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SERVICE SHEETS

250 OHV

Models

CI1G and CI2

BSA SERVICE SHEET No. 209

Reprinted January, 1958

C Group, 4 Speed (1951-55) & A Group Rigid & Plunger

DISMANTLING AND RE-ASSEMBLY OF GEARBOX AND GEARCHANGE

Removal

In most cases it will be found convenient to dismantle the gearbox while it is in position in the frame. If it is necessary to remove the gearbox sprocket or sleeve pinion on an 'A' Group machine, the engine-gearbox unit must be removed from the frame and the gearbox separated from the crankcase (see SERVICE SHEET No. 206). To remove the gearbox from the frame of a 'C' Group machine for attention to bearings see Service Sheets Nos. 308 and 411.

Dismantling the Gearbox

Move the gears to the neutral position between first and second. Next remove the gearbox outer cover which is held in position by three screws and four nuts. The cover will come away with the kickstarter, the gear change and the clutch lever still in position, and these need not be disturbed unless obviously requiring attention. Note that as the cover is withdrawn, the spring pressure on the kickstarter pedal is released. The clutch operating lever should be pulled out to the fullest extent, allowing the kickstarter lever to come to rest against it, thus preventing the kickstarter return spring from being released.

Pull out the clutch operating rod which passes through the centre of the mainshaft, and then release the nut on the mainshaft which holds the kickstarter ratchet pinion and spring, laying the latter aside. The gearbox partition can then be removed together with the foot gear-change rocking lever M. (Fig. A24).

The rod G is pressed into the gearbox shell at the clutch end and secured by a grub screw which is accessible under the gearbox. Release this grub screw and then pull out the rod. It should then be possible to withdraw the entire gear cluster complete with shafts and the two sliding forks bodily from the gearbox, although, if preferred, the components may be withdrawn separately. This may call for a certain amount of manoeuvring, but the experienced mechanic will have no difficulty. Before removing the gear selector plate H, note the notch in which the gear control plunger engages. This is the neutral position between first and second gear, and the plate must be rotated to this position before the box can be reassembled. Unscrew the selector plunger housing locknut and remove the plunger assembly from the gearbox shell. The gear selector plate will now slide from its pivot. The layshaft bushes are a press fit in the gearbox and if necessary must be driven out with the aid of a soft punch.

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 tab washer, the sprocket may be removed and the pinion tapped into the gearbox with the aid of a wooden mallet.

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

Examine the various parts for wear, and if the forks which actuate the sliding pinions show signs of seizure it will be advisable to replace them. Attempts to erase the seizure marks will result in excessive side play.

The fixed pinions on the layshaft and mainshaft are pressed on, and new components must be a tight fit. Examine the selector plate for worn cam grooves and for wear on the ratchet members on the boss in which the selector claw P engages, and replace if necessary. The selector claw should be replaced if the teeth show signs of wear as, of course, should pinions with damaged or worn teeth.

Re-assembly of the Gearbox and Gearbox Mechanism

If it has been decided to fit a new ballrace to the top gear pinion, remove the spring circlip and oil flinger washer with the aid of a screwdriver. In order to remove the ballrace easily, warm the gearbox shell in boiling water. If the sprocket teeth are worn hook-shaped, a new sprocket 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.

Assemble the layshaft with selector fork "F", with the exception of the low gear pinion (this is the largest on the shaft). Replace the selector plate and gear control plunger, rotating to the neutral position between first and second gears. Slide the layshaft complete with gears and selector fork into the box and engage the fork peg in the track of the cam plate.

Assemble the mainshaft pinions on the shaft and the selector fork "E", and insert the complete assembly into the gearbox shell engaging the peg of the selector fork in the cam plate. Slide the gear control shaft through the selector forks and press home into the gearbox case, replace the grub screw turning the edge of the hole over to prevent loss of the screw. Replace the thrust washer and low gear pinion on the layshaft.

The inner cover should next be assembled. Coat the paper washer between the inner cover and the gearbox shell with jointing compound, hold the gear change rocking lever in a central position, slide the inner cover on to the four studs and push it "home". The gear selector claw must engage on the ratchet members on the selector plate boss.

The ratchet mechanism may now be fitted to the mainshaft, the parts assembling in the following order—spacing washer, sleeve bush, spring, ratchet pinion, locking washer, and nut. Tighten the nut and turn over the tab on the washer as a means of locking the nut.

The outer cover can now be replaced. Coat the paper washer with jointing compound. Take up the outer cover with the kickstart lever in the left hand and the footcharge lever in the right hand. Slide the cover onto the gearbox studs and press home, entering the kickstart quadrant in the ratchet pinion and the footcharge slotted lever over the ball end of the rocking lever. Replace the four nuts and three screws on the outer cover.

The unit is now ready for reassembly to the engine (see Service Sheet No. 208).

A.10 & A.A.7. Machines

After engine numbers ZA.10-1215, ZA.7-11192 are fitted with a modified layshaft and gear cluster to obtain improved gear selection and the engine number should be specified when ordering spares.

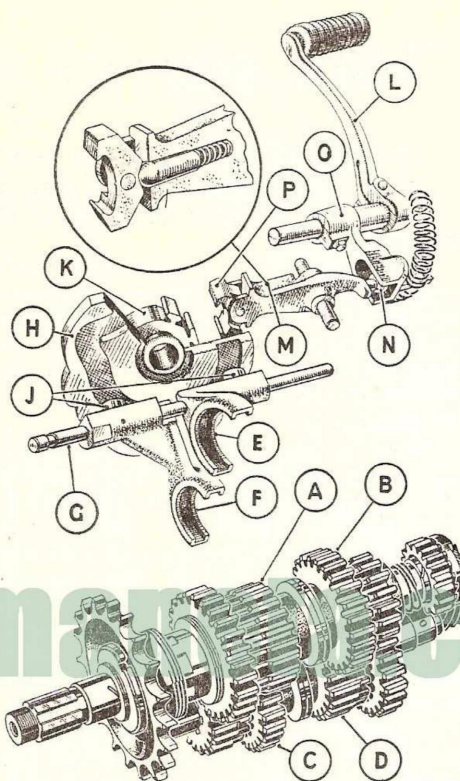
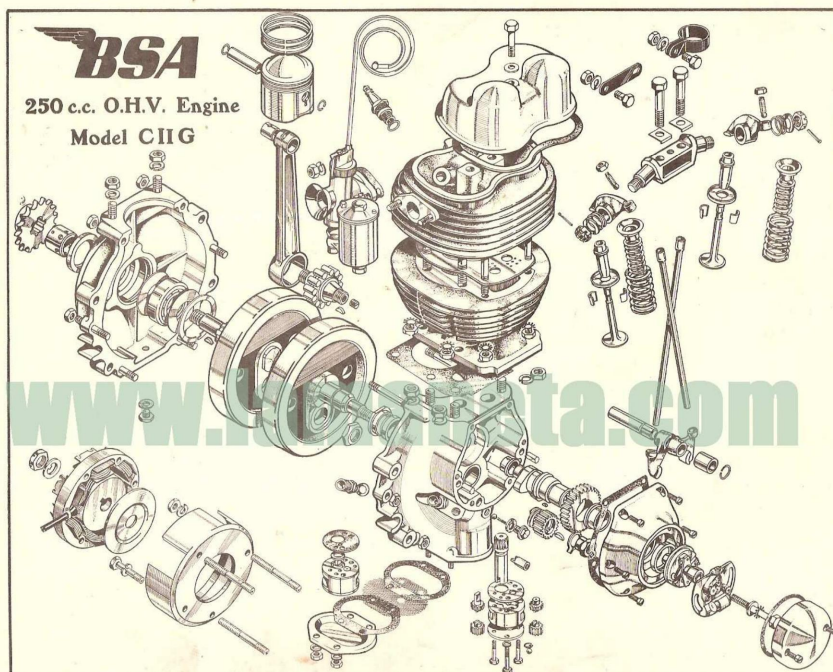


Fig. A24.

BSA SERVICE SHEET No. 402A

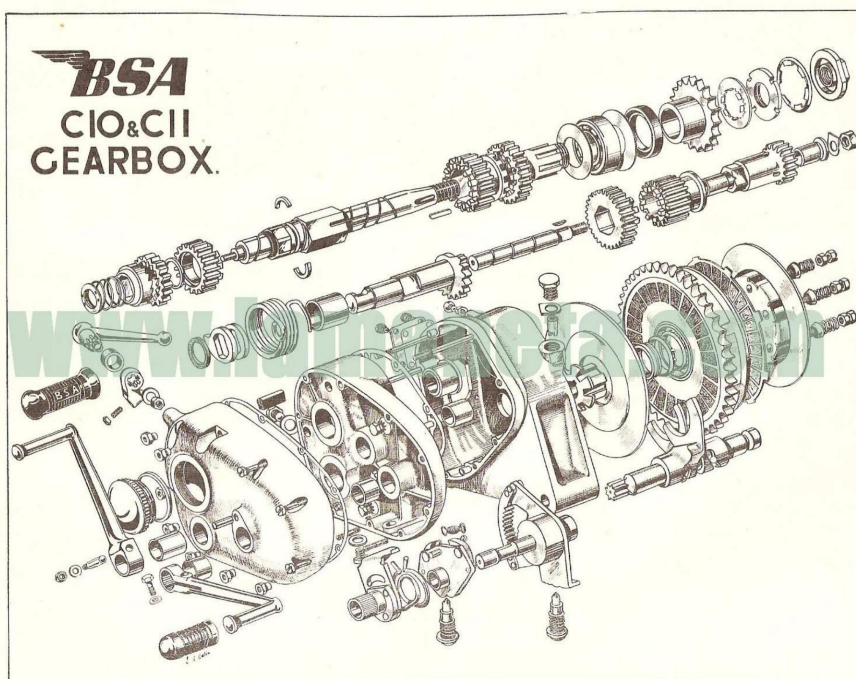
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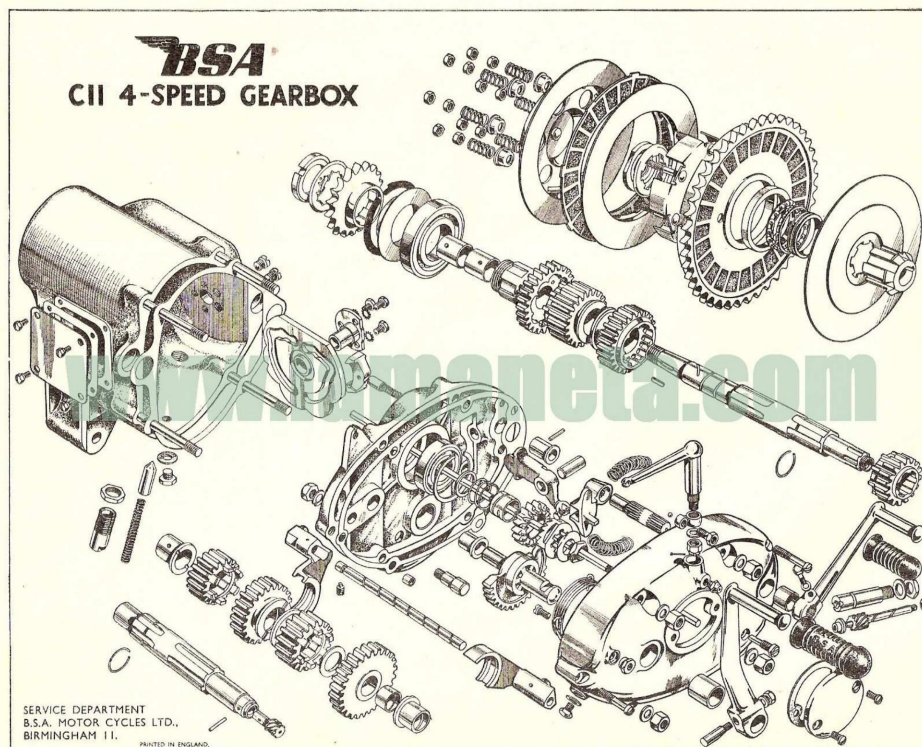


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Fig. C3. The "C" Group 3-speed Gearbox (Exploded View)

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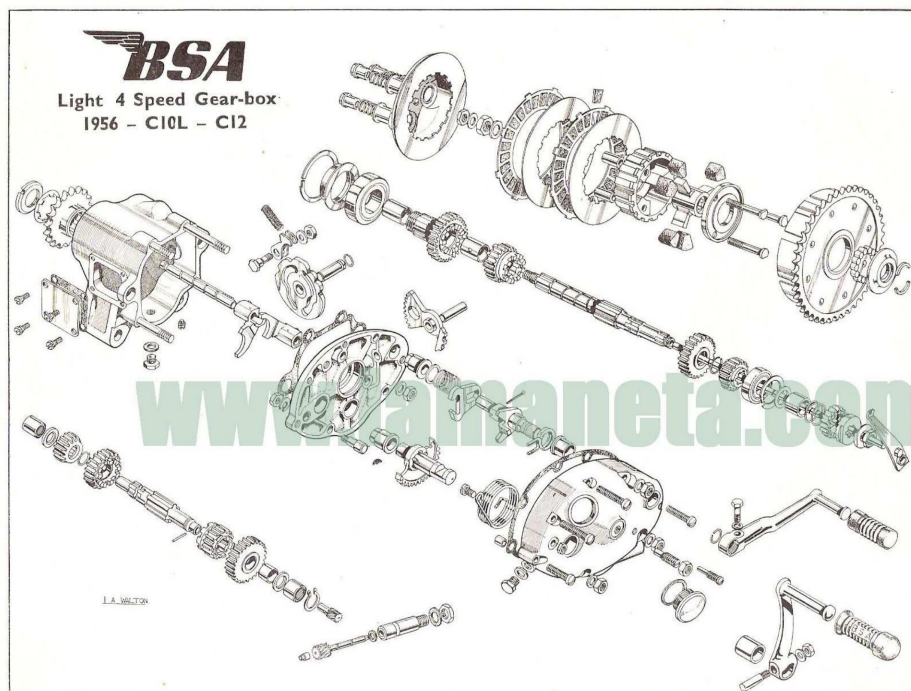


U/B1281

C11 Gearbox 4-Speed (Exploded View)

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BSA SERVICE SHEET No. 404

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C Group Models

ENGINE ADJUSTMENTS WHICH CAN BE CARRIED OUT WITHOUT DISMANTLING

Oil Pressure Valves

As described under 'How the lubrication system works', two ball valves are incorporated in the system, to prevent the transfer of oil from the tank to the crankcase.

The spring loaded valve is located in the delivery passage between the pump and the big end, and lies behind the hexagon-headed plug situated in the side of the crankcase just below the lowest part of the timing cover (see Fig. C4).

Should any foreign matter lodge between the ball and its seating, oil will gradually transfer from the tank when the machine is left standing, and when the engine is started up there will be a heavy discharge of smoke from the exhaust.

To rectify, remove the plug, spring and ball. The simplest way of removing the ball is to hold the hand close to the orifice and gently turn the engine over, when the ball will be forced out by oil pressure.

Clean the ball and seating, and if on replacing there is still a doubt as to whether the ball is seating properly, insert a small punch against the ball and deal it a sharp tap with a light hammer. Finally replace the spring and ball.

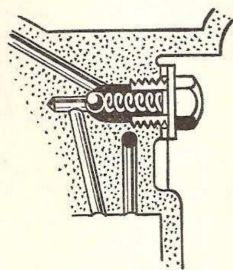


Fig. C4. Ball valve in crankcase.

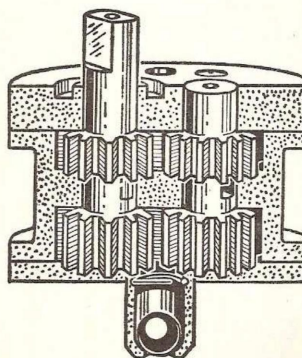


Fig. C5. Ball valve below return pump.

The other ball valve is located beneath the return pump (Fig. C5) and apparent failure of the return pump may be due to this ball having stuck in its seating.

B.S.A. Service Sheet No. 404 (continued)

To rectify, remove the pump cover plate, insert a piece of wire into the orifice and lift the ball off its seating. Should the trouble keep recurring, it may be necessary to fit a new base plate to the pump.

ON NO ACCOUNT REMOVE THE OIL PUMP UNLESS IT IS ABSOLUTELY NECESSARY.

Tappet Adjustment

It is most important that tappet clearances are correctly maintained, and they should be frequently checked and adjusted if necessary, always when the engine is cold.

Before checking, make sure that the cams are in the correct position; otherwise an incorrect measurement may result.

The correct position is arrived at by turning the engine over until the piston is at the top of the compression stroke.

The simplest method is to lift the machine on to its stand and engage any gear. Then remove the compression plug in the cylinder head (on side valve models) or the sparking plug (on O.H.V. models) and with a piece of wire feel the top of the piston while rotating the engine a little in both directions by turning the rear wheel. When the piston is at the top of its stroke with both valves closed, and neither valve is opened by slight backward or forward rotation of the engine, proceed to check the clearances.

S.V. Model

Remove the tappet cover by unscrewing the four securing bolts. Check the clearance between the head of tappet base of valve stem with feeler gauge. This should be .004 in. in the case of the inlet valve and .006 in. in the case of the exhaust valve.

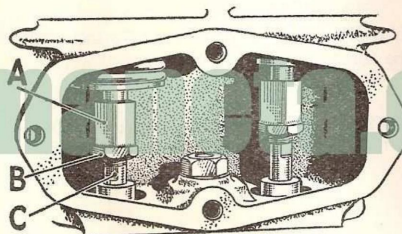


Fig. C6. Tappet adjustment.

If clearances are incorrect hold the tappet head (A, Fig. C6) with a spanner and unscrew the locking nut B. Now hold the stem C, rigid with another spanner, and turn the tappet head to the right to reduce clearance, or left to increase it. When the correct adjustment is obtained, lock B hard against A, and then finally check.

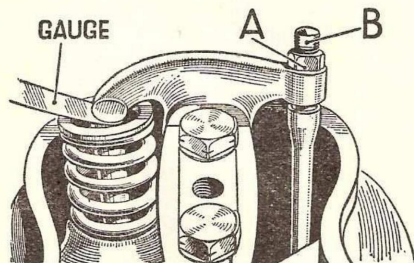


Fig. C7.

incorrect, slacken locknut B and screw adjusting pin A downwards to reduce clearance, and upwards to increase it.

O.H.V. Model

Remove the rocker box cover by unscrewing the central bolt. Check the clearance by inserting a feeler gauge between the end of the rocker and the valve stem (Fig. C7). The correct clearance for both valves is .003 in. when the engine is cold. If the adjustment is

B.S.A. Service Sheet No. 404 (continued)

When correct, tighten the locknut against the rocker, finally check the clearance and replace the rocker cover.

Tappet Adjustment (Ramp Cams)

On C10L Models from Engine No. BC10L.3562 and C11G Models from Engine No. BC11G.10438, ramp cams were fitted, and it is essential to adhere to the following procedure when carrying out tappet adjustment.

To check and adjust exhaust valve clearances, rotate the engine forward until the inlet valve has just closed and set the EXHAUST valve clearance to .015 in. (C10L) or .012 in. (C11G).

To check and adjust inlet valve clearance, rotate engine forward again until exhaust valve clearance is just taken up, but before the valve actually starts to lift. Set the INLET valve clearance to .012 in. (C10L) or .010 in. (C11G).

Ignition Timing (C10 and C11)

If the distributor is removed for any purpose, it will be necessary on replacement to retime the ignition, but before doing this, the contact breaker point gap should be checked.

Turn the distributor shaft until the points are fully open and check the gap. This should be .012 in. If the gap differs from this the points should be adjusted. This is carried out by slackening the screws 'B' Fig. C8, moving the contact plate 'C' until the correct gap is obtained, and finally tightening screws 'B'.

Ignition timing can now be carried out. Set the piston at the top of the compression stroke (as explained under Tappet Adjustment) and insert a piece of wire through the sparking plug hole so that it is resting upright on top of the piston.

Now turn the engine backwards until the piston has descended $\frac{1}{32}$ in.

Remove the distributor cover and turn the centre spindle until there is approximately $\frac{3}{8}$ in. between the fibre pad and the start of the lift of the cam. Insert the distributor into its housing with the flat side towards the rear, and push well down on its seating, noting that as the gear meshes with the driving pinion the distributor shaft turns slightly and takes up a new position. Now rotate the distributor body until the points are just opening, and then tighten the locking screw located under the distributor body at the front.

The C Group of machines are fitted with an automatic advance and retard mechanism, which is housed under the contact breaker base. This mechanism requires periodical lubrication. First remove the distributor top and disconnect the low tension lead at the side, and then unscrew the two bolts 'A' (Fig. C8). The complete contact breaker unit on its base can now be removed and the advance and retard mechanism will be revealed.

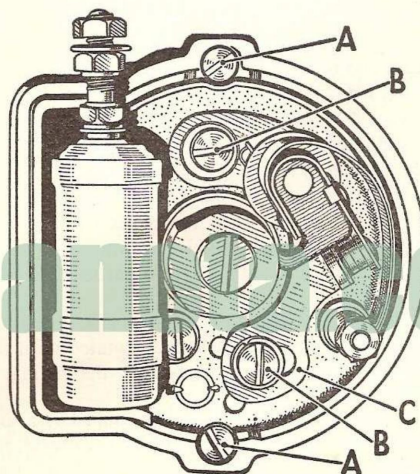


Fig. C8. The distributor.

B.S.A. Service Sheet No. 404 (continued)

Lubricate with thin engine oil but do not overdo it, then replace the contact breaker base, not forgetting the low tension lead. There is also a small lubricator below the main body for lubricating the distributor spindle. Apply a few drops of oil and be sure to close the thimble to exclude dust.

Ignition Timing (C10L and C11G)

The contact breaker mechanism is exposed by undoing the two retaining screws and removing the domed cover A (Fig. C9).

Before inspecting the ignition setting, the contact breaker gap should always be checked. Turn the engine over until the contact breaker gap at B is at its maximum, and then insert a suitable set of feeler gauges between the points. The correct gap is .015 in. and if it differs from this setting, the two screws at D should be slackened slightly and the contact support plate moved until the gap is correct. Tighten the screws and re-check the gap. In no circumstances must the plate be bent to alter the adjustment.

The ignition setting can best be checked in the fully retarded position. Rotate the engine until the piston is at T.D.C. on the compression stroke (as described in Tappet Adjustment).

In the case of the C11G the contact breaker points should just be opening, but when dealing with the C10L insert a piece of thin rod through the plug hole until it rests on the piston crown and rotate the engine backwards (by engaging top gear and turning the rear wheel) until the piston has descended $\frac{1}{32}$ " (12° if using a Timing Disc), the points should now be just opening. This can be checked by inserting a piece of very thin paper between the points, the setting is correct when the paper is only lightly gripped. Make sure when withdrawing the paper that no particles adhere to the contact points.

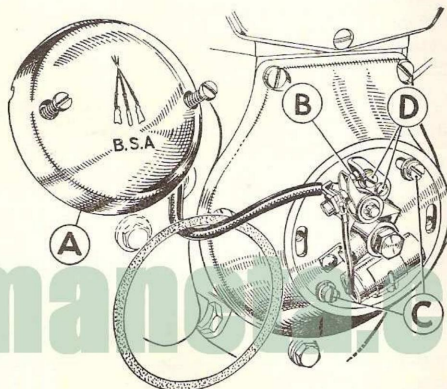


Fig. C.9. Contact Breaker Mechanism

If the ignition timing is not correct, the two screws C (Fig. C9) should be slackened and the contact breaker back plate rotated until the points are just on the point of opening. Tighten the screws and re-check the setting.

A drop of thin oil should be applied occasionally to the felt cam lubricating pad, but over lubrication should be avoided, as the excess oil may be thrown on to the contact breaker points.

Removal of the two screws C, will permit the contact breaker back plate to be withdrawn, to provide access to the advance and retard mechanism, which should receive occasional lubrication with thin oil.

Sparkign Plug

If satisfactory performance is to be obtained, it is most important that the sparking plug is maintained in good condition. The Champion Sparking Plug supplied with the machine is of the non-detachable type and can only be cleaned satisfactorily by using the sand blast type of cleaner which is standard equipment at most garages. All traces of deposit should be cleaned off the points and the inside of the plug to prevent internal shorting.

Re-set the sparking plug points gap to .018—.020 in. by bending the side contact. In no circumstances should the centre electrode be moved as this will crack the insulation. Ensure that the copper sealing washer is in good condition before replacing the plug, and make sure that the thread and plug seat in the head are clean and free from grit. When the plug has been replaced, wipe the outside of the insulation with a piece of clean rag to prevent external shorting.

If it is found that the plug requires frequent attention then the carburettor settings should be checked to ensure that the mixture is correct (See Service Sheet No. 708).

BSA SERVICE SHEET No. 405

C Group Models

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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 crown and valves.

Removing Cylinder Head C10 and C10L

Detach the high-tension lead to the sparking plug and remove the plug. Slacken the cylinder head bolts in the reverse order shown in Fig. C.10. If, when the bolts are removed, the head is inclined to stick, a few taps with a wooden mallet low down on the vertical fins will loosen it, but be careful not to crack or break the fins.

With the head removed, the piston and valves are now exposed. Set the piston at the top of its stroke and scrape off all carbon with an old blunt pen-knife or similar tool, taking care not to damage the piston crown.

Scrape all carbon from the cylinder head. Rotate the engine so that both valves are open and examine the seatings.

If these show a bright unbroken surface all round, leave well alone, but if they show traces of pitting, it is necessary to remove them for grinding in. This will be facilitated if the barrel is removed.

Removing Cylinder Head C11 and C11G

It is easier to detach the cylinder head if the petrol tank is first removed. This is attached at the front to the steering head lug and at the rear to the frame top tube. Before removing the tank, turn off the petrol tap, and detach the petrol pipe. The rubber pads on which the tank is mounted should be marked so that they can be replaced in their original positions.

Detach the high-tension lead and the sparking plug. Next disconnect the petrol pipe at the carburetter and remove the carburetter. Take off the exhaust pipe. Take off the rocker box cover after removing the central bolt.

Unscrew the six nuts holding the cylinder head to the barrel. These are located between the fins at the sides of the barrel.

A gentle tap with a wooden mallet under the exhaust port will free the head, which should be raised just sufficiently at first to enable the push rods to be freed from the rocker ballpins and the push rods withdrawn. Then the head can be lifted right off.

Removing the Valves C10 and C10L

Stand the cylinder on a bench with valve heads downwards, and with a screwdriver or similar tool, press hard on the valve spring collars until the springs are compressed sufficiently to clear the cotters. The split cotters can then be freed, and the valves removed from the cylinder. A special spring compressor tool can be purchased locally or from the B.S.A. Spares Department if desired. Scrape all carbon from the valve pockets but be careful not to damage the valve seats.

Removing the Valves C11 and C11G

Place a wooden block which will fit inside the cylinder head on a bench and then lay the head on to the block with the valve heads resting on it. Then compress the valve springs and remove collets as described for the side valve model.

Scrape all carbon from the piston and from the cylinder head and ports. The head may be polished with emery cloth, but take care not to damage the valve seats, and to remove all traces of dust before reassembly.

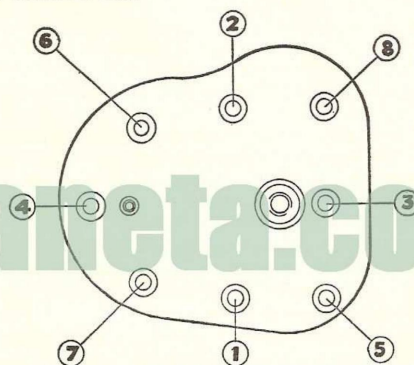


Fig. C.10. Order of tightening cylinder head bolts (S.V.)

Valve Springs

After a period of several thousand miles it may be desirable to fit new valve springs, as these tend to lose their efficiency due to heat. If the springs are renewed whilst decarbonising it will save dismantling specially to do the job at a later date.

Grinding in Valves

Valve grinding should only be attempted if pitting is not deep. If deep pit marks appear, the valve should be refaced, as attempts at grinding in this case will cause wear of the seats and the valves may become pocketed.

Smear a small quantity of grinding compound—obtainable from any garage or accessory shop—over the face of the valve and return it to its seat. On the S.V. model a screwdriver can be used to rotate the valve, but on the O.H.V. model the stem of the valve must be gripped by the special tool provided in the tool kit.

The valve should be rotated backwards and forwards while a steady pressure is maintained, and every few strokes the valve should be lifted and turned to a new position. Continue this operation until the valve face shows a smooth polished surface all round.

It is most important that the valves should be ground in on their correct seats, and for this reason both valves are marked, one 'IN' and the other 'EX'.

After grinding, remove all traces of compound from both valve face and seat, and before replacing the valves, smear the stems with engine oil.

When replacing the springs make sure that the split collets are located correctly.

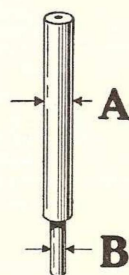
Removing Cylinder Barrel C10 and C10L

First turn off the petrol and detach the carburetter, which can be tied to the frame out of the way.

Next take off the exhaust pipe which is a push fit into the cylinder and can be pulled out when the clip bolts holding it to the frame are slackened.

Now remove the five cylinder base nuts (four outside and one inside the tappet chamber, and then the cylinder barrel can be lifted off.

When removing the cylinder barrel the simplest way is to lift it up and tilt it forward 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 clean rag to prevent dust and grit falling in.



"A" $\frac{1}{2}$ in. dia.
"B" $\frac{3}{10}$ in. dia.

Fig. C.11. Valve guide fitting punch.
Service Tool 61-3264.

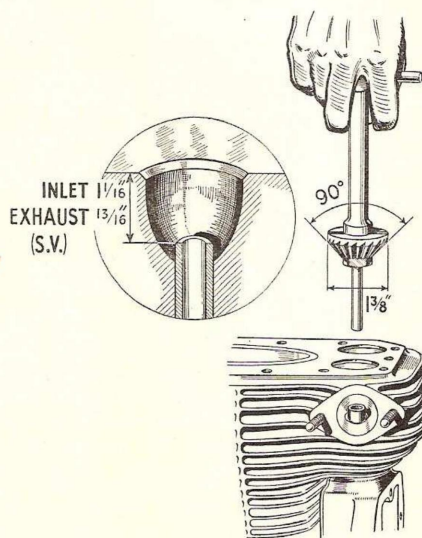


Fig. C.12. Cutting the valve seats.
Service Tool 61-3305

Fitting New Guides

If new guides are to be fitted, the old ones can be driven out by means of a simple punch made from a bar of steel not more than $\frac{1}{8}$ in. dia. (see Fig. C.11).

The new guides can be driven in from the top using the same punch.

After fitting new guides the valve seats must be re-cut with a pilot cutter to ensure concentricity of seats and stems (Fig. C.12).

Piston Rings

The gudgeon pin is located by means of wire circlips which must be removed with the 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 them in the cylinder for gap. (Fig. C.13.) If the gaps are excessive, new rings having gaps of between .008 in. and .012 in. when in position must be fitted.

At this stage it is advisable to check the big-end bearing for wear. Turn the engine until the piston is at the top of its stroke, and resting both hands on the sides of the crankcase mouth, hold the 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 big-end noise has been noticed with the engine running, the engine should be completely dismantled, and a new big-end assembly fitted.



Fig. C.13. Checking piston ring gaps.

Assembly after Decarbonising

Side Valve Model. Replace the valves and springs in the cylinder barrel, making sure that the valves are assembled on the seats from which they were removed, and take care to see that the split collets are seated correctly in their grooves in the valve stems.

Pour a little oil into the crankcase, and smear the cylinder walls liberally with oil. See that the cylinder base washer is in good condition—if damaged, replace, otherwise oil leaks will develop. Turn the engine until the crankshaft is a little past bottom dead centre, then compressing the top piston ring with the fingers, slide the cylinder barrel over the piston and top ring. Each ring must be compressed in turn as the barrel is refitted, and care is necessary to avoid breaking the rings. It is essential to see that the mouth of the crankcase is completely covered with rag before commencing to replace the cylinder, as if it is left uncovered, and a ring is broken, the pieces may drop into the crankcase and will be difficult to recover.

B.S.A. Service Sheet No. 405 (cont.)

Before trying to bolt the cylinder down, make sure that both tappets are in their lowest positions, otherwise the cylinder may not seat properly due to the pressure of the valve springs. Screw up the base nuts lightly at first, and then tighten one quarter turn at a time, working on the outer nuts in diagonal order and then the nut inside the tappet chest.

When the cylinder is finally tightened down, replace the cylinder head gasket—first seeing that the latter is undamaged. If it is damaged, or shows sign of leakage (indicated by black patches) replace with a new one. Now fit the cylinder head, tightening the bolts one quarter turn at a time in the order shown in Fig. C.10. Check these bolts for tightness after 250 miles—particularly if a new head gasket has been fitted.

Replace the exhaust pipe, tightening the frame clips when in position, and then the carburetter. When replacing the carburetter slide take care not to damage the point of the needle. Next fit the petrol pipe.

If the sparking plug is of the detachable type, dismantle and clean it before refitting. If it is non-detachable, and obviously dirty, have it cleaned by a garage equipped for this purpose, or, failing this, fit a new one.

Finally check the tappet clearances and if necessary, adjust. Note, that if a new cylinder base washer has been fitted, it is advisable to check the nuts for tightness after 250 miles, and then again to check the tappet clearances.

O.H.V. Model. Replace the cylinder barrel as described for the side valve model, first checking that the base washer is undamaged. Now replace the valves and springs in the cylinder head, making sure that they are on the correct seats and that the split collets are positioned correctly.

See that cylinder head gasket is in good condition, replace it, and then fit cylinder head loosely in position. Before the head is bolted down the push rods must be fitted. It should be noted that these are crossed, and the exhaust must be fitted first, the plain end fitting into the cup formed on the cam rocker (bottom left), and the cupped end fitting over the rocker ball end (top right). Fig. C.14, shows a section illustrating how the push rods are fitted.

With the push rods in position, the cylinder head can be bolted down. Before replacing the rocker box cover, check tappet clearances and adjust if necessary. Note that the tightness of the head should be checked after the first 250 miles, and that if the nuts are tightened at this period it will probably be necessary to re-adjust the tappets.

Next replace carburetter, taking care not to damage the needle when inserting the slide, and see that the flange washer is in good condition. Then fit exhaust pipe, and finally, replace the petrol tank and petrol pipe.

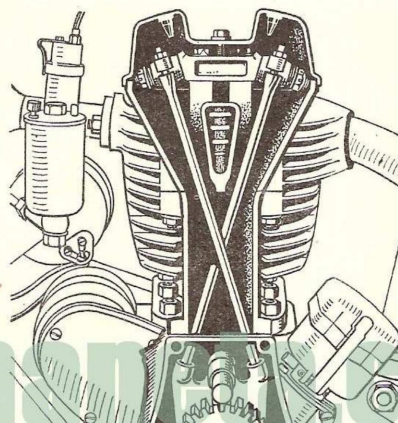


Fig. C.14. Section showing push rods on O.H.V. models.

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C10 and C11 Models

REMOVING ENGINE FROM FRAME AND COMPLETE DISMANTLING

The procedure for the removal of the engine and dismantling will be described from the point reached in the section on decarbonising, when the cylinder head and barrel had been removed.

The next step is to drain the oil tank or remove the oil pipes and plug the holes in the tank. Remove the oil pipes by disconnecting at the crankcase end.

Detach the leads to the dynamo (both of which are held by a small plate and single screw), and the lead to the distributor.

Removing Chain Case

The oil bath chain case follows next. Take off the footrest and undo all the screws round the rim of the case. The nuts of the screws are welded to the rear half of the case and so cannot be lost.

When the outer case is being taken off, careful note should be made of the position of the cork washers and distance pieces to facilitate re-assembly. Before removing the chain, loosen the clutch (as described in the next Section), and then dismantle the engine shaft cush drive.

Tap the lock washer clear of the slot in the cush drive retaining nut and unscrew the nut. Then withdraw the spring and cam sleeve, leaving the sprocket and chain in position.

Removing Clutch

Remove the clutch actuating cap by unscrewing the spring retaining nuts and lock nuts.

Tap the lock washer back, unscrew the clutch retaining nut, and withdraw the long push rod.

The clutch can then be removed with the aid of Extractor 61-3362 which screws into the threads provided in the clutch hub. Now uncouple the chain, take off the clutch as a unit, and then the cush drive hub. (See also Section dealing with Clutch Assembly.)

The inner half of the primary chain case is attached to the crankcase by three bolts, and it can be detached when these are removed.

Undo the engine bolts, taking great care to avoid damaging the threads, and remove the front engine mounting plates. If the rear engine and gearbox plates have been slackened sufficiently, the engine can now be withdrawn if it is tilted slightly to release it.

It is advisable to replace the various bolts and studs loosely in their respective locations to ensure correct re-assembly.

Dismantling the Engine

Before commencing to dismantle the engine, a simple fixture as illustrated in Fig. C.15 will facilitate matters considerably.

Alternatively, clamp the engine in a vice by means of one of the mounting lugs supporting the crankcase on the bench.

Remove the crankcase drain plug and drain the oil. Take out the timing cover screws and pull off the cover. Clean it and place on one side.

Flatten the turned over end of the camshaft nut locking washer and remove the nut. Slacken the dynamo strap nut and turn the dynamo to slacken the chain.

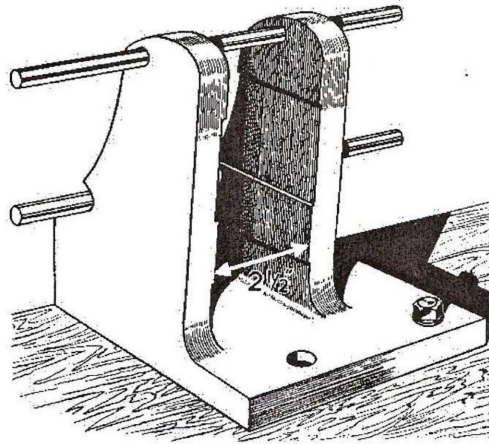


Fig. C.15. Angle bracket for mounting engine.

Take off the dynamo drive sprocket (Service Tool 61-3256) and chain. Remove the dynamo, clean the chain and sprocket in paraffin, and set aside.

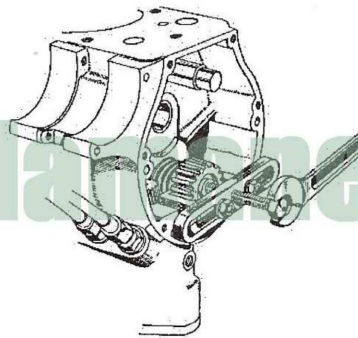


Fig. C.16—Engine shaft pinion extractor. (Service Tool 61-3256.)

B.S.A. Service Sheet No. 406 (cont.)

Slacken off the clamp nut immediately below the distributor head and withdraw the distributor complete. Take out the screws retaining the inner timing cover, noting the locations of the longer screws. Remove the cover, clean it, and set aside.

Withdraw the camshaft complete, flatten out the tab washer and remove the mainshaft nut. The mainshaft pinion can now be drawn off, using Service Tool 61-3256 (see Fig. C.16).

The oil pump drive spindle which meshes with the mainshaft pinion is retained in position by a dowel covered by a plain washer, situated just below the mainshaft to the left, in the edge of the timing chest.

Prick out the plain washer and pull out the dowel by screwing in one of the timing cover screws. The pump spindle can now be drawn upwards into the timing chest.

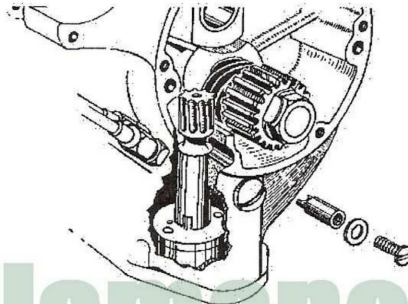


Fig. C.17— Oil pump spindle locking plunger.

Remove the nuts from the crankcase studs and take out the loose studs, noting the locations. Place the engine on its side, with the thumbs on the ends of the engine shaft and, gripping the gear-side crankcase half with the fingers, pull off the gear-side half.

The halves may not separate without some persuasion, but great care is necessary if damage to the casting is to be avoided.

Lift the flywheel assembly clear of the drive-side half, and remove the distance collar and oil flinger.

Take off the four nuts and lock washers at the base of the gear-side crankcase, and remove the filter. **DO NOT REMOVE THE OIL PUMP UNLESS IT REQUIRES ATTENTION.**

If new bushes and bearings are being fitted, the bushes must be reamed in position in line with the opposite bearing.

Old bushes can be driven or drawn out, but it will be necessary to heat the case in hot water to remove ball or roller bearings (see Fig. C.18). The new one should then be immediately fitted while the case is warm. (See Service Sheet No. 702 for dimensions of bushes.)

It is advisable to check and if necessary correct the flywheel alignment. For procedure see the Section dealing with engine re-assembly.

SPECIAL NOTE

The crankcase bearing drive side is held in position by a spring ring, and this must be removed before attempting to remove the bearing. Careful note should also be made of the way the oil flinger is fitted to ensure correct re-assembly.

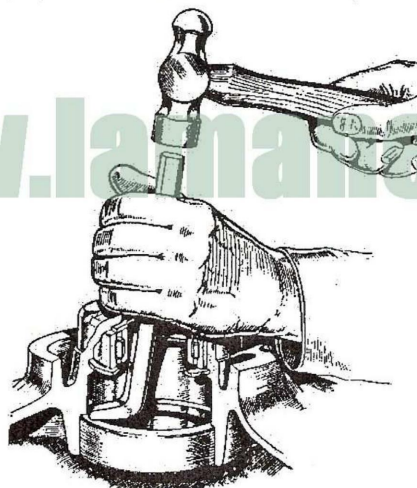


Fig. C.18.—Ballrace extraction (drive-side).

Finally, if the flywheels are to be separated they must be held securely on the bench, as extreme pressure will be required to release the crankpin nuts.

Special spanners are used, and it is usually necessary to add a piece of tubing to obtain additional leverage.

The crankpin is a taper fit in 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 may assist you in your decision:

We do not advise the fitting of over-size rollers to the big end assembly. The whole assembly, comprising crankpin, connecting rod and rollers, should be changed. All these components are carefully matched, working to one ten-thousandth part of an inch, and supplied in complete sets, ready for fitting.

If the bore of the cylinder, when measured at right angles to the gudgeon pin, shows wear to the extent of .010 in. or more, the cylinder should be rebored, and an oversize piston fitted. (Oversize pistons are available in 0.5 mm. (.020 in.) and 1 mm. (.040 in.)

Wear in mainshaft bearings or bushes will be readily apparent, and bearings showing signs of damaged balls, rollers or tracks should be replaced.

Special clearances are specified for mainshaft bearings used on B.S.A. motor cycles, and it is NOT advisable to fit other than genuine B.S.A. replacements.

BSA SERVICE SHEET No. 407

C10 and C11 Models

October, 1948
Reprinted Jan., 1957

RE-ASSEMBLING THE ENGINE

The need for extreme cleanliness cannot be over-emphasized. Parts should be thoroughly cleaned, and all traces of any anti-rust preparations with which new parts may be coated must be removed.

Flywheels

If the big-end assembly is to be renewed it is as well to check the weights of the new components against those which have been removed. A slight variation in weights is inevitable, but provided that the discrepancy does not exceed $1\frac{1}{2}$ ozs. no further action need be taken. This tolerance should not be exceeded since when first assembled the flywheels were balanced to suit the original parts, and the balance may be adversely affected if the weights of the new components differ considerably from those 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 two $\frac{3}{8}$ in. diameter posts rigidly to the bench in a vertical position, the distance between their centres being $3\frac{1}{2}$ in. Midway between the posts a hole of 1 in. 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 punch over the edge of the crankpin with a centre punch to lock the nut.

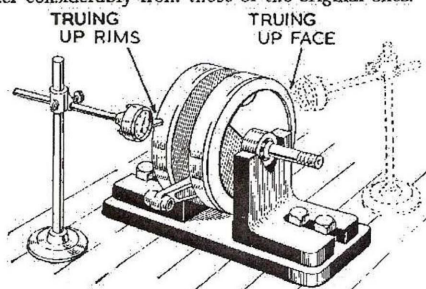
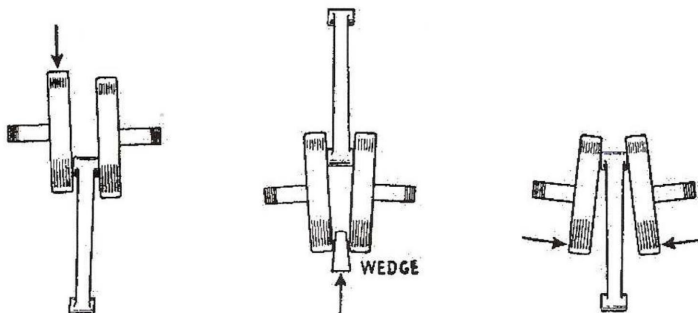


Fig. C.19. Checking flywheel alignment.



To bring shafts into line, a sharp blow with a mallet on timing side flywheel (indicated by arrow).

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

To bring flywheels parallel a sharp blow with mallet on flywheel rims on opposite side to crankpin.

Fig. C.20. Method of correcting flywheels out of alignment. Note that above illustrations are exaggerated.

B.S.A. Service Sheet No. 407 (cont.)

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 .012in. and is not less than .010in.

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 driveside bearings Part No. 24-732 should be fitted to the mainshaft 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. C.19), 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. C.20). The shafts should be finally trued to within .002in. maximum.

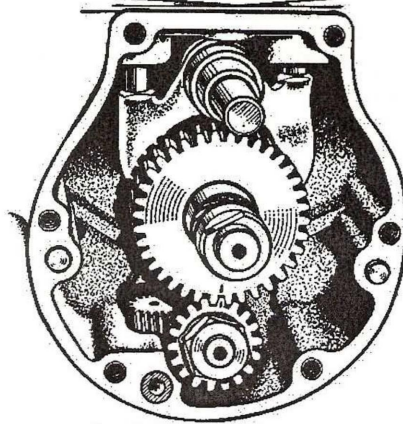


Fig. C.21. Valve-timing gears.

All parts having been cleaned, they must be perfectly free from paraffin, grit or other foreign matter, and all traces of old jointing compound and washers must be removed.

Fit the oil flinger with the boss towards the flywheel; the action of the vanes is to throw the oil away from the bearing.

Replace the distance washer between oil flinger and bearing.

Fit the drive side crankcase half and, after coating the mating portion with jointing compound, replace the gear side half. The two halves must be perfectly mated and the flywheels must rotate freely as the halves are bolted up.

Replace the oil pump spindle and its retaining pin. Fit the oil filter and cover plate at the base of the sump, making sure that the lock washers are replaced under the nuts.

Having bolted up the crankcase, fit the timing pinion key and pinion, apply the lockwasher and nut and turn over the lockwasher after securing the nut.

Fit the cam followers, and also the tappets in the case of the C10, and replace the camshaft, ensuring that the mark on the camshaft pinion meshes with the mark on the timing or mainshaft pinion. (Fig. C.21).

Apply clean engine oil to the pinions and cams.

Now replace the small plain washer in the pump spindle locking plunger hole, and fit the inner timing cover, using a new joint washer coated with cement, and ensure that the star washers are fitted to the two long screws. Tighten the screws down a little at a time to ensure that the cover is not distorted.

Re-fit the dynamo, ensuring that the cork washer is in position, and replace the dynamo drive sprocket and chain.

Fit the camshaft nut washer, turning over the washer to lock the nut.

Now adjust the dynamo chain, and securely tighten the dynamo. Pack the chain housing with grease.

Refit the outer timing cover again, using a new joint washer and cement, and tighten the screws evenly.

Assembly from this point will be the same as after decarbonising.

B.S.A. MOTOR CYCLES LTD.

Service Dept., Birmingham, 11

Printed in England.

BSA SERVICE SHEET No. 408

October, 1948
Reprinted November, 1956

**C Group Models with 3 speed gear box.
(4 speed models use Service Sheet 209).**

REMOVING, DISMANTLING AND RE-ASSEMBLING OF GEARBOX AND GEAR CHANGE

To remove the gearbox from the machine proceed as for engine dismantling up to removal of the clutch (Service Sheet No. 406). Unscrew the two nuts D (Fig. 3.24) and drive out the bolts. Slacken off the nuts clamping the rear engine plates and the chain stays. Take off the rear chain and guard, and the oil pipes.

It is not necessary to remove the oil tank and battery carrier, but if time permits removal of these fittings will enable the operator to raise the gearbox upwards and out of the plates more easily.

Dismantling the Gearbox

The operator should first consider carefully before attempting this operation as considerable trouble and damage can be caused by lack of experience. **If in doubt consult your dealer.**

To assist re-assembly, the positions of the various gears should be carefully studied (Fig. C.22).

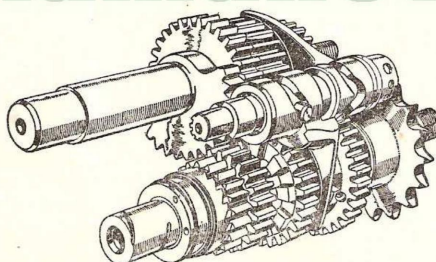


Fig. C.22. The gear cluster.

First of all secure the gearbox in a vice or suitable fixture, with clamps on the clamping lugs. Remove the kickstarter crank B and footchange pedal C (Fig. C.23). The former is removed by unscrewing the nuts and extracting the cotter pin. The latter pedal can easily be taken off when the pinch bolt is released.

Next remove the outer cover by taking out the 3 screws and 7 nuts which hold the cover in position. Unscrew plunger housing underneath the outer cover, the housing will come away complete with the plunger E and the plunger spring. Tap off the outer cover with a wooden mallet, at the same time holding the gear control shaft with a tommy bar so that the gear selector mechanism is retained in position.

B.S.A. Service Sheet No. 408 (cont.)

Next remove the control plunger housing O from the inner cover; this will release the gear selector mechanism comprising footchange operating plate D, pawl plate and spring G and gear selector quadrant H. After dismantling these the inner cover is fully exposed and the $3\frac{1}{4}$ inch (21-2889) Whitworth bolts should be unscrewed. The inner cover may now be tapped off its seating on the 7 studs.

By means of a screwdriver undo the control shaft pin plug which is situated at the nearside end of the gearbox shell, and then insert a $\frac{1}{2}$ in. B.S.F. bolt or stud into the dowel to enable it to be drawn from its seating. The gear control shaft with operating forks, layshaft gear cluster, and mainshaft and sliding gear can now be taken out.

Next undo the tab washer which secures the sprocket locking nut, and remove the locking nut. Remove the locking washer and pull off the gearbox sprocket. Then tap the sleeve pinion from its seating in the bearing, using a hide or wooden mallet.

If it is necessary to remove the ballrace, a hand press is the best method, but if this is not available, warm the shell, and the ballrace can then be easily tapped from the housing.

Turn to the inner cover and the removing of the kickstarter quadrant. Unlock the quadrant from the kickstarter spring, and tap the quadrant from position through the two kickstarter return stops.

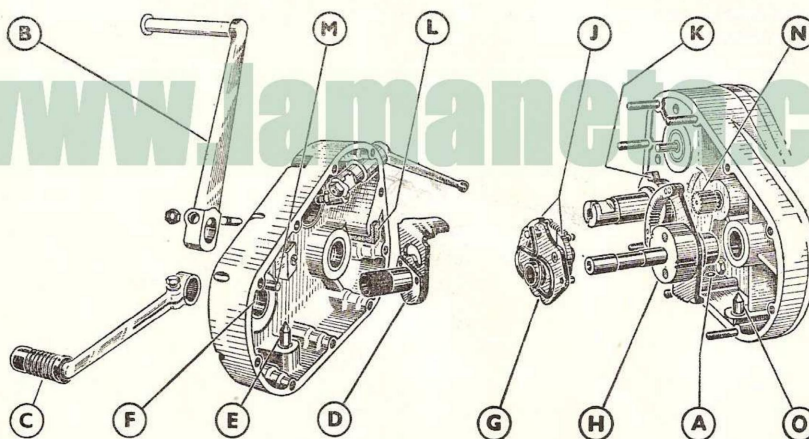


Fig. C.23. Foot gear change mechanism.

Dismantling the Gear Cluster

The sliding gear comes away easily from the mainshaft; then remove the kickstarter ratchet pinion by unscrewing the left-hand kickstarter ratchet sleeve nut. The kickstarter ratchet and shim can then be removed.

To remove the bottom gear pinion, the outer retaining ring has to be split by means of a chisel, so that the ring may be removed in two portions. Extract the two portions of the inner retaining ring with the tang end of a file, the pinion will then slide off the shaft.

B.S.A. Service Sheet No. 408 (cont.)

To dismantle the layshaft gear cluster remove the 1st gear pinion. This is pressed on to the layshaft pinion sleeve and can be removed by holding the gear in a vice and tapping from position with a piece of hard wood a shade larger in diameter than the phosphor bronze bearing.

To dismantle the operating forks, hold the shaft in a vice and tap out the central shaft pegs with a punch. The forks can then be removed from the shaft, but careful note should be taken of the position of the forks on the shaft before taking them off.

Re-assembling

Hold the shell in a vice or suitable fixture. First of all fit the oil seal with recess inwards, the oil seal shim and the roller bearing. If the case is first warmed, the bearing can easily be pressed into its seating. Fit the sleeve pinion, ensuring that the oil retaining washer is fitted between the sleeve pinion and the ballrace. Then tap the sprocket into the splines in the sleeve pinion, securing by means of the tab washer and locknut. Ensure that the tab washer is turned over into the recesses in the locknut.

Fitting the selector forks to the shaft is the reverse operation to that for dismantling. Use new control shaft pegs.

Next replace the low gear pinion on the mainshaft, and fit the inner and outer rings to secure the pinion on the shaft. The outer ring is tapped into position and the pinion should then revolve easily on the shaft. Fit the kickstarter pinion 27-4106, and then the ratchet 27-4112, following that, the ratchet spring 27-4447. Then fit the kickstarter sleeve nut 15-267 (left-hand thread).

Fit the mainshaft sliding pinion, ensuring that the fork track is nearest the sleeve pinion. Next fit the layshaft sliding pinion on the sleeve pinion and press the layshaft first gear pinion on to the sleeve pinion (hexagon end).

Pair the layshaft and mainshaft gear clusters together, fit the operating forks, ensuring that one fork is engaging in the mainshaft sliding pinion and the other fork in the layshaft sliding pinion. Ensure that the teeth on the gear control shaft are at the reverse end to the threads on the mainshaft end.

Before entering the mainshaft and gear clusters into the G/B shell, lubricate the gears and both shafts. Enter the clusters, locate the selector shaft and enter the retaining pin in the groove in the selector shaft. Then fit control pin plug 29-3243 and secure with the locking tab washer.

Next fit the inner cover using a new joint washer coated with jointing cement and tap into position with a wooden mallet. Secure the cover by a bolt either side, check for end-play in the layshaft and mainshaft, and if there is end-play in the former, fit shims underneath the kickstarter quadrant (.005 clearance). If there is play in the mainshaft, fit shims underneath the mainshaft bush (inner cover) 15-268. The mainshaft must be free without end-play.

Fit the remaining $\frac{1}{4}$ in. Whitworth cover bolt.

Next fit the gear control quadrant 29-3298, ensuring that the mark on the foot gear change selector shaft is lined up with the mark cut on the quadrant.

With the aid of a screwdriver, fit the spring to the pawl carrier plate, with the end of the right-hand coil to the left of the stud, and the end of the left-hand coil to the right of the stud.

B.S.A. Service Sheet No. 408 (cont.)

Fit the pawl carrier plate G (Fig. C.23) to the gear control quadrant, followed by the operating plate and sleeve complete, D.

The action of the footchange pedal return spring tends to throw off the operating plate, to prevent this happening a small clip should be made up from light strip and placed in position over the assembly.

Replace the two return stops on the Kickstart Quadrant Stem followed by the cork washer.

Take up the outer cover, place a tommy bar through the operating plate sleeve bush and hold the operating plate in position as the cover is entered on its studs. Remove the clip which was placed over the footchange mechanism and, still holding the operating plate with the tommy bar, push the outer cover home.

Ensure that the dowel peg in the outer cover is located between the ends of the spring on the pawl carrier plate. If this is not so positioned the footchange pedal will not return to neutral.

Secure the outer cover with fixing screws and nuts, and fit the footchange pedal C and kickstarter crank B. Replace filler cap and inspection cover.

Replacement of Gearbox

The replacement of the box should not present any difficulties. When the box is in position and the fixing bolts are ready to be tightened up, make sure that the flats on the heads of the bolts register in the slots of the yoke plates, and that the chain is correctly tensioned. There should be about $\frac{3}{8}$ inches up and down play in one run of the chain when the other run is taut.

Make sure that the gearbox bolts are finally tightened before readjusting the rear chain, and refill the gearbox with oil to the correct level.

BSA SERVICE SHEET No. 408A

Printed Jan., 1957

1956 C10L AND C12 MODELS WITH LIGHT FOUR-SPEED GEAR-BOX

(1954/5 Four-speed Models use Service Sheet 209)

Removal of Gearbox

In most cases it will be found convenient to dismantle the gearbox whilst it is in position. However, if attention to the bearings is required it may be found advisable to remove the complete gearbox. The primary transmission, clutch and chain-case must be removed. (See Service Sheet 411).

To remove the gearbox from the frame, first detach the clutch and speedo cables. Remove the cover plates. Unscrew the gearbox holding bolts and lift the box clear.

Dismantling

In order to obtain access to the gearchange and kickstart mechanism the outer cover must be removed. Drain off the oil, if this has not already been done, and move the gear to neutral. Remove the three stud nuts and four screws securing the outer cover and the cover can be drawn away together with the kickstarter and gearchange levers. The internal clutch operating lever will fall away. The ratchet pinion assembly is secured by a large nut, remove this and the ratchet, ratchet pinion, bush spring and washer can be taken away.

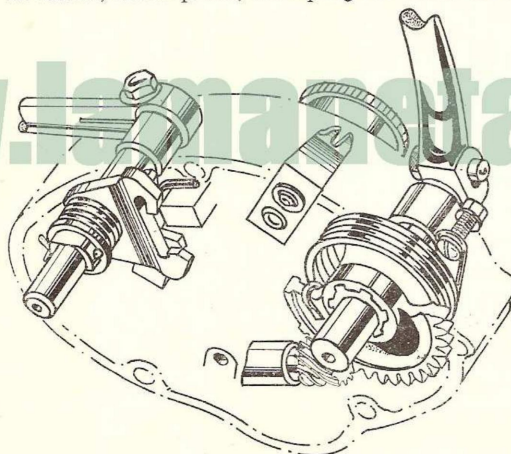


Fig. 2. C4 Kick-start and foot-change mechanism.

B.S.A. Service Sheet No. 408A (cont.)

The gearchange mechanism need not be dismantled unless it needs attention. If this is the case remove the gear lever and the small circlip behind it. The spindle and gearchange mechanism can now be withdrawn.

To obtain access to the gearbox internals the gearbox inner cover must first be removed. After the ratchet assembly has been removed it will be seen that the inner cover is held in position by one nut, undo this and remove the circlip located on the end of the layshaft and adjacent to the speedo drive. The inner cover and mainshaft can now be withdrawn. If it is required to remove the gearchange control quadrant from the inner cover, press out the gearchange spindle bush and expose the end of the control quadrant spindle. The spindle is threaded $\frac{1}{4}$ " B.S.C. and by using a suitable bolt as a draw tool the spindle can be withdrawn.

The selector shaft is secured in the gearbox shell by a grub screw which passes through the gearbox shell and engages in an annulus in the shaft. Slacken the grub screw and pull out the shaft. The gear cluster, forks and layshaft can now be withdrawn. Remove the gearbox sprocket by unscrewing the large ring nut and tap the pinion sleeve from its bearing. Lift the spring loading selector arm and slide the cam plate from its bearing. To remove the pinion sleeve bearing take out the retaining circlip, withdraw the oil seal and warm the case before tapping out the bearing.

Should the needle roller layshaft and bearing need replacing, removal is also facilitated by warming the gearbox shell.

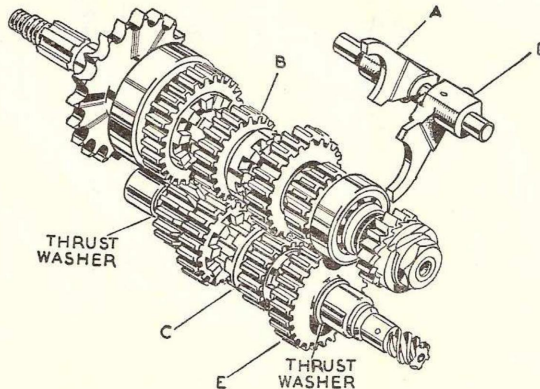


Fig. C43. Gear cluster.

B.S.A. Service Sheet No. 408A (cont.)

Assembly

Lift the spring loaded selector arm and fit the cam plate with the selector arm in the bottom gear position. If the pinion sleeve bearing and oil seal have been removed for any reason it is advisable to fit a new oil seal.

Warm the gearbox and press in the bearing. Fit the oil seal and circlip, making sure that it is correctly located. Fit the pinion sleeve.

Replace the layshaft ensuring that one of the hardened steel thrust washers is in its correct place as shown in Fig. (1). Layshaft thrust washers are available in three sizes.

Part No.	29-3645	Layshaft Thrust Washer	.075/.076
" "	29-3646	" "	.084/.085
" "	29-3626	" "	.092/.093

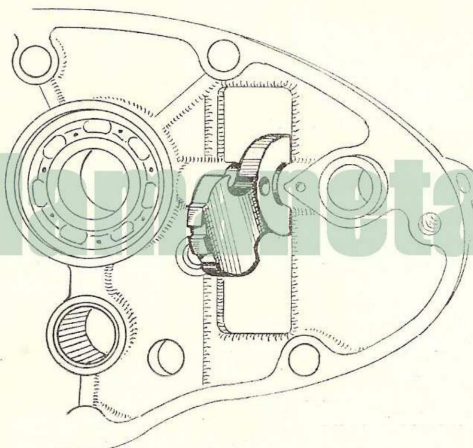


Fig. C44. Timing of gear-change operating lever.

Fit the mainshaft sliding gear fork (A) with its peg in the cam plate slot. Correct location is assisted by sliding the selector shaft through the fork and into its position in the gearbox shell. Fit the mainshaft sliding pinion (B) into its place on the fork and then place the layshaft sliding pinion (C) onto the layshaft. Carefully remove the selector shaft. Fit the layshaft sliding pinion fork and engage the peg in the slot on the cam plate.

Slide the selector fork shaft through the two forks and into position in the gearbox shell. Tighten the small grub screw making sure that it engages in its annulus.

Slide the mainshaft into position, fit the layshaft pinion (E) and place the other hardened steel washer in position.

B.S.A. Service Sheet No. 408A (cont.)

Place the mainshaft and inner cover in position but before they are pushed home the operating lever must be set so that the red dot on the lever and the cover coincide in the bottom gear position. Push the cover home and fit the securing nut.

Assemble the ratchet and pinion assembly. First place in position the steel washer and then the steel bush. Fit the spring ratchet pinion and ratchet. Finally, secure with the nut and tab washer.

Replace the outer cover, ensuring that the clutch operating lever is correctly positioned. To do this remove the inspection cap and fit the push rod in position. Moving the kickstart will prevent jamming and will assist engagement of the speedo drive.

Should the mainshaft ballbearing, located in the inner cover, need replacing it is necessary to extract the circlip, warm the cover and tap the bearing out. Refitting is self-explanatory.

Below is a list of useful part numbers:-

29-3608	Gearbox Sprocket Oil Seal.
29-3598	27T Pinion Sleeve.
29-3603	Outer Cover Stud. (long).
29-3604	„ „ „ (short).
29-3589	Cam Plate.
29-3636	Kickstart Ratchet
67-3376	„ „ Pinion
29-3637	„ „ „ Bush
29-3585	„ „ and Mainshaft Nut Lockwasher
29-3628	Selector Fork
29-3627	„ „ Shaft
29-3614	Mainshaft Sliding Pinion 21T
29-3621	Layshaft „ „ 18T
29-3616	„ „ complete
29-3643	Clutch Push Rod
67-3340	Footchange and Stop Plate Return Spring
67-3174	Kickstart Spring
29-3611	Mainshaft complete
29-3639	Layshaft Bearing Circlip

BSA SERVICE SHEET No. 409

Revised January, 1958

C Group Models

PRIMARY TRANSMISSION

Clutch Adjustment, C10, C11, C10L 1954/5 & C11G.

Removal of the knurled filler plug from the gearbox outer cover will expose the clutch adjusting screw 'A' and locknut 'B' (Fig. C24). Loosen the locknut and turn the screw with a screwdriver until the angle between the operating lever and the cable is slightly less than a right-angle when the clutch is fully withdrawn. It will probably be necessary to alter the length of the cable by means of the adjuster 'C', to obtain the correct position for the lever. Re-tighten the locknut, and replace the filler plug.

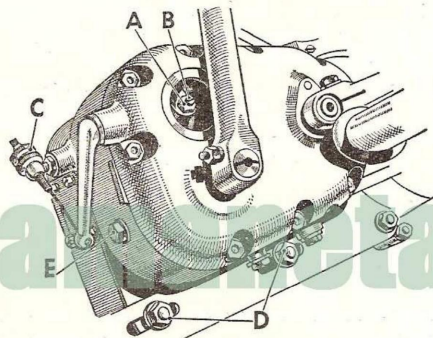


Fig. C24 Clutch and front chain adjustment.

When the clutch is engaged, it is essential that the cable has approximately $\frac{1}{8}$ " free play to avoid a constant pressure on the clutch push rod, with consequent wear and loss of efficiency.

On four-speed models, the positioning of the components is slightly different and the inspection cover is retained by two screws, but the adjustments are identical.

Clutch Adjustment, C10L & C12 (1956 onwards)

The main clutch adjustment consists of a screwed pin C and locknut D, Fig. C24a, on the outside of the gearbox cover. Remove the large round screwed cap to expose the end of the clutch operating lever. There should be approximately $\frac{3}{16}$ inch play between the back of the clutch lever and the inside of the cover when the clutch is released. If the clearance varies appreciably from this, the locknut must be undone and the central pin screwed in or out until the adjustment is correct. The pin is the pivot on which the operating lever rotates and, therefore, screwing the pin in reduces the clearance. Tighten the locknut and re-check the adjustment.

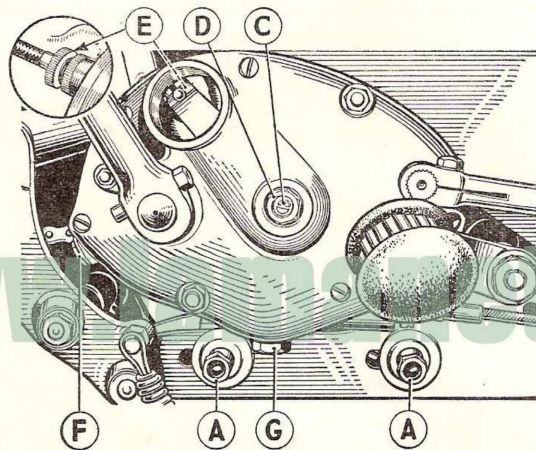


Fig. C24a. Clutch and Front Chain Adjustment.

When the adjustment has been completed the cable should be adjusted by means of the screw adjuster at the back of the gearbox inner cover E (Fig. C24a) until there is approximately $\frac{1}{8}$ inch free play at the handlebar end.

Front Chain Adjustment

The adjustment of the chain can be checked by removing the inspection cover from the chaincase. Turn the engine over slowly, and find the position in which the chain is tightest. There should be a total up and down movement of $\frac{1}{2}$ " at this point.

To adjust, slacken the two nuts ('D' Fig. C24 or 'A' Fig. C24a) and move the gearbox backwards or forwards as necessary, until the adjustment is correct. Then tighten the nuts and re-check the adjustment.

Note that, if the position of the gearbox has been altered, the rear chain will need adjusting also.

Chaincase Removal

Remove the drain plug from the rear of the case, and drain off the oil. Take off the left-hand footrest and undo the screws round the rim of the case, together with the two screws which secure it to the gearbox shield (when fitted). The nuts for these screws are welded on and cannot be lost. The chaincase outer cover can then be removed, taking careful note of the positions of the washers and distance pieces.

On C10 and C11 models, the engine drive shaft assembly is removed by prising back the tab of the lock washer with a screwdriver inserted between the coils of the shock absorber spring, and unscrewing the large nut on the end of the shaft. If the nut is very tight, engage top gear and apply the rear brake to prevent the engine turning. The spring and cam sleeve can then be withdrawn.

Rotate the clutch until the spring connecting link in the chain is on the top run, and in line with the recess in the back of the chaincase. Remove the spring link, followed by the chain and engine sprocket.

Take off the clutch, as described in Service Sheet No. 308, and withdraw the rear part of the chaincase after unscrewing the bolts which secure it to the crankcase.

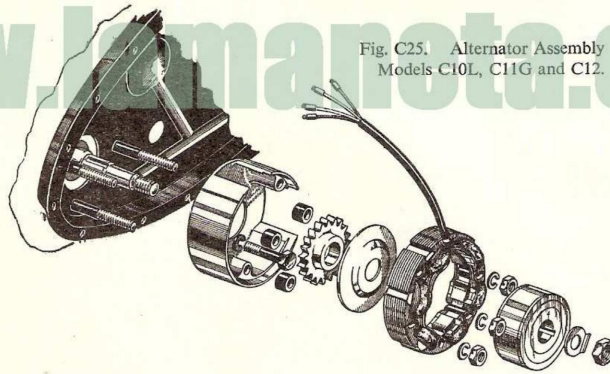


Fig. C25. Alternator Assembly
Models C10L, C11G and C12.

The alternator assembly on C10L, C11G, and C12 models is dismantled by prising back the tab on the lock washer and unscrewing the large nut on the end of the engine shaft. If the nut is very tight, engage top gear and apply the rear brake to prevent the engine turning. Next take off the three nuts (four on some early models) which retain the coil assembly. Lift this off the studs and withdraw the rotor, which is keyed to the shaft, also the dished aluminium washer. Should the coil assembly prove difficult to remove, it may be gently prised off with a screwdriver, taking great care not to damage the windings.

A limited number of machines was produced employing a brass shield behind the rotor, in conjunction with a plain steel washer on the shaft, in place of the dished aluminium washer. The four stud fixing for the coil assembly was used with this arrangement.

B.S.A. Service Sheet No. 409 (continued)

Rotate the clutch until the spring connecting link is on the top run, and in line with the recess in the back of the chaincase. Remove the spring link, followed by the chain and engine sprocket.

The alternator housing can now be withdrawn, after removing the retaining bolt and the three distance pieces from the studs. On models having four studs, the housing is retained by two nuts.

Take off the clutch, as described in Service Sheet No. 411, disconnect the wires from the alternator at the push-in connectors, and withdraw the rear part of the chaincase.

Chaincase Re-assembly

Reassembly of the front chaincase is carried out in the reverse order to dismantling.

Ensure that the alternator (when fitted) is correctly assembled (see Fig. C25), and that the washer between the rotor and the engine sprocket has not been omitted. The wires from the alternator must be positioned so that they cannot foul the chain.

New lock washers should be used for the large nut on the engine shaft, and the nut must be fully tightened before the tab is bent over.

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BSA SERVICE SHEET No. 410

Oct., 1948

C10, C11 and C11G Models

Reprinted Nov., 1956

ADJUSTMENT, DISMANTLING AND RE-ASSEMBLY OF HUBS AND BRAKES

(For Spring Frame Rear Hub, see Service Sheet No. 412)

Front Wheel Removal and Replacement

To remove the front wheel, place a suitable support under the engine crankcase so that the wheel is held clear of the ground. Disconnect the brake cable from the brake arm clip and unscrew the wheel spindle nut which has a left hand thread. Slacken the pinch bolt A (Fig. C27) and pull out the spindle B. Slide the distance bush C outwards to allow the wheel to drop out of the forks.

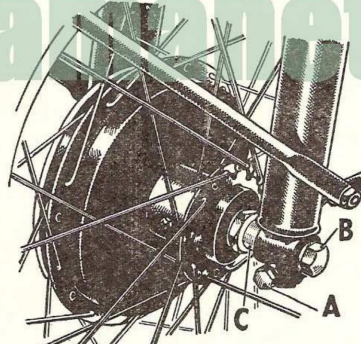


Fig. C27. Removal of front wheel.

The wheel is replaced in the reverse order to that for removal. It is most important that after the spindle nut has been tightened and before the pinch bolt is tightened, the forks are depressed once or twice to enable the left hand fork end to position itself on the distance bush. If this precaution is not observed, the fork leg may be clipped out of position and the fork will not function correctly.

Rear Wheel Removal (Rigid Frame)

Disconnect the rear chain, then remove the bolt holding the brake anchor plate and the knurled brake adjuster nut on the rear brake rod. Disconnect the speedometer drive by unscrewing the nut F (Fig. C28), then loosen the two spindle nuts and the wheel should slide out of the fork ends.

When replacing the rear wheel note that the spindle nuts are shouldered and must be correctly located in the fork ends.

Rear Chain Adjustment (Rigid Frame)

The rear chain must be re-adjusted after the rear wheel has been replaced or when chain wear has taken place. With the spindle nuts just slack, rotate the spindle by means of a spanner on the flats at its left hand end. Clockwise rotation will move the spindle backwards by the action of the two cams bearing on the frame stops.

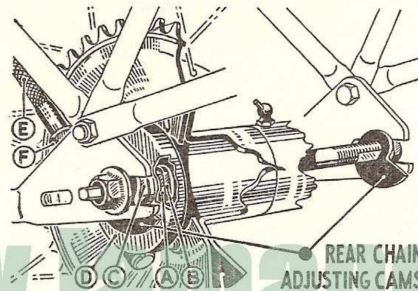


Fig. C.28. Section of hub showing adjustment.

The chain should be adjusted so that there is a total up and down movement of $\frac{1}{2}$ in. in the centre of the chain run and at its tightest point. Tighten the spindle nuts and check the wheel adjustment by means of a taut piece of string which should be equidistant from the front and rear of each wheel.

Note: Where the speedometer drive gearbox is attached to the rear wheel, it must be correctly aligned so that the speedometer cable is not kinked. Slackening nut C (Fig. C.28) will permit the gearbox to be rotated, but the left hand spindle nut must be slackened first.

Bearing Adjustment (Front Hub and Rear Hub Rigid Frame)

Both hubs are adjusted in a similar manner. Cup and cone type bearings are employed and the adjusting cone B (Fig. C.28) with its locknut A, are on the left hand side of the hub. Where the speedometer drive gearbox is fitted to the rear wheel it must be removed, after undoing the retaining nut and washer at C, to gain access to the adjuster cone.

To carry out the adjustment, remove the wheel then slacken the locknut and screw the adjuster cone in or out until, with the locknut re-tightened, the spindle rotates freely but without any appreciable end play.

Hub Dismantling and Re-assembly

With the wheel removed, undo the locknut A (Fig. C.28) and unscrew the adjuster cone B which will permit the brake plate, fixed cone and spindle to be withdrawn from the other side of the hub. The balls will fall free during the operation and care should be taken to prevent their loss, and to avoid the inter-mixing of one set with the other.

Removal of the retaining nut will permit the brake plate to be withdrawn from the spindle. The bearing cups can be tapped from the hubs by means of a suitable drift applied from the opposite end, and will carry with them the felt washers and their retainers. These items should only be removed if they require replacement.

B.S.A. Service Sheet No. 410 (continued)

Re-assembly is carried out in the reverse order. After the cups have been positioned insert the plain steel washer, followed by the felt washer and the felt washer retainer to complete the assembly of the oil seal for each bearing. Pack the cups with grease and insert the ball bearings. The front hub should have eleven $\frac{5}{16}$ in. balls in each cup and the rear hub ten $\frac{5}{16}$ in. balls.

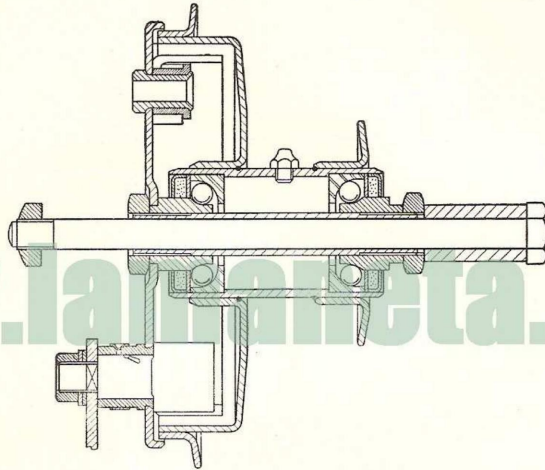


Fig. C.29. Front hub. Section view.

If the non-adjustable cone has been removed from its spindle or spindle sleeve it should be screwed into position again, noting that it screws on to the shorter thread of the rear spindle.

Replace the spindle in the hub and screw the adjustable cone and locknut into position to secure the spindle. Replace the brake plate and its retaining nut or distance piece and adjust the bearings as described in the earlier paragraph. The brake plate should rotate freely without binding.

Brake Re-lining

To remove the brake shoes lay the drum cover plate flat on a bench and lever the shoes upwards. They can then be drawn over, and free of the cam and fulcrum pin. If the cam pads show excessive wear the brake shoes should be removed.

When the brake shoes are removed the linings can be replaced as described in Service Sheet 612.

Chain Wheel Replacement

The rear chainwheel is of the bolted on type and can be simply replaced after removing the rear wheel and the speedometer drive gearbox. Make sure that the retaining bolts are quite tight as, if they are allowed to work loose, fracture is likely.

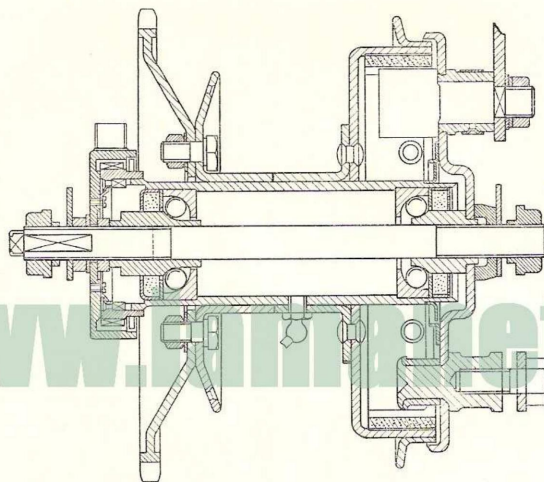


Fig. C.30. The Rear Hub. Section view.

BSA SERVICE SHEET No. 411

*October, 1948
Reprinted June, 1954
Reprinted Jan., 1957*

C10L, C11G and C12 MODELS

CLUTCH

Dismantling

Remove the nearside footrest and then undo the small screws round the rim of the chaincase. As the outer half of the chaincase is taken off, careful note should be made of the positioning of the distance pieces and washers, etc., for replacement purposes. The joint washer should be carefully preserved.

Remove the three spring retaining nuts and withdraw the springs, spring cups and distance pieces. The spring pressure plate and other clutch plates can then be removed, and if only attention to these items is required the clutch need not be dismantled further. The steel plates should be smooth, and if badly scored must be replaced, while the cork inserts will require washing in petrol if there is any trace of oil on them. If the inserts are burnt or glazed they should be replaced.

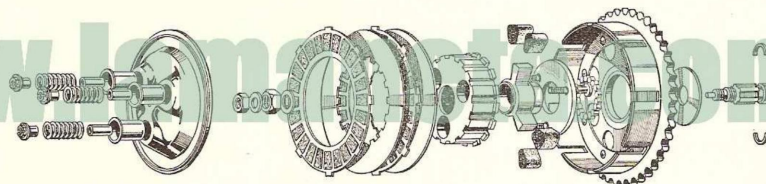


Fig. C31. Exploded View of Clutch.

To dismantle the remainder of the clutch, remove the outer mainshaft nut, which has a left-hand thread. Remove the washer and unscrew the inner nut, which has a right-hand thread. The complete clutch can then be withdrawn from the mainshaft, making sure that the rollers do not fall out from between the clutch centre and the chainwheel. The clutch thrust washer and its split circlip will probably remain in position on the mainshaft, but can easily be withdrawn.

Lift the chainwheel from the clutch centre and remove the 18 rollers. The three bolts and the cover plate from the clutch centre can also be removed to expose the vane and shock absorber rubbers. If the rubbers require attention, the vane must be pushed out with the aid of a suitable drift.

Re-assembly

Before commencing re-assembly examine the roller tracks on the chainwheel bush and clutch centre, and if the wear on either of these components exceeds .0015 in. it should be replaced.

If the chainwheel teeth are worn to a hook shape, the chainwheel must be replaced or rapid wear on the chain will result.

To re-assemble the vane into the clutch centre, first replace the vane and the three thicker rubbers which should be on the left-hand side of each vane arm. (A, Fig. C32). Hold an old gearbox mainshaft in a vice and position the vane centre on it to prevent it rotating.

B.S.A. Service Sheet No. 411 (continued)

Rotate the clutch centre so as to compress the rubbers and slip the remaining three rubbers into position. The clutch centre can best be gripped with the aid of a plain clutch plate. Replace the clutch centre cover plate B and the three bolts.

The remainder of the clutch assembly is quite straightforward. Ensure that the split circlip is properly located on the mainshaft before the clutch thrust washer is positioned against it. A dab of grease will serve to hold them in place. Position the 18 rollers carefully on the clutch centre before sliding the chainwheel over them. Re-position the remainder of the clutch on the shaft and replace the two nuts and washers, noting that the inner nut has a right-hand thread and the outer a left-hand. Make sure that the inner nut is fully tightened before the outer is replaced.

Replace the clutch plates ensuring that the thick plain back plate is put in first. When the spring assemblies have been replaced the retaining nuts should be tightened down firmly on to the distance pieces.

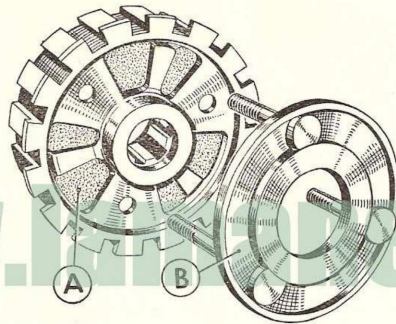


Fig. C32. Vane Assembly.

BSA SERVICE SHEET No. 412

Reprinted Jan., 1957

Models C10, C11 and C11G (With Plunger Type Rear Suspension) ADJUSTMENT, DISMANTLING AND RE-ASSEMBLY OF REAR HUB AND BRAKE

Wheel Removal

Undo the spring link of the rear chain and allow the chain to hang down. A piece of clean paper should be placed below the machine so that the chain does not pick up grit.

Remove the brake rod adjuster D (Fig. C33) and loosen the nuts E. On three-speed models the speedometer drive cable must also be detached. The wheel can then be moved to the rear and withdrawn from the machine.

When replacing the rear wheel ensure that the slot in the brake torque plate is located on the extended head of the pinch bolt on the right hand rear suspension lug, and that the wheel alignment has not been disturbed.

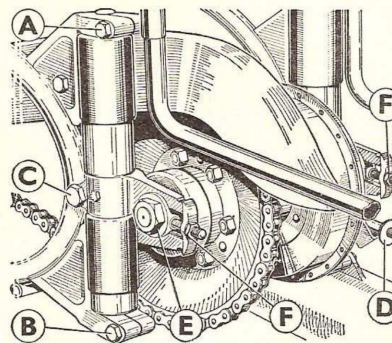


Fig. C33. Rear Wheel Removal

Hub Dismantling and Re-assembly

After unscrewing its retaining nut D (Fig. C34) withdraw the brake plate complete with brake shoes.

Removal of the sleeve nut C will permit the spindle, complete with speedometer drive or dust cover, to be pulled out of the hub from the chainwheel end.

Prise off the dust cap and remove the felt oil seal from the brake drum end of the hub. Then with the aid of a suitable soft drift unscrew the bearing retaining ring A which has a left hand thread. Displace the central distance piece J in the hub and drive out the bearing E with the aid of a suitable drift. As the bearing comes away it will carry with it the oil seal, oil seal holder and oil seal retaining washer.

Remove the distance piece and drive out the other bearing. Unscrewing the nut H will permit the speedometer drive or dust cover to be withdrawn, to leave only the short distance collar F and its retaining nut G on the spindle. The chainwheel can be detached after bending back the lockwashers and undoing the retaining nuts.

Re-assembly is carried out in the reverse order to that for dismantling. Both bearings should be greased before re-assembly. Position the distance collar L in the brake drum side of the hub and insert the bearing B until it is firmly against the collar. Replace the flat oil seal washer and then screw in the bearing retaining collar A which has a left hand thread. Ensure that this collar is quite tight before replacing the felt oil seal and its retaining dust cap.

The centre distance piece J can then be replaced, followed by the chainwheel side bearing and its oil seal assembly. Pass the spindle through the two bearings and the central distance piece and lock the assembly up tight with the sleeve nut C. Replace the speedometer

B.S.A. Service Sheet No. 412 (cont.)

drive gearbox (3-speed models) making sure that the dogs on the inside of the gearbox sleeve engage in the two notches on the end of the hub. Ensure that the washers fitted one on either side of the speedometer drive or dust cover are not omitted.

Replace the brake plate and secure with the aid of the spigot nut D. This completes the re-assembly.

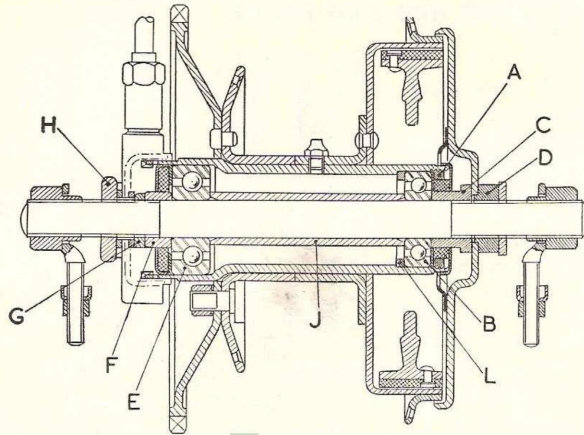


Fig. C34
Section view of
the Rear Hub.

Brake Shoe Re-lining

When the brake plate is removed from the drum it should be laid on a bench, shoes uppermost. Insert two small levers under the edge of the shoes and lever them up and away from the plate. They can then be drawn over and free of the cam and fulcrum pin. The operating cam and fulcrum pin should be inspected but it is unlikely that more than greasing will be necessary. If the cam pads on the brake shoes show excessive wear then new shoes should be fitted. To replace the shoes, attach the springs and push the shoes over the cam and pivot by reversing the dismantling procedure.

For instructions on removing and replacing the brake shoe linings see Service Sheet No. 612.

Rear Chain Adjustment

First place the machine on its centre stand so that the rear wheel is clear of the ground. The wheel must be at its lowest point in the suspension when the adjustment is made. Slacken the two nuts E (Fig. C33) then draw the wheel rearwards by means of the two chain adjusters F to tighten the chain. Turn each nut by an equal number of turns so that the wheel alignment is not altered. The chain should be adjusted so that there is a total up and down movement of $\frac{1}{2}$ in. at its tightest point. Tighten the nuts E and check the adjustment.

The wheel alignment can be checked by means of a taut piece of string which should be equidistant from the front and rear of each wheel. Note that the rear brake may need adjusting when the chain adjustment has been altered.

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BSA SERVICE SHEET No. 412A

January, 1955

C Group Models

ADJUSTMENT, DISMANTLING AND RE-ASSEMBLY OF FRONT HUB AND BRAKE (7 in. Brake)

Wheel Removal and Replacement

To remove the front wheel, first disconnect the brake cable, then slacken the pinch bolt *A* (Fig. C33a). Insert a tommy bar in the hole in the head of the spindle at *B* and unscrew the spindle, noting that it has a left hand thread and therefore unscrews in a clockwise direction. Support the wheel as the spindle is withdrawn, and when it is clear the wheel can be pulled away from the right hand fork leg and removed from the machine.

After removal do not let the wheel fall on to the bush which projects from the brake drum side of the hub. Although the bush is pressed in, it may, if subjected to a sharp blow, be forced back into the hub. If this should happen the bush can be retrieved and re-positioned with the aid of the wheel spindle.

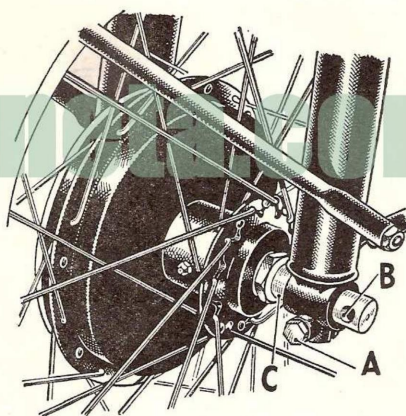


Fig. C33a. Wheel Removal

The wheel is replaced in the reverse order to that for removal. It is most important that after the spindle has been tightened and before the pinch bolt is tightened, the forks are depressed once or twice to enable the left hand fork end to position itself on the spindle shank. If this precaution is not observed, the fork leg may be clipped out of position and will not function correctly.

Dismantling and Re-assembly of the Hub

Withdraw the brake plate which is a push fit on the bush *B* (Fig. C34a). Remove the locking split pins and unscrew the bearing retaining collars *C* and *D*, which have normal right hand threads. Replace the spindle and drive out the brake side ballrace *E* together with the bush *B* by striking the end of the spindle with a hide mallet. Only the ball race *F* now remains in the hub and can be removed with a suitable soft drift.

Before commencing re-assembly make sure that the hub distance collar behind each bearing is in position. Press the bearings in as far as they will go and secure with the screwed collars.

Before replacing the bearing retaining collars ensure that the rubber oil seals in them are in good condition. The collars should be done up quite tight and if necessary fresh holes should be made for the locking split pins.

Brake Relining

To remove the brake shoes lay the drum cover plate flat on a bench and lever the shoes upwards. They can then be drawn over, and free of the cam and fulcrum pin. If the cam pads show excessive wear the brake shoes should be renewed.

When the brake shoes are removed the linings can be replaced as described in Service Sheet No. 612.

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. The fulcrum pin will then move in its slot until both shoes are pressing equally on to the drum. Tighten the fulcrum pin nut firmly and release the brake.

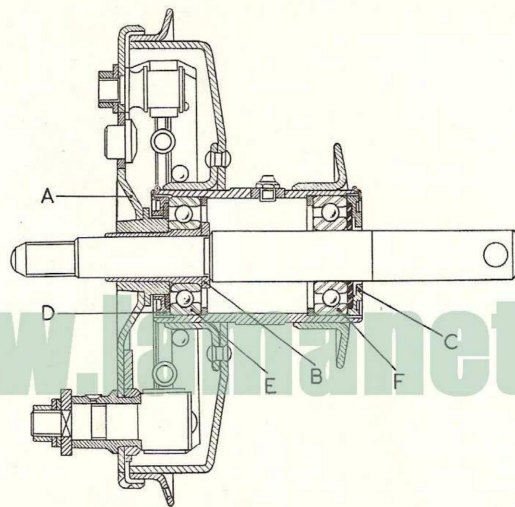


Fig. C34a. Section of Front Hub (7 in. Brake)

BSA SERVICE SHEET No. 412B

Printed February, 1956

C12 Model

ADJUSTMENT, DISMANTLING AND RE-ASSEMBLY OF HUBS AND BRAKES

Wheels

Both wheels are fitted with ball forward bearings which require no adjustment. The bearings are packed with grease during reassembly and should last until the machine is overhauled. The brakes are provided with knurled finger adjusters and should not be adjusted too closely as any 'rubbing' will generate heat which may distort the drum and melt the grease in the hub.

Front Wheel Removal

Place the machine on the stand with the front wheel clear of the ground. Disconnect the brake cable and slacken pinch bolt 'A' (Fig. C42), insert a tommy bar in the wheel Spindle 'B' and unscrew the spindle which has a left-hand thread. Support the wheel and withdraw the spindle. The wheel can be pulled away from the right-hand fork leg and removed from the machine.

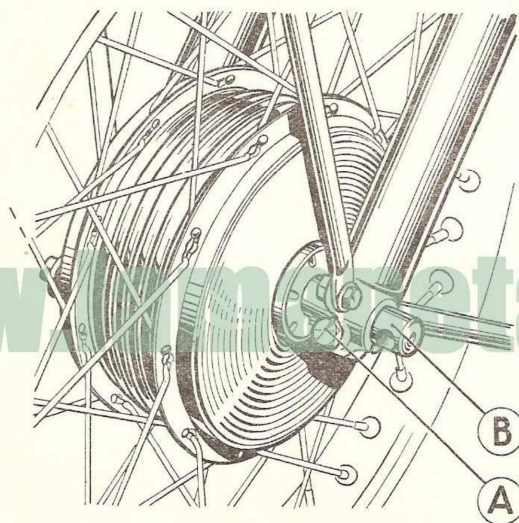


Fig. C42. Front Wheel Removal.

B.S.A. Service Sheet No. 412B (cont.)

After removal take care that the wheel is not allowed to fall on to the bush which projects from the brake drum side of the hub or it may be forced back on to the hub. If this should happen the bush can be retrieved and repositioned with the aid of a wheel spindle.

The wheel is replaced in the reverse order. After the spindle has been tightened and *before* the pinch bolt is tightened, depress the forks several times with the wheel on the ground to enable the left-hand fork end to position itself in the spindle shank otherwise the fork leg may be clamped out of position.

Rear Wheel Removal

Place the machine on the stand and remove the rear chain. Do not allow the chain to unwind itself from the gearbox sprocket. Undo the knurled brake adjuster and slacken the two spindle nuts 'B' (Fig. C43). The wheel can now be withdrawn to the rear and removed from the machine under one side of the rear mudguard.

The wheel is replaced in the reverse order. Ensure that the slot in the brake plate is engaged on its locating peg and that the chain adjusters are up against the fork ends.

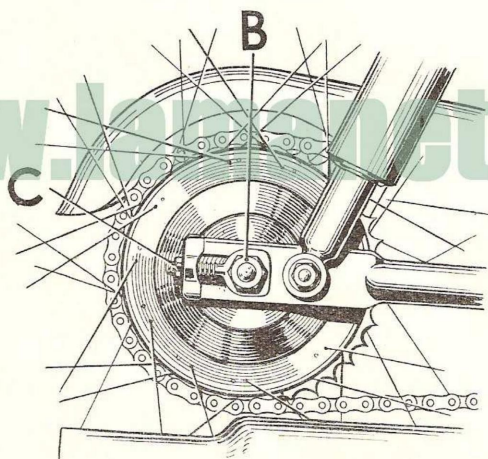


Fig. C43. Rear Wheel Removal and Chain Adjustment.

Rear Chain Adjustment

The rear chain must be adjusted when the machine is on the stand and the suspension is at its lowest point. Rotate the wheel and find the tightest point on the chain. The total up and down movement at this point should be $1\frac{1}{8}$ " measured at the centre of the chain run. If it varies from this the chain must be adjusted by moving the rear wheel. Slacken the spindle nuts 'B' and screw the adjusters 'C' in or out as required. When the chain tension is correct tighten the spindle nuts and recheck. Finally, ensure that the adjusting nuts are tight.

Wheel Alignment

During chain adjustment it is important to see that the wheel alignment remains correct. If the adjusters are moved an equal amount alignment will not be disturbed assuming that it was originally corrected, but it is wise to check it occasionally by means of a long straight edge placed along the sides of the wheels. The straight edge should touch the front and rear walls of both tyres. Where different sizes of tyres are used allowance must be made.

Dismantling Front Hub

This should not be necessary unless it is intended to renew the bearings. Withdraw the brake plate, which is a push fit on the bush 'B' (Fig. C44). After removing the locking cotters unscrew the bearing retaining collars 'C' and 'D' which have right-hand threads. Replace the spindle and drive out the brake side ballrace 'E' together with bush 'B' by striking the spindle with a soft mallet. Ballrace 'F' can now be removed with a suitable drift.

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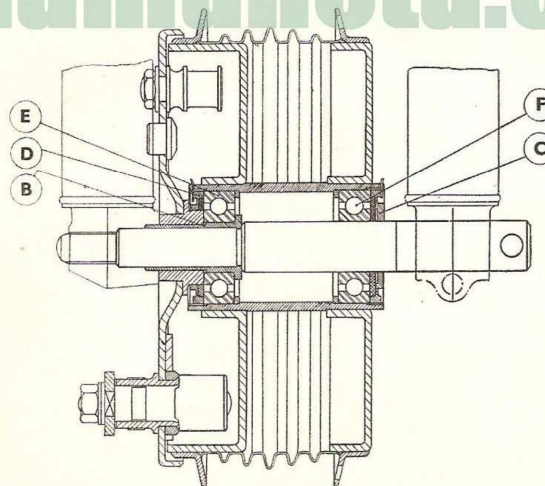


Fig. C44. Front Hub.

Re-assembly

Ensure that the hub distance collar located behind each bearing is in position. Press in the bearings until they are fully home and screw in the retaining collars making sure that the oil seals are serviceable lock the collars up tight. It may be found necessary to drill fresh holes for the split pins.

If the brakes have been relined or new shoes fitted it will be necessary to centralise the brakes. Replace the brake cover plate complete with shoes, cam and fulcrum pin into the drum. Slacken the fulcrum pin nut and turn the cam so as to operate the shoes in the normal way. The fulcrum pin will move in the slot until the shoes press equally on to the drums. The fulcrum pin should be fully tightened and the brake cam can then be released.

Dismantling Rear Hub

Remove the retaining nut 'A' (Fig. C45) and left of the brake plate and shoes. The spindle nut 'B' is now exposed, remove this and tap the spindle through until it can be withdrawn. Prise off the dust caps 'C' and felt washers 'D'. Unscrew the locking ring 'E' (Note:- this has a left-hand thread.) Drive out the ballraces using a suitable drift inserted through the hub.

Re-assemble in the reverse order. Grease the bearings thoroughly and ensure that the bearings are up against the distance collar. Tighten the locking ring fully.

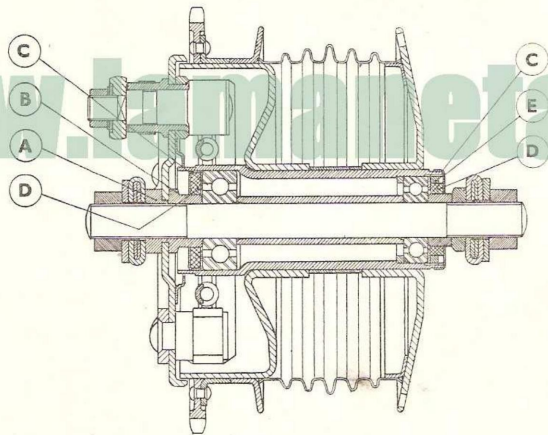


Fig. C45. Rear Hub.

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BSA SERVICE SHEET No. 412C

Revised March, 1958.

C12, D3 AND D5 SWINGING ARM MODELS.

REAR SUSPENSION.

FRAME.

The Silent Bloc bushes fitted to the rear suspension swinging arm are unlikely to need replacement for some considerable time. If it is found necessary to renew them, first remove the suspension units by detaching the top pivot bolts and the bottom retaining nuts.

Remove the rear wheel and chainguard. Undo the fork spindle nut and tap out the spindle, using a suitable drift.

Lift the rear fork until it is clear of the side plates; it can then be turned and pulled away from the rear.

After the central distance piece has been displaced the bushes can be removed with a suitable drift.

DISMANTLING THE SUSPENSION UNITS.

Early C12 models were fitted with a damper spring of 100 lb./inch rate, this was later increased to 124 lb./inch.

The 124 lb./inch spring Part No. 29-4570 can be fitted to early machines where it is considered necessary.

The spring is retained by circlips fitted at its base and a service tool Part No. 61-3513 has been introduced to facilitate removal.

The tool is assembled as shown in Fig. C46 and when the nut is screwed down sufficiently the spring is compressed thus releasing the circlips. The circlips can be extracted through the apertures in the tool and the spring comes away when the tool is removed.

Re-assembly is in the reverse order.



Fig. C46.

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BSA SERVICE SHEET No. 413

August 1954

C10L and C11G Models

REMOVING ENGINE FROM FRAME AND COMPLETE

DISMANTLING

Engine Removal

The procedure for removal and dismantling of the engine will be described from the point reached in Service Sheet No. 405 on decarbonising, when the cylinder head and barrel have been removed.

Remove the primary chaincase as described in Service Sheet No. 409 on Primary Transmission.

Remove the contact breaker cover and disconnect the lead from the terminal. Undo the retaining bolt and place the crankcase and gearbox shield on one side.

Drain the oil tank and disconnect the oil pipes from the crankcase unions.

Remove the nuts securing the front engine plates and the rear crankcase fixing studs. Remove the front engine plates and slacken the frame and gearbox nuts clamping the rear engine plates, as these tend to hold the engine in position. Withdrawal of the rear crankcase securing studs will permit the engine to be lifted from the frame.

Engine Dismantling

Whilst working on the engine, a simple fixture as illustrated in Fig. C35 will facilitate matters considerably. Alternatively, clamp the engine in a vice by one of the mounting lugs, supporting the engine on a bench.

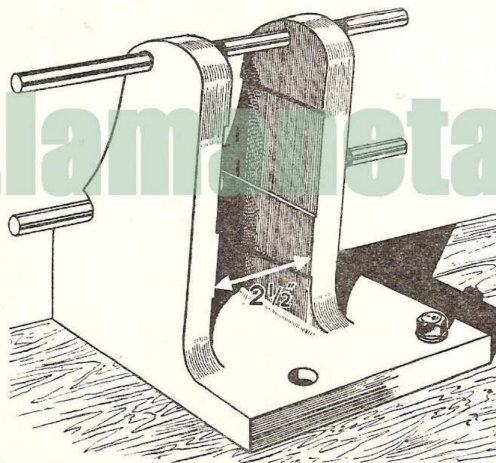


Fig. C35. Angle bracket for mounting engine.

B.S.A. Service Sheet No. 413 (cont.)

Undo the two screws and withdraw the contact breaker back plate. Then remove the advance and retard mechanism by undoing the central bolt. Resistance will be felt after a few turns of the bolt and further rotation will pull the shaft from its taper.

Early models did not have this self-extracting device, but an effective extractor can be simply made. Remove the retaining bolt and pass a piece of $\frac{3}{16}$ in. steel rod down the bolt hole as far as it will go. Mark the rod at a point flush with the end of the shaft, then remove the rod and cut it off $\frac{3}{8}$ in. short of this mark. Replace the rod and screw a $\frac{5}{16}$ in. C.E.I. bolt into the end of the shaft. As this bolt is tightened down on to the rod it will pull the mechanism from its taper.

Take out the timing cover screws and pull off the cover. Clean it and place on one side. If the oil seal requires replacing, it can be prised from the cover with the aid of a screwdriver.

Withdraw the camshaft complete, then flatten out the tab washer and remove the mainshaft nut. The mainshaft pinion can now be drawn off with the aid of Service Tool, Part No. 61-3256. (See Fig. C36.)

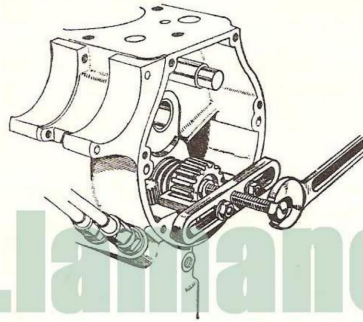


Fig. C36. Engine shaft pinion extractor (Service Tool 61-1735)

The oil pump driving spindle is located by a dowel situated in the bottom left-hand edge of the timing chest. Screw one of the timing screws into the dowel and use it to pull the dowel from the crankcase. The pump driving spindle can then be drawn upwards into the timing chest (Fig. C37.). In some instances the dowel will be found to be covered by a small washer which must be removed before the screw can be inserted.

Before parting the crankcase halves remove any distance washers from the drive side crankshaft and withdraw the sleeve which projects through the crankcase oil seal.

Remove the nuts from the crankcase studs and take out the free studs, noting their locations. The halves may now be separated. This may be somewhat difficult but a little care will allow them to be parted without damage. A few careful blows with a hide mallet will serve to break the joint if the jointing compound prevents separation.

B.S.A. Service Sheet No. 413 (cont.)

Pull the gearside crankcase half away from the flywheel assembly, then lift the flywheel assembly from the other crankcase half, taking care not to lose the oil retaining washer which lies between the flywheel and the mainshaft ball bearing.

Take off the four nuts and lock washers at the base of the gearside crankcase, and remove the base plate and filter.

The two bolts retaining the pump can be unscrewed to permit the pump to be withdrawn, but it should not be removed unless it requires attention. The bolts retaining the pump in position can be identified by the spring washers underneath their heads.

If the drive side ballrace requires replacing, remove the retaining circlip and after heating the case in a degreaser or hot water, the bearing should be driven out with a suitable drift applied from the outside of the case. The new bearing should be fitted while the case is still warm, and the drift used should fit the outer race of the bearing. Do not omit the oil retaining washer behind the bearing.

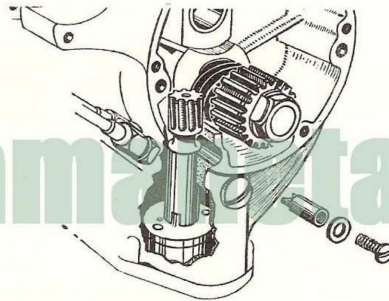


Fig. C37. Oil pump spindle locking plunger.

The case should also be heated before attempting to remove any of the bushes in the timing side crankcase half or timing cover.

The cam pinion spindles should also be inspected for wear and, if necessary, removed while the case is hot.

Finally, if the flywheels are to be separated they must be held securely on the bench, as extreme pressure will be required to release the crankpin nuts.

Special spanners are used, and it is usually necessary to add a piece of tubing to obtain additional leverage.

The crankpin is a taper fit in 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 may assist you in your decision:

B.S.A. Service Sheet No. 413 (cont.)

We do not advise the fitting of over-size rollers to the big end assembly. The whole assembly, comprising crankpin, connecting rod and rollers, should be changed. All these components are carefully matched, working to one ten-thousandth part of an inch, and supplied in complete sets, ready for fitting.

If the bore of the cylinder, when measured at right angles to the gudgeon pin, shows wear to the extent of .010 in. or more, the cylinder should be rebored, and an oversize piston fitted. (Oversize pistons are available in 0.5 mm. (.020 in.) and 1 mm. (.040 in.).

Wear in mainshaft bearings or bushes will be readily apparent, and bearings showing signs of damaged balls, rollers or tracks should be replaced.

Special clearances are specified for mainshaft bearings used on B.S.A. motor cycles, and it is NOT advisable to fit other than genuine B.S.A. replacements.

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