SERVICE MANUAL

VOLVO
P 1800

Export Service Department

AKTIEBOLAGET

VOLVO

GÖTEBORG · SWEDEN

PART 6

FRONT AXLE

DESCRIPTION

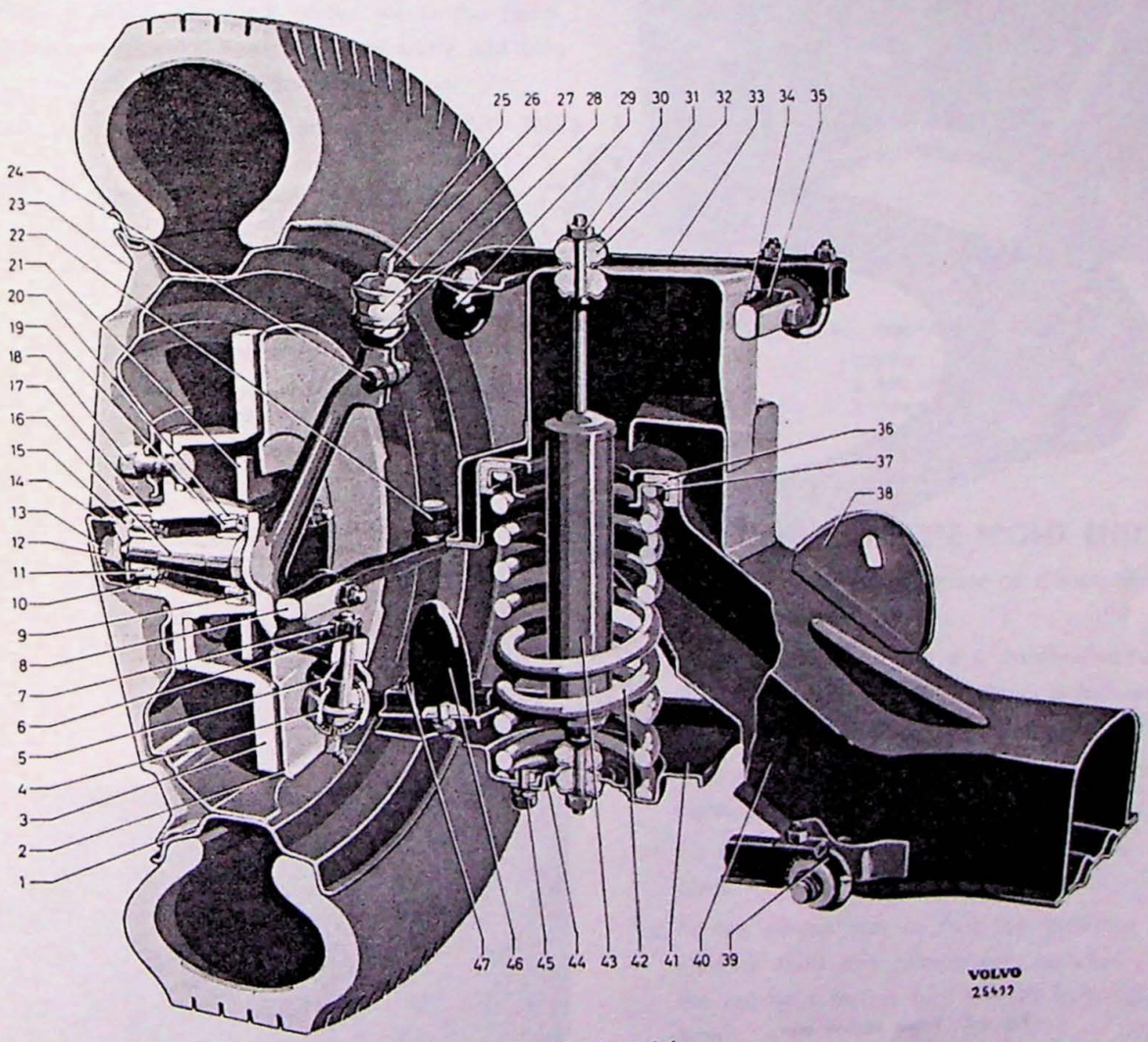

Fig. 6-1. Front Axle

1. Wheel '
2. Dust plate
3. Brake disk
4. Lower ball joint
5. Rubber seal
6. Castle nut
7. Split pin
8. Steering arm
9. Sealing ring
10. Outer ring, outer bearing
11. Outer roller bearing
12. Castle nut
13. Split pin
14. Grease cap
15. Washer
16. Steering knuckle
17. Hub
18. Wheel nut
19. Inner bearing
20. Outer ring, inner bearing
21. Retainer
22. Steering rod
23. Hub cap
24. Bolt
25. Grease nipple
26. Nut
27. Upper ball joint
28. Rubber seal
29. Rubber buffer
30. Nut
31. Washer
32. Rubber bushing
33. Upper control arm
34. Shim
35. Control arm shaft
36. Rubber insert
37. Washer
38. Engine mounting bracket
39. Inner attachment, lower control arm
40. Front axle member
41. Lower control arm
42. Front spring
43. Shock absorber
44. Washer
45. Bolt
46. Rubber buffer
47. Nut

The P 1800 has independent front wheel suspension. There is, therefore, no front axle as such, this being replaced by a robust box-section front axle member. This member is bolted to the front part of the self-supporting body. The wheel suspension and springs are fitted at the ends of this member. The design is shown in Fig. 6-1.

The steering knuckle (16) is flexibly attached to the upper and lower control arms (33 and 41 respectively) by means of ball joints (4 and 27 respectively). Movement at the inner attachments of the contro arms is made through rubber bushings. Camber an caster are adjusted by means of shims at the uppe control arm shaft and the front axle member an the side member respectively.

The front wheels are carried in taper roller bearing (11 and 19). In order to increase stability, the car i fitted with stabilizers which are attached to both the lower control arms and the body.

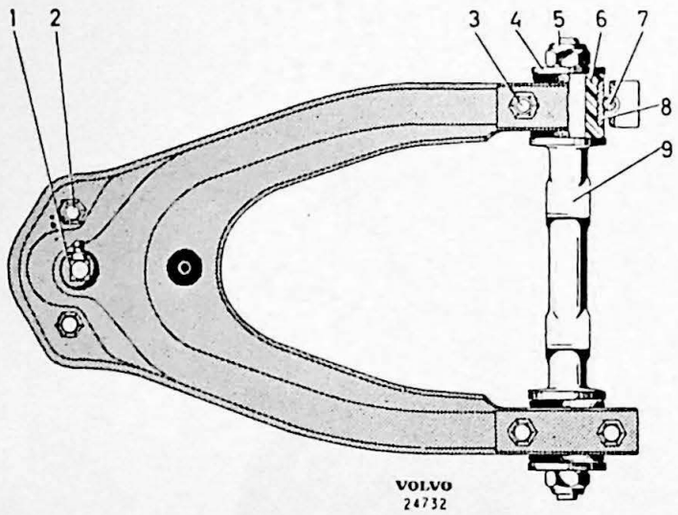

Fig. 6-2. Upper control arm

1. Grease nipple
2. Attaching nut for ball joint
3. Nut for clamp
4. Plain washer
5. Nut
6. Rubber bushing
7. Clamp
8. Sleeve
9. Upper control arm shaft

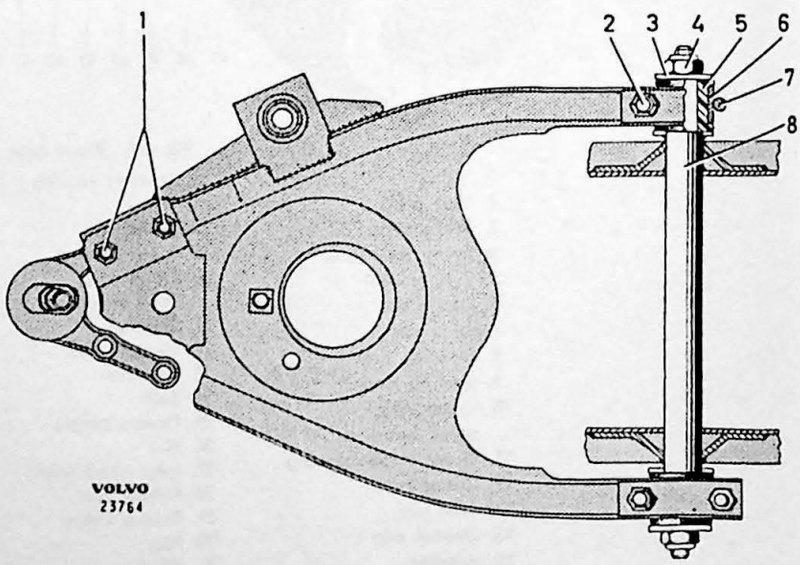

Fig. 6-3. Lower control arm

1. Attaching nuts for ball joint
2. Nut for clamp
3. Plain washer
4. Nut
5. Rubber bushing
6. Sleeve
7. Clamp
8. Lower control arm shaft

REPAIR INSTRUCTIONS

REMOVING THE COMPLETE FRONT END

1. Remove the hub caps and unscrew the wheel nuts.
2. Lift up the front end so that the wheels are clear of the ground. Place blocks under the body at the front jacking points.
3. Remove the wheel nuts and lift off the wheels.
4. Support under the front part of the engine.
5. Place a block of wood under the brake pedal. Remove the brake lines from the body and plug the connections so that no dirt can enter.
6. Remove the pitman arm using puller SVO 2282 (Fig. 6-4).
7. Slacken the front engine mountings. Remove the idler arm bracket and stabilizer from the body.
8. Place a jack under the front axle member. Unscrew the front axle member attaching bolts (2, 3 and 4, Fig. 6-5). Preserve the shims (1).
9. Lower the front axle member and pull it forwards.

Fig. 6-4. Removing the pitman arm
1. Attaching bolt for steering box

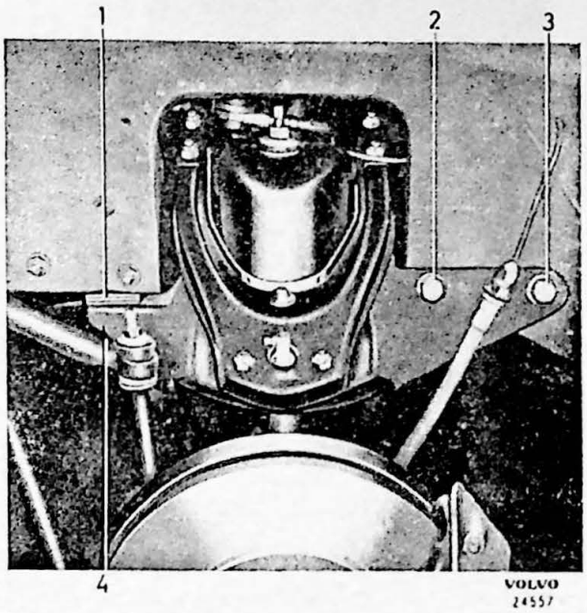

Fig. 6-5. Front axle attachment
1. Shim
2. Attaching bolt
3. Attaching bolt
4. Attaching bolt

FITTING THE COMPLETE FRONT END

1. Place the front axle member on a jack and move it under the car.
2. Raise the jack so that the member comes into the correct position. Place shims in between and tighten the bolts (2, 3 and 4, Fig. 6-5) properly.
3. Remove the support from under the engine and tighten the front engine mounting bolts.
4. Fit the idler arm bracket and stabilizer to the body.
5. Fit the pitman arm so that the markings on the steering shaft and pitman arm coincide. Tighten the nut to a torque of 100—120 lb.ft. (13.5—16.5 kgm).
6. Connect the brake leads and bleed the brake system, see Part 7.
7. Clean the contact surfaces between wheels and hubs, fit the wheels and tighten the nuts sufficiently so that the wheel cannot be displaced by the hub. Lower the car and tighten the wheel nuts. Tighten every other nut a little at a time until all of them are tightened to a torque of 70—100 lb.ft. (10—14 kgm). Fit the hub caps.
8. Check the wheel alignment. See "Wheel alignment".

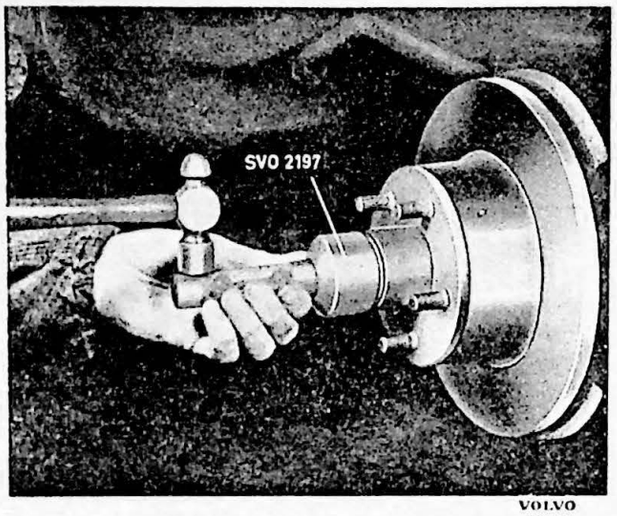

Fig. 6-6. Removing the grease cap

REPLACING AND ADJUSTING FRONT WHEEL BEARINGS

When adjusting the front wheel bearings, first remove the hub to inspect bearing races and rollers. Badly worn or scored bearings should be replaced. The procedure for replacing the bearings is described below. When only inspecting and adjusting, exclude the points which do not apply.

1. Remove the hub caps and loosen the wheel nuts slightly.

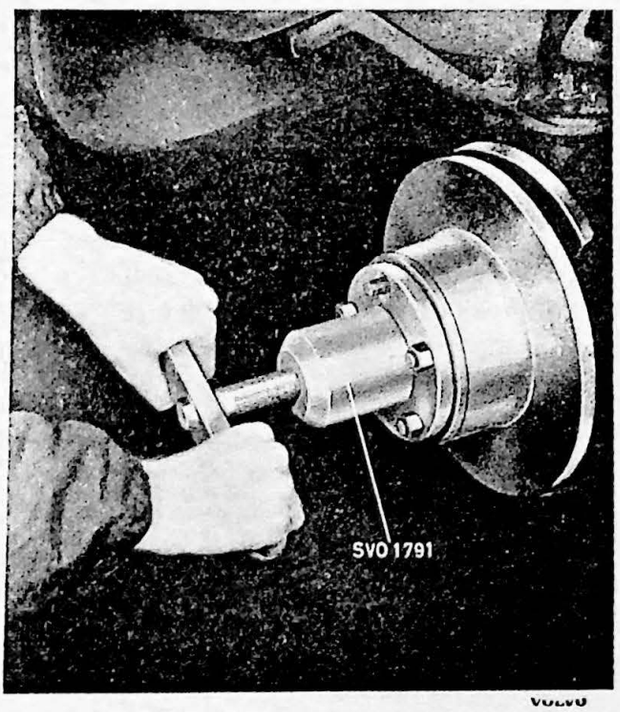

Fig. 6-7. Removing the hub

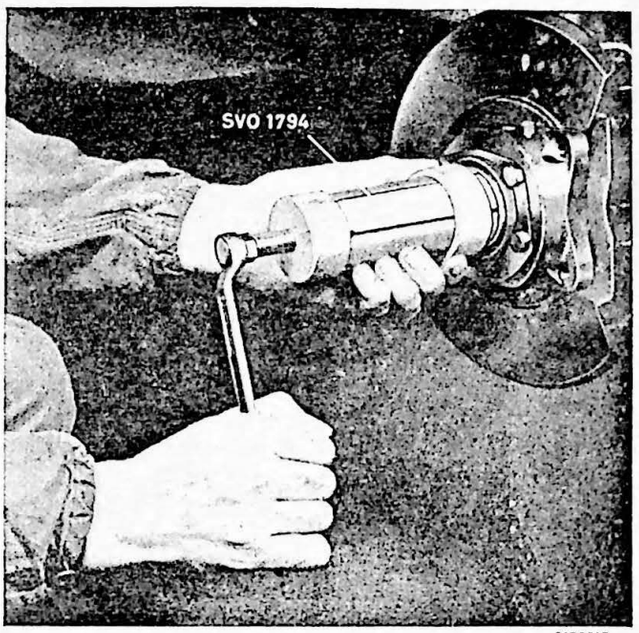

Fig. 6-8. Removing the inner bearing

2. Lift up the front end and block up under the lover control arms. Unscrew the wheel nuts and lift off the wheel.
3. Remove the brake line (3, Fig. 7-11) and plug the connections. Bend up the locking washer (5) and unscrew the attaching bolts (4 and 6). Remove the caliper (2) complete, Fig. 7-12.
4. Remove the grease cap with tool SVO 2197 (Fig. 6-6). Remove the split pin and castle nut. Pull off the hub with puller SVO 1791 (Fig. 6-7). Pull off the inner bearing from the steering knuckle spindle with puller SVO 1794 (Fig. 6-8) if the bearing remains in place.
5. Remove the bearing rings. Use drift SVO 1799

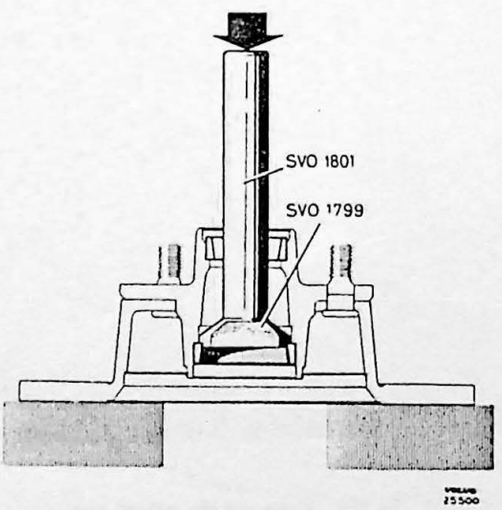

Fig. 6-9. Removing the inner bearing ring

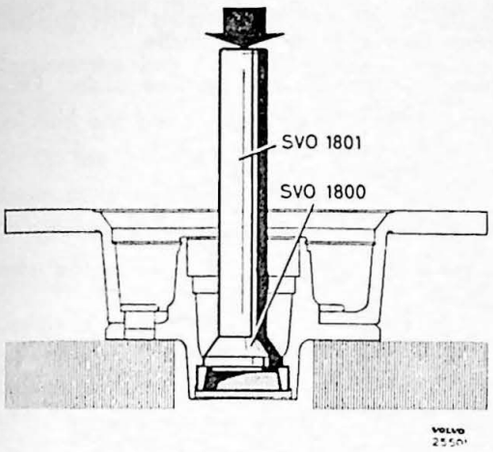

Fig. 6-10. Removing the outer bearing ring

(Fig. 6-9) for the inner bearing ring and drift SVO 1800 (Fig. 6-10) for the outer bearing ring together with the standard handle SVO 1801.

6. Clean the hub, brake disk and grease cap.
7. Press in the new bearing rings. In addition to the standard handle SVO 1801, drift SVO 1798 (Fig. 6-11) is used for the inner bearing ring and drift SVO 1797 (Fig. 6-12) for the outer bearing ring.
8. Fill grease into the bearings with the help of a pressure lubricator. If a lubricator is not available, pack in as much grease by hand as will fill up the space between the roller retainers and the bearing inner ring. Also smear grease on the outsides of the bearings and on the outer rings pressed in the hub. The recess in the hub is filled with grease all round up to the smallest diameter of the outer ring of the outer bearing, see Fig. 6-13.

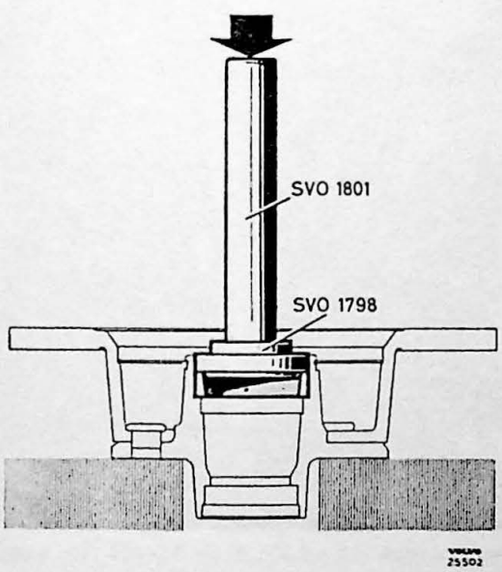

Fig. 6-11. Fitting inner bearing ring

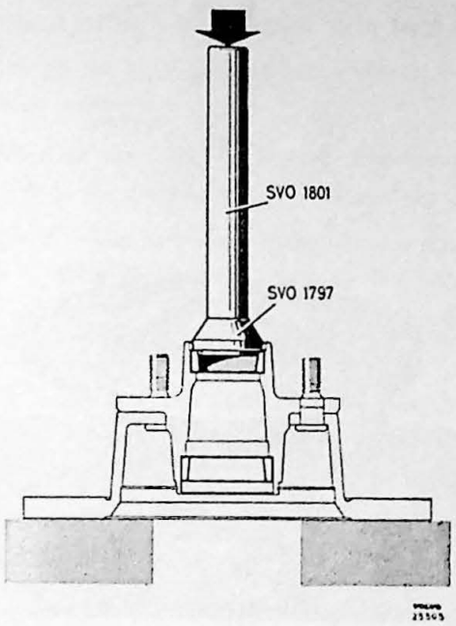

Fig. 6-12. Fitting outer bearing ring

Fit the inner bearing into position in the hub. Press in the sealing ring with drift SVO 1798 and standard handle SVO 1801 (Fig. 6-14).

9. Place the hub on the spindle. Fit the outer bearing, washer and castle nut.
10. The front wheel bearings are adjusted by first tightening the nuts with a torque wrench to a tightening torque of 50 lb.ft. (7 kgm). Then slacken the nut a third of a turn. If the recess in the nut does not coincide with the split pin hole in the spindle, slacken the nut further until the split pin can be fitted. Check that the wheel turns easily but without any looseness.
11. Fill the grease cap half full with grease and fit it with drift SVO 2197.
12. Fit the caliper and lock the attaching bolts. Connect the brake line. Bleed the wheel unit cylinders, see Part 7.
    Clean the contact surfaces between the wheel

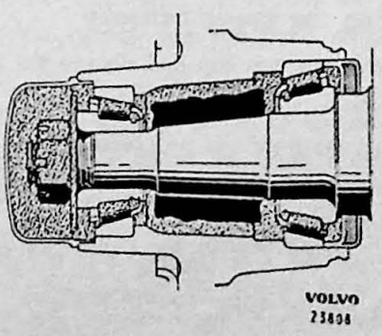

Fig. 6-13. Lubricating the front wheel bearings

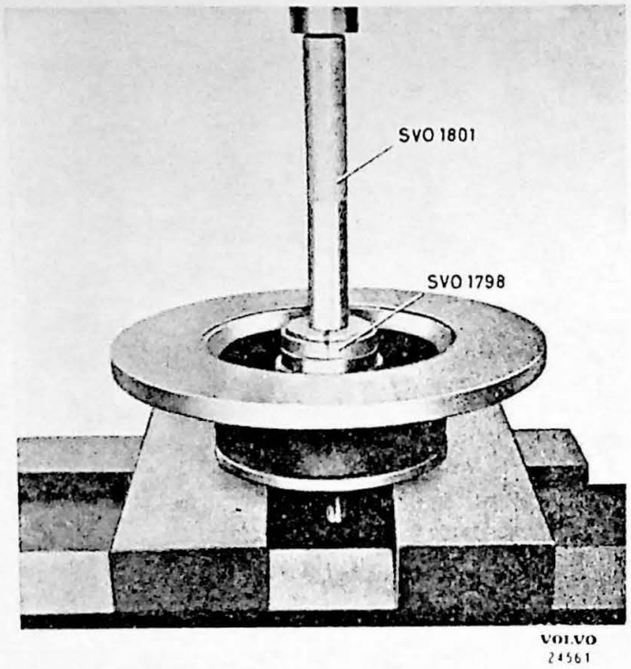

Fig. 6-14. Fitting the sealing ring

and hub, fit the wheel and tighten the nuts sufficiently so that the wheel cannot be displaced by the hub. Lower the car and tighten the wheel nuts. Tighten every other nut a little at a time until all of them are tightened to a torque of 70—100 lb.ft. (10—14 kgm). Fit the hub cap.

RECONDITIONING THE CONTROL ARM SYSTEM

The ball joints cannot be disassembled or adjusted so that when they are worn or damaged they must be replaced.

If the control arms have become distorted, they may only be reset to a small extent and then only in a cold condition. If, when compared with a new part, the old one deviates considerably, it should be replaced.

Replacing the upper ball joint

1. Remove the hub cap and slacken the wheel nuts slightly.
2. Lift up the front end and place a block under the lower control arm. Unscrew the wheel nuts and take off the wheel.
3. Unscrew the nuts (26, Fig. 6-1) and remove the bolts. Lift the upper control arm (33).
4. Unscrew the nut and remove the bolt (24). Remove the upper ball joint (27) with sealing washer and rubber sleeve from the spindle.
5. Fitting is done in the reverse order. Fill grease between the rubber sleeve and the ball joint.

Replacing the lower ball joint

1. Remove the hub cap and slacken the wheel nuts slightly.
2. Lift up the front end and place a block under the lower control arm. Unscrew the wheel nuts and take off the wheel.
3. Screw off the nuts (47, Fig. 6-1) and remove the four bolts. Remove the split pin (7) and nut (6).
4. Disconnect the brake line from the retainer. Apply tool SVO 2281 to the spindle as shown in Fig. 6-15. The retainer for the brake line may have to be bent to the side slightly. Turn the nut of the tool until the tool begins to tension. Turn the nut until the ball joint slackens, not, however, more than one and half turns. If the ball joints fit so tightly that it does not slacken with this amount of turning, strike a few light blows with a hammer and counterhold on the spindle ball joint attachment.
5. Fitting is done in the reverse order. Fill grease between the rubber sleeve and ball joint. Bleed the wheel unit cylinders if the brake lines have been removed.

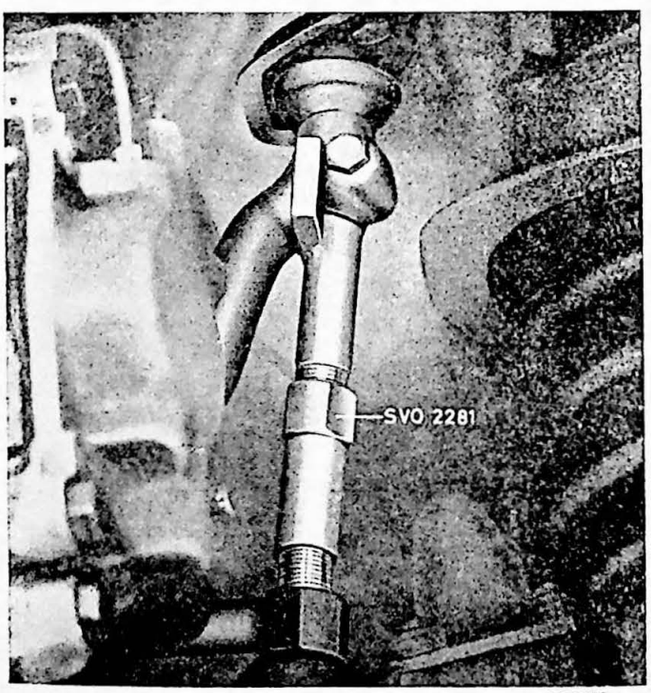

Fig. 6-15. Removing the lower ball joint

Replacing the upper control arm bushings

1. Remove the hub cap and slacken the wheel nuts slightly.
2. Lift up the front end and place a block under the lower control arm. Unscrew the wheel nuts and lift off the wheel.
3. Unscrew the nuts (3, Fig. 6-2) and remove the clamps (7).
4. Bend up the locking washer, unscrew the attaching bolts and remove the shaft (9). Preserve the shims.
5. Remove the nuts (5), washers (4) and bushings (6) together with the sleeves (8).
6. Fit the new rubber bushings (6) and sleeves (8) on the control arm shaft (9).
   Use soft soap as a lubricant to facilitate fitting the rubber bushings.
   Fit the washer (4) and tighten the nuts (5). Then fit the control arm with clamps loosely on both the bushings.
7. Place in the shims and secure the shaft (9) and control arm. Tighten the attaching bolts (2, Fig. 6-36) to a torque of 35—40 lb.ft. (4.8—5.5 kgm) and lock them with the locking plate (3).
8. Tighten the attaching nuts (3, Fig. 6-2) for the clamps to a torque of 15—17 lb.ft. (2.1—2.4 kgm). Fit the other parts in the reverse order to removing.
9. Check the wheel alignment, see under "Wheel alignment".

Replacing the upper control arm

1. Remove the hub caps and slacken the wheel nuts slightly.
2. Lift up the front end and place a block under the lower control arm. Unscrew the wheel nuts and lift off the wheel.
3. Unscrew the nuts (3, Fig. 6-2) and remove the clamps (7).
4. Remove the nuts (2) and attaching bolts for the upper ball joint and lift off the upper control arm.
5. Fitting is done in the reverse order to removing. Tighten the nuts (3, Fig. 6-2) for the clamps to a torque of 15—17 lb.ft. (2.1—2.4 kgm). Check the wheel alignment, see under "Wheel alignment".

Replacing the lower control arm bushings

1. Lift up the front end and place blocks under the axle member.
2. Unscrew the nuts (2, Fig. 6-3) and remove the clamps (7). Remove nuts (4) and washers (3).
3. Place a jack under the lower control arm inside the spring and lift it enough so that loading is removed from the bushings. Pull off the bushings (5) and sleeves (6).
4. Smear a little soft soap on the rubber bushings (5) and sleeves (6) and fit them onto the control arm shaft (8). Fit the washers (3) and tighten the nuts (4) well.
5. Lower the control arm and fit clamps (7) and nuts (2). Tighten the nuts to a torque of 15—17 lb.ft. (2.1—2.4 kgm).
6. Lower the car. Check the wheel alignment, see under "Wheel alignment".

Replacing the lower control arm

1. Remove the hub cap and slacken the wheel nuts slightly.
2. Lift up the front end and place blocks under the axle member. Unscrew the wheel nut and lift off the wheel.
3. Remove the nuts (30, Fig. 6-1), washers (31) and rubber bushings (32). Remove the bolt (45) for the attaching washer (44). Remove the washer and shock absorber (43) downwards.
4. Place a jack under the lower control arm centrally under the spring. Raise the jack until the upper control arm rubber buffer (29) lifts.
5. Disconnect the stabilizer from the lower control arm. Remove the four attaching bolts (47) and disconnect the lower ball joint from the control arm.
6. Lower the jack slowly and remove the spring (42) when the control arm has come sufficiently far down.
7. Remove the nut and clamps at the inner attachment (39) after which the control arm can be lifted off.
8. Fitting is done in the reverse order. Tighten the nuts (2, Fig. 6-3) for the clamps to a torque of 15—17 lb.ft. (2.1—2.4 kgm). Check the wheel alignment, see under "Wheel alignment".