



# **SERVICE MANUAL**

**VOLVO 164 1971**

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**GROUP 43 A**  
**GEARBOX**  
**TOOLS**

The following special tools are used for repairs on the gearbox

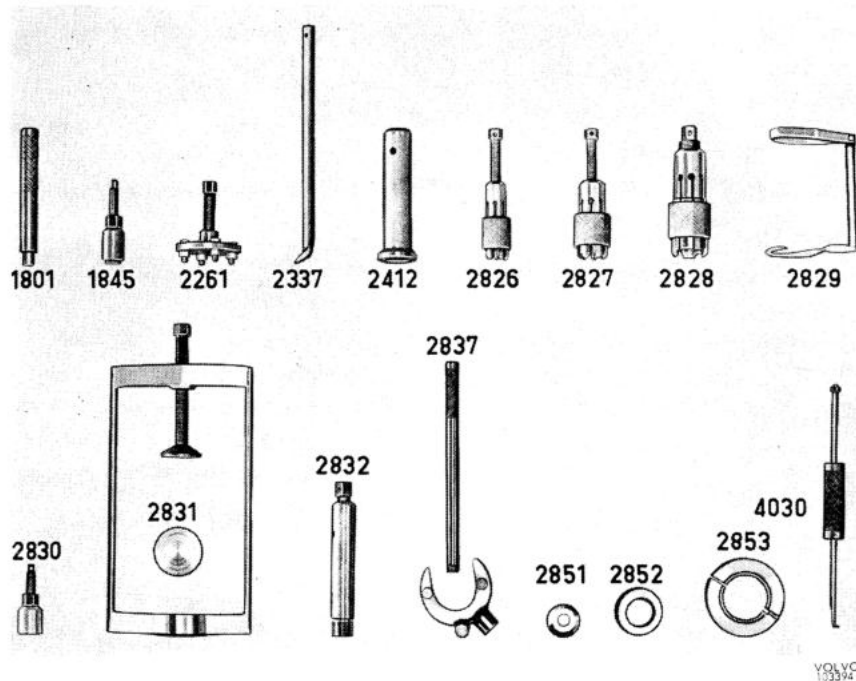


Fig. 4-11. Special tools

- SVO 1801 Standard handle 18×200 mm
- SVO 1845 Press tool for fitting the flange
- SVO 2261 Puller for flange
- SVO 2337 Drift for removing oil seal in cover for input shaft
- SVO 2412 Drift for fitting oil seal in rear cover
- SVO 2520 Stand, see Fig. 4-12. Used together with fixture SVO 2825
- SVO 2727 Tool for suspending engine when removing and fitting gearbox, see Fig. 4-16
- SVO 2825 Fixture for holding gearbox. Used together with stand SVO 2520
- SVO 2826 Puller for front bearing on intermediate shaft
- SVO 2828 Puller for rear bearing on mainshaft, M 400
- SVO 2829 Device for lifting and installing the mainshaft in gearbox
- SVO 2830 Puller for reverse shaft
- SVO 2831 Press tool for fitting bearing on intermediate shaft and rear bearing on mainshaft
- SVO 2832 Puller for rear bearing on mainshaft, M 410  
Used together with SVO 2828
- SVO 2833 Fixture for gearbox. Used on garage jack when removing and fitting gearbox, see Fig. 4-17
- SVO 2837 Counterhold for flange (handle used only for automatic transmission)
- SVO 2851 Drift for fitting oil seal in cover for input shaft
- SVO 2852 Cushioning ring for fitting bearing on input shaft and synchronizers on mainshaft
- SVO 2853 Ring for dismantling mainshaft
- SVO 4030 Puller for oil seal at flange

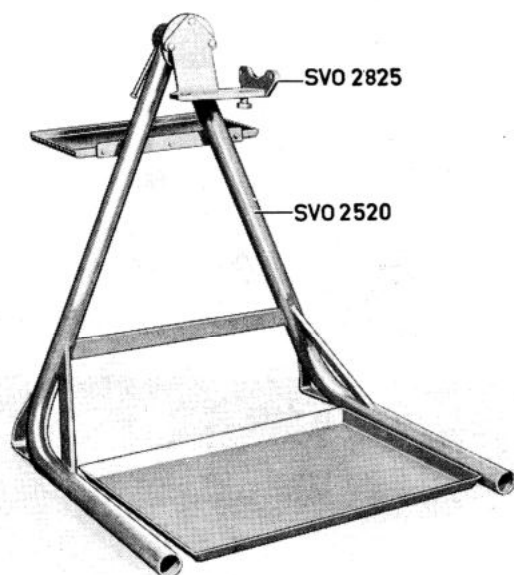


Fig. 4-12. Stand SVO 2520 with fixture SVO 2825

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# DESCRIPTION

(For gearbox with overdrive, see also Group 43 B, Overdrive)

The gearbox is four-speed and fully synchronized. Its design and construction are shown in Fig. 4-13 and Illustration 4B. All gears except reverse are in constant mesh with one another. For this reason, the

mainshaft gear is journalled with needle bearings. When a gear is engaged, the corresponding gear wheel is connected to the mainshaft by means of an engaging sleeve.

## REPAIR INSTRUCTIONS

### WORK WHICH CAN BE CARRIED OUT WITH THE GEARBOX INSTALLED

#### REPLACING THE OIL SEAL

1. Carry out where applicable operations 1—6 under the heading "Removing".
2. Release the nut for the flange. Pull off the flange with puller SVO 2261, see Fig. 4-14.
3. Pull out the old seal with puller SVO 4030. Fit the new oil seal with the help of sleeve SVO 2412.

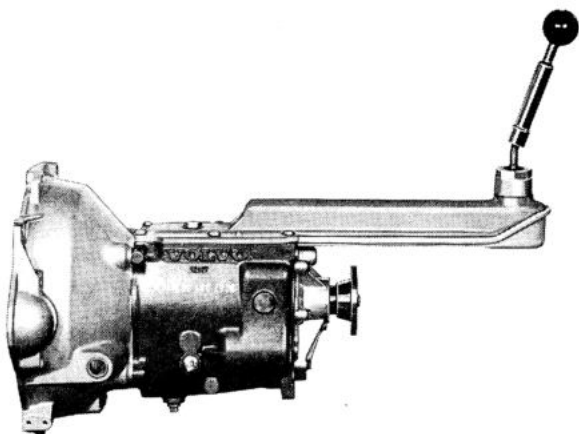


Fig. 4-13. Gearbox M 400

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4. Press on the flange with tool SVO 1845, see Fig. 4-15. Fit the other parts.

#### REMOVING

1. Secure lift tool SVO 2727 to the engine as shown in Fig. 4-16. The lifting hook is secured round the exhaust manifold.
2. Jack up the vehicle and place blocks underneath. Remove the oil from the gearbox.
3. Remove the gear lever. Disconnect the following:

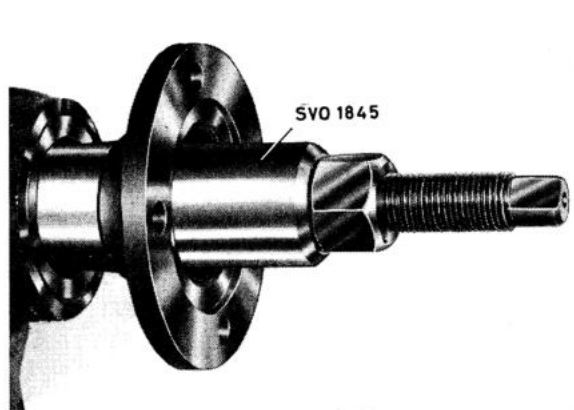


Fig. 4-15. Fitting the flange

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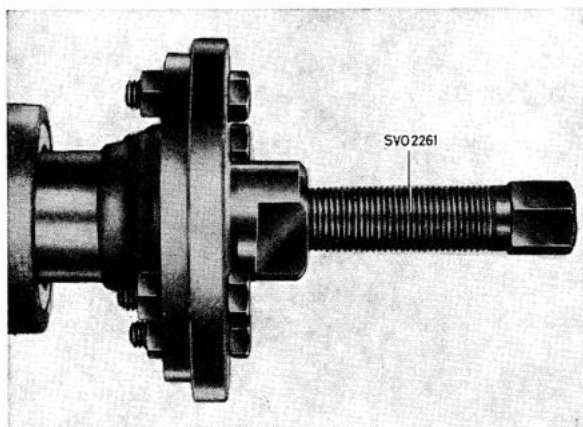


Fig. 4-14. Removing the flange

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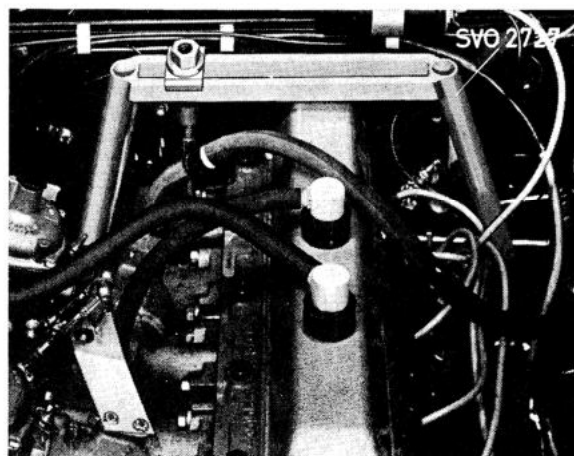


Fig. 4-16. Suspending the engine

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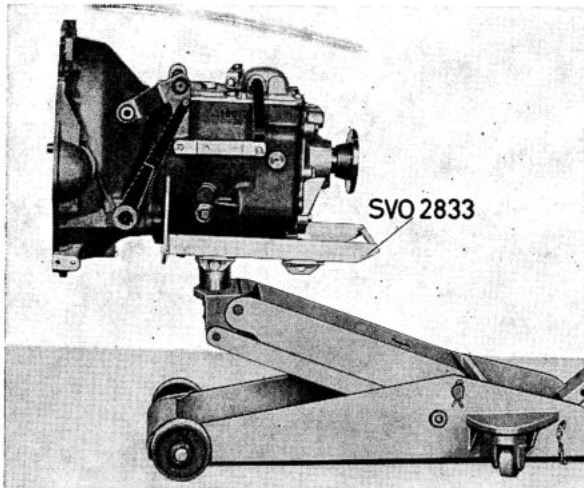


Fig. 4-17. Fixture for removing gearbox

The upper anchorage bolts for the radiator, the nuts for the exhaust manifold flange, the battery lead, the throttle shaft and clutch wire from the flywheel casing.

4. Release and remove the supporting member under the gearbox. Disconnect the bracket for the exhaust pipe. Disconnect the speedometer cable. Disconnect the propeller shaft.
5. Lower the rear end of the engine about 4.5 cm (1.8") and then slacken the lines for the reversing lights and overdrive if fitted.
6. Replace the lifting plate on the jack with fixture SVO 2833. The pin in the fixture should then be located in its front position for gearbox M 400 and in the rear position for the M 410 gearbox. Support the gearbox with the fixture. Slacken the bolts in the clutch casing. Pull the gearbox rearwards and then lower it, see Fig. 4-17.

## DISMANTLING

Applies also to M 410 after the overdrive has been removed.

1. Fit fixture SVO 2825 in stand SVO 2520, see Fig. 4-12. Secure the gearbox in the fixture.
2. Slacken the bolts and lift off the gearbox cover. Remove the springs and the interlock balls for the selector rails.
3. Slacken the nut for the flange. Use for this tool SVO 2837. Pull the flange off with puller SVO 2261, see Fig. 4-14.
4. Remove the release bearing. Release the bolts and remove the cover for the input shaft. Then release the bolts for the clutch casing and remove the casing.
5. Turn the gearbox upside down. Pull out the front bearing of the intermediate shaft with tool SVO

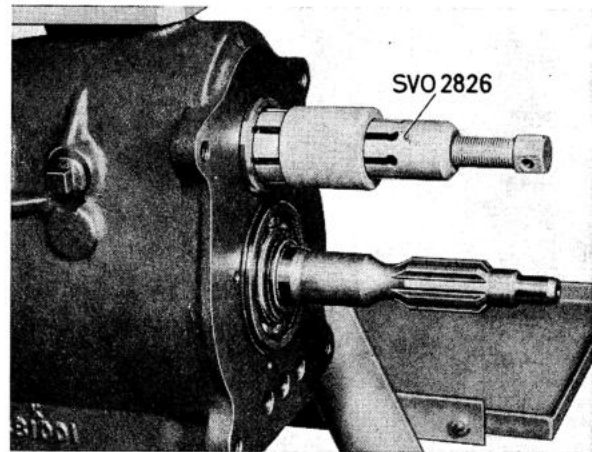


Fig. 4-18. Removing intermediate shaft front bearing

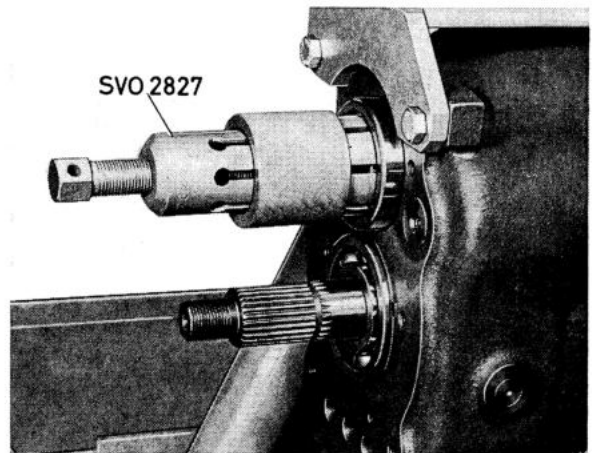


Fig. 4-19. Removing intermediate shaft rear bearing

2826, see Fig. 4-18. Remove the rear cover and then pull off the rear bearing of the intermediate shaft with tool SVO 2827, see Fig. 4-19.

6. Restore the gearbox to its normal position. While doing this ensure that the teeth of the intermediate shaft are not damaged when it drops down into the bottom of the gearbox.
7. Unscrew the bolts for the selector forks. Push the selector rails backwards and drive out the tensioning pin in the flange of the selector rails. Push 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.
8. Remove the speedometer gear. Pull out the rear bearing of the mainshaft with tool SVO 2828, see Fig. 4-20. If the bearing sticks in the gearbox housing, push the mainshaft forwards so that its drive and synchronizers go against the drive of the intermediate shaft. To prevent this, place a piece of flat iron or similar between the front end of the mainshaft and the gearbox housing. For the M 410, remove the bolt in tool SVO 2828

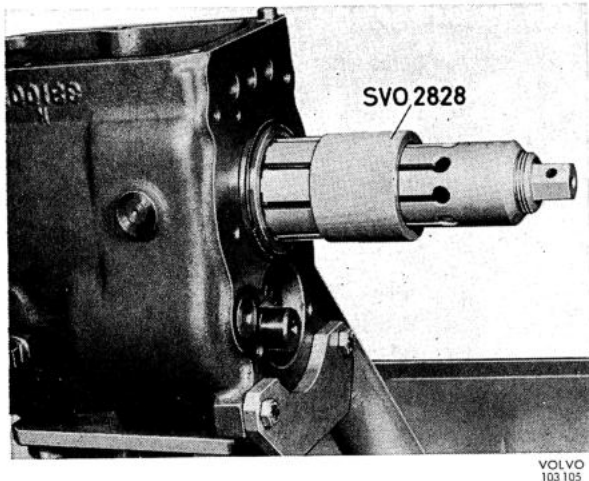


Fig. 4-20. Removing the mainshaft rear bearing, M 400

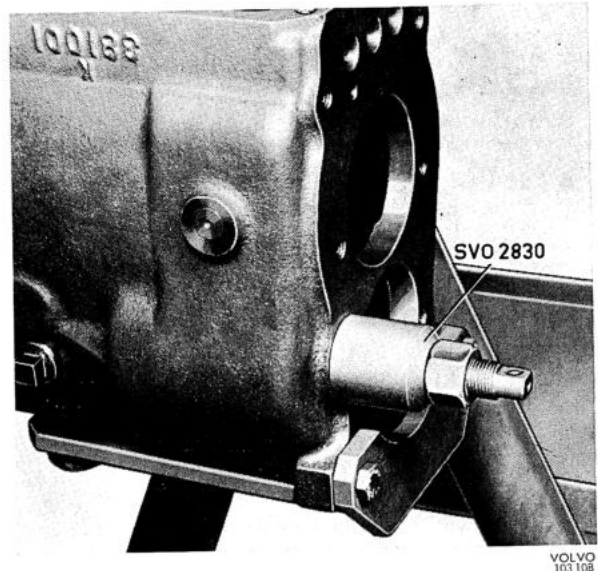


Fig. 4-23. Removing the reverse shaft

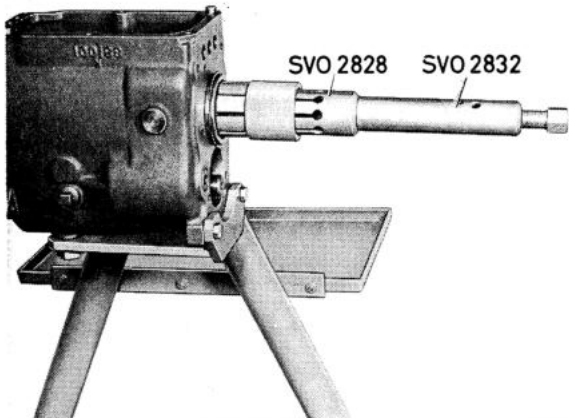


Fig. 4-21. Removing the mainshaft rear bearing, M 410

and replace it with SVO 2832. Then pull off the rear bearing in the same way as for the M 400 unit, see Fig. 4-21.

9. Pull out the input shaft and remove the synchronizing ring. Remove the thrust washer from the mainshaft rear end. Fit lifting tool SVO 2829 on the mainshaft. Push the engaging sleeve for 1st and 2nd speed rearwards. Lift up the mainshaft as shown in Fig. 4-22.
10. Pull out the reversing shaft with puller SVO 2830, see Fig. 4-23, and remove the reverse gear.
11. Pull out the oil seals from the front and rear covers with drift SVO 2337.

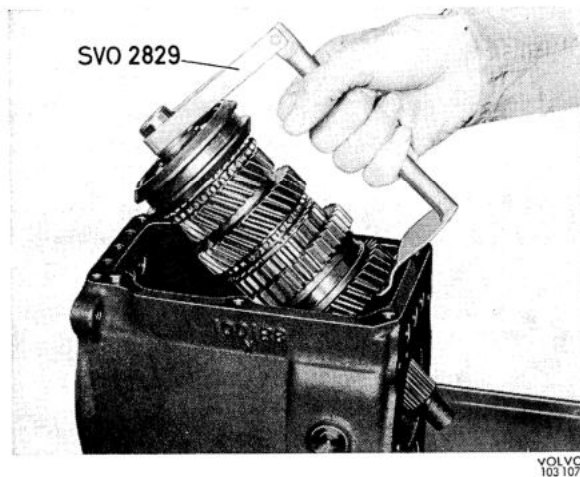


Fig. 4-22. Lifting out the mainshaft

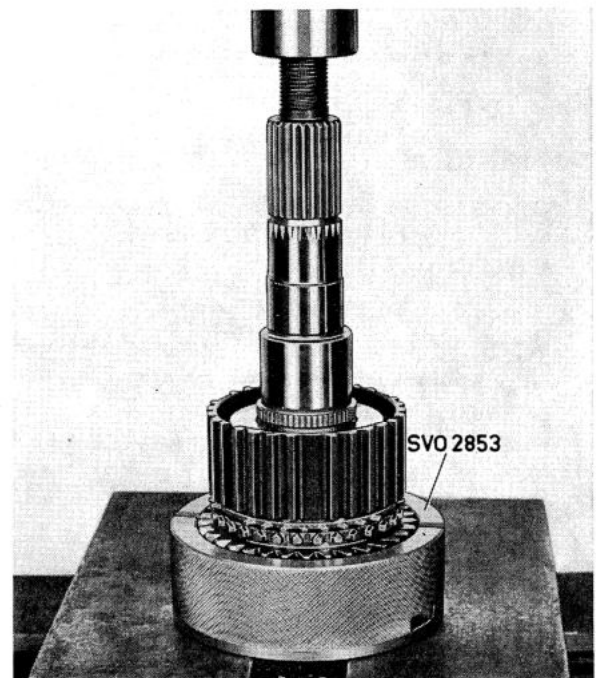


Fig. 4-24. Dismantling the mainshaft, I

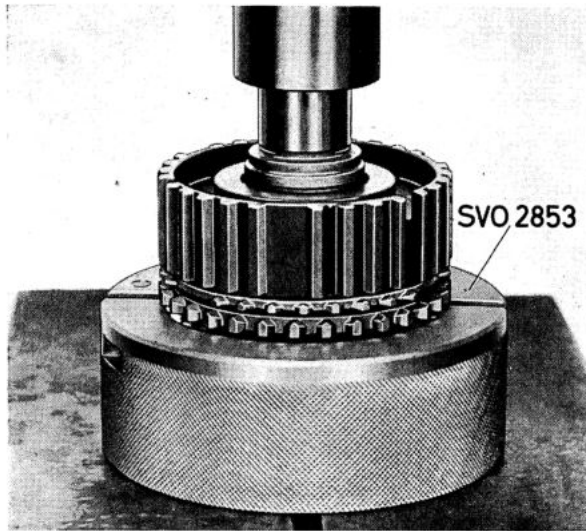


Fig. 4-25. Dismantling the mainshaft, II

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### DISMANTLING THE MAINSHAFT

1. Remove the lifting tool and then 1st speed gear wheel, the needle bearing and the synchronizing cone.
2. Remove the engaging sleeves and the flanges for the synchronizers. Remove the circlips for the synchronizing hub.
3. Fit tool SVO 2853 on to the mainshaft. Place the shaft in a press and support it with the tool as shown in Fig. 4-24. Press off 2nd speed gear wheel and 1st and 2nd speed synchronizing hub.
4. Revert the shaft and place it in the press as shown in Fig. 4-25. Press off 3rd speed gear wheel and 4th speed synchronizing hub.

### INSPECTING

After the dismantling, clean all the parts in white spirit and check for wear or other damage.

Check the gear wheels particularly for cracks or scoring on the teeth surfaces. Damaged or worn gear wheels should be replaced.

Check the synchronizing cones, also the other parts of the synchronizing devices. Damaged or worn parts should be replaced.

Check the ball bearings especially for scoring or cracks in the bearing races or on the balls.

### ASSEMBLING

#### ASSEMBLING THE MAINSHAFT

1. Assemble 1st-2nd and 3rd-4th speed synchronizers. Fit the snap rings correctly, see Fig. 4-26.
2. Place ring SVO 2852 in a press. Place on 3rd-4th synchronizer, synchronizing cone, 3rd speed gear

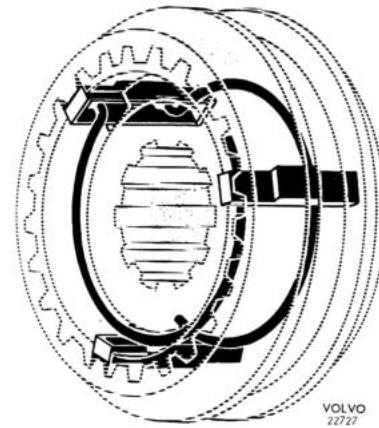


Fig. 4-26. Assembling the synchronizing

wheel and needle bearing. Make sure that the synchronizing flange locates correctly in the grooves in the synchronizing cone. Press the mainshaft into the synchronizing hub as shown in Fig. 4-27. When doing this, turn the 3rd speed gear wheel in order to check that this gear as well as the needle bearing fit correctly. Try out a circlip which fills the groove well and fit the circlip.

3. Place 1st-2nd speed synchronizer, synchronizing cone, 2nd speed gear wheel and needle bearing on ring SVO 2852. Make sure that the gear ring on the engaging sleeve comes forwards and that the flanges fit correctly in the grooves of the synchronizing cone. Press in the mainshaft, see Fig. 4-27. When doing this, turn the 2nd speed gear wheel to prevent it from fastening. Try out a cir-

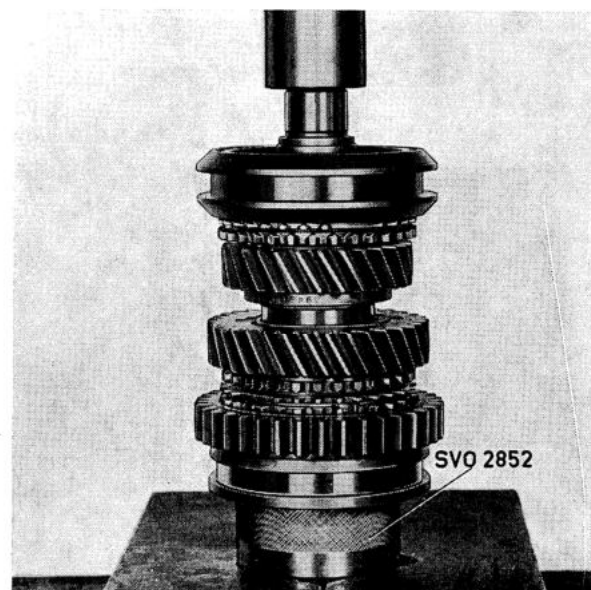


Fig. 4-27. Fitting the synchronizing

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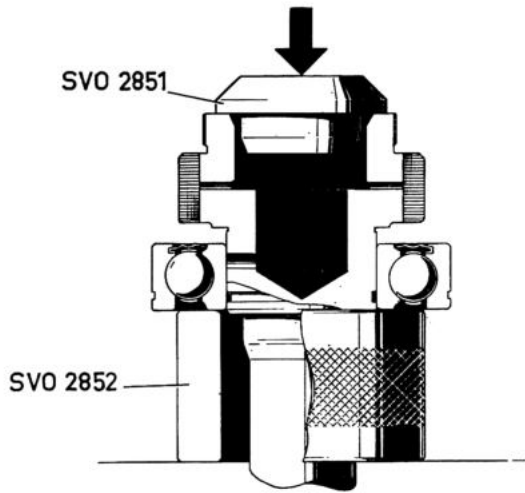


Fig. 4-28. Fitting the ball bearing on the input shaft

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clip which fits well into the groove on the shaft and fit the circlip.

4. Fit 1st speed gear wheel with needle bearing and synchronizing cone on the mainshaft. Fit on lifting tool SVO 2829.

#### ASSEMBLING THE GEARBOX

1. Press the oil seals on to the front and rear covers with drift SVO 2851 and SVO 1801 as well as SVO 2412. Press the ball bearing on to the input shaft with the help of the cushioning ring SVO 2852 and drift SVO 2851, see 4-28. Try out a circlip which fits well into the groove and fit the circlip.
2. Place the gear lever for the reverse shaft on to the bearing pin in the gearbox housing. Fit the reverse gear and the reverse gear shaft. The reverse gear shaft should lie level with the rear end of the housing or a maximum 0.2 mm (0.08") below.

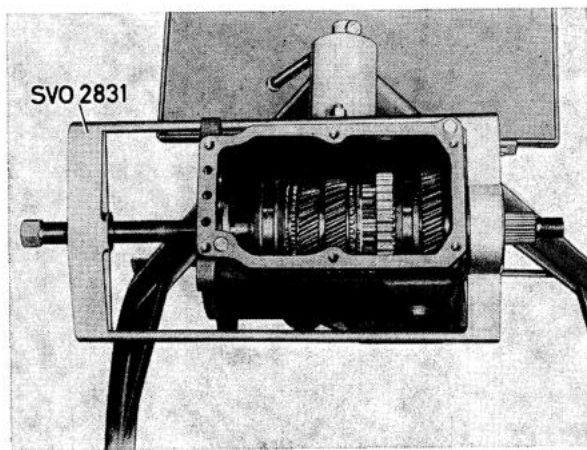


Fig. 4-29. Fitting the mainshaft rear bearing

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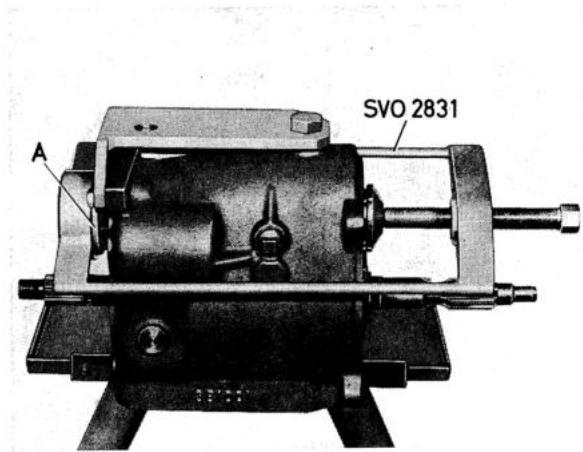


Fig. 4-30. Fitting intermediate shaft bearing  
A. Insert drift

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3. Place the intermediate shaft in the bottom of the gearbox housing. Fit the mainshaft in the housing. Take off the lifting tool and place the thrust washer on to the mainshaft.
4. Fit the rear ball bearing on to the mainshaft. Fit press tool SVO 2831 over the bearing and the mainshaft as shown in Fig. 4-29. Press the bearing on to the shaft. If the bearing does not locate in the housing, the spindle on tool SVO 2831 can be screwed out and a flat iron piece placed between this and the front end of the housing. The bearing can then be pressed into position with the tool.
5. Fit the needle bearing in the input shaft. Install the loose synchronizing cone in the synchronizer for the 3rd-4th speeds. Place it correctly so that the flanges take up in its grooves. Push the input shaft into the housing and on the pin of the mainshaft.

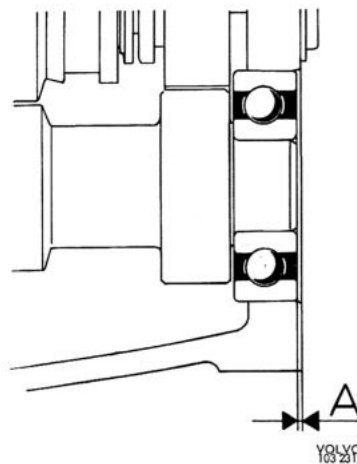


Fig. 4-31. Clearance for intermediate shaft  
A = 0.00—0.05 mm (0.002")

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6. Turn the gearbox upside down. Press the insert drift into press tool SVO 2831. Then press on the bearings for the intermediate shaft with the press tool, see Fig. 4-30. Fit the clutch casing with a new gasket.
7. Fit selector forks, flanges and selector rails. Make sure that the flange for the reverse gear fits correctly in the gear lever. Fit the bolts and tensioning pins. Use new pins.
8. Turn the gearbox with the rear end upwards. Drive forwards the intermediate shaft so that its front bearing lies against the clutch casing. Fit in shims for the intermediate shaft rear bearing so that they lie evenly with or up to 0.05 mm (0.002") under the rear end (see A, Fig. 4-31).
9. Fit on the large speedometer gear. Fit the rear cover with a new gasket. When fitting, compress the gasket and ensure that the intermediate shaft has the correct clearance, 0.20—0.25 mm (0.008—0.010").
10. Press on the flange with tool SVO 1845. Fit the washer and nut. Tighten the nut to a torque of 11—14 kpm (80—110 lb.ft.).
11. Place the interlocking balls and springs in position. Fit the gearbox, cover and gasket. Fit the cover over the input shaft. Fit also the release bearing.

### **FITTING**

Fitting of the gearbox is in reverse order to removal. Fill with oil.