

Part 3

REPAIR INSTRUCTIONS

Section 1

ENGINE

DISMANTLING OUT OF FRAME

1. Loosen battery clamp screw. This disconnects battery from ground.
2. Loosen clamp screw of foot brake lever and take off brake lever.
3. Remove crankcase cover on the right-hand side after unscrewing the three retaining screws.
4. Turn rear wheel until chain master link appears. Remove master link, lift chain from gearbox sprocket, replace master link.
5. Screw adjusting screw of clutch lever (fig. 2/1) at engine block so far out that the clutch lever can be taken out of its guide, unhitch cable from slit in clutch lever. (Do not lose slit nipple!)
6. Remove cover for generator, disconnect generator cable from connection plate and pull it out of generator housing.
7. Unscrew nuts of upper rear engine mounting screw, lift fairing plate from screwing cover of carburettor housing, remove throttle piston and cover from Bowden cable.
8. Loosen mounting screw of flexible speedometer drive and remove it together with clamp of generator cables (fig. 1/5), pull out flexible speedometer drive.
9. Loosen shackle of carburettor and pull off carburettor, pull out throttle piston after unscrewing, unscrew slotted screw on the opposite side of the frame, remove fairing plate.
10. Pull plug cable from spark plug.
11. Undo the three cable straps holding Bowden cables and oil hose together, unscrew connecting screw of oil hose from engine block and pull it out, put open hose end quickly into filling hole of oil tank (fig. 1/1).
12. Unscrew nuts at exhaust pipe flanges (box wrench!), loosen clamp at tube supporting foot rests and remove exhaust pipes.
13. Unscrew nut of forward mounting screw of fuel tank and pull out screw (be careful not to lose spacers), unscrew lock nut and nut of rear fuel tank attachment and knock out screw lightly,

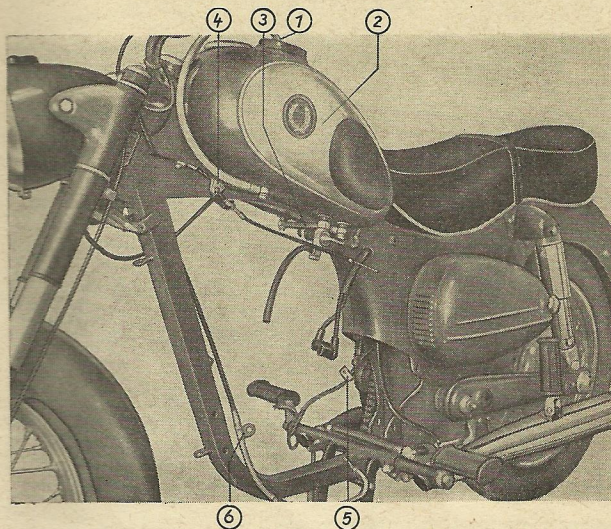


Fig. 1: Chassis after removal of engine

- | | |
|----------------------------------|---------------------------------------|
| 1 Oil hose put into filling hole | 5 Clamp of generator cables |
| 2 Fuel tank raised | 6 Clamp of guide tube of clutch cable |
| 3 Connecting hose | |
| 4 Cable lever | |

until holding washers release the tongues of the tank, so that the tank can be raised (fig. 1/2). Fix tank in raised position by pushing under it a hammer or wooden wedge that rests on the hand wheel of the steering damper. The connecting hose (fig. 1/3) permits this movement, so there is no need of draining off the fuel.

However, the engine is more easily accessible if the fuel tank is removed completely. For this purpose, drain off fuel and remove connecting hose (fig. 1/3).

14. Detach Bowden cable for oil pump from lever on upper frame support (fig. 1/4).
15. Unscrew lock nut of engine mounting screw (top, front), remove clamp of guide tube for clutch cable (fig. 1/6), pull guide tube out of crankcase.
16. Unscrew nuts of the engine mounting screws, pull out screws, remove both tongues of forward engine support.
17. Raise front part of engine block slightly so that rear attachment becomes free, lift engine out

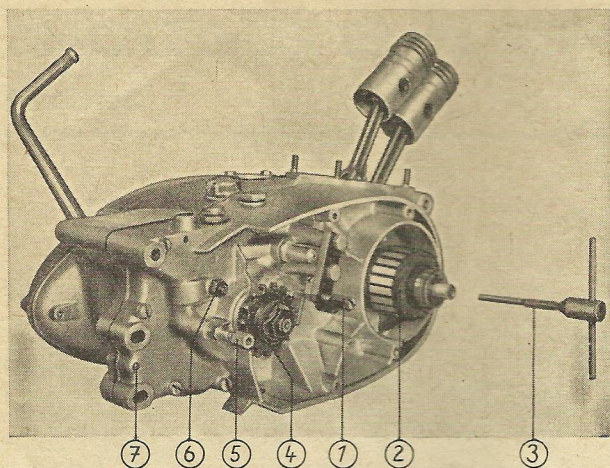


Fig. 2: Engine block, right side view

- | | |
|-----------------------------------|--|
| 1 Adjusting screw of clutch lever | 4 Gearbox sprocket |
| 2 Armature of generator | 5 Stay bolt |
| 3 Armature extractor screw | 6 Nut of speedometer gear spindle bolt |
| | 7 Stud of crankcase |

of frame. If the fuel tank has been removed, lift it out to the left; if the tank has only been raised, raise engine block a bit and remove it to the right (on account of the fuel cock).

DISMANTLING ENGINE (using the Engine Repair Stand No. 250.7017):

Cylinder head:

1. Unscrew spark plugs.
2. Unscrew cylinder head screws by means of box wrench (spec. tool No. 250.7015) (proceeding crosswise from outside to inside) and lift off cylinder head, taking care not to damage the gasket.

Cylinder and pistons

1. Unscrew nuts of cylinder base flange and lift off cylinder, taking care not to damage the pistons now falling forward against the crankcase with the connecting rod.
2. Mark the pistons, remove snapping from face of wrist pin by means of round-nose pliers, push out wrist pin, but be careful not to interchange them, and take off piston. (Do not knock out the wrist pin. If necessary, use special tool No. 250.7020.)

On no account should the skirt of the piston be cleaned by removing the oil carbon, even if it is quite black. The piston rings must move freely in their grooves. Do not remove piston rings without good reasons! Rings that are stuck and their grooves should be thoroughly cleaned of carbon. When removing the piston rings, do not damage or unduly stretch them. Do not interchange them and put them back into their correct position. Rings blackened along the greater

part of their circumference indicate their failure to provide a gas-tight fit and should be replaced by new rings.

Crankcase cover, left-hand side

1. Unscrew clamp screw of foot-operated gear-change lever and pull off gearchange lever.
2. Unscrew camping bolt of kickstarter lever, take off lever (do not lose thrust bolt with spring) and pull the hub of the kickstarter lever off its shaft.
3. Unscrew retaining screws of the left-hand crankcase cover and remove cover. Do not damage the mating surfaces! Do not lose thrust washer of kickstarter shaft!

When removing crankcase cover, the oil will drain out, so place a fan underneath engine!

Clutch, gearbox sprocket and generator

1. Unscrew the five collar nuts retaining the clutch springs, using a screw-driver with recess. For this purpose the spring retainers must be lifted from their retaining grooves by means of another screw-driver (see fig. 3). Remove clutch thrust plate and clutch discs. Take out compression pins and ball.

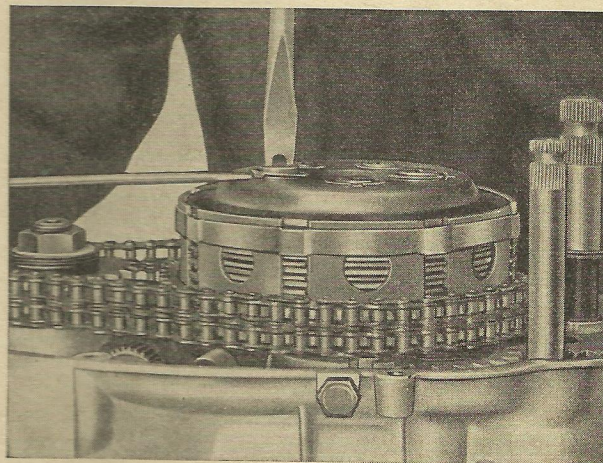


Fig. 3: Unscrewing the collar nuts

2. Insert clutch hub holder (spec. tool No. 253.7014 consisting of some old clutch discs welded together) and chain sprocket clamp (Part No. 253.7031). On the right side of engine block first unscrew stay bolt (fig. 2/5), then flatten lock disc of the retaining nut of the gearbox sprocket (fig. 2/4). Unscrew nut and remove sprocket with extractor tool (Part No. 250.7013). Remove cotter pin (Woodruff key).
3. Remove carbon brusher of generator, unscrew mounting screws and remove base plate. Remove the armature (fig. 2/3) by means of the extractor screw (Part No. 22733) (fig. 2/3).
4. Clutch hub holder and chain sprocket clamp remain in position. Now flatten lock discs of the

clutch hub retaining nuts and of the engine sprocket. Unscrew nuts of the clutch hub with the socket wrench (fig. 4) and pull clutch hub from the shaft.

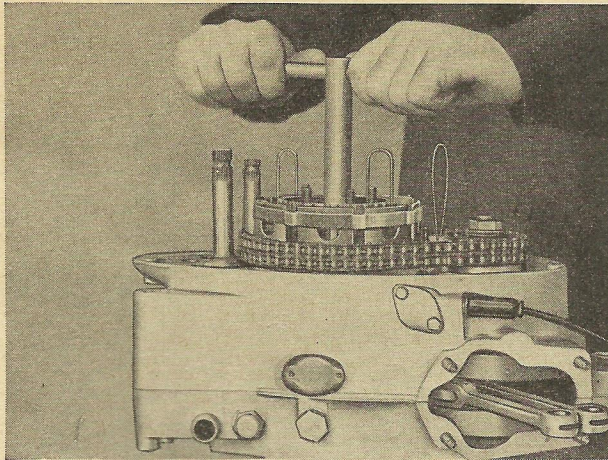


Fig. 4: Dismantling the clutch Unscrewing the hub locking screw

Unscrew retaining nut of the engine sprocket and remove the sprocket with the extractor tool (Part No. as above) (fig. 5).

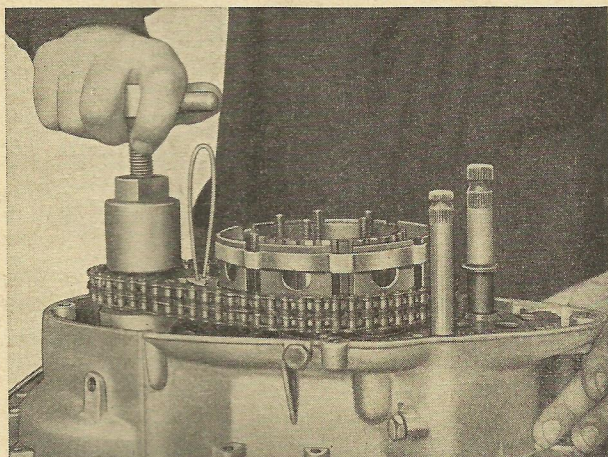


Fig. 5: Extracting the engine sprocket

Now engine sprocket, primary chain and clutch drum can be removed simultaneously. Remove bushing and thrust collar clutch drum as well as woodruff key and spring washer from the crankshaft stub.

Starter

1. Remove dog clutch gear of kickstarter together with spring.
2. Remove snapping from intermediate gear and remove intermediate gear.

Oil pump

Remove safety wire, unscrew mounting bolts and take off pump.

Crankcase

1. Knock out both crankcase locating pins (fig. 2/7) with the aid of a drift pin.
2. Unscrew catch guide with catch and spring from the right-hand half of the crankcase.
3. Unfasten connecting screws and remove right-hand half of crankcase. As the crankshaft runs in a roller bearing in the right-hand half of the crankcase, this half can be removed without the aid of a tool. Under no circumstances should the two halves of the crankcase be separated forcibly by means of a screw-driver or a similar tool. If necessary, screw on extractor for crankcase (Part No. 250.7029) and pull off half of crankcase. (Be careful of the 0,1 mm [0,00394 in.] spacers underneath the races of crankshaft roller bearing and mainshaft roller bearing!)

Gearbox and Crankshaft

1. Pull out mainshaft (fig. 12/1) and remove mainshaft gears. Take thrust collar and roller bearing out of race in the left-hand half of the crankcase.
2. Remove gearshift rail with gearshift yokes.
3. Remove countershaft (fig. 10/1) with gears and thrust collar for the right-hand roller bearing. Take roller bearing out of race in the right-hand half of the crankcase.
4. After dismantling the gearbox the crankshaft can be pressed out. (Do not knock it out!)

Gearchange

This part should not be dismantled except in case of breakage, of any part failing to function properly, or for the purpose of getting the faces of the housing smoothed for a better gas-tight fit.

1. Unscrew the countersunk screw (fig. 9/7), now shim plates and spring housing (fig. 9/3) and shift guide plate with curved gates (fig. 9/8) can be removed.
2. Dismantle snapping from interior gear shift lever and remove the latter with ratchet wheel (fig. 8). Push out guide sleeve.
3. Unfasten countersunk screw (fig. 9/1) and nut (fig. 7/4) and remove supporting plate (fig. 7/1).

Speedometer drive

1. Unscrew nut (fig. 2/6) from speedometer gear-spindle bolt which carries the driving helical gear and press out spindle bolt.
2. Remove securing pin from driven helical gear by means of a punch, then remove helical gear downwards and pull out shaft upwards. The bearing bush should not be pressed out. If this is really considered necessary, the securing pin must be bored out.

Wash all engine parts in kerosene or other solvent. The mating surfaces of crankcase and cover are cleaned with the aid of a scraper.

To examine the gearbox there is no need to dismantle the left-hand crankcase cover and the clutch. The oil need not be drained either.

While the engine is still hanging in the frame and the driving chain has not yet been removed, the gearbox sprocket (brake rear wheel!) and the armature of the generator (engage gear and brake rear wheel!) are pulled off. The removed engine is laid on the left-hand case cover (all the oil runs into the clutch space), then the crankcase pins are knocked out and the crankcase connecting screws are unfastened. After removal of the right-hand half of the crankcase the gearbox is freely accessible.

For removing the kickstarter gears or the oil pump, as also for exchanging the front (engine-to-clutch) chain, the engine can be left in the frame. After dismantling the left-hand foot rest, the clutch lever and the kickstarter lever, the left-hand crankcase cover is removed. (Place a vessel underneath it to collect the oil flowing out.) Now the clutch is dismantled and removed together with the engine sprocket. Then the front chain can be exchanged, or the kickstarter gears or the oil pump can be removed. The oil pump should not be dismantled except for good reasons.

Pressing out of Bearings

When pressing out defective bearings, proceed as follows:

To avoid damaging the bearing seat through the processes of pressing them out and in, it is advisable to warm the crankcase to about 140° F. (about 60° C.), so that it feels warm to your hand.

a) Left-hand crankcase

1. Knock out worm drive of oil pump and exterior small ball bearing by means of a mandrel.
2. Press out seal ring and large interior ball bearing in the direction towards the crankcase with a mandrel whose diameter is slightly smaller than that of seal ring.

b) Right-hand crankcase

For pressing out the roller bearing employ special tool No. 250.7011.2 (fig. 6). The right-hand seal ring is pressed out only if defective.

Seal rings

With two-stroke engines a proper gas-tight seal of the crankcase is indispensable to efficient engine performance. The seals used are rings made of oil-proof rubber. The part adjoining the shaft must have a sharp edge. The tension of the spiral spring must be such as to make the ring fit snugly and tightly along its entire circumference. The shaft itself must be perfectly smooth, without play, and must not knock. For exchanging the seal rings as well as the bearings a press with suitable stamps and base-parts has to be used. When fitting these rings care must be taken not to tear their edges.

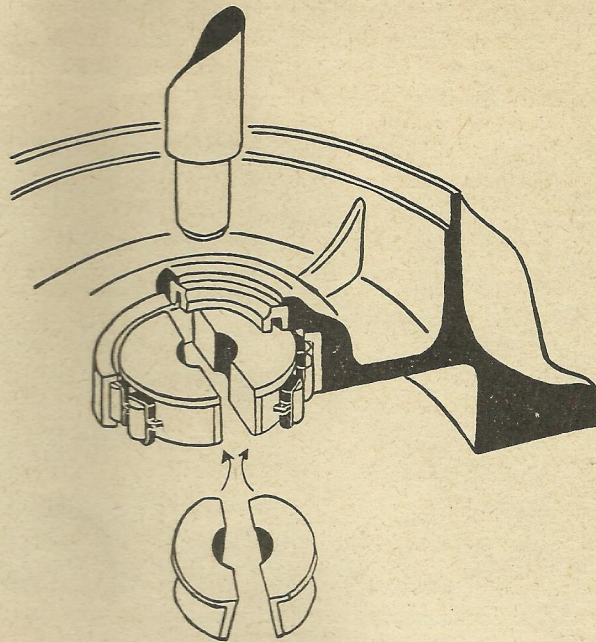


Fig. 6: Pressing out the roller bearing

ENGINE REASSEMBLING

Bearings

Test bearing for easy running lack of axial play and firm seating on shaft and in the housing. Bad fit on the shaft can be overcome by fitting a new bearing. If the seats in the crankcase have been damaged, a new crankcase will have to be installed.

a) Left-hand crankcase

1. Press in large interior ball bearing from inside.
2. Press in seal ring from outside, its sealing edge facing outward. The worm drive of the oil pump and the small exterior ball bearing are not assembled until the two halves of the crankcase have been screwed together.

b) Right-hand crankcase

1. Press in right-hand seal ring from inside with its sealing edge facing inward.
2. Press in first ball-bearing and then roller bearing from inside.

c) Crankshaft

Before pressing the crankshaft with its long journal into the left-hand half of the crankcase, oil the ball bearing. After the crankshaft has been pressed in, its axial play (0,00787 in.) has to be checked by means of a crankshaft distance gauge in the following way: Place the distance gauge (Part No. 253.1032.5 L 1) on the level surface of the left-hand crankcase and test if the measuring face marked (+) (35,5) touches the shoulder of the crankweb without play. If there is still some play, eliminate it by inserting 0,00394 in. thick spacers. Should it prove neces-

sary to use four or more spacers, the crankshaft had better be removed again an half the spacers inserted at the long shaft journal, so that the crankshaft remains well centered. The measuring should be carried out without the gasket.

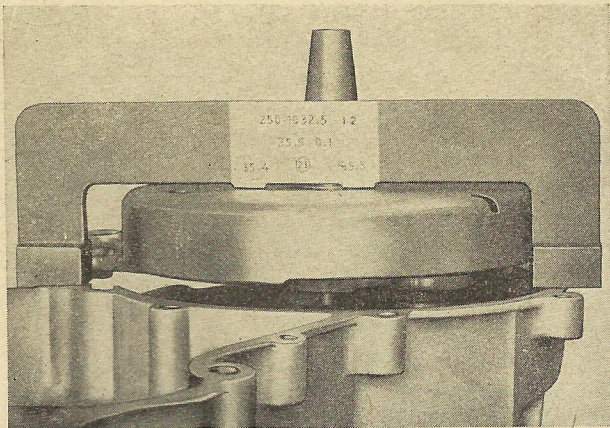


Fig. 6a: Distance gauge for crankshaft

Now press the race of the roller bearing on the shaft journal. If gear shift and gearbox are assembled, the right-hand half of the crankcase can be put in place and screwed down. Only when that has been done, the worm drive of the oil pump with the aperture facing inward, and finally the small ball bearing, can be pressed into the left-hand crankcase from outside.

Test crankshaft for easy running. If the turning is somewhat hard, give both journal ends some light taps with a rubber or light-metal hammer in an axial direction, whereupon it will run easily.

Speedometer drive

1. Insert drive shaft from above and push the driven helical gear into it from below. Insert and fasten securing pin.
2. Press in spindle bolt of speedometer gear and lock it by means of the nut. Pay attention to easy running of gears and shaft.

Gearchange

1. Assemble supporting plate (fig. 7/1) together with hairpin spring (fig. 7/2), put on securing disc (fig. 7/3) and screw on nut (fig. 7/4). Screw in countersunk screw (fig. 9/1) from outside and secure the latter by a blow with a blunt chisel, then tighten nut (fig. 7/4).
2. Insert guide sleeve in the bushing of the supporting plate (fig. 7/5), the slotted end pointing towards the interior of the gearbox, fit interior gear shift lever (fig. 9/2) and secure it from the outside by means of the snapping. Insert ratchet wheel in the position indicated in fig. 8 (fig. 9).
3. Install spring housing (fig. 9/3), spacer shim (fig. 9/4), disc (fig. 9/5) intermediate disc (fig. 9/6)

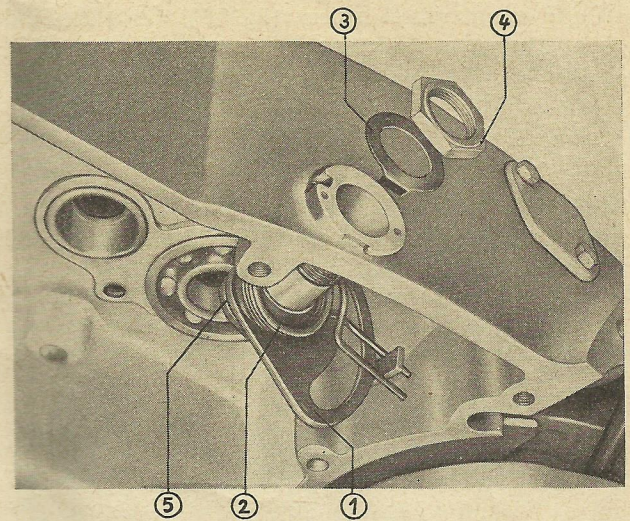


Fig. 7: Assembling the supporting plate

- | | |
|--------------------|---|
| 1 Supporting plate | 5 Bushing of the supporting plate to receive the guide sleeve |
| 2 Hairpin spring | |
| 3 Locking disc | |
| 4 Nut | |

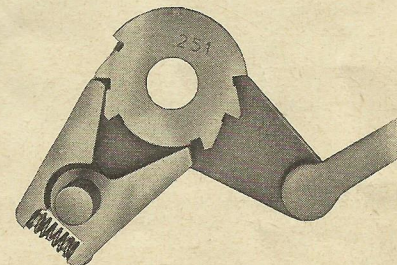


Fig. 8: Ratchet wheel of automatic gear shift

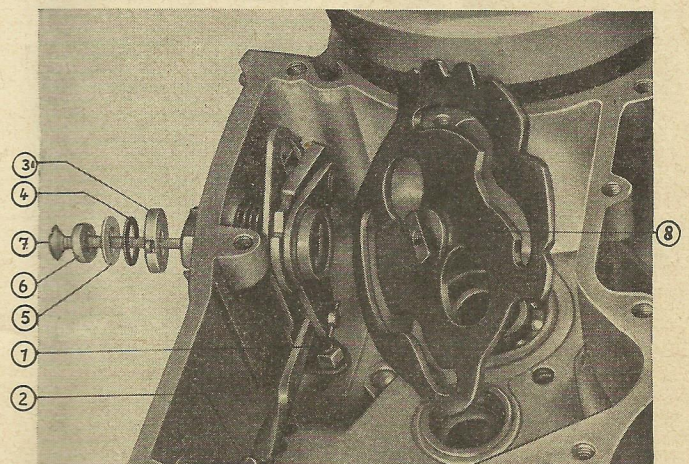


Fig. 9: Gearchange

- | | |
|-----------------------------|--------------------------|
| 1 Countersunk screw | 5 Disc |
| 2 Interior gear shift lever | 6 Intermediate disc |
| 3 Spring housing | 7 Countersunk screw |
| 4 Spacer shim | 8 Gear shift guide plate |

and countersunk screw (fig. 9/7). With the aid of the gear indicator bring slot of the guide sleeve into alignment with the slot of the ratchet wheel. Fit gear shift guide plate (fig. 9/8), tighten countersunk screw and secure it with a punch mark.

Gearbox

1. Install countershaft (fig. 10/1) with gears, fit thrust collar (fig. 10/2) and roller bearing (fig. 10/3) with rubber seal (fig. 10/4) for clutch thrust pin. The open side of the roller bearing cage must face the interior of the gearbox.

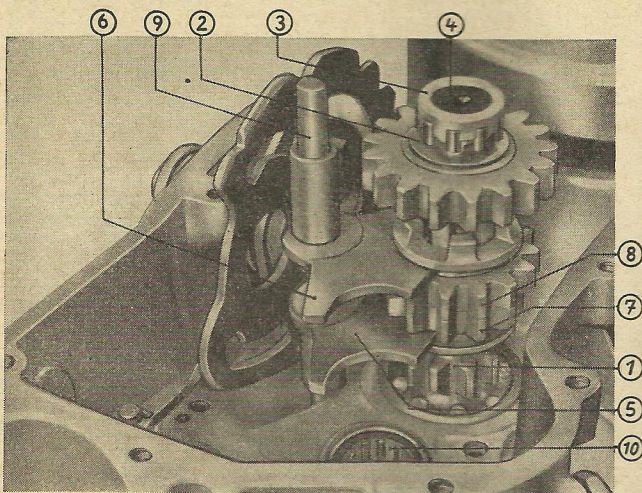


Fig. 10: Gearbox

- | | |
|----------------------------------|--------------------------------|
| 1 Countershaft | 6 Right-hand gear shift yoke |
| 2 Thrust collar | 7 Second-speed spur gear |
| 3 Roller bearing of countershaft | 8 Third-speed spur gear |
| 4 Rubber seal | 9 Gear shift rail |
| 5 Left-hand gear shift yoke | 10 Roller bearing of mainshaft |

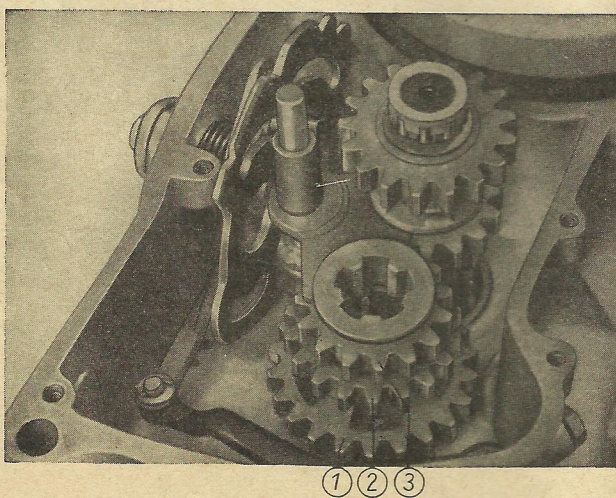


Fig. 11: Gearbox

- | | |
|-------------------------|--------------------------|
| 1 First-speed spur gear | 2 Second-speed spur gear |
| 3 Third-speed spur gear | |

2. Install left-hand gear shift yoke (fig. 10/5) and right-hand gear shift yoke (fig. 10/6) in such a way that the left-hand yoke engages with the guide spline of the second-speed spur gear (fig. 10/7) and the right-hand yoke engages with the guide spline of the third-speed spur gear (fig. 10/8). Put in gear shift rail (fig. 10/9) and fit it into the guide hole in the crankcase.
3. Install roller bearing (fig. 10/10) of the mainshaft into the left-hand half of the crankcase (the open side of the cage facing the interior of the gearbox), fit in thrust collar and first-speed spur gear (fig. 11/1) with pawl slots facing the inner side of the gearbox. Then insert spur gear of the second speed (fig. 11/2) and that of the third speed (fig. 11/3) in such a manner that left-hand and right-hand gear shift yokes engage with the guiding splines of the gears and each pair of gears engages with each other.
4. Insert mainshaft (fig. 12/1). If 0,1 mm (0,00394 in.) spacers were inserted under the race of the roller bearing, these have to be fitted again and then the race is put on.

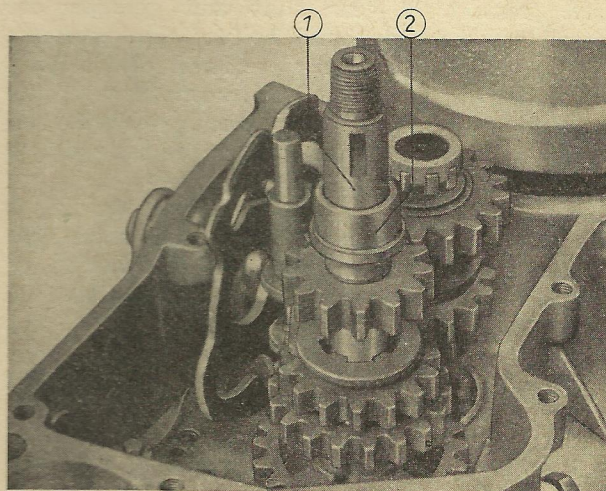


Fig. 12: Gearbox

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|-------------|------------------------------|
| 1 Mainshaft | 2 Race of the roller bearing |
|-------------|------------------------------|

Crankshaft

See the chapter "Fitting a new crankshaft".

Crankcase

1. Apply gasket-making compound to the mating surfaces of the left-hand half of the crankcase, put a new paper gasket on them and soak the gasket on its upper side with oil.
2. Replace right-hand half of crankcase (use rubber mallet), taking care not to damage the ring seals (use spec. tool 250.1000.0 W 18). Knock in crankcase pins (fig. 2/7), screw in and tighten up connecting screw.

Oil pump

(Follow the instruction for assembly most carefully!) (fig. 13)

1. Turn plunger B to its highest position.
2. Coat the packing surface of the pump and the corresponding surface of the crankcase with oil. Assemble the parts without paper gasket, attach pump and slightly tighten the bolts A.
3. Set the oil pump in such a way that plunger B fully meshes with the worm C, with a side clearance of 0,00472 to 0,00787 in.
4. Tighten the bolts A uniformly but not too tightly. Make sure that plunger B can move freely within the flank clearance allowed. If the bolts A are tightened excessively, there is a danger of the oil pump plunger B seizing. This

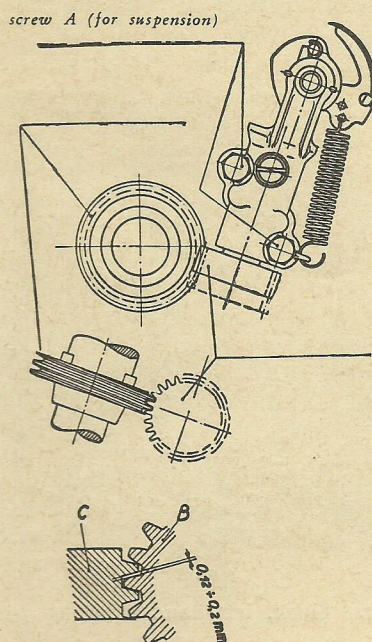


Fig. 13: Mounting the Oil pump

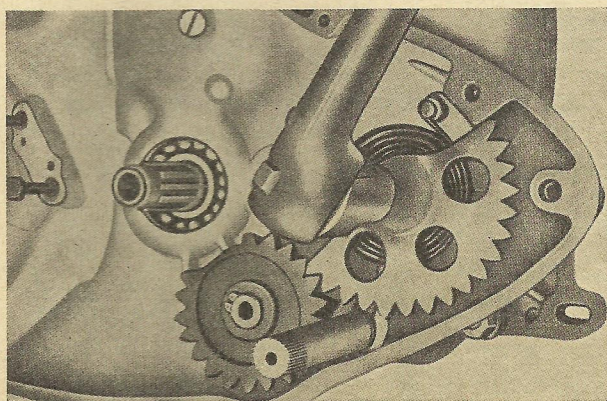


Fig. 14: Kickstarter

can be seen immediately from plunger B being difficult to turn within the gear clearance.

Kickstarter (fig. 14)

1. Put on intermediate gear and secure it by means of a snapping.
2. Attach kickstarter spring to the dog clutch gear of the starter shaft, fit big thrust collar in such a way that it comes to lie between spring and crankcase. Attach spring to the retaining pin in the crankcase and give the spring initial tension until the starter shaft can be inserted in the bore of the crankcase in the position indicated in fig. 14.
3. Mount the small thrust collar (fig. 15/1) facing the crankcase cover.

Clutch and Gearbox Sprocket

1. Put spring washer (fig. 15/2) on the crankshaft stub and insert woodruff key (fig. 15/3). Place check plate (fig. 15/4) and bushing (fig. 15/5) on countershaft.

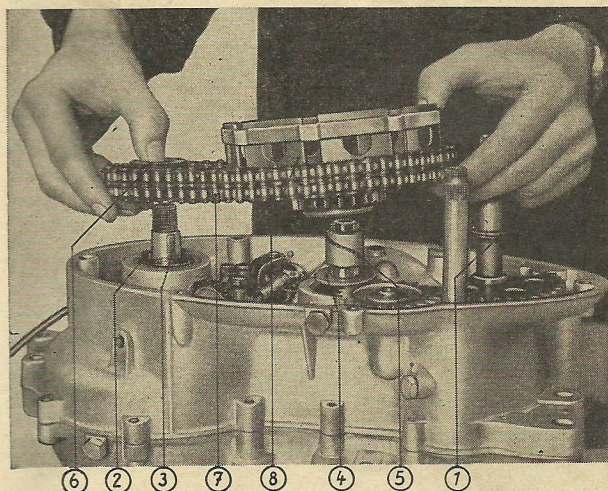


Fig. 15: Clutch

- | | |
|-----------------|-------------------|
| 1 Thrust collar | 5 Bushing |
| 2 Spring washer | 6 Engine sprocket |
| 3 Woodruff key | 7 Front chain |
| 4 Thrust collar | 8 Clutch drum |

2. Install engine sprocket (fig. 15/6) together with the chain (fig. 15/7) and clutch drum (fig. 15/8). Mount clutch hub, put in clutch hub holding tool and chain sprocket clamp, fit locking discs on crankshaft stub and countershaft, put on nuts (fig. 17/1/2) and tighten them lightly at first. Check chain tension (see fig. 16). If the sag exceeds 0,276 in., the chain should be exchanged for a new one. After inspection tighten nuts (fig. 17/1/2) and bend up locking discs.
3. Put key and chain sprocket together with locking disc on mainshaft, tighten nut and bend up locking disc. Remove clutch hub holding tool and chain sprocket clamp.

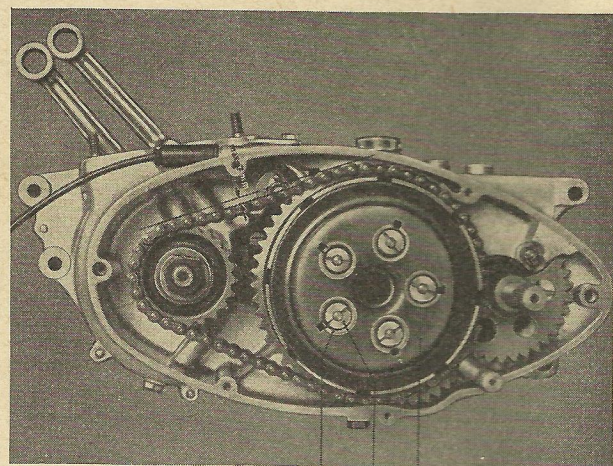


Fig. 16: Sag of engine chain

- 1 Clutch thrust plate 2 Spring retainer cups
3 Collar nut

4. Assemble the clutch discs (fig. 17/3), first putting in the thick steel disc, then alternately a friction disc and exterior tooth projections to fit the grooves in the clutch drum (there are seven of these) and a steel disc with interior tooth projections to fit the grooves in the clutch hub. Finally the steel disc with bent-up prongs, the prongs facing inward, is mounted.
5. Insert the clutch thrust pin (fig. 17/4), its rounded end forward, ball (fig. 17/5) and thrust bolt with button in this order (fig. 17/6).

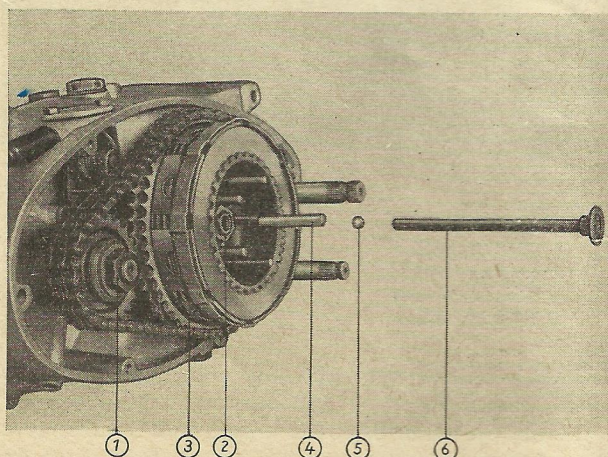


Fig. 17: Clutch thrust pins

- 1 Locking nut of engine sprocket 3 Clutch discs
2 Locking nut of clutch hub 4 Thrust pin
5 Ball
6 Thrust bolt with button
6. Install thrust plate (fig. 16/1) for clutch springs, fit the spring retainer cups (16/2) together with the springs into the apertures of the thrust plate and screw them down uniformly by means of collar nuts. The nuts must not be screwed down

completely. Correct position can be seen in fig. 4. To check whether the locking lugs of the retainer cups and of the nuts which prevent the collar nuts from working loose, have really registered, slightly unscrew the nuts.

We repeat that the collar nuts can be unscrewed only if the spring retainer cups are lifted simultaneously (fig. 3).

Crankcase cover

1. A new gasket soaked in oil is placed on the cleaned mating surface of the left-hand crankcase cover, then the cover is put in place (be careful of the rubber seals of the shaft outlet openings!) and screwed down.
 2. Mount hub (fig. 18/1) of kickstarter crank (fig. 18/2), insert both thrust spring and thrust pin in bore of kickstarter crank and lock the latter by means of its clamping bolt.
- For correct position of the kickstarter crank see fig. 18.

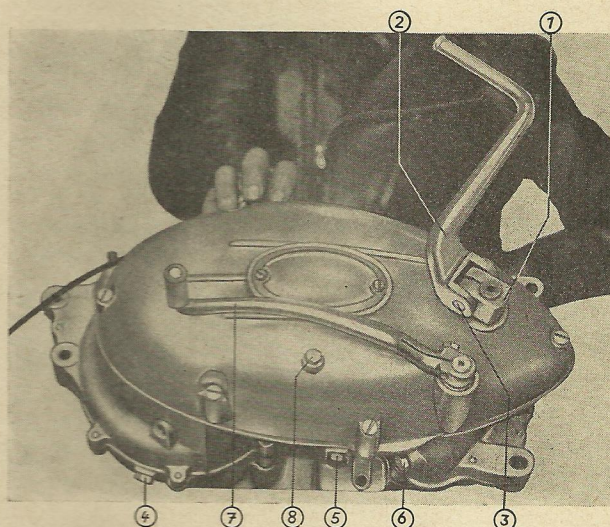


Fig. 18: Engine block, left-hand side, see from below

- 1 Hub of kickstarter crank 5 Drain plug of clutch space
2 Kickstarter crank 6 Drain plug of gearbox
3 Clamping bolt 7 Foot-operated gear shift lever
4 Drain plug of crankcase 8 Oil-level plug

3. Mount foot-operated gear shift lever (fig. 18/7) and clamp it (position as required).

Pistons and Cylinder

1. If for some urgent reason the piston rings have been removed, test them for free movement prior to reassembling by turning them in their grooves. They must not stick anywhere. On the other hand, their axial play (in the long axis of the piston) should not exceed 0,00591 in. (noise!) Then put the piston, complete with rings, into its cylinder bore till the ends of the rings can be seen in the gap between the two bores

(fig. 19). The piston rings must show a gap of at least 0,00394 in.; the maximum admissible gap, caused by the process of wear through long operation, is 0,0315 in. wide. If it becomes wider, loss of performance will result.

2. Fit pistons to connecting rod in such a way that all the piston ring gaps are in the rear. Now slide in the wrist pins. Do not knock them in! If necessary, press them in with the special tool No. 250.7020 or warm the pistons. Secure wrist pins by means of snaprings. (The snaprings must catch well and be easily revolvable in their grooves.) For this work it is advisable to cover the crankcase opening with a clean rag to prevent foreign bodies from dropping into the crankcase.

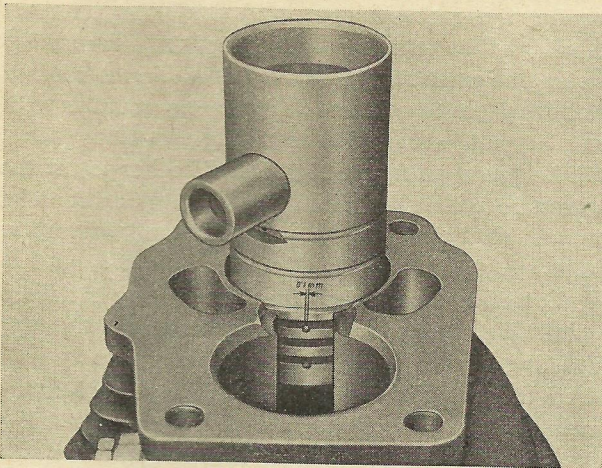


Fig. 19: Gap of piston rings

3. Check gasket of cylinder base flange; if necessary, fit a new one and soak it well in oil. Put some oil on cylinder wall. Turn piston rings until the locking pins appear in the gap between the butts. Only when all piston rings are in their correct positions, may the cylinder be put on. Oil the pistons, get them into a position as much parallel to each other as is possible and put the cylinder in place. We would again stress the importance of a correct positioning of the piston rings, because if they are not properly placed, they may break when the cylinder is mounted.
4. Before screwing down the cylinder base flange screws and while the cylinder can still be moved, rotate the crankshaft slowly a couple of times in order to ascertain unobstructed movement of the pistons. Then screw down uniformly the diagonally opposed cylinder base flange screws.

Generator

1. Put on armature (fig. 2/2) and screw up lock screw lightly.
2. Install stator and tighten both screws.

3. Adjustment of ignition. (See also "electrical equipment".)
4. Tighten armature fixing screw, pull out pin for ignition adjustment, check ignition once more, insert carbon brushes. Close hole for the ignition adjustment pin by means of the screw plug.

Cylinder Head

Insert a good gasket, put on cylinder head and screw it down. When tightening the cylinder head screws, always screw down the diagonally opposed screws uniformly (from inside to outside).

If a reground or new cylinder with new pistons is assembled, the engine has to be run in like a new one. Also new piston rings require about 500 km (300 miles) of running-in.

Filling up with oil

When reassembling is finished, fill the engine up with oil ($\frac{3}{4}$ litre, about 1.5 pint). Oil must flow from the oil-level plug (fig. 18/8) when you check it.

ASSEMBLY INTO FRAME

When the engine has been lifted into the frame,

1. the two rear mounting screws are inserted from the right,
2. then the four fixing screws are put into the right-hand tongue of the front engine support and at the same time into the two eyelets in the frame and into the two eyelets in the engine block. (Mind the crank of the tongues! Engine is tilted out of center to the right.) The further assembly is done in the reversed order of dismantling.

3. Connect cables with generator.

Red cable (30) to central terminal (battery)

White cable (61) to right-hand terminal (control signal lamp)

Black cable (1) to left-hand terminal (Ignition)

Should, after a long time of operation, the colors on the cables no longer be clearly distinguishable, proceed as follows:

Connect battery to ground, insert ignition key, then touch each cable with the ground for a moment. The cable showing a bright spark (direct short-circuit) is the plus cable (30).

The cable producing a blue-purple spark is cable (1).

The cable lighting up control signal lamp of head light is cable (61).

After all works at the oil pump and whenever the oil hose has been disconnected, the enclosed air within the hose is to let out, that means, the connecting screw of the oil hose at gear-box should be tightened, after oil had started to flow from there.

ADJUSTING THE CARBURETTOR

The varied quality of fuels may necessitate an alteration of the carburettor adjustments, but we

should not recommend doing that on a new machine before it has been ridden for about 600 miles. New engines have slightly higher consumption which must not be decreased by using a poor mixture, i. e. a mixture containing too little gas. The screw for regulating idling speed (fig. 20/2) should not be applied for setting idle running at random. As the influence of this screw up to about 38 m.p.h. is very great, it should be applied in this speed range for the purpose of regulating the consumption. If the consumption rises above the ratio, unscrew air-screw for idler. An air-screw entirely screwed up causes rich (fat) mixture (excessive consumption). If the air-screw is loosened consumption will drop immediately. Therefore it is advisable to loosen the screw by quarter turns only. If the result is not satisfactory continue to unscrew for another quarter turn etc. The efficiency will decrease after a full rotation. No effect will be obtained by unscrewing it more than $2\frac{1}{2}$ turns. If one hears banging noises from the carburettor

may occur that the engine refuses to pull with a scanty setting of the carburettor, when the throttle is slowly opened from low speeds. In such a case the air-adjusting screw must also be screwed up until the engine accepts gas regularly.

If in spite of this procedure, there is still excessive consumption or if banging noises are heard from the carburettor, set jet-needle as required. To decrease consumption clamp needle with the needle holder into the next groove. To give an example: Has the needle been clamped into the 4th groove (normal adjustment) then it should be clamped into the 3rd groove (again from top end). When the jet-needle has been adjusted, the air-screw must again be regulated in the manner described above. Concerning the carburettor setting for idling, it must be set so that with the twist grip fully turned off the engine must run in neutral at moderate revs. If the idling position is not set properly trouble with the plug may occur. The adjusting-screw for idling will be found on figure 20/3. Don't bother to set the lowest number of revs. obtainable for idling. The engine, if running idle, should run smoothly, moderately and steadily. On no account should it be allowed to stop, even when the engine is hardly warm. We point out once more that the air-adjusting screw must not be adjusted any more when the gas for idling is set. For perfect functioning of the carburettor the crossbore in the top part of the needle-valve is absolutely transverse to the direction of the carburettor passage. When exchanging the needle valve, take care to select one that guarantees proper position to the cross section bore, if screwed up. Trifling differences can be corrected by inserting a thin ring gasket of 0,00787 in. at most, otherwise the opening of the jet tube would be placed too low, which would cause a change in the composition of the mixture. Two-stroking engines require larger main jets in the hot season. The fitted main jet No. 150 (fig. 20/4) is suitable for exerting rides in summer. In winter use main jet No. 145. If the engine runs more quickly with main jet No. 145 in the hot season, its use is admissible also in summer.

Signs of wear of the carburettor parts usually proclaim themselves only after a very long period of use and it is altogether wrong to try and remedy unsatisfactory performance by altering carburettor adjustment. Abnormal consumption figures are also very likely to be caused by the engine, in which case it would be wrong to try and remedy it by altering the carburettor setting. Use as much as possible the normal carburettor adjustment only.

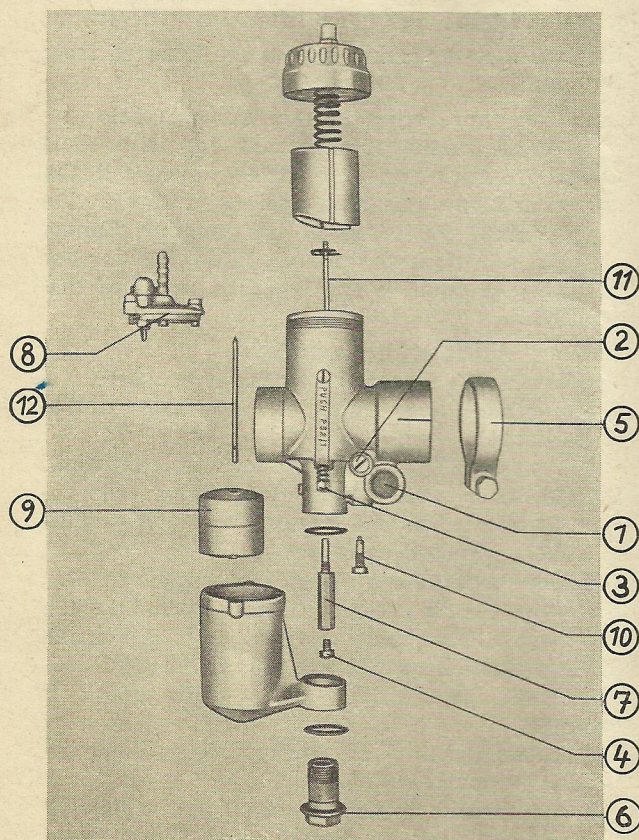


Fig. 20

while riding slowly with a warm engine, while slowly opening out the throttle or while slowly shutting the throttle, the mixture is too poor. Then the air adjusting screw has to be screwed up by quarter turns, until the noises have stopped. It

CHASSIS

Handlebar

a) Detaching handlebar

1. Remove twist grip: turn back rubber cover, unscrew slot screw (fig. 21/6) (below the bore of twist grip tube), pull off end piece and twist grip (fig. 21/5). Unhitch gas cable first from throttle slide of carburettor and then from sliding core piece of twist grip (fig. 21/4). The ring (fig. 21/3) of the twist grip is then loosened by unscrewing the bigger slot screw and finally pulled off the handlebar.
2. Unscrew dimmer switch.
3. Loosen clutch cable by unscrewing the adjusting screw of the clutch lever (fig. 2/1) and detach clutch cable from handlebar.
4. Detach brake cable first from the lever of the front wheel brake and then from brake handlebar.

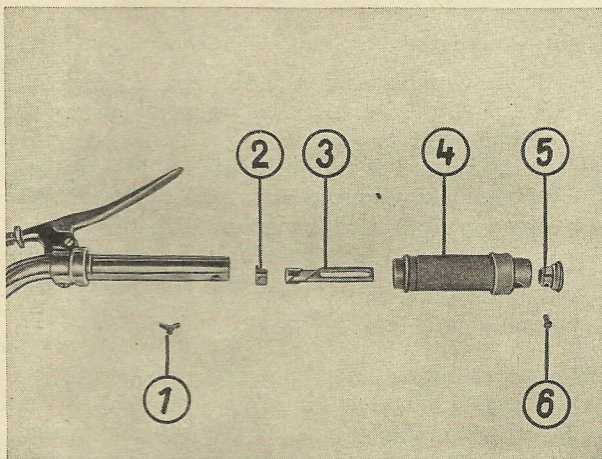


Fig. 21: Twist grip

- | | |
|----------------------|----------------------|
| 1 Brake screw | 4 Sliding core piece |
| 2 Attaching screw | 5 Twist grip |
| 3 Ring of twist grip | 6 Slot screw |

5. Unscrew cover of bridge-piece of the fork and detach handlebar.

b) Reassembling the handlebar

1. Reassembling is performed in reversed order of dismantling. Grease all sliding parts of the twist grip well.
2. The smaller screw on the twist grip ring (fig. 21/1) serves to brake the movement of the twist grip, if it shows a tendency to return automatically.

Front wheel springing

a) Dismantling the telescopic fork

1. Remove front wheel, unscrew fender nuts and detach fender downwards after turning the (legs) of the fork forward.

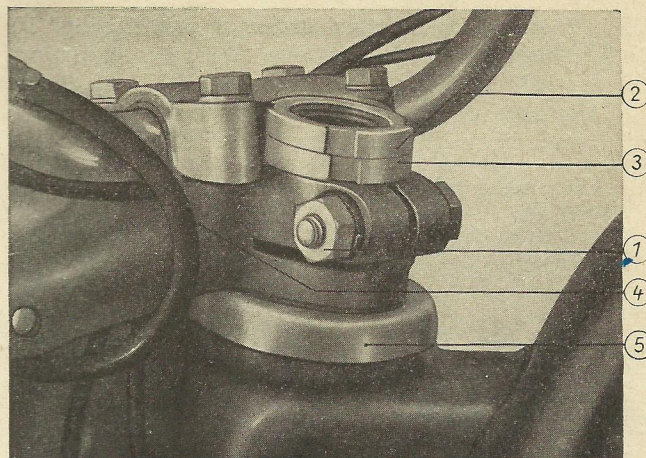


Fig. 22: Adjusting nuts of the steering bearing

- | | |
|-----------------------------|----------------------------|
| 1 Nut of the clamping screw | 4 Top bridge-piece of fork |
| 2 Lock nut | 5 Dust cap |
| 3 Adjusting nut | |

2. Detach positive cable from battery terminal.
3. Unscrew cover ring from headlamp body, disconnect the six cables forming the headlamp cable assembly and pull out the latter. Unscrew dimmer switch from handlebar. Unscrew union nut of flexible speedometer drive and pull out shaft. Dismantle headlamp.
4. Extract split-pin from steering damper, unscrew handwheel and detach same. Unfasten forward tank attachment screw and detach friction discs of steering damper.
5. Detach hand-brake cable, unscrew cover of top bridge-piece of fork and lay handlebar back upon the tank.
6. Loosen the two clamping screws for the fork legs at the top bridge-piece (fig. 22/4), unscrew cap nuts (fig. 23/7) and plug screw of the top end of the fork (fig. 23/8), loosen nut of the clamp screw (fig. 22/1) and unscrew check nut (fig. 22/2) and adjusting nut (fig. 22/3) (by using spec. tool 250.7012). Lift off top bridge-piece (fig. 22/4), using a rubber mallet. (The dust cap, fig. 22/5, is pressed into the bridge-piece together with the bearing cone, so that these two parts are

removed with it.) Then pull out the fork. While doing so, care must be taken not to lose any of the 18 balls of the bottom bearing of the steering head.

b) Assembling the Telescope Fork

Renew worn steering shells. New balls (18 each) should be provided for new shells. The shells should be pressed into the tube of the frame up to their collars. Do not cant them!

Assembly in reversed order of dismantling. To tighten the lock nut (fig. 22/2) the adjusting nut (fig. 22/3) must be held by tool No. 250.7030. Connecting the five cables forming the cable assembly of the headlamp: see wiring diagram.

When the cables have been connected, reconnect battery.

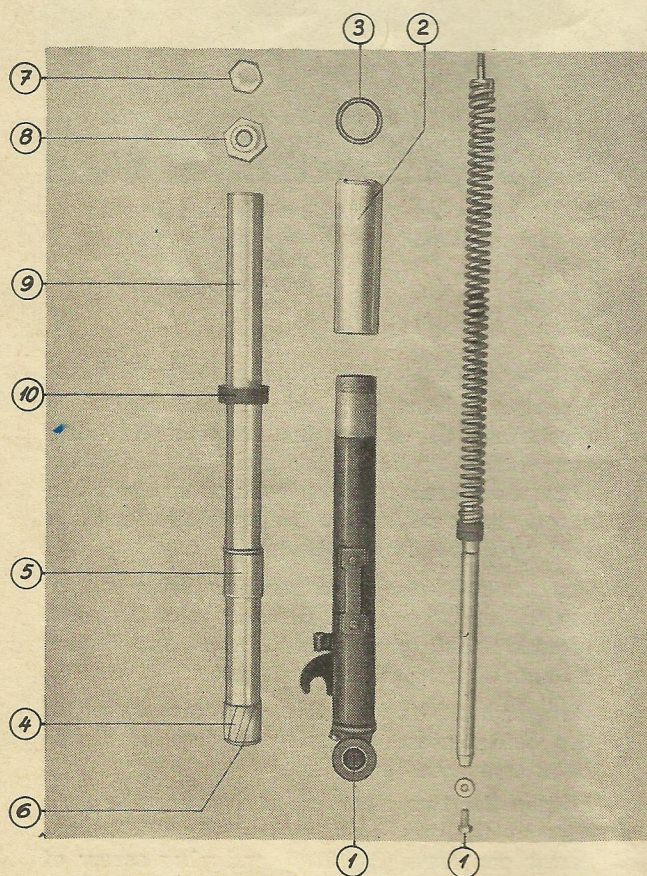


Fig. 23: Telescope leg dismantled

- | | |
|-------------------------------|----------------------------|
| 1 Screw | 7 Cap nut |
| 2 Union nut | 8 Plug for top end of fork |
| 3 Seal ring | 9 Leg tube |
| 4 and 5 Bronze bushing | 10 Buffer ring |
| 6 Plug for bottom end of fork | |

c) Taking to pieces the Telescope Fork

Take off frontwheel, remove fender (mudguard). Complete dismantling for detailed examination (The fork need not be detached from the machine):

1. After removal of the knock-out axle the screw situated inside the eye at the end of the fork (fig. 23/1) has to be loosened and tapped into the fork (place vessel underneath to catch oil flowing out). Then the screw is unscrewed completely.
2. Now pull down sliding tube until union (fig. 23/2) becomes accessible. This union is unscrewed (use special tool No. 250.7021). Pull off sliding tube downwards. A ring seal (fig. 23/3) is situated inside the union (fig. 23/2). If any oil issues from the fork, this seal ring must be exchanged for a new one.
3. Check the bronze bushings (fig. 23/4 and 23/5) and renew them if they show a radial play of about 0,0394 in. (1 mm). These parts are dismantled after the plug for the bottom end of the fork (fig. 23/6) has been unscrewed.

Further dismantling

4. Unscrew both nuts at the top end (fig. 23/7 and 23/8). Pull out the pressure spring together with its supporting tube, loosen the clamp screws of the fork tubes at the top and bottom bridge-pieces and finally pull out the legs (fig. 23/9) in a downward direction. Headlamp bracket and exterior tube can now be detached.

d) Telescope Fork Reassembling

Reassembling is done in reversed order of dismantling. Insert leg tubes in such a way that the top oil holes in both of them face forward. When reassembling, slip rubber buffer ring (fig. 23/10) on leg tube before fitting the bronze bushings.

After reassembly put 5 cu. in. of oil into each tube.

Rear Wheel Springing

a) Dismantling the Telescopic Strut

Unscrew securing worm screw (fig. 24/1) at bottom end, remove joint bolts at top and bottom ends of strut and take out the telescopic strut.

b) Reassembling in reversed order

c) Taking apart Telescopic Strut

Removal of the damper cylinder for renewing its oil.

Unscrew top tubular casing (fig. 24/3). Put screw spanner (clearance 22 mm) through the turns of pressure spring (fig. 24/2) and unscrew sealing screw (fig. 24/5) by means of the above mentioned spanner.

Pull telescopic strut apart. Now empty damper cylinder (fig. 24/7) and fill it up with fresh damper oil ($4\frac{7}{8}$ cu.in.). Reassembling in reversed order of dismantling.

Placing the damper cylinder, take care the little hole of damper cylinder showing to bottom.

After unscrewing the damper piston and dismantling the sealing screw grooved ring sleeve can be changed without any special tool.

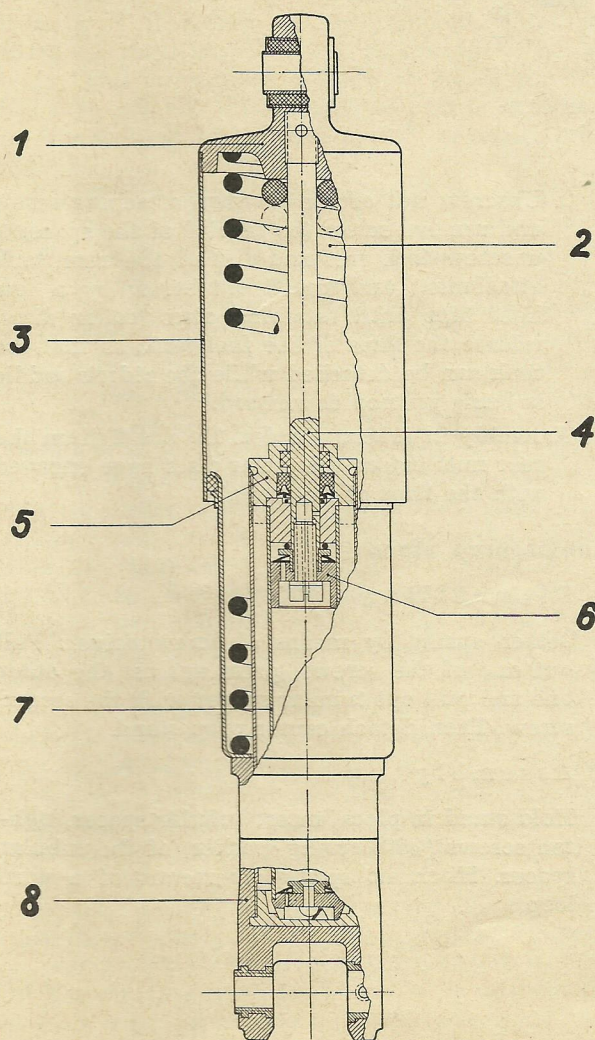


Fig. 24: Rear suspension shock absorber

- | | |
|----------------------|---------------------|
| 1 Top strut head | 5 Sealing screw |
| 2 Pressure spring | 6 Damper piston |
| 3 Top tubular casing | 7 Damper cylinder |
| 4 Bolt of piston | 8 Bottom strut head |

d) Detaching the pivoted swing fork

1. Remove rear wheel, detach chain guard, open chain and pull it out, unscrew nuts of clamping shells and take out clamping shells and chain sprocket carrier, unscrew bracing plate underneath the connecting tube of the two swing arms from the frame, and finally detach telescopic struts.
2. Unscrew lock nut and nut of the swing fork shaft, remove clamp disc and rubber disc and pull out shaft. By pushing aside the two cover rings the two discs lying between the swing arms and the bearing tube of the frame are released and drop out. Then the swing fork can be taken out in a downward direction.

e) Assembling the swing fork

Assembling in reversed order of dismantling. Do not forget to insert the spacers between swing fork and bearing tube of the frame and to cover them with the rubber rings.

Hubs

a) Dismantling the bearings

1. Right-hand side: Press out rubber seal ring with a screwdriver, remove snapping. In the spacer tube keeping the two ball bearings at the correct distance there are two recesses. Insert a mandrel in this recess and press out the right-hand ball bearing from the left.
2. Left-hand side: The left-hand ball bearing is pressed out from the right by means of a mandrel.

b) Reassembling the bearings

1. Right-hand side: Insert guide washer (see fig. 25). Grease and press in right-hand ball bearing, fit snapping. Press intermediate ring into seal ring and press seal ring into hub. The sealing edges of the seal ring must face inwards.
2. Left-hand side: Fit spacer tube, insert guide washer, grease and press in ball bearing. Press in seal ring (sealing edges facing inwards).

c) Chain sprocket carrier

1. Dismantling the bearings: Detach outer snapping from the stub of the clamping shell facing the hub, press out clamping shell, remove seal ring near chain sprocket and both interior snaprings retaining the outer ring of bearing, and press out the bearing.
2. Assembling the bearing: Pressing in the bearing is done from the side of the hub, since the seat of the bearing is conical. Before

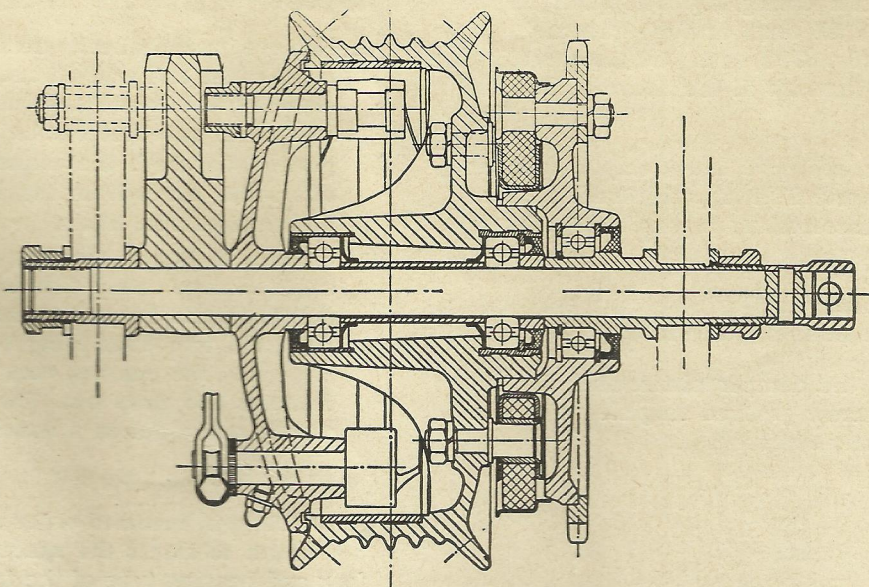


Fig. 25: Rear Wheel Hub

pressing in the bearing insert interior snapping at the side of the chain sprocket to form a stop for the bearing, as otherwise the bearing might be pressed through. After pressing in the bearing fit interior snapping at the side of the hub as a stop for the bearing. Mount seal ring facing the chain sprocket, press in clamping shell and fit its securing outer snapping. Grease the bearings amply.

3. When the six retaining bolts of the chain ring have been unscrewed, it will be easy to lift off the flexible coupling. The arrows marked on the flexible coupling should always point in the direction of wheel rotation, i.e. in a counter-clockwise direction.

Fuel Tank

a) Dismantling

1. Remove oil pipe and allow oil to run into some vessel, drain petrol (gasoline) from fuel tank by means of a hose, pull petrol pipe from the carburettor, detach connecting hose between the two tank halves.

2. Unscrew nut of the forward attaching screw and remove screw (be careful of the spacers), unscrew lock nut and nut of the rear tank attachment and knock out screw by a few light taps until retaining discs (collar discs) release the flaps of the fuel tank, so that the tank can be detached while the rider's saddle is being pressed downward.

- b) Assembly in reversed order. Do not tighten the rear nuts before the collar discs have engaged with the flaps of the tank.

Center prop stand

a) Dismantling

Detach spring by means of screw driver. Pull out one of the screws, press against the other one and pull out tubular spacer with the second screw. Then detach center prop stand.

b) Assembly

Hold stand in place, insert tubular spacer, tighten screws (with spring washer) of the tubular spacer. Hitch up spring by means of a wire loop.

ELECTRICAL EQUIPMENT

Battery-Ignition Lighting

Battery ignition is particularly suited for good starting, supplying as it does an intensive ignition-spark at lowest r. p. m. Easy starting and rapid "get-away" are features which every motor cyclist will always appreciate. And this primarily involves proper care of your battery.

Battery

A new battery has first to be filled-up with chemically pure sulphuric acid of 32° Bé (Baumé). It is then left to "soak" for 3 hours. After that it will be checked whether or not the battery indicates voltage (8 V). If it proves so, that battery is ready for use, otherwise it will have to be charged from a D.C.-source of 0,7 ampere. Continue charging until gas evolves uniformly from all plates and a terminal voltage of 2,7 V per cell has been reached. The density of acid is decreased by the soaking, but should be 32° Bé again, after charging.

There must always be enough acid in the cell to keep the acid level 0,1181 in. to 0,1574 in. (3 to 4 mm) above the top edge of the plates (not the edge of the insulating separator plate) or until acid level is just visible from open hole in splash plate. Spilled acid must be replaced by fresh acid, evaporated acid however, must be compensated for by replenishing battery with distilled water only. Tap water would ruin it! Check level every fortnight. Evaporation is most intensive during hot season. When acid level has dropped below top edge of plates, a further drop of level takes place rather rapidly, on account of the narrow section of acid flow between plates. Thus, another 0,244 cu. in. (4 ccm), of evaporated acid result in a further drop of level of 0,3937 in. (1 cm). Too high a charging-current, as well as too low an acid level (or insufficient density of acid) tend to cause the substance of the positive plates to get mellow and to crumble. The battery having been charged, wipe top surface of battery quite dry and give terminals a coating of acid-free vaseline. Should terminals show signs of oxidation, clean and grease them at once. Should the model be laid up (e.g. for winter, and so on) don't under any circumstances fail to have the battery recharged every month. When installing the battery in your motor cycle remember to connect your cables correctly, put (—) terminal of battery to ground as in case of a mistake this would cause a reversal of the polarity of the dynamo (generator), and subsequent damage to both generator and battery. Don't use force while connecting your cables to the terminals, as this might to break the latter.

Preparing 7 amp./h. motor cycle batteries, prechar-

ged an dispatched in dry condition, for operation. The great advantage of precharged batteries is that they are ready of operation within a very short time after filling.

How to prepare them for operation:

The dry battery is filled with chemically pure sulphuric acid of 1,28 specific weight and then left to soak for at least three hours. After that period the acid level is checked and, if necessary, adjusted. It should be 5 mm ($= \frac{1}{5}$ in.) above the top edge of the plates. Then recharging is started, for which any source of D.C. can be used, the positive pole of the current source being connected with the positive terminal of the battery. Amperage of the charging current should not exceed 0,7 amp., but can be lower than that. Recharging will, in most cases, be finished after a few hours. The dry precharged batteries have a limited storage stability. For quite fresh batteries a recharging period of two hours will suffice. With older batteries the charge diminishes gradually, so that one has to allow for a longer charging period. The density of the acid decreases when the filled battery is left standing, depending on the degree of self discharge owing to long storage. Therefore charging is to be continued until the acid has regained its original density and the positive and negative plates evolve gas uniformly. As self-discharge occurs irregularly, one type of plates will begin evolving gas sooner than the other one. Since it is impossible to observe the formation of gas on the individual plates the conclusion of the charging process is ascertained by checking the voltage as well as by measuring the acid concentration. Charging may be regarded as finished when the density during charging has reached 1,28 again and when the voltage during charging with 0,7 amp. has risen to 8—8,3 volt and does not go on rising. These voltage values only apply to a temperature of 20° C, as they are higher at lower temperatures and vice versa and, in addition, are liable to vary to some degree. The important fact is that neither acid density nor charging voltage continue to rise beyond a certain point.

Attention! Use only chemically pure sulphuric acid. If it is concentrated, dilute only with distilled water! Always pour acid into water, never the other way round! Impure acid and impure water will ruin the battery in a very short time.

The acid must be carefully kept on the required level. If it is too low acid of the same density as the one in the battery has to be added. Only when the acid density is too great (i. e. above 1,28 in the fully charged battery) distilled water should be added. Often it will prove necessary to fill up with

acid and not with water, because gassing throws out more acid than water is decomposed.

Summary:

1. Fill up with sulphuric acid (1,28 density).
2. Leave battery standing for at least three hours.
3. Correct acid level (it should be 5 mm = $\frac{1}{5}$ in. above top edge of plates).
4. Recharge with a maximum of 0,7 amp. until acid density and voltage (8—8,4 volt) stop rising and both types of plates evolve gas.

Ignition key:

The ignition switch is housed in the headlamp. As soon as the key is inserted, the lamp for the charging control of the generator will light up. Extinguishing of lamp indicates that generator is connected parallel to battery and that current is being fed by the dynamo. Should the lamp remain lighted while the engine is running, this is an indication that there is either something wrong or that revolutions are too low. If riding at night at less than 25 m. p. h., use 3rd speed, or the battery will be completely discharged. Don't ever forget to detach ignition key when stopping your engine, because if you don't the battery will be completely discharged within half an hour.

Generator:

Whenever any work has to be done on the electrical equipment do not fail first to disconnect lead (30) from the positive (+) pole of your battery. Once the cover of the dynamo has been taken off, all parts are easily accessible. The accumulated carbon dust should be removed by means of a clean, dry paint brush and blown away.

See to it that carbon brushes (Fig. 26/5) can be moved freely in their grooves.

When owing to a short-circuit, the braided wire of the carbon brushes has become unsoldered, splashes of tin will show on the commutator. Then don't fail to consult immediately an experienced electrician. Also note that iron filings (dust) when dropped into the voltage regulator (1) lead to functional disturbances of the latter. Burned breaker contacts (4) should be smoothed off with small file. The lubricating felt-pad (2) of the contact-breaker cam should be soaked with best heat resisting bearing grease or two or three drops of engine oil every 1300 miles or so. Intensive sparking at the breaker-contact indicates condenser (3) trouble.

When connecting the leads, the braided wires of the cable ends should be carefully (and cleanly) turned in, as projecting wires might easily cause a short — circuit.

Generator and Voltage Regulator:

The 4-pole D.C. shunt wound generator consists of two main parts: 1) the armature which is attached (without cotter pin) to the crankshaft and carries the cam for the make-and-break contact and (1) the

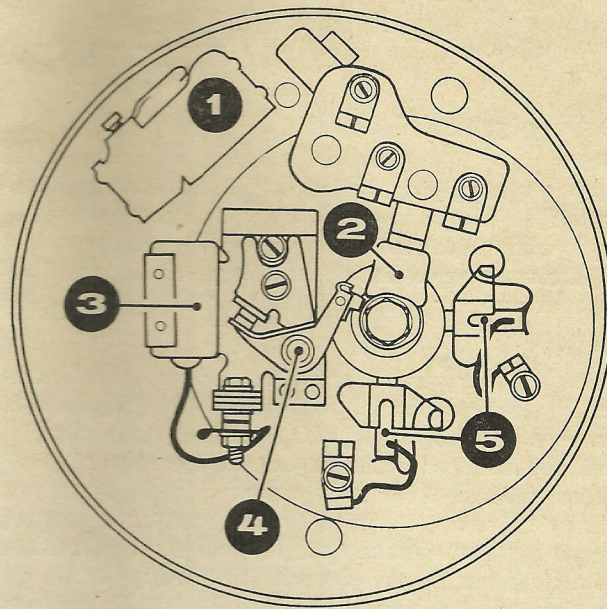


Fig. 26: Generator

- | | |
|-------------------|-------------------|
| 1 Regulator | 4 Contact breaker |
| 2 Grease felt pad | 5 Carbon brush |
| 3 Condenser | |

polehousing incorporating the field windings, the make-and-break contact of the ignition, the condenser and the voltage regulator. All these parts are arranged as a unit on the engine housing. A Bosch system of voltage regulator is used for our machines.

Adjusting of the regulator RS/ZA45-60/6/4

Although every new regulator is correctly adjusted, it is necessary to check the adjustment again after the fitting in warm condition for an event. readjustment. This work is described in the following:

Necessary is an electro dynamic volt meter with a measuring capacity of 0—10 or 0—15 volt and an ampere meter with a measuring capacity of 10—0—10 ampere.

1. Measuring the idling voltage of the generator with disconnected current consumer:

- Take off cover of the generator; on the terminal plate there are 3 clamps no. 1.30/51 and 30/61. Disconnect red cable from the middle clamp 30/51. Connect the plus pole of the volt meter to the free clamp 30/51. Connect negative pole of the volt meter to the earth of the motor vehicle.
- Start the engine (the ignition coil is supplied with current from the accumulator). Read the voltage of the volt meter at about 2000 to 2200 and at about 4000 r.p.m. At very speed range the volt meter has to show 7.6 volts.

If the voltage is lower than 7.6 volt the accumulator will be discharged at slow driving resp. at night. If the voltage is exceeding 7.6 volt, the battery will get to much charging current and the result will be an overflowing of the acid, an abnormal wear of the carbon brushes and the collector.

- c) If the volt meter does not register any voltage, the carbon brushes have to be checked for easy movement in their holders and also that the regulator is switched on. If it has to be connected by depressing with a finger, the cut out current has to be readjusted (see further below).

2. Adjustment of the voltage regulator:

Adjusting or checking the regulator is possible only in warm condition.

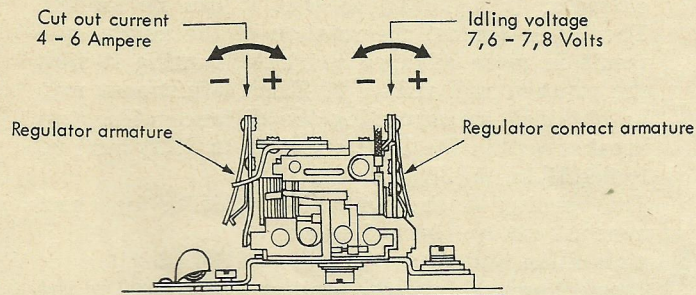


Fig. 27: Adjustment of the regulator

- Before readjusting oxidized or burnt contacts have to be cleaned with a very fine contact file.
- Adjusting of the idling voltage. Contact the volt meter as prescribed and

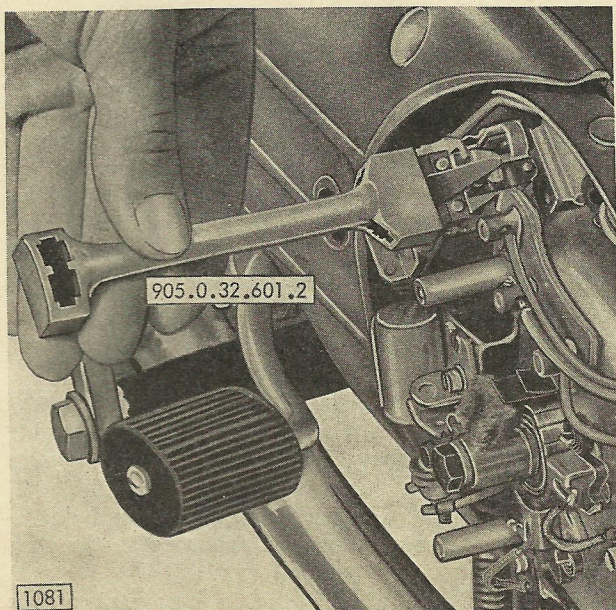


Fig. 28: Adjusting of the voltage regulator with adjusting tool Pos. 905.0.32.601.2

read the idling voltage. If the voltage is below 7.6 volt, the regulator contact armature has to be bent slightly in the direction marked with plus (fig. 27), by means of the adjusting tool Pos. 501.1.55.056.2 (see fig. 28/2), thus increasing the idling voltage, until reaching 7.6 volt.

Bending in the direction marked with minus, reduces the idling voltage.

If the regulator is adjusted correctly to 7.6 volt idling voltage, the generator will supply the battery with the exact charging current, because it is depending only on the charging condition of the battery.

The charging current of a completely charged accumulator will be 1 to 1.5 ampere, a low charged battery will come from 3 to 4 ampere. Therefore, the adjustment of the regulator should never be done by using an ampere meter. The only permissible checking method to apply an ampere meter is the following:

Connect in series an ampere meter between the plus or negative pole of the accumulator.

At running engine and switched on head lights a fully charged accumulator (check acid density) has to be charged from 0.2 to 0.4. In every other case the idling voltage can be raised to 7.8 volt.

3. Adjustment of the cut out current.

Connect in series an ampere meter with a charging and discharging measuring capacity of 10—0—10 ampere between the plus or negative cable of the accumulator. After starting the motor the discharging current is registered (at low r. p. m. idling gear).

By gradually opening the throttle engine r. p. m. are increased until the ampere meter shows the maximum charging current (using a fully charged accumulator). Then pull out the ignition key.

The revolutions of the engine will slow down. The charging current decreases — the ampere meter needle will approach and pass over the zero position and jump back to the zero position suddenly after reaching a specific discharging current capacity.

At this moment the regulator is disconnecting the accumulator from the generator. The ampere meter reading at the moment of disconnection is the cut out current and is amounting to 4 and 6 ampere (can be reduced in special cases to 2—6 amperes).

If the cut out current is below 4 and above 6 ampere, the regulator armature has to be bent slightly with the adjusting tool Pos. 501.1.55.056.2 (see fig. 20/2) until the ampere meter reading of $4\frac{1}{2}$ to $5\frac{1}{2}$ ampere is obtained. Slightly bending in the direction marked with plus raises the cut out current. Slightly bending in the direction marked with minus reduces the cut out current (fig. 27).

The correct adjustment of the cut out current is very important, and is of eminent influence to the charging process.

If the regulator contact is cutting out too early (cut out current below 4 ampere) current will be consumed from the battery, so at low speed or while driving at night, the battery will be discharged.

If the regulator contact is cutting out too early (cut out current over 6 ampere) the accumulator will be discharged by the dynamo. Moreover there is the danger that the armature of the regulator becomes sticking to the magneto, due to the remanent magnetism, when pulling out ignition key.

By doing so, battery will be discharged in a very short time.

We want to point out once more, that the regulator must not be adjusted with the ampere meter alone, as the charging current depends on the charging condition of the accumulator, which in most cases is unknown.

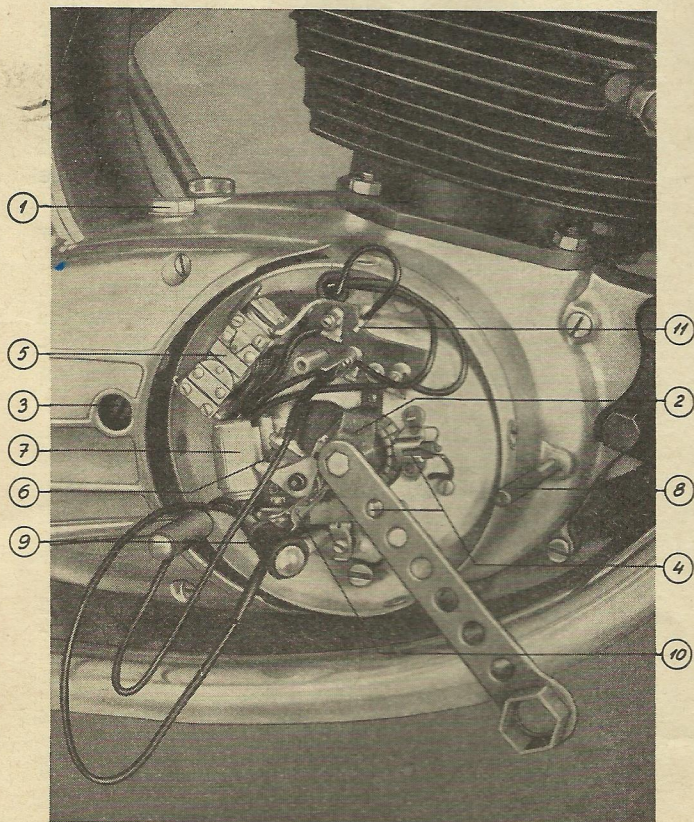


Fig. 29

- | | |
|---------------------|-----------------------|
| 1 Oil filling screw | 7 Condenser |
| 2 Felt pad | 8 Adjusting pin |
| 3 Adjusting screw | 9 Test lamp |
| 4 Carbon brush | 10 Clamp of test lamp |
| 5 Regulator | 11 Disconnected wire |
| 6 Contact breaker | |

Adjustment of ignition

The ignition should take place 0,256 in. (6,5 mm) before reaching top dead center. (Measured at rear piston.) When checking, first of all unscrew sparking plug and remove cover of dynamo. Now the crankshaft can easily be turned with a spanner which is put on hexagon-headscrew of the holding-down screw for armature. After having done that mind that the distance of the contact breaker, if completely opened, is 0,01575 in. (0,4 mm). Exact advance sparking will be obtained if you put pin for ignition adjustment (No. 250.7027) into the control opening at engine base (fig. 29/8) in order to lock crankshaft. The pin fits into a slit for adjustment. In this position the ignition cam just starts disconnecting contact-breaker. If ignition is incorrect, take out carbon brush, and unscrew armature screw, and loosen armature with the extractor (Pos. 22733) so that it can be shifted. Turning it against the rotation of the engine will result in more advance sparking, turning it with the rotation will reduce it. Exact adjustment may be obtained by correcting the distance of contact breaker within the limit of 0,0148 in. (0,38 mm) up to 0,0164 in. (0,42 mm).

The opening of the contact breaker at the exact moment can be checked with:

an ignition timing tool (p. e. Bosch EWA 87).

Connect one cable of the ignition timing tool to the contact lever, the second cable connect to the earth. Switch on the instrument. The instrument produces a weak buzzing sound and the control light glows faintly. By turning the rotating armature in the sense of engine rotation, the buzzing sound becomes stronger and the control light begins to glow brighter at the moment the contact breaker points begins to open.

a control lamp (see fig. 29).

Two cables are soldered to (+) pole and (—) pole of a bulb of 6 V/1—3 W. Disconnect at the connecting plate cable (1). Then connect one cable of the test lamp to terminal 30/51, while the second cable is connected to the contact breaker. Having done this, the armature is turned counterclockwise until contact breaker is closed. If this happens the lamp lights up. Now continue turning the armature in the same direction, until the lamp is extinguished which indicates the exact point of ignition.

Adjusting Beam of Headlamp

The adjustment of the light has to be in accordance to the prescription of law. After loosening the tightening screw the complete headlamp is moveable in order to be adjusted.

Load the motor cycle with one person and adjust the head light only, then you will receive the proper "low beam position" automatically.

Adjust as shown at the sketch below. For this purpose it is necessary to designate a wall (see sketch) for adjustment of the high beam position.

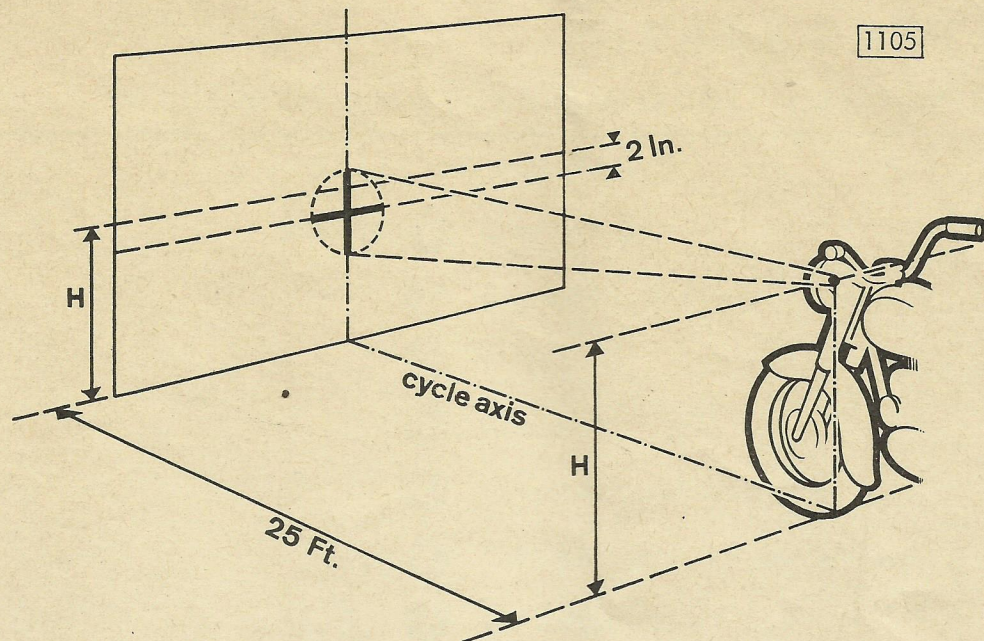


Fig. 30: Motor cycle position with respect to wall

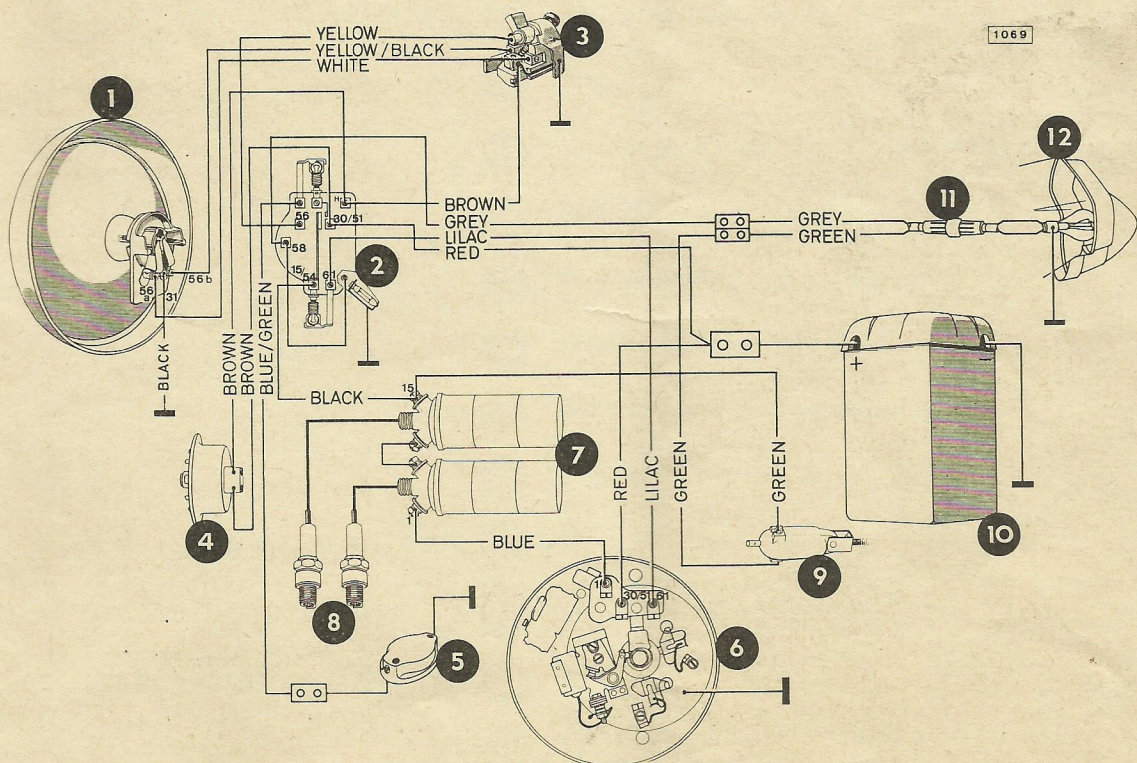


Fig. 31

- | | |
|---|--|
| 1 Head lamp, bulb 6 V 35/35 W | 7 Ignition coils |
| 2 Combined switch, control lamps bulbs 6 V 2 W tubular bulb 6 V 3 W | 8 spark plugs |
| 3 Dimmer switch | 9 stop light switch |
| 4 Horn | 10 Battery 6 V 7 Ah |
| 5 Idle gear indicator | 11 Screw-plug |
| 6 Generator | 12 Rear- and stop light, bulb 6 V 6/18 W |

