

## FRONT AXLE AND FRONT SPRING

The frontwheels are independently suspended by means of links and coilsprings which are dampened by shockabsorbers within the coil-springs. Tyres 5.90 x 13 are fitted, with a tyre pressure as mentioned under Group B, tyre pressure table. In standard measuring position, i. e. horizontal position of lower links, see R Wheel measurement, Figure 2, the track is 1340 mm or appr. 52 3/4".

Roadholding and tyres depend on the proper adjustment of frontwheels. The proper adjustment is most important and for this reason frontwheel measurement is described fully in a special chapter. Most of the work on front axle and steering can be carried out without dismantling the front axle. A holding device for the front axle should be used when work on dismantled axle is carried out, see measures on reverse page. When replacing springs, fit only springs with the same colour mark. Springs are made recognizable by 3 colour marks (red, yellow, and green) to distinguish 3 different spring loads. (See statement below).

### FRONT AXLE

Front axle type	Frontwheel independent suspension
Toe-in	0 mm (measured in wheel center)
Camber	1° - 15'
Castor	3° ± 30'
King pin inclination	6° ± 15'
Shockabsorber	Hydraulic telescopic shockabsorber
	High pressure 190 Kg $\pm$ 10 or
	420 lbs $\pm$ 22
	Low pressure 52 Kg $\pm$ 8 or
	116 lbs $\pm$ 17

### FRONT SPRING

Frontspring type	Coilspring and stabilizer
	Front coil spring
	2 C 55-30 - 34
Length without load	345 mm or appr. 13 57/64"
Number of coils (effective)	12.7 (11.5)
Wire diameter	14.6 mm or appr. 37/64"
Spring rate	54 kg/cm or 307 lbs/in.
Springs are marked by colours. Fit springs only with the same colour marks.	
Mark	Load at 260 mm length
	or 10 15/64"
Red	432-448 kg or 590- 985 lbs
Yellow	448-463 kg or 985-1018 lbs
Green	463-478 kg or 1018-1051 lbs



## V. FRONT AXLE ASSEMBLY

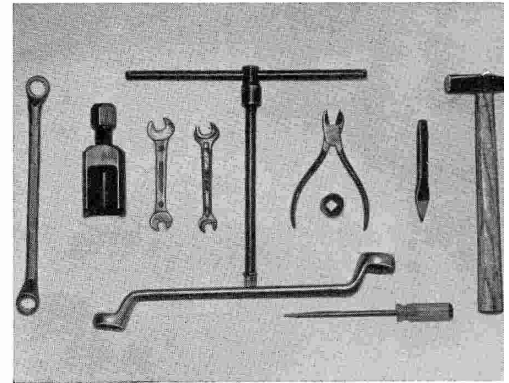
### V 1. Removal and replacement of front axle assembly

Removal and replacement of the front axle assembly can be carried out with or without engine removed. Principally it is not essential to remove the assembly to work on the frontwheel suspension. When removing the assembly without removal of engine, the engine is - after separation from front axle assembly - hanged up and shortly pulled. Vehicle must be jacked up. The following work applies to removal of assembly with engine in place.

Tools: Ring spanner 29, 19, 17 mm, spanner 2 x 14, socket spanner 19 mm, hammer, chisel, side cutting nipper, insulated screwdriver, extractor WK 141.

Figure 1

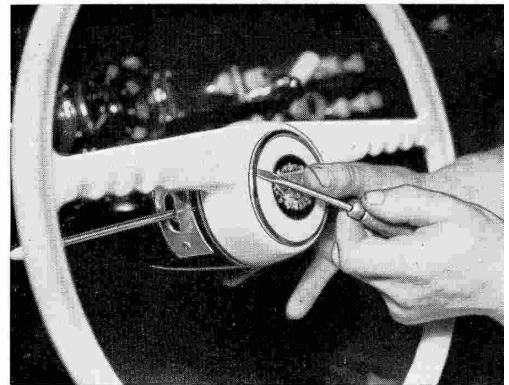
1



1. Lift out horn button.  
(Screwdriver)

Figure 2

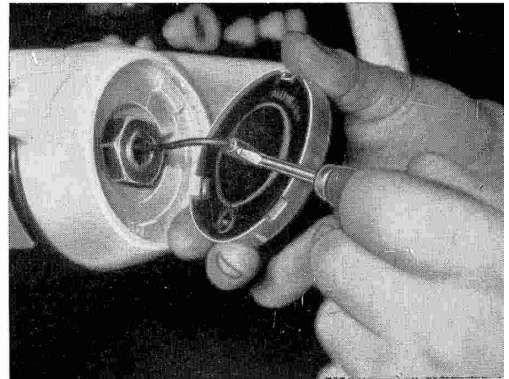
2



2. Disconnect horn cable on horn button and pull out underneath.

Figure 3

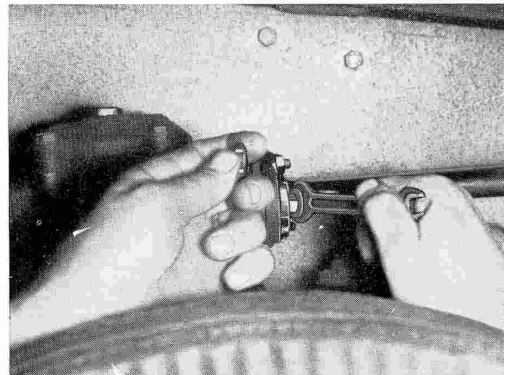
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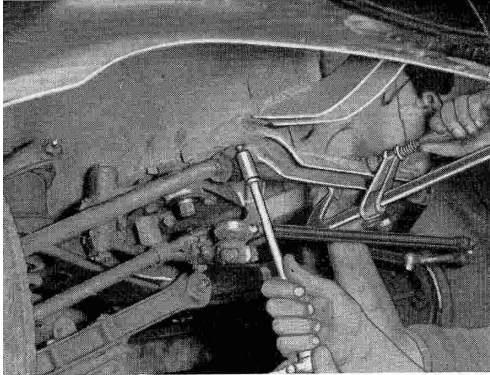
3. Separate steering column from steering assembly.
  - a) Bend up locking plate.  
(Hammer, chisel)
  - b) Slacken bolt, rubber joint remains in steering casing.  
(2 spanner 14 mm)

Figure 4

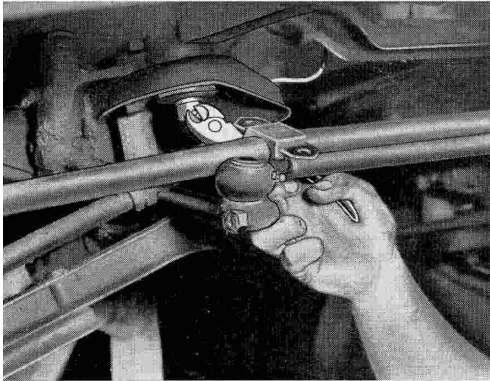
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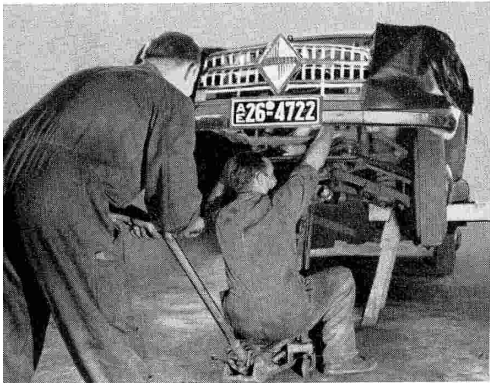
Caution: When reassembling pay attention that driver remains in steering and that a sealing rubber ring ESS. 27 - 61 is fitted.



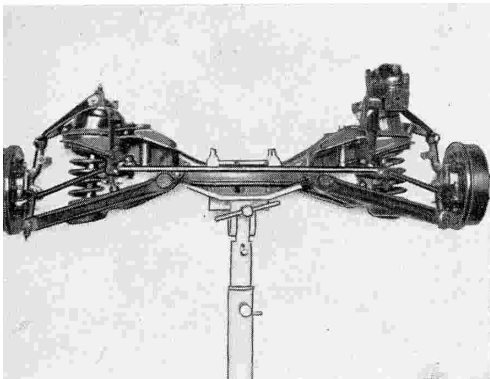
5



6



7



8

4. Disconnect brake hose from brake plate, collect brake fluid in container.  
(Spanner 17 mm, container)

5. Remove split pin and undo ball socket nut on drop (steering) arm.  
(Side cutting nipper, ring spanner 17 mm)

■ Caution: Loosen tie rods (crosstubes) only with springs under tension, vehicle stationary.

6. Pull off tie rods from drop arm.  
(Extractor WK 141, ring spanner 27 mm)

7. Jack up vehicle.

8. Undo stabilizer clamp connections.  
(Socket spanner 14 mm)

■ Caution: When removing or replacing stabilizer bend same in screw clamp or by assistant mechanic.

Figure 5

9. Support front axle assembly with jack.

10. Remove split pins and undo nuts of front axle support beams.  
(Side cutting nipper, socket spanner 19 mm with extension, counterhold with ring spanner)

Figure 6

■ Caution: When removing front axle assembly, let same down with car jack, when replacing use jack again, bolts must be inserted by assistant.

Figure 7

11. Front axle on holding device.

Figure 8

Reassembly in reversed order. Bleed brake system.

### V 3. Front axle assembly - dismantling and reassembling

Assembly removed and separated from engine

Tools: Spanners 13, 14, 17, 36 mm, socket spanner 14, 15, 19, and 27 mm, ring spanner 14, 15, 17, and 22 mm, side cutting nippers, plastic head hammer, hammer, chisel, screwdriver 4 and 10 mm, brake-spring pliers, torque wrench, drill 3 mm, stepped punch, screwdriver insert for socket spanner, clampscrew, extractor WK 141, WK 142/1 left hand, WK 142/2 right hand, spanner for protecting cap WK 102, hub extractor WK 51, slotted nut spanner WK 27, punch WK 7, punch WK 6/1, WK 6/2, WK 6/3.

Figure 9

1. Clamp front axle assembly to holding device. (Swivelling support)

Figure 10

2. Remove split pins and undo ball socket nuts of track rods and remove track rods. (Side cutting nippers, ring spanner 17 mm, spanner 17 mm)
3. Remove split pins and undo inner ball socket nuts on both cross tubes. (Side cutting nippers, ring spanner 17 mm)
4. Pull off both ball sockets. (Extractor WK 141, ring spanner 22 mm)

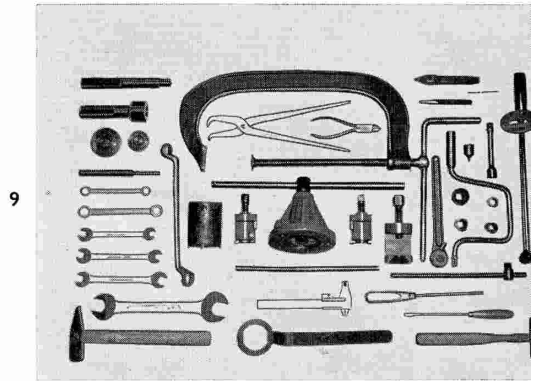
**Caution:** Before removal of front axle assembly the track rod bolt sockets (outer) should be slackened. (See V 1 working process 4). When removed without slackening, spring must be compressed. (Clamp screw)

5. Remove split pins and undo castellated nuts on drop arm bolts (right) and steering column. (Side cutting nippers, socket spanner 30 mm)
6. Cut off rubber seal ring on drop arm bolt (right) to apply extractor and pull off drop arm. (Extractor WK 142/2 (right), spanner 14 mm)
7. Pull off drop arm from steering column. (Extractor WK 142 (left), spanner 14 mm)

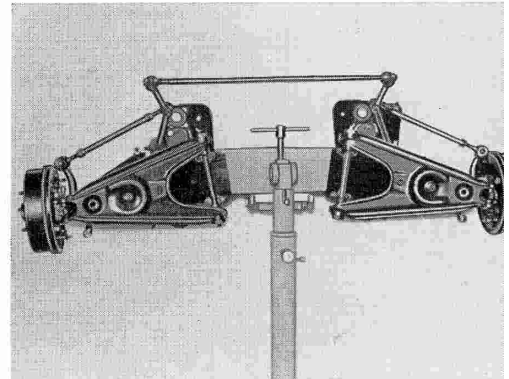
Figure 11

and from drop arm bracket. (Extractor WK 142/2 (right), spanner 14 mm)

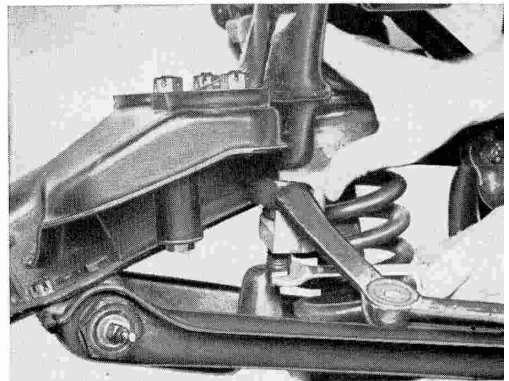
Figure 12



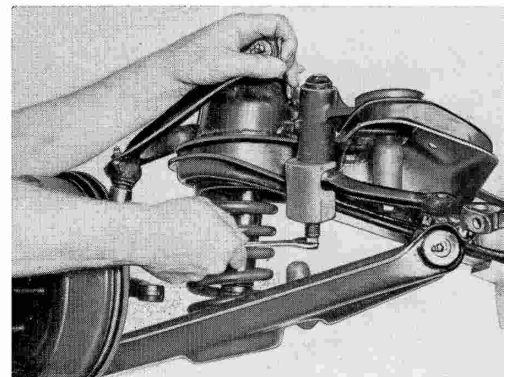
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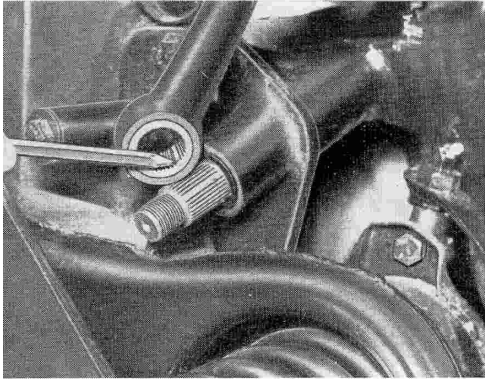
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11



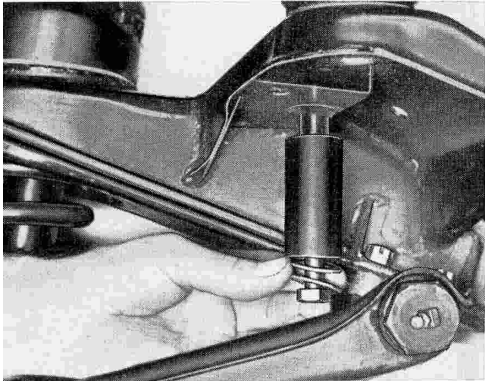
12



13

Caution: When reassembling steering - drop arm observe correct position of drop arm. Tooth space (lash) on drop arm must coincide with large tooth on steering.

Figure 13



14

8. Remove steering complete, remove 3 split pins, undo nuts and remove one screw.  
(Side cutting nippers, spanner 17 mm, ring spanner 17 mm)
9. Remove steering bracket (right). Remove split pins and undo nuts.  
(Side cutting nippers, spanner 17 mm, ring spanner 17 mm)

Caution: The long holding down bolt of the drop arm bracket is fitted with a rubber bush and can only be removed with drop arm below removed. The same applies to the long holding down bolt of the steering (See work process 8). Therefore both bolts must be fitted before lower drop arm is screwed in.

Figure 14



15

10. Dismantling and reassembling of steering bracket.
  - a) Bore out punch marks which secure bronze caps  
(Drill 3 mm appr. 1/8")
  - b) Undo bronze caps.  
(Spanner 14 mm)
  - c) Remove split pin and undo nut for drop arm shaft.  
(Side cutting nippers, socket spanner 19 mm)
  - d) Drive out shaft.  
(Plastic head mallet)

Figure 15



16

- e) Drive out roller bearing with stepped punch.  
(Punch, hammer)

Caution: When driving out shaft, hold bracket by hand.

Figure 16

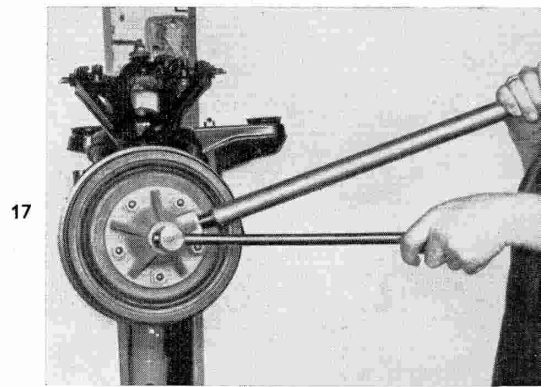
- f) Drive out needle bearing with well fitting stepped punch. (Punch, hammer)

Caution: Needle bearing must be renewed in every case as damage of this bearing cannot be avoided when driven out.



- 11. Undo protecting cap of frontwheel bearing.  
(Tool for protecting cap WK 102)
- 12. Remove split pin from stub axle nut.  
(Side cutting nipper)
- 13. Undo stub axle nut.  
(Socket spanner 27 mm)
- 14. Remove locking plate.
- 15. Pull off hub together with brake drum.  
(Hub extractor WK 51, punch)

Figure 17



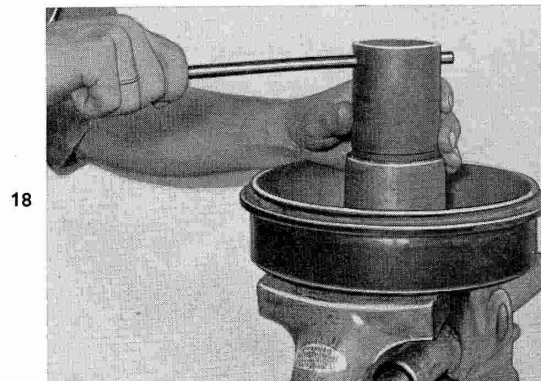
Caution: Hub and brake drum are balanced together and should be separated only in case of replacement. When a new brake drum is fitted both parts must be rebalanced, the permissible maximum radial unbalance is 0.1 mm or .0040".

- 16. Drill secured grub screw for grooved hub nut and unscrew same.  
(Drill 3 mm or 1/8", screwdriver 4 mm)

Caution: When reassembled, drill hub nut anew to secure grub screw. Secure with very light punch blow.

- 17. Undo grooved hub nut.  
(Hub nut spanner WK 27)

Figure 18



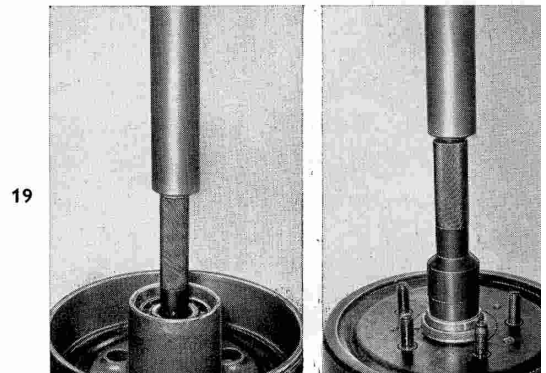
- 18. Press out small ball bearing.  
(Punch WK 7)

Caution: Put punch on inner ring of spacer.

Figure 19, L. H.

Caution: To press in use WK 6/1 with insert WK 6/3

Figure 19, R. H.

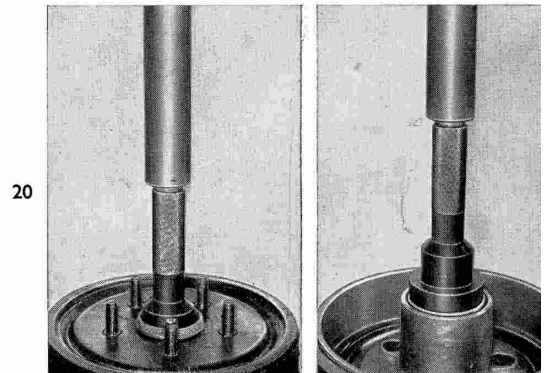


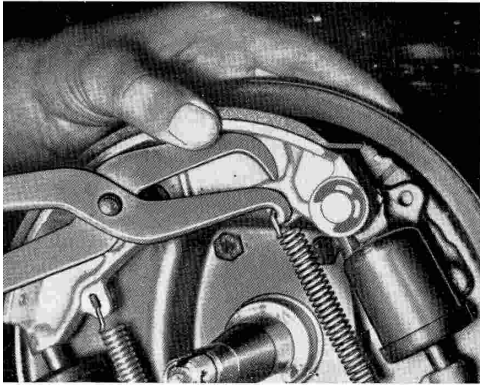
- 19. Press out large ball bearing.  
(Punch WK 6/1)

Figure 20, L. H.

Caution: To press in large ball bearing use punch WK 6/1 with insert WK 6/2.

Figure 20, R. H.





21

Caution: When reassembling insert at first spacer tube and fill up space with grease, then press in large ball bearing and grease the outside of bearing thoroughly. Screw in grooved nut with oil seal and secure. Turn hub and fill with grease, press in small ball bearing and grease well. Screw protecting cap on stub axle, do not fill up with grease.

Caution: When normally removing the front axle, it is not essential to take off brakes. It then continues with work process No. 24. Only in case of accident or when completely overhauling the front axle it must read:

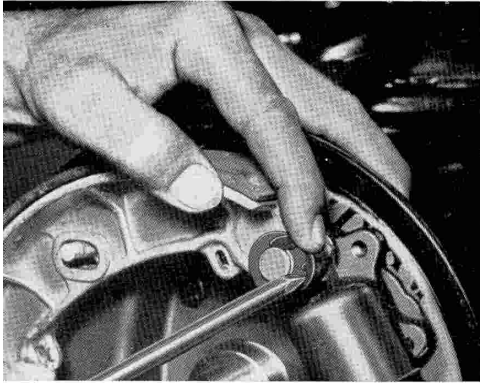
20. Take off tension springs of brake shoes.  
(Brake spring pliers)

Figure 21

21. Pull out eccentric bolt split pins, remove washer and lock washer.  
(Side cutting nippers)

22. Remove locking ring ("BZ" washer) from brake shoe bolt.  
(Screwdriver 10 mm)

Figure 22



22

Caution: When reassembling fix brake shoes by placing corresponding shims under "BZ" washer.

23. Remove brake shoes.

24. Unscrew brake plate.  
(Socket spanner 14 mm, ring spanner 14 mm, torque wrench)

Caution: 4 high tensile bolts. Tighten with torque wrench 3.2 m/kg or 24 ft/lb.

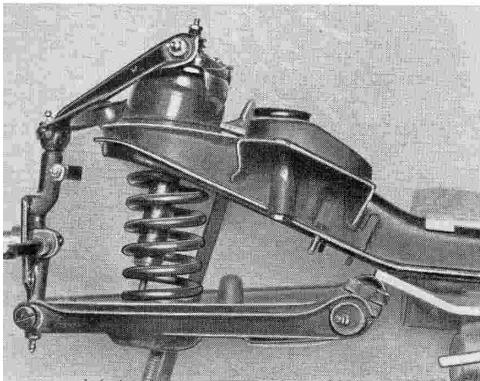
25. Tension spring with clamp screw. Loosen shock-absorber mounting, bottom, and stabilizer.  
(Clamp screw, ring spanner 17 mm, spanner 17 mm)

26. Remove split pins and undo nuts on screw connection on drop arm shaft.  
(Side cutting nippers, socket spanner 15 mm)

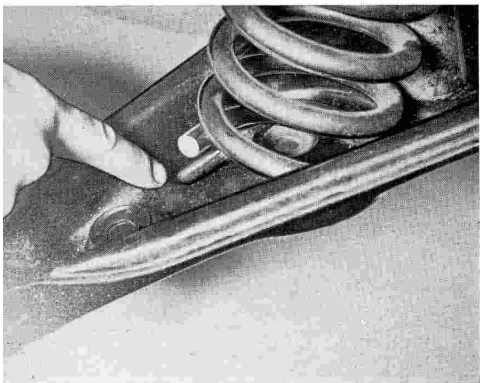
Caution: Inner bolts - bolt heads point downward, outer bolts - bolt heads point upward.

27. Loosen clamp screw and remove link and spring underneath.

Figure 23



23



24

Caution: When refitting springs, care must be taken that only springs with the same colour marks are fitted. Spring bottom end must be positioned in pressed in guide.

Figure 24

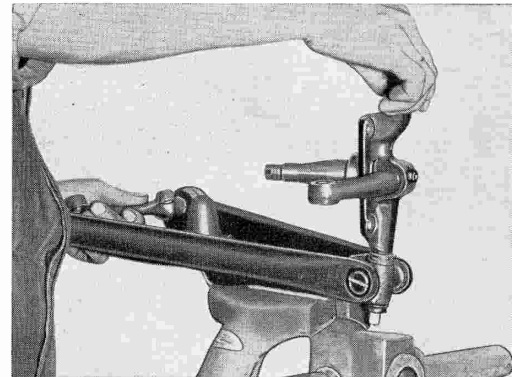


Removal of ball joint from stub axle see V 5/11.

28. Unscrew stub axle from link.

Figure 25

25



■ Caution: When reassembling turn stub axle to stop, turn back about 3/4 to 1 1/2 turn until stub axle is in straight position.

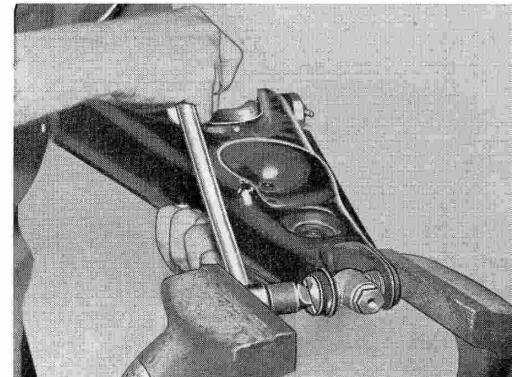
29. Clamp link in vice and remove securing punch marks on swivel pin link, right and left side. (Punch, hammer)

30. Unscrew both bearing bushes. (Screwdriver insert for angle lever, 20 mm width)

■ Caution: When unscrewing threaded bushes keep screwdriver under pressure; for instance clamp slightly in vice.

Figure 26

26

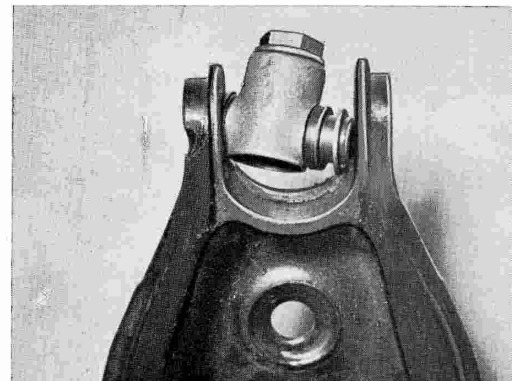


■ Caution: Fit swivel pin link as follows:

- a) Fit both sides of swivel pin link with sealing rubber and sealing ring.
- b) Tilt swivel pin link when inserting, threaded side first.

Figure 27

27



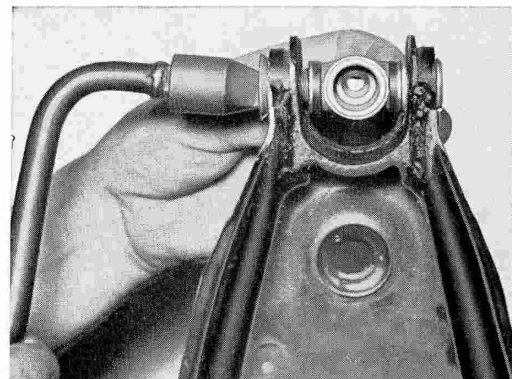
- c) Screw in bearing bush for smooth bearing side up to one thread.
- d) Keep swivel pin link in center and screw in threaded bush with countersunk head so that thread on swivel pin link takes hold in center position.

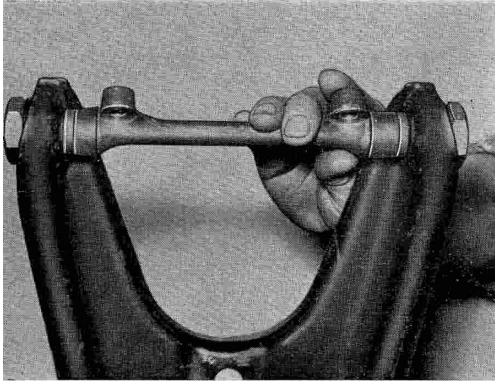
Figure 28

- e) Threaded bush with countersunk head must be tightened firmly.
- f) Tighten threaded bush on opposite side until both rubber rings are slightly under tension,
- g) Secure both threaded bushes with center punch marks.

When reassembled, the swivel pin link must be positioned in center of link.

28





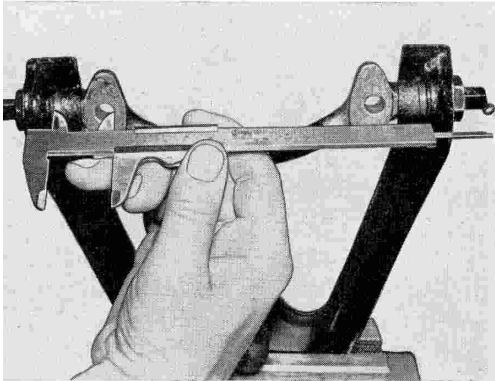
29

Caution: Normally the link shaft is not removed. The threads are cut one upon the other in when assembling.

31. Reassemble link shaft anew.  
(Spanner 36 mm)

Caution: when using new parts: The link shaft as well as link nuts are provided with right and left hand thread. When reassembling bring corresponding threads together, keep shaft with rubber seals in center position and let threads run in into center position. After reassembly turn shaft to correct center position, recognizable by that both rubber seals on right and left side have about the same pre-tension.

Figure 29



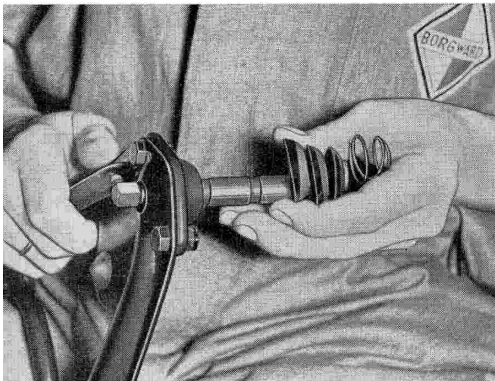
30

32. Remove top link, remove split pins and undo nuts.  
(Side cutting nippers, socket spanner 17 mm, ring spanner 17 mm)

33. Remove link shaft only when necessary, as the thread as bearing medium is abolished.

Caution when using new parts: Reassembly in exactly the same way as link shaft, bottom. This link shaft too must be positioned exactly in center of link. Possible tolerance  $\pm 0,5$  mm or  $.0197''$ .

Figure 30



31

34. Remove split pin and undo ball joint nut.  
(Side cutting nipper, spanner 14 mm, hold up with spanner 13 mm)

Caution: When assembling, care must be taken that 3 dust cups are in the correct position.

Figure 31



32

Caution: Watch position of eccentric drilled flange holes for camber adjustment (see R, wheel measurement).

Figure 32

35. Remove shock absorbers from axle body.  
(Ring spanner 17 mm)  
Work other side of axle in the same way according to working process 11-35.

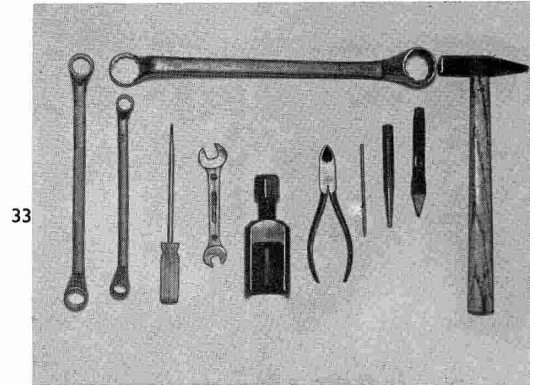
Reassembly in reversed sequence.

V 6. Removal and reassembly of front spring

V 9. Removal and reassembly of front shockabsorber

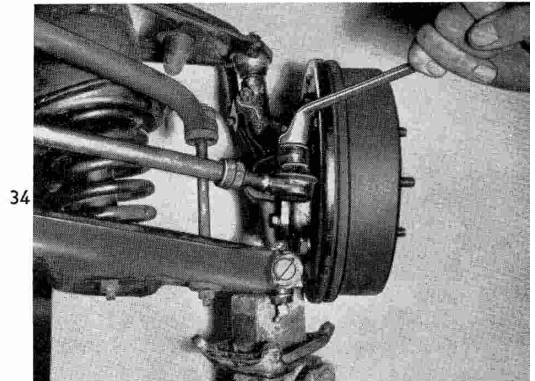
Tools: Screwdriver, wheelnut spanner, side cutting nippers, ring spanner 14, 17, 22 mm, spanner 14, 17 mm, punch 8,4 mm, hammer, chisel, extractor WK 141.

Figure 33



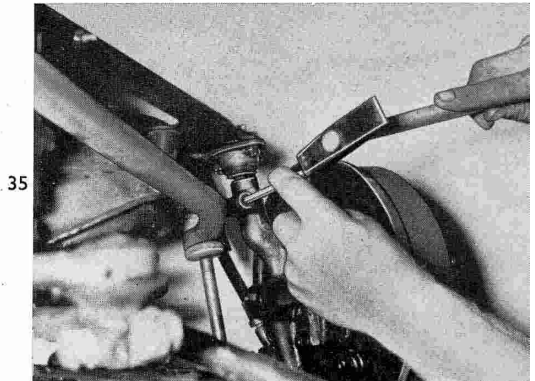
1. Remove hub cover, loosen wheel nuts. (Screwdriver, wheelnut spanner)
2. Jack up front of car and support with jack.
3. Remove wheel. (Wheelnut spanner)
4. Release spring with jack.
5. Remove split pins.
  - a) Nut for drag rod ball.
  - b) Nut for torsion bar stabilizer.
  - c) Nut for hex. bolt on ball joint - stub axle. (Side cutting nippers)
6. Undo ball joint nut - drag rod. (Ring spanner 17 mm)

Figure 34



7. Undo shockabsorber attachment, bottom. (Ring spanner 17 mm, spanner 17 mm)
8. Undo nut for hex. bolt for ball joint in stub axle. (Ring spanner 14 mm, spanner 14 mm)
9. Undo nut for torsion bar stabilizer. (Ring spanner 17 mm)
10. Remove brake hose clip on upper link, lift brake hose. (Thin punch)
11. Drive out bolt for ball joint on stub axle and take out ball joint pivot from stub axle. (Hammer, punch 8 mm)

Figure 15



12. Let off axle with jack underneath, swing down link and remove spring.

Figure 36

13. Undo shockabsorber - attachment, top. (Ring spanner 17 mm)

Caution: When fitting new springs, use springs with same colour mark only. The end of the spring must be fitted to the pressed in guide in the bottom receiver.

(See also V 3 Figure 24.)

