INSTRUCTION BOOK

MATCHLESS

SINGLE CYLINDER

Model G3	***350 c.c.***	***O.H.V.***
Model G3S	***350 c.c.***	***O.H.V. Sports***
Model G80	***500 c.c.***	***O.H.V.***

TWIN CYLINDER

Model G12	***650 c.c.***	***O.H.V.***
Model G12CSR	***650 c.c.***	***O.H.V. Sports***

Issued by:

MATCHLESS MOTOR CYCLES LTD : LONDON S.E.18

DRIVING

FUEL

Although various quality fuels are again available owners are advised to use only the best. The small economy that might be considered to accrue by using the cheaper grades is more than offset by the advantages obtained by using only Premium Grades.

FUEL SUPPLY

A two level petrol tap which gives a reserve supply of fuel is situated at the rear end of the petrol tank on the left side. To turn on the fuel supply press in the hexagon portion of the petrol tap.

The short lever, incorporated in the tap, is operated to bring in the reserve fuel (approximately two pints).

For normal running move this lever to the right. To use the reserve fuel supply, move the lever to the left in register with the word RESERVE embossed on the petrol tap. Refuel as soon as possible after using the reserve and then move the lever on the tap to the normal running position.

Always turn off the fuel supply when the machine is stationary.

STARTING THE ENGINE FROM COLD

Check that there is sufficient fuel in the petrol tank.
Check that there is sufficient oil in the oil tank.
Check that the gear pedal is in the neutral position.
Pull outward the plunger of off-side petrol tap.
Check that the air control (ever *is* in the fully closed position.
Open the throttle not more than one-sixth of the total movement of the twist grip.
Depress the plunger on the top of the carburetter float chamber until it can be felt the chamber Is full of petrol.

SINGLE CYLINDER MODELS

Turn ignition switch to ON. Open the throttle to the smallest amount possible. Raise the valve lifter lever and, while keeping it raised, turn over the engine several times by depressing the kick-starter pedal, three times, the object being to free the engine. (This only applies if the engine is cold.)

Depress the kick-starter until compression is felt, then raise the valve lifter lever and ease the engine just over compression. Then, after allowing the kick-starter pedal to return nearly to its normal position, give it a long swinging kick with the valve closed. Flywheel momentum will carry over compression and the engine should fire immediately. if it fails to do so repeat exactly the same process.

TWIN CYLINDER (DE-LUXE MODELS)

Fully advance the ignition, then pull inwards the control lever one-eighth of an inch. Operate the kick-starter by giving it a long deliberate swinging kick and the engine should start.

The first slow and gentle movement is essential to avoid damage to the teeth of the kick-starter pinion.

After the engine has started, slowly open the air lever until it runs evenly. Then set the throttle so that the engine is running at a moderate speed (neither racing nor ticking over) and allow to warm up. While doing this, check the oil circulation as detailed In page 13. The machine can then be taken on the road.

TWIN CYLINDER (STANDARD MODELS)

Turn the switch to IGN, open the throttle to the smallest amount possible. Operate the kickstarter by giving it a long deliberate swinging kick and the engine should start.

NOTE—Do not race up the engine from cold and do not flood the carburetter to such an extent that petrol is dripping because then, in the event of a backfire, there is a danger of such loose petrol igniting. This cannot possibly happen If the starting instructions are carefully followed, but, in the event of a fire, there is no cause for panic. Merely turn off the petrol tap to isolate the main supply, open wide the throttle and turn over the engine by operating the kick-starter pedal when suction will extinguish the fire.

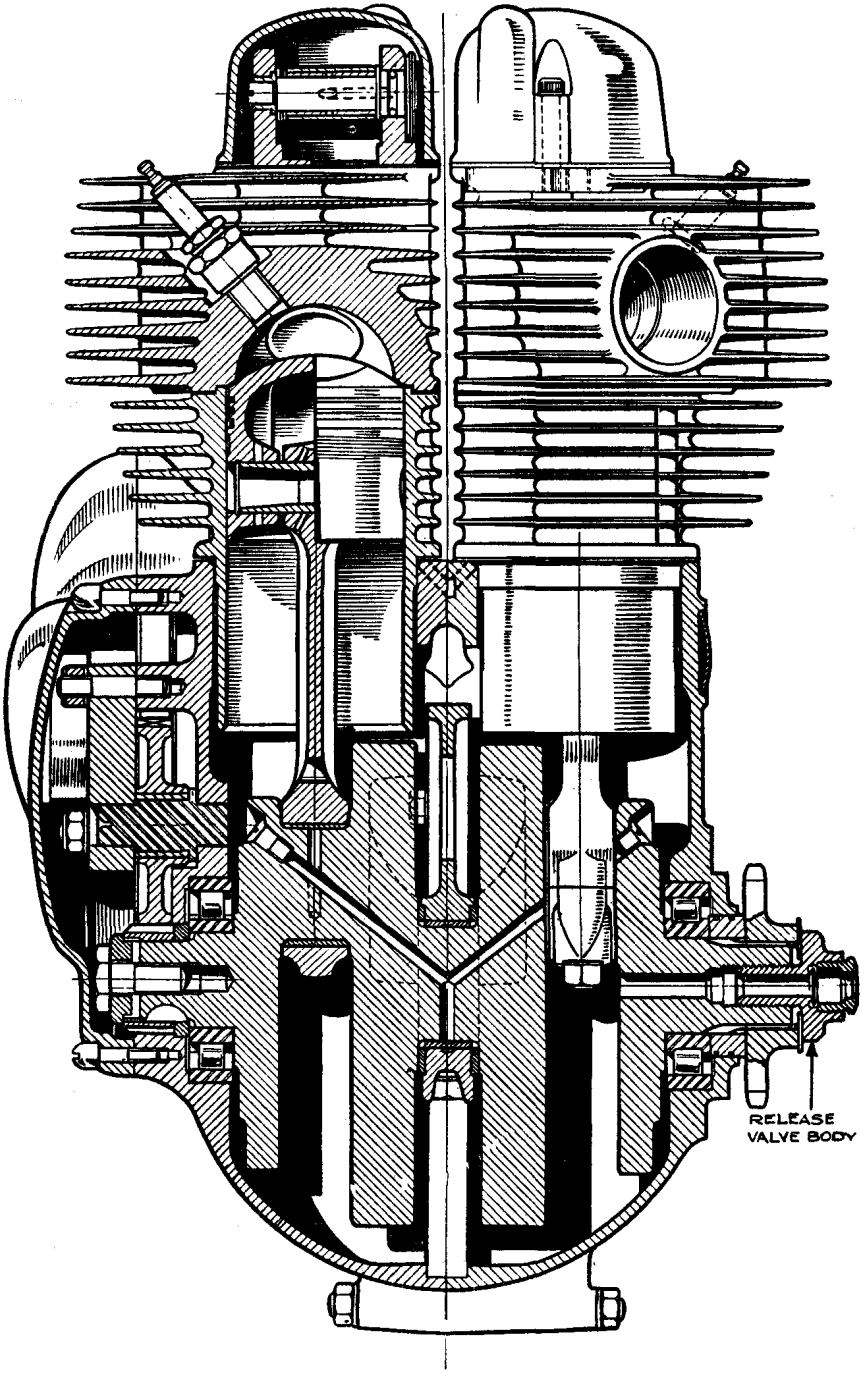

Illustration 8

Cross section of engine showing oil galleries, oil passages, and release valve

DECARBONISATION

Instead of the usual stipulated mileage interval between periods of decarbonisation, ft is recommended that this is undertaken only when the need for same becomes apparent because of loss of power, heavy petrol consumption or generally reduced performance. When undertaken, unless it is thought necessary to inspect the piston and rings, the cylinder barrel/s are best left undisturbed.
The various stages in decarbonisation are described.

SINGLE CYLINDER MODELS

TO REMOVE THE ROCKER BOX

Remove the petrol tank.
Remove the three nuts and fibre washers retaining the rocker box side cover and take away the cover.
Disconnect the oil pipe feeding oil to the rocker box.
Turn over engine until both valves are completely closed.
Remove engine steady bracket by removing bolt from frame clip and nuts and washers from the rocker box bolt extensions.
Remove the nine bolts retaining rocker box to cylinder head.
Disconnect valve lifter cable.
Tilt upward the right hand side of rocker box and extract the two long pushrods. Lay these aside so they may be identified and replaced in their original position.
The rocker box may then be lifted off.

TO REPLACE THE ROCKER BOX

Carefully clean the top of cylinder head and lower face of rocker box.
Revolve engine until both tappets are down, i.e., the top dead centre of firing stroke.
Lay the composition jointing washer on cylinder head. This must be faultless. If necessary, renew,
Lay the rocker box in position then slightly raise the right hand side to allow the long push rods to be inserted into their original respective positions.
Insert all nine rocker box fixing bolts and note that the bolt with short head is in the centre right hand position and the bolts with threaded extensions are fitted one each side of the central short head bolt.
Tighten each bolt in turn bit by bit until alt are fully home.
Replace the engine steady stay.
Turn engine over several times to ensure parts have bedded home.
Re-fix valve lifter cable.
Re-fix rocker box oil pipe union nut using two spanners to ensure that the union screwed into rocker box does not turn while the nut is being tightened.
Check tappet clearances and re-set if necessary.
Inspect rubber fillet on rocker box side cover and renew if not perfect.
Replace the side cover ensuring that a fibre washer is fitted under each of the three retaining nuts.
Beware of over tightening these nuts, the joint being made by the rubber fillet excessive pressure is not necessary.

TO REMOVE THE CYLINDER HEAD

Remove

The petrol tank.
The sparking plug. See note on page 38.
The rocker box.

Remove the exhaust system by:

Remove nut, and washers, retaining exhaust pipe to its stay.
Remove nut, and washers, retaining silencer to its stay.
Remove complete exhaust system, by pulling away from stays and then downwards, from the exhaust port in cylinder head.

TO REMOVE THE VALVES

First remove rockers from cylinder head (see illustration 12)

The importance of correctly locating the valve spring seats is stressed, the wide face of the seat abuts against the cylinder head. Reversal will make the springs coil bound and cause damage to the valve gear. Proceed by removing the rockers (see illustration 12 for assembly sequence). If a valve spring compressor is not available, use a wood block 2" in cube to support the valves with the head on a bench.

Compress the springs to extract the split collets, which are a taper fit. A sharp tap on the spring collar will release them.

REMOVE CARBON DEPOSIT

See details for single cylinder engines, page 32.

TO REMOVE VALVE GUIDES

Both guides are a force fit and located by circlips, the cylinder head must be uniformly heated, the guide can then be pressed out of the port sufficiently to remove the circlip. Reheat the head, press down the guide from outside the port.

VALVE GRINDING

If the face of the valve is deeply pitted, the seat should be refaced with equipment designed for this purpose. The seat angle is 45 degrees. Prolonged grinding will make the valve face and seat in the head saucer-shaped and impair the gas seal.

Use fine grinding paste, moving the valve backwards and forwards, not continuously in one direction, until an unbroken matt surface is obtained. Raise the valve from time to time during this process, the grinding paste will "bite" better.

Usually the inlet valve needs little attention.

A piece of rubber tube with a bore diameter of ¼", part number 011381, can be used for manipulating the valves for grinding.

All traces of abrasive must be removed after grinding, particularly from the valve guides. Apply a little oil on the valve stems before refitting.

REMOVING CYLINDER BARRELS AND PISTONS

Unless it is desired to inspect the pistons and rings, during decarbonisation, they are, as already advised, best left undisturbed.

Having removed the cylinder heads withdraw the cylinder barrels by:

Lift away the four push rods, identify them for re-fitting and lay aside.

Dealing with one barrel at a time, exert upward pressure on a barrel, slightly rocking to and fro while doing so, and steady the piston with one hand as it emerges from the barrel.

Cover the crankcase throat with clean rag to prevent the entry of foreign matter.

To remove a piston

Using 011188 circlip pliers, contact one of the gudgeon pin circlips and, with **a** rotary motion, gently withdraw the circlip from its housing. The gudgeon pin may then be pushed out of the piston which action frees the piston from the connecting rod. (Being a parallel, floating fit in the piston and connecting rod small end it is immaterial from which side the gudgeon pin is withdrawn.)

NOTE—It may be necessary to apply a little heat to the piston to permit free gudgeon pin removal and replacement.

Rings may be removed from a piston by peeling off or by introducing behind them three thin and narrow metal strips, equally spaced round the piston, and then sliding them off, taking care not to scratch the piston.

Carefully examine the contact edge of each piston ring and replace any which do not show a bright surface over the whole circumference.

TO REPLACE GEAR BOX INNER COVER

Ensure gasket is undamaged. Fit inner cover, firmly secure seven fixing nuts. Fit main shaft nut, clutch operating body and steel ball, also clutch actuating arm and roller.

NOTE—Before finally tightening lock nut securing operating body, position small dutch operating lever to register with centre of aperture for clutch cable adjuster. Fit ratchet plate and spindle.

FRONT CHAINCASE COVER—ALTERNATOR MODELS

WARNING.—The stator for the A.C. generator is bolted to the outer cover of the front chain case. Attached to the stator is a cable, which passes through the rear portion of the chain case. Therefore take away the outer cover with extreme care to avoid a strain on the cable. (See illustration 25).

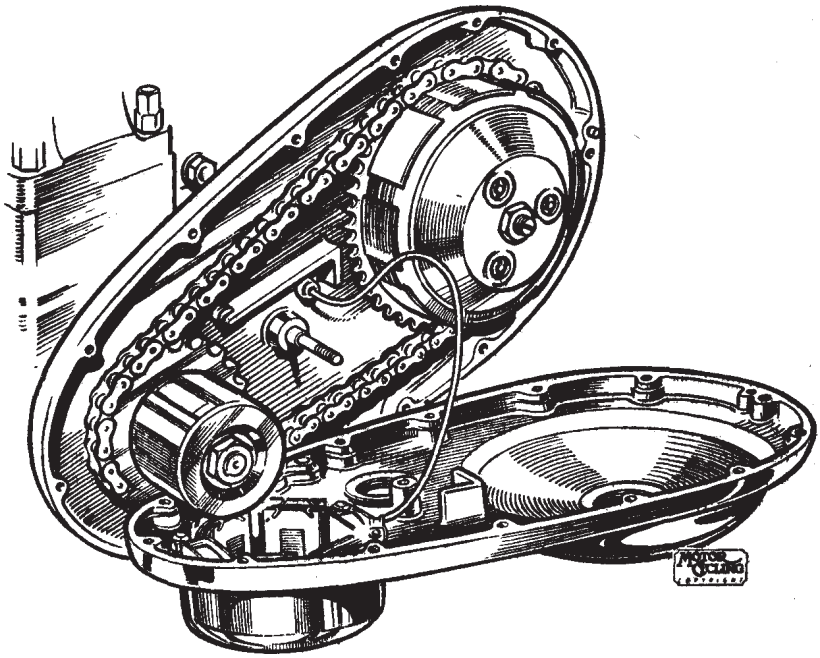

Illustration 25

TO REMOVE OUTER CHAINCASE COVER

Remove the rear engine plate cover and disconnect three snap connectors.

Take off the left side footrest.

Unscrew adjusting nut on rear brake rod.

Place a tray under chaincase to catch oil.

Remove drain plug, allow time to drain (content 12 ozs.).

Remove screwed inspection cap (use spanner 018178 in slot).

Remove nut in centre of chaincase.

Remove fixing screws (14).

Depress the rear brake pedal and carefully remove outer cover squarely to avoid damage to the stator windings, and thread each connector through the rubber grummet in the chaincase, one at a time (See illustration 25).

Disconnect both damper rods, by releasing the lock nut and unscrewing both bolts.

Release both fork crown pinch screws (38).

The fork assembly can now be taken away from the machine.

If the fork tubes are a tight fit in the fork crown and handlebar lug, use the drawbolt to tap out each tube alternately a small amount, changing the bolt from one tube to the other, until the tubes are clear of the frame. Lift off the bottom cover tubes to expose the springs.

The figures in parentheses are shown in illustration 29.

NOTE—If a steering damper is used disconnect damper plate to frame.

TO REFIT THE FORKS AS A UNIT

With the two cover tubes in position, introduce the fork tubes into the fork crown and handlebar lug, lift the assembly then lightly tighten both pinch screws.

Fit the drawbolt through the handlebar lug and pull up each tube a small amount, changing the tool from one tube to the other, to pull the tubes up evenly. With a piece of wire lift up the damper tubes, connect them to the top bolts and firmly tighten the rod lock nut. Replace the top bolts, then very firmly re-tighten the pinch screws.

Re-connect the brake cable to complete the assembly.

FRONT FORK "TOPPING UP"

No part of the **TELEDRAULIC** Front Fork requires individual lubrication, but it is advisable to check the oil content, once every five thousand miles.

Support motor cycle vertically with weight on both wheels. A steady under each footrest is the best method.

Remove the rubber grommet and unscrew the top bolts. Have a graduated measure of not less than 10 fluid ozs, capacity available In which to catch and measure the oil. Remove the drain plug from the bottom of a slider and catch the oil which drains out. If the fork had the correct oil content, about 6 fluid ozs. (170·4 c.c.) will have been drained off. If less, add to make this quantity, or reduce if an excess quantity has been drained off. Next refit drain plug and carefully pour into the top of the tube being checked exactly 6 fluid ozs. (170·4 c.c.) after which the top bolt may be replaced.

NOTE—Although the normal oil content of each side is specified as 64 fluid ozs., it is not possible to drain all the oil via the drain plug. This explains the lesser quantity of 6 fluid ozs. (170·4 c.c.) referred to above. However, if the fork is at any time completely dismantled and then reassembled in a dry state, it should be noted that in that event the correct quantity of oil to add to each leg is 6½ fluid ozs. (184·6 c.c).

TO REMOVE THE COMPLETE FRONT FORK ASSEMBLY

Support the machine with the front wheel clear of the ground. (A box, of suitable height, under each footrest is the best method.)

Remove the front wheel as described in Wheel Section.

Remove the front mudguard and stay.

Slacken the screw on head lamp top, gently prise out the rim and reflector assembly, detach with a slight rotary and lifting movement the cap to which head lamp wires are attached. Pull out pilot bulb and take away rim and reflector assembly.

Disconnect the driving cable from the speedometer head and draw same down through fork crown.

Remove the bolts, leaving the head lamp shell, etc., free to be gently suspended by the wiring loom.

Remove the handlebar half clip and lay the handlebars, complete with controls, upon a pad on top of the petrol tank.

Detach the front brake cable from the forks. (First remove the slotted yoke end and then completely unscrew the cable adjuster.)

Remove the rubber grommet and unscrew the top bolt on each inner tube, raise same and slacken the lock nuts securing the damper rods attached. Then, before removing the top bolts, attach a piece of wire about 18 inches long underneath each damper rod lock nut, to enable the damper rods to be raised for reassembly.

Remove domed nut at top of steering column.

Remove lock nut on steering column.

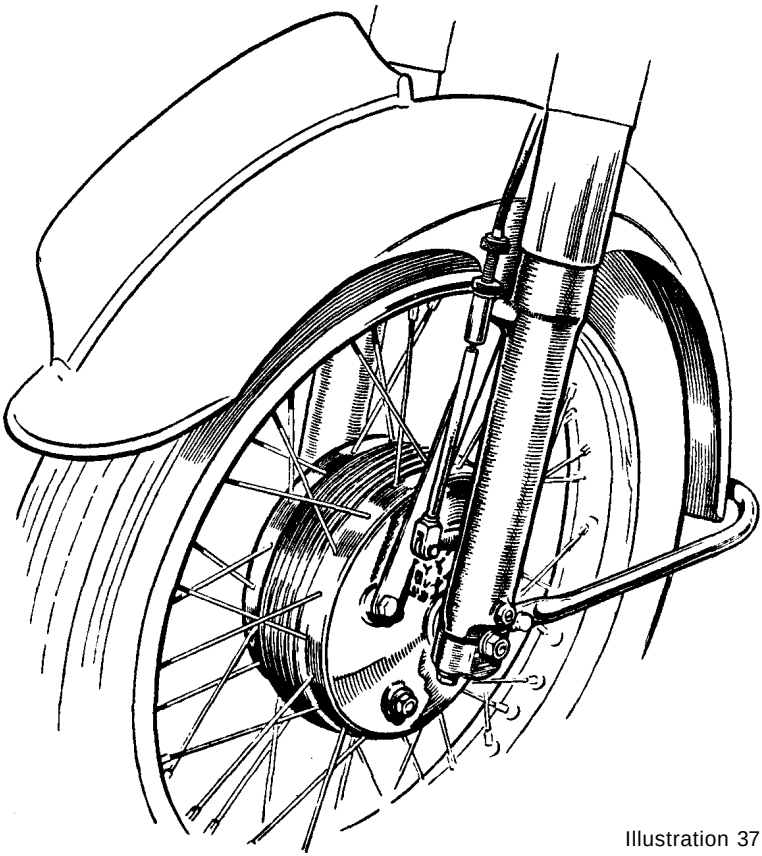

Illustration 37

Showing front brake cable adjuster thread exhausted, indicating brake shoe thrust pin adjustment is necessary.

REAR BRAKE ADJUSTMENT

Major adjustment of the rear brake shoes is made on the brake thrust pins, by fitting packing washers under the pins, as already described.

Minor adjustment of the rear brake shoes is made by altering the position, on the brake rod, of the knurled adjusting nut. Screw the nut further on the rod to "take up" the rear brake.

Adjust rear brake by:

Place machine on centre stand.

Screw further on the brake rod the knurled adjusting nut till, by rotating the wheel, it can be felt the brake shoes are just touching the brake drum.

Then unscrew the adjusting nut five complete turns. (The adjusting nut is automatically locked in position by virtue of the two projecting noses on it engaging in accommodating slots cut in the clip which connects the brake rod and brake expander lever and being retained in that position by the spring which encircles the rear end of the brake rod).

ELECTRICAL SERVICE

MAGNETO MODELS

ELECTRICAL EQUIPMENT

LUCAS electrical equipment is fitted and this comprises three independent electrical circuits, as follows:

(1) IGNITION—Magneto, High-tension wires, Sparking plugs and Cut-out switch.

(2) CHARGING—Dynamo Compensated Voltage Control Unit and Battery.

(3) LIGHTING AND ACCESSORIES—Lamps, Horn, Switches and wiring.

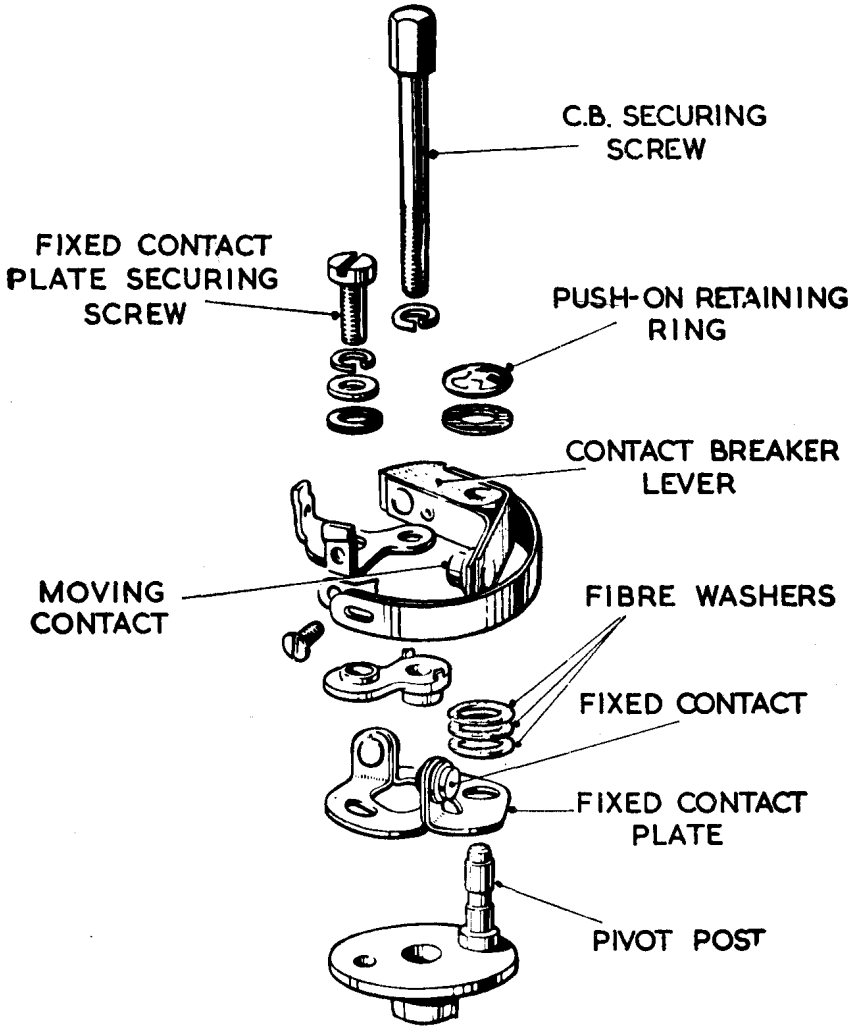

Illustration **44**

Contact Breaker

USEFUL INFORMATION

In the following paragraphs are particulars of failures and troubles that can occur together with the probable reasons. These troubles are arranged in the order of their probability.

TRACING TROUBLES

Engine fails to start, or is difficult to start, may be due to:

Water on high-tension pick-ups, or distributor.
Moisture on sparking plugs.
Oiled up, or fouled, sparking plugs.
Throttle opening too large.
Pilot jet choked.
Air lever In open position or bad air leak at carburetter joints.
Lack of fuel because of insufficient flooding.
Lack of fuel because of pipe, or tap, obstruction.
Excessive flooding of carburetter (with hot engine only).
Stuck up engine valve.
Weak, or broken, valve spring.
Valve not seating properly.
Contact points dirty.
Incorrect contact point gap.
Ignition not switched on.
Discharged battery.

Engine misses fire may be due to:

Defective, or oiled, sparking plugs.
Incorrect contact point gap.
Contact breaker lever sticking.
Contact breaker points loose.
Rocker adjustment incorrect.
Oil on contact breaker points.
Weak valve springs.
Defective sparking plug wire.
Partially obstructed petrol supply.
Ignition switch at EMG.

Loss of power may be due to:

Faulty sparking plugs.
Lack of oil in tank.
No rocker clearance, or too much clearance.
Weak, or broken, valve spring.
Sticky valve stem.
Valve not seating properly.
Brakes adjusted too closely.
Badly fitting, or broken, piston rings.
Punctured carburetter float.
Engine carbonised.
Choked silencer.
Bad air leak between carburetter and head, or manifold.