



# SERVICE MANUAL

TRUCKS

**L 385**

*Export Service Department*

AKTIEBOLAGET

**VOLVO**

GÖTEBORG . SWEDEN

# STEERING GEAR

## DESCRIPTION

L 385 trucks are fitted with cam and twin-lever type steering gear. This operates the steering knuckle arm on the front axle through the Pitman arm (13, Fig. 6-16) and a drag link (23).

The steering gear mechanism (7) is permanently attached to the steering column. It is journalled in the housing (5) by means of two ball bearings (6). In order to carry out adjustment on these ball bearings, there are shims (4) between the steering column jacket (2) and the housing. The upper end of the steering column is carried in a ball bearing which is automatically adjusted by means of a spring.

The Pitman shaft (28) is carried in two bushings (9) pressed into the steering mechanism housing. The Pitman shaft meshes with the cam by means of two pins (32). These are carried in two tapered roller bearings (31) which are adjusted by means of nuts (29). In order to adjust the position of the Pitman shaft relative to the cam there is an adjuster screw (27) in the steering mechanism housing cover (33).

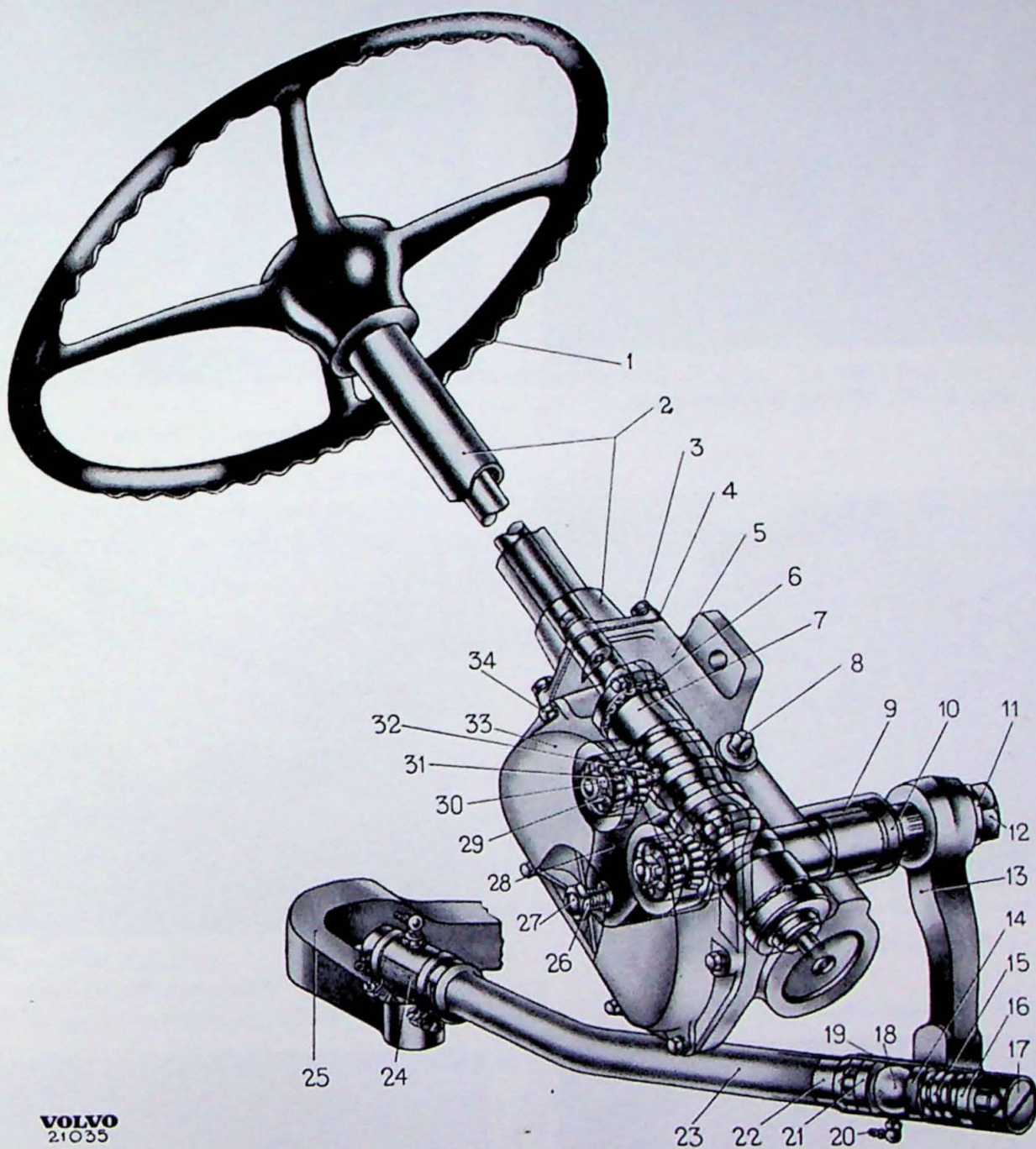
The drag link (23) is carried in ball studs (18) on the Pitman arm and the steering knuckle arm. The drag link is fitted with loose ball sockets (14, 21). These are adjusted by means of a spring (15) and a threaded plug (17).

## REPAIR INSTRUCTIONS

WORK THAT CAN BE CARRIED OUT WITHOUT REMOVING THE STEERING GEAR FROM THE TRUCK

### Replacing the Steering Wheel

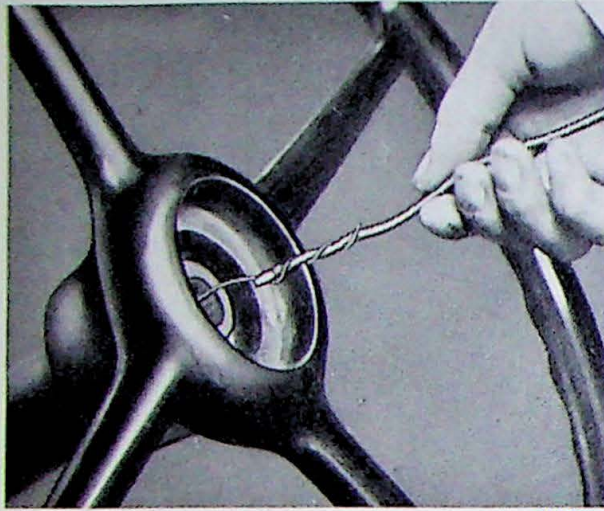
1. Remove the fuse for the horn.
2. Disconnect the cable to the horn button at the connection in front of the steering mechanism.
3. Loosen the horn button by pushing it in and twisting it. Remove the button, the spring and the contact washers. Remove the three screws for the attaching plate and take it out with the cable, spring and contact washer.
4. Loosen the steering wheel nut.



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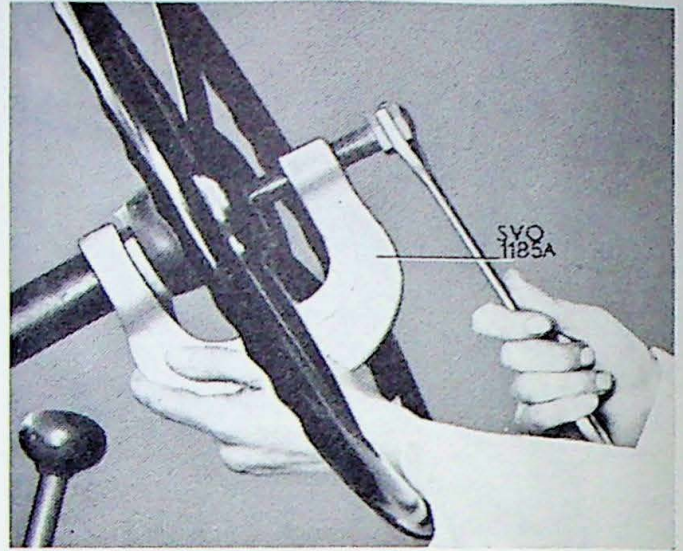
Fig. 6—16. Steering gear.

- |                                    |                          |                              |
|------------------------------------|--------------------------|------------------------------|
| 1. Steering wheel                  | 12. Nut                  | 24. Dust cover               |
| 2. Column jacket                   | 13. Pitman arm           | 25. Steering knuckle arm     |
| 3. Bolt                            | 14. Ball socket          | 26. Nut                      |
| 4. Shims                           | 15. Spring               | 27. Adjuster screw           |
| 5. Steering gear mechanism housing | 16. Seat for ball socket | 28. Pitman shaft             |
| 6. Ball bearing                    | 17. Plug                 | 29. Nut                      |
| 7. Cam                             | 18. Ball stud            | 30. Lock tab                 |
| 8. Oil filler plug                 | 19. Dust cover           | 31. Roller bearing           |
| 9. Bushing                         | 20. Lubricator           | 32. Pin (one of twin-levers) |
| 10. Oil seal                       | 21. Ball socket          | 33. Cover                    |
| 11. Spring washer                  | 22. Seat for ball socket | 34. Bolt                     |
|                                    | 23. Drag link            |                              |



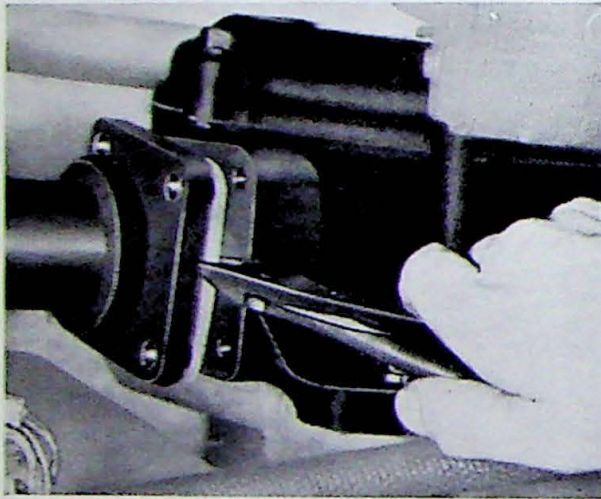
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Fig. 6—17. Fitting the horn cable.



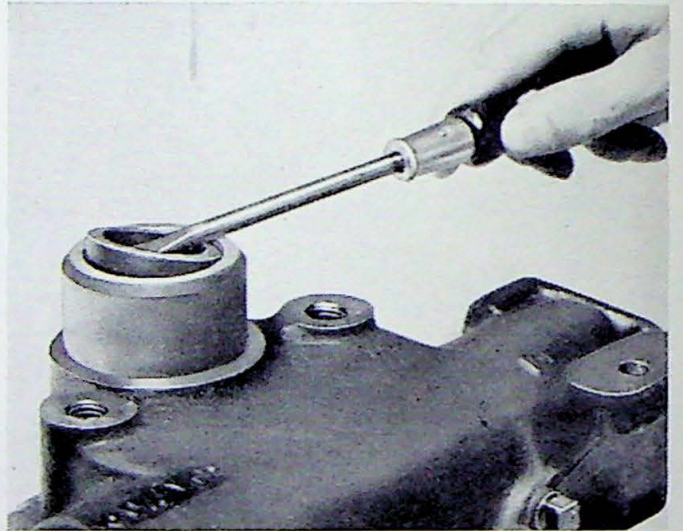
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Fig. 6—20. Removing the steering wheel.



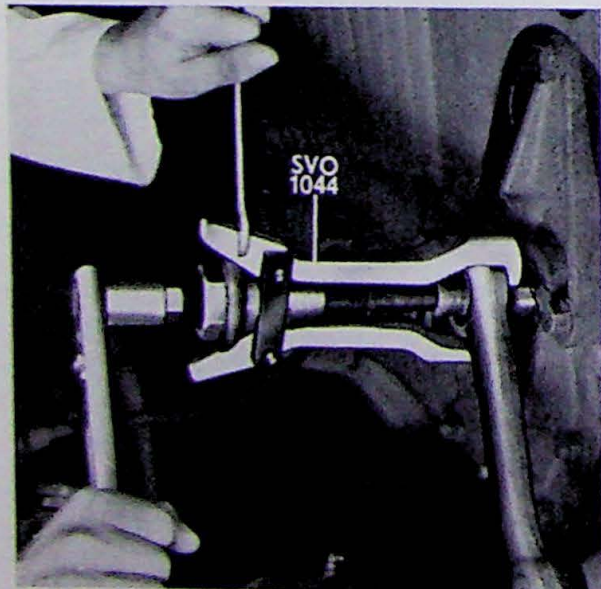
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Fig. 6—18. Removing shims.



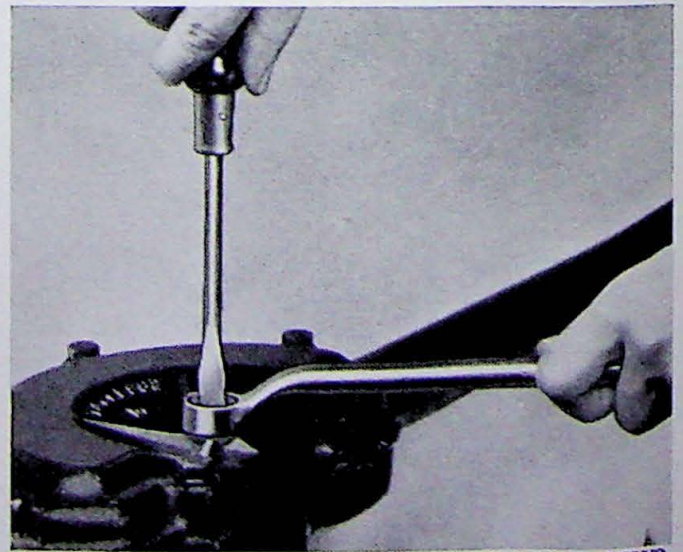
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Fig. 6—21. Removing the oil seal.



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Fig. 6—19. Removing the Pitman arm.



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Fig. 6—22. Adjusting the Pitman shaft axial clearance.

5. Remove the steering wheel by using puller SVO 1185 A (Fig. 6-20). Use the auxiliary tool unit SVO 1186 and clamp SVO 1187.
6. The new steering wheel is fitted in the reverse order to that used above. The simplest way to fit the cable to the horn is to wind it round the end of a bit of a copper wire which should be inserted through the column jacket from below (Fig. 6-17).

#### Replacing the Ball Sockets in the Drag Link

1. Loosen the dust cover (24) which is fitted to the ball stud on the steering knuckle arm.
2. Remove the cotter pins and loosen the plugs (17).
3. Remove the drag link (23) from the ball studs. Separate the various components.  
Note. If the ball studs have been worn to a state of ovality, they must be replaced.
4. Assemble in reverse order to that used when removing.

#### Adjusting the Steering Mechanism

1. See if there is any axial looseness in the steering mechanism bearings. The simplest way to do this is to turn the steering wheel backwards and forwards at the same time as you feel with one finger to see if the steering wheel moves up and down relative to the column jacket. The truck should be standing on a level floor when this is being done.

If there is looseness, remove one thin shim at a time until the looseness just disappears. The column jacket only requires to be loosened and pulled up slightly to enable the shims to be removed with a cutter (Fig. 6-18).

2. Jack up the truck and put a couple of blocks under the front axle.
3. Loosen the nut and remove the Pitman arm (13) with puller SVO 1044 (Fig. 6-19).
4. Move the steering wheel to its center position. Screw in the adjuster screw (27) until a little resistance is felt in the steering wheel when it is turned past the center position. Loosen the screw until this resistance just disappears. Lock the screw in this position.
5. Pull with a spring balance in one of the steering wheel spokes as shown in Fig. 6-23. The spring balance should show a reading of 0.1-0.4 kg (3.1/2 oz.-14 oz.) when "A" = 25 cm (9.27/32"). If the spring balance shows any other reading, carry out an examination to determine if some component part is fitted too loosely or too firmly.

If the spring balance shows the correct reading but the free play in the steering wheel is too great, the steering mechanism should be removed and examined for worn or damaged parts.

6. Move the steering wheel to the center position with the road wheels pointing straight forward. Fit the Pitman arm in this position. Fit the spring washer and the nut. Tighten the nut well. Lower the truck from the blocks.

#### REMOVING THE STEERING GEAR MECHANISM

1. Loosen the nut (12) for the Pitman arm. Pull off the Pitman arm with puller SVO 1044 (Fig. 6-19).
2. Remove the fuse for the horn. Disconnect the cable to the horn button at the connection in front of the steering gear mechanism.
3. Remove the horn button by pushing it down and twisting it. Remove the button, the spring and the contact washers. Loosen the three screws for the attaching plate and remove this together with the cable, the spring and the contact washer. Loosen the steering wheel nut and remove the steering wheel using puller SVO 1185 A (Fig. 6-20). Use auxiliary tool SVO 1186 and clamp SVO 1187.
4. Loosen the three bolts in the column jacket attachment. Remove the attachment.
5. Loosen the bolts retaining the steering gear mechanism to the attachment on the frame. Loosen the attachment from the frame and remove it. Remove the steering gear mechanism.

#### DISASSEMBLING THE STEERING GEAR MECHANISM

1. Unscrew the plug and drain off the oil. Loosen the bolts (34) and lift off the cover (33). Push out the Pitman shaft (28).
2. Loosen the bolts (3) and pull off the column jacket (2). Do not loose the shims (4). If required remove the bearing in the upper end of the column jacket. Remove the steering column and the steering gear mechanism (7) as well as the ball bearing (6). Remove the lock rings and separate the bearing components.
3. If required, press out the bushings (9) with a suitable tool. The oil seal (10) can be removed by using a screwdriver (Fig. 6-21).
4. If required, remove the nut (29) and the pin (32) and the roller bearing (31) can be separated.

## INSPECTING THE STEERING GEAR MECHANISM

All component parts should be cleaned in kerosene or white spirit before inspection. Parts made of steel or cast-iron can be cleaned in an alkali bath after which they should be rinsed with warm water and blown dry with compressed air.

Examine all components for wear, deformation or other damage.

The steering gear mechanism should be examined for wear or pitting on the bearing surfaces. If there are any signs of damage, the steering gear mechanism and the steering column must be replaced.

Examine the twin levers. If one of the pins is worn to a degree of ovality it must absolutely be replaced. An oval pin does not rotate and the result will be rapid wear on both it and the rest of the steering gear mechanism.

## ASSEMBLING THE STEERING GEAR MECHANISM

1. If the bushings are to be replaced, the new bushings (9) are pressed into the housing (5). Ream the bushings with an expanding reamer until the Pitman shaft runs easily without being loose.
2. Fit the steering gear mechanism (7), the bearing (6), the shims (4), the column jacket (2) and the bolts (3) in the steering gear mechanism housing. Tighten the bolts carefully and make sure that the bearings are not too tight. There may, however, be no looseness. Add or remove shims until the steering column rotates easily without any signs of looseness.
3. Fit the twin lever pins (32) with the roller bearings (31) in the Pitman shaft (28). Fit the washer (30) and the nut (29) and tighten the nut until the pins can just be rotated with the fingers. Secure the nut by bending up two of the teeth on the lock washer. Check that the twin lever pins can still be rotated with the fingers.
4. Fit the seal (10). Insert the Pitman shaft (28). Be careful not to damage the oil seal. Fit the gasket, the cover (33) and the bolts (34). Move the steering gear mechanism to the center position and screw in the adjuster screw (27) until a little resistance is felt in the steering wheel when this is turned past the center position. Then loosen the adjuster screw until this resistance just disappears. Lock the adjuster screw in this position.
5. Fit the steering wheel and tighten it using a spring balance as shown in Fig. 6-23. The spring balance should show a reading of 0.1-0.4 kg (3.1/2 oz.-14 oz.) where "A" = 25 cm (9.25/32"). If the spring balance shows any other reading, examine the part which may be fitted too firmly or too loosely.

## FITTING THE STEERING GEAR MECHANISM

The steering gear mechanism is fitted in the reverse order to that used when removing it. The parts for the horn button assembly are fitted as shown in Fig. 6-24. Before fitting the Pitman arm, the following procedure is carried out:

Count the number of turns of the steering wheel from left lock to right lock. Then turn the steering wheel back half this number of turns. Move the road wheels so that they are facing straight forwards. Fit the Pitman arm in this position. Fit the spring washer (11) in the nut (12). Tighten the nut.

Fill the steering gear mechanism with transmission oil SAE 90 up to the level of the plug.

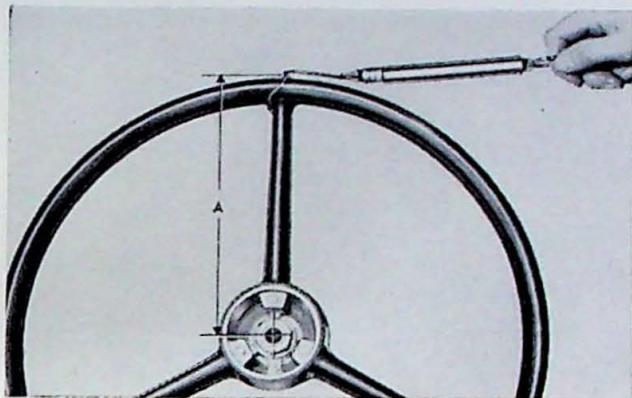


Fig. 6—23. Checking the tightness of the steering column bearing.



Fig. 6—25. Turn tables.  
A. Locking device

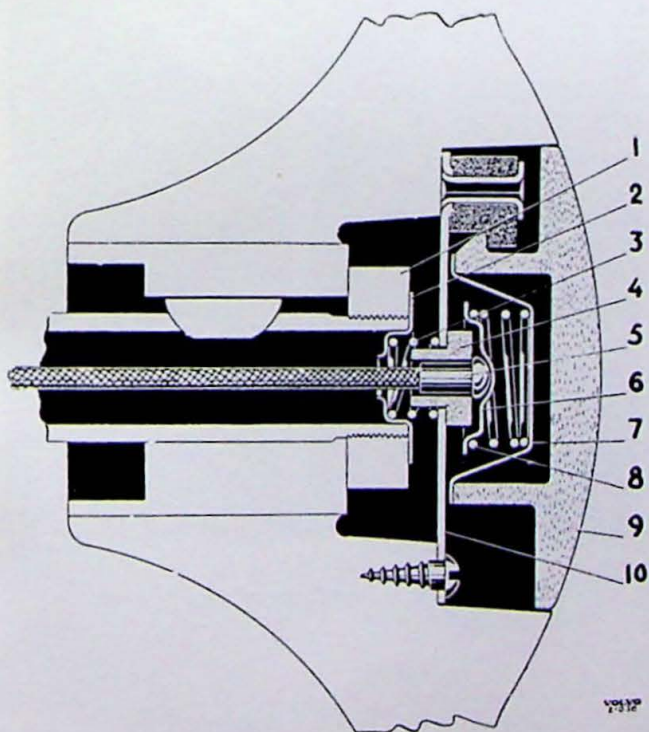


Fig. 6—24. Cross-section of horn button mechanism.

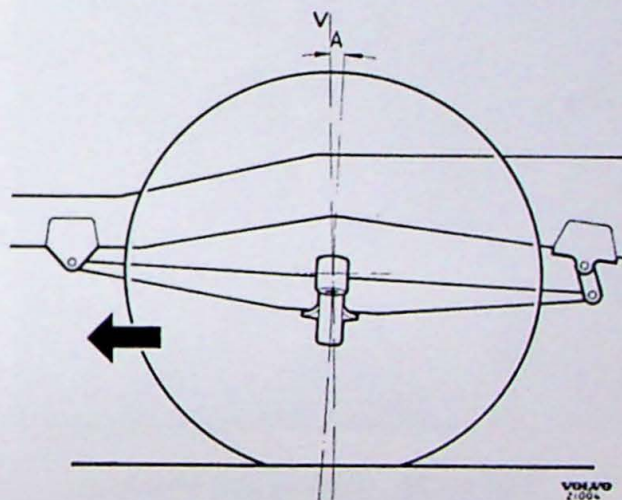


Fig. 6—26. Caster.

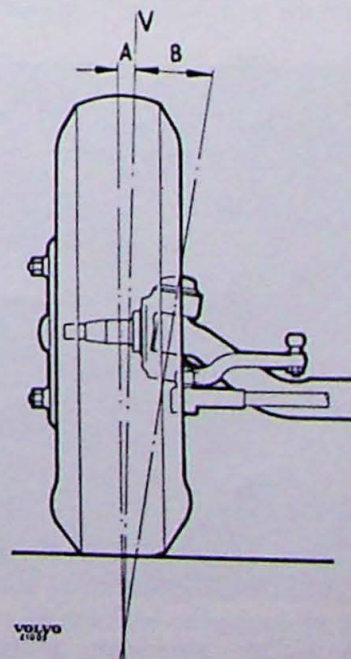


Fig. 6—27. Camber and king pin inclination.