

Removal and Installation of Engine together with Transmission and Sub-Frame

Job-No.

01 — 2

Removal:

1. Drain cooling water and remove radiator (see Job No. 50 — 1).
2. Disconnect heat-exchanger hoses and radiator thermometer hoses.
3. Remove air intake silencer.
4. Disconnect the ground cable at the negative terminal of the battery.
5. Remove the ground cable at the upper screw on starter by unscrewing the hexagon nut.
6. Disconnect all electric cables at the generator, starter, distributor and steering tube.
7. Loosen and remove the upper clamp screw (6) of the steering coupling (see Fig. 01 — 2/1).

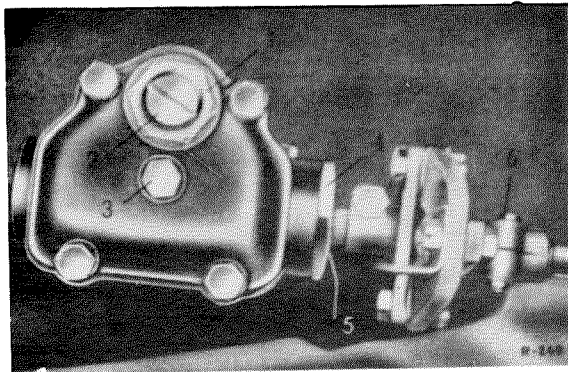


Fig. 01 — 2/1

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|---------------|---------------------|
| 1 Hexagon nut | 4 Hexagon nut |
| 2 Set screw | 5 Adjusting ring |
| 3 Screw plug | 6 Upper clamp screw |

8. Unscrew the grub screw in the steering column jacket (see Fig. 01 — 2/2). Then pull out the steering tube from the steering coupling.

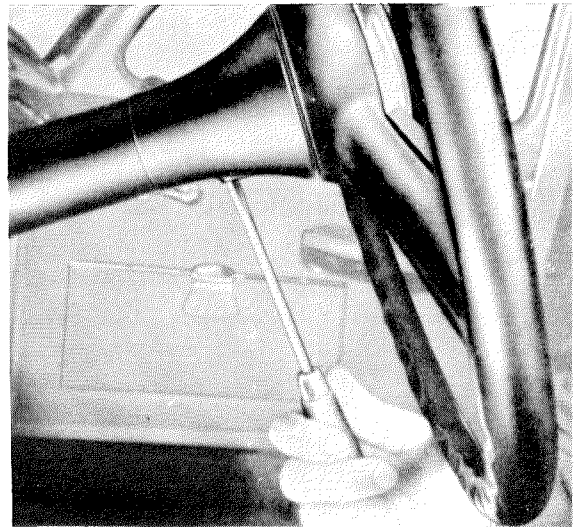


Fig. 01 — 2/2

9. Disconnect the control cable for ignition adjustment at the distributor.

Note: Recently the control cable for ignition adjustment has been superseded.

10. Disconnect the accelerator linkage at the control shaft. Disconnect the choke control cable at the carburetor (see Job No. 30 — 6, paragraphs 5 and 6).

11. Disconnect the fuel line at the fuel pump and the flexible hose for the oil gage line at the oil filter.

Note: In order to avoid damage to the fuel feed pump and the carburetor when detaching or attaching the fuel line, the threaded union must always be held steady with a second wrench.

12. Disconnect spring clips from the ball-cup connectors of the selector and shift rod at the bearing (see Fig. 01 — 2/3).

13. Detach exhaust from exhaust manifold.

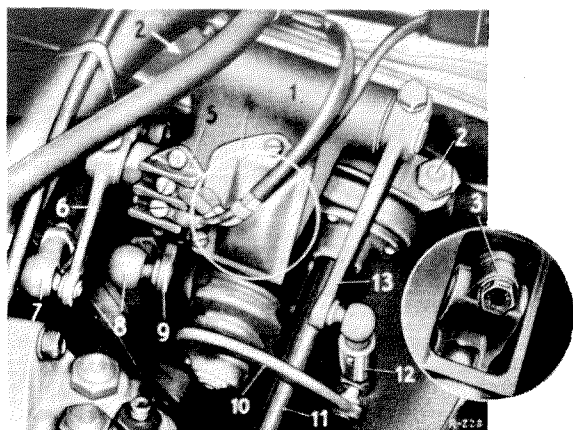


Fig. 01 — 2/3

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|--------------------------------------|-------------------------------------|
| 1 Bearing | 8 Shift rod ball-cup connector |
| 2 Hexagon screw | 9 Relay shaft lever |
| 3 Selector lever at shift tube | 10 Lever at shift tube |
| 4 Dust cover | 11 Steering tube |
| 5 Cable connector | 12 Spring-loaded ball-cup connector |
| 6 Selector lever | 13 Relay lever |
| 7 Ball-cup connector at selector rod | |

14. Detach the support (2) at the mounting plate (1) for the exhaust pipe suspension (see Fig. 01 — 2/4).

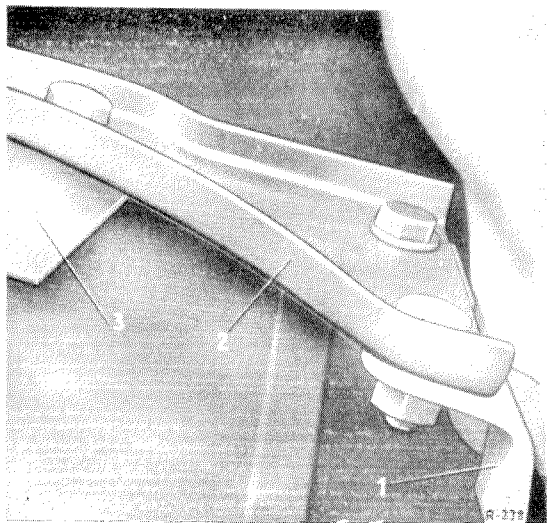


Fig. 01 — 2/4

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|------------------------|
| 1 Mounting plate |
| 2 Support |
| 3 Exhaust pipe bracket |

15. Disconnect the flexible speedometer drive at the transmission.

16. Detach the cover plate for the propeller shaft intermediate bearing. Mark the position of

the bearing bracket on the chassis base panel (5). Then unscrew the two bearing bracket fixing screws and washers (see Fig. 01 — 1/5).

17. Disconnect the propeller shaft at the transmission and push backward.

Note: It is advisable to unscrew the pinion rim grease fitting at the rear end of the slip coupling in order that the air can escape and the slip coupling can be easily telescoped. Where later models are already provided with a bore in the sealing plate to allow surplus air or grease to escape, the grease fitting need not be detached (see Job No. 41 — 1, Fig. 41 — 1/7).

18. Detach the return spring at the clutch throw-out fork and at the transmission. After loosening the hexagon nut (2) and the set screw (1) press down the turnbuckle and the pull rod. Release the swivel support (10) by removing the two hexagon screws from the spring plate (see Fig. 01 — 2/5).

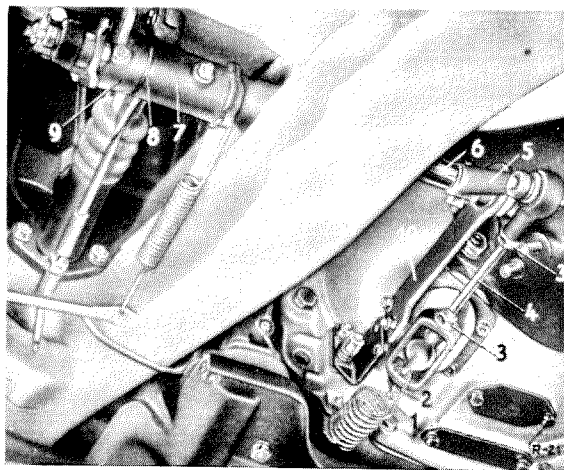


Fig. 01 — 2/5

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|--|
| 1 Adjusting screw for clutch free play |
| 2 Lock nut for adjusting screw |
| 3 Lock nut for pull rod |
| 4 Pull rod |
| 5 Relay lever |
| 6 Clutch pedal shaft |
| 7 Brake pedal |
| 8 Lock washer |
| 9 Clutch pedal |
| 10 Swivel support |

19. After removing the fixing screws (4), remove torsion bar support mounting at left and right of chassis base assembly (see Fig. 01 — 2/6).

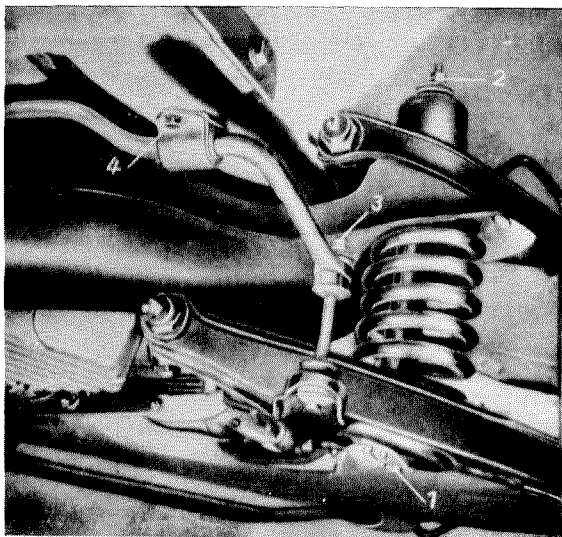


Fig. 01 — 2/6

- 1 Shock absorber mounting at lower control arm
- 2 Upper shock absorber mounting above the dome of the front axle support
- 3 Hexagon nut
- 4 Hexagon screw

20. Back out the sleeve nut (5) at brake line (6) (at left and right on the wheel arch assembly) 2 or 3 turns from the brake hose (2) (see Fig. 01 — 2/7).

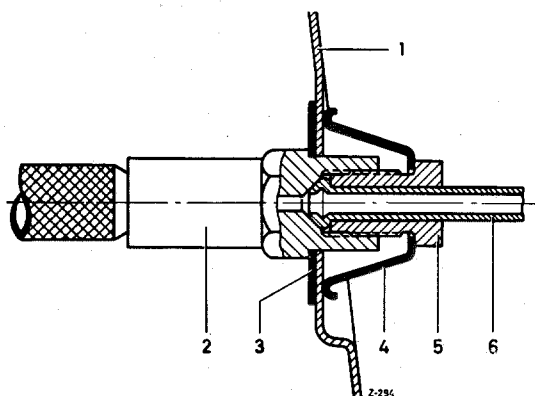


Fig. 01 — 2/7

- 1 Wheel arch assembly
- 2 Brake hose
- 3 Washer
- 4 Brake hose retaining spring
- 5 Sleeve nut
- 6 Brake line

21. Then screw the brake hoses at the left and the right out of the brake line at the brake anchor plate (see Fig. 01 — 2/8).

22. Fit Lifting Rig BE 10 989 for raising the front of the car at the front jack supports and raise the car slightly. Place tail wheel BE 10 990 under the lower anchor pins of the front axle halves (see Fig. 01 — 2/9 and Fig. 01 — 2/10).

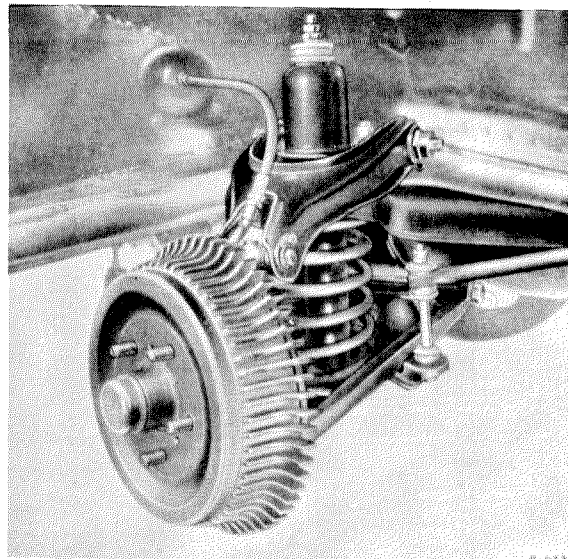


Fig. 01 — 2/8

23. Remove the three fixing screws of the front axle support from the step bearings (1) and (2) at the chassis base assembly (see Fig. 01 — 2/9).

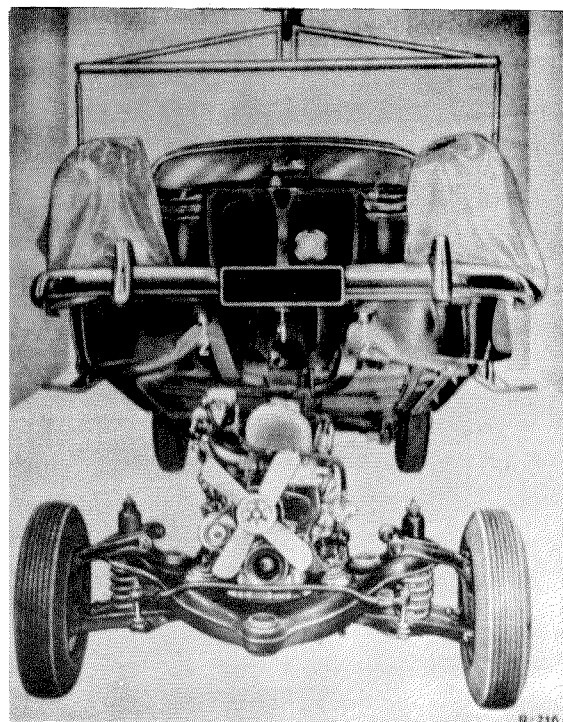


Fig. 01 — 2/9

- 1 Front step bearing of front axle support mounting
- 2 Rear step bearing of front axle support mounting

24. Raise the body approximately 1 meter (see Fig. 01 — 2/9) and push out the sub-frame with engine, transmission and tail wheel toward the front. Lower and support the body.

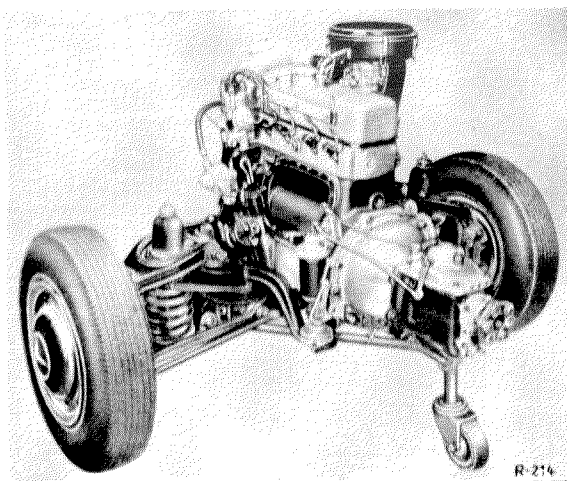


Fig. 01 — 2/10

Installation:

Installation is the reverse of the removal procedure. Particular attention must be paid to the following points:

25. Rub the rubber buffers with talc. Then insert the upper rubber buffers (2) in the front axle support (3) (see Fig. 01 — 2/11 and Fig. 01 — 2/12).

26. Slide the sub-frame into the step bearings. When doing this, check that the rubber buffer is correctly seated between the front axle support and the step bearing.

Fit the lock plate (7), the cup washer (6), the spacer sleeve (4) and the lower rubber buffer (5) on the fixing screws (8).

27. Screw in the fixing screws and tighten with a torque of 4 mkg and tap the lock plate over.

Note: The spacer sleeve must not be distorted by excessive tightening of the fixing screw!

28. Press forward the propeller shaft, connect at the transmission and cotter the castle nuts.

Note: Do not omit the sealing ring (3) between center cross and the propeller shaft flange (see Fig. 01 — 1/11).

Check that the shaft plate is correctly positioned (see Job No. 41 — 1).

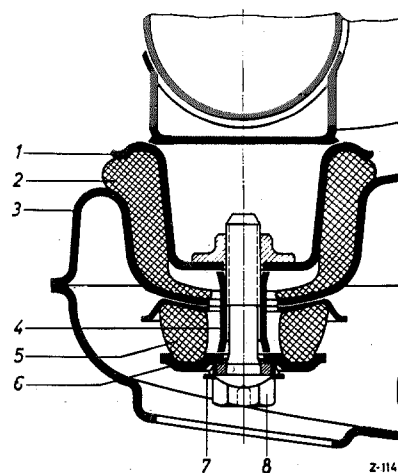


Fig. 01 — 2/11

Front Mounting

- | | |
|-----------------------|-----------------------|
| 1 Step bearing | 5 Lower rubber buffer |
| 2 Upper rubber buffer | 6 Cup washer |
| 3 Front axle support | 7 Lock plate |
| 4 Spacer sleeve | 8 Hexagon screw |

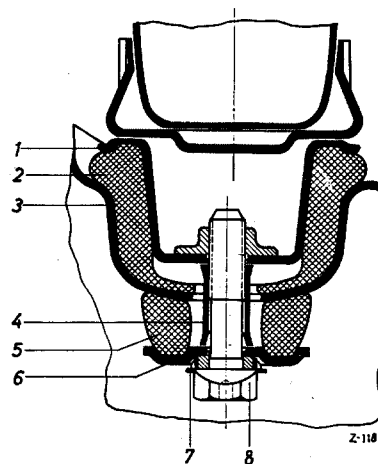


Fig. 01 — 2/12

Rear Mounting

- | | |
|-----------------------|-----------------------|
| 1 Step bearing | 5 Lower rubber buffer |
| 2 Upper rubber buffer | 6 Cup washer |
| 3 Front axle support | 7 Lock plate |
| 4 Spacer sleeve | 8 Hexagon screw |

29. Attach the propellershaft intermediate bearing without forcing, noting the position marked during the removal operation (see Fig. 01 — 1/5).

30. Pull the wiring harness of the steering tube through the cable conduit of the steering. Line up the front wheels in a straight fore and aft position and bring the steering wheel to the exact middle position and insert the steering tube in the steering coupling.

31. Replace the upper clamp screw in the steering coupling and the grub screw in the steering column jacket and tighten up (see Fig. 01 — 2/1 and Fig. 01 — 2/2).

Note: If necessary replace clamp screw, nut and lock washer. Only specified clamp screws may be used to fix the steering coupling to the steering tube. These screws should be tightened so that the steering coupling is seated firmly on the steering worm and on the steering tube. Excessive tightening must be avoided in order to avoid the risk of screws being strained and snapping.

32. Connect the flash direction signal and horn cables to the steering column cable connector at the wheel arch assembly left. When connecting up the cables pay attention to the color coding of the individual cables:

The individual cables must be connected so that the colors of the cables of the steering tube wiring harness correspond to the main wiring harness cables.

(See also Job No. 54 — 1, Section A, Diagram of the Main Wiring Harness, Wiring Sheaf **28**).

33. Connect up all electric cables. When connecting the electric cables, pay attention to the color coding.

a) Cable Connections to Generator:

Connect the black cable of the regulator harness (1.5 mm² section fitted with tag), to terminal DF, the red cable (4 mm² section to terminal D + (61), the brown cable 2.5 mm² section to terminal D — of the generator (see also Job No. 54 — 4, Section A).

Note: Be sure to connect cables to correct terminals! Incorrect connection of the terminals involves the danger of pole reversal to the generator and could result in the destruction of the regulator!

b) Cable Connections to Starter:

Connect battery cable 30 and the red cable 51 (red leads No. 53 and No. 54 of the main wiring harness, see Job No. 54 — 1, Section A, Circuit Diagram of the Main Wiring Harness), Cable Sheaf **3** to the terminal of the solenoid switch. Push the rubber cap over the terminal.

Connect the black/red control cable (lead No. 25) to the slotted screw at the solenoid switch.

Note: The black/red control cable must not be passed through the rubber grommet at the starter terminal, since it might rub against the battery cable terminals 30 and 51 (see Job No. 15 — 1, Fig. 15 — 1/2). In this case the control cable might become live and operate the starter. The black/red cable must therefore be wound around cable 30 and 51 and connected directly to terminal 50.

- c) Fasten the ground strap to the upper fixing screw on starter.

- d) Connect cable from the ignition coil, terminal 1, to the distributor.

- e) Connect the reversing light harness to the connector (5) for the reversing light (see Fig. 01 — 1/3).

- f) Connect the ground cable to the negative terminal of the battery.

34. Mount the two hexagon screws for fixing the swivel support (12) at the spring plate (11) (see Fig. 01 — 1/11).

35. Then center the pedal shaft in the bore of the chassis base plate.

Horizontal centering of the pedal shaft is carried out by removing or adding shims at the point on the clutch housing where the swivel support is mounted (see Fig. 01 — 2/13); **the vertical centering of the pedal shaft** is carried out by moving the bracket (3) upward or downward.

Note: At present, modified brackets (3) are being fitted. Instead of the two slots, these brackets are provided with two normal bores. The shim (4) is no longer necessary. In order to facilitate the vertical adjustment of the clutch pedal shaft the two bores in the swivel support (12) have been increased in size from 6.4 mm Ø to 7.0 mm Ø.

If a new bracket is fitted at a later date, the two holes of the swivel support should be bored out to 7 mm Ø.

36. Attach the turnbuckle for the actuating mechanism and the return spring for the clutch throw-out fork.

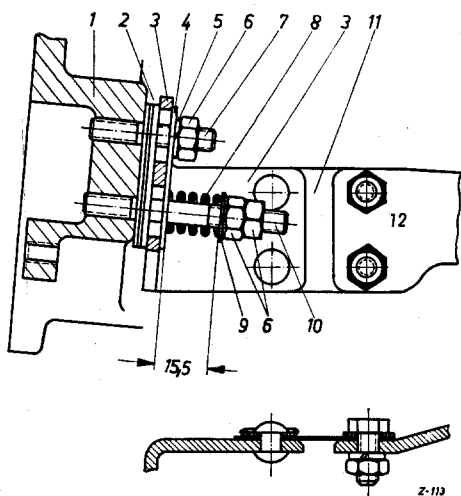


Fig. 01 — 2/13

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|------------------|-------------------|
| 1 Clutch housing | 7 Stud bolt |
| 2 Shims | 8 Damper spring |
| 3 Bracket | 9 Washer |
| 4 Shim | 10 Stud bolt |
| 5 Lock washer | 11 Spring plate |
| 6 Hexagon nut | 12 Swivel support |

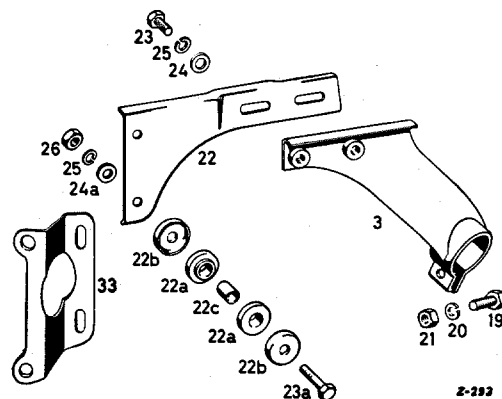


Fig. 01 — 2/14

- | | |
|-------------------------|--------------------------|
| 3 Bracket | 23 Hexagon screw M 8×20 |
| 19 Hexagon screw M 8×20 | 23a Hexagon screw M 8×40 |
| 20 Lock washer | 24 Washer |
| 21 Hexagon nut | 24a Washer |
| 22 Support | 25 Lock washer |
| 22a Rubber washer | 26 Hexagon nut |
| 22b Cup washer | 33 Mounting plate |
| 22c Sleeve | |

37. Adjust the clutch pedal free movement to 25 mm. Check the clutch pedal for ease of movement (see Job No. 29 — 3).

38. Attach the ball-cup connectors and the selector and shift rod (see Fig. 01 — 2/3). Then fasten the spring clips to the ball-cup connectors.

39. Check the adjustment of the gearshift (see Job No. 26 — 3).

40. Attach the exhaust pipe with new gasket to the exhaust manifold; tighten the three hexagon screws and nuts evenly.

41. Attach the support (22) of the exhaust suspension to the mounting plate (33) with rubber washers (22a), the cup washers (22b), the sleeves (22c), and the two hexagon screws (23 a) with the washers (24 a), lock washers (25) and hexagon nuts (26) (see Fig. 01 — 2/14).

42. Connect the choke control cable at the carburetor (see Job No. 30 — 6, Paragraphs 15 — 20).

43. Connect the ignition adjustment control cable at the distributor bearing support or at the adjusting lever (see Job No. 30 — 8, Paragraphs 11 — 13).

Note: This operation has become unnecessary recently, since the ignition adjustment control cable has been superseded.

44. Install the radiator (see Job No. 50 — 1).

45. Screw in the brake hoses at left and right into the brake line at the brake anchor plate (see Fig. 01 — 2/8).

Then tighten up the sleeve nut (5) at the brake line (6) at left and right at the wheel arch assembly (see Fig. 01 — 2/15).

Make sure that the brake hose retaining spring (4) is correctly seated.

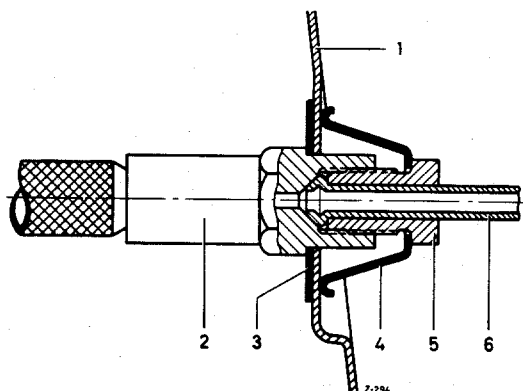


Fig. 01 — 2/15

- | | |
|-----------------------|-------------------------------|
| 1 Wheel arch assembly | 4 Brake hose retaining spring |
| 2 Brake hose | 5 Sleeve nut |
| 3 Washer | 6 Brake line |

46. Bleed the brake lines (see Job No. 42 — 1).
47. Fill up with cooling water and bleed the heat exchangers.
48. Check the oil level in the engine, if necessary top up with oil.
49. Start the engine and check all unions for mechanical tightness and leakage and check the electrical system.
50. Check the cooling-water level, if necessary top up with water.
51. Check toe-in, camber, caster, wheelbase, and if necessary adjust (see Job No. 40 — 3).
52. Adjust headlights (see Job No. 82 — 2).