lambretta TV 175

INSTRUCTIONS FOR REPAIR SHOPS

SUMMARY

The main purpose of this manual is to provide the Service Stations with basic information regarding the dismantling, overhauling, repairing, reassembly and servicing of the Lambretta 175 TV.

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 76 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.

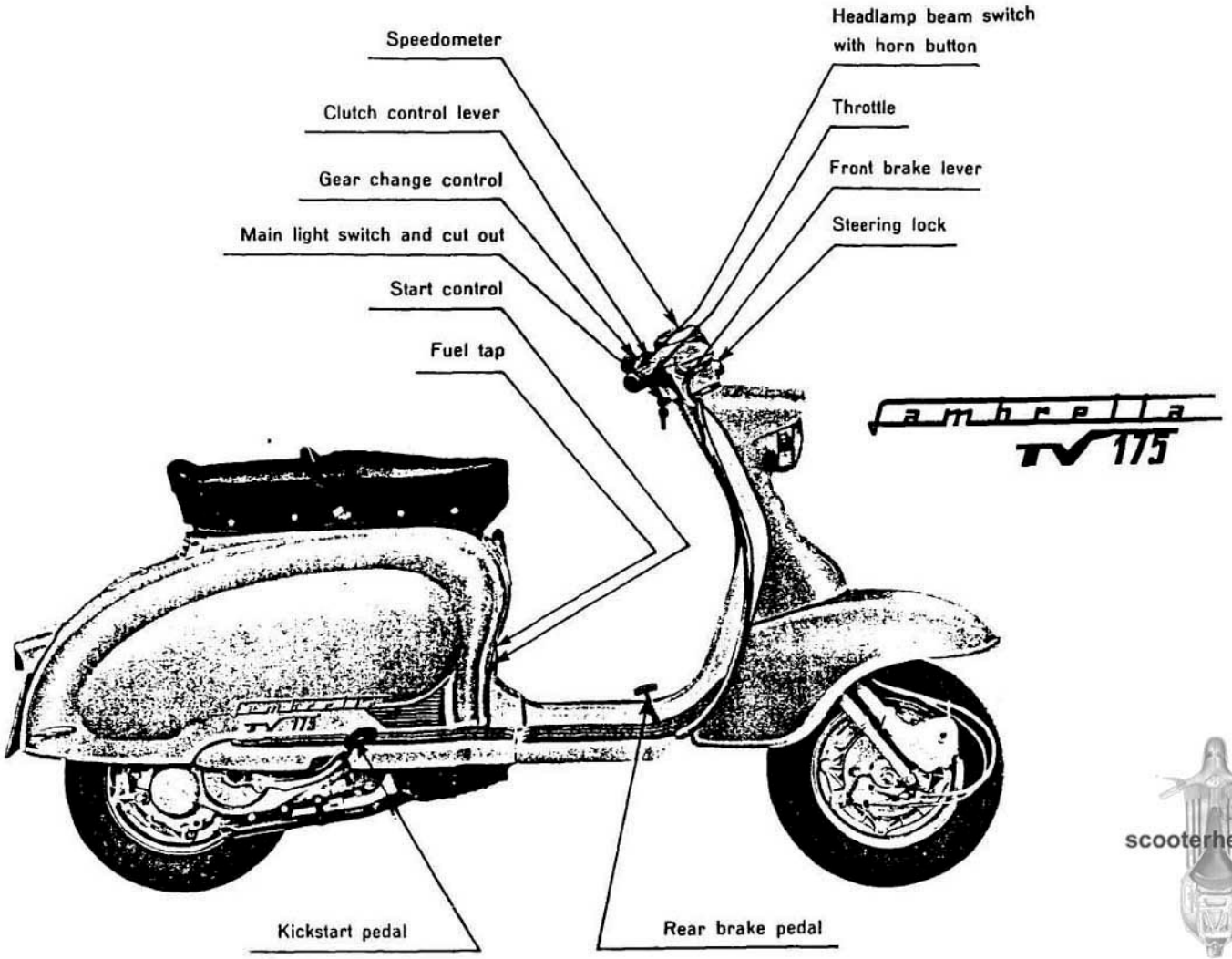
The third section fully covers the electrical equipment and circuit, followed by a chapter on the carburettor, its settings and adjustments.

The fourth section lists operations from No. 101 to 115 covering the servicing of the machine during the guarantee period.

The fifth section gives a list of standard repair operations with the corresponding nett times employed by our specialised mechanics.

Wear limits for parts which are subject to wear and tear are given in the sixth section followed by a chapter on the straightening of forks and frames.

Finally we give a list of tools necessary for the rapid and correct execution of the dismantling and reassembly.



MAIN FEATURES

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Maximum Length	72" (1.825 mt)
Maximum width (handlebars)	28" (0.710 mt)
Maximum Height	42" (1.070 mt)
Ground Clearance	6 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 coupled to shock absorbers.
Rear Suspension	Swinging engine unit coupled to a shock absorber with two unequal pitch springs in series.
Centre Stand	U type with rubber rests.
Unladen weight (no accessories)	264 lbs. (120 Kgs).
Total Fuel Tank Capacity	1 3/4 gallon (8.5 litres).
Reserve	2 1/4 pints (1.2 litres).
Maximum speed (To C.U.N.A. standards)	64 m.p.h. (103 k.m./hr.)
Fuel consumption (To C.U.N.A. standards)	94 m.p.g. (3.2 litres/ 100 Km)
Engine	Single cylinder two stroke forced fan cooled.
Bore	60 mm.
Stroke	60 mm.
Capacity	170 cc.
Compression ratio	7.5
Maximum output	8.6 HP at 6000 R.P.M.
Lubrication	Petroil.
	First 900 miles - 8 % Oil BP Energol SAE 30
	From 900 miles - 6 % Oil BP Energol SAE 30
Kickstart	By Pedal.
Carburettor	Dell'Orto MB 23 B35.
Air Filter	Diaphragm type.
Ignition	
Flywheel Magneto	Filso - type AVS 28-6-140 F-01 105.
External H.T. Coil	Filso - C. 12128/1.
Spark Plug (Long reach 18mm)	Bosch - TJ 6/3.
	During running-in period - Heat range 225 Bosch scale.
	After running-in period - Heat range 225 or 240 Bosch scale.
Ignition advance	Fixed at 26° to 28° before T.D.C.
Clutch	Multi disc type in oil bath.
Transmission	Double chain drive with torque limitator incorporated.

Gear Box — Four speeds in constant mesh, alternatively engaged on rear axle by means of cursor type gear shifter with balls.

Ratio - Rear Wheel Revs/Crankshaft Revs.

1st. Gear - 1/14.32
2nd. Gear - 1/9.77
3rd. Gear - 1/7.30
4th. Gear - 1/5.69

WHEELS AND BRAKES

Interchangeable wheels.

Rims	Pressed steel in two halves.
Brakes	Espansion type, cable controlled.
Tyre size	10" x 3 1/2"
Tyre pressure - front	14 lbs/sq. in. (1 Kg/sq. cm.)
Tyre pressure rear (rider only)	21.5 lbs/sq. in. (1.5 Kg/sq. cm.).
Tyre pressure rear (with passenger)	35.5 lbs/sq. in. (2.5 Kg/sq.cm.).

Electrical equipment

Flywheel magneto	4 pole 27W nominal
Main switch (on handlebar)	5 way type.

Position of switch (Clockwise)

Parking Light
OFF (Key in vertical position)
Day riding
Night riding - on city lights
Night riding - with headlamp.

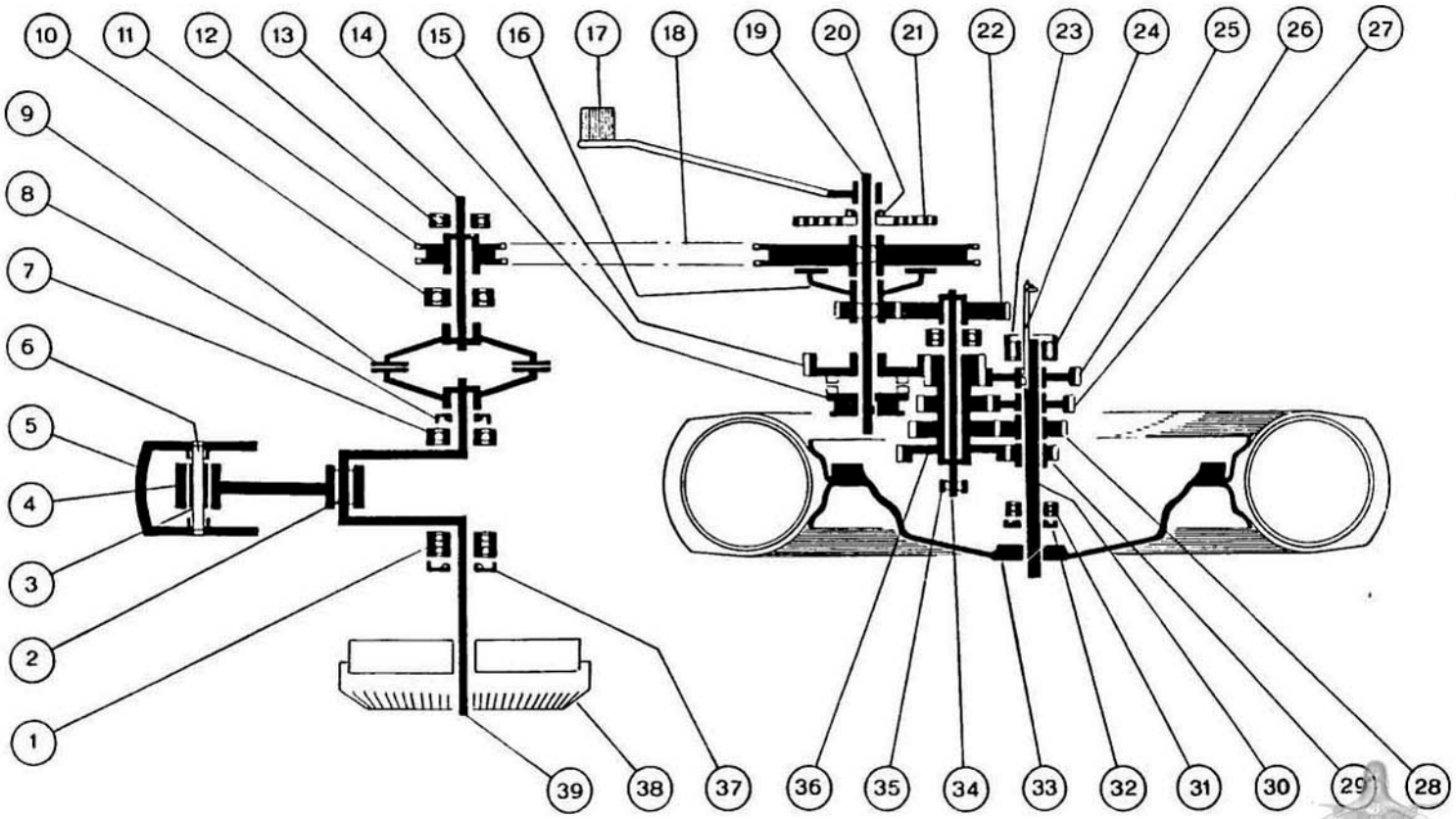
Headlamp and horn switch

Full beam and dipped beam	Placed near T.H. Twist grip.
Fuse	8 (or 5) Amp.
Battery	6.7 Amp. hr. 6 V.
Stop Light switch	Rear Brake Pedal.

Bulbs

Position	Quantity	Type
H/Lamp (Pilot)	1	6 V 5 W
H /Lamp (Twin) filament	1	6 V 25/25 W
Rear Lamp	3	6 V 3 W
Speedometer	1	12 V 2,5 W

Layout of engine group and its functionning



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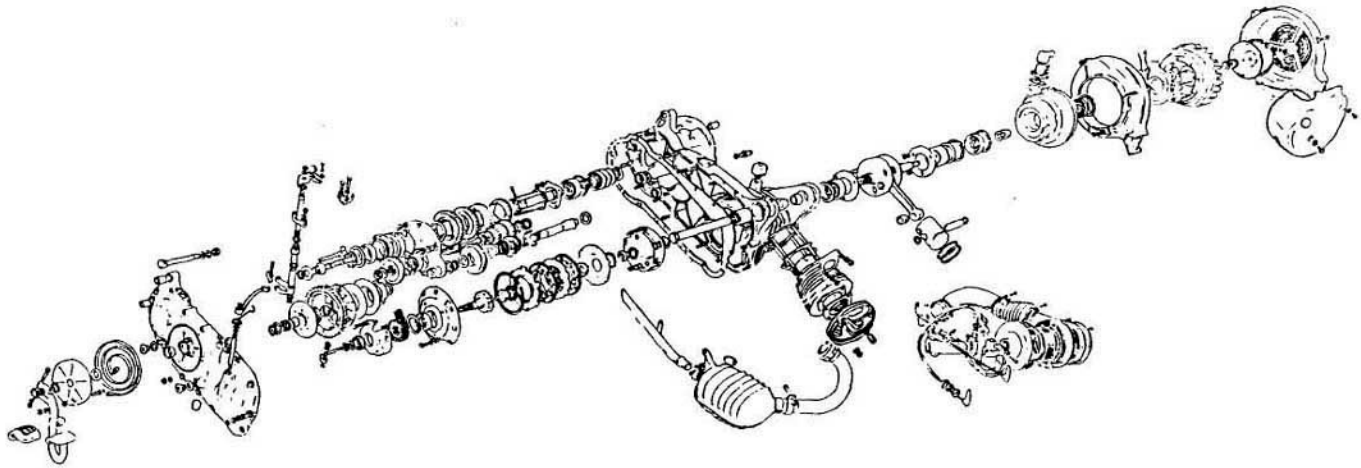
Exploded illustration of TV Engine



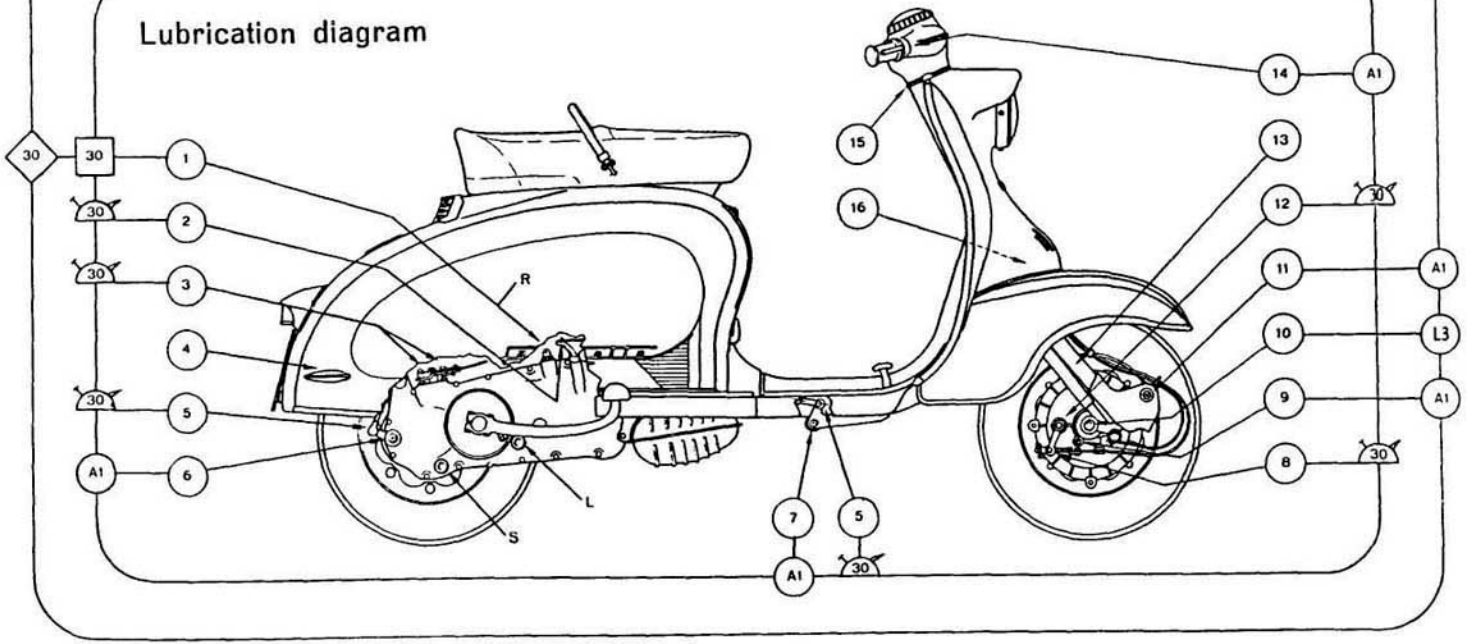
Description of illustration on page 10

1 Ball bearing main flywheel side
2 Needle bearing
3 Bush
4 Crankshaft
5 Piston
6 Gudgeon pin
7 Ball hearing, drive side
8 Oil seal, drive side
9 Clutch
10 Ball bearing for clutch splined collar
11 Sprocked for transmission chain
12 Ball bearing for splined collar
13 Splined collar shaft
14 -Ratchet kick starter
15 Kick starter pinion
16 Dumper friction disc
17 Kick start pedal
18 Transmission chain
19 Kick start shaft
20 Oil seal
21 Return spring
22 Gear drive on main shaft
23 Needle bearing
24 Cursor for gear selector shaft
25 Author bush for needle bearing
26 Lay shaft 1st gear
27 Lay shaft 2nd gear
28 Lay shaft 3rd gear
29 Lay shaft 4th gear
30 lay shaft
31 Ball bearing
32 Oil seal
33 Rear hub
34 Transmission shaft
35 Needle bearing
36 Main Gear Group
37 Oil seal
38 Flywheel magneto
39 Crankshaft

Every 2500 miles

Every 1250 miles

Lubrication diagram



Grease. Oil. Change oil. Re-establish level.

PERIODIC LUBRICATION - (1) Crankcase: change oil after 1000 miles (1500 km.). Use oil SAE 30 (in hot climates use oil SAE 50). (2) Clutch cable knuckles. (3) (;ear 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. (10) Front wheel bearing. (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 Al.
2. Steering ball bearings, parts (15) and (16) should be lubricated with grease L3.
3. Side panel hooks (4) and handlebar control lever knuckles (14) should be lubricated with grease Al.
4. Front suspension helical springs (13) should be smeared with grease Al.
5. Introduce some drops oil SAE 30 in control cable coating before mounting wires.

R = oil filter plug. L = oil level plug. S = oil drain plug. 30 means Agip Energol oil SAE 30. Al means Agip Energrease Al. L3 means Agip Energrease L3.

DISMANTLING AND REASSEMBLY

ENGINE DISMANTLING

NOTE - To carry out the dismantling of the rear wheel and shock absorber, the rear of the machine must be raised and rested on the wooden support used in Operation 10 (See Fig. 4).

Op. 1 Raise the machine on to its stand and take of side panels.

2 Dismantle the silencer, unscrewing the three nuts fixing it to the crankcase (10mm spanner) and the exhaust ring on cylinder, using tool No. 57842.

3 Dismantle the R. Hand footboard, unscrewing the two nuts fixing it to the frame (8mm spanner), the screw fixing the frame connecting piece, and the two screws fixing the footboard bracket (14mm spanner). See Fig. 1.

4 Take off K/Start pedal, extract the circlip, unscrew the return spring fixing nut (10mm spanner), loosen the two pedal bolts (11 mm spanner), slide lever from its shaft, allowing the spring to unload gradually with the help of a screwdriver. See Fig. 2.

5 Remove the pedal return spring cover after extracting its circlip. See Fig. 3.

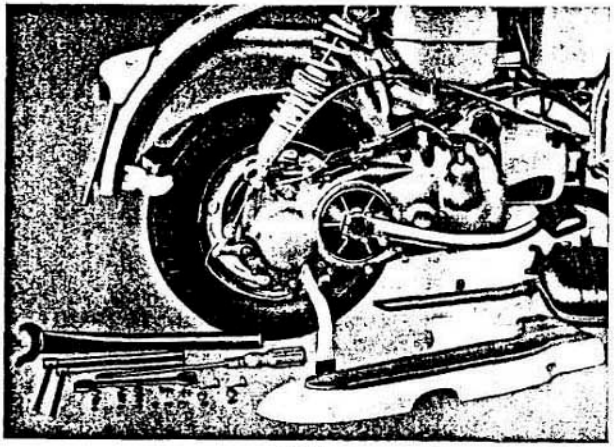


Fig. 1

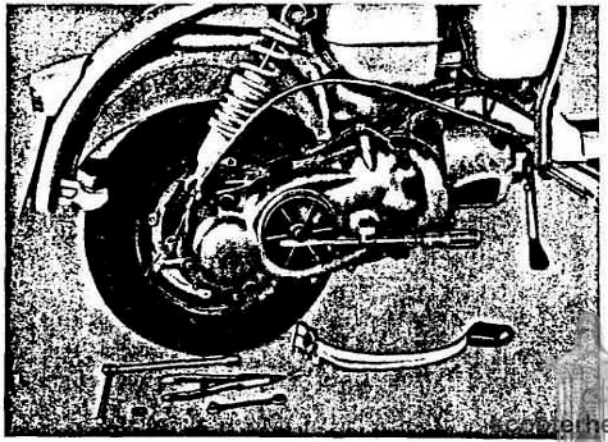


Fig. 2

up. o - urain oii from crankcase; unscrew drain plug (10mm Allen Key No. 57836) collecting oil in tray.

7 - Free Clutch cable from external clutch lever on crankcase cover.

• 8 - Free rear Brake cable from pedal brake rod (19mm spanner).

• 9 - To remove rear brake lever on crankcase, extract circlip, withdraw lever and then the second circlip.

• 10 - To remove shock absorber bolt; place machine on wooden supporto shown in Fig. 4, screw off nut of the shock absorber bolt (19mm spanner) withdraw bolt, taking care to support the wheel.

» 11 - To remove Gear change control cable lever, unscrew the nut fixing this (14mm spanner) and withdraw lever. See Fig. 4.

» 12 - To remove Crankcase cover, unscrew the 13 nuts which fix this to the crankcase (10mm spanner), See Fig. 5.

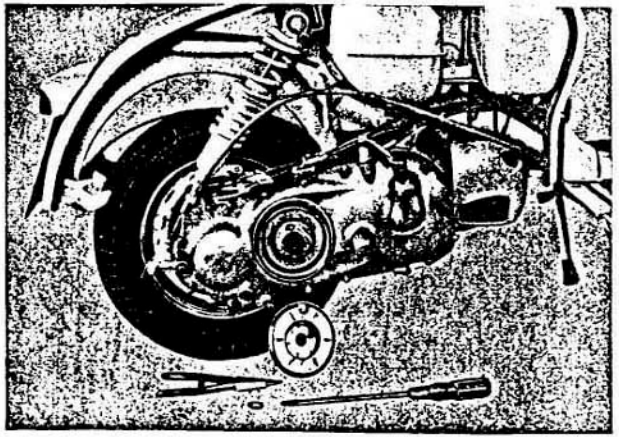


Fig. 3

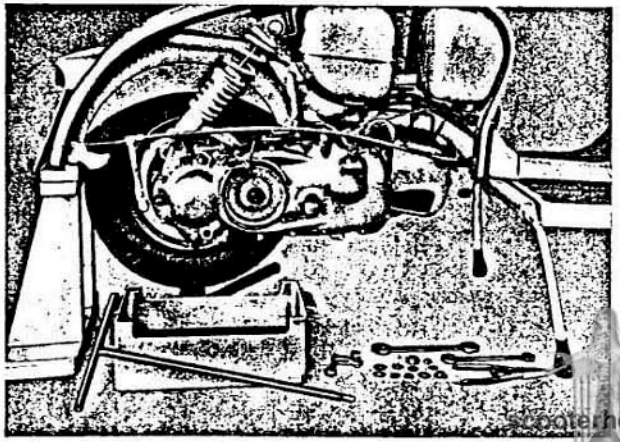


Fig. 4

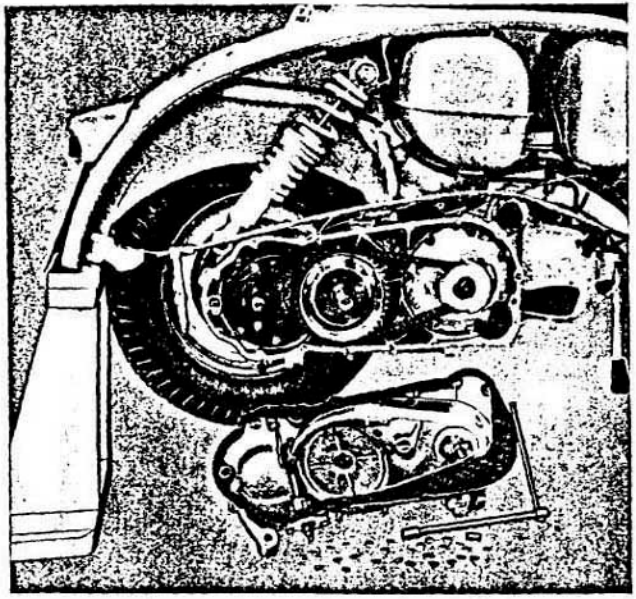


Fig. 5

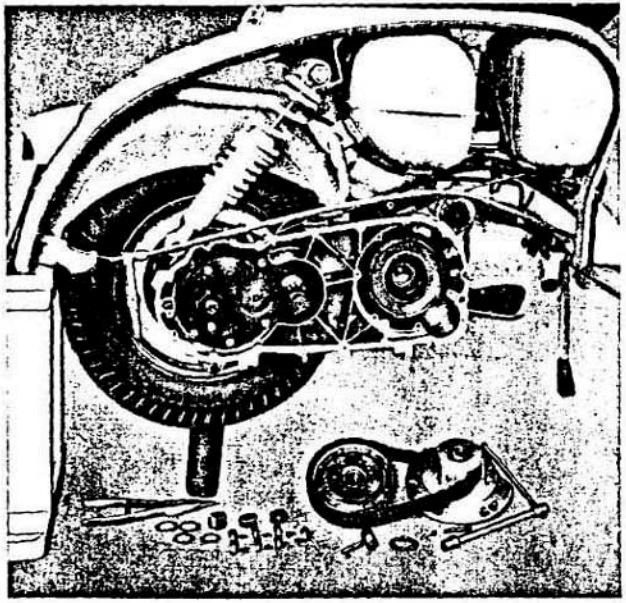


Fig. 6

Op. 13 - To remove Clutch flange and torque damper, unscrew the seven bolts fixing the flange (10mm spanner), extract circlip holding the torque damper together with the shims; slide the damper off in conjunction with the flange complete with sprocket and chain, using if necessary, two bolts 8mm x 1.25 screwed into the two threaded holes on the flange. Withdraw the two needle bearings cage, the distance piece and shims on the Kick Start shaft. See Fig. 6. **The torquedamper has been correctly set before assembly in order to slip when torque reaches 14 = 16 kgm. The chain should never be washed in petrol.**

To dismantle the clutch, apply clutch compressor

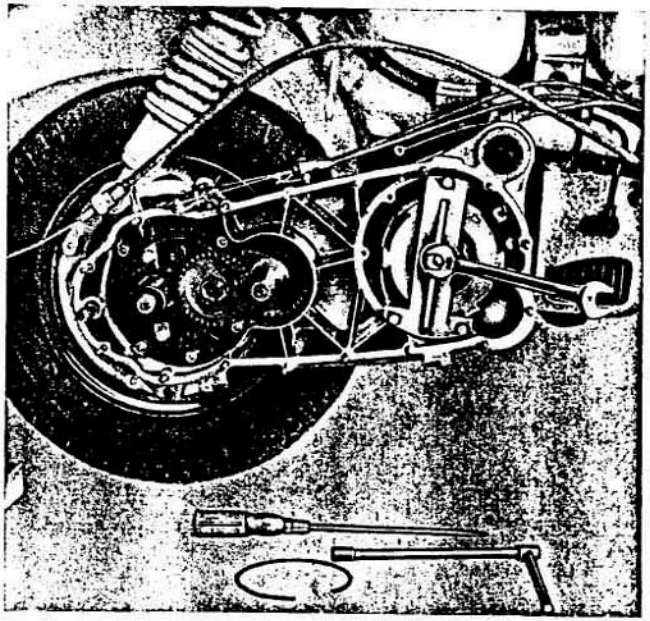


Fig. 7

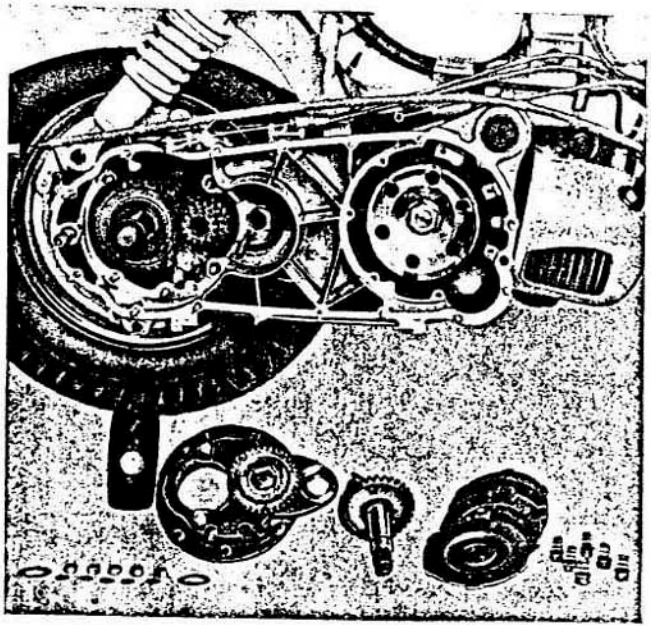


Fig. 8

tool No. 56686, free the circlip by means of a screwdriver, see Fig. 7. Remove tool, withdraw the clutch discs, springs and cups. See Fig. 8.

Op. 15 - To remove gear shaft support flange, unscrew the Five nuts fixing the flange (11 mm spanner), remove flange (using if necessary as extractors, two 8mmx 1.25 screws screwed into the threaded holes), together with main gear cluster shaft and its gear; slide out Kick Start shaft. See Fig. 9.

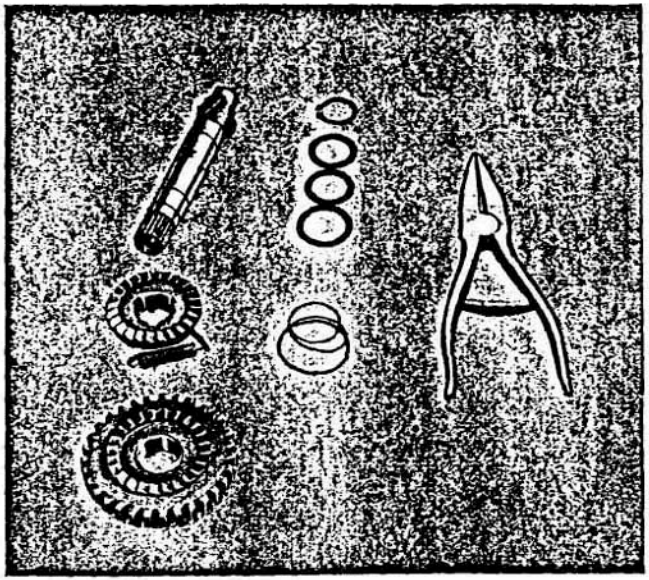


Fig. 9

Op. 16 - To remove Kick start pinion; extract circlip. See Fig. 9.

17 - To remove rear wheel; make sure that the crankcase is supported; remove lock washer if mounted (8mm spanner); unscrew the self locking wheel nut (27mm spanner); withdraw wheel from its shaft by means of extractor No. 57028, or hitting tyre with mallet. See Fig. 10.

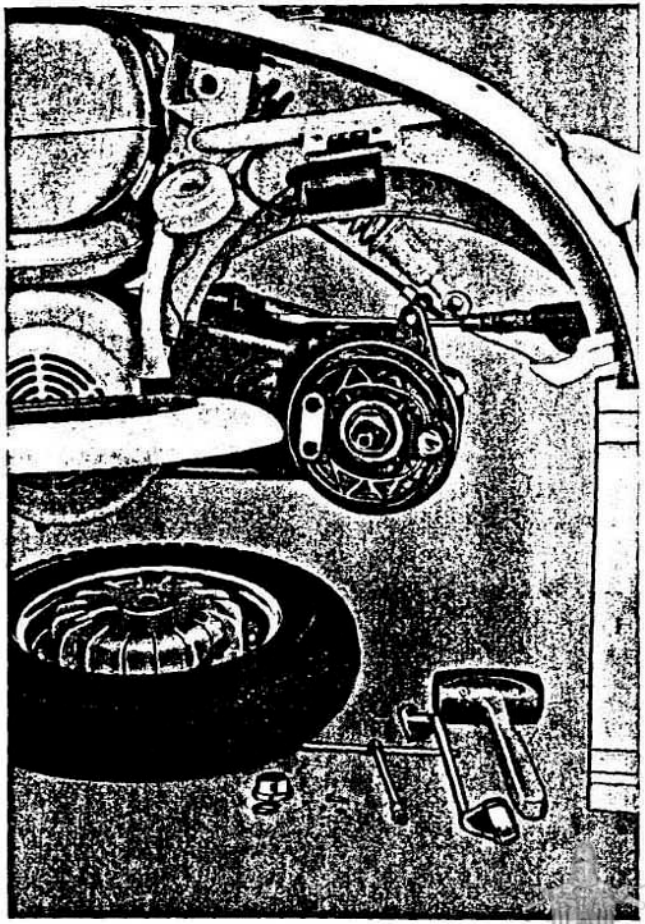


Fig. 10

op. 18 - Tn remove axle shaft; extract the two circlips and dismantle the brake shoes, open up bearing lock tab washers, hold shaft with tool No. 57971, unscrew bearing lock nut (36mm spanner), tap shaft with mallet to free bearing. Withdraw shaft and roller cage. See Fig. 11.

19 - To remove axle shaft gears. Extract the two circlips and slide out the various parts, and, with the help of screwdrivers, withdraw the inner roller Bearing race. See Fig. 12.

» 20 - To remove Carburettor with filter; disconnect the choke cable, loosen securing ring on carburettor and the filter clip-nuts (filter hose end) (8mm spanner) disconnect fuel pipe. Remove carburettor and filter. Unscrew choke control support and knob.

21 - To remove L. Hand footboard; unscrew the four (4) fixing nuts (8mm spanner) and the screw fixing frame connection piece.

22 - Remove spark plug (22mm spanner).

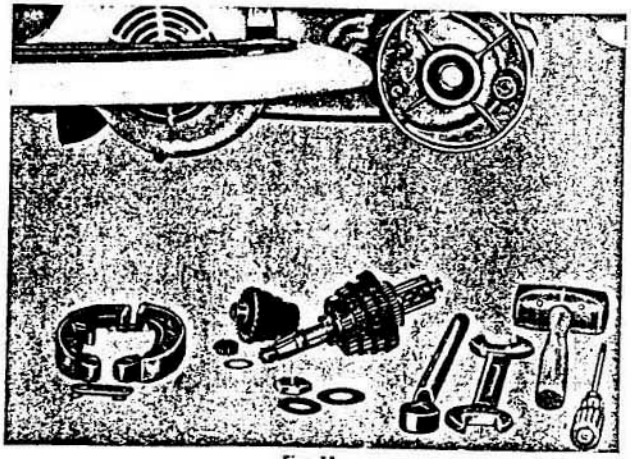


Fig. 11

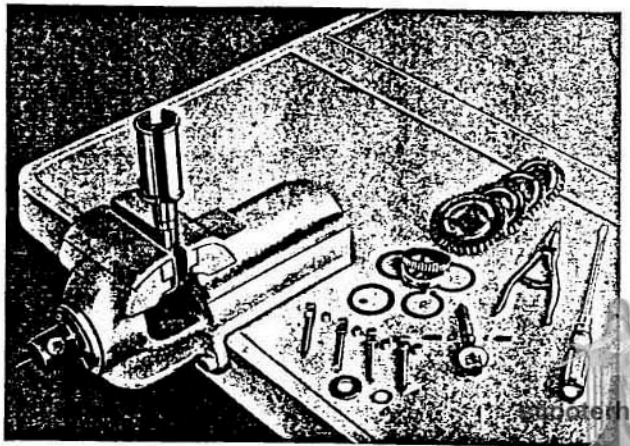


Fig. 12

Op. 23 - To remove Engine Cowl; lift the rear part of crankcase as high as possible, unscrew the two screws fixing the cowl (8 & 14mm spanners).

» 24 - To remove cylinder head; unscrew the head nuts (12mm box spanner, Tool No. 57843).

» 25 - Remove Carburettor induction manifold (llmm spanner).

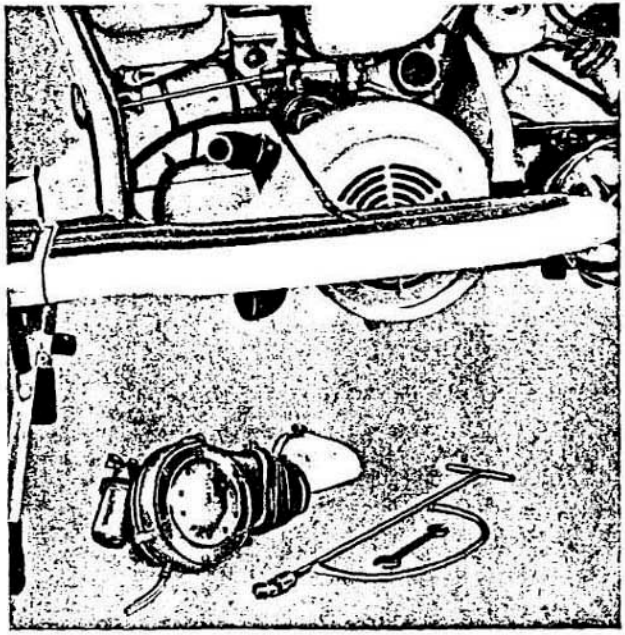


Fig. 13

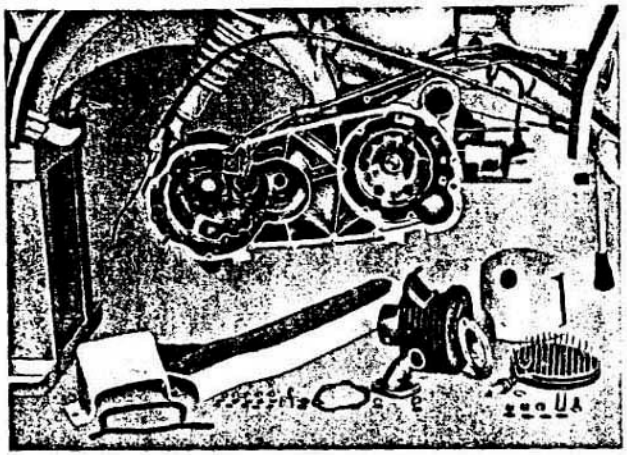


Fig. 14

Op. 26 Remove Cylinder. See Fig. 14.

» 27 To remove Piston; extract gudgeon pin circlips, push out gudgeon pin, using a hand push pin or appropriate tool. Remove piston rings.

» 28 To remove Cowl Cover; unscrew the three screws (8mm spanner).

» 29 Remove fan dust cover by releasing the circlip.

» 30 To remove flyheel locking nut; apply flywheel holding tool No. 58013 and unscrew nut by means of the 19mmm box spanner tool No. 37276. See Fig. 15.

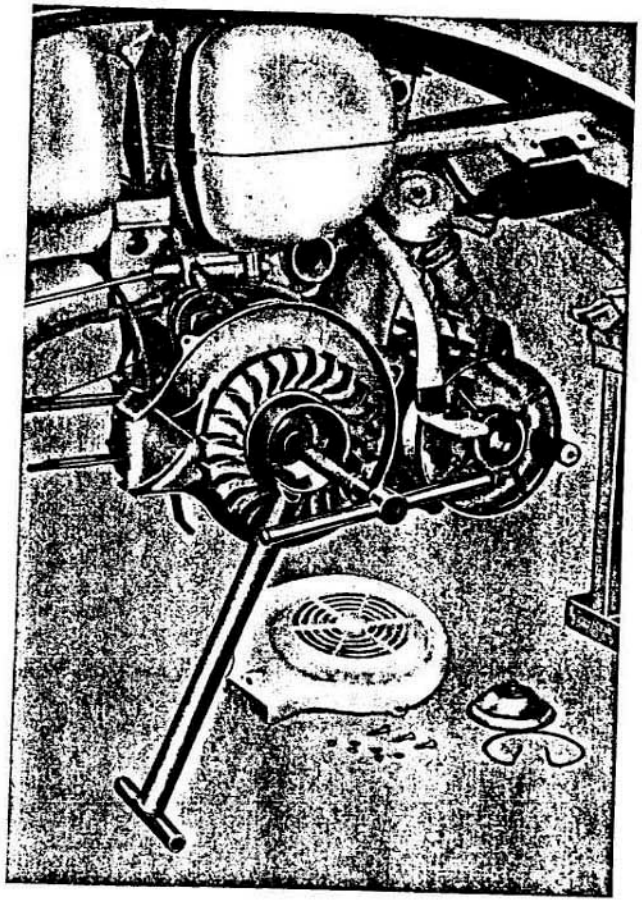
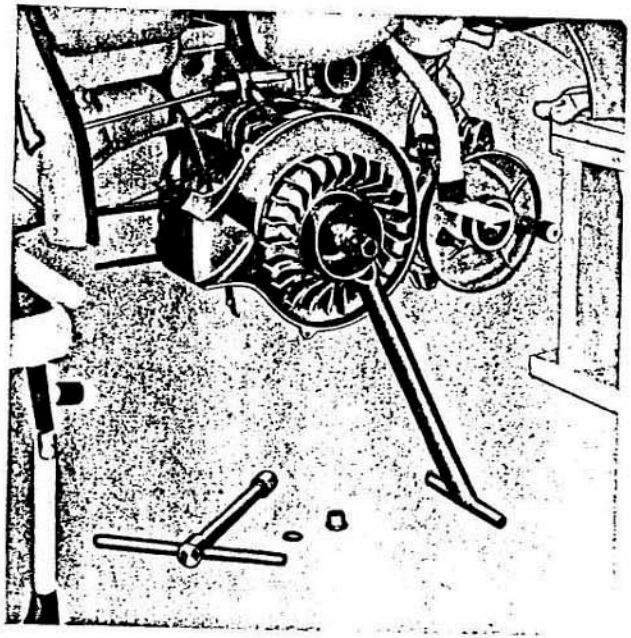


Fig. 15



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C~, 31 ' To remove flywheel; apply extractor No. 37058 and ~o!6ing tool No. 58013. See Fig. 16.

» 32 ' To remove flywheel cowl and flange; unscrew the 3 fixing screws (8mm spanner).

» 33 ' Disconnect all wires from their respective lunction boxes.

Op. 34 - To remove Stator Plate; withdraw the screws fixing this to the flywheel support flange, taking care, if the timing is still correct, to mark the position of the plate before removal, to facilitate the refitting. See Fig. 17.

» 35 - To remove flywheel support flange; withdraw the six screws fixing this to the crankcase (10mm spanner) and apply extractor No. 57839, using three of the stator plate fixing screws. See Fig. 18.

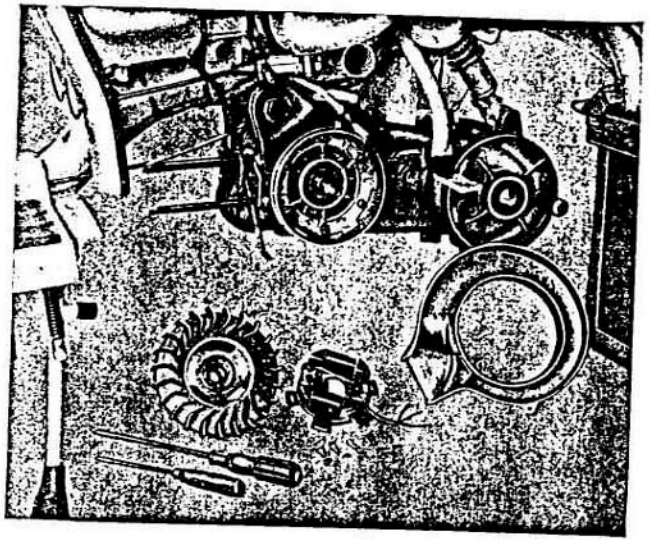


Fig. 17

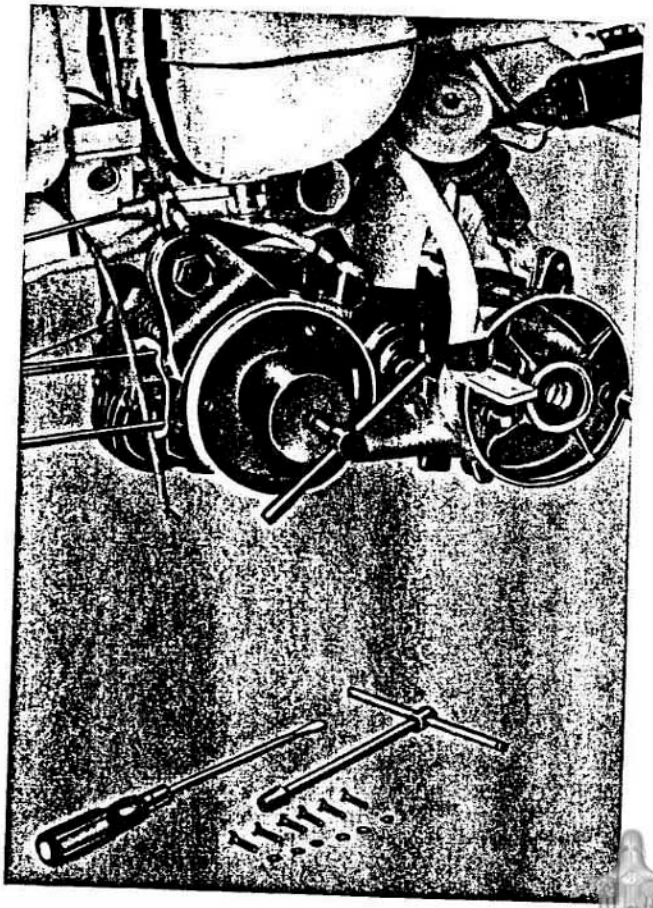


Fig. 18

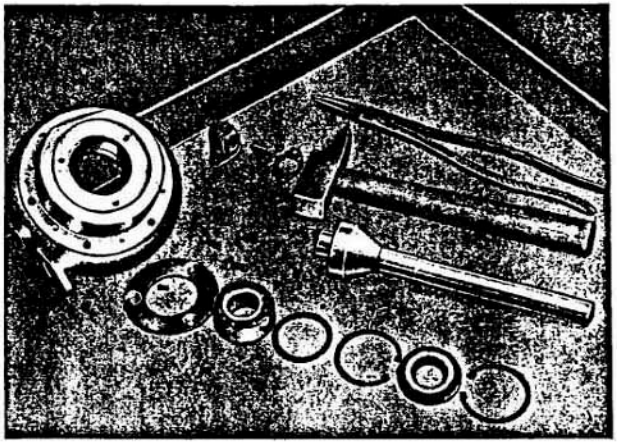


Fig. 19

Op. 36 - To remove the flywheel side main bearing; extract the oil seal circlip, slide off the oil seal with the help of a screwdriver; extract the next circlip and the thrust washer; withdraw the three screws holding the bearing flange, and remove the bearing by using extractor No. 57838. See Fig. 19.

37 - To remove clutch bell housing lock nut; straighten out tab washer, lock housing with Tool No. 57841, unscrew nut **(Left-hand thread)** (27mm box spanner) See Fig. 20.

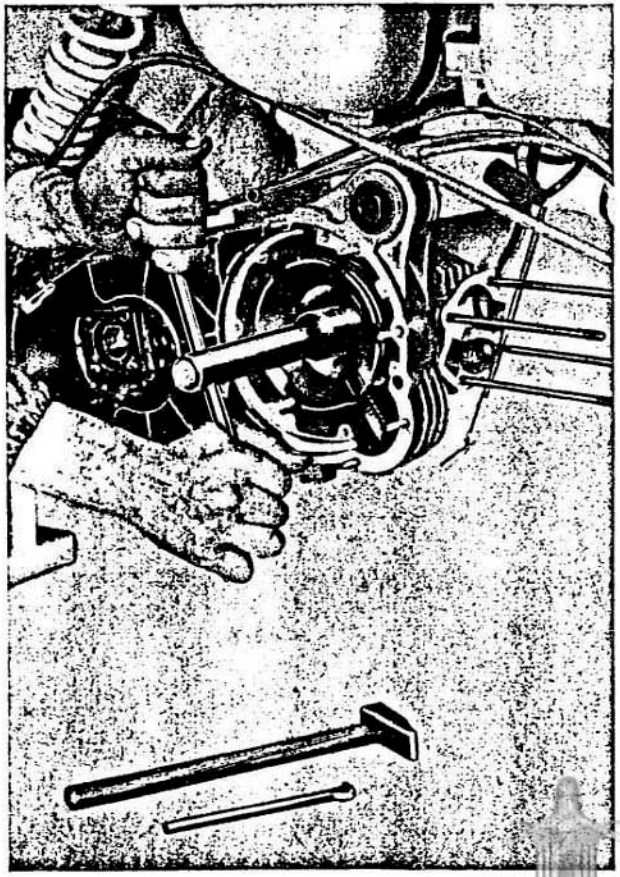


Fig. 20

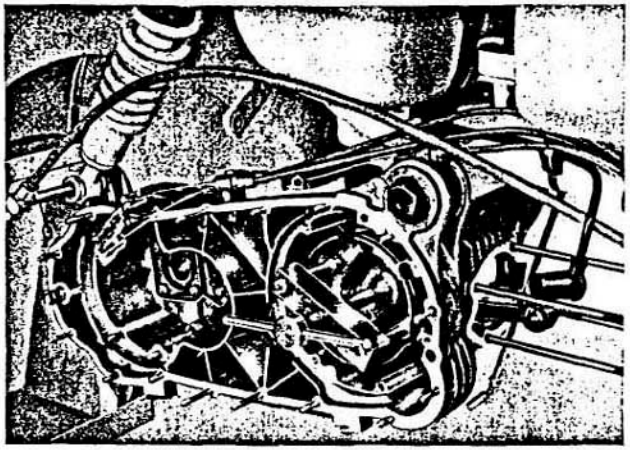


Fig. 21

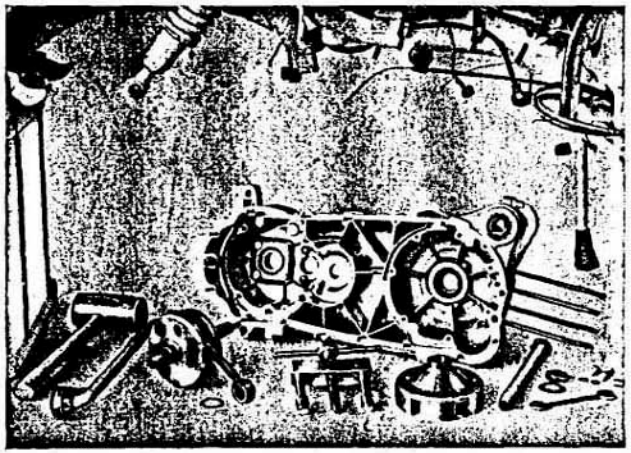


Fig. 22

Op. 38 - To remove Clutch Bell Housing; apply extractor No. 57840. See Fig. 21.

» 39 - Remove Crankshaft from crankcase by tapping on clutch side with mallet.

» 40 - To remove Crankcase from frame; remove gear change cable adjustment support by unscrewing its two screws (10mm spanner). Release clutch cable from its trunnion on clutch lever; open out tab washer or lock washer, extract split pin, unscrew nut (27mm spanner) and slide out crankcase silent bloc spindle. See Fig. 22.

ENGINE REASSEMBLY

To reassemble the engine follow the dismantling operations inversely, namely Operation 40 to 1, bearing in mind the following:

Op. 27 & 26 - Refitting the piston and cylinder; in the case where one or both parts have had to be replaced by new parts, bear in mind that pistons and cylinders are matched according to three standard size grades. These grades +, 0 (plus, zero, minus) are marked on top of the cylinder and crown of the piston. For the correct

matching, both piston and cylinder must belong to the same grading, i.e. bear the same mark, +, 0, or -. In Section VI (Wear Limits) the dimensions and tolerances of the three gradings are shown, followed by those to which the cylinder can be rebored to the three oversizes.

Op. 27 - In refitting the piston, make sure that the arrow marked on the crown, points towards the exhaust port of the cylinder, and the piston ring stop pins face the inlet port. A wrong assembly, that is with the ring pins facing the exhaust port will bring about the breaking up of the piston rings in the first few minutes of running the engine. Change the Gudgeon pin circlips after every strip down and ensure they are well lodged in their grooves.

26 - When inserting the piston into the cylinder, use the piston ring strap No. 57837. It is possible that the piston ring ends open into the inlet port, thus impeding the piston in its fitting. In such a case do not use force on the piston, but close the ring ends by means of a screw driver inserted through the inlet port.

Op, 19 When reassembling the gears to the layshaft, ensure that they are correctly placed as follows:

Top gear - The lubrication grooves must face the outside of the crankcase

3rd gear - Same as above.

2nd gear - The gear has no lubrication grooves. The higher part of its boss must face the inside of the crankcase.

1st gear - Gear with lubrication grooves on both faces, and must be placed with the higher part of its boss facing the inside of the crankcase. If gears are uncorrectly placed, balls get soon damaged and gear may seize.

n 13 Checking of drive chain alignment. In refitting the clutch shaft support flange and the torque damper, it is vital to check the chain alignment using Tool No. 57865. On this tool a dial gauge is fitted. This must have a 31 mm long solid pointed extension. Bear in mind that the torque damper must have an axial play of 0.1 to 0.2 mm and in perfect alignment with the sprocket pinion. The points to check during this operation are as follows:

a) After having locked the flywheel by means of Tool No. 58013, straighten out the lock washer, unscrew the **left-handed** nut which locks the clutch splined collar and dismantle the shaft support with its ball bearing. Withdraw the flywheel locking tool and tap the chain sprocket pinion to its furthest position nearest the clutch by means of a mallet.

b) Remove the spark plug to eliminate compression in the cylinder and place the Tool as shown in Fig. 23, make three readings, rotating the torque damper a quarter of a turn at each reading. If the difference between any two of the readings is more than 0.15 mm., the complete torque damper must be replaced.

c) Place Tool No. 57865 in the position indicated on Fig. 24 and carry out a reading.

d) Ensure that the torque damper is dead against the collar by tapping it with a mallet, then carry out a reading on the dial gauge as in Fig. 23. This reading should be between 0.05 and 0.1 mrns. lower than the

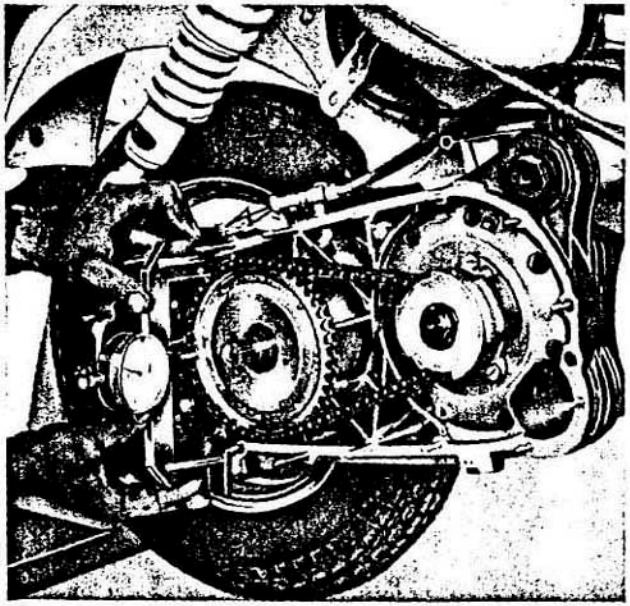


Fig. 23

previous reading. If this is not so, add or substract the shims behind the damper until the correct position is reached.

e) Replace the shims in front of the damper disc and fit the circlip. Pull the damper as far as possible towards the outside of the crankcase; the reading then made on the dial gauge should be between 0.05 and

0.1 mms. higher than that made for the sprocket pinion. If this reading is not as mentioned add or substract shims in front of the damper disc and repeat the reading until the correct position is attained.

Op. 12 - Before refitting the crankcase cover, make sure place Tool No. 57776 on to the Kick Start shaft to protect the oil seal.

» 5 - When refitting the protection cover, the Kick-start return spring must be hooked to its pin in the crankcase cover. This can be done by introducing a rod through the hole in the cover. The spring can be fitted in three positions depending on the load as specified in the next operation.

4 - Before replacing the Kick Start lever it is important to load its return spring, this can be done with the help of two screwdrivers. Fig. 26.

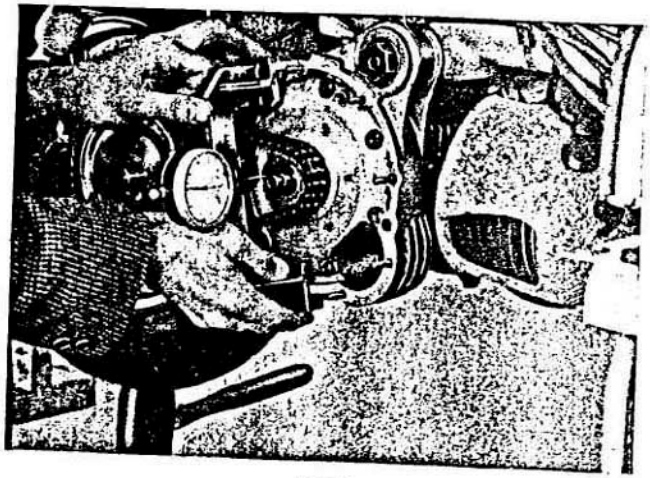


Fig. 24

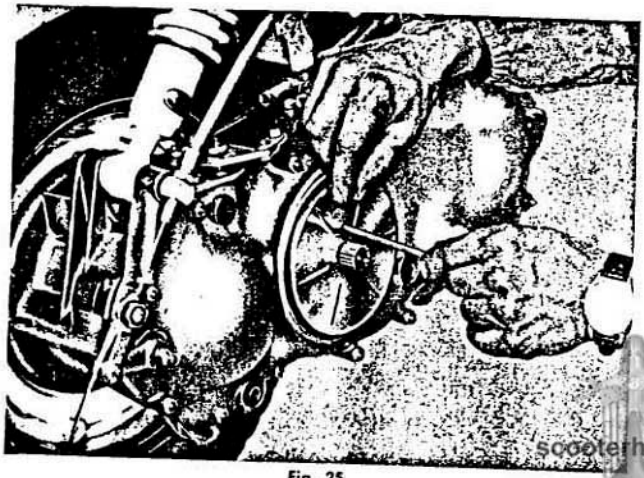


Fig. 25

(On machines fitted with the spring with a 1.5 mm. plate, give spring 1 ½ turns; whilst on a machine fitted with a spring with a 2 mm. plate, give the spring two thirds of a turn). Should the kick-start lever, after these correct spring settings, not return completely, the impedence must be traced to the transmission itself, i.e. the chain is too taught; Kick start shaft bush too tight & c. It is dangerous to increase the return spring load any higher than that specified.

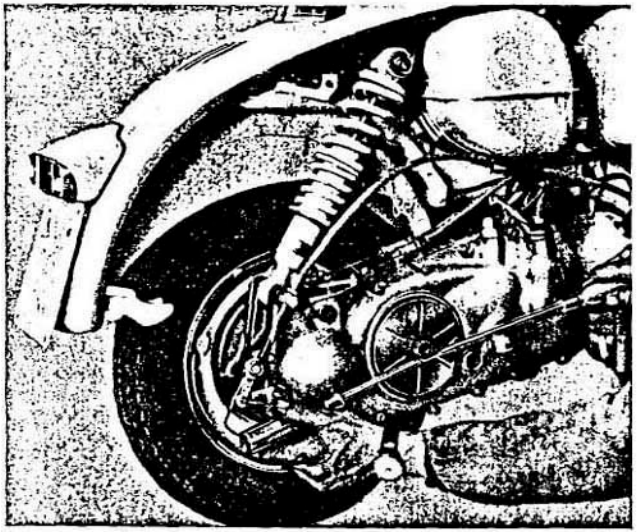


Fig. 26

DISMANTLING & REASSEMBLY OF THE HANDLEBAR UNIT AND CONTROL CABLE

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.

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

42 - Lift the upper portion of the handlebar group just the amount required to reach and unscrew the four screws which hold the speedometer rim. Free the speedo cable from the speedometer by means of the knurled nut, remove the speedo holder base thus freeing the upper part of the handlebar unit. The speedometer can now be freed from the Unit. See Fig. 27.

TO REPLACE CONTROL CABLE INNER WIRES.

Op. 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 fitting new cable. Replacement wires can then be inserted into the outers at the handlebar end.

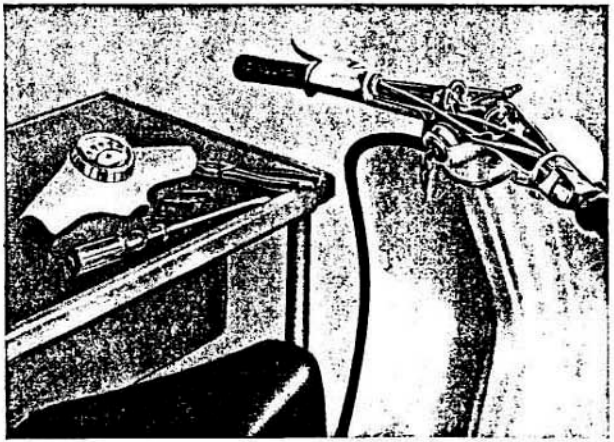


Fig. 27

TO REPLACE CABLE OUTERS.

Op. 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 (10 mm. spanner), remove the four screws fixing the headlamp casting to the legshield together with the two screws fixing the mudguard (8 mm. spanner). See Fig. 28.

» 46 - Slide the cable outers through their retaining clip.

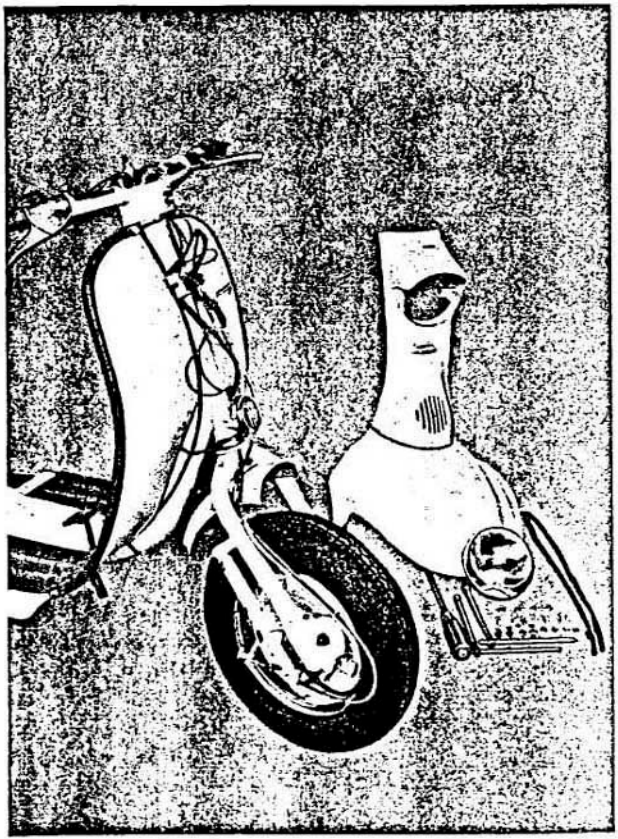


Fig. 28

TO REMOVE CLUTCH CONTROL AND FRONT BRAKE LEVERS.

Op. 47 - The lever pivot in is held by a retaining pin situated behind the cable nipple. To remove the lever it is necessary to loosen the inner cable and remove the nipple from its seat, then draw out the retaining pin by means of a small hook. Pull out the pivot pin and remove the lever. See Fig. 29.

TO REMOVE THROTTLE AND GEAR CHANGE CONTROL SHAFT.

Op. 48 - After having freed the outer extremities of the front brake and clutch cables, loosen the clamp holding the cable control roller (8 mm. spanner) and remove the bolt. 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. When fitting new throttle and gear change control shafts the twist grips should be removed before loosening the cable control roller. See Fig. 30.

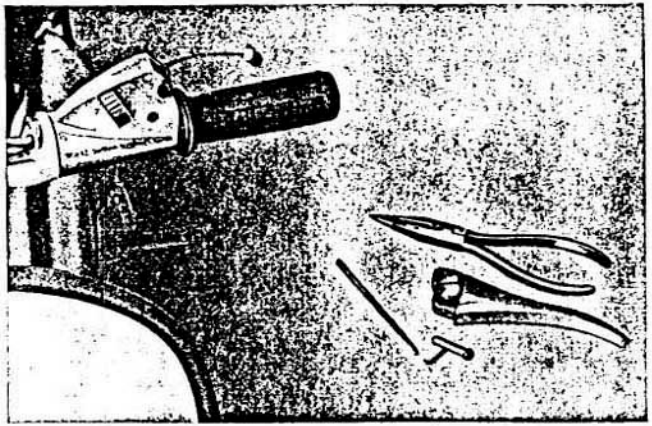


Fig. 29

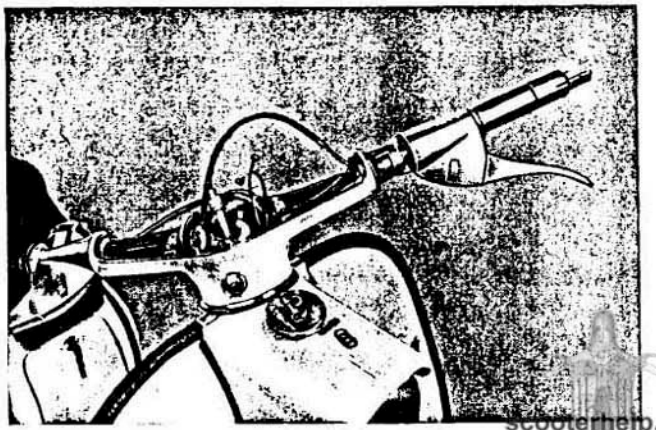


Fig. 30

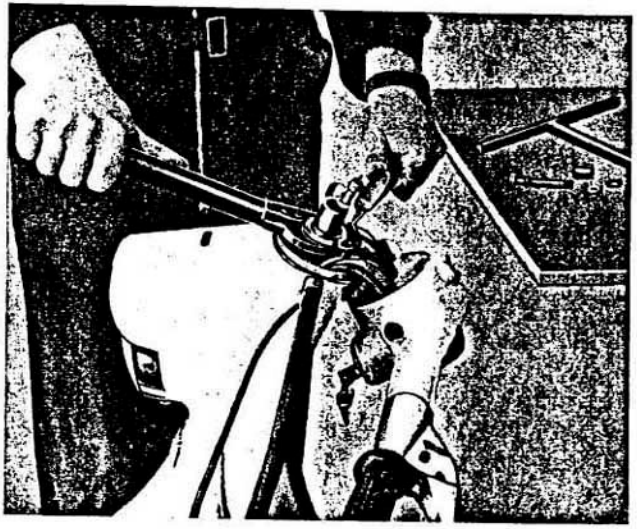


Fig. 31

DAMAGE TO THE MAID! AND/OR HEADLAMP S ITCHES.

Op. 49 - The dismantling of the body of the main switch or the headlamp switch is not recommended. In case of damage to either of these two switches replace them with new parts which are supplied complete with their respective cables.

TO REMOVE HANDLEBARS.

Op. 50 - Carry out Operations 41 and 42, remove the screw fixing the handlebar to the steering (10 mm. spanner, Tool No. 57836), withdraw handlebar from the the front fork tapping it underneath with a mallet.

TO REMOVE THE FRONT FORK.

Op. 51 - After having removed the handlebar (Op. 50), unscrew the steering adjustment ring and the ball race ring using Tools No. 40490, 40842 and slide out front fork. See Fig. 31.

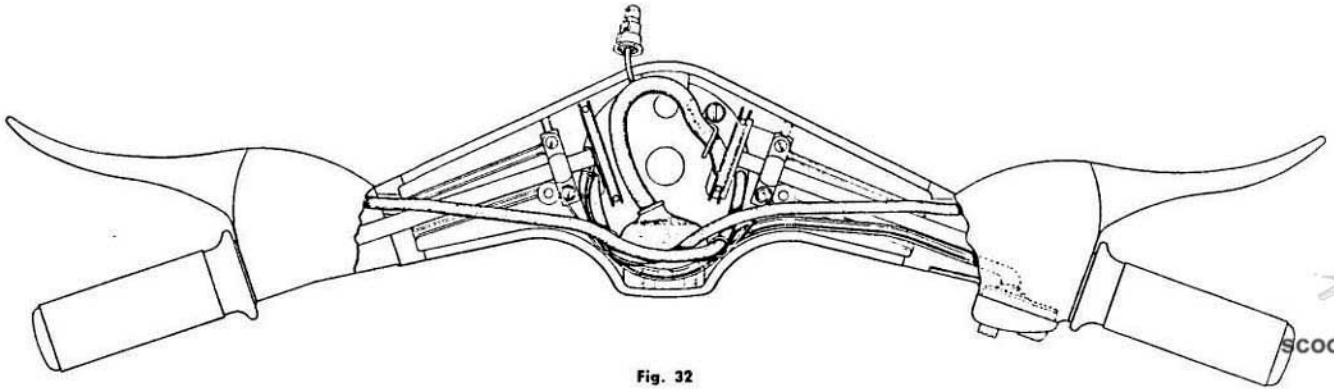


Fig. 32

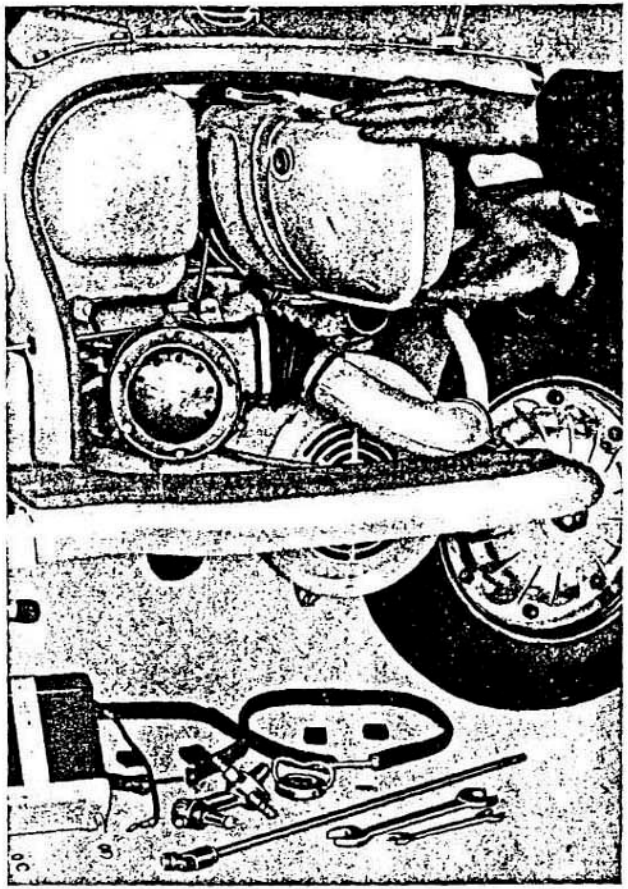


Fig. 33

TO CONTROL THE ALIGNMENT BETWEEN HANDLEBAR AND FRONT WHEEL.

Op. 52 Carry out Operations 44 & 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 (10 mm. spanner) Tool No. 57836, and tighten up again after having carried out the adjustment.

REASSEMBLY. Carry out the above mentioned Operations inversely (Operation 52 to 41). Check with care the placing of the electric cables and control cables inside the handlebar so that they are placed exactly as shown in Fig. 32 to avoid chafing and narrow angled bends.

DISMANTLING AND REASSEMBLY OF THE FUEL TANK

Op. 53 - Remove the battery together with its support by unscrewing the twD nuts fixing these to the bracket on the frame (10 mm. spanner).

54 - Empty all petrol from tank.

55 - Loosen air induction tube clip screw and withdraw tube from air chamber in frame.

56 - Remove petrol tap control rod by extracting its pin.

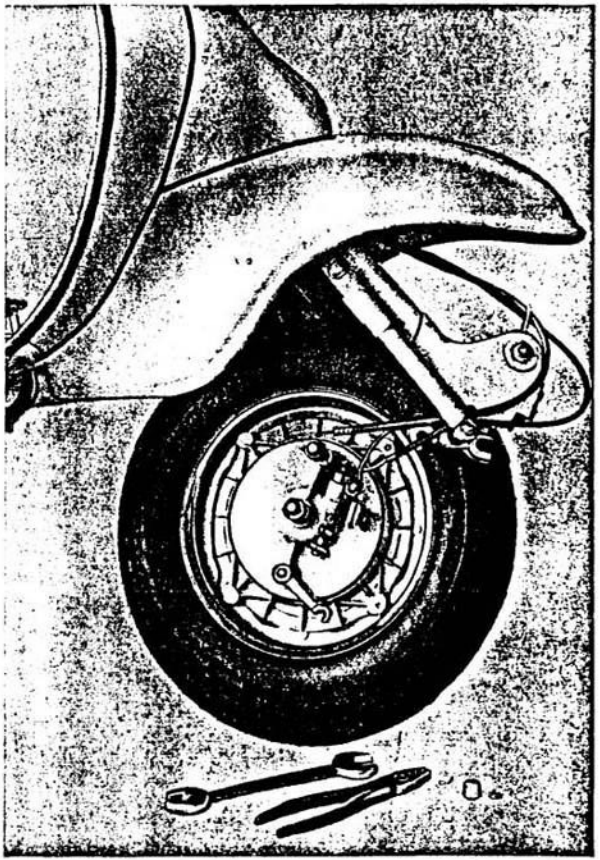


Fig. 34

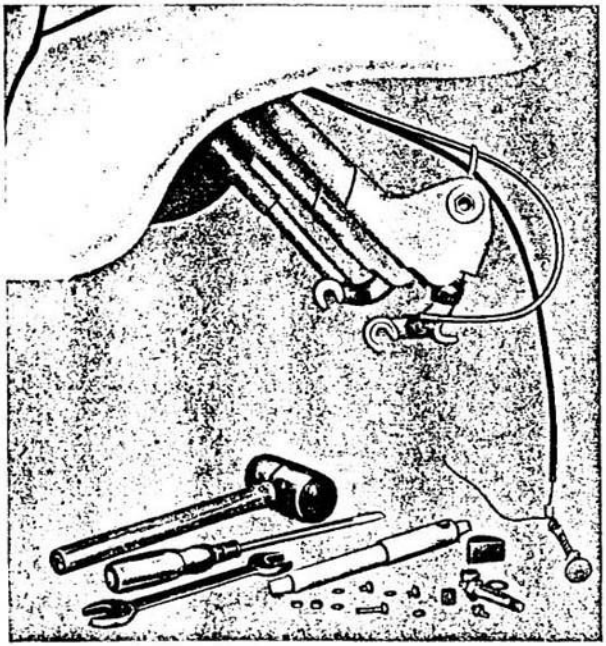


Fig. 35

Op. 57 - Remove petrol tap from tank (16 mm. spanner).

» 58 - Remove the tank support straps (8 mm. box spanner).

» 59 - Take hold of the tank from the flywheel side of the machine rotate it clockwise and slide out of frame. See Fig. 33.

TO REASSEMBLE. Follow the above operations inversely (Op. 59 to 53).

DISMANTLING AND REASSEMBLY OF FRONT SUSPENSION AND WHEEL

Op. 60 Raise machine on 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 drive box.

61 Remove wheel; loosen the two wheel nuts on the trailing links, the nut fixing the right hand lever on the back plate (22 mm. spanner) and incline machine to remove wheel.

62 Remove the shock absorbers (10 mm. spanner).

63 To remove pivot pin on trailing link, unscrew the fixing nut (19 mm. spanner).

64 To remove lower buffer; unscrew grease nipple under the lever, remove screws fixing buffer (10 mm. spanner) remove buffer with the help of a screwdriver. See Fig. 35.

65 To remove the trailing links; apply Tool No. 58021 and contract the suspension spring to remove the lever. See Fig. 36.

66 Remove spring guide pistons, the springs and piston guide ring, using for the last item a hook in case of difficulty. See Fig. 37.

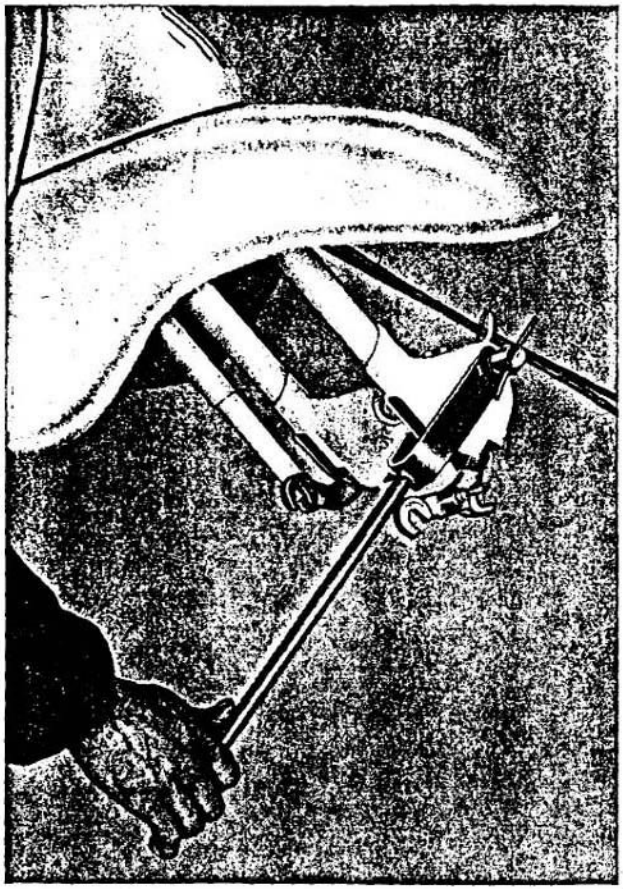


Fig. 36

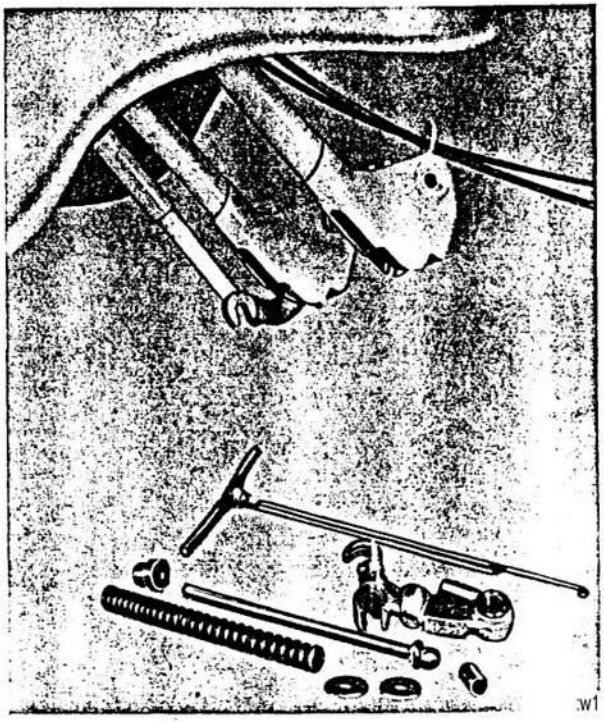


Fig. 37

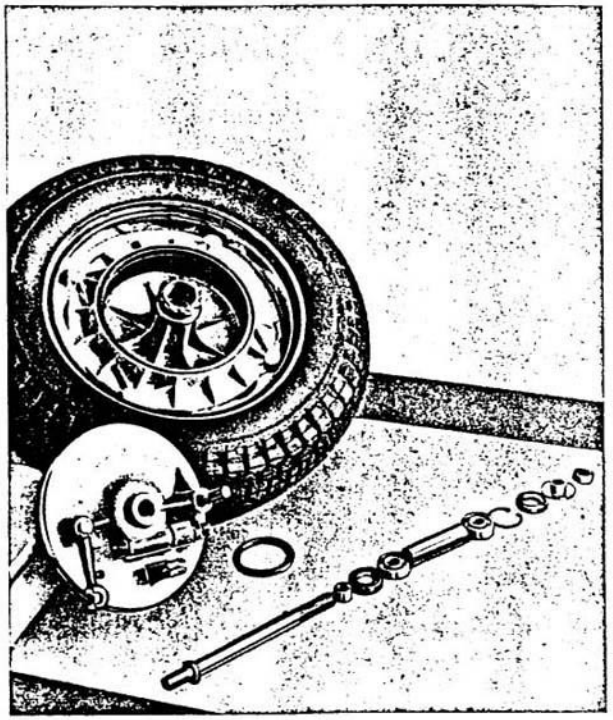


Fig. 38

Op. 67 - Unscrew the L.H. wheel nut (loosened previously), unscrew the wheel lock nut (19 mm. spanner) and withdraw the left hand distance piece.

63 - Withdraw front wheel spindle by tapping it with a punch from the left hand end and remove the brake shoe back plate.

Op. 69 - Remove the two oil seals at each end of the hub.

Op. 70 - Extract circlip from left hand side of hub and tap out the bearings with a suitable punch (Right hand bearing towards the right and left hand towards the left).

TO REASSEMBLE. Follow the above operations inversely (70 to 60). 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.

SETTING AND TIMING OF FLYWHEEL MAGNETO

Op. 71 Remove cylinder Head (Op. 1, 2, 3, 8, 10, 20, 21, 22, 23, 24) 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. 39.

72 Remove cowl cover circlip and fan cover to allow access to the flywheel (Op. 28 & 29).

73 Check condition and gap of the contact points when fully opened. The surface of the points should be flat and clean and if this is not so, rectify with a very fine file. The distance between the contact points i.e. gap, fully opened should be between 0.35 and 0.45 mms. which can be easily checked by means of feeler gauge No. 48054 or any normal type feeler. If the gap is bigger or smaller than the above stated, the adjustment can be carried out through the adjustment screw. To do this however, the flywheel must be removed, see Op. 30 and 31.

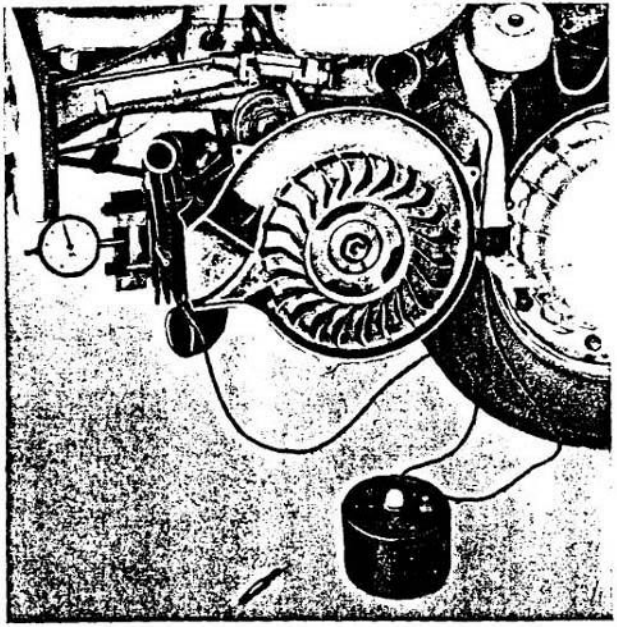


Fig. 39

74 - The checking of the timing can be carried out with the help of the electric buzzer device No. 5017. To do this the key in the main switch has to be turned to the « day-riding » position

connecting one of the buzzer wires to the green wire L.T. on the flywheel junction box, or to the U.T. Coil feed junction box while the other wire of the buzzer will be connected to earth. Detach earth connection of the coil.

Op. 75 - Turn crankshaft until top dead centre is found bring dial gauge to zero in this position.

76 - Switch on the electric buzzer at the T.D.C. and turn the flywheel slowly in a clockwise direction, (i.e. in the opposite direction to that shown by the arrow marked on the flywheel). When the buzzer light goes out, which indicates that the contact points have closed take the dial reading. This should be between 3.8 and 4.4 mms. corresponding to an angle of rotation of the flywheel of 27° T 1 ° 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 advance or in anti-clockwise direction to retard until the moment correct contact point opening is reached. See Fig. 39.

THE ELECTRICAL EQUIPMENT

The electrical circuit of the machine is fed by the fly-wheel magneto which supplies current to the H. T. Coil and to the dual filament 6 V. 25/25 W. Headlamp Bulb.

Furthermore through a rectifier the flywheel maintains the charge to the battery (6 V. - 6.7 A.H.) which supplies current to the 6 V. 5 W. Headlamp Pilot light, the horn and to the two rear lamp stoplight bulbs (6 V. 3 W.).

The 12 V. 2.5 W. speedometer bulb and the 6 V. 3 W. rear light are fed directly from the flywheel or the battery according to the position of the main switch key. On the first series of machines, in every position of the switch rectifier is feeded through intermediate connection of light coil. See layout drawing of the electrical equipment Fig. 40 and the Wiring diagram Fig. 41 A. On the second series of machines (post-mod) rectifier is still feeded through intermediate connection of light coil when switch is in position « O » or « 2 » . When switch is in position « 1 » rectifier is feeded through terminal connection of light coil.

Commutation is obtained through a relay mounted togheter with rectifier and fuse, curtained in a bigger box, fixed in the same position of the rectifier and fuse box of the pre-mod. machines, see layout of electrical equipment (Fig. 40). Wiring Diagram resultes modified as shown in Fig. 41 B.

The Main switch has 5 positions. From left to right

Pilot Light, speedometer light and rear lights on for parking at night.

All lights out, day-time parking.

Day-time riding (no lights on).

Headlamp pilot light, rear light and speedo light on, Night-riding in illuminated districts.

Headlamp, rear lamp, speedo bulb on - Night riding in the country.

The switch key can only be extracted from the switch when in the position of engine cut-out.

The two-way switch control for the headlamp (main beam and dipped beam) which also includes the horn button is placed near the right hand twist grip on the handlebar.

Description	Part No.	Characteristics.
Flywheel Magneto	15017010	1 Ignition Coil with green connetting wire. At a flywheel speed of 150 r.p.m. with lights off a spark over a gap of 5 mms. should be given. 1 Lighting coil with two wires, (brown wire for lights, blue wire or rectifier). This coil should give a 6 V. current at 3000 r. p. m. with a 1.33 Q load on resistance.
Rectifier & Fuse (Pre-mod. machines only)	15081250	Rectifier current 1.5 amp. Inverse current 3 mA. max. Fuse 5 or 8 amps.
Rectifier. Fuse - Relay (Post-mod. machines only	15081280	Rectifier current 2,6 amp. Inverse current 3 mA. Fuse 5 (or 8) amp.

Description	Part No.	Characteristics.
H.T. Coil	00811384 (Filso) 00831000 (Bosch)	Alternating current. Open circuit type.
Main switch	15081220	Five-way.
Two-way switch	15081230	For headlamp beams and containing horn push button.
Horn	15081240	DC. 6 V. with 12 W. max. absorption.
Stop light switch.	15081260	Fitted to the rear brake control pedal.

Layout of electrical equipment

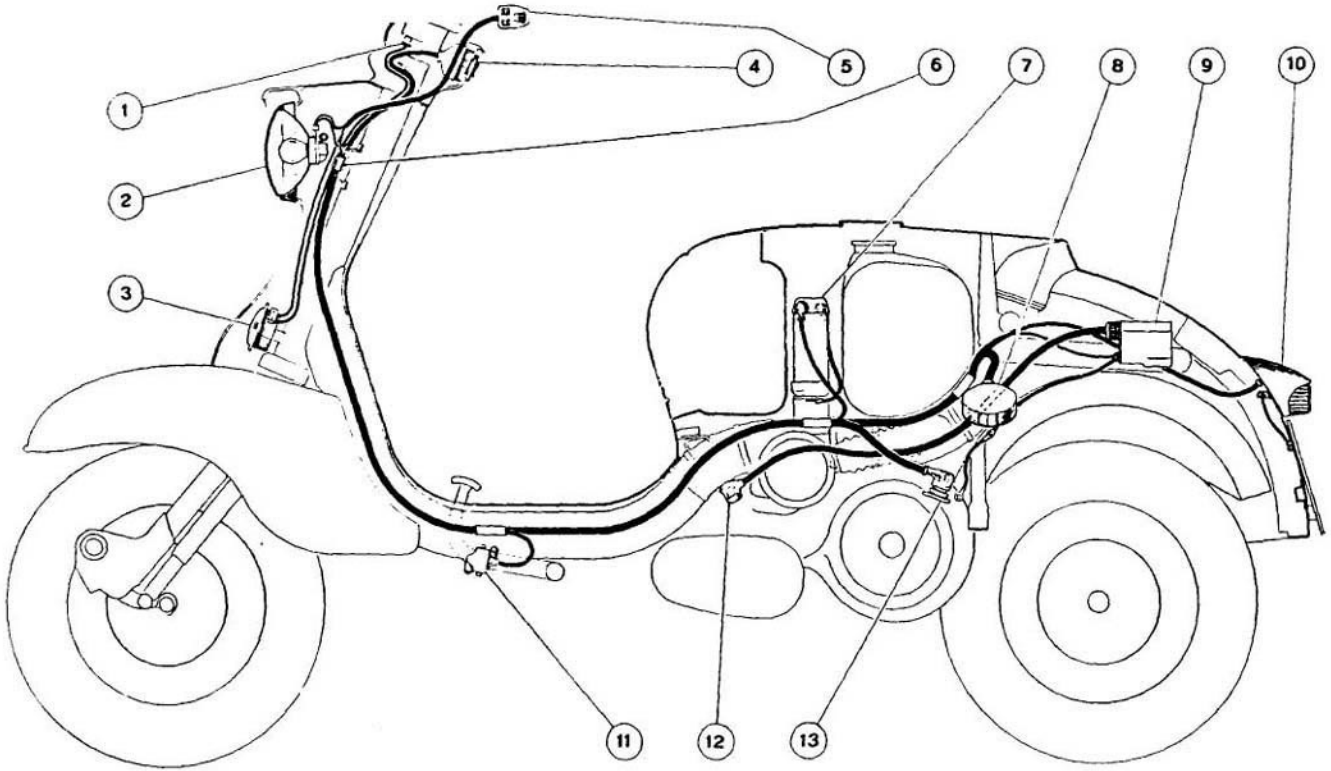


Fig. 40

1 Speedo bulb
2 Headlamp
3 Horn
4 Key switch
5 Headlamp switch with horn
6 Junction box
7 Battery
8 Rectifier-Fuse (eventually *relay)*
9 H. T. Coil
10 Tail light
11 Stop switch
12 Spark plug cap
13 L. T. plug on flywheel magneto

Pre-mod wiring diagram

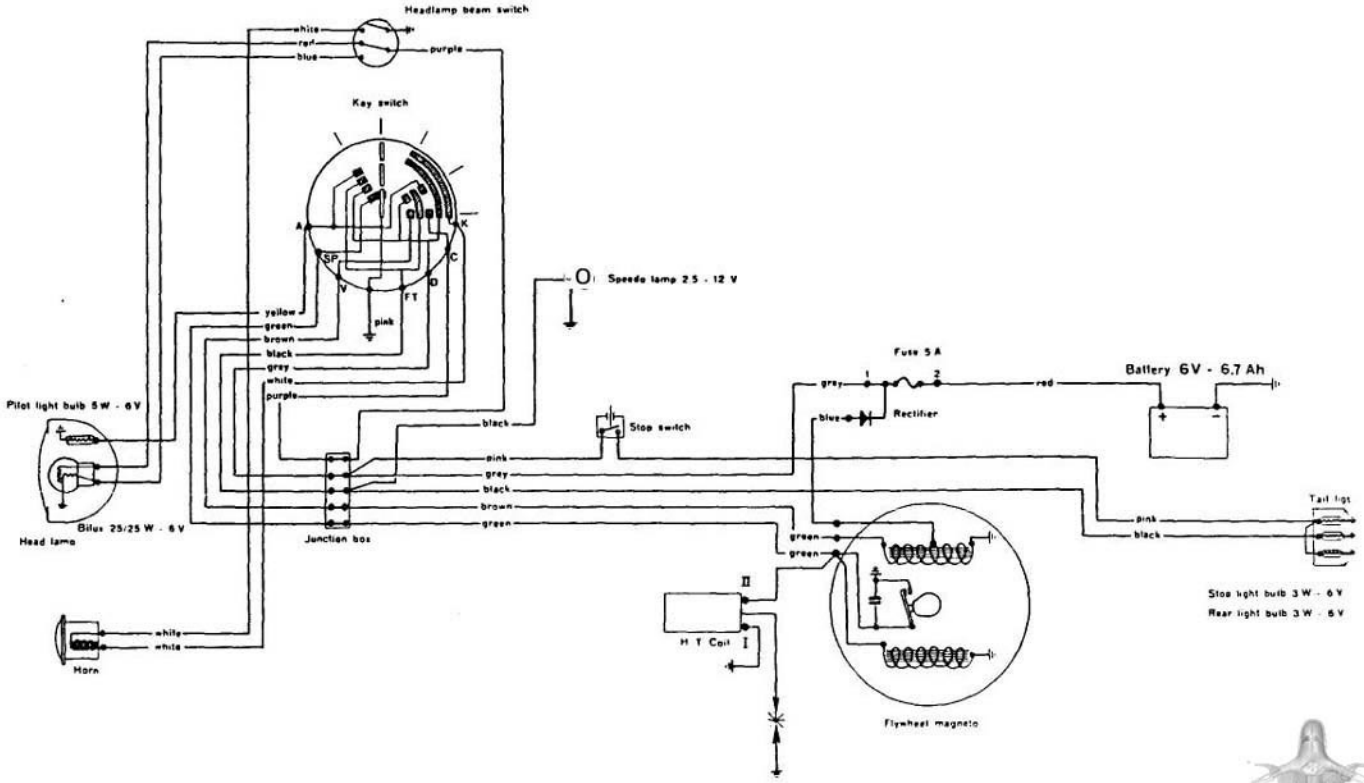


Fig. 41 A

Post-mod wiring diagram

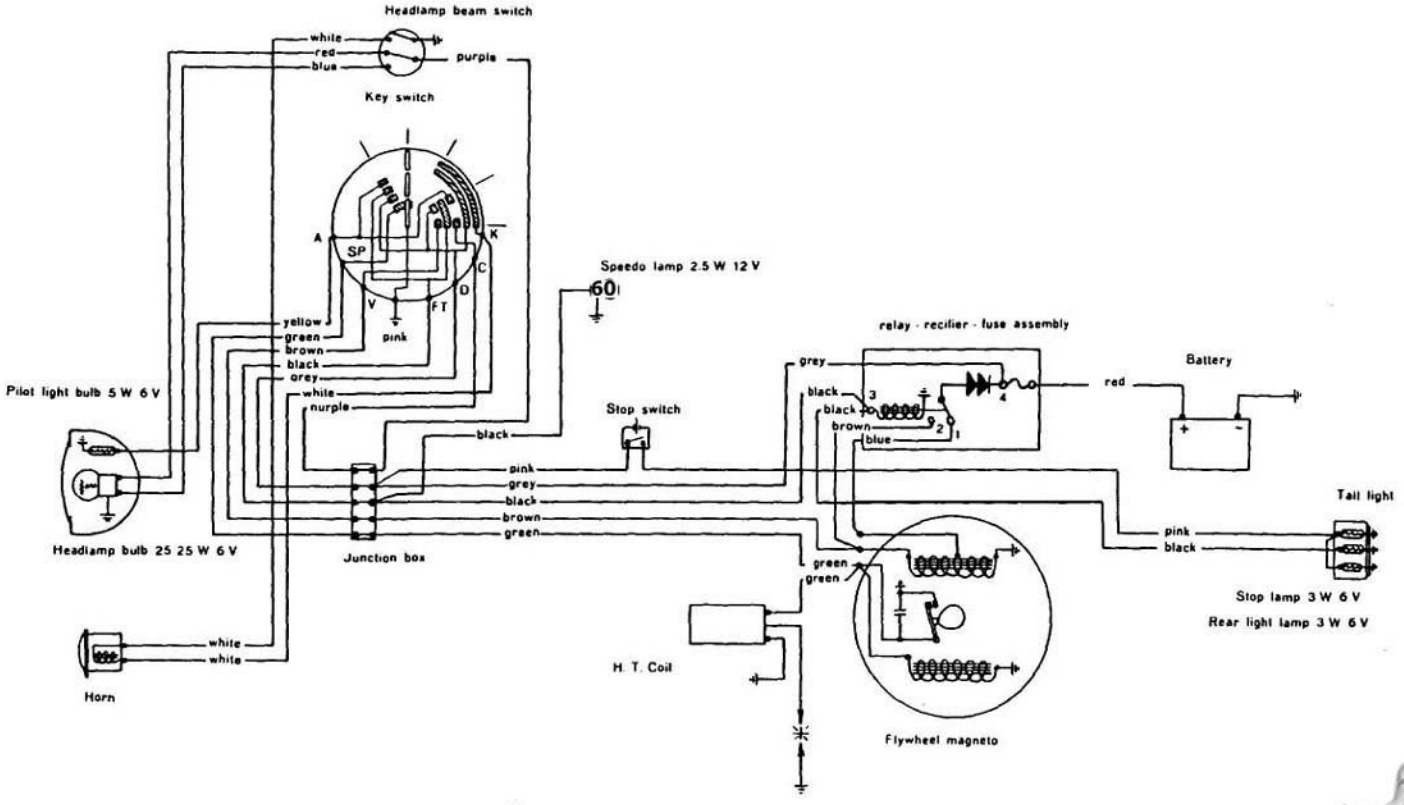


Fig. 41 B

BULBS

Headlamp Bulb	5080003	Twin filament 6 V 25/25 W.
H/Lamp Pilot Bulb	5080004	6 V 5 W Festoon 39 mm long.
Rear & Stop Light Bulbs.	5083004	Three 6 V 3 W Festoons. 30 mm long.
Speedo Bulb	15087002	2 V 2.5 W.
Battery	5081170	6 V - 6.7 Ah.

CHECKING OPERATIONS

The following instruments are needed for the checking.
Rev. counter from 0 to 6000 r.p.m.
Voltometer for DC. 0 - 10 V.
Amp. Meter for DC. 0 - 3 amp.
Milli-amp. Meter for DC. 0 - 10 mA.
Hydrometer for battery liquid control.
Wiring circuit tester. A megaohmeter is recommended.

HEADLAMP ADJUSTMENT.

Check tyre pressure (see Page 9).
Place a vertical screen in front of scooter as shown in Fig. 42 (use Fig. 16 in the instruction manual provided with this machine).

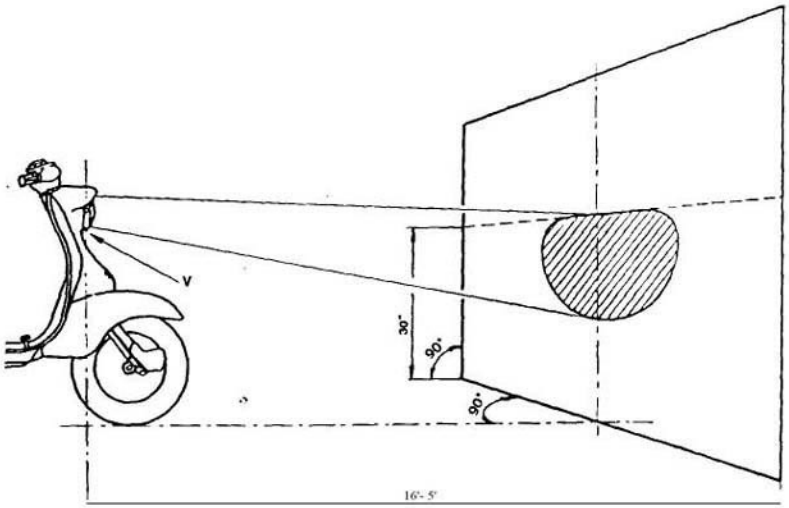


Fig. 42

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.

BATTERY MAINTENANCE.

(To remove the battery from the machine see Op. 53).

1) Do not under any circumstances allow the battery to run down completely, this to avoid damage to the plates and the possibility of rendering the battery useless.

2) Add **distilled water** once a month (during the summer every two weeks) until the level of the liquid is about 5 mil. higher than 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 well greased with vaseline to avoid corrosion.

4) Should the machine be laid up for a considerable time it is advisable to remove the battery, put 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 1 /10th. of its capacity (0.7 amps). Check each of the three battery cells with a volt meter 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 g/cm^3 (equal to 30 baume) corresponds to a fully charged battery, while a density of 1.21 g/cm^3 (25 Be) indicates the battery needs urgently 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 mentiond above. For the first charge follow the Makers' 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 g,/cm' (25 Be) at 15° C. both for the first charge and normal functioning.

Checking of the battery charging circuit

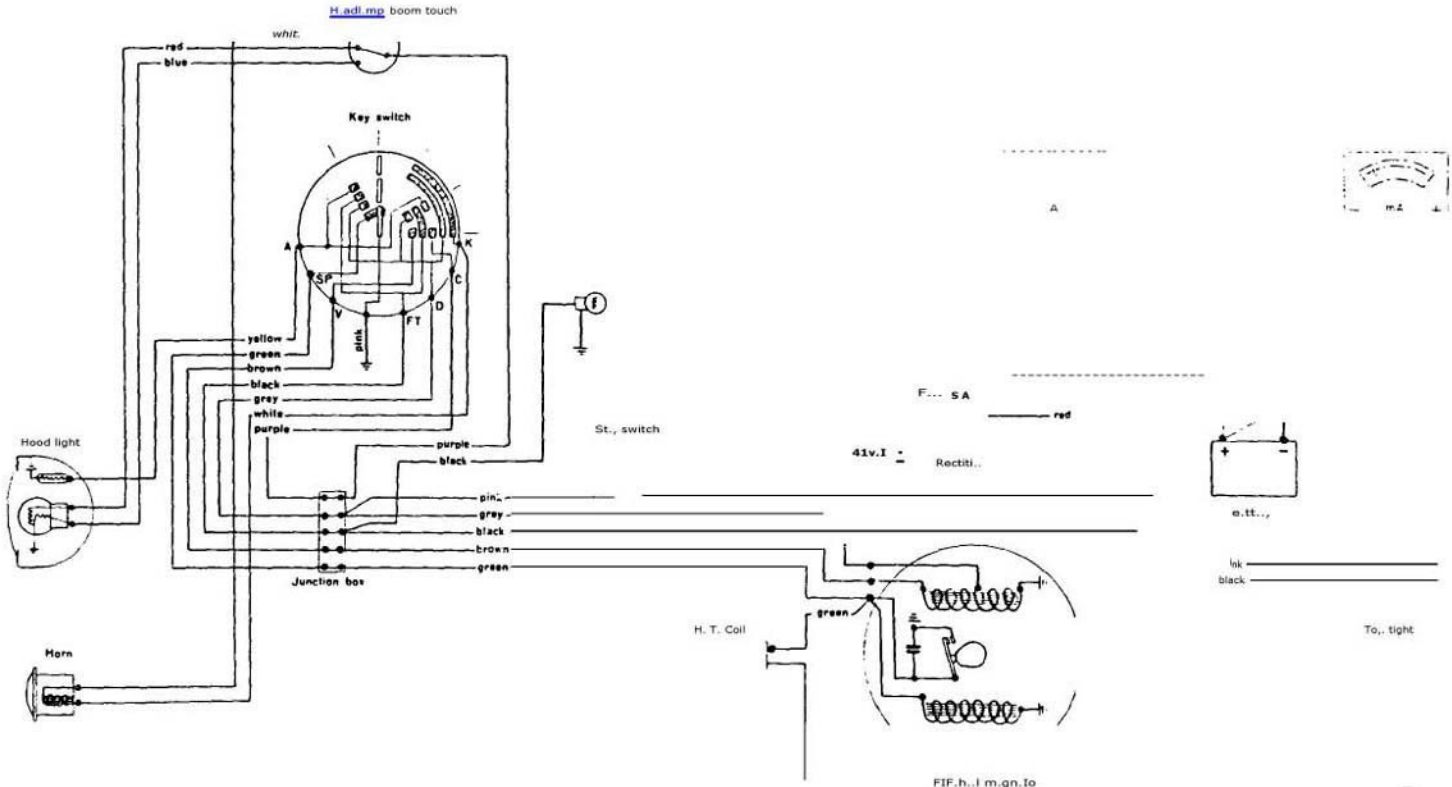


Fig. 43

Checking of the battery charging circuit

Checking of the inverse current

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. 43. Start engine and keep main switch key in the position of day riding. At the under-mentioned speeds checked with a rev. counter placed on the flywheel lock nut, the ammeter should read for a good functioning as follows:
1.5 amp. at 4000 revs.
3 amp. at 6000 r.p.m.
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 remagnetised or replaced.

If there is no charging current, check 5 amp. fuse. If this is burnt change it.

CHECKING OF THE INVERSE CURRENT.

The checking of the inverse current from the battery to the 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 u day parking » position i.e. vertical. Connect positive terminal of the milliammeter to the positive terminal on the battery, and connect the negative terminal of the meter to the cable from the main circuit to the battery. See Fig. 43. Ensure that the 5 amp. fuse is properly fitted into its clips, as a bad contact of this can give erroneous reading. The maximum amount of current acceptable is 3 mA. Should the current be higher than this value the cause could be traced to:

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

FUSE

The fuse is accessible by removing the rectifier cover. Place the main switch key in the first position towards the left, press the foot brake pedal, and should the lights remain off check if fuse has burnt. In such a case check to find the reason for this and then replace it.

CHECKING OF INSULATION AND CURRENT CONTINUITY

— On the pre-mod. machines cisconnect the blue wiring on terminal 3 of the rectifier; on the post-mod. machines disconnect the blue wiring on the terminal 1 of the rectifier.

- Open up rear lamp and remove the three bulbs.
- Dismantle headlamp and remove the two bulbs.
- Disconnect the speedo bulb **black** wire from the junction box. (Do not disconnect any other wire).

Checking of insulation and current continuity

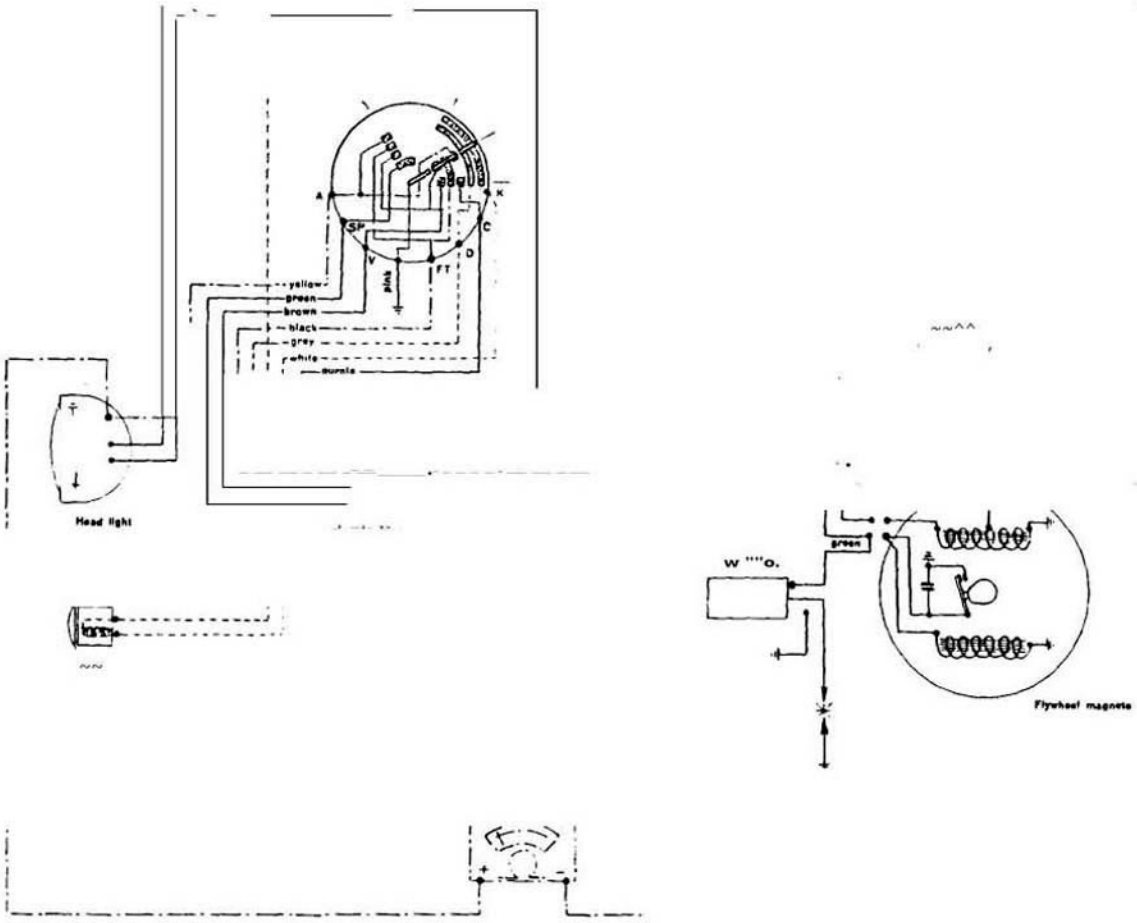


Fig. 44

Checking of battery, stop lights and horn circuit

Checking of pilot and tail light circuit

Disconnect the red wire from the positive battery terminal.

Disconnect the single brown wire (pre-mod. machines) or the two brown wires (post-mod. machines) from the L.T. socket on flywheel.

Disconnect the two green wires from the low tension socket and connect them together, if this is not already so.

Disconnect the H.T. coil earth wire.

1) Battery stop **light and Horn circuit.** See Fig. 44. Place main switch key into the parking light position (second to the right from vertical).
Insert circuit tester between the battery terminal and the stop-light wire... by pressing rear brake pedal the circuit tester should show current continuity, when the pedal is released a good insulation should result.
Now insert the circuit tester between the battery wire and the earth; this should show good insulation; when pressing the horn button continuity should result.

2) Rear **light and Pilot light circuits.** See Fig. 44. Place main switch key in the same position as above. Insert circuit tester between the rear light wire and the pilot light wire... continuity should result. Now connect one of the circuit tester's terminals to earth and this should show a good insulation.

3) **AC Lighting and Headlamp Bulb circuit.** See Fig. 45.
Place the main switch key in the Headlamp i.e. furthest position to the right.
Connect one of the terminals of the circuit tester to the disconnected brown wire from the L.T. socket on flywheel, connecting the other circuit tester wire to one of the two contact pieces of the headlamp bulb.
By moving the two way switch on the handlebar one should have alternatively current continuity or good insulation.
Connect now one of the circuit tester terminals to earth and a good insulation should result.

4) Ignition earth switch earth primary H.T. Coil feed Circuits. See Fig. 45.
Insert circuit tester between the earth and the H.T. Coil terminal from which the earth cable has been detached. Current continuity should be given when switch is placed in the two parking positions and good insulation when the switch is placed in the three running positions.

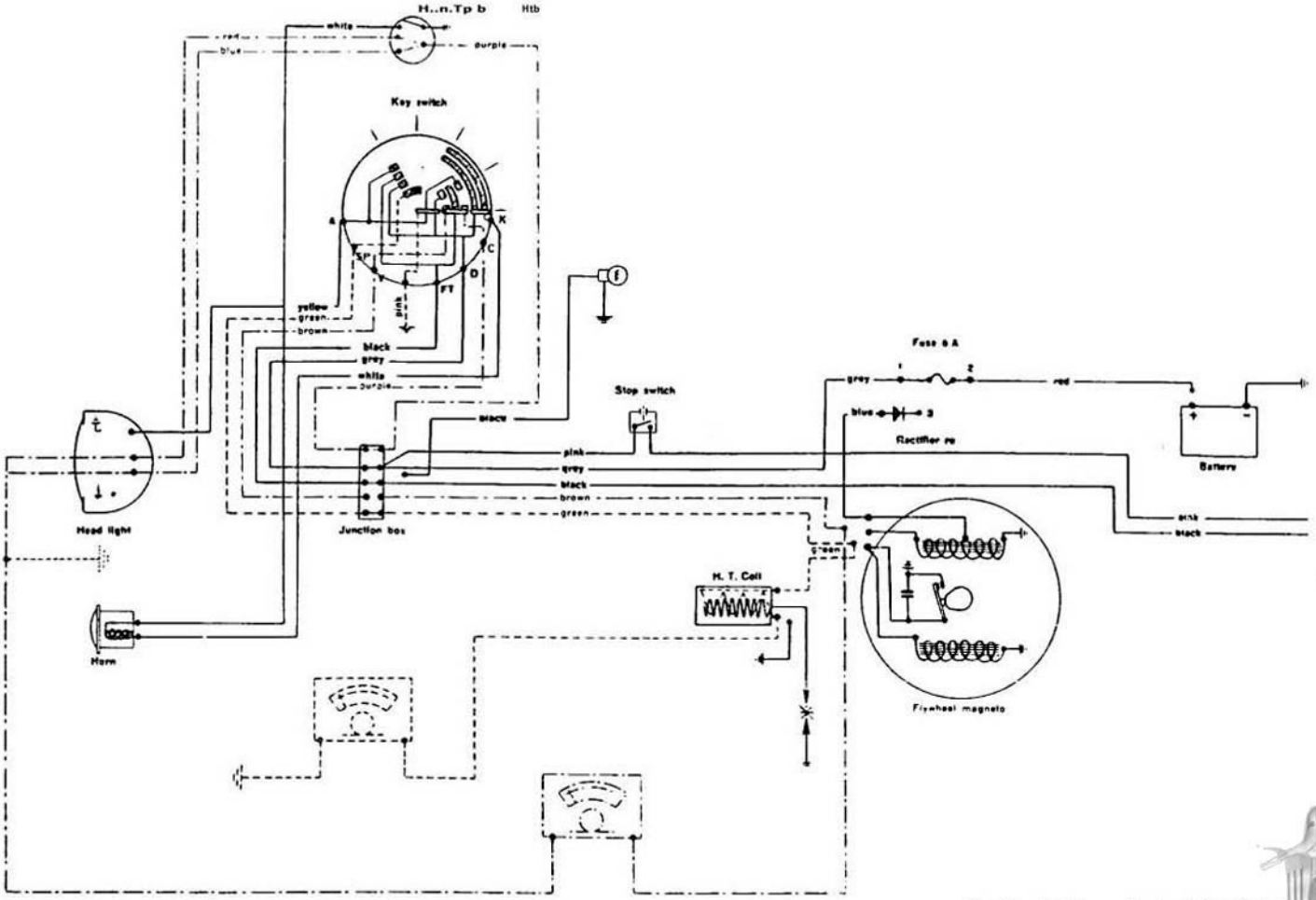


Fig. 45

Checkina of ionition and main switch e[illegible]
and H. T. coil circuit

Cheacking of the A. C. lighting circuit
and headlamp bitux bulb circuit

THE CARBURETTOR

Dell'Orto - MB 23 BS 5

Maximum Jet	105
Starter Jet	60
Minimum Jet	45
Atomizer	240 B
Choke	23

Choke **Control.** Rotate choke lever on the right hand side of the main body by half a turn.

Main Jet **Needle.** This needle has three notches for adjustment purposes. Normally this needle should be held in the second notch for normal running.

Main Jet. Situated under main 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.

Low **running adjustment screw.** Used for fixing the slow running.

Fuel filter. Incorporated in the float chamber cover.

Air filter. With rubber diaphragm.

Air intake from Still air chamber, and filtering element of sieei wool.

Check and ascertain that the carburettor is fitted with a float chamber in a perfectly vertical position with respect to the ground and that both manifolds be tightly fitted to avoid air leaks.

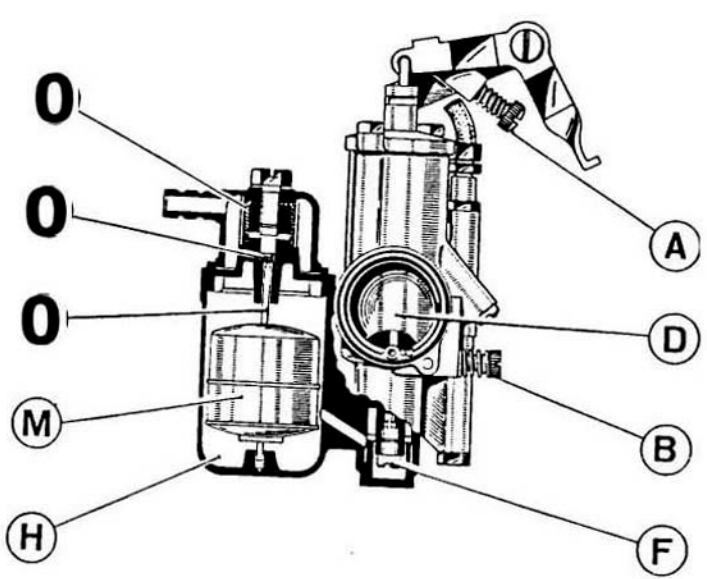
ADJUSTMENT OF THE SLOW RUNNING

This must always be done with a hot engine. The adjustment of the slow running is carried out through two screws, one which adjusts the closing of the throttle Fig. 46 screw A. By screwing this in the throttle will open. The other screw is for adjusting the amount of air Fig. 46 B, it controls the quality of the mixture which is formed at the exit of the slow running jet. (By closing the screw the mixture is made richer, by unscrewing the mixture is made weaker).
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.

Carburettor Dell'Orto MB 23 BS 5



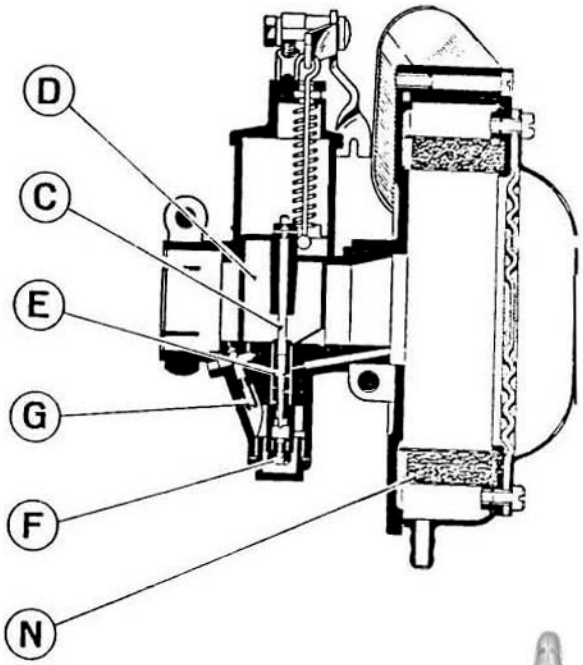


Fig. 46

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 dismantle the Carburettor completely and clean *very* thoroughly its 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. 46.

Throttle Slide D. This should move freely in its seat without excessive play; should there be excessive play or wear, replace.

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

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

Main pilot and starter Jets. Great care must be taken so that the calibrated holes of these Jets are not interfered with.

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 with new parts, ensuring however, that the Float N is not overweight.

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

SERVICING DURING GUARANTEE PERIOD

SERVICING WHEN NEW

Listed hereunder are the servicing details to be carried out during the initial stages of the machine's life.

Distance in Miles.	Operations to be carried out.	Op. No.
300 (500 Km)	Lubricate.	
	Clean Carburettor	101
	Cleanin and adjusting Contact Points	102
	Checking battery acid density and level	103
	Adjust brakes	104
	Adjust Clutch	105
	Check Cylinder Head Nuts and exhaust silencer ring	106
900 (1500 Km)	Lubricate.	
	Adjust gear change cables	107
	Verify and check wiring circuit	108
	Check battery liquid, density and level	103
	Adjust brakes	104
	Change Engine Oil	109
	Clean petrol tap filter and check reserve device	110
2500 (4000 Km)	Lubricate.	
	Clean cylinder head, piston inlet and exhaust ports	112
	Clean, check and adjust contact points	102
	Check battery acid, density and level	103
	Check and adjust steering	113
	Clean Silencer	114
3700 (6000 Km)	Check efficiency of front and rear shock absorbers	115
	(NOTE: We suggest that de-carbonizing should not be necessary before 6,000 Km)	

OP. 101 CLEANING OF CARBURETTOR. See paragraph under Carburettor Maintenance Page 54 Check carburation is correct with special reference to the adjustment of the slow running.

102 CLEANING AND ADJUSTING OF CONTACT POINTS: Follow Operation No. 1, 20, 21, 28, 29, 73.

» 103 CHECK BATTERY ACID DENSITY AND LEVEL. (To dismantle Battery see Op. 53. The liquid should be five mms. higher than the top of separators. If the level is lower add distilled water. Measure density of acid which should be 1.26 $g./cm^3$ equal to 30° Be. If the density is lower charge battery until this has reached prescribed value.

» 104 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.

» 105 ADJUST CLUTCH. The clutch must be adjusted in such a way that it will begin to slip when the clucth lever is in the position illustrated in Fig. 47. The adjustment is carried out by means of the cable adjuster fitted at the crankcase end of the cable.

106 CHECK CYLINDER HEAD NUTS AND EXHAUST PIPE RING NUT. CARRY OUT OPERATION 1, 2, 3, 8, 10, 20, 21, 22, 23 and ensure that the cylinder head nut, as well as the exhaust ring, are fully tightened.

Fig. 47

» 107 ADJUST GEAR CHANGE CABLES. This is carried out through the adjusters placed on the crankcase in such a way that when the gear is in neutral the gear indicator on the handlebar points to zero. Check the correct engagement of all gears. Cables should not be too strained because this might bring about the tightening of the gear control on the handlebar.

Op. 108 CHECK ELECTRICAL CIRCUIT. Using wiring diagram on Page 40.
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.
Ensure that the stop light functions when pressing the brake pedal in all positions of the main switch.
Check the functioning of the two-way headlamp switch on the handlebar with the main switch key in the fourth position to the right.
Check the efficiency of the horn with the main switch key in the three driving positions by pressing horn button on two-way switch.

109 CHANGE ENGINE OIL. Drain oil when engine is warm through the appropriate drain plug. When this has been done close drain plug, add approximately 1/8 pint of fresh oil through the filler plug hole, rotate engine for a few minutes, drain completely through drain plug. Reinsert and tighten drain plug and pour oil until this starts to flow from the oil level hole, fit plugs of both. The approximate quantity of oil needed is 2 1/2 pints of standard SAE 30 oil in normal climates or SAE 50 in hot climates.

» 110 - CLEAN PETROL TAP FILTER AND CHECK RESERVE DEVICE. Carry out operation No. 54, 55, 56 & 57, wash filter in petrol. Check petrol tap to ensure that all holes are clean and the reserve control works efficiently.

Op. 111 - CHECK TYRE PRESSURES. Front 14 lbs./ sq.in. Rear. With driver only 21 lbs./ sq.in., With driver & pillion passenger, 35 lbs./ sq.in.

• 112 - CLEAN CYLINDER HEAD PISTON INLET AND EXHAUST PORTS. Carry out Op. 1, 2, 3, 8, 10, 20/26 and decarbonise.

• 113 - CHECK AND ADJUST STEERING. Carry out Op. 50 and tighten steering adjustment ring and ball race ring so as to eliminate any front fork axial play.

• 114 - CLEAN EXHAUST SILENCER: Carry out Op. 1, 2, 3, dismantle silencer from machine, remove exhaust extension, exhaust tube and plug. Use a flame for burning carbon deposits then tap the silencer so that these carbon deposits fall out of the apertures.

• 115 - Check front and rear shock absorbers. Ascertain that the suspension on the machine is satisfactory but should the shock absorbers work abnormally replace with new ones returning the faulty ones to the Concessionaire.

STANDARD REPAIRS AND TIMES

STANDARD REPAIRS AND TIMES

The following Table gives a list of the most common repairs, showing the operation numbers for the dismantling, repair and refitting. Naturally the reassembly of the parts is carried out inversely to the dismantling.
The times shown against each operation are only an indication and refer to the nett time required by a specialised mechanic.

Fig. 48

Repair	Operations necessary	Time
REPLACEMENT OF SMALL END BUSH	Op. No. 1, 2, 3, 8, 10, 20/27, Fit reamering tool 58873 as shown in Fig. 48 Fit this Tool as follows: - Slide it on to the cylinder studs - Insert bush extractor to centre in connecting rod - Loosen internal locking screw so that it comes into light contact with the connecting rod. Screw in external screw 'and knock connecting rod. Withdraw extractor - Lock the tool on to the studs by means of four distance pieces and cylinder head nuts - Insert new bush on to extractor insert extractor into the tool and proceed to extract the old bush while fitting at the same time the new bush - Withdraw extractor, insert reamer and proceed to the reamering of the new bush - Free the connecting rod, dismantle tool. The old bush which has remained during the reamering inside the locking screw can now be extracted from the Tool.	33 miss
SUBSTITUTION OF PISTON	Op. Nos. 1, 2, 3, 8, 10, 20/27	25 mins.
REPLACEMENT OF CRANKSHAFT DRIVE SIDE OIL SEAL	Op. 1/14, 37, 38, extract circlip and remove oil seal	48 mins.
SUBSTITUTION OF CRANKSHAFT FLYWHEEL SIDE OIL SEAL	Op. 1, 20, 21, 28 to 36, first part	19 mins.
REPLACEMENT OF CRANKSHAFT	Op. 1114, 20/39	74 mins.
REPLACEMENT CLUTCH DISCS	Op. 1/14	42 miss
SUBSTITUTION OF TORQUE DAMPER	Op. 1 / 13	34 mins.
REPLACEMENT OF CLUTCH SPRING ON KICK START GEAR	Op. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16	41 mins.
REPLACEMENT OF GEAR CHANGE BALL BEARINGS	Op. 1 / 13, 15, 17/ 19	49 mins.

Repair	Operations necessary	Time
REPLACEMENT OF REAR WHEEL SHAFT OIL SEAL	Op. 1: place machine on a wooden support; Op. 17, 18 but do not tap shaft to withdraw from bearing. Remove dust protection washer, slide out distance piece by means of a thin pair of pincers then extract the oil seal with the help of a screwdriver	10 mins.
REPLACEMENT OF SPEEDO CABLE	Op. 41, 42 (without removing speedometer) 44, 45; unscrew ring fixing drive to brake back plate, remove cable from speedo and replace	13 mins.
REPLACEMENT AND TIMING OF FLY-WHEEL MAGNETO	Op. 71, 28/34; carry out reassembly of Op. 34/31 and proceed with timing Ops. 73 to 76	33 mins.
REPLACEMENT OF FRONT WHEEL BEARING	Ops. 60, 61, 67, 68, 69, 70	10 mins.
REPLACEMENT FRONT FOR SUSPENSION SPRINGS	Ops. 60/66 without removing the spring guide in fork tube	13 mins.
REPLACEMENT OF FRONT FORK	Loosen front brake cable clamp on front wheel, disconnect cable. Disconnect speedometer cable at the front wheel end; follow Ops. 41, 42 (without dismantling speedo), 51, 61/66; disconnect control cable and remove front mudguard (10 mm spanner)	37 mins.
REPLACEMENT OF FRONT MUDGUARD	Op. 44, 45 and remove mudguard from headlamp casting	12 mins.
REPLACEMENT OF REAR SUSPENSION	Op. 1, 8, 10 and remove shock absorber	4 mins.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INSTALLATION TOLERANCES & WEAR LIMITS FOR CYLINDER & PISTON

See Fig. 49

Operat.	Grading	CYLINDER		PISTON			PLAY AT FITTING	WEAR LIMIT
		Part No.	C O	Part No.	A O	B O		
	–	1501 1010/-	60,0 $^{0}_{+0,006}$	1 5012080/-	59,8 $^{+0\,045}_{+0,051}$	$^{+0,050}_{+0,056}$		
	0	1 501 1010/0	60,0 $^{+0,007}_{+0,013}$	1 5012080/0	59,8 $^{+0\,052}_{+0,058}$	59,9 $^{+0,057}_{+0063}$		
		1 5011010/+	60,0 $^{+0,0}_{+002_0}$	1 5012080/+	59,8 $^{+0,059}_{+0,065}$	59,9 $^{+0,064}_{+0,070}$		
			60,2 + 0,006	1 5012090/-	60,0 + 001	60'1 +0056	Max. D - 0,056	D-0,180
	0		60,2 $^{+0,007}_{+0,013}$	1 5012090/0	60,0 + 0osc	60.1 + 0 0a3		
	+		60,2 + 0,020	1 5012090/+	60,0 $^{+0,059}_{+0,065}$	60,1 $^{+0064}_{+0,070}$		
	–		60,4 + 0,006	1 5012100/ _	60,2 $^{+0,045}_{t\,0,051}$	60,3 $^{+0050}_{+0,056}$		
	0		60,4 + 0,007	1 5012100/0	60 2 $^{+0,052}_{+0,058}$	60,3 $^{+0,057}_{+0,063}$	Min. D = 0,044	
	+		60,4 + 0,020	1 5012100/+	60,2 + oohs	60,3 + 0,070		
	–		60,6 + 0,006	1 5012110/-	60,4 $^{+0,045}_{+0,051}$	60,5 $^{+0,050}_{+0,056}$		
	0		60,6 $^{+0\,07}_{+0,013}$	1 50121 10/ 0	60 4 $^{+0,052}_{+0,058}$	60 5 $^{+0,057}_{+0,063}$		
	+		60,6 + 0,020	1 50121 10/+	60,4 $^{+0,059}_{+0,065}$	60,5 $^{+0,064}_{+0,070}$		

Note: The prescribed roughness is obtained as follows:

1 Bore 0,05=0,07 mm. undersize

2 Finish by honing with abrasive nr. 180

3 Spread a mixture of emery nr. 80 and petroleum on the inside surface of cylinder and keep passing up and down with helical movement a piston of same nominal diameter as cylinder until piston is moving free-use an old piston without rings. Fit on it a connecting rod as handel.

4 Wash out very carefully cylinder and ports with pressure water. Immediately after plunge cylinder in petroleum.

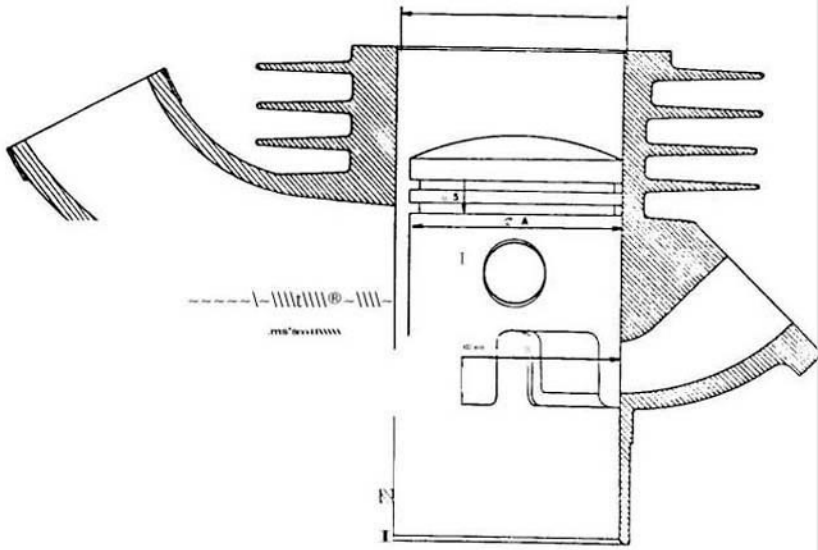

Fig. 49

INSTALLATION TOLERANCES & WEAR LIMITS BETWEEN PISTON & GUDGEON PIN.

See Fig. 50

OPERATION	PISTON	GUDGEON PIN		WEAR LIMIT
		Part No.	O B	
Standard fitting	16,0 006	15012024	16.0 +0,002 0.003	0,010
1st oversize	16,1 g	15012031	16,1 0: 002 + 0003	
2nd oversize	16,2 -0,006	15012032	16,2 +0,002 − 0,003	

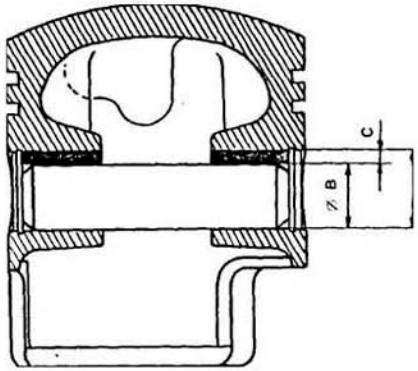

Fig. 50

INSTALLATION TOLERANCES & WEAR LIMITS BETWEEN GUDGEON PIN AND SMALL END BUSH

See Fig. 51

OPERATION	SMALL END BUSH		GUDGEON PIN		PLAY AT FITTING C		WEAR LIMIT C
	Part No.	A	Part Jo	ØB	max.	min.	
Standard fitting	15012005	16,0 +0,022	15012024	16,0 +0,003	0,030	0,01	0,050
1st oversize	[illegible]	16,1 +0,016 +0022	15012031	16,1 +0,002 -0,003			
2nd oversize		162 +0016 +0,022	15012032	16,2 +0002 -0,003			

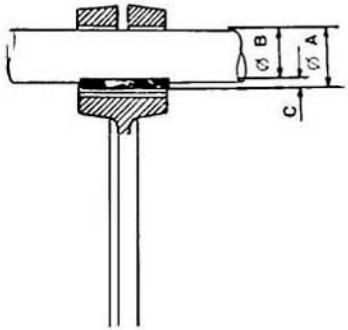

Fig. 51

INSTALLATION AXIAL PLAY & WEAR LIMITS BETWEEN PISTON RING GROOVE & RINGS

See Fig. 52

PISTON GROOVE	HEIGHT OF GROOVE D	RING THICKNESS E	PLAY ON FITTING F		WEAR LIMITS F
I	2,5 $^{+0,07}_{+0,04}$	2,5 $^{0}_{-0,025}$	0,095	0,04	0,15
II	2,5 $^{+007}_{+0,02}$		0,095	0,02	

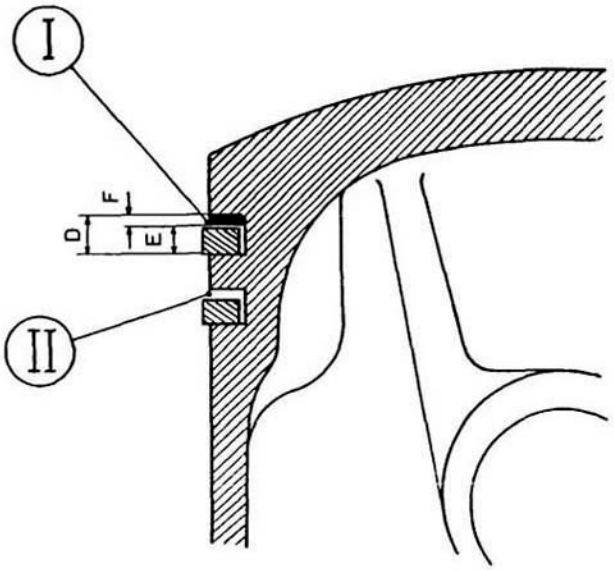

Fig. 52

INSTALLATION TOLERANCES & WEAR LIMITS FOR RING END GAP

See Fig. 53

RING PART No.	NOMINAL OUTSIDE DIAMETER 1 O	RING GAP G	WEAR LIMIT G
15012025	60,0	$0{,}25^{+0{,}15}$	0.8
15012026	60,2		
15012027	60,4		
15012028	60,6		

Fig. 53

INSTALLATION TOLERANCES & WEAR LIMITS BETWEEN CRANKSHAFT & CONNECTING ROD BIG END

See Fig. 54

Width of crank pin A	Connecting width of rod big end B	Play at fitting C		Wear limits C
		max.	min.	
14 -0,110	13,8 -0,075	0,275	0,122	0,40

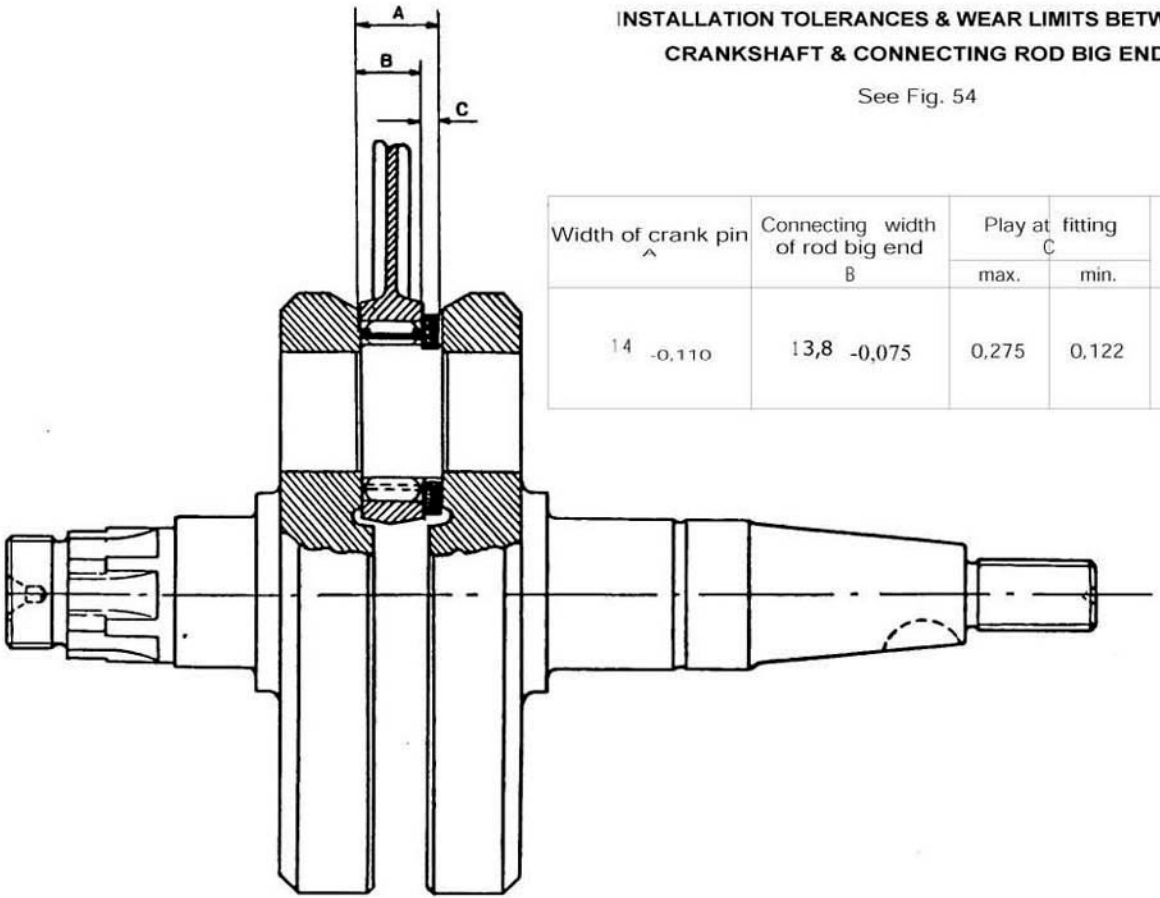

Fig. 54

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 cLses 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 must be straightened 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 and its colour a very dull red.

Carry out the straightening and the dimensional control. (for the fork see page 70), (for the frame see page 76) 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 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 petroleum. 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 petroleum 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 check of the part as well as acting as a vice for the part during the straightening.

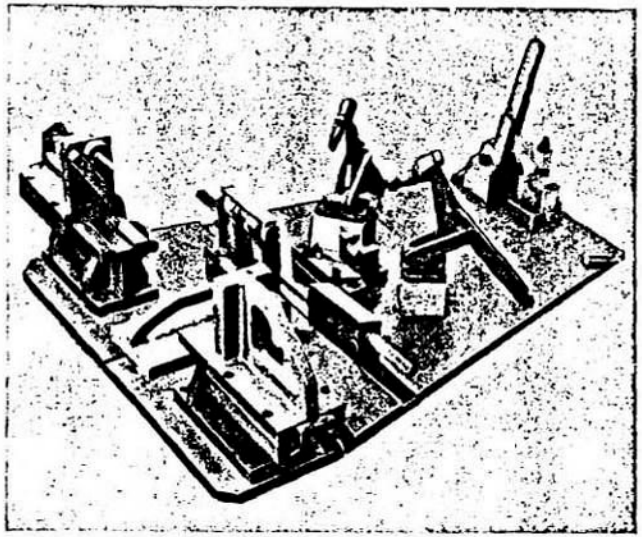

Fig. 55

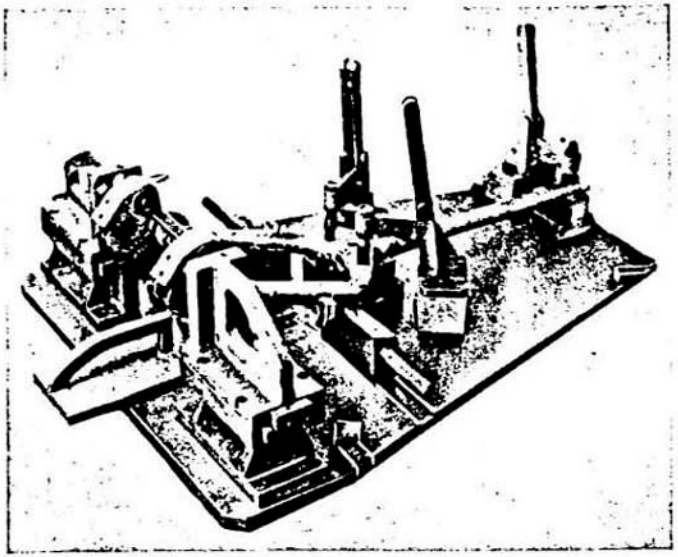

Fig. 56

a) STRAIGHTENING OF THE FORK Jig No. 59651 Fig. 55. 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 retention during the actual straightening. To carry out the dimensional check of the fork this should be locked in the Jig, see Fig. 56. The fork can be accepted as dimensionally correct when:

1) The central slide carrying the checkpin 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 manner possible. A further support can be given to this through the sliding blocks. Avoid hitting the supension 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.

b) STRAIGHTENING OF STEERING COLUMN END OF FRAME Jig No. 58927 Fig. 57.

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 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, 58.
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 con-

Fig. 57

ditions are not obtained, then the deformation of the frame has extended also to the horizontal part of the frame tube 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 gauges come into contact with the steering column. (Should the steering

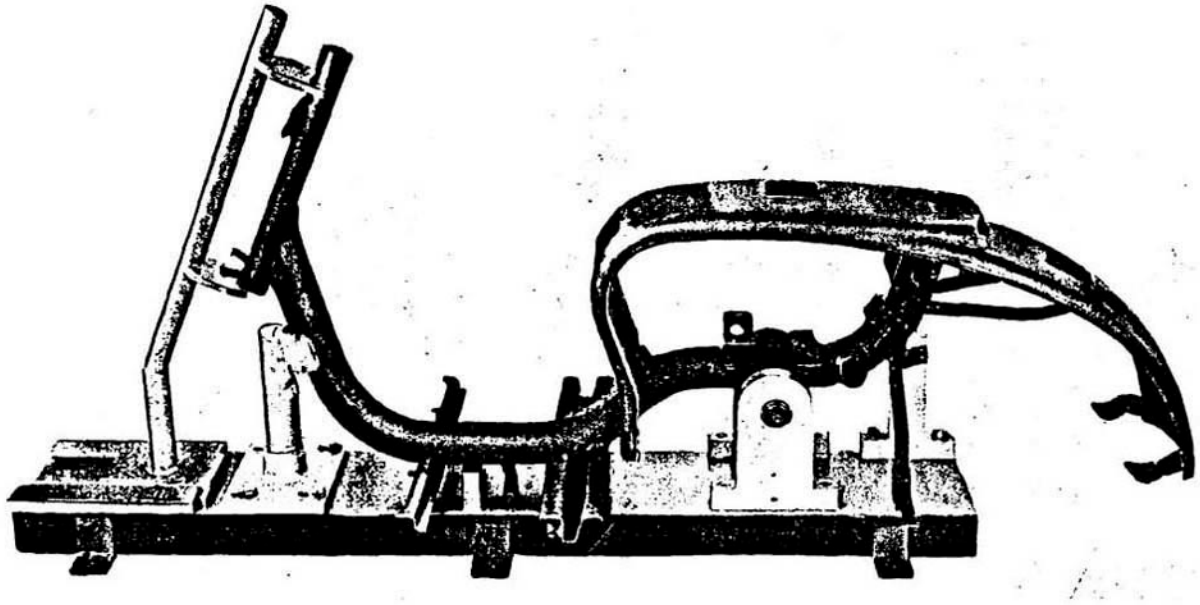

Fig. 58

column of the frame not enter between the two fork gauges due to deformation proceed with a quick straightening by sight after having locked the frame into the sleeve. After the straightening free the frame from the sleeve again before continuing 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 (± 5 mm). Furthermore the lower part of the steering column must be within the limits shown on the lower fork check point i.e. ± 3 mms.

The checking of the longitudinal inclination of the steering column is carried out by means of two fork type pointers.

Fig. 59

When one of these above 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. 60.
The difference between these two thicknesses 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 accurately to the rules explained at the beginning of this chapter.

Fig. 60


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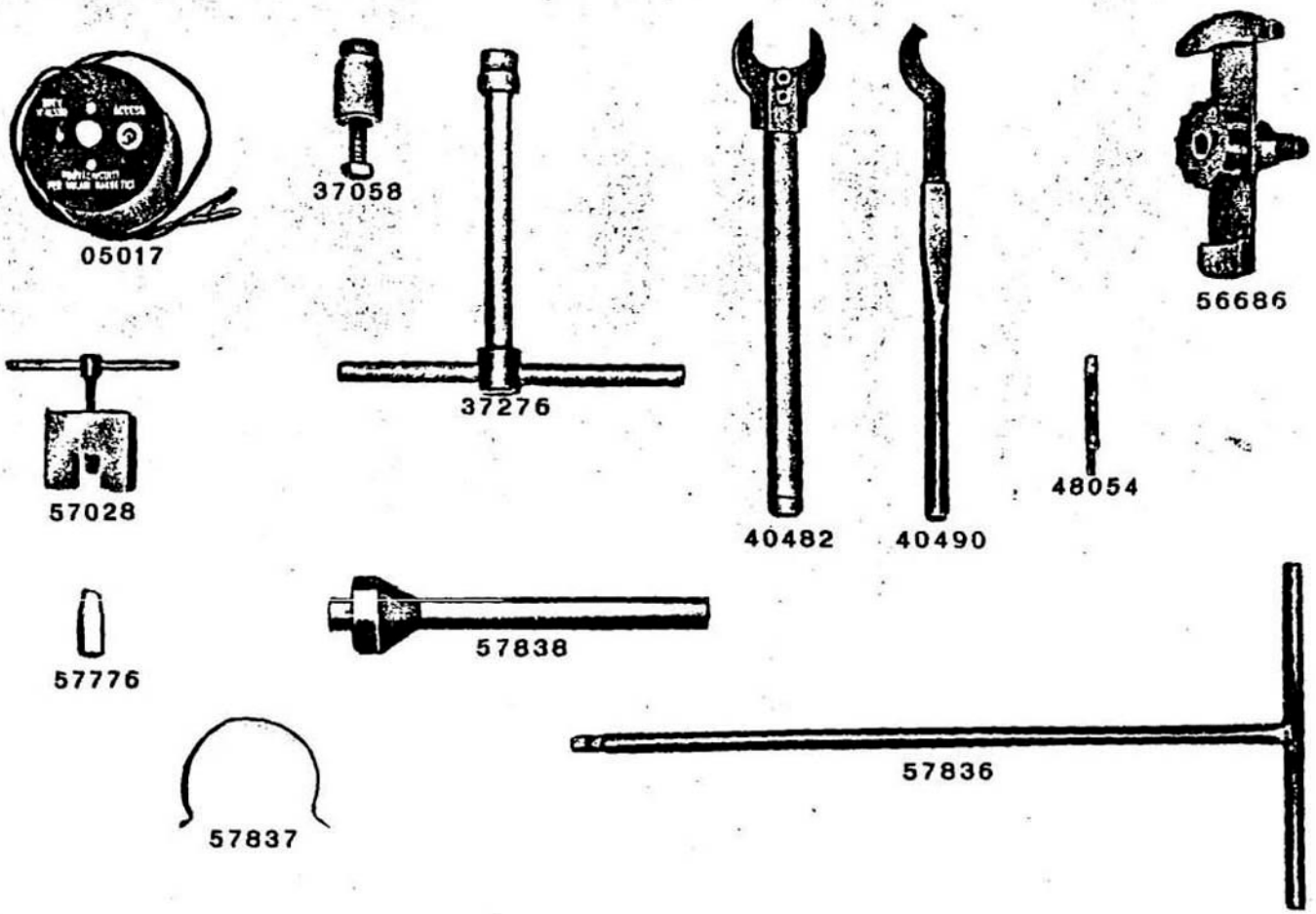

Fig. 61

Fig. 62

INDEX

INDEX