

PRESELECTOR GEARBOX

This is a compound epicyclic gearbox giving four forward and a reverse gear, the top gear being a solid drive. All the gear wheels are permanently in mesh. Each indirect gear is obtained by applying a brake band of special form to one of the drums, each of which is integral with one element of a simple epicyclic gear. By moving the lever on the steering column, a gear may be preselected for subsequent use and engaged when required by fully depressing and releasing the engagement pedal irrespective of the state of the gear when the selection is made.

When the engagement pedal is only partially depressed it acts as an ordinary clutch pedal and frees the engine from the transmission.

THE CONTROL OF THE PRESELECTOR GEARBOX

The control consists of an engagement pedal, which takes the place of the usual clutch pedal, and a selector lever mounted in a dial on the steering column. The dial is marked to indicate top, third, second, first, neutral and reverse positions. The lever selects the gear while the pedal accomplishes the actual gear change. A point of importance is that one gear can be preselected while the car is running in another, the selected gear only being put into use when the engagement pedal is fully operated. Generally when changing gear one should go from one speed to the next, but in cases where a change down necessitates jumping one or two gears, the engine must be speeded up or the car allowed to slow down to ensure a smooth engagement.

MAINTENANCE OF THE PRESELECTOR GEARBOX

A few points which require special attention are :—

- 1 The oil must be kept up to the mark on the dipstick. This is found at the rear of the gearbox. The oil capacity of the box is four pints. The oil used in the gearbox must be as recommended.
- 2 The oil should be changed after the first 500 miles and then after every 5,000 miles. Every 5,000 miles remove the plate held by four set screws which is on the underside of the gearbox adjacent to the drain plug. Remove the gauze filter and after cleaning it, replace.
- 3 The gearbox should be pumped up occasionally to maintain the brake bands in correct adjustment. This operation is carried out about twelve times in each gear with the engine stopped, and consists of pressing the engagement pedal down to the stop, and letting it fly back on its own accord to ensure the automatic adjusters are working correctly.
- 4 The following controls should be lubricated occasionally :—
 - a The preselector rack under the dial on the steering column.
 - b The operating cross shaft through the oil hole in the offside of the gearbox.
 - c The engagement pedal bush.
- 5 If the pick up in low gear from a standstill is harsh, or the engagement pedal heavy, it may be due to :—
 - a Insufficient oil in the gearbox.
 - b The engagement pedal requiring pumping up.
 - c The toggle action set incorrectly, requires decreasing.

ADJUSTING THE TOGGLE ACTION—PRESELECTOR GEARBOX

Before making an adjustment stop the engine and make sure that the gear requiring adjustment is not engaged.

The first and reverse gears are partially engaged when in neutral therefore the latter must not be selected when adjusting either of these gears.

After making an adjustment always engage the adjusted gear and pump up the engagement pedal until the automatic adjuster nut of this particular gear stops rotating.

Very little toggle action is necessary for reverse gear and this point must be borne in mind when making adjustments.

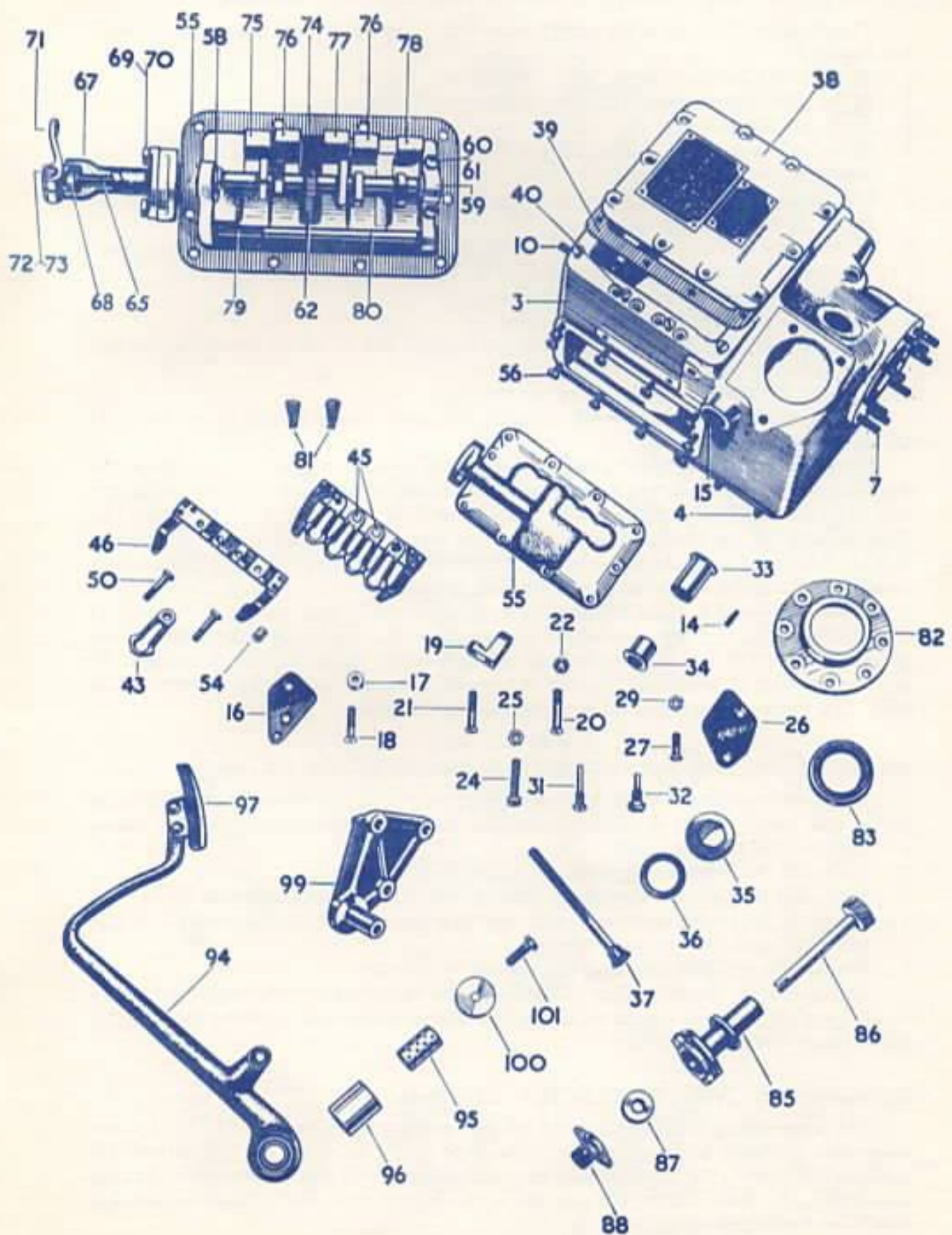


FIGURE 1 A

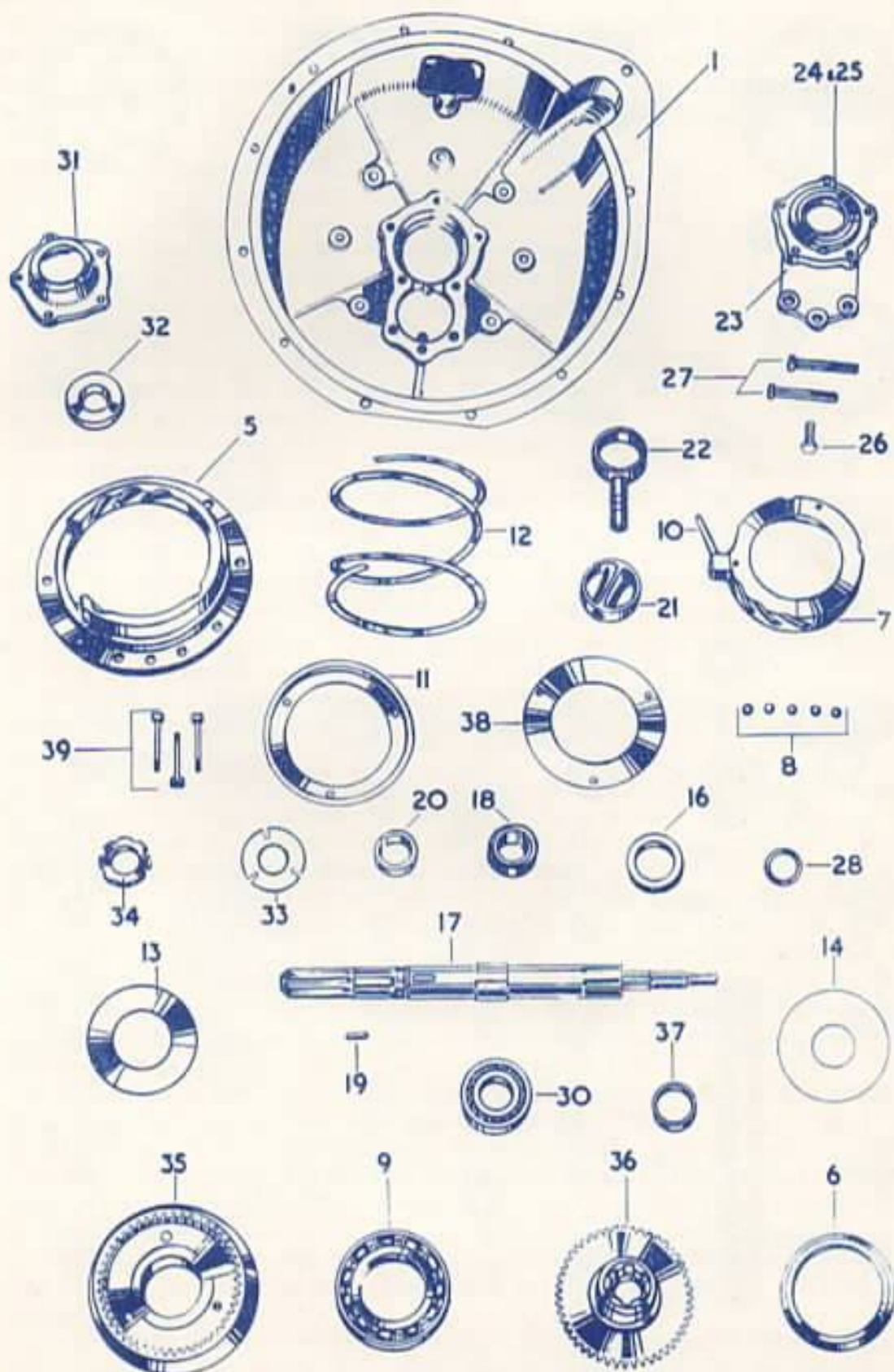


FIGURE 18

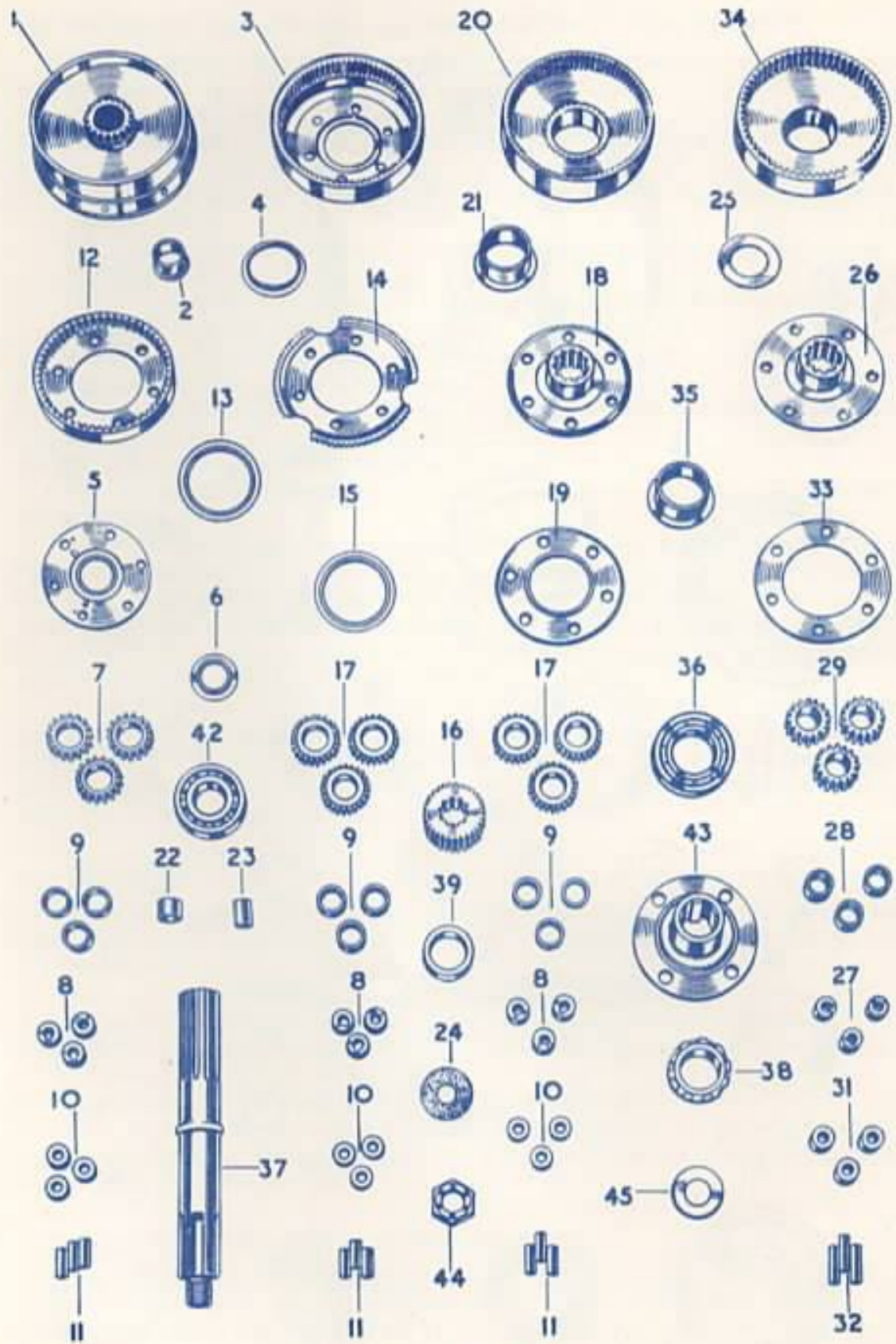


FIGURE 1 C

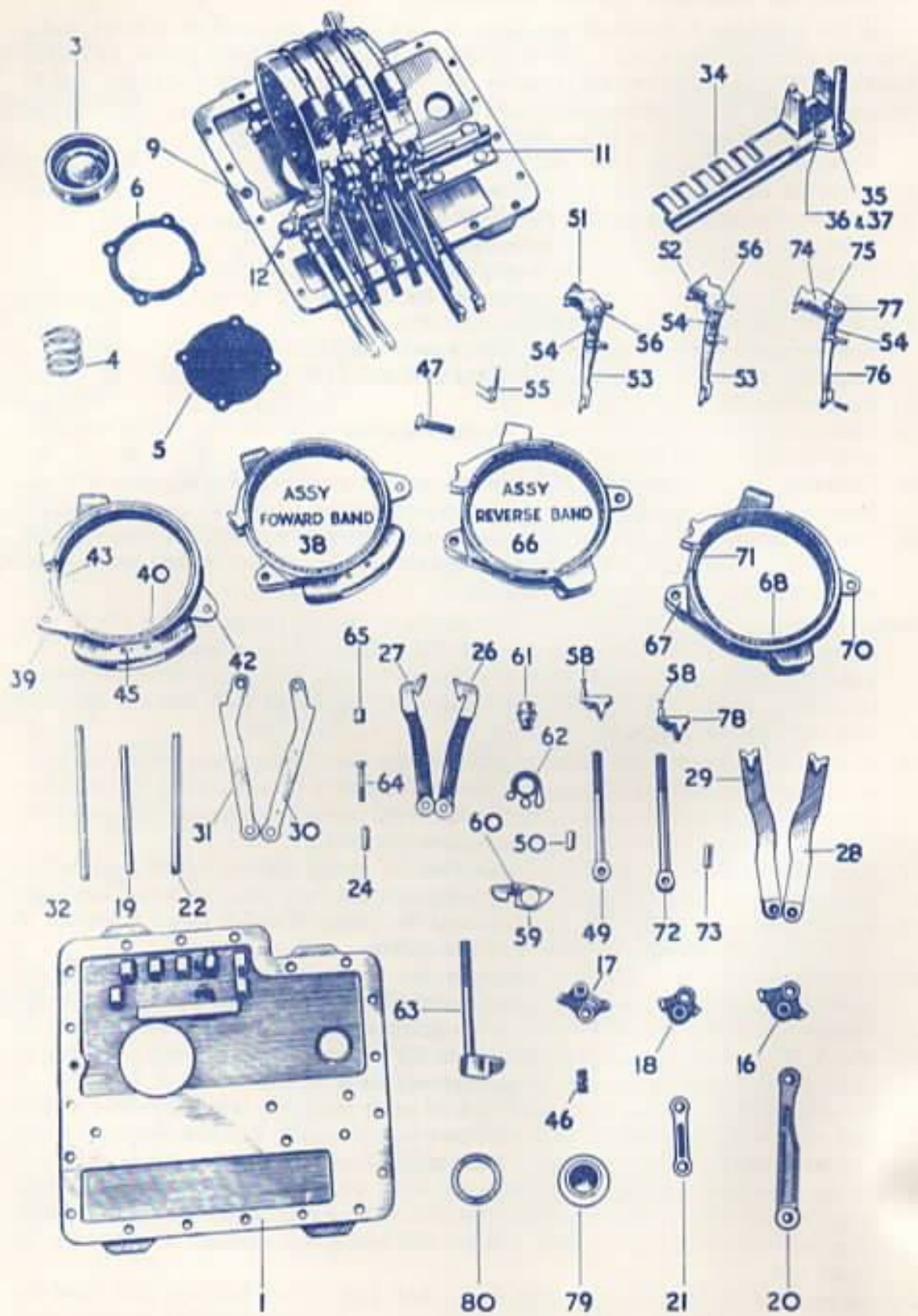


FIGURE 1 D

TO INCREASE THE TOGGLE ACTION—PRESELECTOR GEARBOX

This is necessary if any of the gears tend to slip. The adjustment is made as follows :
See Figure 2.

- 1 Remove the gearbox cover.
- 2 Make sure that the gear requiring adjustment is not engaged.
- 3 Slack off the lock nut B.
- 4 Screw in the pyramid shaped set screw C a quarter of a turn at a time and lock with the nut B.
- 5 Lift the top eye E and the loop D of the spring F off the pins. Do not remove the spring F from the nut A.
- 6 Unscrew by half a turn the adjuster nut A to give the toggle action more movement. A suitable bolt and locknut can be used ($\frac{1}{2}$ " B.S.F.).
- 7 Replace the loop D and the eye E.
- 8 Select the gear which has been adjusted.
- 9 Pump up the engagement pedal until the adjuster nut A, which should be marked with copying pencil, stops taking up.
- 10 Replace the cover and test the car on the road.

The movement of the automatic adjuster nut A, the spring F, ring G, and table H are as follows :—

When the pedal is released after depression, the adjuster nut A moves forward and the point of the ring G strikes against the pyramid shaped set screw C which causes the ring G to rotate slightly carrying with it the loop E of the spring F. The table H to which is fixed the eye D of the spring F does not rotate, neither does the nut A which is locked by the tension on the brake band. This movement causes the spring F to slacken its hold on the nut A and to take up a different position.

When the pedal is again depressed the spring F exerts itself and grips the nut A, the tail of the ring G strikes the tail pin J which turns the ring G which by means of the spring F screws the nut A down the rod attached to the brake band in the case of all gears except top, in which case the nut is screwed down the rod operating the top gear cone, this movement automatically compensating for wear.

TO DECREASE THE TOGGLE ACTION—PRESELECTOR GEARBOX

When the engagement of the gears is inclined to be rough or when the pedal becomes heavy, less toggle action is required, and the following adjustment should be made.

- 1 Remove the gearbox cover.
- 2 Slack off the locknut B.
- 3 Screw out the pyramid shaped set screw C one turn and lock with nut B.
- 4 Pump up the engagement pedal and note that the adjuster nut A rotates, continue pumping until the nut stops turning.
- 5 Replace the gearbox cover and test the car on the road.

This alteration has the effect of reducing the movement of the toggle action by bringing the pyramid shaped set screw into action earlier and screwing the adjuster nut A further down the pull rod.

DISMANTLING THE PRESELECTOR GEARBOX

The dismantling and re-assembly of the gearbox may be undertaken by any competent mechanic and no difficulty should be found provided the instructions are carefully followed. The bench should be clean and free from other parts before the strip is commenced. Take note of the position of the various parts and washers so that they may be re-assembled correctly.

Dismantling the Preselector Gearbox *Continued*

In the following instructions the name of each part is followed by a letter and a figure and reference to Figure 1, A, B, C, D or E should enable each part to be readily identified. These illustrations are the same as those in the Spare Parts List pages 72 to 87 where a complete list of gearbox parts with full description and part number will be found.

- 1 Remove the plug D79 to drain the oil from the gearbox.
 - 2 Remove the top cover A38.
 - 3 Undo the three spring cap bolts E2 unscrewing them evenly.
 - 4 Remove the spring cap E1 and the shims E4.
 - 5 Take out the bus bar spring E5 with the guides E6 and E7.
 - 6 Release and lift off the five automatic adjuster springs D62.
 - 7 Take off the side cover A55 complete with the camshaft A74, etc.
 - 8 Unscrew the five automatic adjuster nuts D61.
 - 9 Remove the automatic adjuster rings D59 and tables D57 and D78.
 - 10 Take out the thrust pad assemblies D51, D52 and D74.
 - 11 Remove the pull rod D63.
 - 12 Take off the seven nuts A10 and gently tap and remove the bell housing B1 complete with the input shaft B17.
 - 13 Withdraw the outer member B5 complete with the actuating ring B7, cone B35 and bearing B9 etc., taking care to guide the operating strut B10 past the casing.
 - 14 The remainder of the running gear can now be withdrawn singly, *i.e.*, brake drums, planet assemblies, etc. Care must be taken to collect all the bushes and washers which may have dropped out of place.
- Note.** If the reverse brake drum C34 is a tight fit in the rear thrust bearing C36 it may be necessary to remove the output shaft C37. This is done as follows:—
Take off the nuts A7 securing the rear end cover A82 and gently drive the output shaft C37 to the rear, complete with rear coupling flange C43, rear oil seal A83 and rear bearing C42, etc.
- 15 In order to dismantle the brake bands D38 and D66, the gearbox casing A3 must be removed from the base plate D1 but before this is possible the top gear hooks D30 and D31 must be released from the side of the casing by taking out the screw D64.
 - 16 Turn the casing and remove the screws from the base.
 - 17 Remove the oil well cover D5 and take out the spring D4 and the oil strainer D3.
 - 18 Reverse the casing and gently tap the lugs on the base plate to break the joint.
 - 19 At the same time collect the $\frac{3}{8}$ " ball from the pump valve D9 which is located at the front end between the base and the casing.
 - 20 Press down the brake bands to disengage the hooks D26 to D29 when the brake bands can be lifted out complete after removing the four link pins D24 of the internal bands. Take care not to lose the seven guide springs D46.
 - 21 The locking piece plate A46 together with the locking pieces A43 and A44 can be taken from the casing as a unit after removing the bolts A50.
 - 22 To strip the bell housing, input shaft and oil pump assembly, take off the five $\frac{1}{4}$ " nuts and remove the front oil seal B32 turn back the tabwasher B33 and remove the ring nut B34 from the input shaft B17. Prise off the front cover B23 with a screwdriver, at the same time tap the end of the input shaft with a hide faced hammer to help break the joint, thus removing the front outboard bearing B24 and bearing sleeve B20.
 - 23 The eccentric for the pump B18, plunger B22 and pump cylinder B21 can now be taken out.
 - 24 To separate the front bearing B30, input shaft and key for eccentric B19 from the bell housing B1 and locknut B25, which has an external *left-hand* thread and is secured by peening the thread, must first be removed.

Dismantling the Preselector Gearbox *Continued*

- 25 To separate the top gear outer member assembly, the three 2BA nuts, which are secured to the ends of the bolts B39 by peaning, must be removed when the anchor plate B38, top gear thrust bearing B9, thrust ring B6, actuating ring B7, five balls B8, outer member B5, return spring B12 and compressor plate B11 will come apart.
- 26 To dismantle the speedometer driving gear C38 the nut for the output shaft C44, rear coupling flange C43 and rear end cover A82 with oil seal A83, rear bearing C42 and oil thrower, and the distance piece C39 must all be removed.

RE-ASSEMBLING THE PRESELECTOR GEARBOX

Care must be taken to see that all the parts are scrupulously clean before re-assembly and that no grit or dust finds its way into the casing.

The Running Gear

- 1 If the bell housing, input shaft and oil pump unit has been stripped it should be assembled first, taking care that the oil hole in the eccentric B18 is opposite the oil hole in the input shaft, and to Shellac the face of the oil pump cover.
- 2 When assembling the actuating ring B7 and other details in the outer member B5 insert the five balls B8 in the helical tracks when lowering the ring and finally screw on the three 2BA nuts with two threads showing which must be peaned over to lock the nuts in place.
- 3 Place the bell housing assembly face down and Shellac the joint before fitting the actuating assembly in place. Line up the holes so that the operating strut B10 is in the correct position.
- 4 Fit in place the inner clutch cone assembly B35 to allow the driving member B36 with the bush B37 to engage with the splines on the input shaft B17 and drive gently home.
- 5 With the input shaft still in the vertical position fit the distance washer B28, a bronze bush for third speed sunwheel C2 and the clutch thrust washer B16.
- 6 Lay on the outer clutch cone C1 and fit the other bush C2 and the bush C4.
- 7 Fit the second speed brake drum C3 in place and then the bush for the planet support C6.
- 8 Fit the first and second speed sun wheel C16 on the splines of the input shaft and then the bronze washer C24 and the two bushes C22 and C23.
- 9 Fit the third speed annulus bush C13.
- 10 Fit the bush C15 to the planet carrier C14 and place the carrier in position on the sun wheel.
- 11 Also fit the planet carrier C18 on the sun wheel.
- 12 Fit the bush C21 to the forward face of the first speed brake drum C20, place it in position on the planet carrier C18.
- 13 Place the washer C25 in position and lay on the reverse planet carrier C26.
- 14 Finally, fit the bush C35 to the reverse brake drum C34 ready to tap the drum in place in the bearing C36.

Make sure all the brake drums rotate freely and then insert the output shaft C37 turning it to engage with the splines of the planet carrier plates.

Note. Take precautions that the running gear assembly is kept in a vertical position and not moved until placed in the gearbox casing, otherwise the bushes may move out of alignment.

Brake Bands

When assembling the brake bands reverse the process of stripping and make certain that all the guide springs D46 are in position in the centralisers D16, 17 and 18, and that the latter are free to move on their pivots.

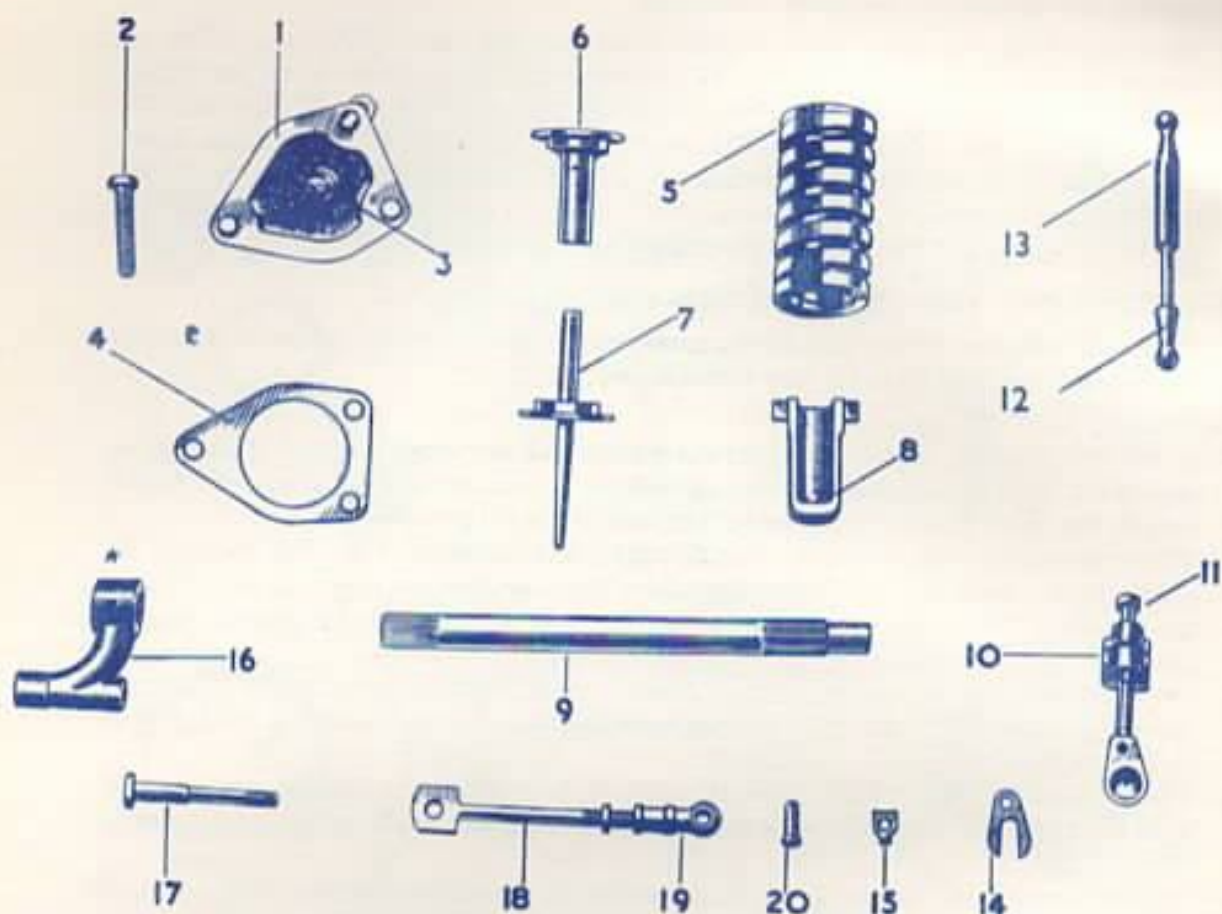


FIGURE 1 E

Re-Assembling the Preselector Gearbox *Continued*

Final Assembly

- 1 Fit the rear thrust bearing C36 in the gearbox casing A3 and tap the reverse drum C34 into place.
- 2 Tie the pull rods D49 and D72 and hooks D26 to D31 in position with a length of wire in such a way that the wire can be released after fitting the casing.
- 3 Fit the bus bar D34 and after cleaning the base plate D1 Shellac the joint, taking care to clean the Shellac from around the hole of the ball seating D9.
- 4 Place the $\frac{1}{16}$ " ball D9 on its seating, then lower the casing and ease it over the brake bands.
- 5 Making sure the ball valve is in place, pull the base plate up to the casing, turn the gearbox over and gently tap the base plate home. Fit shakeproof washers and nuts and tighten down.
- 6 Tighten the oil drain plug D79 and the oil well cover D5.
- 7 Withdraw holding wire and secure the top gear hooks D30 and D31 by means of the screw D64 and distance piece D65, etc.
- 8 With the aid of a screwdriver, guide the lower bus bar strut E13 into engagement with the upper strut E12 noting that the distance piece, if fitted, is in place.
- 9 Fit the pull rod D63 in place.

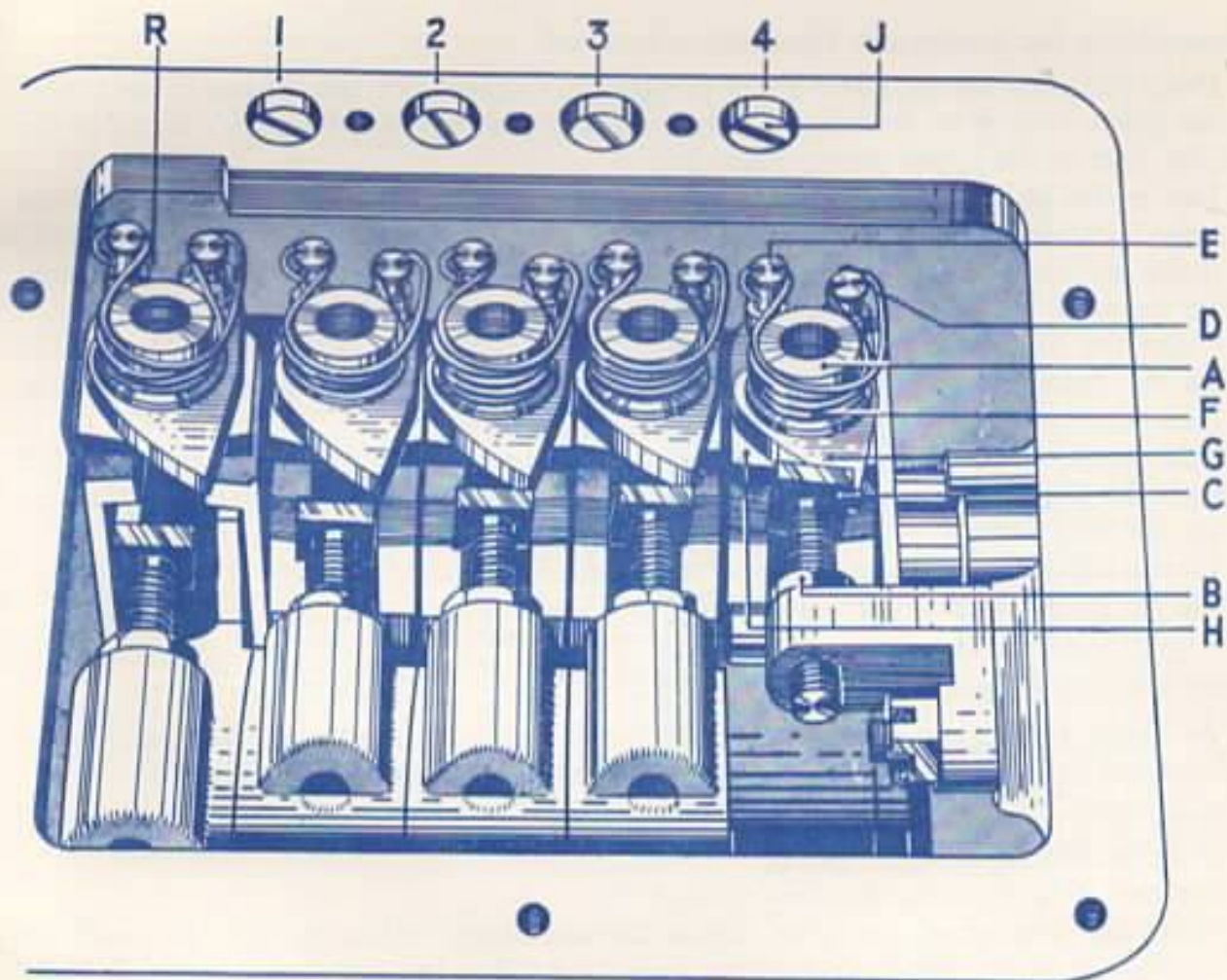


FIGURE 2

Re-Assembling the Preselector Gearbox—Continued

- 10 To position the running gear, fit a tube over the output shaft and with one operator holding the tube and another the input shaft, guide the complete running gear through the brake bands and into the casing. *Take every precaution* to prevent the brake drums separating and allowing the bushes to become displaced. At the same time check that the pull rod D63 does not foul the running gear.
- 11 Push the front cover B1 right home and with the assistance of a hook, guide the operating strut B10 into the cup of the pull rod D63.
- 12 Fit the top gear thrust pad assembly D51 and the table D57 and D58, ring D59 and the nut D61.
- 13 Assemble the details on the output shaft C37 in the reverse order to stripping.
- 14 Ensure that the input and output shafts are both engaged and knock the front cover up before securing it with washers and nuts.
- 15 The reverse thrust pad unit D74, which is wider than the other pads, should first be fitted, together with its automatic adjuster table, ring and nut. Then fit the remaining automatic adjusting parts.
- 16 By means of a hook lower the bus bar bucket E8 on to the horns of the bus bar D34.

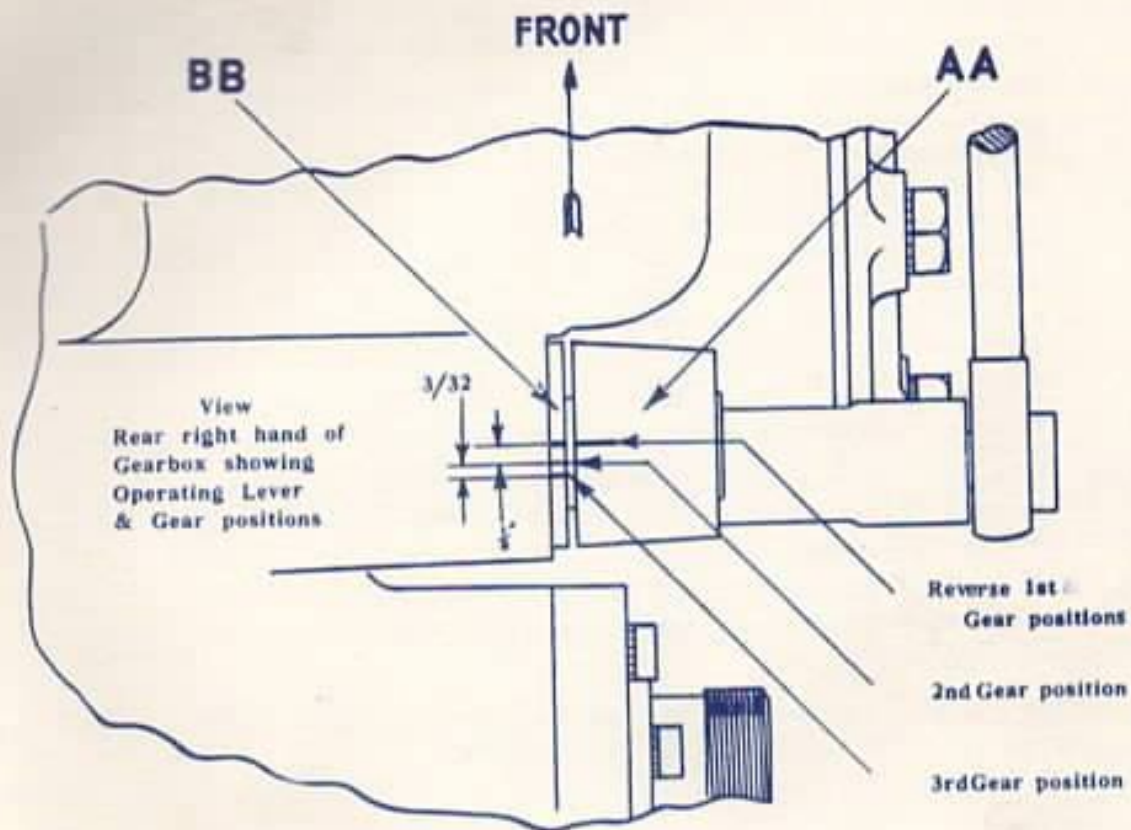


FIGURE 3

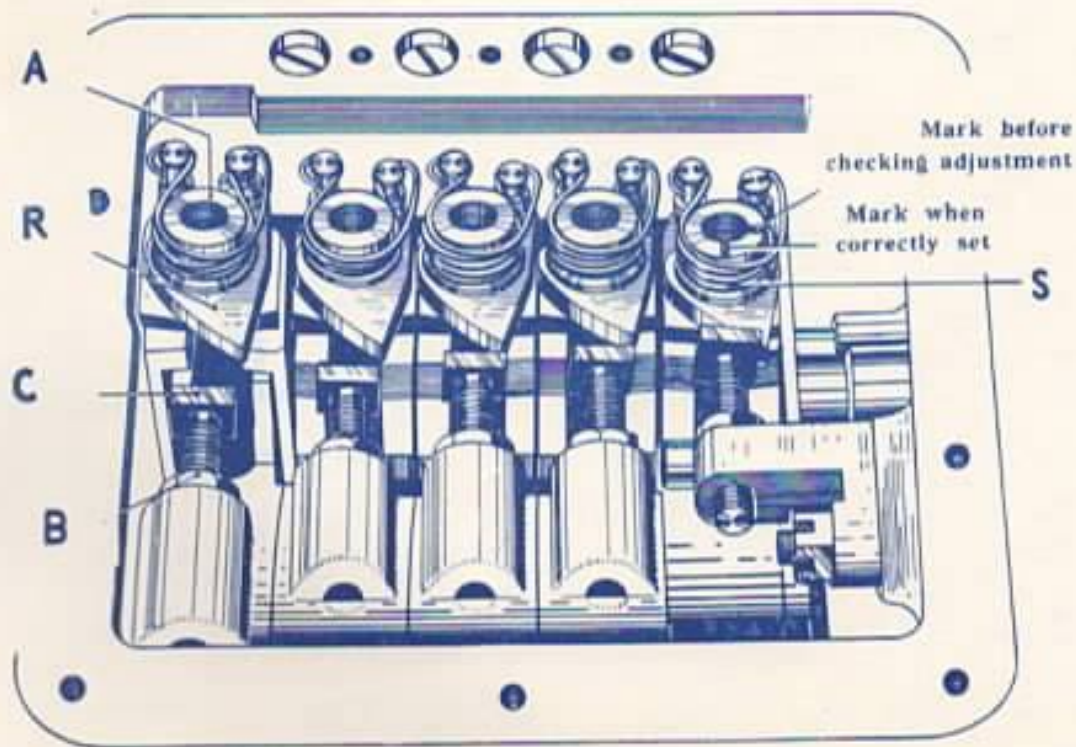


FIGURE 4

Re-Assembling the Preselector Gearbox—Continued

- 17 Place the lower spring guide E7 in position to engage with the bucket E8 and hold the guide vertical by means of a tube over which slide the spring E5. Remove the tube and fit the upper spring guide E6.
- 18 Lay on the shims E4 and the cap E1 and pull down evenly by means of the three bolts E2 at the same time hold the operating strut D53 in engagement.
- 19 If the locking plate A46, etc., have been removed from the casing they should now be replaced.
- 20 Clean the joint and apply Shellac, then fit the side cover assembly A55 to A81.
- 21 Fit the speedometer wheel A86 and the adaptor A85 if they have been removed from the casing.
- 22 Select and engage reverse gear and fit the adjuster spring D62 with the two eyes over the pin D58 on the table D78 and the loop of the spring round the pin D60 on the ring D59.
- 23 Fit the adjuster springs to the remaining gears in the same way.
- 24 Fill the gearbox up to the correct level with the recommended oil.

Setting and Adjusting

To obtain the correct gear setting the following adjustments should be made, in the order set out below. The lettering of the parts can be referred to in Figure 4.

- 1 Slack off lock nuts "B" and screw in automatic adjusting setscrews "C" well clear of automatic adjusting rings "R".
- 2 Remove all automatic adjusting springs "S".
- 3 Select and engage reverse gear, adjust the automatic adjusting nut "A" until the two marks on the bus bar operating lever "AA" and bus bar operating bush "BB" are in line, see top figure 3. The pedal should be allowed to return sharply when making these adjustments to ensure there is no sticking of the band operating mechanism.
- 4 Carry out adjustment of 1st gear as above until the marks on the lever and bush are in line (same position as reverse).
- 5 Carry out adjustment of 2nd gear as above, the mark on the lever in this case should stop $\frac{1}{8}$ " behind the mark on the bush.
- 6 Carry out adjustment of 3rd gear as above, the mark in this case being $\frac{3}{16}$ " behind the 2nd gear position.
- 7 Carry out the adjustment of top gear as above until the marks are in line (same position as the 2nd gear).

Note.—See Figure 3, for lever marked positions.

Gear Automatic Adjusting Settings

- 1 Select and engage reverse gear, screw out the automatic adjusting setscrew "C" until it is just clear of the automatic adjusting ring "R" (.002") when the ring is held as far away from the end of the screw as possible, then tighten automatic adjusting setscrew locknut.

Setting and Adjusting—Continued

- 2 Disengage reverse gear (select and engage top gear) mark reverse gear automatic adjusting nut, see Figure 4, and unscrew 90°, refit automatic adjusting spring "S".
- 3 Select and engage reverse gear, then operate the gear pedal through its full movement sharply up and down. It will be noticed while this movement is being made that the automatic adjusting nut will turn back to its original position. Should it travel past the original setting the automatic adjusting screw C should be turned in one complete turn and the procedure repeated. Should the nut stop before it has reached the original position the automatic adjusting screw should be unscrewed one complete turn and the operation of the pedal continued until the mark reaches its original position. The pedal operation should be continued some twenty strokes after the automatic adjusting nut has stopped, this is to ensure that there is no further movement which would throw the band out of adjustment.
- 4 The above operation should then be carried out on 1st, 2nd, 3rd and top gears in turn.
- 5 Should the automatic adjusting nut refuse to move when the ring is being deflected by the automatic adjusting screw during the pedal operation, the following points should be checked.
 - a Automatic adjusting ring tight on nut
 - b Automatic adjusting nut tight on threads of pull rod
 - c Change the spring

Note.—When making adjustments to the automatic adjusting nut, the correct tool ST 38888 should be used to ensure that the threads are not damaged.