

SERVICE MANUAL

CARS AND VANS

PV. 444—445

Part 2

CLUTCH

Export Service Department

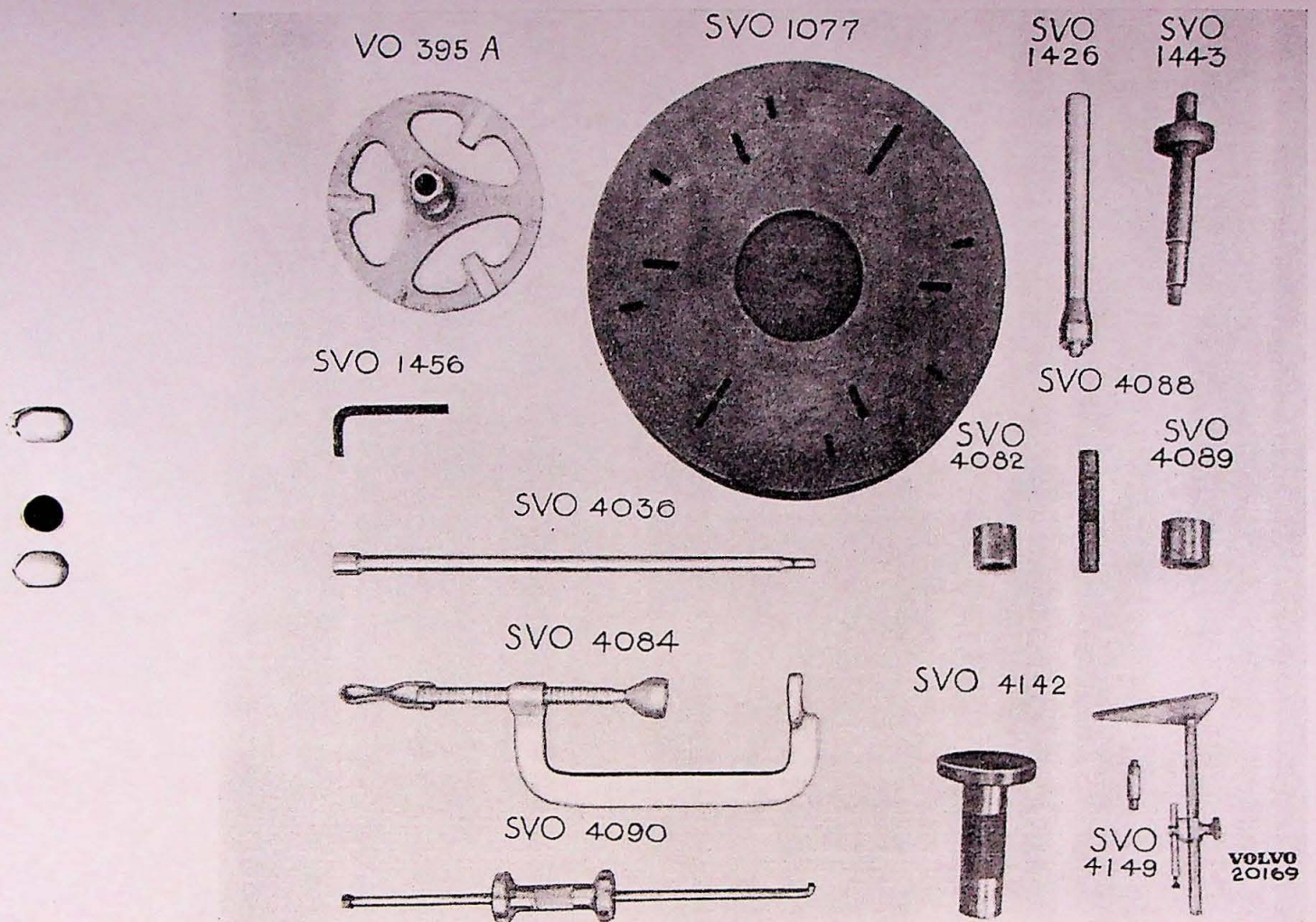
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TOOLS

The following special tools are necessary for clutch and pedal shaft repair.



Clutch.

- VO 395A Adjusting jig for clutch release levers.
- SVO 1077 Universal jig.
- SVO 1426 Driver for flywheel pilot bearing.
- SVO 1443 Alignment driver for driven plate and adjustment gauge for release levers.
- SVO 1456 Wrench for lower gearbox screws.
- SVO 4036 Wrench for upper gearbox screws.
- SVO 4090 Puller for flywheel pilot ball.

Fig. 21.

bearing.

- SVO 4149 Dial indicator carrier.

Pedal shaft.

- SVO 4082 Pedal shaft washer installing driver.
- SVO 4084 Pedal shaft assembling clamp.
- SVO 4088 Pedal bushing driver.
- SVO 4089 Spacer for pedal bushing.
- SVO 1112 Support for fitting pedal shaft washer.

SPECIFICATIONS

Pressure springs.

- Number 6
- Length unloaded 55.5 mm ($2\frac{3}{16}$ "
- loaded with 77 ± 2.5 kg
- (170 ± 5.5 lbs) 38 mm ($1\frac{1}{2}$ "

Facing rivets.

- Number 16

Size 3.5×6.5 mm ($.14" \times .26"$)

Clutch release levers.

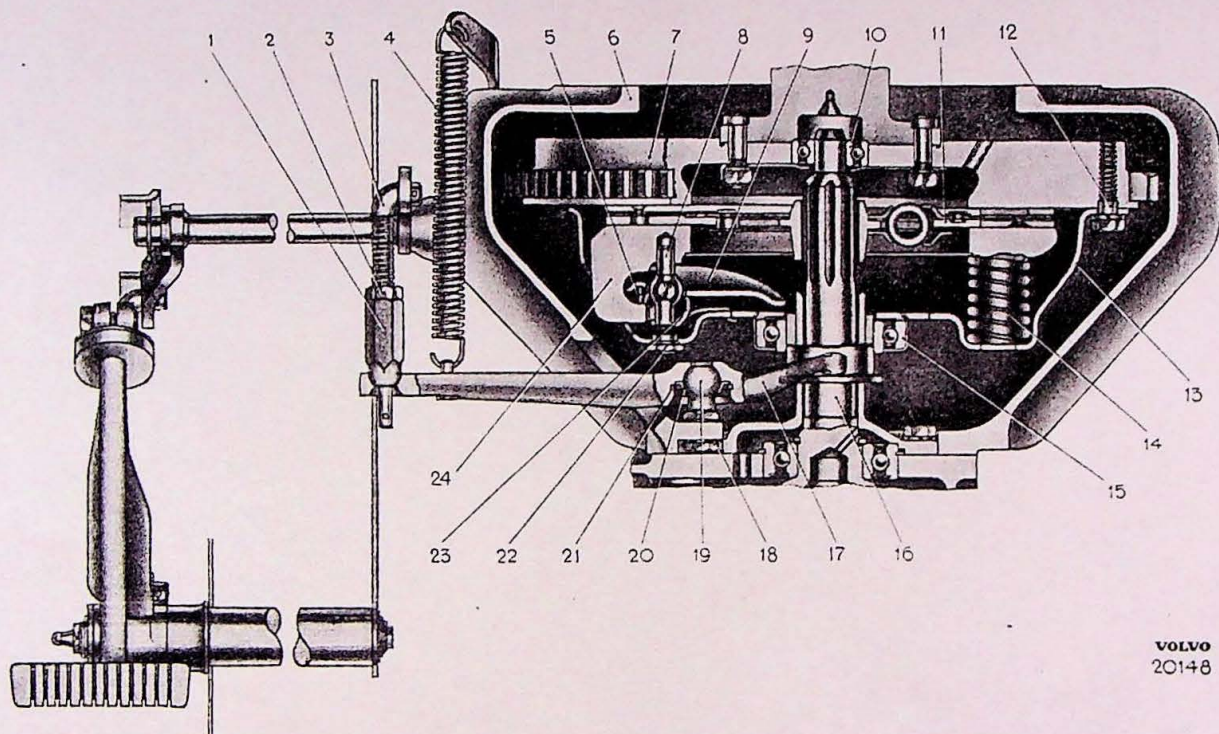
Should be adjusted to a position 7.7 mm (.30") below hub of adjusting jig.

Clutch pedal.

Free travel 20—25 mm ($\frac{3}{4}" - 1"$)

DESCRIPTION

The clutch of PV 444-445 is a single plate, dry disc type. The pressure plate is operated by three release levers, which are actuated from the clutch pedal by links, clutch fork and release bearing. The thrust required on the pressure plate is obtained from six strong pressure springs. The release bearing is guided by a tubular extension of the drive pinion bearing cover. fig. 1.



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Fig. 1.

- | | |
|-------------------------------------------------------|----------------------------------|
| 1. Adjusting nut. | 13. Clutch cover. |
| 2. Lock nut. | 14. Pressure spring. |
| 3. Link. | 15. Release bearing. |
| 4. Return spring. | 16. Main drive pinion. |
| 5. Strut between release lever
and pressure plate. | 17. Clutch fork. |
| 6. Flywheel housing | 18. Ball locking screw. |
| 7. Flywheel. | 19. Clutch fork ball. |
| 8. Lever eyebolt. | 20. Ball seat. |
| 9. Release lever. | 21. Ball seat lock ring. |
| 10. Flywheel pilot bearing. | 22. Release lever adjusting nut. |
| 11. Driven plate. | 23. Release lever spring. |
| 12. Clutch cover screw. | 24. Pressure plate. |

REPAIR INSTRUCTIONS

Removal of clutch from chassis.

1. Remove gearbox according to instructions given in part 3.
2. Disconnect spring (4) and link (3, fig. 1) at clutch fork.
3. Remove release bearing (15).
4. Remove plate housing under flywheel.
5. Remove clutch fork (17) by loosening the ball (19) from the inside of the clutch housing some turns by a 17 mm open end wrench and holding it in that position. Then unscrew the ball locking screw (18). Turn clutch fork half-way round and withdraw it backwards, fig. 2.

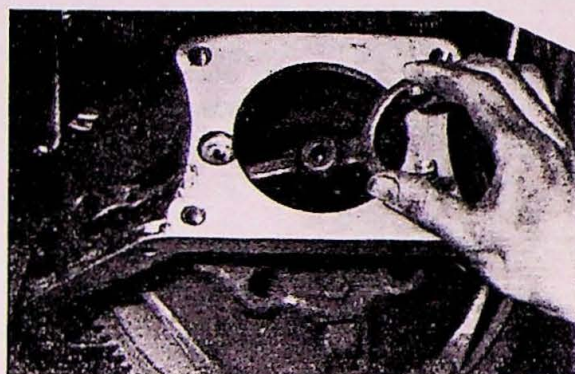


Fig. 2.

6. Punch-mark clutch, fig. 3, so that assembly after overhaul will be correct and the original balance maintained. Turn flywheel round to be sure that no earlier marking exists.
7. Loosen the six clutch screws (12) transversely and gradually to avoid breakage. Remove the screws. Hold the clutch so as not to let it fall. Clutch and driven plate can then be removed downwards, fig. 4.

Replacing driven plate facings.

1. Drill away the old rivets by a drill of the same diameter as the rivets, 3.5 mm (.14"). The best way is to drill through the rivet heads. Remove the old facings. To prevent deformation of driven plate, do not use press or driver.

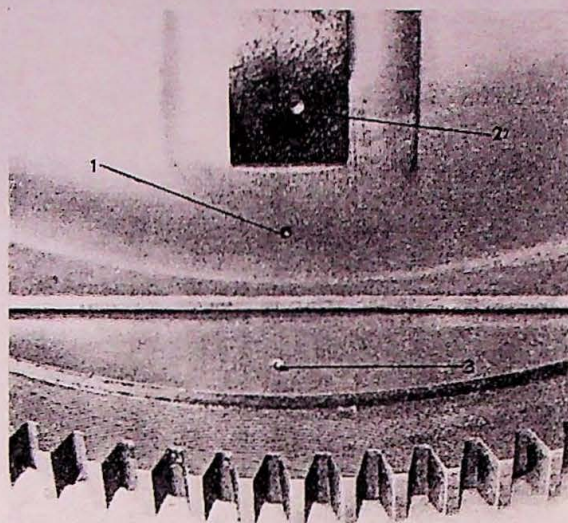


Fig. 3.

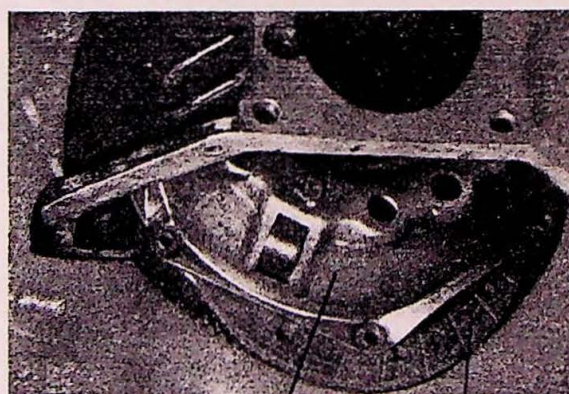


Fig. 4.

1. Clutch. 2. Driven plate.

2. Check driven plate. The set of the tongues should be even. The driven plate must not be warped. The driven plate springs and hub rivets should be tightly fixed. The driven plate is to slide easily on the main drive pinion without excessive play. Check for cracks. Replace driven plate, if such defects are observed. If it shows a pro-

nounced blue colour, indicating clutch slippage, it should be renewed.

3. Rivet the new facings (preferably in a rivet press). Use a riveting punch designed for tubular rivets. Insert rivets from facing side using every second hole of facing. After riveting the facings, the distance between them should be fixed by the set of the driven plate tongues, fig. 5. This is very important for obtaining a smooth engagement.

Keep facings absolutely clean from oil to avoid clutch slippage.

Main drive pinion pilot bearing in flywheel.

Remove pilot bearing with puller SVO 4090, fig. 6.

If flywheel is removed, pilot bearing can be driven out by means of driver SVO 1426.

Wash pilot bearing in gasoline. If pilot bear-

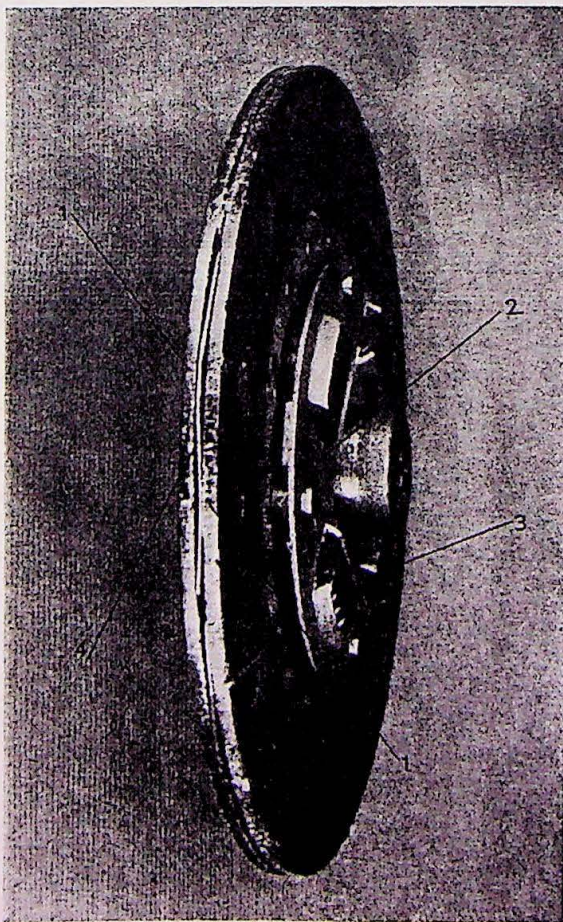


Fig. 5.

1. Facing.
2. Hub.
3. Hub springs.
4. Driven plate cushion springs.

ing is running smoothly without excessive play, repack with grease. Use heat resistant grease.

Use driver SVO 1426 to install pilot bearing.

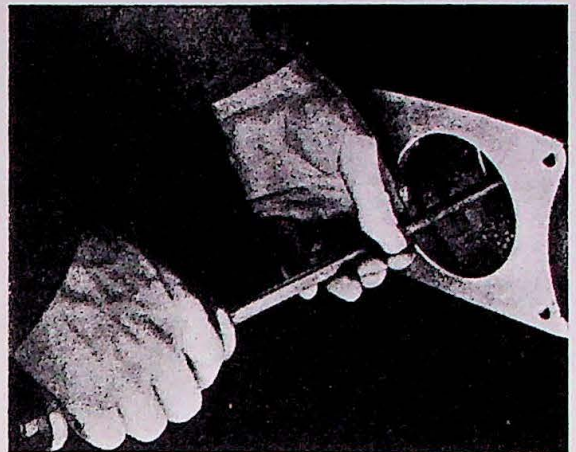


Fig. 6.

Clutch disassembly.

1. Place the clutch in a press with a wood block, $1\frac{1}{2}'' \times 8''$ under pressure plate fig. 7. Mark the clutch as fig. 8 indicates.
2. Place a wood block across clutch top. Press down clutch plate cover about 3 mm ($\frac{1}{8}''$) and lock the press in that position, fig. 7.
3. Unscrew the three release lever adjusting nuts.
4. Release the press spindle slowly to prevent the springs flying out and lift off the clutch plate cover.
5. Mark release lever and spring positions carefully with punch or paint before dismantling for inspection.
6. Remove release levers according to instructions given in fig. 9.

Inspection.

1. Check pressure plate for warping. Place pressure plate on a face plate or a new pressure plate. Check with feeler gauge 0,15 mm (.006''). Excessive warping is indicated if feeler gauge can be inserted anywhere. Pressure plate must not be cracked or have a damaged surface. Scratches or damages caused by rivets are not allowed on pressure plate or flywheel surfaces.

If surfaces are coloured blue or only slightly scratched, they may be recondi-

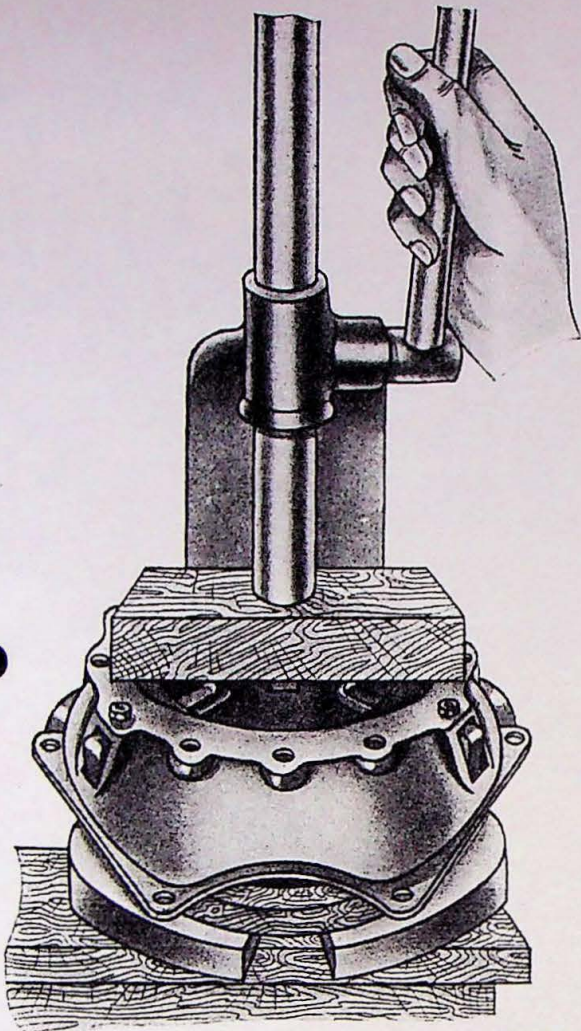


Fig. 7.

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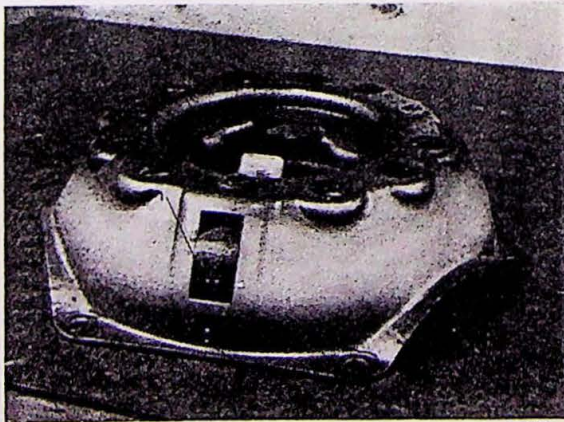


Fig. 8.

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tioned by grinding in a lathe with a slide grinding machine, fig. 10. Do not grind off more material than 0,75 mm (.030"). If damages deeper, renew parts.



Fig. 9.

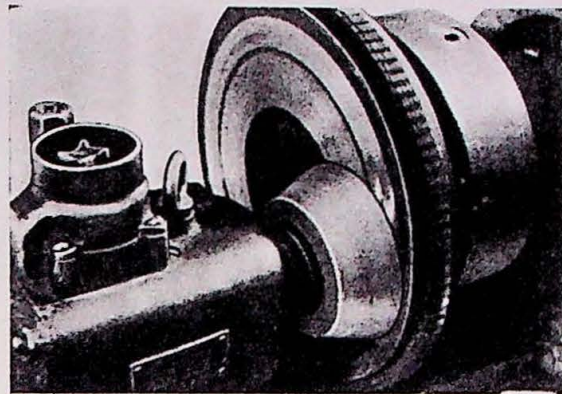


Fig. 10.

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2. Check release levers for wear at contact surfaces.
3. Pressure springs should be as long as stated, loaded as well as unloaded.
Length unloaded = 55,5 mm ($2\frac{3}{16}$ ")
Length loaded with $77 \pm 2,5$ kg ($170 \pm 5,5$ lbs) = 38 mm ($1\frac{1}{2}$ ")
If springs do not keep tension required, they should be renewed.
4. Check release bearing by turning it round slowly when applying a light pressure. The bearing should run smoothly without sticking anywhere.
Release bearing should slide easily on the clutch release sleeve.
Release bearing is from beginning packed with grease intended to last during the life of bearing.
A release bearing found in order when inspecting *must not be washed in gasoline or any other solvent*, or warmed up, as grease may melt and run out of the bearing.
A damaged or worn bearing should be replaced. If bearing is coloured blue caused by bearing ring rotation, it should be renewed. Lack of grease is the reason.
5. Check clutch fork pivot pin. The ball must not be worn or dry. The ball seat should be intact and the ball seat lock ring at its

place to keep the clutch fork in position on the ball.

Replace parts found to be worn or damaged.

Pack ball joint with grease when assembling.

6. Check the driven plate according to "Renewing driven plate facings", part 2.

Clutch assembly.

1. Place pressure plate in a press on the same wood block as used when disassembling, fig. 7.
2. Lubricate release lever contact surfaces with oil. Lubricate with care to keep oil away from facings after assembling.
3. Assemble release levers according to fig. 9.
4. Place the six pressure springs in position according to marking.
5. Check that the three release lever springs are placed in position, fig. 11 (1), and place the clutch plate cover on top of the six pressure springs in the punch-marked position, fig. 8.
6. Place a wood block on top of clutch plate cover and press down making it possible to screw adjusting nuts on threaded lever eyebolts. Tighten nuts until flush with eyebolt top. Clutch is now ready for adjustment.

Release lever adjustment.

This adjustment is very important for making the clutch work satisfactorily. A special

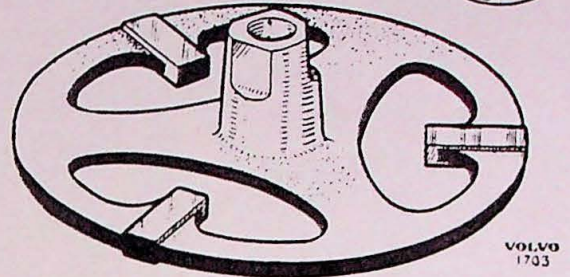
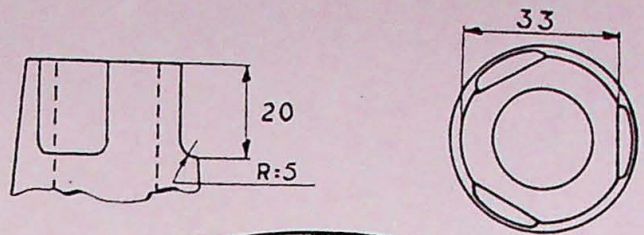


Fig. 12.

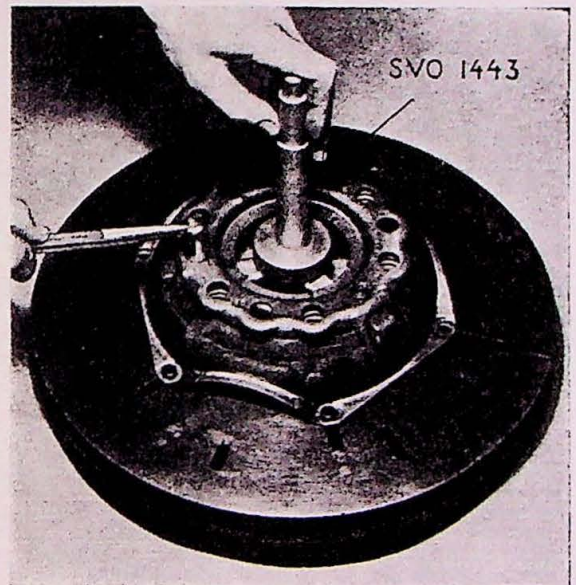


Fig. 13.

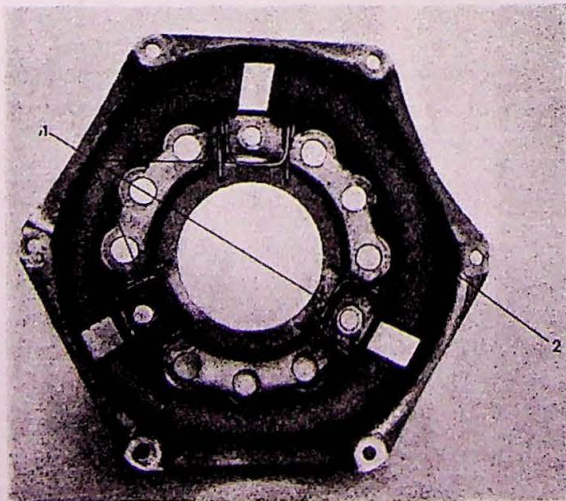


Fig. 11.

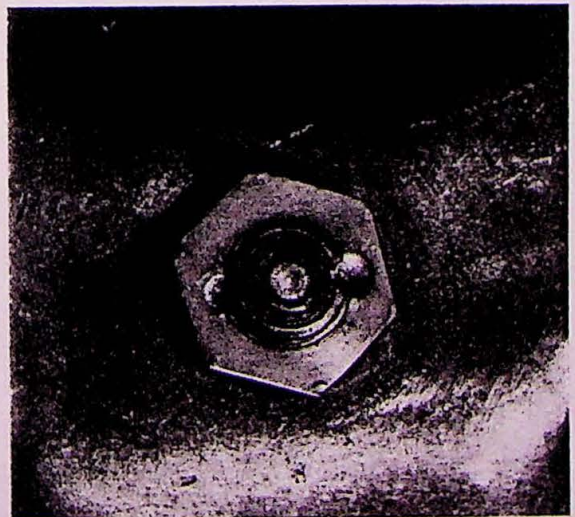


Fig. 14.

jig VO 395 A with cut off hub is used, fig. 12.

Use that jig together with jig SVO 1077, which is specially designed for that purpose.

Place jig VO 395 A instead of the driven plate under the pressure plate with its three heads straight below the release levers. Then attach the clutch to the universal jig.

Press down the release levers to their working positions a few times for instance with a hammer shaft, or similiar. Adjust release levers to a position 7.7 mm (.30") below the top surface of jig hub. Place tool SVO 1443 in jig hub and use the tool as an adjusting gauge, fig. 13.

Check the three release levers when adjusted, and lock adjusting nuts by punching, fig. 14.

Checking flywheel housing with dial indicator.

Before installing the clutch, the position of the flywheel housing in relation to the crankshaft should be checked. The flywheel housing opening is to be concentric to the flywheel pilot bearing. Max. difference 0.20 mm (.008"). The housing surface should be facing gearbox at right angles to the crankshaft centre line. Max. difference 0.15 mm (.006") measured according to fig. 16.

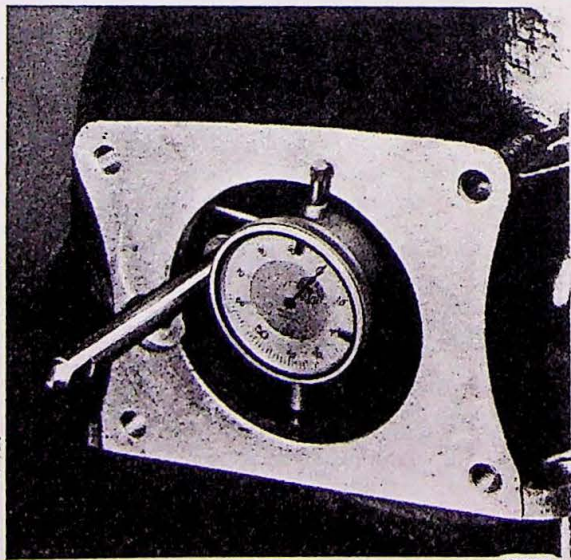


Fig. 15.

Measuring is carried out by means of a dial indicator fixed to the flywheel by a carrier SVO 4149. Fig. 15 shows indicator position when checking the opening. If the difference

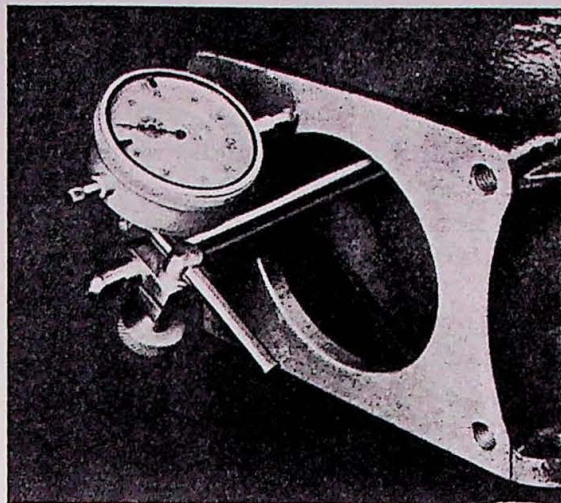


Fig. 16.

exceeds the permissible limit, adjust by loosening screws and moving flywheel housing into correct position.

Fig. 16 shows how to place the dial indicator when checking the surface. Is not the surface at right angles to the crankshaft centre line within the tolerance zone fixed, investigate if caused by dirt between flywheel housing and cylinder block.

Checking flywheel with dial indicator.

Place the short indicator carrier SVO 4149 in one of the holes for the plate cover screws, fig. 17. Fit the indicator with the measuring pointer at the outside edge of the surface and set to zero. Turn the crankshaft round and check the reading. Max. distortion 0.20 mm (.008").

Does the indicator reading indicate excessive distortion, check if there is any dirt or unevenness on crankshaft flange or flywheel.

Clutch installation.

Pack pilot bearing in flywheel with grease. Check before assembling that facings, flywheel and pressure plate are absolutely free from oil. Wash with pure gasoline and wipe carefully with a clean linen rag.

1. Turn flywheel to the position shown by punch marks made when disassembling, fig. 3.
2. Install driven plate (long side of hub facing backwards) and clutch, and insert

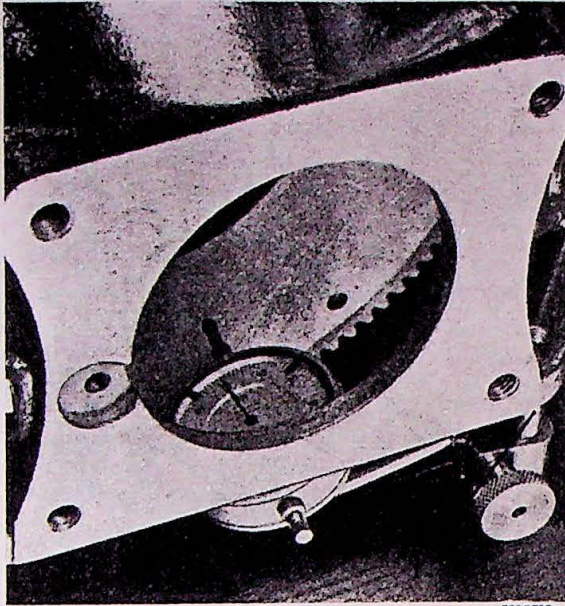


Fig. 17.

1. Indicator carrier SVO 4149.

alignment driver SVO 1443 with guide stud in flywheel pilot bearing.

3. Turn clutch round until the mark on the

clutch is exactly flush with the flywheel mark.

4. Fit the six clutch cover screws and tighten them transversely some turns each. Remove alignment driver.
5. Replace clutch fork turned half way round in flywheel housing. Turn it back and fix the ball with the locking screw (18), fig. 1.
6. Fit release bearing.
7. Fit link between pedal and clutch fork and return spring.
8. Install gearbox according to instructions given in part 3.
9. Fasten plate housing under flywheel with screws.

Clutch pedal free travel adjustment.

Clutch pedal should be adjusted to a free travel 20—25 mm ($\frac{3}{4}$ "—1"). Adjust from below, if the cover plate on the left hand side is not fitted. You can also reach the adjusting nut from above on the left hand side. Adjustment is best carried out with a short open end wrench. Lock adjusting nut with locking nut.

Pedal shaft overhaul.

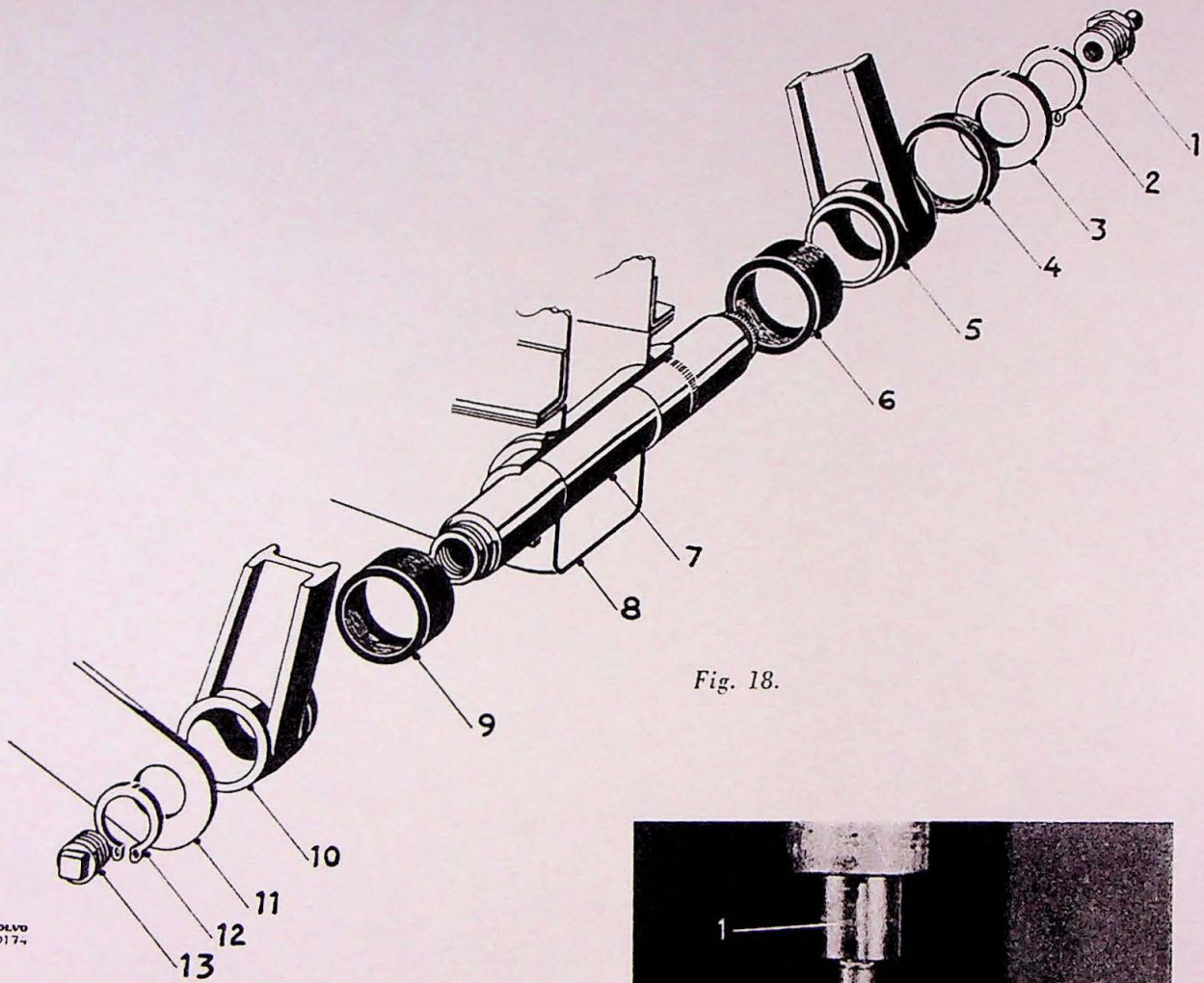


Fig. 18.

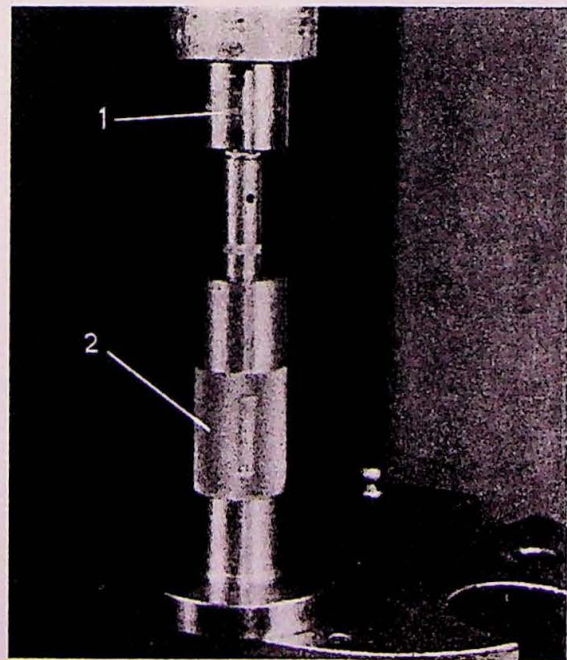


Fig. 19.

1. Tool SVO 4082.

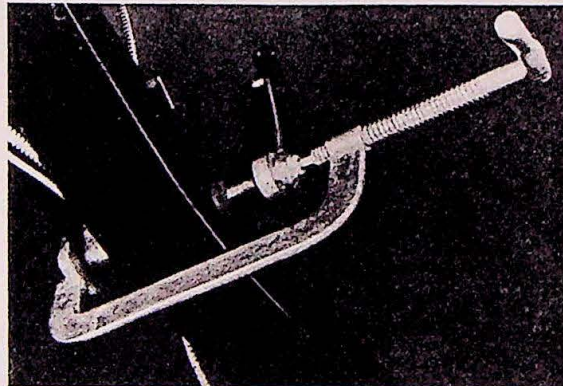
2. Tool SVO 4142.

Disassembly.

1. Loosen pedal parts going through toe board. Disconnect return springs, brake and clutch links.
2. Remove lock spring (12), fig. 18, at the pedal shaft inside end. Drive out pedal shaft and remove pedals.
3. Rebush pedals. Use driver SVO 4088 together with spacer SVO 4089. If necessary ream bushings. Renew pedal shaft if it is worn at pedal positions.

Assembly.

4. Fit washer (3) on splined end of pedal shaft with aid of driver SVO 4082 and support SVO 4142, fig. 19. Fix locking spring (2) in position outside the washer. Lubricate clutch pedal bushing. Fit the narrow rubber ring (4) on the outside and the rubber casing (6) on the frame facing side of pedal. Fit clutch pedal on shaft (7) and push shaft into position in frame. Fit a rubber ring on the frame facing side of brake pedal. Lubricate bushing and fit pedal on shaft. Fit brace rod (11). Press the whole assembly together by means of clamp SVO 4084, fig. 20, and fix locking spring (12).
5. Fit lubricant nipple (1) at clutch pedal side and brass plug (13) at the opposite end. Lubricate with chassis lubricant.
6. Fit brake and clutch links and return springs. Tighten pedal top parts and adjust clutch pedal free travel.



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Fig. 20.

TRACING FAULTS

Occuring faults generally cause the clutch to stick or slip, not to release or to make noise. The reason is usually found in normal wear, but

may be caused by overload or wrongly executed assembly or adjustment.

CAUSE	REMEDY
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Clutch sticks.

Clutch wrongly adjusted.

Follow instructions under "Release lever adjustment" and "Clutch pedal free travel adjustment".

Driven plate warped.

Replace driven plate.

Oil on driven plate facings, flywheel or pressure plate.

Renew driven plate facings. Wash flywheel and pressure plate with pure gasoline.

Driven plate facings enamelled on surface.

Renew driven plate facings.

Driven plate sticks on drive shaft.

Clean and lubricate hub and shaft carefully.

File off burrs if any (Renew drive shaft if necessary).

Pressure plate or flywheel surfaces damaged, cracked or burned.

Renew pressure plate or flywheel (Surface being blue tempered or only slightly scratched may be ground).

Engine loose at its supports.

Fasten engine. Renew damaged engine supports.

Driven plate loose on hub.

Renew driven plate.

Clutch pedal sticks.

Lubricate pedal bushing and clutch joints.

Excessive play in universal joints or rear axle gear.

Adjust or renew worn parts.

Clutch slips.

Clutch wrongly adjusted.

Follow instructions under "Release lever adjustment" and "Clutch pedal free travel adjustment".

Driven plate facings worn.

Renew facings.

Pressure springs too weak or broken.

Renew defect springs.

Clutch pedal sticks.

Check all springs.

Lubricate and renew worn parts.

Clutch does not release.

Clutch wrongly adjusted.

Follow instructions under "Clutch pedal free travel adjustment".

Release bearing defect.

Fit new bearing.

Too thick facings.

Fit new facings.

Worn link or ball joints.

Renew worn parts.

Pressure plate cracked or warped.

Renew pressure plate.

Driven plate warped.

Fit new driven plate.

Clutch noise.

Hub springs broken or loose.

Renew driven plate and facings.

Release bearing dry or worn.

Renew bearing.

Flywheel pilot bearing worn or not lubricated.

Renew or lubricate bearing.

Driven plate loose at hub.

Fit new driven plate.

Broken pressure springs.

Renew springs.