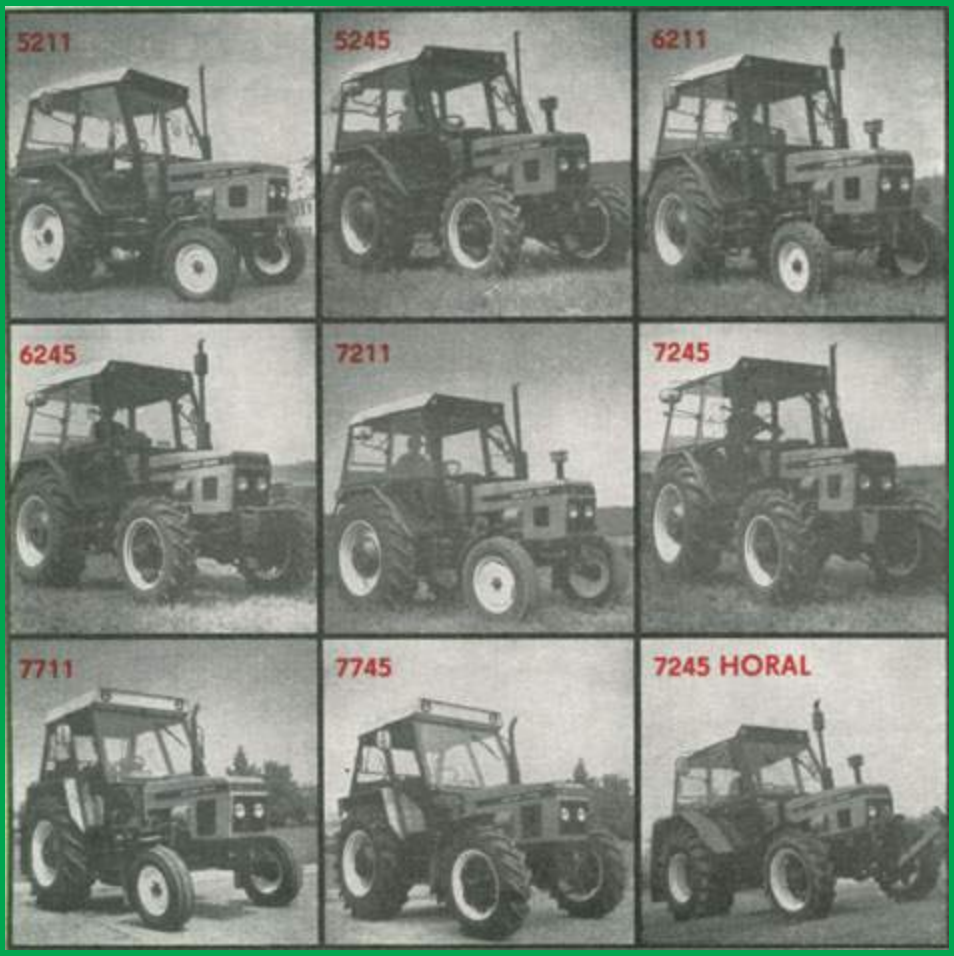


OPERATOR'S MANUAL

Zetor

2/1988

Dear User of a New Zetor Tractor

More than forty years of experience exerted by designers and other specialists from the concern Agrozet-Zetor, gained in the production and operation of tractors, have been concentrated in the products with the trade mark ZETOR.

Zetor tractors have been designed and manufactured with the aim to serve reliably to your satisfaction. We offer you this Operator's Manual to make full use of all favourable characteristics and capabilities which your tractor could give you.

In it you will find information which may prove very useful. Therefore we recommend that you read the Manual through in the order of the individual chapters, rather than search only for the sections, you are interested in at the moment.

By following the instructions given in this Manual you will obtain full warranty of the manufacturer and at the same time you will create conditions for a trouble-free operation, safe driving and long service life of the tractor.

A great many thousands of reliably accomplished engine hours wishes you the manufacturer of your tractor.

Agrozet Zetor

koncernový podnik

BRNO

CONTENTS

Tables:

Diagrams:

RESPONSIBILITY OF THE ZETOR TRACTOR USER

The user of the ZETOR tractor has to follow the recommended procedures and instructions for safe operation of the tractor. The user is also responsible for carrying out the specified procedures for tractor maintenance, checking its proper operation and ensuring to repair in due course all defects which might cause excessive wear or even serious damage of the individual parts or whole assemblies.

Note:

The service cheque-book for tractors is not a part of the Operator's Manual but it is a separate pocket-book which you will obtain when buying a new tractor. At the same time you get a hand-book from the producer of the storage battery concerning the operation and attendance of the battery.

Attention:

In case of a break-down of the tractor, the owner has to ask the repairing workshop to carry out the warranty-repair, and that either personally or by a registred letter.

Fig. 1. Data plate of the tractor

SAFETY INSTRUCTIONS FOR THE ZETOR TRACTOR USER

Basic safety instructions

1. The tractor may be used only by an experienced and trained operator who has a valid autorization to drive a tractor. Tractors with attached trailers may be operated only by persons over 18 years of age.
2. The operator appointed for tractor attendance should be fully aware of appropriate operational and safety precautions.
3. The tractor driven only by rear wheels may be used on a slope with a maximum inclination of 11°. The tractor equipped with the front and the rear driven axles may be used on a slope with a maximum inclination of 12°.
4. Persons having not been appointed to operate auxiliary equipment of the tractor have to keep clear from the tractor and especially they must not stand between the tractor and the attached machine (implement).
5. Only as many persons as stated in the technical certificate may be transported on a tractor.
6. Use the running board and hand rail to enter the driver's cabin or to leave it.
7. Before the start of a drive, the tractor driver has to check among other things the technical condition of the tractor from the safety point of view, function of brakes, steering, lighting and the condition of tyres.
   Check whether the trailer has been safely coupled and secured against spontaneous uncoupling, and check the air pressure supply to the air brakes, air pressure in the air tank, electrical equipment and condition of tyres as well.
8. It is not allowed to start the tractor by running the tractor down the slope.
9. To start the engine by towing the tractor with help of another tractor or vehicle is allowed but only when using a tow bar (if a ballast weight is attached to the front of the frame, it has to be removed).
   A tractor which has been equipped on special order of the user with the electromagnetic steering lock, must have the key in the position „1" of the steering lock, if pulled by another tractor in order to start the engine. If the battery has not been connected on the tractor, it is not possible to lock the steering and the key cannot be turned, even if the engine is switched off. The key is locked in the position „1".
10. Before the tractor has been put in motion, check whether an uncalled-for person or some obstacle obstructs the way.
11. When driving the tractor, select such a gear ratio and such a speed which is appropriate to the condition of the road or field and is completely safe. It is not allowed to drive the tractor downhill without having engaged the proper gear ratio.
12. Special care has to be taken of a tractor steering if driving on a slope of a muddy, sandy, icy or uneven ground. Keep strictly the determined slope inclination when driving the tractor.

13. Never leave a slowly moving tractor in order to attach a trailer by yourself. Ensure the safety of your assistant as well.
14. If it is necessary to stop the tractor on a slope, take the following precautions: apply the parking brake, stop the engine, engage a low gear and place a block under the wheels.
15. When parking the tractor (tractor set) overnight outside the parking place or on a non lighted public road, do not forget to illuminate it with a light which can be seen both from the front and from the rear side; the light has to be positioned on the side of the tractor (tractor set) which is nearer to the centre of the road.
16. Do not park the tractor with attached implements raised. Before leaving the tractor, do not forget to remove the key from the switch-box or from the steering lock with the electromagnet, and to lock the cabin.
17. To free a „bogged-down" tractor, use a tow bar or a rope. Never use chains. It is dangerous to stand near the tow rope when the tractor is being freed.
18. Never use loose planks or bars inserted between the tractor and the pushed object when pushing other vehicles or trailers.
19. When the tractor engine is running in a closed building or room, it is necessary that there is sufficient ventilation as the exhaust gases are highly harmful for the health.
20. All tasks connected with refueling, cleaning, lubrication and adjustment of the tractor or of attached implements have to be carried out only with the engine stopped and with moving parts at rest, with the exception if checking brake function or charging the battery.
21. Refueling has to be preferably done at the end of the working day. In summer time the fuel tank must not be filled to the brim. Spilled fuel should be wiped off immediately. Do not refill the tank near an open flame and when smoking. A fire extinguisher has to be permanently at hand.
22. Use suitable (specified) personal protecting means when carrying out each task.
23. Do not wear an unbuttoned, free fluttering clothing and do not have long hair. Both could be drawn into moving parts and cause serious accident.
24. Check regularly the contents of the first-aid kit and complete agents to be able to treat small injuries and give first aid.
25. A hitch is attached at the front axle chassis pan which may be used to tow the tractor without a trailer or without any other auxiliary equipment only.
26. Check the electric cable when warming-up the engine with help of a coolant heater. Plug the cable into the heater first and then connect the cable to the mains. When the warming-up has been finished, disconnect the cable from the mains first and then the plug from the heater socket.

WARNING: Danger of electrical accident.

27. Operator who is under the influence of alcohol must neither drive the tractor nor attend agricultural machines.
28. The speed of a tractor-trailer set (saddle trailer) equipped with single-hose air-brakes must not exceed 25 km/h (30 km/h).
29. Tractors of all types supplied to the Czechoslovakia are equipped with a spark arrester as a standard outfit; this arrester is not fitted to the tractor but is freely placed as an accessory of the tractor. The tractor user has to fit the spark arrester to the end of the exhaust silencer when the tractor operates in an environment with inflamable materials (straw, hay). The exhaust system of the tractor equipped with a spark arrester is in compliance with the requirements of the Czechoslovak Standard ČSN 47 0060, article 1.7. Since the upper part of the spark arrester is the highest point of the tractor, it is necessary to take care when driving under low structures, in order not to damage or even to break off the complete exhaust system. When the spark arrester is not fitted to the tractor, it has to be stored so that particles of dust, sand, straw etc. cannot fall into the inner part. This type of exhaust may be fitted to tractors exported to foreign countries even without the spark arrester.

CAUTION!

Do not forget to attach the exhaust flap to the top of the spark arrester (Figure 2).

CAUTION!

Figure 2

30. Validity for the export only.

    According to the customer's wishes the tractors may be equipped with an exhaust system having the built-in spark arrester. This spark arrester has no influence upon any of the engine parameters (Figure 3). The outlet of the muffler has been designed so that water cannot penetrate inside and exhaust gases cannot be sucked in by the heater fan or by the cabin ventilator. It is not necessary to do any checking or maintenance of the muffler with the built-in spark arrester during the tractor performance.

31. Tractors are not equipped with special filters for the air sucked into the cabin. For this reason they are not suitable to be used for tasks with aerosols and other materials harmful for the health.

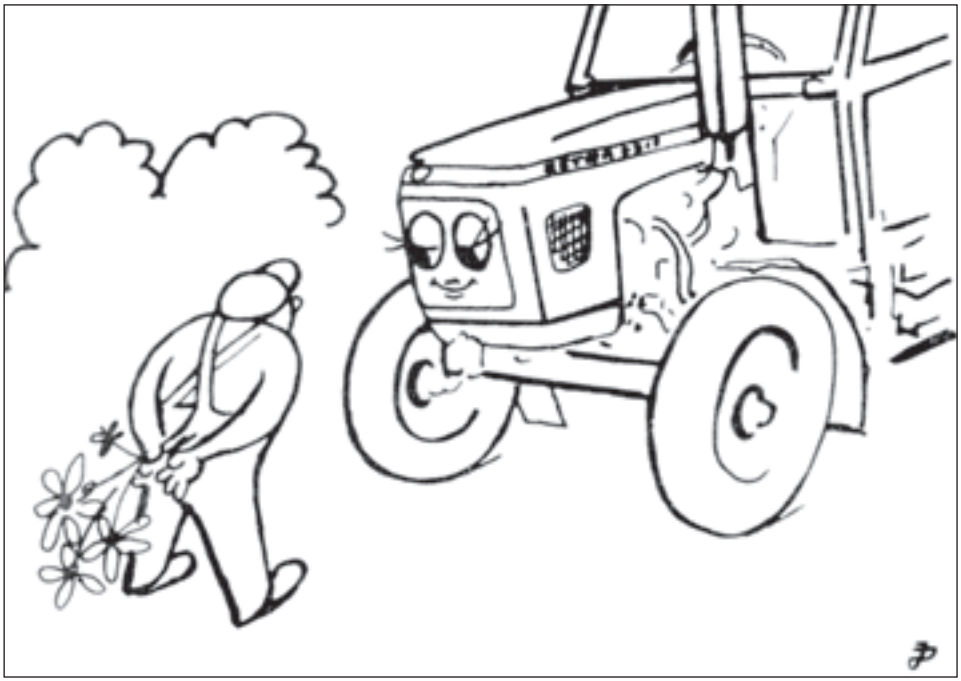
32. Special safety instruction, valid only for tractors ZETOR 7245 HORAL, are given in a separate chapter of this Manual, page 210.

By keeping up the basic safety instructions, you will create good conditions for reliable operation of the Zetor tractor.

Figure 3

Health safeguards when handling oil products

Kerosene, diesel oil, mineral oil and other oil products used during tractor operation and maintenance can cause skin disease by direct contact with the skin, they have irritant effect on mucous membrane and eyes, on digestive organs and upper respiratory organs. Some oil products, when inhaled as vapour or taken internally, can be fatal and cause even total poisoning. Operators who come in touch with oil products have to keep strictly the safety and hygienic safeguards, use suitable protective clothing and work in well ventilated rooms. When they had finished their work or before a meal, it is essential to wash hands with a non-irritant washing agent and apply a suitable regenerating ointment or cream to hands.



ACQUAINTANCE WITH THE TRACTOR

Zetor tractors are of a chassis-less design and are equipped with diesel engines. The tractors Z 5211, Z 6211, Z 7211 and Z 7711 have a swinging beam front axle and the Z 5245, Z 6245, Z 7245, Z 7245 HORAL and Z 7745 have the driven front axle. The front and the rear wheel track is adjustoble.

Dashboard (Fig. 4, 5, 6, 7)

1 – Direction indicator pilot bulb (green)
2 – Air-pressure gauge
3 – Warning light module
4 – Engine-speed indicator
5 – Switch for: direction indicator, lights and horn (dipped and the main beam lights, direction indicators, light flasher and sound horn)
6 – Rear worklight switch
7 – Plugged holes for prospective fit of other pilot bulbs
8 – Steering wheel
9 – Pilot bulb of cabin lights
It indicates switching-on the asymmetrical headlights in the cabin roof (tractors with a cabin only)
10 – Headlights switch
It is fitted only on tractors equipped with the steering lock device using an electromagnet

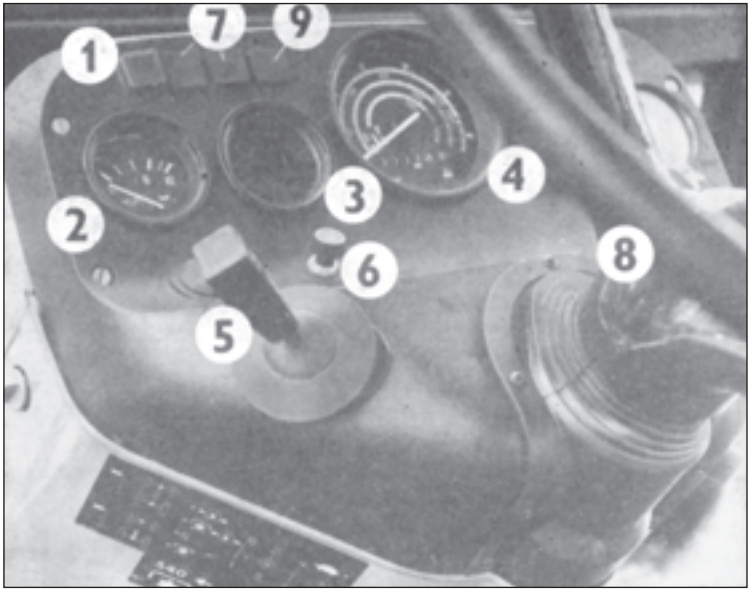


Fig. 4

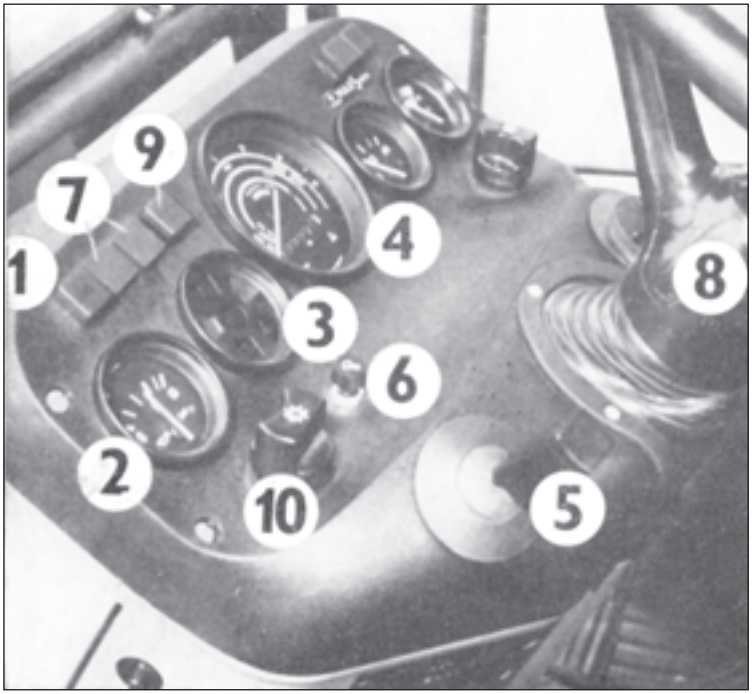


Fig. 5

11 – Fuel gauge

12 – Coolant thermometer

13 – Pilot bulb of the P.T.O.-shaft clutch (red)

14 – Switch box with the key

15 – Low-air pressure pilot bulb (red)
This pilot bulb will light up in case of a failure in the braking system or when the air pressure drops under 390 kPa

16 – Dipped light switch of asymmetric headlights located in the radiator grill or in the cabin roof

17 – Starter button

18 – Switch of the steering lock device with an electromagnet (on special order only)

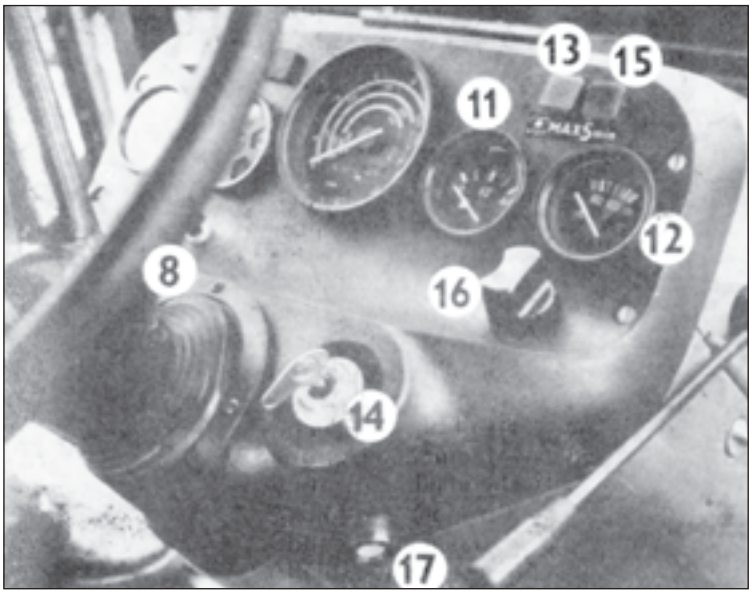


Fig. 6

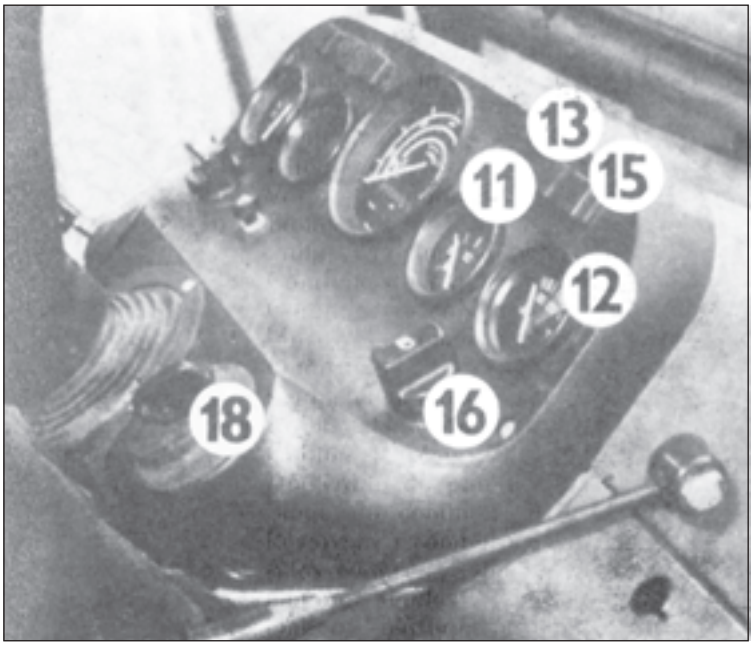


Fig. 7

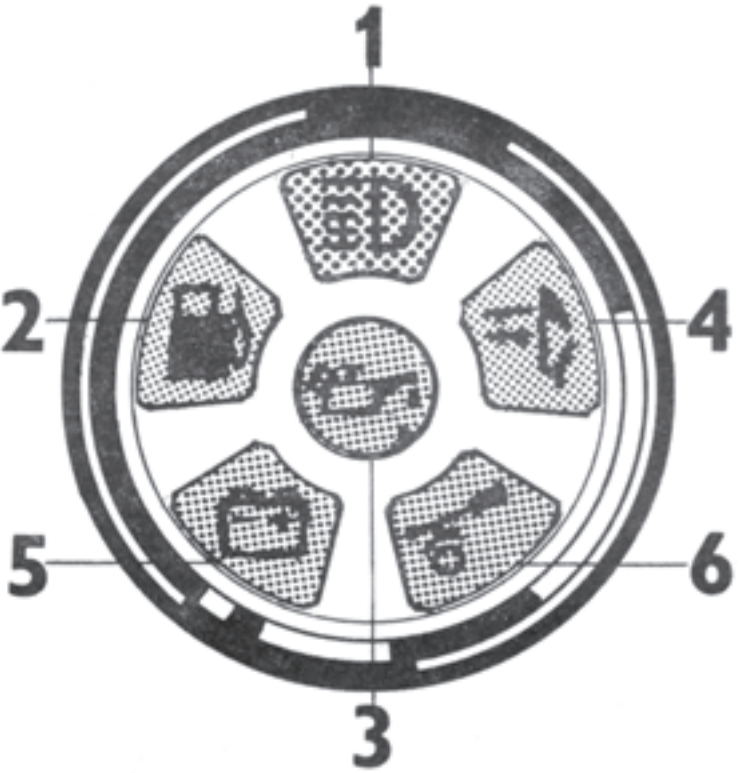


Fig. 8

Warning light module (Fig. 8)

1 — The main beam light (blue)
Is on when the headlights are switched on or when the light horn is used.

2 – – Fuel (orange)
Is on when a fuel rest of 1/6 to 1/10 of the tank capacity is left in the tank

3 · · Lubricating (red)
Is on when the oil pressure of the engine drops under 120 to 60 kPa

4 — Working light (yellow)
Is on when the rear working light is used

5 — Battery charge (red)
Is on when a failure in charging occurs

6 — Hand brake (red)
Is on when the hand-brake lever is applied

Switch positions (Fig. 9) of dipped lights of the asymmetric headlights in the radiator grill of the tractor or in the cabin roof

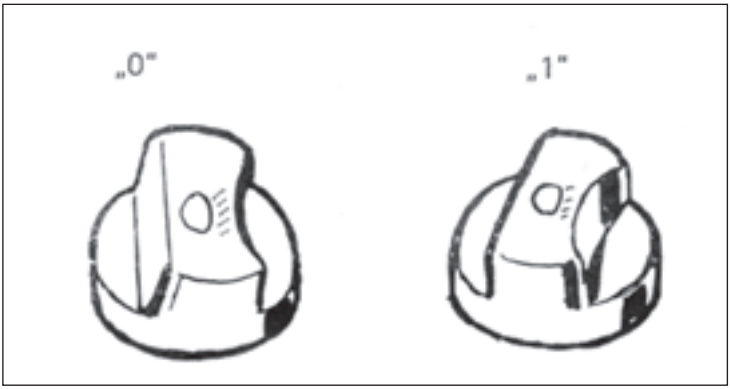


Fig. 9

Position „0" — Dipped lights in the radiator grill of the tractor are on.

Position „1" — Dipped lights in the cabin roof are on.

Note:

Dipped beam of the headlights in the cabin roof are used in cases when the headlights in the radiator grill are covered by an adapter or by a machine coupled to the tractor.

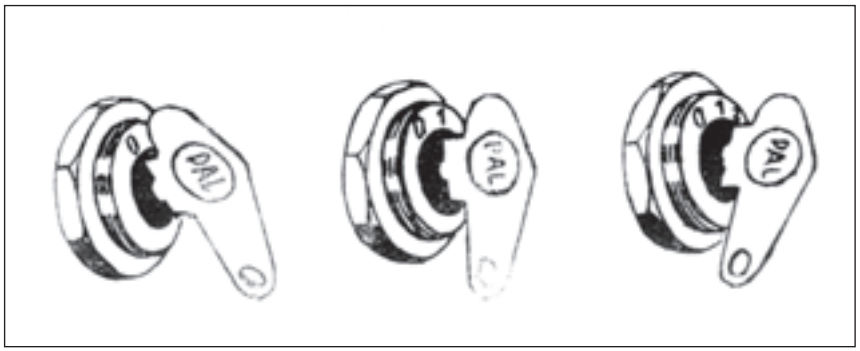


Fig. 10

Switch box with the key (Fig. 10)

When the key is not inserted in the switch box, the circuit of brake lights, the cabin lighting, the sound horn, the headlamp flasher and the switch of the P.T.O.-shaft clutch (the rear working roof-headlights — only on cabins BK 7011 from Vlad Prešov) are permanently switched on.

Electrical devices switched on when the key has been fully plugged in:

Position „0" — Circuit for engine starting, dashboard instruments, direction indicators, windscreen wiper and washer, rear screen washer, heater and ventilation fans, socket for hand light, and pilot bulb for battery charging with pilot bulb for oil pressure which extinguishes as soon as the engine is running; hand-brake pilot bulb which is on when the hand-brake lever is pulled, and the pilot bulb of the minimum air pressure.

Position „1" — Side lights and tail lights, licence plate illumination and all appliances listed in the position „0". The rear working light and its pilot bulb can be switched on by a separate switch.

Position „2" — Dipped beam headlights or the main headlights (according to the switch position of the lights), and all items listed in position „0" and „1".

If the key is inserted in the switch box in positions „1" or „2" only half-way, or if it is completely removed, all appliances will be switched on, with the exception of those mentioned under the position „0".

Warning:

If the engine is running, the key has to be fully inserted in the switch box.

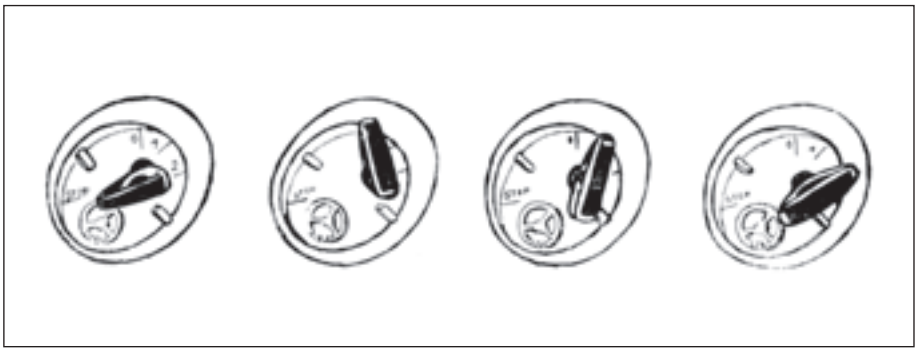


Fig. 11

Steering lock with the electromagnetic locking device (Fig. 11)

This locking device is fitted on special order of the customer and substitutes the switch box (Fig. 10). If this locking device is being attached, the starter button (Fig. 6/17) will not be fitted. Additionally the tractor headlight switch is fitted (Fig. 12).

Warning:

The steering lock with the electromagnetic locking device has to be protected against sprinkling water when carrying out attendance of the tractor.

Wiring of electrical devices (Fig. 11)

If the key is not inserted in the steering lock (the steering wheel locked), or if the key is inserted in **the STOP-position or turned to the „0" position** (the steering wheel unlocked), the following is permanently connected: circuit of brake lights, cabin lighting, sound horn, flasher, headlights, P.T.O.-shaft switch, and the rear working roof-lights in case of the cabin BK 7011 — Vlad Prešov.

Position „1" — Switched on is the following:

Instruments on the dash panel, direction indicators, windscreen wiper with the washer, the rear window wiper, heating and ventilation fans, hand light socket, pilot bulbs of battery charging and oil pressure which are switched off when the engine is running, hand-brake pilot bulb which is switched on when the hand-brake lever is pulled, the minimum air pressure pilot bulb which is switched on when the air pressure drops under 390 kPa, and the electromagnet of the steering locking device.

Position „2" — In this position all electrical devices mentioned above are switched on and additionally the starting circuit.

Note: When the engine is running, the key is locked in the position „1". The electromagnet of the steering locking device has not power supply from the fuse box.

Head light switch (Fig. 12)

This switch will be fitted only in case that the steering lock has the electromagnetic locking device.

Positions of the switch:

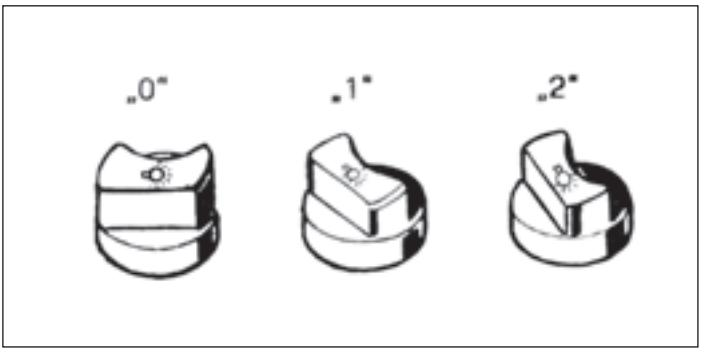


Fig. 12

Position „0" — Headlights off

Position „1" — Switched on is the following:
Parking lights and tail lights, number plate light, instrument lights. The rear working light including the pilot lamp can be switched on by means of a separate switch.

Position „2" — All devices mentioned under the position „1" are switched on and additionally the dipped lights or the main beam lights according to the position of the switch for direction indicator lamps and the light switch (Fig. 4/5).

Note: In the position „2" of the headlight switch and if the switch for direction indicator lamps (Fig. 4/5) is in its position for dipped lights, it is possible to switch on the dipped lights either in the radiator grill or in the cabin roof, according to the position of the switch for dipped lights (Fig. 9). However, the main beam lights may be switched on only in the radiator grill of the tractor, regardless of the position of the switch for dipped lights (Fig. 9).

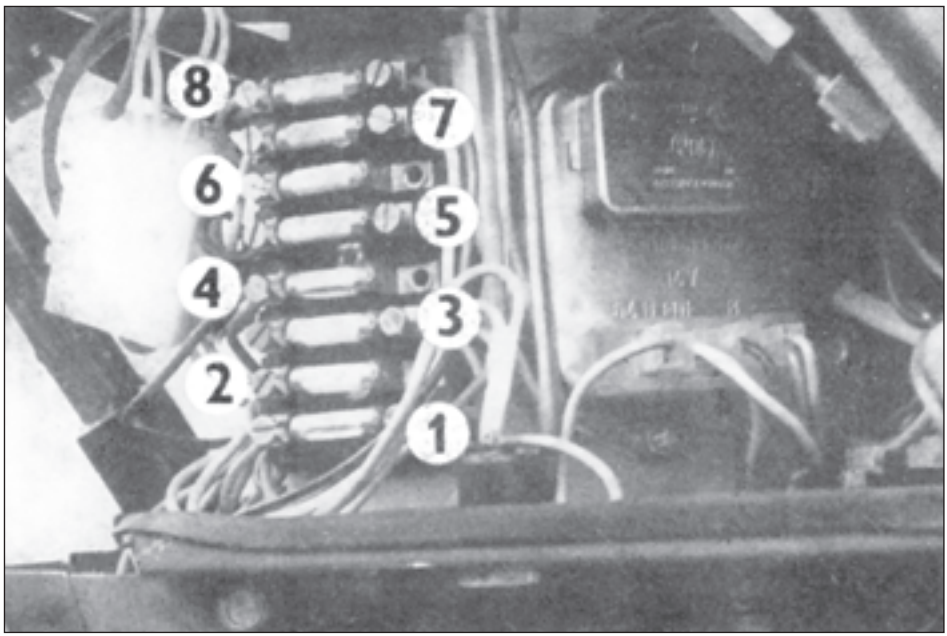
Fuse box (Fig. 13)

The fuse box is accessible after the cover, which is locked by four quick-closing devices, has been removed. The fuse box is of an eight-pole type and contains 15 ampere fuses for the devices. The tractor equipped with a safety cabin has three additional 15 ampere fuses (Fig. 14), and in case of the cabin BK 7011 from Vlad Prešov four fuses.

Wiring of fuses on the panel in the fuse box and location of the control relay and the hand-light socket (Fig. 13).

1. Brakes, sound horn and headlight flasher, P.T.O.-shaft of the clutch
2. Direction indicators
3. Hand-light socket, power supply of the instruments and pilot bulbs
4. Right-hand front and rear parking lights, illumination of instruments and the rear working light
5. Left-hand front and rear parking lights
6. Rigth-hand dipped light in the radiator grill or in the cabin roof
7. Left-hand dipped light in the radiator grill or in the cabin roof
8. The main beam lights and their pilot lamp.

Fig. 13



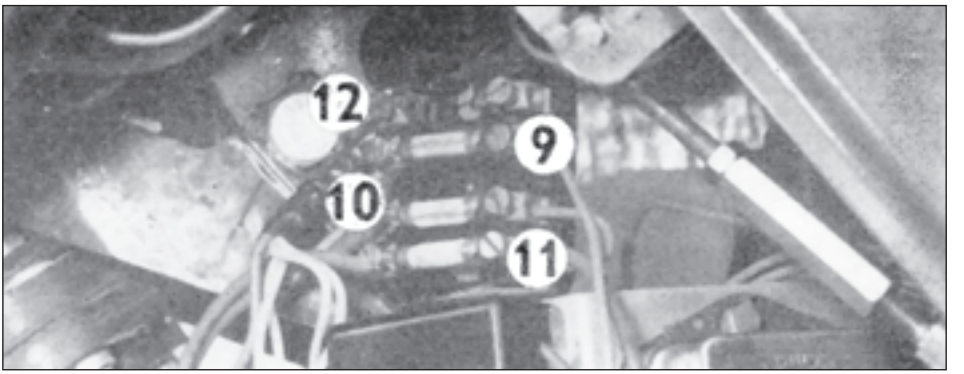


Fig. 14

Fuses for the cabin are situated on a panel above the eight-pole main fuse box (Fig. 14).

9. Windscreen washer, windscreen wiper, rear window wiper and control of heater fan relays (in case of cabin BK 7011 relay for the heated rear window as well).
10. Ceiling lamp and power supply for heater fans
11. Power supply for heater fans
12. Power supply of the rear working roof-lights (in case of the cabin BK 7011 only)
13. Control relay (Fig. 15)
14. Hand-light socket (Fig. 15)

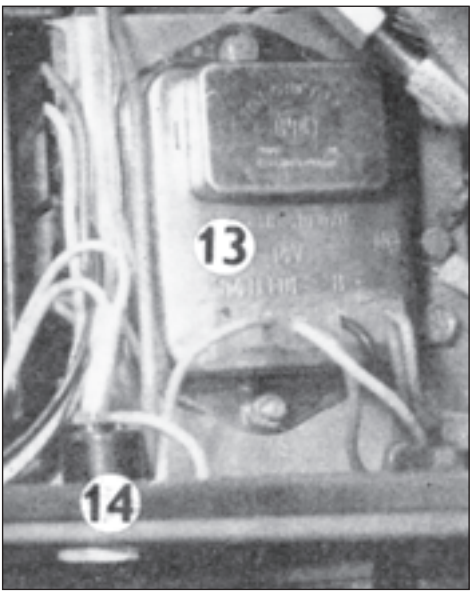


Fig. 15

Symbol explanatory notes

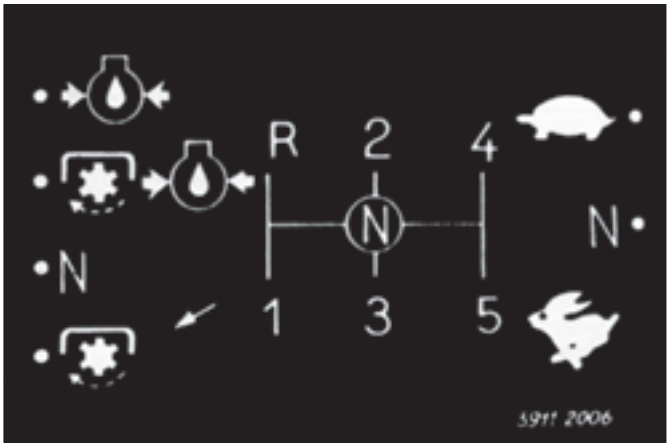


Fig. 16

Hydraulic oil pump and P.T.O.-shaft engagement; Diagram of the gear positions — STANDARD REVERSE GEAR; Gear positions of the road-speed and low--speed gears (hare — turtle) (Fig. 16)

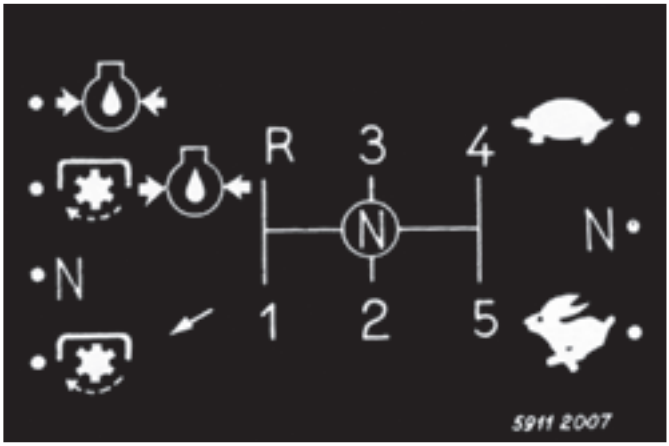


Fig. 17

Hydraulic oil pump and P.T.O.-shaft engagement;
Diagram of gear positions — HIGH REVERSE GEAR (only for tractors Z 5211 and Z 5245 on special order of the customer);Diagram of gear positions of the road-speed and reduced-speed gears (hare — turtle) (Fig. 17).

Fig. 18

Diagram of gear positions of the P.T.O.-shaft 540 and 1000 r.p.m.

Fig. 19

The plate for the P.T.O-shaft clutch disengagement.

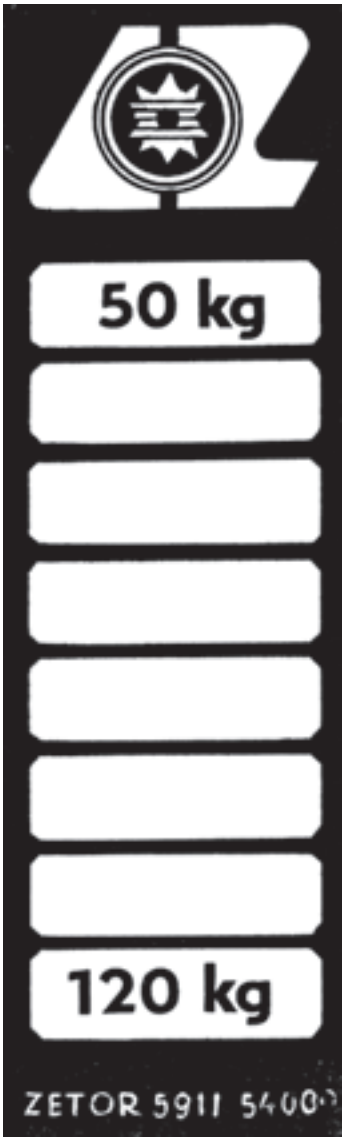


Fig. 20

Plate of the driver's weight for checking the damping adjustment of the driver's seat. Scale grade 10 kg.

Fig. 21

Plate indicating the shifting direction of the driver's seat.

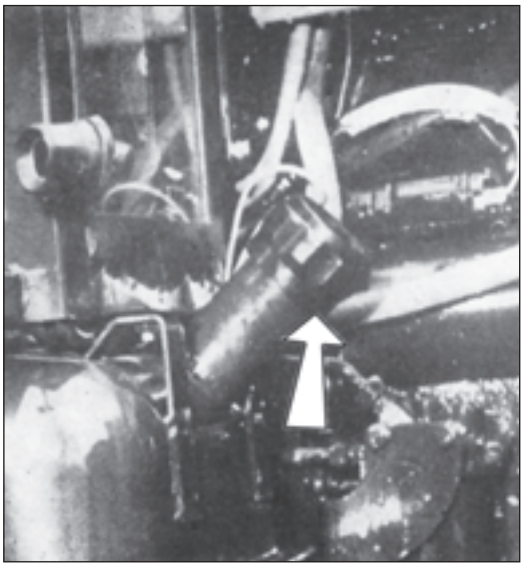


Fig. 22

Filler neck of the fuel tank.

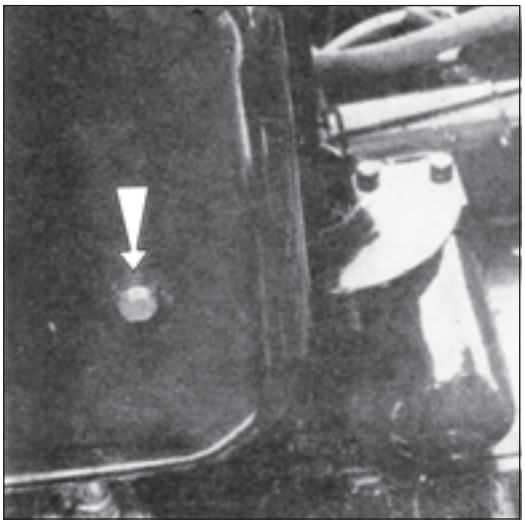


Fig. 23

Fuel tank sedimentation draining hole.

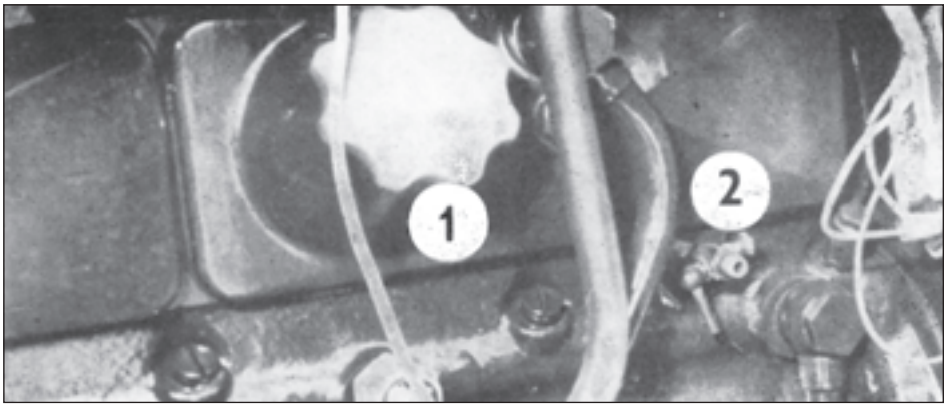


Fig. 24

Engine oil filler cap (Fig. 24/1)
Draining cock for the cooling water from the engine block (Fig. 24/2)

Fig. 25

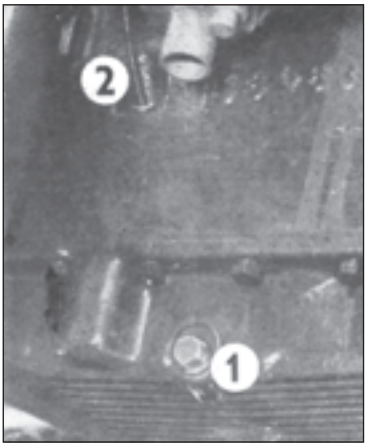
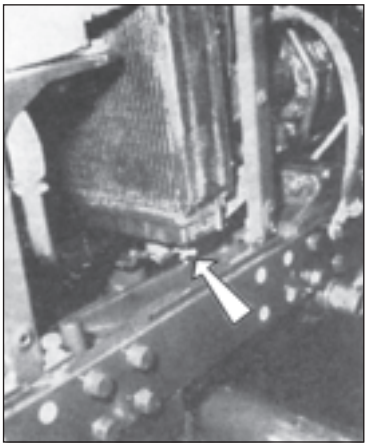
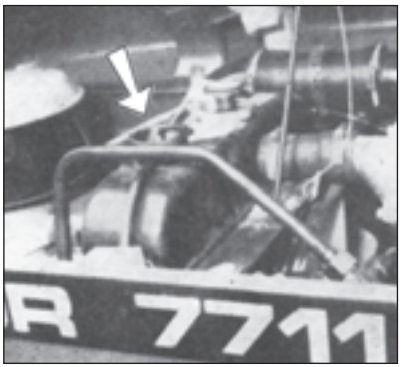


Fig. 25a

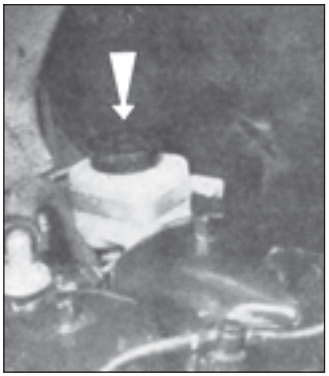


Draining cock for the cooling water from the radiator is situated at the left-hand bottom side of the cooler chamber (Fig. 25a).
Plugged hole for draining oil from the engine pan (Fig. 25/1).
Dip stick for engine oil (Fig. 25/2).



Radiator filling hole for cooling water

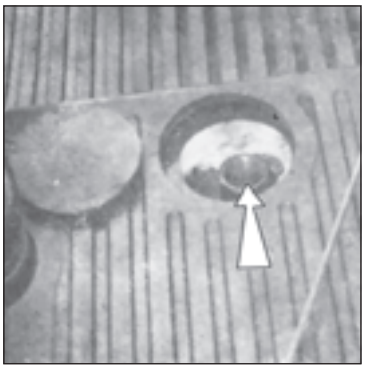
Fig. 26



Filling hole for brake fluid

Fig. 27

The filling hole for oil of the gear-box and the main transmission (the plug serves at the same time as a control dip stick as well).



	5211 6211 7211 7711
Upper mark	32 litres
Middle mark	25,5 litres
Lower mark	16,5 litres

	5245 6245 7245 7745
Upper mark	34 litres
Middle mark	27,5 litres
Lower mark	18,5 litres

Attention: The oil quantities stated are meant with the dip stickscrewed in

Fig. 28

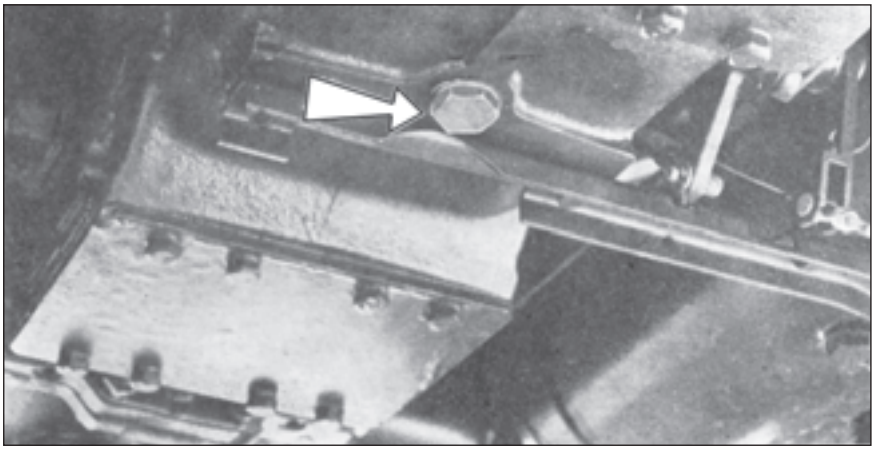
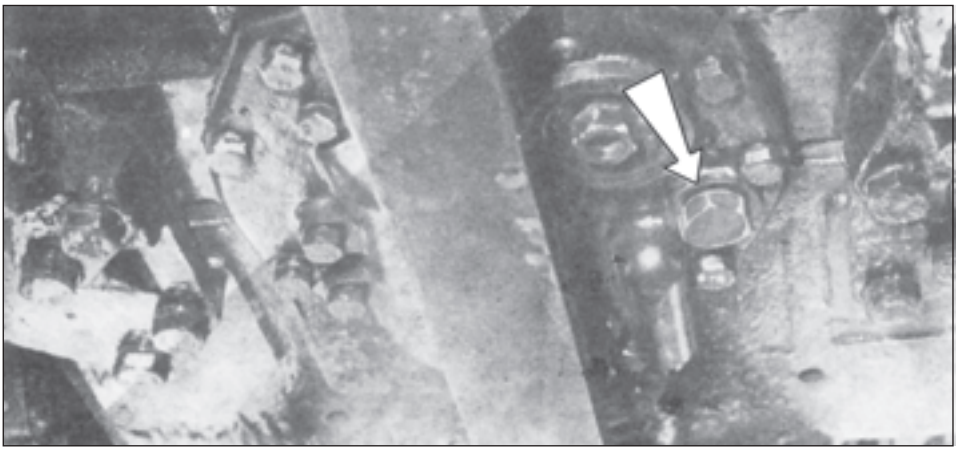


Fig. 29

The draining hole for oil from the gear box on a tractor without the front driven axle.

Fig. 30



The draining hole for oil from the main transmission box (the box of the main transmission)

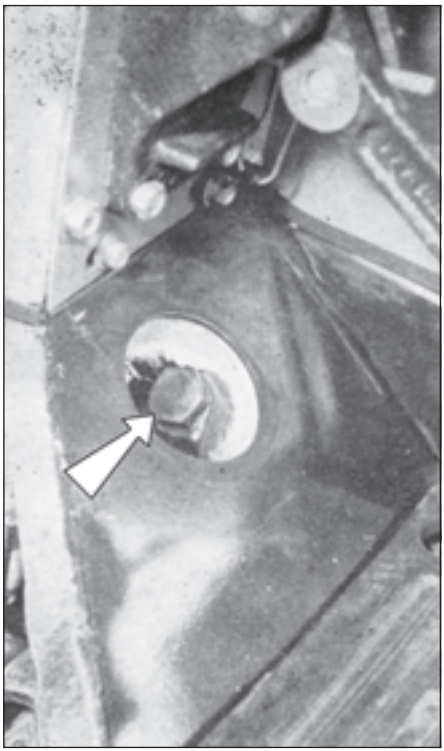


Fig. 31

Oil filling hole of the steering box (the draining hole is in the bottom part of the steering box).

The filling hole serves as the oil level check as well, the correct level is to the top of the neck.

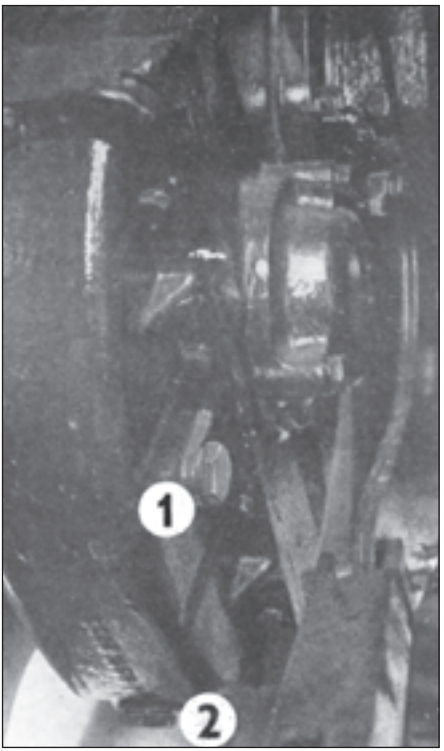


Fig. 32

Oil filling hole of the rear axle bridge (Fig. 32/1). (It serves at the same time also for checking the oil level.)

Draining hole from the bridge of the rear axle (Fig. 32/2).

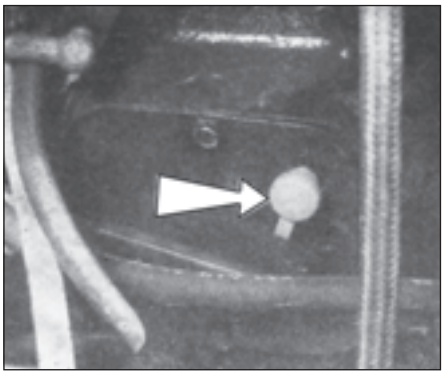


Fig. 33

The hole for additional lubrication of the guide bush of the clutch disengaging bearing (use a few drops of oil only).

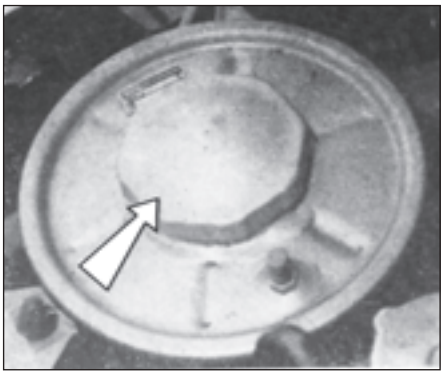
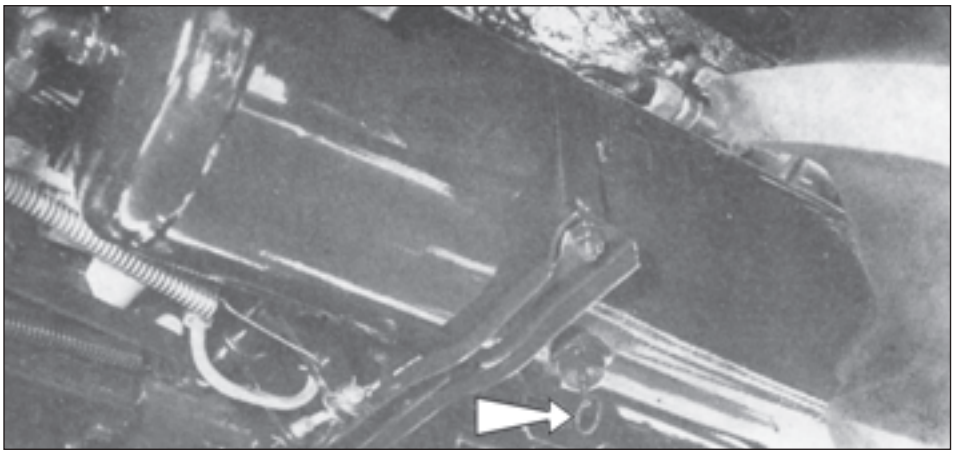


Fig. 34

Oil filling hole for the power assisted steering tank. The draining hole is situated at the bottom part of the tank.

Fig. 35



Draining plug of condensed water from the air reservoir of the pneumatic brakes.

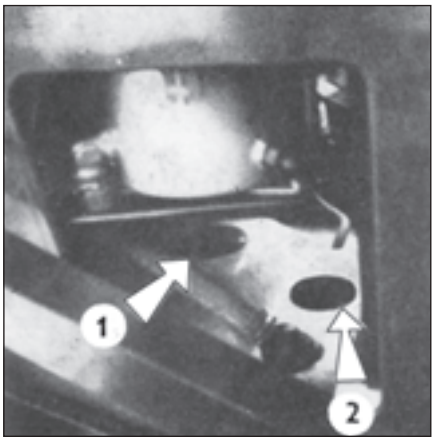
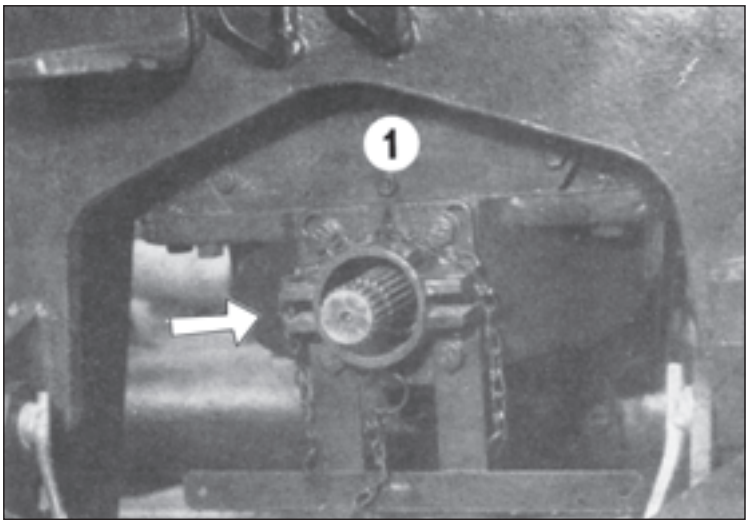


Fig. 36

1. Filling hole to the gear box of the front P.T.O.-shaft (Fig. 36) which will be fitted on special order of the customer.
2. Lubricating point of the front cross-pin cardan joint.

Fig. 37



The checking hole of the front P.T.O.-shaft gear box oil level is situated on the left-hand side of the bottom cover, when viewed from the front of the tractor (Fig. 37).

The draining plug of condensed water and impurities (Fig. 37 1).

Attention: Condensed water in the space of the sealing cuff of the clutch has to be drained before the winter comes. To do this, unscrew the plug (Fig. 37/1) and engage and disengage the P.T.O.-shaft a few times with use of the control lever situated on the dash panel. Possibly present impurities and condensed water will be blown out by compressed air from the space of the cuff. Do not forget to screw in the plug afterwards.

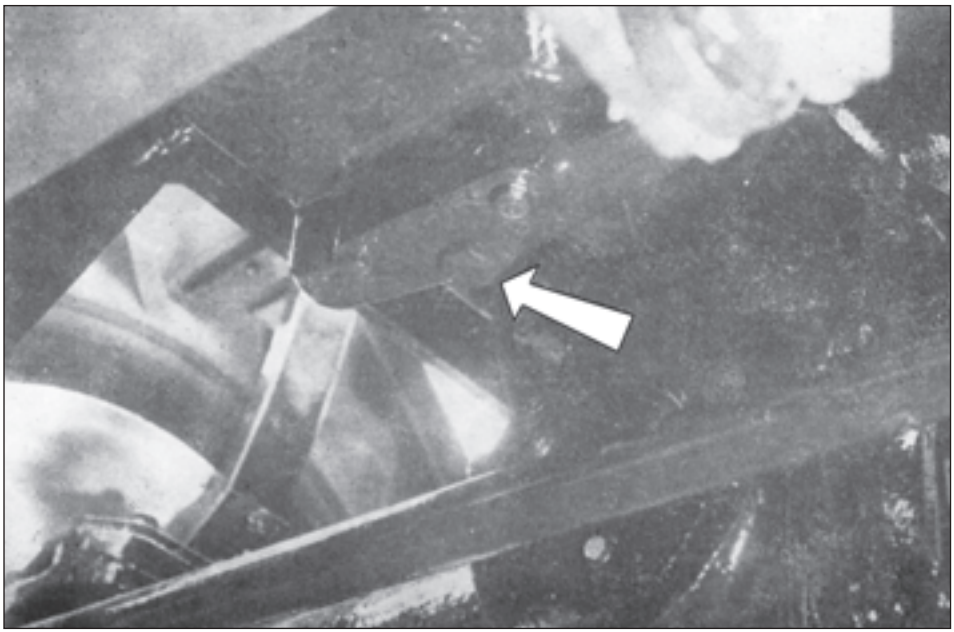


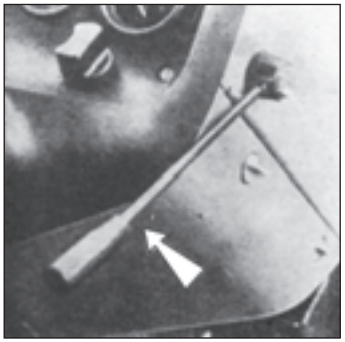
Fig. 38

Oil draining hole from the front P.T.O.-shaft gear box.

LEVERS AND PEDALS OPERATED BY THE DRIVER

Control levers

Manual control of the fuel throttle.



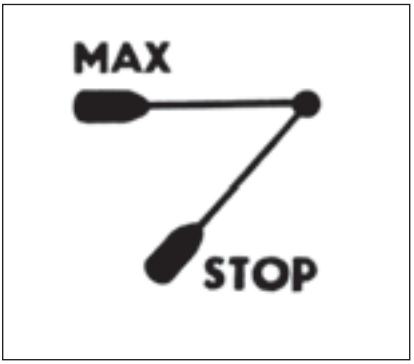
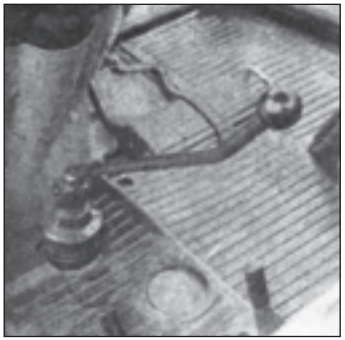


Fig. 39



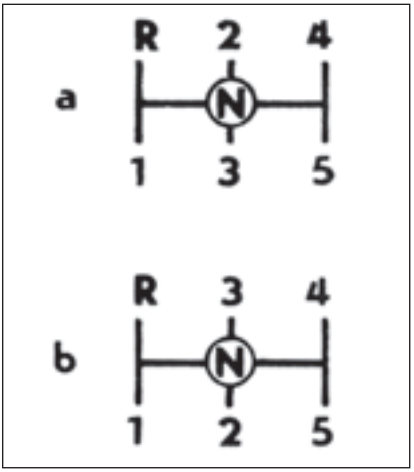


Fig. 40

Gear lever (Fig. 40)

a) Diagram of gear positions by the standard revers gear
b) Diagram of gear positions by the high-speed reverse gear (on special order — only for Z 5211 and Z 5245).

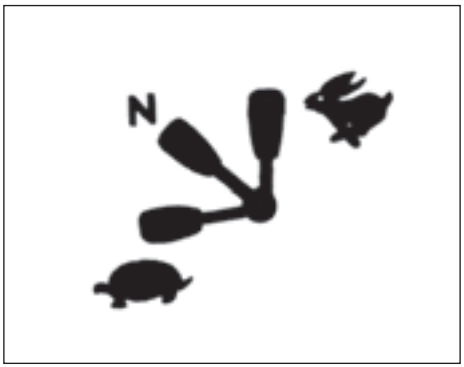
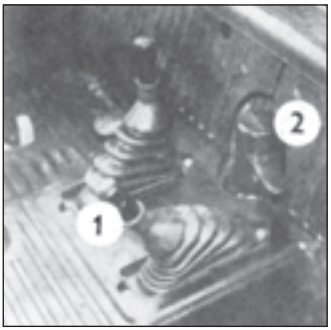


Fig. 41

Range change lever for road speed and reduced speed (Fig. 41/1).
Differential lock pedal (Fig. 41/2).
Foot-operated fuel throttle (Fig. 41/3).



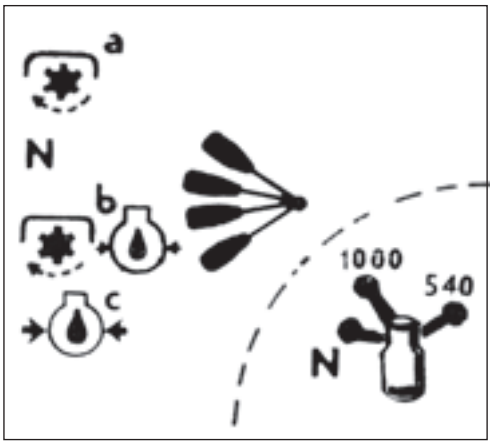
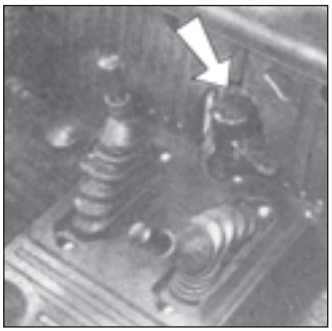


Fig. 42

By use of the hydraulic oil pump and the P.T.O.-shaft engaging lever (Fig. 42/1) the following functions will be engaged:

a) The P.T.O.-shaft is driven by the gear box, i.e. the P.T.O.-shaft speed is dependant upon the engaged gear; the lever is up (the hydroulic pump is disengaged); „N" — neutral position



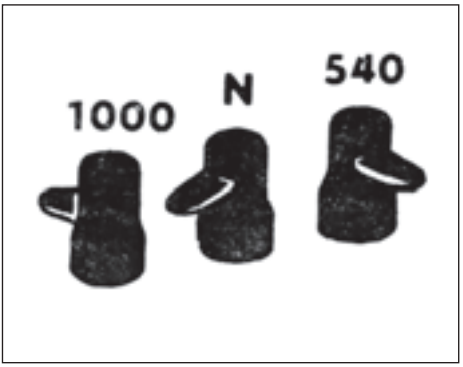


Fig. 43

b) The P.T.O.-shaft on dthe hydraulic pump are engaged (the engaging lever is in its down — first position);

c) The hydraulic oil pump is engaged — the P.T.O.-shaft is not running (the engaging lever is in its lowest position).

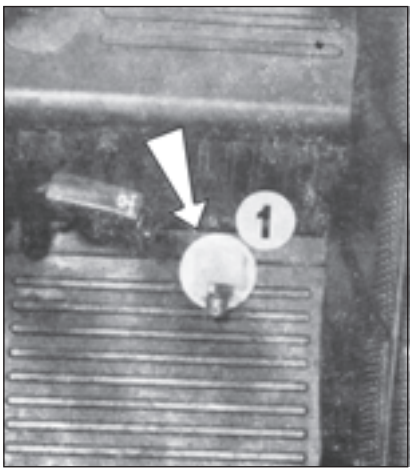
The engaging lever of the P.T.O.-shaft for 540 and 1 000 r.p.m. is without exchangeable end-pieces (Fig. 42/2).

The engaging lever of the P.T.O.-shaft for 540 and 1 000 r.p.m. — execution with exchangeable end-pieces (Fig. 43):

— forward position (the cover lever in the driving direction) — neutral position

— left-hand position — 540 r.p.m. of the P.T.O.-shaft

— right-hand position — 1.000 r.p.m. of the P.T.O.-shaft

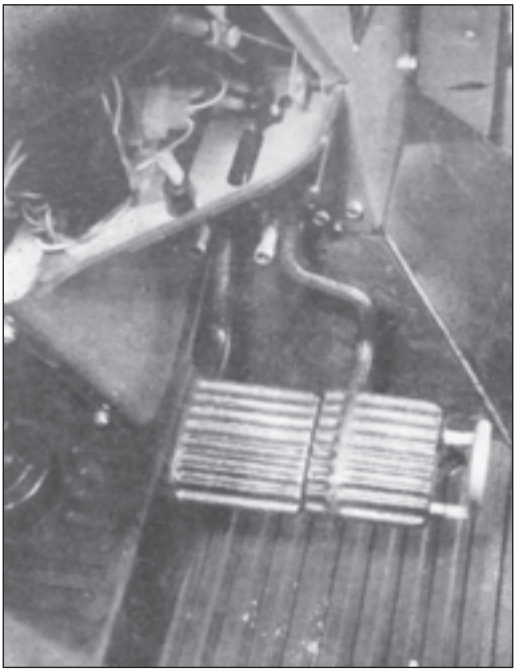


ATTENTION: When changing the speed from 540 r.p.m. to 1,000 r.p.m. or vice versa, the exchanging lever must be put in its neutral position, taken off and then the correct end-piece of the P.T.O.-shaft has to be inserted. The end-piece for a speed of 540 r.p.m. is equipped with six splines, for 1 000 r.p.m. with 21 splines.

The torque multiplier pedal (Fig. 44/1).

The torque multiplier is engaged by pressing down the pedal.

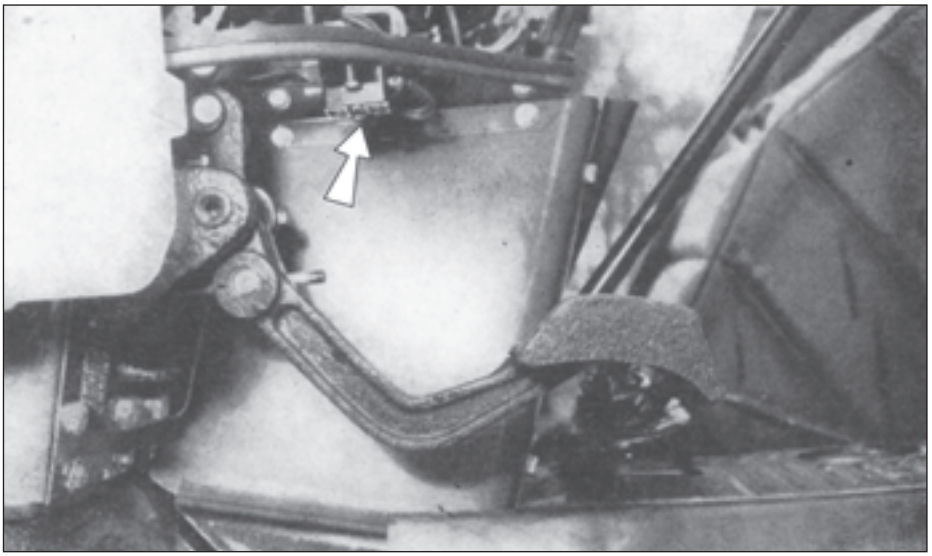
Fig. 44



Foot brake pedals interconnected with pawl. The tractor is equipped with a double-pedal brake system using an automatic pressure equaliser.

Fig. 45

Fig. 46



Driving-clutch pedal of the tractor.

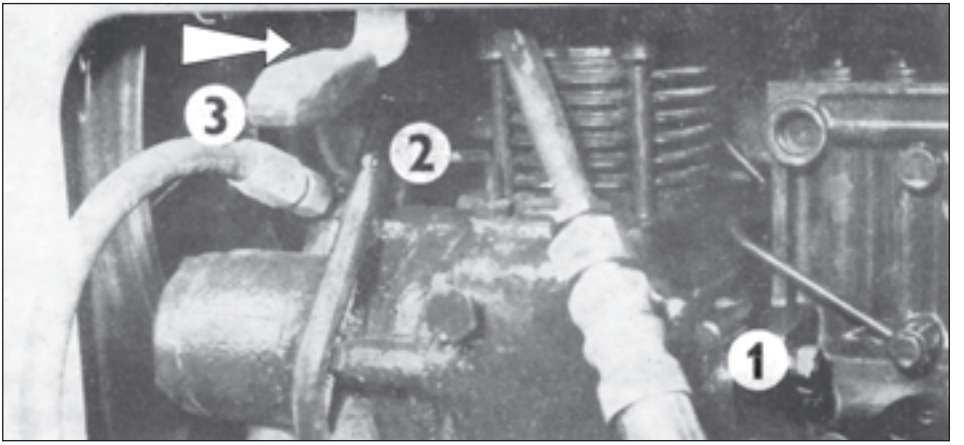
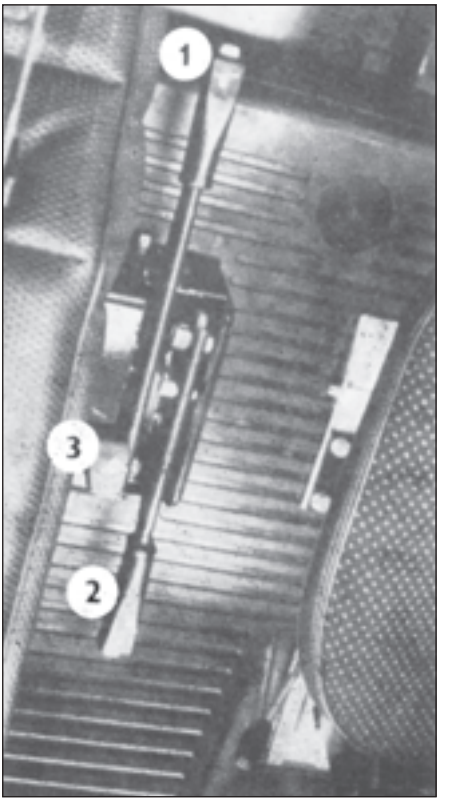


Fig. 47

Compressor engaging lever (Fig. 47/1)
Compressor engaging safety device (Fig. 47/2)
Bonnet opening lever (Fig. 47/3)



Hand-brake lever (Fig. 48/1)
Manual disengaging of the P.T.O.-shaft clutch by a lever (Fig. 48/2)
Pick-up-hitch control lever for a single-axle trailer (Fig. 48/3)

Fig. 48

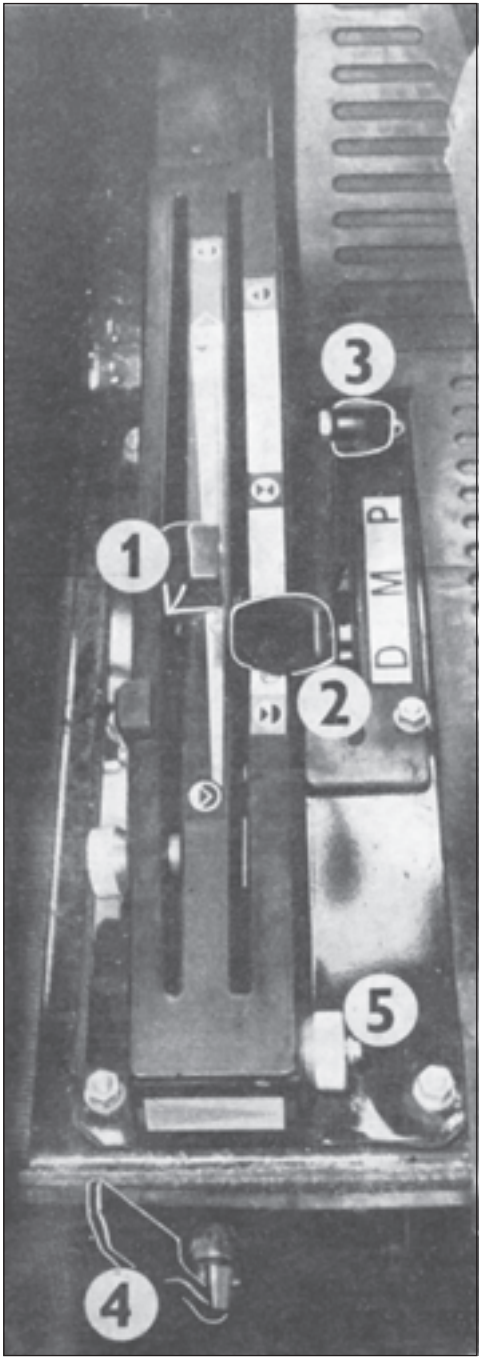
Fig. 49

The control valve lever for the starting clutch of the front P.T.O.-shaft (Fig. 49). To ensure the correct function of the starting clutch, the control valve lever has to be engaged at an air pressure of min. 500 kPa (on the pressure gauge). The valve ensures automatic disengagement of the P.T.O.-shaft if the air pressure drops below the minimum engaging pressure (410 ± 60 kPa).

Important warning:

It is not allowed to do any repair work or to clean functional parts of coupled machines driven by use of the front P.T.O.-shaft when the control valve lever is not in the STOP-position.

If the control valve lever (Fig. 49) is in the STOP-position, then the P.T.O.-shaft is disengaged. To engage the P.T.O.-shaft, the lever has to be raised.



HYDRAULIC LIFTING AND HITCH EQUIPMENT

The ZETORMATIC hydraulic system is used to control agricultural machines and implements. This equipment has two circuits and is controlled with help of a separate lever for the inner circuit and a separate lever for the outer circuit. The functions of these circuits are labelled.

a) **Inner circuit** — It is intended to lift and lower agricultural machines and implements attached. This circuit is controlled by the main inner circuit lever and by two auxiliary levers.

1. The inner circuit lever (Fig. 50/1) controls the following functions:
   - — lifting and lowering of agricultural implements into transport or working position;
   - — height adjustment of the hitch with attached implements by position control;
   - — adjustment of tractive force when used in draft or mixed regulation;
   - — adjustment of floating position when using implement with its own supporting wheel
2. Selection lever of hydraulic system (Fig. 50/3) is used when selecting the respective regulation. It has three positions labelled as P, M, D.
   „P" — Position (fixed) control. The attached implement is automatically held in an approximately constant vertical position in relation to the tractor.

Fig. 50

„M" — Mixed control, a combination of the „P" and „D" types of control. The layout of the hydraulic equipment enables operation with the implement having its own supporting wheel in the so called free (floating) position, as well.

„D" — Draft control: The height of the attached implement is automatically adjusted according to the changing soil resistance.

3. Lever for response control (Fig. 50/4). This lever controls the cock for the response rate which is used for the reduction of the quantity of oil flowing into the inner circuit in connection with the necessary speed of reaction of the hydraulic system according to the art of tractor tasks.

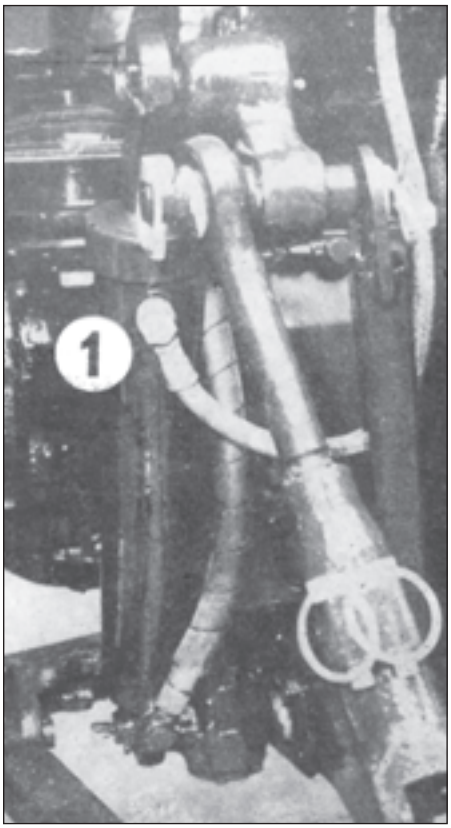


Fig. 51

Throttling the oil quantity supplied from the oil pump to the inner circuit serves for reduction of the response rate, by which responds the hitch control system e.g. to changed resistance of ploughed soil, and by means of the response rate reduction vibration can be eliminated which might occur when ploughing in some types of soil.

The inner circuit consists of the hydraulic oil pump (it supplies oil to the outer circuit as well), the hydraulic distributor box and hydraulic lifting gear. The lifting gear has an internal cylinder, lift arm shaft and lift arms of hydraulics which control the hitch equipment. Tractors with four-cylinder engines are equipped with an additional auxiliary hydraulic cylinder (Fig. 51/1) which is located on the left side of the transmission box and controls directly the left lift arm. This arrangement enables increased lifting performance of the hydraulic equipment.

Fig. 52

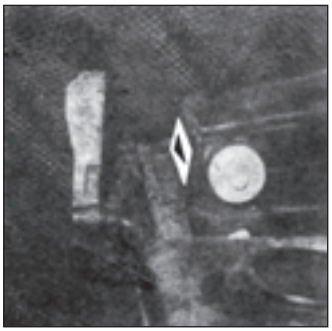
b) **Outer circuit** — This circuit is controlled with a lever (Fig. 50/2). It supplies pressurized oil to machines and implements which have their own single-acting or double-acting cylinders, or rotating hydraulic motors and/or an additional distributor if needed.

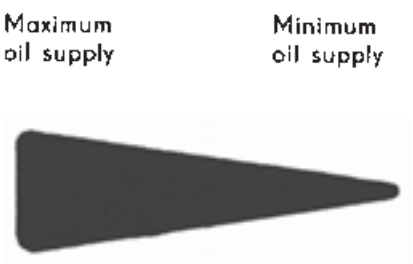
This circuit is equipped with three outlets, each having a quick-coupling device (Fig. 52). The third quick coupling (labelled „O") is directly linked with the inside room of the transmission box and has to be connected to the outlet of the hydraulic motor or of the distributor box attached to the machine.

The ratio of oil supplied to the inner and to the outer circuits is controlled by the response control lever (Fig. 53). When moving this lever in the direction of the arrow, the oil flow coming into the inner circuit is being reduced and the oil flow coming into the outer circuit is being increased, and vice versa. If only the outer circuit is in operation (the slide valve of the inner circuit is not in the lifting position), then the complete quantity of oil will be supplied to the outer circuit, regardless of the position of the response control lever.

The outer circuit lever controls the oil supply to the two quick couplings labelled as „1" and „2" (Fig. 52).

Fig. 53





Art of connection of the outer hydraulic equipment:

The single-acting cylinder will be connected to the quick coupling „1".

1. Lifting — The control lever is in its uppermost position. (The lever has to be held in position with the hand.)
2. Neutral position — The control lever is in the middle position where it is held by a spring.
3. Lowering — The control lever is in the position between the neutral and the lowest position and it is automatically locked (the so-called „floating" position).

The double-acting cylinder will be connected in such a way that the oil from the quick coupling „1" is used for lifting the load and the oil from the quick couplin „2" for lowering the load.

1. Lifting — The control lever is in its uppermost position. (The lever has to be held in position with the hand.)
2. Neutral position — The control lever is in the middle position where it is held by a spring.
3. Lowering — The control lever is in its lowest position.
4. Free (floating) position — The control lever is in the middle between the neutral and the lowest end position and it is automatically locked; both the quick couplings are linked with the outlet for used oil, and it is possible to use such a machine which has its parts frely movable, e.g. when copying an uneven ground.

Rotating hydraulic motor or additional distributor

The oil supply to these appliances (indicated by P) will be connected to the quick coupling „1", the oil outlet (indicated by T) to the quick coupling „0". In case that the reversed hydraulic motor is used, it will be connected to the quick couplings „1" and „2". The control lever has to be moved to the uppermost position in which it can be secured by an adjustable trip dog (Fig. 50'5).

The gear box and the main transmission box have a shared oil filling and the oil is used for the hydraulic system of the tractor as well. The standard quantity of oil is 25 litres. When using the tractor on a hilly ground or when the machine is attached to the outer hydraulic circuit, it is suitable to increase the oil level in the gear box to 32 litres. A minimum quantity of 15 litres of oil must be left for a correct function of the gear box.

ATTENTION: No further oil must be taken from this quantity for the outer hydraulic circuit. The oil quantity have to be increased by two more litres in case of tractors equipped with the front driven axle.

NOTE: A maximum of 10 litres of oil may be taken from the gear box and the main transmission box for the outer circuit of hydraulics.