

REAR AXLE AND REAR SPRING

The rear axle side arms are independently suspended. The rear axle housing is mounted on the cross member, rubber buffers are interpositioned. The axle tubes resp. the independently suspended wheels are guided by radius rods, which are firmly attached with the axle tube. Radius rods are swivel mounted in rubber bearings on chassis. The differential is equipped with Hypoid bevel drive, i. e. the drive pinion is mounted below the axle centre.

The independent rear suspension comprises again coil springs. Attention must be paid that only springs with the same colour mark are fitted when these are replaced or renewed.

REAR AXLE

Rear Axle, Type	Swingaxle, guided by radius rods
Rear axle ratio	1 : 3.9
Crownwheel, teeth	39
Bevel pinion	10
Toothing	Gleason (Hypoid)
Pinion mesh between crownwheel and pinion	(0.15 - 0.18 mm) or (.0591 - .0708")
Shockabsorber, rear	Hydraulic telescopic shockabsorber High pressure 230 kg \pm 12 or 507 \pm 26.5 lbs Low pressure 20 kg \pm 6 or 44 \pm 13 lbs

REAR SPRINGS

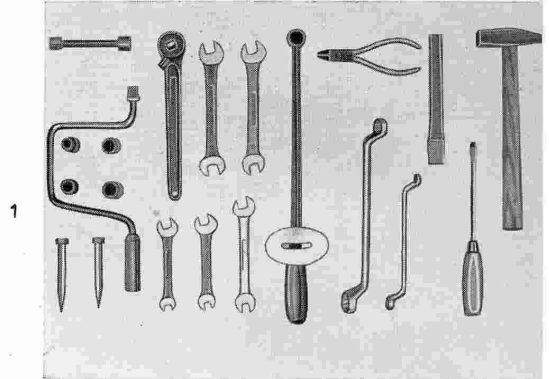
Type of rear spring	Coilspring 2 C 55.30 - 82
Length, unloaded	346 mm or 13 5/8"
Number of coils (effective)	7.5 (6.5)
Wire diameter	13.8 mm or appr. 35/64"
Spring rate	22 kg/cm
Springs are marked by colour marks. When fitting springs, care must be taken that springs with the same colour mark are used.	
Identification colour	Load at 210 mm length or 8 1/4"
Red	185-295 kgs or 628-650 lbs
Yellow	295-305 kgs or 540-672 lbs
Green	305-315 kgs or 672-694 lbs

H. REAR AXLE ASSEMBLY

H1. Removal and installation of rear axle

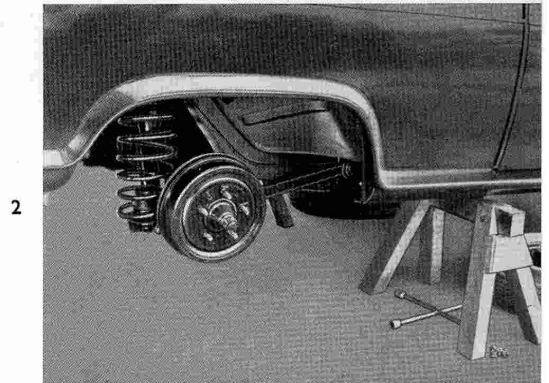
Tools: Screwdriver, wheelnut wrench, ring spanner 10, 17, 19 mm, socket 10, 14, 19 mm, spanner 2 x 14, 2 x 17, 12 mm, ratchet, torque wrench, side cutting nippers, hammer, chisel, 2 guide bolts, pointed.

Figure 1



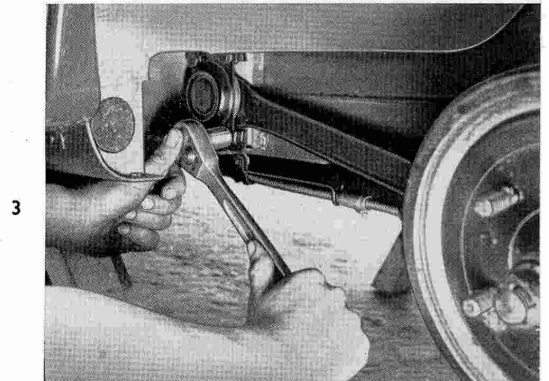
1. Remove hub caps, undo wheel nuts. (Screwdriver, wheelnut wrench)
2. Jack up car under final drive casing and support by two stands on the side. Height of stands 45 cm or 18".

Figure 2



3. Remove wheels completely. (Wheelnut wrench)
4. On each car side:
 - a) Undo handbrake on brake shoe lever, remove split pin and take out bolt. (Side cutting nippers)
 - b) Bend up lock plates for bearing cups on radius arms. (Hammer, chisel)
 - c) Undo 4 bolts for bearing cups. (Socket 14 mm, ratchet)

Figure 3



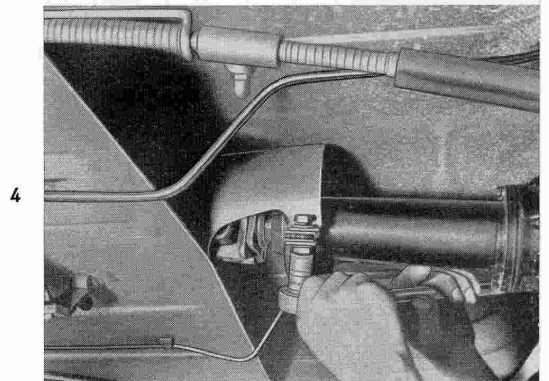
Caution: High tensile bolts. Torque when refitting: 3.2 m/kg or 23 ft/lbs.

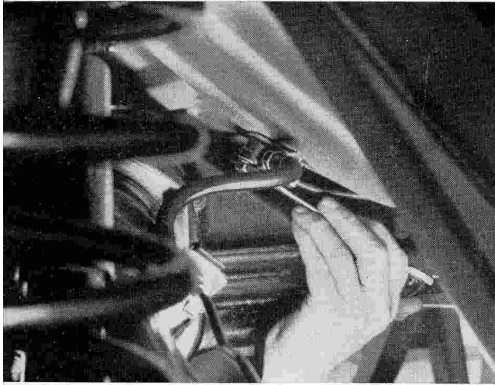
5. Undo the car:
 - a) Disconnect clamp on case neck axle drive. (Spanner 17 mm, ring spanner 17 mm)

Figure 4

- b) Undo propeller shaft, bend up lock plate, undo nuts. (Hammer, chisel, 2 spanners 17 mm)

Caution: The four bolts are set bolts. Use only original bolts.

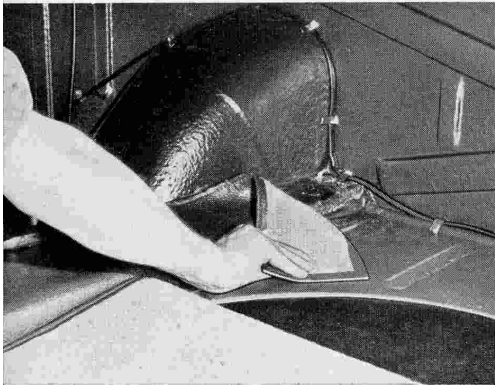




- c) Undo hoses for hydraulic brake on 3 way distributor.
(Spanner on steel tube 12 mm, spanner on brake hose 14 mm)

Figure 5

5



- d) Undo exhaust system. Unscrew exhaust pipe clip on silencer.
(Socket spanner 10 mm)
 - e) Support exhaust pipe and undo silencer under body floor, clip with two bolts.
(Ring spanner 10 mm)
 - f) Remove split pins of nuts for rear axle suspension.
(Side cutting nippers)
6. Work on front part of car:
- a) Open hood.
 - b) Undo exhaust pipe on manifold and let down underneath.
(2 spanners 14 mm)

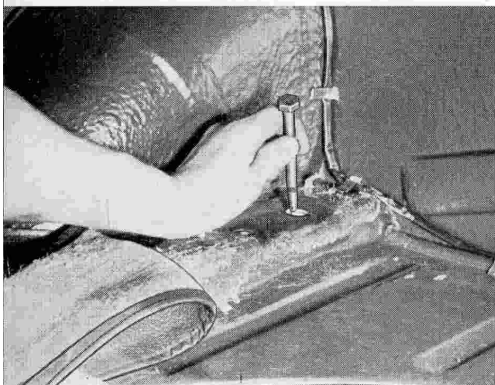
6



7. Work on rear part of car:
- a) Support final drive casing with jack.
 - b) Open rear trunklid.
 - c) Detach trunk lining on both sides and pull forward.

7

Figure 6



- d) Undo bolt for crossmember.
(Socket 19 mm with ratchet, hold up with ring spanner 19 mm)

Figure 7

- e) Jack down axle.

Caution: When installing the axle insert a long pointed bolt on right and left side each for cross member guidance and insert cross beam from below with jack.

8

Figure 8

Reassembly in reversed sequence, bleed brake system.

Removal and installation is done by two mechanics, who complement each other on work as per figures 4, 5, 6, and 7.

H 3. REAR AXLE

Dismantling and reassembling
Rear axle removed
Oil drained

Tools: Holding device for rear axle BW 12, large clamp screw, ring spanner 14, 19, 22 mm, spanner 14, 19, 30 mm, socket 14, 17, 27, 30 mm, ratchet, torque wrench, wheelnut wrench 17 mm, hammer, chisel, side cutting nippers, circlip type pliers, rubberhead mallet, plastic head mallet, screwdriver 6 + 8 mm, punch 5 + 15 mm, extractor WK 17, WK 51, WK 56, two prong spanner WK 112, hook spanner WK 138, special spanner WK 139, extractor ring WK 8 A/4, dial gauge with holder WK 85, set of end measure gauge for drive adjustment WK 137, brake spring pliers.

Figure 9

1. Clamp rear axle in holding device.
(Holding device clamped in vice)

Figure 10

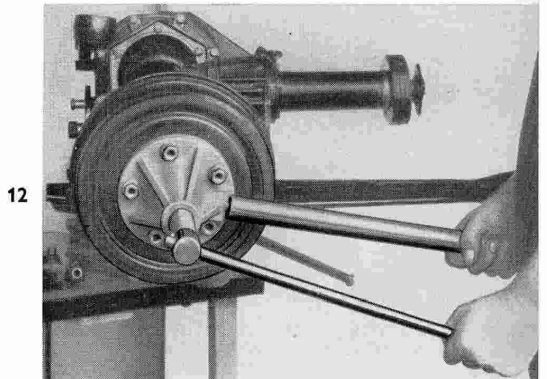
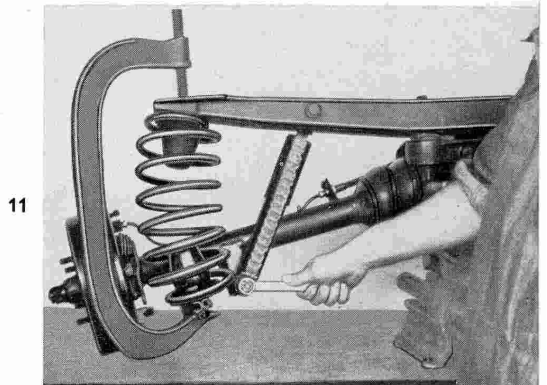
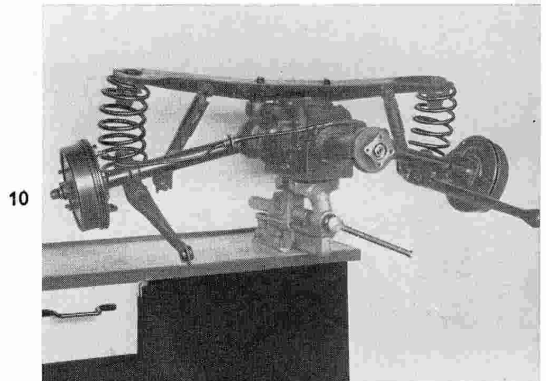
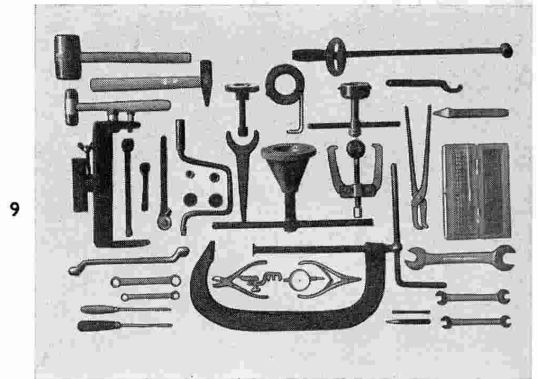
2. Apply clamp screw and tension spring on one side until safety strap is relieved.
(Clamp screw)
3. Remove split pin and undo nut for shockabsorber attachment, bottom.
(Side cutting nippers, ring spanner 19 mm)

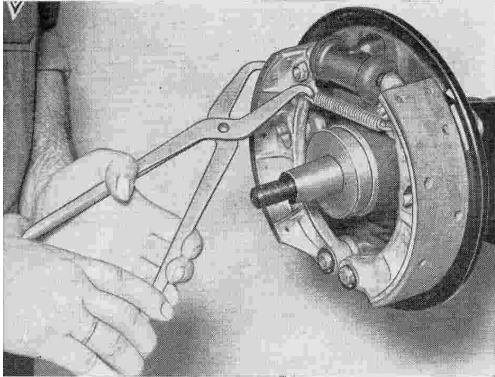
Figure 11

4. Remove safety strap, drive out fixing bolt for shockabsorber with punch.
(Hammer, punch)
5. Slacken clamp screw.
6. Same working processes 2-5 on other page.
7. Remove split pins and undo nuts of fixing bolts on drive casing-cross-member.
(Side cutting nippers, ring spanner 19 mm, spanner 19 mm)
8. Remove split pins and undo nuts on bottom link, both sides.
(Side cutting nippers, ring spanner 19 mm)
9. Drive out bolt for spring attachment upwards. Lift out cross beam together with springs and shock-absorbers.
(Hammer and punch)
10. Remove split pin and undo castellated nut for half axle.
(Side cutting nippers, socket 27 mm)
11. Pull off brake drum with hub.
(Extractor WK 51, wheelnut wrench)

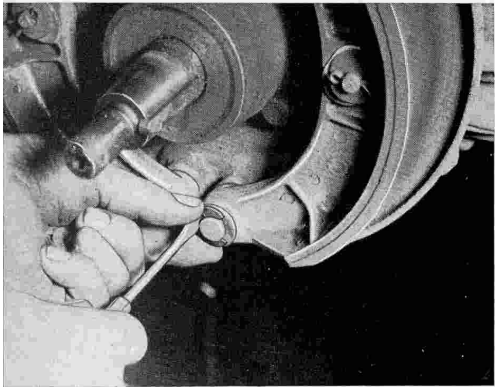
Figure 12

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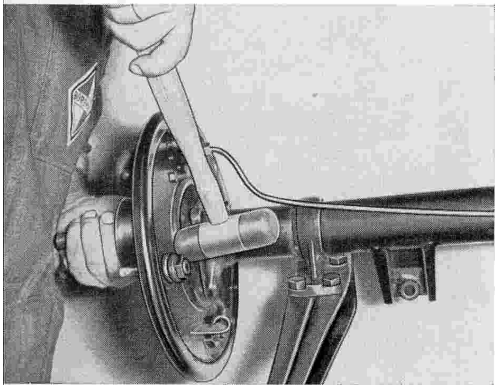




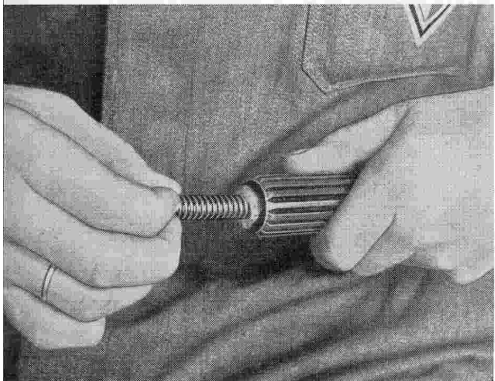
13



14



15



16

Caution: It is not essential to remove the brake separately when normally demounting. Therefore working processes 12-17 do not take place.

For complete dismantling (Accident or the like):

12. Remove split pins, washer and horseshoe clip on eccentric adjuster.
(Side cutting nippers)
13. Remove brakeshoe tension spring.
(Brake spring pliers)

Figure 13

14. Undo spring lock nut for brake plunger on hand brake lever.
(Spanner 14 mm, counterhold with ring spanner 14 mm)
15. Remove both horseshoe clips on brakeshoe bolts.
(Screwdriver)

Caution: Catch springs with palm, springs jump away.

Figure 14

16. Lift out both brake shoes from brakeshoe bolt and dip on top of wheel brake cylinder.
17. Remove brakeshoe lever (handbrake lever) by turning outwards.
18. Disconnect brake pipe on wheel brake cylinder and flexible hose.
(Spanner 14 mm)
19. Undo 4 bolts for attachment of ball bearing housings and brakeplate on axle tube.
(Ring spanner 14 mm, spanner 14 mm)

Caution: When reassembling tighten nuts with torque wrench, torque 3.2 m/kg or 23 ft/lbs. High tensile bolts are fitted. Nuts fitted: Spring lock nuts.

20. Tap halfshaft with bearing housing and brake plate slightly and pull off outwards.
(Plastic head hammer)

Figure 15

Caution: When reassembling, pay attention that equalizer washer is fitted behind ballbearing to equalize side clearance.

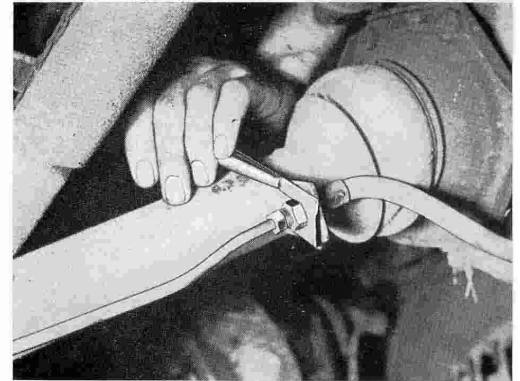
Wrap up compression spring for half shaft in paper and insert in shaft.

Figure 16

21. Strike up brakehose clamp for flexible hose and pull out.
(Hammer)

Figure 17

17

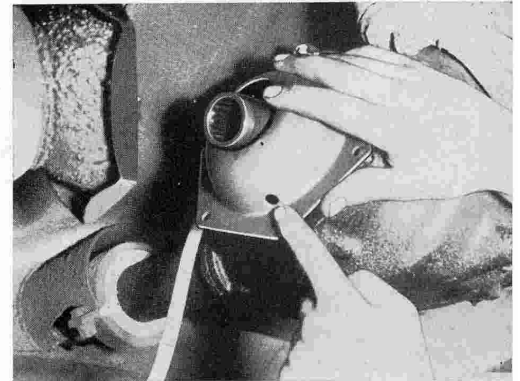


22. Undo bolts for bearing cup on axle tube.
(Socket 14 mm, ratchet)

Caution: When reassembling bearing cup care must be taken that the lubricating hole is positioned underneath.

Figure 18

18

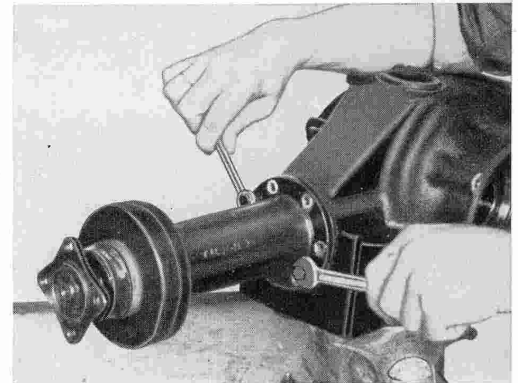


23. Dismount the other axle tube side in the same manner according to 10 - 22.
24. Undo nuts for case neck with small differential pinion and bearing.
(6 bolts, spanner 14 mm)
25. Pull off case neck with 2 puller screws.
(Spanner 14 mm, ring spanner 14 mm)

Caution: After short tightening, remove first of all the shims, which otherwise can get damaged by puller screws.

Figure 19

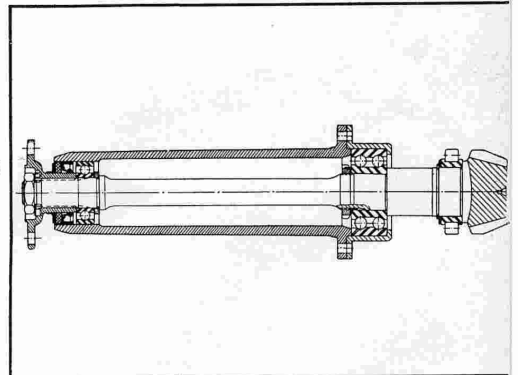
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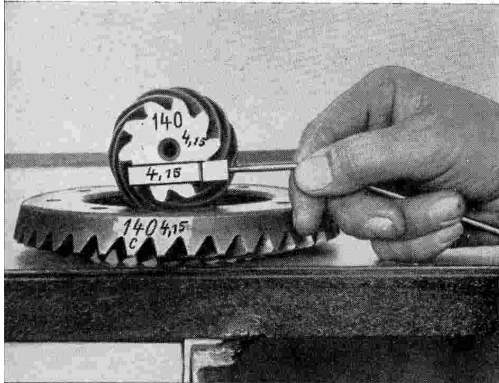


The undone small drive pinion can be removed together with bearing and roller bearing. The outer race of the roller bearing remains in the rear axle casing.

Figure 20

20



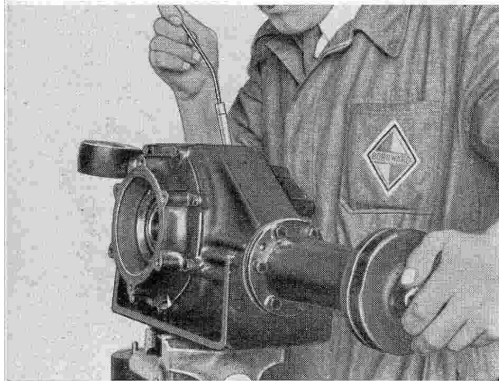


21

Adjustment of the small pinion
when reassembling

Crownwheel and pinion are supplied in pairs only and must only be fitted in pairs. Next to the pair Nos. (in figure 21 the number 140) the installation measurement is marked (in figure 21 the number 4,15). Installation control by end measure gauge.

Figure 21

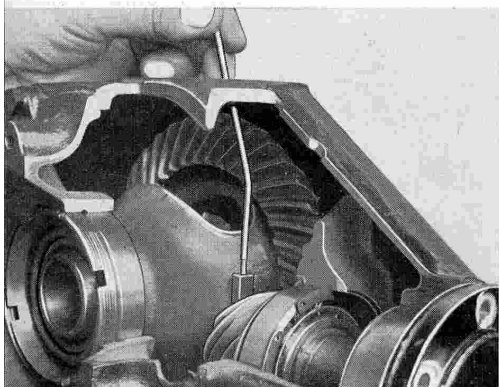


22

1. When reassembling insert small pinion with case neck and tighten 6 attachment bolts firmly.
2. Ascertain standard of measurement between front surface and ground outer facing with end measurement gauge.

■ Caution: Use bearing surface for measurement less pin and threaded pin.

Figure 22 and 23

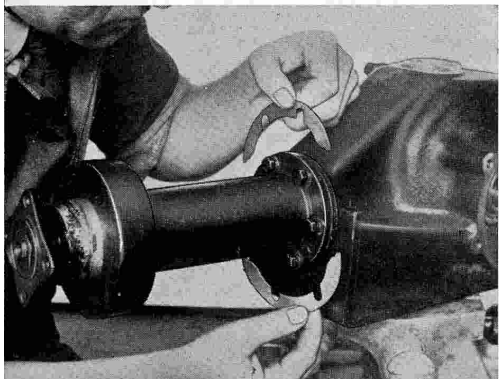


23

■ Caution: Figure 23 shows measuring procedure with end measuring gauge in cut away casing.

3. Equalize difference between found measure and measure on crownwheel by shim half between final drive casing and case neck.

Figure 24



24

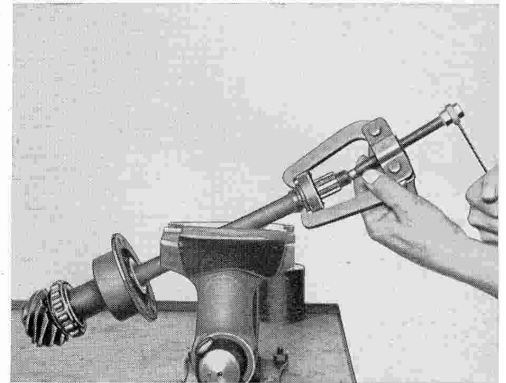
4. Tighten case neck and control adjustment again with correct standard of measurement. If necessary, equalize by shims again.

Further dismantling of the drive pinion bearing

- 26. Bend up locking plate on grooved nut on small drive pinion.
(Hammer, chisel)
- 27. Undo lock nut (see also G 2 Figure 4).
(Socket 30 mm, two prong spanner WK 112)
- Caution: When reassembling tighten cap nut at the utmost with a torque of 6 m/kg or 40 ft/lbs.
- 28. Pull off drive flange (see also G 2, Figure 5).
(Extractor WK 56, spanner 30 mm, ring spanner 22 mm)
- 29. Drive out small drive pinion from case neck.
(Plastic head mallet)
- 30. Drive off grooved bearing from drive pinion.
(Universal extractor WK 17)

Figure 25

25



- 31. Bend up locking plate for grooved nut-tapered bearing.
(Hammer, chisel)
- 32. Undo grooved nut.
(Hook spanner WK 138)

Figure 26

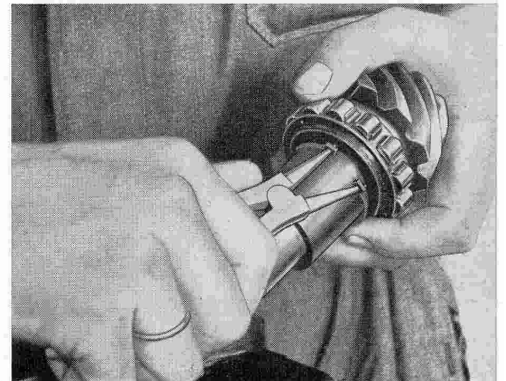
26



- 33. Extract taper bearing 3306 from shaft.
(Extractor ring for tapered roller bearing WK 8 A/4)
- 34. Remove "Seeger" circlip for cylinder bearing.
("Seeger" circlip pliers)

Figure 27

27

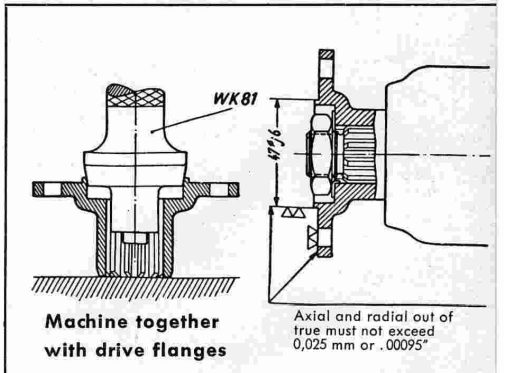


- 35. Drive off cylinder bearing.

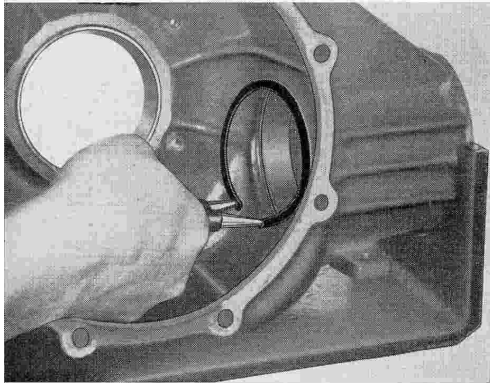
Caution: The drive flange, removed from the drive pinion must be expanded with tool WK 81 before fitting and must be measured and machined later on together with the drive. After machining, the drive flange must not be removed again from drive pinion.

Figure 28

28



Further dismantling of the rear axle casing



29

36. Undo both set screws which secure grooved nut.

Caution: When reassembling the grooved nuts must be secured by drilling and tapping thread M 4 x 0,5 and set screws. Secure set screws by punch marks. Cover up tapered roller bearing when drilling and tapping.

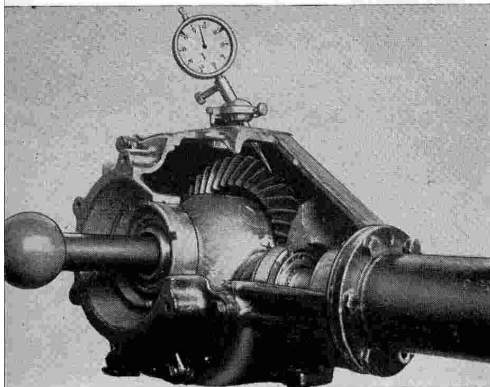
37. Undo cover for rear axle casing and remove. (Socket 14 mm)

38. Lift out differential gear complete with crown wheel and roller bearings.

39. Undo grooved nuts from casing and cover. (Special spanner WK 139)

40. Remove locking circlips for ring cylinder bearing for small drive pinion. ("Seeger" circlip pliers)

Figure 29

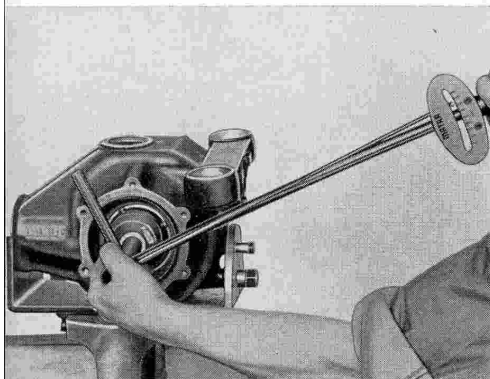


30

41. Drive out taper roller bearing race from casing and cover with piece of wood.

Caution: When reassembling fit differential gear casing first roughly. Screw in grooved nuts uniformly deep. Then insert small drive pinion and adjust backlash of teeth to 1 mm or .0394" by moving the differential gear casing by means of the grooved nut. (Dial gauge, special spanner WK 139)

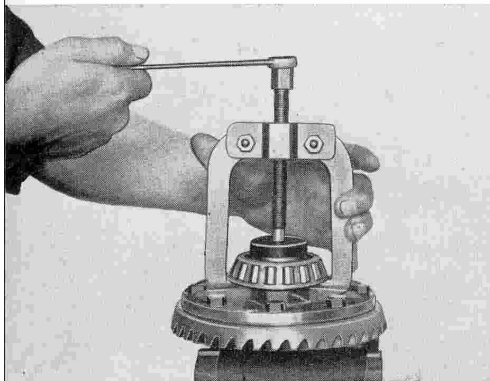
Figure 30



31

Turn differential with piece of tubing or used differential shaft, tighten grooved nuts now with torque wrench. Torque 12 m/kg or appr. 84 ft/lbs. (Special spanner WK 139, torque wrench)

Figure 31



32

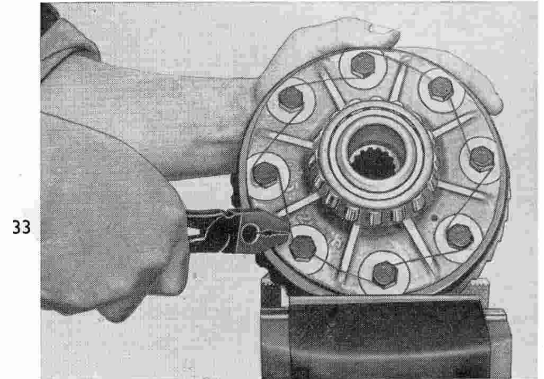
42. Extract taper roller bearing from differential casing. (Extractor WK 17 with insertion, ring spanner 17 mm)

Figure 32

43. Remove securing wire for bolts for attachment of crown wheel.
(Side cutting nippers)

Figure 33

■ Caution: Insert wire on tension when securing bolts.



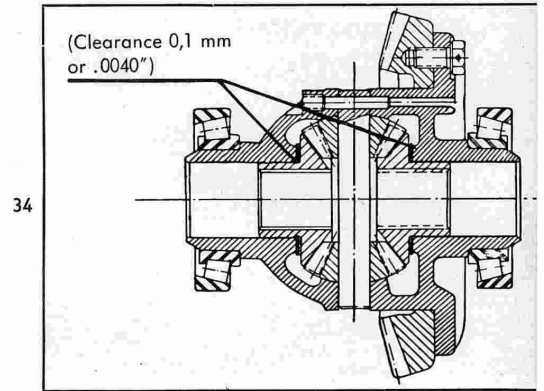
44. Undo bolts for attachment of crown wheel.
(Socket 14 mm)

■ Caution: When reassembling tighten firmly and diagonally. Torque when dry 7 - 7.5 m/kg or 49 - 52.5 ft/lbs or when lubricated 6 - 6.5 m/kg or 42 - 45 ft/lbs.

45. Press off plate edge from casing.
46. Unscrew threaded pin for safety pin for differential bolt. Drive out safety pin.
(Screwdriver 8 mm, punch 5 mm, hammer)
47. Drive out differential bolt, remove small and large differential bevel gears.
(Hammer, punch 15 mm)

■ Caution: When reassembling the differential care must be taken that lateral clearance of the large differential pinion is 0.1 mm or .0040", small differential bevel gear pressed outwards, large bevel differential inwards.

Figure 34

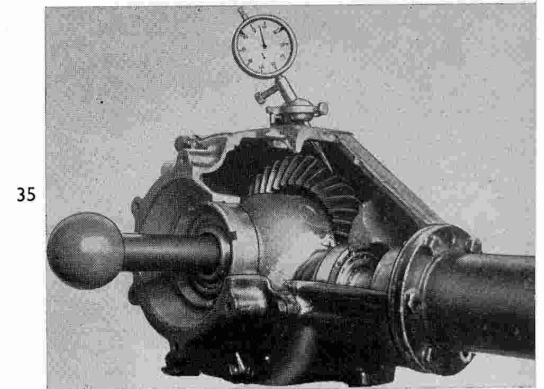


Equalize with shims.

Reassembly in reversed sequence. When reassembling adjust backlash after adjustment of the small bevel gear (see H 3 Figure 21-24) as follows:

- a) Ascertain and mark the tightest spot of backlash of gears by turning the drive in drive flange.

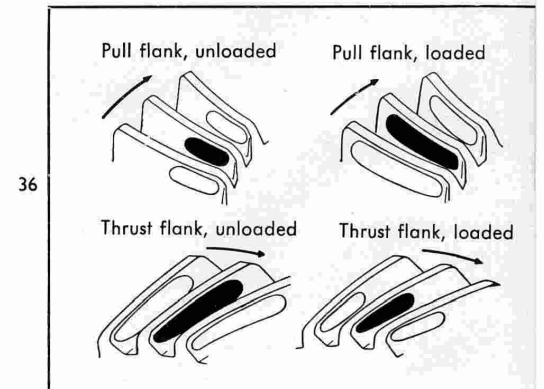
Figure 35



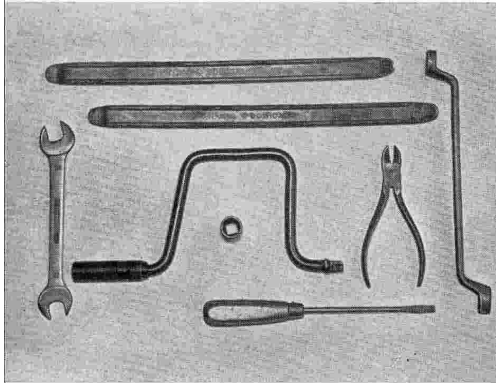
- b) Tighten grooved nut firmly on drive wheel side till backlash on marked spot comes to 0.12 mm or .0047".
(Dial gauge with holder WK 85, grooved nut spanner WK 139, torque wrench)
c) Tighten grooved nut on opposite side firmly until the backlash of gears on the marked spot has increased to 0.15 mm or .0060".
d) Check backlash of gears all round, maximum backlash 0.20 mm or .0080".
e) Drill grooved nut.

■ Caution: To control adjustment the backlash can be re-controlled with prussian blue which must result in contact pressures as shown in figure 36.

Figure 36



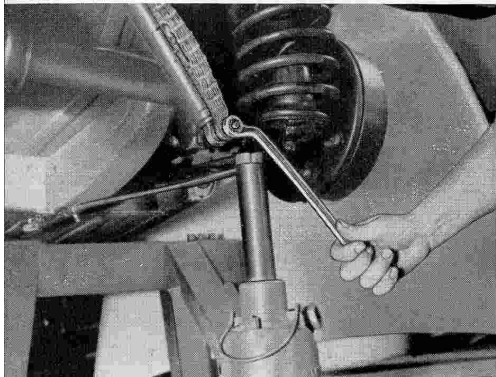
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H 6. Removal and mounting of rear spring

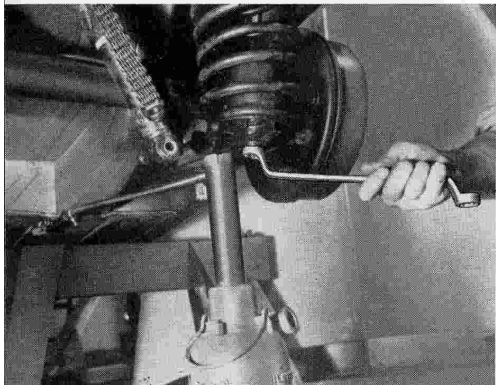
Tools: Screwdriver, wheelnut wrench, ring spanner 19 mm, spanner 19 mm, 2 tyre levers, side cutting nippers.

Figure 37



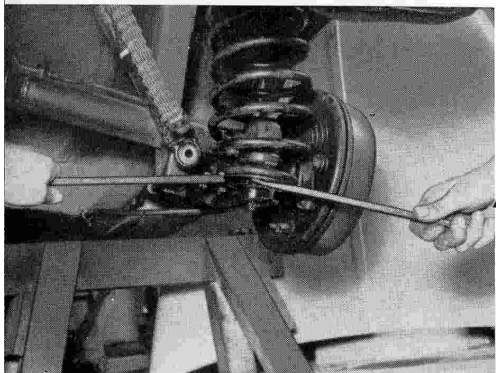
1. Remove hub cap, undo wheelnuts. (Screwdriver, wheelnut wrench)
2. Jack up car, support with stands.
3. Jack under radius rod, compress spring and relieve shock absorber.
4. Remove split pin for nut for shockabsorber attachment, bottom.
5. Remove split pin for nut for spring attachment, bottom. (Side cutting nippers)
6. Remove split pin for spring attachment, top. (Side cutting nippers)
7. Undo nut for shockabsorber attachment, bottom. (Ring spanner 19 mm, spanner 19 mm)

Figure 38



8. Undo nut for spring anchorage, bottom. (Ring spanner 14 mm)

Figure 39



9. Undo nuts for spring anchorage, top. (Ring spanner 19 mm)
10. Jack down and remove axle from underneath.
11. Lift up spring from bottom and remove from the side. (2 tyre levers)

Figure 40

Reassembly in reversed sequence.

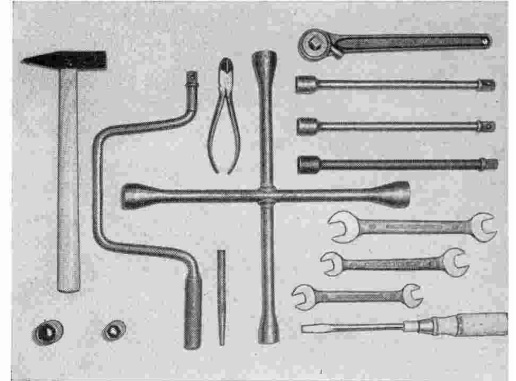
Caution: When replacing or renewing springs care must be taken that only springs with the same color marks are fitted.

H 21. Removal and installation of a jointed cross shaft axle

Tools: Wheelnut wrench, screwdriver, spanner 12, 17, 19 mm, socket 14, 19 mm, side cutting nippers, hammer, punch, speed brace, extensions.

Figure 41

41

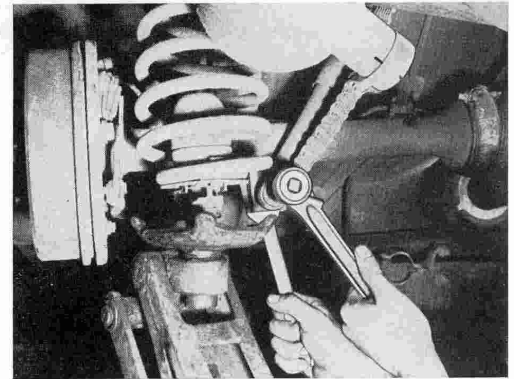


Caution: When reassembling or installing a jointed cross shaft axle the springs and radius rods can remain on the vehicle.

1. Remove hub caps, undo wheel nuts. (Screwdriver, wheel nut wrench)
2. Jack up and support car.
3. Take off wheel, drain oil from rear axle. (Wheel nut wrench, spanner 17 mm)
4. Remove split pin from bolt for hand brake lever. Remove bolt and push out brake cable from clamp. (Side cutting nippers)
5. Put jack under spring, relieve spring and undo safety strap on shock absorber bottom. (Side cutting nippers, socket 19 mm with ratchet, counterhold with spanner 19 mm)

Figure 42

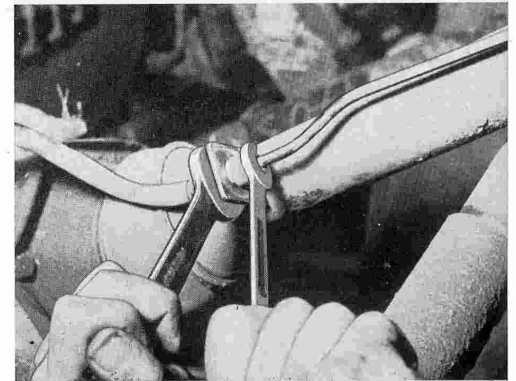
42



6. Remove split pins and undo attachment bolts for axle tube on radius rod. (Spanner 17 mm, side cutting nippers)
7. Drive out brake hose clip. (Hammer, punch, see also H 17)
8. Disconnect brake hose from brake pipe. (Spanner 12 and 19 mm)

Figure 43

43



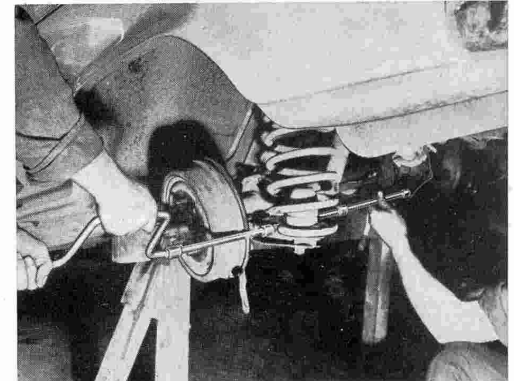
9. Undo 6 bolts on bearing cups. (Socket 14 mm, extensions)

Figure 44

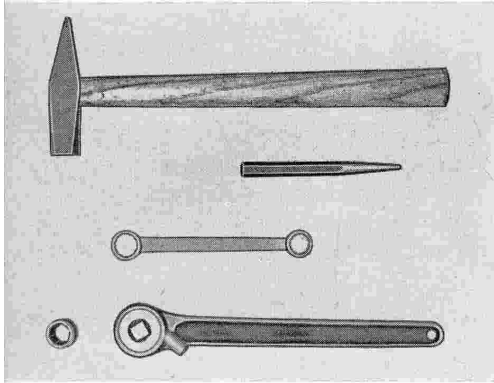
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Caution: When reassembling care must be taken that the lubricating hole of the bearing cup is positioned underneath. (See also Figure H 18).

Reassembly in reversed sequence.
Bleed brake system after reassembly.



Isabella



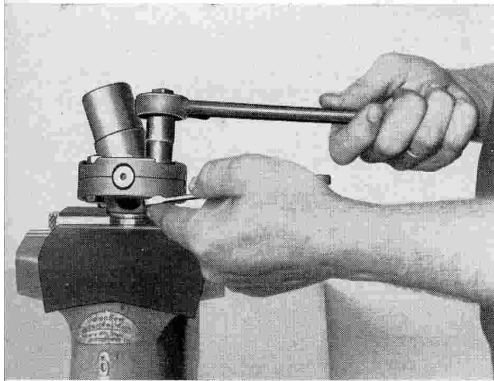
45

H 23. Dismantling and reassembling universal joint

Universal joint is removed

Tools: Socket 14 mm, ring spanner 14 mm, ratchet, punch and torque wrench.

Figure 45

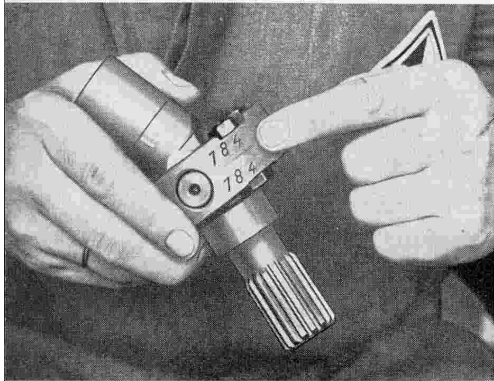


46

1. Separate universal joint cup halves.
(Socket 14 mm, ring spanner 14 mm)

Caution: Nuts are secured by two punch marks each. When reassembling fit new bolts M 8 x 30 and new nuts. Tighten with torque spanner, torque 2.5 m/kg or 17 1/2 ft/lbs. Secure again with punch marks.

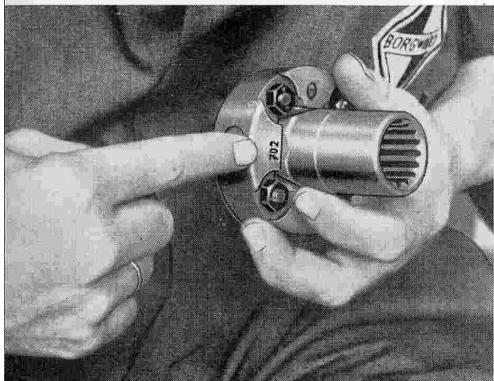
Figure 46



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2. When reassembling care must be taken that:
 - a) the identification numbers on cup halves coincide.

Figure 47



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- b) the identification numbers on the outer driver must coincide with the same identification numbers on cup halves.

Figure 48