

**INSTRUCTION  
MANUAL**

*for*

**TRIUMPH**

**MOTOR CYCLES**



MODEL TRW  
499 c.c. S.V. TWIN

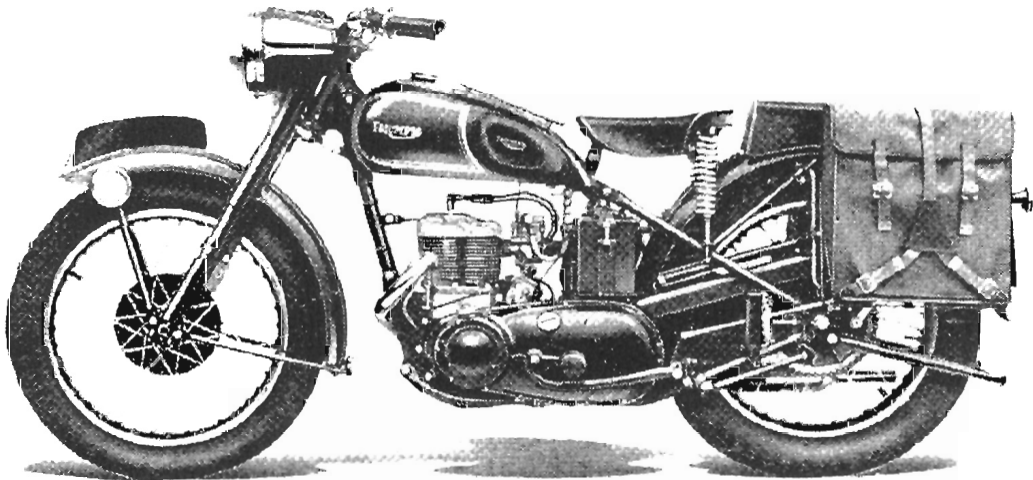
**MARK 2**

**TRIUMPH ENGINEERING CO. LTD.  
Meriden Works, Allesley,  
COVENTRY**

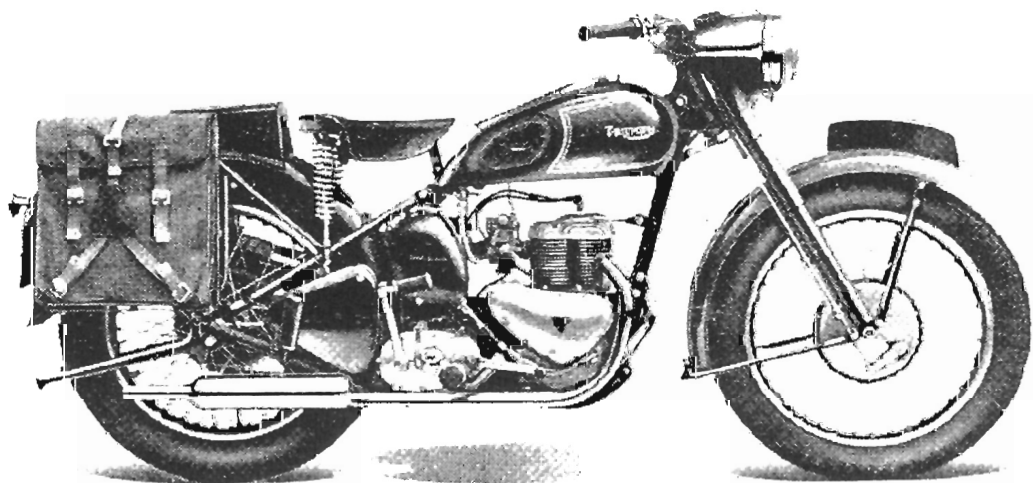


# TRIUMPH

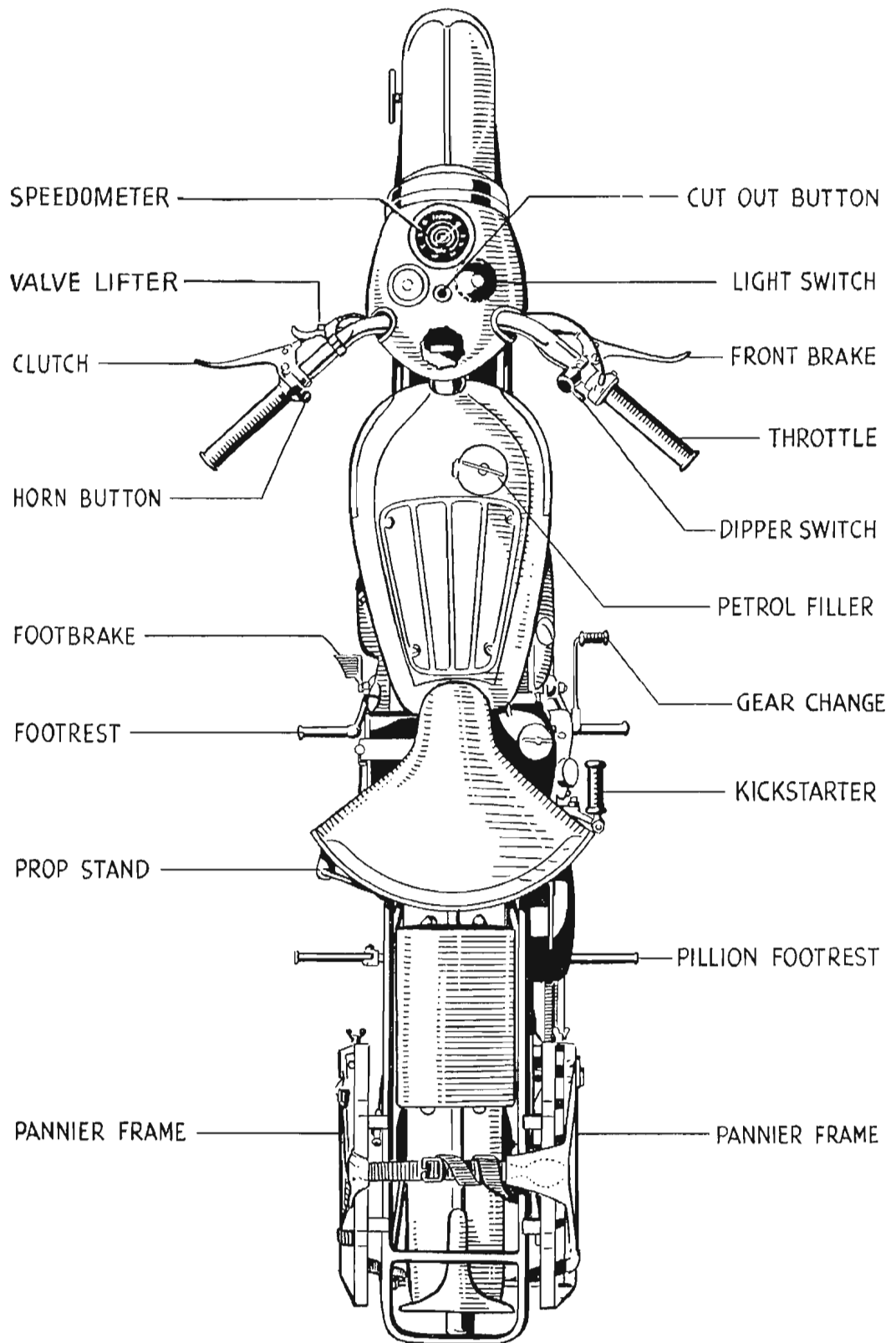
499 cc S.V. TWIN



MARK 2



MODEL TRW



**Layout of Controls.**

## TECHNICAL DATA

Engine Type	...	...	...	...	...	...	SIDE VALVE
Number of Cylinders	...	...	...	...	...	...	2
Bore and Stroke	...	...	...	...	...	63 mm	× 80 mm
Cylinder Capacity	...	...	...	...	...	...	499 c.c.
Compression Ratio	...	...	...	...	...	...	6 : 1
Petrol Tank Capacity	...	...	...	...	...	...	3½ Gallons
Oil Tank Capacity	...	...	...	...	...	...	¼ Gallon
Gearbox Capacity	...	...	...	...	...	...	½ Pint
Primary Chaincase Capacity	...	...	...	...	...	...	½ Pint
Engine Timing—							
Inlet Valve Opens B.T.C.	...	...	...	...	...	...	16°
Closes A.B.C.	...	...	...	...	...	...	56°
Exhaust Valve Opens B.B.C.	...	...	...	...	...	...	47°
Closes A.T.C.	...	...	...	...	...	...	16°
Ignition Fully Advanced	...	...	...	...	...	...	⅛"
Contact Breaker Gap	...	...	...	...	...	...	.012"
Sparking Plug Gap	...	...	...	...	...	...	.015" to .018"
Tappet Clearance (Cold)	...	...	...	...	...	...	.002 min. .005 max.
Carburettor Settings—							
Choke	...	...	...	...	...	...	No. 22
Main Jet	...	...	...	...	...	...	No. 110
Correction Jet	...	...	...	...	...	...	No. 190
Pilot, Air	...	...	...	...	...	...	No. 2.0
Petrol	...	...	...	...	...	...	No. 45
Starter, Air	...	...	...	...	...	...	No. 3
Petrol	...	...	...	...	...	...	No. 65
Engine Sprocket	...	...	...	...	...	...	19 Tooth
Gear Ratio Top	...	...	...	...	...	...	5.8 to 1
Third	...	...	...	...	...	...	8.25 to 1
Second	...	...	...	...	...	...	12.8 to 1
Low	...	...	...	...	...	...	16.85 to 1
Primary Chain Links	...	...	...	...	...	...	74
Pitch	...	...	...	...	...	...	½" × .335" × .305"
Rear Chain Links	...	...	...	...	...	...	90
Pitch	...	...	...	...	...	...	⅝" × .400" × ⅜"
Tyre Size Front (Rim W2-19)	...	...	...	...	...	...	3.25 × 19"
Rear (Rim W3-19)	...	...	...	...	...	...	4.00 × 19"
Wheel Base Static	...	...	...	...	...	...	53"
Overall Width	...	...	...	...	...	...	26½"
Saddle Height	...	...	...	...	...	...	31"
Ground Clearance	...	...	...	...	...	...	6¼"
Weight Dry	...	...	...	...	...	...	320 Lbs.

## CONTROLS—INSTRUMENTS

(“Left” and “Right” assume that the rider is sitting on the machine).

### HANDLEBARS.

**Clutch.**—A hand lever on the left portion of the handlebar. The clutch lever should not be touched when the machine is in motion, except to change gear. Always select neutral and then release clutch when machine is stationary.

**Front Brake.**—A hand lever on the right portion of the handlebar.

**Exhaust Valve Lifter.**—A lever on the left portion of the handlebar ; push to release compression.

**Throttle Control.**—Twist grip operated by right hand. Twist the grip towards you to open, away from you to close. To apply more friction to the twist grip movement, screw in the knurled thumb adjuster.

**Horn Button.**—Fitted in left portion of handlebar, push to operate.

**Dipper Switch.**—Attached to the front brake lever clip.

### NACELLE INSTRUMENT PANEL.

**Speedometer.**—Registers speed, trip and total mileage. Illumination of the speedometer for night riding is controlled by the main lighting switch.

**Lighting Switch.**—Turn the switch knob to operate. Lighting positions are as follows :—

- OFF — All lights off.
- T — Tail lamp and speedometer light on.
- D — Tail lamp, speedometer and parking light on.
- F — Tail lamp, speedometer and headlight on.

**Cut-out Button.**—This stops the engine when the button is pressed by earthing the magneto.

**Steering Damper.**—Turn the damper knob clockwise for more damping effect.

### OIL PRESSURE INDICATOR.

The indicator button operates through the pressure release valve which is in the rear of the timing side crankcase. When the engine is started the indicator button protrudes from the release valve cap.

### CARBURETTOR STARTER CONTROL.

On the side of the carburettor will be found the starter control lever. Push forward for easy starting when the engine is cold. After starting, close to half way position—when the engine is warm it can be fully closed.

**FOOT BRAKE.**

A flat pedal in front of the left footrest.

**PETROL TAP.**

Two taps are fitted under the rear end of the petrol tank. The offside tap is the main supply and the nearside the reserve supply. To open, turn the tap levers downward as far as they will go.

**GEAR CHANGE.**

A small foot lever in front of the right footrest. The lever should be moved down to change down and up to change up. To select neutral withdraw clutch and move the gear lever three movements down and half a movement up. To engage first gear from neutral fully withdraw clutch and press gear lever down one movement. To change up, close throttle, fully withdraw clutch, pause for a moment, and then move lever upwards gently as far as it will go with the toe. To change down, fully withdraw clutch and press lever downwards as far as it will go.

There is an indicator on the top of the gearbox to show the gear positions. This is for use only when the machine is stationary.

**KICKSTARTER.**

On the right hand side behind the footrest. Turn the folding pedal outwards to depress.

## **ADJUSTMENT OF CONTROLS AND RIDING POSITION**

All the controls, footrests, etc., are fully adjustable. When first taking over the machine the necessary adjustments should be made to suit the individual rider.

**FOOTRESTS.**

Remove the footrest spindle nuts and tap off the footrests. The right footrest is fitted to a taper, and the left footrest to dowels in the chaincase ; a series of holes are drilled in the footrest to make it fully adjustable. Replace footrests in required position and tighten up the nuts securely.

**GEAR CHANGE LEVER.**

Fitted to a serrated shaft. Slacken off the set screw and tap the lever off the shaft. Replace in position convenient for the rider's size of boot and tighten up the set screw.

**FOOTBRAKE PEDAL.**

Adjust height from ground by means of the stop screw and locknut in rear of the brake pedal spindle. After making this adjustment it may be necessary to adjust the rear brake (see page 20).

**HANDLEBAR.**

Adjustment is carried out by slackening off the two "U" Bolt clamp nuts and turning the handlebar in the desired position.

**LEVERS.**

If the clamping screws which secure the levers to the handlebars are slackened off, the controls can be moved to suit the rider's preference.

**SADDLE.**

The nose of the saddle can be raised, or lowered, by fitting the fixing bolt in either of the 3 holes in the front brackets. To adjust the rear of the saddle, slacken off the lock nuts securing the studs to the rear stays and screw down or up the top nut to higher or lower the saddle as required.

## CONTROL CABLES

**THROTTLE CONTROL.**

The cable passes through a bracket fitted to the carburetter ; at this point the cable adjuster is fitted.

**CARBURETTER STARTER CONTROL.**

Attached to carburetter ; push forward for starting purposes (see page 43).

**CLUTCH CONTROL.**

Adjustment is made on the top of the gearbox inner cover. Screw in to take out the slack.

**FRONT BRAKE CONTROL.**

Turn the knurled nut down on the front brake anchor plate to adjust brake shoes closer.

**EXHAUST VALVE LIFTER.**

Adjuster is situated on the left hand side of the cylinder base, screw out for closer adjustment and vice-versa to reduce.



## STARTING THE ENGINE

1. See that the gear is located in the neutral position (note indicator on the gearbox inner cover).
2. Turn on the petrol. Offside tap main ; nearside tap reserve.
3. Lift the clutch lever and depress the kickstarter to separate the clutch plates.
4. Pull out the starter knob to put in operation the starter carburetter.
5. Do not open the throttle as this will upset the starting mixture.
6. Turn the engine over with the kickstarter until compression is felt. The kickstarter crank should then be moved down to almost the horizontal position by freeing the clutch.
7. Depress the kickstarter smartly, when the engine should fire immediately. If the carburetter is not set in the ideal position a second or third kick may be necessary.
8. When the engine starts, push the starter knob to the half-way position ; this is determined by a spring loaded ball. The engine can now be run without fear of "overdosing" whilst the engine is warming up. As the mixture is very rich the "starter" must be put out of action as quickly as possible.
9. Attention must be paid to the oil pressure indicator immediately the engine starts up ; the indicator button must protrude from the release valve cap to prove that oil is circulating through the system.

## LUBRICATION

### ENGINE.

The dry sump lubrication system is employed on this engine. The oil is fed by gravity from the oil tank via a filter and pipe to the pressure side of the oil pump. The pump is the double plunger type, fitted with two non-return valves. From this point the oil is forced through drilled passage ways to the crankshaft, and from the big ends the oil issues in the form of a fog to lubricate the pistons and the other internal engine parts. The oil pressure is controlled by means of a release valve situated in the timing side crankcase. This valve serves two purposes, first to release excessive oil pressure, and secondly to indicate the pressure by visible means. The valve consists of a piston, main spring, secondary spring, oil seal and button indicator. When the engine is running the piston is forced back by oil pressure on the secondary spring, this being indicated by the button protruding through the cover nut. Excessive pressure will move the piston back still further on the main spring and allow oil to be by-passed through the release valve body to the crankcase to be then scavenged to the oil tank.

After lubricating the engine, oil falls to the bottom of the crankcase, where it is filtered. The crankcase oil return pipe which can be seen protruding through the filter after the sump plate has been removed, then returns the oil to the suction side of the oil pump to be returned to the oil tank. The suction oil pump plunger has greater capacity than the pressure side, in order to make certain that no liquid oil remains on the floor of the crankcase.

## **MAINTENANCE**

### **LUBRICATION SYSTEM.**

The lubrication system employed is simple and gives long service without attention. Precautions such as changing the oil at the intervals stated should be observed, and the cleansing of all filters carried out during the oil changing operations to ensure that this service is maintained.

It will be noted that the return of oil to the tank is intermittent ; this is due to the greater capacity of the suction pump. A spurt of oil will be seen for a few moments and then a few air bubbles.

In the event of a lubrication fault the following causes have been listed to assist in diagnosing the trouble.

### **OIL TANK.**

The amount of oil contained in the tank should be within 2" of the filler cap, further addition of oil will cause excessive venting at the top of the oil tank due to the lack of air space. Always ensure that the vent pipe is clear, as any obstruction will create a back pressure in the tank and prevent adequate scavenging of the oil pump resulting in over oiling of the engine and excess oil being passed through the breather.

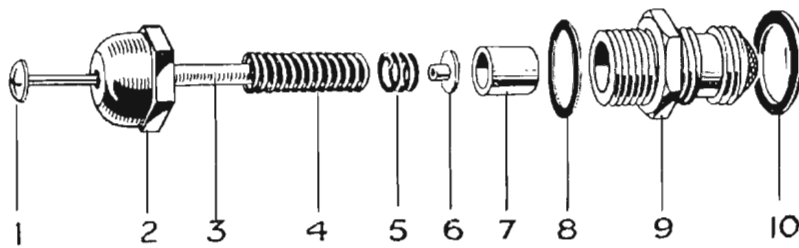
### **OIL PUMP.**

The only part likely to show wear after a considerable mileage is the oil pump block, which can be replaced very easily. The plungers and the pump body being constantly immersed in oil, wear is negligible, therefore it is unnecessary to suspect these parts if the lubrication is at fault. Should the non-return valve balls not be seating properly, then the pump will not function satisfactorily. The remedy is to remove the oil pump and unscrew the two plugs situated under the oil pump body to remove the balls and springs. All parts should then be washed in petrol in order to remove any foreign matter, and when replacing the balls they should be given a sharp tap on to their seatings before re-assembly. Prime the pump with oil before fitting.

### OIL RELEASE VALVE AND INDICATOR.

This unit is very reliable and should not require any maintenance other than cleaning. When the oil is changed it is advantageous to dismantle this unit and thoroughly wash it in petrol to ensure that the piston works freely in the release valve body. Under no circumstances should the release valve springs be tampered with, as the spring poundage is set to give the correct oil pressure. Should it be necessary to replace these springs at any time genuine Triumph spares should be obtained.

If oil leaks from the button shaft it will necessitate dismantling the assembly and replacing the rubber tube oil seal. The illustration below clearly shows its position, and if the shaft nut is gripped with a suitable tool the shaft can be unscrewed by inserting a screw-driver into the slot of the button head.



### OIL PRESSURE RELEASE VALVE AND PRESSURE INDICATOR.

- |                       |                   |
|-----------------------|-------------------|
| 1. Shaft, indicator.  | 6. Nut, shaft.    |
| 2. Cap.               | 7. Piston.        |
| 3. Tube rubber.       | 8. Washer, cap.   |
| 4. Spring, main.      | 9. Body, valve.   |
| 5. Spring, auxiliary. | 10. Washer, body. |

### PRIMARY CHAINCASE.

The primary chaincase houses the clutch, primary chain, engine sprocket, shock absorber and generator unit. These parts are lubricated by a thin oil (SAE20). The correct amount of lubricant is third of a pint. If a thicker oil is used the result will be a sticking clutch and the inability to change gear without grating of the gears.

To drain the oil, remove the drain plug situated under the outer chaincase. If the oil is very dirty and shows signs of sludge, remove the outer cover and wash all parts with paraffin or other suitable cleaning fluid.

### GEARBOX.

The gearbox is lubricated by engine oil (SAE50) and under no circumstances should thick gear oil or grease be employed. The filler plug cap is situated in the gearbox outer cover, and the level plug will be found in the rear portion of the gearbox inner cover. To drain the gearbox, remove the plug in the lower rear portion of the casing. DO NOT REMOVE THE ACORN NUT as this part houses the camplate plunger and spring. The correct level of oil should be ascertained when the oil is hot and the machine is off the stand.

## BICYCLE PARTS.

Component parts such as headraces and brake mechanisms are provided with grease nipples for lubricating purposes, and care should be taken to use only the recommended grease lubricants for these parts. If more solid grades are used then there is a danger that the various bearings and bushes will not receive a proper supply. (For front and rear wheel see page 21).

## CHAINS.

The primary chain is enclosed and fully lubricated, the rear chain, however, is lubricated by oil splash from the primary chaincase, which is controlled by a needle valve situated at the rear of the case. For further information see page 25.

## CONTROLS.

The control cables require lubricating at intervals, as if they become dry, stiffness in operation will result. A good plan is to remove the Bowden wire connection from the lever at its top end and make a funnel with brown paper round the casing, securing it with a rubber band. Then if thin machine oil is fed into the funnel and allowed to remain over night, it will trickle down the casing and lubricate the cable. Control cables should always be kept clear of the engine as far as possible, as if they become over-heated the lubricant will be dried up.

# ROUTINE MAINTENANCE AFTER RUNNING-IN PERIOD

ENGINE.	Miles
Check oil and replenish if necessary ... ..	250
Drain oil tank and refill when warm ... ..	1,500
Clean oil filters ... ..	1,500
Check and adjust tappets ... ..	3,000 to 4,000
Clean and adjust sparking plugs ... ..	2,000 to 3,000
Decarbonise and top overhaul ... ..	10,000 to 12,000
<b>GEARBOX.</b>	
Check oil and replenish ... ..	1,000
Drain oil when warm and refill ... ..	5,000
Check clamp bolts ... ..	1,000
<b>PRIMARY CHAIN CASE.</b>	
Drain oil and re-fill (if the mileage is not covered change monthly) ...	1,000
Check cover security screws ... ..	1,000

**FORKS.**

Drain oil and refill	...	...	...	...	...	...	10,000
Renew bushes, bearings and oil seals	...	...	...	...	...	...	20,000
Apply grease to headraces	...	...	...	...	...	...	1,000
Check play in headraces	...	...	...	...	...	...	5,000

**WHEELS.**

Re-pack with grease	...	...	...	...	...	...	10,000
Check wheel bearings	...	...	...	...	...	...	2,000 to 3,000

**CHAINS.**

Adjust tension	...	...	...	...	...	...	1,000
Lubricate rear chain (winter)	...	...	...	...	...	...	1,000
Lubricate rear chain (summer)	...	...	...	...	...	...	1,500

**BRAKES.**

Grease cable and rod mechanism	...	...	...	...	...	...	1,000
Adjust (normal running)	...	...	...	...	...	...	1,000

**BATTERY.**

Top-up each cell monthly

**TYRE PRESSURES.**

Check and correct weekly

**CARBURETTER.**

Dismantle and clean float bowl and filters	...	...	...	...	...	...	1,500
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**AIR FILTER.**

Clean and re-oil filter element	...	...	...	...	...	...	2,000
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(Where machine is used in extremely dusty conditions the servicing period should be at much more frequent intervals).

**MAGNETO.**

Check and adjust contact Points	...	...	...	...	...	...	2,000 to 3,000
Lubricate cam felt with thin oil	...	...	...	...	...	...	5,000
Grease rocker shaft with Petroleum jelly	...	...	...	...	...	...	5,000

**GENERAL.**

Lubricate all cables, check security of all nuts and bolts	...	...	...	...	...	...	1,000
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# CHANGING THE OIL

When the machine is new, the oil should be changed frequently during the running-in period in order to make certain that any foreign matter which the oil picks up in the course of its circulation shall be eliminated.

## ENGINE.

The oil should be changed at 250, 500 and 1,000 miles during the running-in period and thereafter every 1,500 miles regularly. When changing the oil it is essential that the oil filters are thoroughly cleaned in petrol.

**Oil Tank Filter.** To remove unscrew the union nut attaching the feed pipe to the tank and then the large hexagonal nut to which the filter is fitted.

**Crankcase Filter.** This filter is located in the base of the crankcase. To remove, unscrew the four hexagon headed screws. Withdraw the filter carefully to avoid damage to the gauze.

**Release Valve Filter.** To remove, unscrew by placing a spanner on the large hexagon. Now dismantle by unscrewing the domed nut, in order that the body of the valve, which has the filter fitted can be washed.

It is advisable to flush out the oil tank with a flushing oil. The flushing oil can be filtered through a piece of muslin and retained for further use. If the tank is very dirty it should be removed from the machine and thoroughly cleaned. When possible drain the oil whilst the engine is still hot after a run ; this enables it to flow more freely and carry away any sludge or foreign matter.

After the lubrication system has been drained and refilled, all the joints which have been disconnected and the oil tank drain plug, should be gone over again with a spanner to make certain that they are perfectly tight before the engine is started up. When the engine is again started, immediately check up to see that the oil pressure is registering and that the oil is returning to the tank and that all joints are satisfactory.

## PRIMARY CHAINCASE.

The oil in the primary chaincase should be changed every thousand miles or every month if a thousand miles has not been covered. The correct quantity is  $\frac{1}{2}$  pint. By carefully maintaining the oil level and changing the oil at regular intervals, the primary chain will be kept in excellent condition and will run for a long mileage without attention. If the oil is allowed to become dirty and partially broken down, then wear will develop on the primary chain, which will require constant adjustment.

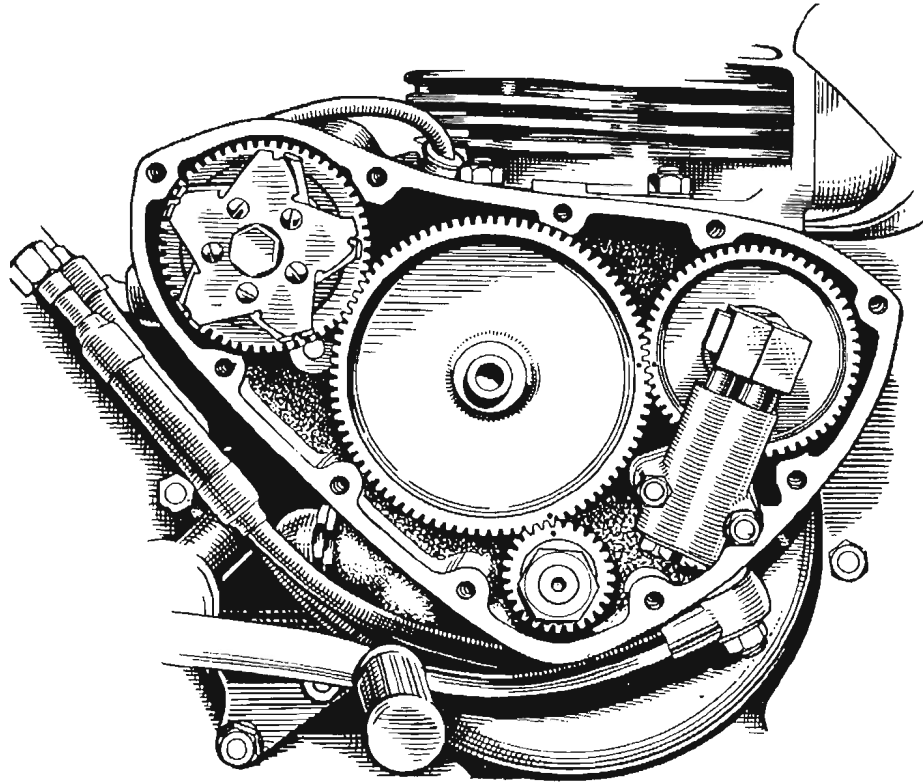
## GEARBOX.

The oil in the gearbox should be drained and the gearbox flushed out after the machine has run 500 miles. Thereafter, the oil should be changed every 5,000 miles, but it is advisable to check up the oil level at thousand mile intervals.

# VALVE AND IGNITION TIMING

## VALVE TIMING.

The camwheel, timing pinion and intermediate wheel which mesh together are suitably punch marked ; therefore when these marks are made to coincide with each other the valve timing is correct. Below is an illustration showing the timing gear correctly meshed. Note when the engine has been rotated these marks will not coincide again for a considerable number of revolutions due to the uneven number of teeth on each gear ; the timing is, of course, not affected.



**TIMING GEAR.**

The dots on the gear wheels when meshed together as illustrated, give the correct valve timing.

## IGNITION TIMING.

The ignition is correctly timed when the magneto is in the fully advanced position and the contact breaker points just breaking ; the drive side piston is  $\frac{1}{8}$ " B.T.D.C.

In order to time the magneto in the fully advanced position it is necessary to turn the moving mechanism of the auto advance control against direction of rotation.

Remove the sparking plugs and turn the engine by engaging a gear ; with the machine on the stand, rotate the rear wheel in the correct direction for forward travel. When the valves are closed on compression stroke in the drive side cylinder, bring that particular piston to T.D.C. and insert a suitable depth gauge through the timing plug hole to test the position. First make certain that the piston is on true T.D.C., and then rotate the engine backwards until the piston has dropped the requisite amount. Now set the magneto points so that they are just opening, and then carefully tighten up the nut holding the auto advance mechanism until grip is felt. It is advisable at this point to check the timing, and if the operator uses a piece of cigarette paper or some similar material between the magneto points, the opening is then much more discernable. The piston position in the cylinder should now be measured. If correct, release the securing tool from the mechanism and tighten up the centre nut holding the auto advance. Finally check the timing over again before assembling all the parts.

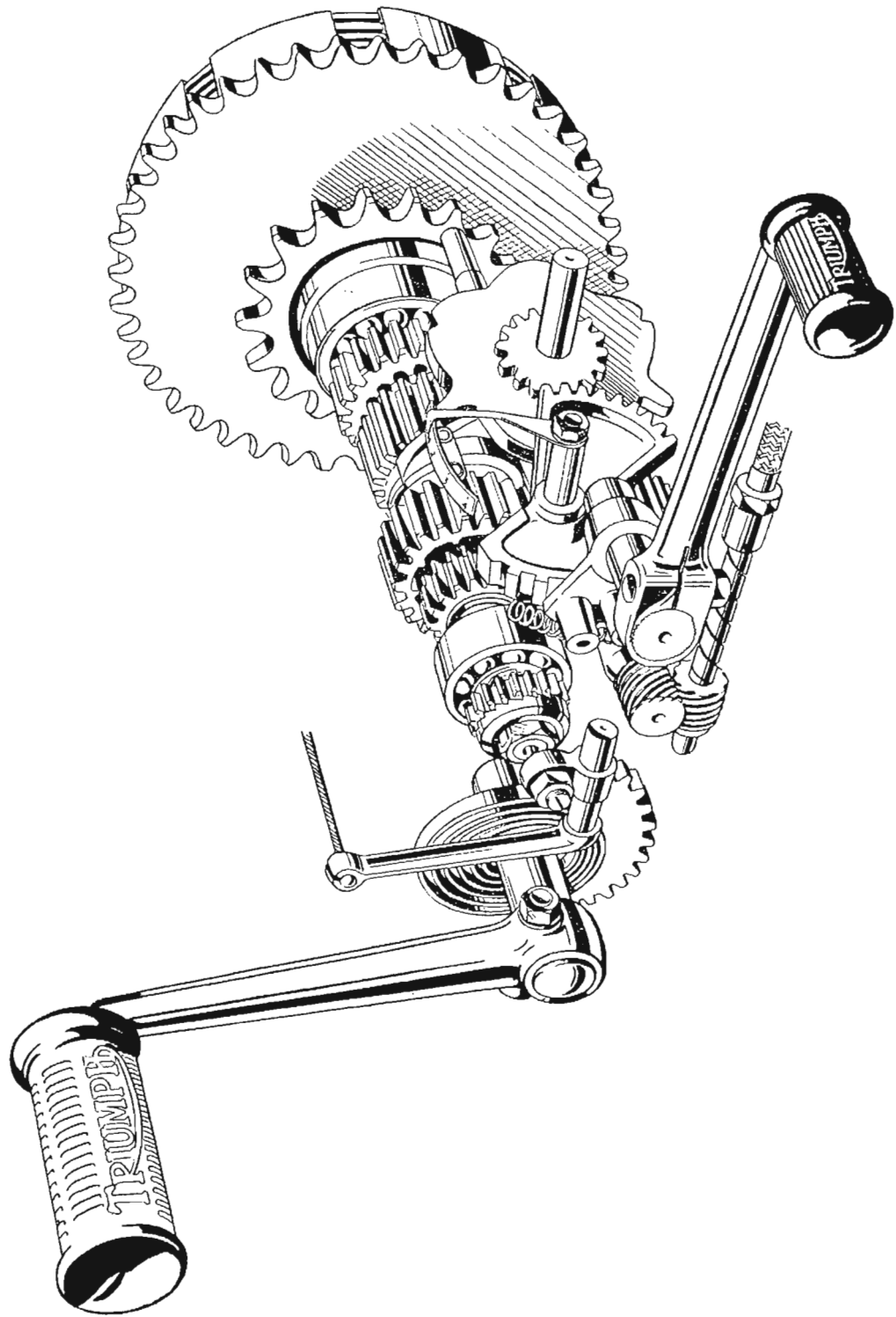
## **GEAR BOX AND CLUTCH**

### **GEAR BOX.**

This unit requires very little attention other than the change of oil at regular intervals as previously indicated, and checking the security of the clamping bolts. Reference to the illustration on page 15 showing the broken open view of the gear box shows clearly the general arrangement of the gear selection and kickstarter mechanism. Gear selections are made by depressing or raising the pedal. The pedal is attached to the plunger carrier, which is spring loaded on either side of its axis. After the pedal has been operated it will therefore return to the neutral position for the next selection. When the pedal is depressed the upper plunger moves under the guide plate, whereas the lower one being released, connects with the gear quadrant which is geared to the camplate. The camplate then rotates, its movement being arrested by a spring loaded plunger which is sprung into one of the notches in the camplate periphery. The rotary movement of the camplate transmits the gear shifting through the selector forks. In the unlikely event of there being difficulty in gear selection, the following points should be checked in the order stated.

1. Footchange pedal springs for weakness or breakage. Remedy obvious.
2. Footchange plungers stuck in the carrier. Remedy—free the plungers by polishing the surface and fit new springs if in doubt.
3. Camplate plunger stuck in the domed carrier nut. Remedy as 2.
4. Slackness of the nuts securing the kickstarter assembly and clutch body. Both of these parts are attached to the gearbox mainshaft and any float due to this fault would cause faulty gear selection. Remedy obvious.
5. Clutch drag due to faulty adjustment of the withdrawal mechanism. Clutch plates not spinning true or incorrect type of oil in the chaincase.





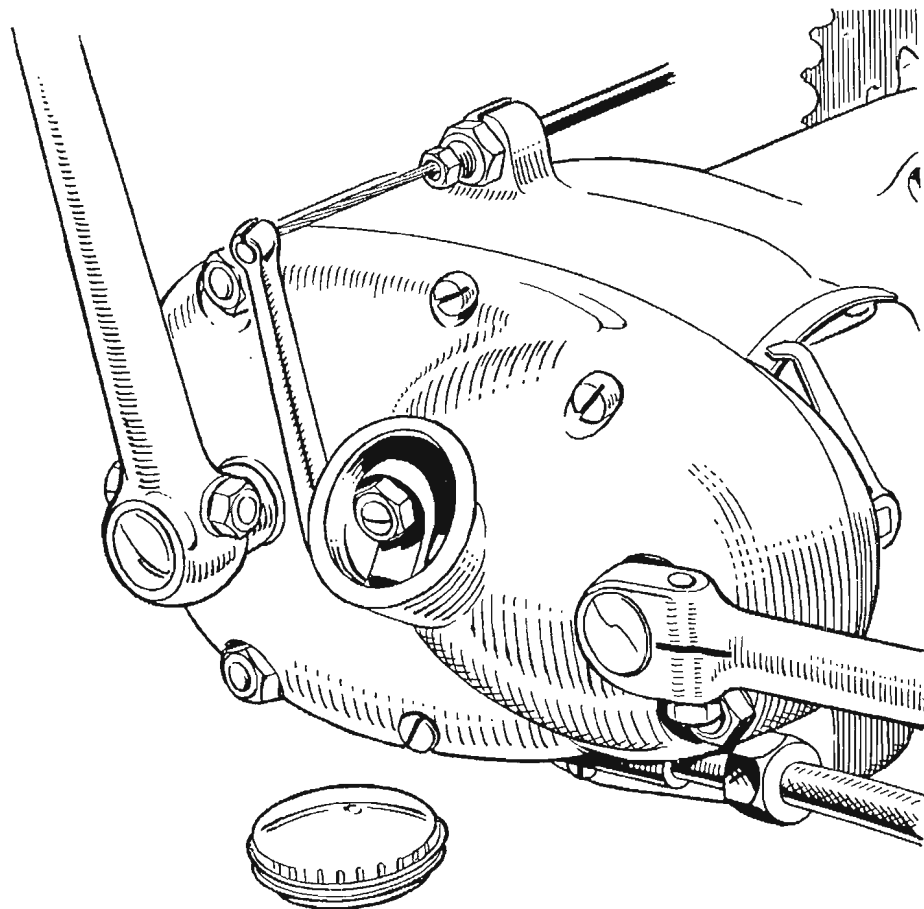
Broken open view of Gear Cluster and operative parts.

In the event of the kickstarter spring breakage, when replacing the new spring ensure that it is fitted to the same spline on the axle shaft as the faulty spring. If the spring is fitted to the incorrect spline, it could either be wound too tightly, causing breakdown of the spring and maybe fracture of the inner casing where the kickstart stop is fitted, or if wound too slackly cause constant mesh of the kickstarter ratchet.

### **CLUTCH.**

The clutch consists of a series of steel plates provided with cork inserts, between which plain steel plates are fitted. The tension on the clutch is made by four equally disposed springs, adjustment being made by the slotted nuts which secure them. This clutch is designed to run in oil, and it is essential that the primary chain case oil level is maintained, otherwise the corks may burn and disintegrate under a heavy load. Always use the recommended oil, as if a thicker grade is used trouble will occur and the clutch may not free properly.

The clutch control cable passes through a lug on the gearbox inner cover, and is there provided with adjustment. There is also an adjustment for the clutch operating rod underneath the gearbox filler cap, where it is readily accessible but entirely enclosed.



**Clutch cable and clutch push rod adjustments.**

The length of the cable is adjusted by means of the cable adjuster on the gear box lug. When making this adjustment, ensure that the angle of the gear box clutch lever is maintained, otherwise if the lever is approaching the vertical the handlebar movement will be heavy.

Adjustment of the gear box clutch lever is made by slackening of the locknut and screwing the adjusting pin in or out as desired. Always see that there is a slight amount of free motion at the handlebar end, which will ensure that the clutch itself is fully engaged when the handlebar lever is released.

These clutches give long and satisfactory service if they are used in a proper manner. The neutral position should always be selected when the machine is stationary. It is bad practice to stop the machine in traffic by simply extracting the clutch. Under all circumstances, except when changing gear or selecting the neutral position, the clutch should remain fully engaged. It must not be slipped on corners or to avoid changing to a lower gear ratio. If these elementary precautions are adopted the cork inserts will give exceptionally long and trouble-free service.

If the clutch is dragging it will be difficult to engage bottom gear from neutral, and the gear change will not be entirely satisfactory. Before starting up the machine the kickstarter should always be operated two or three times with the clutch extracted in order to free the plates. It should then be possible to engage first gear without any grinding.

When assembling, the clutch plates should first be dipped into a bath of the correct grade of oil to make sure that they are oily.

## **CLUTCH DISMANTLING AND ASSEMBLY**

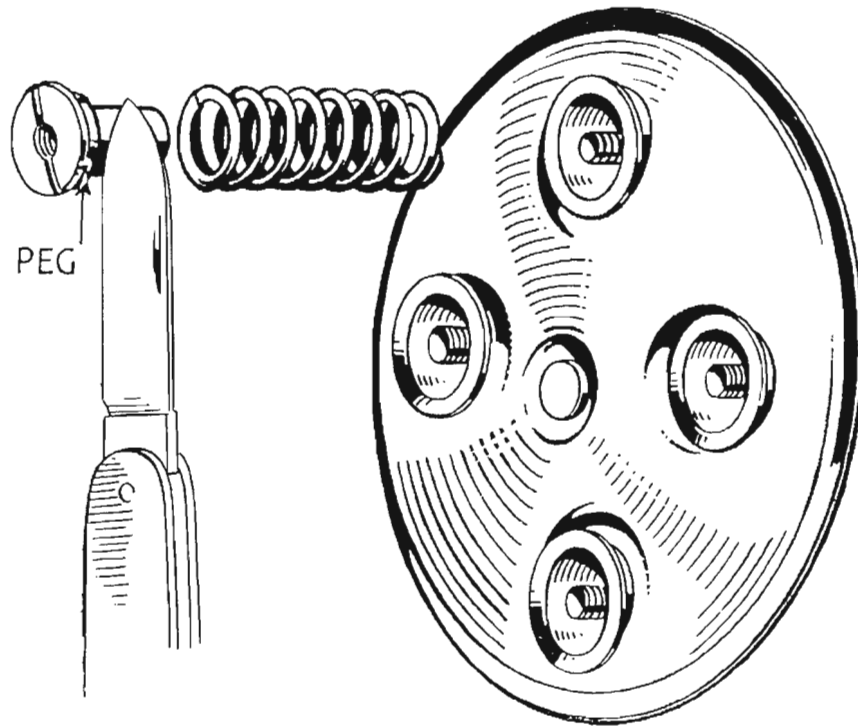
### **PROCEDURE.**

In order to obtain access to the clutch it is necessary to remove the primary chain case, outer portion. The footrest and the brake pedal must first be taken off. The brake pedal can be taken off the spindle after removing the securing nut. It is not necessary to remove the rod.

A large sized screwdriver is required to remove the chain cover screws. If necessary the machine should be allowed to lie on the R.H. footrest, which will permit the mechanic to apply more pressure on the screwdriver. This is important if the slots in the screw heads are not to be damaged. Having removed the screws, the outer portion of the chain case can be removed. Under no circumstances should a screwdriver or other tool be forced between the two halves of the chain case in order to separate them, as this procedure is likely to damage the faces. If the outer half is given a sharp tap with a mallet or hammer handle, no difficulty will be experienced in breaking the joint. It should be noted that there is a tubular distance piece fitted to the footrest rod between the case and the frame. If this is not replaced when re-assembling, the chaincase may be fractured when the footrest rod nut is tightened up.

## DISMANTLING THE CLUTCH.

1. Remove the four slotted clutch nuts, using the special key provided in the tool kit. On the underside of the head of the nut is a small "pip" to prevent the nut from unscrewing. To unscrew the nut a knife blade should be inserted under the head of the nut, in order that the "pip" is held away from the spring while the nut is turned.



**Method of removing clutch spring nut.**

2. Withdraw the spring, pressure plate, driven plates and driving plates.
3. To withdraw the clutch housing from the gear box mainshaft, tap back the locking washer tab and unscrew the mainshaft nut. After removing the nut it will be noted that the clutch hub has an internal thread. In the tool kit a special withdrawal tool is provided ; this screws into the hub thread and by tightening up the bolt the assembly will be drawn off the shaft.
4. The clutch housing assembly is dismantled by pressing out the hub. Take care not to lose the rollers if replacements are not to hand.

## INSPECTION OF PARTS.

**Clutch Springs.** Stand the springs on their ends and compare against a new spring ; if the length is not the same, or very nearly so, the springs should be replaced.

**Corked Plates.** Wash in paraffin and examine the corks for wear and general condition. The corks should protrude  $\frac{1}{32}$ " on each side of the plate and show no signs of burning. The tongues of the plate should be in good condition and unworn.

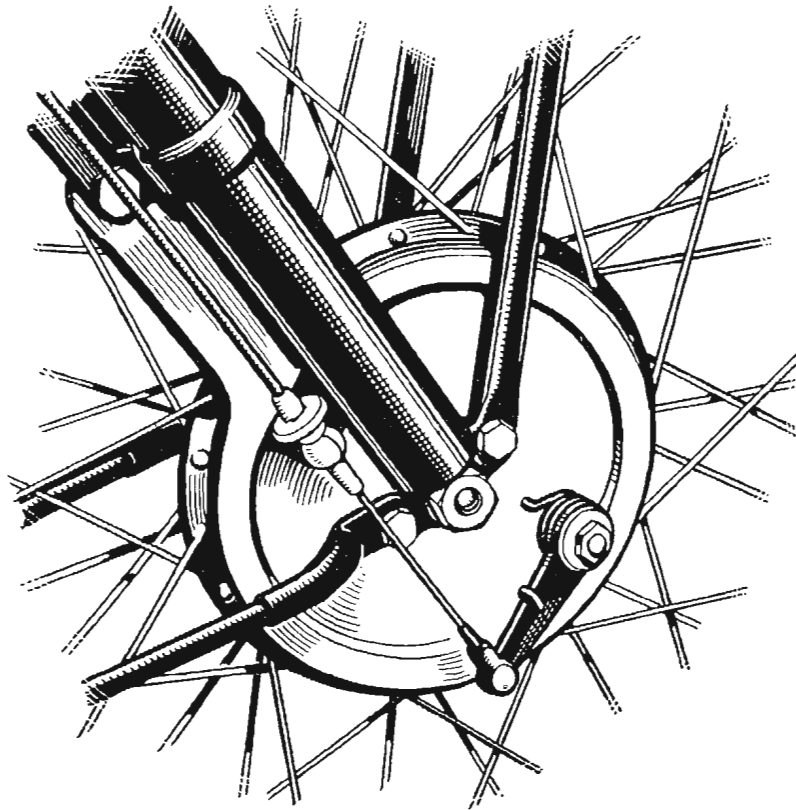
**Steel Plates.** These should be smooth and not scored.

**Roller Race.** Check for wear and pitting, also apply the same check to the rollers.

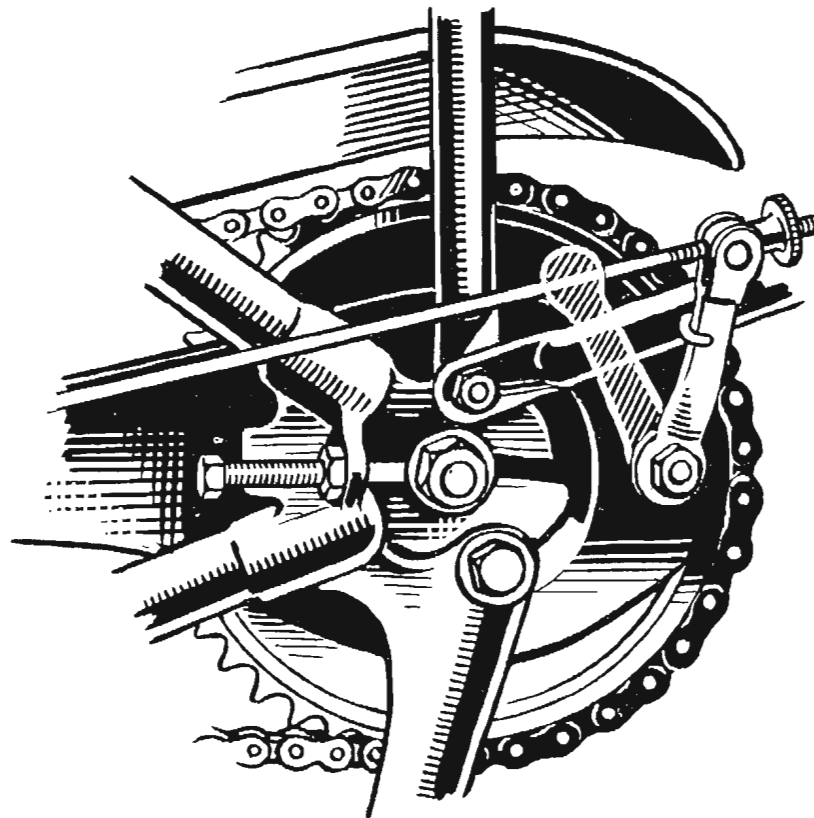
The driven and driving plates should be well oiled and when assembling the rollers to the race use a light grease.

## ASSEMBLING THE CLUTCH.

1. Fit the Woodruff key to the gearbox mainshaft.
2. Assemble clutch housing and ensure the clutch studs are fitted into their slots.
3. Fit the clutch housing to the shaft, well tighten up the shaft nut on the plain washer and lock with tab washer.
4. Assemble the clutch plates, first a plain plate followed by a corked plate, then a plain plate, and so on, which will leave one plain plate to be fitted last. On to the latter plate a pressure plate is fitted, the clutch push rod engaging in the centre button.
5. Place the springs into the cups and screw the four nuts on to the pins. With new corked plates the nuts should be screwed up until the ends of the pins are level with the heads of the screws. If the corks are worn, a little more pressure may be necessary.
6. The final adjustment of the nuts is made after the pressure plate has been checked for "wobble". The clutch should be extracted by means of the handlebar lever and spun with the kickstarter while the mechanic looks down on to it to make certain that it spins true. "Wobble" can be rectified by screwing in the nut adjacent to the part of the pressure plate which is nearest to the edge of the housing. Again spin the clutch and if still not true, repeat the process until the plate can be made to spin accurately. If the adjustment is not correctly made, the clutch will not free properly, causing a difficult gear change and trouble with selecting bottom gear from neutral.
7. Check the clutch rod and cable adjustment. There should be about  $\frac{1}{32}$ " of free movement on the clutch rod and  $\frac{1}{16}$ " free movement at the handlebar lever. When altering the adjustment do not allow the jaw of the spanner to lever up the adjuster on the gearbox cover or the lug may be fractured.



**Front brake adjustment.**



**Rear brake adjustment.**

This position of the brake lever (brake off) indicates that the linings are in good order, the shadow lined lever shows the position with badly worn linings.

# WHEELS

## LUBRICATION AND ADJUSTMENT.

Beyond re-packing the hubs with grease every 10,000 miles, the only attention likely to be required here is an occasional adjustment of the hub bearings. The rear wheel bearings are of the taper roller type and it is important to note that after tightening the locknut the adjustment should be such that there is just perceptible lateral movement at the wheel rim. On no account must the adjustment be closer than this.

The front wheel bearings are of the ball bearing type and therefore require no adjustment. The lateral movement should hardly be perceptible (see illustration below for method of testing).

When dismantling and assembling the front and rear wheel bearing assemblies the illustrations on pages 22 and 23 should be used as a guide to the correct sequence.



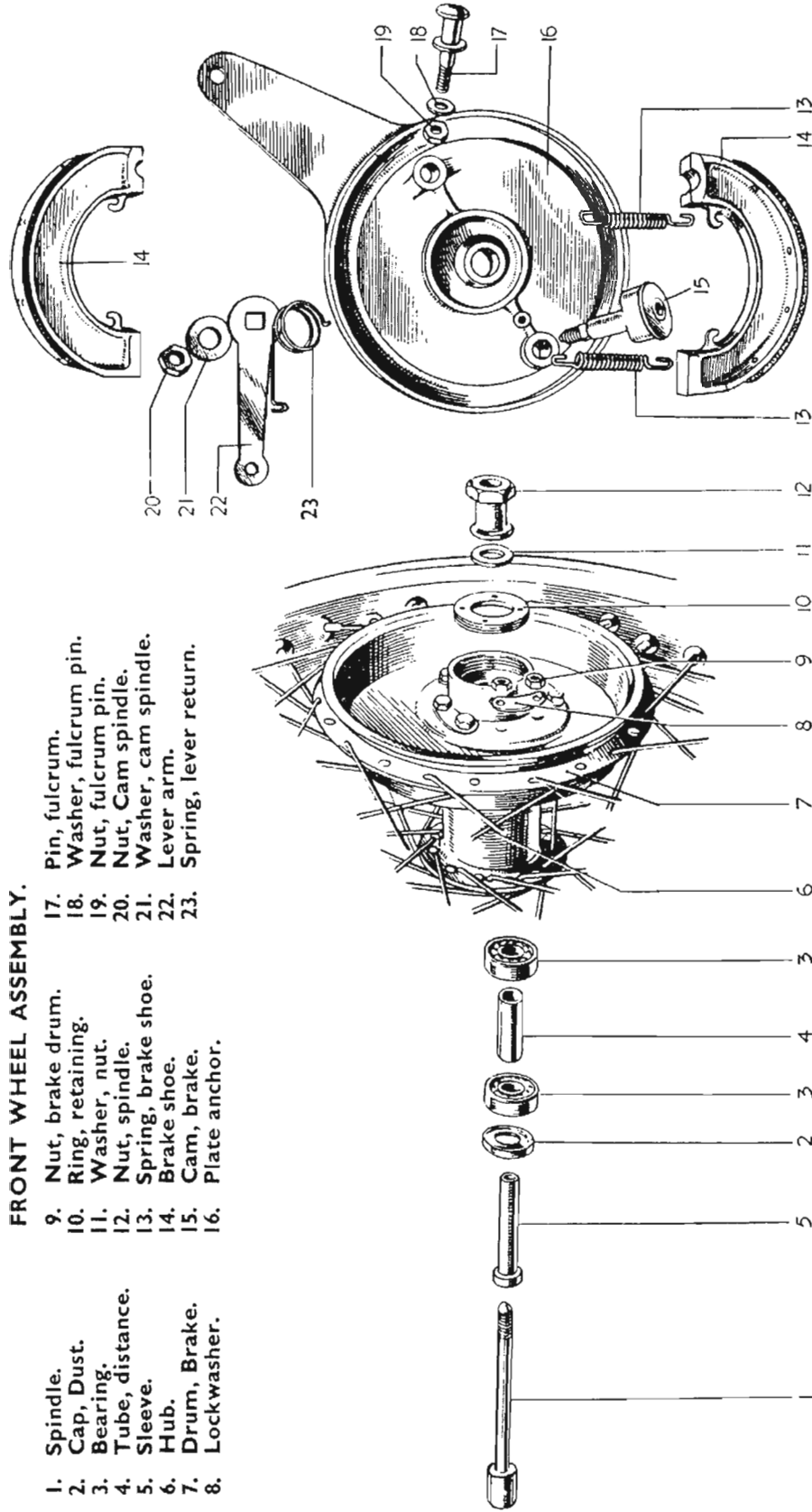
Testing front wheel bearings for wear.

**FRONT WHEEL ASSEMBLY.**

- 1. Spindle.
- 2. Cap, Dust.
- 3. Bearing.
- 4. Tube, distance.
- 5. Sleeve.
- 6. Hub.
- 7. Drum, Brake.
- 8. Lockwasher.

- 9. Nut, brake drum.
- 10. Ring, retaining.
- 11. Washer, nut.
- 12. Nut, spindle.
- 13. Spring, brake shoe.
- 14. Brake shoe.
- 15. Cam, brake.
- 16. Plate anchor.

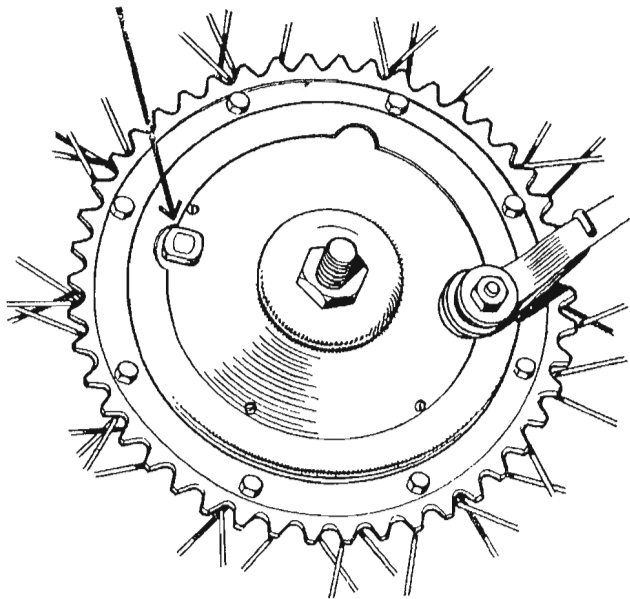
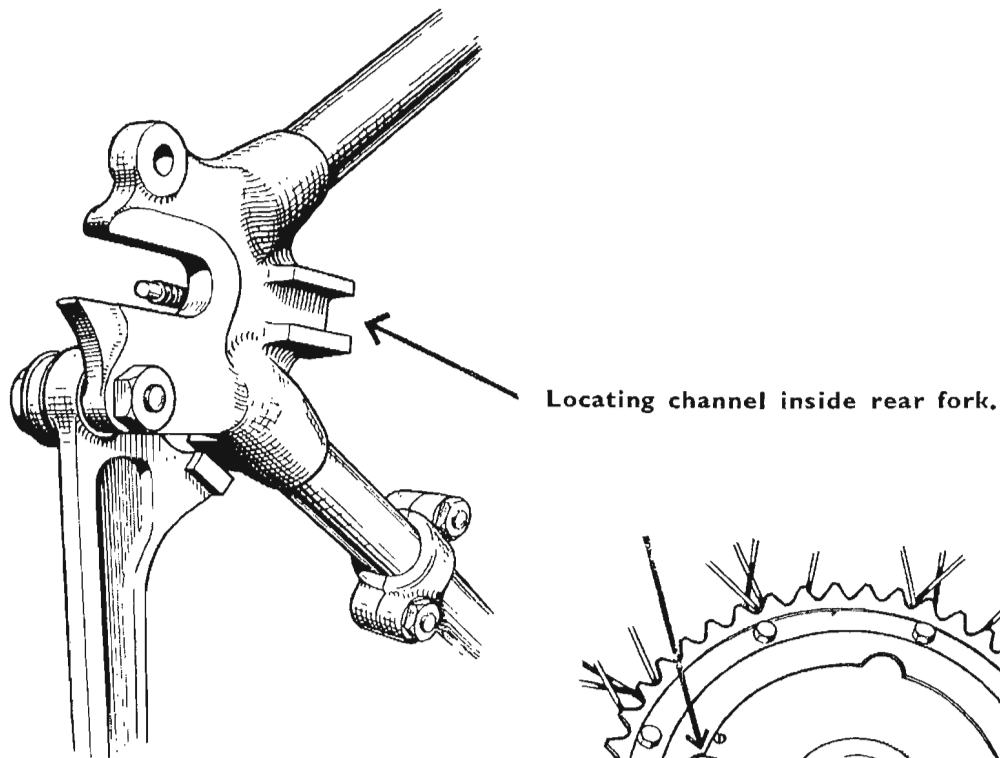
- 17. Pin, fulcrum.
- 18. Washer, fulcrum pin.
- 19. Nut, fulcrum pin.
- 20. Nut, Cam spindle.
- 21. Washer, cam spindle.
- 22. Lever arm.
- 23. Spring, lever return.



Note that the front wheel runs on ball bearings and no adjustment is necessary as with the taper roller bearings fitted in the rear wheel.







**The stud indicated on rear brake anchor plate must be located in rear fork channel.**

#### **FRONT WHEEL REMOVAL.**

Disconnect brake cable at lower end. Remove torque stay bolt. Unscrew spindle nut and then lower the front stand. Slacken off wheel spindle pinch bolt on nearside fork and drive spindle out from the offside. Take care not to damage the threads on the spindle.

## **FRONT WHEEL REPLACEMENT.**

Position the front wheel between the fork members and insert the wheel spindle from the near side. Gently tap the spindle through until the threaded portion is visible through the opposite fork member. Fit the bolt to the brake anchor plate and assemble nut to wheel spindle and tighten up. Re-position the front stand. Grip the handlebars and work the fork movement up and down ; this aligns the lower fork members to the fork stanchions and centralises the front wheel. The spindle pinch bolt and brake attachments can now be fitted. **IT IS ESSENTIAL TO FIT THE FRONT WHEEL BY THE ABOVE METHOD, OTHERWISE THE WHEEL WILL BE OUT OF ALIGNMENT AND THE FORK ACTION WILL BE EXTREMELY STIFF.**

## **REAR WHEEL REMOVAL.**

Slacken off the nuts securing the tailguard mudguard stays and remove the two hexagonal-headed screws securing the tailguard to the mudguard blade. Remove the tailguard and place it at the side of the machine. It is not necessary to remove the rear lamp cable as there is sufficient slack to allow for the removal of the tailguard.

Break the rear chain by removing the spring link. Be careful to see that the gear box is not in the neutral position, as if the gear box sprocket is free the weight of the chain may rotate it and the chain will then fall off. Screw off the brake adjusting nut. Slack off the two spindle nuts and withdraw the wheel from the fork.

## **REAR WHEEL REPLACEMENT.**

To replace the wheel, reverse the removal procedure. Note that there is a stud on the brake anchor plate which must be fitted into the locating channel on the inside of the rear fork.

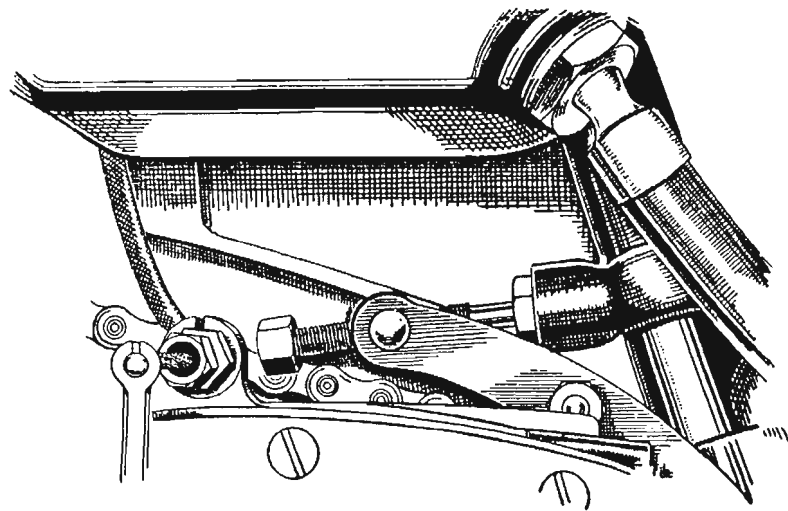
# **CHAINS**

Slack or badly adjusted chains are a prolific cause of harsh running and excessive wear. The adjustment of both chains should be such that there is half an inch free up and down movement mid-way between the sprockets. It is of the greatest importance that both gear box and back wheel clamping nuts are kept dead tight and that both chains are well lubricated.

To adjust the primary chain, slacken off the clamp bolt nut and the gear box pivot bolt ; failure to slacken off either of these may result in fracture of the gear box casing. To gain access to the clamp nut, remove the offside footrest and push the spindle out of the way ; it will then be possible to get the spanner on to the nut and to secure adequate purchase. Above the gear box is the adjuster ; screw in to tighten and out to slacken the chain. When tightening the chain always pull the gear box back after adjusting, before testing the chain tension, by doing this the load transmitted by the rear wheel cannot cause the gear box to move, thus altering the chain tension. The rear chain is adjusted by the two adjusters fitted in the rear stay lugs ; slacken off the locknuts and screw in or out the adjuster bolts to tighten or slacken the chain tension. Particular care should be taken when carrying out this operation not to disturb the alignment of the wheels, so always ensure an equal number of turns each side when making the adjustment.

At the back of the primary chain case will be found an adjusting screw which governs the amount of oil fed to the rear chain. The screw should be so adjusted that the chain receives sufficient lubricant, the adjustment being arrived at by trial and error. To commence with, it is advisable to close the adjusting screw completely, by screwing it right in, after which it should be unscrewed until the supply just lubricates the chain.

Every thousand miles in the winter, and every 1,500 miles in the summer, it is advisable to remove the rear chain and clean it in paraffin. Successive baths of clean paraffin should be used until the chain is quite clean and free from grit. It should then be placed in a bath of molten graphite grease. The chain should be allowed to remain in the grease until it has cooled off and become solid again, as if it is just dipped in and removed, then the grease may not penetrate underneath the rollers and much of it will drain away. When the chain is removed, surplus grease should be wiped off it and it should be re-fitted and adjusted. When fitting the spring fastener on the removable link, care should be taken that it is placed in the correct position. The spring fastener is roughly the shape of a fish, and if you remember that a fish swims nose first, and fit your fastener so that the nose is always proceeding in a forward direction when the machine is running, you will have an easy aid to memory. Modern chains give very large mileages if properly cared for, but no part of a motor cycle shows more quickly the result of abuse. As chains are comparatively expensive, proper maintenance will assist in the economical operation of the machine



**Gearbox adjustment.**

## ALTERATIONS AND REPAIRS.

If the chains have been correctly serviced very few repairs should be necessary. But should the occasion arise to repair, lengthen or shorten a chain, a rivet extractor and a few spare parts will cover all requirements.

To SHORTEN a chain containing AN EVEN NUMBER OF PITCHES remove the dark parts shown in Fig. 1, and replace by cranked double link and single connecting link as Fig. 2.



Fig. 1



Fig. 2

To SHORTEN a chain containing AN ODD NUMBER OF PITCHES remove the dark parts shown in Fig. 3, and replace by single connecting link and inner link as Fig. 4.



Fig. 3



Fig. 4

To REPAIR a chain with a broken roller or inside link remove the dark parts in Fig. 5, and replace by two single connecting links and one inner link as Fig. 6.



Fig. 5



Fig. 6

## RIVET EXTRACTOR.

The rivet extractor can be used on all motor cycle chains up to  $\frac{3}{4}$  in. pitch whether the chains are on or off the wheels. When using the extractor :—

1. Turn screw anti-clockwise to permit the punch end to clear the chain rivet.

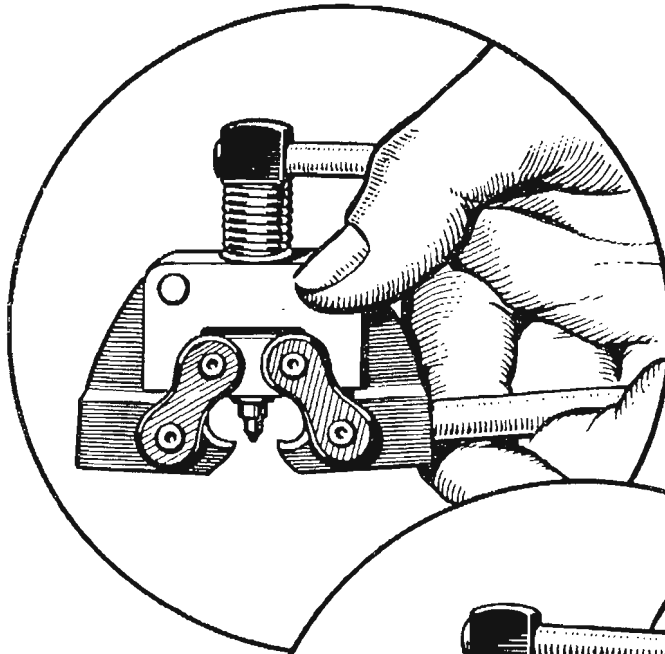


Fig. 1

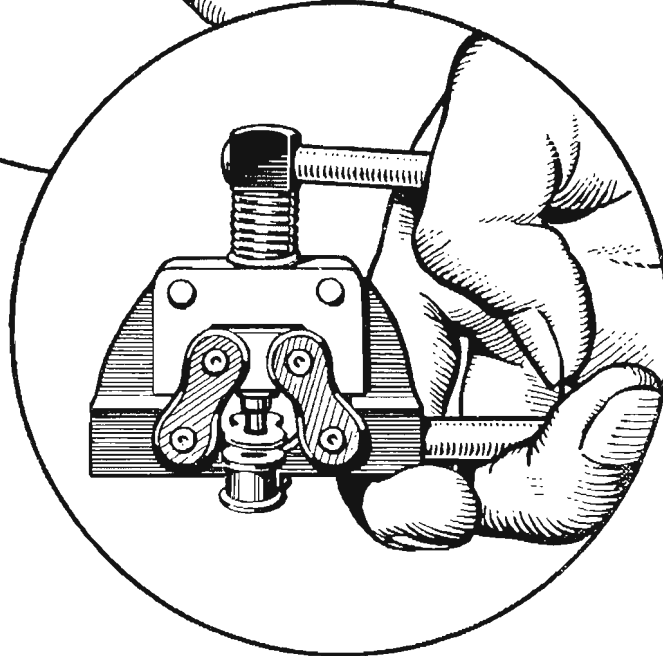


Fig. 2.

The chain rivet extractor.

2. Open the jaws by gripping tommy bar and handle together. (See Fig. 1).
3. Pass jaws over chain and release grip. Jaws should rest on a chain roller free of chain link plates. (See Fig. 2).
4. Turn screw clockwise until punch contacts with and pushes out rivet end through chain outer link plate. Unscrew punch, withdraw extractor and repeat complete operation on the adjacent rivet in the same chain outer link plate.

The outer plate is then free and the two rivets can be withdrawn from opposite side with the opposite plate in position. Do not use the removed part again.

# TELESCOPIC FORK

The telescopic hydraulically controlled fork will require little attention other than an occasional check of the external nuts, screws and washers. Due to its construction, the estimated time between fork overhauls is about 20,000 miles.

The forks should be drained and refilled every 10,000 miles.

At no time during normal service will the forks require topping up with oil ; slight leakage that may have taken place will not affect the fork action.

Should the leakage of oil have been excessive, it will be necessary to drain the forks and refill each leg with 100 c.c. ( $\frac{1}{8}$  pint) of oil (SAE.20). To empty the forks of oil, first remove the two drain plugs and then compress the forks to expell the oil at a greater rate.

To refill the forks, remove the headlamp rim assembly from the nacelle, which will give access to the upper part of the stanchions. In each stanchion a screwed plug is fitted ; when these plugs have been removed the correct amount of oil can be introduced into each fork leg by means of a pressure oilcan or gun through the headlamp aperture.

## FORK REMOVAL.

1. Remove headlamp rim assembly and disconnect wires.
2. Unscrew cable at speedometer head and disconnect light adaptor.
3. Unscrew steering damper knob and withdraw distance washer.
4. Take out the three screws and nuts securing the headlamp mounting ring and detach the ring from the nacelle.
5. Unscrew the six screws securing nacelle top and remove top complete with instruments after disconnecting horn wire and detaching the lighting wires at the plug.
6. Detach handlebar and disconnect front brake cable.
7. Raise the front wheel clear of the ground by placing a suitable box under the crankcase.
8. Remove the front wheel, take off the spindle nut on the nearside fork member and slacken off pinch bolt on the offside fork. Remove brake attachment and brake anchor plate bolt. Withdraw the spindle by tapping through from the threaded end to release the wheel.
9. Unscrew the two large cap nuts situated at the top of the forks. At this point it is advisable to remove the two drain plugs in the lower fork members and drain the oil. To quicken the draining, pump the lower members up and down.

10. Slacken the fork stem pinch bolt and unscrew the top sleeve nut.
11. Tap the top lug away from the taper of the stanchions.
12. Take out damper bolt, lower the fork stem through the frame lug and withdraw the fork assembly. Take care not to loose the steering balls.

If the mechanic does not wish to disturb the steering column, carry out operations 1 to 9, then slacken off the middle lug pinch bolts. Unscrew the two large cap nuts a few turns, then give each a sharp blow with a hide or lead hammer to break the taper fit between top lug and stanchion. Completely unscrew the cap nuts, remove the two hydraulic assembly bolts situated in the bottom member lugs and withdraw the spring and hydraulic assemblies. Remove the fork legs by pulling through the middle lug.

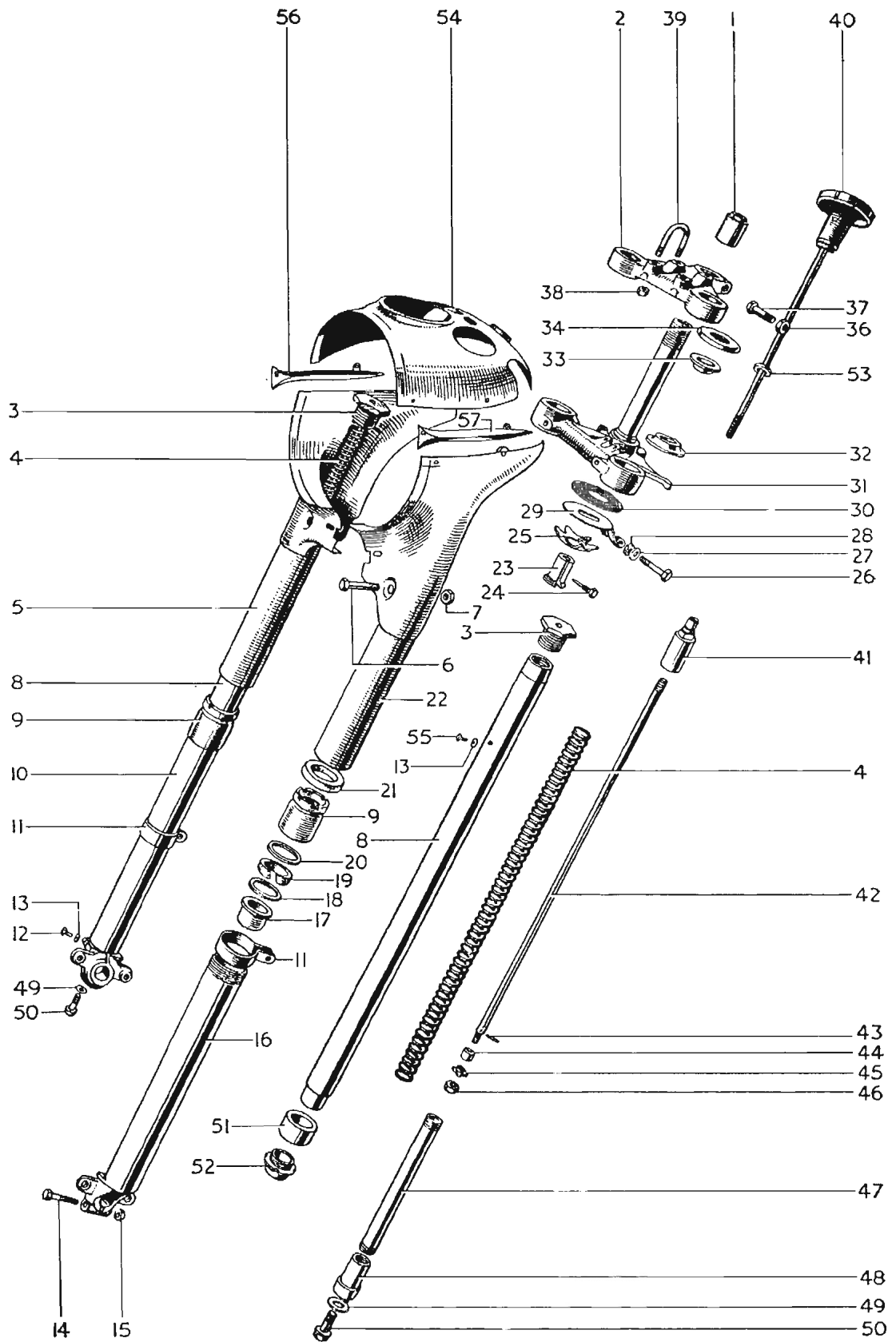
#### **DISMANTLING THE FORKS.**

1. Unscrew the two hydraulic assembly securing bolts in the lower member lugs and withdraw the spring and hydraulic assembly. Take away top head lug.
2. Unscrew the middle lug to stanchion pinch bolts and remove the lower nacelle covers.

#### **INDEX TO ILLUSTRATION ON PAGE 31.**

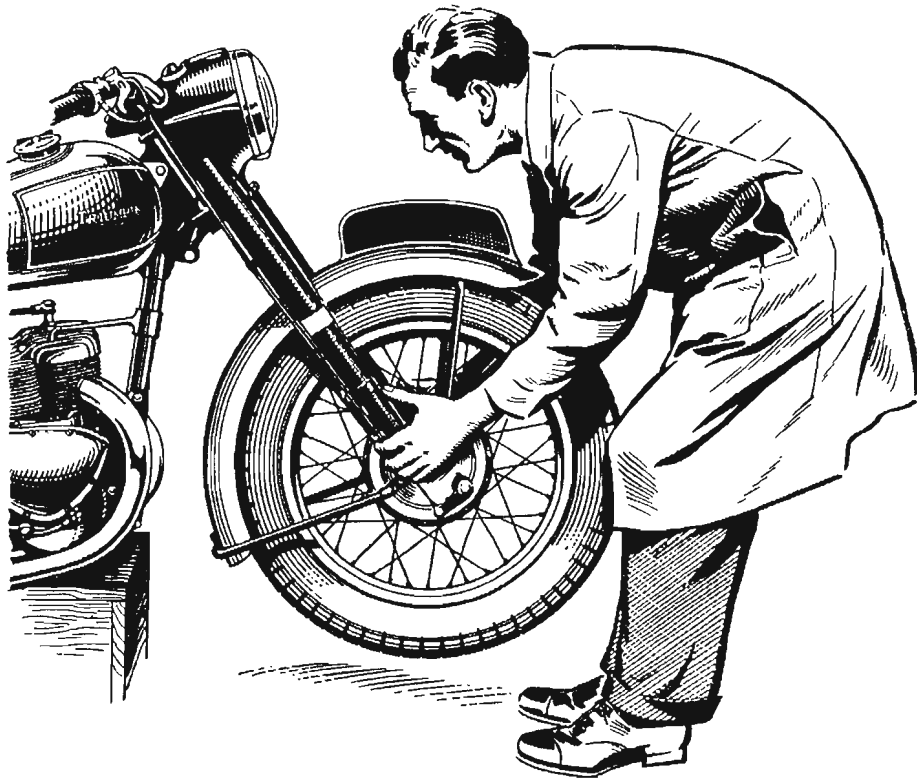
- |                             |                               |
|-----------------------------|-------------------------------|
| 1. Nut, sleeve.             | 29. Plate, damper anchor.     |
| 2. Lug, fork head.          | 30. Disc, friction.           |
| 3. Nut, cap.                | 31. Crown and stem.           |
| 4. Spring, fork.            | 32. Cone.                     |
| 5. Cover, nacelle O.S.      | 33. Cone.                     |
| 6. Bolt, pinch.             | 34. Cover, dust.              |
| 7. Nut.                     | 36. Nut.                      |
| 8. Stanchion.               | 37. Bolt, pinch.              |
| 9. Sleeve, dust excluder.   | 38. Nut.                      |
| 10. Cover, bottom tube O.S. | 39. "U" bolt.                 |
| 11. Clip, mudguard.         | 40. Knob, damper assembly.    |
| 12. Plug, drain.            | 41. Sleeve, pressure tube.    |
| 13. Washer.                 | 42. Rod, oil restrictor.      |
| 14. Bolt, wheel lug pinch.  | 43. Pin, cup.                 |
| 15. Nut.                    | 44. Cup.                      |
| 16. Cover, bottom tube O.S. | 45. Restrictor, oil.          |
| 17. Bearing, upper.         | 46. Nut.                      |
| 18. Washer.                 | 47. Tube, pressure.           |
| 19. Washer, felt.           | 48. Body, pressure tube.      |
| 20. Washer.                 | 49. Washer, copper.           |
| 21. Washer, felt.           | 50. Bolt.                     |
| 22. Cover, nacelle N.S.     | 51. Bearing, stanchion lower. |
| 23. Sleeve.                 | 52. Nut, hydraulic stop.      |
| 24. Pin, securing.          | 53. Washer, damper.           |
| 25. Plate, friction.        | 54. Nacelle, top.             |
| 26. Bolt, anchor plate.     | 55. Plug, oil filler.         |
| 27. Washer.                 | 56. Motif, O.S.               |
| 28. Nut.                    | 57. Motif, N.S.               |





Telescopic Fork.

3. Remove the dust excluder from the top of the lower member. The stanchion can now be released from the member by pulling sharply, this removes the bush at the same time.
4. To remove the felt strip from the dust excluder, remove the bottom steel ring, and the felt strip will then be accessible.
5. At the lower end of the stanchion there is a bearing ; to remove this it is necessary to grip the stanchion in a suitable clamp and remove the hydraulic stop nut.
6. To dismantle the hydraulic assembly, compress the main spring and grip the oil restrictor rod with a pair of pliers. The large cap nut can now be unscrewed off the rod and the spring removed.
7. Grip the valve body which is the lower portion of the valve assembly, and unscrew the top support body. Remove the restrictor rod from the pressure tube.
8. To remove the restrictor valve, unscrew the nut and the restrictor can be pulled off the rod with the restrictor cup. Withdraw the cup-pin from the rod.



**Testing the adjustment of steering head races.**

## ASSEMBLING THE FORKS.

Lubricate all parts before assembly.

1. Fit the bearings to the stanchion and lock with the hydraulic stop nut. Check bearings for freedom of movement.
2. Assemble the drain plug and washer to lower member, ensuring tightness, otherwise complete loss of oil may result.
3. Fit the new felt washer to the dust excluder, firstly fitting the thin metal washer, then the felt, and finally the outer metal washer.
4. Assemble the stanchion to the lower member and fit the top bearing. Screw on the dust excluder and check the movement of the stanchion in the lower member which should be free and smooth.
5. To assemble the hydraulic valve assembly, fit the pin to the restrictor rod, then the cup, restrictor, and lock the assembly with the nut. Screw the lower valve body to the pressure tube ; insert the restrictor rod assembly and screw the top support sleeve to the pressure tube. To ensure correct operation of the valve, place the assembly in a tin of oil and pump the rod up and down ; when the pressure tube is filled, the upward movement of the rod should be restricted and the downward movement unrestricted. Assemble the spring to the hydraulic assembly. Compress the spring and grip the rod with a pair of heavy pliers or in the corner of the vice jaw and screw the cap nut in position.
6. If the steering column assembly has been dismantled, first grease the cups in the frame and press the balls into them.  
SIZE  $\frac{3}{16}$ " TOP AND BOTTOM 22 EACH.  
Assemble the fork crown stem and top lug, tighten down sleeve nut until the steering moves freely from side with no up and down movement. Fit and tighten pinch bolt and lower damper parts.
7. Fit the horn.
8. Assemble the lower nacelle covers and position pinch bolts and nuts only.
9. Place the felt washers in nacelle covers and slide the stanchions through the fork crown lug and into the tapers of the top lug. Lightly tighten up the fork crown pinch bolts.
10. Insert the hydraulic assembly into the stanchion. In the body of the pressure tube a dowel is fitted ; this must be located in the dowel hole in the lower member. Fit the support bolt with copper washer through the spindle lug and screw into the hydraulic assembly ; lock tight.
11. Push the lower tube member up into the upper cover and pour 100 c.c. ( $\frac{1}{8}$  pint) of oil into the top of each stanchion. Now force the leg down by depressing the cap nut. Screw the cap nut into the stanchion and ensure that it is well tightened. If this precaution is not taken the stanchion taper will not be drawn into the top lug and excessive strain will be put on to the crown and stem. Tighten up fork crown pinch bolts.

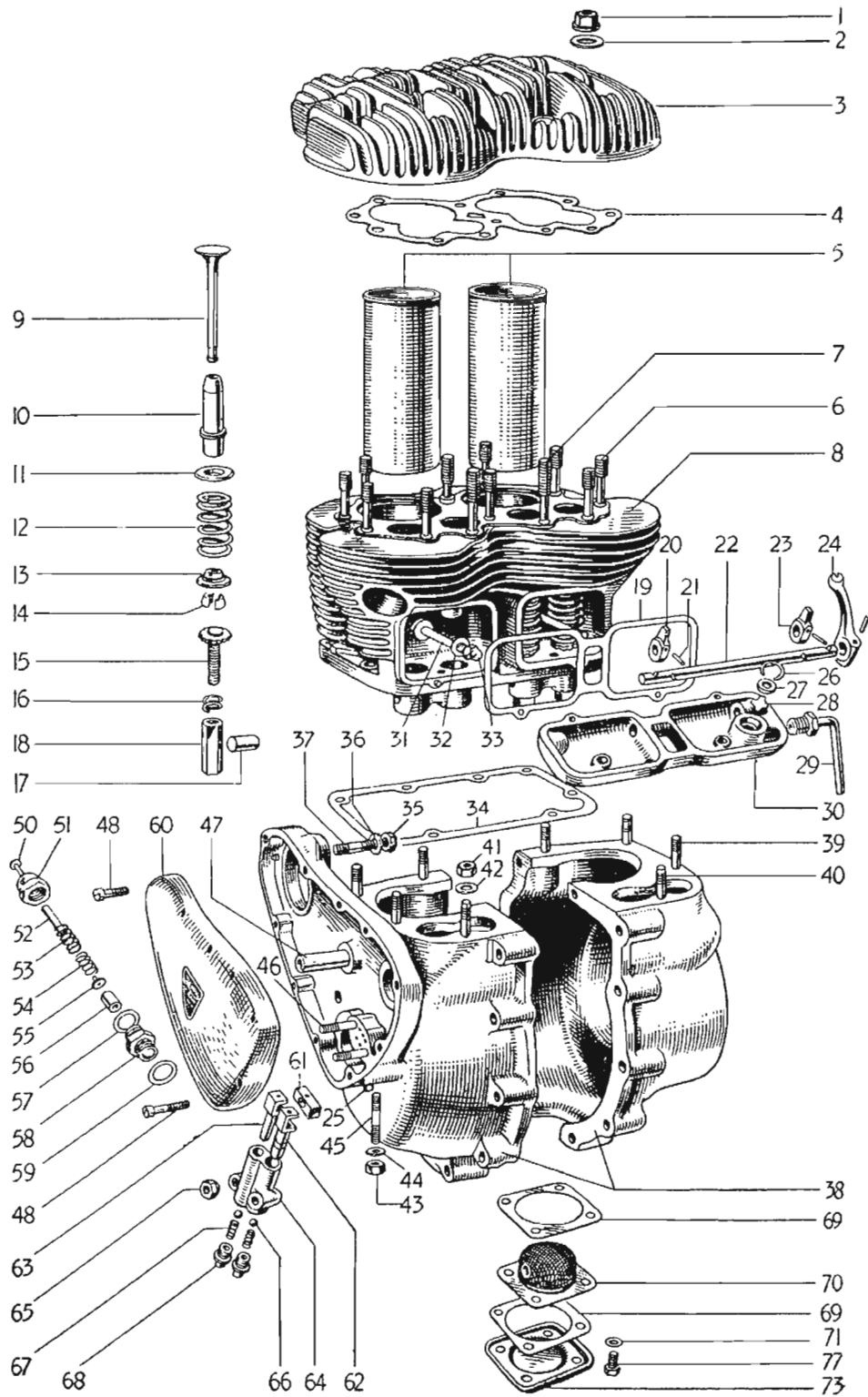
12. Fit the handlebars to the top lug and connect all cables.
13. Connect up wires from nacelle top to plug by means of matching colours on wires and connect horn wire.
14. Fit nacelle top ensuring that control cables and dipper wire are threaded through rubber grommets and that the chrome "flashes" are fitted under the first two of the three retaining screws on each side.
15. Connect speedometer drive and light adaptor.
16. Replace steering damper knob, threading washer on stem on under side of nacelle:
17. Fit lamp mounting rim to front of nacelle by three retaining screws, also lamp front retaining hook and spring.
18. Connect lighting wires to terminals on rear of reflector (earth wire terminals fits on focussing clip screw).
19. Fit reflector followed by rubber retaining ring and lamp front.
20. Fit the front mudguard and front stand.
21. Fit the front wheel (see instructions on page 25).

#### **CHANGING MAIN SPRINGS.**

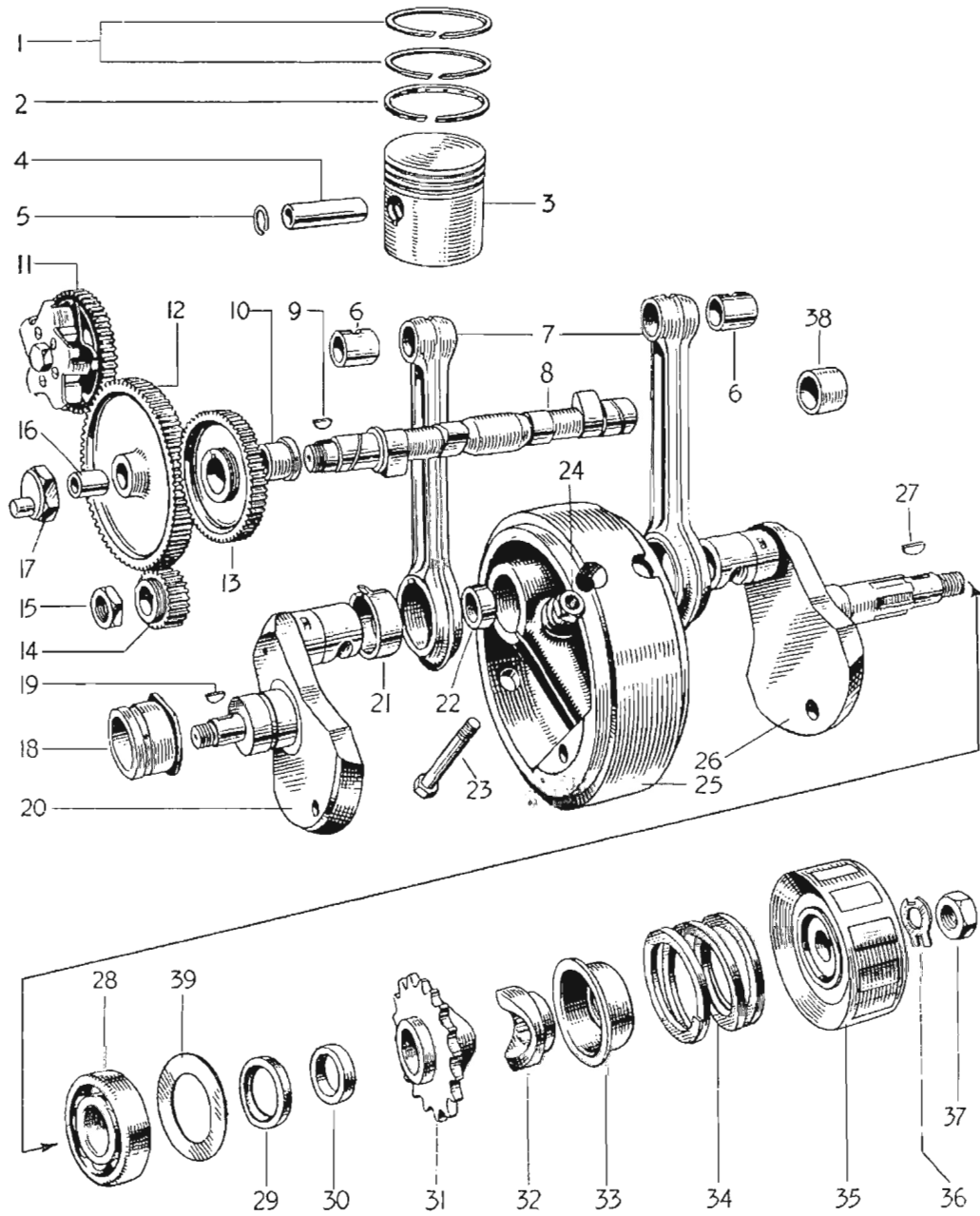
In order to change the main springs, carry out fork removal operations 1, 2, 3, 4, 5, 6 and 7 ; now screw off the two cap nuts in the fork head lug. Remove the box from under the crankcase ; this will make the springs more accessible. Grip the spring and force it down until the restrictor rod can be gripped with a pair of pliers. The cap nut can now be unscrewed off the restrictor rod, and the spring removed. Repeat this operation on the opposite fork leg. Position the new fork springs and re-assemble the forks in exactly the reverse procedure.

## DECARBONISING

1. Remove exhaust pipes and silencer,
2. Disconnect battery and remove, then remove the battery carrier and air cleaner.
3. Detach exhaust valve lifter cable at valve chamber and screw out adjuster at cylinder block.
4. Disconnect petrol pipes at petrol tank and remove throttle lever control by unscrewing the two lock-nuts. Remove carburettor after unscrewing the two flange nuts.
5. Take off the H.T. leads and remove sparking plugs.
6. Unscrew the two nuts securing torque stays to cylinder head and slacken off the bolt holding stays to clip, slide stays out of position.
7. Remove the remaining cylinder head nuts and take off head.
8. Take off valve chamber cover by removing the two domed nuts.
9. Unscrew the cylinder base nuts, note the two nuts inside the valve chamber.
10. Lift cylinder block. If piston ring breakage is suspected, raise the piston to their highest position. Lift the block a little and place some clean cloth or two suitable pieces of cardboard over the crankcase aperture to obviate broken rings falling in when the block is lifted.
11. Remove a circlip from each piston and tap out the gudgeon pin from the opposite end. When the pistons are taken off the connecting rods suitably mark the inside to enable correct replacement.
12. To extract the valves a special spring compressor tool is employed. To remove the cotters, place the foot of the tool on the spring cup and the screwed end to the valve. Turn the screw until the split cotters can be extracted. Withdraw the compressor and the valve, and spring can be taken out of the block. Suitably mark each valve for correct replacement.
13. If the base of the tappets and adjusters show little or no signs of wear they should not be removed from the cylinder block. If wear is obvious, remove by unscrewing the adjuster and slide tappet out of the guide. Between each pair of tappets a distance piece is fitted.



Crankcase, cylinder head, block, etc.  
(Index page 39).



Crankshaft, connecting rods, timing gear, etc.  
(Index page 39).

## PREPARATION

Remove the carbon from the cylinder head and block with a flat round headed scraper, taking care not to damage the valve seatings in the latter. Both parts should then be washed in paraffin or any other suitable cleaning solvent and inspected for faults. Clean the valves and remove any burned oil on the stems ; if the valve faces are not pitted and the seatings in the block show no signs of sinking it will only be necessary to grind the valves in to their original seatings. Where the valve and seating is damaged the former can be trued on a valve surfacing machine and the latter by a seating cutter.

Valve springs should be thoroughly inspected for any signs of fatigue. If there is any doubt a new set of springs should be installed.

Care should be taken when cleaning the pistons not to scratch the crown or damage the skirt in any way. The carbon on the crown should be carefully scraped off, and if the sides of the pistons are rubbed with a clean cloth dipped in cleaning solvent any burned oil will be removed. To clean the ring grooves it is advantageous to use an old broken piston ring, by inserting the end in the groove and working it around the circumference. Clean out the drain holes in the scraper ring groove and thoroughly wash the piston before fitting the piston rings.

Lay all parts out in their correct re-assembly order. Moving parts and surfaces upon which they work should be liberally oiled with the use of any oilcan or brush.

## RE-ASSEMBLY

1. If the tappets have been removed these should first be replaced and the adjusters screwed down to the limit. (Do not forget the tappet distance pieces).
2. Fit a valve spring and cup in position. Thread the spring over the valve guide and by inserting a screwdriver into the valve chamber recess and under the spring cup the spring can be eased into position.
3. Place the valve into position and ease away the spring cup from the tappet with a screwdriver or suitable tool to enable the spring compressor to be positioned. Compress the spring by turning the compressor screw until the split cotters can be fitted into the valve recess. Repeat for the other valves and springs and ensure the valves are returned to their original seating.
4. Replace pistons—ensure correct positioning of circlips and that the gaps in the piston rings are not in line.
5. Place piston ring clips over the pistons to secure the rings (see illustration).
6. Grease the base washer and fit to the cylinder block. Place the block over the pistons squarely to the clips and gently push downwards. When the rings have entered the cylinder bores the clip can be pushed off the pistons and removed past the connecting rods.



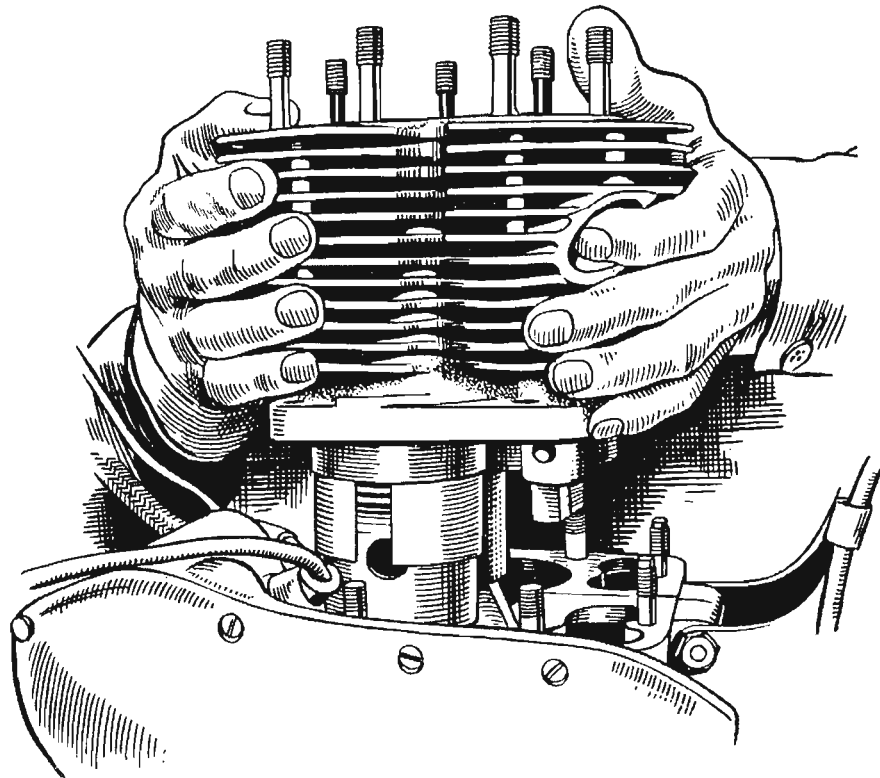
## INDEX TO PAGE 36.

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Nut, cylinder head.</li> <li>2. Washer, ,, ,, nut.</li> <li>3. Head, ,, ,,</li> <li>4. Gasket, ,, ,,</li> <li>5. Liner, ,, block.</li> <li>6. Stud, ,, ,, (9 off).</li> <li>7. Stud, ,, ,, (2 off).</li> <li>8. Block, ,, ,,</li> <li>9. Valve, inlet.<br/>Valve, exhaust.</li> <li>10. Guide, valve (In. and Ex.).</li> <li>11. Collar, ,, spring top.</li> <li>12. Spring, ,, (In. and Ex.).</li> <li>13. Collar, ,, spring bottom.</li> <li>14. Split cotter, valve.</li> <li>15. Adjuster, ,, tappet.</li> <li>16. Spring, valve tappet adjuster.</li> <li>17. Distance piece, tappet.</li> <li>18. Tappet valve.</li> <li>19. Joint washer, valve chamber.</li> <li>20. Lever, exhaust valve lifter (Int.).</li> <li>21. Taper pin, lever to spindle.</li> <li>22. Spindle, exhaust valve lifter.</li> <li>23. Lever, exhaust valve lifter (Int.).</li> <li>24. Lever, ,, ,, ,, (Ext.).</li> <li>25. Dowel, oil pipe block.</li> <li>26. Circlip, diaphragm plate.</li> <li>27. Plate, diaphragm retaining.</li> <li>28. Diaphragm, breather.</li> <li>29. Pipe, breather.</li> <li>30. Cover, valve chamber.</li> <li>31. Stud, valve chamber cover.</li> <li>32. Washer, ,, ,, ,, stud.</li> <li>33. Nut, ,, ,, ,,</li> <li>34. Joint washer, cylinder base.</li> <li>35. Nut, magneto stud.</li> <li>36. Washer, ,, ,,</li> </ol> | <ol style="list-style-type: none"> <li>37. Stud, magneto fixing.</li> <li>38. Crankcase (00 bearings).</li> <li>39. Stud, cylinder base (6 off).</li> <li>40. Stud, ,, ,, (2 off).</li> <li>41. Nut, ,, ,,</li> <li>42. Washer, ,, ,,</li> <li>43. Nut, oil pipe junction block.</li> <li>44. Washer, ,, ,, ,,</li> <li>45. Stud, ,, ,, ,,</li> <li>46. Stud, oil pump.</li> <li>47. Spindle, intermediate wheel.</li> <li>48. Screw, timing cover (short 9 off)</li> <li>49. Screw, ,, ,, (long 1 off)</li> <li>50. Button shaft, indicator.</li> <li>51. Cap, oil release.</li> <li>52. Rubber tube, oil release.</li> <li>53. Spring, oil release main.</li> <li>54. Spring, oil release auxiliary.</li> <li>55. Nut, oil release button shaft.</li> <li>56. Piston, oil release.</li> <li>57. Joint washer, cap.</li> <li>58. Body, oil release.</li> <li>59. Joint washer, body.</li> <li>60. Cover, timing gear.</li> <li>61. Block, oil pump sliding.</li> <li>62. Plunger, oil pump scavenge.</li> <li>63. Plunger, ,, ,, feed.</li> <li>64. Body, ,, ,,</li> <li>65. Nut, ,, ,, fixing.</li> <li>66. Ball, ,, ,,</li> <li>67. Spring, ,, ,,</li> <li>68. Plug, ,, ,,</li> <li>69. Joint washer, crankcase filter</li> <li>70. Filter, crankcase.</li> <li>71. Washer, ,, filter spring.</li> <li>72. Bolt, ,, ,,</li> <li>73. Cover, ,, ,,</li> </ol> |
|---|--|

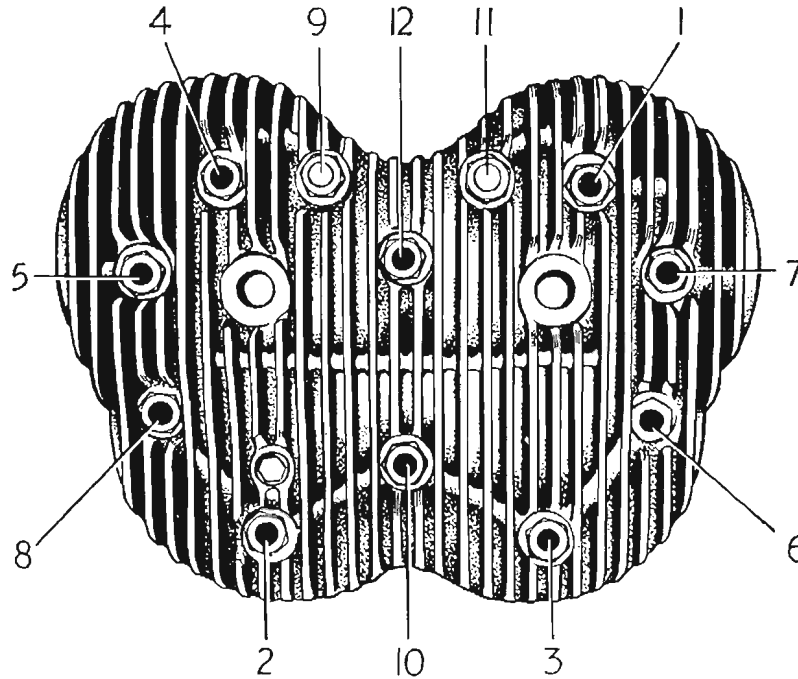
## INDEX TO PAGE 37.

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Ring, piston compression.</li> <li>2. Ring, ,, scraper.</li> <li>3. Piston.</li> <li>4. Pin, ,, gudgeon.</li> <li>5. Circlip, ,, ,, pin.</li> <li>6. Bush, connecting-rod S.E.</li> <li>7. Connecting rod assembly.</li> <li>8. Camshaft.</li> <li>9. Key, camshaft pinion.</li> <li>10. Bush, ,, T.S.</li> <li>11. Auto advance unit.</li> <li>12. Wheel, intermediate.</li> <li>13. Pinion, camshaft.</li> <li>14. Pinion, timing.</li> <li>15. Nut, ,, pinion.</li> <li>16. Bush, intermediate wheel.</li> <li>17. Nut, camshaft, eccentric.</li> <li>18. Bearing, crankcase T S.</li> <li>19. Key, timing pinion.</li> </ol> | <ol style="list-style-type: none"> <li>20. Crankshaft, timing side.</li> <li>21. Bush, connecting rod B.E.</li> <li>22. Tube, crankshaft halves.</li> <li>23. Bolt, ,, to flywheel.</li> <li>24. Nut, ,, ,, bolt.</li> <li>25. Flywheel.</li> <li>26. Crankshaft, driving side.</li> <li>27. Key, generator to crankshaft.</li> <li>28. Bearing, drive side main.</li> <li>29. Oil seal, drive side main bearing</li> <li>30. Collar, bearing.</li> <li>31. Sprocket, engine 19T.</li> <li>32. Slider, engine shock absorber.</li> <li>33. Collar, ,, ,, ,,</li> <li>34. Spring, ,, ,, ,,</li> <li>35. Rotor, AC generator.</li> <li>36. Washer, rotor tab.</li> <li>37. Nut, drive side crank.</li> </ol> |
|--|--|

7. Fit the block over the studs and tighten down evenly.
8. Fit the cylinder head and evenly tighten down (see illustration for sequence). It is advisable to grease the cylinder head gasket before fitting to assist in making a gas tight joint.
9. Adjust tappets (see tappet adjustment, page 42).
10. Replace valve cover and connect exhaust valve lifter cable.
11. Fit and tighten torque stays.
12. Replace carburetter and connect throttle lever attachment.
13. Fit the sparking plugs and replace H.T. cables.
14. Fit exhaust pipes and silencer.
15. Run engine until a working temperature is reached and then re-tighten cylinder head bolts.



**Replacing the cylinder block.**



**Cylinder head tightening down sequence.**

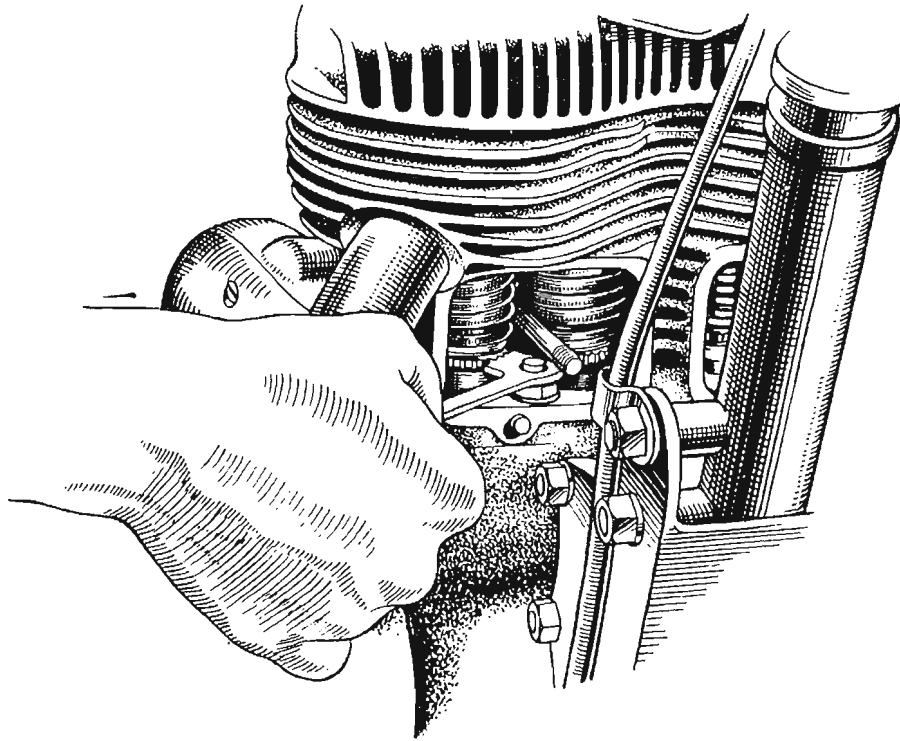
## **PETROL TAPS**

Two petrol taps are fitted, the OFFSIDE is for the MAIN supply and the NEARSIDE for the RESERVE supply. Therefore, the nearside tap should be left in the closed position until the petrol supply is exhausted from the main tap.

Petrol leakage from a tap can be overcome in the following manner. Remove the faulty tap and dismantle ; take out the split pin, remove the washer, spring, back plate and withdraw the spindle and lever assembly. Clean the body and spindle and then apply a smear of fine grinding-in paste to the spindle ; add a little oil and rotate the spindle in the tap body, using the same motion as when grinding-in the valves. When a true surface is obtained, wash the parts thoroughly in petrol and apply tallow fat to the spindle before assembly. Check the tension on the spring and if insufficient stretch slightly.

## TAPPET ADJUSTMENT

When making an adjustment or check, treat each cylinder as a separate unit. First remove the valve cover and turn the engine over until the timing side piston is at T.D.C. on compression stroke ; both valves will now be closed. The clearance measurement is taken between valve tip and tappet head with a feeler gauge. To make an adjustment a special spanner is provided in the tool kit. By placing the spanner over the stud spigot between the valves so that the segments engage with the tappet adjuster, the clearance can be increased or decreased by turning the spanner clockwise or anti-clockwise respectively (see illustration). The movement of the adjuster is arrested by a spring engaging segments on the underside of the tappet, each segment representing approximately .0025". (See data sheet, page 3). Tappets should only be adjusted when the engine is cold.



Method of adjusting tappets.

## SPEEDOMETER DRIVE

The drive is taken from the gearbox layshaft, and is situated in the gear box outer cover. To remove, disconnect cable, take off the outer cover and drift out from the inside of the cover, the gear shaft complete with the bushes. Replacement should be made in the reverse manner, care being taken to see that the slot in the bush lines up with the screw hole in the cover. The gear on the layshaft is pegged in position.

# HORIZONTAL SOLEX CARBURETTER

## TYPE 26 W.H.2.

### THE BI-STARTER.

This unit provides the correct mixture for cold starting. It should be employed until the engine is sufficiently warm to function satisfactorily without its aid, when it must be put out of action.

It has two operative positions :

- (a) When fully in action the mixture is very rich, ensuring easy starting when the engine is cold.
- (b) When half in action (position determined by locating ball), the mixture is weaker. This intermediate position is for use when the engine is slightly warm, but not warm enough to start and continue running on the main Carburetter pilot jet, and, as a secondary position for warming up the engine thoroughly after having started it in the "fully in action" position.

### MAIN FUNCTION.

The main jet (G) is seated submerged in the float chamber, metering petrol to the spraying assembly comprising of an emulsion tube (S) surmounted by air correction jet (a) with a final outlet in the choke tube waist at (DN). It will be obvious that as the butterfly (V) opens, air passing from right to left through the choke tube creates progressively increasing depression on the end of the tube (DN), so drawing downwards an emulsified mixture which is drawn in by the engine.

### SLOW RUNNING.

The pilot jet (g) is so situated that with the throttle butterfly nearly closed and the engine turning over the depression at the orifice controlled by the "volume control screw" (W) lifts the petrol from the float chamber passing through the calibrated hole in end of the pilot jet, thence upwards, then horizontally, and finally downwards to emerge via the volume control screw orifice, the hole adjacent to the throttle edge acting as an air bleed to assist the control of the pilot mixture strength. The orifice (b) is a fixed air bleed assisting the emulsification of the pilot jet output.

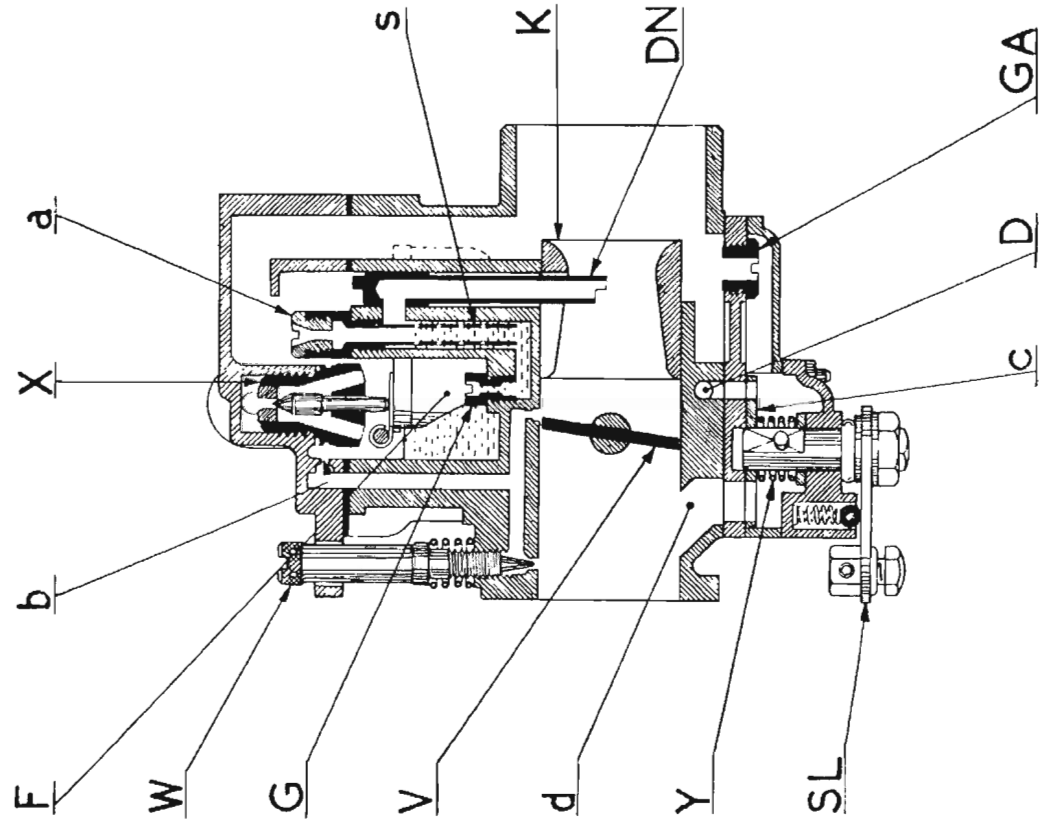
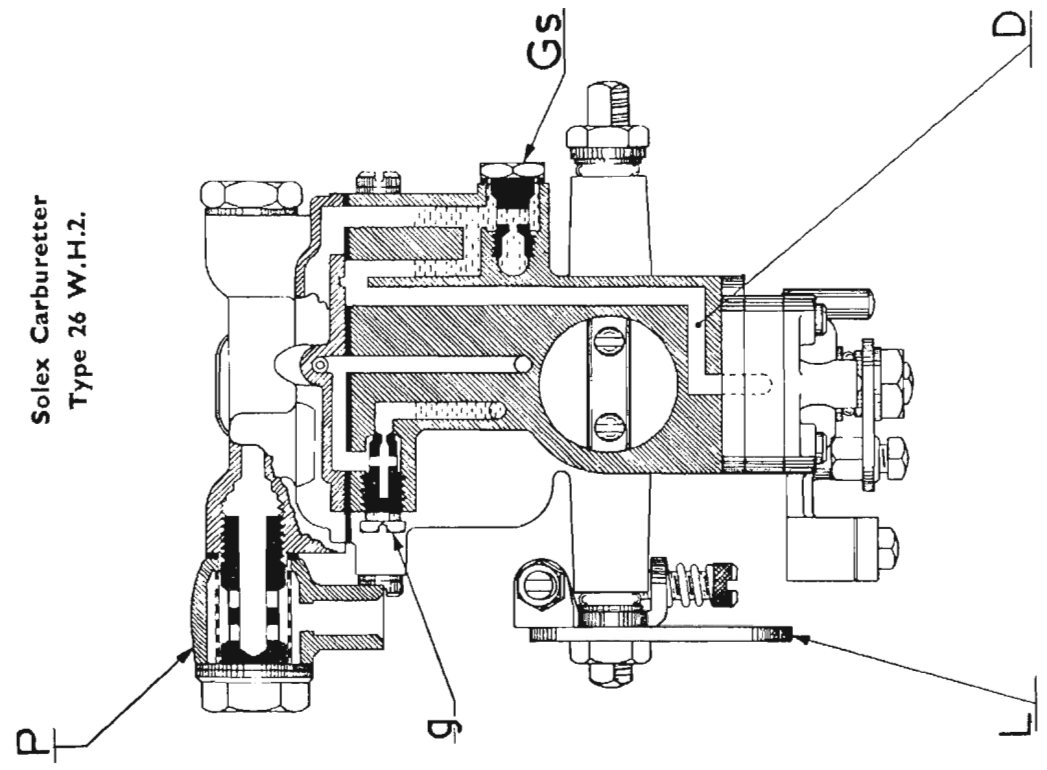
As the throttle commences to open, the air bleed hole adjacent to the throttle edge assumes a different function, for it will be seen that, as the edge of the throttle recedes, depression occurs and the air bleed is transformed into an additional petrol supply.

The control of the piloting mixture strength is therefore by adjustment of the screw (W). Screwing it in weakens the mixture and vice versa. The slow running speed of the engine is controlled in the usual way by adjustment of the spring loaded screw mounted on the abutment plate of the throttle lever (L) assembly.

### COLD STARTING.

With the throttle closed to the minimum idling position, the Solex "Starter" is put into action by moving the lever (SL) to the "on" position, i.e. so that the disc valve (C) rotates allowing holes in it to register with the channels (D) and (d) in the carburetter casting face.

Solex Carburetter  
Type 26 W.H.I.2.

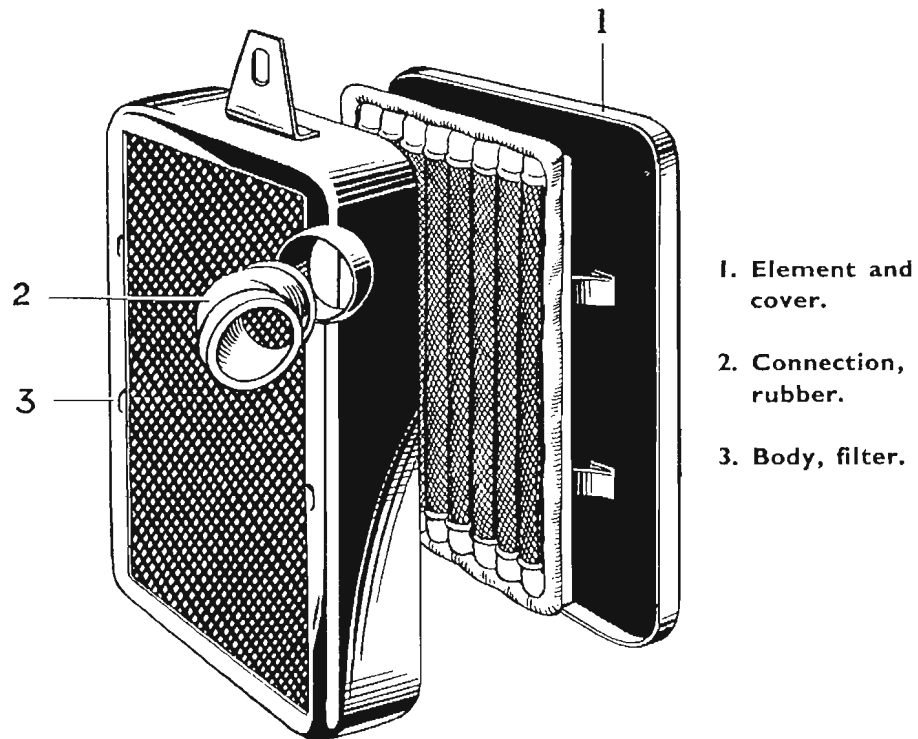


When the engine is turned over, intense suction occurs on the channel (d), and is transmitted via the interior of the "starter" to channel (D), thereby lifting petrol from the float chamber, through the starter petrol jet (GS) to supplement the supply already discharged from the well above it to the "starter" and thence to the engine.

The petrol thus provided is mixed en route to the engine with air admitted by the "starter" air jet (GA), the sizes of GA and GS being selected to suit the capacity of the engine, so that in addition to correct mixture strength for starting from cold, the volume is sufficient to ensure continuity of running.

The engine, once started, the lever (SL) is rotated over approximately half its arc, determined by the spring loaded ball registering with a hole in the lever (SL), and a smaller hole in disc (c) registers with the inlet (D) reducing the mixture strength.

Thus the engine can be warmed up without fear of "overdosing". Nevertheless, since the mixture is necessarily very rich for starting and warming purposes, the Solex "starter" must be put out of action as quickly as possible.



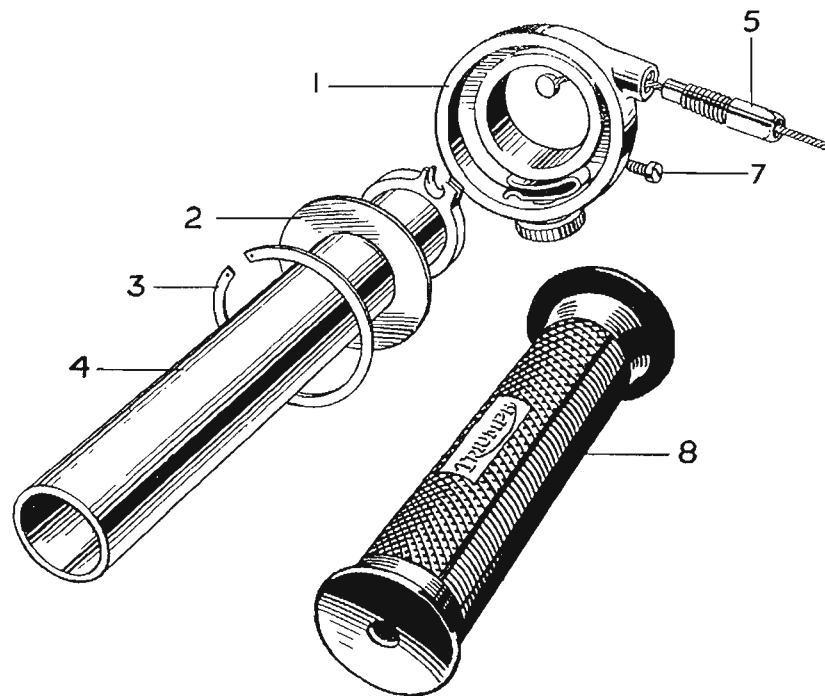
**AIR FILTER.**

To service the air filter, first remove the battery and battery carrier, the filter element is then withdrawn when the lid is removed. Do not attempt to detach the element from the lid for cleaning as these two parts are made as an assembly, the whole being cleaned in petrol, paraffin, or any other similar solvent. After cleaning allow to dry thoroughly and then re-oil with Vokes Trifiltrene Filter Oil or an oil giving the viscosity rating of SAE20. The element can now be replaced for further service.

## TWIST GRIP THROTTLE CONTROL

The Triumph twist grip will require little attention other than an occasional greasing. The twist grip is spring loaded, and to increase the damping, screw in the thumb adjuster. To remove the throttle cable, the cable stop should be unscrewed after which the cable can be drawn out. To dismantle, peel back the rubber grip and extract the spring ring and washer and withdraw the rotor sleeve from the handlebar.

To remove the twist grip head, slacken off the grub screw. When re-assembling smear all parts with a light grease. When re-inserting the cable, the grip must be revolved so that it picks up the cable nipple and draws it into position. It is advantageous to wedge the throttle slide open when carrying out the last operation in order that the throttle stop can be placed in position and screwed into the twist grip head.



### TWIST GRIP CONTROL.

- |                      |                        |
|----------------------|------------------------|
| 1. Head assembly.    | 5. Thimble, cable.     |
| 2. Plate, retaining. | 7. Screw, head fixing. |
| 3. Circlip.          | 8. Grip, rubber.       |
| 4. Sleeve assembly.  |                        |



## B.T.H. TYPE RB FORM AI-I GENERATOR AND LIGHTING EQUIPMENT

### GENERATOR.

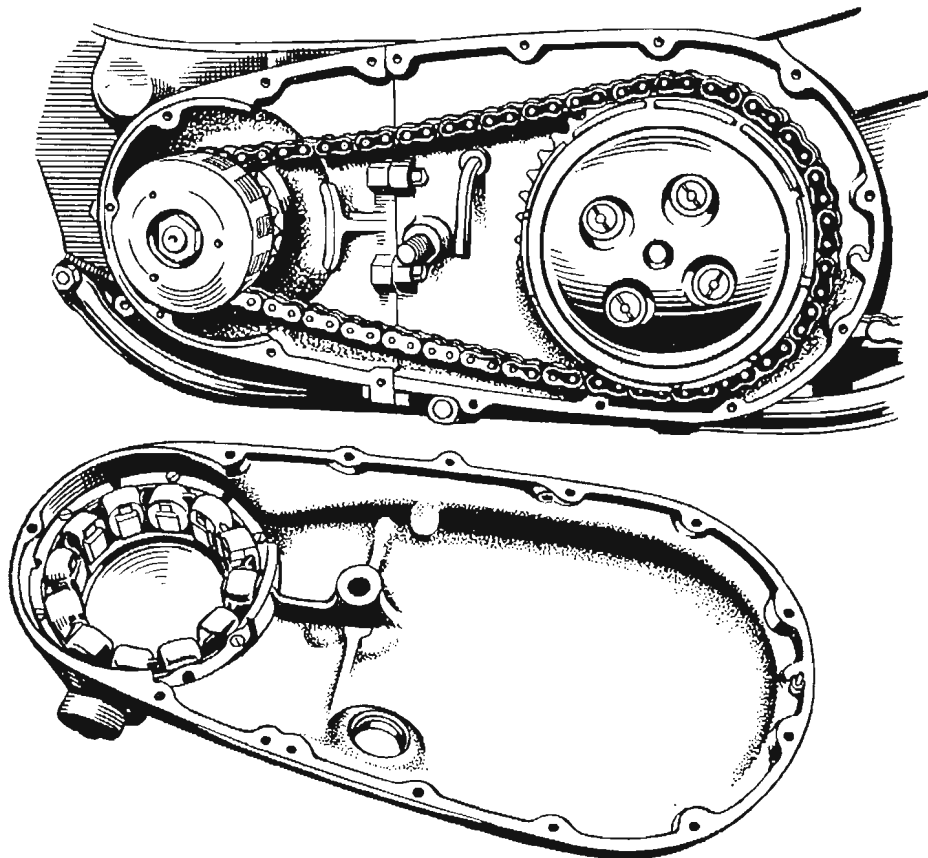
This is a permanent magnet alternator built into the primary chaincase, and comprises two units only—a wound stator and a permanent magnet rotor.

Stator : The stator member is fitted into the primary chaincase.

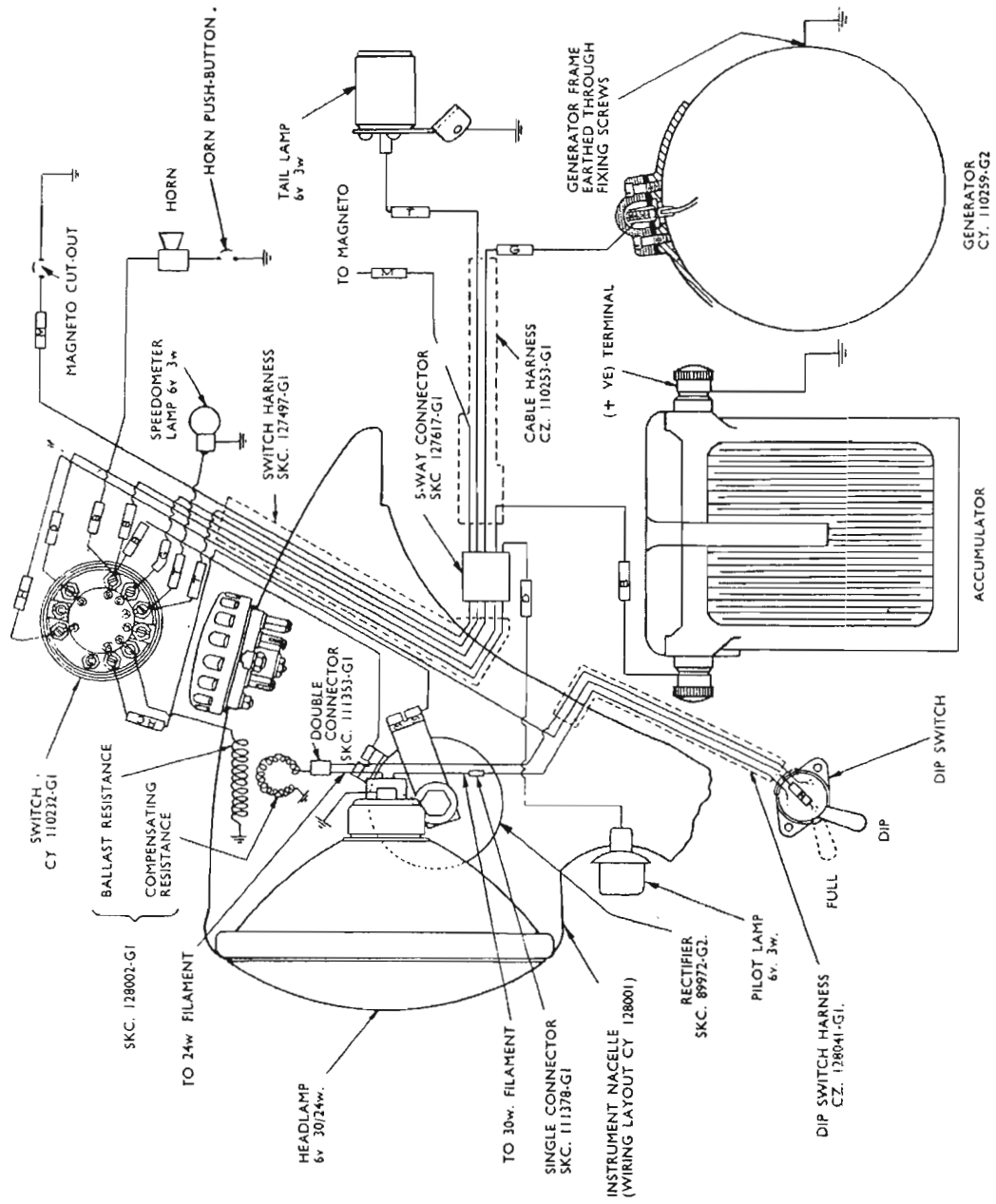
Rotor : The rotor member is keyed directly on to the engine crankshaft.

### TERMINAL COVER.

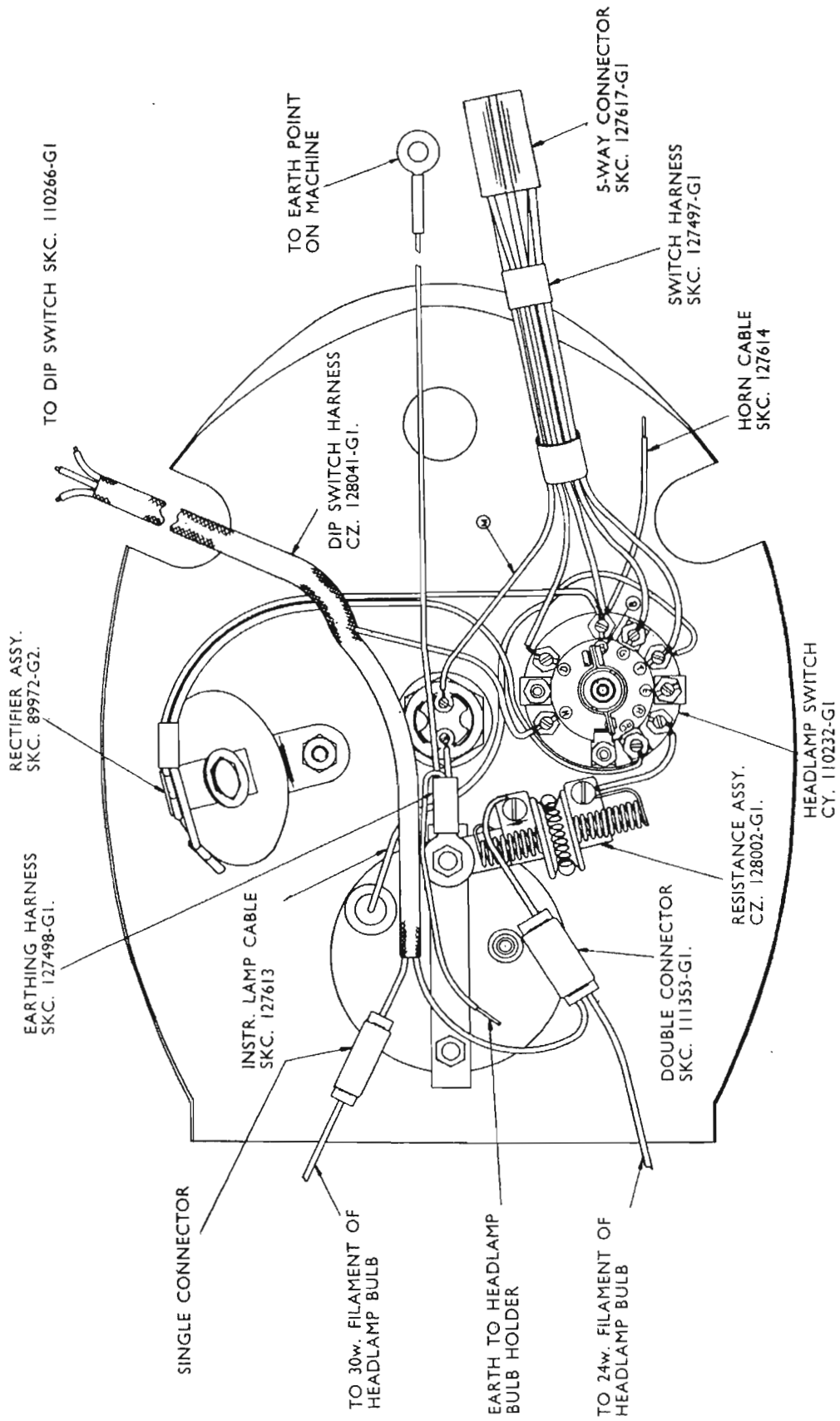
One end of the generator winding is "earthed" to the stator frame and the other end is brought out to a terminal post fitted in the chaincase. This terminal is protected by means of a small aluminium cover which also serves to anchor the cable leading from the generator to the headlamp switch.



Generator Rotor and Stator shown in position.



Lighting wiring diagram.



**Nacelle wiring diagram.**

## **WIRING AND CIRCUIT.**

The circuit is arranged so that the 36-watt headlamp bulb is fed directly from the alternator, the battery is charged through a metal rectifier, and the "dim" and "tail" lamps fed with D.C. from the battery. When the headlamp bulb is not in use, the current normally taken by this unit is by-passed through a resistance fitted to the base of the headlamp switch. The wiring is carried out through cable harnesses as shown on page 48 and 49. It is important that the wiring should be arranged as shown on page 49 to ensure that all insulated wires are kept clear of the resistance which runs hot.

## **HEADLAMP SWITCH.**

This switch serves to change over from "off" to "tail", "dim" and "full" lights, and also carries the thermostatic switch which automatically breaks the battery circuit when the engine is stationary. The purpose of this device is to prevent the battery from becoming discharged by leakage through the rectifier in the event of the motor cycle being left stationary for a long period.

## **DIP SWITCH.**

The dip switch which changes over the A.C. supply from the main to the dip filament in the headlamp bulb, is designed so that the headlamp circuit is never broken. This prevents high voltages being applied to the rectifier during change over from "dip" to "full" and vice-versa. If the headlamp filament fails, the thermostatic switch opens after a few seconds and so disconnects the rectifier from the generator.

# **LAMP BULBS**

## **HEADLAMP BULBS.**

The headlamp bulb used with this equipment is a double filament S.B.C. 6-volt 30 24-watt bulb. The stator windings are designed for this headlamp wattage ; replacement bulbs must therefore be 30 24-watt bulbs. If a lower wattage bulb is used, the alternator voltage will rise to a value which will result in almost immediate failure of the bulb.

## **PILOT AND TAIL LAMP BULBS.**

Replacement bulbs must be 6-volt 3-watt as originally fitted.

# **BATTERY. VARLEY MC 7/12**

## **MAINTENANCE.**

When in general use the dynamo will maintain the battery in a charged condition. If the machine is standing idle the battery should be given a freshening charge at least once a month (8 hours at 1 amp. recommended).

Once a month the battery needs topping up with a small quantity of distilled water. The top of the separator, i.e. the substance inside the vents, must be well moist but not flooded.

## B.T.H. LIGHTING FAULTS CHART

Failure of dim or tail lights	Failure of headlamp bulb	Battery completely discharged	Fluctuating headlight	Defect	Remedy
X	X	X	X	HEADLAMP CONTROL SWITCH Distorted contact springs ... ..	Remove and set or replace
X	X	X	X	Thermal switch contacts dirty ... ..	Clean and re-assemble
X	X	X	X	Thermal element sticking ... ..	Clean and re-adjust
X	X	X	X	Terminal connection loose ... ..	Re-make connection and tighten
				GENERATOR	
	X	X	X	Output terminal damaged ... ..	Repair or replace terminal
	X	X	X	Loose connection at terminal ... ..	Re-make connection and tighten
				CABLE HARNESS	
X	X	X	X	Conductor broken ... ..	Repair or replace cable
X	X	X	X	Cable chafed and shorting to frame ... ..	Insulate with tape or replace cable
				RECTIFIER	
X	X	X		Damaged ... ..	Replace
		X		Ballast resistance broken ... ..	Re-connect if broken near terminal
	X			Compensating resistance broken ... ..	Re-connect if broken near terminal

## FAULT FINDING

The following paragraphs have been drawn up to enable the rider to diagnose trouble that may arise during normal service. For each failure the faults and antidotes are arranged in the order of their probability. In each case the rider should always look for the obvious, such as no petrol, oil, controls incorrectly set, cut out wire shorting, and then follow which process of elimination.

### ENGINE WILL NOT START.

Starter Carburetter not in operation (Engine cold)	...	...	...	Pull starter knob out
Throttle opened with Starter Carburetter in operation	...	...	...	Close Throttle
Lack of Fuel	...	...	...	Tank Empty, obstruction in Petrol Pipes or Tank Filters choked
Excessive Flooding	...	...	...	Dirt under Float Needle Seating (see Page 43)
Starter Jet choked	...	...	...	Remove Jet (G.s. Page 44) and clean
Oiled up or fouled, Sparking Plug	...	...	...	Remove, clean off carbon and wash in petrol. Allow to dry
Engine Valve stuck open	...	...	...	See Page 35 for Valve Removal
Exhaust Valve Seatings burned	...	...	...	" " " "
Magneto Cut-out shorting	...	...	...	Disconnect Terminal at Magneto and check spark at plug
Contact Points dirty	...	...	...	Clean with carborundum stone, wash with petrol and re-gap
Incorrect Contact Point Gap	...	...	...	Re-gap to .012"

Contact Breaker Arm sticking	...	...	...	...	Remove Arm and clean Pivot with fine emery, grease lightly and replace Arm. Check gap.
H.T. Collector shorting to Body	...	...	...	...	Remove Pick-ups and thoroughly clean ; replace if cracked or damaged
Condensation on Sparking Plugs	...	...	...	...	Remove Plugs and heat up.

**ENGINE STOPS.**

No .Petrol or Fuel Obstruction	...	...	...	...	Check Fuel in Tank. Supply at Carburetter if no supply. Remove Pipes and Tank Filters if necessary
Choked Main Jet	...	...	...	...	Remove Jet (G) (Page 44) and clean
Water on H.T. Leads, Pick-ups or Sparking Plug	...	...	...	...	Dry Ignition System
Water in Float Chamber	...	...	...	...	Remove Carburetter and clean out
Vent Hole in Petrol Tank Filler Cap choked	...	...	...	...	Clean out Vent Hole

**ENGINE MISSES FIRE.**

Defective or Oiled Sparking Plug	...	...	...	...	Clean and Test Plugs
Water Fouling Main Jet	...	...	...	...	Clean Carburetter out
Incorrect Contact Breaker Gap	...	...	...	...	Check and Adjust to .012"
Contact Points burned and arcing	...	...	...	...	Remove Points and true with a carborundum stone. Replace and re-gap ; change Condenser if trouble persists.

Weak or broken Valve Spring	...	...	...	Remove Valve Chamber Cover for examination. See Page 38 for replacement
Partial Obstruction of Petrol Supply	...	...	...	Clean out Carburetter and check petrol flow at Carburetter end
H.T. Cable perished and shorting to frame	...	...	...	Replace H.T. Cable
Sparking Plug Insulation cracked	...	...	...	Replace Sparking Plug

**LOSS OF POWER.**

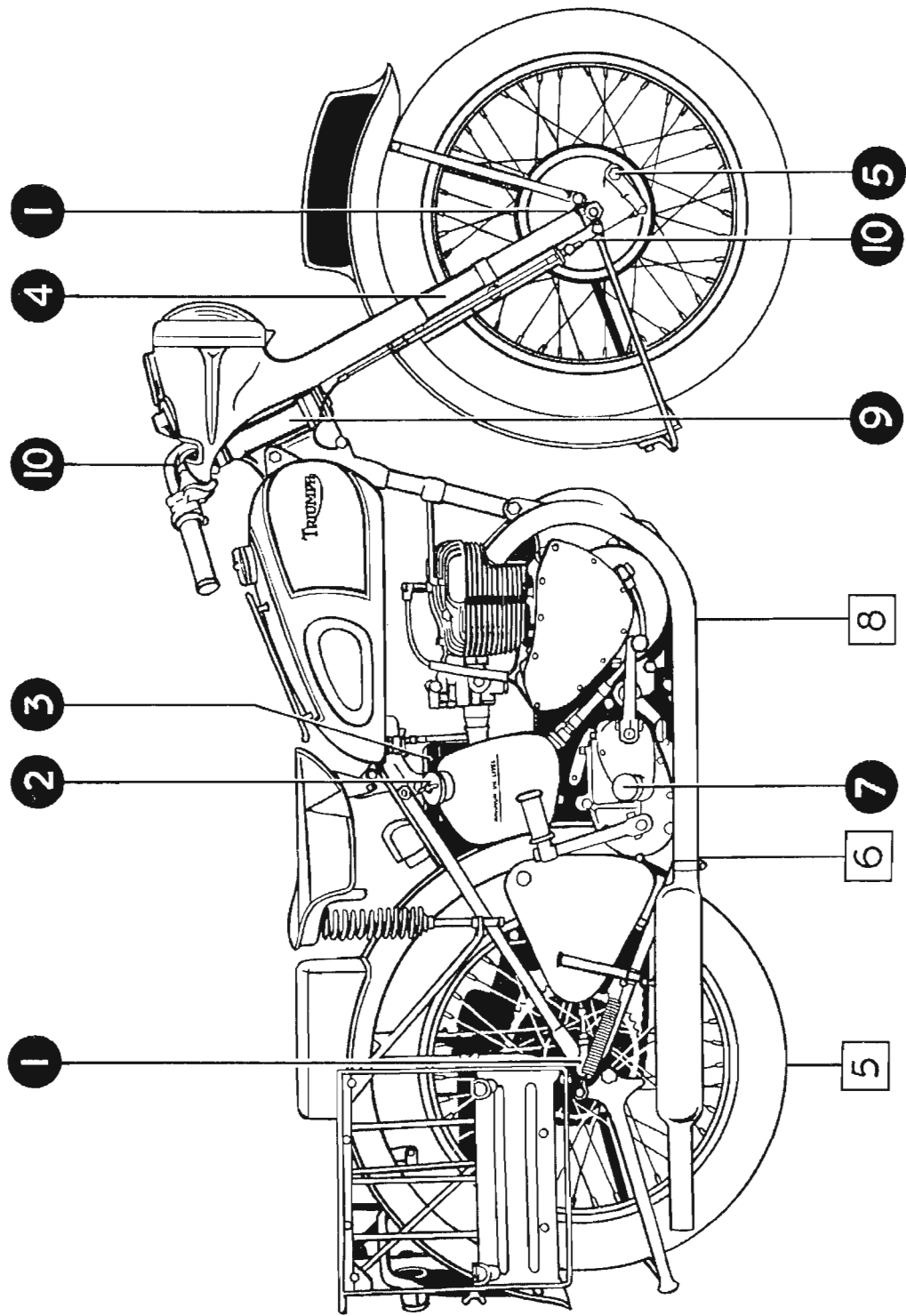
Faulty Sparking Plugs	...	...	...	Change
Incorrect Tappet Adjustment	...	...	...	See Page 42
Lack of Lubrication	...	...	...	See that Oil Indicator Button is working (see Page 9). Check supply in Oil Tank
Weak or Broken Valve Spring	...	...	...	Remove Valve Chamber Cover for examination. See Page 38
Sticky Valve	...	...	...	See Page 35
Broken or gummed-up Piston Ring	...	...	...	See Page 35
Valves not seating	...	...	...	See Page 35
Brakes Binding	...	...	...	Place Machine on the stands and re-adjust Brakes
Engine requires Decarbonising	...	...	...	See Page 35
Head Gasket Blowing	...	...	...	Change Gasket
Air Cleaner choked	...	...	...	Remove, wash in petrol, re-oil and replace





## LUBRICATION GUIDE

Figures in circles refer to offside of machine and those in squares refer to points on nearside not visible in illustration.



No.	Part	Lubricant	No.	Part	Lubricant
1	Wheel hubs ... ..	Medium Grease	6	Footbrake pedal spindle ...	Medium Grease
2	Engine oil tank—Summer ... ..	SAE. "50" oil	7	Gearbox—Summer ... ..	SAE. "50" oil
	" " —Winter ... ..	" " "40" oil		" " —Winter ... ..	" " "40" oil
3	Air filter ... ..	" " "20" oil	8	Primary chaincase ... ..	" " "20" oil
4	Front fork ... ..	" " "20" oil	9	Steering head ... ..	Medium Grease
5	Brake cam spindle ... ..	Medium Grease	10	Exposed cables ... ..	SAE. "20" oil

For brake rod joints and pins lubricate by oil can.

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