WHEEL BRAKES

General

The front and rear wheel brake assemblies are shown in the following illustrations.

The rear wheel brake differs from the front wheel brake in that a parking brake actuating lever and cable are connected to the secondary brake shoe. A pressure rod is installed between the two brake shoes and the shoes are activated by one double acting cylinder, whereas on both front wheels a single acting cylinder activates each brake shoe.

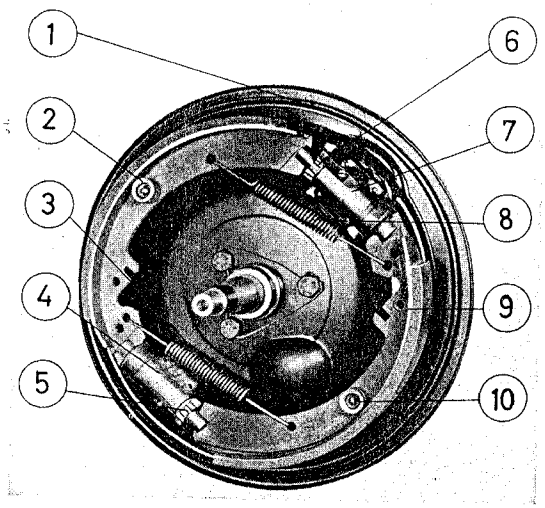
The brake shoes rest freely in the slots of the plungers and adjusting screws.

Constant contact of the shoes with the back plate is assured by two pressure springs which are anchored by dowel pins and collars. When the brake is released, the shoes are free from contact with the drums by return springs.

Adjusting screws and nuts allow adjustment of the brake shoes.

Front Wheel Brake

① **Brake back plate**
② **Pressure spring with collar**
③ **Return spring**
④ **Lower brake cylinder**
⑤ **Lower adjusting nut**
⑥ **Upper adjusting nut**
⑦ **Upper brake cylinder**
⑧ **Return spring**
⑨ **Brake shoe with lining**
⑩ **Pressure spring with collar**

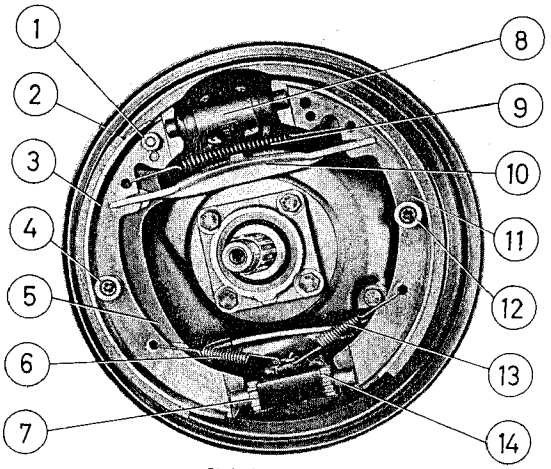


Right-hand side

Fig. 22

Rear Wheel Brake

① **Pivot bolt for parking brake actuating lever**
② **Brake back plate**
③ **Secondary brake shoe**
④ **Pressure spring with collar**
⑤ **Parking brake cable**
⑥ **Return spring**
⑦ **Adjusting nut**
⑧ **Brake cylinder**
⑨ **Return spring**
⑩ **Pressure rod**
⑪ **Primary brake shoe**
⑫ **Pressure spring with collar**
⑬ **Return spring**
⑭ **Adjusting nut**



Right-hand side

Fig. 23

7 Ti

Replacing Front Brake Shoes

Special tools: P 30, P 47

Removal

1. Jack up car, remove front wheel.
2. Remove brake drum (2 St).
3. Remove return springs, pressure springs with collars and dowel pins of brake shoes.
4. Remove brake shoes.

If dismounting takes some time, push clamp (P 47) over plungers of wheel brake cylinder, in order to prevent and piston cup from jumping out (see fig. 12).

Installation

The brake shoes are installed in reverse order, observing the following points:

1. Refer to special instructions on repair work on the brake system (page T 17).
2. Install brake shoes in correct position. The notch in the web points towards the piston side of the wheel brake cylinder.
3. Correctly attach return springs (see fig. 22).
4. Prior to assembly of brake drum check oil seal and conical roller bearing for proper condition.
5. Clean hub in brake drum and conical roller bearing and fill with approx. 3,05 cu. in. (50 c.c.) of multi-purpose grease (see Lubrication Chart, Group S).
6. Adjust front wheel bearings acc. to instructions (4 St).
7. Adjust brake and check effectiveness of entire brake system.

8 Ti

Replacing Rear Brake Shoes

Special tools: P 30, P 36, if nec. P 36 a, P 42, P 44 and 44 a, P 47

Removal

1. Jack up car, remove rear wheel.
2. Loosen castle nut, pull off brake drum.
3. Remove both lower return springs, pressure springs with collars and dowel pins of brake shoes.
4. Remove brake shoes with parking brake actuating lever, pressure rod and upper return spring, detach parking brake cable.

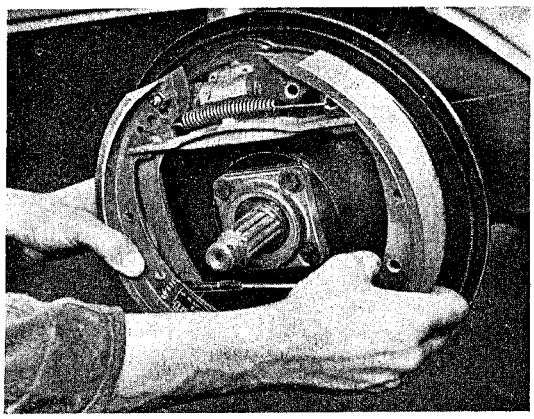


Fig. 24

5. Unhook upper return spring on brake shoes and remove parking brake actuating lever by loosening pivot bolt from brake shoe.

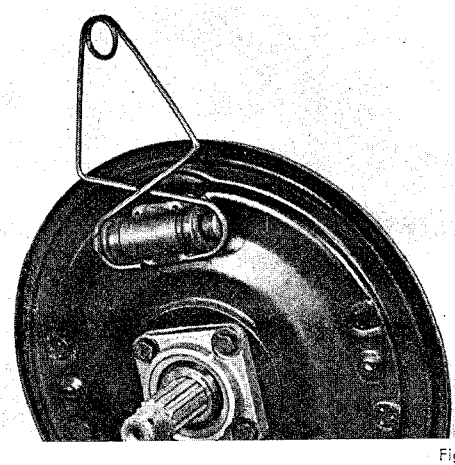


Fig. 25

If dismounting of the brake system takes some time, push clamp (P 47) over plungers of wheel brake cylinder, in order to prevent piston and piston cup from jumping out (see fig. 25).

Installation

The brake shoes are installed in reverse order, observing the following points:

1. Refer to special instructions on repair work on the brake system (page T 17).
2. Install brake shoes with parking brake actuating lever and pressure rod in correct position.
3. Correctly attach return springs (see fig. 23).
4. Tighten rear axle nut with 360–370 lbs.ft. (50–55 mkg) and secure with cotter pins.
5. Adjust foot and parking brake. Check entire brake system for perfect effectiveness.

Special Notes on Repair Work on the Brake System

1. Brake shoes cannot be relined with the commercial means available in service stations, since the brake linings are bonded acc. to a special method. When replacing brake shoes, use only complete brake shoes and linings.
   Replacement brake shoes are available: With normal linings of .28" (7 mm) thickness, for a brake drum inner diameter of 11.024" to 11.062" (280 to 281 mm); with oversize brake linings of .30" (7,5 mm) thickness, for a brake drum inner diameter of 11.062" 281 to 282 mm).
2. Care should be taken to ensure that one vehicle is equipped with 8 brake shoes and brake linings of identical design and material and that they meet the factory specifications.
3. A temporary deviation is only permitted, if there is a difference between both front wheel brakes and both rear wheel brakes. Discrepancies regarding the right and left front wheel brake or the right and left rear wheel brake are not allowed.
4. The brake drums of two opposing wheels should have equal inner diameters. Differences are limitted to 0.2 mm.
5. When doing work on the brake system avoid the brake linings and the braking surfaces in the brake drums getting into contact with oil or grease.
6. In order to obtain optimum effectiveness of new brake shoes, it is recommended to mark the lining surface with dry chalk (no oil chalk) and to refinish the brake lining according to the surface appearance obtained. When doing this, be careful not to remove more than 0.3 mm from the surface of the new brake lining.

Removing and Installing Front Brake Back Plate

Special tool: P 30

9 Ti

Removal

1. Jack up car, remove front wheel.
2. Remove brake drum (2 St).
3. Remove brake shoes and return springs, pressure springs, collars and dowel pins.
4. Loosen brake hose on wheel brake cylinder.
5. Remove securing wire on retaining bolts and unscrew brake back plate.
6. Remove brake back plate and separate it entirely from the brake hose by turning it.
7. Unscrew wheel brake cylinder and connecting line from brake back plate.

Installation

The brake back plate is installed in reverse order, observing the following points:

1. Tighten wheel brake cylinder in correct position, the piston side points towards sense of wheel rotation when driving forward.
2. Clean contact surfaces of stub axle and brake back plate.
3. Check brake back plate for proper condition (deformation and collision).

4. Tighten retaining bolts for brake back plate, using a torque wrench:
   Bolts of grade 8 G with 29 to 32,5 ft.lb. (4 to 4,5 mkg)
   Bolts of grade 10 G with 40 to 43,5 ft.lb. (5,5 to 6 mkg)

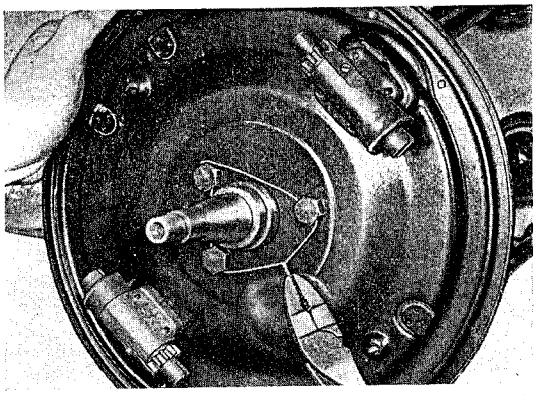


Fig. 26

5. Secure retaining bolts with wire so as to prevent back plate bolts from getting loose (see fig. 26).

6. Install brake shoes and return spring in correct position (see fig. 22).

7. Prior to installing brake drum, check conical roller bearing and oil seal for proper condition.

8. Clean hub in brake drum and conical roller bearing and pack with approx. 3,05 cu.in. (50 c.c.) multipurpose grease (see Lubrication Chart, group S).

9. Adjust front wheel bearing acc. to instructions (4 St).

10. Adjust and bleed brake (13 Ti). Remember dust caps on bleeder valves.

10 Ti

Removing and Installing Rear Brake Back Plate

Special Tools: P 30, P 36, if nec. P 36a, P 42, P 44 and 44a

Removal

1. Jack up car, remove rear wheel.
2. Loosen castle nut and pull off brake drum.
3. Remove spring collar, pressure springs and dowel pins, return springs, brake shoes with parking brake actuating lever and pressure rod.
4. Unscrew bracket for brake cable on brake back plate.

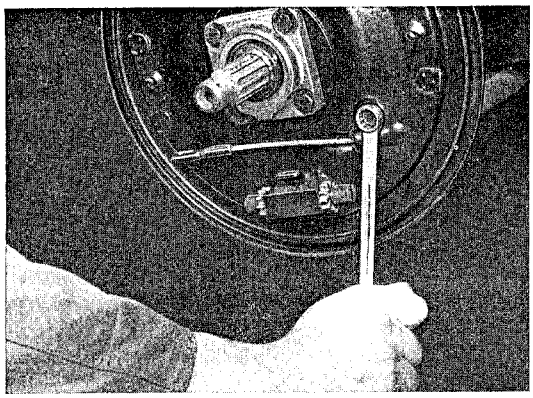


Fig. 27

5. Unscrew brake line from wheel brake cylinder.
6. Loosen brake back plate retaining bolts and take off brake back plate. Remount bearing cap provisionally, so that gear oil cannot escape.
7. Remove wheel brake cylinder and adjusting screws.

Installation

The brake back plate is installed in reverse order, observing the following points:

1. Clean contact surfaces between brake back plate, bearing flange and cover and check for damage.

2. Tighten wheel brake cylinder. Check easy movement of adjusting screws and grease.
   Check whether leaf springs for adjusting nut have sufficient load and insert adjusting nuts with screws. Replace weak leaf springs.

3. Prior to placing the bearing cap for the rear wheel bearing into position, check the appertaining oil seal for exact seat and proper condition.
   The rubber seals for the rear axle bearing should be replaced by new ones whenever effecting disassemblies. Check spacer and cover plate for proper conditions, if necessary replace.

4. Install brake back plate. Make sure that rubber seals are correctly seated and are not jammed. Tighten retaining bolts of brake back plate by means of torque wrench:
   Bolts of grade 8 G with 29 to 32,5 ft. lb. (4 to 4,5 mkg),
   Bolts of grade 10 G with 40 to 43,5 ft. lb. (5,5 to 6 mkg).

5. Install brake shoes with parking brake actuating lever and pressure rod in correct position.

6. Correctly attach return springs (see fig. 23).

7. Tighten rear axle nut with 360–370 lbs. ft. (50 to 55 mkg) and secure with cotter pins.

8. Adjust foot and parking brake. Bleed brake system (13 Ti). Do not forget dust cap on bleeder valve.

Removing and Installing Parking Brake Cables

11 Ti

Special tools: P 30, P 36, if nec. P 36a, P 42, P44 and 44a, P 47

General

The parking brake acts mechanically on the rear wheels. The power applied to the parking brake is transmitted via the front hand brake cable on to a bell crank, from there via the central hand brake cable, which is connected with 2 additional brake cables by a cable coupling, which act on the actuating levers of the rear wheels.

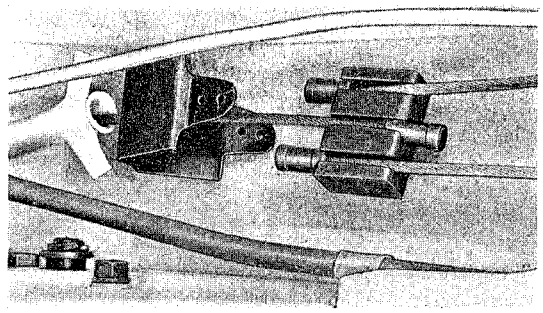


Fig. 29

Removal

1. Jack up car, remove rear wheels.

2. Remove both rear brake drums.

3. Remove brake shoes, left and right (8 Ti).

4. Unscrew bracket of parking brake cables at brake back plates.

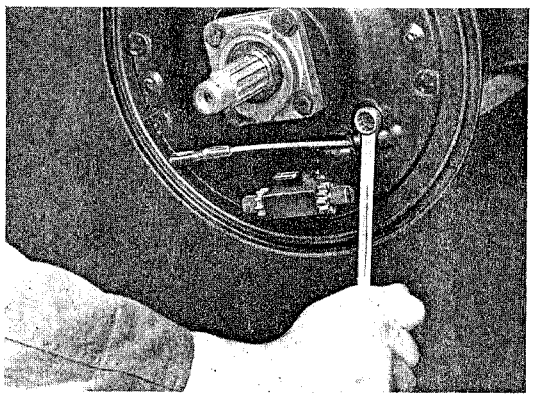


Fig. 28

5. Remove floor board at pedal assembly side and front tunnel covering.

6. Detach spring on cable coupling, unhook parking brake cables.

7. Pull out rear parking brake cables backwards.

8. Unscrew adjusting nuts from central parking brake cable and pull out cable towards front.

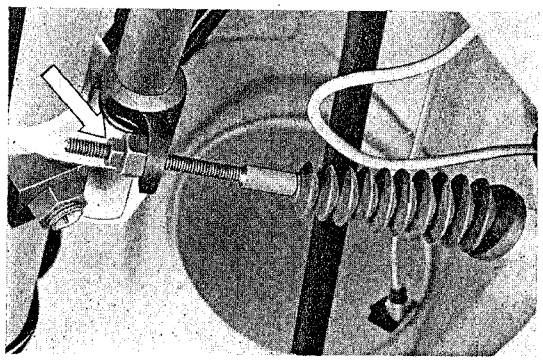


Fig. 30

9. Open front hood, remove cover to steering gear (see fig. 5).

10. Unhook front parking brake cable on bell crank.

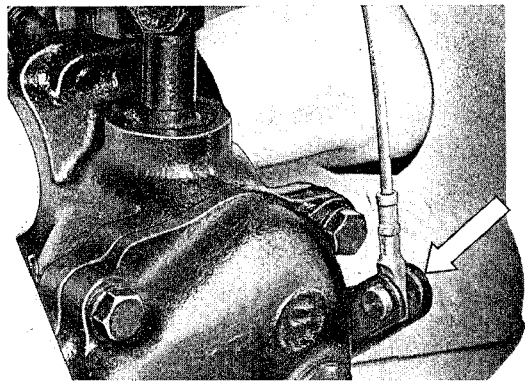


Fig. 31

11. Upon loosening the two retaining nuts, remove parking brake assembly.

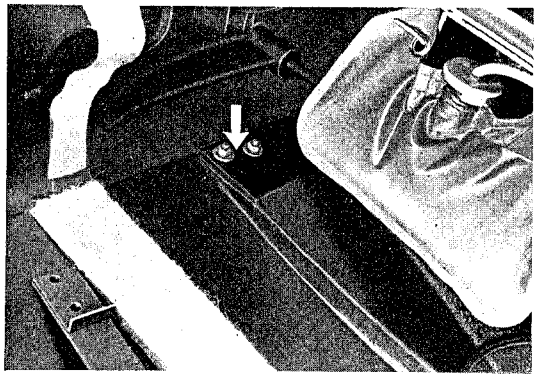


Fig. 32

12. For removal of front hand brake cable dissassemble parking brake actuating system.

Installation

The parking brake cables are installed in reverse order, proceeding acc. to the following points:

1. Correctly assemble parking brake actuating system.

   a) The arresting part side, marked by a "L", must face towards the handle (vice versa with right-hand drive cars).

   b) The hollow of the locking part must point towards the handle.

   The correct succession of the parts to be installed is as follows: (from handle downward) arresting part, spring, locking part, and shim.

   When inserting the parking brake assembly, the handle should be in vertical position, the "L" (or "R" respectively) on the arresting part and the notch mark on the locking part should be visible in the hole.

2. Remember sealing rubbers for parking brake actuating system.

3. Preload brake cable before attaching by approx. half a turn, so that the handle returns automatically from the release position to the horizontal initial position.

4. See to it that adjusting sleeves and nuts move easily.

5. Clean brake cables, fill cable guides with grease.

6. When replacing a brake cable by a new one, make sure to use the correct length.

7. Adjust foot and parking brake (16 Ti and 18 Ti). Check whether brake system functions properly.

Overhauling Brake Drum

Special tools: P 38, VW 400, VW 401, VW 411, VW 418

12 Ti

General

If the inner diameter of brake drums, which are unevenly worn, scored or oval, has not yet reached the wear limit of 11.1023" (282 mm) they may be made serviceable by machining.

Prior to machining a brake drum, it should be checked whether the ovalty which is felt by a intensively vibrating brake pedal, is not caused by incorrectly balanced wheels, a wobbling rear axle shaft or unevenly worn tires. Wobbling rear axle shafts must be replaced. Checking foot and parking brake separately will indicate whether the ovalty is caused by the front axle or the rear axle. It may,however, occur that inspite of a correctly machined brake drum and true running axle shaft the mounted brake drum does not run unobjectively. This may be traced back to a small difference between the serration of the axle shaft and that on the mandrel P 38. This can be remedied by offsetting the brake drum on the serration.

After every machining of the brake drums check carefully whether the inner diameter does not exceed the permissible wear limit of 11.1023" (282 mm). To ensure proper reconditioning of the brake drums, an accurate lathe must be available. Not only machining on brake drums, but also most of the inspection jobs on shafts, rods etc. are carried out on the lathe.

It is very important that the contact surfaces and bearing seats of the drums are cleaned carefully prior to mounting the brake drums on the lathe. Dirt will make perfect eccentricity of the drums impossible, or cause run-out.

If the brake drums have already reached their wear limit or are near it, or if their bearing seats are worn beyond possibility of press fit of the bearing, they have to be replaced by new ones. The same applies if the rear wheel brake drum rivets are insecure.

To avoid unequal braking action, make certain that brake drums opposite each other do not differ as to their inside diameter more than .008" (0.2 mm).

Machining

1. Remove front brake drum, conical roller bearing and oil seal.
2. Clean brake drum.
3. Mount brake drum on mandrel (P 38).
4. Place brake drum and mandrel between head and tail stock of lathe and check for run-out.
5. Machine drum surface by means of carbide lathe tool at low cutting speed, adhering to the max. permissible tolerance of 11.10" (282.0 mm). Make sure that surface is perfectly smooth, do not polish.

Inspection

1. Care must be taken to avoid a tapering cut of the braking surface (Max. permissible taper .04" = 0.1 mm).
2. Reverse mandrel P 38 and drum in lathe and check drum for run-out. Check at point where wheel contacts drum (at wheel studs on the side away from center of drum). Permissible run-out .004" (0.1 mm). If necessary press out wheel bolts and reface wheel contact surface.
3. The braking surfaces of two opposite drums should be of one series (of equal make).

Characteristics for identification:

Version a) without mark

Version b) small bore or punch
at 1.6" (4 mm) wide face of brake surface.

Replacing Wheel Bolts

Wheel bolts may be removed and refitted using VW repair press 400 in connection with VW 401, VW 411, and VW 418. Damaged wheel bolts should be replaced by new ones.

If wheel bolts fit loosely, they must be replaced by oversize bolts.