

Rear Axle HL 4

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Rear Axle HL 4

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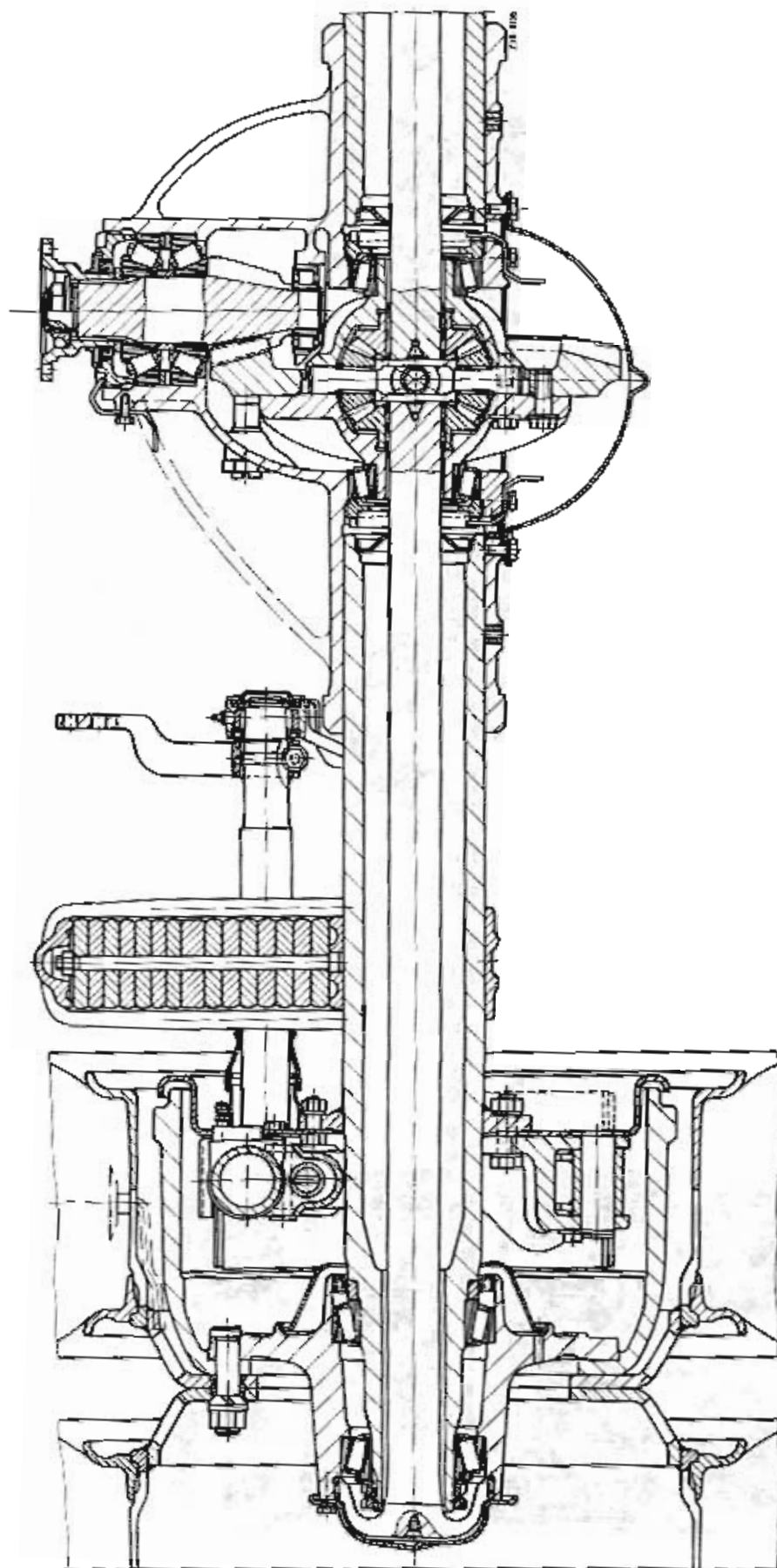
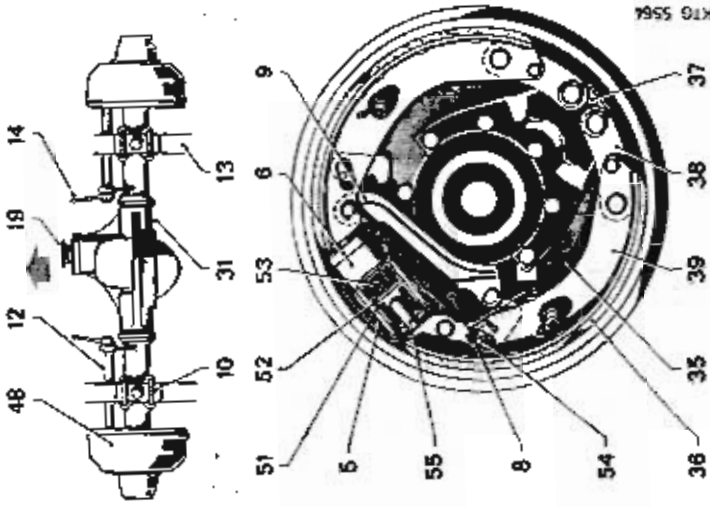


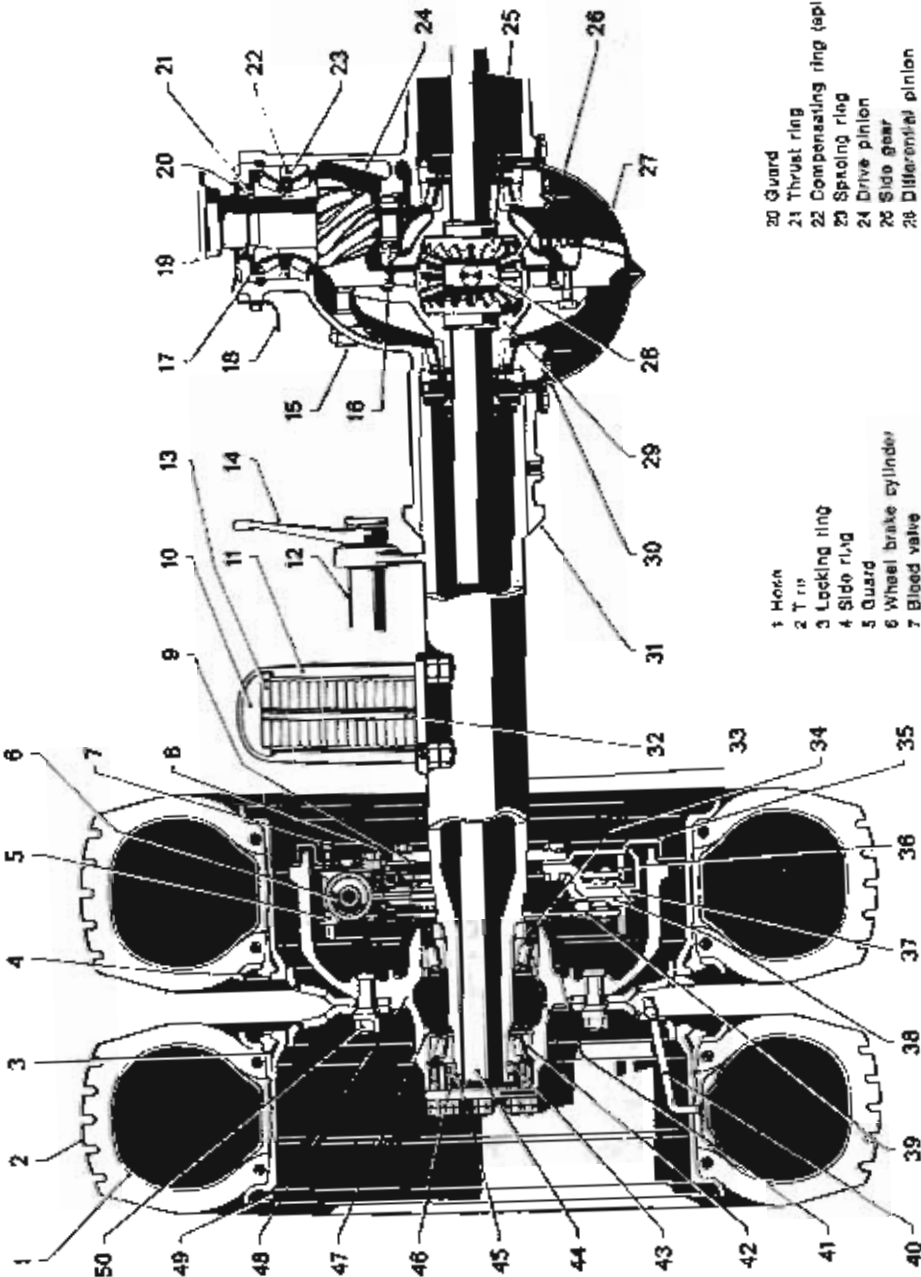
Fig. 1: Rear axle HL 4/8 with rotary shoe brake

35.4 Illustrations – Sectional Views



KTG 5564

- 39 Brake shoe
- 40 Valve
- 41 Oil drip plate
- 42 Wheel bearing
- 43 Spacing washer
- 44 Rear axle shaft
- 45 Locking plate
- 46 Slot nut
- 47 Locking ring
- 48 Brake drum hub
- 49 Disc wheel
- 50 Wheel fastening bolt with nut and snap ring
- 51 Pinion
- 52 C ooze
- 53 Compression spring
- 54 Adjusting cam
- 55 Bolt



- 20 Guard
- 21 Thrust ring
- 22 Compensating ring (split)
- 23 Spacing ring
- 24 Drive pinion
- 25 Side gear
- 26 Differential pinion
- 27 Ring gear
- 28 Differential spider
- 29 Differential housing
- 30 Rear axle housing cover
- 31 Rear axle housing
- 32 Spring bolt
- 33 Support tube
- 34 Radial sealing ring
- 35 Brake carrier plate
- 36 Brake lining
- 37 Brake carrier
- 38 Brake shoe plate

- 1 Hock
- 2 T riv
- 3 Locking ring
- 4 Side ring
- 5 Guard
- 6 Wheel brake cylinder
- 7 Bleed valve
- 8 Return spring
- 9 Pressure link
- 10 Guide plate
- 11 Spring clip
- 12 Brake shaft
- 13 Rear spring
- 14 Brake lever
- 15 Adjusting screw with slide piece
- 16 Cyl. roller bearing
- 17 Threaded ring
- 18 Locking plate
- 19 Coupling flange

Fig. 2: Rear axle HL 4-7.2

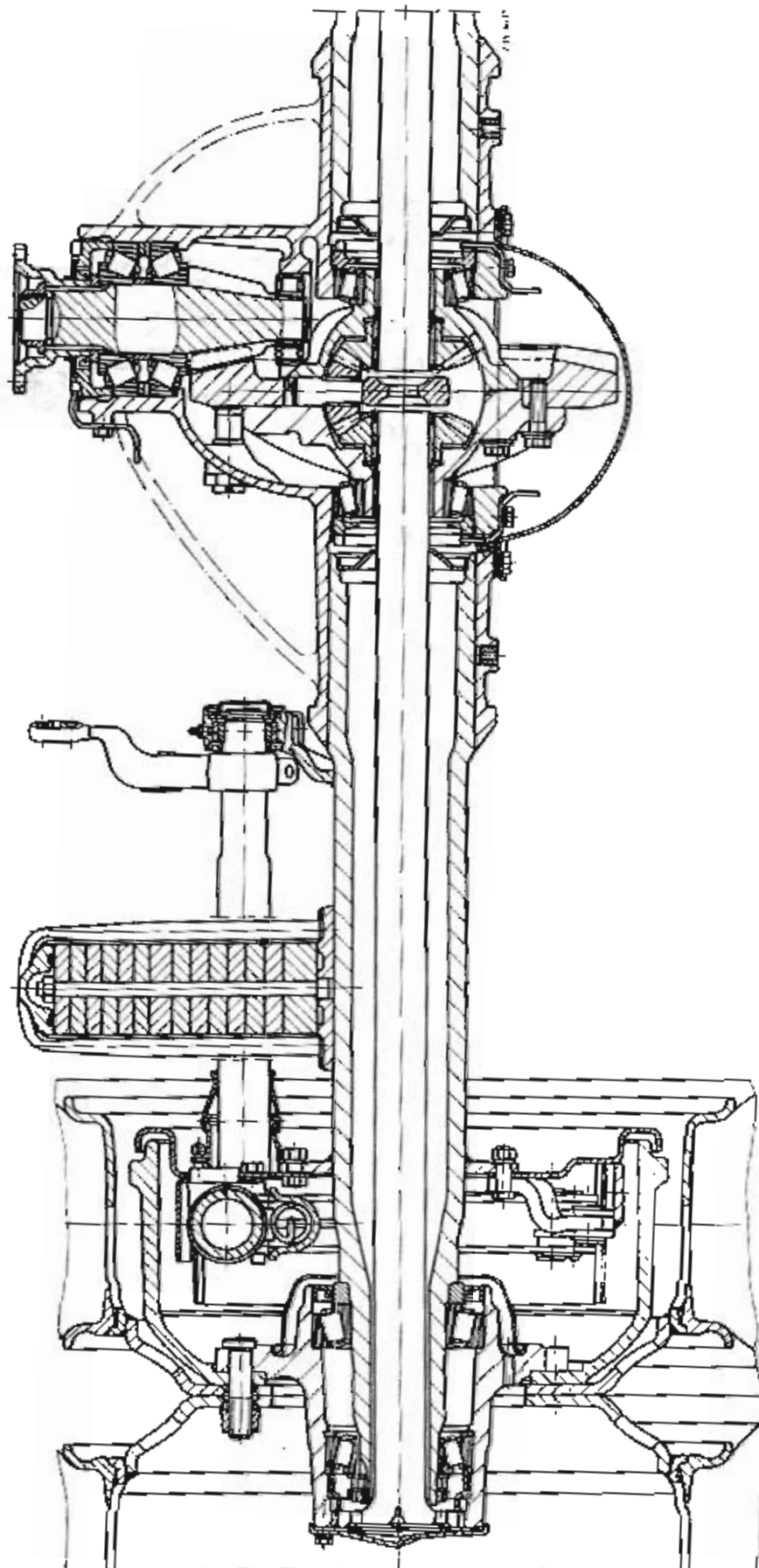


Fig. 3: HL 4/1 with plate brake

35.4 Illustrations – Sectional Views

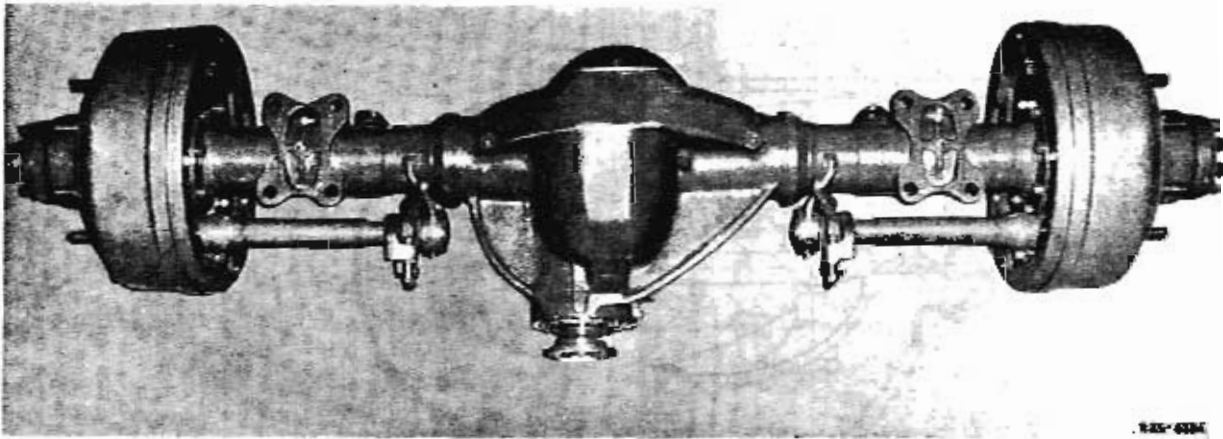


Fig. 4: Rear axle HL 4

| Special Tools | | | | | | |
|---|------------------|----------|----------|------------|------------|--------------|
| Designation | Special Tool No. | HL 4-7,2 | HL 4-8,2 | HL 4/1-7,6 | HL 4/4-8,8 | HD 4/6 G-8,8 |
| Slot nut wrench for threaded ring on drive | 302 589 00 07 00 | ● | ● | ● | ● | ● |
| Slot nut wrench for slot nut on wheel hub | 312 589 03 07 00 | ● | ● | ● | ● | ● |
| Square mandrel for adjusting differential housing bearings | 312 589 04 07 00 | ● | ● | ● | ● | ● |
| Slot nut wrench for slot nut on brake shaft | 312 589 08 07 00 | ● | | | | |
| Slot nut wrench for slot nut on wheel hub | 327 589 00 07 00 | | | | | ● |
| Socket wrench insert SW 50 for flange nut on drive pinion | 000 589 12 09 00 | ● | ● | ● | ● | ● |
| Socket wrench insert SW 27 for U-bolt nuts | 000 589 61 09 01 | ● | ● | ● | ● | ● |
| Torque wrench 8 – 30 kpm | 000 589 62 09 01 | ● | ● | ● | ● | ● |
| Ratchet with handle from tool kit 001 589 18 09 00 | 001 589 18 09 01 | ● | ● | ● | ● | ● |
| Connection from tool kit 001 589 18 09 00 | 001 589 18 09 03 | ● | ● | ● | ● | ● |
| Connection from tool kit 001 589 18 09 00 | 001 589 18 09 05 | ● | ● | ● | ● | ● |
| Changeover ratchet | 001 589 42 09 00 | ● | ● | ● | ● | ● |
| Thrust piece | 312 589 00 15 00 | | | ● | ● | ● |
| Mandrel for outer wheel bearing | 312 589 14 15 00 | | ● | ● | ● | ● |
| Mandrel for radial sealing ring in threaded ring on drive | 312 589 15 15 00 | ● | ● | ● | ● | ● |
| Mandrel for outer race inner wheel bearing | 321 589 02 15 00 | | ● | ● | ● | ● |
| Mandrel for outer race inner wheel bearing | 321 589 05 15 00 | ● | | ● | ● | ● |
| Mandrel for radial sealing ring in wheel hub | 327 589 00 15 00 | | ● | ● | ● | ● |
| Mandrel for differential housing bearing | 401 589 02 15 00 | ● | ● | ● | ● | ● |
| Torque wrench 28 – 75 kpm | 000 589 39 21 00 | ● | ● | ● | ● | ● |
| Dial gauge with 1/100 mm graduation | 001 589 32 21 00 | ● | ● | ● | ● | ● |
| Torque wrench 2 – 10 kpm | 001 589 35 21 00 | ● | ● | ● | ● | ● |
| Torque wrench | 001 589 39 21 01 | ● | ● | ● | ● | ● |
| Adjusting tool for measuring basic dimension | 321 589 04 21 00 | ● | ● | ● | ● | ● |
| Adjusting tool for measuring preload | | | | | | |
| Differential bearing | 354 589 00 21 00 | ● | ● | ● | ● | ● |
| Testing tool for measuring friction torque on drive | 354 589 01 21 00 | ● | ● | ● | ● | ● |
| Measuring tool for measuring wheel bearing play and backlash | 363 589 02 21 00 | ● | ● | ● | ● | ● |
| Holding device for pulling-off rear axle shafts | 317 589 00 31 00 | | | | | ● |
| Assembly device for differential | 337 589 02 31 00 | ● | ● | ● | ● | ● |
| Holding wrench for holding coupling flange on drive | 366 589 00 31 00 | ● | ● | ● | ● | ● |
| Puller for pulling wheel bearing outer races | 000 589 16 33 00 | ● | ● | ● | ● | ● |
| Puller for preloading differential lock | 000 589 19 33 00 | | | ● | ● | ● |
| Internal puller for pulling bearing (throughdrive) | 000 589 30 33 00 | | | | ● | ● |
| Countersupport in combination with 000 589 30 33 00 | 000 589 34 33 00 | ● | ● | ● | ● | ● |
| Countersupport in combination with 000 589 68 33 00 | 000 589 35 33 00 | ● | ● | ● | ● | ● |
| Puller for cyl. bearing inner race intermediate shaft | 000 589 45 33 00 | ● | ● | ● | ● | ● |
| Puller for bearing on throughdrive | 000 589 65 33 00 | ● | ● | ● | ● | ● |
| Puller for outer wheel hub bearing | 000 589 68 33 00 | ● | ● | ● | ● | ● |
| Puller for coupling flange of intermediate shaft | 000 589 89 33 00 | | | | ● | ● |
| Puller for differential housing bearing | 001 589 40 33 00 | ● | ● | ● | ● | ● |
| Puller for coupling flange of drive pinion | 035 589 01 33 00 | ● | ● | ● | ● | ● |
| Puller for pulling wheel hub | 064 589 00 33 00 | ● | ● | ● | ● | ● |
| Puller for removing rear axle shafts | 302 589 00 33 00 | ● | ● | ● | ● | ● |
| Puller for removing drive | 354 589 00 33 00 | ● | ● | ● | ● | ● |
| Clamping ring | 000 589 24 34 00 | ● | ● | ● | ● | ● |

35.4 Special Tools

| Designation | Special Tool No. | HL 4-7,2 | HL 4-8,2 | HL 4/1-7,6 | HL 4/4-8,8 | MD 4/6 G-8,8 | HL 4/8-10 |
|--|------------------|----------|----------|------------|------------|--------------|-----------|
| Remover for forcing-off control arms | 343 589 00 35 00 | | | | | | |
| Special pliers for locking ring in wheel hub | 000 589 27 37 00 | ● | ● | ● | ● | ● | ● |
| Reduction wrench for threaded ring on drive | 000 589 69 63 00 | ● | ● | ● | ● | ● | ● |

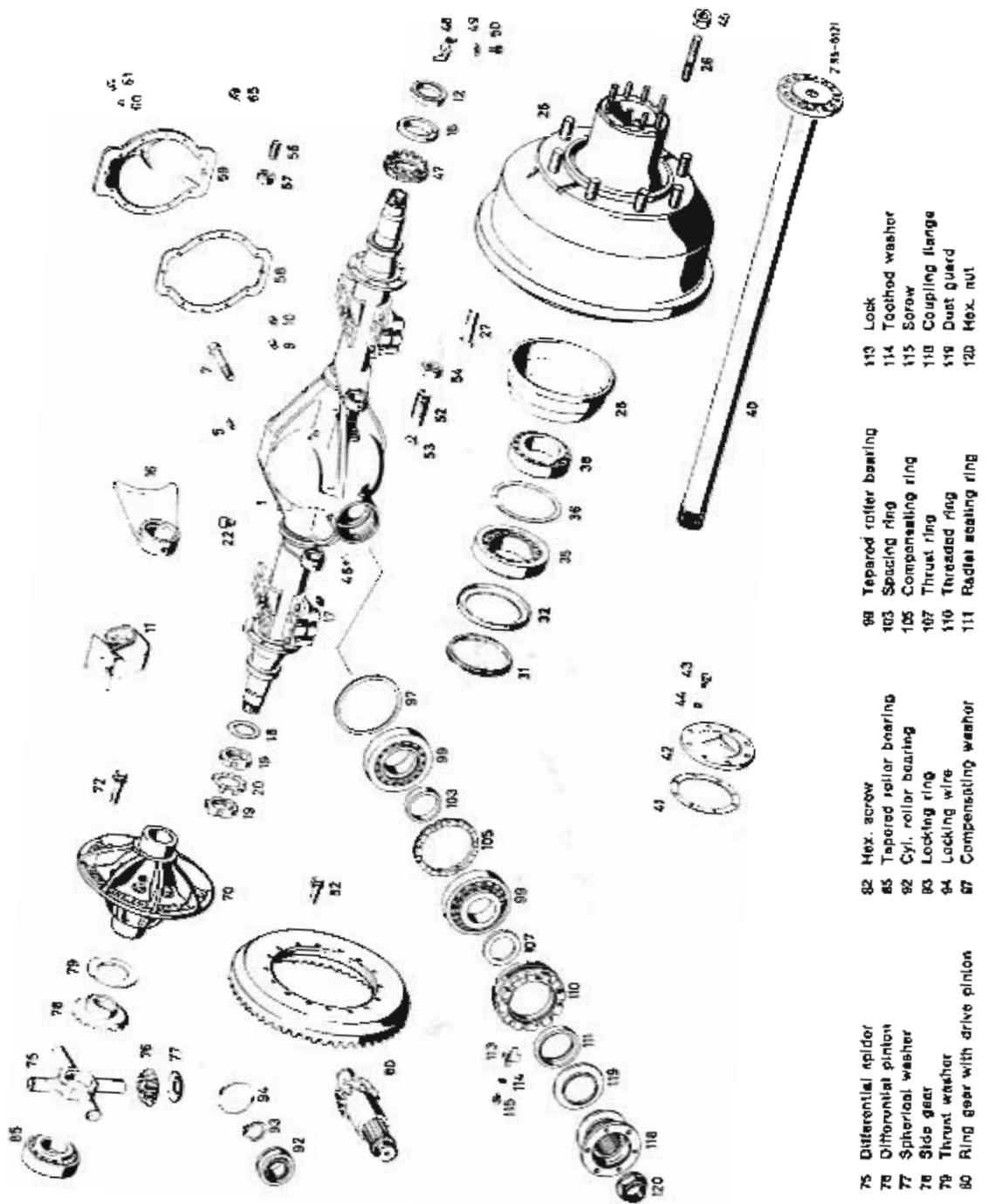


Fig. 1: Axle Components HL 4

- | | | | | | | | |
|----|--------------------------------|----|-----------------------------|-----|------------------------|-----|-----------------|
| 1 | Rear axle housing | 82 | Hex. screw | 98 | Tapered roller bearing | 113 | Lock |
| 5 | Cyl. pin | 85 | Tapered roller bearing | 103 | Spacing ring | 114 | Toothed washer |
| 7 | Hex. screw | 92 | Cyl. roller bearing | 105 | Compensating ring | 115 | Screw |
| 9 | Pin | 93 | Locking ring | 107 | Thrust ring | 118 | Coupling flange |
| 10 | Threaded plug | 94 | Locking wire | 110 | Threaded ring | 119 | Dust guard |
| 11 | Holder | 97 | Compensating washer | 111 | Radial sealing ring | 120 | Hex. nut |
| 12 | Thrust ring left | 75 | Differential spider | | | | |
| 15 | Oil seal ring | 76 | Differential pinion | | | | |
| 16 | Bearing bracket | 77 | Spherical washer | | | | |
| 17 | Tapered brass nipple | 78 | Slide gear | | | | |
| 18 | Spacing washer | 79 | Thrust washer | | | | |
| 19 | Stop nut | 80 | Ring gear with drive pinion | | | | |
| 20 | Locking plate | | | | | | |
| 22 | Bleed connection | | | | | | |
| 25 | Brake drum hub | | | | | | |
| 26 | Shud | | | | | | |
| 27 | wheel fastening bolt | | | | | | |
| 28 | Oil drip plate | | | | | | |
| 31 | Sealing ring | | | | | | |
| 32 | Spacing ring | | | | | | |
| 35 | Tapered roller bearing inside | | | | | | |
| 36 | Locking ring | | | | | | |
| 38 | Tapered roller bearing outside | | | | | | |
| 40 | Rear axle shaft | | | | | | |
| 41 | Gasket | | | | | | |
| 42 | Closing cover | | | | | | |
| 43 | Screw | | | | | | |
| 44 | Snap ring | | | | | | |
| 46 | Nut | | | | | | |
| 47 | Closing plug | | | | | | |
| 48 | Lock | | | | | | |
| 49 | Toothed washer | | | | | | |
| 50 | Screw | | | | | | |
| 52 | Adjusting screw | | | | | | |
| 53 | Slide piece | | | | | | |
| 54 | Hex. nut | | | | | | |
| 55 | Thrust screw | | | | | | |
| 57 | Nut | | | | | | |
| 58 | Gasket | | | | | | |
| 59 | Cover | | | | | | |
| 60 | Snap ring | | | | | | |
| 61 | Screw | | | | | | |
| 65 | Closing plug | | | | | | |
| 70 | Differential | | | | | | |
| 72 | Max. head collar screw | | | | | | |

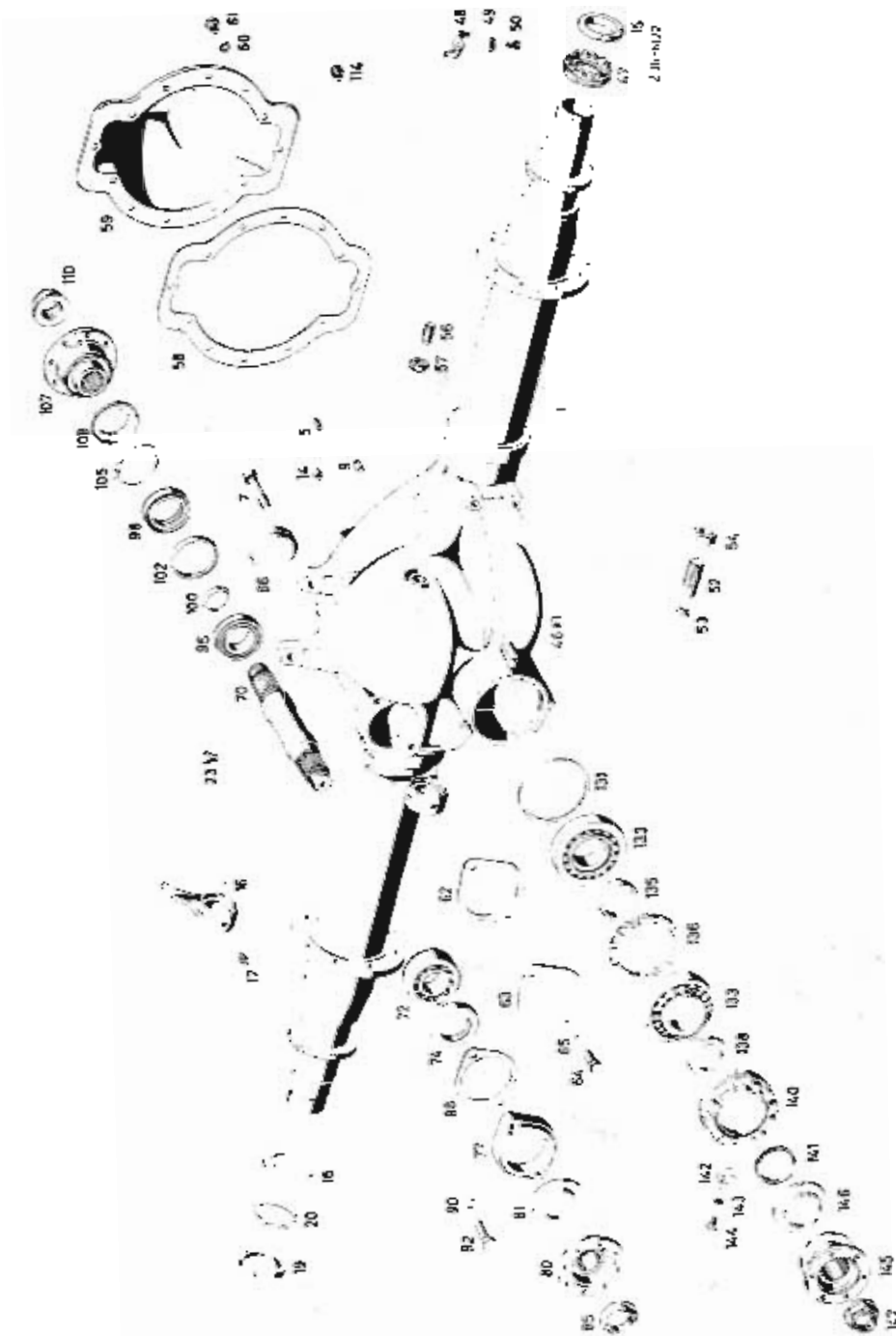


Fig. 2: Axle Components HD 4

- 1 First axle housing
- 5 Cyl. pin
- 7 Hex. screw
- 9 Pin
- 14 Threaded plug
- 15 Oil seal ring
- 16 Bearing bracket
- 17 Tapered grease nipple
- 18 Spacing washer
- 19 Slot nut
- 20 Locking plate
- 23 Bleed connection
- 48 Boring plug
- 47 Threaded ring
- 46 Lock
- 49 Toothed washer
- 50 Screw
- 62 Adjusting screw
- 63 Slits piece
- 64 Hex. nut
- 58 Thrust screw
- 57 Nut
- 64 Gasket
- 65 Cover
- 56 Snap ring
- 61 Screw
- 62 Gasket
- 63 Closing cover
- 64 Screw
- 65 Snap ring
- 66 Closing cover
- 70 Intermediate shell
- 72 Taper bearing
- 74 Radial sealing ring
- 77 Flange
- 80 Coupling flange
- 81 Dust guard
- 85 Hex. nut
- 86 Compensating washer
- 80 Snap ring
- 52 Screw
- 58 Cyl. roller bearing
- 56 Radial sealing ring
- 110 Spacing ring
- 102 Spacing ring
- 105 Thrust ring
- 106 Compensating ring
- 108 Dust guard
- 110 Hex. nut
- 131 Compensating washer
- 133 Tapered rotor bearing
- 135 Spacing ring
- 136 Compensating ring
- 138 Thrust ring
- 140 Threaded ring
- 141 Radial sealing ring
- 142 Lock
- 143 Toothed washer
- 144 Dust guard
- 145 Coupling flange
- 146 Dust guard
- 147 Hex. nut

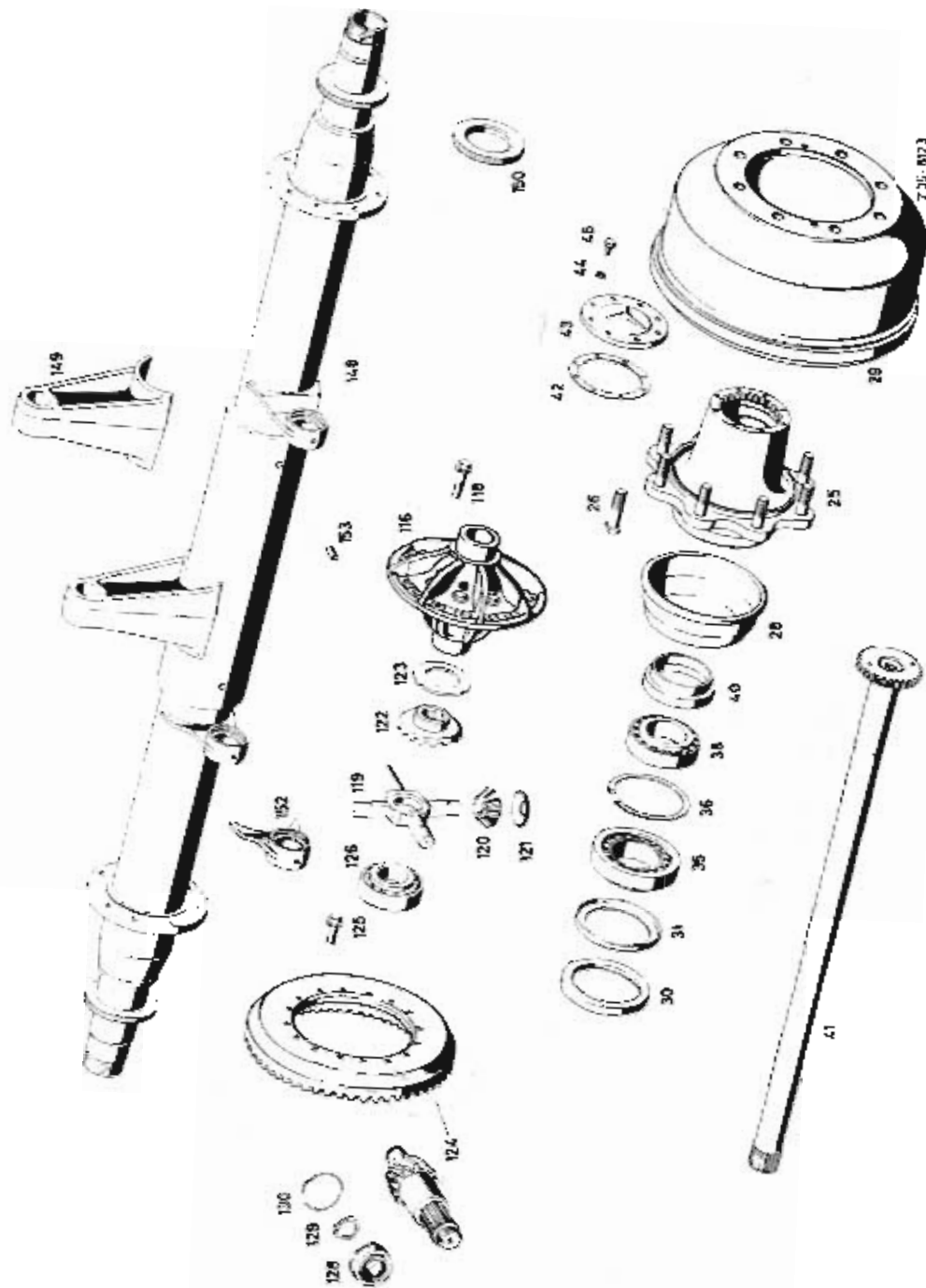


Fig. 3: Axle Components HD 4

- 1 Hub
- 20 Wheel fastening bolt
- 28 Oil drip plate
- 29 Brake drum
- 30 Sealing ring
- 31 Spacing ring
- 35 Tapered roller bearing inside
- 36 Locking ring
- 38 Tapered roller bearing outside
- 40 Spacing tube
- 41 Rear axle shaft left
- 42 Gasket
- 43 Closing cover
- 44 Snap ring
- 45 Screw
- 118 Differential
- 119 Hex. flange screw
- 120 Differential spider
- 121 Differential pinion
- 122 Spherical washer
- 123 Side gear
- 124 Thrust washer
- 124 Ring gear with drive pinion
- 125 Hex. screw
- 126 Tapered roller bearing
- 128 Cyl. roller bearing
- 130 Locking ring
- 130 Locking wire
- 144 Axle center piece
- 148 Bearing bracket
- 150 Thrust ring
- 152 Bearing bracket
- 163 Pin

35.4 Exploded Views

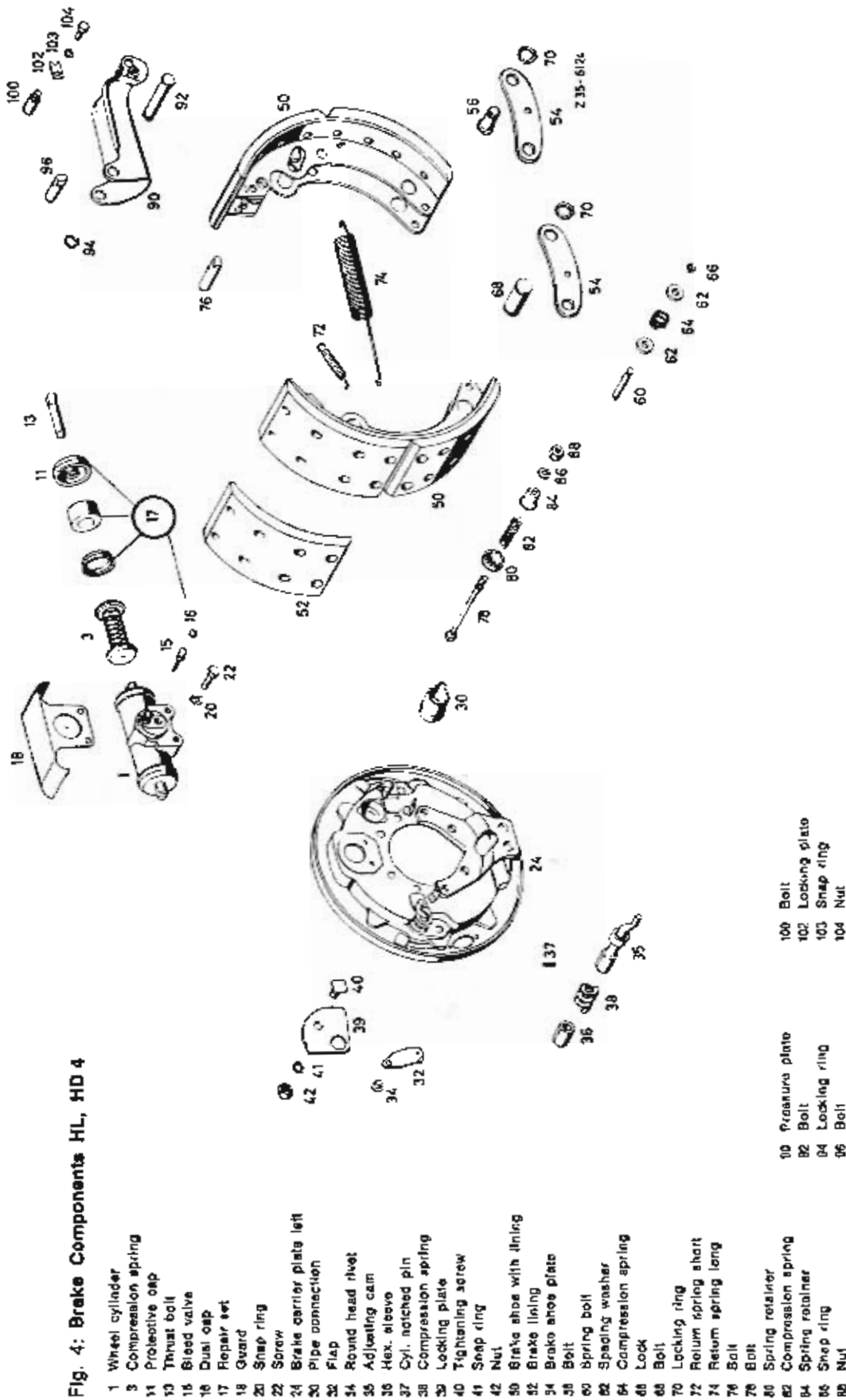
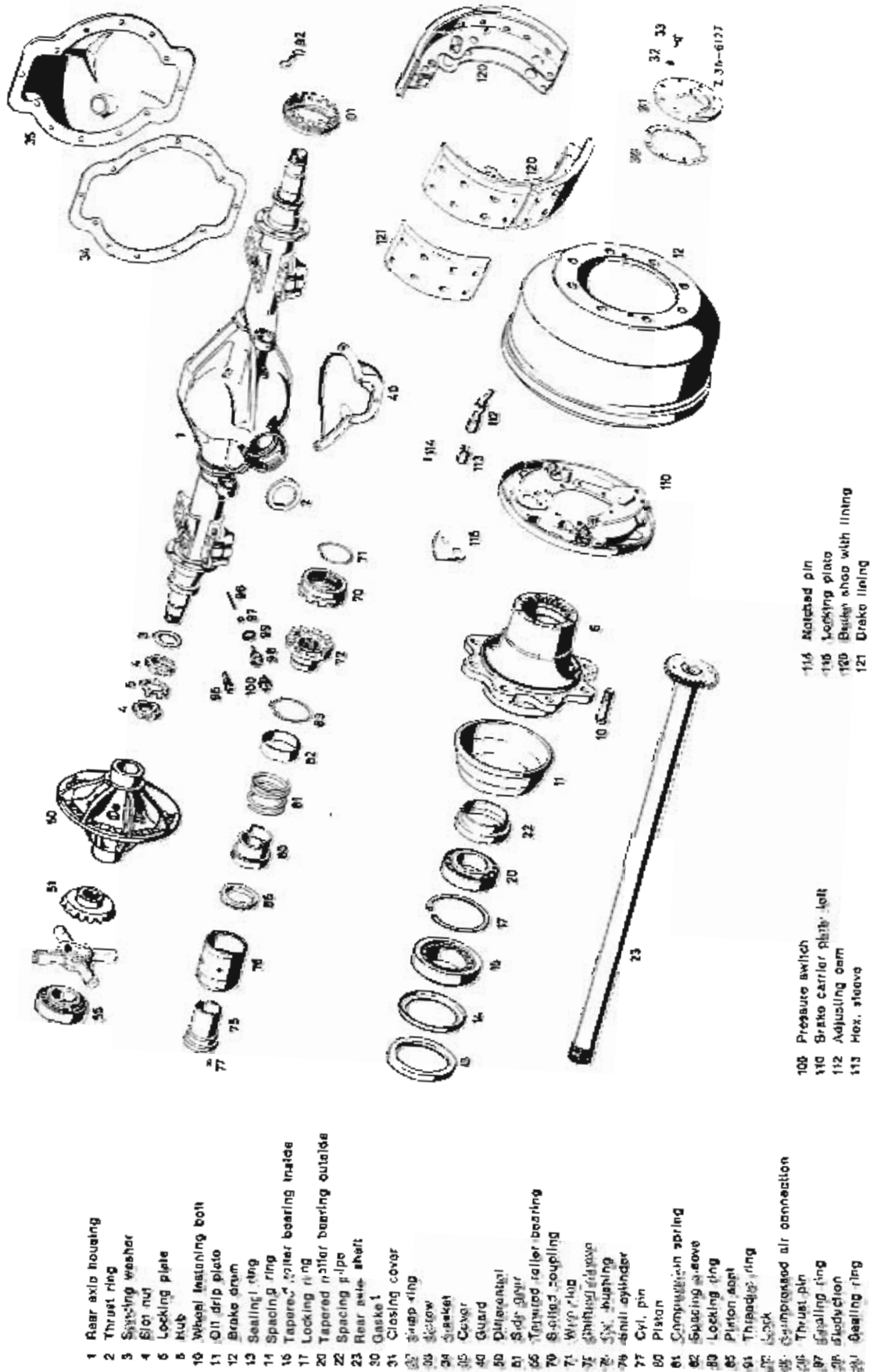


Fig. 5: Axle Components HL 4 with Differential Lock



- 1 Rear axle housing
- 2 Thrust ring
- 3 Spacing washer
- 4 Slot nut
- 5 Locking plate
- 6 Hub
- 10 Wheel fastening bolt
- 11 Oil drip plate
- 12 Brake drum
- 13 Sealing ring
- 14 Spacing ring
- 16 Tapers, roller bearing inside
- 17 Locking ring
- 20 Tapered roller bearing outside
- 22 Spacing pipe
- 23 Rear axle shaft
- 30 Gasket
- 31 Closing cover
- 32 Snap ring
- 33 Screw
- 34 Bracket
- 35 Cover
- 40 Guard
- 50 Differential
- 51 Spider gear
- 56 Tapered roller bearing
- 70 Sealed coupling
- 71 Wiper ring
- 72 Shaft
- 73 Bushing
- 76 Small cylinder
- 77 Cyl. pin
- 80 Piston
- 81 Compression spring
- 82 Spacing sleeve
- 83 Locking ring
- 85 Piston seat
- 91 Threaded ring
- 92 Lock
- 93 Compressed air connection
- 94 Thrust pin
- 95 Equalizing ring
- 96 Dust induction
- 97 Gearling ring
- 105 Pressure switch
- 110 Brake carrier plate, left
- 112 Adjusting arm
- 113 Hex. sleeve
- 114 Slotted pin
- 116 Locking plate
- 120 Brake shoe with lining
- 121 Brake lining

Removal and Installation of Rear Axle 35.4

HL 4

| Tightening Torques | | Nm | (kpm) |
|--------------------|----------------|-----|-------|
| Disc wheels | M 22 x 1,5 | 350 | (35) |
| Rear U-bolt nuts | M 18 x 1,5 8.8 | 270 | (27) |

Oil Capacity ¹⁾

| | |
|-------------------|-------------|
| Rear axle housing | 5,25 liters |
|-------------------|-------------|

¹⁾ Refer to „Specifications for Service Products“

Special Tools

| | |
|----------------------------|------------------|
| Socket wrench insert SW 27 | 000 589 61 09 00 |
| Remover | 343 589 00 35 00 |

Removing and Installing Rear Axle

Installation Note: Check oil level in rear axle housing following test drive.

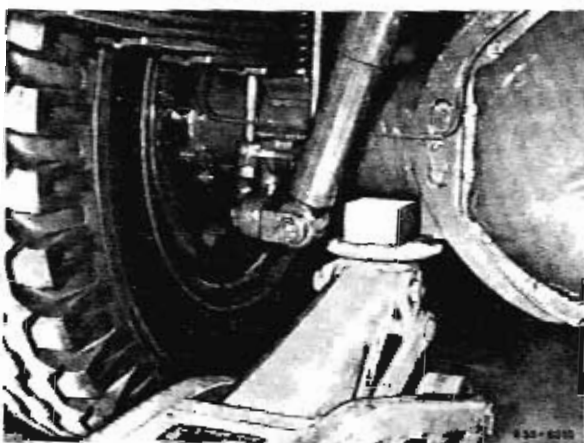


Fig. 1

Unscrew check plug from rear axle housing cover and add hypoid transmission oil until oil comes out of check hole. Screw-in check plug.

3 Unscrew universal shaft on coupling flange of drive pinion and tie to frame.

4 Slightly loosen wheel nuts of rear wheels.

5 Raise vehicle at rear axle in range of spring support, but never under rear axle housing, until wheels are free (Fig. 1).

6 Place supports underneath frame side member in front of rear springs.

1 Place chocks in front of and behind front wheels to secure vehicle.

2 Drain oil when warm.

35.4 Removal and Installation of Rear Axle

7 Unscrew wheel fastening nuts and remove snap rings.

Installation Note: Tighten wheel nuts after driving 50 - 100 km.

On rear axles HL 4-8,2 and HL 4/4-8,8, damage may be caused to hub and rim by inexperienced mounting of wheels.

The rear wheel hubs have no centering flange for disc wheels. Centering is effected by means of spherical rings on wheel fastening bolts between brake drum and inner disc wheel (Fig. 2). Sloppy assembly may result in the wheels not correctly setting on spherical washers and becoming loose while driving. For this reason, mount disc wheels as described below:

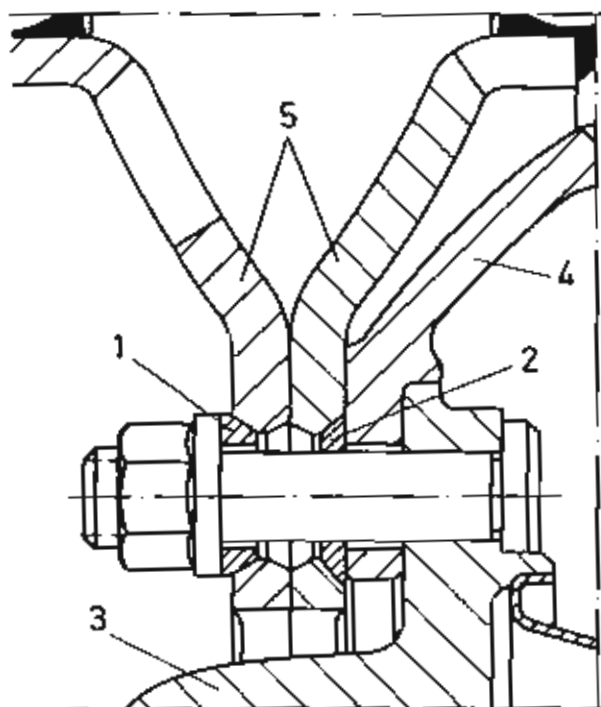


Fig. 2

1 Snap ring 3 Wheel hub 5 Disc wheels
2 Spherical ring 4 Brake drum

Carefully clean all contact surfaces of brake drum and disc wheels. Slightly grease spherical rings and countersunk surfaces of bores in disc wheel, so that wheel can set easily on spherical washers. Mount wheels, position four snap rings crosswise, screw-on pertinent wheel nuts and tighten slightly. Check centering ring and seat of disc wheels through open holes of disc wheels, that is, make sure that the rear wheel is accurately seated on spherical rings.

Then screw-on and tighten remaining wheel nuts.

8 Remove disc wheels.

9 Unscrew brake hose from distributor on rear axle and close both holes with rubber cap.

On rear axles HL 4/6-8,8, unscrew castle nut of lower control arms from spring carrier and remove control arms with remover 343 589 00 35 00 (Fig. 3).

Installation Note: Bleed brakes and add brake fluid, if required. Adjust rear wheel brake.



Fig. 3

R 32-6003

Unscrew upper control arm from rear axle housing (Fig. 4).

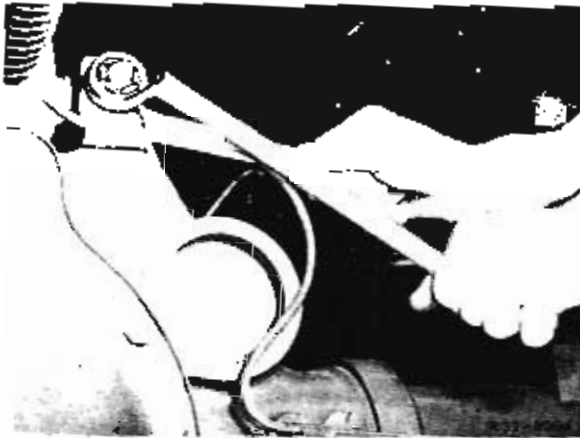


Fig. 4

10 Uncotter pin of hand brake pull rods on brake levers and remove. Tie linkage to frame.

Installation Note: Adjust hand brake.

11 Disconnect ball socket of connecting linkage to load-dependent control valve (optional, if installed).

12 If installed, unscrew shock absorber and stabilizer below from bracket on rear axle.

13 Place mobile vehicle jack with matching holding fork under rear axle. Position vehicle jack with holding fork against rear axle center piece and raise slightly.

14 Unscrew counternuts and nuts of U-bolts with socket wrench insert SW 27, 000 589 61 09 00. Remove U-bolts and knock-out with a soft metal mandrel, if required. Remove U-bolt holder.

Installation Note: Refinish threads of U-bolts and lubricate or grease well. Watch out for correct seat of spring bolt in bore of spring support on rear axle supporting tube.

Counterlock U-bolt nuts and coat projecting threads of U-bolts with an anti-corrosion compound on wax basis.

15 Carefully lower rear axle (safety risk), remove, clean and attach to assembly stand.

16 For installation proceed vice versa.



Adjusting Values

| | |
|--------------------|-------------|
| Wheel bearing play | 0,02 – 0,04 |
|--------------------|-------------|

Tightening Torques

| | Nm | (kpm) |
|------------------------------|-----------|------------|
| Outer slot nut to wheel hub | 350 – 400 | (35 – 40) |
| Rear axle shaft to wheel hub | 70 – 75 | (7 – 7,5) |

Special Tools

| | |
|---------------------------|------------------|
| Slot nut wrench | 312 589 03 07 00 |
| Slot nut wrench | 327 589 00 07 00 |
| Changeover ratchet | 001 589 42 09 00 |
| Torque wrench 26 – 75 kpm | 000 589 39 21 00 |
| Torque wrench 2 – 10 kpm | 001 589 35 21 00 |
| Measuring tool | 363 589 02 21 00 |
| Holding device | 317 589 00 31 00 |
| Puller | 035 589 01 33 00 |
| Puller | 064 589 00 33 00 |
| Remover | 302 589 00 33 00 |

35.4 Removal and Installation of Brake Drum Hub or Wheel Hub

Removing Brake Drum Hub or Wheel Hub

1 Remove rear axle shaft.

On rear axles HL 4-7,2 and HL 4/1 unscrew rear axle shaft outside on wheel hub and remove from hub by means of hook (Fig. 1).

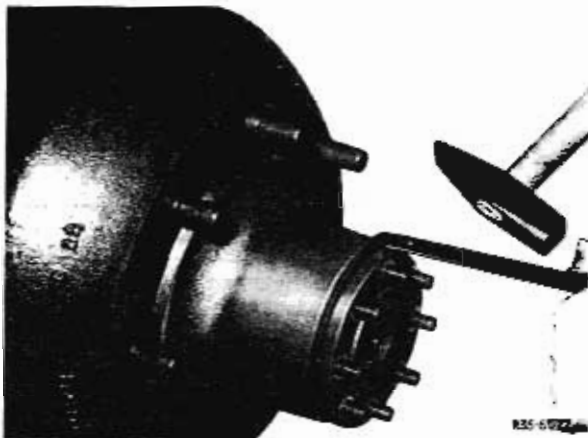


Fig. 1

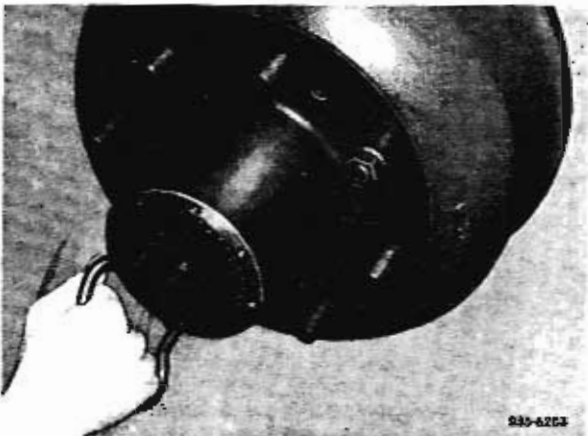


Fig. 2

On rear axles HL 4-8,2 to HL 4/8 unscrew closing cover with gasket outside on wheel hub and pull-off rear axle shafts by means of puller 302 589 00 33 00 (Fig. 2). On rear axles HL 4/8 and HD 4, use holding device 317 589 00 31 00 starting with axle No. K 42 609 (Fig. 3).

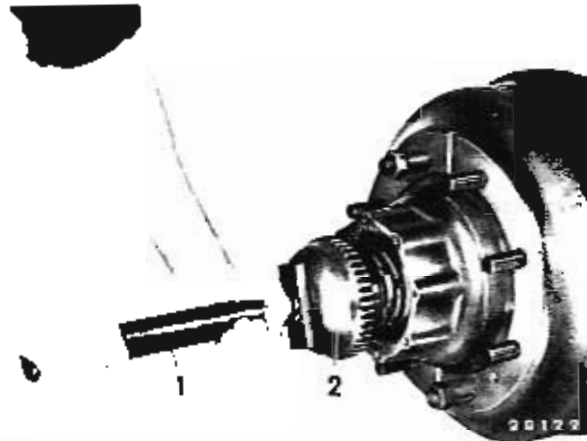


Fig. 3

1 Holding device 2 Rear axle shaft

2 Unlock slot nuts on supporting tube and unscrew with slot nut wrench 312 589 03 07 00 (Fig. 4).

Note: On rear axles HL 4/8 and HD 4, use slot nut wrench 327 589 00 07 00 starting axle No. K 42 609.

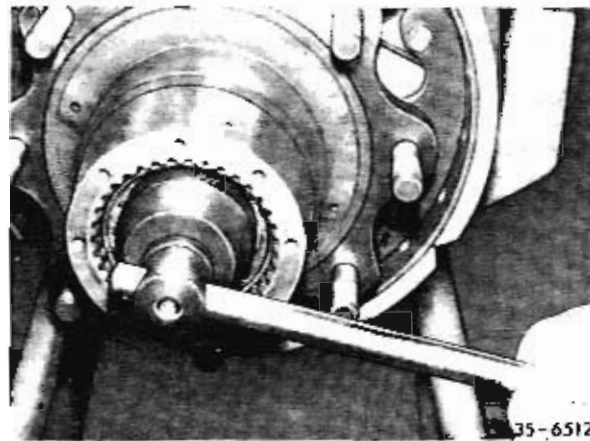


Fig. 4

3 Remove spacing washer from outer wheel bearing.

4 Turn brake shoe adjusting cam inwards until brake drum is running freely.

Note: On rear axles HL 4-8,2 to HL 4/8, force brake drum from wheel hub (Fig. 5) by means of two pulling screws M 12 x 1,75 or M 12 x 1,5 and remove.

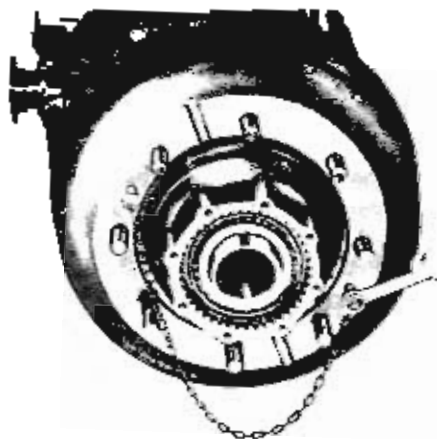


Fig. 5

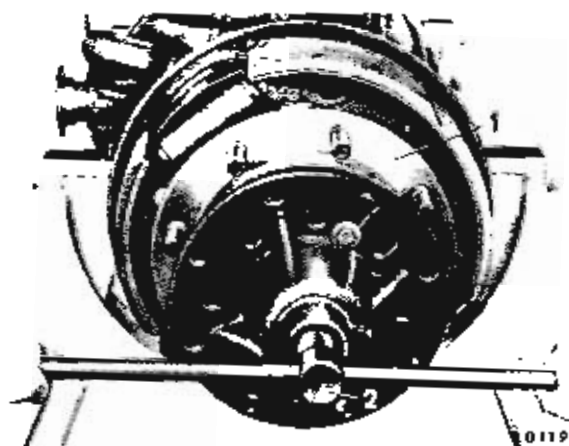


Fig. 7

1 Wheel hub 2 Puller

5 Pull brake drum hub or wheel hub from rear axle supporting tube by means of puller 035 589 01 33 00 and matching thrust piece (Fig. 6).

Note: On rear axles HL 4/8 and HD 4, use puller 064 589 00 33 00 starting axle No. K 42 609 (Fig. 7).

**Installing Brake Drum Hub or Wheel Hub
Adjusting Wheel Bearing Play**

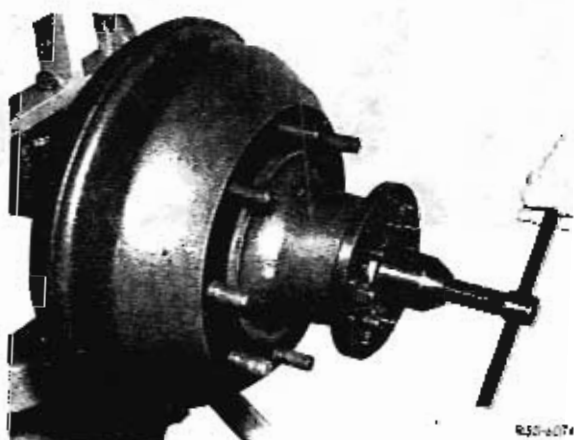


Fig. 6

1 Coat running surface of wheel hub sealing ring on thrust ring with approved grease acc. to page 266.2 of Specifications for Service Products.

2 Carefully slip brake drum hub or wheel hub on supporting tube so that sealing ring and threads on axle supporting tube are not damaged.

3 Screw-on inner slot nut (chamfered surface outwards) with slot nut wrench 312 589 03 07 00 (Fig. 4).

Note: The wheel hub can also be pulled off together with brake drum.

Note: On rear axles HL 4/8 and HD 4, use slot nut wrench 327 589 00 07 00 starting axle No. K 42 609.

35.4 Removal and Installation of Brake Drum Hub or Wheel Hub

Tighten slot nut to approx. 100 Nm (10 kprn). Keep rotating brake drum hub or wheel hub while applying a few blows with a soft hammer at the front against the hub so that the wheel bearings will set and run free of play to permit accurate measuring of wheel bearing play.

5 Slightly loosen slot nut again and pull back brake drum hub or wheel hub until play shows up.

6 Attach measuring tool 363 589 02 21 00 on wheel hub and set feeler pin against face end of axle supporting tube at approx. 1 mm preload. Set measuring scale to „0“.

7 Grip brake drum hub or wheel hub with both hands at circumference and move in bearings by energetic pulling or pushing (Fig. 8).

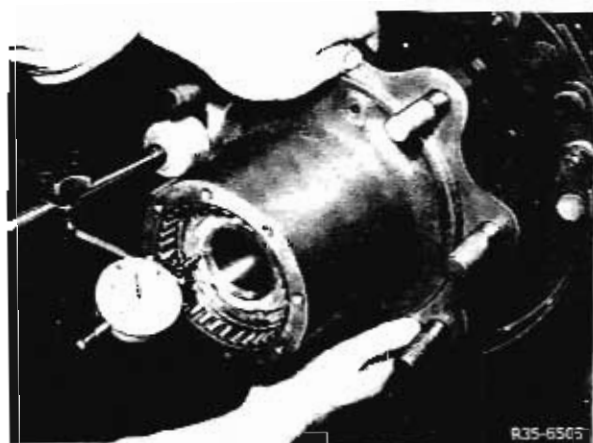


Fig. 8

8 Read play on dial gauge and adjust to specified value by tightening or loosening slot nut with slot nut wrench 312 589 03 07 00.

9 Insert locking plate and tighten outer slot nut (chamfered surface inwards) with slot nut wrench 312 589 03 07 00 or 327 589 00 07 00 and torque wrench 000 589 39 21 00 to specified value.

10 Check wheel bearing play and correct, if required. Remove dial gauge holder and dial gauge.

11 Secure the two slot nuts against rotation by bending locking plate into one slot of outer slot nut.

12 Place brake drum (starting HL 4-8,2) on wheel hub. For safety reasons, attach brake drum to wheel fastening bolts on hub by screwing-on two wheel nuts.

13 Install rear axle shafts (Fig. 9).

Note: On rear axles HL 4/8 and HD 4, use holding device 317 589 00 31 00 starting axle No. K 42 609 (Fig. 3).

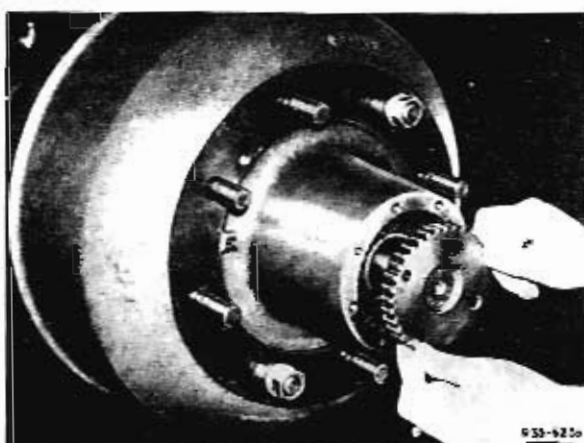


Fig. 9

Note: Rear axles HL 4-7,2 (old version).

Up to October 1961, the vehicle models

L/LA/LP 1113 up to Chassis No. 322.-026379

L/LA/LP 911 up to Chassis No. 328.-005081

were provided with rear axle beams having a total length of 1,916 mm and rear axle shafts approx. 960 mm long.

Starting chassis end No. 026 380 or 005 082, the length of the rear axle beam is 1,936 mm, that of the rear axle shafts approx. 972 mm.

Only the longer rear axle shaft will be supplied by the spare parts stockroom from now on. If this shaft knocks against differential spider when installing into old version, grind rear axle shaft conically as shown in Fig. 10.

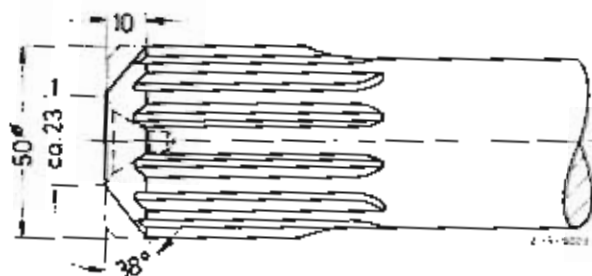


Fig. 10

14 On rear axle HL 4-8.2, HL 4/4-8.8, HL 4/8-10 and HD 4/6-8.8, position closing cover together with inserted gasket onto wheel hub (Fig. 11). Screw-in hex. screws with snap rings and tighten.

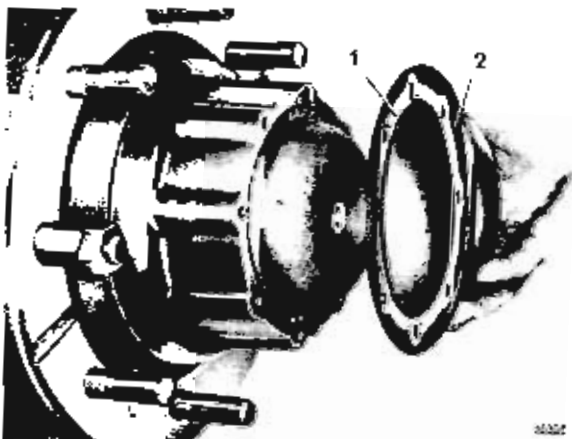


Fig. 11

1 Gasket 2 Closing cover

On rear axles HL 4-7.2 and HL 4/1, coat flange of rear axle shaft with sealing compound, tighten outside on hub with torque wrench 000 589 64 21 00 and changeover ratchet 001 589 42 09 00 to specified tightening torque and secure with counter-nuts (Fig. 12).

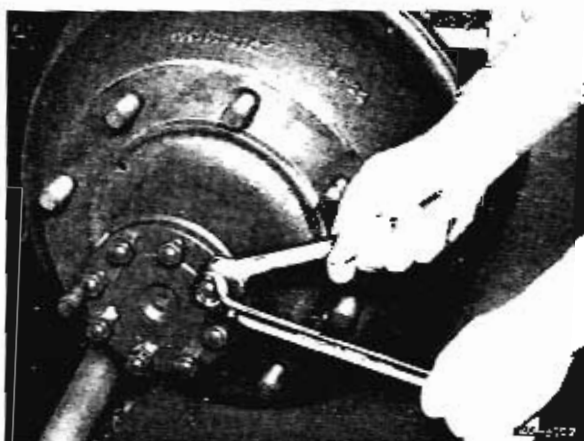


Fig. 12

Adjusting Rear Wheel Brake (Hydraulics)



Fig. 13

1 and 2 Turning direction of adjusting cams
1 Brake shoes are moving inwards (loosening)
2 Brake shoes are moving outwards (tightening)
3 Fastening screw

Place brake shoes completely against brake drum by turning adjusting cams. Turn adjusting cams again back until brake drum can be rotated freely. Tighten fastening screw of locking plate (Fig. 13).



Disassembly and Assembly of Brake Drum Hub 35.4 or Wheel Hub

HL 4

Filling Capacity ¹⁾

| | |
|---|-------|
| Anti-friction bearing grease each wheel hub | 700 g |
|---|-------|

¹⁾ Refer to „Specifications for Service Products“

Special Tools

| | |
|-----------------|------------------|
| Mandrel | 312 589 14 15 00 |
| Mandrel | 321 589 02 15 00 |
| Mandrel | 321 589 05 15 00 |
| Mandrel | 327 589 00 15 00 |
| Puller | 000 589 16 33 00 |
| Counter-support | 000 589 34 33 00 |
| Counter-support | 000 589 35 33 00 |
| Puller | 000 589 68 33 00 |
| Special pliers | 000 589 27 37 00 |

Disassembling Brake Drum Hub or Wheel Hub

1 Knock-out oil drip plate in wheel hub from outside through the two holes by means of thin mandrel (Fig. 1).

2 Pull-off sealing ring, spacing ring and inner wheel bearing with puller 000 589 68 33 00 and counter-support 000 589 35 33 00 (Fig. 2). On rear axles HL 4/8 and HD 4, use puller 000 589 16 33 00 starting axle No. K 42 609 (Fig. 3).

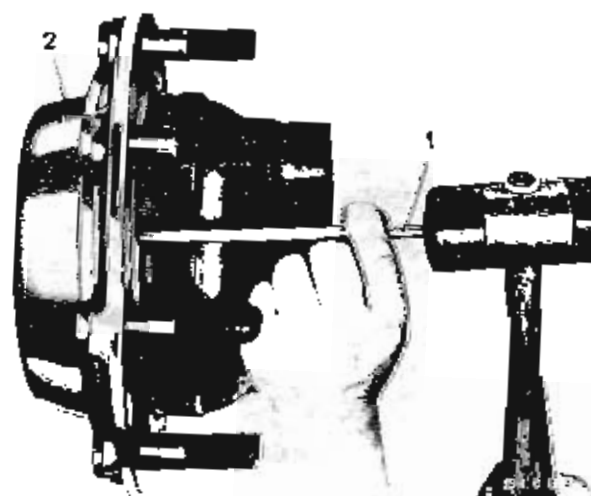


Fig. 1

1 Mandrel

2 Oil drip plate

35.4 Disassembly and Assembly of Brake Drum Hub or Wheel Hub

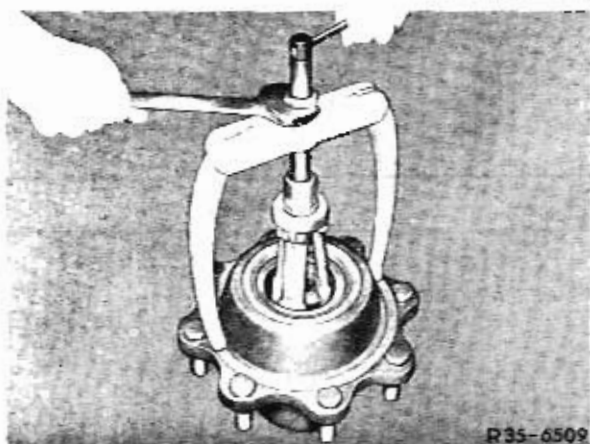


Fig. 2

3 Pull-off bearing outer race of inner tapered roller bearing with puller 000 589 16 33 00.



Fig. 4

4 Remove locking ring of outer wheel bearing with special pliers 000 589 27 37 00 (Fig. 4).

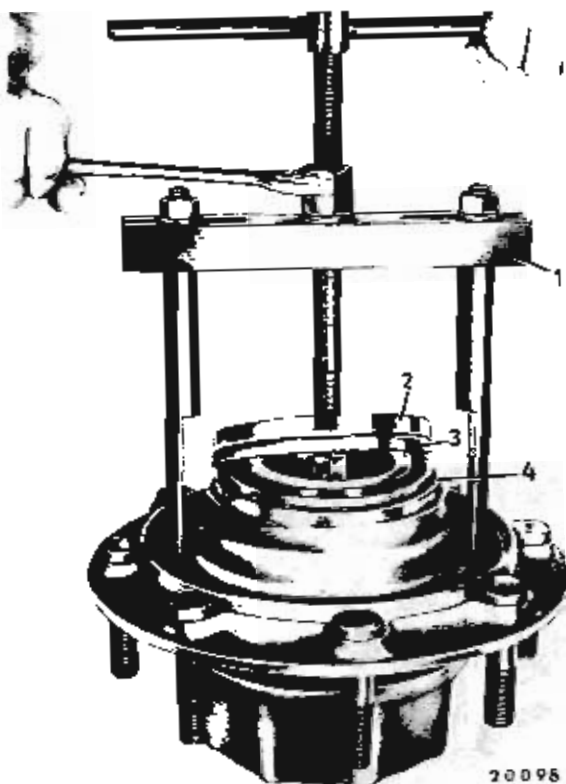


Fig. 3

1 Puller
2 Sealing ring
3 Spacing ring
4 Tapered roller bearing

5 Pull-off outer wheel bearing with puller 000 589 68 33 00 in combination with countersupport 000 589 34 33 00 (Fig. 5). On rear axles HL 4/8 and HD 4 use puller 000 589 16 33 00 starting with axle No. K 42 609 (Fig. 6).

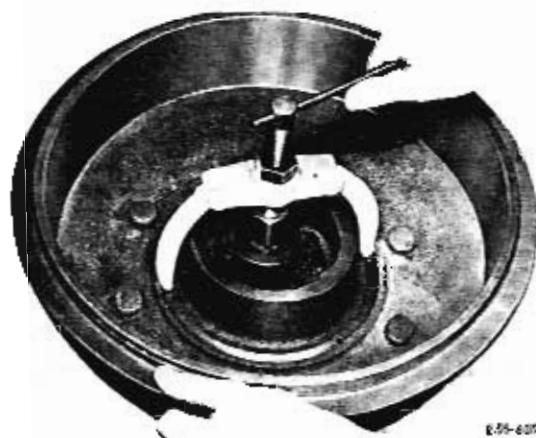


Fig. 5

Note: On rear axles HL 4-8,2, HL 4/4-8,8, HL 4/8-10 and HD 4/6-8,8, remove spacing tube between outer wheel bearing and rear axle shaft from hub.

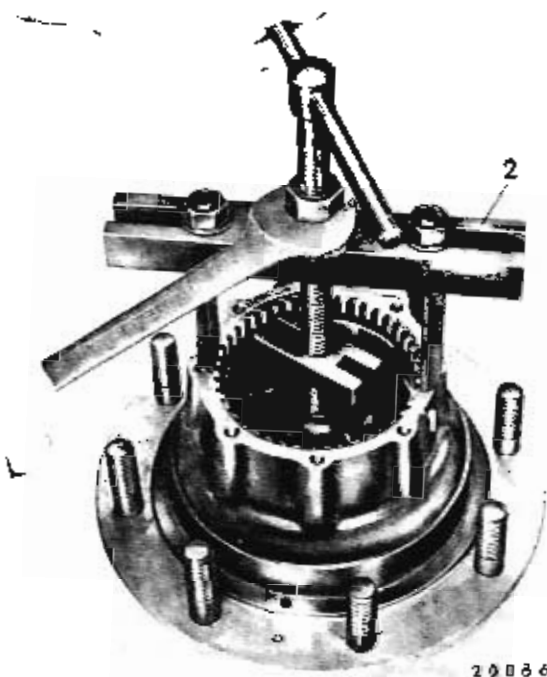


Fig. 6

1 Outer race of tapered roller bearing 2 Puller

A bearing can generally still be used when the running surfaces and the rollers are showing no visible damage or wear. For perfect evaluation, clean bearing first in gasoline or tri-chloroethylene until all contaminations are flushed out of the bearing. A bearing will be free from contaminations when no binding will occur while rotating bearing manually.

For evaluating quiet running, provide well-cleaned bearing with a few drops of thin engine oil. Note that bearings which have been used for only a short time will already be noisier than new bearings without being unfit for use for this reason.

Under normal operating conditions, the radial play of a bearing may increase only slightly during its service life.

In the event of repairs, replace bearings after a service life of approx. 100 000 km even though they seem still fit for use following a checkup in workshop. Also note that replacement of bearings should be easy, that is, without essential assembly jobs or without requiring versatile preliminary jobs.

Assembling Brake Drum Hub or Wheel Hub

Prior to assembly, clean all parts, check carefully for damage and wear, in particular the bearings and the bearing seats. Replace worn parts.

Slightly grease the slide surfaces of all parts to avoid damage and to facilitate installation.

Fill roller cages of wheel bearings with antifriction bearing grease, while also greasing the roller faces well. Check wheel bearings as follows for re-use:

Check contact surface of brake shoes in brake drum and refinish to next repair stage, if required.

1 Install outer wheel bearing.

Insert spacing tube (between outer wheel bearing and rear axle shaft only HL 4-8.2 to HL 4/8) with roller cage and inner race from inside into hub and press-in outer race with mandrel 312 589 14 15 00 (Fig. 7).

Note: Install locking ring for locating outer wheel bearing with special pliers 000 589 27 37 00 (Fig. 4).

35.4 Disassembly and Assembly of Brake Drum Hub or Wheel Hub



Fig. 7

1 Installing mandrel

2 Fill hub with grease.

Note: Use specified quantity of grease. When using too much grease, excessive squeezing will result in considerable heating of grease which may then lose its lubricity. Do not use insufficient quantities of grease either, since this will no longer guarantee perfect greasing of wheel bearings.



Fig. 8

3 Press-in bearing outer race of inner wheel bearing by means of mandrel (Fig. 8 and Fig. 9).

| Axle designation | Mandrel |
|---------------------|------------------|
| HL 4-7,2 and HL 4/1 | 321 589 05 15 00 |
| HL 4-8,2 to HL 4/8 | 321 589 02 15 00 |

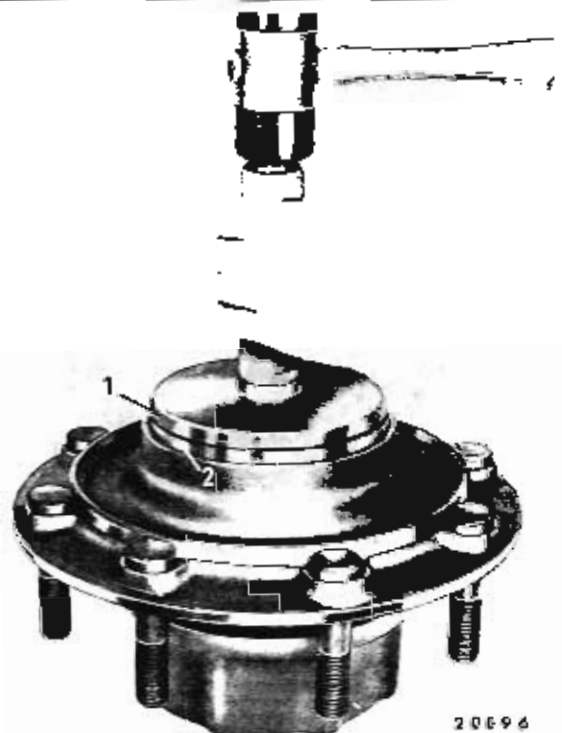


Fig. 9

1 Installing mandrel 2 Outer race for tapered roller bearing

4 Insert inner race with roller cage into outer race and mount spacing ring.

5 Coat sealing ring on circumference with sealing compound and press-in with mandrel.

| Axle designation | Mandrel |
|---------------------|------------------|
| HL 4-7,2 and HL 4/1 | 321 589 05 15 00 |
| HL 4-8,2 to HL 4/8 | 327 589 00 15 00 |

6 Fill cavity between the two sealing lips of the sealing ring with grease.

7 Coat recess of oil drip plate with sealing compound, mount oil drip plate and press into brake drum hub with matching sleeve.

8 Check wheel fastening bolts for damaged threads and tight seat and renew, if required.

| Tightening Torques | | | Nm | (kpm) |
|-----------------------------------|------------|------|-----------|-----------|
| Brake carrier plate to flange | M 12 x 1,5 | 10,9 | 135 | (13,5) |
| | M 16 x 1,5 | 10,9 | 250 – 270 | (25 – 27) |
| Bearing bracket to rear axle beam | M 16 x 1,5 | 8,8 | 200 | (20) |

Special Tools

| | |
|-----------------|------------------|
| Slot nut wrench | 312 589 08 07 00 |
|-----------------|------------------|

Removing Rear Wheel Brake

The brakes of the rear axles HL 4, HD 4 (new type designations), as well as the bearings of the brake shaft and the adjustment of the brake levers were extensively unified. The rear axles HL 4-7.2 (older versions) are different. The most significant deviations are explained below.

- 1 Unscrew brake fluid line with distributor on wheel brake cylinder right and left, as well as on axle housing, and remove. Close line connection of wheel brake cylinders with rubber cap.
- 2 Adjust both brake shoes in outward direction by turning adjusting cams.
- 3 Remove thrust bolts of wheel brake cylinders.
- 4 Place clamp on pistons of wheel brake cylinders so that pistons will not be forced out (Fig. 1).
- 5 Unscrew wheel brake cylinders with guard.



Fig. 1

- | | |
|-----------------------|---------------------|
| 1 Clamp | 3 Brake shoe holder |
| 2 Short return spring | |

- 6 Adjust brake shoes in inward direction and disconnect short return springs (Fig. 1).
- 7 Unscrew hex. nuts of elastic brake shoe holder (Fig. 1). Remove snap ring, outer and inner spring retainer with compression spring and force-out bolt toward the rear.

35.4 Removal and Installation of Rear Wheel Brake

Note: On rear axles HL 4-7,2, disconnect front, long return spring by means of brake spring pliers (Fig. 2).

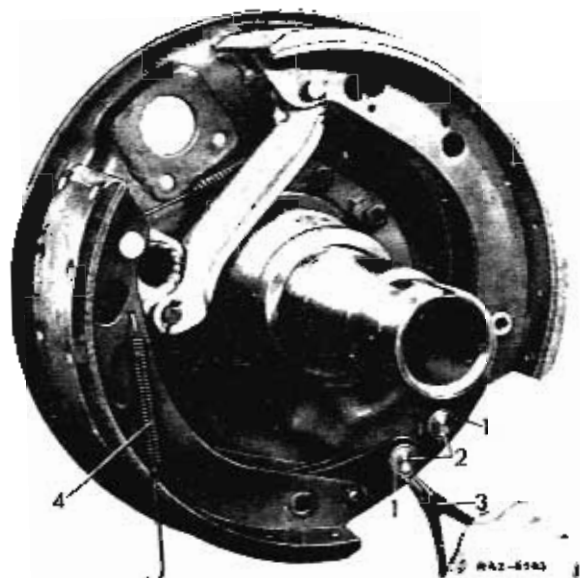


Fig. 2

- | | |
|----------------|--------------------|
| 1 Locking ring | 3 Spreading pliers |
| 2 Bolt | 4 Return spring |

8 Remove locking rings of brake shoe bolts (Fig. 2) and knock bolts out of plates and brake carrier with mandrel (Fig. 3).

Note: On axles with rotary shoe brake, unscrew locking plate of brake shoe bolts and pull-off brake shoe bolts.

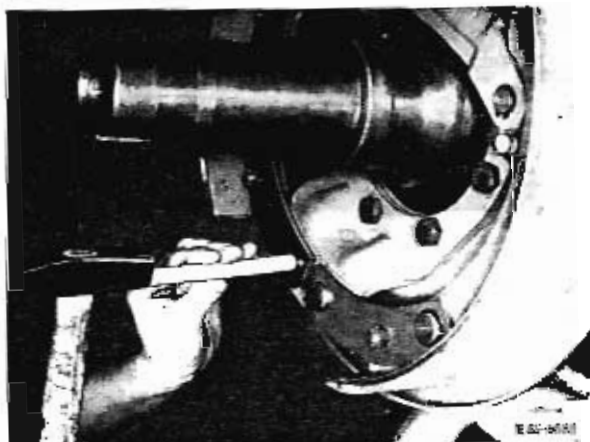


Fig. 3

9 Remove locking ring and closing cover from bearing bracket of brake shaft (Fig. 4).

10 Remove inner locking ring from brake shaft (Fig. 4).

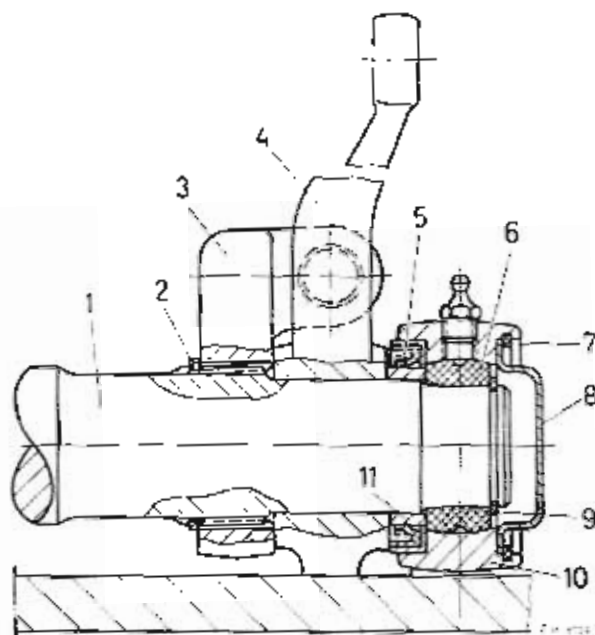


Fig. 4

- | | |
|-------------------|--------------------------------|
| 1 Brake shaft | 7 Locking ring |
| 2 Locking ring | 8 Closing cover |
| 3 Adjusting lever | 9 Locking ring |
| 4 Brake lever | 10 Bearing bracket (welded-on) |
| 5 Sealing ring | 11 Spacing ring |
| 6 Bearing ring | |

Note: On rear axles HL 4-7,2, unbend locking tab of slot nut on brake shaft (Fig. 5) and unscrew slot nut with slot nut wrench 312 589 08 07 00 (Fig. 6).

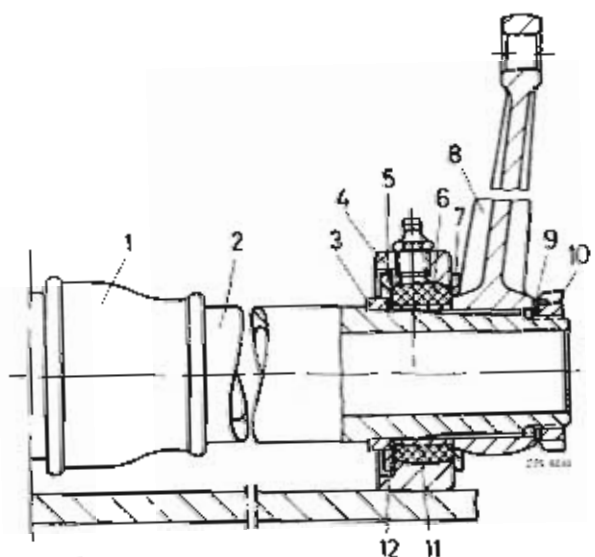


Fig. 5

- | | |
|-------------------------------|----------------------|
| 1 Rubber sleeve | 7 Guard |
| 2 Brake shaft | 8 Brake lever |
| 3 Thrust ring | 9 Locking plate |
| 4 Bearing bracket (welded-on) | 10 Slot nut |
| 5 Guard | 11 Bearing bushing |
| 6 Bearing ring | 12 Compensating ring |

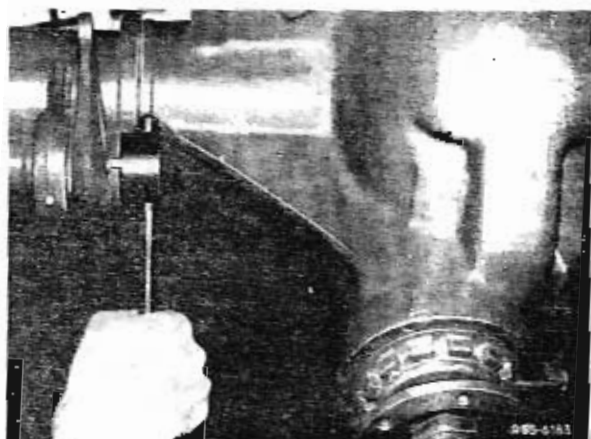


Fig. 6

11 Turn adjusting cams back and forth and pull brake shoes with pressure links one after the other out of bracket on brake carrier plate (Fig. 7).

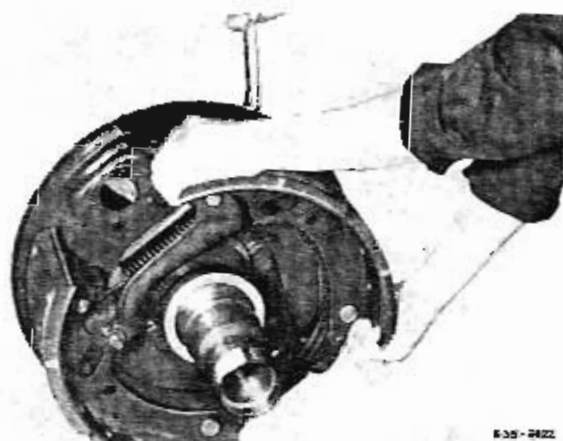


Fig. 7

12 Pull both brake shoes with pressure link and return spring for approx. 10 cm outwards away from brake carrier plate until brake shaft can be completely removed from bearing bracket.

Note: On rear axles HL 4-7.2, knock brake lever (Fig. 5) from splining of brake shaft by means of light hammer blows and remove both brake shoes from brake carrier plate together with large return spring and pressure link. Put aside the two guards, the thrust ring and the bearing bushing (Fig. 5) together with brake shaft for use later on.

13 Loosen counternuts of adjusting lever and stop lever (Fig. 8).

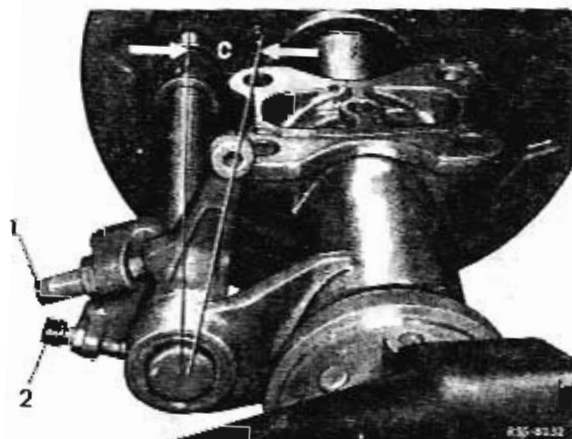


Fig. 8

1 Adjusting screw
2 Stop screw
C Adjusting dimension

14 Knock brake lever and adjusting lever from splining of brake shaft by means of light hammer blows and remove rubber sleeve.

Note: As of late, the adjusting lever is replaced by a clamping lever. Unscrew clamping screw prior to removal.

15 Remove both brake shoes from axle together with return spring and brake shaft (Fig. 9).

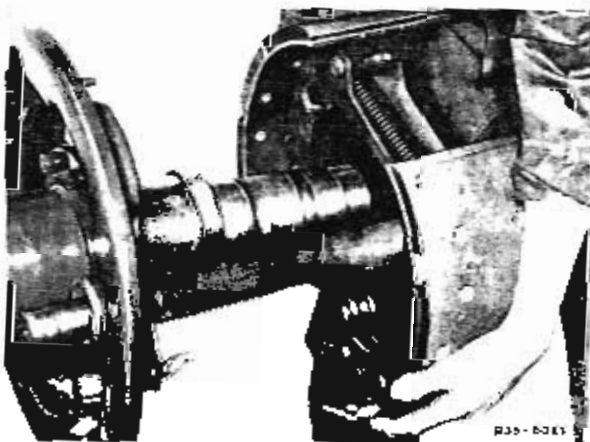


Fig. 9

16 Clamp rear brake shoe into vise. Unlock bolt between pressure link and rear brake shoe and knock-out toward the rear.

Caution! Spring tension! (Fig. 10).

35.4 Removal and Installation of Rear Wheel Brake

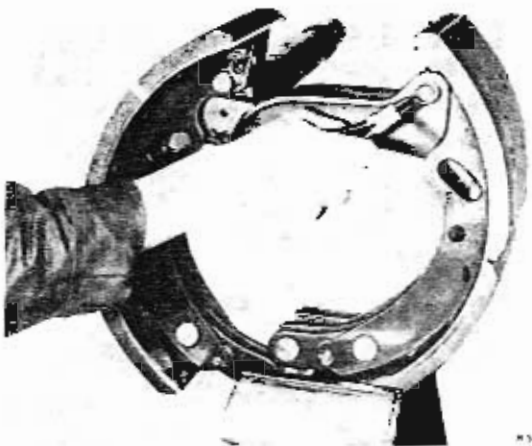


Fig. 10

17 Clamp front brake shoe into vise. Tilt rear brake shoe over front shoe until pressure link disconnects (Fig. 11).

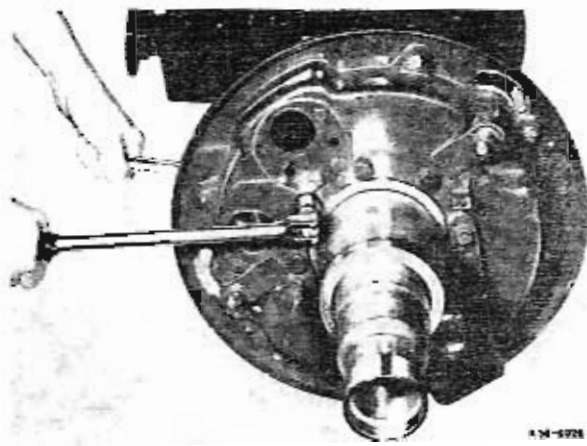


Fig. 12

22 Clean parts and check for wear.

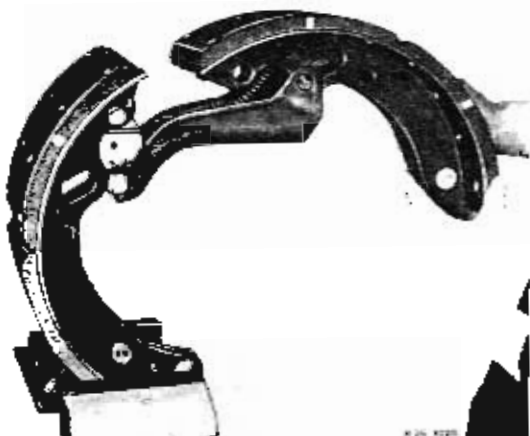


Fig. 11

18 Disconnect return spring from both brake shoes.

19 Unlock both bolts between brake shoe or brake shaft and pressure link and remove.

20 Unscrew brake carrier plate (Fig. 12).

21 Check threaded running surface for radial sealing ring on thrust ring for wear (scoring marks). If removal is required, drilling and subsequent breaking of ring is recommended (Fig. 13).



Fig. 13

Installing Rear Wheel Brake

Heat thrust ring (if removed) to approx. 80° C. For mounting, use matching tube, making sure that thrust ring is slipped on up to machined surface of supporting tube for a flat seat (Fig. 14).

Observe color code:

Yellow – left with righthand threads
Red – right with lefthand threads

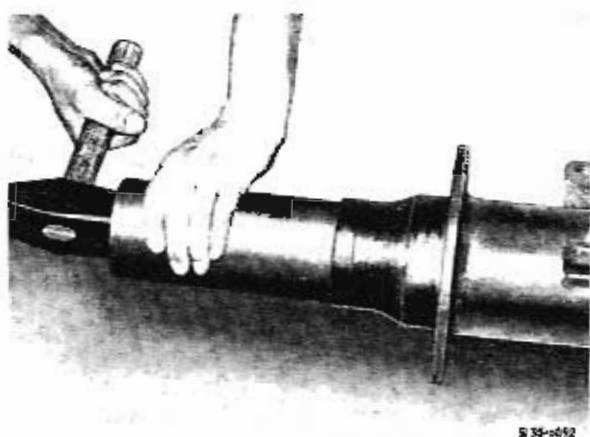


Fig. 14

Screw brake carrier plate to flange of rear axle tube.

Check all brake parts for perfect condition!

Check brake shoe adjusting cam for wear, tight seat and easy operation. Check thickness of brake shoe linings and fit new linings, if required.

Coat all bearing points and bolts of brake shoe mechanism with approved grease acc. to page 266.2 of Specifications for Service Products and check for easy running.

The brakes of rear axles HL 4, HD 4 (new type designations), as well as the bearings of the brake shaft and the adjustment of the brake levers were widely simplified.

Rear axles HL 4-7,2 (older type series) are different. The most significant deviations are described below:

- 1 Clamp front brake shoes into vise.
- 2 Attach brake shaft with bolt to front brake shoe and insert cotter pin.
- 3 Attach pressure link with bolt to other eye of brake shaft and insert cotter pin.
- 4 Attach return spring between the two brake shoes (on rear axles HL 4-7,2 the rear return spring only), on front brake shoe into center bore, on rear brake shoe into first bore.

5 Tilt rear brake shoe slightly over front shoe, fold pressure link into rear brake shoe and tilt downwards while pulling energetically outwards on rear brake shoe (Fig. 11).

6 Center hole of pressure link with that of rear brake shoe by means of a punch, insert bolt and secure with locking ring (Fig. 10).

7 Check bearing race and sealing ring of brake shaft for wear (renew, if required), grease slightly and insert into bearing bracket (Fig. 4).

Note: For rear axles HL 4-7,2, refer to Fig. 5.

8 Slip both brake shoes onto supporting tube together with brake shaft (do not yet attach) (Fig. 9).

9 Slip rubber sleeves on brake shaft and place outer locking ring (2) loosely onto brake shaft (Fig. 4).

10 Slip adjusting lever and brake lever loosely on brake shaft (Fig. 4).

Note: On rear axles HL 4-7,2, slip thrust ring, compensating ring, guard and bearing bushing on brake shaft (Fig. 5).

Note 2: Starting October 1974, a clamping lever will be installed instead of adjusting lever (Fig. 4). In addition, the bearing bracket is screwed to rear axle beam by means of two screws M 16 x 1.5 (Fig. 15).

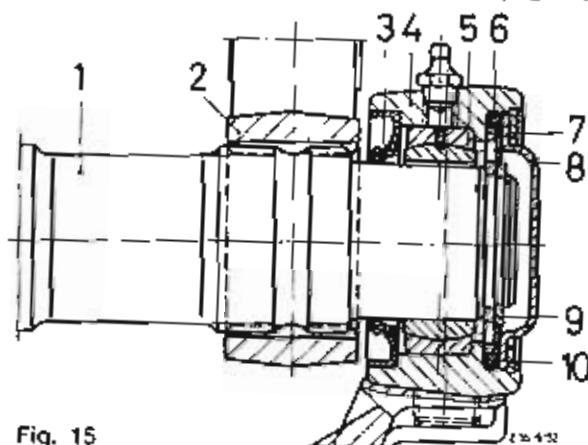


Fig. 15

- | | |
|--------------------------------|-----------------|
| 1 Brake shaft | 6 Sealing ring |
| 2 Brake lever (clamping lever) | 7 Stop washer |
| 3 Radial sealing ring | 8 Closing cap |
| 4 Bearing bracket | 9 Locking ring |
| 5 Universal bearing | 10 Locking ring |

35.4 Removal and Installation of Rear Wheel Brake

11 Slip brake shoes completely against brake carrier plate while introducing brake shaft carefully into bearing bracket.

12 Install inner locking ring on brake shaft and closing cover with outer locking ring into bearing bracket (Fig. 4).

13 Attach brake shoes with pressure links to brake carrier, install bolts and insert locking ring (Fig. 16).

On axles with rotary shoe brake, screw-on locking plate of brake shoe bolts and secure.

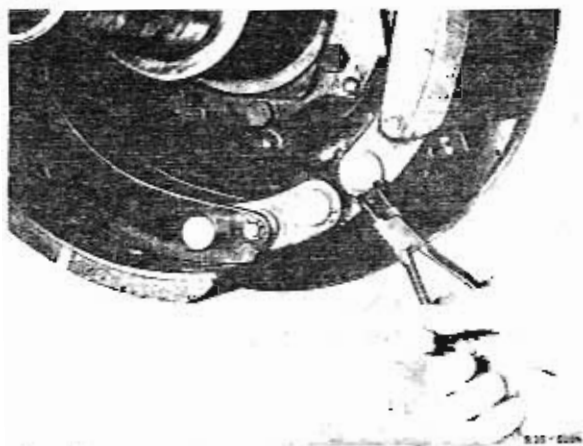


Fig. 16

14 Insert bolts of brake shoe holder from the rear through brake carrier plate and brake shoes, mount outer and inner spring retainer with compression spring and attach with hex. bolt (Fig. 1).

15 Attach short return springs.

16 Adjust brake shoes at adjusting cams in outward direction and install wheel brake cylinder with guard.

17 Remove clamp (Fig. 1). Insert thrust bolt into wheel brake cylinder and adjust brake shoes in inward direction.

Note: On rear axles HL 4-7,2, attach front, long return spring (Fig. 17).

18 Coat splining of brake shaft with approved grease according to page 266.2 of Specifications for Service Products. Slip adjusting lever and brake lever onto splining and adjust unil dimension C amounts to 45 mm. Secure adjusting screw and stop screw by counterlocking (Fig. 8).

On axles with clamping lever, make sure during installation, that the marking on face of brake shaft is in alignment with marking on clamping lever.

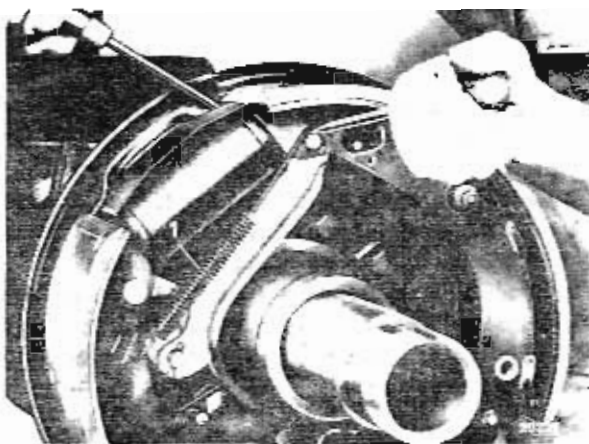


Fig. 17

1 Return spring

19 Insert locking ring (2) for locating adjusting lever into groove of brake shaft (Fig. 4).

Note: On rear axles HL 4-7,2, slip brake lever with guard onto splining of brake shaft (Fig. 5) and adjust in such a manner that dimension C amounts to 45 mm (Fig. 8).

Mount locking plate (Fig. 5) and screw-on slot nut by means of slot nut wrench 312 589 08 07 00 (Fig. 6). Secure slot nut by bending locking plates.

20 Blow-out brake fluid line well with compressed air and screw to axle housing together with distributor, as well as to wheel brake cylinder connection at the right and left.

Adjusting Values

| | |
|---|--------------|
| Backlash | 0,15 – 0,25 |
| Preload of differential housing bearings: | |
| Prior to tightening bearing cap bolts | 0,005 – 0,02 |
| After tightening bearing cap bolts | 0,02 – 0,04 |

Tightening Torques

| | | Nm | (kpm) |
|-------------------|-----------|-----------|-----------|
| Bearing cap bolts | M 16 10.9 | 220 – 230 | (22 – 23) |

Special Tools

| | | |
|------------------|--|------------------|
| Square mandrel | | 312 589 04 07 00 |
| Torque wrench | | 000 589 62 09 01 |
| Dial gauge | | 001 589 32 21 00 |
| Adjusting tool | | 354 589 00 21 00 |
| Measuring device | | 363 589 02 21 00 |

Removing Differential

- 1 Drain oil at rear axle housing.
- 2 Remove rear axle shafts (35.4 – 108).
- 3 Unscrew cover with gasket from rear axle housing and remove.
- 4 Unscrew adjusting screw with slide piece for ring gear support (Fig. 1).

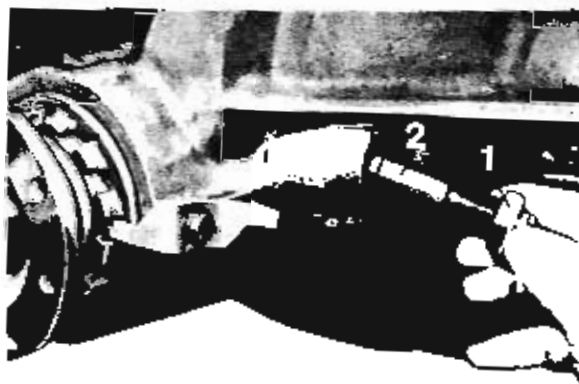


Fig. 1

1 Counter nut

2 Adjusting screw with slide piece

35.4 Removal and Installation of Ring Gear with Differential

5 Unscrew locking plates of adjusting rings from bearing caps (Fig. 2).

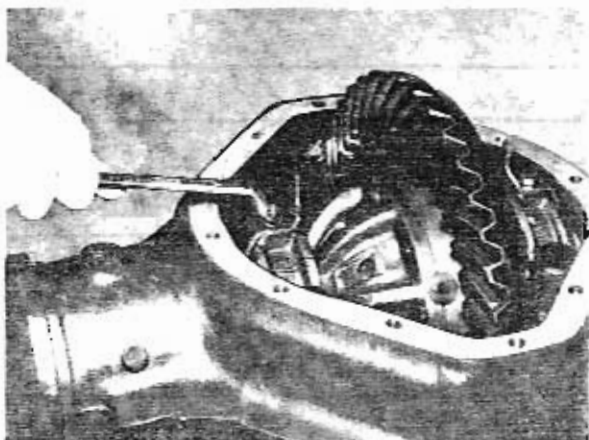


Fig. 2

6 Loosen counter nut of thrust screw on bearing cap at ring gear end by means of a hook wrench and screw back thrust screw (Fig. 3).



Fig. 3

7 Mark bearing cap and adjusting ring in relation to each other.

8 Unscrew bearing cap and remove (Fig. 4). If required, apply light blows with a rubber hammer at an angle from above against flat surface, so that the threads of the bearing caps and adjusting rings are becoming loose.

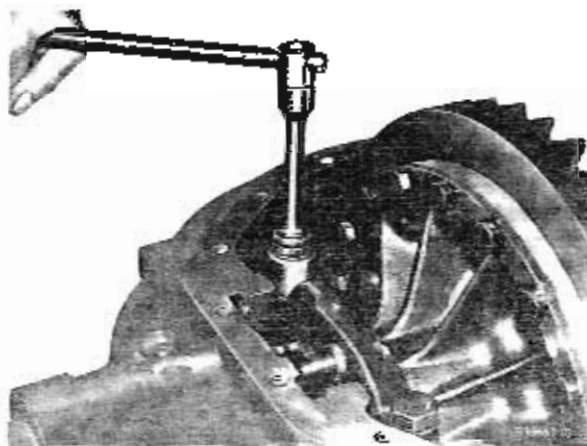


Fig. 4

9 Screw back adjusting rings with square mandrel 312 569 04 07 00 and remove.

10 Remove differential from rear axle housing, while holding differential at a slight angle so that the ring gear can slide past web of rear drive pinion bearing.

Note: Mark outer races of the two tapered roller bearings to avoid any confusion during reassembly.

Installing Differential

1 Insert completely assembled differential with ring gear into bearing points of rear axle beam.

2 Insert adjusting rings into threads (observe marking) and screw down with square mandrel 312 589 04 07 00 until rings are resting against differential housing bearings.

3 Insert bearing caps into threads of adjusting rings (observe marking). Coat threads of bearing cap bolts well with white lead and tighten until adjusting rings can still be easily turned with square mandrel 312 589 04 07 00.

4 Rotate ring gear while applying a few blows with a rubber hammer against bearing caps so that the tapered roller bearings will seat well.

5 Tighten adjusting rings once again until bearings are running free of play and the differential can no longer oscillate. Ring gear should turn easily at light backlash.

6 Attach measuring device 363 589 02 21 00 with dial gauge inserted to rear axle housing and align feeler pin as vertically as possible with approx. 1 mm preload on contact surface of a ring gear tooth (Fig. 5).

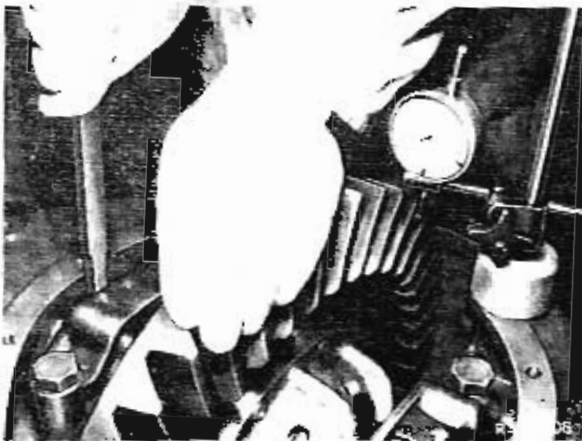


Fig. 5

7 Lock drive pinions well and shift differential in the direction of the drive pinion while alternatingly and uniformly turning adjusting rings (each time to the right and left) until the backlash specified for installed gear assembly is attained. The play is read on dial gauge when turning ring gear back and forth.

8 Measure at least at 3 points on ring gear.

9 If corrections are required, first loosen pertinent adjusting ring slightly and then screw-in opposite ring by the same dimension. Repeat until specified value is attained.

10 Tighten bearing cap at ring gear end with torque wrench 000 589 62 09 01 to specified torque (Fig. 6).

Note: Thrust screw should not rest against axle housing (Fig. 5).

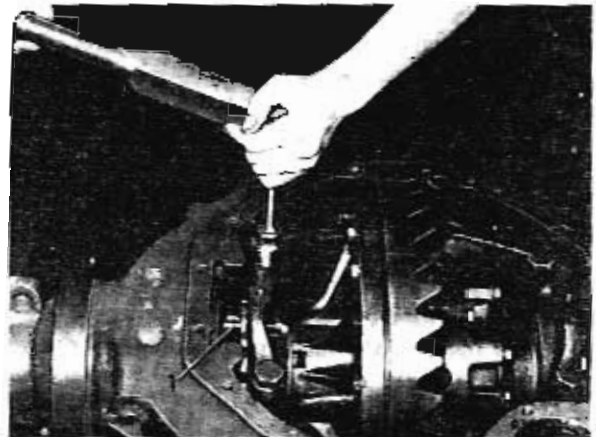


Fig. 6

1 Thrust screw

11 Tighten adjusting tool 354 589 00 21 00 on this bearing cap in such a manner that the lug is located in parallel with ring gear (Fig. 7).

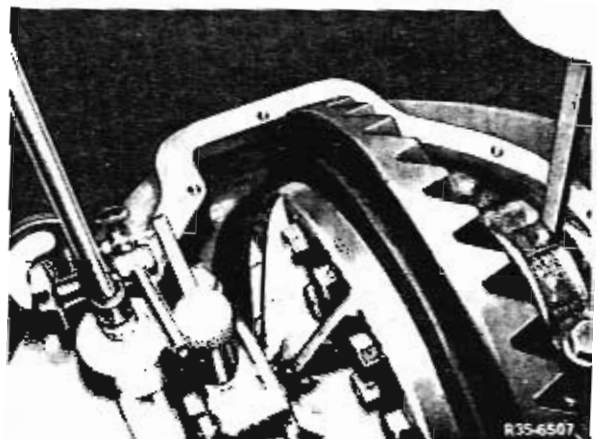


Fig. 7

1 Adjusting tool

35.4 Removal and Installation of Ring Gear with Differential

12 Position measuring device 363 589 02 21 00 with dial gauge on axle housing in such a manner that the feeler pin of the dial gauge ($1/1000$ mm graduation) 001 589 32 21 00 is resting at a right angle on lug of adjusting tool. Provide preload for dial gauge and set to „0“.

13 Tighten opposite adjusting ring until dial gauge deflects 0,005 to 0,02 mm (Fig. 3).

Note: With used bearings try for lower limit, with new bearings for upper limit.

14 Also tighten opposite bearing cap with torque wrench 000 589 62 09 01 to specified torque, the attached dial gauge should now indicate a preload of 0,02 to 0,04 mm.

15 Check backlash once again and remove dial gauge holder.

Note: Screw thrust screw in bearing cap at ring gear end against axle housing and secure by counterlocking with slot nut (Fig. 3).

16 Attach sheet metal locks of adjusting rings on bearing caps (Fig. 2).

Note: Place toothed washers under fastening screws.

Checking Contact Pattern

Production limits of ring gear and drive pinion are such that the adjustment of basic dimension and backlash for installation will be adequate.

The contact pattern of the gear assembly can be independently checked.

For this purpose, coat two teeth of ring gear offset by 180° with blue ink. Then rotate drive pinion back and forth while braking ring gear with a piece of hardwood.

Contact Pattern on Ring Gear Under Load (Ring Gear Braked)

Correct Contact



Fig. 8

Practically, no such ideal contact pattern is generally attained. But it is important that the pattern is not touching the outer edge of the tooth at any point.

Contact at Top (Wrong)



Fig. 9

Remedy: Slightly reduce installation distance (basic dimension) of drive pinion while simultaneously slightly increasing the installation distance of ring gear, that is, permit teeth of ring gear to mesh slightly less with teeth of drive pinion so that the correct backlash is maintained.

Contact at Root (Wrong)



Fig. 10

Remedy: Slightly increase installation distance (basic dimension) of drive pinion while simultaneously slightly reducing installation distance of ring

gear, that is, permit teeth of ring gear to mesh slightly more with teeth of drive pinion, so that the correct backlash will be maintained.

Note: Check slide piece of adjusting screw for wear, equalize or renew slide piece, if required.

17 Screw adjusting screw with slide piece for ring gear support against stop on ring gear; backup adjusting screw for $\frac{1}{4}$ turn which will obtain a distance of approx. 0.25 mm from ring gear. Secure adjusting screw with counter nut (Fig. 1 and 11).

18 Coat gasket and rear axle housing cover with sealing compound Starryt, Dichin 51 or Teroson

Fluid and attach to rear axle housing together with guard.

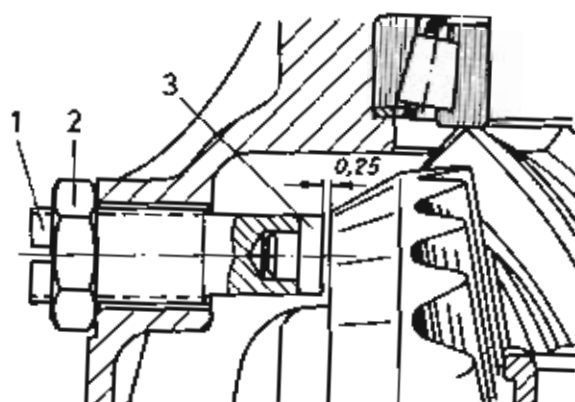


Fig. 11

1 Adjusting screw

2 Counter nut

3 Slide piece



Adjusting Values

| | |
|----------------------------------|------|
| Max. out-of-true on ring gear | 0.1 |
| Max. lateral runout on ring gear | 0.06 |

Tightening Torques

| | | | Nm | (kpm) |
|-----------------------------------|------------|------|-----------|-------------|
| Cover to differential housing | M 14 x 1,5 | 10.9 | 195 – 210 | (19,5 – 21) |
| | M 16 x 1,5 | 10.9 | 280 – 300 | (28 – 30) |
| Ring gear to differential housing | M 14 x 1 | 10.9 | 170 – 190 | (17 – 19) |
| | M 16 x 1 | 10.9 | 250 – 270 | (25 – 27) |

Special Tools

| | |
|---------------|------------------|
| Torque wrench | 000 589 62 09 01 |
| Mandrel | 401 589 02 15 00 |
| Assembly tool | 337 589 02 31 00 |
| Puller | 001 589 40 33 00 |
| Clamping ring | 000 589 24 34 00 |

Disassembling Differential

1 Pull-off both tapered roller bearings on differential with puller 001 589 40 33 00, clamping ring 000 589 24 34 00 and matching thrust piece (Fig. 1).

2 Clamp differential to assembly tool 337 589 02 31 00.

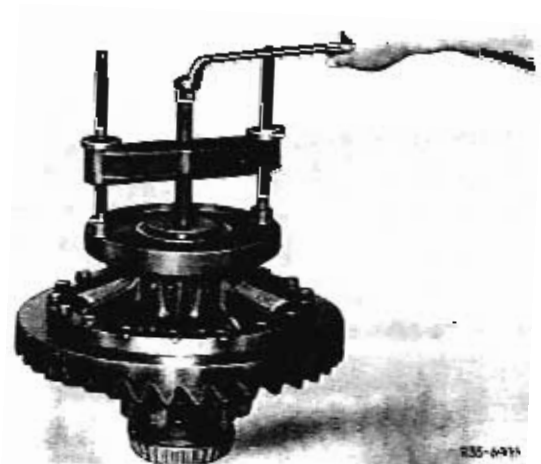


Fig. 1

35.4 Disassembly and Assembly of Differential

- 3 Unlock ring gear screws and remove (Fig. 2).

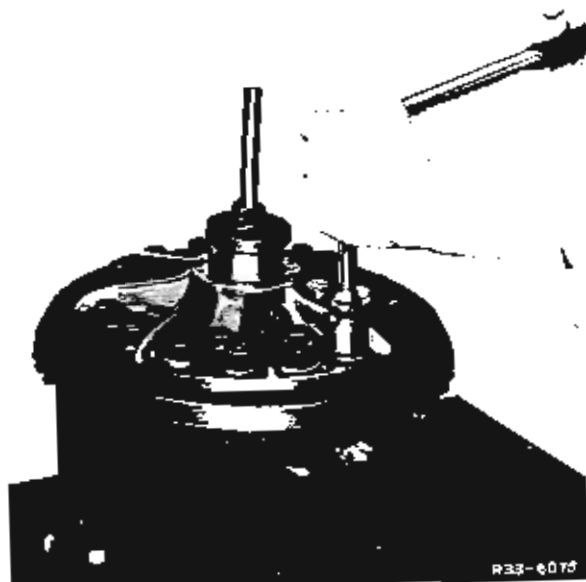


Fig. 2

- 4 Knock-off ring gear by means of light blows against circumference with a rubber hammer or press-off, if required.

- 5 Mark differential housing and differential housing cover. Unscrew hex. screws and remove cover with side gear (Fig. 3).

- 6 Remove differential spider with differential pinions and side gear from housing.

- 7 Clean parts and check for wear.

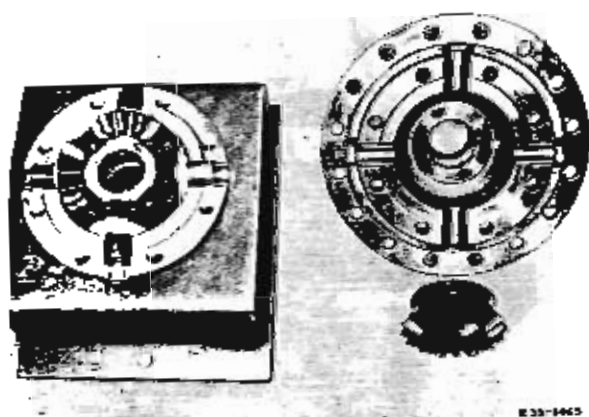


Fig. 3

Assembling Differential

- 1 Place differential housing cover for mounting into assembly device 337 589 02 31 00.

- 2 Insert drive gear with bronze thrust washer into cover.

Note: Lubricating groove of thrust washer toward drive pinion.

- 3 Slip differential pinions with spherical washers on differential spider and insert together into cover.

- 4 Place drive pinion with bronze thrust washer onto differential pinions and mount differential housing (observe mark) (Fig. 4).

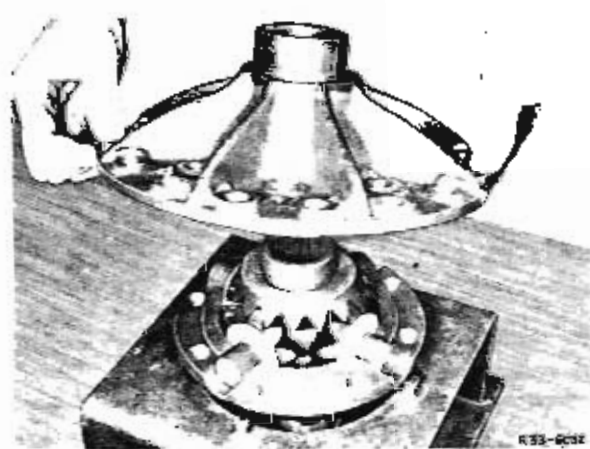


Fig. 4

- 5 Tighten fastening screws of differential housing with torque wrench 000 589 62 09 01 to specified torque.

- 6 Heat ring gear to approx. 80° C, place on differential housing and screw down (Fig. 5).

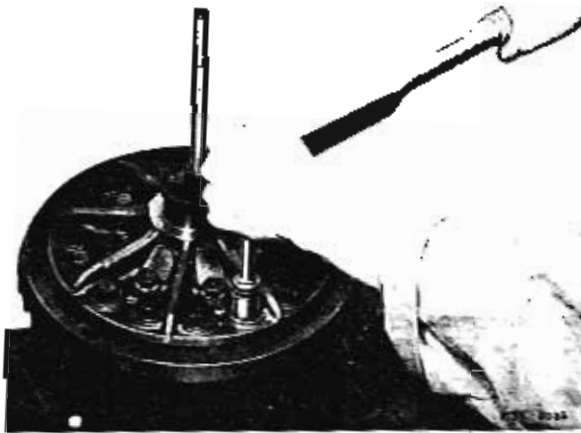


Fig. 5

Note 1: On rear axles HL 4 (older type designations) the fastening screws of the ring gears were M 12 x 1 and the bores in the differential housing had a diameter of 12.3 mm. Starting Feb. 1, 1965, only ring gears with threads M 14 x 1 are supplied.

When exchanging an old gear assembly, enlarge bores in differential housing and then ream to 14.2 mm dia. with a reamer. Upon reaming, deburr bores and countersink hole end for screw head to the extent that the transition from shank of screw to collar of screw head is not binding.

Note 2: Peen each differential housing and ring gear screw with a mandrel (Fig. 6 Note1).

7 Heat both inner races of differential bearing to approx. 80° C and mount with mandrel 401 589 02

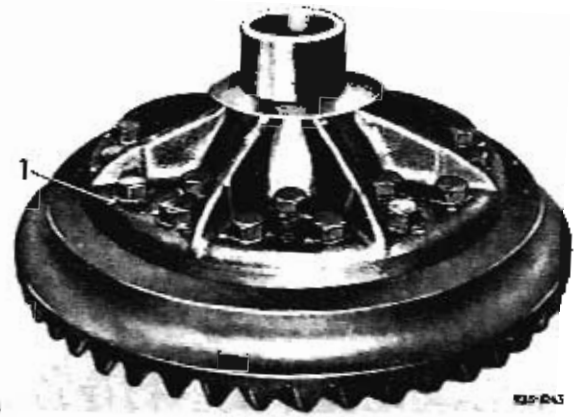


Fig. 6

15 00. Bearings should rest flat against face of housing.

8 Mount differential in tapered roller bearings and check ring gear for concentricity and lateral runout (Fig. 7).

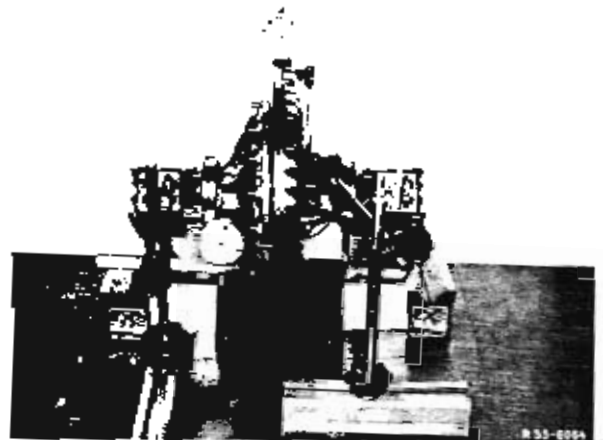


Fig. 7



Removal and Installation of Drive Pinion 35.4

HL 4

Adjusting Values

| | |
|-----------------|------|
| Basic dimension | 83,5 |
|-----------------|------|

Tightening Torques

| | | Nm | (kpm) |
|-------------------------------|-------------|-------------|-------------|
| Threaded ring to drive pinion | M 140 x 1,5 | 1000 – 1200 | (100 – 120) |

Special Tools

| | |
|---------------------|------------------|
| Slot nut wrench | 302 589 00 07 00 |
| Ratchet with handle | 001 589 18 09 01 |
| Connection | 001 589 18 09 03 |
| Torque wrench | 001 589 39 21 01 |
| Adjusting tool | 321 589 04 21 00 |
| Puller | 354 589 00 33 00 |
| Reduction wrench | 000 589 69 63 00 |

Removing Drive Pinion

1 Unscrew locking plate for threaded ring on axle housing (Fig. 1).

2 Unscrew threaded ring with slot nut wrench 302 589 00 07 00 (Fig. 2).



Fig. 1

35.4 Removal and Installation of Drive Pinion

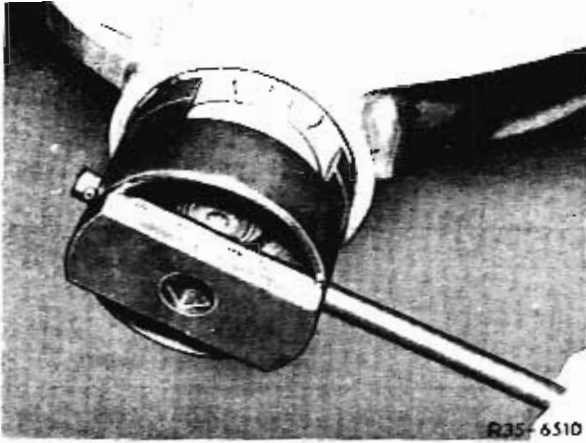


Fig. 2

Caution! Unscrew threaded ring only. Never pull out drive, since this will involve the risk of the compensating ring halves between the tapered roller bearing outer races slipping into the oil groove (Fig. 3 Note A) in axle housing, so that the drive can be removed only after considerably additional work.

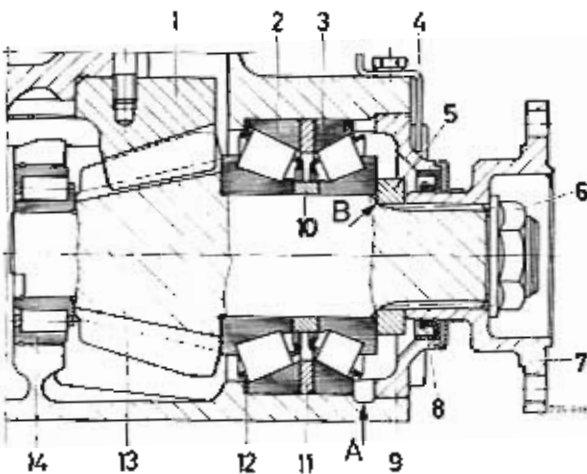


Fig. 3

- | | |
|-----------------------------------|---------------------------------|
| 1 Ring gear | 9 Threaded ring |
| 2 Tapered roller bearing, inside | 10 Spacing ring |
| 3 Tapered roller bearing, outside | 11 Compensating ring (2 halves) |
| 4 Locking plate for threaded ring | 12 Compensating washers |
| 5 Thrust ring | 13 Drive pinion |
| 6 Collar nut | 14 Cyl. roller bearing |
| 7 Coupling flange | A = Oil groove |
| 8 Sealing ring | B = Chamfer |

3 Attach puller 354 589 00 33 00 with two hex. screws to coupling flange of drive pinion. Turn the two thrust screws tightly against threaded ring so

that the tapered roller bearing outer races and the compensating ring halves are pressed against each other. Then screw both pulling screws uniformly against axle housing to pull out drive (Fig. 4).

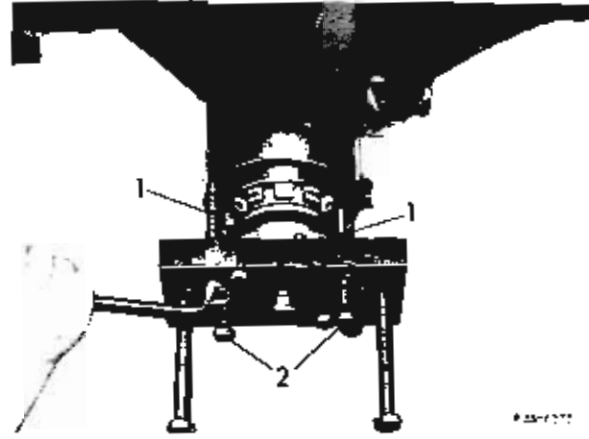


Fig. 4

- 1 Pulling screws 2 Thrust screws

4 Unscrew puller from coupling flange.

5 Remove compensating washers left in axle housing and tie together (Fig. 3).

6 Remove locking wire of cyl. roller bearing outer race from axle housing (Fig. 5).

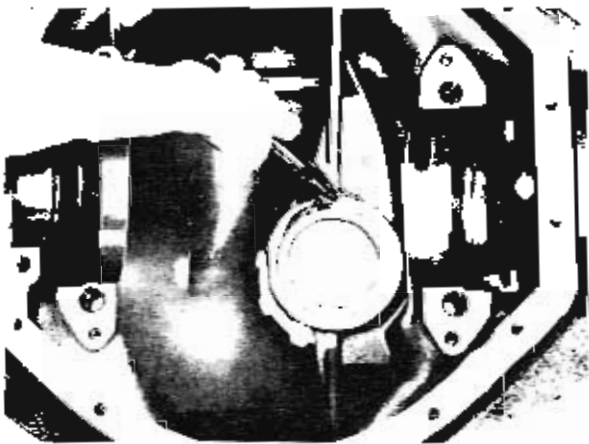


Fig. 5

7 Force cyl. roller bearing outer race out of axle housing by means of mandrel.

Installing Drive Pinion

1 Force outer race of cyl. roller bearing with mandrel 401 589 02 15 00 into rear axle housing until locking wire can be inserted (Fig. 5).

2 Insert a few compensating washers into axle housing (Fig. 3).

3 Attach device 354 589 00 33 00 with two hex. screws to coupling flange and turn the two thrust screws toward threaded ring (Fig. 6) so that the outer races of the tapered roller bearings and the split compensating ring are pressed tightly against each other to eliminate the risk that during installation the compensating ring halves will slip into oil groove in differential housing so that the drive can then be removed only after considerable additional work (Fig. 3, Note A).

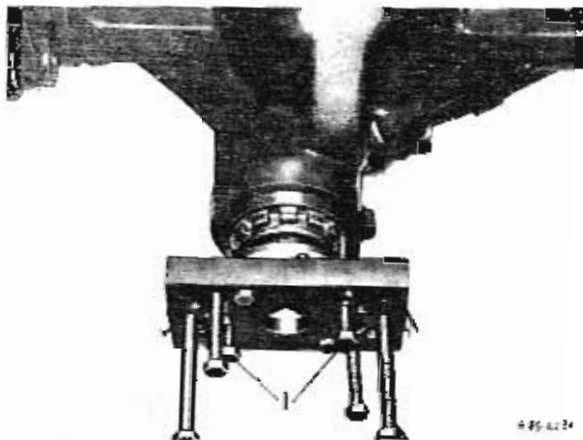


Fig. 6

1 Thrust screws

4 Coat threaded ring with sealing compound Starryt or Atmosit, slip drive into axle housing and screw-in threaded ring manually (Fig. 6).

5 Remove device from coupling flange.



Fig. 7

R 35-6511

6 Tighten threaded ring with slot nut wrench 302 589 00 07 00 in combination with reduction wrench 000 589 69 63 00 and torque wrench 001 589 39 21 01 (Fig. 7).

At a tightening torque of threaded ring of 1000 – 1200 Nm (100 – 120 kpm) tighten to 125 – 150 Nm (12,5 – 15 kpm) with torque wrench, the reduction (1 : 8) will then provide the specified tightening torque.

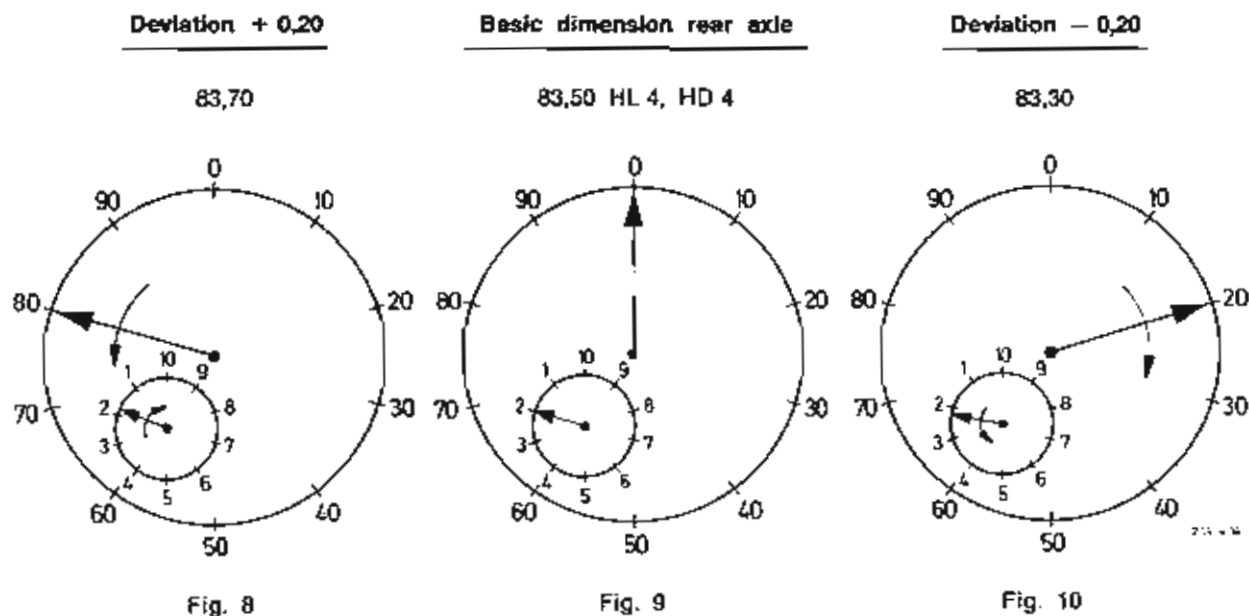
Measuring Basic Dimension

The basic dimension is adjusted by means of adjusting device 321 589 04 21 00.

Prepare measuring device as follows:

1 Insert a dial gauge with $\frac{1}{100}$ mm graduation into holder, but do not yet attach.

35.4 Removal and Installation of Drive Pinion



2 Unscrew adjusting arm from supporting flange and place on flat surface of guide housing (Fig. 11).

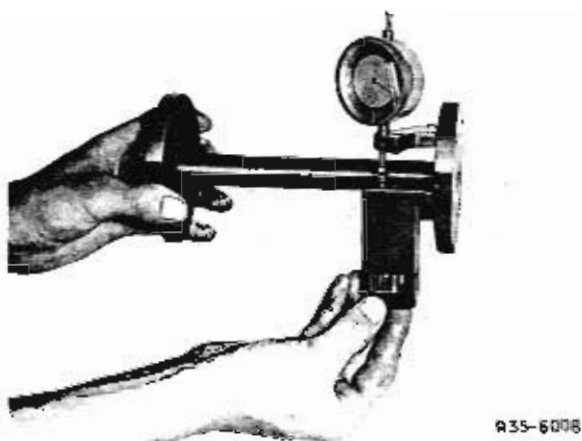


Fig. 11

3 Adjust dial gauge and measuring scale in such a manner that the large pointer ($1/100$ mm graduation) is at 0 (zero) and the small pointer at 2 mm (Fig. 9). Tighten dial gauge. This adjustment now corresponds to basic dimension.

4 Insert adjusting device into rear axle beam in such a manner that the centering pin enters the centering hole of the drive pinion and the feeler pin is aligned toward face (Fig. 12).

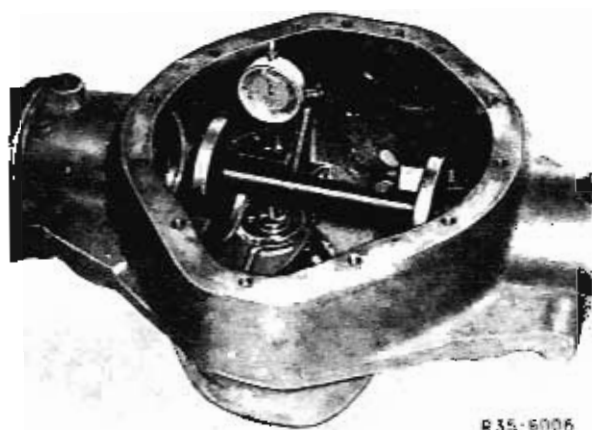


Fig. 12

5 Check basic dimension with reference to deviation written on ring gear.

E. g. 533/ - 2.

The first number (533) is the number of the gear assembly (bevel gear and ring gear). The second number (- 2) is in each case the deviation from the basic dimension in $1/10$ mm, therefore -0,20 mm.

Note: Starting July 1973, the deviation from basic dimension is indicated in mm.

Example gear assembly 533/-2 or 533/-0,20 starting July 1973.

| | |
|----------------------------|------------------|
| Basic dimension HL 4, HD 4 | 83,50 mm |
| Deviation on ring gear | <u>- 0,20 mm</u> |

| | |
|--|----------|
| Basic dimension to be adjusted for gear assembly 533 therefore | 83,30 mm |
|--|----------|

To obtain the basic dimension, a compensating washer thinner by 0,2 mm should be installed into axle housing behind inner tapered roller bearing (Fig. 3), which means that the distance from the

center of the ring gear to the face of the drive pinion should be **reduced** by 0,2 mm. For this purpose, remove and install drive again. If correctly installed, the pointers of the dial gauge inserted in the adjusting device will indicate the following value (Fig. 10). Large pointer ($\frac{1}{100}$ graduation) 20 (deflected toward the right) and small pointer 2,2 mm.

6. Secure threaded ring with locking plate upon completion of adjustments (Fig. 1).

| Adjusting Values | Nm | (kpcm) |
|--|-----------|-----------|
| Friction torque of tapered roller bearings | 1,5 – 3,6 | (15 – 36) |

| Tightening Torques | Nm | (kpcm) |
|-------------------------------|------------|----------|
| Collar nut to coupling flange | M 40 x 1,5 | 360 (36) |

| Special Tools | Nm | (kpcm) |
|----------------------------|------------------|--------|
| Socket wrench insert SW 50 | 000 589 12 09 00 | |
| Torque wrench | 000 589 62 09 01 | |
| Connection | 001 589 18 09 05 | |
| Mandrel | 312 589 15 15 00 | |
| Tester | 354 589 01 21 00 | |
| Holding wrench | 366 589 00 31 00 | |
| Puller | 000 589 45 33 00 | |
| Puller | 035 589 01 33 00 | |

Disassembling Drive Pinion

1 Remove locking ring from shaft stub by means of spreading pliers (Fig. 1).

2 Remove inner race of cyl. roller bearing from drive pinion with puller 000 589 45 33 00.



Fig. 1

35.4 Disassembly and Assembly of Drive Pinion

3 Screw holding wrench 366 589 00 31 00 to coupling flange of pinion and clamp tightly into a vise.

4 Unlock collar nut and unscrew from drive pinion with socket wrench insert SW 50, 000 589 12 09 00 (Fig. 2).

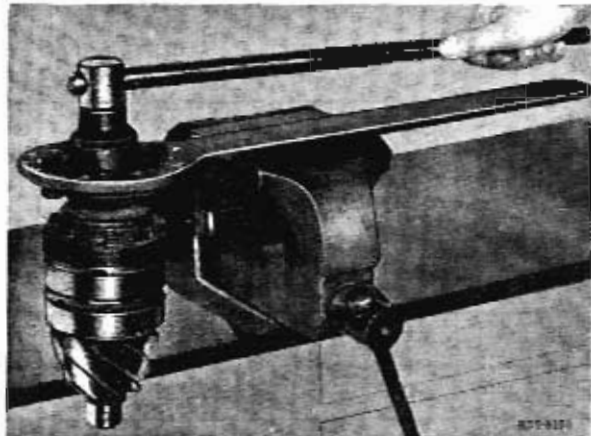


Fig. 2

5 Pull coupling flange from drive pinion with puller 035 589 01 33 00 (Fig. 3).

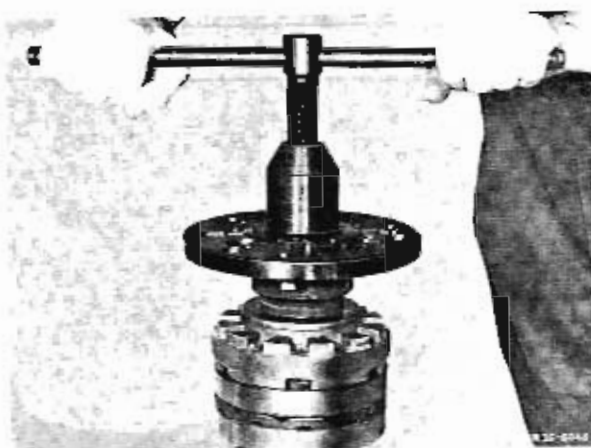


Fig. 3

6 Remove threaded ring with sealing ring, then thrust ring from drive pinion.

7 Remove tapered roller bearing of drive pinion with puller 000 589 45 33 00 (Fig. 4).

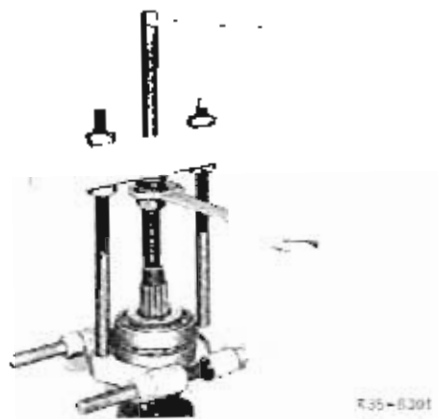


Fig. 4

Assembling Drive Pinion

Prior to assembly, clean all parts, check carefully for damage and wear, in particular bearings, bearing seats and pinion ring gear.

Replace worn parts.

Coat slide surfaces of all parts well with approved grease according to page 266.2 of Specifications for Service Products to avoid damage and facilitate installation.

Ring gear and drive pinion can be exchanged in pairs only, differential pinions and side gears individually.

Note: Each drive pinion and ring gear of a gear assembly is identified by means of an electrically written number. Install only gear assemblies having the same number. The identifications are on face of drive pinion and on bevel of ring gear.

1 Heat inner race of cyl. roller bearing to approx. 80° C, place on drive pinion shaft stub and secure with locking ring (Fig. 1).

2 Heat inner race with roller cage of inner tapered roller bearing to approx. 80° C and press-on by means of sleeve (Fig. 5).

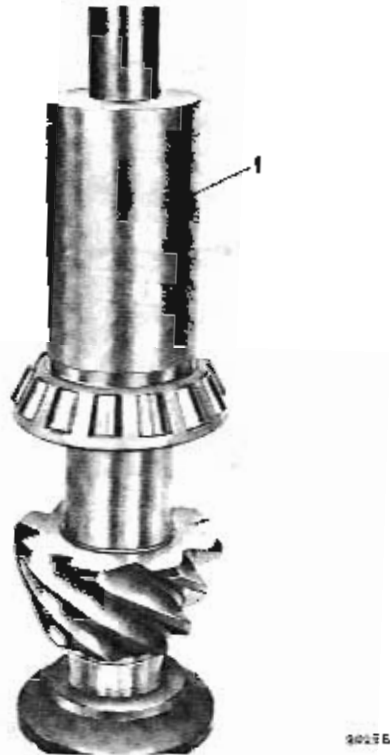


Fig. 5
1 Sleeve

4 Heat inner race with roller cage of outer tapered roller bearing to approx. 80° C and press-on with sleeve (Fig. 7).

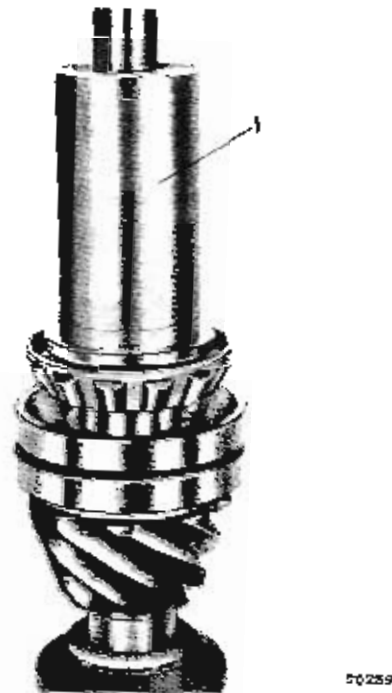


Fig. 7
1 Sleeve

3 Mount spacing ring and both outer races of inner and outer tapered roller bearing (Fig. 6).

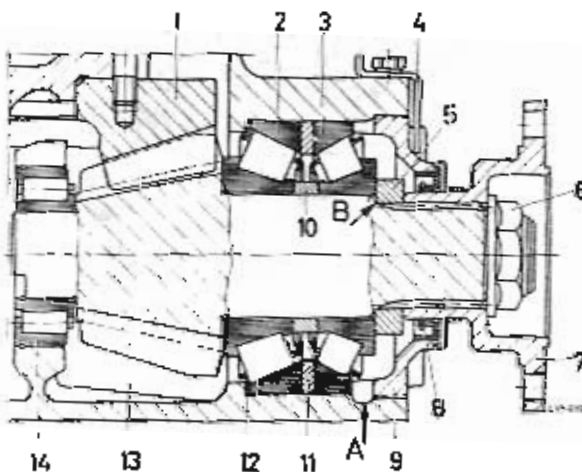


Fig. 6

| | |
|-----------------------------------|---------------------------------|
| 1 Ring gear | 9 Threaded ring |
| 2 Tapered roller bearing, inside | 10 Spacing ring |
| 3 Tapered roller bearing, outside | 11 Compensating ring (2 halves) |
| 4 Locking plate for threaded ring | 12 Compensating washer |
| 5 Thrust ring | 13 Drive pinion |
| 6 Collar nut | 14 Cyl. roller bearing |
| 7 Coupling flange | A = Oil groove |
| 8 Sealing ring | B = Chamfer |

5 Mount thrust ring.

6 Press radial sealing ring into threaded ring with mandrel 312 589 15 15 00 (Fig. 6).

Note: Starting with axle No. 2007 355 a Viton radial sealing ring with threads on sealing lip is installed as standard equipment. If the new radial sealing ring is installed in the event of repairs, make sure that a coupling flange without threads is installed on older axles.

7 Fill space between dust lip and sealing lip with grease.

8 Place threaded ring with radial sealing ring on outer tapered roller bearing.

9 Carefully slip coupling flange against stop on thrust ring on splining of drive pinion and screw-on collar nut (Fig. 6).

10 Screw holding wrench 366 589 00 31 00 to coupling flange. Clamp holding wrench with screwed-on drive tightly into vise and support drive,

35.4 Disassembly and Assembly of Drive Pinion

if required. Tighten collar nut of pinion shaft with socket wrench insert SW 50, 000 589 12 09 00, torque wrench 000 589 62 09 01 and connection 001 589 18 09 05 to specified torque (Fig. 8) and secure (peen collar).

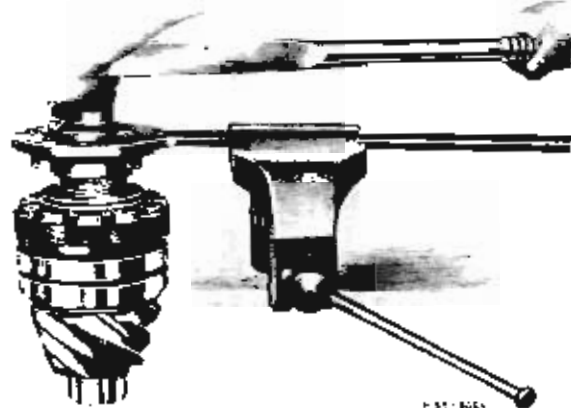


Fig. 8

11 Fit compensating rings in-between the two tapered roller bearings (Fig. 9).

The compensating rings are supplied as complete rings in 0,02 mm steps but they are provided with a lateral parting joint above the ring groove for easier separation.

Note: Compensating rings should fit tightly in-between the two tapered roller bearing outer races, but insertion should be possible without excessive pressure. To determine the correct compensating ring, take two complete rings of uniform thickness and try by introducing rings in-between the tapered roller bearing outer races (Fig. 9).

Separate selected ring at provided joints and round-off sharp edges.

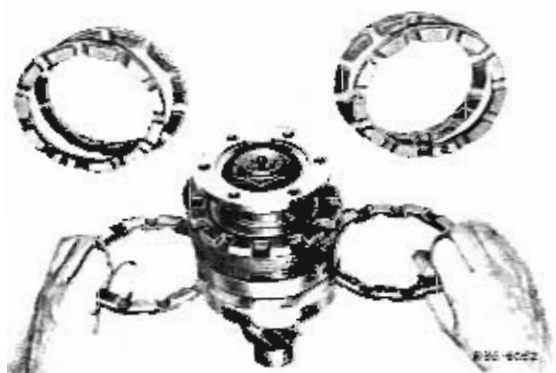


Fig. 9

12 Insert split compensating ring (Fig. 10) and check whether tapered roller bearings can still be rotated manually.



Fig. 10

1 Split compensating ring

13 Place clamp (included in scope of delivery of tester 354 589 01 21 00) around tapered roller bearing of drive and clamp into a vise in such a manner that the clamp will hold the outer rings of the two tapered roller bearings (Fig. 11).

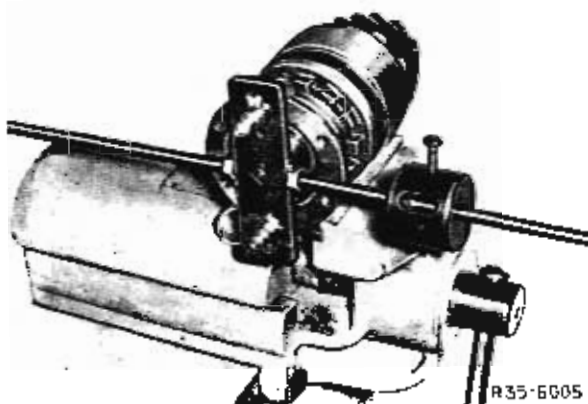


Fig. 11

14 Place tester 354 589 01 21 00 on coupling flange and screw down (Fig. 11). Determine friction torque with slide weight on scale beam. The friction torque (not tearing-off torque) should be between 1,5-3,6 Nm (15-36 kpcm). This corresponds to a preload of 0-0,02 mm.

if the weighing shows that the friction torque is less than 1,5 Nm (15 kpcm) or more than 3,6 Nm (36 kpcm) insert a thicker or a thinner compensating ring. Repeat until the balanced friction torque is between the specified values.

Special Tools

| | |
|--------------|------------------|
| Thrust piece | 312 589 00 15 00 |
| Puller | 000 589 19 33 00 |

Removing and Disassembling Differential Lock.

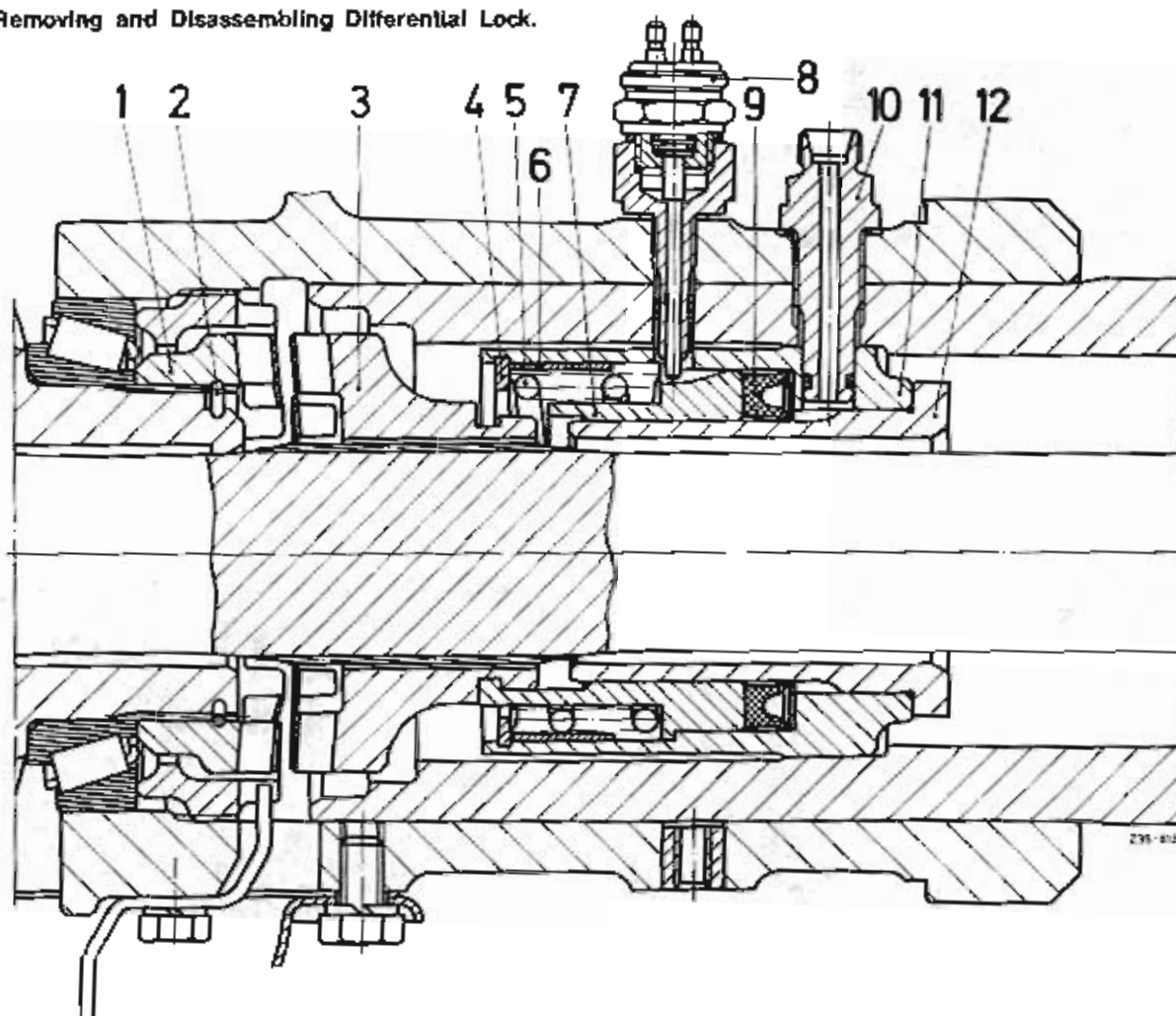


Fig. 1

- | | |
|----------------------|------------------------------|
| 1 Slotted coupling | 7 Piston |
| 2 Wire ring | 8 Pressure switch |
| 3 Shift sleeve | 9 Piston seal |
| 4 Locking ring | 10 Compressed air connection |
| 5 Compression spring | 11 Shift cylinder |
| 6 Spacing sleeve | 12 Cylinder bushing |

35.4 Removal and Installation of Differential Lock

1 Remove ring gear with differential (S7 I-404).

2 Compress wire ring with pliers and remove slotted coupling (Fig. 2).

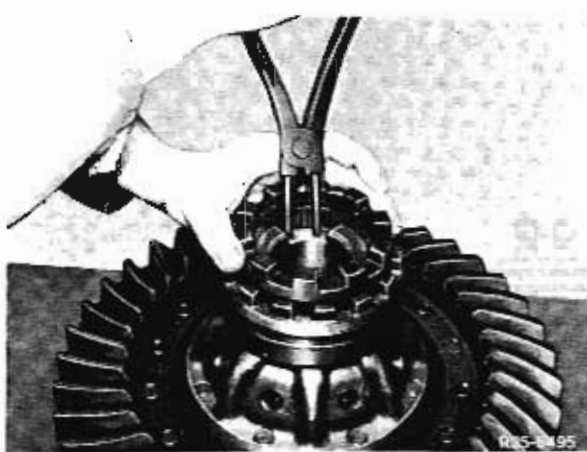


Fig. 2

3 Unscrew pressure switch and compressed air connection (Fig. 3).

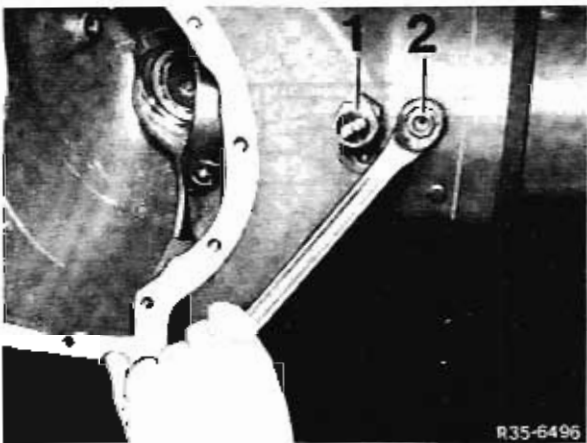


Fig. 3

1 Pressure switch 2 Compressed air connection

4 Remove differential lock from rear axle housing.

5 Unsnap locking ring (Fig. 4) and remove piston with spacing sleeve, compression spring and shift sleeve.

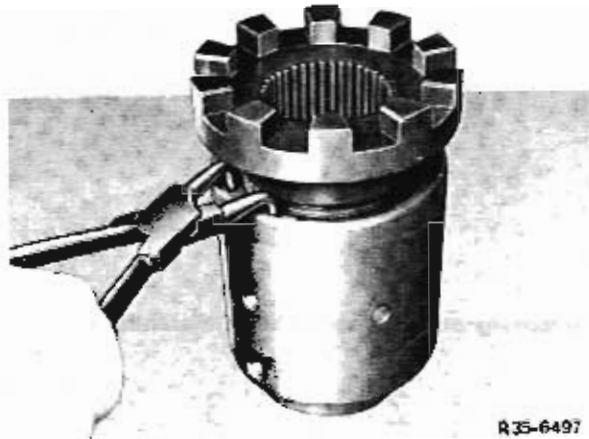


Fig. 4

6 Clamp shift sleeve into a vise, turn compression spring so that piston can be pushed sideways and remove (Fig. 5). Remove piston, compression spring, spacing sleeve and locking ring.

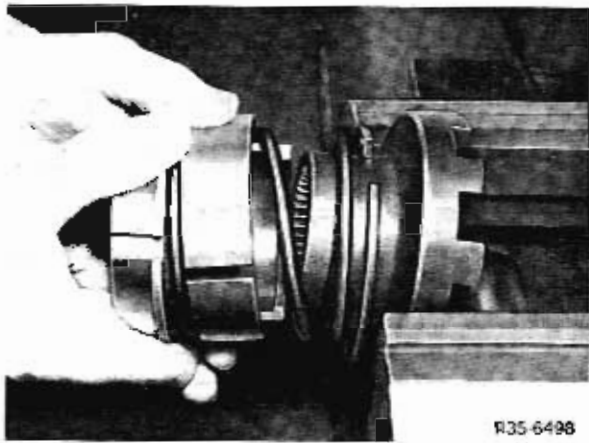


Fig. 5

7 Force cyl. pin out of shift cylinder (Fig. 6).

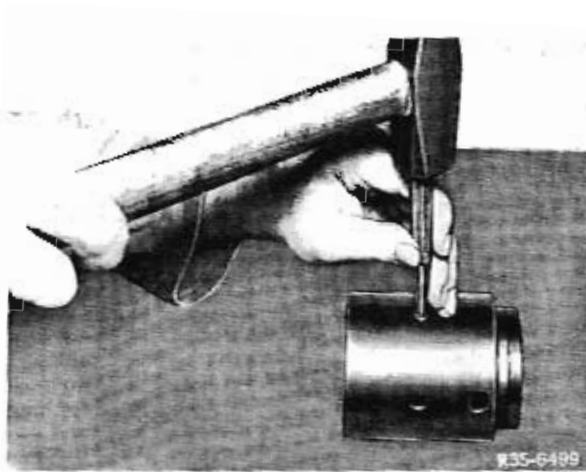


Fig. 6

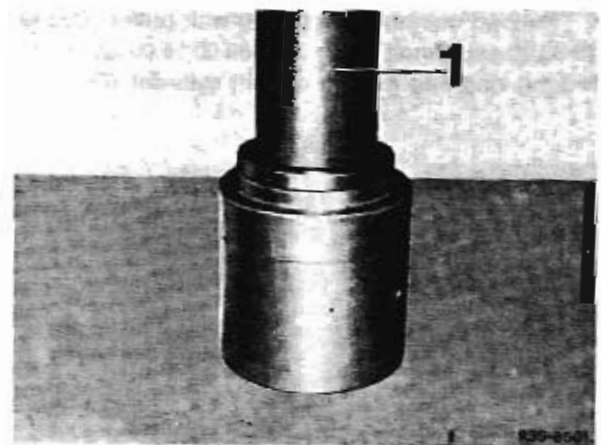


Fig. 8

1 Press die

8 Press cyl. bushing out of shift cylinder (Fig. 7) and remove piston seal.

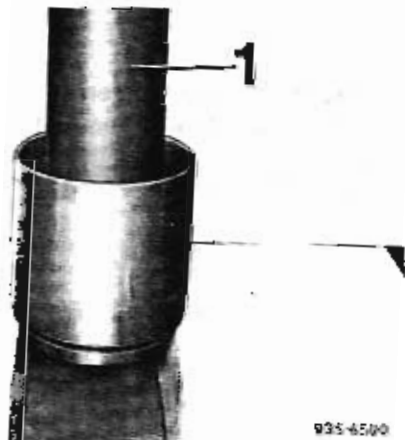


Fig. 7

1 Press die

3 Force cyl. pin into shift cylinder (Fig. 6).

4 Clamp shift sleeve into a vise, mount locking ring. Mount compression spring and spacing sleeve on piston and introduce piston into shift sleeve, turning compression spring in such a manner that the shift sleeve can be introduced by pushing compression spring laterally (Fig. 5).

5 Introduce piston into shift cylinder so that cyl. pin of shift cylinder enters groove of piston (Fig. 9).

9 Clean all parts and check for wear.

Assembling and Installing Differential Lock

1 Press cyl. bushing into shift cylinder (Fig. 8).

2 Install piston seal into shift cylinder.



Fig. 9

1 Groove of piston

2 Cyl. pin

35.4 Removal and Installation of Differential Lock

6 Preload compression spring with puller 000 589 19 33 00 and thrust piece 312 589 00 15 00 and snap locking ring into groove of shift cylinder (Fig. 10).

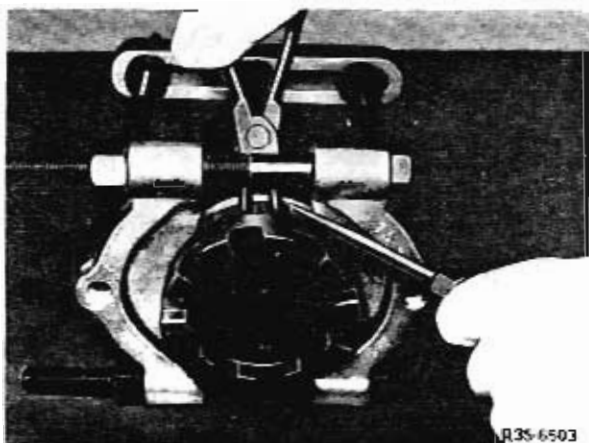


Fig. 10

7 Introduce differential lock into rear axle housing in such a manner that the compressed air connection can be screwed into bore of shift cylinder.

8 Screw-in compressed air connection and pressure switch (Fig. 3).

Note: Prior to screwing-in compressed air connection, make sure that sealing ring is mounted (Fig. 11).

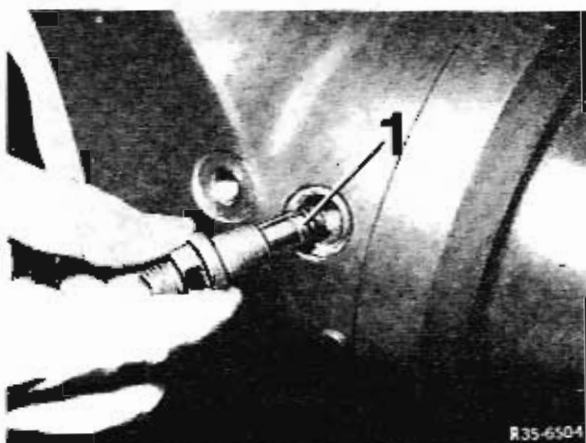


Fig. 11

9 Place slotted coupling on splining of differential housing, compress wire ring with pliers while simultaneously introducing slotted coupling until wire ring engages (Fig. 2).

10 Install ring gear with differential (35.4-464).

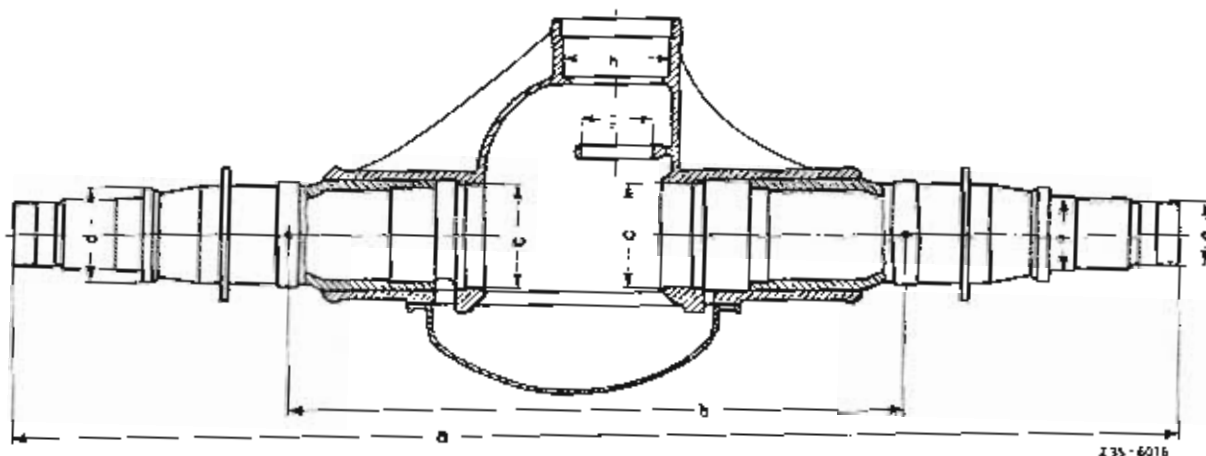


Fig. 1

Rear Axle Housing with Supporting Tube

| Part. No. | a | b | c dia. | d dia. | e dia. | f dia. | g dia. | h dia. |
|---------------|------|---------|--------------------|--------------------|------------------|------------------|--------|---------|
| 322 350 62 20 | 1936 | 1050 ±1 | 120,016 119,994 | 110,000 109,913 | 64,990 64,977 | 79,990 79,979 | | |
| 352 350 16 20 | 1963 | 1050 ±1 | 120,016 | 115,000 | 69,990 | 84,988 | 79,995 | 135,018 |
| 352 350 20 20 | | | 119,994 | 114,913 | 69,977 | 84,966 | | |
| 352 350 28 20 | | | | | | | | |
| 352 350 34 20 | 2110 | - | | 120,000 | 74,990 | 94,988 | 79,976 | 134,993 |
| 352 350 35 20 | | | 120,034 | 119,913 | 74,971 | 94,966 | | |
| 352 350 37 20 | 1963 | | 120,012 | 115,000 114,913 | 69,990 69,977 | 84,984 84,966 | | |
| 358 350 00 20 | 1936 | 1050 ±1 | 120,016 119,994 | 110,000 | 64,990 | 79,990 | | |
| 358 350 04 20 | | | | | 109,913 | 64,977 | 79,979 | |
| 360 350 02 20 | 2004 | | | 125,000 124,900 | 69,990 69,977 | 92,069 92,044 | | |
| 360 350 15 20 | | | 2040 | 120,034 | 120,000 | 74,990 | 94,988 | |
| | | | | 120,012 | 119,913 | 74,971 | 94,966 | |

35.4 Checking Axle Components

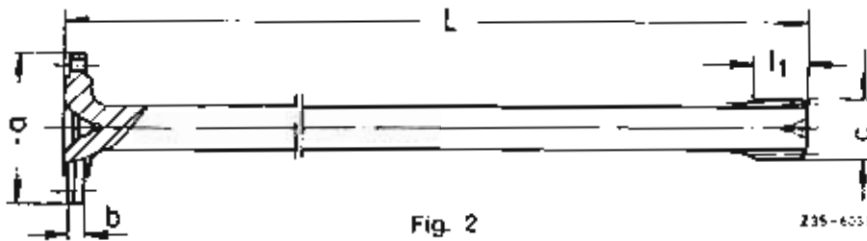


Fig. 2

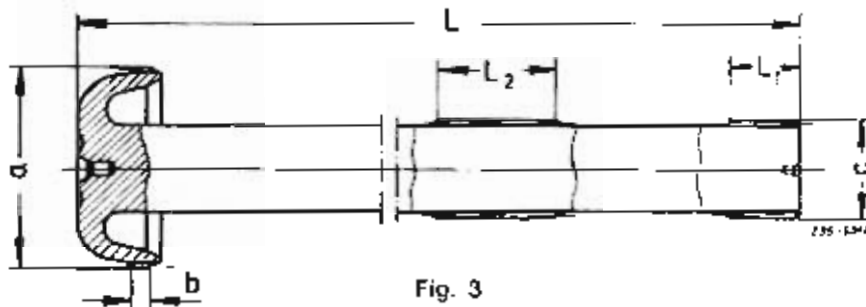


Fig. 3

Rear Axle Shaft

| Part. No. | L | L ₁ | L ₂ | a dia. | b | c dia. | Fig. No. |
|---------------|----------------------|----------------|----------------|------------------|---------------------|-------------------------|----------|
| 302 357 00 01 | 1004 $^{+1}_{-0.5}$ | 40 $^{+1}$ | — | 113,4 $_{-0.2}$ | 16 $_{-0.2}$ | $\frac{51,250}{51,060}$ | 2 |
| 322 357 04 01 | 973 $^{+1}_{-0.5}$ | 50 $^{+1}$ | — | 137 | 11 $^{+0.3}_{-0.2}$ | $\frac{48,750}{48,590}$ | |
| 352 357 04 01 | 985 $^{+1}_{-0.5}$ | 40 $^{+1}$ | — | 113,4 $_{-0.2}$ | 16 $_{-0.2}$ | $\frac{51,250}{51,060}$ | |
| 352 357 07 01 | 984 $^{+1}_{-0.5}$ | | | | | | |
| 352 357 09 01 | — | | 59 | | | | |
| 352 357 10 01 | 1094 $^{+1}_{-0.5}$ | | — | | | | |
| 352 357 11 01 | 985,5 $^{+1}_{-0.5}$ | | 59 | | | | |
| 360 357 09 01 | 1006 ± 0.5 | — | — | 141,75 $_{-0.2}$ | 18 | — | 3 |
| 360 357 10 01 | 1026 ± 0.5 | | | | | | |
| 360 357 11 01 | 1116 ± 0.5 | | | | | | |

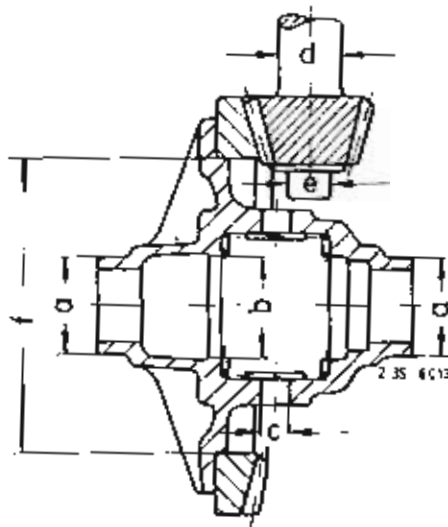


Fig. 4 Differential housing with gear assembly

Differential Housing

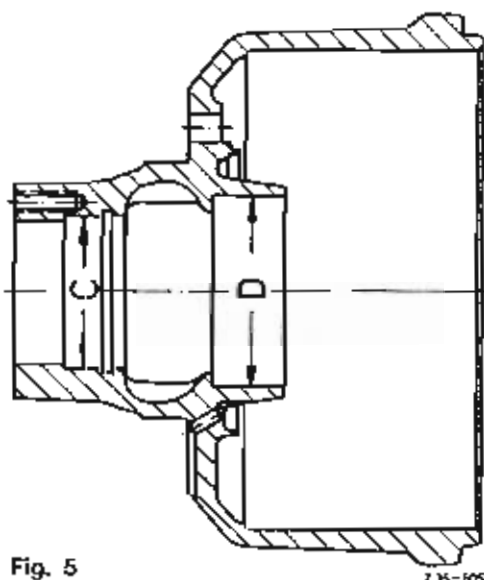
| Part. No. | a dia. | b dia. | c dia. | f dia. |
|---------------|----------------------------|-------------------------|-------------------------|---------------------------|
| 322 350 09 27 | $\frac{69,906}{69,893}$ | $\frac{67,046}{67,000}$ | $\frac{25,052}{25,000}$ | $\frac{205,016}{204,987}$ |
| 352 350 02 27 | $\frac{69,906^1)}{69,893}$ | $\frac{67,000}{67,000}$ | $\frac{25,000}{25,000}$ | $\frac{204,987}{204,987}$ |

¹⁾ $\frac{77,844}{77,831}$ on differential housing cover.

Gear Assembly

| Part. No. | $Z_2 : Z_1$ | d dia. | e dia. | f dia. |
|---------------|-------------|-------------------------|-------------------------|---------------------------|
| 302 350 11 39 | 39 : 6 | $\frac{60,015}{60,002}$ | $\frac{35,013}{35,002}$ | $\frac{205,029}{205,000}$ |
| 322 350 18 39 | 48 : 7 | | | |
| 322 350 21 39 | 40 : 7 | | | |
| 352 350 02 39 | 43 : 7 | | | |

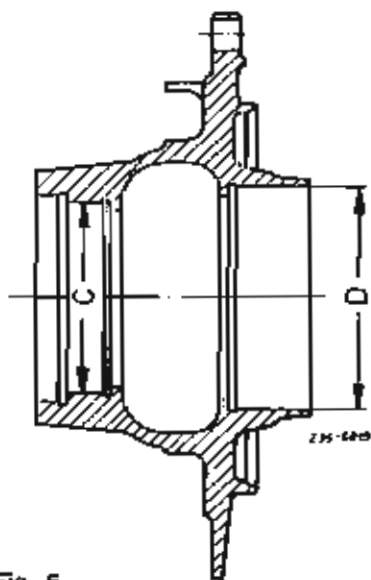
35.4 Checking Axle Components



Brake Drum Hub

| Part. No. | C dia. | D dia. | Brake drum dia. mm | | |
|---------------|---------|---------|--------------------|-----------|-------------|
| | | | Normal | Rep. SL I | Rep. St. II |
| 321 356 03 02 | 119,990 | 139,952 | 408 ±0,1 | 410 ±0,1 | 412 ±0,1 |
| 358 356 01 02 | 119,955 | 139,912 | 418 ±0,1 | 420 ±0,1 | 422 ±0,1 |

Wheel Hub



| Part. No. | C dia. | D dia. |
|---------------|---------|---------|
| 322 356 05 01 | 119,990 | 139,988 |
| | 119,955 | 139,948 |
| 322 356 12 01 | 124,988 | 149,988 |
| | 124,948 | 149,948 |
| 352 356 04 01 | 124,952 | 149,950 |
| | 124,912 | 149,910 |
| 360 356 02 01 | 124,988 | 149,988 |
| | 124,948 | 149,948 |
| 370 356 01 01 | 129,952 | 144,950 |
| | 129,912 | 144,910 |

Fig. 6

Brake Drum

| Part. No. | Brake drum dia. mm | | |
|---------------|--------------------|--------------|---------------|
| | Normal | Rep.-Stage I | Rep.-Stage II |
| 302 423 00 01 | 418 ±0,1 | 420 ±0,1 | 422 ±0,1 |
| 352 423 00 01 | | | |
| 360 423 01 01 | | | |

Brake Lining

| Part. No. | Rep.-Stages | Lining thickness | Lining width | Minimum lining thickness |
|---|-------------------------------------|--|--------------|--------------------------|
| 322 423 00 10 322 423 01 10 322 423 02 10 | normal Rep. St. I Rep. St. II | 10,3 ^{+0,3} 11,3 ^{+0,3} 12,3 ^{+0,3} | 100 ±0,5 | 4 |
| 341 423 00 10 341 423 01 10 341 423 02 10 | normal Rep. St. I Rep. St. II | 15,3 ^{-0,3} 16,3 ^{-0,3} 17,3 ^{-0,3} | 120 ±0,5 | 5,5 |
| 352 423 00 10 352 423 01 10 352 423 02 10 | normal Rep. St. I Rep. St. II | 15,3 ^{-0,3} 16,3 ^{-0,3} 17,3 ^{-0,3} | 140 ±0,5 | |
| 360 423 13 10 360 423 14 10 360 423 15 10 | normal Rep. St. I Rep. St. II | 15,7 ^{-0,3} 16,7 ^{-0,3} 17,7 ^{-0,3} | 160 ±0,5 | |

Removal and Installation of Intermediate Shaft Through-Drive 35.4

HL 4

Adjusting Values

| | |
|--------------------------|------|
| Preload on taper bearing | 0,05 |
|--------------------------|------|

Tightening Torques

| | | | Nm | (lpm) |
|-------------------------------|------------|-----|-----|-------|
| Fastening screws for flange | M 14 x 1,5 | 8.8 | 140 | (14) |
| Collar nut to coupling flange | M 40 x 1,5 | | 360 | (36) |

Special Tools

| | |
|-----------------|------------------|
| Torque wrench | 000 589 62 09 01 |
| Torque wrench | 000 589 39 21 00 |
| Holding wrench | 366 589 00 31 00 |
| Internal puller | 000 589 30 33 00 |
| Countersupport | 000 589 34 33 00 |
| Puller | 000 589 65 33 00 |
| Puller | 000 589 89 33 00 |
| Special pliers | 000 589 27 37 00 |

Removing Intermediate Shaft

1 Unlock both collar nuts on intermediate shaft (Fig. 1).

2 Attach holding wrench 366 589 00 31 00 to front coupling flange and unscrew both collar nuts with socket wrench insert (Fig. 2).

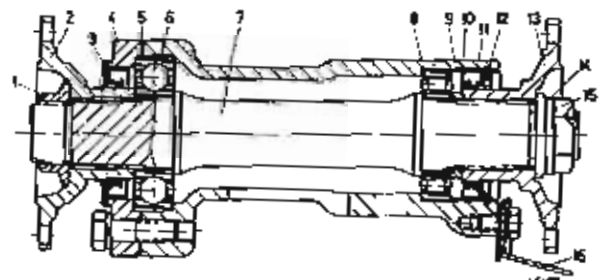


Fig. 1

- | | |
|----------------------------|----------------------------|
| 1 Collar nut (new version) | 10 Spacing ring, inside |
| 2 Coupling flange, front | 11 Sealing ring |
| 3 Sealing ring | 12 Locking ring |
| 4 Bearing cap | 13 Coupling flange, rear |
| 5 Compensating washer | 14 Washer (old version) |
| 6 Taper bearing | 15 Collar nut |
| 7 Intermediate shaft | 16 Rear axle housing cover |
| 8 Cyl. roller bearing | |
| 9 Spacing ring, outside | |

35.4 Removal and Installation of Intermediate Shaft Through-Drive

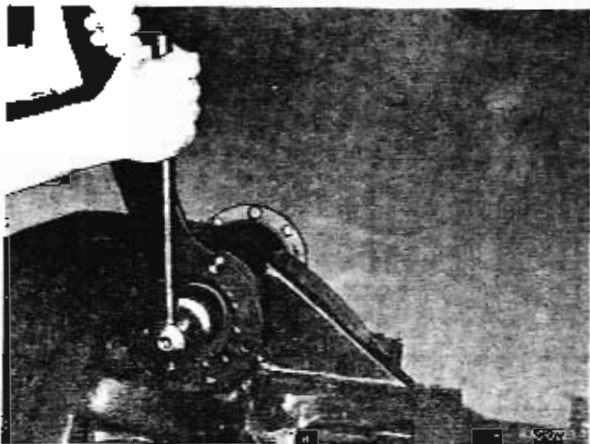


Fig. 2

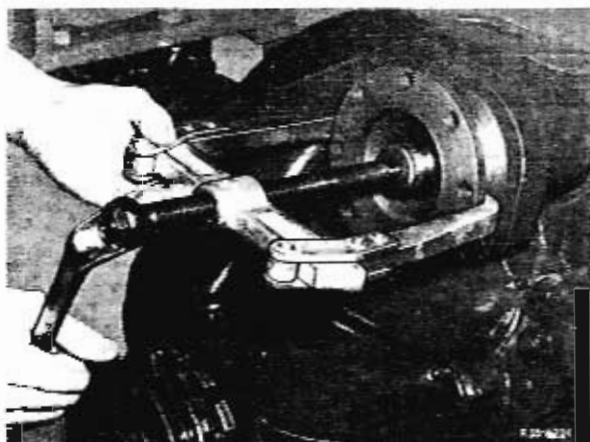


Fig. 3

3 Pull front and rear coupling flange from intermediate shaft with puller 000 589 89 33 00 (Fig. 3).

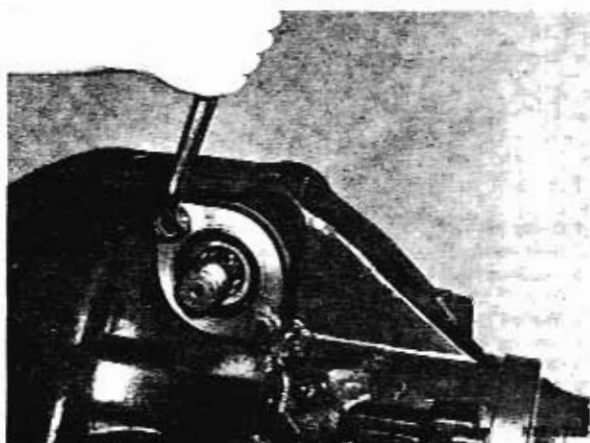


Fig. 4

4 Unscrew bearing cap screws (Fig. 4) and remove bearing cap with sealing ring and compensating washers (Fig. 1). Press-out sealing ring with mandrel.

5 Knock inner race of cyl. roller bearing and inner spacing ring out of axle housing by means of light blows with a plastic hammer against rear shaft end of intermediate shaft with taper bearing (Fig. 5).

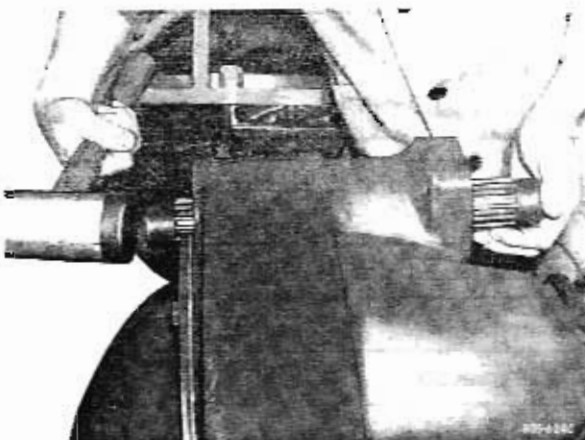


Fig. 5

6 Pull-off inner race of cyl. roller bearing with conventional puller (Fig. 6) and taper bearing with puller 000 589 65 33 00.

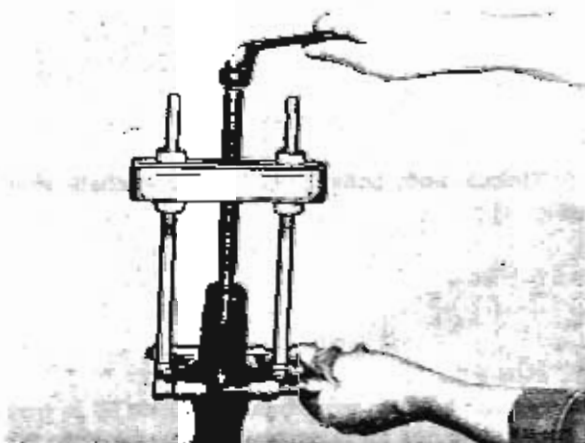


Fig. 6

Removal and Installation of Intermediate Shaft Through-Drive 35.4

7 Remove locking ring for locating rear shaft bearing and pull sealing ring, outer spacing ring and cyl. roller bearing out of axle housing by means of internal puller 000 589 30 33 00 and countersupport 000 589 34 33 00 (Fig. 7).

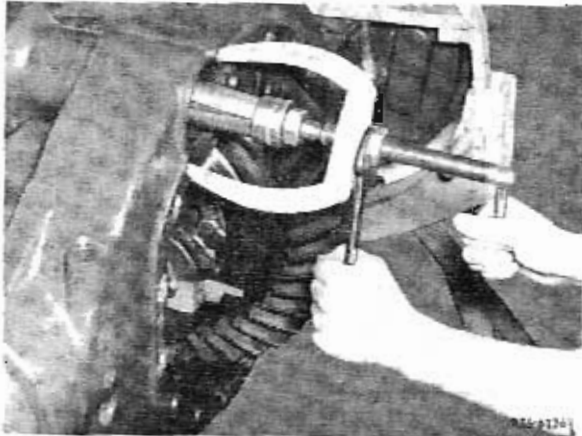


Fig. 7

2 Insert outer spacing ring into housing.

3 Press-in radial sealing ring with mandrel and insert locking ring with special pliers 000 589 27 37 00 (Fig. 9).



Fig. 9

4 Heat taper bearing and inner race of cyl. roller bearing to approx. 80° C and press on intermediate shaft by means of mandrel (Fig. 10).

Installing Intermediate Shaft

1 Force outer race with roller assembly of cyl. roller bearing into intermediate shaft housing by means of mandrel (Fig. 8).

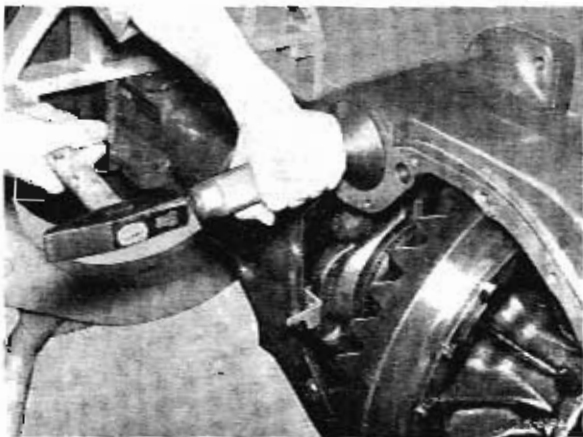


Fig. 8

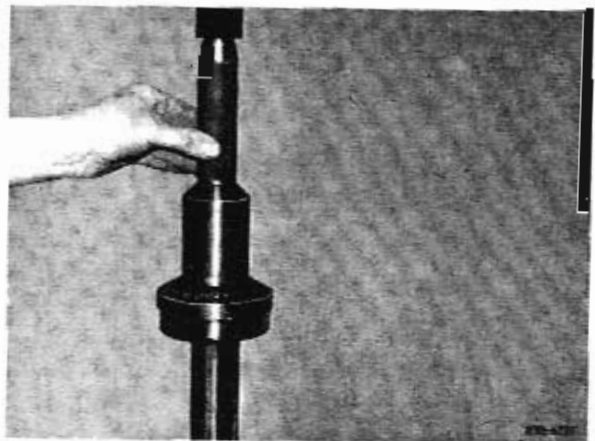


Fig. 10

5 Slip intermediate shaft into housing from the front making sure that the taper bearing rests against housing without clearance. If required, place mandrel on taper bearing and force-in intermediate shaft (Fig. 11).

35.4 Removal and Installation of Intermediate Shaft Through-Drive

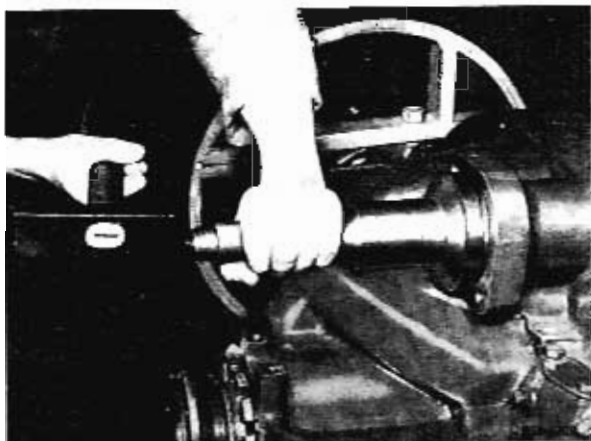


Fig. 11

6 Press radial sealing ring into bearing cap or flange by means of mandrel.

Note: On type designation 352.4 starting with axle No. 450 and 360.4 starting with axle No. 200, the bearing cap (Fig. 12 Item 2) has been replaced by a reinforced flange (Fig. 13 Item 2). The compensating washers and the coupling flange were simultaneously modified. In the event of repairs on through-drive, try installing the new version only. The parts can be exchanged complete only.

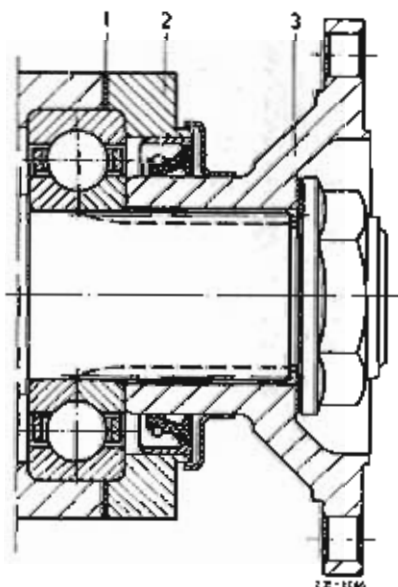


Fig. 12

- 1 Compensating washers Part No.
 343 413 05 52 } optional
 343 413 06 52 }
 343 413 07 52 }
 2 Bearing cap Part No. 361 351 00 11
 3 Coupling flange Part No. 360 350 05 45

7 Screw bearing cap (old version) to housing without compensating washers, screw flange (new version) to housing with compensating washers.

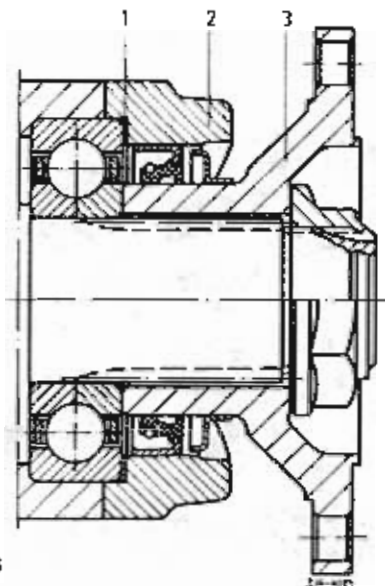


Fig. 13

- 1 Compensating washers Part No.
 312 353 13 52 } optional
 312 353 14 52 }
 312 353 32 52 }
 2 Flange Part No. 352 351 01 49
 3 Coupling flange Part No. 360 350 03 45

8 Measure distance between bearing cap and housing or flange and housing with slip gauge (Fig. 14). Select compensating washers in such a manner that the taper bearing is under a preload of 0,05 mm.

Compensating washers are available as follows:

Old version: 0,1, 0,25 and 0,4 mm thick

New version: 0,1, 0,2 and 0,5 mm thick

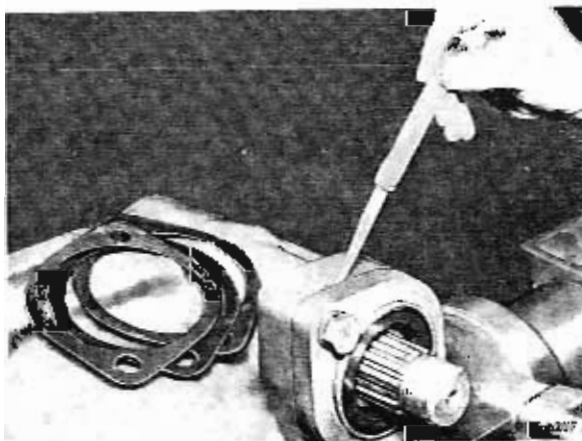


Fig. 14

Removal and Installation of Intermediate Shaft Through-Drive 35.4

Note: For better sealing, a round cord ring Part No. 002 997 51 48 will be installed on flange (Fig. 15) starting with axle No. 2061 666. This round cord ring can also be installed into older axles, if the flange is refinished according to Fig. 16.

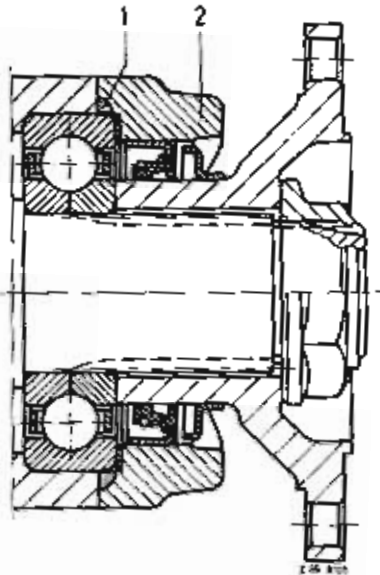


Fig. 15

- 1 Round cord ring 002 997 51 48
- 2 Flange 352 351 01 49

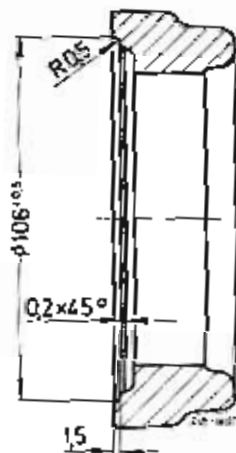


Fig. 16

9 Tighten fastening screws of flange with torque wrench 000 589 62 09 01 to specified torque.

10 Slip front and rear coupling flange with inner spacing ring on splining of intermediate shaft, making sure that the hole patterns of the two flanges are accurately aligned (Fig. 1).

11 Screw-on collar nuts manually (Fig. 1).

12 Attach holding wrench 366 589 00 31 00 with two screws to front coupling flange, tighten both collar nuts with torque wrench 000 589 39 21 00 to specified torque and secure by peening collar (Fig. 17).

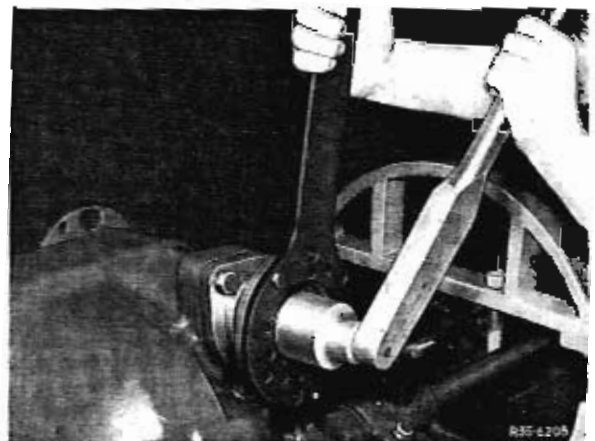


Fig. 17

