BSA SERVICE SHEET No. 306

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B Group Models
(Up to 1948)
REMOVAL, DISMANTLING AND RE-ASSEMBLY OF GEARBOX

The Gearbox described in this sheet is fitted to models up to Engine No. ZB——101. The Gearbox fitted after this number is described in Service Sheet No. 608.

Removal from Frame

To remove the gearbox from the frame the primary chaincase, clutch and cush drive must be removed as described on Service Sheet No. 304 under the heading of Removal of Engine from Frame. The clutch cable rear chain and speedometer drive must also be disconnected.

Withdraw the gearbox bolts and when removing the box from the frame note that the gearbox adjustment bolt which is situated in the rear of the gearbox shell, and moves the gearbox backward or forward to adjust the tension of the primary chain, must be disengaged from the frame lug.

Before dismantling remove the gearbox drain plug so that any oil in the gearbox can be run off.

Disconnect the foot change lever and kick starter lever, and then unscrew the four bolts in the rear of the gearbox cover behind the foot change mechanism, and the screws in the gearbox end cover. The end cover can now be withdrawn, permitting access to the foot change mechanism.

Next remove the pin from the link mechanism, and unscrew the large nut in the rear of the gearbox inner cover, which holds the foot change spindle in position. The gear-change mechanism can now be taken off as a complete unit. Take care not to lose the small plunger which is revealed when the mechanism is withdrawn.

The gearbox inner cover bolts may now be withdrawn, and the inner cover removed, complete with kick starter, quadrant spring, and foot change selector quadrant.

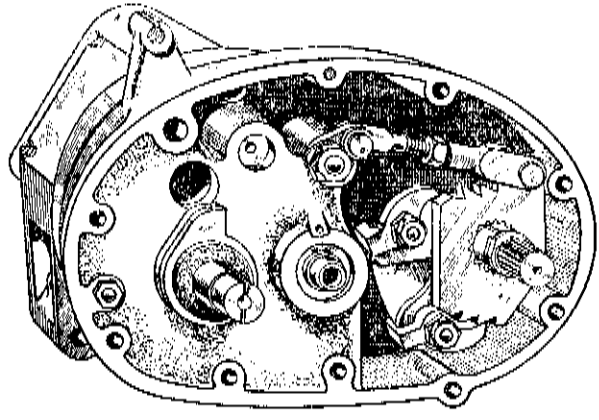

Fig. B.12. Gearbox shewing F/Change mechanism

When removing the gearbox inner cover careful note should be made of the positions of the various distance washers on the shafts, as these washers are of varying thickness and are fitted to allow the correct amount of end play in the shafts. This end play should be evident with the end cover bolted in position, but should not exceed .001 in. to .002 in.

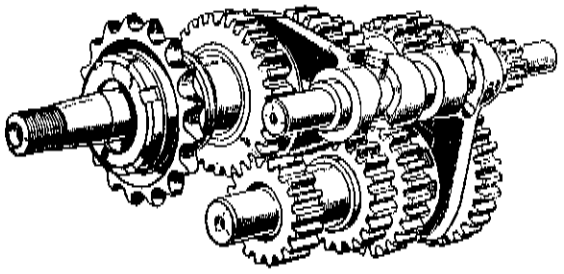

Fig. B.13. Four-speed gearbox interior

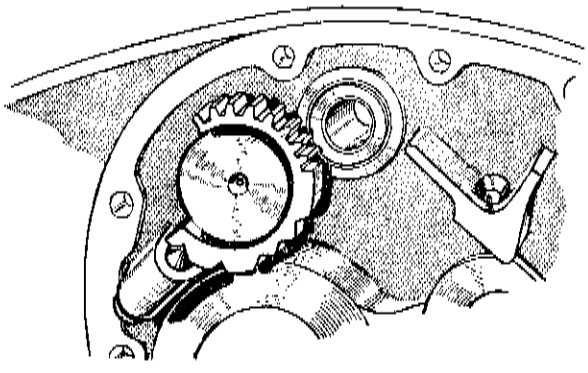

Fig. B.14. Selector quadrant

Replacing the Kickstarter return Spring

Should it be necessary to replace the Kickstarter return Spring, remove the screw retaining the Spring and rotate the Kickstarter quadrant to disengage it from the loop in the Spring. The quadrant can now be driven out with a copper hammer and the Spring removed. Note the position of the return stops on the quadrant shaft so that they may be replaced correctly.

If the gear selector quadrant is removed from the inner cover, care must be taken to ensure that the plunger is in position when re-fitting (Fig. B.14).

The gear cluster can now be removed from the gearbox shell, leaving only the pinion sleeve, mainshaft ballrace, and gearbox sprocket in position. These parts should not be removed unless they definitely require attention.

In the event of one of the above mentioned parts needing replacement, the sprocket ring nut washer must be flattened, and if difficulty is experienced in preventing the pinion sleeve from rotating, a piece of wood can be placed under the teeth of the sprocket, and a punch used to tap the ring nut loose.

Examine the various parts for wear, and if the sliding dogs show signs of seizure it is best to replace them. Attempts to erase the seizure marks will result in excessive side-play.

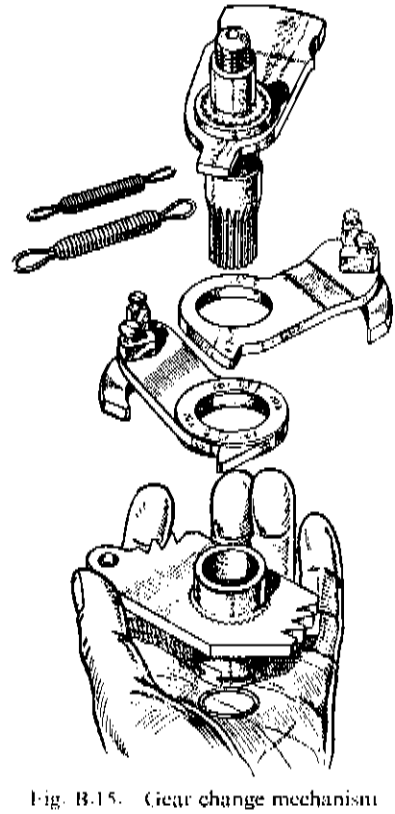

Fig. B.15. Gear change mechanism

Dismantling gear change mechanism

It is only necessary to prise the pawl springs off their pegs, and to remove the circlip, then the whole unit can be stripped into its separate components. The only parts likely to show signs of excessive wear are the pawls and the ratchet plate, and these should be replaced as necessary. If the pawl springs show signs of stretching they too, should be replaced.

Removing the Speedometer drive

This should rarely be necessary and the Speedometer drive should not be removed unless obviously needing attention.

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

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

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

Re-assembly

If it has been decided to fit a new ballrace to the pinion sleeve, make sure that the oil retainer washers are correctly replaced. The flat washer fits between the pinion and ballrace, and the remaining washer fits behind the ballrace, with its face against the bearing.

If the sprocket teeth are worn hook-shaped, a new sprocket must be fitted or rapid chain wear will take place. When the sprocket locknut has been tightened the locking washer must be knocked over into the grooves machined in the nut.

It is only possible to fit the gear cluster into the box when the shafts are assembled (with pinions in top gear position) outside the gearbox, and all inserted together.

Commencing with the layshafts, remove the bottom gear pinion, which is the large one fitted to the kickstarter end of the shaft, and hold the shaft with the left hand. Take the selector shaft and lift the fork at the kick starter end to the dog on the layshaft. Pick up the mainshaft complete, and engage the selector fork at the sprocket end of the shaft with the mainshaft dog. Slide the assembly into the gearbox shell and place the layshaft bottom gear pinion on its shaft. Verify through the inspection cover that the assembly is still in top gear, and replace the various packing washers on their shafts.

The shell is now ready to receive the gearbox inner cover, and after making sure that the kickstarter quadrant and selector quadrant are correctly positioned, a paper washer should be fitted to the cover joint, and the cover replaced. If difficulty is experienced in pushing the cover right home, a *slight* movement of the selector will permit the teeth to mesh. Fitting of the cover will also be simplified if the selector shaft distance washer is liberally coated with grease and positioned around the selector shaft bush on the inside of the cover *before* attempting to replace the cover.

The foot change mechanism may now be re-fitted, and the ratchet plates should be held in the left hand with the shortest length of the sleeve uppermost. Fit the pawl carriers and the spindle in the sequence as shown in the diagram so that the pawls engage with the teeth of the ratchet plate. Fig. B.15.

With the aid of a pair of pliers replace the springs on the pawls, and then fit the spindle circlip which holds the ratchet plate in position.

The unit is now ready for re-assembly in the gearbox. Make sure that the spring loaded plunger is in position in the inner cover before the unit is replaced. Couple the link arm to the ratchet plate, and take care to replace the split pin. Before proceeding with the assembly it is advisable to fit the foot change pedal loosely to its operating shaft, and by looking through the inspection hole, check that all the gears are being properly selected. At the same time the foot change mechanism can be tested to ensure that the springs return the pedal to the neutral position after each gear has been selected. If the selector dogs do not appear to go right home when the box is in top or bottom gear a slight adjustment to the length of the foot change link arm will cure this. It is necessary of course, to rotate the gearbox sprocket by hand while operating the gear change lever.

When all is found to be correct remove the gear change pedal while the gear cluster is in the top gear position, replace the clutch push rod, and finally put back the gearbox and cover with a new paper washer in position, and bolt into position. Next fit the foot change and kick starter levers to their shafts. Replace the gearbox in the frame, and loosely attach the fixing bolts. Reconnect the speedometer drive. Reassemble the primary chaincase inner half, cush drive, chain, and clutch. Rotate the gearbox adjusting bolt to give the correct tension to the primary chain, and then firmly tighten the gearbox holding bolts.

Note

The primary chain is correctly adjusted when it has ½ in. up and down play midway between the two sprockets.

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