

## B. DB Steering Type L 1; Part No. 186 4601201

Model 220

### Disassembly:

1. Remove the steering (see Job No. L 1, paragraphs 1 to 6).
2. Remove the split pin of the castle nut on the steering gear arm, unscrew the castle nut and use Bell-shaped Puller 186 589 04 33 to pull off the steering gear arm.
3. Unscrew the hexagon nut (1) and the set screw (2) in the housing cover to the point where the pressure sleeve (7) is no longer under stress (see Fig. L 4/21).
4. Remove the four housing cover fixing screws and remove the cover and gasket. Take out the pressure sleeve (1) together with the compression spring (Fig. L 4/20).

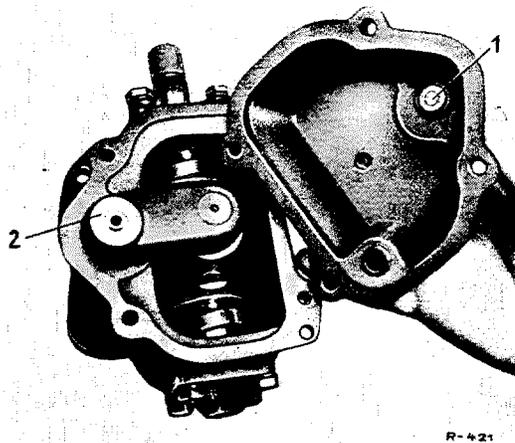


Fig. L 4/20

1 Pressure sleeve  
2 Steering shaft

5. Empty the oil by tilting the steering gear.
6. Pull out the steering shaft (2) upward (Fig. L 4/20).
7. Slacken the 4 fixing screws for the lower bearing cover and remove the cover with the cable guide tube (1), the ball race (2), the ball retainer (3), the shim (4) and the seal (Fig. L 4/21).
8. Slacken the 4 fixing screws for the lower bearing cover. Then use a suitable drift to

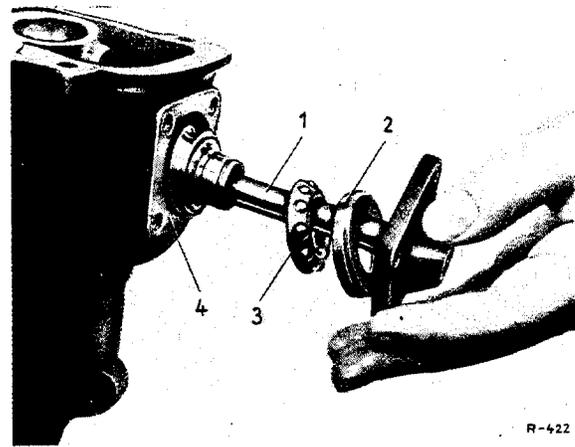


Fig. L 4/21

1 Bearing cover with cable  
guide tube  
2 Ball race  
3 Ball retainer  
4 Shim

knock the steering worm upward until the cover, together with the ball race, ball retainer and sealing ring, can be taken off.

9. Remove the steering worm with the steering nut obliquely upward from the housing (Fig. L 4/22).

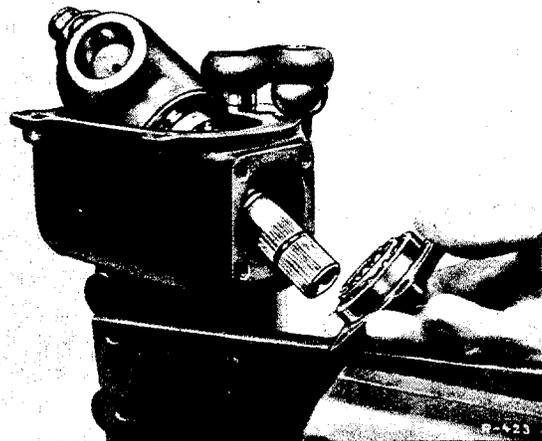


Fig. L 4/22

10. If it is necessary to replace the ball race in the upper bearing cover, use a suitable puller to pull it off.

**Note: The ball races and the ball retainers must not be inadvertently interchanged. To avoid this, place them or mark them so that confusion is impossible.**

11. If necessary, disengage the steering worm from the steering nut. Keep the steering worm horizontal and be careful with the balls.

**Note:** Normally there are in all 82 balls in the steering nut. Because of the permissible tolerances there can in some cases be as few as 80 or as many as 84 balls in the steering nut.

**The ball guide tubes must not be screwed off. If a ball guide tube is bent, the steering nut, complete with steering worm and balls, must be replaced.**

**Only the complete assembly with steering nut, balls, steering worm and taper-roller bearings is supplied as a replacement part.**

12. Remove the sealing ring for the cable guide tube from the lower bearing cover.

13. Then tap out the grease seal from the adjusting ring and the grease seal for the steering shaft from the steering housing.

14. Thoroughly clean all parts.

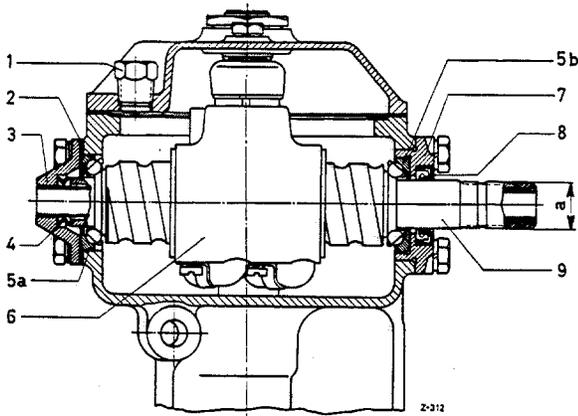


Fig. L 4/23

- a = 21.5mm diameter at the serrations
- 1 Taper plug for oil filler hole
  - 2 Shim
  - 3 Lower bearing cover with cable guide tube
  - 4 Cable guide tube sealing ring
  - 5a Ball race with ball retainer, lower
  - 5b Ball race with ball retainer, upper
  - 6 Steering nut
  - 7 Upper bearing cover
  - 8 Grease seal in adjusting ring
  - 9 Steering worm

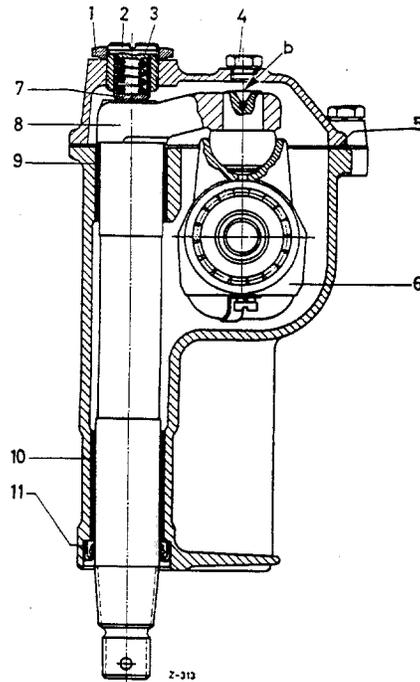


Fig. L 4/24

- a Centering bore for steering shaft arm center position
- 1 Hexagon nut
- 2 Set screw
- 3 Compression spring
- 4 Screw plug
- 5 Gasket
- 6 Steering nut
- 7 Pressure sleeve
- 8 Steering shaft
- 9 Upper bearing bushing
- 10 Lower bearing bushing
- 11 Grease seal

**Assembly:**

15. If the steering nut was screwed out during the disassembly operation, install the steering nut by screwing it onto the steering worm, whilst holding the latter vertical.

16. Now fill the upper ball-race with balls. When doing this, turn the steering worm back and forth and use a suitable bent, blunt wire to insert the balls in the ball guide tube (Fig. L 4/25).

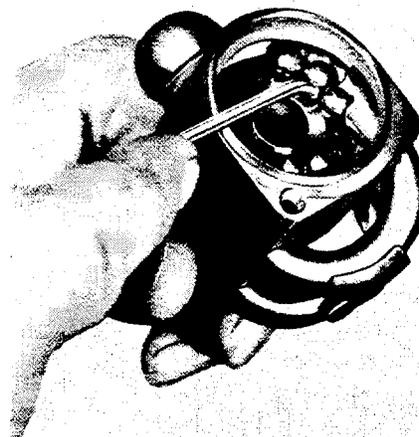


Fig. L 4/25

17. Then fill the lower ball-race in the same manner.

**Note:** When inserting the balls it is not necessary to count them.

Normally 41 balls are needed in each ball-race. In individual cases, however, it is possible that in one ball-race, one ball less, i. e. 40 balls, or one ball more, i. e. 42 balls, are necessary.

**As a check, insert as many balls as will go in Without forcing. The balls must on no account be forced in.**

Now the steering worm can be turned through. When doing this, it must be possible to turn the steering worm easily and without binding. If the steering worm binds at any point, one ball too many has been inserted in one ball-race. If this is the case, the balls no longer roll in the race as they should but instead, they skid.

**On no account use force when turning the steering worm. If binding spots are felt when turning the steering worm, even after the balls have been fitted in the prescribed manner, the steering worm must be replaced complete with balls and steering nut.**

**Similarly, if one or more balls are lost, the complete steering worm assembly must be replaced.**

18. Put the steering worm into the housing obliquely from the top (see Fig. L 4/22).
19. Slide a new sealing ring (4) onto the cable guide tube (see Fig. L 4/23).
20. Put in the lower bearing cover with cable guide tube, sealing ring, outer race, ball retainer and shim and attach it, **loosely** in the first place, to the housing with the 4 hexagon screws.

**Note:** The initial tension on the sealing ring (4) must be approx. 0.5—0.6 mm in order to provide a definite seal against the possibility of oil penetration.

21. Slide the upper bearing cover with the pressed-in sealing ring (8) and the ball race,

together with the ball retainer, over the steering worm shaft and press it into the housing. Attach the cover with the 4 hexagon screws.

**Note:** When sliding on the sealing ring, the serrations of the steering worm should be bound with insulating tape in order to avoid damage to the seal. The outer surface of the insulating tape may be smeared with a little grease.

22. Check the steering worm for end play. To do this, tighten up the 4 fixing screws of the lower bearing cover. The end play of the steering worm should be 0.00 to 0.01 mm.

The shims between the lower bearing cover and the housing are available in 4 thicknesses for correcting the end play. These thicknesses are 0.1 mm, 0.15 mm, 0.2 mm and 0.5 mm. If the specified end play cannot be obtained with the aid of the compensating shims, the upper bearing cover (7) must be correspondingly remachined on the face side (see Fig. L 4/23).

23. Apply SAE 90 hypoid oil liberally to the bearing surfaces of the steering shaft.

Apply Molykote-Paste G to the steering arm ball head. Then insert the steering shaft in the housing.

24. Fill up the steering housing with 0.4 liters of SAE 90 hypoid oil.
25. Place the cover, together with the gasket, on the steering housing and fix it with the four hexagon screws and lock washers.
26. Insert the pressure sleeve (7) together with the compression spring (3) in the cover of the steering housing (with grease) (see Fig. L 4/24). Now screw in the set screw (2) and install the hexagon nut (7) by hand.
27. Back out the screw plug (4) in the housing cover (see Fig. L 4/24) and turn the steering worm so that the center point marked on the steering shaft arm is in the center of the bore in the screw plug.

28. Use a screwdriver to screw the set screw in until the compression spring is bunched solid.

Then back out the set screw approx. 2 mm (measured at its circumference) and lock the set screw with the hexagonal nut. When doing this, use a screwdriver to hold the set screw steady (Fig. L 4/26).

29. Check the steering worm for ease of movement.

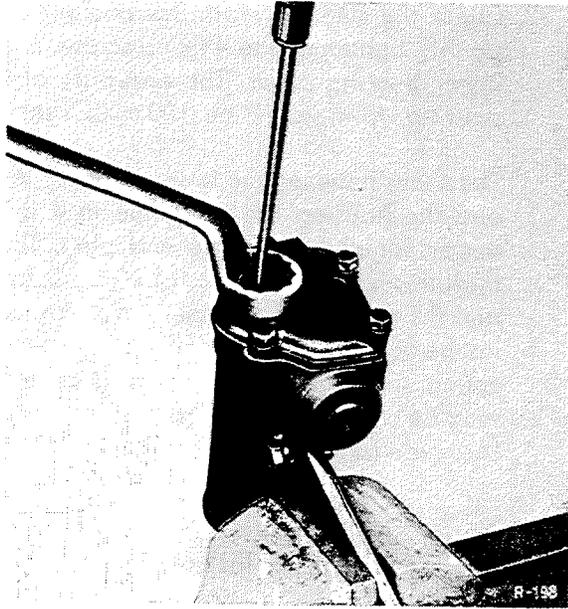


Fig. L 4/26

**Note:** The steering shaft must on no account jam at the center position when it is turned. The adjustment should be so made that a slight pressure is noticeable at the center point when the steering shaft is turned completely.

30. Reinstall the screw plug with sealing ring and tighten up.

31. Bind the serrations of the steering shaft with insulating tape and smear lightly with grease.

Then smear sealing compound along the outer circumference of a new grease seal and use a fitting sleeve to drive it into the housing.

32. Press the steering gear arm onto the serrated part of the steering shaft so that the markings on the steering gear arm coincide with those on the steering shaft.

33. Screw the castle nut onto the steering shaft and tighten firmly.

34. Cotter the castle nut.

35. Install the steering assembly (see Job No. L 1, paragraphs 7—14).