BSA SERVICE SHEET No. 603

"B" "C" and "M" Group Models

Revised June, 1959
Reprinted May, 1960

THE LUBRICATION SYSTEM

The engine lubrication system is of the dry sump type operated by a double gear pump, situated in the bottom of the crankcase on the right-hand side. The only external oilways are the supply and return pipes to the tank and the rocker feed and drainage pipes on the B Group. The oil drawn from the oil tank to the supply side of the pump first passes through a close mesh filter. This filter is not fitted to M Group machines as a felt filter is incorporated in the oil return pipe.

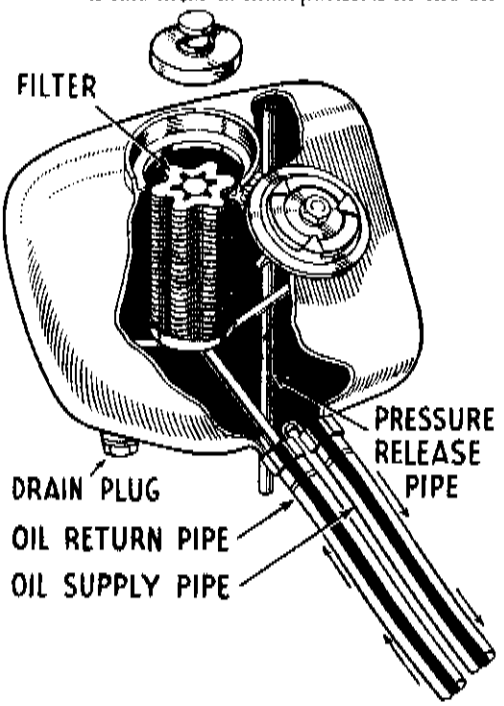
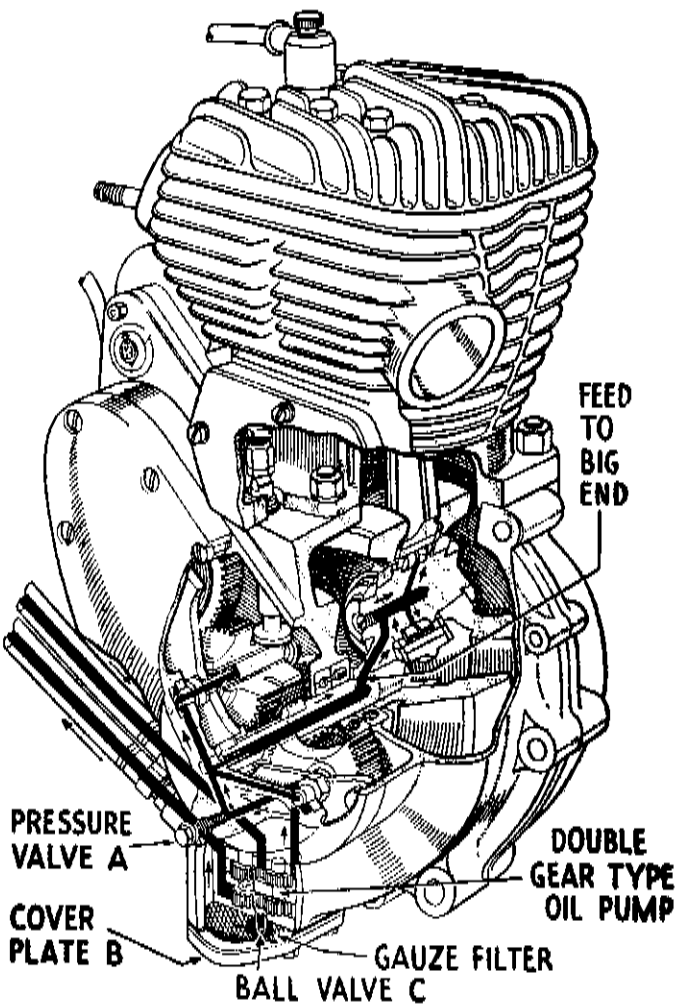


Fig. M3. The Lubrication System Models M20 and M21.



From the supply side of the pump the oil passes through a ball valve *A*, and is then transferred to the hollow drive side mainshaft to supply the big end roller bearing. On B and M Models the transfer is made via a nozzle fitted in the timing cover which projects into the end of the drilled mainshaft and additional oilways in the timing cover provide positive lubrication to the cam pinion spindles. In the case of the C Group models, the oil passes through a hole in the main bearing bush, round an annular groove in the journal and thence via a radial drilling to the hollow centre of the shaft. (See Fig. M4). On C10L and C11G models a fine bleed hole from the main bearing meters a supply of oil to the camshaft and cam followers.

After lubricating the big-end and circulating throughout the engine in the form of oil mist, the oil drains down, through a filter to the bottom of the crankcase from which it is drawn by the return pump past ball valve C and delivered up the return pipe to the tank.

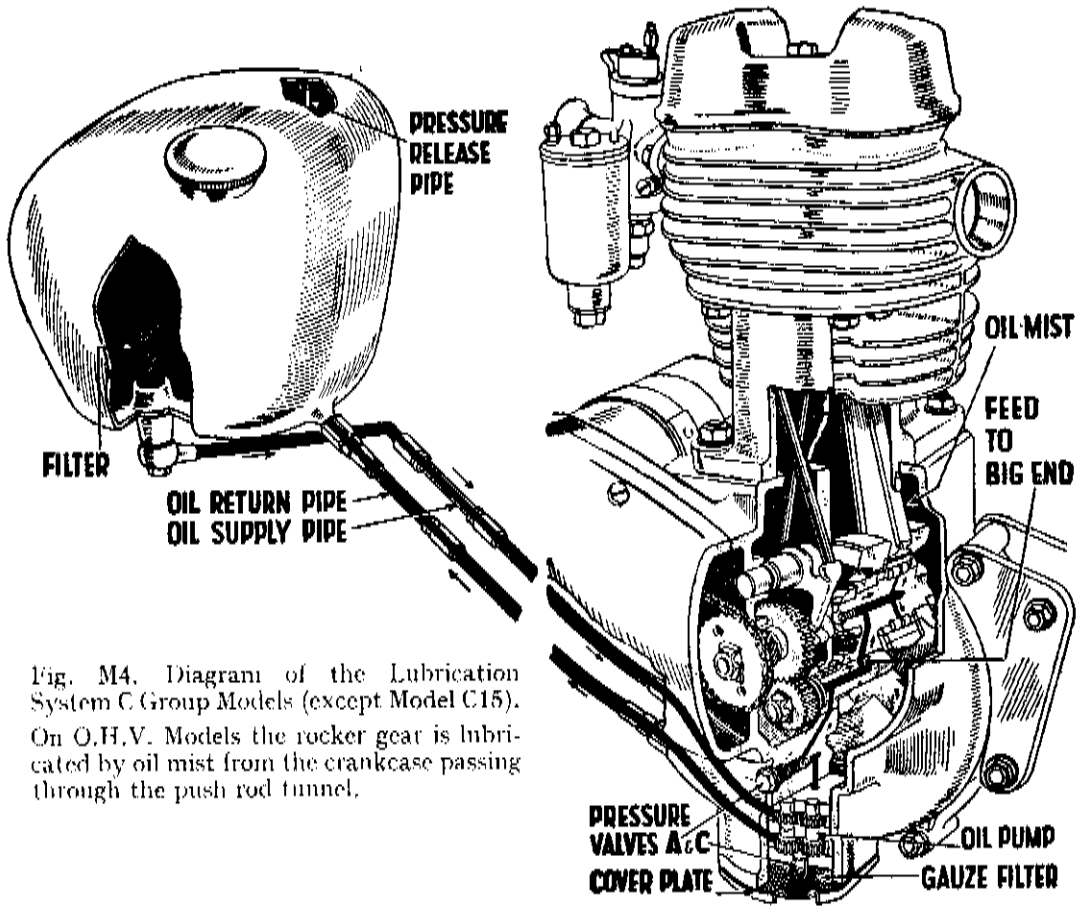


Fig. M4. Diagram of the Lubrication System C Group Models (except Model C15). On O.H.V. Models the rocker gear is lubricated by oil mist from the crankcase passing through the push rod tunnel.

On "B" group machines oil is fed through a union situated in the pipe between the return pump and the tank, to the rocker spindles, and after lubricating the rockers and enclosed valves, is returned to the crankcase through an external oil pipe attached to the base of the inlet valve spring housing (see Fig. M5). An internal oilway connects the two valve spring wells.

Incorrect seating of the ball valve *A* will allow oil to transfer from the tank to the engine, whilst the machine is stationary. In this event, unscrew the plug over the valve, and remove spring and ball. Clean the ball and its seating and replace. If the ball valve *C* should get stuck in its seating, there will be no return of oil to the tank. To correct, remove the cover plate below the pump and insert a piece of wire into the valve orifice, and lift the ball off its seating to free it. To check the flow of oil in the lubricating system, remove the tank filler cap whilst the engine is running. Oil should be seen issuing from the return pipe from the crankcase. The tank and crankcase should be drained periodically, and replenished with clean oil (see Periodical Maintenance).

Any restriction in the pressure release pipe in the tank will cause an increase in pressure inside the oil tank, and will result in leakage of oil at the filler cap. This can be put right by inserting a length of flexible wire into the pipe at its lower end (just in front of the rear mudguard) and pushing the wire right up the pipe, thus clearing obstruction.

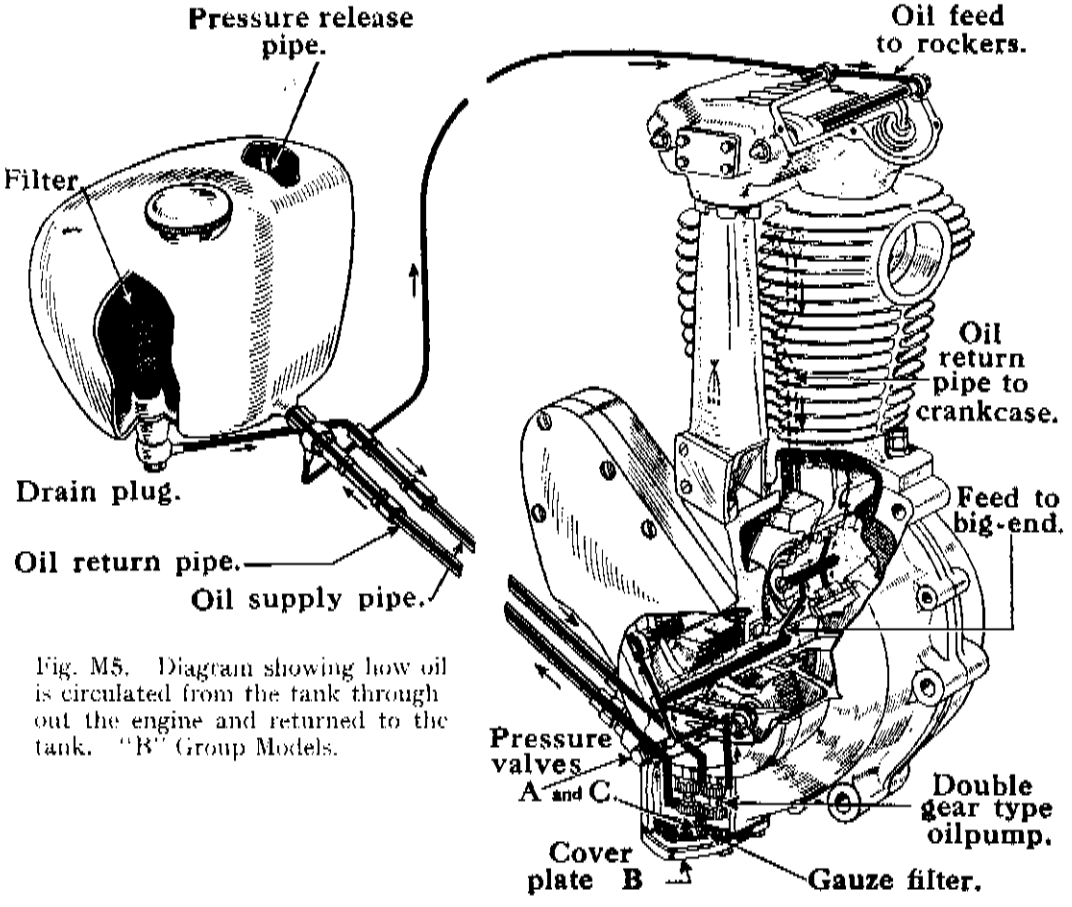


Fig. M5. Diagram showing how oil is circulated from the tank through out the engine and returned to the tank. "B" Group Models.

To remove the "B" and "C" Group oil tank filter for cleaning, remove the oil pipe banjo union plug at the bottom of the tank. The filter will come out with the plug.

On models with the Swinging Arm type frame the oil tank is of slightly different construction but the system is the same. The oil tank filter is attached to the large hexagon nut in the outside of the tank and its removal does not entail interfering with the oil pipes.

To remove the "M" Group filter for cleaning, release the tank filler cap, release the filter cap thus exposed, and lift the filter out. In all cases the filter should be placed in a can large enough to cover it with petrol, and thoroughly washed. Before replacing make sure that it is quite dry of petrol.

The pump filter can be withdrawn after removing the cover plate *B* and should be thoroughly washed with petrol, dried and replaced.

On no account try to remove the oil pump unless it requires attention. (See Service Sheet on Complete Dismantling of Engine).

THE CRANKCASE BREATHER VALVE

The Crankcase Air Release Valve is of similar construction on all models although its position in the crankcase is dependant on the model and the year of manufacture.

On all "C" Group models the breather is situated on the left-hand side of the crankcase behind the primary chaincase. 1946 and 1947 "B" and "M" machines have the breather positioned at the rear of the drive side bearing boss. Later "B" and "M" Group models have the breather positioned in the lower edge of the timing chest cover.

In each case its purpose is to allow free release of air from the crankcase as the piston descends, and to prevent air being drawn back into the crankcase as the piston ascends. A crankcase breather valve which is faulty, or partially blocked, will result in oil leakage from the engine.

Before the breather valve can be withdrawn the air release pipe must be removed by unscrewing the union nut. The complete breather valve can then be unscrewed from the crankcase. To dismantle the breather, undo the large hexagon on the outer end of the valve, the valve retaining collar can then be unscrewed with the aid of a large screwdriver thus allowing the fibre disc valve to fall free. Before reassembling, wash the components thoroughly in petrol to free them from any oil residue that may cause the valve to stick.

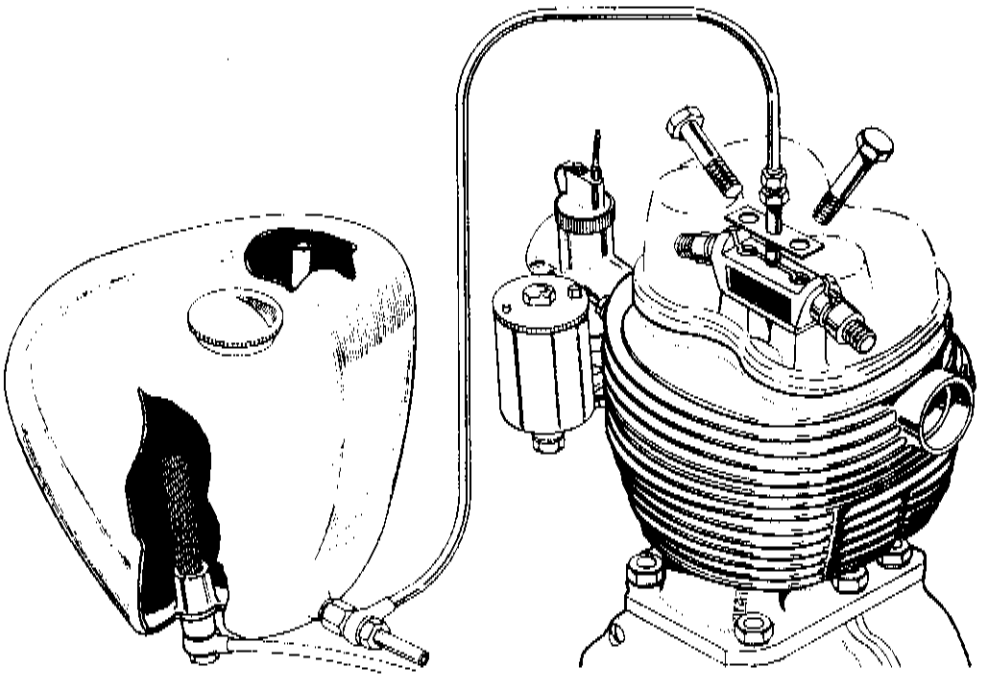
Before replacing the breather valve on "C" Group models the movement of the disc valve should be checked to ensure that it does not exceed .010 in. If excessive clearance is found and the disc valve is undamaged the face of the retaining collar should be ground so as to reduce the depth of the recess in which the disc valve lies. Take care not to grind too much away so that the disc valve has no clearance.

If the breather valve is fitted into the timing case cover, ensure that it is positioned so that the hole drilled in the side of the pipe inside the cover is facing towards the cover and slightly towards the rear. Failure to observe this precaution may result in excessive oil loss. Correct positioning of the hole may be effected by varying the thickness of the fibre washer fitted between the air release valve and the timing case cover.

MODELS C10L and C11G

Instead of the pressure operated clack valve, a mechanically timed breather is employed. This takes the form of a hollow drive-side engine Mainshaft with a radial drilling which, at the appropriate piston position, is brought in line with a drilled port in the crankcase thus allowing the gases to exhaust freely to the atmosphere. The engine sprocket distance sleeve, which fits over the portion of the mainshaft with the radial drilling, has six transfer ports so that it is immaterial which of the six spline-grooves locates the internal peg of the sleeve.

This type of breather is completely automatic and requires no adjustment or other maintenance whatsoever.



Rocker Gear Lubrication C12 (1956).

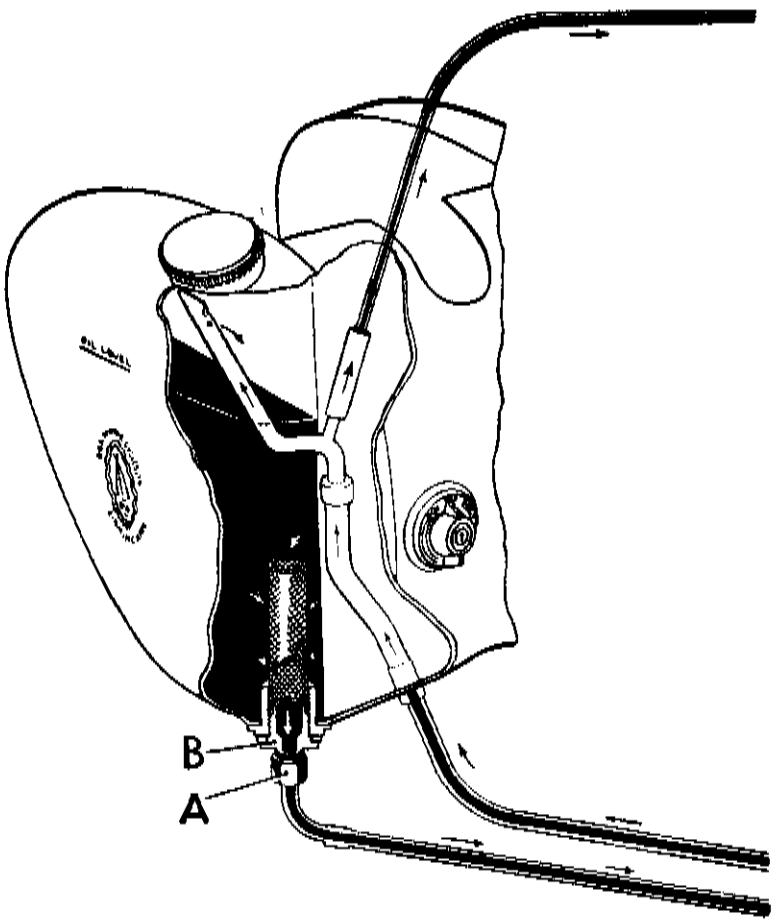
Parts required for conversion of C11 and C11G engines.

Part No.	Description.
29–2086	Rocker Oil Feed Pipe.
29–2091	Rocker Trunnion.
29–2092	Bolt.
45–2454	Locking Plate.
65–8420	Connection.
65–8421	Washer.
65 8424	Nut.

MODEL C12, 1956

The Model C12 engine is identical with the C11G model. However, the lubrication system has been modified to provide positive lubrication to the valve rocker gear. The take off is from the oil tank return pipe, as on the "B" group plunger models and the oil is fed through a rocker feed pipe to the rocker cover securing bolt which is drilled to allow the oil to pass to the trunnion. This trunnion incorporates oil grooves direct to each rocker fulcrum. After lubricating, the oil drains to the sump down the push rod tunnel, providing extra lubrication for the cams and cam followers in the process.

This modification can be adopted on the C11 and C11G engines at very low cost. The parts required are listed above, and they can be obtained through your dealer.

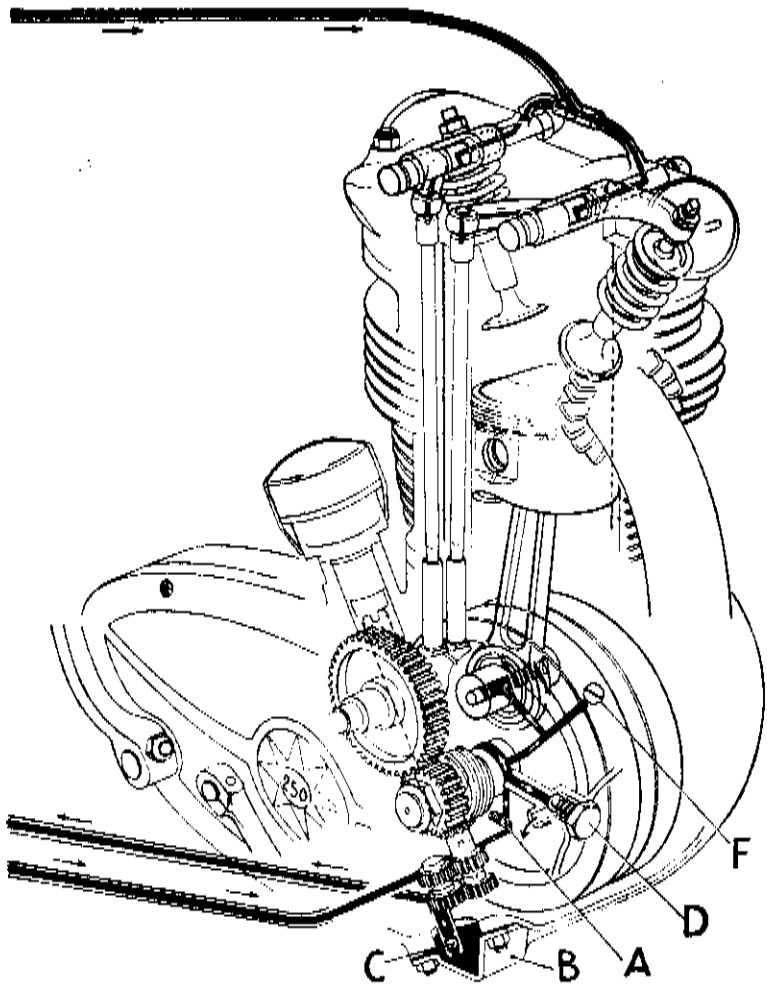


The Oil Tank C15.

MODEL C15

The lubrication system is of the dry sump type and is operated by a double gear pump situated in the bottom of the crankcase on the right-hand side. The oil tank capacity is four pints and oil is drawn from the oil tank to the supply pump (top set of gears). It is then pumped past the non-return valve *A*, and along the hollow mainshaft to the big end.

After lubricating the engine the oil flows down through a filter to the bottom of the crankcase from which it is drawn by the return pump (lower set of gears) past the non-return oil valve *C*, and delivered up the return pipe to the tank. At the junction of the return pipe to the tank a by-pass pipe leads a supply of oil to the rockers, push-rod ends, etc.



Lubrication System C15.

The valve *A* prevents oil transfer from the tank to the crankcase while the machine is standing, and together with the sludge trap *F*, does not require attention until such time as the engine is completely dismantled.

A by-pass valve *D* ensures a constant pressure in the system. Surplus quantities of oil are discharged into the crankcase.

If the ball valve *C* should be stuck in its seating there will be no return of oil to the tank. In this event remove the cover plate *B* below the pump, insert a piece of wire into the valve orifice and lift the ball off its seating to free it.

Crankcase Breather C15.

The breather is mechanically timed as on the C10L and C11G models but takes the form of a hollow camshaft with a radial drilling which, at the appropriate piston position, is brought in line with a drilled port in the inner timing cover, this port has its outlet inside the outer timing cover. Pressure is then released through a small radial cut-away at the rear end of the outer cover joint face.

Changing the Oil C15.

This should preferably be done immediately after running, so that the oil is warm and will, therefore, flow more freely. Disconnect the oil pipe union nut *A*, at the base of the tank and collect the old oil in a suitable receptacle.

Filters.

Remove the oil tank and crankcase filters for cleaning at regular intervals, this can be carried out in conjunction with the change of oil. After releasing the oil pipe at *A*, unscrew the hexagon plug *B*, which carries the filter in the tank, and wash thoroughly in petrol. Make sure that all the petrol has evaporated before replacing. Refill with the correct grade of oil.

The pump filter can be withdrawn after removing the crankcase cover plate and should be thoroughly washed with petrol, dried and replaced. The oil pump is extremely reliable and it is most unlikely that it will give trouble therefore it should not be disturbed unnecessarily. The pump is held in position by three bolts. The two other bolts hold the sections of the pump together.

B.S.A. MOTOR CYCLES LTD., Service Dept.,
Waverley Works, Birmingham 10.
(PRINTED IN ENGLAND