

RALEIGH

ROMA

SCOOTER

MODEL RS1

WORKSHOP MANUAL

PRICE 9/6



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RALEIGH INDUSTRIES LIMITED

Motorised Division Service Department,
Lenton Boulevard,
NOTTINGHAM.

An illustrated spare parts list covering this model
is available at a price of 3/6 post free.

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TECHNICAL DATA

ENGINE

Type: single cylinder, two-stroke.
Bore: 48 mm.
Stroke: 43 mm.
Cubic Capacity: 77.8 c.c.'s.
Compression ratio: 7 to 1.

Maximum power: 3.7 b.h.p. at 6,250 r.p.m.

Mounting: by flexible rubber bushes.

Cooling: by air ducted through scoop above front mudguard on to generously-finned cylinder head and barrel.

ENGINE LUBRICATION

For details of lubrication, see page 4.

IGNITION

By flywheel magneto with separate H.T. ignition coil.

Spark advance, 30° before T.D.C.

Contact breaker points gap, 0.017"–0.019".

Recommended sparking plugs:—

Marelli CW24ON. Champion L86.
KLG F80. Lodge 2 HN.

Sparking plug electrode gap, 0.020".

CARBURETTOR

Dell'Orto ME 15 BS with air intake silencer and built-in air cleaner.

Semi-automatic cold start control.

Choke size: 15 mm.

Main jet: 65.

Pilot jet: 38.

Throttle slide: 50.

Needle: G1.

Needle position: second slot.

Needle jet: 258A.

Pilot air screw setting: 1½–2 turns open.

CLUTCH

Multi-plate, running in oil-bath, with alternate plates of friction material and polished steel.

GEARBOX

Three speeds, with constant-mesh gears engaged by expanding alloy-steel plungers.

Gear ratios: First: 1 : 3.

Second: 1 : 1.67.

Top: 1 : 1.052.

The oil capacity of the gearbox and interconnected primary drive housing is a little over ½ pint. For details of lubrication, see page 4.

TRANSMISSION

Primary drive by helical gears. Ratio: 1 : 3. (19 teeth on mainshaft pinion to 57 teeth on clutch gear.)

Final drive by enclosed roller chain.

½" pitch × ⅝" wide × 80 pitches. Ratio: 1 : 2.214. (14 teeth on gearbox sprocket to 31 teeth on rear wheel sprocket.)

Overall gear ratios: First: 1 : 19.93.

Second: 1 : 11.1.

Top: 1 : 7.

STARTING

By kickstarter, operating through ratchet-engaged constant mesh gear.

FUEL SUPPLY

Gravity feed from 1½ gallon capacity fuel tank with reserve supply of ¾ pints.

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WHEELS AND TYRES

Pressed steel wheels with dividing rims.

Rim width: 2.45".

Tyre size: 3.50" × 8".

Tyre pressures in lbs. per sq. inch:—

Solo: Front—16.
Rear—20.

With pillion: Front—16.
Rear—34.

HUBS AND BRAKES

Light alloy hubs running on ball bearings.

Brake drum diameter: 105 mm.

Brake lining width: 25 mm.

ELECTRICAL EQUIPMENT

Flywheel magneto-alternator with output of 6 volts, 28 watts.

External H.T. ignition coil.

4.0" diameter headlamp with pilot light bulb and main bulb for high beam or dipped beam.

Rear lamp.

Electric horn.

Headlamp bulb (high/dipped beam): 6 v., 25/25 w., twin filament, bayonet cap.

Headlamp bulb (pilot light): 12 v., 10 w., festoon.

Rear lamp bulb: 6 v., 5 w., festoon.

DIMENSIONS AND WEIGHTS

Wheelbase: 43 $\frac{3}{4}$ ".

Maximum length: 65".

Maximum width: 23 $\frac{1}{4}$ ".

Maximum height: 39 $\frac{3}{4}$ ".

Weight, empty: 172 lbs.

RECOMMENDED LUBRICANTS

		B.P.	Castrol	Esso	Mobil	National Benzole	Shell
Engine Petrol/oil ratio shown in brackets	Two-Stroke Oils Pre-Mixed Fuels	Energol Two-Stroke Oil (20 : 1) B.P. Zoom (20 : 1)	Two-Stroke Self-Mixing Oil (16 : 1) —	Two-Stroke Oil (16 : 1) —	Mobilmix T.T. (16 : 1) —	— Hi-Fli* (20 : 1)	2T Two-Stroke Oil (20 : 1) 2T Mixture (20 : 1)
Running in: Where a (20 : 1) ratio is specified, use (16 : 1) for running in. Where a (16 : 1) ratio is specified, use (12 : 1) for running in							
Gearbox	Grade	Energol S.A.E. 90	Castrol S.T. 90	Esso Gear Oil S.T.90	Mobilube GX 90	—	Dentax 90
Driving Chain	Grade	Energol S.A.E. 50	Grand Prix	Extra Motor Oil 40/50	Mobiloil B.B.	—	X100 Motor Oil S.A.E. 50
Working Joints, Control Cables, Etc.	Grade	Energol S.A.E. 20W	Castrolite	Extra Motor Oil 20W/30	Mobiloil Arctic	—	X100 Motor Oil S.A.E. 20W
All Greasing Applications	Grade	Energrease L.2	Castrollease LM	Multi-purpose Grease H	Mobil-grease MP	—	Retinax A

*NATIONAL BENZOLE CO. LTD., ALSO MARKET SHELL AND B.P. LUBRICANTS

IMPORTANT NOTES

Maintenance and overhaul operations on the Raleigh "Roma" scooter are perfectly straightforward and should present no difficulties whatever to the competent mechanic.

The information and instructions contained in this Service Manual are intended to provide the mechanic with the necessary knowledge to cover all aspects of servicing and maintenance.

PRELIMINARY CLEANING— WASHING

Before commencing any dismantling or repair work it is always advisable to clean the machine thoroughly, or at least the parts adjacent to those on which the work is to be carried out. It often happens that during this preliminary cleaning one can spot faults which otherwise might pass undetected, such as loose or missing nuts and bolts, damaged or worn components, etc.

Too much emphasis cannot be laid on the tidiness and cleanliness of the workbench, the tools and all the other equipment to be utilised. The rags used for external cleaning operations and consequently soiled with dirt and grit, must be kept separate from those used for cleaning and drying the working parts.

For the mechanical parts it is advisable to have a large washing tray and a plentiful supply of clean paraffin. It is preferable for the various pieces to be dried out with a jet of compressed air.

SPANNERS AND TOOLS

For all dismantling and assembly work, use spanners, tools and extractors in good condition. Avoid the

use of improvised or inefficient equipment, which often results in a loss of time and is liable to damage the parts to be handled. Service tools available are listed on page 46.

SEQUENCE OF DISMANTLING

When dismantling, take careful note of the sequence of removal of the various components in order to be able to re-assemble them in the correct order. On no account mix the parts with similar ones belonging to other machines.

GASKETS

As a general rule, use new gaskets unless the old ones are still in very good condition. Gaskets should be smeared with engine oil or grease. The use of adhesive jointing compounds is to be avoided. These compounds leave hard deposits on the surface of application which will have to be removed with a sharp tool on the occasion of subsequent dismantling, thus indirectly causing scratches and subsequent oil leakage.

OIL SEALS

Spare oil seals should be kept in a tin stored in a ventilated and dry place. They must be carefully fitted on their seats, preferably by hand (or with the aid of a length of tube of similar diameter to the outside of the seal) after being smeared with engine oil.

Shafts should be inserted into the seals with the assistance of a tapered push rod to avoid damaging the internal lips of the seals. The section of the shaft in contact with the seal must be perfectly smooth,

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otherwise the oil seal will become damaged in a very short time, causing the joint to leak.

BALL AND ROLLER BEARINGS

The bearing tracks, the balls and the rollers must show a surface which is uniformly polished and bright. If signs of roughness or pitting are detected at any point, the bearing must be changed at once. Check that the cages, too, are in perfect condition.

In used bearings which are in good condition, the play should be barely noticeable when they have been washed and degreased. If play is apparent, even when the bearing is smeared with oil, the bearing is worn and must be replaced.

Due to the interference fit of the

bearings in their housings, the clearances will be very slightly greater with the bearings removed. This should be borne in mind when checking for wear.

FITTING SHIMS AND TIGHTENING BOLTS

When reassembling, carefully replace all shims, each of which has a thickness bearing a definite relation to the dimensions of the parts between which it is inserted.

Before commencing to assemble, make sure that the various parts are perfectly clean and dry.

On page 46 are given the torque figures necessary for the correct tightening of the most important bolts.

ENGINE, GEARBOX AND FUEL SYSTEM SERVICING

ACCESSIBILITY

The engine is easily accessible after removing the footboards and engine cover, which are detached as follows:—

Release the footboard screws and fold the footboards outwards. To permit the right footboard to fold out, it is necessary to depress the kickstarter. Once folded, the footboards can be removed by pulling them rearwards and sliding them off their hinge pins. Do not release the kickstart pedal violently, but allow the spring to unwind gently.

To take off the engine cover after the removal of the footboards, unscrew the four fixing screws, lift the cover and release it from the rubber sleeve of the carburettor.

When re-fitting, take care that the sleeve is well seated both on the

carburettor and on the engine cover air intake.

OIL CHANGING

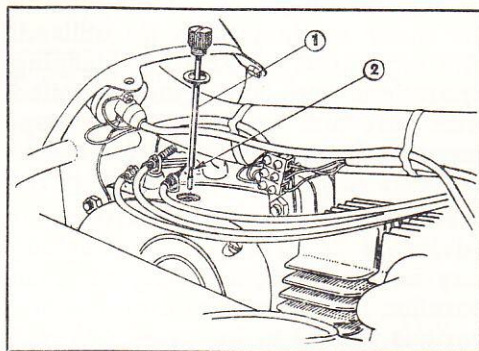
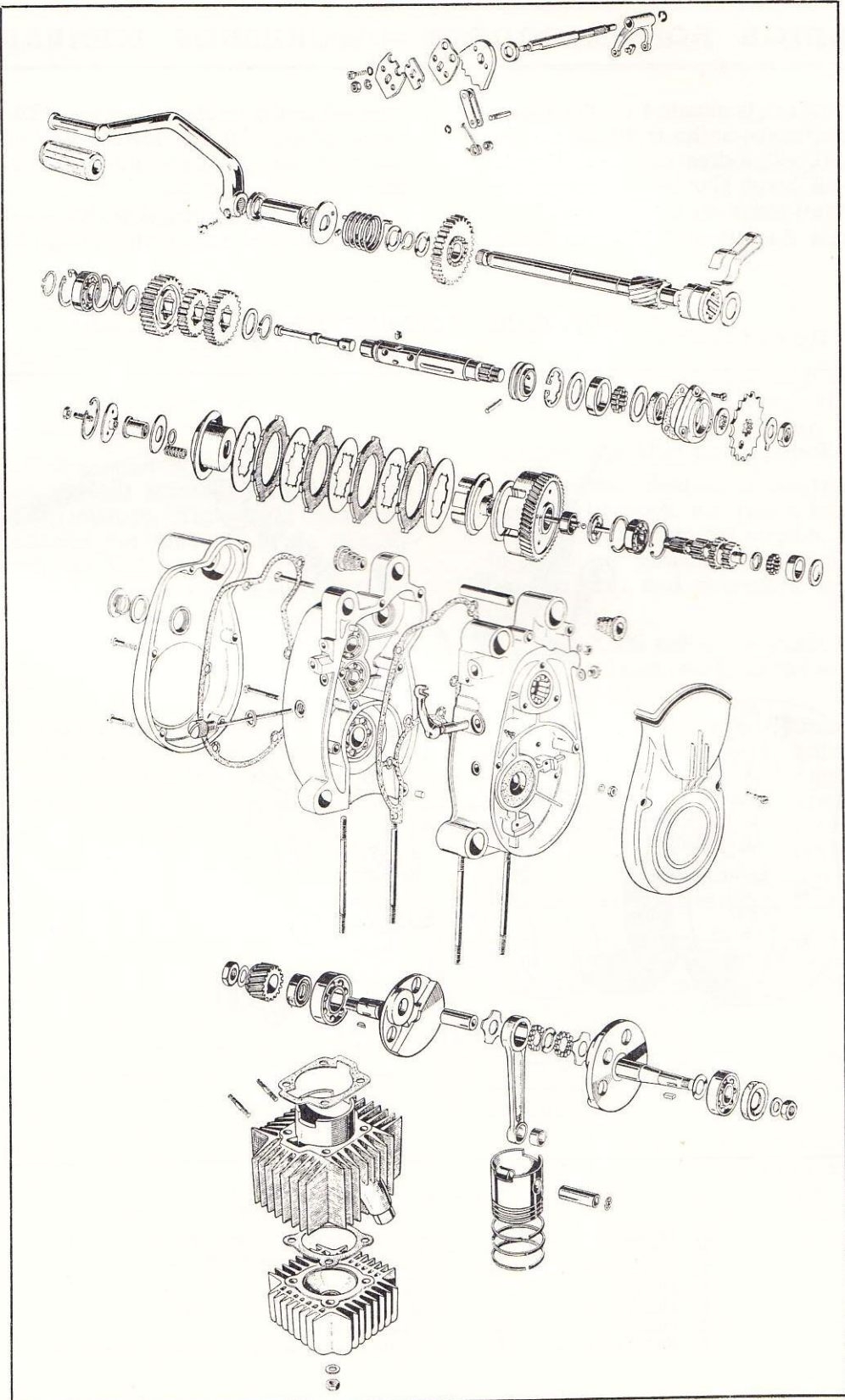


Fig. 1

Checking gearbox oil level

1. Oil level dipstick
2. Level mark

Gearbox oil level should be checked from time to time. To assist with this operation, the filler



EXPLODED VIEW OF ENGINE/GEARBOX UNIT

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plug, which is situated on the top of the crankcase at the right-hand side, is fitted with a dipstick. (See Fig. 1.) The oil level should be within the recessed mark on the dipstick.

Drain the oil at 5,000-mile inter-

vals when the engine is warm. The drain plug is at the lowest part of the gearbox, in line with the kick-starter shaft.

Use an approved S.A.E. 90 gear-box oil when re-filling. (See page 4.)

ADJUSTING CARBURETTOR

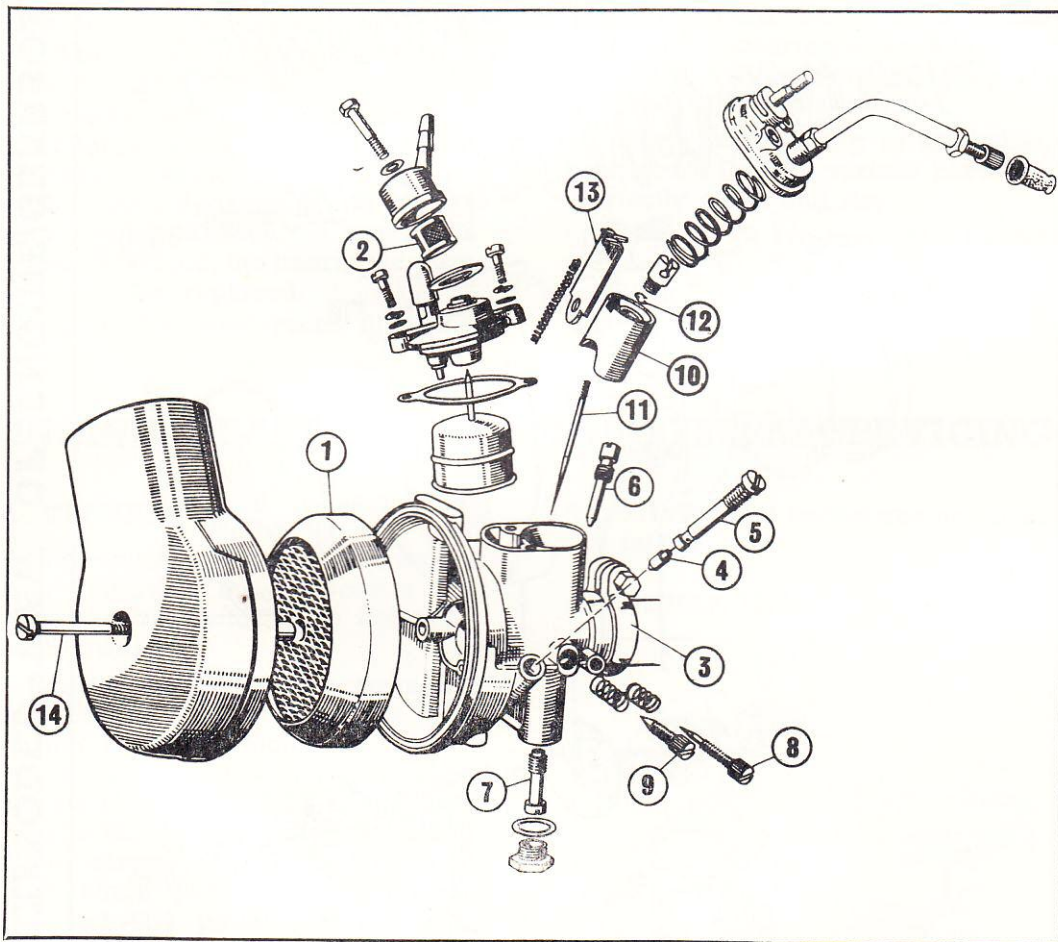


Fig. 2

- | | |
|------------------|-----------------------------------|
| 1. Air cleaner | 8. Pilot air regulating screw |
| 2. Fuel filter | 9. Throttle slide adjusting screw |
| 3. Fixing clamp | 10. Throttle slide |
| 4. Main jet | 11. Taper needle |
| 5. Main jet plug | 12. Needle clip |
| 6. Pilot jet | 13. Cold start shutter |
| 7. Needle jet | 14. Air cleaner fixing screw |

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The adjustment for throttle cable tension is by means of the adjuster on top of the mixing chamber. (See Fig. 2.) Pull back the rubber sleeve, release the locknut, unscrew the adjuster to take up slack and screw it in to provide more.

The throttle stop screw is the foremost of the two spring-loaded adjusting screws on the left of the carburettor body. Screw in to increase the engine idling speed, screw out to decrease.

The second of the two screws is the pilot air screw and controls the idling mixture. Tightening the screw reduces the amount of air mixing with the fuel from the pilot jet and thus provides a rich mixture. Conversely, unscrewing provides a weaker mixture. The normal adjustment for this screw is $1\frac{1}{2}$ to 2 turns open.

Mixture control of the main jet at medium throttle openings is carried out by means of the adjustable taper needle which is retained in the throttle valve by a spring clip. To adjust, remove the mixing chamber cover, which is retained by two screws, and lift out the throttle valve, needle assembly. Remove the valve from the cable. (The cable is retained by the brass plug, which can be held with the blade of a screwdriver whilst the valve is unscrewed from it.) For a weaker mixture, lower the needle in the valve by one slot (raise the clip) and for a richer mixture, raise the needle (lower the clip).

Full throttle mixture is controlled by the main jet. This component has been carefully selected and found to be best for all-round use. We do not, therefore, recommend the fitting of alternative sizes.

It is recommended that the original

setting of the carburettor should not be altered without good reason. Only under extremes of temperature or altitude should this be necessary, and under normal conditions the instrument will function with the minimum of attention.

CLEANING CARBURETTOR

Every 1,250 miles the carburettor air cleaner should be removed after undoing the central screw, and washed in a little clean petrol.

If this air cleaner is allowed to become blocked, too rich a mixture will be drawn into the engine, causing loss of power, increased fuel consumption and excessive carbon formation.

Every 2,500 miles the carburettor should be removed from the engine and dismantled.

If possible, do not disturb the setting of the throttle valve adjusting screw and the pilot air regulating screw, in order to avoid having to re-adjust these when the carburettor is refitted. If the screws have to be removed, note their settings and return them to the same positions.

Wash the whole instrument in clean petrol and blow through the passages with compressed air. Never use a pin, needle or piece of wire, etc., to clear the jets or the other small passages in the carburettor, as this may enlarge them and upset carburation.

On re-assembling the carburettor, ensure that all the joints and washers are replaced in their correct positions and that they are in good condition, to avoid any possibility of leakage of fuel.

Refit the carburettor to the engine with the float chamber exactly vertical.

FUEL TAP

To gain access to the fuel tap, it is necessary to remove the scooter body as described on page 41.

The tap is fitted with a readily replaceable plastic seal. To change the seal, drain the fuel tank, unscrew the hexagon gland nut (15 mm. spanner) and lift out the old seal, using a pen-knife or other sharp pointed instrument.

Thoroughly clean out the fuel tap and fit the new seal, making sure that the seal is correctly located on the three spigots inside the tap. Before refitting the rotor and gland nut assembly, inspect the seating

face of the rotor for burrs or other damage and rectify if necessary. Replace and securely tighten the gland nut assembly.

A gauze filter is fitted to the fuel tap. Should the filter require cleaning, unscrew the tap from the fuel tank, wash in clean petrol and blow through with compressed air in the reverse direction to normal flow with the tap first in the "ON" position and again with the tap in the "RESERVE" position. The filter unscrews from the tap body, although it should not be necessary to detach the filter for normal cleaning.

ADJUSTING CLUTCH

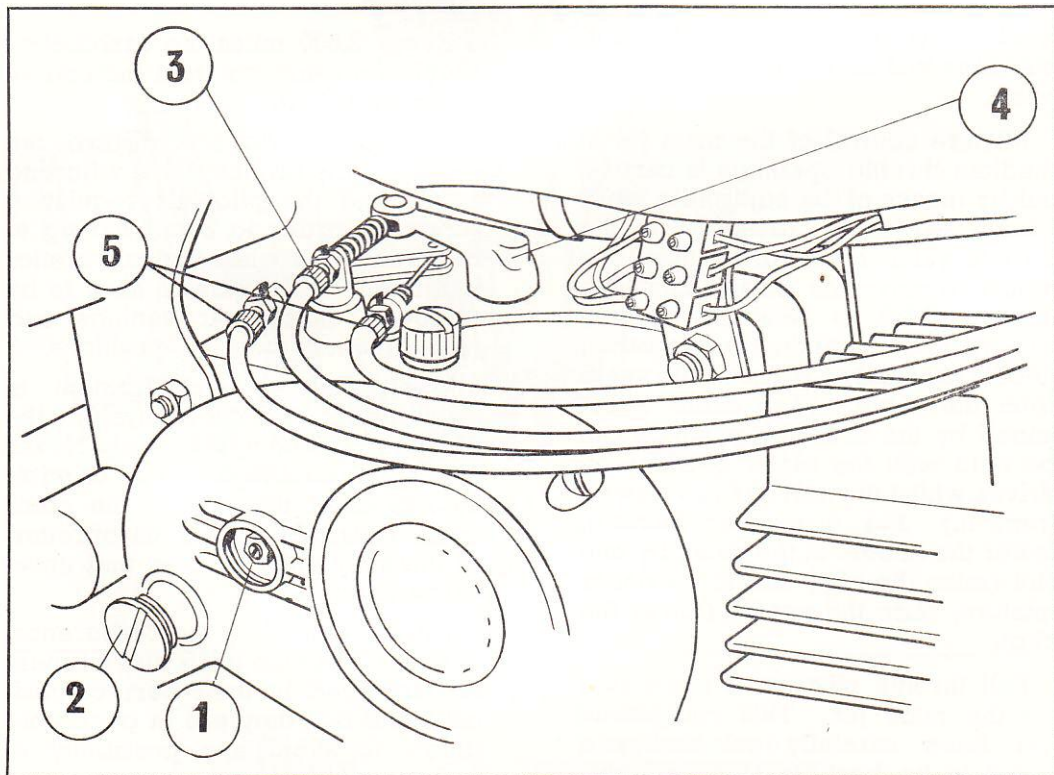


Fig. 3

- | | |
|---------------------------------------|-------------------------------|
| 1. Clutch adjusting screw and locknut | 3. Clutch cable adjuster |
| 2. Clutch access plug | 4. Clutch operating lever |
| | 5. Gearchange cable adjusters |

The purpose of the clutch cable adjuster (see Fig. 3) is mainly to compensate for slack in the cable at the handlebar lever. Adjustments due to clutch plate or thrust-rod wear should be made with the adjusting screw and locknut in the centre of the clutch unit, which comes into view when the special plug in the primary-drive cover is removed. To adjust, remove this plug, slacken off the cable adjuster and also the thrust-rod adjusting screw locknut. Push the small lever on top of the crankcase anti-clockwise until it comes to rest. Tighten or release the adjusting screw until the lever lies parallel to the main frame tube. Tighten the screw locknut in this position and re-adjust the flexible cable to allow about $\frac{1}{8}$ "- $\frac{1}{16}$ " free movement at the handlebar lever.

ADJUSTING GEAR CHANGE

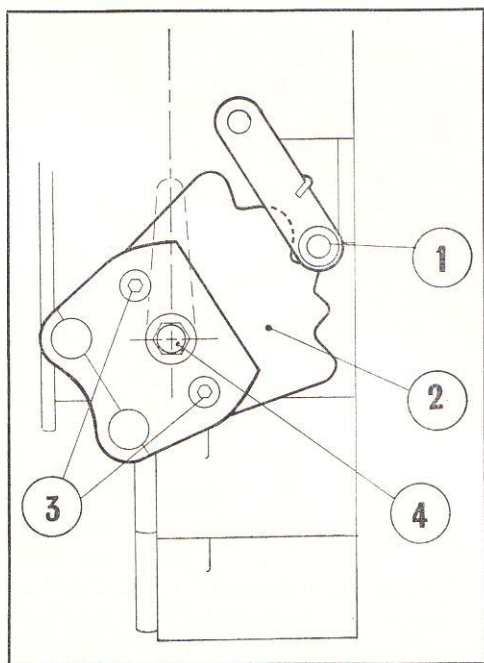


Fig. 4

- | | |
|----------------------|-----------------------|
| 1. Roller arm | 3. Socket head screws |
| 2. Selector quadrant | 4. Selector shaft nut |

Put the gears into neutral by operating the gear selector on top of the gearbox (see Fig. 4) and then adjust the cables until the index on the twistgrip lines up with the neutral mark on the handlebar. Both cables should be put under slight tension to avoid lost motion at the gear-change twistgrip.

To ensure that the gear is correctly engaged when the roller is in the centre of the depression in the quadrant, provisionally tighten the screws and move the quadrant slightly to right and left. The roller should be at an equal distance to each side of the depression when the gear comes out of engagement. If not, loosen the two socket head screws which clamp the quadrant to the selector plate and re-align the quadrant. When correct adjustment is obtained, fully tighten the screws, ensuring that no relative movement takes place between the quadrant and the selector plate meanwhile.

ADJUSTING CONTACT BREAKER POINTS

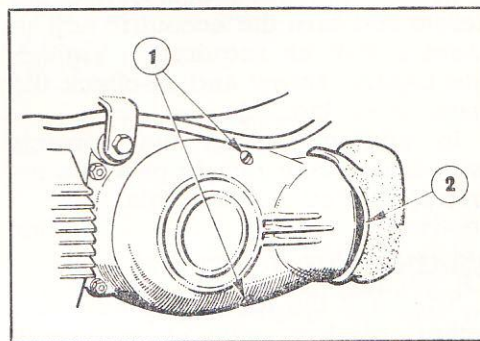


Fig. 5

- | |
|------------------------------|
| 1. Cover screws |
| 2. Chaincase flexible gaiter |

Access to the magneto is gained by removing the two screws securing the left-hand crankcase cover and taking off the cover, which has

to be freed from the chaincase flexible gaiter. (See Fig. 5.)

Every 1,250 miles check the contact breaker points gap, which should be 0.017"-0.019" and adjust if necessary.

To adjust the contacts, rotate the flywheel until the moving contact is fully opened by the cam.

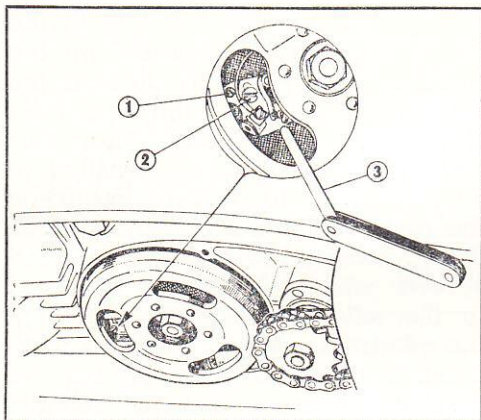


Fig. 6

Adjustment of contact breaker points

1. Eccentric adjustment screw
2. Fixed contact locking screw
3. Feeler gauge for checking gap

Loosen the fixed contact locking screw and turn the eccentric adjustment screw as required. Tighten the locking screw and re-check the gap. (See Fig. 6.)

In addition, clean the contacts with a non-fluffy rag dipped in pure petrol or methylated spirits.

TIMING THE IGNITION

To check the ignition firing point, either of two methods may be employed but in either case first check and adjust if necessary, the contact breaker points gap.

Method 1

Remove the sparking plug and screw in its place the special ignition advance gauge, Part No. 6200556.

Rotate the flywheel anti-clockwise until the piston is at top dead centre. (Apply light finger pressure to the plunger of the timing gauge to keep it in contact with the piston.) Turn the flywheel backwards (clockwise) until the plunger has receded by $\frac{9}{64}$ ". At this position, the contact breaker points should just be beginning to open. To adjust the ignition timing, loosen the three screws which secure the stator plate in its housing and rotate the stator plate, which has slotted holes for this purpose, until the opening of the points coincides with the $\frac{9}{64}$ " before T.D.C. position of the piston.

Method 2

If the special ignition advance gauge is not available, the timing may be checked by finding the T.D.C. position of the piston with a pencil or other suitable tool inserted in the sparking plug hole.

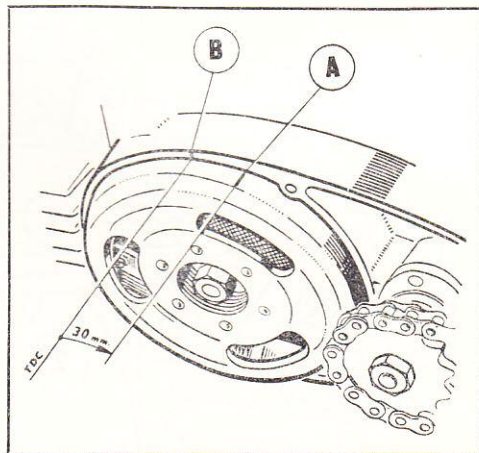


Fig. 7

Make two reference marks with a pencil, one on the flywheel (A) and the other on the crankcase (B), both in line. (See Fig. 7.) Rotate the flywheel backwards (in a clockwise direction) until the distance between

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the two reference marks is 30 mm. ($1\frac{3}{16}$ "). Exactly at that point, the contact breaker points should start opening. If adjustment is required,

slacken the three stator plate fixing screws and move the stator plate by the necessary amount. Firmly re-tighten the screws.

DISMANTLING THE ENGINE/GEARBOX UNIT

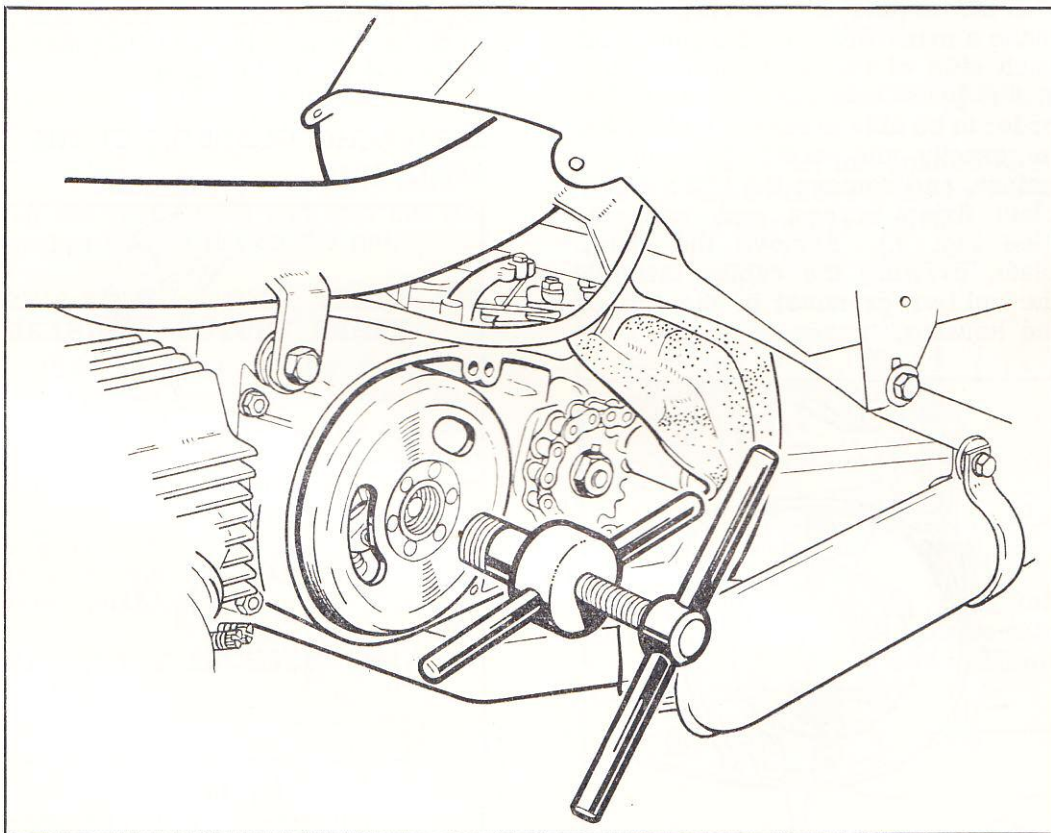


Fig. 8
Using the flywheel extractor

REMOVING MAGNETO FLYWHEEL

Retract the centre stand and select top gear. (Rock the scooter "to and fro" in order to facilitate gear selection and DO NOT FORCE the gear home.) Operate the rear brake in order to lock up the transmission, and using a 14 mm. spanner, unscrew the flywheel nut. If the nut is stubborn, give the spanner a sharp tap with a hammer. Remove the nut

and washer and apply the flywheel extractor (Part No. 6200520) in order to remove the flywheel. (See Fig. 8.) Take out the key from the slot in the shaft.

REPLACING MAGNETO FLYWHEEL

Replace the flywheel in reverse order to dismantling. The key is re-fitted with the taper underneath and towards the flywheel nut.

REMOVING STATOR PLATE

Detach the magneto wires from the terminal block on the frame, taking note that the connections are colour coded, i.e., red to red, black to black, blue to blue.

If the engine is correctly timed, make a mark with a centre punch on each side of the joint between the stator plate and the crankcase in order to be able to re-assemble them in exactly the same position as before, and remove the three stator plate fixing screws and washers. (See Fig. 9.) Remove the stator plate, drawing the cables through the rubber grommet in the top of the housing.

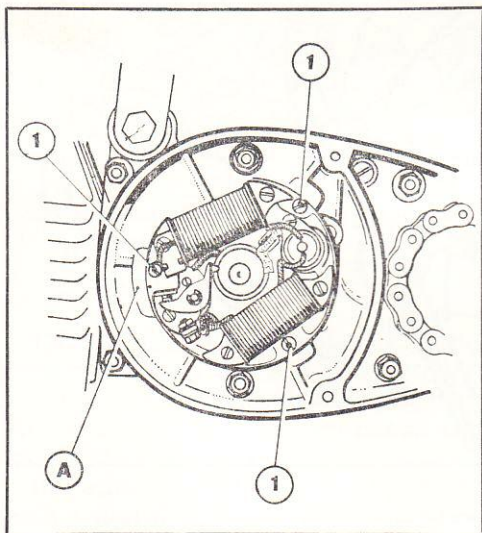


Fig. 9

- A. Centre punch marks
- 1. Stator plate fixing screws

REFITTING STATOR PLATE

If the reference marks mentioned previously have been made, it is sufficient to reverse the operations described in connection with dismantling, taking care that these marks correspond exactly.

If there are no marks, re-time the ignition as described above.

REPLACING MAGNETO-SIDE CRANKSHAFT OIL SEAL

Remove the flywheel and stator plate and hook out the old oil seal with a small screwdriver. Take great care to avoid damaging the internal lip of the new oil seal when fitting and ensure that the seal is pushed fully and squarely home.

REMOVING GEARBOX CHAIN SPROCKET

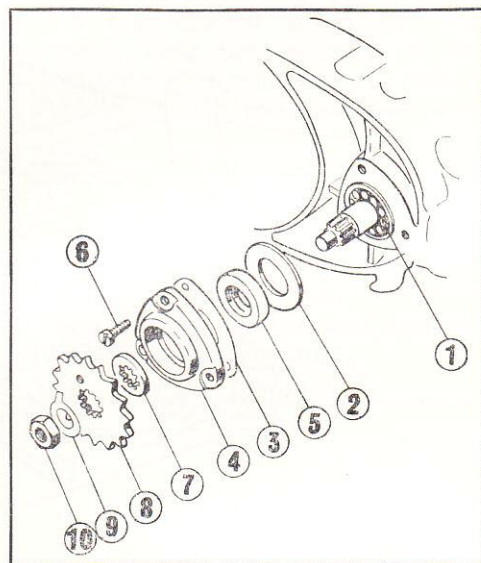


Fig. 10

- 1. Output shaft bearing
- 2. Locating washer
- 3. Paper joint
- 4. Oil seal housing
- 5. Oil seal
- 6. Housing screws rollers
- 7. Splined spacing washer
- 8. Sprocket
- 9. Tab washer
- 10. Sprocket nut

In addition to removing the left-hand crankcase cover, the chain will have to be disconnected, but first, with a hammer and punch, flatten out the sprocket tab washer (see Fig. 10) and unscrew the sprocket nut (19 mm. spanner), holding the sprocket by application of the rear brake.

Rotate the rear wheel until the spring connecting link appears from

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the chaincase and disconnect the link. Remove the chain from the sprocket and hold the two free ends in order to prevent them from falling out of reach into the chaincase. Draw off the sprocket.

REPLACING GEARBOX CHAIN SPROCKET

Fit the sprocket, replace the chain and connecting link and fit the nut and a new tab washer. Tighten the nut, holding the sprocket by applying the rear brake and fold the tab washer over a flat on the nut.

REPLACING OIL SEAL ON GEARBOX OUTPUT SHAFT

After removal of the sprocket, the splined spacing washer and three securing screws, the oil seal housing plate can be withdrawn and a new oil seal fitted. Take care not to lose the spacing washer which is fitted behind the plate. Tighten the screws evenly when replacing.

REMOVING KICKSTARTER CRANK

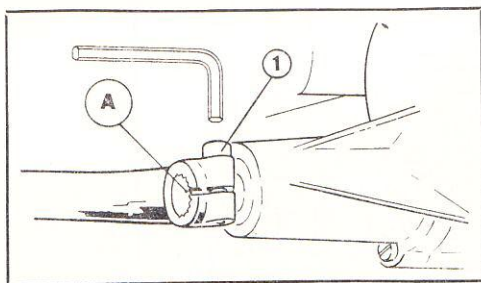


Fig. 11

A. Positioning Mark. 1. Socket head screw

Mark the kickstarter shaft and crank in order to be able to replace them in their correct relative position. (See Fig. 11.) With a 5 mm. socket key from the scooter toolkit, release the crank clamp screw, then slide the crank from the shaft.

REPLACING OIL SEAL ON KICKSTARTER SHAFT

Drain the oil from the gearbox. Replace the seal from the outside, using a screwdriver to hook out the old one.

Take care not to damage the new seal on the shaft splines.

FITTING THE KICKSTARTER CRANK

Fit the crank on the splined shaft with the pedal rubber at the 3 o'clock position, as shown in Fig. 12.

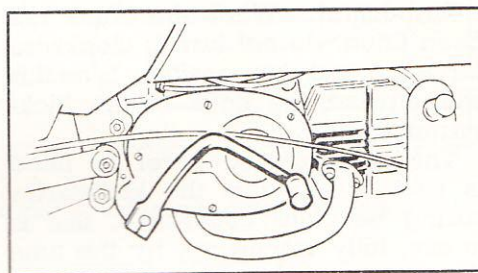


Fig. 12

Disengage the clutch, turn the kickstarter crank anti-clockwise into the position shown in Fig. 13 and refit the offside footboard.

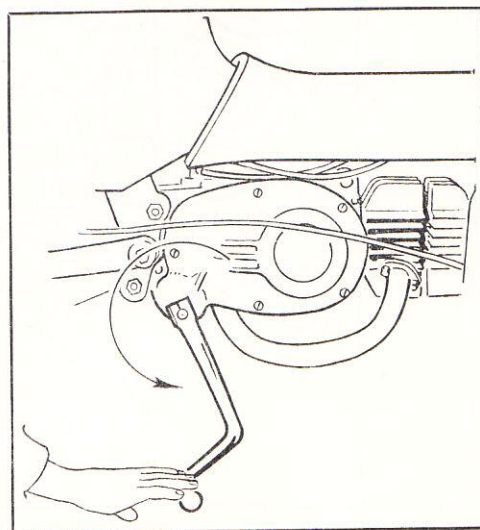


Fig. 13

Let the crank return against its stop on the footboard, as indicated in position 3. (See Fig. 14.)

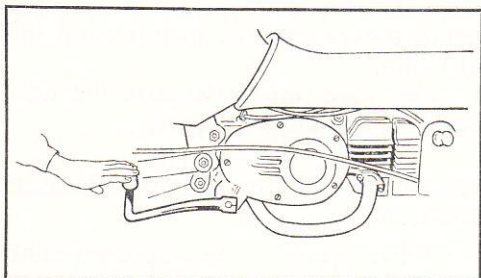


Fig. 14

Important. When the crank has been fitted, do not turn it clockwise further round than position 1, as this will unwind the coils of the kickstarter spring.

The crank should never be fitted in such a way that the kickstarter spring becomes coil-bound, that is to say, fully wound up, by the time the kickstarter crank reaches the bottom of its normal stroke when starting the engine.

REMOVING PRIMARY DRIVE COVER

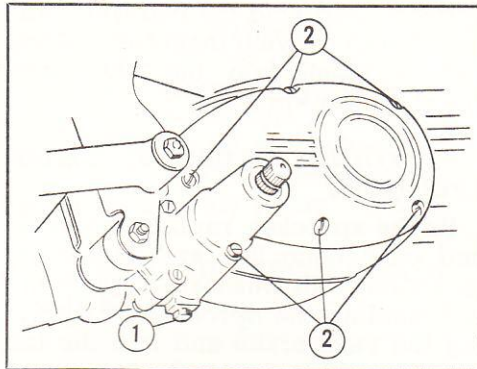


Fig. 15

1. Gearbox drain plug
2. Primary drive cover screws

First drain the oil from the gearbox. Remove the cable clip from the exhaust flange stud, take off the kickstarter crank and place a receptacle under the primary drive cover/crankcase joint to catch the oil drips, before releasing the six cover screws. (See Fig. 15.) Ease the primary drive cover off the kick-

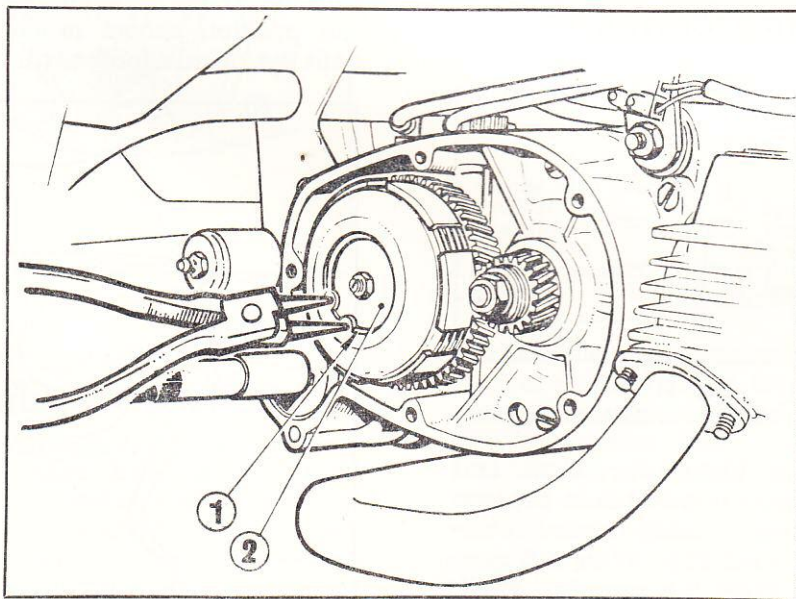


Fig. 16

1. Circlip
2. Clutch thrust plate

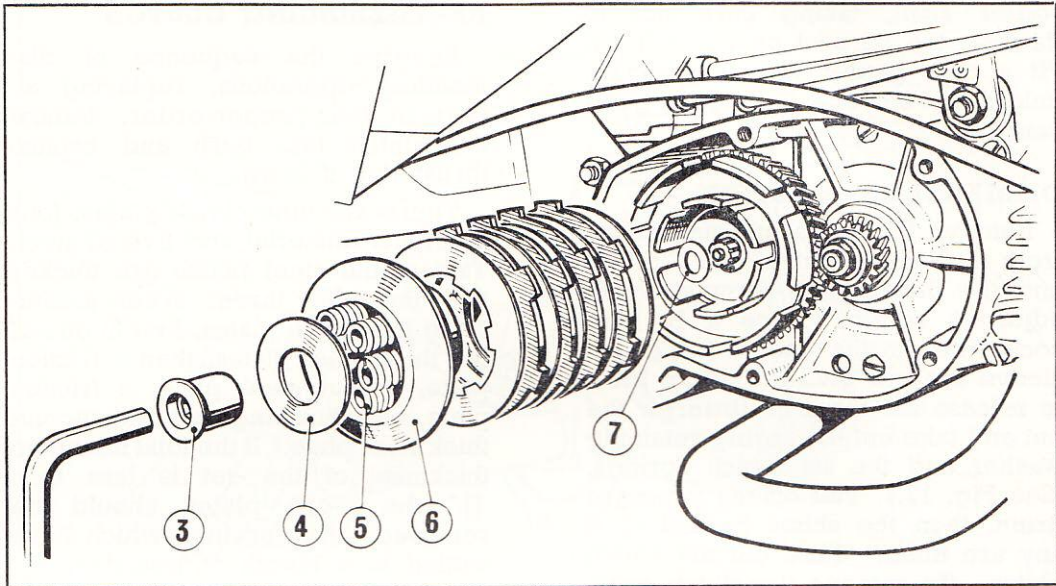


Fig. 17

3. Sleeve nut 4. Spring retaining washer 5. Clutch spring 6. Pressure drum 7. Shim washer

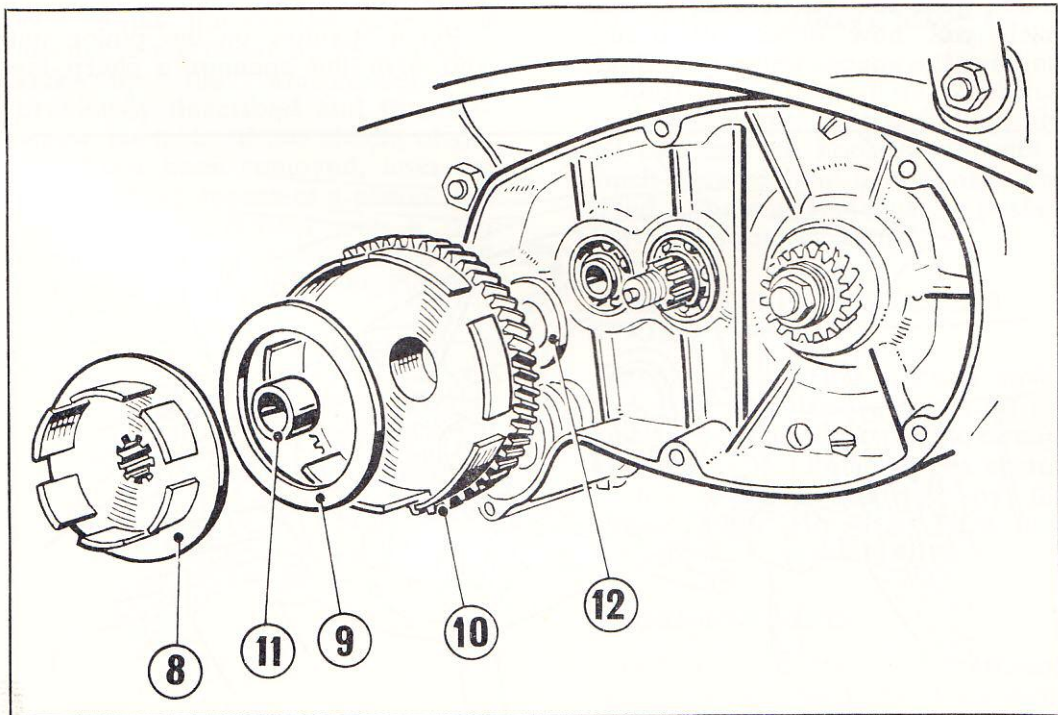


Fig. 18

8. Inner hub 9. Bronze thrust ring 10. Clutch gear 11. Bronze bush 12. Spacing washer

starter shaft, taking care not to damage the oil seal on the splines. Fit a new gasket when replacing, unless the old one is in very good condition.

DISMANTLING CLUTCH

Remove the large internal circlip from the clutch centre (see Fig. 16) and the thrust plate complete with adjusting screw. Place a 10 mm. socket key in the end of the clutch sleeve nut and give it a sharp blow to release the thread. Unscrew the nut and take out the spring retaining washer and the six clutch springs. (See Fig. 17.) Pull off the pressure drum, then the shims behind it, if any are fitted. Take out the clutch plates. To remove the clutch gear, pull the inner hub off the shaft (see Fig. 18) and remove the bronze thrust ring which is behind it. The clutch gear and its internal bronze bush will now come off easily. Remove the spacer behind the gear.

RE-ASSEMBLING CLUTCH

Reverse the sequence of dismantling operations, replacing all parts in their proper order. Renew the clutch hub bush and bronze thrust ring if worn.

There are nine clutch plates, four of friction material and five of steel. Two of the steel plates are thicker than the other three. When assembling the clutch plates, first fit one of the thick steel plates, then a friction plate, a thin steel plate, a friction plate, etc., finishing with the second thick steel plate. If the total minimum thickness of the set is less than $\frac{25}{32}$ " the worn plates should be renewed. Any springs which have settled to a length of less than $\frac{37}{32}$ " should also be replaced.

REMOVING CRANKSHAFT PINION

Put a spanner on the pinion nut and give the spanner a sharp tap

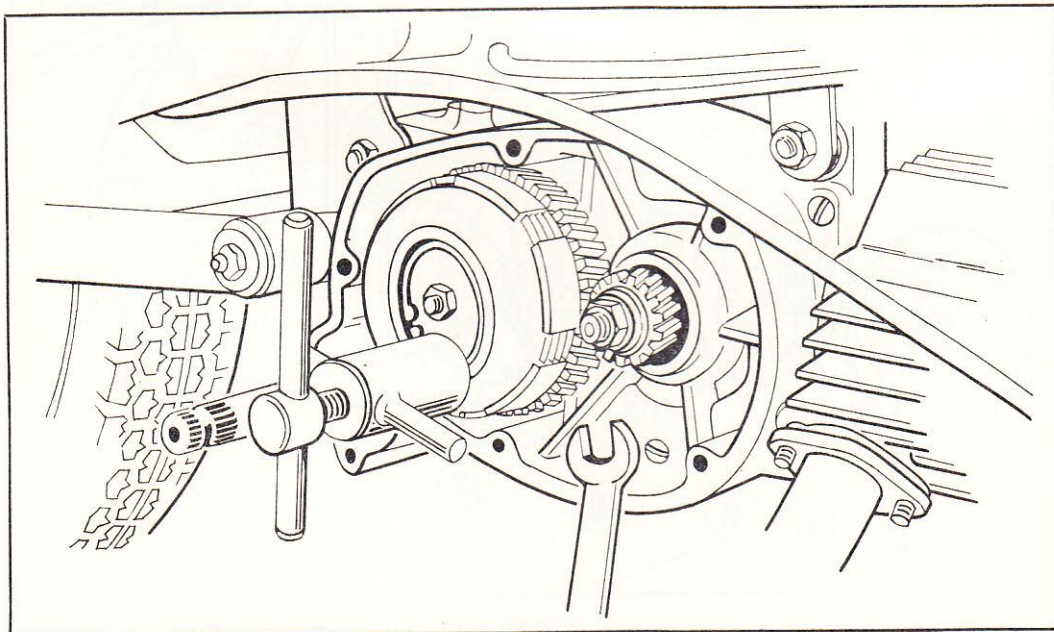


Fig. 19

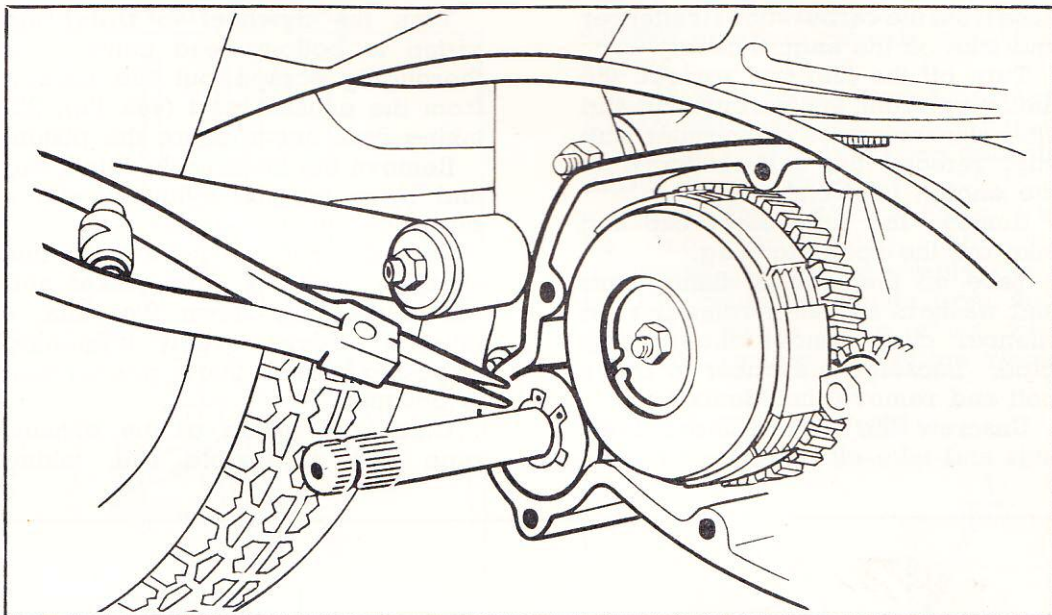


Fig. 20

to free the nut on the thread. If the nut is not freed by this method, lock up the transmission as previously described and then unscrew the nut. If the clutch, chain, etc., have been removed, hold the crankshaft by means of a piston stop or hold the flywheel with a peg spanner. Use extractor No. 6200519 to pull off the pinion. (See Fig. 19.)

REPLACING DRIVE-SIDE OIL SEAL

After removing the crankshaft pinion and the woodruff key, the oil seal can be hooked out with a small screwdriver and a new one fitted. The new seal must be pushed fully and squarely home.

REPLACING KICKSTARTER SPRING

Remove the primary drive cover and slide the distance piece off the kickstarter shaft. Take off the circlip. (See Fig. 20.) Remove the spring anchor washer, followed by the spring. (See Fig. 21.) Fit a new spring and re-assemble.

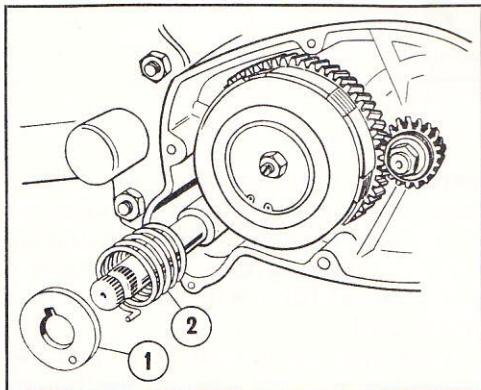


Fig. 21

1. Spring anchor washer 2. Kickstarter spring

DECARBONISING

Unscrew the footboard retaining screws, hinge back the footboards and slide them rearwards off their pivots. Unscrew the four engine cover screws, disengage the rubber

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hose from the carburettor air silencer and take off the engine cover.

Turn off the fuel tap, remove the fuel pipe from the carburettor and after slackening the carburettor stub clip, remove the carburettor from the engine inlet stub.

Remove the suppressor cap and take out the sparking plug.

Take off the exhaust flange nuts and washers and after releasing the silencer clip, remove the exhaust pipe. Loosen the silencer to frame bolt and remove the silencer.

Unscrew the four cylinder head nuts and take off the cylinder head

Turn the flywheel to bring the piston to bottom dead centre and thoroughly scrape out the carbon from the exhaust port (see Fig. 22) taking care not to score the piston.

Remove the loose scale with a rag and clean out the cylinder with a blast of compressed air.

Refit the cylinder head (long fins vertical), using a new gasket and carefully screw down the nuts, a little at a time, evenly tightening opposing nuts so that a perfect seal is obtained.

Clean the inside of the exhaust pipe with a flexible rod, taking

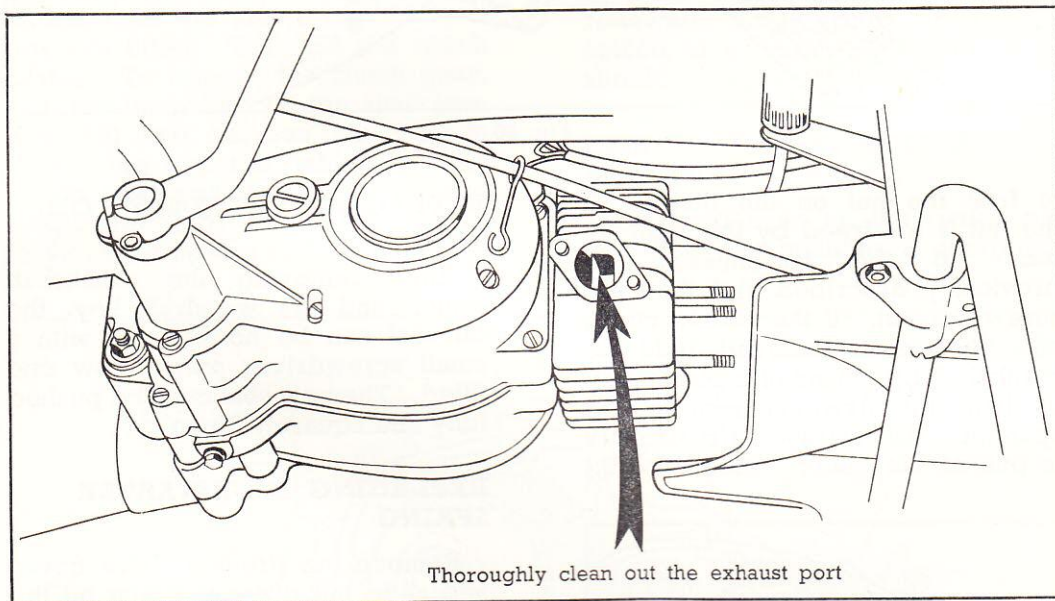


Fig. 22

and its gasket. Clean the inside of the head with a blunt scraper.

Remove the magneto-side crankcase cover, undoing the two screws and disengaging the chaincase rubber sleeve. Turn the flywheel by hand and bring the piston to top dead centre. Try not to break the cylinder base joint. Scrape the carbon from the piston crown.

particular care to clear all carbon from the bends. Clean the silencer and internal tube, after springing off the retaining clip and removing the internal tube with the help of a metal rod.

Re-assemble the silencer and replace the exhaust pipe and silencer on the machine, not forgetting to fit a new exhaust flange gasket.

DISMANTLING PISTON

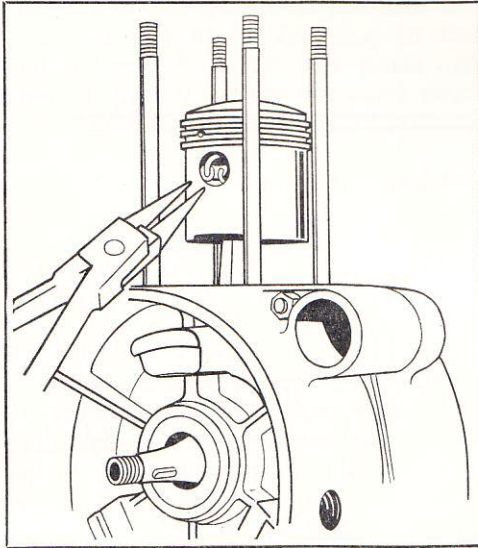


Fig. 23
Removing gudgeon pin circlips

Remove the cylinder head, bring the piston to bottom dead centre and draw off the cylinder. Bring the piston to top dead centre and with a pair of taper nosed pliers, remove the gudgeon pin circlips. (See Fig. 23.)

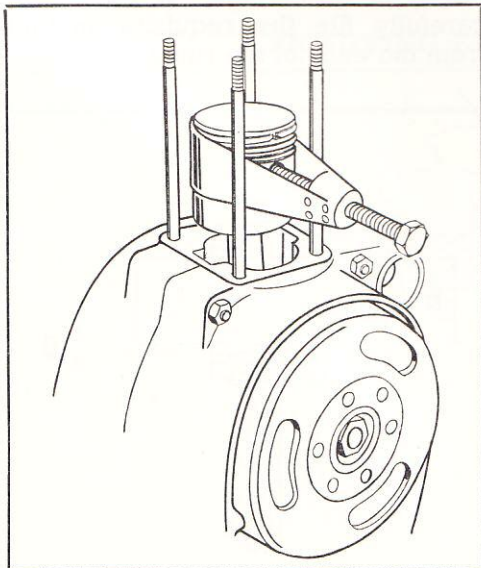


Fig. 24
Using the gudgeon pin extractor

Push out the gudgeon pin using 6200559 gudgeon pin extractor. (See Fig. 24.)

It will help if the piston is warmed during this operation. Wrapping it with a rag soaked in boiling water is usually quite sufficient.

Remove the piston. If there is to be no dismantling of the crankcase/gearbox assembly, protect the crankcase mouth from dirt, etc., by means of a clean rag. Carefully remove the piston rings.

PISTON CLEARANCES

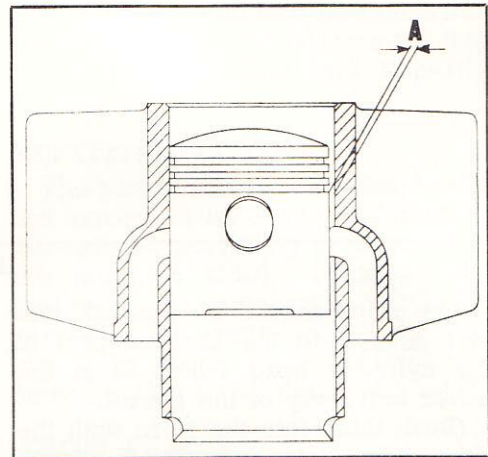


Fig. 25

Running clearances and values of maximum permitted wear for the piston and cylinder are given below:—

The clearance between cylinder and piston (A) (see Fig. 25) when new, is between 0.0035" and 0.0045". Maximum permitted clearance is 0.008".

The thickness (B) of the piston rings (see Fig. 26) is 0.0792" to 0.0797" when new. The height of the groove (C) must not exceed 0.0827". The piston ring gap (D) (with ring inserted in the cylinder) should not be less than 0.008", nor more than 0.020".

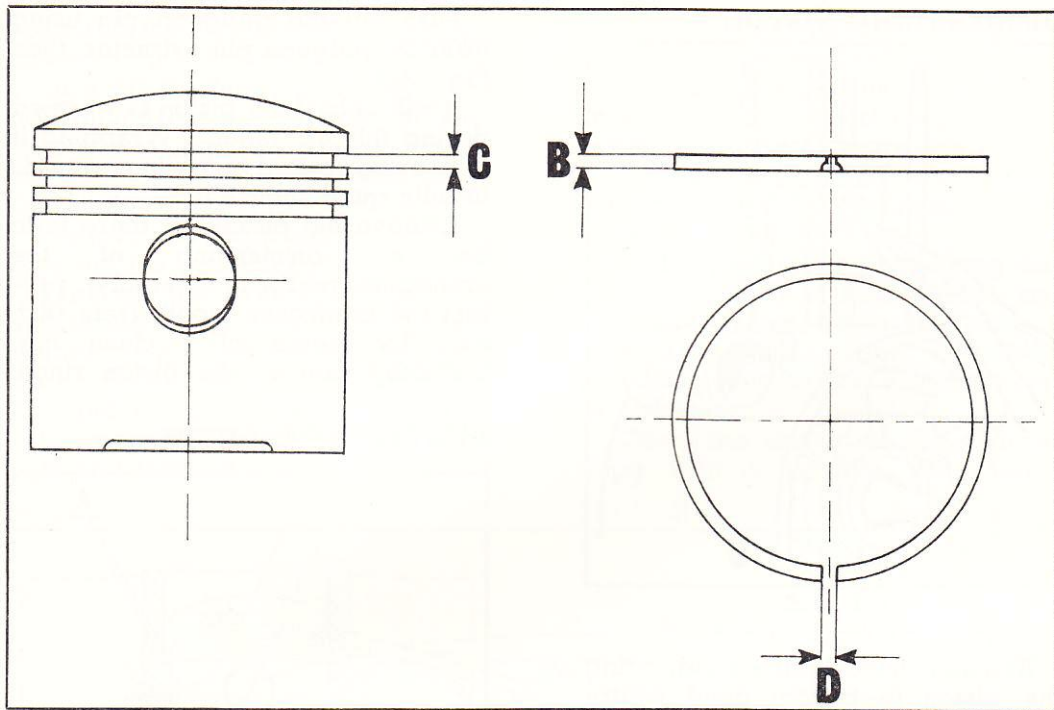


Fig. 26

The rings should be pushed, one at a time, into the unworn part of the cylinder bore which is at the lower extremity of the barrel.

(Push them into the bore with the skirt of the piston in order to ensure

squareness.) Check the ring gaps with feeler gauges while they are in the cylinder. If the gaps are too large, fit new rings. If too small, carefully file the requisite amount from the ends of the rings.

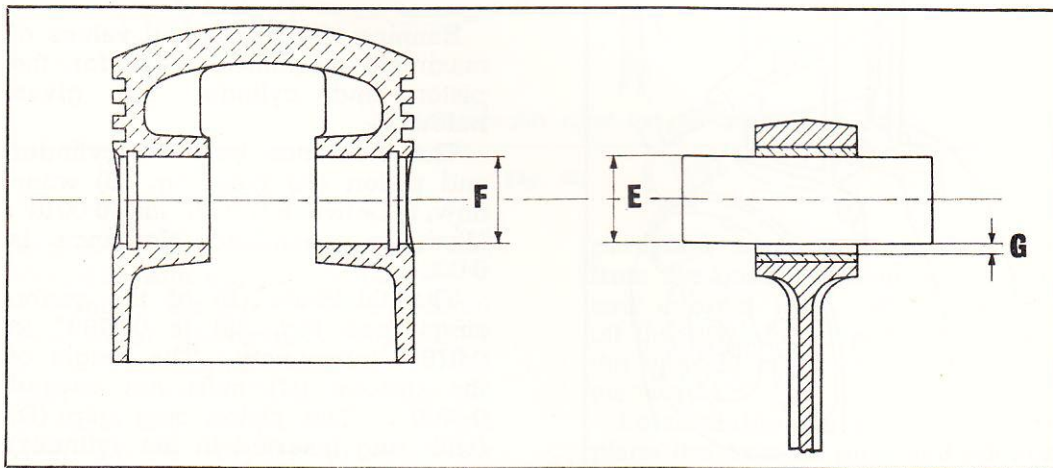


Fig. 27

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Between the diameter (E) (see Fig. 27) of the gudgeon pin and the diameter (F) of its housing in the piston there is, when the parts are new, a gap varying between zero and 0.0003". Maximum clearance due to wear, 0.0008".

Between the gudgeon pin and the small end bush in the connecting rod there is a clearance (G) varying between 0.0005" and 0.00085". Maximum play due to wear, 0.002".

PISTON RINGS

The rings can be considered to be in good condition if they present a uniformly smooth surface over their entire circumference. If, on the other hand, brown or other discoloured patches, or score marks are present, the rings should be replaced.

Examine the pegs in the ring grooves for looseness or wear. If they are loose, or appreciably worn, there is a strong possibility that they will allow the rings to rotate on the piston. If this happens the ring ends will spring out into the cylinder ports as the piston passes and cause

serious damage. If the pegs are not in good condition, there is no alternative but to obtain a new piston.

REPLACING SMALL END BUSH

Press out the small end bush from the exhaust side of the connecting rod. Avoid any bending stress on the connecting rod. Press in the new bush and punch the edge of the bush into the small depression on the magneto side of the small end eye. Using the holes in the small end eye of the connecting rod as guides, drill three $\frac{3}{32}$ " diameter oil holes in the bush.

The bush should now be reamed to size (14 mm.) and it is essential that this job is carefully and expertly carried out.

REFITTING PISTON

The piston should be refitted with the arrow on its crown pointing to the exhaust port (ring pegs towards the magneto side). Press in the gudgeon pin and take particular care that the gudgeon pin circlips are fully home in their grooves. New circlips must always be used.

REMOVING ENGINE FROM FRAME

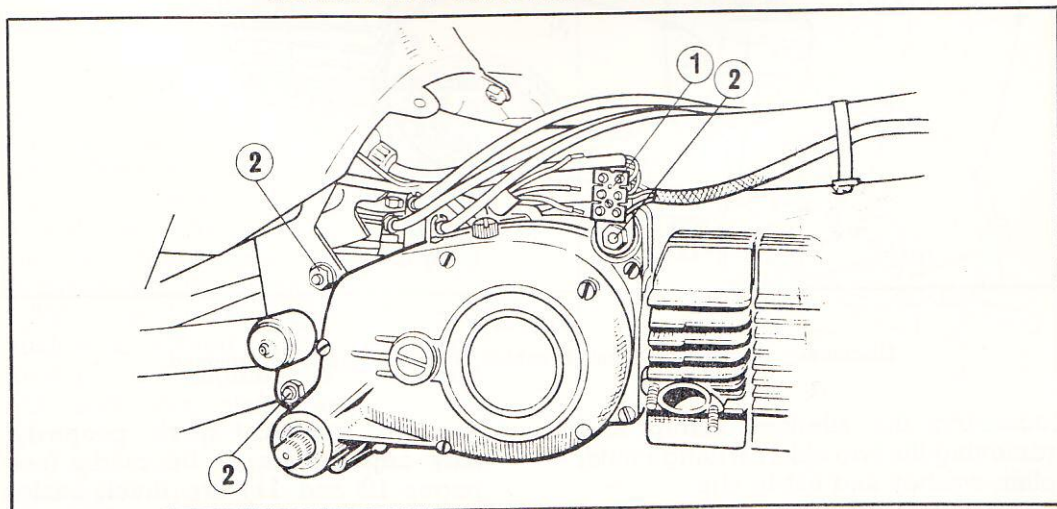


Fig. 28

1. Frame terminal block

2. Engine mounting bolts

Remove the footboards and engine cover and take off the carburettor. Remove the plug lead.

Detach the three magneto leads from the frame terminal block (1) just above the engine. (See Fig. 28.)

Dismantle the chaincase (two screws at front and rear). Also remove the chaincase clamp bolt. Remove the spring link and take off the chain.

Release the kickstarter pinch bolt and take off the kickstarter crank. Remove the exhaust system after

support the engine while taking out the bolts. The engine is now free and should be carefully lowered to the ground. Disconnect the gear change and clutch cables (see Fig. 29) and remove the engine to the work bench.

REFITTING ENGINE

Reverse the sequence of removing operations taking care to connect and adjust first the flexible control cables, checking that the clutch and

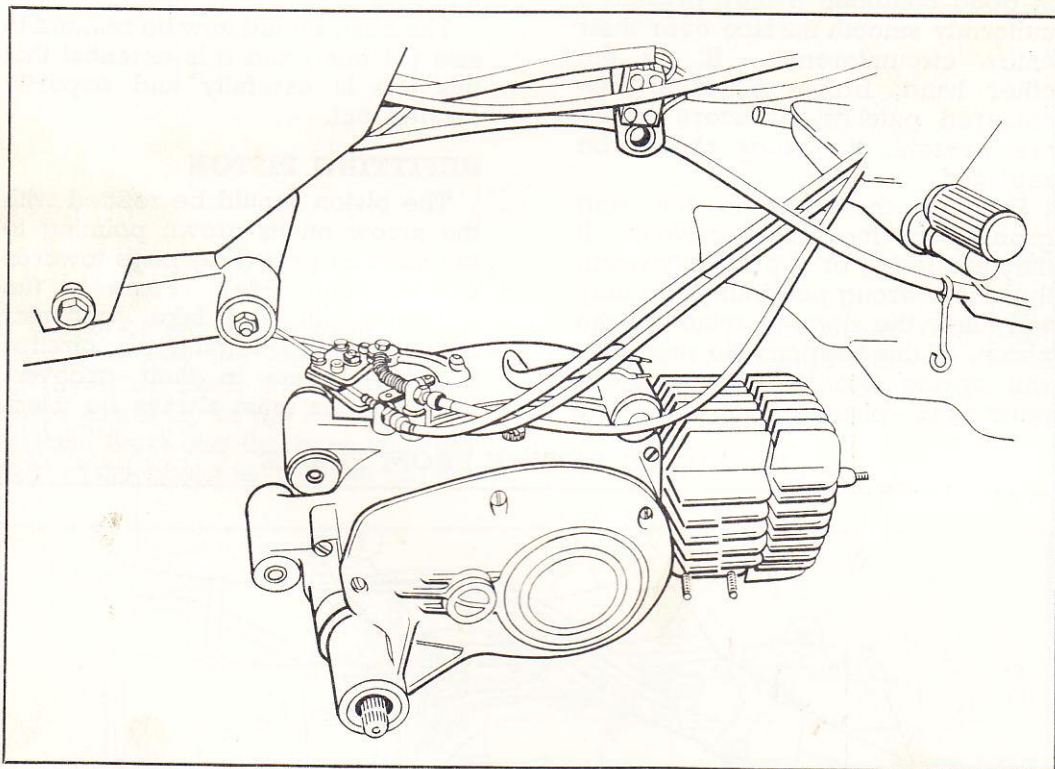


Fig. 29

Disconnect the gear and clutch cables after the engine is removed

loosening the silencer clamp and removing the two exhaust flange nuts, plain washer and cable clip.

Undo the nuts of the three engine mounting bolts (2, Fig. 28) and

gearbox controls work properly. Any adjustments to be made (see pages 10 and 11) are much easier to carry out before the engine is fitted to the frame.

DISMANTLING CRANKCASE/ GEARBOX ASSEMBLY

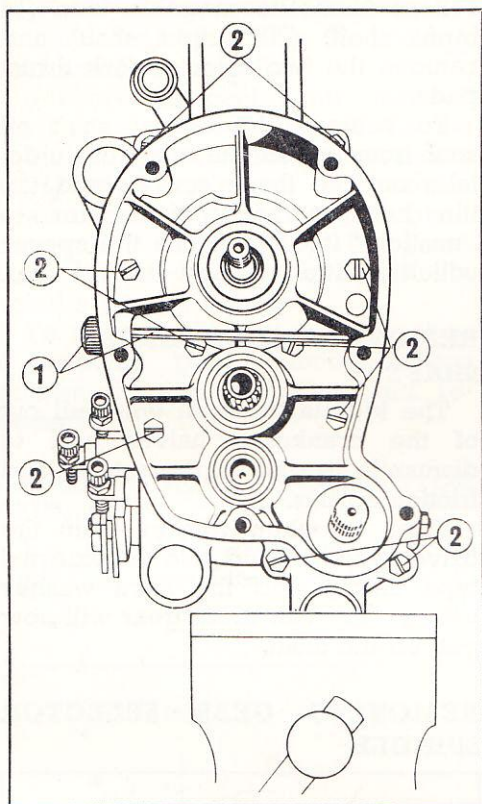


Fig. 30

1. Oil dipstick
2. Crankcase bolts

Rest the engine on its left side and remove the primary drive cover (6 screws), taking care not to damage the kickstarter shaft oil seal. Then turn the engine on to its right side in order to drain out any remaining oil. Remove the gearbox drain plug to assist with this operation.

Take out the six engine mounting bushes and their spacing sleeves. Now put the engine in a vice fitted with soft jaws, clamping it by the lower mounting bracket. Remove the sparking plug. Remove the kickstarter shaft spacing tube, circlip, anchor washer, spring and peg and also the loose shim washer.

Remove the crankshaft pinion and key and commence to dismantle the clutch. Remove the clutch plates, together with the two thrust rods and steel ball; hold the unit with the special clutch holding tool, Part No. 6200516. Take off the magneto cover and remove the chain sprocket from this side of the engine, after flattening out the tab washer and unscrewing the nut. Take off the washer behind the sprocket. Remove the flywheel magneto. (These operations can be performed as described previously, using a piston stop, or preferably a peg spanner in the flywheel apertures, to prevent crankshaft movement.) Take out the magneto cable rubber grommet.

Take off the four cylinder-head nuts and plain washers. Note that these washers are of a thicker gauge than those used elsewhere. Remove the ten crankcase bolts (2, Fig. 30) and washers, after first unscrewing the gearbox dipstick (1, Fig. 30). Turn the piston to bottom dead centre and ease off the cylinder. Remove the piston.

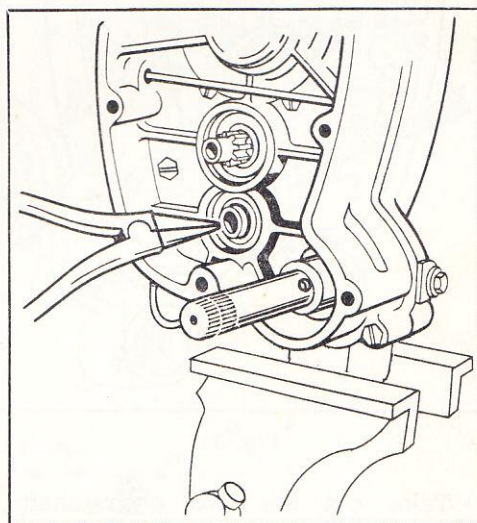


Fig. 31

Removing Output Shaft Circlip

With external circlip pliers, remove the small circlip at the primary drive end of the output shaft. (See Fig. 31.) Take the engine from the vice and place it in a clean drip tray. Tap the ends of the three shafts protruding from the drive side of the engine with a hide hammer or wooden mallet, to assist in splitting the crankcase. (See Fig. 32.) Throw away the gasket. Remove the crankshaft, taking note of the number of shims, if any.

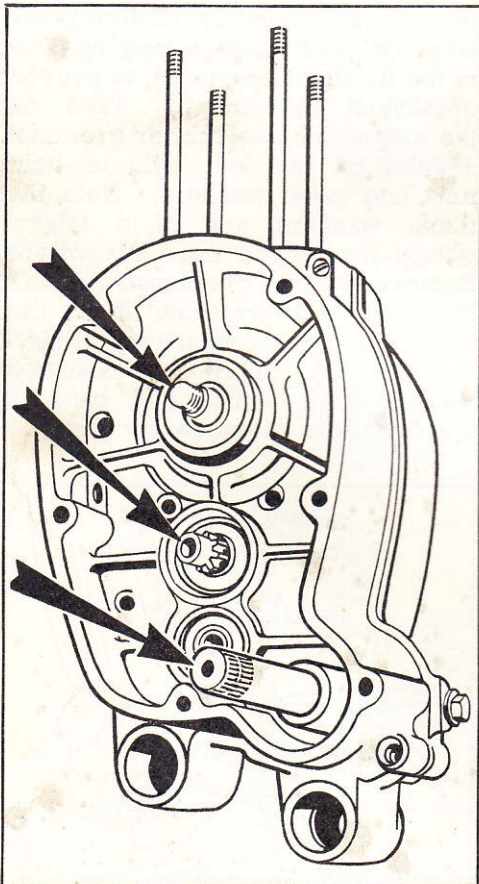


Fig. 32

Take out the two gear shafts, turning the gear selector quadrant on top of the crankcase beyond top gear position, in order to disengage

the output shaft collar from the gear selector fork. Remove the bearing rollers from the magneto side (14 input shaft) (20 output shaft) and remove the two selector fork thrust pads.

To remove the output shaft oil seal housing on the magneto side, take out the three screws and tap the housing round in order to "unstuck" it. Don't lose the spacer which is fitted behind the oil seal.

REMOVING KICKSTARTER SHAFT

The kickstarter shaft will pull out of the crankcase halves and to dismantle it, pull off the ratchet and friction spring.

Take the shim washer from the drive gear end and also the external type circlip and the shim washer beneath it. The drive gear will now pull off the shaft.

REMOVING GEAR SELECTOR SPINDLE

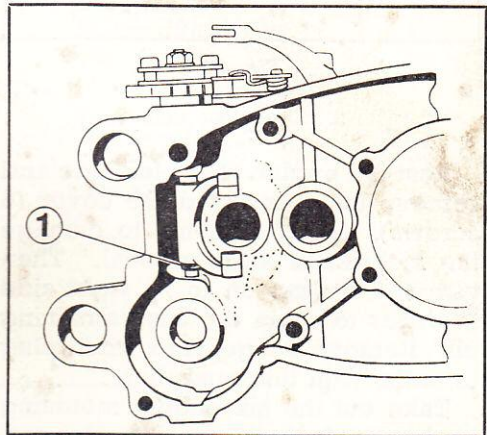


Fig. 33

1. Gear selector spindle circlip

Prise out the lower circlip with a pair of small screwdrivers. (See Fig. 33.) Twist the gear selector quadrant until the fork rests on the

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rear wall of the gearbox. Spring the roller arm out of the way of the quadrant and pull out the quadrant/spindle assembly. Take the spacing washer off the spindle.

Unscrew the central nut, take off the spring washer and pull out the spindle. It is not normally necessary to interfere with the two socket head screws which clamp the quadrant and selector plates, but these may be loosened slightly if the spindle proves stubborn.

To replace either the quadrant or a selector plate, remove these screws, fit the new item and re-assemble.

REPLACING GEAR SELECTOR SPINDLE

Re-assemble in reverse order to removal. Rest the fork, splines to

the bottom, on the inside face of the gearbox and put the selector quadrant in first gear position when refitting the shaft in the fork. Fit a new circlip.

REMOVING ROLLER ARM

The roller arm is attached to the protruding dowel by a small circlip. Prise off the circlip and pull off the arm together with its return spring and spacer. Fit any new parts required and re-assemble, using a new circlip.

REMOVING CLUTCH OPERATING ARM

Unscrew the round-headed pinch screw in the external wall of the magneto-side crankcase and pull out the arm. Reverse this procedure to replace.

DISMANTLING OUTPUT SHAFT

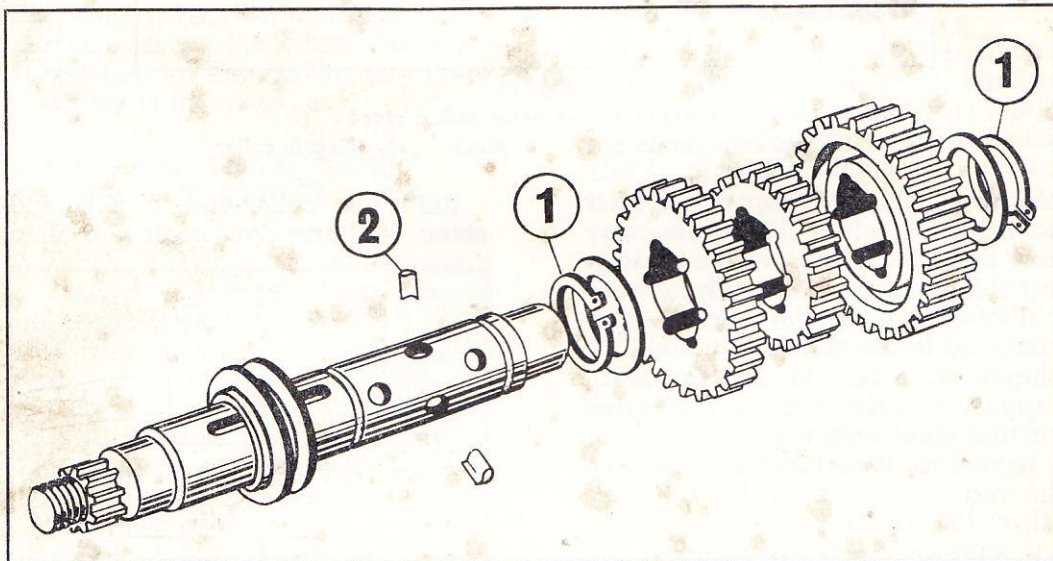


Fig. 34

Gearbox output shaft

1. Gear retaining circlips 2. Gear engagement plungers

Remove the circlip from the primary drive end of the shaft and the shim washer behind. (See Fig.

34.) Push the gear selector collar along the shaft until all the gears are free to rotate (i.e., "Neutral" posi-

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tion) and pull off the gears, making careful note of the way they are fitted. The nine gear engagement

ensuring that no burrs remain proud of the surface of the collar. (See Fig. 36.)

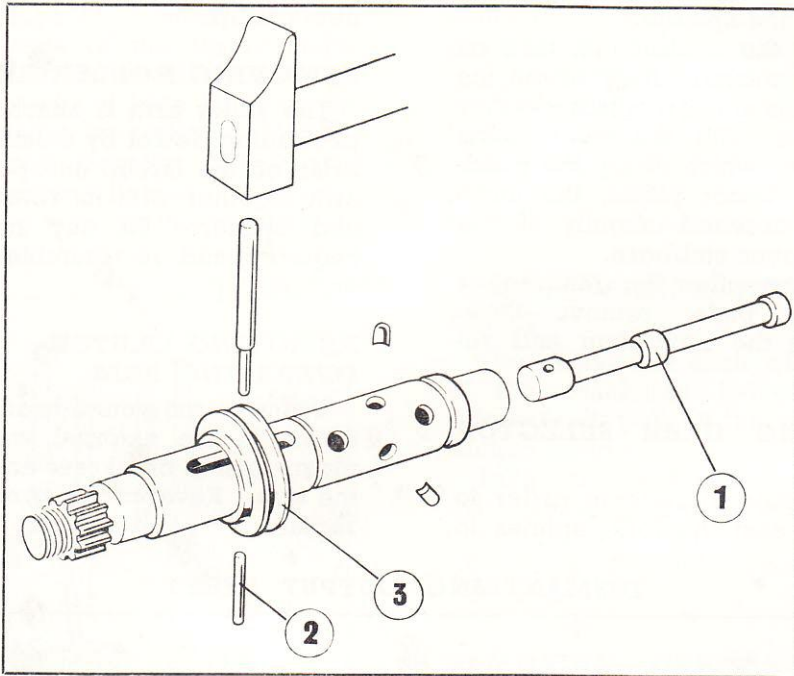


Fig. 35

Driving out selector collar rivet

1. Gear engagement rod 2. Rivet 3. Selector collar

plungers will now drop out of their holes in the shaft. Note the way they are fitted. Remove the remaining shim washer and circlip.

If for any reason the gear engagement rod in the centre of the hollow output shaft has to be removed, support the selector collar and drive out the rivet with a pin punch and a hammer. (See Fig. 35.) Remove the rod.

RE-ASSEMBLING OUTPUT SHAFT

When re-fitting, obtain a new rivet, re-assemble the rod/shaft/collar assembly and fit the rivet.

Carefully expand the rivet ends, using a centre punch and a hammer,

Refit the collar-end circlip and shim washer. Put back the nine

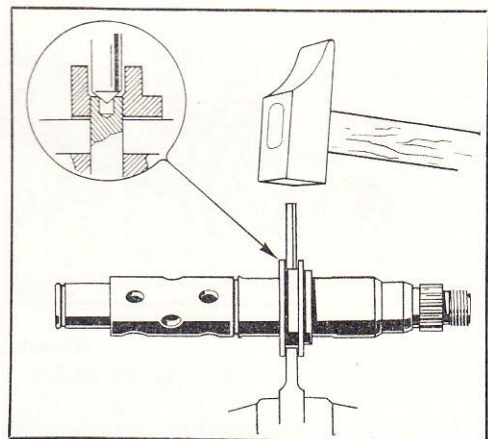


Fig. 36

Expanding the rivet ends

gear engagement plungers with the concave ends inwards, holding them in their holes with a little grease.

Re-assemble the gears, finally fitting the shim washer and circlip to the primary drive end of the shaft. (See Fig. 37.)

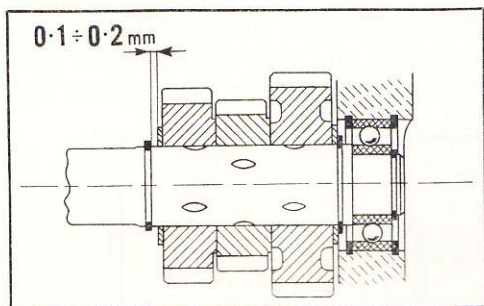


Fig. 37

The end play of the gears on the shaft should be 0.1-0.2 mm. The shim washers are supplied in 0.9 mm. and 1 mm. thicknesses for this purpose and another washer of the correct relative thickness should be substituted for the existing one if the end-play is incorrect.

REMOVING CRANKCASE/ GEARBOX BEARINGS

To remove any of the crankcase/gearbox bearings, it is necessary to heat the castings. First remove the bearing retaining circlip, if fitted, and then evenly heat the casting to approximately 200° F. by immersing it in boiling water. A smart tap of the casting on a bench top or other handy surface will serve to knock the bearings out.

The casting should also be heated before refitting bearings in their seats. Ensure that they enter their seats squarely. Circlips should be renewed if not a firm fit in their housings.

If any oil seals are damaged through application of excessive heat, they should be replaced.

REPAIRING CRANKSHAFT

The side clearance of the connecting rod on the crankpin should not exceed 0.014".

A very slight up and down clearance, or "lift" in the big end is permissible but this should not exceed 0.002".

Repairs to the crankshaft/connecting rod assembly are a precision job, requiring specialised knowledge and equipment. Repairs of this nature should, therefore, only be entrusted to the Raleigh Works, or to experienced precision engineers.

We recommend you to take advantage of the Factory exchange service, whereby for a standard charge, your old assembly can be exchanged for a genuine Factory Reconditioned Unit.

RE-ASSEMBLING CRANKCASE/GEARBOX

Thoroughly clean all parts. Check that all bearings, oil seals, circlips, etc., are in good condition. Refit the gear selector mechanism and clutch operating lever in the left half of the crankcase. (If they have been removed.)

Fit the thrust pads into the gear selector fork.

Fit the gear box output shaft in the left half of the crankcase, selector collar end first, and introduce the fork pads into the collar.

Place the 14 input shaft rollers in the bearing track, keeping them in position with grease.

Place the shim (B, Fig. 38) on the left-hand end of the input shaft and carefully fit the shaft, ensuring that it meshes correctly with the gears on the output shaft.*

Fit the ratchet and friction spring to the kickstarter shaft and place in position the driving gear with drive dogs towards the ratchet. Fit the

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shim washer and circlip next to the driving gear, then another shim washer.

A third shim washer now goes on the extreme left-hand end of the shaft and the shaft is fitted in the left crankcase half. Locate the friction spring in its square recess.

Fit the crankshaft, not forgetting the shims.*

Smear with grease the mating sur-

faces of the two crankcase halves, fit a new paper joint and then place the right-hand half of the crankcase as a cover on the left-hand one, bringing the two parts together by tapping lightly with a mallet or hide-faced hammer.

Fit the ten crankcase bolts from the right-hand side, fit the plain washers and nuts and tighten down the nuts evenly, working first on a front nut,

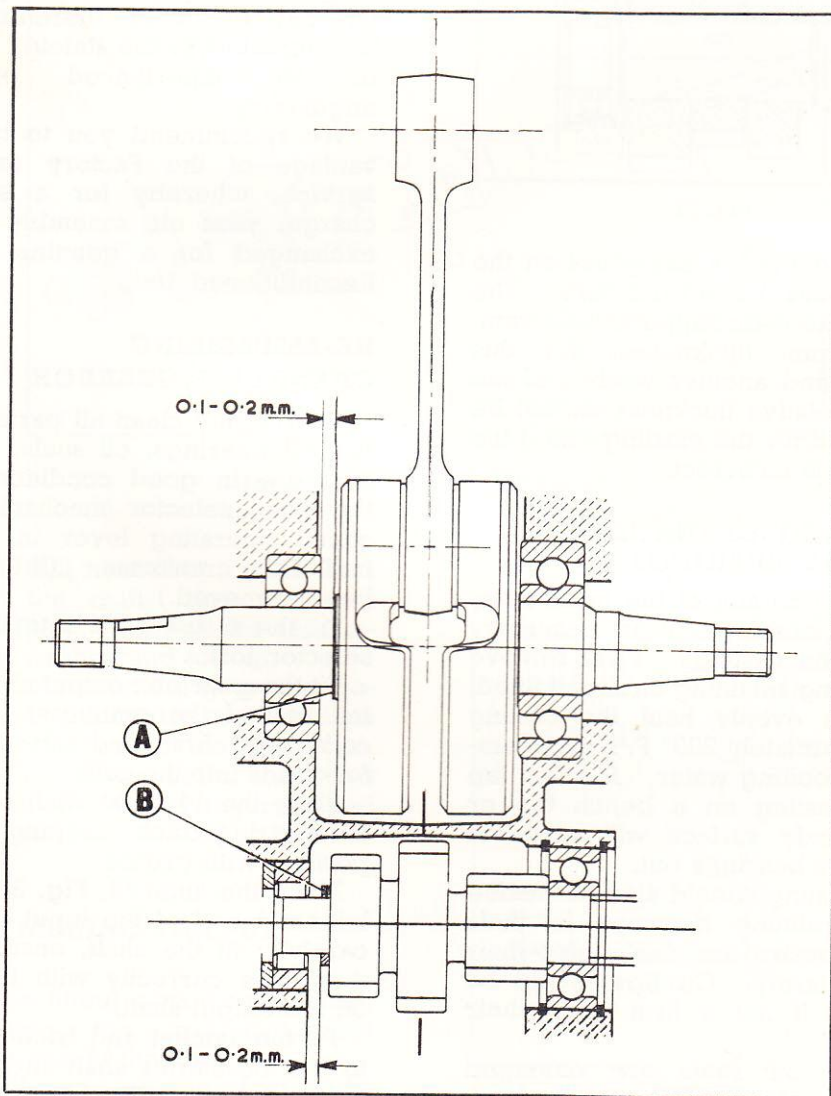


Fig. 38

A. Crankshaft shim

B. Input shaft shim

* See note on page 32.

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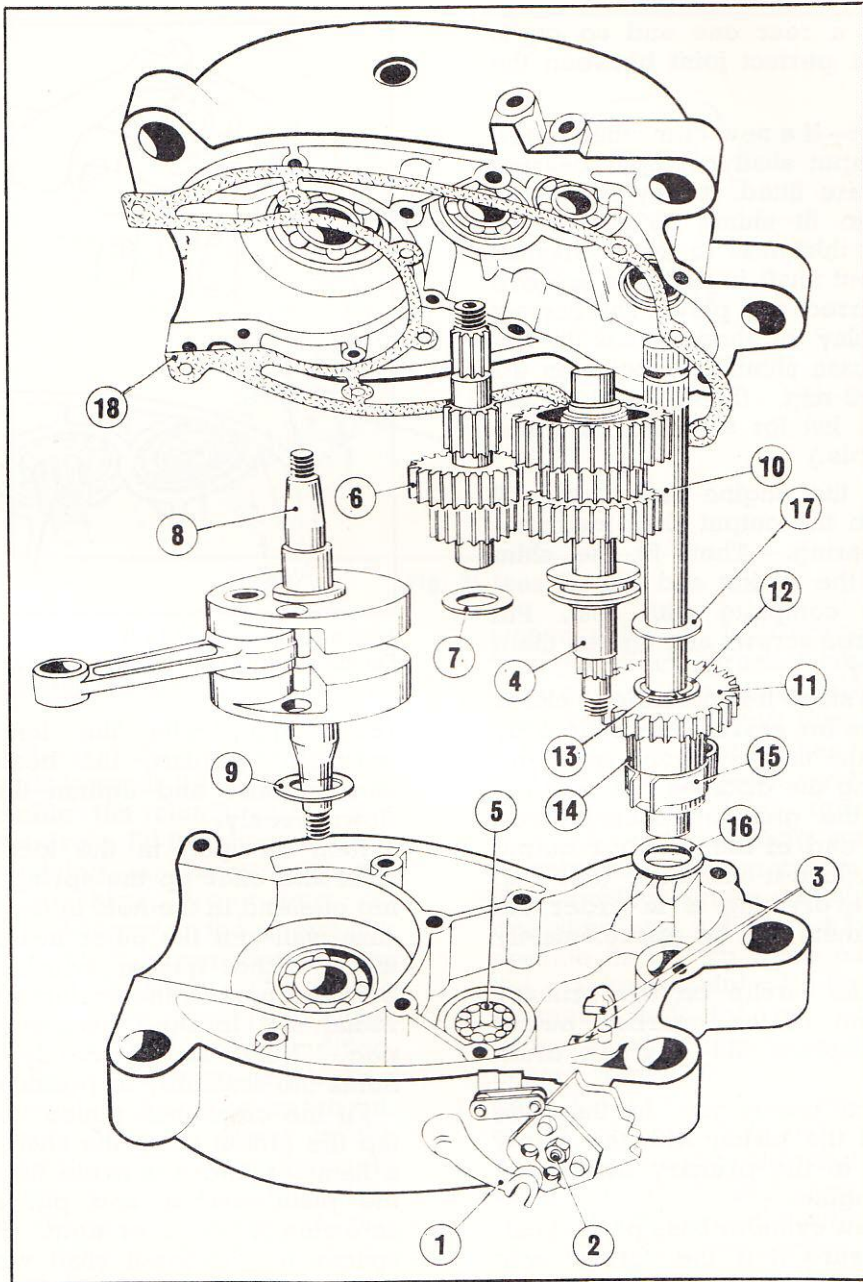


Fig. 39

- | | |
|---|------------------------------------|
| 1. Clutch operating arm | 10. Kickstarter shaft |
| 2. Gear selector spindle | 11. Kickstarter gear |
| 3. Thrust pads, gear selector fork | 12. Shim washer, kickstarter shaft |
| 4. Gearbox output shaft | 13. Circlip, kickstarter shaft |
| 5. Rollers, gearbox input shaft. 14 off | 14. Ratchet, kickstarter shaft |
| 6. Gearbox input shaft | 15. Friction spring |
| 7. Shim ring, gearbox input shaft | 16. Shim washer, kickstarter shaft |
| 8. Crankshaft | 17. Shim washer, kickstarter shaft |
| 9. Shim washer, crankshaft | 18. Paper joint, crankcase |

then on a rear one and so on to ensure a perfect joint between the halves.

***NOTE** :—If a new crankshaft, gearbox input shaft or input bearing track are fitted, it may be necessary to fit shims of greater or lesser thickness to the crankshaft or input shaft in order to achieve the correct end play. The correct end play of these shafts in the crankcase should be between 0.1 and 0.2 mm. (See Fig. 38.) (See spares list for selection of shims available.)

Invert the engine and fit the 20 rollers in the output shaft magnetoside bearing. Then fit the shim washer, the gasket and the oil seal housing, complete with seal. Put in the three screws and tighten them up firmly.

At this stage it is possible to check the gears for correct adjustment by placing the unit in second gear and measuring the distance between the end of the gear engagement rod and the end of the gearbox output shaft in which it operates. (See Fig. 40.) If everything is in order the measurement will be approximately 0.38".

Refit the circlip on the primary drive end of the gearbox output shaft. Replace the gearbox drain plug.

Replace the engine in the vice and refit the piston with the arrow pointing to the primary drive side of the engine.

Fit a new cylinder base paper joint, making sure it is the correct way round. Smear clean oil in the cylinder bore and ease the cylinder on to the piston. (Exhaust port to right-hand side.) Compress the rings in their grooves with the fingers as they enter the cylinder. Fit a new cylinder head gasket and replace the head the correct way

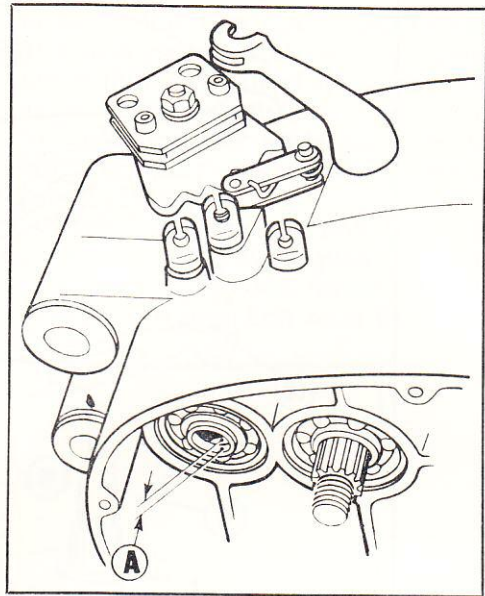


Fig. 40

For correct gear engagement, dimension (A) should be 0.38" when second gear is selected.

round (i.e., with the long fins vertical). Replace the head nuts and washers and tighten the nuts down evenly.

Refit the peg in the kickstarter shaft and offer up the spring, locating one end in the hole in the crankcase wall and the other in the hole in the anchor washer, which should be fitted next to the spring with the radial slot locating over the shaft peg. Next, fit the circlip which holds the assembly in position.

Fit the crankshaft pinion key and tap the pinion on to the shaft, using a hammer and a suitable tube. Fit the plain washer and pinion nut, screwing it up finger tight. Put the spacer on the input shaft with the smaller diameter towards the crankcase. Assemble the clutch gear complete with bronze thrust ring and bush, to the clutch hub.

Enter this assembly on to the splines of the input shaft with the teeth of the clutch gear meshing with those of the pinion and tap the

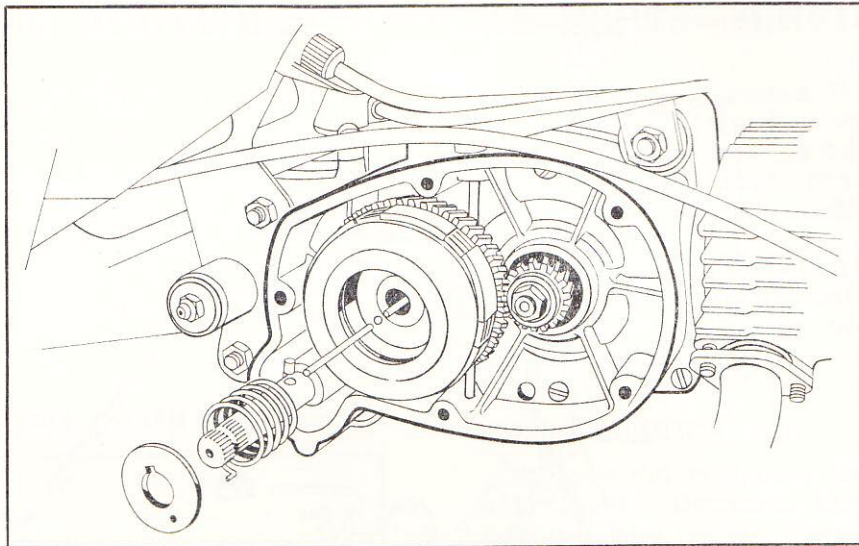


Fig. 41

hub into position using a hammer and suitable tube.

Replace the two clutch thrust rods and the $\frac{3}{16}$ " steel ball. (The ball goes in the middle with the flat ends of the rods towards it.) (See Fig. 41.)

Assemble the clutch plates and pressure drum. Fit the clutch springs and retaining washer. Refit the sleeve nut shims, if any were removed, and screw on the sleeve nut. Replace the chain sprocket spacer on the output shaft. Check the sprocket for hooked teeth and either fit the old one, if in good condition, or replace with a new sprocket. Fit a new tab washer and screw up the nut.

Fit the rubber grommet in the crankcase top and refit the magneto stator plate, feeding the output wires through the grommet. Check that no stretch has taken place in the crankcase bolts, so preventing the stator plate from fitting properly. (If this has occurred, new bolts must be fitted.) Refit the flywheel. Lock up the drive by means of a piston stop, or suitable flywheel holding tool and tighten up the flywheel nut, crankshaft pinion nut, clutch centre

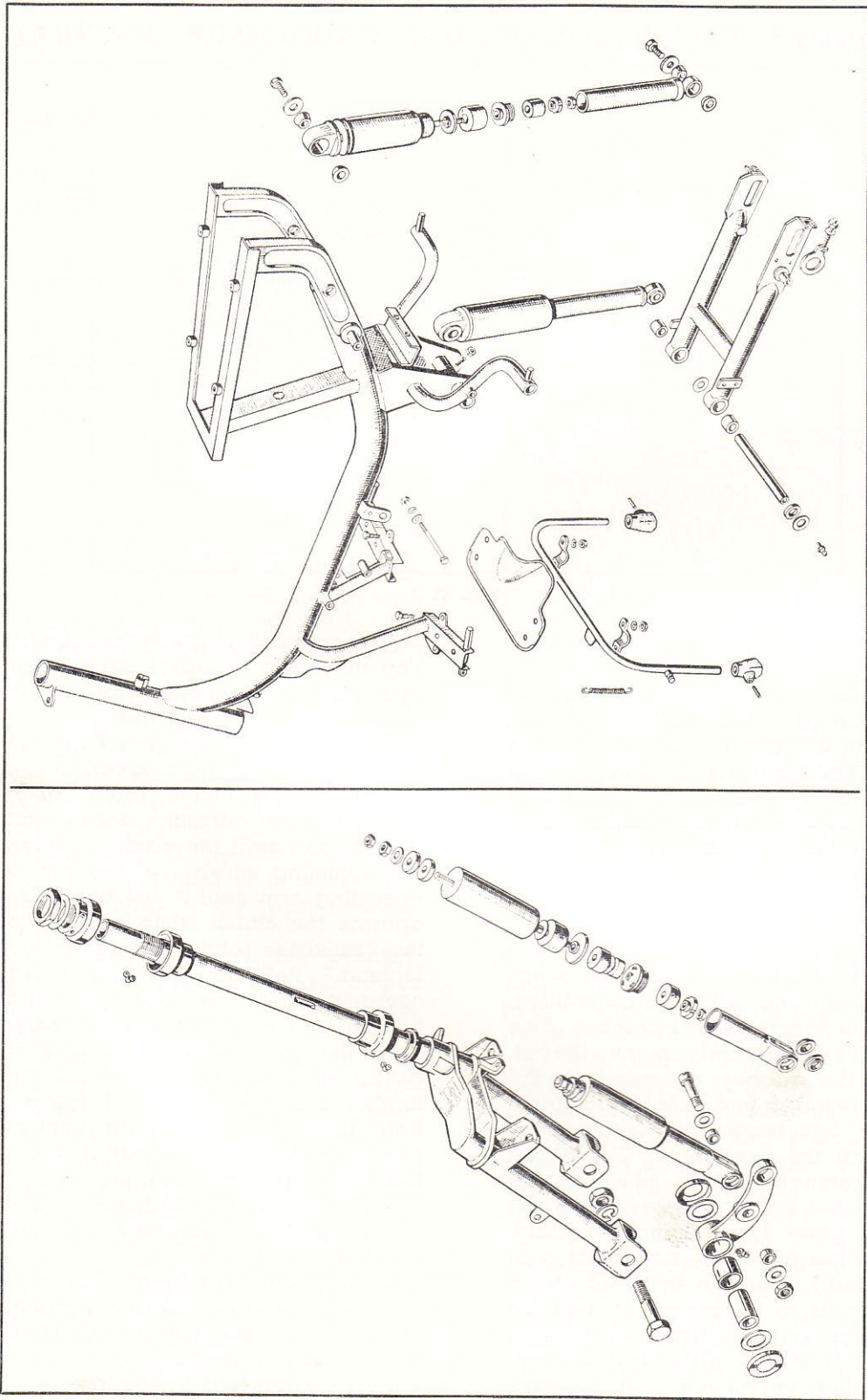
sleeve nut and chain sprocket nut. Tap the chain sprocket tab washer over a flat on the nut, supporting the sprocket whilst doing this.

Re-time the ignition (see Page 12) and refit the magneto cover.

Replace the clutch thrust plate complete with adjusting screw and locknut and refit the circlip. Using the adjusting screw, set the clutch operating arm until it just begins to operate the clutch when parallel to the crankcase joint. Re-tighten the locknut. Refit the primary drive cover, using a new paper joint and tighten down the screws evenly. Refill the gearbox with the correct grade of lubricant and refit the engine mounting bushes and sleeves. Refit the clutch and gear control cables and correctly adjust them before refitting the engine.

Refit the engine and re-connect the magneto output wires to the frame terminal block.

Replace the sparking plug and lead, carburettor, exhaust system, etc., and refit and adjust final drive chain. Refit chaincase, kickstarter, engine covers and footboards.



EXPLODED VIEW OF FRAME, FRONT FORKS AND SUSPENSION UNITS

FRAME, BODYWORK & CYCLE PARTS—SERVICING

CHAIN MAINTENANCE

To ensure long chain life and cut transmission noise to a minimum, it is necessary to keep the chain well lubricated and correctly tensioned at all times. The tension should be checked at 1,250-mile intervals and the chain cleaned and lubricated every 2,500 miles.

ADJUSTING CHAIN TENSION

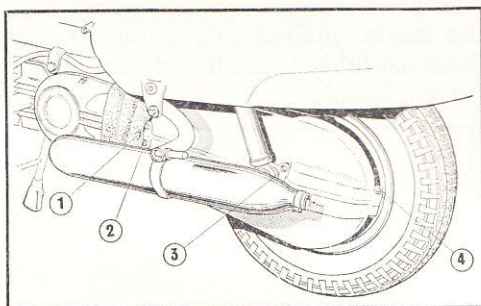


Fig. 42
Removing the chaincase

Pull back rubber sleeve, (1, Fig. 42), remove screws (2) (3) and (4) and take off the chaincase.

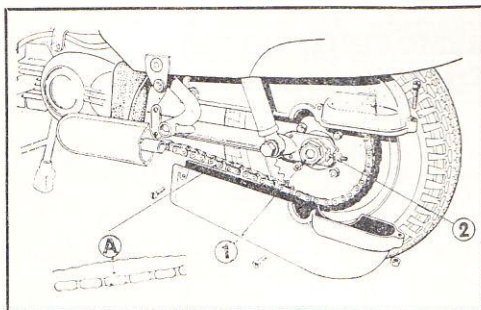


Fig. 43
Adjusting the chain tension

Slacken the axle nuts, (1, Fig. 43) offside first, and rotate the chain adjuster nuts (2) as necessary. With no rider and the wheels resting

normally on the ground, the chain should have an up and down movement of $\frac{3}{4}$ " at the centre of the bottom run (A). Adjustment should be carried out with the chain at its tightest point.

After adjusting, check that the rear wheel is correctly aligned in the rear fork before finally tightening the hub nuts.

CHAIN LUBRICATION

Remove the chaincase and magneto cover. Dismantle the spring link and take off the chain. Wash the chain thoroughly in a bath of clean paraffin, using a stiff brush. Then wipe dry. Immersion in a tin of warm S.A.E. 50 grade oil for 15 minutes or so will allow the lubricant to soak right into the bearing surfaces. Warm the lubricant by standing the tin in very hot water. When the chain is thoroughly soaked, remove it and hang it up to drain off all surplus lubricant. Make sure that the sprockets are clean before refitting the chain.

It is important when replacing a chain to make sure that the spring clip on the connecting link has its closed end pointing in the forward direction of chain travel.

SUSPENSION—BRAKES—WHEELS

Every 1,250 miles the trailing links of the front fork and the pivots of the swinging rear fork should be lubricated with a grease gun through the nipples provided. (See Figs. 44 and 45.) At the same time, one stroke only of the grease gun should be given to the nipple on the speedometer drive gearbox. See section on lubrication on page 4 for recommended grease.

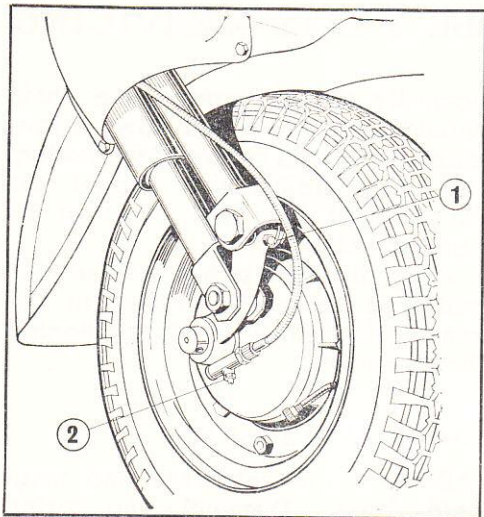


Fig. 44

Lubrication of the front fork links and speedometer drive gearbox

1. Trailing link grease nipple
2. Speedometer drive gearbox grease nipple

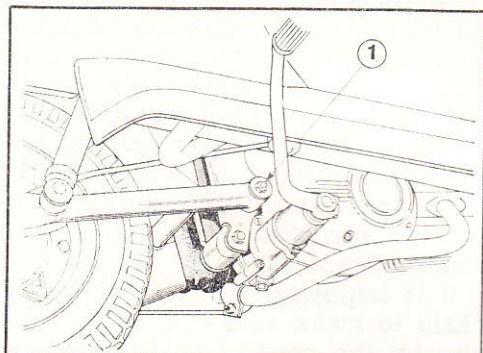


Fig. 45

Lubrication of the rear fork pivots

1. Grease nipple for swinging rear fork pivots. (One each side.)

ADJUSTING BRAKES

The brakes should be adjusted so that there is the minimum amount of free play at the brake operating levers before the brakes come into action. There must be no rubbing or binding of the brake linings on the drums, however, and this should be checked by placing the machine on the stand and seeing that the wheels rotate freely.

When all the available adjustment

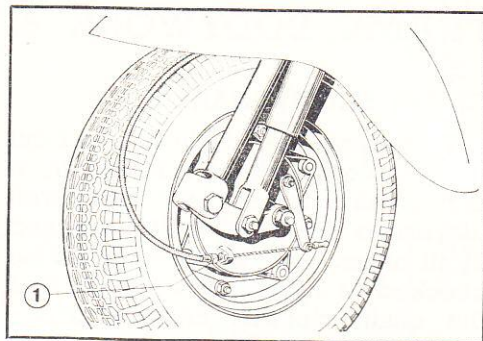


Fig. 46

Front brake adjustment

1. Front brake cable adjuster

has been used up, this means that the brake linings are at the end of their useful life and the shoes should be replaced.

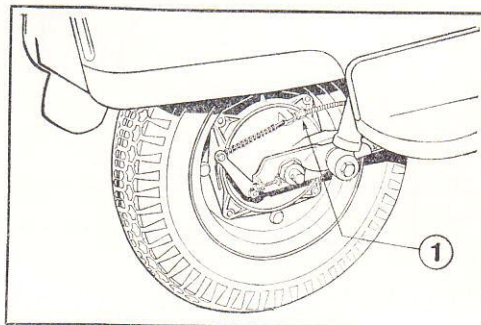


Fig. 47

Rear brake adjustment

1. Rear brake cable adjuster

REMOVING WHEELS

Front

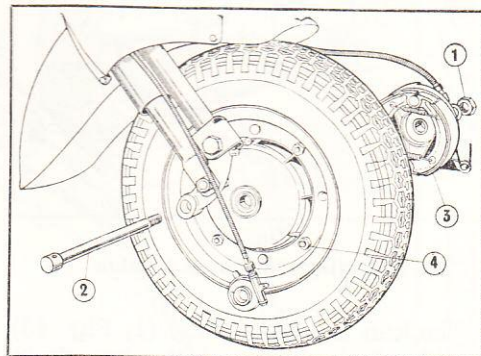


Fig. 48

1. Axle nut.
2. Axle.
3. Brake linings.
4. Wheel nuts

Unscrew the axle nut and withdraw the axle. Remove the complete wheel and hub from the fork. Take the brake assembly and speedometer drive from the hub, leaving these attached to their cables.

Rear

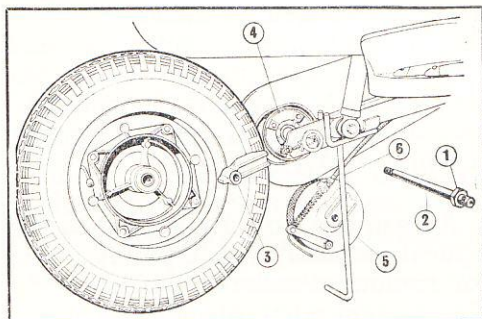


Fig. 49

- | | |
|-------------|-------------------|
| 1. Axle nut | 4. Drive hub |
| 2. Axle | 5. Brake assembly |
| 3. Spacer | 6. Rear propstand |

Place the rear propstand in position, slacken the axle nut and unscrew the axle. Remove the spacer and draw the wheel away from the chaincase to disengage the flexible rubber drive from the hub. Then withdraw the wheel rearwards and take out the brake assembly, leaving this attached to its cable. The chain tensioner will normally remain in position on the fork.

Unscrew the wheel/hub nuts.

REMOVING TYRES

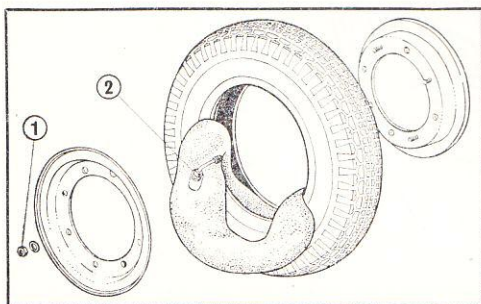


Fig. 50

- | | |
|--------------------|---------------|
| 1. Wheel-half nut. | 2. Tyre valve |
|--------------------|---------------|

(**Caution.** The wheel-half nuts are painted red. Never unscrew these red nuts unless the tyre is completely deflated.)

Remove the wheel from the hub. Deflate the tyre completely by taking out the valve core. Unscrew the wheel-half nuts and part the wheel halves.

REPLACING BRAKE SHOES

The brake linings are bonded to the shoes and therefore cannot be replaced without special equipment. Replacement shoes, complete with linings, are available and should be fitted as follows:—

First spring off the old shoes and thoroughly clean the brake plate. Remove the brake cam lever and apply a trace of grease to the brake shoe pivot and the thrust faces and spindle of the cam. Replace the cam and cam lever. Remove the springs from the old pair of shoes and fit them to the new. Place one shoe in position and spring the other over the cam and pivot.

REPLACING WHEEL BEARINGS

The ball journal bearings in the wheel hubs are packed with grease on assembly and will require no further lubrication throughout their life. When the bearings require renewal, the spacing tube between them should be displaced slightly and a suitable drift inserted through the hub in order to knock out the far side bearing. When this bearing and the spacing tube have been removed, turn over the hub and drive out the other bearing.

Grease the new bearings lightly before fitting and ensure that they are refitted squarely. The bearings can be pressed or tapped into place. In either case, force should only be applied to the outer track of the

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bearing. Fit one bearing first, then the spacing tube, then the other bearing, completing the job by fitting the two shield washers to the outside of the bearings.

DISMANTLING HANDLEBAR/ HEADLAMP

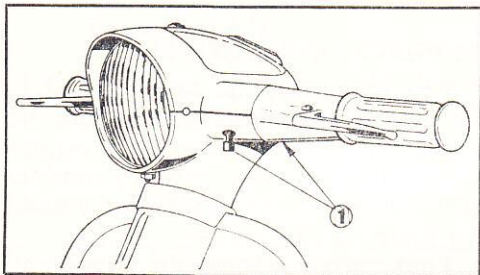


Fig. 51

1. Headlamp housing screws

Unscrew the knurled nut securing the speedometer cable to the front wheel. Undo the four screws situated underneath the headlamp housing. (See Fig. 51.) Lift the upper housing, at the same time carefully feeding the speedo cable up through the hole in the lower end of the steering column behind the air scoop. When the upper knurled nut on the speedometer cable can be reached, unscrew it from the speedometer head. Put the upper housing aside.

Access can now be gained to the optical assembly, cable pulleys, etc., for routine attention. (See Fig. 52.) It is helpful when changing a headlamp bulb, to unspring the wire clip

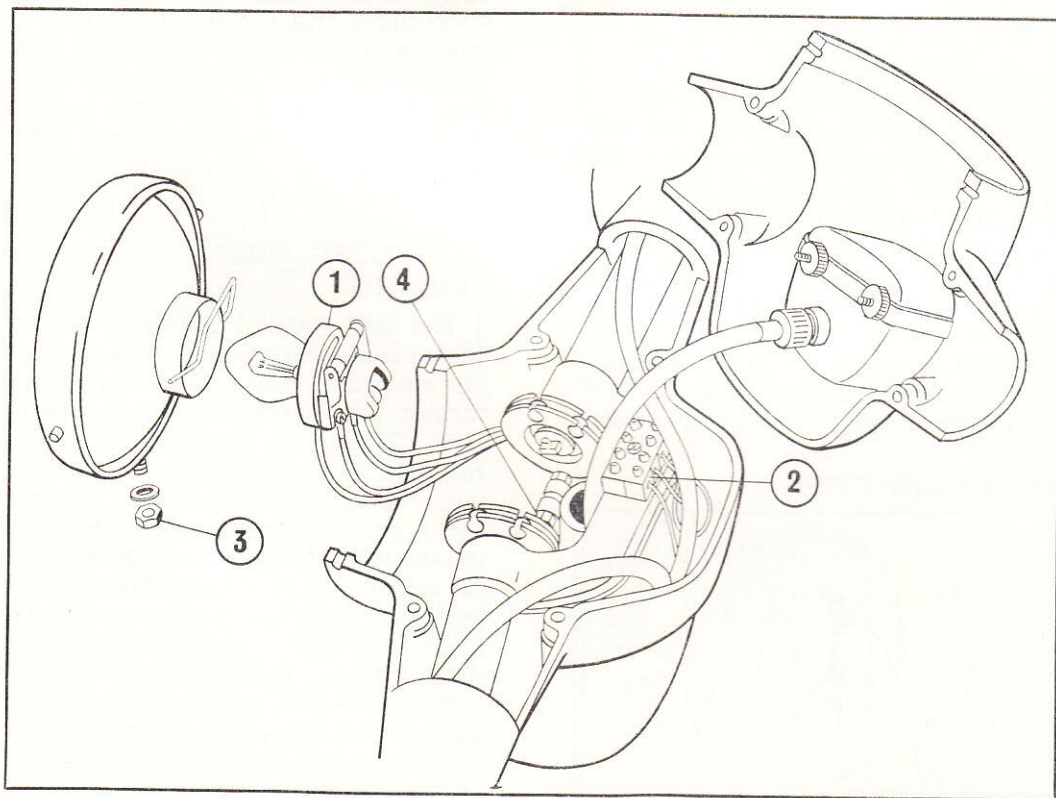


Fig. 52

1. Lampholder
2. Terminal block
3. Headlamp locknut
4. Handlebar clamp bolt

and release by a few turns the lock-nut underneath the headlamp housing.

To release the handlebar from the steering column, remove the optical assembly and loosen the handlebar clamp bolt. The handlebar can now be detached from the steering column and left hanging on its cables.

RE-ASSEMBLING HANDLEBAR/HEADLAMP

Reverse the sequence of operations detailed above. When the job is completed, re-align the headlamp.

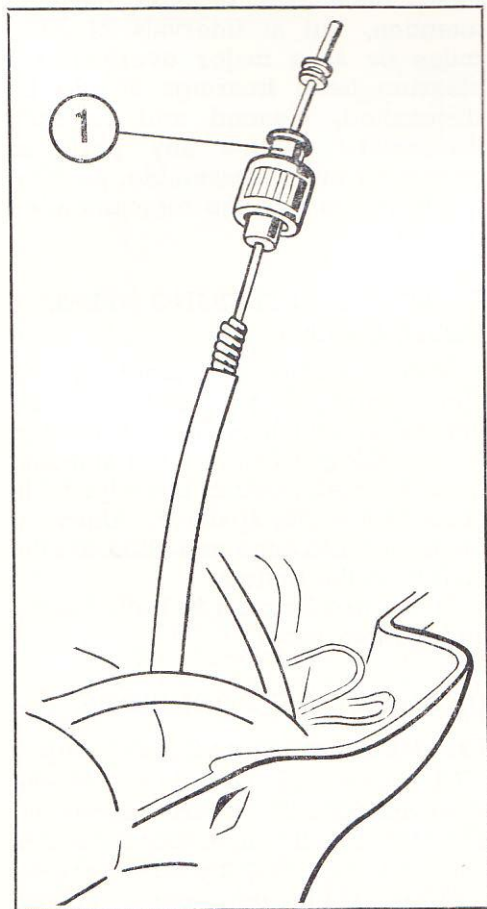


Fig. 53

1. Detachable ferrule (L.-H. thread)

REMOVING SPEEDOMETER CABLE

Remove the top half of the headlamp housing as above.

Detach the drive from the speedometer head and take out the inner cable. The inner cable should be replaced with the locating collar at the speedometer head end.

If the outer cable is to be replaced, the detachable ferrule at the upper end should be unscrewed from the cable (L.-H. thread) (see Fig. 53) to allow the outer cable to be pulled out from below.

Introduce the new cable, minus ferrule and knurled nut, from below. Refit these two items and slide the inner cable in from the top. Refit cable to speedometer head and refit handlebar housing.

REPLACING CONTROL CABLES

Note that the inners are identical for both gearchange cables, but the two outer cables have different lengths.

The drive with the longer outer cable should be mounted on the rear cable abutment at the gearbox and on the front fitting at the handlebar end. Place the shorter cable in the other two positions and adjust the cables as described on pages 10 and 11.

When fitting the control cables, the upper headlamp housing should be removed and the inner cables threaded through the lower housing from the top.

Slide the outer cables over the inners from below and hold the assemblies together by fitting the solderless nipples on to the inners at the lower end and lightly screwing up the nipples.

Feed the cables through to their respective positions, remove the nipples and connect up as above.

The throttle inner cable should first be attached at the carburettor end. To fit the inner cable to the carburettor, remove the mixing chamber cover, unscrew the brass plug from the throttle valve and place the cable nipple in the plug. Screw the plug into the valve and thread the return spring and mixing chamber cover over the cable. Refit the assembly to the carburettor, taking care to locate the valve correctly in its guide in the carburettor wall. Fit the outer cable over the inner and push up the whole cable, complete with upper ferrule, to the headlamp housing from below. Screw the solderless nipple on to the inner cable.

Place the nipple in the pulley and adjust the cable.

ADJUSTING STEERING HEAD

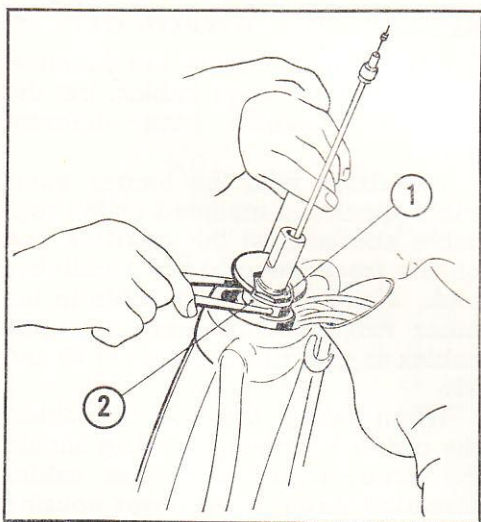


Fig. 54

1. Steering head locknut
2. Adjustable bearing cone

The steering head is correctly adjusted when there is no trace of play in the bearings but the handlebars still turn freely. If the adjustment is too tight the steering will be stiff in operation and the bearings

may be damaged. If too loose, there will be a judder when the front brake is applied and the steering may wobble.

To adjust, slacken the steering head locknut and turn the adjustable cone as required (see Fig. 54), clockwise to decrease the amount of play and anti-clockwise for more play. Tighten the locknut and check the adjustment by rocking the fork backwards and forwards, with your finger on the gap between the adjusting collar and the top frame cup when it will be possible to feel any play.

The lubrication of the steering head does not require frequent attention, but at intervals of 5,000 miles or at a major overhaul the steering head bearings should be dismantled, cleaned and checked for wear. Renew any parts as necessary and re-assemble, packing the bearings with the recommended grease.

REMOVING STEERING STEM/ FORK ASSEMBLY

First remove the front wheel. (See page 36.) Remove the handlebar, which can be left attached to its cables. Unscrew the steering head locknut, holding the adjustable cone with a pin spanner. Unscrew the adjustable cone and slide out the fork from the bottom.

There are 22 balls in both the top and bottom races.

DISMANTLING BODYWORK

Front Mudguard and Air-scoop

The air-scoop is fastened to the front mudguard by six screws (1, Fig. 55) and the mudguard itself is attached to the fork by three screws.

When fitting new parts, ensure adequate clearance between the wheel and mudguard.

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Front Apron

Fixed at the top by two bolts (2, Fig. 55) at the highest point of the steering tube and at the bottom secured to the front brackets of the footboards by four bolts (3, Fig. 55) with interposed rubber washers on the two faces of the panel.

housing unless perished, when it will, of course, need replacing. Unscrew the four small self-tapping screws which hold the chrome-plated cap pressing and take off the cap (7, Fig. 55). Remove the six bolts and pull the apron upwards over the steering column.

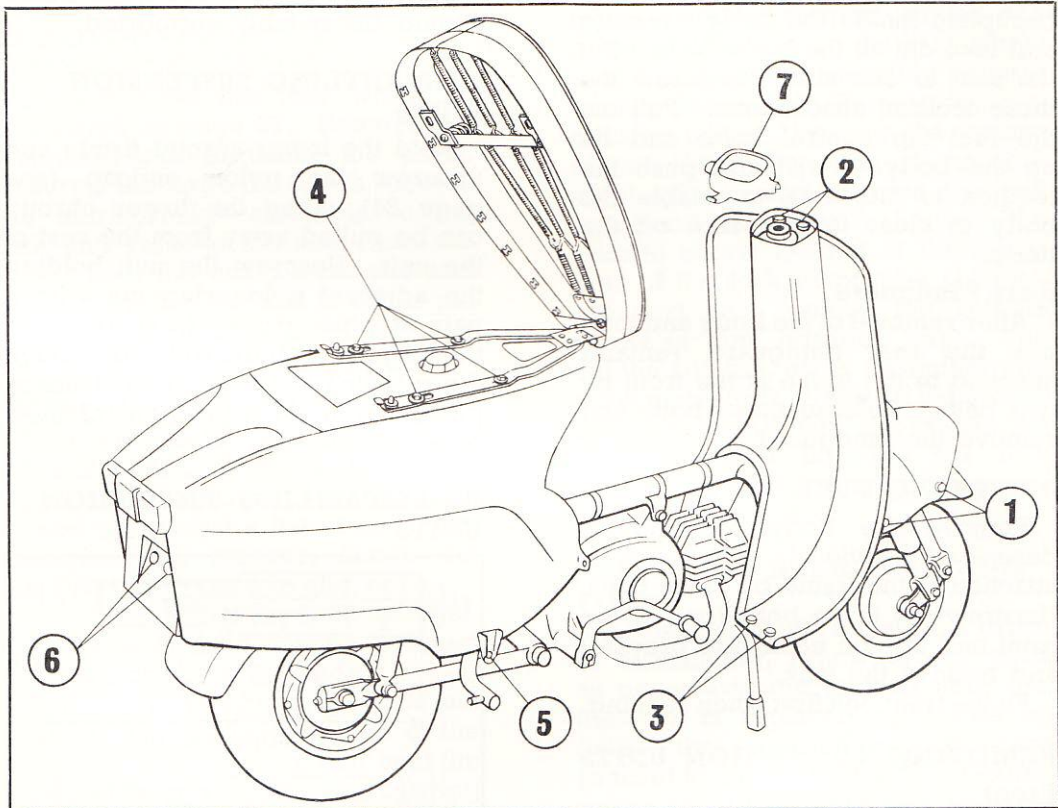


Fig. 55

To remove the front apron, first take off the handlebars as detailed on page 38. Disconnect the front brake, throttle, clutch and gear cables at the handlebar end and the frame electrical connections from the handlebar terminal block. Remove the detached handlebar and the headlamp lower housing and place on one side. The rubber packing ring should be left in its position inside the headlamp lower

Twist the apron first, in order to allow the small nuts which attach the central chromium strip to clear the upper attachment bracket.

Body Pressing

This is attached to the frame by four bolts (4, Fig. 55) at the top, which also hold the dual seat frame and at the bottom by two bolts (5, Fig. 55) to the rear footboard brackets. At the back it is fixed to the mudguard

by two bolts (6, Fig. 55) in the well behind the number plate. All body bolts carry rubber washers on both sides of the panel.

To remove the body, first take out the four number plate bolts and remove the plate. Next, unscrew the two rearlamp lens screws and take off the lens. Push the rearlamp backplate inside the body pressing and take out all the body bolts. Put the seat to one side. Unscrew the three toolbox attachments. Pull out the fuel tap control knob and lift up the body. Twist and push the toolbox to one side to enable the body to clear it, and take off the body.

Rear Mudguard

After removal of the body and toolbox the rear mudguard remains attached to the frame at the front by two bolts. Release these bolts and remove the mudguard.

REMOVING FUEL TANK

Remove the body pressing as described previously. The tank is attached to the frame by three bolts. Unscrew the three bolts (one at the front and one on each side bracket) and remove the tank.

Fit the front bolt first when refitting.

REMOVING SUSPENSION UNITS

Front

Remove the air scoop and front wheel. Remove the two nuts, one steel washer and one rubber, from the top of each suspension unit, and the lower mounting bolt from the bottom. Pull the trailing links out of the suspension unit fork ends and take off the units. The nylon bushes will remain in position in the suspension unit fork end and need not be disturbed. Remove the other rubber washer from the top of each unit.

Rear

Remove the footboards and engine

cover and take off the body pressing. The rear suspension units are fastened to the frame and swinging arm by one bolt at each end of each unit. Take out the bolts, which screw into tapped holes, and pull off the units, taking care not to lose the rubber bushes and steel washers. If both units are removed, the frame should be suitably supported.

DISMANTLING SUSPENSION UNITS

Hold the lower shroud firmly and unscrew the nylon endcap (see page 34), when the lower shroud can be pulled away from the rest of the unit. Unscrew the nut, holding the adjacent nylon ring nut with a pair of pipe grips. Next, unscrew the ring nut from the rod and remove the rubber blocks and their distance pieces, taking careful note of their order of assembly.

RE-ASSEMBLING SUSPENSION UNITS

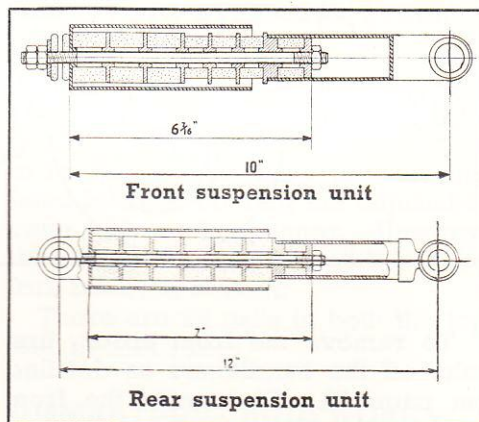


Fig. 56

Ensure that the central rod is perfectly straight and clean and re-assemble the blocks and spacers in their correct order. Tighten the ring nut in order to pre-load the assembly until the lengths shown in Fig. 56 are obtained. Re-tighten

the locknut and refit the lower shroud.

REFITTING SUSPENSION UNITS

Refit the suspension units in reverse order to removing, taking particular care to thoroughly tighten the upper mounting nuts of the front units.

REMOVING REAR HUB/ SPROCKET ASSEMBLY

First remove the rear wheel as described on page 37. Remove the chaincase and dismantle the chain. Unscrew the large nut which secures the hub/sprocket assembly to the fork and remove the unit from the fork. Refit the chain tensioner and the large nut to the unit in order not to misplace them.

DISMANTLING REAR HUB/ SPROCKET ASSEMBLY

The sprocket is attached to the hub by four bolts and locked in position by means of a large plate, which is turned up against a flat of each bolt hexagon. To remove, flatten out the plate and remove the bolts.

After removal of the L.-H. axle nut, the hollow spindle can be pressed out towards the wheel side.

To remove the bearing, prise out the dust cap on the fork side of the hub, remove the circlip and heat the hub in order to allow the bearing to drop out.

Re-assemble the parts in reverse order to dismantling.

REPLACING REAR HUB/ SPROCKET ASSEMBLY

Replace the assembly in the swinging fork, refit the chain tensioner and hub nut. Refit the wheel, screw up the spindle firmly, but do not tighten the spindle locknut at this stage. Refit the drive chain, ensuring that the clip on the spring link is fitted with its closed end pointing in the forward direction of chain travel and

re-tension the chain as described on page 35. Securely tighten the two axle nuts and re-fit the chaincase.

REMOVING REAR SWINGING FORK

First remove chaincase and body pressing. (See pages 35 and 41). Take off the chain. Place a box or other suitable support under the gearbox and remove the rear wheel and hub/sprocket assembly as previously described. Remove the suspension units. Unscrew the grease nipples from the ends of the fork pivot spindle and remove the end caps and felt seals. Loosen the spindle screw locknut at the lower rear of the fork pivot tube (14 mm. spanner) and remove the spindle screw (4 mm. hexagon key). Tap out the spindle, using a hammer and a soft metal drift. Take off the swinging fork, taking care not to lose the thrust washers between the fork and the frame. Remove the chaincase flexible gaiter.

REPLACING REAR SWINGING FORK

Replace the fork in reverse order to dismantling, renewing any parts as necessary and making sure that the fork is replaced right side up (with the welded-on chaincase bracket to the nearside). The flexible gaiter should be replaced with the cut-away to the inside front. Grease the spindle well before replacing. Use a screwdriver in the machined slot at one end of the spindle in order to twist the spindle and line up the central depression with the locking screw. Tighten up the screw and locknut and replace the felt seals, end caps and nipples.

Replace the hub/sprocket assembly and chaincase as described above, and refit the suspension units. Replace the toolbox and body pressing.

ELECTRICAL EQUIPMENT

ADJUSTING HEADLAMP BEAM INCLINATION

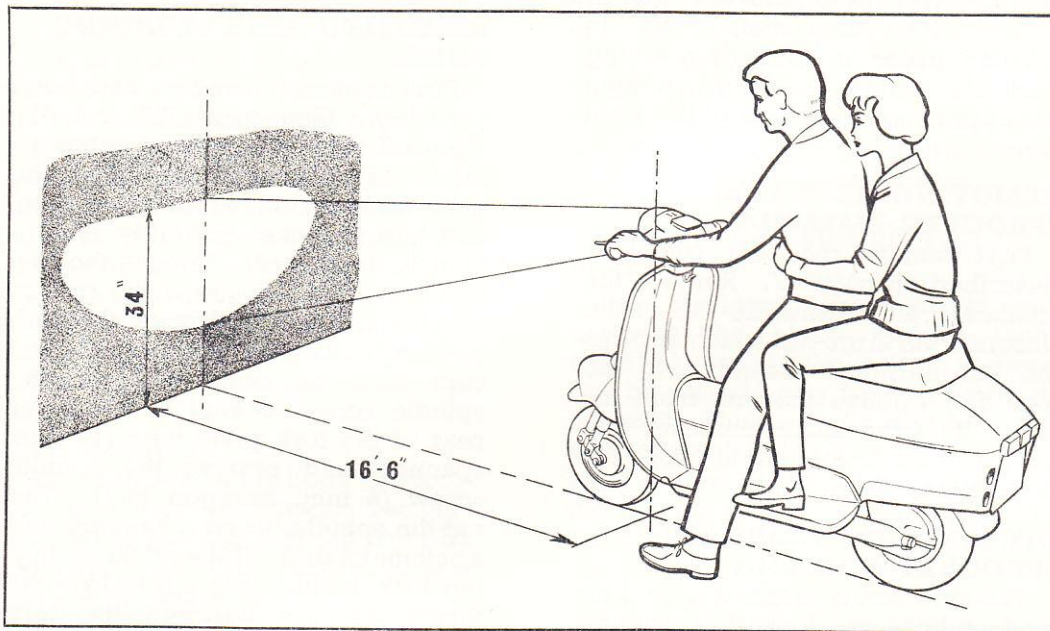


Fig. 57

With the vehicle normally loaded, the top edge of the dipped beam must not exceed a height of 34" above the level of the road when

projected on to a vertical surface 16½ feet in front of the headlamp. (See Fig. 57.)

METHOD OF ADJUSTING HEADLAMP BEAM

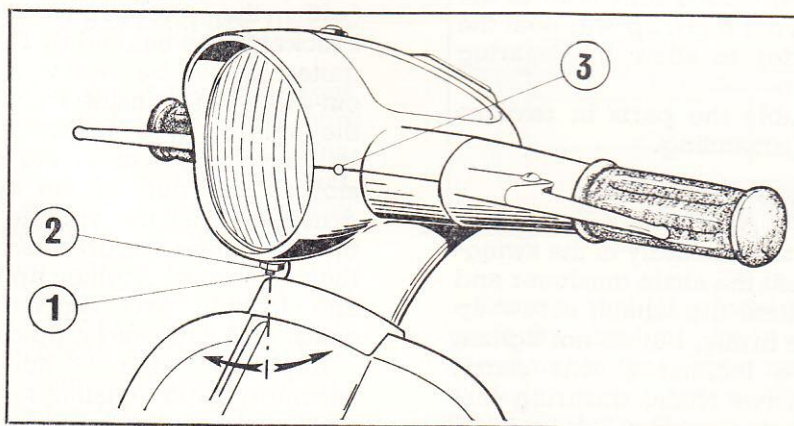


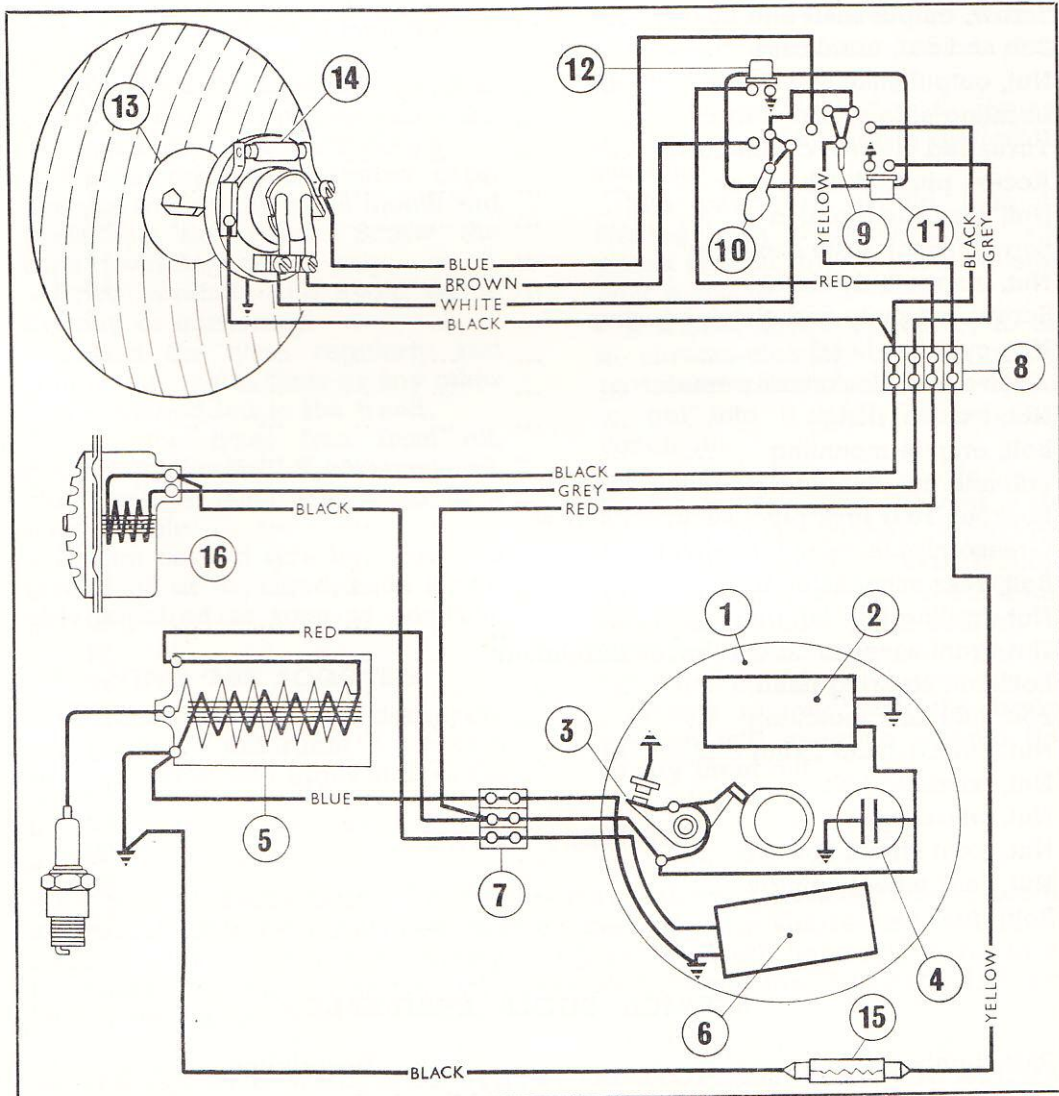
Fig. 58

- 1. Screw attached to light unit
- 2. Nut for locking light unit in position
- 3. Light unit pivot

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Use only bulbs of the stipulated type, i.e., 6 v., 25/25 w., for the headlamp; 12 v., 10 w., for the pilot light, and 6 v., 5 w., for the rearlamp. Remember that if a bulb fails it should be replaced immediately,

otherwise the remaining bulbs will be overloaded and may burn out prematurely. It is therefore advisable to carry some spare bulbs, properly packed and protected, in the toolbox.



Wiring Diagram. Fig. 59

- | | |
|------------------------------------|--|
| 1. Flywheel magneto | 9. Lighting switch |
| 2. Ignition coil. | 10. Dipswitch |
| 3. Contact breaker | 11. Horn button |
| 4. Condenser. | 12. Ignition cut-out Button |
| 5. External ignition H.T. coil | 13. Headlamp bulb, 6 v. 25/25 w. twin filament bayonet cap |
| 6. Lighting coil | 14. Pilot light bulb, 12 v. 10 w. festoon type |
| 7. Magneto terminal block | 15. Rearlamp bulb, 6 v. 5 w. festoon type |
| 8. Headlamp housing terminal block | 16. Electric horn |

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TORQUE RECOMMENDATIONS

For the guidance of repairers in possession of a torque indicating wrench, we give below a list of torque loadings applicable to the more important bolts and nuts.

Screw, output shaft end cover	...	...	...	...	...	...	3 lb./ft.
Bolt and nut, crankcase	...	...	...	...	...	...	6 "
Nut, output shaft	...	...	...	...	...	...	30 "
Locating screw, clutch arm	...	...	...	...	...	...	3 "
Threaded sleeve, clutch hub	...	...	...	...	...	...	58 "
Access plug, clutch cover	...	...	...	...	...	...	5 "
Nut, crankshaft pinion	...	...	...	...	...	...	30 "
Screw, stator plate securing	...	...	...	...	...	...	1 "
Nut, magneto flywheel	...	...	...	...	...	...	18 "
Screw, magneto and clutch housing	...	...	...	...	...	...	5 "
Nut, cylinder head	...	...	...	...	...	...	10 "
Allen screw, kickstarter crank	...	...	...	...	...	...	7 "
Nut, exhaust flange	...	...	...	...	...	...	5 "
Bolt, engine mounting	...	...	...	...	...	...	10 "
Bolt and nut, silencer mounting clip	...	...	...	...	...	...	5 "
Locknut, rear fork pivot securing screw	...	...	...	...	...	...	12 "
Grease nipple, rear fork pivot	...	...	...	...	...	...	2 "
Bolt, rear suspension unit	...	...	...	...	...	...	15 "
Nut, trailing link fulcrum	...	...	...	...	...	...	40 "
Nut, front suspension unit lower attachment	...	...	...	...	...	...	18 "
Locknut, steering head	...	...	...	...	...	...	40 "
Bolt, fuel tank mounting	...	...	...	...	...	...	12 "
Nut, centre stand fixing	...	...	...	...	...	...	5 "
Nut, wheel to hub	...	...	...	...	...	...	12 "
Nut, wheel half	...	...	...	...	...	...	12 "
Nut, front wheel spindle	...	...	...	...	...	...	30 "
Nut, rear wheel spindle	...	...	...	...	...	...	30 "
Bolt, dual seat	...	...	...	...	...	...	12 "

SERVICE TOOLS AVAILABLE

Part Number	Description
6200516	Clutch holding tool
6200518	L. handle socket spanner, cylinder head nuts
6200519	Crankshaft pinion extractor
6200520	Flywheel extractor
6200575	Hexagon key, 10 mm. across flats
6200559	Gudgeon pin extractor

LOOKING AFTER THE MACHINE

CARE OF TYRES

Always maintain the recommended inflation pressures in your tyres. Check the pressures with a gauge when the tyres are cold and not when they have attained their normal running temperature.

When a pillion passenger or additional load is carried, increase the rear tyre pressure accordingly.

Always replace the valve caps, thereby sealing the valve mouth and protecting the core. Screw the caps down finger-tight only.

Drive carefully and avoid fierce braking or cornering.

Inspect the tyres regularly and remove any nails, flints or any other object embedded in the tread.

Keep the tyres free from oil, grease or paraffin. If contaminated, clean with a cloth moistened in a little petrol.

Do not neglect tyre injuries. If a tyre is cut or damaged, have it suitably repaired as soon as possible.

CLEANING THE SCOOTER

Mix a weak solution of household "washing-up" detergent in a bucket of warm water and apply it liberally

but without any rubbing to the paintwork and bright parts.

Allow this to soak thoroughly into the traffic film but not to dry. Then lightly rinse off, using plenty of clean water.

Now sponge over with a clean sponge and clear water.

Finally, use a leather to remove any smear marks and to dry off the machine.

The paintwork should then be treated with a good-quality wax polish and the bright parts polished with a duster.

It should not be necessary to use a chrome-cleaner on the plated parts unless these have been allowed to get into a badly deteriorated condition.

When washing the scooter, care should be taken to prevent water getting into the brakes, "electrics" and working parts. When taking your machine on the road again, however, check your brakes. If they have been rendered inoperative by water entering the drums, a few moments running with the brakes applied will generate enough heat to dry them out.

FAULT FINDING

If the instructions contained in this book are followed conscientiously, and the machine is properly maintained, it is unlikely that any unforeseen trouble will arise. In the event of any difficulty being experienced, however, it should not be hard to remedy if it is tackled systematically with the aid of the following fault-finding procedure.

IF THE ENGINE WILL NOT START, OR STOPS OF ITS OWN ACCORD

It may be because of:—

A. Faulty carburation due to:—

- 1 Absence of fuel: refill the tank.
- 2 Fuel tap not turned on: open the tap.

- 3 Carburettor jet blocked: dismantle the carburettor and clean the jets. At the same time, clean the float chamber and blow through all the

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internal passages in the carburettor.

- 4 Fuel feed line blocked: clean out, preferably by blowing through with compressed air.
 - 5 Flooded carburettor: turn off the fuel tap, dry the carburettor by opening the throttle wide and kicking the engine over as rapidly as possible. If it does not fire after a few attempts, remove, dry and clean the sparking plug. Then turn on the fuel tap again and carry out normal starting procedure. Should flooding still occur, check the float chamber, float, float needle and seating.
- B. Faulty ignition due to:—**
- 6 Dirty or oiled sparking plug: clean the plug.
 - 7 Sparking plug electrode gap too wide: reset the gap to 0.020". If the electrodes are badly burnt or corroded, replace the plug.
 - 8 Faulty or broken sparking plug insulator: replace the plug.
 - 9 Insulation of H.T. lead to sparking plug faulty and spark shorting to earth: wrap the lead temporarily with insulating tape and replace it as soon as possible.
 - 10 Dirty, burnt or maladjusted contact breaker points: clean or reface points and set to correct clearance (0.017"-0.019").
 - 11 Condenser or external H.T. ignition coil faulty: have them checked.

- 12 **Note**—The sparking plug could get "wetted" with fuel due to carburettor flooding or to faulty ignition. It could be fouled by descending a long hill without opening the throttle occasionally, or by letting the engine run light for too long. A sparking plug running too hot may cause the engine to stop due to "whiskering," which is the formation of a conducting filament between the electrodes. A sparking plug running too cold fouls easily.

C. Mechanical trouble, as follows:—

- 13 Leakage at a crankcase joint, or at the crankshaft oil seals. Leakage at cylinder head gasket: check these possibilities, preferably with the aid of a qualified mechanic.

IF THE ENGINE STARTS, BUT STOPS IMMEDIATELY

- 14 This usually happens in winter with a cold engine: let the engine warm up with the cold start control in operation.

IF THE ENGINE WILL START ONLY WITH A WIDE THROTTLE OPENING

- 15 Pilot jet or its passages blocked: clean out.

IF THE ENGINE STOPS WHEN THE THROTTLE IS OPENED

- 16 Engine still cold: allow it to warm up.
- 17 Carburettor main jet blocked: clean it.
- 18 Fuel having difficulty in reaching carburettor: clean petrol pipe, tap and filter. (See also points 1, 3 and 4.)

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IF THE ENGINE DOES NOT RUN PROPERLY

- 19 Mixture too weak: see points 1, 3, 4 and 13.
- 20 Mixture too rich (air cleaner blocked with dirt, carburettor badly adjusted, float not maintaining correct fuel level): wash the air cleaner in petrol or adjust or repair the carburettor as necessary. (See also point 26.)
- 21 Sparking plug dirty or of unsuitable type, or with electrodes corroded or with incorrect gap: clean plug and set gap, or if necessary, replace plug.
- 22 Sparking plug loose in head: tighten correctly.
- 23 Contact breaker or condenser not functioning properly: have them checked.
- 24 Exhaust port or exhaust system choked with carbon: decarbonise and thoroughly clean. (See also point 26.)

IF THE ENGINE FOUR-STROKES EXCESSIVELY

- 25 Mixture too rich: remedy as indicated in point 20.

- 26 Exhaust system choked: remedy as indicated in point 24.

Note—If the four-stroking is caused by too rich a mixture, this can easily be verified by turning off the fuel tap whilst riding the machine. Just before the engine stops due to lack of fuel, it will begin to fire correctly. If this does not prove to be the cause, then it is probably due to carbon deposits obstructing the exhaust system.

MISFIRING

- 27 Fault with ignition equipment: check all items.
- 28 Fuel feed deficiency producing a weak mixture (usually accompanied by spitting back in the carburettor): see points 1, 3 and 4.

IF THE ENGINE STOPS OF ITS OWN ACCORD

- 29 Fuel feed deficiency or absence of fuel if the stoppage is preceded by spitting back in the carburettor and back-firing in the exhaust.
- 30 Ignition defect if the stoppage results from, or is preceded by, a bout of misfiring.

CHAPTER I
THE EARLY HISTORY OF THE UNITED STATES

The first European settlers in North America were the Spanish, who discovered the continent in 1492. They established colonies in Florida, the Southwest, and the Caribbean. The English followed in 1607, settling in Jamestown, Virginia. The Pilgrims arrived in 1620, settling in Plymouth, Massachusetts. The French established colonies in the St. Lawrence Valley and the Mississippi River region.

The Dutch established colonies in New York and New Jersey. The Swedish established a colony in Delaware. The Danish established a colony in Greenland. The British established colonies in the Carolinas and Georgia.

The American Revolution began in 1775, leading to the Declaration of Independence in 1776. The war ended in 1781 with the British surrender at Yorktown. The Constitution was signed in 1787, and the new nation was established.

The early years of the United States were marked by westward expansion and the discovery of gold in California. The Civil War began in 1861, leading to the Emancipation Proclamation in 1863 and the end of slavery in 1865.

The late 19th century saw the rise of industrialization and the Progressive Era. The Spanish-American War was fought in 1898, leading to the acquisition of Puerto Rico, Guam, and the Philippines.

The 20th century was marked by the Great Depression, World War II, and the Cold War. The United States emerged as a superpower, leading the world in economic and military strength.

THE HISTORY OF THE UNITED STATES OF AMERICA

The American Revolution was a struggle for independence from British rule. The Continental Congress declared independence in 1776. The war was fought between the Continental Army and the British Army. The British surrendered at Yorktown in 1781.

The Constitution of the United States was drafted in 1787. It established a federal government with three branches: the executive, the legislative, and the judicial. The Bill of Rights was added in 1791, protecting individual liberties.

The American Civil War was fought between the Union and the Confederacy from 1861 to 1865. It was the bloodiest war in American history, resulting in the death of over 600,000 soldiers.

The Progressive Era was a period of social and political reform in the late 19th and early 20th centuries. Reformers sought to address the problems of industrialization, such as child labor and monopolies.

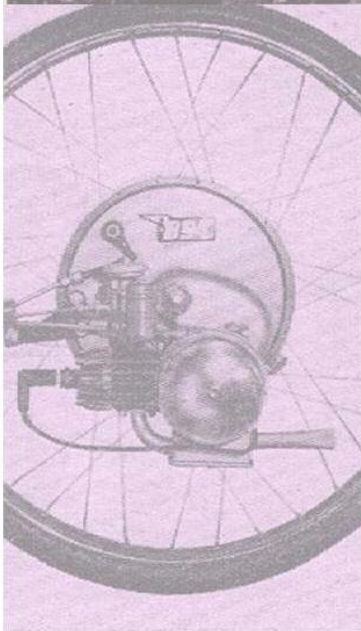
World War II was fought between the United States and the Axis powers from 1941 to 1945. The United States played a crucial role in the Allied victory, leading to the defeat of Hitler and the end of the war.

The Cold War was a period of tension between the United States and the Soviet Union from 1945 to 1991. It was a struggle for global influence, leading to the arms race and the space race.





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