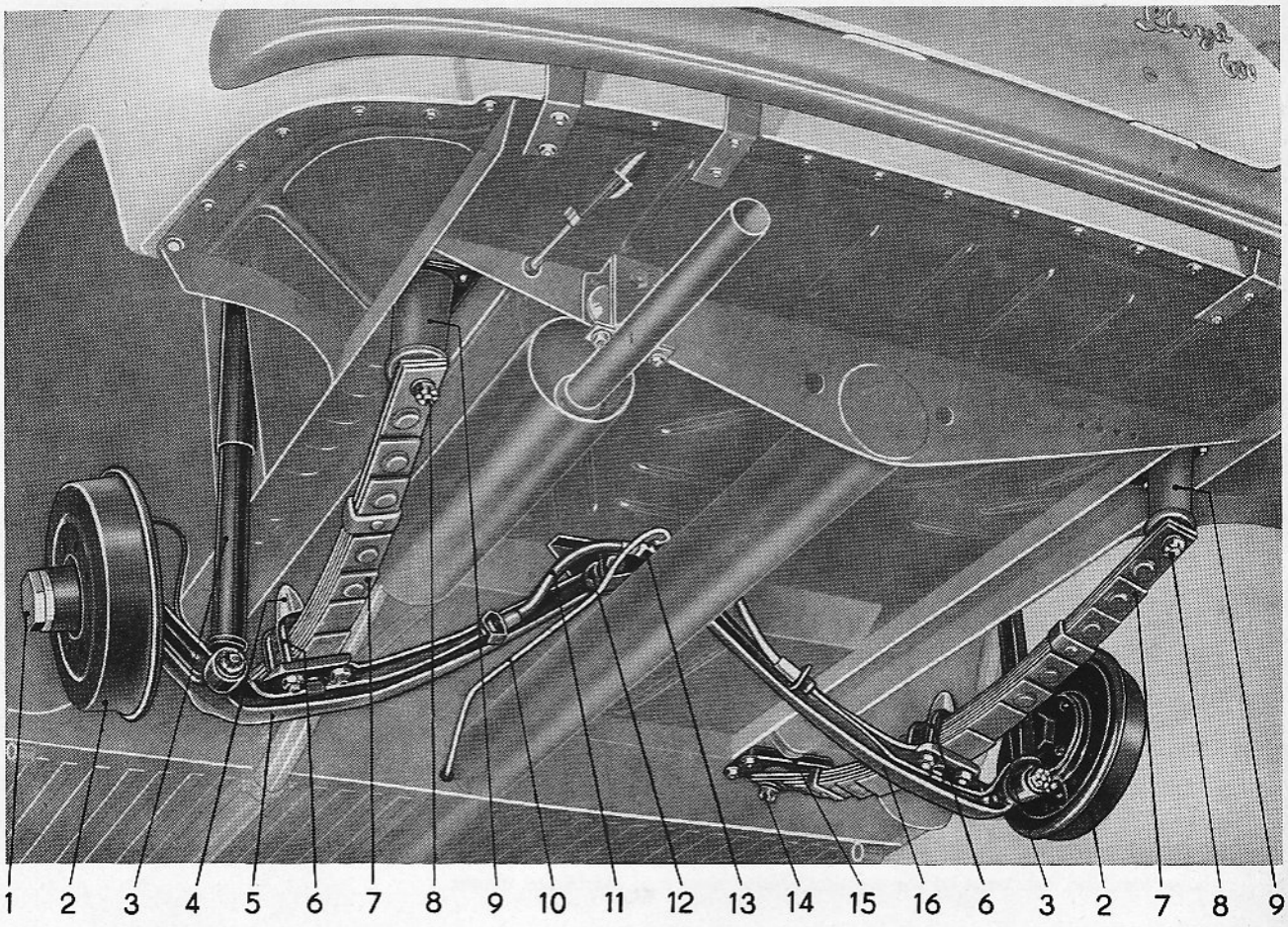
Rear Axle

Main Group RA

Rear axle

Swing axle with leaf spring

1 – Sub group	Swing axle with leaf spring
2 – Sub group	Trailing axle with coil spring
3 – Sub group	Allignment of rear axle
4 – Sub group	Auxiliary tools for self-manufacturing
5 – Sub group	Additional remarks



1 - 1/1

1. Screw cap
2. Brake drum
3. Shock absorber
4. Rubber bumper
5. Rear axle L. H.
6. Spring U-bolt
7. Rear spring with rubber plates
8. Castle nut with washer
9. Support rear spring
10. Brake line, master cylinder – distributor
11. Brake hose
12. Suspension at central tube
13. Distributor brake line
14. Ball joint with washer and castle nut
15. Rubber cushioned mounting bracket
16. Rear axle R. H.

Swing axle with leaf spring

General

All LLOYD vehicles, LP/LS 600, ALEXANDER and LT/LTK 600, are fitted with swing rear axles and semi-elliptical leaf springs. The swing axles are swivel arm mounted in rubber silent blocs at the central tubes and connected to the leaf spring by U-bolts. The springs are supported at the front with a ball joint in a rubber cushioned bracket and at the rear by a rubber support. The springs also control the wheel position. Vehicles LP/LS 600 up to chassis No. 6/293 408 and LT/LTK 600 are fitted with a spring guide instead of the rear rubber support. The axle pivots are pressed in and welded to the rear axle unit. Rear wheel hubs are running on two grooved ball bearings which are held with a distance bush and castle nut on the pivot. Double acting shock absorbers connected to axle and body keep the vibration of the car to a minimum.

Remarks and maintenance work

Spring suspension

The spring guides of the rear axle (LT/LTK 600 and LP/LS 600 up to chassis No. 6/293 408) are to be greased with graphite grease every 3000 km = 1875 miles.

Springs

Spray leaf springs every 6000 km = 3700 miles with graphitized oil. This task must be performed on an unloaded vehicle.

Rear wheel bearing

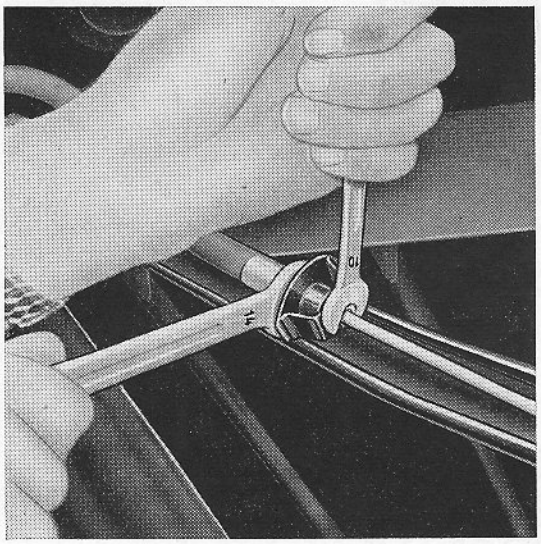
Grease ball bearings every 6000 km = 3700 miles with new universal grease. Remove old grease first and do not overfeed the hub caps as the surplus grease may foul the brake drums.

Removal and refitting of swing axle

Removal

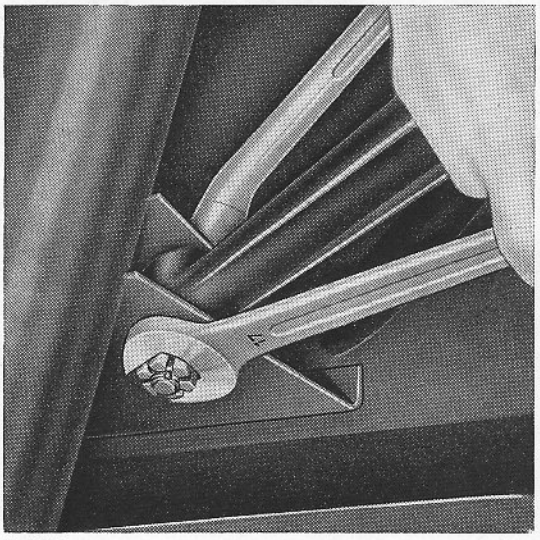
1. Apply hand brake, detach hub cap, slacken wheel studs, jack up vehicle and remove wheel.

2. Loosen brake line with O. J. spanner SW 10. When loosening hold nut with O. J. spanner SW 14 to avoid twisting of the hose. (Fig. 1 - 3/1).
   Close the connections with plugs for protection against foreign matters.



1 - 3/1

3. Remove split pin and slacken castle nut with O. J. spanner SW 17. Remove bolts (Fig. 1 - 3/2).



1 - 3/2

4. Disconnect shock absorber from body and axle (see also page 1 - 8).

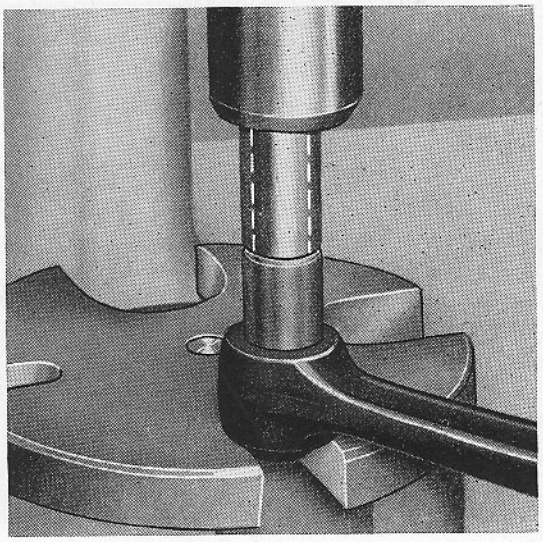
5. Loosen U-bolts (four hex. nuts SW 14). Remove hose bracket and detach swing axle.

Refitting

Reassemble in reversed order observing following points:

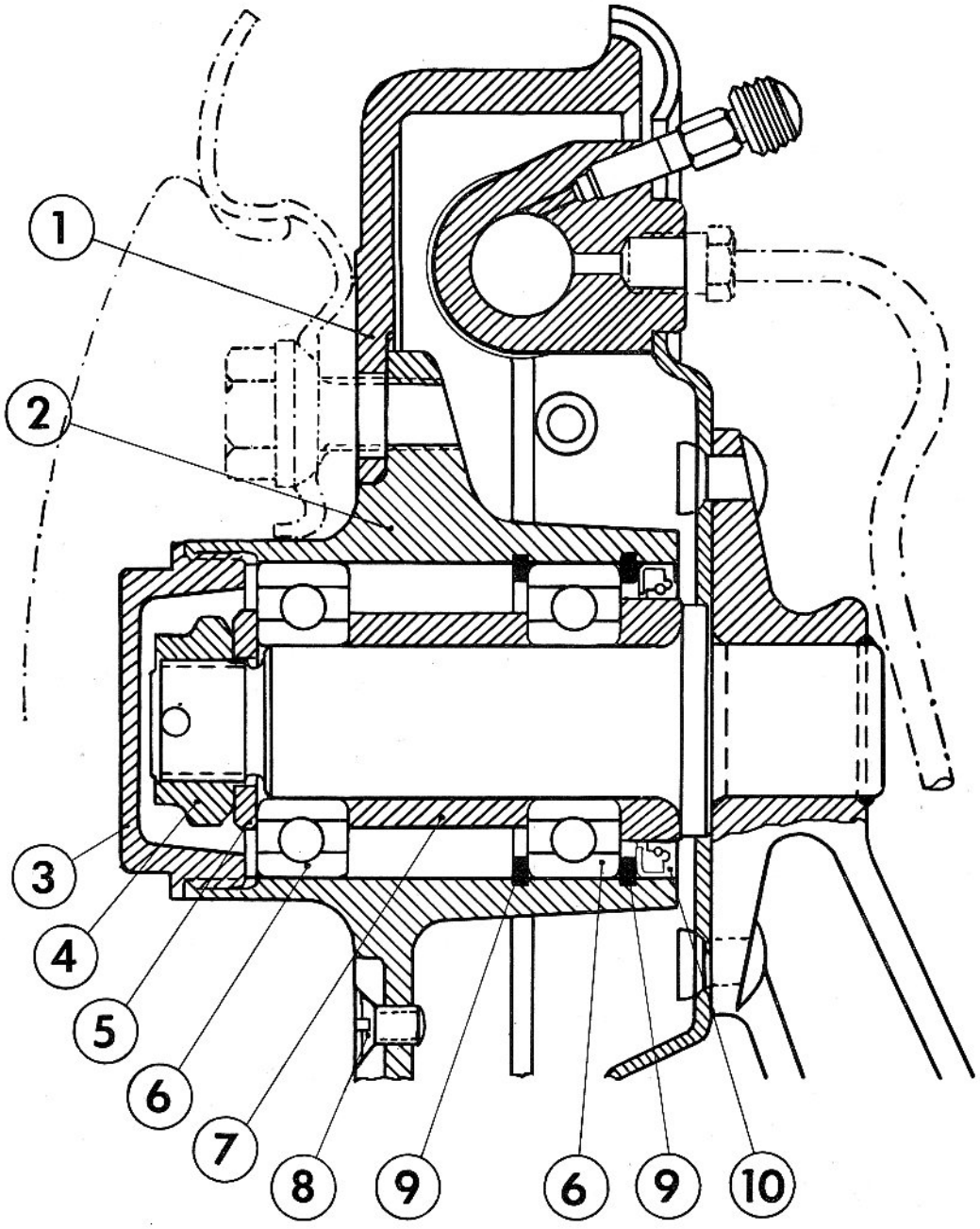
1. Replace defective or worn silent bloc by means of a press and tube with an exterior diameter of 21,5 – 22 mm (0,85") (Fig. 1 - 3/3).

2. Bleed brake system after reconnecting brake hose.



1 - 3/3

Rear wheel hub



1. Brake drum
2. Wheel hub
3. Hub cap
4. Castle nut M 20
5. Washer
6. Grooved ball bearing 6205
7. Distance bush
8. Counter sunk screw AM 6 x 10
9. Locking ring 52 x 2
10. Oil seal B 40 x 52 x 7

Rear wheel hub – removal and refitting

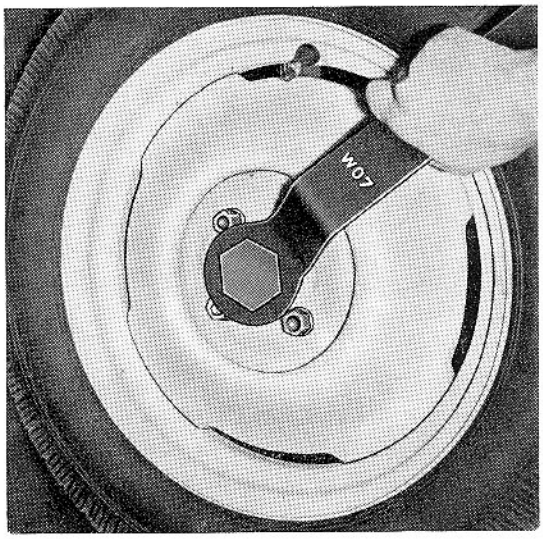
The following special tools are required:

WO 2 Extractor rear wheel hub

WO 7 Spanner for screw cap

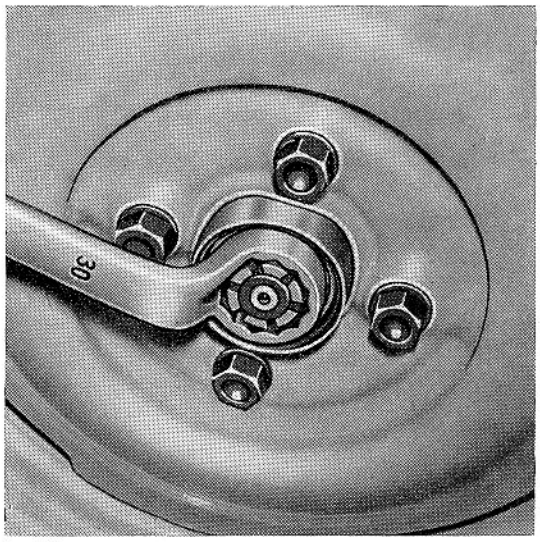
Removal

1. Apply hand brake, remove hub cap and slacken screw cap with special spanner WO 7 or ring spanner SW 50 (Fig. 1 - 5/1).



1 - 5/1

2. Remove split pin and loosen castle nut (ring spanner SW 30) (Fig. 1 - 5/2).



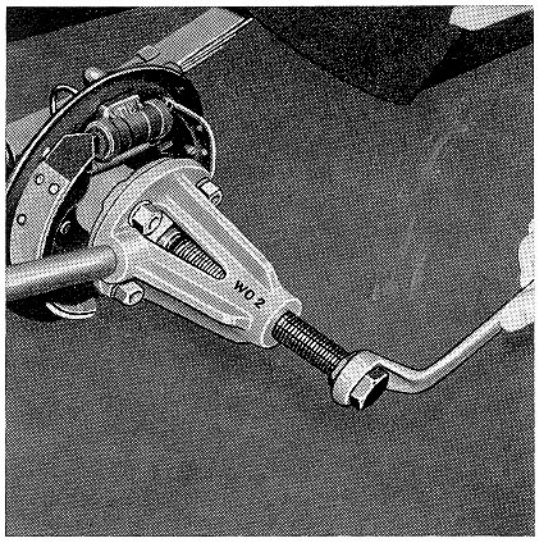
1 - 5/2

3. Slacken wheel studs, jack up vehicle and remove wheel.

4. Open counter sunk screw and remove brake drum.

5. Attach extractor WO 2 by means of wheel studs, secure extractor against twisting by a punch, remove hub (Fig. 1 - 5/3).

6. Inspect all bearings for wear, if damaged, remove the outer bearing carefully by aid of a copper punch to prevent damage of hub (bearing seat).



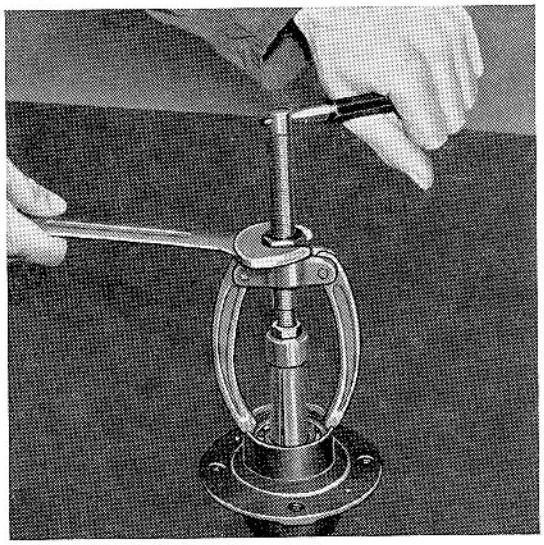
1 - 5/3

Refitting

Reassemble in reversed order, secure screw cap by center mark.

Rear wheel hub – dismantling, inspection of bearings and reassembling

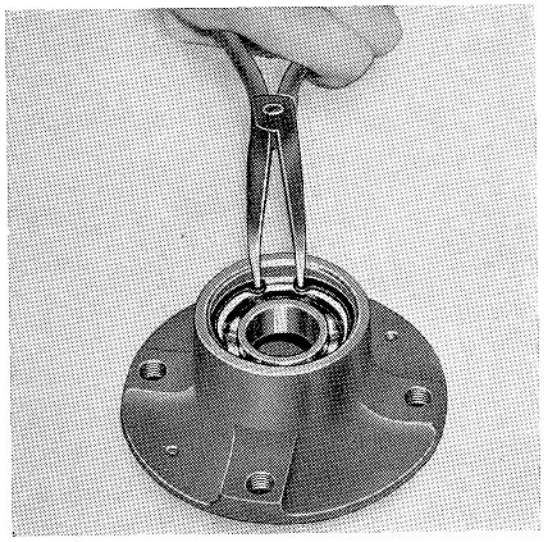
1. Extract the outer bearing 6205 by means of an extractor and remove distance bush (Fig. 1 - 6/1). The illustrated extractor "Kukko" 21/4 (producer: Kleinbongarzt & Kaiser, Remscheid-Hasten) is also obtainable through the Matra-Werke, Frankfurt.



1 - 6/1

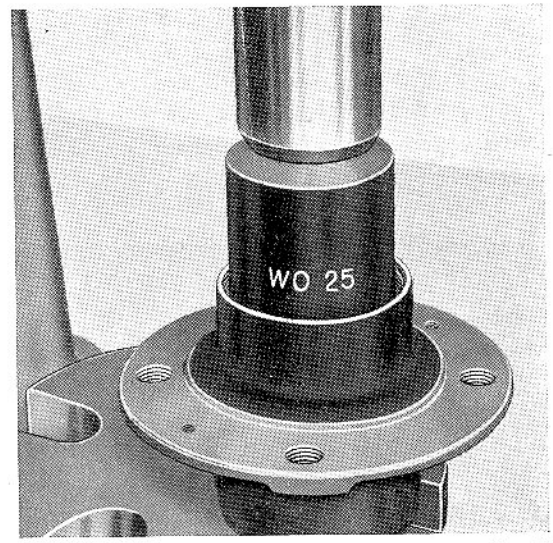
2. Extract the oil seal from hub by means of a screw driver or similar appliance.

3. Remove locking rings 52 x 2 fitted on both sides of the inner ball bearing 6205 with long nosed pliers (Fig. 1 - 6/2).



1 - 6/2

4. Extract the inner ball bearing by use of a press and suitable punch from the hub. Use special tool WO 25 (Fig. 1 - 6/3).



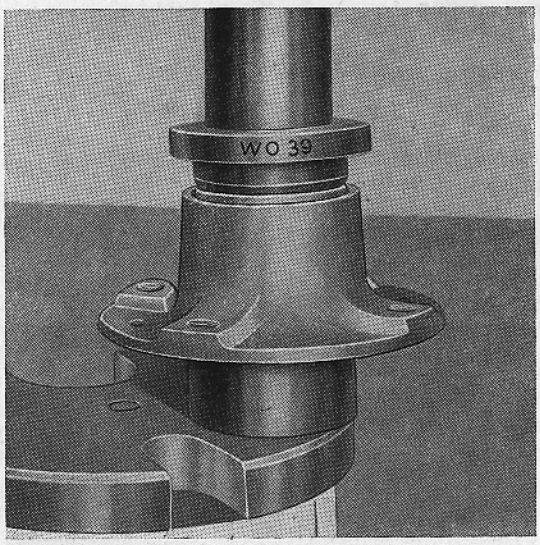
1 - 6/3

When using a different tool ensure that the punch only touches the outer race of the bearing. A smaller punch may not be employed, if the bearing is to be used again.

Cleaning and inspection

Clean bearings in gasoline and blow out with compressed air. Check axial play and inspect the ball race for wear. Damage bearings must be replaced. If a difference in the axial play is noted on both bearings, both have to be replaced as the bearing with the minor play will have to stand a greater thrust and consequently be liable to sooner wear.

Inspect the bearing seats in the hub for wear. If the hub shows marks of wear, the hub should be replaced.



1 - 7/1

Reassembly

Reassemble in reversed order, but observe following points:

1. Oil seals B 40 x 52 x 7 are to be renewed in each case to guarantee a tight sealing of the hub. Use a press and special tool WO 39 for insertion. (Fig. 1 - 7/1).

   Grease oil seals slightly before insertion. Fit open side first.

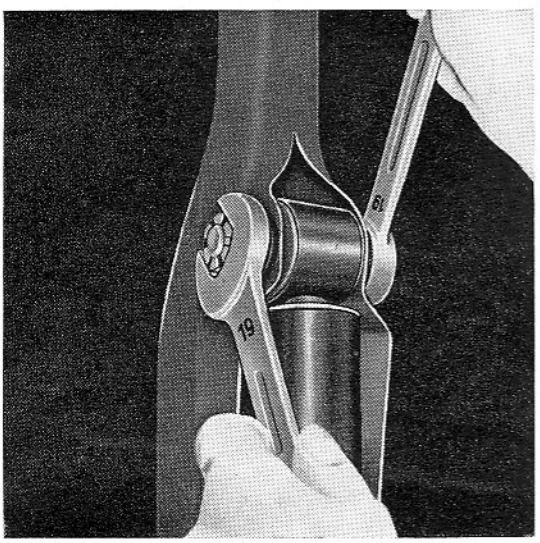
2. Grease bearings before refitting.

Rear spring – removal and refitting

Removal

1. Slacken wheel studs, jack up vehicle and remove wheel.

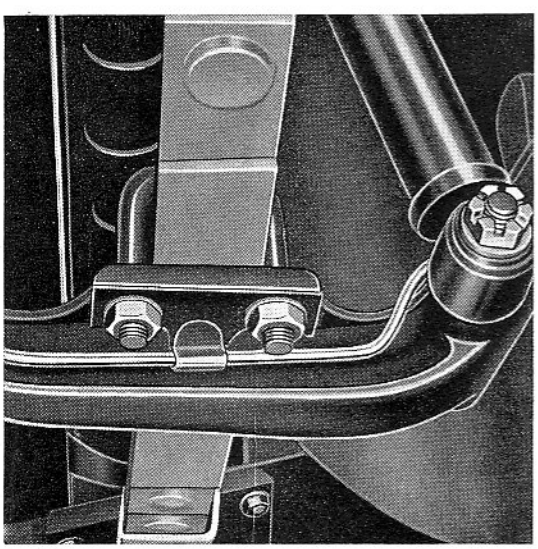
2. Loosen top shock absorber mounting (Fig. 1 - 8/1).



1 - 8/1

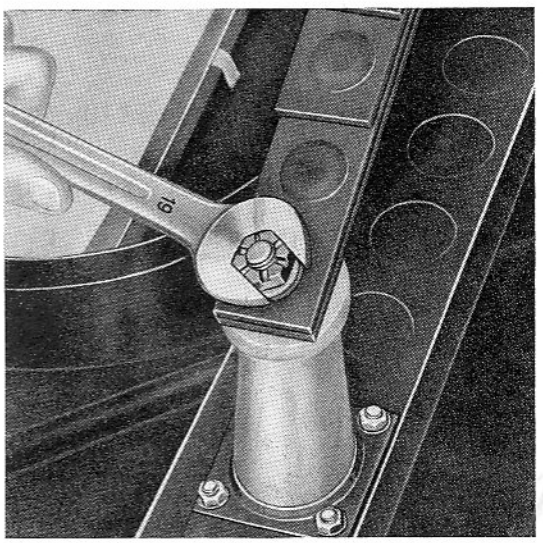
3. Loosen castle nut of lower shock absorber mounting, and remove shock absorber.

4. Open the four hex. nuts of the U-bolts, remove brake hose retainer, U-bolts, base plate and rubber bumper (Fig. 1 - 8/2).



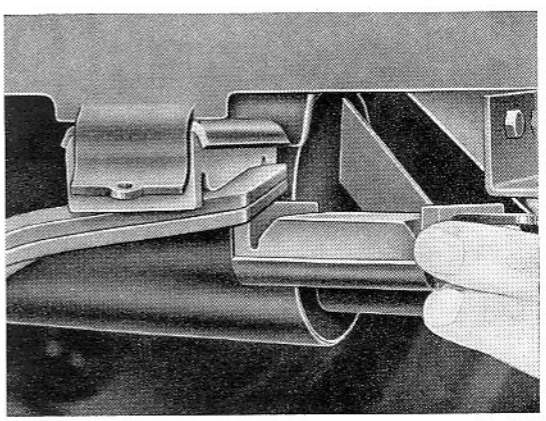
1 - 8/2

5. Slacken and remove castle nut with washer of rear spring support (iFg. 1 - 8/3).

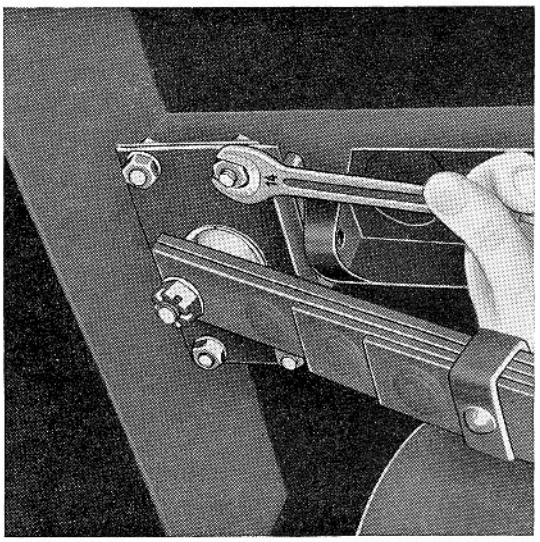


1 - 8/3

6. Vehicles LT/LTK 600 (LP/LS 600 up to chassis no. 6/293 408) are fitted with a spring guide instead of the rear rubber support. Remove one bolt of bottom bracket, slacken the other bolt and push bracket aside (Fig. 1 - 8/4).



1 - 8/4



1 - 9/1

7. Remove split pin and slacken castle nut SW 19. Loosen the four hex. nuts SW 14 and remove spring together with the rubber cushioned mounting bracket and ball joint (Fig. 1 - 9/1).

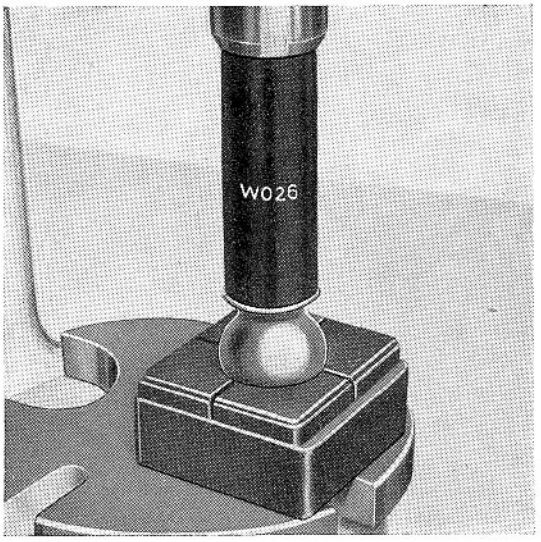
   Slacken castle nut before hex. nuts thus preventing a turning of the ball joint.

8. Remove castle nut, washer and bracket, detach spring.

9. Extract ball head from rubber cushion.

Inspection of ball head and rubber cushion

The surface of the ball head is coarse and should not be smoothed. Squeaks from the spring front suspension are always a sign of excessive play of the ball heads in the rubber cushions. In such case both parts must be replaced. If spares are not available the surface of the ball heads must be roughened by chiselling.



1 - 9/2

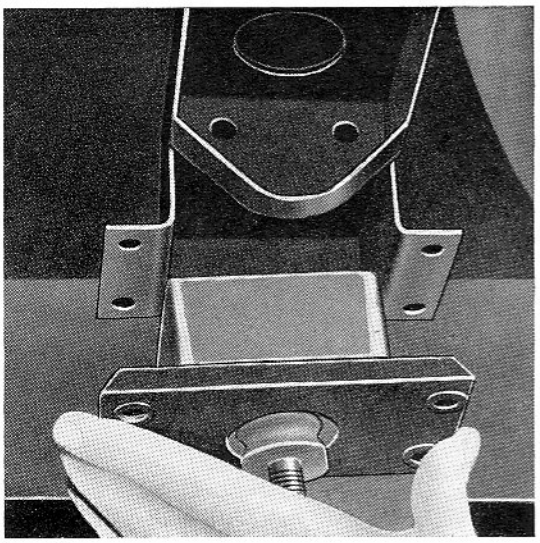
Reassembling

Refit ball head into rubber cushion by means of special tool WO 26 or with a suitable tube (Fig. 1 - 9/2). Wet ball head for easier insertion.

Attention!

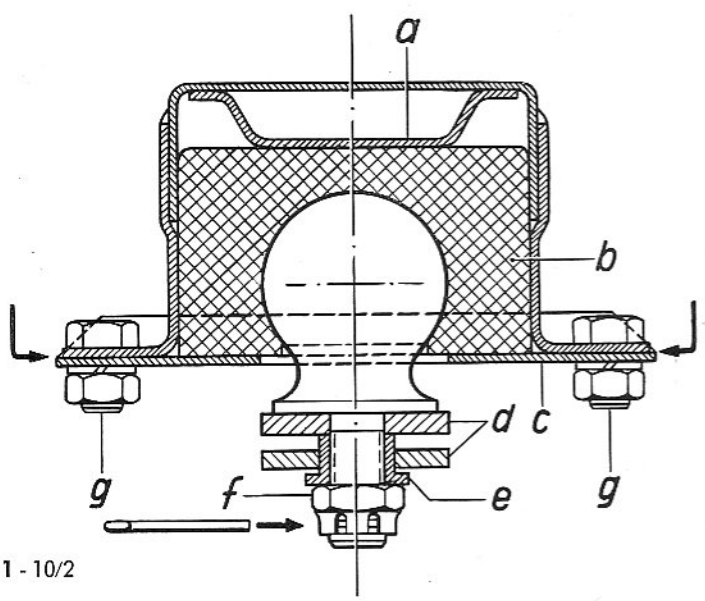
When fitting the ball head or when mounting the spring, also when spraying the leaves, avoid oil or grease settling on ball head or cushion.

2. Replace rubber cushion with fitted ball head and bracket (Fig. 1 - 10/1).



1 - 10/1

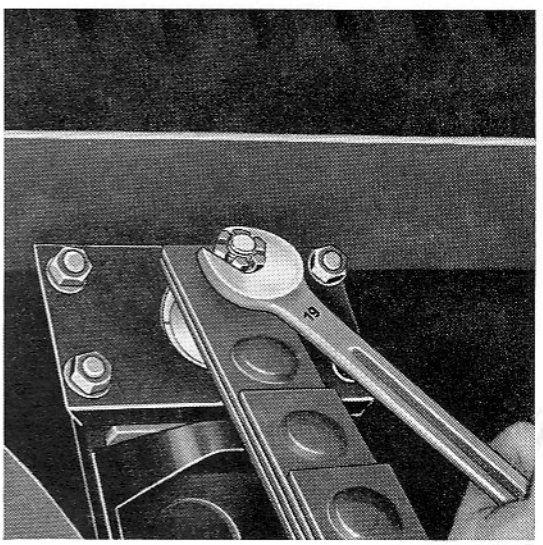
3. Fix bracket with the four hex. nuts and spring washers (Fig. 1 - 10/2).



1 - 10/2

4. Vehicles up to chassis no. 6/293 408 are not equipped with a plate for the rubber cushion. On such design use three washers for each hex. nut to guarantee a proper function of the spring suspension (see arrow on Fig. 1 - 10/2).

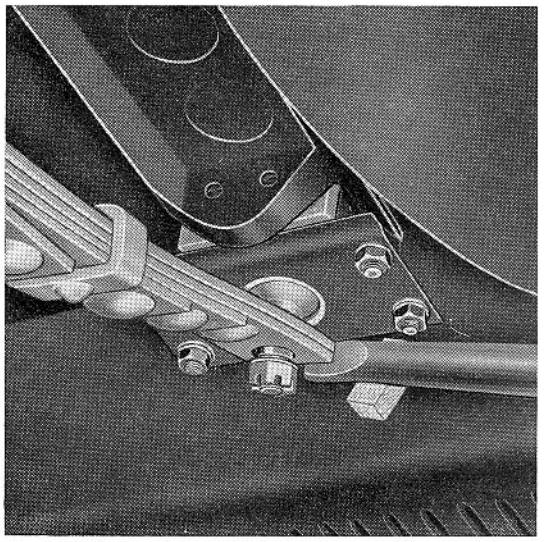
5. Refit spring to ball head and tighten with castle nut SW 19 and washer (Fig. 1 - 10/3).



1 - 10/3

a) Bedding plate for rubber cushion
b) Rubber cushion
c) Bracket
d) Spring leaves
e) Washer
f) Castle nut M 12 x 1,5
g) Hex. nut bolt with nut and spring washer

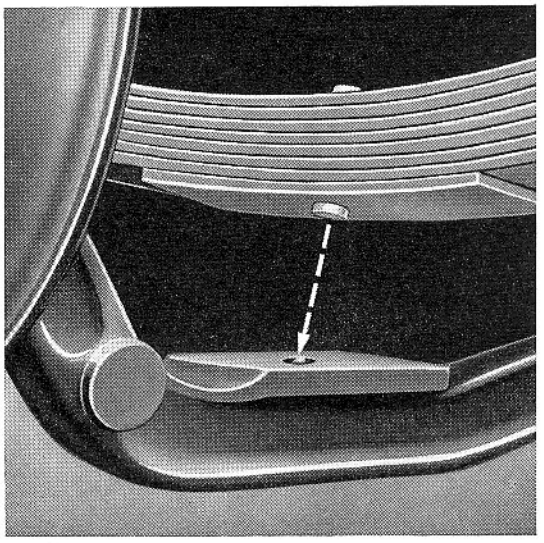
6. Jack up rear spring in the center, place wooden block between body and spring in order to stretch the spring. Guide the spring with the lever backwards until the bolt fits into the spring (Fig. 1 - 11/1).



1 - 11/1

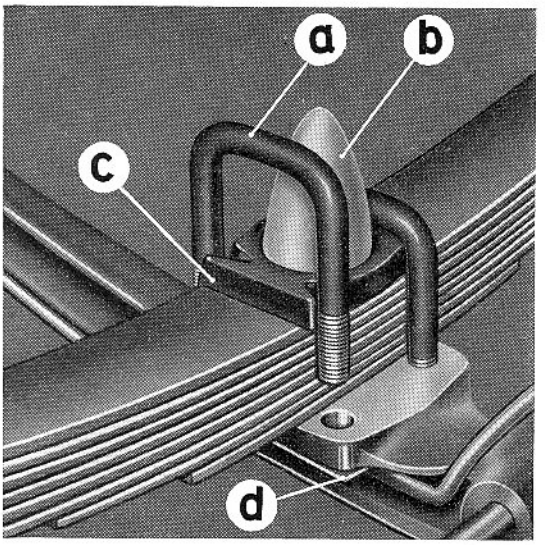
7. Replace washer and castle nut, tighten and secure by split pin.

8. Lift rear axle and fit spring center bolt into the hole provided (Fig. 1 - 11/2).



1 - 11/2

9. Refit U-bolts with rubber bumper, base plate and hose retainer. Fix U-bolts with spring washers and hex nuts (Fig. 1 - 11/3).



1 - 11/3

a = U-bolts
b = Rubber bumper
c = Base plate
d = Hose retainer

10. Inspect shock absorber and remount (see also page 1 – 12 and 1 – 13).

11. Replace wheel, remove jack, tighten wheel studs and refit hub cap.

Shock absorbers

General

The purpose of the shock absorber is to absorb any appearing vibrations and relative motions during the drive arising between the spring suspended body and the rigid mass of the car (axles and wheels) in such way that the best possible effect is obtained with regard to body and wheels. A good roadability depends on a correct shock absorber in relation to body, especially to suspension and axle base. Shock obsorbers fitted on LP/LS 600 ALEXANDER and LT/LTK 600 are marked by colours:

LP/LS 600 and ALEXANDER

Shock absorber front		red/brown
Shock absorber rear	up to chassis No. 6/297 550	green
	from chassis No. 6/297 551 up to chassis No. 6/352 556	black

LT/LTK 600

Shock absorber front		grey
Shock absorber rear	up to chassis No. 6/116 865	green
	from chassis No. 6/116 866	black

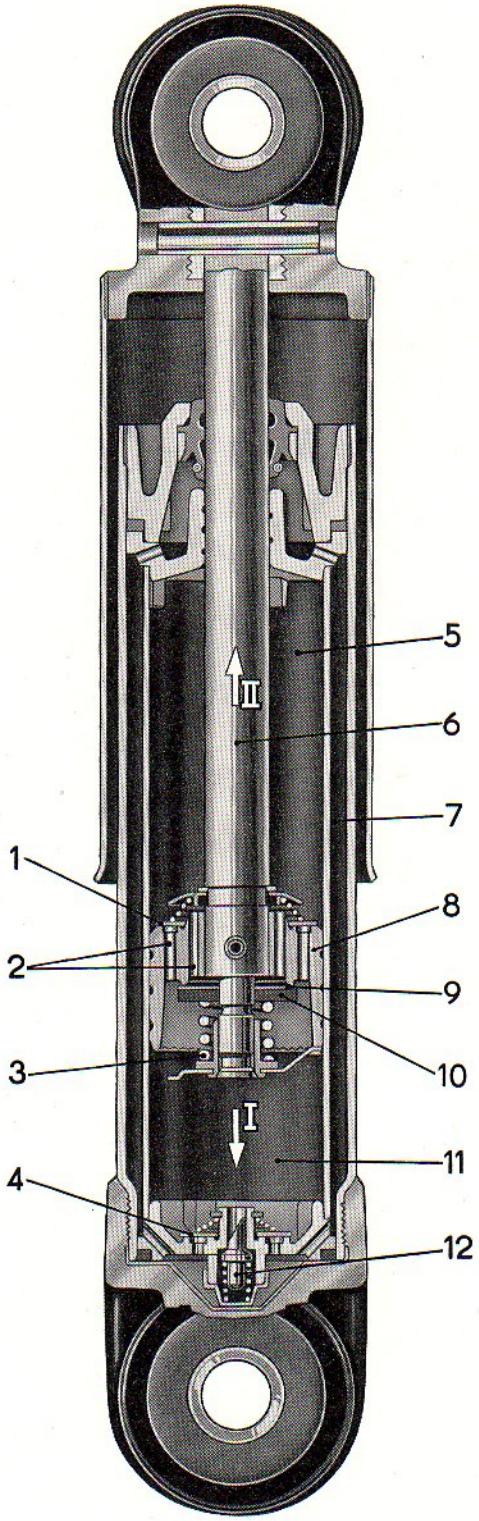
When replacing shock absorbers always use on each axle absorbers with identical markings.

Inspection of shock absorbers

Accurate inspection of shock absorbers to obtain pressure ratio between high and low pressure requires test gauges. As workshops are not equipped with these instruments the inspection has to be carried out by hand. The various pressure ratios are not measurable, but the trained mechanic with practical experience can ascertain whether the shock absorber is still serviceable. A simple method of checking the shock absorber is either by moving the car up and down or by a test drive on a "wash board" road. If the test reveals defective shock absorbers, replace by new ones. Do not try to alter the setting as the shock absorbers are adjusted in relation to the spring tension. Any alteration would reduce the roadability of the car.

The working procedure of the shock absorber is described and illustrated on the following page:

Working procedure of the telescopic shock absorber



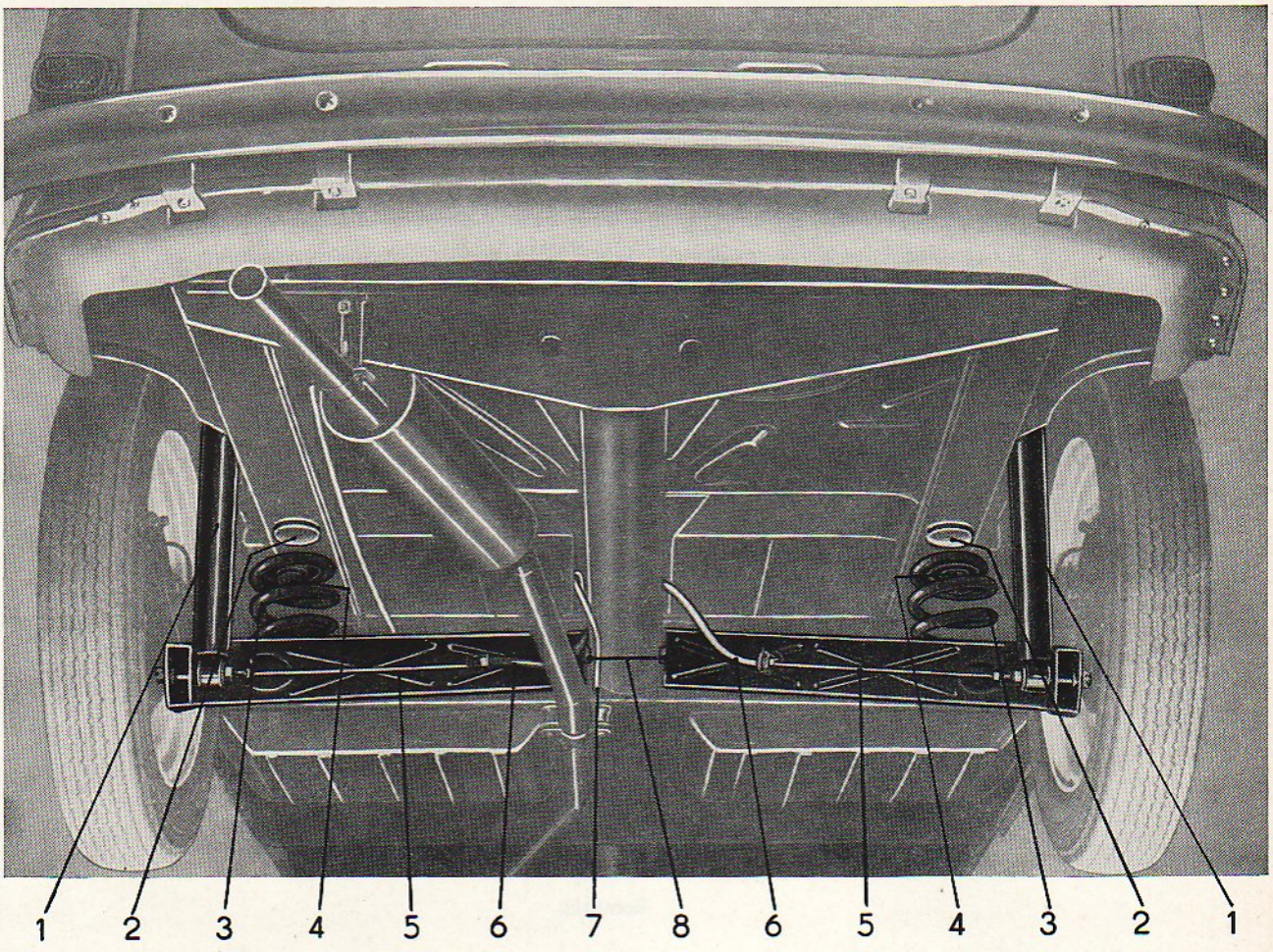
The description and the illustration explain the working procedure of the Hemscheidt-Telescopic shock absorber, Type "Zenz".

When being depressed the piston moves in direction I, the spring is loaded with initial stress resulting in stabilizing the rigid mass by the lower pressure stage of the shock absorber. The relief valve opens during the downward movement and the fluid passes from the low pressure chamber through passages in the piston into the high pressure chamber. The bottom valve A is also opened during this process by the different pressure ratio in the low pressure chamber, and the surplus fluid flows from the low pressure chamber into the reserve chamber.

As soon as the tension is reduced the piston goes upwards in direction II. The fluid returns from the high pressure chamber after overcoming the high pressure spring through the permanent passage and through the high pressure valve back into the low pressure chamber. The bottom Valve B is opened by the created low pressure, and the fluid in the reserve chamber also returns to the low pressure chamber.

The openings in the valves are designed in such way that the shock absorbers give least resistance during the downward movement while during the upward motion a stronger resistance is felt on account of smaller cross sections of the valves operating in reversed direction. The tension of the spring is hereby slowly reduced.

1 – Relief valve
2 – Piston passages
3 – High pressure spring
4 – Bottom valve B
5 – High pressure chamber
6 – Piston shaft
7 – Reserve chamber
8 – Piston
9 – Permanent passage
10 – High pressure valve
11 – Low pressure valve
12 – Bottom valve A



1 – Telescopic shock absorber
2 – Rubber bumper
3 – Coil spring
4 – Top bolt for spring mounting
5 – Brake line
6 – Brake hose
7 – Brake line from master cylinder to distributor
8 – Interior suspension bolt

Trailing axle with coil spring

Description and constructional characteristics

This axle consists of a trailing wishbone with the center of rotation lying in front of the rear wheels, seen in driving direction, i. e. rear axles and wheels are trailing. Progressive coil springs serve for the suspension of the trailing arms. The exterior mounting bolts are rested in rubber silent-blocs on the chassis supporting rail and take up the movement of the trailing axle by means of a toothing.

The square shafted ends of both exterior mounting bolts are connected by clamps to a stabilizer. This stabilizer equalizes the different stresses of the suspended trailing arms with the springs.

If for example the strain on the trailing arm and spring of the off-curve wheel is greater, the stabilizer transfers the stress to the opposite trailing arm. The spring of the opposite axle shares the load and supports the more stressed spring of the exterior wheel. The side tilt of the vehicle is greatly reduced by the equalizing action of the stabilizer.

Remarks

The stabilizer is set in accordance with different stresses appearing during the drive and designed in such way that a delay is caused by the torsion. Moreover, the mounting bolts of the trailing axle are neither in horizontal nor in a vertical position. This arrangement is constructive and has proved its efficiency and improved driving performance.

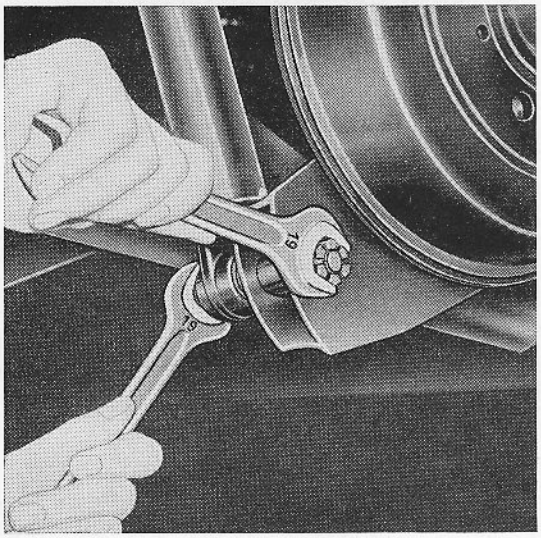
Rear axle and stabilizer – removal and refitting

Following special tools are required:

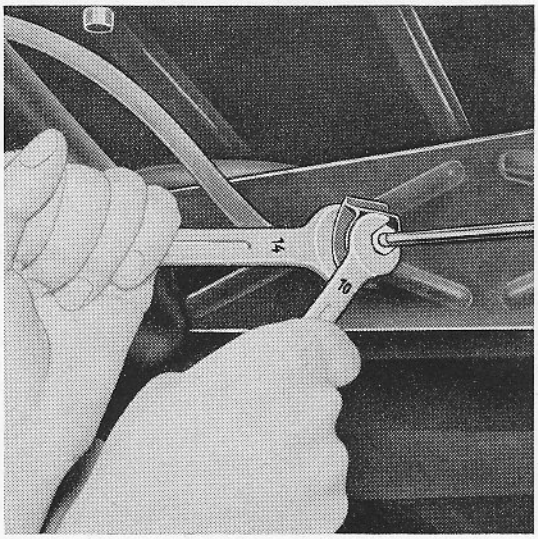
1. WO 59 Extractor for exterior mounting bolt.
2. WO 60 Guiding bush for insertion of exterior mounting bolt.
3. WO 61 Guiding bush for insertion of interior mounting bolt.

Removal

1. Apply hand brake, detach hub cap, slacken wheel studs, jack up vehicle and remove wheel.
2. Loosen hex. nut SW 19 of lower shock absorber mounting (Fig. 2 - 3/1).



2 - 3/1

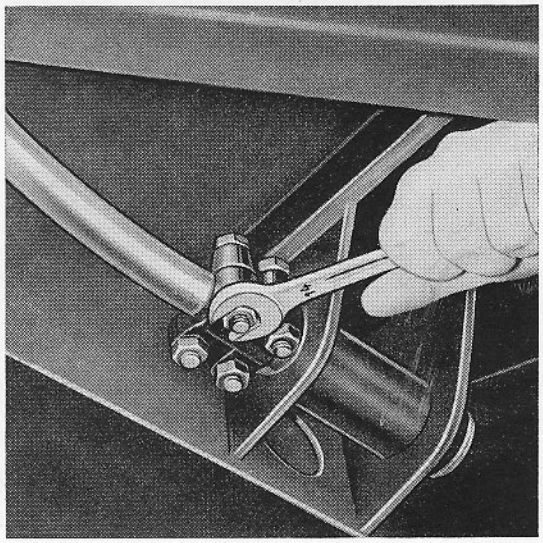


2 - 3/2

3. Disconnect brake hose from brake line at the rear arm. To avoid twisting of the brake hose hold coupling nut with an O. J. spanner SW 14. (Fig. 2 - 3/2).

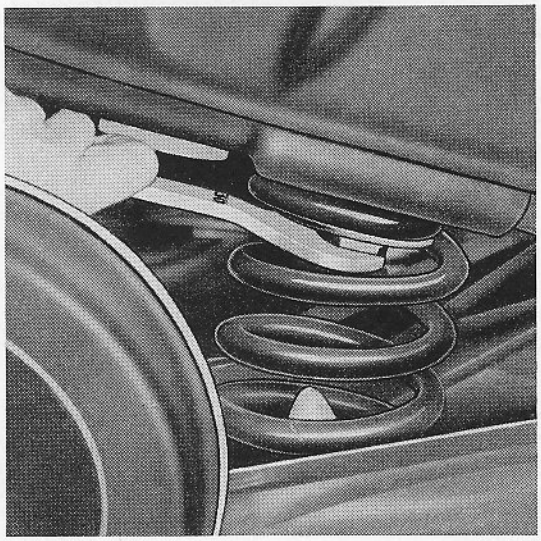
Close brake line and brake hose with plugs to keep foreign matters from entering the brake system.

4. Disconnect clamps connecting stabilizer and mounting bolts (Fig. 2 - 3/3).



2 - 3/3

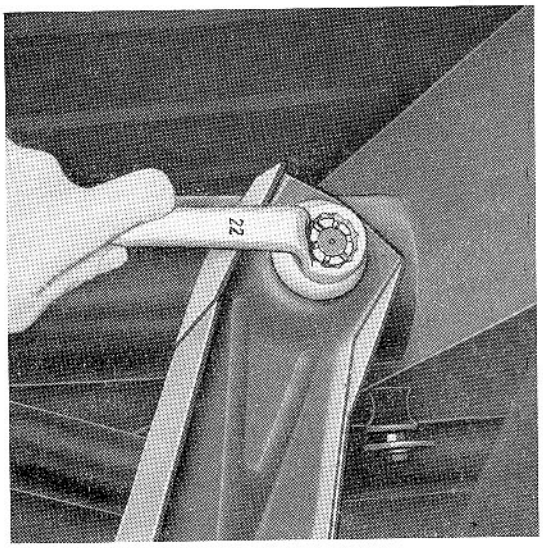
5. Loosen top bolt of spring mounting. Use O. J. spanner SW 30, preferably a flat cranked spanner.



2 - 3/4

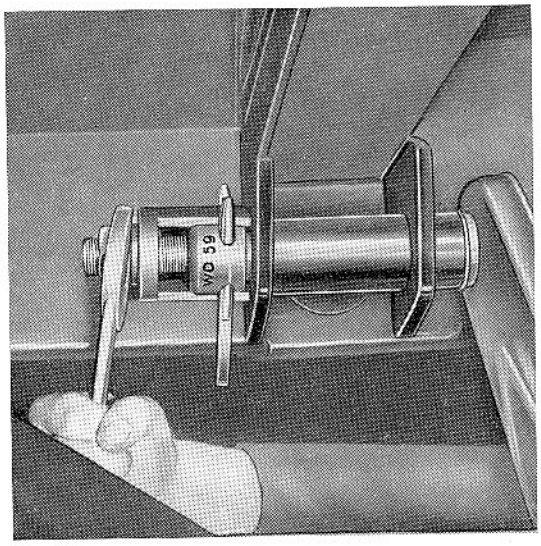
(Fig. 2 - 3/4) (see also Fig. 2 - 9/1).

6. Remove split pin, castle nut SW 22, with washer of the rear axle mounting at the central tube. (Fig. 2 - 4/1).



2 - 4/1

7. Remove castle nut SW 22 of exterior mounting bolt and extract bolt by means of the extracting device WO 59 (Fig. 2 - 4/2).



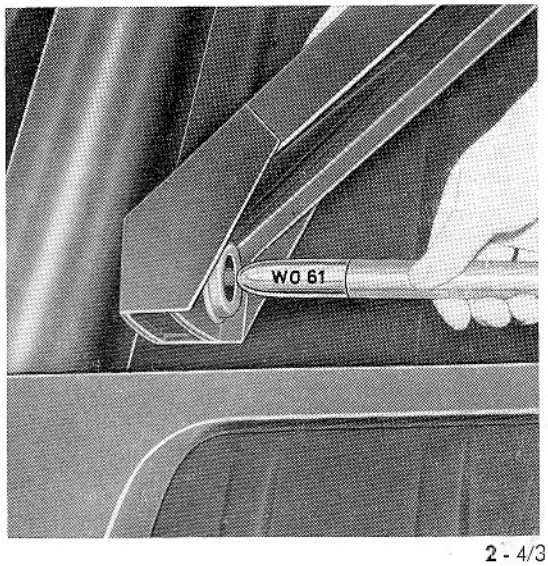
2 - 4/2

8. Push back slightly the interior mounting bolt with a copper punch and remove the complete rear axle.

Refitting

1. Clean and inspect rear axle, interior and exterior mounting bolts. Replace faulty silent-blocs (see page 2 – 6 and 2 – 7).

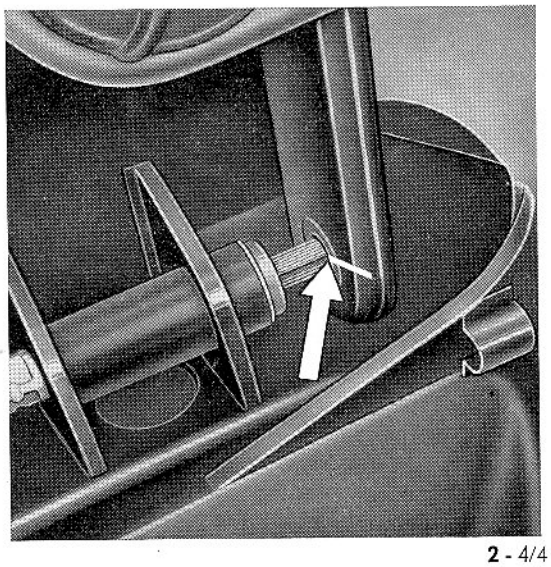
2. Fit one side of the interior mounting bolt with washer for silent-bloc, lock washer and castle nut. Secure by split pin. Screw on guiding bush WO 61 and insert the bolt through the rear axle into the central tube (Fig. 2 - 4/3).



2 - 4/3

3. Place rear axle with spring onto interior mounting bolt lift until the exterior mounting bolt with guiding bush WO 60 can be inserted.

Please note:
The serration of the exterior mounting bolt is interrupted by a groove. It is practical to mark the position of the groove on the rear axle (see arrow) to facilitate the insertion of the exterior bolt. (Fig. 2 - 4/4).

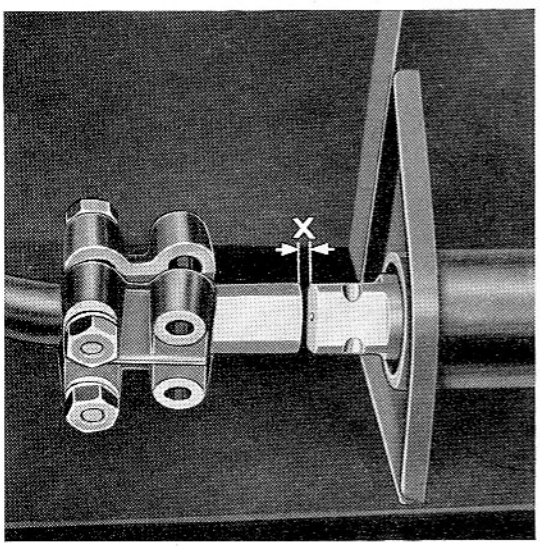


2 - 4/4

4. Unscrew guiding bush from the exterior mounting bolt, replace washer and castle nut SW 22, tighten with a torque of 101 Lbs. sq. ft. and secure by split pin.

5. Unscrew guiding bush from interior mounting bolt, replace washer and tighten castle nut with a torque of 101 lbs. sq. ft. and secure by split pin.

6. Replace stabilizer, refit clamp with four hex. nuts and toothed lock washers. Note:
   The clearance (X) between stabilizer and mounting bolt must have the same distance on both sides. Non-observance may lead to rattles during driving.



2 - 5/1

Do not tighten the clamping nuts until fitting of the spring in order to keep the rear axle movable.

7. Place spring top mounting bolt with toothed lock washer inside spring, lift rear axle and push the spring forward into correct position.

8. Connect spring and spring retainer by bolt SW 30 and toothed lock washer. Please check proper fitting of retaining plate on body. See also Fig. 2 - 9/3

9. Tighten hex. nuts of the clamp on both sides of the stabilizer with a torque of 18 lbs. sq. ft.

10. Connect brake hose SW 14 with brake line SW 10.

11. Reconnect shock absorber to rear axle, secure nut by split pin.

12. Replace wheel, lower vehicle, tighten wheel studs and replace hub cap.

13. Bleed brake system and test brake action.

    Bleed brake system every time a line has been disconnected.

Replacing silent-blocs

Following auxiliary tools are required:

SW 23 Steel disc for removal and replacing of silent-blocs.

SW 24 Steel disc for extracting worn silent-blocs.

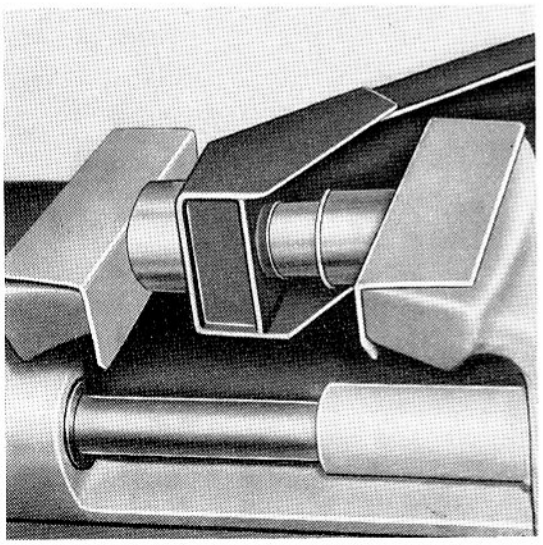
SW 25 Steel disc for inserting new silent-blocs.

Procedure:

1. Remove old silent-blocs from rear axle by aid of punch or tube.

2. Clean the bedding of the silent-blocs and oil slightly.

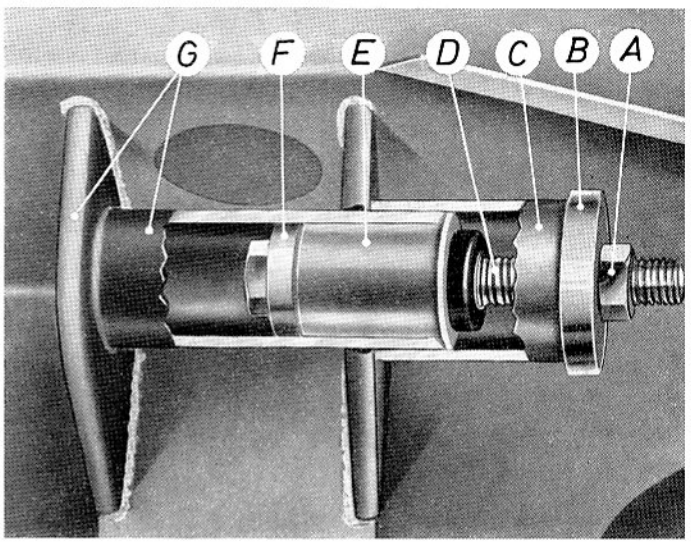
3. Fit new silent-bloc by means of a suitable press or vice with tube.



2 - 6/1

4. Replace silent-bloc of exterior mounting as follows:

a) Attach auxiliary tool SW 23 with a tube (length 3,15") from outside and insert steel disc SW 24 with hex. head bolt M 14 x 120. Screw on hex. nut SW 22, hold hex. nut with a socket spanner SW 22 and extract silent-bloc by tightening the nut.



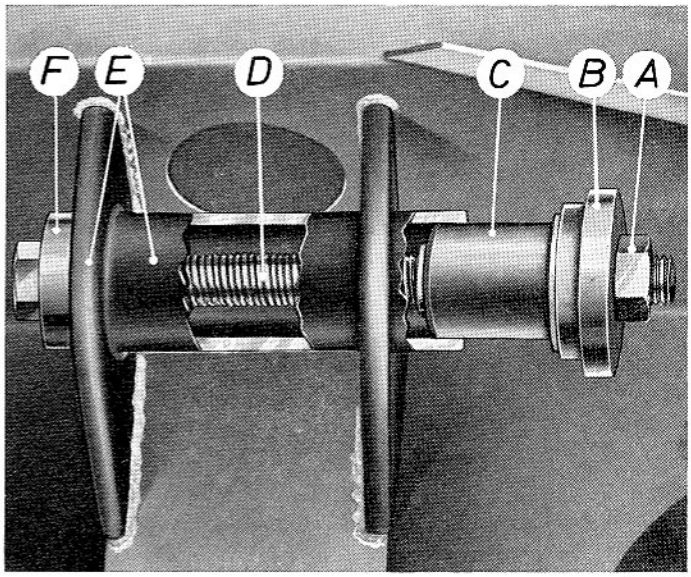
2 - 6/2

A = Hex. nut SW 22
B = Auxiliary tool SW 23
C = Tube 3,15"
D = Hex. head bolt M 14 x 120
E = Silent-bloc
F = Auxiliary tool SW 24
G = Bedding of silent-bloc

On some vehicles the bore for the silent-bloc is smaller. Therefore, a smaller disc than SW 24 has to be used for extracting this silent-bloc.

b) Clean bore of silent-bloc and oil slightly.

c) Attach auxiliary tool SW 25 to the offside and SW 23 on the nearside of the bore together with the silent-bloc. Insert hex. head bolt, fit hex. nut SW 22 and press in silent-bloc by tightening the nut.



2 - 7/1

A = Hex. nut SW 22
B = Auxiliary tool SW 23
C = Silent-bloc
D = Hex. head bolt M 14 x 180
E = Axle mounting
F = Auxiliary SW 25

Shock absorber

General

With taking up production of trailing axles telescoping shock absorbers of longer design are being used, fixed to the body by a bolt. The colour marking of these shock absorbers manufactured by different firms is black. As long as the colour markings agree shock absorbers of different firms may be used.

Testing of shock absorbers

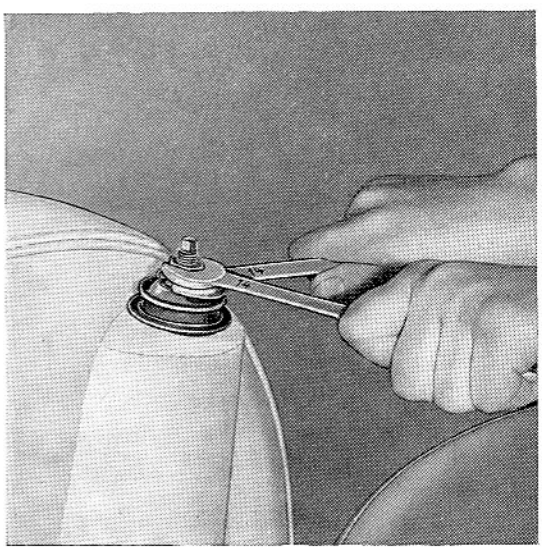
The trained nechanic can judge the condition of the shock absorber by driving over "wash board" roads or by moving the vehicle up and down. A detailed description regarding the testing and working process of a double acting shock absorber is given on page 1-12 and 1-13.

Dismounting and refitting of shock absorber

Dismounting

1. Remove shock absorber from axle by removing split pin, hex. nut M 12 x 80 and castle nut SW 19.
   See also Fig. 2 - 3/1

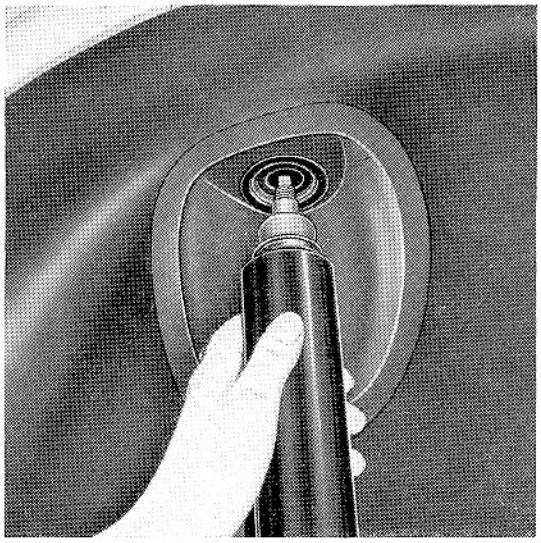
2. Open luggage compartement and remove rubber cap of shock absorber mounting. Hold lock nut SW 14, and open top nut with O.J. spanner SW 14. Fig. 2 - 7/2
   Remove both nuts and detach shock absorber.



2 - 7/2

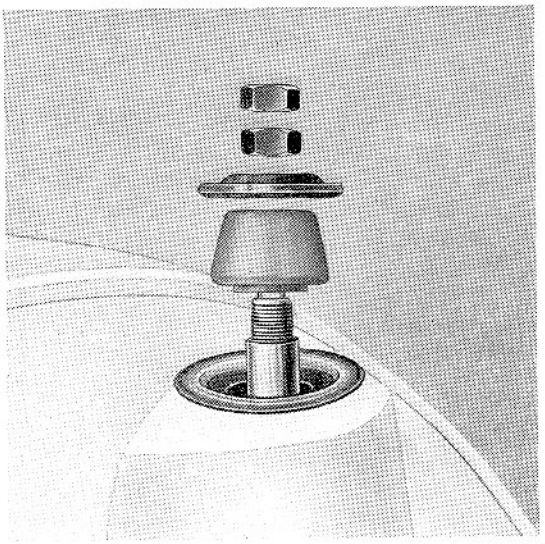
Refitting

1. Insert shock absorber from below after fitting mounting plate, distance bush and rubber buffer onto threading (Fig. 2 - 8/1).



2 - 8/1

2. Place top rubber buffer and plate in position, screw on two hex. nuts SW 14, tighten and lock. Replace rubber cap (Fig. 2 - 8/2).

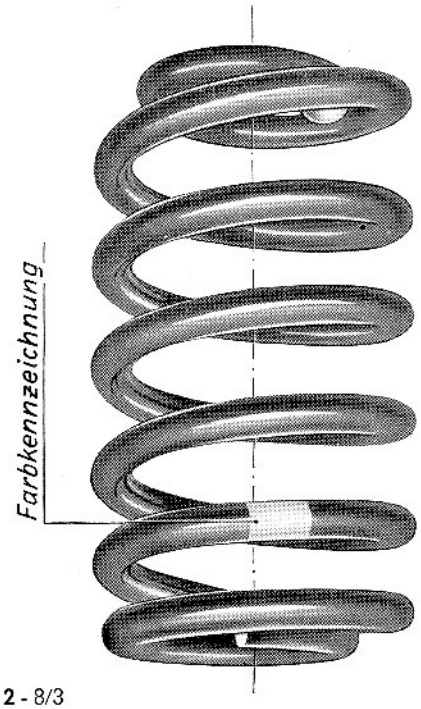


2 - 8/2

3. Reconnect lower shock absorber mounting. Secure with split pin.

Coil spring suspension

Description and constructional characteristics



2 - 8/3

Progressive coil springs serve for the suspension of the trailing axles. The springs are connected to body and rear axle by retaining plates and bolts.

Progressive effect of the coil spring is resulted by the various climbing ratios of the spring coil. Under light load the suspension action is transferred to all coils, with increasing stress the number of climbings is reduced. Under small load the suspension reacts easily, under heavy load the reaction hardens. Fig. 2 - 8/3

Key to Fig. 2 - 8/3:

Farbkennzeichnung = colour marking

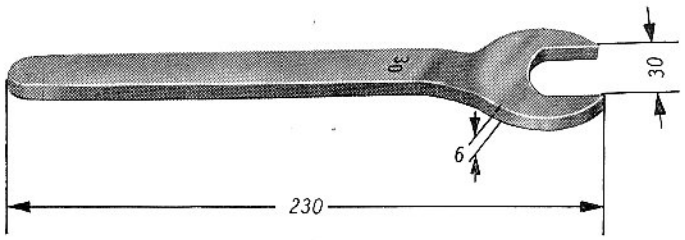
Dismounting and refitting of coil spring

Dismounting

1. Apply hand brake, detach hub cap, slacken wheel studs, jack up and remove wheel.

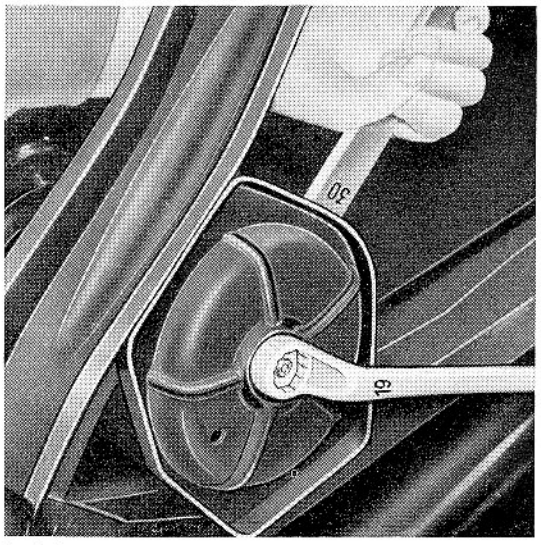
2. Disconnect shock absorber from rear axle.

3. Loosen top spring mounting. Use a flat cranked O. J. spanner SW 30, see Fig. 2 - 3/4. (Spanner for loosening top and bottom mounting illustrated on Fig. 2 - 9/1).



2 - 9/1

4. Slacken and remove hex. head bolt SW 19 (bottom spring mounting (Fig. 2 - 9/2).



2 - 9/2

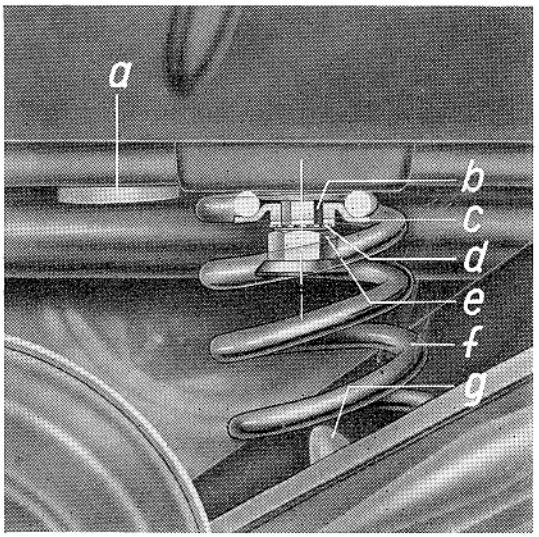
5. Lower axle with lever, and remove spring coil together with rubber bumper and spring retainer.

Refitting

Refitting is carried out in reversed order.

1. If it is necessary to replace one spring, both springs should be renewed. Colour markings must agree.

2. Check spring retainers for correct position when tightening mounting bolts (Fig. 2 - 9/3).



2 - 9/3

a = Rubber stop
b = Hex. projection for holding spring retainer
c = Spring retainer
d = Toothed lock washer
e = Mounting bolt SW 30
f = Coil spring
g = Rubber bumper

Rear wheel hubs and bearings

Trailing axles are equipped with the same hubs and bearings as swing axles.
For removal and refitting as well as for dismantling and reassembling see instructions on pages 1 - 5, 1 - 6, and 1 - 7.

General

Roadability and track holding of a vehicle does not solely depend upon the front wheel alignment but also upon the position of the rear wheels. Misalignment of rear wheels, especially deviation of both rear wheels in same direction to the center line of the vehicle are transmitted to the steering and front axle resulting in single-sided pulling. In most cases the pulling is not unknowingly by turning the steering in the opposite direction which leads to one sided wear of tyres after some time. If an uneven wear is noticed or bad track keeping, front and rear wheels are to be checked for correct alignment. The defect should be traced and eliminated. Recheck the alignment following any repairs carried out on front or rear axles which may have influenced the wheel positions. On vehicles with swing axles not only the position of front wheels but also of the rear wheels depend on the leaf springs.

An optical alignment gauge is required to obtain correct wheel position.

Instructions for alignment

The contents of Main Group V, page 11 - 1, with regard to tyres, tyre pressure, rims, suspension and alignment apply also for the rear axle.

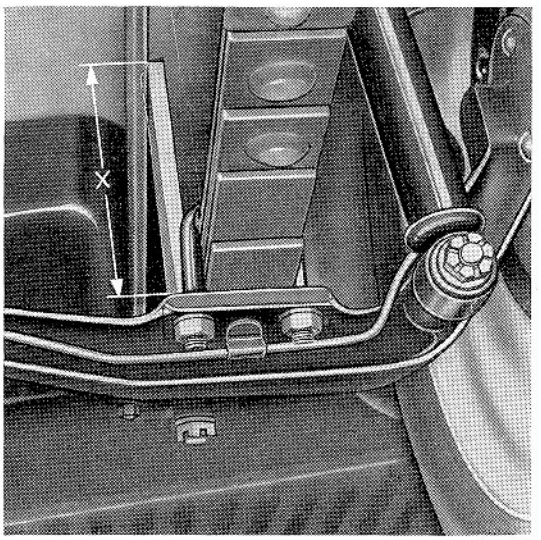
Application of load

Vehicles LT/LTK 600, LP/LS 600, Standard and ALEXANDER are equipped with swing rear axles and leaf spring suspension (except ALEXANDER TS). In respect of these types apply load onto the rear axle to such extent that the following distances are kept between body and spring base of swing axle:

LP/LS 600
up to chassis No. 6/293 408 x = 120 mm = 4,7"

LP/LS 600 and ALEXANDER
from chassis No. 6/293 409 x = 132 mm = 5,1"

LT/LTK 600
up to chassis No. 6/116 463 x = 123 mm (15" tyres) = 4,8"
from chassis No. 6/116 464 x = 135 mm (13" tyres) = 5,3"
(Fig. 3 - 1/1).



3 - 1/1

Vehicles fitted with coil springs (LLOYD ALEXANDER TS) are to be loaded as follows:

front seats . . . . . 2 x 65 kg = 2 x 143 Lbs.
luggage compartment . . 45 kg = 99 Lbs.

It is advisable to keep the prescribed distance by means of hardwood pieces. Apply as illustrated.

Alignment of rear axle

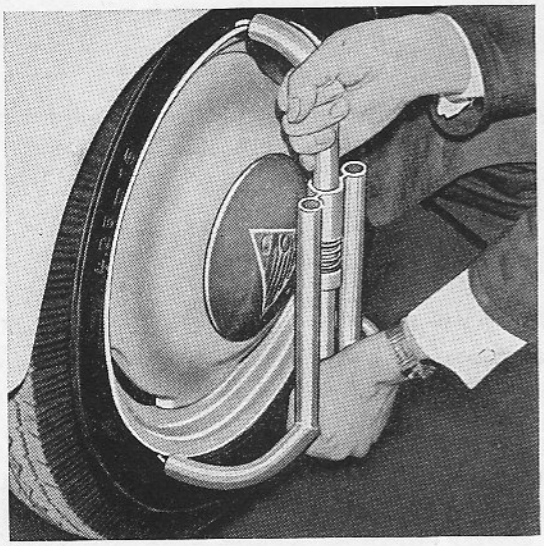
General

The following section explains the optical alignment of the rear axle by means of the EXACTA gauge. A detailed description is supplied with each gauge by the manufacturers F. C. Müller, Heilbronn.

Setting up of EXACTA gauge

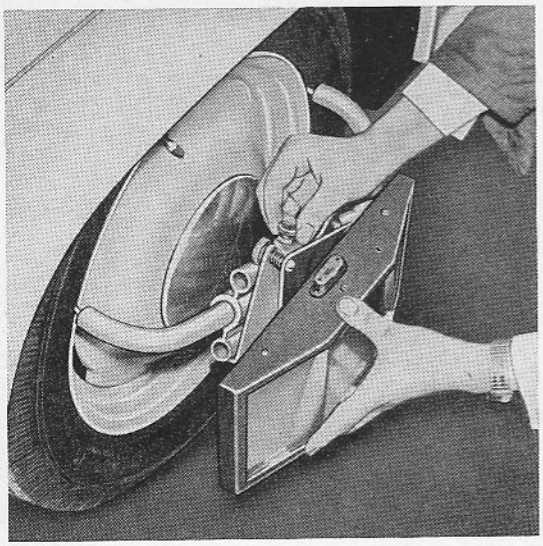
1. Put wheels in neutral position with vehicle on a level.

2. Attach wheel mirror support to both rear wheels between rim and tyres by means of three clamps. (Fig. 3 - 2/1).



3 - 2/1

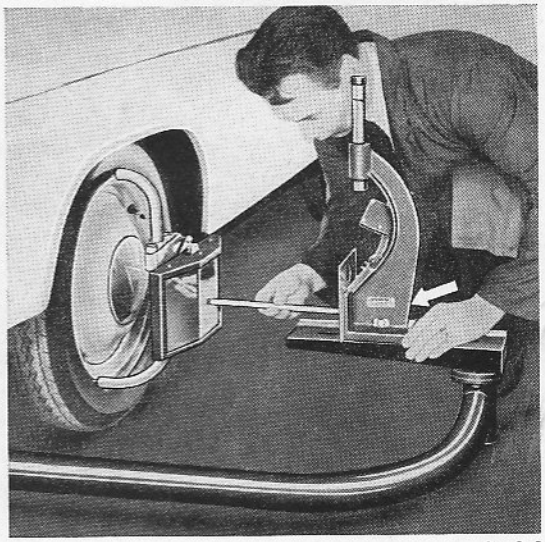
3. Place wheel mirror in position on R/H and L/H rear wheel and tighten clamp screws (Fig. 3 - 2/2).



3 - 2/2

4. Place EXACTA gauge in position, both V-guides centering wheel mirrors.

5. Turn one V-guide for 180° and set the distance on both sides with the distance rods (Fig. 3 - 2/3).



3 - 2/3

Tighten the thumb screw of the optical stand Fig. 3 - 2/3 arrow.

6. Lift the car on the R. H. rear side until the wheel turns freely. On cars fitted with swing rear axles place the jack underneath spring base bringing the rim parallel to the optical device. Otherwise the scale cannot be seen through the optic.

7. Turn the wheel slowly while keeping the mirror stationary and watch through the optic scale and hair line. Should the scale rotate around the hair line cross adjust the wheel mirror by the three knurled nuts on the back until the scale comes to the standstill (Fig. 3 - 3/1).

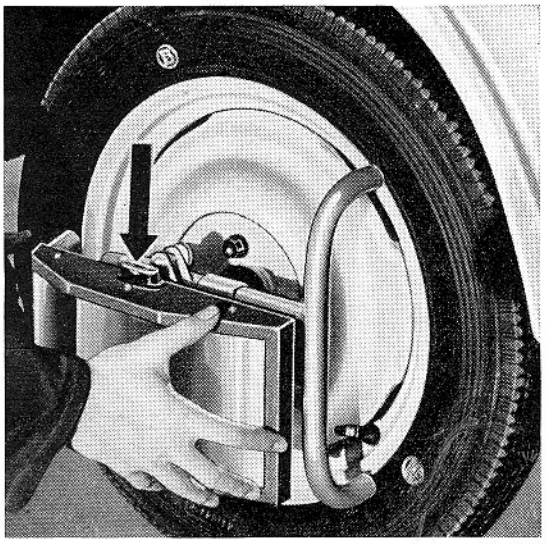
3 - 3/1

The adjustment of the wheel mirror is necessary in order to get reliable results from the measurements.

8. Lower the wheel, and repeat operation as described under 7. After completion of adjusting release the car from the jack, and push it forward and backward a few times allowing bearings, springs and axles to settle.

9. Recheck distance between wheel mirror and scale, readjust if necessary.

10. Adjust spirit levels on both wheel mirrors. Bubbles should be exactly in the center of the glass tube (Fig. 3 - 3/2).



3 - 3/2

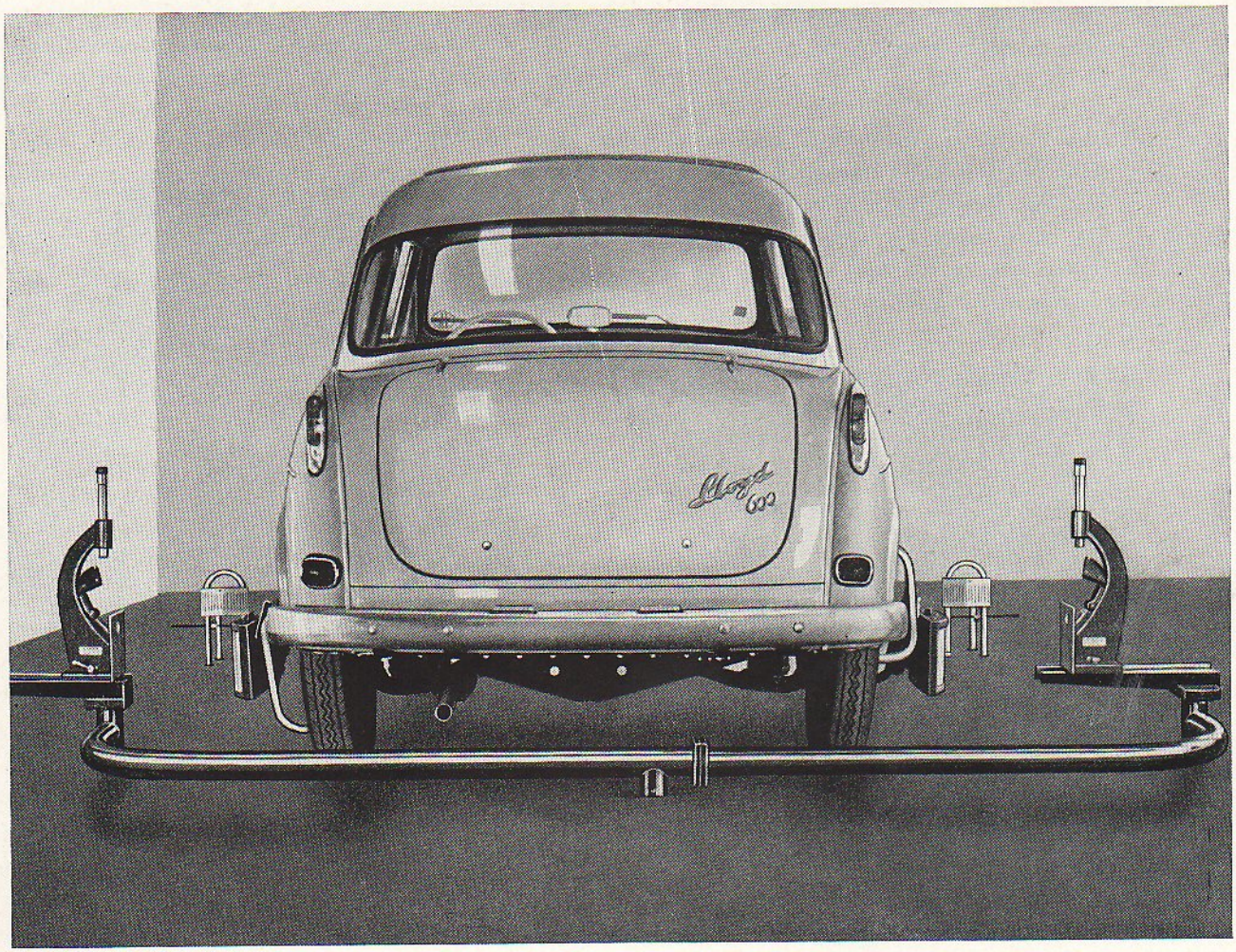
11. Load the vehicle as explained on page 3 - 1.

12. Place both scale supports on the right and left hand side of the scale in such way that the small bracket is located behind the scale. The end of the feeler rod is now made to touch the lower center of the rim after which it is secured. (Fig. 3 - 3/3).

3 - 3/3

Alignment of rear axle

13. The scale support with its feeler rod is placed in the corresponding position at the front wheel of the same vehicle side, the end of the feeler rod again touching the lower center of the rim (Fig. 3 - 4/1).



3 - 4/1

14. Swing optical equipment into position and push forward or backward until the same value appears on both sides in the same colour field.

Reading of track and camber measurements

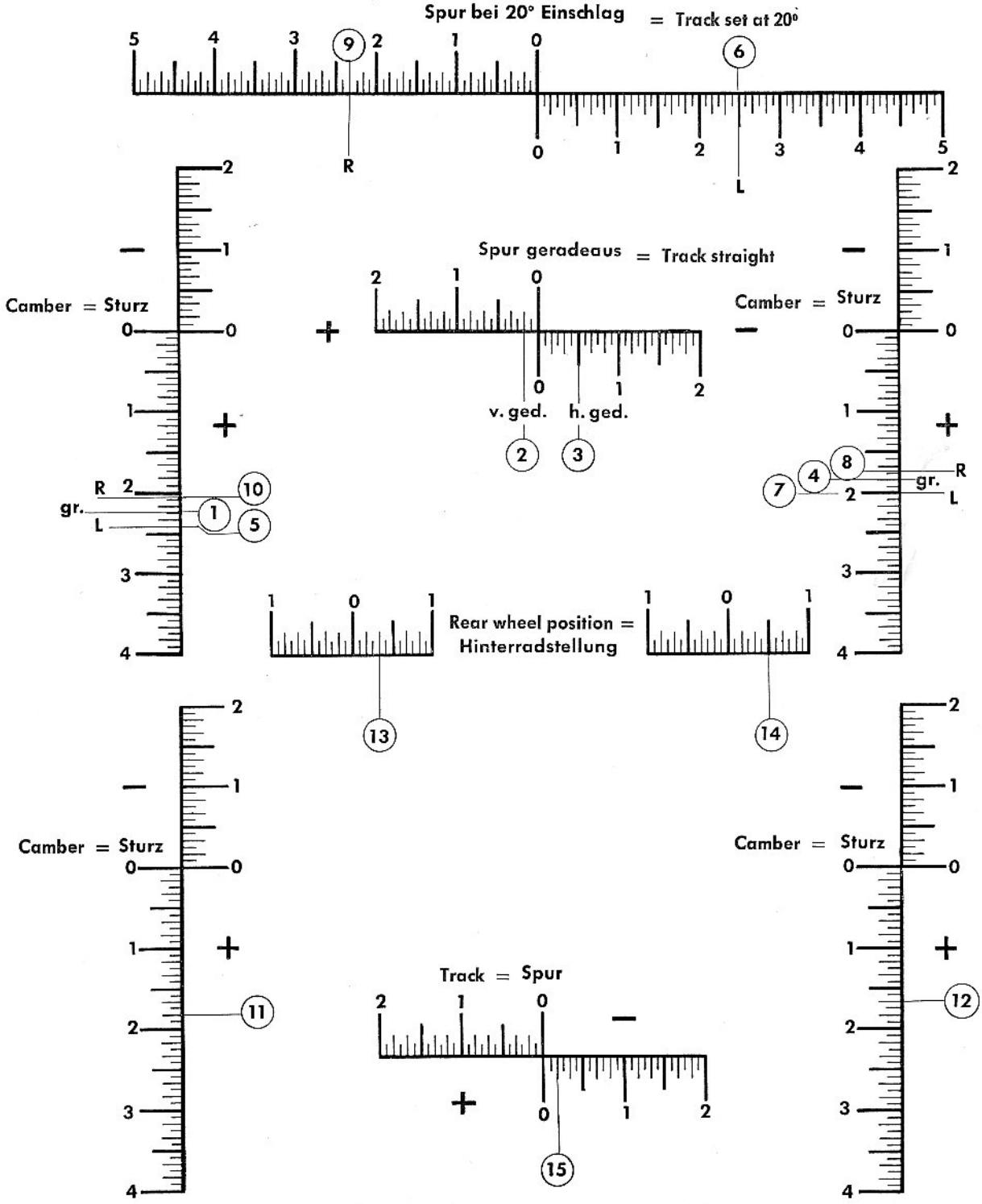
1. Check for horizontal position of wheel mirror, if necessary adjust. Read off value for both rear wheels. Enter the camber values on the camber measuring chart for the right and left rear wheel (see also measurement chart pos. 11 and 12).

2. Enter now the values found for the track angle of the left and right hand rear wheel on the rear axle track angle scale (see scale pos. 13 and 14).

3. Shift the alignment equipment on the right rear wheel until the track scale indicates zero.
   Check distance between scale and wheel mirror as well as for horizontal position, adjust if necessary.

4. Read off the track value of the rear axle through the optic on the track scale of the left rear wheel and enter it in the lower scale on the measurement chart. (See also scale position 15.)

Measuring chart
Meßkarte



Abreviations:

gr	= straight	**R**	= 20° Right hand lock
v ged	= load applied (front)	**L**	= 20° Left hand lock
h ged	= load applied (rear)		

Evaluation of measurements

(For vehicles with swing axle and leaf spring)

Camber of rear wheels

The value on the chart against pos. 11 and 12 give the direct indication of the camber angle of the right and left rear wheel. Following camber values are applicable for the distances as given on page 3-1.

LP/LS 600

Camber of rear wheels	up to chassis No. 6/293 408 = 1°30' ± 50'
	from chassis No. 6/293 409 = 3°40' ± 50'

LT/LTK 600

Camber of rear wheels	up to chassis No. 6/116 463 = 2° ± 50'
	from chassis No. 6/116 464 = 4° ± 50'

Deviation within the tolerance is to be avoided, if the difference of the camber values is greater than 50'. The camber of the right wheel i.e. may not deviate more than 50' to the positive side of the nominal value, if the left rear wheel is in the correct position or deviating to the negative side. In the latter case the difference of the camber values is greater than 50'. These faults are transferred to the front axle and lead to bad track holding, one-sided pulling and consequent one-sided wear of tyres. Adjustments should be carried out as described on the following page in such a case. Defective swing axles are to be replaced.

Rear wheel position and camber

The position of the rear wheels in relation to the center line of the vehicle can be obtained from the scale "rear wheel position". The position of the left hand rear wheel is shown under pos. 13, position of the right hand rear wheel under pos. 14. Providing the distances, as given on page 3-1, are kept the rear wheel position should be

= 0° ± 30'

The tolerances are valid for the permissible deviation of both wheels from zero position to the positive or negative side.

As long as the position of both rear wheels in relation to the center line of the vehicle does not deviate in same direction from the zero position the track holding of the vehicle is hardly influenced.

As soon as both wheels of the rear axle deviate in the same direction from the zero position the total of these values may not exceed 40'. The right rear wheel i.e. may not exceed 20' to the right from the center line, if the left wheel also deviates 20' to the right. The limit is obtained as soon as the right rear wheel deviates to the right for 30', and the left rear wheel is in the zero position or deviating up to 10' to the right from zero position. As long as the left rear wheel is in the zero position the total deviation may not exceed 30' or else the tolerance for the rear wheel position as described on page 3-6 of ± 30' would not be kept any longer.

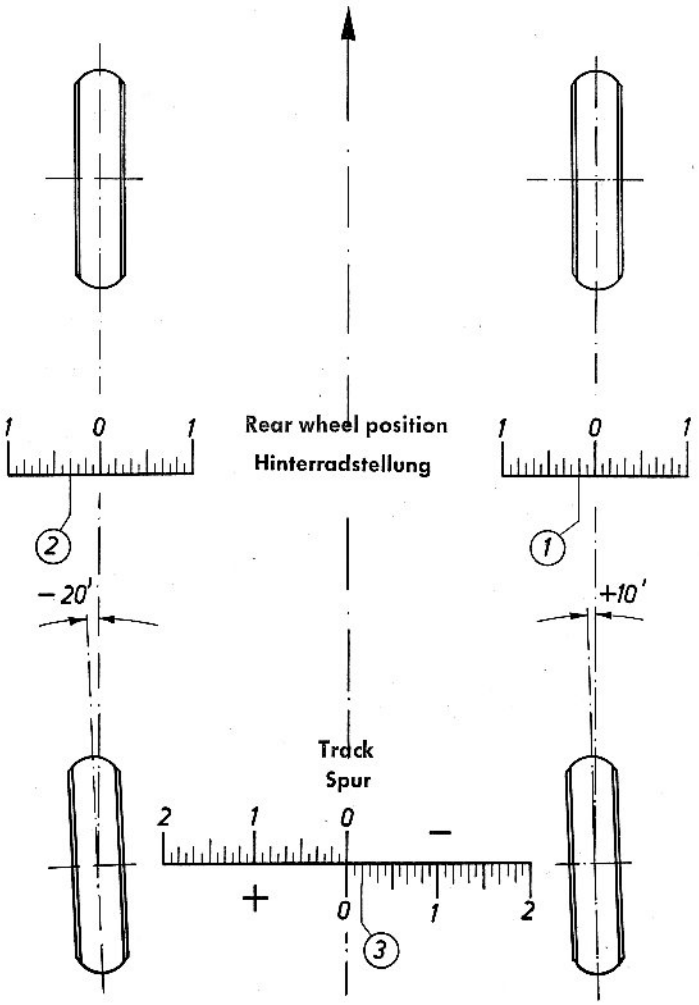
Example for evaluation of track and rear wheel position

Following values were obtained on a vehicle:

1. Position of the right hand (R.H.) rear wheel to the center line = + 10'.
2. Position of the R.H. rear wheel to the center line = –20'.
3. Track of rear axle = –10' = 1,2 mm.

Rear wheel position

Both wheels deviate in same direction from zero position. The right rear wheel deviates for + 10' from zero position to the left, and the left rear wheel for –20' also to the left. The total value of deviation is 10 + 20 = 30'. Fig. 3 - 7/1



3 - 7/1

Alignment of rear axle

Track of rear wheels

The track on the scale for the rear axle is given as –10' = 1,2 mm. The track is also obtainable from the position of the rear wheels to the center line of the vehicle:

The R.H. rear wheel deviates from the zero position for + 10' to the left giving a contribution to the positive track while the left hand rear wheel deviating for –20' to the left from the zero position contributes to the negative track. From this sum with regard to the prefix (–20 +10) a negative track of –10' = 1,2 mm is obtained.

Remarks for adjusting swing axle

If the track and the camber values of a vehicle are exceeding the given tolerances the swing axle can be adjusted in most cases by means of an axle-adjusting tool (SW 26) as illustrated on page 4-2. Before doing so, however, the axle pivot and the swing axle should be checked for defects. Defective parts should always be replaced. Adjust only in cold condition.

Adjusting of swing axle

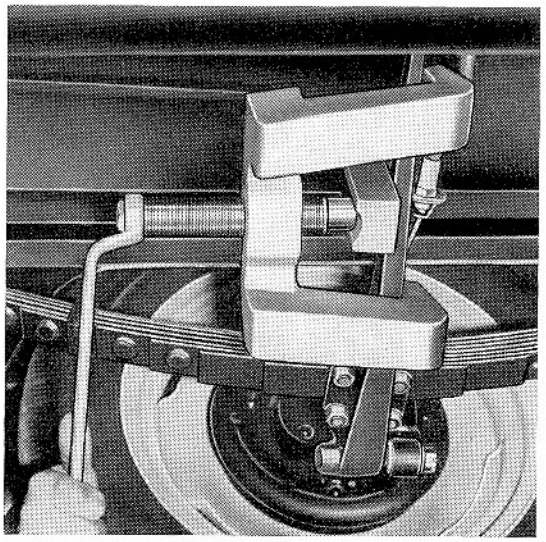
1. Jack up vehicle and loosen the four hex. nuts SW 17 of the U-bolts until the spring center bolt is free.

2. The values for rear wheel position and chamber of rear wheels indicates to which side the swing axle is twisted. If for example the right hand rear wheel deviates for more than 30' to the right from the zero position, the axle-adjusting tool, as shown on the illustration, has to be attached in such way that the pressure piece is pressing against the axle from the front. Fig. 3 - 8/1

3. Attach axle-adjusting tool and adjust swing axle by tightening spindle.

4. Tighten hex. nuts SW 17 of U-bolts, release vehicle and recheck. If the adjustment has not lead to the desired result, repeat adjusting procedure.

   After completion of adjusting the vehicle should be taken on test for setting of springs. Recheck rear axle.



3 - 8/1

Evaluation of measuring results

(for vehicles with trailing rear axles)

Camber of rear wheels

The direct camber values can be obtained from the lower scales of the chart, see page 2-3 pos. 11 and 12.

Camber of rear wheels = +20'±40'

These values are valid with regard to the load as described on page 3-1. The tolerances indicate that for both wheels a deviation of ± 40' is permissible to either the positive or negative side, i.e. for the right hand rear wheel a camber value up to +1° is permissible, if the left hand rear wheel also deviates from the nominal value (+20') to the positive side. The difference of the camber values may not exceed 40'. For example it is not permissible that the camber of the right rear wheel is +1° as soon as the camber of the left rear wheel is smaller than +20'.

If camber values on a vehicle are exceeding the allowed tolerances try to trace the cause as follows:
Remove both coil springs and replace by new ones with identical colour markings. Recheck but before doing so take the car on test for better setting of the springs. If the second test reveals values still exceeding the allowed tolerances, the cause in most cases may be found in a twisted axle or axle pivot.
A defective rear axle should always be replaced.

Rear wheel position and track

Position of both rear wheels in relation to the center line of the vehicles is obtainable from the scale "rear wheel position" (see also page 3-5 pos. 13 and 14).
Following values are prescribed:

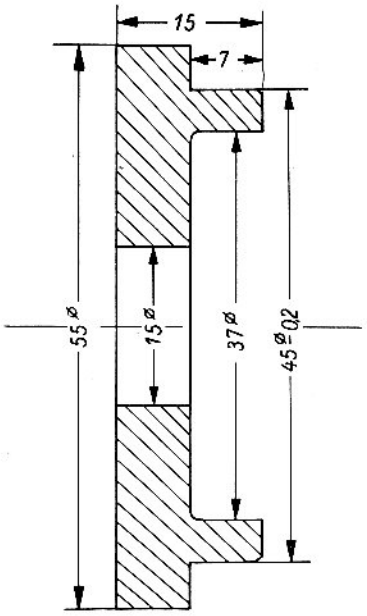
Right rear wheel = 0°, tolerance ± 30'
Left rear wheel = 0°, tolerance ± 30'

Deviation from zero position to the outside are negative, to the inside positive. The tolerances are valid for the permissible deviation of both wheels to the either positive or negative side, in both cases the track value is = + or –1°. If both wheels deviate in same direction from the zero position the total of both values may not exceed 40'.

Track of rear axle

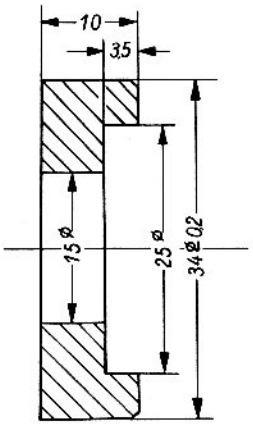
The track is obtainable from the scale pos. 15.

Nominal track value = 0° ± 1°



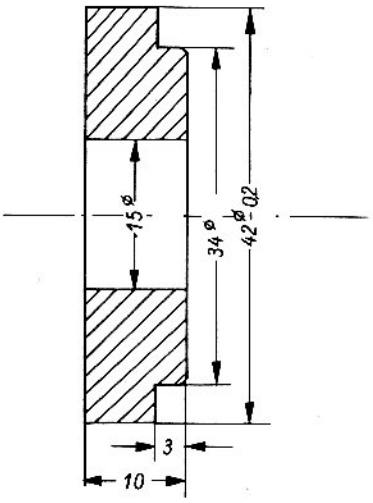
SW 23
Material: steel

Auxiliary tool for removal and refitting of silent-bloc for exterior rear axle mounting.



SW 24
Material: steel

Steel disc for extracting silent-bloc (Application with auxiliary tool SW 23).



SW 25
Material: steel

Steel disc for refitting new silent-bloc (Application with auxiliary tool SW 23).

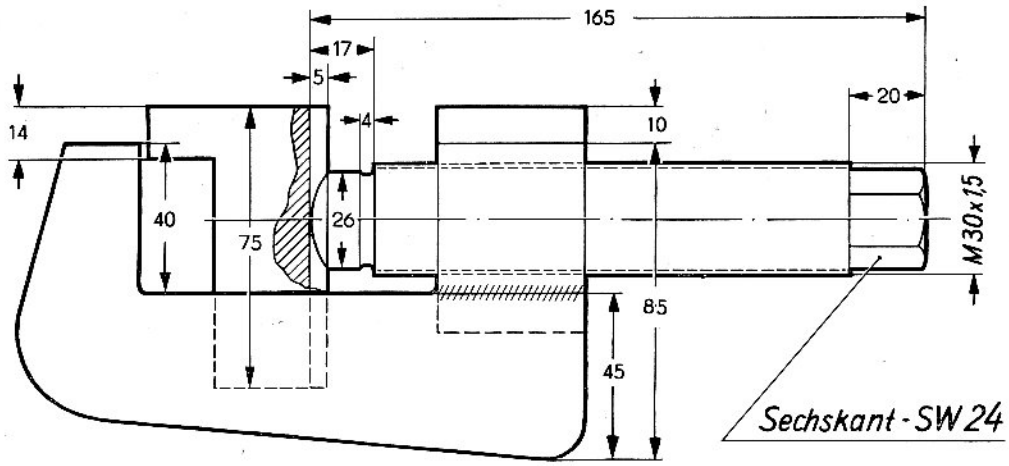
Note:

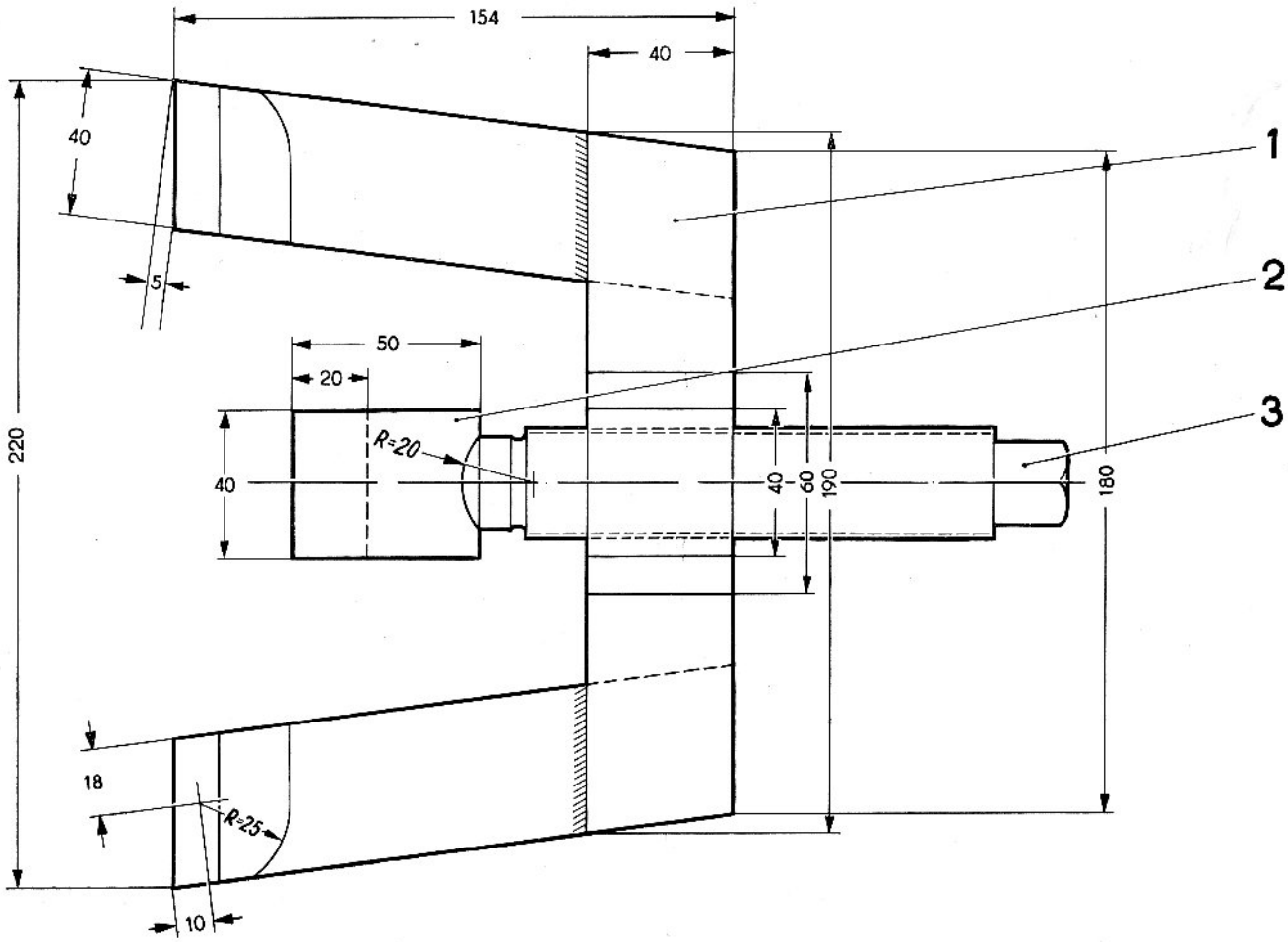
In addition to the auxiliary tools SW 23 and SW 24 a normal metal tube is required for the removal of a silent-bloc:

length of tube 80 mm with a diameter of 45 x 50, also hex. head bolt M 14 x 120. A new silent-bloc is fitted by means of the auxiliary tool SW 23, hex. head bolt M 14 x 180 and also auxiliary tool SW 25.

SW 26

Adjusting-tool for swing axle





1 = bracket
2 = pressure piece
3 = spindle