

Instruction Manual

MOTOR CYCLE, 350 c.c., B.S.A. B40. Mk.I

Contract No. WV/6769

**USER HANDBOOK
1967**

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RUNNING-IN (see page 15)

The "running-in" process is the most important in the life of the engine and the handling it receives during the first 1,500 miles will determine the service it provides in return. One-third of full throttle should not be exceeded in any gear during the first 500 miles because if excessive speeds are used there is risk of piston seizure and other troubles.

During the "running-in" period avoid rapid acceleration and do not allow the engine to labour in a high gear when a change to a lower gear would ensure easier conditions for the engine.

AMENDMENTS

It is essential that this book be kept up to date with all amendments. Immediately an amendment is inserted, particulars will be entered hereunder.

AMDT. No.	DATE	SIGNATURE	AMDT. No.	DATE	SIGNATURE

NOTES TO READERS

ARMY PERSONNEL

The subject matter of this publication may be affected by Defence Council Instructions. If possible, amendments are issued to correct this publication accordingly. When an instruction contradicts any portion of this publication the instruction is to be taken as the overriding authority.

R.A.F. PERSONNEL

The subject of this publication may be affected by Defence Council Instructions, or "General Orders and Modifications" leaflets and amendments are issued to correct this publication accordingly. When an order or leaflet contradicts any portion of this publication, the instruction or leaflet is to be taken as the overriding authority.

The lubricants to be used will be those given on the Air Diagram listed in the Associated Publications.

ASSOCIATED PUBLICATIONS

ARMY

	CODE NO.
Servicing Schedule	
Complete Equipment Schedule	P34133/2
Technical Handbook	Emer. Wh. Veh. B112
Parts List	

R.A.F.

	A.P. No.
Data Book for R.A.F. Vehicles	2782
Electrical Manual for Mech. Trans. and Marine Craft	4343 Series
Manual for Mech. Trans. Servicing	3260A
R.A.F. Engineering — Mech. Trans.	1464E
Technical Handbook	4999A (Vol. 1 & 6)

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DATA

Capacities:

Petrol tank	3½ gallons
Oil tank	5 pints
Front fork (each leg)	⅓ pint
Primary chaincase	½ pint
Gearbox	2/3 pint

Engine:

Bore	79 mm.
Stroke	70 mm.
Capacity	343 c.c.
Sparking plug gap	.020—.025 in.

Transmission:

Top gear ratio	6.53
Engine sprocket	23T
Clutch sprocket	52T
Gearbox sprocket	18T
Rear wheel sprocket	52T

Wheels:

Front tyre	3.00-20 Trials Universal
Rear tyre	3.50-18 Trials Universal
Tyre pressures	See Servicing Schedule

MOTOR CYCLE G.S. — 343 c.c. B.S.A. MODEL B40 Mk.1

This handbook is intended to acquaint the rider with details of the controls and with normal operation of the machine. It must be used in conjunction with the Servicing Schedule. It does not contain information necessary for carrying out major dismantling, overhauls, or operations of a similar nature.

SPECIAL NOTE:—Before starting and using the machine, make sure that the oil tank, gearbox, primary chaincase and front forks are properly topped-up with oil—see appropriate chapters for filling instructions—and that the battery is topped-up and fully charged.

THE CONTROLS

The new rider should make sure that he is quite familiar with all the controls before attempting to ride the machine.

The foot operated levers are adjustable and should be positioned so that they can be reached without moving the feet from the foot-rests. A stop-pin is provided for the brake pedal to ensure that its pad can be situated comfortably below the foot.

Handlebar Controls (Fig. 1)

Twist Grip.—To open the throttle (i.e., to increase the engine speed), turn the grip so that its top moves towards the rider as indicated by the arrow in the illustration. The cable length can be varied if required by means of an adjuster incorporated in the greasing point of the cable. Grease should be applied regularly in accordance with the instructions contained in the Servicing Schedule.

Front Brake.—Grip the lever gently towards the handlebar to operate the brake. Finger adjustment for the cable is provided at the cable abutment at the bottom of the fork leg and also at the handlebar lever. A greasing point is inserted in the outer casing and grease should be applied regularly in accordance with the instructions contained in the Servicing Schedule.

Clutch.—Grip the lever towards the handlebar to declutch, i.e., to disengage the drive between the engine and the rear wheel. Finger

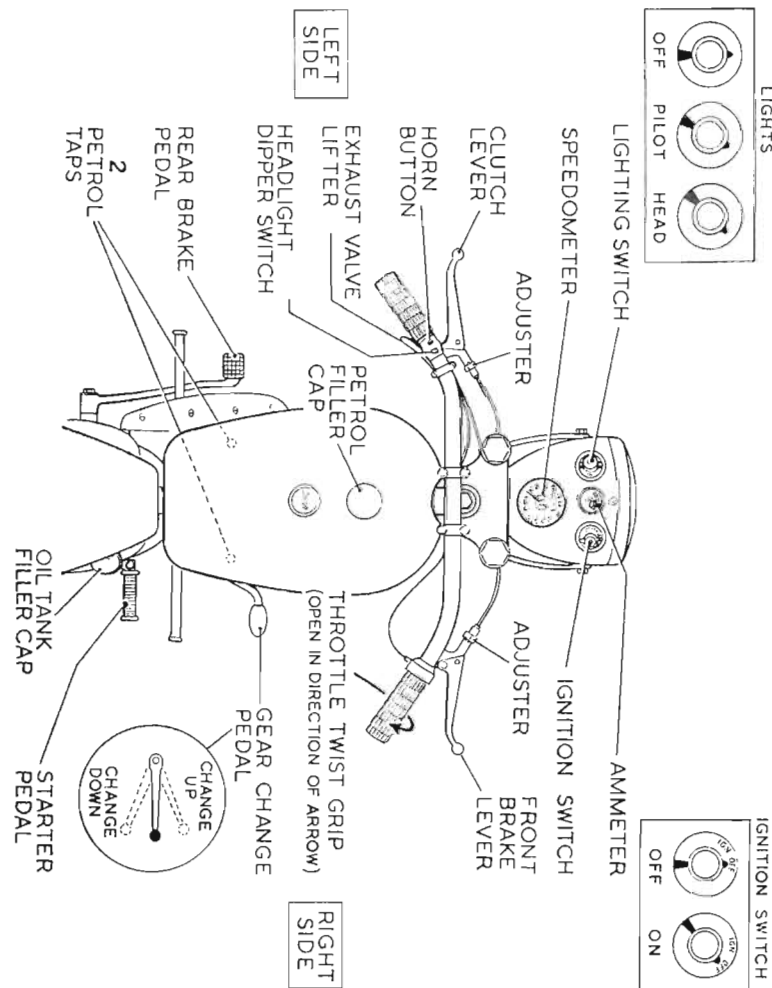


FIG. 1. The controls.

adjustment for the cable is provided at the handlebar lever and a greasing point is inserted in the outer casing. Grease should be applied regularly in accordance with the instructions contained in the Servicing Schedule.

Exhaust Valve Lifter.—Grip the lever, thus raising the exhaust valve and releasing the engine compression (see *To Start the Engine*, page 12). A greasing point is inserted in the cable outer casing and grease should be applied regularly in accordance with the instructions contained in the Servicing Schedule.

Headlight Dip Switch.—This is mounted on the left handlebar and controls the switching from main to dipped headlight beam.

Horn.—The button is incorporated in the body of the headlight dip switch.

Foot Controls

Rear Brake Pedal.—The pedal is situated on the left side of the machine and controls the rear brake only. An adjustable stop is provided to enable the position of the pedal to be set to suit individual requirements. After any pedal adjustment is made the rear brake may require adjustment. Make certain also that the brake-controlled stop light still functions satisfactorily. A grease point is provided on the pedal pivot and grease should be applied regularly in accordance with the instructions contained in the Servicing Schedule.

Gearchange Pedal.—Operated by the right foot. The mechanism is of the 'positive-stop' type, i.e., its movement is limited by an internal stop, and the lever automatically returns to the central position after each gearchange, as soon as the foot pressure is released. Upward movement of the lever selects the next higher gear and downward movement, a lower gear. The neutral position is between first and second gears. The pedal can be re-positioned as required after releasing its pinch bolt.

Starter Pedal.—A folding pedal is fitted on the right-hand side of the gearbox and depression of this pedal rotates the engine.

Other Controls

Petrol Taps.—Two taps are fitted, one at each side of the rear end of the tank. The 'ON' position is obtained by turning the lever downwards. Both taps draw from the main supply in the tank, but if one tap only is used, a reserve supply remains which can be fed to the carburetter when the second tap is turned on.

Lighting Switch.—This has three positions, as indicated in Fig. 1.

- (a) All lights off, but battery being charged when engine is running. This should be visible on the ammeter and will vary according to the state of the battery.
- (b) Pilot, rear light and speedometer bulbs illuminated.
- (c) Headlight, rear light and speedometer bulbs illuminated and the switching from main to dipped beam controlled by the dip switch.

Ignition Switch.—Mounted on the right side of the headlamp body, this switch has two positions, 'OFF' and 'IGN'. The switch must be turned clockwise to the 'IGN' position before starting the engine and remain there while the engine is running. **The switch must be returned to the 'OFF' position whenever the engine is stopped** otherwise there is risk of faults developing in the electrical equipment.

NOTE:—The 'EMG' position is inoperative and must not be used.

Instruments

Ammeter.—This is mounted in the centre of the headlamp body and indicates the rate at which the battery is being charged or discharged.

Speedometer.—This instrument combines speed readings with total mileage and 'trip' mileage recorders. The trip recorder can be re-set to zero by operation of the extended control knob below the headlamp body (Fig. 19). The knob must be pressed upwards before turning.

DRIVING

Before learning how to start the machine, read and fully understand the running-in requirements as detailed on page 00.

To Start the Engine

Stand astride the machine. Make sure that the gears are in the neutral position i.e., between first and second gear. If the machine is in any gear, it will move forward when the starter pedal is pushed down. Turn on a petrol tap and close the 'butterfly' choke control by pushing downwards to its limit (Fig. 2). Open the twist grip about one-quarter of its total movement and press the starter pedal down slowly until a resistance is felt; then, without moving the pedal any further, depress and immediately release the exhaust valve lifter lever on the left handlebar. Now give the starter pedal a firm downward swing which should set the engine in motion. If the engine fails

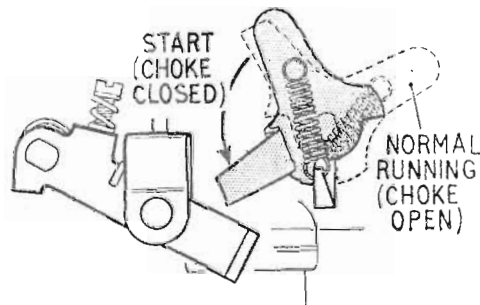


FIG. 2. The carburettor choke control.

to start at the first attempt, repeat this procedure, being careful to avoid rapid kicking at the pedal which will serve no purpose and may damage the operating mechanism.

The choke is automatically opened as the main throttle valve is opened until, at a pre-determined position, the choke springs back into its fully disengaged position.

If the engine is already warm from previous running, it is not necessary to operate the choke control but only to open the throttle about a quarter of its travel and start the engine as described above.

To Stop the Engine

Select the neutral gear position and close the throttle, so reducing the engine speed to 'tick-over'.

Turn the ignition switch to the 'OFF' position.

If the machine is to be parked, turn off the fuel taps.

To Engage First Gear

With the engine running slowly, disengage the clutch by gripping the left handlebar lever and, after a brief interval, press down the gearchange pedal as far as it will go, so selecting first gear. If the pedal will not move through its full travel so that the gear does not engage, move the machine backwards and forwards slightly, maintaining a light pressure on the pedal, until the gear is felt to engage.

Moving Off

Open the throttle slightly and gently release the handlebar clutch lever part way, until the clutch can be felt to take up the drive and the machine tends to move forward. Open the throttle a little more to prevent the possibility of stalling the engine and slowly release the lever as the machine moves away. Until the lever is completely released the clutch is not fully engaged and therefore the engine should not be speeded up excessively nor the clutch remain partly engaged, for longer than is necessary to get the machine away in first gear.

Changing Gear (Up)

When the machine is moving steadily with the clutch fully engaged, the next operation is to engage second gear. Close the throttle, disengage the clutch by gripping the handlebar lever and raise the gearchange pedal as far as it will go by 'hooking' the toe of the boot beneath the pedal.

All three movements should be carried out together. Immediately after the gear is felt to engage, re-open the throttle and re-engage the clutch, releasing the lever steadily.

The same method is required for each upward gearchange.

Changing Gear (Down)

Disengage the clutch by gripping the handlebar lever, open the throttle slightly and press the gearchange pedal down with the sole of the boot as far as it will go. All three movements should be carried out together. Leave the throttle in its new position and steadily release the clutch lever as soon as the gear is felt to engage.

The same method is required for each downward gearchange.

To Select Neutral

Neutral is situated between first and second gears. Declutch and

change gear as many times as necessary to obtain first gear, then with the clutch still disengaged raise the gearchange pedal through half its normal movement until the neutral position can be felt to engage. If the pedal is raised too far, the neutral gear position may be over-run and second gear will be engaged.

Notes on Gearchanging

When changing gear, not only should a suitable road speed be selected at which to perform the action, but the gearchange should be timed in such a way that the speeds of the various pinions within the gearbox coincide as closely as possible.

For this reason, when changing to a higher gear, the throttle is momentarily closed while the clutch is disengaged, allowing the engine-driven gearbox pinions to slow down to the lower speed at which they will operate in the next higher gear.

When changing to a lower gear, the engine speed and corresponding gearbox pinions have to be increased and the throttle must therefore be opened slightly while making the gearchange. As soon as the clutch lever is gripped, the engine will automatically increase in speed and the lower gear will engage quietly.

Changing gear therefore, whilst appearing complicated is simply a matter of synchronizing engine and road speeds for different gears by co-ordinating hand and foot operations. After a little practice, smooth and quiet gearchange will be possible at all times and eventually become a purely automatic action.

USING THE GEARBOX

Correct use of the gearbox must be made in order to obtain best results in all-round performance, especially with regard to acceleration and hill-climbing capabilities.

When travelling uphill, the engine speed will fall as a result of the increased load, with a corresponding fall in power output, because the power delivered by the engine depends upon its speed. In order to regain power, a lower gear must be selected in order to increase the engine speed and so restore the power output.

Similarly, for good **acceleration from moderate** speeds in top gear, more power is required and here again, the solution is to change to a lower gear.

It is better to allow the engine to 'rev' in a lower gear than to let it labour in a higher one.

Riding Hints

Always avoid violent acceleration and braking, particularly on wet roads, or when cornering. Always use both brakes together and apply them smoothly and progressively.

Try to anticipate the need to change gear or to brake, so that driving is free from jerkiness.

Spend some time in obtaining a natural riding position by adjustment of the controls because this will provide maximum control of the machine and prevents discomfort on long journeys.

RUNNING-IN

The 'running-in' process is the most important in the life of the engine and the handling it receives during the first 1,500 miles will determine the service it provides in return. One-third of full throttle should not be exceeded in any gear during the first 500 miles because if excessive speeds are used there is risk of piston seizure and other troubles.

During the 'running-in' period avoid rapid acceleration.

Do not allow the engine to labour in a high gear when a change to a lower gear would ensure easier conditions for the engine.

As the mileage builds up the permitted throttle opening may be increased until the 'running-in' process has been completed (i.e., 1,500 miles) when full throttle can be employed. Do not allow the oil in the tank to fall below the minimum level shown on the dipstick because running with the oil at a consistently low level may cause it to become unduly hot. Economy in oil may prove very expensive at a later date. It must be remembered that the oil cools as well as lubricates, and a new engine tends to run a little hotter than one which is well 'run-in'.

Cleaning

Wash off any dirt with a copious supply of clean water. Any oily areas should be treated with a detergent before being washed. Exposed threads and controls should receive a smear of grease or oil before cleaning commences.

Do not use a caustic soda solution for cleaning aluminium components.

ENGINE LUBRICATION

Lubrication System

The system is of the dry sump type operated by a gear type pump situated in the crankcase. Oil is drawn from the tank by the supply pump which then feeds the big-end.

After lubricating the engine, the oil flows down through a filter in the bottom of the crankcase into a small sump, from which it is drawn by the scavenge pump past the ball valve (C) and delivered to the tank via a special filter (Fig. 3).

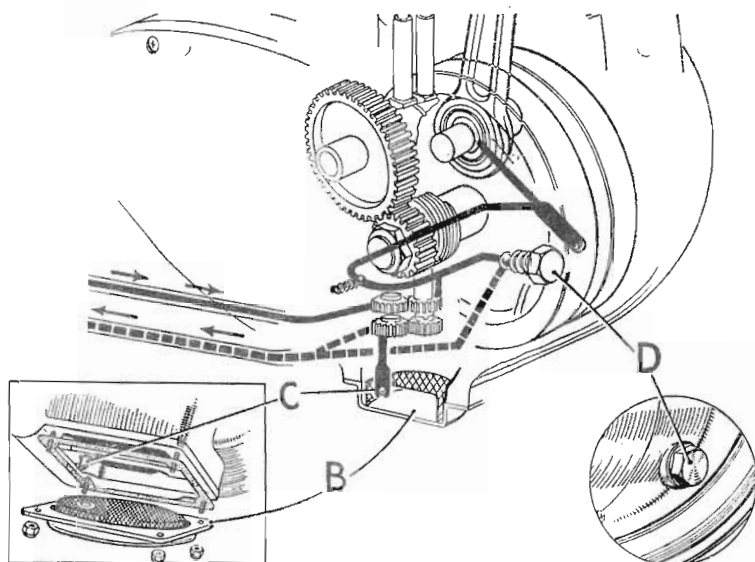


FIG. 3. The engine lubrication system, showing the ball valve and filter.

A by-pass valve (D) Fig. 3, ensures a constant pressure in the system. This valve must not be removed.

Oil Tank

The capacity of the oil tank is approximately 5 pints and the maximum and minimum levels are shown on the dip-stick attached to the filler cap.

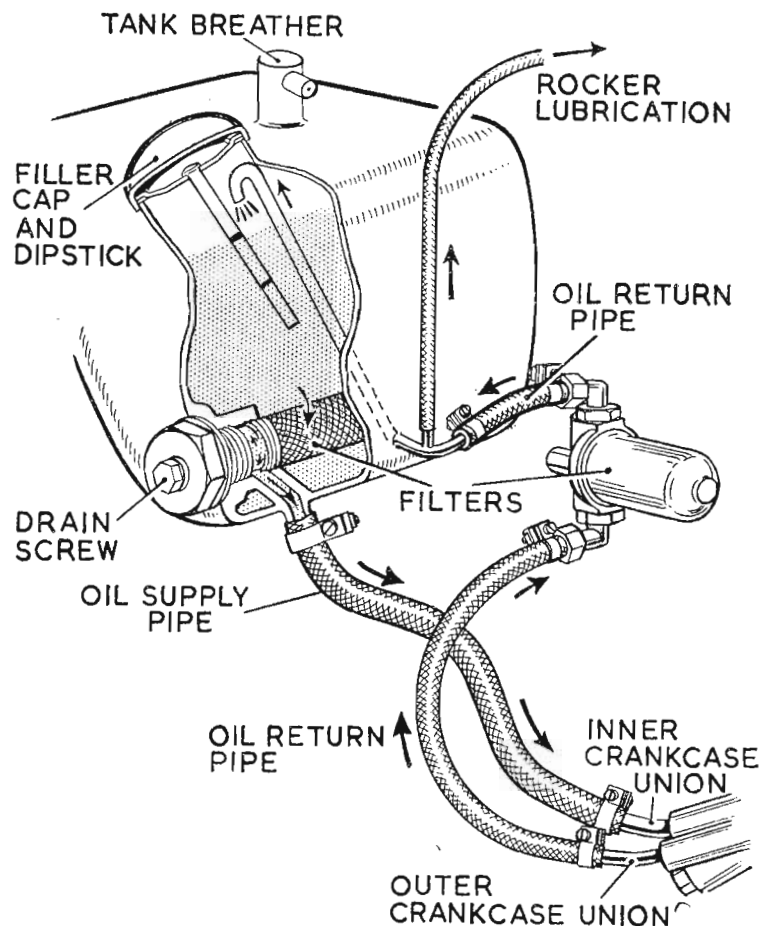


FIG. 4. The oil tank and pipe lines.

Oil Flow

Before starting the engine, remove the oil tank filler cap and check that the oil level is satisfactory. If not, add sufficient engine oil to bring the level up to the 'minimum' mark. When the engine is running, check that oil is being returned from the crankcase by inspection of the return pipe adjacent to the filler orifice. When first starting up the oil flow should be continuous but after a short time the oil will contain air bubbles.

After the engine has been running for a brief period to allow time for oil collected in the system to return to the tank, check the oil level on the dip-stick. If the level is now found to be above the maximum mark, this should be reported immediately.

NOTE:—If a considerable drop in oil level is noted since last using the machine, then a check should be made for any signs of oil leaks, reporting any found.

Oil Pipes—Warning

If at any time the oil pipe lines are disconnected, it is vital for the supply pipe from the tank to be attached to the inner crankcase union pipe when they are reconnected (Fig. 4). If the connections are wrongly made serious damage will be caused and should be reported immediately.

Pump Ball Valve

When the crankcase filter (B) Fig. 3 is removed for cleaning in accordance with the instructions contained in the Servicing Schedule, check the action of the ball valve (C) Fig. 3.

The ball must be free on its seating and this can be proved by carefully inserting a piece of wire into the valve orifice. If the ball adheres to its seating, there will not be a return flow of oil to the tank.

Crankcase Breather

The breather pipe which emerges from the timing case near to the clutch cable must be examined regularly and maintained clear of any obstruction.

Engine Oil Change

This must be carried out at regular intervals in accordance with the instructions contained in the Servicing Schedule.

Before starting this operation, obtain new sealing washers for the drain screw at the centre of the oil tank filter and for the filter body together with gaskets for the crankcase sump plate.

Run the engine until the oil is warm (when it will flow much more freely) and remove the drain screw, allowing the oil to drain into a suitable receptacle, at the same time tilting the machine to the right to drain off as much oil as possible.

Replace the drain screw, and add about 1 pint petrol to the tank. Rock the machine sufficiently to allow the petrol to dislodge any sludge which may be present in the tank and then remove the filter complete with drain screw to allow all the petrol to drain off. Inspect the tank carefully to make sure that all possible sludge has been removed and that no petrol remains. Wash the filter thoroughly in petrol and refit into the tank.

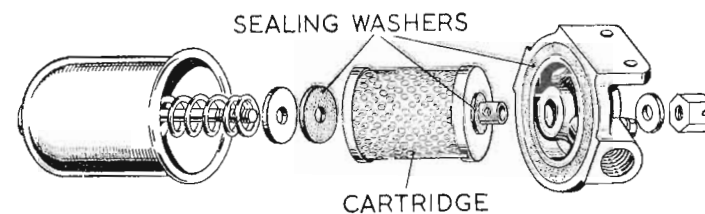


FIG. 5. The external oil filter.

Remove the crankcase shield and then the crankcase sump plate (B) Fig. 3, which carries a filter. Take care when removing the filter that it is not damaged by the oil pump scavenge pipe (carrying ball valve C, Fig. 3). Wash the filter and cover plate in petrol. When replacing, new gaskets should be fitted as required. Refit the crankcase shield.

The main oil filter (external) is fitted in the return oil line from crankcase to tank, Fig. 4. Disconnect the oil lines at the filter and remove it from the machine. Cut the centre nut locking wire and unscrew the nut, at the same time supporting the bowl to avoid possible damage.

Extract the filter cartridge and make sure that the sealing washers are not lost while this is being done. Examine the cartridge and if badly contaminated, it must be renewed. If the cartridge is only lightly contaminated, wash in petrol together with the filter bowl,

body and other parts and dry out.

When reassembling, renew the bowl sealing ring if necessary and re-wire the centre nut after tightening.

When all the above operations have been completed, refill the oil tank to the maximum level given on the dip-stick, operate the starter pedal several times with the fuel and ignition off, at the same time operating the exhaust valve lifter. This is essential in order to circulate oil round the engine before starting up.

Start the engine and check that oil is being returned to the tank (see *Oil Flow*, page 18) then, with the engine still running, check the whole system for leaks.

NOTE:—Where the petrol has been used to wash items in the above operations, make sure that the oil tank in particular is quite clear of petrol and that all other parts are not reassembled until the petrol has evaporated.

Contact Breaker Lubrication

Attention should be given to this unit at regular intervals in accordance with the instructions contained in the Servicing Schedule.

Removal of the circular cover on the timing case (right-hand side of the engine) will expose the contact breaker/auto-advance unit.

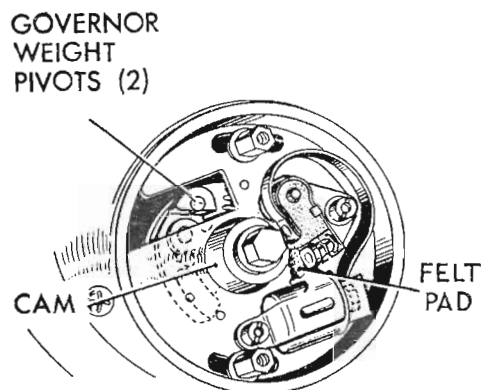


FIG. 6. Lubrication of the contact breaker.



By careful rotation of the engine, the pivots of the governor weights behind the contact breaker become accessible through the rectangular hole in the back plate, and each must receive **a single spot of engine oil**. There are two of these weights equally spaced round the spindle.

The surface of the cam must also be **smeared very lightly with engine oil and one spot of oil applied to the felt pad which lubricates the cam**.

Throughout this check, do not use excessive quantities of lubricant, because it is essential for the contact breaker points to be kept clean and dry, otherwise misfiring and difficult starting may occur.

Exhaust Valve Lifter

Adjustment of the cable length is provided at the engine. The setting must be arranged to give appreciable free movement of the handle-bar lever before considerable resistance to movement indicates that the exhaust valve spring is about to be compressed and the valve to open. Complete absence of free movement of the lever means that the exhaust valve is not seating properly and will cause loss of compression, a burnt valve seat and other troubles.

The Sparking Plug

The upper portion of the insulator should be wiped clean after fitting and before connecting the high-tension cable.

The porcelain insulation should be wiped with a clean cloth in order to remove any accumulation of grime or dust etc., because such deposits can be conductive and result in poor plug performance.

THE CARBURETTER

The Amal carburetter is fitted with jets which have been proved to give satisfactory performance and full economy and **they must not be changed or altered in any way**.

The only items which may require attention by the driver are the main and the pilot jet, which are accessible after removal of the float chamber (Fig. 7).

These jets must not be removed except in case of emergency. If a vehicle mechanic is available, he should carry out any checks required.

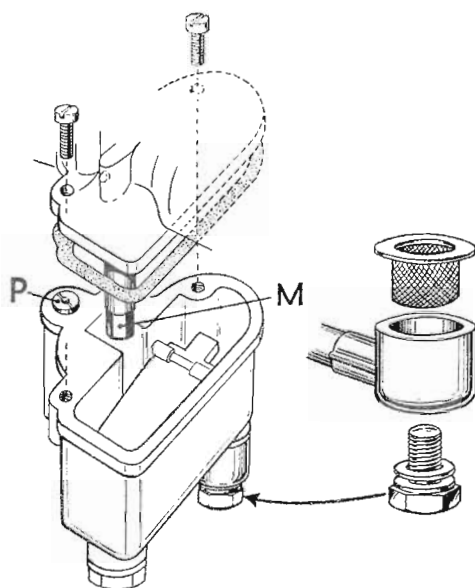


FIG. 7. The jets in the Amal carburettor.

The petrol feed banjo can be disconnected following removal of its fixing bolt, which also allows the filter to be withdrawn. Extraction of the two float chamber screws above the chamber permits it to be lowered from the carburettor body.

Great care must be exercised during this operation to avoid risk of damage to the float or other internal parts.

The pilot jet (P) Fig. 7, is located on the upper face of the float chamber and can be unscrewed by means of a screwdriver.

The main jet (M) Fig. 7, is screwed into its holder which is part of the carburettor body and requires the use of a spanner to unscrew it.

The jets must be washed in clean petrol and then blown through to clear the passageway. **Do not use any sharp implements for cleaning and do not overtighten the jets when replacing.**

The filter should be washed in clean petrol and also at regular intervals in accordance with the instructions contained in the Servicing Schedule.

NOTE:—When reassembling, the float chamber gasket and the banjo union sealing washers must be in good condition otherwise serious petrol leakage will result.

Air Filter

This must be examined at intervals in accordance with the instructions contained in the Servicing Schedule. Release the snap fastener of the lid of the filter box with a screwdriver or a coin and open the lid.

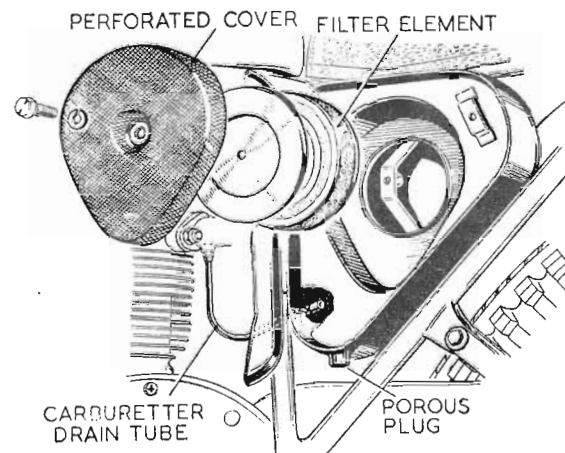


FIG. 8. Dismantling the air cleaner.

Remove the bolt at the centre of the coarse mesh cover, which will then be released together with the filter cover and the filter itself. Note carefully the sequence of dismantling to ensure correct re-assembly. If the filter is contaminated by excessive quantities of dirt it must be renewed. It should be noted that running with a badly choked filter will cause restricted maximum speed, heavy fuel consumption and other troubles. The base of the filter box carries a drain plug of porous sintered steel to allow excess fuel from the carburettor to drain away and **it must not be removed by the driver.** The drain tube from the carburettor which enters at the lower part of the filter box must be examined to make sure that it is free from mud or other obstruction.

TRANSMISSION

Rear Chain Adjustment (Fig. 9)

The rear chain must be adjusted when the machine is on its centre stand so that the wheel is at the lowest point in the suspension.

Make sure that the gearbox is in neutral and rotate the wheel slowly until the tightest point of the chain is at the centre of its run. Then check its total up and down movement which can be felt with the fingers through the hole in the upper half of the chaincase when the rubber plug has been removed.

The total movement should be between $1\frac{1}{8}$ in. and $1\frac{1}{4}$ in. and if it varies from this setting then the chain must be adjusted by moving the rear wheel, usually in a rearward direction.

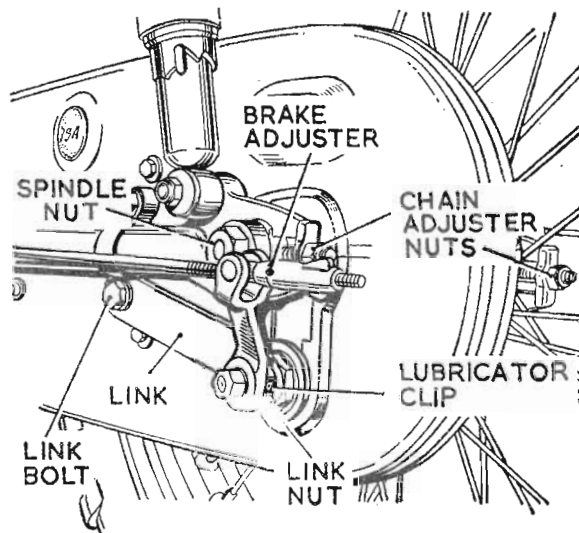


FIG. 9. Rear chain adjustment.

Slacken the nut and the bolt at the ends of the link (between the brake plate and the swinging fork tube) and then the brake rod adjuster.

Loosen the spindle head on the right side of the machine by one or two turns, followed by a similar action to the spindle nut on the left side.

Draw bolt adjusters are fitted to both ends of the spindle and their nuts must be tightened by the same amount on each side until the chain slackness conforms to the figure already given.

Retighten the left spindle nut first and then the main spindle head on the right side. Tighten the link bolt and nut, recheck the chain setting and if correct then re-adjust the brake to suit requirements.

Care of the Rear Chain

Lubrication of the chain is provided by means of a special oiler at the rear of the primary chaincase, which supplies a controlled amount of lubricant to keep the chain in good condition.

The supply of oil to the rear chain is entirely dependent on the correct maintenance of the oil level in the primary chaincase.

A regular check as outlined in the Servicing Schedule must be made of the rear chaincase to ensure that any mud which may be present is removed through the slots in the bottom of the case.

When refitting a chain, it is important that the spring clip of the connecting link has its closed end pointing in the direction of travel of the chain (i.e., forwards on the top run).

Primary Chain Lubrication

The correct oil level will be obtained only when the check is made with the machine standing on level ground and should be carried out regularly in accordance with the instructions contained in the Servicing Schedule.

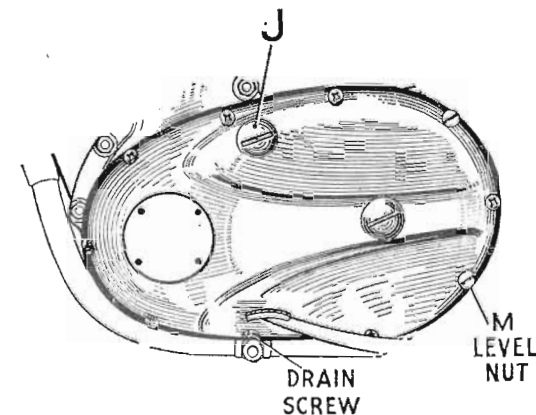


FIG. 10. Primary chain lubrication.

Two of the lower primary chaincase screws are painted red, the one below the brake pedal pad being the drain screw and the other, towards the rear of the case, is a 'sleeve nut' which serves as a level plug.

To replenish with oil, first remove nut (*M*) Fig. 10, and then the inspection cover (*J*). Add oil through the inspection hole until it appears at the level hole and allow sufficient time for any surplus to drain off. Replace the level screw.

NOTE:—Too little oil will not lubricate either the primary chain or the rear chain properly, and an excessive quantity may induce clutch slip.

If the screw has been removed to empty the chaincase, when it has been replaced, add approximately $\frac{1}{2}$ pint of oil of the correct grade (see Servicing Schedule) to bring the oil to its correct level, i.e., with the level plug removed. The drain plug is fitted with a soft alloy washer in order to secure an oil-tight joint.

Clutch Control Adjustment

The control is in correct adjustment when, with the handlebar lever released, the control arm above the timing cover on the right side of the crankcase is inclined outwards by a small amount. In this position there must be approximately $\frac{1}{16}$ in. free play at the handlebar lever before the control arm is operated.

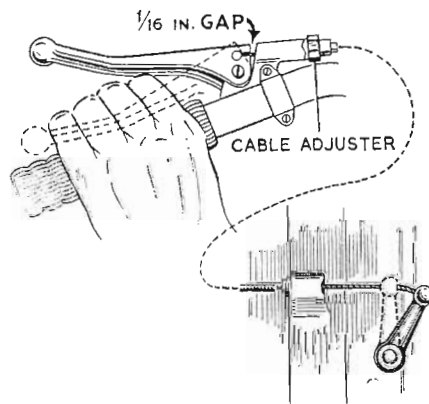


FIG. 11. Adjustment of the clutch operating lever.

When the handlebar lever is gripped, the control lever should take up a position approximately parallel with the timing cover joint (see Fig. 11).

Provision is made for cable adjustment at the handlebar and is intended for fine adjustment only.

Gearbox Lubrication

The correct oil level will be obtained only when the check is made with the machine standing on level ground and should be carried out regularly in accordance with the instructions contained in the Servicing Schedule.

The oil level plug is situated between the starter and gearchange pedals (see Fig. 12) and the filler plug is on top of the gearbox beneath the battery platform. Filling will be made easier if a cardboard chute or a spouted instrument is used.

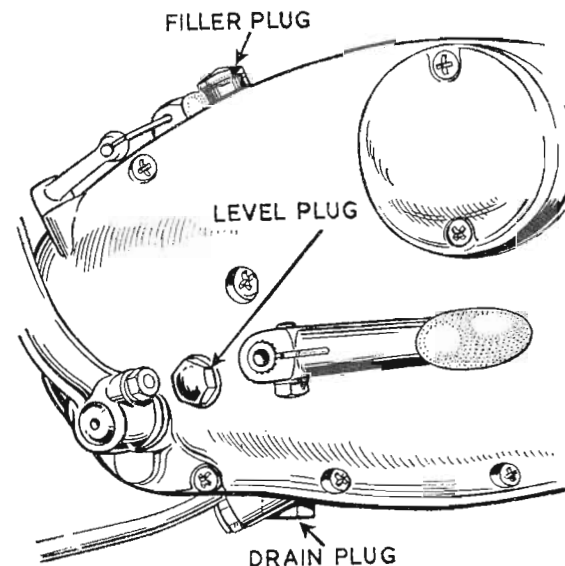


FIG. 12. Gearbox lubrication.

Remove the level and the filler plugs and replenish the gearbox with the correct grade of oil (see Servicing Schedule), allowing sufficient time for any surplus oil to drain off. Replace the level

plug which is fitted with a special sealing ring and which must be examined to make sure it is in good condition, and then the filler plug.

The gearbox should be drained after a run when the oil is still warm. The drain plug is beneath the gearbox section of the engine unit and can be unscrewed through the hole in the crankcase shield specially provided for this purpose. The capacity of the gearbox is approximately two-thirds of a pint and correct oil is detailed in the Servicing Schedule.

WHEELS

Both wheels are fitted with sealed ball journals which do not require adjustment. The bearings are packed with grease during assembly and do not need attention until the machine receives a complete overhaul (see Servicing Schedule).

Speedometer Gearbox

The unit does not require any attention apart from lubrication at intervals (see Servicing Schedule). **Grease with two applications from a hand grease gun only.**

Brake Cam Spindle Lubrication

At regular intervals, in accordance with the instructions contained in the Servicing Schedule, move aside the lubricator clip (Fig. 9 & 14) on the spindle boss and apply two or three drops of engine oil. **Excessive oiling must be avoided because this will allow the lubricant to reach the brake linings.**

Front Wheel, Removal and Replacement

Place the machine on its central stand. First, unhook the cable from the slotted clevis on the brake plate lever (Fig. 14). This operation becomes easier if the lever is raised by hand until the cable becomes slack. Then slacken the pinch bolt at the bottom of the left fork leg (Fig. 13).

Insert a stout tommy-bar through the hole in the head of the wheel spindle on the left side of the machine and unscrew it from the hub.

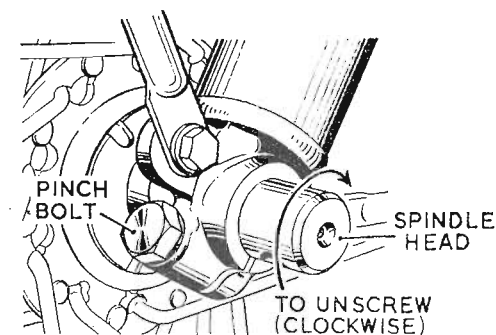


FIG. 13. Removing the front wheel (left side).

Note that it has a left-hand thread and unscrews by turning in a clockwise direction as indicated by the arrow (Fig. 13). Support the wheel as the spindle is withdrawn and when it is clear, the wheel can be pulled away from the right fork leg and removed from the machine. After removal, **do not allow the wheel to fall on to the bush which projects from the brake drum side of the hub.** Although the bush is pressed in, it may, if subjected to a sharp blow, be forced back into

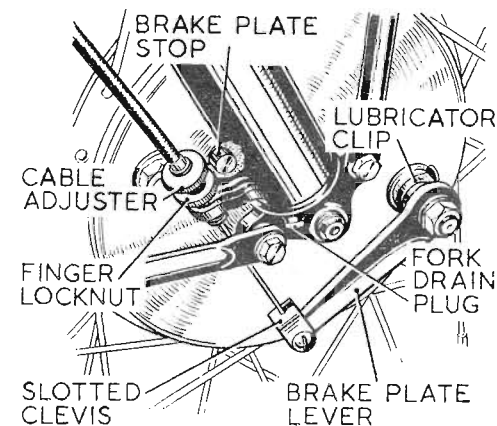


FIG. 14. Removing the front wheel (right side).

the hub. If this should happen, workshop attention must be sought. When replacing the wheel, note especially that the brake plate stop (Fig. 14) must be located in its socket on the inside of the right fork leg. **It is important that after the wheel spindle has been tightened but before the pinch bolt is locked up, the forks are rapidly depressed several times to allow the left fork leg to position itself correctly on the spindle.** If this precaution is not observed, the fork leg may be clamped out of position and will not function properly.

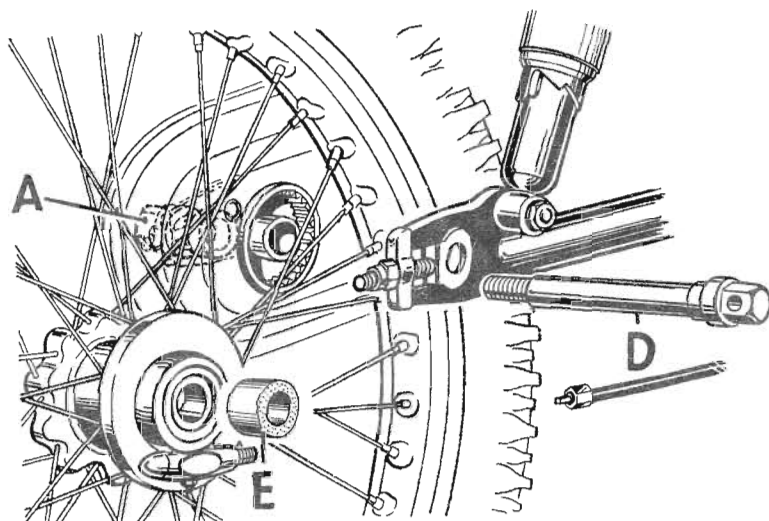


FIG. 15. Removing the rear wheel.

Rear Wheel, Removal and Replacement

Place the machine on its central stand. Removal and replacement of the rear wheel does not effect either the chain or the brake adjustment.

Disconnect the speedometer driving cable at the hub and unscrew the spindle (D) Fig. 15, from the right side, of the machine. The spindle has a normal right-hand thread and unscrews by turning in an anti-clockwise direction. It is also drilled to accept a tommy-bar to assist withdrawal.

The spacing sleeve (E) between the speedometer drive gearbox and the swinging fork end can then be removed and the wheel pulled away from the brake drum and lowered to the ground.

Take the speedometer gearbox off the hub.

To remove the wheel from the machine the driver should stand at the left side of the rear wheel, facing across the machine. Incline the machine towards the rider, then lean over it and draw the wheel out rearwards.

The spindle nut (4) must not be released because this retains the brake drum and chainwheel assembly in position.

TYRE PUNCTURES

NOTE:—The beads of the tyres have wire cores and cannot be stretched over the rim flange without damage. Removing and fitting will be simplified if the wire beads are carefully adjusted into the well of the rim with each application of the lever.

Removal of the Inner Tube

Unscrew the valve cap, valve core, and the ring nut locking the valve to the rim, followed by the nut(s) of the security bolt(s) and push the bolts into the cover.

Press each bead off its seat by hand pressure. Insert a tyre lever under the bead at the valve position and while operating the lever,

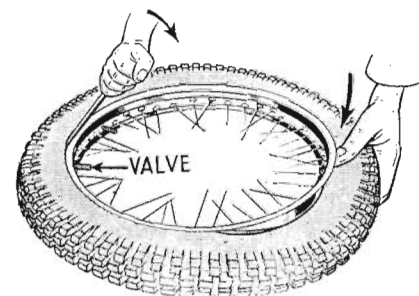


FIG. 16. Removing the tyre bead (first stage).

press the tyre into the well of the rim at a point opposite to the valve position (Fig. 16). Insert a second lever close to the first one and prise the bead of the tyre over the rim flange, whilst holding the removed portion of the bead with the first lever (Fig. 17).

Continue round the bead in steps of 2-3 inches and when the bead is completely lifted over the rim flange, remove the inner tube.

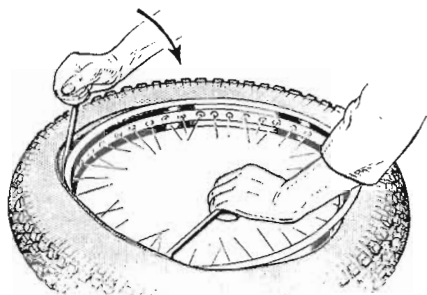


FIG. 17. Removing the tyre bead (continued).

Repairing Inner Tube

Thoroughly clean and roughen the area around the puncture with a wire brush or emery paper and remove dust. Apply solution to tube covering an area a little larger than the patch to be employed and allow to become 'tacky'. **This is most important in obtaining good adhesion of the patch.**

Peel off the protective backing from the patch and apply the exposed surface to the area coated with solution, using firm pressure particularly at the edges.

Dust the repair with chalk to prevent risk of adhesion to the tyre wall.

Replacing the Inner Tube

Examine the tyre both externally and internally for nails, flints, or other damage and be sure to remove the object which caused the puncture. If the outer wall of the tyre is marked with white spots, adjust the position of tyre on rim so that the spots are at the security bolt position in the case of the front wheel, but for the rear wheel the spots should be midway between the two security bolts. This is necessary as an aid to good wheel balance.

Check that the rim band lies centrally in the rim and that its rough side is against the spoke heads.

Dust the inside of the tyre and the pad of security bolt(s) with chalk.

With the security bolt(s) loosely in position, inflate the inner tube just sufficiently to "round" it without stretch. Fit the tube into the cover threading the valve through the valve holes in the band and the rim.

Lubricate the tyre bead with water, preferably with a little soap added. Press the bead into the well of the rim opposite to the valve and insert a tyre lever under the bead as closely as possible to the point where the bead passes over the rim flange. Lever the bead over the flange, at the same time pressing the fitted part of the bead into the well of the rim. As the security bolt(s) position is reached make sure that the inner tube is resting on the flange of the bolt(s) and not overlapping the sides (Fig. 18). Repeat until the bead is completely over the flange, finishing at the valve position.

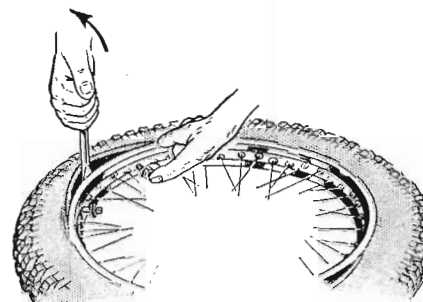


FIG. 18. Completing the refitting of the inner tube.

Push the valve inwards to make sure that the tube is not trapped under the bead and then pull the valve firmly back into position.

Replace valve core and inflate tyre slowly to the correct pressure (see Servicing Schedule). Check that the fitting line on the tyre just above the bead is concentric with the rim flange and that the valve protrudes squarely through the valve hole.

Refit the valve ring nut and the cap. Bounce the wheel at the point where the security bolt is fitted and then tighten its securing nut.

SUSPENSION AND STEERING

Front Forks

The only servicing required by the front forks is renewal of the oil used internally for damping purposes and this should be carried out regularly in accordance with the instructions contained in the Servicing Schedule.

Unscrew the filler plugs on the top of the fork legs (Fig. 19) and also the drain screws at the bottom of the fork sliding members (Fig. 14).

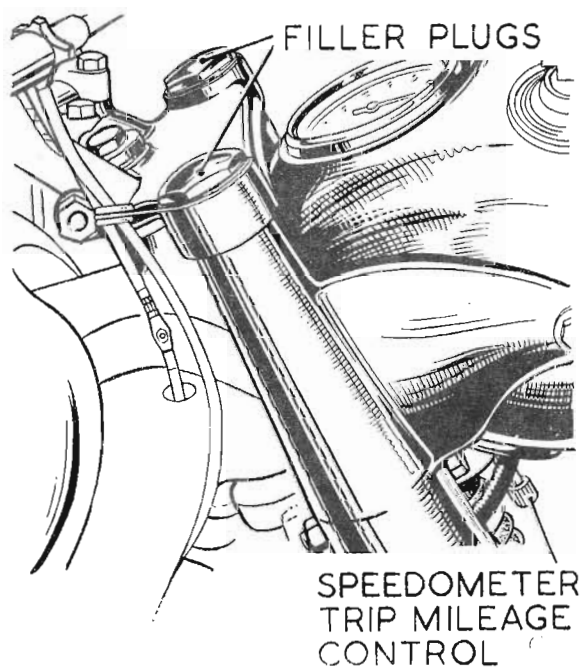


FIG. 19. Front fork lubrication.

Allow all the oil to drain out and when dealing with the right side fork leg lean the machine to the right to prevent oil draining on to the brake plate.

Stand astride the machine, apply the front brake and depress the forks a few times to drive out any oil remaining in the system.

Replace the drain screws, raise the filler plugs a few inches, and pour $\frac{1}{3}$ pint of oil into each leg. Correct oil is given in the Servicing Schedule.

Replace the filler plugs and tighten firmly. **This is important because they hold the fork shafts into the top yoke, and if they are slack, the steering may be affected.**

Steering Head

The steering head should be tested occasionally for play and to ensure that the forks rotate freely.

Rear Suspension

The two suspension units comprise a telescopic damper unit and a totally enclosed coil spring. The hydraulic dampers require no attention whatsoever. They are sealed during manufacture and if they suffer damage or become ineffective they must be replaced.

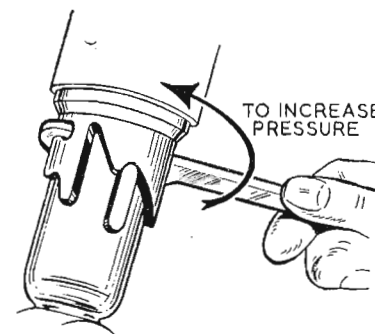


FIG. 20. Adjustment of the rear suspension.

The pressure on the springs can be varied by means of a three-position cam adjuster at the lower end of the unit (Fig. 20) and the springs can be adjusted to suit the load conditions or the nature of the ground.

The higher the cam is set on the peg, the greater is the load required to compress the springs, as required with a pillion passenger or hard cross-country conditions.

THE ELECTRICAL EQUIPMENT

Topping-up the Battery

These checks are required frequently when a new battery is fitted, until the battery plates absorb their full potential of electrolyte.

At regular intervals in accordance with the instructions contained in the Servicing Schedule, check the level of the electrolyte in the battery cells.

Release the retaining strap which engages with the battery platform by means of a hook and remove the battery cover. Disconnect the cables (these are tongued connections and pull apart) and lift off the battery.

Remove the top cover to expose the cell filling holes and if necessary, add distilled water to restore the level of the electrolyte in each cell to the line marked on the wall of the battery body.

Do not use naked lights when examining the condition of the cells and do not add the water while the battery is on charge.

Zener-diode

This unit, attached to a finned mounting below the steering head, must not be interfered with by the driver under any circumstances.

Battery Earth Connection

The A.C. lighting/ignition unit has been designed for positive (+) earth systems. If the battery connections are reversed, the electrical equipment will be damaged. The battery connections are different in size in order to prevent wrong connections and so safeguard the battery.

LIST OF BULBS

HEADLIGHT	...	...	...	12 volt, 50/40 watts, pre-focus
PARKING LIGHT	...	...	...	12 volt, 6 watts
STOP/TAIL LIGHT	...	...	...	12 volt, 6/21 watts
SPEEDOMETER LIGHT	...	...	...	12 volt, 2.2. watts

Bulb Replacement (Headlight)

First slacken the front rim retaining screw, on top of the rim. Disengage and withdraw the front rim and light unit assembly, removing the upper edge first. Press the adapter inwards and turn to the left

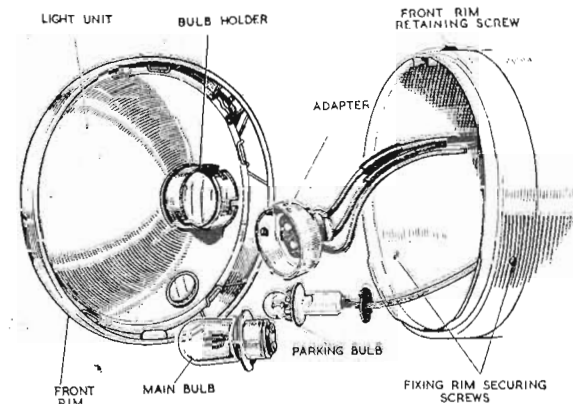


FIG. 21. Headlamp dismantled for bulb renewal.

(anti-clockwise). Lift off the adaptor and remove the defective bulb (Fig. 21). After fitting a replacement bulb, reverse the above procedure to reassemble the lamp. It is essential to ensure that the rim is securely attached to the lamp body, otherwise it will soon become disengaged.

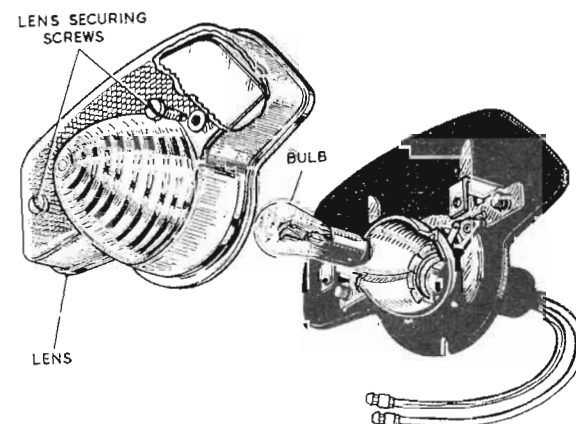


FIG. 22. Tail lamp dismantled for bulb removal.

Bulb Replacement (Parking Light)

Disengage and withdraw the front rim and light unit assembly as described for removal of the headlight bulb. The bulb holder and bulb can then be withdrawn from the reflector in which it is a push-fit (Fig. 21). After fitting a replacement bulb, reverse the above procedure to reassemble the lamp. Ensure that the bulb holder is a tight fit in the reflector, i.e., the rubber washer is in place.

Bulb Replacement (Stop/Tail Light)

To expose the bulb, remove the lens retaining screws. When fitting the replacement bulb, **note that the securing pins are staggered to ensure correct insertion into the bulb holder (Fig. 22).**