

Lambretta 125 li - 150 li

# INSTRUCTIONS FOR REPAIR SHOPS



The main purpose of this manual is to provide Service Agents with basic information regarding the dismantling, overhauling, repairing, reassembly and servicing of the Lambretta 125 and 150 li.

The first section covers the main features of the machine, followed by diagrams and layouts illustrating the functioning of the engine group, together with the rules covering the lubrication.

The second section explains in 71 operations, amply illustrated, the dismantling and reassembly of the engine and other important groups, together with details on the timing settings of the flywheel magneto.

The third section fully covers the electrical equipment and circuit, followed by a chapter on the carburettor, its settings and adjustments.

The fourth section lists operations No. 101 to 117 covering the servicing of the machine during the running in period.

The fifth section gives a list of standard repair operations followed by a chapter giving instructions for fuel consumption test.

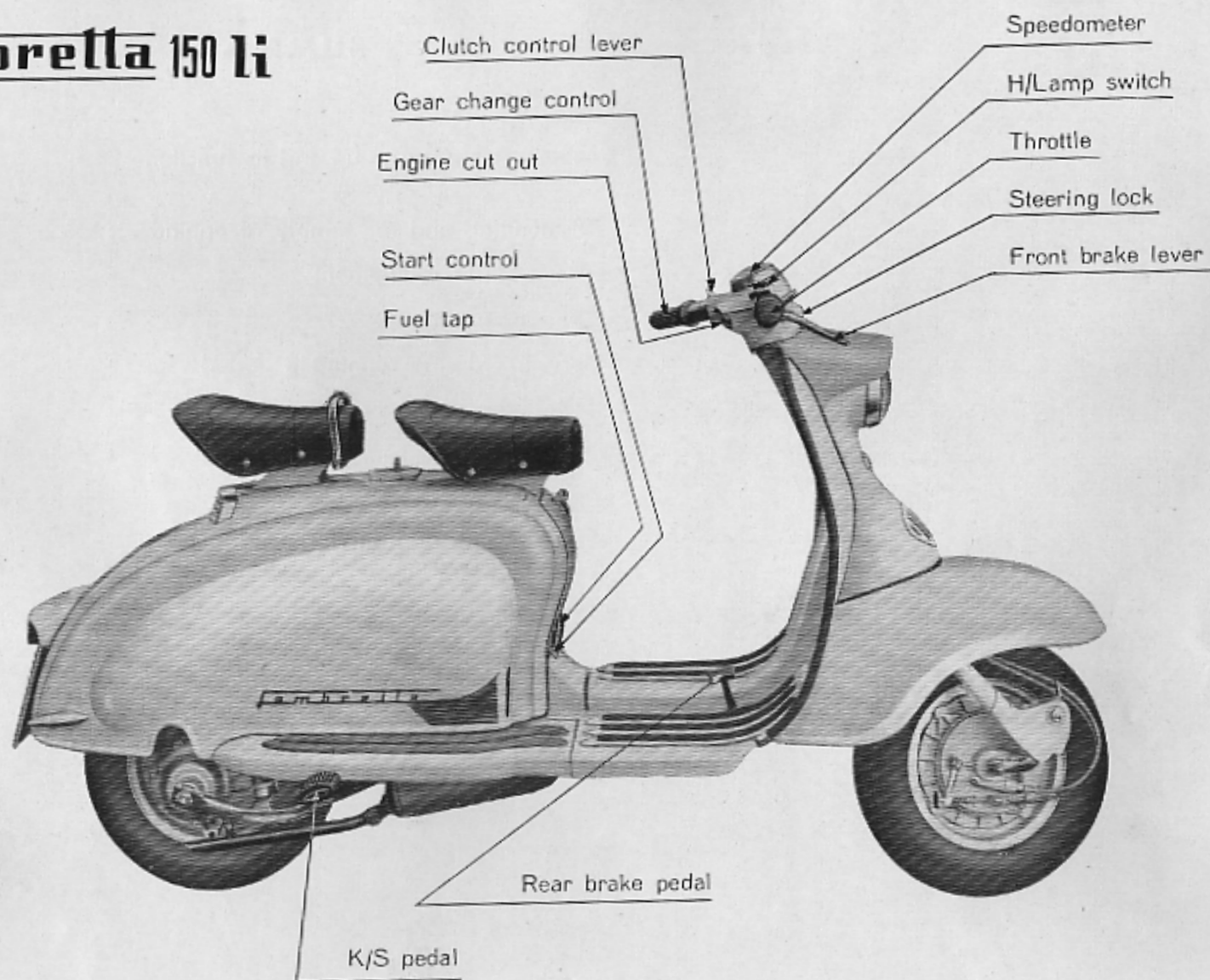
Wear limits for parts which are subject to wear and tear are given in Section VI and finally we give a list of Tools necessary for the rapid and correct execution of the dismantling and reassembling operations.



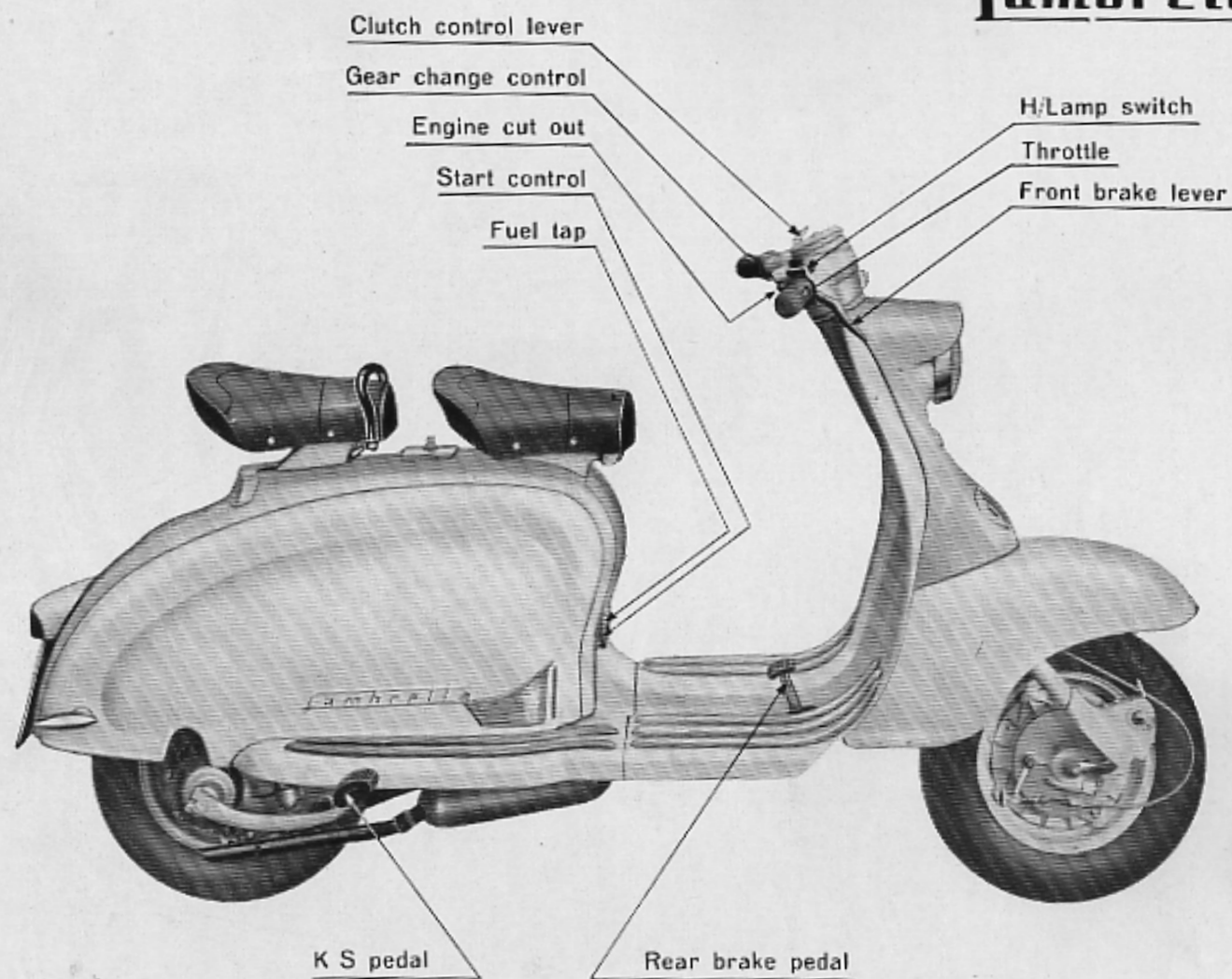
## SUMMARY

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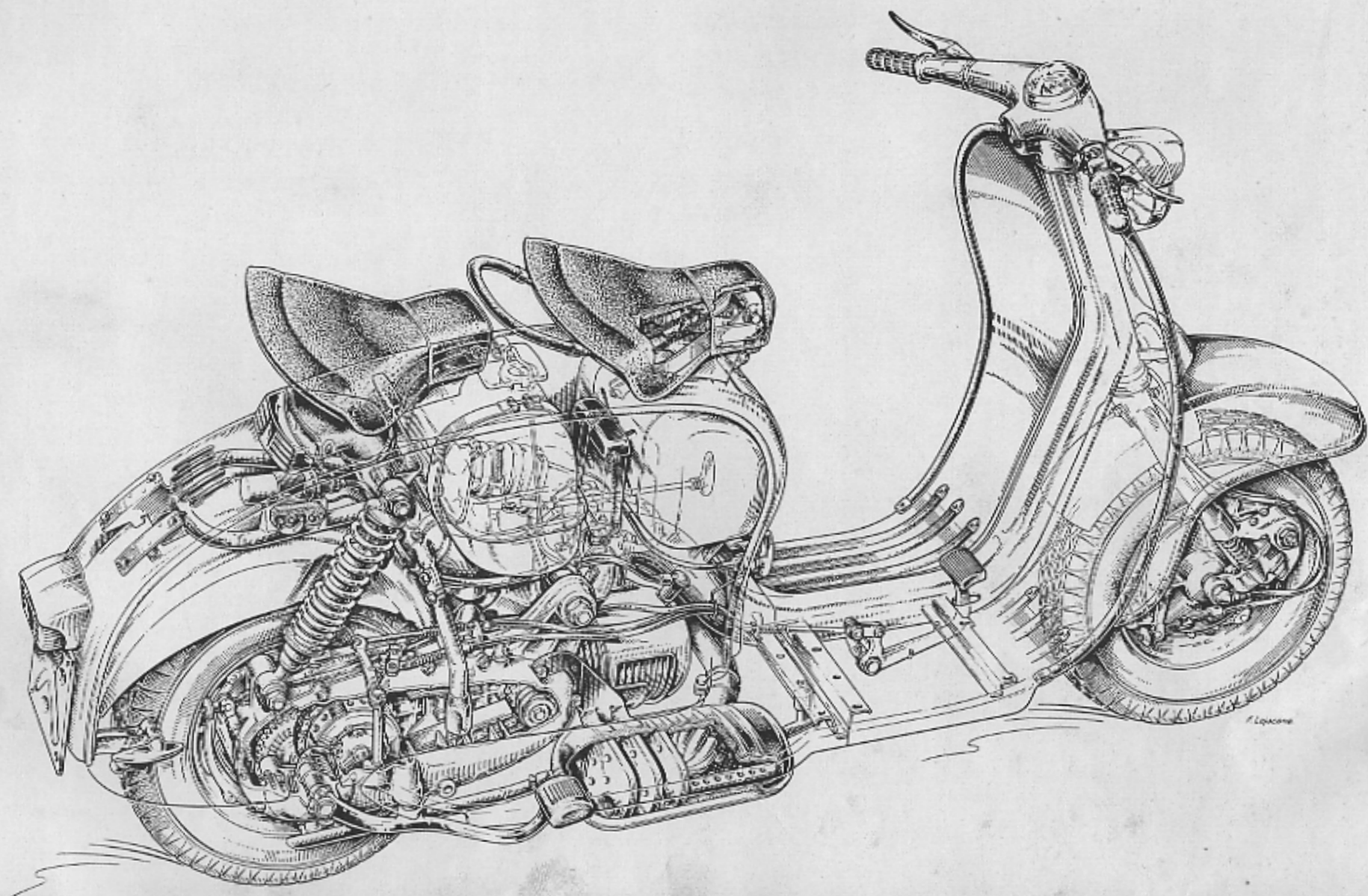
# Lambretta 150 li



## Lambretta 125 li



"X ray" view of **Lambretta** 150 li





## MAIN FEATURES

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Maximum length . . .	71 $\frac{3}{4}$ " (1.825 mt)
Maximum width (handlebars) . . .	28" (0.710 mt)
Maximum height . . .	40 $\frac{3}{4}$ " (1.038 mt)
Ground Clearance . . .	6 $\frac{1}{2}$ " (0.165 mt)
Wheelbase . . .	51" (1.290 mt)
Frame . . .	Central beam type in steel tubing.
Body . . .	In pressed steel sheet.
Front Suspension . . .	Trailing links and variable pitch helical springs.
Rear Suspension . . .	Swinging engine unit coupled to a shock absorber with variable pitch spring.
Centre stand . . .	U type with rubber rests.
Unladen weight (no accessories) . . .	230 lbs. (105 kgs).
Total Fuel Tank Capacity	1 $\frac{1}{3}$ gallons (8.5 litres).
Reserve . . .	1 $\frac{1}{2}$ pints (0.75 litres)

Maximum speed	150 li	125 li
With driver crouched . . . (To CUNA standard) . . .	52/54 m.p.h. (84/86 km/hr)	46/48 m.p.h. (75/77 km/hr)
With driver upright . . .	48/50 m.p.h. (78/80 km/hr)	42/44 m.p.h. (68/70 km/hr)

	125 li
<b>Fuel Consumption</b> . . .	121 m. p. imp. gal (75 m. p. (to CUNA standard) . . . U. S. gal - 2,1 Lt/100 km.)

	150 li	125 li
<b>Uphill</b>		
1 st. Gear . . .	(35%) 1 in 2,9	(25%) 1 in 2,9
2 nd. Gear . . .	(22%) 1 in 4,5	(21%) 1 in 4,75
3 rd. Gear . . .	(14%) 1 in 7,1	(13%) 1 in 7
4 th. Gear . . .	( 9%) 1 in 11	( 7%) 1 in 14
<b>Engine</b> . . .	Single cylinder two stroke forced fan cooled.	

	150 li	125 li
Bore . . .	57 mm	52 mm
Stroke . . .	58 mm	58 mm
Capacity . . .	148 cc.	123 cc.
Compression ratio . . .	7.0	7.0
Maximum output . . . at r.p.m. . . .	6.5 H.P. 5300	5.2 H.P. 5200
Lubrication . . .	Petroil - 4% oil SAE 30.	
Kickstart . . .	By Pedal.	

**Ignition** . . . . . Flywheel Magneto with External H. T. Coil.

14 mm Spark Plug (Long reach) . . . . . Heat range 225 Bosch scale.

Ignition advance . . . . . Fixed at 22° to 24° before T.D.C.

**Clutch** . . . . . Multi disc type in oil bath.

**Transmission** . . . . . Double chain drive with two shock absorbers (one on sprocket and other on pinion).

**Gear Box** . . . . . Four speeds in constant mesh, alternatively engaged on rear axle by means of cursor type gear shifters.

Ratio - Rear Wheel Revs/Crankshaft Revs.

	150 li	125 li
1 st. . . . .	1 : 13.95	1 : 17.40
2 nd. . . . .	1 : 9.00	1 : 10.71
3 rd. . . . .	1 : 6.67	1 : 7.47
4 th. . . . .	1 : 5.22	1 : 5.65

**CARBURETTOR** . . . . . Dell'Orto

150 li	125 li
MB 19 BS 5	MB 18 BS 5

Air Filter . . . . . Steel wool

#### **WHEELS AND BRAKES**

Interchangeable wheels.

Rims. . . . . Pressed steel in two halves.

Brakes . . . . . Expansion type, cable controlled.

Tyre size . . . . . 10" x 3½".

Tyre pressure - front . . . . . 18 lbs./sq.in. (1,25 Kg/sq.cm.).

Tyre pressure - rear (rider only) . . . . . 25 lbs./sq.in. (1,75 Kg/sq.cm.).

Tyre pressure - rear (with passenger) . . . . . 31 lbs./sq.in. (2,25 Kg/sq.cm.).

#### **ELECTRICAL EQUIPMENT**

**Flywheel magneto** . . . . . 4 pole 27 W nominal.

**Main switch** (on handle-bar) . . . . . near R.H. Grip 3 position lever.

##### **150 li**

##### **125 li**

0. Lights out. 0. Lights out.

1. Pilot light, speedolight, rear light. 1. Pilot light, speedolight, rear light.

2. Headlamp, speedolight and rear light. 2. Headlamp, speedolight and rear light.

Horn Button and H/Lamp Beam control button.

**Fuse** . . . . . 5 (or 8) Amp. in rectifier box or on impedance support in H/Lamp.

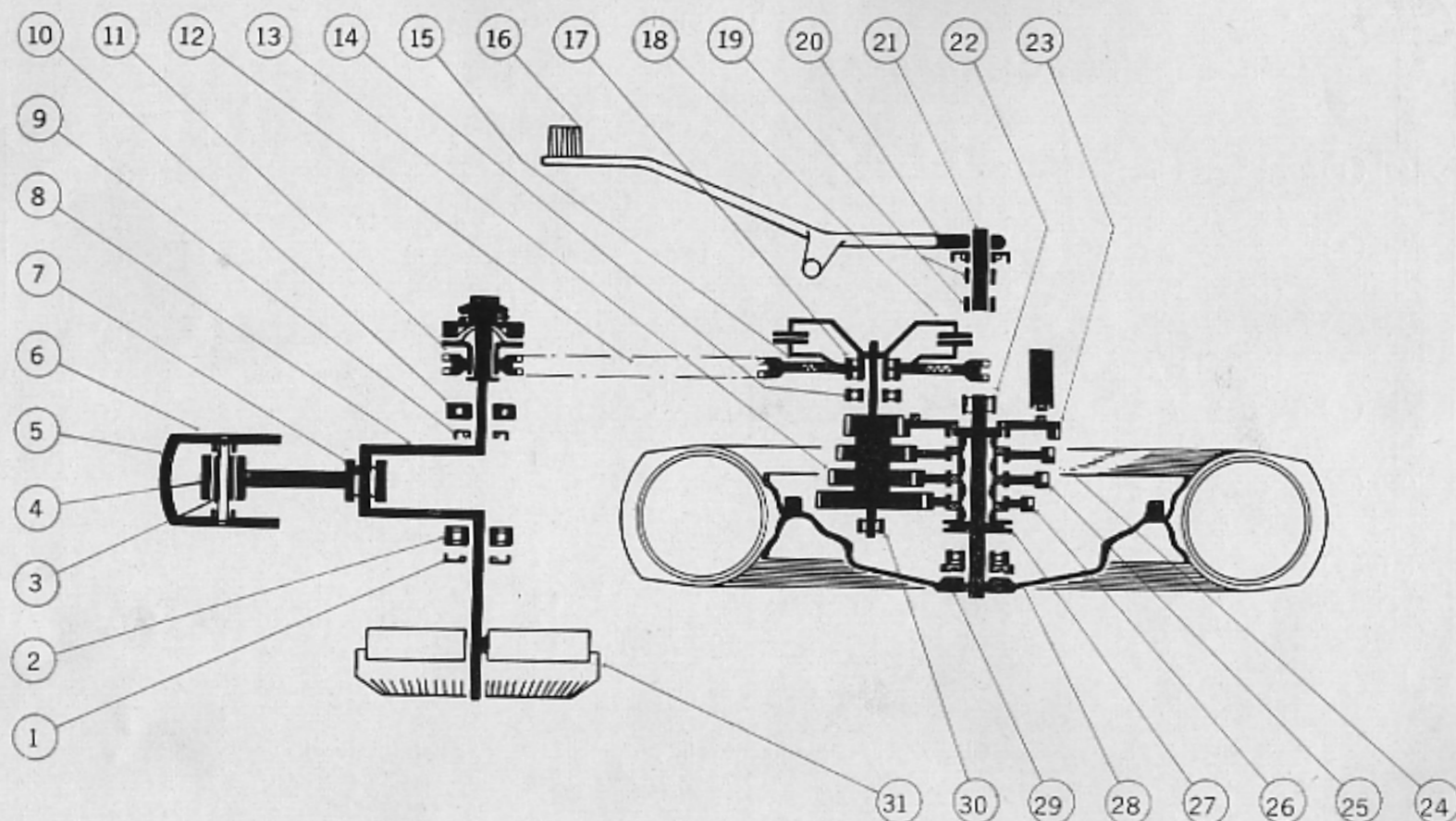
**Battery** . . . . . 6V 4 A.H. or 6V 5 A.H.

List of lamps mounted on 150 li and 125 li models

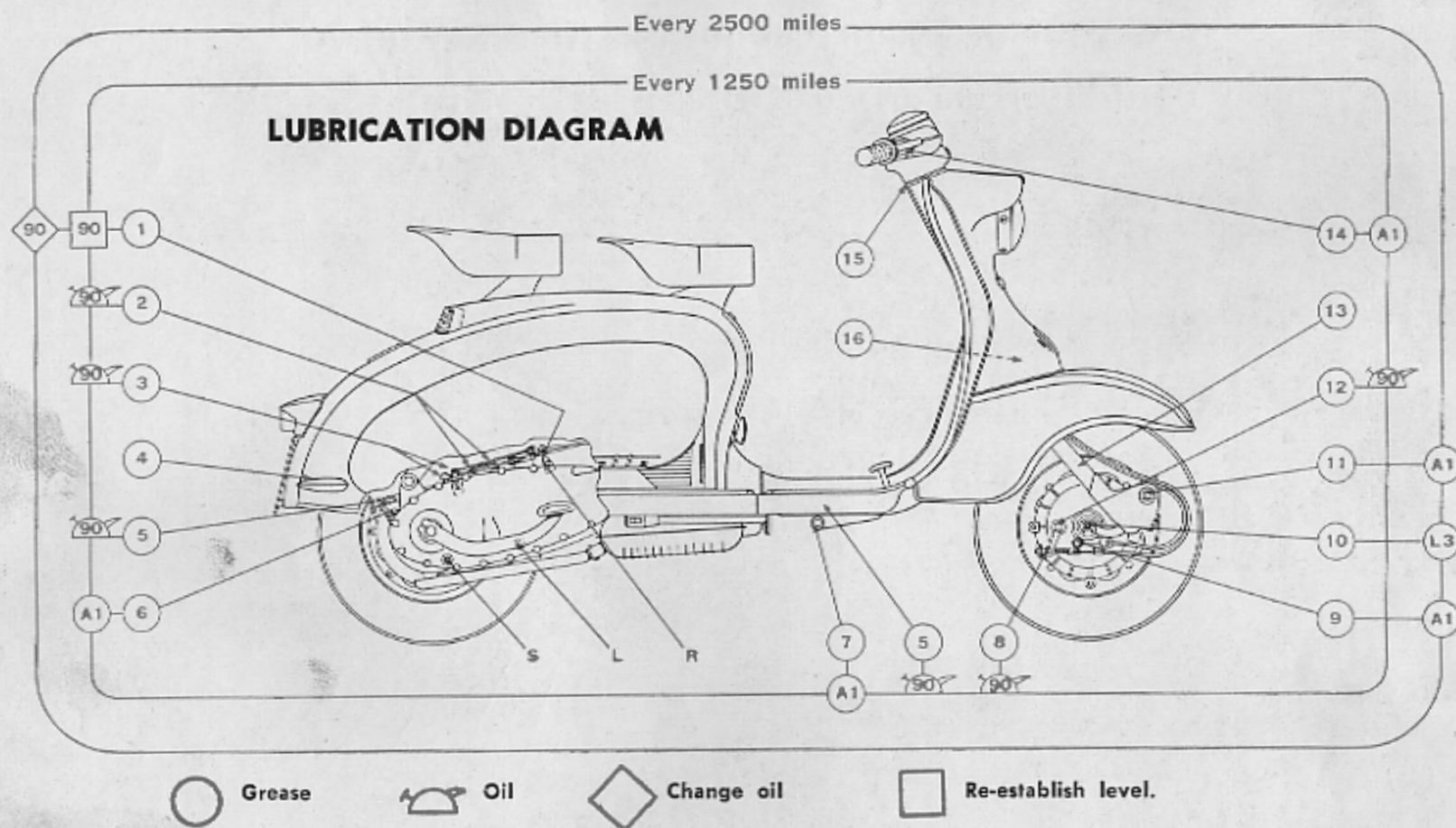
position	type of wiring diagram		
	with battery	without battery	
		pre mod.	post mod.
H. lamp (pilot)	6V 3W	12V 10W	6V 5W
H. lamp (twin filament)	6V <sup>25</sup> / <sub>25</sub> W	6V <sup>25</sup> / <sub>25</sub> W	6V <sup>25</sup> / <sub>25</sub> W
Rear lamp	6V 3W	6V 3W if speedo or stop lamps are mounted	6V 3W
		6V 5W if speedo or stop lamps are not mounted	
Speedometer	12V 2,5W	12V 2,5W	12V 2,5W
Stop lamps (if mounted)	6V 3W	6V 3W	6V 3W



## LAYOUT OF ENGINE GROUP AND ITS FUNCTIONING



- 1 Oil seal, Flywheel side - 2 Ball bearing main Flywheel side - 3 Bush - 4 Crankshaft - 5 Piston - 6 Gudgeon pin - 7 Needle bearing - 8 Main shaft - 9 Oil seal, drive side - 10 Ball bearing clutch side - 11 Pinion and chain shock damper - 12 Transmission chain - 13 Main shaft - 14 Ball bearing on main shaft - 15 Shock damper - 16 Kick start pedal - 17 Needle bearing on clutch pinion - 18 Clutch - 19 Bush for kickstart pinion - 20 Oil seal on kickstart pinion - 21 - Kickstart pinion - 22 Needle bearing on layshaft - 23 Lay shaft 1st gear - 24 Lay shaft 2nd gear - 25 Lay shaft 3rd gear - 26 Lay shaft 4th gear - 27 Lay shaft - 28 Ball bearing with oil seal on lay shaft - 29 Tyre rim - 30 Needle bearing on main gear group - 31 Flywheel magneto.



**PERIODIC LUBRICATION** — (1) Crankcase; change oil after first 1000 miles using BP Energol Transmission SAE 90 Oil. (2) Clutch cable knuckles. (3) Gear change knuckles, twin lever. (5) Rear brake knuckles. (6) Rear brake cam pin. (7) Rear brake pedal pin. (8) Front brake knuckles. (9) Speedometer drive box (if speedometer is fitted). (10) Front wheel bearings. (11) Suspension link boxes. (12) Front brake cam pin. (14) Handlebar control lever knuckles (front brake, throttle, clutch, gear).

**LUBRICATE THESE PARTS WHEN ASSEMBLING SCOOTER AFTER OVERHAUL**

1. Part (2), (3), (5), (8), (12), should be lubricated with grease BP Energrease A1.
2. Steering ball bearings, parts (15) and (16) should be lubricated with grease BP Energrease L3.
3. Side panel hooks (4) and handlebar control lever knuckles (14) should be lubricated with grease BP Energrease A1.
4. Front suspension helical spring (13) should be smeared with grease BP Energrease A1.
5. Introduce some drops oil SAE 30 in control cable coating before mounting wires.

R = oil filler plug.

L = oil level plug.

S = oil drain plug.

90 means BP Energol Transmission SAE 90 oil; A1 means Energrease A1; L3 means Energrease L3.

## DISMANTLING AND REASSEMBLY

## ENGINE DISMANTLING

**NOTE** - To remove the rear wheel and shock absorber the rear of the machine must be raised and rested on a support (wooden or otherwise) as used in Operation 15 (see figure 12).

### Operation No.

### Description.

- 1 Place the machine on bench and raise on to its stand, remove side panels.

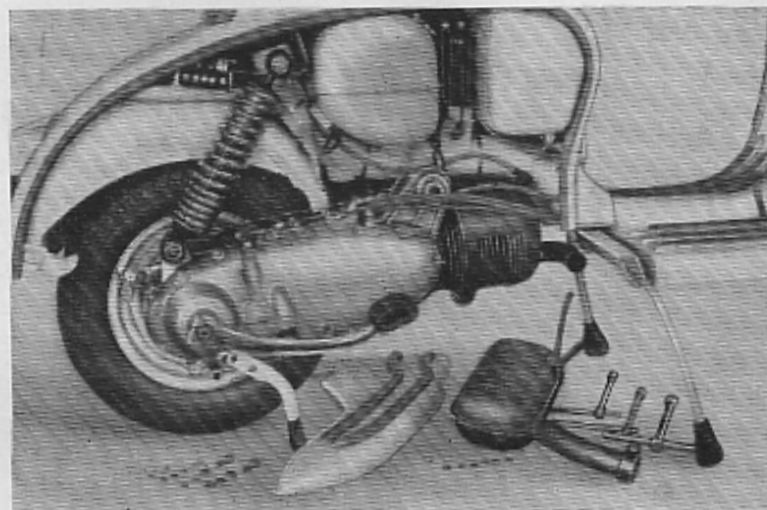


Fig. 1

- 2 Remove the right hand footboard, by unscrewing the two nuts fixing it to the frame (8mm spanner), the screw fixing frame connecting piece and the two screws fixing the footboard bracket (14mm spanner).
- 3 Remove the silencer by unscrewing the three nuts fixing it to the crankcase cover (10mm spanner) and unscrew exhaust tube ring screw (14mm spanner). See Fig. 1.

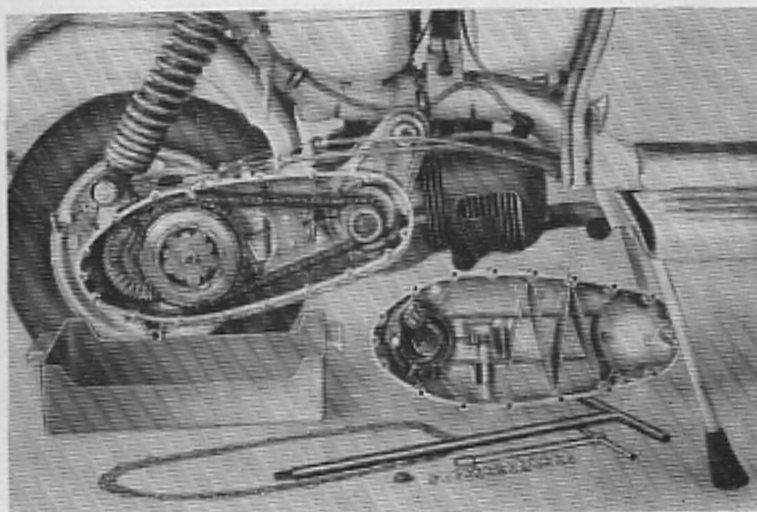


Fig. 2



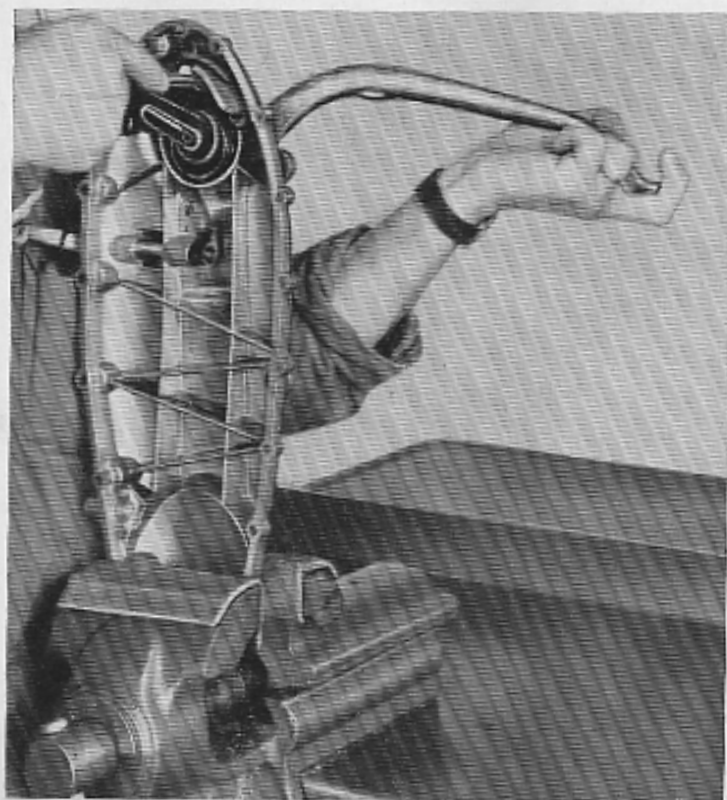


Fig. 3

- 4 Drain oil from crankcase by unscrewing drain plug (10mm allen key No. 57836) and collecting oil in tray.
- 5 Free clutch cable from external clutch lever on crankcase cover. (To rotate the lever use 19mm spanner).

- 6 Remove crankcase cover by unscrewing the 13 nuts (See fig. 2). To remove the spring washers rapidly it is advisable to use a magnet.
- 7 Remove Kick start shaft: place crankcase cover in a vice, rotate kick-start pedal to the end of its stroke and keeping it in this position, remove the cam (10mm spanner). See Fig. 3. Extract pedal circlip, unscrew the fixing bolt (11mm spanner) draw pedal along its shaft enough to allow it to rotate freely but do not remove. Free the spring by slowly moving the pedal. Remove the pedal, the circlip, the washer and then remove the pedal shaft and the spring.

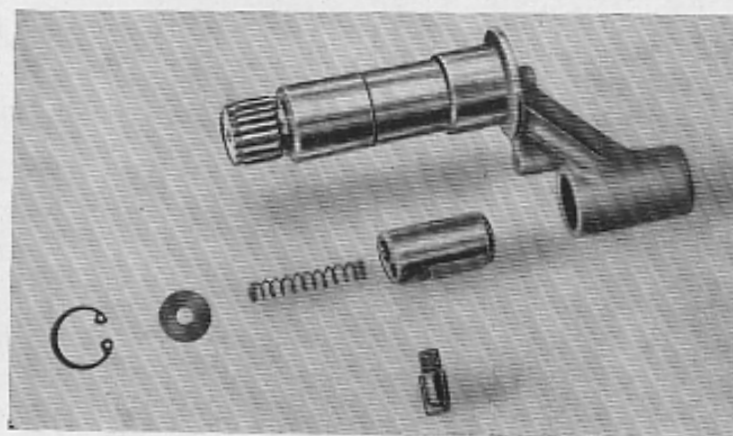


Fig. 4

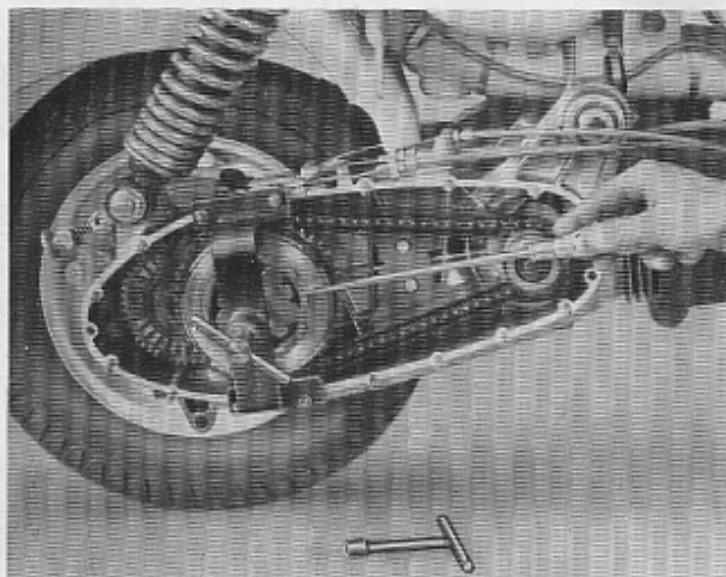


Fig. 5

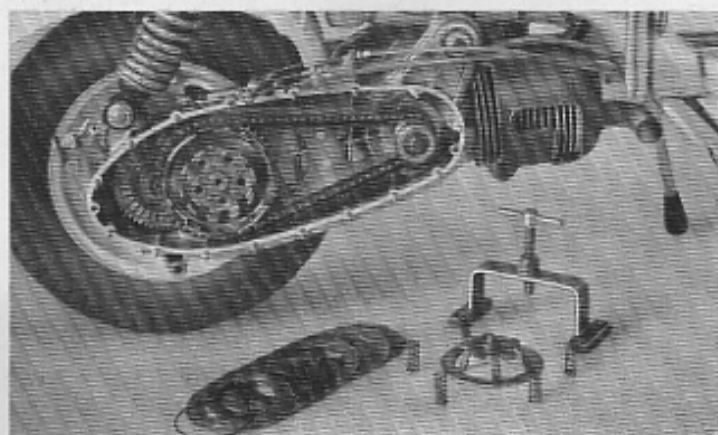


Fig. 6

- 8 To remove kick start shaft action pin. Place shaft in vice, unscrew reference pin then the circlip, the disc, the spring and the action pin itself. See Fig. 4.
- 9 To dismantle clutch plates, fit clutch compressor tool No. 59351, remove circlip with the aid of a screwdriver (See Fig. 5), remove tool, withdraw the clutch discs & springs. (See Fig. 6).
- 10 To unscrew nut fixing internal clutch bell housing: lock bell housing with tool No. 59804 and unscrew nut fixing this to the main shaft (22mm spanner) See Fig. 7.
- 11 To remove inner and outer clutch bell housing: insert tool No. 59328 into the inner bell, remove

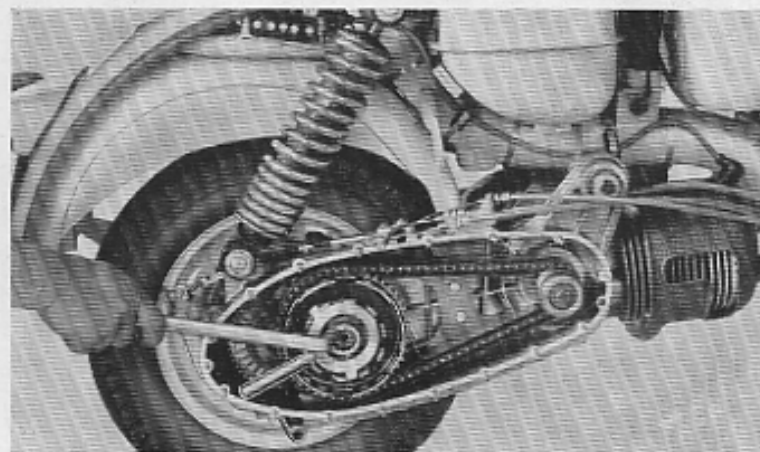


Fig. 7

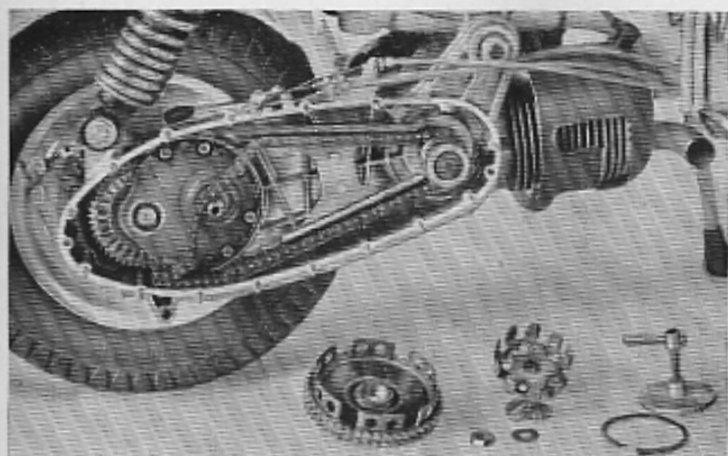


Fig. 8

spring washer and withdraw inner bell. Then slide off outer bell the needle bearing cage and the shims (See Fig. 8).

- 12 To remove chain guides and chain: unscrew the two screws fixing the guide (10mm spanner) (See Fig. 9). **Bear in mind that the chain should never be washed in petrol.** Wrap chain in a clean rag for protection.
- 13 To remove gear shaft support flange: unscrew the 6 nuts fixing it to the crankcase (11mm spanner) and extract flange using the two threaded holes for extraction, by fitting the two 6mm x 1 screws which fix the chain guides helping the extraction with a screwdriver inserted under the flange. (See Fig. 10).

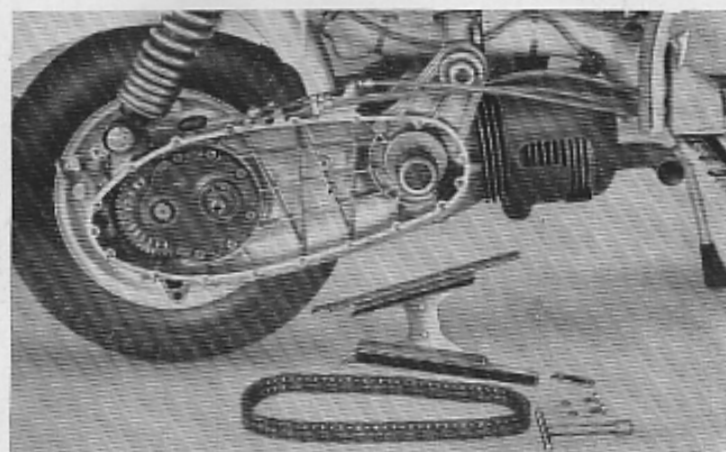


Fig. 9

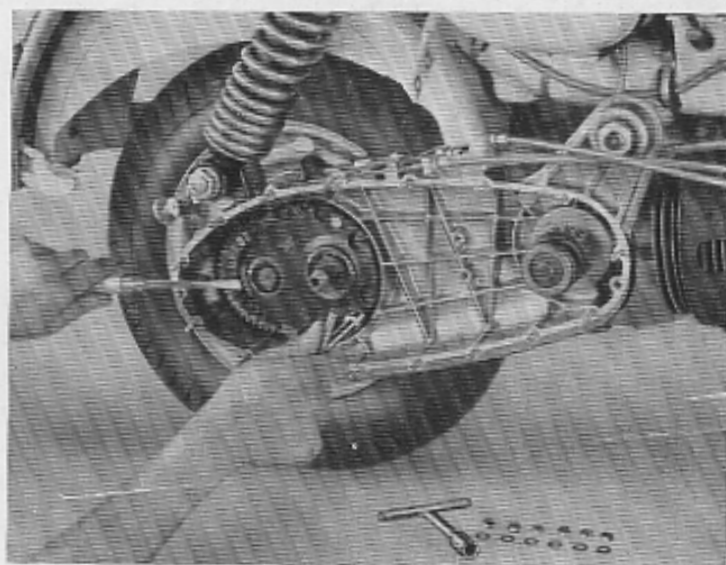


Fig. 10



- 14 Withdraw gear shaft complete with gears on layshaft. (See Fig. 11).
- 15 Raise machine on to the fixed stand.
- 16 To remove rear wheel: unscrew dome nuts and withdraw rim, unscrew the wheel nut (27mm spanner) and withdraw wheel hub by means of extractor 59826 (See Fig. 12).
- 17 To remove rear wheel stub axle (layshaft): extract circlip which holds the gear change lever shaft, withdraw shaft and tap stub axle with a mallet from near side of machine.
- 18 Withdraw selector cursor ring from shaft, taking care not to loose the two balls and the spring. See Fig. 13.
- 19 To remove suspension unit: unscrew the two fixing nuts (24mm spanner). Should difficulty arise in sliding off the silent blocks from their respective pins on the frame and crankcase use a long brass or soft metal punch tapping the blocks from the wheel side.
- 20 Remove crankcase engine return buffer and support crankcase by means of a tie between the two suspension unit fixing pins so that the cylinder head is as low as possible. (See Fig. 14).

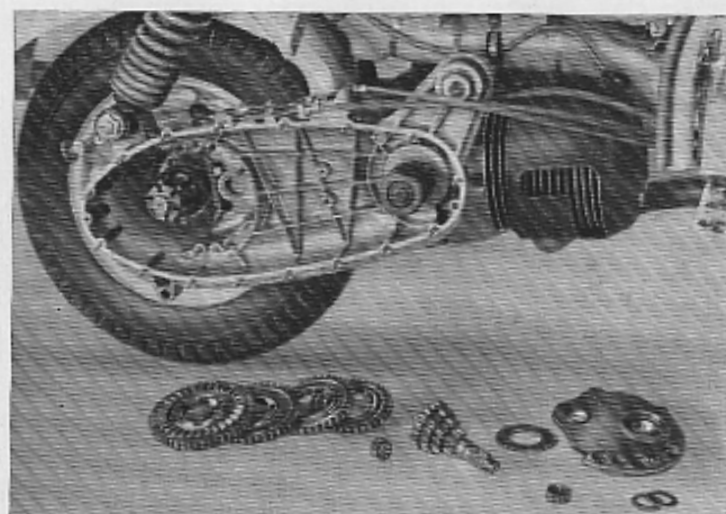


Fig. 11

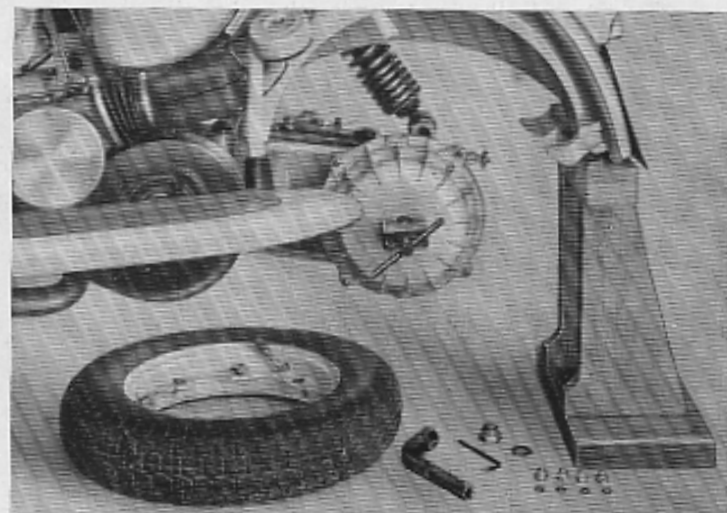


Fig. 12



- 21 To remove left hand footboard: unscrew the four fixing nuts (8mm spanner) and the screw fixing frame connection piece.
- 22 To remove carburettor and air intake: disconnect throttle cable, loosen securing ring fixing air intake to frame and securing ring fixing carburettor to manifold (8mm spanner). Remove carburettor and air intake. Disconnect fuel pipe and choke control (10mm spanner). (See Fig. 15).
- 23 Disconnect high tension lead and remove spark plug. (21mm box spanner).

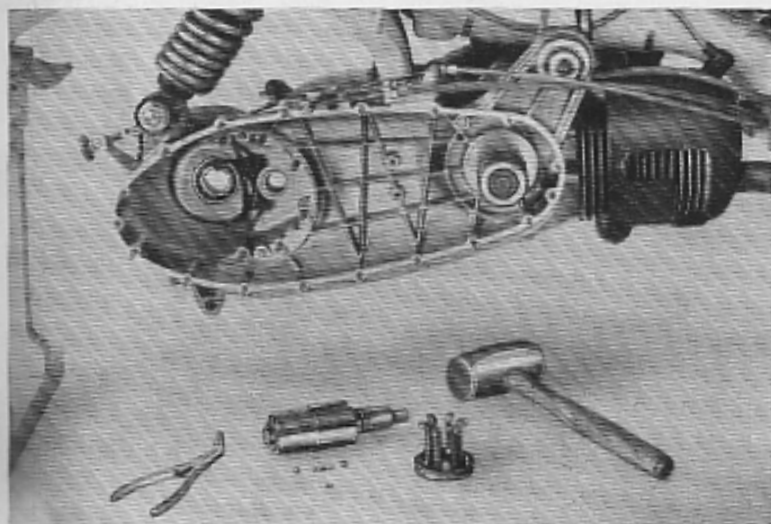


Fig. 13

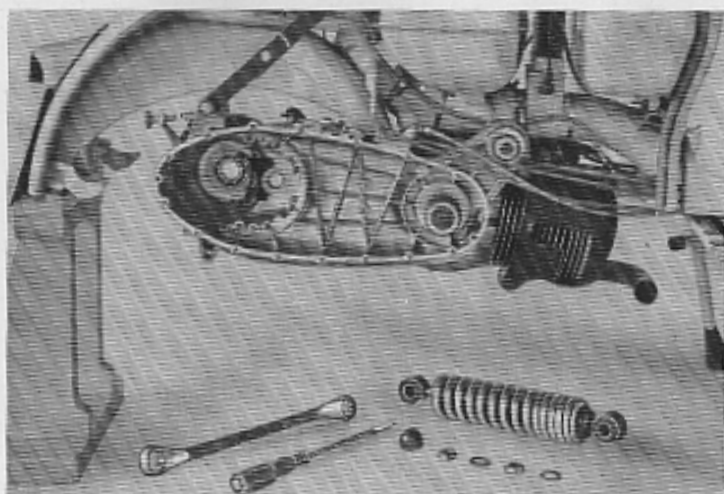


Fig. 14

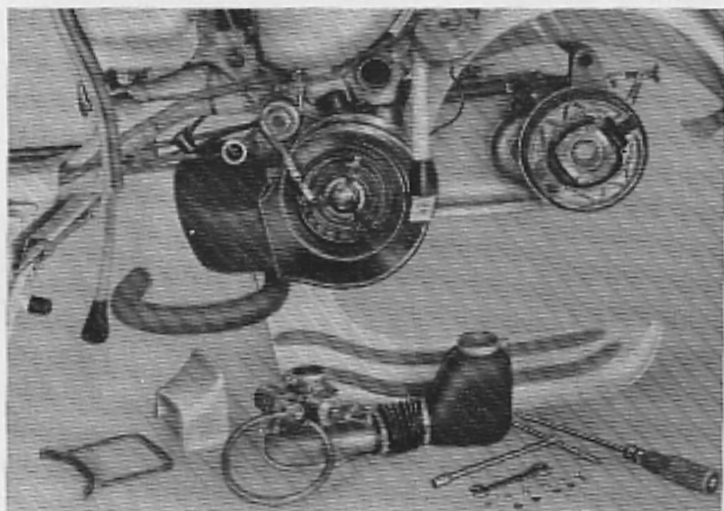


Fig. 15

- 24 To remove cylinder head cowl: remove the two screws fixing to fan cowl and the screw fixing this to cylinder head stud (14mm box spanner). Tool No. 59943.
- 25 To remove cylinder head: unscrew the four head nuts (14mm box spanner - Tool No. 59943). Remove head and cylinder head gasket.
- 26 Remove cylinder.
- 27 To remove piston: extract gudgeon pin circlip push out gudgeon pin using a hand push punch or appropriate tool. Remove the piston rings. (See Fig. 16).
- 28 To remove fan cover cowl: unscrew the five screws (8mm spanner).
- 29 To remove dust cover: remove the two screws fixing this to flywheel or release circlip according to make of flywheel fitted.
- 30 To remove flywheel: lock flywheel with tool No. 58886, unscrew flywheel lock nut (left handed) (17mm box spanner - Tool No. 52150) and withdraw flywheel by means of extractor No. 37058. (See Fig. 17).
- 31 To remove stator plate: disconnect wiring from low tension socket, remove the three screws fixing this to flange (10mm spanner), taking care if the timing is still correct to mark the position of the plate before removal so as to facilitate the re-fitting.



Fig. 16

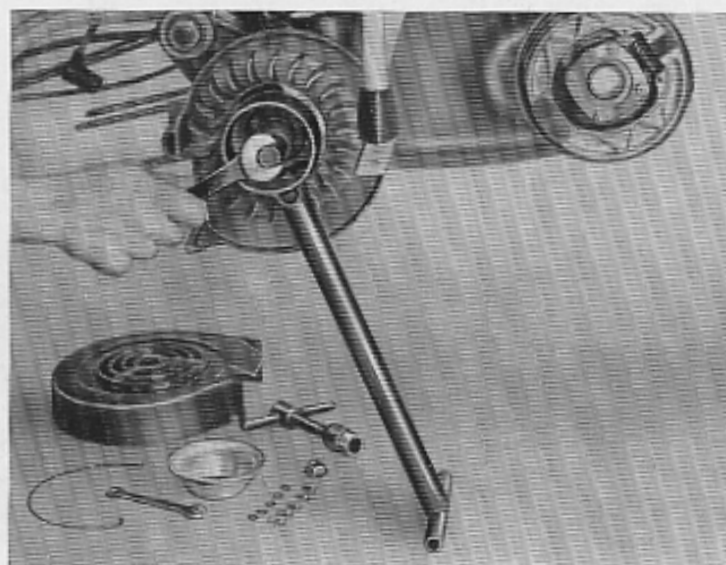


Fig. 17

- 32 To remove the flywheel support flange: withdraw the 3 fixing screws (10mm spanner) remove flange by applying extractor 58903 using two of the three stator plate fixing screws. See Fig. 18.
- 33 To remove engine sprocket shock damper: hold control shaft with Tool No. 49221 fitted to connecting rod, unscrew fixing bolt (14mm spanner) remove washer, spring, splined collar, and sprocket. Then with aid of Extractor No. 60051 extract splined sleeve. See Fig. 19.

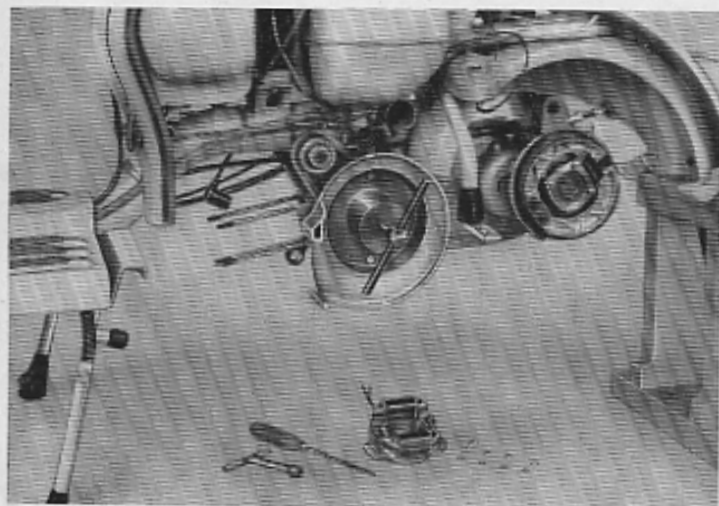


Fig. 18

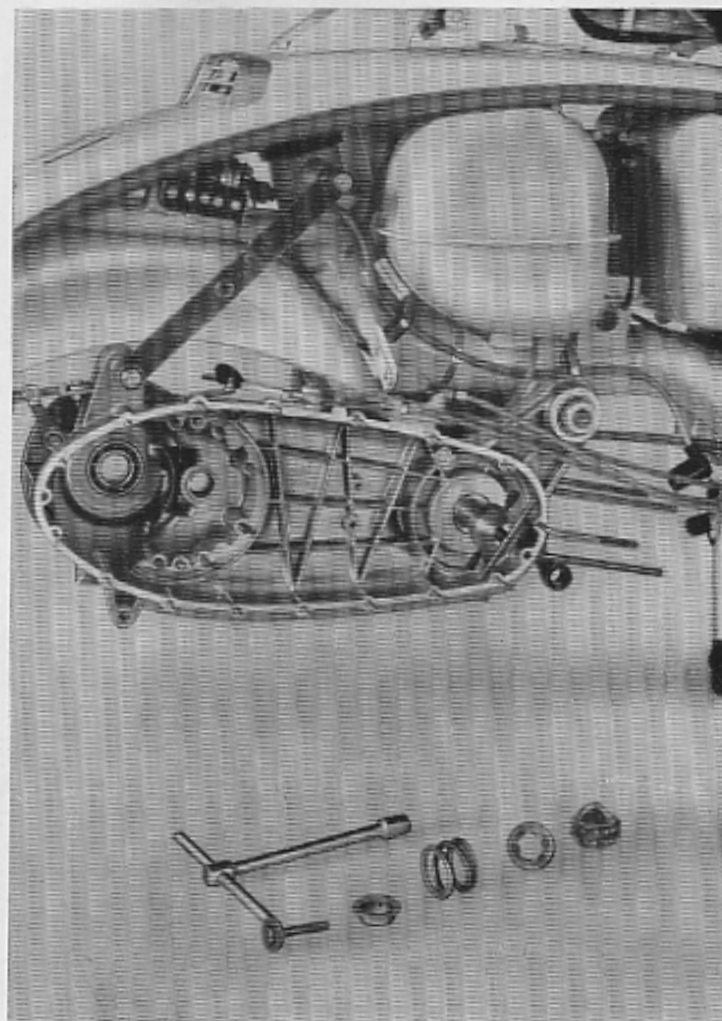


Fig. 19



- 34 To remove crankshaft: tap with copper punch from crankcase end to free it from bearing. See Fig. 20.
- 35 To remove main shaft needle cage outer race: use Tool No. 59350. See Fig. 21.
- 36 To dismantle the crankshaft bearing: Remove the bearing locking flange; insert through the bearing from the sprocket end the threaded end of tool No. 59329 and screw on the flywheel side the disc with three slots for stud retention. Proceed to extract by

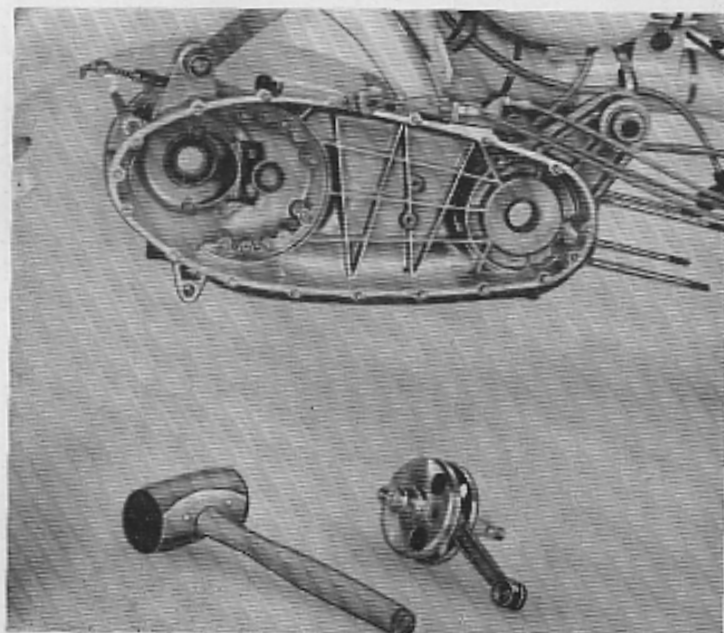


Fig. 20

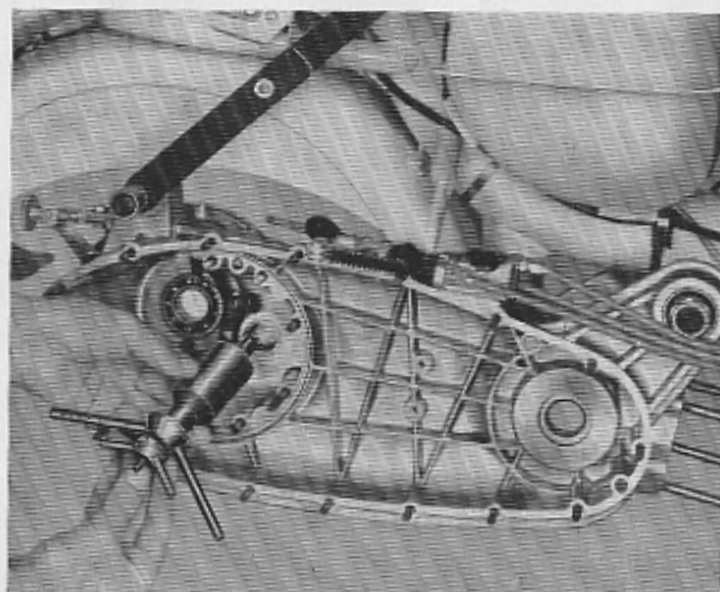


Fig. 21

tightening the nut whilst holding the screw with a 12mm spanner See Fig. 22.

- 37 To dismantle the crankshaft roller bearing inner race, use tool No. 59170. See figure 23. This operation can be carried out with the crankshaft insitu, after having removed the flywheel flange (following operation No. 32). Note: the two halves making up the bearing are not interchangeable and in the case of damage it is necessary to replace the complete bearing.



- 38 To remove roller bearing outer ball race: as the fit between the flywheel flange and the outer race is extremely tight, the cold extraction of the race may prove very difficult, and cause damage to the seat. It is therefore, advisable to heat the flywheel flange in oil to about 150°C, and after having removed the circlip, proceed with the race extraction by tapping on the oil seal with punch No. 59331.
- 39 To remove crankcase from frame: remove the two screws fixing gear change lever support on crank-

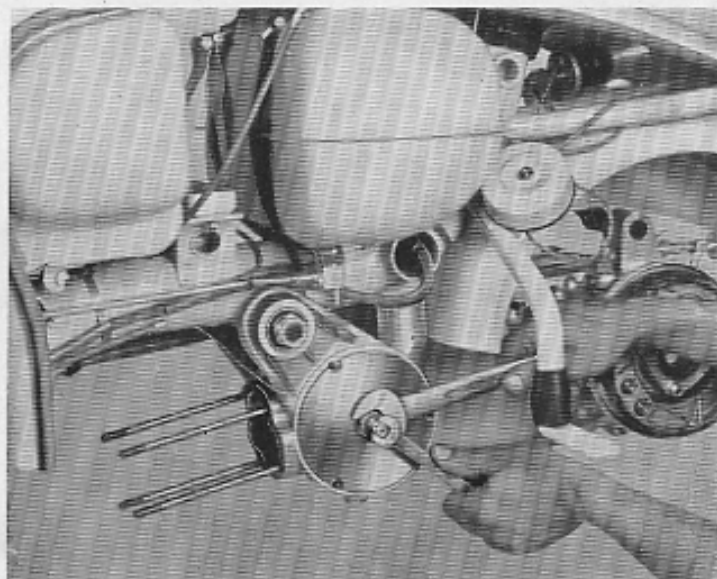


Fig. 22



Fig. 23

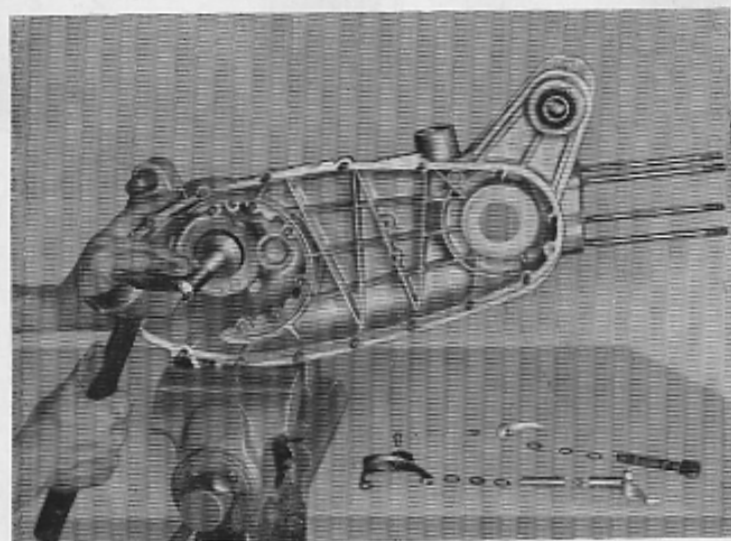


Fig. 24

case; the two screws fixing clutch adjuster support (10mm spanner) unscrew nut lock rear brake cable to adjuster (10mm spanner) unscrew one of the two self locking nuts on silent block spindle (24mm spanner) and tap spindle out of its seat with a punch. See Fig. 24.

- 40 Complete the dismantling of the crankcase by removing the rear brake cam, the gear change fork lever, rear wheel stub axle bearing and the silent blocks; extract the two circlips and remove brake

shoes. Then extract circlip and withdraw rear brake lever and cam. Remove screw fixing inner gear selector lever (9mm box spanner) withdraw the outer gear control lever with its shaft, thus freeing the inner lever. Remove rear wheel bearing retaining flange (10mm spanner) place crankcase in vice as shown in Fig. 24, extract bearing by tapping from the inside of the case with tool No. 59330. See Fig. 25. Extract silent blocks by tapping with appropriate punch resting on the outer ring.

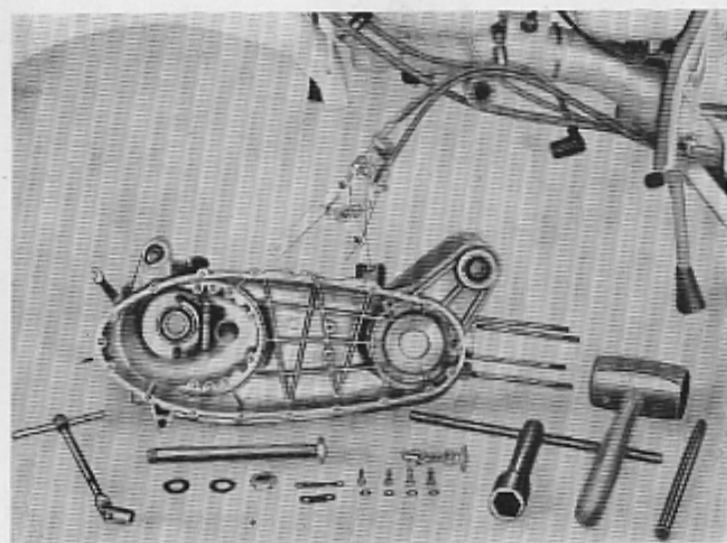


Fig. 25

## ENGINE REASSEMBLY

To reassemble the engine reverse the dismantling operations, namely 39 to 1, bearing in mind the following:

- 40 To refit the rear wheel bearing to the stud axle (layshaft) use punch No. 59330, from the wheel side. Then fit oil seal and retaining flange (10mm spanner).
- 38 To refit the crankshaft roller bearing outer race: Ensure that its seat in the flywheel support flange does not show signs of scoring. If so, the flange should be **replaced**. Warm flange in oil up to 100°-150°C, insert washer and the outer roller bearing race, which kept at normal temperature should fit into the flange with very slight pressure. Then fit the gasket and circlip from the other side of the flange.
- 37 To refit the crankshaft roller bearing inner race: place crankshaft in vice holding it by the flywheel side shoulder. Slide the inner race on to the cone of the shaft so that the highest side of the roller cage faces the crankshaft shoulder. Tap the inner race with punch No. 59331, taking care to keep the race perfectly in line with the shaft.
- 36 To refit the crankshaft drive side ball bearing: Place the 60mm diameter disc on to the tool screw, followed by the bearing, taking care that the cut out face of the disc faces the bearing. Insert screw into the flywheel side bearing seat. Slide on to the screw from drive side the 73mm diameter disc, followed by the distance piece. Screw the nut on to the distance piece holding the screw with a 12mm spanner. Ensure that the bearing enters correctly into its seat and is pushed fully home. Then refit, from the inside of the crankcase, the seal ring and the retaining flange. See Fig. 26.
- 35 To refit the main shaft (primary) outer needle bearing race: Insert the washer and the outer race tapping it home with a proper punch.
- 33 To tighten the shock damper: if the piston has been removed, hold crankshaft with Tool No. 49221, inserted in between the crankshaft shoulders. If the piston and cylinder have not been removed, then screw in fully the damper bolt. Refer to Op. 11, when Tool No. 59328 can be applied to the inner



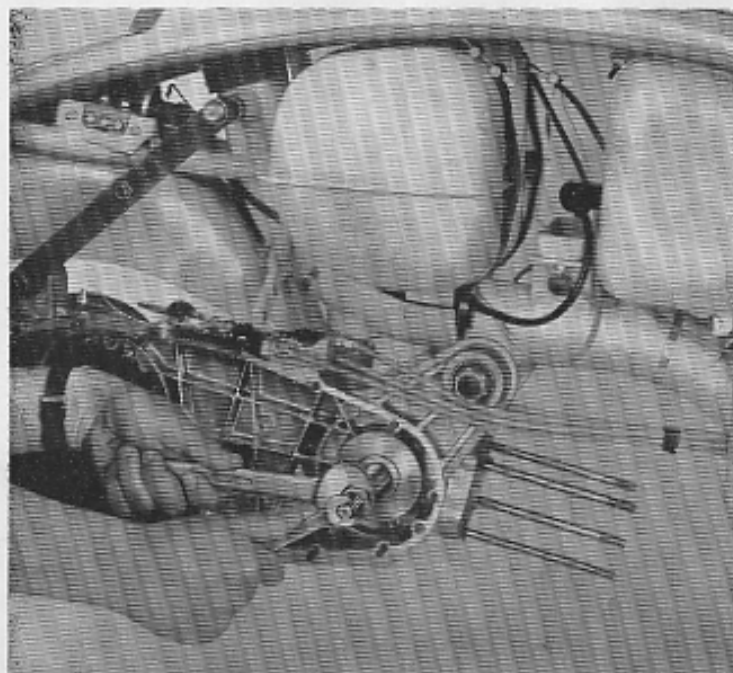


Fig. 26

clutch bell housing; locking the damper sprocket through the outer clutch bell housing and chain.

- 27-25** When refitting the piston and the cylinder barrel, should the case arise where one or the other or both have had to be replaced, **it must be remembered** that the pistons and cylinders are supplied in three standard gradings, plus (+), zero (0) or minus (—),

marked on the crown of the piston and on the cylinder top. Therefore, ensure that both piston and cylinder bear the same grading sign.

On Page 94 (Wear Limits) the principal dimensions of the three grades are shown, together with the oversize honing dimensions.

- 27** To refit piston: It is most **important** that both the piston ring stop pins and the arrow marked on the piston crown face the **exhaust port**. Faulty fitting will bring about the breaking up of the rings in the first few minutes of the engine running.
- 26** When inserting the piston, use piston ring clamp R. 49194. Check that the two screws fixing the exhaust tube to the cylinder are well tightened.
- 18** To refit the gear selector cursor ring. First insert the spring and the two balls into the layshaft, then compress the balls and slide on the ring until it clicks into place.
- 15** To refit the layshaft gears: This must be carried out as follows:



The fourth speed gear must have the high part of its boss facing the outside of the crankcase (cover side).

3rd. gear - must have the high part of the boss facing the inside of the crankcase (wheel side).

2nd. gear - must have the high part of the boss facing the inside of the crankcase.

1st. gear - must have the front dog teeth facing the outside of the crankcase (cover side).

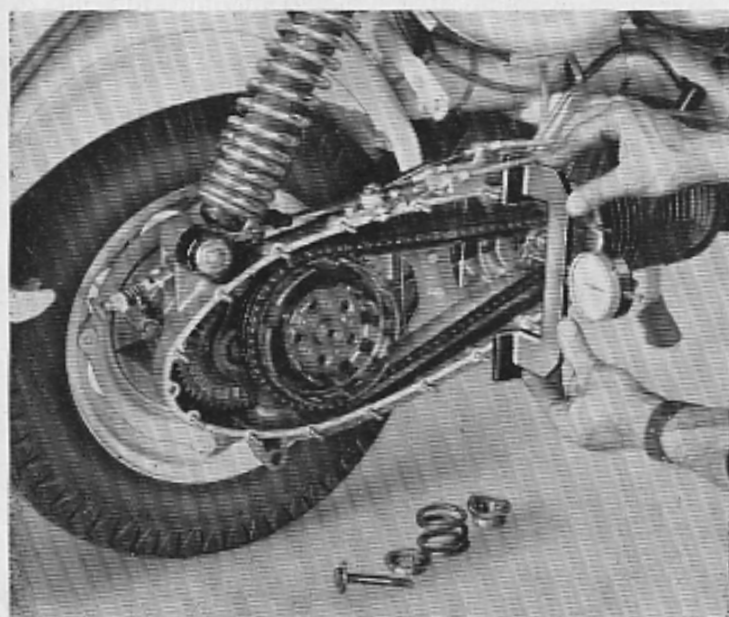


Fig. 27

A faulty assembly will bring about the breaking up of the teeth as soon as the gear change is operated when running.

- 13 When refitting the gear shaft support flange, ensure that the two centering dowels fit into their seats.
- 11 Having locked the inner Clutch bell housing with Tool No. 59084, and tightened nut fixing it to the primary shaft (22mm spanner), it is advisable to proceed with the chain alignment check by means of Tool No. 57865 to which is fitted a dial gauge, fitted with a 72mm long. extension, supplied with the Tool.

To do this, the shock damper dome sprocket bolt must be withdrawn together with its washer, spring and splined collar, ensuring at the same time that the sprocket itself is right against the splined sleeve. To check the chain alignment proceed as follows:

- (a) Measure the distance to the sprocket face, bring dial gauge to ZERO. See Fig. 27.
- (b) Then measure the distance to the main sprocket on rear axle. See Fig. 28. The difference between the two readings should be between  $\pm 0.05\text{mm}$

or  $-0.25\text{mm}$  ( $+0.002''$  to  $-0.010''$ ). Should the readings not be between these limits, it will be necessary to dismantle both the clutch housings and increase or decrease the thickness of the shim or shims on the primary shaft between the inner bell housing and ball bearing until the above readings are obtained. It is the-

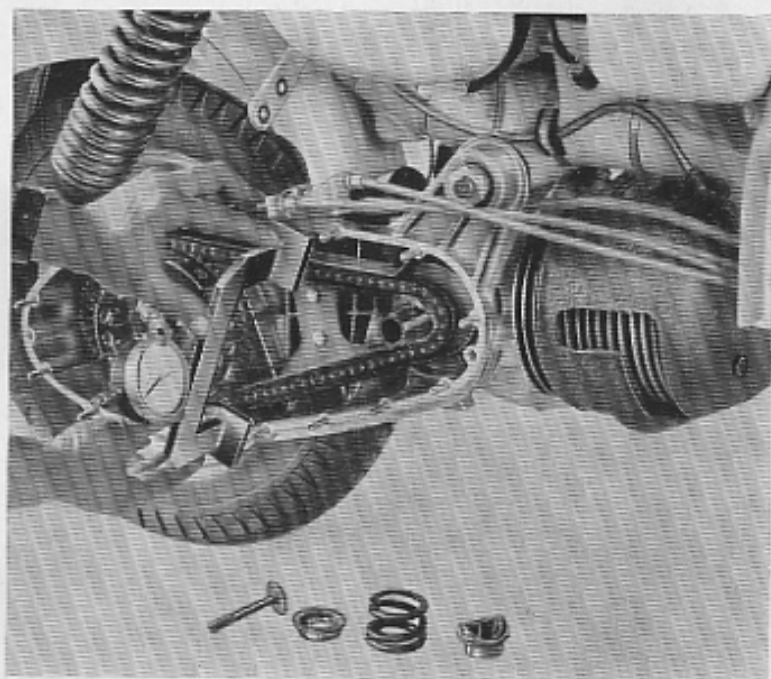


Fig. 28

efore, necessary to have at hand a complete range of shims.

- 8 To refit the K/Start action pin: slide pin on to kick start shaft, ensuring that it moves freely. Screw in pin, burring over end thread by means of a sharp punch through the appropriate hole in the body. Then refit the spring, disc and circlip.
- 7 To refit K/Start return spring and K/Start shaft to crankcase cover. To avoid damaging the oil seal, first insert protector No. 57776, then fit oil seal, followed by washer and circlip. Place crankcase cover in vice as shown in Fig. 3, insert kick start pedal on to its shaft without pushing home, so that it rotates freely from its stop on the cover.

Load return spring by rotating pedal until the K/Start shaft comes up against the stop pin on the crankcase cover; keeping the shaft in this position, fit cam into its place, without tightening the three fixing screws.

Release pedal slowly, withdraw and refit it on again so that when it is up against the rubber buffer on

the crankcase cover, the dowel pin is in the position shown in Fig. 29, in other words:

- (a) The top of the tooth on the K/start action pin level with the K/start shaft.
- (b) The body of the pin can move no more than 1.5mm to the inner end of the K/start shaft.

If necessary alter the cam position that amount sufficient to allow the two conditions to be met, then tighten the 3 screws which fix the cam to the cover (10mm spanner). Refit the circlip for the pedal, and tighten its fixing nut and bolt.

Check and see that the K/start shaft rotates freely and that the pedal returns promptly to its original rest position.

- 6 When refitting the crankcase cover, ensure that the two locating dowel pins locate in their holes.

- 3 When refitting the silencer, scrape away the old sealing around the tube end and apply a new thin layer of this metallic sealing, Bostonia No. 3 of BOSTIK Ltd.

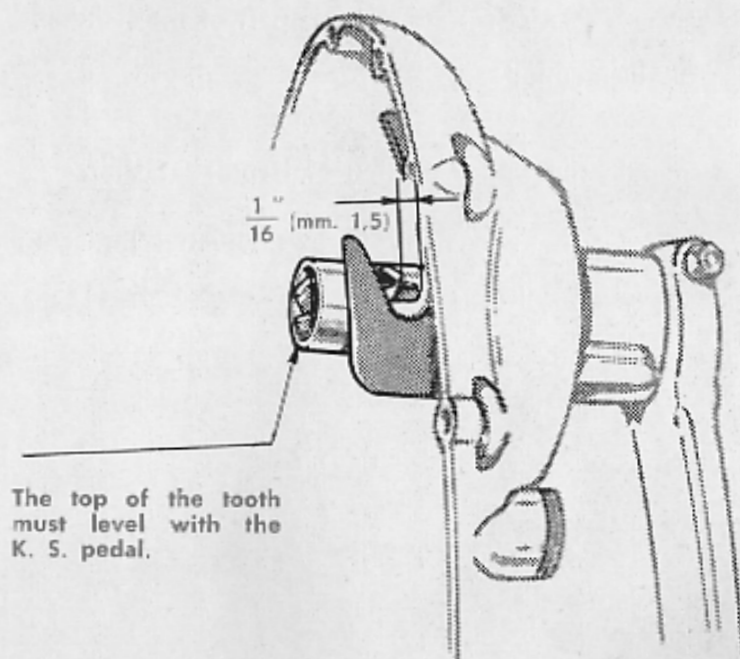


Fig. 29

## DISMANTLING AND REASSEMBLY OF THE HANDLEBAR UNIT AND CONTROL CABLES

**IMPORTANT.** The Speedometer holding rim is fixed to the upper portion of the handlebar unit by means of four screws. To reach these the top part of the handlebar must be dismantled.

**To dismantle the Upper portion of Handlebar Unit.**

- 41 Unscrew the two fixing screws situated under the handlebar unit.

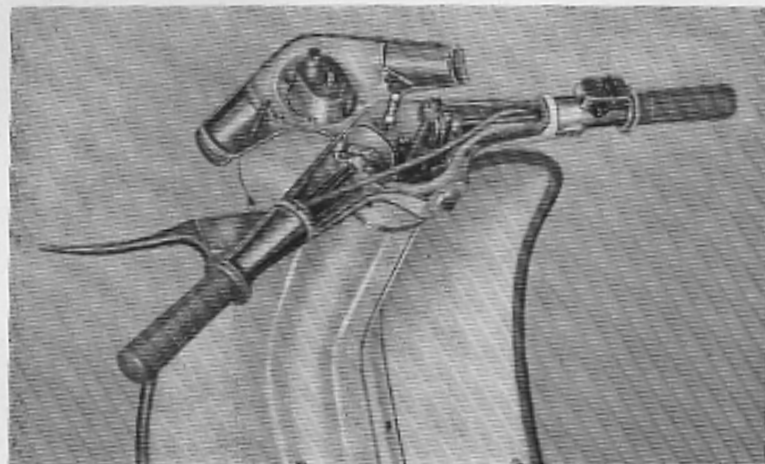


Fig. 30

- 42 Lift the upper portion of the handlebar group just the amount required to reach and unscrew the four



Fig. 31



screws which hold the speedometer rim. Free the speedo cable from the speedometer by means of the knurled nut, remove the speedo bulb holder base thus freeing the upper part of the handlebar unit. The speedometer can now be freed from the Unit. See Fig. 30.

**To replace control cable inner wires.**

- 43 Pull out the inner wires of the cables from the handlebar end after having disconnected the other end, from the respective trunnions. (For the throttle cable it is necessary to unsolder the nipple at the carburettor end of the cable and resolder on when fitting new cable). Replacement cables can then be inserted into the outers from the handlebar end. Grease inner cable well before fitting.

**To replace cable outers.**

- 44 Remove the headlamp by unscrewing the four fixing screws and disconnecting electrical wires.
- 45 Remove the headlamp casting and the front mudguard by taking out the two screws fixing the headlamp casting to the frame, which are placed in the headlamp recess (10mm spanner), remove the four screws fixing the headlamp casting to the legshield together with the two screws fixing the mudguard (8mm spanner) See Fig. 31.
- 46 Slide the cable outers through their retaining clip.

**To remove throttle and gear change control shaft.**

- 47 After having disconnected the outer ends of the front brake and clutch cables, remove the screw from the clamp holding the cable control pulley (8mm spanner) and withdraw the shaft by tapping with a small punch on the head of the shaft itself; the clutch lever support will slide off when its shaft is withdrawn; while the front brake lever support remains fixed to the handlebar and can be removed by unscrewing the two locking screws placed near the headlamp control switch. To substitute the throttle and gear change control shaft the twist grip rubbers should be removed before loosening the cable control pulley. See Fig. 32.

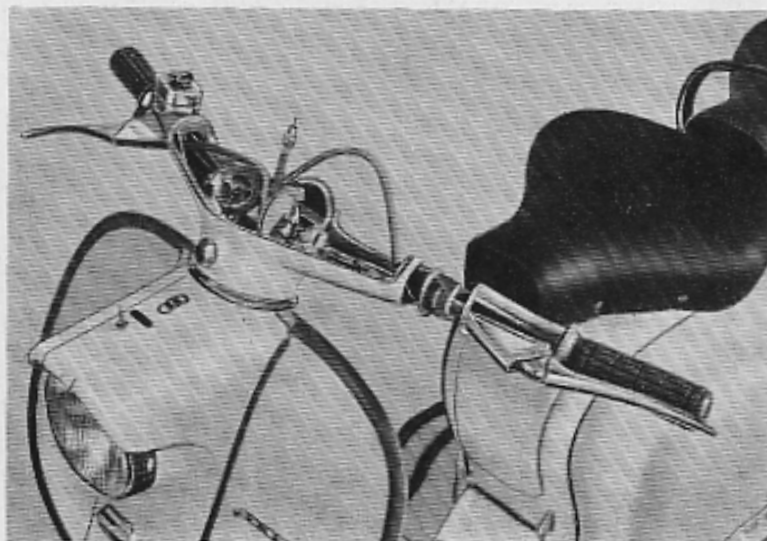


Fig. 32

**To remove handlebars.**

- 48** Carry out Operations 41 and 42, free the other end of the cables, remove the screw fixing the handlebar to the steering (10mm spanner) (Tool No. 57836), withdraw handlebar from the front fork tapping it underneath with a suitable mallet.

**To remove the front fork.**

- 49** After having removed the handlebar (Op. 50), unscrew the steering adjustment ring and the ball race ring using Tools No. 40490 and 40482, and slide out front fork complete. See Fig. 33.

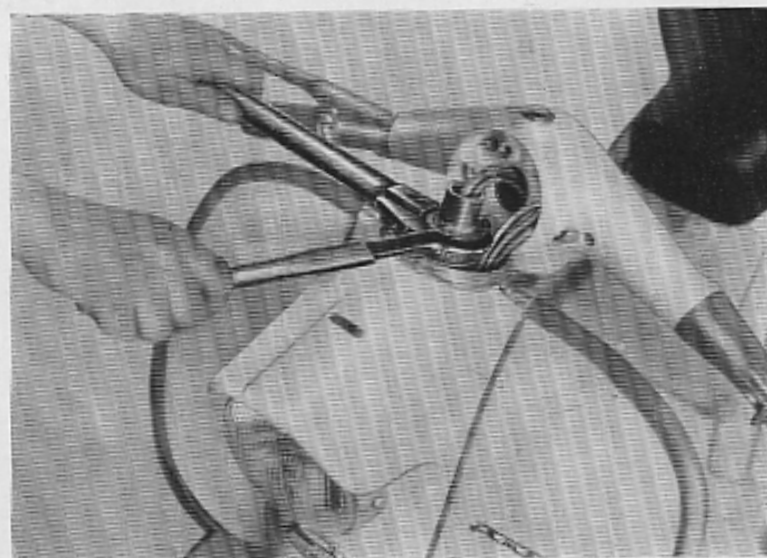


Fig. 33

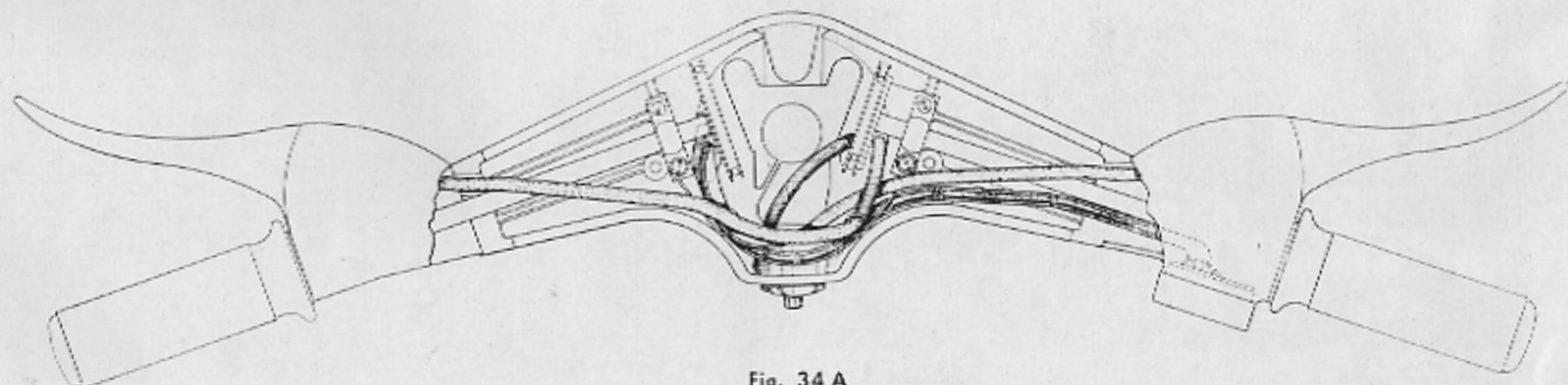


Fig. 34 A

**To realign handlebar and front wheel.**

- 50** Carry out operations 44 and 45 and sight check the position of the handlebar with respect to the front wheel. If it is necessary to adjust the position of the handlebar loosen the bolt locking the handlebar to the steering group (10mm spanner, Tool No. 57836), and retighten after having carried out the adjustment.

**REASSEMBLY.**

Reverse the operations mentioned above, Viz: (Operation 50 to 41). Check the location of the electric and control cables inside the handlebar to ensure they are placed exactly as shown in Fig. 34A and 34B according to the type of fork, to avoid chafing and acute angled bends. If the headlamp has been removed, it is necessary after reassembly to adjust the position (see Page 50).

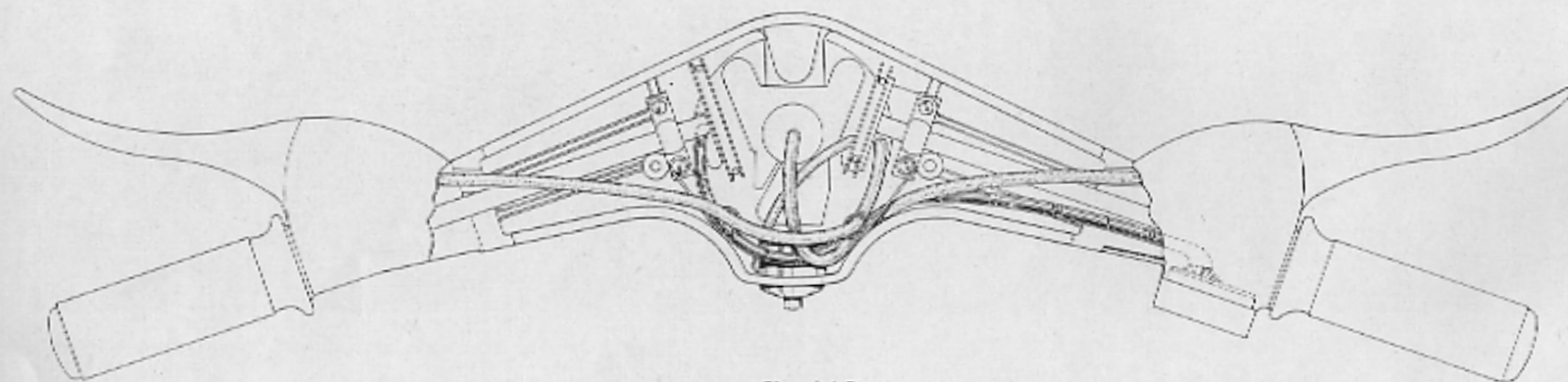


Fig. 34 B

## REMOVAL AND REFITTING OF THE FUEL TANK

- 51 Remove the battery together with its carrier by unscrewing the two nuts fixing these to the bracket on the frame (10mm spanner).
- 52 Drain all petrol from tank.
- 53 Remove Carburettor with air intake. (See op. 22).
- 54 Remove petrol tap control rod by extracting its pin.

- 55 Remove the tank support straps (8mm box spanner).
- 56 Remove the tank from the near side by rotating it in a clockwise direction which will enable the assembly to slide out from the frame with ease.

### TO REASSEMBLE.

Reverse the above operations. (Op. 56 to 51).

## DISMANTLING AND REASSEMBLY OF FRONT SUSPENSION

- 57 Raise machine onto its stand, loosen front brake cable clamp on front wheel and disconnect trunnion from front brake lever on back plate, unscrew speedometer drive lock ring and remove cable.
- 58 Remove wheel; loosen the two wheel nuts on the trailing links (21mm spanner) and tilt machine to remove wheel.

- 59 To remove lower buffers, remove trailing link pin (19mm spanner), unscrew grease nipple under the lever, remove screws fixing buffer (10mm spanner) remove buffer with the aid of a screwdriver. See Fig. 35.
- 60 To remove the trailing links; fit Tool No. 58021 and compress the suspension spring to remove the lever. See Fig. 38.





Fig. 35



Fig. 36

- 61** Remove spring guide pistons, the springs and piston guide ring, using for the last item a hook off in case of difficulty. (See fig. 39).
- 62** Unscrew the R.H. side wheel nut (loosened previously) unscrew the wheel lock nut (19mm spanner) and withdraw the brake shoe back plate complete.

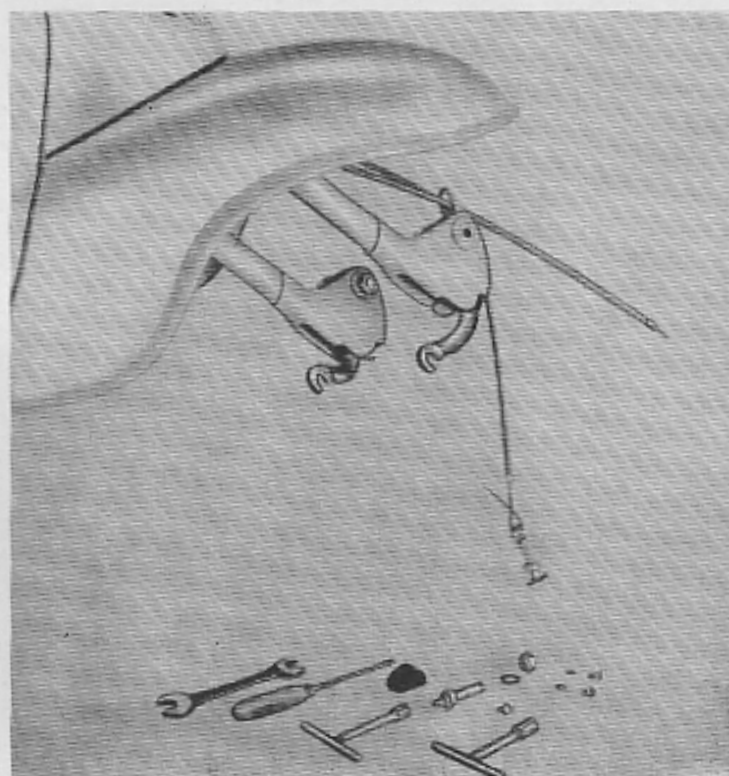


Fig. 37

- 63** Withdraw front wheel spindle by tapping it with a punch from the right hand end.
- 64** Remove the two oil seals and distance pieces from each side of the hub.
- 65** Extract circlip from left hand side of hub and tap out

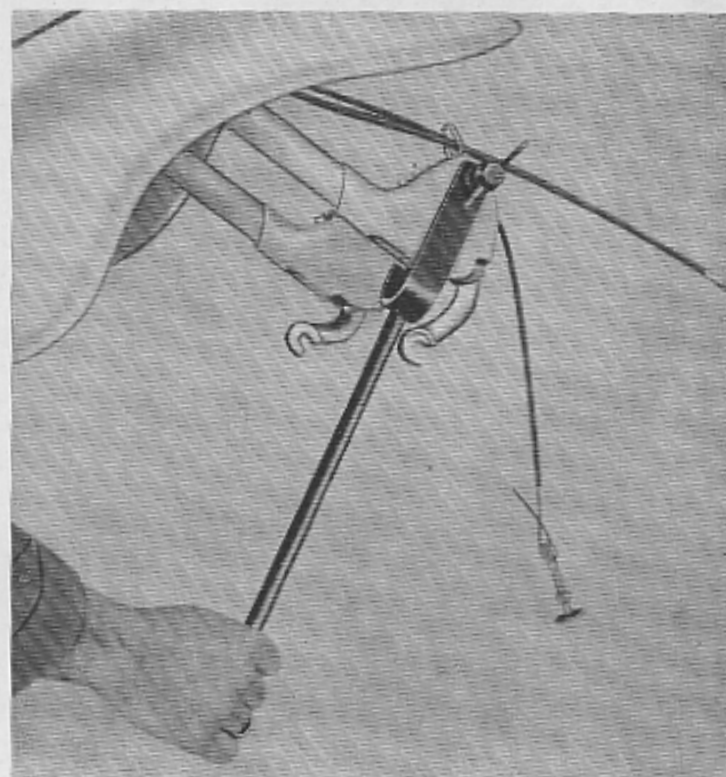


Fig. 38

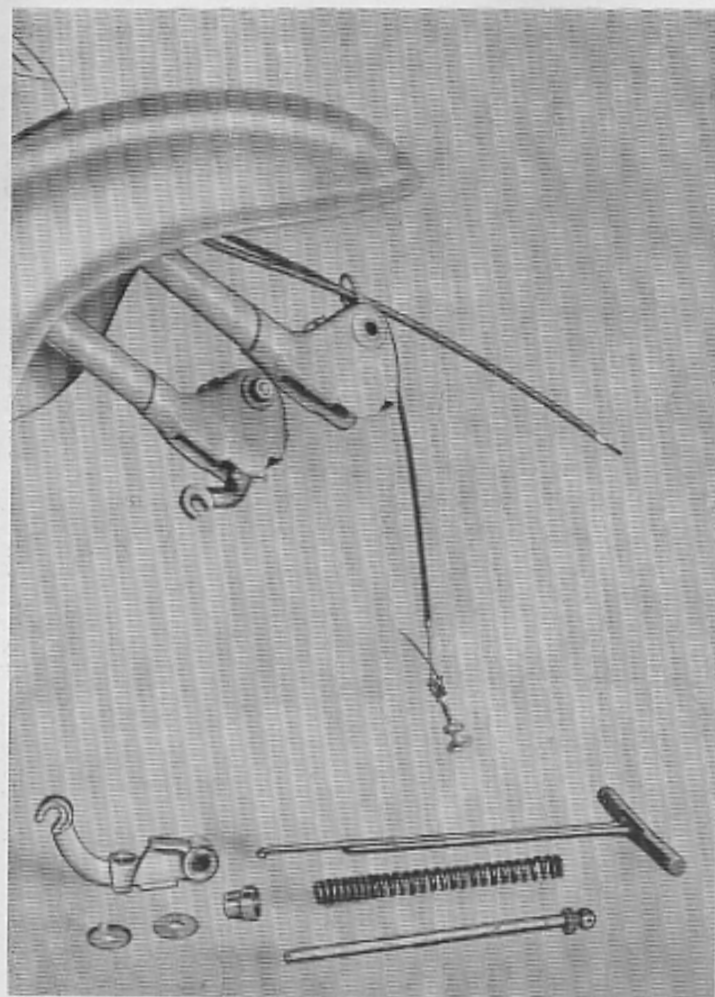


Fig. 39

the bearings with a suitable punch (Right hand bearing towards the right and left hand towards the left). See Fig. 40.

#### TO REASSEMBLE.

Follow the above operations inversely (Ops. 65 to 57). Bear in mind that the oil seals must be fitted with the rim outwards, so that in case of excessive pressure being applied during greasing, the extra grease can easily come out, without damaging the seals.

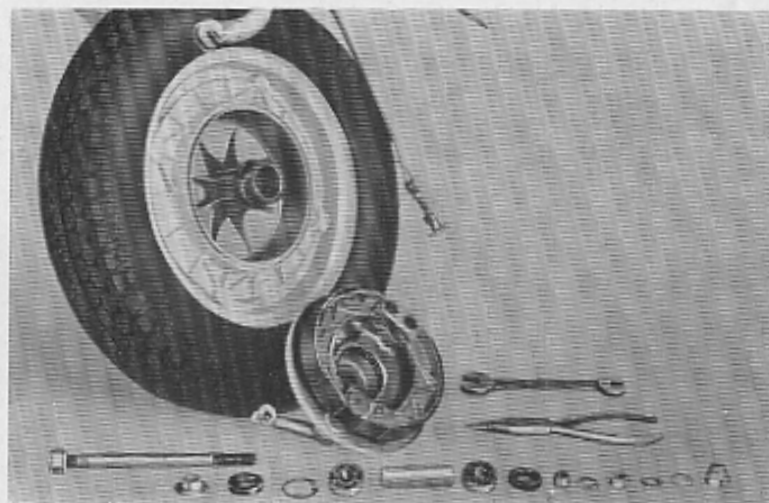


Fig. 40



## SETTING AND TIMING OF FLYWHEEL MAGNETO

- 66 Remove cylinder Head (Op. 1, 2, 3, 15, 19, 20, 21, 22, 23, 24 and 25) and fit Tool No. 57988 which can be locked into position by means of two of the four cylinder studs. To this Tool fit the dial gauge. See Fig. 41.
- 67 Remove cowl cover circlip and fan cover to allow access to the flywheel (Op. 28 and 29).
- 68 Check that the contact points face one another squarely and are in good condition, if not replace with new parts. No fixed gap can be given, but adjustment will cause the ignition to advance as the gap is increased and to retard as the gap is reduced. The points must just «break», as indicated by the Lambretta Contact Tester No. 5017, when the flywheel has rotated in the normal direction, i.e. clockwise,  $10^{\circ}$  from the inter-pole position. If the gap is not set to achieve this condition, difficult starting will result and there will be a tendency for the engine to stall when the headlights are switched on.
- 69 After the contacts have been set, the timing can be checked and adjusted if necessary by removing the

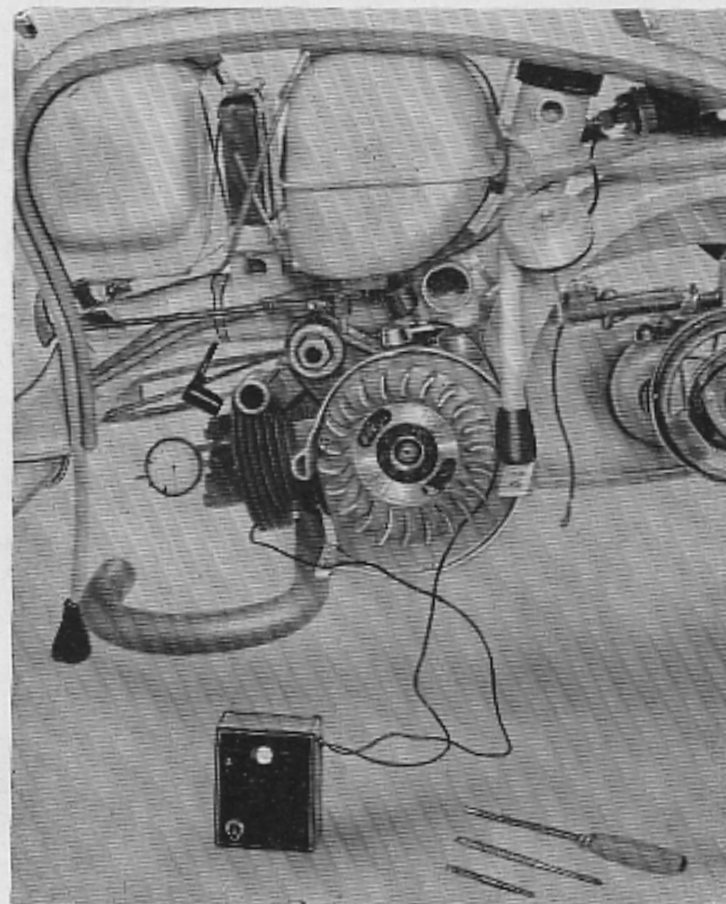


Fig. 41



flywheel and re-positioning the stator plate. For this test and the foregoing check No. 68, the main switch key should be turned to the « day-riding » position and one of the tester wires connected to the green wire L.T. on the magneto terminal block or to H.T. feed terminal. The other tester wire should be connected to earth.

On later machines, disconnect the green wire from the H.T. feed on the rectifier and connect the tester to the green wire from the magneto and also to earth as before.

- 70 Turn crankshaft until top dead centre is found, bring dial gauge to zero in this position.
- 71 Switch on the electric tester at the T.D.C. and turn the flywheel slowly in an anti-clockwise direction (i.e. in

the opposite direction to that shown by the arrow marked on the flywheel). When the tester light goes out or the needle, according to the type of tester, moves, this indicates that the contact points have closed, take the dial reading. This should be between 2.5 and 3.0 mms. corresponding to an angle of rotation of the flywheel of  $23^{\circ} \pm 1^{\circ}$  or to a measurement of 32 to 33 mms. measured on the perimeter of the flywheel. Should the points close before or after the above, remove flywheel (rotating part only), loosen the screws fixing stator plate, move the plate in a clockwise direction to retard or in anticlockwise direction to advance until the moment correct contact point opening is reached. See Fig. 41.

## THE ELECTRICAL EQUIPMENT

# **LAYOUT OF PRE-MOD ELECTRICAL EQUIPMENT** (machines equipped with battery)

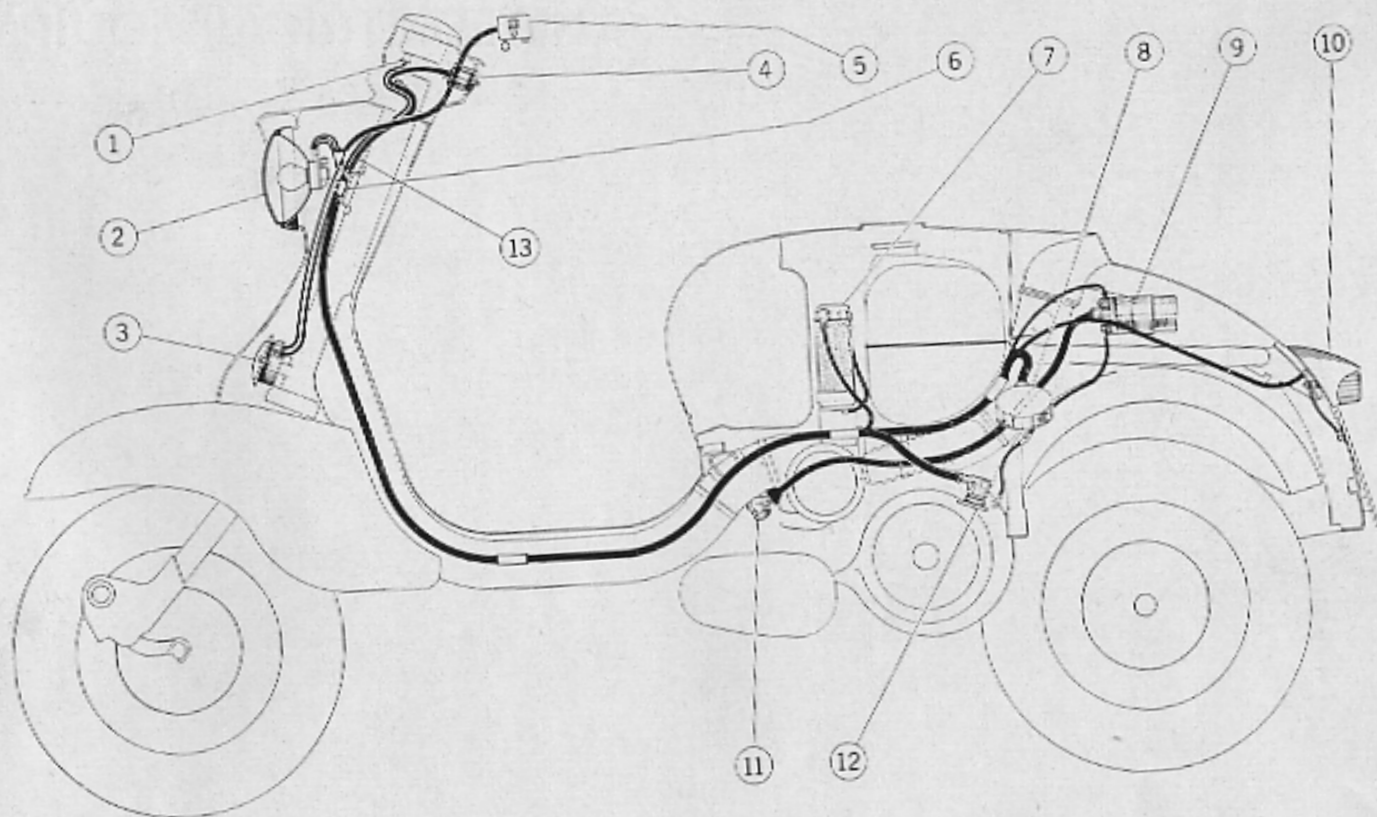


Fig. 42 A

1 Speedometer lamp - 2 Headlight - 3 Horn - 4 Engine cut out button - 5 3 Way light switch with head lamp beam control  
6 Junction box - 7 Battery - 8 Rectifier - 9 H. T. coil - 10 Tail light - 11 Spark plug cap - 12 L. T. plug on Flywheel magneto -

## ELECTRICAL EQUIPMENT AND WIRING

### A) Machines equipped with battery

The electrical circuit of the machine is supplied by the flywheel magneto which feeds current to the H.T. Coil, to the horn and to the dual filament 6 V. 25/25 W Headlamp Bulb. Furthermore through a rectifier the flywheel maintains the charge to the battery and supplies current to the Headlamp Pilot light. Battery and rectifier feed stop lights (if mounted). The Speedometer bulb and the rear light are fed directly from the flywheel or the battery according to the position of the main switch key. The balancing of the battery charge is maintained by an impedance which is inserted in series to the circuit when key is in the 0 and 2 position.

On the first series of machines, the impedance and fuse are fitted to the junction box behind the Headlamp, while the rectifier is fixed to the L.H. footboard support arm. See lay out drawing of the electrical equipment Fig. 42 A and the wiring diagram Fig. 43 A.

On the later series of machines impedance and fuse are fitted together with rectifier in a square box fixed to the L.H. footboard support arm.

See lay-out drawing of the electrical equipment Fig. 42B and the Wiring diagram Fig. 43B.

Note - Some machines are fitted with stop lights. On these machines a switch is fitted on rear brake pedal and the pink wire, which feeds the two stop light bulbs, is connected to the violet wire on the junction box behind headlamp.

The main switch has 3 positions. From left to right:

- 0 - All lights out. Normal day riding.
- 1 - Pilot light, rear and speedo lights - for night city travel and parking.
- 2 - Headlamp, Rear light and speedo light, for night riding out of town.

To switch from main Headlamp beam to dipped beam use the two-way lever on switch.



**LAYOUT OF POST-MOD ELECTRICAL EQUIPMENT**  
(machines equipped with battery)

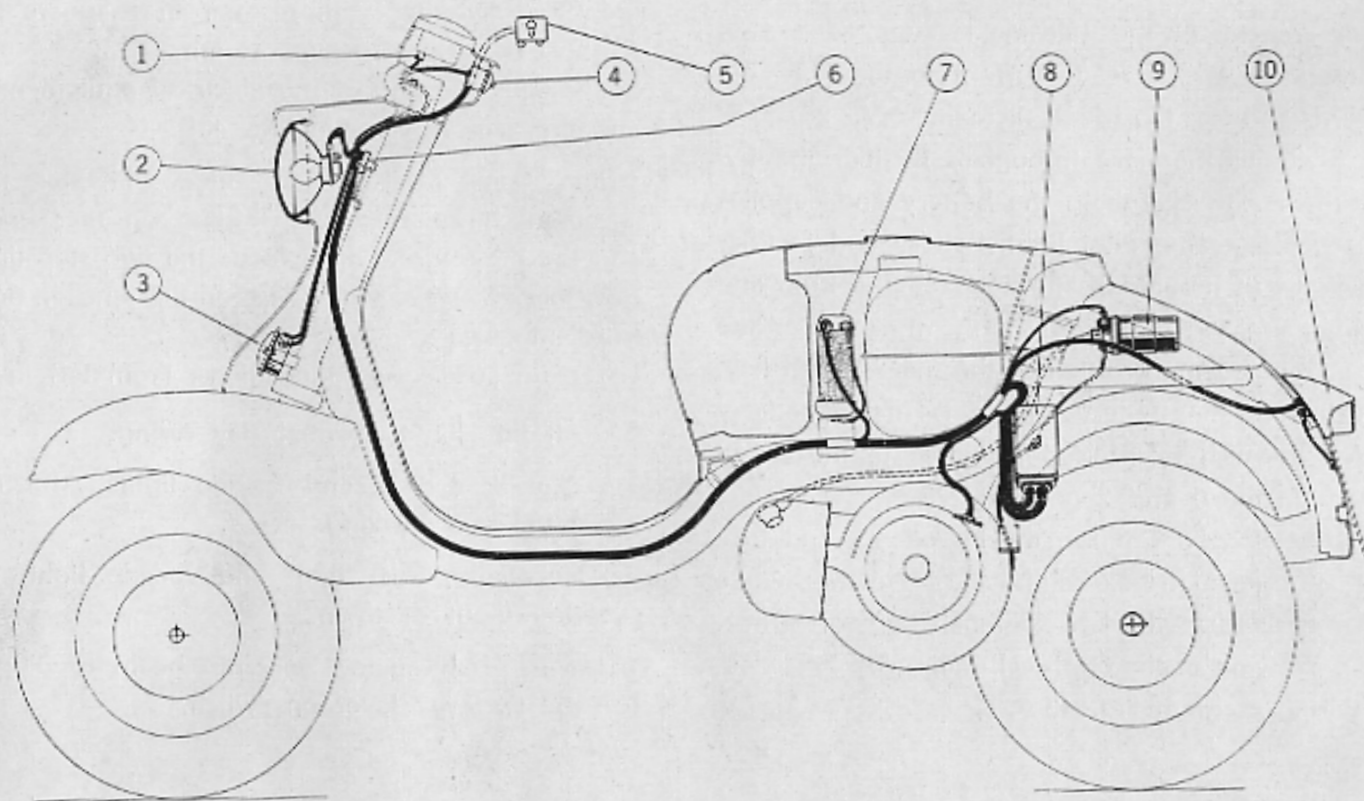


Fig. 42 B

- 1 Speedometer lamp - 2 Headlight - 3 Horn - 4 Engine cut out button - 5 3-way light switch with Headlamp beam control and Horn button - 6 Junction box - 7 Battery - 8 Box containing Rectifier Impedance and Fuse - 9 H. T. coil - 10 Tail light

# **PRE-MOD WIRING DIAGRAM** (machines equipped with battery)

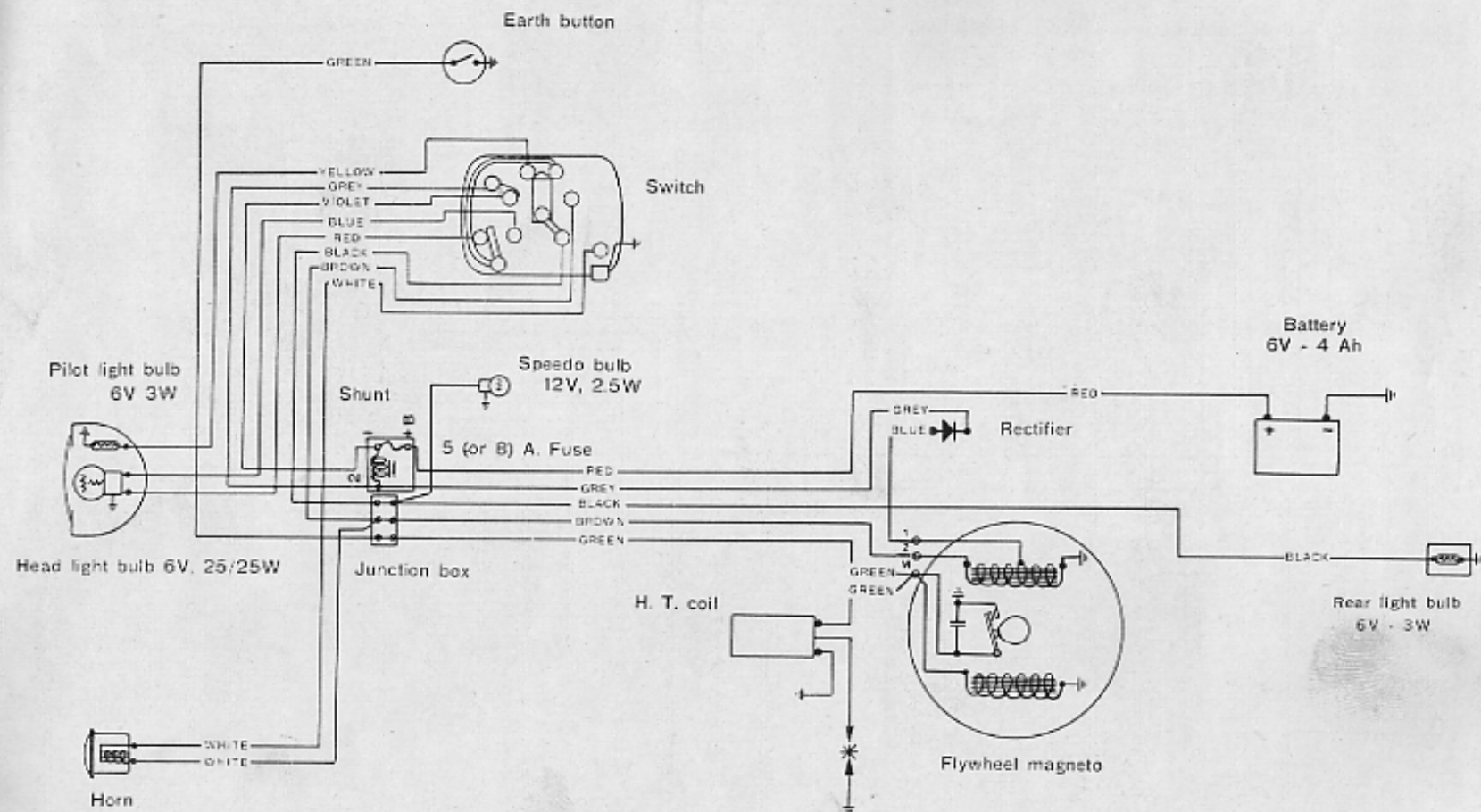


Fig. 43 A

# POST-MOD WIRING DIAGRAM

(machines equipped with battery)

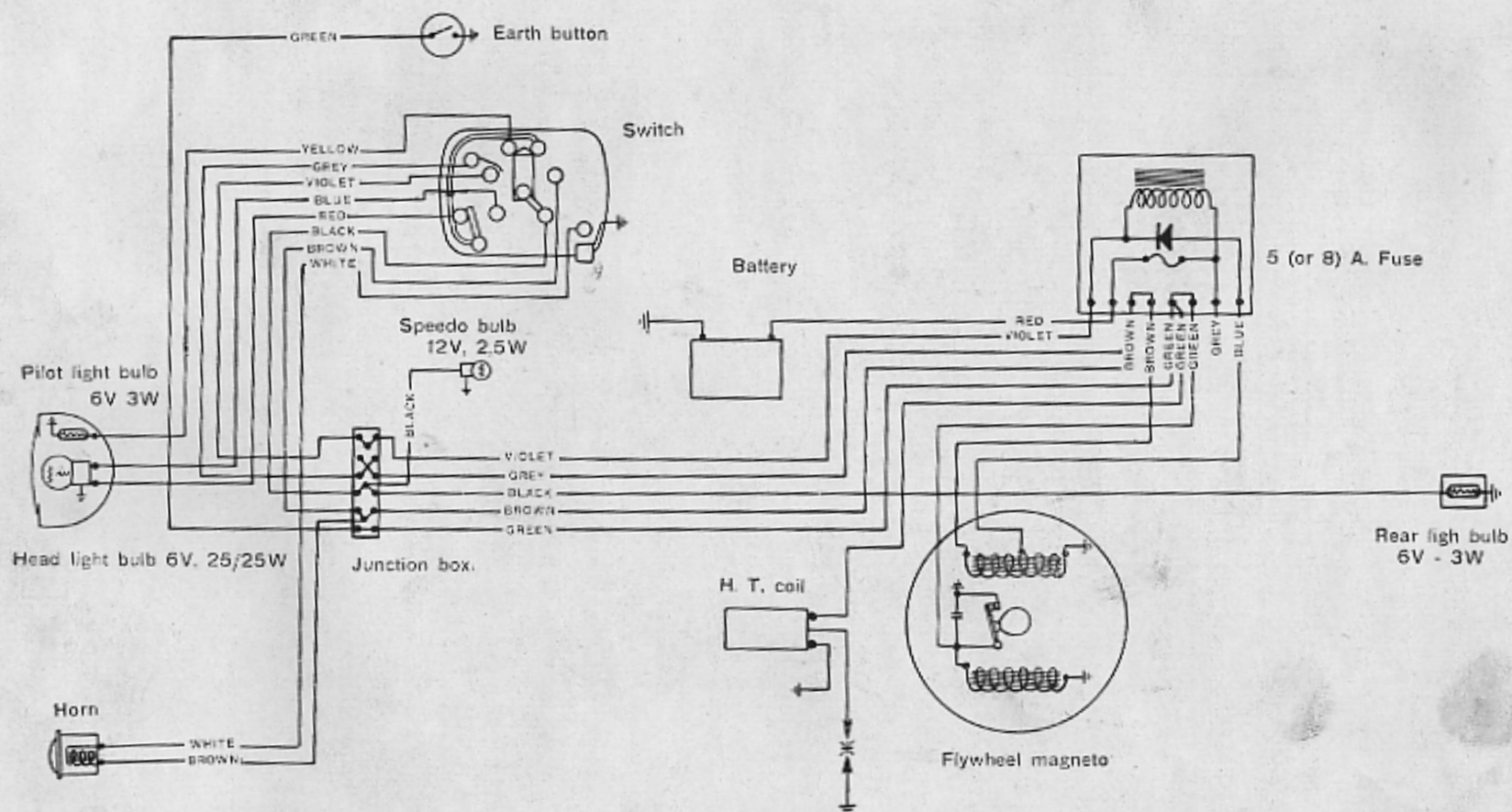


Fig. 43 B

## ELECTRICAL EQUIPMENT

### MAIN FEATURES.

Description	Part No.		Characteristics
	Pre-mod.	Post-mod.	
<b>Flywheel magneto</b>			<p>1 Ignition Coil (with green connecting wire). At a speed of 100 RPM with lights off, a spark over a gap of 5 mm should be given. - 1 Lighting Coil with two wires (Brown for lights - Blue for rectifier). This Coil should give a 6 V current at 3000 RPM. with a 1.33 ohm resistance.</p> <p>Open circuit type. AC.</p> <p><b>NOTE</b> - Coils are interchangeable except Filso coil to be mounted only with Filso Flywheel.</p> <p>Plates in parallel.</p> <p>Impedence 0.8 mH</p> <p>Fuse 8 Amp</p> <p>3-way with horn button and Headlamp beams two way lever.</p> <p>Pre-mod - 6 V. 4 AH.</p> <p>Post-mod - 6 V. 5 Ah.</p>
Filso	00811415		
Marelli	00831593		
Ducati	00840013		
<b>H.T. Coil</b>			
	Filso - 00811384		
	Marelli - 00831579		
	Bosch - 12011081		
	Ducati - 00840016		
Rectifier	15.08.1250		
Impedence		15.08.1300	
Fuse	19.08.1270		
Main Switch	19081220		
Cut out Button	19081270		
Battery	19081170	19081290	
<b>BULBS</b>			
Headlamp Bulb	15080003		Twin filament. 6 V. 25/25 W.
H/Lamp Pilot Bulb	15083004		6 V. 3 W.
Rear Lamp Bulb	15083004		6 V. 3 W.
Speedo Bulb	15087002		12 V. 2.5 W.
Stop light Bulbs (if fitted)	15083004		6 V. 3 W.



## CHECKING OPERATION

The following instruments are needed for the checking.

- REV. counter from 0 to 6000 RPM.
- Voltmeter for DC. - 0 to 10 V.
- Ammeter for DC. - 0 to 3 A.
- Milli-ammeter for DM. - 0 to 10 MA.
- Hydrometer for battery liquid check.
- Wiring Circuit Tester - A Megachometer is recommended.

## HEADLAMP ADJUSTMENT

- Check tyre pressure (see Page 11).
- Place a vertical screen in front of scooter as shewn in Fig. 44.
- Place the machine under its normal load carrying conditions (with rider and/or pillion rider).
- Loosen the two screws marked V on the headlamp, rotate slowly on the remaining screws until the upper edge of the zone illuminated by the headlamp dipped beam coincides with the horizontal line traced on the screen.

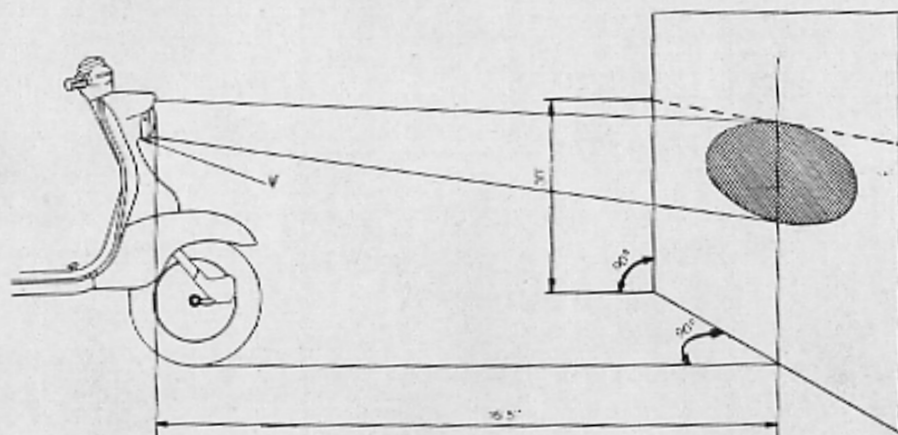


Fig. 44

## BATTERY MAINTENANCE

(To remove the battery from the machine see Op. 51 - Page 36).

- 1 Do not in any circumstances allow the battery to remain in a discharged or low state of charge for any lengthy period, otherwise damage to the plates may occur.
- 2 Check acid level weekly or as required, add distilled water until the level is approximately  $\frac{1}{4}$ " above the cell separators. It is advisable to add distilled water **after** and not before a journey.
- 3 Check at regular intervals to see if the battery terminals are well tightened to the cables and greased with vaseline to avoid corrosion.
- 4 Should the machine be laid up for a considerable time it is advisable to remove the battery; store in a dry place at normal temperature and arrange for a monthly recharge to maintain efficiency.
- 5 On refitting the battery to the machine great care must be taken in connecting the battery in the correct way. See lay-out at Fig. 40. **Positive pole (+)** connected to the machine circuit, **Negative pole (-)** connected to the earth screw situated on the battery support bracket on frame.

- 6 Carry out the charges of the battery only with DC, or rectified current having an intensity equal to  $\frac{1}{10}$ th. of its capacity (0.4 to 0.5 amps). Check each of the three battery cells with a voltmeter and when the current registers 2.6 V per element continue charge for a further 3 hours.

- 7 Measure the density of the liquid by means of a hydrometer. A density of  $1.26 \text{ g/cm}^3$  (equal to  $30^\circ$  baume) corresponds to a fully charged battery, while a density of  $1.21 \text{ g/cm}^3$  ( $25^\circ \text{ Be}$ ) indicates the battery urgently needs charging to avoid corrosion of the plates.

Should lower densities be found then it is advisable to send the battery to the makers because the process of corrosion has already set in.

After the charging of the battery shake to allow the exit of the gas formed during the charging, then bring the level of the liquid to the height mentioned above.

For the first charge follow the Maker's instructions supplied with the battery. If the battery should require to work in tropical climates then the density of the liquid should be  $1.21 \text{ g/cm}^3$  ( $25^\circ \text{ Be}$ ) at  $15^\circ \text{ C}$ . both for the first charge and normal functioning.

## FUSE

The fuse is accessible by removing the Head lamp (pre-mod machines) or the rectifier cover (post-mod machines). Place the main switch in position 1, and if the light remains off, check if the fuse has burnt. If so, find the reason for this and replace fuse, 5 (or 8) Amp.

## CURRENT CIRCUIT ABSORPTION CHECK.

Connect ammeter between battery positive pole and main wire (ammeter positive to battery positive - ammeter negative to main wire) See Fig. 45. Turn lever to Position 1 (light on) and check current absorption, which should be between 0.9 and 1.1 Amp.

## CHECKING OF THE BATTERY CHARGING CIRCUIT ON THE MACHINE

Place the ammeter between the positive pole of the battery and the main wire (battery positive to ammeter

negative, main circuit cable to positive of ammeter) see Fig. 45.

Start engine and keep main switch key in the position of day riding, 0. At the under-mentioned speeds checked with a rev. counter placed on the flywheel lock nut; the ammeter should read for proper functioning as follows:

- Approx. 0.25 amps. at 3000 revs.
- Approx. 0.4 amps. at 5000 revs.

Should the current measured be lower than the prescribed value this could be caused by:

- **Faulty rectifier:** in this case replace.
- **Loss of magnetism in flywheel** (when this happens a poor light will be given by the headlamp):  
Have the flywheel magnetised or replaced.

If there is no charging current, check 5 (or 8) amp. fuse, and replace if necessary.

## CHECKING CIRCUIT

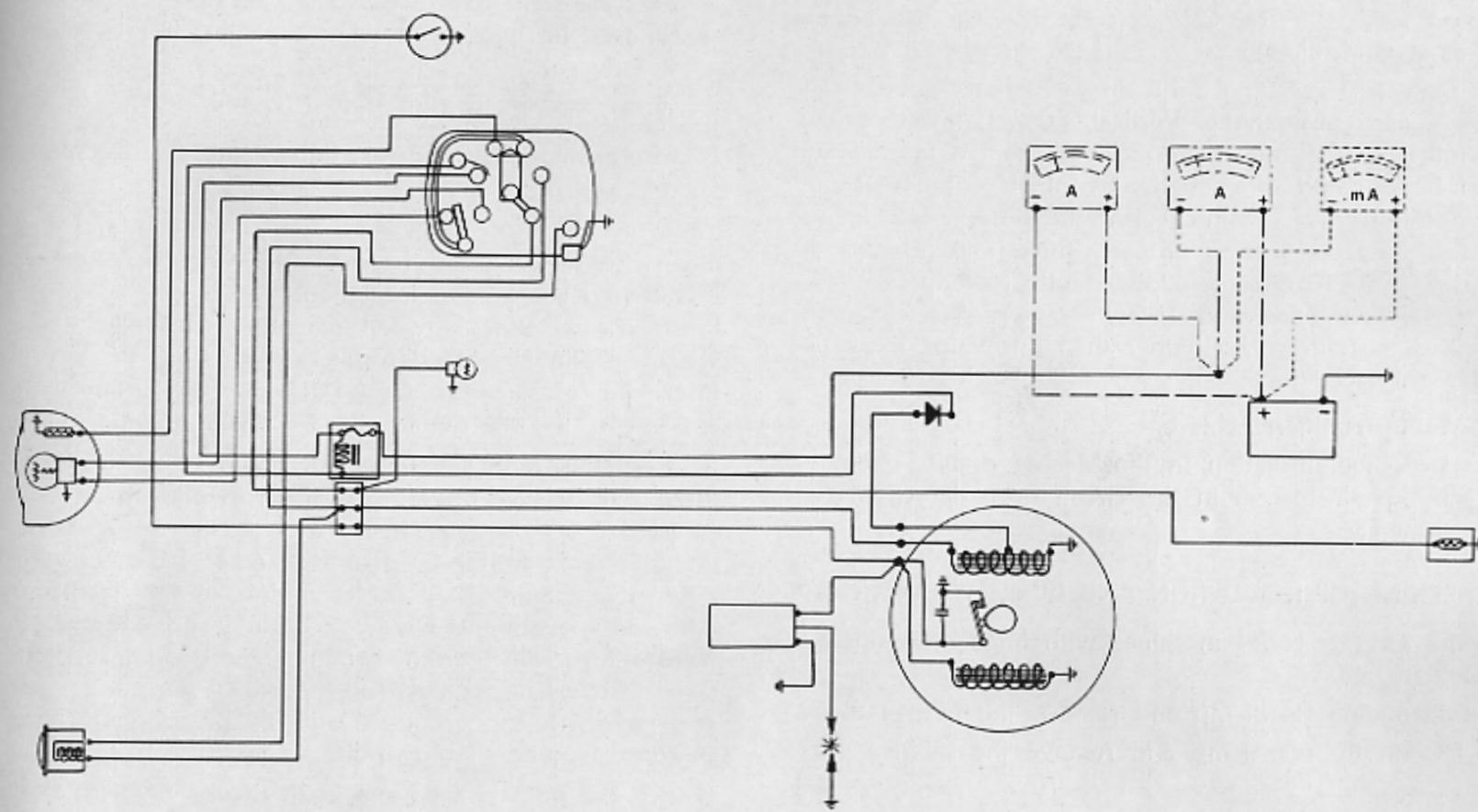


Fig. 45

- . . . . . Checking of current circuit absorption
- - - - - Checking of the battery charging circuit
- . . . . . Checking of the inverse current



### CHECKING OF THE INVERSE CURRENT

The checking of the inverse current between battery and circuit will give the loss of current when the engine is at a standstill.

To carry out a reading the main switch key should be in the « OFF » position i.e. Vertical « 0 ». Connect positive terminal of the milliammeter to the positive terminal on the battery and the negative terminal of the meter to the cable from the main circuit to the battery. See Fig. 45. Ensure that the fuse is properly fitted into its clips, as a bad contact of this can give faulty reading.

The maximum amount of current acceptable is 5 (or 8) m/A. Should the current be higher than this value the cause may be traced to:

- **Faulty rectifier:** Replace.
- **Defective insulation in the electric circuit:** Trace the broken insulation in the circuit or a defective component.

### CHECKING OF INSULATION AND CURRENT CONTINUITY

(Only for first series machines with impedance fitted to junction box).

- Dismantle Headlamp and remove the two bulbs.
- Open up rear lamp and remove the bulb.
- Disconnect speedo bulb black wire from headlamp junction box.
- Disconnect Red and violet wires from impedance and join together.
- Disconnect Red wire from battery positive.

- Disconnect Grey and Blue wires from rectifier and join together.
- Disconnect all wires from L.T. socket on flywheel and connect the two green wires together, if this is not already so.
- Disconnect Green wire from H.T. coil.

#### 1. **Battery pilot light and rear light circuit.** See Fig. 46A.

Place switch lever to position 1 (City lights).

Insert circuit tester between battery terminal and the Blue wire disconnected from the flywheel H.T. socket. This should show good insulation.

Insert circuit tester between rear light and pilot light wires - continuity should result.

Insert circuit tester between the disconnected Battery wire and earth and this should show a good insulation.

#### 2. **Headlamp bulb and horn AC. circuit** - See Fig. 47A.

Place switch lever in No. 2 position (Headlamp on).

Insert one wire of the circuit tester to the Brown wire, disconnected from the L.T. flywheel socket, the other wire alternatively to the two contact points of the headlamp bulb. By moving the two way beam lever, one should have alternatively current continuity or good insulation. Connect circuit tester between the Brown wire and earth and good insulation should result. By pressing the horn button continuity should result.

#### 3. **H.T. coil primary feed and earth circuit** - See Fig. 47A.

Insert current tester between Green wire disconnected from L.T. socket on flywheel and earth. Good insulation should result. By pressing the engine cut-out button, continuity should result.

# **CHECKING CIRCUIT (pre - mod)**

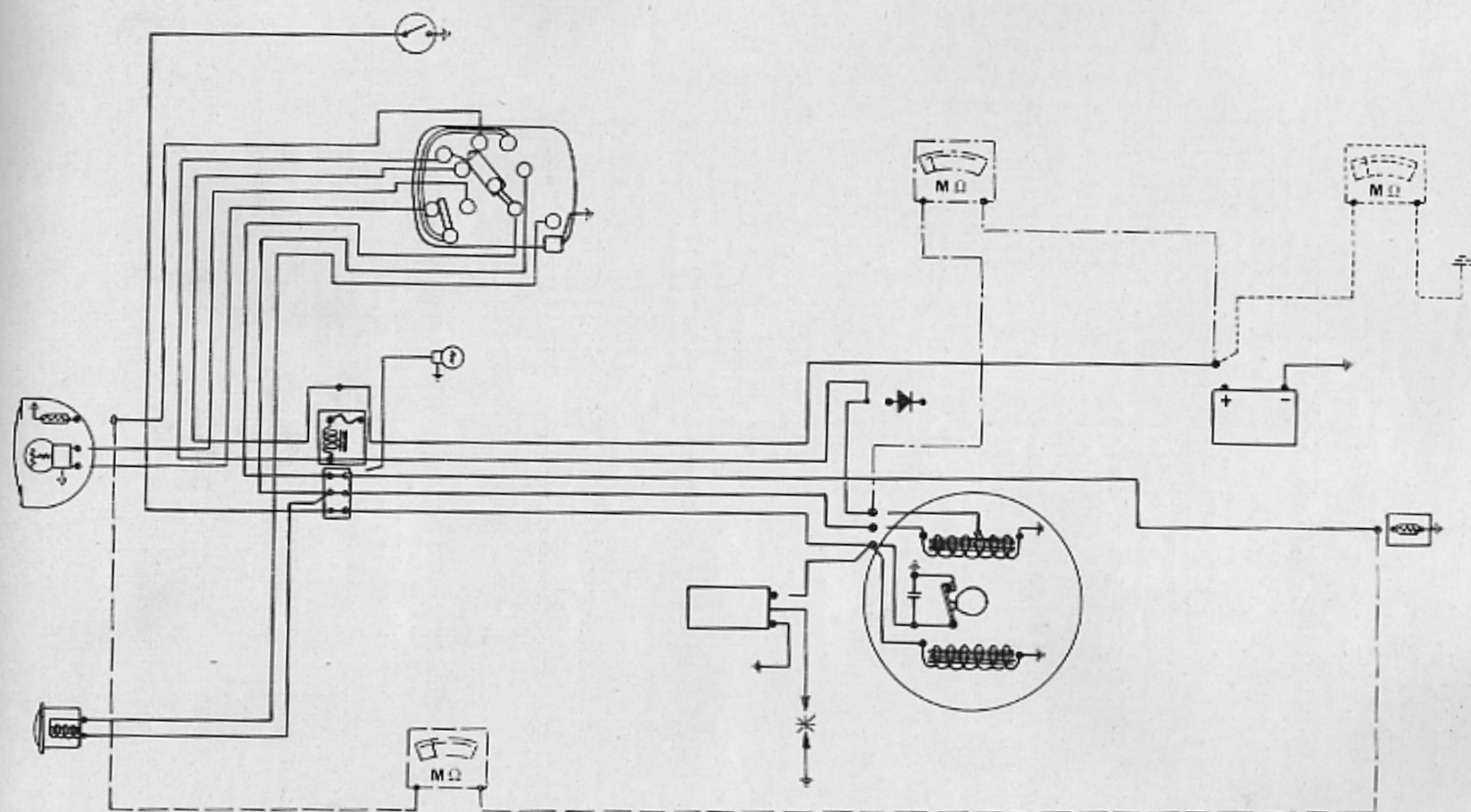


Fig. 46 A

- . — . — Checking of the battery circuit
- - - - - Checking of the battery circuit
- — — — — Checking of the pilot light circuit

### CHECKING CIRCUIT (post - mod)

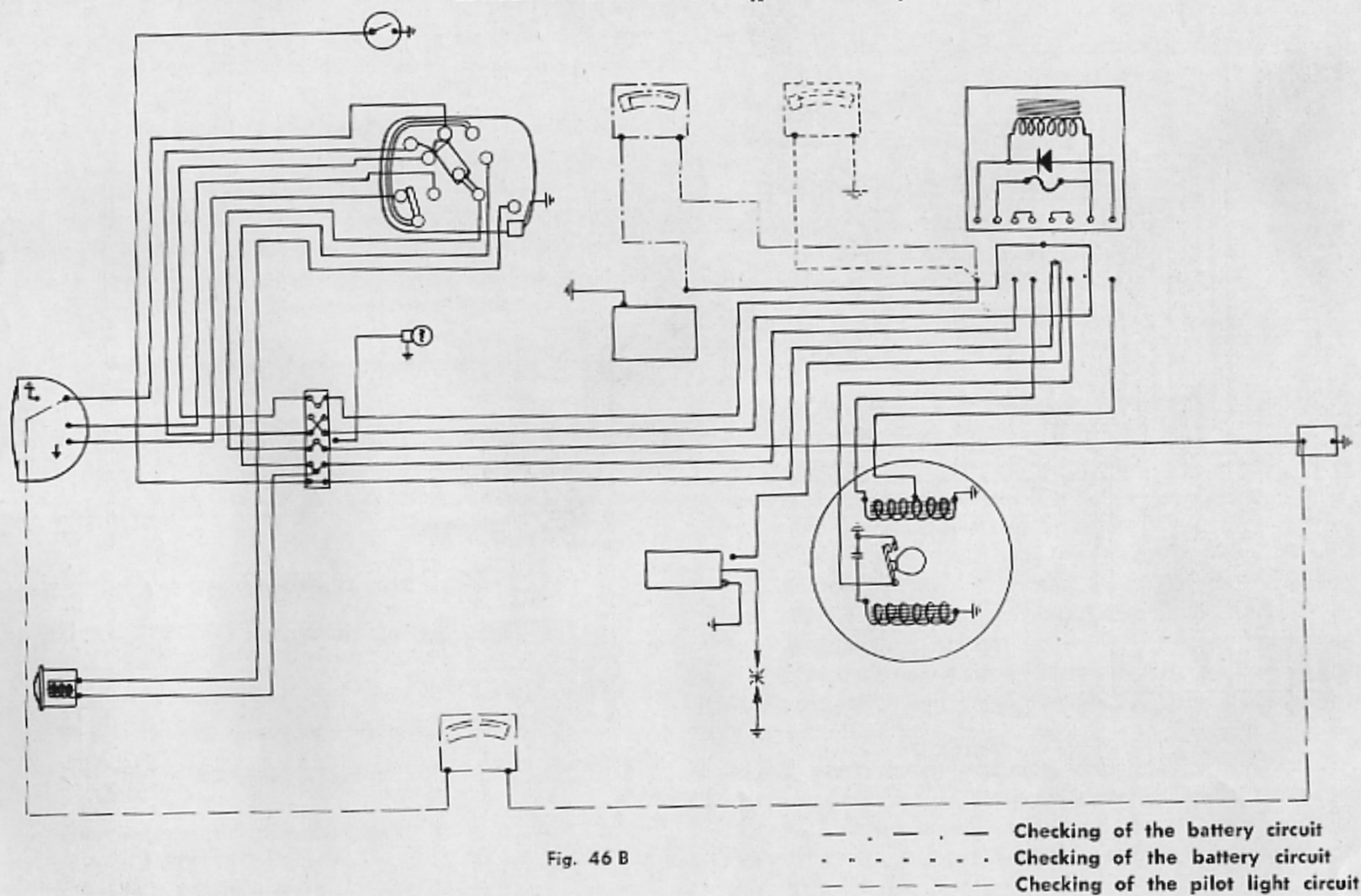
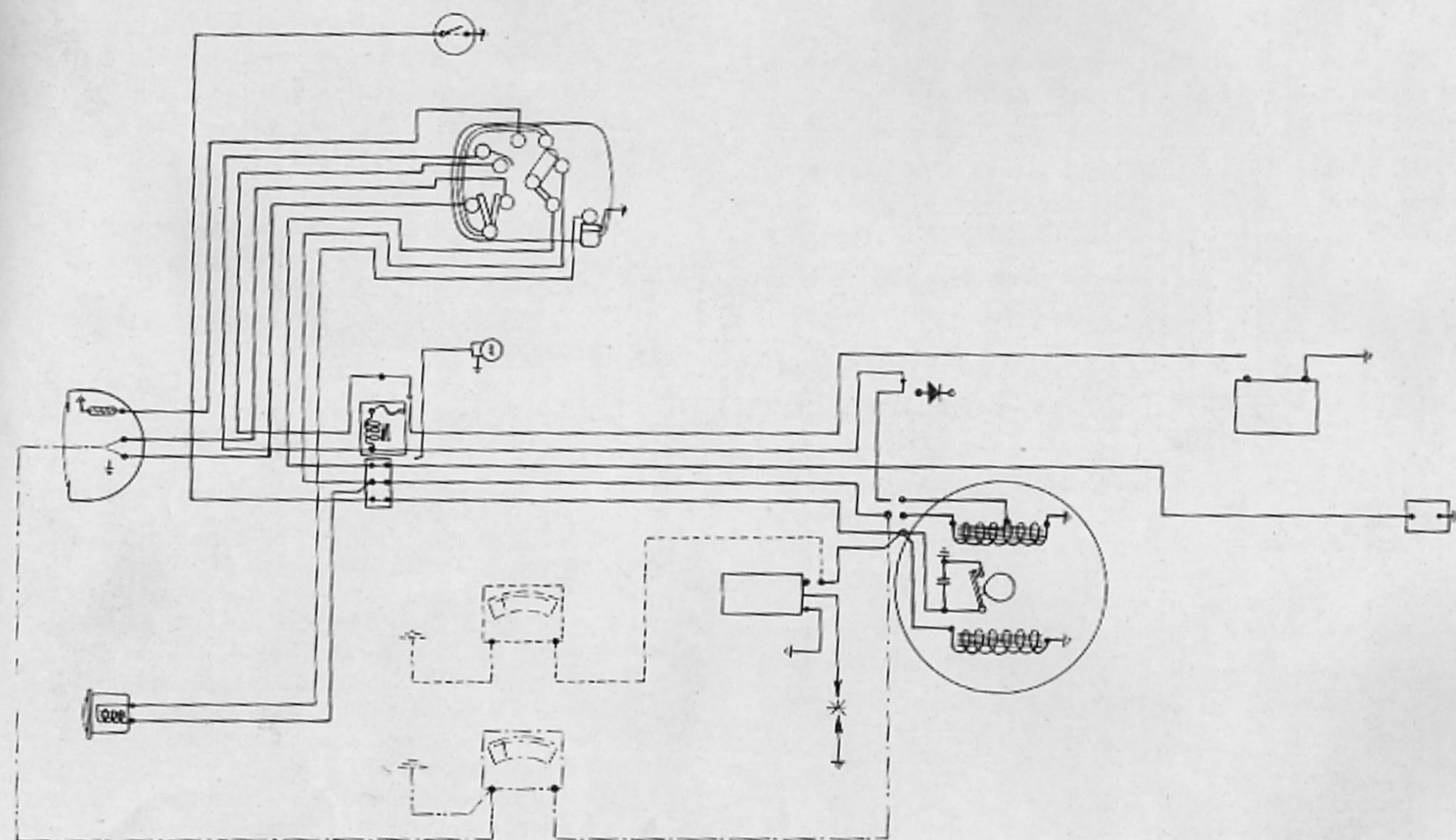


Fig. 46 B

# **CHECKING CIRCUIT (pre-mod)**



— . . . . . Checking of the horn and headlamp bulb a.c. circuits  
 - - - - - Checking of the H.T. coil and earth circuits

Fig. 47 A



# **CHECKING CIRCUIT (post-mod)**

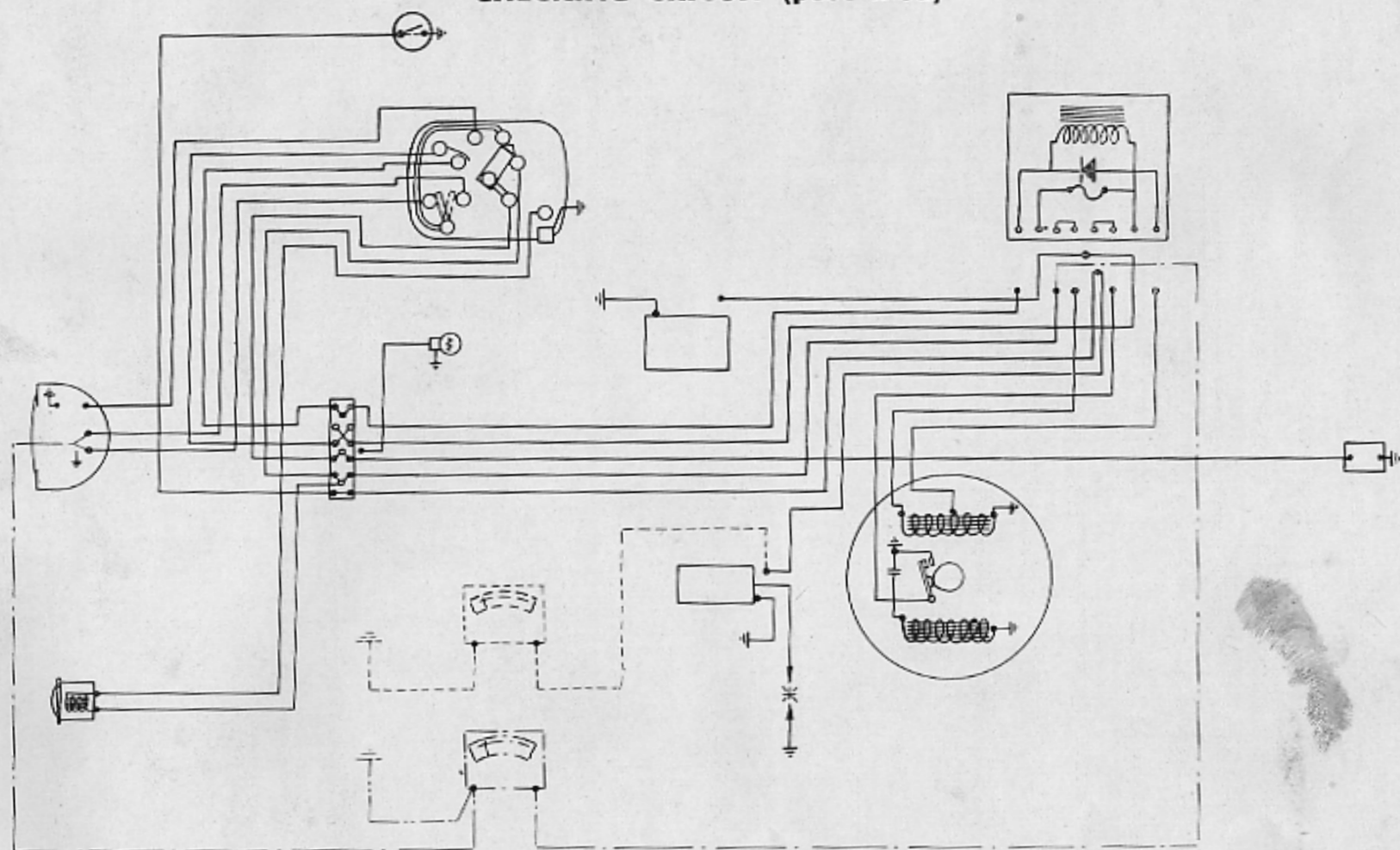


Fig. 47 B

— . — . — . — . Checking of the horn and headlamp bulb circuits  
 - - - - - Checking of the H.T. coil and earth circuits

## INSULATION AND CONTINUITY CHECKS

(Only applicable to machines with modified current as shown in Fig. 42B and 43B).

- Open up Headlamp and remove the two bulbs.
- Open up Rear lamp and remove the bulb.
- Disconnect the speedo bulb black wire junction box behind Headlamp.
- Disconnect Green wire on H.T. Coil.
- Disconnect Red wire on Battery positive.
- Disconnect from the junction box in impedance casing, all wires contained in the cable from flywheel and the one from the main circuit and:

(a) Connect the two Green wires in the main circuit cable (if not already so)

(b) Connect the Red and Grey wires.

1. **Battery, pilot light and rear light circuit** - See Fig. 46B. See check 1 page 54, if in place of Blue wire from L.T. socket, the Violet one from rectifier is used.

2. **Headlamp bulb and horn AC. circuit** - See Fig. 47B. See check No. 2 page 54, if in place of Brown wire from L.T. socket, the Brown wire from rectifier is used.

3. **H.T. coil and earth circuit** - See Fig. 47B. See check No. 3 page 54.

## ELECTRICAL EQUIPMENT AND WIRING

### B) machines not equipped with battery

On the first series of machines, the electrical current is fed by the flywheel magneto, which supplies current, to H.T. Coil, horn and bulbs. See Electrical layout Fig. 48A and wiring diagram Fig. 49A.

On the second series of machines, the circuit is fed by the flywheel magneto which supplies current to H.T.Coil, Horn and twin filament bulb only. The Pilot light is fed through an impedance which regulates the magneto current output. The rear light and the speedo light (if fitted) are fed, through the impedance (switch position 1) or directly from the magneto (switch position 2). See Layout Fig. 48B and wiring diagram Fig. 49B.

**Notes - 1.** By removing the L.H. side panel one can see by the presence or absence of the impedance, if a machine is of the first or second series.

2. Some machines of the first series are provided with stop lights. For these machines see diagram fig. 49 C. Some machines of the second series are too provided with stop lights. On these machines a switch is fitted on rear brake pedal and the pink wire which feeds the two stop light bulbs is connected to the violet wire on the junction box behind headlamp.

The Main Switch has 3 positions:

- 0 - All lights out.
- 1 - Pilot light, rear light and speedo light (if fitted).
- 2 - Headlamp, rear light and speedo light.

To switch from Headlamp main beam to dipped beam, use two way lever on switch.

# **PRE-MOD ELECTRICAL LAYOUT** (machines not equipped with battery)

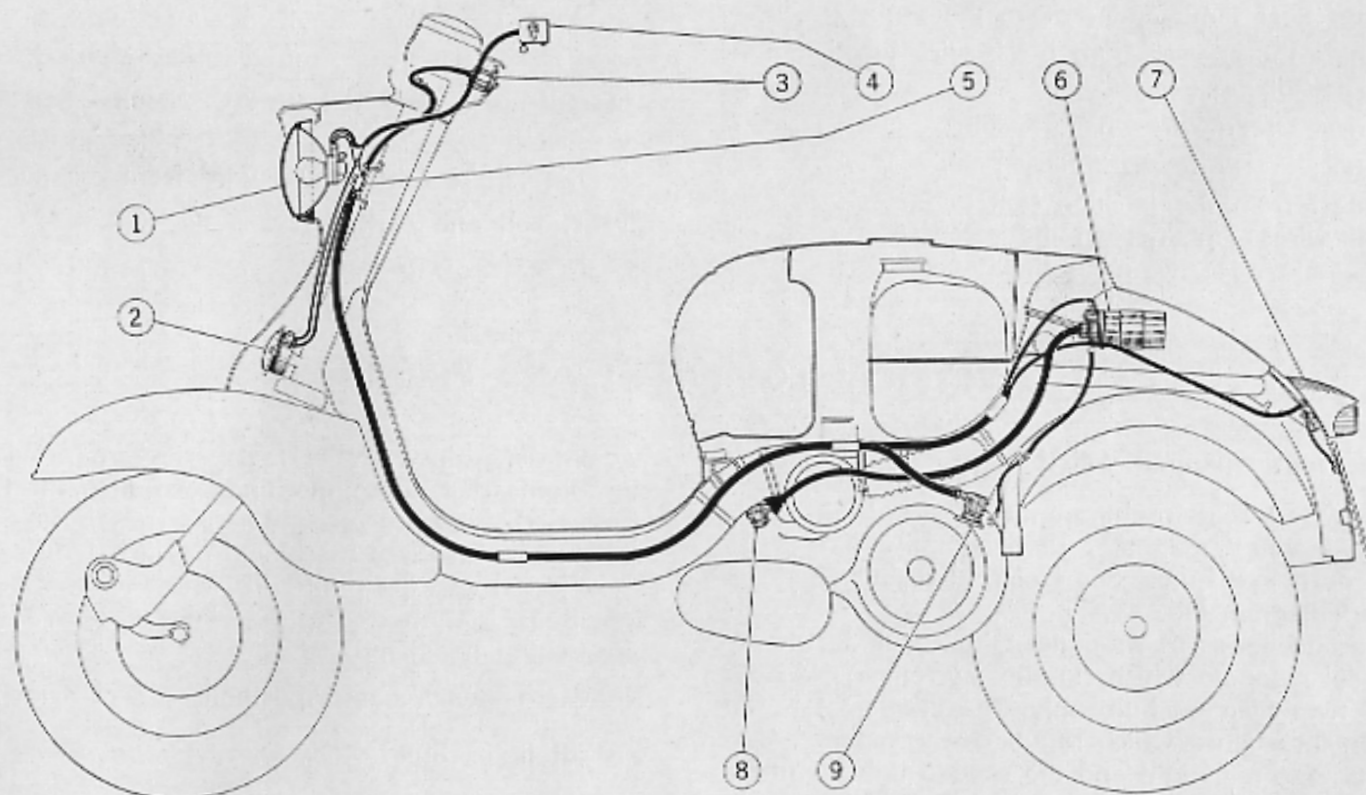


Fig. 48 A

1 Head light - 2 Horn - 3 Engine cut out - 4 3-way light switch with Headlamp beam control and Horn button - 5 Junction box  
6 H.T. coil - 7 Tail light - 8 Spark plug cap - 9 L.T. plug on Flywheel magneto

# **POST-MOD ELECTRICAL LAYOUT** (machines not equipped with battery)

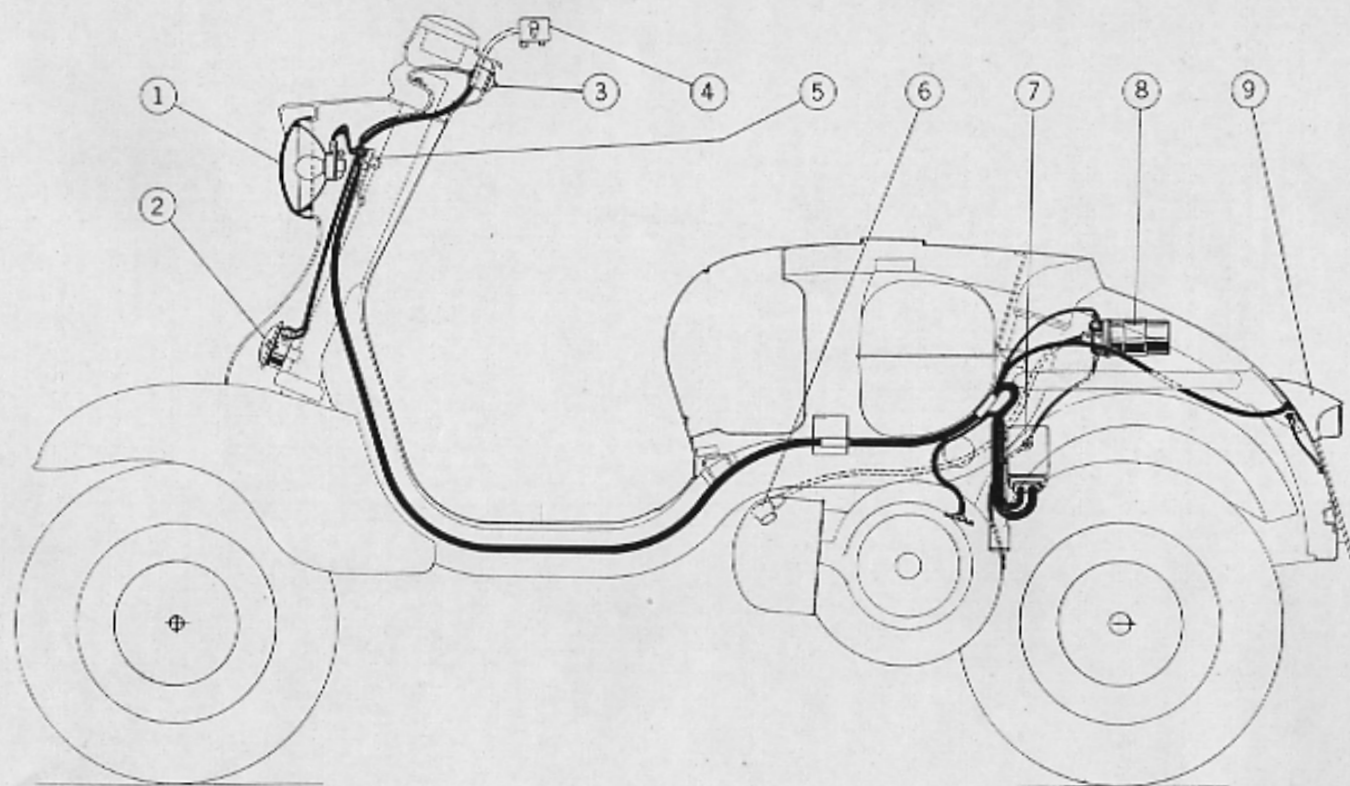


Fig. 48 B

1 Headlight - 2 Horn - 3 Engine cut out - 4 3-way light switch Headlamp beam control and Horn - 5 Junction box - 6 Spark plug cap - 7 Box containing Rectifier-Impedance and Fuse - 8 H.T. coil - 9 Tail light



# **PRE-MOD WIRING DIAGRAM** (machines not equipped with battery)

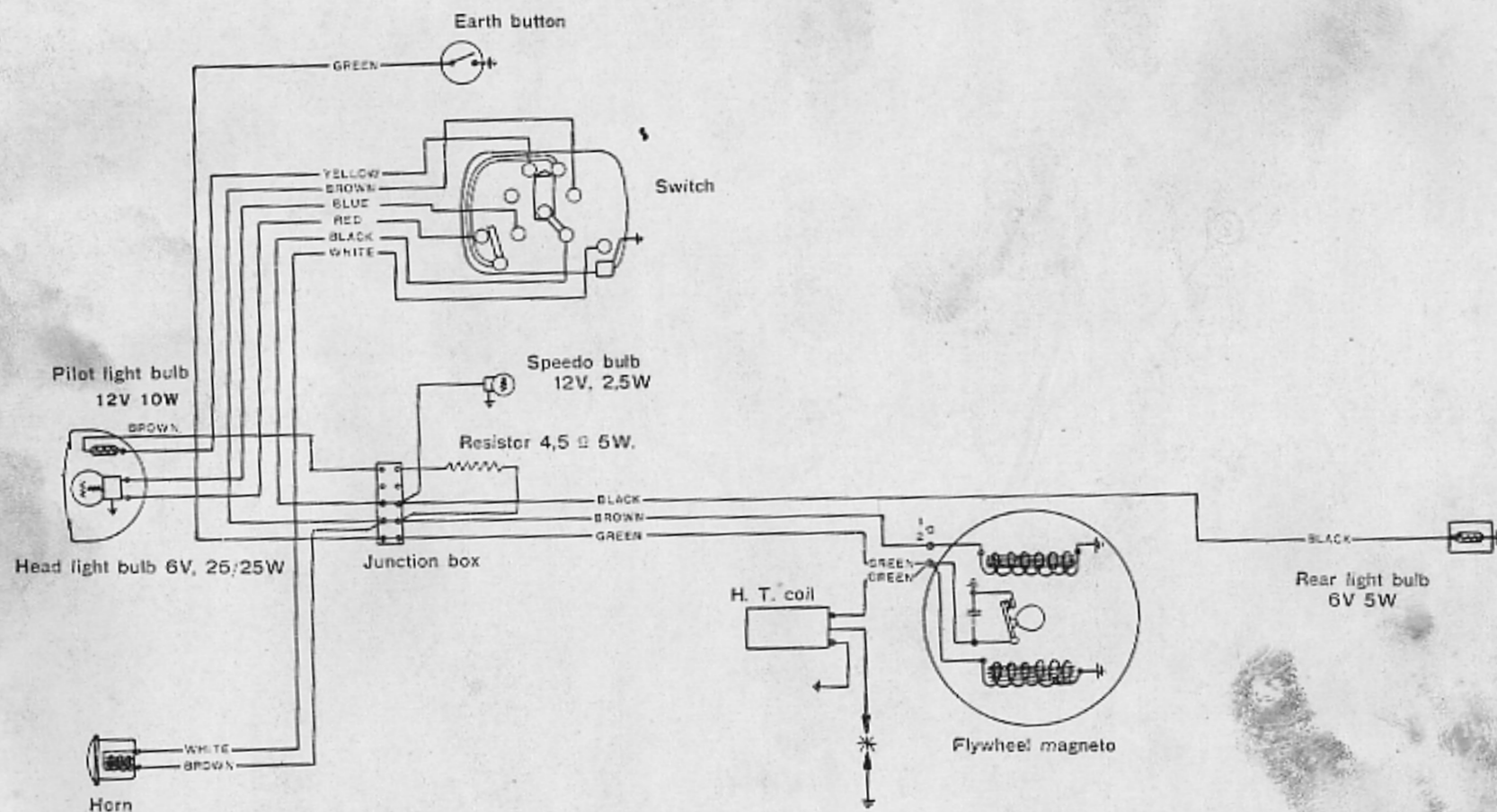


Fig. 49 A

# POST-MOD WIRING DIAGRAM

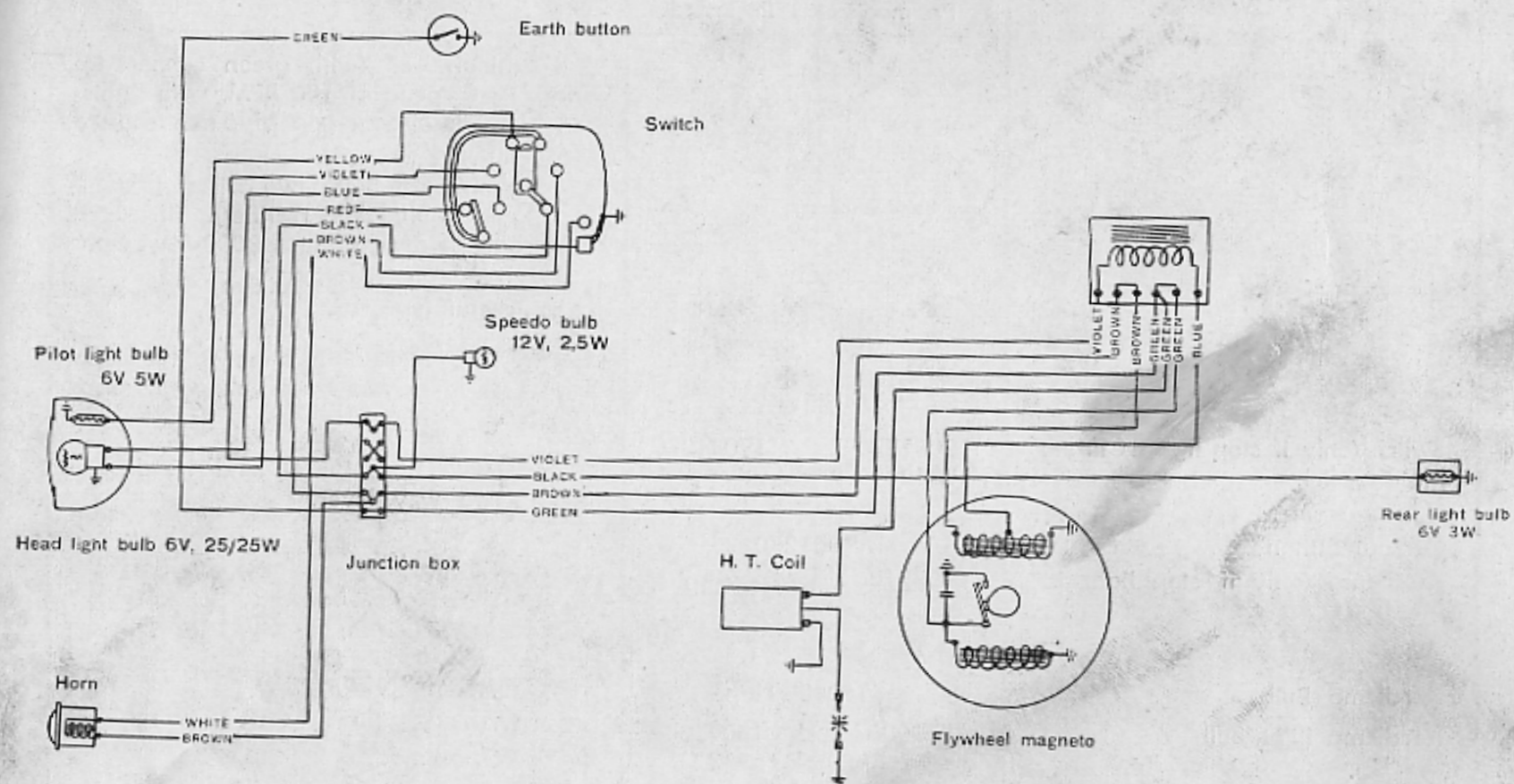


Fig. 49 B

## ELECTRICAL EQUIPMENT

### MAIN FEATURES

Description	Part No.		Characteristics
	Pre-mod	Post-mod	
<b>Flywheel Magneto</b>			1 - Ignition Coil (with green connecting wire). At a speed of 100 RPM. with lights off, a spark over a gap of 5mm should be given.
Filso	00811415		1 - Lighting Coil with two wires. (Brown for lights - Blue for rectifier). This coil should give a 6 V current at 3000 RPM with a 1.33 ohm resistance.
Marelli	00831593		Open circuit type AC.
Ducati	00840013		<b>NOTE</b> - Coils are interchangeable except Filso coil to be mounted only with Filso Flywheel.
<b>H.T. Coil</b>			
Filso	00811384		
Marelli	00831579		
Ducati	00840016		
Bosch	12011081		
Switch (only if stop light is fitted)	19081230	19081220	
Main Switch	19082110	—	3 way with horn button and Headlamp beams two way lever.
Cut out Button	19081270		—
Resistance (only if stop light is fitted)	19082170		18 Ohm - 5W
<b>BULBS</b>			
Headlamp Bulb	15080003		Twin filament 6 V 25/25 W
Headlamp Pilot Bulb	19080004	15083004	12 V 10 W pre-mod. 6 V 5 W post-mod.
Rear Lamp Bulb	19080004	15083004	6 V 5 W only for machines of first series not equipped with stop light and speedo bulb. 6 V 3 W for all other machines.
Speedo Bulb	15087002		12 V 2.5 W if fitted.

If the Speedo bulb is fitted, this is connected to the BlackWire on the Headlamp Junction Box.

## CHECKING OPERATION

The following instruments are needed for the checking:  
Circuit Tester.

Wiring Circuit tester - A megaohmmeter is recommended.

**Headlamp adjustment** - See Page 50

### Checking of insulation and continuity

Only for first 125 li series with electric circuit as shown in Figs. 48A and 49A).

- Remove twin filament Headlamp bulb.
- Remove Rear lamp bulb.
- Disconnect wires on L.T. Sprocket and connect to the two green wires (if not already so).
- Disconnect green wire from H.T. coil.
- If Speedo bulb is fitted, disconnect its wire on junction box.

#### 1. Flywheel, pilot light, rear light and horn circuit

See Fig. 50A.

Switch position - « 1 » - Pilot light.

Insert one of the circuit tester wires to rear bulb clip and the other to the Brown wire taken from the L.T. flywheel socket. Continuity should result. Then insert one of the wires to earth and a good insulation should result. By pressing the horn button, the continuity should be perfect.

#### 2. Flywheel magneto and headlamp circuit - See Fig. 50A.

Switch position - « 2 » - All lights on.

Connect one circuit tester wire to the Brown wire taken from L.T. Socket, and the other alternatively connect to the two Headlamp bulb contacts. By moving the switch lever one should have continuity and good insulation. A good insulation should also result if one of the wires is connected to earth.

#### 3. H.T. Coil feed and ignition earth circuit - See Fig. 50A.

Connect one of the circuit tester wires to the wire disconnected from H.T. Coil and the other to earth, and a good insulation should result. Press Engine cut-out button and one should get good continuity.



# **CHECKING CIRCUIT (pre-mod)**

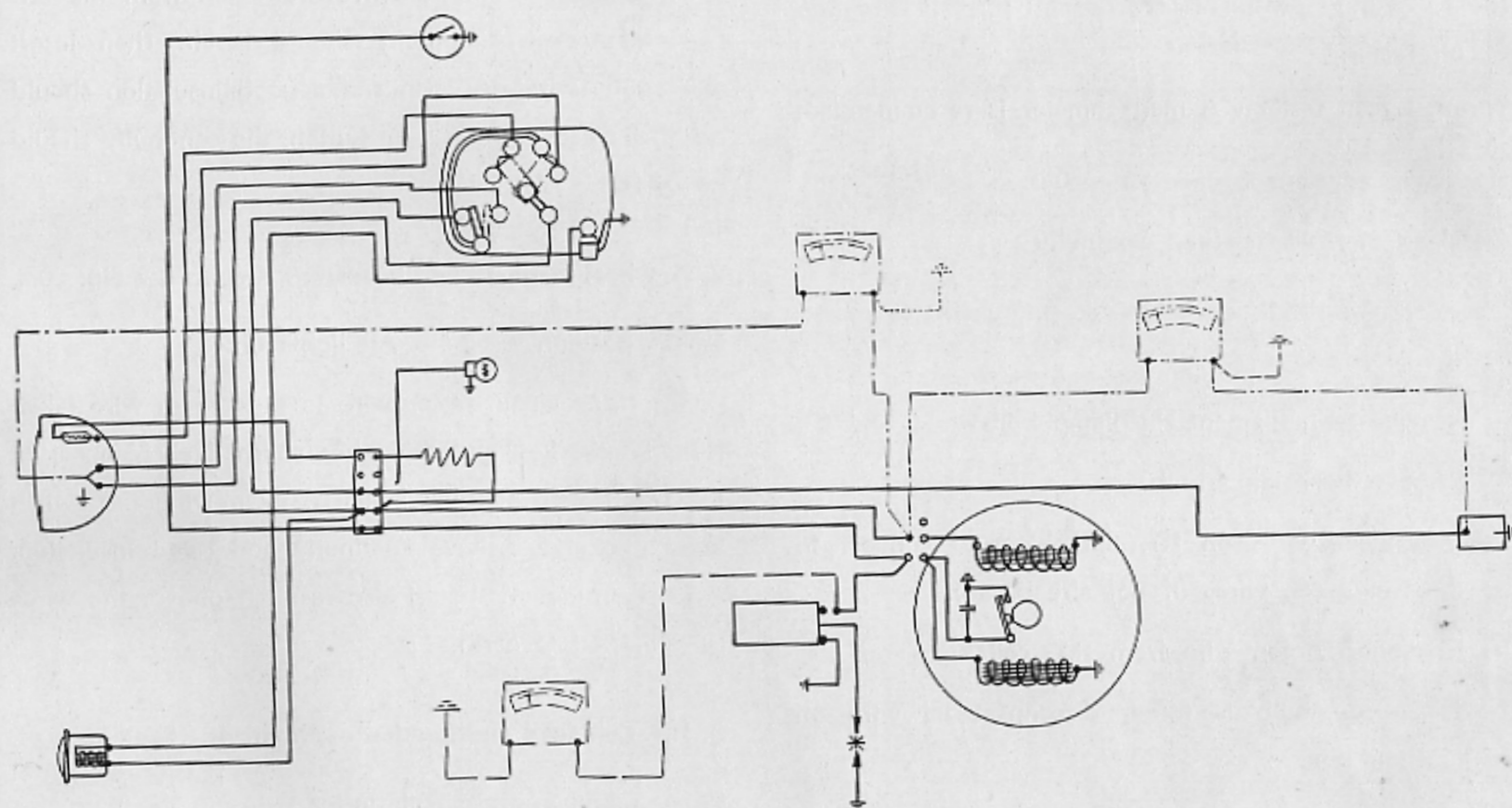


Fig. 50 A

- . . . — . . . — Checking of the Flywheel, pilot light, and Horn circuit
- — — — — Checking of the Flywheel and Headlamp circuit
- — — — — Checking of the H.T. coil feed and engine cut out circuit

## CHECK ON INSULATION AND CONTINUITY

(This refers only to 125 li Machines with modified circuit as in Figs. 48B and 49B).

- Remove headlamp bulb.
- Remove rear lamp bulb.
- After having opened the rectifier cover and lifted the rubber protection, disconnect from the junction box all the wires belonging to the two main cables, one from the flywheel and one from the circuit, and connect the two green wires of the circuit cable together.
- Disconnect the green wire on the H.T. Coil.
- If Speedometer bulb is fitted, disconnect its black wire from Junction box.

### 1. Pilot light and rear light circuit - See Fig. 50B.

Position of switch - « 1 » - (Pilot light).

Insert circuit tester between mauve wire disconnected from rectifier and the main circuit wire for pilot light; a good continuity should result.

Do same as above except connect rear lamp wire instead of pilot light wire and one should get continuity.

### 2. Headlamp Bulb horn circuit - See Fig. 50B.

Position of switch - « 2 » - All lights on.

Connect one circuit tester wire to Brown wire from the cable disconnected from rectifier, and the other to the two Headlamp bulb connection alternatively. By acting as the two way lever or switch a good insulation should result.

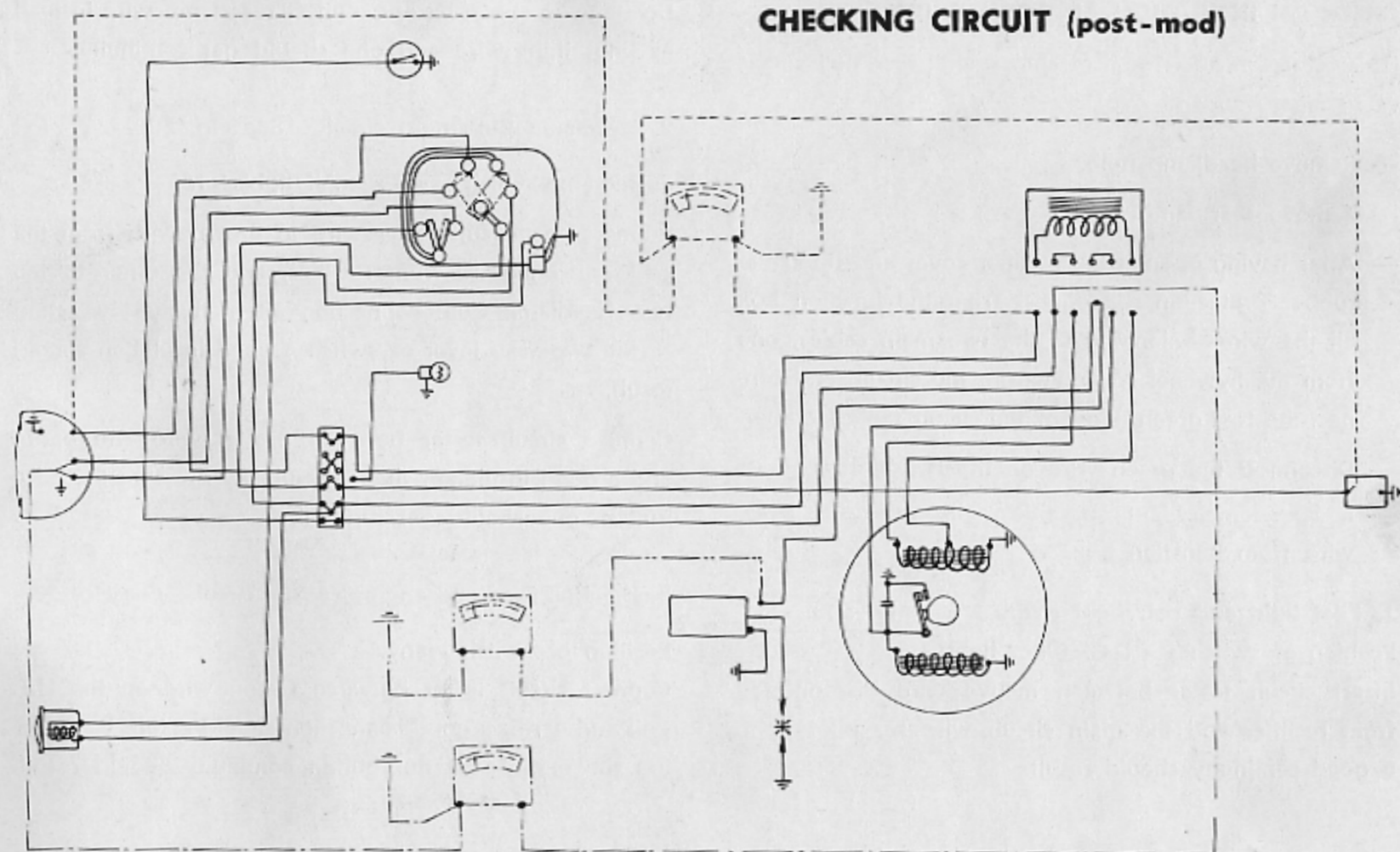
Connect circuit tester between Brown wire and earth, and a good insulation should result. By pressing the horn button, one should get continuity.

### 3. H.T. Coil feed and engine cut out circuit - See Fig. 50B.

Position of switch - any.

Connect circuit tester between Green wire on the H.T. Coil and earth, a good connection should result. By pressing the engine cut out button continuity should result.

# **CHECKING CIRCUIT (post-mod)**



- . . . — . . . — Checkin of Pilot light and rear light circuit
- - - - - Checking of the Horn and Headlight lamp circuit
- . . . . . Checking of the H.T. coil feed and engine cut out circuit

Fig. 50 B

## THE CARBURETTOR



## CARBURETTOR

Dell'Orto - MB 19 BS 5 for 150 li  
MB 18 BS 5 for 125 li

	150 li	125 li
Maximum Jet . . . . .	95	92
Starter Jet . . . . .	55	55
Minimum Jet . . . . .	40	35
Atomizer . . . . .	260 B	260 B
Choke . . . . .	Ø 19	Ø 18

**Choke control.** Rotate choke lever on the right hand side of the main body under driver's saddle by half a turn.

**Main jet needle.** The needle has three notches for adjustment purposes and should be held in the second notch for normal running.

**Main jet.** Situated under mixing chamber of carburettor.

**Mixing device.** With pre-atomization air drawn from carburettor air intake.

**Slow running device.** With screw air adjuster.

**Pilot Jet.** Easily removed and accessible from atomizer chamber.

**Slow running adjustment screw.** Used for setting the slow running.

**Fuel filter.** Incorporated in the float chamber cover.

**Air filter.** Air intake in still air, with steel wool filtering element.

## ASSEMBLY AND ADJUSTMENT

Check and ensure that the carburettor is fitted with the float chamber in a perfectly vertical position and that both manifolds are tightly fitted to avoid air leaks.

### Adjustment of the slow running

This must always be done with a hot engine. The adjustment of the slow running is carried out through 2 screws, one which adjusts the closing of the throttle Fig. 51 screw A. By screwing this in the throttle will open. The other screw is for adjusting the amount of air Fig. 51 and it controls the quality of the mixture which is formed at the exit of the slow running jet. (By turning in a righthand direction the mixture is richened, by unscrewing the mixture is weakened).

Obtain the correct adjustment of the slow running mixture as follows:

1. Adjust screw A which controls the closing of the valve in such a way as to obtain a slightly fast idling.

2. Adjust Screw B so as to obtain the most regular running of the engine. If the engine races this indicates a rich mixture. If Screw B is loosened, the engine will have a tendency to stop, this indicates weak mixture, therefore tighten Screw B.
3. Adjust therefore, Screw A and B alternatively until the best slow running condition is obtained.

Usually Screw B should be unscrewed between half and two turns from the point at which it is fully closed. Once this slow running is adjusted and by opening the throttle

the engine tends to miss or stop, this indicates a weak mixture and Screw B must therefore, be tightened very slightly until this inconvenience is eliminated.

Again after the slow running has been adjusted the carburation should be satisfactory for the total movement of the throttle twist grip. If between a quarter and three-quarters of the twist grip movement one should note a hot engine or a rich or weak mixture, adjust this by moving the needle C (Fig. 46) to the first or third notch, although the correct position should be as said at the second notch.

#### MAINTENANCE OF CARBURETTOR

**Cleaning:** Periodically completely dismantle the Carburettor and clean very thoroughly all component parts. Blow compressed air through all holes and channels existing in the carburettor or in the absence of compressed air a thin copper wire passed through the points should ensure cleanliness. The Jets, however, must be treated with the utmost care. Should the calibrated holes be obstructed these can be freed by blowing. Do not under any circumstances, introduce any solid body, i.e. wire & c. through a Jet. When dismantling the Carburettor ensure

that all parts are in perfect condition especially those mentioned in Fig. 51.

**Throttle valve D.** This should move freely without excessive play: should there be excessive play or wear replace with new.

**Needle C.** This should not show any signs of wear either on the tapered section or in its notches. Should this be found replace needle.

**Atomizer E.** Check the portion into which Needle C enters and in case of wear replace with a new part.

**F Main, Pilot G and Starter Jets.** Great care must be taken not to interfere with the calibrated holes of these jets.

**Constant level Float chamber H.** The Float Needle (i) should always have its conical section in perfect condition

as also should its seat (L) be likewise. Should this not be so replace the new parts ensuring however, that the Float (M) does not become overweighted.

**Air and petrol filters N and P.** Keep a careful check of their condition and wash them regularly in petrol to clear away any foreign matter.

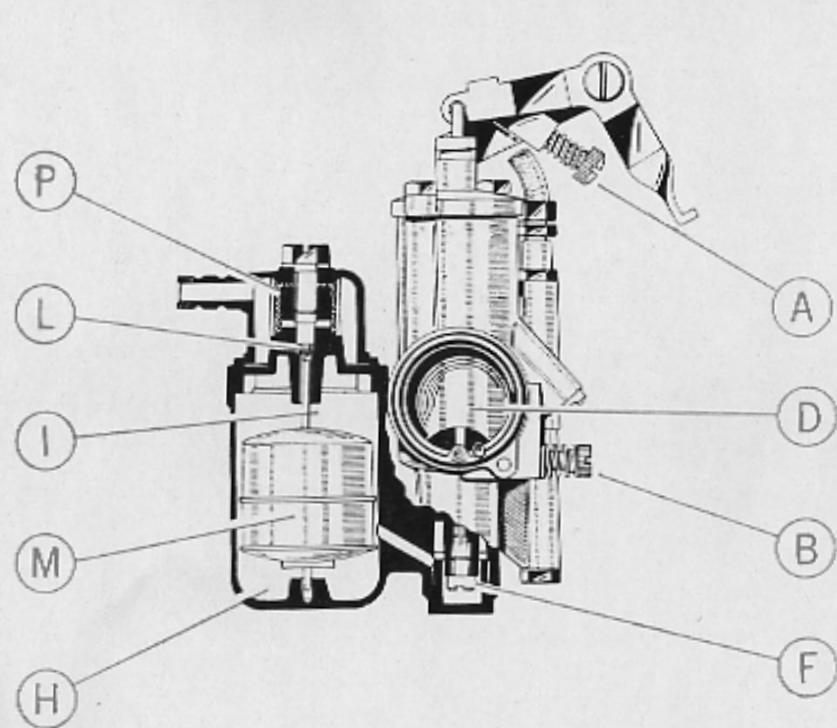
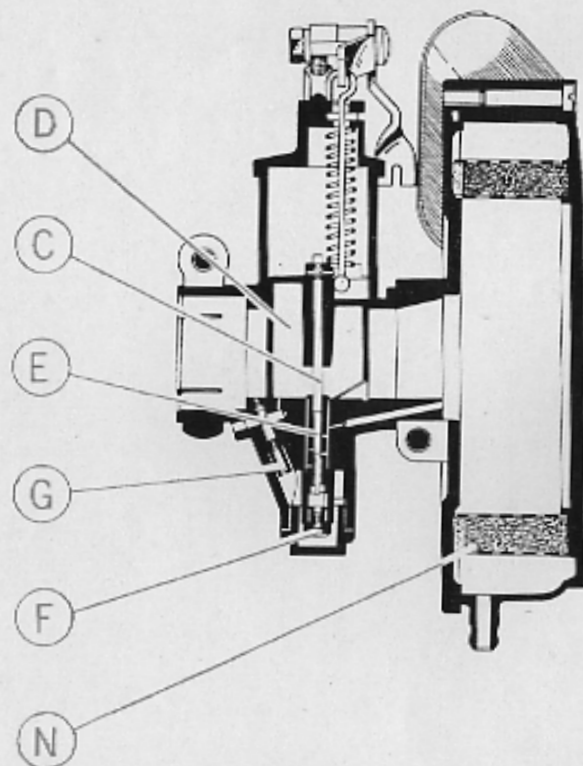


Fig. 51



## SERVICING DURING GUARANTEE PERIOD



### SERVICING DURING RUNNING - IN PERIOD

Listed hereunder are the servicing details to be carried out preferably by an authorised Lambretta Dealer, during the initial stages of the machine's life.

Mileage	Operation	Op. No.
300 (500 Km)	Complete lubrication.	
	1. Check and adjust carburettor.	101
	2. Check starting controls	102
	3. Adjust brakes and clutch	103
	4. Check cylinder head nuts and silencer ring nut	104
	5. Check steering adjustment	105
	6. Check H/Bar fixing clamp	106
	7. Check wheel and hub nuts	107
	8. Check nuts and bolts in general	108
	9. Check the gap of the contact points and Battery Acid level	109
900 (1500 Km)	10. Check tyre pressure.	110
	1. Change engine oil	111
	2. Adjust gear change cable	112
	3. Adjust brakes	103
	4. Check transmission chain	113
	5. Clean petrol tap filter and reserve fuel control	114

Mileage	Operation	Op. No.
1500/2500 (3000/5000 Km)	6. Check lighting circuit, adjust headlamp and check battery acid level	115
	7. Clean and check spark plug gap	116
	8. Check Tyre pressure.	110
	1. Decoke and clean silencer	117
	2. Check and adjust steering	105
	3. Check and adjust front and rear suspension	118
	4. Adjust brakes	103
	5. Clean and adjust contact points and check battery acid level	110
	6. Check tyre pressure.	109

#### **101 CHECK AND ADJUST CARBURETTOR and**

#### **102 CHECK STARTING**

Check that the carburation is correct especially the slow running. Check starting controls (choke & c)  
(See also « The Carburettor » Page 71).

#### **103 ADJUST BRAKES**

The brakes must be adjusted in such a way that the

wheels are free to rotate and the braking action begins as soon as the respective controls are acted on.

#### **ADJUST CLUTCH**

The clutch must be adjusted in such a way that it will begin to slip when the clutch lever is in the position illustrated in Fig. 52. The adjustment is carried out by means of the cable adjuster fitted at the crankcase end of the cable.

#### **104 CHECK CYLINDER HEAD NUTS AND EXHAUST TUBE RING**

Carry out Operation 1, 2, 3, 15, 19, 20, 21, 23, 24, and ensure that the cylinder head nuts (Tool 59943) as well as the exhaust ring nut are fully tightened.

#### **105 CHECK AND ADJUST STEERING**

Carry out Operation 48 and tighten steering lock ring and ball race cone (tools 40482 and 40490), so as to eliminate any axial play on the front fork. Fork must rotate freely.

#### **106 CHECK H/BAR FIXING CLAMP, WHEEL AND RIM NUTS.**

#### **107 NUTS AND BOLTS (general).**

Carry out this check thoroughly.

To tighten H/Bar clamp nut, use Tool 57836.

#### **109 CHECK AND CLEAN CONTACT POINTS & BATTERY LIQUID, DENSITY & LEVEL**

Check points aperture as per operations, 1, 21, 22, 28, 29, 68.

(To remove battery see Op. 51). The liquid should be five mms. ( $\frac{1}{4}$ " ) higher than the top of separators. If the level is lower add distilled water. Control density of liquid which should be  $1.26 \text{ g/cm}^3$  equal to  $30^\circ \text{ Be}$ . If the density is lower charge battery until this has reached prescribed value.

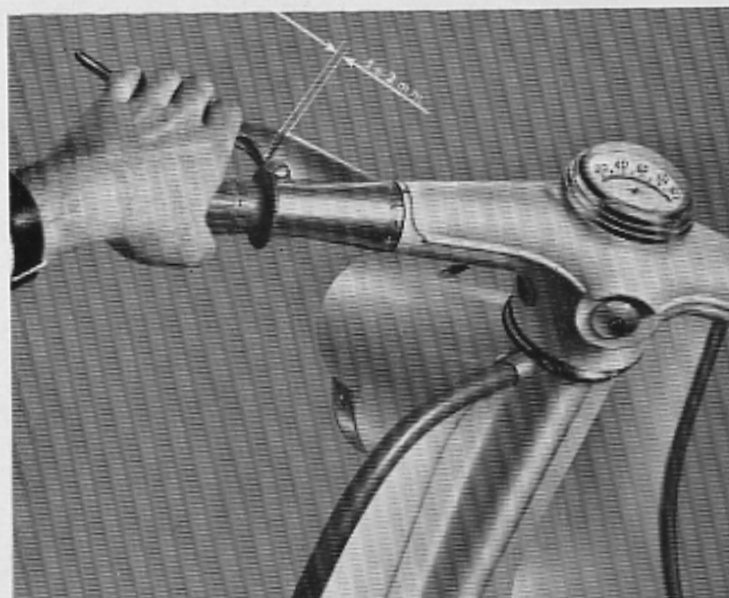


Fig. 52

### 110 CHECK TYRE PRESSURES

**Front** - (1,25 Kg/cm<sup>2</sup>) - 18 lbs/sq.in.

**Rear** - (1,75 Kg/cm<sup>2</sup>) 25 lbs/sq.in - with driver only.

(2.25 Kg/cm<sup>2</sup>) - 32 lbs/sq.in - with driver and pillion passenger.

### 111 CHANGE ENGINE OIL

Drain oil when engine is warm through the appropriate drain plug. When this has been done close drain plug, add approximately 1 gill of fresh oil through the filler plug hole, rotate engine for a few minutes, drain completely through drain plug. Re-insert and tighten drain plug and pour in oil until this starts to flow from the oil level hole, fit plugs to both. The approximate quantity of oil needed is about 2½ pints of standard SAE 30 oil in normal climates or SAE 50 in hot climates.

### 112 ADJUSTMENT OF GEAR CHANGE CABLES

Set the adjusters of the cables situated on the crankcase so that, with the gear change in neutral

position, the zero corresponds with the reference mark. Check the correct engagement of all the gears. The cables must not be too tight because this will tend to make the operation of the gear change on the handlebar stiff.

### 113 CHECK TRANSMISSION CHAIN

Remove Crankcase cover (Op. 1, 2, 3, 4, 5, 6) and check the chain visually. Refit the Silencer without fixing it to the studs. Replace the crankcase cover on studs and start engine. Take off cover and watch chain in movement. If it shows signs of looseness at the drive sprocket end or a waving action in the guides, this is a sign of excessive elongation. Pull the clutch lever in full and listen to the sound; if this is a high pitched whine or a deep and intermittent sound, this indicates a tight or elongated chain respectively. In these cases change the chain.

### 114 CLEAN PETROL TAP FILTER AND CHECK RESERVE DEVICE

Carry out operations 51, 52, 53, 54, wash filter in petrol. Check petrol tap to ensure that all holes are clean and the reserve control works efficiently.



#### **115 CHECK ELECTRICAL CIRCUIT, HEADLAMP ADJUSTMENT AND BATTERY ACID LEVEL**

Check the main switch in all its positions so that the lights are on or off with engine running or at a standstill as accordingly stipulated.

Check the functioning of the two-way headlamp switch on the handlebar and the efficiency of the horn. (See wiring diagram Fig. 43 or 49). Carry out Headlamp adjustment as described on Page 50. To check battery acid level see Op. 109.

#### **116 CLEAN AND CHECK SPARK PLUG GAP**

Remove sparking plug, check to ensure it is of the long reach type and has a heat range to the value of 225 Bosch scale. If necessary clean the electrodes and adjust the gap which should be between 0.5 and 0.6 m.m. i.e. 020/024 inches.

#### **117 DECOKE AND CLEAN SILENCER**

Carry out Operations, 1, 2, 3, 15, 19, 20, 21, 22, 23, 24, 25 and 26, and proceed with the decoking of the cylinder head and cylinder ports. Dismantle silencer, use a flame to burn out the carbon deposits, then tap silencer so that these deposits are removed. When refitting silencer, apply a thin layer of metallic scaler (example - Bostonia No. 3 of Bostik Ltd.) at the cylinder end of the exhaust tube, and at the joint between exhaust tube and silencer body.

#### **118 FRONT AND REAR SUSPENSION**

Carry out road test on machine to ensure suspension riding is correct. Should the suspension unit prove faulty, it is necessary for new ones to be fitted

## STANDARD REPAIRS AND TIMES

## STANDARD REPAIR AND TIMES

### STANDARD REPAIR OPERATIONS

The following tables give a list of the more common repair operations, with the corresponding operation number for the dismantling and any other supplementary instruction. The reassembly in general is carried out inversely to the dismantling.

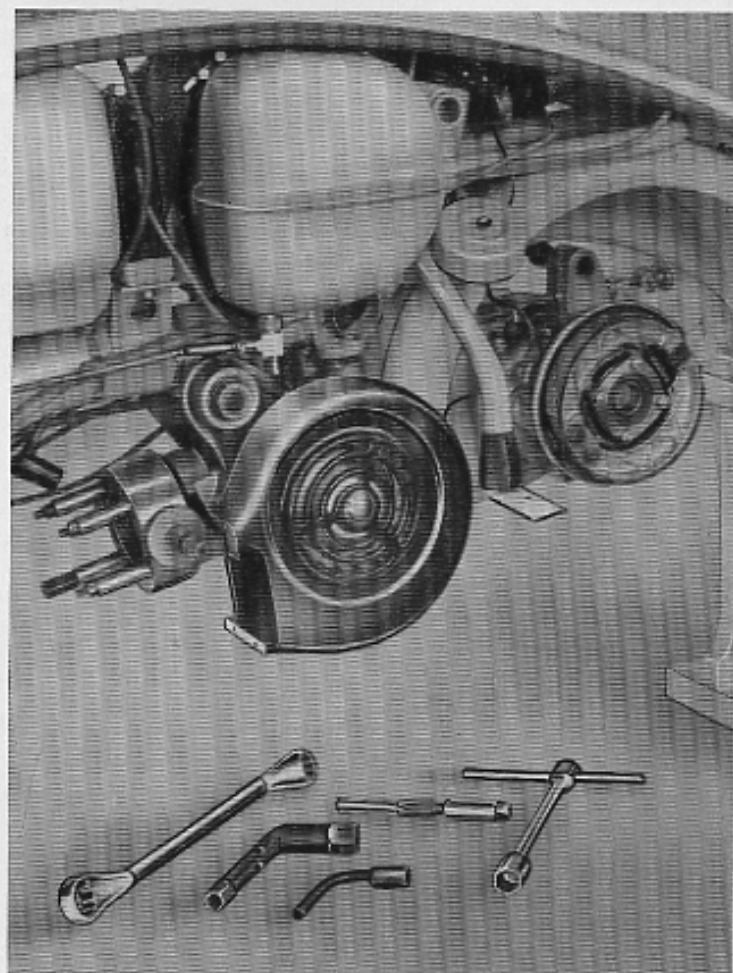


Fig. 53

Repair	Operations required	Time
Changing of small end bush	<p>1, 2, 3, 15, 19, 20, 26 to 27, use Tool 58873 as shown in Fig. 53. To apply Tool:</p> <ul style="list-style-type: none"> <li>— Slide on to the cylinder studs.</li> <li>— Insert bush extractor, short end first, to align the connecting rod.</li> <li>— Unscrew the inner lock screw on the tool so that it contacts the con rod without bending it.</li> <li>— Screw in the outer screw and lock the con rod, withdraw extractor from tool.</li> <li>— Lock tool on studs by means of 4 distance pieces and cylinder head nuts.</li> <li>— Insert the new small end bush on to the extractor.</li> <li>— Insert extractor in the tool, and extract old bush, fitting in the new one at the same time.</li> <li>— Withdraw extractor and insert reamer. Proceed with the reamering of the new bush.</li> <li>— Free the con rod and remove the tool. The old bush can now be taken away from the inner screw.</li> </ul>	30 minutes
Changing of Piston	— Op. 1, 2, 3, 15, 19, 20 to 27.	24 minutes



Repair	Operations required	Time
Changing of Crankshaft drive side oil seal.	— Op. 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 15, 17, 19 to 34. — Remove drive side bearing retaining flange and proceed with the replacement of the seal.	75 minutes
Replacement of crankshaft flywheel side oil seal	— Op. 1, 21, 22, 28, 29, 30, 31, 32. — Remove spring clip from flywheel flange and change the seal. To insert the new seal use Tool No. 59331.	20 minutes
Replacement of crankshaft	— Op. 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 15-19 to 34.	73 minutes
Replacement of clutch discs	— Op. 1, 2, 3, 4, 5, 6, 9.	17 minutes
Replacement of outer clutch bell housing (shock damper on mainshaft)	— Op. 1, 2, 3, 4, 5, 6, 9, 10, 11.	23 minutes
Replacement of selector cursor ring	— Op. 1, 2, 3, 4, 5, 6, 9 to 18.	40 minutes
Replacement of Speedo cable	— Op. 41-42 (without removing speedometer) 44, 45. Unscrew knurled ring on brake shoe back plate, withdraw cable and change.	13 minutes
Replacement and retiming of flywheel	— Op. 66, 67, 30, 31 - For reassembly. Op. 31 & 30 and proceed with timing. Op. 68, 69, 70, 71.	32 minutes
Replacement front wheel Bearing	— Op. 57, 58, 62, 63, 64, 65.	10 minutes
Replacement of front suspension springs	— Op. 57, 58, 59, 60, 61, without removing spring guide rod lock ring.	12 minutes

Repair	Operations required	Time
Replacement of F. Fork	— Loosen front brake cable trunnion on back plate and remove cable. Unscrew ring fixing speedo cable to back plate, remove ring and lock ring. - Op. 58, 59, 60, 61, 41-42 (without removing speedometer), 48, 49, draw out cables and remove mudguard baffle. (10 mm spanner).	35 minutes
Replacement of F. Mudguard	— Op. 44-45, and detach mudguard from H/Lamp casting.	12 minutes
Replacement of rear Suspension	— Op. 1-15-19.	10 minutes
Replacement of Stub axle (Layshaft) bearing oil seal	— Ops. 1-15-16 - Remove bearing retaining flange and washer (10 mm spanner), insert new seal, and fit in its seat by means of Tool 60405.	12 minutes

## PETROL CONSUMPTION TEST

### PETROL CONSUMPTION TEST

The petrol consumption test is carried out in the following manner:

Fit to the machine in correspondence to the driver's saddle a small tank or vessel containing  $\frac{1}{2}$  litre (1 pint) similar to our type 60337 with cap 60331, tap 40171061, gasket 14078101 and plastic petrol pipe. See Fig. 54.

The machine to be tested must have already completed its running - in period, minimum 200 miles. Select a flat circuit of road asphalted and with little traffic about 7 to 8 miles in length. The test should be carried out on a windless day with dry road with the temperature up to a maximum of 25° C (77°F), with driver only. Check tyres for the correct stipulated pressure, i.e. 18 lbs/sq.in front and 25 lbs/sq.in Rear.

Maintain a constant speed of 31-34 m.p.h. read on the speedometer for the model 150 li and a constant speed of 28-31 m.p.h. for the model 125 li.

At the beginning of the test, fill test tank with a 4% oil mixture, run machine to warm up on its own tank. Then close main petrol tap, disconnect petrol pipe, and connect test petrol pipe and opening tap. Then take a reading on speedometer and start test.

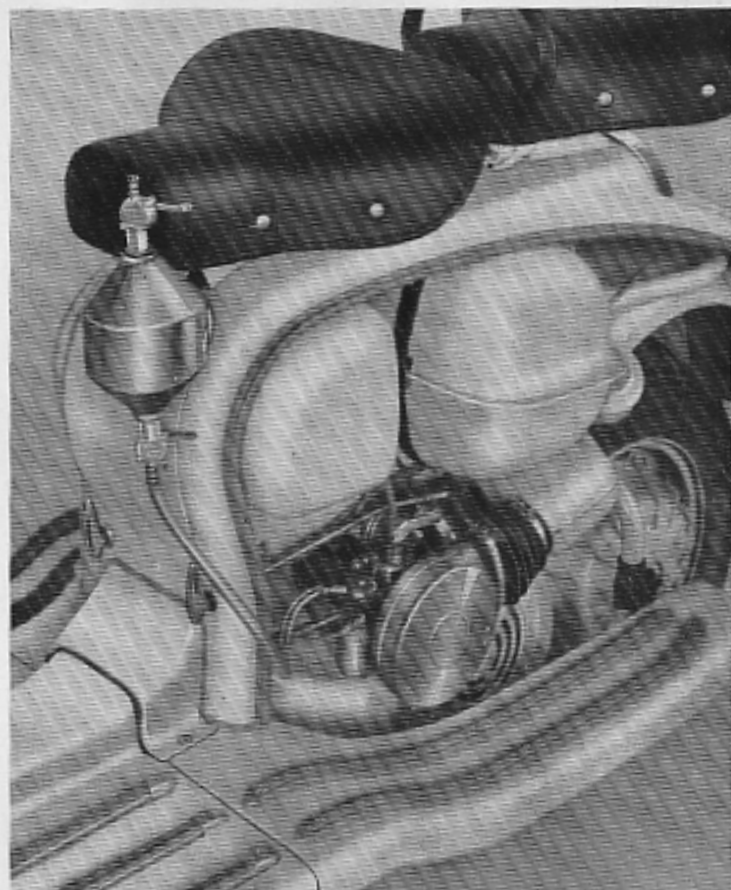


Fig. 54

Repeat reading when machine stops for the exhaustion of the test tank petrol. The difference between the two readings is the distance covered with  $\frac{1}{2}$  l. (1 pint.).



WEAR LIMITS

150 li only

# **ASSEMBLY TOLERANCE AND WEAR LIMITS BETWEEN CYLINDER AND PISTON - See Fig. 55**

operation	grade	CYLINDER		PISTON B = 20		Fitting tolerance D mm	
		part. no.	$\phi$ C mm	part. no.	$\phi$ A mm		
standard fitting	—	19111010/—	57,0 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19012050/—	56,9 $\begin{smallmatrix} + 0,060 \\ + 0,066 \end{smallmatrix}$	MIN. D = 0,034  MAX D = 0,046	D = 0,15
	0	19111010/0	57,0 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19012050/0	56,9 $\begin{smallmatrix} + 0,067 \\ + 0,073 \end{smallmatrix}$		
	+	19111010/+	57,0 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19012050/+	56,9 $\begin{smallmatrix} + 0,074 \\ + 0,080 \end{smallmatrix}$		
1st. oversize	—	Rebore to the specified dimensions (see note pag. 95)	57,2 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19012060/—	57,1 $\begin{smallmatrix} + 0,060 \\ + 0,066 \end{smallmatrix}$		
	0		57,2 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19012060/0	57,1 $\begin{smallmatrix} + 0,067 \\ + 0,073 \end{smallmatrix}$		
	+		57,2 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19012060/+	57,1 $\begin{smallmatrix} + 0,074 \\ + 0,080 \end{smallmatrix}$		
2nd. oversize	—		57,4 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19012070/—	57,3 $\begin{smallmatrix} + 0,060 \\ + 0,066 \end{smallmatrix}$		
	0		57,4 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19012070/0	57,3 $\begin{smallmatrix} + 0,067 \\ + 0,073 \end{smallmatrix}$		
	+		57,4 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19012070/+	57,3 $\begin{smallmatrix} + 0,074 \\ + 0,080 \end{smallmatrix}$		
3rd. oversize	—		57,6 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19012080/—	57,5 $\begin{smallmatrix} + 0,060 \\ + 0,066 \end{smallmatrix}$		
	0		57,6 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19012080/0	57,5 $\begin{smallmatrix} + 0,067 \\ + 0,073 \end{smallmatrix}$		
	+		57,6 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19012080/+	57,5 $\begin{smallmatrix} + 0,074 \\ + 0,080 \end{smallmatrix}$		

# NOTE

The specified finish smoothness can be obtained in the following manner:

1. Bore cylinder to 0.05/0.07 mm Undersize.
2. Hone to correct size using abrasive No. 180.
3. Spread around the cylinder bore a thin layer of abrasive No. 80 soaked in paraffin, and slide a piston of the same nominal diameter up and down with a helical movement until tightness is overcome. An ordinary piston without rings can be used, fitted with a connecting rod as a handle.
4. Wash cylinder, ports etc., very carefully with a jet of water, then immediately immerse cylinder into a bath of diesel oil.

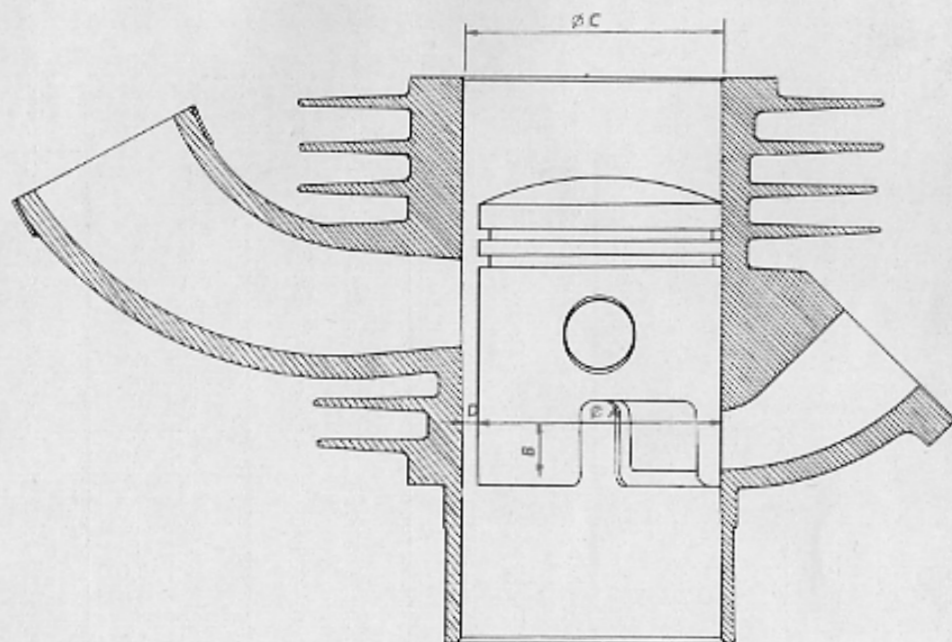


Fig. 55

# **ASSEMBLY TOLERANCE AND WEAR LIMITS BETWEEN CYLINDER AND PISTON - See Fig. 55**

operation	grade	CYLINDER		PISTON		Assembly tolerance D mm	Wear limit D mm
		part. no.	$\varnothing$ C mm	part. no.	$\varnothing$ A B = 15 mm		
standard fitting	—	19111010/—	52,0 $\begin{smallmatrix} 0 \\ + 0,005 \end{smallmatrix}$	19112050/—	51,9 $\begin{smallmatrix} + 0,058 \\ + 0,064 \end{smallmatrix}$	MIN.  D = 0,036       MAX  D = 0,048	D = 0,15
	0	19111010/0	52,0 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19112050/0	51,9 $\begin{smallmatrix} + 0,065 \\ + 0,071 \end{smallmatrix}$		
	+	19111010/+	52,0 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19112050/+	51,9 $\begin{smallmatrix} + 0,072 \\ + 0,078 \end{smallmatrix}$		
1st. oversize	—	Rebore to the specified dimensions (see note pag. 95)	52,2 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19112060/—	52,1 $\begin{smallmatrix} + 0,058 \\ + 0,064 \end{smallmatrix}$		
	0		52,2 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19112060/0	52,1 $\begin{smallmatrix} + 0,065 \\ + 0,071 \end{smallmatrix}$		
	+		52,2 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19112060/+	52,1 $\begin{smallmatrix} + 0,072 \\ + 0,078 \end{smallmatrix}$		
2nd. oversize	—		52,4 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19112070/—	52,3 $\begin{smallmatrix} + 0,058 \\ + 0,064 \end{smallmatrix}$		
	0		52,4 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19112070/0	52,3 $\begin{smallmatrix} + 0,065 \\ + 0,071 \end{smallmatrix}$		
	+		52,4 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19112070/+	52,3 $\begin{smallmatrix} + 0,072 \\ + 0,078 \end{smallmatrix}$		
3rd. oversize	—		52,6 $\begin{smallmatrix} 0 \\ + 0,006 \end{smallmatrix}$	19112080/—	52,5 $\begin{smallmatrix} + 0,058 \\ + 0,064 \end{smallmatrix}$		
	0		52,6 $\begin{smallmatrix} + 0,007 \\ + 0,013 \end{smallmatrix}$	19112080/0	52,5 $\begin{smallmatrix} + 0,065 \\ + 0,071 \end{smallmatrix}$		
	+		52,6 $\begin{smallmatrix} + 0,014 \\ + 0,020 \end{smallmatrix}$	19112080/+	52,5 $\begin{smallmatrix} + 0,072 \\ + 0,078 \end{smallmatrix}$		



**ASSEMBLY TOLERANCES AND WEAR LIMITS BETWEEN  
PISTON AND GUDGEON PIN - See Fig. 56**

Operation	Piston Ø A mm	GUDGEON PIN			Wear limit C. mm
		Part N°		Ø B mm	
		150 li	125 li		
Standard fitting	16,0 $\begin{smallmatrix} 0 \\ -0,006 \end{smallmatrix}$	11110346	11110362	16 $\begin{smallmatrix} +0,002 \\ -0,003 \end{smallmatrix}$	0,010
1st. oversize	16,1 $\begin{smallmatrix} 0 \\ -0,006 \end{smallmatrix}$	11110347	11110363	16,1 $\begin{smallmatrix} +0,002 \\ -0,003 \end{smallmatrix}$	
2nd oversize	16,2 $\begin{smallmatrix} 0 \\ -0,006 \end{smallmatrix}$	11110348	11110364	16,2 $\begin{smallmatrix} +0,002 \\ -0,003 \end{smallmatrix}$	

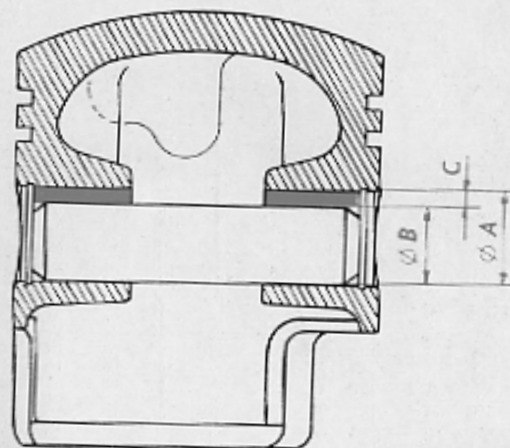


Fig. 56

**ASSEMBLY TOLERANCES AND WEAR LIMITS BETWEEN  
GUDGEON PIN AND SMALL END BUSH - See Fig. 57**

Operation	Small end bush		Gudgeon Pin			Assembly tolerance C		Wear limits mm
	Part N°	Ø A mm	Part N°		Ø B mm	max mm	min. mm	
			125 li	150 li				
Standard fitting	15012005	16,0 $\begin{smallmatrix} + 0,026 \\ + 0,032 \end{smallmatrix}$	11110346	11110362	16,0 $\begin{smallmatrix} + 0,002 \\ - 0,003 \end{smallmatrix}$	0,035	0,024	C = 0,050
1st oversize	Reamer to specified dimensions	16,1 $\begin{smallmatrix} + 0,026 \\ + 0,032 \end{smallmatrix}$	11110347	11110363	16,1 $\begin{smallmatrix} + 0,002 \\ - 0,003 \end{smallmatrix}$			
2nd oversize		16,2 $\begin{smallmatrix} + 0,026 \\ + 0,032 \end{smallmatrix}$	11110348	11110364	16,2 $\begin{smallmatrix} + 0,002 \\ - 0,003 \end{smallmatrix}$			

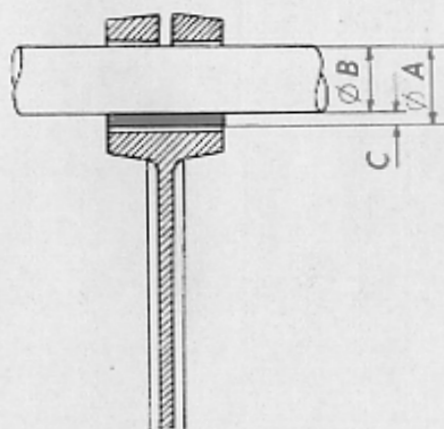


Fig. 57

**PISTON RING GROOVE AXIAL ASSEMBLY TOLERANCES AND  
WEAR LIMITS - See Fig. 58**

Groove	Groove height D mm	Ring thickness E mm	Assembly tolerance		Wear limit F mm
			max mm	min. mm	
1	2,5 $+0,050$ $+0,075$	2,5 $-0,025$	0,10	0,05	0,20
2	2,5 $+0,040$ $+0,065$		0,09	0,04	

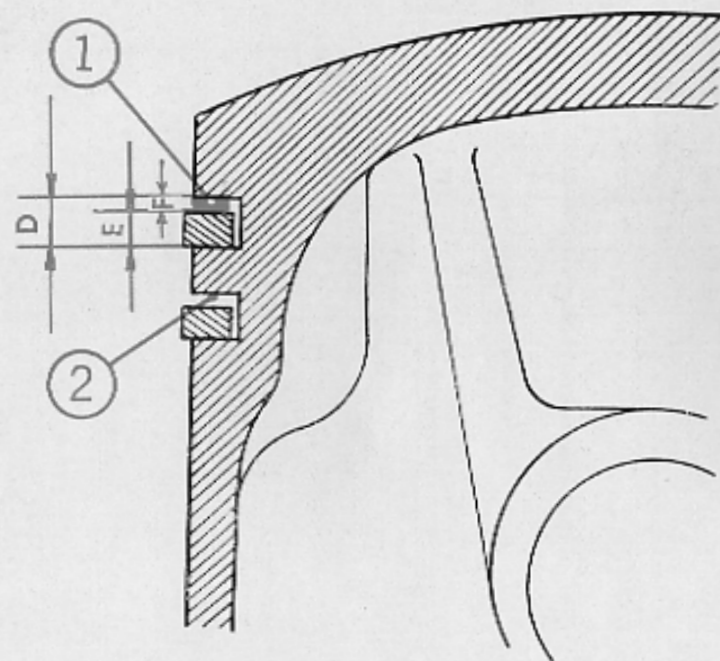


Fig. 58

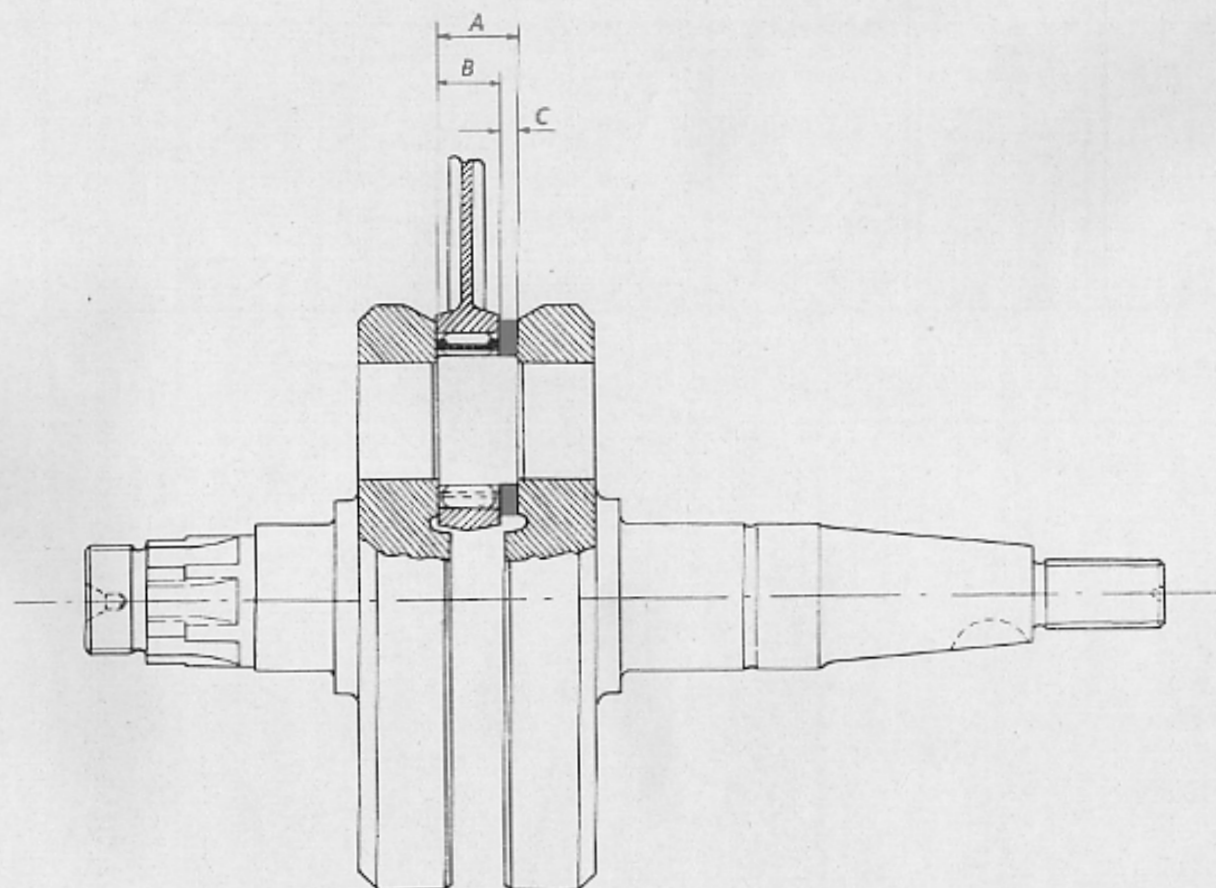


Fig. 59



**ASSEMBLY TOLERANCES AND WEAR LIMITS BETWEEN  
CRANKSHAFT AND CONNECTING ROD BIG END - See Fig. 59**

Crankshaft pin width A mm	Connecting rod big end width B mm	Assembly tolerance C		Wear limit C mm
		max mm	min. mm	
14 $\begin{smallmatrix} 0 \\ -0,110 \end{smallmatrix}$	13,80 $\begin{smallmatrix} -0,032 \\ -0,075 \end{smallmatrix}$	0,275	0,122	0,40

**PISTON RING END GAP ASSEMBLY TOLERANCES AND  
WEAR LIMITS - See Fig. 60**

Ring part N°		Nominal diameter Ø L		Gap mm	Wear limit G mm
150 li mm	125 li mm	150 li mm	125 li mm		
19012024	19112024	57,0	52,0	$0,20 \begin{smallmatrix} + 0,15 \\ 0 \end{smallmatrix}$	0,60
19012025	19112025	57,2	52,2		
19012026	19112026	57,4	52,4		
19012027	19112027	57,6	52,6		

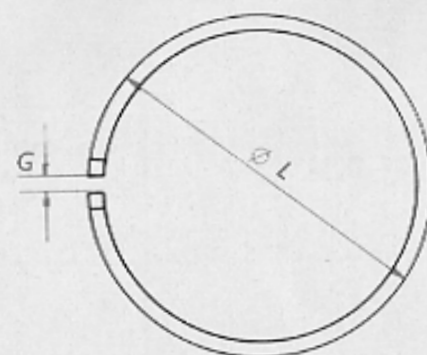


Fig. 60

## STRAIGHTENING OF FRONT FORK AND FRAME

## STRAIGHTENING OF FRONT FORK AND STEERING TUBE OF FRAME

The following instructions refer to the straightening of the front fork or of the steering column part of the frame in cases of distortion.

- Carry out an accurate sight check of the damaged part. Should this show cracks, breaks or kinks due to the accident it is necessary to discard the item and replace with a Service Exchange item.
- All forks should be straightened at cold, it is permissible to heat the frame to a bright red in order to carry out the straightening providing it is then left to cool down slowly in the ordinary atmosphere. A quick cooling with water should only be done when the heated part has already cooled down in the atmosphere.
- Carry out the straightening and the dimensional control. (For the Fork see page 106. For the frame

see page 108). When this is done a very accurate sight check should again be made of the straightened part. Should further cracks & c. caused by the straightening show or in the case of doubt replace the part. It is very important to also carry out the following test.

- Spray abundantly the part to be examined with petroil. After having left to drip or after a quick wiping which will leave the part still damp, sprinkle over this part a quantity of talcum to cover the surface; should any crack be present this will immediately show up as the petroil in the crack will be absorbed by the powder. This test helps considerably in the checking of the state of the surfaces involved.
- The jigs for this work have been designed to allow a dimensional checkage of the part as well as acting as a vice for the part during the straightening.



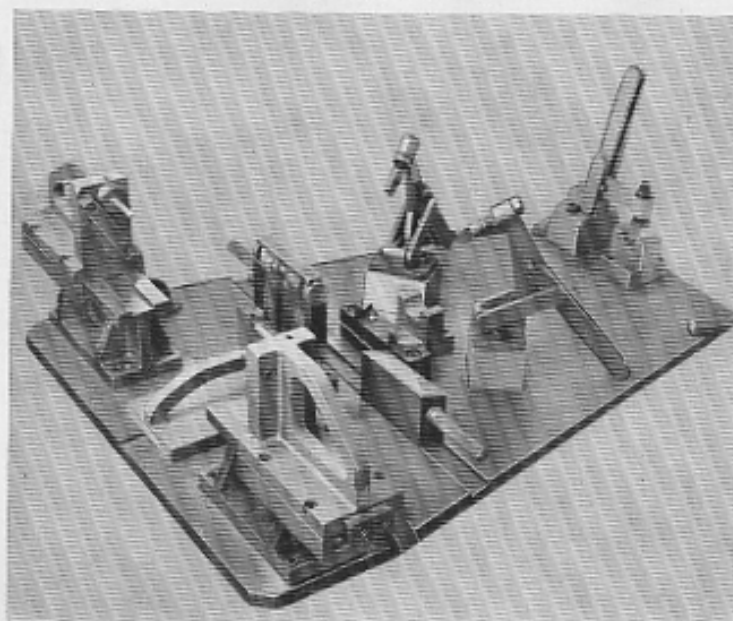


Fig. 61

(a) **STRAIGHTENING OF THE FORK JIG NO. 59651,**  
Fig. 61.

The Jig consists of a base plate on which are fitted three knuckle devices for the locking of the fork in place, three slides carrying points for the checking and two sliding blocks which give to the fork a further means of retainment during the actual straightening.

To carry out the dimensional control of the fork this

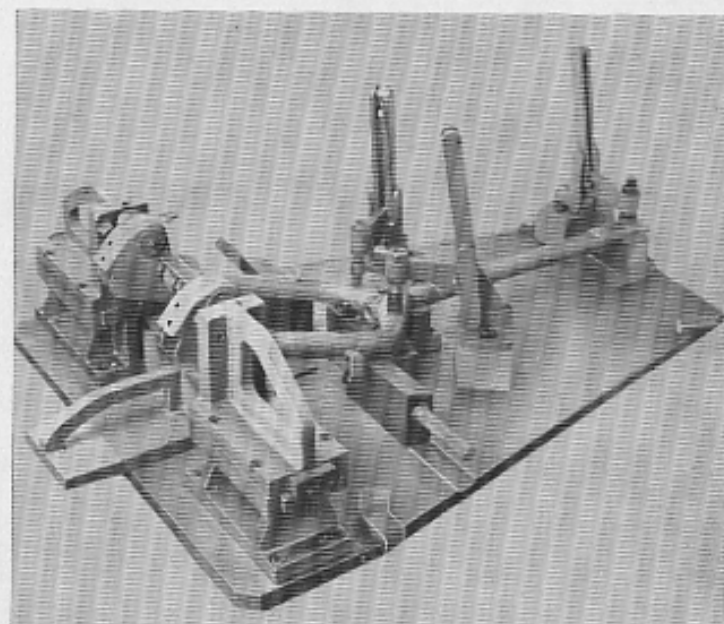


Fig. 62

should be locked in the Jig, see Fig. 62. The fork can be accepted as dimensionally correct when:

- (1) The central slide carrying the check-pin can move freely while its two pins touch the surfaces of the link boxes.
- (2) The two check pins carried on the side slides should enter freely into the suspension box bush holes.

If a Fork is distorted proceed to the straightening in

the best possible manner. A further support can be given to this through the sliding blocks. Avoid hitting the suspension boxes with the lead hammer to avoid damage.

**The Straightening must be carried out at cold,** and the rules given at the beginning of this chapter should be strictly adhered to.

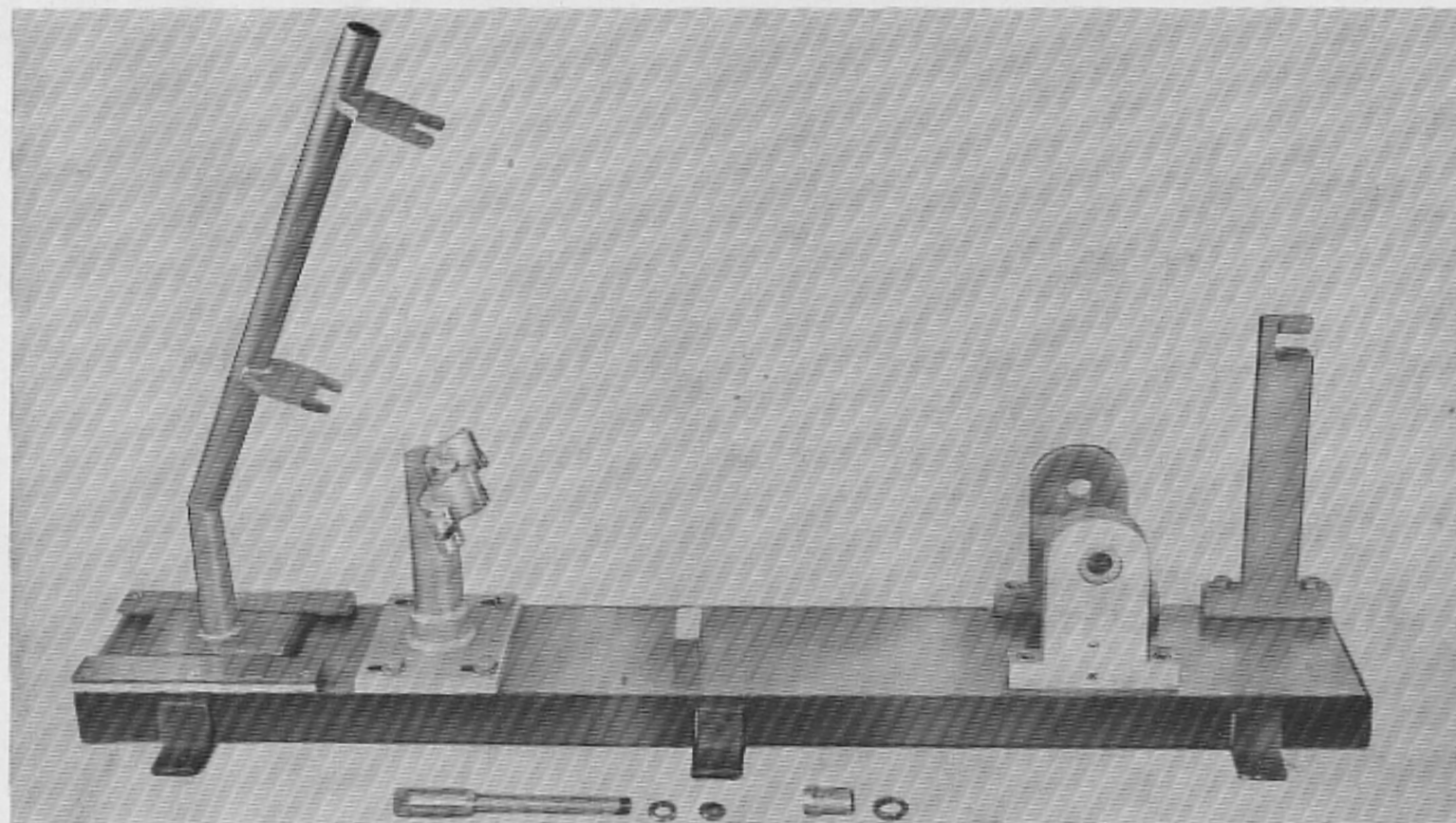


Fig. 63

(b) **STRAIGHTENING OF STEERING COLUMN END OF FRAME Jig. No. 58927 (Fig. 63).**

The Jig consists of a solid base having holes for the pin on which the frame will be carried; a block for the

support of the front part of the frame and a control pin to check the position of the shock absorber pin. The base is also made to carry a sliding graduated set square and other control pins and is fitted with an

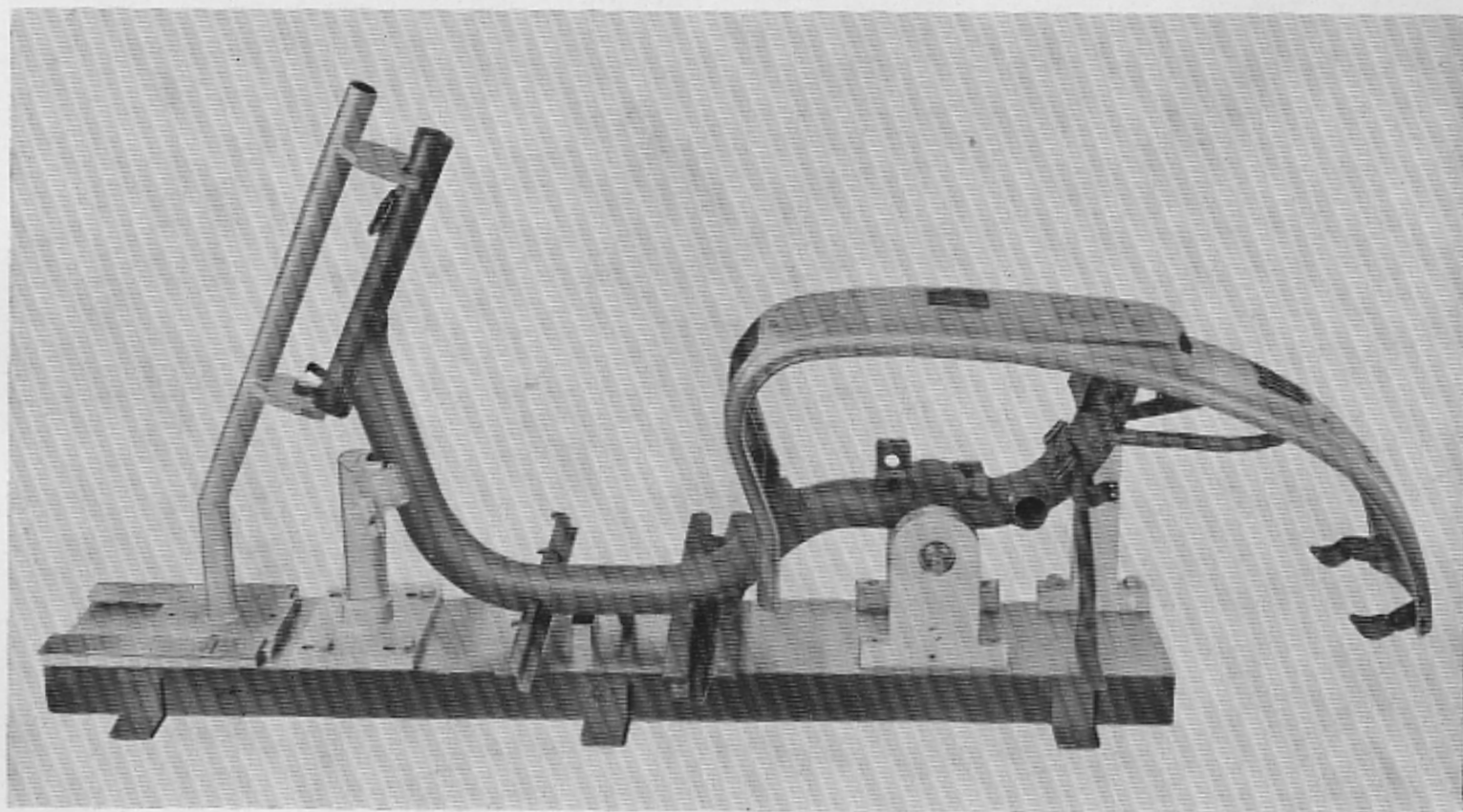


Fig. 64



upright and sleeve which can be moved. This upright does not serve for the checking of the frame but is used solely for the efficient clamping of the frame during the actual straightening.

To place the frame on to the Jig insert and lock the distance bush into its hole making sure that this bush is the one suitable for the type of frame to be checked. After having placed the frame into position insert the pin and lock it as shown in Fig. 64.

At this point the shock absorber pin should be inside its check sleeve without touching and the front part of the frame should be resting on its support block. If these conditions are not obtained, then the deformation of the frame has extended also to the horizontal part of the frame shoe resting on the support block and it is therefore necessary before carrying out the check to effect a straightening in order to correctly fit the frame to the Jig.

To carry out the check move the sliding set square towards the frame until one or two of the fork type pins come into contact with the steering column. (Should the steering column of the frame not enter between two fork pins due to deformation proceed with a quick straightening at sight after having locked the frame into



Fig. 65



the sleeve. After the straightening free the frame from the sleeve before carrying out the check.

The check is now carried out on the graduated part placed at the base of the set square bearing in mind that the pointer must be between the two extremes of the graduations i.e. within the tolerance limits allowed ( $\pm 5$  mm). Furthermore the lower part of the steering column must be within the limits shown on the lower fork check points i.e.  $\pm 3$  mms.

The checking of the longitudinal inclination of the steering column is carried out by means of two fork type pointers. When one of these pointers touches the column the other pointer should be at a maximum 3 mm from the frame. See Fig. 59. The checking of the lateral inclination of the steering column is carried out by means of a feeler gauge, placed between the side pieces of the two check forks (on the same side of the frame) and the column. See Fig. 66.

The difference between these two thickness should be  $\leq 1.5$  mm. If the frame after these checks be out of line after having clamped it to the appropriate sleeve, proceed with the straightening in the best manner possible keeping to the rules explained at the beginning of this chapter.

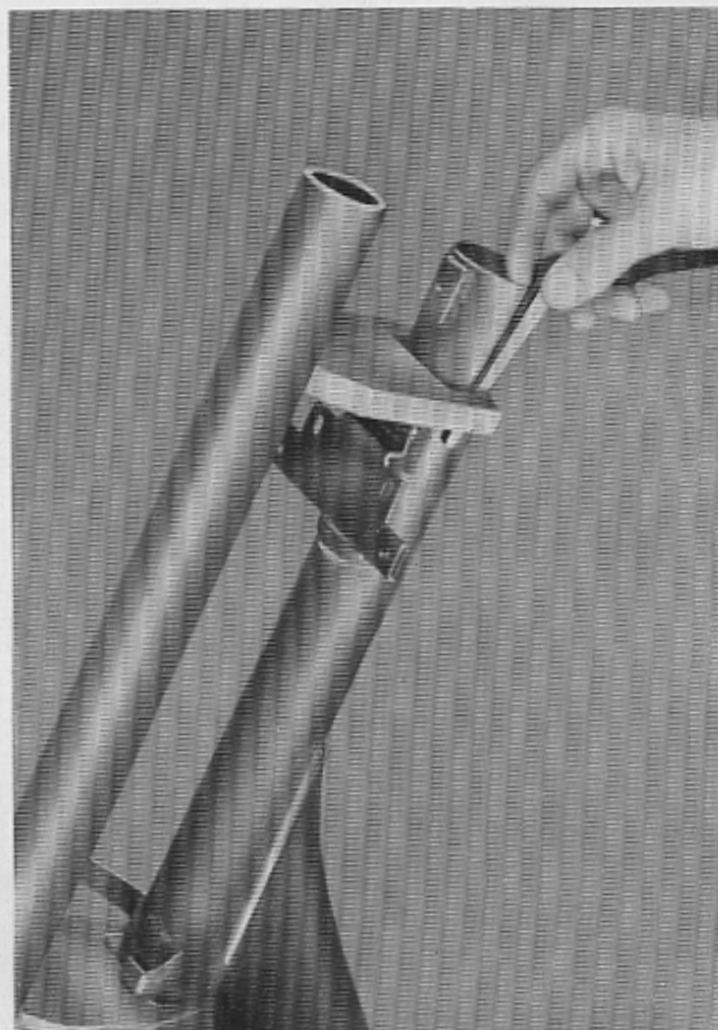
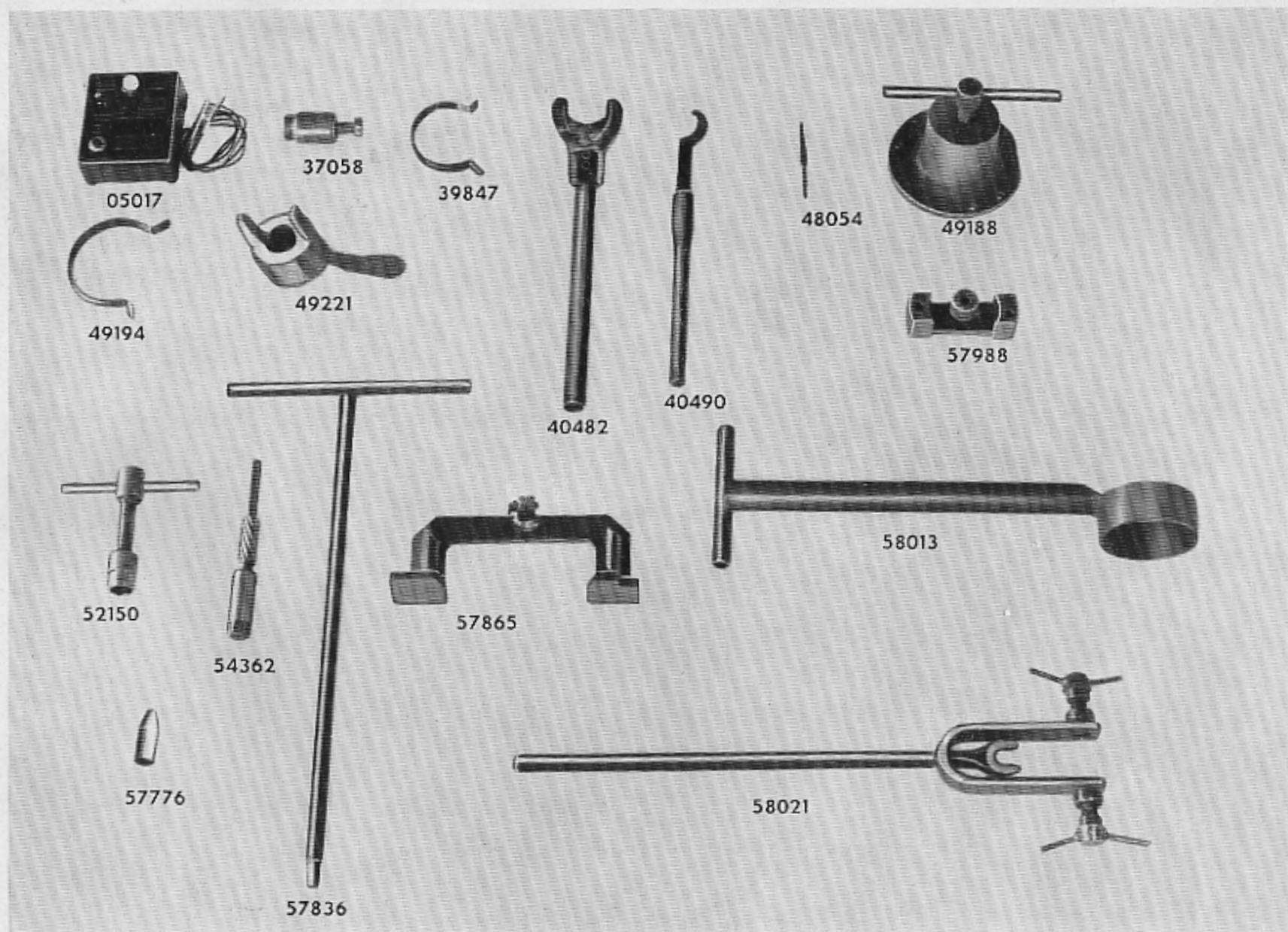


Fig. 66

## WORKSHOP TOOLS



**Fig. 67**

# WORKSHOP TOOL LIST

See Figs. 67, 68

Tool No.	Description	Applicable on Models		
05017/C	Electrical Timing Device . . . . .	All models		
37058	Flywheel Extractor . . . . .	All models		
39847	Piston ring clip . . . . .	125/LD.		125 li
40482	Steering Ball Race cup spanner . . . . .	LD.	TV.	li
40490	Steering Lock ring spanner . . . . .	LD.	TV.	li
49188	Flywheel flange extractor . . . . .	LD.	TV.	li
49194	Piston Ring Clip . . . . .	150/LD.		150 li
49221	Con Rod Holding Tool . . . . .	LD.		li
52150	Flywheel nut box spanner . . . . .	48/cc.		li
54362	Small End Bush Reamer . . . . .	LD.	TV.	li
57776	Protection Bush for K/start shaft oil seal . . . . .	—	TV.	li
57836	Handlebar lock nut spanner . . . . .	—	TV.	li
57865	Drive chain axial alignment Tool . . . . .	—	TV.	li
57988	T.D.C. Dial Gauge Bracket . . . . .	—	TV.	li
58013	Flywheel Holding Tool . . . . .	—	TV.	li
58021	Front fork spring loading tool . . . . .	—	TV.	li





58873



59170



59328



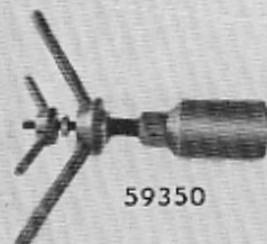
59329



59330



59331



59350



59351



59804



59826



59943



60051



60186



60405

Fig. 68

Tool N.	Description	Applicable on Models		
58873	Small End extractor fitting and reamering tool . . . . .	—	TV.	li
58927	Frame straightening Jig (See Figs. 61 & 63) . . . . .	—	TV.	li
59170	Crankshaft Roller bearing inner race extractor . . . . .	—	—	li
59328	Inner clutch bell housing extractor . . . . .	—	—	li
59329	Crankshaft Ball Bearing extractor and fitting tool . . . . .	—	—	li
59330	Crankshaft Ball Bearing Punch . . . . .	—	—	li
59331	Crankshaft roller bearing inner race punch . . . . .	—	—	li
59350	Primary shaft needle bearing outer race extractor . . . . .	—	—	li
59351	Clutch Circlip fitting tool . . . . .	—	—	li
59651	Fork straightening Jig - (See Figs. 61 & 63) . . . . .	—	TV.	li
59804	Clutch Bell housing locking tool . . . . .	—	—	li
59826	Rear wheel extractor . . . . .	—	—	li
59943	Cylinder Head Spanner . . . . .	—	—	li
60051	Shock damper sleeve extractor . . . . .	—	—	li
60186	Extension for chain alignment gauge . . . . .	—	—	li
60405	Rear wheel bearing punch . . . . .	—	—	li

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