SERVICE MANUAL

TRUCKS

L 385

Export Service Department

AKTIEBOLAGET
VOLVO
GÖTEBORG . SWEDEN

PART 5

REAR AXLE

DESCRIPTION

L 385 model trucks are fitted with a fully floating type of rear axle, that is to say, vertical loading is transferred directly from the rear axle housing to the wheel hubs, the axle shafts carrying only the transmitted turning power.

The rear axle is fitted with a hypoid differential, that is to say the drive pinion is below the center of the ring gear. Due to this position of the drive pinion, there is a sliding or wiping motion between the gear teeth in a hypoid differential. Great demands are thus made on the adhesive properties of the oil used. For this reason, a special type of oil called hypoid oil is used. The use of the wrong type of oil means that there is extremely rapid wear in the differential.

The rear axle housing (43, Illustration 5-A) is made of cast steel and has pressed-in tubular shafts, flanges for the brake backing plates (45) and spring attachments.

The differential case (36) consists of two halves which are held together by means of twelve bolts (37). The ring gear (2) is attached to one of these halves with rivets (35). The differential case is journalled in the drive pinion carrier (5) by means of two tapered roller bearings (1). For adjustment of these bearings and for the adjustment of the backlash between the ring gear and drive pinion there are two adjuster nuts (42). In the drive pinion carrier, there is a support pin (3) with a shoe (4) against the ring gear to unload the differential case and bearings from excessive stresses.

The differential consists of six gears. The two differential side gears (29) are journalled in the differential case and have internal splines in which the axle shafts (56) lie. The four differential pinion gears (32) are journalled in a spider (34). Under each gear there is a thrust washer (30 and 33). Through the journalling of the gears, these can rotate and permit the axle shafts to rotate at different speeds when the truck is driven round curves.

The drive pinion (12) is journalled in a sleeve (18) by means of two tapered roller bearings (16 and 22) and in the drive pinion carrier by means of a cylindrical roller bearing (24). The position of the drive pinion axially can be adjusted by means of shims (19) between

the sleeve and the carrier. The two forward pinion bearings are adjusted by means of shims (20) between the inner races of the bearings. The oil seal at the front end of the pinion consists of an oil seal (10) pressed into a retainer (8).

The outer ends of the axle shafts are fitted with flanges which are bolted to the wheel hubs (52).

The wheel hubs are journalled in two tapered roller bearings (48 and 53) which are adjusted by means of two nuts (57 and 59). The oil seal consists of two seal rings (47 and 60). To prevent oil from reaching the brake linings in the event of leakage, there is an oil catcher (49) on the inside of the hub.

REPAIR INSTRUCTIONS

WORK THAT CAN BE CARRIED OUT WITHOUT REMOVING THE REAR AXLE

Replacement of Axle Shafts

The axle shafts are fully floating and are therefore very easy to replace. Loosen the nuts and pull out the shaft. (See page 5-4 "Disassembly of Rear Axle", point 2.) If the axle shaft is broken, however, the job becomes a little more difficult. The broken shaft can usually be driven out with a steel rod if the other axle shaft is first removed. On the other hand it is possible the differential pinion spider (34) has been perforated. As a rule, the inspection cover must be removed in order to remove any metal filings there may be present. If the shaft has broken close to the differential, it may be necessary to remove and clean the differential assembly.

Replacement of Wheel Hub, Bearing and/or Seal Ring

Replacement of wheel hubs is carried out in the following way (where applicable, this also concerns replacement of bearings or seal rings):

1. Loosen the wheel nuts (63) about 1 turn.
2. Jack up the rear axle housing (43) and put blocks under it. Remove the wheel nuts and lift off the wheels.
3. Remove the axle shaft (56). (See page 5-4 "Disassembly of Rear Axle", point 2).
4. Remove the lock nut (59), the lock washer (58) and the inner nut (57). Use tool SVO 2058 for the nuts. Release the brake shoes. Use adjuster wrench SVO 1780 for early production brakes. Pull off the wheel hub with tool SVO 2063. Turn the hub so that the brake shoes do not follow when the brake drum is removed.

5. Remove the oil seal (60), the washer (61) and the outer bearing inner race (53).

6. Loosen the nuts (51) and remove the oil catcher (49) and the brake drum (50).

7. Remove the oil seal (47) and the inner bearing inner race (48). Drive out the outer races.

8. Assembly is carried out in the reverse order. Pack the bearing well with heat-resisting bearing grease. Pack grease outside the bearing as shown in Fig. 5-23. The bearing is adjusted by tightening the inner nut and then loosening it 1/6 of a turn. Fit the lock washer and lock nut. Tighten the lock nut well. Do not forget to secure it. Adjust the brakes.

Replacement of Pinion Oil Seal

The oil seal (10) at the drive pinion is replaced as follows:

1. Disconnect the propeller shaft from the flange (11).

2. Loosen the nut (13) and pull off the flange with a puller. Loosen the bolts (7) and remove the retainer (8) with the oil seal (10). Press the oil seal out of the retainer.

3. Lay the new oil seal in oil for a while before fitting it. Then press it into the retainer with tool SVO 2024. See Fig. 5-1. Check the wear surface on the cylindrical section of the flange. If this surface on the flange is scored or worn then the flange must be replaced.

4. Fit the retainer on the sleeve (18) and insert the bolts. Do not tighten the bolts before the flange is fitted.

5. Press on the flange with the help of tool SVO 2028. See Fig. 5-2. Fit the washer and nut and tighten the nut to a torque of 35-40 kgm (250-290 lb.ft.).

6. Tighten the sleeve bolts. Secure the bolts and the pinion nut.

REMOVAL

Removal of Rear Axle

1. Loosen the wheel nuts (63) about one turn.

2. Jack up the rear end of the truck and block up the frame immediately in front of the forward spring hanger. The blocks used should be high enough to allow the wheels to be free of the floor. Let the jack remain under the rear axle.

3. Remove the wheel nuts and lift off the wheels. Use a wheel hoist for this job.

4. Disconnect the brake line between the frame and the rear axle. (Fit a wooden block under the brake pedal to prevent it being depressed).

5. Disconnect the propeller shaft at the pinion flange (11).

6. Loosen the spring U-bolts and lower the rear axle.

Removal of Differential Carrier Assembly

It is not usually necessary to remove the entire differential unit to carry out an operation on it. Complete removal is only carried out if the rear axle housing has been damaged in a collision or from other causes. It is carried out in the following way:

1. Jack up the rear axle housing (43) and put blocks under it.

2. Disconnect the propeller shaft from the pinion flange (11).

3. Loosen and remove the axle shafts (56). See "Disassembly of Rear Axle" below, point 2.

4. Remove the inspection cover (28) and allow the oil to run out into a receiver.

5. Loosen the bolts (26) retaining the carrier (5) to the rear axle housing. Lift out and lower the carrier assembly. Use a suitable jack.

DISASSEMBLY

Disassembly of Rear Axle

1. Jack up the rear axle on a couple of blocks and drain off the oil.

2. Loosen the nuts for the axle shafts (56). Pull out the axle shafts 1-2 mm (0.04"-0.08") with the puller bolts (a, Fig. 5-3). Then loosen the puller bolts and strike in the axle shafts with a lead hammer. See Fig. 5-3. The pilot cones (54) will then loosen and then both these and the axle shafts can easily be removed.

3. Loosen and remove the differential carrier assembly.

4. Bend down the tab on the lock nut (59). Then loosen this nut using wrench SVO 2058. Remove the lock washer (58) and the inner nut (57).

5. Back off the brake shoes. Use the adjuster puller SVO 1780 on early production brakes, see Fig. 5-4. Pull off wheel hubs with puller SVO 2063 Fig. 5-5. Turn the hub so that the brake shoes do not follow with the brake drum. Remove the oil seal (60), the washer (61) and the outer bearing inner race.

6. Loosen the nuts (51) for the brake drum (50) and the oil catcher (49). Remove the oil catcher, and the brake drum if necessary.

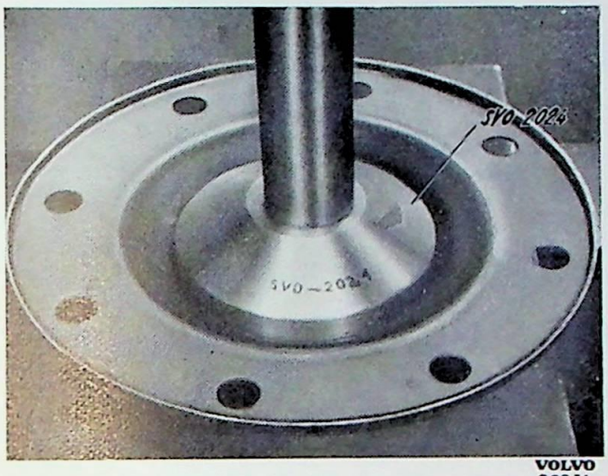

Fig. 5—1. Fitting oil seal.

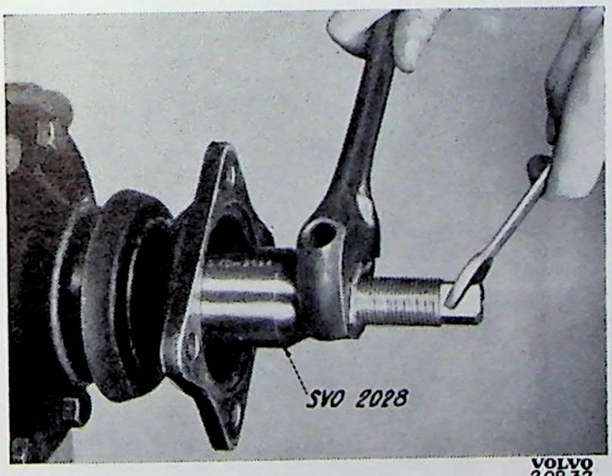

Fig. 5—2. Fitting flange.

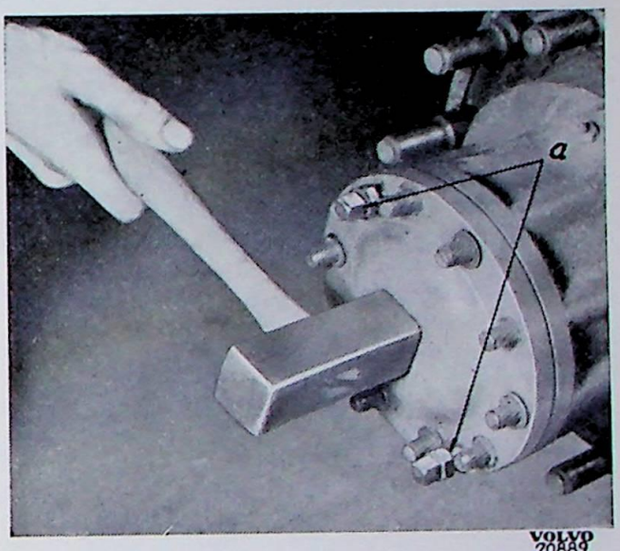

Fig. 5—3. Removing rear axle.

a. Puller bolts

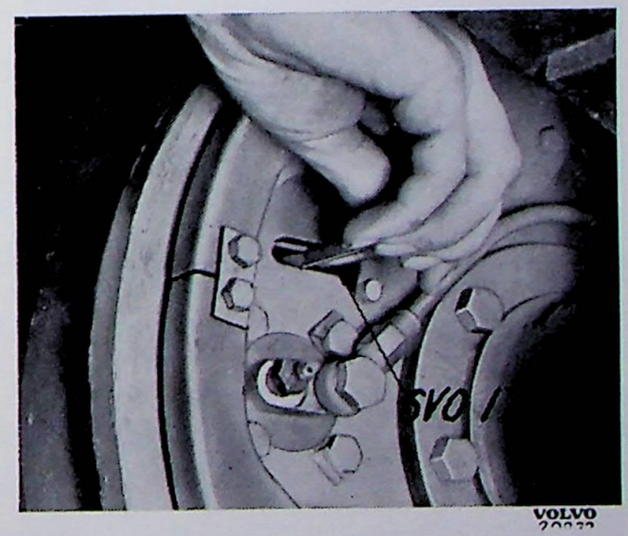

Fig. 5—4. Adjusting brakes (early production).

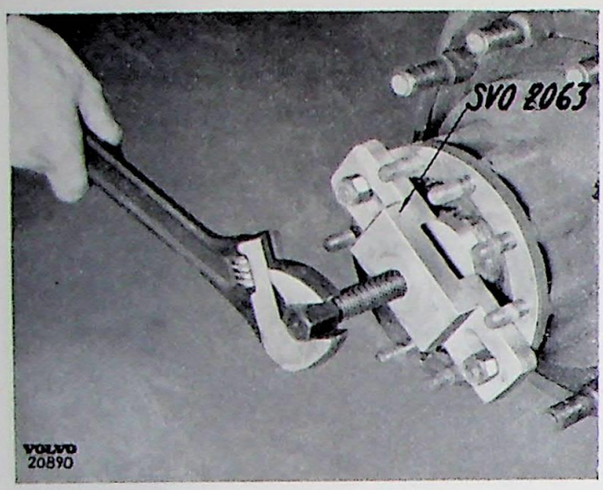

Fig. 5—5. Removing rear wheel hub.

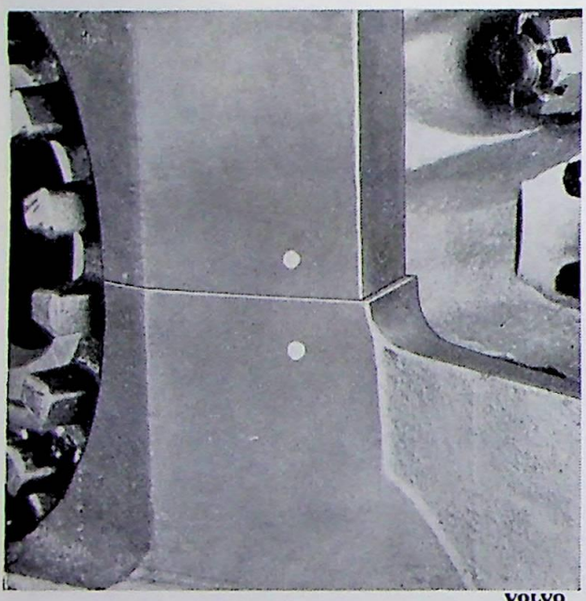

Fig. 5—6. Markings on carrier and cap.

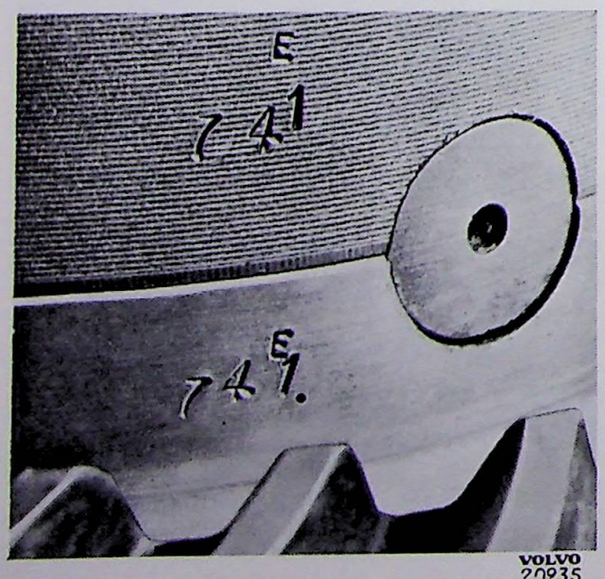

Fig. 5—7. Markings on differential case.

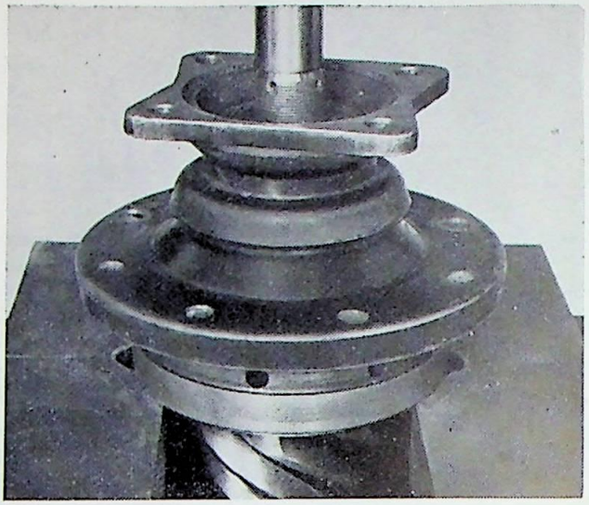

Fig. 5—8. Removing drive pinion.

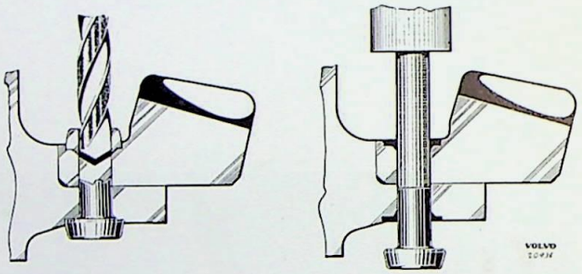

Fig. 5—9. Removing ring gear rivets.

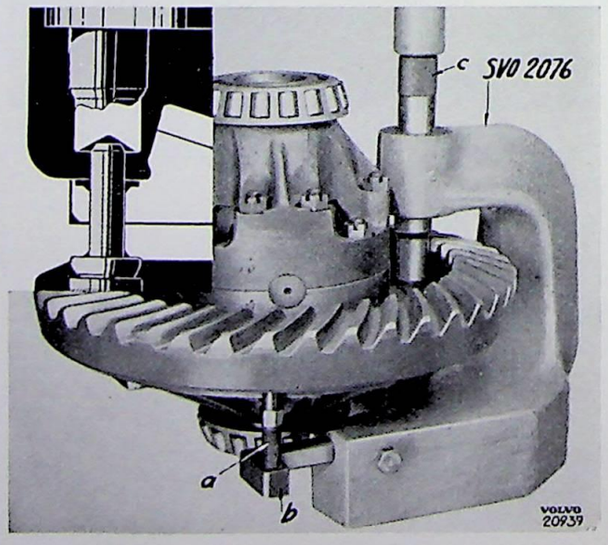

Fig. 5—10. Riveting ring gear.

a. Support bolt b. Support arm c. Riveting tool

7. Remove the oil seal (47) and the inner bearing inner race (48). Drive out the bearing outer races if necessary with a hammer and drift.

8. If necessary, remove the brake backing plates (45) and the brake line from the rear axle housing.

Disassembly of Differential Carrier Assembly

Disassembly of Differential

1. Place the complete differential carrier unit on a workbench or in a special fixture.

2. Remove the support pin (3) and the shoe (4).

3. Check the marking on the cap (39) and the pinion carrier (5). If these parts are not marked, mark the cap together with the housing. See Fig. 5-6. Remove the lock washers (41) for the adjuster nuts (42). Loosen the bolts (38) and remove the cap and adjusting nuts. Lift out the differential with the ring gear (2) and the bearings (1).

5. Check the marking on the differential case (36). The numbers on both halves of the differential case should be opposite one another. See Fig. 5-7.

   Loosen the bolts (37) on the differential case. Separate both halves and the other components. Remove the bearings (1) if required.

Disassembly of Drive Pinion

1. Turn the unit over. Loosen the bolts (7) for the sleeve (18). Lift out the sleeve together with the drive pinion (12). Bind the shims (19) together.

2. Place the drive pinion and sleeve in a vise. Remove the cotter pin, the nut (13) and washer (14).

3. Press out the drive pinion. See Fig. 5-8. The flange (11) will also loosen as well as the oil seal (10) with retainer (8), the forward bearing inner race (16), the shims (20) and the bearing retainer (21). The outer bearing races and oil deflector can be removed from the drive pinion if required.

4. Remove the lock ring (25) for the rear bearing (24). Pull off the bearing with a puller.

5. The center bearing inner race is removed if required.

INSPECTION

All parts must be thoroughly cleaned before inspection is carried out. Use kerosene or white spirit to reduce the risk of fire and go easy on the hands. Steel and cast-iron parts can also be cleaned in an alkali bath after which they should be thoroughly rinsed with warm water and then blown dry with compressed air.

The various component parts of the rear axle should be examined carefully for wear and other damage.

The wear rings on the rear axle housing should not be worn or scored. Make a careful examination of the oil seals.

Check roller bearings. There may be no matt patches or other damage on the races, rollers or cages.

Inspection of Differential Assembly

After thorough cleaning, the component parts of the differential assembly should be carefully examined. Examine the ring gear and the drive pinion carefully to ensure that there is no damage on the teeth. Cracks in the teeth can eventually result in bits loosening while the truck is being driven. Such bits can cause extensive damage to the differential. If there is damage on the gears, both the drive pinion and the ring gear should be replaced. They are only sold in sets which have been run in together in a special machine so that the correct tooth contact and quiet operation are obtained.

Examine the differential case and the pinion bearings very carefully. Replace bearings if there are matt patches or other signs of damage on the races, rollers or cages. This is particularly important as far as drive pinion and ring gear replacement are concerned. Shocks from a damaged tooth can cause microscopical cracks in the races and rollers of the bearings. It is therefore better to replace a suspected bearing than to allow it to cause damage to the new drive pinion and ring gear.

Examine the differential gears for tooth damage. Fit the differential gears, the differential pinion spider and the thrust washers in a clean and dry condition in the differential case. It is easier to find out then if there is any excessive clearance. If clearance exceeds 1 mm (0.04"), the thrust washers should be replaced.

Examine the pinion oil seal. Also check the seal wear surface on the cylindrical part of the flange. This surface may neither be worn or scored. The seal should clamp well onto the flange. If this is not the case or there is any other fault, the seal should be replaced and the flange as well if necessary.

See that the dust slinger is tightly in position on the flange.

REPLACEMENT OF RING GEAR OR DIFFERENTIAL CASE

1. In order to remove the rivets (35), the rivet heads are first drilled through with a 14 mm (35/64") drill from the ring gear side. See Fig. 5-9. If this is not done from the ring gear side, the differential case can be damaged.
2. Press out the rivets and remove the ring gear (2).

3. Fit the new ring gear to the differential case using two 14 mm (35/64") bolts until two rivets have been fitted in position. Make sure that the rivets go easily in the holes before tightening the bolts.

4. Use the riveting fixture SVO 2076. Adjust the bolts and the arms ("a" and "b" respectively in Fig. 5-10) against the ring gear so that it lies perfectly flat and the rivets come centrally over the block.

5. Insert a rivet. Press down the rivet press over the rivet by hand and align the rivet. Then apply a pressure of 45 tons. Carry out riveting in the order shown in Fig. 5-11.

6. Before the differential is finally fitted, the run-out of the ring gear must be measured. See page 5-8 "Assembly of Differential", point 3.

ASSEMBLY

Assembly of Drive Pinion

1. Press the inner race of the bearing (22) onto the drive pinion (12). Use tool SVO 2022. See Fig. 5-12.

2. Place the bearing retainer (21) and shims (20) on the pinion. The combined thickness of the shims should be the same as it was before the shims were removed.

3. Insert the oil deflector (6) and press the outer races into the sleeve (18) with tool SVO 2043, Fig. 5-13. Fit the sleeve and the forward bearing inner race (16) onto the pinion. Oil in well with hypoid oil.

4. Place the drive pinion in a press. Fit the tool SVO 2022 against the forward bearing inner race and bring a pressure of 7 tons to bear. Wind a cord a few times round the sleeve (18) and pull with a spring balance. See Fig. 5-14. The reading on the spring balance should be 1.2-1.6 kg (2.1/2-3.1/2 lb.) when the sleeve starts to turn. If the reading on the balance is too small, then shims are removed and if it is too large, shims are added until the correct reading is obtained. The thickness of the thinnest shim should be 0.1 mm (0.004"). By fitting three or four of these instead of one shim 0.35 mm (0.014") thick, the combined thickness can be varied by 0.05 mm (0.002").

5. Lay the thrust washer (9) on the drive pinion and fit the cork gasket (17) in the groove in the sleeve.

6. Press the oil seal (10) in the retainer with tool SVO 2024, Fig. 5-1. Place the retainer on the sleeve.

7. Press on the flange (11) with the dust slinger (15). Use tool SVO 2022. Also press on the rear bearing (24).

8. Fit the washer (14) and the nut (13) and tighten the nut to a torque of 35-40 kgm (250-290 lb.ft.). Lock the nut with the cotter pin and lock the rear bearing with the lock ring (25).

9. Fit the sleeve with the pinion and shims (19) on the carrier (5) with three bolts. Make sure that the sleeve and the shims are correctly located in relation to the oil channel in the carrier. Use shims so that their combined thickness is the same as it was before the shims were removed.

Assembly of Differential

1. Press on the differential bearings (1), using tool SVO 2025, Fig. 5-15.

2. Oil in all the differential gears and washers with hypoid oil. Place the differential side gears (29) with washers (30) in both halves of the differential case (36). Fit the differential pinion gears (32) with washers (33) on the differential pinion spider and lay the whole unit in one of the halves of the differential case. Fit on the other half. Make sure that the numbers on both the halves are opposite each other, see Fig. 5-7. Fit the bolts and tighten them alternately. Tighten the bolts to a torque of 10.5-12.5 kgm (76-90 lb.ft.). Fit one of the axle shafts in one of the differential side gears. It should be possible to rotate the differential by means of this axle shaft. There must not be any excessively great clearance. If the clearance between the differential case and the gears is greater than 1 mm (0.04") then the thrust washers should be replaced.

3. The run-out of the ring gear must be measured with a dial indicator. The differential case can be placed in V-blocks or can be placed with its bearings in the rear axle housing. See Fig. 5-16. Run-out measured at the outside edge of the ring gear must not exceed 0.14 mm (0.005").

4. Fit the differential assembly with ring gear, bearings (1), adjuster nuts (42) and caps (39). Notice the markings on the caps. Tighten the cap bolts and then loosen them 1/4 of a turn so that the adjuster nuts can be turned.

Adjustment of Tooth Contact

After the differential assembly has been fitted as above, the tooth contact between the drive pinion and the ring gear is adjusted as well as the backlash.

It is extremely important to ensure that the drive pinion and the ring gear come into their correct positions relative to each other so that the stresses are distributed over greater areas. This decreases the risk of tooth breakage and helps to produce more silent operation.

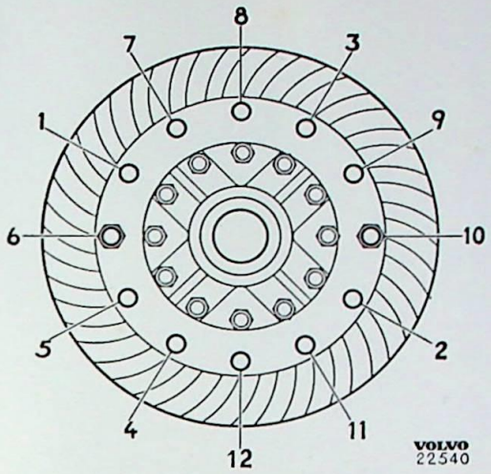

Fig. 5—11. Order in which rivets are fitted.
Use 6 and 10 as guide bolts

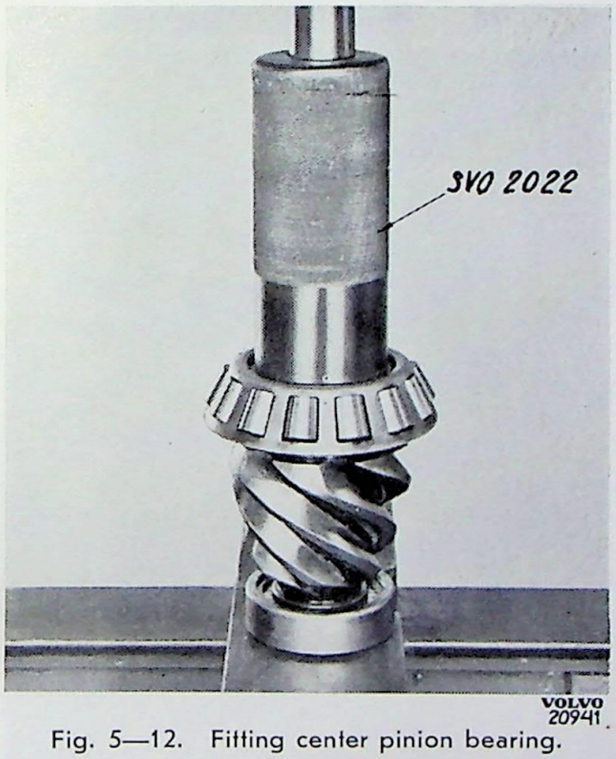

Fig. 5—12. Fitting center pinion bearing.

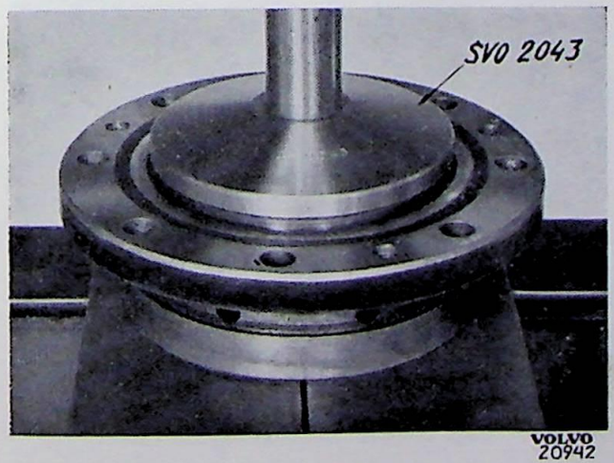

Fig. 5—13. Fitting pinion bearing outer race.

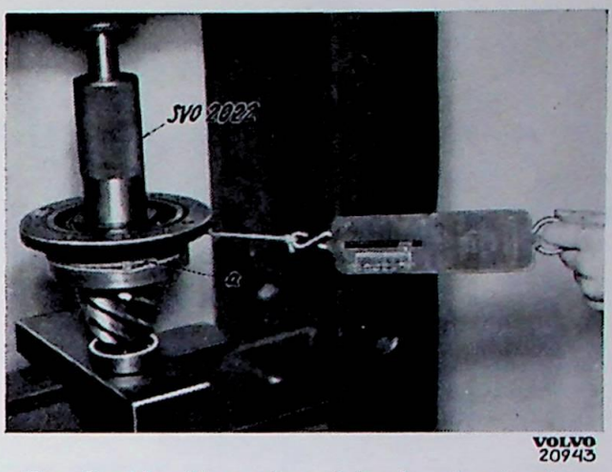

Fig. 5—14. Measuring pinion bearing tension.
a. Steel hook

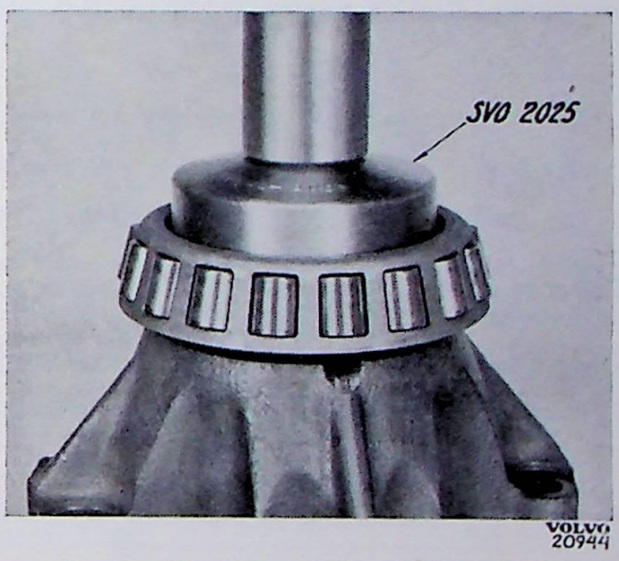

Fig. 5—15. Fitting differential bearings.

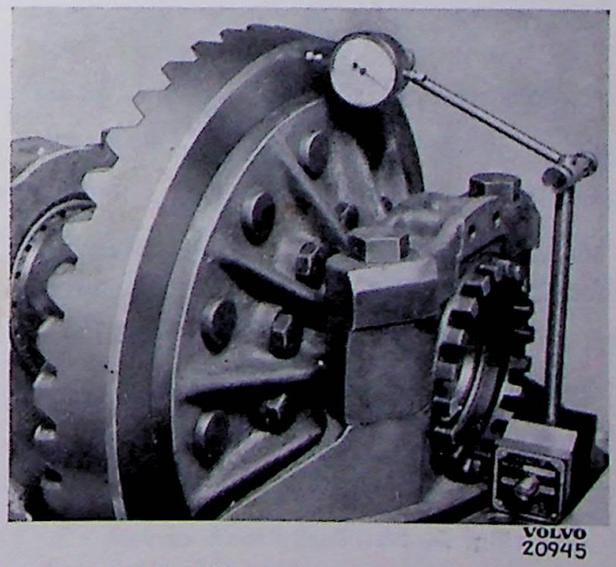

Fig. 5—16. Measuring ring gear run-out.

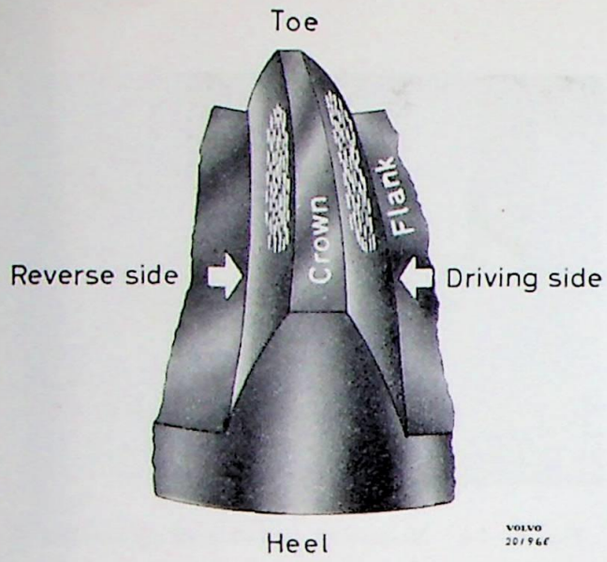

Fig. 5—17. Tooth contact pattern.

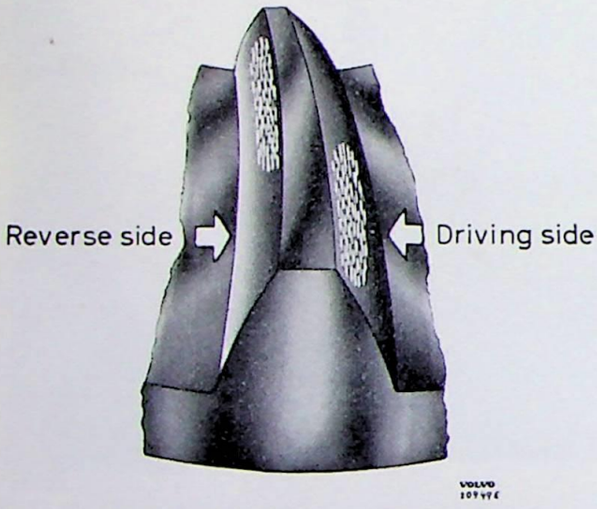

Fig. 5—18. Faulty tooth contact.

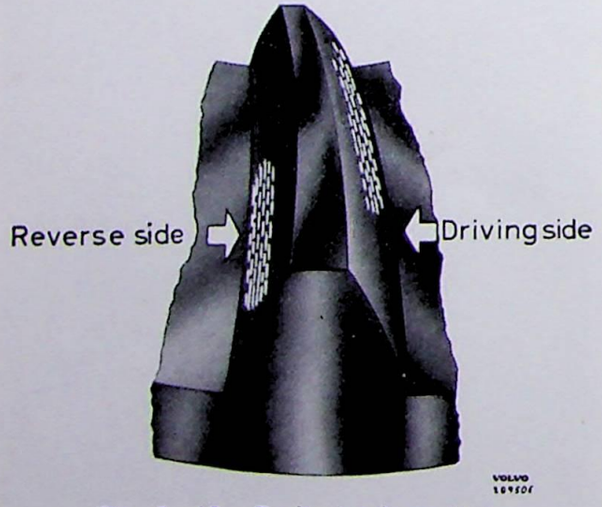

Fig. 5—19. Faulty tooth contact.

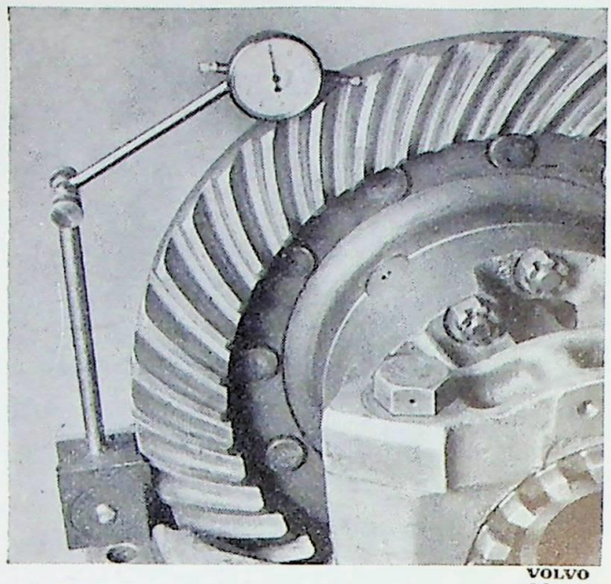

Fig. 5—20. Measuring backlash.

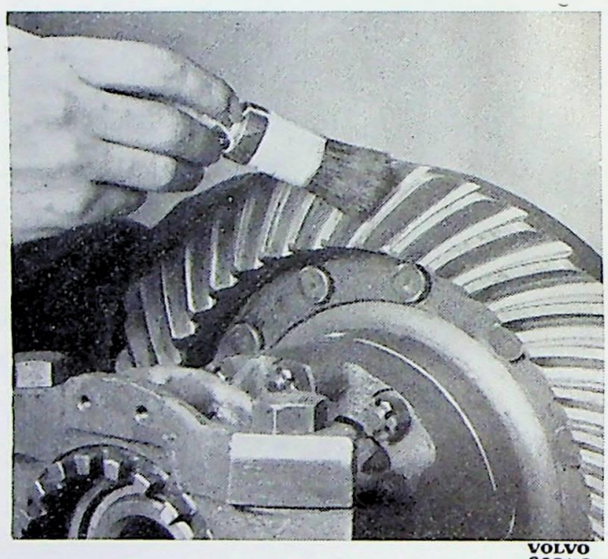

Fig. 5—21. Applying marking paint.

Fig. 5—22. Removing shims.

In order to indicate the position of the teeth, names have been given to the various parts of the teeth as shown in Fig. 5-17.

The driving side denotes the side being subjected to pressure by the drive pinion when the truck is being driven forwards.

The reverse side is the side subjected to pressure when the truck is reversed or when the engine is used to brake the truck.

The heel and toe describe the thickest and thinnest ends of the tooth. The heel is always on the outside edge.

First check the run-out of the ring gear. This may not exceed 0.14 mm (0.005") measured on the outside edge of the ring gear.

In order to see tooth contact more clearly, the teeth on the ring gear are painted with a mixture of read lead and engine oil or special marking paint. This paint should not be too thin in consistency otherwise the results can be misleading. After painting the ring gear teeth, the drive pinion is rotated about ten turns in one direction and then as many turns in the other direction at the same time as the ring gear is braked with a wooden wedge. Where the drive pinion teeth contact the ring gear teeth, the paint will be removed and a pattern is thus obtained showing the position and area of the tooth contact. The correct tooth contact pattern is shown in Fig. 5-17.

NOTE. The ideal pattern has an almost rectangular shape and lies on the driving side on the pitch line (half-way up the tooth), rather nearer the toe than the heel. On the reverse side, the pattern should be rather higher than on the driving side but otherwise similar.

In order to correct faulty tooth contact, the position of the drive pinion is altered relative to the ring gear by means of shims (19) between the sleeve (18) and the carrier (5). If the drive pinion is too far out, then the tooth contact pattern on the driving side will be towards the heel. On the reverse side, it will lie towards the toe. The tooth contact pattern will also be high on both sides. See Fig. 5-18. If the drive pinion is too far in, the tooth contact pattern will be towards the toe on the driving side and towards the heel on the reverse side. At the same time it will be low on both sides. See Fig. 5-19. If the drive pinion is thus moved from the outside inwards, the tooth contact pattern on the driving side will move from a high position at the heel to a low position at the toe. On the reverse side, the pattern will at the same time move from a high position at the toe to a low position at the heel. If the drive pinion is moved from the inside outwards, the movement will be in the opposite direct.

If the backlash between the drive pinion and the ring gear is increased, the tooth contact pattern on the driving side will be extended towards the heel, and if the backlash is decreased, the pattern will be shorter and will move towards the toe. The difference in the tooth contact pattern position obtained by altering the backlash between the ring gear and the pinion is very small since one must remain between certain tolerances.

Adjust the differential bearings (1) before adjusting tooth contact. This is done by loosening one of the adjuster nuts (42) until there is definite looseness. Fit a dial indicator to the back face of the ring gear. See Fig. 5-16. Tighten the adjuster nut until the looseness just disappears. In order to obtain a certain tension, the adjusting nut is then tightened another 1.1/2-2 notches.

Backlash is now adjusted between the given tolerances, 0.15-0.25 mm (0.0006"-0.010"). Both the adjusting nuts are turned an equal number of times and then the cap bolts are tightened. Backlash is measured with an indicator as shown in Fig. 5-20. Coat the teeth with marking paint (see Fig. 5-21) and rotate the drive pinion. If the tooth contact pattern is too far towards the heel on the driving side, see Fig. 5-18, the drive pinion should be moved in towards the center of the ring gear. One or more of the shims between the sleeve (18) and the carrier (5) must be removed. The bolts (7) are loosened and the sleeve and drive pinion are pulled out as far as possible with respect to the rear pinion bearing. The shim or shims can then be removed using a chisel. See Fig. 5-22.

If the tooth contact pattern on the driving side is too far towards the toe, see Fig. 5-19, the drive pinion should be moved outwards and more shims should be added between the sleeve and the carrier. With this last-mentioned type of tooth contact, there is risk for rapid wear and so it must be avoided.

Each time the position of the drive pinion is altered, the clearance must be adjusted to 0.20 mm (0.008").

When the correct tooth contact has been obtained, all the bolts (7) are fitted on the sleeve. Check the differential bearing tension. Tighten the cap bolts (38) to a torque of 27.0 - 29.5 kgm (195-215 lb.ft.). Then check the backlash since this can be altered slightly when the cap bolts are tightened. Secure the adjusting nuts and all bolts.

Finally, the support pin (3) and shoe (4) are fitted. The support pin is first tightened before being loosened 1/8 of a turn. It is then secured with the lock nut.

Assembly of Rear Axle

1. Fit the brake backing plates and the brake lines.
2. The outer wheel bearing races (48, 53) are driven into the wheel hubs (52) with a metal driver. Pack the bearing well with heat-resistant bearing grease. When assembly is carried out, grease is also packed between the bearing and the seals, see Fig. 5-23. The space between the bearings, however, should not be filled with grease. Fit the inner bearing inner race in the hub. Press in the oil seal (47), and fit the brake drum (50) and oil catcher (49). Fit the nuts (51) and tighten them.
3. Press the wheel hubs onto the axle housings. Fit the outer bearing inner race, the thrust washer (61), the oil seal (60) and the nut (57). Tighten the nut hard and then loosen it 1/6 of a turn. Fit the lock washer (58) and the lock nut (59). Tighten the lock nut well. Do not forget to secure it.
4. Fit the differential assembly. Use a new gasket. Make sure that the three long bolts come into the right positions. Use copper washers on the five lower bolts and spring washers on the upper. Tighten the bolts.
5. Fit the inspection cover (28) if it has been removed. This should be turned so that the filler plug (31) comes two sections from the lowest point. See Fig. 5-24.
6. Fit the axle shafts (56). Fit the pilot cones (54) and the nuts. Tighten the nuts.

FITTING

Fitting the Rear Axle

The rear axle is fitted in the reverse order to that used when removing. Air-vent the brakes and adjust them. Tighten the wheel nuts well. Add oil up to the level of the plug. Use only hypoid oil (See specifications for viscosity).

Fitting the Differential Assembly

Use a new gasket between the carrier and the rear axle housing. The gasket can be attached to the carrier with sealing agent. Fitting is then carried out in the reverse order to that used when removing. Make sure that the three long bolts come into the right positions. Use copper washers on the five lower bolts and spring washers on the upper. Fit the inspection cover (28) so that the filler plug (31) comes two sections from the lowest point. See Fig. 5-24. Add oil up to the level of the filler plug.

Use only hypoid oil (See specifications for viscosity).

Note. When topping-up, never mix different makes of hypoid oil.

FAULT TRACING

FAULT	
CAUSE	REMEDY
NOISY OPERATION, POSSIBLY ACCOMPANIED BY HIGH TEMPERATURES	
Wrong type of oil used.	Drain off oil and fill with type of oil shown in specifications.
Oil level too low.	Top-up with oil.
Gear backlash incorrect. Gear tooth contact incorrect. Damaged gear teeth.	Disassemble differential assembly. Examine gears for damage. Adjust in accordance with instructions.
Worn or faultily adjusted roller bearings.	Check and adjust bearings. Replace damaged or worn bearings.
THUMPING SOUND IN DIFFERENTIAL DURING ACCELERATION OR DECELERATION	
(Check first that this does not depend on worn universal joints).	
Differential gear thrust washers worn.	Replace all thrust washers.
Differential gears or differential pinion spider worn.	Replace all worn parts.
One of driving road wheels loose on hub.	Tighten wheel nuts.
Worn splines on shafts or gears.	Replace worn parts.
OIL LEAKAGE	
Oil level too high.	Check oil level.
Blocked air valve.	Check air valve.
Damaged oil seals.	Replace oil seals and possibly wear rings.
Faultily adjusted or damaged wheel bearings.	Adjust or replace bearings.
Damaged oil seal on pinion and/or damaged flange.	Replace damaged parts.
Faultily adjusted or damaged pinion bearings.	Adjust or replace bearings.
Damaged gaskets.	Replace gaskets. Check that sealing surfaces are even and clean.

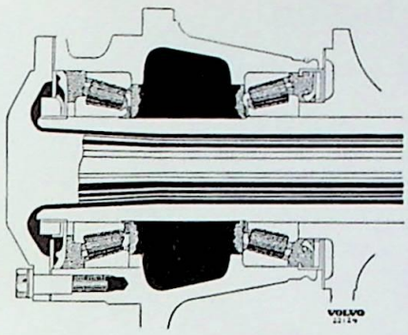

Fig. 5—23. Lubrication of rear wheel bearings.

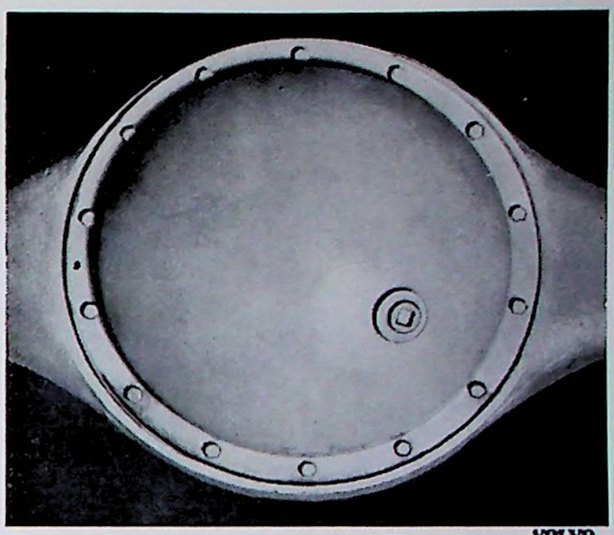

Fig. 5—24. Fitting of inspection cover.

TOOLS

The following special tools are required when carrying out work on the rear axle.

Rear axle, single reduction

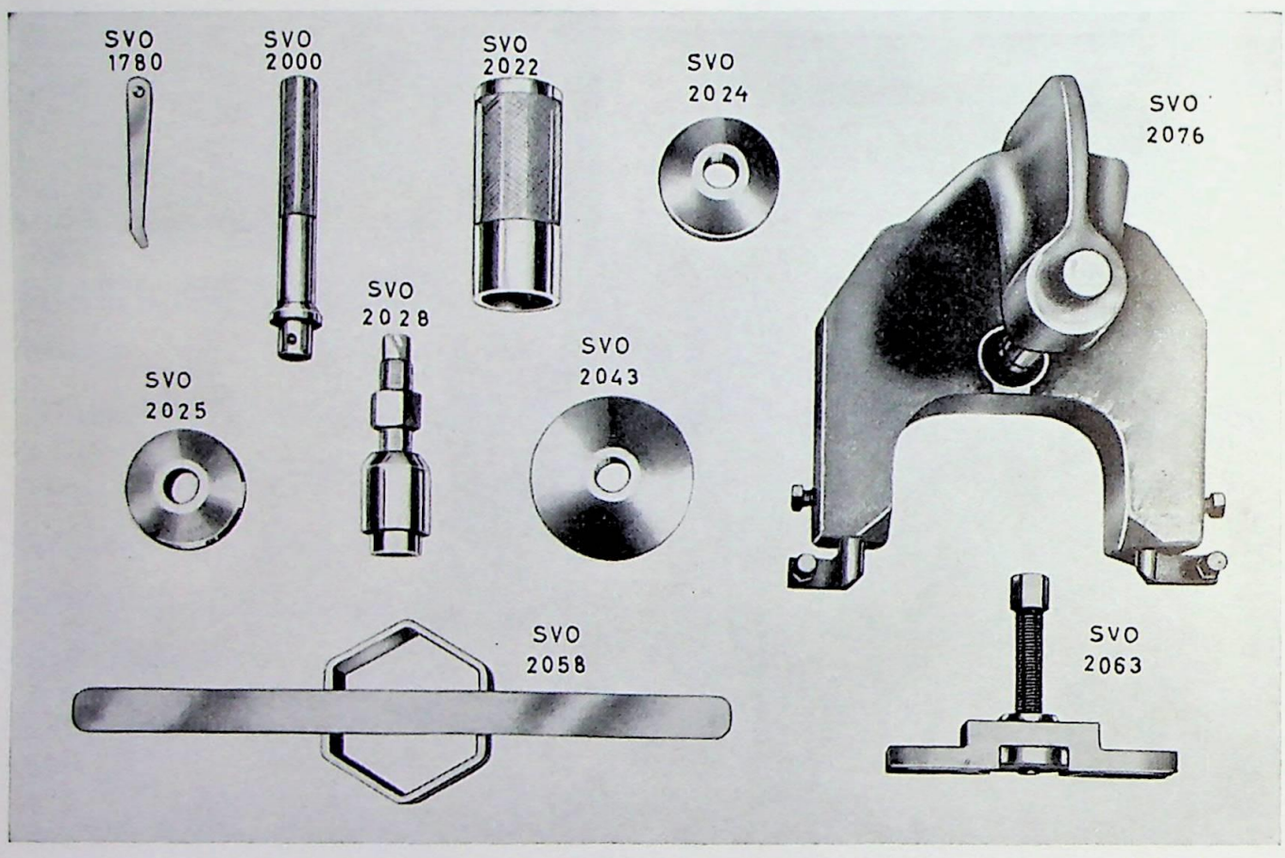

Fig. 5—25.

SVO 1780	Tool for brake adjustment (early production).
SVO 2000	Standard handle.
SVO 2022	Sleeve for fitting pinion bearings.
SVO 2024	Driver for fitting oil seal.
SVO 2025	Driver for fitting differential bearings.
SVO 2028	Press tool for fitting flange.
SVO 2043	Driver for removing outer races, pinion bearings.
SVO 2058	Socket for lock nut, rear wheel hubs.
SVO 2063	Puller for rear wheel hubs.
SVO 2076	Rivet fixture.

Two-speed rear axle

(Repair instructions for two-speed rear axles are in Part L 5)

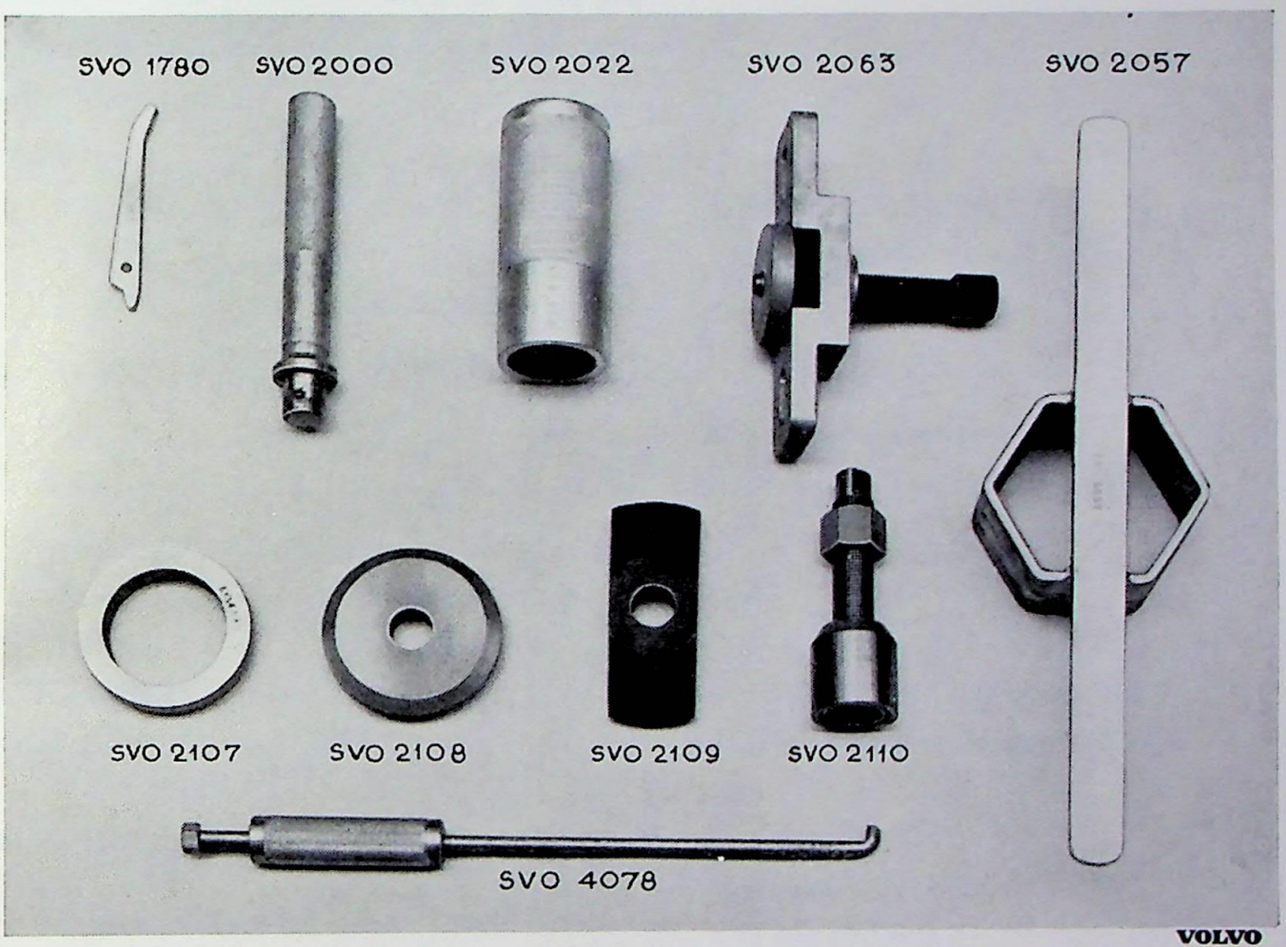

Fig. 5—26.

SVO 1780 Tool for brake adjustment (early production).
SVO 2000 Standard handle.
SVO 2022 Sleeve for fitting forward pinion bearing.
SVO 2057 Socket for lock nut, rear wheel hubs.
SVO 2063 Puller for rear wheel hubs.
SVO 2107 Ring for fitting rear pinion bearing.
SVO 2108 Tool for fitting oil seal, front outer race and small differential bearing.
SVO 2109 Tool for fitting rear outer race and large differential bearing.
SVO 2110 Press tool for fitting flange.
SVO 4078 Puller for oil seal and retainer.

SPECIFICATIONS

The series number and the reduction ratio are stamped on a plate attached to the drive pinion carrier.

Tread:

L 385 B	1770 mm (69.11/16")
L 385 C	1650 mm (65")
L 385 C with two-speed rear axle	1740 mm (68.1/2")

REAR AXLE, SINGLE REDUCTION

Type	Spiral bevel (hypoid)
Reduction ratio	6.33:1 (6:38) or 6.83:1 (6:41)
Adjustment of pinion bearing tension:	
Pull required with 7 tons on forward bearing	1.2-1.6 kg (2.1/2-3.1/2 lb.)
Backlash (drive pinion - ring gear)	0.15-0.25 mm (0.006"-0.010")
Adjustment of support bolt	Tighten and then loosen 1/8 of a turn
Shims for sleeve and pinion bearing, thickness	0.10 mm (0.004")
	0.35 mm (0.014")
	1.0 mm (0.04")
Oil capacity	approx. 7 liters (15 U.S. pints)
Lubricant	Hypoid oil

The correct viscosity is selected from the table below:

Average air temperature		Viscosity
°F	°C	
Below -5	-20	SAE 80
Between -5 and +90	-20 and +30	SAE 90
Over +90	+30	SAE 140

Tightening Torques

	Kgm	lb.ft.
Flange	35-40	250-300
Differential case	10.5-12.5	75-90
Caps	27.0-29.5	195-215

TWO-SPEED REAR AXLE

(Repair instructions for the two-speed rear axle are in Part L-5)

Type	Spiral bevel (hypoid) with planetary gears
Reduction, Model 1	5.57:1 (high) and 7.60:1
" Model 2	6.50:1 (high) and 8.87:1
" Model 3	6.14:1 (high) and 8.38:1
Number of teeth (planetary gears):	
Cylindrical inner gear in ring gear	44 teeth
Planetary gears	14 teeth
Sun wheel	16 teeth
Adjustment of pinion bearing tension:	
Pull required with 10 tons on forward bearing	1.3-1.5 kg (3-3.1/3 lb.)
Backlash (drive pinion-ring gear)	0.15-0.40 mm (0.006"-0.016")
Shims for sleeve, thickness	0.051 mm (0.002")
	0.076 mm (0.003")
	0.254 mm (0.010")
	0.762 mm (0.030")
Spacer washers under forward pinion bearing:	
Thickness, alternatives, (1 washer)	8.001-8.026 mm (0.315"-0.316")
	8.204-8.230 mm (0.323"-0.324")
	8.407-8.433 mm (0.331"-0.332")
	8.611-8.636 mm (0.339"-0.340")
Thickness, alternatives (2 washers)	3.988 mm (0.157")
	4.191 mm (0.165")
	4.292 mm (0.169")
Oil capacity	approx. 10 liters (21 U.S. pints)
Lubricant	Hypoid oil

The correct viscosity is selected from the table below:

	Average air temperature °F	Average air temperature °C	Viscosity
Below	-5	-20	SAE 80
Between	-5 and +90	-20 and +30	SAE 90
Over	+90	+30	SAE 140

Tightening Torques

	Kgm	lb.ft.
Flange	48-55	350-400
Differential case	8.5-10	60-70
Ring gear and outer housing	15-18	110-130
Caps	40-50	300-360