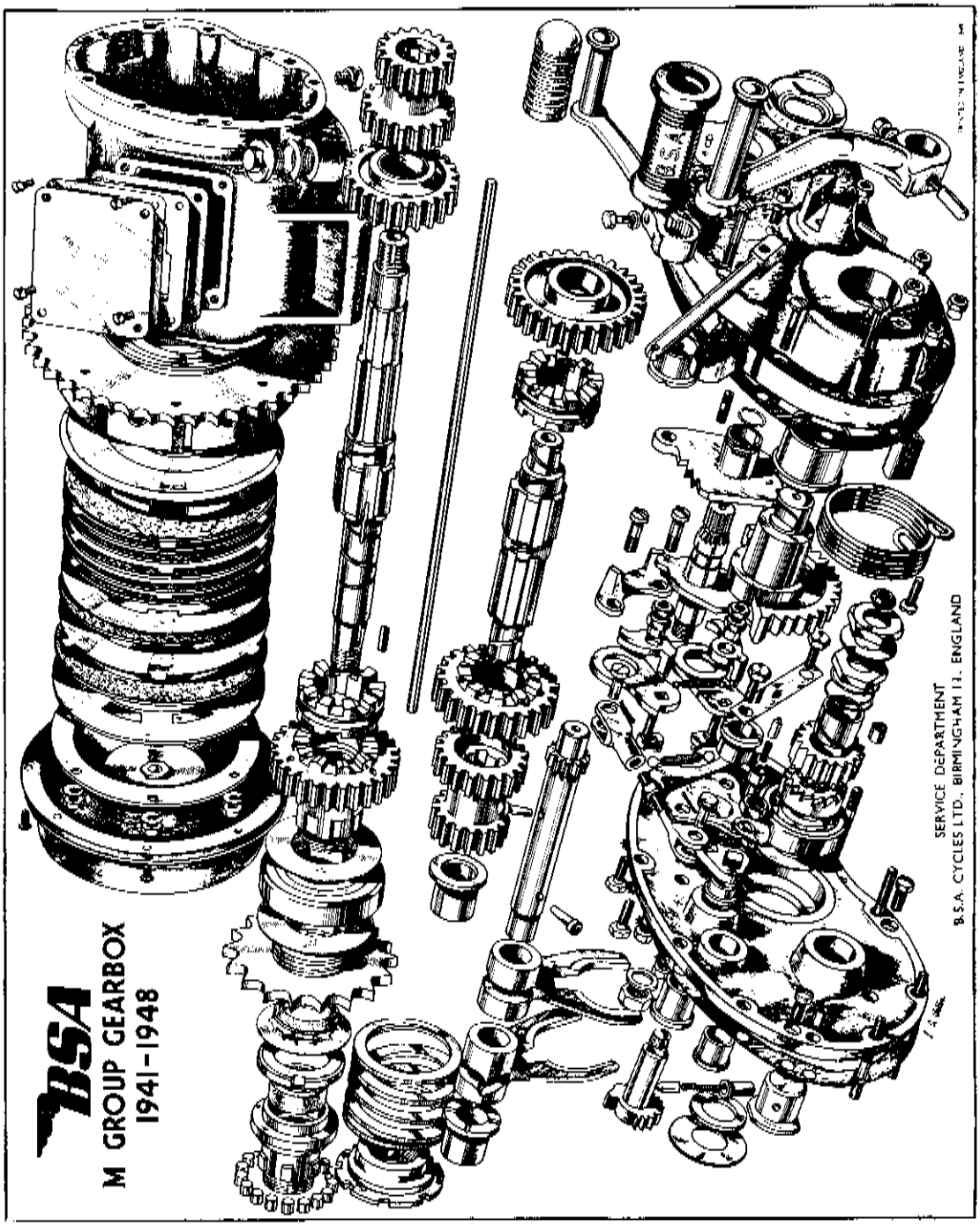
BSA SERVICE SHEET No. 601

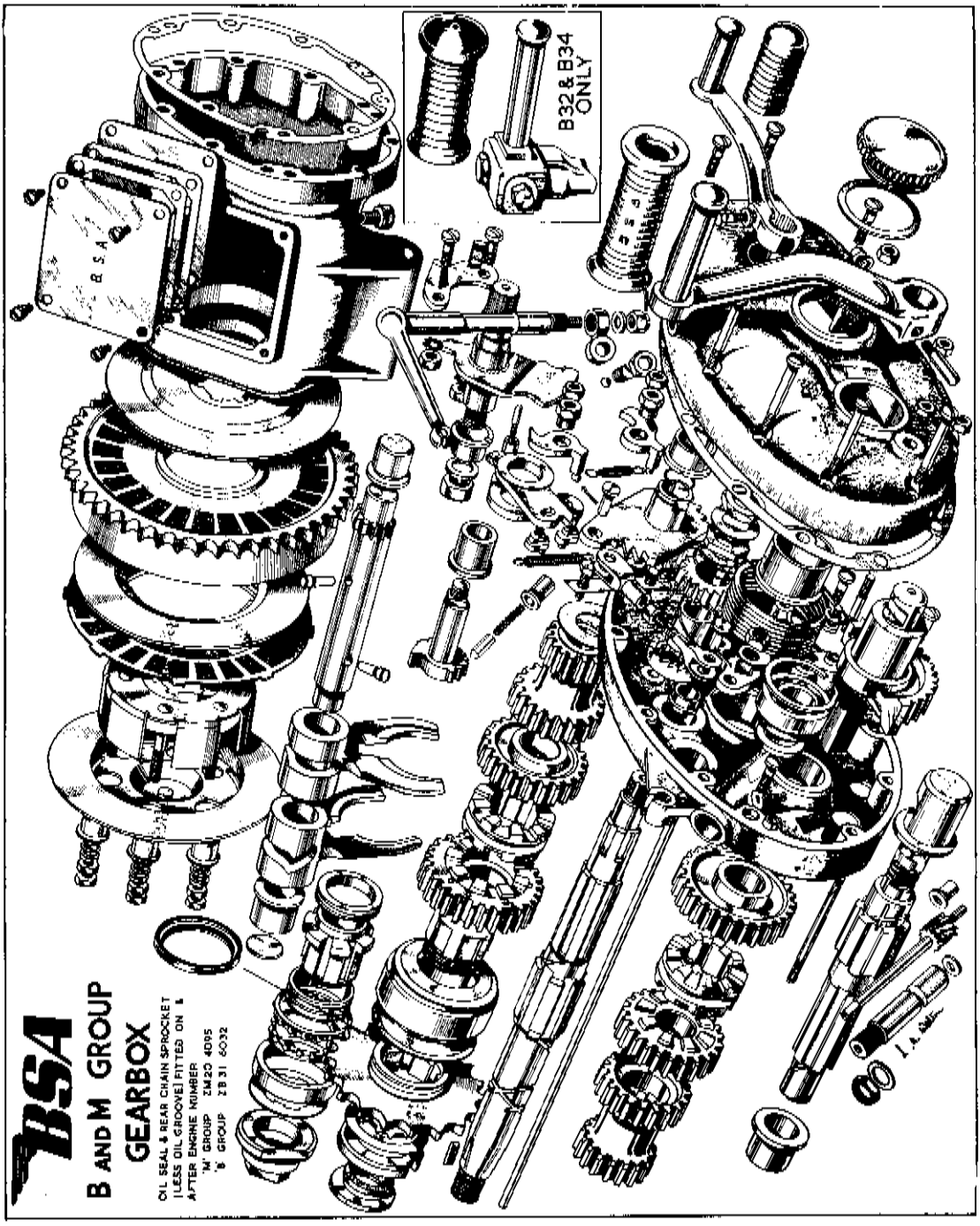
Fig. M1. M20—M21 Engine (Exploded View)

BSA SERVICE SHEET No. 602



BSA SERVICE SHEET No. 602A

Reprinted Sept. 1959



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

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.

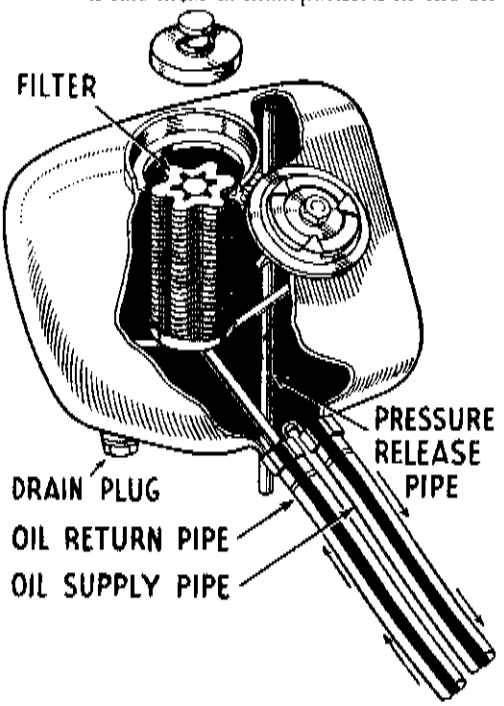
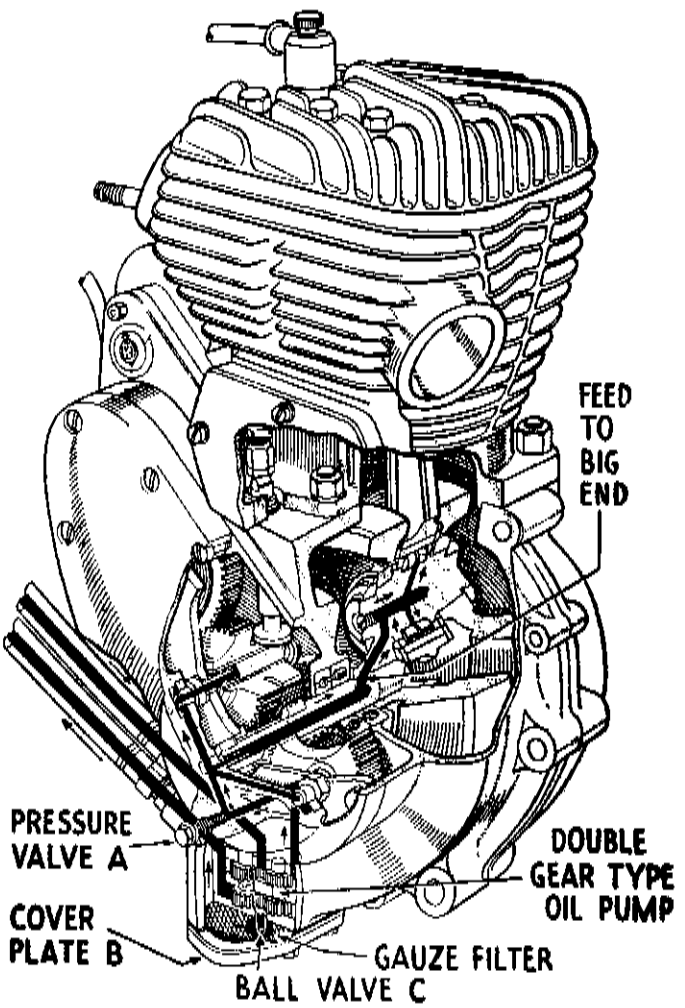


Fig. M3. The Lubrication System Models M20 and M21.



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.

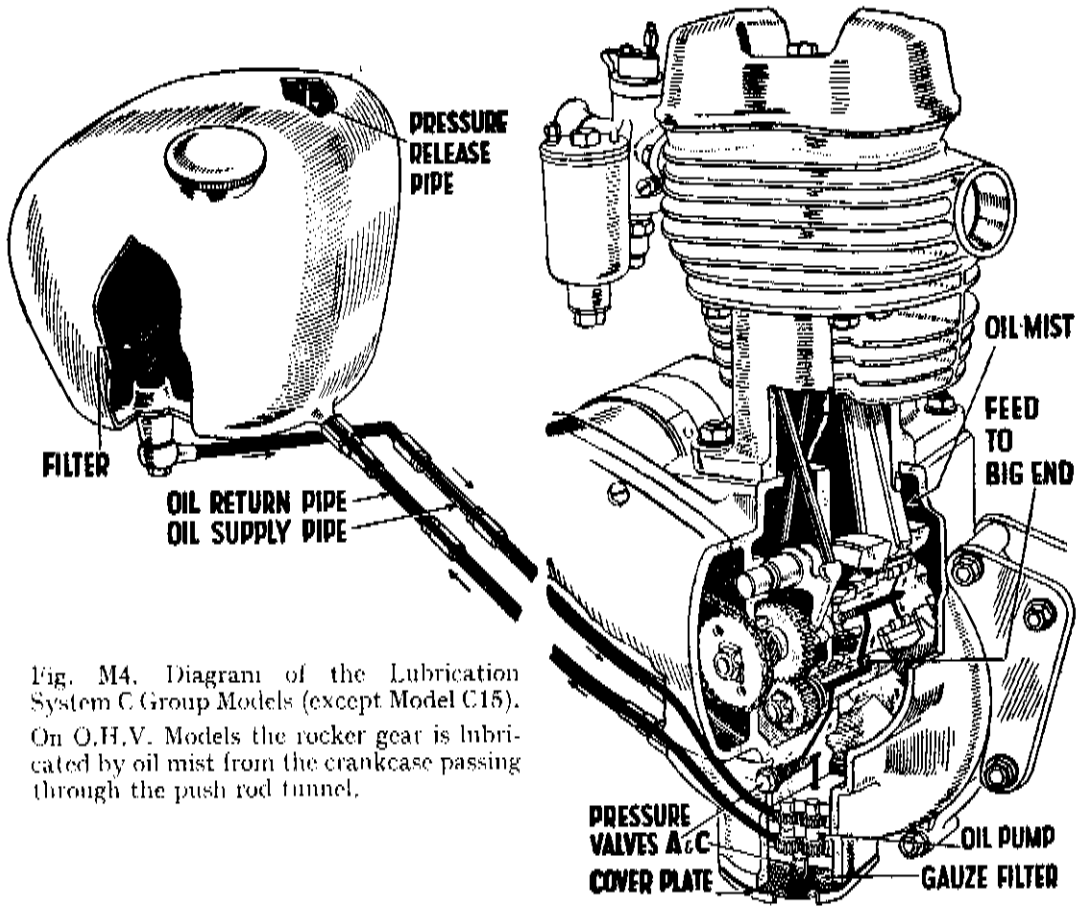


Fig. M4. Diagram of the Lubrication System C Group Models (except Model C15). On O.H.V. Models the rocker gear is lubricated by oil mist from the crankcase passing through the push rod tunnel.

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.

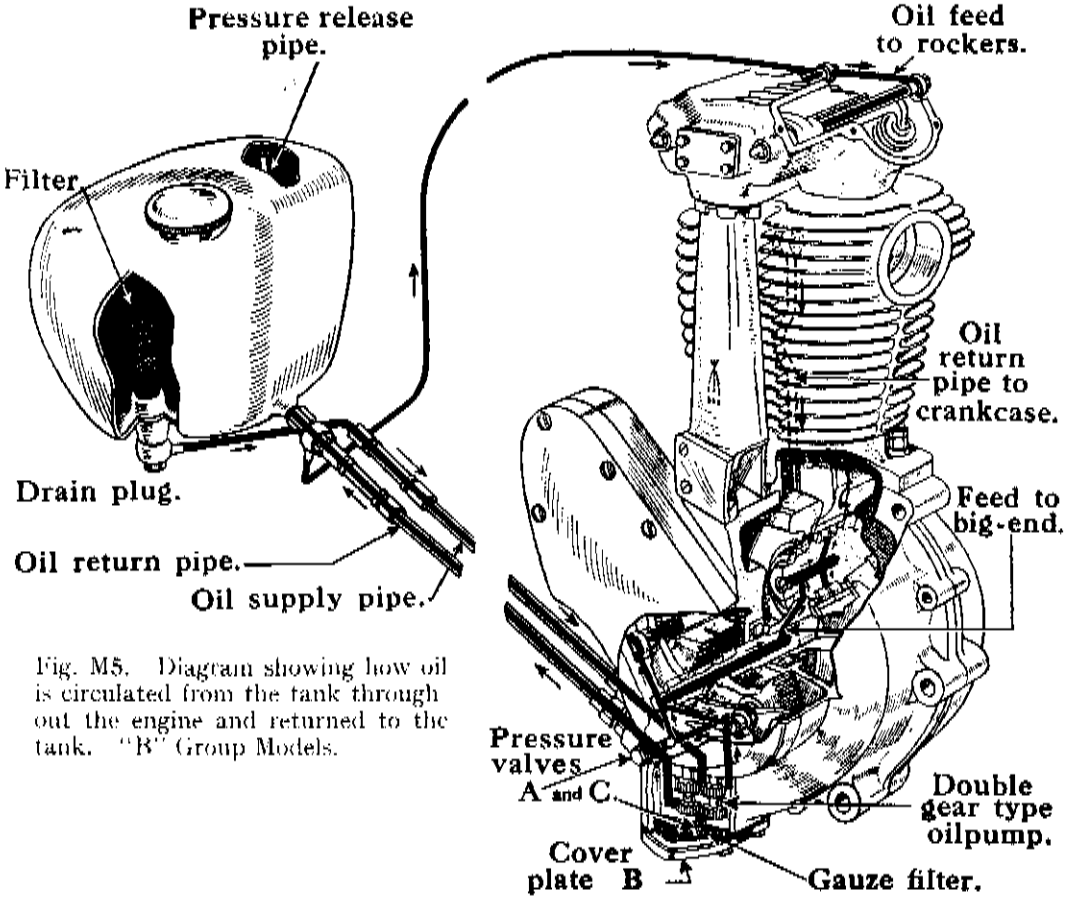


Fig. M5. Diagram showing how oil is circulated from the tank through out the engine and returned to the tank. "B" Group Models.

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.

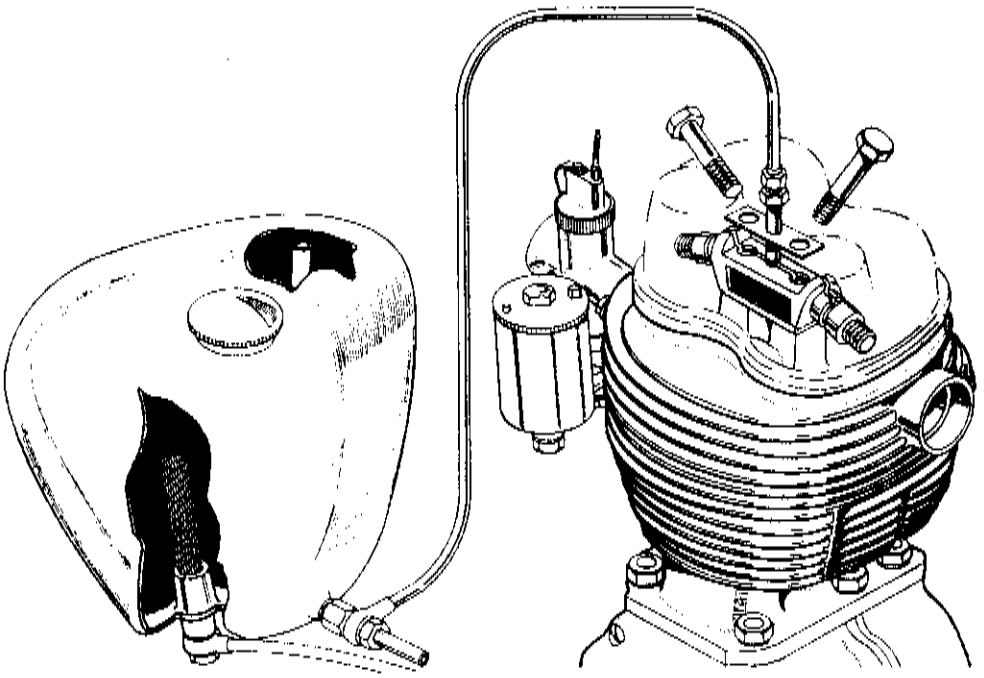
Before replacing the breather valve on "C" Group models the movement of the disc valve should be checked to ensure that it does not exceed .010 in. If excessive clearance is found and the disc valve is undamaged the face of the retaining collar should be ground so as to reduce the depth of the recess 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).

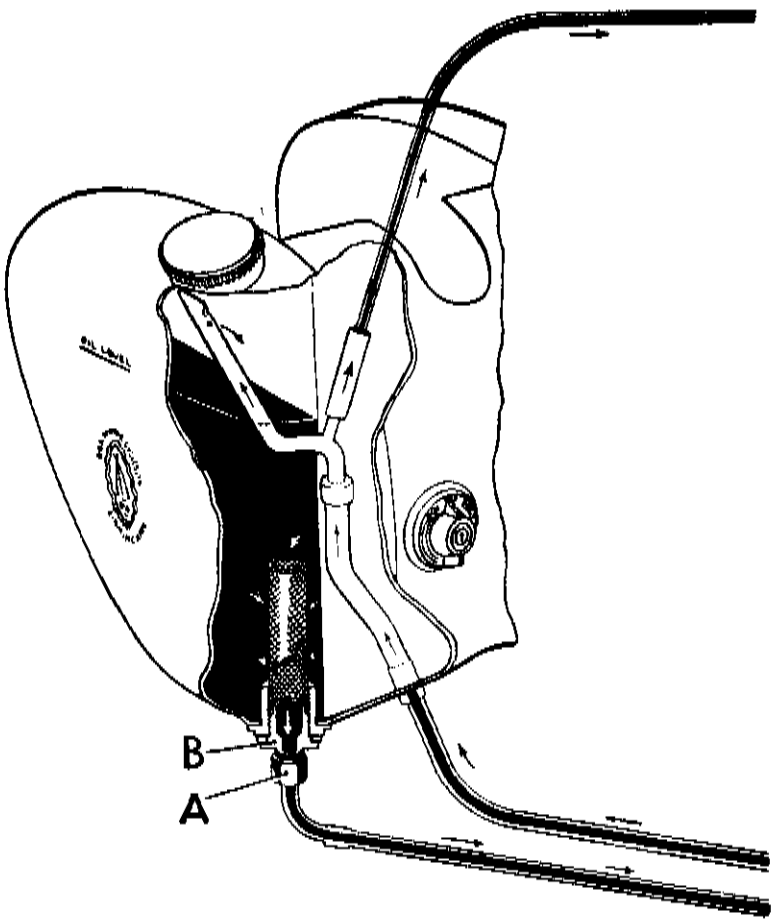
Parts required for conversion of C11 and C11G engines.

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.

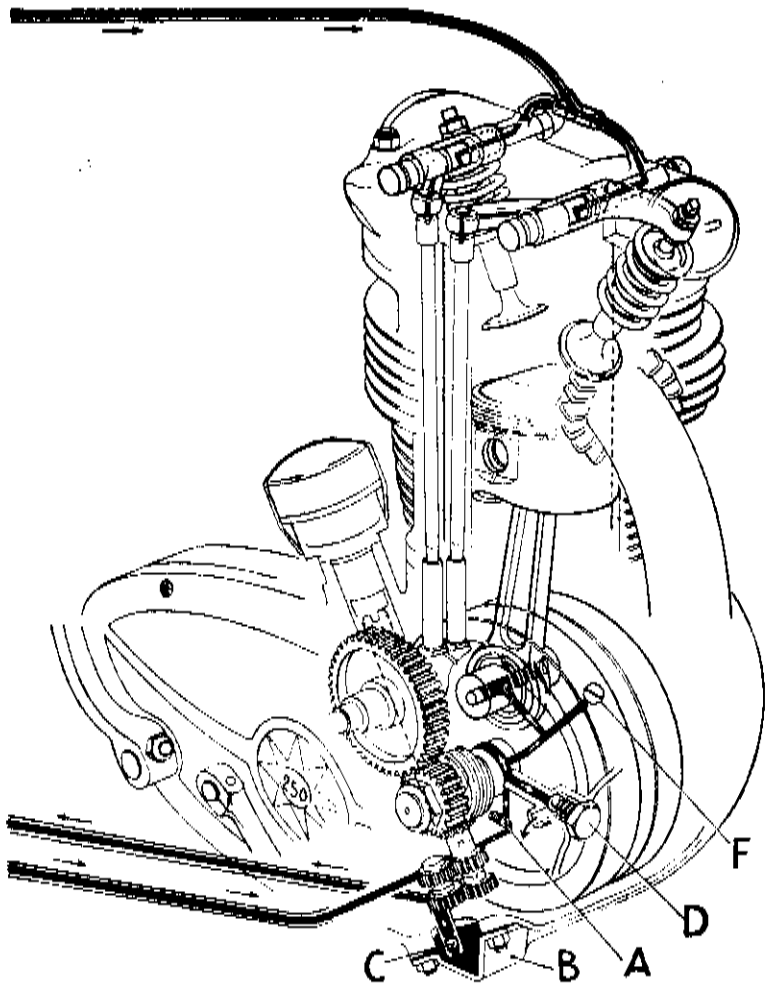


The Oil Tank C15.

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.
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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.

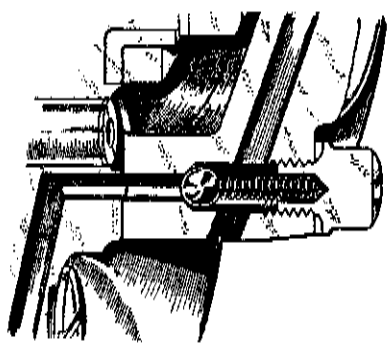

Fig. M.6. Pressure valve in timing cover.

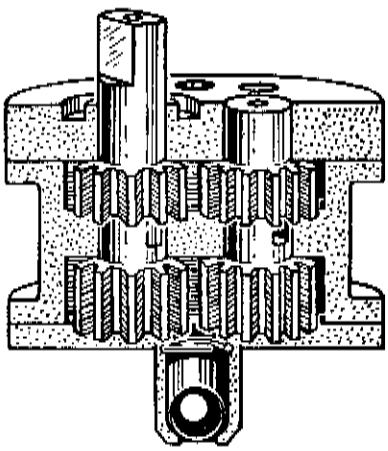

Fig. M.7. Ball valve below return pump.

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.

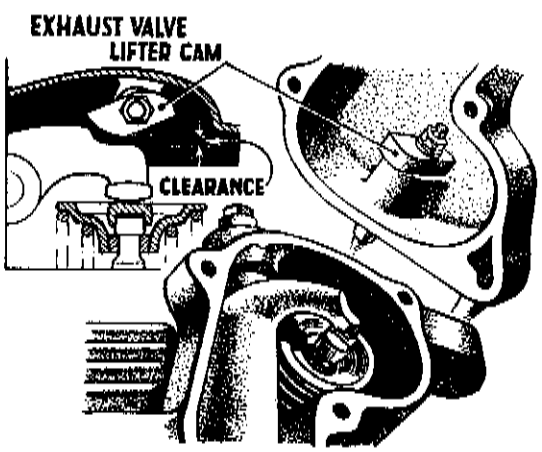

Fig. M.8. Exhaust valve lifter adjustment.

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

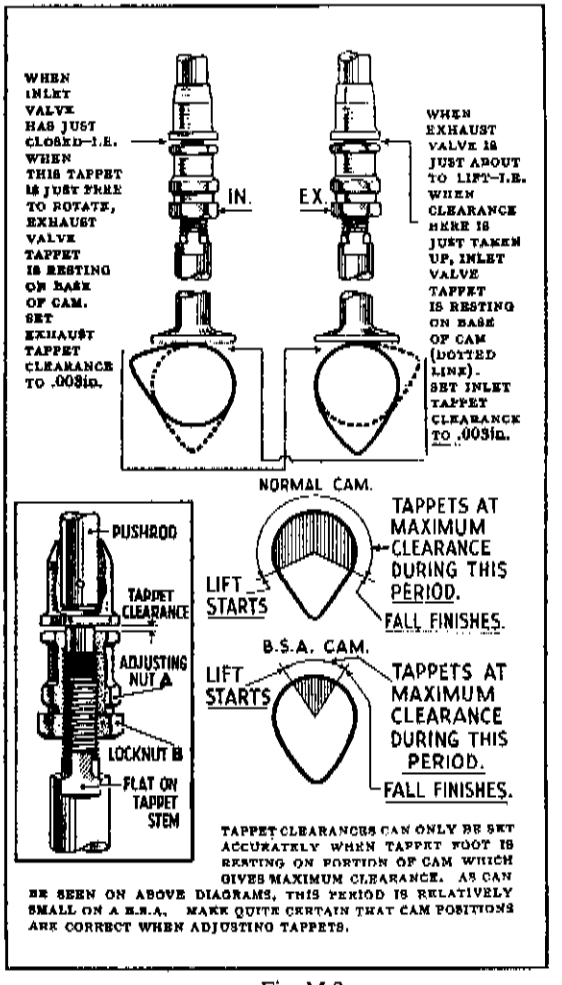

Fig. M.9.

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

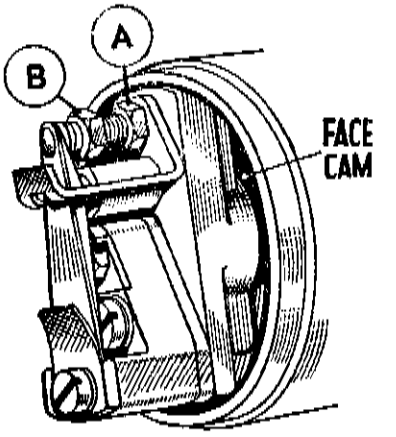

Fig. M.10.

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.

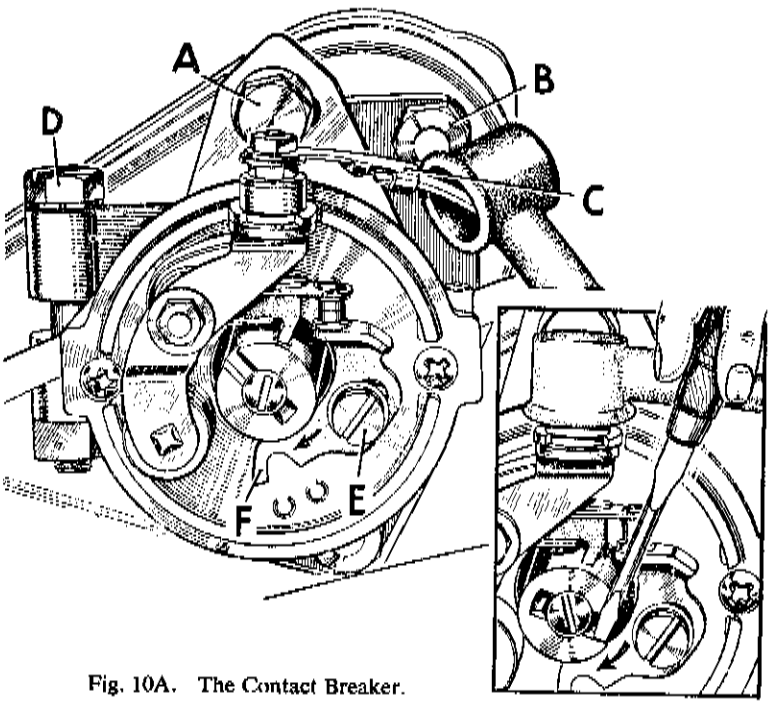

Fig. 10A. The Contact Breaker.

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.

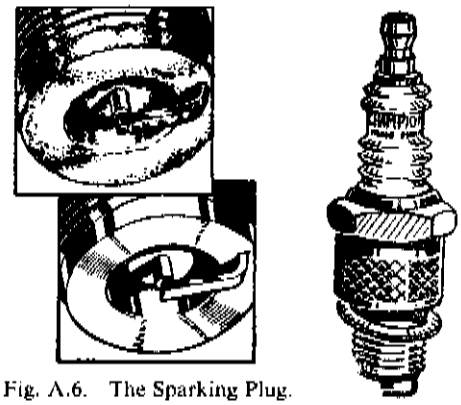

Fig. A.6. The Sparking Plug.

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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Service Dept., Birmingham, 11
B2389 Printed in England.

BSA SERVICE SHEET No. 605

"M" Group Models

Reprinted June 1958.

ENGINE DISMANTLING FOR DECARBONISING

When decarbonising, it is not necessary or desirable to dismantle the cylinder barrel, unless it is suspected that the valves, piston, or its rings are the cause of some trouble. It is sufficient to remove the cylinder head and gasket thus exposing the piston and valves.

REMOVING CYLINDER HEAD.

To detach cylinder head, disconnect sparking plug lead, remove steady strap and the ten cylinder head bolts. Head can then be lifted off.

Rotate the engine until the piston is at the top of its stroke and scrape it with an old penknife, taking great care not to damage the piston crown. Then clean the cylinder head and replace, tightening the bolts in the order shown in Fig. M24

If the valve seats are suspected of gas leakage, due to insufficient tappet clearances or other causes, these should be remedied. It is possible to grind in the valves in position, but it is preferable to remove the barrel from the crankcase so that the work may be carried out on the bench, and at the same time the piston and rings inspected

REMOVING CYLINDER BARREL.

To remove cylinder barrel, first turn off petrol taps and detach carburetter. This can be tied to frame out of the way. Next, the exhaust pipe and silencer should be removed complete. The exhaust valve lifter should be unscrewed from the tappet chest until the eccentric peg on the lifter is clear of the tappet head. Uncouple the exhaust valve lifter cable by removing the pin at the lever end. Now remove the five cylinder base nuts (four outside and one inside tappet chest), and cylinder barrel can be lifted off.

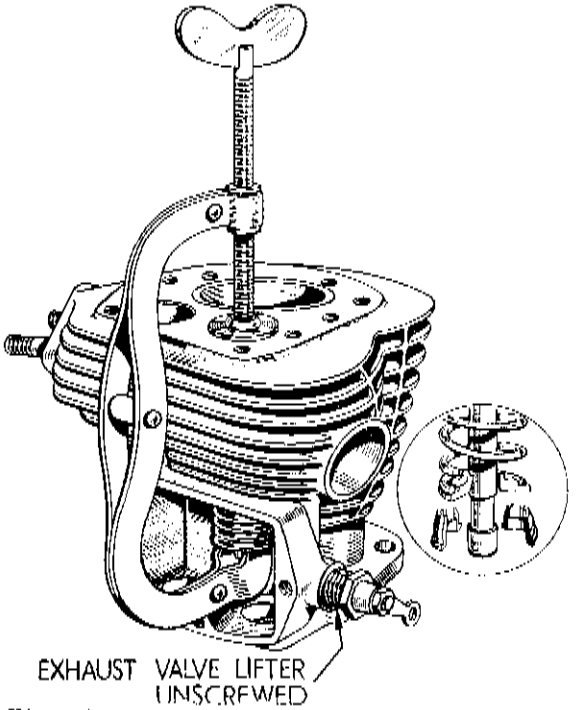
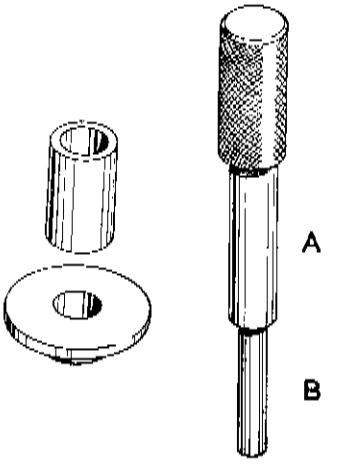


Fig M12. B.S.A. valve removing tool 61-3340



A .555 in. diameter
B .350 in. diameter

Fig. M13. Inserting valve guides Service tool 61-3267.

When removing the cylinder barrel, the simplest way is to lift it up and tilt it forwards into the front angle of the frame. The piston should be steadied as it emerges from the barrel to prevent possible damage. Cover the crankcase mouth with rag to prevent dust and grit falling in.

REMOVING THE VALVES.

To remove the valves a spring compressor as shown in Fig. M12 may be used. If the proper tool is not available, the valves may be removed by laying the cylinder barrel on a bench (valve heads downwards) and compressing the valve springs with the aid of a piece of tube (suitably slotted), while an assistant removes the cotters. Clean all carbon from the ports and check valve guides for wear.

FITTING NEW GUIDES.

If new Guides are to be fitted, the old ones can be driven out from below by means of a punch.

The new guides can be driven in from above, using the same punch in conjunction with the distance piece and depth gauge as show in Fig. M13. These three items comprise Service Tool No. 61-3267. After fitting the inlet guide, reverse the depth gauge before dealing with the exhaust guide. Use of the gauge ensures that the measure-

ments given in the inset on Fig. M. 14 are accurately obtained.

When new guides have been fitted, the valve seats must always be re-cut with a pilot cutter, in order that the seats will be concentric with the guides (Fig. M14). Note that the exhaust valve guide only has its upper end counterbored.

GRINDING-IN VALVES. If the old valves are to be retained, they should only be ground in if the seating shows slight pitting. If badly pitted, they should be refaced, otherwise excessive grinding will wear away the seat in the cylinder barrel and cause the valve to become pocketed. Take great care to remove all traces of grinding compound afterwards. A light spring, inserted under the valve head, considerably simplifies valve grinding, which should be continued until the valve face shows a smooth surface all the way round. If the machine has covered a considerable mileage, the valve springs may need replacing. Refit the valves, springs and cotters with the aid of the tool shown in Fig. M12 after valve stems have been lubricated.

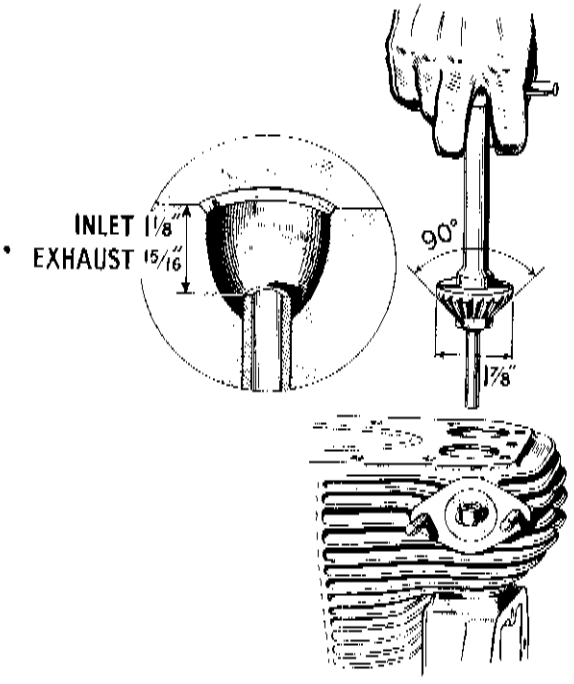


Fig. M14. Valve seating cutter and depth of guide.
Holder No. 61-3290 Tommy Bar No. 61 3291
Pilot No. 61 3291 Cutter No. 61 3302

PISTON AND RINGS. The gudgeon pin is located by means of wire circlips which must be removed by means of a tang of a file or similar tool. Withdraw the gudgeon pin, thus freeing the piston and immediately after its removal mark the inside of the piston so that it may be re-assembled in its original position.

If inspection of the piston rings shows that they are stuck, prise them out very carefully, and clean them. Remove any carbon from the grooves and rings, but before replacing them, check the gap with a ring in the cylinder. If the gap is excessive, new rings must be fitted having gaps of between .008" and .012" when in position.

At this stage it is advisable to check the big-end bearing for wear. Turn engine until piston is at top of stroke, and resting both hands on sides of crankcase mouth, hold connecting rod between fingers and thumbs and feel for up and down play. It should be remembered that, even though there may be a little play present, it will not necessarily mean sudden failure of the bearing, though it will inevitably become worse. Where play seems excessive, and apparent big-end noise has been noticed when engine is running, the engine should be completely dismantled, and a new big end assembly fitted.

Dismantling for decarbonising and piston inspection as described so far is carried out without removing the engine from the frame.

Assembly from this point is described on Service Sheet No. 607.

BSA SERVICE SHEET No. 606

"M" Group Models

October 1948
Reprinted October, 1954
Revised December, 1958

REMOVING ENGINE FROM FRAME AND COMPLETE DISMANTLING

The procedure for the removal of the engine from the frame and dismantling will be described from the point reached in the previous Service Sheet when the cylinder head and barrel had been removed. The oil pipes must next be disconnected, but first the oil tank should be drained. Alternatively the pipes can be disconnected and suitably plugged.

Detach the leads to the dynamo (both of which are held by a small plate and one screw), and then the earth wire adjacent to the contact breaker housing. Follow these with the sparking plug lead.

The magneto control cable can be readily detached from the handlebar lever.

REMOVING CHAINCASE.

The oil bath chaincase follows next. Take off the footrest and then undo all the screws round the rim of the chaincase. The nuts of these screws are welded to the other half of the case and so cannot be lost. When the outer chaincase cover is taken off, careful note should be made of the positioning of the cork washers and distance pieces, to facilitate replacement. Before removing the chain loosen clutch as described in next paragraph, and then dismantle engine shaft cush drive. Tap the lock washer clear of the slot in the cush drive retaining nut and unscrew the latter. Then withdraw the spring and cam sleeve, leaving the sprocket and chain in position. Next, take off the clutch.

REMOVING CLUTCH.

This can be accomplished with the aid of an extractor (shown in Fig. M36) after removal of the clutch outer cover, the actuating cap and the central sleeve nut. The extractor screws into the thread provided inside the clutch centre. Now uncouple the chain, the spring link being of the usual "hairpin" type. Take off the clutch as a unit and then the cush drive. There now remains the inner half of the chaincase, which is held to the crankcase by three bolts, wired together for locking purposes, and by a nut attaching the rear chainguard to the case. The nut can be released easily after the chaincase is pulled off the crankcase register.

The bolts holding the crankcase to the front and rear engine plates can now be removed and it is advisable to release the gearbox bolts in the case of the rear plates, since the latter clamp both gearbox and crankcase lugs between them. The frame bolt at the bottom of the front engine plates should be slackened off so that the plates may be swung forwards, greatly facilitating removal of the engine

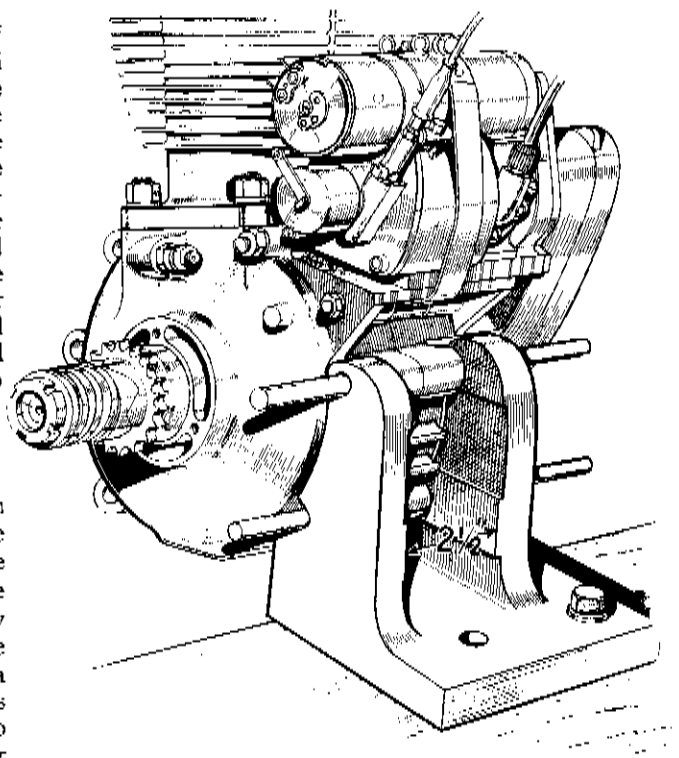


Fig. M15. Angle bracket for mounting engine.

DISMANTLING THE ENGINE.

It is advisable before commencing to dismantle the engine to construct a simple fixture such as that shewn in Fig. M15 on which the engine can be

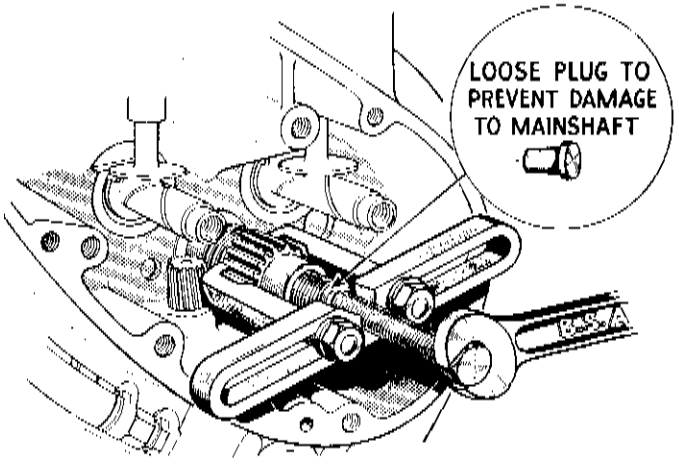


Fig. M16 Engine shaft pinion extractor 61-1735.

mounted. Alternatively, a lug on the crankcase may be clamped in a vice and the crankcase itself supported on the bench.

Attention may next be given to the crankcase portion of the engine. Take off the timing cover, and if any difficulty is experienced in releasing the screws, it will facilitate matters if a long screwdriver is used, and the head given a sharp tap with a mallet. On some models an oil tell-tale is fitted on the timing cover and this must also be taken off. It is possible that the jointing compound on the face between the cover and crankcase will not allow the cover to be removed easily and in this event, the lugs on the ends of the cover should be used to tap it off. Take care not to damage the small nozzle in the timing cover which feeds oil to the hollow crankshaft; if it should be re-fitted in a bent condition, it will foul the mainshaft, and break off eventually, thus starving the big-end and piston of oil.

REMOVING MAGDYNO PINION.

Next, the magdyno pinion should be removed. Since the pinion fits on to a taper shaft difficulty may be experienced in removing it. It is not advisable to attempt to prise the pinion off with levers, as there is grave risk of breaking the timing case, but it will come off quite easily provided an extractor Service Tool 61-1903 is used. Note that there is a special oil seal fitted in the timing case, behind the magneto pinion. It is only necessary to release the magdyno strap bolt, when the straps can be swung on one side, and the magdyno lifted off. The latter is located by dowels only, and if any shims were fitted below the magdyno they should be carefully preserved.

The engine shaft nut should be removed and the plate holding the timing gears in position is detached by removal of the six fixing bolts, three of which screw into the crankcase casting and have coarse threads, while the remaining three screw into the pinion spindles and have fine threads. All the pinions can now be withdrawn with the exception of the engine shaft pinion which may require an extractor. The latter is shown in Fig. M16, and in order to prevent damage to the engine mainshaft, a flat headed pin of suitable dimensions should be inserted in the oil hole, in the manner illustrated. If the pinions are re-bushed they should be reamed out to .6255 ins./.6250 ins. for the cams and .7505 ins./.7495 ins. for the idler pinion. The correct size for the outrigger bearing in the timing gear plate is .815 ins./.814 ins.

Before the oil pump spindle is released it is first necessary to remove the locking plunger which is exposed after removal of the timing cover (Fig. M17). Take care not to lose the loose washer covering the plunger. If the latter cannot easily be removed with the fingers, a timing cover screw should be screwed into the plunger, when it can easily be withdrawn. If it is necessary to remove the pump take off the sump cover

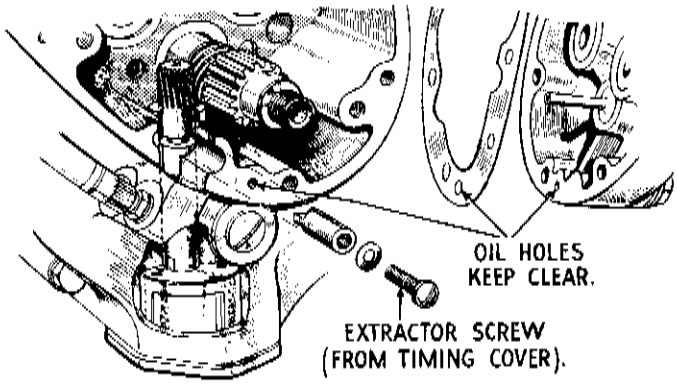


Fig. M17. Oil pump spindle locking plunger.

plate, together with the filter and joint washers, and remove the two bolts holding the pump in position, thus releasing the pump. These two bolts are the ones with spring washers under the heads; the other two bolts hold the pump parts together and should not be disturbed unless it is strongly suspected that the pump is giving trouble.

The crankcase is now ready for "splitting." Release all the bolts round the crankcase joint face (the magdyno strap hinge pins also act as bolts and the nut on these must be removed) and draw each half of the crankcase off the engine mainshaft. Where single lipped roller bearings have been used in the engine, the outer race will remain in the crankcase and if necessary can be pressed out later. It should be remembered that the outside bearing on the drive side has its outer race retained in the crankcase by means of a spring ring which must be removed before extracting the race.

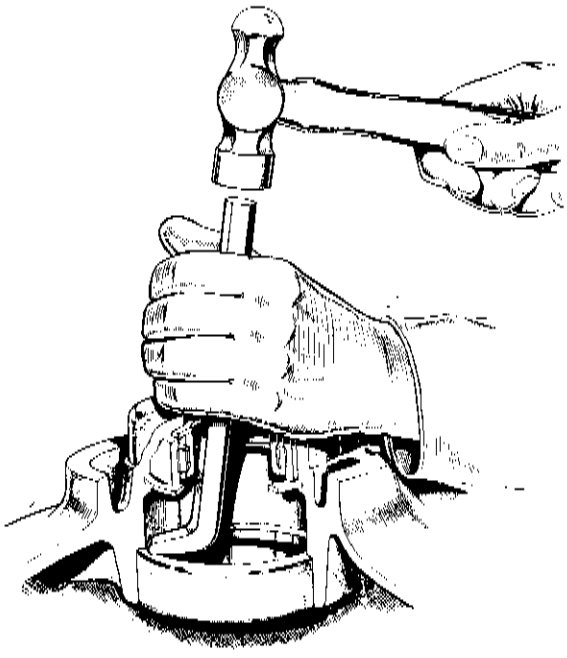


Fig. M19. Ballrace extraction (driveside).

Ball bearings will usually be left on the shafts after removal of the crankcase halves, but should they remain in the crankcase, they may be pressed out of the gearside in an arbor press as shown in Fig. M18. On the drive side the inner bearing must first be tapped out with a punch, projecting through the outer bearing and working all round the bearing to give even extraction (Fig. M19). These operations will be considerably helped if the crankcase is first warmed, the most suitable method being by dipping in boiling water.

If it is desired to remove the cam pinion spindles, they can easily be taken out by means of an extractor (Fig. M20). **Do not remove these spindles unless absolutely necessary.** If the tappets require renewal, then the cam spindles and tappet guides must be removed so that the tappets can be drawn out downwards into the timing case. The exhaust tappet receives special treatment, and should not be replaced by an inlet tappet. The tappet guides unscrew upwards out of the crankcase.

The final item is the flywheel assembly. Remove the locking plates holding the crankpin nuts and take off the latter. They will require an unusu-

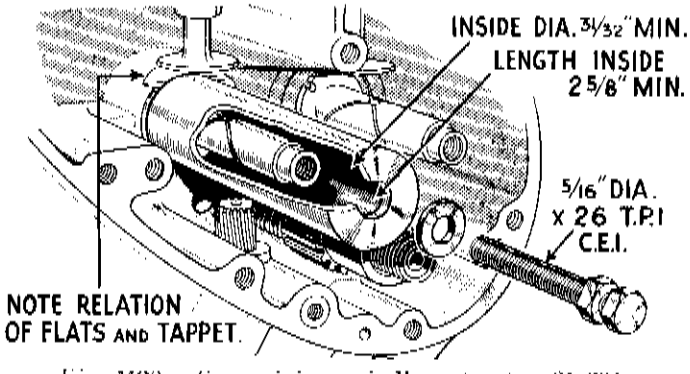


Fig. M20. Cam pinion spindle extractor 61-691.

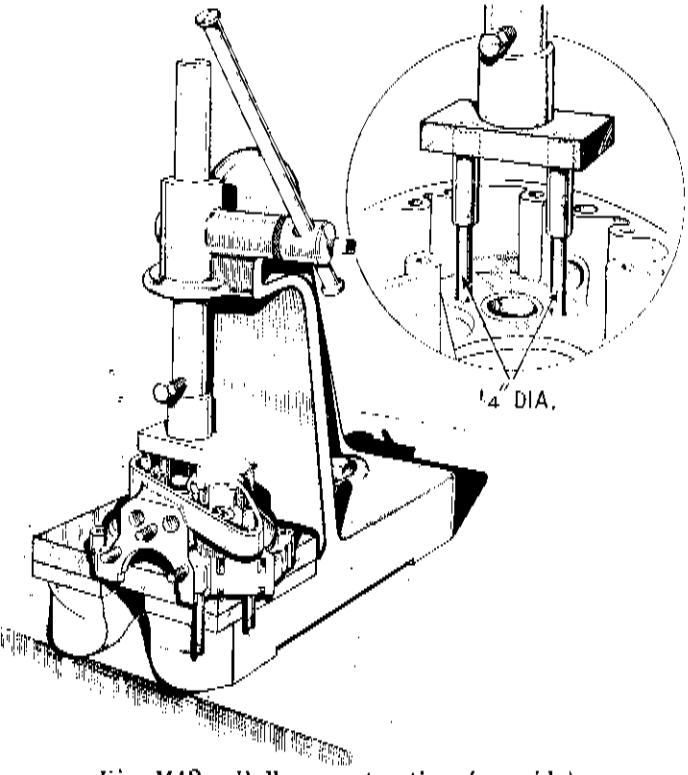


Fig. M18. Ballrace extraction (gearside).

ally large leverage and it may be necessary to add a piece of tubing of suitable size to the spanner before sufficient purchase can be obtained.

The crankpin is a taper fit on the flywheels and can be released by a sharp blow with a mallet.

It is now only necessary to decide which parts require renewal, and the following points may be of assistance in making these decisions.

In the event of big-end wear, we do not advise the fitting of oversize rollers; the whole big-end assembly (consisting of crankpin, rollers and connecting rod), should be changed. All these components are carefully matched by the B.S.A. Co., and supplied in complete sets, ready for fitting.

The bore of a cylinder when new is between 3.2295 ins. and 3.2280 ins. (82mm.) and when the bore (measured at right angles to the gudgeon pin) shows wear to the extent of .010 ins. or more, the liner should then be rebored to ½mm. oversize (3.2487 ins.–3.2477 ins.) and a ½mm. oversize piston fitted. Subsequently, the liner may again be rebored, to 1mm. oversize (3.2684 ins.–3.2674 ins.) and a 1mm. oversize piston fitted.

When wear develops after the second rebore, it is necessary to fit a new cylinder liner. A suitable screw or hydraulic press giving a pressure of between 5 and 7 tons is necessary—first to press out the old liner (which must be pressed out from the base of the cylinder) and then to insert the

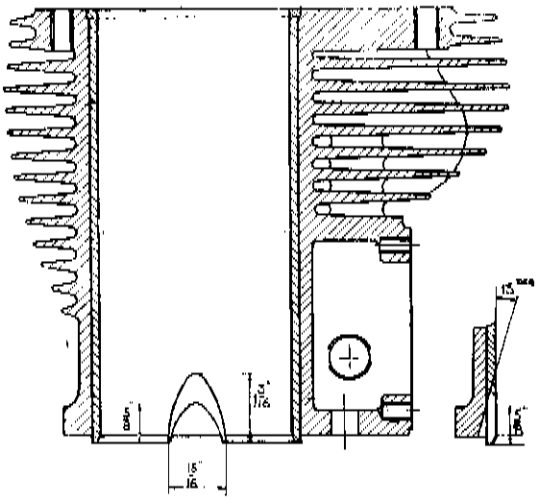
new liner, which is pressed in from the top of the cylinder. Owing to the possibility of the liner "closing-in" during the fitting process, it must be ground to a finished diameter of 3.229 ins. 3.228 ins. when in position.

It is also necessary to grind two scoops at the skirt of the liner at right angles to the gudgeon pin to provide clearance for the connecting rod (see illustration opposite).

A standard piston and rings must of course be fitted when a new liner is used. The piston should be selected so that the clearances between the skirt and the liner fall within the prescribed limits given in Service Sheet No. 704.

After 1951, the cylinder liner was no longer fitted. When it becomes necessary, the cylinder barrel itself can be rebored in the normal way.

Wear in the mainshaft bearings will be readily apparent and bearings showing signs of damaged balls, rollers or tracks should be replaced. Special internal clearances are specified for mainshaft bearings used on B.S.A. motor cycles, and these are "000 clearance" for roller bearings and "00 clearance" for ball bearings. It is not advisable to fit bearings with any other clearance.



Two scoops diametrically opposite, ground after liner is pressed in.

B.S.A. MOTOR CYCLES LIMITED, Service Dept., Birmingham, 11.
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BSA SERVICE SHEET No. 607

"M" Group Models

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RE-ASSEMBLING THE ENGINE

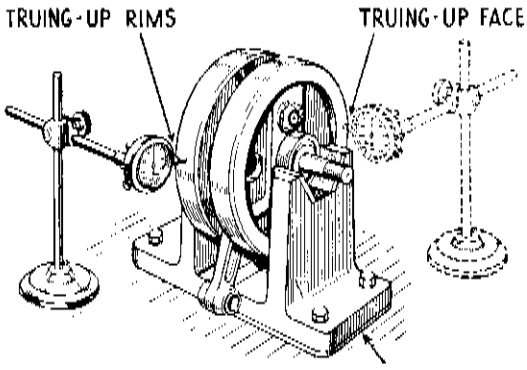
The need for extreme cleanliness cannot be over emphasized. Parts should be thoroughly cleaned and all trace of any antirust preparations with which new parts may be coated must be removed. All bearing surfaces should be liberally smeared with engine oil when assembling.

FLYWHEELS.

If the big-end assembly is to be renewed it is as well to check the weight of the new components against those which have been removed. A slight variation in the weights is inevitable, but provided that the discrepancy does not exceed 1½ ozs. no further action need be taken. This tolerance should not be exceeded since in the first instance the flywheels have been balanced to suit the original parts, and the balance may be adversely affected if the weight of the new components varies considerably from that of the original ones.

The driving side flywheel should now be fitted to the crankpin (this is the side with the keyway) and the nut tightened up by hand. Fit the timing side flywheel and again tighten the crankpin nut by hand.

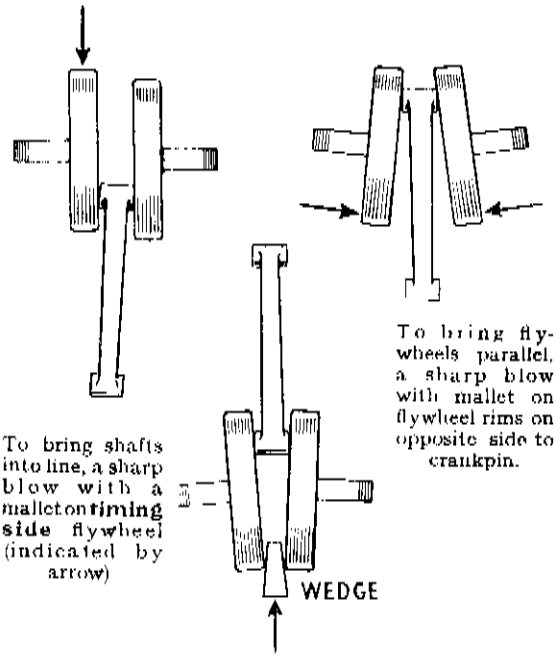
In order to tighten the crankpin nuts, properly, the whole flywheel assembly must be held rigidly. For this purpose, it should be mounted in a large vice (fitted with lead clamps) with the driving side flywheel uppermost. If a large enough vice is not readily available an alternative method is to fix rigidly to the bench in a vertical position, two 1$\frac{1}{16}$ in. diameter posts, the distance between their centres being 3$\frac{7}{8}$ in. Midway between the posts a hole of 1in. diameter should be bored in the bench to receive the mainshaft. The flywheel assembly is mounted on these posts so that they pass through the holes bored in the flywheels and the driving side flywheel should be uppermost. Tighten the crankpin nut **very firmly**, using a tubular extension to the spanner as when dismantling, and fit the locking plate and screw.



Suitable packing under timing side "vee" block to compensate for smaller diameter bearing.

Fig. M21. Checking flywheel alignment. "Vee" block 61-692 and base plate 61 1821.

Now turn the assembly over, so that the gearside flywheel is on top and tighten the crankpin nut lightly. **The grub screw in the end of the crankpin must be riveted over or centre-punched to prevent its unscrewing. If it unscrews serious damage may result to the engine.** Check that the side clearance of the connecting rod in the flywheels does not exceed .012 in. and is not less than .010 in.



To bring flywheels parallel when sides opposite crankpin are converging insert wedge as shown and deal sharp blow with mallet.

Fig. M22. Method of correcting flywheels out of alignment. Note that above illustrations are greatly exaggerated.

The flywheels will now be aligned only very approximately and further steps must be taken to ensure that the wheels are aligned as true as possible. Two of the actual (or similar) bearings to be used in the engine should be fitted to the mainshafts and the latter mounted on vee-blocks. The flywheels must be trued up, both on faces and rims, for which purpose a dial micrometer is necessary (Fig. M21), and after the wheels are trued to within at least .005in. tighten the timing side crankpin nut fully. A mallet or lead hammer applied to the flywheels will provide a sufficiently heavy blow for final truing, and will not harm the flywheels (Fig. M22). The shafts must not be struck. The shafts should be finally trued to within .002 in. maximum.

CRANKCASE.

Withdraw the bearings from the shaft and press them into their appropriate positions in the crankcase halves. A new washer will be required behind small drive side bearing and a new retaining ring must be fitted. In the case of single lipped roller bearings only the outer race can be so fitted. Do not omit the retaining ring which holds the driving side bearing in position, and check that the ends of the spacing sleeve between the bearings are parallel to within .002 in. In order that the inner bearing and the sleeve will stay in position it is advisable to lay the crankcase half on a bench with the outer bearing lowest.

Fit the oil flinger washer to the driving side mainshaft and note that this washer is bent over in one place to prevent accidental movement when fitting. If a new washer is being used it should be bent in a similar manner to the one which has been removed. Insert the driving shaft carefully into the crankcase, taking care not to disturb the flinger washer. The shaft should fit into the bearing without the use of unnecessary force and although the shaft must be a fairly tight fit in the bearings, it should be possible to assemble it by hand. If necessary ease the shaft with emery cloth, **carefully cleaning off any trace of emery afterwards.**

It is advisable to attend to the timing side of the crankcase before continuing further. Replace the oil pump driving spindle together with its locating pin (see Fig. M17) and then fit the oil pump in position. The fibre washer between the pump and the crankcase should be smeared with jointing compound, **but an excessive amount must not be used, since any surplus will be squeezed out and may find its way into the oil passages.** The pins securing the oil pump must not be screwed up too tightly. Check that the pump spindle can be rotated between finger and thumb.

Now replace the tappets and guides, the latter being screwed well home, and insert the cam pinion spindles. **These should be pressed home taking great care to keep them dead square, and must be fitted so that the flat on the spindle shoulder is parallel to the tappet foot, for which it provides clearance and consequently its position is most important.**

Assembly of the crankcase will be made easier if the flywheel assembly, together with the driving side portion of the crankcase fitted on as previously explained, is mounted in a vice. Lead clamps must be used and the splined portion of the shaft held.

The mainshaft bearings may now be pressed into the gearside half of the crankcase and the latter replaced on the mainshaft. Bolt up the crankcase and check that the flywheels, etc., spin easily. Fit sprocket centre, tighten up, and verify also that the connecting rod is centrally disposed in the crankcase mouth. Provided that the connecting rod is not visibly out of centre, there is no necessity for any adjustment to be made. If the connecting rod is out of centre, it will invariably be towards the driving side of the crankcase. In this event a shim will have to be made and inserted between the driving side flywheel and the oil flinger washer. It may also be that the distance sleeve between the driving side bearings has become a little worn on its end faces, and a new component (one specially chosen so that its length is on the maximum limit) will rectify the connecting rod alignment. The maximum length for the distance sleeve is 1.005 in. and the minimum is 1.000 in.

When the connecting rod alignment is found correct, remove the gearside half of the crankcase and clean the joint of any compound used previously. Fit the magdyno straps on their hinge pins, smear jointing compound lightly on the crankcase joint face and again bolt up the crankcase. Check that top of crankcase, where cylinder base flange fits, is dead flat.

TIMING GEARS.

Replace the engine shaft pinion, taking special care to note that the worm is engaging properly with the oil pump spindle and that rotation of the flywheels drives the pump

The cam pinions are interchangeable and consequently the timing marks are duplicated on both pinions. This should not cause any difficulty when timing the valves if it is remembered that the dash mark only is used for the inlet cam and the dot for the exhaust cam. (Fig. M23).

The magdyno can now be fitted to the crankcase and its straps loosely coupled up. Make sure that the dowels in the base engage properly in their holes in platform and that any packing shims are refitted. Refit the idler pinion between the inlet cam pinion and the magdyno pinion, but do not replace the pinion retaining plate at this stage.

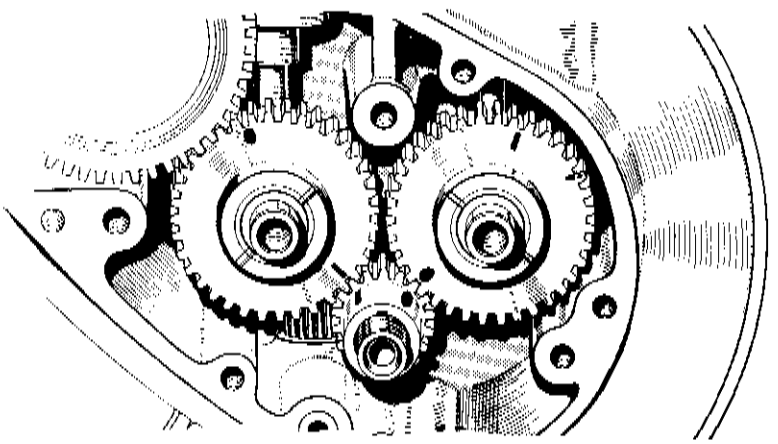


Fig. M23. Valve timing marks.

An oil sealing washer is fitted behind the magdyno pinion and this should be temporarily removed. Replace the magdyno pinion on its taper; it need

not be driven on very firmly but just tightly enough to prevent slip. Check the backlash between this pinion and the idler. If excessive, the gears will be noisy; if insufficient, a whining noise will result.

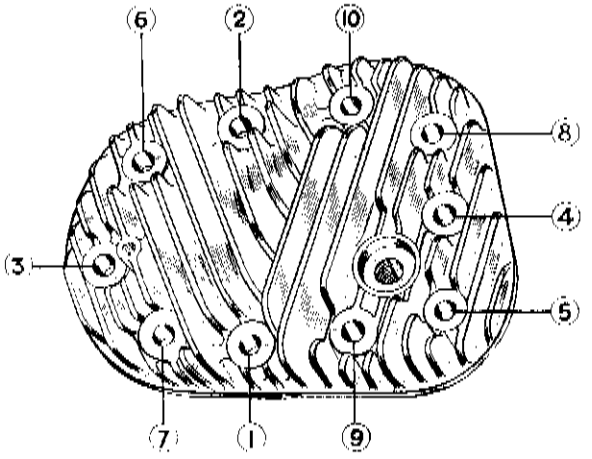


Fig. M24. Cylinder head bolts.

In order to adjust the backlash, shims are fitted under the magdyno if necessary, when the engine is first built. If a different magdyno is being fitted it is essential this backlash be checked carefully, shims of a different thickness being used as required.

Remove the magdyno pinion once more, replace the oil sealing washer and again fit the magdyno pinion **loosely** in position. It is preferable to leave the setting of the ignition until the barrel and piston are in position, and for this reason the magdyno pinion should not be tightened up. The valve timing can now be set. Replace the pinion retaining plate, noting that the coarse threaded bolts screw into the crankcase bosses and then fit the lockwasher and nut on the engine mainshaft. Play between the pinions and the retaining plate should be .002 in./.003 in.

ASSEMBLY FROM THIS POINT WILL BE THE SAME AS AFTER DECARBONISING

CYLINDER AND PISTON

The gap between the ends of the rings should be checked with the ring in the cylinder. If the gap is excessive new rings should be fitted with gaps of .008 in./.012 in.

Replace the piston and gudgeon pin on the connecting rod and if the original piston is used make sure that it is the correct way round (see Service Sheet No. 606). Do not omit the gudgeon pin circlips and verify that they are properly fitted.

Set the tappets on their lowest position, fit the paper washer on the cylinder base and replace the cylinder barrel on the crankcase. The piston rings may be compressed quite easily by hand while the barrel is being replaced.

Tighten the barrel down, not forgetting one nut is inside the tappet chest. The tappet clearances should be set very carefully as described in Service Sheet No. 604.

Next set the ignition timing as described in Service Sheet No. 604. Note that as the magneto cable is disconnected the cam will be in the "full retard" position, and it must be held in the "full advance" position.

The resetting of magneto timing will not apply after decarbonising as there is no necessity to disturb the timing to remove cylinder head and barrel.

Replace the timing cover after lightly smearing both sides of its paper washer with jointing compound, **taking care that the oil hole** (Fig. M16) **is not obscured.** (This does not apply after decarbonising.) Bolt the cylinder head and gasket in position, but if the latter shows signs of leakage from previous use (indicated by black patches) a new one should be fitted. The cylinder head bolts must be tightened down in the order shown in Fig. M24.

The exhaust valve lifter body may now be screwed into its original position. Before the sparking plug is replaced it should be dismantled and cleaned, or if the machine has covered a large mileage a new plug should be used.

Replace the tappet cover and lightly smear the washer with jointing compound before fitting.

The engine is now ready for bolting into the frame (this does not apply after decarbonising), and after replacement check that the bolts are really tight, and that the gearbox bolts have not been forgotten. Refit the offside footrest assembly pushing rod fully home. The near-side footrest sleeve and distance piece (behind chaincase) should now be placed in position. Then refit the

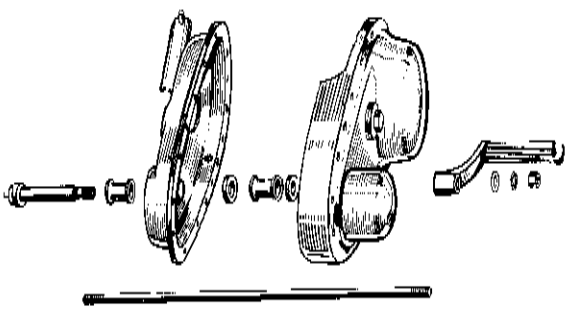


Fig. M25. Assembly of chaincase and footrest.

inner half of the chaincase (first checking that oil seal washer is in good condition) and when the bolts holding it to the crankcase have been finally tightened, wire them together with a fresh piece of wire for locking purposes.

The engine shaft cush drive can be replaced by hand, without the need for special tools to compress

the spring (this does not apply after decarbonising) Lock the central nut up tight, when the clutch and primary chain are in position.

Fit the clutch on the gearbox mainshaft (this does not apply after decarbonising)—see re-assembly of clutch, Service Sheet No. 610– and replace the chain. On fastening the spring link it is important that it should be fixed so that the closed end is pointing in the direction of the "run" of the chain.

When replacing the chaincase outer cover, make sure that the washers, etc., on the footrest bar are in the correct position (see Fig. M25) and that the jointing washer is properly fitted. The chaincase must be refilled with engine oil to the level plug, before the machine is used

If there is any suspicion that the pipes from the oil tank to the crankcase are faulty they should be replaced, otherwise the engine may suffer harm through insufficient oil.

All the control cables (i.e., carburetter, magneto and exhaust valve lifter) should be re-coupled next. followed by the dynamo leads and the earth wire, Finally, replace the petrol pipe and then the exhaust pipe and silencer.

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BSA SERVICE SHEET No. 608

"B" and "M" Group Models

October, 1948.

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Removing, Dismantling and Re-assembly of the Gearbox and Gear Change

The illustrations on this Service Sheet show the gearbox fitted to all "M" group models up to Engine No. ZM -101.

The gearbox fitted to "M" group models after this Engine No. and to "B" group models after Engine No. ZB 101 is identical except that a speedometer drive is taken from the layshaft, through a mechanism fitted to the outer cover, and the clutch operating mechanism is fully enclosed.

All instructions given for removal, dismantling and re-assembly will apply, but the speedometer drive must be removed before the inner cover is dismantled and replaced after it is assembled Detailed instructions for removal and re assembly are given below,

REMOVAL.

Instructions as to the procedure to be adopted for removal of the chaincase and clutch are contained in Service Sheet No. 610 in the case of "M" group machines or Service Sheet No. 304 in the case of "B" group machines. In this case, however, there

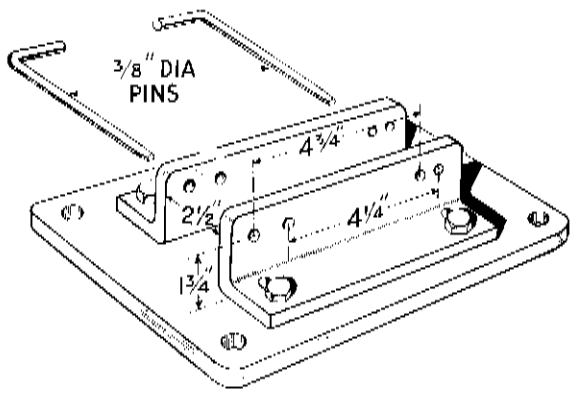

Fig. M26 Gearbox fixture.

is no need to dismantle the clutch entirely; it is only necessary to take off the cover plate (if fitted) and thrust plate when the clutch may be withdrawn from its shaft as a complete unit. Before this is done, i.e., with chain and clutch still in position, it is advisable to engage a gear, and get an assistant to apply the rear brake, so that the engine shaft cush drive ring nut may be unscrewed, thus releasing the cush drive assembly. Uncouple the primary chain and remove the clutch using the extractor shown in Fig. M36.

The inner half of the chaincase can now be taken off. Note that in addition to the three bolts holding it to the crankcase, there is a nut attaching the rear chainguard to the chaincase and this must also be removed. Access to the nut will be made much easier if the three crankcase bolts are unscrewed first and the chaincase pulled off the crankcase register.

The oil tank breather pipe is next to be removed and this is only a matter of releasing the clip bolts.

Turning now to the right-hand side of the machine, first take off the footrest, then uncouple the clutch cable from its operating arm and unscrew the cable adjuster from the gearbox

In order that the bolts which hold the gearbox to the yoke plates may be removed it is necessary to take off the exhaust pipe and silencer.

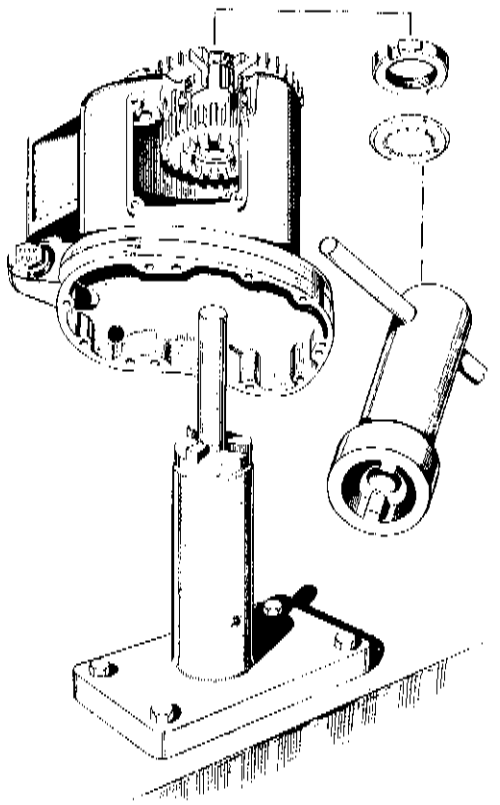

Fig M27 Pinion sleeve removal tool 61-3064.

The box itself can be prised upwards out of the yoke plates. If the latter grip the gearbox lugs too tightly for this to be carried out easily, slacken the bolts and studs which clamp the yoke plates to the crankcase. No difficulty should then be experienced in removing the gearbox.

DISMANTLING THE GEARBOX.

It will greatly help work on the gearbox if it is held in a simple fixture such as that illustrated in Fig. M26. The device can be made from suitable pieces of angle iron, spaced to suit the gearbox lugs. If it is not possible to make the fixture, gearbox can be held in a vice.

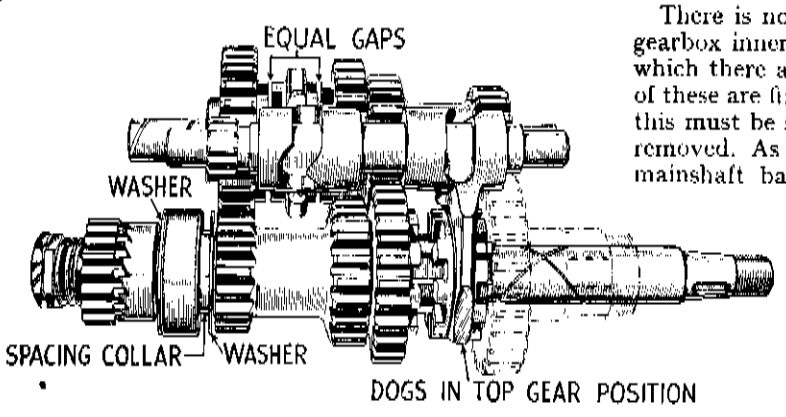

Fig. M28. Gear train.

Commence dismantling by taking off the rectangular inspection cover and follow this with kickstarter crank. The latter is fixed by means of a cycle type cotter. The foot change pedal is held in position by means of a pinch bolt which must be slackened off before the pedal can be removed.

On models before Engine No. ZM 101, there are two circlips behind this pedal. The larger circlip retains the gear indicator disc in position, and the circlip and disc should be removed. No indicator disc is fitted to later models. Leave the small circlip in position for the time being.

The gearbox outer cover is now ready for removal. On earlier models it is held on by seven cheese head screws, and, on the face behind the gear change mechanism, by three bolts and one nut. On later models seven cheese head screws and four nuts, all on the outer cover hold it in position. When the outer cover is taken off, it will contain the kickstarter quadrant and spring, but these need not be disturbed unless obviously requiring attention.

Next, remove the pin from the link rod between the selector quadrant and the gear change mechanism at the latter end and unscrew the nut off the rear of the gearchange spindle. The gearchange mechanism can now be taken out as a complete unit, and dismantled later. Take care not to lose the small plunger and spring exposed by the removal of the previous parts.

The ratchet mechanism on the mainshaft must be dismantled next. First unscrew the locknut, straighten the tag washer, and remove it. By unscrewing the next nut, all the remaining parts of the ratchet mechanism will be free and can be taken off.

REMOVING THE SPEEDOMETER DRIVE.

Slack off the large nut on the drive and give the end of the drive a tap with a hide mallet. Remove the locating screw.

The large nut can now be used to withdraw the drive, distance pieces being built up behind the nut until the drive is fully withdrawn.

When replacing, after fitting the locating screw, fully tighten the large nut. Do not omit the fibre washer behind the nut or oil leaks may result.

There is now no obstacle to the removal of the gearbox inner cover except for its fixing screws of which there are four (three on later models). Two of these are fixed by a locking strip and the ends of this must be straightened before the screws can be removed. As the cover comes off, it will contain the mainshaft ballrace, and leave exposed loosely on the mainshaft an oil flinger (thin) and spacing collar (thick). Also assembled on the inner cover is the gear selector quadrant, but here again this need not be disturbed unless attention is obviously required. If it has to be removed, take care not to lose the plunger and spring and make sure they are refitted when assembling

If, when the inner cover is withdrawn, the three shafts (main, lay and selector) also come out still assembled in the cover, they may be quite easily detached, as they are a running fit in their bushes. In the same way if the shafts are still in the box, after removing the gearbox cover, they can be withdrawn with similar ease by removing all the shafts together. The layshaft bushes are, of course, a press fit in the gearbox and, if necessary, must be driven out with the aid of a soft punch (15/16 ins. diameter).

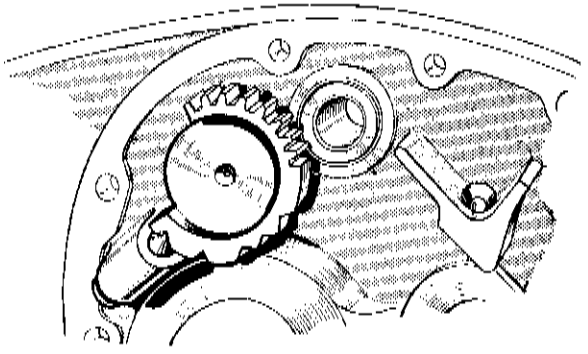

Fig. M29. Selector quadrant.

The top gear pinion sleeve is now the only part still left in the gearbox, and if the sprocket locknut is unscrewed, after suitable attention to the tag washer, the sprocket may be removed and the pinion tapped into the gearbox with the aid of a wooden mallet. If difficulty is experienced in holding the pinion whilst the sprocket is unscrewed, a fixture similar to that in Fig. M27 will solve the problem.

Do not disturb the ballrace unless it is suspected of being faulty. Wash it thoroughly in paraffin, to remove all traces of oil, when any play will be immediately detected.

Examine the various parts for wear and if the forks which actuate the sliding dogs show signs of seizure it is advisable to replace them. Attempts to erase the seizure marks will result in excessive side play. Replacement sliding dogs may be found to have convex faces on the dogs but this will not affect interchangeability, if the originals had flat faces.

Loose pinions on the lay and mainshafts may be rebushed if required, and of course, pinions with damaged teeth should also be replaced.

Fixed pinions on the layshaft and mainshaft are pressed on and new components must be a tight fit.

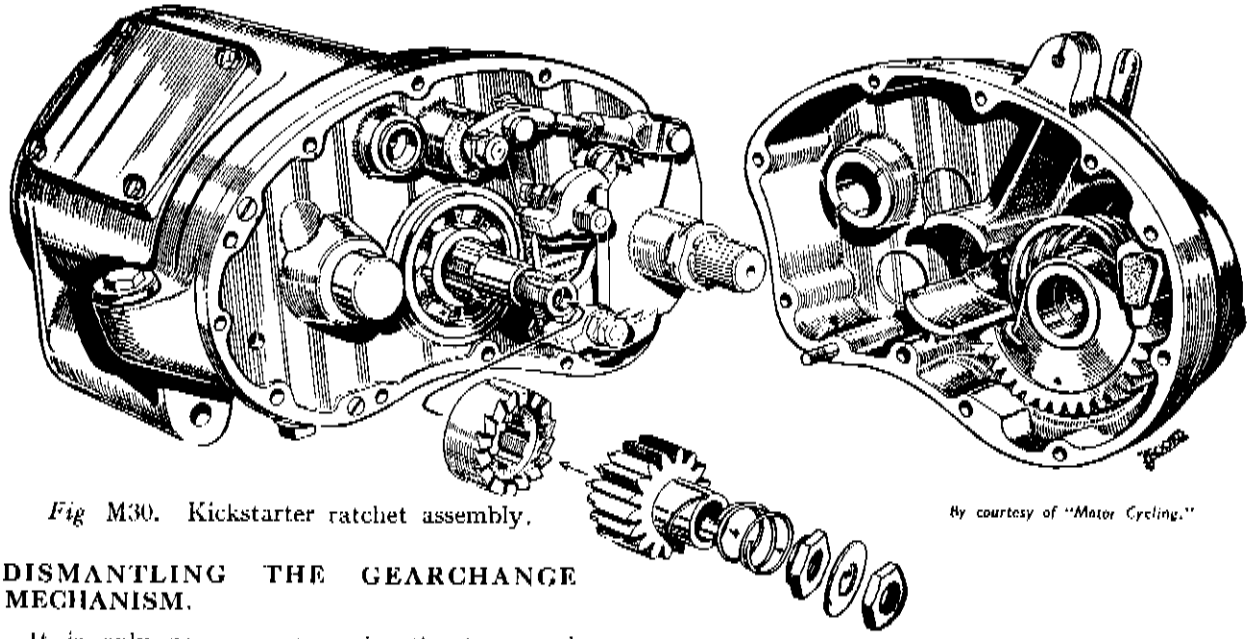

Fig M30. Kickstarter ratchet assembly.

By courtesy of "Motor Cycling."

DISMANTLING THE GEARCHANGE MECHANISM.

It is only necessary to prise the two pawl springs off their pegs, and to remove the circlip, when the whole unit can be stripped into separate components. The only parts which are likely to show signs of excessive wear are the pawls and the ratchet plate, and new components should be fitted if required. If the pawl springs show signs of stretching, they too, should be replaced.

RE-ASSEMBLY OF THE GEARBOX AND GEARCHANGE MECHANISM.

If it has been decided to fit a new ballrace to the top gear pinion, make sure that the oil flinger washers are correctly positioned. In order to remove the ballrace easily, warm the gearbox in boiling water. The flat washer should be placed between the pinion teeth and the bearing while the remaining washer fits on the opposite side of the bearing with its depressed face against the bearing. If the sprocket teeth are worn hook shaped a new one must be fitted, otherwise rapid chain wear will result. Do not forget to set the lockwasher into the grooves machined in the locknut after the latter has been tightened up. The tabs in the centre of the locknut washer must fit properly into the sprocket splines.

It is only possible to refit the shafts and their pinions in the box provided that the shafts are first assembled (with pinions in top gear position) outside the gearbox and then all fitted together.

Commencing with the layshaft, take off the low gear pinion only (this is the largest on the shaft) and hold the shaft in the left hand with the drilled end towards the wrist. Take up the selector shaft and fit the fork nearest to the small pinion into the dog clutch on the layshaft. Pick up the mainshaft, which should be complete with its dog clutch, and put it in position so that the second selector fork engages with the mainshaft dog clutch. The whole assembly can now be fitted into the gearbox, the mainshaft being the first to enter its bearing. Verify again through the inspection cover that the pinions are set in the top gear position (see Fig. M28). In this position the dog clutch on the mainshaft is in mesh with the pinion sleeve.

Replace the low gear pinion on the layshaft and if all has been assembled correctly, the face of this pinion should be just flush with its mating pinion on the mainshaft. The oil flinger washer and spacing collar can now be refitted to the mainshaft (see Fig. M28).

The inner cover is next to be assembled. Set the selector quadrant in the top gear position (see Fig. M29) and replace the cover. The paper washer between the inner cover and the gearbox shell should be smeared with jointing compound before final assembly. If the cover will not fit properly at

the first attempt, a **slight** movement of the selector, by means of a spanner, will cause the selector teeth to mesh properly with the selector shaft pinion and then the cover may be pressed home. Replace the four screws and locking strip, bending the corners of the latter to suit. All shafts should have the minimum of end play, and engagement of dogs should be checked in each gear.

The ratchet mechanism may now be refitted to the mainshaft, the parts assembling in the following order: Ratchet, bush, ratchet pinion, spring and shouldered nut. The latter should be tightened by finger pressure only. Replace the lockwasher and note that the tongue in this washer engages with the groove machined in the mainshaft. Screw up the locknut very tightly, and tap the edge of the washer over the nut.

RE-ASSEMBLY OF THE GEARCHANGE.

The ratchet sleeve plate (i.e., the plate in which there are a series of teeth) should be held in the left hand with the shortest diameter of the sleeve uppermost (see Fig. M31). One of the pawl carrier plates will be seen to have thin washers welded on to both faces, and this plate should now be superimposed upon the ratchet plate so that the pawl fits into one of the teeth adjacent to the link pin hole. Place the remaining pawl carrier on top of the original one so that its pawl engages with the second set of teeth on the ratchet plate.

Still holding the gearchange assembly in the left hand, take up the gearchange spindle in the right hand, holding it by the threaded end and fit it into the ratchet sleeve so that the plate fixed to the spindle lies between the spring anchor pegs. With the aid of a pair of pliers, replace the two springs and then fit the circlip in position. The whole process of re-assembly of the gearchange mechanism will be made much easier by a study of the illustration (Fig. M31).

The unit is now ready for re-assembly into the gearbox. Make sure that the spring loaded plunger is in position behind the unit before it is replaced. Couple the link arm to the ratchet plate and take care to replace the split pin. It should not be necessary to make any adjustment to the length of the link itself; this has been set when the gearbox was originally built, but if the gears will not engage properly a slight adjustment to the length of the link will be sufficient.

Before the re-assembly is carried a stage further, loosely replace the gearchange pedal **and check the operation of all gears by inspection through the cover.** It will, of course, be necessary to move the gearbox sprocket by hand when endeavouring to engage the gears.

When all is found to be correct, set gears in top gear position again, and remove the gearchange pedal. The clutch push rod is next to be replaced, and with this in position the small felt washer must be added. This washer is important since its function is to prevent any possibility of oil passing along the hollow mainshaft, to the clutch plates.

Finally, put back the gearbox cover, carefully tighten all screws, and replace the kickstarter crank and gearchange pedal. As the gearbox is still set in the top gear position when the indicator disc (if fitted) is replaced this also should be set to top gear.

REPLACEMENT OF THE GEARBOX.

The replacement of the gearbox should not present any difficulties. When the box is in position and the fixing bolts are about to be tightened up, make sure that the flats just below the bolt heads register properly in the slots machined in the yoke plates. Also, on the rear bolt, an adjuster is provided for tensioning the primary chain; this must be in position and the chain tension adjusted before the gearbox bolts are finally tightened. The latter must be really tight after the adjustment is made. There should be about ½ in. total play in the chain (see "Front Chain," Service Sheet No. 609).

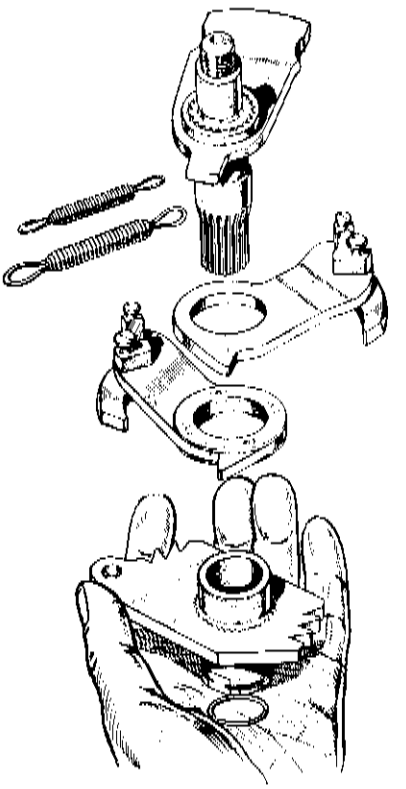

Fig. M31.

Gear change mechanism

Replace the oil tank pressure release pipe together with the clutch cable and its adjuster.

The inner half of the primary chaincase may now be fitted, followed by the cush drive, chain and clutch, together with its pressure plate and cover. Finally refit the outer half of the chaincase and then the footrest.

The re-fitting of the clutch and primary chaincase is described in "Re-assembly of the Clutch" in Service Sheet No. 610. The clutch adjustment may require setting and this should be carried out in accordance with the instructions given in Service Sheet No. 609. It is also possible that the rear chain will require re-tensioning and this may be done by movement of the rear wheel (Service Sheet No. 609).

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BSA SERVICE SHEET No. 609

"M" Group Models

Reprinted April, 1951.

TRANSMISSION

ADJUSTMENTS WHICH CAN BE CARRIED OUT WITHOUT DISMANTLING

CLUTCH ADJUSTMENT.

(Models up to Engine No. ZM–101).

Two adjustments are provided at the clutch control arm on the gearbox outer cover. The adjustment, which is for the clutch push rod will be exposed when the rubber cover at the base of the arm is moved aside and consists of a grub screw and locknut. Between the inner end of the screw and the clutch push rod a steel ball is inserted and the grub screw must be adjusted so that there is just a little clearance between the ball and push rod. The control arm in the de-clutched position should be as upright as possible.

The second adjustment is for the cable itself. If the control arm has been set in a new position, the cable length is altered to suit by means of the thumb nut on the cable stop above the gearbox.

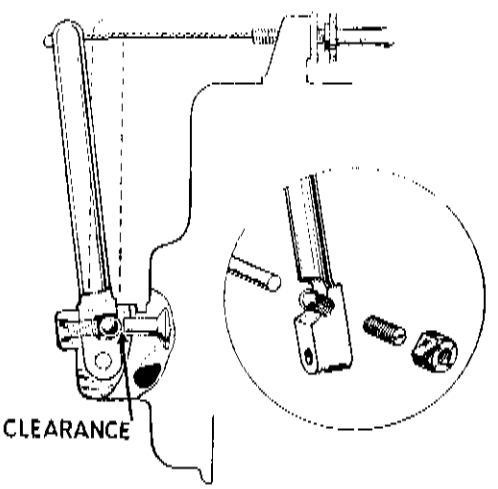

Fig. M32. Clutch control adjustment.

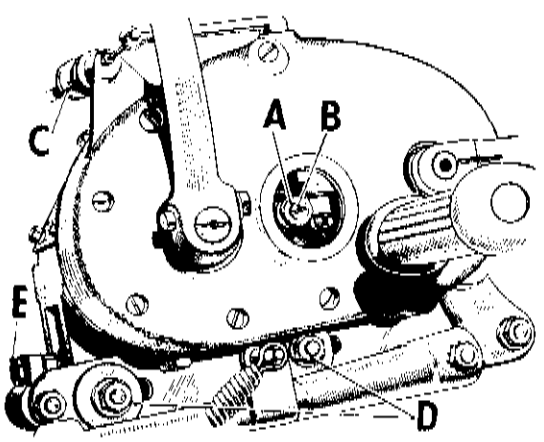

Fig. M32 (a). Clutch Adjustment.

CLUTCH ADJUSTMENT

(Models after Engine No. ZM–101).

The main clutch adjustment is enclosed inside the gearbox inner cover, and access is gained by the removal of the knurled oil filler cap.

The nut "A" locks the adjusting screw "B" in position, and to adjust the clearance between the ball and the end of the clutch push rod nut "A" must be unscrewed, and screw "B" rotated by means of a screwdriver until the necessary clearance is obtained.

Note. It is essential that a very slight clearance is permitted between the ball and the push rod at all times when the clutch is not being operated.

Further adjustment is provided by the knurled nut "C" on the top of the gearbox. Remember, however, that some free movement in the control arm is necessary, for if the adjustment is too tight there will be a constant pressure on the clutch, with consequent wear and loss of efficiency.

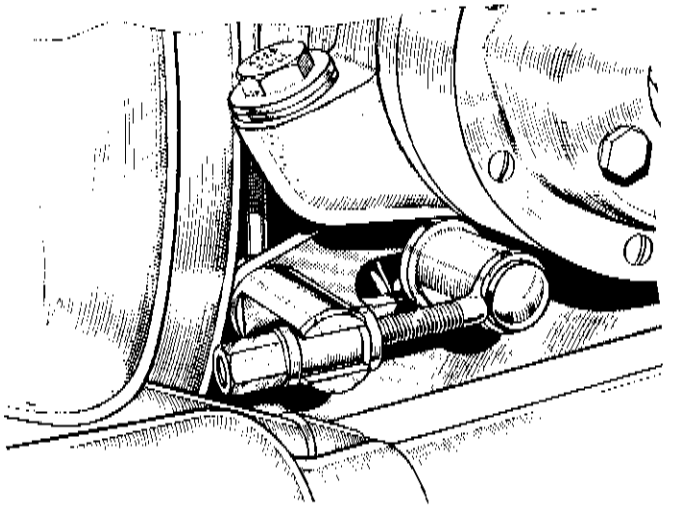

Fig. M33. Front chain adjuster.

FRONT CHAIN ADJUSTMENT.

The front chain is adjusted by moving the gearbox. The latter slides between two plates and cannot, therefore, cause chain misalignment.

Release the gearbox fixing bolts and move the box by means of the screw adjuster (see Fig. M33) until the chain has about $\frac{1}{2}$in. total play at a point about mid way between its sprockets. The chaincase filler plug can be used as an inspection cover for this purpose, or alternatively, the chaincase outer cover can be taken off. Make sure that the adjustment is correct for all positions of the sprockets and that the gearbox bolts are well tightened.

REAR CHAIN ADJUSTMENT.

The rear chain is tensioned by means of a special cam on the nearside of the wheel spindle and by screw adjustment on the offside. First, release the offside spindle nut (see Fig. M34), then the cam locknut on the nearside. The latter nut is the larger of the two nuts on this side. Then, applying a spanner to the smaller nut, turn it in an anti-clockwise direction to tighten the chain, until it has a total amount of play, mid-way between the sprockets, of about $\frac{3}{4}$ in.

Now turn to the offside of the machine and screw the adjuster in (if the chain has been tightened) until the wheel is properly aligned in the frame.

A gauge is provided in the tool kit for this purpose, and fits between the offside chainstay

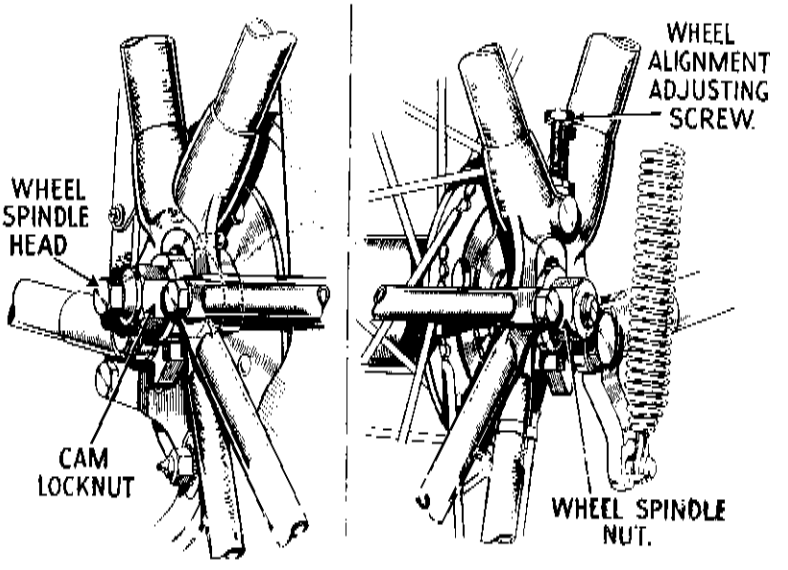

Fig. M34. Rear chain adjuster.

and the wheel rim (Fig. M35). (Before the gauge is used it is necessary that the wheel alignment be checked with a straight edge and then see which gauge—1, 2, or 3—is the correct fit.) If the machine is in the workshop, however, it is much better to use a wooden straight edge, in the normal manner, i.e., it should touch each wheel in two places if both tyres are of the same section. Tighten the cam locknut and check the chain setting. If correct, tighten the offside spindle nut and then the offside adjuster locknut.

Note. It may be necessary to adjust the rear brake, since this will have been altered by movement of the rear wheel.

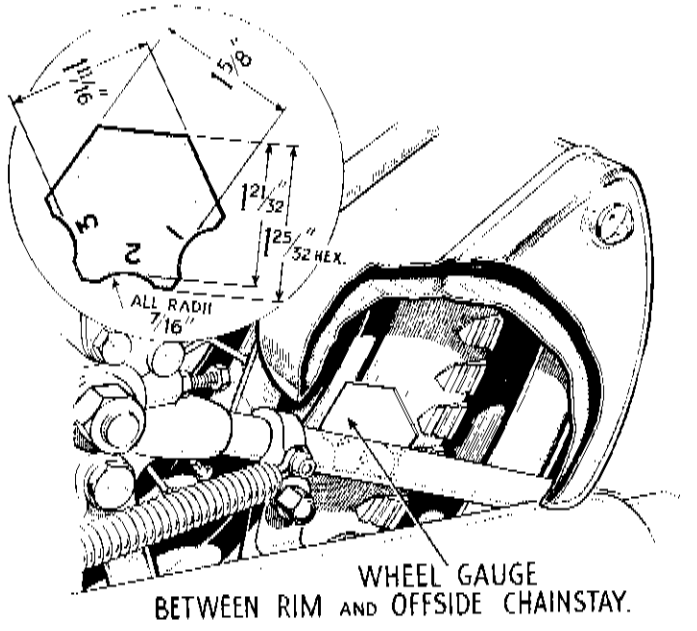

Fig. M35. Wheel alignment gauge.

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"M" Group Models

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DISMANTLING AND RE-ASSEMBLING THE CLUTCH

NOTE.—The clutch described in this sheet is fitted to all "M" group models up to Engine No. YM 101 For later models see Service Sheet No. 308.

Take off the left footrest and then undo all the screws round the rim of the chaincase. The nuts off these screws are welded to the other half of the case, and so cannot get lost. As the outer chaincase cover is taken off, careful note should be made of the positioning of the washers, etc., for replacement purposes (see Fig. M25). The joint washer should be carefully preserved.

The clutch cover is next to be removed exposing the clutch pressure plate, which in turn can be taken off after removal of the six nuts. By unscrewing the central ring nut all the clutch plates, both steel and fabric, will be released. Take care that the spring does not fly off as the nut is removed.

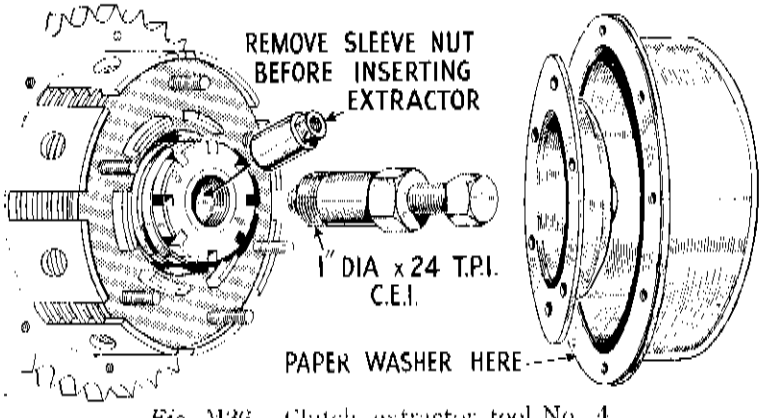

Fig. M36. Clutch extractor tool No. 4.

The clutch hub is held to the gearbox mainshaft by means of a sleeve nut through which the clutch push rod will be seen to protrude. Unscrew this nut and apply the extractor as shown in Fig. M36, thus drawing the remainder of the clutch off the mainshaft.

The various parts may now be examined for wear. Special attention should be paid to the slots in which the steel plates slide and if any grooves worn in them are not too deep the sides of the slots can be filed smooth. If the sprocket teeth are worn to a hook shape the sprocket must be replaced, otherwise rapid chain wear will result. The steel plates should be smooth and if they are badly scored should be replaced, while the fabric rings will require a thorough washing in petrol if there is any trace of oil on them. Finally, examine the rollers and tracks and verify that the cork washer is intact.

RE-ASSEMBLY OF THE CLUTCH.

The clutch is of straight-forward construction, and a study of Fig. M38 will show how the parts are assembled. It is important to note that the

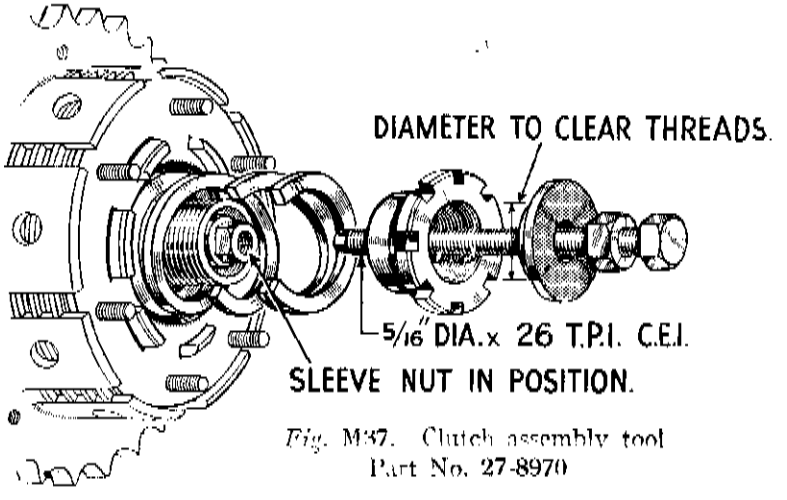

Fig. M37. Clutch assembly tool Part No. 27-8970

cork washer must not be omitted as this is for the purpose of preventing oil reaching the clutch. The plates must be fitted in their proper order, as follows: Fabric disc, driven plate (tongues on outer diameter), fabric disc, driving plate (tongues on inner diameter), etc., starting and finishing with a fabric disc of which there are eight.

Difficulty may be experienced in compressing the spring before the central ring nut can be started on its threads, and a suitable bolt and washer used as illustrated in Fig. M37 will enable the spring to be compressed sufficiently for the ring nut to be screwed home.

No adjustment is provided for altering the tension of the spring and the ring nut must be screwed up tight. After carefully centralising sliding plate (in rear half of chaincase) with gear-box mainshaft, refit clutch assembly to mainshaft after cork washer and key have been placed in position. Screw home and well tighten sleeve nut.

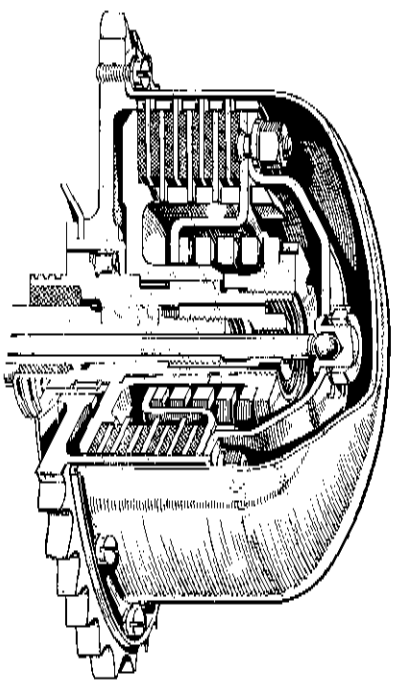

Fig. M38. Section through clutch.

Refit clutch actuating cap (first smearing small quantity of grease on ball in centre) and finally replace clutch cover. When replacing the clutch cover verify that the paper washer is in position and it should be lightly smeared with jointing compound before assembly, to ensure an oil tight joint.

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"M" Group Models

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FITTED WITH GIRDER TYPE FORKS

ADJUSTMENT, DISMANTLING and RE-ASSEMBLING of HUBS and BRAKES

REAR HUB (Fig. M39).

The rear wheel is of the quickly detachable type and the taper roller bearings are contained in the wheel hub. To remove the rear wheel it is only necessary to undo the three retaining bolts and withdraw the spindle from the nearside. The latter is released after the nut on its offside end is removed. **The spindle does not unscrew; it is a push fit in the hub.** Should it be too tight to be removed by hand, it may be tapped out from the offside. Remove the distance piece on the right-hand side and withdraw the hub to the right from the driving studs. The wheel itself is now free and can be taken out rearwards after the detachable portion of the mudguard is removed.

Uncouple the rear chain, the brake cover plate (at its junction with the torque arm) and the brake rod. The whole brake drum assembly can now be taken off, after removal of the hub nut on the nearside of the spindle.

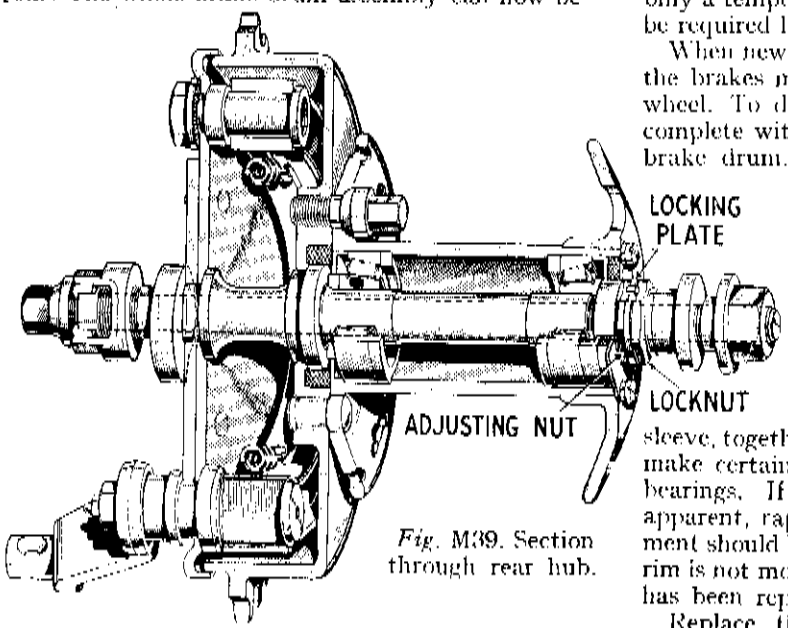

Fig. M39. Section through rear hub.

To remove the bearings it is only necessary to take off the locknut and adjusting nut on the right-hand side of the hub, when the bearing sleeve may be drawn out from the opposite side. The outer races of the bearings are lightly pressed into the hub and will tap out easily after removal of the dust-cap. Thoroughly clean the bearings and examine carefully. If they have been run in too tight a condition, flats may have been worn on the rollers and a track formed in the outer race. Check also that the bearing sleeve and the hub spindle have not been distorted through misuse. If necessary, renew.

The brake drum cover plate can be withdrawn from the brake drum and it will be seen to carry the brake shoes together with their fulcrum pin and operating cam. It is unlikely that these will require attention although the latter should be checked for freedom of movement and dismantled and greased if necessary. To remove the brake shoes, lay drum cover plate flat on bench (shoes uppermost) and lever shoes upwards. They can then be drawn over and free of cam and fulcrum pin. To replace, attach springs and reverse method of removal. If the cam pads show excessive wear, new shoes should be fitted, otherwise if only the brake linings are worn these alone need be replaced.

If examination of the brake drum shows that the sprocket teeth have become hook-shaped and the braking surface scored, a new drum must be fitted. **The drum must not be machined to produce a new braking surface.** To do so is only a temporary cure and further attention would be required later.

When new linings, or new shoes have been fitted, the brakes must be centralised after refitting the wheel. To do this, replace the brake cover plate, complete with shoes, fulcrum pin and cam, in the brake drum. Slacken the fulcrum pin nut, and turn the cam so as to open the brake shoes in the normal manner when the fulcrum pin will move in its slot until both shoes are pressing equally on to the drum. Tighten the fulcrum pin nut firmly and release the brake.

RE-ASSEMBLY.

After fitting new bearings and bearing sleeve, together with the adjusting nut, in position, make certain that there is a trace of play in the bearings. If they are locked up so that no play is apparent, rapid wear will be caused. The adjustment should be such that the side play at the wheel rim is not more than 1/64 ins. after the locking plate has been replaced and locknut screwed up tight.

Replace the brake assembly in position and couple up the rear chain, cover plate and brake rod. Verify that the brake cam is against its stop and adjust the chain for tension (see Service Sheet No. 609). For this latter operation, the wheel spindle must be replaced (without the hub being in position).

Withdraw the wheel spindle and replace the wheel in position. **The wheel bolts must be screwed up tight and must be kept dead tight at all times.** Slackness will result in elongation of the stud and dowel holes in the hub flange, necessitating replacement. Method of tightening is to turn wheel until one of the three bolts can be seen between mudguard upright and saddle to hub backstay. Insert bar type box spanner 69-9068 through hole in hub and engage head of bolt. Place box spanner 66-9067 over squared shank of first spanner and tighten bolt as necessary. A full half turn is possible before spanners need to be

re positioned. Insert the wheel spindle, but before finally tightening the spindle nuts, the chain should be finally adjusted and the wheel aligned by means of the gauge provided in the tool kit (see Service Sheet No. 609).

FRONT HUB.

The particulars given above for the rear hub are essentially the same for the front hub. Before the wheel can be removed, however, the speedometer drive cable must be disconnected at its lower end, and also the front brake cable. After withdrawing the wheel from the forks remove the speedometer drive from the spindle, for which purpose, it is only necessary to unscrew its locknut. This will expose the bearing adjusting sleeve and locknut. When replacing the speedometer drive unit make sure that the tongues on the driving pinion engage with the slots in the hub shell.

BRAKE ADJUSTMENT.

The front brake is adjusted by means of the screwed sleeve on the cable stop, fitted to the brake cover plate

The rear brake is adjusted by means of a wing nut on the end of the brake rod. An adjustable stop is provided to enable the pedal to be altered to suit the rider's convenience.

BRAKE RE-LINING.

After removal of the brake shoes the old lining is easily taken off by gripping the shoe in a vice, inserting a chisel under one end and shearing the rivets off in sequence. The rivet ends can then be punched out of the shoe.

New linings are die-pressed to suit the curvature of the shoes, but will require drilling and counterboring to take rivets. Position the lining and hold it in place at one end by means of clamps. Using the holes in the shoe as guides, drill holes of the correct size (5/32 ins. dia.) for the rivets adjacent to the clamp. Turning the shoe over, counterbore the holes just drilled, sufficiently deep so that the rivet heads will stand below the lining surface; this is important, since the rivets will otherwise score the brake drum.

Insert rivets into the holes and rivet them over on the inside of the shoe. This is easily accomplished by holding in a vice a short length of rod, whose diameter is equal to that of the rivet head, and using it as an anvil upon which to rest the rivet head while hammering the shank over. This will also make sure that the rivets do not stand proud of the lining.

Move the clamps to the next pair of holes, taking care that the lining is kept in firm contact with the shoe the whole time, and repeat the above procedure. When the lining is finally riveted down, bevel off the ends of the linings and file off any local high spots.

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BSA SERVICE SHEET No. 612

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All Models

BRAKE RELINING

Brake Shoe Removal and Replacement

After the brake plate has been removed from the wheel, the brake cam lever A (Fig. M40) should be detached and the cam spindle B pushed in slightly to allow the shoes to clear the brake plate. Insert a screwdriver between the brake shoes at the fulcrum pin C and twist the screwdriver.

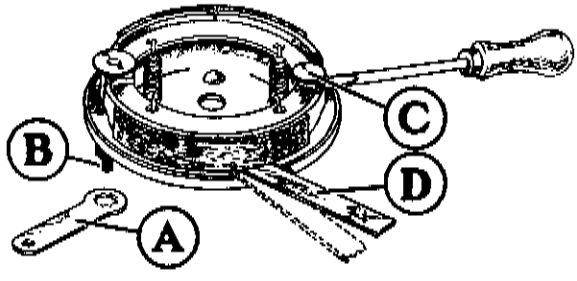

Fig. M40. Removing the Brake Shoes

Place a small lever D between one of the shoes and the cover plate and lever the shoe away from the cover plate until the spring pressure is released. Both shoes can then be lifted from the brake plate.

The shoes can be replaced by the reverse procedure. Hook the springs on to the shoes and place the ends of the shoes in position on the fulcrum pin and cam lever. Then push the shoes outwards until the springs pull them into their correct position.

NOTE: The brake shoe springs are quite strong and care should be taken that the fingers are not trapped by the brake shoes during these operations.

Brake Shoe Relining

With the shoes removed the linings can best be removed by drilling away the heads of the rivets and punching the shanks out to the inside of the shoe with a suitable drift.

New linings are die pressed to suit the curvature of the shoes, but will require drilling and counter-boring for the rivets. Position the lining and hold it in place at one end by means of clamps. Using the holes in the shoes as guides, drill holes of the correct size for the rivets adjacent to the clamp. Turn the shoe over, and counterbore the holes just drilled sufficiently deep so that the rivet heads will stand below the lining surface; this is important, since the rivets will otherwise score the brake drum.

Insert the rivets into the holes and rivet them over on the inside of the shoe. This is easily accomplished by holding in a vice a short length of rod, whose diameter is equal to that of the rivet head, and using it as an anvil upon which to rest the rivet head while hammering the shank over. (See Fig. M41.) This will also make sure that the rivets do not stand proud of the lining.

Move the clamps to the next pair of holes, taking care that the lining is kept in firm contact with the shoe the whole time, and repeat the above procedure. When the lining is finally riveted down, bevel off the ends of the linings and file off any local high spots.

Precautions to be observed when fitting the relined shoes to the hubs are given in the Service Sheet on Hubs and Brakes.

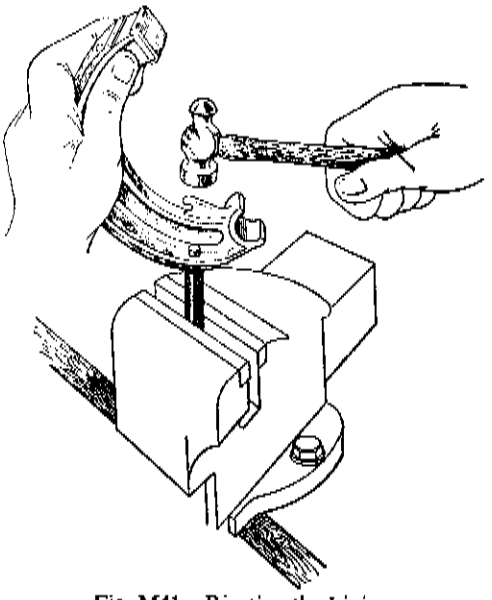

Fig. M41. Riveting the Linings

Works reconditioned brake shoes can be obtained through the medium of your Dealer from the B.S.A. Exchange Replacement Service.

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BSA SERVICE SHEET No. 613

"M" Group Models

FITTED WITH GIRDER TYPE FORKS

October, 1948.
Reprinted January, 1954.

ADJUSTMENTS TO STEERING HEAD AND FRONT FORKS

STEERING HEAD.

In order to feel any play in the steering head the front wheel must be clear of the ground, so that a box of suitable dimensions should be placed under the engine. Loosen the head yoke clip nut (just below the handlebars) and tighten the sleeve nut on top of the steering column until there is no perceptible shake in the head.

Do not adjust too tightly, otherwise the ballrace will be damaged and the steering will become stiff. Lastly, tighten the clip nut.

If a steering damper is fitted it is necessary to remove the knob before the adjusting sleeve is tightened.

FORK LINKS (Fig. M42).

The link bolts must be just tight enough to prevent side play. First, slacken off the shock absorber on the lower fork link, then release the locknuts on the offside of the links, screw up the bolts from the nearside and retighten the nuts.

FORK DAMPER.

This must, of course, be adjusted by the rider to suit road conditions, and the thumb wheel can be reached from the saddle.

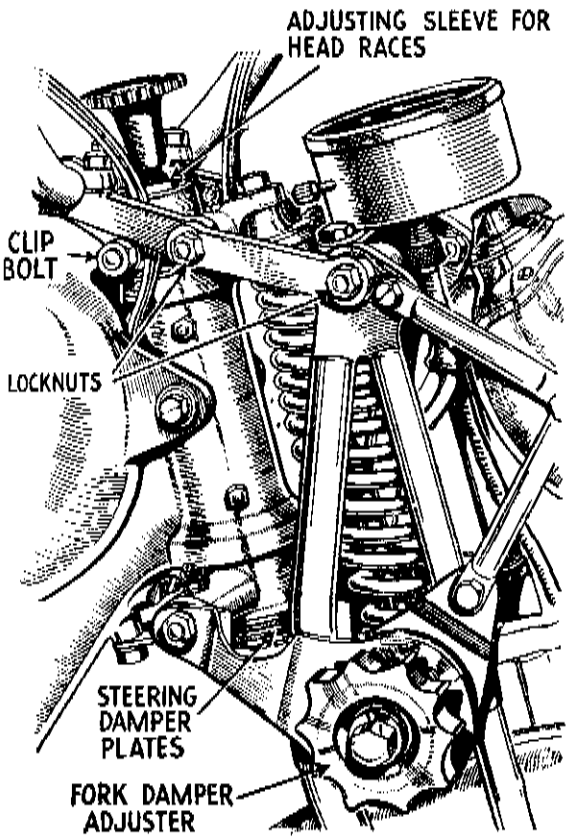

Fig. M42 Fork links and steering head.

(P.T.O.)

REMOVAL, DISMANTLING and RE-ASSEMBLY of FRONT FORKS and STEERING HEAD

There is no necessity to disturb the electrical system as a whole, when removing the forks. The instrument panel on the back of the headlamp is retained by three screws, and if these are removed, the panel is released and the wiring can be withdrawn through the aperture after releasing the four connections (see Fig. M43). Place a box under the engine so that the front wheel is clear of the ground.

Remove the nut from the fork spring top scroll, then remove both top fork links and prise scroll downwards until the bolt is free from headlug. Headlamp wiring should now be drawn out at the side of the forks.

To take off the fork spring it is only necessary to unwind the spring from its bottom scroll. If difficulty is experienced place a piece of rod against end of spring and give a sharp blow with a hammer.

Disconnect the front brake cable, remove the two lower fork links, and the whole front fork assembly can be taken off complete with speedometer, headlamp and front wheel.

Dismantling the steering column is quite straightforward. Take off the steering damper knob (if fitted) and slacken the head yoke clip nut (just below the handlebars). Remove the sleeve nut on top of the column and uncouple the steering damper plates at the frame lug.

The steering stem can now be driven out (downwards) with a lead hammer to prevent damage to the threads. The stem will bring with it the lower ballrace cone, leaving the cups in position at the top and bottom of the steering head. A simple extractor shown in Fig. M44 is used for removal of

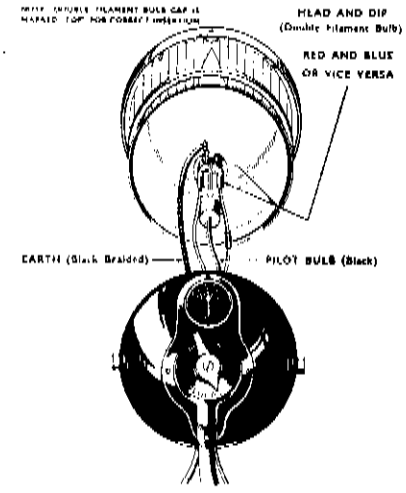

Fig. M43. Headlamp connections.

these cups. They are threaded to take the extractor, which should be screwed well home, since it engages with a few threads only. A bar is then inserted from the opposite end of the head lug, and the extractor and ballrace driven out together.

If the ballrace cups and cones are pitted, to even a slight degree, they must be replaced, otherwise steering will be uncomfortable. Note that this pitting is almost invariably due to "hammering" of the balls in their tracks, due to slack adjustment in the first place.

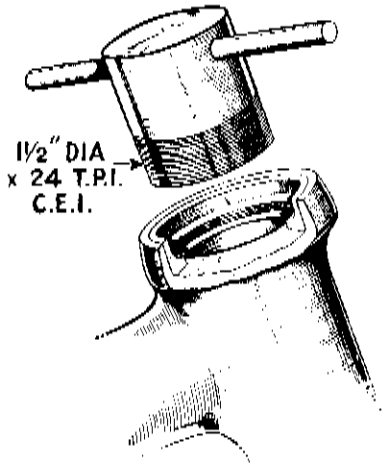

Fig. M44. Steering head ballrace extractor 61-1919.

RE-ASSEMBLY.

When fitting new ballrace cups make sure they are driven in squarely and that they are pressed well home. Replace the steering stem and if any difficulty is experienced in making the balls (of which there are 20 top and 20 bottom—all ¼in.) stay in position, the tracks should be heavily smeared with grease.

Refit the dust cover and steering head yoke, followed by the top sleeve nut. The latter may now be tightened, until there is no trace of play in the head. On the other hand, do not tighten excessively.

Replace the steering damper rod, complete with plates, from below and tighten the damper plate securely to the frame. The lower end of the steering damper rod is slotted to take the fork link bolt, and care must be taken to see that the rod is fitted so that the link bolt can slide through.

The fork spring should be carefully inspected. If it is suspected of having become weak through prolonged use over bad roads, or shows signs of collapse, a new one should be fitted. Attach the spring to its bottom scroll, and replace the bottom two fork links loosely in position. Refit the top scroll in position, draw the wiring to the headlamp forward to its normal position, and assemble the top fork links. Adjustment of the links should be such that there is no side play present. The headlamp connections are shown in Fig. M43.

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"M" Group Models

October, 1948.
Reprinted Nov., 1954.

Fitted with Girder Type Forks

REMOVAL, DISMANTLING and RE-ASSEMBLY of FRONT FORKS and STEERING HEAD

There is no necessity to disturb the electrical system as a whole, when removing the forks. The instrument panel on the back of the headlamp is retained by three screws, and if these are removed, the panel is released and the wiring can be withdrawn through the aperture after releasing the four connections (see Fig. M43). Place a box under the engine so that the front wheel is clear of the ground.

Remove the nut from the fork spring top scroll, then remove both top fork links and prise scroll downwards until the bolt is free from headlug. Headlamp wiring should now be drawn out at the side of the forks.

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Disconnect the front brake cable, remove the two lower fork links, and the whole front fork assembly can be taken off complete with speedometer, headlamp and front wheel.

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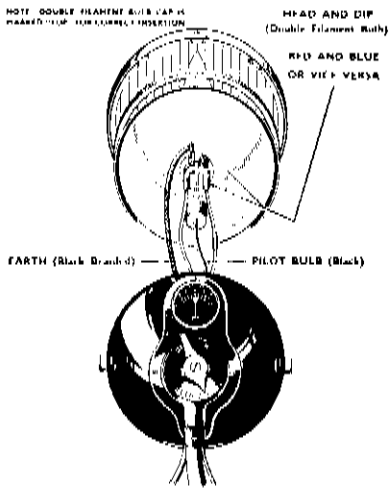

Fig. M43. Headlamp connections.

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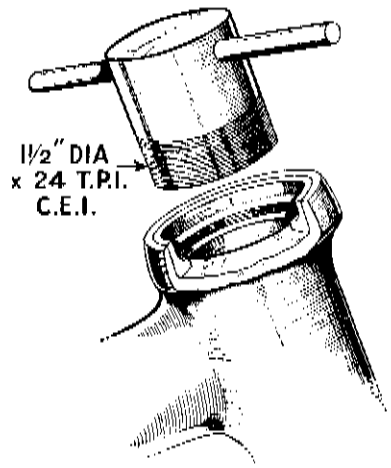

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