

# Chapter 6

## Braking system

The design of the braking system is shown on fig. 6-1.

### Fault diagnosis

Diagnosis	Remedy
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#### *Insufficient efficiency of braking*

1. Leak of brake liquid from wheel cylinders of front or rear brakes	1. Renew bad components of wheel cylinder, wash and dry shoes and drums, bleed braking mechanism
2. Air in brake system	2. Expel air from system
3. Damaged rubber sealings in master brake cylinder	3. Renew seals and bleed system
4. Damaged hydraulic system rubber hoses	4. Renew hoses

#### *Spontaneous braking at working engine*

1. Air inleak in servo unit between valve housing and protective cap	1. Replace servo unit
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#### *Incomplete brake release on all wheels*

1. No brake pedal free travel due to wrong position of stop-signal switch	1. Adjust switch position
2. Projection of servo unit adjusting bolt in relation to fastening surface of master cylinder exceeds 1.25 <sup>±0.2</sup> mm	2. Adjust bolt position (see fig. 6-2)
3. Jammed servo unit valve housing	3. Replace servo unit
4. Plugged compensation aperture in master cylinder	4. Clean aperture and bleed system
5. Swollen master cylinder rubber sealings due to penetration of petrol, mineral oils and etc in liquid.	5. Carefully wash system with brake liquid, renew damaged rubber parts, bleed system
6. Jammed master cylinder piston	6. Check and replace, if necessary, master cylinder, bleed system

#### *Snubbing of one wheel at released brake pedal*

1. Loose or damaged return spring of rare brake shoes	1. Renew spring
2. Jammed piston in wheel cylinder due to corrosion	2. Dismantle cylinder, clean and wash all components, renew damaged parts
3. Swollen wheel cylinder sealing due to penetration of fuels and lubricants in liquid	3. Renew rings, wash system with brake liquid
4. No gap between shoes and drum	4. Adjust parking brake
5. Wrong position of caliper in relation to brake disc due to loose bolts that are fastening carrier to steering knuckle	5. Tighten securing bolts, renew damaged parts if necessary
6. Excessive runout of brake disc (more than 0.15 mm)	6. Grind disc, in case thickness is less than 9 mm - renew

#### *Vehicle wandering or skidding at braking*

1. Leak of brake liquid in one of wheel cylinders	1. Renew seals and bleed system
2. Jammed piston in brake wheel cylinder	2. Check and rectify piston sticking in cylinder, renew damaged components if necessary
3. Clogged tube due to dent or contamination	3. Renew or clean tube, bleed system
4. Different pressure in tyres	4. Adjust pressure
5. Wrong wheel alignment angles	5. Adjust angles
6. Dirty or oily discs, drums and linings	6. Clean braking mechanism components
7. Wrong adjustment of pressure regulator	7. Adjust position
8. Faulty pressure regulator	8. Adjust or renew

#### *Excessive pedal effort at braking*

1. Plugged air filter	1. Renew air filter
2. Jammed servo unit valve housing	2. Renew servo unit
3. Damaged hose between servo unit and engine inlet pipe, or its loose fastening on connectors	3. Renew hose or tighten clips
4. Oxidation of brake pedal metal bushes or dry greasing in pedal bushes	4. Renew worn parts or greasing

#### *Scratch or squeal of brakes*

1. Loose shoe return spring	1. Inspect return spring, replace if necessary
2. Ovality of drums	2. Remachine brake drum
3. Excessive oil on friction linings	3. Clean pads using metal brush with warm water and washing liquid. Eliminate cause of liquid or lubricate ingress
4. Worn linings or trapped detrimental inclusions	4. Renew pads
5. Excessive disc runout or non-uniform wear	5. Grind disc, in case thickness is less than 9 mm - renew

## Inspection and adjustment

### Pipelines and connections - inspection

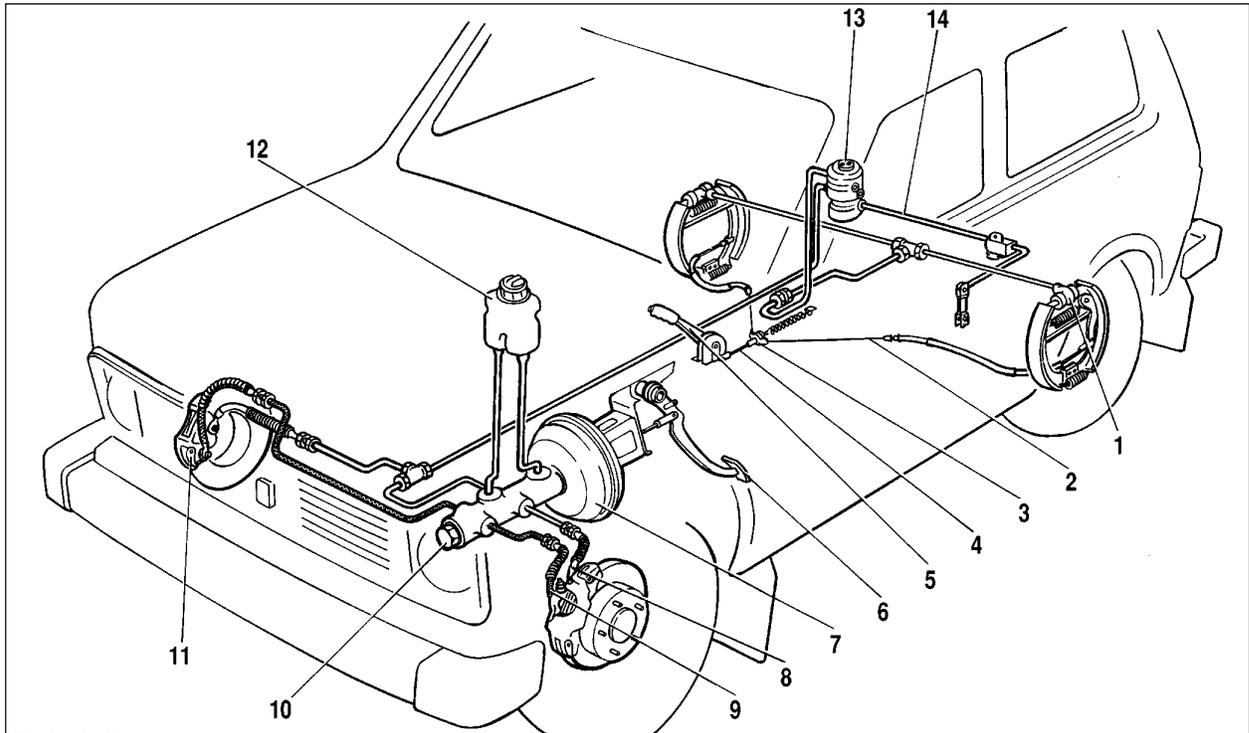
To prevent any occasional failure of the braking system carefully inspect all pipelines:

- metal pipelines should have no dents or cracks and should lie far from sharp edges that can damage them;

- brake hoses should have no cracks on the outer surface and should not get in contact with mineral oils and greasings that dissolve rubber; heavily depress the brake pedal and inspect the hoses for bulges that will indicate malfunctions;

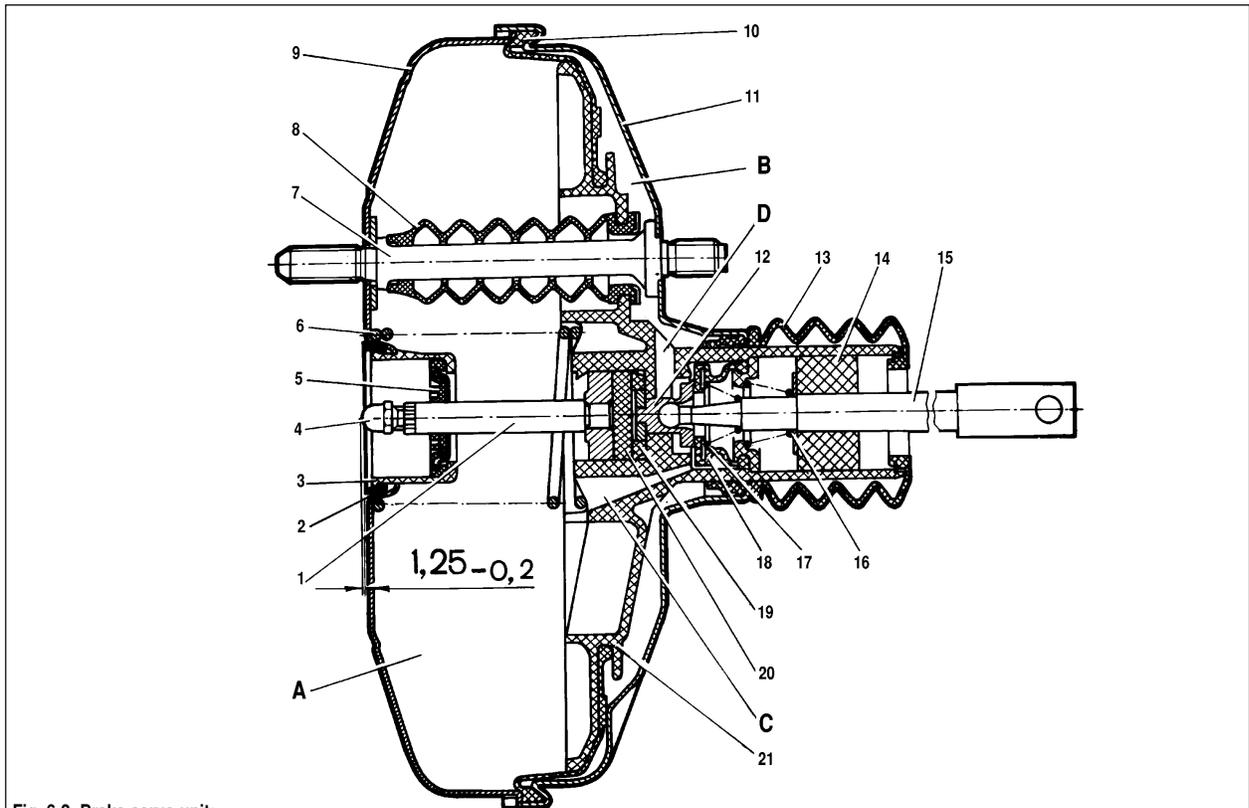
- all brake lines should be reliably fastened; loose fastening will result in vibration causing damage;

- liquid leak through pipeline connections is not allowed; if necessary, fully tighten the connections without deforming the pipelines.



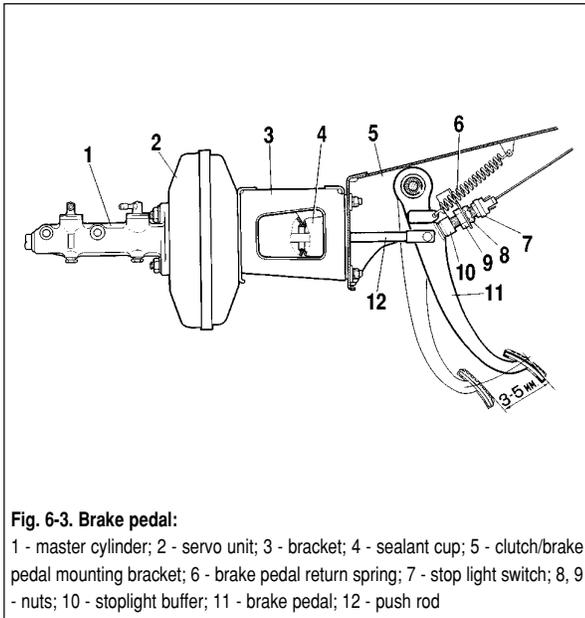
**Fig. 6-1. Braking system:**

1 - rear brake wheel cylinder; 2 - parking brake rear cable; 3 - rear brake guide; 4 - parking brake front cable; 5 - parking brake lever; 6 - brake pedal; 7 - servo unit; 8 - second circuit pipeline; 9 - primary circuit pipeline; 10 - master cylinder; 11 - wheel cylinder block, front brakes; 12 - master cylinder tank; 13 - pressure regulator; 14 - pressure regulator control arm



**Fig. 6-2. Brake servo unit:**

1 - rod; 2 - master cylinder flange sealing ring; 3 - servo housing cup; 4 - adjuster bolt; 5 - rod sealing; 6 - diaphragm return spring; 7 - pin; 8 - sealing boot; 9 - servo unit housing; 10 - diaphragm; 11 - servo unit housing cover; 12 - piston; 13 - valve body boot; 14 - air cleaner; 15 - push rod; 16 - push rod return spring; 17 - valve spring; 18 - valve; 19 - valve body bush; 20 - reaction disc; 21 - valve body; A - vacuum chamber; B - atmospheric chamber; C, D - ports



**Fig. 6-3. Brake pedal:**

1 - master cylinder; 2 - servo unit; 3 - bracket; 4 - sealant cup; 5 - clutch/brake pedal mounting bracket; 6 - brake pedal return spring; 7 - stop light switch; 8, 9 - nuts; 10 - stoplight buffer; 11 - brake pedal; 12 - push rod

Renew the components in the slightest doubt in serviceability.

Flexible hoses, irrespective their condition, should be renewed after 100000 km or after 5 years of vehicle operation to prevent sudden breaks due to aging.

After five years of operation it is recommended to renew the brake liquid.

### Servo unit -serviceability check

Press the brake pedal 5-6 times with the engine not working to create in cavities A and B (fig. 6-2) identical pressure close to atmospheric. Simultaneously, by effort applied to the pedal, define, whether the valve housing 21 is jammed.

Stop the brake pedal in the middle of its travel and start the engine. If the servo unit is OK, the brake pedal after engine start should "go forward".

If the pedal does not "go forward", check the fastening of the hose end piece, condition and fastening of the end piece flange in the booster, hose-to-end piece fastening and connection to the engine inlet pipe, because loose fastening or damage will significantly reduce the underpressure in cavity A and performance efficiency of the unit.

In case of vehicle spontaneous braking, check the servo unit for leak-proofness with the engine running, first with a released, and then depressed motionless brake pedal. "Sticking" of the protective cap 13 to the valve housing tail and hissing of inleaking air will indicate insufficient tightness of the servo unit. In these cases the unit should be renewed.

### Brake drive adjustment

The free travel of the brake pedal with engine not working should be 3-5 mm. This size is received by adjusting the position of the stoplight switch 7 (fig. 6-3).

If the stoplight switch is too close to the pedal, it does not come back to the initial position, valve 18 (see fig. 6-2), being pressed to housing 21, separates cavities A and B, and it results in incomplete release of wheels when the pedal is let off.

To adjust the stop-light switch position slacken nut 8 and by rotating nut 9 (see fig. 6-3) position the switch so that its buffer will slightly touch the pedal rest, thus the pedal free travel should make 3-5 mm. After adjustment tighten nut 8.

**ATTENTION. The brake pedal free travel adjustment is made with the engine not working.**

If the adjustment of the stoplight switch fails to remedy the brake mechanism, disconnect the master cylinder from the servo unit and check the protrusion of the adjusting bolt 4 (see fig. 6-2) in relation to the fastening plane of the master cylinder flange (size  $1.25^{+0.2}$ ). This size can be established by holding with a special key the end of rod 3, and with the other key screwing in or undoing bolt 28.

### Handbrake adjustment

**Note.** In the end of year 1995, the design of the handbrake lever quadrant was changed - the first tooth of the sector became double and thus the order of adjustment, marked below in the text with a "\*" sign, has changed.

If the handbrake does not hold the vehicle on a slope up to 25 % when moving the lever by 4-7 (2-8) \* teeth of the quadrant, adjust the handbrake in following order:

- shift the handbrake lever to the lowest position and then lift by 1-2 teeth of quadrant (this operation is carried out only for the gear sector of the "old" design);
- slacken locknut 5 (fig. 6-4) and by turning the adjusting nut 6 take up cable 1;
- check the full travel of the handbrake lever, which should be 4-5 (2-4)\* teeth on the quadrant, then tighten locknut 5.

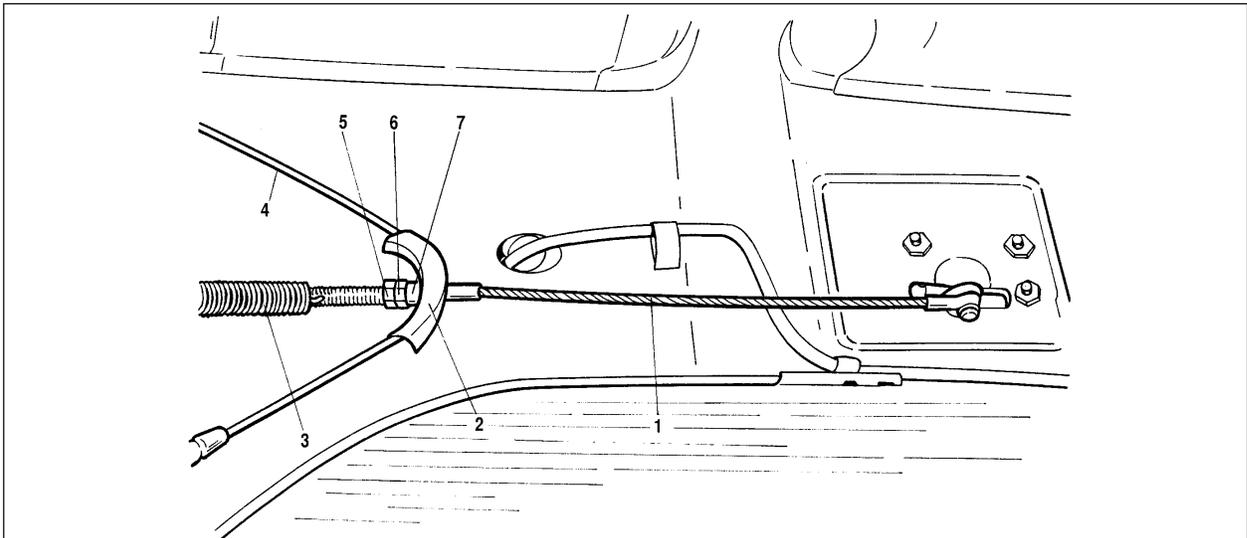
Apply the brake pedal several times to ensure that the lever travel does not change and wheels rotate without jamming at fully lowered lever.

**Note.** If the cables were renewed, depress the brake pedal two or three times applying force on the lever of approx. 392 N (40 kgf). Thus the cables will be stretched.

### Pressure regulator serviceability check

Position the vehicle on a lift or over an inspection pit, clean the pressure regulator and protective cover from dirt.

Carefully remove the protective cover from the pressure regulator, remove the remains of greasing and clean the "torsion-piston" connection.



**Fig. 6-4. Handbrake linkage:**  
 1 - front cable; 2 - rear cable guide; 3 - front cable return spring; 4 - rear cable; 5 - locknut; 6 - adjusting nut; 7 - spacer

Ask an assistant to press the brake pedal with effort of 686-784 N (70-80 kgf) and simultaneously observe the outcoming part of the pressure regulator piston. If the piston moves by 0.5-0.9 mm in relation to the regulator housing, thus twisting the torsion arm, the pressure regulator is efficient. Repeat the pedal depressing 2-3 times to completely ensure the serviceability of the pressure regulator.

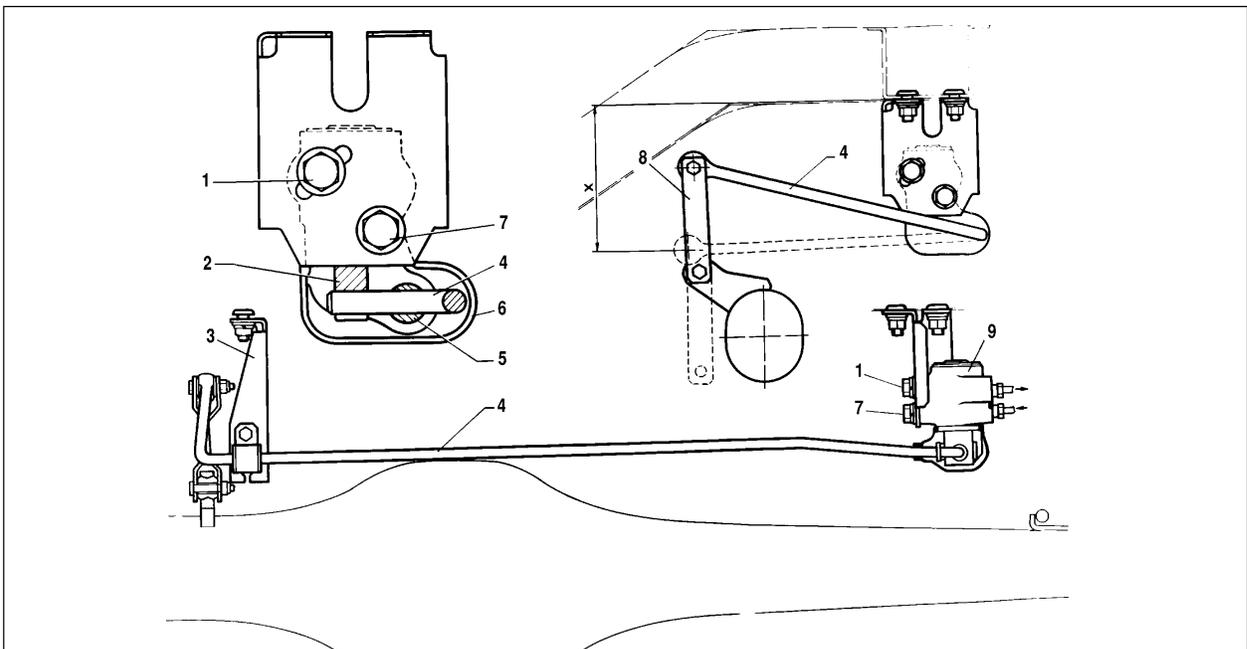
If during pedal depressing the piston remains motionless, this means that the piston became stuck to the housing due to corrosion, and pressure regulator renewal is required.

After ensuring the pressure regulator serviceability and no brake liquid leaks between the piston and the pressure regulator

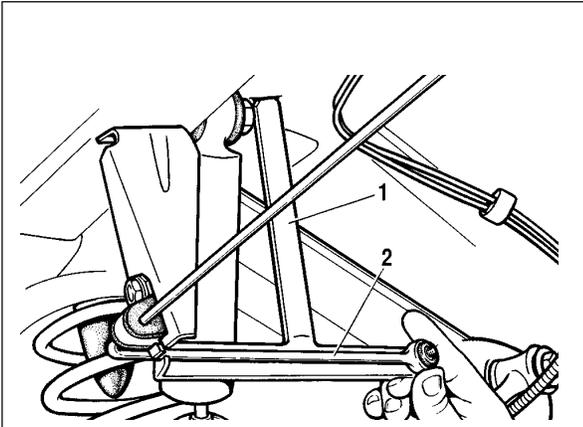
housing, apply a thin layer of ДТ-1 on the shaft and the acting part of the piston, fill 5-6 gr. of this greasing in the rubber boot and refit the cover.

### Pressure regulator position adjustment

The pressure regulator position adjustment is required if the fastening bolts became loose. Raise the vehicle rear axle. Disconnect arm 4 (fig. 6-5) from tie-rod 8 and fix on its end tool 67.7820.9519. Direct the core of the tool upwards until it will get pressed against the car floor (fig. 6-6). This will be distance "X" from the arm end to the body chassis arm (see fig. 6-5), equal to  $(150 \pm 5)$  mm.



**Fig. 6-5. Installation of the rear brake pressure regulator and adjustments:**  
 1, 7 - regulator securing bolts; 2 - piston; 3 - thrust washer bracket; 4 - pressure regulator control arm; 5 - shaft; 6 - cap; 8 - tie rod; 9 - pressure regulator; X =  $150 \pm 5$  mm



**Fig. 6-6. Installing tool 67.7820.9519 to adjust the position of the rear brake pressure regulator:**

1 - tool 67.7820.9519; 2 - pressure regulator control arm

Raise the protective rubber cap 6 (see fig. 6-5) and, by turning the pressure regulator on the bolts, get a slight contact between the arm and piston 2.

Keep the regulator in this position, fully tighten bolts 1 and 7, then apply a thin layer of greasing ДТ-1 on shaft 5 and the working part of piston 2. Fill 5-6 gr. of the same greasing in rubber cap 6 and refit.

Remove tool 67.7820.9519 and reconnect the arm end with tie-rod 8.

## Hydraulic system bleeding

Air, that got into the brake hydraulic system during replacement of pipelines, hoses, sealing rings or due to system leak, causes increase of brake pedal free travel, its "softness" and considerably reduces braking efficiency.

Before bleeding the brake system ensure the leak-proofness of all system units and their connections, check and if necessary fill the tank with brake liquid up to normal level. Then carefully clean from dirt and dust the bleeding connectors and remove the protective caps.

Fit a rubber hose on the connector (fig. 6-7) for liquid drain, and place its free end in a transparent vessel partially filled with liquid.

Sharply depress the brake pedal 3-5 times, with 2-3 sec. intervals, undo the connector by 1/2-3/4 turn with the pedal depressed. Continue to press the pedal, bleed liquid with air through the hose into the vessel. After the brake pedal will reach the lowest front position and the liquid drain through the hose will be finished, tightly close the bleeding connector. Repeat these operations until all air bubbles will be bled from the hose. Then, keeping the brake pedal in depressed position, tightly close the bleeding connector and take off the hose. Wipe dry the connector and refit the protective cap.

All above operations should be carried out through the upper connectors first on the right rear wheel, the most remote from the master cylinder, then further clockwise: the left rear wheel, left and right front wheels. Thus, air from one circuit will be removed. To bleed the other circuit use the lower connectors on the cylinder block of the left and right front brakes. Bleeding can be started from the right or left wheel.

During bleeding maintain normal liquid level in the hydraulic system tank. If there is no air in the system the brake pedal should go no more than 1/2-3/4 of full travel.

To exclude the influence of the servo unit and the pressure regulator on bleeding the hydraulic system, it should be carried out with the engine not working and rear wheels loaded (do not raise the rear part of the vehicle).

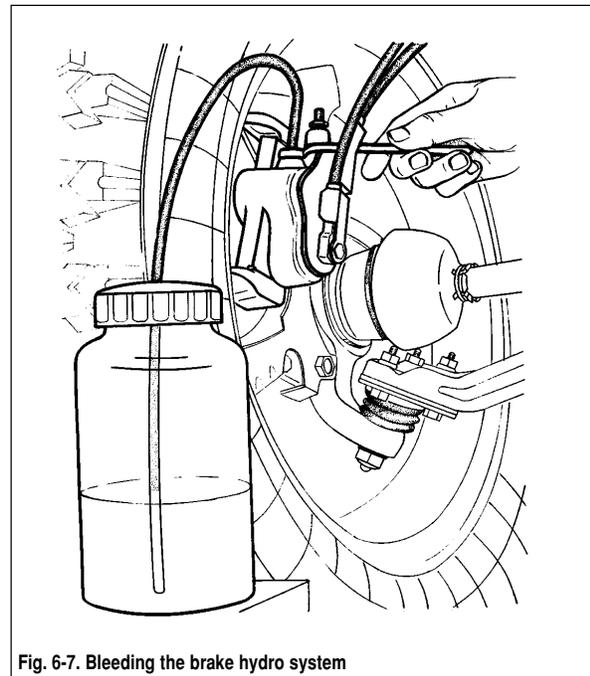
If the brake liquid was completely drained from the system, do the following before bleeding air:

- undo the bleeding connector by 1.5-2 turns on all wheel cylinders;
- sharply depress the brake pedal and smoothly release it, close the connector when liquid will be drained. Then bleed the hydraulic system, as described above.

If, despite continuous bleeding, the air bubbles still come out from the hose into the vessel, it means air penetrates into the system through damaged pipelines, because of insufficient tightness of connections or due to malfunction of the master or wheel cylinders.

When bleeding the vehicle, the braking system of which has worked for a long time, renew the brake liquid.

If the brake liquid is suitable for further use, carefully filter the liquid, and then desilt in a tightly closed vessel.



**Fig. 6-7. Bleeding the brake hydro system**

## Clutch and brake pedal bracket

**Removal and refitting.** To remove the pedal bracket:

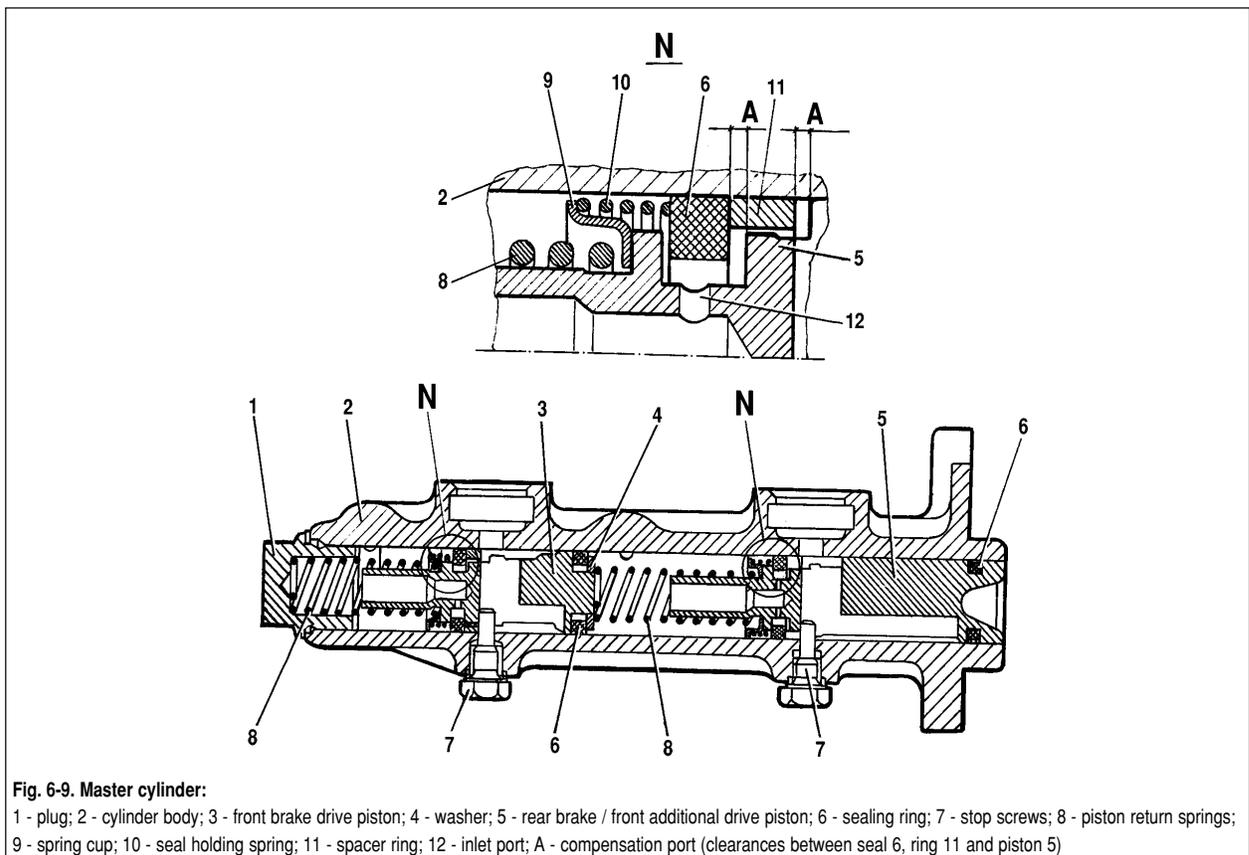
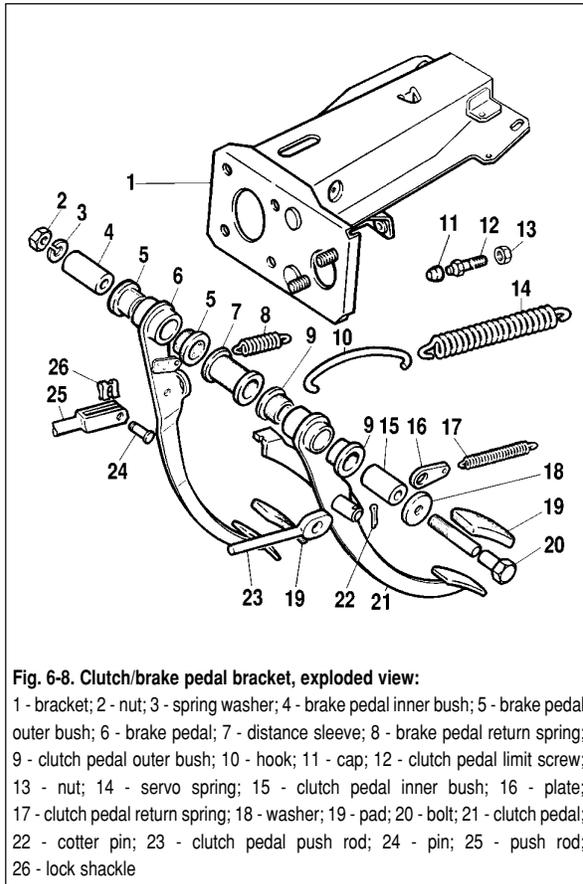
- remove the steering shaft bracket, as mentioned in section "Steering";
- disconnect the servo unit push rod from the brake pedal, having removed lock shackle 26 (fig. 6-8) and taken out pin 24;
- disconnect the wires from the stoplight switch;
- undo the nuts that are fixing the brackets of the servo unit and pedals to the body front and remove the bracket in assembly with the servo unit and the master cylinder, and then the clutch and brake pedal bracket.

Refitting is carried out in reverse sequence. Pay attention to correctly refit the push rod in the jack of the clutch master cylinder piston.

**Dismantle and reassembly.** To dismantle, remove the clutch pedal servo unit spring 14, remove return springs 8 and 17, undo nut 2 of bolt 20, take out the bolt and remove the pedals together with bushes.

To remove and refit the springs use tool A.70017.

Reassembly of the master cylinder is carried out in reverse order. When reassembling, grease with ЛИТОЛ-24 the pedal bushes, spring ends, connection places between the push rods and pedals, and the push rod end adjoining the piston of the clutch master cylinder.



**Check and repair.** At hard pedal movement examine the working surfaces of pedals, bushes and shaft.

If there will be small risks or traces of oxidation on surfaces of metal parts, grind them slightly with sandpaper; renew worn outer plastic bushes on pedals.

Check the spring tension. The length of the brake pedal spring should be: under load of  $12.8 \pm 1.96$  N ( $1.3 \pm 0.2$  kgf) - 80 mm, under load of  $117.5 \pm 5.88$  N ( $12 \pm 0.6$  kgf) - 160 mm.

The clutch pedal return spring has the length of 130 mm under load of  $36.26 - 30.38$  N ( $3.7 - 3.1$  kgf), and 155 mm under load of  $49.49 - 42.63$  N ( $5.05 - 4.35$  kgf). Length of the clutch servo unit spring under load of  $219.52 - 180.32$  N ( $22.4 - 18.4$  kgf) should be 120 mm, and under load of  $645.82 - 529.22$  N ( $65.9 - 53.9$  kgf) - 152 mm.

## Servo unit

**Removal and refitting.** When removing the servo unit, do not disconnect the brake hydrodrive master cylinder from the hydraulic system to avoid air penetration.

The order of removal:

- disconnect the servo unit push rod from the pedal;
- undo the nuts fastening the master cylinder to the unit, remove it from pins and move aside;
- disconnect the hose from the servo unit;

- undo the nuts fastening the servo unit bracket to the body front and remove the unit in assembly with the bracket.

Refitting of the servo unit is carried out in reverse order.

## Master cylinder

The design of the master cylinder is shown on fig. 6-9.

**Removal and refitting.** Disconnect the flexible hoses from the master cylinder and close the openings of hoses and connectors on the cylinder to prevent liquid leak from reservoir and penetration of dust, dirt or foreign matters.

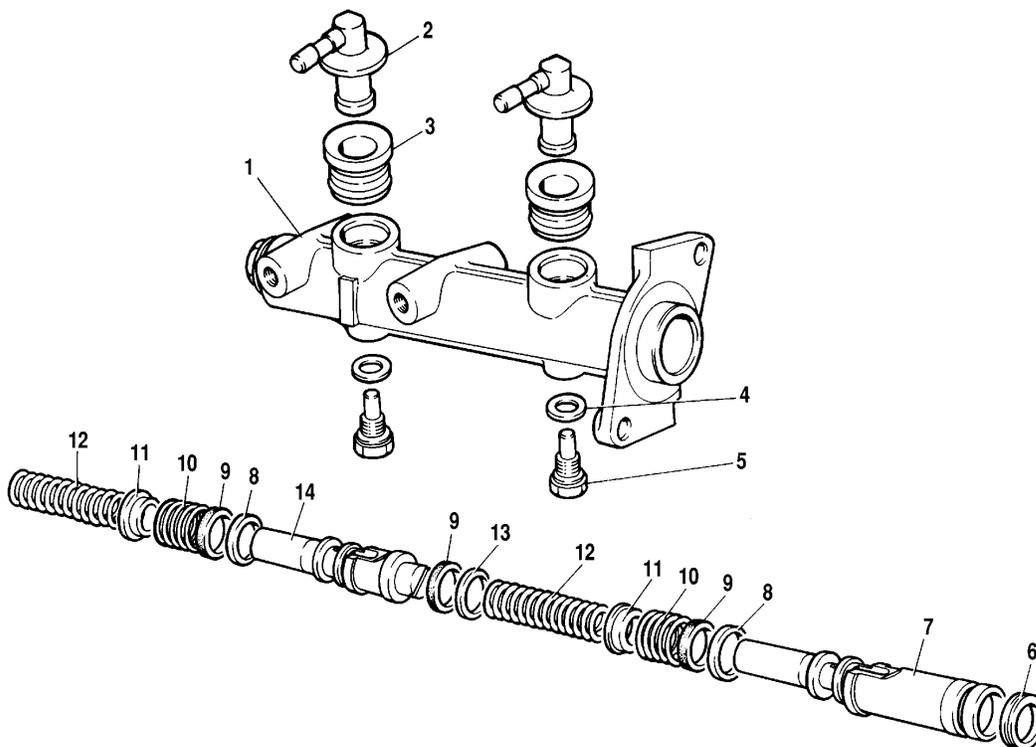
Undo the tube nuts and disconnect from the master cylinder the steel pipelines that are carrying liquid to wheel cylinders of front and rear brakes.

Remove the cylinder, having undone the nuts that are fastening it to the servo unit.

Refitting of the master cylinder is carried out in reverse sequence. After refitting the cylinder, bleed the hydraulic system to expel air.

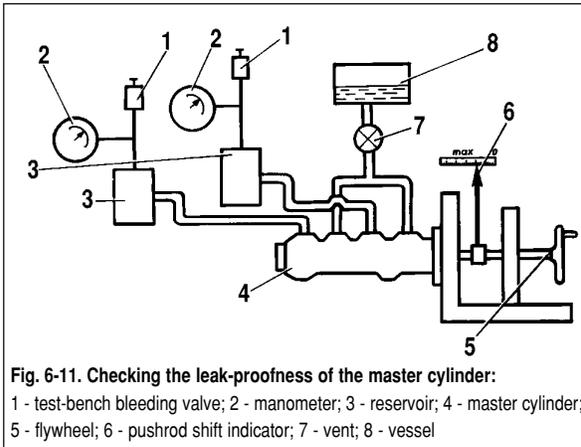
**Dismantle and reassembly.** Remove connectors 2 (fig. 6-10) with connecting bushes 3, turn out lock bolts 5 and take out all components in order specified on fig. 6-10.

The reassembly of the cylinder is carried out in reverse sequence. Grease all components with brake liquid. When reassembling, use tool 67.7853.9543.



**Fig. 6-10. Master cylinder components:**

1 - cylinder body; 2 - connector; 3 - connector bush; 4 - sealing washer; 5 - lock bolt; 6, 9 - sealing rings; 7 - rear brake / front additional drive piston; 8 - distance ring; 10 - sealing ring holding spring; 11 - spring cup; 12 - piston return spring; 13 - washer; 14 - front brake drive piston



**Fig. 6-11. Checking the leak-proofness of the master cylinder:**  
 1 - test-bench bleeding valve; 2 - manometer; 3 - reservoir; 4 - master cylinder; 5 - flywheel; 6 - pushrod shift indicator; 7 - vent; 8 - vessel

**Inspection of components.** Before reassembly, wash all components with isopropyl alcohol; dry by a jet of compressed air or wipe with a clean cloth, but do not allow their contact with mineral oil, kerosine or diesel fuel, which can damage the sealings.

**Note.** Time of washing the sealing rings in isopropyl alcohol is no more than 20 seconds with subsequent drying by compressed air.

The cylinder mirror and working surfaces of pistons should be completely clean, without rust, marks and other defects. No excessive gap between the cylinder and pistons is allowed.

Every time, when dismantling the cylinder, renew the sealings, even if they are in good condition.

Check the piston spring tension, the length of which should be 41.7 mm under load of  $42.18 \pm 3.92$  N ( $4.3 \pm 0.4$  kgf), 21 mm under load of  $90.64 \pm 8.83$  N ( $9.24 \pm 0.9$  kgf), in free state - 59.7 mm.

**Master cylinder leak-proofness check.** Place the master cylinder on a test bench and connect it to the bench elements, as shown on fig. 6-11.

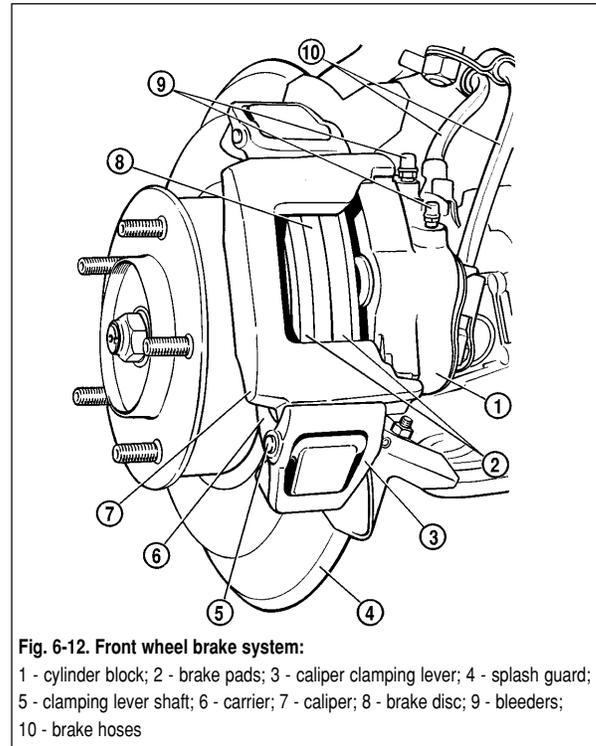
Open the bench bleeding valves 1 and, by moving the master cylinder piston several times by its full stroke, bleed the system. Then close valves 1. Rotate flywheel 5, slowly move the master cylinder pistons until pressure monitored by manometer 2 will reach 12.5 MPA ( $125 \text{ kgf/cm}^2$ ). In this position block the master cylinder push rod. Specified pressure should remain constant for no less than 5 seconds.

In case of liquid leaks or drop of established pressure during 5 seconds, renew the cylinder piston sealings.

## Front brakes

The design of the front brake is shown on fig. 6-12.

Before repairing the brakes, carefully wash them in warm water with washing liquids and immediately dry with a jet of compressed air.



**Fig. 6-12. Front wheel brake system:**  
 1 - cylinder block; 2 - brake pads; 3 - caliper clamping lever; 4 - splash guard; 5 - clamping lever shaft; 6 - carrier; 7 - caliper; 8 - brake disc; 9 - bleeders; 10 - brake hoses

**ATTENTION.** Do not use petrol, diesel fuel, trichloroethylene or any other mineral solvents to clean the brakes, as these materials damage the cylinder sealings.

## Removal and refitting

**Removal.** Lift the front part of the vehicle, place it on supports and remove the wheel.

Remove the hose guide brackets. Undo the bypass bolts, disconnect from the cylinder block hoses 10 (see fig. 6-12), avoid penetration of dirt into the cylinder cavities. Plug the openings of the cylinder block and hoses.

Unbend the edges of the front brake splash guard, undo the bolt fastening the brake to the steering knuckle (fig. 6-13) and remove the brake assembly.

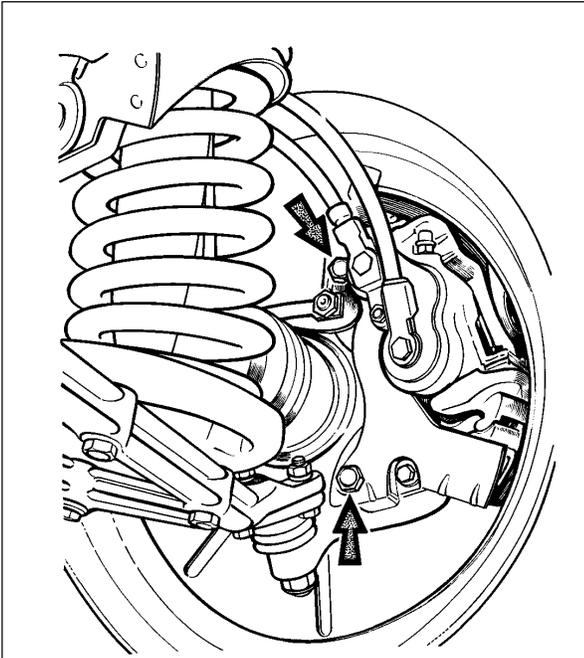
The refitting of the front brake is carried out in sequence reverse to removal.

After refitting, fill the brake liquid in the reservoir and bleed the system to expel air from the hydraulic drive.

## Dismantle and reassembly

Take out pins, then shafts 5 (see fig. 6-12), hold the clamping levers 3 so that not to loose the springs. Remove the clamping levers and their springs, and then caliper 7 in assembly with block 1. Remove brake pads 2.

Take out cylinder block 1 from the caliper grooves by moving apart the caliper grooves up to 118.5 mm and pressing on lock 12. Remove the dust caps 3 (fig. 6-14) from cylinders.



**Fig. 6-13. Removing the front brake:**  
Arrows are pointing to the bolts that should be undone to remove the front brake

Forcing a jet of compressed air through the aperture for brake liquid, push out pistons 14 from the cylinder block and take out sealing rings 4.

The reassembly of the front brake is carried out in sequence reverse to dismantle. When assembling, lubricate the sealing rings, pistons and cylinder mirrors with brake liquid, and grease the protective caps with ДТ-1.

## Components inspection

Carefully examine all components, having previously washed them in warm water with washing liquid and dried by a jet of compressed air.

If on pistons and on cylinder mirrors any traces of wear or jamming are found, renew the cylinder block complete with pistons.

**Note.** In all cases, when the piston is taken out from the cylinder, it is recommended to renew the dust cap and the sealing rings in the cylinder block flutes to ensure satisfactory operation of the system.

## Brake disc runout check

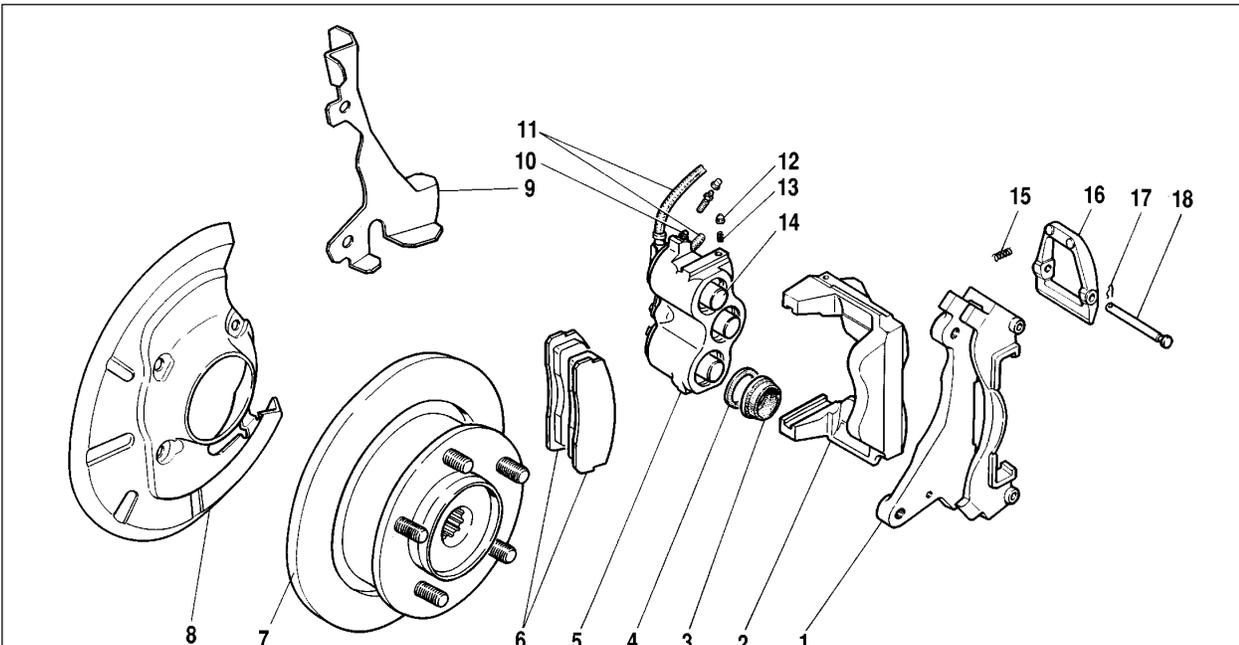
Check the axial runout of the brake disc without removing it from the vehicle (fig. 6-15). The maximum allowable runout by the indicator is 0.15 mm; if the runout is greater, it is necessary to grind the disc, but the final thickness of the disc after grinding should be no less than 9.5 mm. In case of damage or very deep risks, and also if wear exceeds 1 mm on each side, renew the disc.

## Replacement of brake pads

Renew the pads, if the friction lining thickness has decreased to 1.5 mm.

To replace the pads do the following:

- remove the pins from the shaft of the upper clamping lever, take out the shaft and remove the lever; remove the caliper



**Fig. 6-14. Front brake components:**  
1 - carrier; 2 - caliper; 3 - piston cap; 4 - sealing ring; 5 - cylinder block; 6 - brake pads; 7 - brake disc; 8 - caliper dust cover; 9 - brake splash guard; 10 - bleeder; 11 - brake hoses; 12 - cylinder block detent; 13 - detent spring; 14 - piston; 15 - clamping lever spring; 16 - clamping lever; 17 - pin; 18 - clamping lever shaft

## Rear brakes

The design of the rare brake is shown on fig. 6-17.

### Removal and dismantling

Lift the rear part of the vehicle and take off the wheel. Take care of possible liquid spillage from the tank.

Using puller 67.7823.9519 (fig. 6-18) remove the brake drum. Disconnect the cable end piece from the shoe manual lever 18 (see fig. 6-17), remove the cotter pin, press pin 21 and remove the lever. Using flat-nose pliers disconnect the upper 2 and lower 7 return springs.

Turn the cups of the steady post 17, take them off together with posts, springs and bottom cups; remove shoes 8 and 16 and expander strut 20. Disconnect from the wheel cylinder 1 pipeline and plug the openings of the cylinder and pipeline. Remove the wheel cylinder. To replace the brake backplate 4 remove the axle shaft, as specified in chapter "Rear axle", and disconnect the rear cable 13, having turned out two bolts that are fastening it to the brake plate 4.

### Assembly and refitting

Assembly and refitting is carried out as follows.

Fit and fix the wheel cylinder on the brake backplate, attach it to the pipeline and fully tighten the connector nut.

Attach the shoe manual lever 18 (see fig. 6-17) and refit the brake shoes with expander strut 20, then insert posts 17 with springs and bottom cups, put the upper springs and fix them on racks by turning one or other way. Ensure, that the shoe ends have correctly settled down in the support jacks on the wheel cylinder pistons and on the backplate. Attach the rear cable end piece 15 to lever 18.

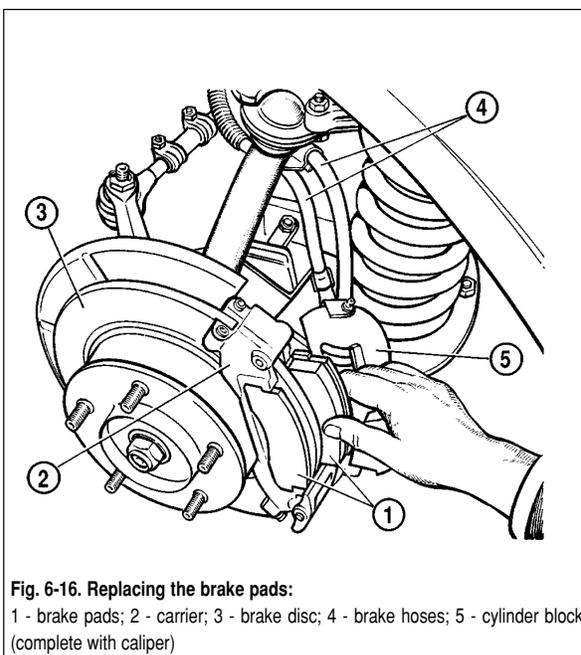
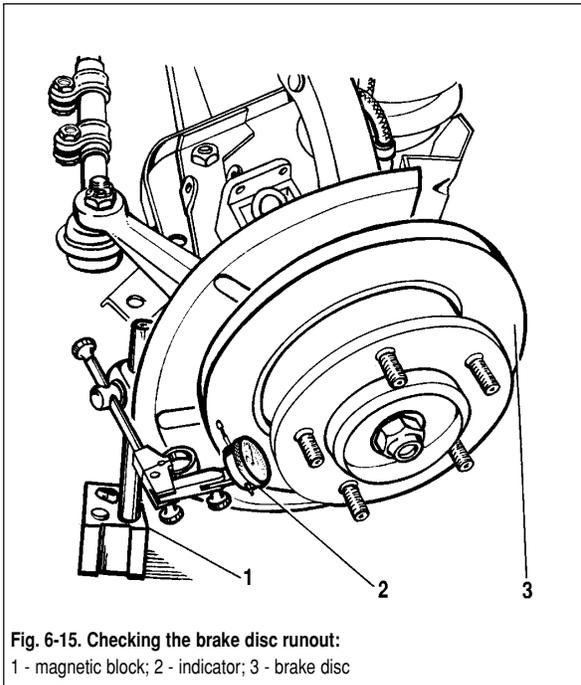
Fit the brake drum, previously having greased the landing shoulder of the axle shaft with graphite lubricant or greasing ЛСЦ-15 and fully tighten the drum fastening bolts.

### Wheel cylinders - dismantle and reassembly

The dismantle and reassembly of the wheel cylinders is carried out as follows.

Remove protective caps 2 (fig. 6-19), then press out from the cylinder body 3 pistons 4 in assembly with the components of the automatic shoe-drum clearance adjuster.

Place the piston in assembly with the automatic adjuster on a special tool so that the ledges of the tool will cover the head of the thrust screw 3 (fig. 6-20). Using a screwdriver and by turning piston 9, turn out thrust screw 3 from the piston. Remove sealing 8 with support cup 7 and retainers 5 from the screw. Separate thrust ring 4 and thrust screw 3.

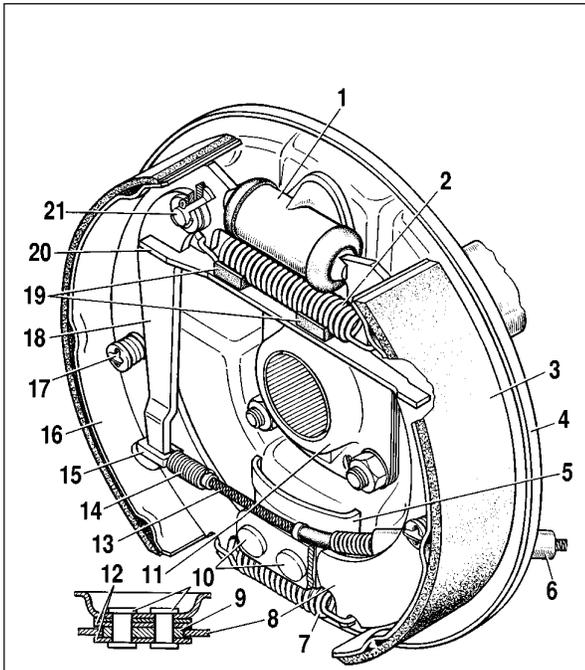


assembly and take out the worn pads from the carrier grooves (fig. 6-16);

- carefully depress the pistons in cylinders to a stop, paying attention not to splash the liquid from the master cylinder reservoir, and place new brake pads in carrier grooves;

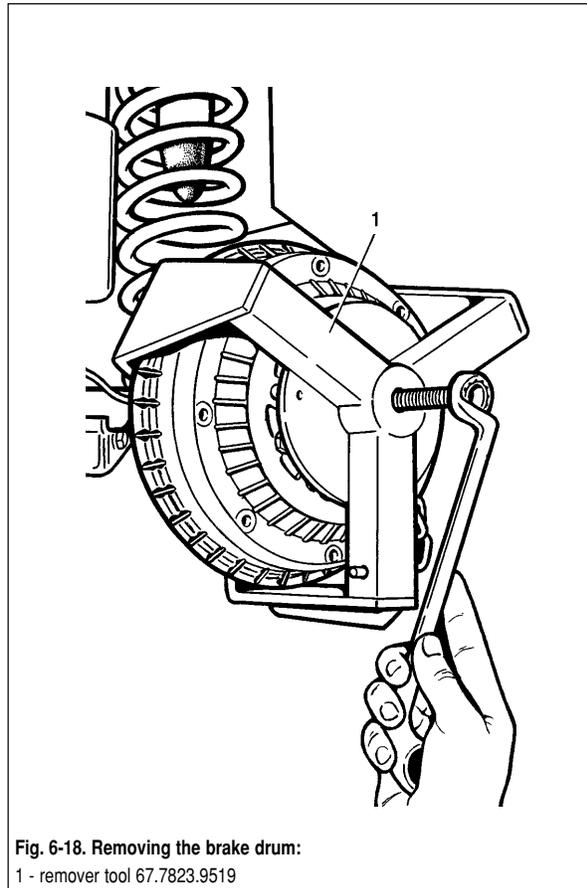
- move the lower directing splay on the caliper under the lower clamping lever, press the caliper to the pads, insert the lever shaft with the head facing the wheel and fix the pins.

The pads should be changed simultaneously on the right and on the left brakes.



**Fig. 6-17. Rear wheel brake mechanism:**

1 - wheel cylinder; 2 - upper return spring; 3 - friction lining; 4 - backplate; 5 - inner plate; 6 - rear cable sheath; 7 - lower return spring; 8 - front brake shoe; 9 - thrust plate; 10 - rivet; 11 - oil deflector; 12 - guide plates; 13 - handbrake rear cable; 14 - rear cable spring; 15 - rear cable end; 16 - rear brake shoe; 17 - steady post; 18 - shoe manual control lever; 19 - rubber pads; 20 - expander strut; 21 - shoe manual control lever pin



**Fig. 6-18. Removing the brake drum:**

1 - remover tool 67.7823.9519

The reassembly of the automatic adjuster and the wheel cylinder is carried out in reverse sequence, paying attention to the following:

- piston thrust screws are tightened to torque 4-7 N•m (0.4-0.7 kgf•m);

- slot A (see fig. 6-19) on thrust rings should be directed vertically upward; vertical deviation should be no more than 30°. Such position of the slot provides complete air bleeding from the brake mechanism;

- for preliminary compression of thrust rings the pistons are press-fitted in the cylinder body with a special tool having the form of a cylinder with a cone inner aperture;

- the effort of press-fitting the piston in the cylinder should be no less than 350 N (35 kgf); in case effort was less than 350 N (35 kgf) - replace the thrust ring;

- when press-fitting the piston in the cylinder it is necessary to maintain the sizes of 4.5-4.8 mm and 67 mm (maximum) (see fig. 6-19) for free landing of the brake drum;

- before refitting the components in the cylinder body thickly grease them with brake liquid.

After reassembly check the movement of each piston in the cylinder body. They should freely move within the limits of 1.25-1.65 mm. The last established in place is the protective cap 2.

## Component inspection

**Wheel cylinders.** Ensure the cleanness of working surfaces of the cylinder, pistons and thrust rings. The surfaces should be absolutely smooth, without roughness, to avoid liquid leak and premature wear of sealings and pistons. The defects on the cylinder mirror can be eliminated by lapping or polishing. However, no increase of the cylinder inner diameter is allowed.

Inspect screw 3 (see fig. 6-20), spring 6, thrust cup 7 and retainers 5. If necessary, renew damaged components.

Renew sealings 8. Inspect protective caps 10 and renew if necessary.

**Shoes.** Carefully check the shoes for damages or deformations.

Check the tension of the upper and lower return springs; if necessary, renew.

The springs should have no residual deformations when stretched with effort of 350 N (35 kgf) for lower springs and 420 N (42 kgf) - the upper ones.

Check the linings for dirt or traces of greasing, if necessary, carefully clean with metal brush and wash with white-spirit, besides, check for leaks of greasing inside the drum; eliminate malfunctions. Renew shoes, if the friction lining thickness is less than 1.5-2 mm.

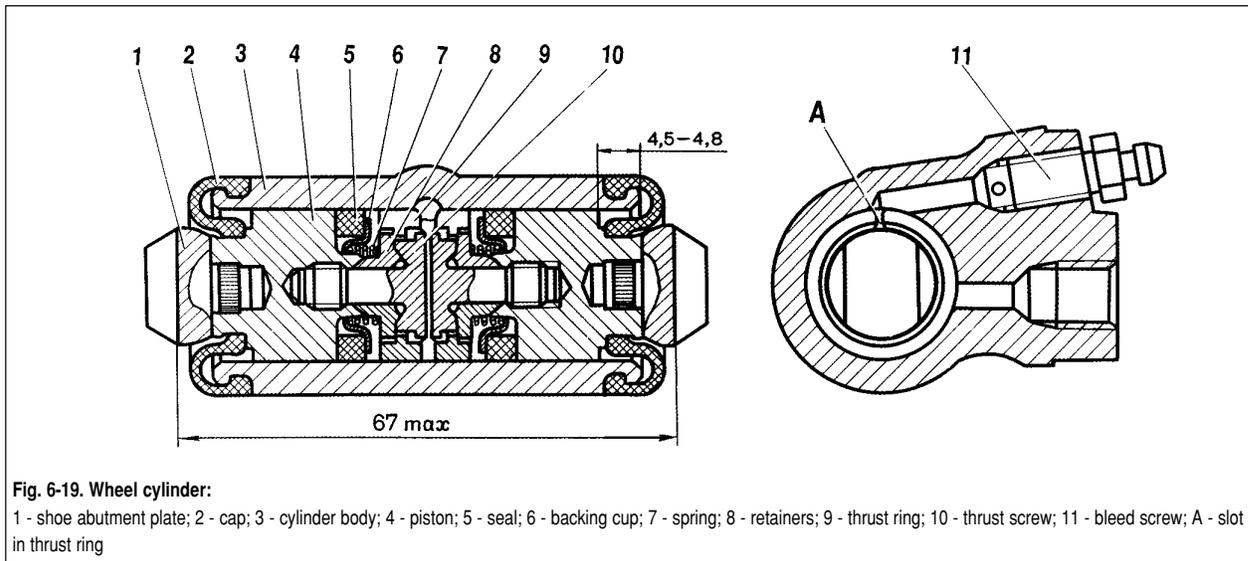


Fig. 6-19. Wheel cylinder:

1 - shoe abutment plate; 2 - cap; 3 - cylinder body; 4 - piston; 5 - seal; 6 - backing cup; 7 - spring; 8 - retainers; 9 - thrust ring; 10 - thrust screw; 11 - bleed screw; A - slot in thrust ring

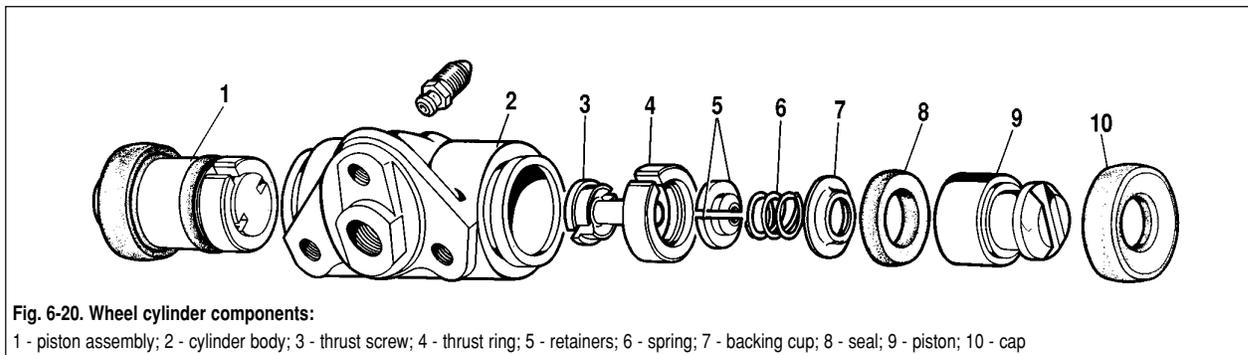


Fig. 6-20. Wheel cylinder components:

1 - piston assembly; 2 - cylinder body; 3 - thrust screw; 4 - thrust ring; 5 - retainers; 6 - spring; 7 - backing cup; 8 - seal; 9 - piston; 10 - cap

**Brake drums.** Examine the brake drums. If the working surfaces have deep risks or excessive ovality, chisel the drums. Then grind on a machine tool with abrasive fine stones. This will help to increase the lining durability, and improve the uniformity and efficiency of braking.

The maximum allowable increase of drum nominal diameter (250 mm) after turning and polishing is 1 mm. These dimension limits should be strictly observed, otherwise, the durability of the drum, and the efficiency of braking will be decreased due to reduction of drum rigidity.

### Rear brake wheel cylinder -test-bench inspection

Position cylinder 2 (fig. 6-21) on the test bench, attach the pipeline from the manometers and bleed the system.

Adjust rests 1 so that the wheel cylinder pistons are rested against them.

Check for liquid leak. Connect a low pressure manometer 4. Slowly rotate flywheel 8 to obtain liquid pressure of 0.05 MPA (0.5 kgf/cm<sup>2</sup>) as read by the pressure gauge 4.

Ensure that pressure holds steady for 5 minutes. Repeat similar test at liquid pressure of 0.1 - 0.2 - 0.3 - 0.4 - 0.5 MPA (1 - 2 - 3 - 4 - 5 kgf/cm<sup>2</sup>).

Reduce pressure and connect a high pressure manometer 5. Ensure that pressure holds steady for 5 minutes, repeat similar test at liquid pressure of 5 - 10 - 15 MPA (50 - 100 - 150 kgf/cm<sup>2</sup>).

There should be no pressure decrease due to liquid leak through sealing elements, pipeline connections, bleeding connectors or through casting pores.

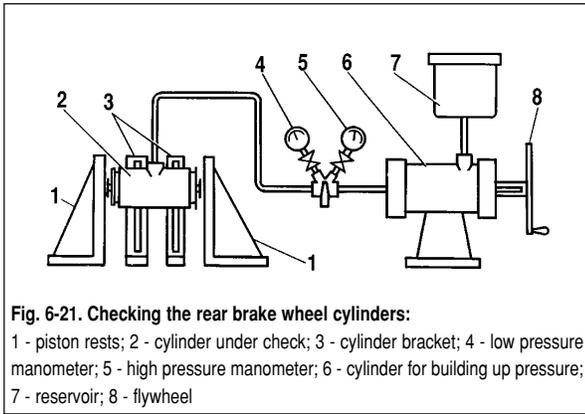
An insignificant reduction of pressure (no more than 0.5 MPA (5 kgf/cm<sup>2</sup>) during 5 minutes is permissible, especially at high pressure, due to shrinkage of sealings.

### Rear brake pressure regulator

**Removal and refitting.** Disconnect arm 12 (fig. 6-22) from tie-rod 7, and holder 18 from bracket 14 and shackle that is fastening the pipelines going to the pressure regulator.

Disconnect the components of muffler mounting from the body and move the pipeline with the mufflers aside.

Undo the bolts fastening the regulator on the bracket and the bracket on the car body, remove the regulator bracket, and then, having lowered the regulator downward, disconnect the pipelines.



**Fig. 6-21. Checking the rear brake wheel cylinders:**  
 1 - piston rests; 2 - cylinder under check; 3 - cylinder bracket; 4 - low pressure manometer; 5 - high pressure manometer; 6 - cylinder for building up pressure; 7 - reservoir; 8 - flywheel

Remove the regulator and disconnect the arm. Plug all openings of the pressure regulator and pipelines.

Refitting of the pressure regulator is carried out in reverse sequence. Before tightening the regulator fastening bolt place tool 67.7820.9519 (see fig. 6-6) on the end of the regulator arm. Direct the tool bar upwards to the car body. Thus, the distance of (150+5) mm (see "Pressure regulator position adjustment") between the end of arm 2 and underframe side member is obtained.

Raise protective cap 3 (see fig. 6-22) and by turning the regulator on the fastening bolts, obtain a slight contact between the arm end and the regulator piston.

Fix the regulator in this position, fully tighten the fastening bolts, then apply a layer of greasing ДТ-1 or "ДИТОР" on shaft 2 and the protruding part of the piston. Refit rubber cap 3 having applied 5-6 gr of the same greasing.

Remove tool 67.7820.9519 and reconnect the arm end to tie-rod 7, previously having covered the bushes of the rod-to-arm connection with greasing ДТ-1 or ДИТОР.

Attach the gas release system pipelines to the car body.

Bleed the brakes to expel air from the rear brakes.

**Dismantle and reassembly.** Use key A.56124 to turn out the plug, remove lining 5 (fig. 6-23), take out piston 10, distance sleeve 2, sealing 7, plate 8, spring 9 and thrust washer with sealing ring 3.

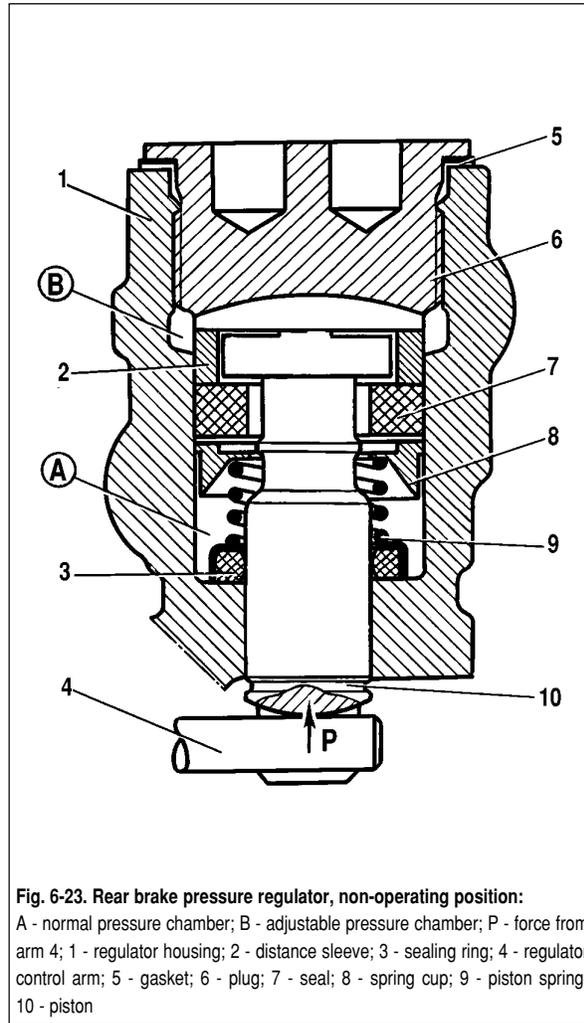
When reassembling, which is carried out in reverse sequence, grease all components with brake liquid.

**ATTENTION. To differentiate the VAZ-2121 and -2123 pressure regulators from others of similar design, there is a groove on the bottom part of the piston.**

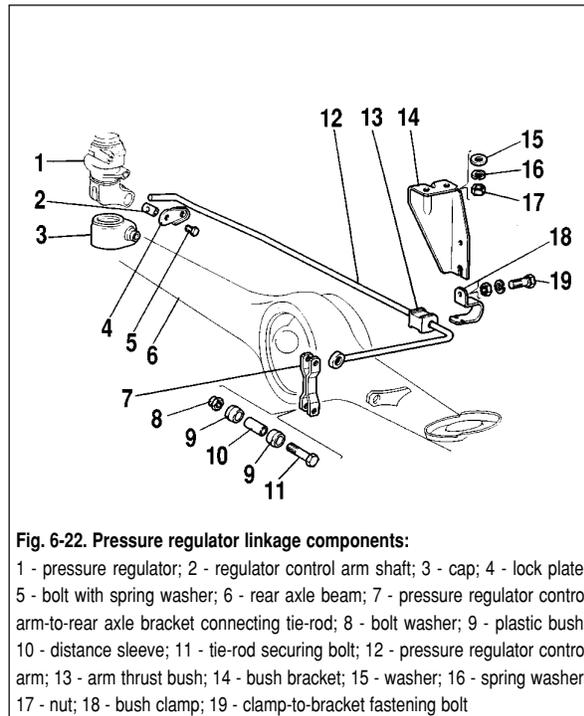
Wash the components with isopropyl alcohol or brake liquid and inspect. The components surfaces should have no marks and roughness.

Check the spring tension, length in free condition should be 17.8 mm, and under load of 76.44 - 64.68 N (7.8-6.6 kgf) - 9 mm.

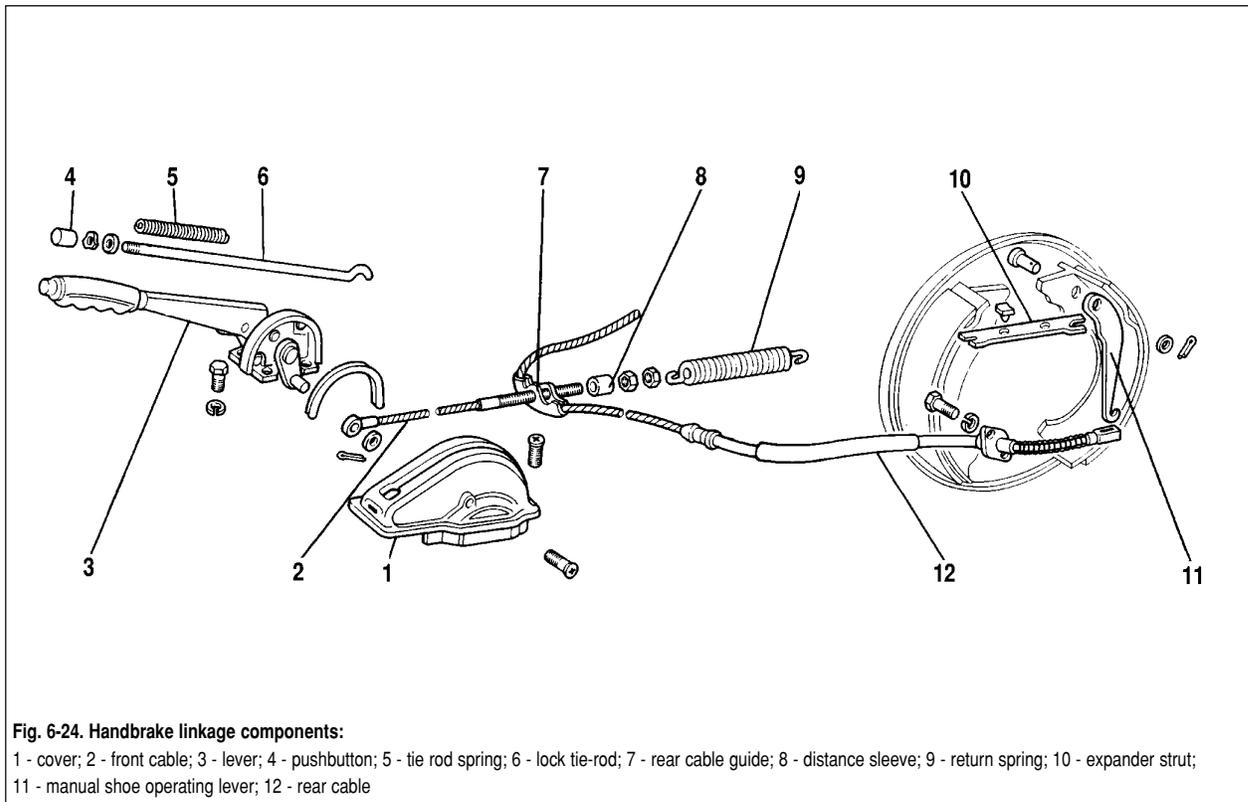
Renew damaged components, sealings and sealing rings.



**Fig. 6-23. Rear brake pressure regulator, non-operating position:**  
 A - normal pressure chamber; B - adjustable pressure chamber; P - force from arm 4; 1 - regulator housing; 2 - distance sleeve; 3 - sealing ring; 4 - regulator control arm; 5 - gasket; 6 - plug; 7 - seal; 8 - spring cup; 9 - piston spring; 10 - piston



**Fig. 6-22. Pressure regulator linkage components:**  
 1 - pressure regulator; 2 - regulator control arm shaft; 3 - cap; 4 - lock plate; 5 - bolt with spring washer; 6 - rear axle beam; 7 - pressure regulator control arm-to-rear axle bracket connecting tie-rod; 8 - bolt washer; 9 - plastic bush; 10 - distance sleeve; 11 - tie-rod securing bolt; 12 - pressure regulator control arm; 13 - arm thrust bush; 14 - bush bracket; 15 - washer; 16 - spring washer; 17 - nut; 18 - bush clamp; 19 - clamp-to-bracket fastening bolt



## Handbrake

**Removal and refitting.** Place the handbrake lever in the lowest position, disconnect the cable ends from the brake shoe levers (see "Rear brake").

Slacken locknut 5 (see fig. 6-4) and adjusting nut 6, remove return spring 9 (fig. 6-24), then completely undo the locknut and nut.

Take out the front end pieces of the rear cable from the brackets on the floor, and the cable sheath from the brackets on the rear axle beam, and remove the rear cable 12.

Remove the lever protective cover and then the lever assembly and the front cable.

Take out the pin and remove the thrust washer, disconnect the front cable from the handbrake linkage lever.

The handbrake is refitted in reverse sequence with subsequent adjustment (see "Handbrake adjustment"). When refitting, grease with ЛИТОЛ-24 or ЛСЦ-15 the rear cable guide, the handbrake lever shaft and the front cable end.

**Check and repair.** Carefully inspect the components of the handbrake mechanism.

If breakage or wire scuffing is detected, renew the cable.

Make sure, that the quadrant teeth and handle lock are not damaged; worn components should be replaced.

Check the condition of the spring. It should provide the lever return to the released position.

Inspect the rear cable sheath and the fastening of end pieces on the sheath, and ensure, that the cable freely moves inside the sheath. Replace the cable in case of sheath damage and loose end piece fastening.