3. WHEELS

Standard 26 × 2 in. wheels are used on all models. The rear wheel differs from the front wheel in the hub design and also in the thickness and length of the spokes. The front and rear wheels of the L model are distinguished from that of the N and S models by the thicker hub section being continued right across the wheel (motor-cycle style). The braking area remains unaltered but the greater hub surface area gives better heat dispersal from the brakes. Also the spokes are the same length on either side of the wheel (9¼ in. or 235 mm) instead of unequal lengths (left-hand 10⅜ in. or 263 mm; right-hand 9¼ in. or 235 mm).

The front wheel on all models is mounted on swinging links bearing against compression springs housed in the forks (*see* Section 4). To remove the wheel it is first necessary to disconnect the front brake cable completely from the right-hand side and slacken off the pinch bolts on each side. (*See* Fig. 35.) The spindle nut is then removed from the right-hand side (or the right-hand nut removed in the case of models subsequent to 482 754/522 989) and the spindle knocked right through, and removed from the left-hand side. The wheel then drops out free.

If a speedometer is fitted this is mounted against the left-hand side of the hub and also drops free with the withdrawal of the spindle. Where there is no speedometer two spacer rings are fitted in lieu of it and these must be replaced on the left-hand bearing cone in refitting the wheel. The brake backplate must also be brought to bear against the anchorage on the swinging arm on the right-hand side of the hub.

The rear wheel is removed in a similar manner, starting by disconnecting the brake rod from the brake arm (*see* Fig. 32) in the case of the N and S models, or by disconnecting the Bowden cable in the case of the L model. First remove the locking loop in each case and slacken off the chain adjuster nuts each side. The axle nut can then be removed from the right-hand side and the spindle driven out to the left, allowing the wheel to drop free. If now slid forwards the chain can be removed from the rear sprocket and the complete wheel removed. (*See* Fig. 33.)

Replacement follows in the reverse order, readjusting the chain tension correctly and making sure that these align the wheel true in the forks. The brake plate must bear against the step on the rear frame (N and S models); or against the step on the rear swinging arm (L model).

When attention is required to the hub bearings or seal, remove the wheel and brake backplate. (*See* Section 2.) Hold the left-hand bearing cone with a suitable spanner and unscrew it. If the hub is then rested over the open jaws of a vice the right-hand cone can be knocked out with a suitable drift or flat punch laid against the inner edge of the cone. If the two ball bearing rings are to be withdrawn an extractor must be used for this purpose. Details of the assembly should be clear from Figs. 28 and 29 which show the front wheel hub; and Figs. 30 and 31 on the rear wheel hub.

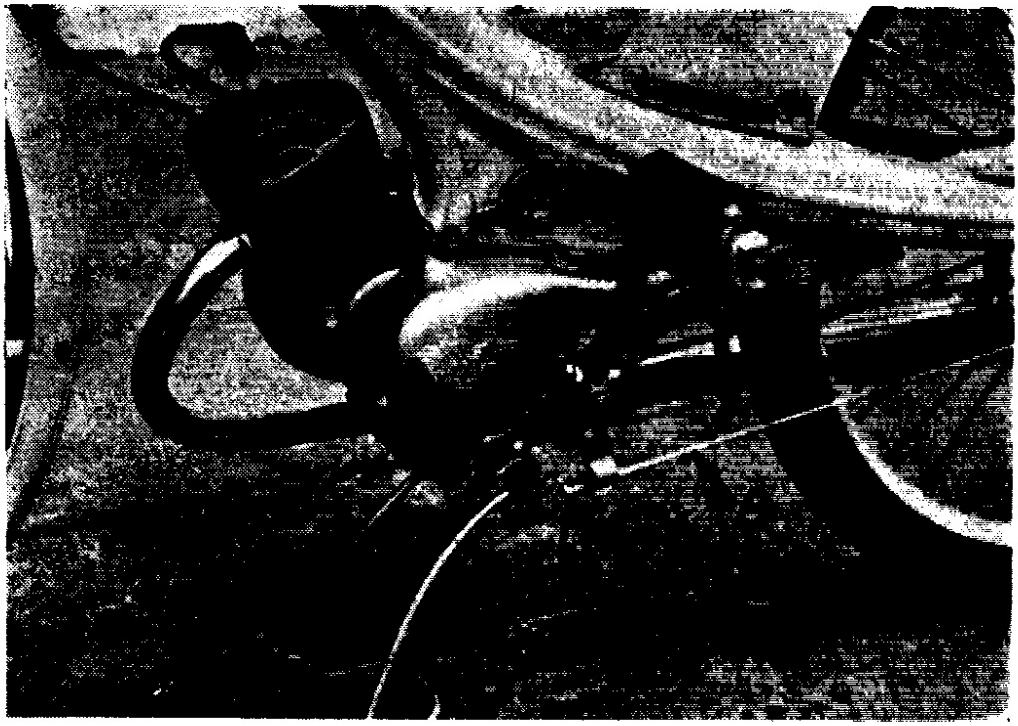


FIG. 32. REAR BRAKE IS OPERATED BY BACK-PEDALLING ACTION

A. Brake lever (actuated by pedals)
B. Brake rod (Bowden cable on L. model)
C. Adjuster

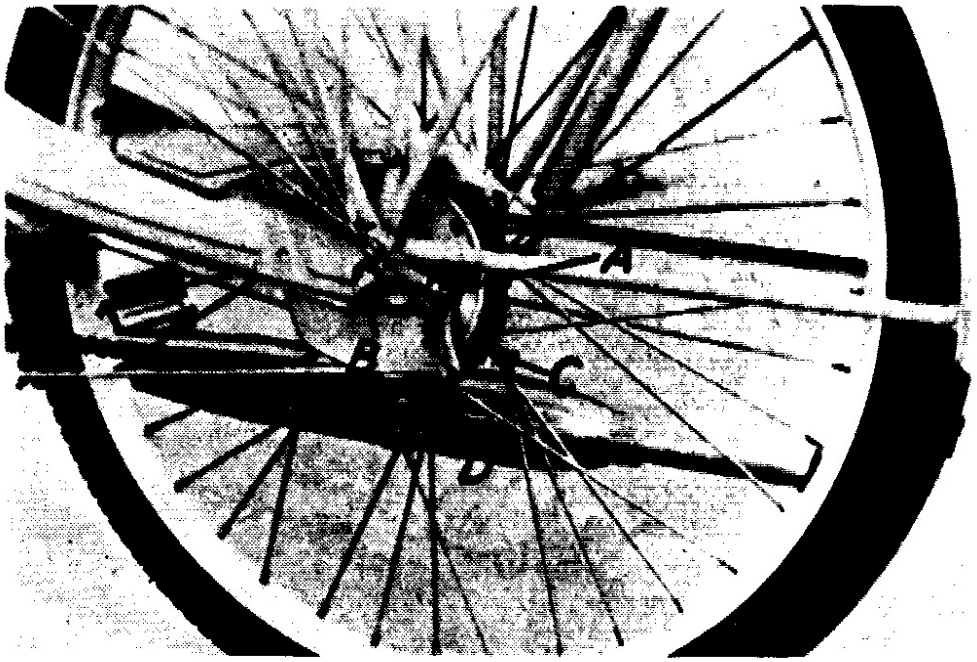


FIG. 33. REAR WHEEL DETAIL

A. Chain tension adjusters (slacken off to remove wheel)
B. Knock-out spindle
C. Spring link (detach to remove chain)
D. Rear brake arm

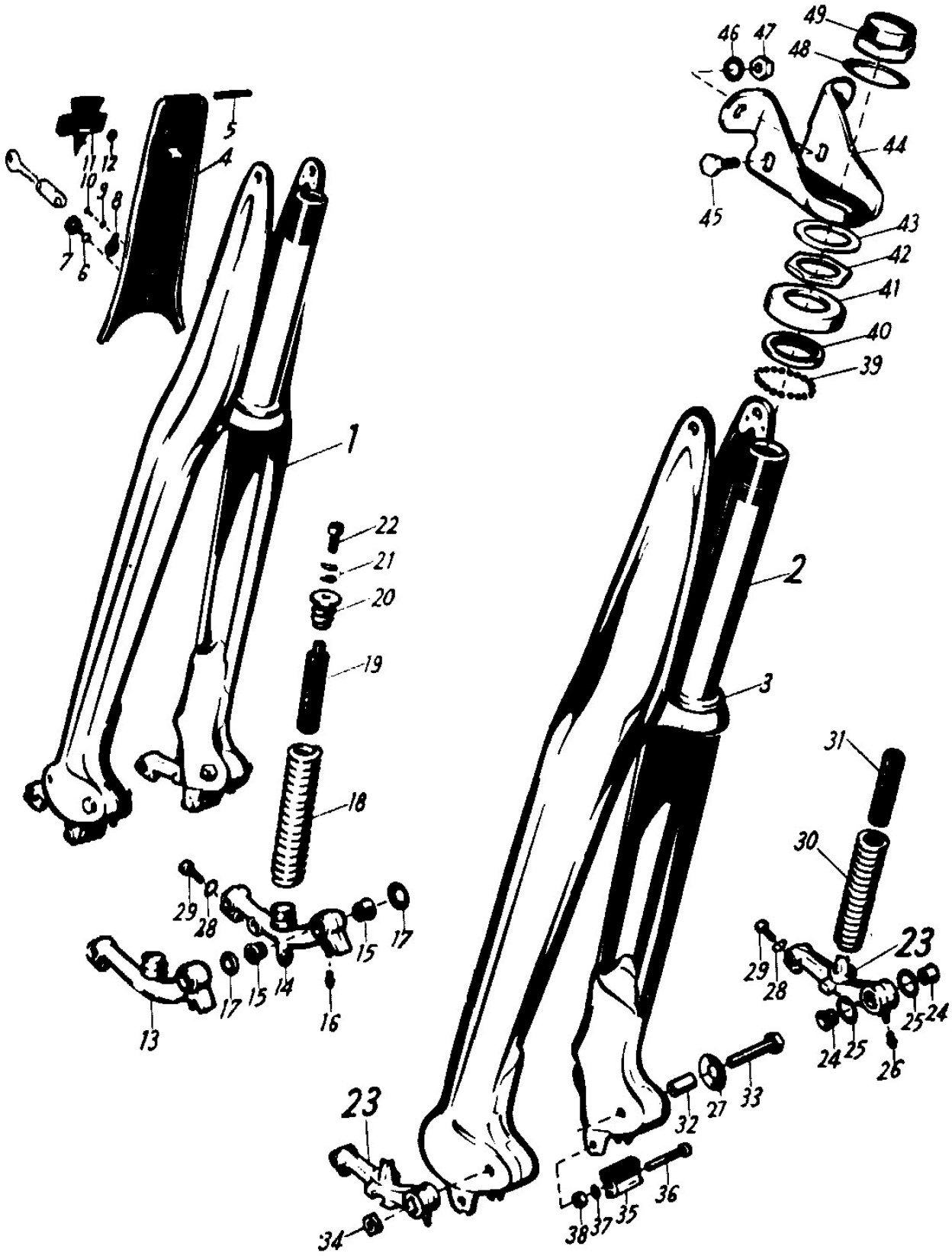


FIG. 34. SPRING FORKS N AND S MODELS

4. SUSPENSION, FRAME AND FORKS

The front spring-fork assembly has been modified in detail on progressive models (*see* Appendix II) although the operating principle remains identical. The appearance of the hubs of the N and S models and the L

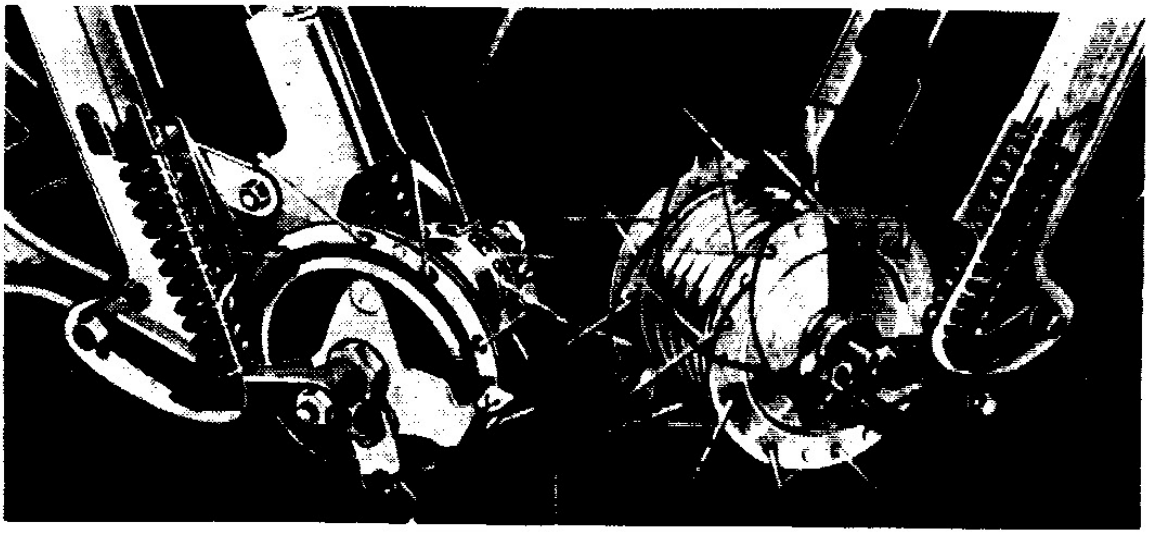


FIG. 35. N AND S MODELS HUB (*left*) AND L MODEL HUB (*right*)
Essential difference lies in the appearance, the brake area being the same.

model is shown in Fig. 35. Details of the component assembly of the spring hub in late models N and S (subsequent to 482 755/522 989) are shown in Fig. 34; and details of the L model spring-fork unit in Fig. 36.

KEY TO FIG. 34

1. Fork unit complete
2. Fork
3. Bottom cone
4. Toolbox cover
5. Rubber strip
6. Spring washer
7. Knurled screw
8. Escutcheon
9. Spring washer
10. Rivet
11. Nameplate
12. Rubber spacer

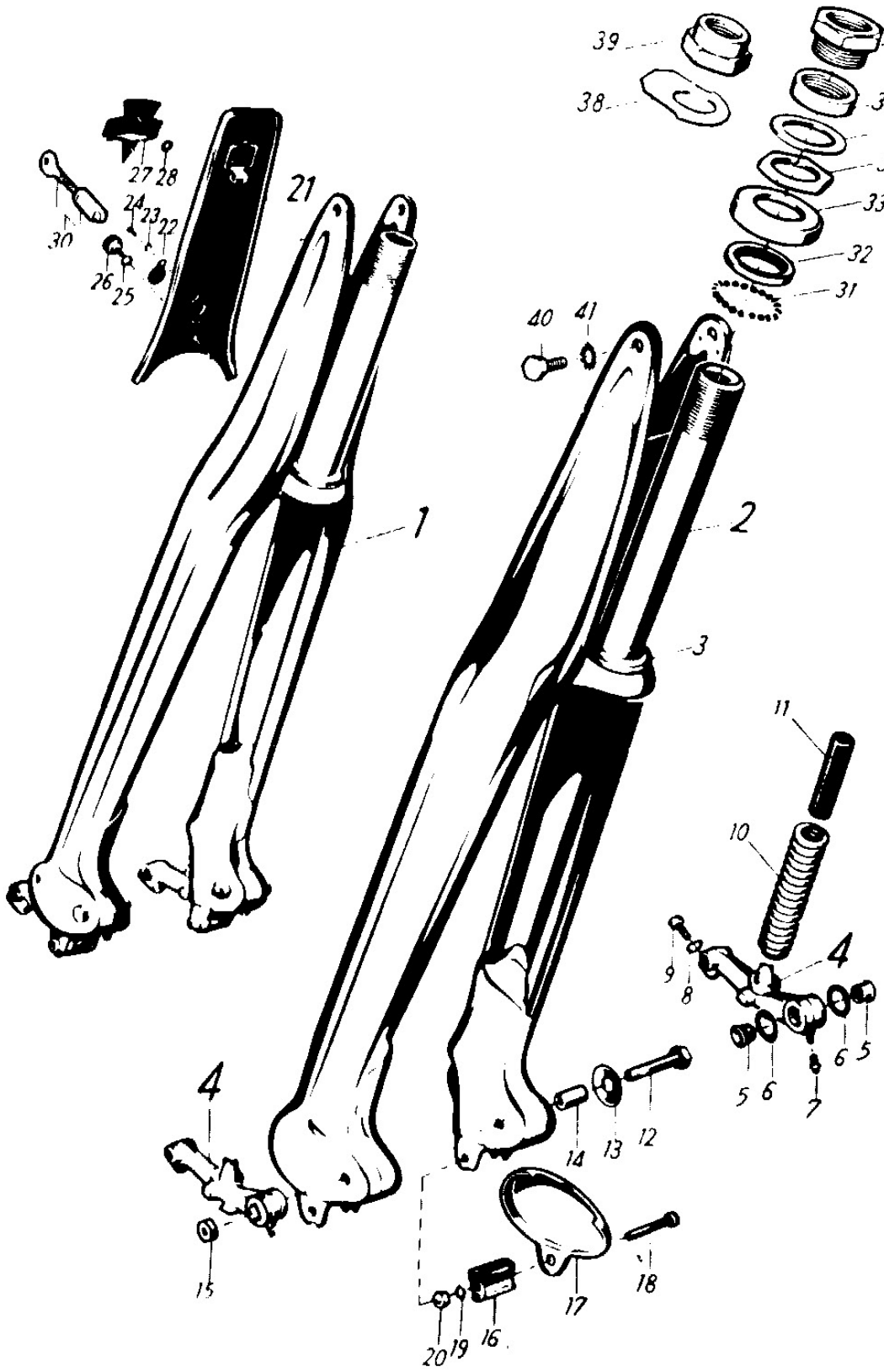
13. Swinging link (*left*)
14. Swinging link (*right*)
15. Bush
16. Grease nipple
17. Cap
18. Spring
19. Rubber plug
20. Top retainer
21. Spring washer
22. Screw

} applicable to models up to 482 754/522 989

23. Swinging link
24. Bush
25. Inner cap
26. Grease nipple
27. Outer cap
28. Spring washer
29. Screw
30. Spring
31. Rubber plug
32. Bush
33. Bolt
34. Nut
35. Buffer
36. Bolt
37. Lock washer
38. Nut

} applicable to models from 482 755/522 990

39. Ball
40. Cone
41. Cover
42. Nut
43. Washer
44. Handlebar support
45. Bolt
46. Lock washer
47. Nut
48. Lock plate
49. Cap nut



1. Spring fork assembly
2. Spring fork
3. Bottom cone
4. Swinging link (*left*)
5. Bush
6. Inner cap
7. Grease nipple
8. Spring washer
9. Screw
10. Spring
11. Rubber plug
12. Bolt
13. Outer cap
14. Bush
15. Nut
16. Buffer
17. Cover plate
18. Bolt
19. Lock washer
20. Nut
21. Cover for tool box
22. Escutcheon
23. Spring washer
24. Rivet
25. Spring washer
26. Knurled screw
27. Name plate
28. Rubber spacer
30. Lock and key
31. Balls
32. Cone
33. Cover
34. Nut
35. Washer
36. Cap nut assembly
37. Ring
38. Bracket
39. Nut
40. Screw
41. Locking washer

FIG. 36. SPRING FORK ASSEMBLY L MODEL

In all cases removal of the pivoted links is similar, first removing the front wheel and then unscrewing the nuts on the pivot bolts and knocking out the bolts. The right-hand pivoted link carries the brake cable carrier, which is removed by unscrewing. The springs are then released by unscrewing the small hexagon-headed bolt at the top end of each spring,

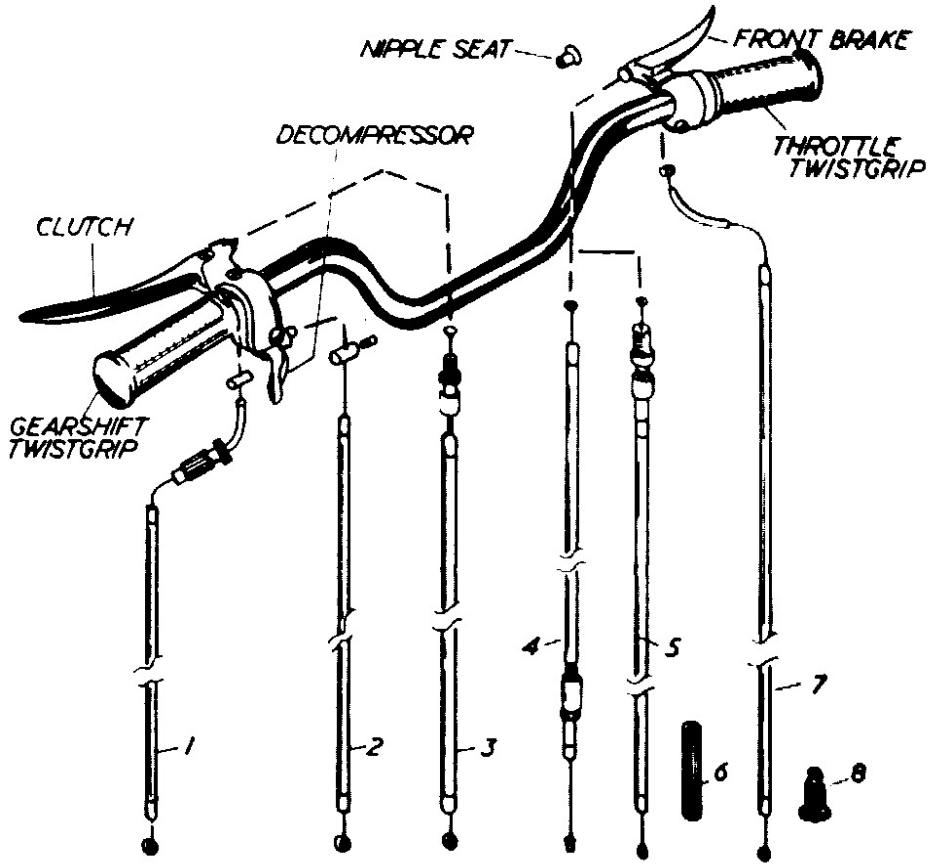


FIG. 37. HANDLEBARS AND CABLES N AND S MODELS

1. Gearchange cable
2. Decompressor cable
3. Clutch cable
4. Front brake cable (early models with adjuster at wheel end)
5. Front brake cable (late models)
6. Rubber sleeve fitting front brake cable end
7. Throttle cable
8. Rubber cover for throttle cable (carburettor end)

where applicable (up to model 482 754/522 989). On subsequent models, and all L models, the pivoted links with springs may be removed once the pivot bolts are knocked out.

The bushes in the pivoted links are press fitted and can be knocked out with a suitable drift or punch, if requiring replacement. New bushes are pressed in place and then reamed to size. The required bush diameter should be checked carefully as this varies with the model series. Earlier machines require a finished bush size of 11·02 mm (0·434 in.) and later machines a reamed size of 12·02 mm (0·473 in.) to match.

Handlebar assembly for the N and S models is shown in Fig. 37; and

the L model in Fig. 38. Again there are differences in detail design on the earlier models, particularly as regards the twistgrips. Removal of the twistgrips is discussed in Section 1. Stripping of the handlebars follows logically; also removal of the handlebars, when necessary.

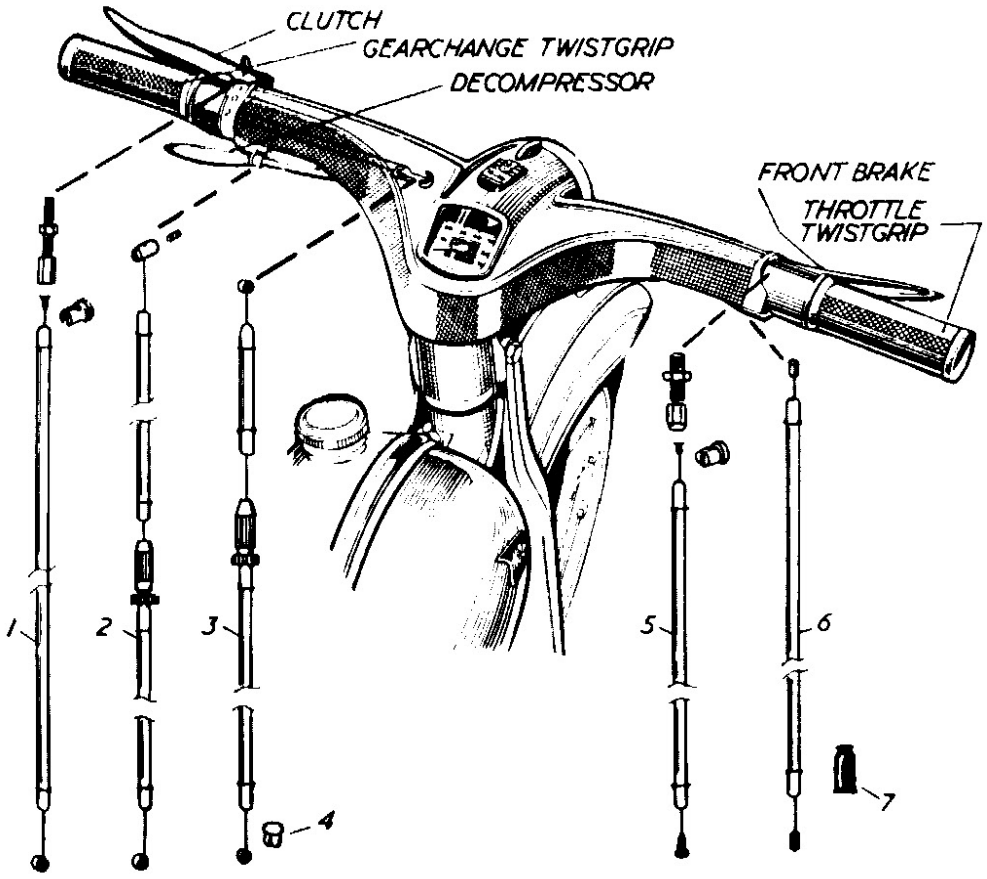


FIG. 38. HANDLEBARS AND CABLES L MODEL

1. Clutch cable
2. Decompressor cable
3. Gearchange cable
4. Sleeve (at end of gearchange cable)
5. Front brake cable
6. Throttle cable
7. Rubber cover for throttle cable (carburettor end)

The front forks may be removed by first removing the wheel. In the case of the N and S models the headlamp rim is then detached by removing the knurled screw, the leads disconnected and pulled out through the rubber grommet. The hexagon nut on the fork stem is then removed, together with its lock washer, and the two hexagon-headed bolts, cap nuts and lock washers on the mounting clips. The handlebars are then removed and laid aside, and the headlamp detached. The fork is then released by undoing the lock nut on the stem, allowing the forks to drop out downwards.

The steering head cones are now exposed. The upper cone cover, upper cone and balls can be withdrawn, also the balls from the lower race. The two races can then be removed, if necessary by driving out with a suitable drift or punch. The lower cone is fitted fork stem and can be driven off with a flat punch or prised off with a screwdriver, if necessary to replace. (*See also* Figs. 34 and 36.)

Reassembly consists of driving the lower cone in place on the stem, e.g. using a metal tube which fits snugly over the stem, refitting the two races

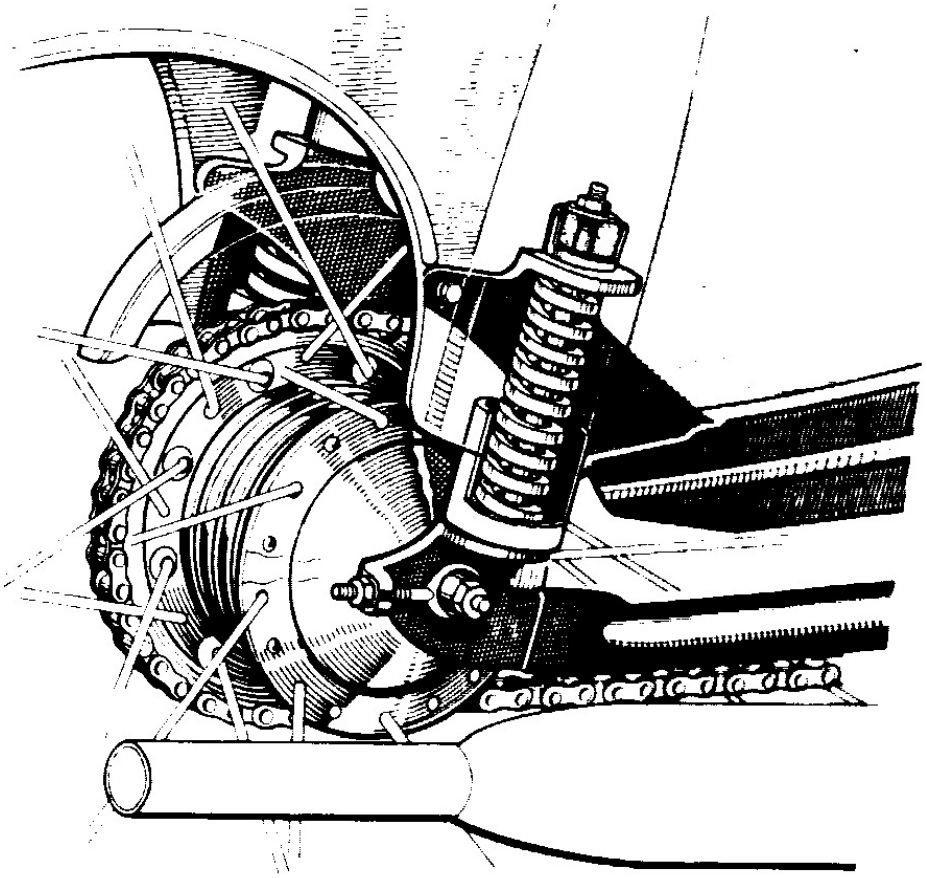


FIG. 39. REAR SUSPENSION OF L MODEL

in the top and bottom of the steering head and then adding the balls. Twenty-one 5 mm diameter balls are used in each race, bedded in grease. The upper cone and cover is then added and the forks offered up and slid in carefully upwards, and secured with the locknut. Head bearings are then adjusted so as not to allow play in the forks, but with sufficient freedom of movement that the weight of the forks, with wheel fitted temporarily, will swing them to full lock on either side.

Whilst the basic frame is essentially similar on all models, detail changes occur after model 482 755/522 990. Also the L model frame incorporates additional fittings for the rear assembly. The frame itself is of pressed-steel construction in the form of a box girder giving exceptional rigidity for a low weight and is unlikely to receive damage except in the case of a

serious accident. A replacement item is the only satisfactory solution in the case of a damaged frame. A particularly important maintenance feature is that unless the three engine-mounting bolts are kept tight—checked at regular intervals (preferably weekly) and retightened as necessary—vibration may cause the bolt holes to elongate and eventually the metal to fracture. Later models have locking plates replacing the star washers under the nuts to lessen the possibility of loosening.

Rear-wheel mounting for the N and S is of the bicycle type, the spindle being bolted directly to the frame unit. On the L model the rear wheel is mounted on a swinging-arm unit pivoted to the frame and sprung with compression springs mounted on the ends of the arms and bearing lug fittings on the frame. (*See* Fig. 39.) The bottom of each spring rests in a cap and at the top is a rubber shock absorber, the complete assembly being mounted on a connecting pin or bolt threaded at the top end to take a threaded washer and nut. The spring can be removed by undoing this nut and washer and withdrawing the spindle downwards, taking care not to lose the spacing washer, spring washer and C-washer under the cap (assembled in that order with the spacing washer next to the swinging-arm lug).

5. CHAIN

The final drive or transmission of power between the gearbox and rear wheel is by roller chain of generous dimensions. A 112 link chain is standard. The chain should give no trouble provided—

1. It is never allowed to run dry (weekly oiling of the rollers is recommended).
2. It is cleaned regularly by washing in paraffin and re-greased before replacing.
3. The chain tension is checked periodically and readjusted, as necessary.

The total free movement of "lift" on the bottom length of the chain, with the machine on its wheels and unloaded, should be between $\frac{5}{8}$ and $\frac{3}{4}$ in. (*See* Fig. 20.) If adjustment is required both rear wheel spindle nuts should be slackened-off and the chain-adjuster nuts tightened an equal amount each side. (*See* Fig. 19.) It is important that both adjusters are tightened the same amount as otherwise the alignment of the wheel will be affected. When the chain sag is again correct, retighten the wheel spindle nuts. Since adjustment of chain tension moves the rear wheel relative to the frame this may affect the rear brake operation, which should be checked and readjusted if necessary.

To remove the chain—e.g. for cleaning or as a preliminary to removing the rear wheel—rotate the pedals to bring the spring link on to the rear sprocket and prise off the spring with a screwdriver. When replacing the chain, again assemble with the connecting link on the rear sprocket inserted from the back so that the spring clip is on the *outside*. The closed end of the spring should always face the direction of travel of the chain (Fig. 20).

6. CARBURETTOR AND AIR FILTER

An exploded view of the carburettor and air filter is shown in detail in Fig. 40. The carburettor is attached directly to the cylinder with two nuts and a gasket sandwiched between the two mating flanges. The air filter is mounted in the frame section, attached by a thin bolt from the

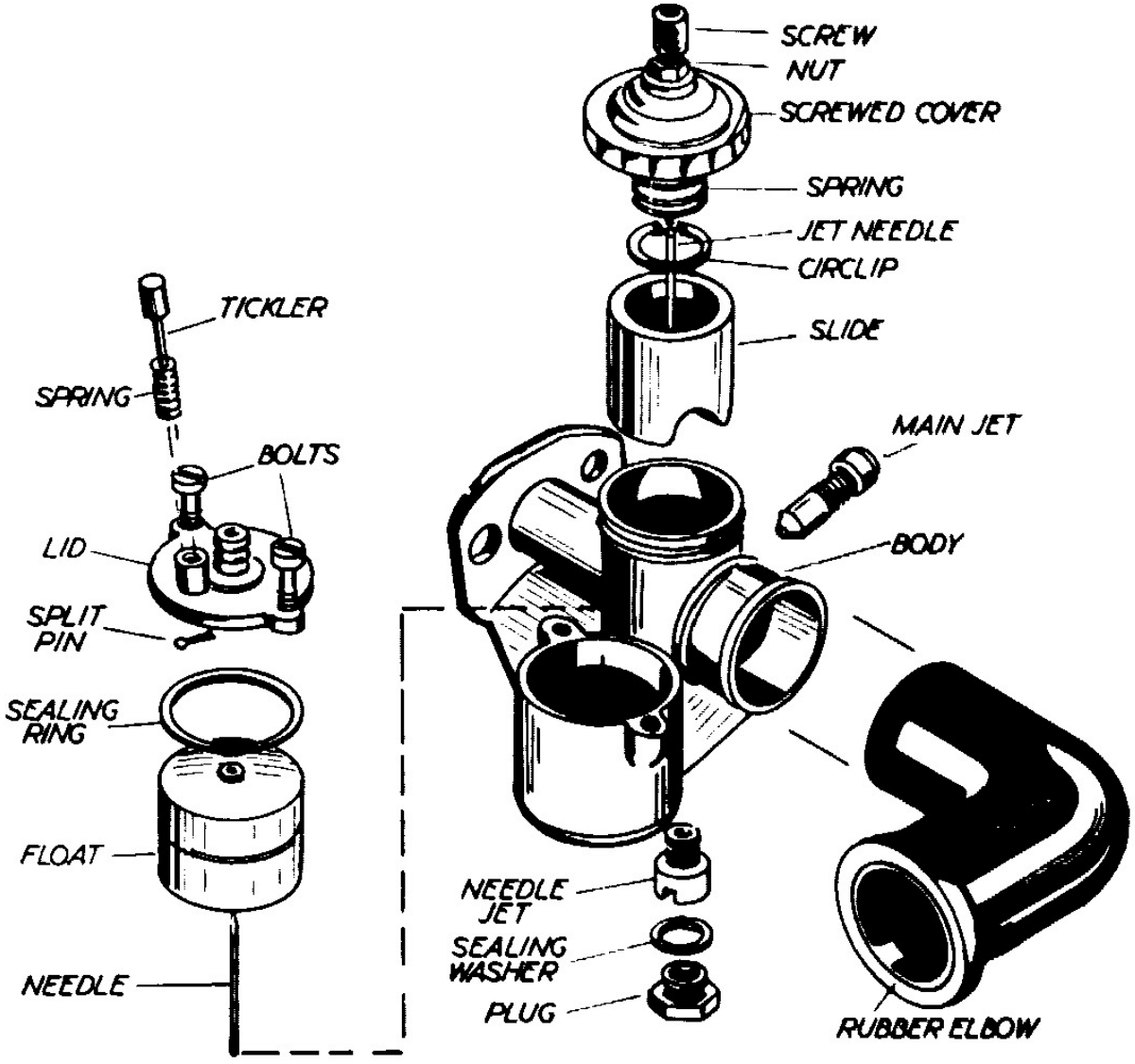


FIG. 40. AN EXPLODED VIEW OF THE CARBURETTOR SHOWING ALL PARTS

choke cover on the left-hand side passing through to terminate in a nut and spring washer on the right-hand side. Removing this nut and washer and withdrawing the bolt enables the air filter to be dropped out for cleaning. Connexion between the air filter and the carburettor intake is by a rubber elbow which is merely pushed on at each end.

Normally no adjustment whatever should be required on the carburettor, the manufacturer's original settings being consistent with optimum performance and minimum fuel consumption. The mixture is controlled by the setting of the jet needle located in the appropriate groove by a

spring circlip. If removed for any reason care should be taken that it is reassembled in the same groove as originally found. Also care must be taken not to bend the needle as this will upset the mixture setting. Wear may be apparent on the needle after long service which could affect the mixture, but moving it down to the next groove should compensate for this.

An over-rich mixture, indicated by a black and velvety sooty deposit on the spark plug, can be caused by the needle being set too high, the

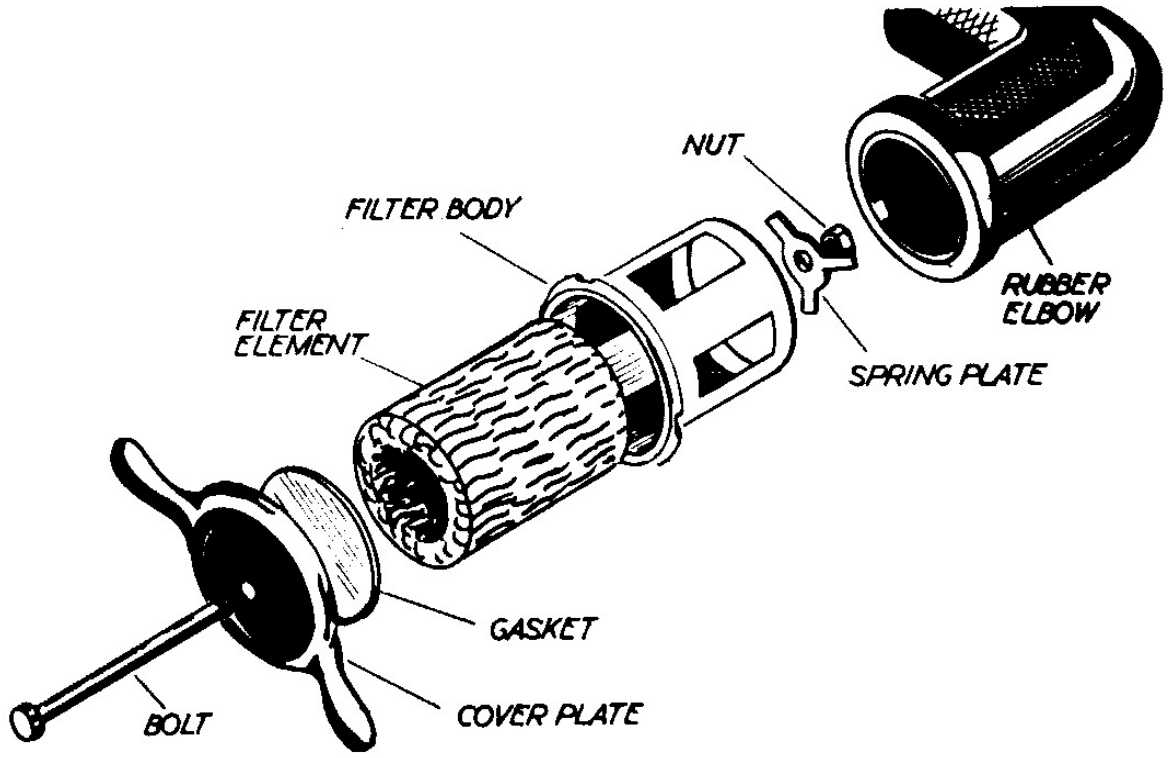


FIG. 41. AIR FILTER

This is mounted at bottom of frame and connected to carburettor with a rubber elbow.

main jet being enlarged (e.g. through being reamed out oversize accidentally by cleaning with a wire instead of a bristle); a sticking float (or float punctured and "sunk," or wrongly placed on its needle); or a clogged air filter. A positive check for over-rich mixture is to close the fuel tap with the engine running and leave the throttle setting undisturbed at a little above normal tick-over. If the engine speeds up markedly just before it dies out through lack of fuel, the mixture setting is on the rich side (too much fuel, or not enough air).

An over-lean mixture, on the other hand, will tend to produce cutting of the engine when running (particularly on opening up the throttle under load). The engine will also lack power and tend to overheat, which will also be evident by the appearance of the spark plug electrode (whitish in colour inside). The jet needle being placed too low will produce an over-lean mixture, but the most common cause is a blocked or partially blocked main jet. This may be produced by some solid matter which has been

drawn into the jet or gummy oil deposits which have collected in the bottom of the carburettor. To guard against the latter possibility it is good practice to partially dismantle and wash out the carburettor with petrol from time to time, particularly if the machine has been left standing for a long period with fuel mixture in the carburettor. The main jet can be unscrewed for cleaning. Blowing through should be adequate to clear a partial blockage, but if the clogging is persistent, use a stiff, non-metallic bristle to remove it.

For starting purposes an over-rich mixture is required because the fuel does not vaporize so readily when the engine is cold. This effect is produced by operating the choke control to cut off most of the air supply temporarily so that the engine sucks in mainly fuel vapour. On later models the disc-type choke control on the bottom of the frame on the left-hand side is replaced by a choke fitting on the carburettor itself which is depressed to operate the choke and which automatically lifts again when the throttle is opened after starting. With the manual choke it is important to remember to turn the choke to the "off" position as soon as the engine is running properly as otherwise an excessively rich mixture will continue to be drawn into the cylinder and the engine will not run properly.

The tickler on the carburettor is merely for the purpose of depressing the float and ensuring that the float chamber is completely full of fuel, ready for starting and running. If the tickler is held depressed, excess fuel will spill out of a small hole in the top of the float chamber as soon as it is full. Continued spillage of fuel through this hole with the tickler released indicates that the float has stuck. The lid of the float chamber and the float should be removed periodically and the float chamber washed out with petrol clean of any sediment which may have gathered in the bottom.

7. MAGNETO/GENERATOR

Only the 17-watt magneto-generator unit is scheduled for export models of the Quickly. The flywheel is exposed by removing the right-hand cover and can be rotated by hand to uncover the contact-breaker unit for access to the points for checking the gap and adjusting. (*See* Fig. 42.) The normal contact gap is 0·008 to 0·012 in. (0·2–0·3 mm) and this can be checked with feeler gauges, turning over the engine by means of a pedal until the points are in the fully-open position. Adjustment of the points gap is made by engaging the eccentric adjuster with a screwdriver and turning. The points may also be cleaned and refaced, if necessary, through one of the flywheel openings, using a thin flat file with very fine teeth. Both contact faces should be perfectly flat and smooth and should contact each other over the whole of their surface, not at an angle touching at one edge. For better access to the contact breaker the flywheel can be removed.

It is necessary to use an extractor for this job, there being several patterns available. Depending on the type of extractor used the flywheel

retaining nut is either unscrewed level with the outside of the flywheel, or removed entirely and replaced with a special cap or threaded bush. The extractor is then applied against the nut, cap or bush, the flywheel being held by the holder. An extractor should *never* be applied directly to the end of the crankshaft as this will almost invariably result in spreading of the thread. The flywheel is locked onto the crankshaft with a Woodruff key and so can only be reassembled in the same position as before. Care should be taken not to lose the key during the removing operation.

The stator or magneto backplate can be removed from the engine unit by unscrewing the two cheesehead screws on the backplate and the cheesehead screw on the terminal plate. The essential components mounted on

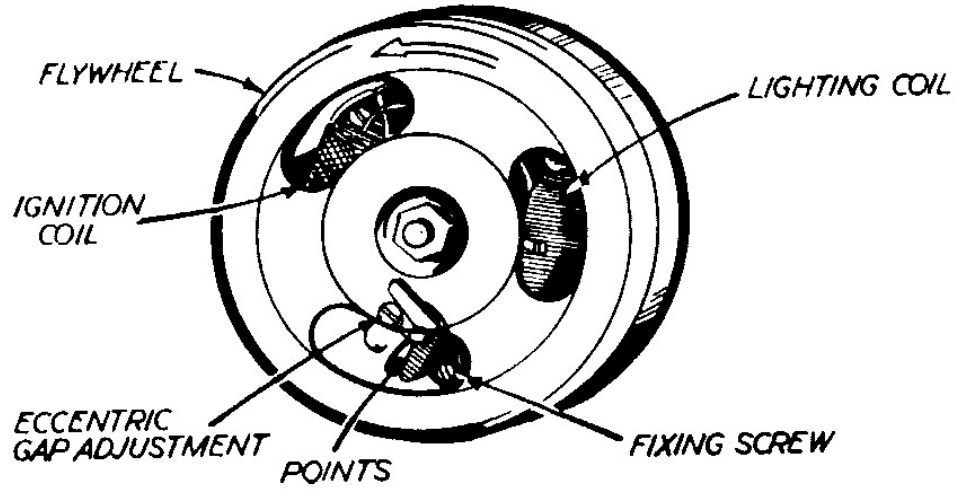


FIG. 42. ACCESS TO THE CONTACT BREAKER

This is achieved through one of the cut-outs in the flywheel. Points may be adjusted without removing the flywheel.

the stator consist of the ignition coil, lighting coil, condenser, contact-breaker assembly and a lubricating pad for the shaft cam. (*See* Fig. 43.)

The magneto-generator unit may differ in small detail according to model number, although many parts are common. Models prior to number 358 398/377 954 have the Bosch LMUP 1/115/17 L 2 unit with an inside flywheel diameter of 90·5 mm. The Bosch LM UPA unit fitted to subsequent models has an inside flywheel diameter of 85·5 mm, different stator, lighting and ignition coils, but the same rocker arm and condenser. Also specified is the Noris ELZJ 17/4 magneto-generator with many dissimilar parts again, although outwardly the same in general appearance. It is therefore important to specify the magneto type number when ordering spares.

Timing adjustment can be made, where necessary, by slackening the two cheeseheaded screws in the slotted holes in the stator and rotating the stator relative to the engine unit, bearing in mind that the engine rotates anticlockwise (viewed from the magneto end of the shaft). Thus rotating the stator clockwise will advance the spark, and anti-clockwise retard the spark. Only a very limited movement is possible, the correct

timing for the spark to occur (i.e. points open) is when the piston is 0·084 in. (2·1 mm) before top dead centre.

The timing position can be checked, if necessary, by removing the cylinder head, putting sleeves on two of the studs and tightening the cylinder temporarily with two nuts on these studs. The engine can then be turned over and the piston position measured with a depth gauge, related to contact-breaker movement.

Normally the only attention required by the magneto is a periodic application of grease to the felt lubricating pad which rubs against the

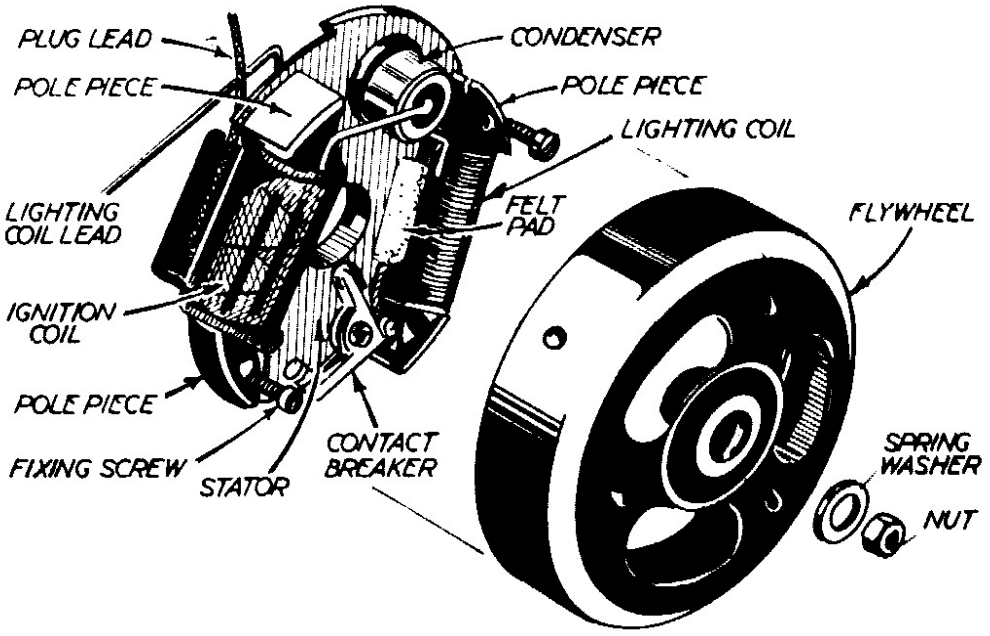


FIG. 43. THE FLYWHEEL MAGNETO-GENERATOR IN DETAIL.
Standard unit is a Bosch LMUP L 2 on earlier models; Bosch LM UPA or Noris ELZJ alternative on later models.

cam-shaped section of the crankshaft (*see* Lubrication Table), and checking and adjustment of the contact-breaker gap and cleaning the points as a matter of routine maintenance.

Any electrical faults which may develop are generally obscure to the non-specialist and normally call for professional attention. It is as well to check first, however, that an apparent ignition or lighting coil failure is not in fact due to broken, frayed or disconnected leads, this type of fault being far more common than actual failure of the magneto-generator itself.

8. ENGINE UNIT

An exploded view of the complete engine unit is shown in Figs. 44 and 45. This is the same for all models, except that the spacer tube fitted on the bolts holding the right-hand engine cover and left-hand chain cover have been eliminated on later models and the gearbox mainshaft has been

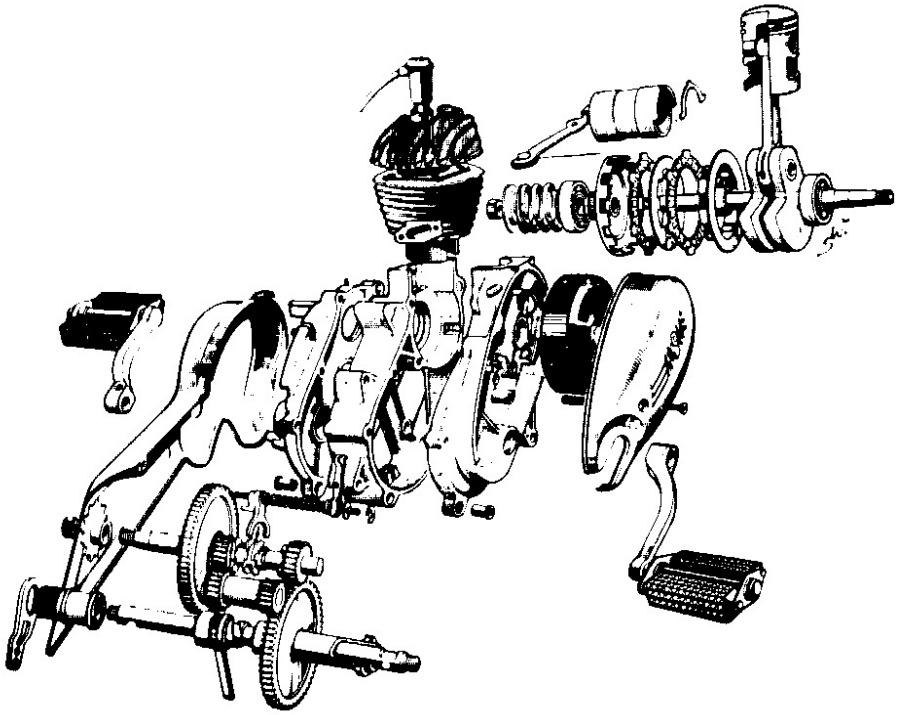


FIG. 44. DETAIL VIEW OF THE ENGINE UNIT, EXPLODED

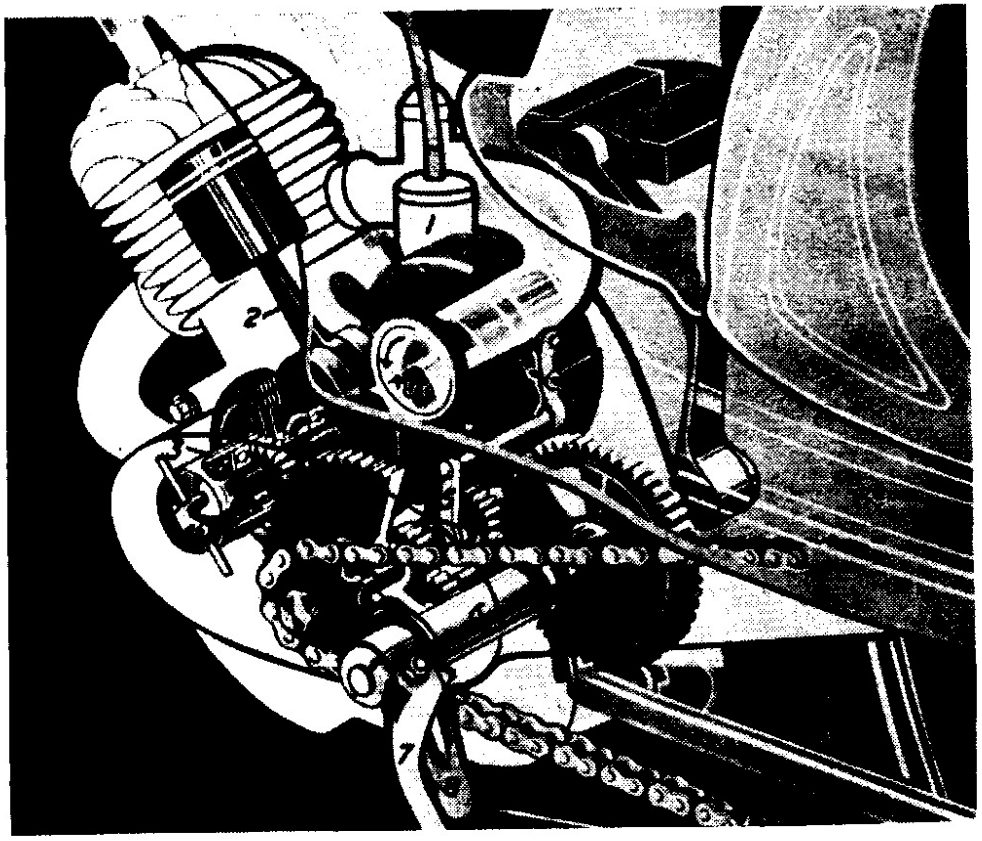


FIG. 45. CUT-AWAY DRAWING OF THE ENGINE UNIT

1 is the carburettor; 2 the piston-connecting rod-crankshaft assembly of the engine proper; 3 the clutch; 4 the main gear on the gearbox mainshaft; 5 the gear selector fork engaging the dog on the gearbox mainshaft (splined length); 6 the pedal crank spindle; 7 the pedal crank; and 8 the rear brake lever.

modified on models later than 20 964/21 026. The shape of the chain cover also differs on the N and S and L models.

If the engine is to be stripped it is first removed from the frame when its size and weight is such that it can easily be lifted and handled on a bench, or mounted on a special clamping fixture. (*See* Appendix III.) This fixture is normally used with an assembly stand although for owner-servicing it is quite adequate to employ only the clamping fixture held in the jaws of a vice. The clamping fixture is not an indispensable piece of equipment for the complete operation of stripping and reassembly can readily be done with the engine laid on a suitable flat surface, such as a

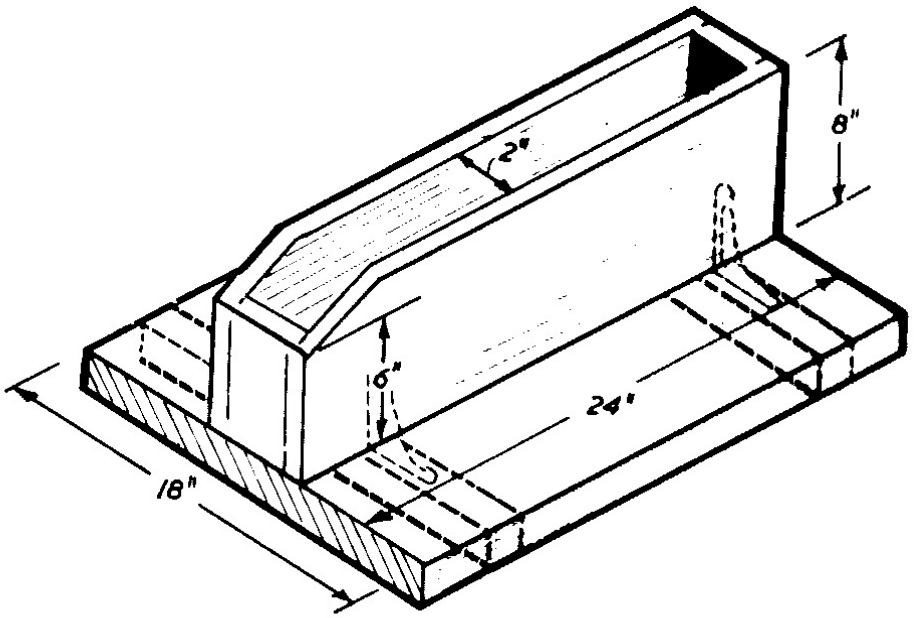


FIG. 46. FRONT WHEEL STAND

Details of a simple stand to hold the front wheel for maintenance work on engine, etc. Instead of a solid base, cross members may be fitted, attached with angle brackets (as shown dotted).

bench top. Recommended proportions for a stand to hold the machine upright whilst working on it are given in Fig. 46, although a conventional cycle stand of sturdy construction will do just as well.

To remove the engine, the chain cover is detached, the chain turned until the spring link comes in a convenient position, the spring link removed and the chain taken off. Also on this side the clutch cable is detached from the clutch lever.

The petrol tap is turned off, the rubber elbow between the carburettor and air intake pulled off and the carburettor and gasket removed by unscrewing the two hexagon nuts holding it to the cylinder.

The exhaust pipe and silencer is detached complete from the cylinder and frame. (*See* Section 10.)

Disconnect the rear brake rod (or cable) from the brake arm. Remove the right-hand engine cover.

Withdraw the clutch cable through the slotted hole in the left-hand crankcase cover. Set the gearchange to second gear position, push the gearchange lever inwards and disconnect the cable, withdrawing this completely through the hole in the right-hand crankcase cover. The decompression valve cable is also released from the cylinder head.

The lighting lead is disconnected from the terminal on the magneto terminal plate and withdrawn upwards through the rubber sleeve.

Finally, removing the three mounting bolts will enable the engine unit to be dropped out clear of the frame.

Stripping the Engine. (Refer to Figs. 47–50 for identification of parts.) Before attempting to strip the engine the outside should be cleaned off as much as possible with petrol or paraffin and a clean rag so that dirt and abrasive matter is not transferred to the inside, as well as making the whole job less messy. Also, of course, before stripping the oil should be drained out of the crankcase by removing the drain plug in the left-hand crankcase cover and either the filler plug (right-hand side) or overflow screw (left-hand side).

The pedal cranks are removed by unscrewing the retaining nut on the end of the spindle and spring washer, and the nut and two washers retaining each cotter pin. The cotter pins can then be driven out with a light punch and the cranks and pedals pulled off the spindle.

The cylinder head is detached from the cylinder barrel by unscrewing the four nuts (first removing the plug lead and plug). The cylinder barrel then withdraws upwards. To remove the gudgeon pin the circlips at each end are taken off with pointed-nose pliers and the piston heated gently to a temperature a little above that of boiling water (approximately 250°F), when the gudgeon pin can be extracted with the gudgeon pin punch. (*See* Appendix III.) The piston can then be laid aside and the lower cylinder gasket removed.

The engine is laid on its left side (or turned on the fixture until the right side is uppermost) to remove the flywheel (*see* Fig. 43) and stator plate (magneto backplate). The position of the stator can be marked to reassemble without resetting the timing. The outer circlip and washer is also removed from the gearchange shaft.

Turning the engine the other way up the nut on the gearbox mainshaft is removed by locking the chain sprocket, e.g. with a screwdriver placed between the sprocket and clutch casing, and unscrewing. Remove the spring washer and withdraw the sprocket with an extractor. Remove the key from the shaft. A rubber sealing ring may be found fitted to the sprocket on earlier models. Detach the brake lever, which is retained by a circlip.

The small filler piece (*see* Appendix III) should be stuck in the cotter pin groove in the pedal crank spindle with grease before attempting to remove the cover. This protects the rubber sealing rings in the brake

sleeve immediately behind the cover and through which the spindle is withdrawn when the cover is lifted. The cover is held by seven nuts (with lock washers) and one bolt. If necessary to free after removing these nuts

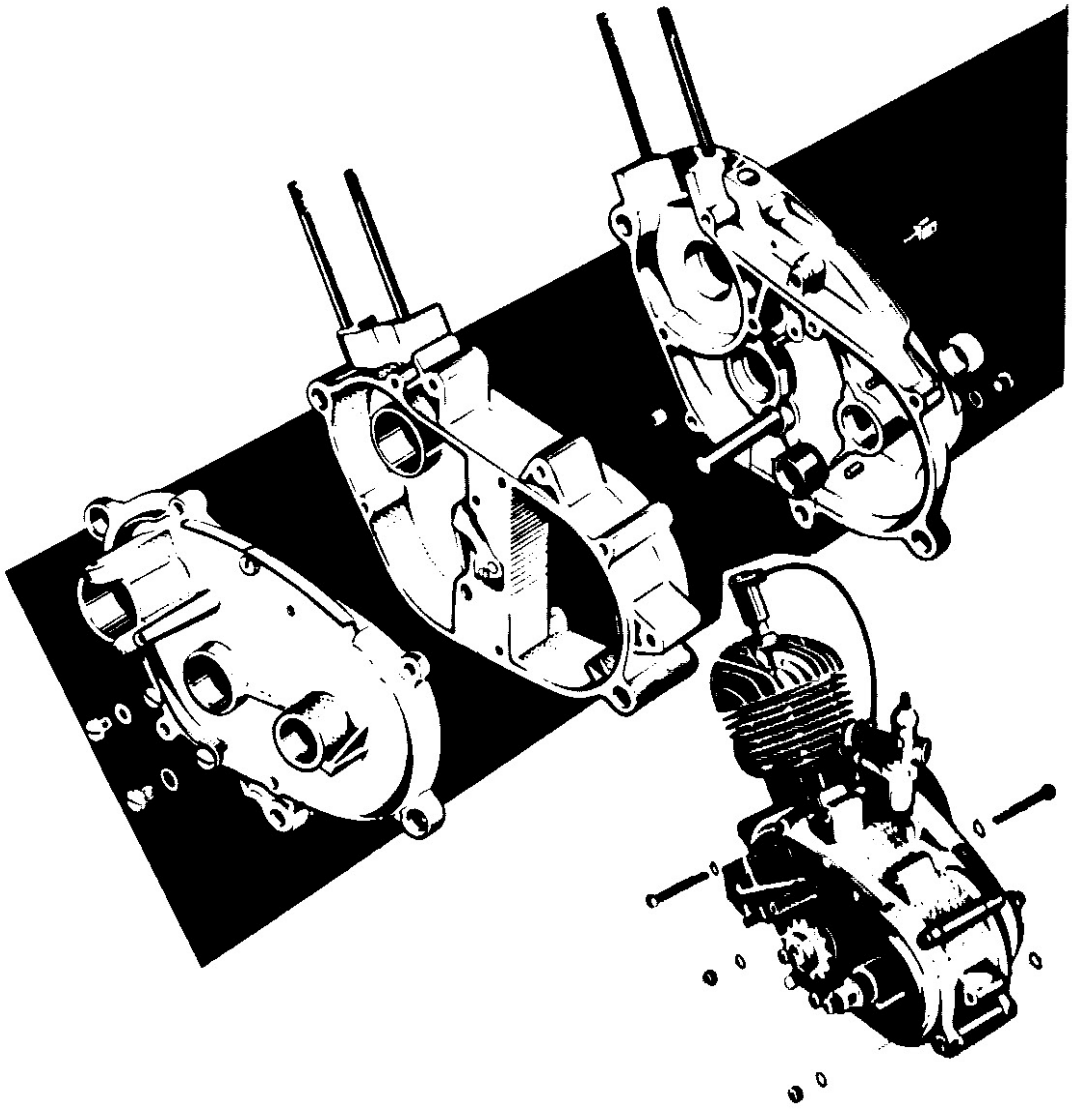


FIG. 47. CRANKCASE COMPONENTS ASSEMBLED AND EXPLODED

and bolt, it should be hit with a piece of wood or rubber hammer. Avoid hitting the cover with a hard tool, or on the edges, as otherwise the casting may fracture.

Once the cover plate is removed the brake sleeve may be detached from it by taking off the circlip. Also the crankcase gasket should be removed.

The clutch-operating cup can be levered off with a pair of screwdrivers or the special levers (*see* Appendix III) after the spring clip is first pushed to one side off the cup. The nut on the crankshaft can then be unscrewed,

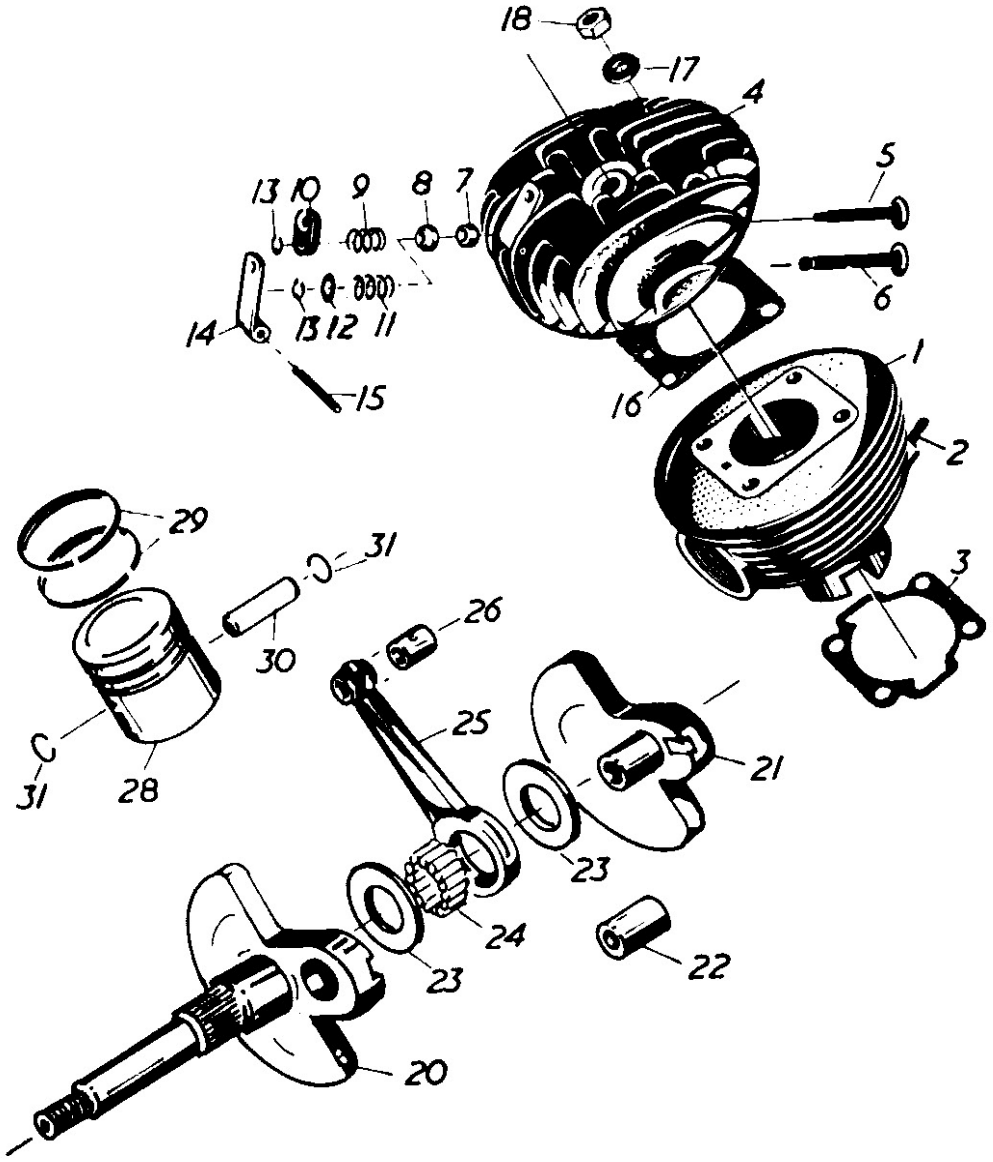


FIG. 48. COMPONENT PARTS OF THE QUICKLY ENGINE

1. Cylinder
2. Stud
3. Gasket (lower cylinder)
4. Cylinder head
5. Decompressor valve (early models)
6. Decompressor valve (late models)
7. Packing
8. Cap
9. Spring } early models
10. Thrust plate }
11. Spring } late models
12. Washer }
13. C-washer
14. Release lever } late models
15. Washer }
16. Head gasket
17. Washer
18. Nut
20. Crankshaft half
21. Crankshaft half
22. Crankpin
23. Washer
24. Roller bearings (16)
25. Connecting rod
26. Bush
28. Piston
29. Piston rings
30. Gudgeon pin
31. Circlips

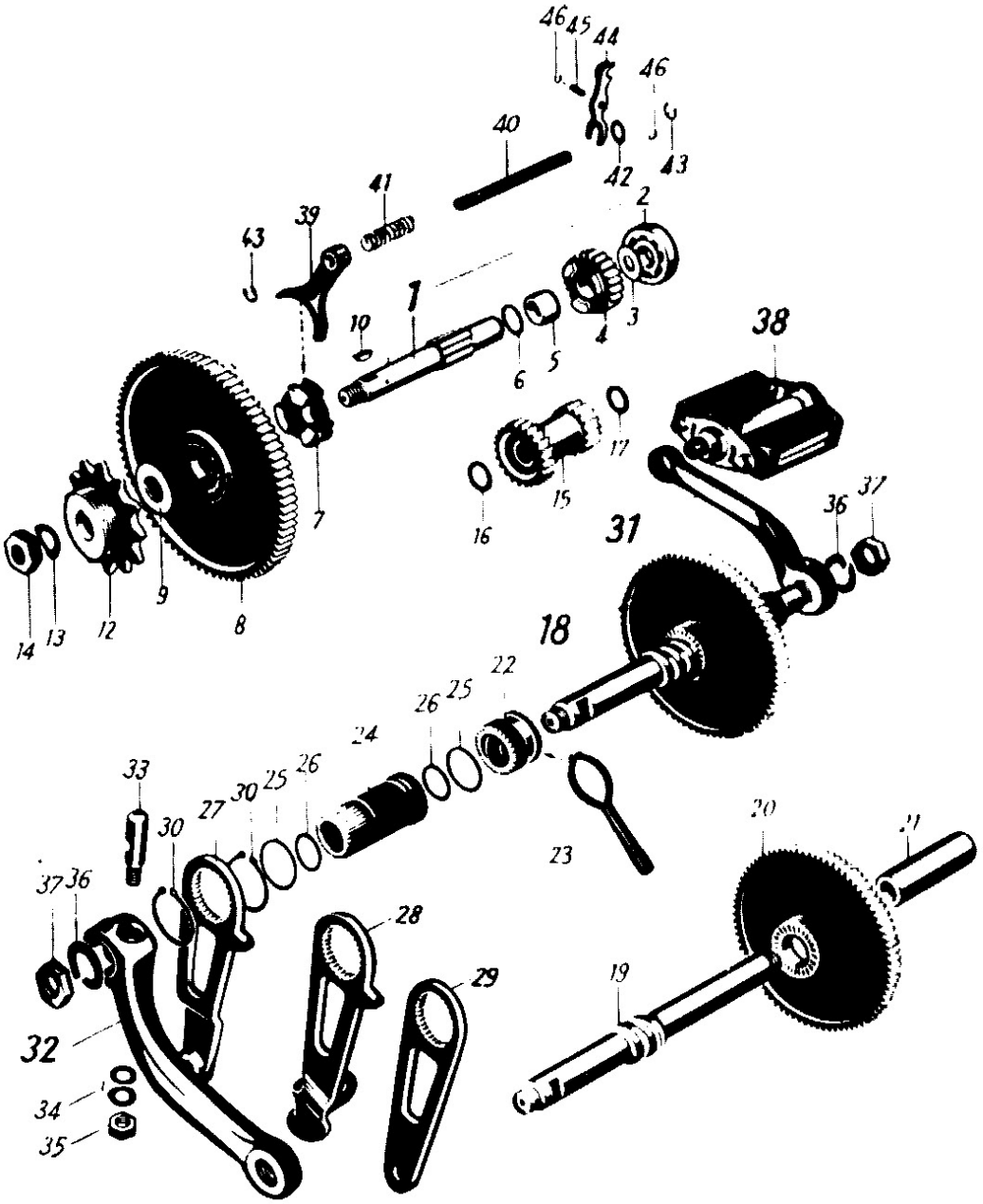


FIG. 49. GEARBOX AND PEDAL COMPONENTS

1. Gearbox main-shaft
2. Bearing
3. Washer
4. Gear
5. Bush
6. Washer
7. Dog
8. Gear
9. Washer
10. Woodruff key
12. Sprocket
13. Spring washer
14. Nut
15. Gear
16. Washer
17. Washer
18. Crank axle unit
19. Crank spindle
20. Gear
21. Spacer
22. Driver
23. Spring
24. Locking member
25. Seal ring
26. Seal ring
27. Brake lever (early models)
28. Brake lever (late models)
29. Brake lever (L model)
30. Circlip
31. Right crank
32. Left crank
33. Screw wedge
34. Spring washer
35. Nut
36. Spring washer
37. Nut
38. Pedal
39. Selector fork
40. Striker shaft
41. Spring
42. Washer
43. C-washer
44. Striker lever
45. Pin } early models
46. C-washer }

holding the gear pinion against rotation with the special tool. (*See* Appendix III.) Following the two spring washers the outer retaining cup, spring, inner retaining cup and ball race can be withdrawn. (*See* Fig. 50.)

The washer and pinion can now be withdrawn from the gearbox mainshaft, freeing as necessary by "jiggling" rather than using force. Follow

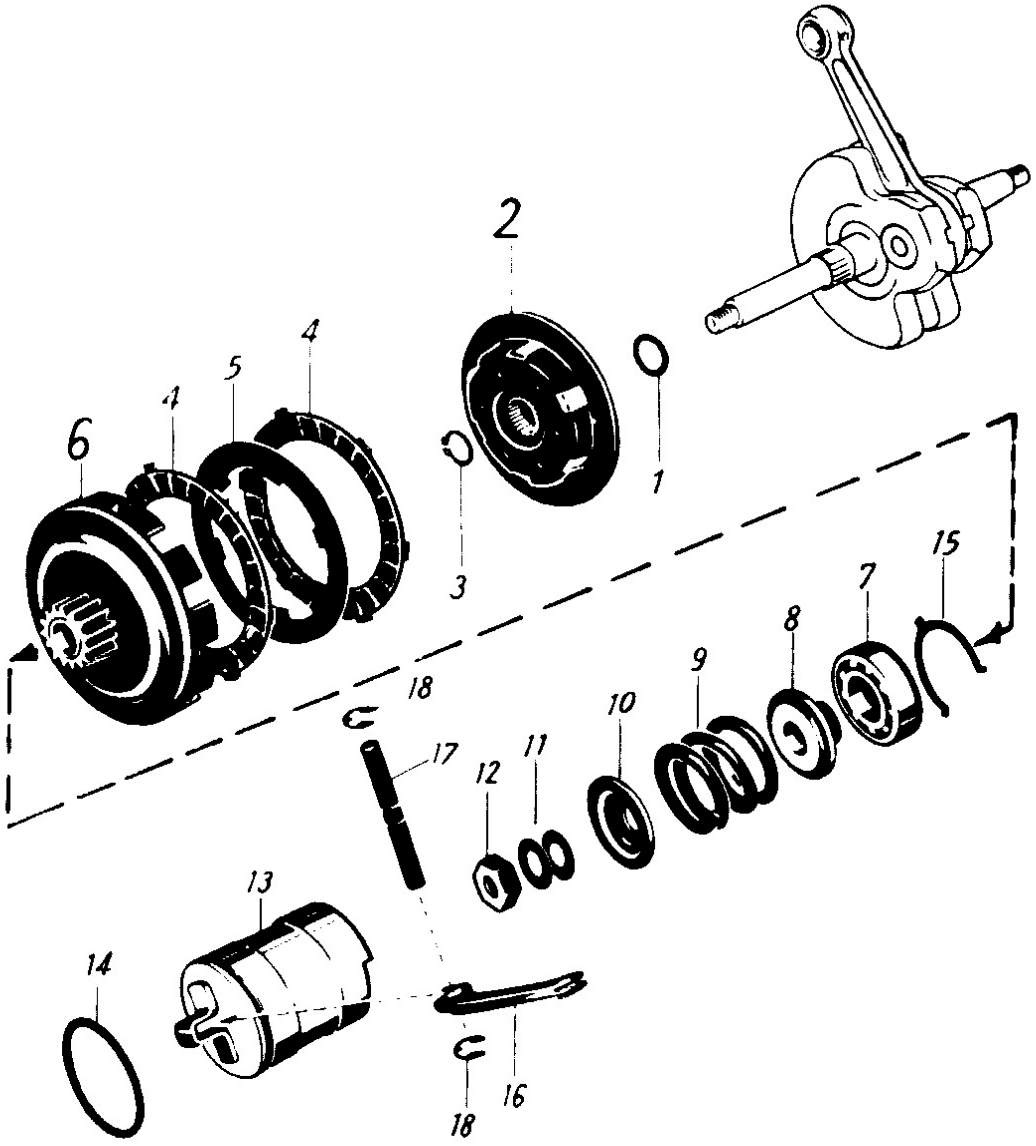


FIG. 50. THE CLUTCH DETAILED

1. Seal ring
2. Inner housing
3. Circlip
4. Clutch plate
5. Clutch plate
6. Clutch housing and pinion
7. Bearing
8. Inner retailer
9. Spring
10. Outer retainer
11. Spring washer
12. Nut
13. Clutch bell (cup)
14. Seal ring
15. C-washer
16. Clutch lever
17. Spindle
18. C-washer

by removing the clutch pinion and outer casing and the three clutch plates, withdrawn from the crankshaft. The inner clutch casing is released by removing the small circlip, the casing may then be prised free with the same levers used for extracting the clutch cup. There remains a rubber sealing ring on this side of the shaft which need not be removed until the crankshaft is taken out.

Working from the other side of the engine, unscrewing the centrally located nut and bolt enables the crankcase to be finally taken apart and the remaining components dismantled.

Reassembly Procedure. For convenience of reference, reassembly of the engine is summarized under basic operations required in correct sequence, all parts being clean and lightly oiled before refitting. References to Figs. 47–50 will clarify the instructions.

1. Start on right-hand half crankcase with gearbox side facing upwards. Stick on gasket with jointing compound.
2. Fit crankshaft with or without shim washers on the right-hand shaft, according to play. (Play should not be more than 0·012 in.)
3. Assemble gearbox mainshaft and bottom gear pinion in crankcase half.
4. Insert gearchange spindle from the outside.
5. Fit gearchange selector fork (lugs downwards) and dogs, also spring. Fit circlip.
6. Mount pedal crank spindle and gear pinion in crankshaft half.
7. Put thrust washer on gearbox mainshaft. Insert layshaft and fit thrust washer (1 mm thick or 2 mm thick, according to model number).
8. Place the two fitted sleeves in right-hand crankcase.
9. Coat edges of left crankcase with jointing compound and assemble on top of right crankcase, holding with the bolt passed from left to right through the assembly. One star washer goes under the head of the bolt and one under the nut. This bolt must not be tightened up excessively otherwise the crankcase will be distorted. Place driver and sliding spring on pedal crank spindle, narrow end facing the pinion. Locate spring eye in recess in left-hand crankcase.
10. Fit rubber sealing ring to crankcase.
11. Fit inner clutch casing and circlip, pushing the casing in place with the special tool.
12. Assemble clutch plates in order and fit outer clutch casing.
13. Assemble the gear pinion on the gearbox mainshaft.
14. Assemble ball race and inner cup, clutch spring and outer cup on the crankshaft. Use the special tool to compress the spring and fit the two spring washers and nut, using a holder on the gear pinion to lock the shaft. The nut should be tightened up until the clutch slips.
15. Fit clutch cup and push the circlip in place. The lugs may be bent to ensure that the circlip is seated properly.

16. Push brake sleeve into left-hand crankcase cover.
17. Stick gasket to left-hand crankcase cover with jointing compound.
18. Fit tapered sleeve in cover and filler piece to pedal crank spindle.
19. Fit left-hand crankcase cover carefully (fitted sleeves in position) and secure with the seven nuts and two lock washers on each stud and the long bolt, nut and two lock washers—the nut on the right-hand side of the crankcase.
20. Fit the circlip retaining the brake sleeve and attach the brake lever in the correct attitude with its circlip.
21. Assemble spring washer, chain sprocket, spring washer and nut on the gearbox mainshaft and tighten up. (On earlier models the sprocket is followed by a rubber sealing ring and two spring washers.)
22. Working on the right-hand side of the engine, place the washer and circlip on the gearchange spindle and check the action.
23. Fit magneto backplate and ignition lead and reattach terminal plate to crankcase.
24. Fit and tighten flywheel, locating in position on the shaft with the Woodruff key and holding the flywheel with a holder to tighten.
25. Fit lower cylinder gasket.
26. Insert one circlip in piston, and assemble on connecting rod little end by pushing gudgeon pin in place (it should not be necessary to warm the piston). Lock with the second circlip. Check that the piston is the right way round—the longer edge of the port facing the rear of the engine.
27. Pull the piston up as far as it will go and insert two strips of wood under the bottom to act as supports. Grip the piston with piston ring pliers to close the rings and slide on the cylinder carefully, finally removing the wooden strips to allow the bottom of the cylinder to seat against the gasket.
28. Fit cylinder head gasket, checking that it is the right way round (i.e. passage from decompressor valve to exhaust is open).
29. Add head gasket and fit head, tightening down with the four nuts.
30. Fit the right-hand pedal crank first, securing with the cotter pin and then the retaining nut. Under no circumstances should the engine be turned over with one pedal not fitted as this will tend to force the pedal crank spindle bush out of position and necessitate stripping the engine again to replace.
31. Fit left-hand pedal crank. Note that the pedals are distinguished with marks "L" for left hand and "R" for right hand and, if the pedal itself is to be unscrewed from the crank, the left-hand pedal has a left-hand thread and the right-hand pedal a right-hand thread.

9. REPLACEMENT OF ENGINE PARTS

Owing to the nature of the construction employed (chrome plated light alloy), the cylinder cannot be "rebored" when worn, as with most conventional engines. When wear has become excessive, in fact, the only solution

is a replacement cylinder-and-piston set. It is essential to obtain a matched set, matching being done by selective assembly from a graduated range of pistons and cylinders manufactured within specified dimensional limits. These limits are too wide for "random" fitting; for example, a piston which happened to be the smallest possible size within the manufacturing specification would be too "sloppy" a fit in a cylinder which happened to have the largest possible bore—again within the manufacturing specification. For the purpose of selection, therefore, pistons and cylinders as made are graded in sizes differing in appreciably less than one-thousandth of an inch in diameter, and matched components are taken from the same grade size.

The original manufacturing tolerances are themselves quite small but the complete range is covered in ten different steps or grade sizes. These numbers are scribed on both the pistons and cylinders (1 to 10) and similar numbers therefore appear on a matched set. The question of specifying similar gradation numbers for piston and cylinder does not arise in purchasing replacements for this is always done in the initial selection by the manufacturers.

There are two patterns of cylinder head, differing only with respect to the decompressor valve assembly. It is quite practicable, if required, to refit the later pattern head to earlier models, should a replacement be necessary. The compression ratio of the engine, and with it the performance, can be increased slightly by omitting the head gasket, although this is certainly not to be recommended as general practice for the mating faces of the head and cylinder may be damaged by burning as a consequence. It is, however, the simplest method of getting a little extra out of the engine for *apparently* nothing.

The crankshaft assembly—or as specified by NSU, the flywheel assembly—is available only as a complete replacement unit, including also the main bearings. Thus it is not possible to replace, say, only the connecting rod in an existing assembly to cure "big end" knock. Actually the amount of "knock" through wear which can be tolerated is often a matter of the owner's attitude to a working piece of machinery. Some people rush for replacements at the first indications of wear being present. Others happily carry on for thousands of miles, probably in blissful ignorance that a part of the engine unit has developed appreciable wear through long use. In point of fact the amount of wear the Quickly crankshaft will tolerate without giving trouble is considerable and normal wear is only to be expected after a working life of thousands of miles and millions of firing strokes hammering on the piston. A rapid rate of wear can, however, result from mis-handling of the machine, particularly as regards lack of attention to lubrication. Cutting down on the proportion of oil specified for the petrol-oil mixture as an "economy" measure is asking for trouble—and a heavy repair bill at an early date.

When reassembling an engine which has been stripped, the amount of

axial play in the crankshaft assembly can be measured and taken up to within a specified limit by adding plain washers to the right-hand side of the crankshaft. Crankshaft clearance can be measured in each half of the crankcase using a depth gauge across the edges. The sum of these two dimensions (i.e. the clearance in each half crankcase) less the dimension across the crankshaft webs gives the axial play. This should not exceed 0·012 in. (3 mm). Washer thicknesses are chosen to reduce axial play within this limit.

Another important point to watch in reassembling an engine is that the piston is refitted the correct way round, i.e. with the longer edge of the port facing towards the *rear*. If this is not so the gas passages will not interconnect properly and so the engine will not run. Care should also be taken when replacing the cylinder to see that the bottom of the piston is properly supported as the cylinder is slid in place—not forced—down the studs. Ignition timing can be checked at this stage—as described elsewhere (Section 7)—by fitting short sleeves over to the studs so that the nuts can be screwed down to clamp the cylinder securely without the head in place.

It is particularly important with all engine replacements parts that only genuine Quickly spares be used, more particularly as these are of metric rather than English sizes. As a guide to when modifications have affected engine and other component—spares, details of model changes are listed in Appendix II. On current models the magneto-generator may be of either Bosch or Noris manufacture, virtually identical in appearance but differing in detail parts specification. The particular manufacturer's name is embossed on both the rotor and stator assemblies of each unit as a quick means of identification. Alternatively quoting the engine number should be sufficient for spares identification purposes.

10. DECARBONIZING

Decarbonizing of the silencer and cylinder head is recommended every 1,200–1,500 miles, or whenever the need is apparent through a falling-off in power from the engine. Decarbonizing the cylinder itself may be delayed for some 4,000 to 6,000 miles, depending largely on how the machine is driven. The best indication that the cylinder could do with decarbonizing is that the falling-off in power is not rectified by decarbonizing the head and silencer only.

The job of decarbonizing the cylinder head and silencer is very simple. Decarbonizing the cylinder involves lifting the cylinder barrel off the engine and many owners may prefer to have this job done for them by a local service station, although again it is not a particularly skilled job.

The silencer fitted may be one of several types—all virtually the same in external appearance but differing in construction. If there is a small screw near the end of the tailpipe this can be removed to release the exhaust pipe baffle which can then be withdrawn for cleaning with the aid of a piece of

stiff wire bent over at right angles at the end. (*See* Fig. 51.) Alternatively the baffle section may be held with a spring clip inside the end of the tailpipe; or the silencer body is in two halves and may be drawn apart by unscrewing the small nut visible in the end of the tailpipe. Once dismantled the baffle tube can be decarbonized by scraping off all the sooty deposit which has accumulated around it, and inside the tube. It should then be reassembled complete as before.

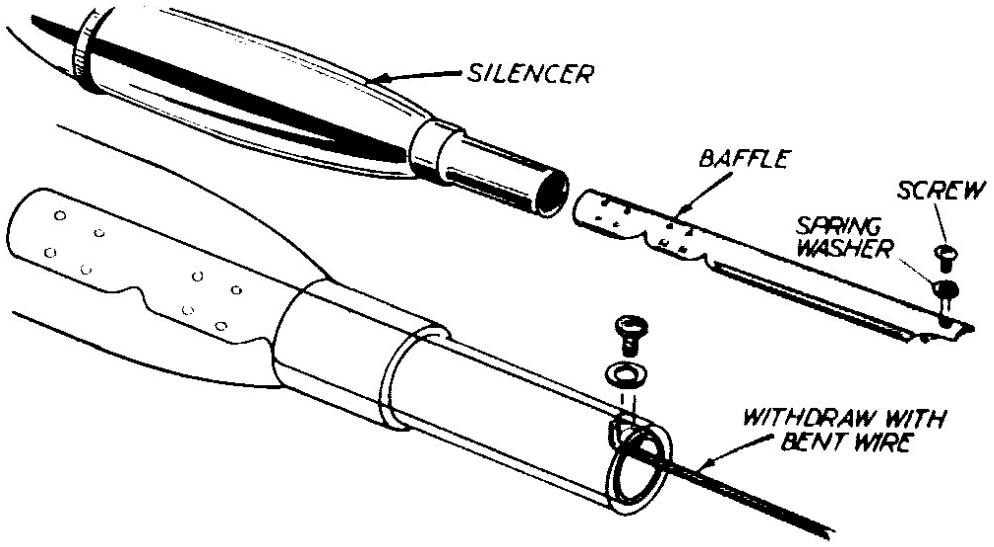


FIG. 51. REMOVAL OF BAFFLE TUBE

The baffle tube on the silencer can be withdrawn for decarbonizing with a piece of bent wire (some models). Other models may have differently assembled silencer unit.

If the silencer and exhaust pipe complete are to be removed from the machine, slacken the clip and bolt on the frame holding the silencer and unscrew the large slotted nut holding the end of the exhaust pipe in the cylinder with a C-spanner. The complete unit can then be removed.

The cylinder head is easily removed for decarbonizing by detaching the plug lead and the decompression valve cable (*see* Section 1) and then the four nuts and washers holding the head down. The head can then be lifted off and the hemispherical-shaped combustion chamber scraped clean of carbon with a piece of wood or similar soft scraper (not metal) after first removing the plug.

When the head is removed it is generally good practice to reface the decompression valve seating by re-grinding. The valve is released by springing off the C-washer on the end of the stem. Then it may be withdrawn inwards. The small components released comprise a thrust plate, spring, cap and packing in the case of machines up to serial number 482 754/522 989. On subsequent machines a washer replaces the thrust plate, and the head incorporates a release lever mounted on a pin. The valves are also different in the length of stem. (*See* Fig. 48.)

Re-grinding is done merely by coating the valve face with grinding paste and rotating the valve against its seating under pressure. It is unlikely that the seating will need much re-grinding if this operation is done regularly (e.g. whenever the head is removed for decarbonizing) but the seating may be damaged, and the valve itself burnt, if the decompression control is wrongly used, for instance if used frequently in place of the throttle.

Before replacing the head, examine the head gasket for possible damage and, if in doubt as to its condition, replace with a new one. Check that the gasket is refitted the right way round. The laminated aluminium gaskets standard on later models should seldom need replacing.

To remove the cylinder for decarbonizing, remove the head first, then the gasket and lift the cylinder straight off, covering the opening in the crankcase with a clean cloth as you do so, to prevent any dirt from falling in. After scraping off all carbon with a wooden scraper or similar tool, replace carefully in the same position, squeezing in the piston rings one at a time by hand to let the piston enter the bottom of the cylinder. A light smearing of oil on the inside of the cylinder is recommended before reassembly rather than fitting back dry. The operation of removing and refitting the cylinder can, of course, also be carried out with the engine still mounted on the frame, only in this case the silencer fitting will have to be slackened-off and the exhaust pipe detached from the cylinder first.

In general it is best to delay decarbonizing of the cylinder for as long as possible and so leave the piston rings undisturbed. When the cylinder unit is removed for decarbonizing, the piston top should be similarly scraped clean of carbon and it may also appear advisable to remove the piston rings and clean out the ring grooves. It is not, however, necessary to detach the piston from the connecting rod for this purpose. A broken or obviously worn ring would, of course, be replaced but if both rings are in good condition they should preferably be replaced in the same order as before and the same way up.

11. SOURCES OF TROUBLE

The NSU Quickly properly driven and properly maintained, enjoys the reputation of being particularly trouble-free. Experience of the NSU Maintenance Establishment has, however, shown the following to be sources of trouble.

Engine Vibrating Loose. The importance of checking engine holding bolts at regular *weekly* intervals has been stressed earlier on. If the engine does work loose and is allowed to continue running in this condition, permanent damage to the frame holes can result. It is essential that, if the engine bolts are removed, the star washers be replaced both under the heads of the bolts and behind the nuts. On later models the star washers under the heads of the two bolts holding the carrying handle have been replaced by locking plates and it is a wise precaution to replace with these in any case on machines which are not so fitted.

Water in the Carburettor. This is a not unknown occurrence on earlier models. Later models have a small hole drilled in the frame to drain off water which might otherwise get into the carburettor.

Water in the Magneto. When the small insulating flap at the end of the high-tension lead becomes worn there is the possibility of water seeping through into the magneto and shorting out the high tension, so that there is no spark. This can be cured by the fitting of a new flap or the use of Bostik compound to repair the damage and renew the seal. Temporarily, a covering of Plasticine will act as a suitable seal.

Shorting Rear Lamp. This can occur when the terminal block in the headlamp becomes badly worn or damaged, or the dipswitch has worn to the point of becoming faulty. This fault can be quite obscure if the wire only is suspected.

Look for the Easy Way. Many owners make a long job of what should be a simple replacement—taking down half the engine to replace a clutch cable, for example. The answer to this is to become quite familiar with the various techniques discussed in this chapter so that any particular job of maintenance can be done the easiest—and most direct way.

CHAPTER VI

ELECTRICAL EQUIPMENT

THE electricity for the spark plug and for the lights and horn is generated by the flywheel magneto-dynamo, hidden under the flywheel. Although this is a single unit it consists, essentially, of a magneto supplying the sparking current to the spark plug, and a separate form of "dynamo" or electricity generator supplying the lights and horn.

PRINCIPLE OF OPERATION

The principle of operation can be followed with reference to Fig. 52. On a circular backplate or stator are two coils terminating in soft iron pole pieces closely matching the shape of the flywheel rim which rotates around them. To the flywheel rim are attached four permanent magnets. The backplate or stator is fixed and the flywheel is driven by the engine crankshaft, so that when the flywheel is in position these magnets fitted to the flywheel rim just clear the coil pole pieces during rotation.

Each time a magnet passes one of the pole pieces its magnetic field produces a reaction in the coil, generating a surge of electricity in the coil, first in one direction and then the other. Since there are four rim magnets, this effect will be experienced by each coil four times per revolution.

Dynamo Circuit. In the case of the lighting coil there is a continuous generation of *alternating* current at a frequency *four* times that of the engine speed, all the time the engine is running. Thus if the lighting coil is connected up to the lights and horn, inserting switches as controls, these form complete electrical circuits. Rather than connect both sides of the lighting coil up with wires to these external circuits, one side of the coil is "earthed" or connected directly to the backplate, leaving only a single wire to be connected to the main circuits. The lamps and horn are similarly earthed (i.e. one side connected to a metal part of the frame, which is obviously in electrical contact with the metal backplate to which the other lighting coil end is connected).

Since both the amount and frequency of current generated by the lighting coil is dependent on engine r.p.m., the lights will be relatively dim at low speed and the horn low-pitched; and vice versa at high speed. The difference in horn note, in fact, is particularly noticeable.

Magneto Circuit. The magneto side is slightly more complicated. The same sort (and frequency) of current is generated in the magneto coil

but since we require only one spark per revolution at the spark plug, only one current surge per revolution is utilized. Also the coil is not a single coil but a double winding, consisting of a primary coil with a relatively small number of turns over which is wound a secondary coil of thinner wire and many more turns.

To get the necessary high tension output for the spark to jump the gap between the spark plug electrodes—and also to make this spark occur at the proper time—a pair of contacts or "points" is inserted in the primary circuit which, when opened, cause a very rapid change of current in the

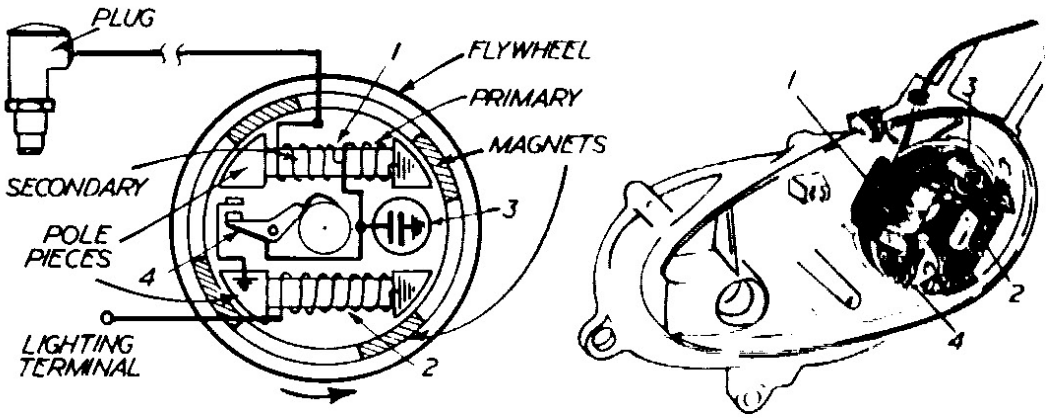


FIG. 52. A MAGNETO CIRCUIT

A typical magneto circuit is shown, together with an *in situ* view of the Quickly magneto: 1 is the ignition coil; 2 the lighting coil; 3 the condenser; and 4 the contact-breaker.

primary. This surge is transformed, by mutual inductance between the two coils wound on top of each other, into a surge of *high-voltage* electricity in the secondary coil. The secondary coil is connected to the spark plug central electrode and is sufficiently high to jump the gap to the other electrode on the body of the plug, earthed by being screwed into the cylinder head. The other side of the secondary coil is earthed to complete the return circuit. (*See* Fig. 52.)

Make-and-break Mechanism. The "make and break" of the contact points is governed by a cam fitted on the engine crankshaft, closing and then opening the points abruptly once each revolution by working against a pivoted fibre plate of special shape (the contact-breaker). One of the points is mounted on the contact-breaker and the other, adjacent to it, is fixed and mounted on the backplate. Quite obviously the moment of opening of the points depends on the relative mounting positions of the contact-breaker and crankshaft cam, and the layout is designed to produce opening at the right time (i.e. 2·1 mm or 0·084 in. before the piston reaches its uppermost or top dead-centre position in the cylinder). Actually the "timing" is not completely fixed by the design layout. Provision is

made for the backplate to be slackened-off and rotated a small amount either way to adjust the timing, as necessary. It is also necessary to ensure that current is being generated in the magneto coil at the instant the points open, i.e. that one of the rim magnets is passing the pole piece of the coil, but this is not critical. Provided the magnet is near enough in position—and there are four of them quite closely spaced—the magnetic field of one will be effective. So, in whatever position the flywheel is bolted on to the crankshaft, the magneto coil will remain effective as a spark generator. The correct position, however (i.e. the one corresponding to maximum effect), is when the break gap of the pole shoe is between $\frac{3}{8}$–$\frac{1}{2}$ in. The direction of rotation of the flywheel is shown by an arrow.

One more component is included in the electrical circuit—a condenser which is virtually connected across the points. This assists in the proper generation of the high-voltage surge in the secondary and also acts as a spark quench across the points to prevent them arcing and thus becoming pitted or burnt. It is a component which is not heavily loaded and should never normally give any trouble. Normally, in fact, the only maintenance required on the magneto unit is a periodic check of the contact-breaker gap and readjustment, if necessary, and cleaning of the points if pitted or burnt. Further details of this are described in Chapter V, Section 7.

THE SPARKING PLUG

A Bosch type W 240 T 11 spark plug is fitted as standard on all Quickly engines, this type also being available from NSU agents as a replacement item. The British equivalent is the KLG F80, which can be used as an alternative. It is a good idea always to carry a spare *clean* plug in the tool-box as the plug is the first component to suspect in the event of the engine stopping, or running badly. Operating in an atmosphere of petrol and oil which burns at a high temperature, all spark plugs are prone to soot up or become covered with a carbon deposit. This does not normally interfere with their operation unless the carboning-up is severe, but it is quite possible that a "whisker" of carbon can form between the plug electrodes, effectively shorting them out so that no spark occurs. Such a plug will normally be quite all right again, once cleaned, but the opportunity should also be taken to check the gap between the electrodes (*see* Fig. 21) and readjust, if necessary.

The operation of a spark plug can readily be checked by removing it, then replacing the high-tension lead and holding the body of the plug against the engine, holding the lead and not the plug (otherwise you will get a strong shock). If the engine is then turned over, a strong spark should appear across the electrodes corresponding to each revolution of the engine.

This is no automatic guarantee that the plug will spark satisfactorily inside the engine when reassembled, for under compression the electrode gap is effectively some eight to ten times greater than in air. Thus, for

enough voltage to jump 0·020 in. under compression, the corresponding "free air" gap will be a matter of $\frac{3}{16}$ in. or more. The quality of the spark delivered by the magneto coil can be checked by leaving the plug in the engine but disconnecting the high-tension lead and holding it about $\frac{3}{16}$–$\frac{1}{4}$ in. away from the top of the plug, or a convenient point on the engine. Turning the engine over should produce a spark jumping this gap with an audible crack. If so, there is certainly enough voltage to bridge the spark plug electrode gap (if normal) and if the plug is failing it is almost certainly because it is excessively dirty, or perhaps faulty (e.g. cracked insulator). Changing the spark plug, or cleaning the plug if dirty, should produce an immediate cure.

For correct operation the spark for igniting the fuel mixture must be of the right temperature. If the electrodes are too "cold" they will allow oil to collect on the points and foul them. Any liquid collecting on the electrodes will normally tend to prevent the spark from forming, which is the main reason why a flooded engine will not start. If the plug points remain too hot, then they may ignite the fuel before the correct time, i.e. before the spark occurs. All these features are bound up in the engine design, and that is why the specified type of plug usually gives best results and alternative plugs of a "hotter" or "colder" type may give troublesome running.

The actual mixture drawn in by the engine also affects the operation of the plug. A correctly balanced plug will soot up but the deposit will be a uniform grey in appearance. If the electrodes are white and heavily corroded then the plug is too "soft" for the mixture. Conversely, if the deposit on the electrodes and up inside the plug around the insulator is very black and oily in appearance the plug is too "hard." Before condemning the plug, if a standard or recommended type, check that you are using the right petrol-oil mixture and then the carburettor settings. (*See* Chapter 5, Section 6.)

LIGHTS AND LIGHTING CIRCUIT

A complete wiring diagram appropriate to the Quickly-N and Quickly-S is shown in Fig. 53, the various leads being identified by colour coding, as listed. Wiring on the Quickly-L is slightly different. (*See* Fig. 54.) Both these circuits apply to the standard export models with 6-volt, 17-watt, lighting coil output. The wiring circuit appropriate to earlier models with a 6-volt, 3-watt system is shown in Fig. 55. Very little trouble should be experienced with the lighting circuit, apart from the possibility of broken or frayed leads (giving an intermittent earth through contact with part of the frame) and a broken filament in the headlight or tail lamp bulb. Replacement bulbs, when fitted, should always be of the recommended voltage and wattage, viz.—

Headlight (all models) 6-volt, 15/15-watt (double filament).

Tail lamp (all models) 6-volt, 3-watt.

The headlamp beam can readily be adjusted, if necessary. The best setting for night driving is for the centre of the beam to fall on the ground

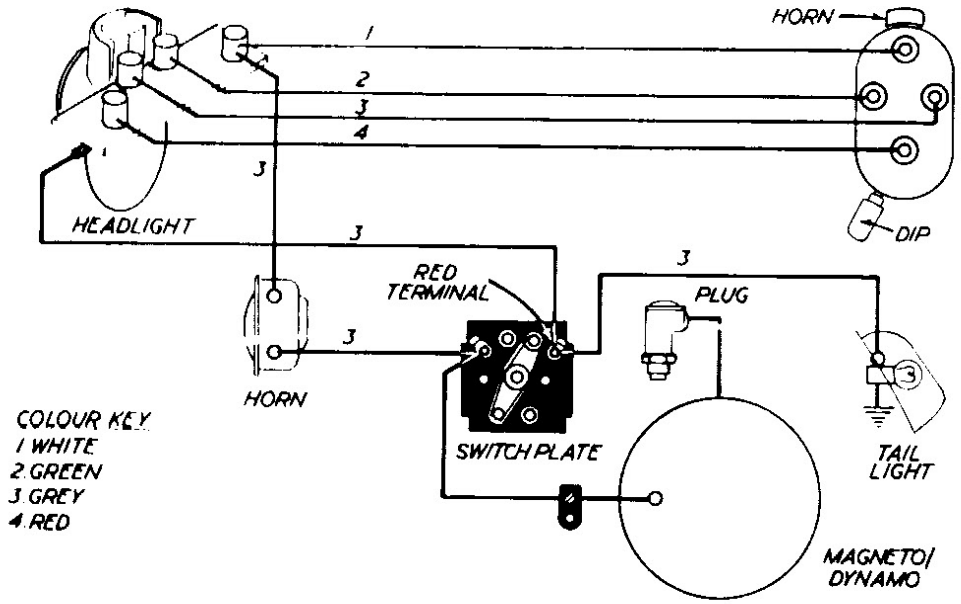


FIG. 53. WIRING DIAGRAM FOR QUICKLY-N AND -S MODELS

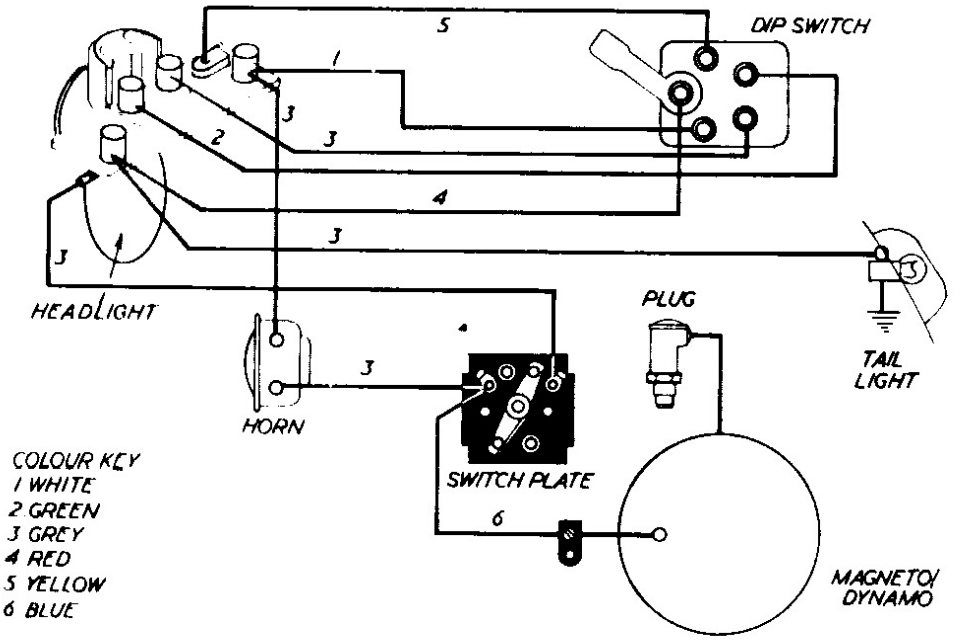


FIG. 54. WIRING DIAGRAM FOR QUICKLY-L MODEL

about 30–35 feet in front of the machine (i.e. ten to twelve paces) when sitting astride the machine on level ground. To adjust the headlamp on the Quickly-N and Quickly-S, loosen the hexagon-headed screw at the back and realign the lamp as required before tightening up again. On the

Quickly-L the headlamp housing is integral with the handlebars, and adjustment of the beam is made by turning the slotted screw on the left-hand side of the headlamp rim. Turning this screw clockwise will raise the beam; turning it anticlockwise will lower it.

If it becomes necessary to remove the lamps or replace wiring, the following instructions apply. The headlamp rim and reflector can be removed if the knurled screw is first undone. Removing the three spring clips on the reflector will then enable this component to be parted from the rim and the glass and sealing gasket removed.

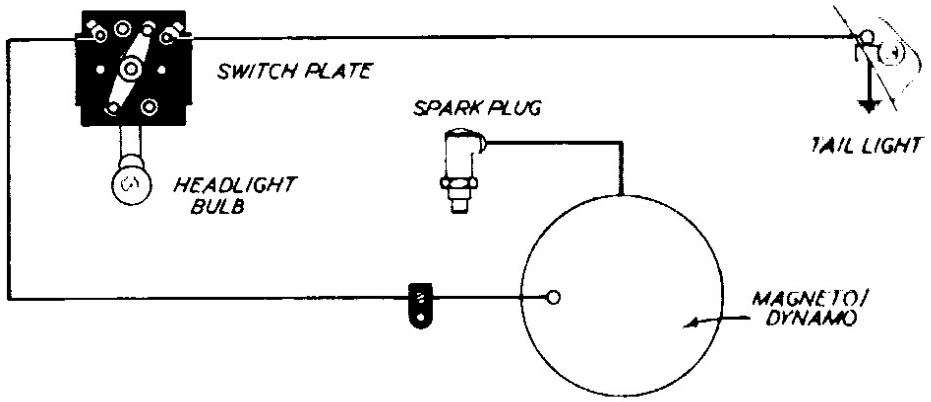


FIG. 55. WIRING DIAGRAM FOR 6-VOLT 3-WATT SYSTEM ON EARLIEST MODELS

To remove the headlamp complete (on Quickly-N and Quickly-S) follow the above by disconnecting both leads. Unscrew the hexagon cap nut on the fork stem and remove the lock washers; then the two hexagon-headed bolts and nuts with their serrated washers between the forks and handlebar bracket so that the complete handlebars can be removed. The lamp can then be taken off.

To remove the headlamp wires only (e.g. to renew the wiring), proceed as in the first paragraph. Disconnect both leads and pull out together with their protective sleeving.

The rear lamp cover is quite simply removed by unscrewing the slotted screw. Disconnecting the lead and unscrewing the nut with lock washer on the mudguard will enable the bulb holder to be removed.

Removal of the rear-light lead is a little more awkward. After disconnecting the lead from the fitting, pull through the mudguard and unclip right back to the frame (bending the clips open to free the lead).

APPENDIX I

SPECIFICATION

Manufacturers. NSU Werke, Aktiengesellschaft, Neckarsulm, Germany. *British and Commonwealth Distributors.* NSU (Great Britain) Ltd., 7 Chesterfield Gardens, Curzon Street, London, W.1. (Telephone: GROsvenor 4446–7–8).

Engine. Two-stroke, light alloy construction with hard-chromed bore.
Bore, 40 mm (1·575 in.)
Stroke, 39 mm (1·535 in.)
Capacity, 49 c.c. (2·99 cu in.)
Head volume, 10·9 c.c. (0·67 cu in.)
Compression ratio, 5·5 : 1
Maximum B.H.P., 1·4 metric H.P. (1·39 B.H.P. (English))
Maximum engine speed, 5,500 r.p.m.
Piston clearance, 0·015 mm–0·025 mm (0·0006–0·001 in.)
Gudgeon pin diameter, 10 mm–0·05 mm (0·394 in.–0·002 in.)
Little end diameter, 10 mm $\begin{cases} +\ 0{\cdot}028 \text{ mm} \\ -\ 0{\cdot}013 \text{ mm} \end{cases}$ $\left(0{\cdot}394 \text{ in.} \begin{cases} +\ 0{\cdot}001 \text{ in.} \\ -\ 0{\cdot}005 \text{ in.} \end{cases}\right)$
Maximum axial crankshaft play, 0·3 mm (0·012 in.).

Fuel. Petroil mixture, 1 part SAE 50 oil to 24 parts petrol (equivalent practical mixture $\frac{1}{3}$ pint SAE 50 per Imperial gallon of petrol).

Fuel Tank Capacity
$\left.\begin{matrix} \text{3·1 litres (5}\frac{1}{2}\text{ pints) or} \\ \text{4·46 litres (8 pints) – new models} \end{matrix}\right\}$ which includes 0·4 litres ($\frac{3}{4}$ pint) reserve.

Overall Dimensions
Maximum height of machine, 960 mm (37$\frac{3}{4}$ in.)
Maximum width, 642 mm (25$\frac{1}{4}$ in.)
Length, 1,895 mm (74$\frac{1}{2}$ in.)
Height of saddle, 780 mm (30$\frac{3}{4}$ in.), adjustable.

Frame. Pressed-steel beam type, welded assembly.

Wheels. Rims, 26 × 2 well-base rims.
Spokes, front wheel, L.H. 263 mm × 2·65 mm diam (10$\frac{3}{8}$ in. × $\frac{1}{10}$ in.)
R.H. 235 mm × 2·65 mm diam (9$\frac{1}{4}$ in. × $\frac{1}{10}$ in.)
rear wheel, L.H. 235 mm × 3·0 mm diam (9$\frac{1}{4}$ in. × 0·118 in.)
R.H. 263 mm × 3·0 mm diam (10$\frac{3}{8}$ in. × 0·118 in.).

Brakes. Internal expanding type, both wheels.
Front brake cable-operated by hand lever.
Back brake (Quickly-N and Quickly-S) rod-operated via back-pedalling.
(Quickly-L) Bowden cable, operated via back-pedalling.

Carburettor. Bing type 1/9/1.
Main jet, No. 56
Needle jet, 2·10
Needle position, 2.

Clutch. Multi-plate type.
Spring pressure, 47·5 kg (105 lb).

Gearbox. Two-speed gearbox built integral with engine unit.
Reduction—engine : gearbox, 5·33 : 1
gearbox : rear wheels, 3 : 1
gearbox ratios, 1·88 : 1
1 : 1
overall reduction ratios, 30·06 : 1 (first gear)
15·99 : 1 (second gear).

Power Transmission. By chain 12·7 × 4·88 mm pitch, 112 links.
Chain sprockets—rear, 36 teeth
front, 12 teeth.

Axial Play of Gearbox Shafts, 0·2 mm (0·008 in.).

Ignition: Flywheel magneto-generator 6-volt, 17-watt.
Spark timing, 2·1 mm (0·084 in.) or 24 degrees before top dead centre
Contact-breaker gap, 0·2–0·3 mm (0·008–012 in.)
Spark plug (standard), Bosch W 240 T 11
(British equivalent), KLG F80
Spark plug gap, 0·5 mm (0·020 in.).

Electrical Equipment.
Dipping headlamp
Tail lamp
Horn.

APPENDIX II

DESIGN CHANGES

EACH Quickly machine is designated by two six-figure numbers, separating by an oblique stroke. The first number refers to the frame number and the second to the number of the engine, e.g.

frame number → 482 754/522 989 ← engine number.

In ordering spare parts for any particular machine it is necessary to quote both these numbers and also the model (i.e. Quickly-N, -L or -S).

NSU Spare Parts are coded numerically in four-figure-blocks commencing with 11, 16 or 19, e.g. 16 01 00 034.

Parts made to German DIN standards (the equivalent of our British Standard Specifications, but designated in metric sizes) are designated by their respective DIN numbers and dimensions.

In addition, where parts are plated or otherwise finished, a further code number is added to indicate the type of finish required—

10—chromium plated
31—black
57—dual-tone: jade green, pale green
70—dual-tone: light grey, dove grey
73 dual-tone: lido blue, pearl grey
74—dual-tone: virginia brown, sand
75 dual-tone: whale grey, coral red.

A Spare Parts List is essential to find the appropriate part number for any component. All NSU Dealers hold such a list and can therefore identify the required spare or spares. There are, however, a number of detail design changes affecting components and assemblies where parts have been changed (or omitted). These are listed below for general reference together with the model numbers concerned.

Engine Unit

For models prior to serial number 501 834/545 056, a replacement engine will require boring out of the engine mounting holes in the frame and on the carrying handle to take 8·3 mm bolts. Also removal of the threaded projection on the frame. New bolts, lock washers and nuts will be required to remount the engine. Replacement of a crankcase on engines prior to 545 056 will require similar treatment on frames prior to 501 834.

Replacement of the gearbox layshaft on models prior to 82 401/87 963 requires grinding down the shoulder on the gear wheel for first and second gear by 1 mm and replacing with a 1 mm thick washer.

Crankcase Assembling Parts

Original design used up to model 193 540/208 745.

(Additional spacer and screw included up to model 62 700/66 989 on chain cover side; and up to model 78 000/82 792 on right side.)

Assembly components changed from model 193 541/208 746 onwards.

Cylinder Head

Original pattern on all models up to 482 754/522 989.

Revised pattern on model 482 755/522 990 and subsequently.

These two parts remain interchangeable.

Carburettor

Original pattern used up to model 482 754/522 989.

Revised pattern on model 482 755/522 990 and subsequently. (This affects only the choke cover plate and gasket.)

Magneto-generator

Bosch LMUP 1/115/17 L 2 on models up to 358 398/377 954.

Bosch LM UPA 1/115/17 L la *or* Noris ELZJ 17/4 on model 358 399/377 955 and subsequently.

Brake Lever (Rear Brake)

Original pattern used up to model 482 754/522 989.

Revised pattern on model 482 755/522 990 and subsequently. The brake lever is a different pattern again for L model.

Frame

Original design up to model 482 754/522 989.

Revised on model 482 755/522 990 and subsequently.

Further modified design on L model.

Saddle

Original pattern used up to model 97 844/104 888.

Design changed on model 97 845/104 889 and subsequently.

Luggage Carrier

Original pattern used on models up to 208 884/225 051.

Changed on model 208 885/225 052 and subsequently.

Silencer Assembly

Original pattern used up to model 103 080/109 872 with minor detail differences.

Modified design introduced on model 331 789/349 436 and subsequently.

Front Forks

Original pattern used up to model 109 741/117 525.

Modified pattern introduced on model 109 742/117 526 up to model 482 754/522 989.

Revised design introduced on model 482 755/522 990 and subsequently.

Handle bar Assembly

Original pattern used up to model 482 754/522 989.
Revised design introduced on model 482 755/522 990 and subsequently.

Speedometer

Original pattern used up to model 281 717/299 049.
Revised pattern used on models 281 718/299 050 to 482 754/522 989.
Revised pattern fitted to model 482 755/522 990 and subsequently.

SUMMARY OF DESIGN CHANGES

Component or Assembly	Up to	Changes (Model Numbers) from
Crankcase		
Bush	164 546/176 279	---
Clevis link	92 805/99 003	---
Assembly parts	193 540/208 745	193 541/208 746
Chain cover spacer	62 700/66 989	eliminated
Right-side cover spacer	78 000/82 792	eliminated
Cylinder Head		
Decompression valve	482 754/522 989	482 755/522 990
Decompression valve assembly	482 754/522 989	482 755/522 990
Carburettor		
Choke cover	482 754/522 989	482 755/522 990
Magneto-generator		
Bosch LMUP L2	358 398/377 954	
Bosch LM UPA		358 399/377 955
Gearbox		
Main gear		at 475 572/515 366
Selector pin	92 805/99 003	92 806/99 004
Washers		at 82 400/87 962
		493 384/535 583
Brake lever	482 754/522 989	482 755/522 990
Frame	482 754/522 989	482 755/522 990
Forked pin	360 029/380 172	eliminated
Stem rivet/bolt	360 029/380 172	360 030/380 173
Rubber plug		211 251/226 947
Saddle	97 844/104 888	97 845/104 889
Luggage carrier	208 884/225 051	208 885/225 052
Stand washers	55 200/61 885	55 201/61 836
Mudguard bolts	109 741/117 525	109 742/117 526
Silencer assembly	at 100 081/109 873	
	at 100 500/107 393	
	at 105 060/112 072	
	at 331 789/349 436	
Handlebar assembly		
(N and S models)	482 754/522 989	482 745/522 990
Throttle twistgrip	268 490/286 207	268 491/286 208
	482 754/622 989	482 755/522 990
Gearchange twistgrip	268 490/286 207	268 491/286 208
	482 754/522 989	482 755/522 990
Throttle cable	268 490/286 207	268 491/286 208
	482 754/522 989	482 755/522 990
Gearchange cable	482 754/522 989	482 755/522 990
Decompressor cable	482 754/522 989	482 755/522 990
Front wheel	261 860/279 419	261 861/279 420
	261 860/279 419	261 861/279 420
Hub	482 754/522 989	482 755/522 990
Brake	482 754/522 989	482 755/522 990
Rear wheel	259 464/277 026	259 465/277 027
	482 754/522 989	482 755/522 990
Hub	259 464/277 026	259 465/277 027
Brake	482 754/522 989	482 755/522 027
	482 754/522 989	482 755/522 990
Brake rod assembly	482 754/522 989	482 755/522 990
Headlamp		
N and S models	281 717/209 049	281 718/209 050

APPENDIX III

SPECIAL TOOLS

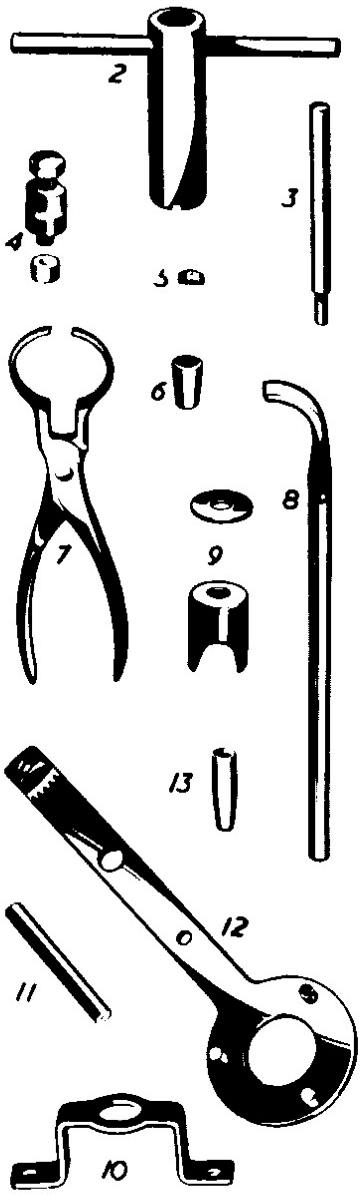


FIG. 56

(Fig. 56)

Fig. Reference	Description	Use	NSU Parts Number
1*	Engine clamping fixture	Bench mounting engine	16 91 00 901
2	Box spanner	Pedal crank spindle nuts	16 91 00 902
3	Punch	Extraction of gudgeon pin	16 91 00 903
4	Extractor	Extraction of flywheel	16 91 00 904
5	Filler piece	,, ,, ,,	16 91 00 905
6	Tapered sleeve	For fitting left-hand end of pedal crank spindle	16 91 00 906
7	Piston-ring pliers	Assembly of piston rings	16 91 00 907
8	Levers (2 reqd.)	For removing clutch cap	16 91 00 908
9	Sleeve	For assembling inner clutch casing	16 91 00 909
10	Bracket	Assembly bracket for clutch spring	16 91 00 910
11	Setting pin	Con rod	16 91 00 911
12	Holder	For holding rotor and intermediate gear	16 91 00 913
13	Tapered sleeve	Assembly of crankcase	01 81 10 282
	Complete set of special tools		16 91 00 914

* Not illustrated.

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