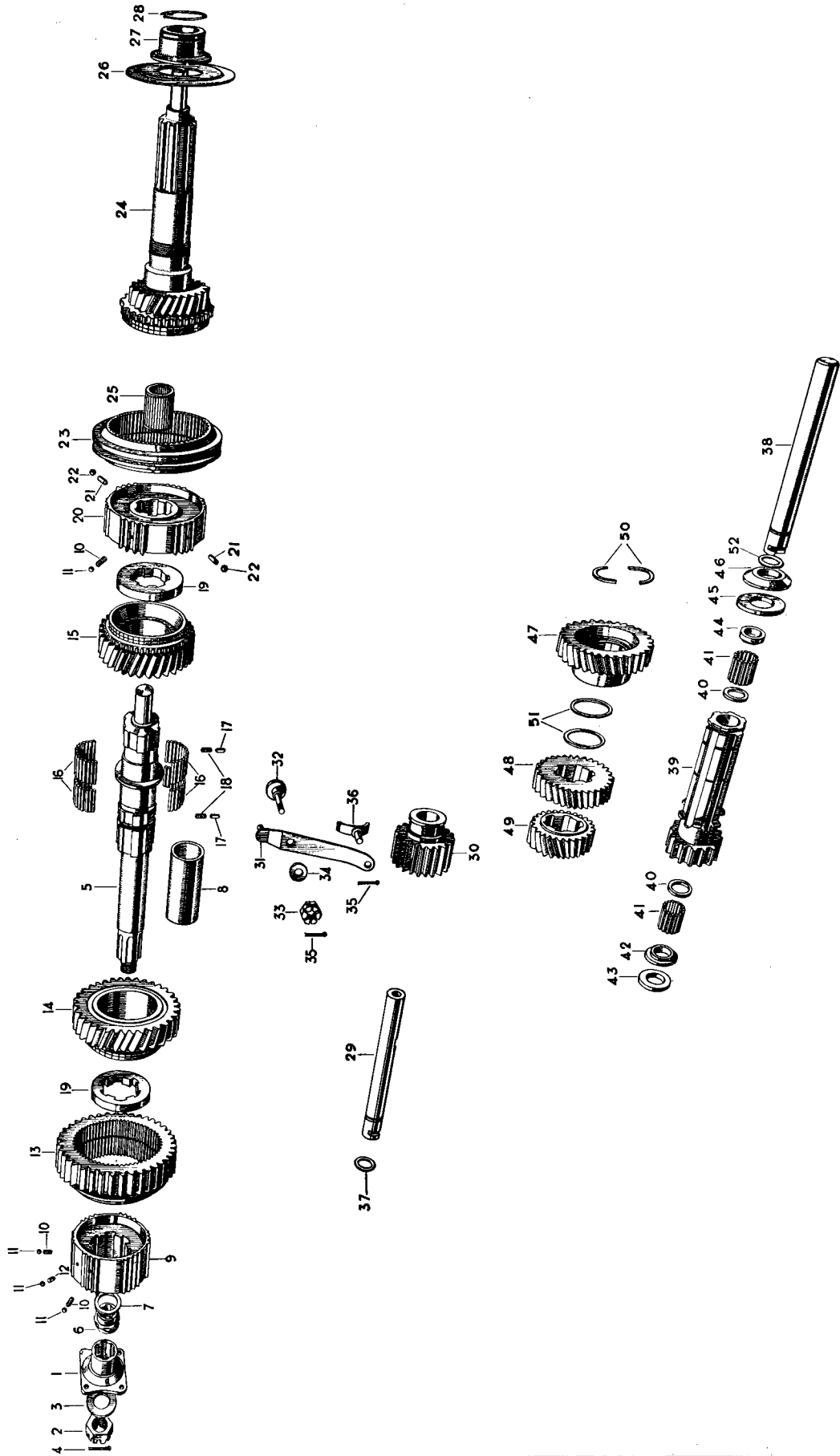


PLATE F.3. GEARS (J.H. SERIES)

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## GEARBOX. TO REMOVE AND REFIT (MARK VII MODEL)

- GENERAL.** The engine and gearbox unit is removed as one assembly by lowering the rear of the assembly and removing it forwards and upwards.
- REMOVE BONNET.** Release bonnet fastener and open bonnet. Support while removing four set bolts from the two hinges at rear and lift bonnet clear.
- REMOVE RADIATOR GRILLE.** Remove the two set screws and plain washers securing the radiator grille to the tie panel at the top of the radiator. From underneath the car remove the two set screws and plain washers securing the grille brackets to the radiator frame.
- Remove the grille, noting the packing washers fitted between the bottom grille brackets and the radiator frame.
- REMOVE TIE PANEL AND SUPPORTING CHANNEL.** Remove the three set screws and plain washers securing the tie panel to the supporting channel. Remove tie panel complete with bonnet release cable and place on wing.
- Remove the set screw and plain washer securing the support channel to each wing valance and remove channel.
- REMOVE RADIATOR BLOCK.** Drain radiator by operating the remote control at top rear of radiator header tank. Slacken the top and bottom hose clips, and disconnect hoses.
- Remove the four set screws securing the radiator block to the vertical members of the radiator frame. The radiator block can now be removed by lifting it upwards, taking care not to foul the fan blades.

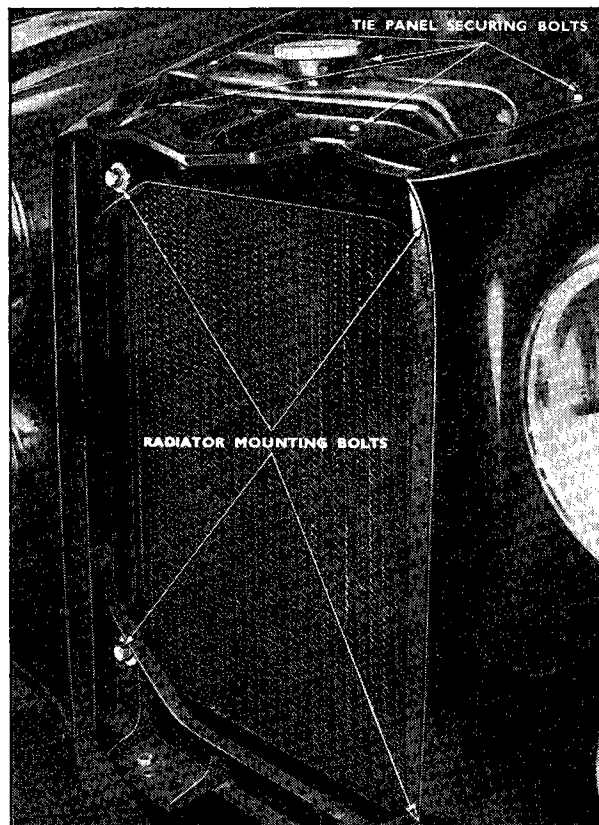


PLATE F.4. RADIATOR BLOCK. REMOVAL (Mark VII).

**RE-POSITION DYNAMO.** Disconnect battery lead. Disconnect dynamo leads, slacken adjustment bolts and clamp up dynamo as near as possible to engine.

**REMOVE AIR SILENCER AND MANIFOLD.** Remove the two set bolts passing through the silencer steady brackets into the intake manifold casting. Remove silencer. Withdraw two bolts securing air silencer manifold to carburetter flanges. Remove manifold.

**DISCONNECT ENGINE CONNECTIONS.** Disconnect throttle linkage at rear flexible joint. Disconnect petrol feed pipe from carburetters. Disconnect wire to self-starting carburetter solenoid. Disconnect electrical connections from starter motor. Disconnect thermometer bulb from water uptake manifold and tie clear. Care must be exercised not to twist the capillary tube to gauge or fracture may occur. Disconnect oil pressure gauge pipe. Disconnect vacuum pipe from inlet manifold. Disconnect two heater pipes from rear of engine. Disconnect revolution counter cable from rear of camshaft. Disconnect front exhaust pipe at joint with intermediate pipe. Remove oil filter unit from engine.

**DISCONNECT GEARBOX CONNECTIONS.** Remove gearbox and bell housing cover. Remove change-speed lever. Disconnect electrical connections to reverse switch at bayonet junction sleeves. Disconnect speedometer cable and place clear. Disconnect front end of propeller shaft at gearbox coupling.

**DISCONNECT SWAY BAR BRACKETS.** Disconnect sway bar support brackets at frame, but do not remove bar from suspension fixing points.

**DISCONNECT CLUTCH LINKAGE.** Disconnect flexible hydraulic pipe from clutch operating cylinder, insert wooden plug in end of pipe to prevent loss of fluid and tie pipe to some convenient part of chassis, clear of engine unit. Note.—System will require bleeding on reassembly.

On early models having the mechanical clutch linkage the following paragraph is applicable in place of the above.

Disconnect two bolts from plate on bell housing, two bolts from plate on frame, two bolts from keeper plate holding shaft to inner (bell housing) ball, two split pins from operating linkage and remove short shaft complete.

**REMOVE ENGINE.** Place sling around engine and take weight on pulley blocks prior to disconnecting engine mountings. Remove both front engine mountings where bolted to crankcase (three bolts per side) and remove mounting rubbers (one nut per side) from chassis mounting plates. Note that the earth lead is connected to one of the right-hand (offside) mounting bolts. Disconnect rear engine mounting rubbers where bolted to chassis plates (two bolts per side), leaving mounting rubbers attached to bell housing brackets. Note number and disposition of packing plates, if fitted, between mounting rubbers and chassis plates.

Lift engine from frame. When lifting engine, note that the sling must be arranged to tilt the engine to the rear, and care must be taken to avoid damage to the revolution counter drive adapter.

**REMOVE GEARBOX.** Remove the two bolts and nuts securing the starter to clutch housing and withdraw starter: Remove the pressed steel cover plate from the bottom of the clutch housing. Remove the bolts securing the clutch housing to the engine and withdraw gearbox unit. The gearbox must be supported during this operation in order to avoid straining the clutch driven plate and constant pinion shaft.

**REFIT.** Refitting is the reverse of the above procedure.

## GEARBOX. TO REMOVE AND REFIT (XK 120 MODELS)

**GENERAL.** The gearbox can be removed from the engine when the floor boards have been removed and the rear of the engine supported.

(Alternatively, the engine and gearbox can be removed as a unit, and the gearbox and clutch bell housing subsequently detached from the engine.)

**REMOVE FLOOR BOARDS.** Remove both seats and floor carpets and place clear of car. Remove gear lever knob and lock nut. Remove the gearbox carpets and cover. Remove floor boards. If desired, remove propeller shaft tunnel; this is not essential but gives better access to the propeller shaft coupling.

**DISCONNECT GEARBOX CONNECTIONS.** Disconnect reverse light wires from switch on remote control. Disconnect speedometer cable and tie clear. Remove four bolts from front end of propeller shaft at gearbox coupling and slide front section of shaft rearwards to limit of splines to clear gearbox coupling flange.

**DISCONNECT CLUTCH LINKAGE.** Remove the split pin and clevis pin securing the adjusting rod to the clutch pedal shaft lever. Remove the pinch bolt securing the pedal stem to the top of clutch pedal and withdraw stem. Remove the pinch bolt securing the clutch pedal to shaft. Withdraw clutch pedal shaft through the chassis frame until the inner end of shaft is well clear of bearing housing in the side of clutch housing. Note that the clutch pedal is keyed to the pedal shaft.

**REMOVE REAR GEARBOX MOUNTING.** Support rear of engine on jack with a suitable packing interposed to distribute the load. Remove the four bolts and nuts securing the platform under the gearbox extension to the mounting. Remove the three bolts and nuts securing the mounting to the bracket on the front of centre cross member. (Fixed Head Coupe—two nuts.) Remove the set screw securing the torque arm to the mounting on the chassis frame.

The torque arm is situated just forward of the clutch housing and on the opposite side to the steering column.

Raise the gearbox sufficiently to enable the mounting to be removed from the cross member bracket.

**REMOVE GEARBOX.** Remove six set bolts securing cover plate to underside of bell housing and remove plate. Remove clutch bell housing bolts and withdraw gearbox and bell housing to rear over cross member. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly.

## GEARBOX. TO DISMANTLE (MARK VII AND XK 120 MODELS)

**REMOVE TOP COVER.** Drain gearbox by removing plug and fibre washer situated at base of the case. Withdraw dipstick. Remove ten set screws with spring washers and lift off top cover observing that this is located by two dowels fitted in the gearbox case. Remove and scrap joint washer. (Dismantling instructions for the top cover will be found on page F.27.)

**REMOVE FRONT END COVER.** Break locking wire and remove four set screws with copper washers securing cover to case. Remove front end cover. Remove and scrap oil seal from cover. Observe oil drain at bottom of cover mating with return hole in case and jointing washer interposed.

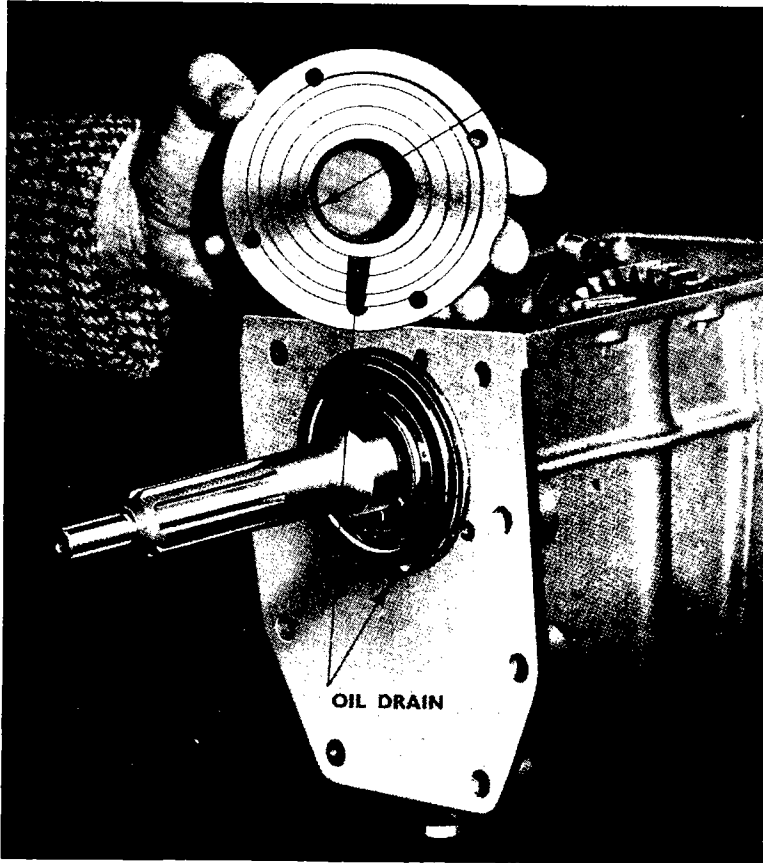


PLATE F.5. FRONT END COVER

**REMOVE REAR END COVER.** Engage top and reverse gears to lock box, remove split pin, slotted nut and plain washer securing propeller shaft drive flange to mainshaft. Tap drive flange off shaft. Remove four bolts with spring washers securing cover to extension. Remove locking screw with spring washer securing speedometer driven gear in cover. Withdraw driven gear and bearing. Remove cheese-headed set screw now disclosed securing cover to extension. Remove rear end cover. Remove and scrap oil seal from cover, scrap jointing washer. Withdraw speedometer driving gear and distance piece behind gear from mainshaft.

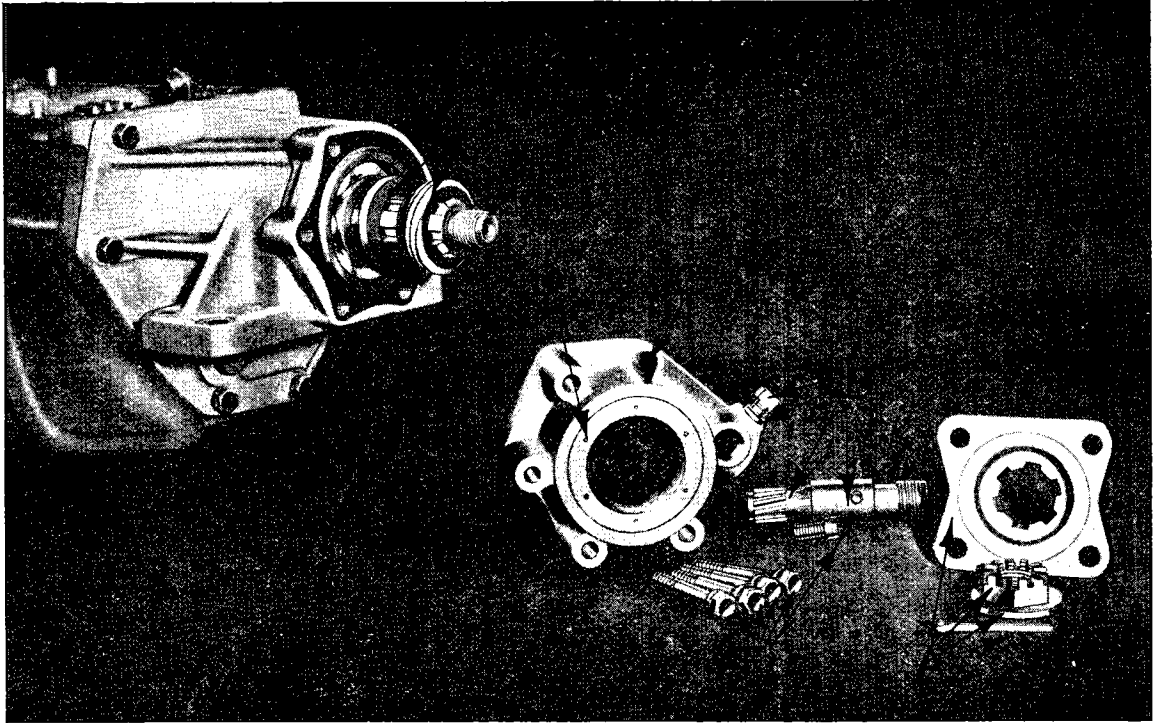


PLATE F.6. REAR END COVER (S.H. and J.H. Series).

- A. Propeller shaft drive flange, slotted nut, washer and split pin.
- B. Speedometer driven gear, bush, lock screw and spring washer.
- C. Rear end cover.
- D. Oil seal.
- E. Speedometer driving gear and distance piece.
- F. Cover securing bolts and cheese-headed set screw.

**REMOVE EXTENSION.**

Disengage top and reverse gears to place box in neutral. Remove seven set screws with spring washers securing extension to case. Do not disturb plate locking counter and reverse shafts since these will be withdrawn with the extension. Using a suitable drawer engaging on the mainshaft and on the extension draw off the extension complete with the mainshaft rear ball bearing, counter and reverse shafts. Remove distance piece between mainshaft front and rear bearings. The countershaft gears will now rest at the bottom of the case out of engagement with mainshaft gears. Remove and scrap felt oil sealing washer fitted on countershaft between extension and countershaft gears. Remove set screw with spring washer securing plate locking counter and reverse shafts, remove locking plate and carefully remove any burrs on the locked ends of the shafts which might damage the shaft mounting holes in the extension when the shafts are withdrawn. Withdraw shafts forward. Tap ball bearing out of extension. Observe oil return hole at bottom and breather hole at top of extension mating with oil return and breather holes in case and jointing washer interposed. Scrap joint washer.



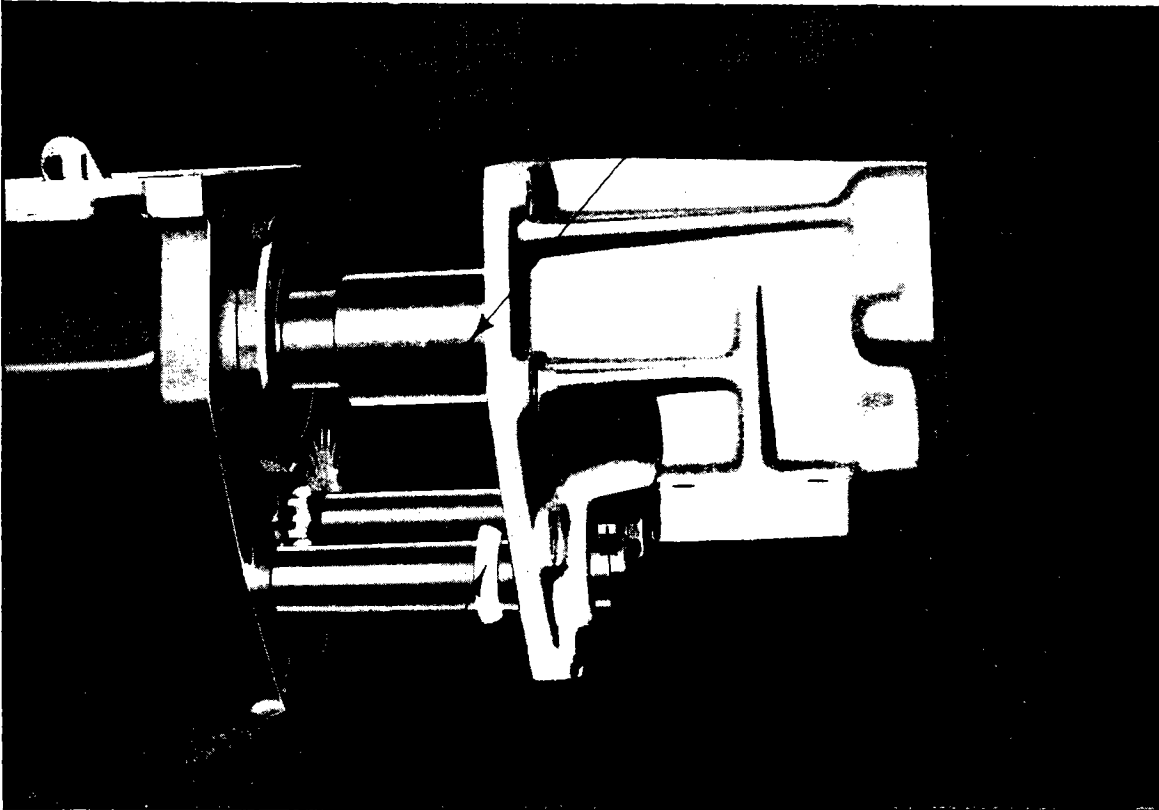


PLATE F.7. EXTENSION (S.H. and J.H. Series).

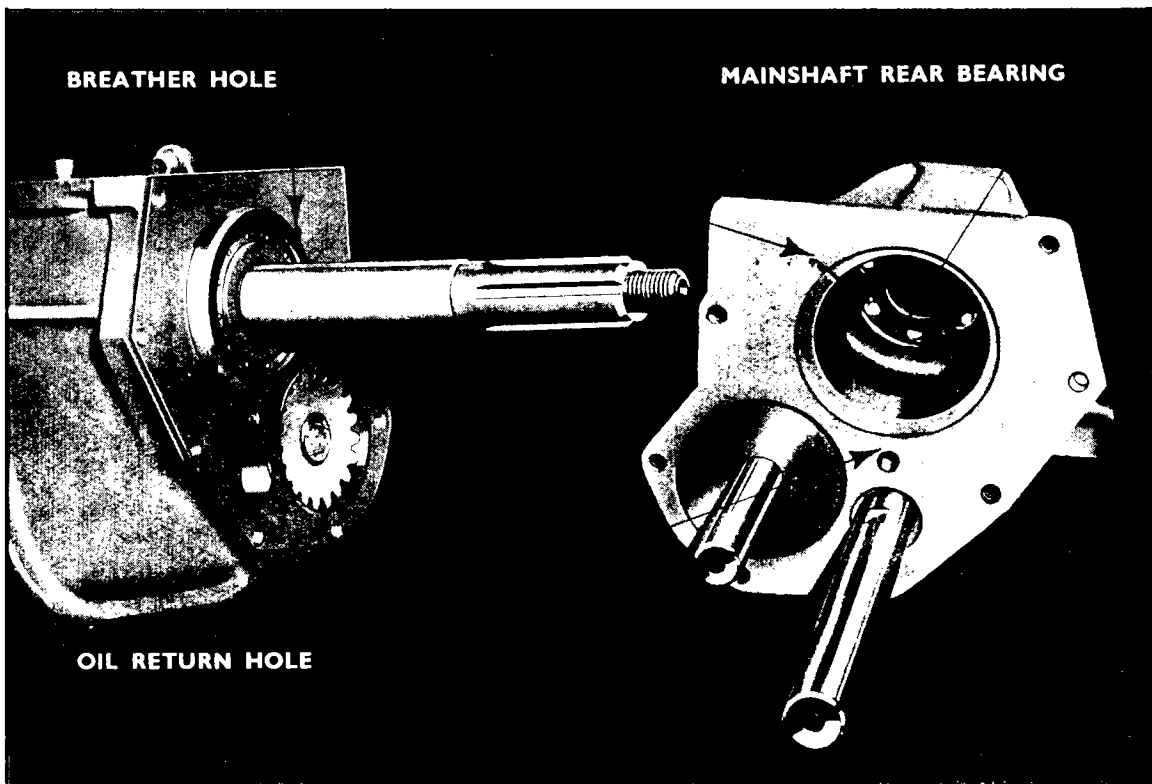


PLATE F.8. EXTENSION REMOVED (S.H. and J.H. Series).

**REMOVE  
CONSTANT  
PINION  
SHAFT.**

Rotate the constant pinion shaft until the two cut away portions of the toothed driving gear are facing the top and bottom of the case. Tap the mainshaft to the front to knock the constant pinion shaft with ball bearing forward out of the case. Remove constant pinion shaft and withdraw roller bearing from shaft spigot.

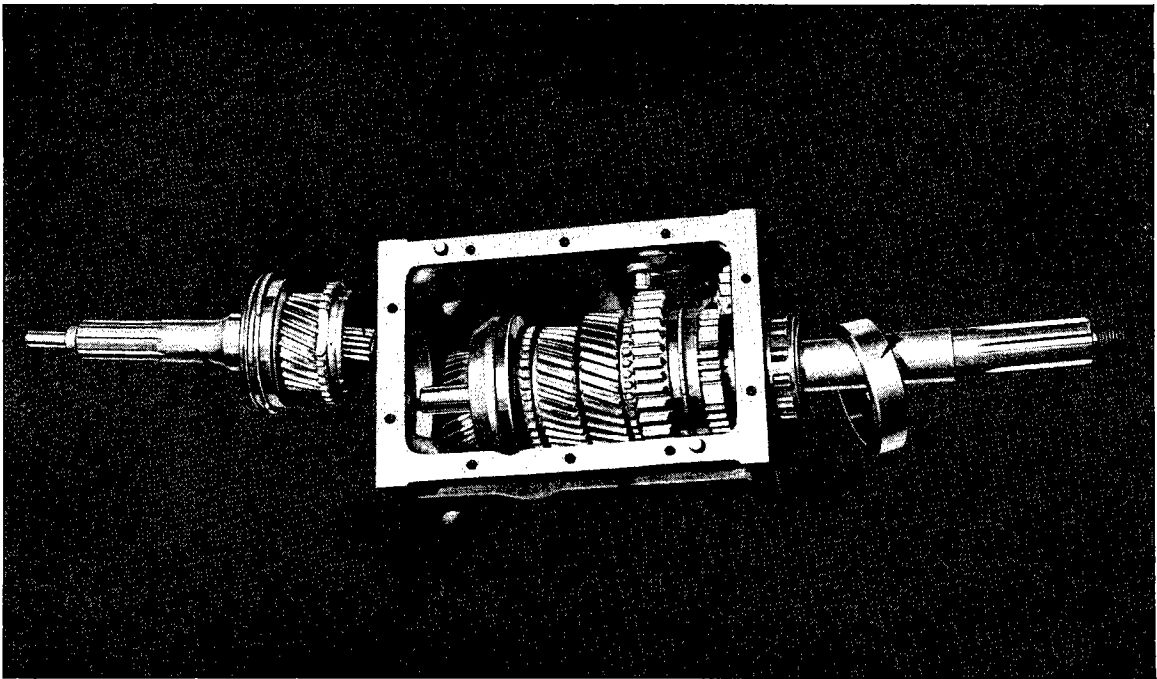


PLATE F.9. REMOVAL OF CONSTANT PINION SHAFT (S.H. Series illustrated).

**DISMANTLE** Remove circlip, packing washer and shims if fitted. Remove collar and circlip from bearing.  
**CONSTANT** With a suitable bearing puller draw bearing off shaft. Remove oil thrower and constant  
**PINION SHAFT** pinion.  
**—S.H. SERIES.**

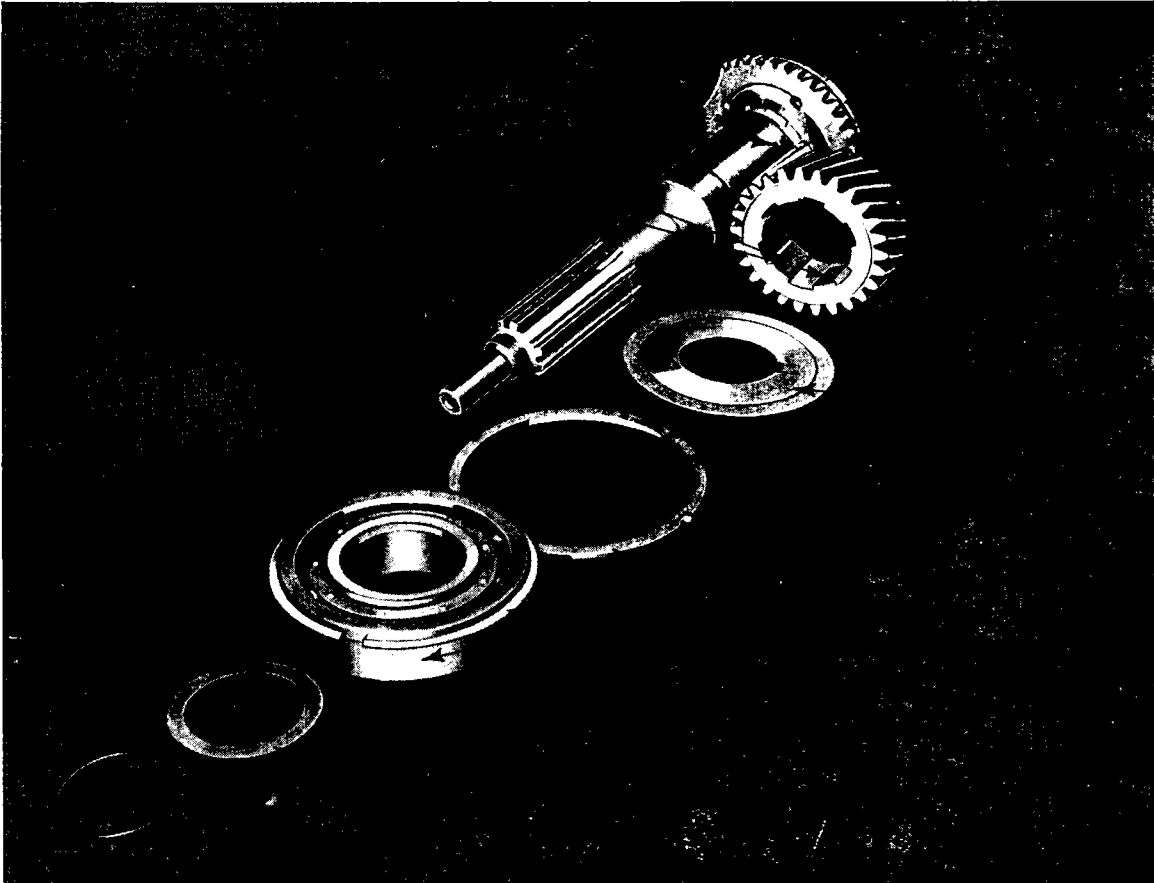


PLATE F.10.  
CONSTANT PINION SHAFT ASSEMBLY  
(S.H. Series).

**DISMANTLE CONSTANT PINION SHAFT —J.H. SERIES.** Withdraw circlip securing lock nut and rotate lock nut off shaft (left-hand thread). Remove collar and circlip from bearing. With a suitable bearing puller draw bearing off shaft. Remove oil thrower. **Note.**—On later J.H. gearboxes the lock nut and circlip fixing is replaced by a circlip, packing washer and shims, as on the S.H. gearboxes.

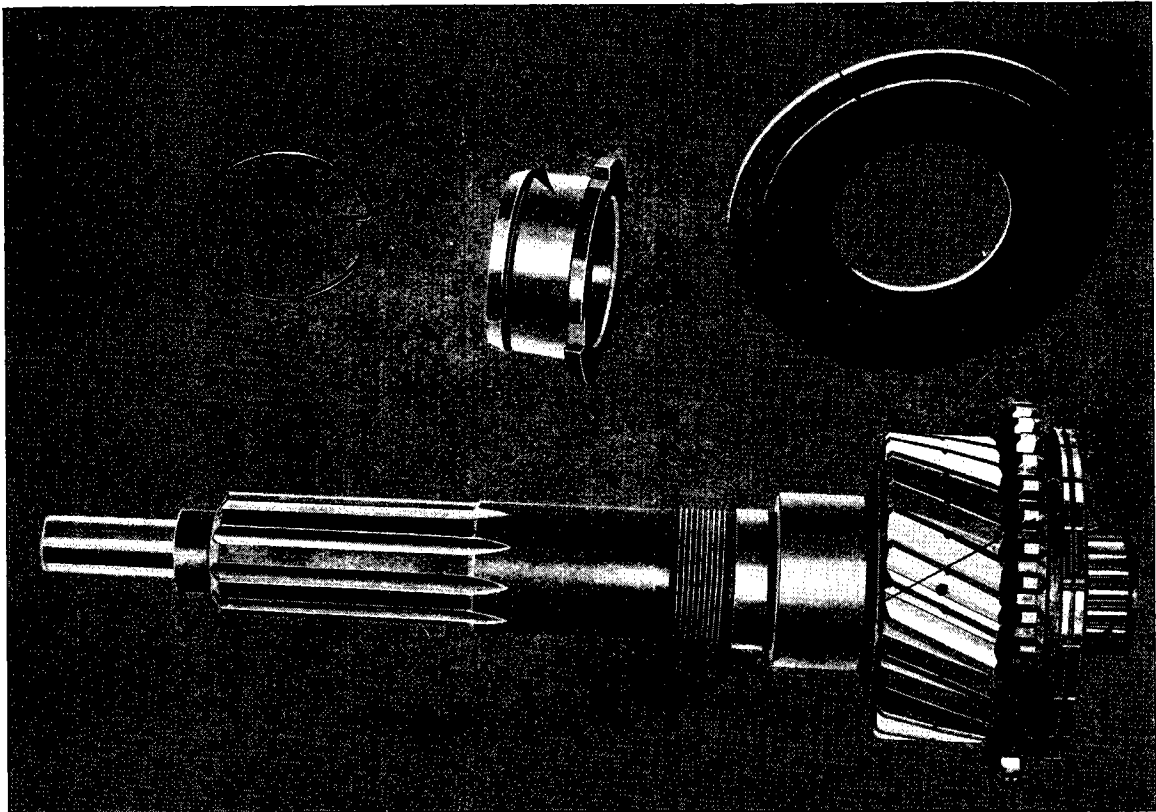


PLATE F.11.  
CONSTANT PINION SHAFT ASSEMBLY  
(Early J.H. Series).

**REMOVE MAINSHAFT.** It may be found that either "A" a roller bearing, or "B" a ball bearing is fitted to the mainshaft. Proceed as follows:—

"A." Roller Bearing. Tap the mainshaft to the rear until the outer race of the bearing can be withdrawn off the shaft leaving the rollers and inner bearing on the shaft which is now free to be withdrawn. (Plate F.9.)

"B." Ball Bearing. Using a suitable drift tap the inner race of the bearing rearwards down the shaft until the complete bearing can be removed and the shaft is free to be withdrawn.

Push reverse gear forward out of engagement to clear mainshaft first speed gear wheel. Lift the front end of the shaft upwards and remove complete with all mainshaft gears forward out of the case leaving countershaft gears at the bottom of the case.

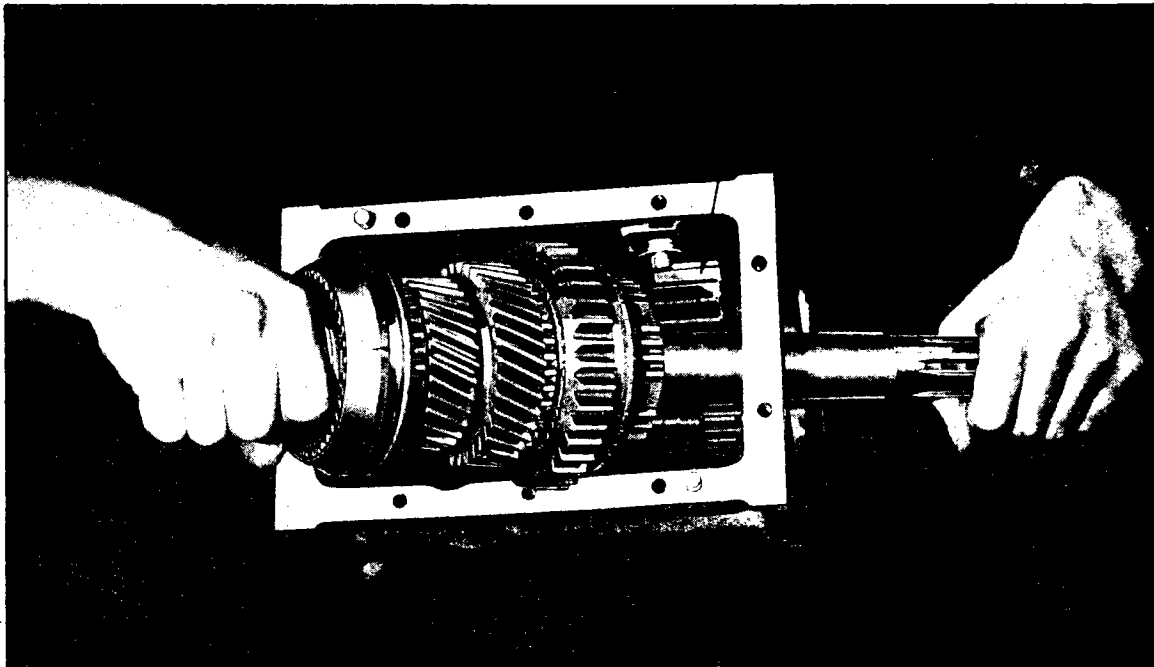


PLATE F.12. REMOVAL OF MAINSHAFT.

**DISMANTLE MAINSHAFT.** Withdraw top and third gear operating and synchronising sleeves forward off the shaft. Press the operating sleeve off the synchronising sleeve and remove the six synchronising balls and springs.

Withdraw second gear synchronising sleeve complete with first speed wheel rearwards off the shaft. Press first speed wheel off the synchronising sleeve and remove six synchronising balls and springs. Remove ball and plunger locking second speed synchronising sleeve to mainshaft.

Press in plunger locking third speed gear wheel thrust washer and rotate washer until splines line up and washer, plunger and spring can be removed. Remove washer forward off shaft followed by third speed gear wheel, taking care not to lose any needles which will emerge as the wheel is removed.

Press in plunger locating second speed gear wheel thrust washer and rotate washer until splines line up and washer, plunger and spring can be removed. Remove washer to rear off shaft followed by second speed gear wheel, taking care not to lose any needles which will emerge as the wheel is removed.

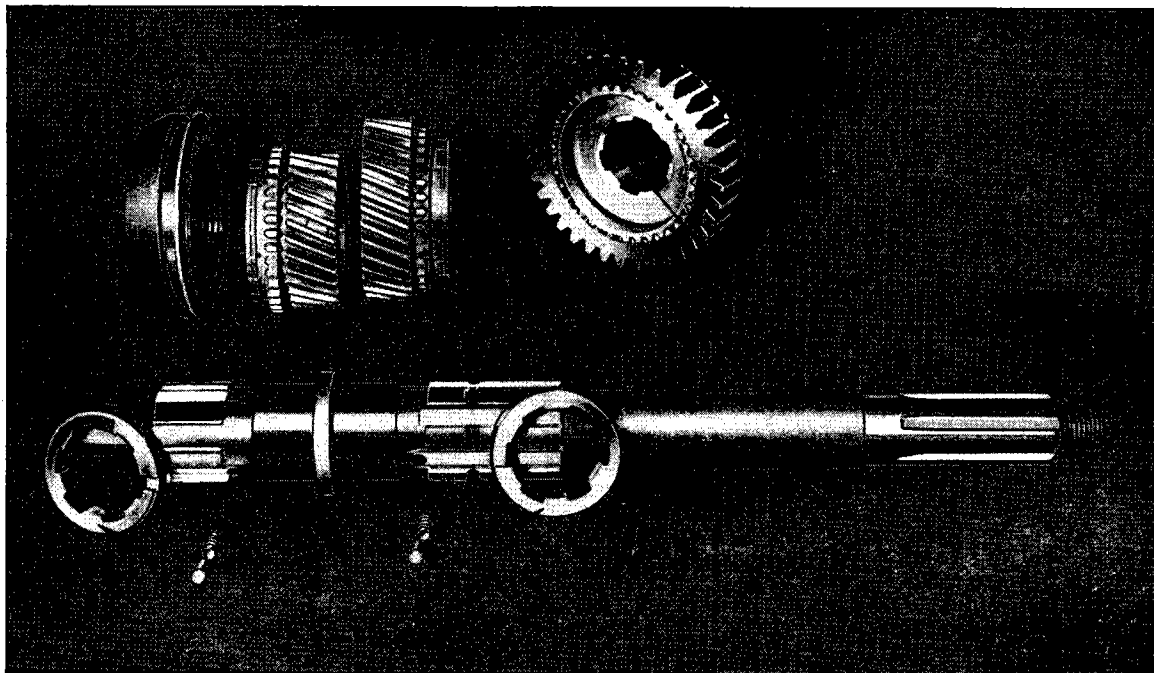


PLATE F.13. MAINSHAFT ASSEMBLY.

- A. Third and top operating and synchronising sleeves.
- B. Third speed gear wheel.
- C. Second speed gear wheel.
- D. Second speed synchronising sleeve with first speed wheel.
- E. Second and third speed gear wheel thrust washers.
- F. Thrust washer locking plungers and springs.
- G. Second speed synchronising sleeve locking plunger and groove on mainshaft.

#### REMOVE COUNTER-SHAFT GEARS.

Draw reverse wheel rearwards as far as it will go to clear countershaft first speed gear wheel. Lift out countershaft gears observing inner and outer thrust washers fitted at either end of the gears. Take care not to lose any needles which are located at either end of the gear unit. Remove fibre washer from hole in case supporting front end of countershaft.

#### DISMANTLE COUNTER-SHAFT GEARS —J.H. SERIES.

On S.H. Series gearboxes the countershaft gear unit is a cluster. On J.H. Series gearboxes second, third and top gears are mounted on a splined extension of first gear. To dismantle, remove circlip located behind top gear wheel and push the wheel as far as it will go up the shaft. Remove split ring and draw off constant mesh wheel. Remove circlip at the front of second and third gear wheels and draw off wheels.

#### REMOVE REVERSE WHEEL.

Push reverse wheel back into case and remove through top. Note bush which is a press fit in reverse wheel. Remove split pin from slotted nut with plain washer securing the fulcrum lever pivot pin. Withdraw pin, lever and reverse slipper. Remove split pin securing reverse slipper to fulcrum lever.

## GEARBOX. TO REASSEMBLE (MARK VII AND XK 120 MODELS)

**FIT REVERSE WHEEL.** Offer up fulcrum lever with reverse slipper split pinned in position and secure to case with pivot pin, plain washer, slotted nut and split pin. Place bushed reverse wheel in slipper and draw wheel rearwards as far as it will go to give clearance for fitting countershaft gears.

**ASSEMBLE COUNTER-SHAFT GEARS —J.H. SERIES.** Press second and third gear wheels on to splined extension of first gear. Locate with circlip. Press on constant mesh wheel as far as it will go. Fit split ring and draw gear wheel forward on to ring. Finally fit circlip behind top gear wheel.

**FIT COUNTER-SHAFT GEARS.** Fit needle roller retaining rings into either end of gear unit followed by needle rollers (29 per end). Apply grease to the needle rollers to facilitate assembly. Fit outer roller retaining ring at front end. Offer up inner and outer thrust washers at either end of gear unit and lower gears into case through the top and insert a thin rod to locate cluster in place.

**ASSEMBLE MAINSHAFT.** Fit needle rollers (41 off) behind shoulder on shaft and slide second speed gear wheels synchronising cone to rear, on to rollers. Apply grease to the needle rollers to facilitate assembly. Fit second speed thrust washer spring and plunger into plunger hole. Slide thrust washer up shaft and over splines. Compress plunger and rotate thrust washer into locked position.

Fit needle rollers (41 off) in front of shoulder on shaft and slide third speed gear wheel, synchronising cone to front, on to rollers. Apply grease to the needle rollers to facilitate assembly. Fit third speed thrust washer spring and plunger into plunger hole. Slide thrust washer down shaft and over splines. Compress plunger and rotate thrust washer into locked position.

Assemble six synchronising balls and plunger into blind holes in second speed synchronising sleeve. Fit locking plunger and ball into hole passing through sleeve, plunger first with round end to shaft, followed by ball. Slide first speed wheel on to sleeve, plain face of gear to synchronising cone end of sleeve, ensuring that relieved tooth at rear of first speed internal spline lines up with locking plunger ball in synchronising sleeve. Slide sleeve on to splines of mainshaft, synchronising cone facing forward. (Plate F.14.)

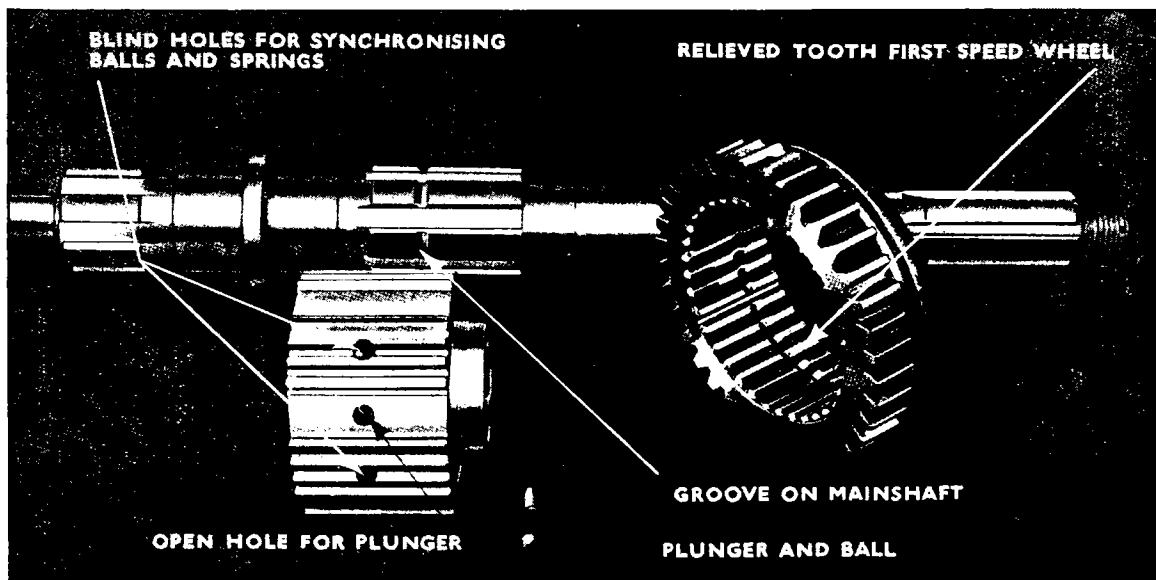


PLATE F.14. SECOND GEAR SYNCHRONISING SLEEVE AND FIRST SPEED WHEEL.

Assemble six synchronising balls and plungers into blind holes in third and top synchronising sleeves. Press on operating sleeve, large boss to front. Slide synchronising sleeve on to splines of mainshaft.

**ASSEMBLE** Press the constant pinion wheel on to the shaft, ensuring that the two oil holes in the  
**CONSTANT** wheel line up with the companion holes in the shaft. Fit oil thrower followed by ball bearing  
**PINION SHAFT** with circlip and collar fitted to outer track of bearing. Fit shims, if necessary, to eliminate  
**—S.H. SERIES.** all end float and secure by circlip. Fit roller race into shaft spigot.

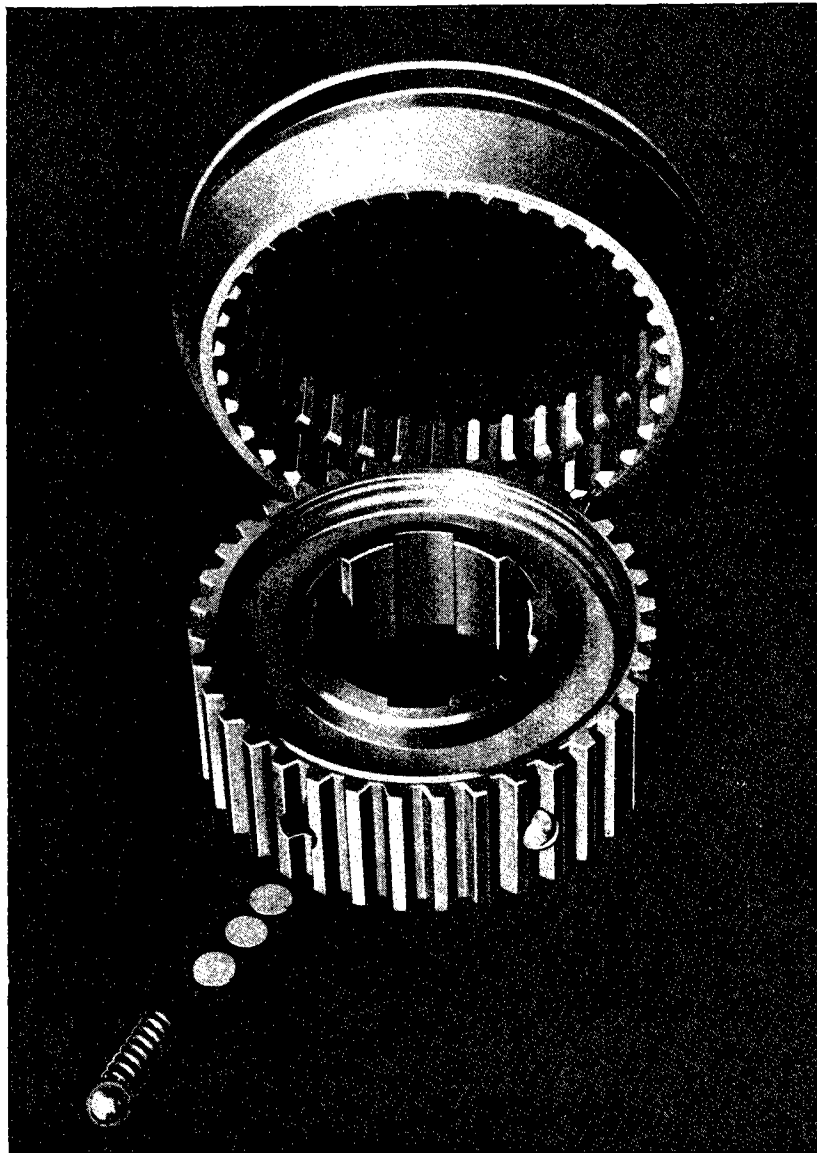


PLATE F.15. TOP AND THIRD SYNCHRONISING AND OPERATING SLEEVES



**ASSEMBLE CONSTANT PINION SHAFT —J.H. SERIES.** Fit oil thrower followed by ball bearing on to shaft with circlip and collar fitted to outer track of bearing. Screw on locking nut (left-hand thread) and secure in position with circlip. Fit roller race into shaft spigot.

**FIT MAINSHAFT.** If the mainshaft front bearing is a roller bearing press the inner race and rollers on to shaft from the rear until the face butts against second speed synchro sleeve. If the front bearing is a ball bearing it will have to be fitted after the mainshaft is in the case.

Enter mainshaft through top of case and pass to the rear through bearing hole in case. Offer up the constant pinion shaft at the front of the case with cut away portions of toothed driving member facing the top and bottom of the case. Tap the constant pinion shaft to the rear until the collar and circlip on the bearing butt against the case. Holding the constant pinion shaft in position tap in the outer race, internal flange outwards, of mainshaft front bearing if it is a roller bearing and the complete bearing if a ball bearing.

**ASSEMBLE EXTENSION.** Fit the ball race to the rear of the extension. Apply a little jointing compound to the countershaft and reverse shaft holes in the extension. Fit the countershaft and reverse shaft into the extension and secure in position with the locking plate, set screw and spring washer. Fit a new felt sealing washer to the countershaft, pressing the rounded surface of the washer into the recess of the extension. (Plate F.7.)

**FIT EXTENSION.** Fit a new jointing washer to the rear of the gearbox case, ensuring that the oil return hole and breather hole apertures are cut in the washer. Fit distance sleeve to mainshaft. Lift the countershaft gears up into engagement with the mainshaft gears using the thin rod left in position when the countershaft gears were fitted. Pass a spare countershaft through the countershaft gears from the **front** to act as a pilot, ensuring that none of the needle rollers are disturbed in the process.

Offer up the extension and tap into position, driving the pilot countershaft forward out of the case. Secure extension with seven set screws and spring washers. Fit a new fibre washer at the front end of the countershaft.

**FIT REAR END COVER.** Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to rear face of extension. Assemble distance piece followed by speedo driving gear, shoulder to front, on to the mainshaft. (Plate F.6.)

Fit cover and secure with four bolts and spring washers. Fit cheese-headed set screw securing cover to extension. Fit speedometer driven gear into bearing, place in end cover and locate with locking screw and spring washer ensuring that screw does not bottom and foul driven gear. Engage top and reverse gears to lock box. Tap propeller shaft drive flange on to splines on mainshaft, fit plain washer and secure with slotted nut and split pin. Place top and reverse gears in neutral. (Plate F.6.)

**FIT FRONT END COVER.** Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to front face of case, ensuring that oil return hole is cut in washer. Offer up front cover, ensuring that oil drain groove is at the bottom and mating with return hole in case. Secure cover with four set screws and plain washers. Lock set screws with new locking wire. (Plate F.5.)

**FIT TOP COVER.** Fit a new joint washer to top face of case. Offer up top cover, observing that this is located by two dowels and secure in position with ten set screws and spring washers. (Two long screws at front, two short screws at rear.) Refit oil dipstick and gearbox drain plug. (Assembly instructions for top cover will be found on page F.29.)

## GEARBOX. TO OVERHAUL

(MARK VII AND XK 120 MODELS)

**GENERAL.** The following remarks in regard to overhauling the gearbox are made in sub paragraphs set out in the correct sequence for assembling the box and may be read in conjunction with paragraphs "Gearbox. To Reassemble," page F.23.

**REMOVE AND DISMANTLE GEARBOX.** Remove and dismantle the gearbox as described on pages F.12 and F.14. Thoroughly clean all parts and gearbox case for examination.

**GEARBOX CASE.**

Examine case for flaws or cracks, particularly at the reverse wheel lever fulcrum lug and at all bosses. Ensure that all machined faces are free from burrs. Paint the interior of the case with oil resisting paint.

**REVERSE WHEEL.**

Check the fulcrum lever pivot pin and slipper for wear and renew if worn or if the pivot pin and shank of the slipper have excessive clearance in the respective operating holes in the fulcrum lever. Observe that if the reverse wheel is not moving sufficiently into engagement the fulcrum lever may be set by bending and thus obtain correct travel of the wheel. Check that the teeth of the reverse gear wheel are sound, are not pitted on the working faces and that case hardening is not flaking. Ensure that the reverse slipper engages with the sleeve on the gear without excessive side play. The reverse wheel bush is not serviced separately and a new bushed wheel must be fitted if bush or wheel is worn. The bush should have .0014"—.0024" (.04 mm.—.06 mm.) clearance on the shaft.

**COUNTER-SHAFT GEARS.**

Check gears for wear, ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Note that S.H. Series countershaft gears are a cluster and therefore must be renewed as a unit. J.H. Series countershaft gears are serviced separately. Check countershaft needle rollers, needle roller retaining rings, outer and inner thrust washers for wear and renew as necessary. Assemble countershaft gears with inner and outer thrust washers in position. Place in case and insert countershaft to ensure that bore of gears is in alignment with holes in box and extension. Countershaft gear end float .002"—.004" (.05 mm.—.10 mm.). The outer thrust washers fitted at the rear of the countershaft are available in the following thicknesses: .152", .156", .159", .162", .164" (3.86 mm., 3.96 mm., 4.04 mm., 4.11 mm., 4.17 mm.).

**MAINSHAFT GEARS.**

Examine shoulders, splines and threads of the mainshaft for damage or wear. Renew shaft if necessary. Check internal bearing faces of second and third speed wheels and needle rollers for damage or wear. Check gears, toothed driving members and synchromesh cones for wear, ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Renew second and third gear wheel thrust washers and ensure that locking springs and plungers are sound. Second and third gear wheel end float on mainshaft .002"—.004" (.05 mm.—.10 mm.).

Check the fit of first speed wheel on second gear synchromesh sleeve and the fit of the sleeve on the mainshaft splines. If internal teeth of first speed bottom on second gear synchronising sleeve or if sleeve is not a good fit on mainshaft splines renew sleeve. Examine first speed gear teeth for wear, ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Grind second gear synchro cones using fine grinding paste until the two mating faces are bedded together and a good bite is obtained when they are in engagement. Examine the synchronising balls and springs and renew the balls if worn and the springs if fatigued. Assemble the six synchronising balls and springs into the blind holes in the synchronising sleeve. Check the tension by endeavouring to slide the operating sleeve off the synchromesh sleeve which should require 62-65 lbs pressure (28-29 kg.). Fit shims under the springs to obtain correct pressure, but ensure that the springs do not become coil bound. As a rough check half of the ball should protrude when the ball is resting on the spring but applying no tension to the spring. Examine the ball and plunger locking second speed synchronising sleeve and renew if worn. Fit the locking plunger and ball into the hole which passes through the sleeve, rounded end of plunger next to the shaft followed by ball. Fit first speed gear to second speed synchronising sleeve, plain face of gear to cone end of sleeve, ensuring that the relieved internal tooth on the rear of first speed gear lines up with the locking plunger on second speed sleeve. Fit the assembly to the mainshaft and check that the plunger locks second speed synchronising sleeve to the mainshaft when first gear is engaged and on disengagement until the teeth of first gear are clear of the first speed wheel on countershaft.

Check the fit of third and top operating sleeve on the synchronising sleeve and the fit of the sleeve on the mainshaft. Examine the synchronising balls and springs and renew the balls if worn and the springs if fatigued. Assemble the six synchronising balls and springs into the blind holes in the synchronising sleeve. Check the tension by endeavouring to slide the operating sleeve off the synchronising sleeve which should require 42-45 lbs. pressure (19-20 kg.). Check teeth for wear and ensure that they are sound. Grind in the synchromesh cones using fine grinding paste until the two mating faces are bedded together and a good bite is obtained when they are in engagement. Examine mainshaft front and rear bearings and renew if wear is present on balls, rollers or races. Instructions in regard to mainshaft end play will be found on page F.27.

**CONSTANT PINION SHAFT.**

Check the constant pinion wheel, toothed driving member and top gear synchromesh cone for wear. Ensure that all teeth are not pitted on the working faces and that case hardening is not flaking. Note that on S.H. Series boxes constant pinion wheel is serviced separately and that the toothed driving gear is integral with the shaft. (Plate F.10.) On J.H. Series

boxes the constant pinion wheel is integral with the shaft. (Plate F.11.) Examine spigot in rear end of shaft and needle roller bearings for wear, renewing parts as necessary. Check constant pinion shaft ball bearing and renew if wear is present on balls or races. Check the clutch plate splines on the shaft and offer up the clutch plate to the shaft to ensure that it slides easily but that there is no circumferential play on the splines. Fit new oil thrower and circlip. Observe that constant pinion shaft should have no end float when fitted.

**EXTENSION.** Check extension for flaws or cracks and ensure that machined faces are free from burrs. Always fit a new joint washer and ensure that oil return hole and breather hole are cut in joint and that the holes in the extension and case are clear. (Plate F.8.) Do not omit the distance piece between mainshaft front and rear bearings when fitting the extension. (Plate F.9.)

The countershaft and reverse shaft should be a firm fit in the extension holes and it is advantageous to apply jointing compound sparingly to the holes before the shafts are fitted. Always use a new countershaft felt sealing washer with the rounded end of the washer fitted in the recess in the extension. When the two shafts are in position and secured by the locking plate they should be checked for parallelism.

**REAR END COVER.** Check end cover for flaws or cracks and ensure that machined faces are free from burrs. Always fit a new joint washer. Do not omit the distance piece and speedometer driving gear, shoulder to front, when fitting cover. The speedometer driving and driven gears should be liberally greased on assembly to provide initial lubrication until oil finds its way down the mainshaft. Ensure that the spring washer is in place on the speedometer driven gear set screw or the set screw may bottom and jam the gear. Always fit a new oil seal to the cover, lip of seal towards interior of case. When fitting the cover and seal, use a suitable taper tube to enter the seal on mainshaft and protect the lip of the seal from damage. (Plate F.6.)

Where the mainshaft front bearing is a ball bearing the end play of the mainshaft is controlled between the front and rear ball bearings. Where the mainshaft front bearing is a roller bearing the end play of the mainshaft is controlled by the fit of the ball race in its housing between the extension and rear end cover.

Mainshaft end play should be between .002"—.006" (.05 mm.—.15 mm.) and should be checked with the drive flange fully tightened and the mainshaft tapped forward. Correction to end play may be made as follows:—

**Ball Bearing.** To increase end float fit shims at one or other end of the distance sleeve positioned between the mainshaft front and rear bearings. To reduce end float machine sleeve.

**Roller Bearing.** Since end float is controlled by the ball bearing at the rear of the mainshaft it is only necessary to ensure that the outer track of the bearing is nipped between the extension and end cover. Observe, however, that if the distance sleeve is too short the mainshaft may jam when the drive flange slotted nut is fully tightened, in which case fit shims at one or other end of the sleeve.

**FRONT END COVER.** Check end cover for flaws or cracks and ensure that machined faces are free from burrs. Fit a new fibre washer at the front end of the countershaft. Always fit a new joint washer and ensure that the oil return hole is cut in the joint and that the grooves in the case and cover are clear. (Plate F.5.) Always fit a new oil seal to the cover, lip of seal towards interior of case. When fitting the cover and seal use a suitable taper tube to enter the seal on to the shaft and protect the lip of the seal from damage. Observe that the end cover set screws are secured by locking wire.

## TOP COVER. TO DISMANTLE (MARK VII AND XK 120 MODELS)

**REMOVE CHANGE SPEED LEVER.** Remove split pin and slotted nut with spring washer securing the selector lever pivot pin. Withdraw selector lever complete with change-speed lever. Observe bush with two thrust washers for selector lever. Remove split pin and slotted nut securing change-speed lever to selector lever and dismantle, observing flexible rubber bearings in two halves with thrust washers for each half. Release and remove lock nut and lever knob.

Remove split pin and slotted nut securing pivot jaw, observing disposition of bush, thrust washers and locking washer.

**REMOVE  
BREATHER  
AND REVERSE  
LAMP SWITCH.**

Unscrew breather and reverse lamp switch, observing fibre washer under breather.

**REMOVE  
STRIKING ROD  
PLUNGERS.**

Break locking wire on the three striking rod plunger grub screws. Remove grub screws, springs and plungers.

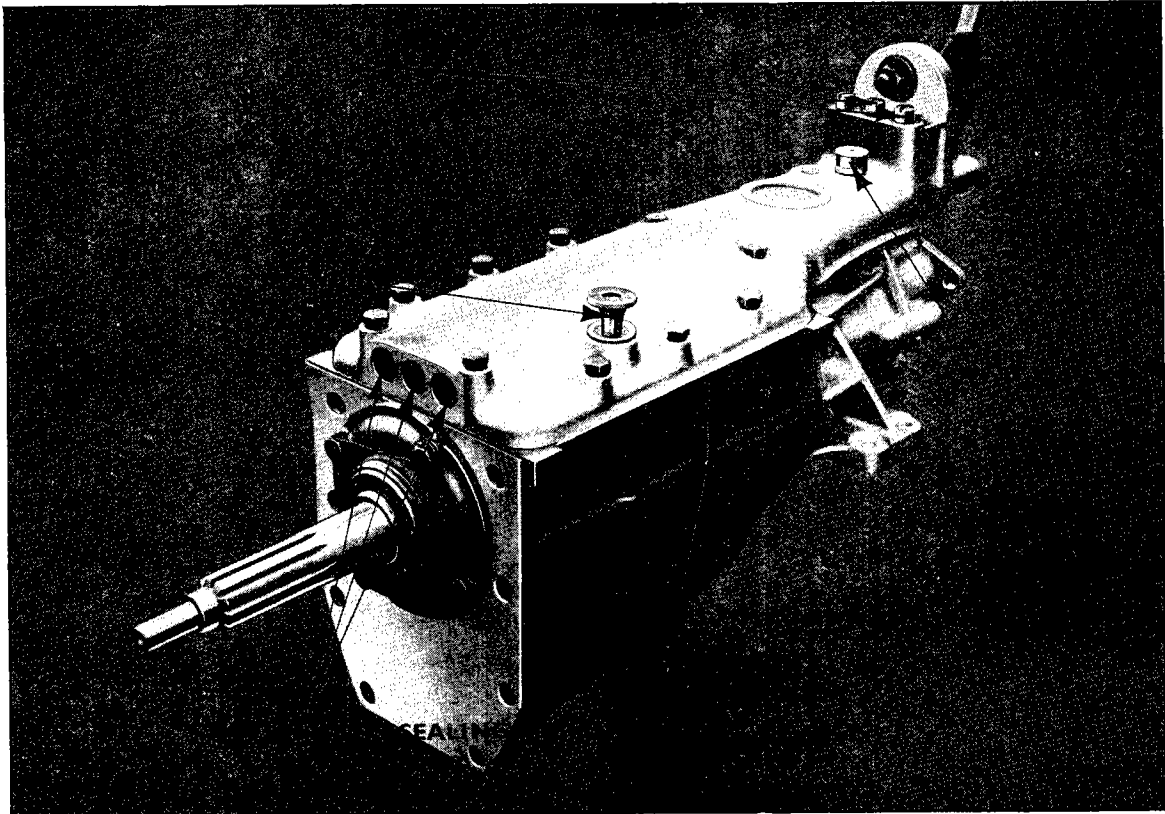


PLATE F.16. TOP COVER (Front view).

**REMOVE  
STRIKING  
RODS.**

Break lock wire and remove stop pin from first/second and third/top striking rods. Break lock wire and remove lock bolts securing change-speed forks to the three striking rods. Draw the striking rods, one at a time, to the rear out of the cover, collecting the interlocking roller and the two interlocking balls as they are released. Remove selectors from third/top and reverse striking rods by breaking lock wire and withdrawing lock bolts. Note that first and second selector is integral with striking rod. Dismantle reverse selector by withdrawing split pin and removing plunger with spring and locking ball with springs.

**REMOVE  
STRIKING ROD  
SEALS.**

The front ends of the striking rod holes in the top cover are sealed by plugs. Tap the centre of the plug with a hammer and punch engaging through the holes in the cover until they are free. The rear ends of the striking rods are sealed by a plate retaining felt seals in recesses in each striking rod hole. Remove two set screws with spring washers retaining plate to cover and withdraw plate and felt washer.

## TOP COVER. TO REASSEMBLE (MARK VII AND XK 120 MODELS)

**ASSEMBLE STRIKING ROD SEALS.** Assemble the reverse selector by fitting the plunger and spring securing the plunger with a new split pin. Fit the plunger locking ball and spring. Fit the reverse selector and the top selector to the respective striking rods and secure in position with lock bolts, locking with new wire.

**FIT STRIKING RODS.** Fit a new felt washer into each recess in the striking rod holes at the rear of the cover. Thread the plate over one or other of the outside rods and slide the rod into the cover, not forgetting to fit the change-speed fork before the rod enters the front hole in the cover, until it occupies the neutral position. This can be checked by looking through the grub screw hole on top of the cover and aligning the neutral groove in the rod under the hole. Enter the other outside rod in a like manner through the plate and the change-speed fork, into the neutral position. Place an interlock ball in the groove in each rod using the centre hole to gain access to the rods which are already in position. Fit the interlock plunger in the hole of the centre rod and pass the rod, through the plate and the change-speed fork, into position. Fit lock bolts to the three change-speed forks and lock with new wire. Fit stop pins to first/second and third/top striking rods and lock with new wire.



PLATE F.17. TOP COVER (Rear view).

- FIT STRIKING ROD SEALS.** Fit three new plugs into the striking rod holes in the front of the cover, tapping the centre of the plug with a hammer and punch until the plugs are secure. Secure plate in position at the rear with the two set screws and spring washers.
- FIT STRIKING ROD PLUNGERS.** Move all striking rods into the neutral position. Place a plunger in each of the three holes followed by springs and grub screws. Observe that the reverse rod grub screw is the longer. Rotate the grub screws until correct tension is obtained and lock with new wire.
- FIT REVERSE LAMP SWITCH AND BREATHER.** Screw reverse lamp switch and breather into their respective holes on the top cover, fitting a new fibre washer under the breather.
- FIT CHANGE SPEED LEVER.** Fitting is the reverse of the dismantling procedure given on page F.27. Observe that where a cranked gear lever is fitted the cranked portion should face forward to carry the knob towards the front of the gearbox.

### TOP COVER. TO OVERHAUL (MARK VII AND XK 120 MODELS)

- GENERAL.** The following remarks in regard to overhauling the top cover are made in sub-paragraphs set out in the sequence of assembling the cover and may be read in conjunction with paragraph "Top Cover. To Reassemble." (Page F.29.)
- DISMANTLE TOP COVER.** Remove and dismantle top cover as described in pages F.14 and F.27.
- TOP COVER:** Examine top cover for flaws or cracks. Ensure that all machined faces are free from burrs. Check the bores of the striking rod holes for size and freedom from damage. Check that the breather passage into the underside of the top cover is clear.
- STRIKING ROD SEALS.** Before fitting the plugs to the front end of the cover ensure that the plug recesses are perfectly clean and are free from burrs. Always use new plugs on assembly. It is most important that an efficient seal is obtained between the felt washers at the rear of the cover and the striking rods. Ensure therefore that the seals are a good fit in the recesses and nip the rods when compressed by the plate. It is permissible to use two felt washers in place of one on each striking rod to obtain a good seal if it should be considered that the nip obtained by one washer is insufficient.
- STRIKING RODS.** Check striking rods, selectors and change-speed forks for wear, also check fit of selectors and change-speed forks on the shaft; renew parts as necessary. Check the alignment of the forked portion of the change-speed forks on first/second and third/top striking rods to ensure that they are not bent. Correct any misalignment by bending. Renew interlock balls and interlock plunger.
- STRIKING ROD PLUNGERS.** Before fitting striking rod plungers ensure that grooves on striking rods line up with plunger holes when each gear is selected, by moving the striking rods, one at a time, into and out of engagement and viewing the groove through the grub screw hole.
- Fit plungers, springs and grub screws and adjust until the rod is held firmly in the selected position. Lock screws with new wire.
- CHANGE-SPEED LEVER.** The most likely points at which wear will be found in the change-speed lever assembly will be at the tip of the selector lever which may be renewed, or alternatively, built up and then dressed to size. The pivot jaw, the selector lever pivot pin and the change-speed lever are all bushed and these bushes may be renewed as necessary.

**REFITTING TOP COVER.** Always fit a new joint washer between cover and the case, observing that the cover is located by two dowels. Ensure that all gears are in neutral and that the change-speed lever is in neutral and offer up the cover which must enter into position without any force being used. Check that first/second and third/top change-speed forks are in alignment with the selector grooves on the respective gears by blueing the forks, refitting the lid and rotating the mainshaft. On removal of the cover the forks should show an even bearing surface on each side of the fork.

Check that the forks are giving full travel into engagement on all gears as follows. Replace the top cover with one screw only holding and select top gear, remove cover carefully with top gear position still selected and check that the gear is fully home. Repeat for third, second, first and reverse gears. Also check that movement of gear from neutral into top and from neutral into third is of equal travel.

## GEARBOX EXTENSION. TO REMOVE AND REFIT (GEARBOX FITTED) (MARK VII MODEL)

**GENERAL.** Although it is possible to remove the gearbox end cover and extension without removing the gearbox from the car it is normally desirable to effect this service with the gearbox removed. The following instruction refer to the rectification of oil leaks at the rear of the countershaft or reverse shaft and also to withdrawing the reverse wheel without removing the gearbox from the car.

**REMOVE TOP COVER.** (This operation is not necessary unless the reverse wheel is to be removed.) Remove both seats and floor carpets and place clear of car. Remove change-speed lever knob and lock nut. Remove gearbox and bell housing cover and carpets. Disconnect reverse light wire from switch on top cover. Remove dipstick. Remove gearbox cover and place clear.

**DISCONNECT GEARBOX.** Raise car on lift to a height convenient for working on the gearbox. Disconnect speedometer cable and place clear. Remove split pins and four slotted nuts from propeller shaft companion flange. Remove bolts and spring front of shaft out of register on gearbox flange. Place jack under engine sump, with suitable packing interposed to prevent damage, and take weight of engine.

**REMOVE END COVER.** Engage top and reverse gears to lock box (or top gear only if top cover has not been removed) Remove split pin, slotted nut and plain washer securing propeller shaft drive flange to mainshaft. Tap drive flange off shaft. Remove four bolts with spring washers securing cover to extension. Remove locking screw with spring washer securing speedometer driven gear in cover. Withdraw driven gear and bearing. Remove cheese-headed set screw now disclosed securing cover to extension. Remove rear end cover. An oil leak at the rear of the mainshaft may now be attended to without further dismantling by renewing the end cover oil seal. Fit seal to cover with lip of oil seal facing interior of box. (Plate F.6.)

**RELEASE COUNTER AND REVERSE SHAFTS.** Remove set screw with spring washer securing plate locking counter and reverse shafts, withdraw locking plate and carefully remove any burrs on the locked end of the shafts which might damage the shaft mounting holes in the extension when the extension is withdrawn.

**REMOVE EXTENSION.** Withdraw speedometer driving gear and distance piece from mainshaft. Remove seven set screws securing extension to case. Using a suitable drawer engaging on the mainshaft and on the extension draw off the extension complete with rear ball bearing, **but keep countershaft in position by tapping it back as extension is withdrawn.** Remove and scrap countershaft felt oil sealing washer. Observe oil return hole at bottom and breather hole at top of extension mating with oil return and breather holes in case and jointing washer interposed. Scrap joint washer.

**OIL LEAKS.** Oil leaks may now be attended to as follows:—

**Countershaft.** Fit a new felt oil seal to the shaft with rounded end of the felt in the recess of the extension. Jointing compound should be applied sparingly to the countershaft hole in the extension before the shaft is fitted.

**Reverse Shaft.** Jointing compound should be applied sparingly to the reverse shaft hole in the extension before the shaft is fitted.

**REVERSE  
WHEEL.**

Should it be necessary to remove the reverse wheel, first withdraw reverse shaft. Remove split pin and slotted nut with plain washer securing the fulcrum lever pivot pin. Tap the pivot pin into the box and if a flat is cut on the head of the pin withdraw pin, and lift reverse wheel, lever and reverse slipper through top of box. If a flat is not cut on the pin it will be necessary to tap the mainshaft to the rear until clearance is provided for removal of the pivot pin.

**REFITTING.**

Reassembly and refitting is the reverse of the above procedure, but particular attention should be paid to the following points. Always fit a new jointing washer between extension and gearbox case and ensure that the oil return hole and breather hole are cut in the washer and that the respective holes are clear. Always fit a new joint washer between the rear end cover and the extension.

Ensure that the spring washer is fitted to the speedometer driven gear locking screw or the screw may bottom on the gear causing jamming. (Plate F.6.)



# FRONT SUSPENSION

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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Servicing	-	-	-	-	-	-	Page J.6

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Torsion Bar .. .. .	Refit .. .. .	J. 6	
Torsion Bars .. .. .	Check and Adjust .. .. .	J. 7	
Upper Wishbone Lever Assembly . . . . .	Remove and Refit .. .. .	J. 9	
Upper Wishbone Lever Assembly .. .. .	Dismantle and Reassemble .. .. .	J.10	
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Lower Wishbone Lever Assembly .. .. .	Dismantle and Reassemble .. .. .	J.11	
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Shock Absorbers .. .. .	Remove and Refit .. .. .	J.12	
Shock Absorbers .. .. .	Description and Service .. .. .	J.12	J.12
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## DESCRIPTION AND MAINTENANCE

(MARK VII AND XK 120 MODELS)

**DESCRIPTION.** The front suspension layout is basically the same on both the Mark VII and the XK 120 models except for the position of the anti-roll bar which is forward of the lower wishbone lever on the XK 120 model and rearward on the Mark VII model.

The torsion bars, which are 52" (127 cm.) long, are positioned along the inner vertical faces of the chassis frame side members. Both ends of the torsion bar have raised splines, a reaction lever with companion splines and clamp bolt being attached to the rear end while a splined muff is fitted to the front end. (Plate J.1.) The reaction lever is forked and the forks are supported on a trunnion positioned by an adjusting barrel nut and bolt, the bolt being attached to the chassis frame. (Plate J.4.) The splined muff at the front end is spigoted and bolted to the inner end of the lower wishbone lever.

The lower wishbone lever is mounted at its inner end to a bracket bolted to the underside of the chassis frame side member. The outer end of the lower wishbone lever carries the ball pin of the lower ball assembly which combines the function of lower steering swivel and suspension articulation. Bolted to the outer extremity of the lower wishbone lever is a tie bar which runs forward to the front end of the lower wishbone lever bracket attached to the chassis frame.

Attached to the outer extremities of both lower wishbone levers by brackets is an anti-roll torsion bar which is further supported by a rubber bush and bracket attached to the bottom face of each side member of the chassis frame at the point where the anti-roll bar passes under the frame.

The two upper wishbone levers on each side form a triangle with their respective mounting brackets which are bolted to mounting posts situated above the chassis frame side members on the axis of the road wheels.

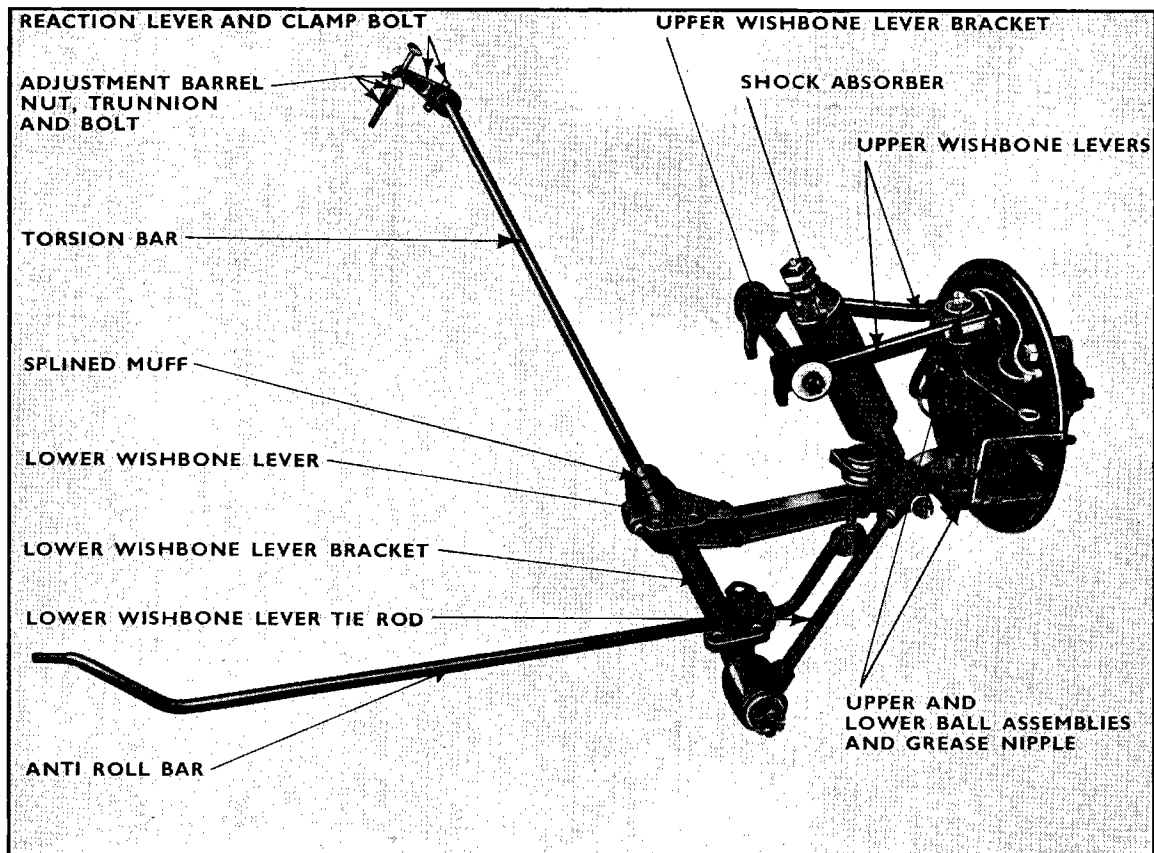


PLATE J.1. FRONT SUSPENSION. GENERAL ARRANGEMENT (XK 120 illustrated).

Situated between the outer extremities of the two upper wishbone levers is the upper ball assembly which combines the function of upper steering swivel and suspension articulation.

Mounted between the outer extremities of the lower wishbone levers and the upper wishbone lever bracket mounting posts are telescopic shock absorbers. Tapered rubber bushes are fitted in pairs at the front and rear ends of the brackets for both the upper and lower wishbone levers. The lower ends of the shock absorbers are mounted on rubber bushes pre-loaded by washers and inserted split pins. If any of the above assemblies are dismantled, either for examination or replacement, it is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes mentioned above or assemblies finally locked. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of rubber bushes.

**(MARK VII MODEL)**

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) lubricate two nipples per side of the upper and lower wishbone ball assemblies with the recommended lubricant.

Every 10,000 miles (16,000 kilometres) check the front suspension nuts and bolts and tighten if necessary. It is advisable at this mileage to check torsion bar settings and correct, if necessary, as described on Page J.7.

**(XK 120 MODEL)**

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) lubricate one nipple per side of the upper wishbone ball assemblies with the recommended lubricant.

Every 10,000 miles (16,000 kilometres) check the front suspension nuts and bolts and tighten if necessary. It is advisable at this mileage to check torsion bar settings and correct, if necessary, as described on Page J.7.

**RECOMMENDED LUBRICANTS**

		Vacuum	Wakefield	Shell	Esso	Price's
Upper and Lower Wishbone Ball Assemblies (Steering Swivels)		Mobilgrease No. 5	Castrollease WB.	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.
Shock Absorbers.	Newton .. .. .	Mobil Shock Absorber Oil Light	Castrol Shockol	Shell Donax A.1	Esso Shock Absorber Oil	Price's Energol S.A. Light
	Girling .. .. .		Girling Piston Type	Thin Shock	Absorber Oil	

**FRONT SUSPENSION DATA**

	<b>MARK VII</b>	<b>XK 120</b>
Type .. .. .	Independent Torsion Bar	Independent Torsion Bar
Shock Absorbers .. .. .	Girling Hydraulic	Newton Hydraulic
Castor Angle .. .. .	0° ± 1/4°	3° positive. (5° positive, prior to Chassis Numbers R.H.D. 660126, L.H.D. 670439)
Camber Angle .. .. .	1° ± 1/4° positive	1 3/4° to 2° positive
Swivel Inclination .. .. .	8°	5°
Ground Clearance .. .. .	7 1/2" (190 mm.)	7 1/8" (181 mm.)

### TORSION BAR. TO REMOVE (MARK VII AND XK 120 MODELS)

- GENERAL.** Place a support under chassis frame. Jack up under lower wishbone lever and remove road wheel. Leave jack in position to relieve load on shock absorber.
- REMOVE SHOCK ABSORBER.** Disconnect shock absorber at top mounting and draw shock absorber clear of mounting post. Remove split pin and washer from shock absorber lower mounting and withdraw shock absorber. (If the original torsion bar is to be refitted it is only necessary to disconnect the shock absorber at the top mounting.)
- RELEASE TORSION.** Remove reaction lever locking bolt passing through chassis cross member into lever. Rotate adjustment barrel nut in an anti-clockwise direction until the nut is almost off the threads on the bolt. (Plate J.4.) (If the original torsion bar is to be refitted scribe a line at either end of bar on muff coupling and on the reaction lever to mark their relative positions and facilitate reassembly.)
- RELEASE MUFF COUPLING.** Remove set screw with spring washer passing through lower wishbone lever into muff. Remove split pin, slotted nut, washer and bolt passing through wishbone lever and muff. Tap muff coupling off register on wishbone lever to rear down raised splines on bar.
- REMOVE TORSION BAR.** Remove nut, washer and bolt clamping reaction lever to torsion bar and withdraw bar forward under lower wishbone bracket. Remove muff coupling.

### TORSION BAR. TO REFIT (MARK VII AND XK 120 MODELS)

- GENERAL.** Note that torsion bars are stamped "O/S" (i.e., offside, right hand) or "N/S" (i.e., nearside, left hand) on the rear end face and are not interchangeable from side to side.
- REFIT TORSION BAR.** Enter the muff coupling, shoulder to rear, over the splines on the forward end of the bar. Enter the rear splines of the torsion bar into the reaction lever and fit the clamping bolt, washer and nut.
- ATTACH MUFF COUPLING.** If a new torsion bar is to be fitted it will be necessary to engage the muff on the correct torsion bar splines to enable final adjustments to be correctly made at the barrel nut. To do this ensure that the adjustment barrel nut is just entered on the threads of the bolt and maintain a distance between the top and bottom shock absorber mountings of  $15\frac{5}{8}$ " (39.7 cm.). On the Mark VII model this is between the centre of the shock absorber lower mounting pin and

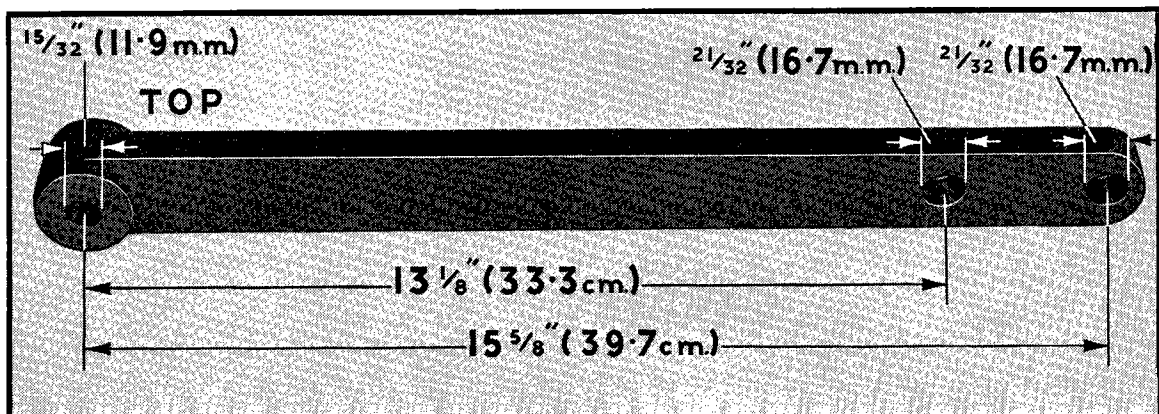


PLATE J.2. DISTANCE GAUGE. SHOCK ABSORBER MOUNTINGS (Mark VII).

the centre of the shock absorber top mounting holes. On the XK 120 model this distance is between the centre of the shock absorber lower mounting pin and the lower face of the shock absorber top mounting hole. This will correctly position the lower wishbone lever in relationship to the torsion bar. Enter the muff on the splines of the bar and the register on the lower wishbone lever and secure in position using the set screw with spring washer, bolt, washer, slotted nut and new split pin.

**Note.** A simple distance gauge can be made up to maintain the distance of  $15\frac{5}{8}$ " (39.7 cm.) between the top and bottom shock absorber mountings, as illustrated in Plate J.2 for the Mark VII model and in Plate J.3 for the XK 120 model.

**APPLY TORSION TO BAR.** Rotate the adjustment barrel nut clockwise until the locking set screw hole in the reaction lever appears in the centre of the slot cut in the rear of the chassis cross member. Fit the locking bolt but do not tighten until final adjustments have been made.

**CHECK TORSION BAR SETTINGS.** Refit shock absorber and road wheel. Test torsion bar settings and correct, if necessary, as described below. Do not forget to tighten the reaction lever locking bolt when adjustments are complete.

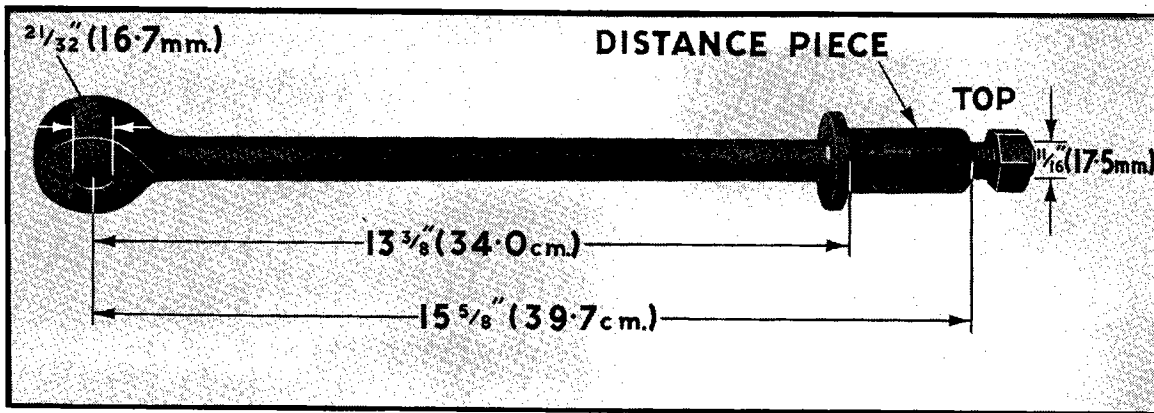


PLATE J.3. DISTANCE GAUGE. SHOCK ABSORBER MOUNTINGS (XK 120).

**TORSION BARS. TO CHECK AND ADJUST  
(MARK VII AND XK 120 MODELS)**

**GENERAL.** It is assumed that the car is full of petrol, oil and water. If not, additional weight must be added to compensate for, say, a low level of petrol. (The weight of ten gallons of petrol is approximately 80 lbs. (36.0 kg.))

Before any check on torsion bar settings is made the car must be placed on a perfectly level surface, wheels in the straight ahead position and tyre pressures correctly adjusted as follows:—

	MARK VII	XK 120
Front .. ..	23 lbs. per sq. in. (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )
Rear .. ..	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )

All pressures adjusted cold.

**CHECK. (MARK VII.)** Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY.

These conditions being fulfilled, an  $8\frac{1}{2}$ " (21.6 cm.) test piece should just pass below the lower face of the chassis side member immediately adjacent to the point where the front end of the cruciform member meets the chassis side member.

**CHECK.** Place two 100 lb. (two 45.4 kg.) weights in the car, one in front of each front seat.  
(XK 120.)

Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY.

These conditions being fulfilled, a  $7\frac{1}{8}$ " (18.1 cm.) test piece should just pass below the lower face of the most forward parallel section of the chassis frame.

**ADJUSTMENT.** If a correction is necessary, check the position of the rear reaction lever locking bolts in the slots to make sure that adjustment in the desired direction is possible. Clockwise rotation of the brass adjusting nut will increase torsion in the bar; move the lock bolt towards the top of the slot and raise the car. Anti-clockwise rotation will have the reverse effect. Adjustment should only be carried out with the locking bolts released and the front of the car jacked up to reduce the load on the adjustment nuts to a minimum.

If the locking bolts have reached the end of their slots and the desired adjustment is not possible, it will be necessary to reposition the torsion bar in relation to the lower wishbone member, as follows:—

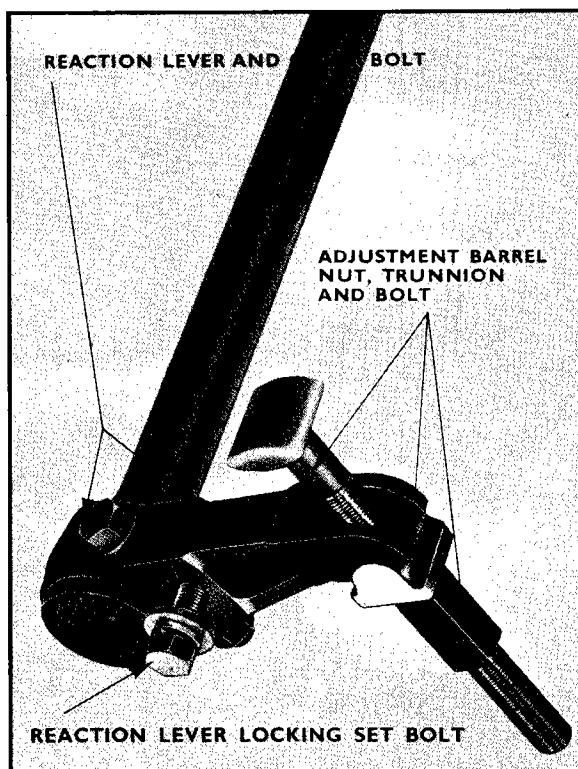


PLATE J.4. TORSION BAR REAR REACTION LEVER.

Jack up the front of the car, remove the rear reaction lever locking bolts, slacken off the torsion bar adjusting barrel nuts to the end of their threads, remove the two bolts from each of the front splined muffs and turn the muff one spline on the torsion bar.

**Note.** Viewing the car from the rear, turning the offside (right hand) muff clockwise will increase torsion in the bar, that is, raise the car, and turning it anti-clockwise will decrease torsion, that is, lower the car. Conversely, turning the nearside (left hand) muff anti-clockwise will increase, or clockwise will decrease torsion.



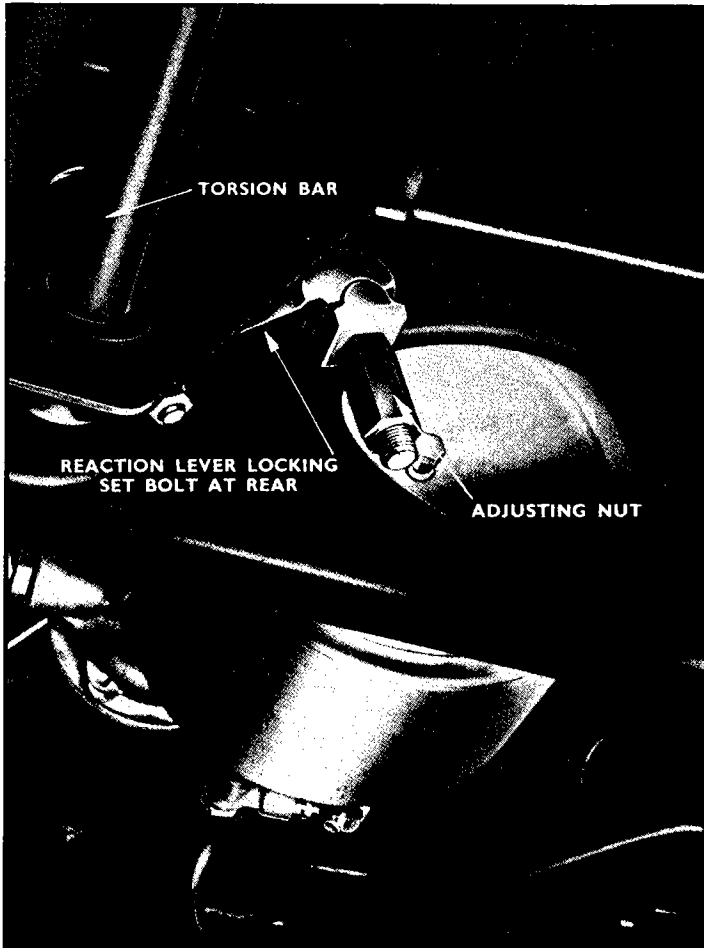


PLATE J.5. TORSION BAR ADJUSTMENT (Mark VII).



PLATE J.6. TORSION BAR ADJUSTMENT (XK 120).

Screw up torsion bar adjustment nuts, lower the car on to its wheels, depress the front and recheck the height of the chassis frame. It is important to note that should correction be required on both torsion bars then adjustment should take place a little at a time on each until the required results are obtained, finally retightening the locking bolts. The front of the car should be jacked up each time an adjustment is made so that the load on the adjusting nuts is reduced to a minimum.

### UPPER WISHBONE LEVER ASSEMBLY. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Place a support under the chassis frame. Jack up under the lower wishbone lever and remove road wheel. Leave jack in position to support torsion bar load. Disconnect shock absorber by removing nuts at top mounting and draw shock absorber clear of mounting posts. Release locking plates and remove two nuts and bolts passing through the upper wishbone ball assembly and the two upper wishbone levers.

Observe castor shims fitted between each face of the ball assembly and the respective wishbone lever. (Plate J.10.) Do not lose or transpose shims from front to rear or rear to front since this will alter castor angle. Remove self locking nuts from the two top bolts securing the wishbone bracket to chassis frame mounting posts, observing distance tube on rear bolt. Remove self locking nuts from the two bottom bolts securing wishbone bracket to flange of chassis frame mounting posts. Tie up the stub axle carrier to a convenient point on the chassis frame.

Note camber shims fitted between wishbone bracket and chassis frame which must be replaced in their original locations or camber angle will be affected. Lift out wishbone levers complete with mounting bracket.

Should it be desired to remove the upper wishbone ball assembly remove brake drum and withdraw split pins and slotted nuts securing steering arm to stub axle carrier. Withdraw front bolt through stub axle carrier and tilt steering arm to clear brake air scoop. Withdraw steering arm to gain access to ball pin slotted nut. Remove split pin, washer and slotted nut from ball pin. Tap shank of ball assembly out of taper in stub axle carrier and remove ball assembly.

**REFIT.** Refitting is the reverse of the above procedure. Ensure that the same number of castor and camber shims found on dismantling are refitted and in their original locations. If any doubt exists regarding shimming, check castor and camber angles and reset, if necessary, as described on Pages J.14 and J.15.

### UPPER WISHBONE LEVER ASSEMBLY. TO DISMANTLE AND REASSEMBLE (MARK VII AND XK 120 MODELS)

**DISMANTLE.** Remove the upper wishbone assembly as described in the previous paragraph. Observe that the upper ball assembly cannot be dismantled and if any parts are worn the complete assembly must be removed. Remove the split pin, slotted nut and plain washer from either end of the upper wishbone bracket and tap the levers off the ends of the bracket. Observe that each lever is mounted on two tapered rubber bushes which should be replaced if showing signs of wear or deterioration.

**REASSEMBLE.** Reassembly is the reverse of the above procedure. It is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes or before assemblies are finally locked up. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of the rubber bushes. The rubber bushes should not in any circumstances be lubricated. Refit the assembly as described above.

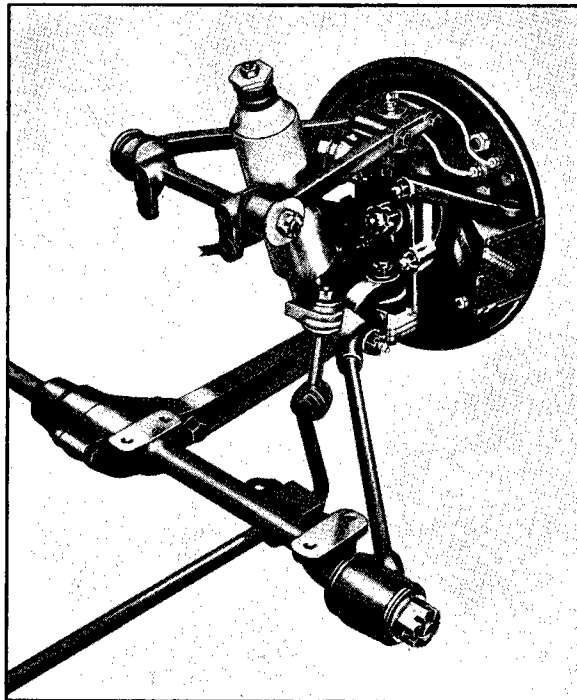


PLATE J.7. UPPER AND LOWER WISHBONE LEVERS  
(XK 120 illustrated).

## LOWER WISHBONE LEVER ASSEMBLY. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Place a support under the chassis frame. Jack up under the lower wishbone lever and remove road wheel. Leave jack in position to relieve load on shock absorber. Remove shock absorber by withdrawing hexagon nuts on top mounting and draw shock absorber clear of mounting post. Remove split pin and washer from shock absorber lower mounting and withdraw shock absorber. Lower jack and place a support under the brake drum. Release tab washers locating the four set screws which retain the ball socket cap and remove cap. Observe shims .004" (.10 mm.) thick, spigot over ball pin, and socket supporting ball pin which can now be removed. Remove split pin and slotted nut from shank of ball pin and drive ball pin downwards out of its taper fixing in the outer extremity of the lower wishbone lever. The seal assembly will be left in position between the lower wishbone lever and stub axle carrier. Scribe a line denoting relative position of torsion bar and torsion bar muff to facilitate reassembly. Remove reaction lever locking bolt passing through chassis cross member into lever. Rotate adjustment barrel nut in an anti-clockwise direction until the nut is almost off the threads of the bolt. Remove set screw with spring washer passing through lower wishbone lever into muff. Remove split pin, slotted washer and bolt passing through wishbone lever and muff. Tap muff coupling off register on wishbone lever to rear down raised splines on bar. Remove split pin and wishbone lever into muff. Remove split pin, slotted nut, washer and bolt passing through wishbone lever and muff. Tap muff coupling off register on wishbone lever to rear down raised splines on bar. Remove split pin and slotted nut securing anti-roll bar to bracket on extremity of lower wishbone lever. Lift wishbone lever up off anti-roll bar observing disposition of plain washer and rubber buffers. Remove four self locking nuts from bolts securing lower wishbone bracket to bottom face of chassis frame side member and lift out assembly.

**REFIT.** Refitting is the reverse of the above procedure. When fitting the muff coupling it is necessary to engage the muff on the correct torsion bar splines and the lines previously scribed should be aligned to ensure that this is so. When the muff has been engaged on the correct spline and on the register at the inner extremity of the wishbone lever, secure in position using the set screw with spring washer, bolt, washer, slotted nut and new split pin. Rotate the adjustment barrel nut clockwise until the locking set screw hole in the reaction lever appears in the centre of the arc cut in the chassis cross member. Fit the locking set bolt with washer but do not tighten until final adjustments have been made. Test torsion bar settings and correct if necessary as described on Page J.7.

## LOWER WISHBONE LEVER ASSEMBLY. TO DISMANTLE AND REASSEMBLE (MARK VII AND XK 120 MODELS)

**DISMANTLE.** Remove lower wishbone lever assembly as described in the previous paragraph. Remove the split pin, slotted nut and plain washer securing the outer extremity of the lower wishbone lever tie rod to the lever. Remove split pin, slotted nut and plain washer securing the outer extremity of the lower wishbone lever tie rod to the lever. Remove split pin, slotted nut and plain washer from either end of the lower wishbone bracket and tap the tie rod and wishbone lever off the ends of the bracket. Observe that the lever and tie rod are each mounted on two tapered bushes, which should be renewed if showing signs of wear or deterioration. Tap the pin which supports the lower end of the shock absorber and the tie rod from the outer extremity of the wishbone lever. Remove the nut and bolt securing the tie rod bracket to the wishbone lever and remove bracket. Should it be required to remove the ball joint seal assembly it will be necessary to remove the brake back plate. Remove four screws retaining seal carrier to stub axle carrier and remove seal assembly.

**REASSEMBLE.** Reassembly is the reverse of the above procedure. It is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes or before assemblies are finally locked up. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of the rubber bushes. The rubber bushes should not in any circumstances be lubricated. Refit the assembly as described in the previous paragraph and check torsion bar settings as described on page J.7.

## BOUND BUFFER. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Remove two nuts, spring washers and bolts securing bound buffer to bottom face of chassis frame wishbone bracket mounting post. Remove buffer.

**REFIT.** Refitting is the reverse of the above procedure.

### SHOCK ABSORBERS. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Place a support under the chassis frame. Jack up under the lower wishbone lever and remove road wheel. Leave jack in position to relieve load on shock absorber.

Disconnect shock absorber by removing hexagon nuts at top mounting and remove shock absorber from mounting post.

Remove split pin and washer from shock absorber lower mounting and withdraw shock absorber.

**REFIT.** Refitting is the reverse of the above procedure, using a hand clamp to press the eye at the bottom of the shock absorber over the rubber bush. Observe that it is essential that the car is in the normal riding position before pre-loading is applied to the lower mounting rubber bush. If these precautions are not taken an excessive load will be applied which will damage the rubber bush and possibly cause premature failure.

### SHOCK ABSORBERS. DESCRIPTION AND SERVICE (MARK VII MODEL)

**GENERAL.** It is recommended that the front shock absorber be dismantled and reassembled only by an authorised agent of Messrs. Girling Ltd. Replacements are available on an exchange basis and it is recommended that advantage be taken of this service.

**SERVICE.** The shock absorbers are pre-filled and require no topping up with fluid in normal service. In the event of the unit being dismantled however, the unit must be filled with 300 c.c. of Girling Piston Type Thin Shock Absorber Oil.

### SHOCK ABSORBERS. DESCRIPTION AND SERVICE (XK 120 MODELS)

**GENERAL.** It is recommended that the front shock absorbers be dismantled and reassembled only by an authorised agent of Messrs. Newton & Bennett Ltd. Replacements are available on an exchange basis and it is recommended that advantage be taken of this service.

**DESCRIPTION.** Suspension control is effected by the movement of a piston in a fluid-filled chamber. When the torsion bar is compressed as the road wheel passes over a bump the piston (A) travels down the cylinder and transfers fluid through the lightly loaded valve (B) to the upper side of the piston head, a volume of fluid equal to the volume of the piston rod (C) entering, passes through the spring-loaded valve (D) to the outer chamber (E). The combined action of these valves gives the correct resistance on compression. As the suspension rebounds the piston (A) travels upwards and fluid from its upper side is transferred through the spring-loaded piston valves (F) to the underside of the head. At the same time the volume of fluid displaced on compression is drawn back into the working chamber through the lightly loaded valve (G). The control valves are designed to give a regulated fluid resistance appropriate to the speed of the suspension—the working parts are few in number and of particularly robust construction.

The gland (H) is virtually leak-proof as any fluid adhering to the piston rod is wiped off by the seal (J) and drains back to the reserve chamber through the leak off ports (K). The outer seal (L) prevents the ingress of water or foreign matter.

**SERVICE—  
Early Type.** A simple filling arrangement is provided thus eliminating damage due to overfilling and ensuring the correct fluid level. In order to obtain the best result it is recommended that the units should be removed from the vehicle for service. Clean the unit externally, particularly the area surrounding the filling orifice at (M). Stand the unit upright with the bottom eye held in a vice and work the unit up and down through the full length of the stroke—uniform resistance in both directions, which will not be equal, will indicate that the working chamber (N) is full of fluid, a deficiency being

indicated by a "flat spot" at the end of the stroke. Extend the unit fully, remove the filler screw at (M), lay the unit flat and fill with recommended fluid. Stand upright and allow fluid to drain to the level of the hole, replace the filler screw and work the unit up and down as above until uniform resistance is felt. Leave the unit fully extended and recheck the fluid level. When correctly filled the fluid should reach the level of the filling hole with the unit standing vertically and fully extended.

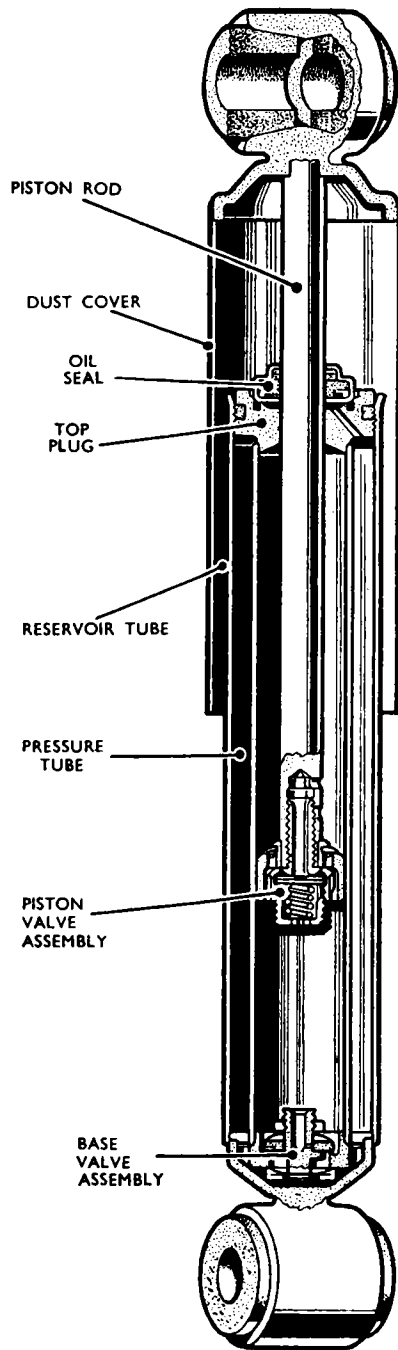


PLATE J.8. GIRLING SHOCK ABSORBER (Mark VII).

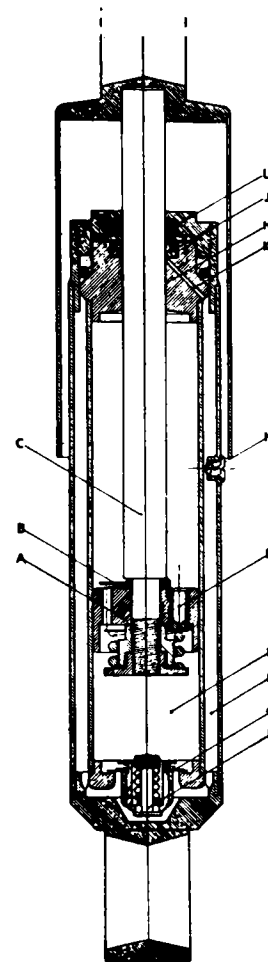


PLATE J.9. NEWTON SHOCK ABSORBER (XK 120).

**Later Type.** On later type Newton front shock absorbers the filler plug has been deleted. In the event of fluid replenishment being necessary, proceed in the following manner:  
Stand the unit upright with the bottom eye held in a vice. Extend the unit to expose the gland nut, which is unscrewed using a  $\frac{3}{4}$ " B.S.F. spanner. As the gland nut is of zinc base alloy and therefore comparatively soft and easily damaged, use only the correct size spanner, or preferably a special key to register on the nut, which is 1.2" (30.5 mm.) across flats. When the gland is unscrewed a sharp upward pull on the piston rod will withdraw the complete inner assembly. Place the dismantled parts on a clean surface, wash out, and if possible air blast the cylinder and dismantled parts before reassembling.

Insert the inner cylinder and foot valve assembly, making sure that it is correctly seated in the outer cylinder, pour in 130 c.c. of one of the fluids **recommended** and insert the piston rod and gland assembly. Screw home the gland nut. Work the unit up and down through the full length of the stroke until uniform resistance is felt.

**ANTI-ROLL BAR. TO REMOVE AND REFIT**  
(MARK VII AND XK 120 MODELS)

**REMOVE.** Remove split pin, slotted nut and plain washer from either extremity of the anti-roll bar. Remove two nuts and bolts securing bearing brackets to support brackets on bottom face of each chassis side member. Tap the anti-roll bar out of the brackets on either lower wishbone lever and draw from under car. Observe disposition of rubber buffers at either end between anti-roll bar and mounting bracket.

**REFIT.** Refitting is the reverse of the above procedure.

**CASTOR ANGLE. TO CHECK AND RESET**  
(MARK VII AND XK 120 MODELS)

**GENERAL.** It is assumed that the car is full of petrol, oil and water. If not additional weight must be added to compensate for, say, a low level of petrol (ten gallons of petrol weigh approximately 80 lbs. (36 kg.)). It is essential to observe that it is useless to check castor until a check has been made on torsion bar settings and any correction necessary carried out. The car must be placed on a **perfectly level surface**, wheels in the straight ahead position and tyre pressures correctly adjusted as follows:—

	<b>MARK VII</b>	<b>XK 120</b>
Front .. ..	23 lbs. per sq. in. (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )
Rear .. ..	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )

All pressures adjusted cold.

**Note.** If it is required to check and reset the castor angle when the full weight of the car is not on the suspension, and/or with the shock absorbers removed, a distance of  $13\frac{1}{8}$ " (33.3 cm.) for the Mark VII model and  $13\frac{3}{8}$ " (34.0 cm.) for the XK 120 models should be maintained between the top and bottom shock absorber mountings.

A simple distance gauge, one for the Mark VII model and one for the XK 120 model, can be made up to maintain the correct distance between the top and bottom shock absorber mountings, as illustrated in Plate J.2 for the Mark VII model and in Plate J.3 for the XK 120 models.

**CHECK TORSION BAR SETTING. (MARK VII.)** Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY.  
These conditions being fulfilled an  $8\frac{1}{2}$ " (21.6 cm.) test piece should just pass below the lower face of the chassis side member immediately adjacent to the point where the front end of the cruciform member meets the chassis side member.

**CHECK TORSION BAR SETTING. (XK 120.)** Place two 100 lb. (two 45.4 kg.) weights in the car, one in front of each front seat. Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY.

These conditions being fulfilled a  $7\frac{1}{8}$ " (18.1 cm.) test piece should just pass below the lower face of the most forward parallel section of the chassis frame.

**TORSION BAR ADJUSTMENT.** If a correction is necessary, check the position of the rear reaction lever locking bolts in the slots to make sure that adjustment in the desired direction is possible. Clockwise rotation of the brass adjusting nut will increase torsion in the rod, move the lock bolt towards the top of the slot and raise the car. Anti-clockwise rotation will have the reverse effect. Adjustment should only be carried out with the locking bolts released and the front of the car jacked up to reduce the load on the adjustment nuts to a minimum.

If the locking bolts have reached the end of their slots and the desired adjustment is not possible, it will be necessary to reposition the torsion bar in relation to the lower wishbone member, as follows:—

Jack up the front of the car, remove the rear reaction lever locking bolts, slacken off the torsion bar adjusting barrel nuts to the end of their threads, remove the two bolts from each of the front splined muffs and turn the muff one spline on the torsion bar.

**Note.** Viewing the car from the rear, turning the offside (right hand) muff clockwise will increase torsion in the rod, that is, raise the car, and turning it anti-clockwise will decrease torsion, that is, lower the car. Conversely, turning the nearside (left hand) muff anti-clockwise will increase, or clockwise will decrease torsion. Screw up torsion bar adjustment nuts, lower the car on to its wheels, depress the front and recheck the height of the chassis frame. It is important to note that should correction be required on both torsion bars then adjustment should take place a little at a time on each until the required results are obtained, finally retightening the locking bolts. The front of the car should be jacked up each time an adjustment is made so that the load on the adjusting nuts is reduced to a minimum.

**CHECK CASTOR. (MARK VII.)** With the torsion bar setting correct, and using an approved castor gauge, check castor, which should be as follows:—  
Castor Angle  $0^{\circ} \pm \frac{1}{4}^{\circ}$ .

**CHECK CASTOR. (XK 120.)** Insert four  $7\frac{1}{8}$ " (18.1 mm.) test pieces between the chassis frame and the ground at the forward and rear ends of the parallel section of the frame.

Jack up the rear of the car, remove rear road wheels and lower until the chassis frame rests on the two rear test pieces. Load the front of the car until the chassis frame rests on the two front test pieces.

Using an approved castor gauge, check castor, which should be as follows:—

Castor Angle  $3^{\circ}$  positive. ( $5^{\circ}$  positive prior to Chassis Numbers R.H.D. 660126, L.H.D. 670439).

**RESET CASTOR.** To alter castor, slacken back two bolts securing the front suspension upper wishbone members to the stub axle carrier and either remove or add shims from front to rear or rear to front as necessary. (Plate J.10.) To decrease **positive** castor, remove shims from front of member and insert at rear, and to increase **positive** castor, remove shims from rear and insert in front. It should be noted that  $\frac{1}{16}$ " (1.6 mm.) of shimming will alter castor by approximately  $\frac{1}{2}^{\circ}$  in either direction. Tighten the two bolts loosened for purposes of extracting shims.

The front of the car should be jacked up when turning the wheels from lock to lock during checking.

**Note.** When castor setting has been altered, the front wheel track must be checked and reset as described in Section I, "Steering".

## CAMBER ANGLE TO CHECK AND RESET

(MARK VII AND XK 120 MODELS)

**GENERAL.** It is assumed that the car is full of petrol, oil and water. If not additional weight must be added to compensate for, say, a low level of petrol. It is also essential to observe that it is useless to check camber until a check has been made on torsion bar settings and any correction necessary carried out.

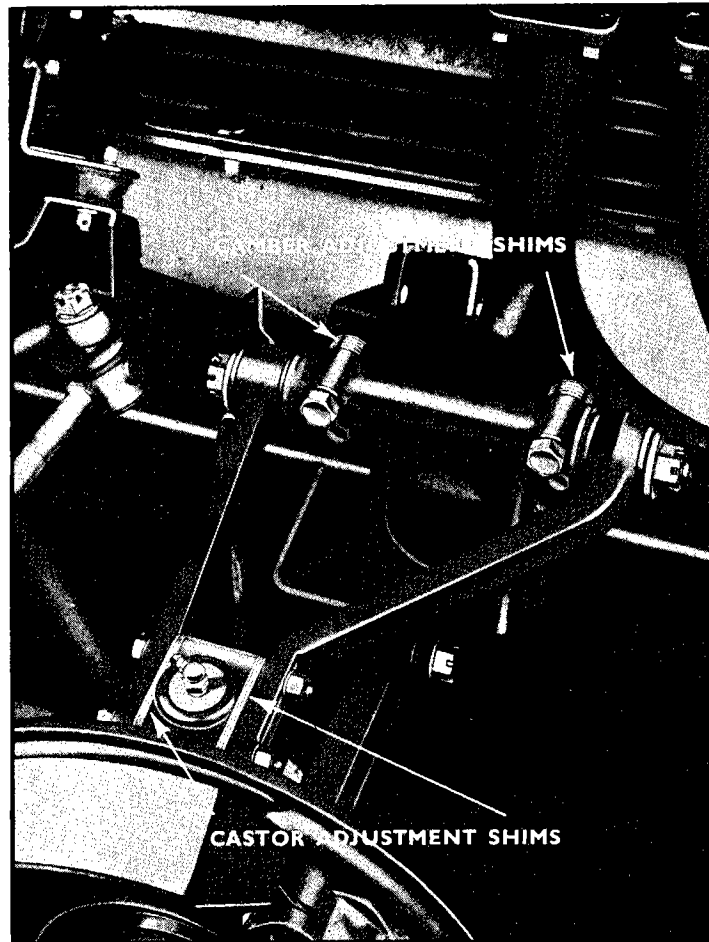


PLATE J.10. CASTOR AND CAMBER ADJUSTMENT.

Before any of the following checks are made the car must be placed on a **perfectly level surface**, wheels in the straight ahead position, and tyre pressures correctly adjusted as follows:—

	<b>MARK VII</b>	<b>XK 120</b>
Front .. ..	23 lbs. per sq. in. (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )
Rear .. ..	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )

All pressures adjusted cold.

**Note.** If it is required to check and reset the camber angle when the full weight of the car is not on the suspension, and/or with the shock absorbers removed, a distance of  $13\frac{1}{8}$ " (33.3 cm.) for the Mark VII model and  $13\frac{3}{8}$ " (34.0 cm.) for the XK 120 models should be maintained between the top and bottom shock absorber mountings.

A simple distance gauge, one for the Mark VII model and one for the XK 120 models, can be made up to maintain the correct distance between the top and bottom shock absorber mountings, as illustrated in Plate J.2 for the Mark VII model and in Plate J.3 for the XK 120 models.

**CHECK TORSION BAR SETTING. (MARK VII.)** Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY. These conditions being fulfilled a  $8\frac{1}{2}$ " (21.6 cm.) test piece should just pass below the lower



face of the chassis side member immediately adjacent to the point where the front end of the cruciform member meets the chassis side member.

**CHECK TORSION BAR SETTING.** (XK 120.) Place two 100 lb. (two 45.4 kg.) weights in the car, one in front of each front seat. Bounce the front of the car on its suspension to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY.

These conditions being fulfilled a  $7\frac{1}{8}$ " (18.1 cm.) test piece should just pass below the lower face of the most forward parallel section of the chassis frame.

**TORSION BAR ADJUSTMENT.** If a correction is necessary, check the position of the rear reaction lever locking bolts in the slots to make sure that adjustment in the desired direction is possible. Clockwise rotation of the brass adjusting nut will increase torsion in the rod, move the lock bolt towards the top of the slot and raise the car. Anti-clockwise rotation will have the reverse effect. Adjustment should only be carried out with the locking bolts released and the front of the car jacked up to reduce the load on the adjustment nuts to a minimum.

If the locking bolts have reached the end of their slots and the desired adjustment is not possible, it will be necessary to reposition the torsion rod in relation to the lower wishbone member, as follows:

Jack up the front of the car, remove the rear reaction lever locking bolts, slacken off the torsion bar adjusting barrel nuts to the end of their threads, remove the two bolts from each of the front splined muffs and turn the muff one spline on the torsion bar.

**Note.** Viewing the car from the rear, turning the offside (right hand) muff clockwise will increase torsion in the rod, that is, raise the car, and turning it anti-clockwise will decrease torsion, that is, lower the car. Conversely, turning the nearside (left hand) muff anti-clockwise will increase, or clockwise will decrease torsion. Screw up torsion bar adjustment nuts, lower the car on to its wheels, depress the front and recheck the height of the chassis frame. It is important to note that should correction be required on both torsion bars then adjustment should take place a little at a time on each until the required results are obtained, finally retightening the locking bolts. The front of the car should be jacked up each time an adjustment is made so that the load on the adjusting nuts is reduced to a minimum.

**CHECK CAMBER.** (MARK VII.) Line up the front wheels being checked parallel to the centre line of the car. Using an approved camber gauge, check the camber. Rotate the wheel which is being checked through  $180^\circ$  and recheck.

Camber Angle  $1^\circ \pm \frac{1}{4}^\circ$  positive.

**CHECK CAMBER.** (XK 120.) Insert four  $7\frac{1}{8}$ " (18.1 mm.) test pieces between the chassis frame and the ground at the forward and rear ends of the parallel section of the frame.

Jack up the rear of the car, remove rear road wheels and lower until the chassis frame rests on the two rear test pieces. Load the front of the car until the chassis frame rests on the two front test pieces.

Line up the front wheel being checked parallel to the centre line of the car. Using an approved camber gauge, check camber. Rotate the wheel being checked through  $180^\circ$  and recheck.

Camber Angle  $1\frac{3}{4}^\circ - 2^\circ$  positive.

**RESET CAMBER.** Slacken the four bolts securing the top wishbone bracket to the chassis frame mounting post.

Adjustment is effected by removing or adding shims between the chassis frame mounting post and the front suspension top wishbone bracket. (Plate J.10.) Inserting shims increases, removing shims decreases camber. It should be noted that  $\frac{1}{16}$ " (1.6 mm.) of shimming equals approximately  $\frac{1}{2}^\circ$  of camber. Shims are available in the following thicknesses—.036", .048" and .064" (.91 mm., 1.2 mm. and 1.63 mm.). Tighten the bolts, loosened to make adjustment, and recheck. Check the other front wheel in a similar manner.

**Note.** When the camber setting has been altered, the front wheel track must be checked and reset as described in Section I, "Steering".

# REAR SUSPENSION

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above  
rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket  
to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

Index to Contents	-	-	-	-	-	-	Page K.2
Index to Plates	-	-	-	-	-	-	Page K.3
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**(MARK VII AND XK 120 MODELS)**

**DESCRIPTION.** The rear suspension consists of semi-elliptical springs controlled by hydraulic piston type shock absorbers. The road springs are mounted on spring saddles situated on the lower face of the axle casing and are retained in position on the saddles by "U" bolts and "U" bolt plates. The front ends of the springs are mounted on anchor bolts passing through bushes pressed into the spring eyes. The anchor bolts are located in brackets attached to the outside face of the chassis frame side members. The rear ends of the springs are mounted on the ends of shackles, the other ends of which are mounted on the chassis frame. The spring eye bushes and shackle bushes are of the bonded rubber and steel type. The road springs are fitted with gaiters which serve to keep the springs clean and also to retain lubricant on the spring leaves. Lubricating nipples are fitted to the gaiters.

The shock absorbers are mounted on the inside vertical face of the chassis frame side members immediately in front of the rear axle casing. Short link arms connect the shock absorber main arms to lugs on the rear axle casing. Rubber bushes are pressed into the eyes of the link arms composite with the assembly bolts.

A plate is attached to the chassis frame above the rear axle casing on either side which carries the axle bound rubbers. Attached to each chassis frame side member in front and behind the rear axle are "U" shaped check straps which carry the rebound buffers at the bottom of the strap.

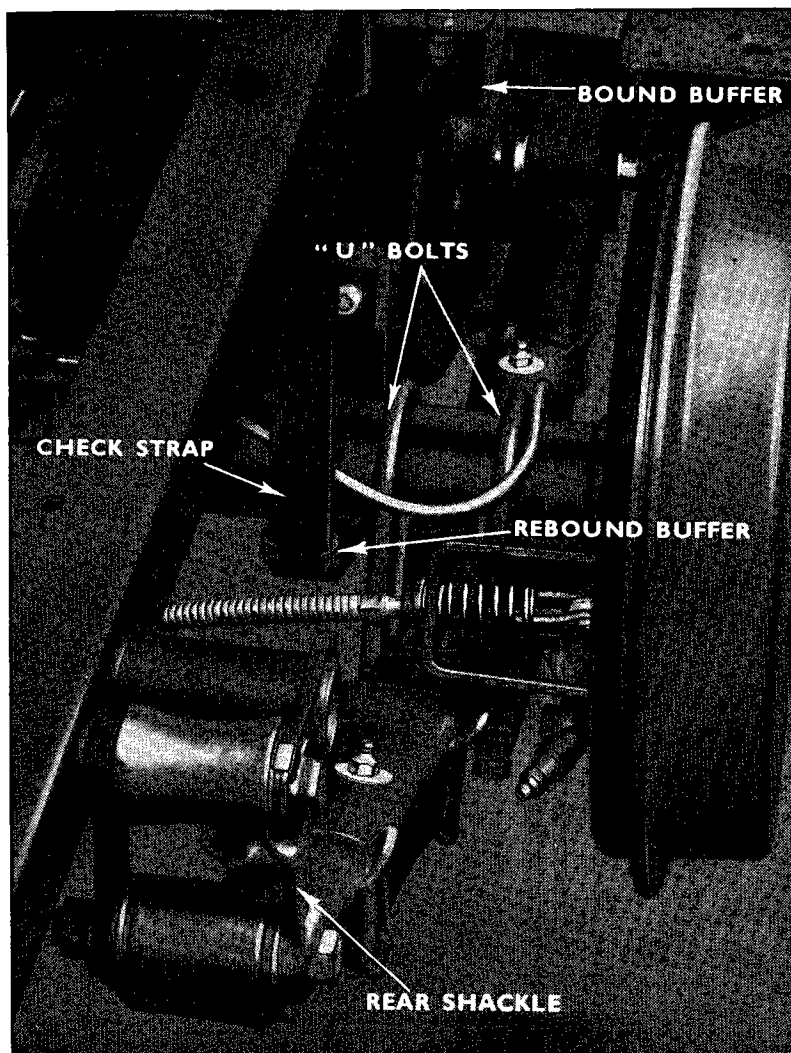


PLATE K.1. REAR SUSPENSION (XK 120).

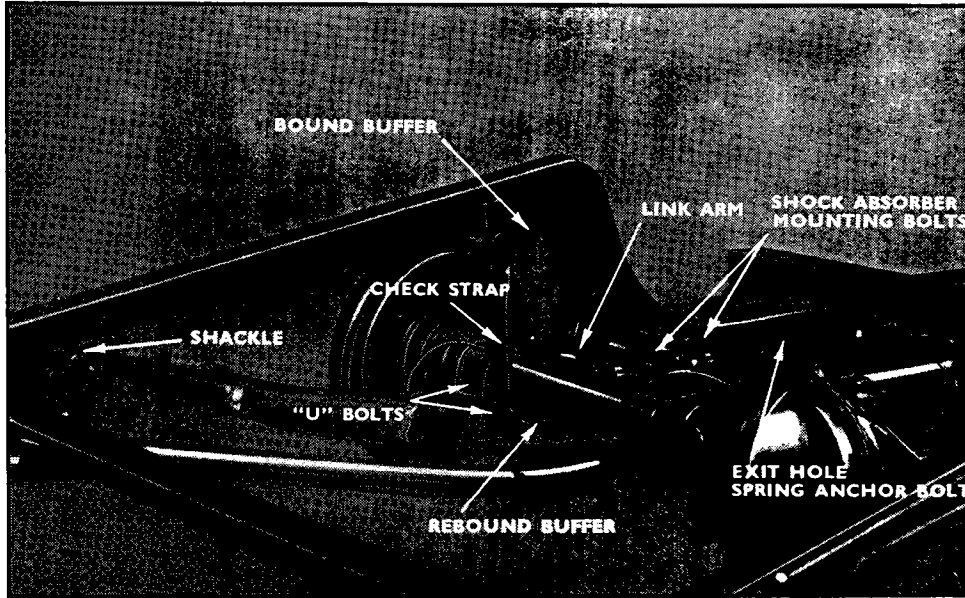


PLATE K.2. REAR SUSPENSION (Mark VII).

**MAINTENANCE.**

When the rear road wheels are removed, lubricate the rear springs through the four nipples provided on the gaiters with the recommended lubricant.

Every 10,000 miles (16,000 kilometres) thoroughly clean the rear shock absorbers, examine the fluid level and top up, if necessary, using the recommended grade of fluid. The filler is situated on top of the shock absorber body and the body should be completely filled. Since grit or dirt will damage the shock absorber movement it is vitally important to clean thoroughly before removing the filler plug. (See page K.8 for full details regarding service.)

Every 10,000 miles (16,000 kilometres) check tightness of rear axle "U" bolts, shackle and anchor bolts, shock absorber mounting bolts and check strap mounting bolts. Tighten, if necessary.

**RECOMMENDED LUBRICANTS**

		Vacuum	Wakefield	Shell	Esso	Price's
Road Springs	.. ..	Mobilgrease No. 5	Castrollease WB	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.
Shock Absorbers	.. ..	Use only Girling Piston Type Thin Oil				

**REAR SUSPENSION DATA**

Road Springs:		<b>Mark VII</b>	<b>XK 120</b>
Type .. ..	.. ..	Semi-elliptic	Semi-elliptic
Number of leaves .. ..	.. ..	9	7
Type of leaves .. ..	.. ..	Tapered and speared	Tapered and speared
Free camber (see Note) .. ..	.. ..	6"	5½"
Laden camber .. ..	.. ..	Spring flat at 875 lb.	Spring flat at 585 lb.
Spring eye diameter .. ..	.. ..	1"—.016" — .026"	1"—.016" — .026"
Shock Absorbers:			
Type .. ..	.. ..	Hydraulic piston type	Hydraulic piston type
Make .. ..	.. ..	Girling PV.7	Girling PV.7

**Note.** Spring camber on the Mark VII model is measured from a line taken from the bottom of the upturned eye to the top of the downturned eye, and from this line to the top of the main leaf. Spring camber on the XK 120 model is measured from the centres of the spring eyes to the top of the main leaf.

**SUSPENSION RUBBER BUSHES. SERVICING**  
**(MARK VII AND XK 120 MODELS)**

**SERVICING.** Whenever any of the rubber bushes fitted to the road spring anchor bolts, road spring shackles and shock absorber link arms are dismantled either for examination or replacement it is essential that the car is in the normal riding position, either before pre-loading is applied to any of the rubber bushes mentioned above or assemblies finally locked up. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of rubber bushes. The rubber bushes should not in any circumstances be lubricated.

**ROAD SPRING. TO REMOVE AND REFIT**  
**(MARK VII AND XK 120 MODELS)**

**GENERAL.** Jack up rear of car and lower on to stands placed beneath chassis frame in front of rear spring front anchorages.

Remove rear wing valances, nave plates and road wheels.

Lower jack until axle assembly is supported by rebound stirrups.

**REMOVE "U" BOLTS.** Remove lock nuts and nuts from spring saddle "U" bolts and withdraw "U" bolts.

**REMOVE FRONT ANCHOR BOLT.** Remove nut securing front anchor bolt and withdraw bolt through exit hole provided in chassis side member. (Mark VII—Plate K.2 ; XK 120—Plate K.3.)

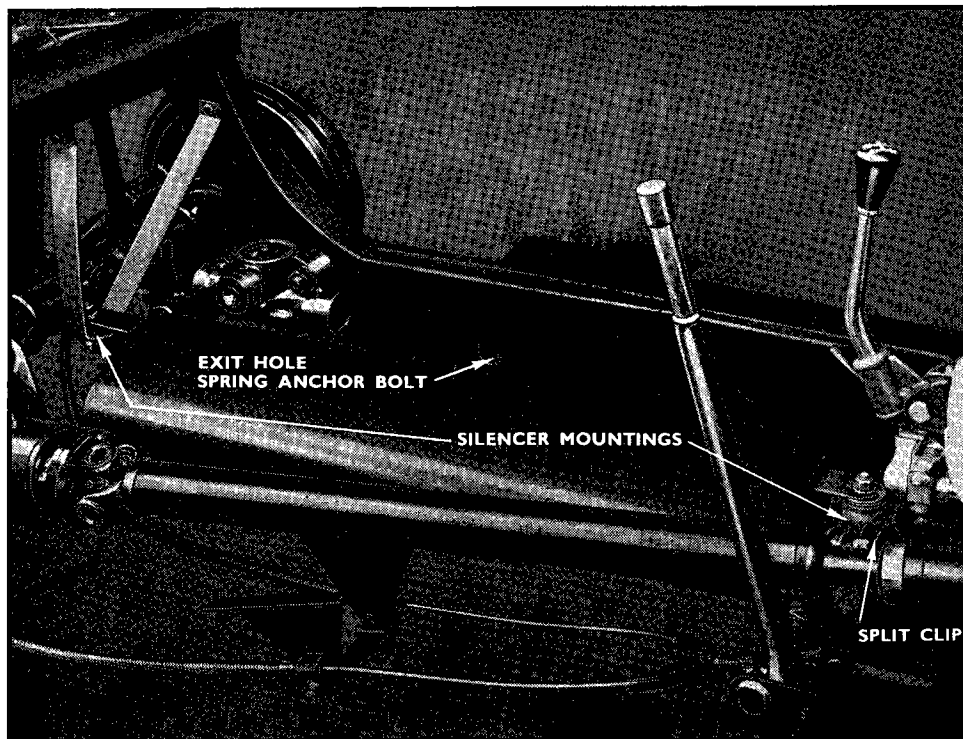


PLATE K.3. EXIT HOLE. SPRING ANCHOR BOLT (XK 120).

**REMOVE SHACKLE BOLT.**

Remove securing nut from spring shackle bolt and withdraw bolt.

Withdraw spring towards rear of car.

**REFITTING.**

When the spring has been replaced on rear shackle and front anchor bolt it will be necessary to jack up the spring into engagement with the rear axle to facilitate fitting of spring saddle "U" bolts and nuts, taking care that spring centre bolt is located in the hole in the axle saddle.

Before tightening the rear shackle nuts or front anchor bolt it is of great importance to have the weight of the car on the rear springs, that is, the car must be in the normal riding position. Failure to observe this procedure before tightening nuts will result in premature failure of the steel and rubber bushes due to excessive load being applied to the rubber.

**ROAD SPRING. TO DISMANTLE AND REASSEMBLE****(MARK VII AND XK 120 MODELS)****DISMANTLE.**

Remove road spring as described on page K.6. Release gaiter laces and remove gaiters. Thoroughly clean road springs. Withdraw bolts from the spring clips. Clamp spring in vice with the jaws of the vice engaging on the top and bottom leaves. Remove nut from centre bolt and release vice slowly.

Withdraw spring leaves from vice. The bushes may now be pressed out of the spring eyes.

**REASSEMBLE.**

Reassembly is the reverse of the above procedure. Replacement road springs are available on an exchange basis and where a spring has settled, or is worn, it is recommended that advantage be taken of this scheme. Always fit replacement springs in pairs. Refit road spring as described in the preceding paragraph.

**ROAD SPRING GAITERS. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)****REMOVE.**

Raise car on a lift to a height convenient for working on the road springs. Release gaiter laces and draw off gaiters. Observe that each road spring has two gaiters with a grease nipple fitted to each.

**REFIT.**

Liberally coat the spring leaves with recommended lubricant and fit the gaiters, securing in position with the laces provided. Lower car from lift.

**CHECK STRAP. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)****REMOVE.**

Raise car on lift to a height convenient for working on check straps. Remove nut, bolt and washer securing either end of the check strap to chassis side member and withdraw check strap downwards clear of rear axle casing.

**REFIT.**

Refitting is the reverse of the above procedure.

**REBOUND BUFFER. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)****REMOVE.**

Remove check strap as described in previous paragraph. Release clips securing buffer to check strap and remove buffer.

**REFIT.**

Fit new buffer into angle of check strap and secure in position by bending clips round check strap.



**BOUND BUFFER. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)**

**REMOVE.** Jack up car and remove wing valance, nave plate and road wheel adjacent to buffer affected. Remove two nuts, washers and bolts securing buffer to chassis frame bracket and remove buffer.

**REFIT.** Refitting is the reverse of the above procedure.

**SHOCK ABSORBER. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)**

**REMOVE.** Raise car on lift to a height convenient for working on shock absorber. Remove nut and washer securing link arm to lug on axle casing. Remove two nuts, washers and bolts securing shock absorber to chassis frame side member. Support shock absorber and tap link arm out of lug on axle casing. Remove shock absorber.

**REFIT.** Refitting is the reverse of the above procedure. Observe that the shock absorber link arm can be incorrectly positioned in relationship to the shock absorber main arm. The link arm passes downward from the lug on the axle casing to the main arm. (The link arm must **not** be fitted so that it passes from the lug upward to the main arm.)

**SHOCK ABSORBER LINK ARM. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)**

**REMOVE.** Raise the car on a lift to a height convenient for working on shock absorber. Remove nuts and washers securing either end of the link arm to the shock absorber main arm and axle casing lug respectively. Tap out and remove link arm.

**REFIT.** Refitting is the reverse of the above procedure, but observe that the car should be in the normal riding position before the slotted nuts are finally tightened. Observe that the shock absorber link arm can be incorrectly positioned in relationship to the shock absorber main arm. The link arm passes downward from the lug on the axle casing to the main arm. (The link arm must **not** be fitted so that it passes from the lug upward to the main arm.)

**SHOCK ABSORBER. DESCRIPTION AND SERVICE****(MARK VII AND XK 120 MODELS)**

**GENERAL.** The general construction of the unit is extremely robust, comprising a cast-iron body in which operate two cast-iron pistons, flexibly linked together and actuated by a hardened steel rocker-arm bearing on hardened steel pads. The cylinder and pistons being of the same material ensures that a constant clearance is maintained between pistons and cylinder walls at all temperatures, which contributes materially towards consistent performance. The recuperation valves have been so designed that no flexing of the shim steel discs takes place in operation, thus obviating the possibility of fractured valves. The high pressure relief valves in the P.V. Type are located in a separate chamber in the main body of the damper, and are especially designed to facilitate accurate setting to the pressures required. They are far less susceptible to the presence of small particles of dirt or solid matter than the original disc valves employed in previous piston types; and by their location in a separate chamber end to end discharge of the working chambers is assured, so that even at the highest piston speeds there will be positive and immediate filling of each working chamber in readiness for the next stroke in the reverse direction. Any wear between pistons and rocker is taken up by high-tensile steel spring connections, and as there is a free and ample passage for fluid through the recuperating valve of the returning pistons there is a minimum of drag which prevents the occurrence of hydraulic or mechanical knocks.

To seal the cylinders the use of gaskets has been completely avoided and both cylinder ends are closed by special steel inserts (later type screwed plugs) which ensure complete closure and freedom from leaks. The standard type of robust forged steel linkage is used, fitted with tight rubber bearings.

**DESCRIPTION.** The flexing of the vehicle suspension causes rotary movement of the rocker which actuates the pistons in the working chamber. Movement of the piston towards the end of the chamber forces the fluid through a channel into the valve chamber, which is cast integral with the main body. On generation of sufficient pressure the fluid lifts the spring-loaded sleeve valve off its seating and escapes to the low pressure side of the main chamber. While one piston is forcing the fluid at high pressure through the sleeve valve concerned the pressure in the other cylinder falls, allowing the recuperating disc valve to open in order to recuperate the very small volume of fluid that has escaped past the piston into the reserve chamber, thus maintaining the pressure chambers full of fluid ready for a change in direction of movement and reversal of the direction of flow of the fluid. To control the bleed for slow movement of the rocker a bleed valve is incorporated in the valve body. This valve is pre-set before leaving the factory and operates in both directions. The setting of both pressure and bleed valves is highly critical and is carried out with extreme accuracy on special test rigs by the manufacturers and subsequently the adjustment is plugged and sealed. Under no circumstances should any attempt be made to interfere with these adjustments as the riding qualities will be impaired and serious damage may be caused to the unit. No responsibility can be accepted for any units where this adjustment has been tampered with.

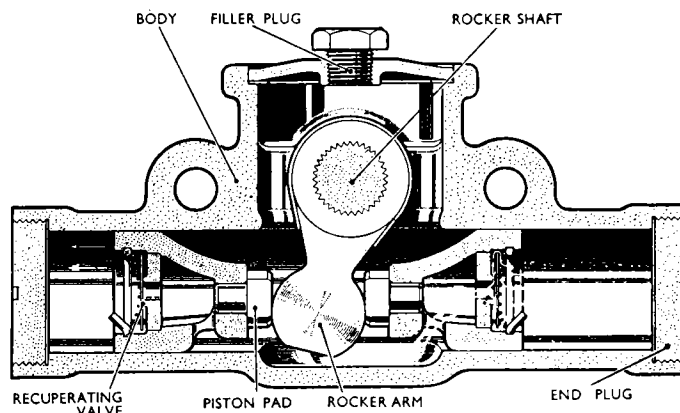


PLATE K.4. GIRLING SHOCK ABSORBER (Side elevation).

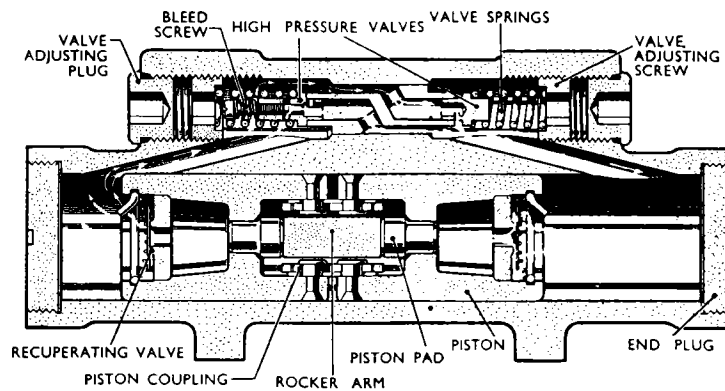


PLATE K.5. GIRLING SHOCK ABSORBER (Plan view).

**SERVICE.** To check the shock absorbers remove them from the chassis as described on page K.8. Bolt to a suitable plate using the fixing lugs and hold plate in vice (holding the chamber directly in the vice will distort the unit). Move the lever arm up and down throughout its complete stroke, when an even resistance should be felt. If the resistance is erratic and free movement of the lever arm is noted

it may indicate lack of fluid. If topping up as described in the following remarks does not give an improvement a replacement shock absorber should be fitted.

Remove the complete assembly and place in a vice using a suitable clamping plate as described above. Before removing the filler plug it is vitally important to completely clean the exterior of the shock absorber since dirt or foreign matter will damage the internal parts. Use only Girling Piston Type Thin Oil. While adding fluid the lever arm must be worked throughout its full stroke to expel air from the pressure chamber. Fill to the bottom of the filler plug hole (the unit cannot be over-filled). When the unit has been refitted to the chassis (page K.8), after bolting in position but before reconnecting the link arm work the main arm through the full stroke several times to make sure no air is present.

If the shock absorber is being topped up whilst attached to the chassis frame the following precautions are essential:

- (a) The unit must be thoroughly cleaned before the filler plug is moved.
- (b) A shield should be placed over the unit before the plug is removed in order to protect the unit and not removed until after the filler plug is replaced.
- (c) The filler can must be absolutely clean internally and externally.
- (d) Use only Girling Piston Type Thin Oil.

# STEERING

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MK. VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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Steering Lock .. .. .	Adjust .. .. .	I.28	

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(MARK VII MODEL)

**DESCRIPTION.** The steering unit is of the high efficiency, recirculating ball type, in which motion is transmitted from column to rocker shaft through a sliding member running on a continuous train of ball bearings. The single start worm on the lower end of the inner column is supported at either end by crowded ball races, correctly adjusted by means of shims placed between end cover and casing. The upper end of the inner column is located in an oilless bush, needing neither adjustment nor lubrication. Formed on the sliding member is a conical abutment, mating with similar faces on the rocker shaft and a bearing pin carrying a roller which runs in a slot in the cover plate.

The rocker shaft is supported in two bushes and at its lower end is connected to a double-ended drop arm which is secured by a nut and split pin.

The drop arm is of a divided type and consists of a double-ended main arm which is pivoted and a free fit on a secondary arm. The secondary arm is splined to the rocker shaft and connected to the main arm by a rubber coupling. The main drop arm fulcrum is bushed and provided with a grease nipple. The front end of the drop arm is interconnected to a double-ended idle lever housed on the opposite chassis member by an adjustable track rod which passes through the front cross member. The idle lever shaft is supported in two taper roller bearings in an aluminium housing which is packed with grease on assembly. No grease nipple is provided and

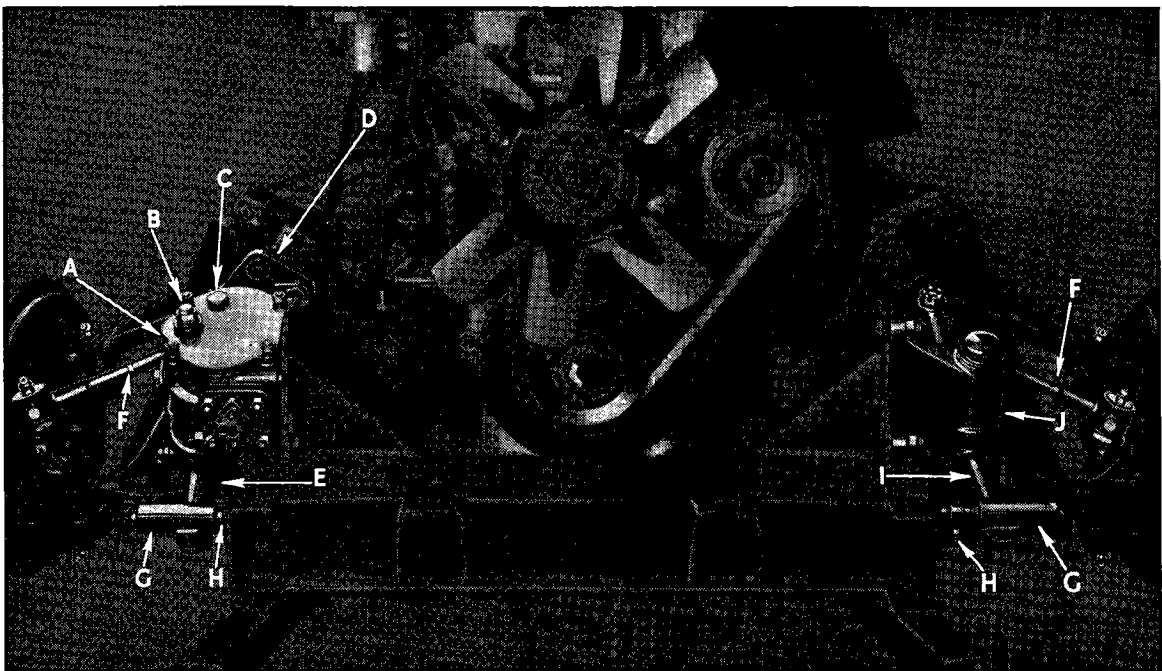


PLATE I.1. STEERING. GENERAL ARRANGEMENT (Mark VII).

- |                           |                        |
|---------------------------|------------------------|
| A. Steering Box.          | F. Tie Rods.           |
| B. Rocker Shaft Adjuster. | G. Track Rod Ends.     |
| C. Filler Plug.           | H. Track Rod Clamps.   |
| D. Universal Joint.       | I. Idle Lever.         |
| E. Drop Arm.              | J. Idle Shaft Housing. |

the unit only requires replenishing with grease if it has been dismantled. The rear ends of the drop arm and idle lever are interconnected to their respective steering arms with tie rods which are of a fixed length. The ends of the track rod and tie rods are connected by ball joints provided with grease nipples.

The steering swivels (Plate I.13) consist of two ball assemblies per side attached to the outer extremities of the upper and lower wishbone members and to the stub axle carrier. These ball assemblies form both the steering pivot and front suspension articulation. Grease nipples are provided for each ball joint.

**Note.** Early cars (prior to Chassis Nos. R.H.D. 710376, L.H.D. 730596) were fitted with a one-piece drop arm and Ferobestos ball sockets for the lower steering swivels, neither of which require lubrication.

### (XK 120 MODELS)

**DESCRIPTION.** The steering unit is of the high efficiency, recirculating ball type, in which motion from column to rocker shaft is transmitted through a sliding member running on a continuous train of ball bearings. The single start worm on the lower end of the inner column is supported at either end by crowded ball races, correctly adjusted by means of shims placed between the cover and casing. The upper end of the column is located in a composition bush which requires neither adjustment nor lubrication.

Formed on the sliding member is a conical abutment mating with similar faces on the rocker shaft and a bearing pin carrying a roller runs in a slot in the cover plate. The rocker shaft is supported in bushes in the steering box and at its lower end has taper splines on to which the drop arm is secured by means of a slotted nut and

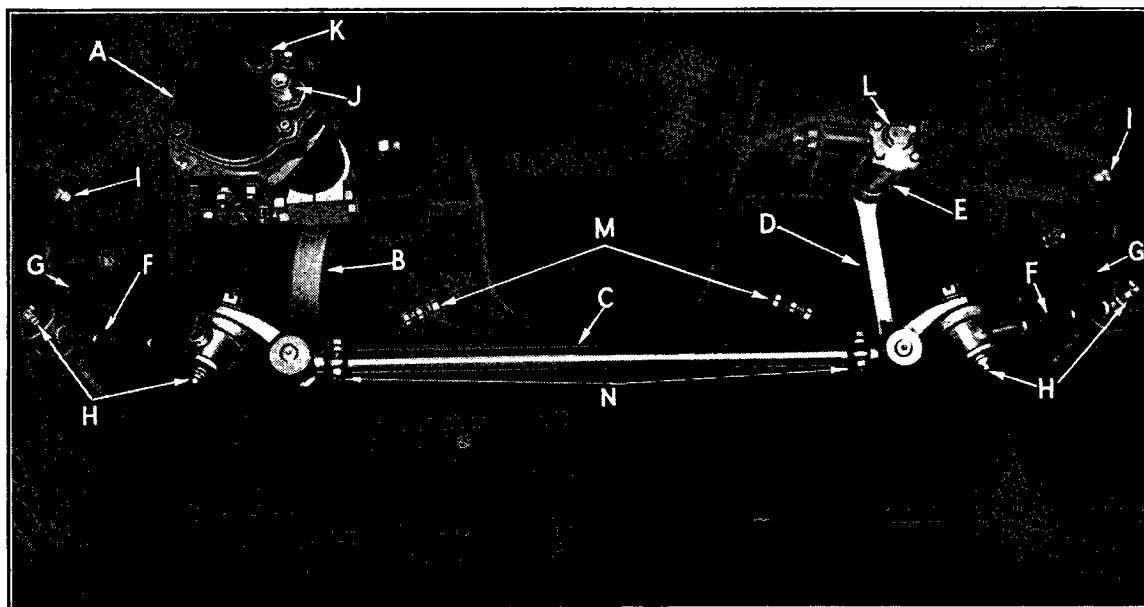


PLATE I.2. STEERING. GENERAL ARRANGEMENT (XK 120).

- |                        |                                     |
|------------------------|-------------------------------------|
| A. Steering Box.       | H. Nipples. Tie Rods.               |
| B. Drop Arm.           | I. Nipples. Upper Steering Swivels. |
| C. Track Rod.          | J. Rocker Shaft Adjuster.           |
| D. Idle Lever.         | K. Filler Plug. Steering Box.       |
| E. Idle Shaft Housing. | L. Filler Plug. Idle Shaft Housing. |
| F. Tie Rods.           | M. Steering Lock Stops.             |
| G. Steering Arms.      | N. Track Rod Clamps.                |



split pin. The steering box is carried in a split trunnion mounting which is attached to the upper wishbone bracket on the chassis frame. (Plate I.2.)

The front end of the drop arm is interconnected to an idle lever on the opposite chassis member by an adjustable track rod, the ends of which have rubber bearings. (Early cars were fitted with thread bearings and provided with grease nipples.) Extensions of the track rod ends are interconnected to their respective steering arms with tie rods which are of a fixed length. (Early cars were fitted with adjustable tie rods, but it is most important that their lengths be maintained within  $\frac{1}{16}$ " (1.6 mm.) of 9" (22.86 cm.) from ball centre to ball centre.) This dimension ensures that the tie rods and upper wishbone arms operate through equal radii and thus maintain constant steering track irrespective of the vertical positions of road wheels.

The steering swivels (Plate I.13) consist of two ball assemblies per side attached to the outer extremities of the upper and lower wishbone members and to the stub axle carriers. These ball assemblies form both the steering pivot and front suspension articulation. The lower steering swivel ball sockets are of the Ferobestos type and do not require lubrication.

**(MARK VII AND XK 120 MODELS)**

**MAINTENANCE.** At the free service—after 500 miles (800 kilometres)—top up the steering box with the recommended lubricant through the filler plug provided. (Plates I.1 and I.2.) The filler plug has a plain hexagon head and should not be confused with the rocker shaft adjusting screw which is threaded externally. On the XK 120 models top up the steering idle lever housing with the recommended lubricant through the filler plug in the housing cover plate. Lubricate all the steering nipples with the recommended lubricant. Check the steering track—see "Steering Track—To adjust" on page I.28. Check the steering box mounting bolts for tightness. On the Mark VII model check the steering column universal joint clamp bolts for tightness.

Every month or at every 2,500 miles (4,000 kilometres) top up the steering box with the recommended lubricant through the filler plug provided. (Plates I.1 and I.2.) The filler plug has a plain hexagon head and should not be confused with the rocker shaft adjustment screw which is threaded externally. On the XK 120 models top up the steering idle lever housing with the recommended lubricant through the filler plug in the housing cover plate. Lubricate all the steering nipples with the recommended lubricant. The location and number of nipples is as follows:—

(Refer to Plates I.1 and I.3 for the Mark VII model and Plate I.2 for the XK 120 models.)

	<b>Mark VII</b>	<b>XK 120</b>
Track Rod .. .. .	2 Nipples	None (two on early cars with thread bearings)
Tie Rod. Right Hand .. .. .	2 Nipples	2 Nipples
Tie Rod. Left Hand .. .. .	2 Nipples	2 Nipples
Wheel Swivel. Right Hand .. .. .	2 Nipples (one on early cars fitted with Ferobestos lower ball socket)	1 Nipple
Wheel Swivel. Left Hand .. .. .	2 Nipples (one on early cars fitted with Ferobestos lower ball socket)	1 Nipple
Drop Arm—Fulcrum .. .. .	1 Nipple (none on early cars fitted with one-piece drop arm)	None

Every 10,000 miles (16,000 kilometres) check the tightness of all steering mounting bolts and steering joints

**RECOMMENDED LUBRICANTS**

	Vacuum	Wakefield	Shell	Esso	Price's	S.A.E.
Steering Gearbox; Steering Idle Lever Housing—XK 120 .. .. .	Mobilube C	Castrol D	Shell Spirax 140 E.P.	Esso Gear Oil 140 (Heavy)	Price's Energol 140	Viscosity 140
All Steering Nipples .. .. .	Mobilgrease No. 5	Castrol W.B.	Shell Retinax A	Esso High Temp. Grease	Price's Belmoline H.M.P.	

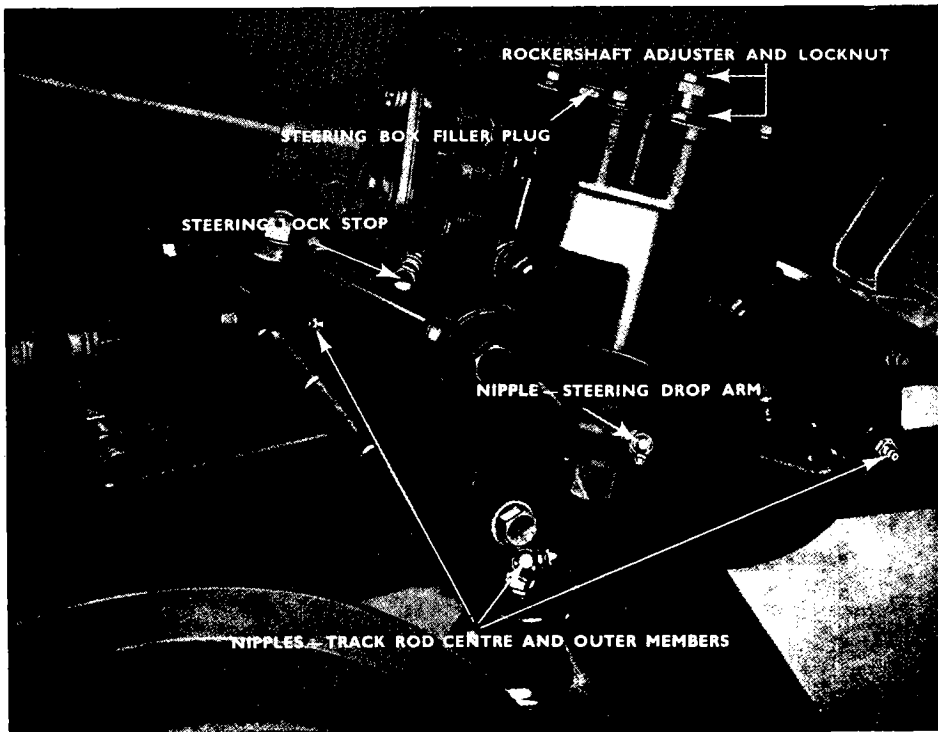


PLATE I.3. STEERING BOX AND LINKAGE (Mark VII).  
(Divided drop-arm illustrated).

**STEERING DATA**

Steering Unit. Type .. .. .	.. .. .	Burman Recirculating Ball
Adjustment—Inner Column End Float	.. .. .	Shims under end plate
Adjustment—Rocker Shaft End Float	.. .. .	Adjusting screw and pre-load spring
Steering Wheel. Type .. .. .	.. .. .	Adjustable for reach
	<b>Mark VII</b>	<b>XK 120</b>
Steering Wheel Diameter	18" (45.7 cm.)	17" (43.2 cm.)
Castor Angle	0° ± ¼°	3° positive (5° prior to Chassis No. R.H.D. 660126, L.H.D. 670439)
Camber Angle	1° ± ¼° positive	1¾° to 2° positive
Swivel Inclination	8°	5°
Track	⅛" to ⅜" toe-in (3.2 to 4.8 mm.)	⅛" to ⅜" toe-in (3.2 to 4.8 mm.)
Turning Circle	36' (11 metres)	31' (9.5 metres)

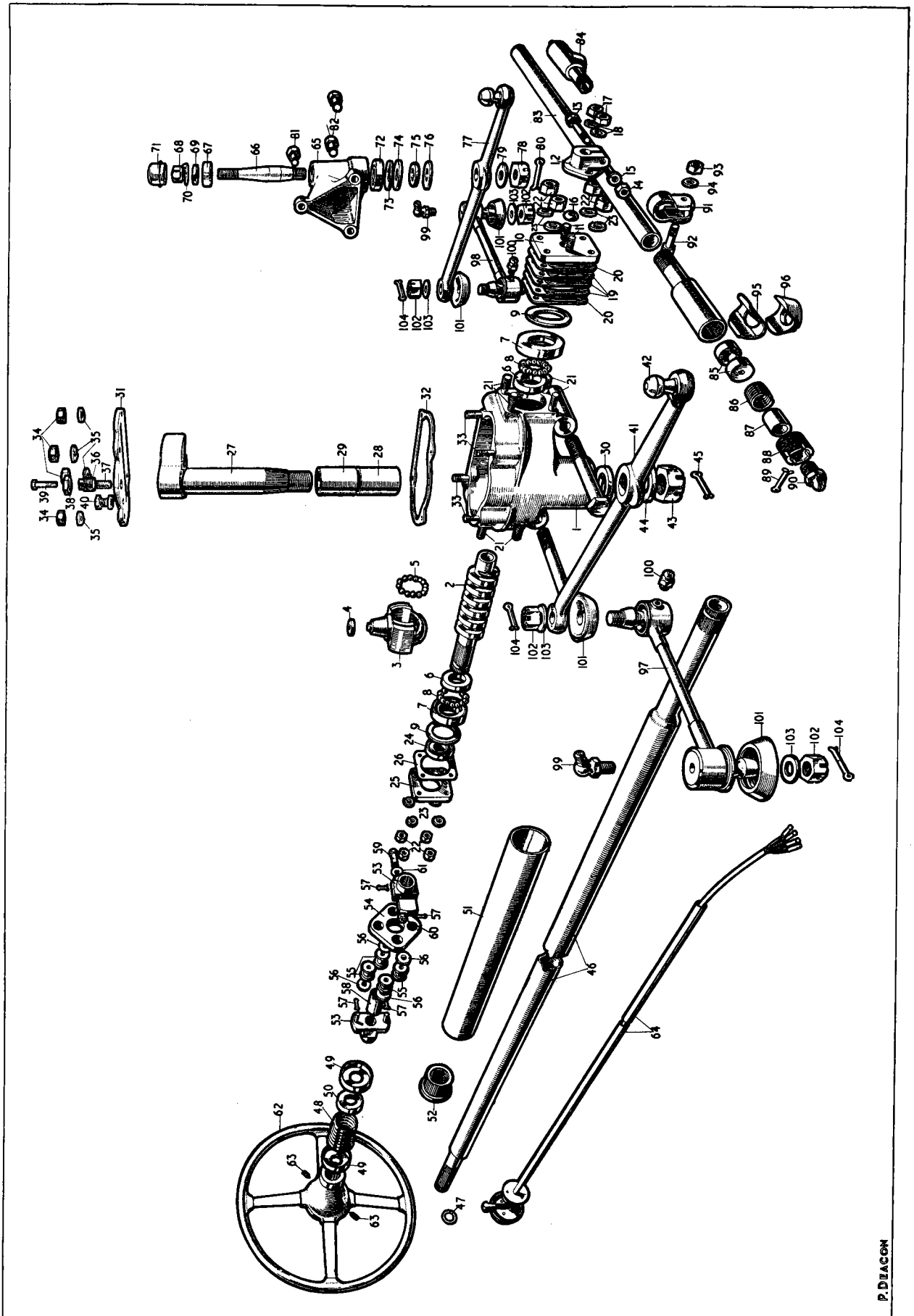


PLATE I.4. STEERING ASSEMBLY (Mark VII). (One piece drop-arm illustrated).

INDEX TO PLATE I.4

Steering Box .. .. .	1	Flange for Universal Joint .. .. .	54
Worm .. .. .	2	Bush (Rubber) for Couplings .. .. .	55
Main Nut (complete with Transfer Tube, Tube Retainer and Steel Balls) (supplied complete only) .. .. .	3	Washer, Plain, adjacent to Rubber Bushes .. .. .	56
Roller on Spigot of Main Nut .. .. .	4	Pin, Split, retaining Washers and Bushes .. .. .	57
Ball (Steel) between Main Nut and Worm .. .. .	5	Seal (Rubber) on Coupling .. .. .	58
Washer, Ball Race, at each end of Worm .. .. .	6	Bolt, Clinch, for Universal Joint .. .. .	59
Ball Race at each end of Steering Box .. .. .	7	Nut on Bolts .. .. .	60
Ball (Steel) between Ball Race and Ball Race Washer .. .. .	8	Washer, Shakeproof, under Nuts .. .. .	61
Washer, Packing, adjacent to Ball Races .. .. .	9	Steering Wheel (Telescopic) .. .. .	62
Plate, End, at bottom of Steering Box .. .. .	10	Screw, Grub, in Hub of Steering Wheel .. .. .	63
Stud in bottom End Plate .. .. .	11	Steering Column Control .. .. .	64
Bracket, Clip, on bottom End Plate .. .. .	12	Housing for Idle Lever Shaft .. .. .	65
Bolt through Clip Bracket .. .. .	13	Shaft, inside Housing, for Idle Lever .. .. .	66
Nut on Bolt .. .. .	14	Bearing, Roller, at top of Shaft .. .. .	67
Washer, Spring, under Nut .. .. .	15	Nut at top of Shaft .. .. .	68
Seal, Oil (Felt), between Clip Bracket and End Plate .. .. .	16	Washer "D", under Nut .. .. .	69
Nut, securing Clip Bracket .. .. .	17	Washer, Tab, locking Nut .. .. .	70
Washer, Spring, under Nuts .. .. .	18	Cap at top of Housing .. .. .	71
Shim for bottom End Plate .. .. .	19	Bearing, Roller, at bottom of Shaft .. .. .	72
Gasket for bottom End Plate .. .. .	20	Cover, Dust, underneath bottom Bearing .. .. .	73
Stud, in Steering Box, for top and bottom End Plates .. .. .	21	Ring, Abutment, underneath bottom Bearing .. .. .	74
Nut on Studs .. .. .	22	Seal (Felt) around Abutment Ring .. .. .	75
Washer, Spring, under Nuts .. .. .	23	Washer, Plain, underneath Felt Seal .. .. .	76
Seal, Oil, in Steering Box, for Worm .. .. .	24	Lever, Idle .. .. .	77
Plate, End, at top of Steering Box .. .. .	25	Nut, securing Idle Lever to Shaft .. .. .	78
Gasket for top End Plate .. .. .	26	Washer, Plain, under Nut .. .. .	79
Rocker Shaft .. .. .	27	Pin, Split, retaining Nut .. .. .	80
Bush, in Trunnion of Steering Box .. .. .	28	Bolt, securing Idle Lever Assembly at top .. .. .	81
Seal, Oil, at bottom of Trunnion, for Rocker Shaft .. .. .	29	Tube only for Track Rod .. .. .	82
Plate, Cover, at top of Steering Box .. .. .	30	End Assembly, right hand, for Track Rod .. .. .	83
Gasket, between Cover Plate and Steering Box .. .. .	31	End Assembly, left hand, for Track Rod .. .. .	84
Stud, in Steering Box, for Cover Plate .. .. .	32	Track Rod End Assembly .. .. .	85
Nut on Studs .. .. .	33	Socket for Ball Pins .. .. .	86
Washer, Spring, under Nuts .. .. .	34	Spring inside Track Rod Ends .. .. .	87
Screw, in Cover Plate, adjusting Rocker Shaft .. .. .	35	Piece, Distance, inside Spring .. .. .	88
Spring, inside Adjusting Screw .. .. .	36	Plug in Track Rod Ends .. .. .	89
Nut, locking Adjuster Screw .. .. .	37	Pin, Split, retaining Plugs .. .. .	90
Bolt, tensioning Spring in Adjuster Screw .. .. .	38	Nipple, Grease .. .. .	91
Plug, Filler, in Cover Plate .. .. .	39	Clamp, securing Ends in Track Rod .. .. .	92
Drop Arm .. .. .	40	Bolt through Clamps .. .. .	93
Ball-Peg in Drop Arm .. .. .	41	Nut on Bolts .. .. .	94
Nut, securing Drop Arm to Rocker Shaft .. .. .	42	Washer, Plain, under Nuts .. .. .	95
Washer, Plain, under Nut .. .. .	43	Plate, Oil Retaining, under Ball Pins .. .. .	96
Pin, Split, retaining Nut .. .. .	44	Seal, Oil (Rubber), under Track Rod Ends .. .. .	97
Inner Column .. .. .	45	Steering Tie Rod Assembly, Right Hand .. .. .	98
Circlip at top of Inner Column .. .. .	46	Steering Tie Rod Assembly, Left Hand .. .. .	99
Cover, Dust, at top of Inner Column .. .. .	47	Nipple, Grease, on outer end of Steering Tie Rods .. .. .	100
Cup, Retaining, at top and bottom of Dust Cover .. .. .	48	Seal, Oil (Rubber), on inner end of Steering Tie Rods .. .. .	101
Cup, Retaining, at bottom of Dust Cover .. .. .	49	Nut, securing Levers to Tie Rods .. .. .	102
Steering Outer Column .. .. .	50	Washer, Plain, under Nuts .. .. .	103
Upper Bearing Assembly .. .. .	51	Pin, Split, retaining Nuts .. .. .	104
Coupling for Universal Joint .. .. .	52		
	53		

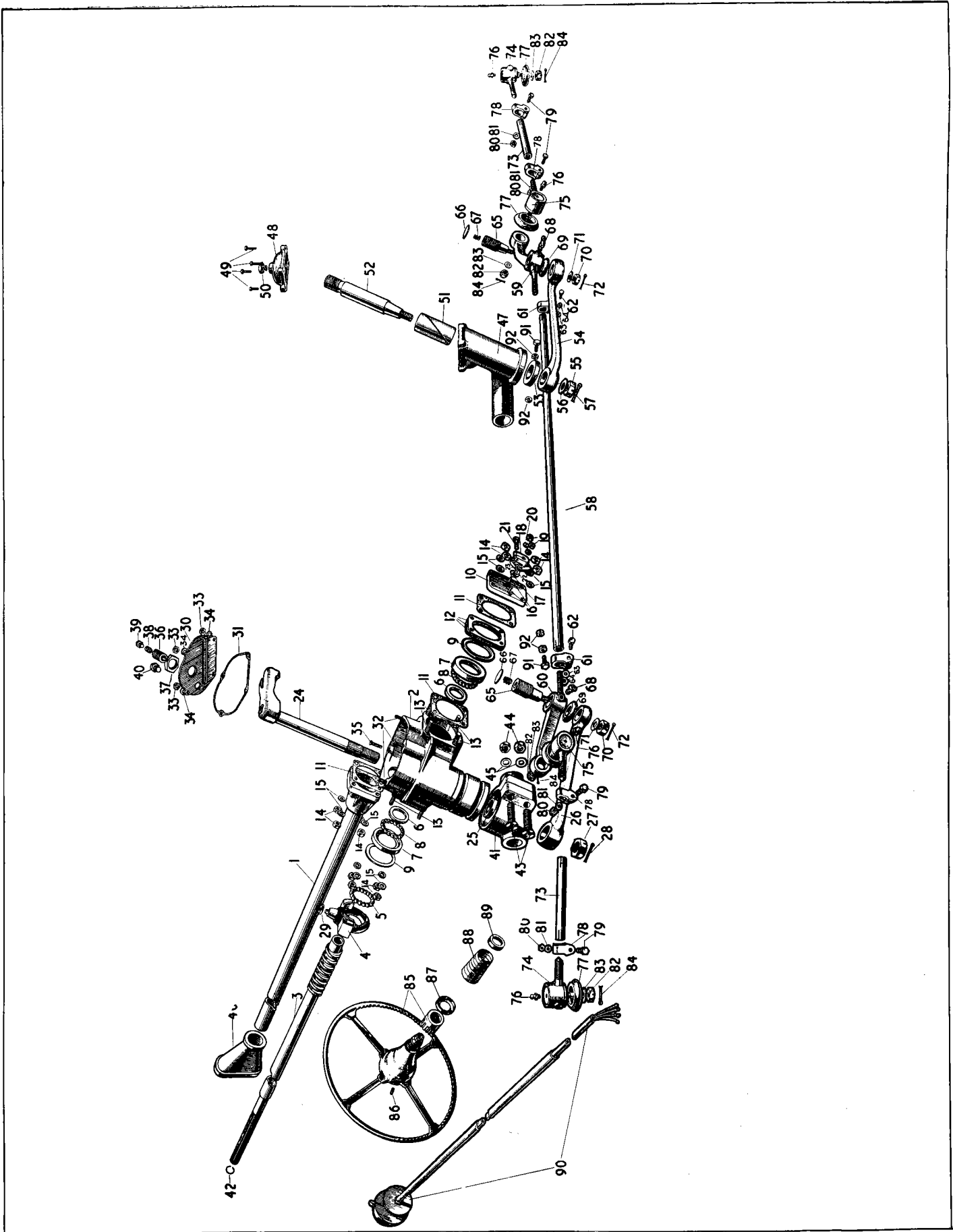


PLATE I.5. STEERING ASSEMBLY (XK 120).

INDEX TO PLATE I.5

Column, Outer .....	1	Grommet (Rubber) for Steering Unit .....	46
Steering Box (complete with Trunnion Bush and Rocker Shaft Oil Seal Assembly) .....	2	Housing for Screwed Shaft .....	47
Column, Inner .....	3	Plate, Cover, on top of Housing .....	48
Main Nut (complete with Transfer Tube, Tube Retainer, Bolts, Tab Washers and Steel Balls) (supplied complete only) .....	4	Screw, Shakeproof, securing Cover Plate .....	49
Ball (Steel) between Main Nut and Worm on Inner Column .....	5	Plug, Oil Filler, in Cover Plate .....	50
Washer, Ball Race, at each end of Inner Column Worm .....	6	Bush, in Housing .....	51
Ball Race in each end of Steering Box .....	7	Shaft (Screwed) for Idle Lever .....	52
Ball (Steel) between Ball Race and Ball Race Washer .....	8	Seal (Rubber) in bottom of Housing .....	53
Washer, Packing, adjacent to Ball Races .....	9	Lever, Idle .....	54
Plate, End, at bottom of Steering Box .....	10	Nut, securing Idle Lever to Screwed Shaft .....	55
Gasket for Steering Box .....	11	Washer under Nut .....	56
Shim, between End Plate and Steering Box .....	12	Pin, Split, locking Nut .....	57
Stud at each end of Steering Box .....	13	Tube only for Track Rod .....	58
Nut, securing Outer Column and End Plate to Steering Box .....	14	End, Track Rod (Left-Hand Thread) (complete with Screwed Pin Plate, Ref. 65, and Cover Plate, Ref. 66) .....	59
Washer, Spring, under Nuts .....	15	End, Track Rod (Right-Hand Thread) (complete with Screwed Pin Plate, Ref. 65, and Cover Plate, Ref. 66) .....	60
Stud, in End Plate, for Clip Bracket .....	16	Clamp, securing Ends in Track Rod .....	61
Seal, Oil (Felt), between End Plate and Clip Bracket .....	17	Bolt through Clamps .....	62
Bracket, Clip, on End Plate .....	18	Nut on Bolts .....	63
Nut, securing Clip Bracket to End Plate .....	19	Washer, Spring, under Nuts .....	64
Washer, under Nuts .....	20	Spring, between Plates and Screwed Pins .....	67
Bolt, through Clip Bracket .....	21	Nipple, Grease, on Track Rod Ends .....	68
Nut on Bolt .....	22	Seal (Rubber) between Levers and Track Rod Ends .....	69
Washer, Spring, under Nut .....	23	Nut, securing Drop Arm and Idle Levers to Screwed Pins .....	70
Rocker Shaft .....	24	Washer under Nuts .....	71
Seal, Oil, for Rocker Shaft .....	25	Pin, Split, locking Nuts .....	72
Drop Arm .....	26	Tube only .....	73
Nut, securing Drop Arm to Rocker Shaft .....	27	Ball Joint Assembly, Left Hand .....	74
Pin, Split, securing Nut .....	28	Ball Joint Assembly, Right Hand .....	75
Roller, on Spigot of Main Nut .....	29	Nipple, Grease, in Retaining Plates .....	76
Plate, Cover, at top of Steering Box .....	30	Seal (Rubber) on Ball Joints .....	77
Gasket, between Cover Plate and Steering Box .....	31	Clamp, securing Ball Joints in ends of Steering Connecting Tubes .....	78
Stud, in Steering Box, for Cover Plate .....	32	Bolt through Clamps .....	79
Nut, securing Cover Plate to Steering Box .....	33	Nut on Bolts .....	80
Washer, Spring, under Nuts .....	34	Washer, Spring, under Nuts .....	81
Screw, securing Cover Plate to Steering Box .....	35	Nut, securing Track Rod Ends and Steering Arms to Ball Joints .....	82
Screw, in Cover Plate, adjusting Rocker Shaft .....	36	Washer, under Nuts .....	83
Nut, locking Adjusting Screw in Cover Plate .....	37	Pin, Split, locking Nuts .....	84
Spring, inside Adjusting Screw .....	38	Steering Wheel (Telescopic) .....	85
Bolt, in end of Adjusting Screw .....	39	Screw, Grub, in Steering Wheel .....	86
Plug, Filler, in Cover Plate .....	40	Washer at top of Telescopic Dust Cover .....	87
Bracket, Trunnion, securing Steering Unit at lower end .....	41	Cover, Dust (Telescopic) .....	88
Circlip, on upper end of Inner Column, retaining Steering Wheel .....	42	Washer at bottom of Telescopic Dust Cover .....	89
Bolt, securing Trunnion Bracket to Chassis Frame .....	43	Steering Column Control .....	90
Nut on Bolts .....	44	Bolt, Stop, for Steering Lock .....	91
Washer under Nuts .....	45	Nut, locking Stop Bolts in position .....	92

**STEERING BOX. TO REMOVE AND REFIT  
(MARK VII MODEL)**

**GENERAL.** The steering assembly of the Mark VII model consists of a separate steering box and inner column which are connected by a universal joint; couplings splined to the worm shaft and inner column being joined to a flange plate by rubber bushes. (Plate I.3.)

The steering box can be removed from the chassis frame without removing the inner and outer column, as described in the following paragraphs.

**REMOVE ROAD WHEEL.** Jack up the front of the car and remove the front road wheel on the steering column side. The steering box and universal joint will now be accessible from underneath the wing.

**REMOVE MANETTE CONTROL.** Disconnect battery positive lead and set the road wheels in the straight ahead position. Disconnect the four manette control wires from the junction box fitted to the wing valance of the steering column side. Slacken the clamp bolt of the stator tube bracket attached to the bottom end plate of the steering box. Unscrew the two grub screws in the steering wheel hub and withdraw manette control with a twisting motion. Plug hole in stator tube bracket to avoid loss of oil.

**DISCONNECT INNER COLUMN.** From underneath the wing remove the pinch bolt securing the upper coupling of the universal joint to the inner column. Withdraw the inner column from the universal joint by pulling on the steering wheel. (This operation may partly withdraw the top bush from the outer column but can be replaced on reassembly.) If the stator tube was not withdrawn with the manette control, push the tube upwards with a pair of grips from between the bottom of the inner column and universal joint until the end of the tube is clear of the steering box.

**REMOVE STEERING BOX.** Remove the split pin and nut securing the steering tie rod inner ball joint to the rear end of the drop arm. Tap the ball joint out of its taper in the drop arm and place clear. Remove the split pin from the end of the track rod and unscrew the end plug until the track rod end can be lifted from the ball on the front end of the drop arm.  
Remove the two bolts and stud nut securing the steering box to the bracket on the chassis frame and remove the box.

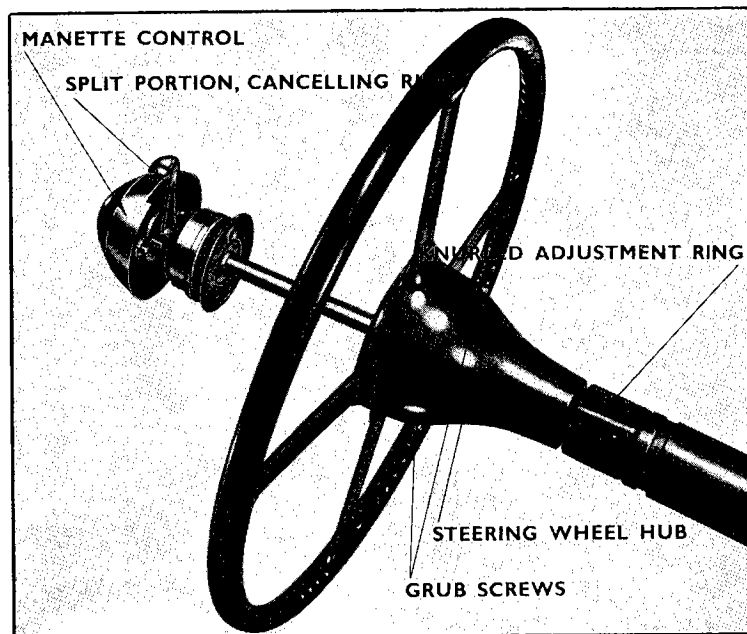


PLATE I.6. STEERING WHEEL AND MANETTE CONTROL.

**REFIT.** Refitting is the reverse of the removal instructions, but special attention should be given to the following points when refitting the manette control.

Set the road wheels in the straight ahead position. Push stator tube down inner column until bottom of tube is flush with the end of clip bracket attached to bottom of steering box. Temporarily tighten clip bracket clamp bolt. Pass the manette control wires down through the stator tube and enter the keyed end of manette tube into the slot of the stator tube. Slacken the clip bracket clamp bolt and centralise the trafficator hand control. Turn manette control until the trafficator hand control is in the top centre position and tighten clip bracket clamp bolt. Withdraw manette control slightly and turn cancelling ring until the split portion is also at the top centre position. (Plate I.6.) Push manette control fully home into the steering wheel hub and secure with the two grub screws through the side of the hub.

Check that the trafficators cancel evenly on each side of the straight ahead position. Refill steering box with the recommended grade of oil.

## INNER AND OUTER COLUMN. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** The steering assembly on the Mark VII model consists of a separate steering box and inner column which are connected by a universal joint; couplings splined with the worm shaft and inner column being joined to a flange plate by rubber bushes. (Plate I.3.)

The inner and outer column can be removed from the car without detaching the steering box from the chassis frame, as described in the following paragraphs.

**REMOVE ROAD WHEEL.** Jack up the front of the car and remove the front road wheel on the steering column side. The steering box and universal joint will now be accessible from underneath the wing.

**REMOVE MANETTE CONTROL.** Disconnect the battery positive lead and set the road wheels in the straight ahead position. Disconnect the four manette control wires from the junction box fitted to the wing valance on the steering column side. Slacken the clamp bolt of the stator tube bracket attached to the bottom end plate of the steering box. Unscrew the two grub screws in the steering wheel hub and withdraw manette control with a twisting motion. Plug the hole in the bottom end plate of steering box to avoid loss of oil.

**REMOVE OUTER COLUMN BRACKET.** Remove the dash casing underneath fascia panel by unscrewing the drive screws. Remove the three bolts securing the flat transverse bracket underneath the outer column. Remove the pinch bolt from the clamp securing the outer column in the tube attached to the inside of scuttle. Remove driver's seat.

**REMOVE INNER AND OUTER COLUMN.** From underneath the wing remove the pinch bolt securing the upper coupling of the universal joint to the inner column. Remove stator tube if not withdrawn with manette control. Withdraw the inner and outer columns by pulling on the steering wheel.

**REFIT.** Refitting is the reverse of the removal instructions, but attention should be given to the following points.

**Refit Inner and Outer Column.** When refitting the inner and outer columns, pass the inner column through the aperture in the scuttle and engage the bottom splines in the splines of the universal joint coupling. Ensure that the annular groove is in line with the pinch bolt hole and fit pinch bolt.

Before tightening the outer column clamp and bracket, position the upper face of the top bush 1" below the bottom of the inner column splines to ensure full travel of the telescopic steering wheel.

**Refit Steering Wheel Manette Control.** Set the road wheels in the straight ahead position, fit the washers and telescopic dust cover and engage the steering wheel on the splines of the inner column so that one spoke is at the top centre position.

Fit the circlip to the annular groove at top of inner column. Push stator tube down inner column until bottom



of tube is flush with the end of clip bracket attached to bottom of steering box. Temporarily tighten clip bracket clamp bolt. Pass the manette control wires down through the stator tube and enter the keyed end of manette tube into the slot of the stator tube. Slacken the clip bracket clamp bolt and centralise the trafficator hand control. Turn manette control until the trafficator hand control is in the top centre position and tighten clip bracket clamp bolt. Withdraw manette control slightly and turn cancelling ring until the split portion is also at the top centre position. (Plate I.6.) Push manette control fully home into the steering wheel hub and secure with the two grub screws through the side of the hub.

Check that the trafficators cancel evenly on each side of the straight ahead position.

## STEERING UNIT. TO REMOVE

(XK 120 MODELS)

### REMOVE STEERING WHEEL AND MANETTE CONTROL.

Disconnect battery positive lead. Set road wheels in straight ahead position. On the Super Sports model disconnect the manette control wire from the horn relay box fitted to the wing valance on the steering column side. On the Fixed Head Coupe model disconnect the four wires from the rubber snap connectors.

Unscrew the two grub screws in the steering wheel hub and withdraw the manette control complete with wiring harness. Rotate steering wheel knurled adjustment ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel and remove washers and telescopic dust cover.

### REMOVE OUTER COLUMN CLAMP PINCH BOLT.

From underneath the facia panel remove drive screws securing dash casing and withdraw casing. Remove the outer column clamp pinch bolt.

### DISCONNECT CONNECTIONS.

On right-hand drive cars only detach the grommet between outer column and scuttle. Remove the three nuts securing the windscreen wiper motor to its bracket and place motor clear. Remove the four bolts securing the windscreen wiper motor bracket to the scuttle and remove bracket.

Jack up the front of the car and remove road wheel on the steering column side. From underneath the wing remove the wing valance plate by removing the securing bolts.

Remove the two bolts securing the brake fluid supply tank and tie up adjacent to the engine.

### REMOVE STEERING UNIT.

Tap back the tab washer securing the track rod end and remove nut and pegged tab washer. Tap the track rod end out of its taper in the drop arm and place clear.

Remove the upper wishbone bracket front securing bolt which passes through the steering box trunnion. Lever the trunnion out of the upper wishbone bracket and manoeuvre the steering unit out from underneath the front wing.

## STEERING UNIT. TO REFIT

(XK 120 MODELS)

### GENERAL.

Refitting is the reverse of the removal procedure. Special attention should, however, be given to the following points.

### REFIT CONNECTIONS.

Do not forget to fit the rubber grommet to column before offering up the unit. Before tightening steering unit mounting bolt, trunnion bolts and top clamp under facia, ensure that the unit is not strained or distorted. It is advisable to tighten the top clamp bolt before tightening the steering unit mounting bolt and trunnion bolts. Refill steering box with the recommended grade of oil.

When refitting the track rod end to the drop arm it is important to carry out the following procedure:—

If the track rod end is of the rubber bearing type, turn the drop arm to the straight ahead position before entering the taper of the bearing bolt in the companion taper of the drop arm.

If the track rod end is of the thread bearing type, turn the drop arm and road wheels to the full left lock position (This applies to both right-hand and left-hand steering.) Rotate the thread bearing bolt clockwise as far as possible into its housing, overcoming the tension of the pre-load spring and then unscrew half a turn anti-clockwise. Enter the taper of the bearing bolt in the companion taper of the drop arm and secure with nut and new pegged tab washer. (Split pin and slotted nut on early cars.)

### REFIT STEERING WHEEL AND MANETTE CONTROL.

**Super Sports Model.** Set the road wheels in the straight ahead position. Fit the telescopic dust cover and washers to the inner column and engage the steering wheel on the splines so that one spoke is at the top centre position. Fit circlip to the annular groove at top of inner column. Pass the horn wire down the centre of the inner column and enter the manette control tube into the steering wheel hub with the head of the "Jaguar" on the horn push upright.

Feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Push manette control fully home into the steering wheel hub and secure with the two grub screws through the side of the steering wheel hub.

**Note.** If, when the manette control tube has been engaged with the stator tube, the head of the "Jaguar" on the horn push is not upright it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

**Fixed Head Coupe Model.** Set the road wheels in the straight ahead position. Fit the telescopic dust cover and washers to the inner column and engage the steering wheel on the splines so that one spoke is at the top centre position. Fit the circlip to the annular groove at top of inner column. Pass the wiring harness down the centre of the inner column; centralise the trafficator hand control and ensure that the split portion of the cancelling ring is in line with this control. (Plate I.6.) Enter the manette control tube in the inner column and feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Ensure that the trafficator hand control and split portion of the cancelling ring are in the top centre position and push manette control fully home into the steering wheel hub. Secure with the two grub screws through the side of the steering wheel hub. Check that the trafficators cancel evenly on each side of the straight ahead position.

**Note.** If, when the manette control tube has been engaged with the stator tube, the trafficator hand control is not at the top centre position it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

## STEERING UNIT. TO DISMANTLE

(MARK VII AND XK 120 MODELS)

**GENERAL.** Left-hand and right-hand steering units are not interchangeable.  
(Refer to Plate I. 7.)

**REMOVE COVER PLATE.** Remove three nuts and spring washers and one set screw securing cover plate to steering box. Remove cover plate together with rocker shaft adjuster and pre-loading spring, observing jointing washer fitted between cover and box. Withdraw pre-loading set screw, lock nut and adjuster.

**REMOVE DROP ARM AND ROCKER SHAFT.** Remove the split pin and nut securing the drop arm to the rocker shaft. Observe line scribed on drop arm and rocker shaft to facilitate correct assembly. Using a suitable extractor draw the drop arm off the splines on the rocker shaft. (Under no circumstances must the drop arm be hammered off, otherwise indentation and damage will be caused to the ball tracks.) Observe roller on spigot of main nut which should now be removed. Remove and scrap oil seal at base of rocker shaft lower bush.

**REMOVE OUTER COLUMN.** (XK 120.) Remove four nuts and spring washers securing outer column to steering box and withdraw outer column, observing jointing washer fitted between. Withdraw ball race, observing packing washer fitted at column end of outer race. Ensure that no balls are lost during this operation.

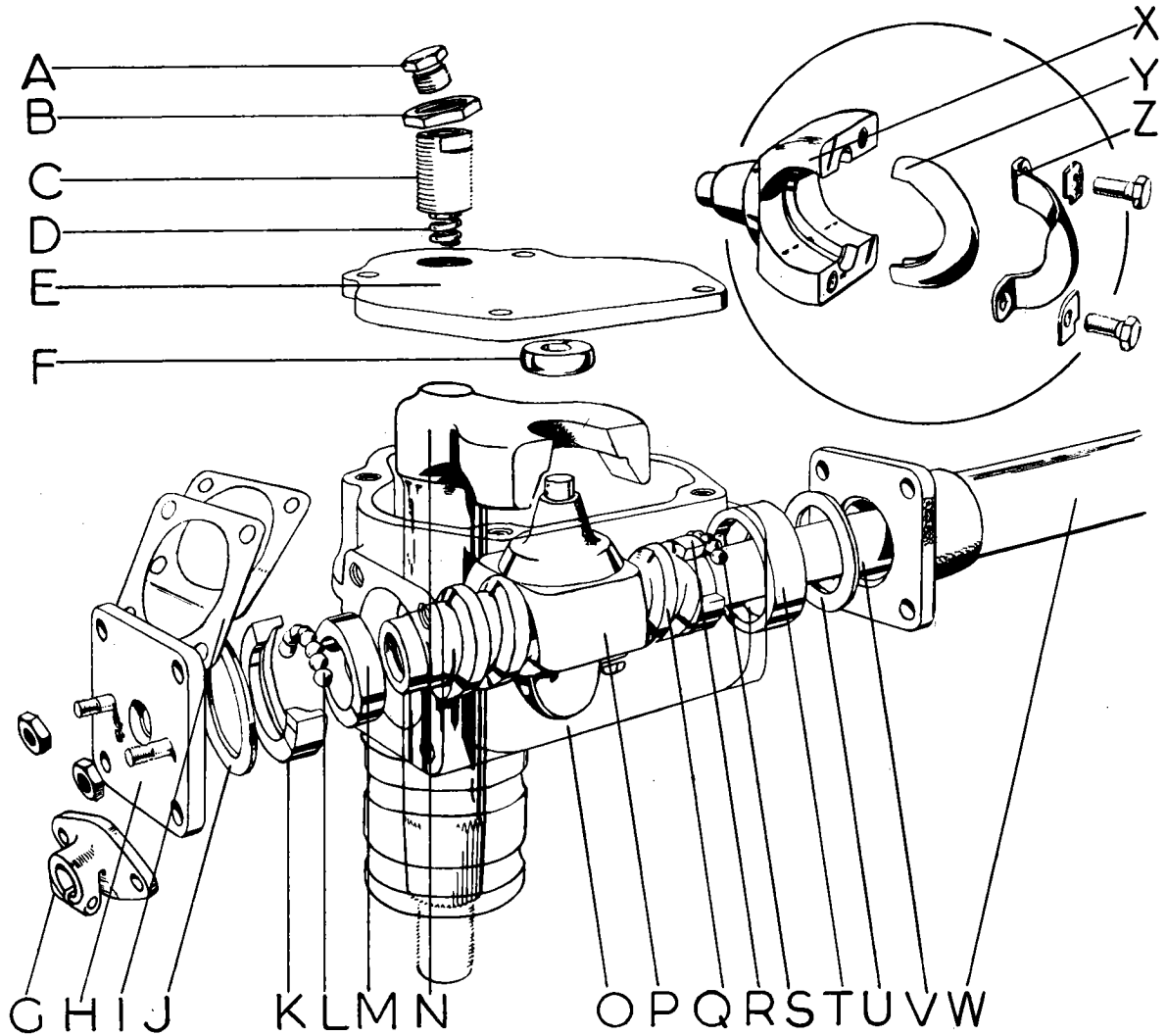


PLATE I.7. STEERING BOX (XK 120 illustrated).

- |  |                                  |
|--|----------------------------------|
| A. Rocker Shaft Adjustment. Preload Set Screw. | N. Rocker Shaft.                 |
| B. Rocker Shaft Adjustment. Lock Nut.          | O. Steering Box.                 |
| C. Rocker Shaft Adjustment. Adjuster.          | P. Nut.                          |
| D. Rocker Shaft Adjustment. Preload Spring.    | Q. Worm.                         |
| E. Cover Plate.                                | R. Washer.                       |
| F. Roller on Nut Spigot.                       | S. Balls.                        |
| G. Stator Tube Clip.                           | T. Ball Race. Upper.             |
| H. End Plate.                                  | U. Packing Ring.                 |
| I. Adjustment Shims. (Inner Column End Play.)  | V. Inner Column.                 |
| J. Packing Ring.                               | W. Outer Column.                 |
| K. Ball Race. Lower.                           | X. Nut with Ball Track.          |
| L. Balls.                                      | Y. Transfer Tube.                |
| M. Washer.                                     | Z. Clip retaining Transfer Tube. |

**REMOVE WORM. (MARK VII.)** Remove the pinch bolt securing the universal joint coupling to the worm shaft and withdraw universal joint from splines.

Remove the four nuts and spring washers securing the end plate to the bottom of steering box. Remove end plate, observing the gaskets and shims. Remove the packing ring and ball race taking care not to lose any of the balls.

Remove the four nuts and spring washers securing the end plate to the top of the steering box and remove end plate. Remove gasket, oil seal, packing washer, and withdraw ball race, taking care not to lose any of the balls. Unscrew the worm through the main nut and withdraw from box.

**REMOVE INNER COLUMN. (XK 120.)** Remove two nuts and washers securing stator tube bracket to end plate. Withdraw bracket complete with stator tube. Remove four nuts with spring washers securing end plate to steering box and remove end plate, observing shims with jointing washers fitted in front and behind shims. Remove packing ring and ball race taking care not to lose any of the balls which will now emerge. Unscrew inner column through the main nut and withdraw column from box.

**DISMANTLE NUT ASSEMBLY.** Lift out nut and remove two set screws and tab washers retaining the transfer tube to the main nut and remove the clip, tube and balls.

**REMOVE STEERING BOX TRUNNION BRACKET. (XK 120.)** The steering box trunnion bracket may be removed by unscrewing the two nuts and withdrawing the bolts securing the split portion of the trunnion to the steering box.

**DISMANTLE DIVIDED DROP ARM. (MARK VII.)** Remove the split pin and nut securing the double-ended arm to the secondary arm, and remove bolt. Remove the two rubber bushes and plain washers. Lift off the double-ended arm from the secondary arm.

**STEERING UNIT. TO REASSEMBLE  
(MARK VII AND XK 120 MODELS)**

**ASSEMBLE TRUNNION TO STEERING BOX. (XK 120.)** Fit the trunnion to the steering box and secure in position with the two bolts, washers and nuts. Do not fully tighten the nuts since the position of the trunnion on the steering box may have to be adjusted when the unit is fitted to the chassis. (Plate I.2.)

**ASSEMBLE NUT ASSEMBLY.** Fit the balls in the nut assembly by packing it with grease, which will hold the balls in position, and attach the transfer tube to the main nut with the clip, two studs and tab washers. Lock the set screws with the tab washers and place the assembly in the steering box.

**ASSEMBLE STEERING BOX.** Liberally grease the upper ball race to facilitate assembly of the balls; fit balls and outer race to the washer against the upper end of the worm. Enter the worm into the steering box and screw through the nut. When in position, fit the packing washer and new jointing washer.

**FIT OUTER COLUMN. (XK 120.)** Slide the outer column over the inner column and secure in position with four nuts and spring washers.

**REFIT TOP END PLATE UNIVERSAL JOINT COUPLING. (MARK VII.)** Fit oil seal and top end plate to steering box and secure with four nuts and spring washers. Engage universal joint coupling on splines of the worm shaft so that the clamp bolt hole is in line with the annular groove around shaft. Secure with the clamp bolt, shakeproof washer and nut.

**REFIT END PLATE.** Fit a new jointing washer to the bottom face of the steering box and assemble the lower ball race and packing washer. Grease should be used to facilitate assembly of the balls. Fit the ball race and packing washer followed by the necessary number of shims to eliminate all end float of the inner column. Finally fit a new jointing washer on the outside face of the shims, followed by the cover plate retaining this in position with four nuts and spring washers. It is important to observe that, whilst there should be no end play in the inner column, it is essential that the inner column is not pre-loaded otherwise indentation of the ball races may take place.

**FIT STATOR TUBE. (XK 120.)** Refit stator tube and bracket to the end plate so that the slot in the top end of the stator tube will be at the top centre position in the inner column. Secure bracket with two nuts and washers.

**REFIT ROCKER SHAFT AND COVER PLATE.** Fit a new rocker shaft oil seal at the bottom of steering box. Ensure that the roller is in position on the spigot of the main nut. Insert the rocker shaft through the rocker shaft bushes and the oil seal already in position at the bottom of the steering box. Refit the cover plate with a new jointing washer and secure in position with three nuts and spring washers and one set screw.

**REFIT DROP ARM. (MARK VII.)** Refit the drop arm, ensuring that the locating line scribed on the boss matches the similar line on the end of the rocker shaft. (Plate I.8.) Secure in position with the nut.

**Check Main Arm End Float.** Disconnect the double-ended main arm from the short secondary arm by removing the damper bolt, washers and rubber buffers. With the rocker shaft nut fully tightened, test the double-ended drop arm for freedom of movement on the secondary arm by checking the end clearance of the double-ended arm, which should be .002" to .006" (.05 to .15 mm.).

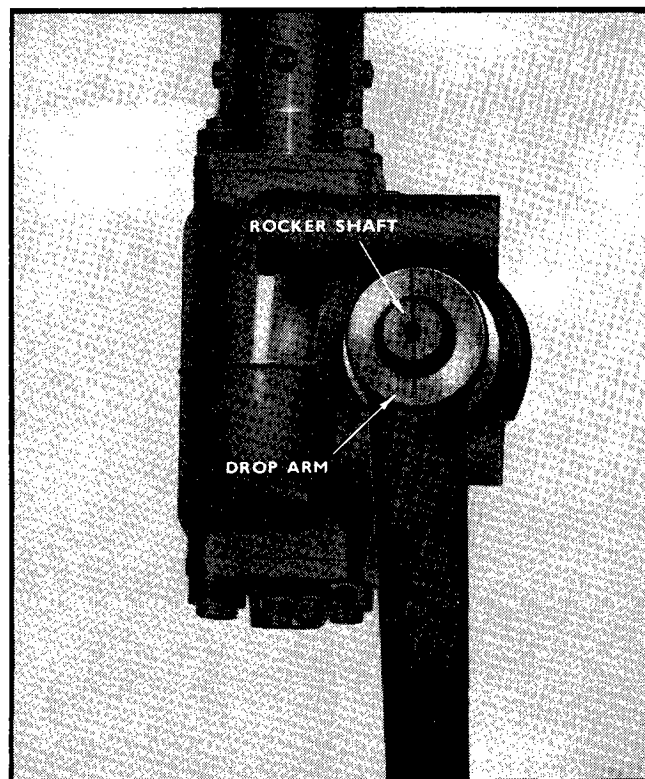


PLATE I.8. DROP ARM/ROCKER SHAFT ALIGNMENT MARKS (XK 120 illustrated).

**Adjustment.** To adjust end float, remove nut from end of rocker shaft and fit a shim(s) between the flange of nut and the secondary (inner) arm only. The shims for this purpose should be .0025", .005" or .0075" (.06, .13 or .19 mm.) thick and have an internal diameter of  $1\frac{1}{8}$ " (28.6 mm.) and an external diameter of  $1\frac{3}{4}$ " (44.4 mm.). Part numbers of shims: C.6893, C.6894 and C.6895 respectively.

Finally check the alignment of the split pin hole in the nut and rocker shaft with the nut fully tightened. If necessary, fit a shim(s) (in addition to the shim(s) if fitted as referred to above) between flange of nut and the end faces of both secondary and main drop arms to effect alignment. This large shim(s) must be fitted directly against the flange of nut.

The shim(s) for this purpose should be .010" thick (.25 mm.) and have an internal diameter of  $1\frac{1}{8}$ " (28.6 mm.) and an external diameter of  $2\frac{9}{16}$ " (66 mm.). Part number of shim: C.6892.

Refit split pin to rocker shaft nut and reconnect secondary arm to the main arm.

**REFIT DROP ARM. (XK 120.)** Refit the drop arm, ensuring that the locating line scribed on the boss matches the similar line on the end of the rocker shaft. (See Plate I.8.) Secure in position with the nut and fit new split pin.

**ADJUST ROCKER SHAFT END FLOAT.** Turn the steering unit to the straight ahead position, that is, with the drop arm in line with the column when the nut will be in the centre of the worm. Fit the adjusting screw to the cover but with the pre-load spring and set screw removed. Screw down the adjuster by hand until it just touches the rocker shaft. Secure adjuster by tightening lock nut. It is of the utmost importance that this adjustment is made with the steering unit in the straight ahead position, as the conical faces of the rocker shaft are so designed as to give slightly more backlash towards full lock. If the rocker shaft is adjusted without end play on either lock it will be tight in the straight ahead position. Having arrived at the correct adjustment in the straight ahead position with no end float on the rocker shaft, refit the pre-load spring and set screw.

**GENERAL.** Test the gear for free rotation from one lock to another. Refit unit to chassis as described on page I.12 for the Mark VII and page I.14 for the XK 120 models. Remove the filler plug from the top cover and fill with recommended lubricant. The bush at the top end of the column requires no adjustment or lubrication.

## STEERING COLUMN TOP BUSH. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE ROAD WHEEL.** Jack up the front of the car and remove the front road wheel on the steering column side. The steering box and universal joint will now be accessible from underneath the wing.

**REMOVE MANETTE CONTROL.** Disconnect the battery positive lead. Set road wheels in the straight ahead position. Disconnect the four manette control wires from the junction box fitted to the wing valance on the steering column side. Unscrew the two grub screws in the steering wheel hub, and withdraw manette control. Rotate steering wheel knurled adjustment ring until it is free.

**REMOVE TOP BUSH.** From underneath the wing remove the pinch bolt securing the upper coupling of the universal joint to the inner column.

Pull steering wheel upwards, withdrawing inner column through top bush until wider portion of inner column butts against bottom of bush. Further pulling on the steering wheel will withdraw the top bush from the outer column.

Remove circlip at top of splined portion of inner column. Draw off steering wheel, washers and remove telescopic dust cover.

Remove bush assembly from inner column. Note that the bush comprises a rubber bush, outer sleeve and impregnated bush which are supplied only as an assembly.

**REFIT.** Refitting is the reverse of the removal procedure but attention should be paid to the following points when refitting the steering wheel and manette control.

Set the road wheels in the straight ahead position. Fit the washers and the telescopic dust cover and engage the steering wheel on the splines of the inner column so that one spoke is at the top centre position. Fit the circlip to the annular groove at top of inner column. Pass the manette control wires through the stator tube and engage the keyed end of the manette tube in the slot of the stator tube.

Enter the manette control into the hub of the steering wheel with the trafficator hand control and split portion of the cancelling ring in the top centre position. Push the manette control into the steering wheel hub as far as possible and secure with two grub screws through the side of the hub. (Plate I.6.)

Check that the trafficators cancel evenly on each side of the straight ahead position.

## STEERING COLUMN TOP BUSH. TO REMOVE AND REFIT

(XK 120 MODELS)

**GENERAL.** The steering column top bush may be withdrawn without removing the steering unit from the chassis frame. It will be found in practice that this bush will not be affected by wear except after very high mileages.

**REMOVE STEERING WHEEL AND MANETTE CONTROL.** Disconnect battery positive lead. Set the road wheels in straight ahead position. On the Super Sports model disconnect the manette control wire from the horn relay box fitted to the wing valance on the steering column side. On the Fixed Head Coupe model disconnect the four wires from the rubber snap connectors.

Unscrew the two grub screws in the steering wheel hub and withdraw the manette control complete with wiring harness. Rotate steering wheel knurled adjustment ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel and remove washers and telescopic dust cover.

**REMOVE TOP BUSH.** Insert two wood screws in the end of the bush diametrically opposite each other, and engaging a suitable puller on the screws withdraw the bush from the outer column. (If a puller is not available it will be found that stout cord attached to the screws may be used to withdraw the bush.)

**REFIT.** Refitting is the reverse of the removal procedure, but attention should be paid to the following points when refitting the steering wheel and manette control.

**Super Sports Model.** Set the road wheels in the straight ahead position. Fit the telescopic dust cover and washers to the inner column and engage the steering wheel on the splines so that one spoke is at the top centre position. Fit circlip to the annular groove at top of inner column. Pass the horn wire down the centre of the inner column and enter the manette control tube into the steering wheel hub with the head of the "Jaguar" on the horn push upright. Feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Push manette control fully home into the steering wheel hub and secure with the two grub screws through the side of the steering wheel hub.

**Note.** If, when the manette control tube has been engaged with the stator tube, the head of the "Jaguar" on the horn push is not upright, it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

**Fixed Head Coupe Model.** Set the road wheels in the straight ahead position. Fit the telescopic dust cover and washers to the inner column and engage the steering wheel on the splines so that one spoke is at the top centre position. Fit circlip to the annular groove at top of inner column. Pass the wiring harness down the centre of the inner column, centralise the trafficator hand control and ensure that the split portion of the cancelling ring is in line with this control. (Plate I.6.) Enter the manette control tube in the inner column and feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Ensure that the trafficator hand control and

split portion of the cancelling ring are in the top centre position and push manette control fully home into the steering wheel hub. Secure with two grub screws through the side of the steering wheel hub. Check that the trafficators cancel evenly on each side of the straight ahead position.

**Note.** If, when the manette control tube has been engaged with the stator tube, the trafficator hand control is not at the top centre position it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

## STEERING BOX—ROCKER SHAFT. TO ADJUST

(MARK VII AND XK 120 MODELS)

**GENERAL.** Jack up the front of the car and remove the road wheel adjacent to the steering box. Turn the steering unit to the straight ahead position. Check the end float in the rocker shaft by applying a light bar under the nut attaching the drop arm to the rocker shaft. There should be no end float in the rocker shaft.

**ADJUSTMENT.** If adjustment is required, retain the steering in the straight ahead position and remove the pre-load set screw and spring. (Plate I.7.) Clean off all dirt from adjuster. Release lock nut and screw down the adjuster by hand until it just touches the rocker shaft. Secure adjuster by tightening lock nut. Replace and tighten the spring and pre-loading set screw. It is important that the adjustment is carried out with the road wheels in the straight ahead position since the conical faces on the rocker shaft are so designed as to give slightly more backlash towards full lock, since the majority of wear takes place in the straight ahead position.

If the rocker shaft is adjusted without end play on either lock it will be tight in the straight ahead position. Test the steering from lock to lock to ensure that it is free. Replace road wheel and remove jack.

## STEERING IDLE LEVER ASSEMBLY TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT

(MARK VII MODEL)

**REMOVE.** Jack up the front of the car and remove the road wheel on the idle lever assembly side. Turn the steering to a position where the track rod end may be disconnected from the idle lever. Remove the split pin from the end of the track rod and unscrew the end plug until the track rod can be lifted off the idle lever ball. Remove the split pin from the nut securing the steering tie rod to the rear of the idle lever and remove nut. Tap the ball joint out of its taper. Remove the three bolts securing the idle lever housing to the bracket and lift out housing complete with lever.

**DISMANTLE.** Remove split pin and nut securing the idle lever to the shaft. Withdraw the lever off the taper on the shaft and remove plain washer, seal abutment ring and dust cover. Remove the domed cap on the top of housing by levering under the flange. Tap back the tab washer and unscrew the nut. Remove the tab washer and "D" washer. Suitably support the idle lever housing and press the shaft through the inner race of the top (smaller) bearing. Withdraw shaft complete with large inner race. Withdraw inner race from shaft.

**REASSEMBLE.** Reassembly is the reverse of the dismantling procedure, but do not tighten nut at top of shaft until the taper in the idle lever has been fully tightened on the companion taper of shaft. Finally tighten nut at top of shaft sufficiently to pre-load the taper roller bearings slightly, and secure with new tab washer. During reassembly pack the idle housing with one of the following greases:—

Vacuum	Wakefield	Shell	Esso	Price's
Mobilgrease	Castrollease	Retinax	High Temp.	Belmoline
No. 5	W.B.	A	Grease	H.M.P.

**REFIT.** Refitting is the reverse of the removal procedure, but it is necessary when fitting the track rod end to the idle lever to ensure that the ball is interposed between the two ball cups. The end plug should be screwed home to a position where the track rod can just be rotated by hand.



**STEERING IDLE LEVER ASSEMBLY  
TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT  
(XK 120 MODELS)**

**REMOVE.** Jack up front of car and remove the road wheel on the idle lever assembly side. Turn the steering to a position where the nut securing the track rod end to the idle lever may be removed. Tap back the tab washer and remove the nut and washer. Tap the track rod end out of the taper in the idle lever. Remove upper wishbone front mounting bolt which passes through the idle lever housing and the smaller retaining bolt fitted underneath. Lift out idle lever housing complete with idle lever.

**DISMANTLE.** Tap back the tab washer and remove the nut and washer securing the idle lever to the shaft. Withdraw the idle lever from the lever shaft, and unscrew the shaft anti-clockwise out of the housing. Remove four screws securing cover to top of housing and remove cover.

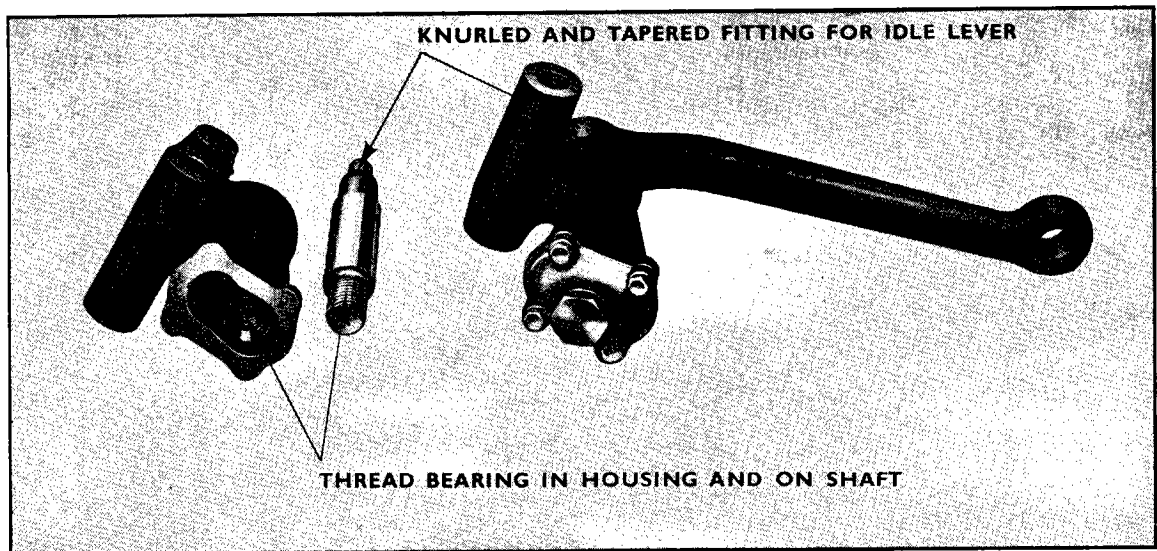


PLATE I.9. STEERING IDLE LEVER ASSEMBLY (XK 120).

**REASSEMBLE.** Replace the top cover and secure with four screws. Offer up the idle lever shaft into the housing and rotate clockwise as far as it will go. Fit a new seal to the bottom of the shaft. Rotate the idle lever shaft anti-clockwise half a turn and offer up the idle lever to the taper on the shaft, ensuring that the idle lever is in the full left lock position. Tap the idle lever on the taper and secure in position with a new pegged tab washer and nut.

**REFIT.** Mount the idle lever housing at the front of the upper wishbone securing bracket on the chassis frame and secure with the two bolts and nuts.

On cars fitted with rubber bushed track rod ends set the idle lever in the straight ahead position and tap the taper pin into the companion taper of the idle lever with a light blow from a soft metal hammer.

On early cars having track rods fitted with thread bearings turn the idle lever to the full left lock position and rotate track rod thread bolt in its housing as far as possible clockwise and then unscrew half a turn. Tap track rod end taper into companion taper of the idle lever.

Secure in position with a new pegged tab washer and nut. Remove hexagon plug situated on top of the idle lever housing and fill with the recommended lubricant. (Plate I.2.)

## STEERING TRACK ROD ASSEMBLY TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT (MARK VII MODEL)

**GENERAL.** The track rod consists of a hollow tube threaded right and left hand internally, into which the track rod ends are screwed, thus providing adjustment for the setting of the track (toe-in). The tube is secured to the track rod ends by a clamp at each end. The track rod end consists of two ball cups, the outer one of which is spring loaded and retained in position with a screwed plug fitted with a grease nipple. The ball cups of each track rod end are interposed with a ball which at one end is integral with the drop arm and at the other with the idle lever.

**REMOVE.** Raise the front of the car. Remove the split pins from the ends of the track rod and unscrew the end plug sufficiently to allow the track rod to be lifted off the ball pins on the drop arm and the idle lever. Note the rubber seal and seal retainer and renew if necessary.

**DISMANTLE.** Slacken the clamps at each end of the track rod tube. Unscrew the track rod ends from the tube, noting that one end has a left-hand thread and the other a right-hand thread. To dismantle the track rod end, remove the screwed end plug and take out the spring, distance piece and two ball cups.

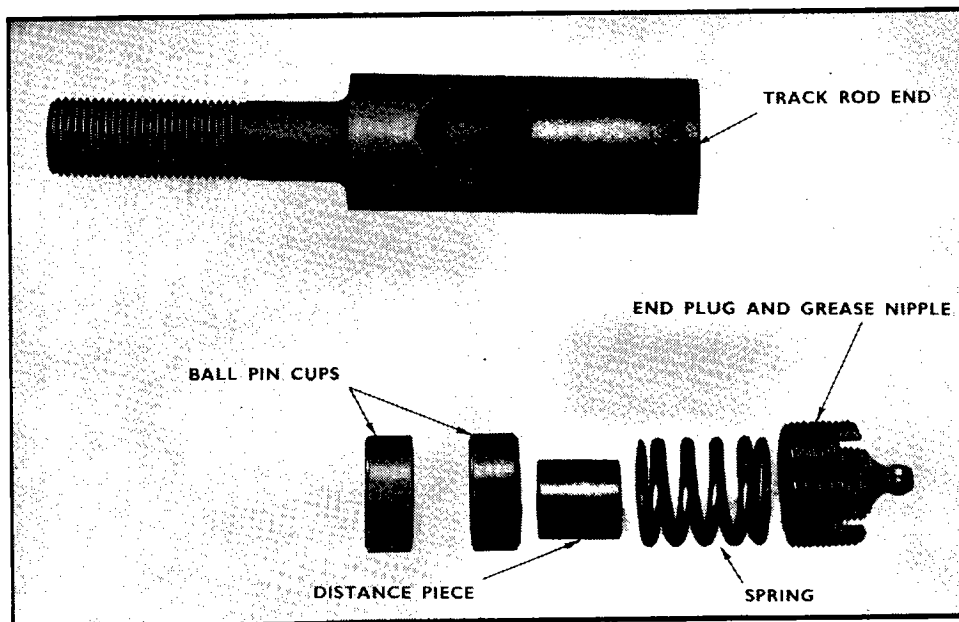


PLATE I.10. TRACK ROD END ASSEMBLY (Mark VII).

**REASSEMBLE.** To reassemble the track rod end, insert the two ball cups with their concave surfaces facing each other. Refit the spring and insert the distance piece in the centre of the spring. Start the end plug in the track rod end but do not screw home fully.

To reassemble the track rod, screw the track rod ends into the appropriate ends of the tube an equal number of turns. Tighten the clamps at each end of the tube.

**REFIT.** If they have been removed, refit the rubber seals and seal retainers over the ball pins on the drop arm and idle lever. Refit the track rod to the balls so that the ball cups are

positioned on both sides of the balls. Screw home the end plug to a position where the track rod can just be rotated by hand. Align a slot in the end plug with a hole in the track rod end and fit a split pin, opening out the legs one each side of the grease nipple.

In all cases where the track rod has been dismantled reset the steering track as described on page I.28.

### STEERING TRACK ROD ASSEMBLY TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT (XK 120 MODELS)

**GENERAL.** The track rod consists of a hollow tube threaded internally at each end, into which are screwed the track rod ends, thus providing adjustment for the setting of the track (toe-in). The tube is secured to the track rod ends by a clamp at each end. Rubber bearings are used each end of the track rod, which require no maintenance other than periodic checking of the securing nuts. These rubber bearings consist of a rubber bush pressed into the track rod end, containing a taper bolt which engages in the companion taper of the drop arm and idle lever. The taper bolt is retained by a plain nut and pegged tab washer. Early cars were fitted with thread bearings which require lubricating and are, therefore, provided with grease nipples.

These thread bearings have a right-hand thread for the bearing bolts and a pre-load spring is fitted between the bearing bolt and the top of its housing. (Plate I.12.) The bearing bolts are secured in the drop arm and idle lever by a tapered fitting with tab washer and plain nut. (Early cars, slotted nut and split pin.)

**REMOVE.** Jack up the car and remove both front road wheels. Moving the steering side to side as necessary to gain access to the track rod ends, remove the split pins and slotted nuts securing the inner ball joint assemblies of the tie rods to the track rod ends and tap the ball joints out of the tapers.

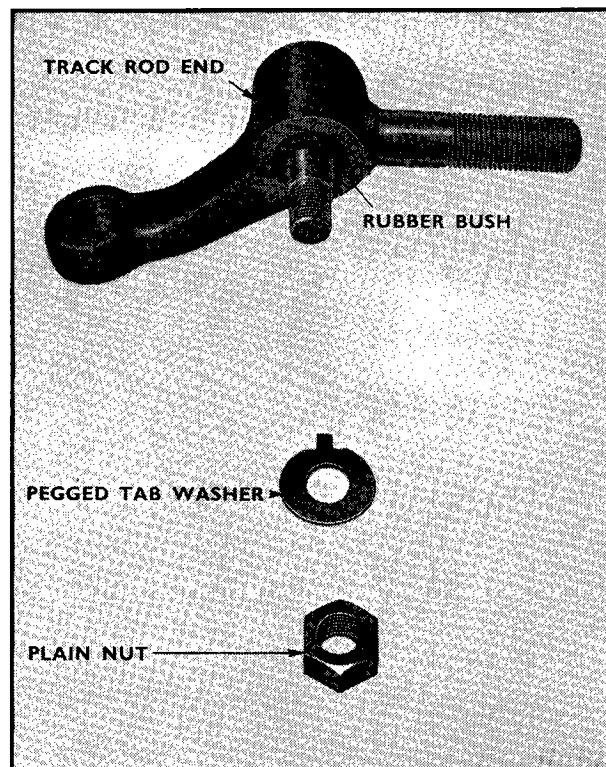


PLATE I.11. TRACK ROD END.  
RUBBER BEARING TYPE (Later XK 120).

Tap back the tab washers and remove the plain nuts and pegged tab washers retaining the track rod assembly to the steering drop arm and idle lever. Tap the track rod ends out of the drop arm and idle lever, observing that these are a taper fitting. Lift out track rod assembly.

**DISMANTLE.** Slacken the clamps at each end of the track rod tube. Note that the left-hand and right-hand track rod ends have left and right-hand threads respectively and unscrew the ends from the tube. To dismantle the track rod ends of the threaded bearing type, remove the rubber seals from the shanks of the bearing bolts and rotate the thread bearings anti-clockwise out of their housing, observing the pre-load springs fitted in the recess at the top of the thread bearing bolts. Later type rubber bearings cannot be dismantled and must be renewed, if necessary, as assemblies.

**REASSEMBLE.** Reassembly of the track rod is the reverse of the dismantling operation. To reassemble the thread bearings, screw the bearing bolts into their housing as far as possible. Fit new rubber seals to shanks of thread bearing bolts.

**REFIT.** **Rubber Bearing Track Rod Ends.** Since the rubber bearings are subjected to torsional loading when the steering is turned from lock to lock it is essential that the drop arm and idle lever are in the straight ahead position before the taper bolts of the track rod ends are engaged and located in position.

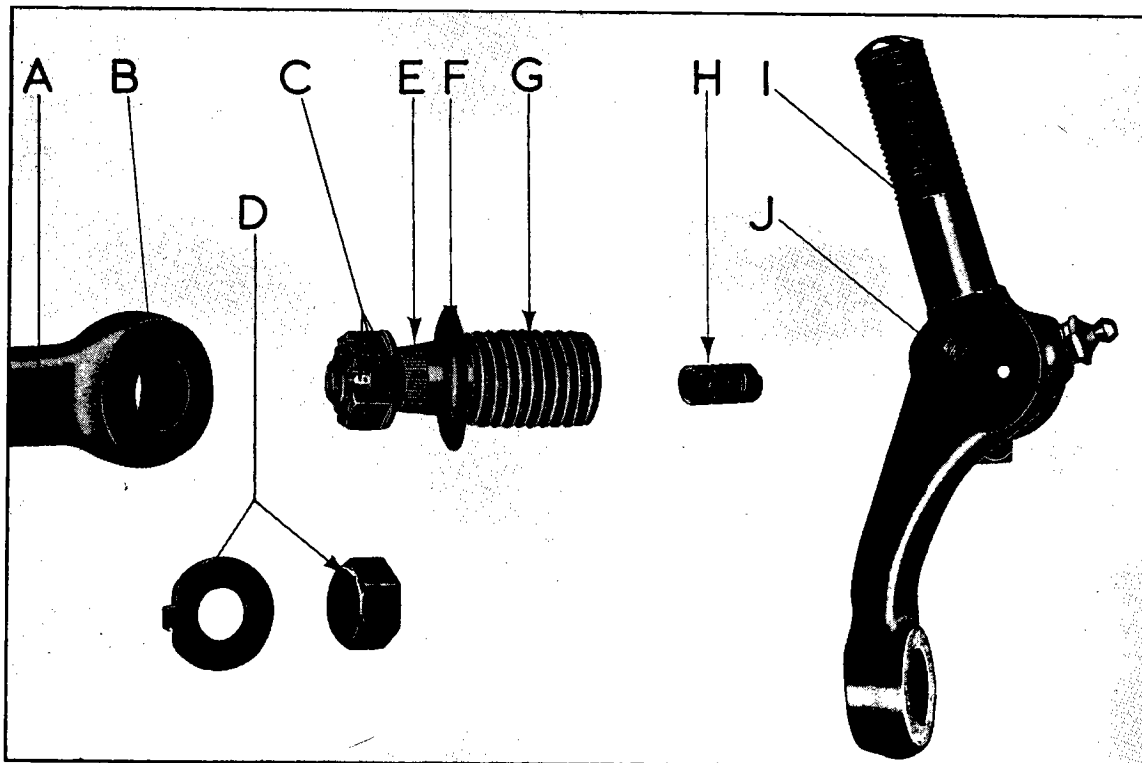


PLATE I.12. TRACK ROD END. THREAD BEARING TYPE (Early XK 120).

- |  |                            |
|--|----------------------------|
| A. Steering Drop Arm (or Steering Idle Lever).                           | F. Rubber Seal.            |
| B. Taper Hole.   | G. Thread Bearing Bolt.    |
| C. Clotted Nut, Plain Washer and Split Pin.                              | H. Preloading Spring.      |
| D. Plain Nut and Pegged Tab Washer.<br>(Alternative to "C", later cars.) | I. Track Rod End.          |
| E. Knurled and Tapered Shank.  | J. Thread Bearing Housing. |

The following assembly procedure must, therefore, always be adopted or excessive load will be applied and damage will be caused to the rubber bearings. Turn the steering drop arm and idle lever to the straight ahead position. Enter the tapers of the bearing bolts into the companion tapers of the drop arm and idle lever. Locate with a light blow from a soft metal hammer and secure with plain nuts and new pegged tab washers.

**Thread Bearing Track Rod Ends.** Screw the bearing bolts into their housings clockwise as far as they will go, overcoming the tension of the pre-load springs and then unscrew half a turn anti-clockwise. The drop arm and idle lever must then be turned to full left lock and the shanks of the thread bearings entered into the companion tapers of the drop arm or idle lever, secured with a light blow from a soft metal hammer and then locked with the nut provided.

Enter the tie rod ball joints into the extensions of the track rod ends and secure in position with the slotted nut and new split pin.

In all cases where the track rod has been dismantled reset the steering track as described in page I.28.

## STEERING TIE RODS. TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** The steering tie rods which connect the track rod ends to their respective steering arms are of a fixed type and non-adjustable for length. The ends of the tie rods are attached to the steering arms and track rod with normal ball joints which are of the non-adjustable type and cannot be dismantled.

Early XK 120 cars were fitted with tie rods that were adjustable for length, the tube being secured to the ball joints with a clamp at each end. It is most important, however, that the length of these tie rods be maintained within  $\frac{1}{16}$ " (1.6 mm.) of 9" (22.86 cm.) from ball centre to ball centre.

**REMOVE.** Remove slotted nuts and split pins securing the ball joints at either end of each tie rod to the steering arms and extremities of the track rod respectively. Tap the ball joints out of their tapers and remove tie rods.

**DISMANTLE.** The fixed length type of tie rod cannot be dismantled and should be renewed, if necessary, as an assembly.

To dismantle the tie rods fitted to early XK 120 cars, that is, those adjustable for length, remove the clamps at each end of the tie rods and unscrew the ball joints, noting that the ends are threaded one right hand and one left hand.

The ball joint assemblies cannot be dismantled and should be renewed, if necessary, as assemblies.

**REASSEMBLE.** In the case of the adjustable tie rods screw the ball joints into either end of the connecting tubes and secure in position with clamps provided.

It is of the utmost importance that the lengths of the tie rods be maintained within  $\frac{1}{16}$ " (1.6 mm.) of 9" (22.86 cm.) from ball centre to ball centre. Adjust the tie rods to this length before finally securing the clamps.

**REFIT.** Refit the tapers of the ball joint assemblies into the companion tapers of the steering arms and extremities of the track rod; tap with a soft metal hammer and lock in this position with the slotted nuts and new split pins. On the Mark VII model each tie rod must be fitted so that the ball end with the grease nipple in the top cap is at the steering arm end with the grease nipple on the other ball end facing forward. (Plate I.3.) Check steering track and reset, if necessary, as described on page I.28.

## STEERING SWIVEL—UPPER. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** The steering upper swivel also serves as the articulation between the outer extremity of the upper wishbone levers and the stub axle carrier.

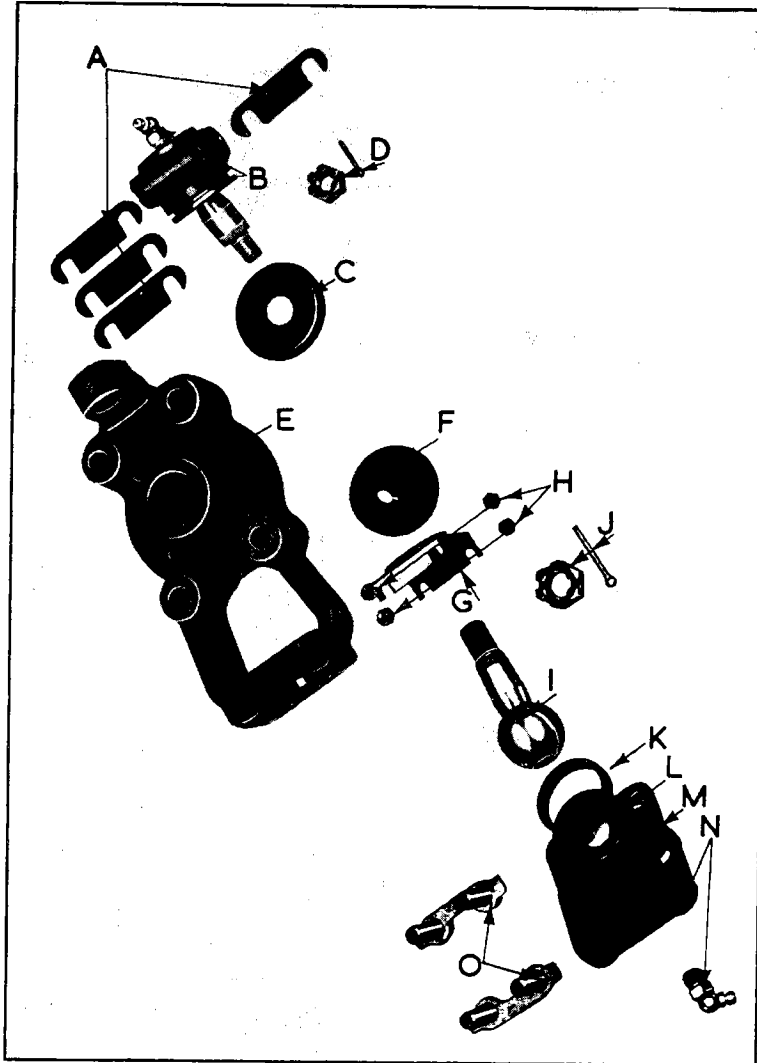


PLATE I.13. UPPER AND LOWER STEERING SWIVELS.

- |    |   |    |   |
|----|---|----|---|
| A. | Castor Shims.                             | I. | Ball Pin.                                   |
| B. | Upper Swivel Assembly with Grease Nipple. | J. | Split Pin and Slotted Nut.                  |
| C. | Rubber Seal. Upper Swivel.                | K. | Spigot over Ball Pin.                       |
| D. | Split Pin and Slotted Nut.                | L. | Socket supporting Ball Pin.                 |
| E. | Stub Axle Carrier.                        | M. | Adjusting Shims.                            |
| F. | Rubber Seal. Lower Swivel.                | N. | Ball Socket Cap and Grease Nipple.          |
| G. | Seal Carrier.                             | O. | Ball Socket Cap Set Screws and Tab Washers. |
| H. | Seal Carrier Retaining Screws.            |    |   |

**REMOVE.** Jack up front of car and remove road wheels. Release locking plates and remove nuts and bolts passing through the upper wishbone ball assembly and the two upper wishbone levers. Observe castor shims fitted between each face of the ball assembly and the respective wishbone lever. (Plate I.13.) Do not lose or transpose shims from front to rear or rear to front since this will alter castor angle. Remove brake drums. Withdraw split pins, slotted nuts and washers securing steering arms to stub axle carriers. Withdraw bolts through back plate. Remove steering arms and place clear. Remove split pin and slotted nut from ball pin and tap assembly out of stub axle carrier. Observe rubber seal between ball joint housing and stub axle carrier. The ball assembly cannot be dismantled further and should a replacement be required a new assembly should be fitted. (Plate I.13.)

**REFIT.** Refitting is the reverse of the above procedure, but ensure that the same number of castor shims are fitted and in their original location. If any doubt exists as regards shimming, check castor and reset, if necessary, as described in Section J—"Front Suspension".

**STEERING SWIVEL—LOWER. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**GENERAL.** The steering lower swivel also serves as the articulation between the outer extremities of the lower wishbone lever and the stub axle carrier.

**REMOVE.** Jack up front of car and remove road wheels. Release tab washers locating the four set screws which retain the ball socket cap and remove cap. Observe shims, .004" (.10 mm.) thick, spigot over ball pin and socket supporting ball pin which can now be removed. Remove split pin and slotted nut from shank of ball pin and drive ball pin downwards out of its taper fixing in the outer extremity of the lower wishbone lever. The seal assembly will be left in position between lower wishbone lever and stub axle carrier. (Plate I.13.)

Should it be required to remove the seal assembly it will be necessary to remove the brake back plate. Remove four screws retaining seal carrier to stub axle carrier and remove seal assembly.

**REFIT.** Refitting is the reverse of the above procedure. When refitting ball socket cap position a suitable number of shims between cap and stub axle carrier to allow .010" (.25 mm.) end float between ball and housing.

**STEERING ARMS. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Jack up and remove the road wheel and brake drum adjacent to the steering arm affected. (On XK 120 cars fitted with brake air scoops, spring back the clip and slide out the grid.) Remove the split pin and nut securing the tie rod ball joint to the steering arms. Tap ball joint out of taper in steering arm and place clear. Remove split pins and slotted nuts securing steering arms to bolts passing through brake back plate and stub axle carrier. Remove the steering arm.

**REFIT.** Refitting is the reverse of the above procedure.

**STEERING TRACK. TO ADJUST  
(MARK VII AND XK 120 MODELS)**

Check tyre pressures with tyres cold and adjust, if necessary, to:—

		Front	Rear
<b>Mark VII</b>	.. ..	23 lbs. per sq. in. (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )
<b>XK 120</b>	.. ..	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. in. (1.8 kg./cm. <sup>2</sup> )

Place the car on a level surface and spin wheels and check for running true. Set the wheels in the straight ahead position. Check the track setting using an approved track-setting gauge. This should be  $\frac{1}{8}$ " to  $\frac{3}{16}$ " (3.2 mm. to 4.8 mm.) toe-in. Check again after rolling car forward to turn wheels through 180°. If adjustment is required, slacken off clamp bolts at each end of the track rod and rotate tube in the necessary direction. Retighten the clamp bolts. When finally checking track, roll car forward so that wheels rotate 180° and recheck.

**STEERING LOCK. TO ADJUST  
(MARK VII AND XK 120 MODELS)**

**Mark VII Model.** Steering lock control is provided by set screws mounted in brackets situated on the steering box and idle lever housing mounting brackets. (Plate I.3.)

Slacken the lock nuts and rotate the set screws to positions which allow  $\frac{1}{2}$ " (12.7 mm.) clearance between the wheel and chassis on each full lock. Tighten lock nuts.

**XK 120 Models.** Steering lock control is provided by set screws mounted in brackets situated on the front chassis cross member. Slacken the lock nuts and rotate the set screws to positions which allow  $\frac{1}{4}$ " (6.3 mm.) clearance between the wheel and chassis on each full lock. Tighten the lock nuts. (Plate I.2.)

# PROPELLER SHAFTS

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MK. VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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Servicing	-	-	-	-	(Mark VII Model)	-	Page G. 6
Servicing	-	-	-	-	(XK 120 Models)	-	Page G.10



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(MARK VII MODEL)

**DESCRIPTION.** A Hardy Spicer divided propeller shaft transmits the drive from the gearbox to the rear axle. The propeller shaft is attached at either end by flanged yokes connected to companion flanges on the gearbox mainshaft and rear axle pinion shaft by four bolts passing through the respective flange faces. The shaft is divided to obtain a flat floor and dispense with a tunnel. The front shaft has a needle roller bearing universal joint at the front end and is supported by a deep grooved ball bearing at the rear end, the outer track of which is located in an oval housing attached to the chassis frame by flexible rubber bushes pinched and expanded by through-going bolts. The rear shaft is flange bolted to the front shaft by four bolts passing through the flange faces. Needle roller bearing universal joints are fitted to the front and rear of this shaft and a splined sliding joint is incorporated immediately behind the front universal joint.

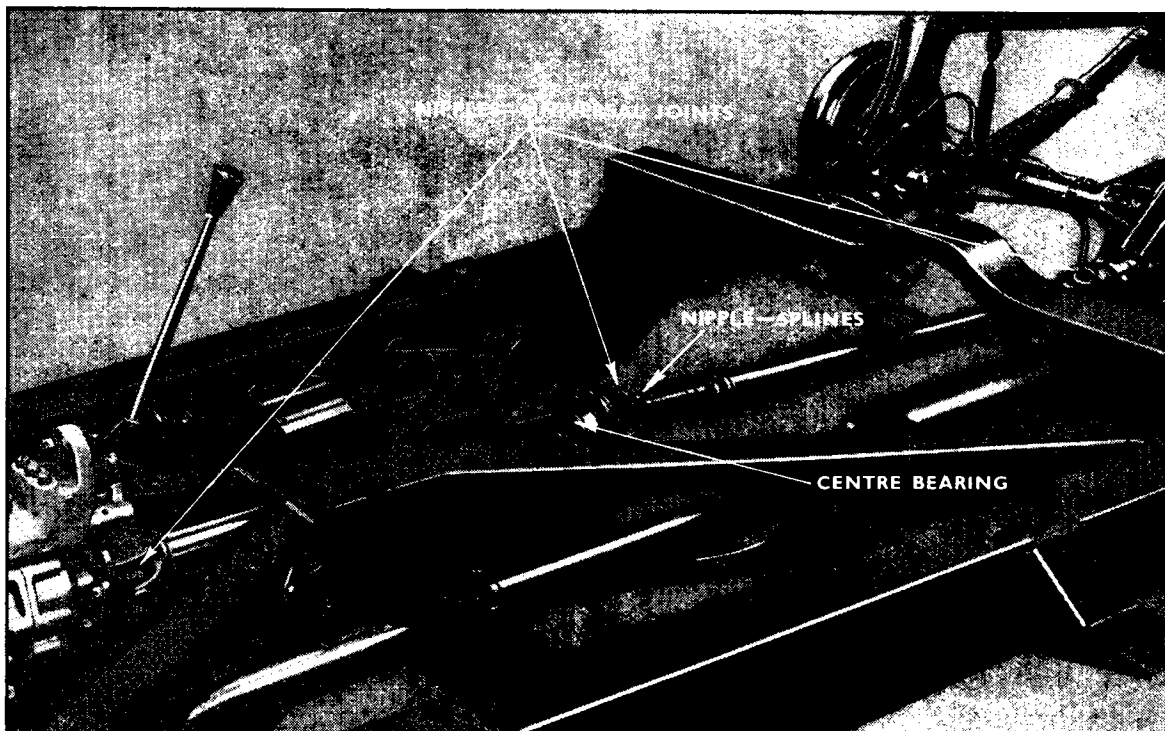


PLATE G.1. PROPELLER SHAFTS. GENERAL ARRANGEMENT (Mark VII).

**MAINTENANCE.**

Routine maintenance consists of lubrication of the universal joints and the sliding spline. Every 2,500 miles (4,000 kilometres) lubricate these nipples with the recommended lubricant. The number of nipples and their location is as follows:—

- |            |                   |                        |
|------------|-------------------|------------------------|
| 1 Nipple.  | Universal Joint.  | Front propeller shaft. |
| 1 Nipple.  | Splines.          | Rear propeller shaft.  |
| 2 Nipples. | Universal Joints. | Rear propeller shaft.  |

(Refer to Plate G.1.)

The supporting centre bearing on the front propeller shaft is pre-lubricated and requires no attention except at overhauls when it should be packed with grease. Grease is not suitable as a lubricant for universal joint, needle bearings, and gear oil as recommended should always be used. After high mileages it is desirable to check that the slotted nuts securing the flanged yokes to gearbox mainshaft splines and rear axle pinion shaft splines are tight. Also check that the companion flange bolts are tight and that wear has not taken place in the universal joints. Wear on the thrust faces can be located by testing the lift in the joint either by hand or with a light bar. Any circumferential movement of shaft relative to flange yokes indicates wear in the needle roller bearings or the sliding splines.

## (XK 120 MODELS)

**DESCRIPTION.** A Hardy Spicer propeller shaft transmits the drive from the gearbox to the rear axle. The propeller shaft is attached at either end by flanged yokes connected to companion flanges on the gearbox mainshaft and rear axle pinion shaft by four bolts passing through the respective flange faces. Needle roller bearing universal joints are fitted to the front and rear of the propeller shaft, and a splined sliding joint is incorporated immediately behind the front universal joint.

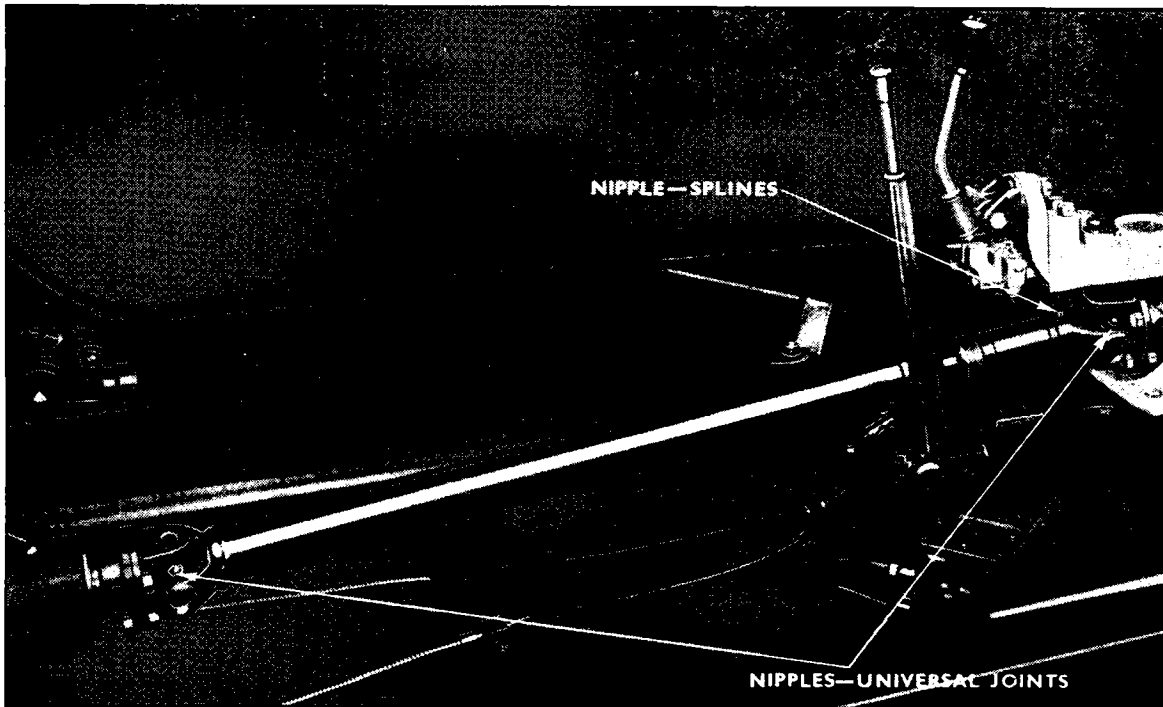


PLATE G.2. PROPELLER SHAFT. GENERAL ARRANGEMENT (XK 120).

**MAINTENANCE.**

Routine maintenance consists of lubrication of the universal joints and the sliding spline. Every 2,500 miles (4,000 kilometres) lubricate these nipples with the recommended lubricant. The number of nipples and their location is as follows:—

1 Nipple. Splines.  
2 Nipples. Universal Joints.

(Refer to Plate G.2.)

Grease is not suitable as a lubricant for universal joint needle bearings, and gear oil as recommended should always be used. After high mileages it is desirable to check that the slotted nuts securing the flanged yokes to gearbox mainshaft splines and rear axle pinion shaft splines are tight. Also check that the companion flange bolts are tight and that wear has not taken place in the universal joints. Wear in the thrust faces can be located by testing the lift in the joint either by hand or with a light bar. Any circumferential movement of the shaft relative to flange yokes indicates wear in the needle roller bearings or the sliding splines.

### RECOMMENDED LUBRICANTS (MARK VII AND XK 120 MODELS)

	Vacuum	Wakefield	Shell	Esso	Prices	S.A.E. Viscosity
Needle Bearings ..	Mobilube C	Castrol D	Spirax 140 E.P.	Gear Oil 140 (Heavy)	Energol 140	140
Splines .. ..	Mobilgrease No. 5	Castrol WB	Retinax A	Esso High Temperature Grease	Belmoline H.M.P.	

**PROPELLER SHAFTS. TO REMOVE AND REFIT ASSEMBLY****(MARK VII MODEL)**

**REMOVAL.** Place the car on a lift with the hand brake off and the gear lever in neutral. Raise the car to a height convenient for working on the propeller shaft, ensuring that chocks are in position at either end of the ramp. Remove hexagon adjustment nut from hand brake mechanism and place cable assembly clear of propeller shafts to facilitate subsequent operations. Moving the car backwards or forwards on the ramp to gain access to the bolts, remove cotter pins and slotted nuts from front companion flange (gearbox end). Remove bolts and ease front universal joint from register. Remove cotter pins and slotted nuts from rear companion flange (axle end) and ease rear universal joint from register. Support shaft. Remove two through-going bolts from centre bearing housing oval flange and ease housing clear of chassis plates. Disengage and remove from platforms the coil spring supporting centre bearing. Withdraw shafts to rear of car, taking care not to collapse the shafts, thus imposing undue load on the intermediate universal joint bearings.

**REFITTING.** Refitting is the reverse of the above procedure. If it has been found necessary to remove the intermediate universal joint and splined sleeve from rear propeller shaft it is essential, when assembling, to adhere strictly to the lining up arrows stamped on the shaft and on the splined sleeve. Failure to do so will result in damage to the universal joints due to incorrect angular relationship. Care should be taken when refitting the hand brake adjustment nut that no tension exists in the brake cables when the hand brake is in the off position. (Refer to Section L.—“Brakes”.)

**PROPELLER SHAFT—FRONT. TO REMOVE AND REFIT****(MARK VII MODEL)**

**REMOVAL.** Place the car on a lift with the hand brake in the off position and the gear lever in neutral. Raise the car to a height convenient for working on the propeller shaft, ensuring that chocks are in position at either end of the ramp. Remove hexagon adjustment nut from hand brake mechanism and place cable assembly clear of propeller shafts to facilitate subsequent operations. Moving the car backwards or forwards on the ramp to gain access to the bolts, remove cotter pins and slotted nuts from front companion flange (gearbox end). Remove bolts and ease front universal joint from register. Mark relative position of intermediate companion flanges joining front and rear propeller shafts so that they may be reassembled in correct relationship and thus preserve the balance of the assembly. Remove cotter pins and slotted nuts from intermediate companion flange between the front and rear propeller shafts. Ease rear propeller shaft universal joint from register backwards on spline and secure shaft to chassis cruciform member on one side. Remove two through-going bolts from centre bearing housing oval flange and ease housing clear of chassis plates. Disengage and remove from platforms the coil spring supporting centre bearing. Withdraw front propeller shaft to rear of car.

**REFITTING.** Refitting is the reverse of the above procedure, paying particular attention to the points given in refitting “Propeller Shafts. To Remove and Refit Assembly” (above). Ensure that the marks on the intermediate companion flanges of the front and rear shafts are in line when assembling or the balance of the assembly may be disturbed.

**PROPELLER SHAFT—REAR. TO REMOVE AND REFIT****(MARK VII MODEL)**

**REMOVAL.** Place car on lift and raise to a height convenient for working on propeller shaft. Mark relative position of intermediate companion flanges joining front and rear propeller shafts so that they may be reassembled in correct relationship and thus preserve the balance of the assembly. Remove cotter pins and slotted nuts from front and rear companion flanges. Support shaft and remove bolts. Withdraw shaft to rear.

**REFITTING.** Refitting is the reverse of the above procedure. If it has been found necessary to remove the intermediate universal joint and splined sleeve from rear propeller shaft, it is essential when assembling to adhere strictly to the lining up arrows stamped on the shaft and on the splined sleeve. Failure to do so will result in damage to the universal joints due to incorrect angular relationship. Ensure that the marks on the intermediate companion flanges of the front and rear shafts are in line when assembling or the balance of the assembly may be disturbed.

**PROPELLER SHAFT—FRONT. TO DISMANTLE AND REASSEMBLE  
(MARK VII MODEL)**

**REMOVE SHAFT.** Remove propeller shaft as described previously.

**DISMANTLE UNIVERSAL JOINT.** The universal joint consists of a spider with four journals, each carrying a needle roller bearing assembly which is retained in the respective yoke ear by a circlip. Dealing with each needle bearing in turn, remove the circlip. If difficulty is experienced tap the bearing housing to release the tension on circlip. Tap the yoke ear in the vicinity of the bearing with a copper or lead hammer until the bearing cage emerges. (If the bearing housing is tight in the yoke ear it may be necessary to drive out one bearing housing by hitting the opposite bearing housing with a hammer and punch. Repeat for the remaining bearings.) Hold the shaft with the bearing facing downwards and withdraw bearing, taking care not to lose any of the needles. Repeat for the remaining needle bearings.

**DISMANTLE CENTRE BEARING.** The centre bearing consists of a deep grooved ball bearing pressed into a housing which has an oval shaped bearer plate attached, and this assembly is mounted on the tail of the propeller shaft with dust shield interposed between housing and shaft tubing. The bearing is retained on the shaft by a flange coupling which is bolted to the companion flange on the rear propeller shaft. This flange coupling is retained on the front propeller shaft by keyways in the coupling engaging with Woodruff keys on the shaft and slotted nut and cotter pin. Remove cotter pin and slotted nut. Draw off flange coupling and remove Woodruff keys. Remove outer dust cover. Drive shaft through bearing and housing. Scrap dust cover. Press bearing out of housing.

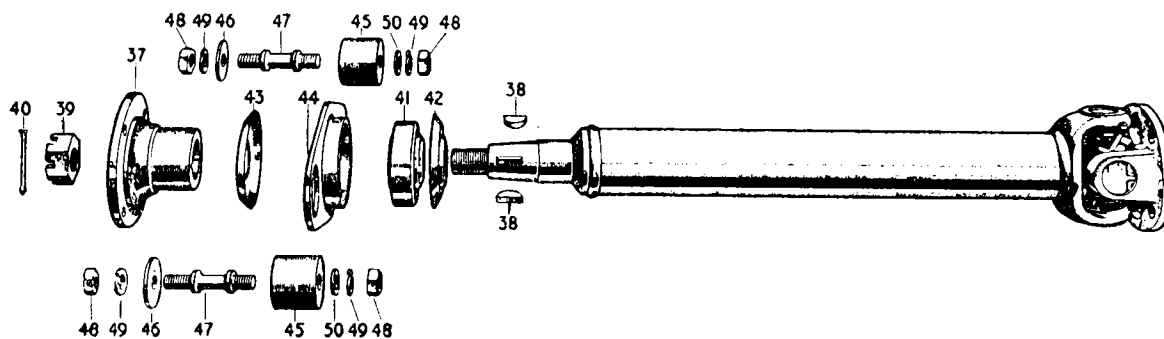


PLATE G.3. FRONT PROPELLER SHAFT AND CENTRE BEARING (Mark VII).

Flange, Companion, on rear of Shaft .. .. .	37	Shield, Dust, at rear of Ball Bearing .. .. .	43
Key (Woodruff), locating Companion Flange on Shaft .. .. .	38	Plate, Complete with Bearing Housing .. .. .	44
Nut, securing Companion Flange .. .. .	39	Insulator (Rubber) in Mounting Plate Flanges	45
Pin, Split, locking Nut .. .. .	40	Washer on exposed face of Insulators .. .. .	46
Bearing, Ball .. .. .	41	Stud, through Insulators .. .. .	47
Shield, Dust, between Front Shafts and Ball Bearing .. .. .	42	Nut on Studs .. .. .	48
		Washer, Spring, under Nuts .. .. .	49
		Washer, Plain, under Spring Washers .. .. .	50

**REASSEMBLE.** Reassembly is the reverse of the foregoing procedure. The lubricating nipple should be removed from the universal joint spider and the oil ways blown clean with an air line before assembly. Vaseline applied to the needle bearing housings will facilitate assembly of the needles in the housing. Following assembly, replace nipple and fill the bearings with recommended lubricant. Fit new dust covers to centre bearing.

**PROPELLER SHAFT—REAR. TO DISMANTLE AND REASSEMBLE  
(MARK VII MODEL)**

**REMOVE SHAFT.** Remove the propeller shaft as described previously.

**DISMANTLE SPLINE JOINT.** Unscrew by hand knurled dust cap at the rear of the sliding joint. Observe steel washer and cork washer fitted behind knurled dust cap. Draw the splined sleeve yoke off the splines on the propeller shaft, observing that arrows are stamped on splined sleeve yoke and on the propeller shaft tube and, when refitting, these arrows must be in line.

**DISMANTLE UNIVERSAL JOINT.** Each individual joint consists of a spider with four journals, each carrying a needle roller bearing assembly which is retained in the respective yoke ear by a circlip. Dealing with each needle bearing in turn, remove the circlip. If difficulty is experienced tap the bearing housing to release the tension on circlip. Tap the yoke ear in the vicinity of the bearing with a copper or lead hammer until the bearing cage emerges. (If the bearing housing is tight in the yoke ear it may be necessary to drive out one bearing housing by hitting the opposite bearing housing with a hammer and punch. Repeat for the remaining bearing.) Hold the shaft with the bearing facing downwards and withdraw bearing, taking care not to lose any of the needles. Repeat for the remaining needle bearings.

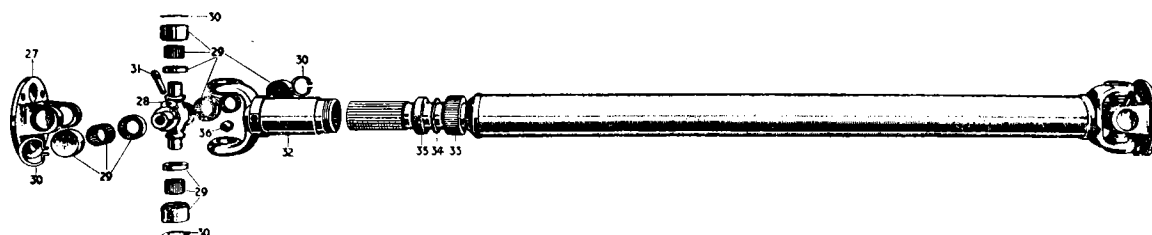


PLATE G.4. REAR PROPELLER SHAFT (Mark VII).

Yoke, Flange, at each end of Shaft .. .. .	27	Yoke, Sleeve, Assembly, on Sliding End of Shaft	32
Journal, connecting Flange Yokes to Shaft .. .. .	28	Cap, Dust, on Sleeve Yoke Assembly .. .. .	33
Bearing, Needle, Assembly, on Journals .. .. .	29	Washer (Steel) in Dust Cap .. .. .	34
Ring, Snap, retaining Needle Bearing Assembly	30	Washer (Cork) in Dust Cap .. .. .	35
Nipple, Grease, on Journals .. .. .	31	Nipple, Grease, on Sleeve Yoke Assembly .. .. .	36

**REASSEMBLE.** Reassembly is the reverse of the foregoing procedure. The lubricating nipple should be removed from the universal joint spider and the oil ways blown clean with an air line before assembly. Vaseline applied to the needle bearing housings will facilitate assembly of the needles in the housing. Following assembly, replace nipple and fill the bearings with recommended lubricant. Care is necessary when assembling the spline joint to ensure that the lining up arrows stamped on the shaft and on the splined sleeves are in line or damage will be caused to the universal joints due to incorrect angular relationship.

## PROPELLER SHAFTS. TO OVERHAUL (MARK VII MODEL)

**GENERAL.** Factory reconditioned propeller shafts are available on an exchange basis and it is recommended that advantage be taken of this scheme in preference to overhauling the original assembly.

**UNIVERSAL JOINTS.** If the journals of the spider or the trunnion bearing holes of the yokes show signs of wear or ovality it will be necessary to renew these parts completely and since one yoke in each case is an integral part of the shaft it is preferable to fit a reconditioned shaft complete. Oversize journals and bearings are not available.

If no wear is present in the universal joints apart from the needle bearing assemblies the latter may be renewed as described in paragraphs "Propeller Shafts. To Dismantle and Reassemble." Note, however, that the needle bearing assemblies must be a light drive fit in the yoke trunnions.

**Note.** Replacement journal assemblies are available, comprising journal, needle bearing assemblies and snap rings. Part No. K.5/L/4.

**SPLINE JOINT.** If wear is present on the splines of the shaft or in the splined sleeve yoke a replacement shaft must be fitted.

**CENTRE BEARING.** Renew the ball bearing if this is worn. Observe that the bearing should be lubricated on assembly with a good quality grease. If the bearing is not a press fit in the housing the latter must be renewed. The flange coupling must be a good fit on the taper of the shaft; if not, renew the flange. Examine the mounting rubbers of the bearing housing and if perished fit replacements. Check all centre bearing bracket bolts for tightness.

## PROPELLER SHAFT CENTRE BEARING BRACKET. DESCRIPTION (MARK VII MODEL)

**DESCRIPTION.** The centre bearing bracket is illustrated in Plate G.5. It will be seen that a light coil

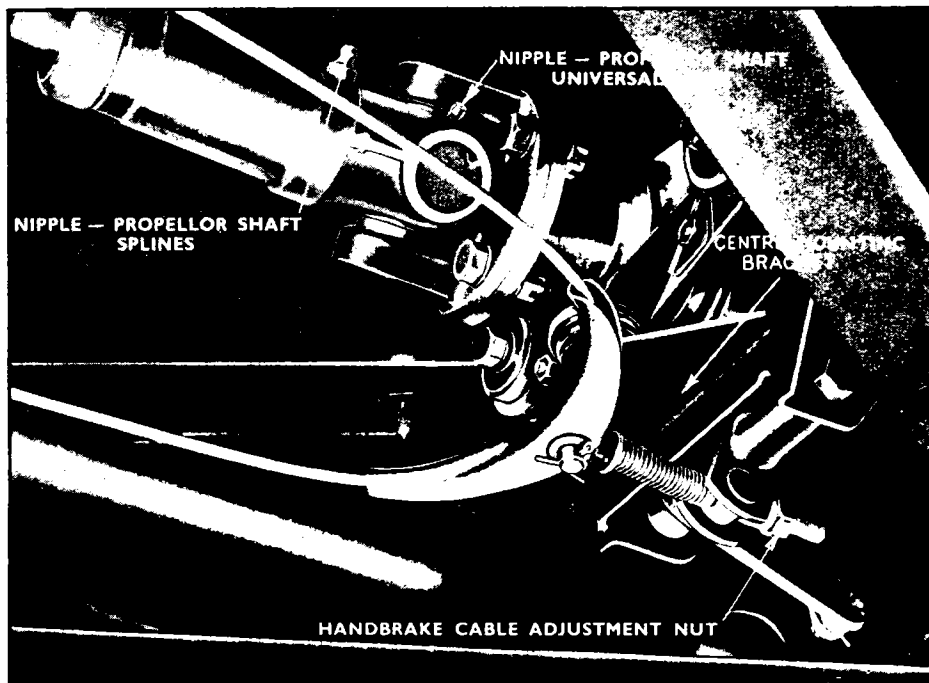


PLATE G.5. CENTRE BEARING BRACKET (Mark VII).



spring is interposed between the oval bearing housing and the bearing mounting bracket. The object of this spring is to give support to the bearing and thus allow flexible mounting rubbers to be used in the bearing mounting flange.

**PROPELLER SHAFT. TO REMOVE AND REFIT ASSEMBLY  
(XK 120 MODELS)**

**REMOVAL.** Remove gear lever knob and locknut. Remove gearbox carpets and cover. Moving car backwards and forwards to gain access to bolts, remove split pins and castellated nuts from front companion flange (gearbox end). Support shaft, remove bolts and ease front universal joint from register. Place car on lift with hand brake off, and raise it to a height convenient for working on the propeller shaft, ensuring that chocks are in position at either end of the ramp. Remove split pins and castellated nuts from rear companion flange (axle end), remove bolts and ease rear universal joint from register. Withdraw shaft to rear of car.

**REFITTING.** Refitting is the reverse of the above procedure. If it has been found necessary to remove the splined sleeve from the propeller shaft it is essential, when assembling, to adhere strictly to the lining-up arrows stamped on the shaft and on the splined sleeve.

**PROPELLER SHAFT. TO DISMANTLE AND REASSEMBLE  
(XK 120 MODELS)**

**REMOVE SHAFT.** Remove the propeller shaft as described previously.

**DISMANTLE SPLINE JOINT.** Unscrew by hand knurled dust cap at the rear of the sliding joint. Observe steel washer and cork washer fitted behind knurled dust cap. Draw the splined sleeve yoke off the splines on the propeller shaft observing that arrows are stamped on splined sleeve yoke and on the propeller shaft tube, and when refitting these arrows must be in line.

**DISMANTLE UNIVERSAL JOINT.** Each individual joint consists of a spider with four journals, each carrying a needle roller bearing assembly which is retained in the respective yoke ear by a circlip. Dealing with each needle bearing in turn, remove the circlip. If difficulty is experienced tap the bearing housing to release the tension on circlip. Tap the yoke ear in the vicinity of the bearing with a copper or lead hammer until the bearing cage emerges. (If the bearing housing is tight in the yoke ear it may be necessary to drive out one bearing housing by hitting the opposite bearing housing with a hammer and punch. Repeat for the remaining bearings.) Hold the shaft with the bearing facing downwards and withdraw bearing, taking care not to lose any of the needles. Repeat for the remaining needle bearings.

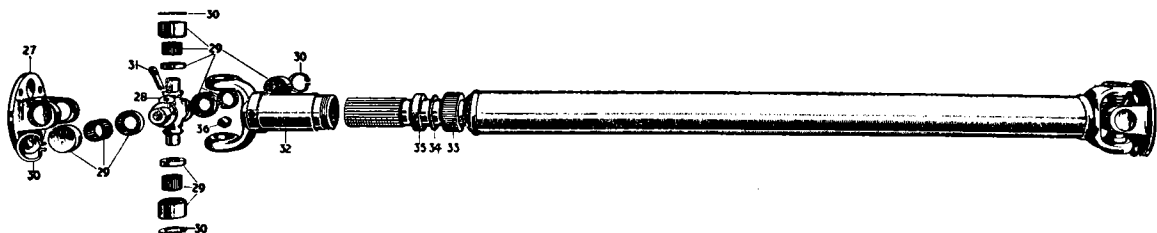


PLATE G.6. PROPELLER SHAFT (XK 120).

Yoke, Flange, at each end of Shaft .. .. .	27	Yoke, Sleeve, Assembly, on Sliding End of Shaft	32
Journal, connecting Flange Yokes to Shaft .. .. .	28	Cap, Dust, on Sleeve Yoke Assembly .. .. .	33
Bearing, Needle, Assembly, on Journals .. .. .	29	Washer (Steel) in Dust Cap .. .. .	34
Ring, Snap, retaining Needle Bearing Assembly	30	Washer (Cork) in Dust Cap .. .. .	35
Nipple, Grease, on Journals .. .. .	31	Nipple, Grease, on Sleeve Yoke Assembly ...	36

**REASSEMBLE.** Reassembly is the reverse of the foregoing procedure. The lubricating nipple should be removed from the universal joint spider and the oil ways blown clean with an air line before assembly. Vaseline applied to the needle bearing housings will facilitate assembly of the needles in the housing. Following assembly, replace nipple and fill the bearings with recommended lubricant. Care is necessary when assembling the spline joint to ensure that the lining up arrows stamped on the shaft and on the splined sleeves are in line or damage will be caused to the universal joints, due to incorrect angular relationship.

### PROPELLER SHAFT. TO OVERHAUL (XK 120 MODELS)

**GENERAL.** Factory reconditioned propeller shafts are available on an exchange basis and it is recommended that advantage be taken of this scheme in preference to overhauling the original assembly.

**UNIVERSAL JOINTS.** If the journals of the spiders or the trunnion bearing holes of the yokes show signs of wear or ovality it will be necessary to renew these parts completely, and since one yoke in each case is an integral part of the shaft it is preferable to fit a reconditioned shaft complete. Oversize journals and bearings are not available.

If no wear is present in the universal joints apart from the needle bearing assemblies the latter may be renewed as described in paragraphs "Propeller Shaft. To Dismantle and Reassemble." Note, however, that the needle bearing assemblies must be a light drive fit in the yoke trunnions.

**Note.** Replacement journal assemblies are available, comprising journal, needle bearing assemblies and snap rings. Part No. K.5/L/4.

**SPLINE JOINT.** If wear is present on the splines of the shaft or in the splined sleeve yoke a replacement shaft must be fitted.

# REAR AXLE

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

##### (Salisbury Axle)

(Stamped on the chassis left-hand side member above rear mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

##### (E.N.V. or Salisbury Axle)

(Stamped on the chassis left-hand side member bracket to rear of  
twin exhaust down pipes)

##### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

##### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

### REAR AXLE NUMBERS

#### Salisbury Axle

(Stamped on gear carrier housing)

#### E.N.V. Axle

(Stamped on top of differential nose piece)

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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## SALISBURY AXLE

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## E.N.V. AXLE

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Rear Axle .. .. .	Remove .. .. .	H1.26
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## E.N.V. AXLE

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**REAR AXLES. GENERAL**  
**(MARK VII AND XK 120 MODELS)**

**MARK VII MODEL.** This model is fitted with the Salisbury type of axle (Type 2HA) but is not to the same specification as the Salisbury axle used on the XK 120 models, and therefore the axles fitted to the two models are not interchangeable as assemblies; for the interchangeability of individual parts refer to the appropriate Spare Parts Catalogues.

**XK 120 MODELS.** These models are fitted with either an E.N.V. or Salisbury axle; for the recognition features of the two types of axle refer to "Axle Identification" below.

**INTERCHANGEABILITY.** The E.N.V. and Salisbury axles, except for the brake back plates, hubs and hand brake cable assembly, are interchangeable as assemblies; individual parts are not interchangeable.

The 3.77 : 1 (standard) and 3.31 : 1 (high) ratio Salisbury axles are interchangeable as assemblies; crown wheels and pinions for the two ratios are **not** interchangeable. For the interchangeability of individual parts refer to the appropriate Spare Parts Catalogue.

**Note.** If a change is made in the ratio of the rear axle it is also necessary to change the speedometer in accordance with the following table. The Smiths code number and cable revolutions are marked on the speedometer dial.

	Rear Axle Ratio	Speedometer Cable Revolutions	Smiths Code No.	Jaguar Part No.
(E.N.V.)	3.64	1225 per mile	X51691/28	C.4574
		760 per kilometre	X51691/29	C.4575
(E.N.V.)	3.27	1100 per mile	X51691/30	C.4576
		680 per kilometre	X51691/31	C.4577
(Salisbury)	3.77	1280 per mile	X51691/41	C.5381
		780 per kilometre	X51691/42	C.5382
(Salisbury)	3.31	1120 per mile	X51691/37	C.5383
		700 per kilometre	X51691/38	C.5384

**AXLE IDENTIFICATION.** **Salisbury.** Differential unit not removable with axle casing in chassis. Cover plate bolted to rear of axle casing. No dipstick fitted, filler and level plug in rear cover plate.

**E.N.V.** Differential unit bolted to axle casing and is withdrawn forward. Cover plate at rear welded to axle casing. Dipstick and filler plug situated at top left hand of pinion shaft housing.

**DESCRIPTION AND MAINTENANCE (SALISBURY AXLE)**

**GENERAL.** The Salisbury axle is fitted to all Mark VII cars and to a proportion of XK 120 cars; the remaining XK 120 cars being fitted with the E.N.V. type of axle. For further information and the identification features of the two types of axle refer to "Rear Axles. General" on page H.4.

**DESCRIPTION.** The rear axle assembly (Plate H.1) is of the semi-floating type with shim adjustment for all bearings and meshing of the hypoid drive gear and pinion matched assembly. The axle shafts are splined at the inner ends, which engage splines in the differential side gears, while the outer ends have tapers and keys to fit the rear wheel hubs. The hubs are supported by taper roller bearings pressed on to the axle shafts and located in the ends of the axle tubes. Outward thrust on either wheel is taken by the adjacent hub bearing, whilst inward thrust is transmitted through the axle shafts and slotted axle shaft spacer to the opposite bearing. Thus, each hub bearing takes thrust in one direction only.

A cover on the rear of the gear carrier housing permits the inspection and flushing of the differential assembly without dismantling the axle.

The axle gear ratio is stamped on a tag attached to the assembly by one of the rear cover screws. The axle serial number is stamped on the gear carrier housing.

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) check the level of the oil in the rear axle differential when the car is standing on level ground. A combined level and filler plug is fitted to the cover plate. Top up, if necessary, to the bottom of this plug with the recommended grade of lubricant. Since hypoid oils of different brands may not mix satisfactorily, draining and refilling is preferable to topping up if the brand of oil in the axle is unknown.

Every 5,000 miles (8,000 kilometres) lubricate the rear wheel bearings sparingly with recommended lubricant through the nipples provided. The nipples are situated on the ends of the axle casing immediately behind the brake back plates. A bleed hole is provided on the axle casing to indicate when sufficient lubricant has been applied.

Every 10,000 miles (16,000 kilometres) drain, flush out with flushing oil and refill with the recommended grade of lubricant. The drain plug is situated at the base of the differential. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

Every 10,000 miles (16,000 kilometres) check and tighten, if necessary, the rear axle "U" bolts. It is desirable at this mileage to check and correct, if necessary, the axle shaft end float.

**RECOMMENDED LUBRICANTS**

	Vacuum	Wakefield	Shell	Esso	Price's	S.A.E. Viscosity
Rear Axle .. .. . (Use only <b>HYPOID</b> oil)	Mobilube G.X.90	Castrol Hypoy	Spirax 90 E.P.	Expee Hypoid 90	Energol Hypoid 90	Hypoid 90
Wheel Bearings .. .. .	Mobilgrease No. 5	Castrolase W.B.	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.	

Rear Axle Capacity, 3½ pints (2.0 litres)—4.2 U.S. pints.

**AXLE RATIOS**

<b>MARK VII</b> (Type 2HA)		<b>XK 120</b> (Type 4HA)
4.27 : 1 (47×11)	Standard 3.77 : 1 (49×13)	High 3.31 : 1 (43×13)

**DATA**

Axle Shaft End Float .. .. .	.006" to .008" (.15 to .20 mm.).
Differential Bearing Preload .. .. .	.008" (.20 mm.) shim allowance.
Pinion Bearing Preload .. .. .	8 to 12 lbs./in. (.09 to .14 kg./m.).
Backlash .. .. .	As etched on drive gear (minimum .004" (.10 mm.)).
Tightening Torque—Drive Gear Bolts .. .. .	40 to 50 lbs./ft. (5.53 to 6.91 kg./m.).

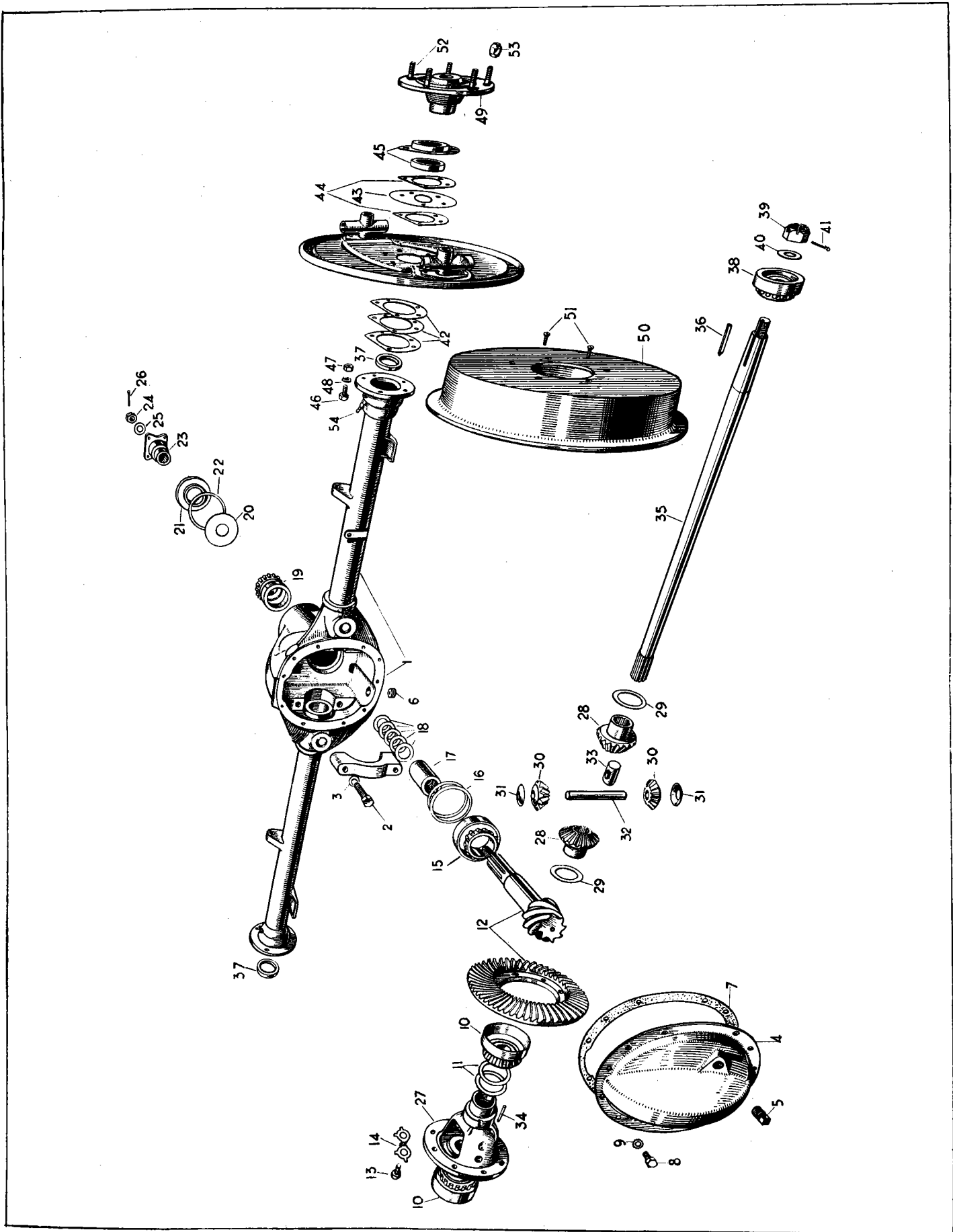


PLATE H.1. SALISBURY REAR AXLE ASSEMBLY, Exploded view. (Mark VII illustrated).



INDEX TO PLATE H.I. REAR AXLE (SALISBURY). EXPLODED VIEW

Carrier and Tube Assembly .. .. .	1	Gear, Side, for Differential.. .. .	28
Screw, Set, securing Differential Caps .. .. .	2	Washer, Thrust, for Side Gears .. .. .	29
Washer, Lock, on Set Screws .. .. .	3	Gear, Differential Pinion Mate .. .. .	30
Cover for Carrier .. .. .	4	Washer, Thrust, for Pinion Mate Gears .. .. .	31
Plug, Filler, on Cover .. .. .	5	Shaft for Pinion Mate Gears .. .. .	32
Plug, Drain, on Gear Carrier .. .. .	6	Spacer, Axle Shaft, on Pinion Mate Gear Shaft .. .. .	33
Washer, Jointing, for Cover .. .. .	7	Pin, locking Pinion Mate Gear Shaft in Differential Case .. .. .	34
Screw, Set, securing Cover to Carrier .. .. .	8	Rear Axle Shaft .. .. .	35
Washer, locking Screws .. .. .	9	Key .. .. .	36
Bearing, Roller, on Differential Case .. .. .	10	Seal, Oil, in end of Axle Tubes .. .. .	37
Shim, adjusting Differential .. .. .	11	Bearing, Roller, for Hubs .. .. .	38
Drive Gear and Pinion .. .. .	12	Nut, Slotted, on Axle Shaft .. .. .	39
Screw, Set, securing Ring Gear to Differential Case .. .. .	13	Washer, under Nut.. .. .	40
Lock-Strap for Set Screws .. .. .	14	Cotter, securing Nut on Axle Shaft .. .. .	41
Bearing, Roller, at rear end of Pinion .. .. .	15	Shim, adjusting Hub Bearing .. .. .	42
Shim, Adjusting, rear of Pinion .. .. .	16	Plate, retaining Hub Bearings .. .. .	43
Spacer, between Front and Rear Bearings .. .. .	17	Washer, Jointing, at each side of Retainer Plate .. .. .	44
Shim, Adjusting, front of Pinion .. .. .	18	Seal, Oil, Assembly .. .. .	45
Bearing, Roller, at front end of Pinion .. .. .	19	Screw, securing Rear Brake Assembly to Carrier Assembly .. .. .	46
Slinger, Oil, on Pinion .. .. .	20	Nut on Screws .. .. .	47
Seal, Oil, Assembly, on Pinion .. .. .	21	Washer, locking Nuts .. .. .	48
Gasket for Oil Seal .. .. .	22	Rear Axle Hub .. .. .	49
Flange, Companion, Assembly .. .. .	23	Drum, Brake.. .. .	50
Nut, securing Companion Flange Assembly to Pinion .. .. .	24	Screw, Set, locating Brake Drum on Hubs .. .. .	51
Washer, between Nut and Companion Flange Assembly .. .. .	25	Stud, securing Brake Drum and Road Wheels to Hubs .. .. .	52
Pin, Cotter, securing Nut .. .. .	26	Nut on Studs .. .. .	53
Case, Differential .. .. .	27	Nipple, Grease, on Axle Tubes .. .. .	54

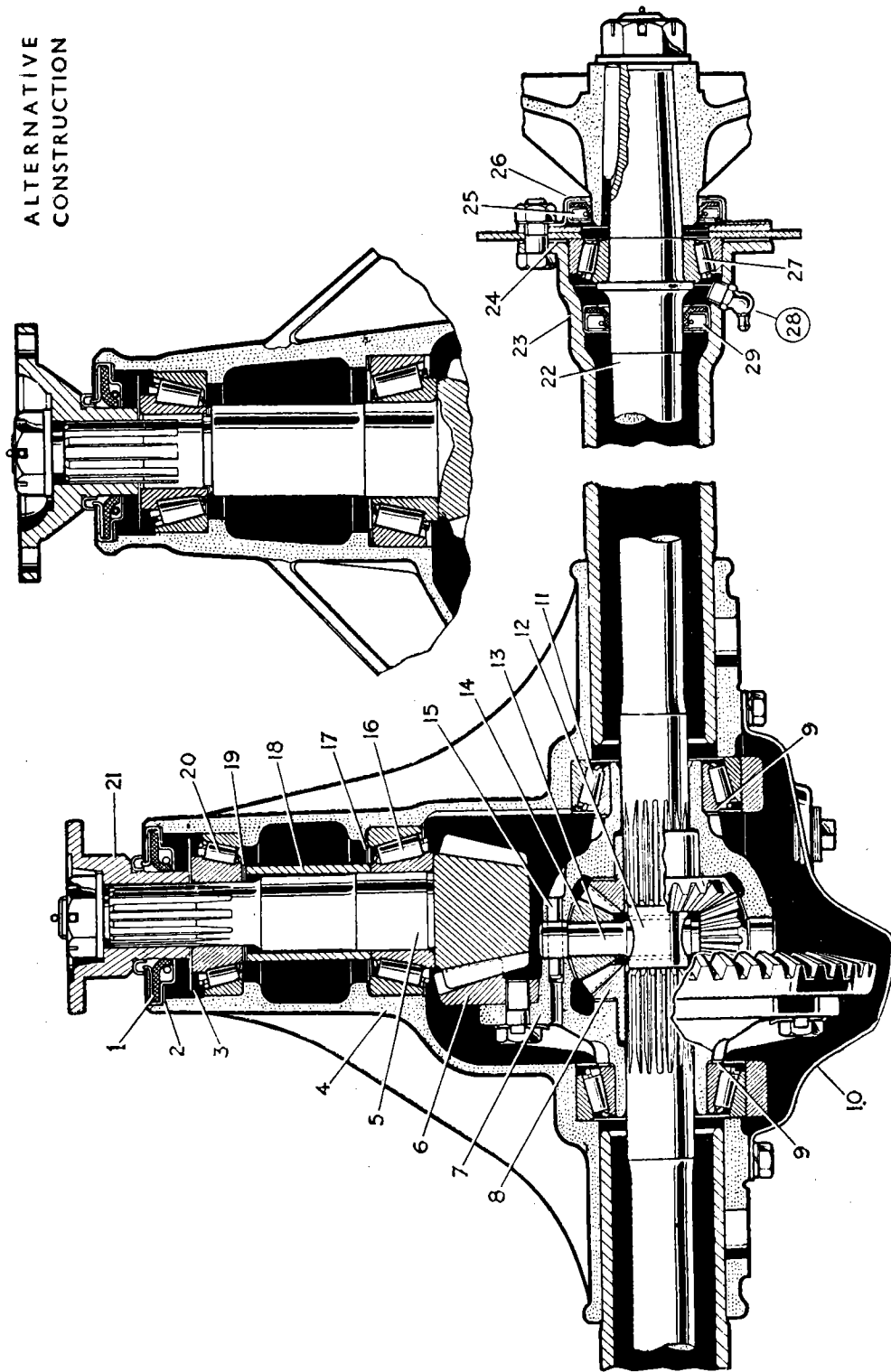


PLATE H.2. SALISBURY REAR AXLE ASSEMBLY. Sectioned view (Mark VII illustrated).

**REAR AXLE. SERVICING**

**GENERAL.** Factory reconditioned rear axles are available on an exchange basis (consisting of axle complete, less hubs, brake drums and back plates), and it is recommended that this service be utilised in preference to overhauling the existing rear axle, particularly in view of the intricate adjustments and the number of special tools required. Full servicing instructions are, however, given in this section.

The service methods described assume the availability of certain tools which are separately listed below and shown in the illustrations. In extreme emergency it may be necessary to carry out repairs without these special tools, and alternative methods have been described which give the minimum risk of serious damage to the unit if considerable care is taken. The use of emergency methods is not recommended for normal service requirements.

**SPECIAL TOOLS.** Drawings of the special tools listed below and shown in the illustrations are available from:—  
Salisbury Transmission Ltd., Birch Road, Witton, Birmingham, 6.

Tool No.	Description
SE.102 .. ..	Axle Shaft Extractor.
SE.103 .. ..	Pinion and Differential Bearing Cone Puller.
SE.104 .. ..	Gear Carrier Stretching Fixture.
SE.105 .. ..	Pinion Bearing Cup Extractor.
SE.106 .. ..	Bearing Cup Installation Tool.
SE.107 .. ..	Pinion Cone Setting Gauge.
SE.108 .. ..	Pinion Oil Seal Installation Collar.

**INDEX TO PLATE H.2**

Drive Pinion Oil Seal .. .. .	1	Drive Pinion Bearing (Inner) .. .. .	16
Drive Pinion Oil Seal Gasket .. .. .	2	Drive Pinion Bearing Shim (Inner) .. .. .	17
Drive Pinion Oil Slinger .. .. .	3	Drive Pinion Bearing Spacer .. .. .	18
Gear Carrier .. .. .	4	Drive Pinion Bearing Shim (Outer) .. .. .	19
Hypoid Drive Pinion } Matched { .. .. .	5	Drive Pinion Bearing (Outer) .. .. .	20
Hypoid Drive Gear.. } Assembly { .. .. .	6	Universal Joint Flange .. .. .	21
Differential Case .. .. .	7	Axle Shaft .. .. .	22
Differential Side Gear .. .. .	8	Axle Tube .. .. .	23
Differential Bearing Shim .. .. .	9	Hub Bearing Shim .. .. .	24
Gear Carrier Cover .. .. .	10	Hub Oil Seal .. .. .	25
Differential Bearing .. .. .	11	Hub Oil Seal Container .. .. .	26
Axle Shaft Spacer .. .. .	12	Hub Bearing .. .. .	27
Pinion Mate Shaft .. .. .	13	Grease Nipple .. .. .	28
Differential Bevel Pinion Mate .. .. .	14	Axle Shaft Oil Seal .. .. .	29
Pinion Mate Shaft Lock Pin .. .. .	15		

**REAR AXLE. TO REMOVE**

- GENERAL.** Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release hand brake.
- REMOVE HUBS.** Slacken off all available brake shoe adjustment by rotating adjuster anti-clockwise. Remove two set screws locating each brake drum to the hub and remove drums. Withdraw cotter pin and slotted nut with washer securing each hub to axle shaft and draw off hubs with suitable puller.
- DISCONNECT BRAKES.** At the rear of the back plates disconnect the hydraulic pipe unions to the wheel cylinders and remove the clevis pins securing the hand brake cable to the operating levers. Remove the bolt securing the three-way connection to the rear axle case and tie up hydraulic pipe to chassis frame.
- REMOVE BRAKE BACK PLATES.** Remove the five bolts and nuts securing each back plate to the ends of the axle case and withdraw back plate.  
On the Mark VII model note the oil seal, bearing retainer plate and two gaskets at the front of each back plate, and the shims fitted between the back plate and the flange of axle tube.  
On the XK 120 model note the oil seal and gasket at the front of back plate and the bearing retainer plate and shims fitted between the back plate and the flange of the axle tube.  
Do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.
- DISCONNECT PROPELLER SHAFT.** Remove cotter pins and four slotted nuts securing rear axle companion flange to propeller shaft. Withdraw bolts, spring propeller shaft out of register and place clear.
- REMOVE "U" BOLTS.** Remove lock nuts and nuts from rear axle "U" bolts. Remove "U" bolts and "U" bolt plates.
- REMOVE CHECK STRAPS.** Remove two nuts and bolts per side securing check straps to chassis frame and withdraw check straps.
- DISCONNECT SHOCK ABSORBERS.** Disconnect rear shock absorbers by removing two nuts from each link arm and tap link arms out of lugs on axle casing and shock absorber arms.
- REMOVE AXLE.** Slide axle assembly to the right until left-hand end of case is clear of road spring and exhaust tail pipe. Lower to floor and withdraw under car.

**REAR AXLE. TO REFIT**

- GENERAL.** Refitting is the reverse of the above procedure, but particular attention should be paid to the following points.
- REFIT AXLE.** When the rear axle assembly has been attached to the rear springs it will be necessary to jack up each spring to facilitate the fitting of the shock absorber links and check straps. Ensure that the centre bolt of the spring seats in the dowel hole in the spring pad.
- REFIT BRAKE BACK PLATES.** Ensure that the same number of shims found on dismantling are positioned behind the back plates when refitting. The same number of shims should be fitted on either side to centralise the half shafts, the combined end play on which should be from .006" to .008" (.15 to .20 mm.). Full details on adjusting end play will be found on page H.12.
- CONNECT BRAKES.** After refitting the hydraulic connections and brake drums it will be necessary to bleed the hydraulic system and adjust the rear brakes as described in Section L, "Brakes".

**AXLE SHAFTS. TO REMOVE AND REFIT**

**REMOVE HUB.** Jack up the car and remove wing valance and road wheel. Slacken off all available brake shoe adjustment by rotating adjuster anti-clockwise. Remove the countersunk screws and withdraw brake drums. Remove the split pins and slotted nut, and with a suitable extractor withdraw the hub from the axle shaft.

Before proceeding further check the combined end float of the axle shafts which should be .006" to .008" (.15 to .20 mm.); if necessary adjust end float when refitting by adding or subtracting shims fitted between back plate and end of axle tube.

**DISCONNECT BRAKES.** At the rear of the back plate disconnect metal hydraulic pipe from wheel cylinder. Remove the clevis pin securing the hand brake cable to the operating lever which protrudes through the back plate. (A hole is provided in the hand brake cable bracket on the back plate to gain access to the clevis pin.) Pull back the hand brake cable return spring and lever out the spring retainer from the top of cable clevis and withdraw cable.

**REMOVE BACK PLATE.** Remove the five bolts and nuts securing the back plate to the end of axle tube and withdraw back plate.

On the Mark VII model note the bearing retainer plate, two gaskets and oil seal at the front of back plate and the shims fitted between the back plate and the flange of the axle tube. Do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.

On the XK 120 models note the oil seal and gasket at the front of back plate and the bearing retainer plate and shims fitted between the back plate and the flange of the axle tube. Do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.

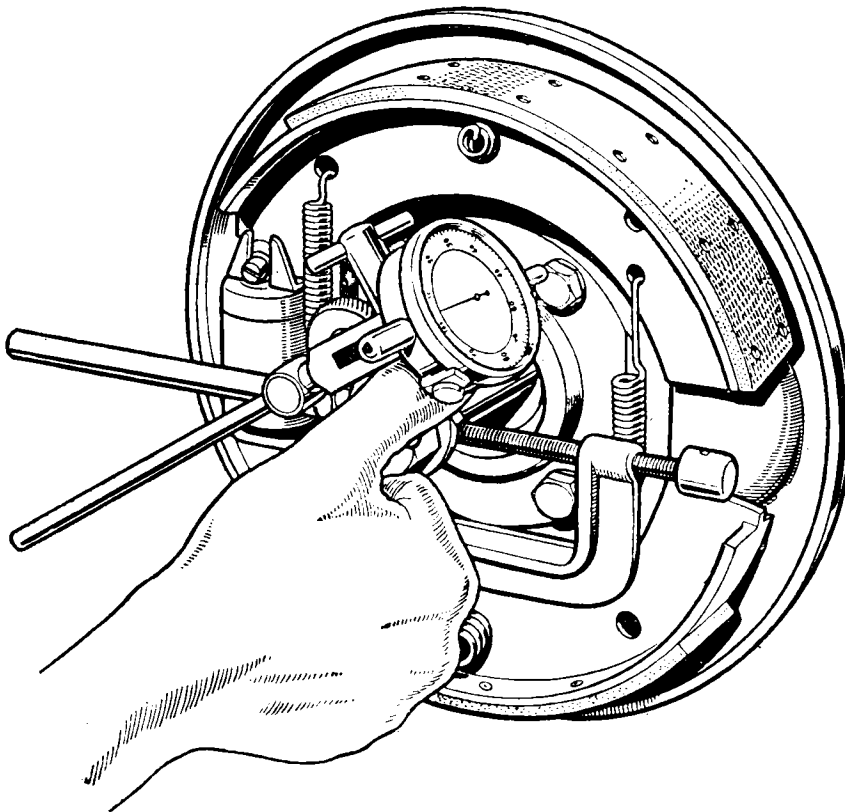


PLATE H.3. CHECKING AXLE SHAFT. END FLOAT.

**REMOVE AXLE SHAFT.** Withdraw the axle shaft with its taper roller bearing from the end of the axle tube, using Salisbury Tool No. SE.102 (see "Special Tools" on page H.9).

Examine the hub bearing and if a replacement is necessary withdraw the inner race from the axle shaft using Salisbury Tool No. SE.103 (see "Special Tools" on page H.9).

Examine the oil seal which is pressed inside the axle tube and if necessary withdraw and fit a replacement seal.

**REFIT.** Refitting is the reverse of the removal procedure but it is important to observe the following points:—

Wash the hub bearing so that the axle shaft end float may be determined accurately. Install the shaft with the taper roller inner race, taking care not to damage the oil seal. Assemble the bearing outer race, making absolutely sure that the race enters the housing squarely. Examine the hub oil seal and replace if necessary.

On the Mark VII model fit the shims, back plate, bearing retainer plate with two new paper gaskets, and oil seal. On the XK 120 model fit the shims, bearing retainer plate, back plate, new paper gasket and oil seal.

Check the axle shaft end float as in Plate H.3 with a dial indicator assembly, after gently tapping with a rawhide mallet on each axle shaft to ensure that the bearing cups are butting against the brake back plates or retaining plates.

Add or subtract adjusting shims available in thicknesses of .003", .005", .010" and .030" (.08, .13, .25 and .76 mm.) until the correct axle shaft end float of .006" to .008" (.15 to .20 mm.), which is just perceptible by hand, is obtained. Adding shims increases end float, subtracting shims decreases end float. Remove or install approximately an equal thickness of shims at each end of the axle in order to retain the axle shaft spacer in a central position.

Reconnect the hand brake cable and hydraulic pipe connections. Refit hubs and brake drums; adjust rear brakes and "bleed" the hydraulic system as described in Section L, "Brakes".

Refit road wheels and wing valances. Grease hub bearings with the recommended lubricant until grease exudes from the bleed hole.

### **DIFFERENTIAL. TO REMOVE AND DISMANTLE**

**REMOVE AXLE ASSEMBLY.** Remove the axle assembly as described on page H.10.

**REMOVE AXLE SHAFTS.** Remove axle shafts as described on page H.11.

**REMOVE DIFFERENTIAL WITH SERVICE TOOLS.** First drain the lubricant from the gear carrier housing and then remove the gear carrier rear cover. Flush out the unit thoroughly so that the parts can be carefully inspected. To remove the differential, proceed as follows:—

(1) Withdraw the four bolts securing the two differential bearing caps and remove the two caps.

(2) Before attempting to remove the differential assembly, fit the stretching fixture, Salisbury Tool No. SE.104 Plate H.4. (See "Special Tools" on page H.9.)

The fixture should be adjusted to suit the model being serviced, a series of holes being provided in the member opposite the turn-buckle for this purpose. Open the fixture by means of the turn-buckle until it is hand-tight, then spread the case by using a spanner. **DO NOT OVERSPREAD, OR THE AXLE CASING WILL BE DAMAGED BEYOND REPAIR.** The correct spread does not exceed a half turn on the turn-buckle, and this figure should not be exceeded even if the differential is still stiff to remove.

(3) The differential assembly may now be prised out by means of two levers, one on each side of the differential case opening. During this operation use suitable packing between the levers and the gear carrier.

**REMOVE DIFFERENTIAL —EMERGENCY METHOD.** First drain the lubricant from the gear carrier housing and then remove the gear carrier rear cover. Flush out the unit thoroughly so that the parts can be carefully inspected. To remove the differential, proceed as follows:—

(1) Withdraw the four bolts securing the two differential bearing caps and remove the two caps.

(2) The differential assembly should now be prised out by means of two levers, one on each side of the differential case opening, taking care not to tilt the assembly and so wedge it more tightly than it is held by the preload. During this operation use suitable protective packing between the levers and the gear carrier.

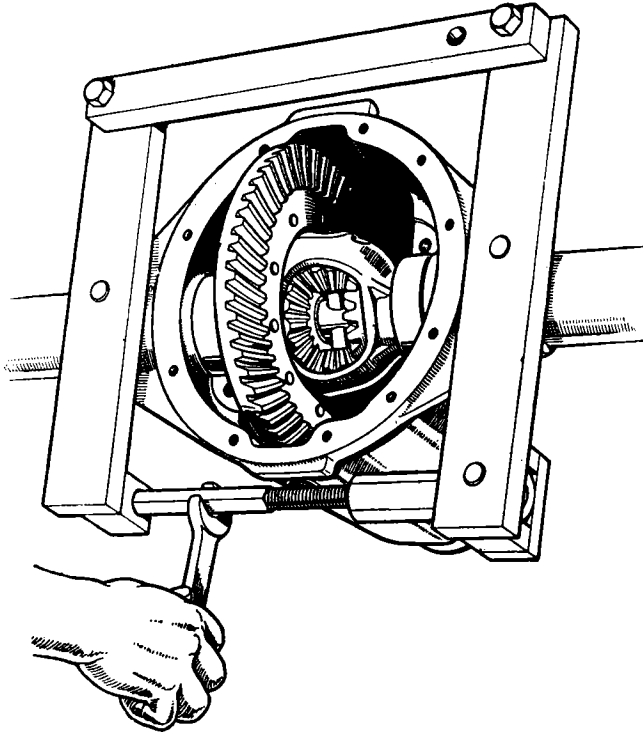


PLATE H.4. REMOVAL OF DIFFERENTIAL.

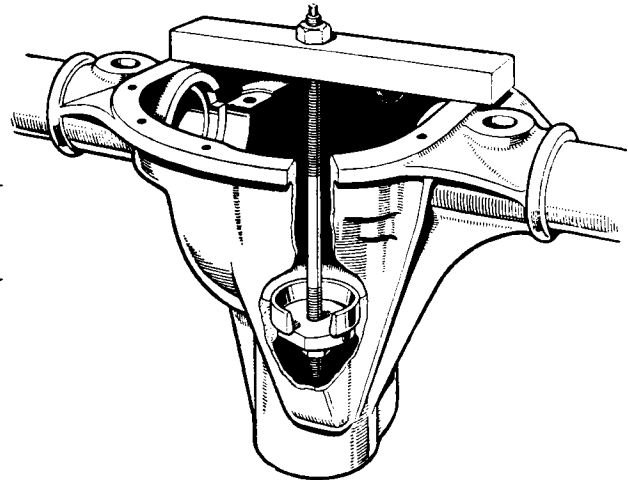


PLATE H.5. PINION INNER BEARING CUP REMOVAL

**REMOVE PINION.**

- (1) Remove the pinion split pin, nut and washer.
- (2) Withdraw the universal joint companion flange with a suitable puller.

(3) PRESS the pinion out of the outer bearing. It is important that the pinion should be pressed and not driven out to prevent damage to the outer bearing. The pinion, having been pressed from its outer bearing, may now be removed from the gear carrier housing. **Note.** Keep all shims intact.

(4) Remove the pinion oil seal together with the oil slinger and outer bearing cone.

(5) Examine the outer bearing for wear and, if replacement is required, extract the bearing cup, using Salisbury Tool No. SE.105 shown in Plate H.5. The extractor plate should be installed behind the cup and then the drawbar may be fitted together with the extractor bar which seats on the nose of the gear carrier. The bearing cup may then be withdrawn by tightening the nut on the drawbar.

(5a) If the correct service tool is not available, and the old bearing cup is to be scrapped, it is possible to drive out the cup, the shoulder locating the bearing being recessed to facilitate the operation.

(6) Remove the pinion inner bearing cup, as shown in Plate H.5, using Salisbury Tool No. SE.105, if the bearing requires replacement or adjustment of the pinion setting is to be undertaken. Take care of the shims fitted between the bearing cup and the housing abutment face.

(6a) If the inner bearing is to be replaced it may be driven out, but the correct service tool should be used when the bearing is removed in order to carry out pinion setting adjustment.

**DISMANTLE DIFFERENTIAL.** (1) Bend down the tabs on the drive gear screws locking straps and remove the drive gear screws.

(2) Remove the drive gear from the differential case by tapping with a rawhide mallet.

(3) Using a small punch, drive out the pinion mate shaft locking pin, which is secured in place by peening the case, and remove the pinion mate shaft. Plate H.6 indicates the direction in which the locking pin is removed; it is not possible to drift the pin in the opposite direction.

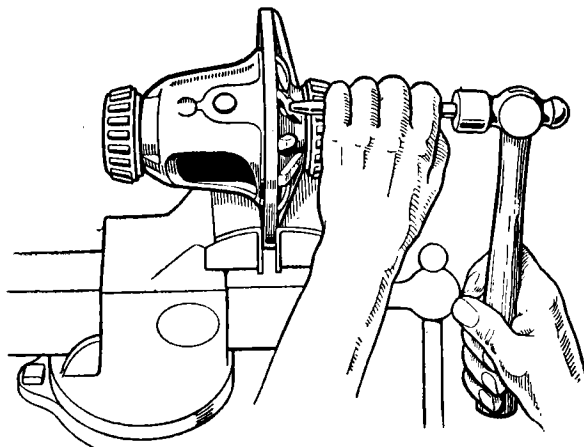


PLATE H.6. REMOVAL OF PINION MATE SHAFT PIN.

(4) Remove the axle shaft spacer.

(5) Rotate the side gears by hand until the pinions are opposite the openings in the differential case, then remove the differential gears, care being taken not to lose the thrust washers fitted behind them.

(6) If the drive gear setting is to be altered, it will be necessary to withdraw the differential bearings, using the extractor (Salisbury Tool No. SE.103), to gain access to the shims located between the bearing and the abutment face on the differential case.

## DIFFERENTIAL. TO REASSEMBLE AND REFIT

**ASSEMBLE DIFFERENTIAL.** (1) Assemble the side gears with the thrust washers in position.

(2) Insert the differential pinions, through the openings in the differential case, and mesh them with the side gears. Hold the pinion thrust washers on the spherical thrust faces of the pinions whilst rotating the differential gear assembly into its operating position by hand.

(3) Line up the pinions and thrust washers, then install the pinion mate shaft with the axle shaft spacer in position.

(4) Line up the cross hole in the shaft with the hole in the differential case, then fit the pinion mate shaft lock pin.

(5) Using a punch, peen some of the metal of the differential case over the end of the lock pin to prevent its working loose and thereby causing extensive damage to the axle assembly.

(6) Clean the drive gear and differential case contacting surfaces and carefully examine same for burrs.

(7) Align the drive gear attaching bolt holes with those in the flange of the case, and gently tap the drive gear home on the case with a hide or lead hammer.

(8) Insert the drive gear bolts, with NEW locking straps, and tighten them uniformly, preferably with a torque spanner to the reading given on page H.5. Then bend the locking tabs round the bolt heads to prevent their working loose.

The procedure for fitting the differential case assembly into the gear carrier is given under the heading "Differential Bearing Adjustment".



**DIFFERENTIAL BEARING ADJUSTMENT.** The thickness of shims required in the installation of the differential bearings is determined as follows:—

- (1) Fit the differential bearings, without shims, on the differential case, making sure that the bearing cones and cups and the housing are perfectly clean.
- (2) Place the differential assembly, with the bearing cups in their housing, within the gear carrier, the pinion not being assembled.
- (3) Install the dial indicator set on the gear carrier with the button against the back face of the drive gear.
- (4) Inserting two levers between the housing and the bearing cup, move the differential assembly to one side of the carrier, as shown in Plate H.7.

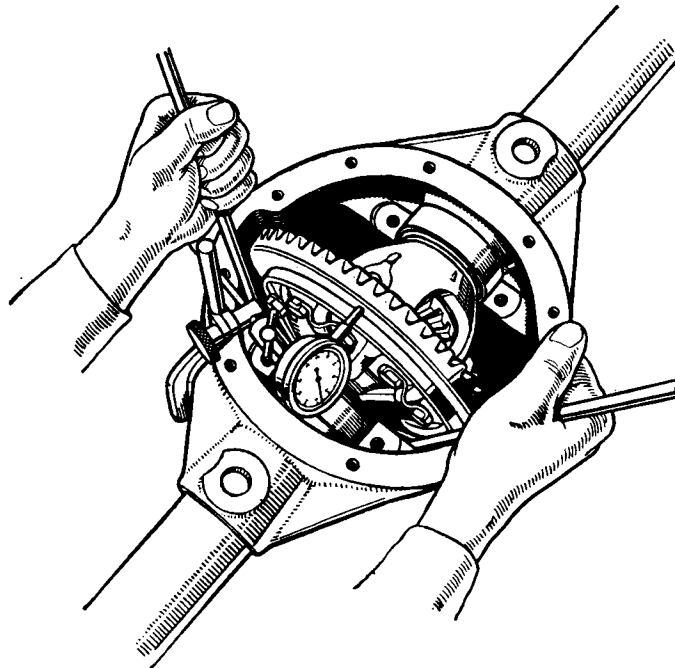


PLATE H.7. DIFFERENTIAL BEARING ADJUSTMENT.

- (5) Set the indicator to zero.
- (6) Move the assembly to the other side and record the indicator reading, which gives the total clearance between the bearings as now assembled and the abutment faces of the gear carrier housing.

Add .008" (.20 mm.) more to the clearance reading to give preload; this thickness of shims to be used in the installation of the differential bearings, the shims being divided to give the gear position with correct backlash as detailed under "Drive Gear Adjustment" on page H.18.

- (7) Remove the differential assembly from the gear carrier.

**PINION ADJUSTMENT.** Reinstall the pinion outer bearing cup with Salisbury Tool No. SE.106. Reinstall the pinion bearing inner cup with the original adjusting shims positioning same. Press the inner bearing cone on the pinion, using an arbor press and a length of tube, contacting the inner race only and not the roller retainer.

The hypoid drive pinion should be correctly adjusted before attempting further assembly, the greatest care being taken to ensure accuracy.

The correct pinion setting is marked on the ground end of the pinion as shown in Plate H.8. The matched assembly serial number at the top is also marked on the drive gear, and care should be taken to keep similarly marked gears and pinions in their matched sets, as each pair is lapped together before despatch from the factory. The letter on the left is a production code letter and has no significance relative to assembly or servicing of an axle. The letter and figure on the right refer to the tolerance on offset or pinion drop, dimension "A" in Plate H.9, which is stamped on the cover facing of the gear carrier housing. When ordering spares, specify the offset required if the best performance is to be obtained. Thus, L.1 carrier requires L.1 gears, or H.2 carrier requires H.2 gears.

The number at the bottom gives the cone setting distance of the pinion and may be Zero (0). Plus (+) or Minus (-). When correctly adjusted, a pinion marked Zero will be at the zero cone setting distance, dimension "B" in Plate H.9, from the centre line of the gear to the face on the small end of the pinion; a pinion marked Plus Two (+2) should be adjusted to the nominal (or Zero) cone setting plus .002", and a pinion marked Minus Two (-2) to the cone setting distance minus .002".

The zero cone setting distances ("B", Plate H.9) for the various axles are given below:—

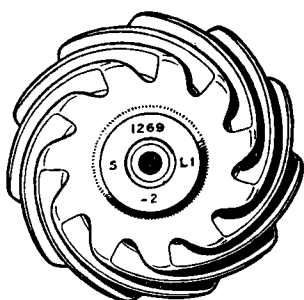


PLATE H.8.  
PINION SETTING MARKS.

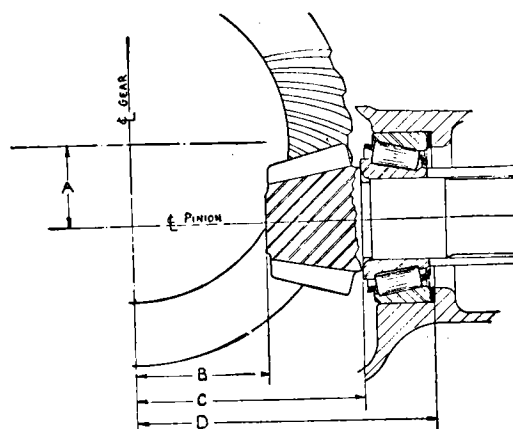


PLATE H.9.  
PINION SETTING DISTANCES.

	Mark VII		XK 120	
	4.27 : 1 ratio		3.77 : 1 ratio	3.31 : 1 ratio
A. Pinion Drop .. .. .	1.75" (44.45 mm.)		1.75"	1.5" (38.1 mm.)
B. Zero Cone Setting .. .. .	2.75" (69.85 mm.)		2.75"	2.625" (66.67 mm.)
C. Mounting Distance .. .. .	4.625" (117.47 mm.)		4.625"	4.312" (108.52 mm.)
D. Centre Line to Bearing Housing ..	5.808" (147.52 mm.)		5.808"	5.505" (139.83 mm.)
	to	to	to	to
	5.818" (147.77 mm.)		5.818"	5.495" (139.57 mm.)

Thus for a Mark VII pinion marked Minus Two (-2) the distance from the centre of the drive gear to the face of the pinion should be 2.748" (that is, 2.75" - .002") and for a pinion marked Plus Three (+3) the cone setting distance should be 2.753".

When the pinion bearing cups have been installed in the gear carrier, with the original pinion inner bearing adjusting shims, as described in the first paragraph of this section, proceed with pinion as follows:—

- (1) Place the pinion, with the inner bearing cone assembled, in the gear carrier.
- (2) Turn the carrier over and support the pinion with a suitable block of wood for convenience before attempting further assembly.
- (3) Install the pinion bearing spacer if fitted on the unit under repair (see Plate H.2 for alternative constructions).
- (4) Install the original outer bearing shims on the pinion shank so that they seat on the spacer or a shoulder on the shank, according to the construction of the unit.
- (5) Fit pinion outer bearing cone, companion flange, washer and nut only, omitting the oil slinger and oil seal assembly, and tighten the nut.
- (6) Check the pinion cone setting distance by means of the gauge, Salisbury Tool No. SE.107, as shown in Plate H.10. The procedure for using the gauge is:—
  - (a) Adjust the bracket carrying the dial indicator to suit the model being serviced, then set the dial indicator to zero with the setting block.
  - (b) Place the dial indicator assembly on the fixed spindle of the gauge body.
  - (c) Fit the fixed spindle of the gauge body into the centre in the pinion head, slide the movable spindle into position, locating in the centre in the pinion shank with the gauge body underneath the gear carrier, and lock the spindle with the screw provided.
  - (d) Check the pinion setting by taking a dial indicator reading on the differential bore with the bracket assembly seated on the ground face on the end of the pinion. The correct reading will be the minimum obtained: that is when the indicator spindle is at the bottom of the bore. Slight movement of the assembly will enable the correct reading to be easily ascertained. The dial indicator shows the deviation of the pinion setting from the zero cone setting, and it is important to note the direction of any such deviation as well as the magnitude.

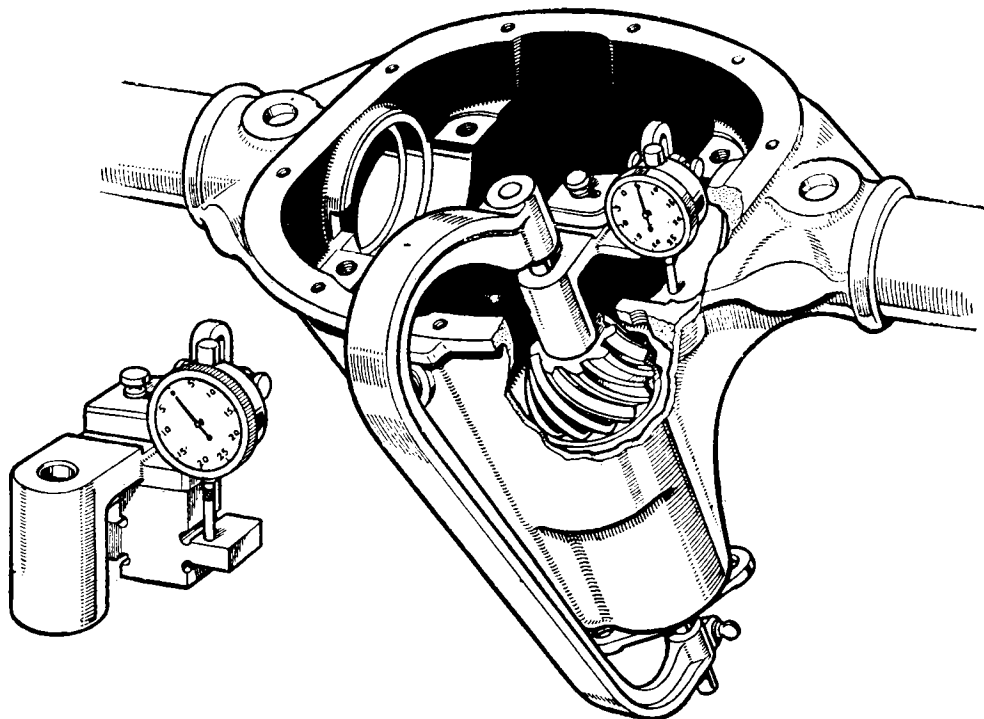


PLATE H.10. CHECKING PINION CONE SETTING.

(7) If the pinion setting is incorrect it is necessary to dismantle the pinion assembly and remove the pinion inner bearing cup using Salisbury Tool No. SE.105. Add or remove shims as required from the pack locating the bearing cup and reinstall the shim pack and the bearing cup. The adjusting shims are available in thicknesses of .003", .005" and .010". Then carry out the operations (1) to (6) detailed on page H.17.

(8) When the correct pinion setting has been obtained, check the pinion bearing preload, which should afford a slight drag or resistance to turning, there being no end play of the pinion. The correct preload for the pinion bearings gives a torque figure as listed in "Data" on page H.5. Less than the correct range will result in excessive deflection of the pinion under load, whilst too much preload will lead to pitting and failure of the bearings. To rectify the preload, adjust the shim pack between the outer bearing cone and the pinion shank or spacer, but do not touch the shims behind the inner bearing cup, which control the position of the pinion. Remove the shims to increase preload and add shims to decrease preload.

Installation of pinion oil seal assembly and oil slinger is usually effected after fitting differential assembly, see operations (1), (2) and (3) under "Final Assembly" on page H.20.

**DRIVE GEAR ADJUSTMENT.** (1) Place the differential assembly with bearing cups, and less shims, in the housing, being sure that the bearing cones, cups and housing are perfectly clean.

(2) Install a dial indicator on the housing with the button on the back face of the drive gear as shown in Plate H.7.

(3) Inserting two small levers between the housing and bearing cup, move the differential case and drive gear assembly away from the pinion until the opposite bearing cup is seated against the housing.

(4) Set the dial indicator to zero, then move the differential assembly towards the pinion until the drive gear is in metal to metal contact deeply in mesh with the pinion.

The indicator reading now obtained (clearance between drive gear and pinion) minus the backlash allowance as etched on the drive gear (e.g., B/L: .007) denotes the thickness of shims to be placed between the differential case and the bearing cone on the drive gear side of the differential.

(5) Install the thickness of shims, determined in operation (4), on the drive gear side of the differential, taking the shims from the pack determined previously; see "Differential Bearing Adjustment" on page H.15.

(6) Install the balance of the total shims required on the opposite side of the differential case.

As an example of differential and drive gear adjustment, assume that the total indicator reading obtained, as described under "Differential Bearing Adjustment", is .080". This figure, plus .008" for the recommended preload, equals .088", which denotes the total thickness of shims to be used. Also assuming the clearance between the drive gear and pinion to be .042", determined as in operations (1) to (4) above, subtract the backlash as etched on the gear, say .007", from the .042" clearance. The .035" difference denotes the thickness of shims to be placed between the differential case and bearing cone on the drive gear side of the differential. Then subtract the thickness of shims (.035") inserted on the drive gear side of the differential case from .088" and the .053" difference denotes the thickness of shims to be installed on the opposite side of the case.

(7) To facilitate installation of the differential assembly, fit the stretching fixture as shown in Plate H.4. Stretch the gear carrier, being sure not to exceed the half turn specified on the turn-buckle or the axle casing will be damaged beyond repair.

(8) Lower the differential assembly into position, lightly tapping the bearings home with a hide hammer, whilst ensuring that the gear teeth are led into mesh with those of the pinion. Careless handling at this stage may result in bruising the gear teeth, and removal of the consequent damage can only be partially successful and result in inferior performance.

(7a) **Emergency Operation.** In an emergency it is possible to install the differential assembly by slightly tilting the bearing cups and tapping same lightly into position with a hide hammer. Naturally, this method increases the difficulty of avoiding damage to gear teeth, and extreme care is necessary to prevent damage to the differential bearings. This procedure is not recommended and should be strictly reserved for emergencies.

(8a) Install the differential bearing caps, taking care to ensure that the position of the numerals marked on the gear carrier housing face and the caps correspond, as indicated in Plate H.11. Finally tighten the bolts securing the bearing caps.

(9) When refitting the bearing caps, be sure that the position of the numerals marked on the gear carrier housing face and the caps correspond, as indicated in Plate H.11. Tighten the caps tightly, remove the stretching fixture, then finally tighten the bolts securing the bearing caps. Then continue with operation (10).

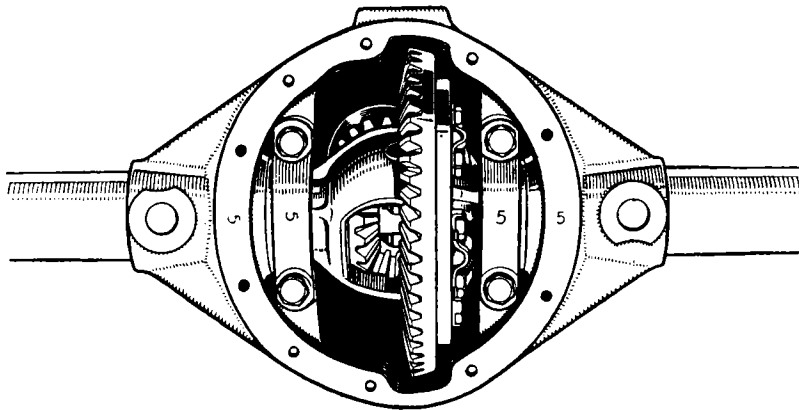


PLATE H.11. DIFFERENTIAL BEARING CAP MARKINGS.

(10) Mount a dial indicator on the gear carrier housing with the button against the back face in a similar manner to that employed for differential bearing adjustment, as shown in Plate H.7. Turn the pinion by hand and check the run out on the back face, which should not exceed .005" (.13 mm.). If there is excessive run out, strip the assembly and rectify by cleaning the surfaces locating the drive gear. Any burrs on these surfaces should be removed.

(11) Remount the dial indicator on the gear carrier housing with the button against one of the drive gear teeth, as nearly in line with the direction of tooth travel as possible (see Plate H.12). Move the drive gear by hand to check the backlash which should be as etched on the gear. If the backlash is not in accordance with the specification, transfer the necessary shims from one side of the differential case to the other to obtain the desired setting. To increase backlash, remove shims from the drive gear side of the differential and install on the opposite side. Backlash is decreased by transferring shims to the drive gear side from the opposite side of the differential case.

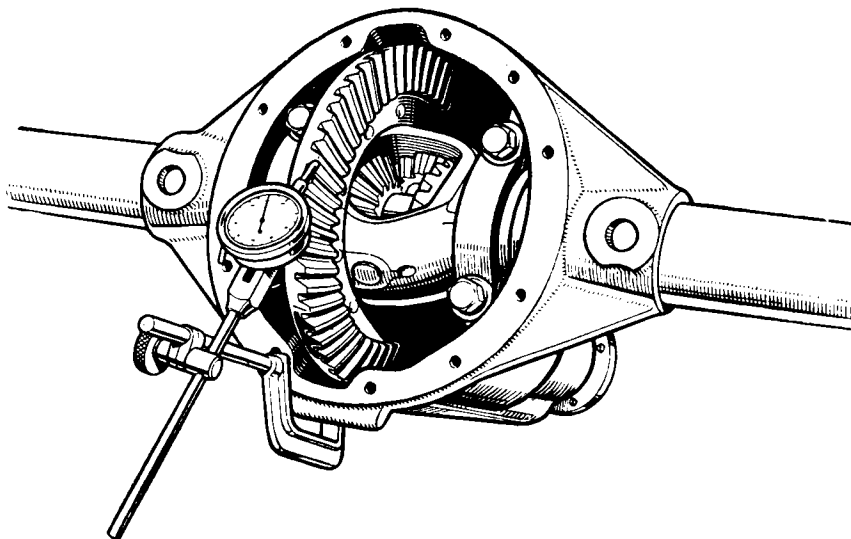


PLATE H.12. CHECKING BACKLASH BETWEEN GEARS.

(12) After setting the backlash to the required figure, use a small brush to paint eight or ten of the drive gear teeth with a stiff mixture of marking raddle, used sparingly, or engineer's blue may be used if preferred. Move the painted gear teeth in mesh with the pinion until a good impression of the tooth contact is obtained. The resulting impression should be similar to Fig. A in Plate H.14. Refer to the section on tooth contact and to Plate H.14 for instructions on correction of tooth contact if the impression obtained is not satisfactory.

**FINAL ASSEMBLY.**

To complete the rebuilding of the unit:—

- (1) Remove the drive pinion nut, washer and companion flange.
- (2) Install the oil slinger, and then fit the pinion oil seal assembly, using Salisbury Tool No. SE.108, as shown in Plate H.13. Place the oil seal with the dust excluder flange uppermost (not omitting the oil seal gasket used with the metal case type seal on later models), fit the installation collar, Salisbury Tool SE.108, and then tighten down the pinion nut and washer to drive the assembly home. Remove the installation collar.

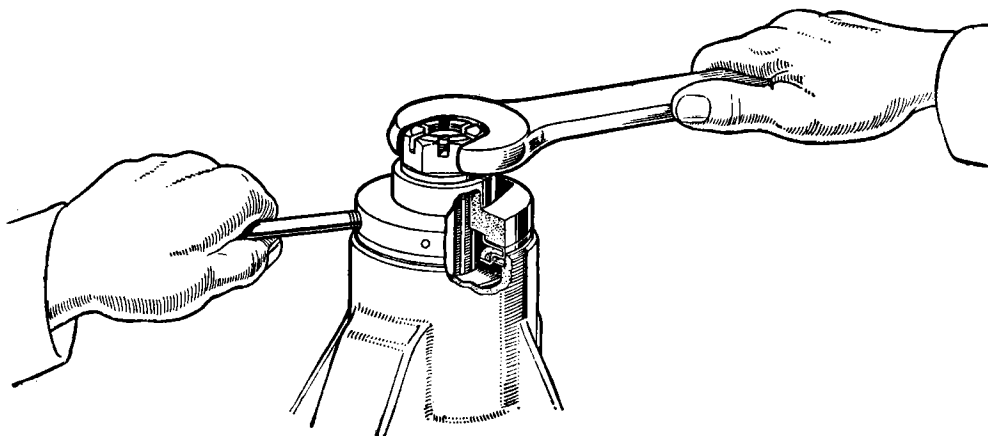


PLATE H.13. FITTING PINION OIL SEAL.

- (3) Fit the companion flange with dust excluder, washer and pinion nut, tighten, and secure with a cotter pin.
- (4) Fit the rear cover gasket, renewing it if required, and rear cover, securing same with set bolts and lock washers, not omitting the ratio tag which is attached by one of the set bolts.
- (5) Reinstall the axle shafts and hub bearings, etc., as described on Page H.11 under "Axle Shafts. To Refit".
- (6) Check that the drain plug is securely tightened, then fill with the appropriate quantity of one of the hypoid lubricants recommended on page H.5.
- (7) Replace the filler plug and check that the cover set bolts are tight.
- (8) Check for oil leaks at the cover, pinion oil seal and where the differential cap bolt holes break through the carrier.
- (9) Finally grease the hub bearings.

**TOOTH CONTACT.**  
(Refer to Plate H.14.)

The illustrations referred to in this section are those shown in Plate H.14, which indicate the tooth bearing impression as seen on the drive gear.

- The HEEL is the large or outer end of the tooth.
- The TOE is the small or inner end of the tooth.
- The FACE, top or addendum is the upper portion of the tooth profile.
- The FLANK or dedendum is the lower portion of the tooth profile.
- The DRIVE side of the drive gear tooth is CONVEX.
- The COAST side of the drive gear tooth is CONCAVE.

	TOOTH CONTACT (DRIVE GEAR)	CONDITION	REMEDY
A		<p><b>IDEAL TOOTH CONTACT</b> Evenly spread over profile, nearer toe than heel.</p>	<p style="text-align: center;">○ — ○</p>
B		<p><b>HIGH TOOTH CONTACT</b> Heavy on the top of the drive gear tooth profile.</p>	<p>Move the <b>DRIVE PINION DEEPER INTO MESH.</b> <i>i.e.</i>, <b>REDUCE</b> the pinion cone setting.</p>
C		<p><b>LOW TOOTH CONTACT</b> Heavy in the root of the drive gear tooth profile.</p>	<p>Move the <b>DRIVE PINION OUT OF MESH.</b> <i>i.e.</i>, <b>INCREASE</b> the pinion cone setting.</p>
D		<p><b>TOE CONTACT</b> Hard on the small end of the drive gear tooth.</p>	<p>Move the <b>DRIVE GEAR OUT OF MESH.</b> <i>i.e.</i>, <b>INCREASE</b> backlash.</p>
E		<p><b>HEEL CONTACT</b> Hard on the large end of the drive gear tooth.</p>	<p>Move the <b>DRIVE GEAR INTO MESH.</b> <i>i.e.</i>, <b>DECREASE</b> backlash <i>but</i> maintain minimum backlash as given on page H.5.</p>

PLATE H.14. TOOTH CONTACT INDICATION (Contact markings on drive gear).

(a) **Ideal Contact.** Fig. A shows the ideal tooth bearing impression on the drive and coast sides of the gear teeth. The area of contact is evenly distributed over the working depth of the tooth profile and is located nearer to the toe (small end) than the heel (large end). This type of contact permits the tooth bearing to spread towards the heel under operating conditions when allowance must be made for deflection.

**(b) High Tooth Contact.** In Fig. B it will be observed that the tooth contact is heavy on the drive gear face or addendum, that is, high tooth contact. To rectify this condition, move the pinion deeper into mesh, that is, reduce the pinion cone setting distance, by adding shims between the pinion inner bearing cup and the housing and adding the same thickness of preload shims between the pinion bearing spacer, or the shoulder of the pinion shank and outer bearing cone. This correction has a tendency to move the tooth bearing towards the toe on drive and heel on coast, and it may therefore be necessary after making this change to adjust the drive gear as described in paragraphs (d) and (e).

**(c) Low Tooth Contact.** In Fig. C it will be observed that the tooth contact is heavy on the drive gear flank or dedendum, that is, low tooth contact. This is the opposite condition from that shown in (b) and is therefore corrected by moving the pinion out of mesh, that is, increase the pinion cone setting distance by removing shims from between the pinion inner bearing cup and housing, and removing the same thickness of preload shims from between the pinion bearing spacer or the shoulder on the pinion shank and the outer bearing cone. This correction has a tendency to move the tooth bearing towards the heel on drive and toe on coast, and it may therefore be necessary after making this change to adjust the drive gear as described in (d) and (e).

**(d) Toe Contact.** Fig. D shows an example of toe contact which occurs when the bearing is concentrated at the small end of the tooth. To rectify this condition, move the drive gear out of mesh, that is, increase backlash, by transferring shims from the drive gear side of the differential to the opposite side.

**(e) Heel Contact.** Fig. E shows an example of heel contact which is indicated by the concentration of the bearing at the large end of the tooth. To rectify this condition move the drive gear closer into mesh, that is, reduce backlash, by adding shims to the drive gear side of the differential and removing an equal thickness of shims from the opposite side.

**Note.** It is most important to remember when making this adjustment to correct a heel bearing that sufficient backlash for satisfactory operation must be maintained. If there is insufficient backlash the gears will at least be noisy and have a greatly reduced life, whilst scoring of the tooth profile and breakage may result. Therefore, always maintain a minimum backlash requirement of .004" (.10 mm.).

**BACKLASH.** When adjusting backlash always move the drive gear as adjustment of this member has more direct influence on backlash, it being necessary to move the pinion considerably to alter the backlash a small amount (.005" (.13 mm.) movement on pinion will generally alter backlash .001" (.025 mm.)).

**GEAR AND PINION MOVEMENT.** Moving the gear out of mesh moves the tooth contact towards the heel and raises it slightly towards the top of the tooth.  
Moving the pinion out of mesh raises the tooth contact on the face of the tooth and slightly towards the heel on drive, and towards the toe on coast.



**DESCRIPTION AND MAINTENANCE (E.N.V. AXLE)**

**GENERAL.** The E.N.V. axle is fitted to a proportion of XK 120 cars; the remaining cars being fitted with the Salisbury type of axle. For further information and the identification features of the two types of axle refer to "Rear Axles—General" on page H.4.

**DESCRIPTION.** The rear axle assembly, Plate H1.1, is of the hypoid semi-floating type with shim adjustment of pinion shaft bearings but with adjusting nuts for the differential crown wheel. The axle shafts are splined at the inner ends to engage splines in the differential side gears, the outer ends being integral with the hub, this assembly being attached to the flanges at either end of the axle casing by bolts passing through the bearing housings. The wheels are each supported on a taper roller bearing retained in the housing previously referred to and the side thrust from the wheels is transferable from one shaft to the other by a thrust button on the end of each axle shaft. The axle can be either partially dismantled, that is, for purposes of examination of half shafts and hub races, or fully dismantled, that is, for removal of differential without necessarily removing axle casing from chassis. The axle serial number and gear ratio is stamped on the flat rectangular face on top of the nose of the differential.

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) check the level of oil in the rear axle differential when the car is standing on level ground. A combined filler and dipstick is fitted on top of the nose of the differential. Top up, if necessary, to the high mark on the dipstick with the recommended grade of lubricant. Since hypoid oils of different brands may not mix satisfactorily, draining and refilling is preferable to topping up if the brand of oil in the axle is unknown.

Every 5,000 miles (8,000 kilometres) lubricate the rear wheel bearings sparingly with recommended lubricant through the nipples provided. The nipples are situated on the bottom of the axle casing immediately behind the brake back plates. A bleed hole is provided above the nipple to indicate when an excess of lubricant has been applied.

Every 10,000 miles (16,000 kilometres) drain, flush out with flushing oil and refill with the recommended grade of lubricant. The drain plug is fitted at the base of the differential. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

Every 10,000 miles (16,000 kilometres) check and tighten, if necessary, the rear axle "U" bolts. It is desirable at this mileage to check and correct, if necessary, the axle shaft end float.

**RECOMMENDED LUBRICANTS**

	Vacuum	Wakefield	Shell	Esso	Price's	S.A.E. Viscosity
Rear Axle .. .. . (Use only <b>HYPOID</b> oil)	Mobilube GX.90	Castrol Hypoy	Spirax 90 E.P.	Expee Compound 90	Energol E.P.	Hypoid 90
Wheel Bearings .. ..	Mobilgrease No. 5	Castrollease WB	Retinax A	Esso High Temp. Grease	Belmoline H.M.P.	

Rear axle capacity, 3½ pints (2.0 litres)—4.2 U.S. pints.

**AXLE RATIOS**

Standard .. 3.64 : 1 (51×14) High .. 3.27 : 1 (59×18)  
Alternative ratios: 3.92 : 1 ; 4.3 : 1 ; 4.56 : 1

**DATA**

Axle Shaft End Float .. .. .005" to .008" (.13 to .20 mm.)  
Backlash .. .. .006" (.15 mm.)

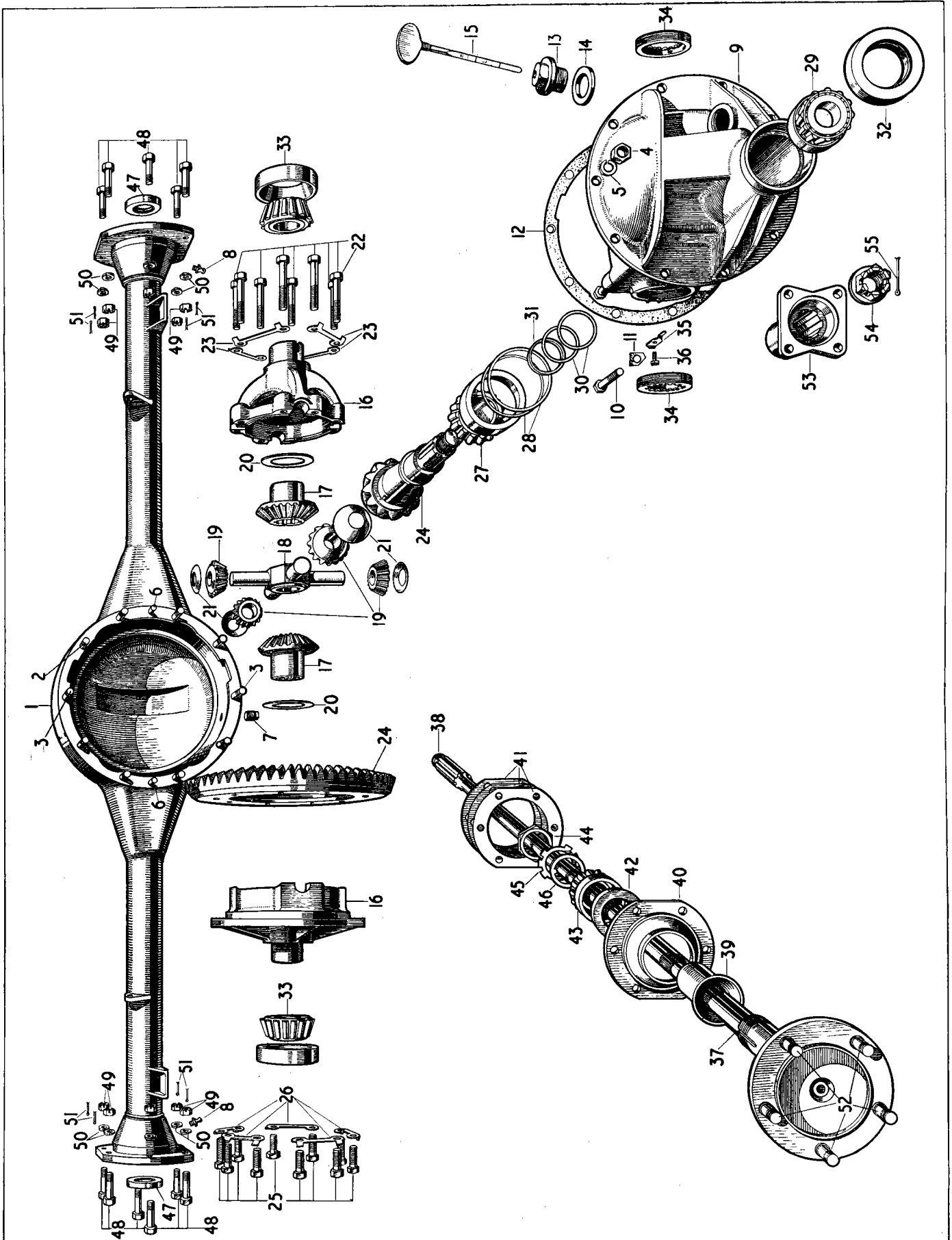


PLATE H1.1. REAR AXLE ASSEMBLY (E.N.V.). Exploded view.

INDEX TO PLATE H.I.1. REAR AXLE ASSEMBLY (E.N.V.). EXPLODED VIEW

Axle Casing .. .. .	1	Shim, adjusting Pinion Shank Bearing .. .. .	30
Stud (Short) for the attachment of Pinion Housing .. .. .	2	Piece, Distance, between Shank of Pinion and Shank Adjusting Shims .. .. .	31
Stud (Long) for the attachment of Pinion Housing .. .. .	3	Seal, Oil, in end of Pinion Housing .. .. .	32
Nut on Studs .. .. .	4	Bearing, Roller, for Differential Box .. .. .	33
Washer, Spring, under Nuts .. .. .	5	Nut, adjusting Differential Box .. .. .	34
Pin, Dowel, locating Pinion Housing on Casing .. .. .	6	Plate, locking Adjusting Nut .. .. .	35
Plug, Oil Drain .. .. .	7	Screw, Set, securing Adjusting Nut Lock Plate to Bearing Cap .. .. .	36
Nipple, Grease, on outer end of Axle Casing .. .. .	8	Rear Axle Shaft (combining Hub and Thrust Button) .. .. .	37
Pinion Housing (complete with Bearing Caps and Bolts)	9	Button, Thrust, on Inner End of Axle Shafts .. .. .	38
Bolt, securing Bearing Caps .. .. .	10	Piece, Distance, on Shafts .. .. .	39
Plate, locking Bearing Cap Bolts .. .. .	11	Housing, for Hub Bearings .. .. .	40
Washer, Jointing, between Pinion Housing and Axle Casings .. .. .	12	Shim, Adjusting, between Bearing Housing and Brake Anchor Plate .. .. .	41
Plug, Oil Filler .. .. .	13	Seal, Oil, in Bearing Housings .. .. .	42
Washer, Jointing, for Oil Filler Plug .. .. .	14	Bearing, Roller, for Hubs .. .. .	43
Dipstick .. .. .	15	Nut, locking Hub Bearing on Axle Shaft .. .. .	44
Case, Differential .. .. .	16	Washer, Tab, for Lock Nut .. .. .	45
Gear Side, for Differential .. .. .	17	Washer, Tongued, between Tab Washer and Hub Bearing .. .. .	46
Piece, Star, for Differential Pinion Mate Gears .. .. .	18	Seal, Oil, for Axle Shaft .. .. .	47
Gear, Differential Pinion Mate .. .. .	19	Bolt, securing Bearing Housing and Brake Anchor Plate to Axle Casing .. .. .	48
Washer, Thrust, for Side Gears .. .. .	20	Nut on Bolts .. .. .	49
Washer, Thrust, for Pinion Mate Gears .. .. .	21	Washer, Spring, under Nuts .. .. .	50
Bolt, securing Differential Case .. .. .	22	Pin, Split, through Nuts .. .. .	51
Plate, locking Bolts .. .. .	23	Stud for Brake Drum and Road Wheels .. .. .	52
Crown Wheel and Pinion .. .. .	24	Pinion Companion Flange .. .. .	53
Bolt, securing Crown-Wheel to Differential Case .. .. .	25	Nut, securing Companion Flange to Pinion .. .. .	54
Plate, locking Crown-Wheel Bolts .. .. .	26	Pin, Split, through Nut .. .. .	55
Bearing, Roller, Pinion Head .. .. .	27		
Shim, adjusting Pinion Head Bearing .. .. .	28		
Bearing, Roller, Pinion Shank .. .. .	29		

**REAR AXLE. SERVICING**

Factory reconditioned differential units are available on an exchange basis, and it is recommended that this service be utilised in preference to overhauling the existing differential. Full servicing instructions are, however, given in this section.

**REAR AXLE. TO REMOVE**

**GENERAL.** Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release hand brake.

**DISCONNECT BRAKES.** Disconnect the metal hydraulic pipe at the connection to each wheel cylinder. Plug ends of hydraulic pipe to avoid loss of fluid. Remove the bolt securing the three-way connection to the rear axle case and tie up hydraulic pipe to chassis frame. Disconnect the hand brake cable from the levers protruding through brake back plate by removing the clevis pin and release the cable from its attachments to the rear axle case.

**REMOVE AXLE SHAFTS.** Slacken off all available brake shoe adjustment by rotating adjuster anti-clockwise. Remove two set screws locating each brake drum to axle shaft flange. Ease drums off register. Remove split pins, slotted nuts and spring washers from the six bolts securing each bearing housing and brake back plate to the flanges of axle casing. Ease axle shafts away from casing, thus exposing adjusting shims between bearing housing and back plate. (Plate H1.2.) Remove back plate. Do not lose or transpose shims from side to side.

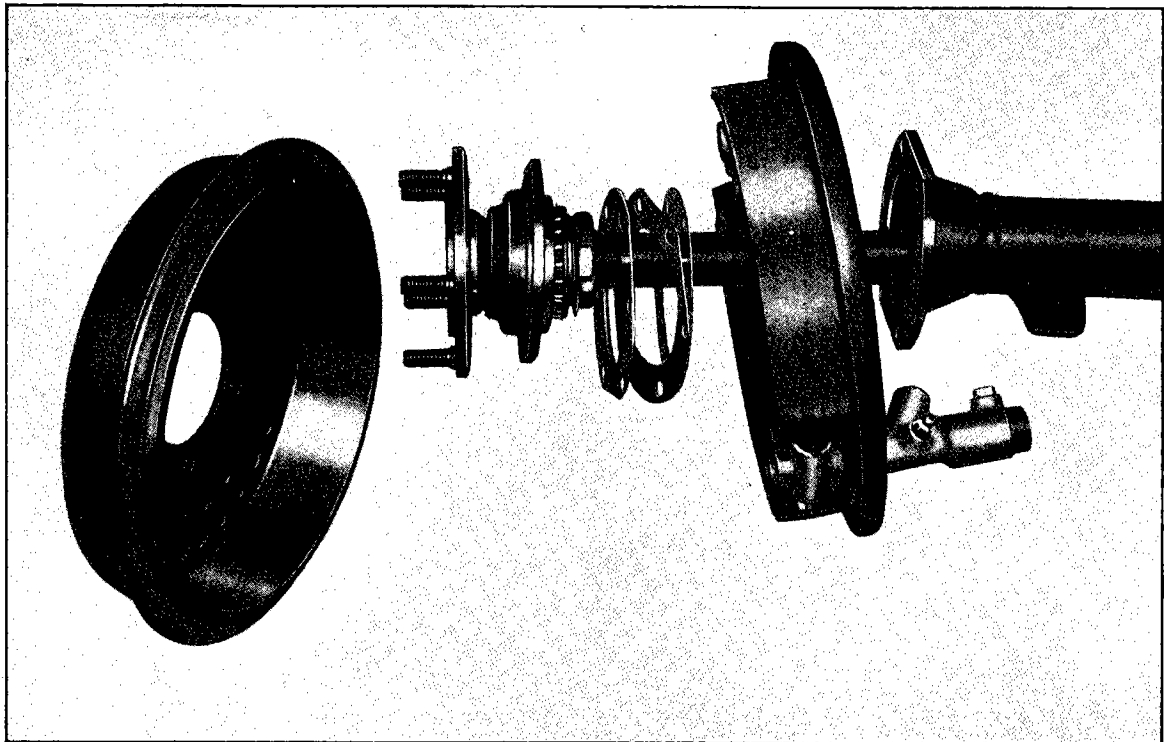


PLATE H1.2. AXLE SHAFT REMOVAL.

**DISCONNECT PROPELLER SHAFT.** Remove cotter pins and four slotted nuts securing rear axle companion flange to propeller shaft. Withdraw bolts, spring propeller shaft out of register and place clear.

**REMOVE DIFFERENTIAL.** Removal of the rear axle will be facilitated if the differential is withdrawn from the axle case after draining the oil and unscrewing the securing nuts.

**REMOVE "U" BOLTS.** Remove lock nuts and nuts from rear axle "U" bolts. Remove "U" bolts and "U" bolt plates.

**REMOVE CHECK STRAPS.** Remove two nuts and bolts per side securing check straps to chassis frame and withdraw check straps.

**DISCONNECT SHOCK ABSORBERS.** Disconnect rear shock absorbers by removing two nuts from each link arm and tap link arms out of lugs on axle casing and shock absorber arms.

**REMOVE AXLE.** Slide axle assembly to the right until left-hand end of case is clear of road spring and exhaust tail pipe. Lower to floor and withdraw under car.

**Note.** On early production XK 120 cars a wedge was fitted between the spring and the axle spring pad. This wedge must be fitted so that the widest end is to the front.

### REAR AXLE. TO REFIT

**GENERAL.** Refitting is the reverse of the above procedure but particular attention should be paid to the following points. Refitting of the rear axle will be facilitated if the differential unit is not assembled to the axle case until the case has been attached to the rear springs.

**REFIT.** When the rear axle assembly has been attached to the rear springs it will be necessary to jack up each spring to facilitate the fitting of the shock absorber links and check straps. Ensure that the centre bolt of the spring seats in the dowel hole in the spring pad and observe that on a number of early cars a wedge is fitted between spring and axle spring pad. In such cases ensure that the wedge is refitted widest end to front and that the hole in the wedge engages with the spring centre bolt.

**REFIT AXLE SHAFTS.** Fit a new oil seal into the housing at either end of the axle casing, lip of oil seal facing axle centre. Offer up brake back plate to axle shaft assembly and pass axle shaft into casing until the splined end engages with the differential side gear. Ensure that the same number of shims found on dismantling are positioned between the back plates and the bearing housing. The same number of shims should be fitted on either side to centralise the axle shafts, the combined end play on which should be from .005" to .008" (.13 to .20 mm.). Secure the bearing housing to the flange of the axle casing with the six bolts, spring washers, nuts and new split pins. Full details on adjusting end play will be found on page H1.28.

**CONNECT BRAKES.** After refitting the hydraulic connections and brake drums it will be necessary to "bleed" the hydraulic system and adjust the brakes as described in Section L, "Brakes".

### AXLE SHAFTS. TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT

**GENERAL.** Early production XK 120 cars were fitted with axles having a four-pinion differential as illustrated in this section. Later production cars are fitted with axles having a two-pinion differential with an axle shaft spacer interposed between the side gears; to accommodate this spacer, shorter axle shafts are fitted.

Axle shafts fitted to the two-pinion differential type of axle are therefore not interchangeable with those fitted to the four-pinion type.

**REMOVAL.** Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release hand brake. Remove two set screws locating each brake drum to axle shaft flanges. Ease drums off register. Remove split pins, slotted nuts and spring washers from six bolts securing each bearing housing and brake back plate to the flange of axle

casing. Ease axle shafts away from casing thus exposing adjusting shims between bearing housing and back plate. Refit two bolts to secure back plate in position and thus avoid damage to brake hydraulic connections. Do not lose or transpose shims from side to side.

**DISMANTLING.** Bend back locking tab of tab washer and remove securing nut. Press axle shaft through housing noting that a distance piece is fitted on the shaft to locate the race inner member. (Plate H1.3.) Extractor slots are provided in the bearing housing for the purpose of removing outer ring of the hub bearing and oil seal. Remove and scrap oil seal situated in axle casing flange.

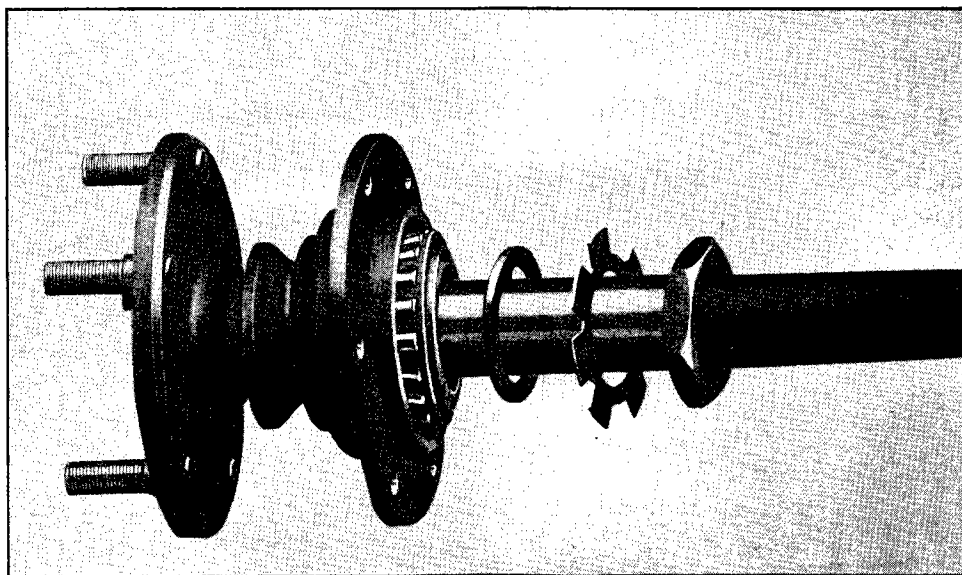


PLATE H1.3. AXLE SHAFT ASSEMBLY.

**REASSEMBLE.** Drop bearing spacer on to axle shaft with large diameter facing flange and then assemble bearing housing taking care to ensure that a new oil seal is used and is correctly located on parallel section of spacer. Lip of oil seal should face axle centre.

Lubricate bearing with recommended lubricant and press inner member of hub bearing on to shaft, fit distance washer and tab washer and secure with nut, locking after finally tightening.

**REFIT.** Fit new oil seals into their housings in the axle flanges, lip of oil seal facing centre of axle. Install the axle shafts in the axle casing and secure each bearing housing with the six bolts, spring washers, slotted nuts and new split pins. Check the combined axle shaft end float which should be .005" to .008" (.13 mm. to .20 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting shims decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position. Shims are available in thicknesses of .002", .006", .010", .032" and .062" (.05 mm., .13 mm., .25 mm., .81 mm. and 1.57 mm.). Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled. The remaining operations are the reverse of the removal procedure.

**DIFFERENTIAL. TO REMOVE**

**GENERAL.** The differential may be withdrawn without disturbing the axle casing from the chassis. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release hand brake. Drain oil from differential.

**REMOVE AXLE SHAFTS.** Remove two set screws locating each brake drum to axle shaft flange. Ease drums off register. Remove split pins, slotted nuts and spring washers from the six bolts securing each bearing housing and brake back plate to the flanges of axle casing. Ease axle shaft away from casing thus exposing adjusting shims between bearing housing and back plate. Remove back plates. Do not lose or transpose shims from side to side.

**DISCONNECT PROPELLER SHAFT.** Remove cotter pins and four slotted nuts securing rear axle companion flange to propeller shaft. Withdraw bolts, spring propeller shaft out of register and place clear.

**REMOVE DIFFERENTIAL.** Remove ten nuts with spring washers securing differential housing to studs on axle casing and withdraw the housing forward observing that this is located by dowels. (Plate H1.4.)

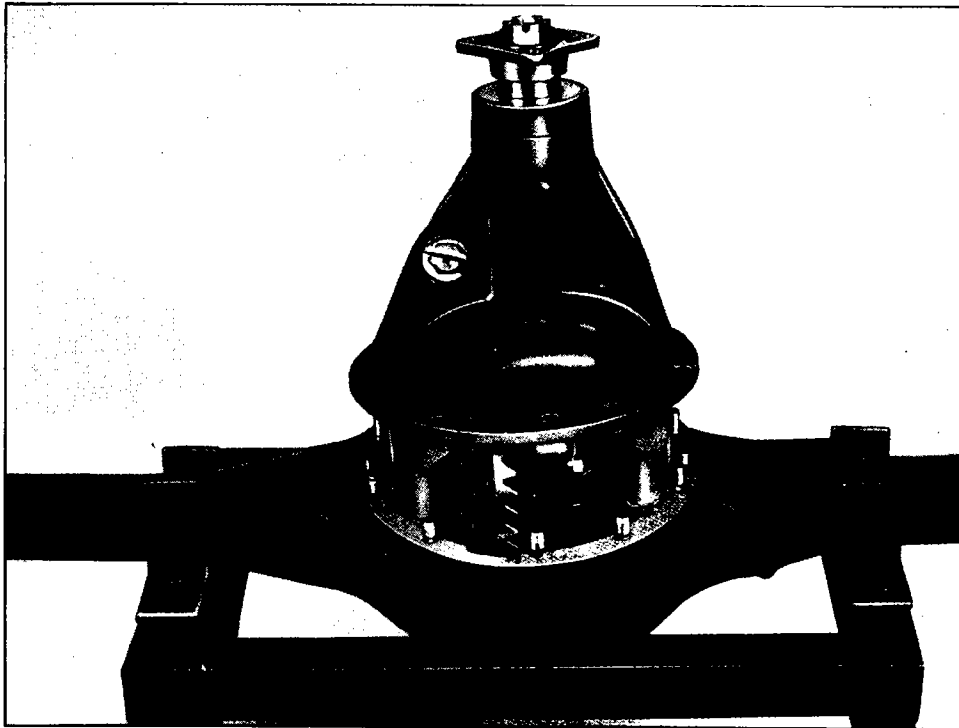


PLATE H1.4. DIFFERENTIAL REMOVAL.

**DIFFERENTIAL. TO REFIT**

**REFIT DIFFERENTIAL.** Clean axle case and differential housing joint faces. Apply a new jointing washer and jointing compound over studs of axle casing. Assemble housing over studs and dowel pins and secure with ten nuts and spring washers.

**RECONNECT PROPELLER SHAFT.** Assemble propeller shaft to pinion shaft flange and secure with nuts, bolts and new cotter pins.

**REFIT AXLE SHAFTS.**

Fit new oil seals into their housings in the axle flanges, lip of oil seal facing centre of axle. Install the axle shafts in the axle casing and secure each housing bearing with the six bolts, spring washers, slotted nuts and new split pins. Check the combined axle shaft end float which should be .005" to .008" (.13 mm. to .20 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting shims decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position.

Shims are available in thicknesses of .002", .006", .010", .032" and .062" (.05 mm., .13 mm., .25 mm., .81 mm. and 1.57 mm.). Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled. The remaining operations are the reversal of the removal procedure. Refill differential with recommended lubricant.

**DIFFERENTIAL ASSEMBLY. TO DISMANTLE**

**GENERAL.**

Early production XK 120 cars were fitted with axles having a four-pinion differential as illustrated in this section. Later production cars are fitted with axles having a two-pinion differential with an axle shaft spacer interposed between the side gears; to accommodate this spacer, shorter axle shafts are fitted.

**REMOVE ADJUSTING NUTS.**

Remove set screw and locking plates retaining the two differential adjusting nuts in the differential box. Remove adjusting nuts.

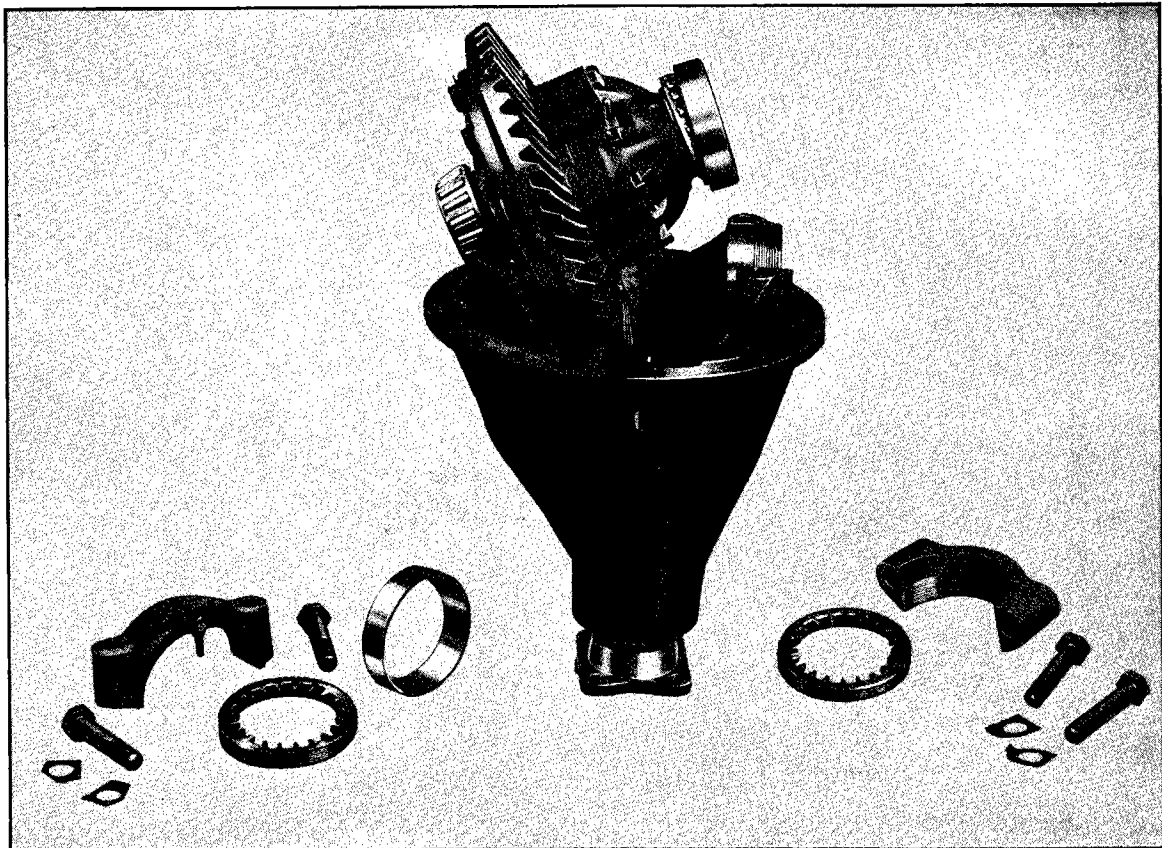


PLATE H1.5. DIFFERENTIAL BOX REMOVAL.



**REMOVE  
DIFFERENTIAL  
BOX.**

Lift tab washers and remove four set bolts securing differential box bearing caps. Withdraw differential box complete with bearings.

**REMOVE  
CROWN  
WHEEL.**

Release tab washers on the ten set screws securing crown wheel to the differential box. Remove crown wheel.

**REMOVE  
DIFFERENTIAL  
GEARS.**

Release tab washers and remove eight set bolts securing the two halves of the differential case together. Separate differential case at centre register. Remove differential pinion mate gears and thrust washers, side gears, thrust washers and star piece.

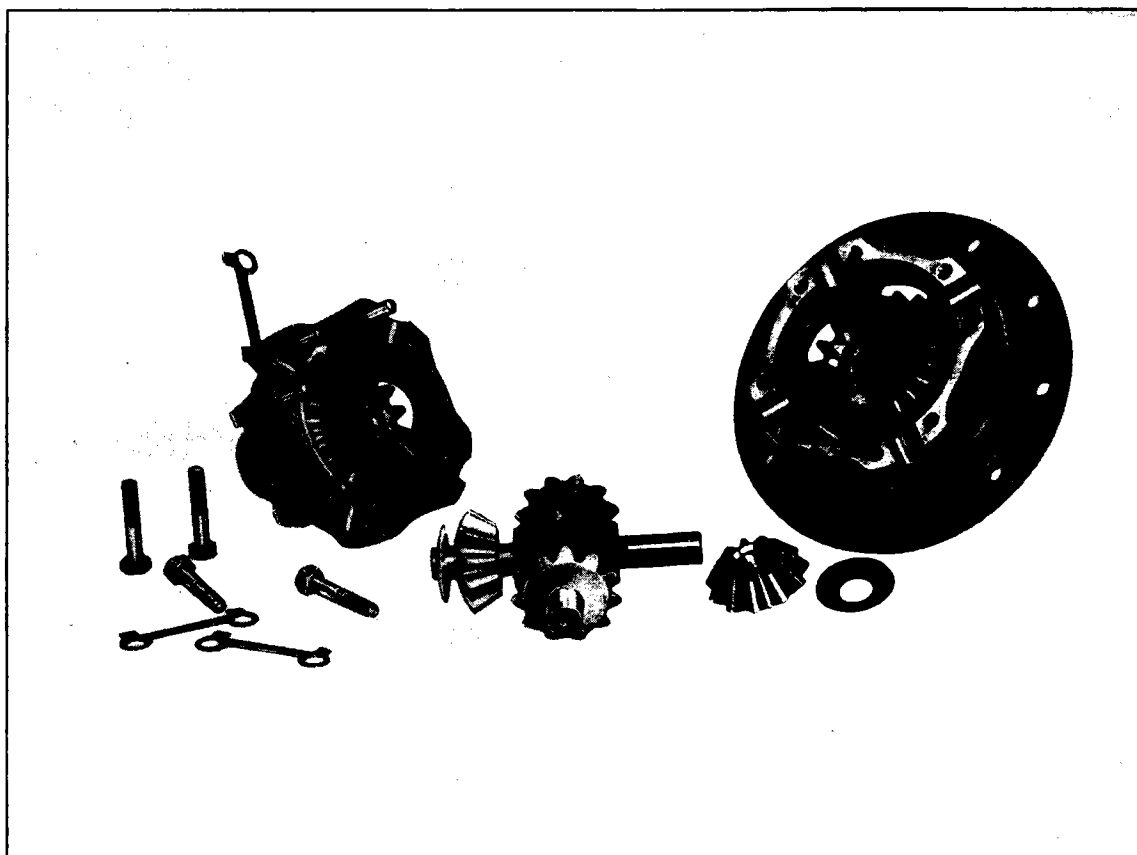


PLATE H1.6. DIFFERENTIAL DISMANTLED (Four-Pinion Type illustrated).

**REMOVE PINION SHAFT.**

Remove split pin, slotted nut and plain washer from pinion shaft and press pinion through coupling flange and bearings. The inner cone of pinion head bearing will be left on the pinion shaft. Remove and scrap oil seal from recess in nose of differential case and press out the outer race of the pinion head bearing observing shims fitted behind bearing which control correct meshing of pinion in relationship to crown wheel. Press out the pinion tail bearing observing shims fitted behind shoulder of pinion and thrust face of bearing which control bearing pre-load. Draw the differential bearing off each half of the differential case.

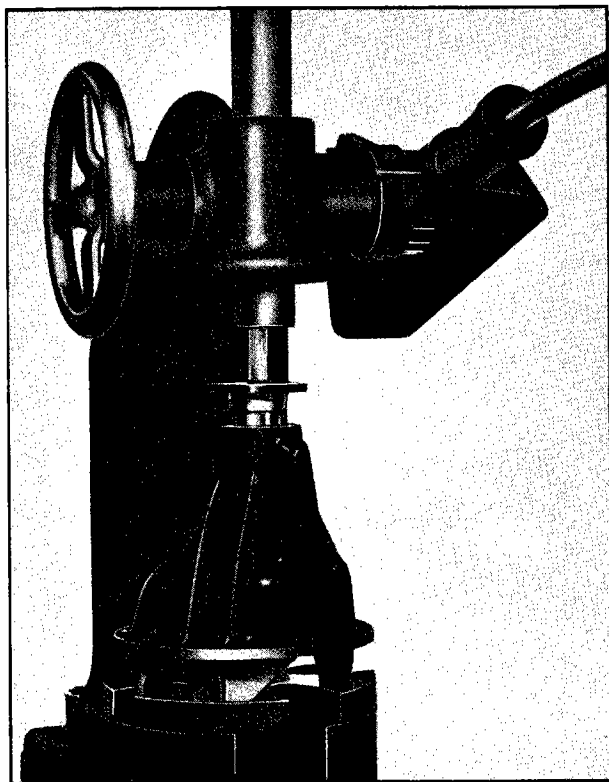


PLATE H1.7. PINION SHAFT REMOVAL.

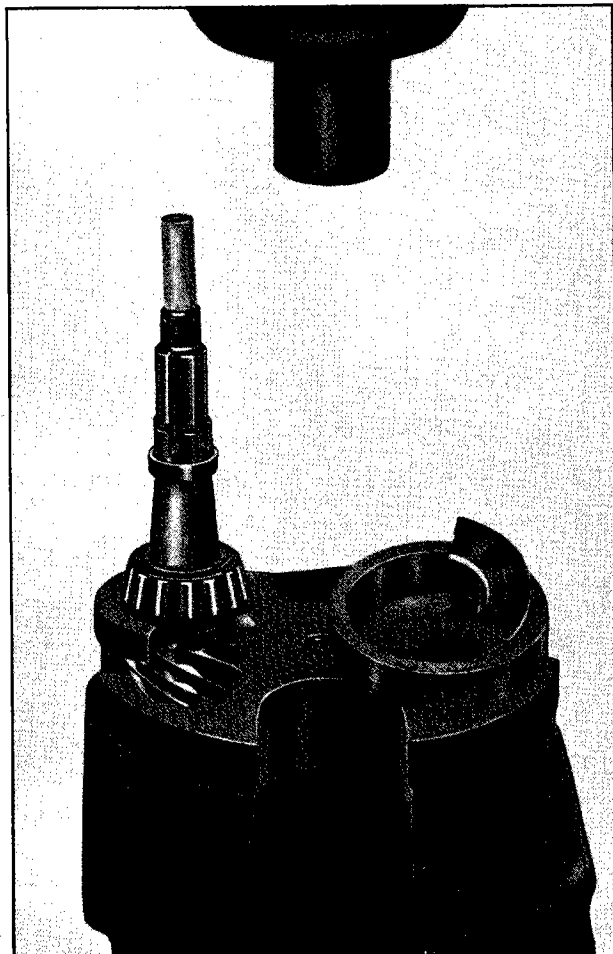


PLATE H1.8. REMOVAL OF INNER CONE. PINION HEAD BEARING.

**DIFFERENTIAL ASSEMBLY. TO REASSEMBLE**

**GENERAL.**

Early production XK 120 cars were fitted with axles having a four-pinion differential as illustrated in this section. Later production cars are fitted with axles having a two-pinion differential with an axle shaft spacer interposed between the side gears; to accommodate this spacer, shorter axle shafts are fitted.

**ASSEMBLE DIFFERENTIAL CASE.**

Mount the pinion mate gears and side gears with thrust washers on to the star piece and assemble the two halves of the differential case with star piece in position ensuring that the serial numbers of the case are together to maintain concentricity of differential case. Secure the two halves of the case together using eight new securing bolts and lock with new locking plates.

**MOUNT CROWN WHEEL.**

Secure crown wheel to differential box with ten new set bolts and new locking plates. Bend the tabs of the locking plates against the heads of the set bolts.

**FIT PINION.**

Insert shims to equal .020" (.51 mm.) in pinion head bearing housing and press outer ring of bearing into position, the thrust face of the bearing being against the shoulder of the housing. Shims are available in thicknesses of .004", .006" and .010" (.10 mm., .15 mm. and .25 mm.). Press outer ring of tail bearing into housing with the thrust face of the bearing against the shoulder of the housing. Press inner member of head bearing on to pinion shank with thrust face of bearing against shoulder of pinion. Assemble distance piece together with .050" (1.27 mm.) of shimming on to pinion shank tail shoulder and insert pinion through head bearing outer ring. Shims are available in thicknesses of .004", .006" and .010" (.10 mm., .15 mm. and .25 mm.). Support pinion head and press inner members of tail bearing and flange coupling on to pinion and secure with plain washer, slotted nut and split pin. There should now be no end float in pinion bearings.

Adjust by reducing shims behind tail bearing inner member until a pre-load of 8 to 10 inch pounds (.092 to .115 m./kg.) pull is obtained. Do not at this stage fit the oil seal into the recess in the nose of the differential since the pinion shaft may have to be removed during the adjustment of the crown wheel and pinion.

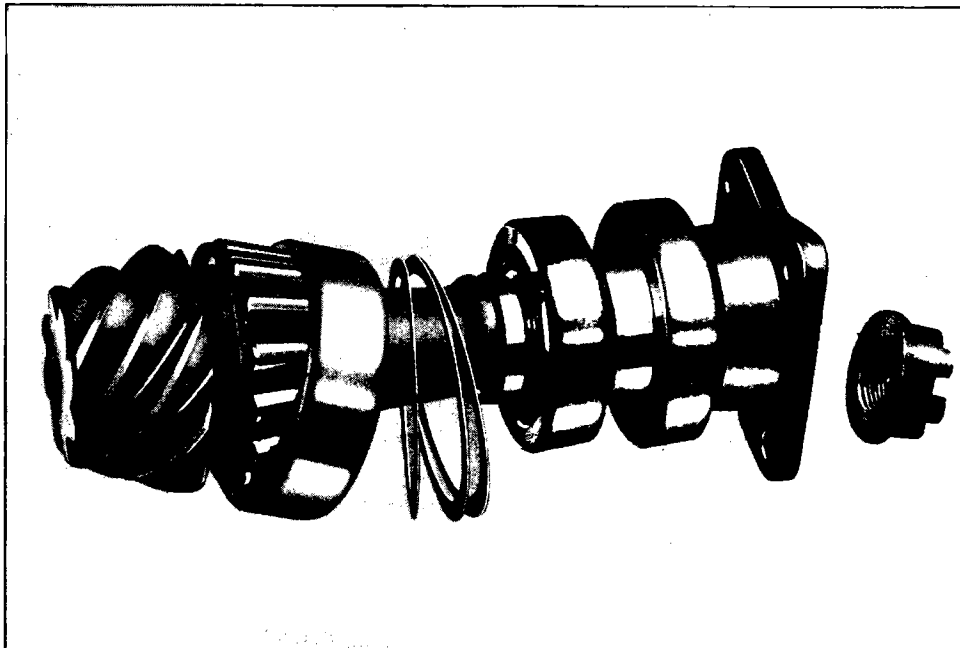


PLATE H1.9. PINION SHAFT ASSEMBLY.

**FIT AND ADJUST DIFFERENTIAL.**

Assemble differential box with crown wheel attached into the housing. Replace bearing caps, lightly tighten cap bolts, and fit adjusting nuts. Rotate the adjusting nuts until there is no end play in the bearings and backlash between gears equals .006" (.15 mm.) measured at the periphery of the crown wheel. Paint gear teeth with marking and rotate gears in both directions and note marking on teeth.

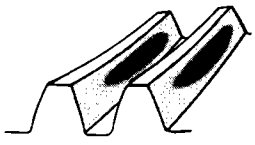
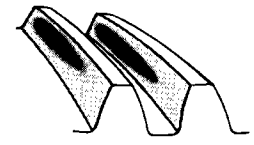
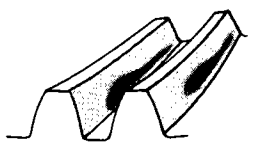
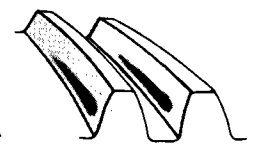
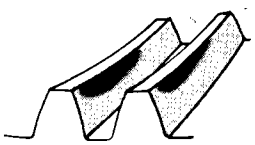
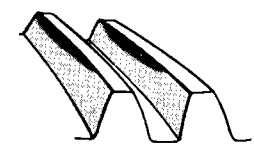
CROWN WHEEL TEETH.		
DRIVE SIDE.	OVERRUN SIDE.	REMARKS.
<p>①</p> 	<p>①</p> 	<p>CORRECT POSITION OF MARKING MOUNTED IN RIGID BEARINGS. .006"/-.008" BACKLASH PRIVATE CARS.</p>
<p>②</p> 	<p>②</p> 	<p>PINION TOO NEAR CENTRE OF CROWN WHEEL. MOVE PINION AWAY FROM CROWN WHEEL AND ADJUST CROWN WHEEL FOR BACKLASH TO OBTAIN CORRECT MARKING.</p>
<p>③</p> 	<p>③</p> 	<p>PINION AWAY FROM CENTRE OF CROWN WHEEL. MOVE PINION TOWARD CROWN WHEEL AND ADJUST CROWN WHEEL FOR BACKLASH TO OBTAIN CORRECT MARKING.</p>

PLATE H1.10. TOOTH CONTACT INDICATION.

Adjust pinion backwards or forwards as required by removing or adding an equal thickness of shims behind head bearing outer member and tail bearing inner member. This will move the pinion and at the same time maintain pre-load on the bearings. The efficiency and quietness of the gears is dependent upon correct setting and profile bearing. When making the final adjustment liberally smear the bearings with grease and press tail bearing oil seal into position, the location having previously been painted with jointing compound. It will also be necessary to pre-load the differential bearings, this pre-load being obtained by rotating adjusting nuts until no end float exists and then tightening adjuster one extra castellation, making sure that backlash between gear is maintained at .006" (.15 mm.).

**GENERAL.**

Replace all lock plates, finally tighten all set bolts and turn over tab washers and split cotter pins where required. The differential assembly is now ready for refitting to the axle casing. (Page H1.29.)

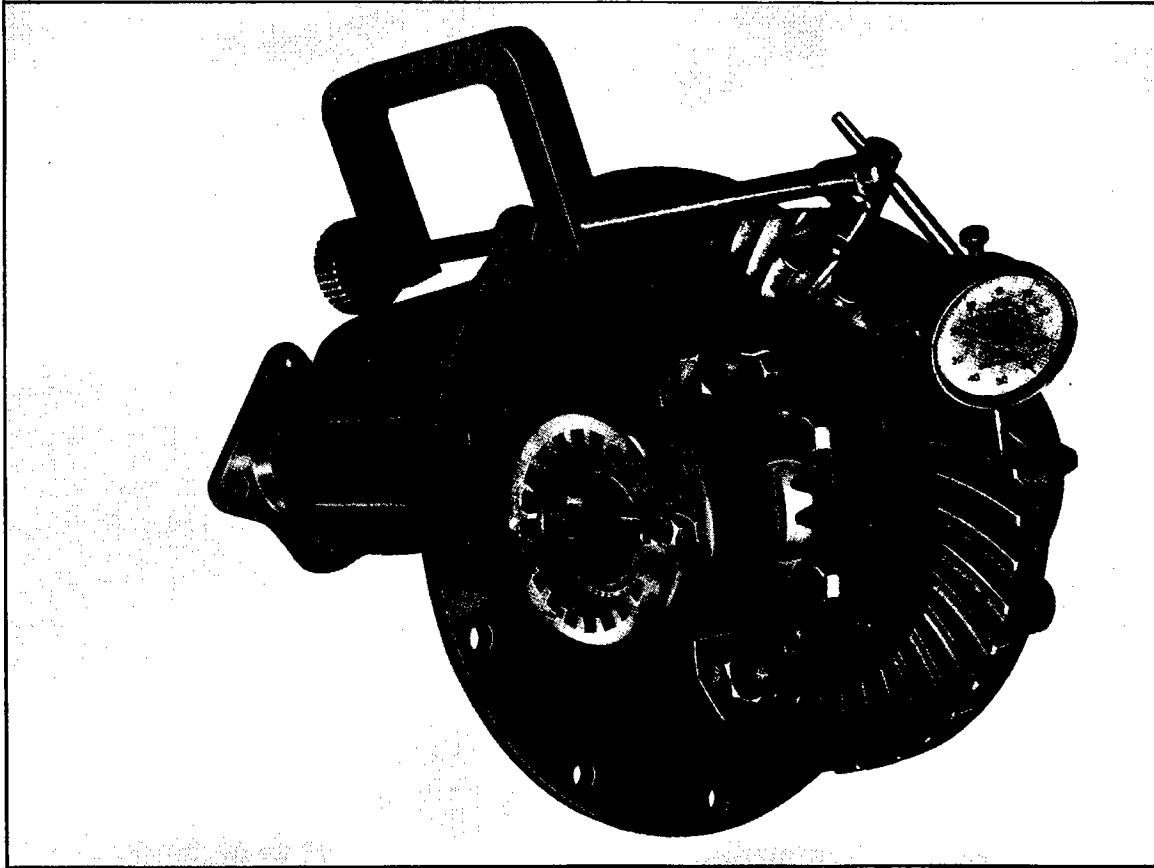


PLATE H1.11. CHECKING BACKLASH BETWEEN GEARS.

# BRAKES

## MARK VII and XK 120 MODELS

### MARK VII (GIRLING BRAKES)

### XK 120 (LOCKHEED BRAKES)

#### Early Type

	Chassis Numbers	
	R.H. Drive	L.H. Drive
Super Sports Model	660001-660979	670001-672048
Fixed Head Coupé Model	669001-669002	679001-679621

#### Later Type

Super Sports Model	660980 onwards	672049 onwards
Fixed Head Coupé Model	669003 onwards	679622 onwards
Drop Head Coupé Model	667001 onwards	677001 onwards

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

	Mk. VII	Page	
		Early type	XK 120 Later type
Index to Contents - - - - -	L.2		L.2
Index to Plates - - - - -	L.3		L.3
Description and Maintenance - - - - -	L.4	L.23	L.37
Servicing - - - - -	L.7	L.25	L.41

## INDEX TO CONTENTS

Contents	Operation	Page		
		Mark VII	XK 120	
			Early Type	Later Type
Description .. .. .		L. 4	L.23	L.37
Maintenance .. .. .		L. 6	L.23	L.39
Data .. .. .		L. 6	L.24	L.40
Brake Adjustment .. .. .		L. 7	L.25	L.41
Bleeding the Hydraulic System .. .. .		L. 8	L.26	L.41
Brake Overhaul .. .. .	General Instructions .. .. .	L. 9	L.27	L.42
Master Cylinder .. .. .	Remove and Refit .. .. .	L.10	L.28	L.43
Master Cylinder .. .. .	Dismantle and Reassemble .. .. .	L.10	L.28	L.44
Wheel Cylinders—Front .. .. .	Remove and Refit .. .. .	L.11	L.30	L.45
Wheel Cylinder—Rear .. .. .	Remove and Refit .. .. .	L.12	L.30	L.46
Wheel Cylinders .. .. .	Dismantle and Reassemble .. .. .	L.12	L.30	L.46
Flexible Hoses .. .. .	Remove and Refit .. .. .	L.12	L.32	L.46
Brake Shoes—Front .. .. .	Remove and Refit .. .. .	L.13	L.32	L.47
Brake Shoes—Rear .. .. .	Remove and Refit .. .. .	L.14	L.33	L.49
Brake Shoe Steady Posts .. .. .	Adjust .. .. .	L.16	—	—
Back Plate—Front .. .. .	Remove and Refit .. .. .	L.16	L.35	L.50
Back Plate—Rear .. .. .	Remove and Refit .. .. .	L.16	L.35	L.50
Brake Pedal—Free Travel .. .. .	Adjust .. .. .	L.17	L.36	L.50
Adjuster—Rear Brakes .. .. .	Remove and Refit .. .. .	L.17	—	—
Supply Tank .. .. .	Remove and Refit .. .. .	L.17	L.36	L.51
Handbrake Cable .. .. .	Remove and Refit .. .. .	L.17	L.36	L.51
Servo Unit .. .. .	Remove and Refit .. .. .	L.18	—	—
Servo Unit .. .. .	Servicing .. .. .	L.18	—	—

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Rear Brake Adjuster .. .. .									L. 7
Handbrake Cable Adjuster .. .. .									L. 8
Master Cylinder. Removal .. .. .									L.10
Master Cylinder. Exploded View .. .. .									L.11
Flexible Hose. Removal .. .. .									L.13
Front Brake Assembly .. .. .									L.14
Rear Brake Assembly .. .. .									L.15
Hydraulic Supply Tank .. .. .									L.18
Servo Unit. Exploded View .. .. .									L.20

Plate	XK 120								Page	
									Early Type	Later Type
Hydraulic Supply Tank .. .. .									L.24	L.39
Front Brake Adjustment .. .. .									L.25	—
Rear Brake Adjustment .. .. .									L.25	L.41
Handbrake Cable Adjuster .. .. .									L.26	L.42
Master Cylinder. Removal .. .. .									L.28	L.44
Master Cylinder .. .. .									L.29	L.45
Front Wheel Cylinder. Sectioned View .. .. .									L.31	—
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Flexible Hose. Removal .. .. .									L.32	L.46
Adjuster Bar. Exploded .. .. .									—	L.47
Front Brake Assembly .. .. .									L.33	L.48
“Micram” Brake Shoe Adjuster .. .. .									L.33	—
Rear Brake Assembly .. .. .									L.34	L.49



**(MARK VII MODEL)**

**DESCRIPTION.** Girling "Autostatic" fully hydraulic system assisted by a vacuum servo unit.

**FRONT BRAKES.** The front brakes are self-adjusting and have two trailing shoes which minimise braking variations due to changes in friction characteristics and ensures a retention of balance under all braking conditions.  
(Refer to Plate L.7.)

**Brake Shoes and Springs.** The front brake shoes are operated by two single acting wheel cylinders situated diametrically opposite each other on the inside of the brake back plate and interconnected by a bridge pipe.

Each brake shoe is pivoted on the base of one wheel cylinder and expanded by the piston of the other with the trailing edges of both shoes making initial contact with the drum, thus giving a smoothness of action obtained by the forward direction of rotation of the drum travelling from the abutment ends of the shoes to the operating ends.

Two bias reducing springs are fitted adjacent to the fulcrum points of the shoes. The shorter ends are connected to a peg on the back plate and the longer ends hooked round a peg on the shoes near the abutment ends. They are positioned between the shoes and the back plate.

These springs assist in the shoe location, partially counteract the light pressure exerted by the wheel cylinders, and achieve a state of balance in which the shoes remain in slight frictional contact with the drums, but exert no material braking effect.

**Stabilisers.** A stabiliser situated in the centre of the brake shoe web overcomes any tendency for the shoes to be shaken away from the drums by exceptionally bad road surfaces but does not prevent the shoes from returning to their positions close to the drums as lining wear takes place.

The stabiliser is in the form of a drilled bolt and is located in an elongated hole in the shoe web. It is retained by a pair of friction washers, one on either side of the web, secured by a spring and Simmonds nut. The bolt is supported by an adjustable steady post on the back plate which engages in the hole in the bolt with a small working clearance adequate for the very small shoe operating movement required.

**Wheel Cylinders.** Each wheel cylinder consists of a cast-iron body containing a spring base, a spring, a bakelite seal support, a seal, a steel piston and a rubber dust cover. The base of the body carries a slot through which a pivot pin is bolted to the back plate and acts as an abutment for the ends of the shoes.

A bleed screw incorporated in one wheel cylinder presses a steel ball firmly on a valve aperture in the cylinder and a rubber cap is fitted to exclude dust, etc. When "Bleeding the Hydraulic System" the screw is released.

**REAR BRAKES.** The rear brakes are of the leading and trailing shoe type with the trailing shoe in slight contact with the brake drum.  
(Refer to Plate L.8.)

**Brake Shoes and Springs.** The rear brake shoes are not fixed but allowed to slide and centralise during the braking operation. The trailing shoe is always in slight frictional contact with the drum.

The shoes are operated by a hydraulic double acting wheel cylinder and adjustment for lining wear is by a shortened version of a Girling wedge type mechanical inclined adjuster.

The cylinder and the adjuster are situated opposite one another on the inside of the back plate, with the ends of the shoes locating in the wheel cylinder pistons and adjuster links respectively.

Each shoe rests on an adjustable steady post fitted with a felt bush to retain lubrication. The shoes are held in position by two springs. The stronger (bias reducing) spring is positioned from shoe to shoe at the adjuster end, and has two "swan necks" which hook into holes in the shoe webs from underneath.

The lighter (shoe return) spring hooks into a hole in the web of the leading shoe from underneath and passed to a peg on the back plate near the wheel cylinder body.

Both springs are situated between the shoe webs and the back plate.

**Adjuster.** The adjuster has a steel housing which is spigotted and bolted firmly to the inside of the back plate.

The housing carries two opposed steel links, the outer end slotted to take the shoes, and the inclined inner faces bearing on inclined faces of the hardened steel wedge (the axis of which is at right angles to the links).

The wedge has a finely threaded spindle with a square end which projects on the outside of the back plate. By rotating the wedge in a clockwise direction the links are forced apart and the fulcrum of the brake shoes expanded.

**Wheel Cylinders.** Each wheel cylinder consists of a die-cast aluminium body containing a centrally located spring at either end of which is situated a bakelite seal support, a seal and a piston with dust cover.

A bleed screw and steel ball are also incorporated in the cylinder body with a rubber dust cap over the nipple end.

The nuts securing the wheel cylinder to the back plate should be half to one turn slack to allow for centralisation of the hand brake mechanism.

**HAND BRAKE.** The hand brake operates the rear brakes through a separate mechanical linkage, which is (Refer to Plates L.1 and L.8.) actuated by a lever situated between the two front seats.

The brakes are operated by a mechanism housed on the side of the wheel cylinder casting and consists of two flat inclined faced hardened steel tappets (which expand the shoes), two hardened steel rollers and a flat hardened steel wedge which acts as a draw link. The retaining cover is secured to the body by four set screws and has two tabs to prevent the tappets sliding out of the body when brake shoes are removed.

A spring is fitted between the tappets on the outside of the cover to return them to the "off" position when the hand brake is released.

**HYDRAULIC SYSTEM.** The brakes on all four wheels are hydraulically operated by foot pedal application, directly coupled to a master cylinder in which the hydraulic pressure is originated and in turn is assisted by a vacuum servo unit.

A supply tank provides a reservoir by which the fluid is replenished, and a pipe line consisting of tubes, flexible hoses and unions interconnect the supply tank, master cylinder, servo unit and the wheel cylinders.

The pressure generated in the master cylinder by application of the brake foot pedal is built up by the servo unit and transmitted with equal and undiminished force to all wheel cylinders simultaneously. This moves the pistons which in turn expand the brake shoes, thus producing automatic equalisation and efficiency in direct proportion to the effort applied to the pedal.

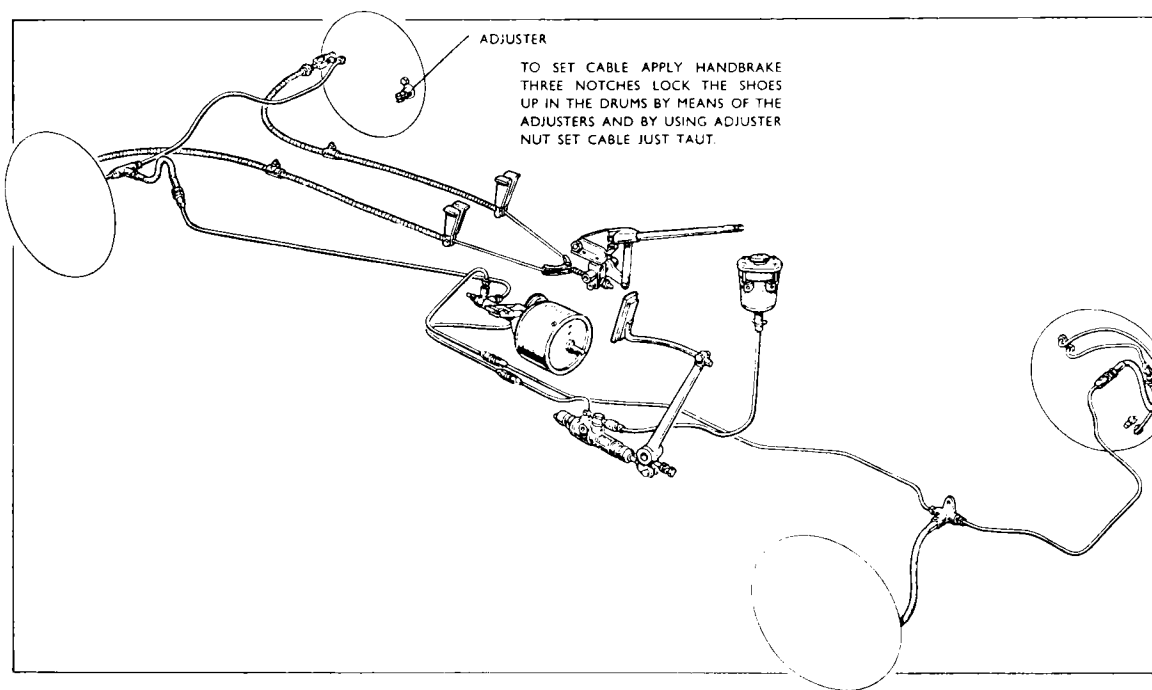


PLATE L.1. BRAKE LAYOUT DIAGRAM (Mark VII—Right-Hand Drive illustrated).

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) examine the fluid level in the brake supply tank and, if necessary, top up with recommended grade of fluid. Never allow the fluid level to fall more than 1" (25.0 mm.) from the top of the supply tank. (Plate L.9.)

Should it be found that the fluid level falls rapidly indicating leakage from the system, an immediate examination should be carried out to ascertain the cause.

Every 2,500 miles (4,000 kilometres) lubricate the nipple on the foot brake pedal boss with the recommended grade of lubricant.

Every 2,500 miles (4,000 kilometres) lubricate the two nipples on the hand brake cable with the recommended grade of lubricant. These are accessible from underneath the car, one on either side of the rear propeller shaft.

Every 10,000 miles (16,000 kilometres) remove road wheels and brake drums, clean out brakes and examine liners. Should replacements be required always use genuine factory relined shoes, available on an exchange basis.

Every 10,000 miles (16,000 kilometres) check and tighten, if necessary, the brake back plate mounting bolts and hydraulic pipe unions.

**RECOMMENDED LUBRICANTS  
(MARK VII MODEL)**

	Vacuum	Wakefield	Shell	Esso	Price's
Foot Brake Pedal .. .. .	Mobilgrease	Castrollease	Retinax	Esso	Belmoline
Hand Brake Cables .. .. .	No. 5	W.B.	A	High Temp. Grease	H.M.P.

**BRAKE FLUID  
(MARK VII MODEL)**

GIRLING CRIMSON Hydraulic Brake Fluid.  
Or, if not obtainable:

LOCKHEED ORANGE Hydraulic Brake Fluid or WAGNER 21 Hydraulic Brake Fluid.

**Note.** Before a change from one type of brake fluid to another is made it is necessary to completely drain the system of the fluid before the alternative is used. The system must be topped up with the brand of fluid in use or trouble may be experienced.

**BRAKE DATA  
(MARK VII MODEL)**

Make .. .. .	Girling—Fully Hydraulic
Type .. .. .	Two Trailing Shoe—Front
Drum Diameter .. .. .	12" (30.5 cm.)
Brake Lining—Material .. .. .	Mintex M.14 (Bonded to Shoe)
Total Area .. .. .	207 sq. ins. (1335 cm. <sup>2</sup> )
Length .. .. .	11½" (29.2 cm.)
Width .. .. .	2¼" (57.1 mm.)
Thickness .. .. .	¼" (6.3 mm.)
Master Cylinder—Bore Diameter .. .. .	¾" (19.05 mm.)
Wheel Cylinder (Front)—Bore Diameter .. .. .	1¼" (31.75 mm.)
Wheel Cylinder (Rear)—Bore Diameter .. .. .	¾" (19.05 mm.)

## BRAKE ADJUSTMENT (MARK VII MODEL)

**FRONT.** The front wheel brakes are so designed that no adjustment for lining wear is necessary or provided for, as this automatically takes place when the foot brake is operated.

**REAR.** Place chocks under the front wheels. Release the hand brake and raise the rear of the car. Turn the square-headed adjuster situated at the rear of the back plate (Plate L.2) in a clockwise direction until solid resistance is felt. Slacken back the adjuster until the brake drum rotates freely (usually two clicks). A slight drag may be felt from the trailing shoe but this should not be sufficient to prevent the wheel from turning freely. Spin the wheel and apply the brakes hard to centralise the shoes in the drum and recheck adjustment. Repeat for the other rear wheel.

**Note.** Immediately after fitting replacement shoes it is advisable to slacken the adjuster one further click to allow for possible lining expansion, reverting to normal adjustment afterwards.

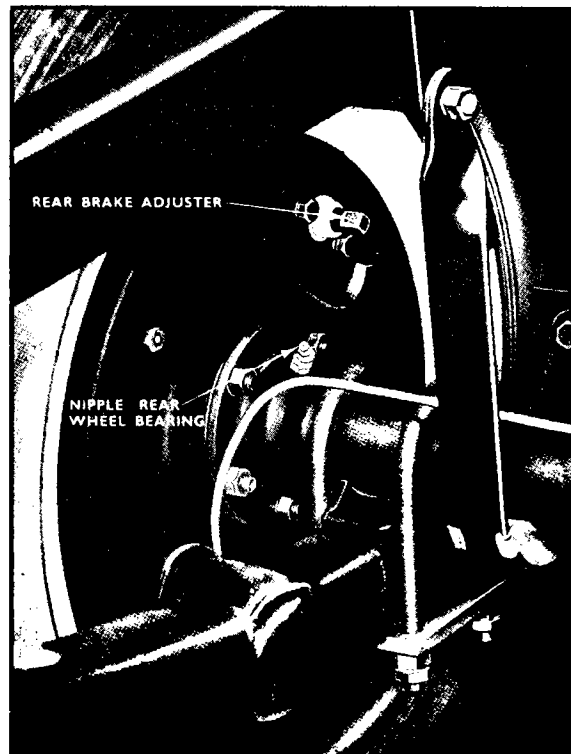


PLATE L.2. REAR BRAKE ADJUSTER (Mark VII).

**HAND BRAKE.** Adjustment of the rear brakes will automatically adjust the hand brake. If, however, it is found that, with the rear brakes in correct adjustment, excessive hand brake free travel is obtained, check the hand brake as follows:—

Any adjustment required is carried out at the yoke linkage attached to the central cross member. To effect adjustment jack up both rear wheels, lock shoes by means of the adjusters and then set cable at yoke to give three notches free movement at the lever. (Plate L.3.) Slacken off brake adjusters two clicks when the wheels should rotate freely. Adjustment must on no account be made other than in the manner described, as haphazard adjustment to the cable may preload the rear brake shoes, causing the brake shoes to bind. When the hand brake is released no tension should exist in the cable.

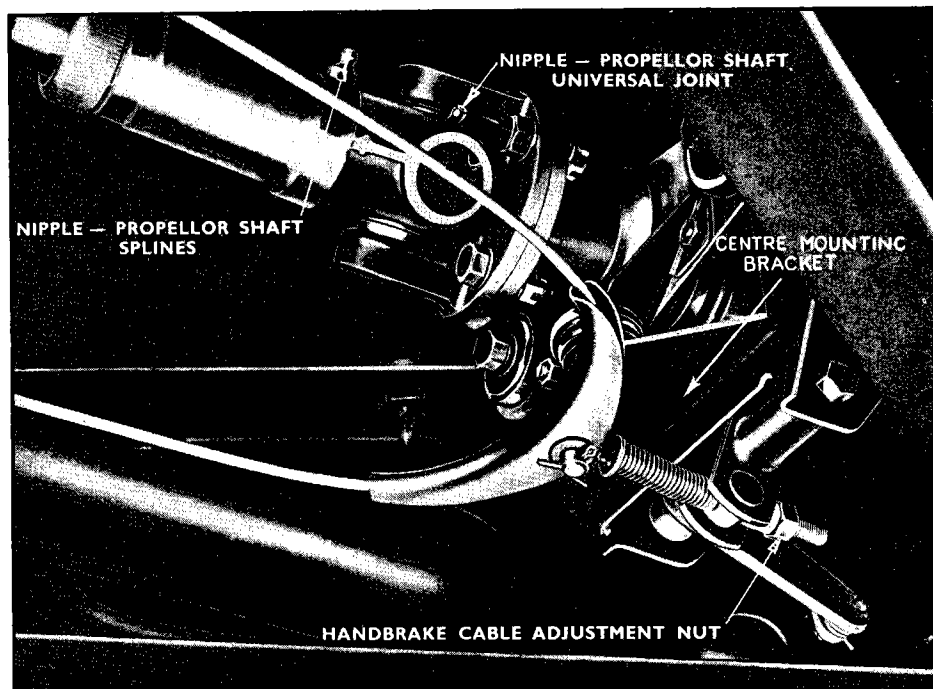


PLATE L.3. HAND BRAKE CABLE ADJUSTER (Mark VII).

### BLEEDING THE HYDRAULIC SYSTEM (MARK VII MODEL)

“Bleeding” (expelling air) the hydraulic system is not a routine maintenance operation, and should only be necessary when a portion of the hydraulic system (including the vacuum servo unit) has been disconnected or if the level of the brake fluid has been allowed to fall so low that air has entered the master cylinder. Proceed as follows:—

With all the hydraulic connections secure and the supply tank topped up with fluid remove the rubber cap from the left-hand rear wheel cylinder bleed nipple and fit the bleed tube over the bleed nipple, immersing the free end of the tube in a clean jar containing a little Girling brake fluid.

Unscrew the bleed nipple about three quarters of a turn and then operate the brake pedal with slow full strokes until the fluid entering the jar is completely free of air bubbles. Then during a down-stroke of the brake pedal, tighten the bleed screw sufficiently to seat the ball, remove bleed tube and replace the bleed nipple dust cap. Under no circumstances must excessive force be used when tightening the bleed screw.

This process must now be repeated for each bleed screw at each of the three remaining back plates, finishing at the wheel nearest the master cylinder. Always keep a careful check on the supply tank during bleeding since it is most important that a full level is maintained. Should air reach the master cylinder from the supply tank the whole of the bleeding operation must be repeated.

If the vacuum servo unit has been disconnected or removed the column of air expelled at the wheel cylinder bleed screws will be in excess of that normally encountered.

It is essential that an adequate supply of clean Girling brake fluid is maintained in the supply tank during the whole of the bleeding procedure.

After bleeding in the normal manner, start the engine and make a number of hard brake applications, after which the system can be rebled with advantage to clear any pockets of air which may have been retained in the internal passages of the servo unit.

After bleeding, top up the supply tank to its correct level of 1" (25.0 mm.) below the filler neck.

Never use fluid that has been bled from a brake system for topping up the supply tank, since this brake fluid may be to some extent aerated.

Great cleanliness is essential when dealing with any part of the hydraulic system, and especially so where the brake fluid is concerned. Dirty fluid must never be added to the system.

## BRAKE OVERHAUL. GENERAL INSTRUCTIONS (MARK VII MODEL)

**CLEANLINESS.** The importance of absolute cleanliness when dealing with hydraulic parts such as the master cylinder and operating cylinders cannot be over-stressed. Clean off road dirt and grease before removing the units from their mountings. Dismantle on a clean bench and do not handle internal parts with dirty or greasy hands. Never use petrol, paraffin, trichlorethylene or other similar cleaning agents to wash the unit or internal components since this will have the tendency to destroy rubber parts. Place the parts in a tin containing brake fluid and, after soaking, wipe clean with a clean lintless rag. Similarly brake linings must never be touched with greasy hands or their efficiency may be permanently impaired.

**EXAMINATION.** When all parts have been cleaned as described above and are thoroughly dry, carry out an examination and scrap all rubber seals which show signs of deterioration. If doubt exists, comparison with new parts will indicate whether replacements are required. Only use genuine Girling spares. Never endeavour to clear out the internal bore of flexible hydraulic pipes by probing since this will undoubtedly result in rupture of the pipe. Where the flexible pipes are choked or perished fit replacements.

Take care not to scratch the highly finished surfaces of cylinder bores and pistons.

Replace all seals, hoses and gaskets with new ones if it is suspected that incorrect fluids have been used, or the system contaminated with mineral oil or grease. Drain off the fluid, thoroughly wash all metal parts, and flush out all pipes, etc., with alcohol or clean brake fluid. Never use anything else for this purpose.

**ASSEMBLY.** Ensure that castings are perfectly clean and bear no traces of cleaning fluid other than genuine brake fluid. Dip all internal parts in clean brake fluid and assemble wet. The importance of absolute cleanliness during assembly is again stressed. Always use Girling Crimson brake fluid to top up the system. If Girling fluid is not available, Lockheed Orange brake fluid or Wagner 21 brake fluid may be used, but it is essential to drain the system of one fluid before an alternative is used. The system must be topped up with the brand of fluid in use. Attention is drawn to the instructions given on removing and refitting hydraulic flexible hoses on page L.12.

Use only Wakefield Girling rubber grease No. 3 (red) for packing rubber boots, dust covers and lubricating parts likely to contact any rubber component. Never use Girling white brake grease or other grease for this purpose.

**TESTING.** Before brakes are tested check tyre pressures and correct, if necessary. Correct pressures are: Front, 23 lbs. sq. in. (1.6 kg./cm.<sup>2</sup>); Rear, 25 lbs. sq. in. (1.8 kg./cm.<sup>2</sup>).

**STORAGE.** Special care is required in the storage and handling of brake equipment parts, particularly rubber cups, since distortion or damage will affect their correct functioning when fitted.

## MASTER CYLINDER. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** The master cylinder is situated on right-hand drive cars at the outside of the right-hand chassis side member and on left-hand drive cars on the inside of the left-hand chassis side member.

**REMOVE.** (Refer to Plate L.4.) Disconnect the lower hose clip from rubber hose beneath the supply tank and drain contents of tank into a clean receptacle.

Disconnect the two pipe unions from the top of the cylinder. Disconnect the operating rod from the foot brake pedal by removing the clevis pin and pedal return spring. From the rear of the master cylinder disconnect the two stop light wires.

Remove the two bolts and nuts securing the master cylinder to its mounting brackets, and withdraw cylinder.

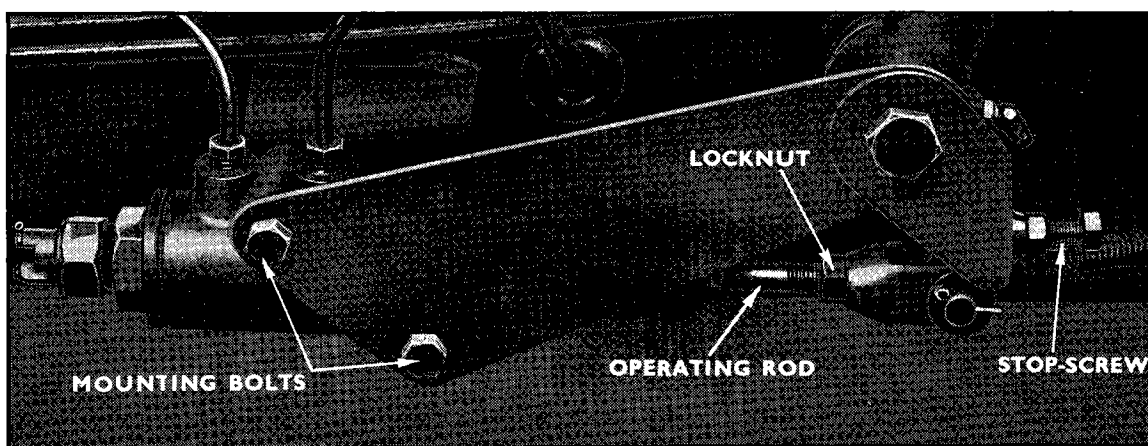


PLATE L.4. MASTER CYLINDER REMOVAL (Mark VII).

**REFIT.** Refitting is the reverse of the removal procedure. It will be necessary to bleed the brake hydraulic system as described on page L.8.

Ensure that there is approximately  $\frac{1}{8}$ " (.80 mm.) clearance between the master cylinder plunger and the operating rod. If adjustment is required, refer to "Brake Pedal—Free Travel. To Adjust" on page L.17.

## MASTER CYLINDER. TO DISMANTLE AND REASSEMBLE (MARK VII MODEL)

**GENERAL.** (Refer to Plate L.5.) The assembly consists of a cast-iron body with a highly finished bore, into which is assembled a plunger return spring (fitting inside the end cap and the body of the plunger), a polished steel plunger, a recuperating seal, a steel shim, an end seal and a steel seal retainer. A screwed end cap which is machined on the inside to support the recuperating seal also carries the stop light switch on the outside.

The plunger is operated by a push rod with a hardened rounded end which engages the concave end of the seal retainer and is retained in the cylinder by a dished washer and a circlip. A fixed collar mid-way on the push rod takes the small end of a rubber boot fitted over the end of the cylinder to exclude dirt and dust.

Always exercise extreme cleanliness when dealing with any part of the hydraulic system. Before dismantling the master cylinder refer to "Brake Overhaul. General Instructions" on page L.9.

**DISMANTLE.** Prepare a clean space (free of oil, grease, dirt, etc.) upon which to work and lay the parts. Unscrew the end cap and gasket and withdraw the plunger return spring, pull back the rubber boot and remove the circlip with pliers, then withdraw the push rod.

Push the plunger out from the pressure end and detach seal retainer and end seal and remove the recuperating seal and shim from the body.

Carefully examine all components and replace any that appear worn or damaged. It is especially important to renew any seals which appear distorted or lack resilience.

Never allow petrol, paraffin or trichlorethelene to contact hydraulic parts.

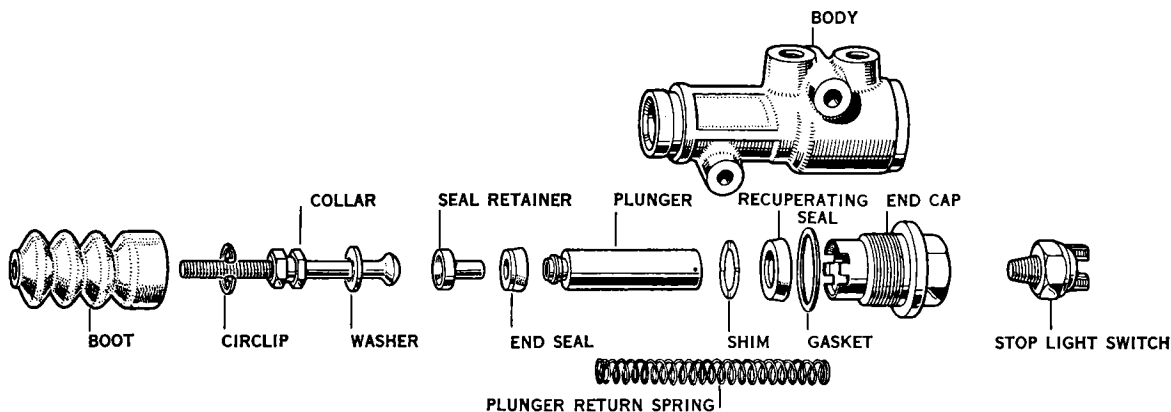


PLATE L.5. MASTER CYLINDER. Exploded view (Mark VII).

**REASSEMBLE.** Thoroughly clean all parts with clean Girling brake fluid which must not be used again. The rubber seals and the plunger should be smeared with clean fluid immediately before assembly.

Insert the steel shim into the pressure end of the cylinder against the shoulder formed inside. Replace the recuperating seal with the back of the seal towards the shim.

Fit the end seal to the plunger with the lip of seal first, facing away from the concave end of the seal retainer, which fits next. Insert the plunger (open end first) into the cylinder from the push rod end, easing the end seal carefully into the bore. (The lips of both seals will then be facing towards the pressure or end cap end of the cylinder.)

Insert the push rod assembly, round end first, into the bore and replace the washer and circlip. Pack the boot with Girling rubber grease No. 3 (red) and stretch over the end with the smaller aperture seating in the collar.

Insert the plunger return spring in the other end. Replace the end cap and gasket and tighten firmly, taking care not to damage the stop light switch.

## WHEEL CYLINDERS—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Remove the front brake shoes as described on page L.13.

Unscrew the metal pipe union(s) to each wheel cylinder at rear of back plate. Remove the large hexagon nut and two set screws securing each wheel cylinder to the back plate. Withdraw cylinders from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to "Brake Shoes—Front. To Refit" on page L.13 when refitting the brake shoes. It will be necessary, following refitting, to "bleed" the hydraulic system as described on page L.8.



## WHEEL CYLINDER—REAR. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Remove the rear brake shoes as described on page L.14.

At the rear of back plate remove the clevis pin securing the hand brake cable to the operating link which protrudes through the back plate. (A hole is provided in the hand brake cable bracket on the back plate to provide access to the clevis pin.)

Unscrew the metal pipe union from the rear of wheel cylinder. Unscrew the bleeder valve from the wheel cylinder and remove the loose steel ball from the valve seat.

Remove the three Simmonds nuts, double coil spring washers and cover plate from the rear of wheel cylinder. Withdraw cylinder from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure. When refitting the three Simmonds nuts securing the wheel cylinder to the back plate, tighten the nuts fully and then slacken back the nuts a half to one turn to allow centralisation of the wheel cylinder.

Reference should be made to "Brake Shoes—Rear. To Refit" on page L.15 when refitting the brake shoes. It will be necessary to "bleed" the hydraulic system as described on page L.8.

## WHEEL CYLINDERS. TO DISMANTLE AND REASSEMBLE (MARK VII MODEL)

**DISMANTLE.** Before dismantling any of the wheel cylinders refer to "Brake Overhaul. General Instructions" (Refer to Plates L.7 and L.8.) on page L.9.

**Front.** Remove the front wheel cylinders as described on page L.11.

Remove the rubber dust cover from the end of the cylinder, and withdraw the piston, rubber seal, seal support, spring and spring base. (Gentle air pressure applied to union hole at rear of cylinder will assist removal.)

**Rear.** Remove the rear wheel cylinder as described on page L.12.

Remove the piston and dust cap from each end of the cylinder and withdraw the rubber seals, centrally located spring and seal supports. (Gentle air pressure applied at union hole at rear of cylinder will assist removal.)

To remove the hand brake operating mechanism release the return spring for the expander tappets. Unscrew the four set screws securing the cover plate to the wheel cylinder and remove plate. Remove the tappets, rollers and draw link.

**REASSEMBLE.** Reassembly is the reverse of the dismantling procedure, but reference should be made to "Brake Overhaul. General Instructions" on page L.9.

Ensure that rubber seals are fitted the correct way round in the cylinders. On the front wheel cylinders, this is with the lip or widest end of seal facing the blank end of the cylinder. On the rear wheel cylinder, the lips or widest ends of the seals should be facing inwards, that is, towards each other.

Refit the wheel cylinders as described on pages L.11 and L.12 for the front and rear brakes respectively.

## FLEXIBLE HOSES. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** (Refer to Plate L.6.) The flexible hoses must be disconnected at the support bracket end first, otherwise rupture of the hose is likely to occur.

**Front.** At the support bracket on the brake back plate, unscrew the conical union securing the metal pipe to the end of the flexible hose. Hold the hexagon of the flexible hose end sleeve situated underneath the support bracket, unscrew the lock nut, and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

**Rear.** At the bracket on the chassis frame above the right-hand rear shock absorber, unscrew the conical union securing the metal pipe to the end of the flexible hose.

Hold the hexagon of the flexible hose end sleeve at one side of the support bracket, unscrew the lock nut from the other side and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

**Note.** Do **not** attempt to clear the bore of a flexible hose by probing. If a hose is choked or perished fit a replacement.

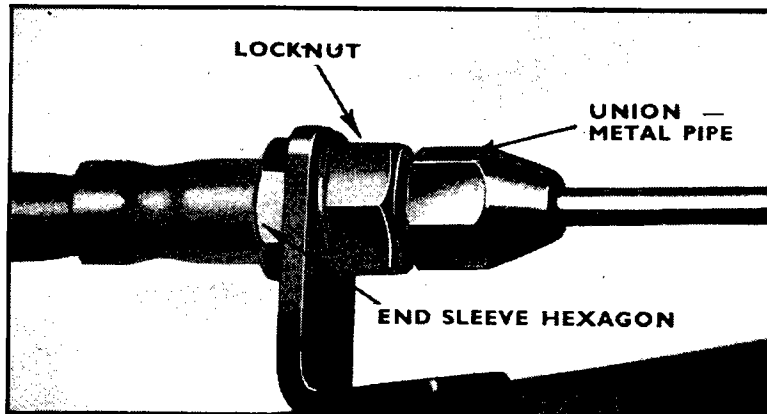


PLATE L.6. FLEXIBLE HOSE. REMOVAL (Mark VII).

**REFIT.** Refitting is the reverse of the removal procedure. When refitting the flexible hose at the support bracket end ensure that the hose does not twist, by holding the hexagon of the end sleeve with a spanner whilst tightening the lock nut.

After refitting the hose(s) it will be necessary to "bleed" the hydraulic system as described on page L.8.

### BRAKE SHOES—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** Always fit Girling "Factory lined" replacement shoes obtainable from Jaguar Spares Department or from Girling agents. These have the correct type of lining and are accurately ground to size which ensures a quick and easy "bed in" to the drums.

When fitting replacement shoes always fit a new set of shoe return springs.

**REMOVE.** (Refer Jack up the car and remove road wheel. Remove the two countersunk screws securing the to Plate L.7.) brake drum to the hub and remove drum.

Slacken off the nuts in the stabilisers. Lift one shoe out of the abutment slot in one wheel cylinder, then release from the piston slot of the other and detach the spring. Repeat with the other shoe and spring. (To prevent the wheel cylinder piston from expanding it is advisable to place a rubber band round each cylinder.)

**REFIT.** Smear the tops of the steady posts, the operating and abutment ends of the new shoes with Girling (white) brake grease. Girling (white) brake grease must not be allowed to contact hydraulic cylinder, pistons or rubber parts. Keep all grease off the linings and do not handle linings more than necessary.

Pair the brake shoes. Hook the long end of one spring round the spring post on the underside of the shoe web and the shorter end round the peg of the back plate. Place the spring post end of the shoe into the abutment slot on the wheel cylinder base and then ease the other end into the piston of the opposite wheel cylinder. Seat the stabiliser bolt on the steady posts, hold with a spanner and tighten the Simmonds nut. Remove rubber bands from cylinder.

Refit brake drums ensuring that they are clean and free from grease or oil.

**Note.** If replacement brake shoes have been fitted or if there is any question of uneven wear across the width of the brake linings: the brake shoe steady posts should be adjusted as described on page L.16.

Refit road wheel.

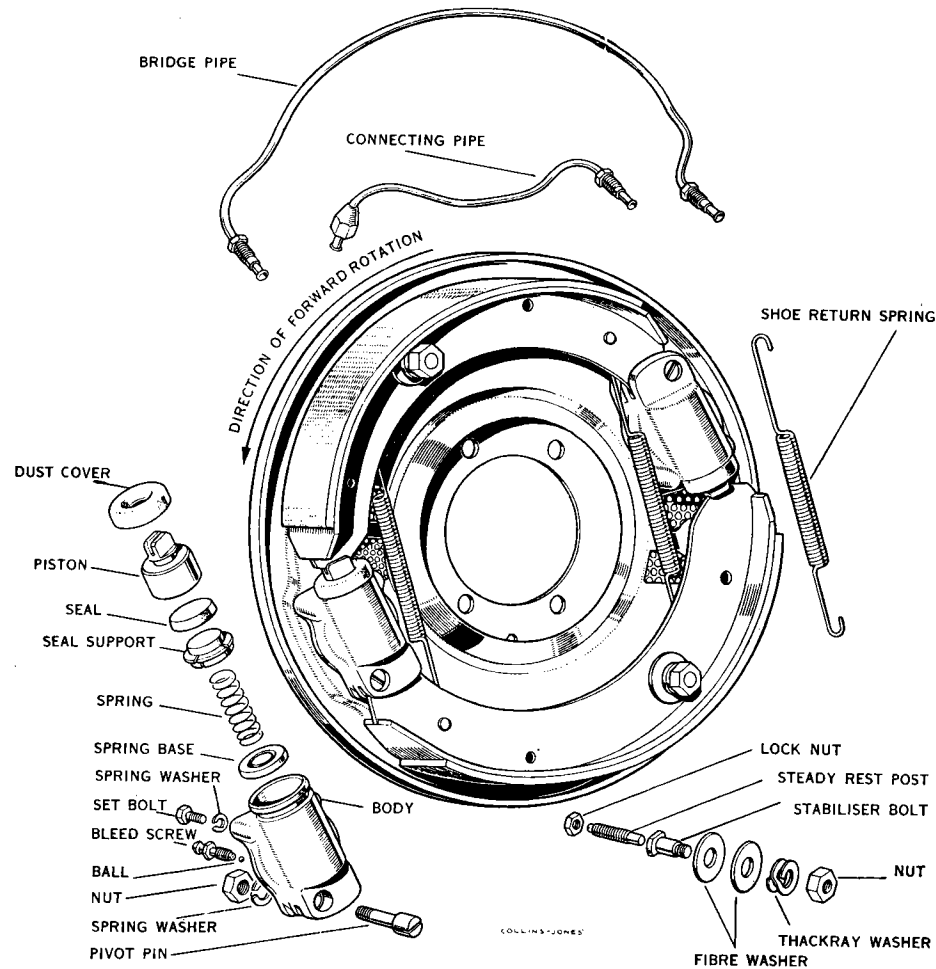


PLATE L.7. FRONT BRAKE ASSEMBLY (Mark VII—Left-Hand Side illustrated).

### BRAKE SHOES—REAR. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** Always fit Girling "Factory lined" replacement shoes. These have the correct type of lining and are accurately ground to size which ensures a quick and easy "bed in" to the drums.

When fitting replacement shoes always fit a new set of shoe return springs.

**REMOVE.** Jack up the car and remove road wheel. Slacken off all available shoe adjustment by rotating square-headed adjuster anti-clockwise. Remove the two countersunk screws securing the brake drum to the hub and remove drum.

Lift the trailing shoe out of the slot in the adjuster link. Detach the light spring from the peg on the back plate and remove both shoes and springs. (It is advisable to place a rubber band round the wheel cylinder to keep the pistons in place.)

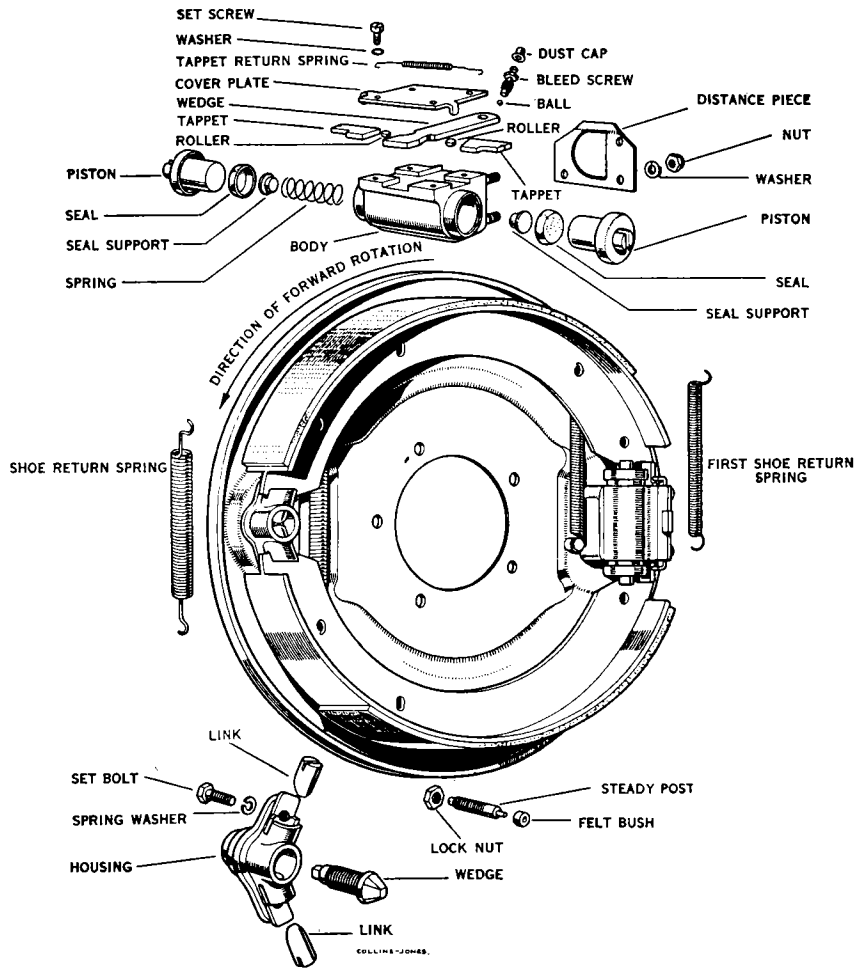


PLATE L.8. REAR BRAKE ASSEMBLY (Mark VII—Left-Hand Side illustrated).

**REFIT.** Smear the tops of the steady posts, the operating and abutment ends of the new shoes with Girling (white) brake grease. Keep all grease off the linings of new replacement shoes and do not handle the linings more than necessary.

Pair the brake shoes. (The leading shoe has the lining positioned towards the adjuster end of the shoe and the trailing shoe has the lining positioned towards the operating end in both left-hand and right-hand brake assemblies.)

Fit the shoe return spring to the underside of the shoes at the adjuster end with the "swan necks" hooked up and into the holes in each shoe web from underneath.

Locate the leading shoe in the adjuster link slot first, then into the wheel cylinder piston. Attach the free end of light spring to the peg on the back plate. Ease the trailing shoe into the respective slots in the adjuster link and piston. Remove rubber bands from wheel cylinder.

Refit brake drums ensuring that they are clean and free from grease or oil.

**Note.** If replacement brake shoes have been fitted or if there is any question of uneven wear across the width of the brake linings the brake shoe steady posts should be adjusted as described on page L.16.

Refit road wheel. Adjust brakes as described on page L.7.

## BRAKE SHOE STEADY POSTS. TO ADJUST (MARK VII MODEL)

**GENERAL.** The brake shoe steady posts require resetting only when replacement brake shoes are fitted or if there is evidence of uneven wear across the width of the linings.

The steady posts, one for each shoe, are threaded in the brake plate and should contact the underside of the brake shoe web. The end of the steady post, accessible at the rear of the back plate, is provided with a screwdriver slot and lock nut. (Plates L.7 and L.8.)

**ADJUST.** At the rear of the brake back plate slacken the steady post lock nut, and rotate the post anti-clockwise with a screwdriver about four turns.

Lock the shoes in the drum by applying the brakes firmly and rotate the post clockwise until the post bears against the shoe web. Retain the post and secure in position with the lock nut. Repeat for the other brake shoe.

## BACK PLATE—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE HUB.** Jack up car and remove road wheel. Remove the two countersunk screws and withdraw brake drum. Lever out the cap from the end of hub and remove the split pin and slotted nut. With a suitable extractor, withdraw the hub from the stub axle shaft.

**DISCONNECT FLEXIBLE HOSE.** Disconnect the flexible hose at the support bracket on the back plate as described on page L.12.

**REMOVE BACK PLATE.** Remove the four split pins, slotted nuts and bolts securing the back plate to the stub axle carrier. Remove the back plate complete with shoe assemblies.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to page L.13 when reconnecting the flexible hose. When the hub has been refitted, tighten the slotted nut until there is no end float in the hub. Slacken the nut one slot, check end float which should just be perceptible by hand and secure with new split pin. Following reassembly, it will be necessary to "bleed" the hydraulic system as described on page L.8.

## BACK PLATE—REAR. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE HUB.** Jack up car and remove wing valance and road wheel. Slacken off all available shoe adjustment by rotating square-headed adjuster anti-clockwise. Remove the two countersunk screws and withdraw brake drum.

Remove the split pin and slotted nut and with a suitable extractor withdraw the hub from the axle shaft.

**DISCONNECT BRAKES.** At the rear of the back plate unscrew the metal hydraulic pipe union from the wheel cylinder.

Remove the clevis pin securing the hand brake cable to the operating link which protrudes through the back plate. (A hole is provided in the hand brake cable bracket on the back plate to provide access to the clevis pin.)

Pull back the hand brake cable return spring and lever out the spring retainer from the top of the cable clevis and withdraw cable.

**REMOVE BACK PLATE.** Remove the five bolts and nuts securing the back plate to flange of axle case, and withdraw back plate.

Note the retainer plate, two gaskets and oil seal on the front of plate. Also note the shims fitted between the back plate and the flange of the axle case; do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.

**REFIT.** Refitting is the reverse of the above procedure but attention should be given to the following points.

Fit the same number of shims between the back plate and axle case flange as found on dismantling. These shims control the axle shaft end float; full details for adjusting are given in Section H—"Rear Axle".

When the brake assembly has been completely refitted, "bleed" the hydraulic system as described on page L.8. Adjust the rear brakes as described on page L.7.

### BRAKE PEDAL—FREE TRAVEL. TO ADJUST (MARK VII MODEL)

**GENERAL.** It is essential that the master cylinder plunger is **not** prevented from returning to the fully "off" position, otherwise pressure may be built up in the hydraulic system.

The operating rod at the front of the master cylinder is provided with end float in the cylinder, and it is necessary to ensure that approximately  $\frac{1}{32}$ " (.80 mm.) clearance exists between the operating rod and plunger.

**ADJUST.** (Refer to Plate L.4.) Ensure that the foot brake pedal is against the stop screw at the bottom of the pedal. Slacken the lock nut adjacent to the operating rod clevis and rotate rod to give approximately  $\frac{1}{32}$ " (.80 mm.) end float, which entails with a margin of safety  $\frac{1}{4}$ " to  $\frac{3}{8}$ " (6.3 to 9.5 mm.) free travel at the pedal pad. This free movement can be felt if the pedal is depressed gently by hand. Tighten the lock nut.

### ADJUSTER—REAR BRAKES. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** (Refer to Plate L.8.) Remove the rear brake shoes as described on page L.14.

From the rear of the back plate remove the two set screws securing the adjuster to the back plate and withdraw assembly from front. To dismantle the adjuster assembly, withdraw the tappets (links), noting that they are left and right handed, and unscrew wedge from housing.

**REFIT.** Refitting is the reverse of the removal procedure.

### SUPPLY TANK. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** The brake supply tank is situated at rear of the wing valance on the steering column side. From underneath the supply tank disconnect the flexible hose from the metal pipe by slackening the clip. Draw hose off pipe and drain fluid into a clean receptacle.

Remove the two bolts and nuts securing the supply tank bracket to its mounting bracket and lift out supply tank. (Plate L.9.)

**REFIT.** Refitting is the reverse of the above procedure. Refill the supply tank to 1" below the filler neck with the same grade of fluid that is present in the remainder of the hydraulic system.

### HANDBRAKE CABLE. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** At the hand brake lever end remove the clevis pin securing the hand brake cable yoke to the adjusting rod. (Plate L.3.) Detach the hand brake cable from its attachments at the mounting brackets and on the rear axle casing.

Slacken off all the available adjustment of the rear brake shoes by rotating the square-headed adjuster anti-clockwise. At the rear of the back plate remove the clevis pin securing the hand brake cable to the operating link which protrudes through the back plate. (A hole is provided in the hand brake cable bracket on the back plate to provide access to the clevis pin.)

Pull back the cable return spring, lever out the spring retainer from the top of the cable clevis and withdraw hand brake cable.

**REFIT.** Refitting is the reverse of the removal procedure. After refitting the hand brake cable it will be necessary to adjust the rear brakes as described on page L.7. Check the hand brake adjustment and adjust, if necessary, as described on page L.8.



PLATE L.9. HYDRAULIC SUPPLY TANK  
(Mark VII—Right-Hand Drive illustrated).

### SERVO UNIT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** The servo unit is situated between the cruciform and right-hand side member of the chassis frame and is accessible from underneath.

Brush away road dirt, etc., in the immediate vicinity of the servo pipe connections. Disconnect the two hydraulic connections and the vacuum connection. While supporting the unit from below, remove the three nuts securing the servo unit to the top of the support member. Immediately after removal, plug the connections on the servo to prevent the ingress of foreign matter.

**REFIT.** Refitting is the reverse of the removal procedure. After the hydraulic connections have been refitted it will be necessary to "bleed" the hydraulic system as described on page L.8.

### SERVO UNIT. SERVICING (MARK VII MODEL)

**GENERAL.** The Vac-Hydro brake servo unit is a device in which vacuum created by the engine is employed to assist brake operation.

The degree of assistance is progressive throughout the full travel of the brake pedal, and proportionate to the effort applied by the driver, up to the maximum vacuum available in the induction manifold at the time of application.

The servo unit is designed to permit direct communication between the Girling hydraulic master cylinder and the Girling hydraulic wheel cylinders to allow normal (unassisted) braking to be made where there is any loss of vacuum (due to the engine being stationary or for any other cause).

Before leaving the works, servo units are correctly adjusted, tested and lubricated to withstand long periods of service without attention. It should, therefore, be unnecessary to interfere with the unit in any way unless a major overhaul is required or if brake trouble has been traced positively to the servo unit.

It is of the utmost importance that extreme care should be exercised during the whole of the time the servo (or its components) is being handled to prevent mineral fluids of any type from coming into contact with the rubber seals.

Absolute cleanliness is most essential and the unit must never be immersed in a cleaning bath or degreasing plant.

When assembling, smear all the servo cylinder and hydraulic cylinder parts with clean Girling crimson brake fluid.

**SERVICING.** The following procedure should be sufficient to ensure that the servo unit will function correctly between major overhauls.  
(Refer to Plate L.10.)

1. Remove the servo unit as described on page L.18.
2. Stand the unit with the hydraulic cylinder upright and allow the fluid to drain from the vacuum cylinder via the breather pipe. Discard the fluid.
3. Check the valve lever for freedom of movement, cleanliness, etc., and relubricate the axis pins. (The wide clearances of this assembly are deliberate and must not be confused with the excessive wear.) If it is considered necessary to remove the lever and pin, replace the pins correctly with the heads towards the fixing bosses of the servo.
4. Check that when the spherical head of the plunger under the lever is depressed a .020" (0.6 mm.) "feeler" will pass freely between the lever face and the head of the plunger.
5. Check the split pins for security.
6. After the unit has been drained as in paragraph 2, and immediately prior to refitting to the chassis, inject approximately one-eighth of a pint (0.07 litres) of clean Girling crimson brake fluid into the vacuum cylinder via the breather pipe.
7. Refit the servo unit to the chassis as described on page L.18.
8. Bleed the hydraulic system as described on page L.8.

## FAULT FINDING

If the foregoing instructions are carried out correctly, the servo should require no other attention over long periods. Should trouble be experienced with the servo unit reference should be made to the following fault-finding table.

### 1. INSUFFICIENT LUBRICATION.

- Symptoms.**
- (a) Loss of power—hard brake pedal.
  - (b) Engine may race when brakes are applied (car stationary).
  - (c) Brakes released slowly, jerkily, or not at all.

**Remedy.** Relubricate as described in the foregoing servicing instructions. (See also paragraph No. 8.)

### 2. DAMAGED OR DENTED SERVO CYLINDER. (No. 1, Plate L.10.)

- Symptoms.**
- (a) Loss of power—hard brake pedal.
  - (b) Brakes released slowly, jerkily, or not at all.

**Remedy.** Remove end cover screws, end cover, piston assembly and piston return spring. Slight indentations or high spots in bore can be removed by stoning. Where the damage cannot be dealt with in this manner it is recommended that the complete unit be changed, the assembly of the cylinder being jig built to ensure concentricity.

*(continued on page L.22.)*



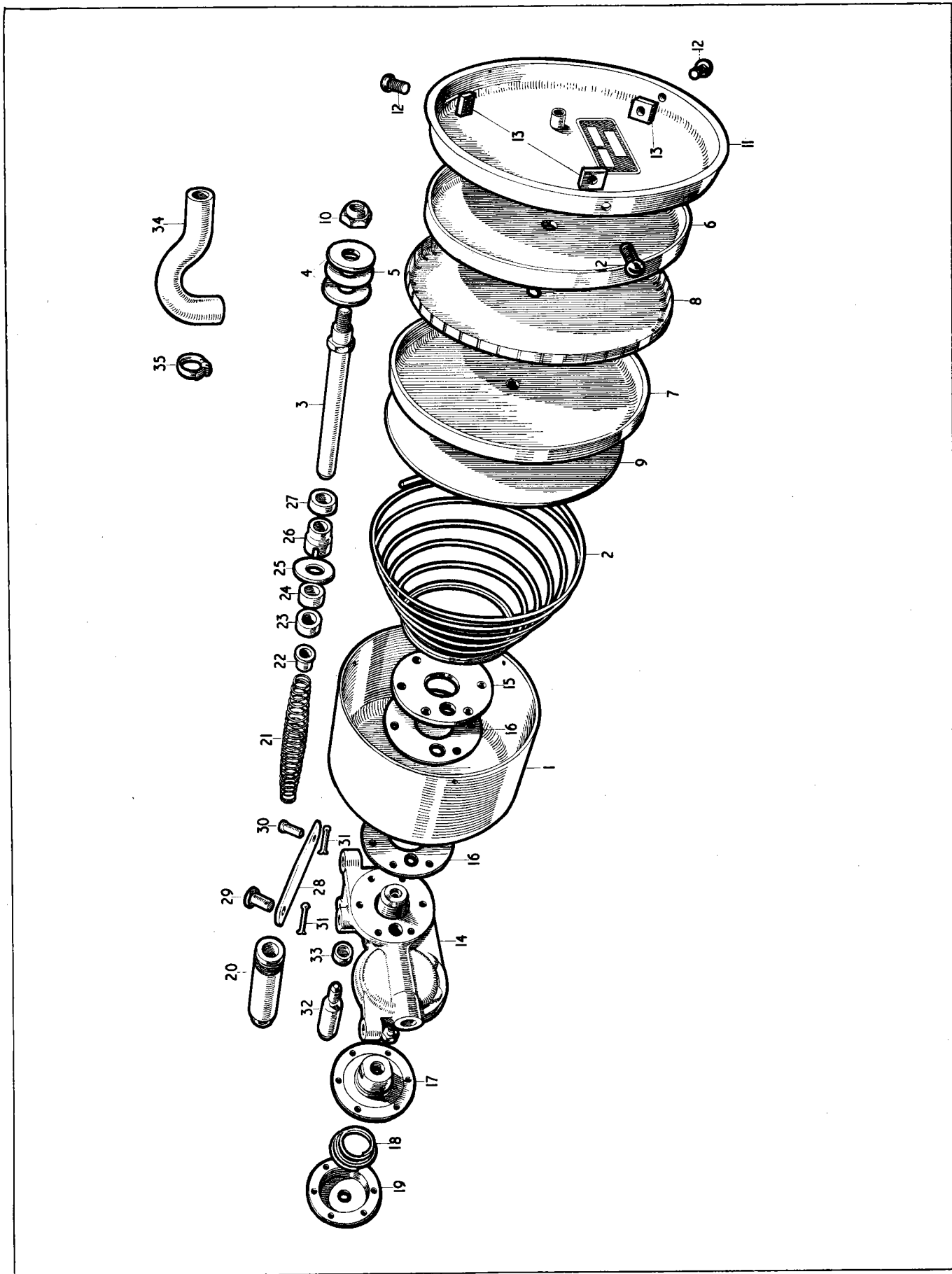


PLATE L.10. SERVO UNIT. Exploded view (Mark VII).

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**3. DAMAGED OR WORN PISTON LEATHER. (No. 7, Plate L.10.)**

- Symptoms.** (a) Loss of power—hard brake pedal.  
(b) Brakes released slowly, jerkily, or not at all.

**Remedy.** Remove piston as in 2 above, replace piston leather, refit to bore, working up and down several times to ensure concentricity before finally tightening stop nut. Refit end cover and relubricate. (**Note.** A partially worn leather can often be made serviceable by re-expanding the brass ring fitted under the leather.)

**4. DAMAGED SEAL. (No. 27, Plate L.10.)**

- Symptoms.** (a) Hydraulic master cylinder supply tank requires continual filling.  
(b) Brakes spongy.  
(c) Traces of brake fluid in vacuum pipe.  
(d) Excessive brake fluid in vacuum cylinder on vacuum side of servo piston.

**Remedy.** Remove piston as previously explained and drain the servo. Unscrew hydraulic cylinder from servo body, noting that the return spring will eject the internal components of the hydraulic cylinder. Remove copper washer, seal spreader and faulty seal. Insert new seal and replace spreader and copper washer. Screw hydraulic cylinder tightly into servo body. Bleed brake system.

**5. DAMAGED SEAL. (No. 33, Plate L.10.)**

- Symptoms.** (a) Slight reduction of power assistance.  
(b) Power assistance not evident at light pedal pressures.  
(c) Brake fluid leaking at periphery of spherical headed plunger (must not be confused with a slight weep at this point, which is permissible).

**Remedy.** Disconnect valve lever and remove plunger by **lightly** depressing brake pedal. Renew seal and reinsert plunger, taking care not to damage lip of seal. Refit valve lever and bleed brake system.

**6. DAMAGED SEAL IN HYDRAULIC CYLINDER. (No. 23, Plate L.10.)**

- Symptoms.** Reduction or loss of power assistance.

**Remedy.** Unscrew hydraulic cylinder from servo body. Note that the return spring will eject the internal components. Replace faulty seal, refit cone seat and screw hydraulic cylinder tightly into servo body. Bleed brake system.

**7. FAULTY DIAPHRAGM VALVE ASSEMBLY. (No. 17, Plate L.10.)**

- Symptoms.** (a) Engine tends to race when brake pedal is depressed (car stationary).  
(b) Loss or reduction of power assistance when brakes are applied, accompanied by a leak which is audible at the centre of the valve dome cover.

**Remedy.** Remove valve lever and domed valve cover. Renew faulty diaphragm and valve assembly. Refit domed cover and spring. Refit valve lever.

**8. DAMAGED OR FAULTY CONE SEAT IN HYDRAULIC CYLINDER. (Nos. 3 and 24, Plate L.10.)**

- Symptoms.** (a) Brakes remain "on" after brake pedal has been released.  
(b) Power assistance intermittent.

**Remedy.** Unscrew hydraulic cylinder as previously described and allow spring to eject female cone seat. Remove end cover from servo cylinder and push piston so that rod projects through body sufficient to expose the male cone end. Using fine grinding paste, lap the male and female cones until there is no tendency for these two parts to cling together. Remove all traces of grinding paste and refit vacuum cylinder end cover. Replace female cone in hydraulic cylinder and screw this component tightly into the servo body. Relubricate the servo and bleed the brake system.

**(XK 120 MODELS)**

The contents of this section apply only to cars with the following chassis numbers:—

	R.H.D.	L.H.D.
<b>Super Sports Model</b> .. ..	660001 to 660979	670001 to 672048
<b>Fixed Head Coupe Model</b> ..	669001 and 669002	679001 to 679621

**DESCRIPTION.** Lockheed fully hydraulic brake equipment is fitted. The hand brake operates the rear brakes only through a separate mechanical linkage.

**FRONT BRAKES.** The front brakes are of the two leading shoe type which are operated by two single ended wheel cylinders situated diametrically opposite each other on the back plate inside the brake drum.

Each wheel cylinder operates one brake shoe only; one end of the brake shoe is operated by the single piston in the wheel cylinder and the other end has a floating anchorage at the closed end of the other cylinder. "Micram" adjusters, one for each shoe, are interposed between the wheel cylinder pistons and the tips of the shoes. (Plate L.21.)

**REAR BRAKES.** The rear brakes are of the leading and trailing shoe type and are operated by a single ended wheel cylinder which also incorporates the hand brake operating lever.

The wheel cylinder is fitted in an elongated slot in the back plate and is free to slide. The cylinder piston acts on one end of the leading shoe and the other end of the shoe has a floating anchorage in an abutment attached to the back plate. The trailing shoe is located in a similar manner between the closed end of the cylinder and the abutment, and is also free to slide. The trailing shoe is operated by movement of the cylinder assembly in the elongated slot as a result of the reaction of the leading shoe against the brake drum.

**HAND BRAKE.** The hand brake operates the rear brakes through a separate mechanical linkage; the wheel cylinder being operated mechanically by a cranked lever incorporated in the cylinder. (Plate L.18.)

**HYDRAULIC SYSTEM.** The brake hydraulic system comprises a fluid supply tank and a master cylinder connected to wheel cylinders by metal pipes and flexible hoses.

Application of the foot brake pedal generates hydraulic pressure in the master cylinder which is transmitted to the wheel cylinders simultaneously.

The pressure in the wheel cylinders moves the pistons which in turn expand the brake shoes. When the brake pedal is released, the pull-off springs connected between each pair of brake shoes return the wheel cylinder pistons to their original positions and the fluid passes back to the master cylinder.

**MAINTENANCE.** Every 2,500 miles (4,000 kilometres) examine the fluid level in the brake supply tank and, if necessary, top up with recommended grade of fluid. Never allow the fluid level to fall more than 1" (25.0 mm.) from the top of the supply tank. (Plate L.11.)

Should it be found that the fluid level falls rapidly, indicating leakage from the system, an immediate examination should be carried out to ascertain the cause.

Every 2,500 miles (4,000 kilometres) lubricate the nipple on the foot brake pedal boss with the recommended grade of lubricant.

Every 2,500 miles (4,000 kilometres) lubricate the two nipples on the hand brake cable with the recommended grade of lubricant. These are accessible from underneath the car, one on either side of the propeller shaft.

Every 10,000 miles (16,000 kilometres) remove road wheels and brake drums, clean out brakes and examine liners. Should replacements be required always use genuine factory relined shoes, available on an exchange basis.

Every 10,000 miles (16,000 kilometres) check and tighten, if necessary, the brake back plate mounting bolts and hydraulic pipe unions.

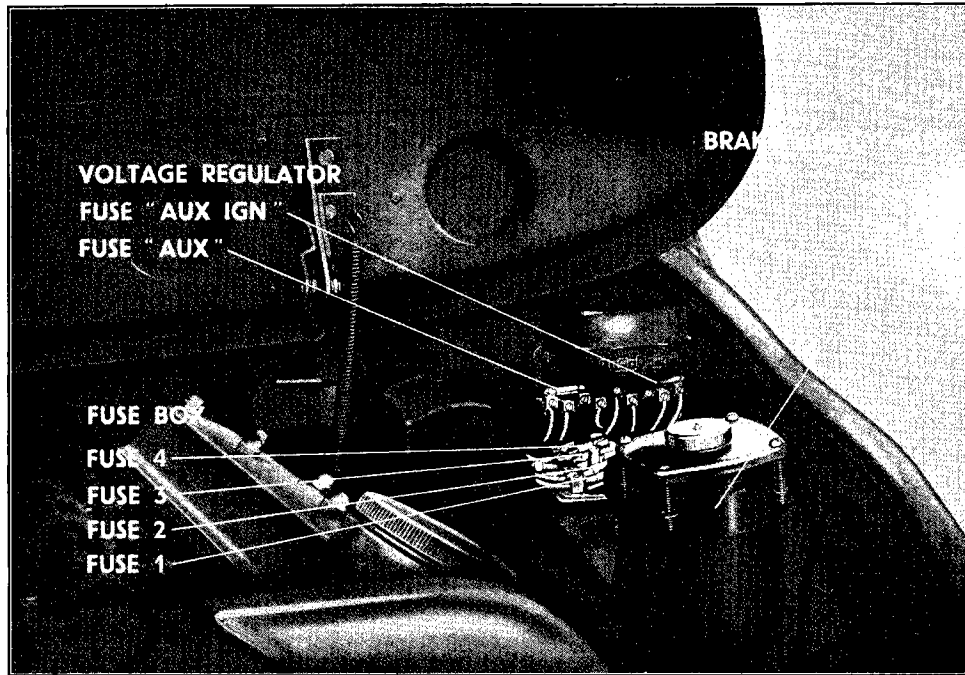


PLATE L.11. HYDRAULIC SUPPLY TANK (XK 120—Left-Hand Drive illustrated).

**RECOMMENDED LUBRICANTS**

		Vacuum	Wakefield	Shell	Esso	Price's
Foot Brake Pedal .. .. .	Mobilgrease	Castrolease	Retinax	Esso	Belmoline	
Hand Brake Cables .. .. .	No. 5	W.B.	A	High Temp. Grease	H.M.P.	

**BRAKE FLUID**

LOCKHEED ORANGE Hydraulic Brake Fluid.  
Or, if not available

WAGNER 21 Hydraulic Brake Fluid or GIRLING CRIMSON Hydraulic Brake Fluid.

**Note.** Before a change from one type of brake fluid to another is made it is necessary to completely drain the system of the fluid before the alternative is used. The system must be topped up with the brand of fluid in use or trouble may be experienced.

**BRAKE DATA**  
(EARLY XK 120 CARS)

Make .. .. .	Lockheed—Hydraulic
Type .. .. .	Two Leading Shoe—Front
Brake Drum—Diameter .. .. .	12" (30.5 cm.)
Brake Lining—Material .. .. .	Mintex M.14
Total Area .. .. .	207 sq. in. (1335 cm. <sup>2</sup> )
Length .. .. .	11 $\frac{1}{8}$ " (29.2 cm.)
Width .. .. .	2 $\frac{1}{4}$ " (57.1 mm.)
Thickness .. .. .	$\frac{3}{8}$ " (4.8 mm.)
Number of Rivets .. .. .	16 per Shoe
Master Cylinder—Bore Diameter .. .. .	1" (25.4 mm.)
Wheel Cylinder—Bore Diameter .. .. .	1 $\frac{1}{8}$ " (28.57 mm.)

## BRAKE ADJUSTMENT

### (EARLY XK 120 CARS)

The necessity for adjustment of the brakes cannot be laid down on a mileage or time basis, but can best be judged by observing the amount of brake pedal free travel before solid resistance is felt.

When this free travel is three quarters or more of the total available pedal pad travel, adjustment should be made as follows:—

**FRONT.** Jack up one front wheel until it is free to revolve. Remove the road wheel which will disclose two holes provided on the outer face of the brake drum through which access is gained to the two slotted adjusting screws. (Plate L.12.) Pass a screwdriver blade through the hole in the brake drum and engage with one of the slotted adjusting screws, turn the adjuster in a clockwise direction until the brake shoe is in contact with the brake drum, then turn the adjuster back one notch (anti-clockwise) which should provide the correct clearance between the shoe and the drum. If closer adjustment is required, spin the drum and apply the brakes hard. This will correctly position the shoe after which a further adjustment check should be made. Repeat these operations on the second adjuster, observing that each adjuster operates on its individual shoe and therefore adjustment must be made at both points.

Repeat for the other front wheel.



PLATE L.12. FRONT BRAKE ADJUSTMENT  
(XK 120—Right-Hand Side illustrated).



PLATE L.13. REAR BRAKE ADJUSTMENT  
(XK 120—Left-Hand Side illustrated).

**REAR.** Place chocks under one front wheel and release the hand brake. Jack up one rear wheel until it is free to revolve and remove the road wheel. The procedure is as described for the front brakes except that there is only one slotted adjusting screw for each wheel. (Plate L.13.)

Repeat for the other rear wheel.

**Note.** Rotating the adjuster one notch off (anti-clockwise) may not be sufficient in all cases to allow the drum to revolve freely, being dependent on drum concentricity. The adjustment must not be such as to cause the drum to rub.

**HAND BRAKE.** Adjustment of the rear brakes will automatically adjust the hand brake. If, however, it is found that with the rear brakes in correct adjustment excessive hand brake free travel is obtained, check the hand brake as follows:—

Any adjustment required is carried out at the yoke linkage attached to the central cross member. To effect adjustment, jack up both rear wheels, lock shoes by means of the adjuster and then set cable at yoke to give the required three notches free movement at the lever. (Plate L.14.) Slacken off brake adjusters one click when the wheels should rotate freely. Adjustment must on no account be made other than in the manner described as haphazard adjustment to the cable may preload the rear brake shoes, causing the brake shoes to bind. When the hand brake is released no tension should exist in the cable.

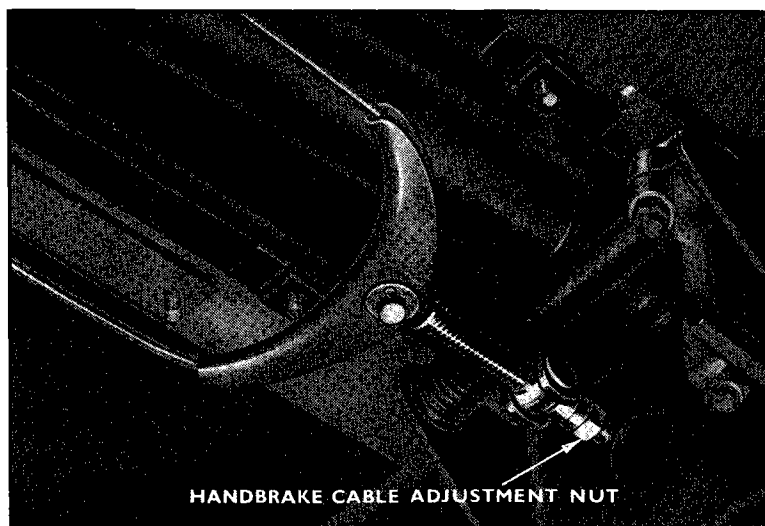


PLATE L.14. HAND BRAKE CABLE ADJUSTER (XK 120).

### **BLEEDING THE HYDRAULIC SYSTEM (EARLY XK 120 CARS)**

“Bleeding” (expelling air) the hydraulic system is not a routine maintenance operation and should only be necessary when a portion of the hydraulic system has been disconnected or if the level of the brake fluid has been allowed to fall so low that air has entered the master cylinder. Proceed as follows:—

Fill up the supply tank with fluid, exercising great care to prevent entry of dirt. Taking one brake at a time, remove rubber cover from bleed nipple and fit rubber bleed tube, allowing this to hang in a clean glass jar. Unscrew the nipple about three quarters of a turn and depress the brake pedal slowly, allowing it to return unassisted and with two or three seconds between each stroke. Pumping must be continued until the fluid is entirely free of air, care being taken to see that the reservoir is replenished frequently during this operation, for should it be allowed to empty, more air will enter. After expelling all traces of air, hold the brake pedal down firmly, tighten nipple and replace dust excluder. Repeat procedure at other brakes. On completion, top up reservoir to correct level of 1" (25.0 mm.) below filler neck.

Do not on any account use the fluid which has been bled through the system to replenish the reservoir as it will have become aerated. Always use fresh fluid straight from the tin.

## BRAKE OVERHAUL. GENERAL INSTRUCTIONS

### (EARLY XK 120 CARS)

**CLEANLINESS.** The importance of absolute cleanliness when dismantling hydraulic parts such as the master cylinder and wheel cylinders cannot be overstressed.

Clean off the mud and grease before removing the unit. Dismantle on a bench covered with a sheet of clean paper. Do not handle the internal parts—particularly rubbers—with dirty hands. Do not swill a unit, after removal from the vehicle, in paraffin, petrol or trichlorethylene as this will ruin rubber parts and, on dismantling, will give a misleading impression of their original condition. Place all metal parts in a tray of clean brake fluid to soak, afterwards dry off with a clean fluffless cloth and lay out in order on a clean sheet of paper.

**EXAMINATION.** Rubber parts should be carefully examined and, if there is any doubt of their condition, a comparison should be made with new parts. Any signs of swollen cups or perished rubber indicate that they should be renewed immediately. In the case of the master cylinder, make sure that the by-pass port is clear by probing with a piece of fine wire. The brakes will drag if the by-pass port is clogged as pressure will build up in the system, thereby forcing the shoes into contact with the drums. The port is deliberately drilled first with a  $\frac{1}{16}$ " (1.59 mm.) drill halfway and then completed with a .028" (.71 mm.) drill which just breaks through into the bore.

Never endeavour to clear out the internal bore of flexible hydraulic pipes by probing, since this will undoubtedly result in rupture of the pipe. Where the flexible pipes are choked or perished, fit replacements.

**FLUSHING THE SYSTEM.** Should the fluid in the system become thick or "gummy" after many years in service, or after a vehicle has been laid up for some considerable time, the system should be drained, flushed and refilled. It is recommended that this should be carried out once every five years.

Pump all fluid out of the hydraulic system through the bleeder screw of each wheel cylinder in turn. Connect one end of a rubber tube to the bleeder screw, allowing the other end to fall into a container, unscrew one complete turn and pump the brake pedal by depressing it quickly and allowing it to return without assistance. Repeat, with a pause in between each operation, until no more fluid is expelled. Discard the fluid extracted.

Fill the supply tank with industrial methylated spirit and flush the system by pumping as described above. Keep the supply tank replenished until at least a quart of spirit has been passed through each wheel cylinder. Where possible, remove the supply tank and pour off any remaining spirit.

Refill with clean Lockheed brake fluid and "bleed" the system.

**Note.** If the system has become contaminated by the use of mineral oil, etc., the above process may not prove effective. It is recommended that the various units, including the pipe line, should be dismantled and thoroughly cleaned and that all rubber parts, including flexible hoses, should be replaced. The contaminated fluid should be destroyed immediately.

**ASSEMBLY.** Ensure that the castings are perfectly clean and bear no traces of cleaning fluid other than genuine brake fluid. Dip all internal parts in clean brake fluid and assemble wet.

Use Lockheed orange brake fluid to top up the system. If Lockheed orange brake fluid is not available Wagner 21 brake fluid or Girling crimson brake fluid may be used, but it is essential to drain the system of one fluid before an alternative is used. The system must be topped up with the brand of fluid in use. Attention is drawn to the instructions given on removing and refitting hydraulic flexible hoses on page L.32.

**TESTING.** Before the brakes are tested check tyre pressures and correct if necessary. Correct pressures are: Front, 25 lbs. per sq. in. (1.8 kg./cm.<sup>2</sup>); Rear, 25 lbs. per sq. in. (1.8 kg./cm.<sup>2</sup>).

**STORAGE.** Stores departments should exercise special care in handling brake parts to ensure that no damage is caused which would affect their correct functioning when assembled. Rubbers should be stored in a cold, dark place well removed from any fumes.



### MASTER CYLINDER. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**GENERAL.**  
(Refer to  
Plate L.15.)

The master cylinder is situated at the bottom of the foot brake pedal: on right-hand drive cars at the outside of the chassis right-hand side member, and on left-hand drive cars at the inside of the chassis left-hand side member.

**REMOVE.**

Jack up and remove the road wheel. Disconnect the supply pipe union from the banjo on top of the master cylinder and drain the contents of the supply tank into a clean receptacle.

At the front of the master cylinder unscrew the two pipe unions from the banjo and disconnect the two wires from the stop light switch.

Remove the pedal stem from the foot brake pedal by unscrewing the retaining bolt and nut. Unscrew the two bolts passing through the master cylinder and the nut at the foot brake pedal boss. Withdraw the master cylinder and foot brake pedal complete.

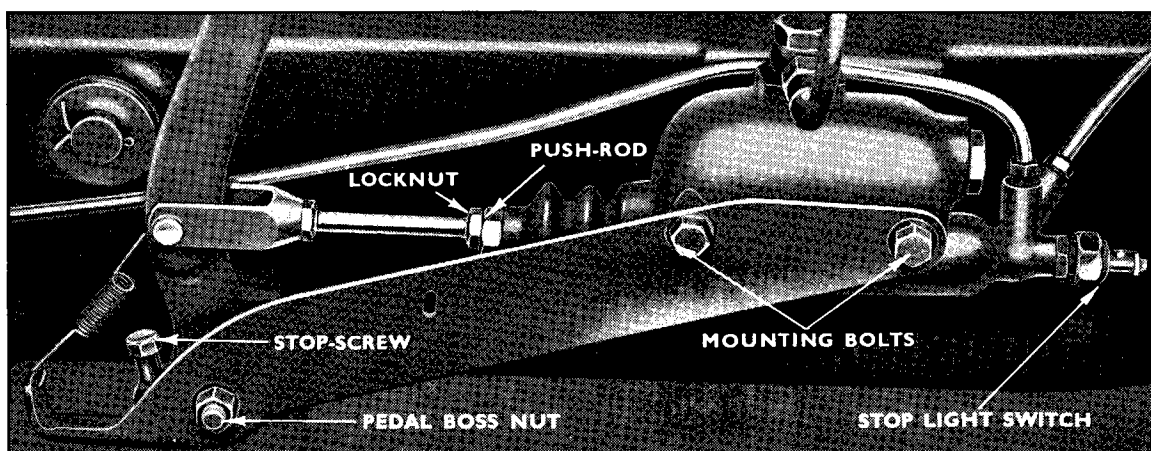


PLATE L.15. MASTER CYLINDER. REMOVAL (XK 120).

**REFIT.**

Refitting is the reverse of the removal procedure. It will be necessary to bleed the hydraulic system as described on page L.26. Ensure that there is  $\frac{1}{32}$ " (.80 mm.) clearance between the master cylinder piston and the pedal push rod. If adjustment is required, refer to "Brake Pedal—Free Travel. To Adjust" on page L.36.

### MASTER CYLINDER. TO DISMANTLE AND REASSEMBLE (EARLY XK 120 CARS)

**GENERAL.**  
(Refer to  
Plate L.16.)

In the head of the cylinder (E) is an inlet and outlet valve consisting of a metal body (B) containing a rubber cup (C), and a rubber washer (A) on which the metal body is urged by a return spring (D). The function of the valve is to prevent the return to the master cylinder of fluid pumped into the "line" during the bleeding operation, thereby ensuring a charge of fresh fluid being delivered at each stroke of the brake pedal and a complete purge of air from the system. During normal operation, fluid returning under pressure and assisted by the effort of the brake shoe pull-off springs, lifts the valve off its seat thereby permitting fluid to return to the master cylinder and the brake shoes to the "off" position.

Directly in front of the main rubber cup (F), when the system is at rest, is a by-pass port (X) which ensures that the system is maintained full of fluid at all times, and allows full compensation for expansion or contraction of the fluid due to changes of temperature. It also serves to release additional fluid drawn into the cylinder from the annular space formed by the reduced skirt of the piston (H) through the small holes in the piston after each

brake application. If this additional fluid is not released to the reservoir through the by-pass port, due either to the hole being covered by the main cup as a result of incorrect pedal adjustment, or to the hole being choked by foreign matter, pressure will build up in the system and all brakes will drag.

Always exercise extreme cleanliness when dealing with any part of the hydraulic system. Before dismantling the master cylinder refer to "Brake Overhaul. General Instructions" on page L.27.

**DISMANTLE.** Remove the rubber boot (N), push the piston (H) down the bore of the cylinder to release the pressure on the piston stop (L), remove the circlip (M) and the piston stop. Withdraw the piston, rubber cup (F), return spring (D), valve body (B) complete with rubber cup (C) and the rubber washer (A). Using only the fingers to prevent damage, remove the secondary cup (K) by stretching it over the end flange of the piston.

**Note.** Later production cars are fitted with a piston washer between the piston and main cup; this washer should be fitted with the concave side towards the main cup.

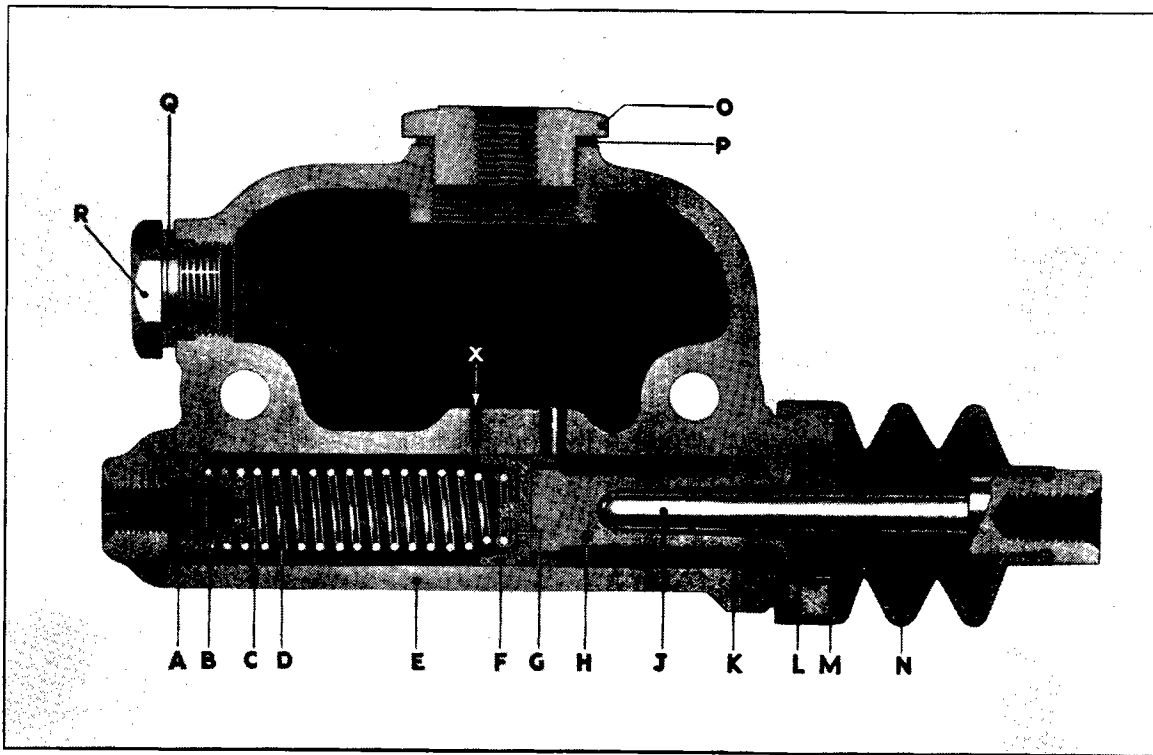


PLATE L.16. MASTER CYLINDER. Sectioned view (XK 120).

**REASSEMBLE.** Dip all internal parts in clean brake fluid and assemble wet. Fit the secondary cup (K) on the piston (H), so that the lip of the cup faces the piston head, and gently work the cup round the groove with the fingers to ensure that it is properly seated. Place the rubber washer (A) in position in the bottom of the cylinder bore. Fit the rubber cup (C) in the metal body (B) and assemble the body on the larger end of the return spring (D). Assemble the retainer (G) on the smaller end of the return spring and insert the assembly into the cylinder so that the valve body is in contact with the rubber washer. Insert the main cup (F) into the cylinder, lip foremost, taking care not to damage or turn back the lip of the cup. Press the piston (H) into the cylinder, taking care not to damage or turn back the lip of the secondary cup (K).

Insert the piston stop (L) and fit the circlip (M), ensuring that it beds evenly in its groove. Refit the rubber boot (N).

Fill the master cylinder with clean Lockheed brake fluid and test the master cylinder by pushing the piston inwards

and allowing it to return unassisted; after a few applications, fluid should flow from the outlet connection in the cylinder head.

**Note.** Later production cars are fitted with a piston washer between the piston and main cup; this washer should be fitted with the concave side towards the main cup.

### **WHEEL CYLINDERS—FRONT. TO REMOVE AND REFIT (EARLY XK 120 CARS)**

**REMOVE.** Remove the front brake shoes as described on page L.32.

At the rear of back plate unscrew the two hollow bolts securing the banjo connections to the wheel cylinders and remove connection complete with bridge pipe. (Note the sealing washers one at each side of the banjo connections.) Remove the three nuts securing each wheel cylinder to the back plate. Withdraw cylinders from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to "Brake Shoes—Front. To Refit" on page L.33 when refitting the brake shoes.

It will be necessary, following refitting, to "bleed" the hydraulic system as described on page L.26.

### **WHEEL CYLINDER—REAR. TO REMOVE AND REFIT (EARLY XK 120 CARS)**

**REMOVE.** Remove the rear brake shoes as described on page L.33.

At the rear of the back plate remove the clevis pin securing the hand brake cable to the operating lever which protrudes through the back plate. Unscrew the hollow bolt securing the banjo connection to the wheel cylinder. (Note the two sealing washers, one on each side of the banjo connection.) Remove the rubber boot from the hand brake lever. Remove the piston and cover from the wheel cylinder and withdraw cylinder from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to "Brake Shoes—Rear. To Refit" when refitting the brake shoes.

It will be necessary, following refitting, to "bleed" the hydraulic system as described on page L.26.

### **WHEEL CYLINDERS. TO DISMANTLE AND REASSEMBLE (EARLY XK 120 CARS)**

**DISMANTLE.** Before dismantling any of the wheel cylinders refer to "Brake Overhaul. General Instructions" (Refer to Plates L.17 and L.18.) on page L.27.

**Front.** Remove the front wheel cylinders as described above.

Withdraw the piston and cover from the end of the wheel cylinder. Apply gentle air pressure to the union hole at rear of cylinder to blow out the rubber cup, cup filler and spring.

**Note.** On early cars a cup filler spring was not fitted to the wheel cylinders and the cup filler was of a different type, having no recess for the spring.

**Rear.** Remove the rear wheel cylinder as described above.

Withdraw the piston and cover from the end of the wheel cylinder. Push out the hand brake lever pivot pin and remove the lever. Remove the piston, rubber cup, cup filler and spring.

**Note.** On early cars a cup filler spring was not fitted to the wheel cylinders and the cup filler was of a different type, having no recess for the spring.

**REASSEMBLE.** Reassembly is the reverse of the dismantling procedure, but reference should be made to "Brake Overhaul. General Instructions" on page L.27.

Ensure that the rubber cups are fitted the correct way round in the cylinders, that is, with the lip or widest end of the cup facing the blank end of the cylinder.

**Note.** On early cars not fitted with a cup filler spring, the cup filler should be fitted so that the domed end faces the rubber cup.

Refit the wheel cylinders as described on page L.30.

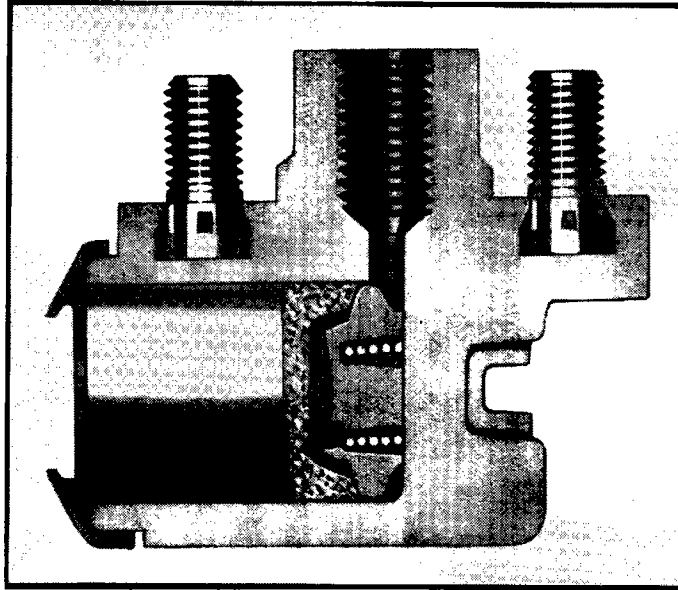


PLATE L.17. FRONT WHEEL CYLINDER. Sectioned view (XK 120).

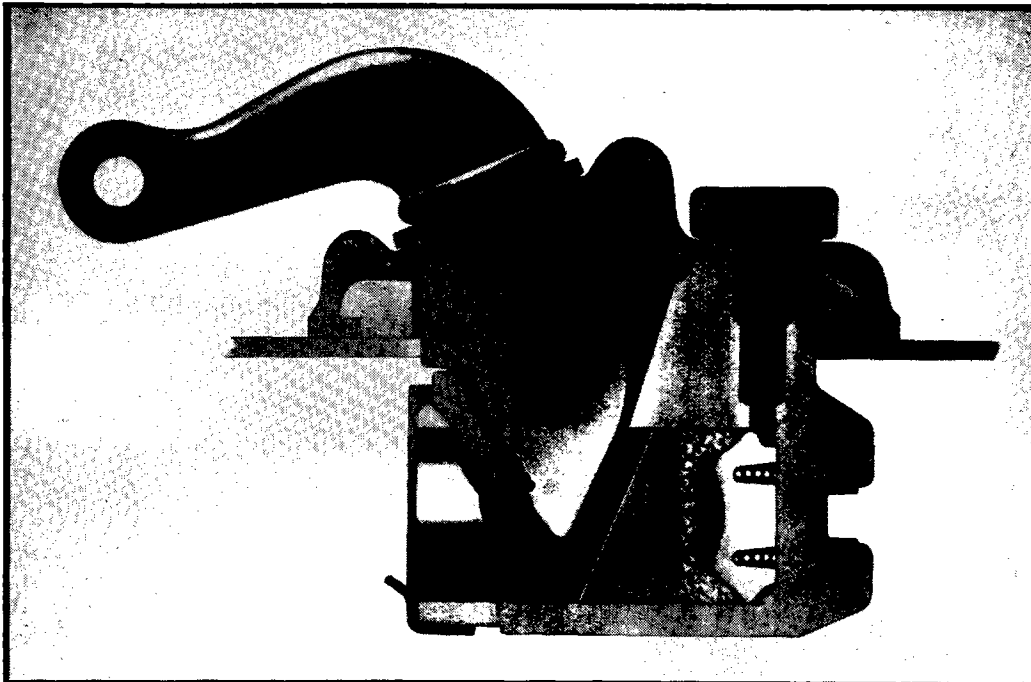


PLATE L.18. REAR WHEEL CYLINDER. Sectioned view (XK 120).

## FLEXIBLE HOSES. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**REMOVE.** (Refer to Plate L.19.) The flexible hoses must be disconnected at the support bracket end first, otherwise rupture of the hose is likely to occur.

**Front.** At the hose support bracket on the front suspension post unscrew the union securing the metal pipe to the end of the flexible hose. Hold the hexagon of the flexible hose end sleeve with a spanner, unscrew the lock nut on the other side of the support bracket and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

**Rear.** At the hose support on the chassis frame above the right-hand rear shock absorber, unscrew the union securing the metal pipe to the end of the flexible hose. Hold the hexagon of the flexible hose end sleeve with a spanner, unscrew the lock nut on the other side of support bracket and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

**Note.** Do **not** attempt to clear the bore of a flexible hose by probing. If a hose is choked or perished, fit a replacement.

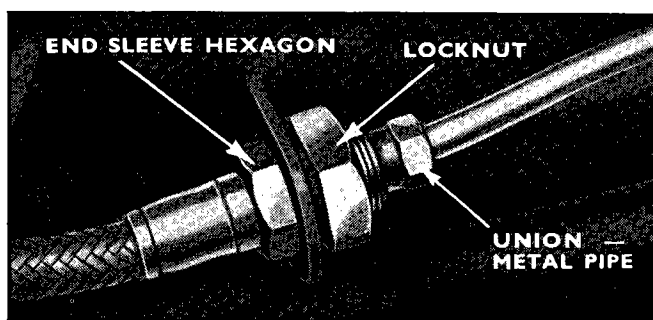


PLATE L.19. FLEXIBLE HOSE. REMOVAL (XK 120).

**REFIT.** Refitting is the reverse of the removal procedure. When refitting the flexible hose at the support bracket end, ensure that the hose does not twist by holding the hexagon of the end sleeve with a spanner whilst tightening the lock nut.

After refitting the hose(s) it will be necessary to "bleed" the hydraulic system as described on page L.26.

## BRAKE SHOES—FRONT. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**GENERAL.** It is recommended that advantage be taken of the Lockheed Exchange Brake Shoe Scheme in preference to relining the existing shoes. These replacement shoes are obtainable from Jaguar Spares Department or from Lockheed agents, and are accurately ground to size, which ensures a quick and easy "bed in" to the drums.

**REMOVE.** (Refer to Plate L.20.) Jack up the car and remove road wheel. Slacken off all available brake shoe adjustment by rotating the two "Micram" adjusters (accessible through a hole in the brake drum) anti-clockwise. Remove the two countersunk screws securing the brake drum to the hubs and withdraw drum.

Pull one of the brake shoes (against the load of the pull off springs) away from the abutment at the closed end of the adjacent cylinder and slide the "Micram" adjuster mask off the piston cover of the operating cylinder. On releasing the tension of the pull off springs, the opposite brake shoe will fall away.

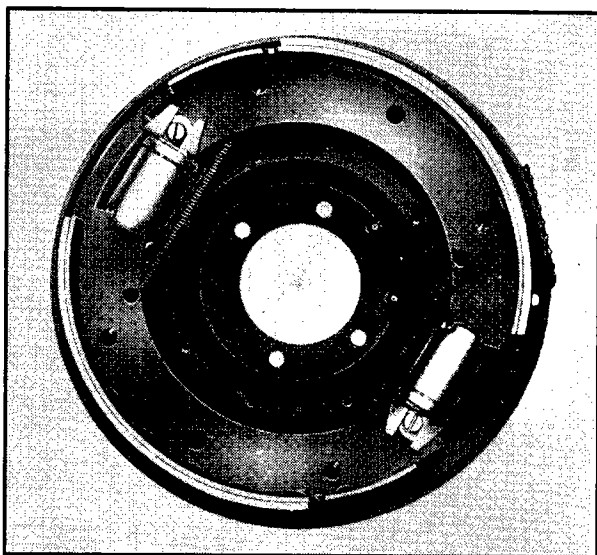
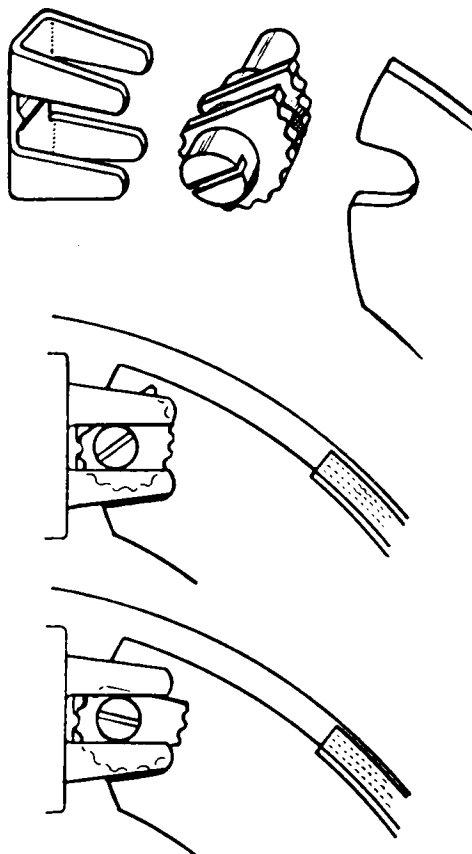


PLATE L.20. FRONT BRAKE ASSEMBLY  
(XK 120—Right-Hand Side illustrated).



*Drawings by courtesy of the "Autocar"*

PLATE L.21.  
"MICRAM" BRAKE SHOE ADJUSTER  
(XK 120).

**REFIT.** Keep all grease off the brake shoe linings and do not handle more than necessary.

Pair the brake shoes and fit the pull off springs to the underside of the shoe webs, that is, so that the springs will be between the shoes and the back plate.

By pulling against the load of the pull off springs enter the non-recessed ends of the shoes in the slots at the blank ends of the wheel cylinders and the recessed ends against the piston covers. Fit the "Micram" adjuster to the mask in the fully off position, pull the recessed end of the shoe against the load of pull off springs and slide in the adjuster. Ensure that the mask is entered between the lips of the piston cover and that the adjuster is seated in the recess at the end of the brake shoe.

Repeat for the other brake shoe. Refit the brake drum and adjust brakes as described on page L.25. Refit road wheel.

### BRAKE SHOES—REAR. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**GENERAL.** It is recommended that advantage be taken of the Lockheed Exchange Brake Shoe Scheme in preference to relining the existing shoes. These replacement shoes are obtainable from Jaguar Spares Department or from Lockheed agents, and are accurately ground to size, which ensures a quick and easy "bed in" to the drums.

**REMOVE.** (Refer to Plate L.22.) Jack up the car and remove the road wheel. Slacken off all available brake shoe adjustment by rotating the "Micram" adjuster (accessible through holes in the brake drum) anti-clockwise. Remove the two countersunk screws securing the brake drum to the hub and withdraw drum.

On later production cars fitted with "beehive" springs to the centres of the brake shoes remove springs by depressing and twisting to disengage the end of the spring from the steady pad on the back plate.

Pull the trailing shoe (against the load of the pull off springs) away from its abutment at either end. On releasing the tension of the pull off springs the leading shoe and "Micram" adjuster will fall away.

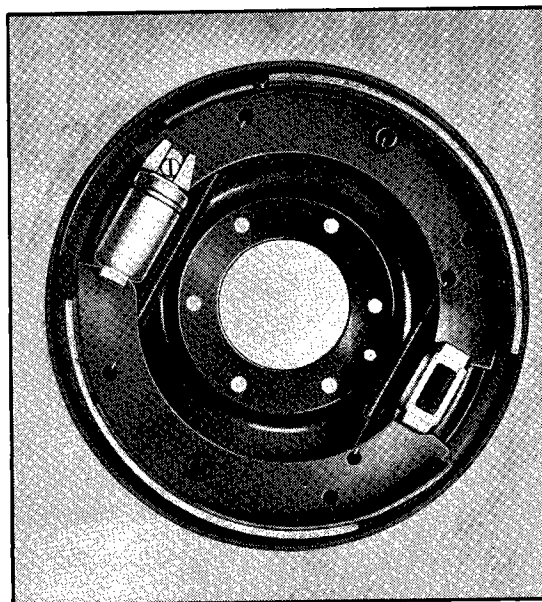


PLATE L.22. REAR BRAKE ASSEMBLY  
(XK 120—Right-Hand Side illustrated).

**REFIT.** Keep all grease off the brake shoe linings and do not handle more than necessary.

Pair the brake shoes (the leading and trailing shoes are not interchangeable) and fit the pull off springs to the underside of the shoe webs, that is, so that the springs will be between the shoes and the back plate. The stronger spring is fitted to the wheel cylinder end of the shoes, that is, the end with a recess in the leading shoe for the adjuster.

Offer up the brake shoes and pull off springs to the back plate with the recess in the end of the leading shoe to the piston end of the wheel cylinder. By pulling against the load of the pull off springs, enter the ends of the shoes in the slots in the abutment and the other ends on each side of the wheel cylinder. Fit the "Micram" adjuster to the mask in the fully off position, pull the recessed end of the leading shoe against the load of pull off springs and slide in the adjuster. Ensure that the mask is entered between the lips of the piston cover and that the adjuster is seated in the recess at the end of the leading shoe.

If "beehive" springs are fitted to the centres of the brake shoes, refit the springs to the shoes and engage with steady pads on the back plate by depressing and twisting.

Refit the brake drum and adjust brakes as described on page L.25. Refit the road wheel.

### BACK PLATE—FRONT. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**REMOVE HUB.** Jack up car and remove road wheel. Slacken off all available brake shoe adjustment by rotating the two "Micram" adjusters (accessible through holes in the brake drum) anti-clockwise.

Remove the two countersunk screws and withdraw the brake drum. Lever out the cap from end of hub and remove the split pin and slotted nut. With a suitable extractor withdraw the hub from the stub axle shaft.

**DISCONNECT BRIDGE PIPE.** At the rear of the back plate unscrew the two hollow bolts securing the banjo connections to the wheel cylinder and place bridge pipe clear. (Note the sealing washers fitted to each side of the banjo connections.)

**REMOVE BACK PLATE.** Remove the four split pins, slotted nuts and bolts securing the back plate to the stub axle carrier. Remove the back plate complete with shoe assemblies.

**REFIT.** Refitting is the reverse of the removal procedure. When the hub has been refitted, tighten the slotted nut until there is no end float in the hub. Slacken nut one slot, check end float which should just be perceptible by hand and secure with new split pin.

Following reassembly it will be necessary to "bleed" the hydraulic system as described on page L.26.

### BACK PLATE—REAR. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**REMOVE.** For the recognition feature of the two types of axle fitted to the XK 120 models refer to Section 'H'.

Jack up car and remove road wheel. Slacken off all available brake shoe adjustment by turning the "Micram" adjuster (accessible through hole in brake drum) anti-clockwise. Remove the two countersunk screws and withdraw brake drum.

At the rear of the back plate unscrew the hollow bolt securing the banjo connection to the wheel cylinder, and remove the clevis pin securing hand brake cable to the lever.

**E.N.V. Axle.** At the rear of the axle case flange remove the split pins, slotted nuts and spring washers from the six bolts securing the back plate to the flange. Ease the axle shaft bearing from the casing, noting the adjusting shims between the bearing housing and the back plate. Withdraw axle shaft and remove back plate.

**Salisbury Axle.** Remove the split pin and slotted nut securing the hub to the axle shaft and with a suitable extractor withdraw hub from shaft.

Remove the five bolts and nuts securing the back plate to flange of axle case and withdraw back plate. Note the gasket and oil seal at the front of back plate. Also note the bearing retainer plate and shims fitted between the back plate and the flange of the axle case: do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.

**REFIT.** Refitting is the reverse of the above procedure but attention should be given to the following points.

Ensure that same shims found on dismantling are refitted to their correct side. These shims control the axle shaft end float; full details for adjusting are given in Section 'H'—"Rear Axle".

When the brake assembly has been completely refitted, "bleed" the hydraulic system as described on page L.26. Adjust the rear brakes as described on page L.25. Refit road wheel.



### BRAKE PEDAL—FREE TRAVEL. TO ADJUST (EARLY XK 120 CARS)

**GENERAL.** It is essential that the master cylinder piston is **not** prevented from returning to the fully “off” position, otherwise pressure may be built up in the hydraulic system, causing the brakes to drag or remain on.

A minimum clearance of  $\frac{1}{32}$ " (.80 mm.) is necessary between the pedal push rod and the master cylinder piston.

**ADJUST. (Refer to Plate L.15.)** Ensure that the pedal is not being prevented from returning to the full “off” position; the stop screw at the bottom of the pedal should be in contact with the master cylinder support bracket.

Ease the small end of the rubber boot towards the master cylinder until the end of boot is off the enlarged diameter of push rod. Slacken the lock nut adjacent to the push rod hexagon and rotate hexagon until a minimum clearance of  $\frac{1}{32}$ " (.80 mm.) is obtained, which entails, with a margin of safety,  $\frac{1}{4}$ " to  $\frac{3}{8}$ " (6.3 to 9.5 mm.) free travel at the pedal pad. This free movement can be felt if the pedal is depressed gently by hand. Tighten the lock nut and refit rubber boot.

### SUPPLY TANK. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**REMOVE.** The brake supply tank is situated at rear of the wing valance. (Plate L.11). From underneath the supply tank disconnect the flexible hose from the metal pipe by slackening the clip. Draw hose off pipe and drain fluid into a clean receptacle.

Remove the two bolts and nuts securing the supply tank bracket to the wing valance and lift out supply tank.

**REFIT.** Refitting is the reverse of the above procedure. Refill the supply tank to 1" below the filler neck with the same grade of fluid that is present in the remainder of the hydraulic system.

### HANDBRAKE CABLE. TO REMOVE AND REFIT (EARLY XK 120 CARS)

**REMOVE.** At the hand brake lever end remove the clevis pin securing the hand brake cable yoke to the adjusting rod. (Plate L.14.) At the rear of the back plate remove the clevis pin securing the hand brake cable to the lever protruding through the back plate.

Detach the hand brake cable from the brackets and clips on the rear axle case and from the abutment bracket underneath the propeller shaft. The cable can now be removed.

**REFIT.** Refitting is the reverse of the removal procedure. Check hand brake adjustment and adjust, if necessary, as described on page L.26.

## SELF ADJUSTING FRONT BRAKES AND TANDEM MASTER CYLINDER (LATER XK 120 CARS)

The contents of this section apply only to cars with the following chassis numbers and onwards:—

	R.H. Drive	L.H. Drive
Super Sports Model ... ..	660980	672049
Fixed Head Coupé Model ... ..	669003	679622
Drop Head Coupé Model ... ..	667001	677001

### DESCRIPTION

**FRONT BRAKE ASSEMBLY.** The front brakes are of the self-adjusting type, in that brake adjustment takes place automatically as the linings wear.

(Refer to Plate L.30)

The assembly consists of a back plate to which two single wheel cylinders are rigidly attached in diametrically opposed positions. Each wheel cylinder carries a piston whose end is specially formed to provide an abutment for the toe of one of the brake shoes.

The heel of each shoe finds a floating anchor in the slot at the closed end of the opposite wheel cylinder.

Two adjusting bars link each shoe with the other, one end of each bar being formed with a slightly enlarged hole through which a bar anchor pin passes; the pin is threaded into the web of the shoes and secured by a nut and a spring washer, and the adjuster bar retained on the pin by a circlip which bears on a plain washer. A bolt, with a spring under its head, passes through the web of the opposite brake shoe and locates within a slot at the other end of the adjusting bar. The bolt is fitted with a nut to retain two pad plates, between which two friction pads and the adjusting bar are assembled, a ratchet spring surrounds the latter assembly and engages within teeth formed on the adjusting bar.

The shoes are retained on the back plate by two pull-off springs, one end of each being attached to the heel of a brake shoe and the other end being hooked on to a spring anchor pin which screws into the back plate and is secured by a nut and a spring washer. The three struts which are welded to each shoe, strengthen that part of the shoe which carries the lining, so improving the contact between the lining and the drum.

**Principle of Operation.** As the linings wear, each adjuster bar is dragged through the friction pads by the shoe to which it is attached by a pin. The grip of the friction pads is such that any return movement of the adjuster bar is prevented, but a minimum clearance between the lining and the drum under all conditions is ensured by the clearance between the pin and the enlarged hole in the adjuster bar.

The ratchet springs are fitted as a follow up device and are a safety factor in the event of oil being present on the friction pads, which might otherwise allow the adjuster bars to slip back.

The adjustment, however, if dependent upon the ratchet springs, would be much coarser owing to the formation of the ratchet teeth.

**REAR BRAKE ASSEMBLY.** The rear brake assembly comprises a back plate which is slotted to carry a wheel cylinder and to which an adjuster is rigidly attached. A rubber boot, through which a lever passes,

(Refer to Plate L.31)

is fitted to the wheel cylinder at the rear of the back plate, to prevent the intrusion of foreign matter to the unit. The wheel cylinder contains two pistons, the outer of which abuts the toe, that is, the more sharply tapered end of the leading shoe; the inner piston operates the outer when hydraulic pressure is applied, but when the hand brake is brought into operation the lever operates the outer piston without disturbing the inner one. The heel of the trailing shoe is located within a slot at the end of the wheel cylinder body, and the trailing shoe is operated by the movement of the cylinder assembly along the slot in the back plate as a result of the reaction of the leading shoe against the drum.

The adjuster carries an adjuster wheel into which a slotted adjuster screw is threaded to provide a location for the heel of the leading shoe; a slot at the other end of the adjuster provides a floating abutment for the toe of the trailing shoe.

The beehive springs and pull-off springs retain the shoes on the back plate, the pull-off springs being attached to the shoes and the beehive springs to steady pads which are welded to the back plate. Greater rigidity for the brake shoes is provided by three struts welded to each.

**TANDEM  
MASTER  
CYLINDER.**  
(Refer to Plate  
L.27)

The tandem type master cylinder consists of two separate and complete hydraulic systems in line, one operating the front brakes and the other the rear. This duplication ensures that, in the event of one system being damaged, there will still remain an effective brake on the other.

The unit comprises a body bored to receive a primary piston and a secondary piston between which a spring is fitted, the secondary piston is also loaded by a spring which is retained by a stop and an outlet adapter. The latter screws down on to a rubber seal and is chambered to admit a combined inlet and outlet valve which consists of a rubber washer against which a valve body, housing a cup, is urged by a spring.

A stop pin screws into the body, with a gasket under its head, and acts as a stop for the secondary piston: the primary piston is retained by a washer and a spring ring. Both pistons are grooved to admit taper seals, the primary also being formed with a deep depression to admit a push rod. A boot is fitted to the push rod and the body to prevent the ingress of foreign matter to the unit.

The upper face of the body is internally threaded in three places to receive a combined inlet and outlet valve and two tilting type valve assemblies. Each of the latter consists of an inlet adapter which screws down on to a rubber seal and is recessed to admit a valve loaded by a spring, the parts being retained by a plate on to which the inner edge of the adapter is peened; the tilting valve assemblies cannot be dismantled. The combined inlet and outlet valve is made up of identical parts to the one at the end of the bore and is housed in a similar adapter.

**HAND BRAKE** The hand brake operates the rear brakes through a separate mechanical linkage; the wheel cylinder being operated mechanically by a cranked lever incorporated in the cylinder.

**HYDRAULIC  
SYSTEM**

The tandem master cylinder, in effect, consists of two single master cylinders in line without any direct fluid communication between them. Each cylinder is fed from an independent compartment in the supply tank and each operates the brakes on one axle only. On depressing the brake pedal the primary piston allows the rear tilting valve to close and forces fluid via the combined inlet and outlet valve on the top of the cylinder to the rear wheel cylinders until the shoes touch the drums. Further movement of the primary piston generates pressure in the primary cylinder which causes the secondary piston to move forward, allows the front tilting valve to close and forces fluid via the combined inlet and outlet valve in the end of the cylinder to the front wheel cylinders. When all shoe clearances have been taken up, further effort on the pedal generates equal pressure in both cylinders by virtue of the secondary piston being a floating member. Thus all brakes are fully compensated despite the fact that two separate systems are in use. In the event of a leak occurring in the primary cylinder the primary piston would move forward without effect until it picked up the secondary piston. Further effort would apply the brakes which are operated by the secondary cylinder.

Should a leak occur in the secondary cylinder the pressure generated in the primary would first drive the secondary piston to the end of its stroke and then apply the rear brakes. It is essential that the full stroke of a tandem cylinder is utilised in order that the safety feature is retained.

**MAINTENANCE**  
(LATER XK 120 CARS)

Every 2,500 miles (4,000 kilometres) examine the fluid level in the brake supply tank and, if necessary, top up with recommended grade of fluid. Never allow the fluid level to fall more than 1" (25 mm.) from the top of the supply tank. (Plate L.23.)

Should it be found that the fluid level falls rapidly, indicating leakage from the system, an immediate examination should be carried out to ascertain the cause. Every 2,500 miles (4,000 kilometres) lubricate the nipple on the foot brake pedal boss with the recommended grade of lubricant.

Every 2,500 miles (4,000 kilometres) lubricate the two nipples on the hand brake cable with the recommended grade of lubricant.

These are accessible from underneath the car, one on either side of the propeller shaft.

Every 10,000 miles (16,000 kilometres) remove road wheels and brake drums, clean out brakes and examine linings. Should replacements be required always use genuine factory relined shoes, available on an exchange basis. Every 10,000 miles (16,000 kilometres) check and tighten, if necessary, the brake back plate mounting bolts and hydraulic pipe unions.

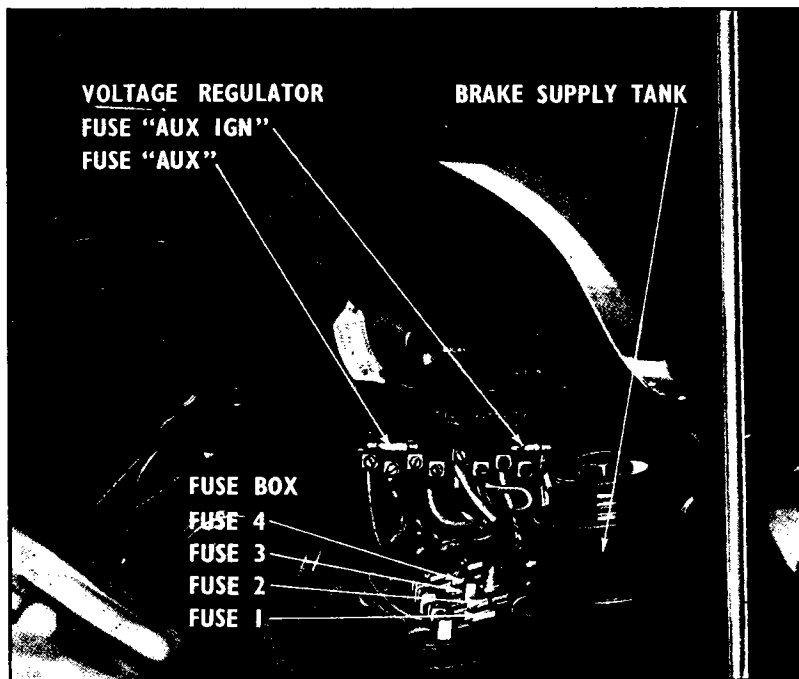


PLATE L.23. HYDRAULIC SUPPLY TANK  
(XK 120—Left-Hand Drive illustrated).

**RECOMMENDED LUBRICANTS**

				<b>Vacuum</b>	<b>Wakefield</b>	<b>Shell</b>	<b>Esso</b>	<b>B.P.</b>
Foot Brake Pedal	...	...	...	Mobilgrease	Castrollease	Retinax	Esso	<b>Energol</b>
Hand Brake Cables	...	...	...	No. 5	W.B.	A	High Temp. Grease	Belmoline H.M.P.

**BRAKE FLUID**

LOCKHEED ORANGE Hydraulic Brake Fluid  
or if not available

WAGNER 21 Hydraulic Brake Fluid or GIRLING CRIMSON Hydraulic Brake Fluid.

**Note.** Before a change from one type of brake fluid to another is made it is necessary to completely drain the system of the fluid before the alternative is used. The system must be topped up with the brand of fluid in use or trouble may be experienced.

**BRAKE DATA  
(LATER XK 120 CARS)**

Make ... ..	Lockheed—Hydraulic
Type ... ..	Self-adjusting—Front
Brake Drum—Diameter ... ..	12" (30.5 cm.)
Brake Linings—Material ... ..	Mintex M.20 (see note)
—Total Area ... ..	189 sq. in. (1219 cm <sup>2</sup> .)
—Length ... ..	10 $\frac{1}{2}$ " (26.7 cm.)
—Width ... ..	2 $\frac{1}{4}$ " (57.1 mm.)
—Thickness ... ..	$\frac{1}{4}$ " (6.4 mm.)
—Number of Rivets ... ..	12 per Shoe
Master Cylinder—Bore Diameter ... ..	1" (25.4 mm.)
Wheel Cylinders—Bore Diameter ... ..	1 $\frac{1}{8}$ " (28.57 mm.)

**Note.** Mintex M.14 brake linings fitted prior to chassis numbers:—

	R.H. Drive	L.H. Drive
Super Sports Model ... ..	661087	674076
Fixed Head Coupé Model ... ..	669034	681207
Drop Head Coupé Model ... ..	667002	677492

## BRAKE ADJUSTMENT (LATER XK 120 CARS)

**Fronts.** The front wheel brakes are so designed that no manual adjustment for lining wear is necessary or provided for, as this automatically takes place when the foot brake is operated.

**Rears.** Place chocks under one front wheel and release the hand brake. Jack up one rear wheel until it is free to revolve. Remove the road wheel and rotate brake drum until the slotted adjusting screw can be seen through hole in outer face of drum. The position of the adjusting screw is at front end of brake approximately 30° above the horizontal. Engage screw-driver blade with the slotted adjusting screw, turn the adjuster in an **anti-clockwise direction** until the brake shoe is in close contact with the brake drum, then turn the adjuster back two clicks (clockwise) which should provide the correct clearance between the shoe and the drum. If closer adjustment is required spin the drum and apply the brakes hard. This will correctly position the shoe after which a further adjustment check should be made.

Repeat for the other rear wheel.

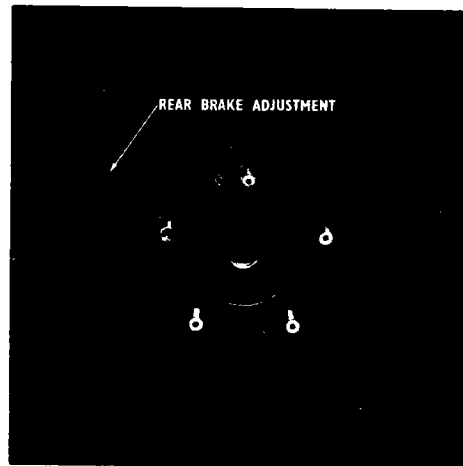


PLATE L.24. REAR BRAKE ADJUSTMENT  
(XK 120—Left-Hand Brake illustrated).

**Hand.** Adjustment of the rear brakes will automatically adjust the hand brake, however, it may be found that with the foot brake in correct adjustment excessive hand brake free travel is obtained. The hand brake has an individual adjustment situated in the operating cable immediately behind the centre cross member. Rotate the hexagon adjustment nut clockwise until the hand brake travels two notches on the ratchet before being fully applied, ensuring that no tension exists in the cables when the hand brake is in the 'off' position (Plate L.25).

## BLEEDING THE HYDRAULIC SYSTEM (LATER XK 120 CARS)

"Bleeding the system" (expelling air) is not a routine operation and should be necessary only when some portion of the hydraulic equipment has been disconnected or when fluid has been drained off. As a tandem master cylinder is fitted, the best result will be obtained by bleeding one front and one rear wheel cylinder simultaneously.

(1) Fill the supply tank with brake fluid and keep **both compartments** at least a quarter full throughout the operation, otherwise air will be drawn in, necessitating a fresh start.

(2) Attach rubber tubes to the bleeder screws on one front wheel cylinder and one rear wheel cylinder and allow the free ends of the tubes to be submerged in a little fluid in clean glass jars. Open the two bleeder screws one complete turn.

(3) Depress the brake pedal slowly, allowing it to return unassisted, repeating this pumping action with a slight pause between each operation. Watch the flow of fluid in the jars and when all air bubbles cease to appear, hold the pedal down firmly and securely tighten the bleeder screws.

(4) Repeat at the remaining cylinders.

(5) Top up the supply tank with fluid ensuring that both compartments are filled and that the level is just above the compartment division in the supply tank.

**Note.** Clean fluid bled from the system should be allowed to stand for several hours, until it is clear of all air bubbles, before being used again. Dirty or discoloured fluid, if **not contaminated** may be filtered and used again.

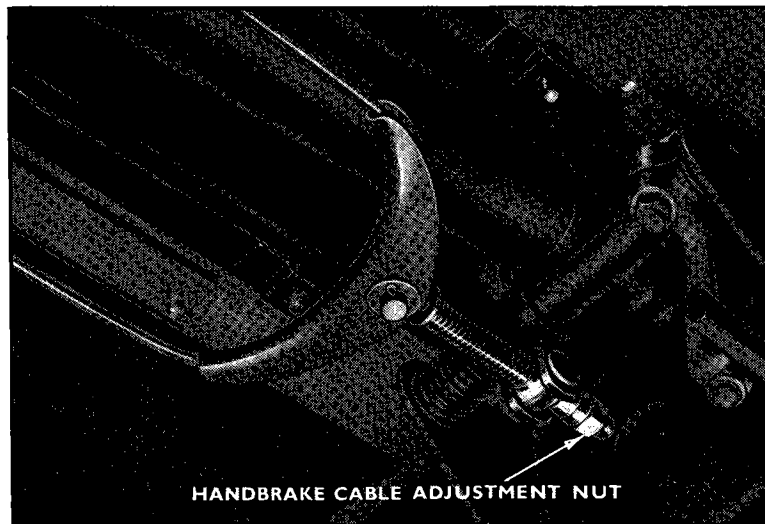


PLATE L.25. HAND BRAKE CABLE ADJUSTER (XK 120)

## BRAKE OVERHAUL—GENERAL INSTRUCTIONS (LATER XK 120 CARS)

**CLEANLINESS** The importance of absolute cleanliness when dismantling hydraulic parts such as the master cylinder and wheel cylinders cannot be overstressed.

Clean off the mud and grease before removing the unit. Dismantle on a bench covered with a sheet of clean paper. Do not handle the internal parts—particularly rubbers—with dirty hands. Do not swill a unit, after removal from the vehicle, in paraffin, petrol or trichlorethylene as this will ruin rubber parts and, on dismantling will give a misleading impression of their original condition. Place all metal parts in a tray of clean brake fluid to soak, afterwards dry off with a clean fluffless cloth and lay out in order on a clean sheet of paper.

### EXAMINATION.

Rubber parts should be carefully examined and, if there is any doubt of their condition, a comparison should be made with new parts. Any signs of swollen seals or perished rubber indicate that they should be renewed immediately. Never endeavour to clear out the internal bore of flexible hydraulic pipes by probing, since this will undoubtedly result in rupture of the pipe. Where the flexible pipes are choked or perished, fit replacements.

**FLUSHING THE SYSTEM.** Should the fluid in the system become thick or “gummy” after many years in service, or after a vehicle has been laid up for some considerable time, the system should be drained, flushed and refilled. It is recommended that this should be carried out once every five years.

Pump all fluid out of the hydraulic system through the bleeder screw of each wheel cylinder in turn. Connect one end of a rubber tube to the bleeder screw, allowing the other end to fall into a container, unscrew one complete turn and pump the brake pedal by depressing it quickly and allowing it to return without assistance. Repeat, with a pause in between each operation, until no more fluid is expelled. Discard the fluid extracted. Fill the supply tank with industrial methylated spirit and flush the system by pumping as described above. Keep the supply tank replenished until at least a quart of spirit has been passed through each wheel cylinder. Where possible, remove the supply tank and pour off any remaining spirit.

Refill with clean Lockheed brake fluid and “bleed” the system.

**Note.** If the system has become contaminated by the use of mineral oil, etc., the above process may not prove effective. It is recommended that the various units, including the pipe lines, should be dismantled and thoroughly cleaned and that all rubber parts, including flexible hoses, should be replaced. The contaminated fluid should be destroyed immediately.

**ASSEMBLY.** Ensure that the castings are perfectly clean and bear no traces of a cleaning fluid other than genuine brake fluid. Dip all internal parts in clean brake fluid and assemble wet. If Lockheed orange brake fluid is not available Wagner 21 brake fluid or Girling crimson brake fluid may be used, but it is essential to drain the system of one fluid before an alternative is used. The system must be topped up with the brand of fluid in use.

Attention is drawn to the instructions given on removing and refitting hydraulic flexible hoses on page L.46.

**TESTING.** Before the brakes are tested check tyre pressures and correct if necessary. Correct pressures are: Front and rear, 25 lbs. per sq. in. (1.8 kg./cm<sup>2</sup>).

**STORAGE.** Stores departments should exercise special care in handling brake parts to ensure that no damage is caused which would affect their correct functioning when assembled. Rubbers should be stored in a cold, dark place well removed from any fumes.

## TANDEM MASTER CYLINDER—TO REMOVE AND REFIT (LATER XK 120 CARS)

**REMOVE.** The master cylinder is situated at the bottom of the foot brake pedal: on right-hand drive cars at the outside of the chassis right-hand side member, and on left-hand drive cars at the inside of the chassis left-hand side member.  
(Refer to Plate L.26.)

Jack up and remove the road wheel. Disconnect the supply pipe unions from the tilting valve assemblies on top of the master cylinder and drain the contents of the supply tank into a clean receptacle.

At the front of the master cylinder unscrew the pipe union from the banjo connection and disconnect the two wires from the stop light switch.

At the top of master cylinder unscrew the pipe union from the banjo connection. Remove the two bolts passing through the master cylinder and slacken the nut at the foot brake pedal boss. Ease the rubber boot from the pedal push rod and withdraw the master cylinder.

**REFIT.** Refitting is the reverse of the removal procedure. It will be necessary to bleed the hydraulic system as described on page L.41. Ensure that there is  $\frac{1}{32}$ " (.80 mm.) clearance between the master cylinder piston and the pedal push rod. If adjustment is required, refer to “Brake Pedal—Free Travel. To Adjust” on page L.50.



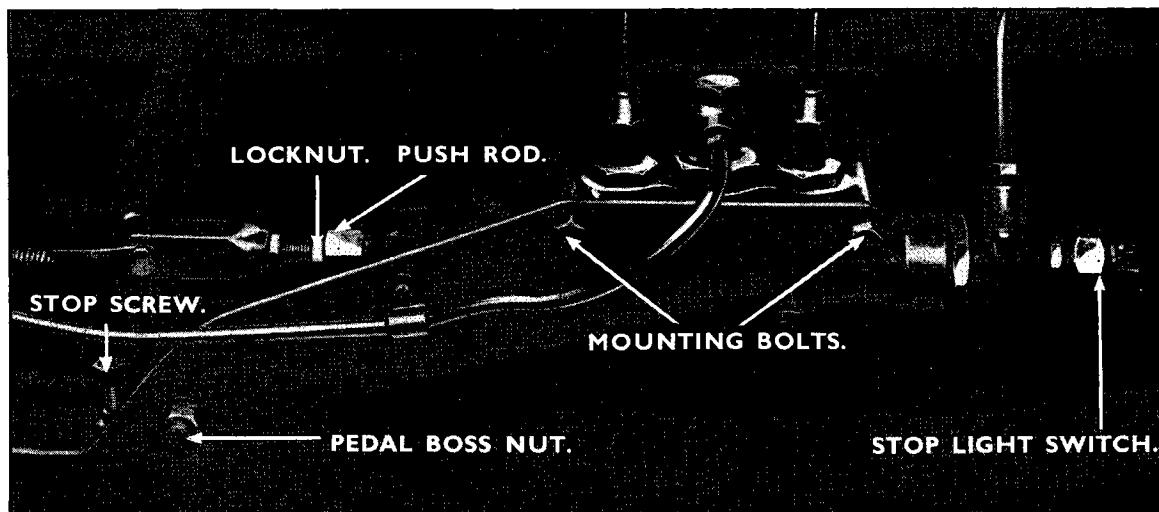


PLATE L.26. MASTER CYLINDER. REMOVAL (XK 120).

### MASTER CYLINDER—TO DISMANTLE AND REASSEMBLE (LATER XK 120 CARS)

**DISMANTLE.** Thoroughly clean external parts of master cylinder before dismantling.  
(Refer to Plate L.27.) Remove boot and push rod from rear end of master cylinder body. **Insert a suitable rod, push pistons forward to end of travel and remove both inlet adapter (tilting valve) assemblies.**

Release pistons and remove outlet adapter from centre position on top of master cylinder.

Remove retaining circlip and stop washer from rear end of master cylinder. Remove setscrew stop pin from underside of forward end of master cylinder. Remove outlet adapter from front end of master cylinder. Finally withdraw primary and secondary pistons and attendant parts.

**REASSEMBLE.** Carefully check all parts for cleanliness and lubricate by immersion in hydraulic brake fluid before assembly. Lubricate bore of master cylinder with hydraulic brake fluid before assembling internal parts.

Fit the taper seals to the secondary pistons with the wider ends facing away from each other. Fit the taper seal to the primary piston with the wider end facing the longer portion of the piston.

From the push-rod end of the cylinder insert the secondary piston, seals rearmost, taking care not to damage the lips of the seals. Push the piston down the bore of the cylinder, and observe the movement through the rear tilting valve hole.

**When the forward seal appears, depress the top edge of the seal with a blunt instrument such as a pencil, to avoid the top edge of the seal being cut by the front edge of hole.**

Push the piston to within approximately 1" (25 mm.) from the forward (threaded) end and fit the stop screw to the base of the master cylinder.

Fit one of the return springs in the rear end of the secondary piston, and insert the primary piston, seal rearmost, into the bore of the cylinder taking care not to damage the lip of the seal. Push the piston down the bore and fit the stop washer and circlip.

Insert the other return spring in the front end of the secondary piston, and fit the piston stop and valve spring.

Assemble the rubber valve washer and valve assembly to the front outlet adapter and screw home into end of master cylinder.

Assemble the rubber valve washer, valve assembly and valve spring to the top outlet adapter and screw home into top of master cylinder.

Insert a suitable rod in the rear end of the master cylinder, push both pistons fully forward in the cylinder and screw home both tilting valve assemblies.

Fit the rubber boot and push rod.

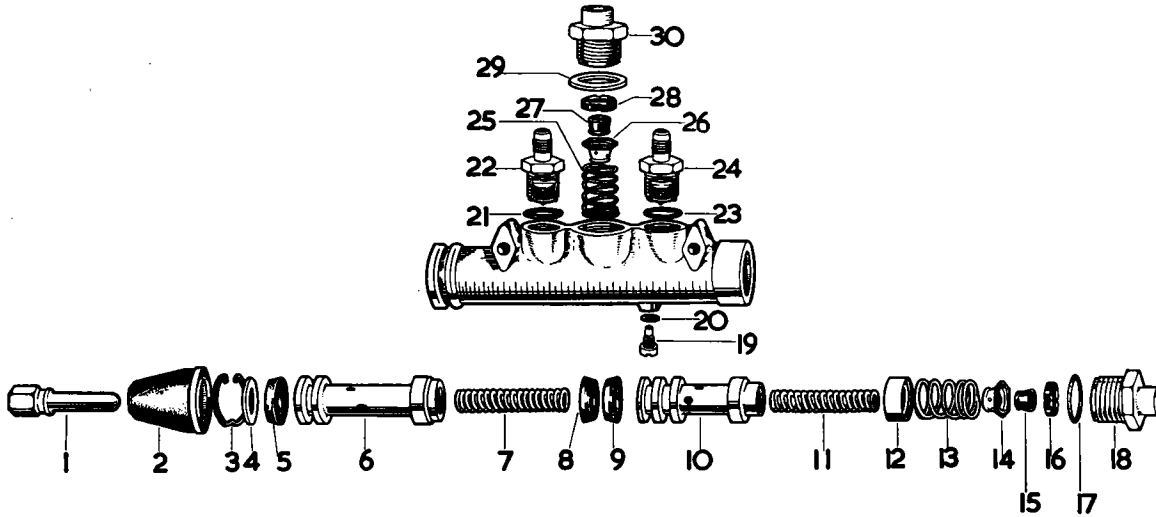


PLATE L.27. MASTER CYLINDER. Exploded view (XK 120).

- |                                 |  |
|---------------------------------|--|
| 1. Push rod.                    | 16. Valve washer.                        |
| 2. Rubber boot.                 | 17. Seal—outlet adapter.                 |
| 3. Circlip.                     | 18. Outlet adapter.                      |
| 4. Stop washer.                 | 19. Stop screw.                          |
| 5. Seal—primary piston.         | 20. Gasket—stop screw.                   |
| 6. Primary piston.              | 21. Seal—inlet adapter.                  |
| 7. Return spring.               | 22. Inlet adapter (tilting valve)—rear.  |
| 8. Rear seal—secondary piston.  | 23. Seal—inlet adapter.                  |
| 9. Front seal—secondary piston. | 24. Inlet adapter (tilting valve)—front. |
| 10. Secondary piston.           | 25. Valve spring.                        |
| 11. Return spring.              | 26. Valve body.                          |
| 12. Piston stop.                | 27. Valve cup.                           |
| 13. Valve spring.               | 28. Valve washer.                        |
| 14. Valve body.                 | 29. Gasket—outlet adapter.               |
| 15. Valve cup.                  | 30. Outlet adapter.                      |

**WHEEL CYLINDERS—FRONT. TO REMOVE AND REFIT  
(LATER XK 120 CARS)**

**REMOVE.** Remove the front brake shoes as described on page L.47. At the rear of back plate unscrew the two hollow bolts securing the banjo connections to the wheel cylinders and remove connection complete with bridge pipe. (Note the sealing washers one at each side of the banjo connections.) Remove the three nuts securing each wheel cylinder to the back plate. Withdraw cylinders from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to “Brake Shoes—Front. To Refit” on page L.48 when refitting the brake shoes. It will be necessary, following refitting, to “bleed” the hydraulic system as described on page L.41.

### WHEEL CYLINDERS—REAR. TO REMOVE AND REFIT (LATER XK 120 CARS)

**REMOVE.** Remove the rear brake shoes as described on page L.49. At the rear of the back plate remove the clevis pin securing the hand-brake cable to the operating lever which protrudes through the back plate. Unscrew the hollow bolt securing the banjo connection to the wheel cylinder. (Note the two sealing washers one at each side of the banjo connection.) Remove the rubber boot from the hand-brake lever. Remove the piston and cover from the wheel cylinder and withdraw cylinder from front of back plate.

**REFIT.** Refitting is the reverse of the removal procedure, but reference should be made to "Brake Shoes—Rear. To Refit" when refitting the brake shoes. It will be necessary, following refitting, to "bleed" the hydraulic system as described on page L.41.

### WHEEL CYLINDERS—TO DISMANTLE AND REASSEMBLE (LATER XK 120 CARS)

**DISMANTLE.** Before dismantling any of the wheel cylinders refer to "Brake Overhaul. General Instructions" on page L.42.

**Front. (Refer to Plate L.30.)** Remove the front wheel cylinders as described above. Remove the wire clip and rubber boot. Withdraw the piston from the end of the wheel cylinder. Apply gentle air pressure to the union hole at rear of cylinder to blow out the rubber cup, cup filler and spring.

**Rear. (Refer to Plate L.31.)** Remove the rear wheel cylinder as described above. Withdraw the piston and cover from the end of the wheel cylinder. Push out the hand-brake lever pivot pin and remove the lever. Remove the piston, rubber cup, cup filler and spring.

**REASSEMBLE.** Reassembly is the reverse of the dismantling procedure, but reference should be made to "Brake Overhaul. General Instructions" on page L.42.

Ensure that the rubber cups are fitted the correct way round in the cylinders, that is, with the lip or widest end of the cup facing the blank end of the cylinder.

### FLEXIBLE HOSES—TO REMOVE AND REFIT (LATER XK 120 CARS)

**REMOVE.** The flexible hoses must be disconnected at the support bracket end first, otherwise rupture of the hose is likely to occur. (Refer to Plate L.28.)

**Front.** At the hose support bracket on the front suspension post unscrew the union securing the metal pipe to the end of the flexible hose. Hold the hexagon of the flexible hose end sleeve with a spanner, unscrew the lock nut on the other side of the support bracket and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

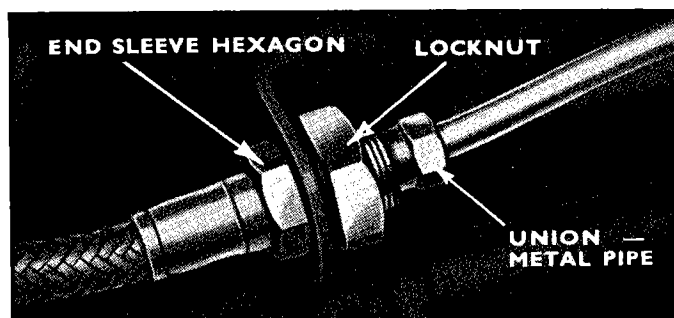


PLATE L.28. FLEXIBLE HOSE. REMOVAL (XK 20).

**Rear.** At the hose support on the chassis frame above the right-hand rear shock absorber, unscrew the union securing the metal pipe to the end of the flexible hose. Hold the hexagon of the flexible hose end sleeve with a spanner, unscrew the lock nut on the other side of support bracket and release hose. Unscrew the hose at the other end, allowing the hose to rotate.

**Note.** Do not attempt to clear the bore of a flexible hose by probing. If a hose is choked or perished, fit a replacement.

**REFIT.** Refitting is the reverse of the removal procedure. When refitting the flexible hose at the support bracket end, ensure that the hose does not twist, by holding the hexagon of the end sleeve with a spanner whilst tightening the lock nut. After refitting the hose(s) it will be necessary to "bleed" the hydraulic system as described on page L.41.

### BRAKE SHOES—FRONT. TO REMOVE AND REFIT (LATER XK 120 CARS)

**GENERAL.** It is recommended that advantage be taken of the Lockheed Exchange Brake Shoe Scheme in preference to relining the existing shoes. These replacement shoes are obtainable from Jaguar Spares Department or from Lockheed agents, and are accurately ground to size, which ensures a quick and easy "bed in" to the drums.

**REMOVE.** Jack up the vehicle and remove the wheel and the brake drum. Remove the split pins and unscrew the slotted nuts from the two adjuster bars. Remove the circlips and plain washers and detach the adjuster bars from the brake shoes. Collect the pad plates and the friction pads and disengage the ratchet springs from the adjuster bars, exercising caution to avoid straining the springs.

Pull the toe of one brake shoe against the load of the pull-off spring and disengage the shoe from the slots in the wheel cylinder piston and the opposing wheel cylinder body, disconnect the pull-off spring from the brake shoe and the anchor pin. Repeat for the other shoe.

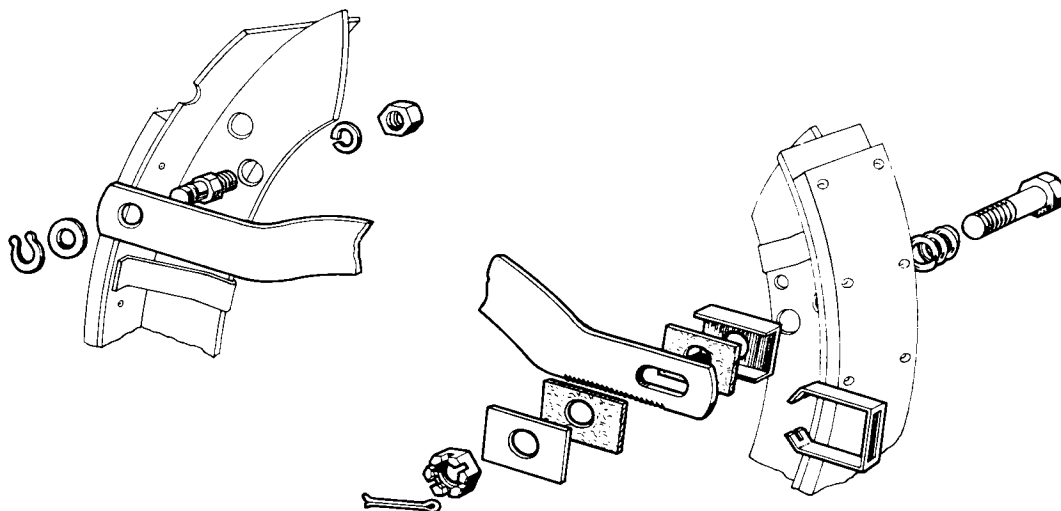


PLATE L.29. ADJUSTER BAR. Exploded (XK 120).

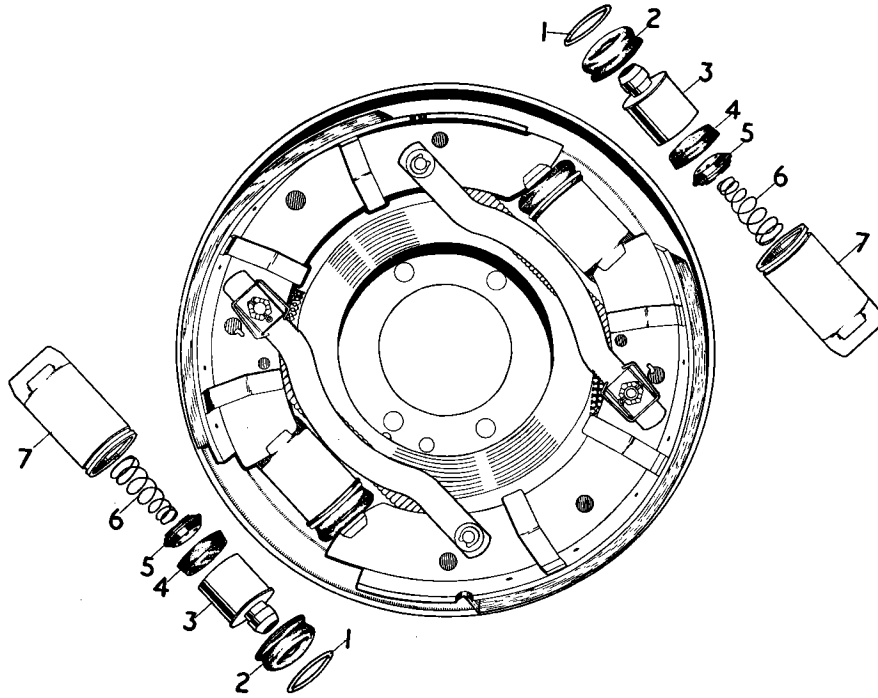


PLATE L.30. FRONT BRAKE ASSEMBLY (XK 120—Left-Hand Brake illustrated).

1. Clip-boot.
2. Rubber boot.
3. Piston.
4. Rubber cup.
5. Cup filler.
6. Spring—cup filler.
7. Wheel cylinder.

**REFIT.** Pass the adjuster bar bolt with the coil spring under its head, through the appropriate hole in one of the brake shoes and temporarily secure by partly fitting a nut. Hook a pull-off spring to the shoe and attach the other larger hooked end of the spring to one of the anchor pins. Using the closed end of one of the wheel cylinder boots as an abutment for the heel of the shoe, and exercising extreme caution to avoid damaging the wheel cylinder boot, pull the toe of the shoe against the load of the pull-off spring and locate the toe within the slot in a piston: the heel can then be tapped into position in the slot of the opposing wheel cylinder. Repeat to attach the other brake shoe then centralise the shoes in relation to the back plate. Fit the ratchet springs to the adjuster bars, paying particular attention to ensure correct assembly. Remove the nuts, offer up one of the adjuster bars and an inner pad plate and friction pad to the brake shoes and adjust the ratchet spring until the clearance between the anchor pin and the appropriate hole in the adjuster bar is on the outside of the pin; position a friction pad and an outer pad plate on the outside of the adjuster bar. Repeat for the other adjuster bar. Both adjuster bars can now be attached to the brake shoes, using the nuts and the circlips, fitting plain washers under the latter parts; the correct load on the bolts is obtained by screwing the nuts up tight and then slackening back **two flats or 1/3 of a turn**. The operation of the adjusters should now be checked by pulling the toe of each shoe so that the pin moves to the outer edge of its enlarged hole. When released it is essential that the shoe returns promptly and unassisted to its fully off position.

## BRAKE SHOES—REAR. TO REMOVE AND REFIT (LATER XK 120 CARS)

**GENERAL.** It is recommended that advantage be taken of the Lockheed Exchange Brake Shoe Scheme in preference to relining the existing shoes. These replacement shoes are obtainable from Jaguar Spares Department or from Lockheed agents, and are accurately ground to size, which ensures a quick and easy "bed in" to the drums.

**REMOVE.** Place chocks under the front wheels, jack up the back axle, apply the hand brake and remove the wheel. Release the hand brake back off all available adjustment and disconnect the hand-brake linkage from the lever. Remove the screws securing the drum to the hub and remove the drum squarely. Compress the beehive springs and, by twisting, disengage them from the steady pads on the back plate. Lever the upper shoe out of its slots in the wheel cylinder piston and adjuster screw against the load of the pull-off springs; on releasing the load on the springs the lower shoe will fall away.

**REFIT.** Lay the brake shoes on the bench, with the toe of one facing the heel of the other, and connect the pull-off springs to them. Offer up the assembly to the back plate with the double formation spring nearer to the adjuster. Locate a beehive spring over the central hole in one of the brake shoes and by depressing and twisting engage the spring with the steady pad below it. Repeat the latter for the other brake shoe.

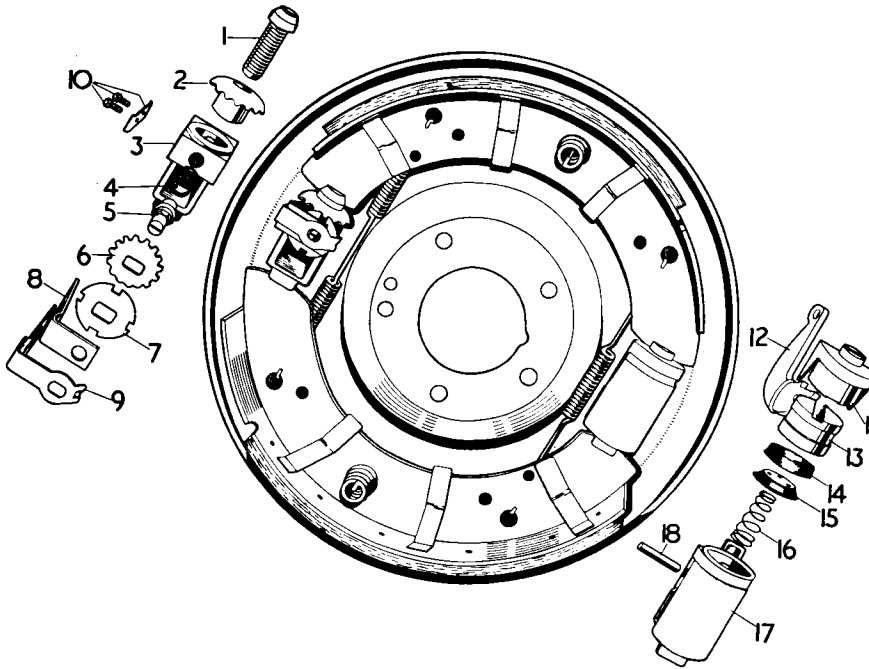


PLATE L.31.

REAR BRAKE ASSEMBLY (XK 120—Left-Hand Brake illustrated).

- |                      |                                  |
|----------------------|----------------------------------|
| 1. Adjustment screw. | 10. Locking plate and setscrews. |
| 2. Adjustment wheel. | 11. Piston and cover.            |
| 3. Adjuster body.    | 12. Lever—hand-brake operation.  |
| 4. Spring.           | 13. Piston.                      |
| 5. Adjustment stud.  | 14. Rubber cup.                  |
| 6. Pinion.           | 15. Cup filler.                  |
| 7. Plate—pinion.     | 16. Spring—cup filler.           |
| 8. Bracket.          | 17. Wheel cylinder.              |
| 9. Clicker spring.   | 18. Fulcrum pin.                 |

### BACK PLATE—FRONT. TO REMOVE AND REFIT (LATER XK 120 CARS)

#### REMOVE HUB.

Jack up car and remove road wheel. Remove the two countersunk screws and withdraw the brake drum. Lever out the cap from end of hub and remove the split pin and slotted nut. With a suitable extractor withdraw the hub from the stub axle shaft.

#### DISCONNECT BRIDGE PIPE.

At the rear of the back plate unscrew the two hollow bolts securing the banjo connections to the wheel cylinder and place bridge pipe clear. (Note the sealing washers fitted to each side of the banjo connections.)

#### REMOVE BACK PLATE.

Remove the four split pins, slotted nuts and bolts securing the back plate to the stub axle carrier. Remove the back plate complete with shoe assemblies.

#### REFIT.

Refitting is the reverse of the removal procedure. When the hub has been refitted, tighten the slotted nut until there is no end float in the hub. Slacken nut one slot, check end float which should just be perceptible by hand and secure with new split pin. Following reassembly it will be necessary to "bleed" the hydraulic system as described on page L.41.

### BACK PLATE—REAR. TO REMOVE AND REFIT (LATER XK 120 CARS)

#### REMOVE.

Jack up car and remove road wheel. Slacken off all available brake shoe adjustment by turning the adjuster (accessible through hole in brake drum) clockwise. Remove the two countersunk screws and withdraw brake drum.

At the rear of the back plate unscrew the hollow bolt securing the banjo connection to the wheel cylinder. Remove the clevis pin securing hand-brake cable to the lever which protrudes through the back plate. (A hole is provided in the hand-brake cable bracket on the back plate to provide access to the clevis pin.)

Pull back the cable return spring, lever out the spring retainer from the top of the cable clevis and withdraw hand-brake cable.

Remove the split pin and slotted nut securing the hub to the axle shaft and with a suitable extractor withdraw hub from shaft. Remove the five bolts and nuts securing the back plate to flange of axle case and withdraw back plate. Note the shims fitted between the back plate and the flange of the axle case: do not lose or transpose these shims to the other side of the axle case as they control the end float of the axle shafts.

#### REFIT.

Refitting is the reverse of the above procedure but attention should be given to the following points. Ensure that same shims found on dismantling are refitted to their correct side. These shims control the axle shaft end float; full details for adjusting are given in Section H—"Rear Axle." When the brake assembly has been completely refitted, "bleed" the hydraulic system as described on page L.41. Adjust the rear brakes as described on page L.41. Refit road wheel.

### BRAKE PEDAL—FREE TRAVEL. TO ADJUST (LATER XK 120 CARS)

#### GENERAL.

It is essential that the master cylinder pistons are not prevented from returning to the fully "off" position, otherwise pressure may be built up in the hydraulic system, causing the brakes to drag or remain on.

A minimum clearance of  $\frac{1}{32}$ " (.80 mm.) is necessary between the pedal push rod and the master cylinder primary piston.

#### ADJUST.

Ensure that the pedal is not being prevented from returning to the full "off" position; the stop screw at the bottom of the pedal should be in contact with the master cylinder support bracket.

Ease the small end of the rubber boot towards the master cylinder until the end of boot is off the enlarged diameter of push rod.

Slacken the lock nut adjacent to the push rod hexagon and rotate hexagon until a minimum clearance of  $\frac{1}{32}$ " (.80 mm.) is obtained, which entails with a margin of safety,  $\frac{1}{4}$ " to  $\frac{3}{8}$ " (6.3 to 9.5 mm.) free travel at the pedal pad. This free movement can be felt if the pedal is depressed gently by hand. Tighten the lock nut and refit rubber boot.

**SUPPLY TANK. TO REMOVE AND REFIT  
(LATER XK 120 CARS)**

**REMOVE.** The brake supply tank is situated at rear of the wing valance on the steering column side (Plate L.23). From underneath the supply tank unscrew the two pipe unions and drain fluid into a clean receptacle.

Unscrew the bolt securing the clamp and lift out supply tank.

**REFIT.** Refitting is the reverse of the above procedure. Refill the supply tank to just above the compartment division with the same grade of fluid that is present in the remainder of the hydraulic system.

**HAND-BRAKE CABLE. TO REMOVE AND REFIT  
(LATER XK 120 CARS)**

**REMOVE.** At the hand-brake lever end, remove the clevis pin securing the hand-brake cable yoke to the adjusting rod (Plate L.25). At the rear of the back plate remove the clevis pin securing the hand-brake cable to the lever which protrudes through the back plate. (A hole is provided in the hand-brake cable bracket on the back plate to provide access to the clevis pin.)

Pull back the cable return spring, lever out the spring retainer from the top of the cable clevis and withdraw hand-brake cable. Detach the hand-brake cable from the brackets and clips on the rear axle case and from the abutment bracket underneath the propeller shaft. The cable can now be removed.

**REFIT.** Refitting is the reverse of the removal procedure. Check hand-brake adjustment and adjust, if necessary, as described on page L.41.



# **CHASSIS**

## **MARK VII and XK 120 MODELS**

### **CHASSIS NUMBERS**

#### **MARK VII**

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### **XK 120**

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### **Super Sports Model**

660001 Right-Hand Drive

670001 Left-Hand Drive

#### **Fixed Head Coupe Model**

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

Index to Contents	-	-	-	-	-	-	Page M.2
Index to Plates	-	-	-	-	-	-	Page M.3
Description and Maintenance	-	-	-	-	-	-	Page M.4
Servicing	-	-	-	-	-	-	Page M.6

**INDEX TO CONTENTS**

Contents	Operation	Page	
		Mark VII	XK 120
Description .. .. .		M. 4	M. 5
Maintenance .. .. .		M. 4	M. 5
Chassis Frame Alignment .. .. .	Check .. .. .		M. 6
Exhaust System .. .. .	Remove and Refit .. .. .	M. 6	M. 7
Hub Bearings—Front .. .. .	Remove and Refit .. .. .		M. 8
Hub Bearing—Front .. .. .	Adjust .. .. .		M. 8
Revolution Counter .. .. .	Remove and Refit .. .. .	M. 8	M. 9
Revolution Counter Cable .. .. .	Remove and Refit .. .. .		M.10
Road Wheels and Tyres .. .. .	General Instructions .. .. .		M.10
Speedometer .. .. .	Remove and Refit .. .. .	M.11	M.12
Speedometer Cable .. .. .	Remove and Refit .. .. .		M.12

## INDEX TO PLATES

Plate No.	Plate	Page	
		Mark VII	XK 120
M. 1	Exhaust Down and Intermediate Pipes .. .. .	M. 6	—
M. 2	Exhaust Silencer and Tailpipe .. .. .	M. 6	—
M. 3	Exhaust Silencer Mountings .. .. .	—	M. 7
M. 4	Front Hub .. .. .	M. 8	
M. 5	Centre Facia. Removal .. .. .	M. 9	—
M. 6	Centre Facia. Removal .. .. .	—	M. 9
M. 7	Road Wheel and Tyre Assembly .. .. .	M.11	

**(MARK VII MODEL)**

**DESCRIPTION.** The chassis frame side members are of deep box section which taper in plan view towards the front of the car from a point on the axis of the rear spring anchor bolts. Mounted on the front road wheels are mounting posts which carry the upper wishbone members and also provide the top mounting for the telescopic shock absorbers. Ahead of these are two further mounting posts, to one of which is attached the steering box and to the other the steering idle lever housing, depending on whether the car is left-hand or right-hand drive. Immediately in front of these mounting posts the side members are joined by a heavy box section cross member with webs running back to give additional support to the mounting posts. The centre section of the side members is reinforced by cruciform bracing with a second cross member joining the intersection of the cruciform members to the side members. A third and fourth cross member support the side members and the axis of the rear road spring anchor bolts and shackle bolts respectively.

In side elevation the top and bottom faces of the side members are parallel from the rear road spring anchor bolts to a point in line with the rear of the engine sump. From the front of this parallel section the frame slopes up on its lower surface to meet the front cross member; to the rear the side members are sharply upswept over the rear axles. The entire construction gives a chassis frame of immense strength and rigidity with lightness.

The exhaust system consists of a branched down pipe, with flexible inserts to allow for engine movement and to absorb vibration, which is connected to the twin exhaust manifolds on the nearside (left hand) of the engine. The rear end of the down pipe is flange bolted to an intermediate pipe which passes through holes provided in the nearside (left hand) cruciform bracing members. The intermediate pipe is in turn secured by a split clip to a large single silencer with tail pipe discharging at the nearside (left hand) rear of chassis. Flexible mountings are provided on the intermediate pipe, silencer and tail pipe.

The front hub bearings consist of two adjustable taper roller bearings on each side mounted on a stub axle pin bolted to the stub axle carrier. A grease nipple is provided in each front hub and a bleed hole in the hub dust cap to indicate when an excess of lubricant has been applied.

The road wheels are attached to the front and rear hubs with a five stud mounting and are fitted with detachable nave plates.

The speedometer and revolution counter are connected to their respective drive gears in the gearbox and the engine by flexible cables.

**MAINTENANCE.** Every week check tyre pressures when tyres are cold with an approved tyre pressure gauge and adjust the pressure to: Front, 23 lbs. per sq. inch; Rear, 25 lbs. per sq. inch (1.6 kg./cm.<sup>2</sup> and 1.8 kg./cm.<sup>2</sup>). Ensure that all valves are fitted with valve caps. Periodically remove all flints and chips from the tyres and check that all wheel nuts are tight. For fast driving conditions where comfort is not of primary importance maintain pressures at: Front, 25 lbs. per sq. inch; and Rear, 27 lbs. per sq. inch, cold (1.8 kg./cm.<sup>2</sup> and 1.9 kg./cm.<sup>2</sup>).

Every 2,500 miles (4,000 kilometres) interchange the road wheels diagonally, that is change left-hand front with right-hand rear, and right-hand front with left-hand rear.

Every 5,000 miles (8,000 kilometres) lubricate the front wheel bearings sparingly with recommended lubricant through the nipple provided. The nipples are situated on the wheel hub and are accessible when the front wheels are removed.

Every 10,000 miles (16,000 kilometres) check tightness of all chassis nuts and bolts and exhaust mountings. Tighten if necessary.

**RECOMMENDED LUBRICANTS**

	Vacuum	Wakefield	Shell	Esso	Price's
Wheel Bearings	Mobilgrease	Castrollease	Retinax	High Temp.	Belmoline
	No. 5	W.B.	A	Grease	H.M.P.

**TYRE PRESSURES**

Front	Rear
23 lbs. per sq. inch, Cold (1.6 kg./cm. <sup>2</sup> )	25 lbs. per sq. inch, Cold (1.8 kg./cm. <sup>2</sup> )
For fast driving when comfort is not of primary importance use:	
25 lbs. per sq. inch, Cold (1.8 kg./cm. <sup>2</sup> )	27 lbs. per sq. inch, Cold (1.9 kg./cm. <sup>2</sup> )

**(XK 120 MODEL)**

**DESCRIPTION.** The chassis frame side members are of deep box section which taper in plan view towards the front of the car from a point on the axis of the rear spring anchor bolts. Mounted on the axis of the front road wheels are mounting posts which carry the upper wishbone members and also provide the top mounting for the telescopic shock absorbers. The steering box is attached to one of these mounting posts and the steering idle lever housing to the other, depending on whether the car is left-hand or right-hand drive. Immediately in front of these mounting posts the side members are joined by a heavy box section cross member. The centre section of the side member is reinforced by a box section cross member with webs running back to give additional support to the side members. A third cross member supports the side members at the top of the sweep over the rear axle. The fourth cross member is a tubular member located on the axis of the rear road spring shackle bolts.

At the front the frame slopes up on its lower surface to meet the front cross member. At the rear the side members are sharply upswept over the rear axle. The entire construction gives a chassis frame of immense strength and rigidity with lightness.

The exhaust system consists of a branched down pipe, with flexible inserts to allow for engine movement and to absorb vibration, which is connected to the twin exhaust manifolds on the nearside (left hand) of the engine. The rear end of the down pipe is secured by a split clip to a large single silencer with tail pipe discharging at the nearside (left hand) rear of chassis. Flexible mountings are provided on the intermediate pipe silencer and tail pipe.

The front hub bearings consist of two adjustable taper roller bearings on each side mounted on a stub axle pin bolted to the stub axle carrier. A grease nipple is provided in each front hub and a bleed hole in the hub dust cap to indicate when an excess of lubricant has been applied.

The road wheels are attached to the front and rear hubs with a five-stud mounting and are fitted with detachable nave plates.

The speedometer and revolution counter are connected to their respective drive gears in the gearbox and the engine by flexible cables.

**MAINTENANCE.** Every week check tyre pressures when tyres are cold with an approved tyre pressure gauge and adjust the pressure to: Front, 25 lbs. per sq. inch; Rear, 25 lbs. per sq. inch (1.8 kg./cm.<sup>2</sup> and 1.8 kg./cm.<sup>2</sup>). Ensure that all valves are fitted with valve caps. Periodically remove all flint and chips from the tyres and check that all wheel nuts are tight. For fast driving conditions where comfort is not of primary importance maintain pressure at: Front, 35 lbs. per sq. inch; and Rear, 35 lbs. per sq. inch, cold (2.5 kg./cm.<sup>2</sup> and 2.5 kg./cm.<sup>2</sup>)

Every 2,500 miles (4,000 kilometres) interchange the road wheels diagonally, that is, change left-hand front with right-hand rear and right-hand front with left-hand rear.

Every 5,000 miles (8,000 kilometres) lubricate the front wheel bearings sparingly with recommended lubricant through the nipple provided. The nipples are situated on the wheel hub and are accessible when the front wheels are removed.

Every 10,000 miles (16,000 kilometres) check tightness of all chassis nuts and bolts and exhaust mountings. Tighten if necessary.

**RECOMMENDED LUBRICANTS**

		Vacuum	Wakefield	Shell	Esso	Price's
Wheel Bearings	.. ..	Mobilgrease	Castrolase	Retinax	High Temp.	Belmoline
		No. 5	W.B.	A	Grease	H.M.P.

**TYRE PRESSURES**

Front	Rear
25 lbs. per sq. inch, Cold (1.8 kg./cm. <sup>2</sup> )	25 lbs. per sq. inch, Cold (1.8 kg./cm. <sup>2</sup> )
For fast driving when comfort is not of primary importance use:	
35 lbs. per sq. inch, Cold (2.5 kg./cm. <sup>2</sup> )	35 lbs. per sq. inch, Cold (2.5 kg./cm. <sup>2</sup> )

## CHASSIS FRAME ALIGNMENT. TO CHECK (MARK VII AND XK 120 MODELS)

**GENERAL.** Correct chassis frame alignment is particularly important where independent front wheel suspension is concerned. The following remarks are intended to act as a guide in checking chassis frames where damage is suspected. But it must be realised that each particular case may require individual treatment.

Reference to Section J "Front Suspension" will disclose that castor and camber angles are checked with the car on a perfectly level surface and the chassis frame supported by four test pieces. It is recommended that where special trammels are not available, or where it is suspected that chassis distortion has affected the upper wishbone lever mounting points, that checking should be carried out in the following manner.

**CHECKING.** Place the car on a **perfectly level surface** and insert four test pieces of the following length—XK 120,  $7\frac{1}{8}$ " (18.1 cm.); Mark VII,  $8\frac{1}{2}$ " (21.6 cm.)—between the chassis frame and the ground at the forward and rear ends of the parallel section of the chassis side members. Jack up the car, remove all road wheels and allow the chassis frame to rest on the four test pieces.

Plumb lines can now be dropped vertically from convenient opposite points of the frame to the ground and marks scribed on the ground to indicate the plan of the chassis frame. Suggested points for a preliminary check are the front mounting bolts of the front bumper brackets and the rear spring shackle bolts in the chassis frame. Checking in the manner suggested will give a figure scribed on the ground, the sides and diagonals of which should be of equal length within  $\pm\frac{1}{8}$ " (3.2 mm.).

Since the chassis frame is supported parallel to the ground on the test pieces a further check should be made of the heights of opposite points of the frame from the ground when a discrepancy of more than  $\pm\frac{1}{8}$ " (3.2 mm.). indicates that some distortion has taken place.

It will be realised that castor and camber angles are controlled by shims fitted respectively at the extremities of the upper wishbone levers and behind the upper wishbone lever mounting brackets. It is thus important that the abutment faces for the upper wishbone lever mounting brackets on the chassis frame side members are at right angles to the ground, when the chassis frame is standing on the test pieces.

**RESETTING.** Resetting of chassis frame is the work of specialists and in all cases where distortion greater than the limits given above is found, it is recommended that a replacement chassis frame is obtained from the Factory.

## EXHAUST SYSTEM. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Remove four nuts, spring washers and bolts securing flanges of down pipe and intermediate pipe. Observe jointing washer interposed between flanges. Remove four nuts and spring

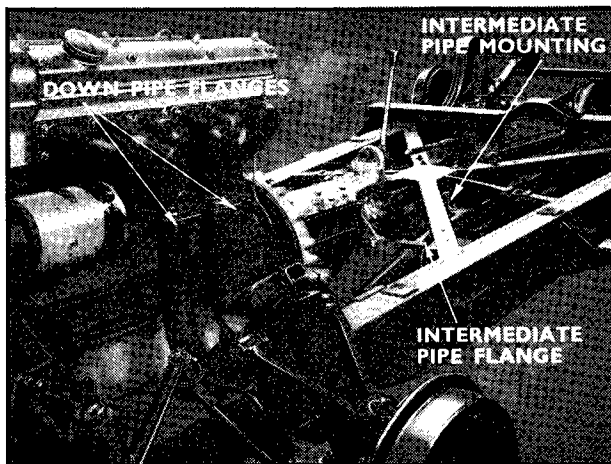


PLATE M.1. EXHAUST DOWN AND INTERMEDIATE PIPES (Mark VII).

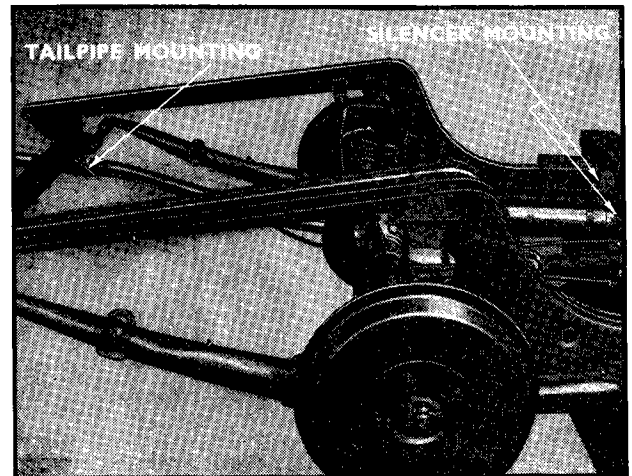


PLATE M.2. EXHAUST SILENCER AND TAILPIPE (Mark VII).

washers securing each flange of the branched down pipe to its respective exhaust manifold flange. Lower down pipe and remove from under car, observing jointing washers fitted between flanges.

Remove nut, washer and bolt clamping split clip at rear of intermediate pipe. Remove nut, washer and bolt securing intermediate pipe to flexible mounting. Remove intermediate pipe forward.

Remove nut and spring washer securing rear of tail pipe to flexible mounting. Support silencer. Remove two bolts and nuts securing the silencer straps to the flexible mounting. Remove silencer and tail pipe.

**REFIT.** Refitting is the reverse of the above procedure, but ensure that the exhaust system is correctly aligned and is not placing an excessive strain on any of the three mountings. Conversely ensure that the system is clear of the chassis frame and that flexible inserts in the down pipe are not strained.

### EXHAUST SYSTEM. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE.** Remove four nuts and spring washers securing each flange of the branched down pipe to its respective exhaust manifold flange. Remove nut, washer and bolt clamping split clip at front of silencer, and withdraw pipe from silencer. Lower down pipe and remove from under car, observing jointing washer fitted between flanges.

Remove nut and spring washer securing rear of tail pipe to flexible mounting. Support silencer. Remove top nuts securing silencer brackets to flexible mountings. Remove silencer and tail pipe.

**REFIT.** Refitting is the reverse of the above procedure, but ensure that the exhaust system is correctly aligned and is not placing an excessive strain on any of the three mountings. Conversely ensure that the system is clear of the chassis frame and that flexible inserts in the down pipe are not strained.

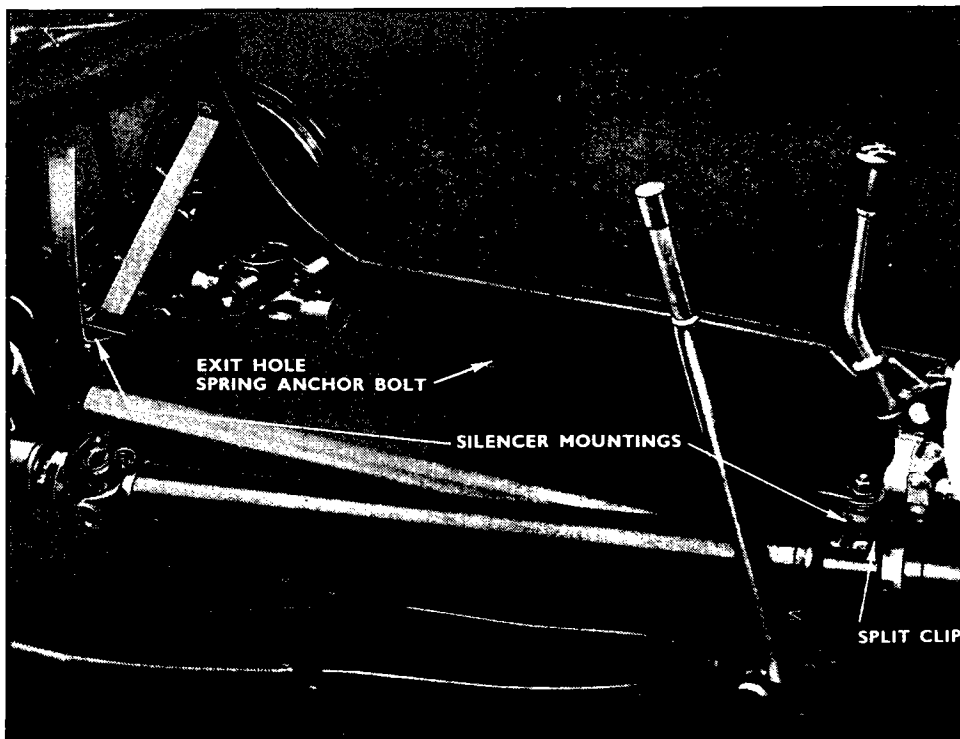


PLATE M.3.

EXHAUST SILENCER MOUNTINGS (XK 120).

**HUB BEARINGS—FRONT. TO REMOVE AND REFIT**  
(MARK VII AND XK 120 MODELS)

**REMOVE.** Jack up, remove nave plate, road wheel and brake drum from hub affected. Prise off dust cap, remove split pin, washer, and castellated nut. Withdraw hub with outer bearing. Remove inner bearing, cover plate and felt grease retainer. (Plate M.4.)

**REFIT.** Refitting is the reverse of the above procedure. Adjust hub bearing as described in the following paragraph. Pack hub bearing with recommended lubricant by applying grease gun to nipple until excess exudes from bleed hole in dust cap.

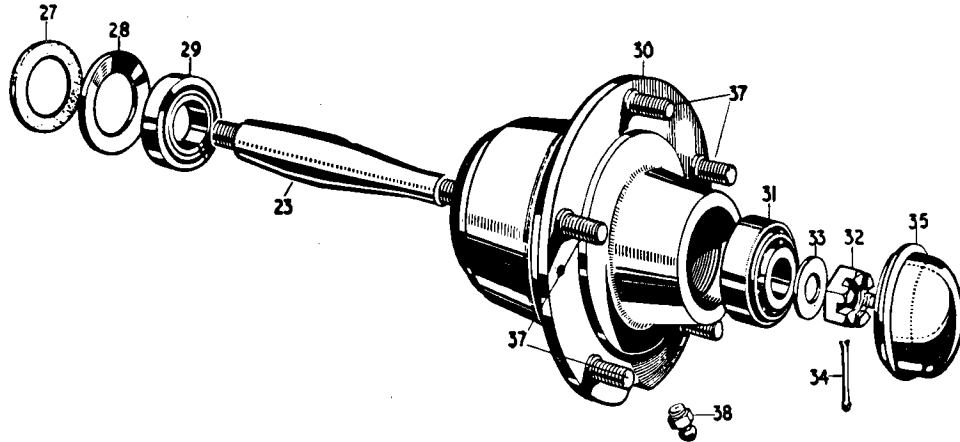


PLATE M.4. FRONT HUB.

Shaft, Stub Axle .. .. .	23	Retainer, Grease (Felt), on Stub Axle Shafts ..	27
Plate, Cover, over Grease Retainer .. .. .	28	Bearing, Inner, for Hub .. .. .	29
Hub, Front (complete with Studs) .. .. .	30	Bearing, Outer, for Hub .. .. .	31
Nut, securing Hubs and Bearings to Stub Axle Shafts .. .. .	32	Washer, "D", under Nuts .. .. .	33
Pin, Split, locking Nuts .. .. .	34	Cap for Hub .. .. .	35
Studs in Hubs .. .. .	37	Nipple, Grease, on Hubs .. .. .	38

**HUB BEARING—FRONT. TO ADJUST**  
(MARK VII AND XK 120 MODELS)

**ADJUST.** Jack up, remove nave plate, road wheel and brake drum from hub affected. Prise off dust cap and remove split pin. Rotate castellated nut clockwise until there is no end float in the hub. Turn nut anti-clockwise one castellation and secure with new split pin. Recheck end float which should be .005" (.13 mm.).

**REVOLUTION COUNTER. TO REMOVE AND REFIT**  
(MARK VII MODEL)

**REMOVE.** Disconnect battery positive lead. Withdraw centre tray but not radio if fitted. Remove drive screws securing dash casing and release casing. Remove two thumb screws at outside top of centre facia. Remove two screws passing through base of instrument panel into centre facia. Pull off all control knobs (spring-loaded fixing). Remove centre facia panel. (Plate M.5.)

Remove four round-headed screws: two at top, two at bottom of instrument panel fixing panel to dash structure. Withdraw instrument panel. Disconnect feed wire to the electric clock by removing screw. Disconnect two earth wires from back of instrument case. Disconnect revolution counter cable by rotating knurled ring. Remove three screws securing instrument carrier and withdraw revolution counter.



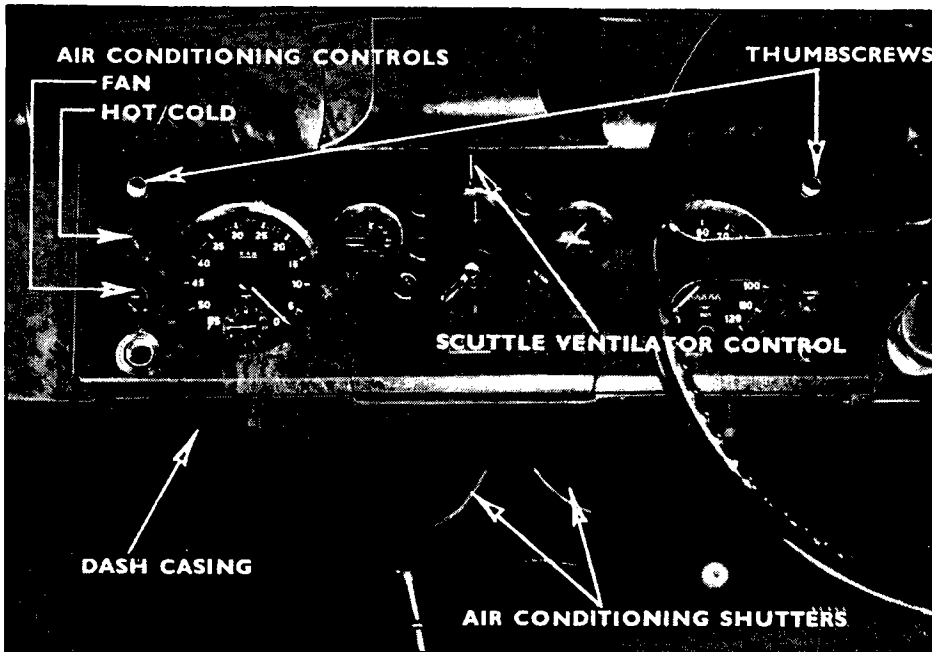


PLATE M.5. CENTRE FACIA. REMOVAL (Mark VII).

**REFITTING.** Refitting is the reverse of the above procedure.

**REVOLUTION COUNTER. TO REMOVE AND REFIT  
(XK 120 MODELS)**

**REMOVE.** Disconnect battery positive lead. Remove the drive screws securing instrument panel casing, and release casing. Remove two nuts each side of instrument panel securing panel

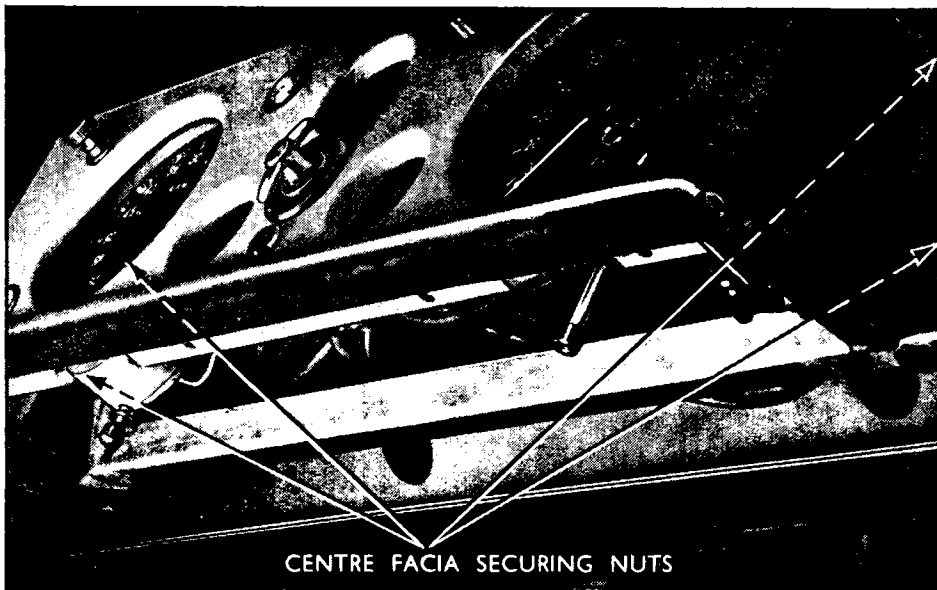


PLATE M.6. CENTRE FACIA. REMOVAL (XK 120).

to facia structure. Withdraw instrument panel from rest of facia. (Plate M.6.) Disconnect feed wire to the electric clock by removing screw. Disconnect two earth wires from back of instrument case. Disconnect revolution counter cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw revolution counter.

**REFITTING.** Refitting is the reverse of the above procedure.

### REVOLUTION COUNTER CABLE. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Raise the bonnet. Disconnect front end of revolution counter cable by unscrewing the knurled ring on rear end of left-hand camshaft cover. Remove dash casing. Unscrew knurled ring securing cable to instrument. Disengage cable grommet in dash and remove cable forward.

**REFIT.** Refitting is the reverse of the above procedure. Whenever the cable assembly is removed it is advisable to withdraw the inner cable and reassemble well greased. Position cable in as straight a line as possible between attachment points or noise may be experienced which will appear to come from the Instrument.

### ROAD WHEELS AND TYRES. GENERAL INSTRUCTIONS (MARK VII AND XK 120 MODELS)

**TYRE AND TUBE BALANCE MARKS.** It may be found that tyres are fitted with a rubber patch inside the casing. This patch is associated with the balance of the tyre and should under no circumstances be removed. These balance patches should not be confused with tyre gaiters to which they are somewhat similar in appearance. White spots may be visible in the neighbourhood of the cover bead and coloured spots on the underside of the tube. These are also associated with tyre balance and when fitting care should be taken to ensure that the white spots on the cover coincide with the coloured spots on the tube. (Plate M.7.)

**WHEEL AND TYRE BALANCE.** It is of the utmost importance that wheel and tyre assemblies are in a state of static and dynamic balance. All wheels and tyre assemblies on new cars are statically and dynamically balanced at the Works and balance weights (Plate M.7) may be fitted on the inner and outer wheel rims. When tyres are removed from wheels care should be taken to mark the relationship of tyre to wheel rim and of balance weights to wheel rim to facilitate reassembly in the original position. When new tyres have been fitted, or if the balance weights have been disturbed, it is necessary to balance the wheel and tyre assemblies using approved static and dynamic balancing equipment. Static and dynamic balance should be maintained within the limits of  $\frac{1}{2}$  oz. (.014 kg.) measured at the wheel rim.

**NAVE PLATES.** It will be observed that the nave plates are attached to the wheels by three mounting posts. (Plate M.7.) When fitting nave plates apply a light smear of grease to the posts and enter the lip of the plate over the shoulder of any two posts. Attach the plate with a sharp tap from the hand at a point in line with the third post, noting that the lip of the plate engages over the shoulder of the third post. If the plate is fitted in a haphazard manner it may be thrown off due to flexing of the road wheel.

**WHEEL AND TYRE INTER-CHANGING** It is strongly recommended that every 2,500 miles (4,000 kilometres) road wheels are interchanged from left-hand front to right-hand rear, and right-hand front to left-hand rear. When tyres are used in the same road wheel position for distances greater than those quoted above the resulting tread wear can set up tyre noise which is often mistaken for transmission noise at speeds between 20-40 m.p.h. (32-64 k.p.h.). Regular interchanging of wheels will also give increased tyre life.

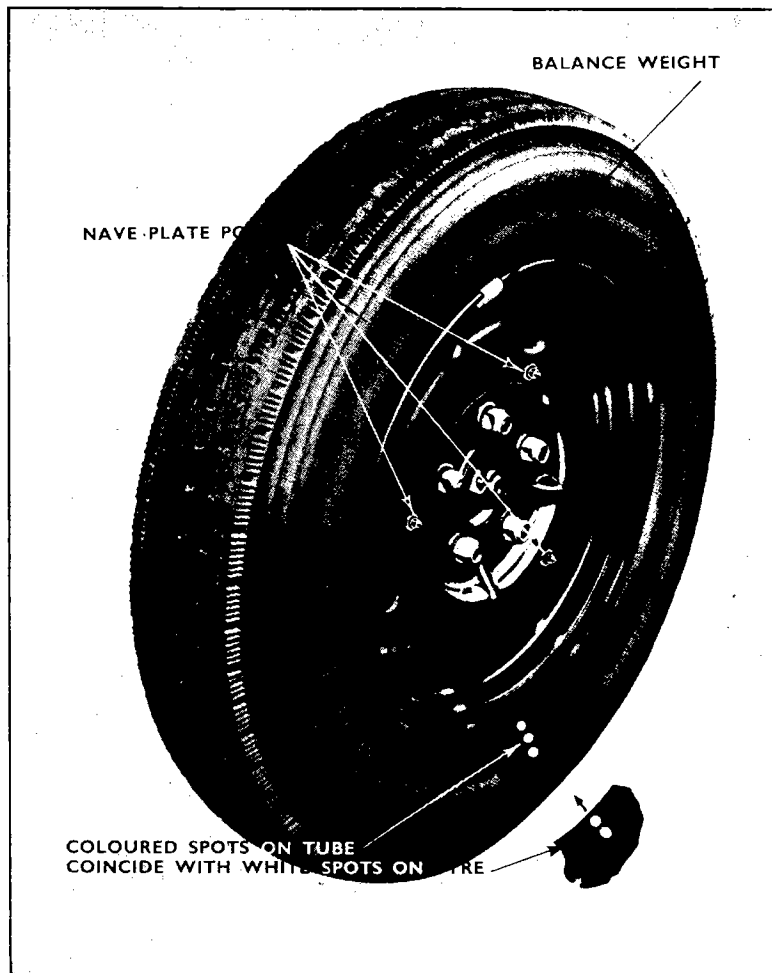


PLATE M.7. ROAD WHEEL AND TYRE ASSEMBLY.

### SPEEDOMETER. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Withdraw centre tray but not radio if fitted. Remove drive screws securing dash casing and release casing. Remove two thumb screws at outside top of centre facia. Remove two screws passing through base of instrument panel into centre facia.

Pull off all control knobs (spring-loaded fixing). Remove centre facia panel. Remove four round-headed screws: two at top, two at bottom of instrument panel fixing panel to dash structure. Withdraw instrument panel. (Plate M.5.) Disconnect head lamp warning light by pulling bulb carrier out of socket in instrument case. Disengage speedometer cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw speedometer.

**REFIT.** Refitting is the reverse of the above procedure.

**SPEEDOMETER. TO REMOVE AND REFIT  
(XK 120 MODELS)**

**REMOVE.** Remove the drive screws securing instrument panel casing and release casing. Remove two nuts each side of instrument panel securing panel to facia structure. Withdraw instrument panel from rest of facia. Disconnect head lamp warning light by pulling bulb carrier out of socket in instrument case. Disengage speedometer cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw speedometer. (Plate M.6.)

**REFIT.** Refitting is the reverse of the above procedure.

**SPEEDOMETER CABLE. TO REMOVE AND REFIT  
(MARK VII AND XK 120 MODELS)**

**REMOVE.** Release bonnet catch by pulling control under right-hand side of facia. Disconnect speedometer cable at gearbox (drive end) by rotating knurled ring. Remove dash casing and disconnect cable from instrument by rotating knurled ring. Disengage grommet in dash and remove cable forward.

**REFIT.** Refitting is the reverse of the above procedure. Whenever the cable assembly is removed it is advisable to withdraw the inner cable and reassemble well greased. Position cable in as straight a line as possible between attachment points or noise may be experienced which will appear to come from the instrument.

# COACHWORK

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

### BODY NUMBERS

(The body number is stamped on a plate attached to the left-hand side of the scuttle, and also on the identification plate which is attached to the scuttle)

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

	Page	
	Mk. VII	XK 120
Index to Contents - - - - -	N.2	N.3
Index to Plates - - - - -		N.4
Construction and Maintenance - - - - -	N.5	N.22
Servicing - - - - -	N.7	N.26

## INDEX TO CONTENTS

(MARK VII MODEL)

Contents	Operation	Page
Body Construction .. .. .		N. 5
Maintenance .. .. .		N. 5
Body Assembly .. .. .	Remove and Refit	N. 7
Bonnet .. .. .	Remove and Refit	N. 8
Boot Lid .. .. .	Remove and Refit	N. 8
Bumpers—Front and Rear .. .. .	Remove and Refit	N. 8
Cappings—Polished Wood .. .. .	Remove and Refit	N. 9
Chrome Moulds .. .. .	Remove and Refit	N.10
Doors .. .. .	Remove and Refit	N.10
Doors .. .. .	Adjust .. .. .	N.10
Door Glass and Frame—Front .. .. .	Remove and Refit	N.11
Door Glass and Frame—Rear .. .. .	Remove and Refit	N.12
Door Locks .. .. .	Remove and Refit	N.13
Door Trim Casing .. .. .	Remove and Refit	N.13
Facia—Centre .. .. .	Remove and Refit	N.15
Glove Boxes .. .. .	Remove and Refit	N.15
No Draught Ventilators—Front .. .. .	Remove and Refit	N.15
No Draught Ventilators—Rear .. .. .	Remove and Refit	N.16
Radiator Grille .. .. .	Remove and Refit	N.17
Rear Light Glass .. .. .	Remove and Refit	N.17
Seat and Slides—Front .. .. .	Remove and Refit	N.17
Sliding Roof Drain Tubes .. .. .	Servicing .. .. .	N.17
Sliding Roof .. .. .	Remove and Refit	N.18
Squab. Rear Seat .. .. .	Remove and Refit	N.18
Window Winder. Front Door .. .. .	Remove and Refit	N.19
Window Winder. Rear Door .. .. .	Remove and Refit	N.20
Windscreen .. .. .	Remove and Refit	N.20
Wings—Front .. .. .	Remove and Refit	N.20

# INDEX TO CONTENTS

(XK 120 MODELS)

Contents	Operation	Page	
		Super Sports Model	F.H. Coupe Model
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Maintenance .. .. .			N.25
Body Assembly .. .. .	Remove and Refit		N.26
Bonnet .. .. .	Remove and Refit		N.27
Boot Lid .. .. .	Remove and Refit		N.28
Cappings, Polished Wood .. .. .	Remove and Refit	—	N.28
Doors .. .. .	Remove and Refit		N.29
Doors .. .. .	Adjust .. .. .	N.29	N.29
Door Glass and Frame .. .. .	Remove and Refit	—	N.30
Door Locks .. .. .	Remove and Refit	N.32	N.32
Door Trim Casing .. .. .	Remove and Refit	N.32	N.32
Facia—Centre .. .. .	Remove and Refit		N.33
Facia .. .. .	Remove and Refit	N.33	N.34
No Draught Ventilators—Front .. .. .	Remove and Refit	—	N.34
No Draught Ventilators—Rear .. .. .	Remove and Refit	—	N.35
Rear Light Glass .. .. .	Remove and Refit	—	N.35
Seats and Slides .. .. .	Remove and Refit		N.35
Window Winder .. .. .	Remove and Refit	—	N.35
Windscreen .. .. .	Remove and Refit	N.36	N.36
Wings—Rear .. .. .	Remove and Refit		N.37

**INDEX TO PLATES**

**(MARK VII MODEL)**

<b>Plate No.</b>	<b>Plate</b>	<b>Page</b>
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N. 2	Body Mounting Points .. .. .	N. 7
N. 3	Polished Wood Cappings .. .. .	N. 9
N. 4	Front Door Glass and Frame. Removal .. .. .	N.11
N. 5	Rear Door with Trim Casing Removed .. .. .	N.12
N. 6	Door Trim Casing. Removal .. .. .	N.14
N. 7	Centre Facia. Removal .. .. .	N.15
N. 8	No Draught Ventilator—Rear. Removal.. .. .	N.16
N. 9	Sliding Roof. Removal .. .. .	N.18
N.10	Front Door with Trim Casing Removed .. .. .	N.19
N.11	Front Wing Mounting Points .. .. .	N.21

**(XK 120 MODELS)**

<b>Plate No.</b>	<b>Plate</b>	<b>Page</b>	
		<b>Super Sports Model</b>	<b>F.H. Coupe Model</b>
N.12	Front End Assembly .. .. .		N.22
N.13	Rear End Assembly .. .. .		N.23
N.14	Dash Assembly .. .. .		N.23
N.15	Sill Assembly .. .. .		N.24
N.16	Canopy Assembly .. .. .	—	N.24
N.17	Body Mounting Points .. .. .		N.27
N.18	Front Wing and Valance .. .. .		N.27
N.19	Polished Wood Cappings .. .. .	—	N.28
N.20	Door with Trim Casing Removed .. .. .	—	N.30
N.21	Door Glass and Frame. Removal .. .. .	—	N.31
N.22	Centre Facia. Removal .. .. .		N.33
N.23	Rear Wing Mounting Points .. .. .		N.37



**BODY CONSTRUCTION**

**(MARK VII MODEL)**

The body consists of various pressings (Plate N.1) which are welded together to form a body shell which combines lightness with great strength. The front wings are separate assemblies and are attached to the valances with setscrews.

The various panels which make up the body shell are serviced separately and when carrying out body repairs it will be found in many instances more economical to replace the section or sections affected in preference to effecting a panel beating repair.

If the damage is confined to only a portion of the panel it may be found advantageous, in certain instances, not to use the complete panel if the welded joints can be made in a more suitable position. For example, if the rear wing is damaged but the rear quarter of the roof panel remains unaffected, the top portion of the panel which forms the rear quarter (see Plate N.1) can be cut off and the joint made along the continuance of the door waistline. The joint can then be lead filled and smoothed off.

**MAINTENANCE**

**(MARK VII MODEL)**

Every 5,000 miles (8,000 kilometres) carry out oil-can lubrication of such points as door hinges, boot lid hinges and locks, door locking mechanism, bonnet hinges and catches and petrol filler cover lock and hinges.

Check and tighten, if necessary, all body screws, nuts and bolts.

**RECOMMENDED LUBRICANTS**

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's.	S.A.E. Viscosity.
Oil Can Lubrication ...	Mobiloil A.	Castrol X.L.	Double Shell.	Essolube 30.	Energol 30.	30.

**CARPETS.** These should be kept free from dirt by the use of a vacuum cleaner or air line. Alternatively, the carpets may be brushed clean, using a soft brush. Stains or marks can be removed by light rubbing with a cloth soaked in petrol.

**CELLULOSE.** Never clean the cellulose other than by washing with a soft sponge and hose pipe. Use a steady flow of water and sponge lightly. Dry and polish the cellulose with a good quality wash leather. Tar may be removed with a clean soft cloth moistened in petrol or with a proprietary brand of tar remover. The cellulose may be polished from time to time with a good quality proprietary polish, either wax or emulsion type.

**CHROMIUM PLATE.** It is desirable to clean chromium plate occasionally to remove deposits which in time, if left undisturbed, will discolour the bright finish. It is, however, necessary to ensure that an abrasive cleaner is not employed as this will scratch and destroy the chrome. Use an approved brand of chrome shine and apply this with a soft cloth.

**HEAD LINING.** Dirt may be removed by the use of a vacuum cleaner. Alternatively, clean with a soft hand brush or pad of mutton cloth soaked in petrol and applied briskly but without pressure.

**INTERIOR HIDE** The seat upholstery may be kept clean by brisk rubbing with a wash leather well wrung out in water. Grease marks should be removed by light rubbing with a soft cloth moistened in petrol.

**POLISHED WOODWORK.** A good quality wax polish applied occasionally will retain the high finish of the woodwork.

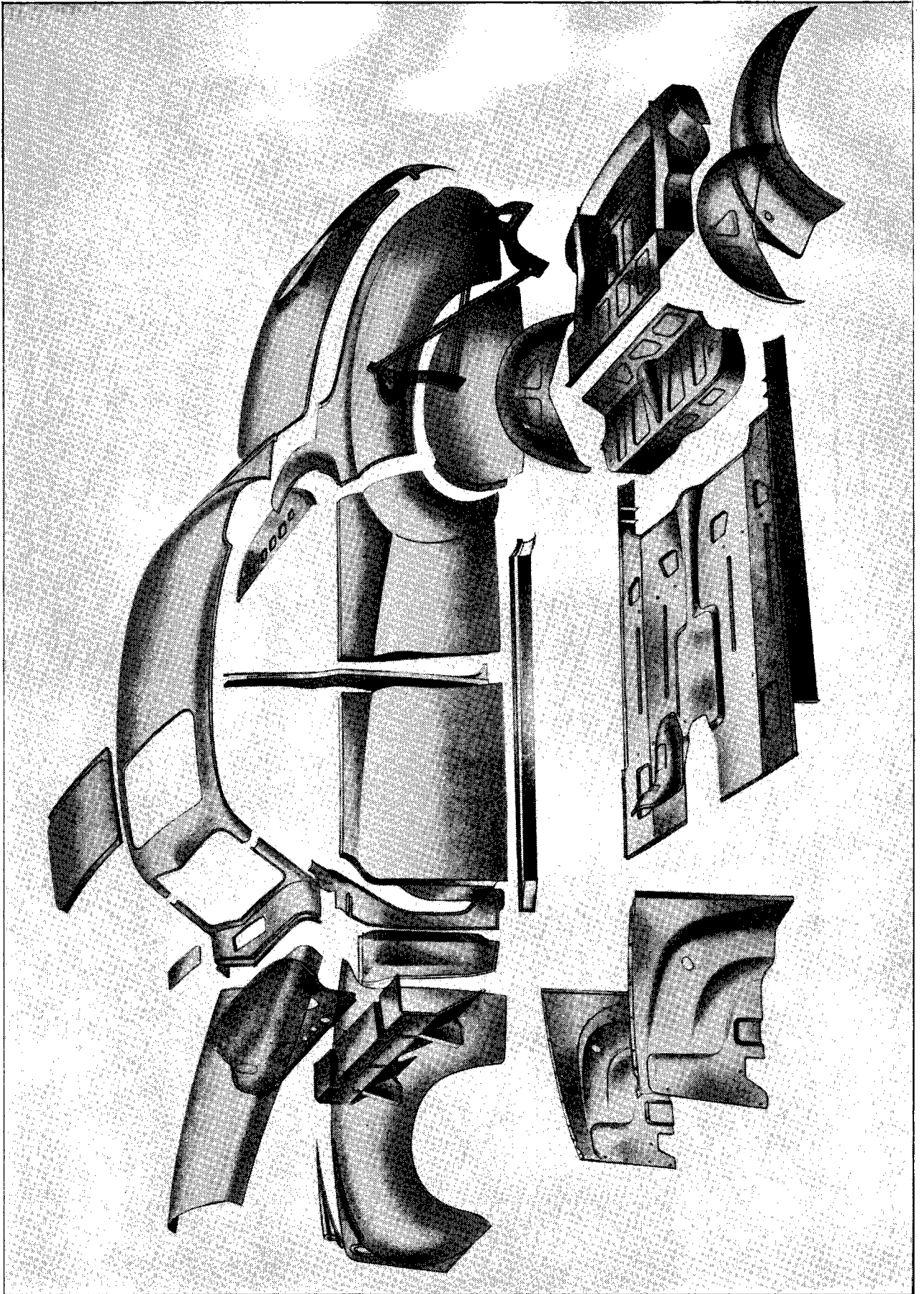


PLATE N.1. BODY PANELS (Mark VII).

## BODY ASSEMBLY. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** The operations necessary to remove the body assembly from the chassis can be carried out in many different sequences and the following instructions are offered only as a guide. The reference in brackets following some of the operations indicate the section or page in which full details of the procedure will be found.

**DETACH MECHANICAL CONNECTIONS.** Drain the cooling system (Section D). Drain petrol tanks and disconnect petrol pipes at the two unions at the ends of the rear cross member. Remove the handbrake lever. Remove speedometer cable from instrument (Section M). Remove revolution counter cable at rear of left-hand camshaft cover. Remove water temperature gauge bulb from thermostat housing (Section D). Remove oil gauge pipe at flexible connection above oil filter. Remove clutch and brake pedals. Disconnect throttle linkage at flexible joint adjacent to rear carburettor (Section C). Disconnect engine breather pipe at front of cylinder head. Disconnect air conditioner hoses at bottom of inlet manifold, and at the metal pipe below manifold. Disconnect brake servo pipe at bottom of inlet manifold. Disconnect clutch supply tank by removing bolt and nut and springing tank out from clip; tie up tank to engine. Disconnect brake supply tank by removing bolts and nuts from mounting bracket and tie up tank to engine. Remove air cleaner (Section C). Remove steering manette control, steering wheel, column and stator tube (Section I). Remove radiator and top and bottom hoses (Section D).

**DETACH ELECTRICAL CONNECTIONS.** Disconnect battery positive lead. Remove lead from starter motor and earth strap from top securing bolt. Remove horns (Section P). Disconnect wires from dynamo, and earth wire from rear mounting bolt. Disconnect wires from rear of snap connector block at front of left-hand wing valance. Disconnect high tension lead and distributor wire from coil.

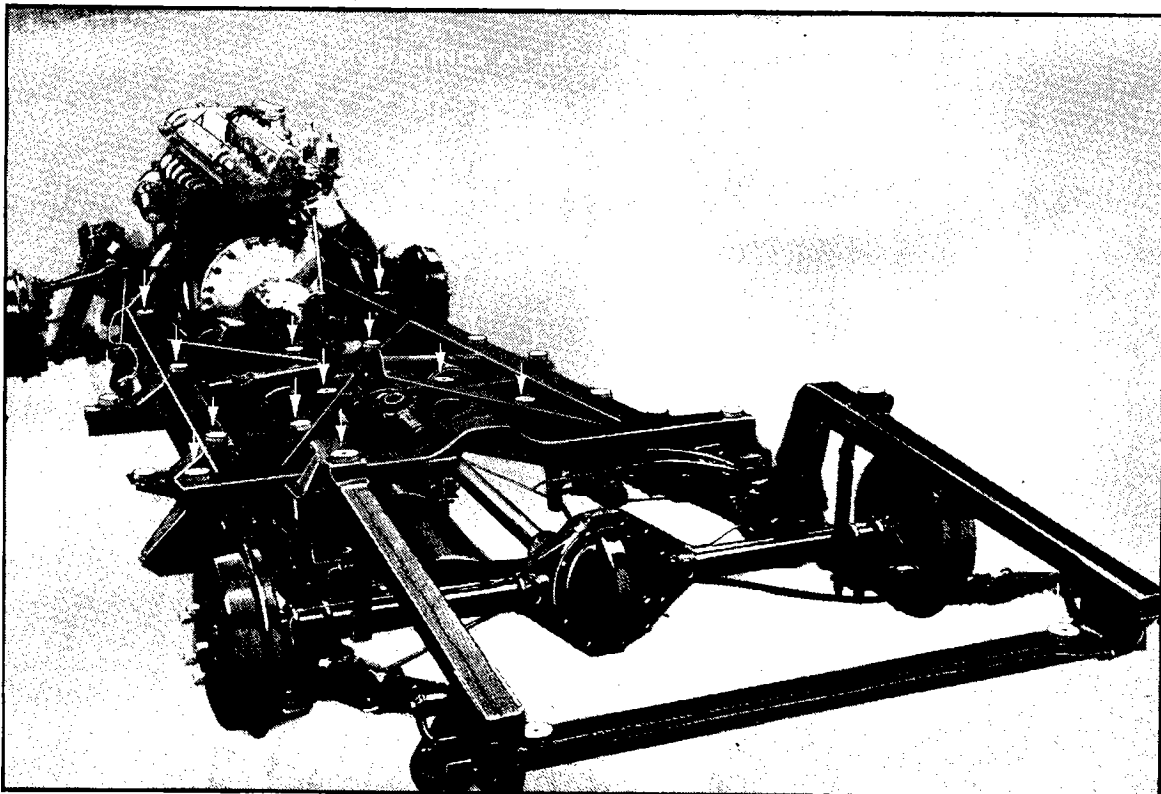


PLATE N.2. BODY MOUNTING POINTS (Mark VII).

Disconnect wires from auxiliary starting carburettor solenoid. Remove fuse box cover and disconnect the two petrol pump wires (blue and white). From underneath body at rear of right-hand front wheel, pull the petrol pump wires out of body conduit, remove harness clip and coil up wires at side of chassis frame. Disconnect stop and reverse light wires from snap connector. Disconnect wiring harness clips at chassis frame front cross member.

**REMOVE BODY.** Remove radiator grille as described on page N.17. Remove front and rear bumpers as described on page N.8. Remove front seats as described on page N.17. Remove carpets, gear lever knob and gearbox cowl.

**Body Mounting Points.** The location of the twenty-four body mounting points (early cars twenty-two points), are as follows:—Bottom of radiator frame—2 bolts and nuts. Bottom of dash panel (engine side)—2 nuts. Body floor to chassis frame side member brackets—4 bolts and nuts. Body floor to cruciform and side members—10 setscrews. Rear seat floor to cross member—2 setscrews. Inside of boot (early cars), rear of floor—2 bolts and nuts. Inside of boot (later cars), rear of floor—2 bolts and nuts. Front of floor—2 setscrews.

### **BONNET. TO REMOVE AND REFIT (MARK VII MODEL)**

**REMOVE.** Raise the bonnet and support with prop. Mark the positions of the hinge brackets relative to the bonnet panel to facilitate reassembly; the setscrew holes in the hinge brackets are elongated to allow for adjustment of the bonnet position.

Remove the two setscrews securing each hinge bracket to the channels at rear of bonnet. Lift off bonnet.

**REFIT.** Refitting is the reverse of the removal procedure. Reposition hinges to the marks made on removal.

### **BOOT LID. TO REMOVE AND REFIT (MARK VII MODEL)**

**DISCONNECT ELECTRICAL CONNECTIONS.** Raise the boot lid and support with prop. At the left-hand hinge release the wiring cable clips and disconnect the two wires from the snap connectors, noting their respective positions. Disconnect the earth wire by removing the drive screw adjacent to hinge aperture.

**REMOVE BOOT LID.** Mark the position of hinges relative to the boot lid to facilitate reassembly; the tapping plates for the hinge setscrews in the boot lid are a loose fit to provide adjustment in both directions. Support the boot lid and remove the four screws securing each hinge to the boot lid. Remove the locknut, nut and bolt securing the prop to the boot lid. Lift off boot lid.

**REFIT.** Refitting is the reverse of the removal procedure.

### **BUMPERS—FRONT AND REAR. TO REMOVE AND REFIT (MARK VII MODEL)**

**REMOVE.** **Front.** From underneath each front wing remove the bolt and nut securing the bumper valance to bracket at front of wing. Remove the nut and bolt (front) and setscrew (rear) securing each bumper bracket to the chassis frame side members and withdraw bumper and valance complete.

**Rear.** Raise the boot lid. At the rear of the longitudinal box section panels remove the four rubber covers from the access holes for the bumper bar bolts.

Remove the two bolts and nuts securing each bumper bracket to the rear of the chassis frame side members and withdraw bumper and brackets.

**REFIT.** Refitting is the reverse of the removal procedure.

## CAPPINGS—POLISHED WOOD. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** (Refer to Plate N.3.)

**Door Facia Capping.** Remove the top capping by unscrewing the four screws. Prise up the felt strip which is tacked to the door facia capping. Unscrew the four screws at the top of door facia capping. Remove capping by lifting upwards to disengage spring clips from holes in door panel.

**Screen Pillar Capping.** Partly withdraw the door seal rubber and remove the three screws securing the capping to door aperture flange.

**Cantrail Capping.** Partly withdraw front and rear door seal rubbers and remove the seven screws securing the capping to the flanges of the door apertures.

**Rear Quarter Capping.** Partly withdraw the door seal rubber and remove the three screws securing the capping to door aperture flange.

**Centre Pillar Capping.** Prise out trim casing to disengage spring clips from centre pillar.

Remove the waist facia capping by pulling downwards to disengage spring clip from hole in centre pillar. Remove the long centre pillar capping by pulling downwards to disengage spring clip from hole in centre pillar.

**Screen Rail Capping.** From underneath the capping unscrew the two nuts securing the rail to its mounting brackets. Lift out capping.

**REFIT.** Refitting is the reverse of the removal procedure.

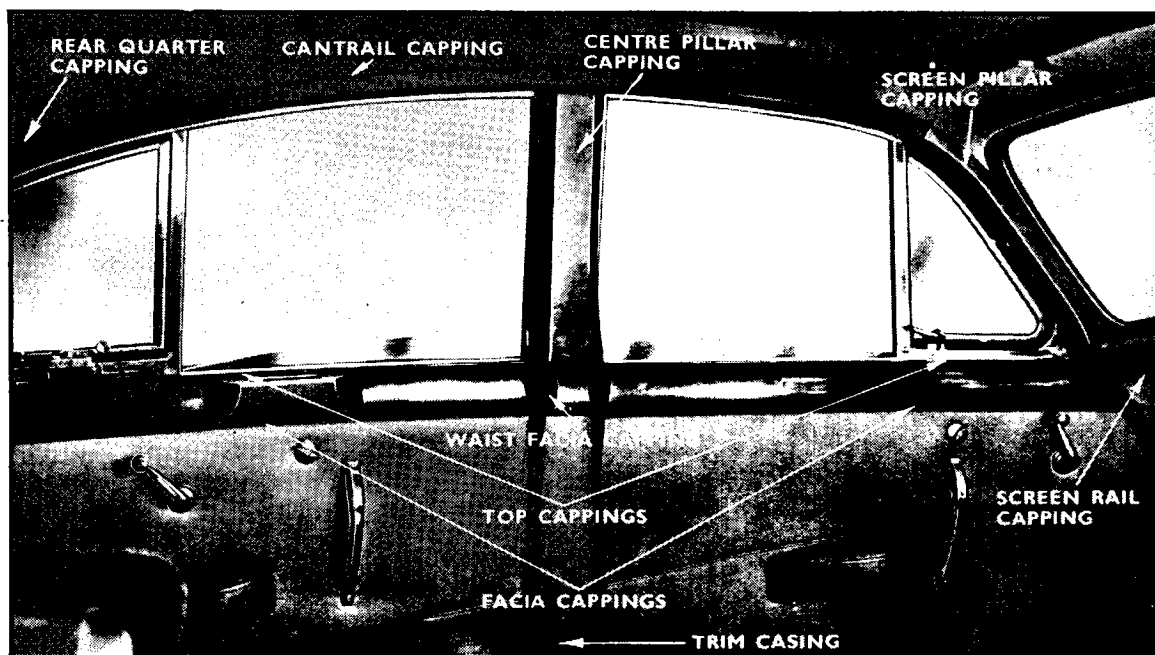


PLATE N.3. POLISHED WOOD CAPPINGS (Mark VII).

### CHROME MOULDS. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** **Door Moulds.** Remove the door trim casing as described on page N.13. Adjust the position of the window to gain access to the nuts securing the chrome mould to the inside of door panel.

Remove the outside door handle by unscrewing the round-headed screw on inside of door flange and the stud nut at inside of door panel. Unscrew the three nuts securing the chrome mould studs to inside of door panel and remove mould.

**Rear Wing Mould.** Remove the rear squab as described on page N.18. Remove the rear quarter trim casing by unscrewing the two drive screws. Unscrew the two nuts securing the chrome mould studs and remove mould.

**Scuttle Mould.** Remove the glove box as described on page N.15. Remove the side trim casing by removing the two drive screws. Unscrew the two nuts securing the chrome mould studs and remove mould.

**REFIT.** Refitting is the reverse of the removal procedure.

### DOORS. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** **Front Door.** Open the door to its fullest extent and mark the position of the two hinges relative to the body panel. Support door and remove the four setscrews securing each hinge to body panel. (Use only the correct type and size of screwdriver.) Release check strap from roller and lift out door.

**Rear Door.** Open the door to its fullest extent and mark position of hinges through the access holes for the securing screws at the rear of centre pillar.

Prise out trim casing from lower half of centre pillar and remove the check strap by unscrewing the two setscrews.

Support door and remove the eight setscrews through the access holes at the rear of centre pillar. (Use only the correct type and size of screwdriver.) The door can now be lifted out.

**REFIT.** Refitting is the reverse of the removal procedure. Reposition hinges to the marks made on removal. If it is found that the doors require adjustment, refer to "Doors—To Adjust," below.

### DOORS. TO ADJUST (MARK VII MODEL)

**FRONT DOOR.** The door can be moved bodily forward or rearward by adding or subtracting an equal number of shims between the two hinges and the hinge panel in the front wing. Adding or subtracting shims at one or other of the door hinges will tilt the door in its aperture.

The door striking plate is adjustable to a limited extent in any direction by slackening the two securing screws. If it is required to bring the striking plate closer to the door, shims can be fitted between the plate and body.

**REAR DOOR.** The tapping plates for the door hinge securing screws are a loose fit in their cages in the centre pillar and to a limited extent provide adjustment in all directions. The top hinge is also adjustable inside the door at the top inner corner. To gain access to the hinge securing screws it will be necessary to remove the door light frame and glass as described on page N.11; to adjust door, slacken the four setscrews securing the mounting plate.

**DOOR LIGHT FRAMES.** The position of the door light frame can be adjusted in a vertical direction to suit the door aperture by fitting packing washers between the frame and the top of the door panel. The door light frame can be brought into more intimate contact with the door seal rubber by fitting plywood packing pieces between the bottom of the door frame pillars and the mounting brackets inside the doors.

## DOOR GLASS AND FRAME—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**GENERAL.** (Refer to Plate N.4.) To enable the door glass to be removed it is necessary first to remove the chromium plated door glass frame.

**REMOVE TRIM CASING.** Remove the door trim casing as described on page N.13.

**REMOVE N.D.V.** Remove the No Draught Ventilator as described on page N.15.

**REMOVE DOOR GLASS FRAME.** Remove the ten screws, indicated in Plate N.4, securing the frame to the door panel. Note that the two centre screws in the N.D.V. surround rubber channel (Nos. 2 and 3, Plate N.4) secure the N.D.V. friction pivot brackets, which should be held during the removal of the screws and nuts and withdrawn through aperture in door panel.

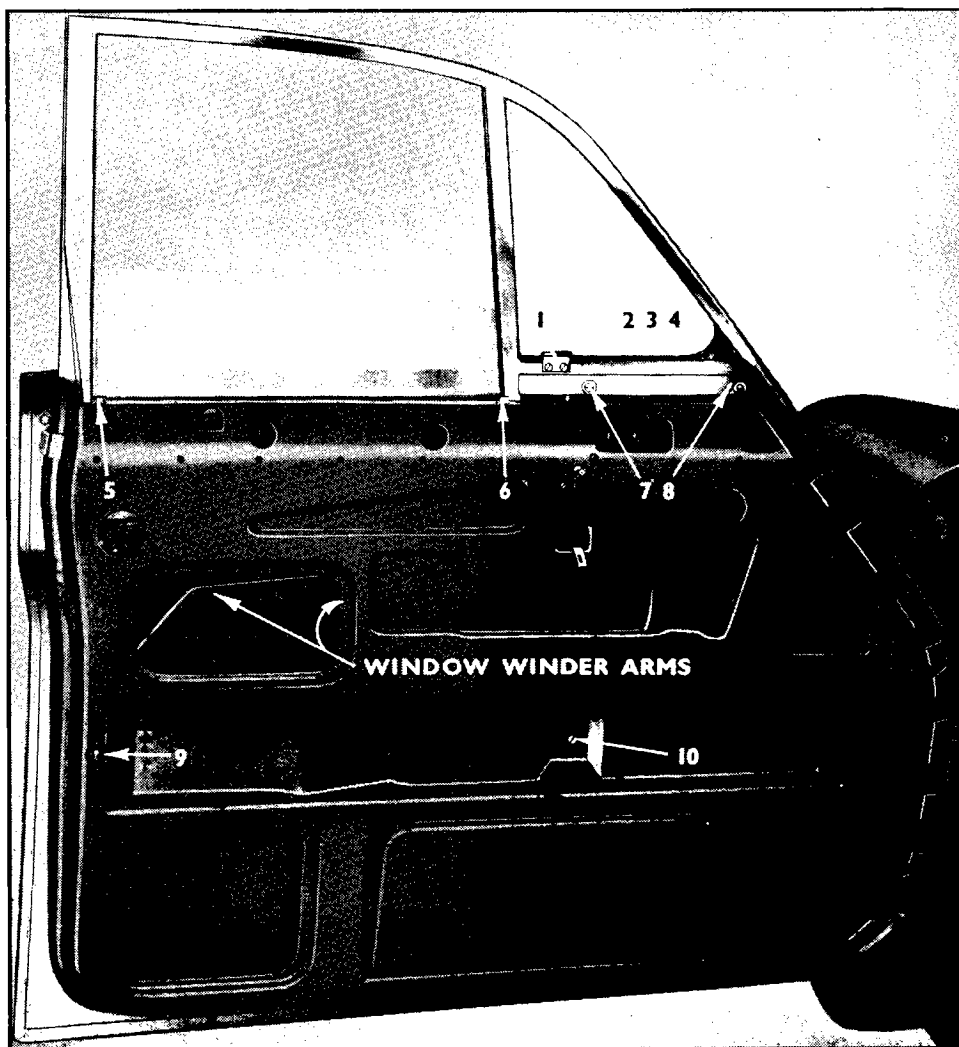


PLATE N.4. FRONT DOOR GLASS AND FRAME. REMOVAL (Mark VII).

Wind window down fully. Lift frame upwards and tilt towards inside edge of door for brackets at bottom of frame to clear aperture at top of door.

**REMOVE DOOR GLASS.** Wind door window up until outer winder arm is visible through aperture in door panel. (See Plate N.4.) Slide window inwards and disengage winder arm from guide channel. Wind window up fully, disengage inner winder arm from guide channel and remove glass.

**REFIT.** Refitting is the reverse of the removal procedure. Do not omit to replace any packing washers and packing pieces found on removal, or the position of the door glass frame will be altered.

**DOOR GLASS AND FRAME—REAR. TO REMOVE AND REFIT  
(MARK VII MODEL)**

**GENERAL.** (Refer to Plate N.5.) To enable the door glass to be removed it is necessary first to remove the chromium plated door glass frame.

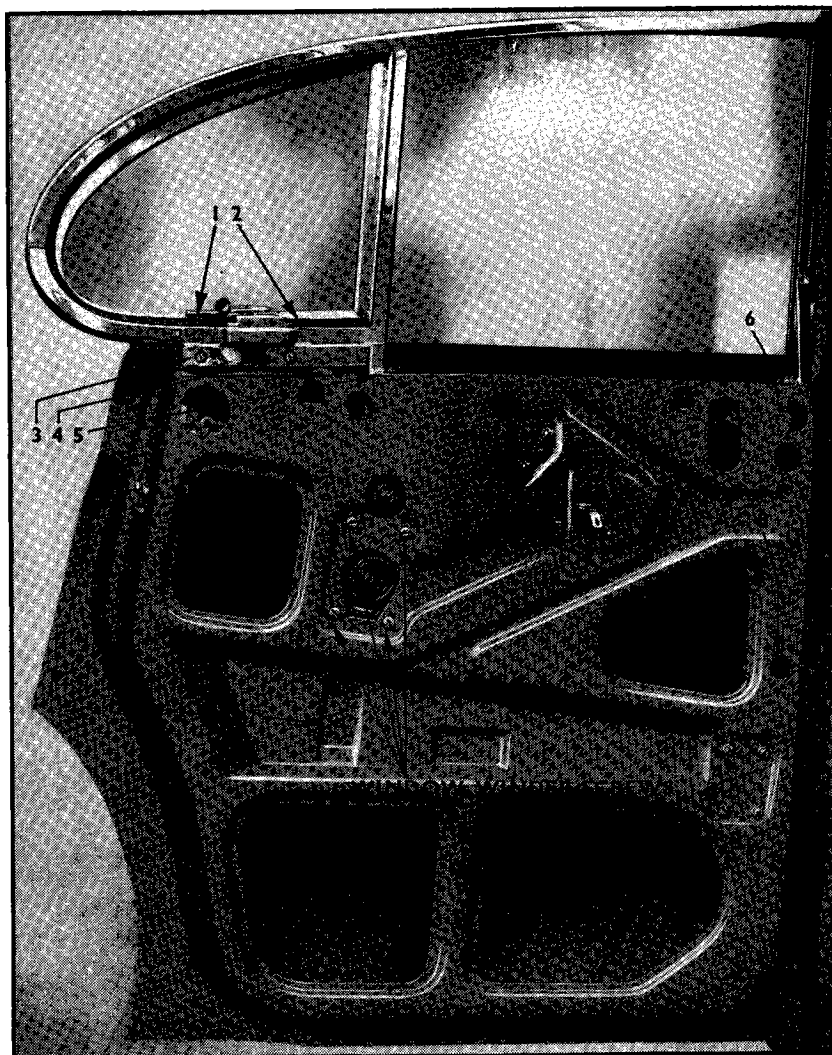


PLATE N.5. REAR DOOR WITH TRIM CASING REMOVED (Mark VII).



**REMOVE TRIM CASING.** Remove the door trim casing as described on page N.13.

**REMOVE DOOR GLASS FRAME.** Remove the following eight screws, indicated in Plate N.5, securing the frame to the door panel. Two screws in bottom channel for N.D.V. rubber surround (Nos. 1 and 2). Two screws securing flange at bottom of N.D.V. to door frame (Nos. 3 and 4). Two screws (Nos. 5 and 6), securing frame to top of door panel; note packing washers, if fitted, between frame and door.

One screw and nut (No. 7) securing outer door frame pillar to bracket inside door; note packing pieces fitted between pillar and bracket. One screw (No. 8) securing inner door frame pillar, accessible through hole in edge of door panel.

Pull the door frame and glass bodily outwards to clear door aperture in body and withdraw frame upwards. Wind window up fully, disengage winder arm from guide channel and remove glass.

**REFIT.** Refitting is the reverse of the removal procedure. Do not omit to replace any packing washers and packing pieces found on removal, or the position of the door glass frame will be altered.

### **DOOR LOCKS. TO REMOVE AND REFIT (MARK VII MODEL)**

**REMOVE DOOR TRIM CASING.** Remove door trim casing as described on page N.13.

**REMOVE DOOR LOCK.** Remove the setscrew securing the outer door frame pillar. (Front door—No. 9, Plate N.4.) (Rear door—No. 7, Plate N.5.) Wind window up fully to allow movement of door glass frame.

Remove the four screws securing lock in position at door shut face. Remove the two screws securing the inside handle remote control. Remove the two screws securing the door lock safety catch (not fitted to driver's door). (Plate N.10.)

At the door shut face turn the toggle catch to the fully down position. Withdraw lock to inside of door and remove assembly through aperture in door panel.

**REFIT.** Refitting is the reverse of the removal procedure.

### **DOOR TRIM CASING. TO REMOVE AND REFIT (MARK VII MODEL)**

**REMOVE CAPPINGS.** (Refer to Plate N.6.) Remove the door top capping by unscrewing the four screws. Prise up the felt strip which is tacked to the door facia capping. Unscrew the four screws at top of door facia capping. Remove capping by lifting upwards to disengage spring clips from holes in door panel.

**REMOVE ARM REST.** From underneath the arm rest unscrew the two drive screws and remove rest by lifting upwards.

**REMOVE DOOR LOCK SAFETY CATCH.** Remove catch by unscrewing the centre screw. (Catch not fitted to driver's door.)

**REMOVE INSIDE DOOR HANDLE.** Unscrew the screw at bottom of door handle and remove handle. Detach the door lock trigger and handle clip by removing the screws.

**REMOVE WINDOW WINDER HANDLE.** Push back the sleeve in the centre of the window winder escutcheon, drive out pin and remove handle and escutcheon.

**REMOVE TOOL COMPARTMENT BUTTON ESCUTCHEON.**

In the case of the front doors remove the tool compartment push button escutcheon by rotating anti-clockwise.

**REMOVE TRIM CASING.**

Carefully pull back trim from top of door panel and remove casing by prising outwards to release spring clips from holes in edge of door panel.

**REFIT.**

Refitting is the reverse of the removal procedure.

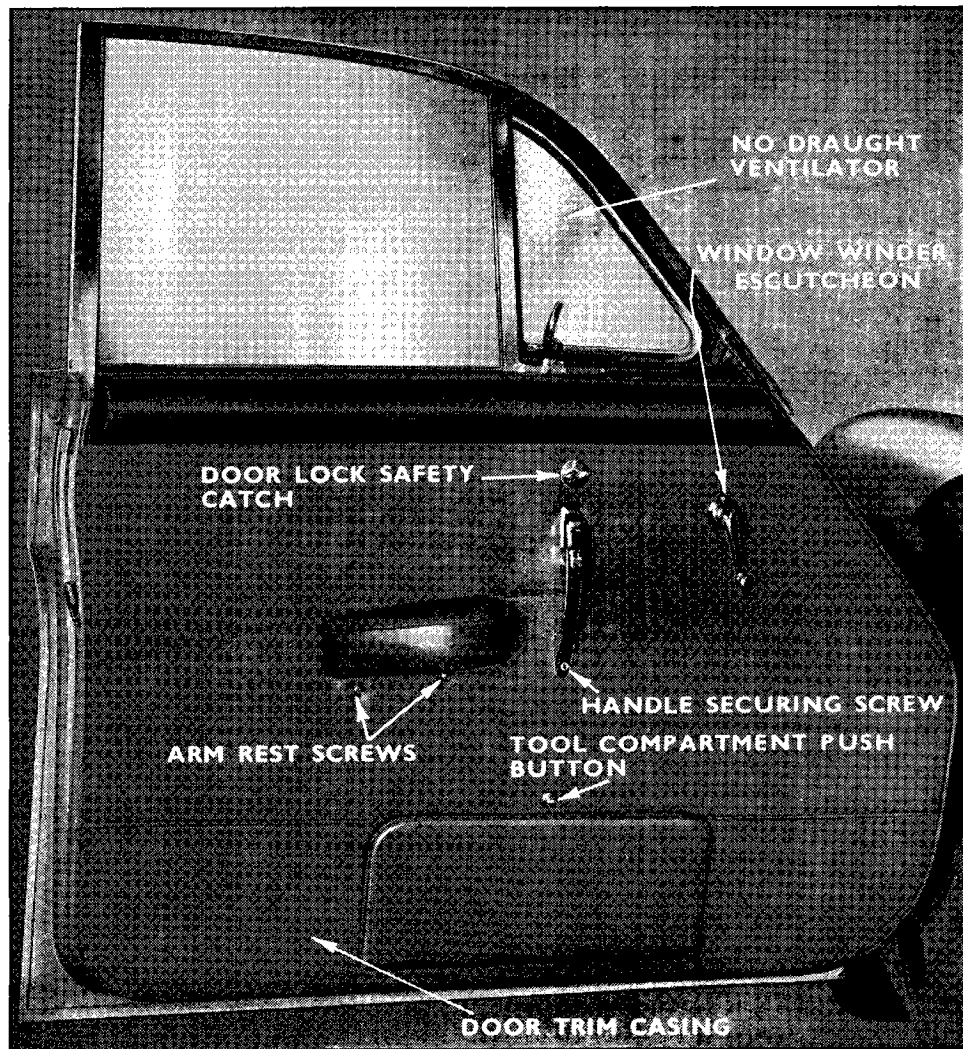


PLATE N.6. DOOR TRIM CASING. REMOVAL (Front Door illustrated).

### FACIA—CENTRE. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Disconnect battery positive lead. Remove the two drive screws securing dash casing to centre facia panel. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side, securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly, and remove centre facia.

**REFIT.** Refitting is the reverse of the removal procedure.

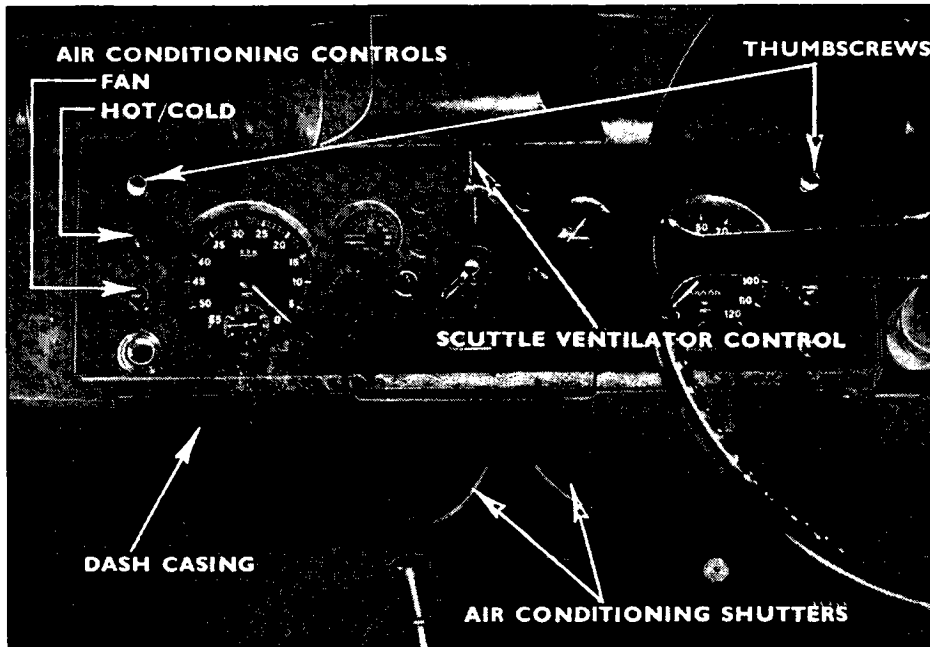


PLATE N.7. CENTRE FACIA. REMOVAL (Mark VII).

### GLOVE BOXES. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE CENTRE FACIA.** Remove centre facia as described above.

**REMOVE GLOVE BOX.** Remove the dash casing from underneath the facia by unscrewing the drive screws. Remove the two screws securing the glove box brackets to the instrument panel. In the case of the glove box fitted to the driver's side remove the transverse bracket securing the steering column by unscrewing the three setscrews. From underneath outer edge of glove box remove the two screws securing the bracket to body, and remove box. On the driver's side it will be necessary to cant the glove box to clear the steering column.

**REFIT.** Refitting is the reverse of the removal procedure.

### NO DRAUGHT VENTILATORS—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE DOOR CAPPINGS.** Remove door cappings as described on page N.9.

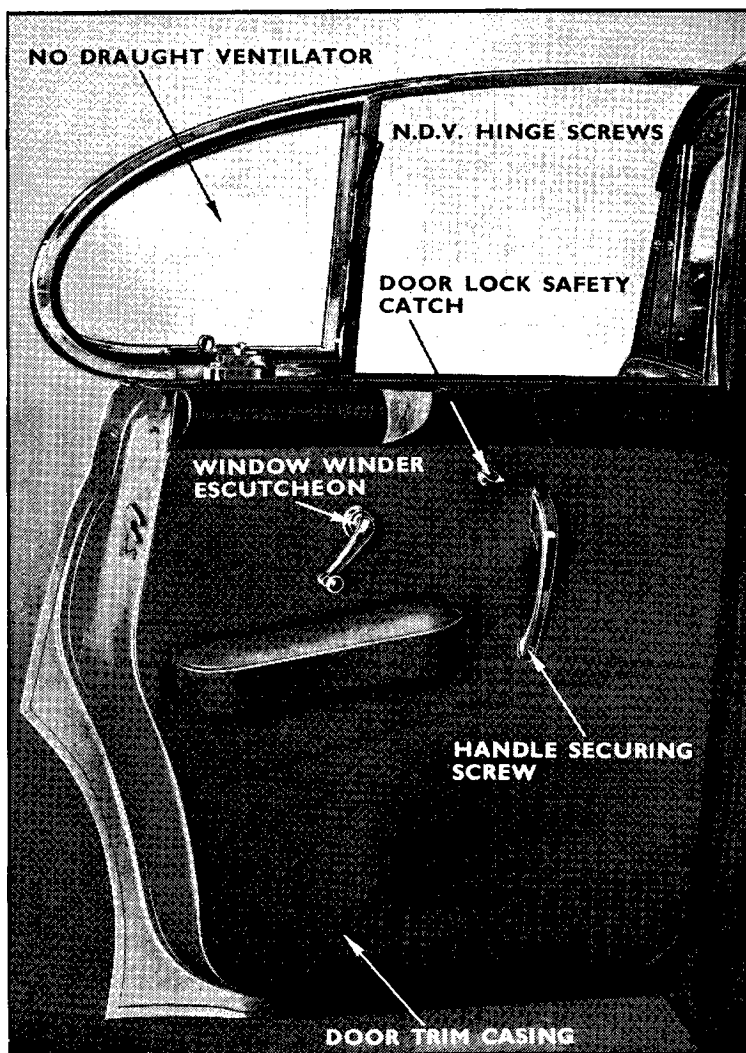
**REMOVE N.D.V.** Carefully pull back trim and slacken the two N.D.V. friction pivot nuts accessible through aperture in door panel. Remove the screw securing the N.D.V. frame to the pivot. Remove N.D.V. by lifting upwards to withdraw spindle at bottom of frame from friction pivot clamping plates.  
**(Refer to Plate N.10.)**

**REFIT.** Refitting is the reverse of the removal procedure.

**NO DRAUGHT VENTILATORS—REAR. TO REMOVE AND REFIT  
 (MARK VII MODEL)**

**REMOVE.** Open N.D.V. and remove the screw and nut securing the operating arm to the slide plate on the glass frame. Open N.D.V. as far as possible, unscrew the four screws at hinge and remove N.D.V.  
**(Refer to Plate N.8.)**

**REFIT.** Refitting is the reverse of the removal procedure.



**PLATE N.8. NO DRAUGHT VENTILATOR—REAR. REMOVAL  
 (Mark VII).**

### RADIATOR GRILLE. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Raise and support bonnet. At the top of radiator grille remove the two setscrews securing the grille brackets to the tie panel. From underneath the front bumper remove the two setscrews securing the grille to the radiator frame brackets, and withdraw grille.

**REFIT.** Refitting is the reverse of the removal procedure.

### REAR LIGHT GLASS. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** From outside of rear light prise out the chromium plated embellisher and capping from the groove in surround rubber. From inside the car press out the rear light, lipping the rubber over the flange of the rear light aperture.

**REFIT.** Assemble the glass to the surround rubber and insert a length of thin strong cord in the groove of the rubber for the rear light aperture flange, with the ends of the cord to the bottom. From **outside** the car offer up the rear light to the aperture and exert pressure from the outside whilst another operator on the inside lips the surround rubber over the aperture flange by pulling on the cord. Refit the chrome embellisher and capping to its groove in the surround rubber.

### SEAT AND SLIDES—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE SEAT.** From the seat slide flanges, which all face towards the centre of the car, remove the two setscrews securing each seat slide to the body floor. Lift out seat.

**REMOVE SLIDES.** Remove each stop plate by unscrewing the nuts and bolts, noting that the plates are right and left handed. At the end of the seat runner remove the locknut, nut and washer and withdraw slide, taking care not to lose the ball bearings.

**REFIT.** Refitting is the reverse of the removal procedure. Do not omit to fit the adjustment lever spring to the lug on the stop plate.

### SLIDING ROOF DRAIN TUBES. SERVICING (MARK VII MODEL)

**GENERAL.** Water is conducted away from the sliding roof aperture by rubber tubes situated one in each corner. The front tubes pass down through the screen pillars and discharge at the rear of the front wing. The rear tubes pass along the cantrails and discharge at the top of the rear wheel arches.

**SERVICING.** It is advisable to clear out the drain tubes periodically or if it is suspected that the tubes are blocked. Use compressed air, or if a blockage cannot be cleared by this means pass a thin cane or flexible cable through the tube. The front outlet holes for the sliding roof aperture are accessible with the roof open, but to gain access to the rear outlet holes it will be necessary to remove the sliding roof as described on page N.18.

### SLIDING ROOF. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.**  
(Refer to  
Plate N.9.)

Unlock the sliding roof and slide back approximately 4" (10 cms.); do not open further than this amount or the top of panel may be scratched on removal. Remove the two side polished wood cappings by unscrewing the screws and withdrawing downwards. Remove the screw securing each slide bracket and press brackets outwards to clear channel slide rails. Raise the front edge of roof panel and withdraw panel forwards.

**REFIT.**

Enter the locking bar into slot at rear edge of sliding roof and push back until panel will enter aperture. Replace slide brackets in position and centralise with pointed instrument pulling brackets fully inwards to ensure correct location of securing screw. Refit the two slide bracket retaining screws, centralise sliding roof and tighten screws. Refit polished wood cappings.

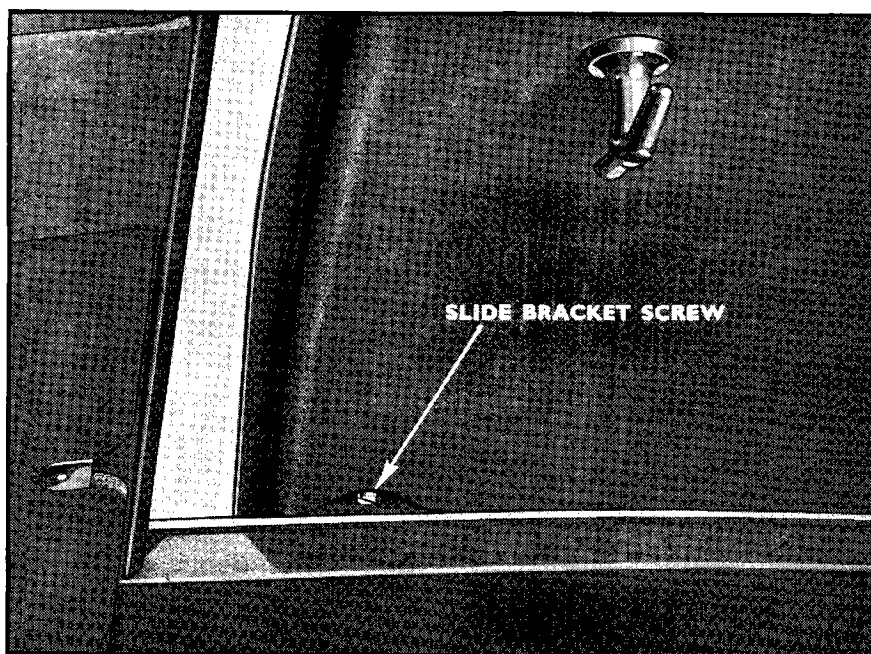


PLATE N.9. SLIDING ROOF. REMOVAL (Mark VII).

### SQUAB—REAR SEAT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.**

Lift out the rear seat cushion. At the bottom of the squab remove the two screws securing the squab brackets. Remove the rear wing valances and unscrew the screw at the front of each wheel arch. Lift up squab and remove.

**REFIT.**

Refitting is the reverse of the removal procedure.

## WINDOW WINDER—FRONT DOOR. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE DOOR GLASS AND FRAME.** Remove the frame and door glass as described on page N.11.

**REMOVE WINDOW WINDER.** From the centre of door remove the four screws securing the outer winder arm pivot. Unscrew the four screws surrounding the winder coil spring and withdraw window winder mechanism through rectangular aperture at outer edge of door.  
(Refer to Plate N.10.)

**REFIT.** Refitting is the reverse of the removal procedure.

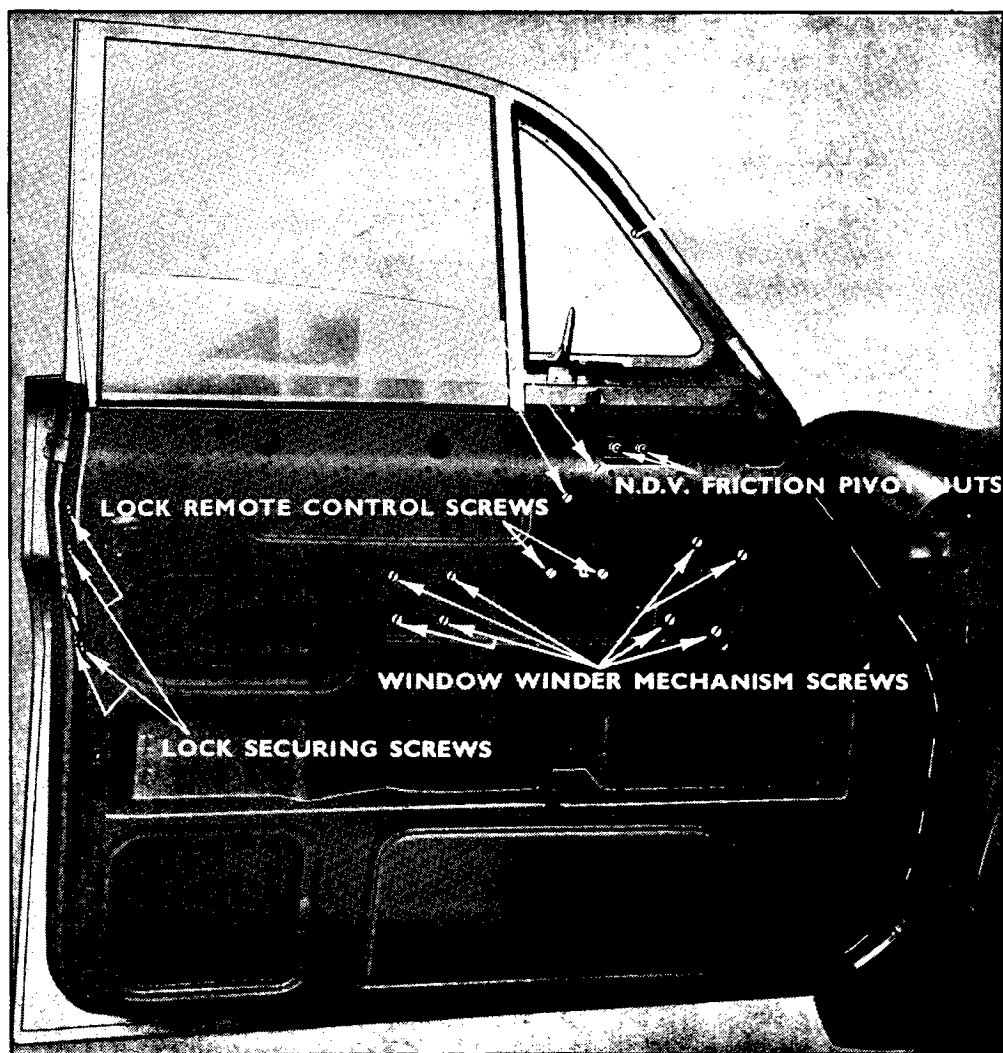


PLATE N.10. FRONT DOOR WITH TRIM CASING REMOVED (Mark VII).

## WINDOW WINDER—REAR DOOR. TO REMOVE AND REFIT (MARK VII MODEL)

- REMOVE DOOR GLASS AND FRAME.** Remove the frame and door glass as described on page N.12.
- REMOVE WINDOW WINDER.**  
(Refer to Plate N.5.) Remove four surround setscrews, the winder coil spring and withdraw winder mechanism through aperture in door.
- REFIT.** Refitting is the reverse of the removal procedure.

## WINDSCREEN. TO REMOVE AND REFIT (MARK VII MODEL)

- GENERAL.** To assist in the removal and refitting of the windscreen, manufacture a template made from  $\frac{3}{8}$ " (9.5 mm.) plywood to cover the visible portion of one half of the windscreen glass.
- REMOVE CAPPINGS.** Remove the screen rail capping and the two screen pillar cappings as described on page N.9.
- REMOVE DEMISTER NOZZLES.** Remove the two demister nozzles by unscrewing the four drive screws and withdrawing nozzles from tubes.
- REMOVE WINDSCREEN.** At the inside of the windscreen prise out the chromium plated embellisher from the centre pillar rubber. At the outside of the windscreen prise out the chromium plated embellishers from the centre pillar rubber and from the surround rubber. From the **outside** of the car offer up the template to one half of the windscreen and press inwards, lipping the surround rubber over the flange of windscreen aperture. Repeat for the other half of windscreen.
- REFIT.** Assemble the windscreen glasses to the surround rubber and insert a length of thin strong cord in the groove of the rubber for the windscreen aperture flange, with the two ends of the cord to the top of the screen. From the **inside** of car offer up the windscreen to the aperture and taking one half of the screen at a time, exert pressure with the template on the inside of the screen whilst another operator on the outside lips the surround rubber over the flange of the windscreen aperture by pulling on the cord. Refit the chromium plated embellishers to the grooves in the surround rubber.

## WINGS—FRONT. TO REMOVE AND REFIT (MARK VII MODEL)

- REMOVE ROAD WHEEL.** Jack up the car and remove the road wheel.
- REMOVE FRONT BUMPER.** Remove the front bumper as described on page N.8.
- REMOVE RADIATOR GRILLE.** Remove the radiator grille as described on page N.17.



**DISCONNECT  
LAMP  
CONNECTIONS.**

At the snap connectors on the inside of the wing valance disconnect all the wires that pass through the rubber grommet. From underneath the wing pull the wires through the grommet.

**REMOVE  
VENTILATOR.**

Open the ventilator door and detach by removing the two nuts. Unscrew the eight screws securing the ventilator box and remove box from inside of wing.

**REMOVE WING.  
(Refer to  
Plate N.11.)**

Remove the three setscrews securing wing to radiator frame. From underneath the wing at rear remove the five setscrews securing the wing to body plate, and the setscrew securing wing to wing stay. At the top of wing remove the nine setscrews securing the wing to valance and lift off wing.

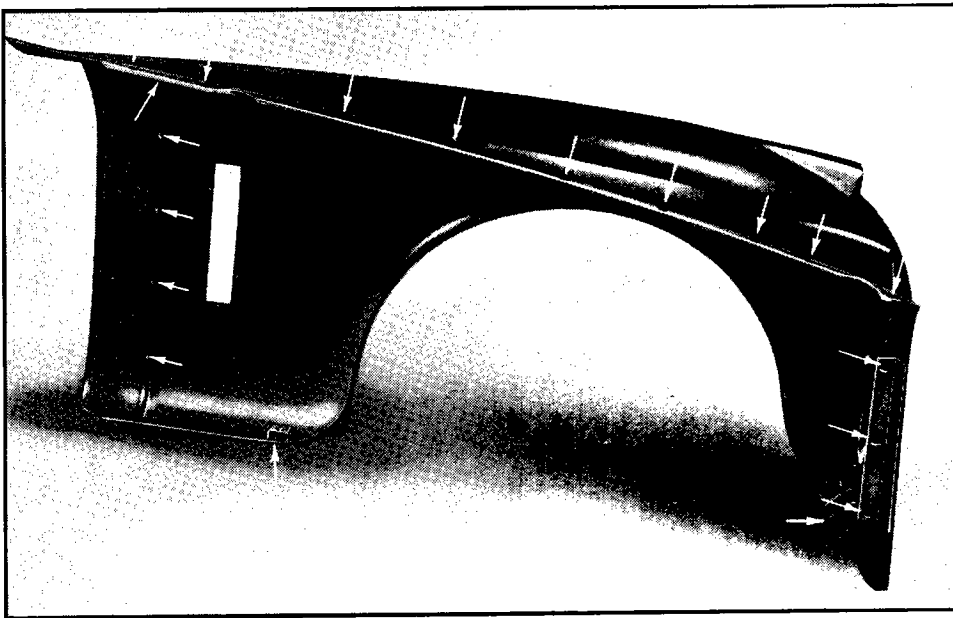


PLATE N.11. FRONT WING MOUNTING POINTS (Mark VII).

**REFIT.**

Refitting is the reverse of the removal procedure.

## BODY CONSTRUCTION

### (XK 120 MODELS)

**SUPER SPORTS MODEL.** The body consists of various sub-assemblies welded together to form four main assemblies, that is, Front End Assembly, Rear End Assembly and Sill Assemblies (right hand and left hand). The front end and rear end assemblies are in turn fitted to a jig and joined by welding the sills to the two assemblies.

The sill assemblies are welded to the front end and rear end assemblies at the following points :

- |                     |  |
|---------------------|--|
| Front End Assembly. | Gas welded to main dash panel.<br>Arc welded to dash side structures.                |
| Rear End Assembly.  | Spot welded to rear of door shut panel.<br>Spot welded to front of wheel arch panel. |

**Front End Assembly.** (Plate N.12.) The front end assembly consists of the following sub-assemblies :  
 Front wing and Valance (right hand and left hand). (Plate N.18.)  
 Fairing Piece (joining wings at front).  
 Door Hinge Face Panels (welded to rear of wings).  
 Scuttle-top.  
 Dash (comprising side structure (2), main dash panel, beam assembly). (Plate N.14.)  
 Bonnet (light alloy).

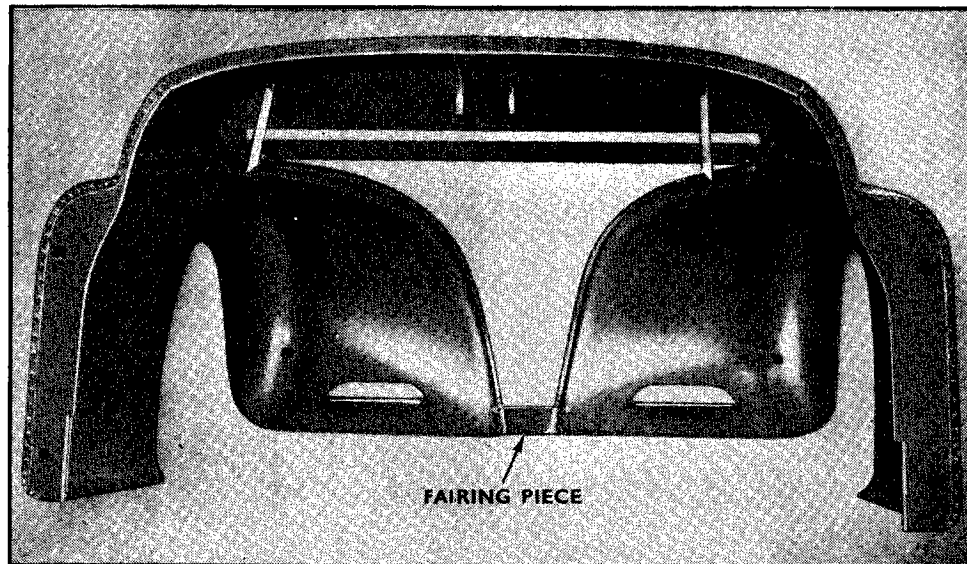


PLATE N.12. FRONT END ASSEMBLY (XK 120).

**Rear End Assembly.** (Plate N.13.) The rear end assembly consists of the following sub-assemblies :  
 Tonneau Panel.  
 Wheel Arches.  
 Battery Container.  
 Boot Floor.  
 Spare Wheel Tray.  
 Side Curtain Tray.  
 Boot Lid (wood structure—light alloy panelled).  
 Rear Wings (detachable). (Plate N.23.)

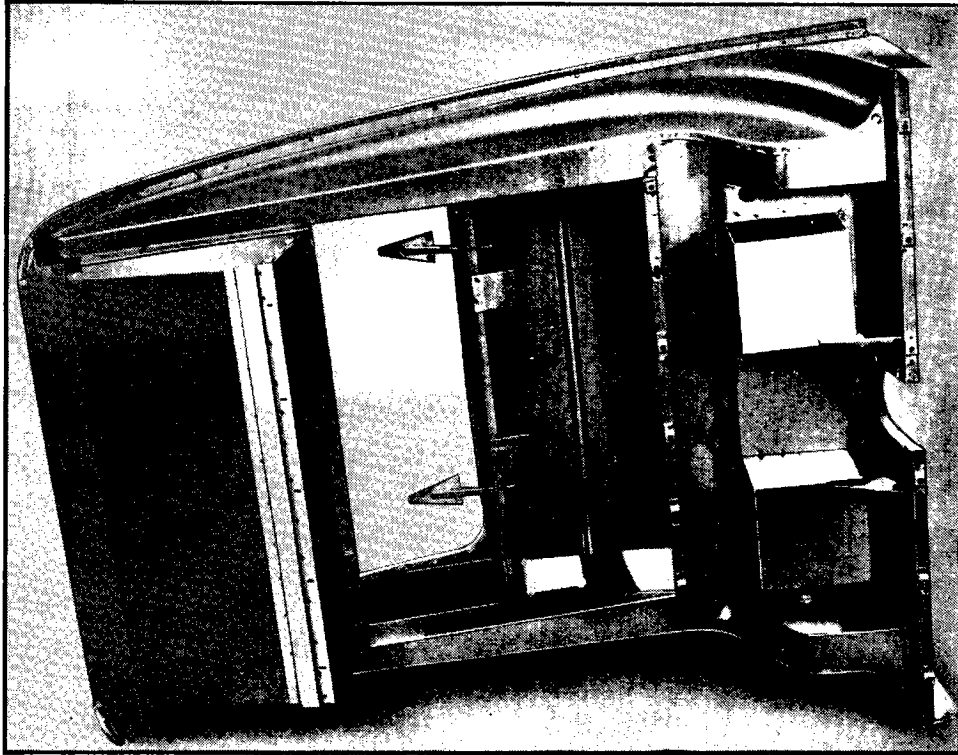


PLATE N.13. REAR END ASSEMBLY (XK 120. Viewed from underneath).

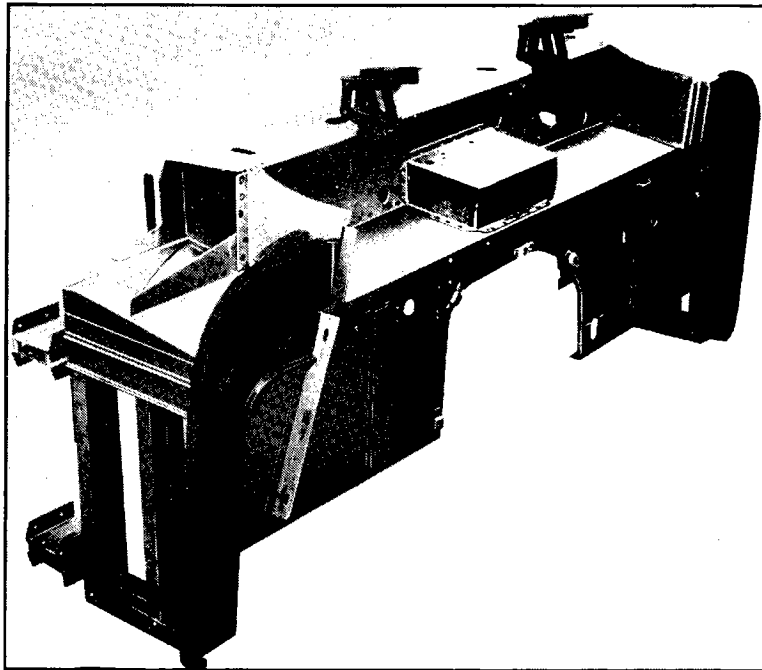


PLATE N.14. DASH ASSEMBLY (XK 120).

**Sill Assemblies.** (Plate N.15.) The Sill assemblies (right-hand and left-hand) consist of a sill to which the door shut face pillar is welded.

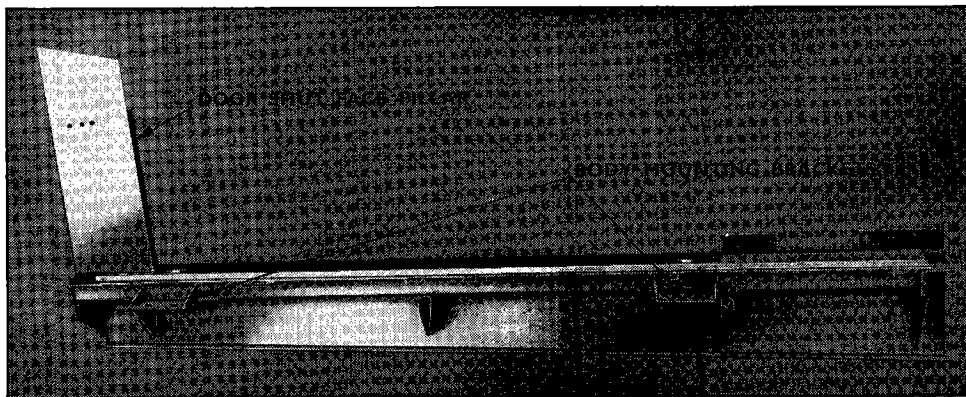


PLATE N.15. SILL ASSEMBLY (XK 120. Left-Hand Illustrated).

**F.H. COUPE MODEL.**  
(Refer to Plate N.16.)

The body of the Fixed Head Coupe Model is basically the same as the Super Sports model with the addition of the canopy assembly which is welded to the rear end of the top scuttle panel and to the front end of the tonneau panel. At the front end, the canopy windscreen aperture flange is spot welded to the flange of the top scuttle. At the bottom of the outer

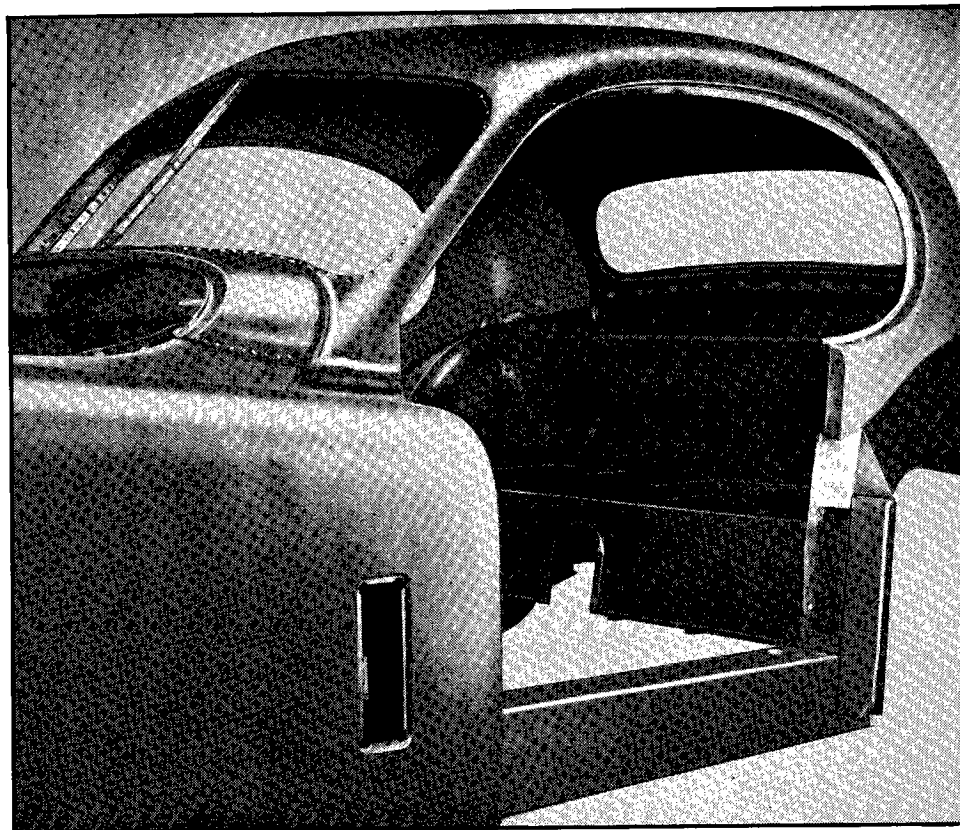


PLATE N.16. CANOPY ASSEMBLY (XK 120 F.H. Coupe).

screen pillars the canopy is gas welded to the top scuttle and front wings at the outside, and arc welded to the dash beam structure on the inside.

At the rear end, the canopy is spot welded to the flange at the front end of tonneau panel. On the outside, the joint between the canopy and tonneau panel is welded at the ends and lead filled. The bottom end of the rear quarter is secured to the door shut face panel with two nuts.

**MATERIAL.** The Super Sports and Fixed Head Coupe bodies are of steel construction except for the following panels, which are of light alloy containing 2% to 3% Magnesium.

Bonnet .060" to .064" (1.52 to 1.62 mm.) thick. Doors .042" to .046" (1.07 to 1.17 mm.) thick. Boot lid .042" to .046" (1.07 to 1.17 mm.) thick.

**MAINTENANCE  
(XK 120 MODELS)**

Every 5,000 miles (8,000 kilometres) carry out oil can lubrication of such points as door hinges, boot lid hinges and locks, door locking mechanism, bonnet hinges and catches and petrol filler cover lock and hinges.

Check and tighten, if necessary, all body screws, nuts and bolts.

**RECOMMENDED LUBRICANTS**

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's	S.A.E. Viscosity.
Oil Can Lubrication ...	Mobiloil A.	Castrol X.L.	Double Shell.	Essolube 30.	Energol 30.	30.

**CARPETS.** These should be kept free from dirt by the use of a vacuum cleaner or air line. Alternatively, the carpets may be brushed clean, using a soft brush. Stains or marks can be removed by light rubbing with a cloth soaked in petrol.

**CELLULOSE.** Never clean the cellulose other than by washing with a soft sponge and hose pipe. Use a steady flow of water and sponge lightly. Dry and polish the cellulose with a good quality wash leather. Tar may be removed with a clean soft cloth moistened in petrol or with a proprietary brand of tar remover. The cellulose may be polished from time to time with a good quality proprietary polish, either wax or emulsion type.

**CHROMIUM PLATE.** It is desirable to clean chromium plate occasionally to remove deposits which in time, if left undisturbed, will discolour the bright finish. It is, however, necessary to ensure that an abrasive cleaner is not employed as this will scratch and destroy the chrome. Use an approved branch of chrome shine and apply this with a soft cloth.

**HEAD LINING. (F.H. Coupe Model.)** Dirt may be removed by the use of a vacuum cleaner. Alternatively, clean with a soft hand brush or pad of mutton cloth soaked in petrol and applied briskly but without pressure.

**INTERIOR HIDE.** The seat upholstery may be kept clean by brisk rubbing with a wash leather well wrung out in water. Grease marks should be removed by light rubbing with a soft cloth moistened in petrol.

**POLISHED WOODWORK. (F.H. Coupe Model.)** A good quality wax polish applied occasionally will retain the high finish of the woodwork.

**HOOD. (Super Sports Model.)** Never stow the hood while it is damp. Care is necessary when cleaning not to destroy the waterproof qualities of the material. Cleaning may be carried out with a soft brush and a "frothy" solution of soap and water.

## BODY ASSEMBLY. TO REMOVE AND REFIT (XK 120 MODELS)

**GENERAL.** The operations necessary to remove the body assembly from the chassis can be carried out in many different sequences and the following instructions are offered only as a guide. The reference in brackets following some of the operations indicate the section or page in which full details of the procedure will be found.

**DETACH MECHANICAL CONNECTIONS.** Remove the seats (page N.35), centre cover and carpets. Remove the gearbox cowl, floorboards and propeller shaft tunnel. Remove the boot carpet and floorboard, and metal cover plate around petrol filler hose. From underneath the front wings remove the plates at rear of wing valances. Drain the cooling system (Section D). Remove water temperature gauge bulb from thermostat housing (Section D). Remove radiator (Section D). Remove the dash casing by unscrewing the drive screws. Remove the speedometer cable at instrument, withdraw cable through grommet at engine side of scuttle and release cable from clip. Remove the revolution outer cable at rear of left-hand camshaft cover. Disconnect throttle linkage at flexible connection adjacent to rear carburettor. Remove air cleaners from carburettors (Section C). Remove clutch and brake pedals. Disconnect oil gauge pipe at flexible connection above oil filter. Disconnect brake supply tank pipe union at master cylinder and drain fluid into a clean container. Disconnect petrol feed pipe at flexible hose connection and release pipe from clips at engine side of scuttle. Remove the steering column (Section 1). Slacken one of the petrol filler hose clips and detach the rubber tube from the vent pipe.

**DETACH ELECTRICAL CONNECTIONS.** Disconnect the battery positive lead. Disconnect wire from oil level unit in sump. Remove lead from starter motor and earth strap from top securing bolt. Disconnect wires from dynamo. Disconnect stop light wires from switch at front of master cylinder. Disconnect reverse light wires from switch on top of gearbox and withdraw wires through chassis frame side member. Disconnect the petrol pump wire from snap connector at right-hand of scuttle (engine side) and withdraw wire through conduit on scuttle. Remove horns (Section P). On right-hand drive cars only disconnect wires from horn relay box on right-hand wing valance. Disconnect wires from snap connector block at front of right-hand wing valance. Withdraw both sets of wires through grommets to underside of wing. Disconnect harness from clips under front apron and withdraw harness to left-hand side. From inside boot, disconnect earth wire from chassis frame cross plate. Disconnect the two wires from petrol gauge tank unit.

**REMOVE BODY.** Remove front and rear bumpers. Remove spare wheel and remove the three setscrews at each of the spare wheel tray side panels. Remove the five bolts securing the front half of spare wheel tray to rear half.

**Body Mounting Points.** (Refer to Plate N.17.) The location of the twelve mounting points and eight wing valance connections are as follows:—

Spare wheel compartment to chassis frame side members—2 bolts and nuts.  
Luggage compartment (rear) to chassis frame side members—2 bolts and nuts.  
Luggage compartment (front) to chassis frame side members—2 setscrews.  
Door sills to four chassis frame side member brackets—3 bolts and nuts per bracket.  
Scuttle panel (cockpit side) to chassis frame side members—2 setscrews.

**Wing Valance Mounting Points.** (Refer to Plate N.18.)

Valance to front suspension mounting posts—2 bolts and nuts.  
Valance to lock stop bolt brackets—2 bolts and nuts.  
Valance to front apron—2 bolts and nuts.  
Valance to front apron bracket—2 bolts and nuts.

**Note.**—On the Fixed Head Coupe Model thicker packing pieces than those used on the Super Sports Model are fitted at the body mounting points.

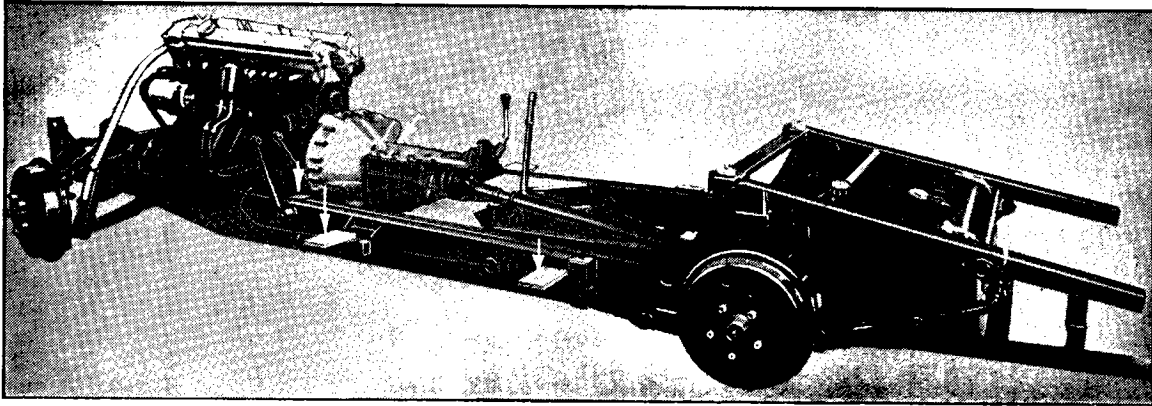


PLATE N.17. BODY MOUNTING POINTS (XK 120).

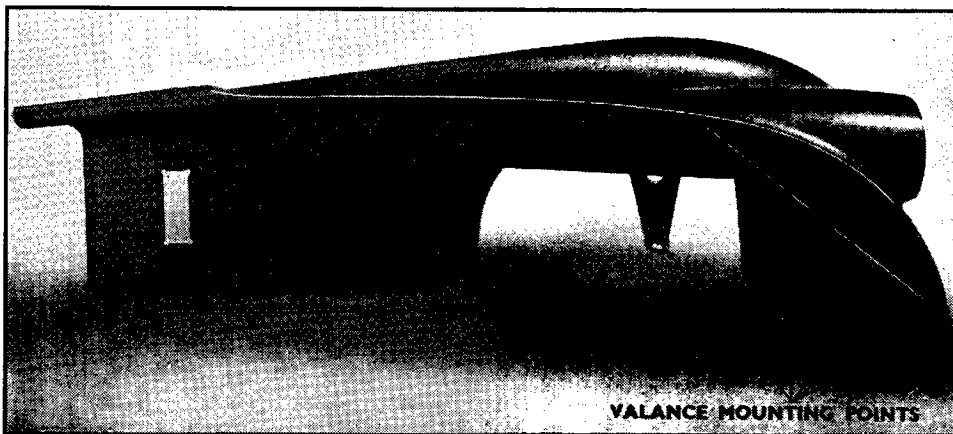


PLATE N.18. FRONT WING AND VALANCE (XK 120).

### BONNET. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE.** Raise the bonnet and support with prop. Mark the positions of the hinge brackets relative to the bonnet panel to assist reassembly; the setscrew holes in the hinge brackets are elongated to allow for lateral adjustment of the bonnet position. Remove the four setscrews securing each hinge bracket to bonnet. Lift off bonnet.

**REFIT.** Refitting is the reverse of the removal procedure. Reposition hinges to the marks made on removal. Adjustment in a forward or rearward direction is provided by alteration of the tapping plate position in the bonnet. To adjust, slacken the two setscrews located between the two halves of each hinge bracket, move bonnet to the desired position and tighten setscrews.

**BOOT LID. TO REMOVE AND REFIT**  
(XK 120 MODELS)

**DISCONNECT ELECTRICAL CONNECTIONS.** Raise the boot lid and support with prop. At the rear of the boot light switch disconnect the number plate, reverse and boot light wires from the snap connectors, noting their respective positions.

**REMOVE BOOT LID.** Mark the position of each hinge relative to the boot lid to facilitate reassembly ; the cage nuts for the setscrews in the boot lid are a loose fit to provide adjustment in both directions. Support the boot lid and remove the three setscrews securing each hinge bracket to the boot lid. Lift off boot lid.

**REFIT.** Refitting is the reverse of the removal procedure. Reposition hinges to the marks made on removal.

**CAPPINGS—POLISHED WOOD. TO REMOVE AND REFIT**  
(XK 120. F.H. COUPE MODEL)

**REMOVE.** (Refer to Plate N.19.)

**Door Facia Capping.** Remove the top capping by unscrewing the four screws. Prise up the felt strip which is tacked to the door facia capping. Unscrew the four screws at top of door facia capping. Remove capping by lifting upwards to disengage spring clips from holes in door panel.

**Screen Pillar Capping.** Partly withdraw the door seal rubber and remove the three screws securing the capping to door aperture flange.

**Cantrail Capping.** Partly withdraw the door seal rubber and remove the five screws securing the capping to door aperture flange.

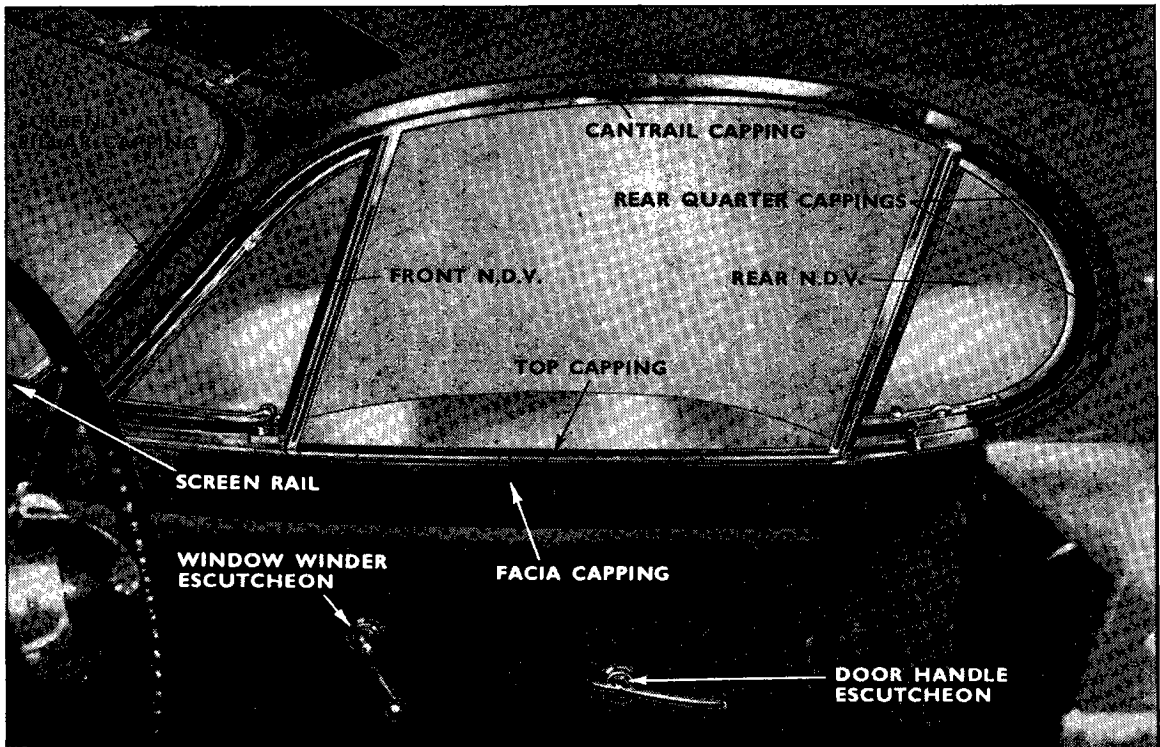


PLATE N.19. POLISHED WOOD CAPPINGS (XK 120 F.H. Coupe).



**Rear Quarter Cappings.** Partly withdraw the door seal rubber. To remove the upper capping remove the three screws securing the capping to door aperture flange. To remove the lower capping remove the two screws securing the capping to door aperture flange.

**Screen Rail Capping.** To remove the screen rail capping it is necessary to remove the capping and fascia as an assembly. See "Fascia—To Remove and Refit" on page N.34.

**REFIT.** Refitting is the reverse of the removal procedure. Take care not to chip or damage the cappings during removal and refitting.

### **DOORS. TO REMOVE AND REFIT (XK 120 MODELS)**

**REMOVE.** Open the door fully. Mark position of hinges relative to door panel to facilitate reassembly. Support door and remove the four setscrews securing each hinge bracket to door. Remove door, noting adjustment shims, if fitted, between hinges and door. Take care to keep the adjustment shims to their respective hinges.

**REFIT.** **Super Sports Model.** As a loose tapping plate is fitted for the bottom hinge it will be necessary to remove the door bottom trim casing (eight drive screws) to enable the tapping plate to be held in position whilst refitting the bottom hinge screws.

Reposition hinges to marks made on removal. If it is found that the doors require adjustment, refer to "Doors—To Adjust" on page N.29.

**Fixed Head Coupe Model.** As loose tapping plates are fitted to both the top and bottom hinges it will be necessary to remove the door trim casing as described on page N.32, to enable the tapping plates to be held in position whilst refitting the hinge screws.

Reposition hinges to marks made on removal. If it is found that the doors require adjustment, refer to "Doors—To Adjust" on page N.29.

### **DOORS. TO ADJUST (XK 120. SUPER SPORTS MODEL)**

**GENERAL.** Each door is mounted on two hinges and provision is made for the insertion of shims between each hinge and the door panel. The striking plate for the door lock at rear of door aperture has elongated holes for the two securing screws and is adjustable laterally.

**ADJUST.** By adding or subtracting an equal number of shims between the door and the two hinges, the door will be moved bodily forward or rearward. Adding or subtracting shims at one or other of the door hinges will tilt the door in its aperture.

If the engagement of the lock to the door striking plate is not correct, the striking plate can be adjusted laterally by slackening the two screws and tapping to the required position. If it is required to bring the striking plate closer to the door, shims can be fitted between the plate and the body.

### **DOORS. TO ADJUST (XK 120. F.H. COUPE MODEL)**

**GENERAL.** Each door is mounted on two hinges and provision is made for the insertion of shims between each hinge and the door panel. The holes in the door panel for the hinge setscrews are enlarged to allow the door to be adjusted both vertically and laterally. The striking plate for the door lock at rear of door aperture is adjustable in a vertical direction.

**ADJUST.** By adding or subtracting an equal number of shims between the door and the two hinges, the door will be moved bodily forward or rearward. Adding or subtracting shims at one or other of the door hinges will tilt the door in its aperture. The door can be moved vertically or laterally in relation to the hinges by slackening the eight setscrews and moving to the required position. (Do not completely remove the setscrews as loose tapping plates are fitted inside the door panel.)

If the engagement of the lock to the door striking plate is not correct, the striking plate can be adjusted vertically by slackening the four screws and tapping to the required position. If it is required to bring the striking plate closer to the door, shims can be fitted between the plate and body.

The door light frame can be brought in more intimate contact with the door seal rubber, by removing the trim casing as described on page N.32 and removing the packing washers, if fitted, between the bottom of the door frame pillars and the right angle brackets. If no washers are fitted, the screws securing the right angle brackets to wooden door frame can be repositioned.

## DOOR GLASS AND FRAME. TO REMOVE AND REFIT

(XK 120. F.H. COUPE MODEL)

**GENERAL.**  
(Refer to Plates  
N.20 and N.21.)

To enable the door glass to be removed it is necessary to remove the chromium plated door glass frame and glass as an assembly.

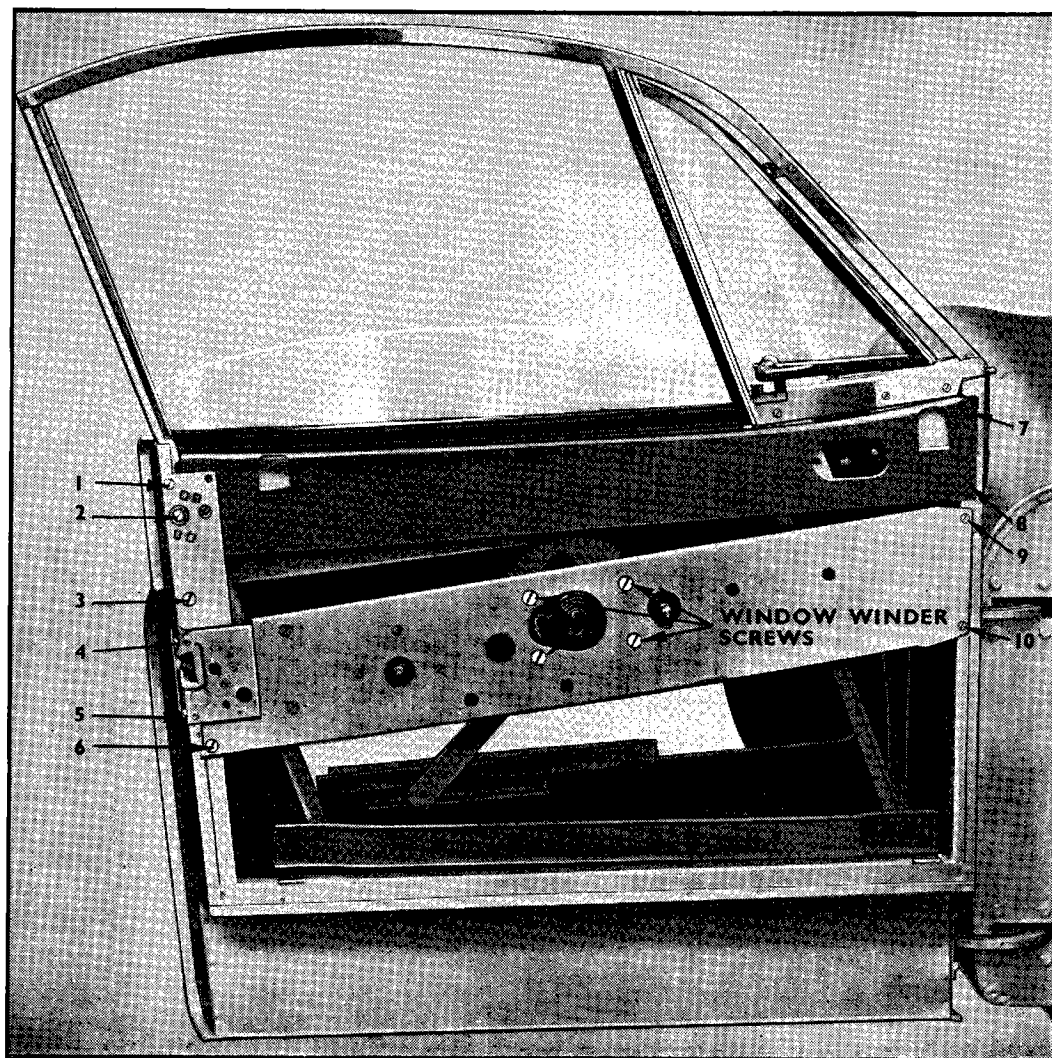


PLATE N.20. DOOR WITH TRIM CASING REMOVED (XK 120 F.H. Coupe).

**REMOVE TRIM CASING.**

Remove the door trim casing as described on page N.32.

**REMOVE DOOR LOCK SUPPORT PLATES.**

Remove the door lock support plates by removing the ten screws indicated in Plate N.20, and withdrawing winder arm from slide channel. Lower glass to bottom of frame.

**REMOVE DOOR GLASS FRAME.**

Turn back the outer end of the door glass felt and remove the screw securing the chromium plated frame to the door panel (No. 1, Plate N.21). Remove the five remaining screws indicated on Plate N.21. Hold the door glass in at bottom of frame and remove as an assembly by lifting upwards.

**REFIT.**

Refitting is the reverse of the removal procedure.

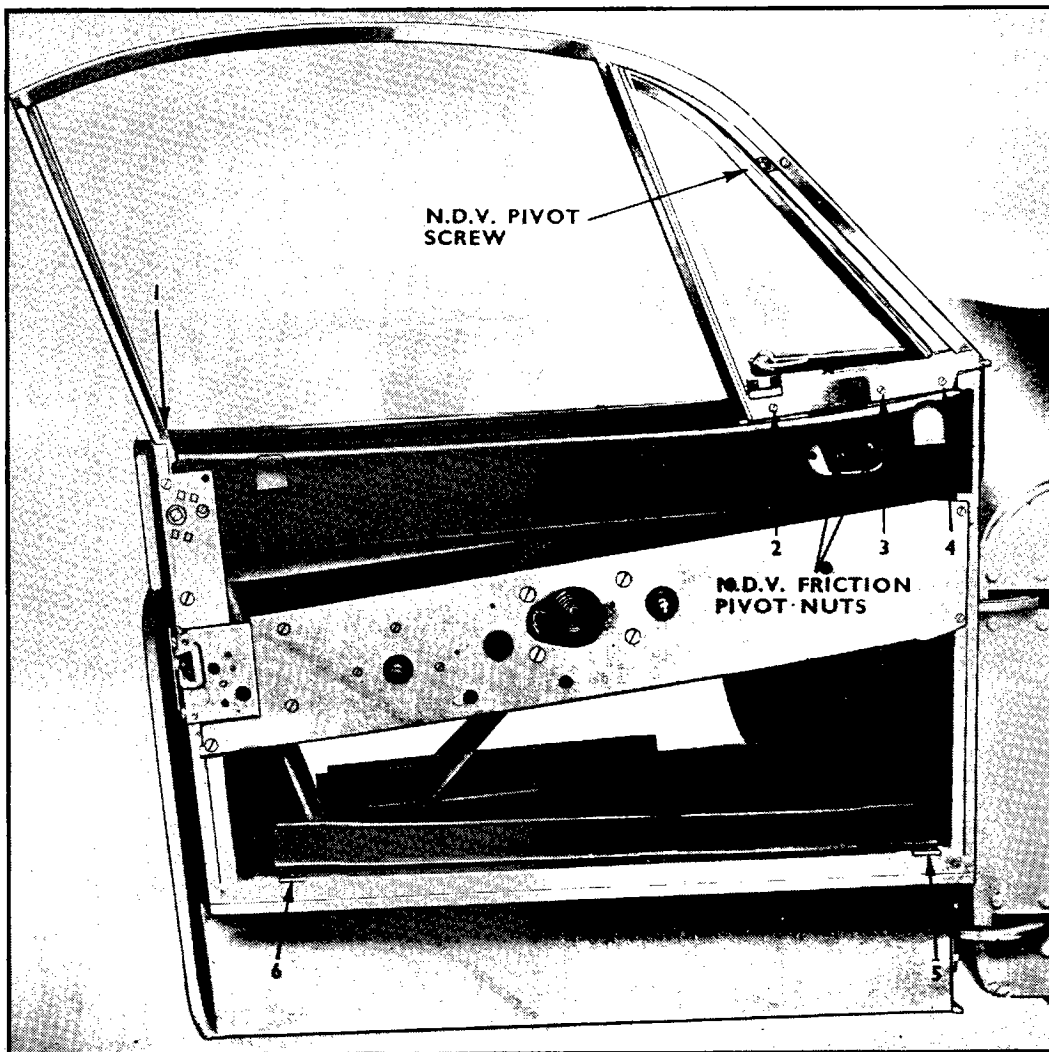


PLATE N.21. DOOR GLASS AND FRAME. REMOVAL (XK 120 F.H. Coupe).

### DOOR LOCKS. TO REMOVE AND REFIT (XK 120. SUPER SPORTS MODEL)

- REMOVE DOOR TRIM CASING.** Remove the door trim casing as described on page N.32.
- REMOVE DOOR POCKET.** Remove the door pocket by unscrewing the two screws at each side and lifting outwards.
- REMOVE DOOR LOCK.** Operate the door lock safety catch until the split pin securing the link from lock to safety catch is visible through the hole at top rear of door. Remove the split pin and disconnect link arm noting the flat and Belleville washer. Remove the five countersunk screws and nuts securing the door lock to door panel and withdraw lock from inside. To remove the door lock safety catch and link unscrew the two countersunk screws securing the catch to door panel and withdraw through hole in door.
- REFIT.** Refitting is the reverse of the removal procedure.

### DOOR LOCKS. TO REMOVE AND REFIT (XK 120 F.H. COUPE MODEL)

- GENERAL.** (Refer to Plate N.20.) The door lock and the remote controls from the inside and outside handles are secured to the door lock support plates. Therefore to gain access to the door lock mechanism it is necessary to remove the two plates complete with window winder mechanism.
- REMOVE TRIM CASING.** Remove the door trim casing as described on page N.32.
- REMOVE DOOR LOCK SUPPORT PLATES.** Remove the door lock support plates by unscrewing the ten screws indicated in Plate N.20 and withdrawing window winder arm from slide channel. Lower glass to bottom of frame.
- REMOVE DOOR LOCK MECHANISM.** The door lock mechanism is now accessible on the inside of the door lock support plates and can be dismantled as necessary.
- REFIT.** Refitting is the reverse of the removal procedure.

### DOOR TRIM CASING. TO REMOVE AND REFIT (XK 120. SUPER SPORTS MODEL)

- REMOVE.** Unscrew the two knurled nuts which retain the side curtain brackets and remove the two escutcheon plates by unscrewing the four screws. Remove the door lock safety catch by unscrewing the centre screw. Remove the door lock pull strap by unscrewing the two drive screws securing the chrome bracket and hooking other end over door lock lever. Remove the door trim casing by unscrewing the six screws.
- REFIT.** Refitting is the reverse of the removal procedure.

### DOOR TRIM CASING. TO REMOVE AND REFIT (XK 120. F.H. COUPE MODEL)

- REMOVE DOOR CAPPINGS.** (Refer to Plate N.19.) Remove the door top capping by unscrewing the four screws. Prise up the felt which is tacked to the door facia capping. Unscrew the four screws at top of facia capping. Remove capping by lifting upwards to disengage spring clips from holes in door panel.
- REMOVE INSIDE HANDLES.** Remove the inside door handle and window winder handle by pressing back the sleeve in the centre of the escutcheons and driving out pins. (Plate N.19.)

**REMOVE DOOR LOCK PLATE.** At the outer rim of door remove the chromium plated door lock plate by unscrewing the four screws.

**REMOVE TRIM CASING.** Carefully pull back trim from top of door panel and remove the four screws securing trim casing to door. Unscrew the seven drive screws and remove door trim casing.

**REFIT.** Refitting is the reverse of the removal procedure.

### FACIA—CENTRE. TO REMOVE AND REFIT

(XK 120 MODELS)

**REMOVE.** (Refer to Plate N.22.) Disconnect battery positive lead. Remove drive screws securing dash casing and release casing. Remove two nuts (Fixed Head Coupe—two setscrews) from each side of instrument panel, securing panel to facia structure. Withdraw instrument panel from rest of facia.

**REFIT.** Refitting is the reverse of the removal procedure.

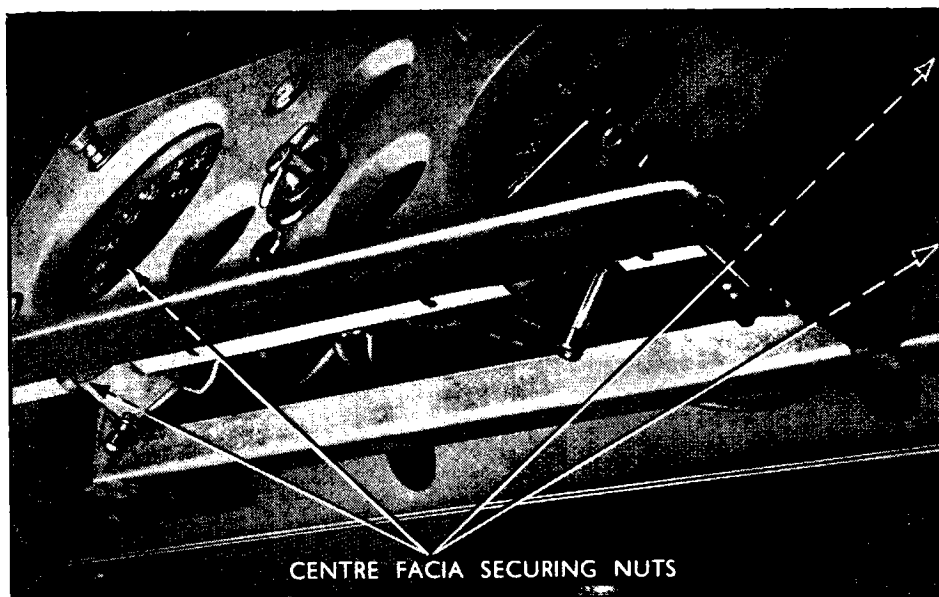


PLATE N.22. CENTRE FACIA. REMOVAL (XK 120. Super Sports illustrated).

### FACIA. TO REMOVE AND REFIT

(XK 120. SUPER SPORTS MODEL)

**REMOVE SCUTTLE CASING.** Remove the trim casing from above facia panel by removing the thirteen drive screws.

**REMOVE CENTRE FACIA.** Disconnect the battery positive lead. Detach the centre facia as described above. Disconnect the speedometer and revolution counter cables at rear of instruments by unscrewing the knurled nuts. Disconnect the oil pressure and water temperature gauge from rear of centre facia by removing the retaining plates. Disconnect all electrical wires from instruments, noting their respective positions.

**REMOVE STEERING WHEEL AND MANETTE CONTROL.**

washers and telescopic dust cover.

Set road wheels in straight ahead position. Disconnect the manette control wire from the horn relay box fitted to the wing valance on the steering column side. Unscrew the two grub screws in the steering wheel hub and withdraw the manette control complete with wiring harness. Rotate steering wheel knurled adjustment ring until it is free. Remove the circlip at top of splined portion of inner column. Draw off steering wheel and remove

**REMOVE FACIA.**

Remove the grab rail from the passenger's side by unscrewing the two nuts at rear of facia. If the car is fitted with air conditioning equipment, remove the wires from rear of fan switch. Unscrew the four chromium plated screws securing facia to dash structure and remove facia.

**REFIT.**

Refitting is the reverse of the removal procedure, but attention should be paid to the following instruction when refitting the steering wheel and manette control. Set the road wheels in the straight ahead position. Fit the telescopic dust cover and washers to the inner column and engage the steering wheel on the splines so that one spoke is at the top centre position. Fit circlip to the annular groove at the top of inner column. Pass the horn wire down the centre of the inner column and enter the manette control tube into the steering wheel hub with the head of the "Jaguar" on the horn push upright. Feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Push manette control fully home into the steering wheel hub and secure the two grub screws through the side of the steering wheel hub.

**Note.**—If when the manette control tube has been engaged with the stator tube, the head of the "Jaguar" on the horn push is not upright, it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

**FACIA. TO REMOVE AND REFIT****(XK 120. F.H. COUPE MODEL)****REMOVE SCREEN CAPPINGS.**

Remove the two polished wood cappings at each side of the windscreen as described on page N.28.

**REMOVE SCREEN RAIL CASING.**

Remove the driving mirror bracket by unscrewing the two securing screws. Remove the screw that is accessible when driving mirror bracket has been removed. From underneath the polished wood screen rail unscrew the screw at each end and remove the screen rail trim casing.

**REMOVE CENTRE FACIA.**

Detach the centre facia from the facia panel as described on page N.33. Withdraw centre facia slightly and support.

**REMOVE FACIA PANEL.**

Unscrew the two screws securing each demister nozzle to the top of facia panel and release nozzles. Remove facia panel by withdrawing upwards over centre facia.

**REFIT.**

Refitting is the reverse of the removal procedure.

**NO DRAUGHT VENTILATORS—FRONT. TO REMOVE AND REFIT****(XK 120. F.H. COUPE MODEL)****REMOVE DOOR CAPPINGS.**

Remove door cappings as described on page N.28.

**REMOVE N.D.V. (Refer to Plate N.21.)**

Carefully pull back trim and slacken the two N.D.V. friction pivot nuts accessible through aperture in the door lock support plate. Remove the screw securing the N.D.V. frame to the pivot. Remove N.D.V. by lifting upwards to withdraw spindle at bottom of frame from friction pivot clamping plates.

**REFIT.**

Refitting is the reverse of the removal procedure.

**NO DRAUGHT VENTILATORS—REAR. TO REMOVE AND REFIT****(XK 120. F.H. COUPE MODEL)**

**REMOVE.** Remove the screw and nut securing the operating arm to the slide plate on the glass frame.

Open N.D.V. fully. Pull back rubber at bottom end of channel and remove the screw securing the pivot block to channel. Gently tap the pivot block out of channel and release N.D.V. from top pivot.

To remove the channel frame, detach the trim casing below N.D.V. by removing the four screws. Remove the N.D.V. surround rubber from the channel, unscrew the five screws and bolt and nut securing the frame to the rear quarter panel and remove frame.

**REFIT.** Refitting is the reverse of the removal procedure.

**REAR LIGHT GLASS. TO REMOVE AND REFIT****(XK 120. F.H. COUPE MODEL)**

**REMOVE.** From the inside of car remove the screws from rear light surround. Remove glass and surround rubber by exerting even pressure from the outside. Note the sealer strip between the surround rubber and the rear light aperture.

**REFIT.** Refitting is the reverse of the removal procedure. Fit new sealer strip between the surround rubber and rear light aperture.

**SEATS AND SLIDES. TO REMOVE AND REFIT****(XK 120 MODELS)**

**REMOVE SEATS.** Lift out the seat cushion. Slide seat forward and remove the two setscrews securing the seat slides to floor at rear. Slide seat rearward and remove the two setscrews securing the seat slides to floor at front. Note that on the Super Sports Model the two screws securing the inside slides are longer than those fitted to the outside slides.

**REMOVE SLIDES.** Remove the two nuts and bolts securing each slide to the seat frame and remove slide.

**REFIT.** Refitting is the reverse of the removal procedure.

**WINDOW WINDER. TO REMOVE AND REFIT****(XK 120. F.H. COUPE MODEL)**

**REMOVE DOOR TRIM CASING.** Remove door trim casing as described on page N.32.

**REMOVE WINDOW WINDER.** Wind window up fully. Hold up door glass and remove the four screws surrounding the window winder coil spring. Slide out winder arm from guide, remove mechanism and lower glass to bottom of frame.  
(Refer to Plate N.20.)

## WINDSCREEN. TO REMOVE AND REFIT (XK 120. SUPER SPORTS MODEL)

**GENERAL.** Either of the windscreen glasses can be removed without removing the assembly as a whole, as described in the following paragraph. The instructions for removing the complete windscreen assembly are also given.

**REMOVAL OF WINDSCREEN GLASS.** Remove the dash casing underneath the facia panel by unscrewing the drive screws. Slacken the top windscreen side pillar set bolts and remove the bottom bolt. Remove the chrome capping at the top of the centre pillar by unscrewing the five screws. Remove the two round-headed screws securing the side pillar to the glass frame.

Pull side pillar outwards slightly and withdraw glass and frame upwards. If difficulty is experienced in removing the glass, the side pillar should also be withdrawn after the removal of the top setbolt. Repeat for the other glass if necessary.

**REMOVAL OF WINDSCREEN ASSEMBLY.** Remove the dash casing underneath the facia panel by unscrewing the drive screws. At the rear of the centre facia panel unscrew the rod with large hexagon end which secures the windscreen centre pillar. Remove the two setbolts securing each windscreen side pillar whilst holding the loose tapping plate accessible through large hole in dash panel. (Remove the two tapping plates from body otherwise they may drop down into dash side structures.) The windscreen assembly can now be withdrawn bodily upwards.

**REFIT.** Refitting is the reverse of the removal procedure.

## WINDSCREEN. TO REMOVE AND REFIT (XK 120. F.H. COUPE MODEL)

**REMOVE SCREEN CAPPINGS.** Remove the polished wood capping from each outer screen pillar (Plate N.19) by lifting the door seal rubber and unscrewing the three screws in the door aperture flange.

**REMOVE SCREEN RAIL CASING.** Remove the driving mirror bracket by unscrewing the two securing screws. Remove the screw that is accessible when driving mirror bracket has been removed. From underneath the polished wood screen rail unscrew the screw at each end and remove the screen rail trim casing.

**REMOVE WINDSCREEN.** From inside the car unscrew the three screws at the windscreen centre pillar and remove the inside and outside chrome strips. Taking one half of the screen at a time, unscrew the drive screws securing the metal screen retainers. Exert even pressure with a plywood of template from the outside of the screen and remove the glass and surround. Repeat for the other half of windscreen if necessary.

**REFIT.** If new surround rubbers are to be fitted it will be necessary first to cut off the flange at the centre pillar edge. Coat the groove in the surround rubber and the flange of windscreen aperture with sealing compound.

Taking one half of the windscreen at a time, fit the glass and surround rubber to the screen aperture. Fit the metal retainer with the flange of the surround rubber underneath the side of retainer to which the screws are fitted.

Align the drive screw holes in the metal retainer and windscreen aperture flange with pointed instruments and fit the drive screws. Fit the centre pillar chrome strips to the inside and outside of centre pillar and secure with the three screws.

Refit screen rail trim casing and polish wood screen cappings.



## WINGS—REAR. TO REMOVE AND REFIT (XK 120 MODELS)

### REMOVE ROAD WHEEL.

Jack up the rear of car and remove the road wheel.

### REMOVE WING. (Refer to Plate N.23.)

body and wing.

From underneath the wing remove the five nuts at front and the seven setscrews securing the inside edge. (Note that the setscrews are of different lengths and that it is important to refit the shorter screws to the rearward positions.) Remove the nut from rear stay and the nuts and bolt from the front stay. Remove wing, noting the piping between

### REFIT.

Refitting is the reverse of the removal procedure. When refitting the seven setscrews it is important that the shorter screws are fitted to the rearward positions.

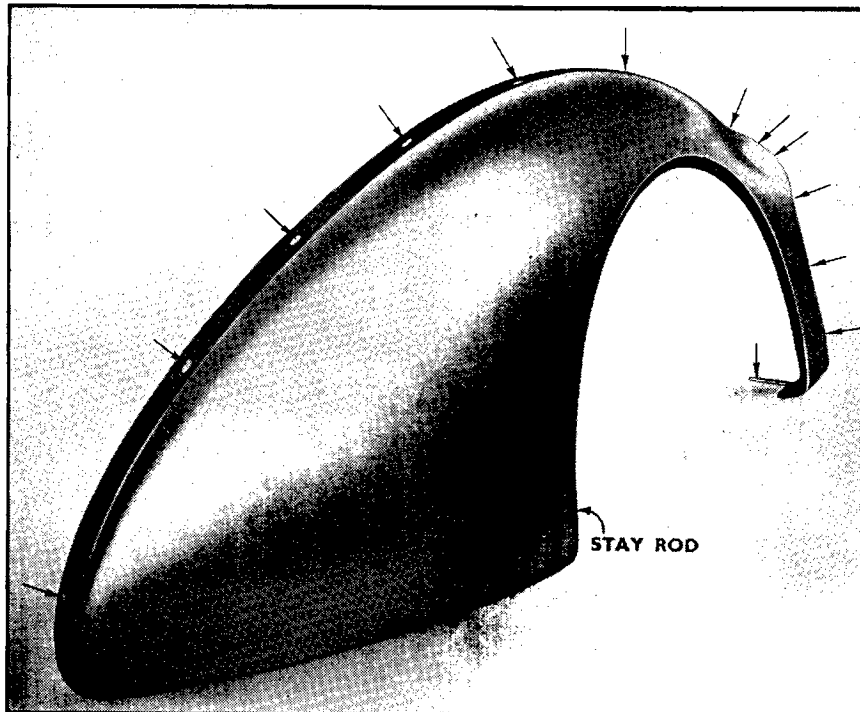


PLATE N.23. REAR WING MOUNTING POINTS (XK 120).

# ELECTRICAL

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660001 Right-Hand Drive

670001 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

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Coil .. .. .	Maintenance, Removal and Refitting..	P.10
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**ELECTRICAL DATA**  
(**MARK VII AND XK 120 MODELS**)

**BATTERY**

	<b>Mark VII</b>		<b>XK 120</b>
MAKE AND TYPE .. .. .	Lucas 12 v. G.T.W.11A		Home: Lucas 6 v. S.T.X.W.11E (2 off) Export: Lucas 6 v. S.T.Z.W.11E (2 off)

**TABLE OF SPECIFIC GRAVITY AND CHARGING RATES**

No. of Plates in each cell	Ampere-hour capacity		Volume of electrolyte required to half fill one cell	Initial Charging Current (amps.)	Normal Recharge Current (amps.)
	At 10-hour rate	At 20-hour rate			
11	63	72	½ pint	4½	7

**SPECIFIC GRAVITY OF ELECTROLYTE (CORRECTED TO 60° F.)**

Home trade and climates normally below 80° F. (27° C.)		Sub-tropical climates 80°-100° F. (27°-38° C.)		Tropical climates over over 100° F. (38° C.)	
Filling	Fully charged	Filling	Fully charged	Filling	Fully charged
1.350	1.280-1.300	1.320	1.250-1.270	1.300	1.220-1.240

**MAXIMUM PERMISSIBLE ELECTROLYTE TEMPERATURE DURING CHARGE**

Climates normally below 80° F. (27° C.) 100° F. (38° C.)	Climates between 80°-100° F. (27°-38° C.) 110° F. (43° C.)	Climates frequently above 100° F. (38° C.) 120° F. (49° C.)
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**CONTROL BOX**

**SETTING DATA**

**Cut-Out**

Cut-in voltage .. .. .	12.7-13.3 volts
Drop-off voltage .. .. .	9 -10 volts
Reverse current .. .. .	3.0- 5.0 amps.

**Regulator—Settings on open circuit**

Temperature		Voltage
10° C. (50° F.)	Cold climate .. .. .	16.1-16.7 volts
20° C. (68° F.)	Normal temperature .. .. .	15.8-16.4 volts
30° C. (86° F.)	Hot climate .. .. .	15.6-16.2 volts
40° C. (104° F.)	Very hot .. .. .	15.3-15.9 volts

**DISTRIBUTOR**

**DESIGN DATA**

Open Period	Closed Period	Firing Angles
22°±4°	38°±4°	0°, 60°, 120°, etc., ±1°

## CENTRIFUGAL ADVANCE DATA

Service No.	Type	Rotation	Control		Intermediate		Control ends	
			begins (r.p.m.)	(r.p.m.)	(degrees)	(r.p.m.)	(degrees)	
40198B	GC47	Clock	150-300	850	8-10½	1,380	16-18	
40199B	GC48	Clock	450-580	1,050	6-8	1,600	13-15	
40249B	GC49	Clock	140-300	850	8-10½	1,400	16-18	
40263A	GC50	Clock	500-700	1,250	9-12	1,650	16-18	
40276A	GC53	Clock	380-500	925	6½-8½	2,025	18-20	

**Note.** R.p.m. and degrees given in the above table are distributor revolutions and degrees.

## IGNITION COIL DATA

Service No.	Type	Primary Resistance (ohms)	Slow-Speed Sparking Gap		High-Speed Test	Test Volts (max.)	Approximate Running Current at 1,000 r.p.m. (amps.)	Approximate Stall Current (amps.)
			mm.	ins.	(Distributor r.p.m.)			
45012A	B12	4.0-4.4	11.0	0.44	3,500	12.5	1.0	2.9

## DYNAMO

## PERFORMANCE DATA

Nominal Voltage	..	..	..	..	..	..	12
Cutting-in Speed (r.p.m.)	..	..	..	..	..	..	900-1050
At Generator Volts	..	..	..	..	..	..	13.0
Maximum Output (amps.)	..	..	..	..	..	..	20
At r.p.m.	..	..	..	..	..	..	1500-1700
At Generator Volts	..	..	..	..	..	..	13.5
On Resistance Load (ohms)*	..	..	..	..	..	..	0.67
Field Resistance (ohms)	..	..	..	..	..	..	6.0

\*Resistance load must be capable of carrying 20 amperes without overheating.

## STARTER MOTOR

## PERFORMANCE DATA

Nominal Voltage	..	..	..	..	..	..	12
Lock Torque (lbs.-ft.)	..	..	..	..	..	..	22
Current (amps.)	..	..	..	..	..	..	430-450
Voltage..	..	..	..	..	..	..	7.8-7.4
Torque at 1,000 r.p.m. (lbs.-ft.)	..	..	..	..	..	..	8.3
Current (amps.)	..	..	..	..	..	..	200-220
Voltage..	..	..	..	..	..	..	10.2-9.8

## WINDSCREEN WIPER

## TEST DATA

	Model CR.4	Model CRT.14
Normal Current Consumption (motor cold and driving both blades on wet screen)	1.75-3.0 amps.	2.0-3.25 amps.
Stall Current (motor cold)	5.5-6.5 amps.	7.5-8.5 amps.

(Continued on page P.6)

Armature Resistance (between adjacent commutator segments) .. .. .	0.85-1.05 ohms	0.8-1.0 ohms
Field Coil Resistance .. .. .	15-16 ohms	8.4-9.0 ohms
Field Current (approximate) .. .. .	0.8 amps.	1.4 amps.

**BULB REPLACEMENT DATA  
(MARK VII MODEL)**

Lamp.	Lucas Bulb No.	Volts	Watts	Application
Head. Left Hand .. .. .	302	12	48/48	} Home. Left-Hand Drive. Export. Right-Hand Drive. Export. U.S.A.
Right Hand .. .. .	185	12	48	
	303	12	48/48	
	302	12	48/48	
	Sealed Beam Units			
Fog .. .. .	325	12	36	
Side .. .. .	207	12	6	
	361	12	6/18	U.S.A.
Number Plate and Rear Boot ..	989	12	6	
Reverse .. .. .	199	12	24	
Rear and Brake .. .. .	361	12	6/18	
Panel Lights .. .. .	987	12	2.2	
Trafficators, Interior Map Light ..	256	12	3	
Trafficator and Ignition Warning Lights ..	987	12	2.2	
Head Lamp Warning Light .. .. .	987	12	2.2	

**(XK 120 MODELS)**

Lamp	Lucas Bulb No.	Volts	Watts	Application
Head. Left Hand .. .. .	302	12	48/48	} Home. Left-Hand Drive. Export. Right-Hand Drive. Export. U.S.A. and Canada
Right Hand .. .. .	185	12	48	
	303	12	48/48	
	302	12	48/48	
	Sealed Beam Unit			
Side .. .. .	989	12	6	
Side/Flasher .. .. .	361	12	6/18	Fixed Head Coupe.
Number Plate .. .. .	989	12	6	
Reverse .. .. .	199	12	24	
Rear and Brake .. .. .	361	12	6/18	
Rear and Brake/Flasher .. .. .	361	12	6/18	Fixed Head Coupe.
Panel .. .. .	207	12	6	
Rear Boot .. .. .	256	12	3	
Interior Lights .. .. .	256	12	3	Fixed Head Coupe.
Ignition, Head Lamp and Petrol Level Warning Lights .. .. .	987	12	2.2	
Flasher Warning Light .. .. .	987	12	2.2	Fixed Head Coupe.

### AMMETER. TO REMOVE AND REFIT (MARK VII MODEL)

#### REMOVE CENTRE FACIA.

Disconnect battery positive lead. Remove the two drive screws securing dash casing to centre facia panel. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side, securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly, and remove centre facia.

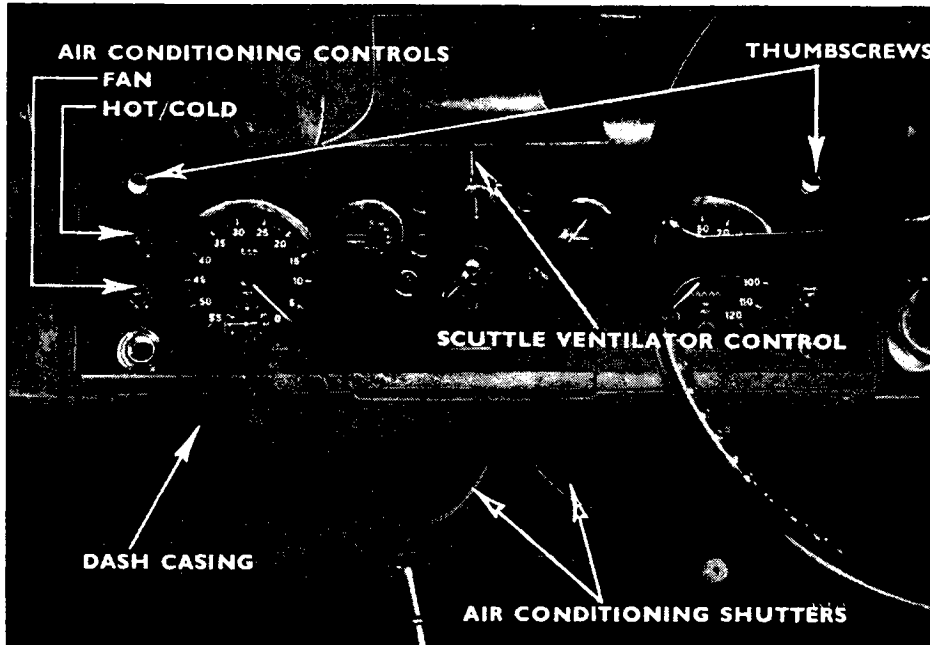


PLATE P.1. CENTRE FACIA. REMOVAL (Mark VII).

#### REMOVE AMMETER.

Remove the two screws securing the ammeter to the instrument panel. Withdraw the ammeter slightly and from rear of instrument remove the wires, noting their respective positions. Remove ammeter.

#### REFIT.

Refitting is the reverse of the removal procedure.

### AMMETER. TO REMOVE AND REFIT (XK 120 MODELS)

#### REMOVE CENTRE FACIA.

Disconnect battery positive lead. Remove drive screws securing the dash casing and release casing. Remove two nuts (Fixed Head Coupe—two set screws) from each side of instrument panel, securing panel to facia structure. Withdraw instrument panel from rest of facia. (Plate P.2.)

#### REMOVE AMMETER.

From rear of instrument panel remove the two screws securing the ammeter to the instrument panel. Draw instrument away from panel and remove wires, noting their respective position. Remove ammeter.

#### REFIT.

Refitting is the reverse of the removal procedure.



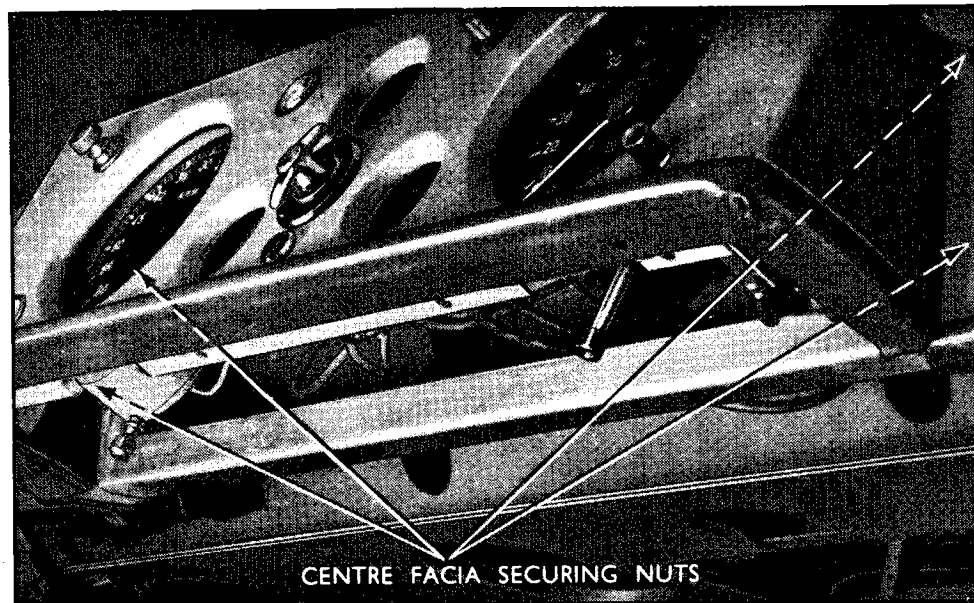


PLATE P.2. CENTRE FACIA. REMOVAL (Super Sports illustrated).

### BATTERY. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE. (MARK VII.)** Disconnect the two terminals from the battery posts by unscrewing the two centre screws. Unscrew the two long bolts securing the strap at the front of the battery. Lift out battery.

**REMOVE. (XK 120.)** Pull the backs of the two seats forward. On the Super Sports model remove the battery cover box from behind the seats by unscrewing the screw at each end of the box. On the Fixed Head Coupe model unscrew the screw at each end of the rear locker one half-turn and pull locker lid forward.

Disconnect the four terminals from the battery posts by unscrewing the centre screws. Remove the bolts securing the straps at the front of the batteries. Lift out the two batteries.

**REFIT.** Refitting is the reverse of the above procedure.

### BATTERY. MAINTENANCE (MARK VII AND XK 120 MODELS)

Every 2,500 miles (4,000 kilometres) (or more frequently in very hot weather) examine the level of the electrolyte in the cells, and if necessary add **distilled** water to bring the level up to the tops of the separators.

The use of a Lucas Battery Filler will help to ensure that the correct electrolyte level is automatically maintained and also to prevent distilled water spilled over the top of the battery.

**Never use a naked light when examining a battery**, as the mixture of oxygen and hydrogen given off by the battery when on charge, and to a lesser extent when standing idle, can be dangerously explosive.

Examine the terminals. If they are dirty, clean them and coat them with petroleum jelly. Wipe away all dirt and moisture from the top of the battery, and ensure that the connections and the fixings are clean and tight.

The specific gravity of the electrolyte varies with the temperature; therefore, for convenience in comparing specific gravities, this is always corrected to 60° F., which is adopted as a reference temperature.

The method of correction is as follows:—

For every 5° F. below 60° F. deduct .002 from the observed reading to obtain the true specific gravity at 60° F.  
For every 5° F. above 60° F. add .002 to the observed reading to obtain the true specific gravity at 60° F.

The temperature must be that actually indicated by a thermometer immersed in the electrolyte, and not the ambient temperature.

### **BATTERY. SERVICING** (MARK VII AND XK 120 MODELS)

**BATTERY PERSISTS IN LOW STATE OF CHARGE.** First consider the conditions under which the battery is used. Remember that if the battery is subjected to heavy loads without suitable opportunities for recharging, a low state of charge is only to be expected. A fault in the dynamo or regulator, or neglect during a period out of commission may also be responsible for the trouble.

**Vent Plugs.** See that the ventilating holes in each vent plug are clear, and that the rubber washer fitted under the vent plug is in good condition.

**Level of Electrolyte.** The surface of the electrolyte should be level with the tops of the separators. If necessary, top up with distilled water. Any loss of acid from spilling or spraying (as opposed to the normal loss of water by evaporation) should be made good by dilute acid of the same specific gravity as that already in the cell.

**Cleanliness.** See that the top of the battery is free from dirt or moisture which might provide a discharge path. Ensure that the battery connections are clean and tight.

**Hydrometer Tests.** Measure the specific gravity of the acid in each cell in turn with a hydrometer. The reading given by each cell should be approximately the same: if one cell differs appreciably from the others, an internal fault in that cell is indicated. This will probably be confirmed by the heavy discharge test described below.

The appearance of the electrolyte drawn into the hydrometer when taking a reading gives a useful indication of the state of the plates; if it is very dirty, or contains small particles in suspension, it is possible that the plates are in a bad condition.

**DISCHARGE TEST.** A heavy discharge tester consists of a voltmeter, 2 or 3 volts full scale, across which is connected a shunt resistance capable of carrying a current of several hundred amperes. Pointed prongs are provided for making contact with the inter-cell connectors. Press the contact prongs against the exposed positive and negative terminals of each cell. A good cell will maintain a reading of 1.2-1.5 volts, depending on the state of charge, for at least 6 seconds. If, however, the reading rapidly falls off, the cell is probably faulty and a new plate assembly may have to be fitted.

**RECHARGING FROM AN EXTERNAL SUPPLY.** If the above tests indicate that the battery is merely discharged, and is otherwise in a good condition, it should be recharged, either on the vehicle by a period of daytime running or on the bench from an external supply. (On the Mark VII model a battery charging socket is provided on the scuttle to the right-hand side of battery.) If the latter, the battery should be charged at the rate given on page P.4 until the specific gravity and voltage show no increase over three successive hourly readings. During the charge the electrolyte must be kept level with the tops of the separators by the addition of distilled water.

A battery that shows a general falling-off of efficiency, common to all cells, will often respond to the process known as "cycling". This process consists of fully charging the battery as described above, and then discharging it by connecting to a lamp board, or other load, taking about 5 amperes. The battery should be capable of providing this current for at least 7 hours before it is fully discharged, as indicated by the voltage of each cell falling to 1.8. If the battery discharges in a shorter time, repeat the "cycle" of charge and discharge.

### **BOOT LIGHT BULB. TO REPLACE** (MARK VII AND XK 120 MODELS)

**MARK VII MODEL.** The boot light bulb (bayonet fixing) is fitted to the number plate/reverse light bulb carrier, accessible from underneath the boot lid.

**XK 120 MODELS.**

The boot light is situated in the underside of the boot lid.

Remove the boot light rim and plastic cover by unscrewing the two screws. Remove the festoon bulb by springing back the bulb holder.

**BOOT LIGHT SWITCH. TO REPLACE****(XK 120 MODELS)**

The boot light switch is situated at the rear of the boot lid aperture and is operated by a plate attached to the boot lid.

Remove the two screws securing the switch to the boot lid aperture surround. Withdraw switch sufficiently to enable the wire to be disconnected. Remove switch.

**CHARGING AND INSPECTION LAMP SOCKET. DESCRIPTION****(MARK VII MODEL)**

Situated under the bonnet between the voltage regulator and the battery is a two-pin plug, which may be used to "trickle" charge the battery or to illuminate an inspection lamp. (Plate P.12.)

**COIL. MAINTENANCE, REMOVAL AND REFITTING****(MARK VII AND XK 120 MODELS)**

**LOCATION.** The location of the coil on the Mark VII and XK 120 models is as follows:—

<b>Mark VII</b>	.. .. .	At front of right-hand wing valance.
<b>XK 120.</b>	Super Sports (early cars) .. .. .	Attached to cylinder block at rear of distributor.
<b>XK 120.</b>	Super Sports (later cars) and Fixed Head Coupe	Attached to front carburetter flange.

**MAINTENANCE** The coil requires no attention other than the cleaning of the exterior, particularly between the terminals, and periodic checking of the terminal connections to ensure that they are clean and tight.

**REMOVE.** Disconnect both low tension wires from the coil by removing the two terminal nuts. Disconnect the high tension wire from the centre of the coil by unscrewing the knurled nut. Unscrew the two mounting bracket nuts and remove coil.

**REFIT.** Refitting is the reverse of the above procedure.

**DISTRIBUTOR. TO REMOVE AND REFIT****(MARK VII AND XK 120 MODELS)**

**REMOVE.** Disconnect battery positive lead. Spring back clips and remove distributor cover.

Disconnect low tension wire from terminal on distributor body. Disconnect vacuum pipe by unscrewing union nut from vacuum advance unit. Slacken the distributor clamp plate pinch bolt, and withdraw distributor from cylinder block.

**REFIT.** Refitting is the reverse of the removal procedure, but it will be necessary to reset the ignition timing, as follows:—

Set micrometer adjustment to the centre of scale. Connect the low tension wire to terminal on distributor body. Fit the distributor to cylinder block with the vacuum advance unit facing to rear of engine. Rotate rotor arm until offset of driving dog engages with the offset in distributor drive shaft.

Turn engine until rotor arm is opposite the No. 6 cylinder (front) segment in the distributor cover, and the top dead centre arrow on the flywheel is 5° (two flywheel teeth approximate) before the arrow on the cylinder block.

Rotate the distributor body until the contact breaker points are just breaking, and tighten distributor clamp plate pinch bolt. Fit distributor cover, and connect up vacuum advance pipe.

Make final ignition setting on road test.

## DISTRIBUTOR. DESCRIPTION AND MAINTENANCE (MARK VII AND XK 120 MODELS)

**GENERAL.** One of the following types of distributor is fitted but the instructions under this heading apply equally to all types:—

	Mark VII	XK 120
7 to 1 compression ratio:		
(Early engines) .. ..	DVX6A, GC49, 40249B	
(Later engines) .. ..	DVX6A, GC50, 40263A	DVX6A, GC47, 40198B
8 to 1 compression ratio .. ..	DVX6A, GC53, 40276A	DVX6A, GC48, 40199B

Mounted on the distributor driving shaft, immediately beneath the contact breaker, is an automatic timing control mechanism. It consists of a pair of spring-loaded governor weights linked by lever action to the contact breaker cam. At slow engine speeds the spring force maintains the cam in a position in which the spark is slightly retarded. Under the centrifugal force imparted by high engine speeds the governor weights swing out, against the spring pressure, to advance the contact breaker cam and thereby the spark to suit engine conditions at the greater speed.

A vacuum-operated timing control is also fitted, designed to give additional advance under part-throttle conditions. The inlet manifold of the engine is in direct communication with one side of a spring-loaded diaphragm. This diaphragm acts through a lever mechanism to rotate the heel of the contact breaker about the cam, thus advancing the spark for part-throttle operating conditions. There is also a micrometer adjustment by means of which fine alterations in timing can be made to allow for changes in running conditions, e.g., state of carbonisation, change of fuel, etc. The combined effects of the centrifugal and vacuum-operated timing controls give added efficiency over the full operating range of the engine with a corresponding economy in fuel consumption.

**MAINTENANCE.** In general, lubrication and cleaning constitute normal maintenance procedure.

**Lubrication—every 2,500 miles (4,000 kilometres).** Take great care to prevent oil or grease from getting on or near the contacts.

Replenish the oil well with one or two teaspoonsful of good grade engine oil: this lubricates the automatic advance mechanism and also the distributor shaft.

Smear the cam and the pivot on which the contact breaker works with Mobilgrease No. 2 or an equivalent grease. Lift off the rotor arm by pulling vertically and apply to the spindle a few drops of thin machine oil to lubricate the cam bearing. It is not necessary to remove the exposed screw since it is either drilled or affords a clearance to permit passage of oil.

Replace the rotor arm, carefully locating its moulded projection in the keyway in the spindle and pushing it on as far as it will go in order to avoid the risk of the moulded cap being burned or tracked.

**Cleaning—every 5,000 miles (8,000 kilometres).** Thoroughly clean the moulded distributor cap, inside and out, with a soft dry cloth, paying particular attention to the spaces between the metal electrodes. Ensure that the small carbon brush moves freely in its holder.

Examine the contact breaker. The contacts must be quite free from grease or oil. If they are burned or blackened, clean them with very fine carborundum stone or emery cloth, then wipe with a petrol-moistened cloth. Cleaning is facilitated by removing the contact breaker lever. To do this, slacken the nut on the moulded terminal block and lift out the end of the contact breaker spring. The contact breaker lever may now be removed from its pivot. After cleaning, check the contact breaker setting. This should measure 0.012" (.31 mm.). If the measurement is incorrect, keep the engine in the position giving maximum opening, slacken the two screws securing the fixed contact plate and adjust its position to give the required gap. Tighten the screws. Recheck the setting for other positions of the engine giving maximum opening.

## DISTRIBUTOR. SERVICING (MARK VII AND XK 120 MODELS)

Before starting to test, make sure that the battery is not fully discharged, as this will often produce the same symptoms as a fault in the ignition circuit.

**TESTING IN POSITION TO LOCATE CAUSE OF UNEVEN FIRING.** Run the engine at a fairly fast idle speed. Short circuit each plug in turn with, say, the blade of an insulated screwdriver or a hammer head placed across the terminal to contact the cylinder head. Short circuiting the defective plug will cause no noticeable change in the running note. On the others, however, there will be a pronounced increase in roughness.

Having thus located the defective cylinder, stop the engine and remove the cable from the sparking plug terminal. Restart the engine and hold the cable end about  $\frac{3}{16}$ " (4.8 mm.) from the cylinder head. If sparking is strong and regular, the fault lies with the sparking plug, and it should be removed, cleaned and adjusted, or a replacement fitted.

If, however, there is no spark, or only weak irregular sparking, examine the cable from the plug to the distributor for deterioration of the insulation, renewing the cable if the rubber is cracked or perished.

Clean and examine the distributor moulded cap for free movement of the carbon brush. If tracking has occurred, indicated by a thin black line, usually between two or more electrodes a replacement distributor cap must be fitted.

**TESTING IN POSITION TO LOCATE CAUSE OF IGNITION FAILURE.** Spring back the clips on the distributor head and remove the moulded cap. Lift off the rotor, carefully levering with a screwdriver if necessary.

Check the contacts for cleanliness and correct gap setting. Switch on the ignition and turn the engine. Observe the ammeter reading, which should rise and fall with the closing and opening of the contacts if the low tension wiring is in order. When the reading does not fluctuate, either a short circuit or contacts remaining closed is indicated. No reading indicates a broken or loose connection in the low tension wiring or badly adjusted or dirty contacts.

**LOW TENSION CIRCUIT—FAULT LOCATION.** If it is determined that the fault lies in the low tension circuit by the eliminating check above, switch on the ignition and turn the engine until the contact breaker points are fully opened. Refer to the wiring diagram and check the circuit with a voltmeter (0-20 volts) between the following points and a good earth. If the circuit is in order the voltage reading should be approximately 12 volts. No reading indicates a damaged cable or loose connections, or a breakdown in the section under test.

**Battery to Ammeter.** Connect the voltmeter between the ammeter terminal "B" and a good earth on the chassis.

**Ammeter.** Check the voltage to earth at the other ammeter terminal "A" and earth. No reading indicates a faulty ammeter.

**Ammeter to Control Box.** Connect the voltmeter between the control box terminal "A" and earth. No reading indicates a faulty lead or loose connection.

**Control Box.** Check the voltage to earth at the control box terminal "A1". No reading indicates a broken connection in the series winding.

**Control Box to Ignition Switch.** Connect the voltmeter between the ignition switch terminal, to which the lead from the control box is connected (via terminal "A" of the lighting switch) and a good earth. No reading indicates a faulty lead or loose connection.

**Ignition Switch.** Check the voltage between the other terminal of the ignition switch and earth. No reading indicates a fault in the switch.

**Ignition Switch to Ignition Coil.** Remove the lead from the ignition coil "SW" terminal, and connect the voltmeter between the free end of the cable and earth. This portion of the circuit is made by way of the control box "A3" terminal, and a voltage check should be made at this point also. Remake the connection to the coil.

**Ignition Coil.** Disconnect the lead from the "CB" terminal of the coil and connect the voltmeter between the "CB" terminal and a good earth. No reading indicates a fault in the primary winding of the coil, necessitating coil replacement. If, however, the correct reading is obtained, remake the cable connection to the coil terminal.

**Ignition Coil to Distributor.** Disconnect the low tension cable to the distributor and connect the voltmeter between the end of the cable removed and earth. No reading indicates a faulty lead or loose connection. Reconnect the cable to the distributor.

**Contact Breaker and Condenser.** Connect the voltmeter across the contact points. If no reading is obtained, recheck with the condenser removed. If a reading is now given, the condenser is faulty and must be replaced. Measure the contact breaker spring tension. This should be 20-24 oz. (.56-.68 kg.), measured at the contacts.

### HIGH TENSION CIRCUIT.

If, after carrying out these tests, the fault has not been located, remove the high tension lead from the centre terminal of the distributor. Switch on the ignition and turn the engine until the contacts close. Flick open the contact breaker lever while the high tension lead from the coil is held about  $\frac{3}{16}$ " (4.8 mm.) from the cylinder block. If the ignition equipment is in good order, a strong spark will be obtained. If no spark occurs, a fault in the circuit of the secondary winding of the coil is indicated and the coil must be replaced.

The high tension cables must be carefully examined, and replaced if the rubber insulation is cracked or perished using 7mm. rubber covered ignition cable. To fit a new high tension cable to the ignition coil, pass the cable through the knurled, moulded nut, bare about  $\frac{1}{2}$ " (6 mm.) of the end cable, thread the wire through the brass washer (removed from the original cable) and bend back the strands. Finally screw the nut into its terminal.

To make connections to the terminals in distributor cap, remove the cap and slacken the screws on the inside of the moulding. Cut the cables to the length required and push firmly home in the holes in the moulding. Tighten the screws, which will pierce the rubber insulation to make good contact with the cable core. The connection to the centre terminal is made accessible by removing the small carbon brush.

The cables from the distributor to the sparking plugs must, of course, be connected in the correct firing order.

## DISTRIBUTOR. TO DISMANTLE AND REASSEMBLE (MARK VII AND XK 120 MODELS)

**DISMANTLE.** Before dismantling, carefully note the position in which the various components are fitted, in order to ensure their correct replacement on subsequent reassembly. As the driving dog is offset, note the relation between it and the rotor electrode, and maintain this relation in reassembling the distributor.

(i) Spring back the securing clips and remove the moulded cap. Lift the rotor arm off the top of the spindle. If tight, carefully lever off with a screwdriver. Remove the nut on the moulded terminal block and lift off the end of the contact breaker spring. The contact breaker lever can now be lifted from its pivot. Lift the insulating washer from the pivot. Remove the two screws, together with the spring and plain steel washers, securing the fixed contact plate, and remove the plate.

Unscrew the screw from the condenser band clip. Unscrew the terminal nut, lift off the spring washer and remove the condenser and connecting strip.

(ii) Undo the three screws fitted at the edge of the contact breaker base casting and lift them out. The screws are accessible through the apertures cut in the contact breaker plate. The contact breaker base can then be removed from the body of the distributor. Remove the jump ring from the underside of the contact breaker base, lift off the star-shaped spring and slide the contact breaker plate out of the base, first withdrawing the screw securing the earth connection to the base.

(iii) Undo the two nuts from the studs securing the vacuum unit to its bracket, pull the unit off its seating so that the studs are clear of the fixing bracket and rotate the vacuum unit to unscrew the connecting rod from the control barrel. Take care not to mislay the spring and serrated washer inside the barrel. Unscrew the control barrel from its sleeve and remove it. The sleeve can now be slid out of its housing.

(iv) Remove the driving dog from the shaft.

(v) Take out the screw from inside the top of the cam spindle and lift off the cam and cam foot. The automatic timing control is then accessible. Before dismantling, carefully note the positions in which the various components are fitted in order that they may be replaced correctly. To remove the automatic timing control and shaft assembly from the distributor, it must be pressed out of its bearing. The bearings must not be disturbed unless they are worn and need replacing. The bearing bush fitted at the lower end of the shaft can be removed by driving it out with a suitable punch, while the ball bearing at the top can be removed by means of a shouldered mandrel locating on the inner journal of the bearing.

**REASSEMBLE.** If the bearings have been removed, the distributor should be assembled with new bearings fitted. Press the ball bearing into its housing at the top of the shaft, using a shouldered mandrel which locates on the inner and outer journals of the bearing. The bearing bush at the lower end of the shaft must also be fitted, using a shouldered mandrel.

Before fitting the bearing bush it should be allowed to stand completely immersed in thin oil for at least 24 hours. Place the distance collar over the shaft, fit the shaft in its bearings and replace the driving member. Assemble the automatic timing control, taking care that the parts are fitted in their original positions and that the control springs are not stretched. Place the cam on its spindle and tighten the locking screw.

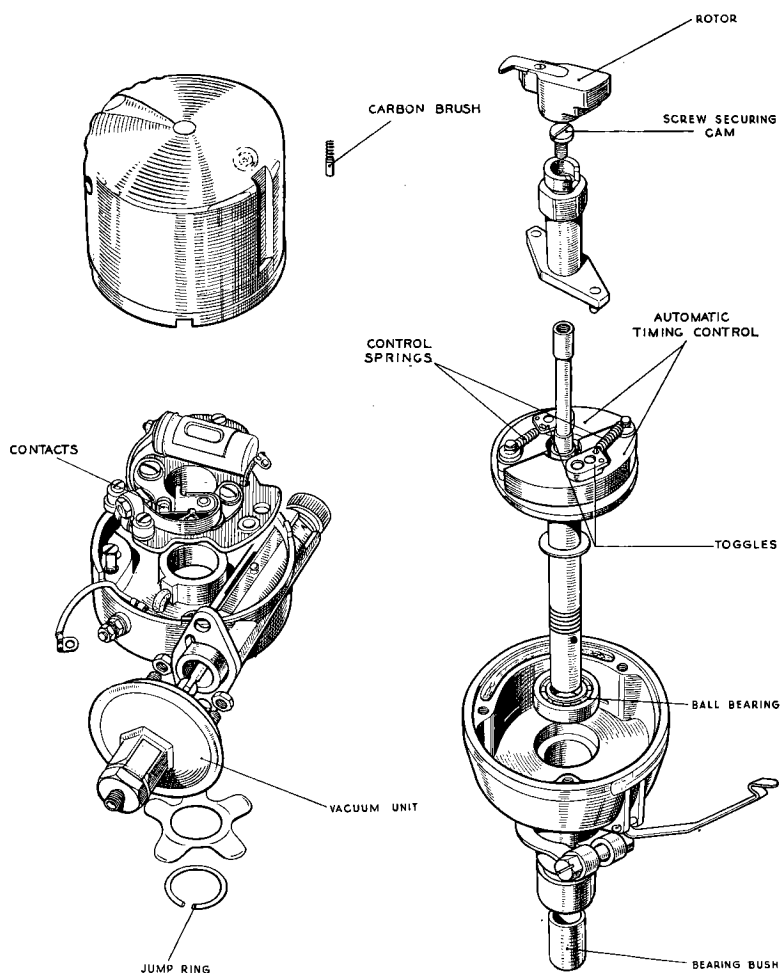


PLATE P.3. DISTRIBUTOR (Exploded view).

(i) Fit the sleeve of the micrometer adjustment into its housing in the contact breaker base, so that the timing scale appears in the window on the right of the body. Screw the control barrel fully home in the sleeve. With the barrel and sleeve pushed as far into the housing as they will go, screw the vacuum unit connecting rod into the barrel, taking care that the serrated washer is correctly fitted. Position the vacuum unit on its fixing plate so that the two studs fit through the holes provided. Place a spring washer over each stud and secure by tightening the locking nuts.

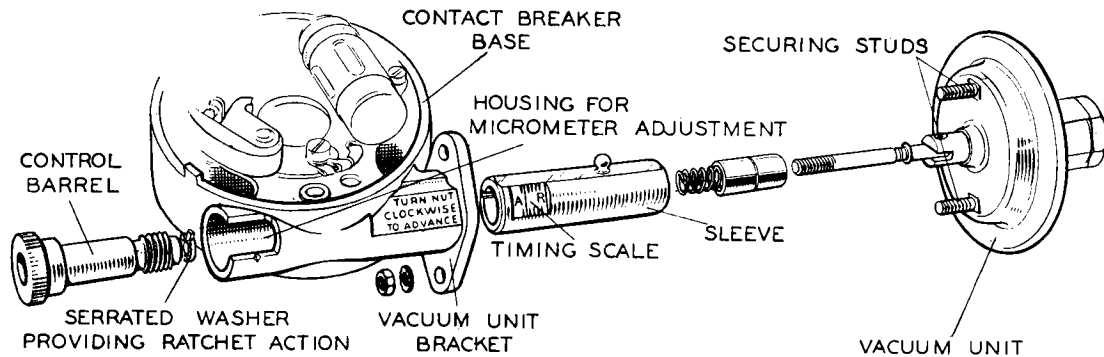


PLATE P.4. VACUUM ADVANCE MECHANISM (Exploded view).

(ii) See that the two cables are connected to the terminal and to the earthing screw in the base casting. Position the contact breaker plate in the base casting so that the peg fitted in the control barrel locates in the hole provided in the contact breaker plate. Place the star-shaped spring over the bearing sleeve on the underside of the base casting and secure by springing the jump ring into its location.

Place the contact breaker base on the distributor body and secure by means of the three screws.

(iii) Insert the terminal post on the condenser through the hole in the connector strip. Replace the spring washer and tighten the terminal nut. Secure the band clip by replacing and tightening the fixing screw.

Position the plate carrying the fixed contact on the contact breaker base and secure it by replacing and lightly tightening the two screws, first placing a spring washer and flat steel washer under the heads of each of the screws. The eyelet on the end of the cable connected to the earthing screw must be fitted under the head of one of the screws. Place the insulating washer over the contact breaker pivot pin and position the contact breaker lever on its pivot pin. Insert the square-headed bolt through the condenser connecting strip and the hole in the end of the contact breaker spring. Fit the bolt in the moulded junction block, place the eyelet on the end of the connector from the low tension terminal over the bolt, followed by a spring washer and secure by tightening the nut. Adjust the contact breaker setting to give a maximum opening of .012" (.31 mm.).

**Note.** If it becomes necessary to renew the contacts, a replacement set comprising fixed and moving contacts must be fitted.

Place the rotor arm on the top of the spindle, locating the register correctly and push it fully home. Fit the distributor moulding and secure by means of the spring clips.

## CONTROL BOX. DESCRIPTION

### (MARK VII AND XK 120 MODELS)

**GENERAL.** The control box houses the dynamo voltage regulator and the cut-out. Although combined structurally, the regulator and cut-out are electrically separate. Both are accurately adjusted during manufacture, and the cover protecting them is sealed and should not be removed unnecessarily. Connections are by means of the normal grub screw terminal.



**THE REGULATOR.** The regulator unit is arranged to work in conjunction with the shunt-wound dynamo described in the Dynamo section. The regulator is set to maintain a predetermined dynamo voltage at all speeds above the regulating point, the field strength being controlled by the automatic insertion of a resistance in the dynamo field circuit. When the dynamo voltage reaches a predetermined value, the magnetic field due to the shunt or voltage winding becomes sufficiently strong to attract the armature. This causes the contact to open, thereby inserting the resistance in the field circuit. The consequent reduction in field current lowers the dynamo voltage and this, in turn, weakens the magnetic field due to the voltage coil. The armature is allowed to return to its original position, thus closing the contacts, so that the voltage returns to the predetermined maximum. The cycle is then repeated, and the armature is set into vibration.

As the speed of the dynamo rises above that at which the regulator comes into operation the amplitude of vibration increases and the periods of interruption increase in length with the result that the mean value of the dynamo output undergoes practically no increase once the operating speed has been attained.

The series of current winding provides a compensation on this system of control, for if the control were arranged entirely on the basis of voltage there would be a risk of very seriously overloading the dynamo when the battery was in a low state of charge, particularly if the lamps were simultaneously in use. Under these conditions, with a battery of low internal resistance, the dynamo would be forced to give an output to bring the voltage of the system up to the same value as if the battery were fully charged. This would necessitate an extremely heavy current far beyond the normal capacity of the machine. The series winding assists the voltage coil, so that when the dynamo is delivering a heavy current into a discharged battery the regulator comes into operation at a somewhat reduced voltage, thus limiting the output accordingly. A split series winding is used, the centre tapping carrying the battery charging current while the complete winding carries lighting and ignition loads.

By means of a temperature compensation device the voltage characteristic of the dynamo is caused to conform more closely to that of the battery under all climatic conditions. In cold weather the voltage required to charge the battery increases, whilst in warm weather the voltage of the battery is lower. The method of compensation takes the form of a bi-metallic spring suspension for the armature of the regulator which causes the operating voltage of the regulator to be increased in cold weather and reduced in hot weather, and thereby to compensate for the variations in charging current which would otherwise occur due to the changing characteristics of the battery.

**THE CUT-OUT.** The cut-out is an automatic switch connected between dynamo and battery. It consists of a pair of contacts held open by a spring and closed magnetically when the engine is running fast enough to cause the dynamo voltage to exceed that of the battery. The battery will then be charged by the dynamo. On the other hand, when the speed is low or the engine is stationary the contacts open, thus disconnecting the dynamo from the battery and preventing current flowing from the battery through the windings.

## CONTROL BOX. SERVICING

### (MARK VII AND XK 120 MODELS)

**Testing in Position to locate Fault in Charging Circuit.** If the procedure given in the Dynamo Instructions shows the dynamo to be in order, proceed to check further as follows:—

(i) First ensure that the wiring between the battery and regulator is in order. To do this, disconnect the wire from the A terminal of the control box and connect the end of the wire removed to the negative terminal of the voltmeter. Connect the positive voltmeter terminal to an earthing point on the chassis. If a voltmeter reading is given, the wiring is in order and the regulator must be examined.

(ii) If there is no reading, examine the wiring between battery and control box for broken wires or loose connections.

(iii) Reconnect the wire to terminal A.

**REGULATOR ADJUSTMENT.** The regulator is carefully set during manufacture to suit the normal requirements of the standard equipment and in general it should not be necessary to make further adjustments. However, if the battery does not keep in a charged condition, or if the generator output does not fall when the battery is fully charged it may be advisable to check the setting and readjust if necessary.

It is important before altering the regulator setting when the battery is in a low state of charge to check that its condition is not due to a battery defect or to the generator belt slipping.

**Electrical Setting.** It is important that a good quality MOVING COIL VOLTMETER (0-20 volts) be available before attempting to adjust the regulator.

The electrical setting can be checked without removing the cover from the control box. Withdraw the cables from the terminals marked A and A1 at the control box and join the wires together.

Connect the negative lead of the moving coil voltmeter to the "D" terminal on the dynamo and connect the other lead from the meter to a convenient chassis earth. Slowly increase the speed of the engine until the voltmeter needle "flicks" and then steadies; this should occur at a voltmeter reading between the limits given on page P.4 for the appropriate temperature of the regulator. If the voltage at which the reading becomes steady occurs outside these limits, the regulator must be adjusted.

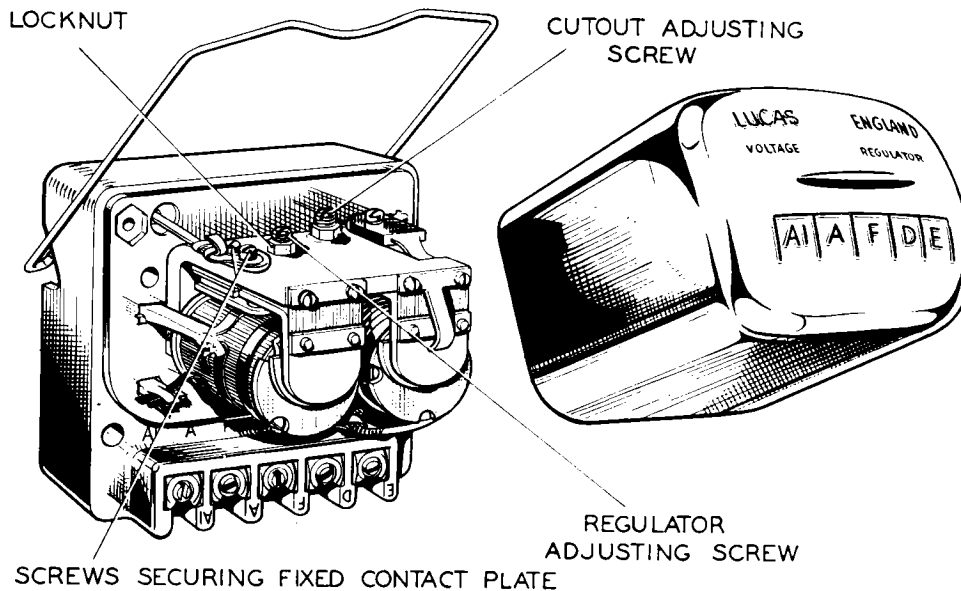


PLATE P.5. CONTROL BOX (Mark VII illustrated).

Shut off the engine and remove the control box cover. Release the lock nut holding the adjusting screw and turn the screw in a clockwise direction to raise the setting or in an anti-clockwise direction to lower the setting. Turn the screw a fraction of a turn only at a time and then tighten the lock nut. Repeat as above until the correct setting is obtained.

Remake the original connections.

When the dynamo is run at a high speed on open circuit it builds up a high voltage. Therefore, when adjusting the regulator do not run the engine up to more than half throttle or a false voltmeter reading will be obtained.

**Mechanical Setting.** The mechanical setting of the regulator is accurately adjusted before leaving the works and provided that the armature carrying the moving contact is not removed, the regulator will not require

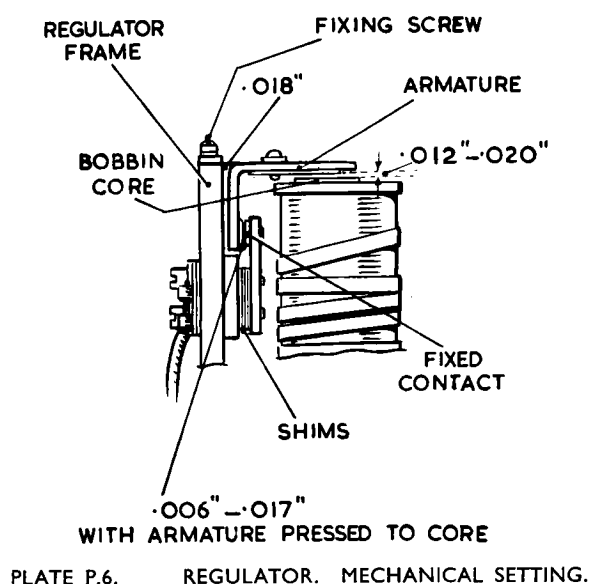
mechanical adjustment. If, however, the armature has been removed from the regulator for any reason, the contacts will have to be reset. To do this, proceed as follows:—

Slacken the two armature fixing screws. Insert a .018" (.46 mm.) feeler gauge between the back of the armature and the regulator frame.

Press back the armature against the regulator frame and down on to the top of the bobbin core with gauge in position, and lock the armature by tightening the two fixing screws.

Check the gap between the underside of the arm and the top of the bobbin core. A shim is fitted to the underside of the arm and the gap should be .012"-.020" (.31-.51 mm.). If the gap is outside these limits correct by adding or removing shims at the back of the fixed contact.

Remove the gauge and press the armature down, when the gap between the contacts should be .006"-.017" (.15-.43 mm.).



**Cleaning Contacts.** After long periods of service it may be found necessary to clean the vibrating contacts of the regulator. These are made accessible by slackening the screws securing the plate carrying the fixed contact. It will be necessary to slacken the upper screw a little more than the lower so that the contact plate can be swung outwards. Clean the contacts by means of fine carborundum stone or fine emery cloth.

Carefully wipe away all traces of dirt or other foreign matter. Finally tighten the securing screws.

**CUT-OUT ELECTRICAL SETTING.** If the regulator setting is within the correct limits, but the battery is still not receiving current from the dynamo, the cut-out may be out of adjustment, or there may be an open circuit in the wiring of the cut-out and regulator unit. Remove the cable from the terminal marked A on the control box (ensuring that the bared end does not come into contact with the chassis). Remove the voltmeter lead from the "D" terminal of the unit and connect it to terminal A. Run the engine as before at a fairly low engine speed; the cut-out should operate, when a voltmeter reading should be given of the same value as that when the voltmeter was connected to terminal "D".

If there is no reading, the setting of the cut-out may be badly out of adjustment and the contacts not closing. To check the voltage at which the cut-out operates, remove the control box cover, and connect the voltmeter between the "D" terminal and earth. Start the engine and slowly increase its speed until the cut-out contacts are seen to close, noting the voltage at which this occurs. This should be 12.7-13.3 volts.

If the operation of the cut-out takes place outside these limits, it will be necessary to adjust. To do this, slacken the lock nut on the cut-out adjustment screw and turn the screw in a clockwise direction to raise the voltage setting or in an anti-clockwise direction to reduce the setting, testing after each adjustment by increasing the engine speed until the cut-out is seen to operate, and noting the corresponding voltmeter reading.

Tighten the lock nut after making the adjustment.

**Mechanical Setting.** If, for any reason, the cut-out armature has to be removed from the frame, care must be taken to obtain the correct gap settings on reassembly. The correct settings can be obtained as follows:—

Slacken the two armature fixing screws and also the two screws securing the fixed contact. Insert a .008" (.20 mm.) gauge between the back of the armature and the cut-out frame, and a .011"-.015" (.28-.38 mm.) gauge between the core face and the armature. A .005" (.12 mm.) brass shim is fitted to the underside of the armature, and the gap must be measured between the core face and the underside of this shim.)

Press the armature down and back against the two gauges and tighten the armature fixing screws. With the gauges still in position, set the gap between the armature and the stop plate arm to .030"-.034" (.76-.86 mm.).

Remove the gauges and tighten the screws securing the fixed contact. Insert a .025" (.65 mm.) gauge between the core face and the armature. Press the armature down to the gauge. The gap between the contacts should now measure .002"-.006" (.05-.15 mm.). Adjust the gap, if necessary, by adding or removing shims beneath the fixed contact plate.

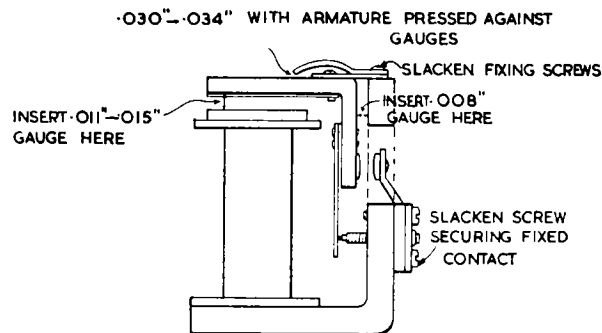


PLATE P.7. CUT-OUT. MECHANICAL SETTING.

**Cleaning Contacts.** If the cut-out contacts appear burnt or dirty, place a strip of fine glass paper between the contacts, then, with the contacts closed by hand, draw the paper through. This should be done two or three times with the rough side towards each contact. Do not use emery cloth or a carborundum stone for cut-out contacts.

## DYNAMO. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** Disconnect the battery positive lead. Remove the connections from the dynamo, noting that the yellow wire is connected to terminal "D" (large terminal) and the yellow with green wire to terminal "F" (small terminal). Remove the adjusting set screw situated at the top of dynamo and push dynamo towards engine to release fan belt tension. Remove the two mounting bolts and nuts underneath the dynamo, disengage fan belt, and lift out dynamo.

**REFIT.** Refitting is the reverse of the above procedure. After the fan belt has been fitted, pull the dynamo outwards until the belt can be flexed approximately  $\frac{1}{2}$ " (12 mm.) either way in the middle of the vertical run of the belt, and fully tighten adjusting set screw.

## DYNAMO. DESCRIPTION AND MAINTENANCE

(MARK VII AND XK 120 MODELS)

**DESCRIPTION.** The dynamo is a specially finished shunt-wound two-pole two-brush machine, arranged to work in conjunction with a compensated voltage control regulator unit. A fan draws cooling air through the dynamo—inlet and outlet holes being provided in the end brackets of the unit. Ball bearings are fitted at each end of the armature shaft.

The output of the dynamo is controlled by the regulator and is dependent on the state of charge of the battery and the loading of the electrical equipment in use. When the battery is in a low state of charge, the dynamo gives a high output, whereas if the battery is fully charged, the dynamo gives only sufficient output to keep the battery in good condition without any possibility of overcharging. In addition, an increase in output is given to balance the current taken by lamps and other accessories when in use. Further, a high boosting charge is given for a few minutes immediately after starting up, thus quickly restoring to the battery the energy taken from it by the electric starting motor.

**MAINTENANCE.** **Lubrication.** No routine lubrication is necessary as the bearings are packed with grease before assembly.

**Inspection of Brush Gear and Commutator.** Every 12,000 miles (19,000 kilometres) remove the metal band cover to inspect the brush gear and commutator. Check that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and clean its sides with a petrol-moistened cloth. Be careful to replace brushes in their original positions in order to retain the “bedding”. Brushes which have worn so that they will not “bed” properly on the commutator must be renewed.

The commutator should be clean, free from oil or dirt and should have a polished appearance. If it is dirty, clean it by pressing a fine dry cloth against it while the engine is slowly turned over by hand. If the commutator is very dirty, moisten the cloth with petrol.

**Belt Adjustment.** Occasionally inspect the dynamo driving belt and adjust, if necessary, to take up any undue slackness by turning the dynamo on its mounting. Care should be taken to avoid overtightening the belt, which should have sufficient tension only to drive without slipping.

See that the machine is properly aligned, otherwise undue strain will be thrown on the dynamo bearings.

## DYNAMO. TO DISMANTLE AND REASSEMBLE

(MARK VII AND XK 120 MODELS)

**DISMANTLE.** (i) Remove nut and withdraw the driving pulley.  
(Refer to Plate P.8.) (ii) Remove the cover band, hold back the brush springs and remove the brushes from their holders.

(iii) Remove the nut, spring washer and flat washer from the smaller terminal (i.e., the FIELD terminal) on the commutator end bracket.

(iv) Unscrew and withdraw the two through bolts.

(v) The commutator and bracket can now be withdrawn from the dynamo yoke.

(vi) The driving end bracket together with the armature can now be lifted out of the yoke.

(vii) The driving end bracket, which on removal from the yoke has withdrawn with it the armature and armature shaft ball bearing, need not be separated from the shaft unless the bearing is suspected and requires examination, or the armature is to be replaced; in this event the armature should be removed from the end bracket by means of a hand press.

**REASSEMBLE.** Reassembly is the reverse of the dismantling procedure.

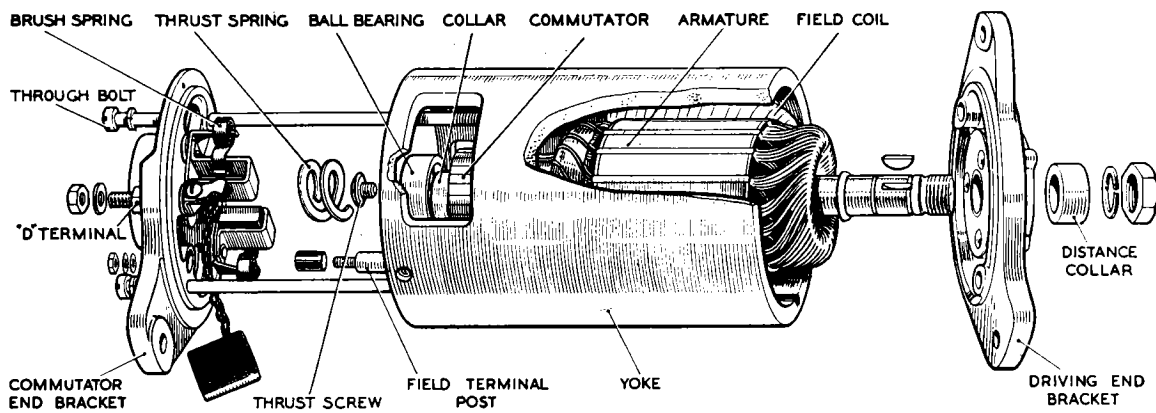


PLATE P.8. DYNAMO (Exploded view).

## DYNAMO. SERVICING (MARK VII AND XK 120 MODELS)

### TESTING IN POSITION TO LOCATE FAULT IN CHARGING CIRCUIT.

In the event of a fault in the charging circuit, adopt the following procedure to locate the cause of trouble:—

- (i) Inspect the driving belt and adjust if necessary.
- (ii) Check that the dynamo and control box are connected correctly. The dynamo terminal "D" must be connected to control terminal "D" and dynamo terminal "F" to control box terminal "F".
- (iii) Switch off all lights and accessories, disconnect the cables from terminals of dynamo marked "D" and "F", and connect the two terminals with a short length of wire.
- (iv) Start the engine and set to run at normal idling speed.
- (v) Clip the negative lead of a moving coil type voltmeter, calibrated 0-20 volts, to one dynamo terminal and the other lead to a good earthing point on the yoke.
- (vi) Gradually increase the engine speed, when the voltmeter reading should rise rapidly and without fluctuation. Do not allow the voltmeter reading to reach 20 volts and do not race the engine in an attempt to increase the voltage. It is sufficient to run the dynamo up to a speed of 1,000 r.p.m. If there is no reading, check the brush gear as described in (vii) below. If there is a low reading of 4-5 volts the armature winding may be at fault (see Armature on page P.22).
- (vii) Remove the cover band and examine the brushes and commutator. Hold back each of the brush springs and move the brush by pulling gently on its flexible connector. If the movement is sluggish, remove the brush from its holder and ease the sides by lightly polishing on a smooth file. Always replace brushes in their original positions. If the brushes are worn so that they do not bear on the commutator, or if the brush flexible is exposed on the running face, new brushes must be fitted and bedded to the commutator.

Test the brush spring tension with a spring scale. The tension of the springs when new is 36-44 oz. (.02-1.25 kg.). In service, it is permissible for this value to fall to 30 oz. (.85 kg.) before performance may be affected. Fit new springs if the tension is low.

If the commutator is blackened or dirty, clean it by holding a petrol-moistened cloth against it while the engine is turned slowly by hand cranking. Retest the dynamo as in (vi); if there is still no reading on the voltmeter, there is an internal fault and the complete unit, if a spare is available, should be replaced. Otherwise the unit must be dismantled for internal examination.

(viii) If the dynamo is in good order, remove the link from between the terminals and restore the original connections, taking care to connect dynamo terminal "D" to control box terminal "D" and dynamo terminal "F" to control box terminal "F". Proceed to test the regulator unit as described in the section covering the Control Box Instructions.

**COMMUTATOR.** A commutator in good condition will be smooth and free from pits or burned spots. Clean the commutator with a petrol-moistened cloth. If this is ineffective, carefully polish with a strip of fine glass paper while rotating the armature. To remedy a badly worn commutator, mount the armature with or without the drive end bracket in a lathe, rotate at a high speed and take a light cut with a very sharp tool. Do not remove more metal than is necessary. Polish the commutator with very fine glass paper.

Undercut the insulators between the segments to a depth of  $\frac{1}{32}$ " (.79 mm.) with a hack saw blade ground down to the thickness of the insulator.

**ARMATURE.** The testing of the armature winding requires the use of a volt drop test and growler. If these are not available, the armature should be checked by substitution. No attempt should be made to machine the armature core or to true a distorted armature shaft.

**FIELD COILS.** Measure the resistance of the field coils, without removing them from the dynamo yoke, by means of an ohm meter. A value of approximately 6 ohms should be obtained.

**Continuity and Insulation Tests.** If an ohm meter is not available, connect a 12 volt D.C. supply with an ammeter in series between the field terminal and dynamo yoke. The ammeter reading should be approximately 2 amperes. No reading on the ammeter indicates an open circuit in the field winding.

To test car for earthed field coils, unsolder and isolate the end of the field winding from the earth terminal on the dynamo yoke end: with a mains test lamp, check between the field terminal and yoke. If the lamp lights, the field coils are earthed. In either case, unless a substitute dynamo is available, the field coils must be replaced. To do this, carry out the procedure outlined below, using a pole shoe expander and a wheel-operated screwdriver.

- (i) Remove the insulation piece which is provided to prevent the junction of the field coils from contacting with the yoke.
- (ii) Mark the yoke and pole shoes in order that they can be fitted in their original positions.
- (iii) Unscrew the two pole shoes retaining screws by means of the wheel-operated screwdriver.

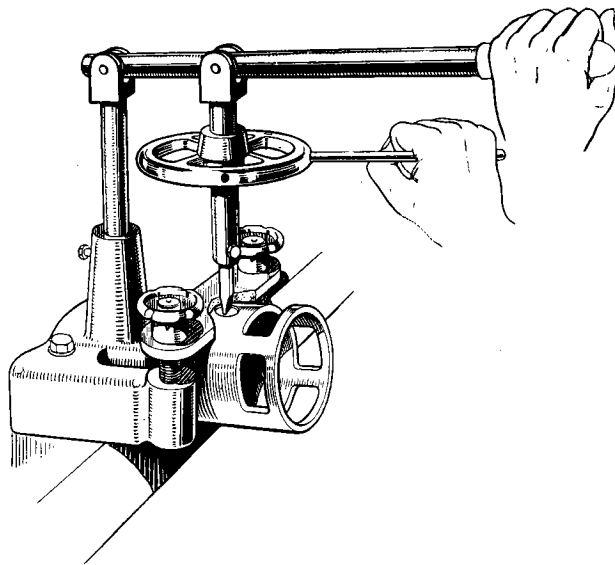


PLATE P.9. POLE SHOE SCREWS. REMOVAL.

- (iv) Draw the pole shoes and coils out of the yoke and lift off the coils.
- (v) Fit the new field coils over the pole shoes and replace them in position inside the yoke. Take care to ensure that the taping of the field coils is not trapped between the pole shoes and the yoke.
- (vi) Locate the pole shoes and field coils by lightly tightening the fixing screw.
- (vii) Insert the pole shoe expander, open it to the fullest extent and tighten the screws.
- (viii) Finally tighten the screws by means of the wheel-operated screwdriver and lock them by caulking.
- (ix) Replace the insulation piece between the field connections and the yoke.

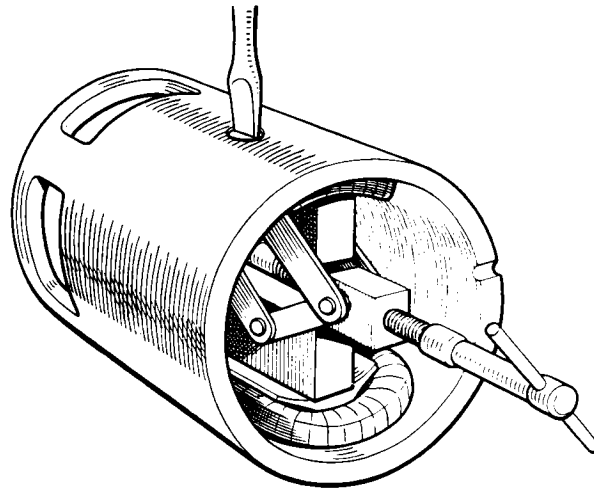


PLATE P.10. POLE SHOE EXPANDER IN OPERATION.

**BEARINGS.** Bearings which are worn to such an extent that they will allow side movement of the armature shaft must be replaced.

The ball bearing at the driving end is replaced as follows:—

- (i) Knock out the rivets which secure the bearing retaining plate to the end bracket and remove the plate.
- (ii) Press the bearing out of the end bracket and remove the corrugated washer, felt washer and oil-retaining washer.
- (iii) Before fitting the replacement bearing see that it is clean and pack it with high melting point grease.
- (iv) Place the oil retaining washer, felt washer and corrugated washer in the bearing housing in the end bracket.
- (v) Locate the bearing in the housing and press it home by means of a hand press.
- (vi) Fit the bearing retainer plate. Insert the new rivets from the inside of the end bracket and open the rivets by means of a punch to secure the plate rigidly in position.

The ball bearing at the commutator end is secured to the armature shaft by a thrust screw, and can be withdrawn with an extractor after the screw has been removed. See that the new bearing is clean and packed with high melting point grease, force it home against the shoulder on the armature shaft and insert and tighten the thrust screw.



## ELECTRIC CLOCK. REMOVE, ADJUST AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** The electric time clock is built into the revolution counter instrument and must be removed with the revolution counter.

**REMOVE.  
(MARK VII.)** Disconnect battery positive lead. Remove the two drive screws securing dash casing to centre facia panel. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side, securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly and remove centre facia. (Plate P.1.)

Remove four round-headed screws; two at top, two at bottom of instrument panel, fixing panel to dash structure.

Withdraw instrument panel. Disconnect feed wire to the electric clock by removing screw. Disconnect the two earth wires from back of instrument case. Disconnect revolution counter cable by rotating knurled ring. Remove three screws securing instrument carrier and withdraw revolution counter.

To detach the clock from the revolution counter instrument, remove the two screws securing the flange of clock to rear of instrument and lift out clock.

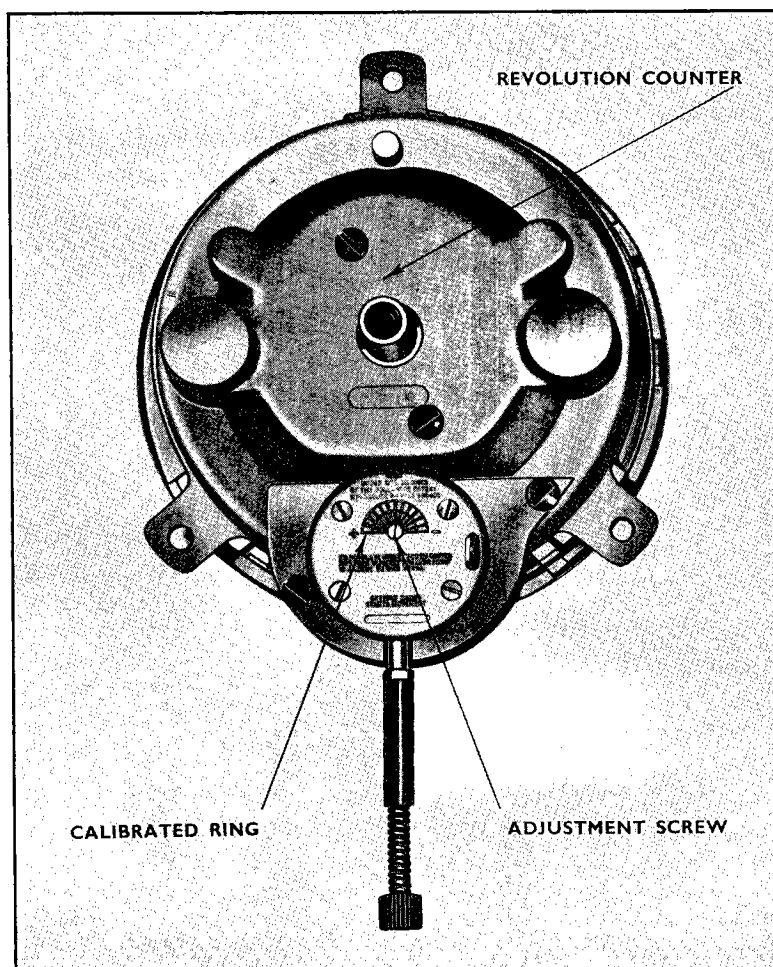


PLATE P.11. ELECTRIC CLOCK. ADJUSTMENT.

**REMOVE.** (XK 120.) Disconnect battery positive lead. Remove the drive screws securing dash casing and release casing. Remove two nuts each side of instrument panel, securing panel to facia structure. Withdraw instrument panel from rest of facia. Disconnect feed wire to the electric clock by removing screw. Disconnect two earth wires from back of instrument case. (Plate P.2.)

Disconnect revolution counter cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw revolution counter.

To detach the clock from the revolution counter instrument, remove the two screws securing the flange of clock to rear of instrument and lift out clock.

**ADJUST.** Situated on the rear of the time clock is a small screw surrounded by a semi-circular scale. If the clock is gaining, turn screw towards minus sign (—); if clock is losing, turn screw towards positive sign (+). (Plate P.11.)

**REFIT.** Refitting is the reverse of the above procedure.

**Note.** The action of setting the hands automatically restarts the clock.

### FUSES. DESCRIPTION (MARK VII AND XK 120 MODELS)

Should any component in the electrical system fail to function it is possible that the fuse protecting that component has blown.

If a replacement fuse of the correct capacity also blows, this indicates a fault in the circuit servicing the affected component and a careful examination should, therefore, be carried out to ascertain the fault.

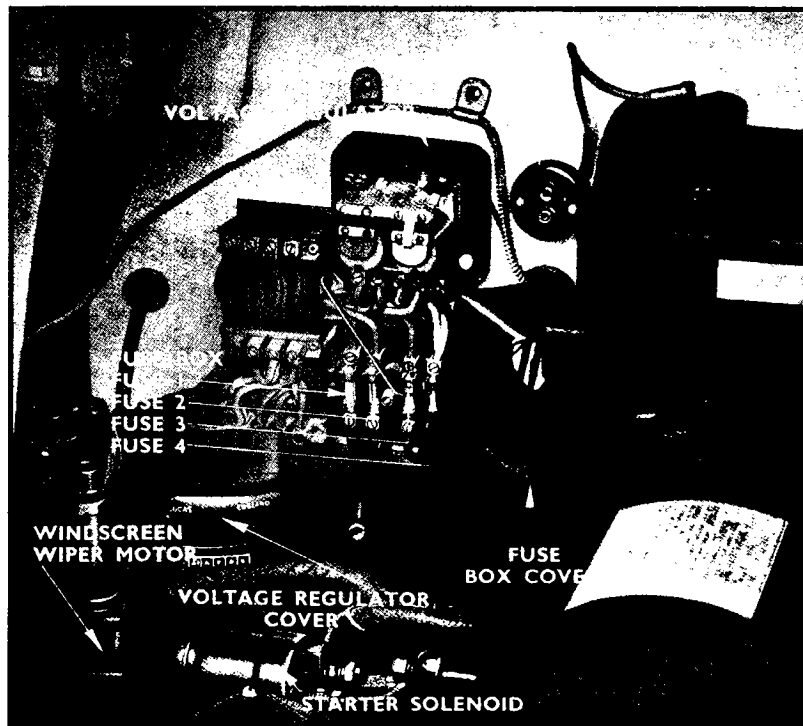


PLATE P.12. FUSES (Mark VII).

The fuses are situated on the engine side of the scuttle, and serve the various circuits as follows. (See Plate P.12 for the Mark VII model and Plate P.13 for the XK 120 models.)

	<b>Mark VII</b>	<b>XK 120</b>
Voltage Regulator.	—  —	"Aux." Interior lights (Fixed Head Coupe only).  "Aux. Ign." Brake light, petrol gauge, windscreen wipers, petrol warning light, flasher lights and flasher unit, horn relay, air conditioner motor.
Fuse Box.	Fuse 1. Side and tail lights, rear licence plate lights, boot light.  Fuse 2. Head lamps and head lamp warning light.  Fuse 3. Panel lights, interior lights, map light, cigar lighter.  Fuse 4. Self-start carburetter, petrol gauge, screen wipers, air conditioner motor, stop lamps, horn relay, reverse lights, trafficators or flasher units and flasher lights.	Fuse 1. Cigar lighter.  Fuse 2. Side and tail lights, reverse light, number plate light, boot light.  Fuse 3. Head lamp dipper.  Fuse 4. Head lamps, head lamp warning light.

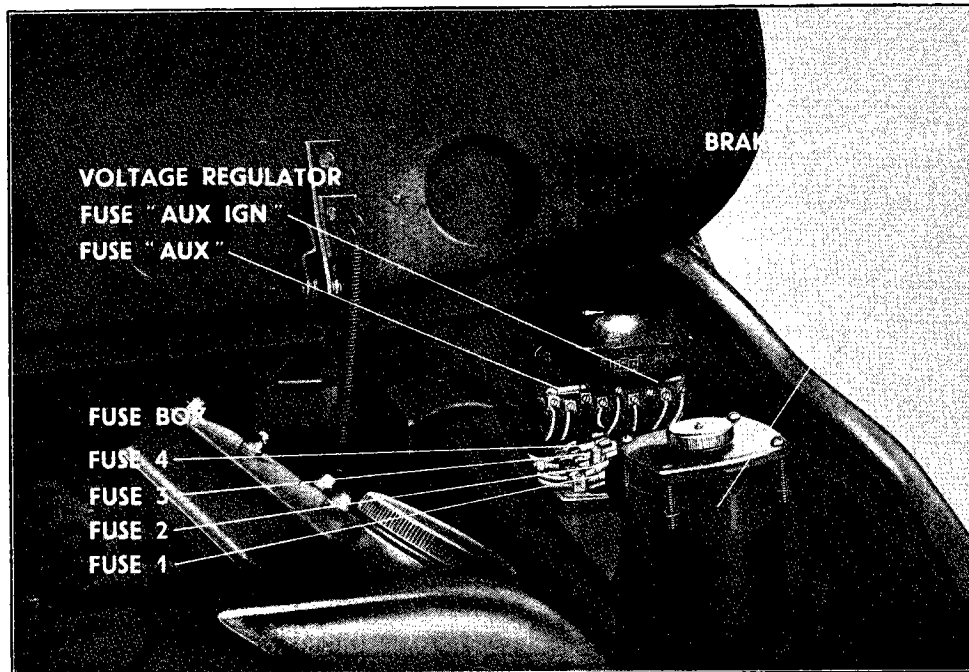


PLATE P.13. FUSES (XK 120).

## FOG/PASS LAMP BULBS. TO REPLACE (MARK VII MODEL)

It will be seen from Plate P.14 that the fog lamps are generally similar in construction to the head lamps, since both contain a light unit and pre-focus type bulb. To remove the light unit, unscrew the rim securing screw and lift out the rim and rubber dust excluder. (Three spring-loaded adjustment screws will be visible by means of which the setting can be adjusted as required.) Press the light unit in against the tension of the adjustment screw springs and turn it in an anti-clockwise direction until the heads of the screws can be disengaged through the slotted holes in the light unit rim. Do not disturb the screws when removing the light unit otherwise the lamp setting will be altered.

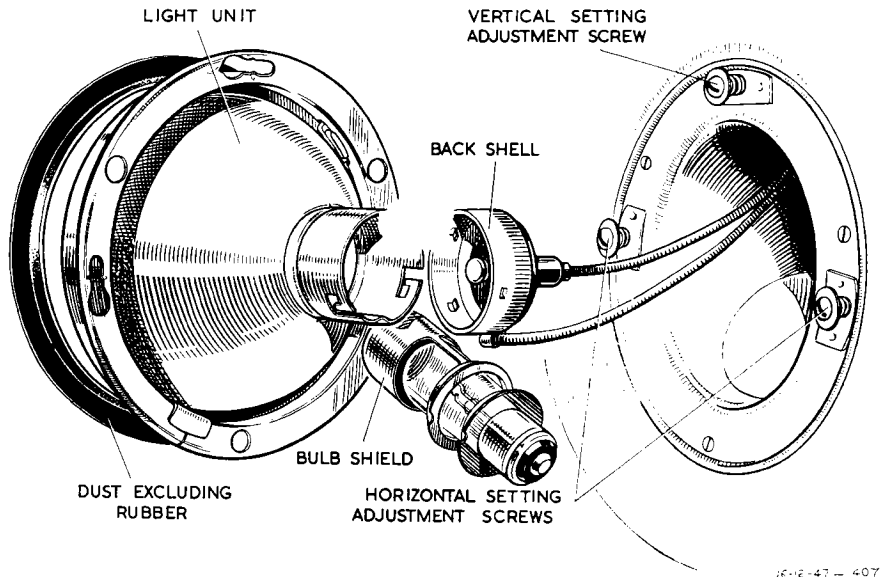


PLATE P.14. FOG/PASS LAMP (Mark VII).

## FOG/PASS LAMPS. TO SET BEAM (MARK VII MODEL)

Remove the lamp rim and dust excluder by unscrewing the rim securing screw.

If vertical adjustment is required, set the light unit to the required position by means of the vertical adjustment screw at the top of the reflector unit. (See Plate P.14.) To raise the beam rotate screw in a clockwise direction; to lower beam rotate screw in an anti-clockwise direction.

If horizontal adjustment is required, set the light unit by means of the two adjusting screws, one on each side of the light unit. To turn the beam to the left, rotate the left-hand screw clockwise, and to turn the beam to the right, rotate the right-hand screw clockwise.

## HEAD LAMPS. DESCRIPTION (MARK VII AND XK 120 MODELS)

**GENERAL.** The head lamps incorporate a Lucas light unit, consisting essentially of a combined reflector and front glass assembly, which by means of a mounting flange is secured in the body housing. The bulb which is of the Lucas pre-focus design is located accurately in the reflector and secured by a bayonet fixed backshell. The backshell also provides the contacts to the bulb. The bulb and bulb holder are so designed that the bulb is correctly positioned in relation to the reflector and no focusing is required.

**DIPPING.** Dipping of the head lamp beams is achieved by the use of double-filament bulbs in one or both head lamps. On home models a double-filament bulb is fitted in the nearside lamp and a single-filament bulb in the offside lamp. For overseas markets double-filament bulbs are fitted in both head lamps.

The double-filament bulbs are designed so that the dipping filament turns the dipped beam to left or right according to the requirements of the countries concerned: for example, with right-hand drive cars the dipped beam is turned to the left.

## HEAD LAMP BULBS. TO REPLACE

(MARK VII AND XK 120 MODELS)

First remove the front rim by unscrewing the rim securing screw and lifting off the rim. Slacken the four screws which secure the flange of the light unit and turn the unit in an anti-clockwise direction to detach the flange from the securing screws, when the light unit can be lifted out of the lamp body. Twist the backshell in an anti-clockwise direction and pull it off. The bulb can then be removed.

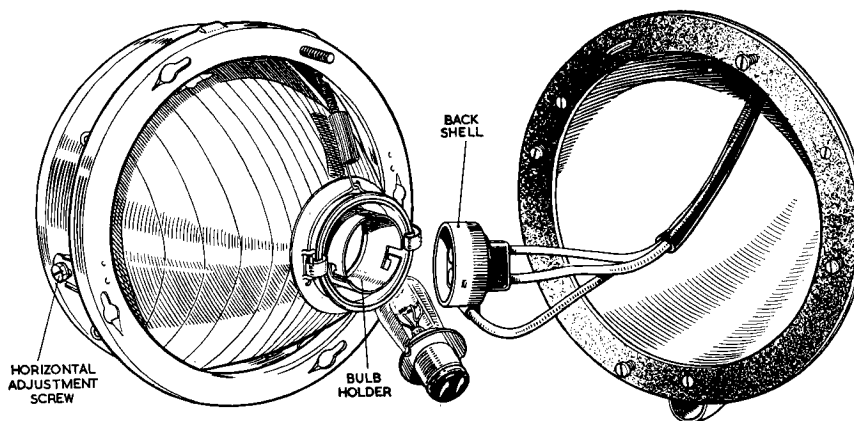


PLATE P.15. HEAD LAMP. BULB REMOVAL.

Enter the replacement bulb in the holder, taking care to locate it correctly. Engage the projections on the inside of the backshell with the slots in the holder. Press on and secure by twisting to the right. Position the light unit to the lamp body so that the vertical-trim adjusting screw locates in the slot in the body rim, and so that the heads of the four fixing screws protrude through the holes in the flange of the light unit. Twist the light unit in a clockwise direction and secure by tightening the four screws.

## HEAD LAMPS. TO SET BEAM

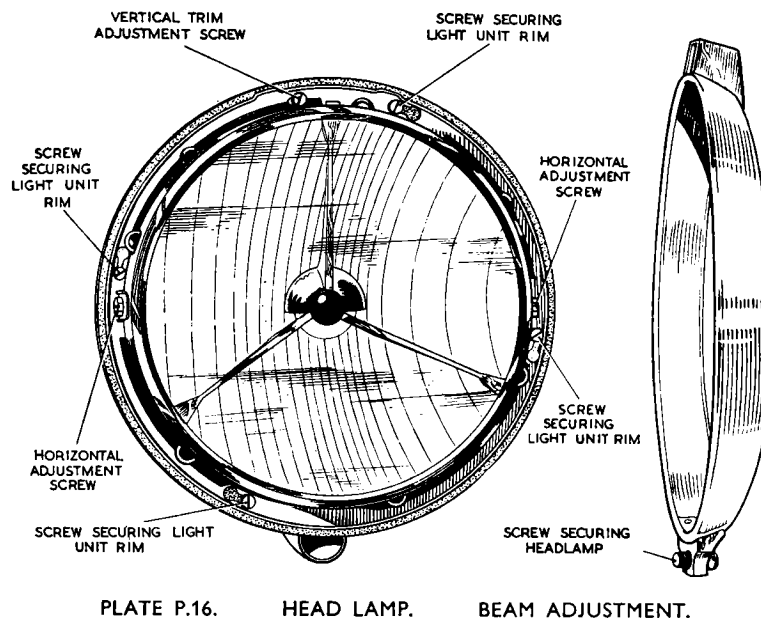
(MARK VII AND XK 120 MODELS)

**SETTING.**  
(Refer to  
Plate P.16.)

The head lamps must be set so that the beams of light are directed straight ahead and are parallel with the ground and with each other. If adjustment is necessary, proceed as follows:—

Remove the front rim by unscrewing the rim securing screw. If vertical adjustment is required, set the light unit to the correct position by means of the vertical-trim adjusting screw at the top of the reflector unit. Turn the screw in a clockwise direction to raise the beam, or in an anti-clockwise direction to lower it. If

horizontal adjustment is required, set by means of the two adjusting screws which are located one on each side of the light unit.



## HORNS. TO REMOVE, ADJUST AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE. (MARK VII.)** The twin horns are mounted to a bracket situated on the left-hand wing valance.

Remove the two bolts and nuts securing each horn to the mounting bracket. Draw each horn clear and remove centre screw from dome cover and remove cover. Disconnect the two wiring connections and remove horn.

**REMOVE. (XK 120.)** The horns are attached to brackets on the front end of the chassis frame side members, and are accessible from under each front wing.

Remove the two bolts and nuts securing each horn to its bracket, noting the earth wire eyelet under one of the bolt heads. Draw horn clear and remove centre screw from dome cover and remove cover. Disconnect the two wiring connections and remove horn.

**ADJUST.** Adjustment does not alter the pitch of the note, but merely takes up wear of moving parts. Slacken the lock nut on the fixed contact and rotate the adjusting nut until the contacts are just separated (indicated by the horn failing to sound). Turn the adjusting nut half a turn in the opposite direction and secure in this position by tightening the lock nut. (Plate P.17.) If the note is still unsatisfactory, do not dismantle the horn but return it to a Lucas Service Depot or Service Agent for examination.

**REFIT.** Refitting is the reverse of the above procedure.

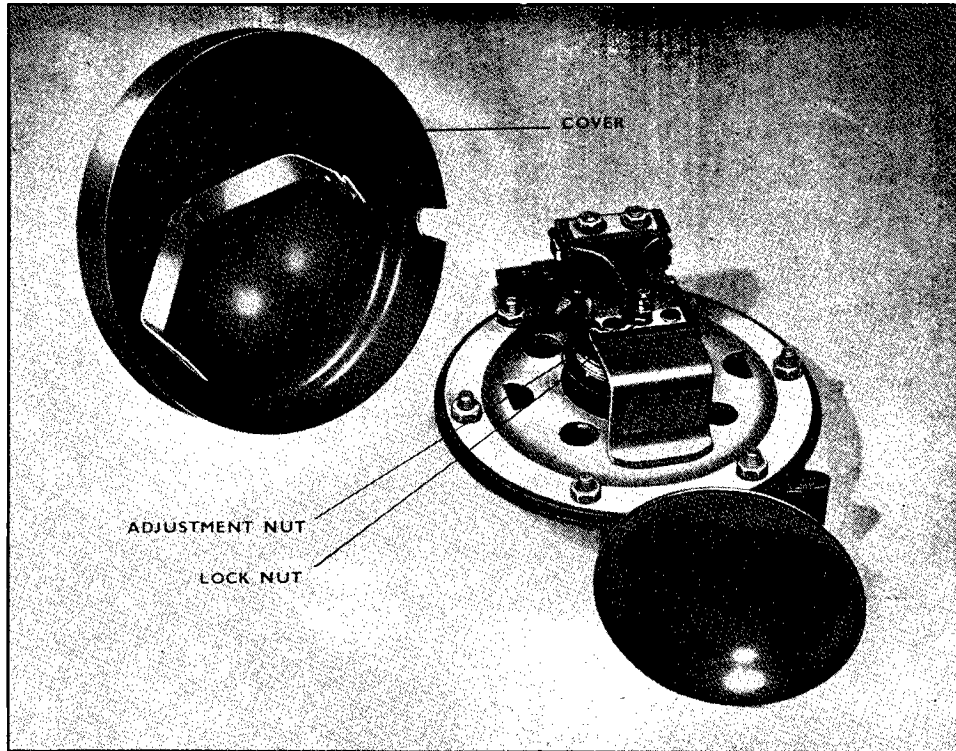


PLATE P.17. HORN.

### INSTRUMENT PANEL COMPONENTS. TO REPLACE (MARK VII MODEL)

#### HEAD LAMP WARNING LIGHT.

The head lamp warning light can be removed without disturbing the centre facia panel. Remove the dash casing by unscrewing the drive screws, and withdraw bulb holder from rear of speedometer. The warning light bulb is screwed into its holder.

#### GENERAL.

To gain access to the following instrument panel components it will be necessary to remove the centre facia panel as described below.

#### REMOVE CENTRE FACIA.

Disconnect battery positive lead. Unscrew the drive screws securing dash casing and remove casing. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly, and remove centre facia. (Plate P.1.)

#### SWITCHES.

The following switches are removed in the manner described below.

Windscreen wiper switch.  
Panel and interior light switch.  
Map light switch.  
Petrol change-over switch.

Lighting switch.  
Ignition switch.  
Air conditioner fan switch.

Remove centre facia panel as described in the foregoing paragraph.

Disconnect the wiring connections to switch at rear of instrument panel, noting their respective positions.

Remove the set screw(s) or nut securing switches to the instrument panel, and withdraw switch.

Starter switch

Remove centre facia panel as described in the foregoing paragraph. Disconnect the wires from the rear of the switch. Remove the starter switch push button by pressing in the spring-loaded pin through the hole in the side of the button. Unscrew the chromium-plated nut securing the switch to the front of the instrument panel, and withdraw switch to rear.

**WARNING LIGHTS.**

Remove centre facia panel as described in the foregoing paragraph.

To remove the ignition or trafficator warning light bulb, unscrew the bulb from its holder on the front of the instrument panel.

To remove the bulb holder, unscrew the two screws securing the bulb holder retainers.

Withdraw the bulb holder through the instrument panel and disconnect the wires at the rear of holder.

**CIGAR LIGHTER HOLDER.**

Remove centre facia panel as described in the foregoing paragraph. Disconnect the terminal wire at the rear of cigar lighter holder. Remove the nut securing the bridge piece, noting the insulating washers, and remove bridge piece. Remove the nut securing the earth wire connector plate, noting the insulating washer. Withdraw the cigar lighter holder from

front of instrument panel.

## INSTRUMENT PANEL COMPONENTS. TO REPLACE (XK 120 MODELS)

**CIGAR LIGHTER HOLDER.**

Disconnect the battery positive lead. Remove the dash casing by unscrewing the drive screws. Disconnect the wire from the cigar lighter terminal by unscrewing the nut. Remove the nut securing the bridge piece, noting the insulating washers, and remove bridge piece. Remove the nut securing the earth wire connector plate, noting the insulating

washer. Withdraw the cigar lighter holder from front of instrument panel.

**LIGHTING SWITCH.**

Disconnect the battery positive lead. From the centre of switch unscrew the chromium-plated screw and withdraw the switch control. Remove the dash casing by unscrewing the drive screws. From the rear of switch disconnect the wires, noting their respective positions. Remove the two nuts securing the lighting switch to the instrument panel posts and withdraw

switch to rear.

**HEAD LAMP WARNING LIGHT.**

Remove the dash casing by unscrewing the drive screws. From the rear of instrument panel withdraw the warning light bulb holder from bottom of speedometer. The warning light bulb is screwed into its holder.

**IGNITION WARNING LIGHT.**

Remove the dash casing by unscrewing the drive screws. Withdraw the bulb holder complete from the spring clip on the instrument panel. The ignition warning light bulb is screwed into its holder.

**PETROL WARNING LIGHT.**

Remove the dash casing by unscrewing the drive screws. Slacken the central nut of the petrol and oil gauge until the contact plate can be removed from the rear of the warning light bulb. Remove the bulb holder complete from rear of instrument. To remove bulb, screw out from holder.

When refitting bulb holder to instrument, ensure that the spring contact bears against the side of holder.

**GENERAL.**

To gain access to the following instrument panel components it will be necessary to remove the centre facia panel as described below:—

**REMOVE CENTRE FACIA.**

Disconnect battery positive lead. Remove drive screws securing dash casing and release casing. Remove two nuts (Fixed Head Coupe—two set screws) each side of instrument panel, securing panel to facia structure. Withdraw instrument panel from rest of facia. (Plate P.2.)



If it is required to withdraw the centre facia panel further away from the facia structure, it will be necessary to remove the revolution counter and speedometer cable by unscrewing the knurled nut at the rear of the instruments, and remove the oil pressure and water temperature gauge by unscrewing the two set screws securing the gauge retainers.

**PANEL LIGHTS.** Remove the centre facia as described above. Remove the bulb holder complete by turning in an anti-clockwise direction until the holder is released from the spring clips on the instrument panel.

The bulb is fitted to the holder with a bayonet fixing.

**SWITCHES.** The following switches are removed in the manner described below:—

Panel light switch.

Windscreen wiper switch.

Starter switch.

Remove the centre facia panel as described above. Disconnect the wires from rear of switch. Slacken the nut securing the switch to rear of instrument panel. Unscrew the bezel at front of panel and withdraw switch to rear.

Ignition switch

Remove the centre facia panel as described above. Remove ignition key. Disconnect the wires from rear of switch, noting their respective positions. Remove the two nuts securing the switch to the instrument panel and withdraw switch to rear.

Oil level switch

Remove the centre facia panel as described above. Disconnect the wires from the switch, noting their respective positions. Unscrew the bakelite switch and withdraw switch and push button to the rear.

### INTERIOR LIGHT BULB. TO REPLACE (MARK VII AND XK 120 F.H. COUPE MODELS)

Disconnect the battery positive lead. Remove the plastic cover by depressing the spring clip at bottom and prising cover outwards. The festoon bulb can now be removed by springing back the bulb holder.

### MANETTE CONTROL. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Disconnect battery positive lead. Set the road wheels in the straight ahead position. Disconnect the four manette control wires from the junction box fitted to the wing valance on the steering column side. Unscrew the two grub screws in the steering wheel hub and withdraw manette control complete with wiring harness.

**REFIT.** Set the road wheels in the straight ahead position. Pass the wiring harness down the centre of the inner column, centralise the trafficator hand control and ensure that the split portion of the cancelling ring is in line with this control. (Plate P.18.) Enter the manette control tube in the inner column and feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Ensure that the trafficator hand control and split portion of the cancelling ring are in the top centre position and push manette control fully home into the steering wheel hub. Secure with the two grub screws through the side of the steering wheel hub. Check that the trafficators cancel evenly on each side of the straight ahead position.

**Note.** If, when the manette control tube has been engaged with the stator tube, the trafficator hand control is not at the top centre position it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

### MANETTE CONTROL. TO REMOVE AND REFIT (XK 120 MODEL)

**REMOVE.** Disconnect battery positive lead. Set road wheels in straight ahead position. On the Super Sports model disconnect the manette control wire from the horn relay box fitted

to the wing valance on the steering column side. On the Fixed Head Coupe model disconnect the four wires from the rubber snap connectors.

Unscrew the two grub screws in the steering wheel hub and withdraw the manette control complete with wiring harness.

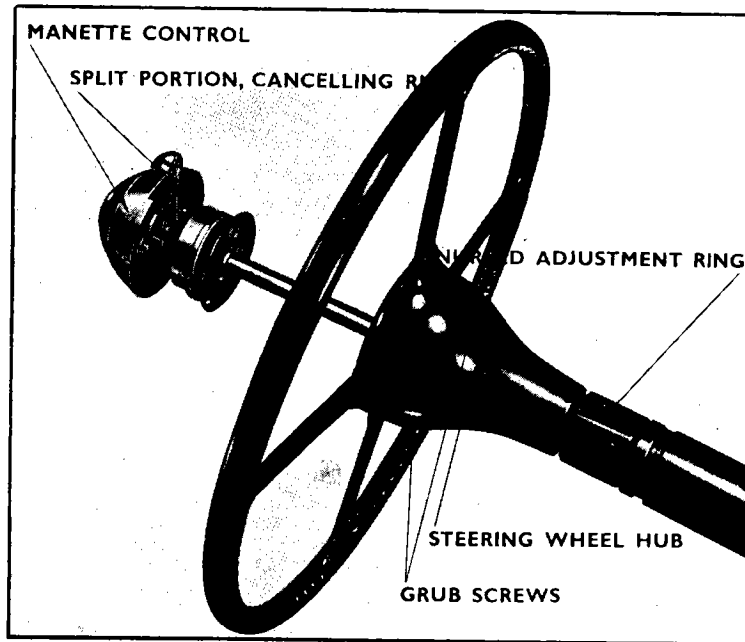


PLATE P.18. MANETTE CONTROL.

#### REFIT.

**Super Sports Model.** Set the road wheels in the straight ahead position. Pass the horn wire down the centre of the inner column and enter the manette control tube into the steering wheel hub with the head of the "Jaguar" on the horn push upright. Feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Push manette control fully home into the steering wheel hub and secure with the two grub screws through the side of the steering wheel hub.

**Note.** If, when the manette control tube has been engaged with the stator tube, the head of the "Jaguar" on the horn push is not upright, it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

**Fixed Head Coupe Model.** Set the road wheels in the straight ahead position. Pass the wiring harness down the centre of the inner column, centralise the trafficator hand control and ensure that the split portion of the cancelling ring is in line with this control. (Plate P.18.) Enter the manette control tube in the inner column and feel the key of the manette control tube into the keyway of the stator tube. (It may be necessary to rotate the manette control each way slightly to accomplish this.) Ensure that the trafficator hand control and split portion of the cancelling ring are in the top centre position and push manette control fully home into the steering wheel hub. Secure with the two grub screws through the side of the steering wheel hub. Check that the trafficators cancel evenly on each side of the straight ahead position.

**Note.** If, when the manette control tube has been engaged with the stator tube, the trafficator hand control is not at the top centre position it will be necessary to slacken the clamp bolt in the bracket attached to the bottom end plate of the steering box to enable the manette control to be turned to the correct position.

### MAP AND PANEL LIGHT BULBS. TO REPLACE (MARK VII MODEL)

**MAP LIGHT BULB.** From underneath the polished wood rail at the bottom of windscreen withdraw the plastic map light cover downwards out of its spring clip. The festoon bulb can now be removed by springing back the bulb holder.

When refitting the plastic map light cover note that the spring clips should be inserted inside the cover and the ends of the clips engaged with the holes at each side.

**PANEL LIGHT BULBS.** From underneath the polished wood rail at the bottom of windscreen withdraw the violet panel light glass downwards and unscrew the bulb.

### MAP LIGHT DOOR SWITCHES. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** The map light door switches are situated at the front of each front door aperture, adjacent to the door sealing rubbers.

Disconnect the battery positive lead. Remove the two drive screws securing the door light switch to the door aperture surround and withdraw switch. From the rear of switch disconnect the wire and remove switch.

**REFIT.** Refitting is the reverse of the removal procedure.

### NUMBER PLATE AND REVERSE LAMP BULBS. TO REPLACE (MARK VII MODEL)

The number plate illumination lamp contains four bulbs, of which one serves to light up the boot compartment and another as a reverse light.

Access to the bulbs is obtained by lifting the boot lid. When replacing either the number plate bulbs or the reverse light bulb, remove the bulb holder bracket by unscrewing the two cheese-headed screws securing the bulb carrier to the body of the lamp and remove the complete bulb carrier downwards.

The boot light bulb is on the underside of the carrier and can be removed without disconnecting the bulb carrier from the lamp body.

### NUMBER PLATE AND REVERSE LAMP BULBS. TO REPLACE (XK 120 MODELS)

Disconnect the battery positive lead. Remove the two chromium screws at each side of lamp glass and withdraw chromium-plated cover. The bulbs are now accessible, the large central bulb being the reverse light and the two outer bulbs the number plate lights.

### REVERSE LIGHT SWITCH. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

The reverse light switch is situated on the gearbox top cover forward of the gear lever.

**REMOVE GEARBOX COWL. (MARK VII.)** Remove the gear lever knob. Remove the centre carpets. Remove the gearbox cowl by unscrewing the round-headed screws.

**REMOVE GEARBOX COWL. (XK 120.)** Remove both seat cushions. Remove the set screw at each end of the seat runners and remove seats. Remove the centre arm rest by removing the two screws at front and the two screws at rear.  
Remove the gear lever knob and remove centre carpet. Remove the gearbox cowl by unscrewing the securing screws.

- REMOVE SWITCH.** Disconnect the battery positive lead. Disconnect the two wires from the switch. Unscrew the switch from the gearbox top cover.
- REFIT.** Refitting is the reverse of the removal procedure.

### **SIDE LAMP BULBS. TO REPLACE (MARK VII AND XK 120 MODELS)**

- EARLY TYPE.** The front rim of bulb holder assembly are secured by an internal spring. To expose the bulb holder, lever the rim out of its housing and withdraw the assembly.
- LATER TYPE.** The front rim and bulb holder assembly are secured by a single retaining screw. To expose the bulb holder, slacken the screw and withdraw the assembly.

### **SPARKING PLUGS. SERVICING (MARK VII AND XK 120 MODELS)**

**GENERAL.** The sparking plug is of great importance in satisfactory engine performance, and every care should be taken to fit the correct type when replacements are necessary. There is little to be gained by experimenting with different plugs as the make and type fitted as standard is best suited to the requirements of the engine.

<b>Sparking Plug Type.</b>	<b>Mark VII and XK 120</b>
	7 to 1 compression ratio . . . Champion L.10S
	8 to 1 compression ratio . . . Champion N.A.8

**MAINTENANCE.** Paint splashes, accumulation of grime and dust, etc., on the top half of the insulator are often responsible for poor plug performance. Plugs should be wiped frequently with a clean rag.

Plugs should be cleaned and tested at regular intervals on special plug cleaning equipment. Plugs which are allowed to remain oily and dirty with corroded electrodes will seriously impair the efficient running of the engine and waste petrol. It will be found economical to fit a new set of sparking plugs approximately every 10,000 miles (16,000 kilometres).

**GAP SETTING.** The correct gap setting of sparking plugs (i.e., the width between the firing point of the centre electrode and the earth electrode) is essential to good engine performance, and the recommended gap setting is .022" (.56 mm.).

**REFITTING.** When refitting the plugs make sure that the copper washers are not defective in any way. If they have become worn and flattened, fit new ones to ensure obtaining a gas-tight joint.

When installing plugs, first screw the plug down by hand as far as possible, then use spanner for tightening only. Always use a tubular box spanner to avoid possible fracture of the insulator, and do not in any circumstances use a moveable wrench.

### **STARTER MOTOR. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)**

- REMOVE.** Disconnect battery positive lead. Remove the starter lead from the terminal on the end plate. Remove the two securing bolts, nuts and spring washers and withdraw starter.
- REFIT.** Refitting is the reverse of the above procedure, but after the starter has been refitted the securing bolts should be slackened slightly, the starter operated for a few turns and then the bolts finally tightened. Do not omit to refit the earth strap to the top securing bolt.

## STARTER MOTOR. DESCRIPTION AND MAINTENANCE

### (MARK VII AND XK 120 MODELS)

**GENERAL.** The electric starting motor is a four-pole four-brush machine having an extended shaft which carries the engine starter drive. One of two patterns ("R.E." or "Eclipse") is fitted and full service instructions for each are given in the "Servicing" section. Both patterns are arranged to give an inboard type drive.

The starting motor is of a similar construction to the dynamo except that heavier copper wire is used in the construction of armature and field windings. (The latter are connected to form a series-parallel field circuit as it must be remembered that the current consumption of the motor is very high.) For example, the average 12-volt starter under lock conditions takes 450-500 amperes at about 7 volts.

To crank the engine, the starting motor is connected to the battery via a solenoid-operated switch controlled remotely by a pilot switch mounted on the instrument panel.

**MAINTENANCE.** The only maintenance normally required by the starting motor is the occasional checking of the brush gear and commutator. About every 10,000 miles (16,000 kilometres) remove the metal band cover. Check that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and clean its sides with a petrol-moistened cloth. Be careful to replace brushes in their original positions in order to retain the "bedding".

Brushes which have worn so that they will not "bed" properly on the commutator must be renewed.

The commutator should be clean, free from oil or dirt and should have a polished appearance. If it is dirty, clean it by pressing a fine dry cloth against it while the starter is turned by hand by means of a spanner applied to the square extension of the shaft.

Access to the squared shaft is gained by removing the thimble-shaped metal cover. If the commutator is very dirty, moisten the cloth with petrol.

If any difficulty is experienced with the starting motor not meshing correctly with the flywheel, it may be that the drive requires cleaning. The pinion should move freely on the screwed sleeve; if there is any dirt or other foreign matter on the sleeve it must be washed off with paraffin.

In the event of the pinion becoming jammed in mesh with the flywheel, it can usually be freed by turning the starter motor armature by means of a spanner, applied to the shaft extension at the commutator end. This is accessible by removing the cap.

## STARTER MOTOR. SERVICING

### (MARK VII AND XK 120 MODELS)

**TESTING IN POSITION.** (i) Switch on the lamps and operate the starter control. If the lights go dim, but the starting motor is not heard to operate, an indication is given that current is flowing through the starting motor windings but that the armature is not rotating for some reason; possibly the pinion is meshed permanently with the geared ring on the flywheel. In this case, the starting motor must be removed from the engine for examination.

(ii) Should the lamps retain their full brilliance when the starter switch is operated, check the circuits for continuity from battery to starting motor and the pilot and starter switches and examine the connections at these units. If a switch is found to be faulty, fit a new unit. If the supply voltage is found to be applied to the starting motor when the switch is operated, an internal fault in the motor is indicated and the latter must be removed from the engine for examination.

(iii) Sluggish or slow action of the starting motor is usually caused by poor connection in the wiring, giving rise to a high resistance in the motor circuit. Check as described above.

(iv) If the motor is heard to operate, but does not crank the engine, indication is given of damage to the drive.

**BENCH TESTING AND EXAMINATION OF BRUSH GEAR AND COMMUTATOR.**

(i) If it is necessary to remove the starting motor from the engine, first proceed as follows:—

Disconnect the cable from the positive battery terminal to avoid any danger of causing short circuits. Disconnect the heavy cable from the starting motor.

(ii) After removing the starting motor from the engine, secure the body in a vice and test by connecting it with heavy gauge cables to a 12-volt battery. One cable must be connected to the starter terminal and the other held against the body or end bracket.

Under these light load conditions, the starter should run at a very high speed.

(iii) If the operation of the starting motor is unsatisfactory, remove the cover band and examine the brushes and commutator. Hold back each of the brush springs and move the brush by pulling gently on its flexible connector. If the movement is sluggish, remove the brush from its holder and ease the sides by lightly polishing on a smooth file. Always replace brushes in their original positions. If the brushes are worn so that they will not bear on the commutator or if the brush flexible is exposed on the running face they must be replaced.

Check the tension of the brush springs with a spring scale. The correct tension is 30-40 ozs. (.85-1.13 kg.) and new springs should be fitted if the tension is low.

If the commutator is blackened or dirty, clean it by holding a petrol-moistened cloth against it while the armature is rotated.

(iv) Retest the starter as described under (ii). If the operation is still unsatisfactory, the unit must be dismantled for detailed inspection and testing.

**Dismantle.** (i) Remove the cover band, hold back the brush springs and lift the brushes from their holders.

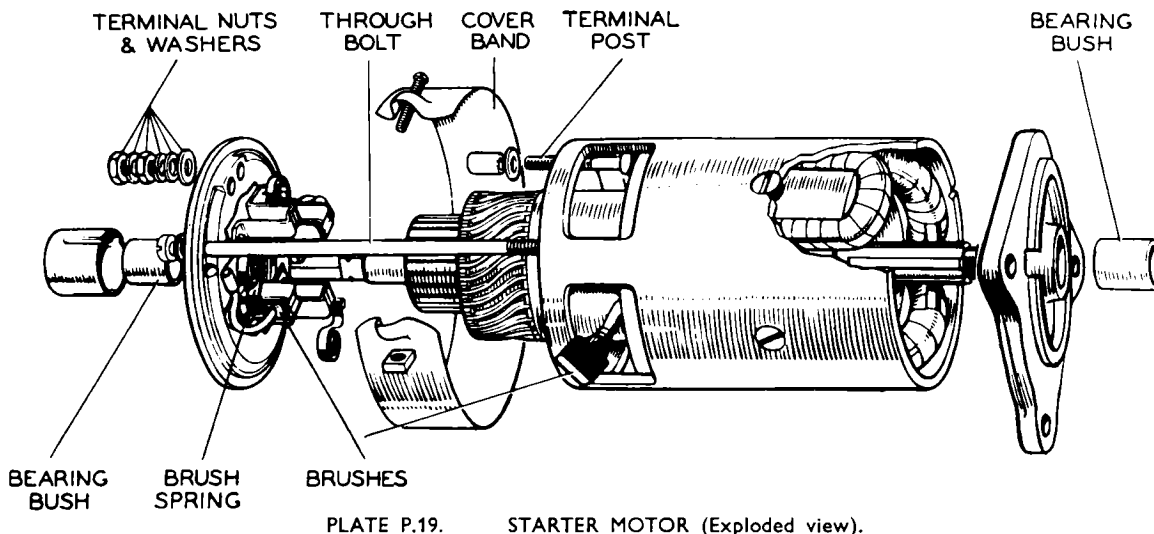
(ii) Unscrew the terminal nuts from the terminal post.

(iii) Screw the two through bolts from the commutator end bracket. Remove the commutator end bracket from the yoke.

(iv) Remove the driving end bracket complete with armature and drive from the starting motor yoke. If it is necessary to remove the armature from the driving end bracket it can be done by means of a hand press after the drive has been dismantled.

**Replacement of Brushes.** If the brushes are worn so that they do not bear on the commutator, or if the flexible connectors are exposed on the running face, they must be replaced.

Two of the brushes are connected to terminal eyelets attached to the brush boxes on the commutator end bracket and two are connected to the field coils. (Plate P.19.)



The flexible connectors must be removed by unsoldering and the connectors of the new brushes secured in their place by soldering. The brushes are reformed so that bedding to the commutator is unnecessary.

**Commutator.** A commutator in good condition will be smooth and free from pits and burned spots. Clean the commutator with a petrol-moistened cloth. If this is ineffective, carefully polish with a strip of fine glass paper, while rotating the armature. To remedy a badly worn commutator, dismantle the starter drive as described later and mount the armature in a lathe, rotate at a high speed and take a light cut with a very sharp tool. Do not remove any more metal than is necessary. Finally polish with a very fine glass paper. The insulators between the commutator segments **must not be undercut**.

**Armature.** Examination of the armature may reveal the cause of failure, for example, conductors lifted from the commutator due to the starting motor being engaged while the engine is running and causing the armature to be rotated at an excessive speed. A damaged armature must in all cases be replaced—no attempt should be made to machine the armature core or to true a distorted armature shaft.

**CHECKING FIELD COILS.** **Continuity.** Test the field coils for continuity by connecting a 12-volt battery with a 12-volt bulb in series between those points of the field coils at which the brushes are connected. Failure of the lamp to light indicates an open circuit in the wiring of the field coils.

**Insulation.** Lighting of the lamp does not necessarily mean that the field coils are in order, as it is possible that one of them may be earthed to a pole shoe or to the yoke. This may be checked with a test lamp connected from the supply mains, the test leads being connected to one of the field coil tapping points, and to a clean part of the yoke. Should the lamp light, it indicates that the field coils are earthed to the yoke.

In either case, unless a replacement starting motor is available, the field coils must be replaced. To do this, carry out the procedure outlined below, using a pole shoe expander and a wheel-operated screwdriver. (Plates P.10 and P.9.)

Remove the insulation piece which is provided to prevent the intercoil connectors from contacting with the yoke.

Mark the yoke and pole shoes in order that they can be fitted in their original positions. Unscrew the four pole shoe retaining screws by means of the wheel-operated screwdriver. Draw the pole shoes and coils out of the yoke and lift off the coils. Fit the new field coils over the pole shoes and place them in position inside the yoke. Take care to ensure that the taping of the field coils is not trapped between the pole shoes and the yoke. Locate the pole shoes and field coils by lightly tightening the fixing screws. Insert the pole shoe expander, open it to the fullest extent and tighten the screws.

Finally tighten the screws by means of the wheel-operated screwdriver. Replace the insulation piece between the field coil connections and the yoke.

**BEARINGS.** Bearings which are worn to such an extent that they will allow excessive side play of the armature shaft must be replaced. To replace the bearing bushes, proceed as follows:—

(i) Press the bearing bush out of the end bracket.

(ii) Press the new bearing bush into the end bracket using a shouldered, highly polished mandrel of the same diameter as the shaft which is to fit in the bearing. Porous bronze bushes must not be opened out after fitting, or the porosity of the bush may be impaired.

**Note.** Before fitting a new porous bronze bearing bush it should be completely immersed for 24 hours in clean thin engine oil. In cases of extreme urgency this period may be shortened by heating the oil to 100° C. when the time of immersion may be reduced to 2 hours.

**REASSEMBLY.** The reassembly of the starting motor is the reverse of the dismantling procedure.

### **STARTER DRIVE (Rubber Coupling Type) TO DISMANTLE AND REASSEMBLE (XK 120 MODELS)**

**DISMANTLE.** Having removed the armature as described in the section dealing with starting motors, the drive can be removed from the armature shaft as follows:—

Remove the retaining pin (A) from the centre sleeve (B), and then slide the drive back along the shaft and remove the key (C). Withdraw the drive unit from the shaft.

The drive can be dismantled as follows:—

Remove the retaining ring (D) from inside the end of the pinion and barrel assembly (E) and then withdraw the pinion and barrel assembly and washers (F).

Unscrew the location nut (G). This nut is held in position on the centre sleeve (B) by caulking. When reassembling, therefore, it will be necessary to fit a new sleeve.

Remove the washer (H), restraining spring (J), control nut (K) and withdraw the screwed sleeve (L). Remove the centre coupling plate (M), friction washer (N) and rubber unit assembly (O). Finally remove cushioning spring (P) and transmission plate (Q).

**REASSEMBLE.** Reassembly is the reverse of the above procedure.

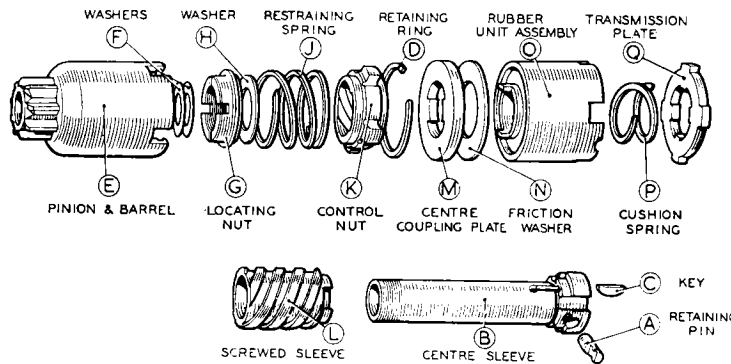


PLATE P.20. STARTER DRIVE (Rubber Coupling Type).

### STARTER DRIVE (Eclipse Type). TO DISMANTLE AND REASSEMBLE (MARK VII AND XK 120 MODELS)

**DISMANTLE.** Having removed the armature as described in the section dealing with starting motors, the drive can be removed from the armature shaft as follows:—

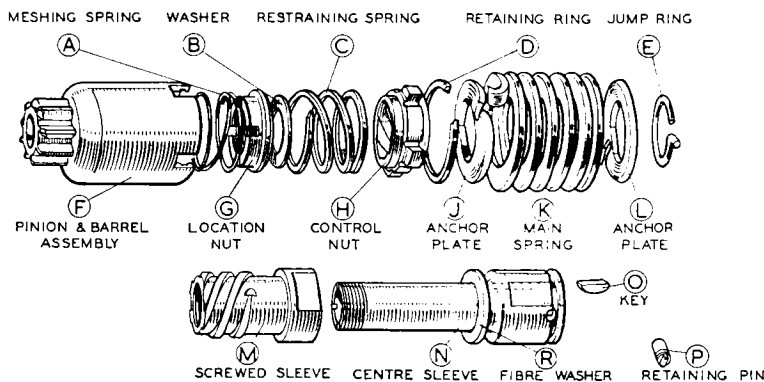


PLATE P.21. STARTER DRIVE (Eclipse Type).



Press in the anchor plate (L) and main spring (K) and pull out the retaining pin (P) and then slide the drive back along the shaft and remove the key (O). Withdraw the drive unit from the shaft.

The drive can be dismantled as follows:—

Remove the retaining ring (D) from inside the end of the pinion and barrel assembly (F) and slide off the pinion and barrel assembly (F) and meshing spring (A). Unscrew the location nut (G). This nut is held in position on the centre sleeve (N) by caulking. When reassembling, therefore, it will be necessary to fit a new sleeve.

Remove the washer (B), restraining spring (C), control nut (H) and withdraw the screwed sleeve (M). Remove the anchor plate (J), main spring (K) and fibre washer (R). The other anchor plate (L) can be removed from the centre sleeve assembly (N) by withdrawing the jump ring (E).

**REASSEMBLE.** The drive must be reassembled and fitted to the starter shaft by reversing the above procedure. Take care to caulk the centre sleeve to the location nut.

### STARTER SOLENOID SWITCH. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**GENERAL.** The starter solenoid switch incorporates a manual push button to enable the engine to be turned from the engine compartment with the ignition switched off.

**REMOVE.** The starter solenoid switch is situated on the right-hand side of the scuttle at rear of engine compartment.

Disconnect the battery positive lead. Pull back the rubber protectors over the solenoid switch terminals and disconnect the starter cable and wires, noting their respective positions. Also disconnect the solenoid switch wire from its terminal. Unscrew the two nuts securing the solenoid switch to the scuttle. Remove solenoid switch.

**REFIT.** Refitting is the reverse of the removal procedure.

### STOP LIGHT SWITCH. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE.** The stop light switch is situated at the front end of the brake hydraulic master cylinder.

Disconnect the two wires from the stop lamp switch. Unscrew the stop lamp switch from the end of the master cylinder. Take care not to operate the brake pedal or leave the switch removed for more than a short space of time, otherwise it will be necessary to bleed the brakes as described in Section L "Brakes".

**REFIT.** Refitting is the reverse of the above procedure.

### TAIL/STOP BULBS. TO REPLACE (MARK VII AND XK 120 MODELS)

Prise out the chromium-plated rim from the rubber lamp body. Prise out the lamp glass.

The bulb which has a bayonet fixing can now be removed by pressing in and rotating. Note that in order to ensure the correct action of the twin filament bulb, the bulb can only be fitted one way round in the holder.

### TRAFFICATORS. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Disconnect the battery positive lead. From the inside of the door pillar remove the trim pad by prising outwards. Remove the square polished wood capping by sliding downwards. Remove the long polished wood fillet by sliding downwards.

Remove the two set screws securing the trafficator bracket to the door pillar. Withdraw trafficator and disconnect the wire. Remove trafficator.

**REFIT.** Refitting is the reverse of the removal procedure.

### TRAFFICATORS. MAINTENANCE (MARK VII MODEL)

In normal service the trafficators need very little maintenance apart from the lubrication procedure described below, which should be carried out every 5,000 miles (8,000 kilometres). It is important to use only the slightest trace of oil, as any excess may adversely affect operation.

To lubricate the mechanism, lift the trafficator arm and apply **one drop** of thin machine oil to the catch pin between the arm and the operating mechanism.

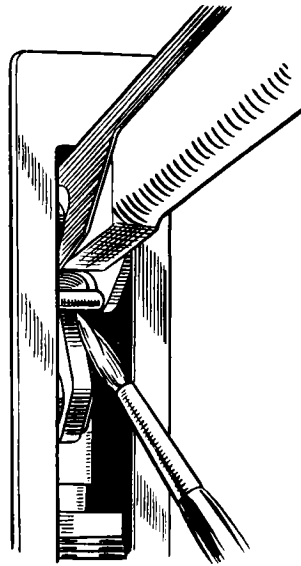


PLATE P.22. TRAFFICATOR. LUBRICATION.

Withdraw the screw at the end of the arm and slide off the arm cover. Move to one side the connecting wire to the bulb and apply a drop of thin oil to the felt pad at the top of the arm. When replacing the arm cover, slide it along the arm until the side plates or tongues engage with the slots below the pivot bearing. Replace the cover securing screw.

### TRAFFICATOR BULB. TO REPLACE (MARK VII MODEL)

Remove the screw at the end of the arm and lift off the arm cover. The bulb is of the tubular festoon type, and is located between two ribs within the translucent moulding. Remove the defective bulb and replace with the recommended type.

### TRAFFICATOR ARM. TO REPLACE (MARK VII MODEL)

The trafficator must first be removed from the car as described on page P.40. Unscrew the single securing screw linking the trafficator bracket with the car fixing plate. Take off the arm cover and remove the bulb. If the old bulb contact and cable are in good condition and it is decided not to replace them, open the clip securing the cable to the arm.

If, however, the old cable and contact need replacing, slacken the screw securing the terminal assembly; remove the terminal plate and unsolder the cable, temporarily replacing the screw to hold the solenoid in position.

Drill out the rivet securing the arm. Place the new arm in position so that the catch pin locates correctly between the lifting plate and the locking plate, and secure by fitting a new rivet. Solder the free end of the braided cable to the tag on the terminal plate and refit the plate in position. Before finally tightening the securing screw, fit the cable neatly between the coil and the insulating strip, so that although firmly held there is no danger of the insulation being damaged by sharp edges. There must be sufficient slack to allow the arm to move freely without straining the cable or bending it sharply. Finally fit the bulb and arm cover securing screw.

## WINDSCREEN WIPERS. DESCRIPTION

(MARK VII AND XK 120 MODELS)

**SINGLE-SPEED TYPE.** The single-speed type of wiper is fitted to the XK 120 models and early Mark VII cars.

The arrangement, as described below, consists essentially of a motor and gearbox mounted under the bonnet, and a flexible cable rack mechanism which transmits the drive from the motor to the wiper spindles, which are mounted at the bottom of the screen.

The flexible cable rack consists of an inner core of steel wire around which is wound a wire helix forming the rack. The rack, which is contained in an armoured outer casing, is given a reciprocating motion by means of a crank in the wiper gearbox, and engages with gears on the wiper spindles to drive the wiper arms.

The wipers consist of motor and gearbox and two wheel boxes, one for each of the two wiper arms.

The motor is controlled by a separately mounted switch and parking is effected by switching off at the end of a stroke.

**Note.** Later XK 120 cars are fitted with model C.R.T.14 windscreen wiper assemblies, the motor of which incorporates a protective device in the form of a thermostat which, under conditions of excessive heating cuts off the current supply to the motor until normal conditions are restored. If the blades are prevented from moving (as for examples by ice or packed snow on the windscreen in extreme winter conditions) the thermostat will operate as soon as the motor becomes hot; normal working will be resumed, if the obstruction has been removed, when the motor has cooled. The cooling-down period will depend on general operating conditions, and may be as long as ten minutes. Excessive heating from any other cause will also temporarily stop the wiper, but again the wiper will automatically restart as soon as the temperature falls.

**TWO-SPEED TYPE.** This type of windscreen wiper assembly which is fitted to later Mark VII cars is designed to give two working speeds. The control switch has three positions: "High Speed", "Normal" and "Park". The first position is intended for use when driving through heavy rain, whilst switching to "Park" causes the arm and blade assemblies to come to rest correctly parked, irrespective of their positions at the moment of switching.

## WINDSCREEN WIPERS. MAINTENANCE

(MARK VII AND XK 120 MODELS)

The moving parts, being packed with grease before assembly, need no lubrication and no adjustment is necessary. Thus the only maintenance consists of the occasional inspection of the rubber wiping blades, which become worn after long service and have to be renewed.

## WINDSCREEN WIPERS. SERVICING

(MARK VII AND XK 120 MODELS)

If the wiper fails to operate, or operates unsatisfactorily, switch on the wiper and note the current being supplied to the motor, either on the instrument panel ammeter or preferably on a moving-coil ammeter, 0-20 amps., connected in the wiper circuit. Then proceed as follows:—

**Wiper takes No Current.** Examine the fuse protecting the wiper. If it has blown, examine the wiring of the motor circuit, and that of all other circuits protected by the fuse, for evidence of chafed leads or short circuits. Replace any leads which are badly worn or chafed, if necessary fitting protective sleeving over the leads to prevent a recurrence of the fault. For internal faults causing blown fuse see "Wiper takes Abnormally High Current".

**Wiper takes Abnormally Low Current.** First ensure that the battery is not discharged, as this will obviously result in a falling off in performance of the motor. If the current is that normally taken by the field coils only a fault in the armature, commutator or brush gear must be suspected.

Remove the screws securing the commutator end cover and lift off the cover. Clean the commutator with a cloth moistened with petrol, and carefully remove any carbon dust from between the commutator segments.

Check that the brushes bear firmly on the commutator. If they are loose, and do not make contact, the tension spring must be renewed. If they are stiff they should be freed by working them backwards and forwards by hand.

**Wiper takes Abnormally High Current.** The normal current consumption of the wiper is given in "Electrical Data". If the ammeter reading is greatly in excess of this value the armature windings, commutator or bearings may be at fault. Check that the armature can revolve freely, and that a blow on the motor end bracket has not thrown the bearing out of line. A screw and lock nut are provided in the commutator end cover to take up the end thrust of the armature. The screw has a special hard alloy tip, and under normal conditions should not require adjustment.

Remove the commutator end cover and clean the commutator, paying particular attention to any pieces of carbon that may be short circuiting adjacent segments.

Remove the brush gear and withdraw the two screws securing the fibre plate. Pull the plate carefully away from the motor body, and examine the two leads to the field coil for chafed insulation, burning and other signs of a short circuit. (This, a very occasional fault, will be indicated either by repeated blowing of the fuse with the circuit wiring in order, or by the motor operating even when the switch is in the "OFF" position. An insulation test from each terminal of the motor to the body will confirm the fault.) If a short circuit has occurred, remove the fibre plate by softening the solder at the top of the brush lever posts and freeing the leads. Slip a new piece of sleeving over the chafed leads and arrange them so that they do not rub against sharp edges.

When reassembling, care must be taken that both the wire from the field coil and the thicker lead to the terminal are correctly held by the solder at the top of the brush lever posts.

Finally recheck the insulation of each motor terminal to earth.

If the performance of the motor is still unsatisfactory, the fault may be due to the armature. Check by substitution, and if necessary fit a new armature.

Sluggish operation with excessive current consumption may also be caused either by frictional losses in a badly-positioned driving cable or by the wiper spindle binding in its hole in the scuttle. See that the run of the driving cable contains no sharp bends (minimum radius of bend, 9 inches (23 cm.)) and, if necessary, add suitable distance pieces under the motor mounting bolts to straighten the run of the cable.

**Motor operates but does not drive the Wiper Arms.** Examine the wiper arms, making sure that they are firmly secured to the wheel box spindles. Remove the cover of the gearbox and examine the mechanism. Rotation of the armature should cause a push-pull motion of the cable rack. When overhauling, the gears must be lubricated by packing the gearbox with a grease of the zinc oxide type.

To detach the cable rack from the gearbox, proceed as follows:—

Remove gearbox cover. On earlier wipers, remove the split pin and washer from the crank pin on the final gear.

Lift off the connecting link. Disengage the outer casing, cable rack and cross head from the gearbox. Replace the gearbox cover to prevent the ingress of dirt. Remove the wiper arms from the wheel box spindles. The flexible cable rack can now be withdrawn from the outer casing for inspection.

See that the gears in the wheel boxes are undamaged and can engage correctly with the flexible rack. Before refitting the flexible cable rack into the outer casing, grease it thoroughly with Duckham's H.B.B. or an equivalent grease.

## WINDSCREEN WIPER BLADES. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

- REMOVE.** Pull the arm away from the windscreen and disengage the blade by swivelling it upwards.
- REFIT.** Hold the wiper arm with one hand and the blade with the other, insert the curved wrist of the arm into the slotted spring fastening of the blade; swivel the two components into engagement with a closing action. (Plate P.23.)

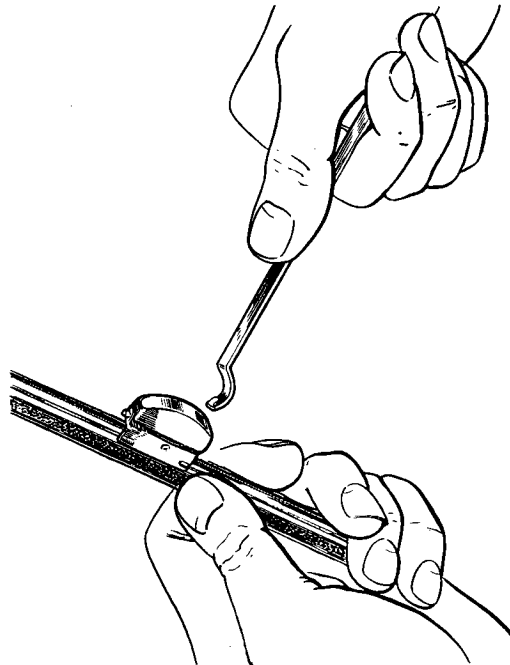


PLATE P.23. WINDSCREEN WIPER BLADE. REFITTING.

## WINDSCREEN WIPER ARMS. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS) SINGLE-SPEED WIPER TYPE

- REMOVE.** To remove the arm slacken the collet nut and tap sharply to loosen the collet and pull arm off the spindle.
- REFIT.** Refitting is the reverse of the above procedure, but do not fully tighten the collet nut until the arm is positioned to wipe over the correct area of the screen and the blades lie unobtrusively at the bottom of the screen when in the parked position.

### TWO-SPEED WIPER TYPE. (Later Mark VII cars)

- REMOVE.** Raise the arm and press back the spring catch in the head piece and withdraw from spindle.
- REFIT.** Press the head pieces on to the spindles at the correct parking angle (that is lying against the glass along the lower edge of the windscreen) until the spring catch is heard to clip over the end of the spindle drum.

Switch on the ignition and turn the wiper control switch to "N". The area of "wipe" of each blade should be approximately symmetrical and terminate a short distance from the centre pillar, due allowance being made for high speed working on a wet screen. Rotate the wiper control switch to "P" when the blades should come to rest against the glass along the lower edge of the windscreen.

**TO ADJUST.** To alter the position of the wiped area adjust the position of the arms on their spindles. Do NOT attempt to rotate the arms on the spindles, but press back the spring catch in the head piece and withdraw from spindle. Refit in the desired position. The spline fixing provides adjustment in steps of 5°.

Adjustment of the wiped area may affect the self-parking position. If so, the following adjustment can be made by turning the knurled nut to be found adjacent to the cable outlet on the motor gearbox attached to the right-hand wing valance. (Plate P.24.) To raise the self-parking position rotate the knurled nut in a **clockwise** direction. To lower, turn nut in an **anti-clockwise** direction.

**Note.** Turn the adjusting nut one or two serrations at a time and test for correct operation at each adjustment.

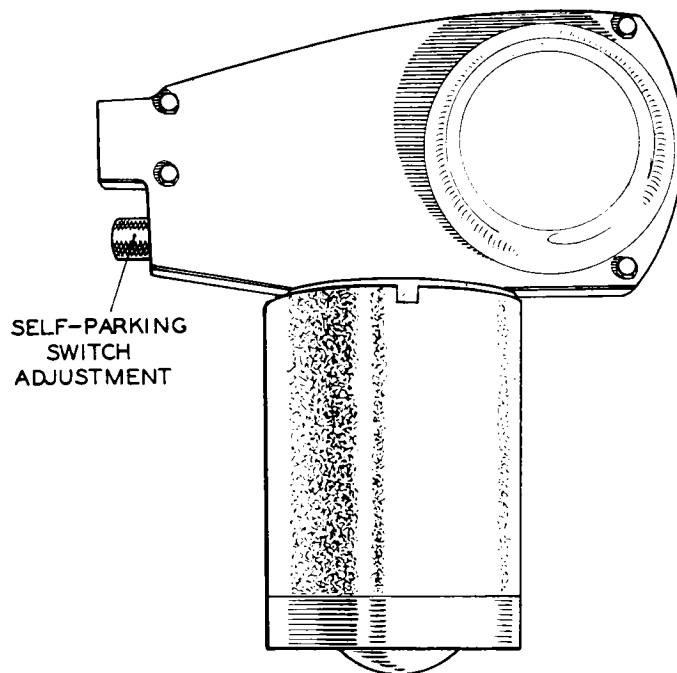


PLATE P.24. SELF-PARKING ADJUSTMENT NUT (Two-Speed Wiper).

### WINDSCREEN WIPER MOTOR. TO REMOVE AND REFIT (MARK VII AND XK 120 MODELS)

**REMOVE. (MARK VII.)** The windscreen wiper motor is located at the rear of the right-hand wing valance. Disconnect the battery positive lead, and the two wires from the wiper motor. Remove the cover plate from the motor gear housing by unscrewing the three set screws.

Remove the link connecting the final gear to the end of the inner cable and release cable from drive gear housing. From underneath the wing remove the three nuts securing the motor to the wing valance and remove motor.

**REMOVE. (XK 120.)** The windscreen wiper motor is located on the right-hand side of the scuttle at rear of engine compartment. Disconnect the battery positive lead. Remove the cover plate from the motor gear housing by unscrewing the three set screws.

Remove the link connecting the final gear to the end of the inner cable and release cable from drive gear housing. Remove the motor from its mounting bracket by unscrewing the three nuts. Disconnect the two wires from the motor and remove motor.

**REFIT.** Refitting is the reverse of the removal procedure.

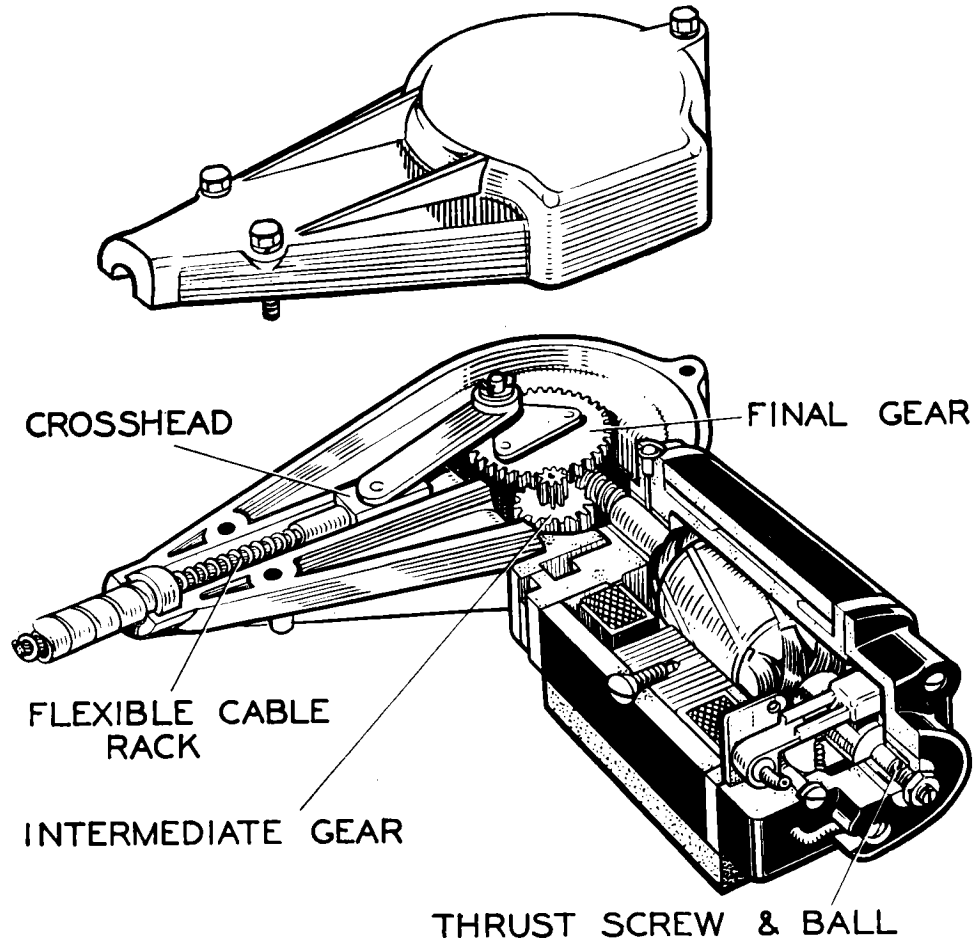


PLATE P.25. WINDSCREEN WIPER MOTOR (Single-Speed Type).

### WINDSCREEN WIPER ASSEMBLY. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE  
WIPER ARMS.**

Remove wiper arms as described on page P.44.

**REMOVE  
SCREEN RAIL  
CAPPING**

From underneath the polished wooden rail at the bottom of windscreen unscrew the two nuts securing the rail to its mounting brackets and remove the rail.

**DISCONNECT WHEEL BOXES.** Remove the right-hand demister nozzle by unscrewing the two drive screws. Slacken the right-hand outer cable clamp screw of the right-hand wheel box.

**REMOVE MOTOR AND INNER CABLE.** Disconnect the two wires from the wiper motor situated on the right-hand wing valance. From underneath the wing remove the three nuts securing the motor to the wing valance, and support motor.

Remove the cable grommet from scuttle and withdraw drive cable into engine compartment.

**REMOVE WHEEL BOXES.** Remove the left-hand demister nozzle by unscrewing the two drive screws. Remove the large chromium nut securing each wheel box and spindle to the outside of scuttle.

Withdraw the wheel boxes and outer connecting cable into the car.

**REFIT.** Refitting is the reverse of the removal procedure. For the instructions on the refitting of the wiper arms, see page P.44.

## WINDSCREEN WIPER ASSEMBLY. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE WIPER ARMS.** Slacken the chromium-plated collet nut, tap sharply to loosen the collet and pull arm off the spindle.

**DISCONNECT FACIA PANEL.** **Super Sports Model.** Remove the casing from above the facia panel by unscrewing the drive screws. Remove the dash casing from underneath facia panel by unscrewing the drive screws.

Disconnect the revolution counter and speedometer cables by unscrewing the knurled nuts at the rear of the instruments. Disconnect the pipe from the oil gauge by unscrewing the union nut.

Remove the grab rail from the passenger side of the facia panel by unscrewing the two nuts at rear of panel.

Disconnect the facia panel from its mounting brackets by unscrewing the two round-head screws at each side of the centre facia panel. Withdraw the facia panel sufficiently to gain access to the wheel boxes.

**REMOVE WINDSCREEN RAIL CASING.** **Fixed Head Coupe Model.** Remove the polished wood side cappings from the door pillars by lifting the door sealing rubber and unscrewing the two screws in the door aperture flange.

Remove the driving mirror bracket by unscrewing the two screws. Remove the screw accessible when the driving mirror bracket has been removed.

From underneath the polished wood screen rail unscrew the screw at each end and remove screen rail casing.

**REMOVE MOTOR AND INNER CABLE.** Slacken the right-hand outer cable clamp screw of the right-hand wheel box. Remove the motor from its mounting bracket on the scuttle by unscrewing the three nuts. Disconnect the two wires from the motor and support motor.

Remove the cable grommet from the scuttle and withdraw drive cable into engine compartment.

**REMOVE WHEEL BOXES.** Remove the two nuts securing each wheel box and withdraw the wheel boxes and connecting outer cable into the car.

**REFIT.** Refitting is the reverse of the removal procedure.





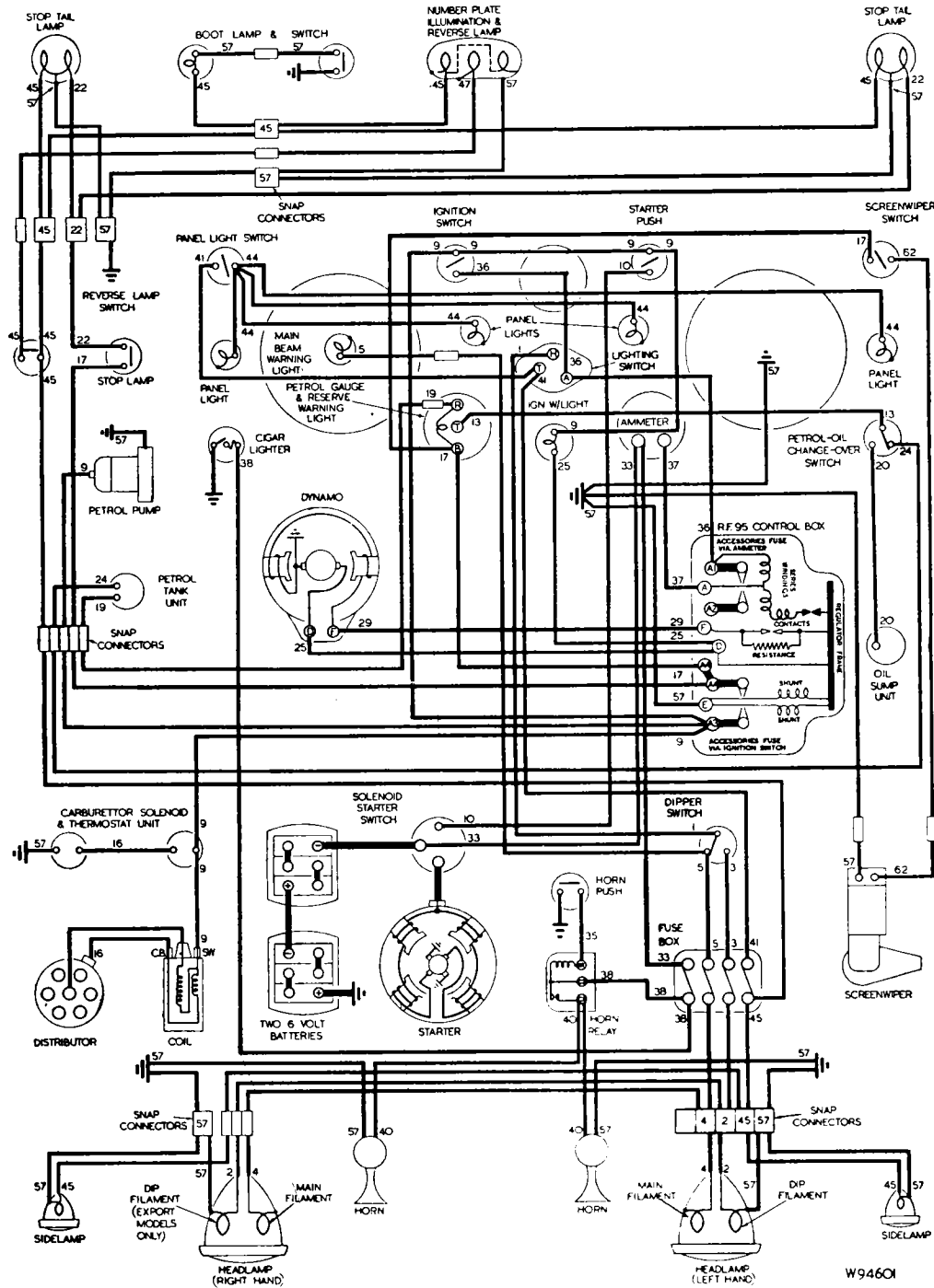
XK150 Models. Fixed Head, Drop Head Coupé, Open 2-seater and XK150S

Ammeter ... ..	BM4	36237A	Lamps—continued			Switches—continued		
Battery (2-off) ... ..	STG11E	—	Export Switzerland and Hol-			Windshield wiper ... ..	PRS7	31427E
Coil, ignition ... ..	HA12	*45067H (45075)	land ... ..	PF700	51565B	Knob ... ..	—	312613
Control box ... ..	RB310	37297B	Export Sweden ... ..	PF700	58632A	Washer, rubber, switch panel	—	315209
Distributor			Export Italy ... ..	PF700	58293A	Terminal block ... ..	TB6	37101B
7.1 compression ratio ...	DMBZ6A	40578A/D	Export U.S.A. ... ..	PF700	51562B	Windshield wipers:		
8.1 compression ratio ...	DMBZ6A	40576B	Export U.S.A. (later) ...	F700	58669A	Motor, right hand drive ...	DR3	75319B
9.1 compression ratio ...	DMBZ6A	40616B	Number plate illumination,			Motor, left hand drive ...	DR3	75308B
8.1 compression ratio (3.8 litre)	DMBZ6A	40640B	boot and reverse ... ..	512	53215A	Crosshead and rack ... ..	—	744254
9.1 compression ratio (3.8 litre)	DMBZ6A	40665B	Number plate illumination,			Crosshead and rack (cut to		
Distributor (XK150S)			boot and reverse (Export			39 $\frac{1}{4}$ ") ... ..	—	†744256
8.1 compression ratio (3.4 litre)	DMBZ6A	40670A	France) ... ..	512	53556A	Outer casing (motor to wheel-		
9.1 compression ratio (3.4 litre)	DMBZ6A	40616B	Side ... ..	513	52175D	box) ... ..	—	747248
9.1 compression ratio (3.8 litre)	DMBZ6A	40617A/D	Side (Export Switzerland) ...	563	52499A	Outer casing (motor to wheel-		
Flasher unit ... ..	FL5	35010A	Stop tail, flasher and reflex			box) ... ..	—	†54710186
Fuse box ... ..	SF4	37263B	Left hand ... ..	627	53738A	Outer casing (wheelbox to		
Fuse box ... ..	SF6	54038009	Right hand ... ..	627	53739A	wheelbox) ... ..	—	745555
Generator ... ..	C45PV5-6	22496B	Left hand (Export U.S.A.) ...	627	53755A	Outer casing (short, wheelbox)	—	740746
Horn—Low note ... ..	HF1748	*70063F (069448)	Right hand (Export U.S.A.) ...	627	53756A	Ferrule, outer casing retaining	—	740715
High note ... ..	HF1748	*70071F (069474)	Starting motor ... ..	M45G	26062A	Wheelbox ... ..	—	72715A
Lamps:			Steering column control ...	CC5	32902H	Arm, right hand drive (2 off)	—	54711569
Flasher, front ... ..	563	52271B	Slip ring (serviced by Jaguar) ...	CR51	38263A	Arm, left hand drive (2 off) ...	—	54711570
Flasher, front (Export U.S.A.)	563	52343B	Switches:			Blade ... ..	—	54711614
Flasher, front (Export Switzer-			Dipper ... ..	FS22-1	31284D	BORG WARNER		
land) ... ..	513	52500A	Cap, rubber ... ..	—	54334682	TRANSMISSION		
Fog ... ..	SFT576	55174E	Direction indicator ... ..	375A	31776B	Solenoid, gear holding ... ..	11S	76516B
Fog (Export France) ... ..	SFT576	55133F/H	Heater/Fan ... ..	CHRI	78262B	Solenoid, brake line ... ..	BVS1	76502E
Head			Knob ... ..	—	768473	Starting motor ... ..	M45G	26097D
Home and Export, right hand			Ignition ... ..	S45	31287F	Switches:		
drive, dip left ... ..	J700	51762A	Interior light ... ..	PS9	31527A	Hydraulic pressure ... ..	HPS1	31393A
Export, left hand drive, dip			Lighting ... ..	PRS7	31524E	Rotary inhibitor ... ..	S55A	31680A
right ... ..	J700	51763A	Knob ... ..	—	317603	Throttle ... ..	TOS1	31392A
Export Austria ... ..	PF700	58633A	Panel light ... ..	PS9	31528A	LAYCOCK DE NORMANVILLE		
Export Europe (except coun-			Reverse lamp ... ..	SS10-1	*31077E (31542)	OVERDRIVE		
tries stated) ... ..	PF700	51507A	Solenoid, starting motor ...	ST950	*76411E (76464)	Relay ... ..	SB60	33174B
Export France ... ..	PF700EF	51563B	Solenoid operating ... ..	25T	31253E	Solenoid, transmission gear ...	11S	76515A/B
Export France (later) ... ..	PF700	58588A	Knob ... ..	SS9	31253E	Switches:		
Export Norway, Sweden and			Stop light ... ..	HL2	317370	Rotary throttle ... ..	I2SA	31504D
Germany ... ..	PF700	51564B			31082H	Top gear ... ..	SS10-1	*31077E (31542)

\* When ordering, quote part number shown in brackets † Open 2-seater

# LUCAS ELECTRICAL EQUIPMENT

## JAGUAR XK120 CARS (1950-54) HOME AND RIGHT HAND DRIVE EXPORT MODELS



### KEY TO CABLE COLOURS

1 BLUE	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
2 BLUE with RED	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
3 BLUE with YELLOW	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
4 BLUE with WHITE	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
5 BLUE with GREEN	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
6 BLUE with PURPLE	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
7 BLUE with BROWN	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
8 BLUE with BLACK	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
9 WHITE	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
10 WHITE with RED	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
11 WHITE with YELLOW	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
12 WHITE with BLUE	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	65 DARK GREEN
13 WHITE with GREEN	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE	66 LIGHT GREEN

### WIRING DIAGRAM

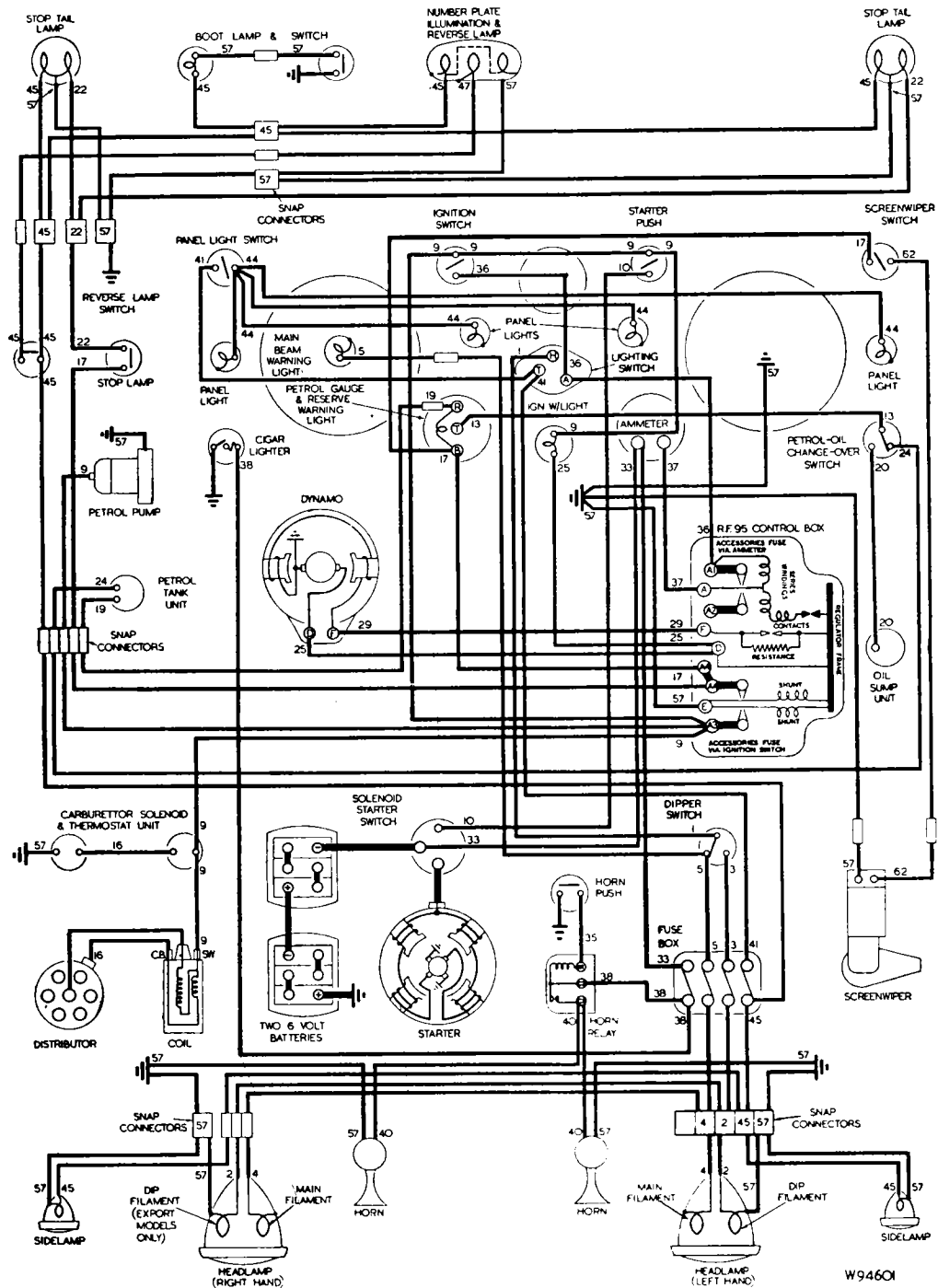
No. W94601

12-VOLT

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE

# LUCAS ELECTRICAL EQUIPMENT

**JAGUAR XK120 CARS**  
(1950-54)  
HOME AND RIGHT HAND DRIVE EXPORT MODELS



**KEY TO CABLE COLOURS**

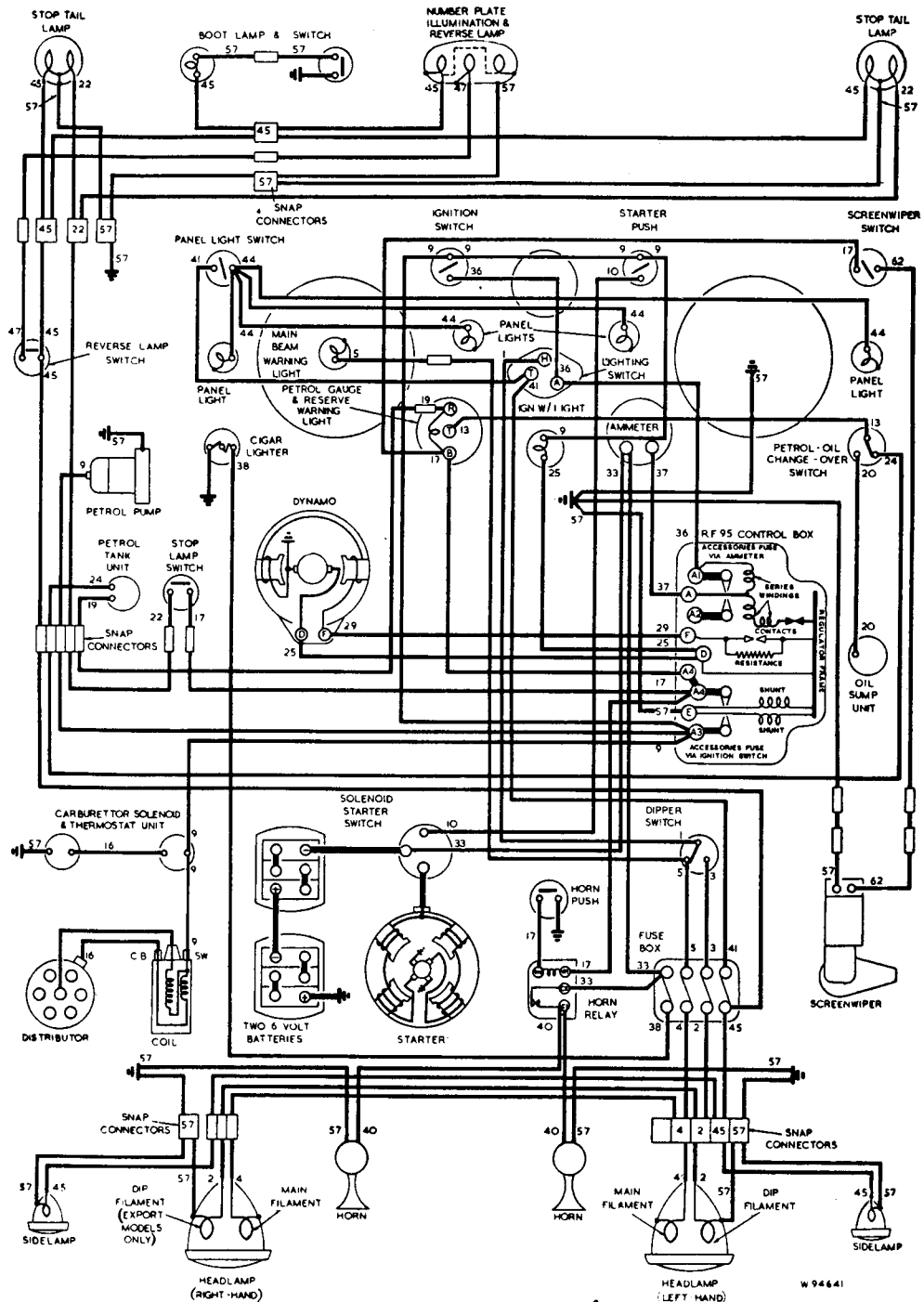
1 BLUE	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
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11 WHITE with YELLOW	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
12 WHITE with BLUE	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	65 DARK GREEN
13 WHITE with GREEN	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE	66 LIGHT GREEN

**WIRING DIAGRAM**  
**No. W94601**  
**12-VOLT**

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE

# LUCAS ELECTRICAL EQUIPMENT

## JAGUAR XK120 CARS (1950-54) LEFT HAND DRIVE EXPORT MODELS



### KEY TO CABLE COLOURS

1 BLUE	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
2 BLUE with RED	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
3 BLUE with YELLOW	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
4 BLUE with WHITE	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
5 BLUE with GREEN	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
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8 BLUE with BLACK	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
9 WHITE	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
10 WHITE with RED	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
11 WHITE with YELLOW	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
12 WHITE with BLUE	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	65 DARK GREEN
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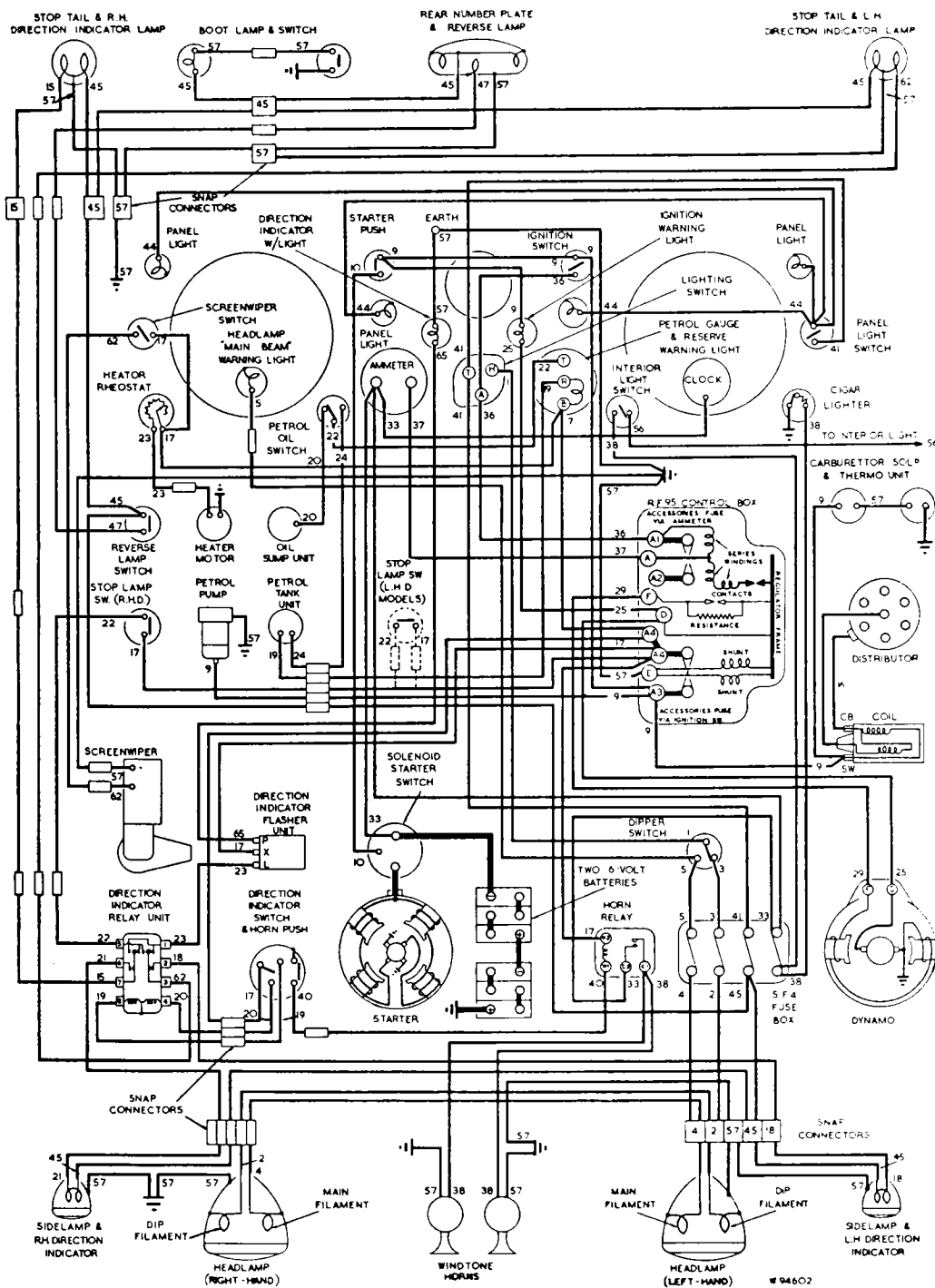
**WIRING DIAGRAM**  
**No. W94641**  
**12-VOLT**

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE

# LUCAS ELECTRICAL EQUIPMENT

JAGUAR XK120 FIXED HEAD COUPE  
(1952-54)

HOME & EXPORT MODELS



## KEY TO CABLE COLOURS

1 BLUE	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
2 BLUE with RED	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
3 BLUE with YELLOW	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
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12 WHITE with BLUE	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	65 DARK GREEN
13 WHITE with GREEN	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE	66 LIGHT GREEN

WIRING DIAGRAM

No. W94602

12-VOLT

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE

# AIR CONDITIONING EQUIPMENT

## MARK VII and XK 120 MODELS

### CHASSIS NUMBERS

#### MARK VII

(Stamped on the chassis left-hand side member above rear engine mounting bracket)

710001 Right-Hand Drive

730001 Left-Hand Drive

#### XK 120

(Stamped on the chassis left-hand side member bracket to rear of twin exhaust down pipes)

#### Super Sports Model

660911 Right-Hand Drive

671493 Left-Hand Drive

#### Fixed Head Coupe Model

669001 Right-Hand Drive

679001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown:—

Index to Contents	-	-	-	-	-	-	Page O. 2
Index to Plates	-	-	-	-	-	-	Page O. 3
Description and Maintenance	-	-	-	-	-	-	Page O. 4
Servicing. Mark VII Model	-	-	-	-	-	-	Page O. 8
Servicing. XK 120 Models	-	-	-	-	-	-	Page O.10

## INDEX TO CONTENTS

Contents	Operation	Page	
		Mark VII	XK 120
Description .. .. .	.. .. .	O. 4	O. 6
Controls .. .. .	.. .. .	O. 4	O. 6
Operating Instructions .. .. .	.. .. .	O. 5	O. 7
Maintenance .. .. .	.. .. .	O. 5	O. 7
Heater Unit .. .. .	Remove and Refit .. .. .	O. 8	O.10
Heater Water Tap .. .. .	Remove and Refit .. .. .	O. 9	O.10
Fan Unit .. .. .	Remove and Refit .. .. .	O. 9	—
Fan Switch .. .. .	Remove and Refit .. .. .	O. 9	O.11
Demister/Defroster Nozzles .. .. .	Remove and Refit .. .. .	O. 9	O.11 (F.H. Coupe)
Water Tap Control Rod .. .. .	Remove and Refit .. .. .	O.10	—



## INDEX TO PLATES

Plate No.	Plate	Page	
		Mark VII	XK 120
O. 1	Air Conditioning Controls .. .. .	O. 4	—
O. 2	Air Conditioner Hot/Cold Control .. .. .	—	O. 6
O. 3	Heater and Fan Units .. .. .	O. 8	—

## OPERATING INSTRUCTIONS (MARK VII MODEL)

### UNIT NOT IN USE.

#### Air conditioning, demisting or defrosting not required.

- (a) Close scuttle ventilator.
- (b) Switch the air conditioner motor to "OFF".
- (c) Close the gallery shutters.
- (d) Turn the water control tap to "COLD" (rotate clockwise).

### UNIT IN USE —COLD AIR REQUIRED.

#### 1. Demisting only.

- (a) Open scuttle ventilator.
- (b) Switch air conditioner motor to "ON".
- (c) Turn the "Hot-Cold" tap to "COLD" (rotate clockwise).
- (d) Close the gallery shutters.

#### 2. Cold air conditioning and demisting.

- (a) Open scuttle ventilator.
- (b) Switch air conditioner motor to "ON".
- (c) Turn the "Hot-Cold" tap to "COLD" (rotate clockwise).
- (d) Open the gallery shutters.

**Note.** In condition 1, continuous cold air demisting of the windscreen will take place, and in condition 2, cold air conditioning of the body interior in addition. It will be appreciated that in condition 2 described above, if the air conditioner motor is switched off, a supply of cold air will be automatically circulated when the car is in motion.

### UNIT IN USE —WARM AIR REQUIRED.

#### 3. Demisting and defrosting only.

- (a) Open scuttle ventilator.
- (b) Switch air conditioner motor to "ON".
- (c) Turn the "Hot-Cold" tap to "HOT" (rotate anti-clockwise).
- (d) Close the gallery shutters.

#### 4. Warm air conditioning, demisting and defrosting.

- (a) Open scuttle ventilator.
- (b) Switch the air conditioner motor to "ON".
- (c) Turn the "Hot-Cold" tap to "HOT" (rotate anti-clockwise).
- (d) Open the gallery shutters.

**Note.** In condition 3, continuous demisting and defrosting of the windscreen will take place, and in condition 4, warm air conditioning of the body interior in addition. It will be appreciated that in condition 4 described above, if the air conditioner motor is switched off, a supply of warm air will be automatically circulated when the car is in motion.

## (MARK VII MODEL)

### MAINTEN- ANCE.

To protect the heater radiator from frost damage during the winter months it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers. If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine and the heater radiator.

Drain the radiator while the car is standing on level ground by operating the remote control of the radiator drain tap situated at the top left side of the radiator block and the engine by opening the tap at the left-hand rear of the cylinder block.

When the water is being drained from the radiator and cylinder block the air conditioner "Hot-Cold" control on the centre facia should be turned to the "Hot" position, that is, anti-clockwise.

**Note.** On early cars fitted with a heater bleed valve in the front face of the heater radiator casing it is necessary to unscrew the valve to prevent an air lock occurring and water remaining in the heater system.

When water has ceased to flow, run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system completely.

For further details in regard to the use of anti-freeze and the filling of the cooling system, see Section D "Cooling System".

**(MARK VII MODEL)**

**DESCRIPTION.** The air conditioning equipment consists of a centrifugal fan driven by an electric motor, which draws cold air from outside the car and delivers it to a duct situated under the instrument board through a special radiator which is heated, if desired, by the engine cooling water. Air is then directed from the duct over the windscreen and may be delivered to the car interior as required.

A ventilator is fitted on top of the scuttle panel, which can be operated by either driver or passenger and permits filtered air to pass into the fan housing situated on the left-hand side of the dash under the bonnet. The fan discharges the air through the radiator and into a built-in duct fitted with two shutters situated under the instrument panel above the gearbox cowl and operated by handles (Plate O.1), allowing the passage of conditioned air into the interior of the car. Additional ducts are provided to deliver air from the air conditioning unit to vents at the base of the windscreen for the purpose of demisting and defrosting the screen. The inlet connection to the heater radiator is taken from the engine inlet manifold water jacket and the return to the water pump inlet elbow. It will thus be seen that water is circulated through the radiator, the flow being controlled by a tap operated from the instrument panel which opens or closes the water circuit. (Plate O.1.)

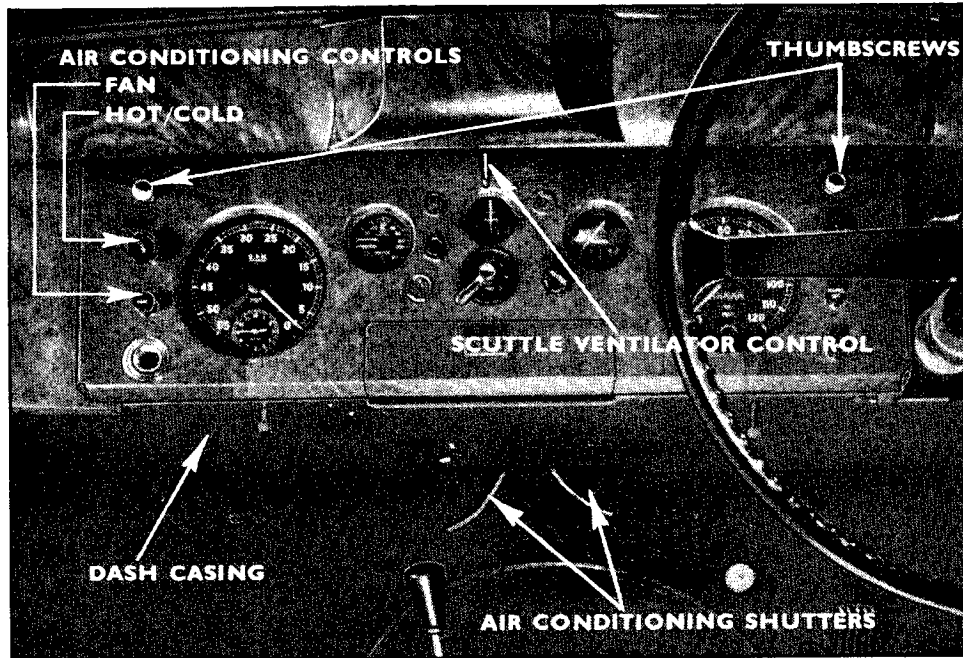


PLATE O.1. AIR CONDITIONING CONTROLS (Mark VII).

**CONTROLS**

**(MARK VII MODEL)**

The air conditioner controls are situated on the left-hand side of the centre facia panel and consist of a temperature control marked "Hot/Cold" and a small "On/Off" switch governing the fan motor.

**TEMPERATURE CONTROL.** Turn anti-clockwise for heat and clockwise for cold as indicated by arrow on control knob. This control operates the tap situated at the inlet pipe of the air conditioner radiator.

**FAN CONTROL.** Pull out to switch on air conditioner fan motor. Note that the fan switch will only operate when the ignition switch is on.

## (XK 120 MODELS)

**DESCRIPTION.** The air conditioning unit, consisting of heating element, fan and electric motor, is mounted on the scuttle under the facia immediately above the gearbox cowl. Engine cooling water may be circulated through the heating element by the water pump and an "ON-OFF" tap. An "ON-OFF" switch for the electric motor is also controlled by the driver.

Situated on the face of the air conditioning unit are two doors which control the flow of air into the body of the car.

On the Fixed Head Coupe model suitable pipes deliver air from the air conditioning unit to vents at the base of the screen to provide demisting and defrosting of the screen.

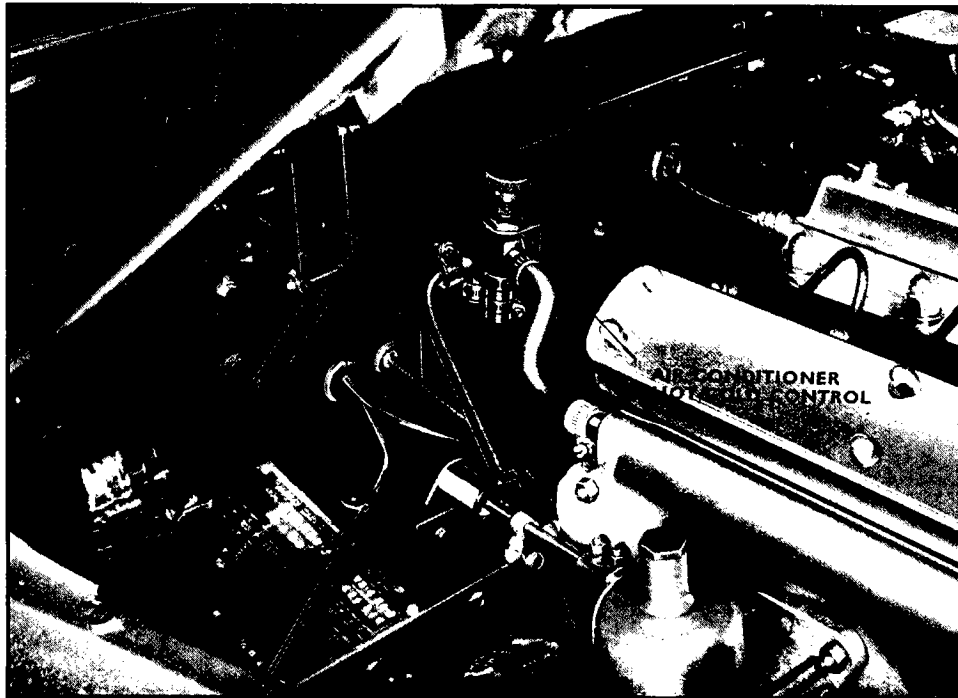


PLATE O.2. AIR CONDITIONER HOT/COLD CONTROL (XK 120).

**CONTROLS**

## (XK 120 MODELS)

**"HOT-COLD" CONTROL.** The "HOT-COLD" control knob controlling the flow of water from the engine cooling system to the element is fitted on the scuttle at the rear of the engine, and is accessible when the bonnet is raised. (Plate O.2.) The "HOT-COLD" tap is set to hot when rotated fully anti-clockwise. Rotation fully clockwise sets the tap to cold. The tap will normally be left in the "ON" or "HOT" position during the winter running and the "OFF" or "COLD" position during summer running.

**FAN SWITCH.** On the Fixed Head Coupe model the "ON-OFF" rheostat switch for the air conditioner motor is situated at the lower extreme right-hand side of the facia panel. On the Super Sports model the switch is situated on the facia panel, forward of the steering wheel.

The motor switch knob is off when rotated fully anti-clockwise. Rotation clockwise switches on the motor at its maximum speed: further rotation clockwise brings the rheostat into operation and the motor speed progressively falls until the knob reaches the end of its travel.

**Note.** The motor switch is wired through the ignition switch and will be automatically switched off with the ignition.

## OPERATING INSTRUCTIONS

## (XK 120 FIXED HEAD COUPE MODEL)

**UNIT NOT  
IN USE.****Air conditioning, demisting or defrosting not required.**

- (a) Set motor to "OFF".
- (b) Close air conditioner doors.

**UNIT IN USE  
—COLD AIR  
REQUIRED.****1. Demisting only.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "COLD".
- (c) Close air conditioner doors.

**2. Cold (recirculated) air conditioning and demisting.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "COLD".
- (c) Open air conditioner doors.

**UNIT IN USE  
—WARM AIR  
REQUIRED.****3. Demisting and defrosting only.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "HOT".
- (c) Close the air conditioner doors.

**4. Warm (recirculated) air conditioning, demisting and defrosting.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "HOT".
- (c) Open air conditioner doors.

Use the rheostat switch to control the speed of the fan.

## (XK 120 SUPER SPORTS MODEL)

**UNIT NOT  
IN USE.****Air conditioning not required.**

- (a) Set motor to "OFF".
- (b) Close air conditioner doors.

**UNIT IN USE  
—COLD AIR  
REQUIRED.****1. Cold (recirculated) air conditioning.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "COLD".
- (c) Open air conditioner doors.

**UNIT IN USE  
—WARM AIR  
REQUIRED.****2. Warm (recirculated) air conditioning.**

- (a) Set motor to "ON".
- (b) Turn "HOT-COLD" tap to "HOT".
- (c) Open air conditioner doors.

Use the rheostat switch to control the speed of the fan.

## (XK 120 MODELS)

**MAINTEN-  
ANCE.**

As the normal draining of the radiator and cylinder block does NOT drain the heater unit it is strongly recommended that if frosty conditions are anticipated an approved anti-freeze solution should be added to the cooling water in the proportions recommended by the appropriate manufacturer. Otherwise damage to the heater radiator may occur.

For further details in regard to the use of anti-freeze and the filling of the cooling system, see Section D, "Cooling System".

## HEATER UNIT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Drain the cooling system with the car standing on level ground. Turn the air conditioner "HOT-COLD" control on the centre fascia to the "HOT" position, that is, anti-clockwise.

Operate the remote control of radiator drain tap situated at the top left-hand side of the radiator block and open the engine drain tap situated at the left-hand rear of the cylinder block.

From underneath the fascia panel remove the dash casing by unscrewing the drive screws. Disconnect the two demister hoses from the heater stub pipes, which protrude through the scuttle, by slackening the clips.

Remove the rubber elbow of the inlet and outlet pipes from the water tap and front face of heater casing respectively.

Remove the four bolts securing the brackets at the rear of heater casing to the scuttle. At the hose between the fan unit and the heater casing, slacken the clip securing the hose to the heater casing. The heater unit can now be removed.

**Note.** The water tap control rod has a "T" shaped end which engages with a slot in the water tap connection.

**REFIT.** Refitting is the reverse of the removal procedure. Ensure that when offering up the heater unit to the scuttle that the "T" shaped end of the water tap control rod is engaged with the slot in the water tap connection.

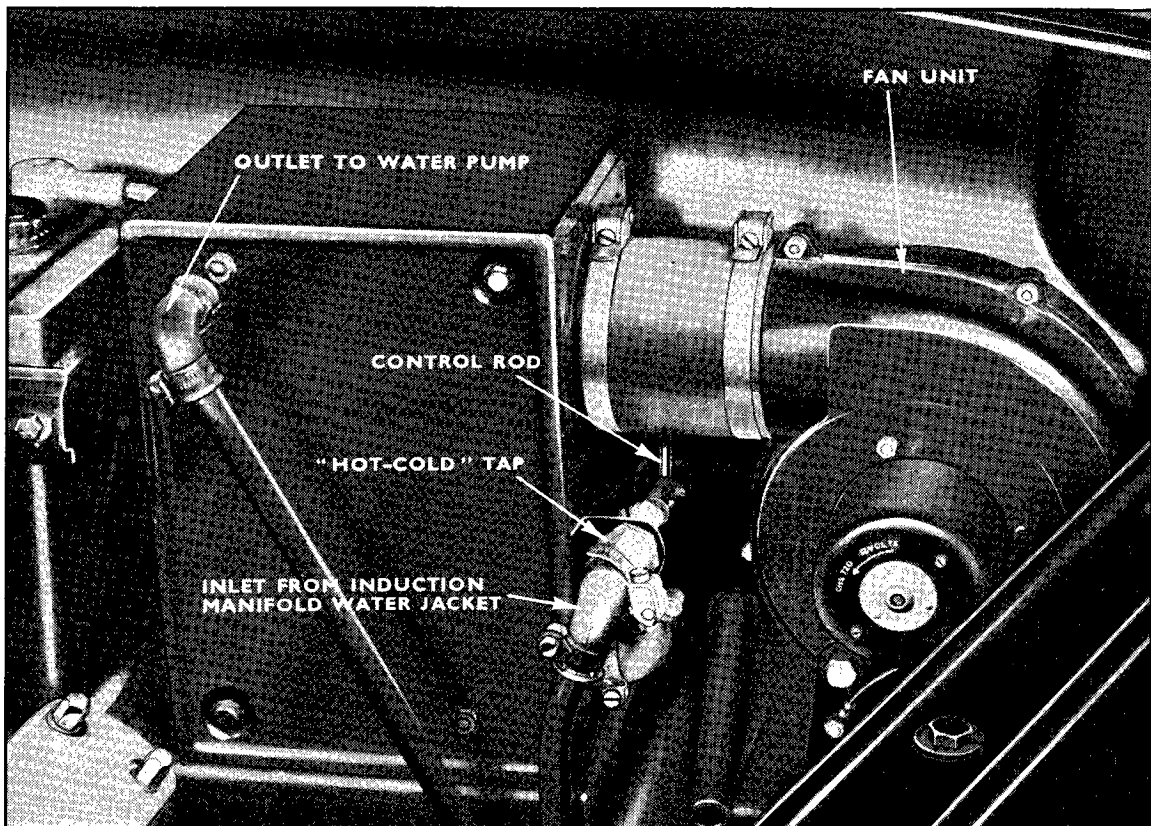


PLATE O.3. HEATER AND FAN UNITS (Mark VII).

### HEATER WATER TAP. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Drain the cooling system with the car standing on level ground. Turn the air conditioner "HOT-COLD" control on the centre fascia to the "HOT" position, that is, anti-clockwise. Operate the remote control of radiator drain tap situated at the top left-hand side of the radiator block and open the engine drain tap situated at the left-hand rear of the cylinder block.

Slacken the two clips and remove the rubber elbow connections to the water tap. Remove the lock nut from behind the water tap mounting bracket on the heater casing. Slacken the pinch bolt securing the clamp to the water tap spindle, and withdraw water tap from front.

**REFIT.** Refitting is the reverse of the removal procedure.

### FAN UNIT. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE.** Remove the dash casing from underneath the fascia panel by unscrewing the drive screws. Disconnect the feed wire to the fan at the snap connector. At the hose between the fan and heater unit slacken the hose clip securing the hose to the fan. Slacken the hose clip at the rear of the fan unit.

From underneath the dash unscrew the four nuts securing the fan mounting bracket to the horizontal scuttle, and remove the fan unit.

**REFIT.** Refitting is the reverse of the removal procedure.

### FAN SWITCH. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE CENTRE FACIA.** Disconnect battery positive lead. Remove the drive screws securing dash casing and release casing. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side, securing lower edge of fascia to support brackets. Remove two thumb screws, each passing through a top corner of the fascia panel. Withdraw glove drawer slightly and remove centre facia. (Plate O.1.)

**REMOVE SWITCH.** Disconnect the wires from the rear of switch. Unscrew the screw securing the switch to the instrument panel and withdraw switch from front of panel.

**REFIT.** Refitting is the reverse of the removal procedure.

### DEMISTER/DEFROSTER NOZZLES. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE SCREEN RAIL.** From underneath the polished wooden rail at the bottom of windscreen unscrew the two nuts securing the rail to its mounting brackets and remove the rail.

**REMOVE DEMISTER/DEFROSTER NOZZLES.** Remove the demister/defroster nozzle by unscrewing the two drive screws and disconnecting the hose from bottom of nozzle.

**REFIT.** Refitting is the reverse of the removal procedure.

## WATER TAP CONTROL ROD. TO REMOVE AND REFIT (MARK VII MODEL)

**REMOVE CENTRE FACIA.** Disconnect battery positive lead. Remove the drive screws securing dash casing and release casing. Remove seven control knobs, all being retained by a spring-loaded pin registering in a hole in the knob. Press in pins and withdraw knobs. Remove cigar lighter and ignition key. Remove two bolts, one from either side, securing lower edge of facia to support brackets. Remove two thumb screws, each passing through a top corner of the facia panel. Withdraw glove drawer slightly and remove centre facia. (Plate O.1.)

**REMOVE CONTROL ROD.** Turn the "HOT-COLD" control to the fully cold position, that is, fully clockwise. Slacken the screw at each corner of the instrument panel and withdraw panel slightly. Each end of the control rod has a "T" piece which at the front end fits into a slot in the water tap connection and at the rear engages with a slot in the "HOT-COLD" control.

Extract the control rod from the "HOT-COLD" control and withdraw the control rod through the grommet in the scuttle.

**REFIT.** Refitting is the reverse of the removal procedure. When refitting the control rod to "HOT-COLD" control turn the rod fully clockwise and position the control with spring plunger for the knob at the top centre position.

## HEATER UNIT. TO REMOVE AND REFIT (XK 120 MODELS)

Drain the cooling system by opening the tap situated at the front of the radiator block and the engine drain tap situated at the left-hand rear of the cylinder block.

From underneath the facia panel remove the dash casing by unscrewing the drive screws. Remove the three nuts and one set screw from the top of the heater box at the rear of engine compartment.

At the top of the heater box slacken the bottom clip of the hose connecting the water tap to the heater unit. Slacken the lower clip of the rubber elbow connecting the outlet pipe to the heater unit. (Plate O.2.)

From inside the car lower the heater unit; disconnect the electrical wires and demister hoses (if fitted) and remove heater, taking care not to spill any water retained in the radiator.

**REFIT.** Refitting is the reverse of the removal procedure.

## HEATER WATER TAP. TO REMOVE AND REFIT (XK 120 MODELS)

**REMOVE.** Drain the cooling system by opening the tap situated at the front of the radiator block and the engine drain tap situated at the left-hand rear of the cylinder block.

Slacken the clip securing the hose from inlet manifold water jacket, and disconnect hose from water tap. Slacken the top clip of the short connecting hose between the tap and heater box. Remove the nut and set screw securing the water tap bracket to the heater box and withdraw tap upwards. (Plate O.2.)

**REFIT.** Refitting is the reverse of the removal procedure.



### **FAN SWITCH. TO REMOVE AND REFIT (XK 120 MODELS)**

**REMOVE.** Disconnect the battery positive lead. From underneath the facia panel remove the dash casing by unscrewing the drive screws.

Remove the control knob by unscrewing the screw in the side of the knob. On the Super Sports model slacken the lock nut at the back of the facia panel. Unscrew the chromium-plated bezel securing the switch to front of panel. Withdraw switch from rear of panel and disconnect the wires.

**REFIT.** Refitting is the reverse of the removal procedure.

### **DEMISTER/DEFROSTER NOZZLES. TO REMOVE AND REFIT (XK 120 FIXED HEAD COUPE MODEL)**

**REMOVE SCREEN RAIL CAPPING.** Remove the polished wooden side cappings from the door pillars by lifting the door sealing rubber and unscrewing the three screws in the door aperture flange.

Remove the driving mirror bracket by unscrewing the two screws. Remove the screw accessible when the driving mirror bracket has been removed.

From underneath the polished wood screen rail capping unscrew the screw at each end and remove screen rail capping.

**REMOVE DEMISTER/DEFROSTER NOZZLES.** From underneath the facia panel remove the dash casing by unscrewing the drive screws. Disconnect the demister pipe at the heater and attach a piece of string to assist refitting.

Remove the two screws securing the demister nozzle to the facia structure. Withdraw the nozzle just sufficiently to allow the demister pipe to be disconnected and remove nozzle.

**REFIT.** Refitting is the reverse of the removal procedure.