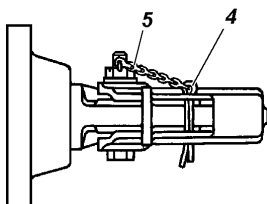


Fig. 51. Towing Gear of Rigid Type:
 1 -case; 2 -pawl; 3 -catch; 4 -cotter pin;
 5 -chain



Suspension

The suspension of automobiles YA3-31512, YA3-311514, YA3-31519 (Fig. 52) consists of four longitudinal semielliptic springs functioning in conjunction with four hydraulic telescopic shock absorbers. The front and rear shock absorbers are identical in design and interchangeable.

The automobile YA3-3153 and some automobiles YA3-31512, YA3-31514, YA3-31519 are equipped with a combined suspension: the front suspension (Fig. 53) - spring with transverse stabilizer, the rear one (Fig. 54) - on small-leaf springs. The front and rear shock absorbers of the combined suspension are not interchangeable.

Maintenance of the Suspension

Periodically check the condition and attachment of the springs and shock absorbers. To prevent corrosion and eliminate squealing noise, lubricate the spring leaves at least once a year. To lubricate the springs, remove them from the automobile, disassemble, wash in kerosene, dry and lubricate each leaf with a grease according to Lubrication Table. The small-leaf springs of combined suspension need no grease.

Knocks and squeaks in the spring eyes are symptoms of worn-out rubber pads.

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

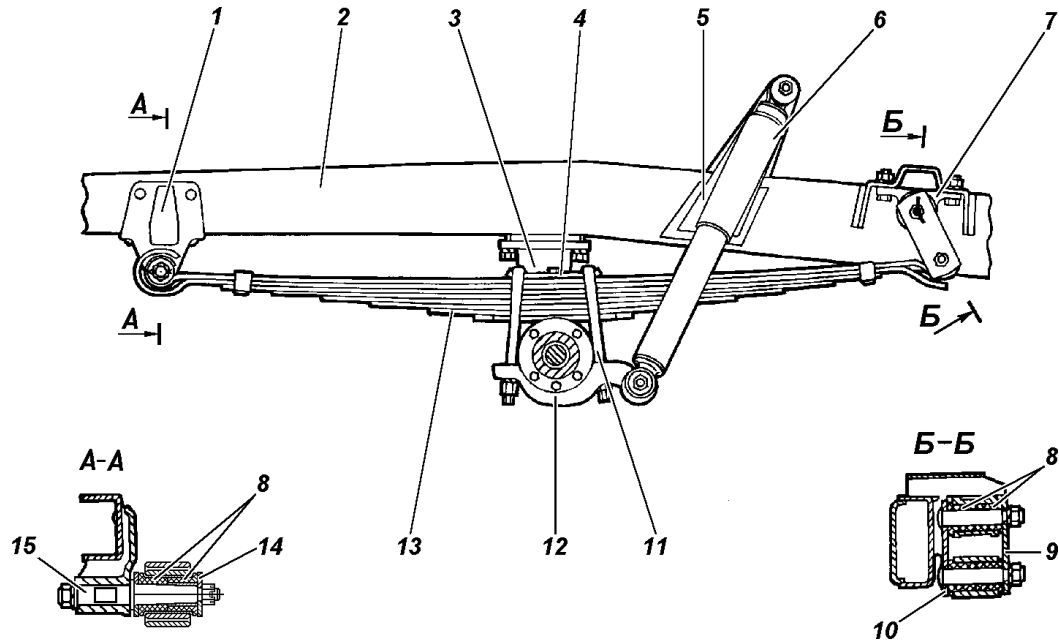


Fig. 52. Front Suspension of Automobiles YA3-3152, YA3-31514, YA3-31519:

- 1 -front hanger; 2 -frame; 3 -buffer; 4 -cover plate; 5 -shock absorber hanger; 6 -shock absorber; 7 -rear hanger; 8 -rubber bushings; 9 -shackle outer cheek; 10-shackle inner cheek; 11 -U-bolt; 12 -gasket; 13 -spring; 14 -washer; 15 -spring axle

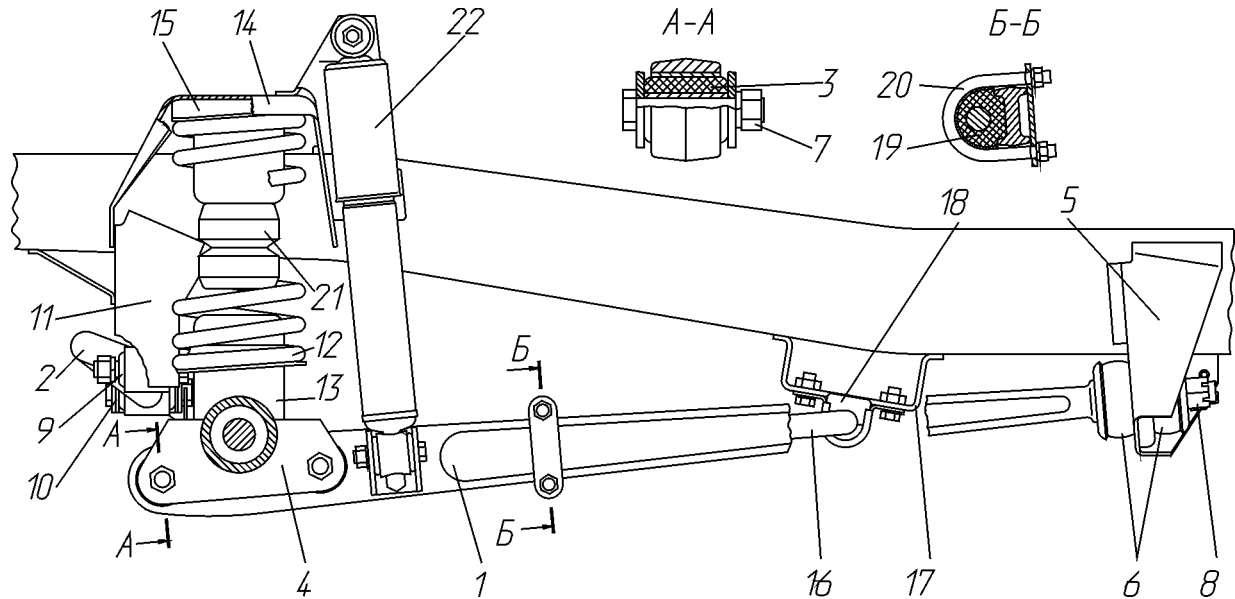


Fig. 53. Front Spring Suspension:

1-longitudinal lever; 2-tie-rod; 3,9-rubber-metal joints; 5-longitudinal lever hinges; 6-rubber joints; 7,8-nuts; 10,11-tie-rod hinges; 12-spring; 13,14-spring hinges; 15-vibration damping gasket; 16-stabilizer; 17-stabilizer bracket; 18,19-rubber bushings; 20-U-bolt; 21-buffer; 22-shock absorber

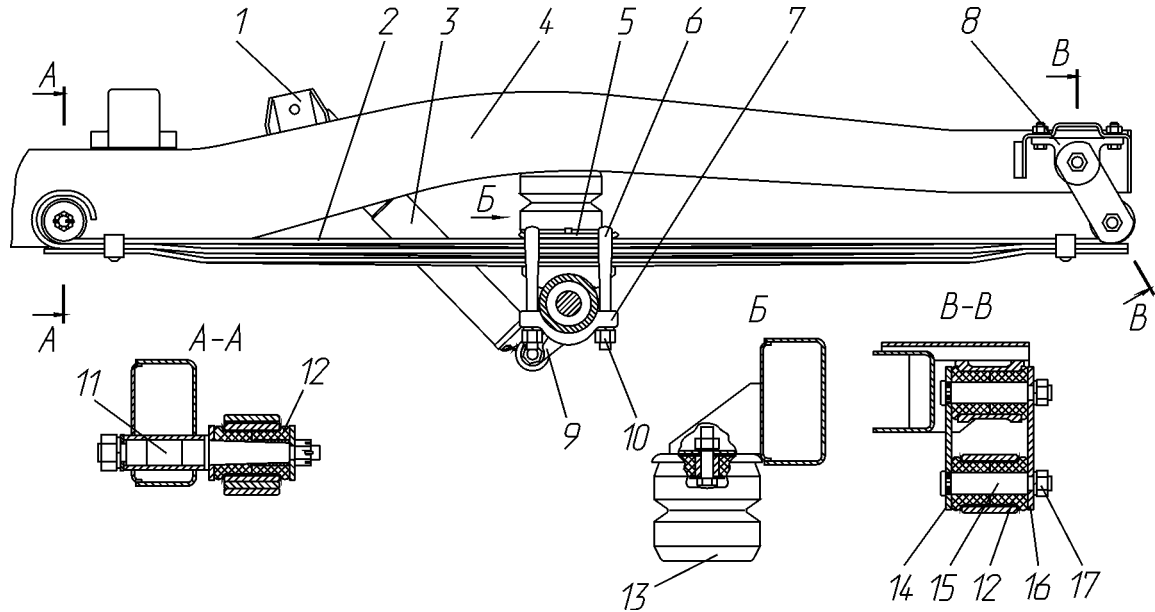


Fig. 54. Rear Suspension on Small-Leaf Springs:

1-shock absorber hanger; 2-spring; 3-shock absorber; 4-frame; 5-cover plate; 6-U-bolt; 7-pad; 8-shackle bracket;
 9-shock absorber hanger; 10-U-bolt nut; 11-axle; 12-rubber bushing; 13-buffer; 14-shackle inner cheek; 15-pin; 16-shackle outer cheek;
 17-pin nut

Maintenance of the front spring suspension comes to checking and tightening the joints of longitudinal lever, tie-rod and transverse stabilizer. Knocks and squeaks in the joints are the symptoms of worn-out joints. Remedy these troubles by replacing these joints. In the service period, do not allow a deformation of the tie-rod and steering linkage. When replacing the joints, carry out the last tightening of nuts on the automobile standing on the wheels.

Never operate the automobile provided with the spring suspension when the shock absorber is faulty or when there is no shock absorber on the automobile.

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. 55). If the leakage fails to be eliminated, repair the shock absorber in a workshop.

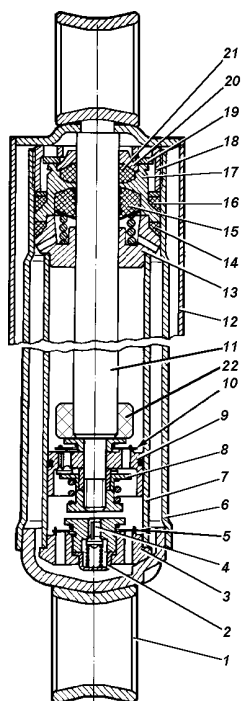


Fig. 55. Shock Absorber:

1 -eye; 2 -compression valve stop 3 - compression valve body; 4 -compression valve; 5 -inlet valve; 6 -reservoir; 7 -cylinder; 8 -rebound valve; 9 -piston; 10 -by-pass valve; 11 -rod; 12 -housing; 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; 22 -rebound buffer (rebound buffer is installed only in shock absorbers of front spring suspension)

Wheels, Tyres

Attachment of the spare wheel is shown in Fig. 56. When opening the tail gate, swing the hinged wheel carrier together with the spare wheel to the right through 90 °C .

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.

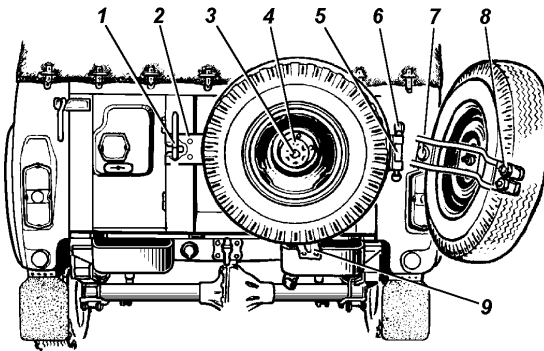


Fig. 56. Attachment of Spare Wheel:

1 -lock of hinged spare wheel carrier; 2 - hinged wheel carrier; 3 -bolt; 4 -hold-down washer; 5 - fixed hinge; 6 -wheel carrier hinge pin; 7,8 -buffers; 9 -support

With the normal tyre inflation pressure the toe-in of the front wheels should be such that the dimension "A" (Fig. 57) 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 lock nuts 1 and 3 (Fig. 58) provided with the right- and left-hand thread, rotate adjusting sleeve 2 (Fig. 58) to set a required value of the toe-in. Upon adjustment, tighten the lock nuts.

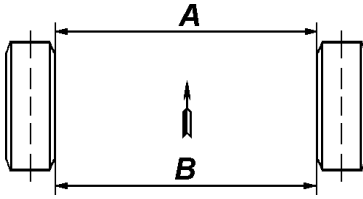


Fig. 57. Toe-In of Wheels

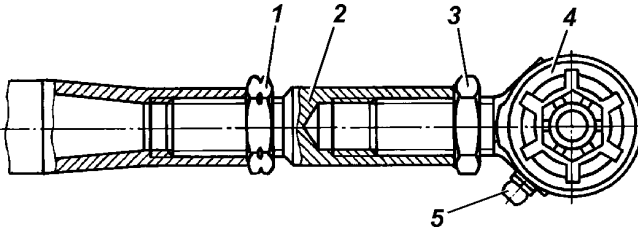


Fig. 58. Steering Linkage Rod:

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

To provide uniform wear of tyres, carry out tyre rotation as a preventive treatment.

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. 59).

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

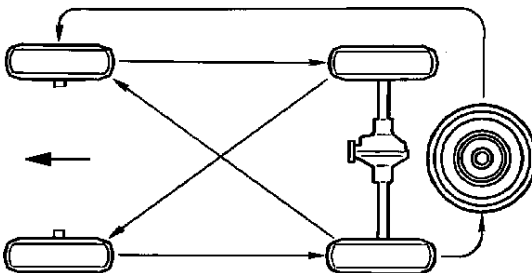


Fig. 59. Tyre Rotation Diagram

Wheel Hubs

The hub design is illustrated in Fig. 49, 50, 60.

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.

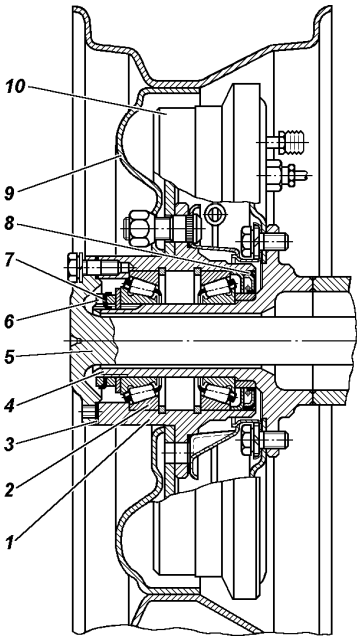


Fig. 60. Rear Wheel Hub:

1 -hub; 2 -bearing; 3 -gasket; 4 -journal;
5 -axle shaft; 6 -lock nut; 7 -lock
washer; 8 -collar; 9 -wheel disk; 10 -
brake drum

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 shaft 5 (Fig. 60) (remove the axle driving flange with hub drive) 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 lock nut 6 and remove the locking washer.

4. Back off the bearing adjusting nut $1/6$ to $1/3$ turn (1-2 flats).

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. 61). 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 lock nut.

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

8. Check adjustment of the bearings after tightening the locking 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 locking washer round the flat of the nut, bend the second tab round the flat of the locking nut. (Fig. 62).

10. Reinstall the axle shaft of the rear axle (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.

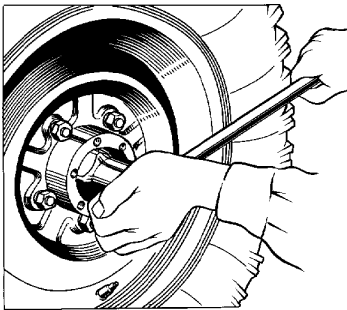


Fig. 61. Adjustment of Hub Bearings

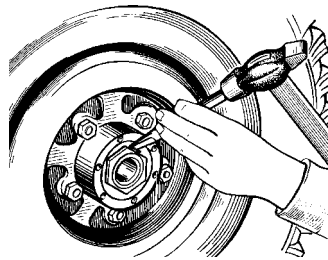


Fig. 62. Locking Hub Bearing Nuts

CONTROL SYSTEMS

Steering gear

The automobile steering gear is safe to handle in service, the splined steering shaft is provided with the cardan joint.

The automobile YA3-31512 is equipped with the steering mechanism of the "hour-glass screw and roller" type.

The automobile YA3-31512, YA3-31519, YA3-3153 are equipped with the steering mechanism of the "screw-ball nut-sector" type with the hydraulic steering booster or without it.

Maintenance of these steering mechanisms are the same, except for adjustment of the steering mechanisms and maintaining the hydraulic steering booster.

Timely tighten up the bolts attaching the steering mechanism case to the frame side member, check the pins of the steering rods and arms for proper attachment pins. Check the steering wheel play, adjust the steering mechanism, lubricate the steering linkage joints, add oil into the steering mechanism case or into the reservoir of the hydraulic steering booster.

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.

Check the steering wheel play of the steering arrangement with the hydraulic steering booster at an idling speed with the wheels set in a straight-ahead position by turning the steering wheel in both directions until the front wheels are turned.

If the steering wheel play exceeds the above-mentioned value, check the steering case and steering column joint yokes for proper tightening, check the tie-rod joints for proper condition, check the key securing crankshaft for proper tightening and plays in joined and splined connections.

Adjust the steering mechanisms in a workshop.

Periodically check for proper tightening the lock nuts of the tie-rod tips. 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. 63), and then unscrew it by half-turn and in this position turn off it.

If knocks in the steering column (Fig. 64 and 65a) are heard, remove the steering wheel and check the circlips of the expansion bushing in the shaft grooves for proper condition. For the steering column without an antitheft device (Fig. 64), loosen first the bracket fastening nuts, pull the column upwards and check the condition of the rubber bushing. A loose attachment of the body to the frame may also result in knock in the steering column.

When knock in double-coupling steering column (Fig. 65b) is heard, check the circlip 8 in the shaft groove for proper condition, tighten up the nuts 15, 28 and adjust bearings by tightening the nut 27.

In the process of maintenance of automobiles pay attention to proper fastening of the bearings in the yokes of the steering arrangement universal joint.

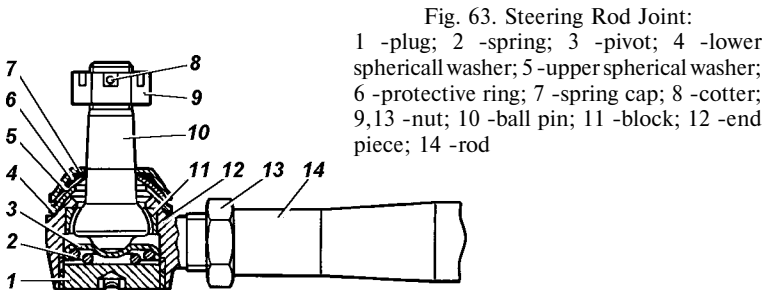


Fig. 63. Steering Rod Joint:

- 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

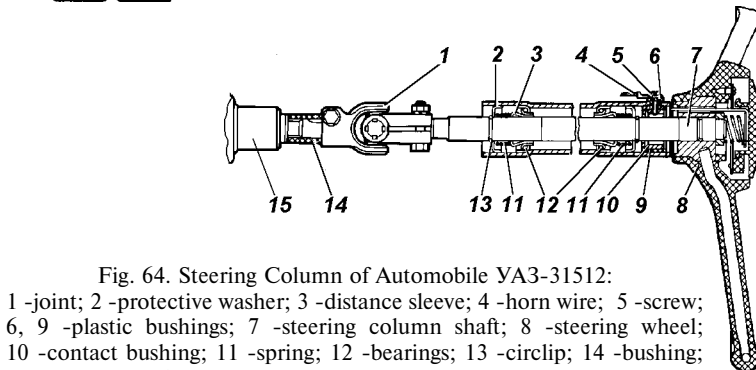


Fig. 64. Steering Column of Automobile YA3-31512:

- 1 -joint; 2 -protective washer; 3 -distance sleeve; 4 -horn wire; 5 -screw; 6, 9 -plastic bushings; 7 -steering column shaft; 8 -steering wheel; 10 -contact bushing; 11 -spring; 12 -bearings; 13 -circlip; 14 -bushing; 15 -steering mechanism

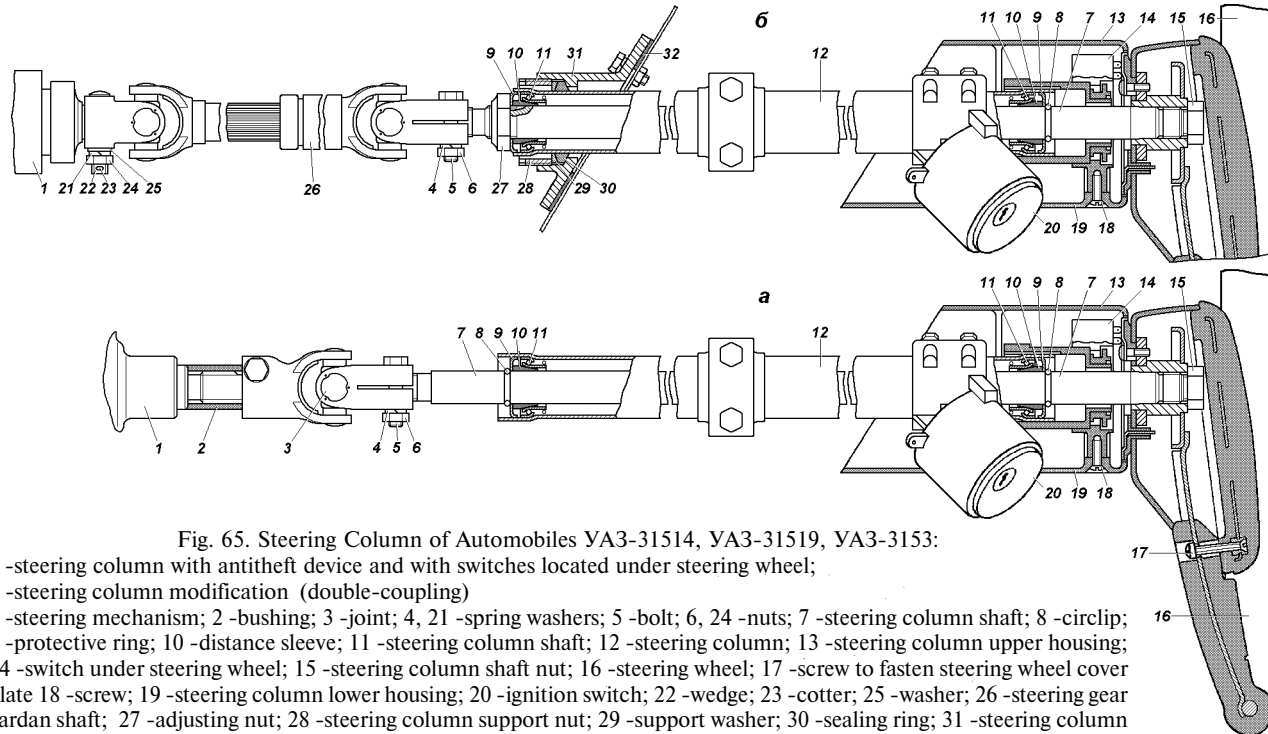


Fig. 65. Steering Column of Automobiles YA3-31514, YA3-31519, YA3-3153:

a -steering column with antitheft device and with switches located under steering wheel;

6 -steering column modification (double-coupling)

1 -steering mechanism; 2 -bushing; 3 -joint; 4, 21 -spring washers; 5 -bolt; 6, 24 -nuts; 7 -steering column shaft; 8 -circlip; 9 -protective ring; 10 -distance sleeve; 11 -steering column shaft; 12 -steering column; 13 -steering column upper housing; 14 -switch under steering wheel; 15 -steering column shaft nut; 16 -steering wheel; 17 -screw to fasten steering wheel cover plate; 18 -screw; 19 -steering column lower housing; 20 -ignition switch; 22 -wedge; 23 -cotter; 25 -washer; 26 -steering gear cardan shaft; 27 -adjusting nut; 28 -steering column support nut; 29 -support washer; 30 -sealing ring; 31 -steering column support; 32 -seal

If radial play in the joint (axial displacement of the center cross in the bearings) is detected, carry out an additional stop-punching of the bearings in the yoke eyes. During stop-punching do not allow the crumpling of the bearing body.

Radial displacement of the splined bush of the cardan shaft 26 (Fig. 656) is allowed, if there is no a perceptible side play in splines.

During assembly, the bearings of the universal joint center cross are prepacked with grease Литол-24 and there is no need in addition of grease in the service period.

Maintenance of the Steering Gear with Hydraulic Steering Booster

In case of failure of the hydraulic steering booster due to damage of the pump, deterioration of the hose or the pump drive belt or during towing of the automobile due to engine stop, the steering mechanism could be operated only a short period of time. **A prolonged operation of the automobile with the non-operating hydraulic steering booster would cause preliminary wear of the steering mechanism.** Do not allow that the pump of the hydraulic steering booster functions without oil. When leakage of oil from the hydraulic steering booster is detected, the belt of the hydraulic steering booster drive is to be removed.

Belt tension of the hydraulic steering booster pump drive. At a normal belt tension, its deflection in the middle between the crankshaft pulleys and pump pulleys should be equal to 12-17 mm when a force of 39 N (4 kgh) is applied to the belt. If required, adjust the belt tension by shifting the pump along the bracket attaching it to the engine. To do this, back off bolts attaching the pump to the bracket, shift the pump by means of the adjusting screw until a normal tension would be achieved and tighten up the bolts.

In case of failure of the belt or its excessive tension, replace the belt.

Checking oil level and changing oil in hydraulic steering booster. When checking oil level in the oil reservoir, set the front wheels in the position corresponding to the straight-ahead motion of the automobile. Refill oil when idling until oil reaches the level of the filler filter gauze in the oil reservoir or 5 mm higher, but not more.

Filtrate oil preliminarily using a filter with absorption trap not more than 40 μm .

Oil filling capacity is 1.1 l.

Change oil and replace the filter in the oil reservoir every 100 000 km of run or every two years of service. Change oil also when repairing or adjusting the steering mechanism.

Fill up the hydraulic steering booster as follows:

1. Uncouple the pitman arm drag link from the pitman arm or hold wheels off the ground by means of a lifter.

2. Remove the oil reservoir cover, fill up oil until it would appear over the filter gauze (not more than 5 mm).

3. Without starting the engine, turn the steering wheel or steering mechanism output shaft from lock-to-lock position until air bubbles cease to escape from the oil reservoir. Refill oil.

4. Start the engine simultaneously refilling oil.

Note. Excessive foaming of oil in the reservoir indicates that air is inside of the system. In this case, stop the engine and settle oil for 20 minutes minimum (until air bubbles cease to escape from oil). Check connections of hoses to the hydraulic steering booster units for tightness and eliminate untightness if required.

5. Run the engine for 15-20 s and bleed the hydraulic steering booster by turning the steering wheel from lock-to-lock position without holding it in extreme positions, three times in each direction.

6. Top up oil if required.

7. Place the reservoir cap and tighten the cap nut by hand.

8. Couple the pitman arm drag link, tighten and secure the ball pin nut with a cotter.

Maintenance of the by-pass and safety valves. When the by-pass and safety valves are dirty, wash them out. For this:

1. Screw out the stopper plug 9 (Fig. 66) over the inlet hole of the pump.

2. Take out the spring 5 and the control valve core 1, and place the stopper plug to prevent flowing out oil.

3. Unscrew the safety valve seat 6, take out the ball 4, the guide 3 and the spring 2. Take out the ring 8 and the filter 7 from the safety valve seat.

4. Wash the parts and blow them out with compressed air.

5. Carry out assembly in the reverse order. Keep cleanness when assembling. When disassembling and assembling, do not

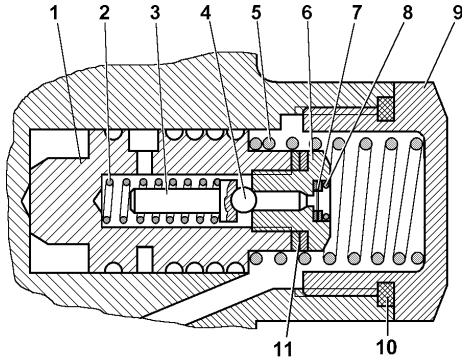


Fig. 66. By-pass and Relief Valves of Pump:
 1 -control valve of by-pass valve ; 2 -relief valve spring; 3 -guide of relief valve spring; 4 -relief valve ball; 5 -control valve spring; 6 -relief valve seat; 7 -filter; 8 -ring; 9 -plug-stopper; 10 -sealing gasket; 11 -adjusting shims

change the number of the adjusting shims 11 in order not to disturb the adjustment of the safety valve.

Brake System

Maintenance of the Service Brakes

Periodically check the fluid level in the brake master cylinder reservoirs and top up if required (Fig. 67). 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.

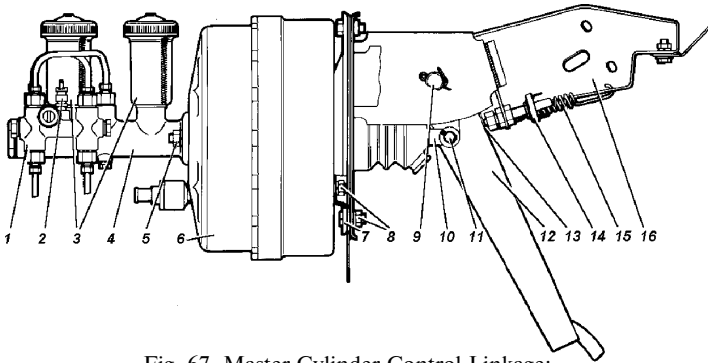


Fig. 67. Master Cylinder Control Linkage:
 1 -signalling device; 2 -brake hydraulic system emergency condition warning lamp switch; 3 -reservoirs; 4 -brake master cylinder body; 5, 8 -nuts; 6 -vacuum booster; 7 -plate; 9 -brake pedal shaft; 10 -fork; 11 -pin; 12 -brake pedal; 13 -stop; 14 -stop-light switch; 15 -return spring; 16 -bracket

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

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.

Check the pressure regulator* for serviceability during seasonal maintenance. Clean the pressure regulator of dirt and check it for proper fastening. Visually make sure that the regulator and the parts of its drive are not faulty, and also make sure that there is no leakage of brake fluid and there are no backlashes between the post complete with resilient lever and the bracket of the rear axle.

When pressing the brake pedal, the regulator piston should be extended from the regulator body by 1.7 - 2.3 mm. No piston stroke and also its deficient or excessive stroke indicate that the regulator or its drive is damaged.

When maintaining the hydraulic steering system, pay attention to the stopper 17 (Fig. 68) and check, if there is no leakage of brake fluid from under it. The plug in its service condition must be flushed with the opening of the regulator body against the stop. If the stopper is extended above the opening, and brake fluid leaks, repair or replace the regulator.

In the service period, when replacing the rear springs, adjust force of the toggle 5 (Fig. 69) on the regulator piston. Carry out the adjustment in the following sequence:

1. Place the automobile ready for driving on a level ground.
2. Loosen the lock nut of the adjusting bolt and back out the bolt through 2-3 of a turn.
3. Screw the bolt 4 until it touches the regulator piston 1 (Fig. 68), draw the bolt tight through 2/3 of a turn (4 bolt flats) and tighten the lock nut.
4. Check the regulator piston stroke (see above).
5. With the automobile in motion, check the adjustment for correctness. To this end, brake the automobile until locking the wheels, when driving on a straight level dry asphalt road. When the regulator is serviceable and the adjustment of the drive is

* Installed on some automobiles

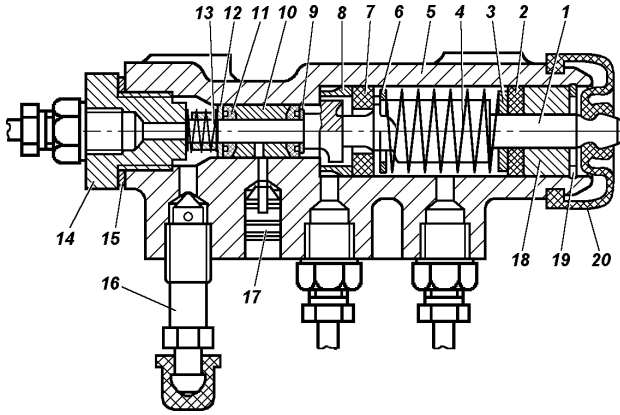


Fig. 68. Pressure Regulator:

1 - piston; 2 - piston sealing ring; 3,6 - piston spring bearing disk; 4 - piston spring; 5 - body; 7 - piston head seal; 8 - body liner; 9 - pusher sleeve bearing disk; 10 - pusher sleeve; 11 - pusher sealing ring; 12 - bearing plate; 13 - pusher sleeve spring; 14 - plug; 15 - plug gasket; 16 - by-pass valve; 17 - stopper; 18 - piston bushing; 19 - stopper ring; 20 - boot

done correct, the front wheels are locking first than the rear ones. If the rear wheels are locking first, unscrew the bolt 4 through 1-2 bolt flats and repeat checking with automobile in motion.

During service, keep close watch on the brake system serviceability, timely perform its adjustment and eliminate defected 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:

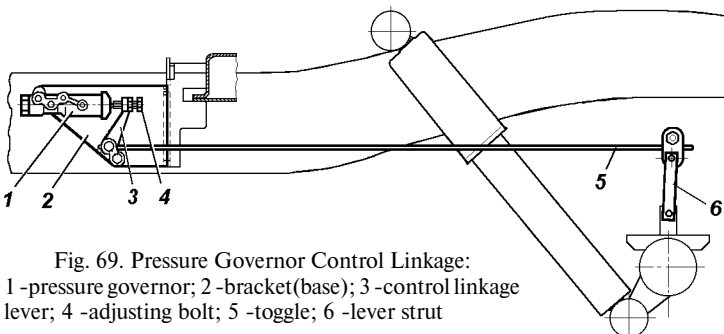


Fig. 69. Pressure Governor Control Linkage:

1 - pressure governor; 2 - bracket(base); 3 - control linkage lever; 4 - adjusting bolt; 5 - toggle; 6 - lever strut

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. 70) or 4 (Fig. 71) until the wheel is braked (Fig. 71).
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.

Adjust **the brake pedal free travel** by setting the stop of the stop-light switch 14 (Fig. 67) in a position ensuring the free travel of brake pedal in a range of 5 - 14 mm. Check the brake pedal free travel when the engine is shut down.

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. Clean of dust the brake master cylinder reservoir surface round the cap and unscrew the cap. 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 0.5-1 capacity half filled with brake fluid (Fig. 72).

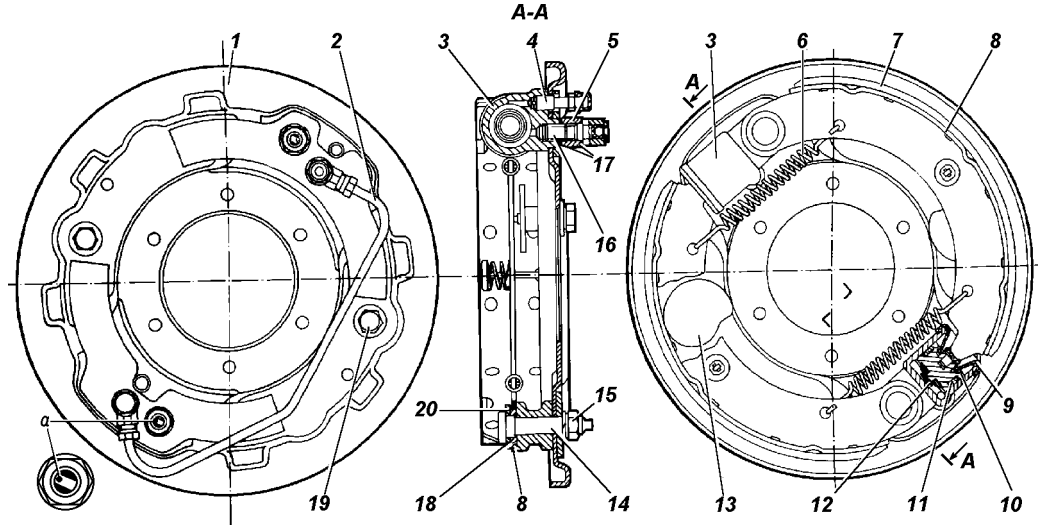


Fig. 70. Front Wheel Brake:

1 -brake backing; 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 ring; 12 -piston spring; 13 -adjusting eccentric; 14 -anchor pin; 15 -nut; 16 -coupling bolt; 17 -gaskets; 18 -support bushing; 19 -adjusting eccentric bolt; 20 -washer

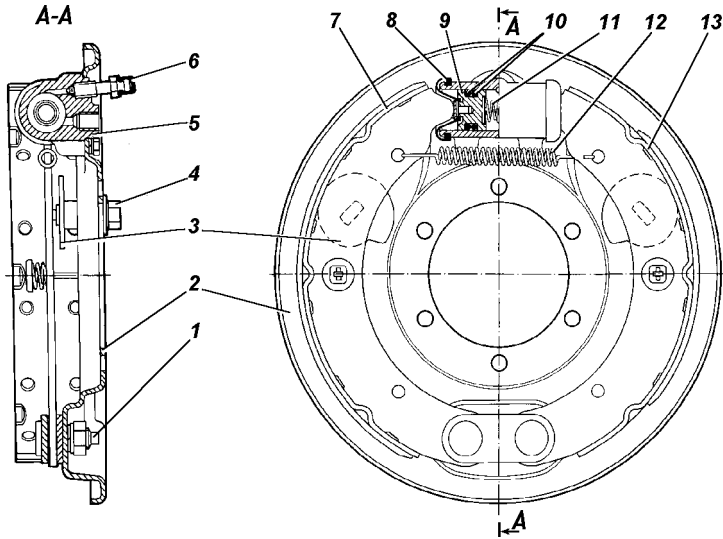


Fig. 71. Rear Wheel Brake:

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

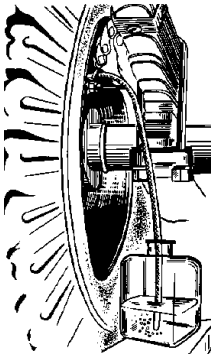


Fig. 72. Bleeding Brake System

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 in the following sequence: the r.h. brake wheel cylinder and the l.h. brake wheel cylinder of the rear brakes, the front circuit of the pressure regulator, the r.h. brake wheel cylinder and l.h. brake wheel cylinder of the front brakes.

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 signalling device pistons 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.

Switch on the signalling device brakes 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 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 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 7 (Fig. 73) 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 control rod in the following sequence:

1. Shift the lever to the extreme forward position.
2. Screw off lock nut 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 lock nut.

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 или 957.3701-10 - without brushes.

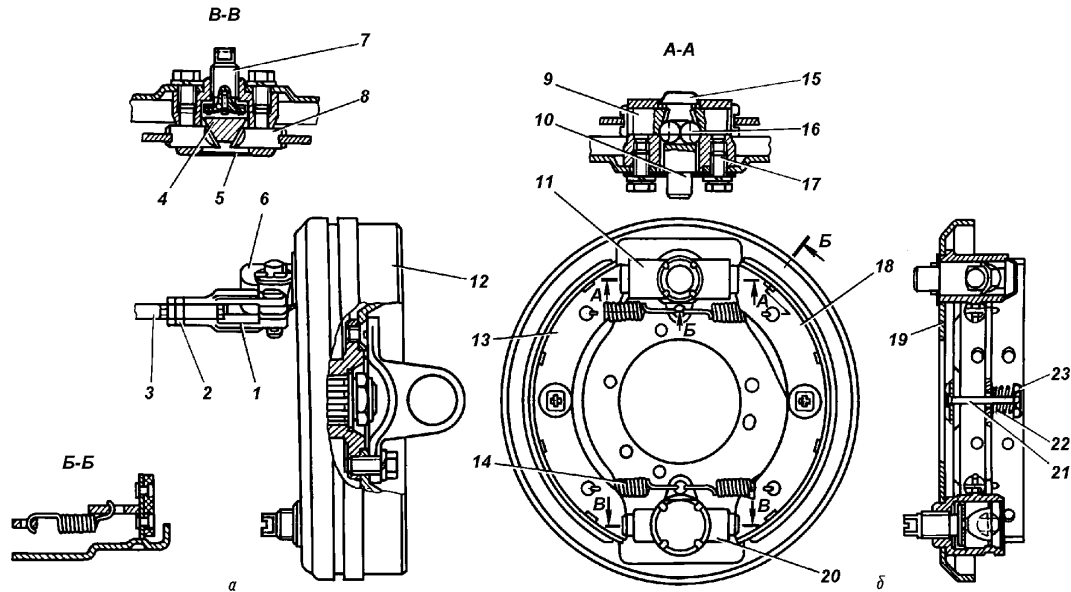


Fig. 73. Parking Brake:

1 -adjusting fork; 2 -lock nut; 3 -cable end; 4 -expanding cone; 5 -blank cover; 6 -operating lever; 7 -adjusting screw; 8 -brake shoe support; 9 -expander mechanism pushrod; 10 -cage of balls; 11 -expander mechanism housing; 12 -brake drum; 13,18 -brake shoes; 14 -brake shoe return spring; 15 -cap; 16 -expander mechanism ball; 17 -bolt; 19 -brake backing plate; 20 -adjusting mechanism housing; 21 -rod; 22 -spring; 23 -spring retainers

a - view with brake drum; б - view without brake drum

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 13.6 - 14.7 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 on the bracket under the hood.

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. 74) securing garnish molding 2 and remove it. Loosen three screws 5 and take out inner molding 4 together with the sealed beam unit 3.

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. 74) until the area of the concentrated light corresponds with the marks on the aiming screen or the wall as indicated in Fig. 75. 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. 76. For replacing the fog lamp bulb, remove the cover of the bulb holder by turning it counterclockwise and take out the bulb.

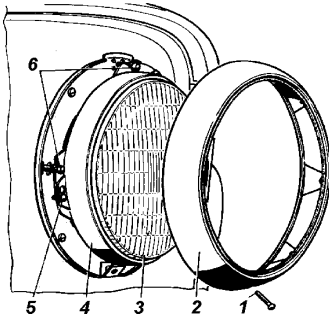


Fig. 74. Headlamp:
 1,5 -screws; 2 -garnish molding;
 3 -sealed beam unit; 4 -inner
 molding; 6 -adjusting screws

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.

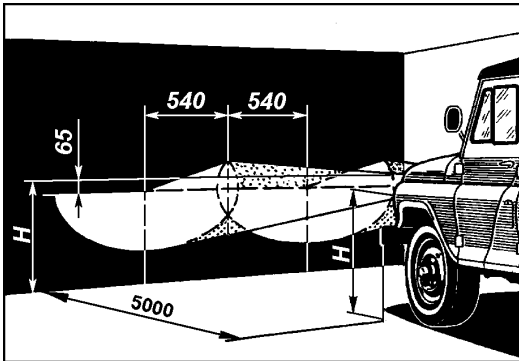


Fig. 75. Aiming
 Screen for
 Headlamp Adjust-
 ment:
 H - distance from
 center of headlamps
 to ground level

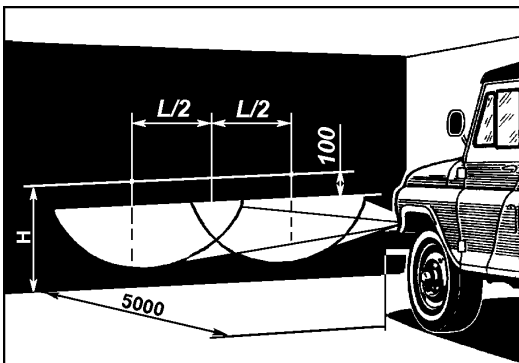


Fig. 76. Aiming
 Screen for Fog
 Headlamp Adjust-
 ment:
 H - distance from
 center of headlamps
 to ground level
 L - distance between
 centers of fog head -
 lamps

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.

Adjust the horn in a workshop.

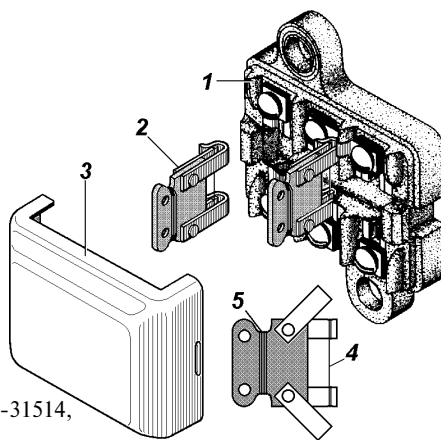
Turn indicators. The turn indicators are switched on manually by means of the switch and switched off automatically.

Maintenance of the turn indicators of the automobile YA3-31512 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 unit of overload breakers (Fig. 77) provided with three fuses 10A each is located under the automobile hood, on the body front panel.

Fig. 77. Fuse Unit:
1 -fuse unit body; 2 -fuse link;
3 -body cover; 4 -fuse link
filament; 5 -reserve filament



Circuits to be protected

Automobiles YA3-31512, YA3-31514,
YA3-31519:

№1 - turn indicators, backing lamp;

№2 - driving controls, light flashers

№3 - turn indicators in emergency warning mode, horn;

Automobile YA3-3153:

№1 - heater motor, backing lamp;

№2 - turn indicators, driving controls, light flashers, upper and lower beam lamp relay

№3 - turn indicators in emergency warning mode, horn

The thermal pushbutton cut-out 24 protects the lighting circuit (see Fig. 9, 10, 11).

The fuse (16A) protects the cigarette lighter circuit. The fuse is mounted in the wire bundle under the instrument panel near to the cigarette lighter.

The fuse (6A) protects the heater motor circuit of the automobiles YA3-31512, YA3-31514, YA3-31519. The fuse is mounted in the wire bundle under the instrument panel from the left of the heater.

The fuse (10A) protects the fog lamp circuit of the automobile YA3-3153. The fuse is mounted in the wire bundle in the engine compartment on the body front panel near to the fog lamp relay

Before replacing the worn-out filament of the fuse link or before switching off 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, voltmeter, 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 light 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. 78) 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.

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.

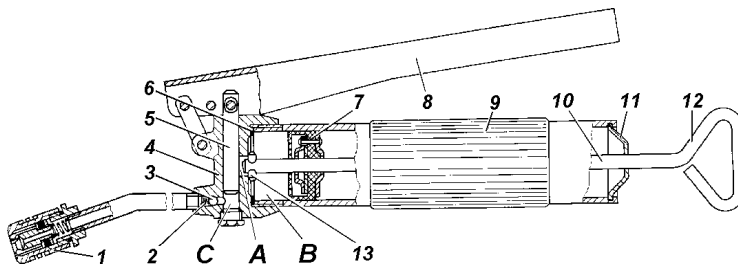


Fig. 78. Grease Plunger Gun:

- 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

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. 79) 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.

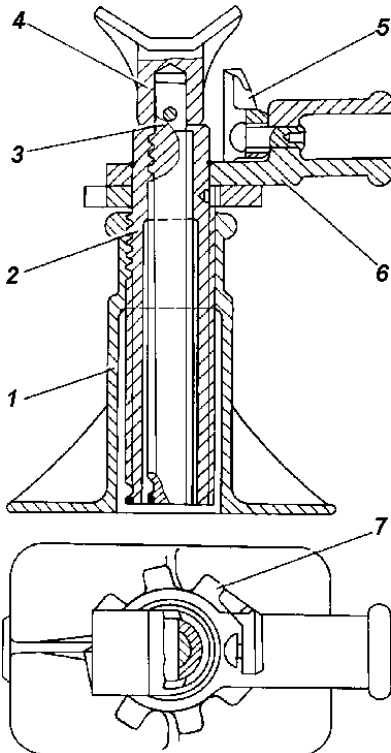


Fig. 79. Jack:
1 -body; 2 -external screw;
3 -internal screw; 4 -head;
5 -pawl; 6 -handle; 7 -ratchet

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.

BODY

The automobile body is of a metal multipurpose open type provided with detachable soft (tarpaulin) top, four doors, a hinged tailgate and is adapted for carrying passengers and cargoes.

The flap door of cargo compartment which is fixed in the upper position by means of the stops.

The doors and body tail gate are removable.

The door locks and handles are of safe type. The front door locks are locked up by a key. The internal door panels are provided with handles 2 (Fig. 80); by means of these handles, the door locks are locked up from inside (the lower handle position).

The locks locked up from inside by means of the handles 2 are not unlocked from outside. The lock of the flap door is locked up by a key.

The body floor is provided with access hatches to the transmission, transfer box, parking brake, as well as to the sensors and intake pipes of the fuel tanks. The hatches are closed by doors with rubber seals and are held to the floor by bolts.

For accommodation of filler necks of the fuel tanks the center pillars of the body are provided with hatches having hinged doors (Fig. 81).

There are boxes for oil reservoir, tow etc. in the rear body compartment.

It is possible to install a box for papers with lid detachable upwards on the body floor between front seats. The cowling parts of the body, radiator shell, fenders, mud guards, hood are removable (Fig. 82).

The windshield frame is hinged to the body and is secured by locks. When the tarpaulin is removed, it may be hinged out onto

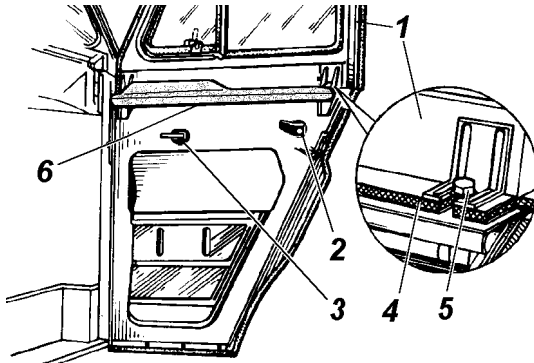


Рис. 80. Automobile Door:
 1 -door extension; 2 - door lock inner handle; 3 -door lock outer handle; 4 -gasket; 5 -extension fastening bolt; 6 -armrest

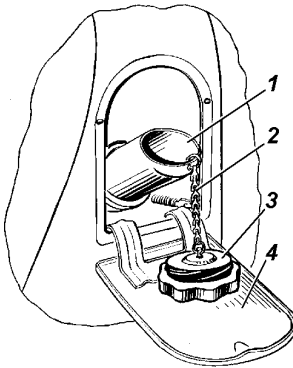


Fig. 81. Fuel Tank Filler Neck:
 1 -extending pipe; 2 -chain; 3 -fuel tank filler cap; 4 -access door

the hood and strapped to it. The windshield blades with levers should be removed.

For access to the engine the hood could be set in two positions (Fig. 83).

A detachable tarpaulin is secured on a metal knock-down framework (Fig. 84).

The metal frame work integrates with the safety bows.

To disassemble the tarpaulin, proceed as follows:

1. Unfasten the tarpaulin from the rear part of the body and from the body sides, and thereafter remove the tarpaulin from the fasteners.

2. Screw out the extreme bolts securing the metal holding-down strips located on the windshield frame, ease off the remaining bolts and remove the metal hold-down strips.

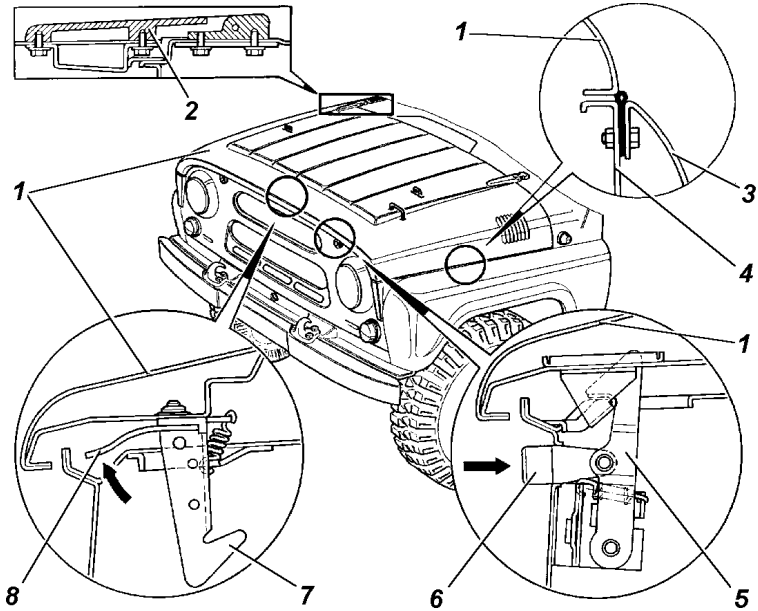


Fig. 82. Hood Lock and Safeguard:

1 -hood; 2 -hood hinge; 3 -fender; 4 -wheel mud guard; 5 -hood lock hook;
6 -hood lock button; 7 -hood safety catch; 8 -hood safety catch lever

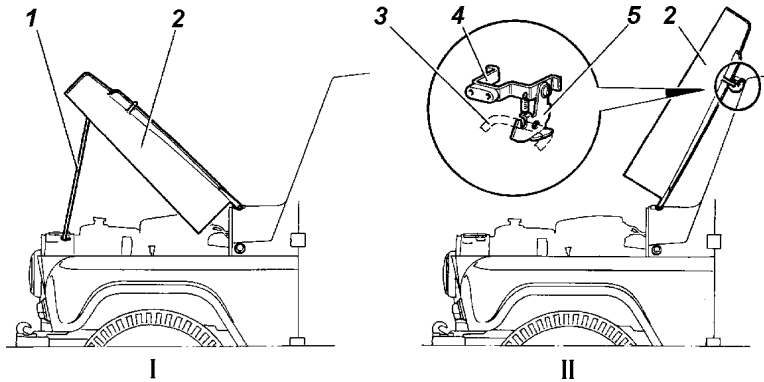


Fig. 83. Setting Hood in Open Position:

I -hood in propped-up position; II -hood latched to windshield frame; 1 -hood prop; 2 -hood; 3 -hood retainer clamp; 4 -hood retainer bracket; 5 - hood retainer latch

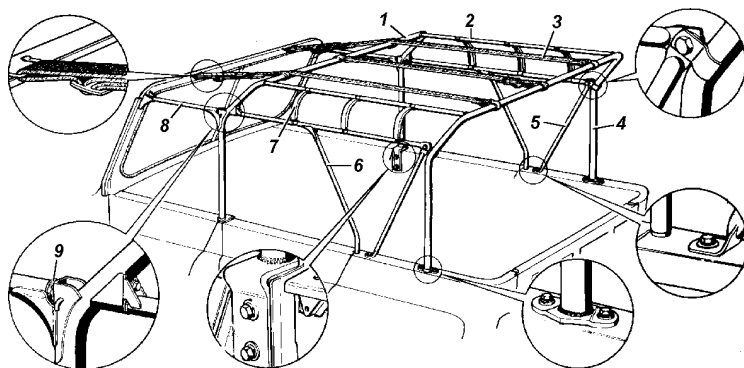


Fig. 84. Body Tarpaulin Frame:

1 -front bow; 2 -bow rear tie; 3 -fixing strap; 4 -rear bow; 5 -brace; 6 -inclined strut; 7 -spring strut; 8 -bow front tie; 9 -rubber bushing

3. Open the door and release the tarpaulin.

4. Remove the tarpaulin from the bolts of the windshield frame and from the hooks of the tarpaulin framework front bow. Remove the tarpaulin from the framework and stow it in a clean place.

5. Secure the tarpaulin metal hold-down strips in place by screwing in all the bolts on the windshield frame.

6. Unfasten and remove the fixing straps of the tarpaulin framework.

7. Remove the spring struts of the tarpaulin framework.

8. Remove the longitudinal struts of the tarpaulin framework.

9. Unscrew the bolts and remove the inclined props of the tarpaulin framework.

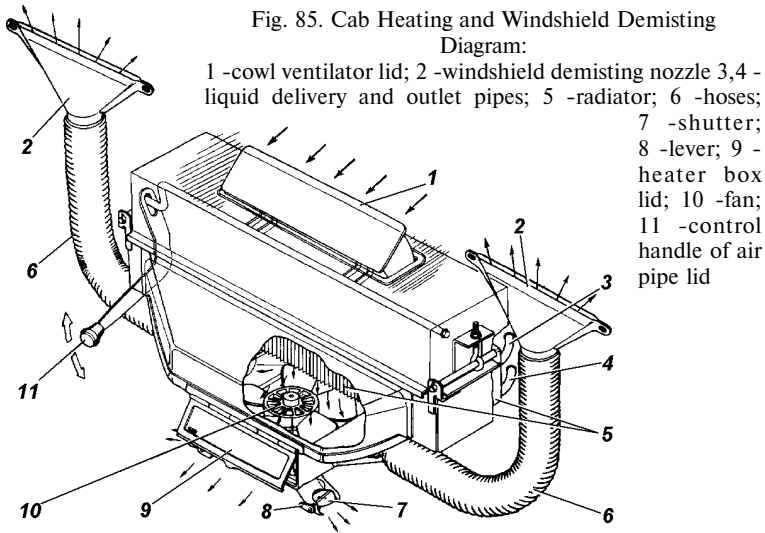
10. Unscrew and remove the tarpaulin bows.

11. Fold up the tarpaulin placing the inclined struts, spring braces and straps inside. Couple the tarpaulin bag by means of the belts.

Body Heating and Ventilation

The body is heated with air admitted from the outside through the cowl ventilator located in the middle part of the body front. The air passes through heater radiator 5 (Fig. 85) connected into the engine cooling system.

Fig. 85. Cab Heating and Windshield Demisting
Diagram:



The body is ventilated through the cowl ventilator and swivelling quarter-lights provided in the extensions of the doors.

Effective operation of the heater is insured when a temperature of coolant in the engine cooling system is not less than 80 °C.

When draining water from the cooling system, keep the drain cock open otherwise fluid would not drain from the heater radiator.

When the automobile is operated on extremely dusty roads, open the cowl ventilator lid for admitting air into the body which will reduce penetration of dust. At that time the door swivel glasses should be closed.

Windshield Wiper and Water Pump (Windshield Washer)

Windshield wiper. The automobile is equipped with the electric two-speed windshield wiper. It consists of the drive located under the instrument panel and two levers with blades.

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

Do not recommended to wipe the dry glass surfaces. Keep the rubber of brushes out of fuel and oil.

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. 86). 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.

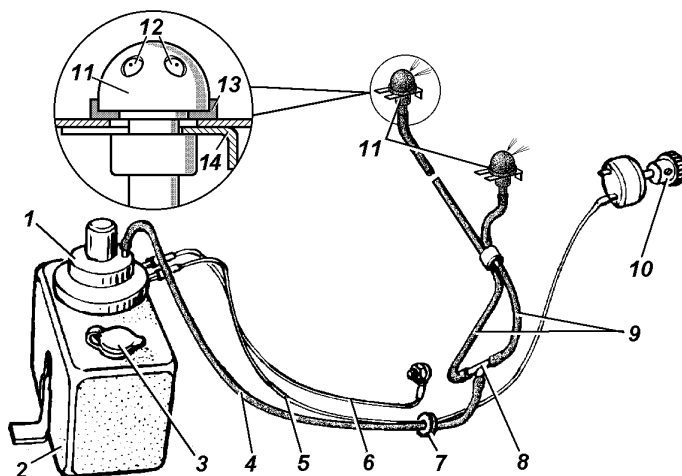


Fig. 86. Windshield Washer:

1 -windshield washer pump housing complete with electric motor; 2 -reservoir; 3 -cap; 4,9 -hoses; 5 -"+" wire ; 6 - ground wire; 7 -seal; 8 -T-pipe; 10 - combination switch; 11 -jet; 12 -jet balls; 13 -gasket; 14 -clamp

Keep watch on the level of fluid in the reservoir not allowing it to drop below a value of 20 mm above the reservoir bottom in order to avoid failure of the washer pumps.

Never keep the washers 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. Do not expose the automobile to sun lights what provokes damage of wheel tyres and sealings.

To take care of the body coatings, use prophylactic polishing liquids: car emulsion, polishing spray, wax AB-70 (for cars) etc. For recovering the lustre of dulled coating, use a cleaning-polishing compound.

During service of the automobile, periodically treat the body surfaces, especially enclosed spaces, with corrosion-preventive compounds. Treat the enclosed spaces of the body through the special holes in the panels and cross-members of the floor which are closed by means of the rubber plugs.

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

Lubricate assemblies and parts of the body in accordance with Lubrication Table.

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" of Table 3, 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).

5. 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.

TRANSPORTATION

The automobiles are moved depending on the user location: by water, rail or air. The transportation of the automobiles by the course is allowed.

When moving the automobiles in the hold or on the deck of ships, and also by air make them fast in accordance with the ship scheme or air transport scheme. Use appliances, which not damage the parts and paint of the automobile.

Before loading check the driver's kit, accessories and spare parts in accordance with the complete list.

The loading and unloading should be carried out by a crane with special grips in accordance with the scheme in Fig. 87.

On all transports the automobiles should be located so that the distance between the automobiles (extrem points) on the radiator side would be equal to 50-100 mm, and on the other sides - not less than 100 mm.

When moving, the parking brake of the automobile should be on, the engine - shut down, the gearbox lever should be in the position of the first gear, the fluid (water) should be poured out from the cooling system and the signboard "Water is poured out" should be hanged, the storage battery should be cut off with the ground switch.

To protect the automobile from axial and side shiftings attach it with four tension wires of steel wire (dia. 6 mm) with double thread each, and also with wooden wedges 300x160x80 nailed to the floor under wheels. Attach the tension wires to the towing hooks on th frame ahead, and to the towing gear-in rear part of the automobile. After attaching seal the automobile.

Before moving by air, fill the fuel tanks with fuel, but not more than 75% of its capacity.

The automobile should be get into an airplane with the gear box shifted in the first gear and with the transfer box shifted to the low range or by moving backwards (depending on the loading or unloading conditions).

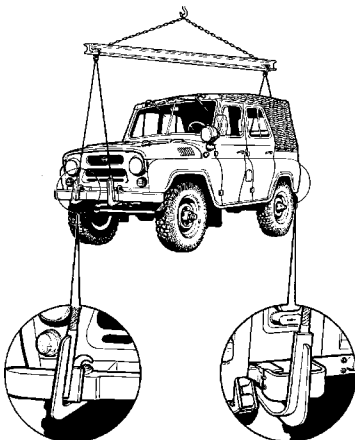


Fig. 87. Scheme of automobile loading (unloading)

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-15К	SAE 90
ТСП-10	SAE 75W
Lubricant Grease	
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 fluids ОЖ-40 "Лена", ОЖ-65 "Лена", ТОСОЛ-А40М, ТОСОЛ-А65М	Shell safe

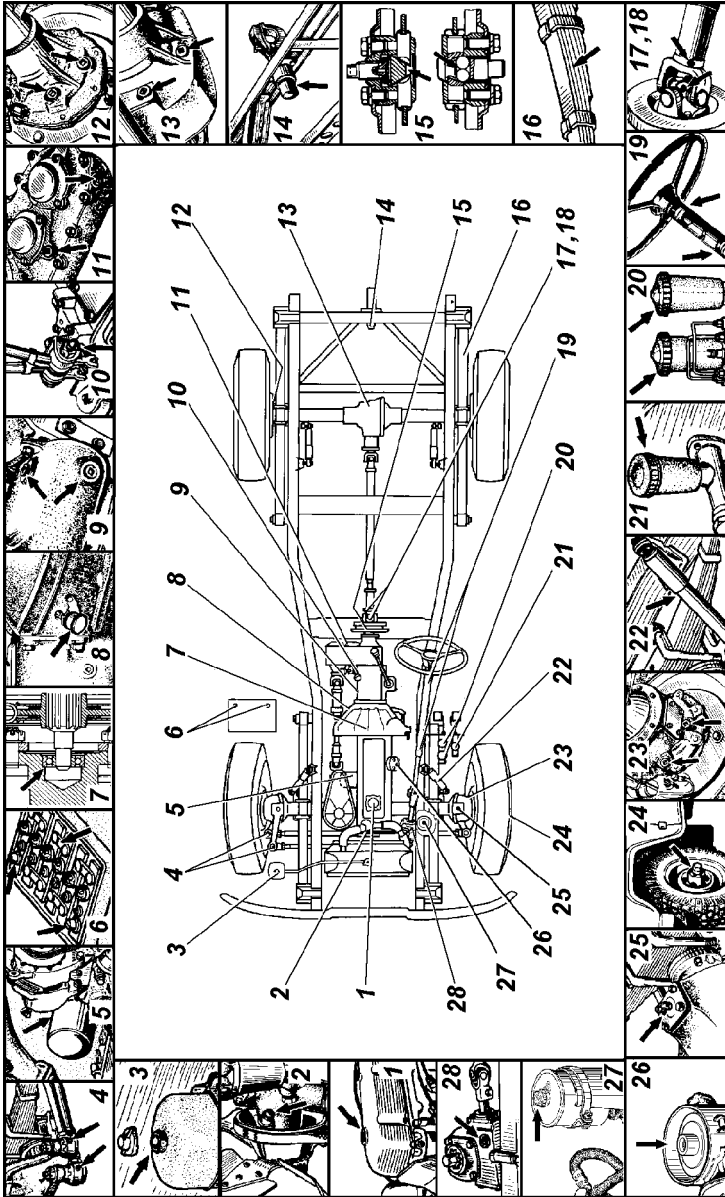


Fig. 88. Lubrication and Tank Chart of Automobile