# BSA SERVICE SHEET No. 604

*Oct.*, 1948
*Revised Sept., 1958*

## B. & M. Group Models
## ENGINE ADJUSTMENTS
### which can be carried out without dismantling

### Oil Pressure Valves

There are two ball valves in the system, and both are placed between the tank and the sump to prevent the transfer of oil when the engine is not running. The spring loaded ball valve as illustrated in Fig. M.6 is situated in the timing cover, and permits a supply of oil under pressure to the big end.

In the event of dirt or foreign matter lodging between the ball and its seating oil will slowly drain from the tank and into the sump when the engine is stationary, and on starting smoke will issue from the exhaust, but will clear after the engine has been running for some time. To rectify this dismantle the pressure valve by unscrewing the hexagon headed nut in the base of the timing cover, withdraw the spring and bolt, and carefully clean the ball and its seating. Finally replace the ball and give it a sharp tap with a hammer and copper drift to ensure a correct seating, and replace the spring, fibre washer and nut.

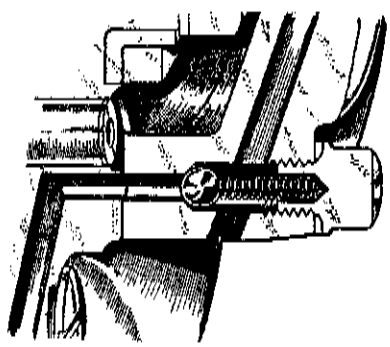

Fig. M.6. Pressure valve in timing cover.

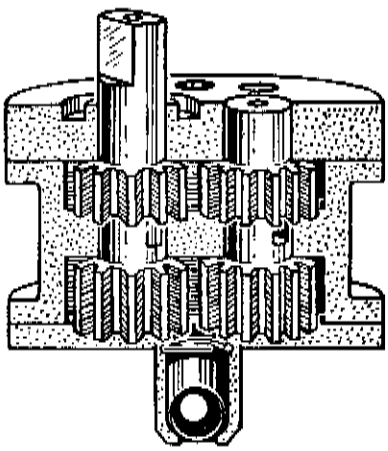

Fig. M.7. Ball valve below return pump.

The other valve is situated in the base of the oil pump (see Fig. M.7) and consists of a ball bearing held on to its seat by gravity. Failure of the oil to return may be due to this ball sticking on its seat. This can be overcome by inserting a short length of wire into the valve orfice, and forcing the ball off its seating. It is not advisable to remove the pump from the crankcase unless such a procedure is absolutely essential, for unless the pump seating is oiltight, oil will transfer from the tank via the pump housing.

### Exhaust Valve Lifter

At all times keep the actuating cam on the lifter clear of the rocker arm on B group and M.33 machines (Fig. M.8) or the tappet head on M.20 and M.21 machines; otherwise the tappet clearances will be affected and the valve gear will be noisy. Failure to check this clearance may result in a burned exhaust valve. Adjustment is usually carried out by means of the cable adjuster, but the actuating arm can be removed and reset at any position on the serrated shaft.

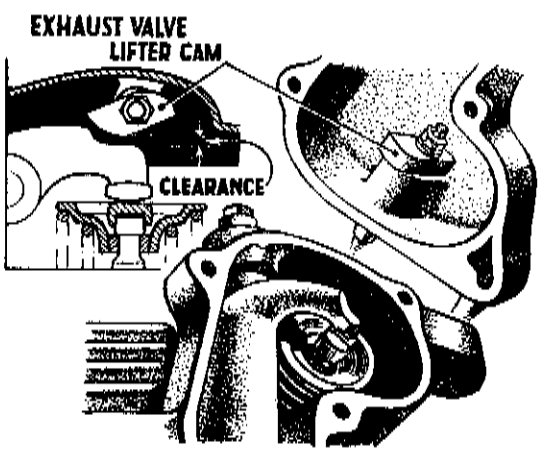


Fig. M.8. Exhaust valve lifter adjustment.

## Tappet Adjustment

Before any attempt is made to check the tappets ensure that the exhaust lifter is adjusted in accordance with the previous instructions. Owing to the special cam design it is essential that the following directions be adhered to.

1. Rotate engine until the **inlet** valve has just closed.

2. Adjust **exhaust** tappet.

3. Turn engine until **exhaust** valve has just taken up tappet clearance, but has not started to open valve.

4. Adjust **inlet** tappet.

Obviate the possibility of an incorrect tappet clearance on O.H.V. Models by lifting the push rod with the fingers before inserting feelers, or the weight of the push rod may prevent the feelers being correctly inserted.

The actual adjustment is carried out by releasing the locknut B (Fig. M.9), holding the tappet with a spanner and screwing the tappet head A up or down. When the correct clearance is obtained tighten the locknut on to the head of the tappet and re-check clearance.

**Note.** Correct Tappet clearances are as follows:

Models B 31, B 32, B 33, B 34, M 33
Inlet .003 Exhaust .003

Models M 20, M 21
Inlet .010 Exhaust .012

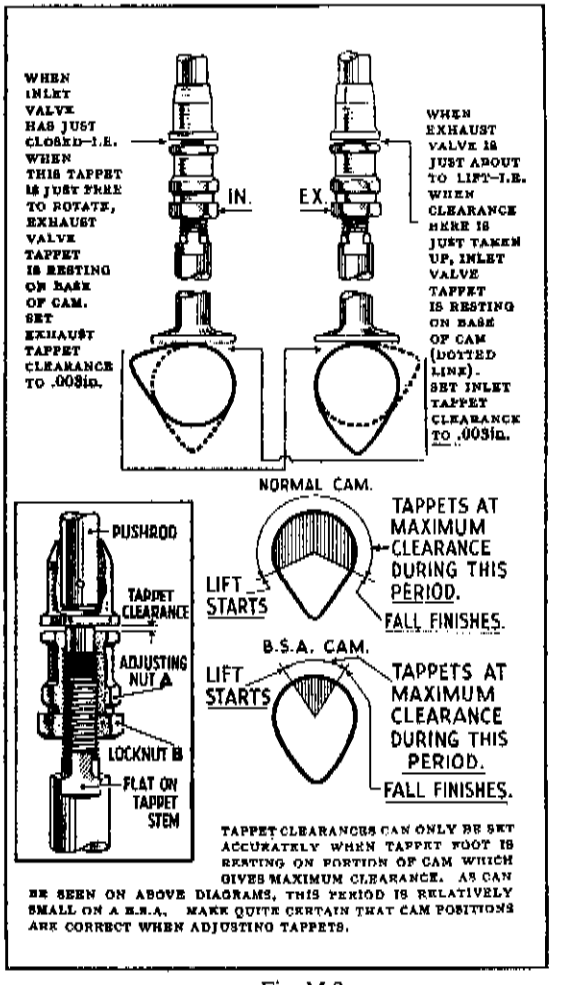


Fig. M.9.

## Ignition Timing (Except models with engine prefix letters G.B.)

It is a rare occurrence for the magneto pinion to slacken off and upset the timing, and it is inadvisable to disturb the setting unless absolutely necessary, or unless the timing is known to be at fault.

It is advisable however, to check the timing periodically, or after carrying out any adjustment to the contact breaker points, as a slight variation tends to advance or retard the engine. If the timing requires resetting first check that the fully open gap is .010 in.-.012 in., then remove the timing cover and in so doing take care to see that the small nozzle which feeds oil to the hollow crankshaft is not damaged. (See Service Sheet No. 606.)

With the cover removed, take off the locknut which holds the magneto pinion on to its taper, and with the aid of a magneto pinion extractor, withdraw the pinion. (The pinion is fixed on its shaft by a plain taper.)

To reset the timing, turn the engine forward until the piston is at the top of the compression stroke, and then turn the engine **backwards** until the piston has descended $\frac{7}{16}$ in. Turn the contact

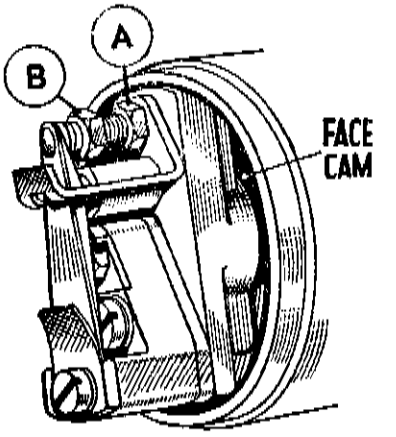


Fig. M.10.

breaker in the direction of rotation until the points are just open (.002 in.) with the ignition lever fully advanced. Tap the magneto pinion lightly on to its taper, tighten up the nut carefully, and when dead tight re-check the setting.

N.B.—It is essential that the ignition setting as laid down here be adhered to or high running temperatures and the possibility of a seizure will be present.

To adjust the contact breaker gap, release the locknut A (Fig. M.10) and adjust the gap to .012 in. max. by rotating the small bolt B in the desired direction.

## 'B' Models with engine prefix letters G.B.

### Ignition Timing

It is unlikely that the ignition timing will alter, but if, for any reason, it is found necessary to check or re-set the ignition timing it is advisable first to check the contact breaker points and if necessary, re-adjust as described under the next heading.

To check the timing, remove the sparking plug and the contact breaker cover. Insert a slim rod through the sparking plug hole to feel the top of the piston, then rotate the engine until the piston is at top dead centre on the compression stroke (i.e. with both valves closed). Keep the rod as vertical as possible and mark T.D.C. position on it. The best way of rotating the engine is to engage top gear and turn the rear wheel.

Turn the engine backwards through about 45° then bring it forward again until the contact breaker points are just on the point of opening. When the cam is moved to the fully advanced position as shown in the unit (Fig. M.10A) the position of the points is best determined by inserting a piece of fine paper, (such as cigarette paper) between the points. The points are just about to open when the paper is only lightly gripped and can be withdrawn with a gentle pull.

The piston should then be $\frac{7}{16}$ inch before T.D.C. for Model B31, and $\frac{3}{8}$ inch for Model B33, as measured by the rod through the plug hole.

If the timing is slightly out it can be set by slackening bolt A (Fig. M10A.) and rotating the contact breaker a degree or two either way as required until the points are in position as described above. Then re-tighten bolt A.

To re-time the ignition if this becomes necessary remove the contact breaker complete with housing by taking out the 3 top timing cover screws (i.e. the one at the top of the timing cover, and the one on each side of it). These are longer than the other timing cover screws, which need not be disturbed, and are provided with nuts B at the back. When they are taken out the contact breaker with housing can be drawn out as a complete unit together with its driving pinion still in position. Disconnect the low tension cable C from its terminal.

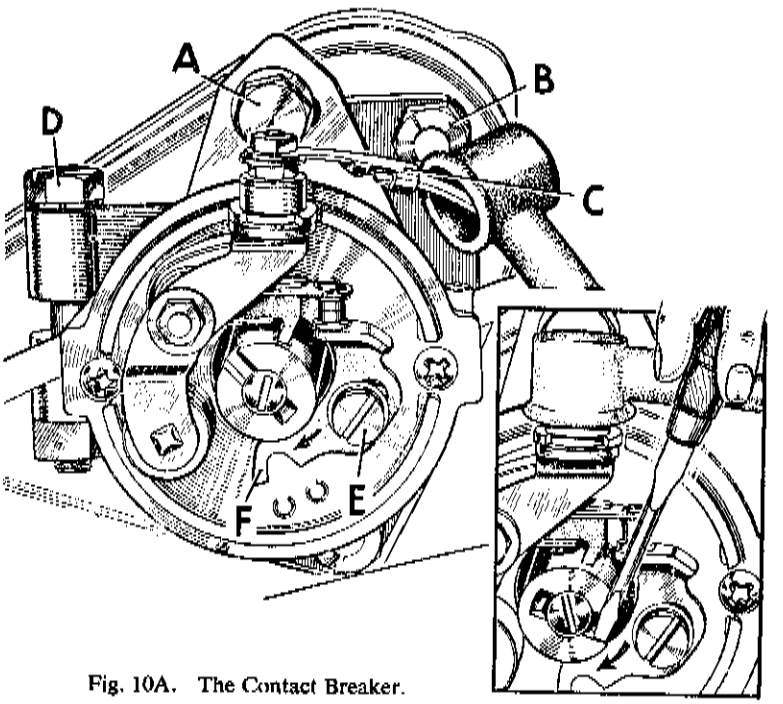


Fig. 10A. The Contact Breaker.

Rotate the engine until the piston is in the correct position as described above (i.e. $\frac{7}{16}$ in. for B31 and $\frac{3}{8}$ in. for B33 before T.D.C. at the end of the compression stroke). Now take the contact breaker unit, remove the cap, and turn the driving pinion until the points are just on the point of opening with the cam held in the fully advanced position as already described for checking the timing. Release the cam and hold the unit in such a position that the nut A and terminal C are vertical. (These two should be in line. If they are not, then slacken pinch bolt D and turn the housing until A comes into line with C. Then re-tighten pinch bolt D).

Holding the unit in this position, gently insert it into its register at the back of the timing cover. If it will not go right home withdraw it and turn the pinion the least fraction of a tooth to enable it to mesh with the idler pinion which drives it and re-insert. When it is fully home re-fit the three screws, and check the timing, making any necessary adjustment at bolt A.

**To adjust the Contact Breaker Points.**

Turn the engine until the points are fully open and check with a set of feeler gauges. The correct gap is .012—.015 inches. If incorrect slacken screw E and move plate F gently with a screw-driver until the correct gap is obtained. Then tighten screw E and re-check the gap.

## Carburetter (All Models)

To maintain the efficiency of the carburetter it is necessary to dismantle it periodically and wash thoroughly in clean petrol.

Renew any worn parts, particularly the needle valve if the head has a distinct ridge at the point of seating, the throttle valve if excessive side play is present, and the taper needle and clip if it is possible to rotate the needle freely in the clip.

For further attention to the carburetter and for tuning details see Service Sheet No. 708.

## Sparking Plugs (All Models)

The machine is supplied with Champion non-detachable type sparking plugs to suit the characteristics of the engine. If the best performance with regard to both power and economy is to be obtained then they must remain clean and properly gapped.

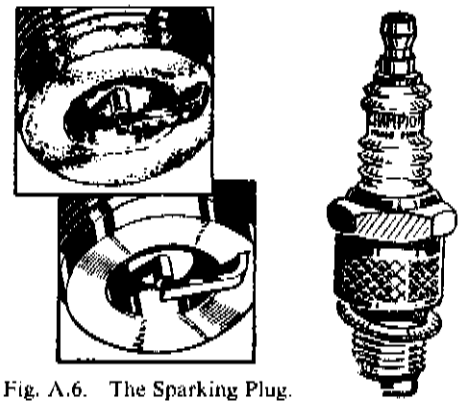

Fig. A.6. The Sparking Plug.

The sparking plugs should be removed periodically for examination. If the carburation is correct and the engine is in good condition the plugs will remain clean for considerable periods. An over-rich mixture will however cause the formation of a sooty deposit on the plug points and eventually on the plug body (see upper view of Fig. A6). Heavily leaded fuels may form a greyish deposit in a similar manner. If a heavy deposit is found, the plug should be cleaned, with the aid of the sand blast type of plug cleaner found at most garages, as otherwise the performance of the machine may be affected. If a heavy deposit is allowed to build up inside the plug it may prevent the engine from firing altogether. A weak mixture will cause burning of the plug points and give the plug a whitish appearance. See Service Sheet No. 708.

Check that the gap between the sparking plug points is correct and if necessary re-set to .018—.020 in. (.45—.50 mm.) by bending the side wire. In no circumstances attempt to move the central electrode as this may damage the insulation. If the points are badly burnt away or cleaning fails to restore the plug to its full efficiency then it should be replaced by a new one.

When replacing the plug make sure that the copper washer is in good condition. Use a tubular spanner to prevent damage to the plug and keep the outside of the insulation free from oil and dirt by wiping with a clean rag.

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