

Part 4

POWER TRANSMISSION,
REAR AXLE

CONTENTS

Group 41 Clutch

Tools	4 : 1
Description	4 : 1
Repair Instructions	4 : 2
Replacing the clutch wire	4 : 2
Replacing the clutch pedal or bushes	4 : 2
Removing	4 : 3
Replacing the clutch facings	4 : 3
Input shaft bearing in the flywheel	4 : 3
Inspecting	4 : 4
Fitting	4 : 4

Group 43 A Gearbox

Tools	4 : 5
Description	4 : 6
Repair Instructions	4 : 8
Replacing the oil seal	4 : 8
Removing	4 : 9
Dismantling	4 : 9
Inspecting	4 : 10
Fitting	4 : 13

Group 43 B Overdrive

Tools	4 : 14
Description	4 : 15
Repair Instructions	4 : 19
Checking the oil pressure	4 : 19
Replacing the solenoid and operating valve	4 : 19
Checking and replacing the relief valve	4 : 19
Cleaning the orifice nozzle	4 : 20
Checking and replacing the check valve	4 : 20
Cleaning the filter	4 : 20
Removing	4 : 20
Dismantling	4 : 21
Inspecting	4 : 21
Assembling	4 : 22
Fitting	4 : 24

Group 45 Propeller Shaft

Description	4 : 25
Repair Instructions	4 : 26
Replacing the support bearing	4 : 26
Removing	4 : 26
Dismantling	4 : 26
Inspecting	4 : 26
Assembling	4 : 27

Group 46 Rear Axle

Tools	4 : 28
Description	4 : 30
Repair Instructions	4 : 30
Replacing drive shaft oil seals	4 : 30
Replacing drive shaft bearing	4 : 32
Replacing pinion oil seal	4 : 32
Removing	4 : 33
Dismantling	4 : 33
Inspecting	4 : 35
Assembling	4 : 36
Fitting	4 : 41

Illustration 4-A. Clutch and clutch controls

Illustration 4-B. Gearbox

Illustration 4-C. Overdrive

Illustration 4-D. Final Drive

GROUP 41

CLUTCH

TOOLS

The following tools are used for work on the clutch.

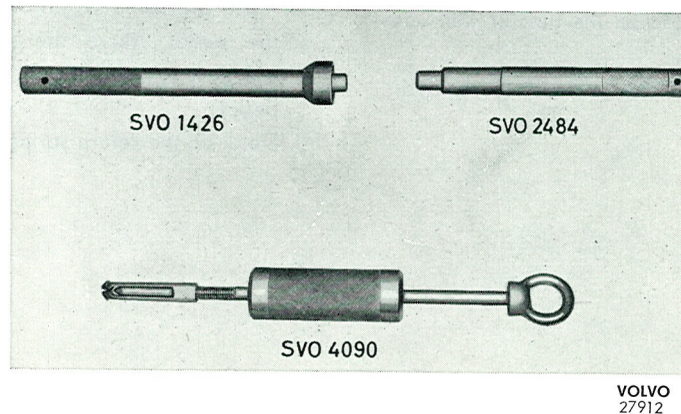


Fig. 4-1. Special tools

SVO 1426 Drift for pilot bearing in flywheel.
SVO 2484 Mandrel for centring clutch plate.
SVO 4090 Puller for ball bearing in flywheel.

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DESCRIPTION

The clutch (Illustration 4-A) is of the diaphragm spring type. It is available in two different versions (Figs. 4-2 and 4-3), but both mainly consists of a pressure plate, a diaphragm spring and clutch casing. The diaphragm spring has a double function, that of the clutch lever when declutching and the pressure spring when engaging.

The clutch operation takes place by means of the clutch pedal, the movements of which are transferred to the clutch via a wire, a lever and a release bearing.

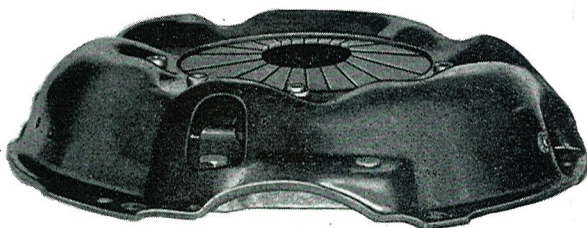


Fig. 4-2. Clutch, type 1

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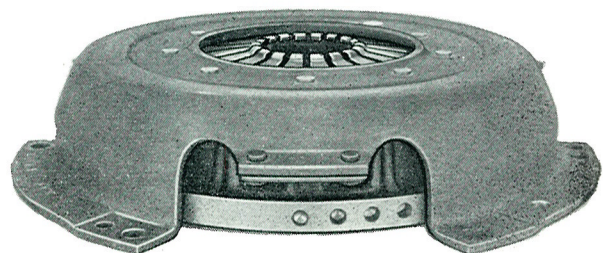


Fig. 4-3. Clutch, type II

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REPAIR INSTRUCTIONS

WORK WHICH CAN BE CARRIED OUT WITH THE CLUTCH INSTALLED

REPLACING THE CLUTCH WIRE

1. Unhook the return spring for the release fork. Slacken the rear nut and possibly the front nut a couple of turns. Disconnect the wire from the release fork.
2. Loosen the clamp holding the wire to the reinforcing member of the wheel housing.
3. Remove the panel under the dashboard. Take off the bearing bolt for the pedal. Disconnect the wire from the pedal. Slacken the nut for the wire sleeve. Remove the wire.
4. Fit the new wire in the reverse order to removal.

REPLACING THE CLUTCH PEDAL OR BUSHES

The description given below is applicable if it concerns either the replacement of the pedal or of the bushes.

1. Unhook the return spring for the pedal. Slacken the nut and remove the bolt. Disconnect the pedal from the wire and remove the pedal.
2. Take out the tubular shaft. Drive out the bushes with a suitable drift.
3. Fit the new bushes. Lubricate them with grease. Fit the tubular shaft.
4. Place the return spring on the bearing sleeve of the pedal. Move the pedal into position and attach it to the wire. Fit the bolt which holds the pedal.
5. Hook on the return spring.

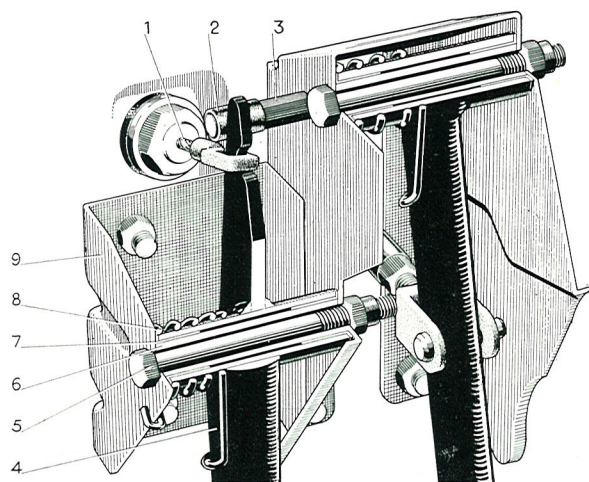


Fig. 4-4. Pedal carrier

- | | |
|------------------|------------------|
| 1. Clutch wire | 6. Shaft |
| 2. Rubber sleeve | 7. Bush |
| 3. Pedal stop | 8. Return spring |
| 4. Clutch pedal | 9. Bracket |
| 5. Bolt | |

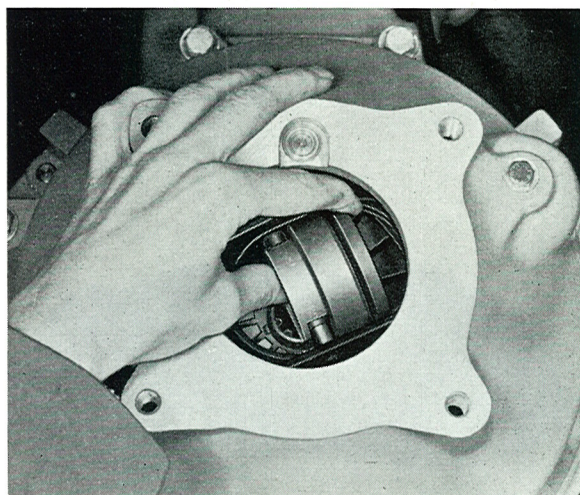


Fig. 4-5. Removing the release bearing

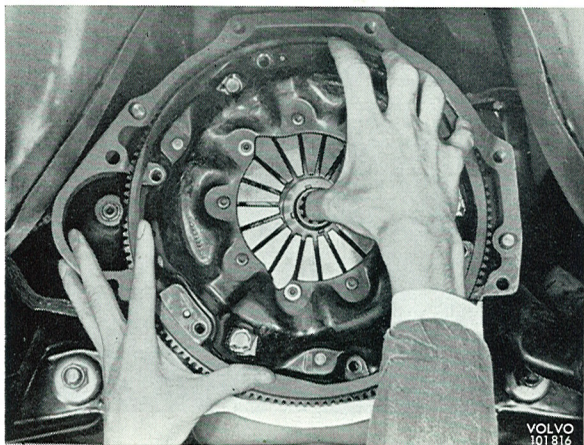


Fig. 4-6. Removing the clutch

REMOVING THE CLUTCH

1. Remove the gearbox according to the instructions given in Group 43.
2. Remove the upper bolt for the starter motor.
3. Remove the release bearing. Disconnect the wire from the release fork. Slacken the wire sleeve from the bracket.

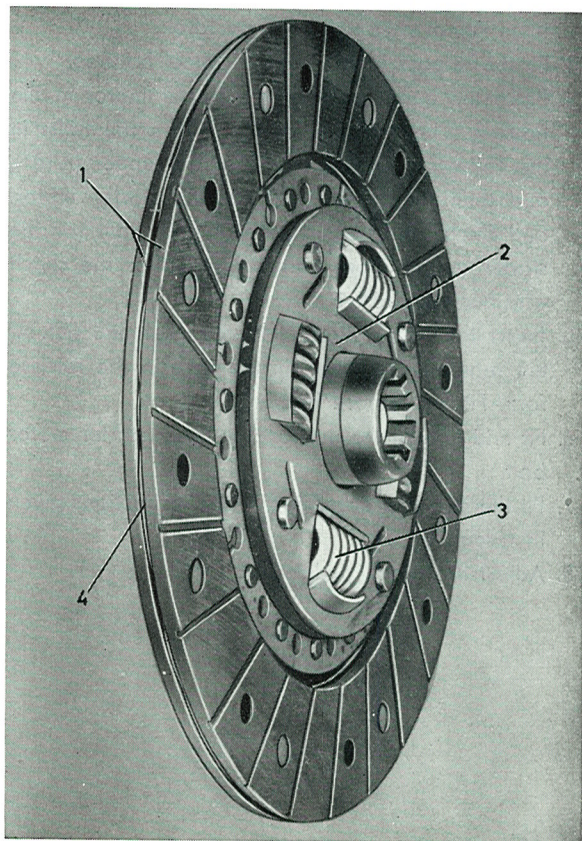


Fig. 4-7. Clutch disc

1. Facings 2. Hub 3. Spring 4. Disc

4. Slacken the bolts and remove the flywheel housing.
5. Slacken the bolt for the release fork ball joint. Remove the ball and the release fork.
6. Slacken the bolts holding the clutch to the flywheel by loosening them crosswise a couple of turns at a time to prevent warping. Remove the clutch and clutch plate.

REPLACING THE CLUTCH FACINGS

1. Drill out the old rivets with a drill having the same diameter as the rivets, 3.5 mm (0.14"), and remove the old facings.
2. Check the clutch plate. The indentations on the tongues should be even. The clutch plate must not be warped. The clutch springs and rivets in the hub should fit securely and not show any signs of looseness. Check to make sure that there are no cracks.
If the clutch plate has any of the above defects, it should be replaced with a new one.
3. Rivet on the new facings (preferably in a rivet press). N.B. The rivets should be inserted from the side on which the facing lies and riveted up from the opposite direction against the disc. Use every other hole in the facing. After riveting, the facings should be spaced from each other as determined by the indentations on the clutch disc. See Fig. 4-7. This is most important in order to achieve a smooth engagement when starting and driving.

The clutch facings must be absolutely free from oil. Oil on the facings can cause clutch grabbing.

INPUT SHAFT BEARING IN THE FLYWHEEL

1. The bearing is pulled out with puller SVO 4090, see Fig. 4-8. The bearing is cleaned in petrol

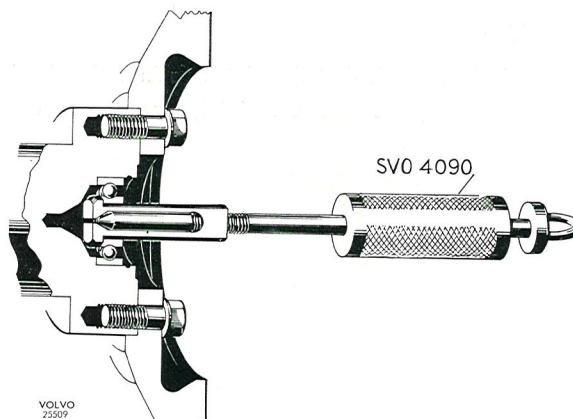


Fig. 4-8. Removing the pilot bearing

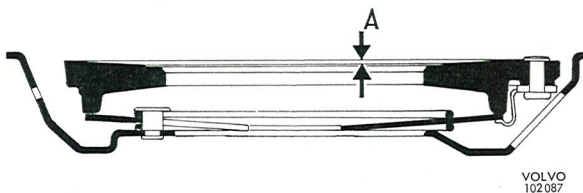


Fig. 4-9. Checking the curvature of the pressure plate

(gasoline). If the bearing, upon inspection, runs smoothly and evenly and has no noticeable play, it should be packed with ball bearing grease and refitted. N.B. Heat-resistant grease should be used.

The bearing should be pressed in by drift SVO 1426.

INSPECTING

As the clutch cannot be dismantled, it must be replaced completely if faulty. Check the clutch carefully. Check the pressure plate for damage by heat, cracks, scoring or other damage on the friction surface. Check the curvature of the pressure plate with a 240 mm (9½") long steel ruler, which is placed diagonally across the friction surface of the pressure plate. Then measure the distance between the straight edge of the ruler and the inner diameter of the pressure plate. This measurement must not exceed a maximum 0.03 (0.0012"), see Fig. 4-9. There must be no "crowning", i.e. clearance between the straight edge of the ruler and the outer diameter of the pressure plate. Carry out the check at several points. Check the pressure spring carefully; if it is cracked or damaged in any other way, the clutch should be replaced.

Check the release bearing by turning it round a few times under light pressure so that the balls rotate against the races. The bearing should turn easily without binding at any point. The release bearing should also slide easily on the guide sleeve from the gearbox.

FITTING

Before fitting, check that the clutch facings, flywheel and pressure plate are completely free from oil.

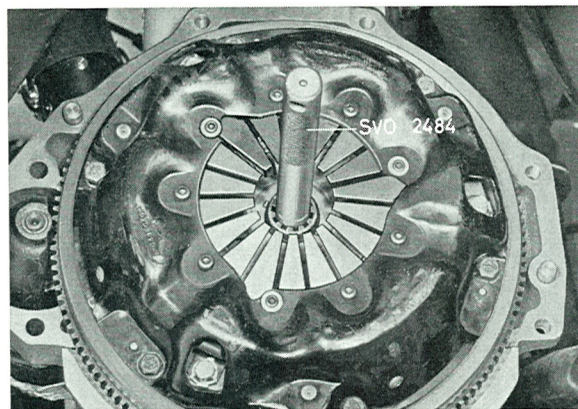


Fig. 4-10. Fitting the clutch

Wash them with clean petrol (gasoline) and wipe off well with a clean piece of cloth.

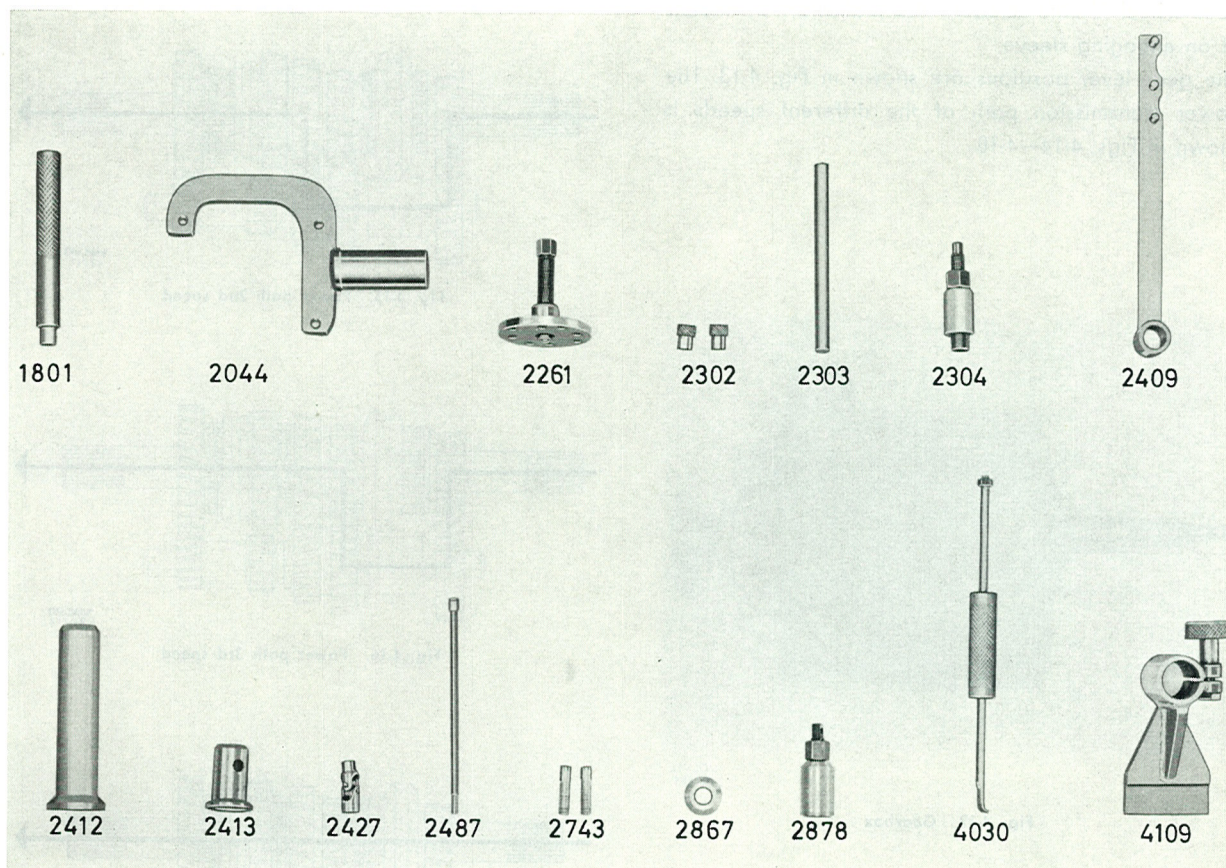
1. Set up the clutch plate (the longest side of the hub facing backwards) together with the clutch and insert the centering mandrel SVO 2484 so that the guide journal on this centres the pilot bearing in the flywheel, see Fig. 4-10.
2. Place in the six bolts which hold the clutch and tighten them crosswise a couple of turns at a time. Remove the centering mandrel.
3. Fit the release yoke in the flywheel housing.
4. Place the upper bolt for the starter motor in the housing. Then fit the housing. Fit on the bolts in the following order: First the four upper (7/16"), and then the lower bolts for the starter motor, and finally the two lower (3/8"). The nut for the starter motor upper bolt is fitted after the clutch wire has been fitted.
5. Insert the wire sleeve in the bracket and put on the rear nut. Securely fix the wire in the release fork. Fit the release bearing.
6. Fit and tighten the nut for the upper starter motor bolt.
7. Fit the gearbox according to the instructions given in Group 43.
8. Adjust the clutch pedal play.

GROUP 43 A

GEARBOX

TOOLS

The following special tools are required for carrying out gearbox repairs.



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Fig. 4-11. Special tools

- SVO 1801 Standard handle 18×200 mm.
- SVO 2044 Fixture for gearbox when dismantling and assembling.
(used together with SVO 4109).
- SVO 2261 Puller for flanges.
- SVO 2302 Guide plug for thrust washer, used (two) together with
SVO 2303 when fitting idler gear.
- SVO 2303 Drift for fitting idler gear.
- SVO 2304 Press tool for fitting yoke (flange).
- SVO 2409 Counterhold for yoke (flange).
- SVO 2412 Fitting drift for bearing on input shaft, for bearing in
rear cover output shaft and for fitting input shaft
in housing.

- SVO 2413 Fitting drift for oil seal in rear cover.
- SVO 2427 Universal joint for SVO 2487.
- SVO 2487 3/8" hexagon socket spanner for upper gearbox bolts.
- SVO 2743 Dowels for gearbox.
- SVO 2867 Fitting drift for oil seal in cover for input shaft.
- SVO 2878 Puller for removing reverse shaft.
- SVO 4030 Puller for oil seal on (flange) yoke.
- SVO 4109 Stand for fixture SVO 2044.

The following tool is also used for removing the gearbox:

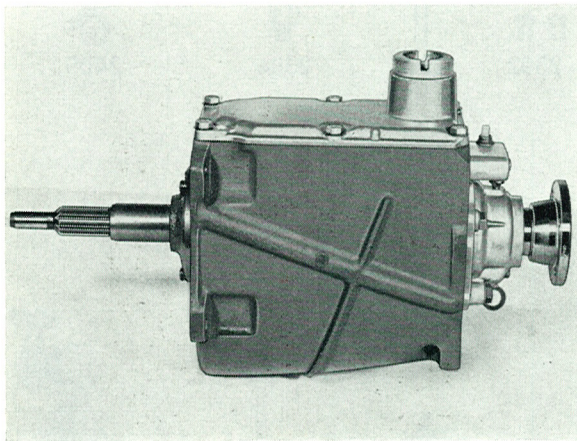
- SVO 2727 Engine suspension device.

DESCRIPTION

(Concerning gearbox with overdrive [M 41], see also Group 43 B "Overdrive")

M 40 is a four-speed fully synchronized gearbox. The fact that the gearbox is fully synchronized means that there is synchronization on all the forward gears. The construction of the gearbox is shown in Fig. 4-12 and Illustration 4-B. All gears with the exception of reverse are in constant mesh with one other. In the neutral position the gears on the mainshaft rotate freely. For this reason they are provided with bronze bushes. When engaging a gear, the corresponding gear wheel is connected to the mainshaft by means of an engaging sleeve.

The gear lever positions are shown in Fig. 4-13. The power transmission path of the different speeds is shown in Figs. 4-14—4-18.



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Fig. 4-12. Gearbox

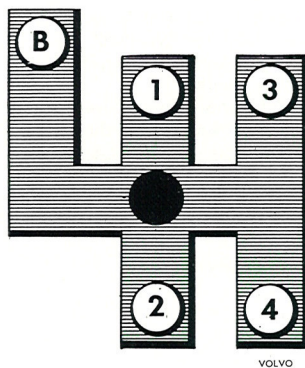
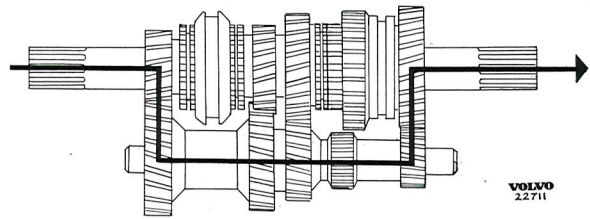
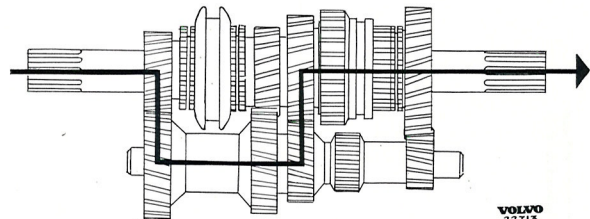


Fig. 4-13. Gear lever positions



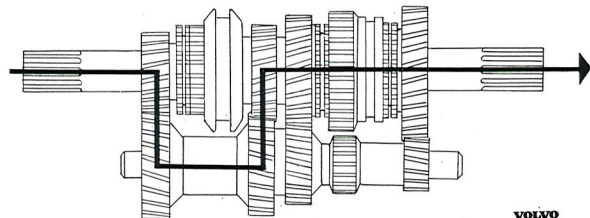
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Fig. 4-14. Power path 1st speed



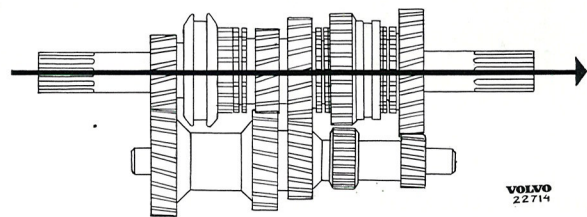
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Fig. 4-15. Power path 2nd speed



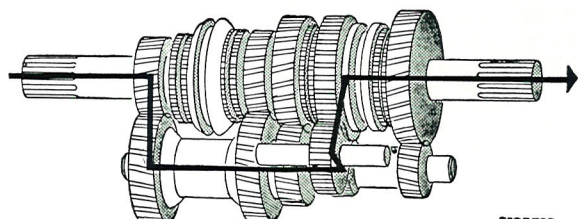
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Fig. 4-16. Power path 3rd speed



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Fig. 4-17. Power path 4th speed



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Fig. 4-18. Power path reverse gear

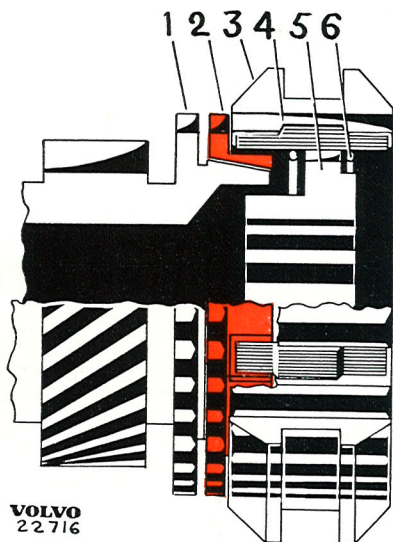


Fig. 4-19. Neutral position

- | | |
|-----------------------|----------------------|
| 1. Ring gear | 4. Engaging spring |
| 2. Synchronizing cone | 5. Synchronizing hub |
| 3. Engaging sleeve | 6. Spring |

The design and function of the synchronizing mechanism is shown in Figs. 4-19—4-21. When a gear is engaged, the gear selector fork presses the engaging sleeve (3, Fig. 4-19) towards the corresponding gear wheel. The engaging springs (4) then press the synchronizing cone (2) against the cone on the gear wheel (1). If the synchronizer and gear wheels are rotating at different speeds, the synchronizing cone will turn in relation to the engaging sleeve. However, the synchronizing cone is prevented from turning more than half a tooth-width by the engaging springs, see Fig. 4-20. The teeth on the synchronizing cone then have half their width in contact with the teeth on the engaging sleeve and in this way prevent it from engaging. Due to friction between the synchronizing cone and the gear wheel, the gear wheel attains the same rotational speed as the synchronizer. When they are both rotating at the same speed, the engaging sleeve is able to turn back the synchronizing cone and the gear engages, see Fig. 4-21.

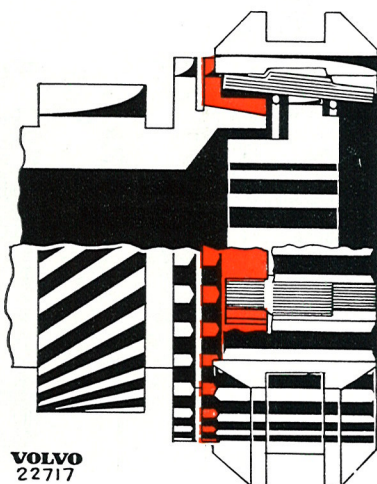


Fig. 4-20. Synchronizing

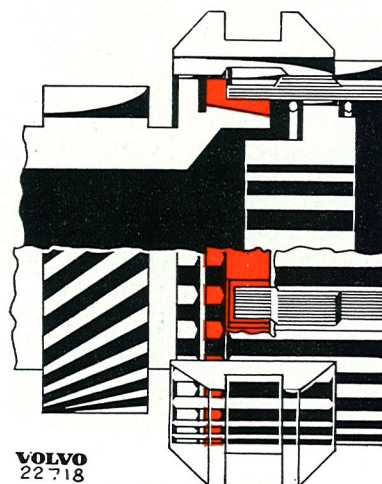


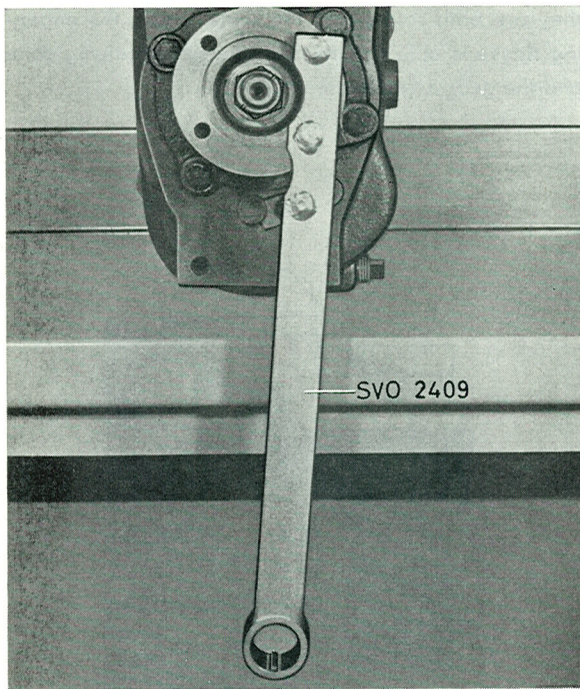
Fig. 4-21. Gear engaged

REPAIR INSTRUCTIONS

WORK WHICH CAN BE CARRIED OUT WITH THE GEARBOX INSTALLED IN THE VEHICLE

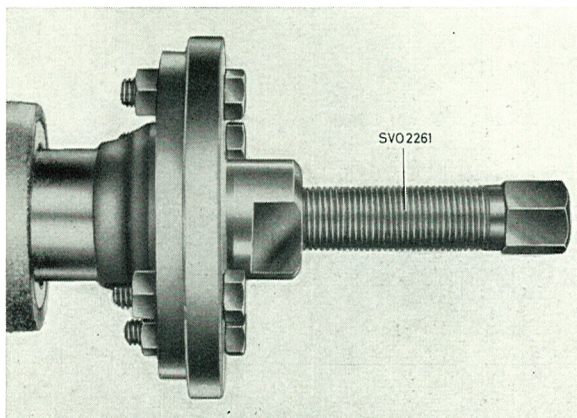
REPLACING THE OIL SEAL

1. Carry out operations 1—5 under the heading "Removing" as far as is necessary.
2. Slacken the yoke (flange) nut. USE SVO 2409 as a counterhold, see Fig. 4-22. Pull off the yoke (flange). Use puller SVO 2261, see Fig. 4-23.
3. Pull out the old oil seal with puller SVO 4030, see Fig. 4-24. Fit the new seal with the help of sleeve SVO 2413, see Fig. 4-25.



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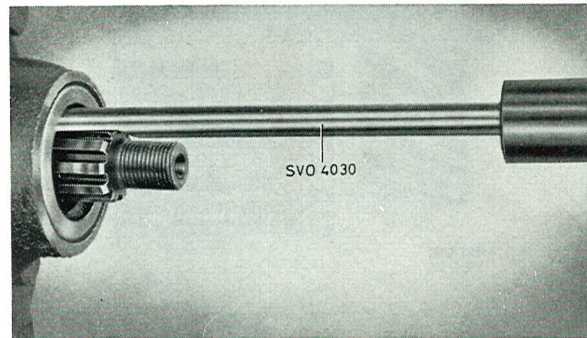
Fig. 4-22. Counterhold for yoke (flange)



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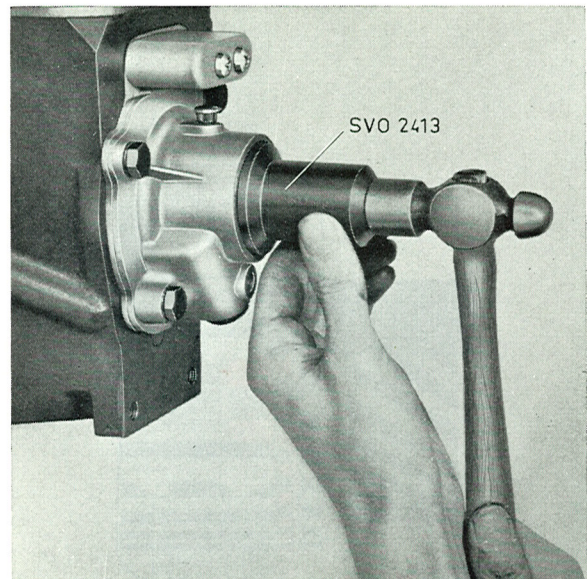
Fig. 4-23. Removing the yoke (flange)

4. Press on the yoke (flange) with tool SVO 2304, see Fig. 4-26. Fit the remaining parts.



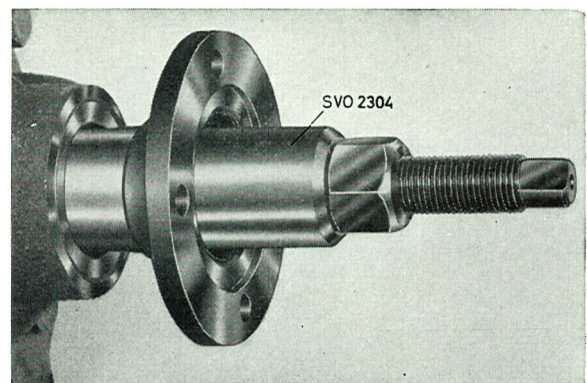
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Fig. 4-24. Removing the oil seal



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Fig. 4-25. Fitting the oil seal



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Fig. 4-26. Fitting the yoke (flange)

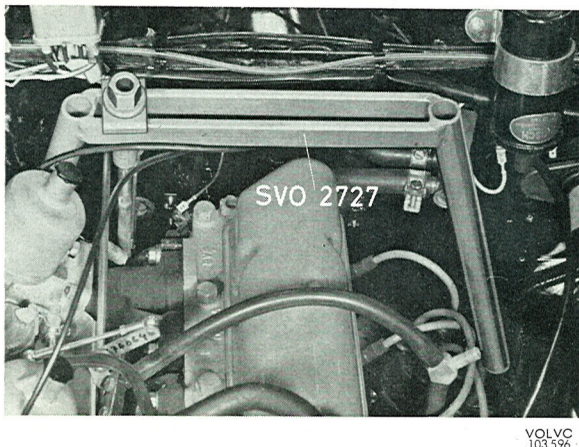


Fig. 4-27. Suspending the engine

REMOVING

1. Fix tool SVO 2727 on the engine, see Fig. 4-27. Place the lifting hook round the exhaust pipe.
2. Remove the rubber protector and gear lever.
3. Jack up the vehicle and place blocks underneath. Begin with the rear end. Drain the oil from the gearbox.
4. Loosen and remove the supporting member under the gearbox. Disconnect the front universal joint from the gearbox yoke (flange). Disconnect the speedometer cable. Disconnect the rear engine mounting and the bracket for the exhaust pipe.
5. Lower the rear end of the engine about 2 cm (0.8") and then slacken the lines for the reversing lights and overdrive, if fitted.
6. Slacken the right upper and left lower gearbox bolts with spanner SVO 2487, swivelling joint SVO 2427, extension piece with 3/8" square end and ratchet handle, see Fig. 4-28. Fit two guide pins SVO 2743, see Fig. 4-43. Slacken the other two bolts. Pull out the gearbox backwards and lower it.

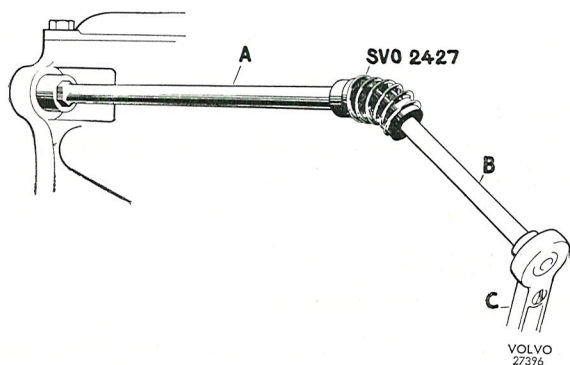


Fig. 4-28. Removing the gearbox bolts

- A = SVO 2487
B = Extension with 3/8" square
C = Ratchet handle

DISMANTLING

The following description applies to gearboxes without overdrive. If the gearbox is fitted with an overdrive, unscrew the bolts in the rear end and remove the overdrive. Then carry out the operations described below as far as necessary.

1. Secure stand SVO 4109 and fixture SVO 2044 in a vice. Place the gearbox in the fixture.
2. Unscrew the bolts for the gearbox cover. Lift off the cover. Remove the springs and interlock balls for the selector rails.
3. Remove the cover over the selector rails. Unscrew the selector fork bolts.
4. Slide the selector fork backwards to 1st speed position. Drive out the pin slightly (it must not foul the 1st speed gear wheel). Then move the selector fork forwards sufficiently to allow the pin to pass in front of the gear wheel. Drive out the pin.
5. Slide out the selector rails. When doing this, hold the selector forks so that they do not come askew and jam on the rails. Remove the selector forks.
6. Unscrew the bolts for the rear cover. Turn the cover so that it does not lock the shaft for the idler and reverse gears. Drive out the shaft for the idler gear. **N.B. The shaft must be driven out backwards.** Let the idler gear fall into the bottom of the gearbox.
7. Pull out the mainshaft.
8. Unscrew the bolts and remove the cover over the input shaft. Prise out the oil seal from the cover with a screwdriver or similar.
9. Drive out the input shaft. If necessary, remove the circlip and press the ball bearing off the shaft.
10. Take out the idler gear. Pull out the shaft for the reverse gear with puller SVO 2878, see Fig. 4-29. Take out the reverse gear and other parts.

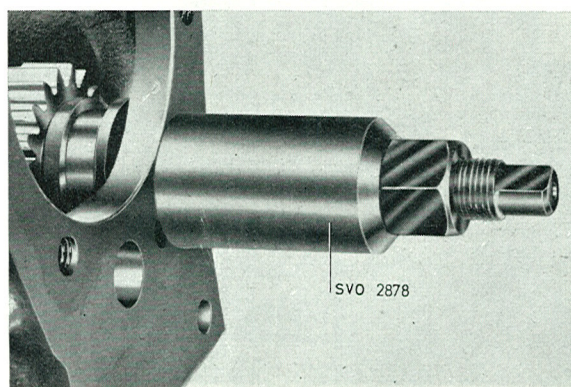


Fig. 4-29. Removing the reverse gear

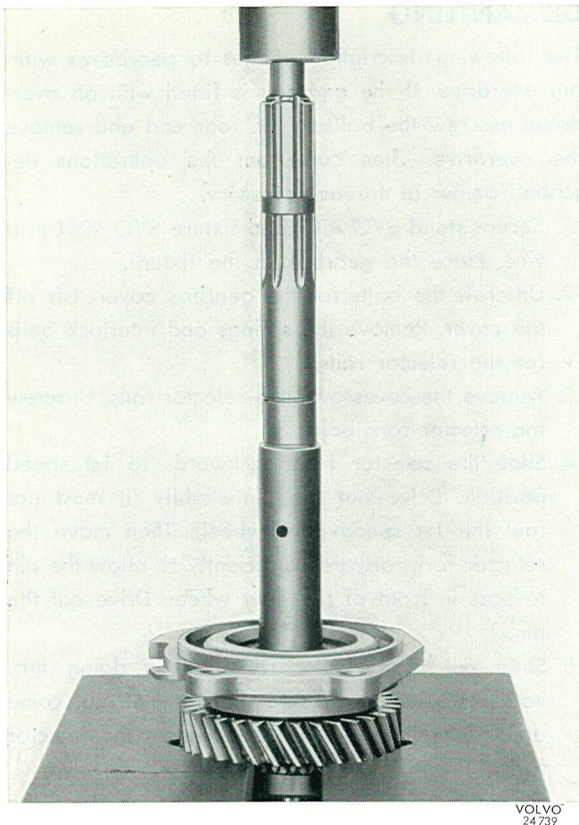


Fig. 4-30. Dismantling the mainshaft, M 41

DISMANTLING THE MAINSHAFT

1a. Gearbox with overdrive (M41):

Remove the circlip and press off the rotor for the overdrive oil pump. Remove the circlip for the

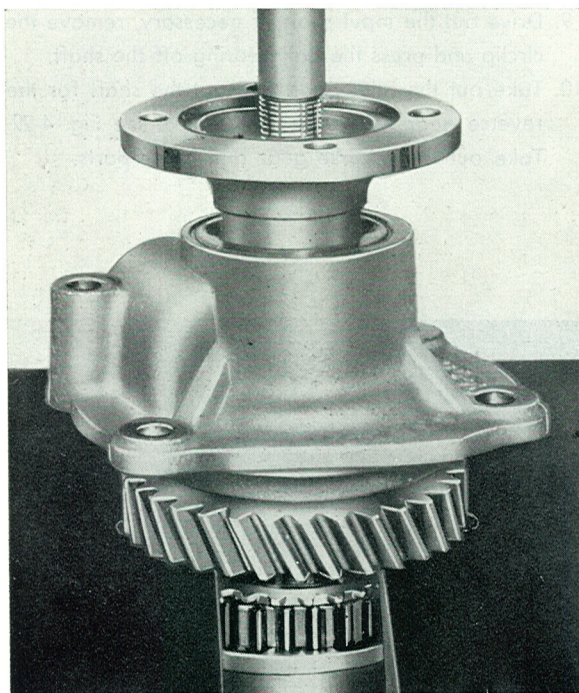


Fig. 4-31. Dismantling the mainshaft, M 40

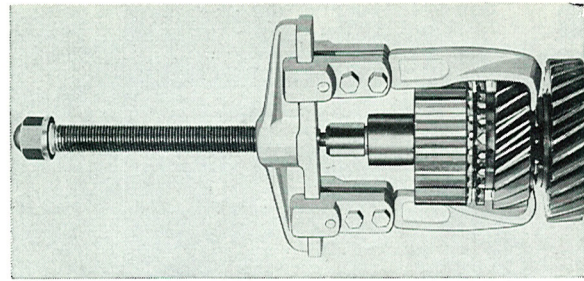


Fig. 4-32. Removing the front synchronizer

mainshaft rear bearing. Slide the engaging sleeve for 1st speed and 2nd speed forwards. Place the shaft in a press and a support under the 1st speed gear wheel. Press out the shaft as shown in Fig. 4-30.

1b. Gearbox without overdrive:

Unscrew the yoke (flange) nut. Use SVO 2409 as a counterhold on the yoke (flange). Slide the engaging sleeve for 1st speed and 2nd speed forwards. Place the shaft in a press and a support under the 1st speed gear wheel. Press out the shaft with a drift, see Fig. 4-31.

2. Remove the synchronizing cone, thrust washer, engaging sleeves, engaging springs, and snap springs from the shaft.
3. Remove the circlip on the front end of the shaft. Pull off the synchronizing hub and 3rd speed gear wheel with a puller, see Fig. 4-32. Remove the thrust washer.
4. Remove the circlip and then the thrust washer, 2nd speed gear wheel, synchronizing cone and spring.
5. Remove the oil seal from the rear cover and take out the speedometer gear. If necessary, remove the circlips and press out the ball bearing.

INSPECTING

Check the gear wheels, particularly for cracks or chips on the tooth surfaces. Damaged or worn gears must be replaced.

Check the ball bearings, particularly for scoring or cracks on the races or balls.

ASSEMBLING

ASSEMBLING THE MAINSHAFT

1. Press the ball bearing into the rear cover, see Fig. 4-33, and fit the circlip. There are different thicknesses of circlips, so select one which fits snugly into the groove.

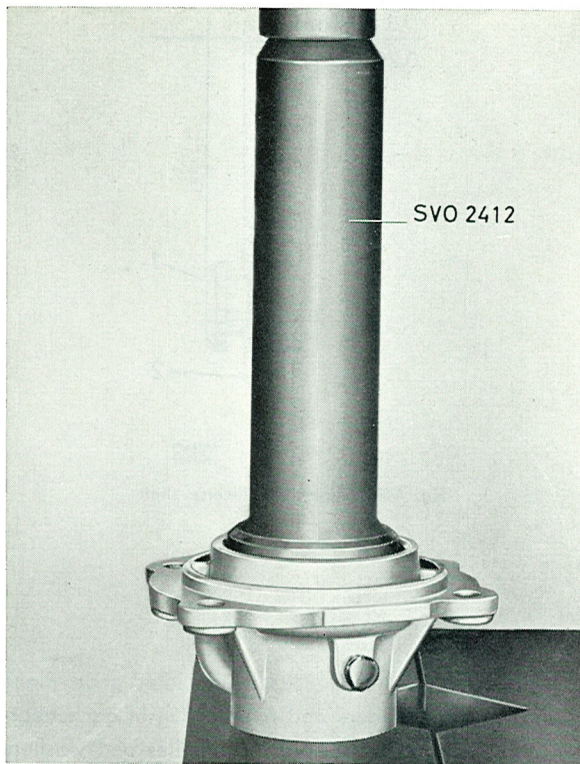


Fig. 4-33. Fitting the ball bearing in rear cover

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2. Gearbox without overdrive:
Place the speedometer gear on the bearing in the oil seal with drift SVO 2413, see Fig. 4-34.
3. Fit the parts for the 1st and 2nd synchronizer on the mainshaft. Fit the snap rings correctly, see Fig. 4-35.

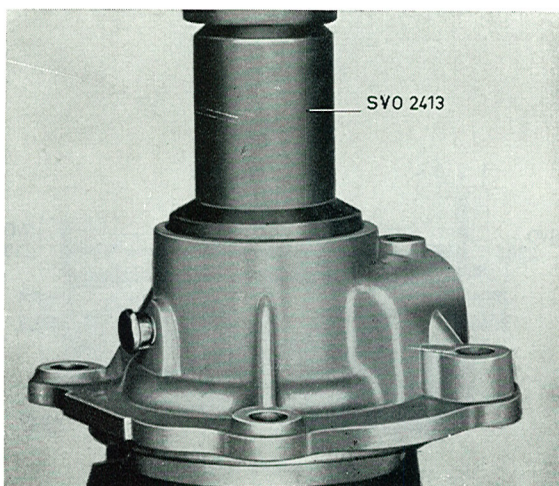


Fig. 4-34. Fitting the oil seal in rear cover

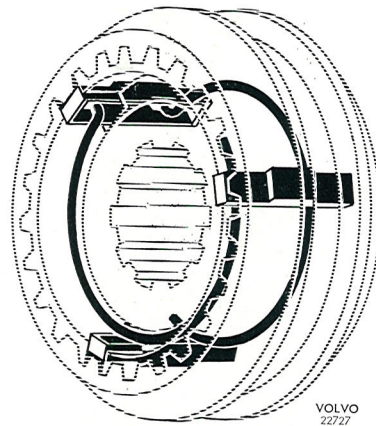


Fig. 4-35. Assembling the synchronizer

4a. Gearbox without overdrive:

Fit the synchronizing cone, 1st speed gear wheel and thrust washer. Place the rear cover on the shaft. Ensure that the speedometer gear is positioned correctly. Fit on the yoke (flange). Use a sleeve which fits into the recess in the yoke (flange), press on the cover and yoke (flange), see Fig. 4-36. Place on the washer and nut for the (flange) yoke. Use SVO 2409 as a counterhold on the yoke (flange) and tighten the nut.

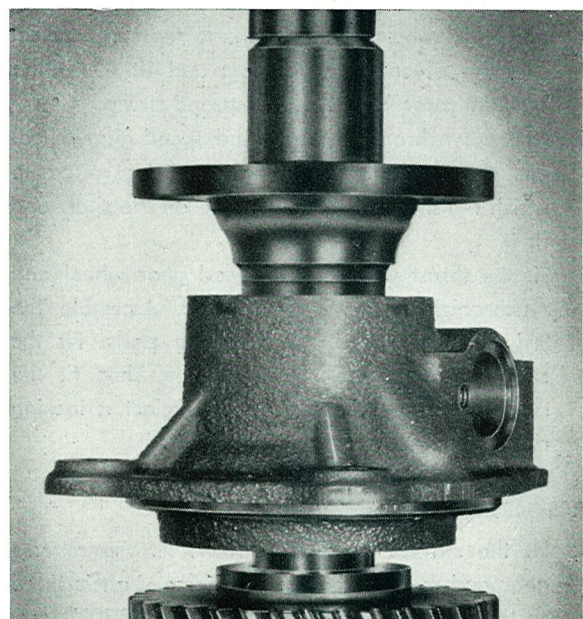


Fig. 4-36. Fitting the rear cover M 40

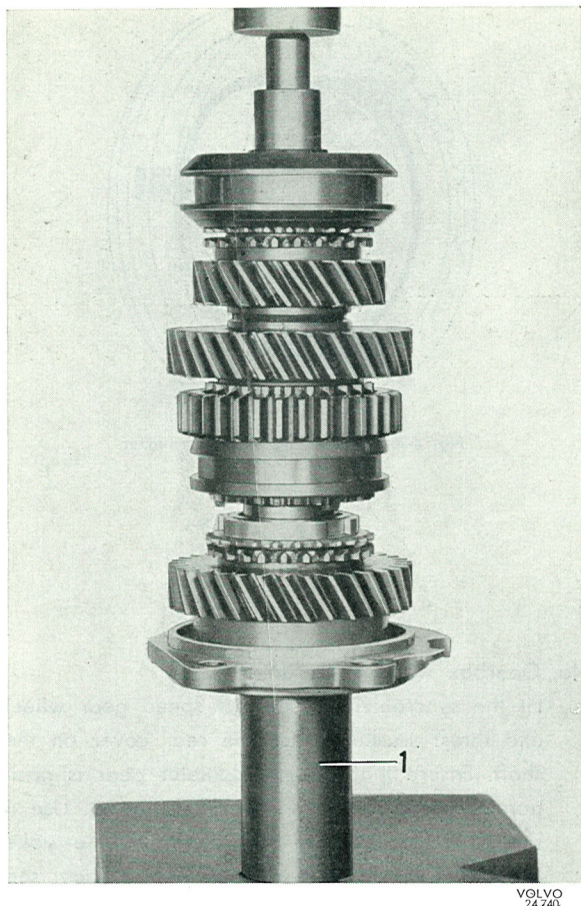


Fig. 4-37. Fitting the rear cover, M 41
1. Sleeve

4b. Gearbox with overdrive (M 41):

- Place the rear cover and ball bearing on a cushioning ring or sleeve as shown in Fig. 4-37. Place on the thrust washer, 1st speed gear wheel and synchronizing cone. Press in the shaft. Select a circlip of suitable thickness and fit it. Fit the key, the rotor for the oil pump and circlip.
5. Fit the synchronizing cone, 2nd speed gear wheel and thrust washer on the shaft. Select a circlip which fits snugly into the groove on the shaft and fit it.
6. Fit the thrust washer, 3rd speed gear wheel and synchronizing cone on the shaft. Assemble the 3rd and 4th speed synchronizing parts. Fit the snap rings correctly, see Fig. 4-35. Then fit the synchronizer on the main shaft. Select a locking ring of the correct thickness and fit it.

ASSEMBLING THE GEARBOX

1. Fit the striker lever and striker. Fit the reverse gear and reverse shaft. The reverse shaft is fitted so that it projects 7.0–7.6 mm (0.276–0.300") outside the gearbox housing, see Fig. 4-38.

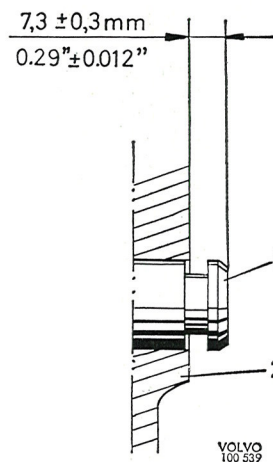


Fig. 4-38. Fitting the reverse shaft

2. Place mandrel SVO 2303 in the idler gear. Place in spacing washers and needles (24 in each bearing). Use grease to hold the needles and washers in position.
3. Fix the washers to the housing with grease and guide them up into position with the centering plugs SVO 2302, see Fig. 4-39. Lay the idler gear in the bottom of the housing.
4. Press the bearing onto the input shaft with the help of drift SVO 2412, see Fig. 4-40. Select a circlip of suitable thickness and fit it. Place the 14 bearing rollers for the mainshaft in position in the input shaft. Use grease to hold the rollers in place. Press the input shaft into position in the housing. Press the oil seal into the cover with drift SVO 2867.
5. Place the mainshaft in the housing. Turn the rear cover so that the countershaft can be fitted.

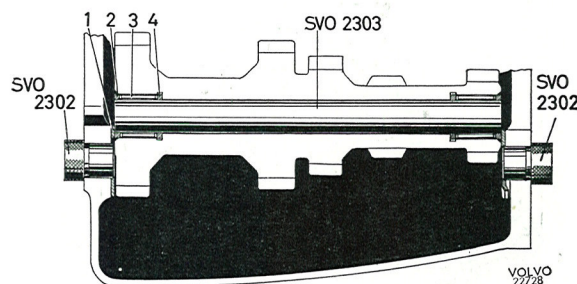


Fig. 4-39. Fitting idler gear

- | | |
|-------------------|-------------------|
| 1. Thrust washer | 3. Needle bearing |
| 2. Spacing washer | 4. Spacing washer |

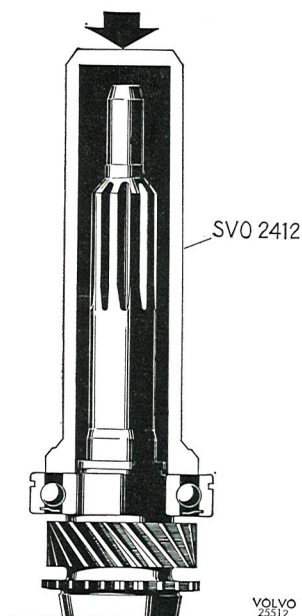


Fig. 4-40. Fitting ball bearing on input shaft

6. Turn the gearbox upside down. Fit the counter-shaft from the rear. Hold against SVO 2303 with the hand. Ensure that the thrust washers do not loosen and fall down.
- 7a. Gearboxes without overdrive:
Fit the bolts for the rear cover.
- 7b. Gearboxes with overdrive:
Fit the overdrive. Use new locking for the intermediate flange.

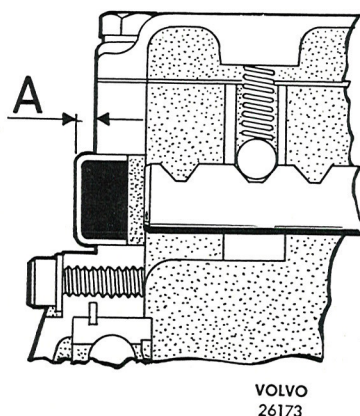


Fig. 4-41. Fitting end cap over selector rail

A = approx. 4 mm (0.16")

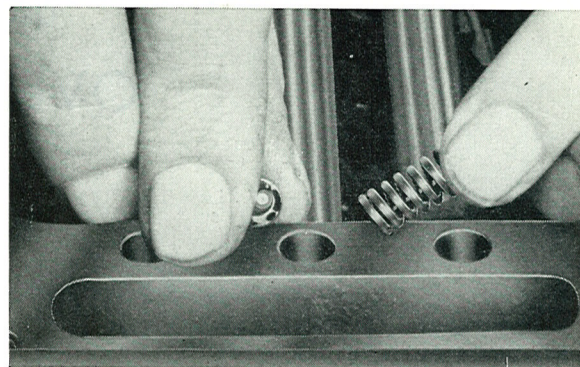


Fig. 4-42. Fitting interlock balls and springs

8. Fit the selector rails and forks. Move over the selector fork to the rear position when fitting the pin. Use a new pin. Fit the cover over the selector rails.
- N. B. If the end caps at the front end of the housing have been removed, these should be fitted in the same way as previously, i.e. the centre end cap should project about 4 mm (0.16") outside the face of the housing, see Fig. 4-41.
9. Place the interlock balls and springs in position, see Fig. 4-42. Fit on the gearbox cover. Check that all the gears engage and disengage freely.

FITTING

Make sure that guide pins SVO 2743 are fitted according to Fig. 4-43. Fitting is done in the reverse order to removing. Fill up the gearbox with oil.

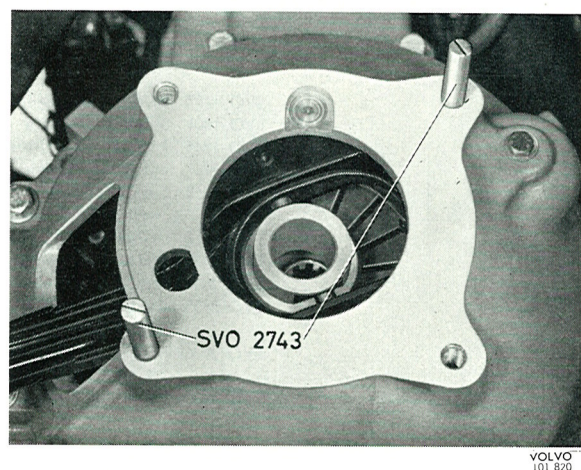


Fig. 4-43. Guide pins for gearbox

GROUP 43 B

OVERDRIVE

TOOLS

The following special tools are required for work on the overdrive unit

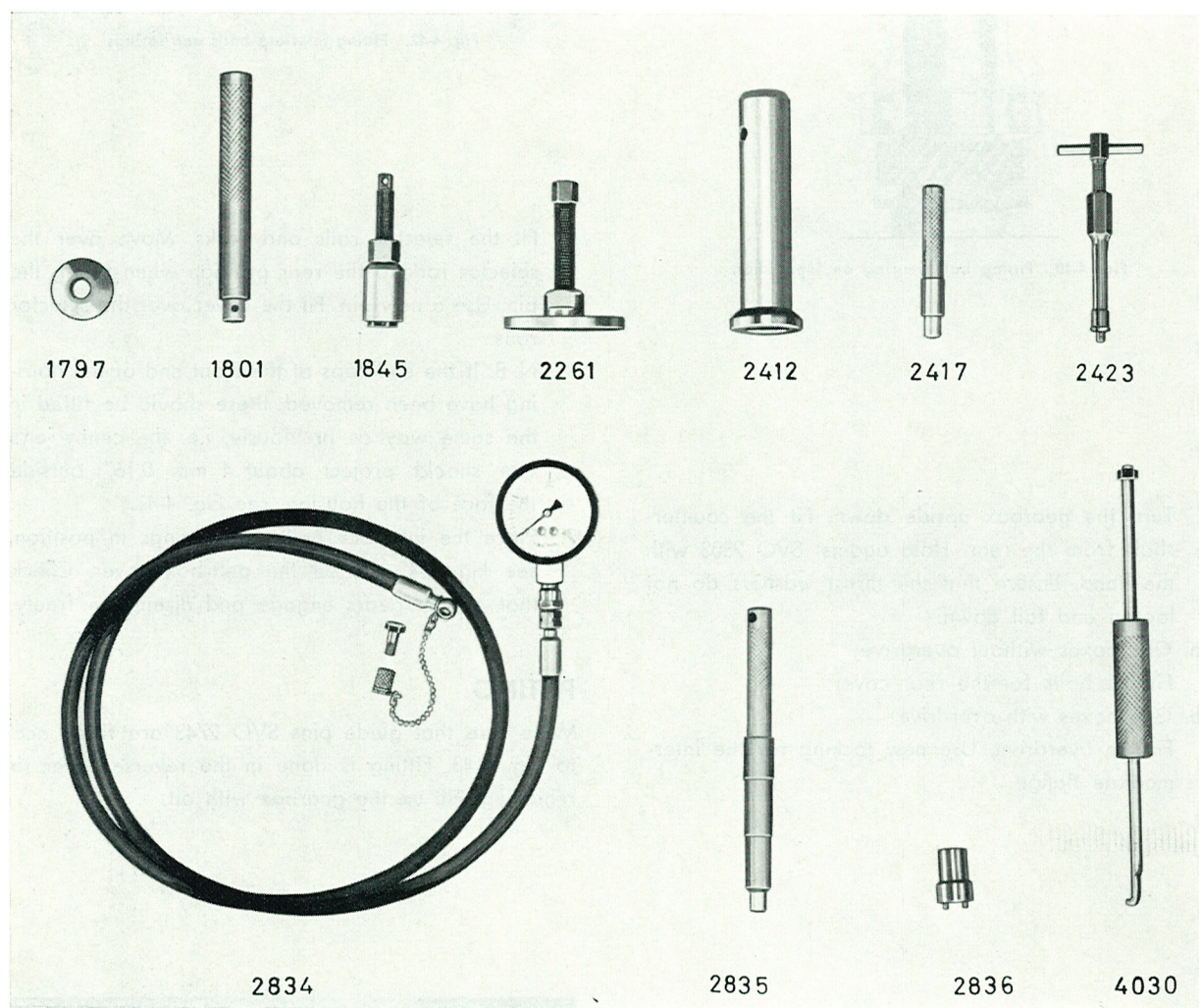


Fig. 4-44. Special tools

- SVO 1797 Drift for removing rear bearing shaft
- SVO 1801 Standard handle
- SVO 1845 Press tool for fitting flange
- SVO 2261 Puller for flange
- SVO 2412 Sleeve drift for fitting front rear bearing on output shaft and oil seal at flange
- SVO 2417 Drift for fitting bush in output shaft
- SVO 2423 Puller for bush in output shaft
- SVO 2834 Pressure gauge for checking oil pressure
- SVO 2835 Centering mandrel for splines in planet carrier and undirection clutch
- SVO 2836 Socket for removing and fitting plugs for fine filter oil pump and relief valve
- SVO 4030 Puller for oil seal at flange

VOLVO
103 262

DESCRIPTION

The overdrive unit is of the epicyclic type and is attached to the rear end of the gearbox. Its design and construction are shown in Fig 4-52 and Illustration 4-C. The working principle of the overdrive is as follows:

DIRECT DRIVE POSITION

When travelling forwards the power is transmitted from the gearbox mainshaft through the uni-directional clutch to the output shaft of the overdrive. At the same time the clutch sliding member (position I, Fig. 4-45, is pressed by four springs against the tapered part of the output shaft. When reversing or when the engine acts as a brake, the torque is transmitted through the clutch sliding member.

OVERDRIVE POSITION

In the overdrive position the clutch sliding member is pressed against the brake ring (see II, Fig. 4-45) with the help of the pistons (27, Fig. 4-52) in the hydraulic cylinders. This also locks the sunwheel. Since the planet gear retainers are linked to the mainshaft through the splines, the planet gears are forced to rotate around the sunwheel. As a result of this, the output shaft will rotate at a higher speed than the mainshaft.

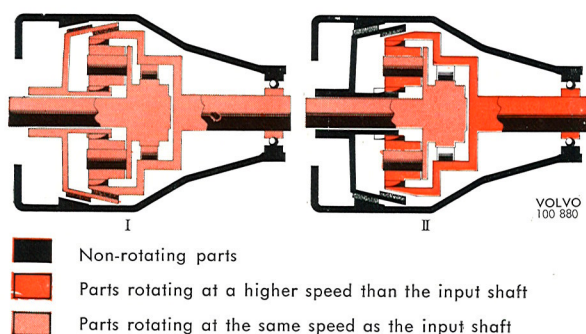


Fig. 4-45. Working principle of the overdrive

- I. Direct drive position
- II. Overdrive position

ELECTRICAL SYSTEM

The overdrive is engaged by electro-hydraulic means. On the gearbox cover there is a contact which cuts in when 4th speed is engaged. Thus the overdrive can only be engaged when this speed is engaged. It is switched on by means of a switch placed underneath the steering wheel. This switch closes the circuit via the switch on the gearbox to a solenoid on the overdrive. The solenoid armature is thus moved and this operates the control valve to the position for overdrive.

HYDRAULIC SYSTEM

The hydraulic system consists of the following main parts: Pre-filter, plunger pump, fine filter, hydraulic cylinders and plungers, relief valve and a control valve which is operated by the solenoid.

The relief valve has a special construction with an hydraulic piston and four different springs. It has three different functions: It must maintain a low pressure in the system with direct drive, a high pressure with overdrive, and also provide smooth changing when shifting from overdrive to direct drive and vice versa. Its function is described in more detail below.

The oil flow with direct drive is shown in Fig. 4-49.

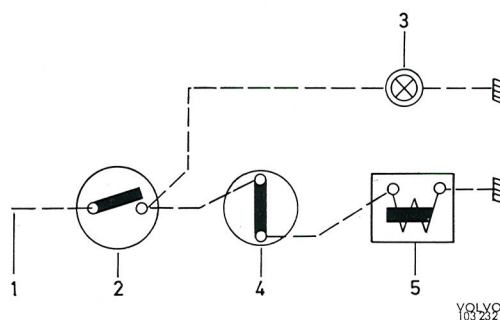


Fig. 4-46. Electrical circuit diagram

1. Lead from fusebox
2. Switch for overdrive
3. Indicator lamp for overdrive
4. Switch on gearbox
5. Solenoid on overdrive

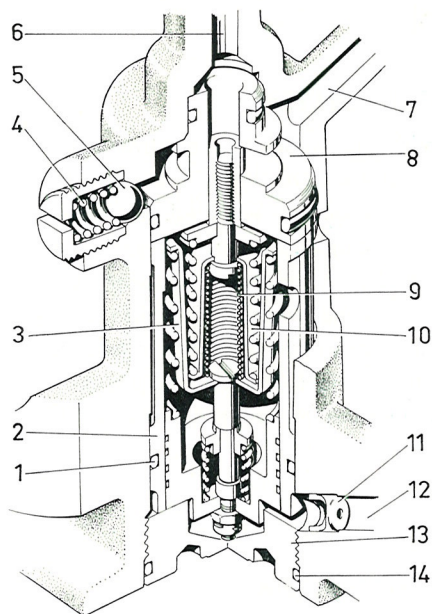
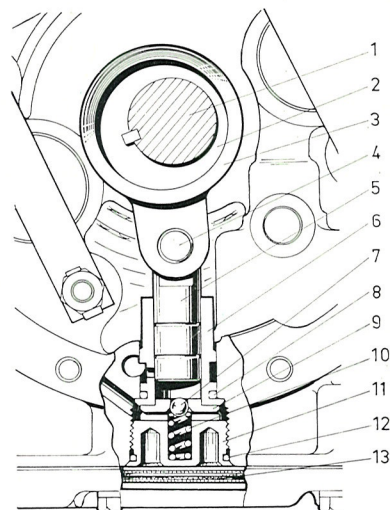


Fig. 4-47. Relief valve

- | | |
|-------------------------|--------------------------------|
| 1. O-ring | 8. End piece |
| 2. Cylinder | 9. Spring |
| 3. Large piston unit | 10. Small piston unit |
| 4. Spring | 11. Nozzle |
| 5. Valve ball | 12. Channel from control valve |
| 6. Channel for oil pump | 13. Plug |
| 7. Channel to mainshaft | 14. O-ring |

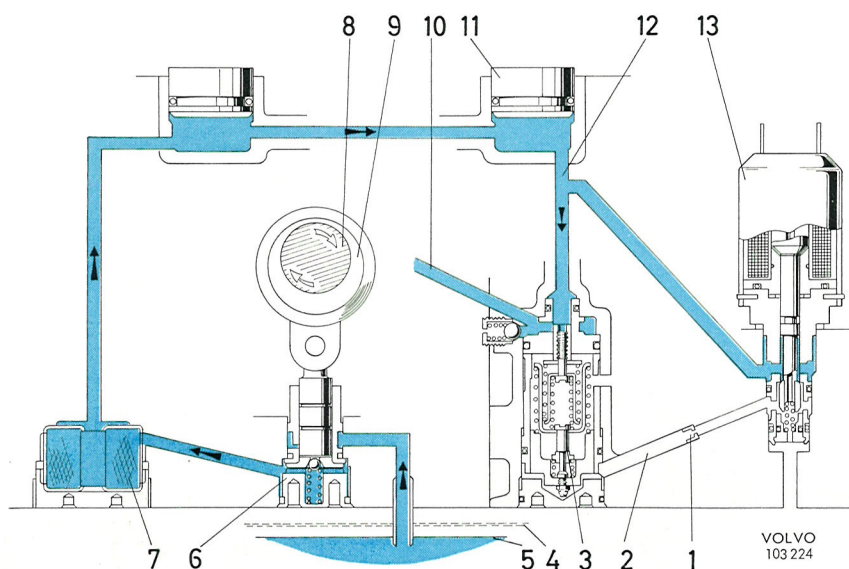
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Fig. 4-48. Oil pump

- | | |
|-------------------|----------------|
| 1. Mainshaft | 8. O-ring |
| 2. Eccentric | 9. Valve seat |
| 3. Connecting rod | 10. Spring |
| 4. Gudgeon pin | 11. Plug |
| 5. Piston | 12. O-ring |
| 6. Cylinder | 13. Pre-filter |
| 7. Ball | |



VOLVO
103 224

Fig. 4-49. Function with direct drive

- | | |
|--|--|
| 1. Nozzle | 8. Gearbox mainshaft |
| 2. Channel, control valve-relief valve | 9. Eccentric |
| 3. Relief valve | 10. Channel, relief valve — mainshaft |
| 4. Pre-filter | 11. Piston |
| 5. Oil-sump | 12. Channel, oil pump — hydraulic cylinder — control and relief valves |
| 6. Oil pump | 13. Control valve and solenoid |
| 7. Fine filter | |

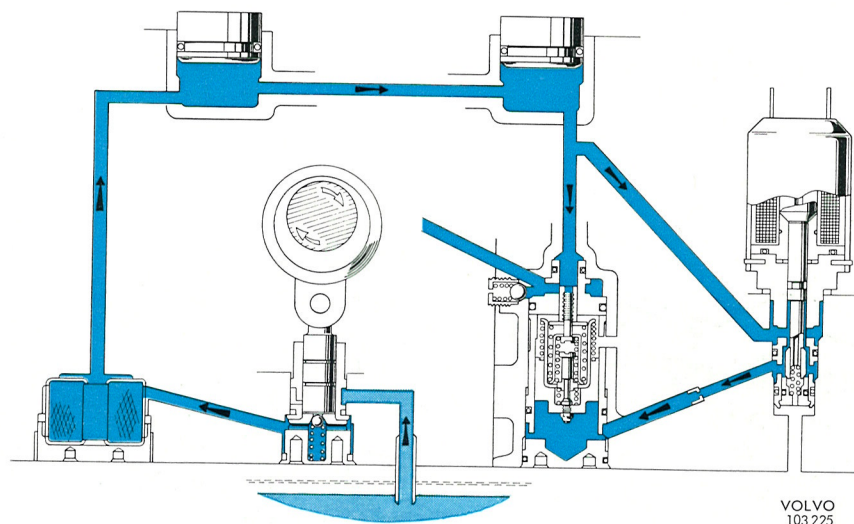


Fig. 4-50. Overdrive in function

The oil is drawn through the pre-filter by the plunger pump and is conveyed under pressure through the fine filter. From here the oil flows further through the hydraulic cylinders to the relief and control valves. The control valve is closed and the large piston of the relief valve is in its lower position. This off-loads the springs so that only a low pressure is required to press down the small piston of the relief valve. Oil then flows past the small piston out into the channel to the mainshaft.

When the overdrive is engaged, the control valve is displaced and oil flows through the oilway and operates the large piston of the relief valve. This is then moved upwards and causes the springs to tension. The more the springs tension the greater the force is required to press down the small piston, this causing the hydraulic pressure to rise. The pistons are thereby displaced in the hydraulic cylinders, the clutch sliding member is pulled forwards and contact made with the brake ring.

With disengagement of the overdrive, the connection between channels 12 and 2 is closed. Instead, the connection between channel 2 and the sump is opened. This permits oil under the large piston of the relief valve to flow out into the sump, the pressure in the system drops and direct drive is engaged. Because of the orifice nozzle in the channel and owing to a suitable balancing of the spring force, a certain time

passes for the piston of the relief valve to move from one outer position to the other. This time is so adapted that a smooth engagement occurs without any slipping of gears.

Oil passing the small piston of the relief valve is conveyed through the channel and a drilling in the mainshaft to the uni-directional clutch and the needle bearing shaft. Thereafter the oil is caught up by a plate and led via the planet gear back to the gear-box housing, see Fig. 4-51.

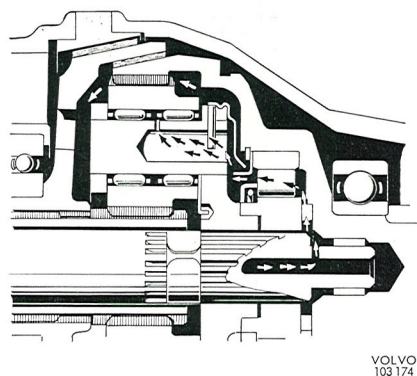
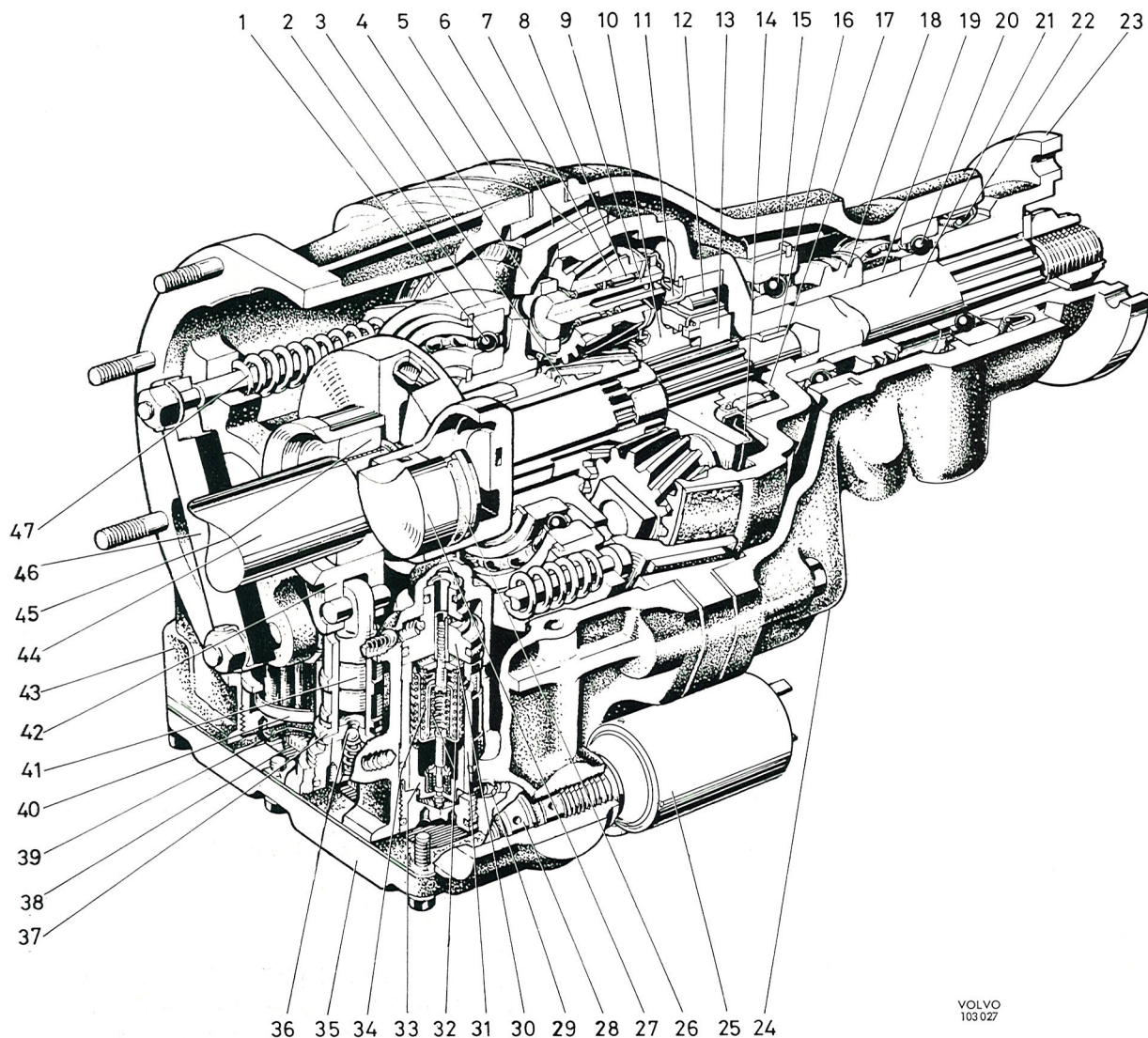


Fig. 4-51. Lubricating system



VOLVO
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Fig. 4-52. Overdrive

- | | | |
|------------------------------------|------------------------------|------------------------------|
| 1. Output shaft support bearing | 16. Bush | 32. Spring |
| 2. Thrust bearing retainer | 17. Thrust washer | 33. Large piston |
| 3. Sunwheel | 18. Speedometer driving gear | 34. Small piston |
| 4. Clutch sliding member | 19. Spacer | 35. Base plate |
| 5. Brake ring | 20. Ball bearing | 36. Check valve for oil pump |
| 6. Clutch member outer lining | 21. Output shaft | 37. Pump cylinder |
| 7. Planet gear | 22. Oil seal | 38. Magnet |
| 8. Needle bearing | 23. Coupling flange | 39. Pre-filter |
| 9. Shaft | 24. Rear casing | 40. Fine filter |
| 10. Planet carrier | 25. Solenoid | 41. Pump plunger |
| 11. Oil thrower | 26. Piston seal | 42. Connecting rod |
| 12. Uni-directional clutch rollers | 27. Piston | 43. Front casing |
| 13. Uni-directional clutch | 28. Operating valve | 44. Input shaft |
| 14. Oil trap | 29. Orifice nozzle | (gearbox mainshaft) |
| 15. Ball bearing | 30. Cylinder top | 45. Bridge piece |
| | 31. Cylinder | 47. Spring |

REPAIR INSTRUCTIONS

WORK WHICH CAN BE CARRIED OUT WITH THE OVERDRIVE INSTALLED

CHECKING THE OIL PRESSURE

The oil pressure can be suitably checked when driving on test rollers or on a motorway. The check can also be made with the vehicle jacked up but this should be avoided for reasons of safety.

Checking is as follows:

1. Remove the plug under the operating valve and connect the pressure gauge SVO 2834, see Fig. 4-53.
2. Read off the pressure when driving on direct drive at about 40 km.p.h. (25 m.p.h.). The pressure should then be about 1.5 kg/cm² (21 lb./sq.in.).
3. Engage the overdrive and check that the pressure rises to 32—35 kg/cm² (455—498 lb./sq.in.).
4. Disengage the overdrive and check the time for the pressure to drop to 1.5 kg/cm² (21 lb./sq.in.). The time must not exceed 3 seconds.

REPLACING THE SOLENOID AND OPERATING VALVE

The solenoid and operating valve are integrally built as one unit, which is replaced complete. For removing and fitting, use a 25 mm (1") fixed spanner. Use a new seal and O-rings when fitting. The tightening torque should be 4.2—5.5 kgm (30—40 lb.ft.).

CHECKING AND REPLACING THE RELIEF VALVE

1. Remove the base plate and the pre-filter. Collect the oil in an oil container. Warning. If the vehicle has been driven recently, the oil may be hot and cause damage if it comes into contact with your skin.
2. Remove the plug under the relief valve with tool SVO 2836, see Fig. 4-54. Pull out the large piston of the relief valve, then the spring and spring

retainer. Even the low-pressure spring will also be included in the removal. Then pull out the small piston with its spring and spring retainer, also the cylinder and end washer. Use a pair of pliers with narrow jaws for the piston unit and a loop, see Fig. 4-55, for the cylinder and washer.

3. Wash all the parts in white spirit and blow them dry with compressed air. Check them carefully for wear and damage. The pistons should run easily in their cylinders. Faulty parts must be replaced. N.B. The following units are available as spare parts: End washer, cylinder, the small piston, adjuster washer, low-pressure spring, large piston, plug and the O-rings.

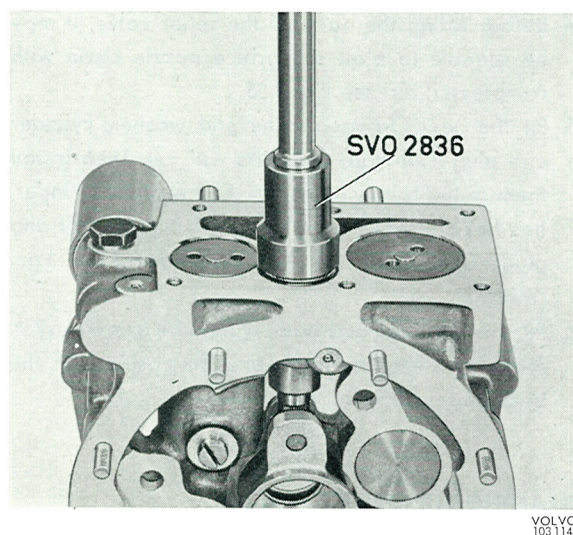


Fig. 4-54. Removing the plug

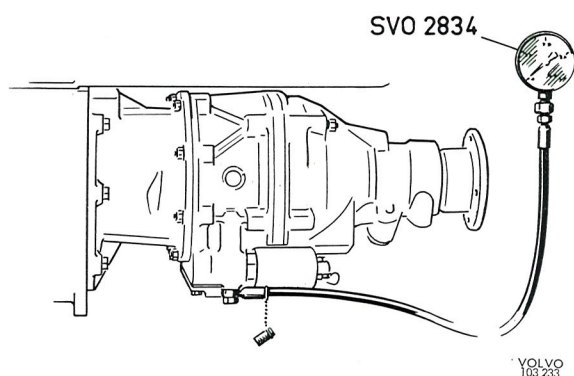


Fig. 4-53. Checking the oil pressure

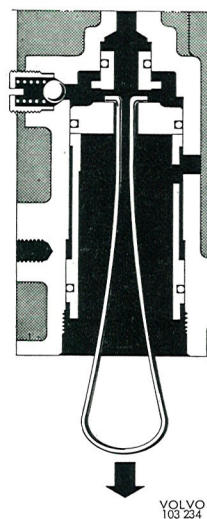
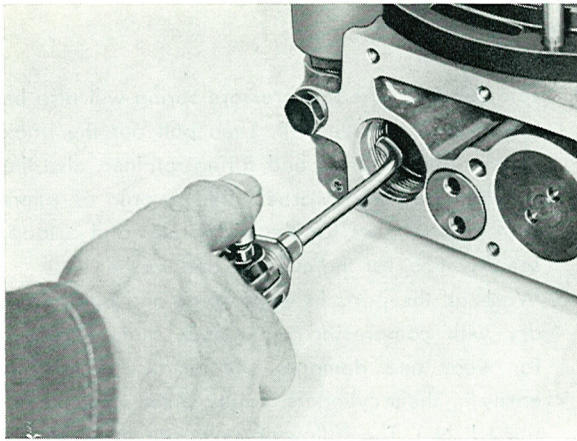


Fig. 4-55. Removing the relief valve



VOLVO
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Fig. 4-56. Blowing the orifice nozzle clean

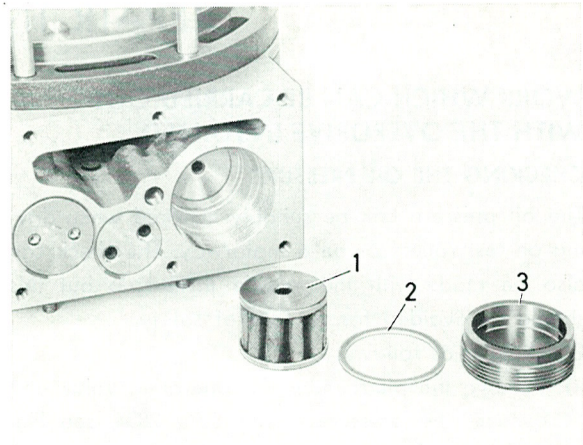
4. Before fitting the parts of the relief valve, it may be suitable to blow the orifice nozzle clean with compressed air, see Fig. 4-56.
5. Fit the new O-rings on the end washer, cylinder and plug. Lubricate the parts with oil. Then install them in the following order: End washer, cylinder, has been recently driven, the oil may be hot and plug. Tighten the plug to a torque of 2.2 kgm (16 lb.ft.).
6. Fit the pre-filter and base plate with a new gasket. Make sure that the magnet is in position on the base plate. Fill with oil.

CLEANING THE ORIFICE NOZZLE

The orifice nozzle is accessible after the cylinder of the relief valve has been removed according to above. Blow the orifice nozzle clean with compressed air, see Fig. 4-56.

CHECKING AND REPLACING THE CHECK VALVE

1. Remove the base plate and pre-filter. Collect the oil in an oil container. Warning. If the vehicle has been recently driven, the oil may be hot and cause damage if contact is made with your skin.
2. Remove the plug with tool SVO 2836. Take out the non-return valve spring, non-return ball and non-return body.
3. Clean all the parts in white spirit and blow them dry with compressed air. Check the parts for damage and wear. Replace faulty parts.
4. Fit a new O-ring on to the plug and then re-fit the non-return body, ball, spring and plug. Tighten the plug to a torque of 2.2 kgm (16 lb.ft.).



VOLVO
103 116

4-57. Fine filter

1. Filter 2. Seal 3. Plug

5. Re-fit the pre-filter and base plate together with a new gasket. Do not forget the magnet on the bottom plate. Fill with oil.

CLEANING THE FILTER

1. Remove the base plate and the pre-filter. Collect the oil in an oil container. Warning. If the vehicle has been recently driven, the oil may be hot and cause damage if contact is made with your skin.
2. Remove the plug and take out the seal and fine filter, see Fig. 4-57.
3. Clean all the parts in white spirit. Then blow them dry with compressed air.
4. Fit the fine filter, a new seal and the plug. Tighten the plug to a torque of 2.2 kgm (16 lb.ft.).
5. Re-fit the pre-filter and the base plate with a new gasket. Make sure that the magnet is in position on the base plate. Fill with oil.

REMOVING THE OVERDRIVE

To facilitate removal, the vehicle should first be driven with the overdrive engaged and then disengaged **with the clutch pedal depressed**. The last-mentioned is important in order to avoid torsional tensions in the shaft between the planet carrier and uni-directional clutch. Any stresses will disappear even if oil with pressure of 20—25 kg/cm² (284—335 lb./sq.in.) is connected to the output at the operating valve. The overdrive is engaged and disengaged with this pressure.

Removal is as follows:

1. Carry out operations 1—5 under "Removing" in Group 53a.
2. Disconnect the cables to the solenoid.

3. Unscrew the bolts holding the overdrive unit to the intermediate flange. Pull the overdrive straight out backwards until it goes free from the gear-box mainshaft.

DISMANTLING THE OVERDRIVE

Maximum cleanliness must be observed when working with the overdrive unit. Before the dismantling, clean the outside of the unit thoroughly. Then first dismantle the main parts as follows:

1. Place the overdrive vertically in a vice provided with copper jaws. Remove the solenoid and operating valve.
2. Bend down the locking tab, unscrew and remove the nuts for the piston bridge pieces. Remove the bridge pieces.
3. Unscrew the nuts holding the brake ring, front and rear casing. Loosen the nuts gradually all round in order to avoid any distortion from the springs. Lift off the front casing and brake ring, see Fig. 4-58.
4. Tap loose the brake ring from the front casing with the help of a copper drift and hammer.
5. Remove the springs for the clutch sliding member. Lift out the clutch sliding member complete with thrust bearing and sunwheel.
6. Lift out the planet gear carrier complete.

REMOVING THE FRONT CASING

1. Place the casing with the front side downwards on a bench. Connect compressed air to the hole for the operating valve and blow out the pistons.
2. Disconnect the base plate and remove the pre-filter. Then remove the plugs and take out the parts for the respective fine filter, relief valve and pump check valve. See also under the heading "Work which can be carried out with the overdrive installed".

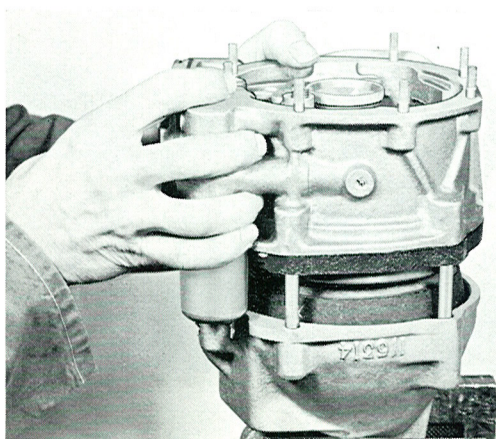


Fig. 4-58. Dismantling the overdrive

VOLVO
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3. Press down and pull out the pump cylinder. Then take out the connecting rod and pump plunger.

DISMANTLING THE CLUTCH UNIT

1. Remove the circlip for the sunwheel. Pull out the sunwheel backwards.
2. Remove the inner circlip for the bearing. Hold the bearing body and tap loose the clutch sliding member with a rubber mallet.
3. Remove the outer circlip and press the bearing out of the bearing housing.

DISMANTLING THE REAR CASING

1. Remove the bolt and pull out the retainer, the bush and the speedometer pinion.
2. Remove the nut and pull off the flange with puller SVO 2261. Place the housing in a press and press out the output shaft.
3. Remove the spacer, the speedometer driving gear. Pull out the bearing on the output shaft, suitably with a so-called knife extractor. The rear bearing and oil seal are pressed out of the housing with drift SVO 1797 and handle SVO 1801.
4. Remove the circlip and the oil thrower, which hold the uni-directional clutch on the output shaft. Lift out the uni-directional clutch components. Remove the thrust washer. If necessary pull the bush on the output shaft out with puller SVO 2423, see Fig. 4-59.

INSPECTING THE OVERDRIVE

Before inspecting, clean all the parts in white spirit and then blow them dry with compressed air. Pay particular attention to the cleaning of the filters and

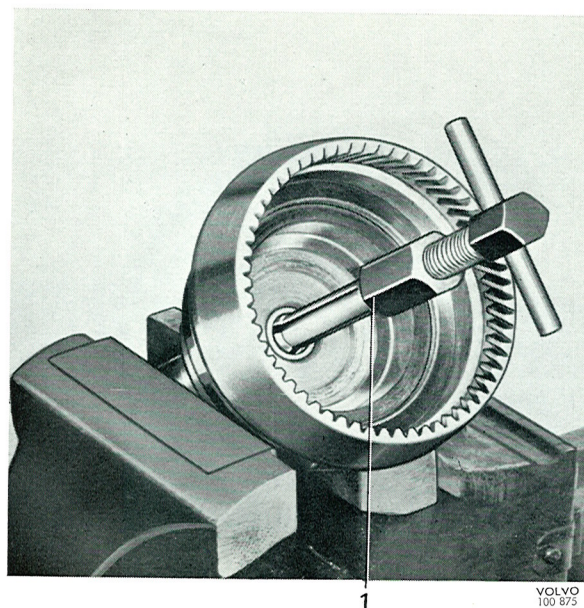


Fig. 4-59. Removing the bush, output shaft
1. Puller SVO 2423

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all the oilways. Check that the orifice nozzle in the channel between the relief and operating valves is clean. If it is not possible to blow the nozzle clean, it can be cleaned with a pointed wooden stick or suchlike. Hard objects must not be used since this can alter the graduation.

Check also that the groove inside the ring gear on the output shaft is properly cleaned. Dirt collects here due to the centrifugal force. After cleaning, check all the parts carefully for wear, cracks or other damage.

Pay particular attention to the following:

Check the solenoid with the help of a 12 volt battery and an ammeter. Current consumption should be about 2 ampères. Check the movement of the valve during engagement and disengagement.

Check to make sure that the filters are not damaged. Also check the pistons of the hydraulic system for abrasion and wear. Check the valves for wear. Make sure that all the springs are not damaged. Check all the gears and ball bearings for cracks and wear. Make sure that the bush on the sunwheel is not worn. With replacement, change the sunwheel complete with bush. The bush must be concentric with the gear wheel, and this is difficult to bring about outside a workshop.

Check the brake ring for abrasion, cracks or wear. Check to make sure that the linings on the clutch sliding member are not burnt or worn.

ASSEMBLING THE OVERDRIVE

Use new gaskets. O-rings, lock washer and seals when assembling. Observe maximum cleanliness since the hydraulic system is sensitive to impurities.

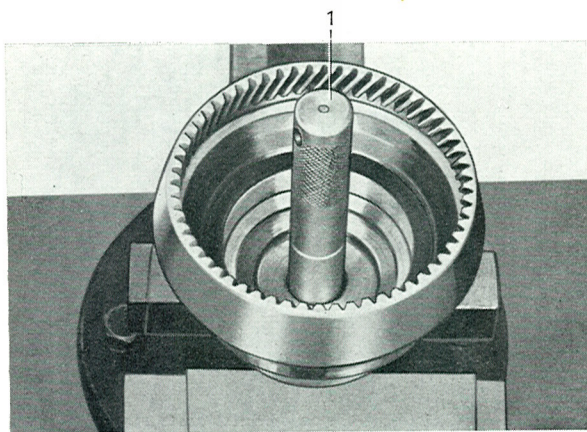


Fig. 4-60. Fitting the bush, output shaft
1. Drift SVO 2417

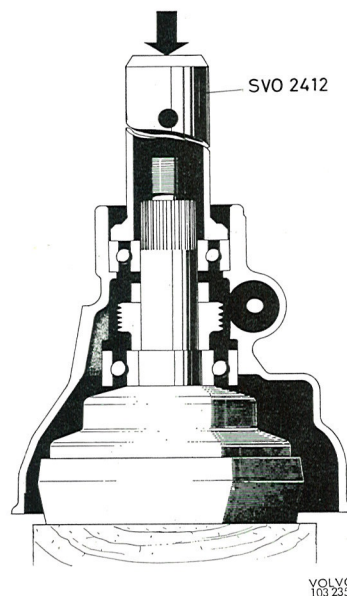


Fig. 4-61. Fitting the output shaft

ASSEMBLING THE REAR CASING

1. Push the bush on to the output shaft with drift SVO 2417, see Fig. 4-60. Press the front bearing to the output shaft with drift SVO 2412.
2. Press the rear bearing on to the rear casing section with drift SVO 2412.
3. Place a wooden block under the output as support. Fit the speedometer driving gear and spacer. Press on the rear casing with drift SVO 2412, see Fig. 4-61.
4. Press in the oil seal with drift SVO 2412. Fit the coupling flange, the washer and nut. Tighten the nut to a torque of 11—14 kgm (80—100 lb.ft.).

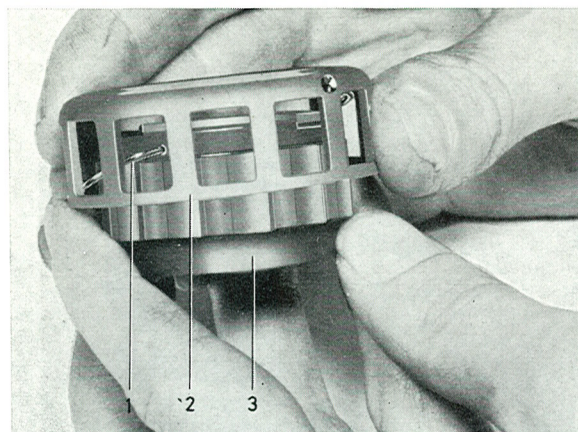


Fig. 4-62. Assembling the uni-directional clutch, I
1. Spring 2. Cage 3. Uni-directional clutch hub

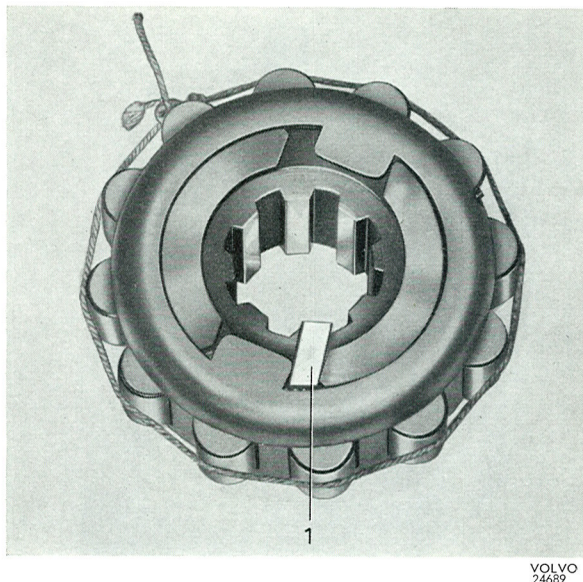


Fig. 4-63. Assembling the uni-directional clutch, II
1. Key

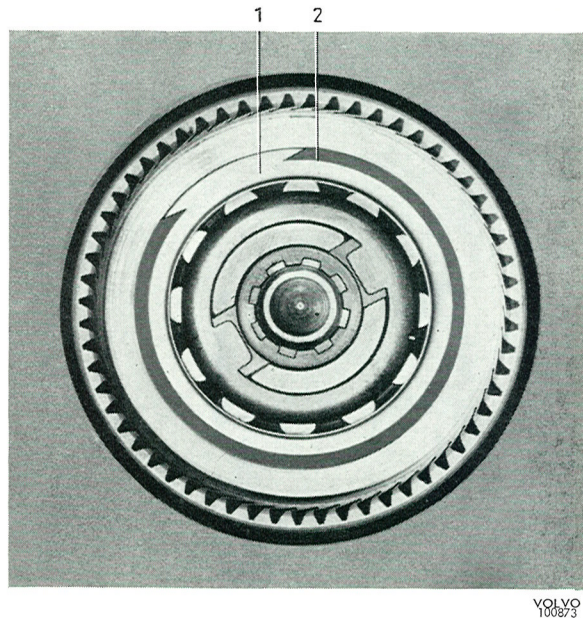


Fig. 4-65. Fitting the oil thrower
1. Oil thrower plate 2. Circlip

5. Assemble the uni-direction clutch, spring and roller cage, see Fig. 4-62. Turn the roller cage clockwise as far as it will go and lock it in this position with a key as shown in Fig. 4-63. Place in the rollers. Tie a piece of rubber band or string round the rollers.
6. Fit the thrust washer and then the uni-directional clutch in position on the output shaft, see Fig. 4-64. Fit the oil thrower and install the circlip, see Fig. 4-65.
7. Fit the speedometer pinion and bush. Fit the retainer and bolt.
8. Place the planet carrier complete with planet gear in position on the output shaft. Guide up the splines into the planet carrier and uni-directional clutch with drift SVO 2835, Fig. 4-66.

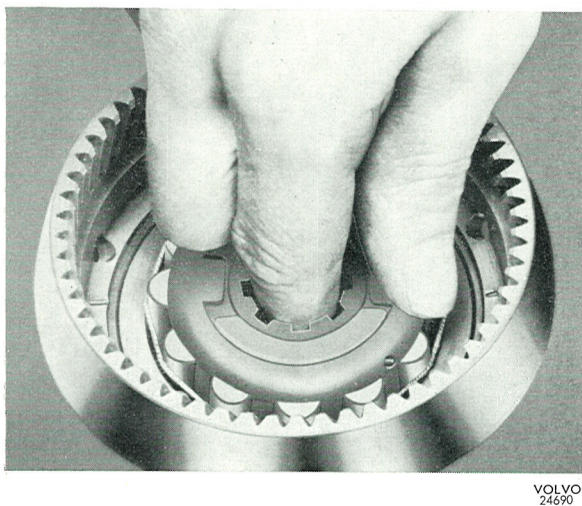


Fig. 4-64. Fitting the uni-directional clutch

ASSEMBLING THE CLUTCH UNIT

1. Press the ball bearing into the retainer and fit the circlip.
2. Fit the bolts on the bearing retainer. Then press the bearing with retainer on to the clutch sliding member. Fit the circlip.
3. Fit the sunwheel on to the clutch sliding member. Fit the circlip.
4. Install the clutch unit in position on the output shaft. Fit the four thrust springs on to the bolts.

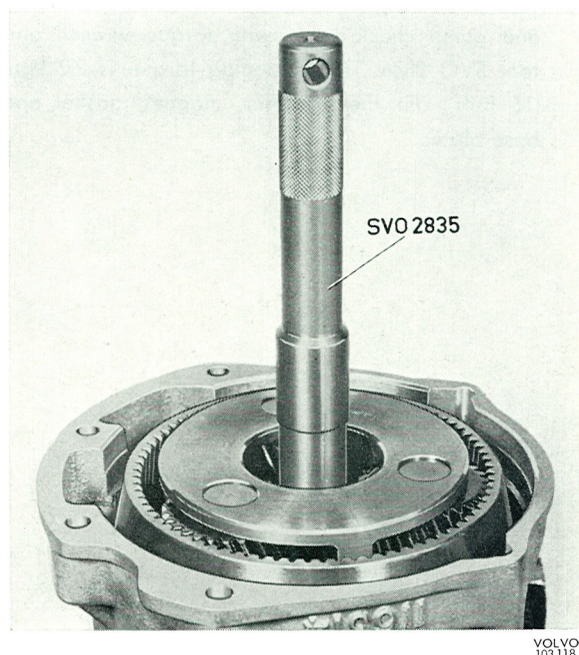


Fig. 4-66. Fitting the planet gear

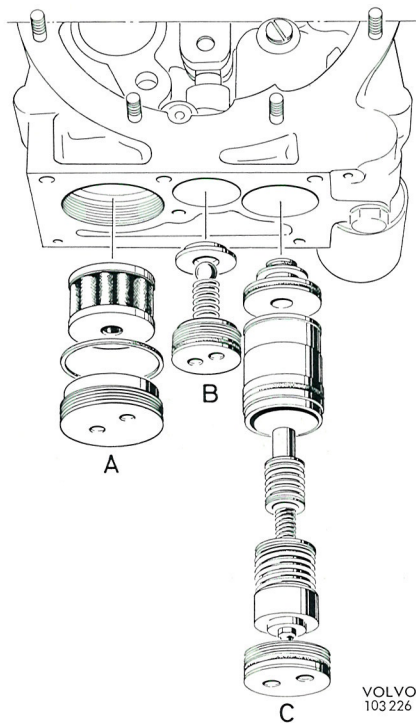


Fig. 4-67. Fitting the fine filter, oil pump check valve and relief valve

ASSEMBLING AND FITTING THE FRONT CASING

1. Fit the fine filter. Also fit the relief valve parts in the following order: End washer, cylinder, small piston, low-pressure spring, large piston and plug, see Fig. 4-67.
2. Place the connecting rod and pump plunger in position in the casing. Then push in the cylinder. After that the non-return body, non-return ball, spring and plug.
3. Tighten the plugs for the fine filter, relief valve and pump check valve with torque wrench and tool SVO 2836. The tightening torque is 2.2 kgm (16 lb.ft.). Fit the pre-filter, magnet, gasket and base plate.

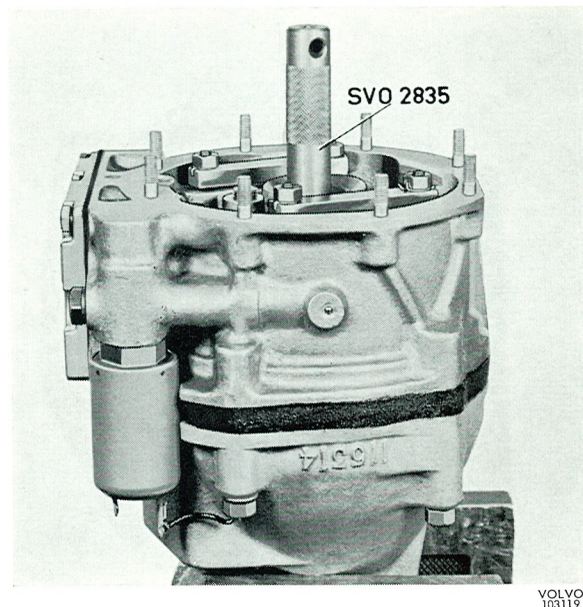


Fig. 4-68. Fitting the front casing

4. Fit the operating pistons in their cylinders.
5. Install the brake ring on the front casing. Place the front casing on the rear one. Fit washers and nuts, see Fig. 4-68. Note that both the copper washers should be fitted on the upper bolts. Tighten the bolts a little at a time until they are tightened evenly all round.
6. Fit both the thrust washers. Tighten and lock the nuts. Fit the operating valve and solenoid.

FITTING THE OVERDRIVE

Fitting the overdrive is in reverse order to removal. Fill with oil. Check the oil in the gearbox after the vehicle has been driven 10—15 km (6—9 miles).

PROPELLER SHAFT

DESCRIPTION

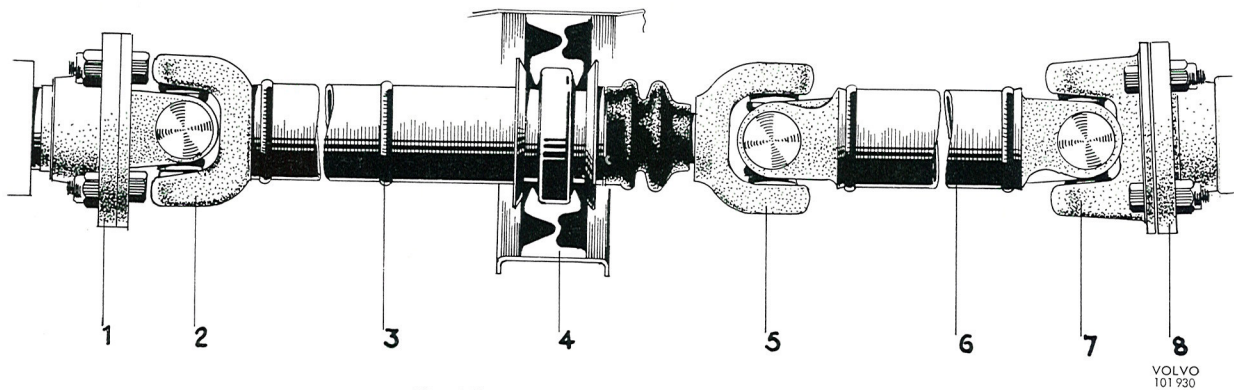


Fig. 4-69. Propeller shaft with support bearing

- | | |
|-------------------------------------|---------------------------------|
| 1. Flange on gearbox | 5. Intermediate universal joint |
| 2. Front universal joint | 6. Rear propeller shaft |
| 3. Front section of propeller shaft | 7. Rear universal joint |
| 4. Support bearing | 8. Flange on rear axle |

The propeller shaft is of the divided, tubular type, see Fig. 4-69. The rear end of the front section of the propeller shaft is in the form of a splined sleeve. In this there is a splined shaft which also forms one of the yokes on the intermediate universal joint. The rear end of the front section of the propeller shaft is carried in a ball bearing. The ball bearing is fitted

in a rubber bearing housing, which is attached to the propeller shaft tunnel with a cover, see Fig. 4-70. The propeller shaft is fitted with three universal joints. Each joint consists of a spider with four ground trunnions which are carried in flange yokes by means of needle bearings.

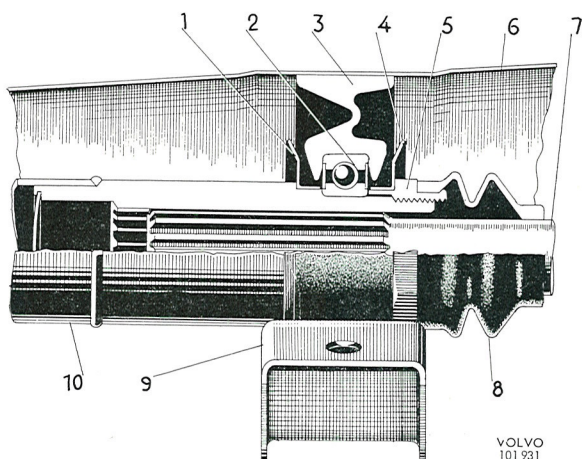


Fig. 4-70. Support bearing

- | | |
|-------------------|--------------------------------------|
| 1. Dust cover | 6. Floor tunnel |
| 2. Ball bearing | 7. Rear section of propeller shaft |
| 3. Rubber housing | 8. Rubber cover |
| 4. Dust cover | 9. Cover |
| 5. Nut | 10. Front section of propeller shaft |

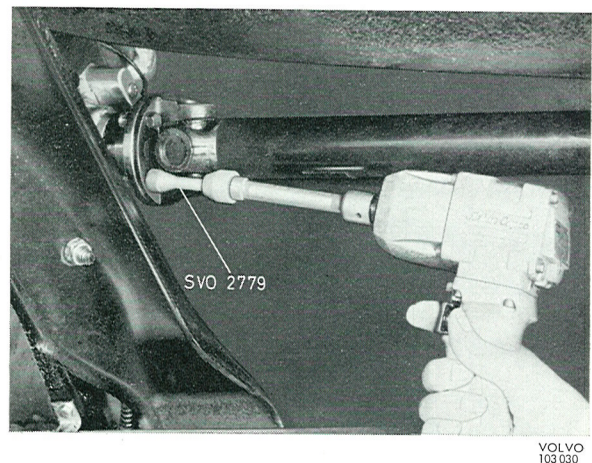


Fig. 4-71. Removing the bolts

REPAIR INSTRUCTIONS

REPLACING THE SUPPORT BEARING

1. Jack up the vehicle. Slacken the propeller shaft from the rear axle flange. Bend back the lock washer and unscrew the nut at the sliding joint. Pull out the propeller shaft to the rear.
2. Loosen the cover for the support bearing. Pull off the complete support bearing.
3. Press the old bearing out of the rubber housing. Fit in the new bearing.
4. Fit the support bearing and the other parts in the reverse order to removing. If the splined joint appears dry, lubricate it with grease mixed with molybdenum disulphide.

REMOVING

Jack up the car. Slacken the propeller shaft from the gearbox and rear axle flanges. The bolts can be loosened by an air impact wrench and special socket SVO 2779, see Fig. 4-71. Loosen the cover for the support bearing and take down the complete propeller shaft.

DISMANTLING

DISMANTLING THE PROPELLER SHAFT

1. Bend back the lock washer and unscrew the nut for the support bearing. Remove the rear section of the propeller shaft. Pull off the support bearing.
2. Take the support bearing out of the housing.

DISMANTLING THE UNIVERSAL JOINTS

1. Remove the snap rings which secure the needle bearings in the yokes, see Fig. 4-72.
2. Secure the shaft in a vice so that the universal joint comes as near as possible to the vice jaws. Remember that the propeller shaft is tubular and can easily be deformed.

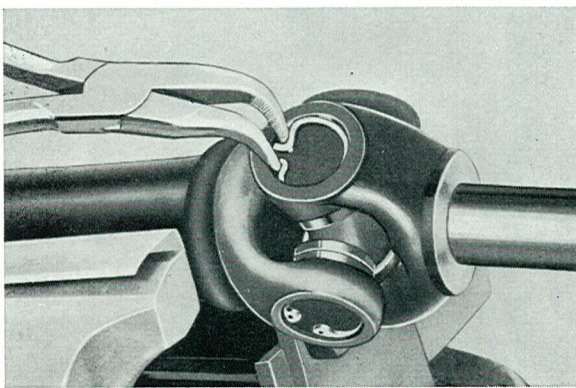


Fig. 4-72. Removing the snap ring

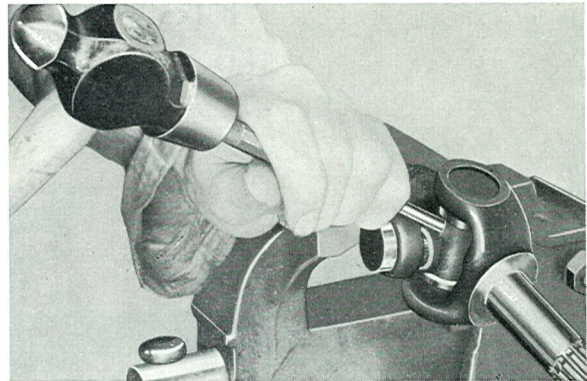


Fig. 4-73. Removing the spider, I

3. With a hammer and metal punch drive the spider as far as it will go in one direction. The needle bearing will then come about half way out.
4. Then drive the spider as far as it will go in the opposite direction, see Fig. 4-73.
5. Drive out one of the needle bearings with a thin metal punch. Remove the spider, see Fig. 4-74. Drive out the other needle bearing.

INSPECTING

It is extremely important to ensure that the propeller shaft is straight. Since even minor damage on a propeller shaft can cause vibration, inspection must be carried out very carefully. The shaft should be set up between centres and checked along its entire length with an indicator gauge while it is rotating. If it is out-of-true more than 0.25 mm (0.010"), the shaft must be replaced.

N.B. No attempt should be made to straighten a damaged propeller shaft — it should be replaced with a new one.

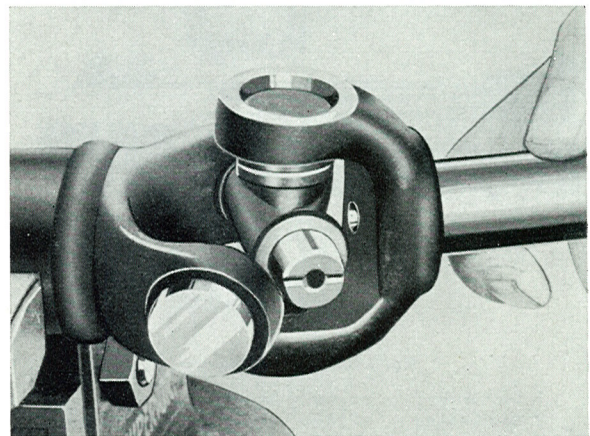


Fig. 4-74. Removing the spider, II

Examine the support bearing by pressing the bearing races against each other by hand and turning them in opposite directions. The bearing should run easily without binding at any point. If it does not, scrap the bearing and replace it with a new one. Check needle bearings and spiders. Worn or damaged parts should be replaced.

ASSEMBLING

ASSEMBLING THE UNIVERSAL JOINTS

1. During possibly the fitting of the old needle bearings, check that they are filled with grease and that the rubber seals are not damaged. New bearings should be half filled with grease.
2. Insert the spider in the flange yoke. Push over the spider in one direction so far that the needle bearing can be fitted onto the trunnion, see Fig. 4-75. Then press in the needle bearing so far that the snap ring can be fitted. Use a drift having a diameter slightly less than that of the needle bearing sleeve.
3. Fit the other needle bearing and snap ring in the

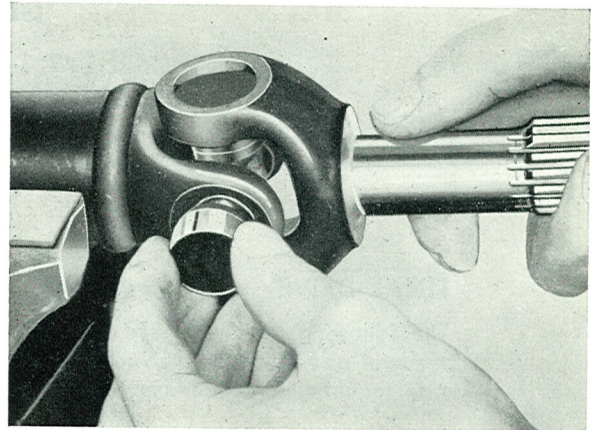


Fig. 4-75. Fitting the spider

same way. Also the fitting of the spider in the other yoke should be carried out in the same way as described in the previous paragraph.

INSTALLING

Installing is done in the reverse order to removing.

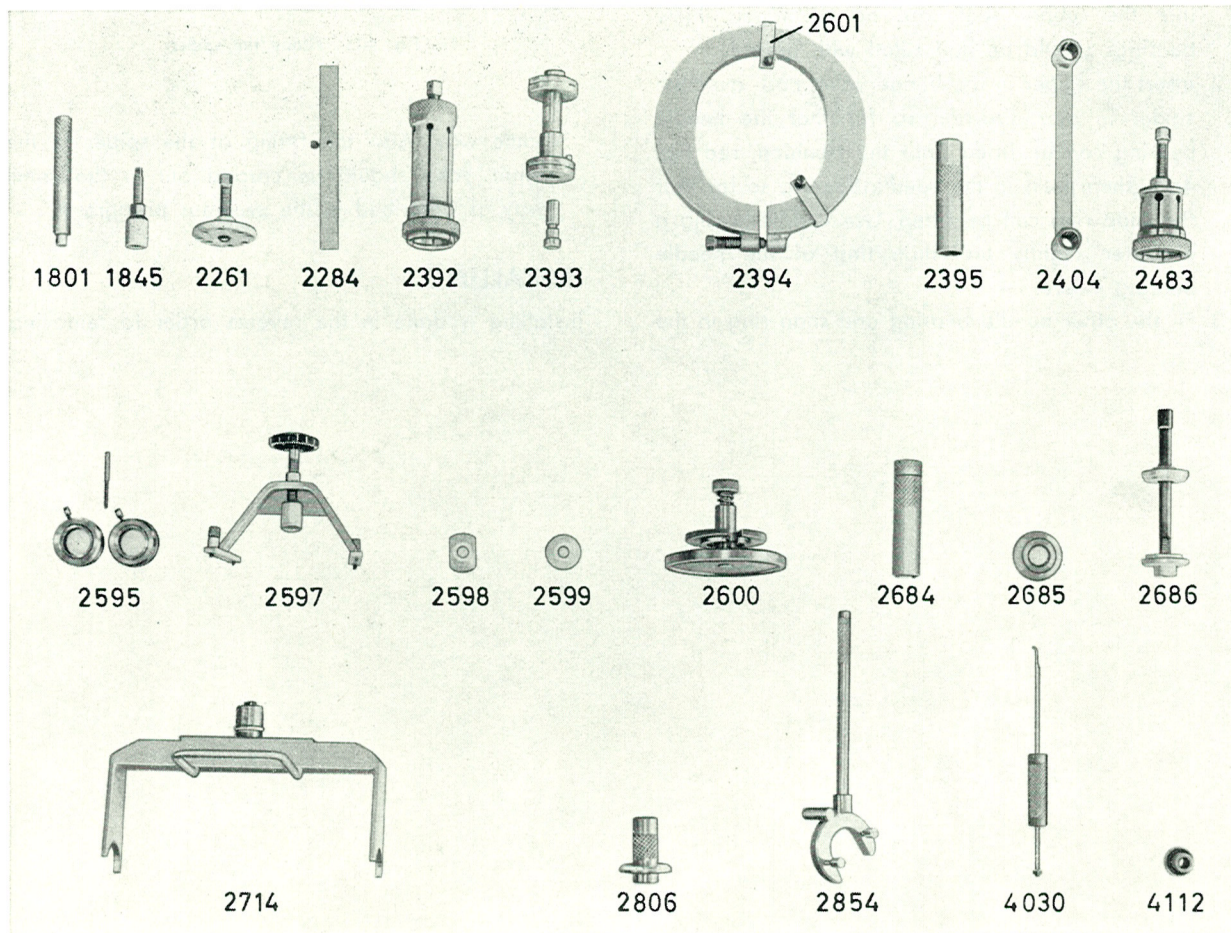
GROUP 46

REAR AXLE

TOOLS

FINAL DRIVE

The following tools are used for repair work and adjustment of the final drive. For removal and fitting of the brake drums and drive shafts a number of other tools are also required, see under the heading "Drive shaft".



VOLVO
103 892

Fig. 4-76. Special tools for rear axle

SVO 1801 Standard handle 18×200 mm
 SVO 1845 Press tool for fitting flange
 SVO 2261 Puller for flange
 SVO 2284 Retainer for dial indicator for final drive adjustment
 SVO 2392 Puller for rear pinion bearing
 SVO 2393 Measuring tool for adjustment of pinion
 SVO 2394 Expander tool used for removing and fitting differential
 SVO 2395 Sleeve for fitting inner ring rear pinion bearing
 SVO 2404 Tool for fitting front pinion bearing
 SVO 2483 Puller for differential carrier bearings
 SVO 2520 Stand (Fig. 4-77)
 SVO 2522 Fixture for rear axle (used together with stand SVO 2520 work on the final drive) (Fig. 4-77)
 SVO 2595 Adjusting rings for differential

SVO 2597 Brake for crown wheel, used when checking tooth contact
 SVO 2598 Drift for removing outer ring, rear pinion bearing
 SVO 2599 Drift for removing outer ring, front pinion bearing
 SVO 2600 Measuring fixture for adjusting rings
 SVO 2601 Holder for expander tool SVO 2394 (fitted on tool)
 SVO 2684 Spanner for adjusting ring SVO 2685
 SVO 2685 Adjusting ring for pinion
 SVO 2686 Press tool for fitting outer rings, pinion bearing
 SVO 2714 Fixture for rear axle, used on garage jack for removing and fitting rear axle
 SVO 2806 Tool for fitting oil seal at flange
 SVO 2854 Counterhold tool for flange
 SVO 4030 Puller for oil seal at flange
 SVO 4112 Drift for fitting differential carrier bearings

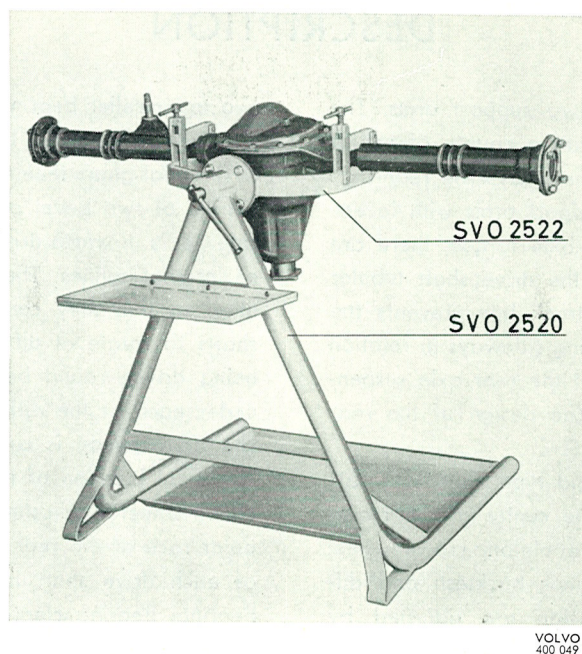


Fig. 4-77. Stand and fixture for rear axle

DRIVE SHAFT

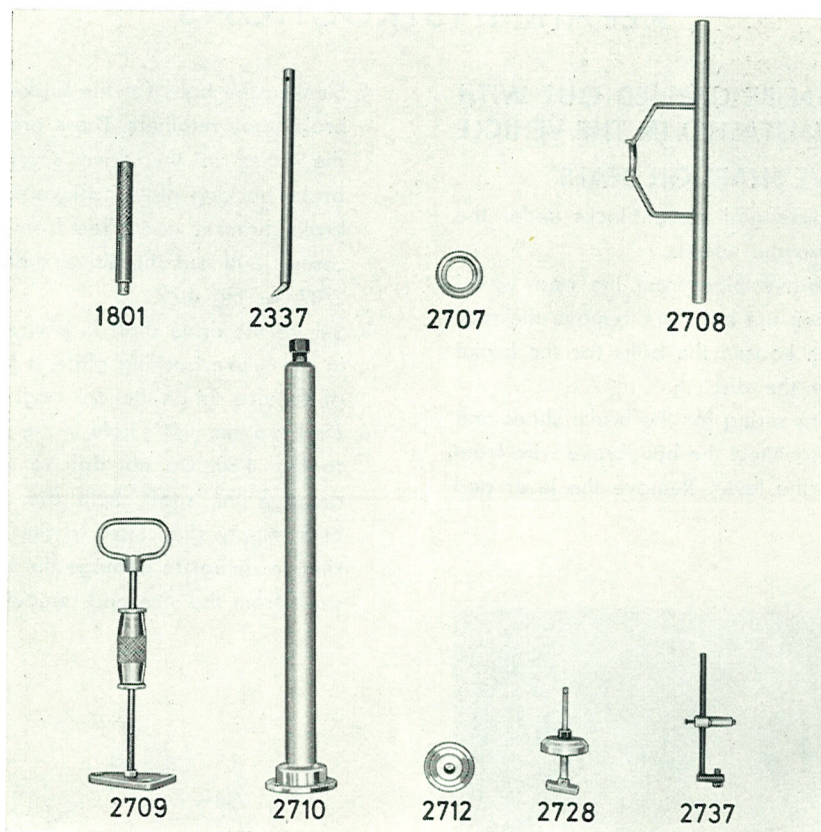


Fig. 4-78. Special tools for drive shaft

- | | | | |
|----------|---|----------|--|
| SVO 1801 | Standard handle 18×200 mm | SVO 2710 | Puller for drive shaft bearing |
| SVO 2337 | Drift for removing outer oil seal | SVO 2712 | Tool for fitting outer and inner oil seals |
| SVO 2707 | Cushioning ring for fitting bearing and stop ring | SVO 2728 | Puller for inner oil seal |
| SVO 2708 | Spanner for adjusting nut | SVO 2737 | Retainer for dial indicator |
| SVO 2709 | Puller for drive shaft | | |

DESCRIPTION

The rear axle is carried in two support arms. The support arms are provided with a couple of robust bushes and are attached to the body. The rear axle housing is attached to the support arms with levers. In order to take up the rear axle torque, there are two torque rods attached to the drive shaft tubular covers and to the body. A track bar prevents the body and rear axle from moving sideways in relation to each other. The principle of the rear axle suspension is shown in Fig. 4-123. The design of the rear axle is shown in Illustration 4 D.

The final drive is of the hypoid type, that is to say, the drive pinion lies below the centre of the crown wheel. It consists of the drive pinion, crown wheel and differential gears. The gear backlash and differential carrier bearing tension are adjusted by means of shims inside the differential carrier bearings.

The differential carrier and the crown wheel are journalled in the final drive housing by means of

two taper roller bearings. The crown wheel is attached to the differential carrier by means of bolts. The differential gears themselves in the differential carrier consist of two bevel pinions on a trunnion and two side gears in which drive shafts are carried by means of internal splines. The differential gears are journalled so that they can rotate and permit the drive shafts to rotate at different speeds when the car is being driven round bends. There is a thrust washer under each of the differential gears.

The drive pinion is carried in taper roller bearings. The axial location of the drive pinion relative to the crown wheel is adjusted by means of shims under the outer race of the rear pinion bearing. The outer end of each drive shaft is journalled in a taper roller bearing. Bearing clearance is adjusted by means of an adjusting nut at the left-hand side.

There are oil seals on both sides of the drive shaft bearings.

REPAIR INSTRUCTIONS

WORK THAT CAN BE CARRIED OUT WITH THE REAR AXLE INSTALLED IN THE VEHICLE

REPLACING DRIVE SHAFT OIL SEALS

1. Jack up the vehicle and place blocks under the rear axle. Remove the wheel.
2. Disconnect the brake pipe from the rear wheel brake unit. Slacken the bolts and remove the rear wheel brake unit. Loosen the bolts for the brake disc and remove the disc.
3. Remove the return spring for the brake shoes and remove them. Disconnect the handbrake wire from the bracket and the lever. Remove the lever and wire.

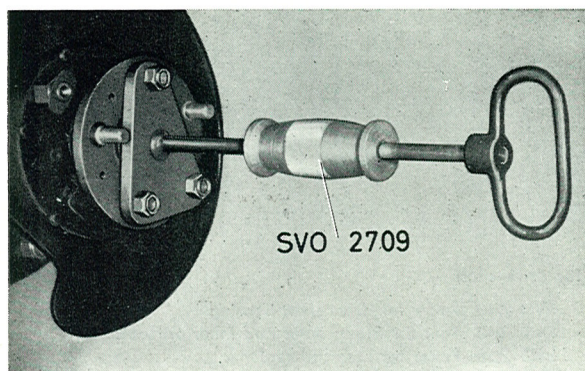


Fig. 79. Removing the drive shaft

4. Slacken the bolts for the brake backing plate and brake shoe retainers. These are slackened through the holes in the drive shaft flange. Turn the brake backing plate backwards so that the handbrake bracket goes free from the flange on the casing. Pull out the drive shaft with puller SVO 2709, see Fig. 4-79.
5. Secure the drive shaft in a vice so that the recess in the brake backing plate is facing the rear jaw of the vice. Fit on the lock ring.
6. Drill a 6 mm (1/4") hole in the lock ring according to Fig. 4-80. Do not drill to such a depth as to damage the shaft. Split the ring with a chisel. N. B. Apply the chisel to the outer edge of the ring so as not to damage the bearing. Loosen the shaft from the vice and remove the lock ring.

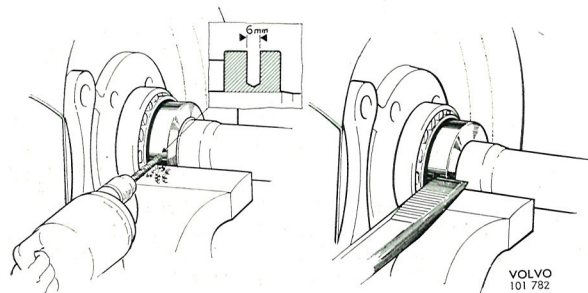


Fig. 4-80. Removing the lock ring

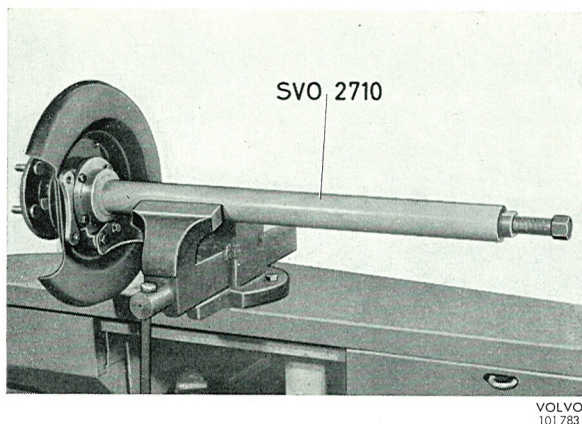


Fig. 4-81. Removing the drive shaft bearing

7. Place tool SVO 2710 in the vice. Insert the drive shaft and fit the attaching bolts for the brake backing plate and brake shoe retainers. With the puller, pull loose the bearing, see Fig. 4-81. Then remove the brake backing plate and brake shoe retainers.
8. Place tool SVO 2707 under the brake shoe retainer and drive out the oil seal with tool SVO 2337.
9. Clean and check all the parts. Especially make sure that no cuttings from the drilling remain as these would damage the bearing.
10. Drive in the new oil seal in the brake shoe retainer (adjusting nut) with drift SVO 2712, see Fig. 4-82.
11. Place the brake backing plate and brake shoe retainers on the drive shaft. Fit the lock ring and bearing in the cushioning ring SVO 2707. Fit in the drive shaft and place the whole assembly in a press. Press on the drive shaft until the bearing and lock ring are in position, see Fig. 4-83.
12. Pull out the inner oil seal with puller SVO 2728, see Fig. 4-84. Drive in the new seal ring with drift SVO 2712, which automatically locates the oil seal correctly in the drive shaft tubular cover, see Fig. 4-85.

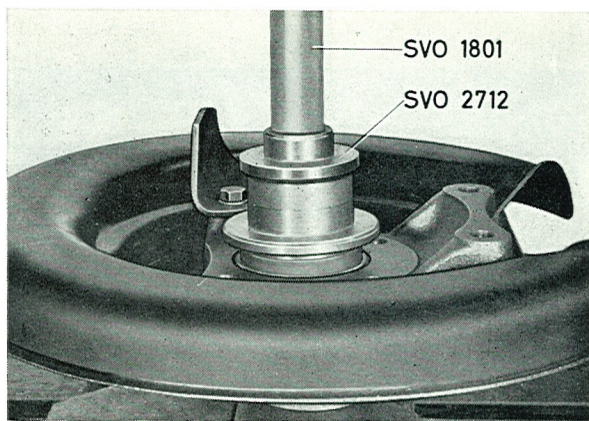


Fig. 4-82. Fitting the outer oil seal

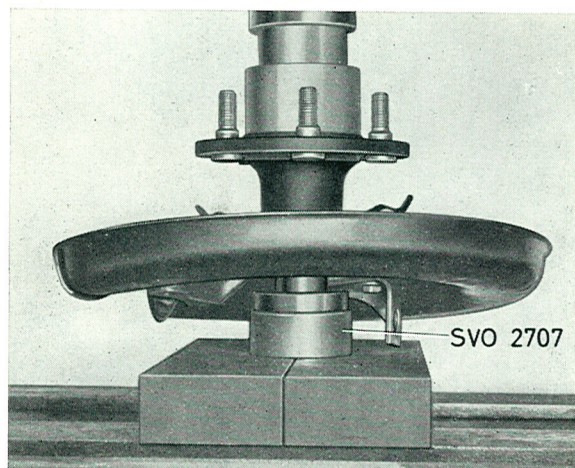


Fig. 4-83. Fitting the drive shaft bearing

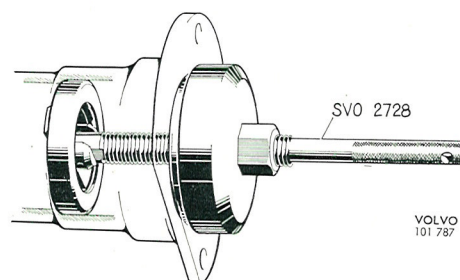


Fig. 4-84. Removing the inner oil seal

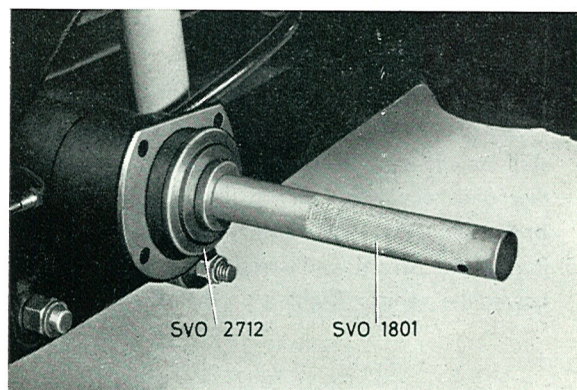


Fig. 5-85. Fitting the inner oil seal

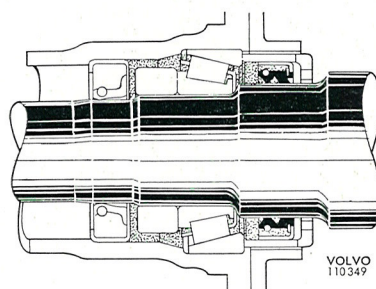


Fig. 86. Lubricating the rear axle bearings

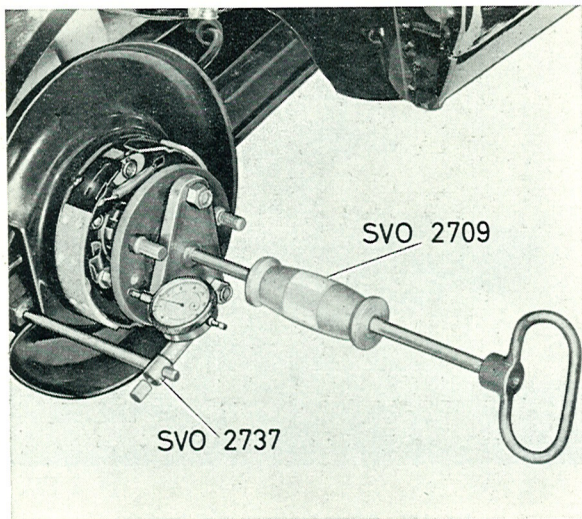


Fig. 4-87. Measuring the drive shaft end play

13. Pack the bearing well with a high-class multi-purpose grease and then fit the drive shaft, the brake backing plate and brake shoe retainers. After fitting, the entire space between the oil seals should be filled with grease, see Fig. 4-86. Check the end play, which should be 0.05—0.13 mm (0.002—0.005"), with dial indicator and retainer SVO 2737, see Fig. 4-87. First press out the outer rings in their bearings with the help of the impact hammer on tool SVO 2709. Adjust if required. To do this use tool SVO 2708, see Fig. 88. Lock the adjusting nut with suitable tab.
14. Fit the lever, the brake shoes for the handbrake together with spring and the adjusting device as well as the handbrake wire. Then fit the brake disc and rear wheel brake unit. Connect up the brake line. Vent and adjust the brakes, see Part 5.
15. Put on the wheel and screw on the wheel nuts. Lower the vehicle. Tighten up the wheel nuts.

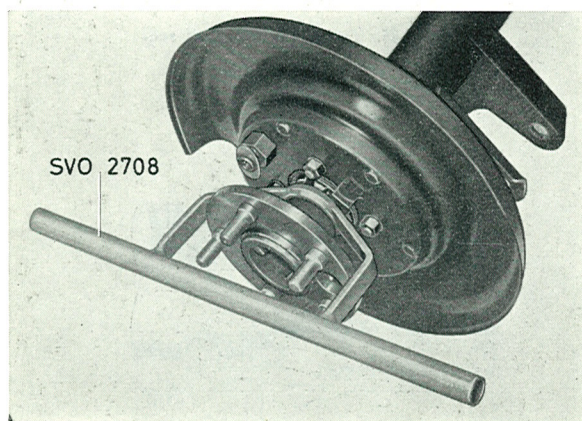


Fig. 4-88. Adjusting the drive shaft end-play

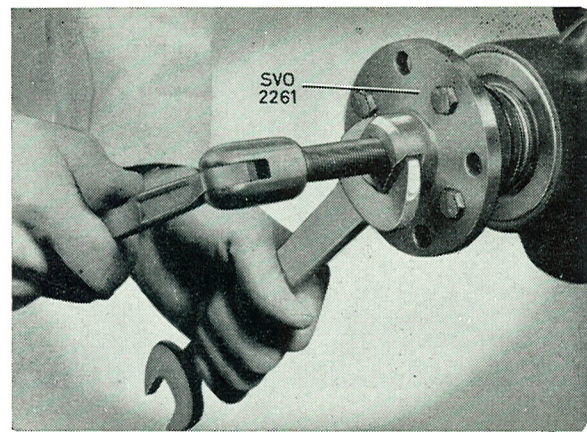


Fig. 4-89. Removing the flange

REPLACING THE DRIVE SHAFT BEARING

When replacing the drive shaft bearing, follow points 1—7, 9, 11—15 in the description given above.

REPLACING THE PINION OIL SEAL

1. Disconnect the rear section of the propeller shaft from the flange on the pinion. Check for looseness of the pinion in its bearing. If it is loose, this must be remedied before a new oil seal is fitted. See the instructions under the heading "Assembling".
2. Remove the nut for the flange. For this purpose, use tool SVO 2854 as a counterhold. Pull off the flange with puller SVO 2261, see Fig. 4-89. Pull out the old oil seal with puller SVO 4030, see Fig. 90.
3. Coat the seal lips of the new ring with grease. Lubricate also the spring coil so that it does not jump off during fitting. Then fit the oil seal with SVO 2806, see Fig. 4-91.
4. Press on the flange with the help of press tool SVO 1845, see Fig. 4-92. Fit the washer and nut. Tighten the nut to a tightening torque of 28—30 kgm (200—220 lb.ft.).

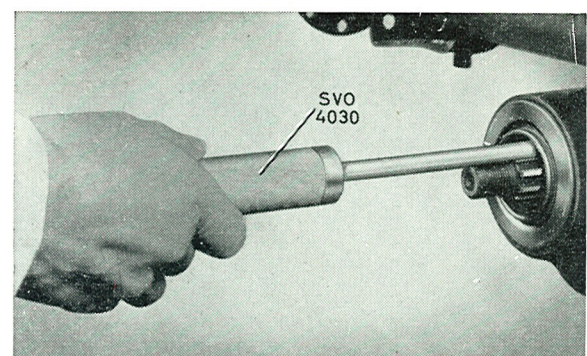


Fig. 4-90. Removing the oil seal

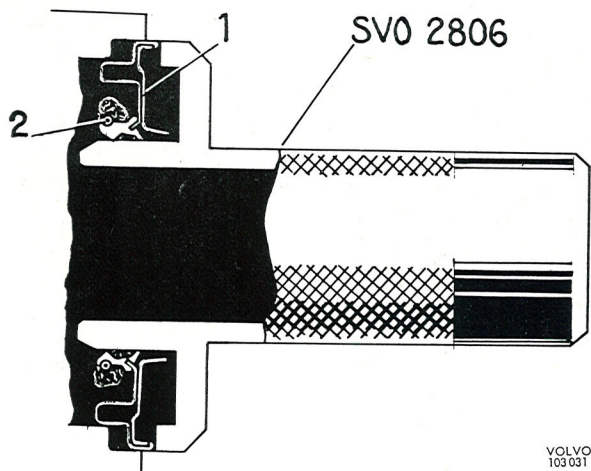


Fig. 4-91. Fitting the oil seal

1. Pinion oil seal
2. Spring coil with grease

REMOVING

1. Place blocks in front of the front wheels. Loosen the rear wheel nuts. Place fixture SVO 2714 on a garage jack and lift up the rear end with this. Compare with Fig. 4-122. Place blocks in front of the rear jack attachments, see Fig. 4-93, and then lower the jack slightly. Note that the blocks must not be placed at a point further than the dash line indicated in the figure. Remove the rear wheels.
2. Loosen the upper attaching bolts for the shock absorbers. Disconnect the handbrake wires from the levers and brackets on the brake backing plate. Use a spring fixture for this purpose, see Part 5.
3. Loosen the propeller shaft from the flange on the pinion. Remove the brake pipe union from the rear axle casing.

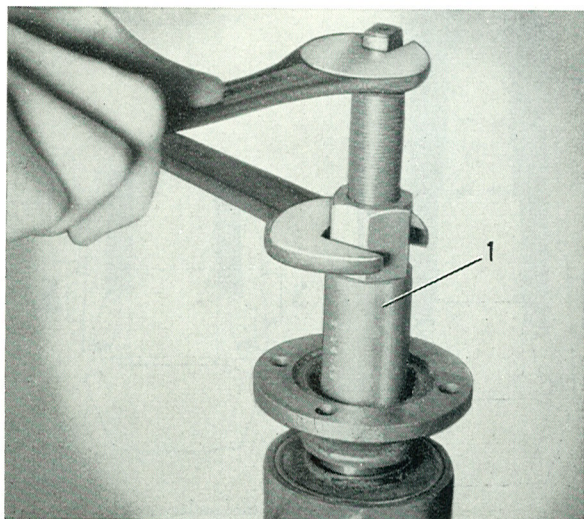


Fig. 4-92. Fitting the flange

1. Press tool SVO 1845

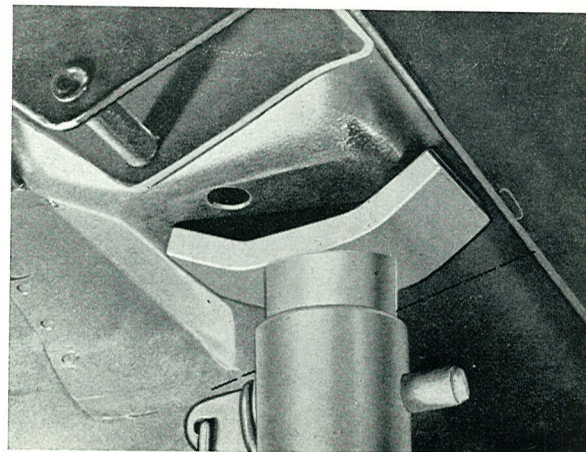


Fig. 4-93. Locating the block support

4. Loosen the front attaching bolts for the support arms about 1 turn. Unscrew the rear bolts for the torque rods. Loosen the track bar from the bracket on the rear axle casing. Remove the lower attaching bolts for the spring.
5. Lower the jack until the support arms release from the spring. Slacken the bolts holding the rear axle casing to the support arms. Lower the jack and pull the rear axle forwards.

DISMANTLING

1. Place the rear axle in fixture SVO 2522. The rear axle is placed with the underside of the final drive facing inwards to the fixture support, when the pinion is pointing downwards. Remove the brake pipes.
2. Slacken the bolts for the brake backing plates and brake shoe retainers. They are slackened through the holes in the drive shaft flanges. Pull

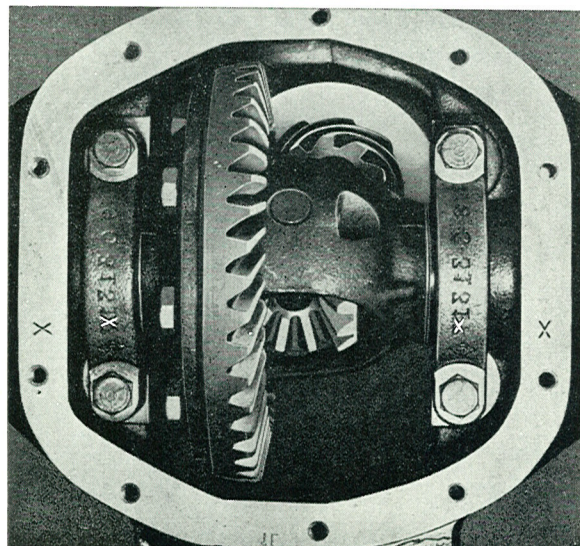


Fig. 4-94. Alignment marking on cap and carrier

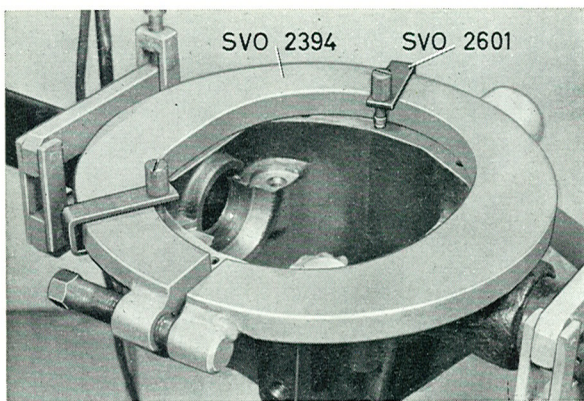


Fig. 4-95. Expanding the drive pinion carrier

out the drive shafts with puller SVO 2709, see Fig. 4-79.

3. Remove the inspection cover.
4. If the final drive is being reconditioned because of noise, the contact pattern should be checked before disassembling takes place, as this might assist in locating the fault. Before doing this, clean the teeth so that no misleading contact pattern is obtained.
5. Check the alignment markings on the cap and carrier, see Fig. 4-94. If there are no markings, or if they are difficult to see, mark one side with a punch. Remove the cap.
6. Fit tool SVO 2394 in the holes in the drive pinion carrier as shown in Fig. 4-95. Fit the tool with retainers SVO 2601. Tension the tool until it fits exactly in the holes in the carrier. Then tension the bolt a further 3—3½ turns. Lift out the differential carrier with crown wheel. Tool SVO 2337 can be used for this purpose.
7. Turn the final drive and let the oil run out into a container. Remove the nut for the flange. Use for this purpose tool SVO 2854 as a counterhold. Pull off the flange with puller SVO 2261, see Fig. 4-89. Press out the pinion.

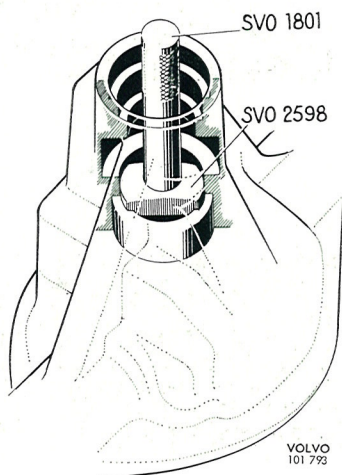


Fig. 4-96. Removing the rear pinion bearing race

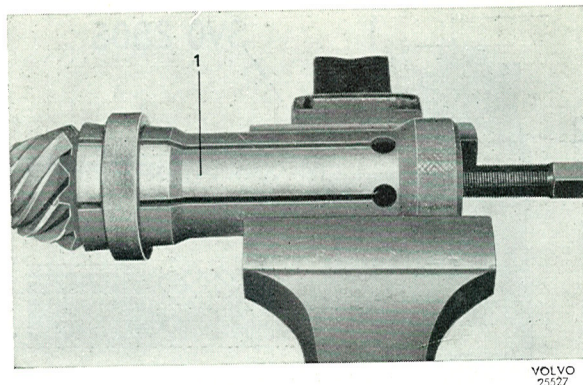


Fig. 4-97. Removing the rear pinion bearing

1. Puller SVO 2392

8. Drive out the front pinion bearing, the washer and the oil seal with standard handle SVO 1801 and drift SVO 2599.
9. If necessary, drive the rear bearing out of position, see Fig. 4-96. Use standard handle SVO 1801 and drift SVO 2598.
10. Clean the gasket surface. File off all burr on the surface on which the indicator retainer SVO 2284 will slide.
11. If necessary, pull off the rear bearing from the pinion with puller SVO 2392, see Fig. 4-97. The puller is fitted in the following way:

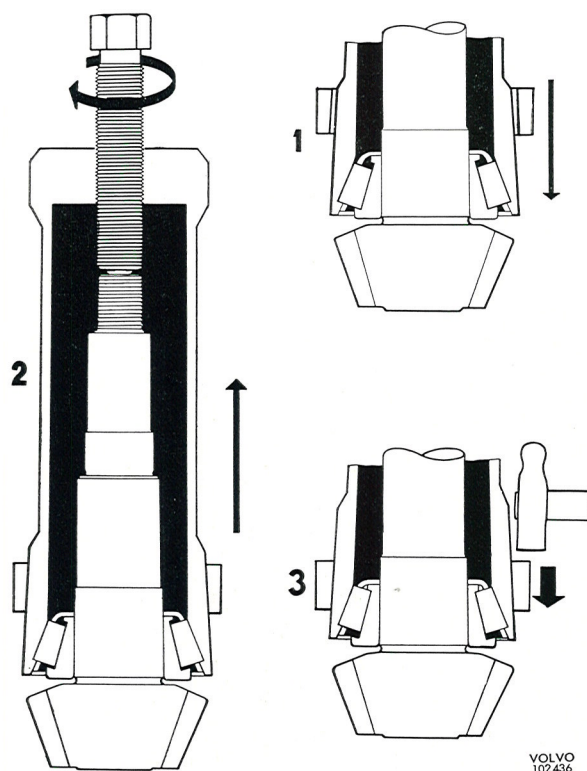


Fig. 4-98. Fitting the puller

1. The puller is pressed down over the rollers
2. The puller is pressed down over the rollers
3. The lock ring is secured by tapping

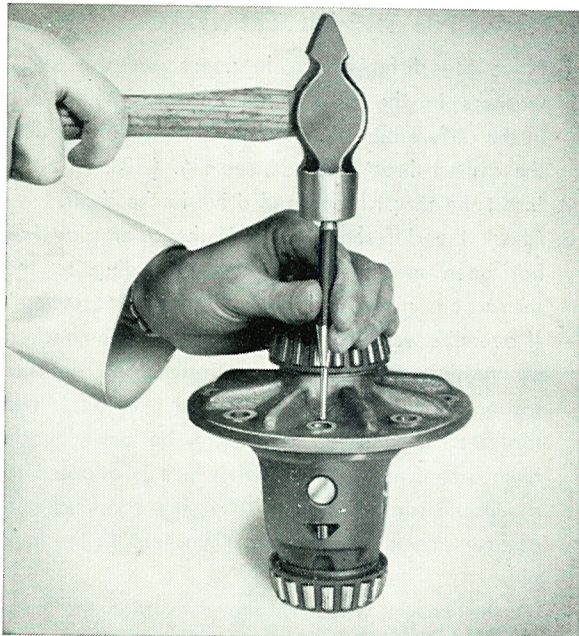


Fig. 4-99. Removing the lock pin

Move the puller down over the rollers and press down the lock ring. Then pull up the puller with the bolt until the rollers lie flush with the edge of the inner race and the edge on the puller. Knock out the lock ring with a hammer. See also Fig. 4-98.

DISMANTLING THE DIFFERENTIAL

1. Loosen the ring gear bolts and remove the crown wheel.

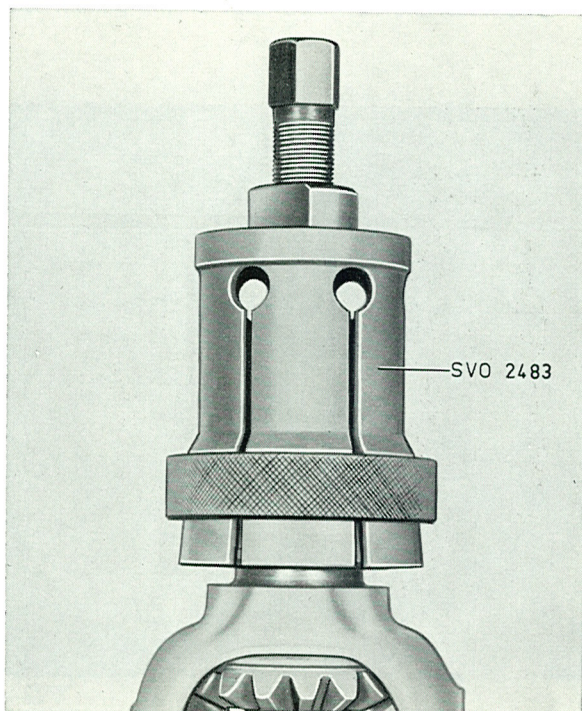


Fig. 4-100. Removing the differential carrier bearings

2. Drive out the lock pin, see Fig. 4-99, and then the shaft for the differential gears. Take out the block, the differential gears and the thrust washers.
3. Pull off the differential carrier bearings with puller SVO 2483, see Fig. 4-100. Do not loosen the shims. Concerning the fitting of the puller, see also Fig. 4-98.

INSPECTING

First clean all the parts thoroughly. Check all the bearing races and bearings. The races, rollers or roller retainers must not be scratched or damaged. All damaged bearings and bearing races must be replaced.

Check both the pinion drive and crown wheel carefully for damage to the teeth. The most common damage is seizing gear teeth, see Figs. 4-101 and 4-102. This is caused by incorrect running-in, wrong oil, insufficient tooth flank clearance or faulty tooth contact. If the cause of the seizing is not remedied at an early stage, the whole gear wheel can be damaged.

The differential gears should also be examined for damage to the teeth. They should be fitted in a clean and dry condition in the differential carrier together with the shaft and thrust washers. Play should then be checked by means of marking blue behind both the differential side gears. If the play exceeds 0.06 mm (0.0024"), when the gears have been rotated to maximum play, replace with thicker washers. These are available in sizes 0.78 mm, 0.86 mm and 0.94 mm.



Fig. 4-101. Gear seizing

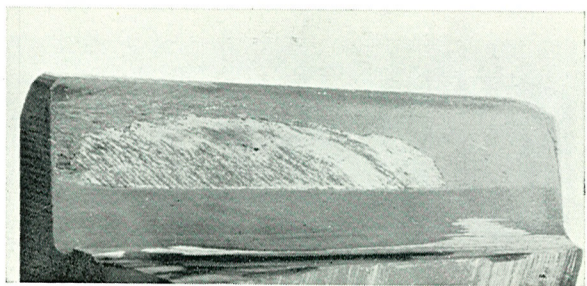


Fig. 4-102. Gear seizing

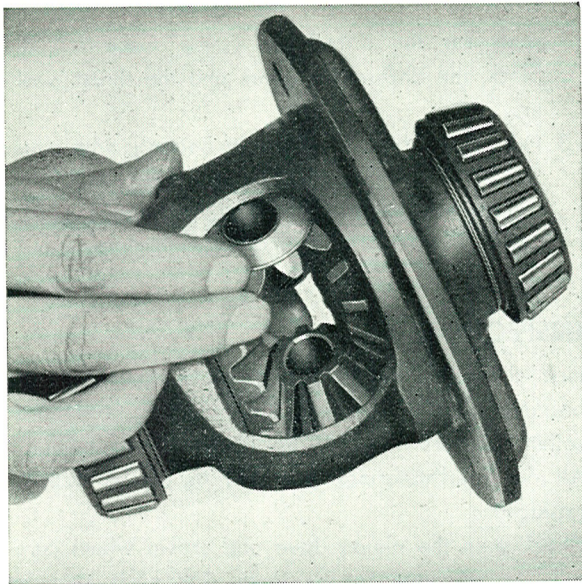


Fig. 4-103. Fitting the differential gear

Also check to see whether the cylindrical part of the flange which goes into the oil seal is worn or scratched. If so, replace the flange together with the oil seal.

The pinion nut is provided with a slit for locking. In time this slit loses its locking effectiveness. For this reason, the nut should be replaced if it has been removed a couple of times. The washer under the nut should also be replaced if it has become deformed.

Check the oil seals and replace them if they are damaged or worn.

Make sure that there are no cracks in the rear axle casing. Check that the brackets for the support arms and track rod are intact.

ASSEMBLING

The greatest cleanliness should be observed when assembling and adjusting final drives. Dirt in a tapered roller bearing can result in completely inaccurate measurement values.

On measuring the bearing clearance or pre-loading, the bearing should be oiled and rotated several turns loaded.

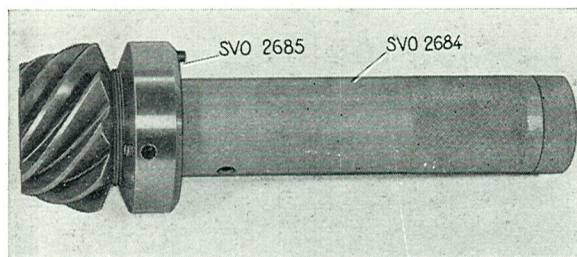


Fig. 104. Adjusting ring and tool for piston location

ASSEMBLING THE DIFFERENTIAL

1. Place the differential side gears and the thrust washers in the differential carrier. Then "roll" in the differential pinions both simultaneously with the dished thrust washers, see Fig. 4-103.
2. Insert the thrust block and drive in the shaft.
3. Check the differential unit. If the gear play has not been measured, check it according to the instructions given under the heading "Inspecting". If oversize washers are fitted, this can be checked by turning the gears one turn. The requisite torque should not exceed 1 kgm (7.0 lb.ft.). The tool for marking this check can be easily made from a shortened drive shaft which is adapted to a suitable torque wrench. After the checking and any replacement of the thrust washers, fit the lock pin.
4. Fit the crown wheel. Make sure that the contact surfaces are clean and without burr. Tighten the bolts. The tightening torque is 6.5—8.5 kgm (47—72 lb.ft.).

NOTE. Always use new bolts for those gears where the bolts are locked only by means of friction in the thread and the contact surface of the screw head. To achieve the effect intended, the bolts are tightened to their limits. A certain permanent elasticity is thereby obtained in the bolt which becomes distorted for further fitting.

FITTING THE PINION

1. Clean the marking surface on the pinion with extremely fine emery cloth. Fit the adjusting ring SVO 2685 and tool SVO 2684 on the pinion, see

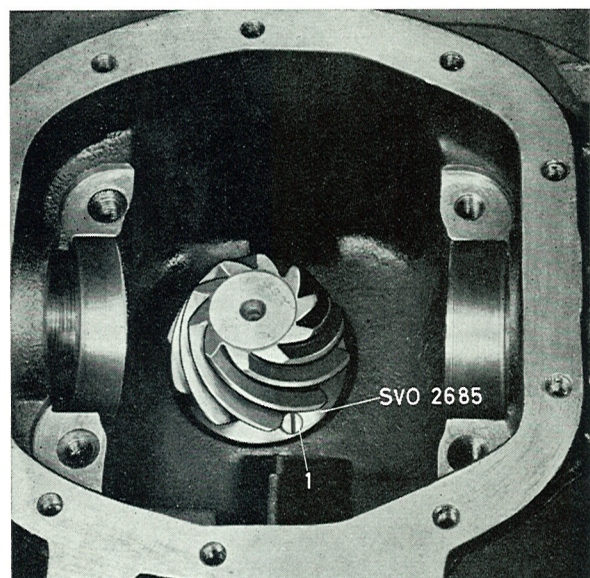


Fig. 4-105. Locating the pinion with adjusting tool

1. Lock screw

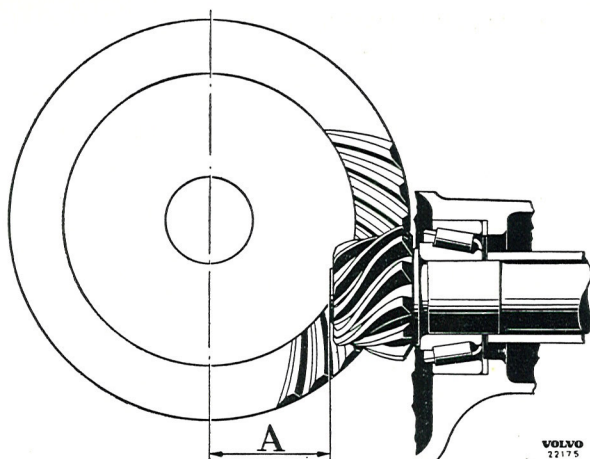


Fig. 4-106. Pinion location
A Nominal measurement = 2.55"

Fig. 4-104. Place the pinion in the carrier so that the bolt on the adjusting ring faces the larger side of the carrier, see Fig. 4-105.

2. The pinion should have a certain nominal measurement (A, Fig. 4-106) to the centre line of the crown wheel. Due to tolerances in the manufacturing, there are deviations from the nominal measurement.

This is indicated on the ground surfaces on the pinion with a figure. Here there is an important difference between Volvo-manufactured and other types of rear axles.

On final drive units made by Volvo, the surface is generally ground down 0.30 (0.012") so that the deviation is always indicated by plus tolerance and in hundredths of a millimetre. The plus sign is excluded. On other final drive units, the deviation is indicated in thousandths of an inch and with plus or minus sign. If there is a plus sign in front of the figure, the nominal measurement is to be increased and, in the case of a minus sign, the nominal measurement is to be decreased.

To check the location of the pinion, use a dial indicator, indicator retainer SVO 2284 and a

measuring tool SVO 2393, which consists of two parts: a pinion gauge and an adjuster fixture.

The check is carried out in the following way: Place the pinion on the ground surface of the

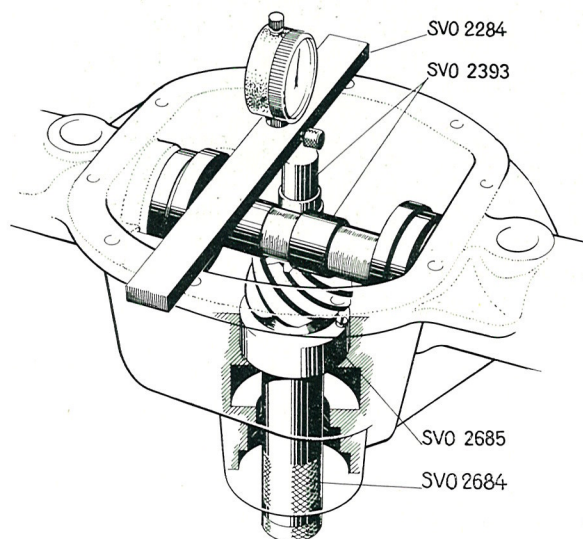


Fig. 4-107. Locating the measuring tools

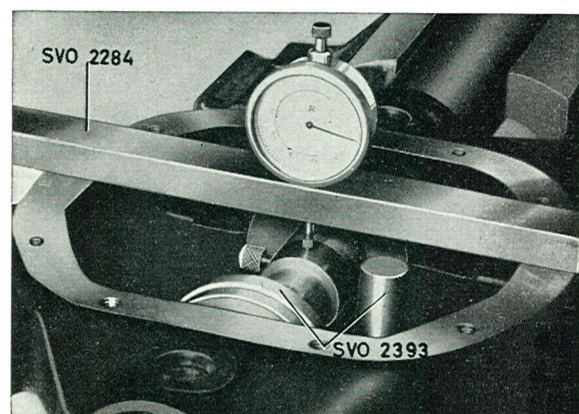


Fig. 4-108. Zero-setting the indicator

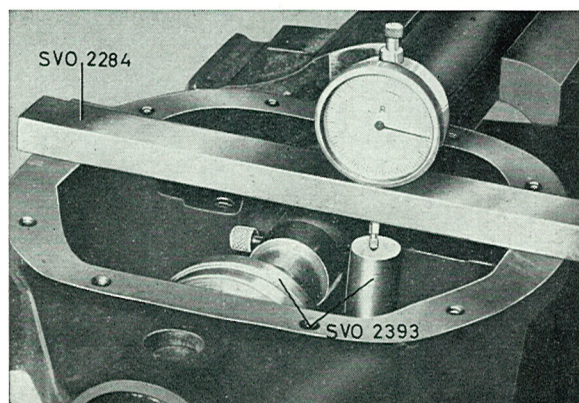


Fig. 4-109. Measuring the pinion location

Conversion table, inches to millimetres	
inches	millimetres
0.001	0.025
0.002	0.051
0.003	0.076
0.004	0.102
0.005	0.127
0.006	0.152
0.007	0.178
0.008	0.203
0.009	0.229

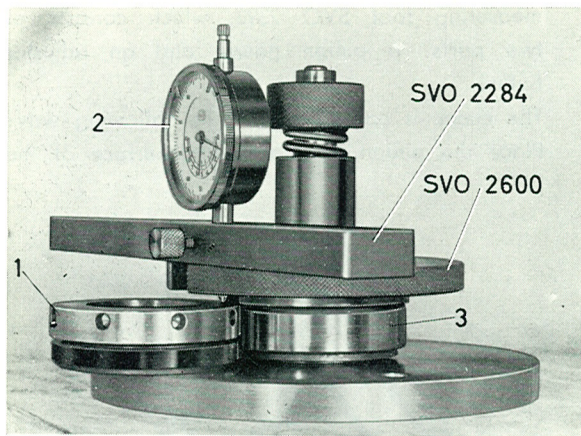


Fig. 4-110. Determining the shim thickness

1. Adjusting ring 2. Dial indicator 3. Bearing, complete

pinion and the adjusting jig in the differential bearing position as shown in Fig. 4-106. Place the indicator retainer on the drive pinion carrier and zero-set the gauge against the adjusting jig, see Fig. 4-108. Then move the indicator retainer over so that the indicator comes against the pinion gauges, see Fig. 4-109.

If a Volvo final drive unit is fitted and the pinion is, for example, marked 33, the pinion gauge should lie 0.33 mm (0.013") under the adjuster fixture. Concerning the other final drive units, if the pinion is marked O, the adjuster fixture and pinion gauge should be at the same height; if the pinion is marked —, the pinion gauge should be higher than the adjuster fixture; and if it is marked +, the pinion gauge should be lower than the adjuster fixture with correct setting. The setting is adjusted by turning the cam on the pinion until the gauge dial shows the correct value. Then lock the adjusting ring with the lock screw. Remove the measuring tool and pinion.

3. Place the complete rear pinion bearing with the

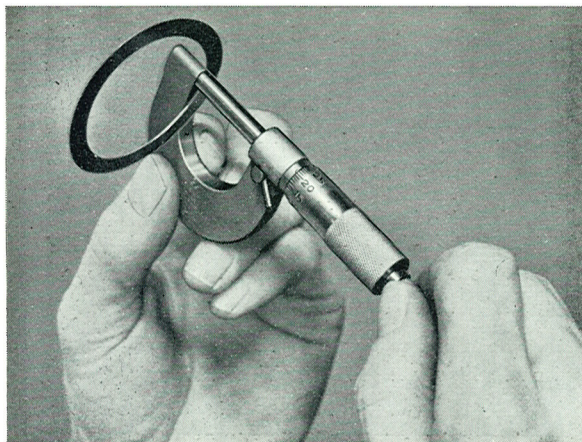


Fig. 4-111. Measuring the shims

outer ring in measuring fixture SVO 2600. Put on the plate, spring and nut. Turn the nut with the flat side facing upwards. The plate, and thereby the bearing, is turned forwards and backwards several times so that the rollers take up the correct position. Place the adjusting ring in the measuring fixture as shown in Fig. 4-110. Use retainer SVO 2284 and dial indicator, place the measuring point of the indicator opposite the adjusting ring and zero-set the indicator. Then set the pointer of the indicator to the outer ring of the bearing. The dial indicator now shows directly the thickness the shims should have. Measure shims for the correct thickness with a micrometer, see Fig. 4-111. N.B. It is almost impossible to obtain a shim with exactly the correct thickness. However, they must not be 0.03 mm (0.0012") thicker than the measured value, but up to 0.05 mm (0.002") thinner.

4. Press the rear bearing on the pinion with sleeve SVO 2395, see Fig. 4-112. N.B. The washer under the rear bearing inner ring on a Volvo final drive must **not** be fitted when reconditioning. Place on the measured shims and press in both the outer rings of the bearings with tool SVO 2686, see Fig. 4-113.
5. Insert the pinion in the casing and fit on three 0.75 mm (0.03") thick shims and the front pinion bearing. Fit tool SVO 2404 and press tool SVO 1845 on the front end of the pinion and pull in

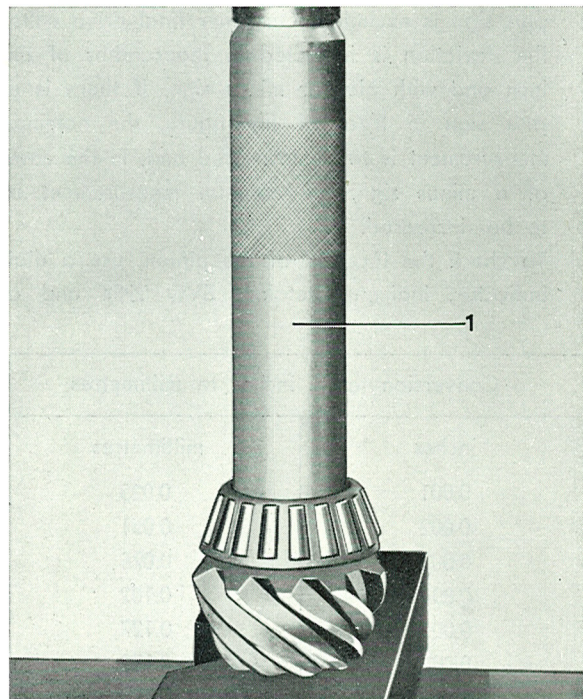


Fig. 4-112. Fitting the rear pinion bearing

1. Fitting sleeve SVO 2395

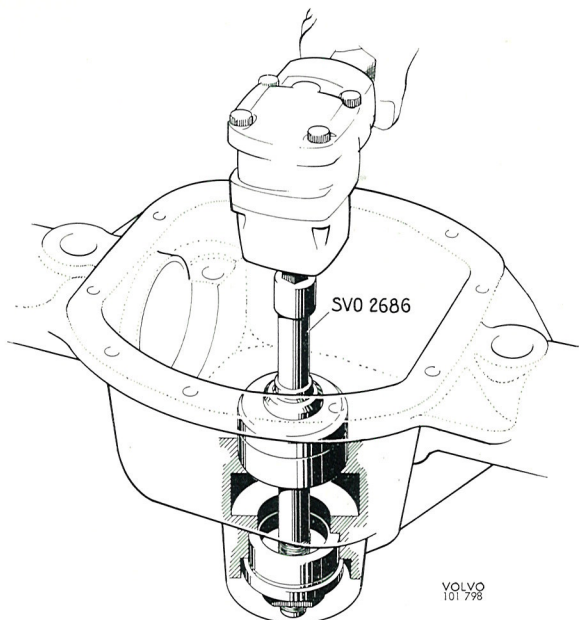


Fig. 4-113. Fitting the bearing races

the pinion, see Fig. 4-114. Use the nut tightener until it presses the pinion forwards so that it does not strike the bearing positions.

6. Replace press tool SVO 1845 with washer and nut. Tighten the nut to a tightening torque of 28—30 kgm (200—220 lb.ft.) Fit on the pinion gauge and the dial indicator retainer. Pull down the pinion while turning it forwards and backwards at the same time. Zero-set the indicator. Then press the pinion upwards, turning it at the same time forwards and backwards. Read off the clearance.

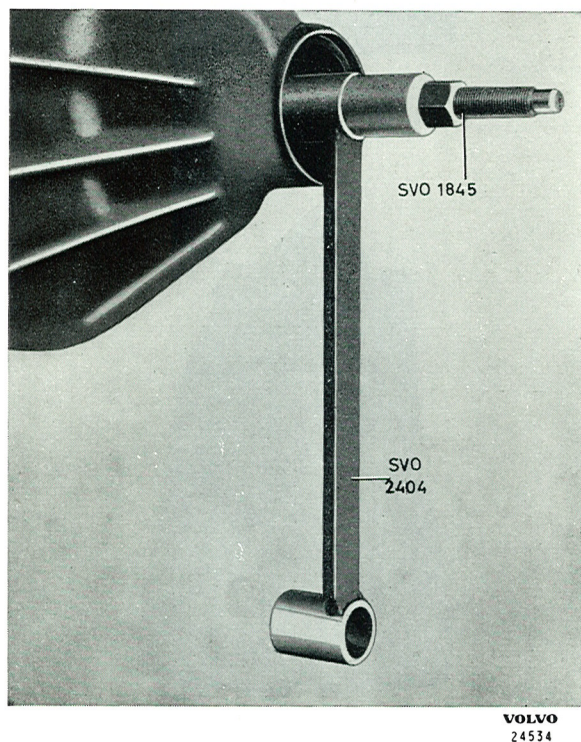


Fig. 4-114. Fitting the pinion

7. Remove the pinion. Remove the shims corresponding to the measured clearance + 0.07 mm (0.003"). Fit on the pinion.
8. Then check the pinion bearing fit with the torque gauge. The torque gauge should show 6—11 kgcm (5.20—9.55 lb. in.) for used bearings, and 11—23 kgcm (9.55—20 lb. in.) for new bearings when the pinion rotates. On new final drive units, stresses can be higher due to another type of installation method. In other words, there is no fault. Often an alteration in the thickness of the shims is required because of the tolerances which must be present.
9. Check the location of the pinion with the dial indicator, retainer SVO 2284 and measuring tool SVO 2393, see also point 2.

FITTING THE DIFFERENTIAL

1. Lubricate the inside of the adjusting rings SVO 2595 and put them on the differential carrier. The ring with the black-oxidized adjusting ring should be placed on the crown wheel side. Also lubricate the bearing location in the carrier. Place the differential carrier and the adjusting rings in the final drive housing, see Fig. 4-115. Use the dial indicator and adjust in the rings so that the correct backlash 0.15 mm (0.006") is obtained. The tooth flank clearance may vary between 0.13 mm (0.005") and 0.20 mm (0.008"), but should be kept as near 0.15 mm (0.006") as possible. Tighten the lock screws in the adjusting rings.
2. Fit on brake tool SVO 2597 as shown in Fig. 4-116. Mark with colour several teeth at three points on the crown wheel. This can act as a check for possible crown wheel warping. Rotate the pinion 10—12 turns in both directions and check the contact marking pattern. At the correct tooth contact, the contact marking pattern should be horizontally in the middle of the tooth but some-

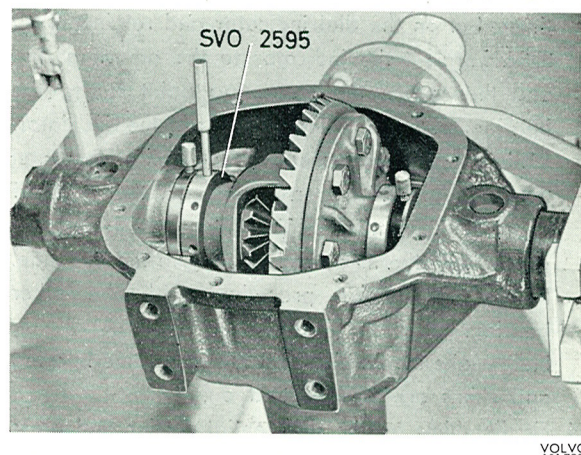


Fig. 4-115. Adjusting rings for differential

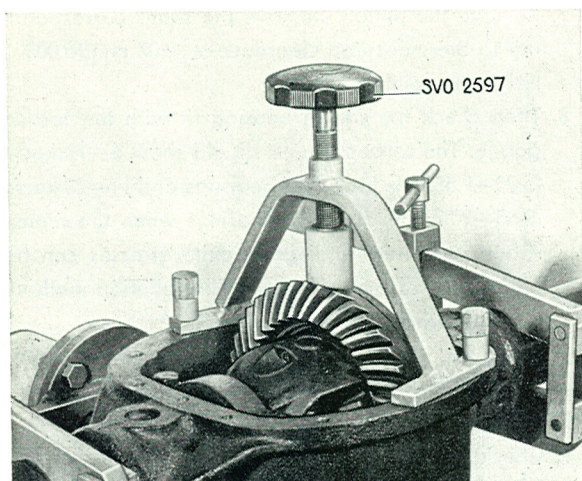


Fig. 4-116. Brake tool for differential

what nearer to the toe than the heel. The pattern on the reverse side and driving side should coincide with each other. See Fig. 4-117. If the patterns do not coincide, the location of the pinion must be adjusted before assembling is continued. If the patterns lie too far towards the heel on the driving side and too far towards the toe on the reverse side, see Fig. 4-118, the pinion should be moved inwards.

If the contact patterns lie too far towards the toe on the driving side and too far towards the heel on the reverse side, see Fig. 4-119, the pinion should be moved outwards. Note that the patterns will lie somewhat nearer the toe when the adjusting rings are fitted than when the bearings are fitted.

3. When the correct backlash and contact pattern are obtained, remove the differential and adjusting ring. Then place the centre washer on the measuring fixture. Fit a bearing into the measuring fixture, likewise the plate, spring and nut. Fit the nut with the flat side facing downwards. Rotate the plate forwards and backwards several times. Put on the dial indicator and retainer SVO 2284. Zero-set the indicator to the adjusting ring and then place the measuring point facing the bearing, see Fig. 4-110. Read off the indicator. With a micrometer measure the shims, the total thickness of which corresponds to the read-off value + 0.07 mm (0.003"). Place the shims together with the measured bearing to the one side. Repeat the above procedure with the other bearing.

N. B. Make sure which side the respective bearing and shims are to be fitted on.

4. Fit the shims on the differential carrier and press on the bearings. For this purpose use drift SVO

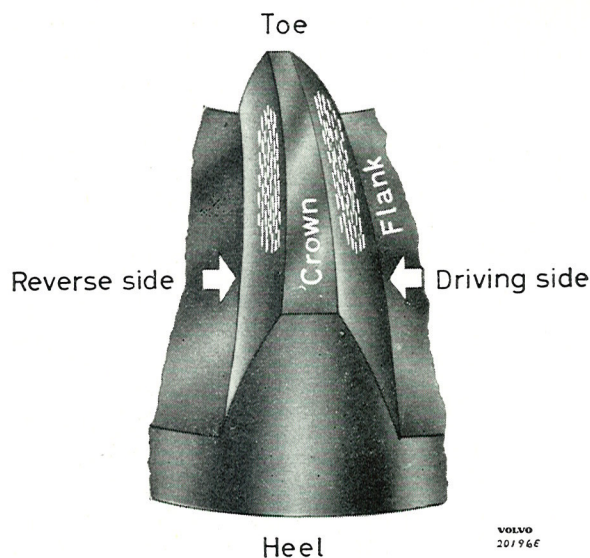


Fig. 4-117. Correct tooth contact

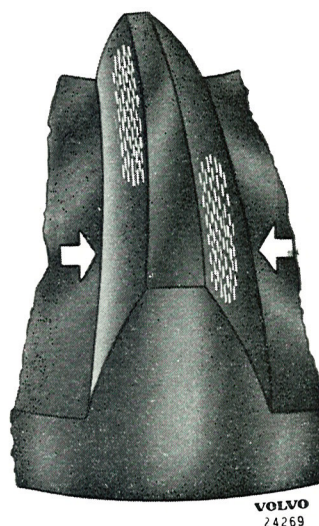


Fig. 4-118. Faulty tooth contact

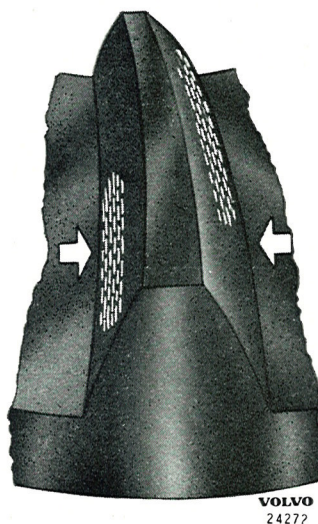


Fig. 4-119. Faulty tooth contact

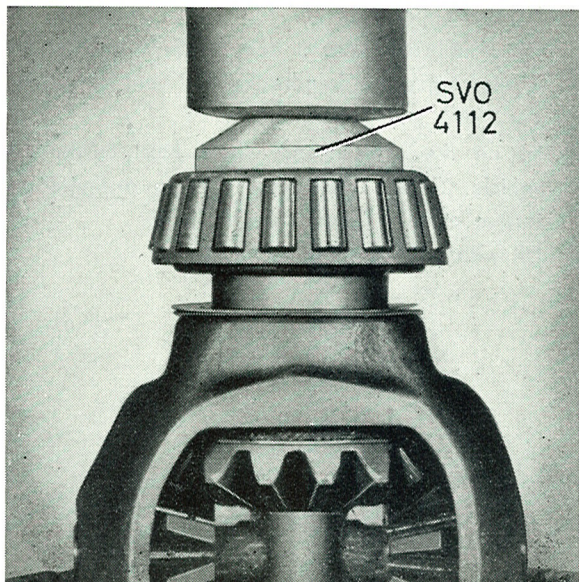


Fig. 4-120. Fitting the differential bearings

4112, see Fig. 4-120. When fitting the second bearing, use drift SVO 2599 as a cushioning ring so as not to damage the first bearing already pressed on.

5. Fit tool SVO 2394 on the drive pinion carrier, see Fig. 4-95. Expand the tool until the pins are exactly flush against the hole edges in the carrier and then tighten the screws a further 3—3½ turns. Fit the differential and outer rings. Remove tool SVO 2394. Fit the cap and tighten the bolts to a torque of 5.0—7.0 kgm (36—50 lb.ft.).
6. Check the backlash and the contact marking patterns.

ASSEMBLING THE REAR AXLE

1. Remove spanner SVO 2404. Fit the oil slinger. Smear the oil seal lips with grease. Lubricate the spring coil also with grease to prevent it from jumping out during fitting. Then fit the oil seal with drift SVO 2806. Press on the flange with the help of tool SVO 1845, see Fig. 4-114. Fit the washer and nut. Tighten the nut to a tightening torque of 28—30 kgm (200—220 lb.ft.).
2. Fit the inspection cover and gasket.
3. If the inner oil seals for the drive shaft are not fitted, drive them in with drift SVO 2712, see Fig. 4-85.
4. Fill the bearing well with a high-class multi-purpose grease and then fit the drive shaft, the brake backing plate and brake shoe retainers. After the fitting, the entire space between the oil seals should be filled with grease, see Fig. 4-86. Check the end play, which should be 0.05—0.13 mm (0.002—0.005") with a dial indicator and retainer

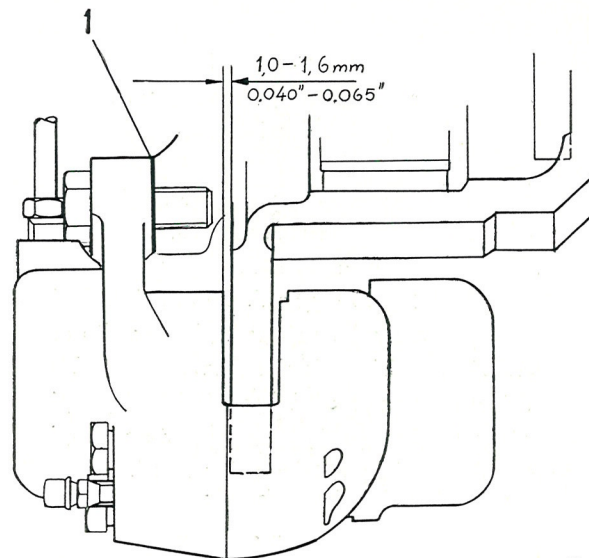


Fig. 4-121. Clearance between brake caliper and disc
1. Shim

SVO 2737, see Fig. 4-89. When making this check, first press out the outer rings in their bearings with the help of the impact hammer on SVO 2709. Adjust if necessary. To do this use tool SVO 2708, see Fig. 4-88. Lock the adjusting nut with a suitable tab.

5. Fit the brake discs and the brake calipers. N.B. There should be a clearance of 1.0—1.6 mm (0.040"—0.065") between the inner edge of the brake disc and the inner edge of the brake caliper. On the right-hand side, this clearance is altered by adjusting the axial play of the drive shaft. The clearance should, therefore, be checked and, if necessary, adjusted when working with the drive shaft on the right-hand side. The clearance is adjusted with shims, see Fig. 4-121, which are available in thicknesses of 0.6, 1.2 and 1.8 mm (0.024, 0.048 and 0.072").

On the left-hand side the correct clearance is obtained without shims. Fit the brake pipes.

FITTING THE REAR AXLE

1. Place the rear axle on fixture SVO 2714, which is mounted on a garage jack, see Fig. 4-122. Move the rear axle in under the vehicle and fit on the bolts for the support arms and torque rods.
2. Raise the jack until the track bar attachment on the rear axle is at the same level with the attachment on the body. Fit the track rod.
3. Fit the attaching bolts for the spring. Tighten the nuts for the torque rods and support arms.
4. Fit bracket, union and brake hoses. Fit the universal joint to the flange.

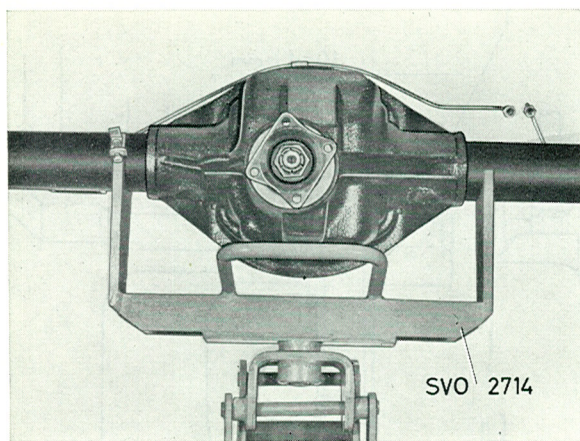


Fig. 4-122. Fixture for rear axle

5. Fit the upper bolt for the shock absorbers. Fit the handbrake wire in the brackets and at the levers. Adjust the handbrake and vent the brake, see Part 5.
6. Fit on the wheels and wheel nuts. Lower the vehicle. Tighten the wheel nuts to a tightening torque of 10—14 kgm (70—100 lb.ft.). Fill with oil. Use only hypoid oil.

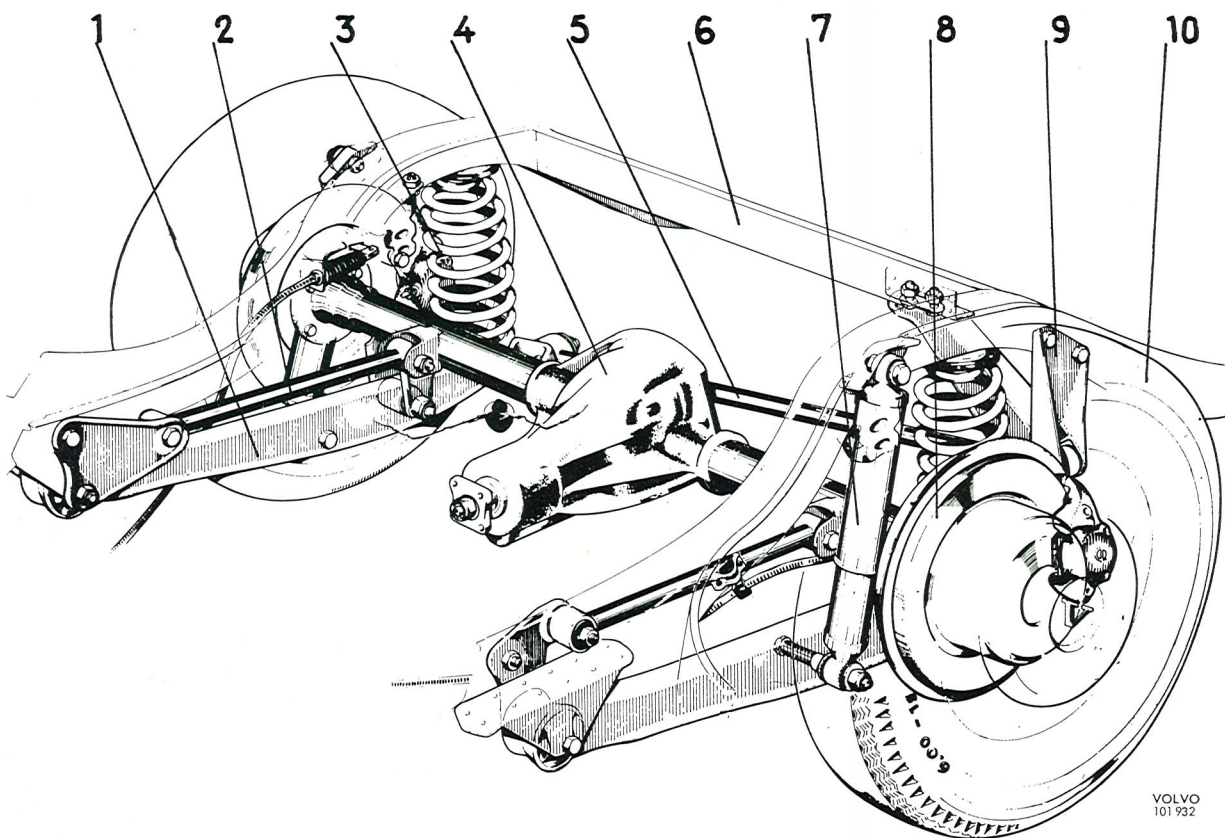


Fig. 4-123. Rear axle with suspension

- | | |
|----------------|--------------------------|
| 1. Support arm | 6. Member system in body |
| 2. Torque rod | 7. Shock absorber |
| 3. Spring | 8. Disc brake |
| 4. Rear axle | 9. Bracket for track rod |
| 5. Track rod | 10. Wheel |

1. Flywheel casing
2. Clutch cover
3. Clutch plate
4. Flywheel
5. Crankshaft
6. Support bearing in crankshaft
7. Circlip
8. Adjusting nuts
9. Return spring
10. Release fork
11. Dust cover
12. Release bearing
13. Clutch plate shaft (input shaft gearbox)
14. Cover, gearbox
15. Support rings
16. Thrust spring
17. Pressure plate
18. Retainer
19. Clutch wire
20. Washer
21. Rubber bush
22. Washer
23. Nut
24. Pedal stop
25. Rubber sleeve
26. Bracket
27. Screw for pedal shaft
28. Return spring
29. Clutch pedal

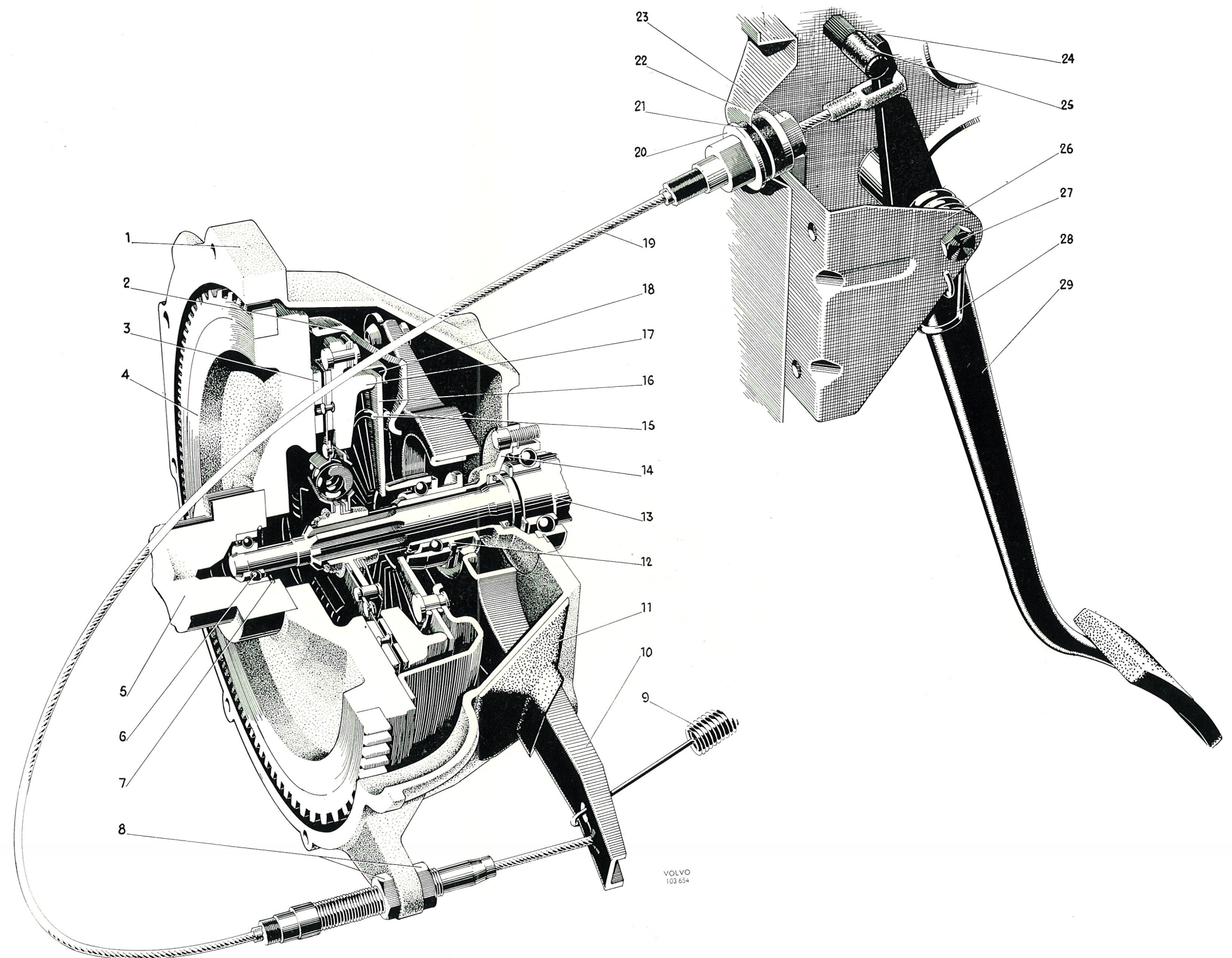


Illustration 4-A. Clutch and clutch controls

1. Flange
2. Oil seal
3. Speedometer worm gear
4. Rear cover
5. Venting nipple
6. Ball bearing
7. Striker ("X-ray" view)
8. End casing
9. Selector fork, 1st and 2nd speeds
10. Striker
11. Gear lever
12. Cover
13. Washer
14. Spring
15. Cover
16. Sliding plate
17. Spring
18. Sleeve (reverse catch)
19. Sleeve
20. Spring
21. Engaging spring
22. Engaging sleeve and gear wheel for reverse
23. Synchronizing cone
24. Bush
25. Gear wheel for 2nd speed
26. Thrust washer
27. Circlip
28. Thrust washer
29. Gear wheel for 3rd speed
30. Bush
31. Selector fork, 3rd and 4th speeds
32. Mainshaft
33. Synchronizing hub
34. Engaging spring
35. Spring
36. Interlock ball
37. Selector rail for 3rd and 4th speeds
38. Selector rail for 1st and 2nd speeds
39. Selector rail for reverse
40. Engaging sleeve
41. Snap ring
42. Synchronizing cone
43. Ball bearing
44. Roller bearing
45. Oil seal
46. Front cover
47. Input shaft
48. Spacing washer
49. Thrust washer
50. Housing
51. Needle bearing
52. Spacing washer
53. Countershaft
54. Idler gear
55. Reverse shaft
56. Reverse gear
57. Bush
58. Striker lever ("X-ray" view)
59. Bush
60. Gear wheel for 1st speed
61. Thrust washer

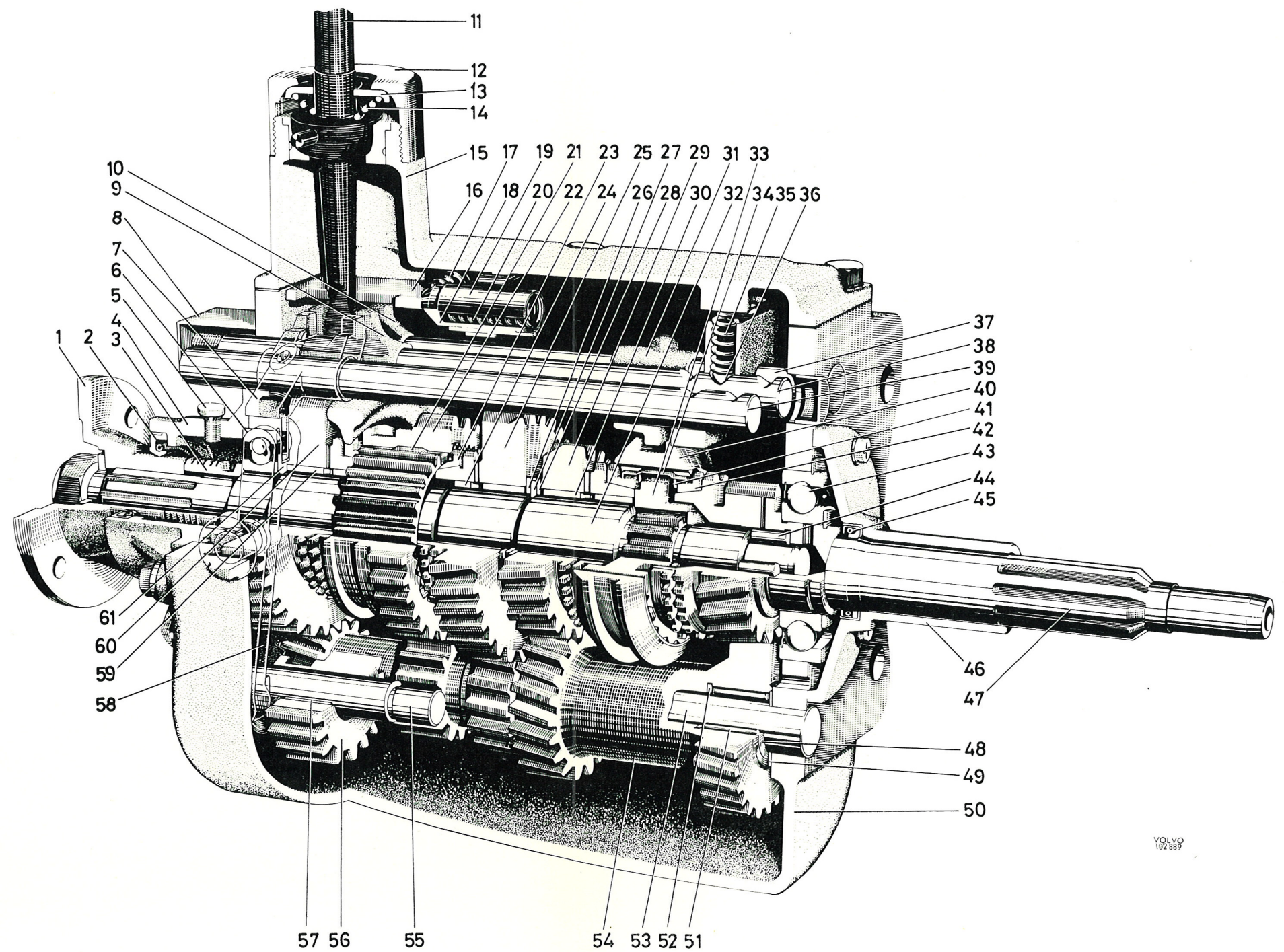


Illustration 4-B. Gearbox M40

- | | |
|-----------------------------|-------------------------------|
| 1. Nut | 56. Washer |
| 2. Lock washer | 57. O-ring |
| 3. Bridge piece | 58. Cylinder |
| 5. Breather | 59. O-ring |
| 6. Front casing | 60. Plug |
| 7. Gasket | 61. Spring |
| 8. Brake ring | 62. Ball |
| 9. O-ring | 63. Non-return body |
| 10. O-ring | 64. O-ring |
| 11. Seal | 65. Pump body |
| 12. Gasket | 66. Pump plunger |
| 13. Solenoid | 67. Washer (2) |
| 14. Bolt | 68. Fine filter |
| 15. Thrust bearing retainer | 69. Seal |
| 16. Spring | 70. Plug |
| 17. Ball bearing | 71. Data plate |
| 18. Circlip | 72. Screw |
| 19. Circlip | 73. Planet gear and carrier |
| 20. Circlip | 74. Sunwheel |
| 21. Stud | 75. Clutch sliding member |
| 22. Piston seal | 76. Pre-filter |
| 23. Piston | 77. Gasket |
| 24. Connecting rod | 78. Magnet |
| 25. Non-return ball | 79. Base plate |
| 26. Non-return valve spring | 80. Bolt |
| 27. Plug | 81. Resilient washer |
| 28. Key | 84. Bush |
| 29. Resilient ring | 85. Thrust washer |
| 30. Circlip | 86. Oil thrower |
| 31. Eccentric | 87. Circlip |
| 32. Piston pin | 88. Uni-directional clutch |
| 33. Gasket | 89. Stud |
| 36. Stud | 90. Resilient washer |
| 37. Orifice nozzle | 91. Nut |
| 38. Seal | 95. Speedometer pinion |
| 39. Plug | 96. O-ring |
| 40. O-ring | 97. Bush |
| 41. End piece | 99. Bolt |
| 42. Piston | 100. Retainer |
| 43. Washer | 101. Oil seal |
| 44. Spring | 102. Stud |
| 45. Retainer | 106. Speedometer driving gear |
| 46. Spring | 110. Output shaft |
| 47. Screw | 111. Ball bearing |
| 48. Screw | 112. Spacer |
| 49. Holder | 113. Rear casing |
| 50. Spring | 114. Ball bearing |
| 51. O-ring | 115. Oil seal |
| 52. Plug | 116. Flange |
| 53. Nut | 117. Washer |
| 54. Piston | 118. Nut |
| 55. Spring | |

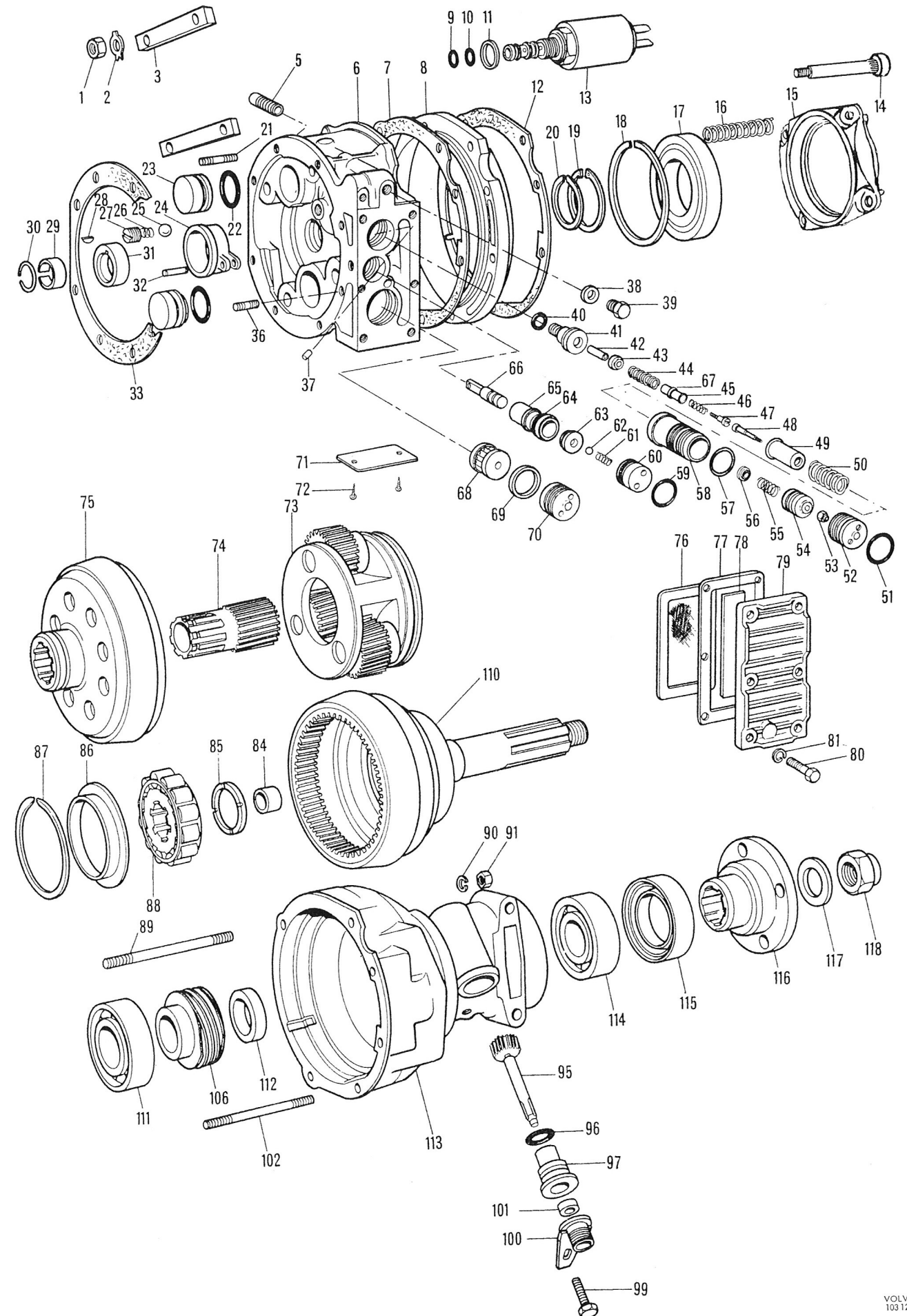


Illustration 4-C. Overdrive

1. Tubular shaft
2. Differential carrier bearing
3. Bearing cap
4. Shims
5. Differential carrier
6. Thrust washer
7. Differential side gear
8. Lock pin
9. Differential pinion
10. Crown wheel
11. Shaft
12. Thrust washer
13. Rear axle casing
14. Flange
15. Dust cover plate
16. Oil slinger
17. Oil seal
18. Shims
19. Front pinion bearing
20. Pinion
21. Rear pinion bearing
22. Shims

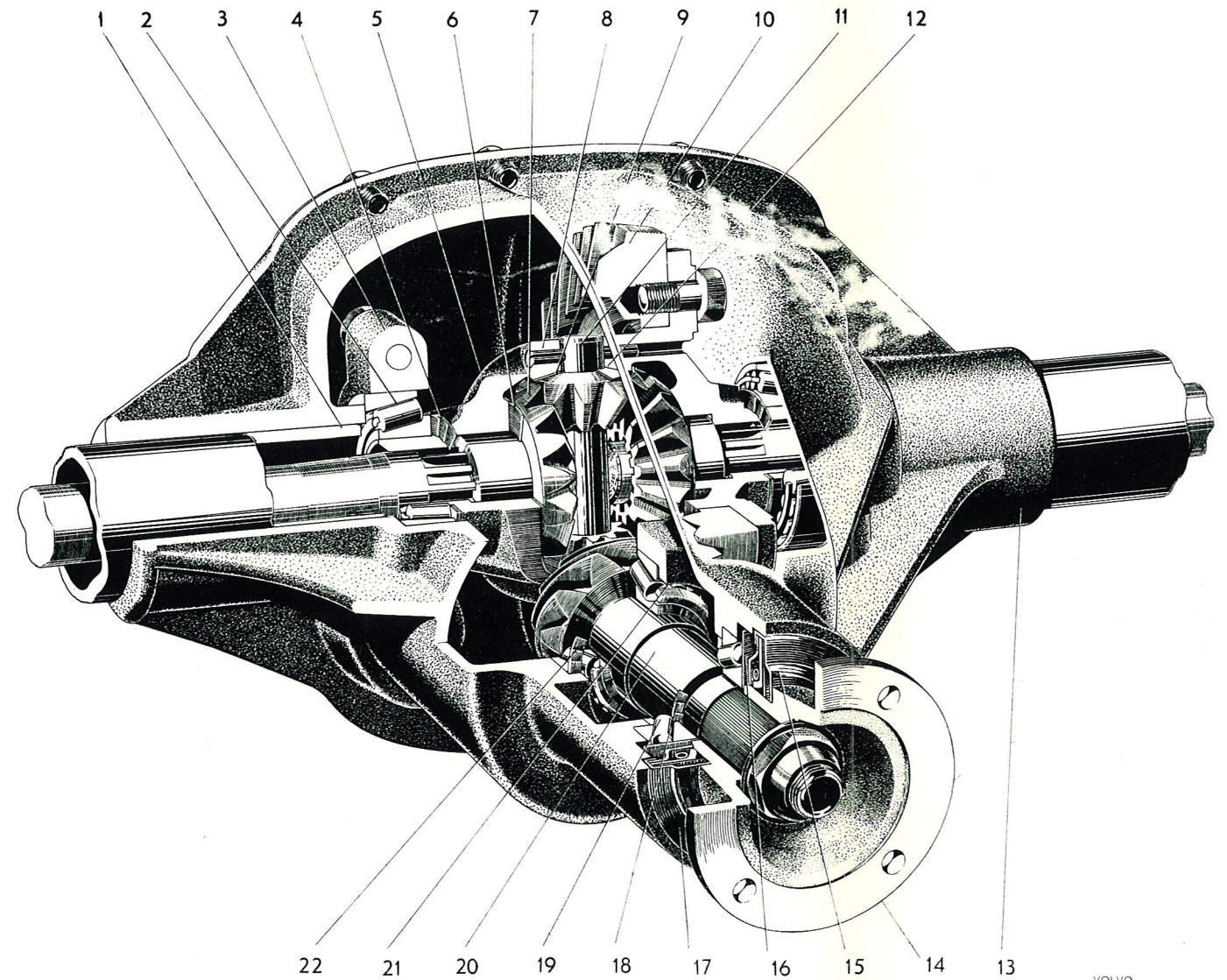


Illustration 4-D. Final drive