AUTOMOBILES

УАЗ-451М, УАЗ-452

AND THEIR VERSIONS

Instruction manual

V/O·AVTOEXPORT·USSR·MOSCOW

AUTOMOBILES УА3-452, УА3-451М
AND THEIR VERSIONS

INSTRUCTION MANUAL

V/O "AVTOEXPORT"

USSR MOSCOW

CONTENTS

Vneshtorgizdat. Order No. 947A

Инструкция по эксплуатации УАЗ-452, УАЗ-451М

на английском языке

Типография ВТИ. Заказ № 6221

FOREWORD

To ensure trouble-free operation and long life of your vehicle, read this manual carefully and follow the instructions set forth herein. Lubricate and service the vehicle at the scheduled intervals to keep it in a peak working order.

The maintenance of your vehicle may be entrusted to one of the service stations recommended by your dealer. These service stations are well stocked with spares and all the necessary service facilities. All servicing is carried out by experienced specialists.

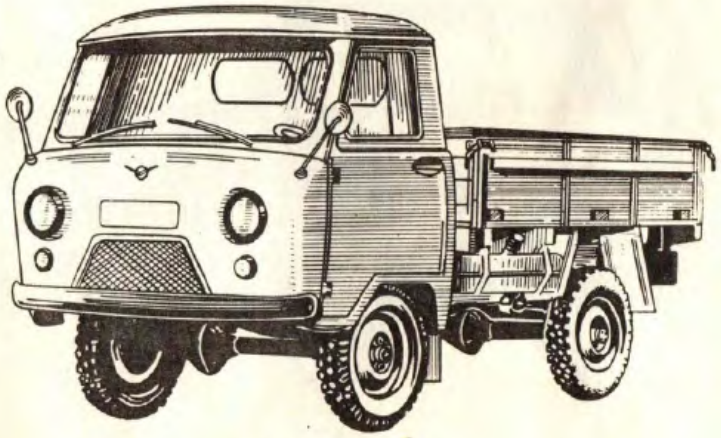
Due to continuous improvements, the latest modifications which do not affect the operation and maintenance routine may fail to be described in this publication.

Happy journey!

УАЗ-452 Van

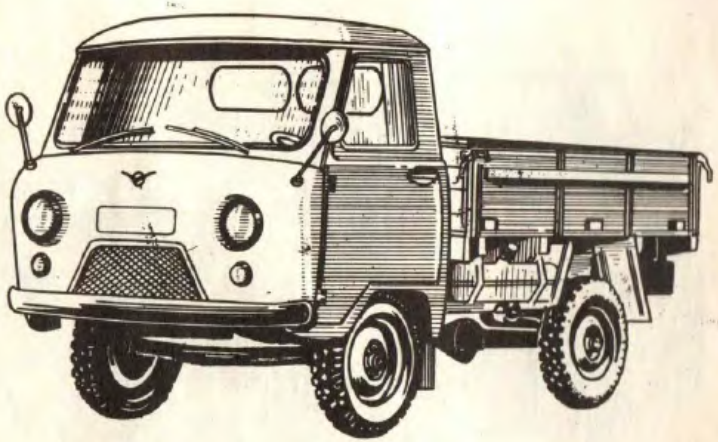
УАЗ-452А Ambulance

УАЗ-452В Bus



УАЗ-452Д Truck

УАЗ-451М Van



УАЗ-451ДМ Truck

IMPORTANT

1. The following procedure must be carried out to get a new vehicle ready for service:

(a) If the vehicle is preserved, remove the preservatives:

- Remove the external preservative coating.

- Before starting the engine, thoroughly wash the spark plugs in lead-free petrol, pour 30-50 g of engine oil into each cylinder and crank the engine 10-15 times with a starting handle.

(b) Check oil level in the engine and chassis units and fluid level in the brake master cylinder.

(c) Check tyre pressures and tightness of the wheel nuts.

2. After starting the engine, always allow it to warm up before revving up or moving off. Maintain the coolant temperature at 80-90°C,

3. To drain the cooling system, be sure to open the radiator bottom tank drain cock, drain cock on the right side of cylinder block, car heater valve and radiator cap. If an engine heater is provided, also open the boiler cock.

4. Observe the following instructions when operating vehicles of the УАЗ-452 family:

- Engage the front axle before shifting the transfer case into low.

- Disengage the front axle when operating on dry, hard roads.

- Disengage the front wheels if the vehicle is to make an extended run on dry, hard roads.

- Do not engage the front axle if the front wheels are disengaged.

5. Make periodic checks for the security of the external screwed fastenings. Tighten them, if necessary, during the running-in and thereafter.

Model	УАЗ-452	УАЗ-452А	УАЗ-452В	УАЗ-452Д	УАЗ-451М	УАЗ-451ДМ
Load capacity, kg	800	-	-	800	1000	1000
Seating capacity (driver included)	2	9	11	2	2	2
Overall dimensions, mm						
Length	4360	4360	4360	4460	4360	4460
Width	1940	1940	1940	2044	1940	2044
Height	2090	2237 (at spot-light)	2090	2070	2070	2070
Wheelbase, mm	2300	2300	2300	2300	2300	2300
Track, front and rear, mm	1444	1442	1442	1442	1442.	1442
Ground clearance, laden, mm	220	220	220	220	220	220
Gross weight, kg	2670	2620	2690	2620	2700	2660
Maximum speed, fully laden, km/hr	95	95	95	95	100	100
Minimum turning radius at front outer wheel, m	6.0	6.0	6.0	6.0	6.0	6.0
Body inside dimensions, mm:						
Length	-	-	-	2600	-	2600
Width	-	-	-	1870	-	1870
Height of sides	-	-	-	425	-	425
Engine	Petrol, four-stroke, carburettor fuel system					
No. of cylinders	4					
Firing order	1 - 2 - 4 - 3					
Bore, mm	92					

	УАЗ-452	УАЗ-452А	УАЗ-452В	УАЗ-452Д	УАЗ-451М	УАЗ-451ДМ
Stroke, mm	92					
Displacement, l	2.445					
Compression ratio	6.7					
Rated horsepower at 4000 rpm, SAE	75					
Maximum torque at 2000 rpm, kg-m	17					
Fuel	Petrol, octane 72					
Lubrication system	Pressure and splash					
Crankcase breathing system	Open					
Cooling system	Liquid, closed, forced circulation					
Clutch	Dry, single-plate					
Gearbox	Four forward speeds and reverse					
Gear ratios:						
1st	4.124					
2nd	2.641					
3rd	1.58					
4th	1.00					
Reverse	5.224					
Transfer case	Two speeds					
Gear ratios:						
Direct	1.00					
Low	1.94					
Rear axle	Spiral bevel pinion and wheel. Gear ratio 5.125					
Front axle (driving)	Spiral bevel gear and wheel. Gear ratio 5.125					

	УАЗ-452	УАЗ-452А	УАЗ-452В	УАЗ-452Д	УАЗ-451М	УАЗ-451ДМ
Front axle (non-driving)					I-beam stamping	
Steering knuckle universal joints..			Constant velocity, ball bype			
Front wheel alignment:						
Camber			$1^{\circ}30'$			
Caster			3°			1°
Side tilt			$5^{\circ}30'$			$4^{\circ}30'$
Toe-in			1.5-3.0 mm			
Suspension			Four longitudinal semielliptic springs controlled by four double-acting hydraulic shock absorbers			
Tyres			Tubed, six-ply, 215-380 mm (8.40-15")			
Steering gear			Hourglass worm and double roller. Gear ratio 20.3 (mean)			
Brakes:						
Service			Shoe brakes on all wheels. Front brake shoes operated by individual cylinders. One cylinder on each rear brake. Hydraulic control			
Handbrake			Transmission type, internal-shoe drum			
Electrical equipment			12 V, negative earth return			

Adjustment Data

Valve clearance, cold, intake and exhaust, mm	0.25-0.30
Fan belt deflection under 5 kg pressure, midway between pulleys, mm	10-15
Spark gap, mm	0.8-0.9

	УАЗ-452	УАЗ-452А	УАЗ-452В	УАЗ-452Д	УАЗ-451М	УАЗ-451ДМ
Breaker point gap, mm			0.35-0.45			
Clutch pedal free travel, mm			28-35			
Brake pedal free travel, mm			8-14			
Front wheel toe-in, mm			1.5-3.0			
Steering wheel play, deg.			10 maximum			
Tyre pressures, kg/cm^2:						
Front	2.0	2.0	2.2	2.0	2.0	1.8
Rear	2.2	2.0	2.2	2.2	2.4	2.7
			Capacities, l			
Fuel tanks:						
Main	56	56	56	56	56	56
Auxiliary	30	30	30	-	-	-
Cooling system				13		
Lubrication system				6.2		
Air cleaner				0.25		
Gearbox				1.0		
Transfer case				0.7		
Axle housings (each)				0.75		
Steering gear				0.25		
Shock absorbers (each)				0.145		
Hydraulic brake system				0.52		

IDENTIFICATION DATA

1. Nameplate

The nameplate is located above the windscreen, on the right side (Fig.1). It bears the following data: vehicle model, year of manufacture, engine number and chassis number.

2. Chassis number

The chassis number is stamped on the nameplate and stencilled at the rear of the right side member (Fig.2).

3. Engine number

The engine number is stamped on the nameplate and on the left side of the cylinder block (Fig.3).

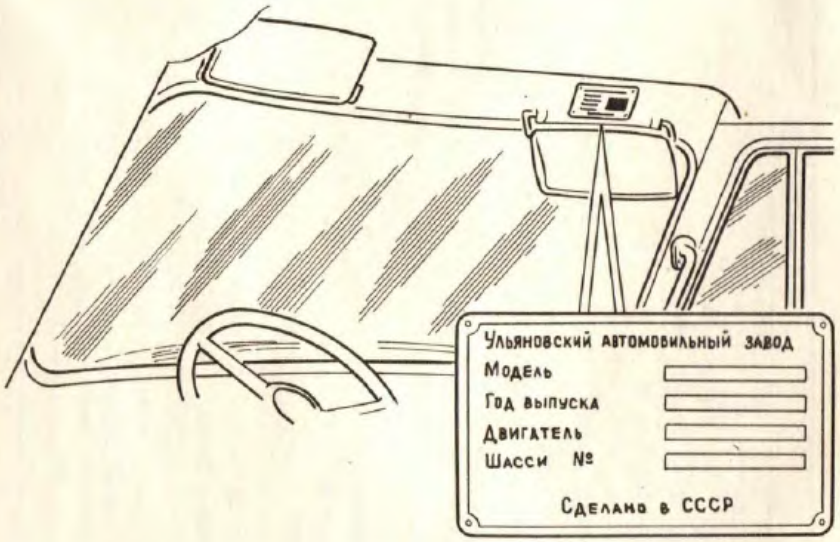


Fig.1. Nameplate Location

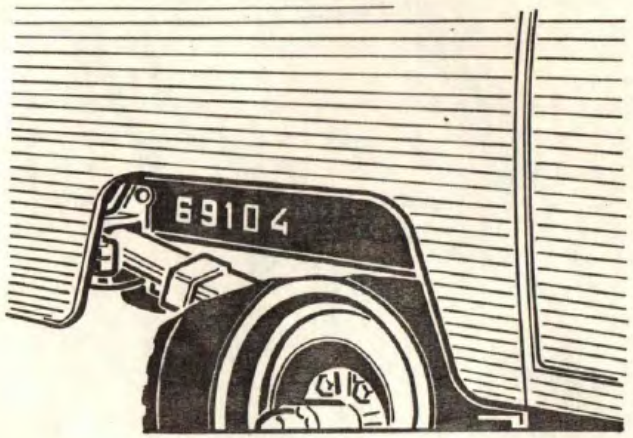


Fig.2. Chassis Number

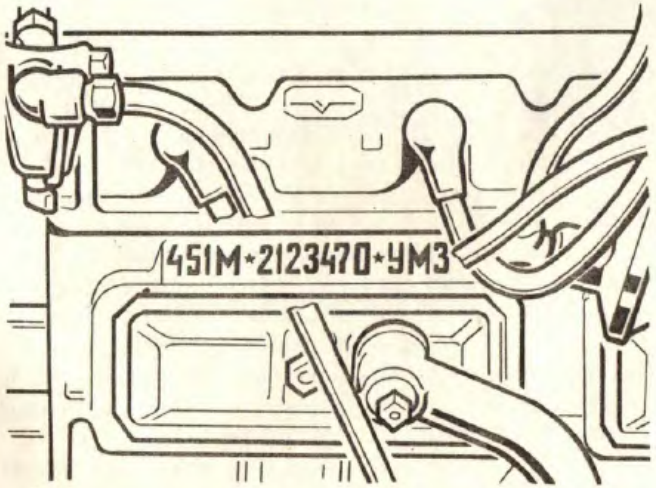
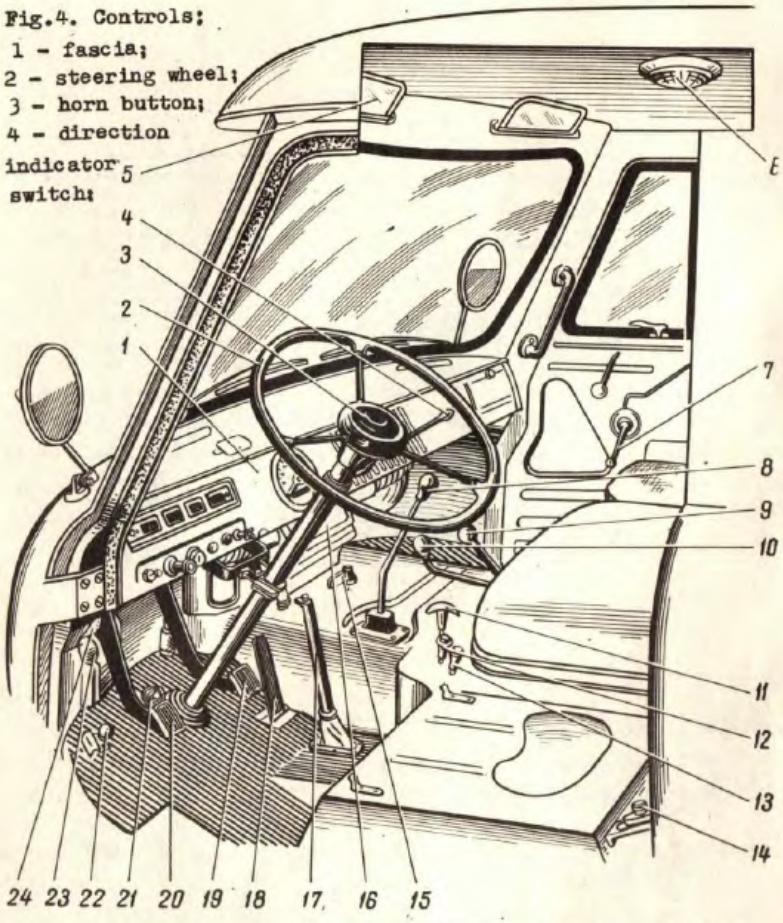


Fig.3. Engine Number

Fig.4. Controls:
1 - fascia;
2 - steering wheel;
3 - horn button;
4 - direction indicator switch;



5 - sun visor; 6 - lamp; 7 - window winder handle; 8 - gear lever; 9 - front axle control lever (not on УАЗ-451М and УАЗ-451ДМ models); 10 - transfer case control lever (not on УАЗ-451М and УАЗ-451ДМ models); 11 - radiator shutter control handle; 12 - throttle knob; 13 - choke knob; 14 - earth switch; 15 - selector valve (not on models УАЗ-452Д, УАЗ-451М, УАЗ-451ДМ); 16 - heater; 17 - handbrake lever; 18 - accelerator pedal; 19 - brake pedal; 20 - clutch pedal; 21 - screenwasher pedal; 22 - dipswitch; 23 - socket; 24 - fuse block

CONTROLS AND INSTRUMENTS

The location of the controls of the УАЗ-452 vehicles and their versions is shown in Fig.4.

Brake pedal 19 and clutch pedal 20 are located according to the conventional layout. To the right of the brake pedal is accelerator pedal 18. To the left of the clutch pedal is dipswitch 22. Located near the clutch pedal is screenwasher pedal 21.

Steering wheel 2 has a centrally located horn button 3. Mounted on the side of the steering column below the wheel is direction indicator switch 4. Gear lever 8 is mounted on the air duct case. Also mounted on this case is tank selector valve 15 having three positions: valve lever points forward - OFF, valve lever points to the left - main tank ON, valve lever points to the right - auxiliary valve ON.

Located in front of the engine cowl, to the right of the driver, are levers 9 and 10 for controlling the front axle and transfer case respectively (not provided on the vehicles УАЗ-451ДМ and УАЗ-451М)

The following controls are located to the right of the driver: radiator shutter control handle 11, hand throttle knob 12 (pull out to open the throttle, see that the knob is fully in during travel); choke knob 13 (pull out to close the choke); handbrake lever 17.

Located behind the driver's seat is earth switch 14. The ambulance is fitted with a spotlight which is operated by means of a handle on the cab ceiling.

The fascia mounts the following equipment (Fig.7):

An instrument panel which comprises pressure gauge 9, engine temperature gauge 10, fuel gauge 11, ammeter 12 and two warning lights (in arrow form) for direction indicators.

Speedometer 7 with an odometer.

Screenwiper switch 6 having three positions: off, slow, fast.

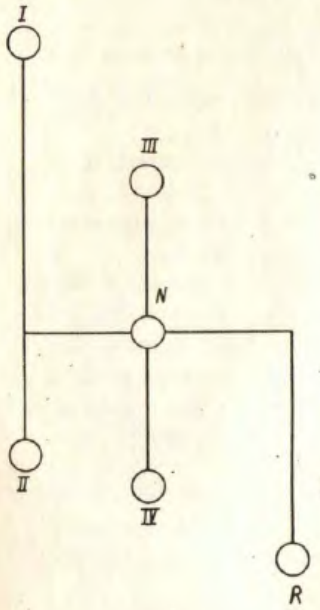


Fig.5. Gear Lever Positions:
N - neutral; R - reverse
I - 1st gear; II - 2nd gear;
III - 3rd gear; IV - 4th gear

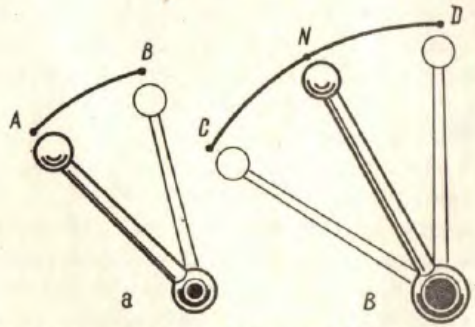


Fig.6. Transfer Case Shifting Positions (УАЗ-452 and Its Versions):
(a) Front axle (upper lever); A - disengaged
B - engaged
(b) Transfer case (lower lever): C - engaged
N - neutral
D - disengaged

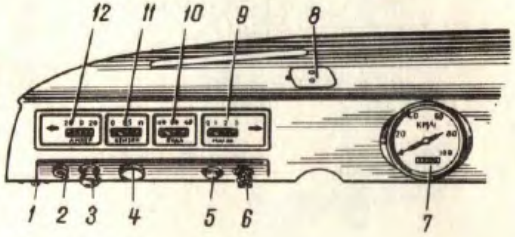


Fig.7. Fascia;
1 - lighting circuit breaker button; 2 - cab fan switch; 3 - main light switch; 4 - ignition switch; 5 - engine overheat warning lamp; 6 - screenwiper switch; 7 - speedometer; 8 - lid; 9 - oil pressure gauge; 10 - engine temperature gauge; 11 - fuel gauge; 12 - ammeter

Ignition switch 4 (Fig.8).

Main light switch 3 having three positions: 1st position - OFF; 2nd position - traffic lights (dipswitch selects sidelamps or lower beam); 3rd position - country driving lights (dipswitch selects upper or lower beam).

Cab heater fan switch 2 having three positions: off, slow, fast.

Engine temperature warning lamp 5.

Brake master cylinder filler lid 8.

Glove box in the right end of the fascia.

The following items are located under the fascia: lighting circuit thermal breaker button 1, heater 16 (Fig.4), fuse block 24, service lamp socket 23.

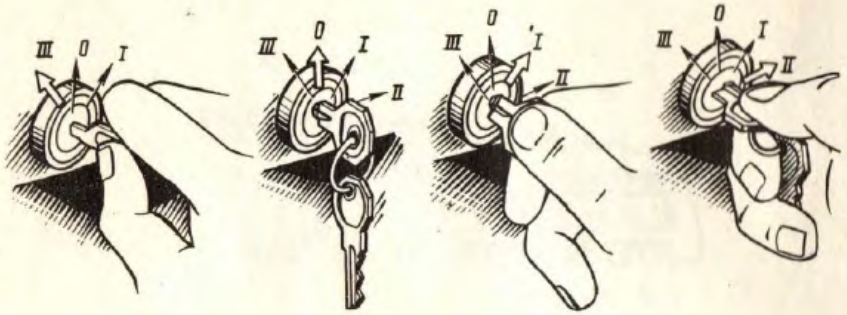


Fig.8. Ignition Key Positions;
0 - neutral
1 - ignition ON; II - ignition and starter ON; III - radio ON

CHECKOVER BEFORE THE DAY'S RUN

1. Open the radiator cap and check water level. If water is not visible through the filler, top up to overflow pipe (Fig.9).

Avoid using hard water as it causes heavy scale deposits.

Check the drain cocks and the connections for water leaks.

2. Check engine oil level. If it is below the "II" mark on the dipstick (Fig.10), refill (Fig.11).

3. Check tyre pressures and inflate as necessary.

4. Switch on the ignition and read the fuel gauge to see if there is a sufficient supply of fuel.

If the vehicle has been standing for a long time, operate the carburettor hand priming lever to compensate for possible evaporation of fuel (Fig.12).

5. Remove lid 8 (Fig.7) and check fluid level in the brake master cylinder.

6. Check oil level in the transmission units. Refill if the oil level is below the filler hole.

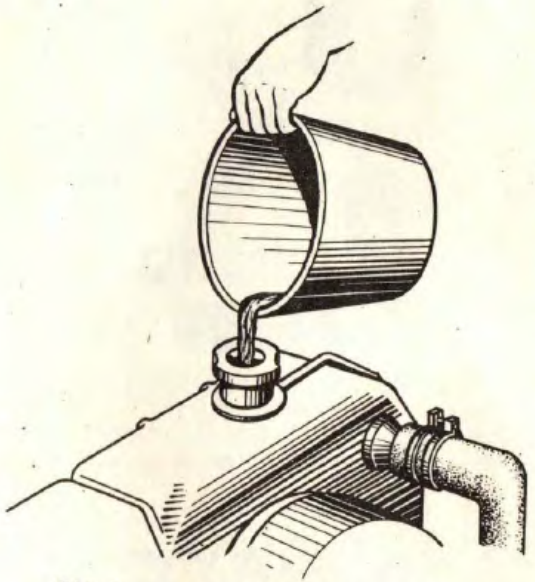


Fig.9. Topping Up Cooling System

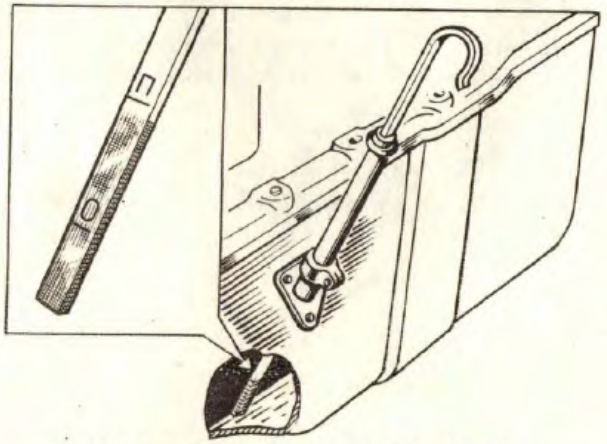


Fig. 10. Checking Engine Oil Level

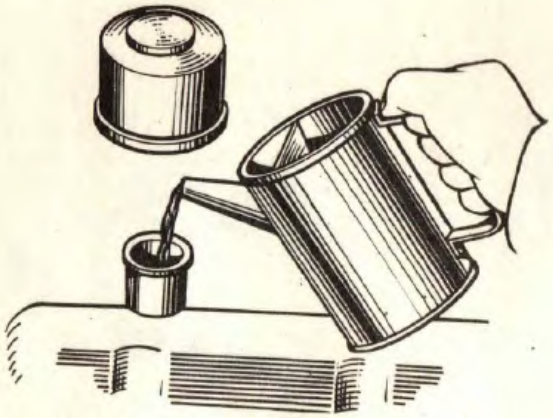


Fig. 11. Refilling Engine with Oil

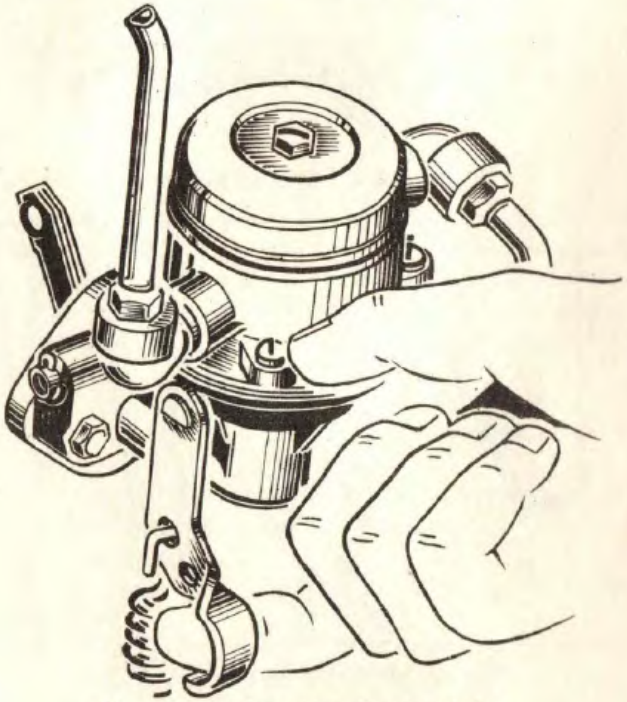


Fig. 12. Carburettor Hand Priming

RUNNING-IN

The future life of the vehicle largely depends on the treatment it receives during the early stages of use. Special care should be taken for the first 1000 km of operation to enable the vehicle components to run in properly.

Observe the following requirements during the running-in period:

1. Always warm up the engine to at least 50°C before revving up or moving off. Do not race the engine while it is cold.

2. Do not exceed the following speed limits: 45-50 km/hr in direct drive, 30 km/hr in third gear, 20 km/hr in second gear, 12 km/hr in first gear.

3. Do not overload the vehicle.

4. The manufacturer's oil supply in the engine sump and filters and in the transmission units must be used throughout the first 1000 km.

Upon completion of the running-in change the oil in the engine sump, filters and transmission units and tighten the cylinder head nuts in the sequence shown in Fig.13. The nuts should be tightened with a special wrench to 7.3-7.8 kg-m when the engine is cold. Thereafter check the valve clearance and adjust, if necessary.

During the running-in keep a check on the fastenings and tighten them up if loose. Perform the 2000 km service specified in the Lubrication Chart.

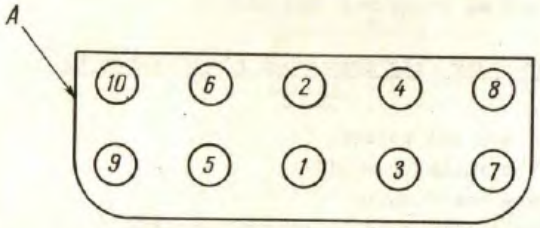


Fig. 13. Cylinder Head Nut Tightening Sequence
A - engine front end

STARTING, WARMING UP AND STOPPING THE ENGINE

Starting Cold Engine at 0°C and Above

1. Prime the carburettor by operating the hand lever.
2. Pull the choke knob all the way out.
3. Depress the clutch pedal fully.
4. Turn on the ignition.
5. Operate the starter for not more than 5 sec. Always wait 10-15 sec before re-engaging the starter. Do not operate the starter more than three times in succession.

If the starter cranks the engine sluggishly, use the starting handle.

6. As soon as the engine starts firing, push the choke knob in 1/4 to 1/2 of its travel to the position where the engine runs steadily and at the same time press on the accelerator pedal. Warm up the engine without revving up, gradually moving in the choke knob until it is pushed home.

Starting Cold Engine at Temperatures from 0° to -15°C

1. Cut out the oil cooler by turning the cooler valve handle 90°C.
2. Close the radiator shutter by pulling the control handle all the way out.
3. Crank the engine by hand 3-5 turns.

Then proceed as described previously.

Starting Cold Engine at Temperatures Below -15°C

1. Cut out the oil cooler.
2. Close the radiator shutter.
3. Disengage the clutch.
4. Turn the fan by hand to remove probable ice formation.
5. Fill the engine with hot water through the radiator. As the water cools off, drain it from the engine jacket through the drain cock and refill with hot water again. Proceed in this manner until the engine can be cranked rather easily by hand against well perceptible compression.

6. Prime the carburettor by hand.
7. Warm the inlet manifold by pouring hot water on it in a small stream so as to allow time for the manifold to pick up the heat.
8. Pull the choke knob all the way out. With the ignition off and the throttle closed, crank the engine by hand 3-5 times to charge the cylinders.
9. Turn on the ignition and start the engine by hand cranking.
10. Close the drain cocks and heater valve and fill the cooling system with water. Fill slowly so as to allow the air to escape from the system.

Thereafter proceed as in Item 6 under "Starting Cold Engine at 0°C and Above".

2. Starting Warm Engine

1. Switch on the ignition.
2. Operate the starter.
3. If the first or second attempt at starting has failed, pull out the choke knob approximately 1/4 of its travel and operate the starter again.
4. As soon as the engine fires, push the choke button home and at the same time press the accelerator pedal about half-way down.

If two or three starting attempts have failed, with the engine warm and the ignition system functioning properly, overenrichment of the mixture should be suspected. To remedy, blow out the cylinders by smoothly depressing the accelerator pedal to the end of its stroke and cranking the engine a few revolutions with the starter. If the engine does not catch during this procedure, start it in the usual way after the blowing-out.

Stopping the Engine

If the engine runs under heavy load, it should be allowed to cool off before stopping. To this end, let the engine idle slowly for 1-2 min before switching off the ignition.

ENGINE MAINTENANCE

1. Tighten the cylinder head nuts after the running-in and 1000 km after every removal of the cylinder head. The nuts should be tightened when the engine is cold. Proceed in the sequence shown in Fig.13. Tighten in two steps to a final torque of 7.3-7.8 kg-m.

2. Check the valve clearance when necessary. Clearance adjustment should be made when the engine is cold. Proceed as follows:

- Remove the breather air filter and the vacuum timing control pipe.

- Remove the rocker cover, being careful not to damage the gaskets.

- Position the No.1 cylinder on top centre of the compression stroke as indicated by the timing mark on the crankshaft pulley (Fig.14). Using a feeler gauge, check the clearance between the rockers and valves on No.1 cylinder. If the clearance is wrong, loosen the adjusting screw locknut and, using the feeler (Fig.15), turn the adjusting screw with a screwdriver to the required position. Thereafter, holding back the adjusting screw with the screwdriver, draw up the locknut and recheck the clearance.

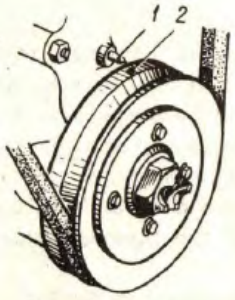


Fig. 14. Finding TDC Position:
1 - timing pin; 2 - timing mark

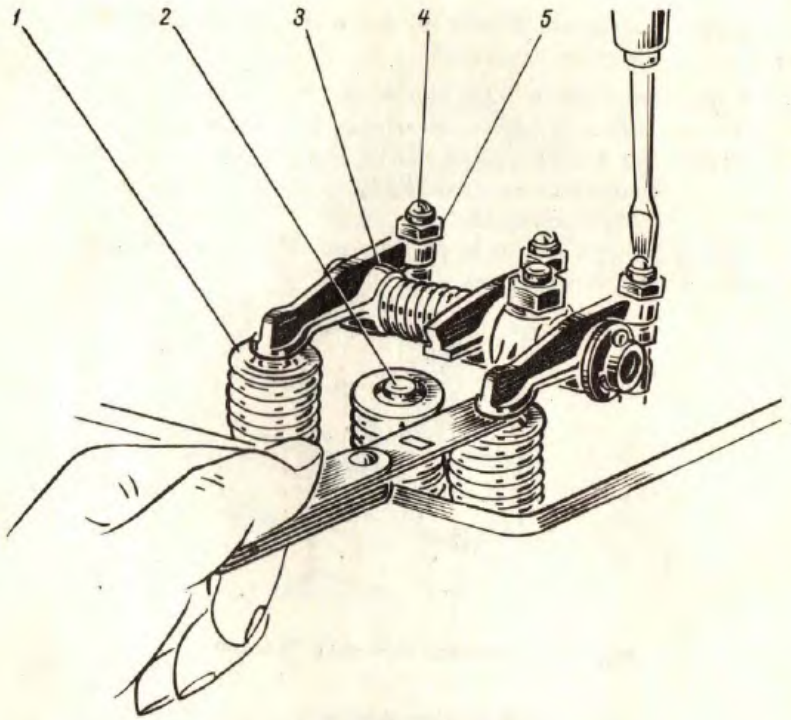


Fig. 15. Adjusting Valve Clearance:
1 - spring seat; 2 - valve; 3 - rocker; 4 - adjusting bolt; 5 - nut

- Turning the crankshaft one-half revolution at a time, adjust the valve clearance on the other cylinders in the firing order. The clearance must measure 0.25-0.30 mm.

3. To remove scale and deposits from the cooling system, flush it out preparatory to summer operation. The engine and radiator should be flushed separately. If the radiator tubes are scaled heavily, proceed as follows:

- Remove the radiator from the vehicle and fill it with a 10 percent solution of caustic soda at 90°C.

- After a lapse of 30 minutes drain the solution from the radiator.

- Flush the radiator with hot water for 30-40 min first in the normal direction of circulation and then in reverse.

CAUTION. DO NOT flush the engine water jacket with alcaline solutions as they cause corrosion of the cylinder block and head.

4. Check fan belt tension at regular intervals (Fig.16). Fan deflection should be 10-15 mm.

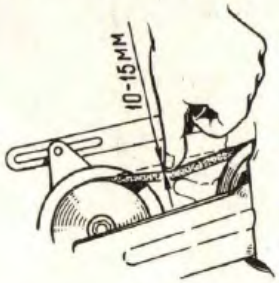


Fig. 16. Checking Fan Belt Tension

Lubrication System

The oil pressure in the engine should be 2-4 kg/cm^2 at a road speed of 45 km/hr. The oil pressure may rise to 4.5 kg/cm^2 when the engine is cold and drop down to 1.5 kg/cm^2 in hot weather. If the oil pressure at a medium engine speed is below 1 kg/cm^2, it indicates a fault. Should this trouble occur, stop the engine and do not operate the vehicle until the trouble is remedied.

The oil pressure at slow idling should read at least 0.5 kg/cm^2.

The oil cooler should be put in circuit at air temperatures above +20°C.

Clean the element of the coarse oil filter every day while the engine is hot by working its handle 15-20 times back and forth (Fig.17). At each oil change drain sediment from the filter bowl.

Change the element of the fine oil filter when changing crankcase oil (Fig.18).

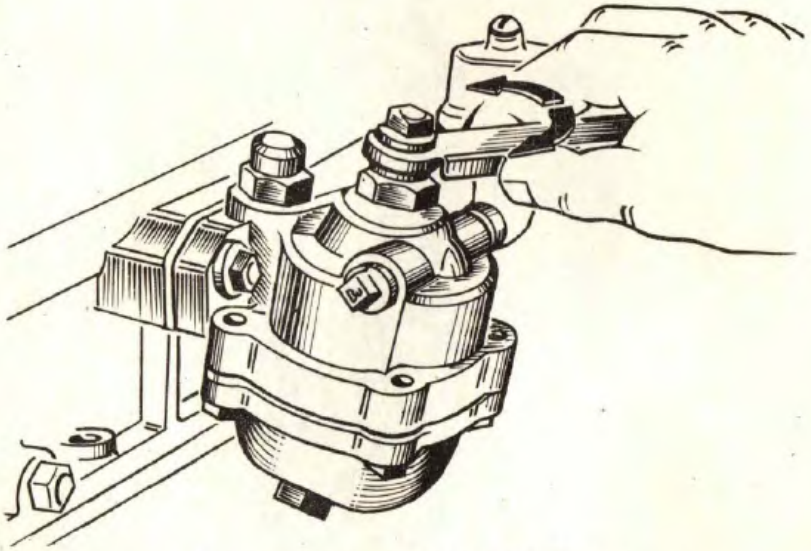


Fig. 17. Cleaning Coarse Oil Filter

If there are heavy accumulations in the engine sump, the engine should be flushed with low-viscosity oil (spindle oil is suitable).

Maintain oil level between the "O" and "П" marks on the dipstick.

In cold weather check the breather pipe for obstructions every day and clean it out, if necessary. Clogging of the breather pipe is likely to cause overpressure in the crankcase and oil leaks past the seals.

At the time of engine oil change, wash the crankcase breather filter (Fig. 19), allow it to dry, dip in engine oil and let the excess drip off. Remember that if left dry, the filter will pass dust into the crankcase.

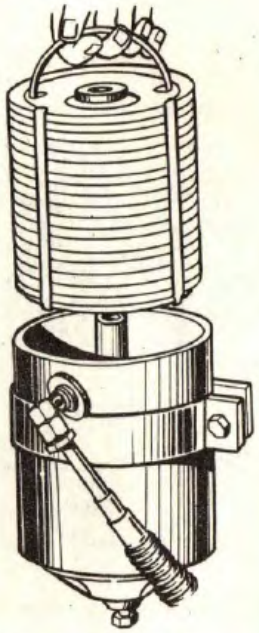


Fig. 18. Changing Fine Oil Filter Element

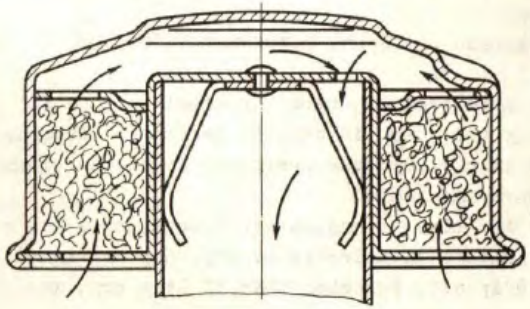


Fig. 19. Crankcase Breather Filter

Fuel System

The layouts of the fuel system are shown in Figs 20 and 21.

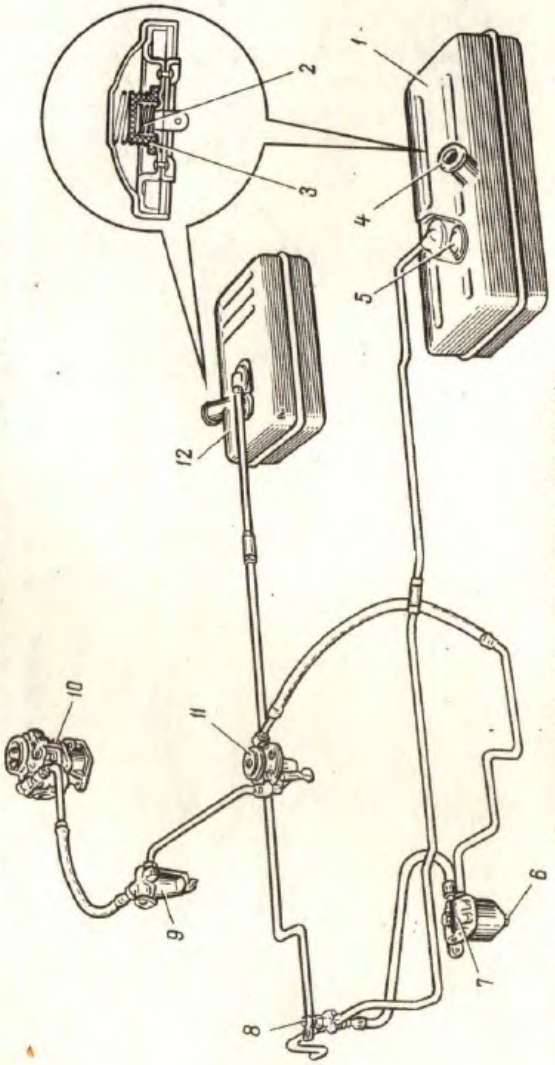


Fig. 20. Fuel System Layout (YA3-452, YA3-452A, YA3-452B):
1 - main fuel tank; 2 and 3 - inlet and outlet valves;
4 - filler cap; 5 - fuel level transmitter; 6 - coarse filter drain plug; 7 - coarse filter; 8 - selector valve;
9 - fine filter; 10 - carburettor; 11 - fuel pump;
12 - auxiliary fuel tank

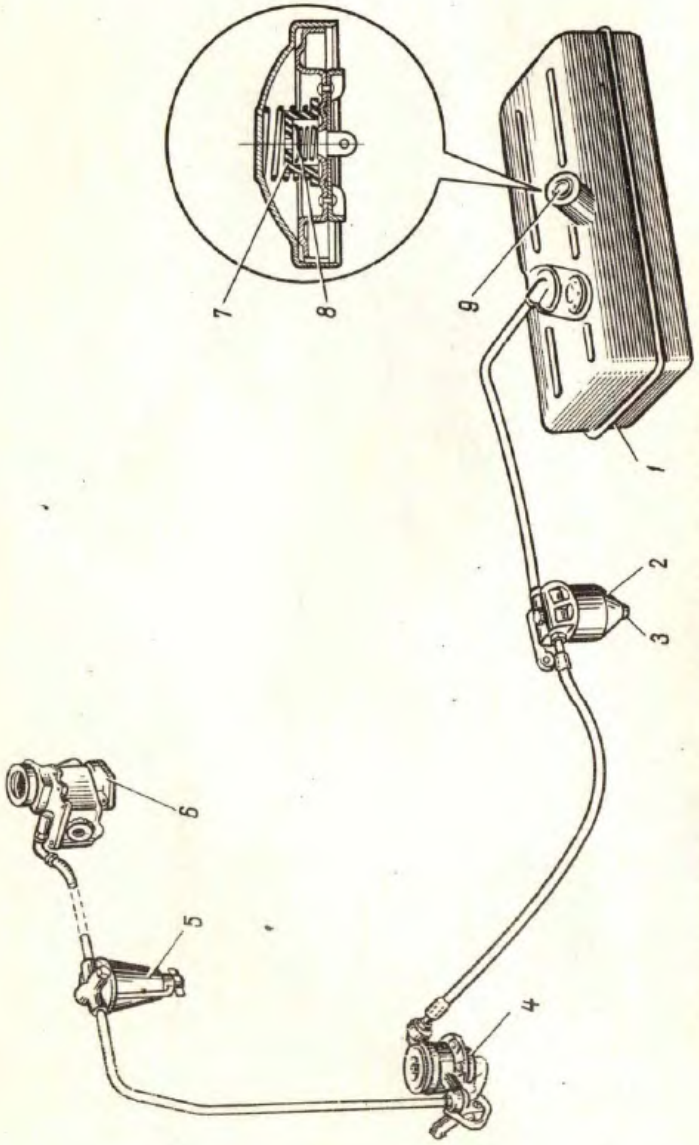


Fig. 21. Fuel System Layout (УАЗ-452Д, УАЗ-451ДМ, УАЗ-451М):
1 - fuel tank; 2 - coarse filter; 3 - coarse filter drain plug; 4 - fuel pump; 5 - fine filter; 6 - carburettor; 7 and 8 - outlet and inlet valves; 9 - filler cap

Carburettor

To check fuel level in the float chamber, place the vehicle on a level surface and stop the engine. Operate the carburettor hand priming lever and look through the carburettor peephole. The fuel should stand at the level indicated by peephole marks "a"

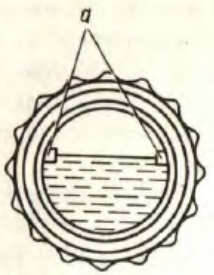


Fig. 22. Float Chamber Peephole
a - fuel level marks

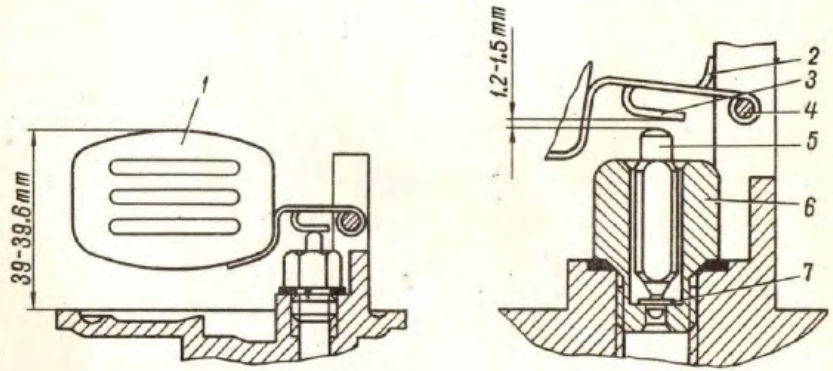


Fig. 23. Carburettor Float Adjustment:
1 - float; 2 - float stop; 3 - float level adjustment lip; 4 - float arm pin; 5 - float needle; 6 - needle seat; 7 - needle washer

(Fig. 22). If the level is wrong, adjustment is necessary. Remove the float chamber cover, bend lip 3 (Fig.23) to obtain correct fuel level and also bend stop 2 to set the needle travel to 1.2-1.5 mm. Recheck the fuel level and, if necessary, readjust. Since wear of the float mechanism tends to raise fuel level, set the adjustment as near the low limit as possible to save the trouble of readjustment for a longer time.

CAUTION. DO NOT bend the lip by applying pressure to the float. Use a screwdriver or a pair of pliers.

Correct low idling speed is 600 rpm. Adjustment is necessary if the engine idles harshly or the idling speed is too high. Another purpose of idle adjustment is to reduce the toxic effects of the exhaust fumes.

To adjust, warm up the engine and proceed as follows:

1. Turn screw 2 (Fig. 24) to a position where the engine idles steadily at the minimum possible speed. Engine speed is increased by turning screw 2 in and decreased by turning it out.

2. Using screw 1, adjust idle mixture to the slowest steady idling possible at the throttle setting obtained above. The mixture is weakened by turning screw 1 in and enriched by turning it out.

3. Backing off screw 2 and at the same time turning in screw 2, again bring the engine speed to minimum possible steady idling speed.

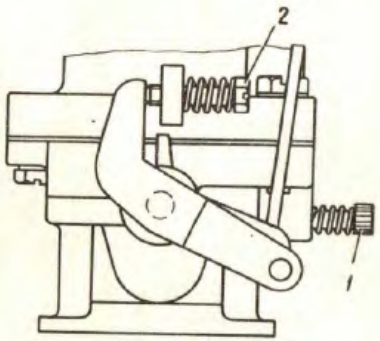


Fig. 24. Carburettor Adjusting Screws:
1 - idle mixture screw; 2 - throttle stop screw

4. Check the adjustment as follows. Throttle up to the medium idling speed and then close the throttle suddenly. If this does not stall the engine, the adjustment is correct. If the engine stalls, turn screw 2 out 1/2 turn and recheck.

Ignition System

For proper operation of the ignition system, the following conditions must be observed:

1. Ensure that the breaker point gap is 0.35-0.45 mm (Fig.25) and the points are clean.

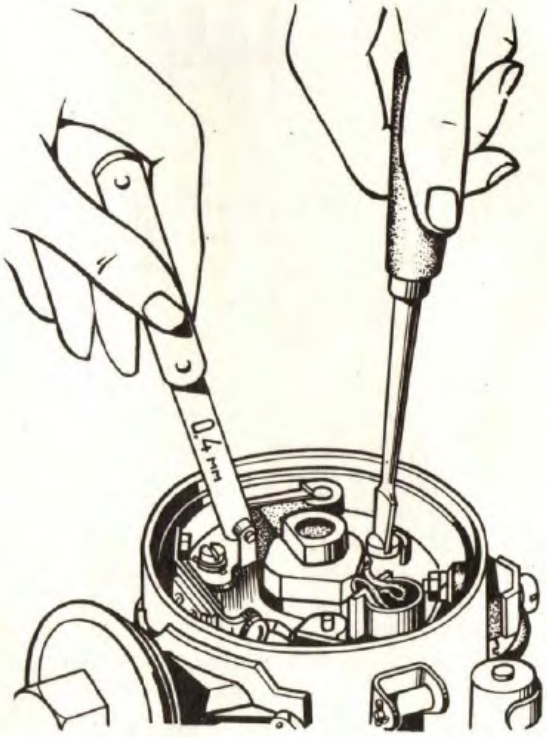


Fig. 25. Breaker Point Gap Adjustment

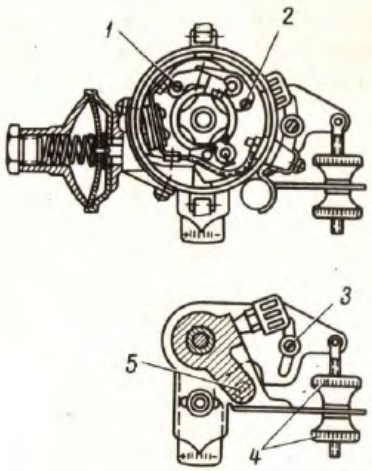


Fig. 26. Distributor:
1 - lockscrew; 2 - eccentric adjusting screw; 3 - distributor to drive housing attaching screw; 4 - octane selector nuts; 5 - octane selector to distributor attaching bolt

Clean the breaker points with a piece of chamois and dress with a fine file if worn. To adjust the breaker point gap, loosen locking screw 1 (Fig.26) and turn adjusting screw 2. After the adjustment is made, draw up the locking screw.

2. Keep the spark plugs clean and maintain correct spark gap (0.8-0.9 mm). Adjustment is made by bending the side electrode.

3. Set the octane selector correctly. Adjustment should be made by turning the octane selector nut (Fig.28), with the engine warmed up. The setting is correct when acceleration is best. Combustion knock of short duration on speed-up is of no significance. If knock is heavy, retard ignition and make sure that the octane rating of the fuel conforms to the specification.

Fig. 27. Checking Spark Gap

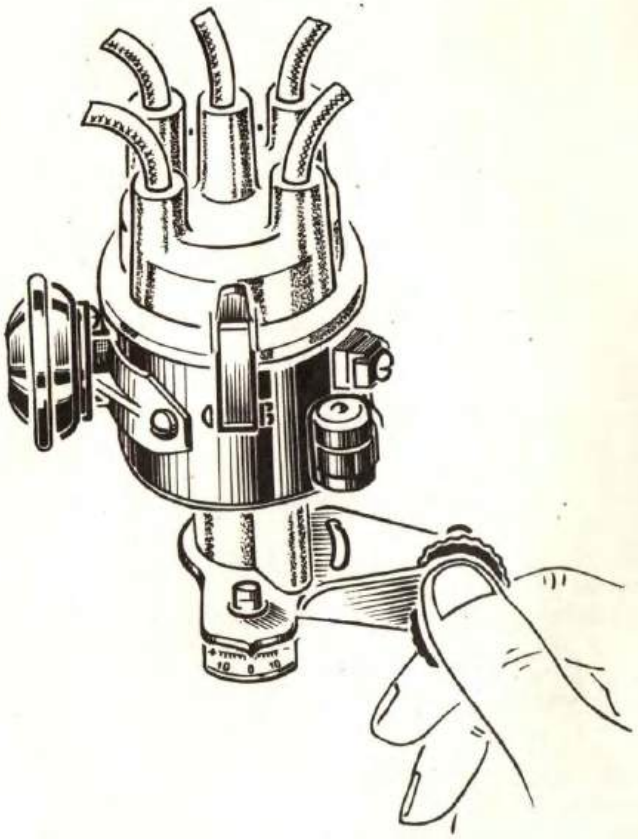


Fig. 28. Setting Octane Selector

CLUTCH

Keep a constant check on the clutch pedal free travel. This must be 28–35 mm. Adjustment is made by varying the length of the horizontal link and pushrod.

Lubricate the release bearing by the use of grease cup 4 (Fig.29) located on the right side of the clutch housing. Access to the grease cup is from underneath the vehicle.

If the grease hose is empty for some reason or a new hose is installed, two cupfuls of grease will be required to prime it. Only the third charge will feed grease to the bearing. Do not over-lubricate , otherwise grease may get onto the clutch plate, causing clutch slip.

Periodically check and clean out the vent in the bottom of the clutch cover. Under muddy road conditions this check should be made daily to prevent accumulation of dirt and consequent damage to the clutch parts and the starter overrunning clutch.

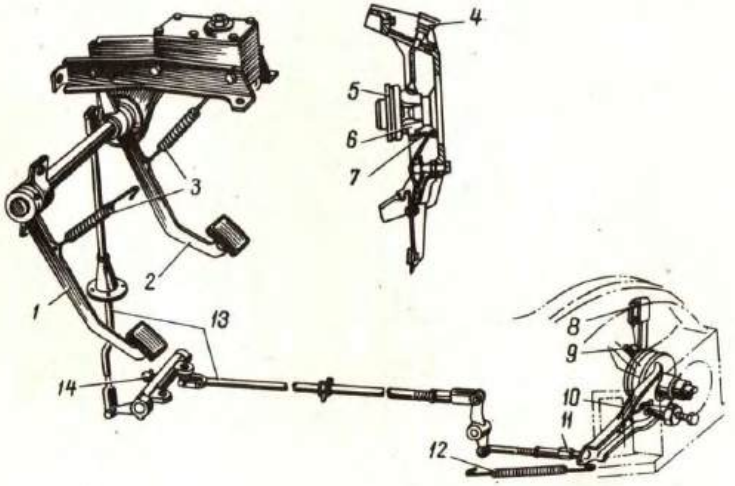


Fig. 29. Clutch Operating Mechanism:
1 - clutch pedal; 2 - brake pedal; 3 - pedal retracting springs; 4 - grease cup; 5 - clutch release bearing; 6 - release bearing carrier; 7 - release bearing carrier retracting spring; 8 - release lever; 9 - adjusting bolt; 10 - release fork; 11 - pushrod; 12 - release fork retracting spring; 13 - control rods; 14 - intermediate lever shaft grease fitting

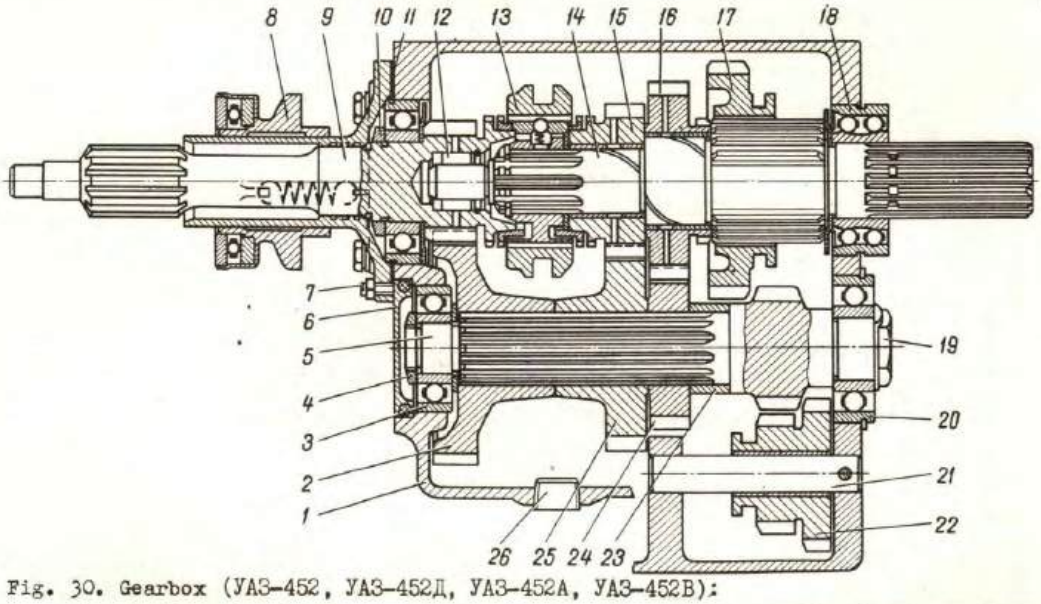


Fig. 30. Gearbox (УАЗ-452, УАЗ-452Д, УАЗ-452А, УАЗ-452В):
1 - casing; 2 - layshaft drive gear; 3 and 20 - layshaft bearings; 4 - nut; 5 - layshaft; 6 - bearing cap; 7 - lockscrew; 8 - clutch release bearing carrier; 9 - clutch shaft; 10 - nut; 11 - gasket; 12 - mainshaft roller bearing; 13 - synchronizer sleeve; 14 - mainshaft; 15 - 3rd speed gear; 16 - 2nd speed gear; 17 - 1st speed gear; 18 - mainshaft bearing; 19 - layshaft bearing attaching bolt; 21 - reverse idler shaft; 22 - reverse idler; 23 - spacer; 24 - layshaft 2nd speed gear; 25 - layshaft 3rd speed gear; 26 - drain plug

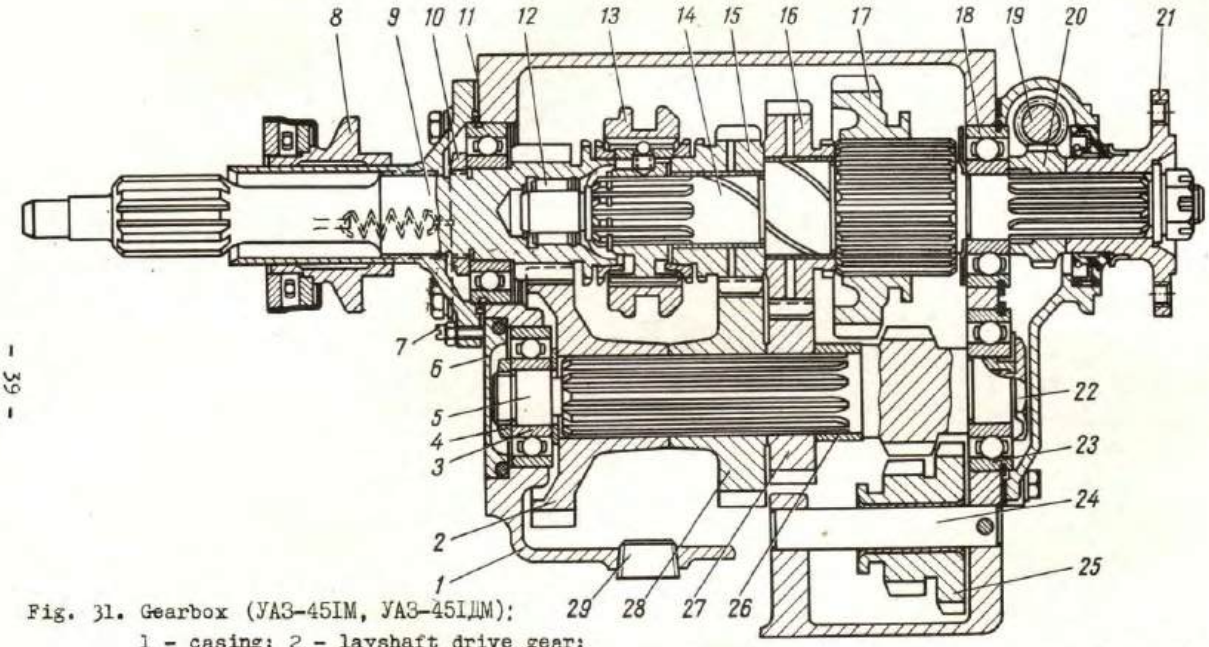


Fig. 31. Gearbox (УАЗ-451М, УАЗ-451ДМ):
1 - casing; 2 - layshaft drive gear; 3 and 23 - layshaft bearings; 4 - nut; 5 - layshaft; 6 - bearing cap; 7 - lockscrew; 8 - clutch release bearing carrier; 9 - clutch shaft; 10 - nut; 11 - gasket; 12 - mainshaft roller bearing; 13 - synchronizer sleeve; 14 - mainshaft; 15 - 3rd speed gear; 16 - 2nd speed gear; 17 - 1st speed gear; 18 - bearings; 19 - speedometer driven gear; 20 - speedometer driving gear; 21 - flange; 22 - bearing bolt; 24 - reverse idler shaft; 25 - reverse idler; 26 - sleeve; 27 - 2nd speed gear; 28 - 3rd speed gear; 29 - drain plug

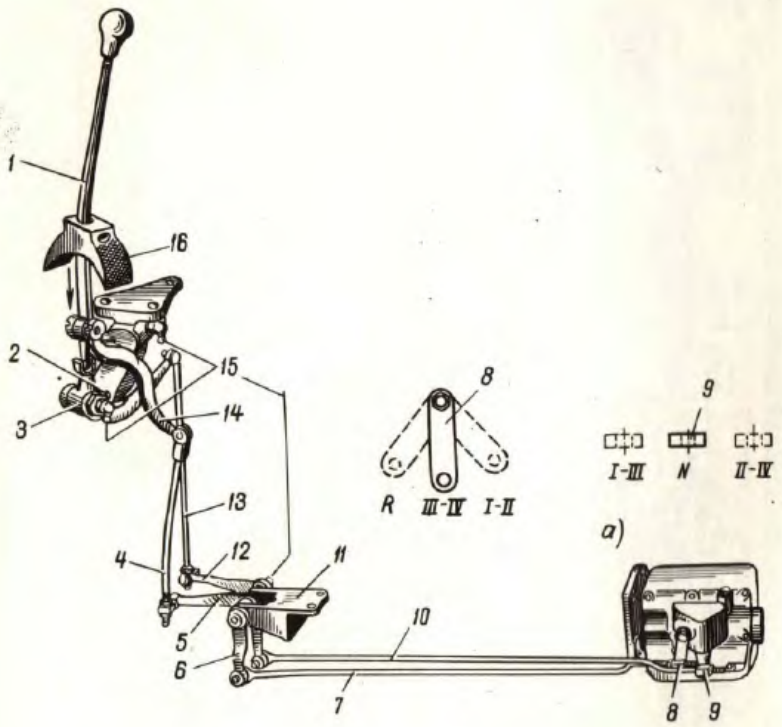


Fig. 32. Gearbox Controls:
1 - gear lever; 2 - selector lever centre lock; 3, 6, 8, 12 - selector levers; 7, 13 - selector rods; 5,9,14 - shift levers; 4,10 - shift rods; 11 - intermediate lever bracket; 15 - grease fitting; 16 - dust cover
a) positions of selector 8 and shift lever 9
N - neutral; R - reverse

GEARBOX

The gearbox (Figs 30 and 31) has four forward speeds and one reverse, with synchromesh on 3rd and 4th gears.

Operate the gear lever gently. Too rapid shifting, particularly from direct drive to 3rd gear, may damage the synchronizer. Shift into 1st and 2nd gears only after the road speed drops considerably. Do not shift into reverse until the vehicle has come to a complete stop. Remember that to shift into 1st gear, the gear lever has to be moved twice the distance required to engage 2nd gear. Failure to engage 1st gear completely causes rapid wear of the gear teeth and leads to gear breakage.

The gear lever is mounted on the air duct case and operates the gearbox through a remote-control linkage (Fig.32). Adjustment is made by varying the length of the control rods.

TRANSFER CASE
(Vehicles of YA3-452 Family)

The transfer case is mounted directly to the rear of the gearbox. It has two speeds: direct drive and low speed with gear ratios of 1.00 and 1.94 respectively.

The transfer case may be shifted into low only after engaging the front axle. This condition is catered for by provision of an interlocking device (a shift rod lock). The transfer case gears are of the straight-tooth type. They transmit drive only when the front axle is engaged.

The front axle drive should be used for heavy going (in sand, mud, snow and the like). When the front axle drive is in operation, it produces gear hum which is not heard otherwise.

Driving with the front axle constantly in gear adds to wear on the vehicle and tyres and increases fuel consumption. Avoid using the front axle drive on hard-surface roads.

The low gear of the transfer case should be used on a hard pull (climbing a hill, heavy road conditions, etc.). Before shifting into low, slow down the vehicle to 3-5 km/hr.

All the transfer case bearings are of the radial type and need no adjustment.

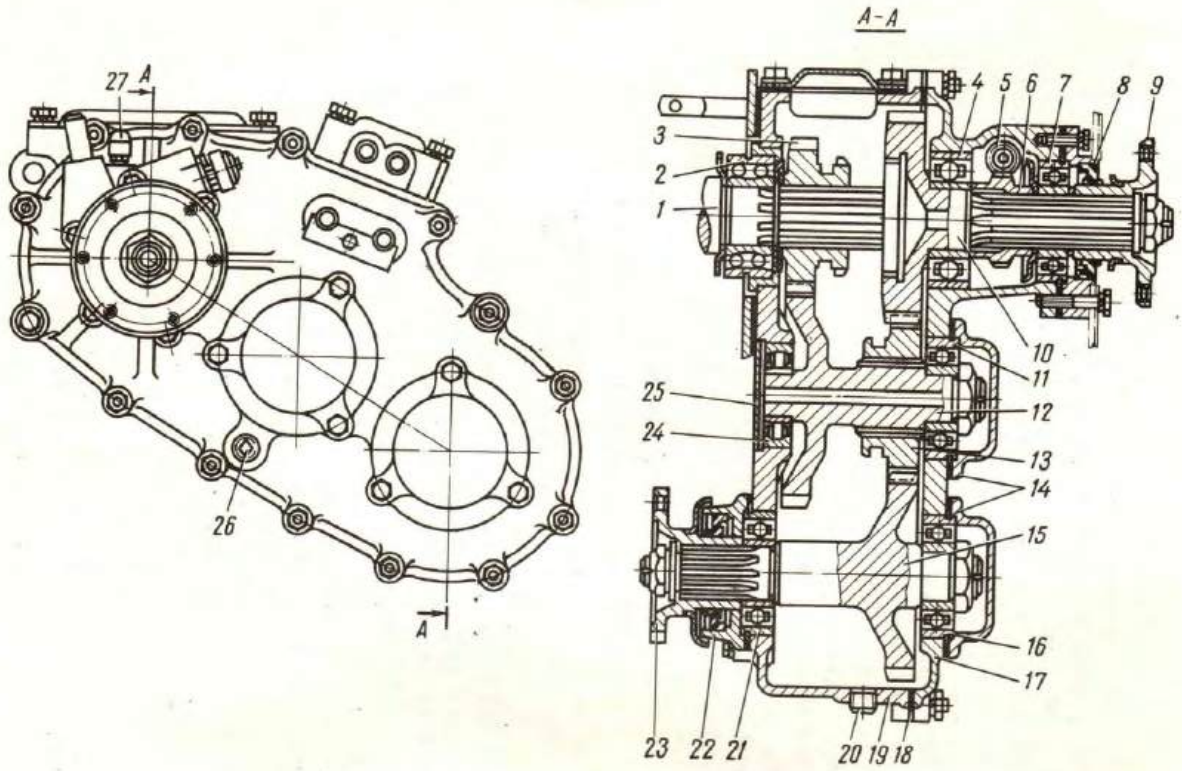


Fig. 33. Transfer Case (УАЗ-452, УАЗ-452Д, УАЗ-452В, УАЗ-452А):
1 - gearbox mainshaft; 2 - mainshaft bearing; 3 - low speed sliding gear; 4 and 7 - rear axle drive shaft bearings; 5 - speedometer driven gear; 6 - speedometer driving gear; 8 - seal; 9 - flange; 10 - rear axle drive shaft; 11 and 24 - layshaft bearings; 12 - layshaft; 13 - front axle drive sliding gear; 14 - caps; 15 - front axle drive shaft; 16 and 21 - front axle drive shaft bearings; 17 - cover; 18 - gaskets; 19 - case; 20 - drain plug; 22 - cover; 23 - flange; 25 - plug; 26 - filler plug; 27 - breather

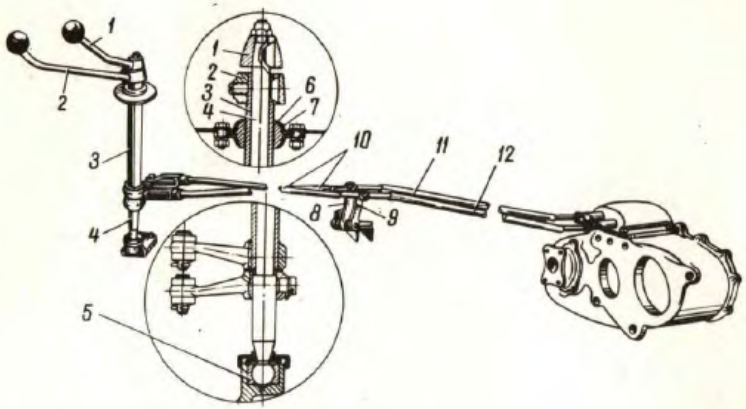


Fig. 34. Transfer Case Controls:
1 - front axle control lever; 2 - transfer case control lever; 3 - direct and low control shaft; 4 - front axle control shaft; 5 - bottom socket; 6 - spherical sleeve; 7 - spherical sleeve housing; 8 and 9 - intermediate levers; 10 - adjustable rods; 11 - front axle control rod; 12 - direct and low control rod

The transfer case controls (Fig.34) are located to the right of the driver, ahead of the engine cowl, and operate the transfer case through a remote-control linkage. The upper lever controls front axle engagement. The lower lever selects direct drive and low gear. The control gear positions are shown in Fig.6 on a plate attached above the windscreen.

The front control rods are adjustable by the use of threaded clevises (the adjustment is made at the time of manufacture).

The upper shaft support and the intermediate lever shaft bush are made of plastic and need no lubrication. The lower shaft support should be lubricated on reassembly.

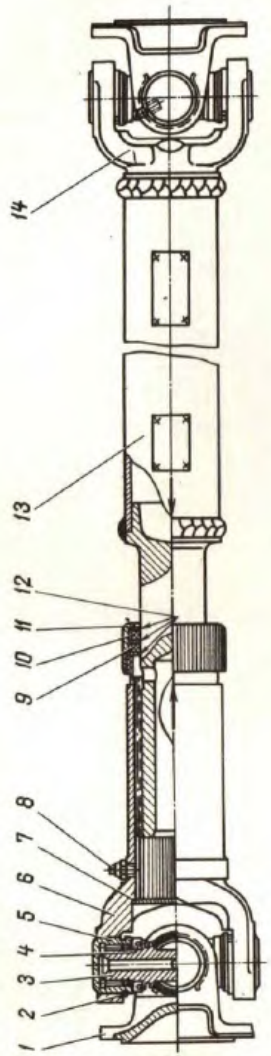


Fig. 35. Rear Axle Propeller Shaft
1 - flange; 2 - lockring; 3 - spider; 4 - spider seal; 5 - needle bearing; 6 - slip yoke; 7 - plug; 8 - lubrication fitting; 9 - rubber ring; 10 - felt ring; 11 - retainer; 12 - steel split rings; 13 - propeller shaft tube; 14 - universal joint yoke

PROPELLER SHAFTS

The propeller shafts (Fig. 35) need the following periodic attention: check and tighten home the bolts which secure the universal-joint flanges, lubricate the universal joints, clean the shafts of dirt. On the vehicles of the УАЗ-452 family, the front and rear propeller shafts must be installed with the splined ends towards the transfer case. On the vehicles УАЗ-451М and УАЗ-451ДМ, the splined end of the propeller shaft must be towards the gearbox.

Pay due attention to the lubrication. Charge the needle bearings until lubricant shows at the lips of the cross seals. The grades of lubricant are specified in the Lubrication Chart. Do NOT use solidol grease or its mixtures if failure of the needle bearings is to be avoided.

Lubricate the splined joints with two or three shots of grease gun only, without causing the lubricant to escape. Do not overlubricate as excess lubricant will be forced out of the splined joint, which is harmful to the seals and may dislodge the sliding yoke plug.

To lubricate the universal joints, put a special nozzle on the gun (the nozzle is provided in the driver's toolkit).

REAR AXLE

The final drive consists of a spiral bevel pinion and crown wheel (Fig. 36).

The rear axle housing is split vertically and the two halves are bolted together. The differential has four bevel pinions. The faces of the axle shaft gears bear against replaceable thrust washers.

The rear axle calls for the following attention: maintain oil level up to the filler hole, change oil at the specified periods, tighten up loose fastenings, periodically clean out the breather and, if necessary, adjust the bearings.

The drive pinion must have no axial play. To eliminate such a play, tighten home nut 7. If this fails to remedy (the shims may have become worn due to prolonged operation of the bearing with the nut loose), change worn shims 8 and adjust the tension on the double bearing.

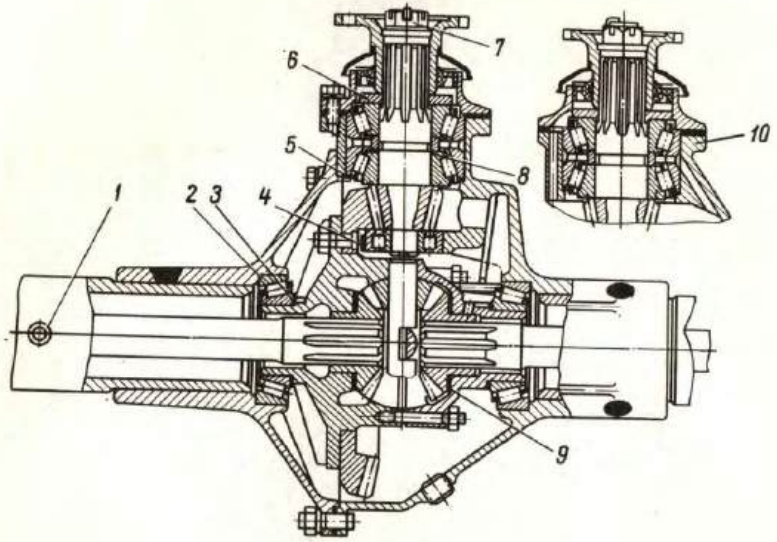


Fig. 36.Rear Axle

1 - breather; 2 - differential bearing; 3 - shims; 4 - pinion rear bearing; 5 - adjusting ring; 6 - oil slinger; 7 - nut; 8 - shims; 9 - thrust washer; 10 - double bearing

If axial play of the crown wheel has developed, add shims of the same thickness to the left and right sides of the differential cage so as to put a light drag on the crown wheel.

To remove the drive pinion, first detach the housing cover, take the housing apart and remove the assembly of the differential and crown wheel. To reassemble the axle, conversely, first install the assembly of the drive pinion and bearing and then the assembly of the differential and crown wheel.

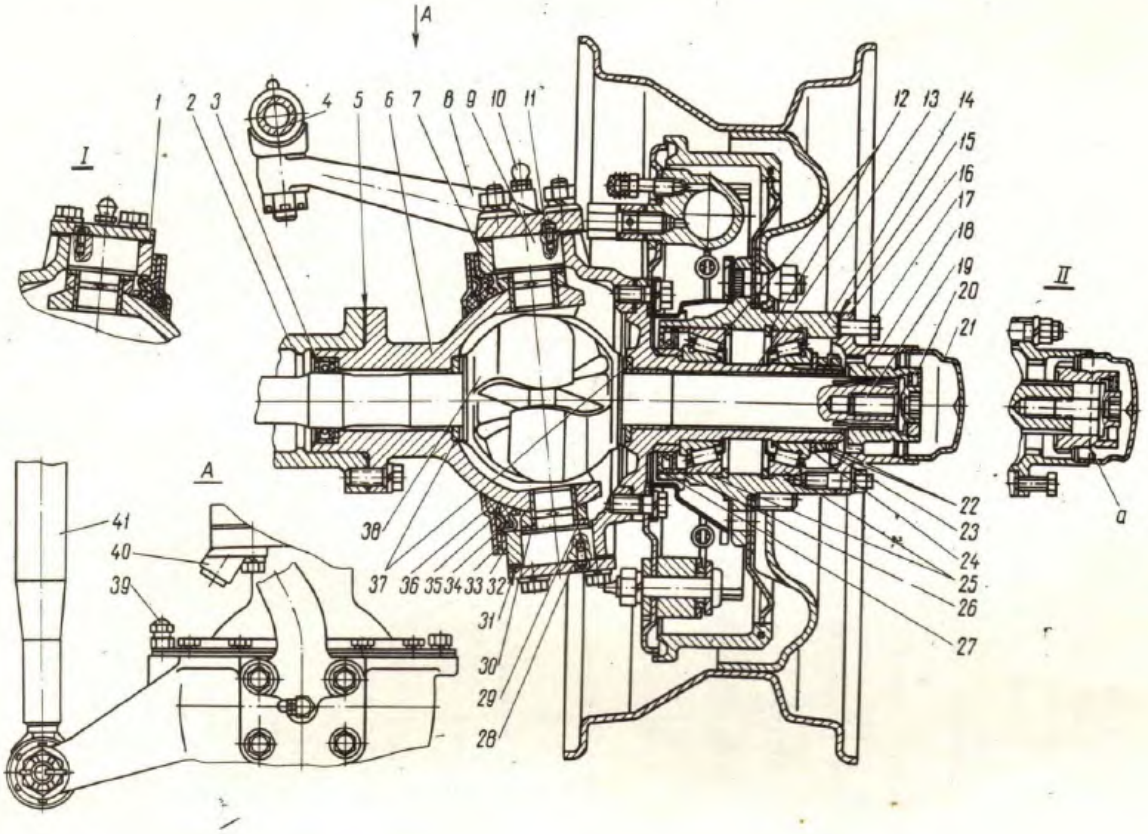


Fig. 37. Steering Knuckle (УАЗ-452, УАЗ-452Д, УАЗ-452А, УАЗ-452В):

1 - upper plate; 2 - axle shaft sleeve; 3 - joint seal; 4 - steering drag link; 5 - gasket; 6 - ball joint; 7 - housing; 8 - lever; 9 - knuckle pin; 10 - grease fitting; 11 - locking pin; 12 - stop ring; 13 - knuckle spindle; 14 - wheel hub; 15 - drive flange gasket; 16 - drive flange; 17 - puller bolts; 18 - sliding coupling; 19 - locking bolt; 20 - lock ball; 21 - protective cap; 22 - hub bearing nut; 23 - lockwasher; 24 - lockwasher; 25 - hub bearings; 26 - spacing ring; 27 - hub seal; 28 - lower plate; 29 - thrust washer; 30 - knuckle pin bush; 31 - adjusting shims; 32 - seal outer retainer; 33 - intermediate ring; 34 - seal outer retainer; 35 - rubber collar; 36 - felt ring; 37 - thrust washers; 38 - knuckle joint; 39 - turning angle adjusting bolt; 40 - turning angle stop; 41 - tie-rod

a - indicating groove

I - right-hand steering knuckle

II - sliding coupling disengaged

DRIVING FRONT AXLE

(Vehicles of УАЗ-452 Family)

The final drive and differential are similar to those in the rear axle. The construction of the steering knuckle is shown in Fig. 37.

If the steering knuckles have up-and-down play (Fig.38), adjustment should be made by removing the required number of shims 31 (Fig.37). To avoid disturbing knuckle alignment, be sure to remove the same number of shims at top and bottom.

When inspecting the knuckles, check the condition and security of turning angle adjusting bolts 39 and stops 40.

The front wheels can be disengaged from the drive. For the purpose remove cap 21 and, by turning out bolt 17, move the coupling into the position where its circular groove "a" is coplanar with the end face of the flange. Thereafter reinstall the cap.

To engage the wheels, turn the bolt in until the flange butts up against the shaft and then pull the bolt tight. These operations should be carried out on each front wheel.

Do not put the front axle in gear with the wheels disengaged.

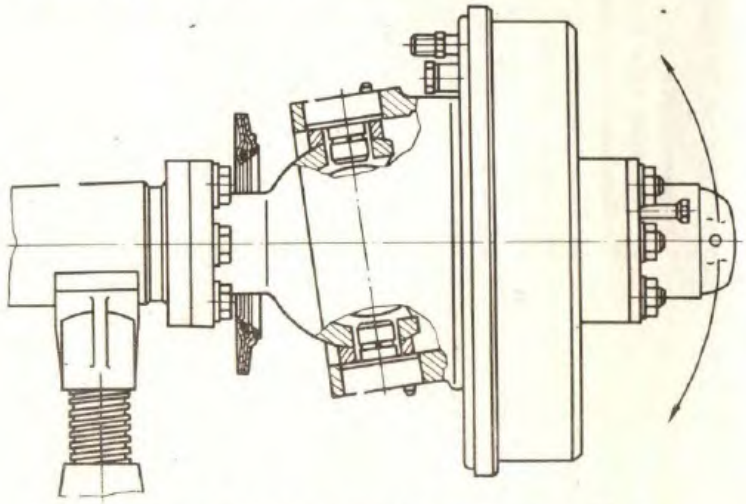


Fig. 38. Checking Knuckle Up and Down Play

NON-DRIVING FRONT AXLE

(УАЗ-45IM, УАЗ-45IДМ)

The front axle beam (Fig.39) is a forging. The steering knuckles are supported by thrust ball bearings and pivot on bronze-bushed king pins keyed to the beam. The bushes are lubricated through grease fittings.

Knuckle up-and-down play is taken up by the use of shims fitted between the knuckle upper lug and the beam.

WHEEL BEARING ADJUSTMENT

The wheel bearings need very careful adjustment. If the bearings are slack, they may be damaged by internal impacts. If the bearings are too tight, they will run hot and fail due to escape of lubricant.

To adjust:

A. УАЗ-45IM, УАЗ-45IДМ. Front Wheels

1. Jack up the axle. Remove the hub cap. Uncotter and back off 1/8 turn the adjusting nut mounted on the end of the knuckle spindle. Push the wheel with the hand to check whether it spins freely. If the wheel binds, eliminate the cause (dragging brake shoes, jamming seal, etc.).

2. Tighten the nut gradually with a wrench until the wheel binds.

3. Back off the nut 1/8 to 1/4 turn (1 to 2 slots) so as line up the nut slot with the cotter pin hole in the spindle. Cotter up the nut.

Make a road test for hub temperatures. Slight hub heating is not objectionable only if new bearings or seals have been fitted.

B. Driving Axle Wheels, Front and Rear

1. Jack up the wheel.

2. Take out the axle shaft (on the rear axle). Remove the driving flange and wheel coupling (on the front axle). The removal is facilitated by the use of two puller bolts 17 (Fig.37). Turning the bolts in forces off the axle shaft or driving flange.

3. Bend off the lockwasher tab, unscrew the locknut and take off the lockwasher.

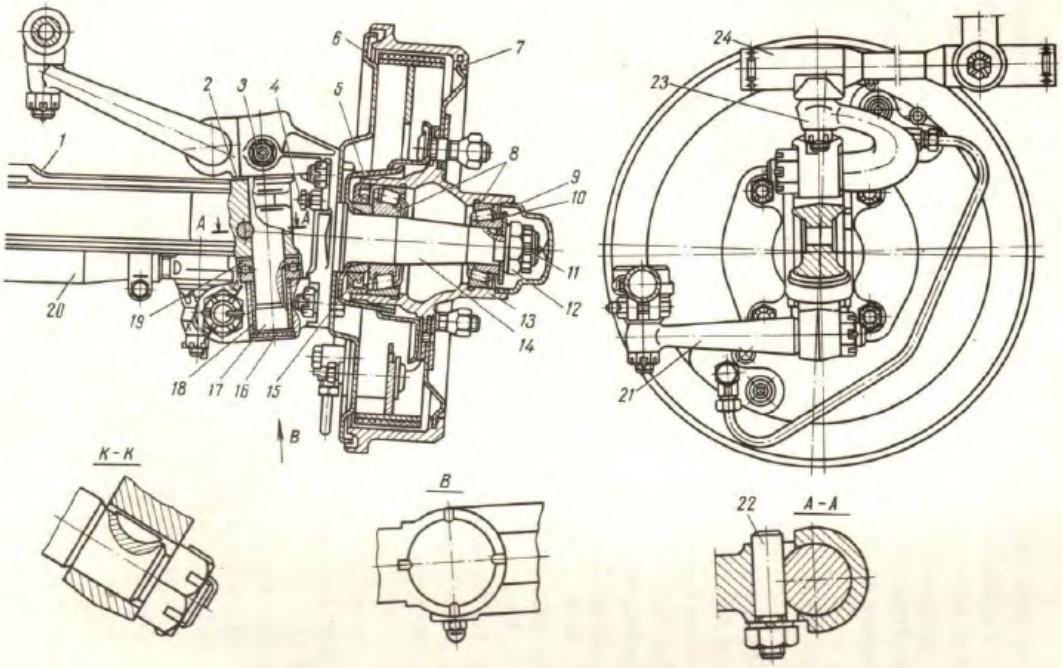


Fig. 39. Front Axle (УАЗ-451М, УАЗ-451ДМ):
1 - axle beam; 2 - adjusting washers; 3 - grease fitting;
4 - turning angle adjusting bolt; 5 - oil baffle;
6 - brake anchor plate; 7 - brake drum; 8 - bearings;
9 - hub cap; 10 - thrust washer; 11 - cotter pin;
12 - knuckle nut; 13 - hub; 14 - steering knuckle;
15 - seal; 16 - plug; 17 - king pin; 18 - bush; 19 - thrust
bearing; 20 - tierod; 21 - tierod steering arm; 22 - king
pin key; 23 - draglink steering arm; 24 - draglink

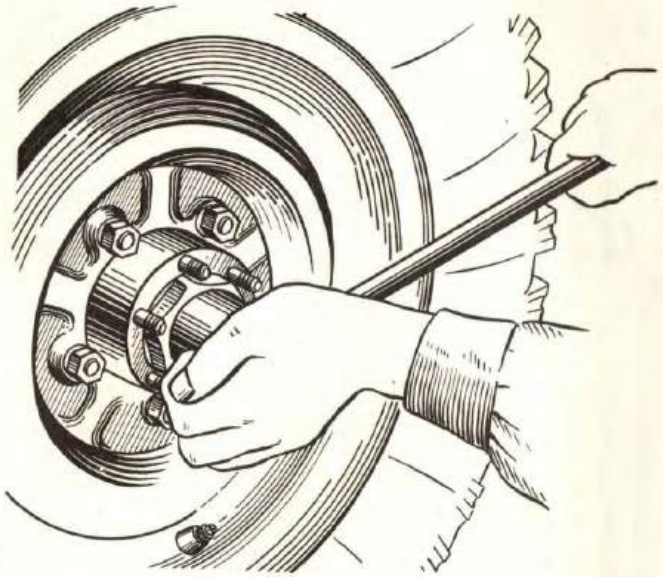


Fig. 40. Wheel Bearing Adjustment

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

5. Check the wheel by hand for easy spinning. If the wheel binds, eliminate the cause (dragging brake shoes, etc.).

6. Using a wrench and a handle 300-350 mm long, tighten the adjusting nut gradually with one hand until the wheel binds (Fig.40), While tightening the nut, rotate the wheel for the bearing rollers to become seated on the raceways.

7. Back off the nut 1/4 to 1/3 turn (1.5 to 2 flats). Fit the lockwasher, tighten the locknut and bend the lockwasher tabs onto the flats of the nut and locknut (Fig.41). If even slight cracks are found on the lockwasher tabs, be sure to use a new lockwasher. Neglect of this point may result in the lockwasher tabs breaking off and the nut working loose or tight. In either case bearing failure is likely to result.

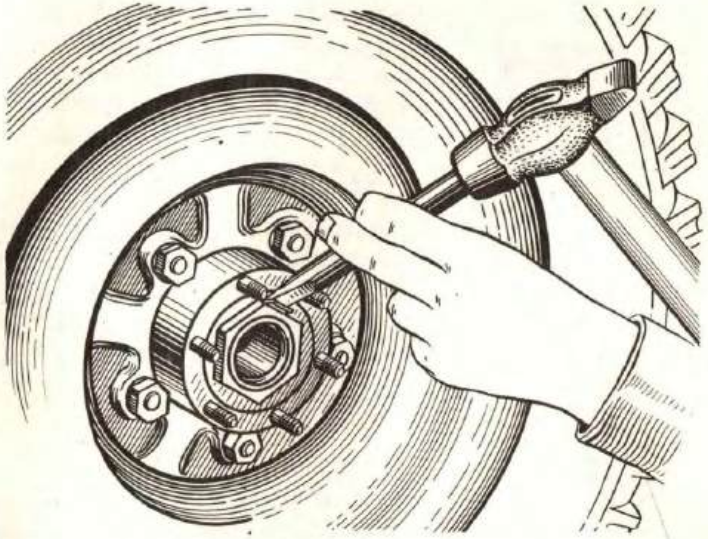


Fig. 41. Locking Wheel Bearing Nuts

8. Check that the wheel rotates freely without perceptible play and rock. As a final judgement, make a road test for hub temperatures.If the hub overheats, back the nut off 1/6 turn by using the procedure described above.

TYRES

Periodically inspect the tyres and check tyre pressures. Interchange the tyres when necessary (Fig.42). Bear in mind that in the case of all-wheel drive vehicles unbalanced tyre pressures will cause difficulties in putting the front axle into and out of engagement because of difference in the wheel rolling radii.

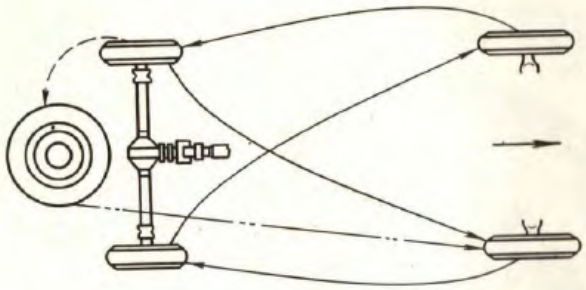


Fig. 42. Tyre Interchanging Diagram

If the front wheel tyres show signs of uneven wear, check and adjust the toe-in (Fig.43). With the tyres inflated to normal pressure, the difference between the dimension "A" at the front and the dimension "B" at the rear should be 1.5-3 mm as measured at the wheel centre level.

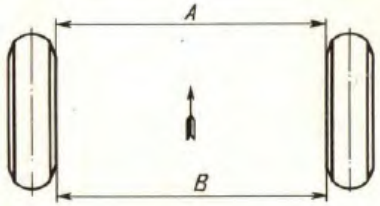


Fig. 43. Checking Toe-In

On the vehicles УАЗ-452, УАЗ-452Д, УАЗ-452А, УАЗ-452В, adjust the toe-in by varying the length of the tierod (Fig.44). Before making this adjustment, make sure that there is no slackness in the steering joints and wheel bearings. Loosen the locknuts (threaded right and left) and turn the adjusting sleeve as necessary. Draw up the locknuts.

On the vehicles УАЗ-451М and УАЗ-451ДМ, uncotter and loosen nuts 5 (Fig.45) and clamps 3 and turn the tierod as necessary. End 1 is right-hand threaded and end 4 is left-hand threaded. Therefore rotating the tierod varies its total length. After the adjustment tighten the clamps and cotter up the nuts.

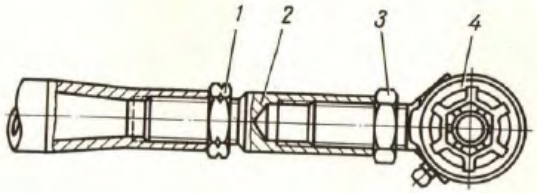


Fig. 44. Tierod (УАЗ-452, УАЗ-452Д, УАЗ-452А, УАЗ-452В):
1 - left-hand threaded nut; 2 - adjusting sleeve; 3 - right-hand threaded nut; 4 - end

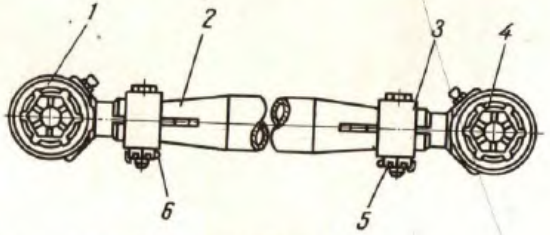


Fig. 45. Tierod (УАЗ-451М, УАЗ-451ДМ):
1 - left end; 2 - tierod; 3 - clamp; 4 - right end; 5 - nut; 6 - cotter pin

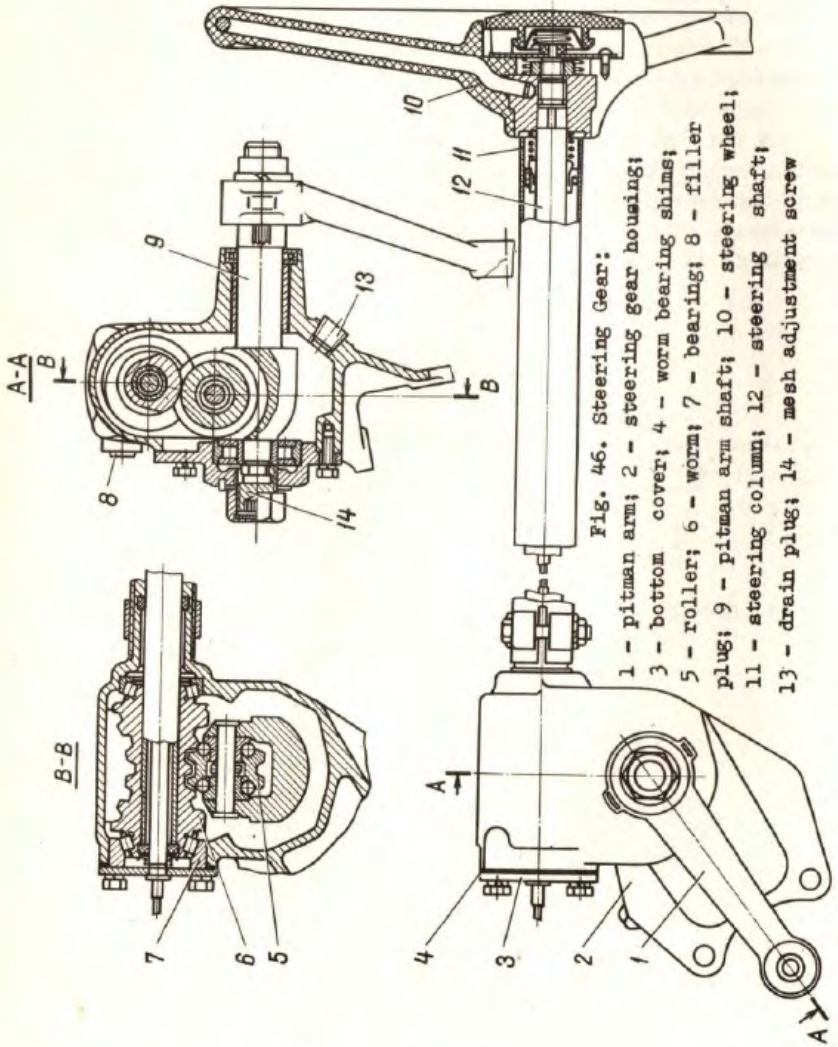


Fig. 46. Steering Gear:
1 - pitman arm; 2 - steering gear housing; 3 - bottom cover; 4 - worm bearing shims; 5 - roller; 6 - worm; 7 - bearing; 8 - filler plug; 9 - pitman arm shaft; 10 - steering wheel; 11 - steering column; 12 - steering shaft; 13 - drain plug; 14 - mesh adjustment screw

STEERING

The worm and roller are constructed so that with the wheels in the straight ahead position the backlash is practically zero. As the wheels are turned the backlash increases gradually and reaches its maximum in the extreme positions.

The steering gear (Fig.46) needs no adjustment if the play of the steering wheel at the mid-point of its travel is within 10° which is an equivalent of 40 mm at the wheel rim.

Before correcting excessive play, make sure that the steering gear housing bolts are secure and the ball joints are in good condition.

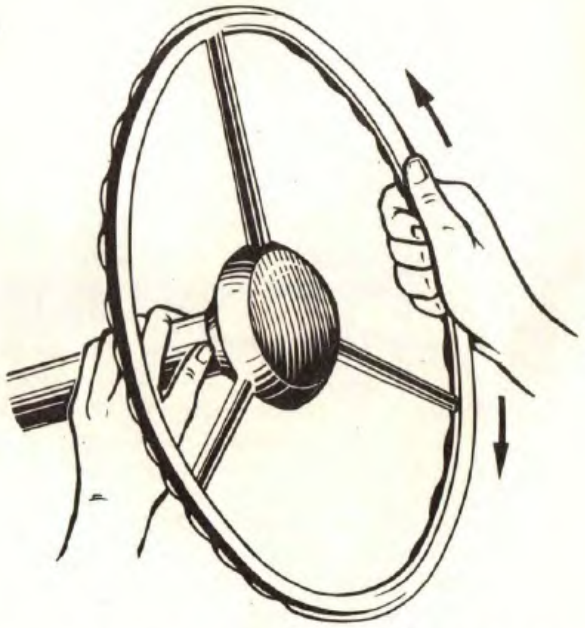


Fig. 47. Checking Worm Bearings for End Play

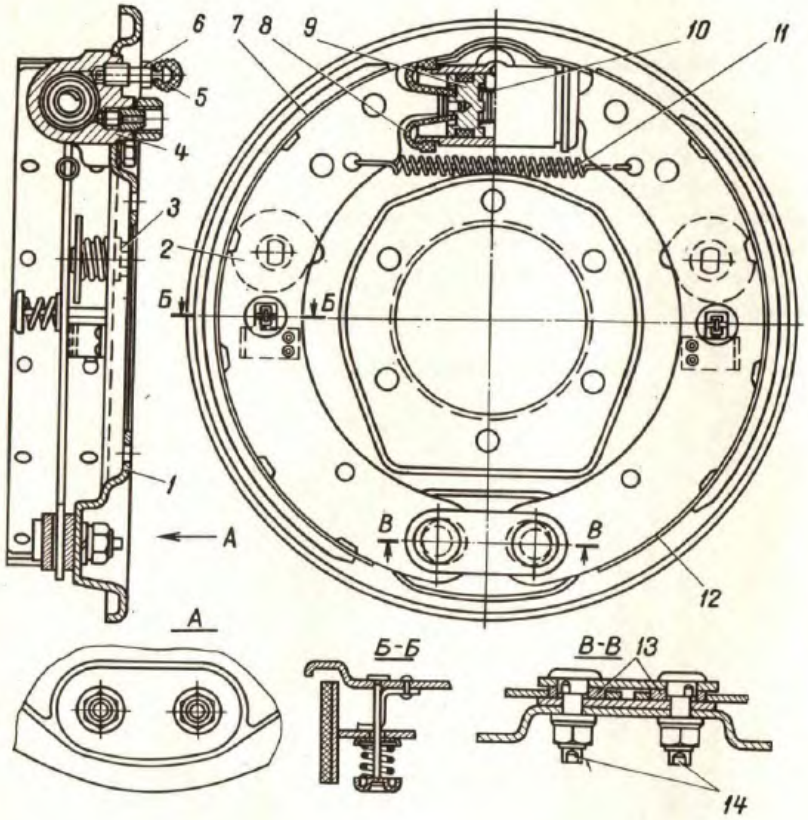


Fig. 48. Rear Brake:
1 - brake anchor plate; 2 - adjusting cam; 3 - cam head; 4 - wheel cylinder; 5 - cap; 6 - bleeder valve; 7 - front shoe; 8 - boot; 9 - piston; 10 - spring; 11 - retracting spring; 12 - rear shoe; 13 - anchor pin eccentrics; 14 - anchor pins

First check the axial play in the worm bearings. Grasp the steering column so that the thumb touches the face of the steering wheel hub and turn the steering wheel through some angle back and forth (Fig.47). If the worm bearings are worn, the thumb will feel the wheel hub moving axially in relation to the column. If there is no worm axial play, then only the roller-to-worm mesh needs adjustment.

The worm bearing tension is adjusted by the use of shims 4 (Fig.46) between the steering housing and its bottom cover. For the purpose the steering gear should be removed. The tension is correct if the steering wheel can be turned with a pull of 0.22-0.45 kg (with the pitman arm shaft left out).

To adjust the roller-to-worm mesh, shift the pitman arm shaft by means of adjusting screw 14 fitted in the steering gear housing side cover. This adjustment is made with the steering gear mounted on the vehicle. The adjustment is correct if a pull of 0.7-1.2 kg at the wheel rim is sufficient to turn the steering wheel from the mid-position of its travel.

BRAKES

Wear on the brake drums and shoe linings increases clearance between them and the working stroke of the brake pedal. Adjustment should be made by means of the adjusting cams whose hexagon-headed pins extend through the brake anchor plate. Proceed as follows:

1. Jack up the wheel.
2. Turning the wheel, gradually turn the adjusting cam until the brake drags (Fig.51).
3. Turning the wheel, gradually back off the cam until there is no drag and the wheel rotates.
4. Adjust the other brakes in the same manner.

When adjusting the front brakes and the front shoes of the rear brakes, the wheel should be turned forward. When adjusting the rear shoes of the rear brakes, the wheel should be turned backward.

Turn the adjusting cams in the direction of wheel rotation to decrease the shoe clearance and in reverse to increase it.

5. Make a road test to ensure that the brake drums do not heat and the brakes operate synchronously.

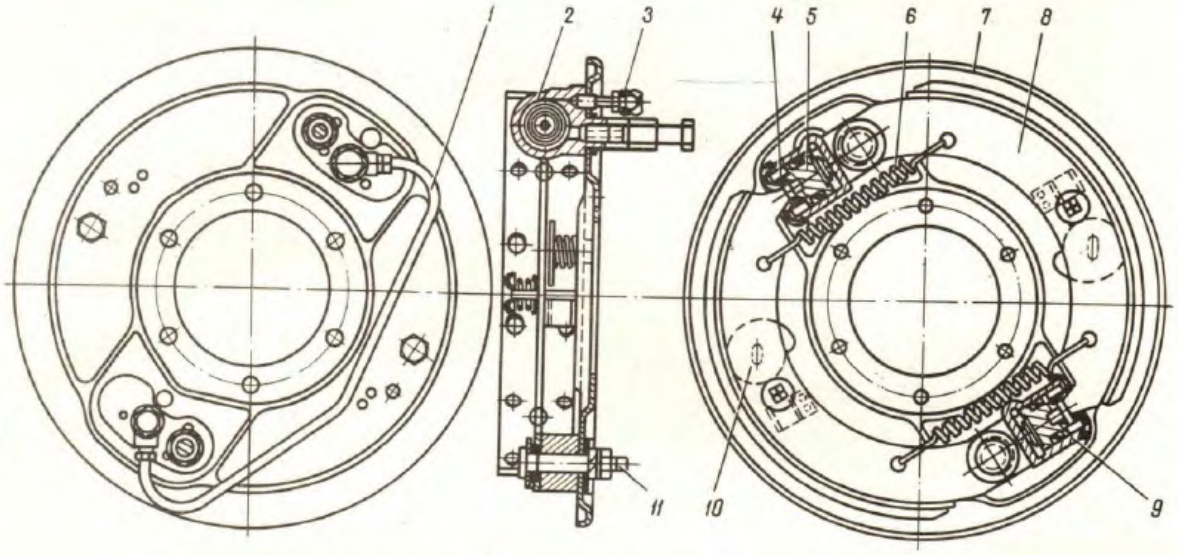


Fig. 49. Front Brake (УАЗ-452, УАЗ-452Д, УАЗ-452А, УАЗ-452В):
1 - bridge pipe; 2 and 9 - wheel cylinders; 3 - bleeder valve; 4 - boot; 5 - piston; 6 - shoe retracting spring; 7 - brake anchor plate; 8 - shoe; 10 - adjusting cam; 11 - anchor pin

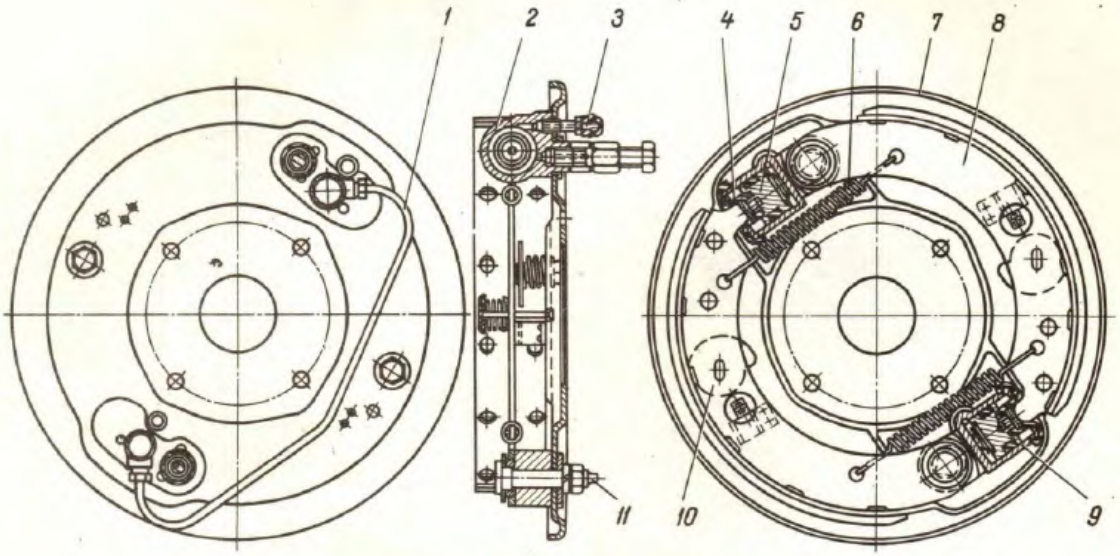


Fig. 50. Front Brake (УАЗ-45IM, УАЗ-45IДМ):
1 - bridge pipe; 2 and 9 - wheel cylinders; 3 - bleeder valve; 4 - boot; 5 - piston; 6 - shoe retracting spring; 7 - brake anchor plate; 8 - shoe; 10 - anchor pin eccentric; 11 - anchor pin

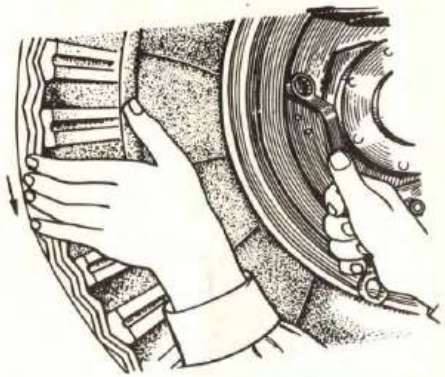


Fig. 51. Shoe Clearance Adjustment

To adjust brake pedal free travel, set the correct clearance between the brake master cylinder piston and pushrod (Fig.52). The correct clearance gives 8-14 mm free travel of the brake pedal. To adjust, vary the pushrod length by turning the pushrod in or out of the pedal clevis.

The brake fluid must conform to the specifications in the Lubrication Chart.

The brake system priming procedure is as follows:

1. Check the hydraulic brake system to see that all the connections are leaktight and the rubber hoses are sound.

2. Remove lid 8 (Fig.7) from the fascia.

Remove the brake master cylinder filler cap and fill the cylinder with brake fluid.

3. Remove the rubber cap from the bleeder valve of the right rear brake and put on a rubber bleeder tube about 400 mm long. Place the free end of the tube in a glass container of at least 0.5-litre capacity filled half-full with brake fluid (Fig.53).

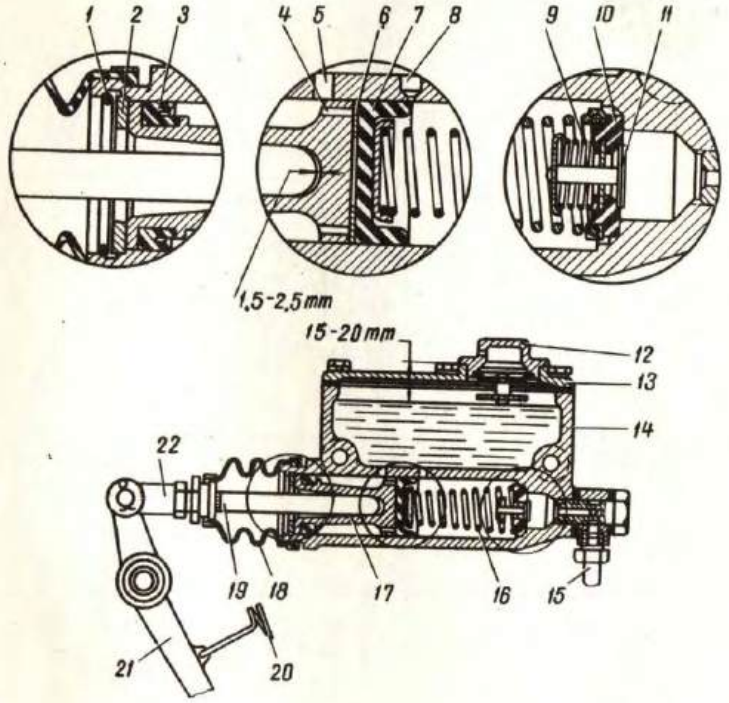


Fig. 52. Brake Master Cylinder:
1 - snapring; 2 - stop disk; 3 - sealing ring; 4 - piston holes; 5 and 8 - master cylinder ports; 6 - disk; 7 - cup; 9 - outlet valve spring; 10 - inlet valve; 11 - outlet valve; 12 - plug; 13 - cover; 14 - reservoir; 15 - pipe; 16 - return spring; 17 - piston; 18 - boot; 19 - pushrod; 20 - retracting spring; 21 - brake pedal; 22 - clevis

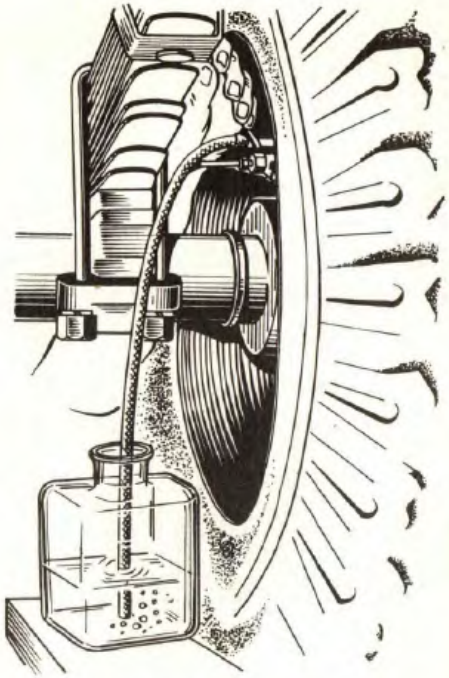


Fig. 53. Bleeding Brakes

4. Back off the bleeder valve 1/2 to 3/4 turn and pump the brake pedal by depressing it rapidly and releasing slowly. Continue this pumping until no more air bubbles appear from the end of the bleeder tube submerged in the brake fluid. During this operation keep the master cylinder filled with fluid. If the fluid is allowed to run out and uncover the cylinder bottom, air will enter the system again.

5. Draw up the bleeder valve tight, remove the tube and replace the cap on the valve. While drawing the bleeder valve, keep the brake pedal depressed.

6. The brakes must be bled in the following order: rear right, front right, front left, rear left. On the front brakes, first bleed the lower cylinder and then the upper one.

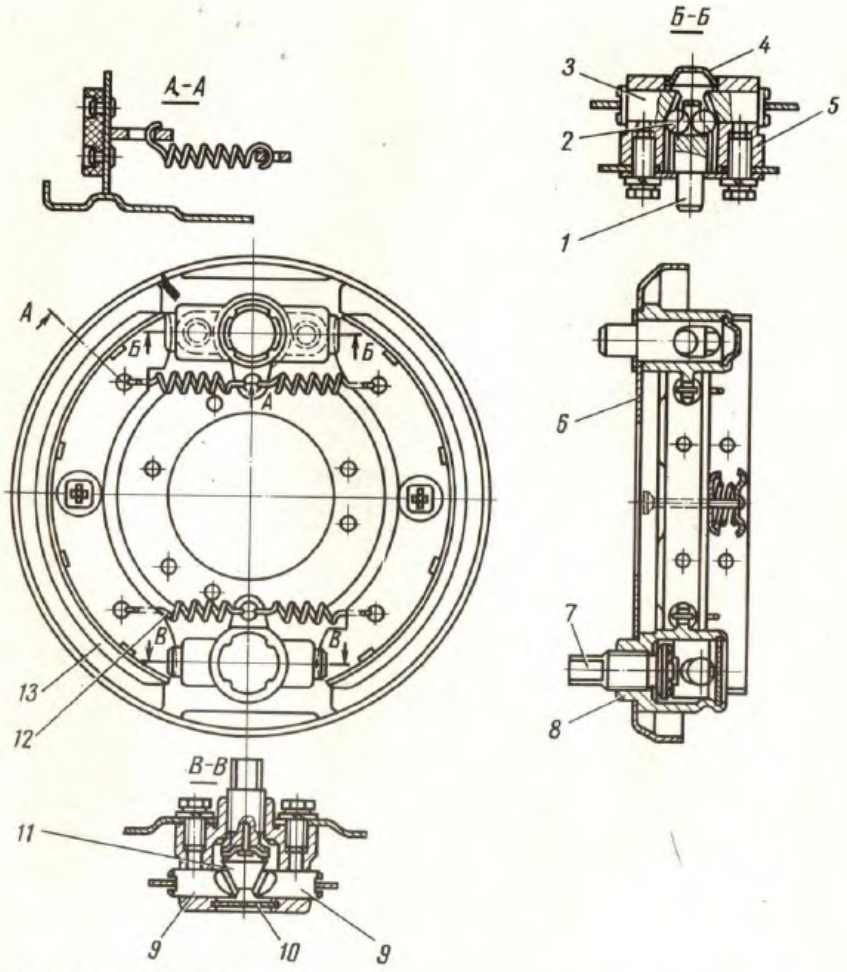


Fig. 54. Handbrake:
1 - ball housing; 2 - expander balls; 3 - expander tappets; 4 - plug; 5 - expander housing; 6 - brake anchor plate; 7 - adjusting screw; 8 - adjuster housing; 9 - shoe abutments; 10 - plug; 11 - thrust block; 12 - shoe spring; 13 - shoe

7. After all the brakes have been bled, refill the master cylinder to 15-20 mm below the upper edge of the filler hole. Clean out the filler cap vent and draw up the cap tight.

8. Test the brakes on the road. The brakes are O.K. if they are fully applied by depressing the brake pedal 1/2 to 2/3 of its stroke, after which resistance should be felt.

The handbrake (Fig.54) is meant for parking and for holding the vehicle on an incline and should not be used for stopping the vehicle except in an emergency.

If the handbrake lever has to be move past the mid-point of its complete travel to apply the brake, adjustment is necessary. The fault may be traced to:

Excessive brake shoe clearance. - Adjust.

Excessive free travel of brake control. - Adjust control cable length.

To adjust the shoe clearance, drive screw 7 (Fig.54) home and then back it off 4-6 clicks (1/3 to 1/2 turn).

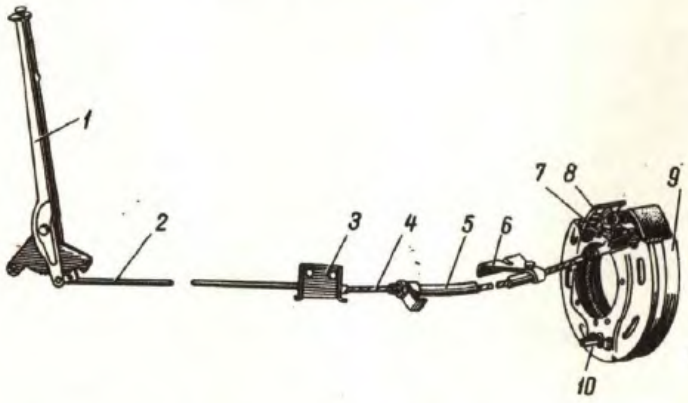


Fig. 55. Handbrake Control Mechanism:
1 - handbrake lever; 2 - control rod; 3 -bracket; 4 - cable; 5 - conduit; 6 - conduit bracket; 7 - cable clevis; 8 - lever; 9 - handbrake drum; 10 - handbrake assembly

To adjust the length of the cable, set lever 1 in the extreme forward position (Fig.55), take up all slack by turning adjusting clevis 7. back off the clevis 1 1/2 to 2 turns, line up the holes in the clevis and lever, insert the pin, cotter it up and draw up the locknuts.

The adjustment is correct if the handbrake is applied by engaging the lever pawl in the 3rd or 4th notch in the quadrant.

ELECTRICALS

The electrical equipment is of the 12 V negative earth return type. Figs 56, 57 and 58 show the wiring diagrams of the electrical system.

The generator is a shunt-wound, two-brush unit driven by the fan belt. Belt adjustment is correct if a finger pressure of 4.5 kg applied midway between the water pump and generator pulleys produces 10-15 mm deflection.

The brushes should be replaced, if worn. Bed new brushes to the commutator.

Periodically clean the commutator with a petrol-moistened rag. If the commutator is rough, sand it with sandpaper (do NOT use emery).

The generator is controlled by a regulator (Fig.59) which consists of the following units: cut-out, current regulator and voltage regulator.

The cut-out closes the generating circuit when the generator voltage reaches 12.2-13.2 V (at 20°C outside air and regulator temperature). The cut-out opens the generating circuit at a reverse current of 0.5-6 A.

The current regulator limits the generator output to 19-21 A and thus protects the generator from overload.

The voltage regulator limits voltage output to 13.8-14.8 V at 10 A

Periodically check the regulator contact gaps, clean the contacts and check the regulator for secure mounting.

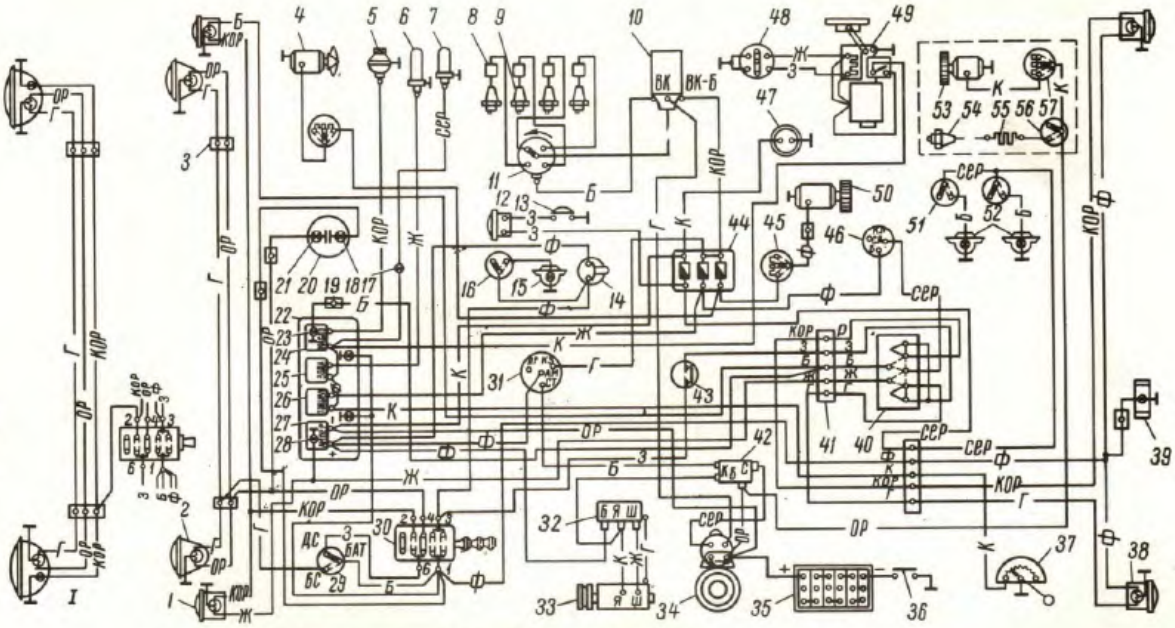


Fig. 56. Wiring Diagram (УАЗ-45IM, УАЗ-452):
1 - sidelamp; 2 - headlamp; 3 - junction block; 4 - cab fan; 5 - oil pressure transmitter; 6 - engine temperature transmitter; 7 - overheat warning lamp switch; 8 - suppressor resistor; 9 - spark plug; 10 - ignition coil; 11 - distributor; 12 - horn; 13 - horn button; 14 - thermal circuit

breaker; 15 - cab lamp; 16 - cab lamp switch; 17 - overheat warning lamp; 18 - instrument panel light; 19 - connector; 20 - speedometer; 21 - upper beam warning lamp; 22 - instrument panel; 23 - right turn indicator; 24 - oil pressure indicator; 25 - engine temperature indicator; 26 - fuel level indicator; 27 - ammeter; 28 - left turn indicator; 29 - dipswitch; 30 - main light switch; 31 - ignition switch; 32 - generator regulator; 33 - generator; 34 - starter; 35 - storage battery; 36 - earth switch; 37 - fuel level transmitter; 38 - rearlamp; 39 - number plate lamp; 40 - direction indicator switch; 41 - junction block; 42 - starter relay; 43 - stoplight switch; 44 - fuse block; 45 - heater motor switch; 46 - flasher unit; 47 - socket; 48 - screenwiper switch; 49 - screenwiper; 50 - heater motor; 51 - interior lamp switch; 52 - interior lamp; 53 - engine heater motor; 54 - glow plug; 55 - glow plug tell-tale coil; 56 - glow plug switch; 57 - engine heater motor switch

Note. 1. 1 - alternative hookup for asymmetric light unit.
2. Fan (ref.No.4) is provided in tropicalized vehicles.
3. Items under ref.Nos.53, 54, 55, 56 and 57 are optional.
4. Wire colour key: Б - white; Ж - yellow; К - red; З - green; Ф - violet; Ор - orange; Сер - grey; Р - pink; Г - light blue; Кор - brown

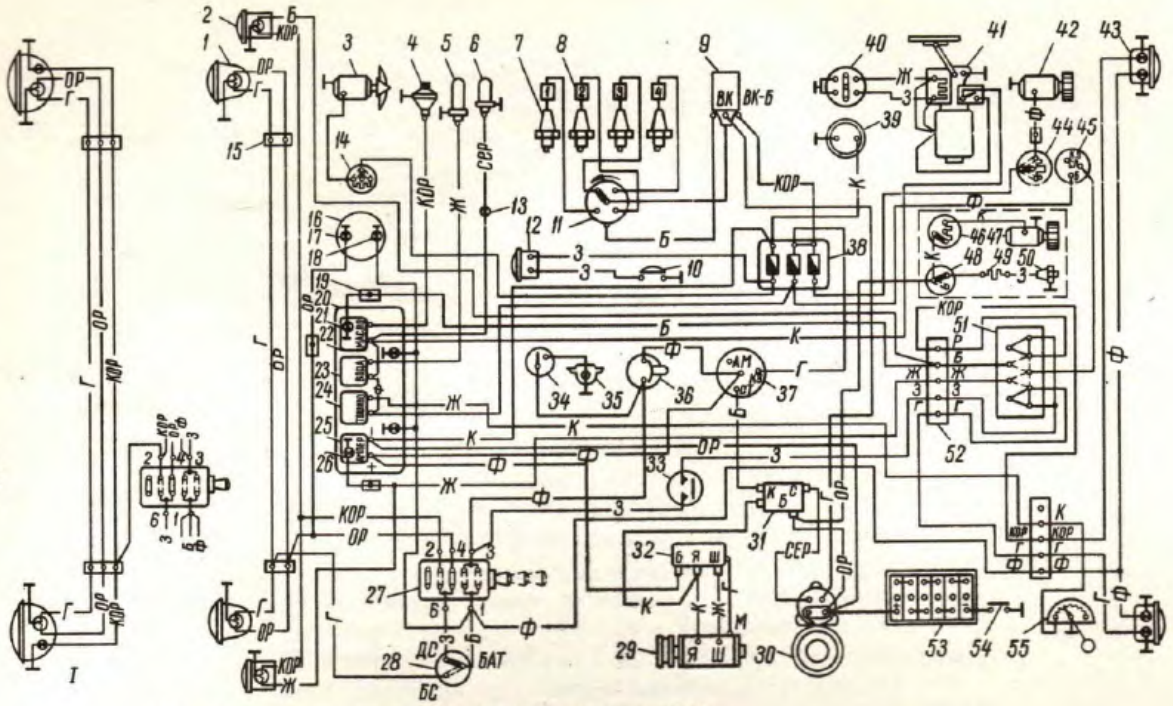


Fig.57. Wiring Diagram (УАЗ-452Д, УАЗ-451ДМ):
1 - headlamp; 2 - sidelamp; 3 - cab fan; 4 - oil pressure transmitter; 5 - engine temperature transmitter; 6 - overheat warning lamp switch; 7 - spark plug; 8 - suppressor resistor; 9 - ignition coil; 10 - horn button; 11 - distributor;

12 - horn; 13 - overheat warning lamp; 14 - fan switch; 15 - junction block; 16 - speedometer; 17 - upper beam warning lamp; 18 - instrument panel light; 19 - connector; 20 - instrument panel; 21 - right turn indicator; 22 - oil pressure indicator; 23 - engine temperature indicator; 24 - fuel level indicator; 25 - ammeter; 26 - left turn indicator; 27 - main light switch; 28 - dipswitch; 29 - generator; 30 - starter; 31 - starter relay; 32 - generator regulator; 33 - stoplight switch; 34 - cab lamp switch; 35 - cab lamp; 36 - thermal circuit breaker; 37 - ignition switch; 38 - fuse block; 39 - socket; 40 - screenwiper switch; 41 - screenwiper; 42 - cab heater fan motor; 43 - rearlamp; 44 - heater motor switch; 45 - flasher unit; 46 - engine heater motor switch; 47 - engine heater motor; 48 - glow plug switch; 49 - glow plug tell-tale coil; 50 - glow plug; 51 - direction indicator switch; 52 - junction block; 53 - storage battery; 54 - earth switch; 55 - fuel level transmitter

Note. 1. 1 - alternative hookup for asymmetric light unit.
2. Fan (ref.No.3) is provided in tropicalized vehicles.
3. Items under ref.Nos 46, 47, 48, 49 and 50 are optional.
4. Wire colour key: Б - white; Ж - yellow; К - red; З - green; Ф - violet; Ор - orange; Сер - grey; Р - pink; Г - light blue; Кор - brown

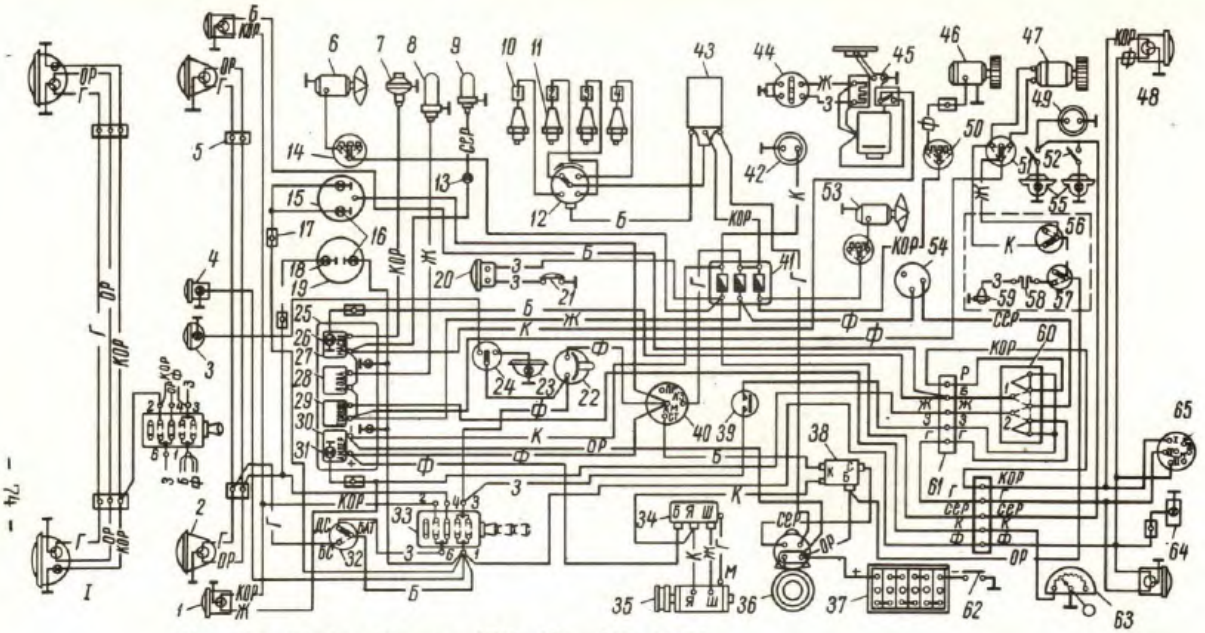


Fig. 58. Wiring Diagram (УАЗ-452, УАЗ-452В)

1 - sidelamp; 2 - headlamp; 3 - spotlight; 4 - sign lamp; 5 - junction block; 6 - cab fan; 7 - oil pressure transmitter; 8 - engine temperature transmitter; 9 - overheat warning lamp switch; 10 - suppressor resistor; 11 - spark plug; 12 - distributor; 13 - overheat warning lamp; 14 - fan switch; 15 - clock; 16 - instrument panel lights; 17 - connector; 18 - upper beam warning lamp; 19 - speedometer; 20 - horn; 21 - horn button; 22 - thermal circuit breaker; 23 - cab lamp; 24 - cab lamp and spotlight switch; 25 - instrument panel; 26 - right turn indicator; 27 - oil pressure indicator; 28 - engine temperature indicator; 29 - L.H. tank fuel level indicator; 30 - ammeter; 31 - left turn indicator; 32 - dipswitch; 33 - main light switch; 34 - generator regulator; 35 - generator; 36 - starter; 37 - storage battery; 38 - starter relay; 39 - stoplight switch; 40 - ignition switch; 41 - fuse block; 42 - cab socket; 43 - ignition coil; 44 - screenwiper switch; 45 - screenwiper; 46 - cab heater fan motor switch; 47 - interior heater fan motor; 48 - rearlamp; 49 - interior socket; 50 - fan motor switch; 51 - switch; 52 - interior lamp switch; 53 - interior fan; 54 - flasher unit; 55 - interior lamps; 56 - engine heater motor switch; 57 - glow plug switch; 58 - glow plug tell-tale coil; 59 - glow plug; 60 - direction indicator switch; 61 - junction block; 62 - earth switch; 63 - fuel level transmitter; 64 - number plate lamp; 65 - trailer socket

Note. 1. 1 - alternative hookup for asymmetric light unit.

2. Items under ref.Nos 3 and 4 are fitted only in УАЗ-452А.
3. Items under ref.Nos 6, 7 and 53 are provided only in tropicalized vehicles.
4. Items under ref. Nos 15, 56, 57, 58 and 59 are optional.
5. Wire colour key: Б - white; Ж - yellow; К - red; З - green; Ф - violet; Ор - orange; Сер - grey; Р - pink; Г - light blue; Кор - brown

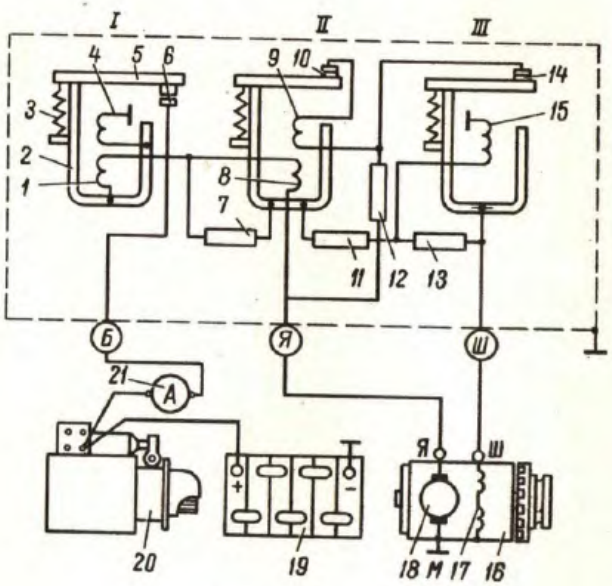


Fig. 59. Generator Regulator Circuit Diagram:
1 - cutout; II - current regulator; III - voltage regulator
1 - cutout series winding; 2 - yoke; 3 - armature return spring; 4 - cutout shunt winding; 5 - armature; 6 - cutout contact points; 7 - resistor, 1 Ω; 8 - current regulator main winding; 9 - current regulator bucking winding; 10 - current regulator contact points; 11 - resistor; 13 Ω; 12 - resistor, 30 Ω; 13 - resistor, 80 Ω; 14 - voltage regulator contact points; 15 - voltage regulator winding; 16 - generator; 17 - generator field winding; 18 - generator armature; 19 - storage battery; 20 - starter; 21 - ammeter

The gap "A" (Fig.60) between the armature and core of the voltage and current regulators must measure 1.4-1.5 mm with the contacts closed. To adjust, loosen screws 1 and reposition bracket 2 up or down.

The gap "C" between the armature and core of the cut-out must measure 0.6-0.8 mm with the contact open. The gap "B" between contacts 13 and 14 should not be less than 0.25 mm. The armature gap is adjusted by bending the armature stop. The contact gap is adjusted by bending the lower contact bracket.

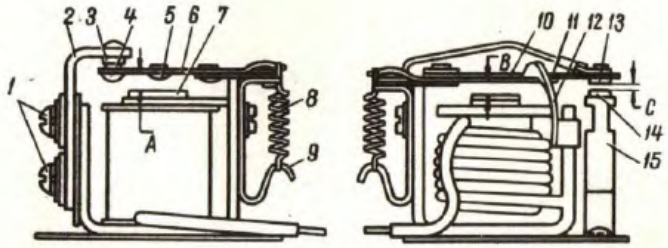


Fig. 60. Checking Generator Regulator Contact Point Gap:
1 - fixed point bracket screws; 2 - point bracket; 3 - fixed point; 4 - moving point; 5 - brass pin; 6 - armature; 7 - core; 8 - armature spring; 9 - adjusting arm; 10 - armature; 11 - contact plate; 12 - armature stop; 13 - moving point; 14 - fixed point; 15 - point bracket
A - armature gap of voltage and current regulators; B - cutout armature gap; C - cutout point gap

The 6CT-60-ЭМ battery is located behind the driver's seat. The battery voltage is 12 V, capacity is 60 Ah at 10-hour discharge rate. The battery is filled at the works with electrolyte of 1.270 sp.gr.

Check the battery for proper condition and secure mounting. Clean it of oxides and dirt.

The specific gravity of the electrolyte should be adjusted to the specified figure.

If the vehicle is to be out of use for a long time, measures should be taken to prevent damage by self-discharge and sulphation. It is good practice to remove the battery from the vehicle, charge it fully and thereafter recharge it every month in storage.

In case of a prolonged standstill keep the battery earth switch open.

Top up only with distilled water. Remove the filler caps (Fig.61) and put them tightly on the vents. Top up to 10-15 mm below the bottom edge of the filler well, remove the caps from the vents and replace them tightly in the filler holes.

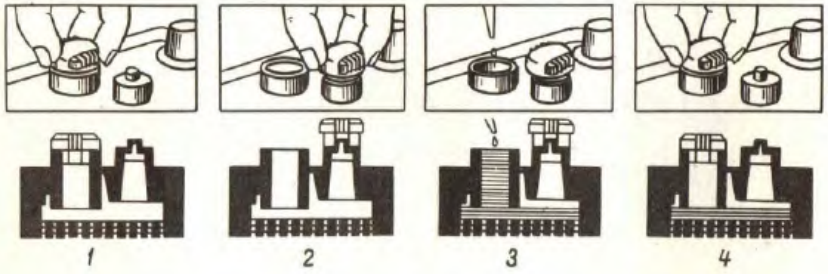


Fig. 61. Topping Up Storage Battery

Head and Side Lamps

The headlamps light unit, of the semi-integral type, has a two-filament bulb. Various types of headlamps may be fitted at option.

To aim headlamps with symmetrical light units, place the vehicle (unladen) 7.5 m away from the aiming screen and turn on the upper beams. Remove the outer rims (Fig.62), and aim each lamp in turn by using the adjusting screws. The light spots must be centred as shown in Fig.63.

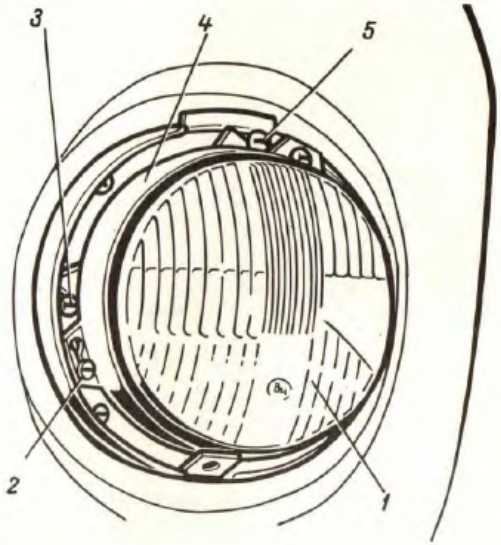


Fig. 62. Headlamp:
1 - light unit; 2 - rim screw; 3 and 5 - adjusting screws; 4 - rim

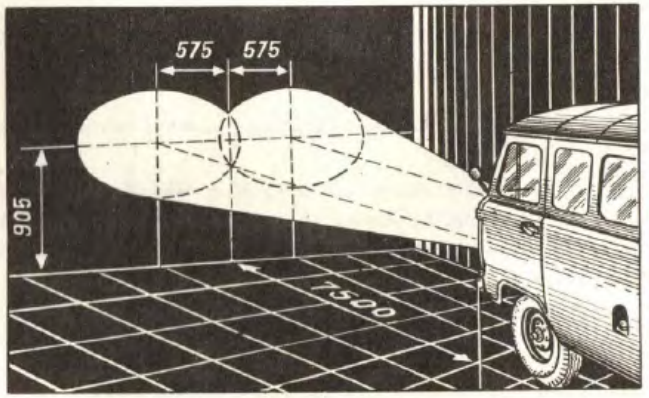


Fig. 63. Upper Beam Aiming Screen

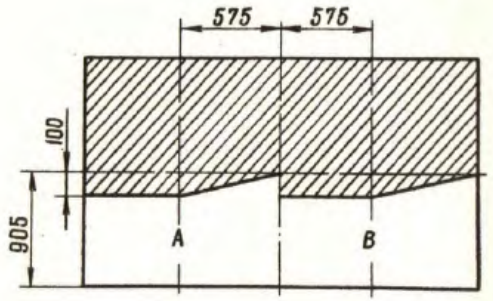


Fig. 64. Aiming Screen for Asymmetric Headlamps:
A - left headlamp; B - right headlamp

In the case of asymmetric light units, place the vehicle (unladen) 10 m from the screen (Fig.64) and switch on the lower beam.

To replace a bulb, remove the rim, loosen three screws and take out the light unit.

Although the light units are properly sealed, dust accumulation may dim the lights in time. To remove dust, wash the light unit with clean water, using a cotton wad, and then allow it to dry at room temperature.

To replace two-filament bulb 1 (Fig.65) in a sidelamp, take out the two screws securing rim 4 and remove lens 3.

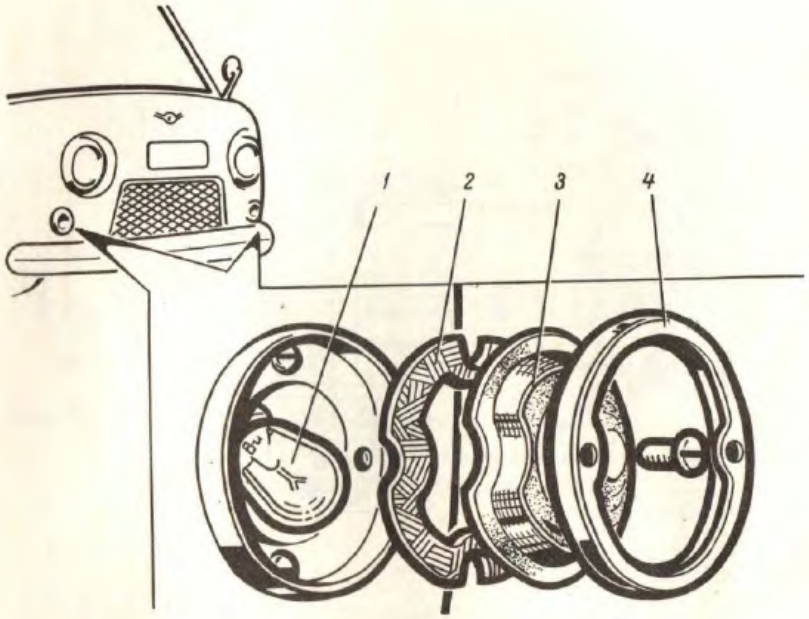


Fig. 65. Sidelamp:
1 - two-filament bulb; 2 - rubber seal; 3 - lens; 4 - rim

Starter

The starter is solenoid operated. The starter wiring diagram is shown in Fig.66.

The starter is controlled by the ignition switch. Turning the key energizes the starter relay, the latter putting the solenoid in operation.

Do not operate the starter for more than 5 sec and always wait 10-15 sec after each starting attempt. Not more than three attempts should be made in succession.

The starter operation should be timed with respect to the position of the drive pinion. To make this adjustment, the starter must be removed.

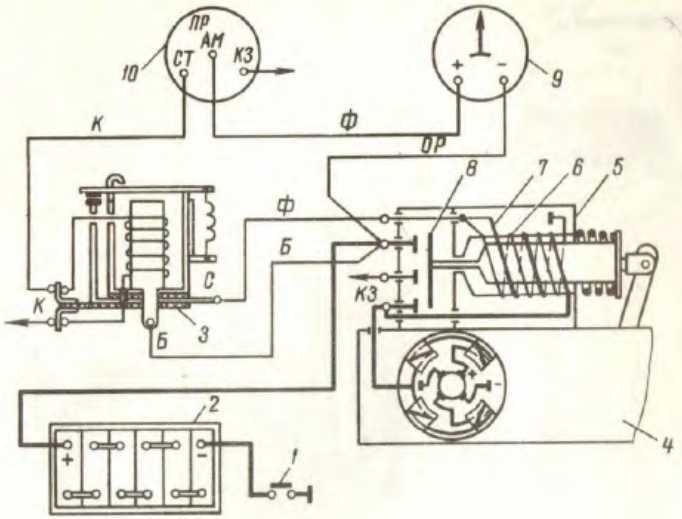


Fig. 66. Starter Wiring Diagram:
1 - earth switch; 2 - storage battery; 3 - starter relay; 4 - starter; 5 - solenoid; 6 - holding winding; 7 - pulling winding; 8 - contact disk; 9 - ammeter; 10 - ignition switch

With the starter switched off, the pinion must not be more than 34 mm away from the joint face of the starter flange (Fig.67).

Check the complete stroke of the pinion with the solenoid in circuit. The distance between the pinion and thrust ring must not exceed 4±1 mm. This clearance should be adjusted by turning the shift lever eccentric pin. After the adjustment is made, tighten the pin nut.

Before removing the starter for maintenance, open the battery earth switch.

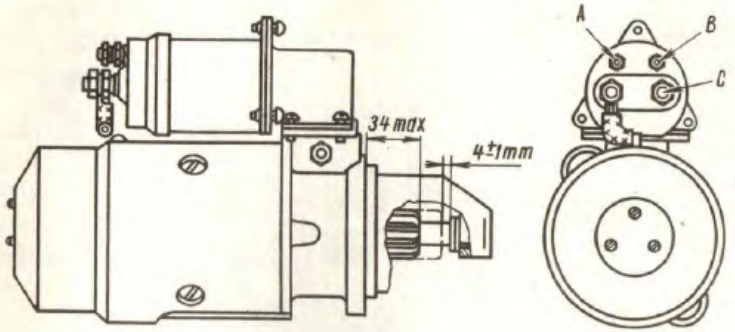


Fig.67. Starter Pinion in Disengaged Position
A - solenoid winding output terminal; B - coil wire terminal; C - battery wire terminal

Instruments

1. To provide against shorting when removing the transmitters of the engine temperature, oil pressure or fuel level, insulate the ends of the wires or open the battery earth switch.

The oil pressure transmitter must be installed with the "ВЕРХ" (TOP) mark up. The angle with the vertical must not exceed 30°.

2. If the fuel level transmitter housing has been removed for some reason (washing the tank, transmitter repairs, etc.), measures must be taken when reinstalling the housing to ensure that the tank is leaktight.

3. Always keep the engine coolant supply sufficient to cover the tubes in the radiator top tank, otherwise the overheat switch may be damaged.

4. Lubricate the speedometer cable (from the gearbox) with ЦИАТИМ-201 grease. For the purpose remove the cable from the vehicle, draw the core out of the cable and wash both in clean petrol. Also lubricate the speedometer with vaseline oil through the hole in the shaft end plug.

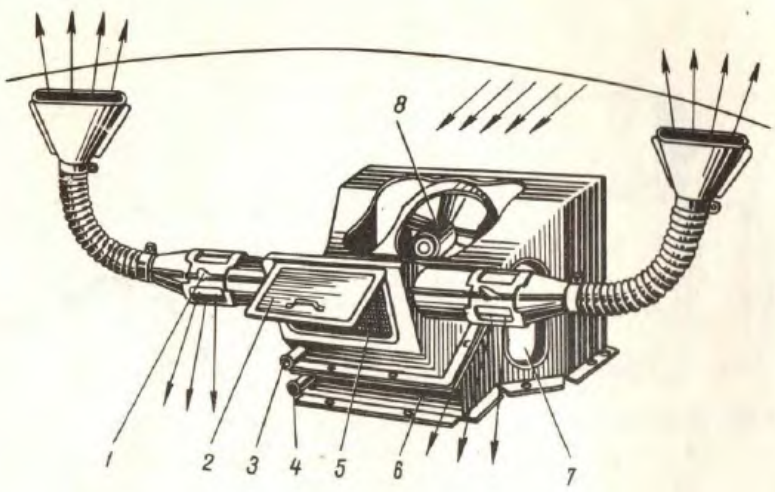


Fig. 68. Cab Heater/Demister:
1 - gate; 2 - cover; 3 - radiator outlet pipe; 4 - radiator inlet pipe; 5 - heater radiator; 6 - case; 7 - vent; 8 - fan

HEATING AND VENTILATION

The heat for the cab and windscreen is supplied by a radiator connected to the engine cooling system in parallel with the engine radiator. The heater/demister unit is shown in Fig.68.

Hot water passes through the valve and piping into inlet pipe 4. On passing through the radiator, the water returns to the water pump through outlet pipe 3 and the piping.

Heater radiator 5 is installed in case 6. Fresh air is drawn by fan 8 mounted in the air intake. On picking up heat from the radiator the air passes into the case upper part and from there is ducted into the cab and to the windscreen.

The hot air supply is proportioned by means of gates 1 (gates up for demist only, gates down for demist and heating). Air boost is controlled by the fan switch located on the fascia.

For normal operation of the heater the temperature of the water in the engine cooling system should be at least 80°C. At lower water temperature the heater works poorly and, therefore, water temperature should be watched and regulated by closing the engine radiator shutter.

When starting from cold in low air temperatures, before filling the cooling system close the heater valve on the cylinder head in order to prevent cold water from getting into the heater radiator and freezing there. Open the valve only after the engine has been warmed up. After the valve is opened, part of the water leaves the cooling system for the heater and the cooling system must be topped up.

When draining the cooling system, keep the heater valve open, otherwise water will remain in the heater radiator.

Fresh air for ventilation is admitted into the cab through the front intake, two openings in the ventilation duct, swivelling glasses and drop windows.

In the ambulance and bus versions, the rear compartment is provided with a separate heater of the same construction as described above. Fresh air is drawn by the heater fan through louvers in the right side panel, picks up heat from the heater radiator and passes into the rear compartment. The heater switch is located in the rear compartment on the right side of the partition wall.

The ambulance compartment of the YA3-452A vehicle and the saloon of the YA3-452B bus are provided with swivelling ventilating glasses in the side windows. The cargo compartment of the YA3-452 van and YA3-45IM vehicle is ventilated through louvers in the side panels.

Sockets are also provided in the cab, ambulance compartment and bus saloon for use of ancillary fans (optional).

AMBULANCE EQUIPMENT

The ambulance compartment of the YA3-452A has provision for accommodating the following equipment:

	Qnty
1. Stretchers	4
2. Attendant's case	1

	Qnty
3. Oxygen inhaler KM-3M in case	1
4. Feeding cup in case	1
5. Drinking water pot	1
6. Urinal	1
7. Bedpan	1
8. Wire splints	2
9. Deterichs splints	2

The following stretcher mountings are provided: four folding brackets on each side wall, holders on the ceiling, strap clamps on the floor.

There are three folding two-person seats for sitting patients (two seats on the left side, one seat on the right side). Handhold straps are attached to the ceiling opposite each seat.

A folding attendant's seat is mounted on the partition wall. Also attached to this wall are hooks for an attendant's case, inhaler case and feeding cup case.

Located on the floor, on the left side behind the ambulance compartment, is a chest with three sections for stowage of a bedpan, urinal and stretcher straps.

Splints are attached to the side wall with two straps.

To facilitate moving stretchers, ways are fitted in the floor.

Ambulance Accommodation

The YA3-452A ambulance can carry 6 to 8 people (plus the driver) in the following arrangements:

Arrangement One

	Persons
On folding seat	1
In cab	1
On stretchers	4

Arrangement Two

	Persons
On stretchers (one side)	2
On folding seats	5
In cab	1

Arrangement Three

	Persons
On folding seats	7
In cab	1

Before the operation the ambulance must be got ready to take patients. Take special care to ensure that the stretcher mountings are secure. Check that the brackets are attached to the walls securely and engage properly. Check the stretcher strap splices and make sure that the strap loops are in place. Check the attachment of the holders on the ceiling and clamps on the floor. After the checkover is completed, attach the stretcher straps (Fig.69).

To carry only sitting cases (Arrangement Three), remove all the stretchers and fold down the side seats. Strap up the stretchers in pairs and place along the rear compartment under the seats. Remove the stretcher straps, roll them up and place in the stowage chest.

Check the security of the seats, handholds and rear step.

Fig. 69. Attaching Stretcher Strap

Stretcher Installation

First install the upper stretchers and then the lower ones. Place the ends of one stretcher rod on the brackets and the ends of other rod in the straps suspended from the ceiling. Engage the brackets and tighten with the straps with the loops (Fig.70).

On installing the lower stretchers, secure the free ends of the straps in the floor clamps.

Drive carefully when carrying patients. Move off gently and avoid abrupt braking.

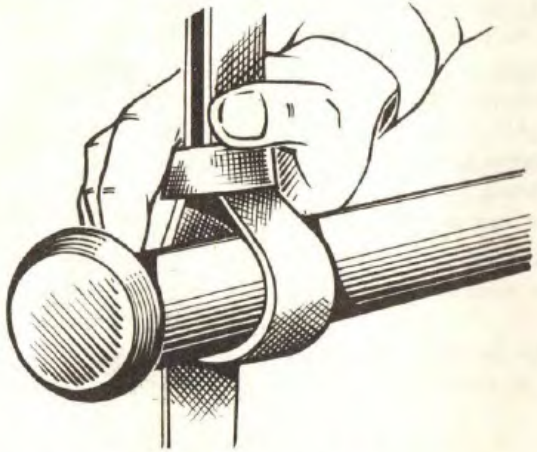


Fig. 70. Tightening Strap on Stretcher

ENGINE HEATER

The УАЗ-452 and its versions have provision for fitting an engine heater to facilitate engine starting in low temperatures (below -15°C) by warming the engine coolant (water or antifreeze) and crankcase oil.

The heater burns the same grade of petrol as the engine. The construction of the engine heater is shown in Fig.71.

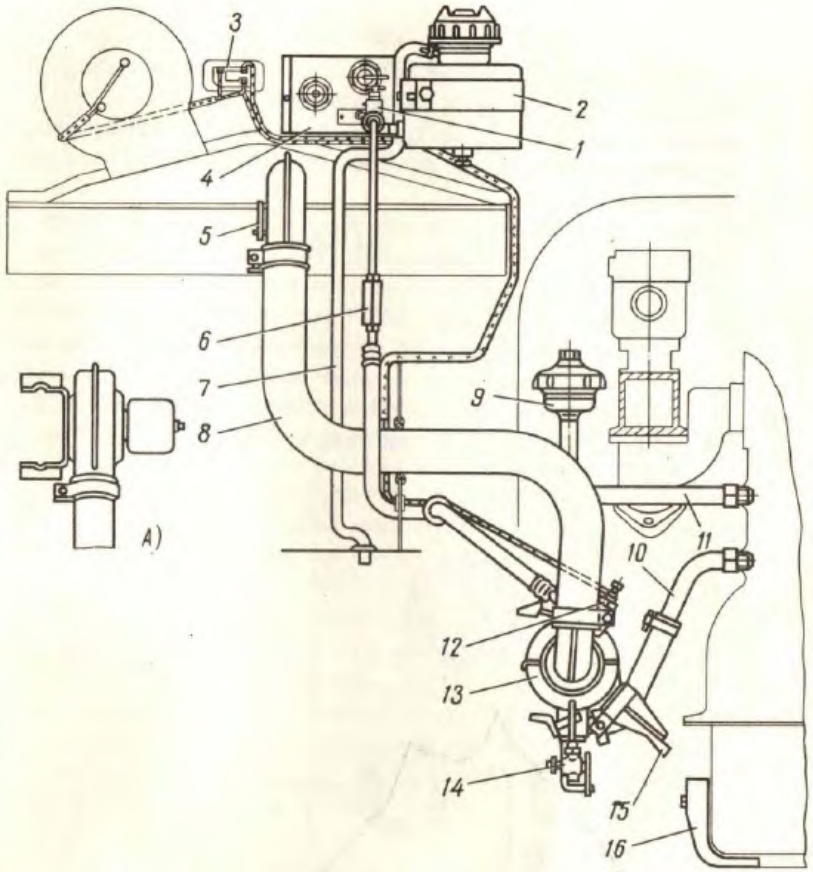


Fig. 71. Engine Heater:
1 - shutoff valve; 2 - fuel reservoir; 3 - motor switch; 4 - control panel; 5 - air flap (not on models УАЗ-452Д, УАЗ-452); 6 - jet; 7 - drain pipe; 8 - boiler air feed hose; 9 - water filler; 10 - boiler hot water outlet pipe; 11 - boiler cold water inlet pipe; 12 - igniter plug; 13 - boiler; 14 - drain cock; 15 - nozzle; 16 - pan
A - hose with motor УАЗ-452, УАЗ-452Д;

Engine Heater Operation

Fuel flows by gravity through jet 6 into the boiler combustor where it mixes with air delivered by the heater fan.

The mixture is kindled by an igniter plug which remains energized until steady combustion takes place. Further burning is effected by self-ignition.

Passing in a swirl motion through the boiler flues, hot gases give off heat to the coolant which comes from the engine into the heater jacket and the heater nozzle directs the gases into the pan to heat the oil in the engine sump. The liquid heated in the boiler circulates by a thermo-siphon effect in the closed circuit: boiler - outlet connection - cylinder block - inlet connection - boiler.

The operation of the boiler is controlled by shutoff valve 1, air flap 5, fan switch 2 (Fig.72) and igniter plug switch 3. The

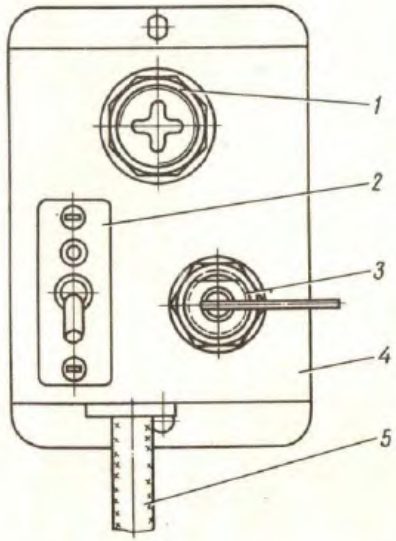


Fig. 72. Engine Heater Control Panel:
1 - tell-tale coil; 2 - switch; 3 - switch; 4 - panel;
5 - wire assembly

fan and igniter plug switches are located on the control panel mounted on the cab wall. The control panel also includes a tell-tale coil connected in series with the plug circuit. The spiral gives a visual indication of the plug operation. The engine heater circuit is shown in the vehicle wiring diagram.

Caution

Careless or improper handling of the engine heater may result in a fire. Before using the heater, thoroughly study its construction and operating instructions. Do not leave the vehicle unattended while the heater is operating.

To avoid the danger of carbon monoxide poisoning, do NOT operate the heater in poorly ventilated enclosures. Keep the fuel valve open only while the boiler is operating. In summer the heater fuel reservoir must be kept empty.

Keep the heater in good working order and see that both the heater and engine are clean. Remember that oil and fuel leaks may cause a fire.

To avoid burning-out of the boiler, fill it with 3 litres of water immediately after setting the heater in operation.

If antifreeze is used, the initial priming of the cooling system should be done by first pouring a portion of the antifreeze into the boiler filler and then pouring the remaining antifreeze into the engine radiator. If this requirement is neglected, the burner jacket may become air-bound and, consequently, burnt-out.

Heater-Assisted Starting

1. Have ready 10 litres of water and another 3 litres of water in a small container.
2. Remove the radiator filler cap and the heater filler cap.
3. Close the radiator shutter.
4. Open heater air flap 5 (Fig.71).
5. Check the fuel supply in the reservoir and top up, if necessary.
6. Close the earth switch.
7. Set switch 2 (Fig. 72) to high fan speed for 15-20 sec.

This will blow out the combustor and flues to exclude the possibility of petrol vapour explosion.

8. Stop the fan and switch on the igniter plug. Hold the switch closed 15-20 sec for the plug to get heated as indicated by the glow of the tell-tale coil on the control panel.

9. Back off fuel valve 1 (Fig.71) by two turns, wait 3-5 sec and set switch 2 (Fig.72) to low fan speed. If the fan fails to run at low speed (this may happen at air temperatures of -30°C and below), switch over to high speed at intervals of 2-5 sec.

10. Immediately the combustor pops firing, set the fan to high speed, when steady combustion humming should be heard in the boiler. After the heater operation becomes steady, switch off the igniter plug and immediately pour into the filler the prepared supply of 3 litres of water.

If the first attempt at firing the heater fails, shut off fuel immediately, blow out the combustor and flues as described above and repeat Items 1 to 10.

11. When the temperature of the water in the engine reaches approximately 50°C, crank the engine a few times by hand, with the clutch disengaged. If the engine is ready for starting, it will crank readily against compression

12. Start the engine as follows:

- Prime the carburettor with the hand lever.
- Pull the choke knob all the way out.
- Press the clutch pedal fully down.
- Switch on the ignition.
- Switch on the starter. The starter must be operated for not more than 5 sec, pausing at least 10-15 sec before re-engaging. Not more than three starting attempts should be made at a time.

If the battery is low and the starter cranks the engine sluggishly, crank the engine by hand.

- As soon as the engine starts firing, pushing the choke knob 1/4 to 1/2 of its travel to where the engine runs steadily and at the same time depress the accelerator pedal. Warm the engine without revving up, progressively pushing in the choke knob.
- Run the engine within the medium rpm to bring its temperature to 60°C. Do NOT attempt to quicken the warm-up by revving up the engine.

13. After the engine is started, refill the cooling system to the proper level.

14. Shut off the heater fuel valve and after the boiler ceases humming switch off the fan. Do NOT fail to follow this procedure faithfully to avoid backfiring and burning of the air inlet hose.

15. Close the heater air flap (this will starve the heater of air).

16. Top up the heater fuel reservoir.

The heating rate in freezing weather is approximately 2°C per minute.

To drain the cooling system of the vehicle fitted with the engine preheater, open two drain cocks (one on the radiator bottom tank, the other on the heater boiler). To ensure complete draining and no risk of freezing, also remove the radiator and heater filler caps. After draining, start the cap two turns on the heater filler so that it can be readily removed for the next heater operation.

If antifreeze, grade "40" or "65", is used, its amount should be less than the water capacity by 5-6 or 7-8 percent respectively since antifreeze expands with heat more than water. The starting procedure with antifreeze is the same as with water, but antifreeze will take a little more time to heat.

Engine Heater Maintenance

Preparatory to winter operation:

1. Remove the boiler, clean it of dirt, flush the jackets, clean out the drain pipe, blow out the flues with compressed air.

2. Remove the fuel reservoir, valve and filter assembly and coupling and jet assembly. Wash them in kerosene or petrol and blow out with compressed air.

3. Remove the heater filler cap and clean the thread.

4. Remove dirt from the nozzle, its extension and pan.

5. Every 2000 km inspect the fuel reservoir drain pipe and clean it out if necessary.

6. Reinstall all the heater components.

Preparatory to summer operation remove the filler cap, lubricate with Solidol grease and reinstall. This will prevent the cap thread from sticking in summer.

PERIODIC ATTENTION

To keep the vehicle in good working order and prolong its life, the following periodic services should be carried out:

Daily.
After running-in.
Every 2000, 4000, 8000 and 16000 km.
Seasonally.

Daily

Before the day's run:

1. Check level of fuel, water and engine oil. Inspect tyres.
2. Examine vehicle for fuel, water, oil and brake fluid leaks. Look for signs of leaks on the floor under the vehicle.
3. Check the operation of the steering, brakes, lighting, screenwiper and signalling equipment.
4. In very dusty conditions, wash air cleaner and change oil.

For services after the running-in period see "Running In".

Every 2000 km

1. Check condition and tension of fan belt.
2. Check level of electrolyte and security of battery terminal connections.
3. Carry out the 2000 km service prescribed in the Lubrication Chart.

Every 4000 km

1. Perform the 2000 km service.
2. Wash crankcase breather filter and dip it in oil.
3. Check engine, manifolds, exhaust pipe, generator bracket and generator for secure attachment.
4. Check free travel of clutch and brake pedals.
5. Check steering connections. Check steering wheel play.
6. Check brake system connections for condition and leaks.
7. Carry out the 4000 km service prescribed in the Lubrication Chart.

8. Make road test for operation of brakes, steering, lighting and signalling equipment and instruments.

Every 8000 km

1. Perform the 4000 km service.
2. Check cooling system connections for leaks. Check condition of waterp pump.
3. Remove and wash fine fuel filter. Blow out filter element with dry compressed air.
4. Check fuel line connections for leaks. Drain sediment from fuel tanks. Wash coarse fuel filter element.
5. Inspect propeller shafts.
6. Check final drive pinion and crown wheel bearings for play.
7. Check king pins and wheel bearings for play.
8. Check security of axle shaft flanges, hub drive flanges, steering linkage ball pin nut cotters, spring U-bolts, spring bolts, shick absorbers and all fastenings.
9. Examine axles for alignment. Check condition of frame.
10. Remove brake drums. Clean brakes, inspect linings and check security of brake anchor plates. Check foot and hand brakes for operation.
11. Check security of pitman arm and steering gear housing.
12. Clean spark plugs and check spark gap.
13. Check breaker point gap.
14. Check headlamp aiming and performance of direction indicators.
15. Check state of battery charge.
16. Carry out the 8000 km service prescribed in the Lubrication Chart.
17. Make road test for operation of brakes, steering, lighting and signalling equipment.

Every 16000 km

1. Check cylinder compression.
2. Check operation of engine valves. Grind in valves, if necessary. Adjust valve clearance.
3. Remove deposits from crankcase breathing passage and pipe.
4. Check radiator cap valves for operation. Check radiator for secure mounting.

5. Remove and clean carburettor. Check float level and carburettor performance. Adjust carburettor idling setting.

6. Tighten propeller shaft flange nuts.

7. Check gearbox and transfer case for secure mounting.

8. Blow out axle, gearbox and transfer case breathers.

9. Check front wheel alignment. Adjust, if necessary.

10. Remove, disassemble and wash brake master and wheel cylinders. Clean brakes. Adjust foot and hand brakes.

11. Inspect distributor. Check performance of centrifugal and vacuum timing controls. Check braker point gap and ignition timing.

12. Check performance of generator regulator and ignition coil.

13. Inspect brushes and commutator of generator and starter.

14. Lubricate speedometer cable

15. Carry out the 16000 km service prescribed in the Lubrication Chart.

16. Make road test for operation of brakes, steering, lighting and signalling equipment.

Seasonal Service

(to be carried out once a year along with coincident periodic service)

1. Remove starter. Inspect brushes and commutator and blow out with compressed air. At assembly lubricate bearings and journals with engine oil.

2. Remove and disassemble fuel pump. Clean and inspect pump parts. On reassembling, make bench test.

3. Remove handbrake drum and check linings for wear. Remove, disassemble, wash and lubricate expander and adjuster mechanisms.

4. Remove shock absorbers. Screw out valve plugs, withdraw valves and wash them with petrol. Allow parts to dry before reassembling.

5. Flush out cooling system to remove svale and deposits.

6. Preparatory to summer operation set the menifold heat valve in the summer position. Preparatory to winter operation set the valve in the winter position.

7. Change oil in the vehicle units for the grades suitable to the oncoming season.

Lubrication

Timely and careful lubrication is of utmost importance for the life and performance of the vehicle.

The lubrication points of the chassis and engine are indicated in Fig.73. Lubrication should be carried out during the periodic service. The lubrication periods are marked "+" in the chart.

Observe the following lubrication requirements:

1. Before lubricating, thoroughly wipe dirt off the fittings and plugs.

2. After lubricating, remove all excess lubricant from the parts.

3. Change oil while it is hot.

4. If the oil in the crankcase, transfer case or axles is very dirty or contains metal particles, flush the case before refilling.

Lubricants and Fluids for УАЗ-452 and УАЗ-45IM Vehicles

Description	SAE Equivalent				
	Summer			Winter	
	above 30°C	0°C to 30°C	0°C to -10°	-10°C to -30°C	below -30°C
1	2	3	4	5	6
All seasons: automobile oil АС-8 (М8Б), GOST 10541-63 or Summer (above 5°C): automobile oil АС-10 (МIОБ), GOST10541-63 Winter (below 5°C): automobile oil АС-6 (М6Б) GOST 10541-63	SAE 40 or 20W-40	SAE 30 or 10W-30	SAE 20 or 10W-30	SAE 10W	SAE 5W or 5W-20
Automobile transmission oil ТАп-I5В; МРТУ 38-1-185-65 or ТАп-I5, GOST 8412-57 Winter (below 25°C): automobile transmission oil ТАп-IО, GOST 8412-57	SAE 140	SAE 90		SAE 80	
Press-solidol "С" or solidol "С" (automobile grease УСс), GOST 4366-64	Chassis grease or multipurpose grease				
Automobile grease ЯНЗ-2, GOST 9432-60 or fat grease 1-13, GOST 1631-61	Multipurpose grease				
Grease ЦИАТИМ GOST 6267-59	Multipurpose grease				

1	2	3	4	5	6
Automobile grease АМ (universal joint), GOST 5730-51, of mixture: Summer. 70% solidol УС-I or УС-2, GOST 1033-51 and 30% automobile transmission oil ТАп-I5В, МРТУ 38-1-185-55 or ТАп-I5, GOST 8412-57. Winter. 70% solidol УС-I or УС-2, GOST 1033-51 and 30% automobile transmission oil ТАп-IО, GOST 8412-57	Multipurpose grease				
Graphite grease (УСсА)GOST 3333-55 or mixture: 30% solidol; 30% graphite and 40% automobile transmission oil	Graphite grease				
Spindle oil АУ, GOST 1642-50 or mixture: 60% transformer oil, GOST 982-68 and 40% turbine oil 22, GOST 32-53	Shock absorber oil				
Petrolatum, GOST 782-59	Petrolatum				
Brake fluid БСК ТУ МХП 1608-47	Hydraulic brake fluid SAE-70R1				

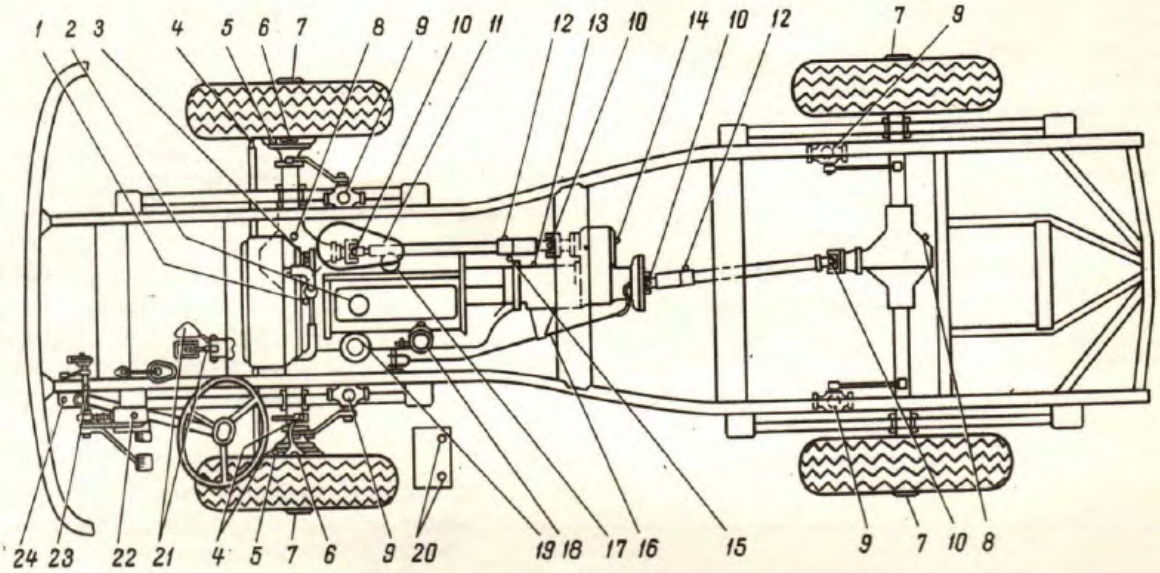
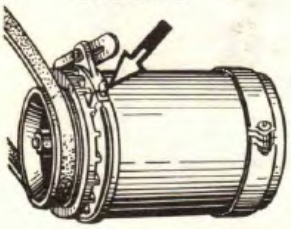
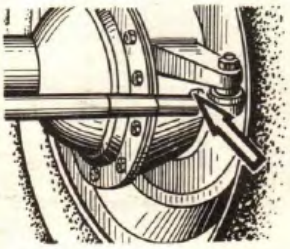


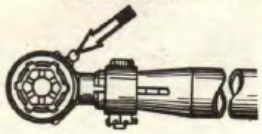
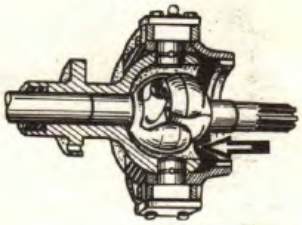
Fig. 73. Lubrication Chart

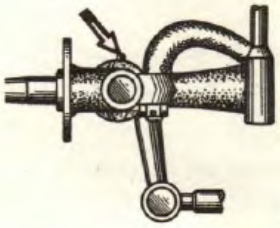
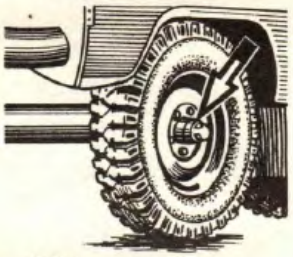
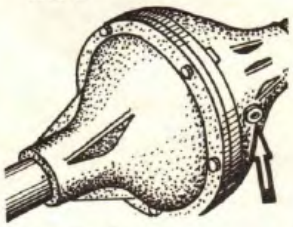
Lubrication Chart

Ref.No. in Fig.73	Where Lubricated	No.of Points	Lubricant	Lubrication Period, km				Instructions
				2000	4000	8000	16000	
1	2	3	4	5	6	7	8	9
1	Water pump bearings	1	Automobile grease ЯНЗ-2 or fat grease 1-13	+				Apply gun until grease shows from vent. Wipe off excess

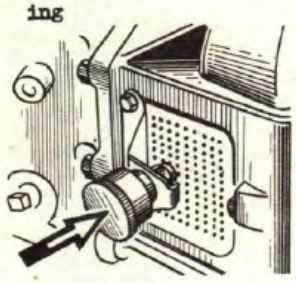
2	Engine crankcase	1	<u>All seasons</u>. Automobile oil AC-8 (M8Б) or <u>Summer</u>. Automobile oil AC-10 (MIOБ) <u>Winter</u>. Automobile oil AC-6 (M6Б)		+			Check level daily. Top up to dipstick upper mark. Change.

1	2	3	4	5	6	7	8	9
3	Generator 	1	Grease No.158					Disassemble generator. Wash bearings in petrol and repack every 75000 km. In subtropical and tropical climates repack every 35000 km
4	Steering connections							
IC2	(a) УАЗ-452 vehicles 	4	Press-solidol "C" or solidol "C" (automobile grease УСс)	+				Apply gun until grease shows

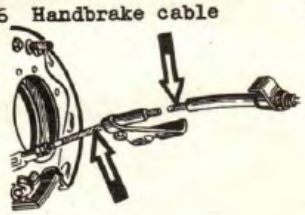
1	2	3	4	5	6	7	8	9
	(b) УАЗ-451ДМ and УАЗ-451М vehicles 	4	Press-solidol "C" or solidol "C" (automobile grease УСс)	+				Apply gun until grease shows
IO3 5	Steering universal joints (УАЗ-452 vehicles) 	2	Driving front axle grease АМ (universal joint) or <u>Summer</u>. Mixture of 70% solidol УС-I or УС-2 and 30% automobile transmission oil ТАп-15В or ТАп-15 <u>Winter</u>. Mixture of 70% solidol УС-I or УС-2 and 30% automobile transmission oil ТАп-10				+	Wash joints and pack with 500 g each

1	2	3	4	5	6	7	8	9
6	King pins (a) YA3-452 vehicles	2	Driving front axle grease AM (universal joint) or: Summer. Mixture of 70% solidol YC-I or YC-2 and 30% automobile transmission oil TAn-I5B or TAn-I5		+			Lubricate through top pin fitting
			Winter. Mixture of 70% solidol YC-I or YC-2 and 30% automobile transmission oil TAn-IO					
	(b) YA3-45IM vehicles	4	Press-solidol "C" or solidol "C" (automobile grease YCc)		+			Lubricate through fittings
								
7	Wheel bearings	4	Grease ZH3-2 or fat grease 1-13			+		Wash hubs and bearings with kerosene, pack roller cages and between races. Coat hub inside 10-15 mm thick
								
8	Axles	2	Automobile transmission oil TAn-I5B or TAn-I5 Below -25°C oil TAn-IO			+		Change
								
9	Shock absorbers	4	Spindle oil AY or mixture of 60% transformer oil and 40% turbine oil 22			+		Top up to filler hole
								

1	2	3	4	5	6	7	8	9
15	Clutch release bearing	1	Grease ЯНЗ-2 or fat grease 1-13	+				2-3 turns of grease gun

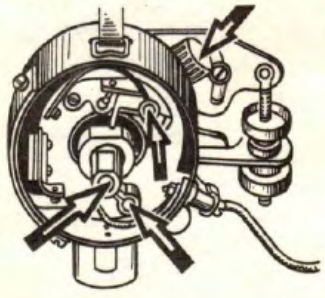


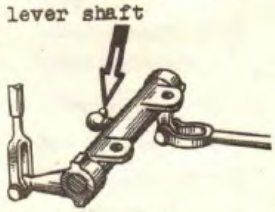
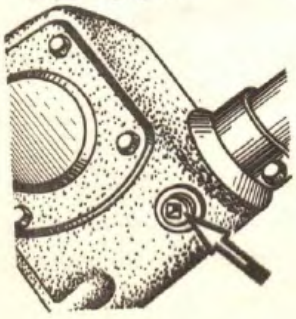
16	Handbrake cable	1	Grease ЯНЗ-2 or graphite grease УСсА				+	Coat



17	Coarse oil filter	1		+				Daily, while engine hot, work handle 15-20 strokes,
						+		Drain sediment at engine oil change.

18	Distributor							
	(a) Drive shaft	1	Grease ЦИАТИМ-201	+				Half-turn of grease cup
	(b) Breaker arm post	1	Engine oil	+				1-2 drops
	(c) Cam wick	1	Engine oil			+		1-2 drops
	(d) Cam sleeve	1	Engine oil			+		4-5 drops (remove rotor and seal)



1	2	3	4	5	6	7	8	9
19	Fine oil filter 	1			+			Drain sediment and change filter element at engine oil change
20	Storage battery 	1	Petrolatum	+				Coat terminals
					+			Remove oxides and coat non-contacting terminal surfaces and cell connectors
21	Gearchange mechanism 	3	Press-solidol "C" or solidol "C" (automobile (grease УСс)	+				Lubricate through fittings
22	Brake master cylinder 	1	Brake fluid БСК Below -28°C dilute with alcohol 1:1	+				Check level. Top up to 15-20 mm below filler hole edge
							+	Change
23	Clutch intermediate lever shaft 	1	Press-solidol "C" or solidol "C" (automobile grease УСс)	+				Lubricate through fitting
24	Steering gear 	1	Automobile transmission oil ТАп-15В or ТАп-15 Below -25°C oil ТАп-10				+	Change

1	2	3	4	5	6	7	8	9
			Body Parts					
	Door hinges		Press-solidol "C" or solidol "C" (automobile grease УСс)					Lubricate through fittings when necessary
	Door locks		Grease ЦИАТИМ-201			+		Lubricate
	Door lock bolts, seats and latches		Graphite grease УСсА			+		Lubricate
	Door rubber seals and blocks		Graphite powder			+		Apply
	Screenwiper joints		Grease ЦИАТИМ-201			+		Lubricate
	Screenwiper and heater motor bearings		Grease ЦИАТИМ-201					Apply light coat once a year