TM5-9045

SEMI-TRAILER, LOW BED FRONT LOADING 20 TON

La Crosse

OPERATOR'S MANUAL MAINTENANCE MANUAL AND PARTS IDENTIFICATION LIST

DEPARTMENT OF THE ARMY · DECEMBER 1944

OPERATOR'S MANUAL

MAINTENANCE MANUAL

and

PARTS IDENTIFICATION LIST

for

SEMI-TRAILER, LOW BED
FRONT LOADING
20 TON

DECEMBER 23, 1944

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I

Operator's Manual

SECTION I

GENERAL

SCOPE

These instructions are published for the information and guidance of the personnel to whom this equipment is assigned. They contain information on operation and maintenance as well as descriptions of the major units and their functions in relation to the other components of the equipment. They apply only to the 20 ton front loading trailer and are arranged in four parts: Part One — Introduction; Part Two — Operating Instructions; Part Three — Maintenance Instructions; Part Four — Parts Identification List.

RECORDS

Maintenance instruction forms and record forms listed and briefly described in the following subparagraphs will be used in the maintenance of this equipment.

WD AGO Form No. 6 — Duty Roster. This form slightly modified will be used for recording operation and scheduling lubrication and preventive maintenance services at the proper intervals on individual items of equipment.

WD AGO Form No. 48. Driver's Trip Ticket and P.M. Service Record. This form will be used by equipment operators for reporting the accomplishment of daily preventive maintenance services and for reporting any deficiencies observed on the equipment during operation.

Lubrication Chart. This is a maintenance instruction form and is intended to instruct operators and personnel of the using organization as to the proper lubricants to be used and intervals to follow in lubricating individual items of equipment.

War Department Preventative Maintenance Services Engineer Equipment. This is a maintenance instruction form and prescribes daily maintenance services to be performed by the operator as well as the weekly and monthly services to be performed by mechanics of the using organization in providing proper maintenance on individual items of equipment.

WD AGO Form No. 464. Preventative Maintenance Services and Technical Inspection Work Sheet for Engineers Equipment. This form is used by personnel of the using organization and higher echelons for reporting the results of preventive maintenance services, command, and technical inspections.

WD AGO Form No. 7353. Spot Check Inspection Report for All Motor Vehicles. This form may be used as a check list for items to be inspected during spot check inspections in lieu of WD AGO Form No. 464.

WD AGO Form No. 478. MWO and Major Unit Assembly Replacement Record. Major repairs or rebuilding, the replacement of major unit assemblies and the accomplishment of equipment modifications will be recorded on this form.

SECTION II

DESCRIPTION AND DATA

DESCRIPTION. (Figs. 1, 2 and 3)

The 20 ton front loading semi-trailer is a four wheel trunnion axle vehicle equipped with dual tires. A hydraulically actuated landing gear is provided at the front end of the frame to support the semi-trailer when the truck or dolly is disconnected. The semi-trailer is designed to be pulled by a tractor-truck equipped with a suitable fifth wheel or it can be pulled with the dolly coupled to the semi-trailer and the drawbar of the dolly attached to the pintle hook of the towing vehicle. Air brakes are provided on the semi-trailer which receive their air supply from the tractor-truck through the conventional removable hoses. Two service clearance lights and two black out clearance lights are provided on each side of the semi-trailer frame, and one combination stop and tail light and one combination blackout service stop and black out tail light are installed on the rear cross member. The entire front kick up can be lowered to form a ramp for loading the trailer. This is accomplished by means of a hydraulic mechanism which can be operated by one man.

IDENTIFICATION (Fig. 4)

The semi-trailer can be identified by its drop frame construction and by the hinged front end which lowers to form the loading ramp. The name plates on the semi-trailer are located on the right front side of the main trailer frame.

DATA

Physical Characteristics:

Weight (total)	23,900 lbs.
Net chassis weight on king pin	8,000 lbs.
Net chassis weight on rear tires	15,900 lbs.
Maximum payload	20 tons
Length overall	35 ft. 4 in.
Length of main deck	14 ft. 6 in.
Width	9 ft. 7 in.
Height from ground to deck	3 ft. 2 in.
Height from ground to top of front kick up	5 ft. 9 in.
Height from ground to top of rear kick up	5 ft. 1 in.
Height of pintle hook	2 ft. 10 in.
Ground clearance (loaded)	2 ft. 0 in.

Tires:

Quantity	8
Size	14.00/20
Number of plies	12
Air pressure (Maximum)	40 lbs.
Allowable speed	40 m.p.h.

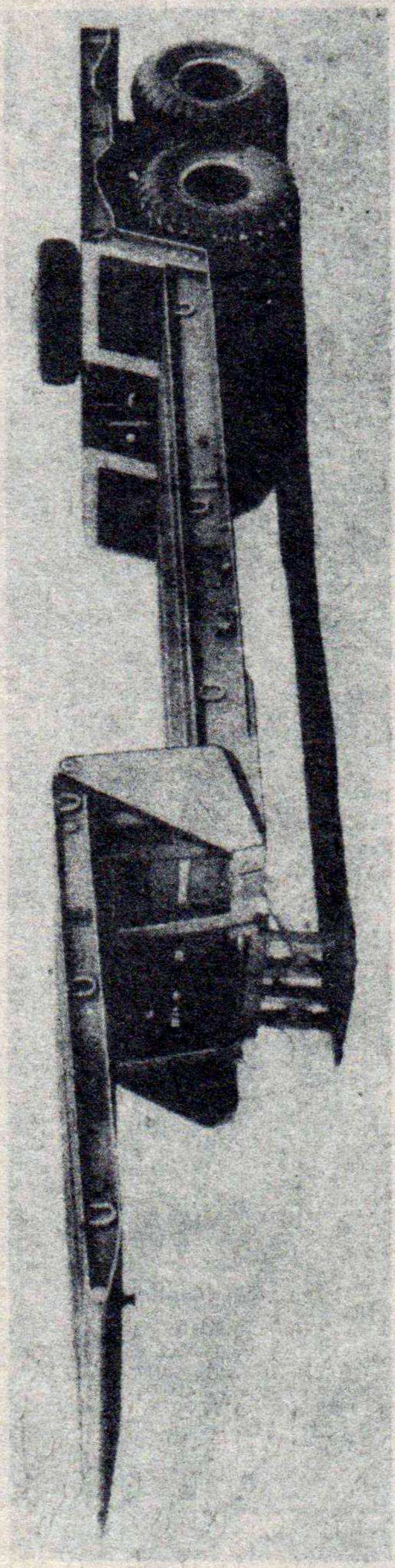

Figure 1. ¾ Front View — Ramp Up

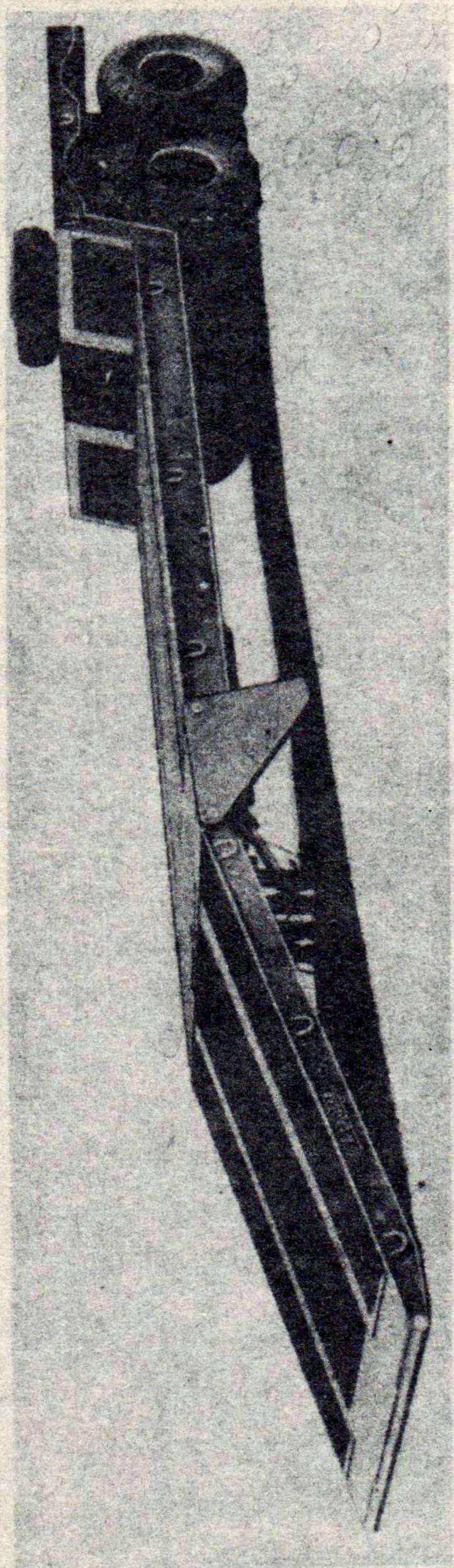

Figure 2. ¾ Front View – Ramp Down

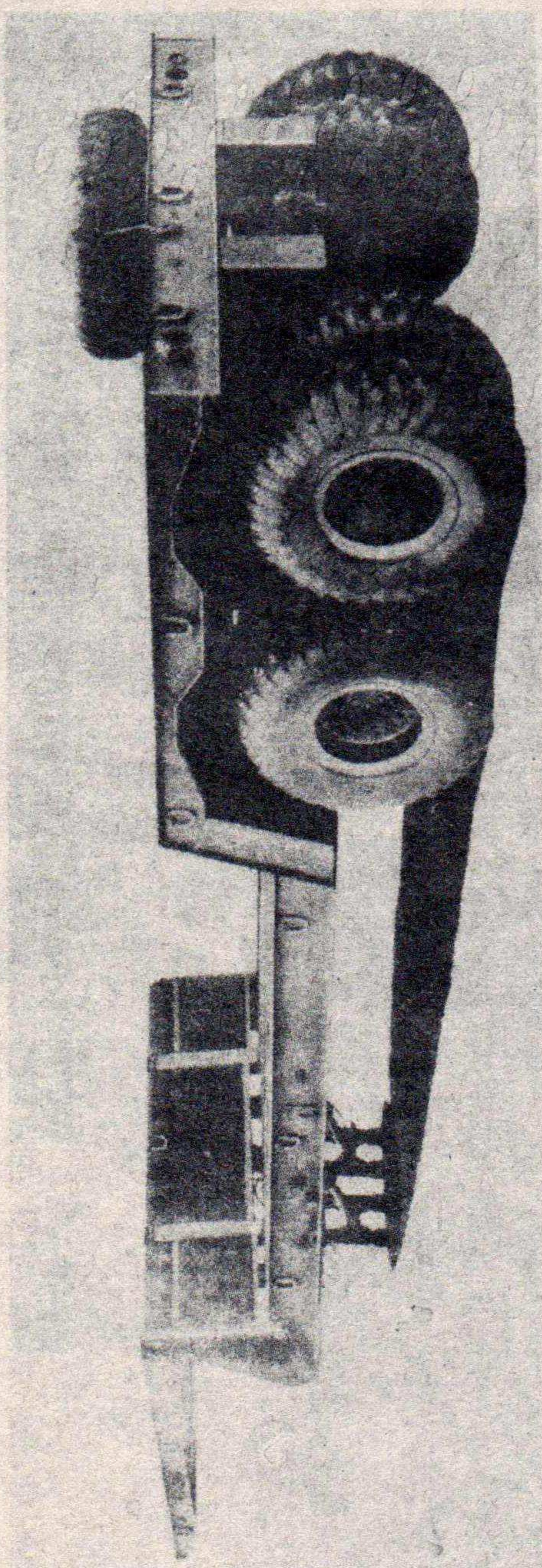

Figure 3. ¾ Rear View

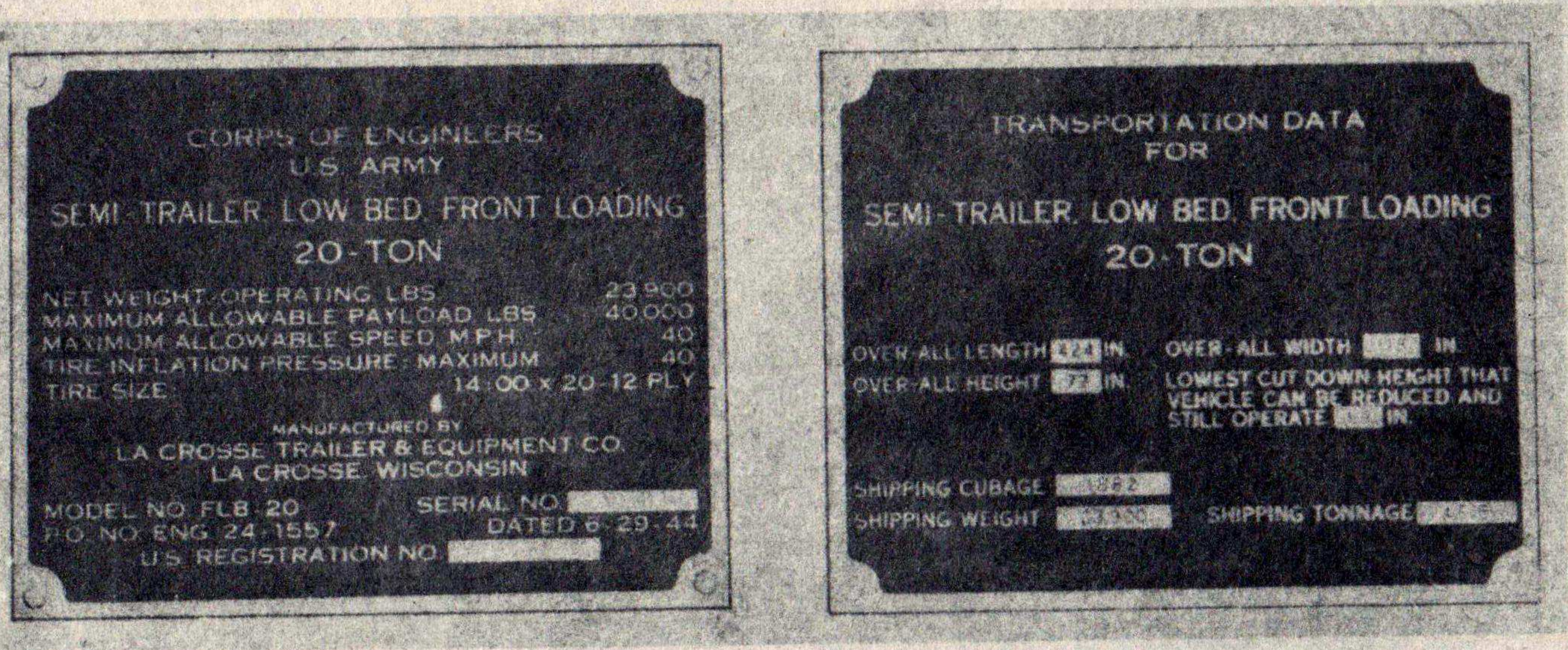

Figure 4. Name and Transportation Data Plates

SECTION III
TOOLS, ACCESSORIES AND FIRST ECHELON SPARE PARTS

1. LIST OF TOOLS: (Fig. 5)

Part No.	Part Name	Quantity
21T-6300	WRENCH, Seamless, Spindle Nut, with Handle, Octagonal Opening One End 3.267″ – 3.287″; other end 3.833″ – 3.856″ (Measured Across Flats)	1
21T-6302	WRENCH, Lug, with Handle to Fit Budd No. 43808E Inner Cap Nut Budd No. 43809E Inner Cap Nut Budd No. 43811E Outer Cap Nut Budd No. 43812E Outer Cap Nut	1
Budd 45867	WRENCH, Socket, for Divided Rim Wheels	1
21T-7008	BAR, Wrecking, ¾″ x 24″ Forged Steel Gooseneck Claw and Pinch Type (41-1322.300-240)	1
21T-7009	BAR, Crow, 5½′ Pinch Point	1
21T-7013	JACK, 25 Ton Mechanical, Height Closed 24″ Rise 17″ (Buda 224) Without Hook	1
16T-2412	SCREWDRIVER, 10″ (41-7172.100-045)	1
16T-2413	PLIERS, Combination 6″ (41-5976.300-060)	1
21T-7104	SLEDGE, Cross Pein 6 lbs. with 30″ Hickory Handle (41-7531.300-060)	1
16T-2415	WRENCH, Crescent, 10″ Federal Spec. GGG-W-631 (41-9587.500-300)	1
16T-2416	BAG, Tool 6″ x 18″	1
21T-7105	TOOL, Tire, ¾″ Stock, Taper End, 15″ to 18″ Long	1
	SOCKET, Blackhawk, No. 21014	1
	HANDLE, Socket Blackhawk No. 24999	1

2. ACCESSORIES (Fig. 6)

	HOSE, Jumper Air Brake (215604)	2
	CABLE, Jumper 8′ Long Warner Elec. No. 3731	1
21T-7000	CHAIN, Loadbinder, ½″ x 20′ Long, BBB Quality, Grab Hook Each End	4
21T-7007	LOADBINDER, for ½″ Chain (McKissick M42)	4
21T-7002	CHAIN, Tow, ¾″ x 25′ BBB, Quality Grab Hook One End Pear Link Other End	1
21T-7003	BLOCK, Snatch, 8″ Quick Opening (For ⅝″ Wire Rope. Swivel Hook One End Shackle Bar Other End (McKissick HD-1)	1
	HANDLE, Hydraulic Pump	2
21T-7106	TAPE, Friction ½ lb. Roll (17-8848.200-500)	1
	MANUAL, Technical	2

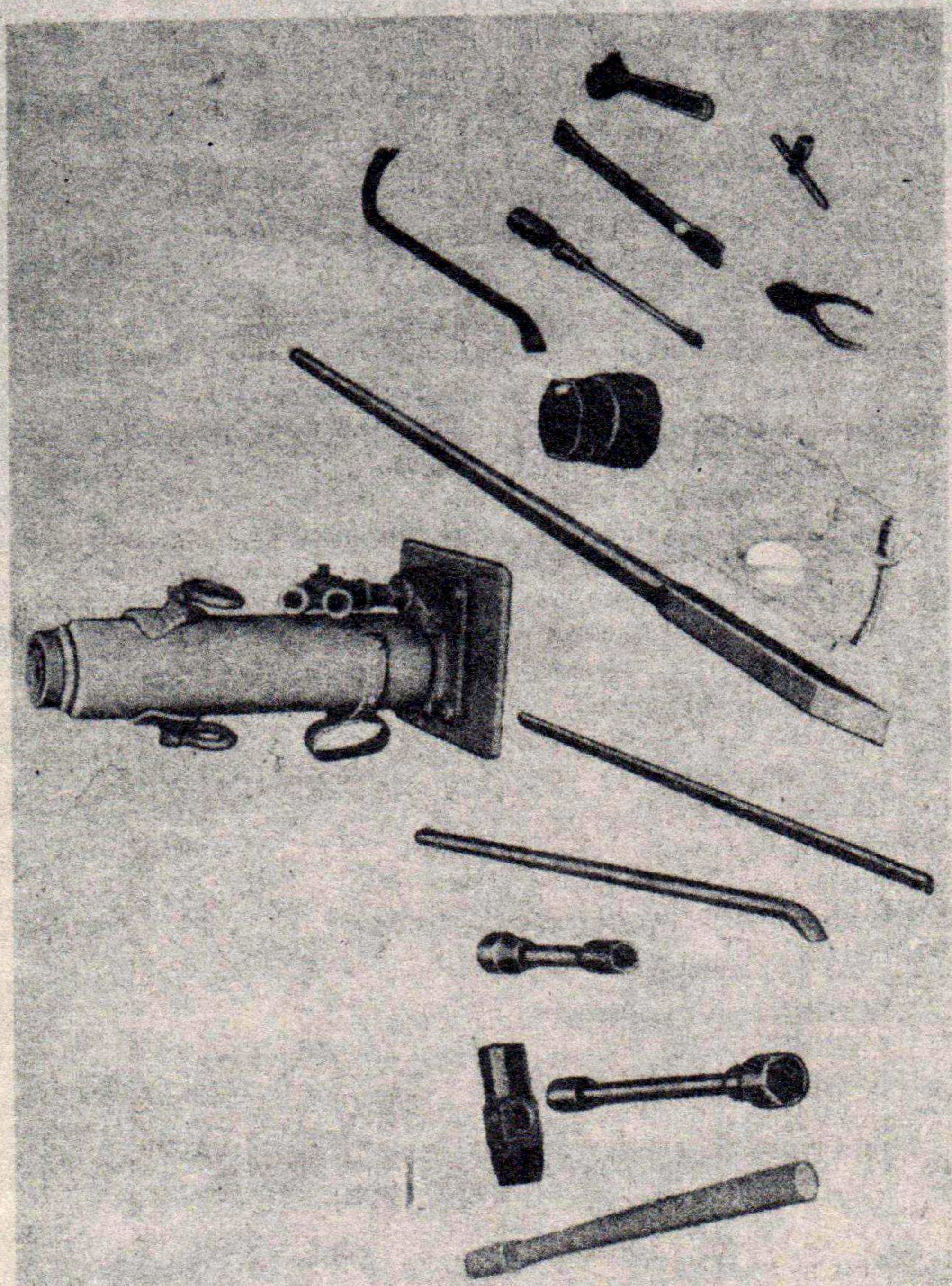

Figure 5. Tools

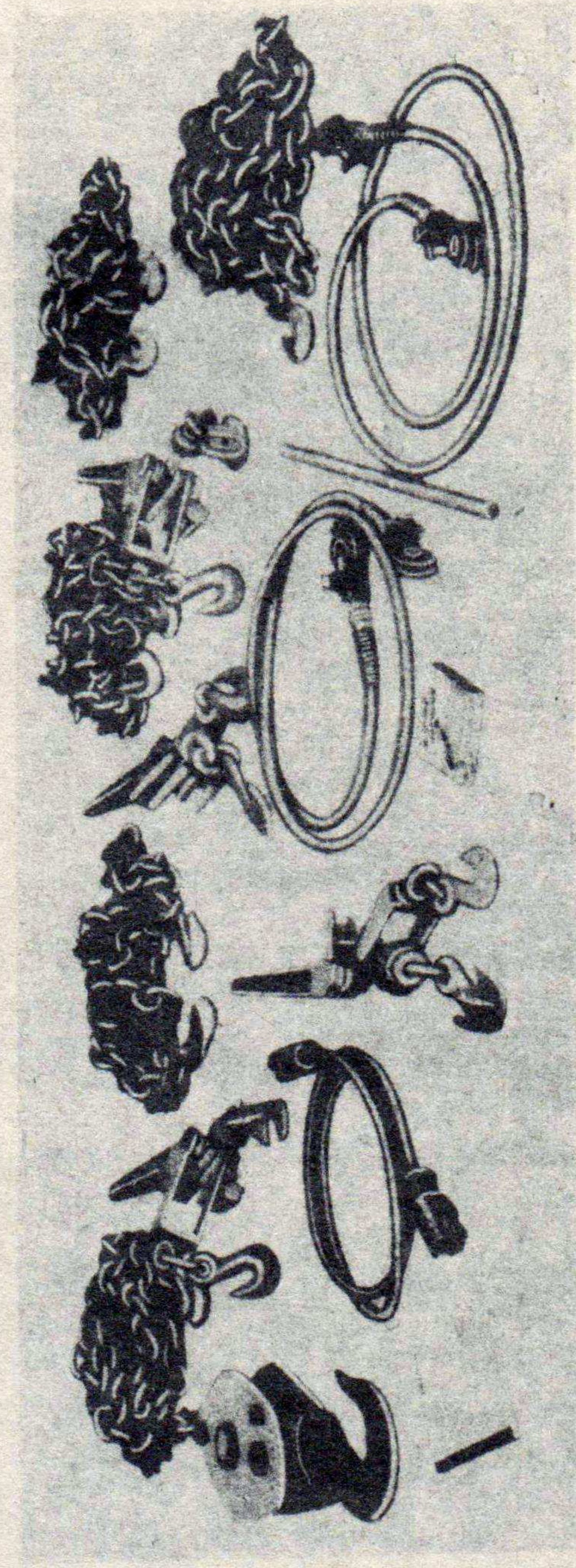

Figure 6. Accessories

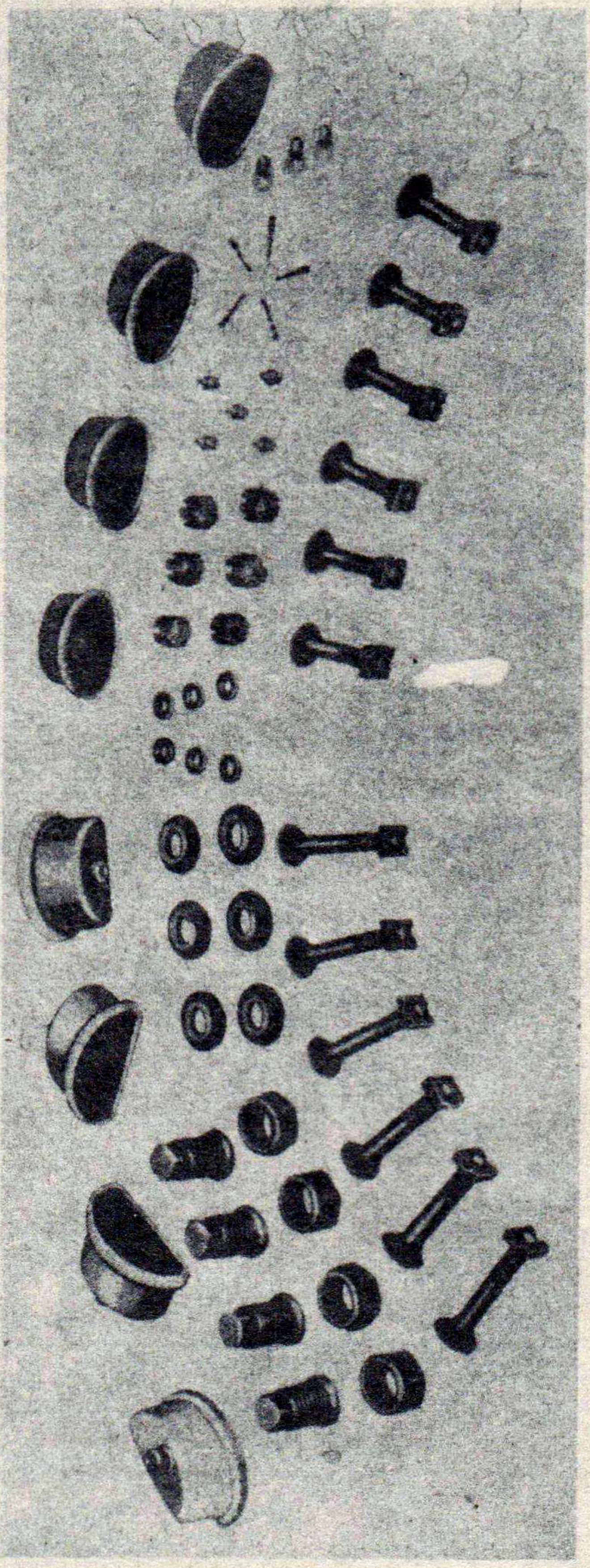

Figure 7. Spare Parts

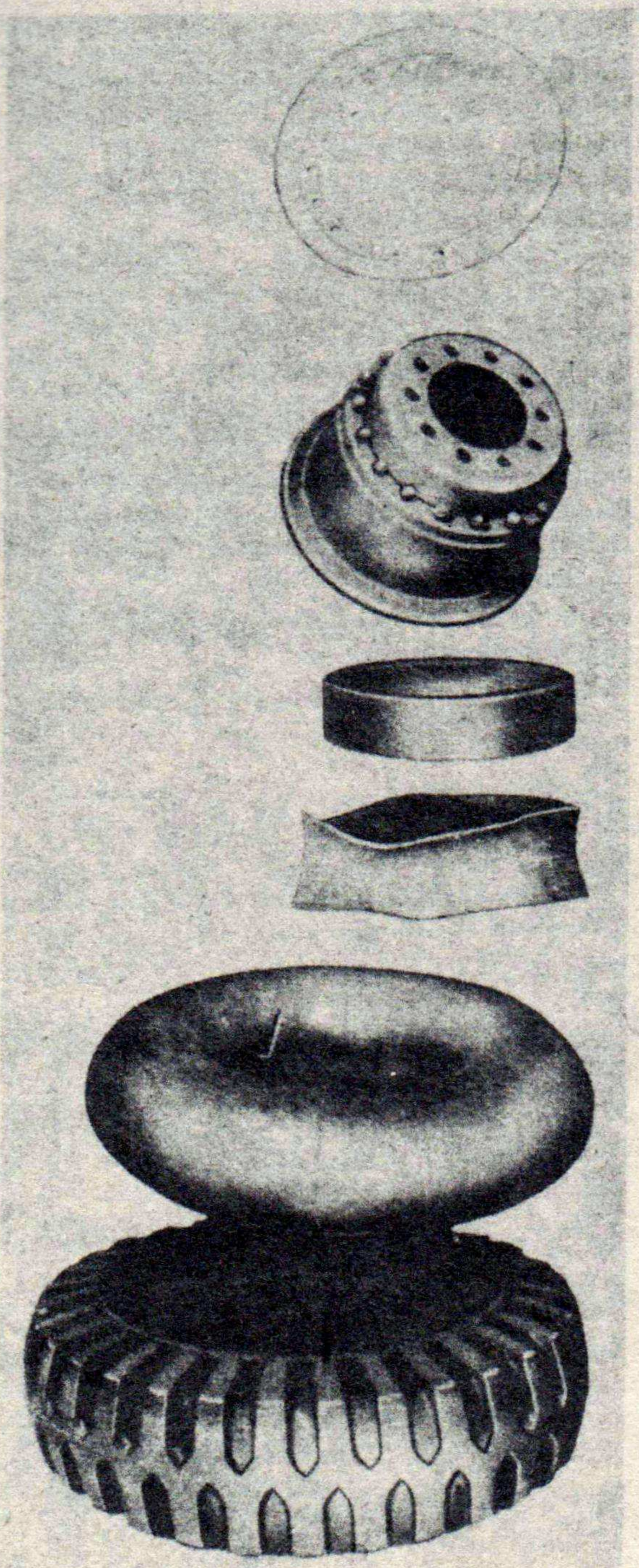

Figure 8 Wheel and Tire

3. SPARE PARTS: (Fig. 7)

Part No.	Part Name	Quantity
	SLEEVE, Hose (203610)	6
	GASKET (203608)	6
	PACKING, Ring (213630)	6
	NUT, Inner Cap R.H. (43808E)	2
	NUT, Inner Cap L.H. (43809E)	2
	NUT, Outer Cap R.H. (43811E)	2
	NUT, Outer Cap L.H. (43812E)	2
16T-1878	UNIT, Service Upper (KD-8039-6V)	2
16T-1874	UNIT, Blackout Lower (KD-8040-6V)	4
16T-1873	UNIT, Blackout Upper (KD-8041-6V)	2
21T-7010	BOLT, Car. Lewis Sealtite ½" x 3½" Complete with No. 2 Square Locktite Nut or Equal	6
21T-7011	BOLT, Car. Lewis Sealtite ½" x 2½" Complete with No. 2 Square Locktite Nut or Equal	6
16T-2742	CAP, Valve (Schrader 880)	5
16T-2743	CORE, Valve (Schrader 7611)	5
16T-1867	LAMP, (Mazda No. 55)	3

4. SPARE WHEEL AND TIRE: (Fig. 8)

	TIRE, 14:00 x 20, 12 Ply	1
	TUBE, 14:00 x 20, Heavy Duty	1
	FLAP, Thin	1
D11L	BEADLOCK	1
	WHEEL ASSEMBLY	1
	SIDE FLANGE	1

SECTION IV
CONTROLS

BLACKOUT SWITCH

The blackout switch is located on the left hand side of the front kick up. By operating the switch with a coin, screwdriver or key, the operator can turn on either blackout or standard running lights. The face of the switch is marked with an arrow indicating which set of lights is in operation.

RAMP RELEASE AND LANDING GEAR RELEASE CONTROL (Fig. 9.)

This control is located on the left hand side of the trailer near the front of the main frame. It is operated by means of the hydraulic pump handle. Pushing the handle forward releases the ramp pins and pulling the handle backward releases the landing gear pins.

LANDING GEAR HYDRAULIC CONTROL VALVE (Fig. 9)

This valve is located adjacent to the ramp and landing gear release control. It serves to direct the flow of oil to the hydraulic cylinder which actuates the landing gear. Pushing the valve all the way in causes the landing gear to retract when the pump is operated. Centering the valve will lock the landing gear against motion in either direction. Pulling the valve all the way out will cause the landing gear to descend when the pump is operated.

RAMP HYDRAULIC CONTROL VALVE (Fig. 9)

This valve is located adjacent to the landing gear hydraulic control valve and serves to control the flow of oil to the hydraulic cylinder which actuates the ramp. Pushing the valve all the way in will cause the ramp to raise when the hydraulic pump is operated. Centering the valve will lock the ramp in any position. Pulling the valve all the way out will cause the ramp to descend.

TIRE INFLATION SUPPLY VALVE

This valve is located on the left hand side of the trailer approximately midway on the side channel. It may be used to inflate the trailer tires in combination with the inflation hose supplied with the tractor-truck.

PARKING BRAKE (Fig. 10)

The parking brake is located on the rear cross member of the trailer. It is applied by turning the crank handle clock-wise, and is released by turning the handle counter-clockwise. Pulling the handle down and giving it a quarter turn will allow it to fold out of the way

PINTLE HOOK (Fig. 10)

The pintle hook is located in a frame between the rear bumpers and is used as a means for attaching another vehicle to be towed behind the trailer. It will also be found useful for towing the dolly when the trailer is used with a tractor-truck. The pintle hook is of the standard Army type.

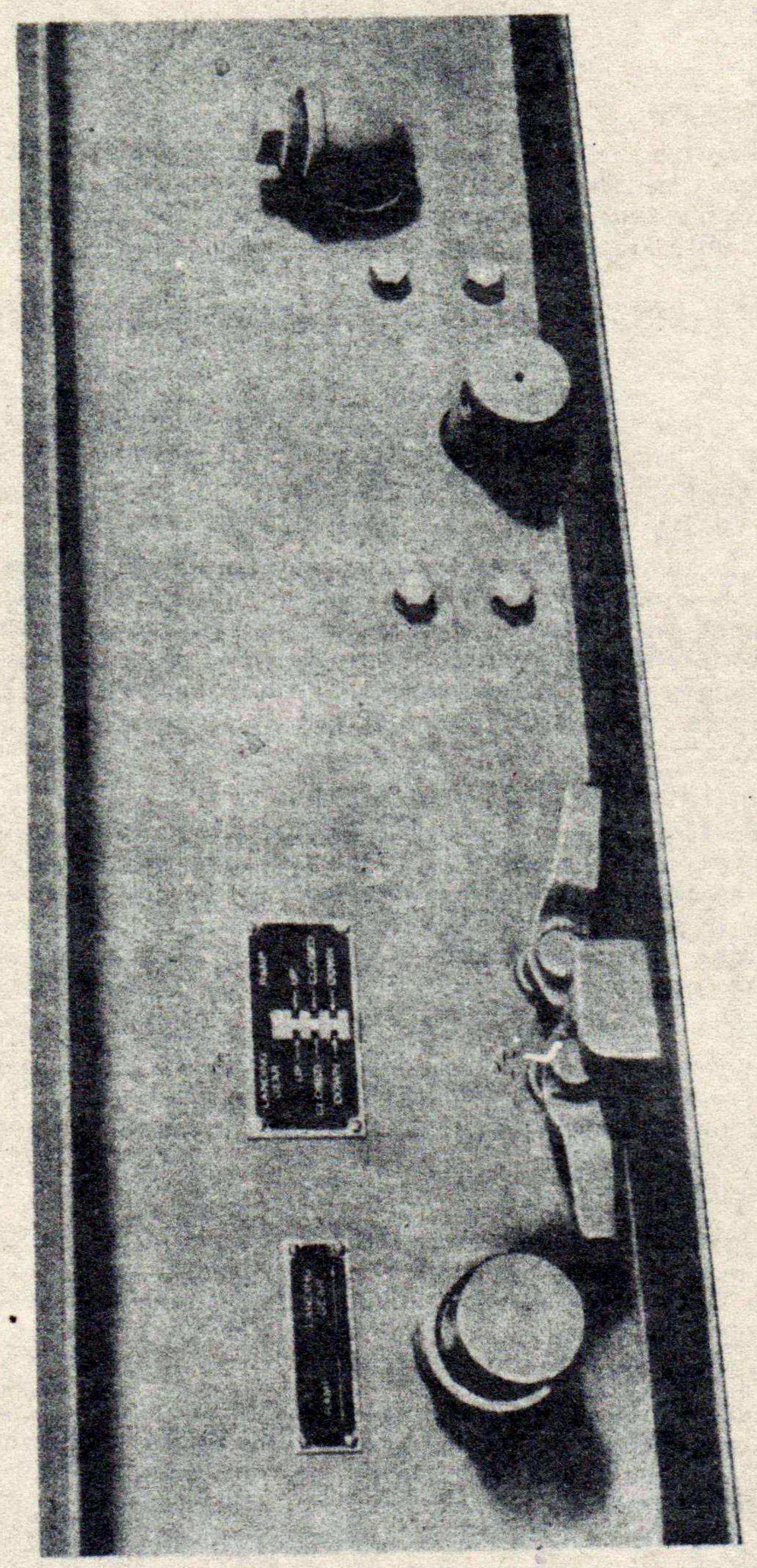

Figure 9. Controls

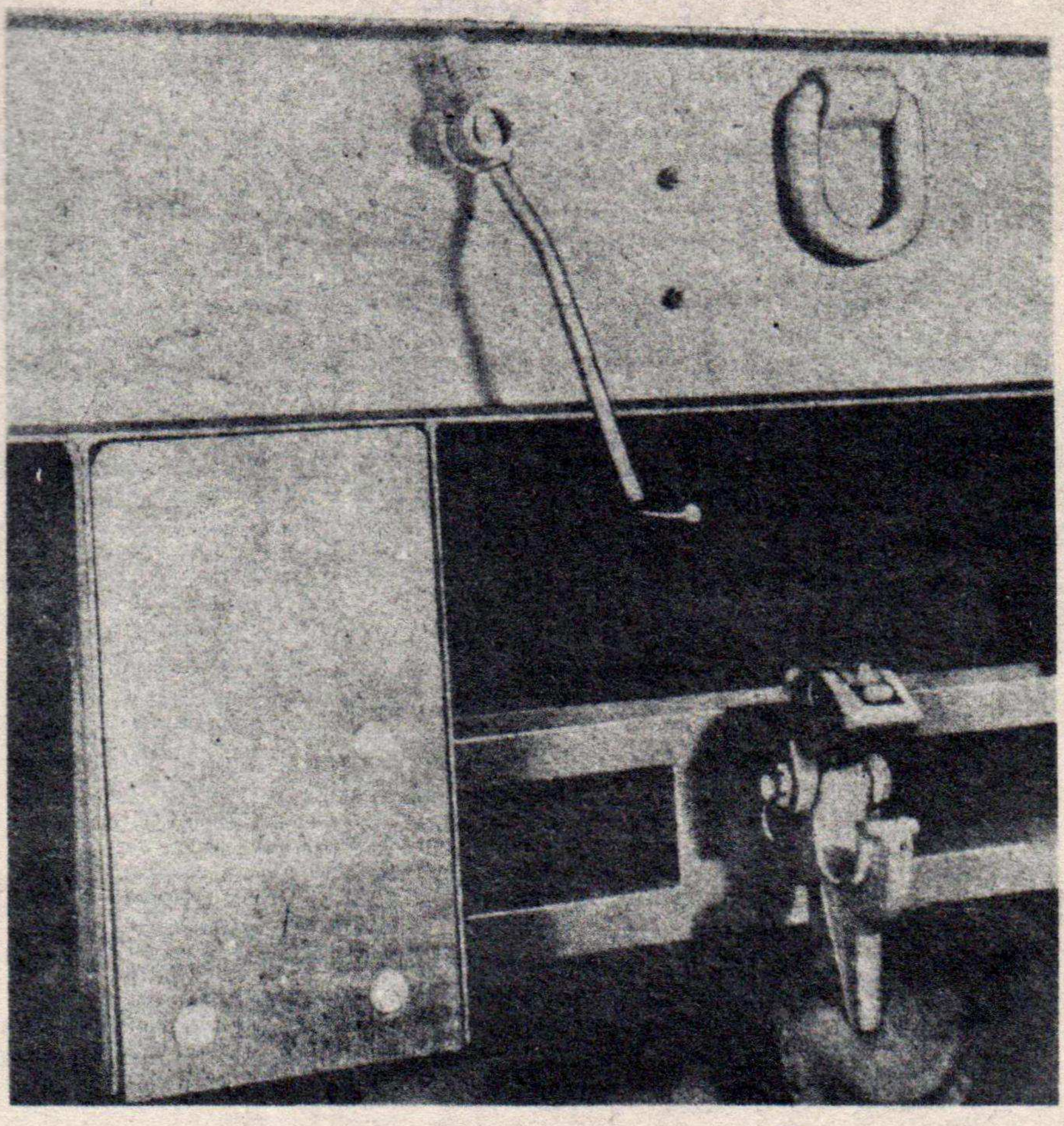

Figure 10. Parking Brake and Pintle Hook

SECTION V
OPERATION

TO LOWER LANDING GEAR

Place the landing gear hydraulic control valve (Fig. 9) in the up position and give the hydraulic pump a few strokes. Then operate the landing gear release control by placing the pump handle in the socket provided for it, and pulling it all the way back. While holding the handle back, move the landing gear hydraulic control valve to the down position. Operate hydraulic pump until the landing gear reaches the down position. This will be apparent through the sudden increase in handle effort caused by a build up of oil pressure when the hydraulic cylinder bottoms. Move the hydraulic control valve to the closed position. WARNING: NEVER PLACE THE LANDING GEAR HYDRAULIC CONTROL VALVE IN THE UP POSITION, UNLESS THE SEMI-TRAILER IS CONNECTED TO THE TRACTOR-TRUCK OR TO THE DOLLY.

TO RAISE LANDING GEAR

After the tractor-truck or dolly is connected to the semi-trailer, place the landing gear hydraulic control valve in the up position. Operate the hydraulic pump until the landing gear is completely retracted. The retracted position will be apparent through the sharp click made by the landing gear locking pins snapping into position. Move the landing gear hydraulic control valve to the closed position.

TO LOWER RAMP

Place the ramp hydraulic control valve in the up position and give the hydraulic pump a few strokes. Then operate the ramp release control by placing the pump handle in the socket and pushing it all the way forward. While holding the handle in this position, move the ramp hydraulic control valve to the down position. The ramp will then fall under the influence of gravity. If, for any reason, the ramp refuses to fall, the pump may be operated with the spare handle, which will force the ramp down.

TO RAISE RAMP

Place the ramp hydraulic control valve in the up position and operate the hydraulic pump until the ramp is completely raised. This will be apparent through the sharp click made by the ramp locking pins snapping into position. If the semi-trailer is to be connected to the dolly or to the tractor-truck immediately it is not always necessary to raise the ramp all the way. If it is raised until the front end engages the slide leading up to the fifth wheel, the tractor-truck or dolly can be made to lift the ramp through a considerable portion of its travel. Whichever method is used, the ramp locking pins should always be inspected to be sure that they are completely seated.

COUPLING TRACTOR-TRUCK OR DOLLY TO SEMI-TRAILER

Set the hand brake and then raise the ramp as outlined above. Unlock the fifth wheel on the tractor-truck or dolly, as the case may be, and then back underneath the ramp until the king pin engages the fifth wheel. CAUTION: Care must be exercised to see that the king pin enters the jaws of the fifth wheel since the king pin is spring loaded and if improperly handled, the truck or dolly may be backed to such a position that the king pin will pass completely over the fifth wheel. If this should happen, it will be necessary to pry the king pin into its socket by means of a crowbar and block of wood in order to get it back over the fifth wheel. If an extra man is not available, the truck driver can accomplish the same result by using the truck jack to push the king pin into its socket.

The truck should always be pulled forward slightly after coupling to insure that the fifth wheel lock has functioned properly. Remove the air brake hoses from the dummy couplings on the trailer, attach them to the couplings on the truck, and open the cut out cocks. Be careful to see that the service line on the towing vehicle is connected to the service line on the trailer and that the emergency line on the towing vehicle is connected to the emergency line on the trailer. Identification tags are mounted on all connections. Connect the jumper cable between the trailer and towing vehicle by placing one end in the socket underneath the ramp and the other end in the socket provided at the rear of the towing vehicle. Release the hand brake and raise the landing gear as outlined above. The vehicle is now ready for travel.

UNCOUPLING TRACTOR-TRUCK OR DOLLY FROM SEMI-TRAILER

Apply hand brake by turning handle clock-wise. Close shut out cocks on towing vehicle and uncouple air hoses and attach them to the dummy couplings provided on either side of the main trailer frame (see Fig. 12). Remove jumper cable and place in tool compartment. Lower landing gear as outlined above. Unlock fifth wheel and drive towing vehicle forward until it is clear of the trailer. NOTE: In both coupling and uncoupling when the semi-trailer is heavily loaded, it may be found that the landing gear strikes the ground before it is completely lowered. If this is the case, the landing gear hydraulic control valve may be placed in the proper position and the trailer moved backward or forward over or off from the landing gear. This will save considerable pumping time.

LOADING AND UNLOADING

Experience will be the best teacher in loading both tractors and shovels. However, there are a few precautions which should be observed. In loading bulldozers, the tractor should be driven up the ramp frontwards, so that the blade will rest on the rear kick up. Shovels or cranes may be loaded more easily by driving up the ramp with the dipper or boom leading. The cab may be swung around after the cargo deck is reached in order to improve clearance on the road. If the trailer is on a slope, the ramp should always be pointed up hill in order to secure the

most favorable loading angle. When unloading crawler type vehicles, they should be allowed to roll freely down the ramp since setting the brakes will cause them to slide sideways. The opening provided in the front of the rear kick up will often times accommodate a tractor drawbar, power control unit, pusher or some such projection thereby allowing a longer piece of equipment to be carried than is normally possible. In case of dead equipment which cannot travel under its own power, the front mounted winch on the 6 ton 6 x 6 truck may be used for loading. It will be found that the truck bumper is of such height that it will engage the trailer bumpers allowing the winch line to pass thru the opening in the rear kick up, thence through the snatch block attached to the dead equipment and back to the bull ring just over the opening in the rear kick up. If necessary, the truck snatch block may be used in combination with that furnished with the trailer to rig a triple line. With this arrangement any piece of equipment within the capacity of the truck winch may be loaded.

TIRE CHANGING

The spare tire is mounted on top of the rear kick up (Fig. 3). The jack is mounted in the opening at the front of the rear kick up. The jack handle, lug wrench and lug wrench handle will be found either in the tool box on the rear kick up or in the compartment on the left hand side of the main frame. Remove the hold down bolts on both the spare tire and hydraulic jack with the 10" crescent wrench. Place the jack underneath the pintle hook frame at the rear end of the trailer on the side where the flat tire is located. It will be found that the jack in this position will lift all tires, both front and rear, clear of the ground. The tire is changed in the conventional manner, although it should be noted that the studs on the left hand side of the vehicle are left hand thread and those on the right hand are right hand thread. In stowing the flat tire it will probably be found necessary to use the truck winch to hoist it to the top of the rear kick-up.

TIRE INFLATION

The 20 ton front loading semi-trailer is one of the first pneumatic tired Engineer Corps vehicles designed to secure maximum mobility off the highway. In sand or mud, the large, low pressure 14.00 x 20 tires have very much less rolling resistance than the conventional high pressure truck or trailer tires. In general the lower the inflation pressure the easier it will be to pull the trailer through soft terrain. The following inflation table is presented as a guide:

TABLE 1 — TIRE INFLATION

Operating Conditions	Inflation Pressure Loaded Trailer	Empty Trailer
Emergency	16 lbs. Minimum	6 lbs. Minimum
10 M.P.H. Off-Road	20 lbs. Minimum	8 lbs. Minimum
25 M.P.H. Off-Road	25 lbs. Minimum	10 lbs. Minimum
40 M.P.H. Highway	40 lbs. Min. & Max.	12 lbs. Minimum

If necessary the loaded trailer may be run for considerable distances on the highway at any tire inflation above 16 lbs. provided the speeds indicated in the above table are not exceeded.

Experience will be the best guide as to the proper tire inflation under a given set of conditions and the operator may exercise his own judgment in this matter as long as the minimums given in the table are maintained. Tire inflation should be closely watched when operating in hot weather both to see that the 40 lbs. maximum is not exceeded and to see that the tires do not overheat from operating at too high a speed for the inflation pressure used.

The air supply valve (Fig. 12) is intended for use in inflating tires by means of the inflation hose supplied as standard equipment with the tractor truck. The cap nut is removed from the air supply valve and the tire inflation hose attached. Turning the valve handle at right angles to the trailer frame will supply air for tire inflation directly from the emergency system on the truck. WARNING: ALWAYS TURN HANDLE PARALLEL TO FRAME WHEN AIR SUPPLY VALVE IS NOT BEING USED FOR TIRE INFLATION. The emergency system on the trailer receives its air supply through the air supply valve and if the valve handle is not kept in the proper position the emergency system can lose its air pressure, thereby becoming inoperative.

PART II

Maintenance Manual

SECTION VI

GENERAL

SCOPE

Part Three contains information for the guidance of personnel of the using organizations responsible for the maintenance (1st & 2nd Echelon) of this equipment. It contains information needed for the performance of the scheduled lubrication and preventive maintenance services as well as descriptions of the major systems and units and their functions in relation to other components of the equipment.

SPECIAL TOOLS AND EQUIPMENT

The small socket wrench (Fig. 5) is provided for the removal and replacement of hydraulic grease fittings located in counter bores in the various pins.

SECTION VII
LUBRICATION

LUBRICATION CHART (Fig. 11)

The lubrication chart prescribes lubrication maintenance for the 20-ton semi-trailer.

Lubrication instructions on the chart are binding on all echelons of maintenance and there shall be no deviations from these instructions.

Service intervals specified on the chart are for normal operating conditions. Reduce these intervals under extreme conditions such as excessively high or low temperatures, prolonged periods of high speed, continued operation in sand or dust, immersion in water, or exposure to moisture, any one of which may quickly destroy the protective qualities of the lubricant and require servicing in order to prevent malfunctioning or damage.

Lubricants are prescribed in the "Key" in accordance with three temperature ranges: (Above thirty-two degrees Fahrenheit, thirty-two degrees to zero degrees Fahrenheit, and below zero degrees Fahrenheit). Determine the time to change grades of lubricants, by maintaining a close check on operation of the vehicle during the approach to change-over periods. Ordinarily, it will be necessary to change grades of lubricants only when air temperatures are consistently in the next higher or lower range, unless malfunctioning occurs sooner due to lubricants being too thin or too heavy.

NOTES ON INDIVIDUAL UNITS AND PARTS

The following instructions pertain to lubrication and service of individual units and parts.

WHEEL BEARINGS

Remove bearing cone assemblies from hub. Wash bearings, cones, spindle, and inside of hub, and dry thoroughly. Do not use compressed air. Inspect bearing races and replace if damaged. Coat the spindle and inside of hub and hub cap with Grease, general purpose No. 2, to a maximum thickness of $\frac{1}{16}$ inch, to retard rust. Lubricate bearings with Grease, general purpose No. 2 with a packer, or by hand, kneading lubricant into all spaces in the bearing. Use extreme care to protect the bearings from dirt, and immediately reassemble and replace wheel. Do not fill hub or hub cap. The lubricant in the bearing is sufficient to provide lubrication until the next service period. Any excess might result in leakage into the drum. Adjust bearings as follows:

Tighten adjusting nut using axle nut wrench until wheel binds, and at the same time rotate wheel to make certain all surfaces are in contact. Then back adjusting nut off about $\frac{1}{6}$ turn, or more, if necessary, making sure wheel rotates freely. Check hub bearing for end play by testing sidewise shake of wheel with hands or with a bar under tire. If bearings are correctly adjusted, shake of wheel will be just perceptible and wheel will turn freely with no drag. If bearing adjustment is too tight, bear-