

When installing the springs, carry out the last tightening of the U-bolt nut on the automobile standing on the wheels.

Maintenance of the shock absorbers consists in periodically checking them for tightness and reliable fastening, as well as in changing the fluid in compliance with the instructions laid down in Lubrication Table.

If leakage of fluid through the rod seal and the reservoir sealing rings is detected, tighten nut 18 (Fig. 49). If the leakage fails to be eliminated, repair the shock absorber in a workshop.

Change fluid in the shock absorbers every 100 000 km of run.

Wheels, Tyres

The spare wheel attachment is shown in Fig. 50.

The spare wheel should be secured properly on the carrier by means of the sector 2 (Fig. 50, A) or bracket 7 (Fig. 50, B).

To avoid burns of the tyre by the exhaust pipe before securing the spare wheel, move the spare wheel from the exhaust pipe until a clearance of not less 40 mm is reached.

When maintaining, inspect the wheels and tyres for proper condition, check the wheel attachment nuts for tightening and the tyre inflation pressure.

To provide for uniform tightening of the nuts, tighten them alternately, every second one.

Before every run, check the condition of tyres and eliminate detected defects. Periodically check the tyre inflation pressure and bring it to normal, if required.

Check inflation pressure in cold tyres.

If an uneven wear of the front wheel tyres is detected, check and adjust the toe-in of the front wheels.

With the normal tyre inflation pressure the toe-in of the front wheels should be such that the dimension "A" (Fig. 51) measured by the center line of side surface of the tyres ahead of the axle is 1.5-3.0 mm less than the dimension "B" measured back of the axle. As required, adjust the toe-in of the front wheels by changing the length of the steering tie rod; then, having loosened locknuts 1 and 3 provided with the right- and left-hand thread, rotate adjusting sleeve 2 (Fig. 52) to set a required value of the toe-in. Upon adjustment, tighten the locknuts. To provide uniform wear of tyres, carry out tyre rotation as a preventive treatment.

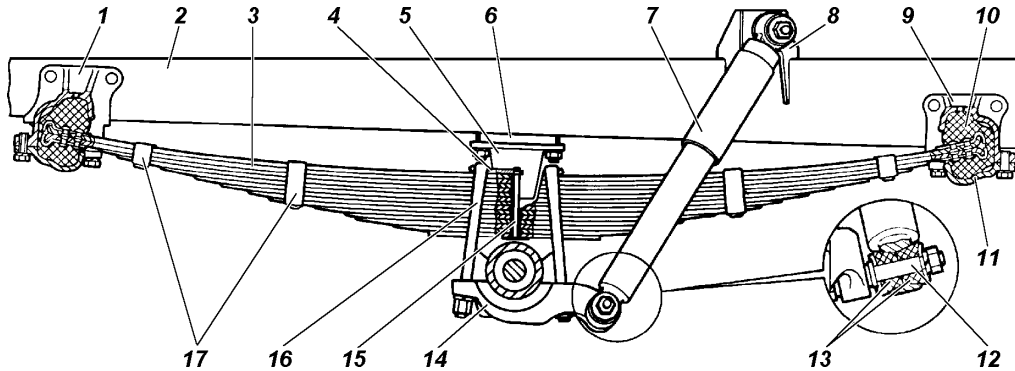


Fig. 48. Front suspension:

1 -spring front hanger; 2 -frame; 3 -spring; 4 -cover plate;
 5 -buffer; 6 -buffer liner; 7 -shock absorber; 8 -shock
 absorber bracket; 9 -spring rear hanger; 10 -rubber pad;
 11 -bracket cover; 12 -shock absorber pin; 13 -rubber
 bushings; 14 -U-bolt liner; 15 -contracting bolt; 16 -U-
 bolt; 17 -yokes

Note. Rear suspension design is the same

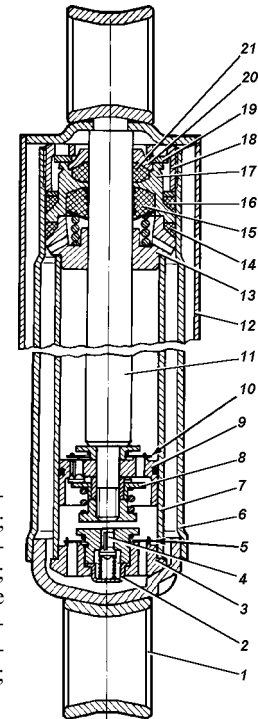


Fig. 49. Shock absorber:

1 -eye; 2 -compression valve stop; 3 -com-
 pression valve body; 4 -compression valve;
 5 -intake valve; 6 -reservoir; 7 -cylinder; 8 -
 rebound valve; 9 -piston; 10 -by-pass valve;
 11 -rod; 12 -dust shield tube; 13 -rod guide
 bushing; 14 -lower sealing ring; 15 -seal; 16 -
 upper sealing ring; 17 -seal holder; 18 -
 reservoir nut; 19 -washer; 20 -protective ring;
 21 -rod seal

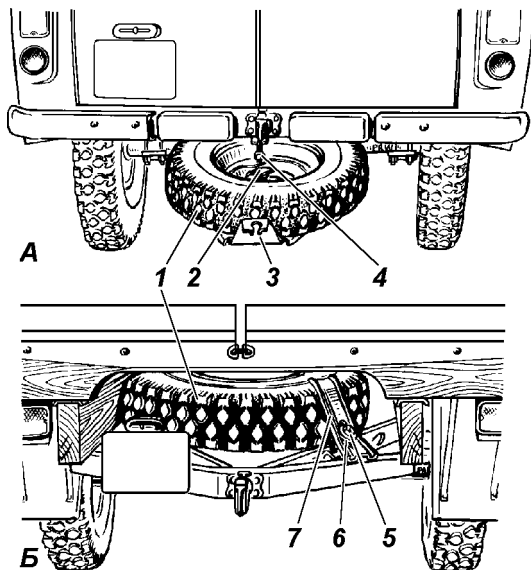


Fig. 50. Spare wheel attachment:

A - automobiles YA3-3741, YA3-3962, YA3-3909, YA3-2206, YA3-33036, YA3-39094, YA3-39095;

Б - automobile YA3-3303;

1 -spare wheel; 2 -sector; 3 -carrier; 4 -nut; 5 -bolt; 6 -washer; 7 -bracket

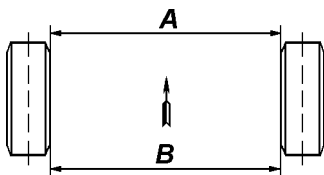


Fig. 51. Wheel toe-in

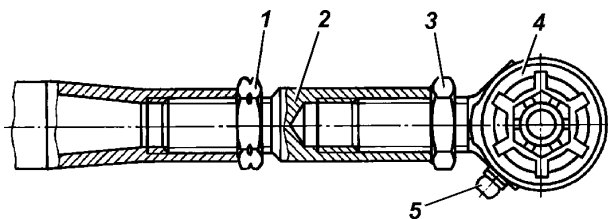


Fig. 52. Steering rod end :

1 -locknut with l.h. thread; 2 -adjusting sleeve; 3 -locknut with r.h. thread; 4 - joint; 5 -grease fitting

When rotating the cross-ply tyres, introduce the spare wheel tyre into the rotation if its wear does not differ from wear of the other tyres (Fig. 53).

When rotating the radial-ply tyres, rotate the front and rear wheel tyres separate for each side. Do not introduce the spare wheel tyre.

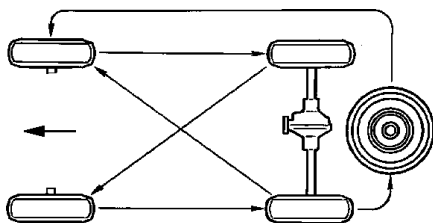


Fig. 53. Tyre rotation diagram

Wheel Hubs

The hubs of all the automobile wheels are the same.

Maintenance of the wheel hubs consists in checking the wheel hub bearings for tightening and, if required, in their adjusting, in checking the fasteners of the axle shaft flanges and hub driving flanges.

Rock a jacked-up wheel to detect play in bearings.

Pay special attention to correct adjustment of the wheel hub bearing on a new automobile.

Change grease in compliance with Lubrication Table. For changing grease, remove the hub from the spindle, remove old grease and thoroughly wash the bearings and lubricate them. Apply 10-15 mm grease between the bearings. Do not apply too much grease to the hubs to avoid its ingressing in the wheel brakes.

Adjust the wheel hub bearings in the following sequence:

1. Jack up the wheel whose bearings are to be adjusted.
2. Take out the rear axle axle shaft 5 (Fig. 54) or remove the hub driving flange and the front axle wheel disengaging coupling.
3. Unbend the tab of the locking washer 7, turn off the locknut 6 and remove the locking washer.
4. Back off the bearing adjusting nut $1/6$ to $1/3$ turn (1-2 flats).

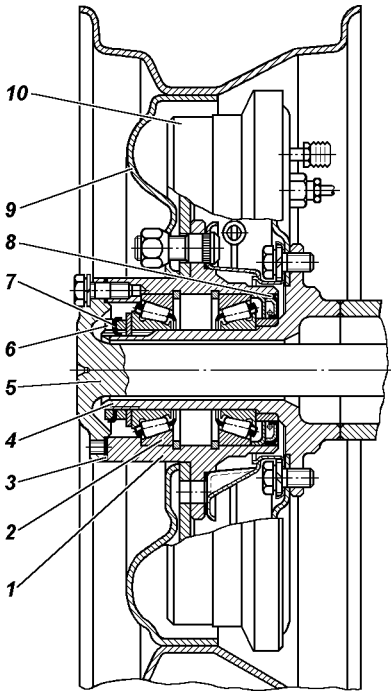


Fig. 54. Rear wheel hub:
 1 -hub; 2 -bearing; 3 -gasket; 4 -
 journal; 5 -axle shaft; 6 -locknut; 7
 -lock washer; 8 -collar; 9 -wheel
 disk; 10 - brake drum

5. Rotate the wheel by hand to check it for easy turning (the wheel should rotate freely without rubbing of the brake drum against the brake shoes).

6. Tighten the adjusting nut of the hub bearings with the aid of a wrench applying a hand effort to the wrench tommy bar 300-350 mm long until the wheel is rotated with difficulty (Fig. 55). When tightening the nut, apply the effort to the tommy bar smoothly without jerks and simultaneously rotate the wheel to allow the roller to assume correct position on races of the bearings.

7. Back off the nut 1/4 to 1/3 of a turn (1.5-2 flats) and install the locking washer, screw in and tighten the locknut.

Replace the washer if some cracks on the tabs of the locking washer are detected.

8. Check adjustment of the bearings after tightening the lock-nut. If the adjustment is correct, the wheel should rotate freely, without binding noticeable axial play and wobbling.

9. Bend the one tab of the lock washer round the flat of the

nut, bend the second tab round the flat of the locknut. (Fig. 56).

10. Reinstall the axle shaft of the rear axle or driving flange and front axle wheel disengaging coupling, install the spring washers and tighten the bolts.

After a run, check the wheel hub for correct bearing adjustment by its heating. If the hub overheats, back off the nut $1/6$ of a turn (1 flat), observing the above sequence and rules.

When checking the bearing adjustment by hub heating, do not apply the service brakes since the hubs will be heated from the brake drums.

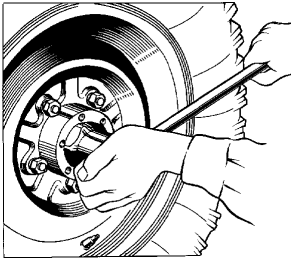


Fig. 55. Adjustment of hub bearings

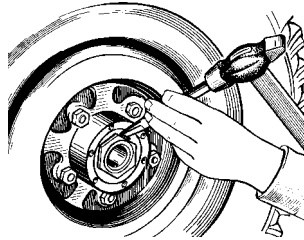


Fig. 56. Locking hub bearing nuts

CONTROL SYSTEMS

Maintenance of the Steering Gear

For maintenance of the steering gear, timely tighten up the bolts attaching the steering gear case to the bracket, check the pins of the steering rods the steering knuckle lever, steering arm for proper attachment. Check the steering wheel play, adjust the steering mechanism, lubricate timely the steering rod joints and add oil into the steering gear case (if required).

The steering rod joints are lubricated through the grease fitting 5 (refer to Fig. 52).

Periodically check the locknuts of the tie-rod tips for proper tightening. Do not allow any clearances in tapered joints of the levers and pins.

If radial play in the joint of the tie-rod tip is detected, turn off the plug 1 against the stop (Fig. 57), and then unscrew it by half-turn and in this position turn off it. If radial play is not eliminated, replace the tie-rod tip.

Periodically check the steering wheel play. The steering mechanism is considered to be in serviceable condition and needs no adjustment if the steering wheel play with the wheels set in a straight-ahead position is not over 10° under a force of 7.35 N (0.75 kgf) applied to a dynamometer which corresponds to 40 mm when measured on the steering wheel rim.

If the steering wheel play exceeds the above-mentioned value, then prior to adjustment of the steering mechanism, make sure that the bolts securing the steering gear case are properly tightened and the joints of the steering linkage are in serviceable condition.

Start the adjustment procedure by checking the worm bearings for axial play. To this end, grasp the steering column so that the thumb is in contact with the end face of the steering wheel hub and turn the steering wheel in either direction through a definite angle (Fig. 58). If the bearings are worn the axial play of the steering wheel hub relative to the steering column tube will be felt by the thumb. If there is no axial play of the worm, adjust only the meshing of the roller and worm.

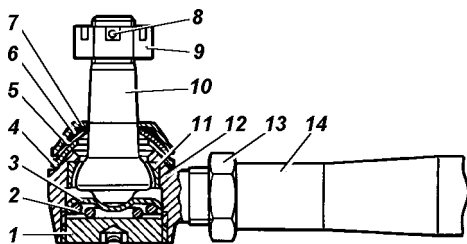


Fig. 57. Steering rod joint:

- 1 -plug; 2 -spring; 3 -pivot; 4 -lower spherical washer; 5 -upper spherical washer; 6 -protective ring; 7 -spring cap; 8 -cotter; 9,13 -nut; 10 -ball pin; 11 -block; 12 -end piece; 14 -rod

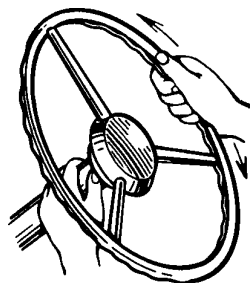


Fig. 58. Checking worm bearings for axial play

With the steering mechanism removed, adjust the tightening of the worm bearings by means of the shims 4 (Fig. 59) installed between the steering gear case and the case lower cover. When the worm bearings are tightened correctly the force required for turning the steering wheel (without the steering arm shaft) should be in a range of 2.2-4.4 N (0.22-0.45 kgf).

Adjust the meshing of the roller with the worm without removing the steering mechanism from the automobile (having only disconnect the drag link from the steering arm) by shifting the steering arm shaft with the aid of the adjusting screw 21 provided on the side cover of the steering gear case. Upon adjustment, the steering wheel should be freely turned from the middle position corresponding to a straight-ahead movement when a force of 8.8 - 15.7 N (0.9-1.6 kgf) is applied to the steering wheel.

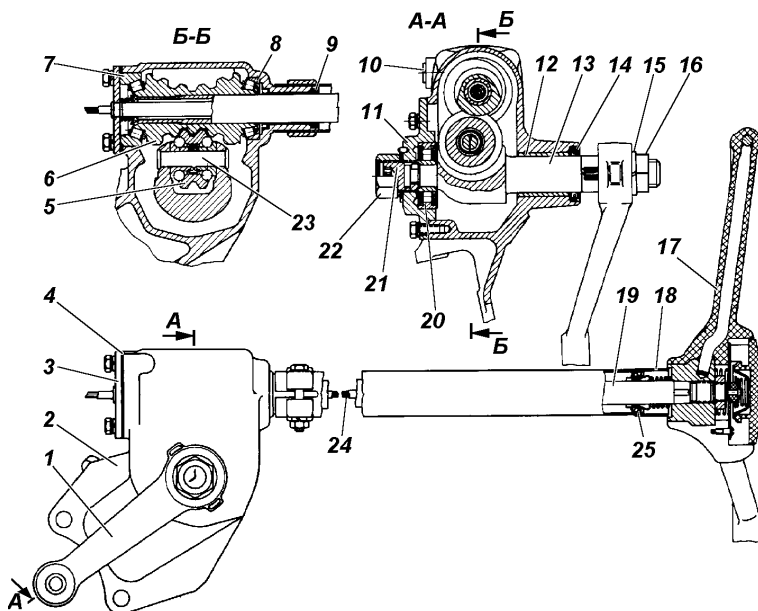


Fig. 59. Steering gear:

- 1 -steering arm; 2 -case; 3 -lower cover; 4 -adjusting shims of worm bearings;
- 5 -roller; 6 -worm; 7, 8, 25 -bearings; 9 -plug seal; 10 -filler hole plug; 11 -case side cover;
- 12 -bushing; 13 -steering arm shaft; 14 -seal; 15 -washer; 16 -nut;
- 17 -steering wheel; 18 -column; 19 - steering wheel shaft; 20 -steering arm shaft bearing;
- 21 -adjusting screw; 22 -nut-cap; 23 -roller axle; 24 -horn wire

Brake Systems

Maintenance of the Service Brakes

Periodically check the fluid level in the brake master cylinder reservoirs 16 (Fig. 60) and top up if required. The level should be 15-20 mm below the filling hole upper edges. Make sure of the hydraulic brake system tightness. Check the pipelines for condition and reliable attachment to the frame and rear axle.

Do not operate the automobile when the pipes and hoses are faulty.

If one of the hydraulic brake circuits is a failure, the warning lamp on the instrument panel lights up.

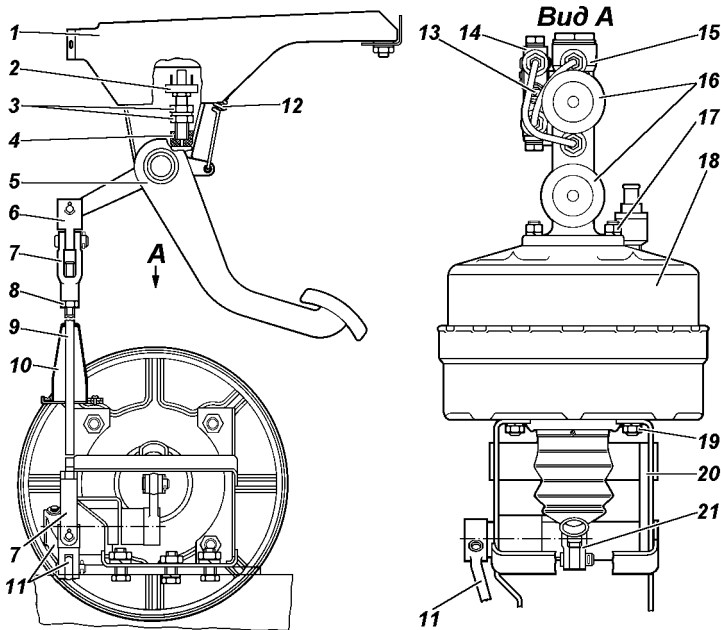


Fig. 60. Control linkage of brake master cylinder:

1 и 20 -brackets; 2 -stop-light switch; 3 -nuts; 4 -stop-buffer; 5 -brake pedal; 6 -intermediate fork; 7 -fork; 8 -locknut; 9 -rod; 10 -boot; 11 -intermediate lever; 12 -return spring; 13 -brake emergency warning lamp switch; 14 -emergency warning device; 15 -brake master cylinder body; 16 -reservoirs; 17 and 19 -nuts; 18 -brake vacuum booster; 21 -pushrod fork

Periodically remove the brake drums and clean the brake parts of dirt. Periodicity of this operation depends on service conditions of the automobile. In the summer season and when driving on mud-covered roads, carry out cleaning more frequently.

Keep a close watch on the brake system serviceability, timely perform its adjustment and eliminate detected faults.

For restoring the normal clearances between the brake shoes and drums and for reducing the brake pedal travel, adjust the brake drum-to-shoe in the following sequence:

1. Jack up the wheel which brake is to be adjusted.
2. Check the adjustment of the wheel hub bearings for correctness and carry out the adjustment, if required, as indicated in the section "Wheel Hubs".
3. Rotate the wheel and gradually turn the adjusting eccentric 19 (Fig. 61) or 4 (Fig. 62) until the wheel is braked.
4. While rotating the wheel, gradually back out the eccentric until the wheel starts rotating freely, without brushing of the drum against the brake shoes.
5. Similarly, adjust the drum-to-shoe clearances in the remaining brakes.

When adjusting the brakes of the front wheels and the front shoes of the rear wheel brakes, rotate the wheel forward. When adjusting the rear shoes of the rear wheel brakes, rotate the wheel backward.

For reducing the clearance, turn the eccentric in the direction of the wheel rotation and for increasing the clearance, rotate the eccentric in the reverse direction.

6. Make a road test to check the brakes for drum heating and for uniform application.

During the brake running adjustment, do not touch the anchor pins as the Manufacturer's setting of the brake shoes will be disturbed.

If the rivets of the linings are flush-mounted on a depth of less than 0.5 mm, replace the shoes or linings.

For adjusting the brake pedal free travel, change the length of the vertical rod 9 (Fig. 60). The brake pedal full travel is 200 mm. The brake pedal free travel must be 5-14 mm.

Check the brake pedal free travel when the engine is shut down.

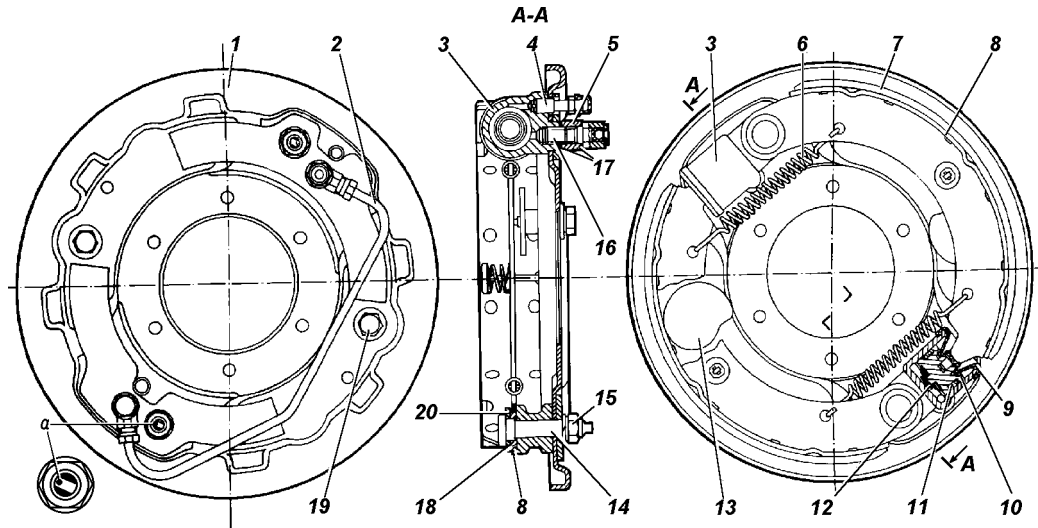


Fig. 61. Front wheel brake:

1 -brake backing plate; 2 -bridge pipe; 3 -wheel cylinder; 4 -bleeder valve; 5 -coupling; 6 -shoe return spring; 7 -brake shoe lining; 8 -brake shoe; 9 -boot; 10 -piston; 11 -sealing rings; 12 -piston spring; 13 -adjusting eccentric; 14 -shoe anchor pin; 15 -nut; 16 -coupling bolt; 17 -gaskets; 18 -support bushing; 19 -adjusting eccentric bolt; 20 -washer

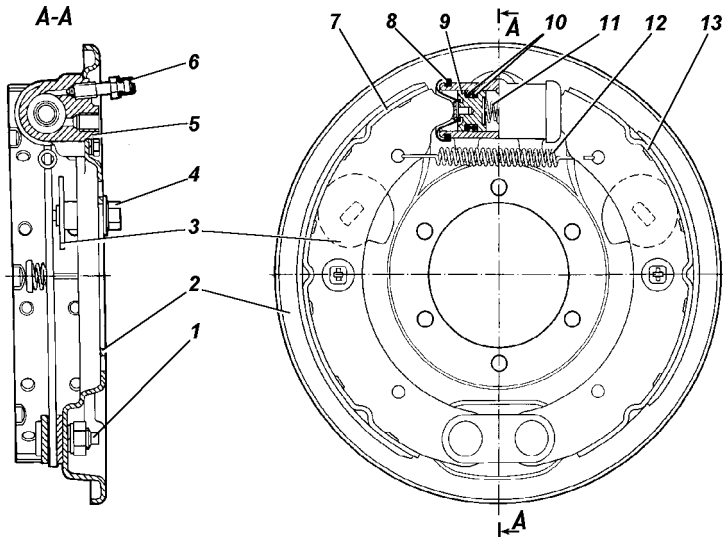


Fig. 62. Rear wheel brake:

1 -anchor pin; 2 -brake backing plate; 3 -adjusting eccentric; 4 -eccentric bolt head; 5 -wheel cylinder; 6 -bleede valve; 7,13 -brake front shoes; 8 -boot; 9 -piston; 10 -sealing rings; 11 -piston spring; 12 -return spring

Fill the brake hydraulic system in the following sequence:

1. Check all the connections of the brake hydraulic system for leaks and the flexible hoses for proper condition.

2. Remove the radiator shell and unscrew the cap of the brake master cylinder reservoir. Fill up the reservoir with brake fluid.

3. Remove the cap from the by-pass valve of the brake master cylinder or from the pressure regulator and put the end of a rubber hose, about 400 mm long on the by-pass valve.

Dip the other end of the hose in a glass vessel of at least 0.5l capacity half filled with brake fluid (Fig. 63).

4. Screw out the by-pass valve through 1/2 - 3/4 of a turn, then press the brake pedal several times. Depress the pedal quickly and release it slowly.

Under pressure of the brake master cylinder piston, brake fluid fills the hydraulic system and forces out air. Perform the bleeding procedure until air bubbles cease to escape from the hose dipped in the vessel with brake fluid. In the process of bleeding, add brake fluid into the reservoirs of the brake master

cylinder seeing to it that they are never empty in order to prevent penetration of air into the system again.

During the whole operation, keep the free end of the hose dipped in fluid. If neither fluid nor air escape from the hose, the hose is clogged or the valve is closed.

5. With the brake pedal pressed down, tightly screw in the by-pass valve of the wheel brake cylinder, remove the hose and put the cap on the valve.

6. Bleed the remaining brake cylinders in the following sequence: first the rear r.h. brake, rear l.h. brake, then the front r.h. brake, front l.h. brake. On the brakes of the front wheels, first bleed the lower cylinder, then the upper one.

7. After all the brakes have been bled, add brake fluid into the brake master cylinder reservoirs. Screw on the caps of the reservoirs.

8. Switch off the brake warning device for which purpose, do as follows:

- screw out the by-pass valve of the r.h or l.h. wheel brake cylinder of the rear brakes;
- smoothly press the brake pedal until the warning lamp on the instrument panel goes out; if the warning lamp flashes, this means that the pistons of the warning device are passed over the neutral position and it is necessary to repeat the operation by unscrewing the by-pass valve of the front wheel.
- screw in the by-pass valve with the brake pedal depressed.

Check the brakes with the automobile in motion. If the service brake, their control linkage and their hydraulic system have been adjusted and bled correctly, the full application of the brakes should take place within $1/2 - 2/3$ of the pedal travel.

Do not add into the brake master cylinder the brake fluid collected in the glass vessel during bleeding.

Do not depress the brake pedal with the brake drum removed because due to pressure in the hydraulic system, the pistons will be forced out of the wheel brake cylinders and the fluid will flow outside.

Change brake fluid once every two

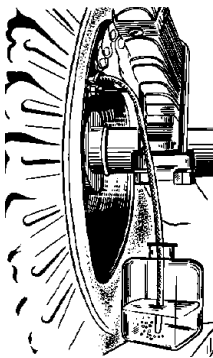


Fig. 63. Bleeding brake system

years for proper functioning of the brakes. When changing fluid, fill up the system until fresh fluid will escape from the hose.

Maintenance of the Parking Brake

Maintenance of the parking brake comes to periodic checking the parking brake mechanism and its control linkage for proper condition and for reliable fastening, cleaning of dirt, adjusting, lubricating the expander and adjuster and eliminating defects, if required.

Periodically disassemble the expander, clean it of dirt and pack with fresh grease, making sure grease does not get on the pack with fresh grease, making sure grease does not get on the drum and friction linings. When disassembling the parking brake mechanism, clean the brake shoes of dust and dirt and also check the friction linings for proper condition. Replace the shoes or linings, if the rivets are flush-mounted on a depth less than 0.5 mm.

Complete braking of the automobile should be insured when the pawl of the parking brake lever is in the third or fourth notch of the sector (3-4 clicks).

Do not allowed to check the parking brake for proper condition when starting away from rest or with automobile in motion. Check the parking brake only on a downhill.

Increased travel of the parking brake lever in the service period may be caused either by large clearance between the brake shoes and drum (in which case, adjust this clearance) or by an excessive free play in the control linkage (in which case, adjust the length of the control rod).

To adjust the brake shoe-to-drum clearance, turn in the screw 10 (Fig. 64) on the brake anchor plate, and then turn out the screw against the stop through 4-6 clicks ($1/3$ - $1/2$ of a turn) until the drum is free to rotate.

Adjust the length of the parking brake cable in the following sequence:

1. Shift the lever to the extreme forward position.
2. Screw off locknut of adjusting fork 1, uncotter and take out the pin securing fork to control lever.
3. Rotate the adjusting fork to take up all plays in the control linkage.
4. Give the adjusting fork 1.5-2 turns out, align the holes in the fork and lever, insert and cotter the pin and tighten the locknut.

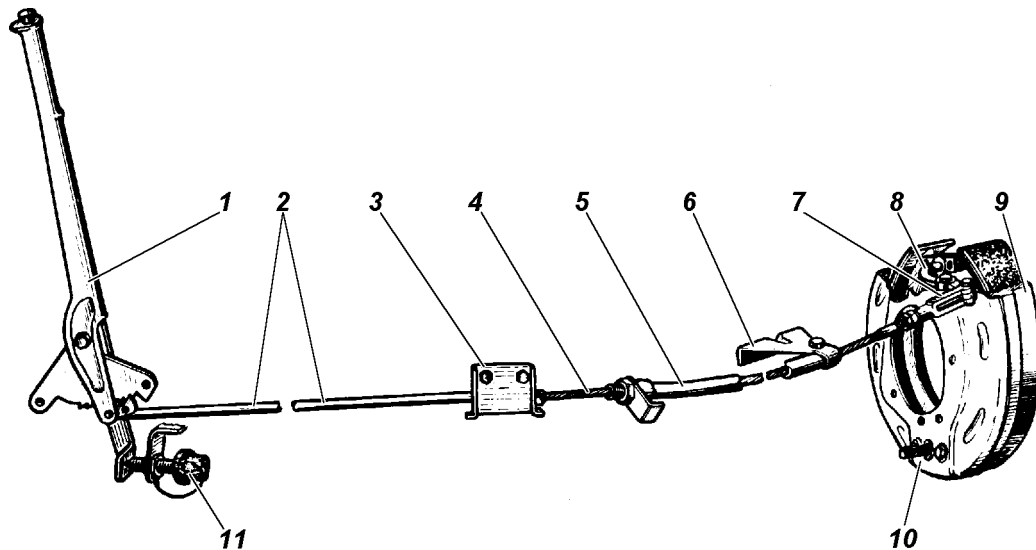


Fig. 64. Parking brake linkage:

1 -linkage lever; 2 -rod; 3 -bracket; 4 -cable; 5 -protective tube; 6 -protective tube bracket; 7 -cable fork; 8 -lever; 9 -parking brake drum; 10 -adjusting screw; 11 -warning lamp switch

ELECTRICAL EQUIPMENT

See wiring diagrams of automobiles in Appendix 4.

Maintenance of the Alternator

The automobiles could be provided with the alternator with a built-in rectifier operating in conjunction with a voltage regulator. The automobiles could be equipped with alternators of two types:

- 665.3701-01 or 161.3771 - with brush assembly;
- Г700А.30 or 957.3701-10 - without brushes.

Check the alternator function in accordance with ammeter reading. When the ignition and the engine are off, the ammeter shows the voltage across the battery terminal, and after the engine starting - the voltage across the alternator terminal.

The voltage across the alternator terminal should be 13.5 - 14.8 V.

If the voltage is increased, check the alternator or the voltage regulator and eliminate the defect.

The built-in integral voltage regulators are not repaired. In case of breakage of the regulator replace it for the regulator of the same type.

Periodically check the brush assembly and the contact part of the integrated voltage regulator for proper condition. To do this, remove the alternator 665-3701 from the automobile, and remove the brush assembly on the alternator 161.3771. Replace worn-out brushes.

Maintenance of the Storage Battery

The storage battery is installed in the cab on the left, behind the wheel mud guard.

The storage battery is connected parallel to the alternator. If in the service period of the automobile, the storage battery is gradually discharging or is excessively charging by the alternator, and the electrolyte begins to gas, check the alternator for proper condition.

Keep the storage battery clean and in charged state, protect its leads and terminals from oxides as indicated in Lubrication Table.

Periodically clean vent holes in plugs, check the electrolyte level and, if required, add distilled water.

Check the electrolyte level in each battery cell on a cold battery and if necessary, add distilled water up to the lower end of the filler hole tube.

Before operation, depending on the climatic condition under which the automobile is to be employed, correct the electrolyte specific gravity.

New automobiles delivered from the manufacturing plant are furnished with the storage batteries filled with electrolyte of the same specific gravity equal to 1.27 g/cm³.

The battery discharged by more than 25% in winter and more than 50% in summer is to be charged.

Specific gravity of electrolyte reduced to 25 °C, g/cm³

Fully charged battery	Battery discharged by	
	25%	50%
1.30	1.26	1.22
1.28	1.24	1.20
1.27	1.23	1.19
1.26	1.22	1.18
1.23	1.19	1.15

Do not allow discharging the battery under a heavy load current for a prolonged period of time (when starting cold engine in winter) because it could provoke curling of electrodes, falling-out of active material and reduces service life of the storage battery.

Carefully prepare the engine for starting and switch on the starter for 5 s maximum.

Cut off the battery by means of the ground switch if the automobile is to be removed from operation for a prolonged period of time.

Maintenance of the Starter

Before removing the starter for servicing open the battery switch.

Periodically clean the starter of dirt, visually check the starter for proper attachment to the clutch housing.

Check the condition of terminals, working surfaces of contacts, remove caking with a fine cut file, then wipe them with

waste and blow out. Check the starter drive, its pinion, lever and spring.

Clean of dirt frictioning parts, wash out and wipe them dry, if required, lubricate with grease "Литол-24".

Check axial play of the rotor shaft which should be not more than 1.0 mm. If required, tighten up bolts of the starter frame.

The starter drive is to be freely shifted along the shaft splines and returned to its initial position by means of the return spring. The rotor should not be rotated when rotating the drive pinion in the direction of working rotation. Check the rotor by hand for easy rotating in bearings when brushes are risen up. Replace the brushes if their length is less than 6 mm.

Warnings: 1. The overrunning clutch of the starter could be failed if the starter is keeping on after starting the engine.

2. Do not wash the starter covers and drive with gasoline or kerosene to avoid washing out grease out of bronze-graphite oilless sliding bearings.

Lighting System, Light Flashers and Horn

Maintenance of the headlamps amounts to their aiming and replacing defective lamps, cleaning of dust from the headlamp body and lens.

In spite of the good sealing, dust may penetrate into the sealed beam unit. For removal of dust, wash the sealed beam unit with clean water and a cotton wad, and dry at a room temperature.

For replacing the bulb in the headlamp, turn out screw 1 (Fig. 65) securing garnish molding 2 and remove it. Loosen three screws 5 and take out inner molding 4 together with the sealed beam unit 3.

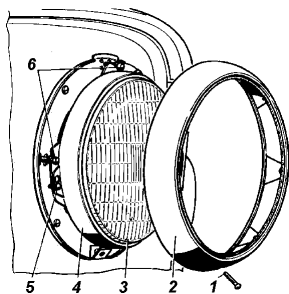


Fig. 65. Headlamp:
1,5 -screws; 2 -garnish molding;
3 -sealed beam unit; 4 -inner
molding; 6 -adjusting screws

Perform aiming of the headlamps in the following sequence:

1. Place ready for road automobile with a driver's seat load of 75 kg. on a level ground. Erect the aiming screen in front of the automobile at a distance of 5 m. Remove the rims.

2. Switch on the headlamp and by operating the foot switch be sure that the lower and upper beams are lighting up simultaneously.

3. Turn on the lower beam and cover one headlamp. Adjust the beam by turning the screws 6 (Fig. 65) until the area of the concentrated light corresponds with the marks on the aiming screen or the wall as indicated in Fig. 66. The adjusting screws of the headlamp 62.3711-09 are located symmetrical about the headlamp center in the horizontal plane.

4. Adjust the second headlamp in the same manner ensuring that the upper edges of concentrated lights are at the same height.

5. Fasten the rims.

Adjust the fog lamps that the area of concentrated light on the aiming screen or the wall is located as indicated in Fig. 67. For replacing the fog lamp bulb, remove the cover of the bulb holder by turning it counterclockwise and take out the bulb.

Front headlamps, rear lamps, backing lamp, side turn indicator repeaters, rear fog lamp. For replacing the lamps, undo screws attaching the lens and remove it.

License plate lamp. For replacing the lamp, undo the screw attaching the cover, remove the cover and the lens.

Maintenance of the horn amounts to periodic checking it for proper fastening, tightening the wire clamps, cleaning of dirt and dust, and also to checking the sound intensity and adjusting, if required.

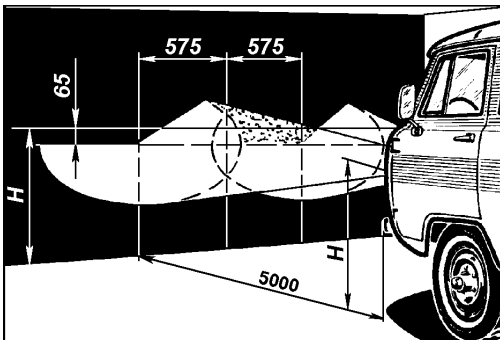


Fig. 66. Aiming screen for headlamp adjustment: H - distance from center of headlamps to ground level

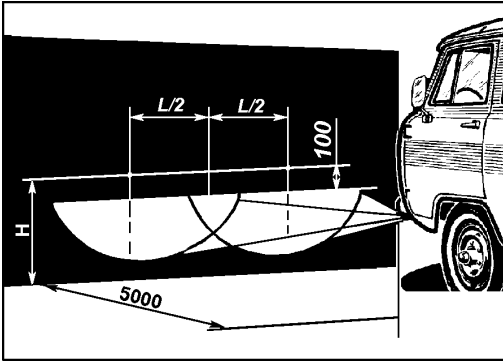


Fig. 67. Aiming screen for fog headlamp adjustment:
 H - distance from center of headlamps to ground level
 L - distance between centers of fog headlamps

Adjust the horn in a workshop.

Turn indicators. The turn indicators are switched on manually by means of the switch and switched off automatically.

Maintenance of the turn indicators comes to insuring a clearance of 2-2.5 mm between the rubber roller of the switch and the hub of the steering wheel with the switch lever set in the neutral position. Adjust the clearance by moving the switch along the bracket. Shift the switch lever from one into another position smoothly without jerks and blows. Take care to prevent getting of lubricant and water on the switch rubber roller and keep the roller clean.

Overload Breakers

The circuits of the instruments, horn, heater motors and windshield motor are protected by fuses. The fuse unit (Fig. 68) provided with three fuse 10 A each is located under the instrument panel on the l.h. pillar of the door aperture.

The fuse 1 protects the fog lamp circuit (refer to Fig. 13, 14).

Before replacing the worn-out filament of the fuse link or before switching on the thermal pushbutton cut-out, determine the cause of overloading and eliminate defects.

Instrumentation and Warning Flashers

Instrumentation and warning flashers are intended to keep watch on the condition and function of some mechanisms and units in the automobile. They consists of: speedometer, voltme-

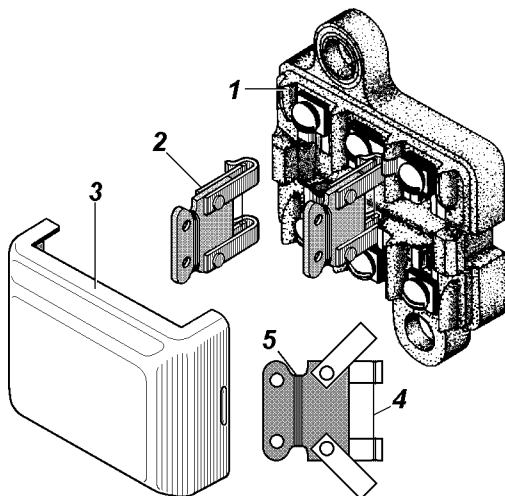


Fig. 68. Fuse unit:
 1 -fuse unit body; 2 -fuse link; 3 -body cover; 4 - fuse link filament; 5 - reserve filament

ter, oil pressure gauge, engine coolant gauge and fuel level gauge. The gauges operate in conjunction with transmitters.

The automobile is provided with the automobile emergency condition warning flashers (all the turn indicators flush simultaneously).

Maintenance of the devices comes to periodic checking the devices for proper attachment, terminal connections for proper condition, cleaning them of dust and dirt.

Before removing the electric transmitters, insulate the end of a lead in order to prevent a short circuit. For removing the transmitters, use a box wrench or hexagon wrench to avoid damage of the transmitter body.

Do not allow a drop of the coolant level in the radiator, as it may cause failure of the temperature transmitter.

Check the coolant temperature gauge for proper reading once a year. To do this, immerse the transmitter into hot water and measure its temperature by means of the test thermometer.

Check the oil pressure gauge and oil emergency pressure warning lamp transmitter for proper reading by means of the test pressure gauge once a year.

Check the flexible shaft for proper installation. The flexible shaft should be installed in that way that the radius of bending would be not less than 150 mm.

SPECIAL TOOLS AND APPLIANCES

New automobiles delivered from the manufacturing plant are provided with a set of tools and appliances. Use this set for maintenance and simple repair of the automobile en route. For convenience of storage, there are two tool bags in the automobile: a big and a small one.

Use a **plunger grease gun** (Fig. 69) for lubricating the automobile assemblies provided with nipples.

For lubricating, pull the handle 12 until the stud 13 touches the piston 7; by rotating the handle insert the stud through slot of the piston and by rotating the handle lock the stud in the piston, fit the head 1 over a nipple. When rocking the lever 8, press the handle 12.

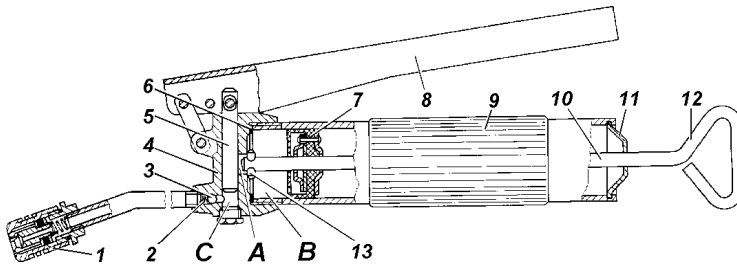


Fig. 69. Grease plunger gun:

1 -head; 2 -spring; 3 -ball valve; 4 -body; 5 -plunger; 6 -gasket; 7 -piston; 8 -lever; 9 - gun cylinder; 10 -rod; 11 - cover; 12 -handle; 13 -stud

Fill the gun with grease in the following sequence:

1. Screw the cylinder 9 out of the body 4.
2. Pull the piston 7 inside of the cylinder through 1/5 of strokes by means of the handle 12.

3. Using a wood spatel, fill the gun cylinder with grease. Then press the piston against the stop and fill the whole cylinder with grease. Make sure, there are no air bubbles in the cylinder.

The gun fails to be operated if air would find its way into the chamber B.

For deaerating, unscrew the bolt of the cylinder C, press the gun handle until grease is emerged and tighten the bolt.

The capacity of the chamber B is 340 cm³ of grease.

The jack (Fig. 70) is designed to jack up the automobile wheels for maintenance. The jack load-lifting capacity is 2 t. The maximum height of lifting is 240 mm.

For jacking up the wheel, proceed as follows:

1. Install the jack on a level ground under the axle shaft sleeve.

2. Turn out the jack internal screw 3 as high as the clearance between the axle shaft sleeve and the ground permits.

3. Throw over the jack latch 5 to the l.h. side relative to the jack handle 6 so that the latch projection enters the tooth space of the ratchet wheel 7.

4. By stroking the tyre iron inserted on the hole of the jack handle, lift the automobile wheel to a required height.

For jacking down the wheel, throw over the jack latch to the r.h. side and by stroking the tyre iron, jack down the wheel. After work is over, turn the internal 3 and external 2 screws in the jack body as far as they will go.

Maintenance of the jack amounts to periodically cleaning it of dirt and lubricating the external and internal screws.

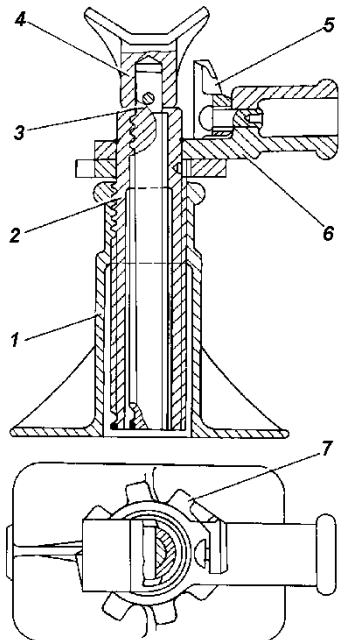


Fig. 70. Jack:

- 1 -body; 2 -external screw;
- 3 -internal screw; 4 -head;
- 5 -pawl; 6 -handle; 7 -ratchet

BODY(CAB)

The body of the automobile YA3-3962 is provided with the partition complete with sliding glasses. The ambulance compartment is equipped with hinged seats, brackets and straps for attachment of a stretcher, grab handles in door apertures and on the roof, and curtains for the windows of the body side panels, doors and partition.

The passenger/cargo compartment of the automobiles YA3-39625 is equipped with three folding double seats, one unfolding single seat and a demountable folding table. Depending on the complete equipment, the automobiles could be equipped with a folding single seat instead of an unfolding single seat and demountable folding table.

The passenger compartment of the automobile YA3-2206 is equipped with three single and two triple seats of which the rear one is a triple folding seat*.

The passenger compartment of the automobile YA3-3909 is equipped with a demountable folding table, two single and one triple seats. The passenger compartment is divided from the cargo compartment by a partition with the sliding glasses.

The passenger compartment of the automobile YA3-39094 is equipped with a triple cushioned seat.

The cab of the automobile YA3-39095 is equipped with a hinged berth for cargo (up to 110 kg) or special equipment and a cargo compartment under the berth.

The body and cab doors are sealed with rubber foam seals.

Avoid spilling fuel and oils on the door rubber seals.

Additionally, the automobiles could be equipped with:

- guard for the radiator shell and headlamps;
- sunroof of the cab;
- seats (for driver and passenger) with adjustment: longitudinal, backrest inclination and height;
- locking plugs of fuel tanks;
- upholstery of doors and cab rear wall;
- improved sound insulation of the hood;
- container installed on the hood.

* Depending upon the complete equipment , could be not installed.

Body (Cab) Ventilation

The cab is ventilated through the air vent in the middle part of the cowl and the heater box shutters, and also through the swivelling quarter-lights and drop windows of the cab doors. To make the cab ventilation more effective, make use of the heater fan, but for that shut off the cock on the cylinder head.

Fresh air is admitted into the sanitary and passenger compartments through the swivelling quarter-lights of the side glasses, and also through the heater box when the shutter is completely open and the radiator is shut in. To make the ventilation more effective, make use of the heater fan.

Ventilation of the cargo compartment is effected through the shutters in the front and rear parts of the body side panels.

Body (Cab) Heating

The cab heating and defrosting of the windshield are effected through the heater-radiator (Fig. 71) connected into the engine cooling system in parallel with the main radiator.

The warm air is admitted either for demisting the windshield completely or for heating the cab and demisting the windshield depending upon the positions of the shutters 4 (Fig 71) and the lid 3. Intensity of air flow could be controlled by the air vent lid of the cowl.

Effective operation of the heater is insured when a temperature of coolant in the engine cooling system is not less than 80 °C. Check the coolant temperature in the engine cooling system, adjust it by shutting the radiator shutter folds of the cooling system.

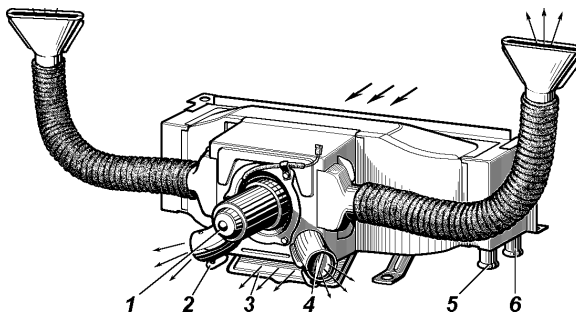


Fig. 71. Cab heating and windshield demisting diagram: 1 -fan motor; 2 -shutter handle; 3 -lid; 4 -shutter; 5, 6 -radiator manifolds

When starting the cold engine in the winter, shut off the cock on the cylinder head. Open the cock only when the engine is warmed up. The sanitary and passenger compartments are heated by an independent heater (Fig. 72), which is operated similar to the cab heater. The fresh air is sucked in through the heater radiator fan and passes into the rear compartment. The heater selector switch is located in the driver's cab on the r.h. side of the partition.

Sanitary Equipment of the Automobile YA3-3962

The following sanitary equipment could be placed in the sanitary compartment of the automobile (Fig. 73):

Unified stretcher.....	4
Sanitary bag	1
Bag with oxygen inhaler КИ-3М	1
Bag with feeding-cup.....	1
Reservoir for drinking water	1
Urine receiver	1
Bed-pan	1
Wire splints	2
Splints	2

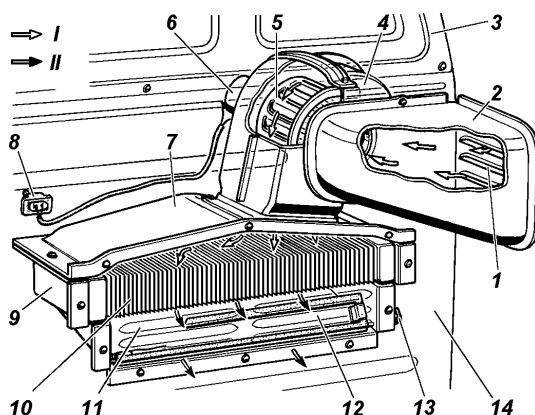


Fig. 72. Heating of sanitary and passenger compartments:

I -cold air; II -warm air

1 -louvers in body side panel; 2 -air duct housing; 3 -upper portion of partition (installed only in sanitary compartment); 4 -fan assembly; 5 -fan impeller; 6 - electric motor; 7 -heater shell; 8 -electric motor switch; 9 -radiator shell; 10 - radiator; 11 -louvers in lower portion of partition; 12 -shutter; 13 -shutter control handle; 14 -lower portion of partition

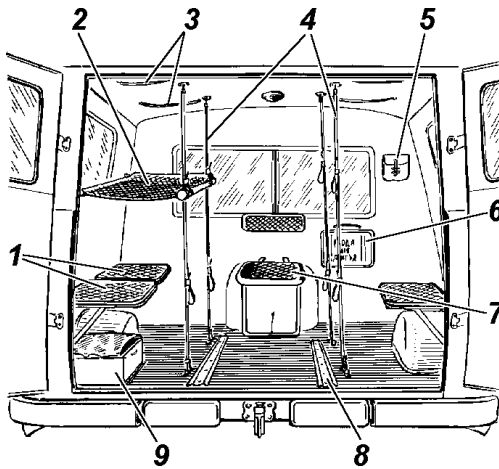


Fig. 73. Location of sanitary equipment:
 1 -hinged double seats;
 2 -stretcher; 3 -rails; 4 - suspension straps; 5 -bag;
 6 -reservoir for drinking water; 7 -hinged single seat; 8 -stretcher guide; 9 -box

For installing and fastening an unified stretcher in the sanitary compartment each of the side panels is provided with four hinged brackets, the ceiling is provided with holders and the body floor is provided with clips for attachment of suspension straps.

For carrying walking patients three double seats are installed in the ambulance body: two on the l.h. side of the body and one on the r.h. side; the body ceiling is provided with hand straps located opposite to each seat.

An accompanying person takes up the hinged seat secured to the partition. The hooks for the sanitary bag with the oxygen inhaler and feeding-cup are also secured to this partition.

The box provided with three pigeon-holes for bed pan, urine receiver and suspension straps is located on the body floor on the left in the rear part of the sanitary compartment.

The splints are secured with two straps on the body side panel in the r.h. corner.

The guides on the body floor make easy moving the stretcher along the body.

Carrying Patients

The automobile YA3-3962 and its equipment permit to carry from 6 to 8 persons (driver not included) at the following accommodation:

FIRST ACCOMMODATION:

- On hinged seat 1 person
- In driver's cab 1 person
- On stretchers 4 persons

SECOND ACCOMMODATION

- On stretchers on the left 2 persons
- On hinged seats 3 persons
- In driver's cab 1 person

THIRD ACCOMMODATION

- On stretchers on the right 2 persons
- On hinged seats 5 persons
- In driver's cab 1 person

FOURTH ACCOMMODATION (without stretchers)

- On hinged seats 7 persons
- In driver's cab 1 person

Before run, make the automobile ready for receiving patients.

For that, check the stretcher strap knots for reliability, check the brackets for proper securing to the body panels, for proper functioning, check the suspension strap clips for proper securing.

After checking the equipment and sanitary belongings, fit the suspension straps (Fig. 74).

When carrying patients accommodated on seats, remove all the stretchers and hinge out the side seats. Put a pair of the stretchers together, tie up with straps and place along the sanitary compartment under the hinged-out seats.

Remove the suspension straps, roll them up and place into the box.

Then, check the hinged seats, flexible rails and footsteps of the body rear end door for reliability.

Fastening Stretcher

When installing the stretchers with patients, fasten at first the upper stretcher, then fasten the lower one.

Fasten the handle of one stretcher beam to the hinged brackets, fasten the other handle in loops of hanging down straps, then close the bracket and tighten the strap loops by means of the pressing frame (Fig. 75). The rear straps are provided with labels.

After installing the lower stretcher, attach the hanging down strap ends to the special clips on the body floor.



Fig. 74. Fitting suspension strap in place

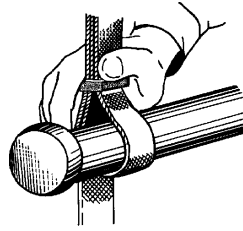


Fig. 75. Fastening stretcher handle in strap

When carrying patients, be carefull, start away from rest smoothly and avoid abrupt braking.

Windshield Wiper and Windshield Washer

For convenience, when washing the windshield, the blade-and-lever assemblies could be swung out of the way.

For increasing the service life of the windshield wiper and its blades, the operation of the blades on dry glass is not recommended.

In the service period, check the windshield, rear window and headlamp wipers for proper functioning, check them for reliable attaching, periodically clean the glasses and rubber tapes of blades of dirt and grease.

During the seasonal maintenance, switch on the wipers for 15-20 min, in this case the blade-and-lever assemblies of the windshield should be swung out of the way, and the blade-and-lever assemblies of the rear window should be removed.

After 18-24 months of run and also, if required, replace blades and rubber tapes.

Washer (Fig. 76). The electric washer is intended for high-speed cleaning the windshield.

Fill up the washer reservoir with clean water (in summer) or with special antifreezing fluid (in winter).

Adjust the direction of fluid jet (except for headlamp washer jets) by changing the position of the jet balls by means of a needle inserted through the channel of the balls. When clogging the jet, uncouple the pipe and blow out the jet.

Keep watch on the level of fluid in the reservoir not allowing

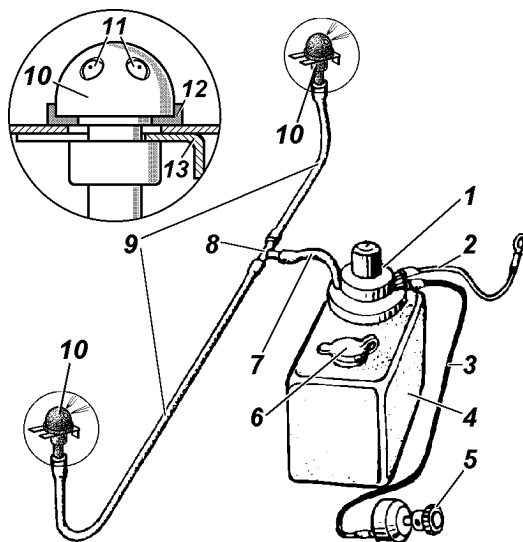


Fig. 76. Electric washer:

1 -pump body complete with electric motor; 2 -ground wire; 3 -wire "+"; 4 - reservoir; 5 -combined switch; 6 -cover; 7, 9 -hoses; 8 -tee-piece; 10 -jet; 11 - jet ball; 12 -gasket; 13 -clamp

it to drop below a value of 20 mm above the reservoir bottom in order to avoid failure of the washer pump.

Never keep the washer switched on in excess of 10 s.

Maintenance of the Body

To take care of external appearance of the automobile, maintain regularly the varnish coating of the body. Do not wipe dust and dirt with a dry cloth. Wash the body with water jet of low head using soft rags. Upon washing, wipe the body surfaces dry. Do not use soda or alkaline solutions because the varnish coating could be become dull. Avoid exposing the automobile to sunlight for a long time. Never spill acids, solutions, soda, brake fluids, fuel and antifreezing agents on the painted surface of the body and rubber parts.

To take care of the body coatings, use prophylactic polishing liquids.

Straighten minor surface irregularities, if required, clean of dirt, grind and paint.

If damage of the body (cab) is considerable, prime, dry and paint the surface.

During service of the automobile, periodically treat the body surfaces, especially enclosed spaces, with corrosion-preventive compounds, as "Mobil", "Tectil" etc.

If required, recovery the body floor coated with bituminous cement by spreading it by means of a special spray or brush.

If required, clean the seat upholstery, for that make use of a neutral soap with water (water-and-soap solution), then wipe dry with a soft cloth. Never make use of fuel for cleaning the upholstery of leather substitute.

Remove the heater radiator and remove scale and sediment, if using water as a coolant, before winter and summer seasons.

Scale and sediment are removed by flushing them with a fast jet of clean water. The direction of the flushing water flow should be reverse to the direction of the hot water flow. Also, carry out external washing of the radiator.

Lubricate according to Lubrication Table: locks, hinges and catches of doors; door check joints; joints of windshield wiper blade control linkage, bearings of windshield wiper and body (cab) heater motors.

LUBRICATION OF AUTOMOBILE

Service life and trouble-free operation of the automobile depend to a great extent on timely and correct lubrication.

The lubricating materials and special fluids are specified in this Instruction Manual. The points on the chassis and engine subject to lubrication are indicated in Lubrication Table.

If there are no special instructions in the column "Description", the indicated oil or grease sorts are used in all seasons.

If several grease marks with the same periodicity of changing are indicated in the column, all the marks are interchangeable. If the grease mark is provided with the note "substitute", and the other periodicity of changing is indicated, use preferably the base grease mark.

In the process of lubrication, adhere to the following rules:

1. Change oil from the engine and transmission when the units are hot.
 2. Remove dirt from the grease fittings and plugs.
 3. Upon lubrication, remove the squeezed out or leaked lubricant from all parts.
 4. Before filling the transmission case, transfer box, the housings of the front and rear axles with fresh oil, wash them, if the waste oil drained from the mentioned units is contaminated or metal particles are detected in it.
 5. Mixing the grease "Литол - 24" with the substituting grease "Лита" is allowed in any proportions. When using other substitutes wash the unit with kerosene.
 6. Mixing the brake fluids "Роса", "Роса-3", "Томь", "Роса Дот-4" is allowed in any proportions.
- If metal particles are detected in oil, open the unit, check it and replace the worn parts.

PRESERVATION

If the automobile is to be removed from operation for a prolonged period of time, it should be subjected to preservation, for which purpose, do the following:

1. Carry out the scheduled maintenance.
2. Wash the automobile and wipe it dry. Touch up the paintwork wherever damaged.
3. To protect the engine cylinders against corrosion pour 30-50 g of engine oil into the cylinders through the spark plug holes. To insure uniform spreading of oil throughout the entire surface of cylinders, crank the engine through 15 revolutions by the starting handle.
4. Clean all wires from dirt and wipe dry.
5. Using the preservative lubricant ПБК (for lack of it - with petrolatum), coat all unpainted external metal surfaces of the automobile and all unpainted parts of hinged joints (hinges and locks of doors, control rods of the carburettor, parking brake, towing gear, and other parts and also ignition coils).
6. Lubricate the springs with a graphite lubricant.
7. Check, clean the tools, accessories and spare part set and wrap them with oiled paper or with cloth.

8. Seal the external cab glasses with light-tight paper (cloth) or shut with shields.

9. Remove the wheels for automobile, clean the wheel disks of dirt and touch up the areas with damaged paint. Clean, wash and wipe dry the tyres, and bring the tyre inflation pressure to normal.

10. If required, flush out the fuel tanks and fill them with fuel.

11. Prepare the battery for storage as is specified in the maintenance manual of lead-acid batteries.

12. Seal the slits of the air cleaner and the muffler exhaust pipe with oiled paper.

13. Loosen the tension of the fan driving belt.

14. Drain the coolant from the engine cooling system and the fluid from the windshield washer reservoir.

15. Seal the transfer box and housings of the front and rear axles for each purpose, wrap the safety valves with the insulating tape.

16. Clue the clearances between the brake drums and backing plates with oiled paper.

17. Protect the tyres and other rubber parts from action of direct sunlight.

18. Put under the axles the metal or wooden props, that the wheels would be raised above the surface.

Unload the springs; for that put the wooden struts between the frame and axles. The preserved automobile should be located in a clean, ventilated room with relative humidity 40-70% and temperature not less + 5°C.

Do not keep chemically aggressive substances such as acids, alkalis and other in one location with the automobile.

Maintenance of Automobile Placed in Storage

Once in two months, carry out the following operations:

1. Carefully inspect the automobile from the outside.

2. Unscrew the spark plugs and shift in the first gear of the gearbox and the low range of the transfer box, then turn the crankshaft with the starting lever through 15 of a turn. Once a year before turning the crankshaft lubricate the engine cylinders with 30-50 drops of engine oil.

3. Clean and paint corroded areas, if any are detected.
4. Rotate the steering wheel from lock-to-lock position for 2-3 times.
5. Check the service and parking brakes, clutch, choke and throttle valves, manual and foot-operated linkages of the throttle valve, headlamp switches for proper functioning.
6. Check the level of working fluid in the reservoirs of the brake master cylinder and the hydraulic clutch master cylinder, and, if required, top up to normal.
7. Inspect the ignition distributor, and if required, lubricate its metal parts.
8. Check the tools and accessories, if required, wipe and lubricate them.
9. Check the condition of tyres and other rubber parts.
10. Eliminate the troubles detected during inspection.

Depreservation

1. Remove the preservative lubricant from the parts for which purpose, wash them with kerosene or clear gasoline. Remove the lubricant from areas which may come in contact with rubber parts or painted surfaces.
2. Carry out daily maintenance.
3. Check the level of oil in the engine crankcase and drain an excess amount of oil.
4. Before engine starting lubricate each cylinder with 30-50 drops of engine oil and turn the crankshaft with the starting lever through 10-15 of a turn.

LUBRICATING MATERIALS AND SPECIAL FLUIDS

Description of fluid or grease	SAE equivalents
Motor Oils	
M6 ₃ /12Г ₁	SAE 15W-40
M-5 ₃ /10Г ₁	SAE 10W-30
M-6 ₃ /10B	SAE 10W-40
Transmission Oils	
ТСП-15K	SAE 90
ТСП-10	SAE 75W
Lubricant Greases	
Grease Литол-24	Lithium grease to NLGJ №3
Graphite powder	Barbatia Grease 2
Fluids	
Shock absorber fluid АЖ-12Т, Spindle oil АУ	Shock absorber oil, Shell Donax A
Brake fluid "Томь", "Роса" "Роса-3", "Роса Дот-4"	SAE 1703F, DOT-4
Cooling fluid ТОСОЛ-А40М	Shell safe

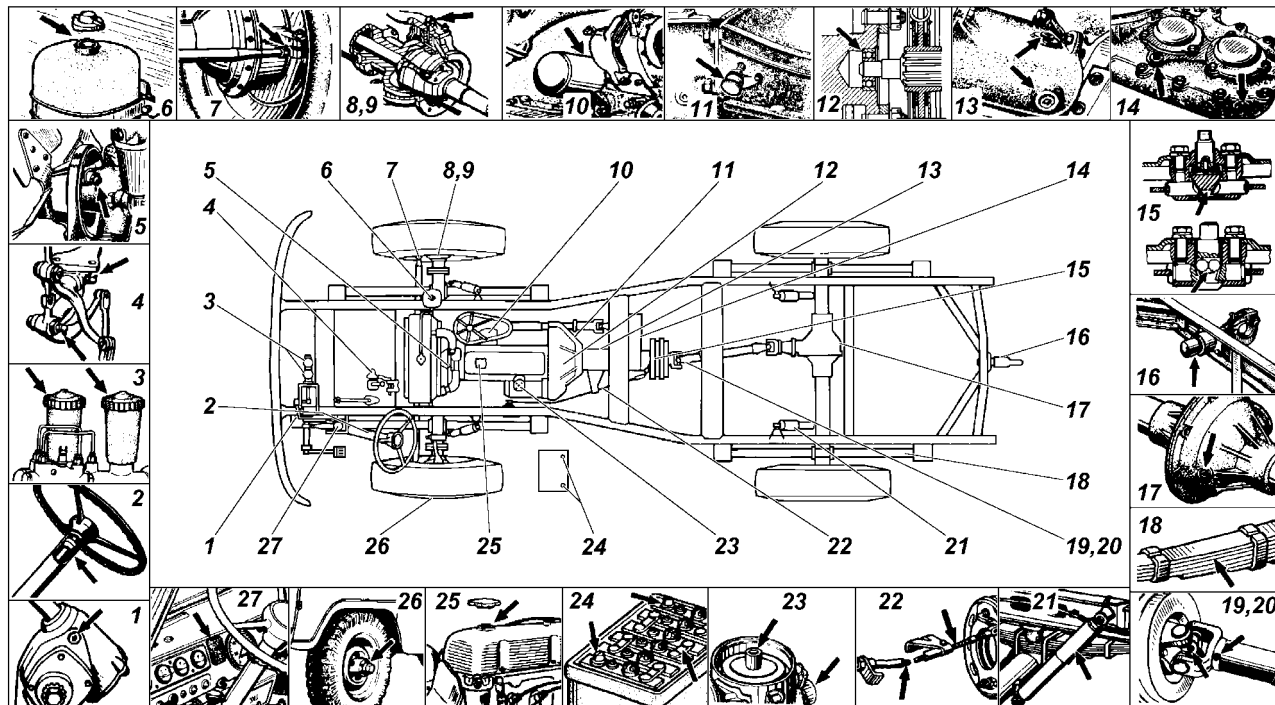


Fig. 77. Lubrication and tank chart of automobile