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TM 9-811

WAR DEPARTMENT TECHNICAL MANUAL

U.S. Dept. of Army

4-TON, 6x6 TRUCKS

(DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

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(DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

WAR DEPARTMENT

25 January 1944

**This manual supersedes TB 811-1 dated 22 October 1943. This manual also contains pertinent information from TM 10-1297, TM 10-1335, TM 10-1517, TM 10-1533, TM 10-1605, and TM 10-1607, and, together with TM 9-1811 and TM 9-1832A, supersedes these manuals.*

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WAR DEPARTMENT
Washington 25, D. C., 25 January 1944

TM 9-811, 4-ton, 6 x 6 Trucks (Diamond T Models 968A Cargo, 969A Wrecker, 970A Ponton, and 972 Dump) is published for the information and guidance of all concerned.

[A. G. 300.7 (3 June 43)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

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PART ONE—VEHICLE OPERATING INSTRUCTIONS

Section I

INTRODUCTION

	Paragraph
Scope	1

1. SCOPE.

a. *This technical manual is published for the information and guidance of the using arm personnel charged with the operation and maintenance of this materiel.

b. In addition to a description of the 4-ton, 6 x 6 truck (Diamond T, Models 968A Cargo, 969A Wrecker, 970A Ponton, and 972 Dump), this manual contains technical information required for the identification, use, and care of the materiel. The manual is divided into two parts. Part One, section I through section VIII, contains vehicle operating instructions. Part Two, section IX through section XLIII, contains vehicle maintenance instructions for the using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction.

c. In all cases where the nature of the repair, modifications, or adjustment is beyond the scope or facilities of the unit, the responsible ordnance service should be informed, so that trained personnel with suitable tools and equipment may be provided, or proper instructions issued.

*To provide operating instructions with the materiel, this technical manual has been published in advance of complete technical review. Any errors or omissions will be corrected by changes, or, if extensive, by an early revision.

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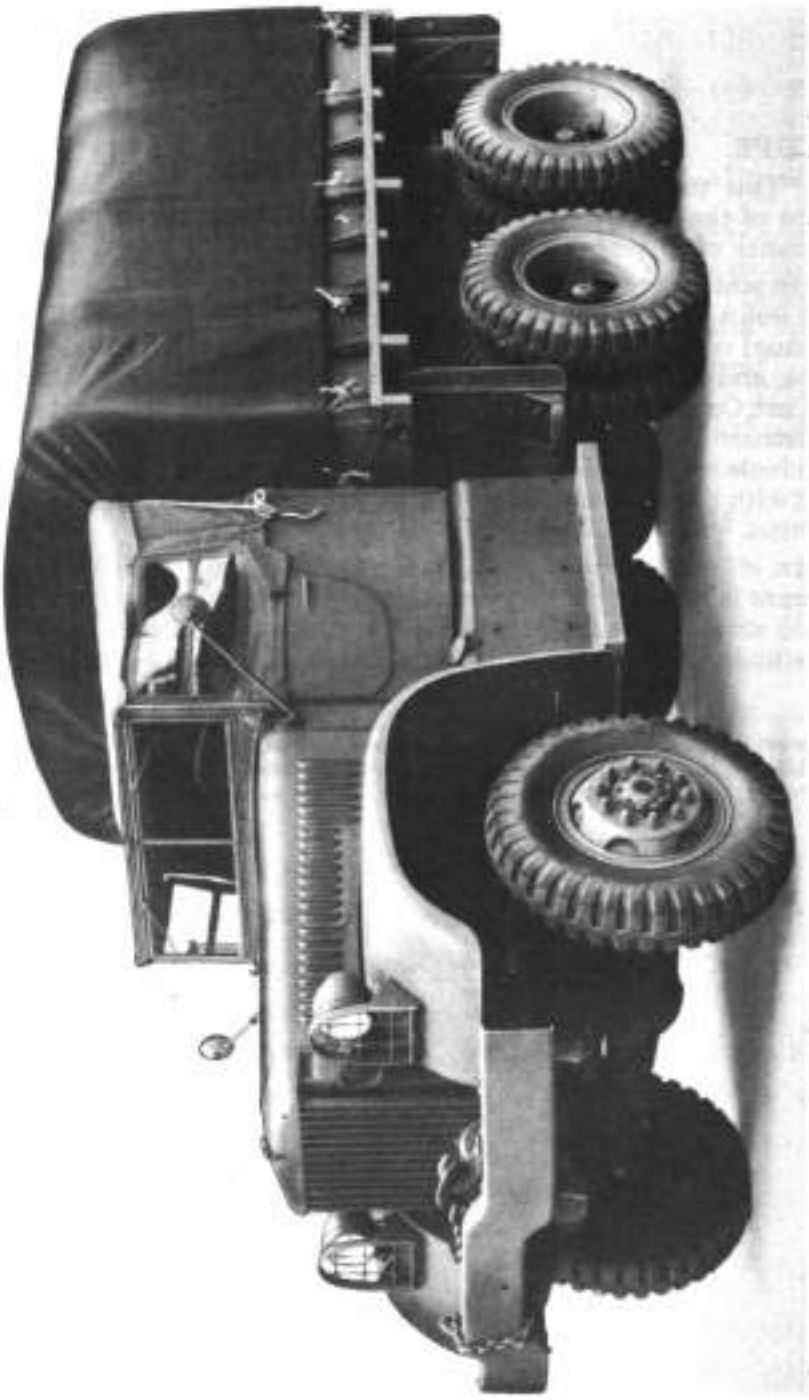

PD 303923

Figure 1—Model 968A Cargo Truck with Open Cab—3/4 Front

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Section II

DESCRIPTION AND TABULATED DATA

	Paragraph
Description	2
Designations	3
Data	4

2. DESCRIPTION.

a. General. The various models covered by this publication are all built on the same basic chassis, which is a 4-ton, 6 x 6 job, powered with a conventional six-cylinder gasoline engine. A five-speed overdrive transmission and a direct and underdrive transfer are used on all models. All three axles are driving axles of conventional double-reduction design. Rear axles are dual-wheeled.

b. Identification. The four chassis are similar in appearance, and are built with open-type and closed-type cabs. These vehicles may be recognized by the design of the cabs, the contour of the fenders, and the appearance of the hood and radiator. The axle housings are clearly visible under the vehicle, and may be recognized as the banjo type. The vehicles may be positively identified by the nomenclature plate mounted on the left cowl side under the hood.

c. Differences among Models (figs. 1, 2, 3, and 4).

(1) CARGO TRUCK (MODEL 968A). The cargo truck is built on the standard 4-ton, 6 x 6 chassis. Special equipment consists of a standard-type wooden cargo body with a tarpaulin top and troop seats, a power-driven, front-mounted winch, and two spare tires. The power take-off is mounted on the transmission.

(2) WRECKER TRUCK (MODEL 969A) (figs. 5, 6, 7, and 8). The wrecker truck is built on the standard 4-ton, 6 x 6 chassis. Special equipment consists of a steel wrecker body, twin boom power-driven wrecker equipment, welding tanks and equipment, a gasoline-driven air compressor unit, a power-driven front-mounted winch, and two spare tires. The power take-off which drives the wrecker equipment is mounted on the transfer, and the power take-off which drives the winch is on the transmission.

(3) PONTON TRUCK (MODEL 970A) (figs. 9 and 10). The ponton truck is built on a chassis which is the same as the standard 4-ton, 6 x 6 chassis, except that it has a longer wheelbase (par. 5). Special equipment consists of a standard-type wooden ponton body, with a tarpaulin top and a power-driven front-mounted winch. The power take-off is mounted on the left side of the transmission.

(4) DUMP TRUCK (MODEL 972) (figs. 11 and 12). The dump truck is built on the standard 4-ton, 6 x 6 chassis. Special equipment consists of a steel dump body, with power-driven hoist equipment. The power take-off for the hoist is mounted on the transfer case. There is no winch on this model.

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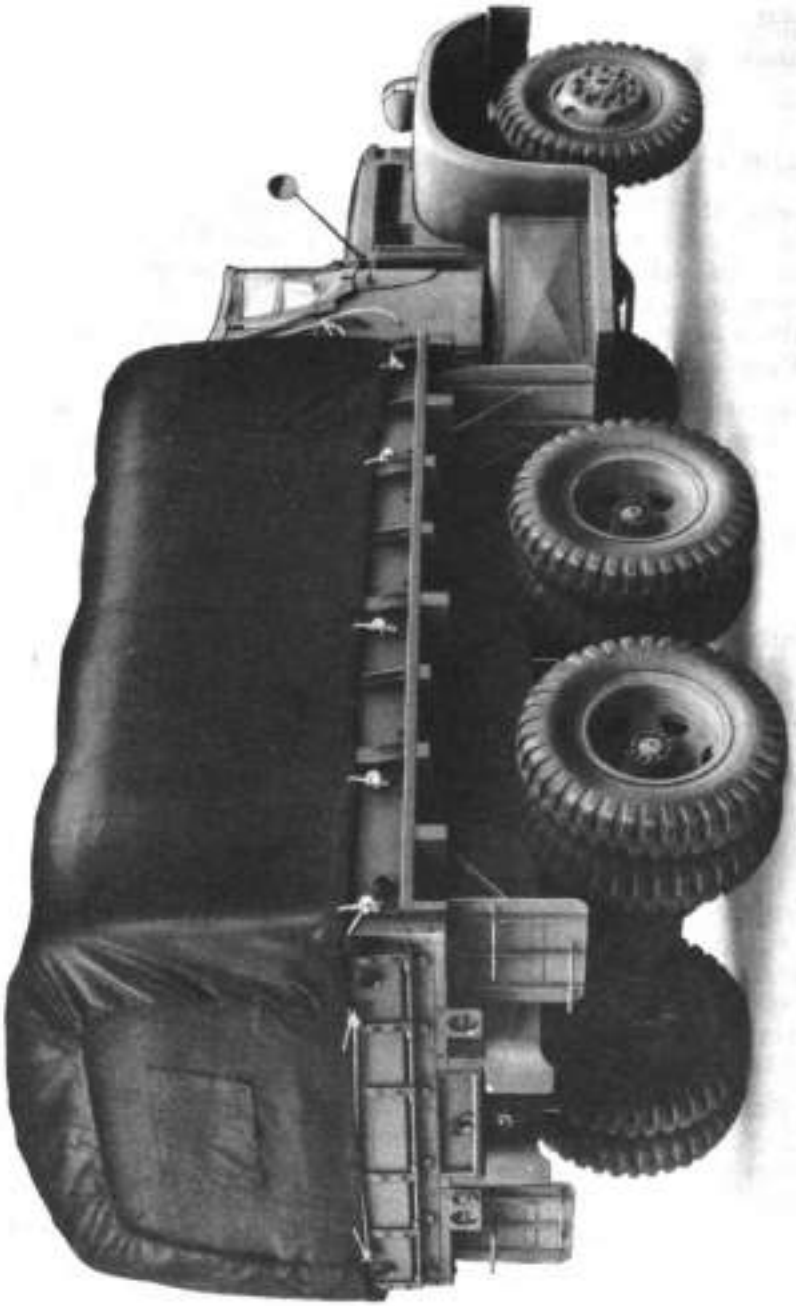

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Figure 2—Model 968A Cargo Truck with Open Cab—2/3 Rear

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U.S. PD 303925

Figure 3—Model 968A Cargo Truck with Closed Cab—3/4 Front

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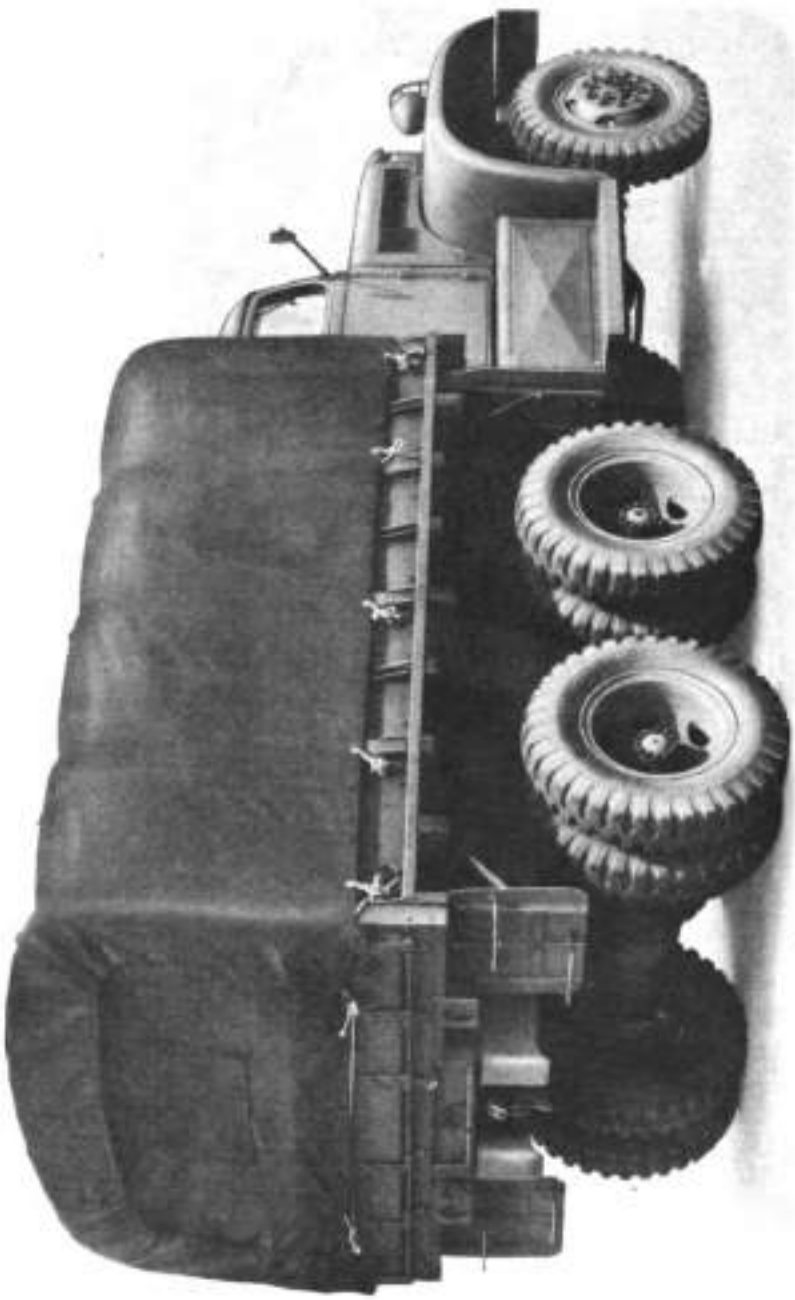

RA PD 303926

Figure 4—Model 968A Cargo Truck with Closed Cab—3/4 Rear

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DESCRIPTION AND TABULATED DATA

3. DESIGNATIONS.

a. **General.** Serial numbers and type designations sometimes appear on plates attached to the various units, and sometimes are stamped on the units. Detailed information regarding the location of these follows:

b. **Chassis Plate** (fig. 13). A chassis nomenclature plate, showing the vehicle nomenclature, make, model, weights, serial number, and gasoline and oil recommendations, is attached to the left side of the cowl under the hood.

c. **Engine Plate.** An engine serial number plate is located on the left side of the cylinder block.

d. **Publication Plate** (fig. 14). A plate is mounted on the left side of the cowl under the hood, which lists the Ordnance Department numbers of publications applying to these vehicles.

e. **Winch Plate** (fig. 14). A plate is mounted on top of the winch gear box which gives the model and serial number of the winch assembly. This plate is not found on dump trucks.

f. **Winch Power Take-off Plate** (fig. 14). A serial number plate is mounted on the transmission power take-off shifting cover. This plate is not found on dump trucks.

g. **Wrecker Plate** (fig. 14). A serial number plate is attached to the right side of the wrecker frame.

h. **Wrecker Air Compressor Plates** (fig. 14). A serial number plate is attached to the air compressor units used on wrecker models.

i. **Miscellaneous Designations.**

(1) FRAME. Vehicle serial number is stamped on the right side-rail over the front spring rear hanger.

(2) FRONT AXLE. The front axle serial number is stamped on the top of the housing banjo, and that of the differential carrier is stamped on a boss at the filler plug.

(3) REAR AXLES. The forward rear axle serial number is stamped on the housing just above the level plug. The rear rear axle serial number is stamped on the housing banjo on the side opposite the filler plug near the carrier deck.

(4) TRANSFER. The transfer serial number is stamped on a boss on the case next to the filler plug.

(5) TRANSMISSION. The transmission serial number is located on the rear face of the case.

(6) STEERING GEAR. An identification number is stamped on top of the gear housing.

(7) ELECTRICAL ACCESSORIES. The generator, distributor, starting motor, starter switch and solenoid switch have plates designating model and manufacturing data. Generators also carry serial numbers.

(8) AIR COMPRESSOR. A plate showing model and manufacturing data is attached to the air compressor.

(9) GOVERNOR. A plate showing the serial number is attached to the governor flyball housing.

(10) BATTERY. The type designation is stamped on one of the cell connecting bars.

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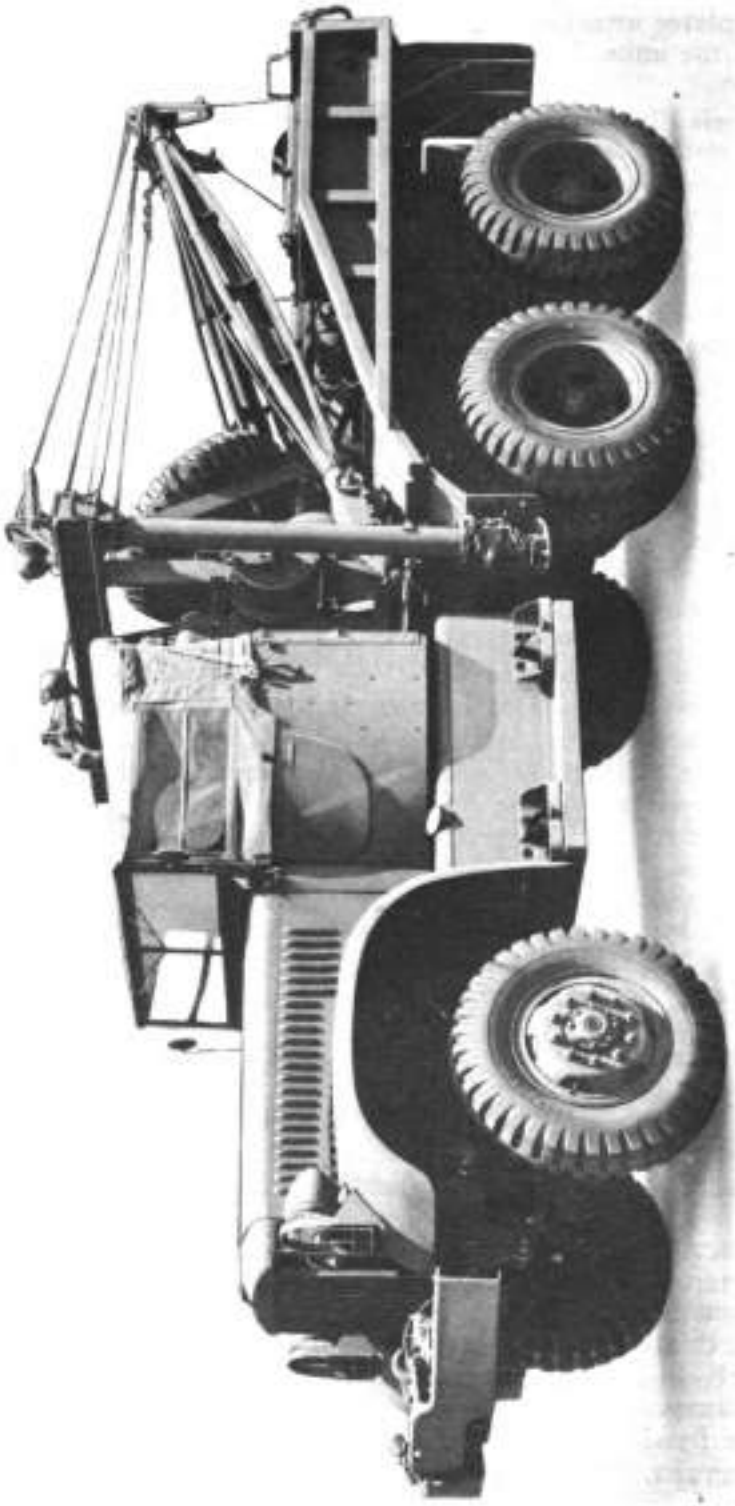

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Figure 5—Model 969A Wrecker Truck with Open Cab—3/4 Front

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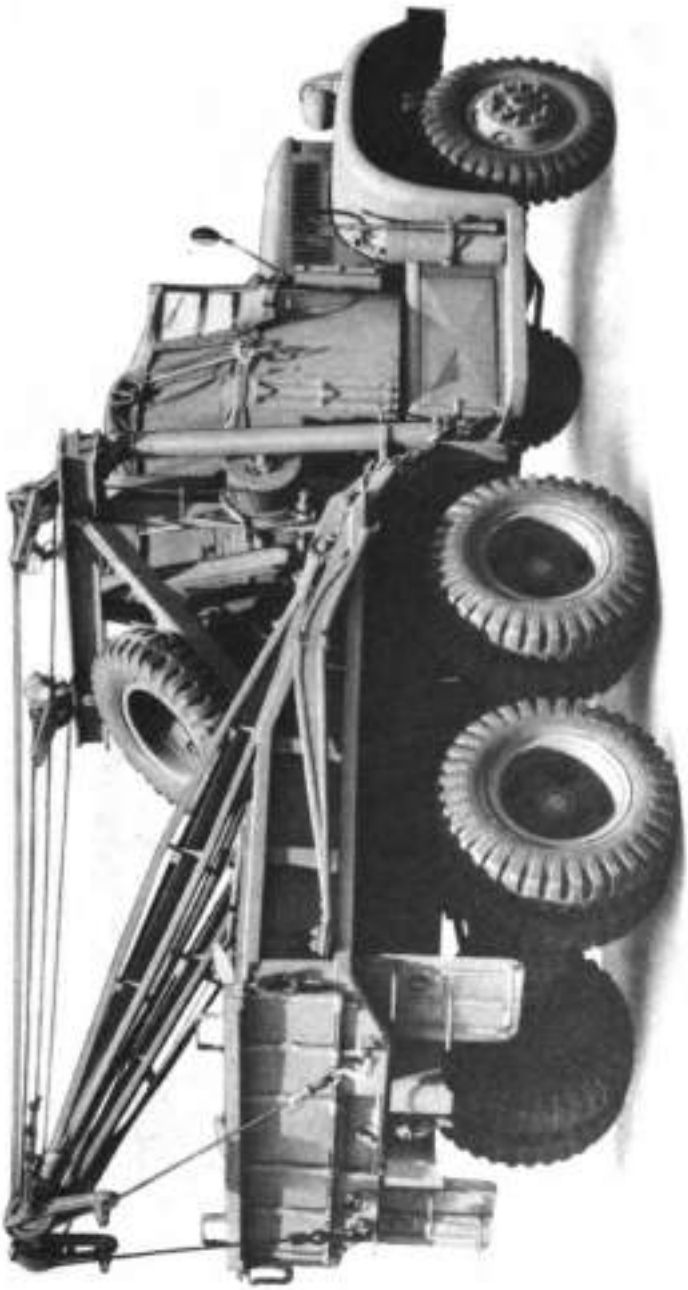

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Figure 6—Model 969A Wrecker Truck with Open Cab—3/4 Rear

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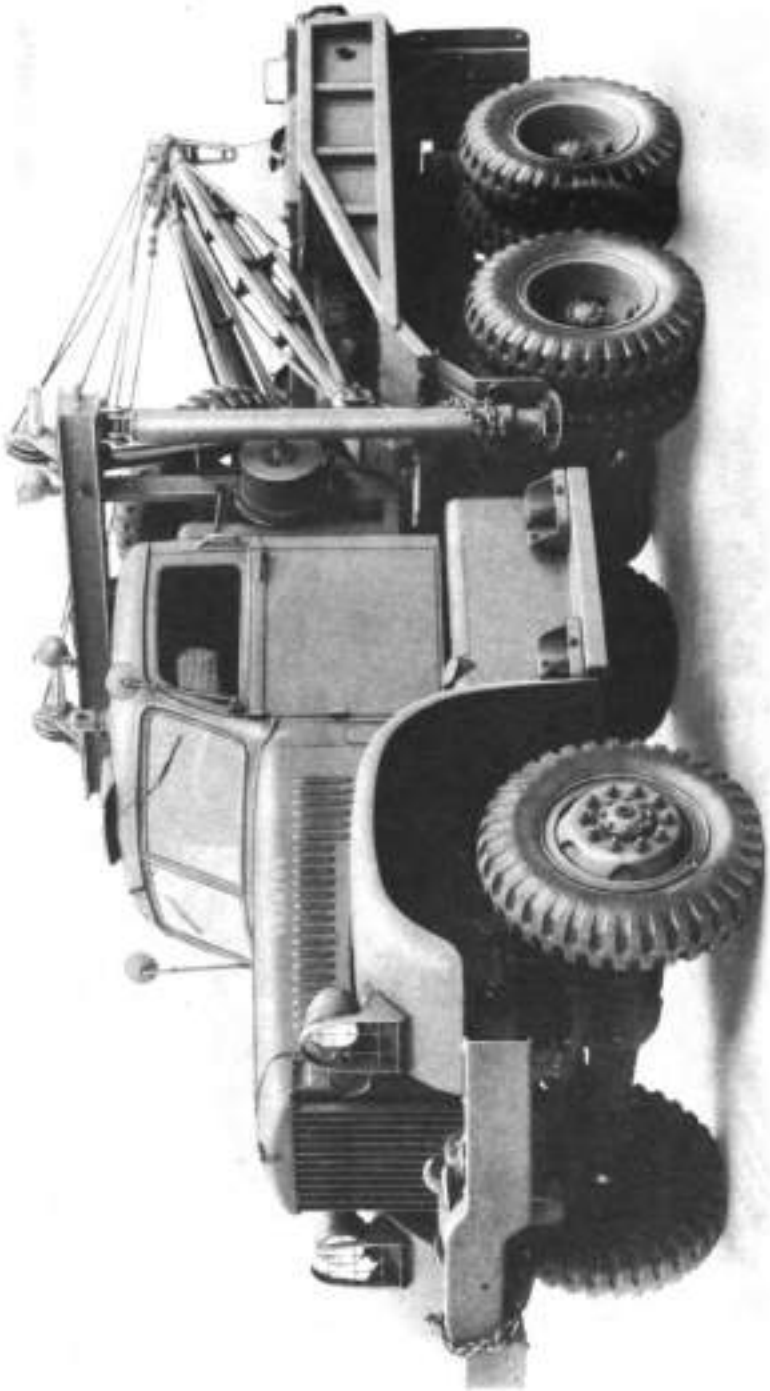

R.A. PD 303929

Figure 7—Model 969A Wrecker Truck with Closed Cab—3/4 Front

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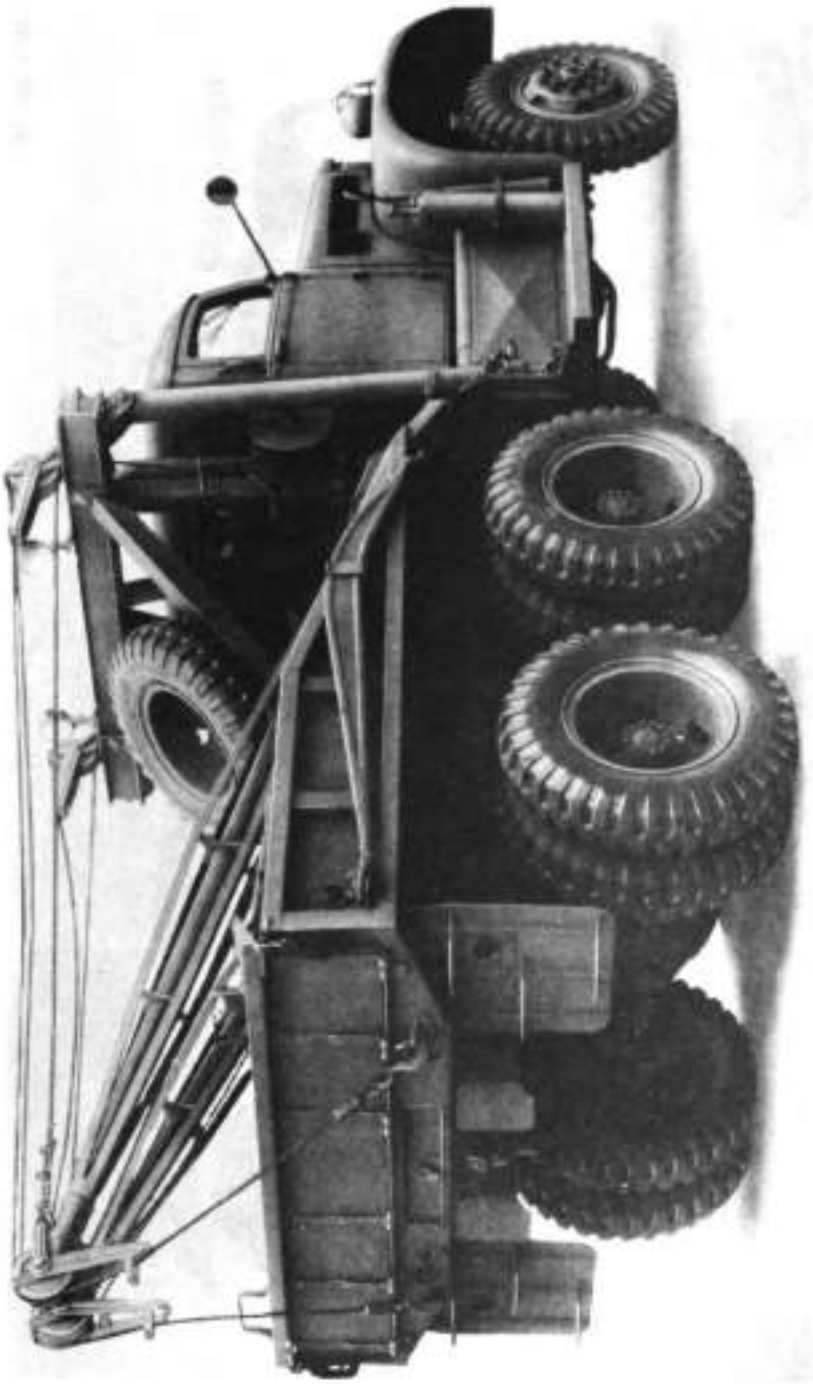

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Figure 8—Model 969A Wrecker Truck with Closed Cab—3/4 Rear

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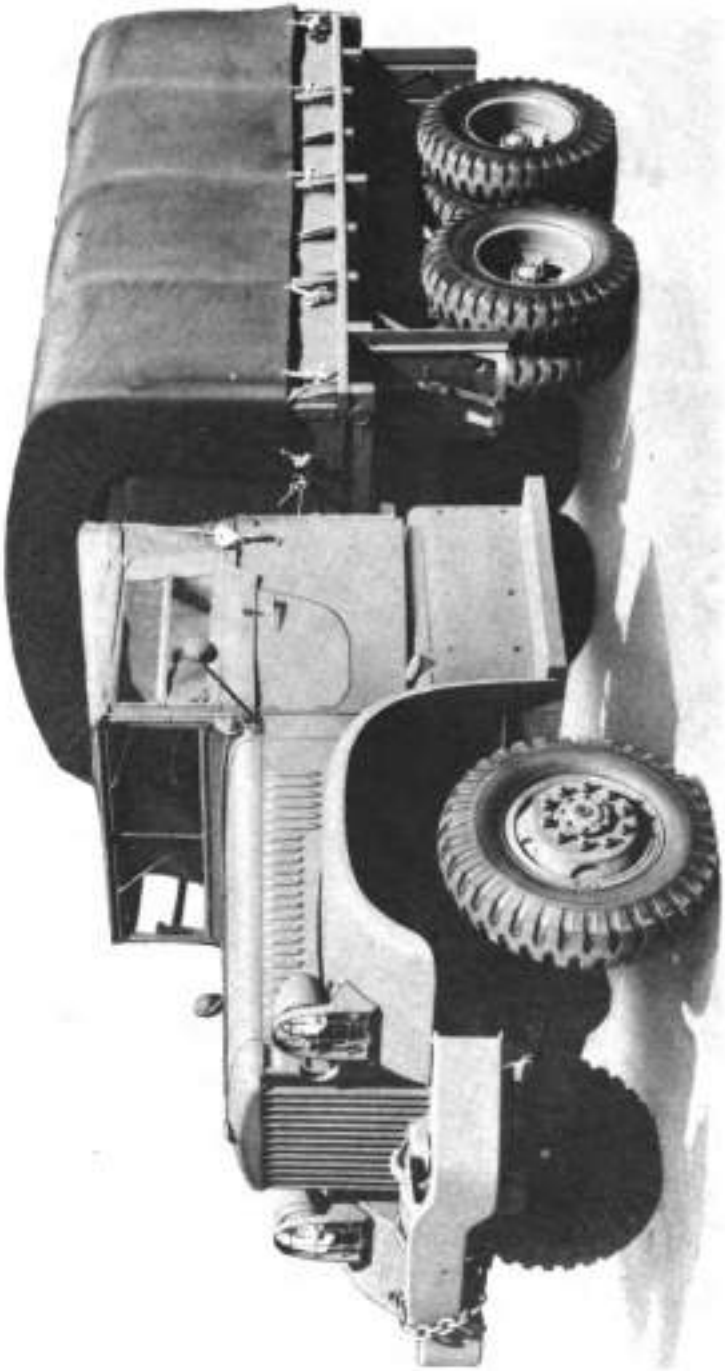

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Figure 9—Model 970A Ponton Truck with Open Cab—3/4 Front

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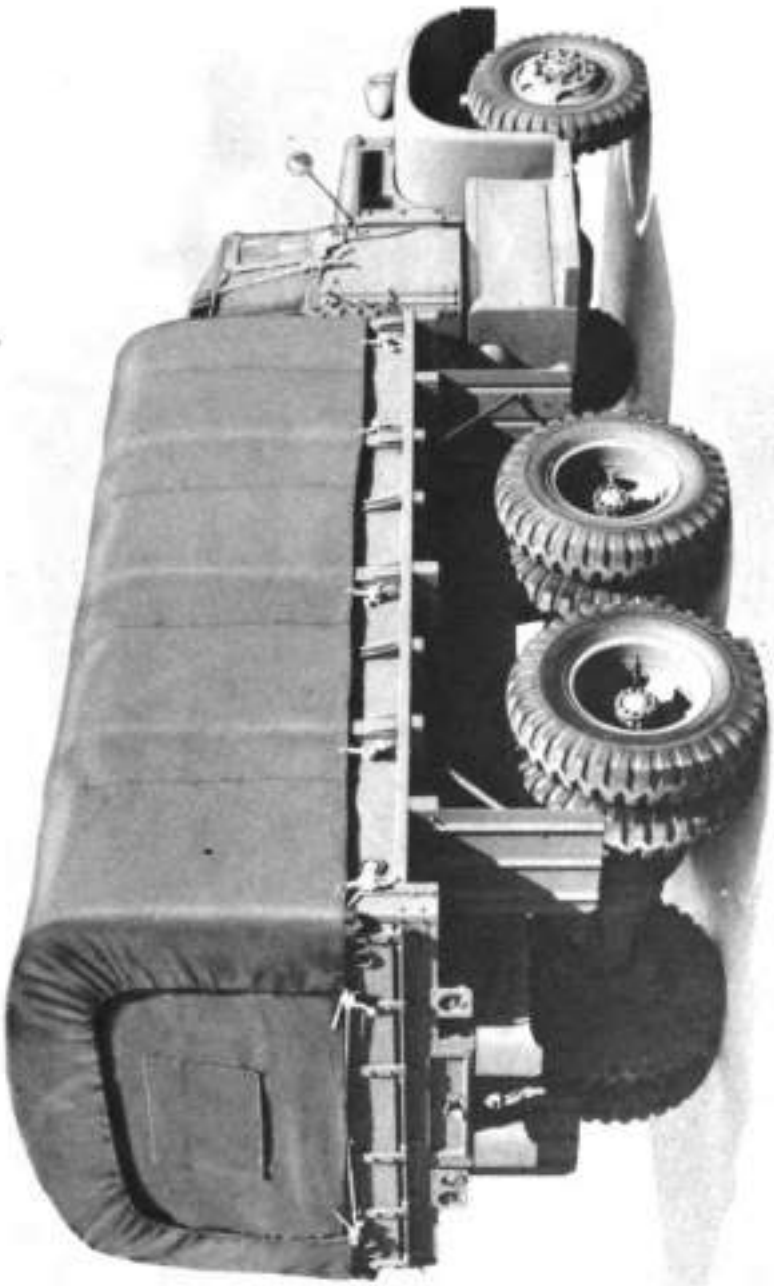

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Figure 10—Model 970A Ponton Truck with Open Cab—3/4 Rear

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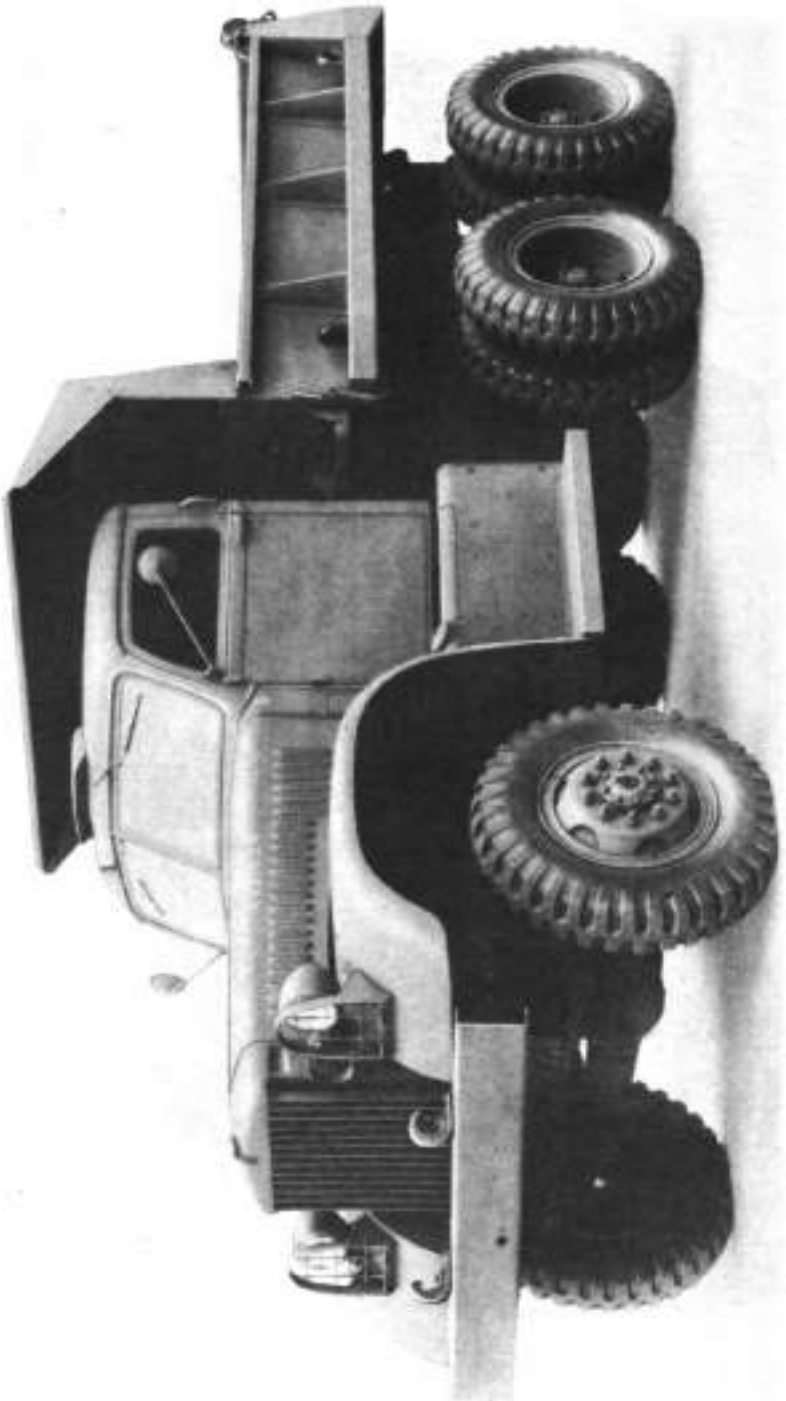

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Figure 11—Model 972 Dump Truck with Closed Cab—3/4 Front

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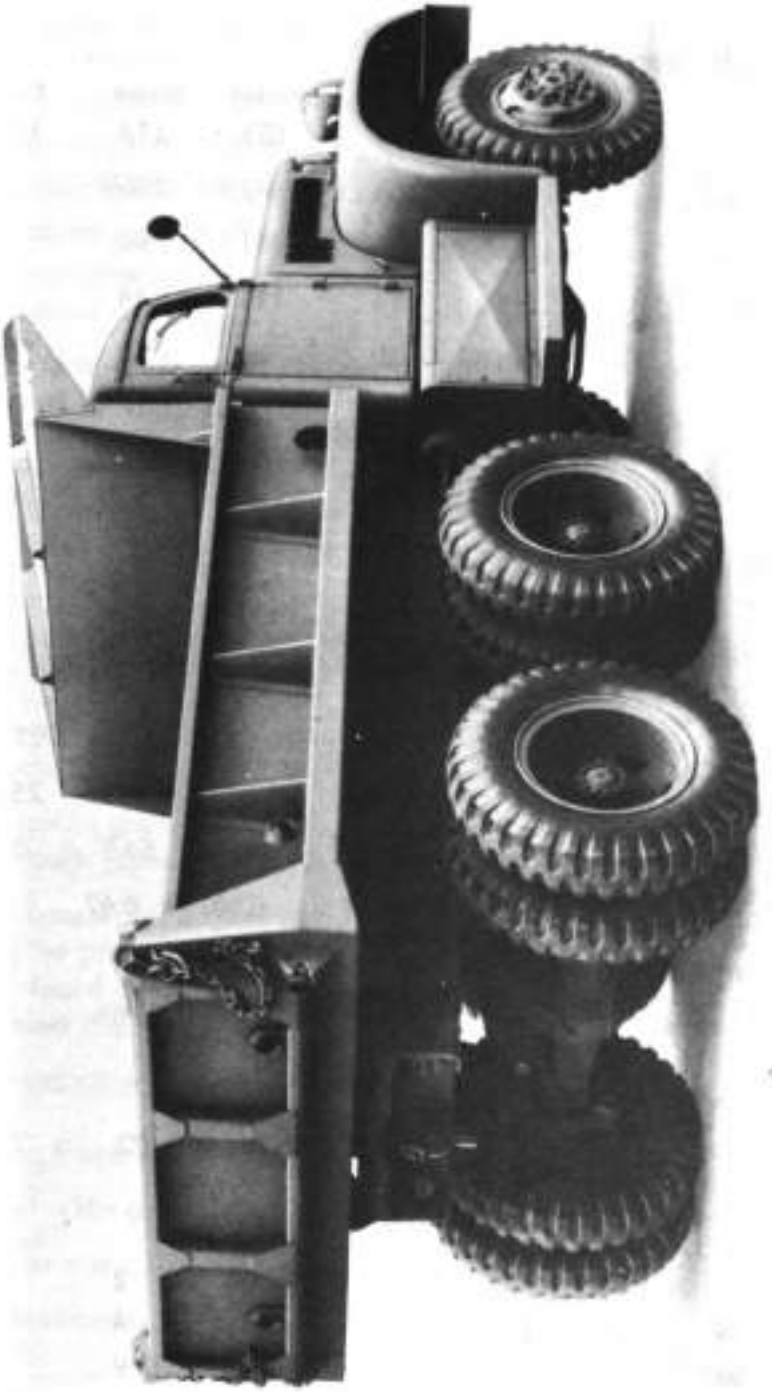

RA PD 303934

Figure 12—Model 972 Dump Truck with Closed Cab—3/4 Rear

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

4. DATA.

a. Vehicle Specifications.

	Cargo	Wrecker	Ponton	Dump
Wheelbase . . . . . (in.)	151	151	172	151
Length, over-all . . . . . (in.)	268	291⅝	296⅛	
Width, over-all . . . . . (in.)	96	101	96	
Height, over-all . . . . . (in.)	114	111	114	
Wheel size . . . . . (in.)	20	20	20	20
Tire size . . . . . (in.)	9.00x20	9.00x20	9.00x20	9.00x20
Tire type	Rib Tread	Rib Tread	Rib Tread	Rib Tread
Tread (center to center) (front) . . . . . (in.)	73¾	73¾	73¾	73¾
Tread (center to center) (rear) . . . . . (in.)	72¾	72¾	72¾	72¾
Weight (empty) . . . . . (lb)	18,400	21,700	18,800	17,725
Weight (loaded) . . . . . (lb)	26,400	. . . . .	26,800	25,725
Ground pressure . . . . (psi max)	60.7	61.6	60.7	53.6
Ground contact . . . . (sq in. min)	6.47	6.50	6.47	6.22
Ground clearance . . . . . (in.)	11	11	11	11
Pintle height (loaded) . . . . (in.)	36¾	36¾	36¾	36¾

b. Performance.

Fuel (octane)	72	72	72	72
Maximum speeds in low range in the transfer:				
Transmission in 1st . . . (mph)	2	2	2	2
Transmission in 2nd . . (mph)	4	4	4	4
Transmission in 3rd . . (mph)	9	9	9	9
Transmission in direct (mph)	17	17	17	17
Transmission in overdrive . . . . . (mph)	22	22	22	22

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DESCRIPTION AND TABULATED DATA

	Cargo	Wrecker	Panel	Dump
Maximum speeds in high range in transfer:				
Transmission in 1st. . . (mph)	4	4	4	4
Transmission in 2nd. . (mph)	8	8	8	8
Transmission in 3rd. . (mph)	16	16	16	16
Transmission in direct (mph)	30	30	30	30
Transmission in overdrive . . . . . (mph)	40	40	40	40
Approach angle . . . . . (deg)	37	37	37	37
Departure angle. . . . . (deg)	46	46	46	46
Minimum turning radius,				
Right. . . . . (ft in.)	36-5	36-5	38-5	36-5
Left . . . . . (ft in.)	35-0	35-0	37-0	35-0
Fording depth (height of tail pipe. . . . . (in.)	24	24	24	24
Towing facilities:				
Front . . . . . (tow hooks)	2	2	2	2
Rear	Pintle	Pintle	Pintle	Pintle
Maximum grade without load (ascending).	65%	65%	65%	65%
Fuel consumption:				
Miles per gallon (hard-surfaced roads without towed load)	3	3	3	3
Cruising range . . . . . (miles)	150-175	150-175	150-175	150-175

c. **Engine.**

Model (Hercules).	RXC	RXC	RXC	RXC
Horsepower (SAE).	51.34	51.34	51.34	51.34
Displacement . . . . . (cu in.)	529	529	529	529
Bore . . . . . (in.)	4⅝	4⅝	4⅝	4⅝
Stroke . . . . . (in.)	5½	5½	5½	5½
Number of cylinders.	6	6	6	6
Governed speed . . . . . (rpm)	2300	2300	2300	2300

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

d. Capacities.

Fuel tanks	60 gal
Engine crankcase—refill	16 qt
Cooling system	48 qt
Transmission with P.T.O.	24 pt
Transmission without P.T.O.	21 pt
Transfer	3 pt
Front axle differential	15 pt
Rear axle differential (2 differentials) each	7½ pt
Winch	3½ pt
Carburetor air cleaner	4½ pt
Engine crankcase breather	⅛ pt
Briggs and Stratton engine	1 pt
Kellogg compressor	½ pt
DeVilbiss compressor	1 pt
Wrecker transmission	8 pt

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Figure 13—Chassis Plates

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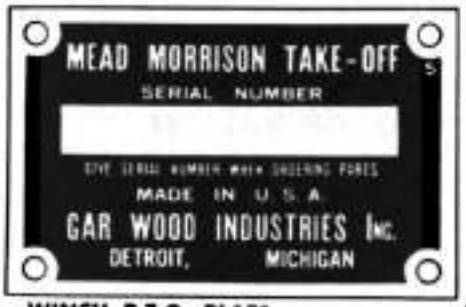
DESCRIPTION AND TABULATED DATA



WINCH P.T.O. PLATE

AIR COMPRESSOR PLATES

WRECKER PLATE

ENGINE PLATE

WINCH PLATE

PUBLICATION PLATE

RA PD 313907

Figure 14—Serial Plates

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

Section III

DRIVING CONTROLS AND OPERATION

	Paragraph
Controls and cab equipment	5
Starting and warming up the engine	6
Operating the vehicle	7
Towing the vehicle	8

5. CONTROLS AND CAB EQUIPMENT (figs. 15 and 16).

a. **General.** The controls are employed according to the usual automotive practice. The driver must become thoroughly familiar with the location and use of all control devices and instruments before attempting to operate the vehicle.

b. **Steering Wheel.** The vehicle is steered by a conventional type of steering mechanism.

c. **Horn Button.** A conventional push-button type of horn control switch is located at the center of the steering wheel.

d. **Warning Plate** (fig. 17). Several plates which contain special information and cautions to be observed in vehicle operation are mounted on the dash inside the cab. The operator should read these plates and become familiar with their content before operating the vehicle.

e. **Windshield Wiper.** Conventional-type windshield wipers are mounted at the top of each windshield glass. They are controlled by valves at each end of the instrument panel.

f. **Hand Control Valve.** A hand control valve is mounted on the steering post and is used to control air brakes on a trailed unit.

g. **Windshield Wiper Control.** Air control valves are mounted at each end of the dash to control the windshield wipers.

h. **Instrument Lights.** Three instrument lights are arranged at the top of the dash to illuminate the instruments for night driving. These are controlled by a plunger-type switch mounted on the dash.

i. **Main Light Switch.** This switch, located at the top of the dash, controls the complete lighting circuit. When the button is flush with the dash, all of the lights are out. When pulled out against the latch stop, the blackout lights come into service. With the latch depressed and the button pulled to the second out position, all the service lights come into operation. For day driving the stop lights only are in circuit with the button pulled to the full-out position.

j. **Tachometer.** A tachometer, or engine revolution counter, is provided to aid the driver in maintaining definite engine speeds, and in intelligently changing gear ratios in the transmission and transfer case. The tachometer has a set hand with a lock, which records the maximum engine speed reached.

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k. Ammeter. A conventional-type ammeter is located near the center of the dash. It is useful in checking operation of generator and regulator.

l. Panel Light Switch. A plunger-type switch is mounted near the center of the dash to control the instrument lights. It will not turn the dash lights on unless the main light switch is in the second out position.

m. Front Battery Ammeter. An indicating ammeter (without graduations) is mounted on the left side of the dash. It indicates when the front battery (which does not register on the ammeter in the charging circuit) is not being charged.

n. Viscometer. A viscometer gage is mounted on the dash on the right side of the instrument group. It indicates the condition of the crankcase lubricant. If the viscosity is not normal on the gage after the engine is thoroughly warmed up, it is an indication of an improper grade of oil, a sludge condition, or dangerous crankcase dilution. **NOTE**: *Run engine at a speed slightly in excess of idling speed.*

o. Speedometer. A conventional mileage recording speedometer with a speed range of 60 miles per hour is used. It is located near the center of the dash.

p. Temperature Gage. This gage is located above and to the right of the ignition switch. It registers the operating temperature of the engine, which should be 160°F to 180°F for good performance.

q. Hand Throttle Button. The throttle button, mounted at the right of the choke, is used when starting or making adjustments on an engine. It should be kept in idling position (flush with dash) during all ordinary driving.

r. Oil Pressure Gage. An oil pressure gage is located at the center of the dash and is an indicator of the efficiency of engine lubrication. Oil pressure should not be less than 5 to 10 pounds at idling speeds and not less than 25 pounds at running speeds.

s. Choke Button. A choke control button is mounted on the dash, to the right of the ignition switch. The choke is used to assist in starting the engine, especially when cold. Choking the engine results in an over-rich mixture which washes lubricant from the cylinder walls and dilutes the crankcase oil. For this reason the choke should be used only when necessary.

t. Ignition Switch. A lever-operated ignition switch is located at the center of the dash. It functions the same as the conventional key-type ignition lock, except that a permanently mounted lever tumbler is used, and no key is required.

u. Fuel Gage. An electric-type fuel gage is mounted on the dash above and to the left of the ignition switch.

v. Spark Control. A manual control, mounted on the dash to the left of the ignition switch, is provided to advance and retard the spark as driving conditions warrant. The spark should be retarded with the engine lugging, to eliminate spark knock.

w. Air Pressure Gage. This gage registers the air pressure (in pounds per square inch) available for brake application. It provides a convenient method of checking the operation of the compressor, and is

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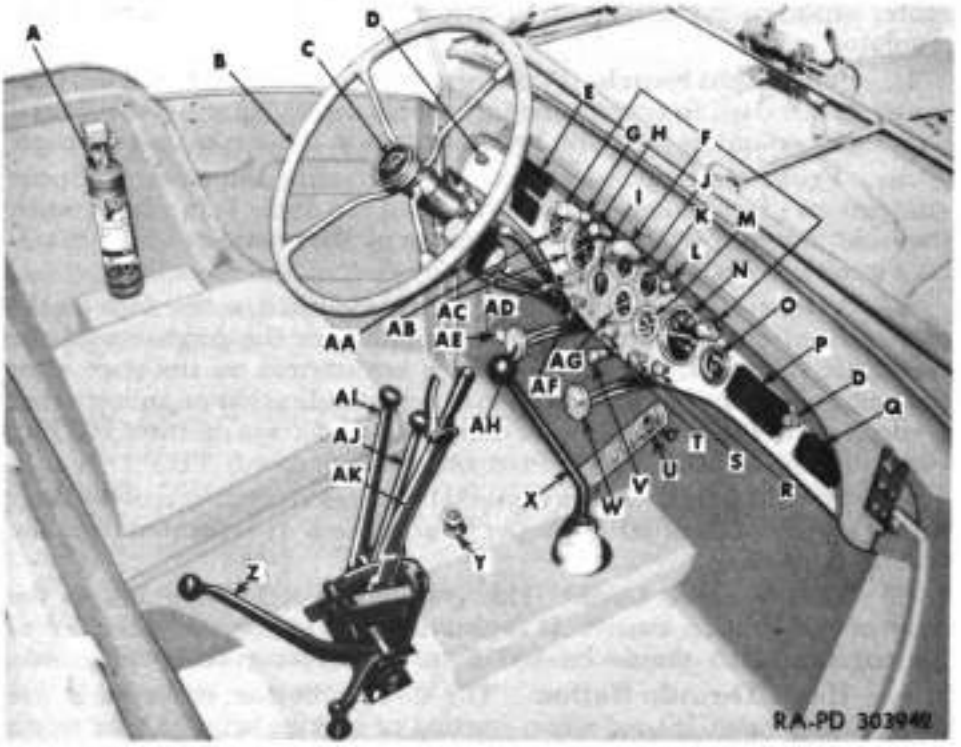
4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)



A	FIRE EXTINGUISHER	S	CHOKE CONTROL
B	STEERING WHEEL	T	IGNITION SWITCH
C	HORN BUTTON	U	ACCELERATION PEDAL
D	WINDSHIELD WIPER CONTROL	V	COWL VENTILATOR HANDLE
E	WARNING PLATES	W	BRAKE PEDAL
F	DASH LAMP	X	TRANSMISSION LEVER
G	BLACKOUT DRIVING LAMP SWITCH	Y	STARTER BUTTON
H	MAIN LIGHT SWITCH	Z	POWER TAKE-OFF SHIFT LEVER
I	FUEL GAGE	AA	HAND BRAKE VALVE
J	AMMETER	AB	AIR PRESSURE GAGE
K	FRONT BATTERY AMMETER	AC	TACHOMETER
L	PANEL LIGHTS	AD	TACHOMETER LOCK
M	TEMPERATURE GAGE	AE	DIMMER SWITCH
N	SPEEDOMETER	AF	SPARK CONTROL
O	VISCOSITY GAGE	AG	OIL PRESSURE GAGE
P	WINCH CAUTION PLATE (Hoist Caution Plate on Dump Truck)	AH	CLUTCH PEDAL
		AI	TRANSFER SHIFT LEVER
Q	COOLING SYSTEM PLATE	AJ	TRANSFER DECLUTCH LEVER
R	THROTTLE CONTROL	AK	PARKING BRAKE LEVER

Figure 15—Instruments and Controls—Open Cab

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as much a warning signal as the buzzer. **IMPORTANT**: *Do not drive the vehicle with less than 70 pounds air pressure. If the gage should read below 50 pounds pressure with the vehicle in motion, stop at once and ascertain cause of low air pressure.*

x. Accelerator Pedal. The accelerator pedal is of the conventional type, and is located on the toeboard. It is operated with the right foot, and controls the speed of the engine by regulating the amount of gasoline fed to it.

y. Brake Pedal. The brake pedal is located on the toeboard, and controls the air valve in the air braking system. The pedal should be depressed gradually to avoid slamming on the brakes.

z. Dimmer Switch. The dimmer switch, located on the toeboard to the left of the clutch, is operated with the left foot, and controls the selection of the upper or lower headlamp beam. Pushing down on the switch changes from one selection to the other.

aa. Clutch Pedal. A conventional clutch pedal is located on the toeboard. When it is depressed the engine is disengaged from the transmission, making it possible to shift gears. Do not ride with foot on the clutch pedal as it will cause excessive wear on the clutch facings.

ab. Transmission Lever. The transmission lever is located in the middle of the cab floor, and is used to select the various gear ratios provided in the transmission according to the shifting diagram above the dash. The lever controls this selection (5 speeds forward and 1 reverse) through a set of shifting forks and rails.

ac. Transmission Power Take-off Shift Lever. The power take-off lever is located in back of the transmission lever, and is used to engage the take-off gears with the transmission for winch operation. As illustrated on the shifting plate, the power take-off has a high and a low range, a reverse and two neutral positions.

ad. Hand Brake Lever. The hand brake lever is mounted inside the cab and controls the disk brake in the drive line. It should be used as a parking brake or in emergencies.

ae. Declutching Lever. The declutching lever is located behind the transmission lever, and is used to engage or disengage the declutching unit to the front axle drive.

af. Transfer Case Shift Lever. The transfer case shift lever is located behind the transmission lever, and is used to change the gear ratio in the transfer case according to the positions shown on the shifting plate.

ag. Cranking Motor Switch. A cranking motor switch is located on the floorboard in such a position as to be conveniently reached with the right heel.

ah. Blackout Driving Lamp Switch. A plunger-type switch is mounted on the dash next to the main light switch, and is used to control the blackout driving lamp.

6. STARTING AND WARMING UP THE ENGINE.

a. General. Good driving is perhaps the most important requisite for long and satisfactory service of any automotive vehicle. A real driver is more than a machine with one hand on the transmission lever

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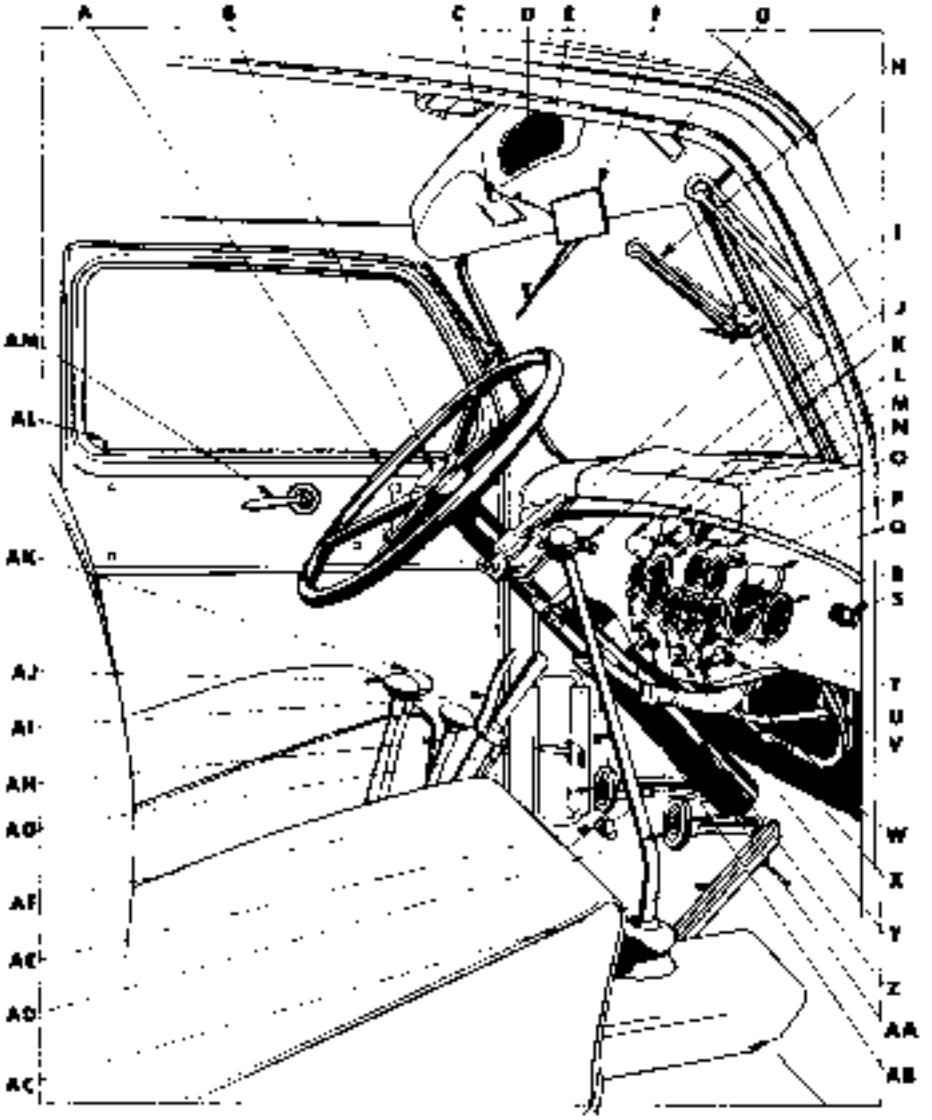

A STEERING WHEEL
B HORN BUTTON
C WARNING PLATE
D WINDSHIELD WIPER
E GLOVE COMPARTMENT
F REAR VIEW MIRROR
G CAUTION PLATE
H WINDSHIELD SECTOR ARM
I HAND AIR VALVE
J WINDSHIELD WIPER CONTROL
K INSTRUMENT LIGHTS
L MAIN LIGHT SWITCH
M TACHOMETER
N AMMETER
O PANEL LIGHT SWITCH
P FRONT BATTERY AMMETER
Q INSTRUMENT LIGHT
R VISCOMETER
S WINDSHIELD WIPER CONTROL
T SPEEDOMETER
U TEMPERATURE GAGE
V HAND THROTTLE BUTTON
W OIL PRESSURE GAGE
X CHOKE BUTTON
Y IGNITION SWITCH
Z FUEL GAGE
AA SPARK CONTROL BUTTON
AB AIR PRESSURE GAGE
AC ACCELERATOR PEDAL
AD BRAKE PEDAL
AE DIMMER SWITCH
AF CLUTCH PEDAL
AG TRANSMISSION LEVER
AH POWER TAKE-OFF SHIFT LEVER
AI HAND BRAKE LEVER
AJ DECLUTCHING LEVER
AK TRANSFER CASE SHIFT LEVER
AL HIGH LATCH BUTTON
AM REMOTE CONTROL HANDLE

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Figure 16—Instruments and Controls—Closed Cab

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and the other on the steering wheel. He must be able to think and feel his truck. He must recognize any unnatural condition such as vibrations, scrapings, knocks, clicks, sluggishness, etc.

b. Preliminary Instructions. Before the engine is started, make the prestarting inspection outlined in paragraph 21. To start the engine, proceed as follows:

(1) Place transmission lever in neutral position.

(2) Set hand brake lever.

(3) If the engine is cold, crack hand throttle about ¼ open, and pull choke button until it is half open. These steps may not be necessary when the engine is warm. If it is very cold, it may be necessary to choke the engine more.

(4) Turn on ignition.

(5) Push clutch pedal to floor and hold there until after engine is started.

(6) Press starter button.

(7) Release the starter button the moment the engine begins to run. Never press the starter button for more than 10 to 15 seconds at a time. If the engine has not started after two such trials, allow the starter to cool for one minute. If the engine fails to start, or makes a false start, do not press the starter button again until the engine has come to a complete stop. Failure to observe this precaution, especially after a false start, may result in a broken starter motor drive housing.

(8) After the engine has started, slowly release the clutch. Adjust the hand throttle to prevent the engine from racing. As soon as the engine runs smoothly, push the choke control. Excessive use of the choke will cause dilution of the engine oil and probable engine failure. During the engine warm-up period, operate the engine at 800 to 900 revolutions per minute as indicated by the tachometer. Idling is permissible for only very short periods of time, not to exceed five minutes.

7. OPERATING THE VEHICLE.

a. Starting under Normal Conditions. After the engine has been thoroughly warmed up and checked for satisfactory operation, the vehicle may be started by following the steps listed below. NOTE: *Be sure that sufficient air pressure (70 pounds per square inch as shown on dash gage) has been built up to provide adequate braking power* (figs. 15 and 16).

(1) Push clutch pedal to the toeboard to completely disengage the clutch.

(2) Disengage the front axle drive by shifting the declutch lever as shown in the shifting diagram. (When extra traction is needed, engage front axle.)

(3) Shift transfer case lever into proper position. (Transfer case should be in low when heavily loaded, or when starting on a grade, and in high when unloaded or when starting on level ground.)

(4) Shift the transmission lever into first speed.

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14

WINCH CAPACITY 15000 POUNDS

ON FIRST LAYER OF ROPE IN LOW SPEED OF TAKE-OFF. LINE SPEEDS REQUIRE THAT WHEN THIS WINCH IS USED TO ASSIST THIS VEHICLE WITH WHEELS DRIVING, THE TAKE-OFF SHOULD BE IN LOW SPEED, TRANSMISSION IN LOW GEAR, WITH TRANSFER CASE IN LOW RANGE.

VEHICLE AND WINCH GUARANTEE REQUIRE THAT THE WINCH SHALL BE OPERATED AT ALL TIMES AS REQUIRED BY APPROPRIATE REGULATIONS.

GAR WOOD INDUSTRIES, INC. DETROIT, MICH.

TO DRAIN COOLING SYSTEM

TO COMPLETELY DRAIN THE COOLING SYSTEM, OPEN PET COCKS AT:

(1) RADIATOR LOWER FITTING
(2) LEFT SIDE OF CYLINDER BLOCK.

IF ENGINE IS OPERATED FOR ANY LENGTH OF TIME AT A SPEED GREATER THAN 2300 RPM, AS SHOWN BY ENGINE SPEED RECORDER ON INSTRUMENT PANEL, THE ENGINE WILL BE SERIOUSLY DAMAGED

— WARNING —

BUZZER OPERATION IS AN INDICATION THAT THE TRUCK MUST IMMEDIATELY BE BROUGHT TO A STOP AND THE CAUSE OF THE LOSS OF BRAKE AIR PRESSURE DETERMINED

HOIST CAUTION

ENGINE SPEED MUST NOT EXCEED 1000 R.P.M. WHEN HOIST IS OPERATED

BLOCK ELEVATED BODY WHEN SERVICING

RECOMMENDED BY MANUFACTURER:

GRADE OF OIL ABOVE 80° F. OE SAE 30
GRADE OF OIL 10° F. TO 80° F. OE SAE 10
GRADE OF OIL BELOW 10° F. OH HYDRAULIC OIL

FILL HOIST TO LEVEL OF FILLER OPENING WITH BODY FULLY ELEVATED

RA PD 313908

Figure 17—Instruction Plates

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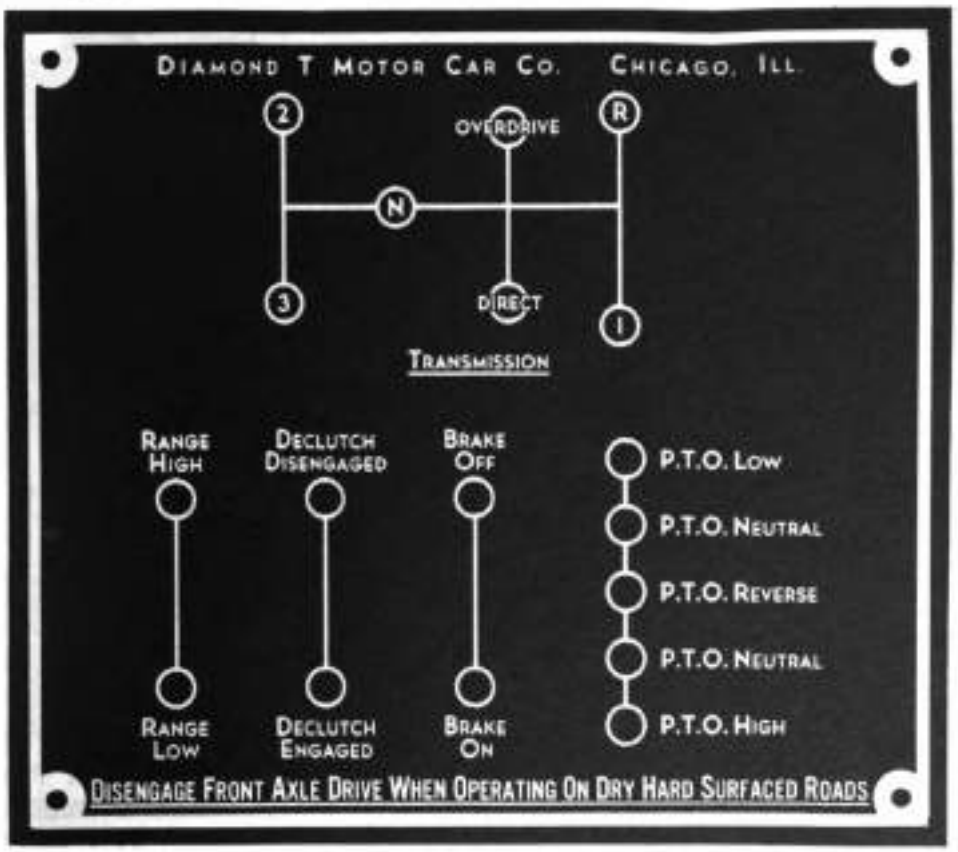
(5) Release the hand brake.

(6) Push down on the accelerator pedal to speed up the engine and at the same time release the clutch gradually. Feed sufficient gasoline to the engine to insure a smooth even start. Do not race the engine.

b. Gearshift (Transmission) (figs. 18, 19 and 20).

(1) After the vehicle is started, to increase speed it is necessary to shift through the transmission to the high position.

(2) As the truck increases speed, release the accelerator pedal, disengage the clutch and move the transmission lever into neutral, and



RA PD 303949

Figure 18—Shifting Plate—Cargo and Ponton Vehicles

then into the second speed position. Then release the clutch pedal smoothly, and at the same time accelerate the engine.

(3) Repeat this for each step in the transmission until it is in driving gear. Shifting should be accomplished with a smooth, positive, yet unhurried movement of the transmission lever.

(4) When it is necessary to reverse the truck, stop truck and shift into reverse position in the transmission.

(5) It is very important that every shift made be complete, with the gears fully in mesh. Incomplete shifting leads to uneven gear tooth wear

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and expensive repair. With a little experience the driver will feel the poppets engage when gears are completely in mesh.

(6) It is good driving practice to drop a step in the transmission before the vehicle loses too much speed and the engine starts to lab-- It is easiest to double-clutch when shifting into a lower gear as follow..

(a) Disengage clutch and release accelerator pedal.

(b) Move transmission lever into neutral position.

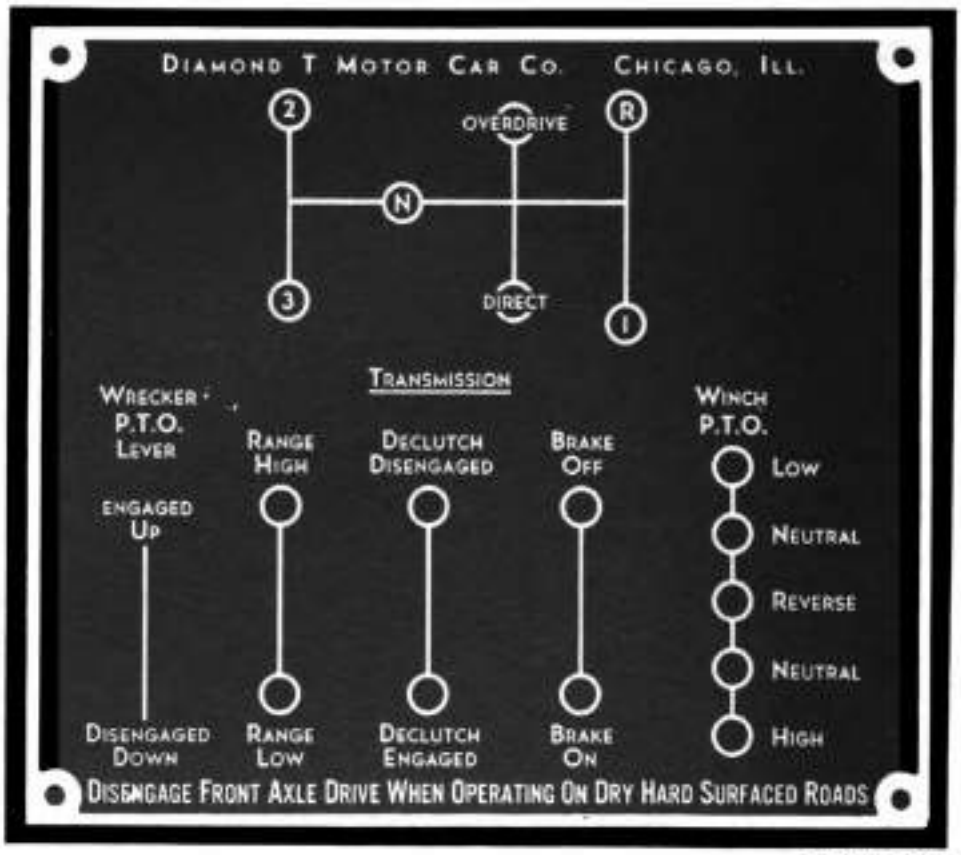

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Figure 19—Shifting Plate—Wrecker Vehicles

(c) Release clutch pedal and accelerate engine to synchronize it with vehicle speed.

(d) Disengage the clutch once again and shift into lower gear.

(e) Engage clutch smoothly while accelerating the engine. **IMPORTANT:** *Never force transmission lever into position or shift into lower gears at high engine speeds.*

c. Gearshift (Transfer Case). It is good practice to operate the vehicle in high range over hard-surfaced terrain when there is easy rolling. When there are extreme grades, or when the conditions are so difficult as to require high traction, the low range should be utilized,

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especially when heavily loaded, to help the engine to "hold on" in the main transmission. NOTE: *The shift from high to low speed should never be attempted unless the vehicle is standing still, or being operated at low speeds.*

(1) Disengage the clutch and move the shifting lever to a neutral position.

(2) Release clutch and accelerate engine.

(3) Disengage the clutch again, and move the shift lever into the low position.

(4) Release clutch and accelerate engine to synchronize with vehicle speed.

(5) IMPORTANT: *Shift smoothly, never forcing the shifting lever, as a sudden shock of gear engagement is likely to damage the transmitting parts.* The shift from low to high may be accomplished at any speed, whether the vehicle is in motion or standing still. Follow the same procedure outlined above except shift into high in the third step.

d. Use of the Tachometer in Gear Ratio Selection.

(1) The tachometer is a valuable aid to intelligent gear ratio selections in the transmission. Best performance will be obtained with the engine operating between 1800 and 2300 revolutions per minute. If conditions are such that the vehicle cannot maintain its speed in the gear ratio being used, shift down in the transmission to keep the engine operating between the recommended limits. When shifting up in the transmission, do not select a higher ratio until after the engine speed reaches 1800 revolutions per minute.

(2) The figures in the table (fig. 21) are based on a maximum engine speed of 2300 revolutions per minute and hence indicate the difference in the readings obtained on the tachometer and speedometer. The tachometer indicates at any time the speed at which the engine is turning over, and might be considered as a measure of the amount of work the engine is doing. Note that the engine can develop its maximum torque and peak horsepower for any gear selection in the transmission or transfer case. The speedometer on the other hand indicates only the linear speed, or distance the vehicle moves per unit of time.

(3) Experienced drivers use the tachometer rather than the speedometer in vehicle operation, especially in the low gears. In that way they can get the most out of their power plant by selecting the proper gear ratios to permit the engine to operate in its most effective range, between 1800 and 2300 revolutions per minute.

e. Cautions.

(1) In shifting from one speed ratio to another, do not skip positions.

(2) Do not ride the clutch. The driver's foot should rest on the clutch only when he is operating it.

(3) Do not engage the clutch suddenly. A sudden engagement is injurious to the mechanism and may stall the engine.

(4) Disengage the clutch fully, to avoid gear damage and shifting difficulties.

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

f. Front Axle Drive. The front axle drive should be engaged before the vehicle leaves hard-surfaced roads to negotiate hazardous conditions. Driven by all wheels, a vehicle can traverse mud, snow, ice or sand which it might not negotiate with the rear drive only. The front axle engagement is controlled by the declutch lever in the cab as indicated on the shifting diagrams (figs. 18, 19 and 20).

(1) ENGAGING. If the engagement cannot be made readily, try shifting while turning the vehicle to right or left. The gears involved

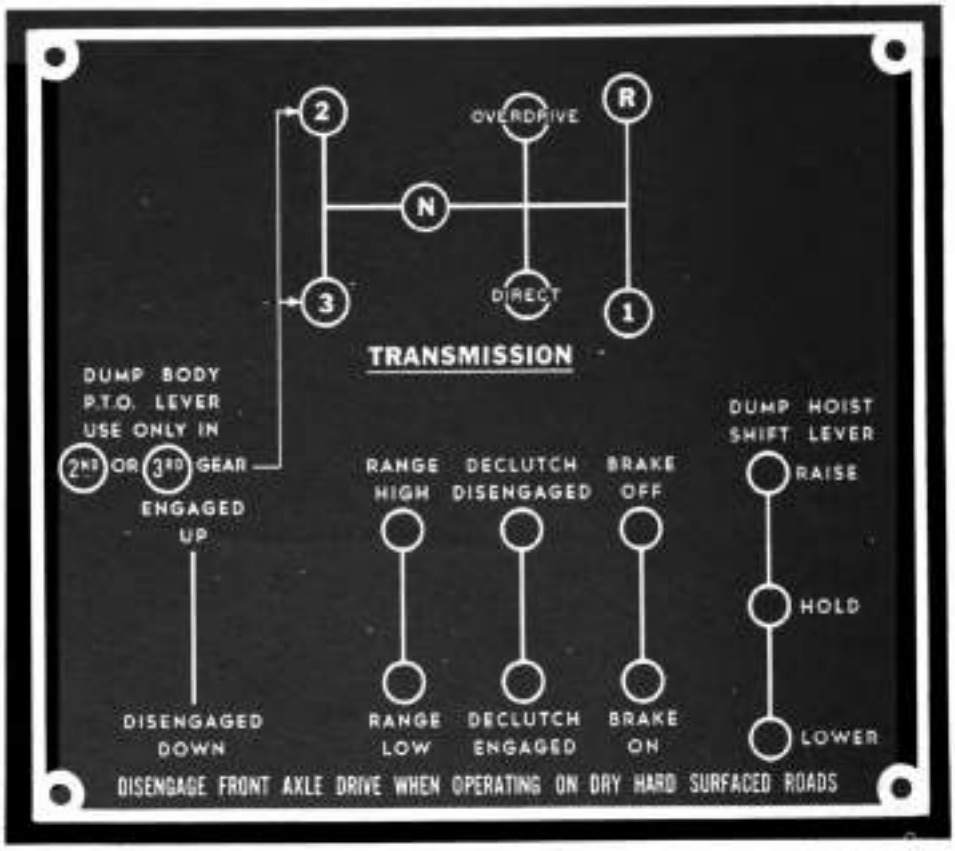

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Figure 20—Shifting Plate—Dump Vehicles

turn at slightly different speeds while the vehicle negotiates the turn, the difference in their speeds permitting them to engage. *Do not force the shifting lever.*

(2) DISENGAGING. It is generally more difficult to disengage the front axle drive than to engage it. Action is aided by exerting moderate pressure on the shift lever while the vehicle is rolling slowly in first or reverse gear. Avoid sudden shock to the driving parts when in low gear. Guard carefully against engaging the clutch suddenly at any time, and especially if the vehicle rolls backward, no matter how slowly.

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(3) CAUTIONS. If there is any tendency for the vehicle to roll backwards, block the wheels before attempting to start, and then engage the clutch and accelerator carefully. If it is not convenient to block the wheels, and should conditions permit, by all means allow the vehicle to coast back, under control of the brakes, to a standstill before attempting to start forward. Failure to observe these simple precautions will result in snapping of drive shaft gears and shafts.

(4) It is not possible to drive in the low range with the front axle declutched because of stops on the transfer case and declutch control levers. When in the high range, it is possible to engage or disengage the front axle at will. This is advantageous under easy rolling conditions where the front drive is not required.

g. Stopping. This vehicle is equipped with air brakes providing exceptionally great braking capacity. A person inexperienced with this type of brakes must exercise caution until quite familiar with them, for his own as well as his passengers' comfort and safety.

(1) Release accelerator pedal and depress the brake pedal gradually to apply the brakes smoothly.

(2) When the truck's speed is down to from ten to fifteen miles per hour, disengage the clutch and shift the transmission into neutral.

(3) When the vehicle is completely stopped, release clutch pedal, set hand brake and release brake pedal.

(4) When another unit is trailed behind this vehicle, the air lines are arranged so that when the foot pedal is depressed the brakes are applied on both the truck and the trailed unit. However, the hand brake valve will operate only the trailer brakes.

(5) Hard application of the brakes should cause all wheels to lock; however, note that the maximum retarding effect occurs just before they lock. Intermittent application will reduce wear of brake linings and drums. Application should be gradual with just enough force to accomplish the desired result.

(6) In anticipating a stop, make full use of the engine braking effect, disengaging the clutch in time to avoid stalling the engine. When descending hills, let the engine brake by using the proper gear ratio and applying the brakes from time to time to prevent over-speeding the engine. Do not turn off the ignition. The engine speed when descending a hill should be no greater than the speed necessary for ascending the hill at the same transmission gear ratio. On steep hills, engage the proper gear before the vehicle is started down the hill. Attempting to shift gears after the vehicle has started down a steep slope may result in a runaway vehicle.

(7) After passing through water, set the brakes slightly and operate the vehicle for a short distance until the brakes are dry.

h. Stopping Engine. The engine may be stopped by turning the ignition switch to the left or into the "OFF" position. In the event that

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the engine is excessively overheated, allow it to idle until a normal temperature (160°F–180°F) is reached before shutting it off.

i. **Traction Aids.** Chains should always be carried with the vehicle. Keep them in serviceable condition to permit installation with a minimum of delay. Remove them promptly when they are no longer necessary in order to prevent unnecessary damage to tires and roads. Apply the chains before the vehicle becomes mired. Install them properly with the fastenings in correct relation to the direction of rotation so that the chains will not be lost. Fairly loose adjustment gives better traction and less tire wear than tight adjustment. Install chains on all wheels.

8. TOWING THE VEHICLE.

a. **Towing to Start Vehicle.** If mechanical difficulties make it impossible to start the vehicle with the starting motor, this can generally

Transmission Selection	MAXIMUM PERMISSIBLE ROAD SPEEDS	
	Transfer Case in Low	Transfer Case in High
1st or Reverse	2 M.P.H.	4 M.P.H.
2nd	4 M.P.H.	8 M.P.H.
3rd	9 M.P.H.	16 M.P.H.
Direct	17 M.P.H.	30 M.P.H.
Overdrive	22 M.P.H.	40 M.P.H.

RA PD 303952

Figure 21—Table of Road Speeds

be accomplished by towing the vehicle. Run a chain or cable over the tow hooks on the front bumper, and attach it securely to the towing vehicle. Shift the transfer into low range and the transmission into direct in the stalled vehicle. When the towing truck starts, the driver of the towed vehicle should disengage the clutch until starting speed is reached. When the vehicles are moving from 10 to 15 miles per hour, the clutch should be released slowly to engage the engine. When the engine starts the clutch should be released, and the hand throttle pulled out far enough to idle the engine at 800 to 900 revolutions per minute as shown on the tachometer. The driver of the towed vehicle should then shift the transmission to neutral, and signal the driver ahead to stop. After the vehicles are stopped, the tow chain may be disconnected. When a vehicle is started in this manner, always report it to the proper authority.

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b. **Caution.** The driver should always note the reading of the air pressure gage before his vehicle is towed. If less than 70-pounds pressure is indicated, the air brakes are not to be depended upon to stop the vehicle. Check the condition of the hand brake, and if it is satisfactory the vehicle may be stopped with this device. If air pressure is below 70 pounds per square inch and the hand brake is in poor adjustment, no attempt should be made to start the vehicle by towing it.

c. **Towing Disabled Vehicle.** If a vehicle is disabled with no damage to the running gear or the steering apparatus, it may be towed in the same manner as prescribed for towing to start a vehicle. (See subparagraph a above). Be sure that the vehicle to be towed has brakes. If the brakes are inoperative or the running gear is damaged it will be necessary to use a wrecker to tow the vehicle, making use of a V-type tow bar (par. 9 h).

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

Section IV

OPERATION OF AUXILIARY EQUIPMENT

	Paragraph
Winch	9
Wrecker	10
Air compressor	11
Dump truck	12
Fire extinguisher	13

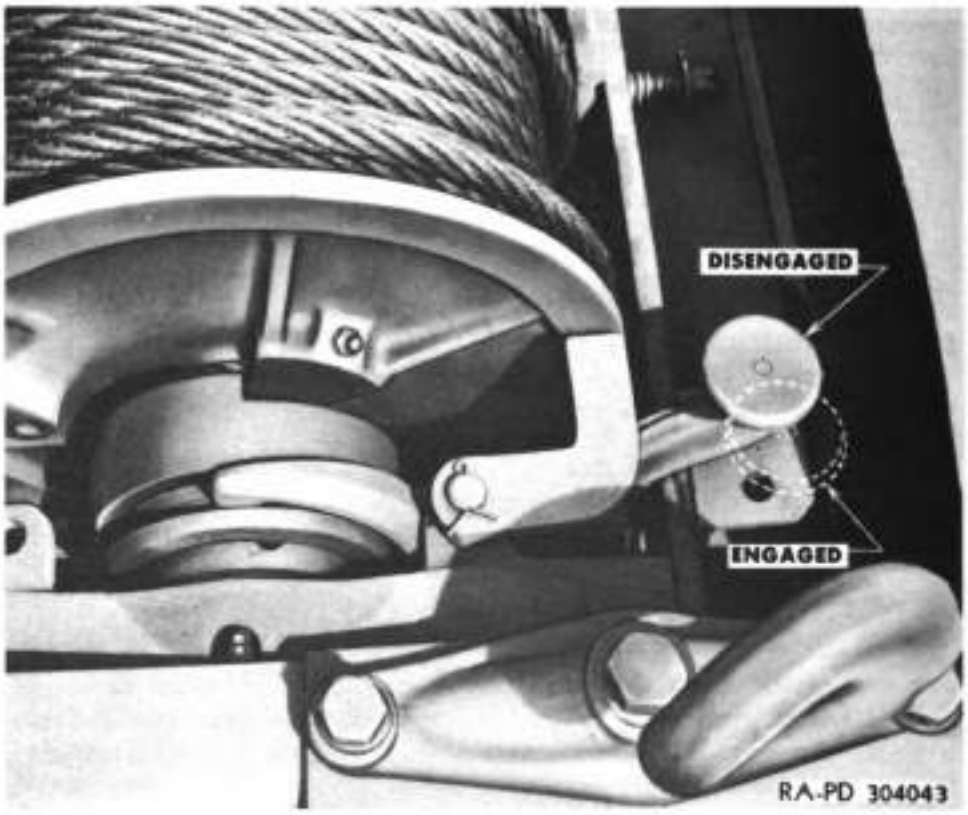

Figure 22—Winch Clutch Poppet Handle

9. WINCH.

a. General. A front-mounted winch is used on all cargo, wrecker and ponton vehicles. The winch is power-driven and may be used for pulling, hoisting or lowering. The winch is power-driven through a three-speed power take-off mounted on the side of the vehicle transmission. The driving torque is transferred from the power take-off through a propeller shaft with universal and slip joints to the winch

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drive shaft. The winch cable is 300 feet long, and has a safe pull capacity of 15,000 pounds on the first layer of cable.

b. Operation. The winch is operated from inside the cab. It has an automatic safety brake which will sustain the load while the power take-off is being shifted. Winch pulling speeds are based on a maximum engine speed of 1000 revolutions per minute, which should not be exceeded in winch operation, as excessive speed will result in strains and failures of parts. Note the instructions on the winch caution plate in the cab (fig. 18).

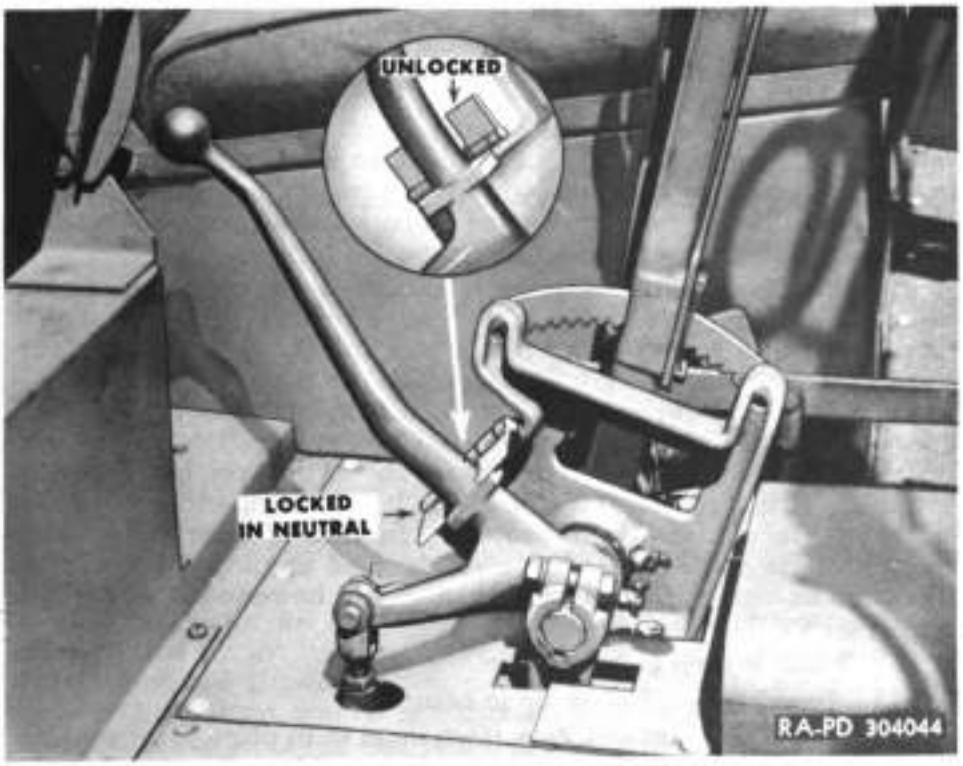

Figure 23—Winch Power Take-off Shift Lever

(1) HOOKING ON.

(a) Disengage the sliding jaw clutch by shifting the poppet handle mounted on the winch (fig. 22).

(b) Pull the cable off the drum by hand. The drag brake will keep the drum from spinning. Care should be exercised to avoid kinking the cable.

(c) Run the cable out to the load and hook on. Take care not to damage cable when hooking on. It is best to wrap a chain or cable around the load and to attach the winch cable to it.

(2) PULLING.

(a) Engage the sliding clutch, making sure that the poppets are locked.

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(b) Start the engine, depress the clutch, shift the transmission into neutral, and shift the power take-off into high or low speed. See vehicle shifting plate for power take-off lever positions (figs. 18, 19, 20 and 23).

(c) Release the clutch gradually and accelerate engine to pick up the load. Do not jerk load or exceed 1000 engine revolutions per minute.

(3) STOPPING. To stop pulling it is necessary to release the clutch and to shift the power take-off into neutral.

(4) LOWERING OR REVERSING. To reverse the winch, it is necessary to disengage the clutch, slip the take-off lever into reverse and to release the clutch pedal. When reversing it is not necessary to accelerate the engine.

c. **Winding Speeds.** The power take-off has a high and low gear ratio for winding in, permitting two different winding speeds. Use the high-speed gears for handling light loads, and the low-speed gears for heavy loads. Never race the engine when winching, especially when pulling a light load or winding in a rope.

d. **Winding Cable.** The cable should never be wound on the drum without some load on it. If no load is available, the rope should be properly attached to an anchor or tree and the vehicle pulled forward by the winch. A very light pressure on the vehicle brake will insure a neat and tight wind. It is important that the first layer of rope goes on in order. If necessary, it should be hammered or pushed into place with a block of wood to insure the first layer being closely wrapped. It is also necessary to see to it that each additional layer starts back across the drum properly. In case of emergency where there is no time to exercise this care, the rope should be wound onto the drum as well as possible and then should be rewound at the first opportunity.

e. **When Winch Is Not in Use.**

(1) Power take-off must be in neutral.

(2) Power take-off shift lever lock must be in place to prevent the power take-off from being thrown into gear accidentally (fig. 23).

(3) Winch sliding clutch must be in mesh with drum clutch so that drum will not turn due to vibration or weight of chains.

(4) End of cable must be securely wrapped around bumper hooks so that it will not come loose and drag.

f. **Shear Pins.** The front universal joint of the winch propeller shaft is connected to the winch drive shaft by means of a shear pin. It is made of a special material so that it will shear before parts fail when the winch is overloaded. NOTE: *Never substitute other rivets, bolts or pins for the standard shear pin, as to do so may result in damage to equipment or personnel.* When a shear pin fails, remove the broken parts and install a new one. (Extra shear pins will be found in vehicle tool kit.) Attempt to correct overload before again operating winch.

g. **Snatch Block.** A snatch block is provided for use in winch operations where the load is very heavy, or where low pulling speeds are desirable with a high engine torque. When using the snatch block,

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the cable should be run through the block sheave free of twists or kinks, and the free end of the cable brought back to the vehicle bumper hook. The snatch block hook is then attached to the load, and winching is accomplished as already described.

10. WRECKER.

a. **General.** Twin boom wrecker equipment of 5-ton capacity (10-ton capacity when snatch block is used) is installed on all 4-ton, 6 x 6 wrecker vehicles. The equipment is made up of a wrecker frame mounted on the chassis which supports the wrecker transmission, the winches and the booms. The transmission has a forward and a reverse speed, and is so arranged that it can drive the winches separately or simultaneously. The winches are each provided with 200 feet of cable. The booms are on pivots so that they may be swung out to a position at right angles to the vehicle and may be raised or lowered as desired. A telescoping outboard brace leg is mounted on each side so that these may be swung out to give the vehicle greater stability in wrecking operations. The necessary anchors, blocks, tow bars, clamps, etc., are furnished with the vehicle (fig. 24).

b. **Brace Legs.**

(1) The two brace legs are tubular steel telescoping in design, the upper and outer portion being pinned to a swivel mounted on the end of the wrecker frame. The lower or sliding member is equipped with a steel foot, to which a chain is attached. The chain, with a grab hook at the free end, serves to limit movement of the brace leg when in use, and to prevent kicking out under load. In traveling position the brace leg is secured in a bracket welded to base of wrecker frame. The sliding portion is secured in its nested position by a spring pin near the bottom of the outer tube which passes through a corresponding hole in the inner or sliding tube.

(2) To place the brace leg in position for operation, operator should lift it by the handle on the foot clear of carrying bracket and draw spring pin, allowing sliding portion to move out. Swing brace leg in direction of load, and carry out towards the load as far as is necessary, dropping brace leg foot to the ground and locking pin in upper-half so that the inner portion cannot slide and the two sections become a single stiff-leg. Tie the chain to loop in the base of the wrecker frame.

(3) The brace leg on the load side only of the wrecker should be used, as if the one on the far side from the load is also lowered, the strain of the pull on the vehicle will tip it towards the load, and the brace leg on far side will tend to slip in towards the wrecker, so that when strain of pull is slacked, the wrecker would not return to its normal position, but would be cocked up by the brace legs.

(4) After operation is complete, raise brace leg and replace in holding bracket before moving vehicle.

c. **Operation** (fig. 25).

(1) To release cable, winch drum is thrown out of gear by means of a handle controlling a sliding pinion which meshes with the bull gear. A backlash brake prevents cable unwinding when there is no pull on

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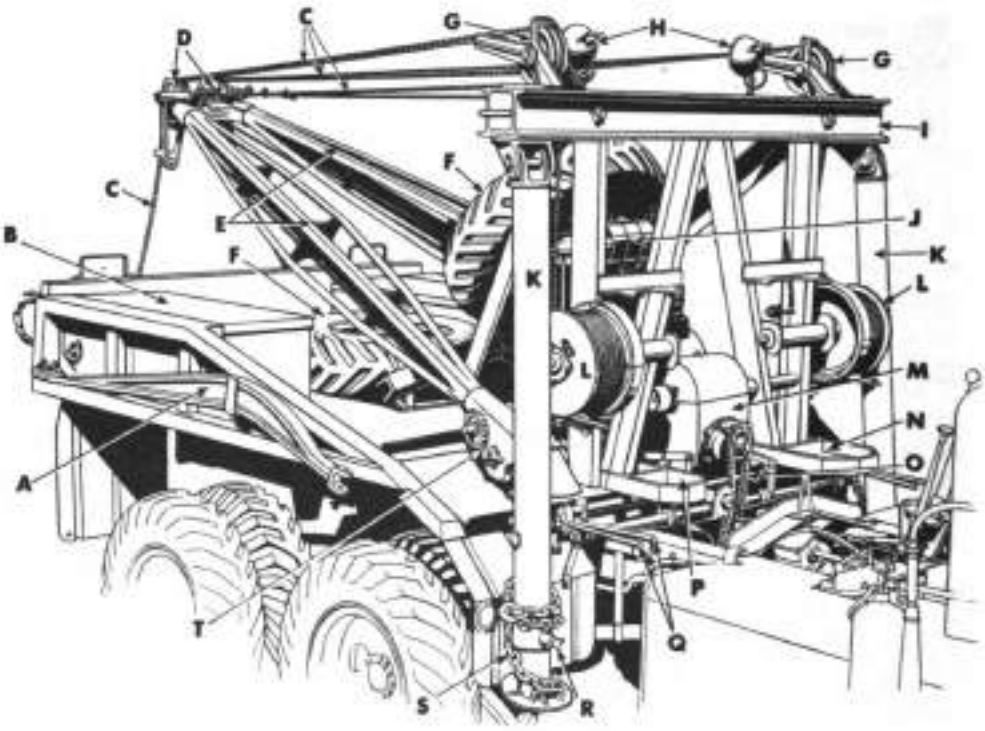
4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)



A	TOW BAR	K	BRACE LEGS
B	STOWAGE BOX	L	WINCHES
C	CABLES	M	WRECKER TRANSMISSION
D	BOOM SHEAVES	N	ACETYLENE TANK SUPPORT
E	BOOMS	O	TRANSMISSION DRIVE CHAIN
F	SPARE TIRES	P	OXYGEN TANK SUPPORT
G	MAST SHEAVES	Q	CONTROL HANDLES
H	SPOT LIGHTS	R	BRACE LEG LOCK PIN
I	CRANE	S	BRACE LEG CHAIN
J	AIR COMPRESSOR	T	BOOM DRUM RATCHET AND PAWL

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Figure 24—Wrecker Equipment

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the line. When cable is released it may be slacked sufficiently to unhook from loops in back of wrecker body so that it will be free for work at back of truck, or to swing with the boom when the latter is unlocked for rigging in position for work at an alongside position.

(2) Figure 25 identifies operating mechanism. The cable backlash brake loop is shown in brake applied position. Tension on the cable straightens it and, by pulling the loop into a vertical position, releases the brake through an eccentric.

(3) To free cable drum when running out the cable, the pinion shift lever is pushed in, and pulled out when it is desired to again engage the drum with the power mechanism.

(4) The booms are raised or lowered manually by the hand operating crank on the end of the ratchet wheel shaft. The same crank may be used on the cable drum when tightening cable for traveling.

(5) The power operation of the winding (cable) drums can be controlled from either side, there being two handles on each side. The outer handles control the near drums, while the inner handles control the drums on the far side of the wrecker. The inner handles are also equipped with a sleeve which can be twisted to accelerate or decelerate the engine, similar to the throttle control on a motorcycle.

(6) APPLYING POWER (fig. 26).

(a) Shift transfer case lever into neutral.

(b) Shift transmission into direct speed, as normal operations can be carried out in this gear. All the speeds in the transmission may be used in wrecker operation except overdrive and reverse.

(c) Engage transfer case power take-off by pulling up the lever at the lower left of the control levers in cab, to engaged position as shown in figure 26.

(d) The chain drive connecting the power take-off with the wrecker transmission main shaft is now in operation. To apply power to the cable drums for pulling or lowering, the load operator should stand on side nearest load. The control handles are held in neutral by a heavy spring so that as soon as pressure is released they return to neutral, stopping movement of drum and cable, the load being held by self-locking brake on worm shaft. To raise load, bear down on handle (fig. 25). To lower load, raise up on handle. Be sure that these shifts are made complete to prevent faulty engagement of the transmission. Speed of haul can be controlled by sleeve throttle control as previously described.

d. Cautions.

(1) Never run engine over 1800 revolutions per minute when operating wrecker. Never race the engine, especially when wrecker is operating without a load or with a very light load.

(2) Always use moderate speeds when pulling heavy loads until the load starts to move.

(3) When pulling over rough ground where possible use crowbars to ease load over rocks or other obstructions.

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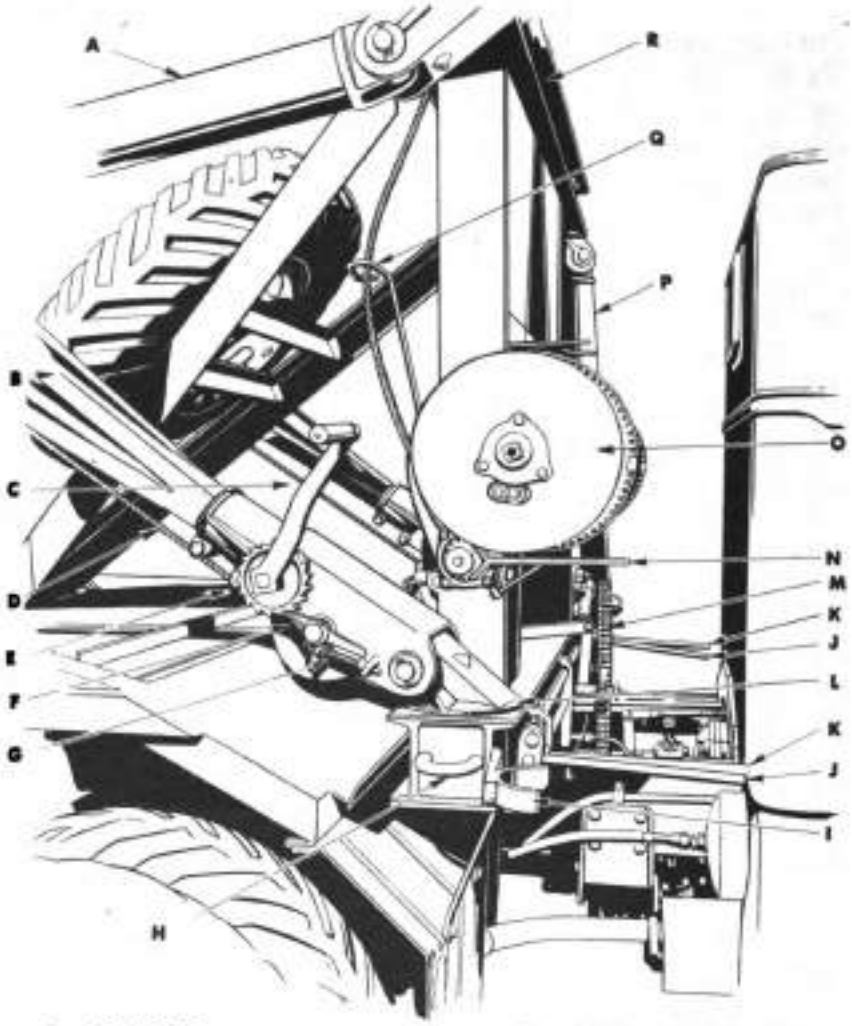
4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)



A	BRACE LEG	J	R.H. WINCH CONTROLS
B	BOOM	K	L.H. WINCH CONTROLS
C	HAND OPERATING CRANK	L	BOOM HEEL SWIVEL
D	BOOM DRUM CABLE	M	ROLLER CHAIN
E	BOOM DRUM RATCHET	N	PINION SHIFT HANDLE
F	BOOM DRUM PAWL	O	SERVICE DRUM
G	PAWL SPRING	P	BRACE LEG
H	BRACE LEG CHAIN LOOP	Q	BACKLASH BRAKE LOOP
I	BRACE LEG REST	R	WRECKER FRAME

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Figure 25—Wrecker Operating Mechanism

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(4) Whenever possible to turn a wreck on its wheels this should be done as early in the operation as possible.

(5) Watch the cables to see they do not chafe on sharp edges.

(6) Keep cables free of kinks.

(7) Anchor lines must always be at least as strong as a service or hauling line.

(8) Cables should always be wound tight on drums. Wherever possible wind them up under load.

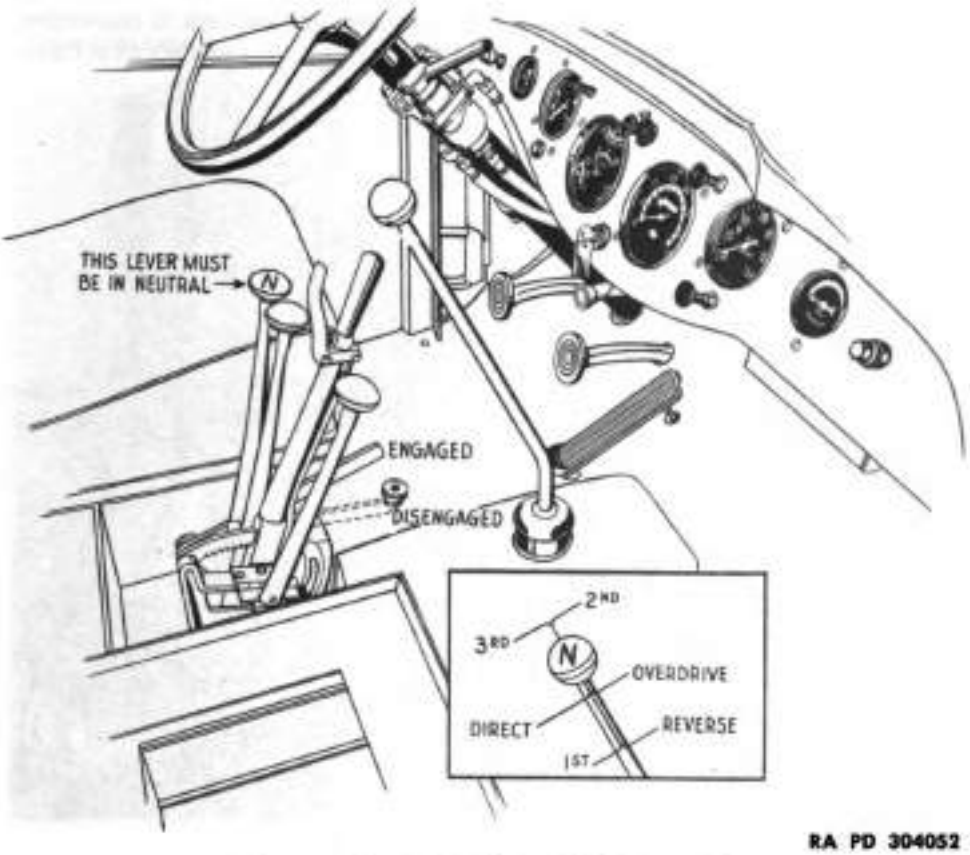

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Figure 26—Wrecker Cab Controls

e. Safety Rings on Body Bolster (fig. 27).

(1) When the wrecker equipment is not in use, the ends of the cables should be hooked to the safety rings on the rear bolster of the body. These rings are designed so that if an excess tension is placed on the cables, the safety ring strap will open up and release the ring before damaging the body bolster.

f. Stowing Cable.

(1) In order to secure the proper tension on the cables when not in use, the truck transmission should be placed in one of the lower gears to slow down the cable speed and then by means of the winch-operating

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levers, the cable should be wound up until the backlash brake loop is moved forward until there is only ½-inch to ¾-inch bend in the cable from top sheave to drum. This backlash brake loop serves as an excellent gage for the cable tension, and is in clear view of the operator.

(2) It is necessary that these cables be kept under a slight tension to prevent up-and-down movement of the booms on rough roads.

11. AIR COMPRESSOR (figs. 28 and 29).

a. Description. An independent air compressor unit is mounted on the wrecker body for use in tire inflation. The unit consists of a belt-

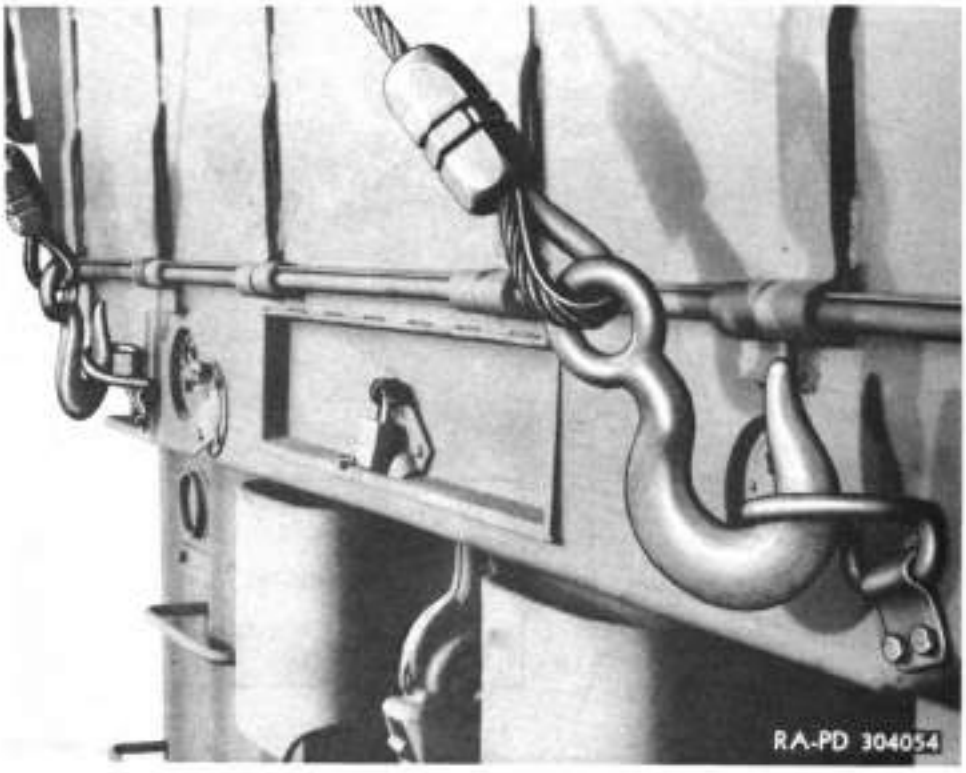

Figure 27—Rings on Body Bolster

driven compressor, a gasoline engine, an air reservoir, an automatic cut-off switch, a check valve, a safety valve and a pressure gage. The cut-off switch automatically shuts off the engine when the reservoir pressure reaches 150 pounds per square inch. The check valve prevents air in the reservoir from flowing back when the compressor stops.

b. Operating Suggestions.

(1) BELT TENSION. The belt should be kept in proper adjustment at all times. When adjusting belts be sure pulleys are properly lined up. Belts should be just tight enough to prevent slippage. Heating of motor pulley indicates slipping.

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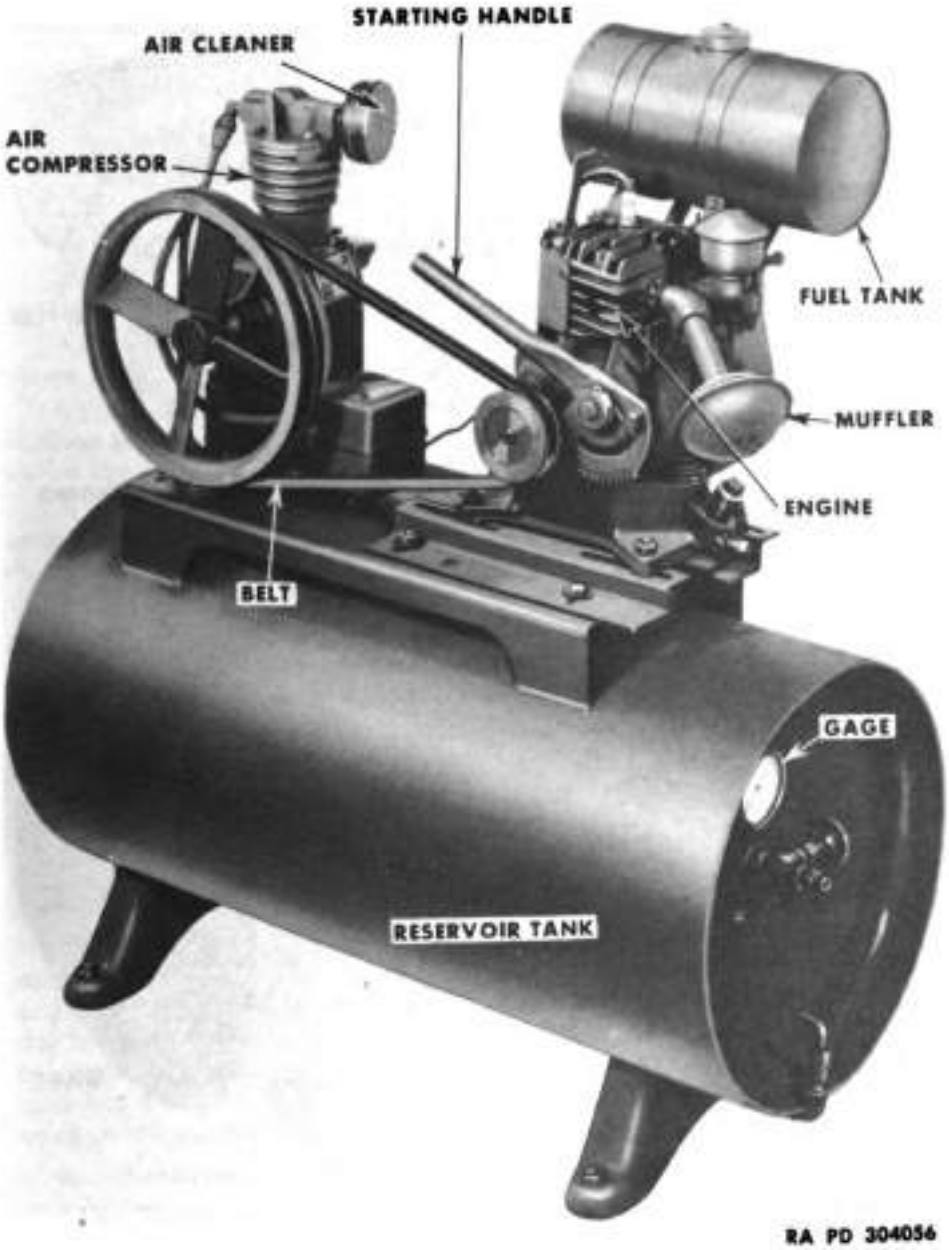

Figure 28—Air Compressor Unit—Kellogg

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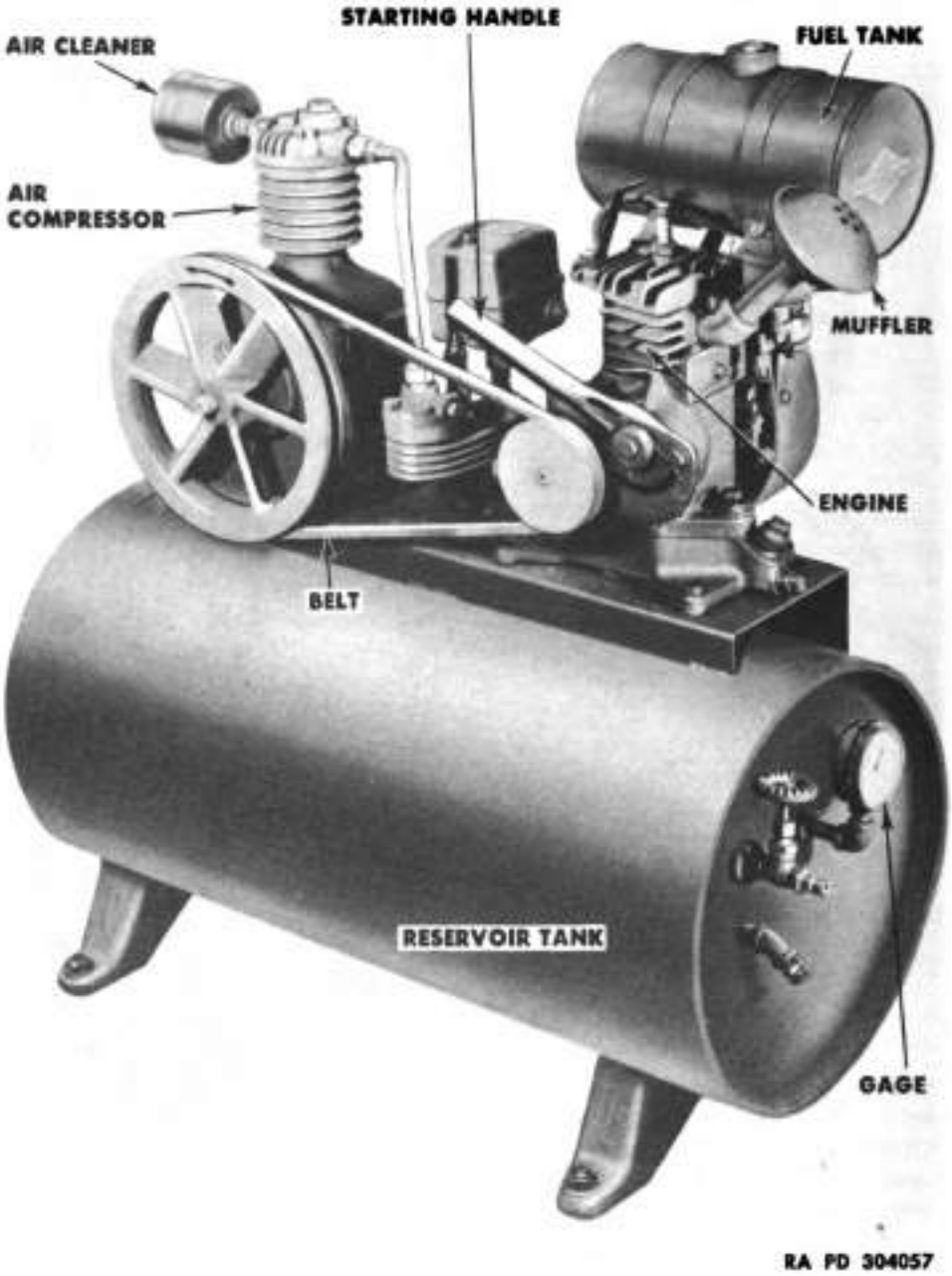

Figure 29—Air Compressor Unit—De Vilbiss

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(2) DRAINING CONDENSATION. Open the screen chamber drain and check valve drain every day while the compressor is running to blow out moisture which has condensed in the pipe and tubing.

(3) KEEP THE MOTOR AND COMPRESSOR CLEAN. See that no dirt or water enter when adding oil or gasoline. Always wipe off the gasoline cap and oil filler plugs, as well as around them, before refilling.

(4) EXHAUST TUBING. Water is condensed in the exhaust after it cools off. For this reason, after stopping motor, place exhaust tube so that water cannot drain into exhaust port of motor to corrode the mechanical parts.

c. **Starting Air Compressor Unit.**

(1) See that both the compressor and the engine are properly lubricated, and that there is gasoline in the fuel tank.

(2) Open check valve drain to relieve the back pressure on the compressor to assist in starting.

(3) Choke engine and pull quickly on starter lever three or four times to prime the engine.

(4) After motor is primed, open choke about halfway and again pull on starter lever to start motor. After motor is started, close check valve drain to pump air into reservoir tank.

(5) As the motor warms up, adjust the choke until the motor operates smoothly. Use the choke in the same way that the choke on an automobile is used.

(6) To start the motor shortly after having stopped it by choking, and while it is still warm, pull the starter lever three or four times without choking. If it does not start, prime as explained above. A warm motor does not require as much priming as a cold one.

(7) If the motor fails to start after a reasonable number of trials, report to the proper authority.

(8) To stop unit, press the spring clip against the spark plug to short the ignition circuit.

12. DUMP TRUCK (fig. 30).

a. **General.** The dump body is attached to a hoist subframe by means of hinges at the rear and is elevated by a power-driven hydraulic arm type hoist located under it. Pressure is delivered to the hoist cylinder by a hydraulic pump driven from a drive shaft connected to a power take-off on the top of the transfer. The body is of all-steel construction and has a capacity of 4 cubic yards. A stop chain is provided to prevent overdumping and damage to equipment.

b. **Controls.**

(1) Power hoist controls are installed in the cab as shown in figure 31. Instructions for operating these controls are shown in figure 20.

(2) POWER TAKE-OFF LEVER. The dump body power take-off lever has two positions, namely, "engaged" and "disengaged." When it is pulled up to the engaged position, power from the engine is transmitted through drive line from the transfer power take-off to the hoist

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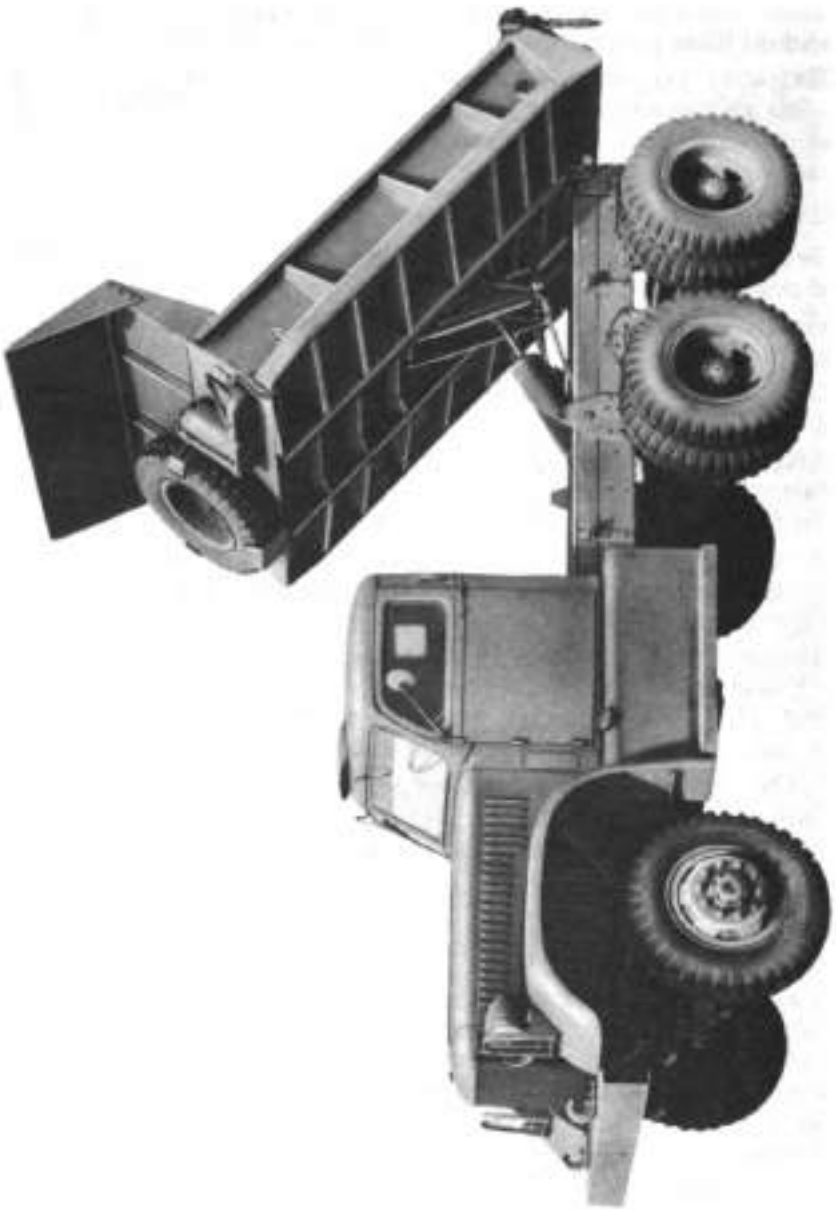

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Figure 30—Dump Body Raised

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pump. **NOTE:** *It is important that the operator keep the power take-off disengaged when the hoist is not being operated to prevent damage to the pump.* Dump trucks are being equipped with a warning device which emits a loud rattling noise when the truck is in motion with the power take-off lever engaged. When this noise is heard the operator should stop the truck and disengage the power take-off before proceeding. Vehicles in early production were not equipped with this device and so special care must be exercised to be sure the lever is always in the disengaged position when the vehicle is in motion.

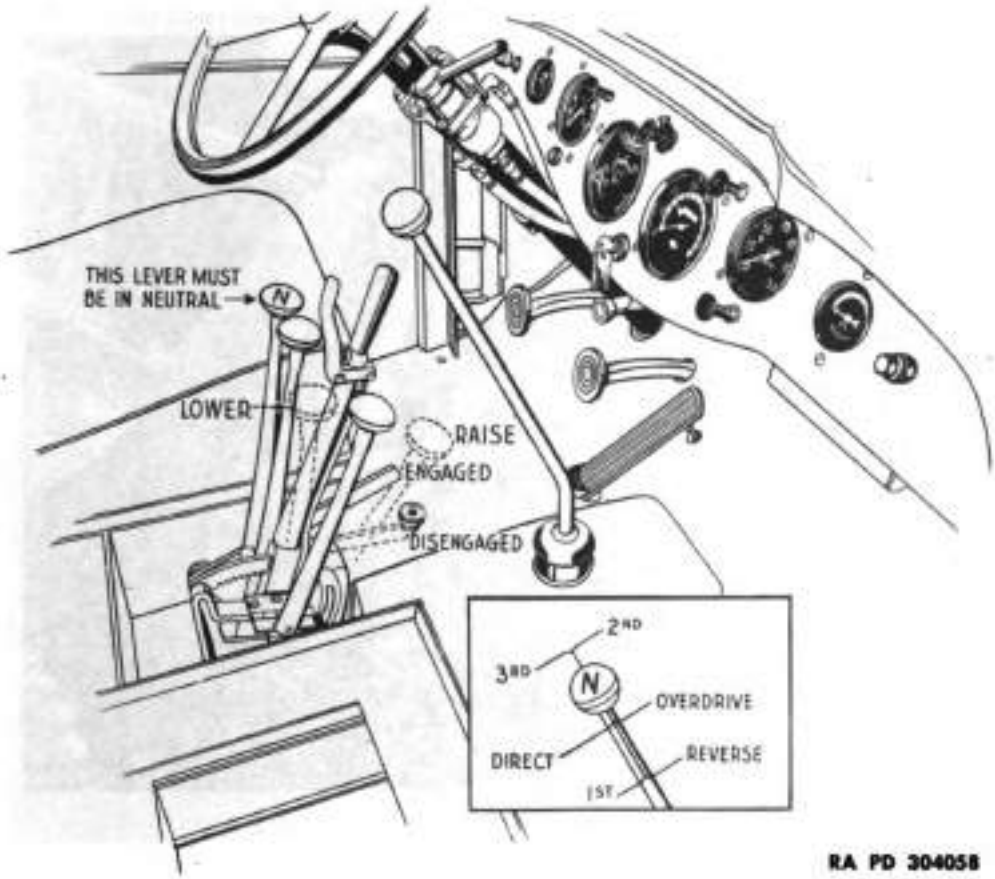

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Figure 31—Hoist Controls

(3) PUMP HOIST LEVER. This lever may be shifted to any one of three different positions, namely, "raise," "hold" or "lower." With the lever in the "raise" position, the pump valves are so arranged that fluid is pumped into the cylinder and the body is raised. (When the body reaches the limit of its travel it automatically stops.) When the lever is in the "hold" position, the body remains suspended in whatever position it was in when the lever was shifted. With the lever in the "lower" position, the fluid is forced out of the cylinder by the weight of the body, and the body comes down.

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(4) TAIL GATE CONTROL. The tail gate is controlled by a lever located at the left front corner of the body. When the lever is against the body, the tail gate hooks are locked, but when it is away from the body, the tail gate hooks are open and the lower end of the tail gate is free to swing out (fig. 40).

c. Operation.

(1) Release tail gate locking lever. Start engine if it is not running. Depress clutch pedal. Shift transfer to neutral. Shift transmission to second or third speed.

Figure 32—Tailgate Arranged for Spreading

(2) Engage the dump power take-off. Release the clutch pedal. Move the dump hoist lever forward and accelerate the engine to raise the body. Do not exceed an engine speed of 1000 revolutions per minute during this operation. The body will automatically stop when it has reached the limit of its travel.

(3) To stop the body in any intermediate position, shift the dump hoist lever to the "hold" position. It is not necessary to use the clutch to accomplish this.

(4) When the hoist has reached its full stroke, depress the clutch pedal and disengage the power take-off to prevent wear and tear on the pump.

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(5) To lower the body, shift the dump hoist lever to the "lower" position, and the body will return to a horizontal position. It is not necessary to run the engine during this operation. Lock tail gate lever.

13. FIRE EXTINGUISHER.

a. Carbon Dioxide Extinguisher.

(1) The wrecker truck is equipped with a large carbon dioxide extinguisher mounted on the right running board. It is held in place by a snap clamp and is easily removed in emergencies. To use the extinguisher, proceed as follows:

(2) Carry extinguisher to fire and then open valve. Carry it in one hand and hold the nozzle at the hose end of the handle with the other.

(3) Direct discharge close to fire. Do not stand at a distance, as effectiveness will then be lost.

(4) Direct discharge first at the edge nearest the operator, or if on a vertical surface, at bottom of fire.

(5) Slowly and deliberately increase the discharge as flame is extinguished. Do not haphazardly direct discharge over various sections of fire. Put out one portion of fire completely before attacking other parts.

(6) Continue discharge after flames are out to coat hot material with carbon dioxide snow.

(7) Recharge extinguisher as soon as possible after use.

b. Carbon Tetrachloride Extinguisher. All vehicles are equipped with a one-quart carbon tetrachloride extinguisher mounted on brackets inside the cab. The extinguisher is operated by twisting the handle past the locking lugs and then pumping, directing the discharge at the fire. Attack the fire in the same manner as described in subparagraph *a* above. Recharge extinguisher as soon as possible after use.

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Section V

OPERATION UNDER UNUSUAL CONDITIONS

	Paragraph
Operation in extreme cold	14
Operation on ice	15
Operation in snow	16
Operation in extreme heat	17
Operation in desert or sandy terrain	18
Operation in mud	19

14. OPERATION IN EXTREME COLD.

a. General.

(1) Operation and maintenance of automotive vehicles at low temperatures involve factors not found at normal operating temperatures, and operators must devote more time to protective maintenance. Failure to provide extra service will result in actual damage, unnecessary and unwarranted expense, and failure to start.

(2) Temperatures have been divided into two ranges: above 0°F, and below 0°F. Metals and lubricants undergo changes in their physical properties below 0°F. In subzero temperatures accessory equipment for supplying heat to engine, fuel, oil, and intake air is required.

b. Gasoline for Low Temperatures.

(1) SELECTION. Use the winter grade of gasoline procured under U. S. Army Specification 2-103, grade C, latest revision.

(2) The formation of ice crystals from small quantities of water in the fuel sometimes causes considerable trouble. To keep water out of the fuel tank, observe the following precautions:

(3) Strain the gasoline through a filter paper or any other type of strainer that will prevent the passage of water. CAUTION: *Be sure to provide a positive metallic contact between fuel container and gasoline tank, unless both fuel tank and container are independently grounded.*

(4) Insofar as possible, always keep the fuel tanks full. This will reduce the free air space above the fuel from which moisture can be condensed.

(5) Add one quart of denatured alcohol, grade 3, to fuel tank at start of winter season and one pint per month thereafter. This will reduce the hazard of ice formation in the fuel.

(6) Do not store fuel in old drums unless they are free from rust and have been thoroughly cleaned. If time is not an urgent factor, do not pump fuel from drum to vehicle until it has settled for 24 hours after filling or moving the drum. Keep portable fuel pumps clean and protected from snow and frost.

(7) When a drum has been opened, be sure to cover the opening or replace the bung to keep out snow, frost, or other foreign matter. Store drums in a covered building, or cover them with a tarpaulin.

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OPERATION UNDER UNUSUAL CONDITIONS

c. **Engine Lubrication.**

(1) Engine lubrication at temperatures above 0°F is covered in section VII, and in the Lubrication Guide. The following instructions supplement this information, and apply only to instances where the temperature falls below 0°F for long periods.

(2) Several methods of keeping engine oil sufficiently fluid for proper lubrication at temperatures below 0°F are listed below. Give preference to these methods in the order listed according to available facilities.

(a) Keep the vehicle in a heated enclosure when not in operation.

(b) When engine is stopped, drain crankcase oil while it is hot, and store in a warm place until vehicle is to be operated again. If warm storage is not available, heat the oil before reinstalling. (Avoid overheating the oil; heat only to the point where the bare hand can be inserted without burning.) Tag the vehicle in a conspicuous place in the drive compartment to warn personnel that crankcase is empty. Close both shut-off valves to prevent flooding of the carburetor, and crankcase dilution because of the accumulation of gasoline vapor pressure in the gasoline tanks.

(c) Dilute the crankcase oil with gasoline or Diesel fuel, with preference given to gasoline. For satisfactory starting in subzero temperatures, use one of the following two procedures to provide the engine with properly diluted engine oil.

(3) GASOLINE AS DILUENT.

(a) Fill engine crankcase to the "FULL" mark with the grade of engine oil prescribed for use at temperatures from +32°F to 0°F. Add 1½ quarts of gasoline for each 5 quarts of crankcase oil capacity. EXAMPLE: *Crankcase with capacity of 10 quarts will require 3 quarts of gasoline as an oil diluent.*

(b) Run the engine 5 to 10 minutes to mix the lubricant and diluent thoroughly.

(c) Stop the engine and note that the level of the diluted oil is above the normal "FULL" mark on the oil gage. This level should be marked on the gage for future reference.

(d) The presence of a large percentage of light diluent will increase oil consumption and, for that reason, the oil level should be checked frequently. Use the grade of engine oil prescribed for use between —32°F to 0°F to maintain the oil level to manufacturer's "FULL" mark on the gage during operation.

(e) If the vehicle is operated four hours or more at operating temperature, redilution will be necessary if it is anticipated that the vehicle will be left standing unprotected for five hours or more. This can be accomplished by adding engine oil prescribed for use between +32°F to 0°F to the manufacturer's "FULL" mark; then adding gasoline to the dilution mark on the gage described in subparagraph c (3) *(c)* above.

(4) DIESEL FUEL AS DILUENT. Drain the crankcase while the engine is still warm and refill using engine oil prescribed for temperatures between +32°F to 0°F diluted with grade X Diesel fuel oil in the proportion of 1½ quarts of Diesel fuel to 5 quarts of engine oil.

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The presence of a large percentage of diluent will increase oil consumption and, therefore, the oil level will be checked frequently during operation and maintained with the diluted oil to manufacturer's "FULL" mark on gage.

d. Transmission, Transfer Case and Differentials.

(1) Where the use of SAE 10 engine oil is prescribed for use at temperatures +32°F to 0°F, it will be used undiluted for operation below 0°F.

(2) SAE 80 universal gear lubricant, where prescribed, is suitable for use at temperatures as low as —20°F. If consistent temperature below 0°F is anticipated, drain the gear cases while warm, and refill with grade 75 universal gear lubricant which is suitable for operation at all temperatures below +32°F. If grade 75 universal gear lubricant is not available, SAE 80 universal gear lubricant, diluted with the fuel used in the engine in the proportion of 1 part fuel to 6 parts SAE 80 universal gear lubricant, shall be used. Make-up oil will be diluted in the same proportion before it is added to gear cases.

(3) After engine has been warmed up as provided in subparagraph a (2) above, engage clutch and maintain engine speed at fast idle for 5 minutes until gears can be engaged. Put transmission in low (first) gear, and drive vehicle for 100 yards, being careful not to stall engine. This will heat gear lubricants to the point where normal operation can be expected.

e. Chassis Lubricants.

(1) At temperatures below 0°F lubricate chassis points with No. 0 general purpose grease.

(2) Brake bands, particularly on new vehicles, have a tendency to bind when they are very cold. Always have a blowtorch handy to warm up these parts if they bind when you are attempting to move the vehicle. Parking the vehicle with the brake released will eliminate most of the binding. Precaution must be taken, under these circumstances, to block the wheels or otherwise prevent movement of the vehicle.

(3) Inspect the vehicle frequently. Shock resistance of metals, or resistance against breaking, is greatly reduced at extremely low temperatures. Operation of vehicles on hard, frozen ground causes strain and jolting which will result in screws breaking or nuts jarring loose.

(4) Disconnect oil-lubricated speedometer cables at the drive end when operating vehicles at temperatures of —30°F and below. These cables often fail to work properly at these temperatures, and sometimes break due to the excessive drag caused by the high viscosity of the oil with which they are lubricated. Grease-lubricated cables should operate satisfactorily at all temperatures, provided they are coated with No. 0 general purpose grease and there is no excess grease in the housing.

f. Antifreeze.

(1) Protect the cooling system with antifreeze compound for operation below +32°F.

(2) Before adding antifreeze compound, be sure the cooling system is clean and completely free from rust.

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(3) Inspect all hose and replace if deteriorated. Inspect hose clamps, plugs, and petcocks, and tighten if necessary. Make sure radiator does not leak before adding antifreeze compound, and that no exhaust gas or air leaks into the cooling system.

(4) After the cooling system is clean and tight, fill with water to about one-third capacity. Then add antifreeze compound, using the proportion of antifreeze compound to the cooling system capacity indicated below.

ANTIFREEZE TABLE

Lowest expected temperature	Pints, compound antifreeze per gallon of cooling system capacity
+10°F	2
0°F	2½
—10°F	3
—20°F	3½
—30°F	4
—40°F	4½
—50°F	5

(5) After adding antifreeze compound, fill with water to slightly below the filler neck; then start and warm the engine to normal operating temperature.

(6) The engine should then be stopped and the solution checked with a hydrometer, adding antifreeze compound if required.

(7) Inspect the coolant weekly for strength and color. Rusty solution must be drained, the cooling system thoroughly cleaned, and new solution of the required strength added. CAUTION: *Use an accurate hydrometer. To test a hydrometer use 1 part antifreeze compound to 2 parts water. This solution should produce a hydrometer reading of 0°F.*

g. Other Lubrication Points.

(1) Drain steering gear housing if possible, or use suction gun to remove as much lubricant as possible. Refill with grade 75 universal gear lubricant, or, if not available, with SAE 80 universal gear lubricant diluted with fuel used in the engine in the proportion of 1 part fuel to 6 parts SAE 80 universal gear lubricant. Make-up oil will be diluted in the same proportion before it is added to the housing.

(2) For oilcan points where engine oil is prescribed for above 0°F, use light preservative lubricating oil.

h. Protection of Electrical System.

(1) GENERATOR AND STARTER. Inspect the brushes, commutators and bearings. See that the commutators are clean. The large surges of current which occur when starting a cold motor require good contact between brushes and commutators.

(2) WIRING. Inspect and clean all connections, especially the battery terminals. Take care that no short circuits are present, or that there is no ice on the spark plugs, wiring, or other electrical equipment.

(3) COIL. Check coil for proper functioning.

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(4) DISTRIBUTOR. Clean thoroughly, and clean or replace points. Check the points frequently. In cold weather the current is heavier, and the points may pit and burn more than usual.

(5) SPARK PLUGS. Clean, test and replace if necessary. If it is difficult to make the engine fire, reduce the gap 0.005 inches. This will make sparking easier at the reduced voltages likely to prevail.

(6) TIMING. Check carefully. Take care that the spark is not unduly advanced or retarded.

(7) BATTERIES.

(a) The efficiency of batteries decreases sharply with decreasing temperatures and becomes practically nil at —40°F. Do not attempt to start the engine with the battery when it has been exposed to temperatures below —30°F, until the battery has been warmed unless a warm slave battery is available.

(b) A fully charged battery will not freeze at temperatures likely to be found even in arctic climates, while a fully discharged battery will freeze and rupture at + 5°F. See that the battery is always fully charged with a hydrometer reading between 1.275 and 1.300.

(c) Do not add water to a battery when it has been exposed to subzero temperatures unless the battery is to be charged immediately. If water is added and the battery not put on charge, the layer of water will stay at the top and freeze before it has a chance to mix with the acid. Keep vent holes in filler plugs open. Keep terminals tight and clean. At regular intervals, apply a coating of general purpose grease, No. 0, or light rust preventive compound.

(8) LIGHTS. Inspect lights carefully.

i. General Conditions.

(1) Make sure that no heavy grease or dirt has been left on the starter throw-out mechanism. Heavy grease or dirt may keep the gears from being meshed, or cause them to remain in mesh after the engine starts and thus ruin the starter.

(2) Pull the choke control all the way out to secure the air-fuel ratio required for cold weather starting. Make sure the butterfly valve in the carburetor closes all the way and otherwise functions properly.

(3) Carburetors which give no appreciable trouble at normal temperatures may not operate satisfactorily at low temperatures. A fuel pump which will deliver enough gasoline at normal starting speeds of 400 revolutions per minute may have leaky valves, or a diaphragm which will prevent it from delivering a sufficient quantity of fuel at cranking speeds of 30 to 60 revolutions per minute. Another source of trouble is the float needle valve which, although a close fit, must move freely. Different expansions of the metals used in the needle valve parts may cause the needle valve to stick at extremely low temperatures.

(4) Inspect the vehicles frequently. Shock resistance of metals or resistance against breaking is greatly reduced at extremely low temperatures. Operation of vehicles on hard, frozen ground causes strain and jolting which will loosen or break bolts and nuts.

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(5) Remove or bypass oil filters at temperatures below —30°F, because the viscous oil will not flow freely through them.

(6) Disconnect speedometer and tachometer cables at the drive end for operating vehicles at temperatures of —30°F and below. These cables often fail to work properly at these temperatures, and they sometimes break, because of excessive drag caused by the high viscosity of the lubricating oil.

(7) Remove and clean sediment bulb, strainer, etc., at frequent intervals.

j. Starting and Operation.

(1) It is possible to start gasoline engines with batteries at temperatures as low as —30°F, if the engines are properly lubricated and in good mechanical condition.

(2) To insure that the engine will start on the first attempt, proper preparation of the engine is very important. Should the engine fire a few times and stop, water vapor, which is a product of combustion, may form frost in the combustion chamber and make it impossible to start without heating the engine to above 32°F. Prolonged starting efforts wear down the battery.

(3) Pull the choke lever all the way out for starting, and keep it partially pulled out until the engine has warmed up. Since only the lightest components of the gasoline vaporize in a cold engine, a very rich mixture is necessary. Depress the clutch pedal to ease the starting load.

(4) When attempting to start, turn the engine over as rapidly as possible. All engines have a critical cranking speed, i. e., the engine must be turned over at a certain rate of speed before any start at all is possible. For engines in good mechanical condition, this critical rate of speed may vary from 40 to 70 revolutions per minute. Below this speed, the fuel pump will not deliver fuel fast enough.

(5) After the engine is started, idle it at 800 to 1,000 revolutions per minute until it has warmed up enough to run smoothly. Do not place the vehicle in operation under its own power until its operating temperature of 160°F has been reached. Maintain this temperature by adjusting the radiator shutters during operation.

(6) Cover engine with tarpaulin, tent, or portable shed. Place oil stoves, fire pots, or four or five ordinary kerosene lanterns under the covering about three hours prior to starting time.

(7) Keep vehicles in sheltered areas shielded from wind. Cold winds increase starting difficulties.

k. Stopping. Increase engine speed before turning off ignition. Then turn off ignition and release throttle at the same time. As the engine coasts to a stop, it will blow out all the residual products of combustion, including water vapor, and leave only air and gasoline vapor in the engine.

l. Cold Weather Accessories.

(1) A number of the most commonly used accessories have been mentioned in the preceding sections. These, together with other acces-

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sories and attachments used successfully in northern climates, are listed below. The use of these accessories is not mandatory. They are given only as suggestions, and are to be used at the discretion of officers in charge of the materiel.

(2) Tarpaulins, tents, or collapsible sheds are useful for covering vehicles, particularly the engines.

(3) Fire pots (Primus type) or Van Prag blowtorches, ordinary blowtorches, oil stoves, or kerosene lanterns can be used for heating vehicles.

(4) Extra batteries and facilities for changing batteries quickly help in starting.

(5) Steel drums and suitable metal stands are useful for heating crankcase oil.

(6) Insulation for the fuel line helps prevent ice formation inside the line.

(7) Radiator covers, improvised locally, help keep the engine running at normal temperatures.

15. OPERATION ON ICE.

a. **General.** It is essential, when driving on ice or slippery terrain, that the operator exercise special care in order to avoid skidding and possible accident. The hazards of this type of operation are greatly increased when visibility is poor and when equipment is trailed behind the vehicle. It is a test of the driver's ability, his judgment, and his "feel" of the truck. In general, automotive vehicles should be operated on ice at slow speeds with all wheels driving.

b. **Starting and Accelerating on Ice.**

(1) When starting from a dead stop all available traction is required, so that it is necessary that the front axle drive be engaged. Tire chains will make starting easier, but will not prevent the wheels from spinning.

(2) Shift the transfer case into high range, and select a gear ratio in the transmission one step higher than that required for a normal start on dry pavement. The ratio to be selected will depend on the load that is carried, but in general the start should be made with the transmission in second gear when the vehicle is loaded (and with the transmission in third gear when the vehicle is unloaded).

(3) After shifting into the proper gear in the transmission, accelerate the engine slightly more than would be necessary for a normal start to take care of the extra load on it, and release the clutch very slowly until it is all the way out. If the wheels start to spin, immediately release the clutch and start over again.

(4) Accelerate very slowly to avoid spinning the wheels. Shift up in the transmission to driving gear, and accelerate to driving speed. If at any time the wheels start to spin, immediately release the accelerator pedal and then depress it gradually to pick up the load.

c. **Vehicle Speed.** It is not possible to drive as fast on slippery roadways as it is on dry pavement. The speed at which the vehicle may

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be safely operated depends on the skill of the driver and the condition of the road. Drive the vehicle at such a speed that it is under control at all times. Stay far enough behind the vehicle ahead so that it will be possible to coast to a stop without hitting it. Avoid any tendencies toward sudden changes in direction or speed. Make all sharp turns at a very low speed.

d. Stopping on Ice.

(1) WARNING. Do not attempt to apply the brakes and make a quick stop on slippery pavement. *This is not possible.* The wheels will lock and the vehicle will skid and more than likely spin. This situation is especially acute on vehicles equipped with air brakes. The ideal method of stopping on slippery pavement is to stop without any brake application.

(2) The driver must at all times be prepared to start to stop well in advance of the real necessity. He must watch the road ahead and anticipate the necessity of halting the vehicle.

(3) When it is necessary to stop, start well in advance and utilize the engine compression as a brake. Shift progressively down in the transmission as the vehicle slows up. If brake application is necessary it must be very light but do not release the clutch when braking, unless the vehicle speed is very low. If the brakes lock and the wheels skid, release the brakes immediately. If possible avoid stopping where it will be necessary to start uphill.

(4) When the vehicle is stopped, shift to neutral, shut off the engine and apply the hand brake. If the vehicle is in a precarious position, block the wheels to prevent accidents.

e. Recoveries.

(1) It will sometimes happen under extremely bad conditions that the vehicle will start to skid and spin in spite of the care exercised by the driver, and it is important that he understand the proper method to attempt recovery. As soon as the wheels start to spin or skid, the driver should immediately release the accelerator or the brake, whichever he is using. In most instances this will be all that is necessary. In the event that the vehicle is skidding or spinning, the driver must steer in front of the vehicle. That is, he must steer in such a direction that the front of the vehicle will stay forward. If the back end swings to the left, steer to the left; if it swings to the right, steer to the right. Straighten out the wheel as the vehicle corrects itself. *Do not apply the brakes.*

(2) When equipment is trailed behind the vehicle there is always the possibility of "jackknifing." In the event this occurs, *do not apply the brakes*, but accelerate the engine slowly and try to stay ahead of the trailer. It is important that the acceleration be gradual enough so that the wheels will not spin. Apply the trailer brakes lightly. The possibility of recovery from this jeopardy depends on the alertness of the driver, as it is impossible to straighten out once the trailer has swung out too far.

f. Vehicle Stalled. If the vehicle is stopped on an incline, in a rut, in a hole or against the curb so that it is impossible to drive the vehicle, *do not accelerate wildly or spin the wheels.* Extra traction may be obtained by scattering sand, ashes, gravel, etc., under the wheels. In

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emergencies, it is possible to drive out on blankets or tire chains placed on the ice ahead of each wheel. When the latter expedients are used it is of the utmost importance to avoid spinning the wheels, else the blankets or chains be kicked out from under them.

g. Frozen Terrain. In general, tire chains are of great value when going cross country over frozen ground, and may be indispensable. Start and stop slowly, drive cautiously and avoid holes and deep ruts whenever possible.

h. Steep Inclines. It is almost impossible for automotive vehicles to negotiate steep inclines on ice or slippery pavements. Where distances are not too great and where suitable anchors are available, winching operations may be accomplished to raise or lower the vehicle and load. In operations of this type, care should be exercised to prevent injury and damage in the event of accident.

16. OPERATION IN SNOW.

a. General. The conditions of operation in snow vary with its amount and quality. In general, operations in light snow or slush are similar to ice operations. For heavier snow, the driver should avoid unnecessary perils and heavy drifts whenever possible. When a snow plow is available, it should be used to clear a roadway for other vehicles.

b. Light Snow. When driving on light snow or slush, tire chains are not necessary. Operate the vehicle with caution, stop and start slowly and observe the precautions outlined in paragraph 14.

c. Heavy Snow. With all six wheels driving, and with tire chains installed, these trucks can operate successfully in snow up to 18 inches deep. When trucks are traveling in convoy all vehicles should follow in the tracks of the leader. It is important to keep the truck going; select the proper gear ratio in the transmission to permit the engine to operate with full power (1800 to 2300 revolutions per minute) to avoid stalling. In the event the vehicle is stalled, do not attempt to start again bucking heavy snow. Back up in the vehicle tracks far enough before starting so that the vehicle will have acquired sufficient momentum to avoid stalling when it hits the snow.

d. Drifts. In driving through drifts the vehicle transmission should be put into low gear before entering the drift, and should have sufficient momentum before it hits it. Once in the drift, keep the vehicle moving. Stopping or slowing up to change gears in a drift will often result in stalling.

e. Stalled Vehicles. When the vehicle is so badly stalled that it cannot be freed by rocking the vehicle (alternate shifting from forward to reverse speed), the driver should get out and determine the seriousness of the situation. NOTE: *Do not make more than a few attempts at rocking the vehicle as this will only cause the vehicle to dig in and make the situation worse.* Dig out around the wheels and make a path for the vehicle. If chains are not installed, put them on. Drive out cautiously and then keep the vehicle moving to avoid further stalling.

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f. Steep Inclines. When inclines are encountered which are too steep to be negotiated in heavy snow, winching operations may be attempted. Observe the same precautions as are observed for winching in icy conditions.

17. OPERATION IN EXTREME HEAT.

a. General. The engine cooling system will require careful attention in torrid regions. The loss of cooling water will cause severe engine damage and prevent operation of the vehicle. In addition to the most careful attention for the cooling system, the operator must exercise special maintenance precautions to prevent failure of critical parts.

b. Overheating.

(1) In order to prevent overheating it is essential that all units be in proper adjustment to permit a cool-running engine. Cooling system checks must be made at every possible opportunity in order to prevent trouble. It is of the utmost importance that all water leaks be discovered and repaired before they can cause damage to the engine. Check possible causes of overheating as follows:

(a) Keep radiator full of water. Repair leaks.

(b) Keep fan belt in proper adjustment.

(c) Flush cooling system if it is clogged up.

(d) Be sure water pump is properly functioning.

(e) Check thermostat for faulty action

(f) Look for rotted or defective rubber hose.

(g) Clean dirt or insects from radiator air passages, and clean dirt or sand from bottom of radiator shroud.

(h) Check crankcase oil level.

(i) See that choke valve will open all the way to prevent a rich mixture.

(j) Clean carburetor and check float level to prevent a lean mixture.

(k) Check timing.

(l) Do not drive with spark too far retarded.

(m) Check exhaust for restrictions.

(n) Check brakes for dragging.

(o) Do not permit engine to labor. Drive in proper gear.

(2) In torrid regions it may be necessary to permit free circulation of water to get the maximum cooling effect. This may be accomplished by removing the thermostat and blocking off the thermostat bypass tube. If this is done, it is recommended that the vehicle be tagged conspicuously so that the changeover may be reversed if the vehicle moves into another climate.

(3) Special surge tanks or condensers are available for vehicles operating in extremely hot regions. These are used in connection with pressure cooling systems and serve as a reservoir for water which would be lost with an ordinary cooling system.

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(4) Scale and rust formations in the cooling system occur more readily than usual during operations in extreme heat. Rust inhibitors should be added to the cooling liquid. Use only clean water and avoid the use of water containing alkalis or other harmful substances.

c. **Special Maintenance.**

(1) In extremely hot weather preventive maintenance checks must be made as frequently as possible. Rubber hose and diaphragms deteriorate rapidly when exposed to heat.

(2) Lubricating oils thin out and flow past seals more readily than at normal temperatures.

(3) Brake drums become excessively hot, with the danger of galling and cracking.

(4) Tires wear out rapidly and inflation must be checked more frequently than usual.

(5) Excessive heat may cause vapor lock, and it may be necessary to insulate the fuel lines or to install special pressure caps on the gasoline tanks. If vapor lock occurs, pour water over the lines and affected units, or wait until they cool off.

(6) The level of the water in the battery should be checked daily and replenished, if necessary, with drinking water.

18. OPERATION IN DESERT OR SANDY TERRAIN.

a. **General.** Desert driving calls for great individual skill on the part of the driver because of the necessity for dispersion and for avoiding the tracks of preceding vehicles. It takes considerable experience to develop the quick eye necessary to pick the best ground and the proper gear.

b. **Cooling System.** In desert operations, it is important that all preventive maintenance practices outlined in paragraph 17 be followed. Special emphasis should be placed on those aspects of preventive maintenance which are concerned with the cooling system as water is at a premium in the desert.

c. **Air Cleaners.** There is always sand in the air in the desert and more is stirred up by the wind and by the passage of vehicles. In order to prevent damage to the engine, the air cleaners (engine air cleaner, air compressor, air cleaner and auxiliary unit air cleaners where provided) be given very frequent attention. Under extremely bad conditions it may be necessary to clean the air cleaners every hour or so. When cleaning the air cleaners always check the breathers on the engine, transfer case and axles.

d. **Tires.**

(1) In desert operations the tires must be suitable for almost every type of terrain. The greatest difficulties will be encountered in sand. The tires should be of plain rib tread and of round cross section, as tires with deeply corrugated or raised flat treads will break through the crust and dig into the soft sand underneath. Air pressure must be varied to suit the type of ground surface.

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(2) When going over sand or soft powdered clay, the tires should be deflated as much as is possible. By deflating the tires, the area in contact with the ground is increased and hence the unit ground pressure is decreased. The soft tire fits itself into the irregularities of the sand without breaking through the crust. It has been found that tire life is very little shortened by running soft over sandy ground which does not contain rocks or imbedded boulders.

(3) On rocky ground the tires must be fully inflated. Soft tires would be quickly rendered useless from chafing against the rocks.

(4) Since a normal day's march will take a vehicle over different kinds of ground, strict tire discipline is necessary. These vehicles are equipped with an air hose so that air from the air brake reservoirs can be used to inflate the tires.

e. **Special Operating Instructions.**

(1) Operations over sand should be made with the front axle engaged with the transfer case in low range.

(2) All starts and stops on sandy ground should be made slowly and gradually without spinning or skidding the wheels. When changing gears, release the clutch gradually to prevent sudden changes in vehicle speed. To neglect these precautions will cause the vehicle to break through the crust and become stuck.

(3) The driver should shift gears at the proper time so as not to lose vehicle speed, or cause the engine to labor. He must learn to make full use of momentum to keep from being stuck any more often than can be helped. If possible, the truck should never be parked facing uphill.

(4) As soon as the vehicle has broken through the sand crust and ceased to move, no attempt should be made to get the vehicle out under power, as to do so will only cause the vehicle to sink deeper into the sand. Dig a path out in front of the wheels which are dug in, making it long and of shallow slope and as deep as the wheels are sunken in. Place mats in front of the front wheels and place a single spar between the duals of the rear wheels (so that it will function as a rail) and drive out slowly and carefully. In extreme cases it may be necessary to attempt winching operations.

19. OPERATION IN MUD.

a. **General.** The operation of an automotive vehicle over mud and soft ground calls for the utmost in skill and judgment on the part of the driver. The driver must avoid bad holes and deep ruts, and should steer for those parts of the ground which afford the easiest going.

b. **Preparation.** Operations in mud require all available flotation and traction. If the mud is not very bad, it may not be necessary to make any special installations, but for deep mud it may be desirable to mount the spare wheels on the front axle to provide duals all the way around for extra flotation, and to install tire chains for extra traction.

c. **Hints for Operation.**

(1) Engage the front axle drive and shift to low range in the transfer case before starting through the mud.

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

(2) Keep the engine wound up and do not permit it to labor. Select the proper gears and shift up or down in the transmission to keep the engine up to its full power (1800 to 2300 revolutions per minute).

(3) Keep the vehicle moving to make full use of its momentum. Change gears quickly.

(4) If the vehicle becomes bogged down, do not attempt to drive out as it will only cause the wheels to dig in deeper. Dig the wheels clear and spread dry soil, sand, branches, etc., in front of them. It may be necessary to attempt winching operations.

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Section VI

INSPECTION AND PREVENTIVE MAINTENANCE SERVICE

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20. PURPOSE.

a. To insure mechanical efficiency it is necessary that the vehicle be systematically inspected at intervals each day it is operated and weekly, so defects may be discovered and corrected before they result in serious damage or failure. Certain scheduled maintenance services will be performed at these designated intervals. The services set forth in this section are those performed by driver or crew, before operation, during operation, at halt, and after operation and weekly.

b. Driver Preventive Maintenance Services are listed on the back of "Driver's Trip Ticket and Preventive Maintenance Service Record," W.D. Form No. 48, to cover vehicles of all types and models. Items peculiar to specific vehicles, but not listed on W.D. Form No. 48, are covered in manual procedures under the items with which they are related. Certain items listed on the form that do not pertain to the vehicle involved are eliminated from the procedures as written into the manual. Every organization must thoroughly school each driver in performing the maintenance procedures set forth in manuals, whether they are listed specifically on W.D. Form No. 48 or not.

c. The items listed on W.D. Form No. 48 that apply to this vehicle are expanded in this manual to provide specific procedures for accomplishment of the inspections and services. These services are arranged to facilitate inspection and conserve the time of the driver and are not necessarily in the same numerical order as shown on W.D. Form No. 48. The item numbers, however, are identical to those shown on that form.

d. The general inspection of each item applies also to any supporting member or connection, and generally includes a check to see whether the item is in good condition, correctly assembled, secure, or excessively worn.

e. The inspection for "good condition" is usually an external visual inspection to determine whether the unit is damaged beyond safe or serviceable limits. The term good condition is explained further by the following terms: not bent or twisted, not chafed or burned, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut.

f. The inspection of a unit to see that it is "correctly assembled" is usually an external visual inspection to see whether it is in its normal assembled position in the vehicle.

g. The inspection of a unit to determine if it is "secure" is usually an external visual examination, a hand-feel, or a pry-bar check for

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looseness. Such an inspection should include any brackets, lock washers, lock nuts, locking wires, or cotter pins used in assembly.

h. "Excessively worn" will be understood to mean worn close to, or beyond, serviceable limits, and likely to result in a failure if not replaced before the next scheduled inspection.

i. Any defects or unsatisfactory operating characteristics beyond the scope of first echelon to correct must be reported at the earliest opportunity to the designated individual in authority.

21. BEFORE-OPERATION SERVICE.

a. This inspection schedule is designed primarily as a check to see that the vehicle has not been tampered with, or sabotaged since the After-operation Service was performed. Various combat conditions may have rendered the vehicle unsafe for operation, and it is the duty of the driver to determine whether or not the vehicle is in condition to carry out any mission to which it is assigned. This operation will not be entirely omitted, even in extreme tactical situations.

b. **Procedures.** Before-operation Service consists of inspecting items listed below according to the procedure described, and correcting or reporting any deficiencies. Upon completion of the service, results should be reported promptly to the designated individual in authority.

(1) ITEM 1, TAMPERING AND DAMAGE. Look for injury to vehicle in general, accessories or equipment, caused by tampering or sabotage, collision, falling debris or shell fire since parking vehicle. Look under hood for signs of tampering or sabotage, such as loosened or damaged accessories, loose fuel, oil or water lines, disconnected wiring or linkage. Dry electrical wiring or accessories, if necessary, to facilitate starting.

(2) ITEM 2, FIRE EXTINGUISHERS. Inspect for corrosion, clogged nozzle, full charge (shake to test), and secure mounting.

(3) ITEM 3, FUEL, OIL AND WATER. Observe amount of fuel in tanks, vehicle and wrecker air compressor and spare cans; add fuel if necessary. Read crankcase oil level (also oil level of compressor on wrecker). Add oil if necessary. Inspect water level and condition of coolant. If necessary to add considerable water during period when antifreeze is used, have hydrometer check made of coolant and add antifreeze if required. Investigate and report any appreciable change in levels since performing last After-operation Service.

(4) ITEM 4, ACCESSORIES AND DRIVES. Examine all accessories such as carburetor, generator, regulator, starter, fuel pump, fuel strainer, fan, and water pump for loose connections and mountings or leaks. Make sure winches are not engaged and that cable is properly wound and fastened. Examine winch transmission roller chain (wrecker) for good condition, and one-half inch deflection from vertical opposite idler gear. Examine fan belts for good condition and one-inch deflection between fan and crankshaft pulleys.

(5) ITEM 5, AIR BRAKE TANKS. Inspect air brake valve assemblies for leaks with brakes applied and released; check connections if hooked up to trailer. See that dummy couplings are installed. Exam-

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ine air brake reservoir tanks for damage and security of mounting, also air line connections for tightness. Be sure water (condensation) is drained from air tanks. CAUTION: *Close drain valves.*

(6) ITEM 6, LEAKS, GENERAL. Look under vehicle and on ground for indications of fuel, oil, water, and gear oil leaks. Examine radiator core and hose, oil filters, crankcase, fuel tank and fuel and oil lines for leaks. Correct leaks or report.

(7) ITEM 7, ENGINE WARM-UP. Start engine. Observe any tendency toward slow cranking speed, and improper or noisy engaging or disengaging when starting control is operated. Set throttle to give 800 to 900 revolutions per minute (tachometer reading) and warm-up engine while proceeding with the following Before-operation Service. NOTE: *During engine warm-up listen for unusual noises and observe instrument indications and engine performance, such as misfiring and rapid temperature rise. If oil pressure does not read at least 5 to 10 pounds at idle immediately after starting, STOP ENGINE, and report.*

(8) ITEM 8, CHOKE. At starting, test operation of choke. As engine warms up, push in choke to prevent overchoking and engine oil dilution.

(9) ITEM 9, INSTRUMENTS. Inspect for secure mounting, proper connections, damage, and proper readings.

(a) Oil Pressure Gage. Normal gage pressure is 5 to 10 pounds at idle and 25 pounds minimum at running speeds, with warm engine. Pressure will be higher before engine warms up.

(b) Ammeters. After engine starts and is running at 800 to 900 revolutions per minute (fast idle), both ammeters should show a high positive (+) charge rate for short period until battery current used in starting is restored, then a zero or slight positive (+) charge, with lights and accessories turned off.

(c) Fuel Gage. Must register approximate amount of fuel in tank.

(d) Temperature Gage. Reading should increase gradually as engine warms up to 160° to 180°F operating temperature.

(e) Tachometer. Observe whether tachometer indicates engine revolutions per minute without undue noise or fluctuation.

(f) Air Brake Pressure Gage and Warning Buzzer. Gage should show 70-pounds pressure before starting truck. Warning buzzer should operate up to 50- to 60-pounds pressure. If 70-pounds pressure is not reached within reasonable warm-up time, investigate system for faulty operation or leaks. Maximum governed pressure is 105 pounds.

(g) Viscosity Gage. Gage may indicate "heavy" during warm-up period, but must indicate "ideal" after warm-up. "Thin" indication shows need for oil change.

(10) ITEM 10, HORN AND WINDSHIELD WIPER. If tactical situation permits, test horn. Operate windshield wipers, and observe for blade contact throughout full arc of operation.

(11) ITEM 11, GLASS AND REAR VIEW MIRROR. Inspect for damaged frames, brackets, and discolored glass. Clean windshield and door glass. Clean mirror and aim properly.

(12) ITEM 12, LAMPS (LIGHTS) AND REFLECTORS. Tactical situation permitting, turn on switches and see that all lights light. See that

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all lights are secure and lenses of lights and reflectors are clean and not broken.

(13) ITEM 13, WHEEL AND FLANGE NUTS. Examine all wheel mountings, rim and flange nuts to see they are secure.

(14) ITEM 14, TIRES. Look for damage. See that there are no stones, glass or other foreign objects imbedded in treads or carcass, or between duals. Inspect for presence of valve caps. Air pressure should be 65 pounds.

(15) ITEM 15, SPRINGS AND SUSPENSIONS. See that they are secure, not damaged or shifted.

(16) ITEM 16, STEERING LINKAGE. Inspect steering gear case and all connecting linkage for good condition and security. Make sure there are no excessive lubricant leaks.

(17) ITEM 17, FENDERS AND BUMPERS. Inspect for looseness or damage. Inspect 5-gallon cans and bracket for good condition and security.

(18) ITEM 18, TOWING CONNECTIONS. (Pintle and two tow hooks.) See that towing connections are secure and not damaged.

(19) ITEM 19, BODY, LOAD AND TARPAULINS. Inspect for good condition, security and even load distribution.

(20) ITEM 20, DECONTAMINATOR. Inspect for full charge (shake), closed valve, and secure mounting.

(21) ITEM 21, TOOLS AND EQUIPMENT. Inspect for presence, serviceability, and proper stowage.

(22) ITEM 22, ENGINE OPERATION. Engine should idle smoothly with choke button fully depressed. Accelerate and decelerate, and listen for unusual noises that may indicate compression or exhaust leaks, worn, damaged, loose, or inadequately lubricated engine parts or accessories. Note any unusual smoke from exhaust.

(23) ITEM 23, DRIVER PERMIT AND FORM NO. 26. Driver must have his operator's permit and make sure that Standard Accident Report Form No. 26, and Vehicle Operator's Manual are in the vehicle, legible, and safely stowed.

(24) ITEM 24, DURING-OPERATION SERVICE. The During-operation Service must start immediately after vehicle is put in motion.

22. DURING-OPERATION SERVICE.

a. While vehicle is in motion, listen for any sounds such as rattles, knocks, squeals, or hums that may indicate trouble. Look for indications of trouble in cooling system and for smoke from any part of the vehicle. Be on the alert to detect any odor of overheated components or units such as generator, brakes, clutch, fuel vapor from a leak in fuel system, exhaust gas or other signs of trouble. Any time the brakes are used, gears shifted, or vehicle turned, consider this a test, and notice any unsatisfactory or unusual performance. Watch the instruments constantly. Notice promptly any unusual instrument indication that may signify possible trouble in the system to which the instrument applies.

b. **Procedures.** During-operation Services consist of observing items listed below according to the procedures following each item,

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and investigating any indications of serious trouble. Notice minor deficiencies to be corrected or reported at earliest opportunity, usually next scheduled halt.

(1) ITEM 27, FOOT AND HAND BRAKES. Foot brake should operate smoothly and effectively without pulling vehicle to right or left. Free travel before brake operation should be ½ to 1 inch. When vehicle is stopped, hand brake should hold vehicle satisfactorily on a reasonable incline. Reserve of ¼ to ⅓ of lever travel must be available.

(2) ITEM 28, CLUTCH. Test clutch pedal for one to one and one-half inches free travel before disengagement. Clutch must not chatter, squeal, or slip.

(3) ITEM 29, TRANSMISSION, (POWER TAKE-OFF ON CARGO, PONTON AND WRECKER TRUCKS). Gears must shift smoothly, operate quietly, and not creep out of mesh during operation.

(4) ITEM 30, TRANSFER, (POWER TAKE-OFF ON DUMP TRUCK). Gears should shift smoothly, operate quietly, and not creep out of mesh during operation.

(5) ITEM 31, ENGINE AND CONTROLS. Be alert for deficiencies in engine performance such as lack of usual power, misfiring, unusual noise, stalling, engine overheating, or unusual exhaust smoke. Note whether engine responds to controls satisfactorily and whether controls seem to be in proper adjustment, and not loose.

(6) ITEM 32, INSTRUMENTS. Observe all instruments for indication of normal functioning of systems to which they apply.

(a) Temperature Gage. Normal operating temperature is 160°F to 180°F.

(b) Oil Pressure Gage. Normal oil pressure is 5 to 10 pounds at idle and 25 pounds minimum at running speeds. Any unusual drop, or no pressure, requires immediate stopping of engine.

(c) Ammeters. Both should indicate zero or positive (+) reading during operation. Discharge may indicate faulty generator, regulator or other serious electrical trouble.

(d) Fuel Gage. Should indicate approximate amount of fuel in tank.

(e) Speedometer and Odometer. The speedometer should indicate vehicle speed (except reverse) without noise or fluctuation. Odometer should record accumulating trip and total mileage.

(f) Tachometer. Should register engine revolutions per minute without noise or fluctuation.

(g) Air Pressure Gage. Should indicate 85 to 105 pounds during operation. Maximum governed pressure is 105 pounds.

(h) Air Pressure Warning Buzzer. Indicates dangerously low pressure (50 to 60 pounds or less).

(i) Viscosity Gage. Must show "ideal" after engine is fully warmed up.

(7) ITEM 33, STEERING GEAR. Test for looseness, binding, pulling to one side, wheel tramp wander, shimmy, or unusual noises.

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(8) ITEM 34, RUNNING GEAR. Listen for any unusual noises from wheels, axles or suspension parts, that may indicate looseness or damage.

(9) ITEM 35, BODY AND TRAILER. Be alert for shifting load, abnormal sagging or tilting of vehicle, loose top, presence and condition of tarpaulin or curtains, unusual weaving of towed loads, loose hardware, gun mounts, or equipment.

23. AT-HALT SERVICE.

a. At-halt Services may be regarded as minimum maintenance procedures and should be performed under all tactical conditions, even though more extensive maintenance services must be slighted or omitted altogether.

b. **Procedures.** At-halt Services consist of investigating any deficiencies noted during operation, inspecting items listed below according to the procedures following the items, and correcting any deficiencies found. Deficiencies not corrected should be reported promptly to the designated individual in authority.

(1) ITEM 38, FUEL, OIL AND WATER. Replenish as required. Fuel filler cap vents must be free.

(2) ITEM 39, TEMPERATURES: HUBS, BRAKE DRUMS, TRANSFER, TRANSMISSION, AND AXLES. Feel for overheating. Transfer temperatures will run higher than other gear units. Lower than average temperature of brake drum may indicate inoperative brake.

(3) ITEM 40, AXLE AND TRANSFER VENTS. Wipe vents clean and examine for damaged or clogged condition; remove and clean if necessary.

(4) ITEM 41, PROPELLER SHAFTS. Examine for looseness, damage, or oil leaks.

(5) ITEM 42, SPRINGS AND SUSPENSION. Inspect for broken or shifted spring leaves, damaged or loose clips, U-bolts, eyebolts, shackles, shock absorbers, torque rods, and torque rod pins.

(6) ITEM 43, STEERING LINKAGE. Examine steering control mechanism, arms, and linkage for looseness or damage.

(7) ITEM 44, WHEEL AND FLANGE NUTS. All nuts must be present and secure.

(8) ITEM 45, TIRES. Tires must have 65 pounds maximum pressure (when cool). Examine for flats or damage. Remove foreign matter from treads and from between duals.

(9) ITEM 46, LEAKS, GENERAL. Look under hood and under vehicle for indications of fuel, oil, water, or hoist fluid leaks.

(10) ITEM 47, ACCESSORIES AND BELTS. Examine for looseness, damage and incorrect alinement. Fan belt must have tension to give one-inch deflection between fan and crankshaft pulley. Wrecker rear winch drive chain tension must have one-half inch deflection.

(11) ITEM 48, AIR CLEANERS. Cleaners must be secure and air passages clean. When operating under extremely dirty or sandy con-

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ditions, inspect air cleaners and breather caps frequently. Clean and oil the following as required: carburetor and compressor air cleaners, oil filler breather, and air cleaners on air compressor of wrecker.

(12) ITEM 49, FENDERS AND BUMPERS. Examine for looseness or damage.

(13) ITEM 50, TOWING CONNECTIONS. Make sure all towing connections are secure and locked.

(14) ITEM 51, BODY, LOAD AND TARPAULIN. Inspect vehicle load for shifting and tarpaulins for secure fastening and good condition.

(15) ITEM 52, APPEARANCE AND GLASS. Clean windshield, door and window glass, rear-view mirror, and lamp lenses, and inspect for damage.

24. AFTER-OPERATION AND WEEKLY SERVICE.

a. After-operation Servicing is particularly important, because at this time the driver inspects his vehicle to detect any deficiencies that may have developed, and corrects those he is permitted to handle. He should report promptly to the designated individual in authority, the results of his inspection. If this schedule is performed thoroughly, the vehicle should be ready to roll again on a moment's notice. The Before-operation Service, with a few exceptions, is then necessary only to ascertain whether the vehicle is in the same condition in which it was left upon completion of the After-operation Service. The After-operation Service should never be entirely omitted even in extreme tactical situations, but may be reduced to the bare fundamental services outlined for the At-halt Service if necessary.

b. **Procedures.** When performing the After-operation Service the driver must remember and consider any irregularities noticed during the day in the Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing the following items. Those items of the After-operation that are marked by an asterisk (*) require additional weekly services, the procedures for which are indicated in subparagraph (b) of each applicable item.

(1) ITEM 55, ENGINE OPERATION. Test for smooth engine idle without stalling. Accelerate and decelerate engine, noting any tendency to miss or backfire, unusual noises, or vibration. Investigate any unsatisfactory engine operating characteristics noted during operation.

(2) ITEM 56, INSTRUMENTS. Before stopping engine inspect instruments for good condition, secure mountings, proper connections, and proper readings.

(a) Oil Pressure Gage. Oil pressure should be 5 to 10 pounds at idle and a minimum of 25 pounds at running speeds.

(b) Temperature Gage. Temperature should range between 160°F to 180°F.

(c) Ammeters. Both should read zero or slight positive charge at idle speed (with lights and accessories turned off).

(d) Fuel Gage. Gage should indicate approximate contents of tank.

(e) Tachometer. Should register engine revolutions per minute without fluctuation of indicator.

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(f) Viscometer. Should indicate "ideal" (normal).

(g) Air Pressure Gage. Gage should indicate in excess of 50 pounds and not over 105 pounds with buzzer NOT operating. (Pressures subject to 5 or 6 pounds plus or minus variation.)

(3) ITEM 54, FUEL, OIL AND WATER. Fill vehicle fuel tank (and air compressor tank on wrecker, if required) and spare cans. Read engine oil level (and air compressor oil level on wrecker) and fill to proper level with specified oil. Note level of coolant, observe for contamination, and add water if needed. If necessary to add considerable quantity of water during period when antifreeze is used, have hydrometer test made and add antifreeze if required.

(4) ITEM 57, HORN AND WINDSHIELD WIPERS. Inspect horn for secure mounting and proper connections, wipers for good condition, smooth operation, full stroke and contact.

(5) ITEM 58, GLASS AND REAR-VIEW MIRROR. Clean and examine for good condition and secure mounting. Cover exposed glass to avoid reflections if situation requires camouflage.

(6) ITEM 59, LAMPS (LIGHTS) AND REFLECTORS. Observe whether lights go on and off as operated. Inspect all lenses and reflectors for dirt or damage; clean if necessary.

(7) ITEM 60, FIRE EXTINGUISHER. Inspect for good condition, leaks, and tight mountings. If extinguisher has been used report for refill or replacement.

(8) ITEM 61, DECONTAMINATOR. Inspect for good condition and security of mounting.

(9) ITEM 62, *BATTERIES.

(a) Inspect batteries for good condition, secure mounting and connections, proper electrolyte level, and leaks. Vent caps must be clean and secure.

(b) Weekly. Clean dirt from top of batteries and remove caps. Add clean drinking water if necessary. When terminals or posts are corroded, clean and grease lightly. Tighten terminal bolts and mounting bolts carefully. Clean and paint battery carrier if corroded.

(10) ITEM 63, *ACCESSORIES AND BELTS.

(a) Inspect carburetor, air cleaner, compressor, generator, regulator, starter, fan, and water pump for loose connections or mountings. Inspect air cleaner, carburetor, and water pump for leaks. Test fan belt for one-inch deflection between fan and crankshaft pulleys.

(b) Weekly. Tighten, if necessary, all accessories and inspect for any loose connections or leaks.

(11) ITEM 64, *ELECTRICAL WIRING.

(a) Inspect ignition wiring and outside of spark plugs and distributor cap for secure connections, cleanliness, and good condition.

(b) Weekly. Inspect all accessible low voltage wiring for good condition and security.

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INSPECTION AND PREVENTIVE MAINTENANCE SERVICE

(12) ITEM 65, *AIR CLEANERS AND BREATHER CAPS.

(a) Inspect carburetor air cleaner, crankcase breather mesh, air compressor cleaners, and clean if necessary, according to paragraph 26 c (3).

(b) *Weekly.* Clean, dry and recoil air compressor air cleaners according to paragraph 26 c (3).

(13) ITEM 66, *FUEL FILTER.

(a) Inspect filter for good condition, security of mounting, and leaks.

(b) *Weekly.* Remove drain plug from fuel strainer under left front fender, bottom side edge (not the center bowl nut), allow water and sediment to drain out of bowl and replace and tighten plug securely.

(14) ITEM 67, ENGINE CONTROLS. Examine for wear, damage, disconnected linkage, and proper lubrication.

(15) ITEM 68, *TIRES.

(a) Remove all foreign matter such as nails, glass, or stones from tires or from between duals. Inspect tires for signs of low pressure, abnormal tread wear and cuts. Replace missing valve caps. Inflate to 65 pounds pressure, *when tires are cool.*

(b) *Weekly.* Replace badly worn or unserviceable tires. Inspect valve stems on inside and outside duals; stems should be diametrically opposite (180 degrees). Inside dual and front wheel valves point away from vehicle; outside duals point toward vehicle. Change wheel position at first sign of irregular wear.

(16) ITEM 69, *SPRINGS AND SUSPENSIONS.

(a) Inspect springs for abnormal sag, broken or shifted leaves, loose or missing rebound clips, eyebolts, U-bolts, or shackles. Inspect torque rods, pins, and shock absorbers for looseness or damage.

(b) *Weekly.* Aline and tighten securely as necessary.

(17) ITEM 70, STEERING LINKAGE. Inspect steering linkage for good condition, loose, or inadequately lubricated parts. Examine steering gear case for leaks.

(18) ITEM 71, PROPELLER SHAFTS. Remove excess dirt and grease from around shafts and universal joints. Remove any foreign material wrapped around shafts. Inspect for loose connections, lubricant leaks, and damage.

(19) ITEM 72, *AXLE AND TRANSFER VENTS.

(a) Examine all axle, housing, and transfer vents for presence, good condition and security.

(b) *Weekly.* Free all breather vents of obstructions.

(20) ITEM 73, LEAKS, GENERAL. Look under hood and beneath vehicle for indications of fuel, oil, and water leaks. Inspect around brake drums for lubricant leaks. Examine axles, transmission, transfer, and power take-off for gear oil leaks. Inspect hoist and hoist pump and lines on dump truck for fluid leaks. Trace all leaks to source and correct or report.

(21) ITEM 74, GEAR OIL LEVELS. Inspect differentials, transmission, and transfer case units for correct lubricant levels (from ½ inch below, when cool, to filler hole level, when hot).

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

(22) ITEM 75, *AIR BRAKE TANKS AND CONNECTIONS.

(a) Listen at several points about truck for indications of air leaks. Drain condensation water from both air brake tanks, and close valves after draining. Inspect air brake chambers and linkage for security of mountings.

(b) Tighten tank mounting and all air-line connections that are loose. Clean air-line hose.

(23) ITEM 76, FENDERS AND BUMPERS. Inspect for security and good condition.

(24) ITEM 77, TOWING CONNECTIONS. Inspect towing hooks and pintle for looseness or damage. Be sure any towed load is secure and safety catches lock properly.

(25) ITEM 78, BODY, LOAD AND TARPAULIN. Inspect bodies for damage and loose or missing parts. See that load is evenly distributed and secure. Tarpaulin must be secure and not damaged.

(26) ITEM 82, *TIGHTEN.

(a) Tighten all wheel mounting, axle flange, and spring U-bolt nuts securely.

(b) Weekly. Tighten all vehicle assembly mounting nuts or screws that inspection indicates need to be tightened; be sure to tighten body mounting bolt nuts.

(27) ITEM 83, *LUBRICATE AS NEEDED.

(a) Lubricate all parts which inspection has revealed need lubrication. Wipe all dirt from fittings before applying lubricant. Report any missing fittings.

(b) Weekly. If due, lubricate all points indicated on vehicle Lubrication Guide as requiring attention on weekly or mileage basis.

(28) ITEM 84, *CLEAN ENGINE AND VEHICLE.

(a) Clean dirt and trash from inside cab and body. Remove excessive dirt and grease from exterior of vehicle and engine.

(b) Weekly. Wash vehicle and remove all dirt and excess grease. If washing is impracticable, wipe as clean as possible using care to avoid creating bright spots which would cause glare. CAUTION: *Do not flush out cab, but sweep when necessary. Clean engine and accessories thoroughly.*

(29) ITEM 85, TOOLS AND EQUIPMENT. Check all tools and equipment assigned to vehicle against stowage lists to make certain they are in good condition and properly mounted and stowed. See paragraphs 27 through 31 of this manual.

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Section VII

LUBRICATION

	Paragraph
Introduction	25
Lubrication Guide	26

25. INTRODUCTION. Lubrication is an essential part of preventive maintenance, determining to a great extent the serviceability of parts and assemblies.

26. LUBRICATION GUIDE.

a. General. Lubrication instructions for this materiel are consolidated in a Lubrication Guide (figs. 33, 34, 35, and 36). These specify the points to be lubricated, the periods of lubrication, and the lubricant to be used. In addition to the items on the Guide, other small moving parts, such as hinges and latches, must be lubricated at frequent intervals.

b. Supplies. In the field it may not be possible to supply a complete assortment of lubricants called for by the Lubrication Guide to meet the recommendations. It will be necessary to make the best use of those available, subject to inspection by the officer concerned, in consultation with responsible ordnance personnel.

c. Lubrication Notes. The following notes apply to the Lubrication Guide (figs. 33, 34, and 35). All note references in the Guide itself are to the subparagraph below having the corresponding number:

(1) FITTINGS. Clean before applying lubricant. Lubricate until new lubricant is forced from the bearing, unless otherwise specified. CAUTION: *Lubricate chassis points after washing.*

(2) INTERVALS INDICATED ARE FOR NORMAL SERVICE. For extreme conditions of speed, heat, water, sand, mud, snow, rough roads, dust, etc., reduce interval by ⅓ or ½, or more if conditions warrant.

(3) AIR CLEANERS. Daily, check level and refill engine air cleaner oil reservoir to bead level with used crankcase oil or OIL, engine, crankcase grade. Every 2,000 miles (daily under extreme dust conditions) remove air cleaner and wash all parts. CAUTION: *Keep all air pipe connections clean and tight.* Every 1,000 miles (daily under extreme dust conditions) remove crankcase breather sump and mesh and wash in SOLVENT, dry-cleaning, and recoil mesh and fill sump to bead level with used crankcase oil or OIL, engine, crankcase grade. Wash cab ventilator air cleaner filter screen in water every 2,000 miles, and renew filter every 15,000 miles. (Closed-type cab only.) Weekly, wash, dry and recoil curled hair in air compressor air cleaner with used crankcase oil or OIL, engine, crankcase grade. Check daily under extreme conditions. Weekly, wash, dry and recoil curled hair and air strainers in wrecker air compressor air cleaner and air compressor engine air cleaner with used crankcase oil or OIL, engine, crankcase grade. Kellogg-type air

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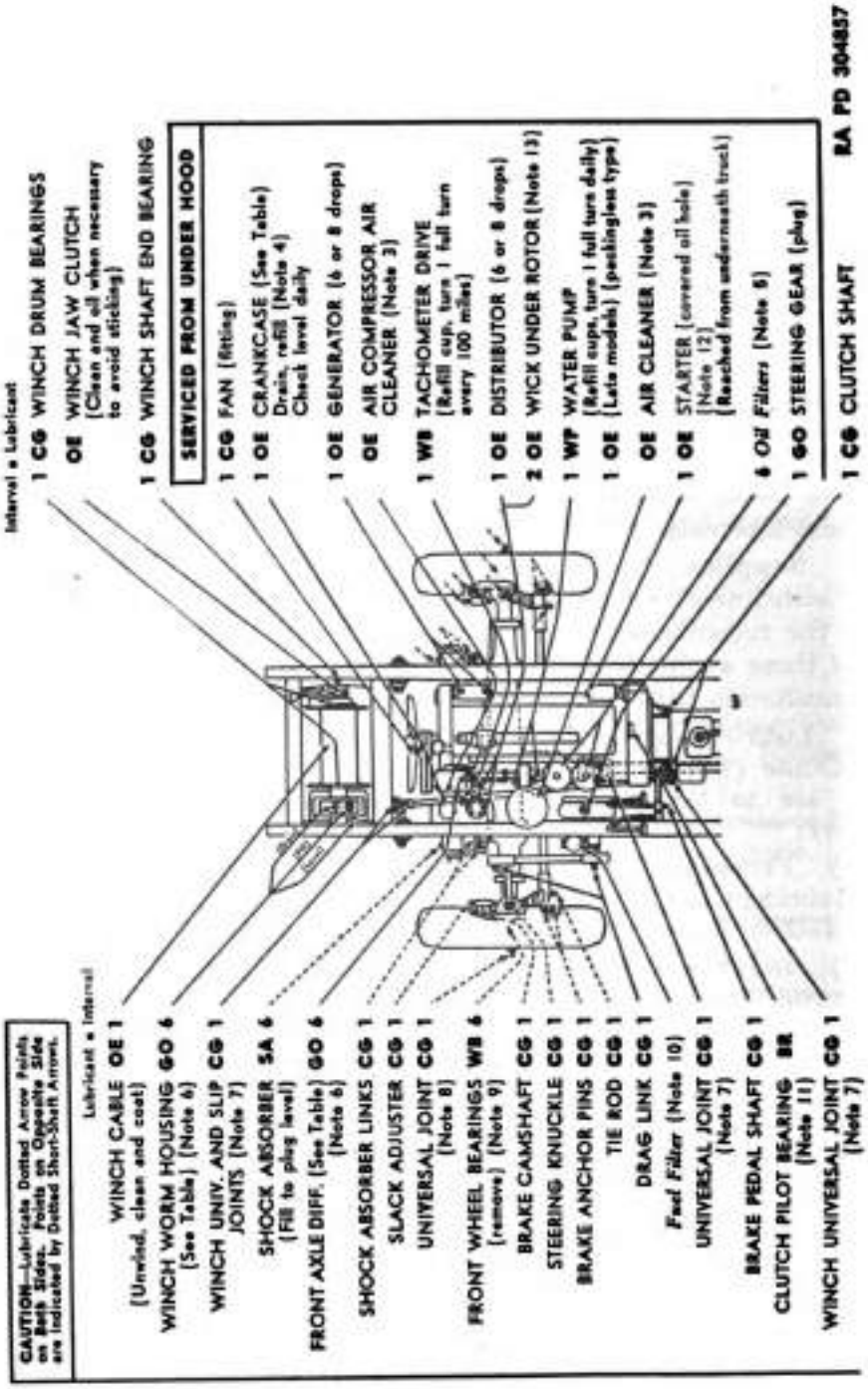
4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)



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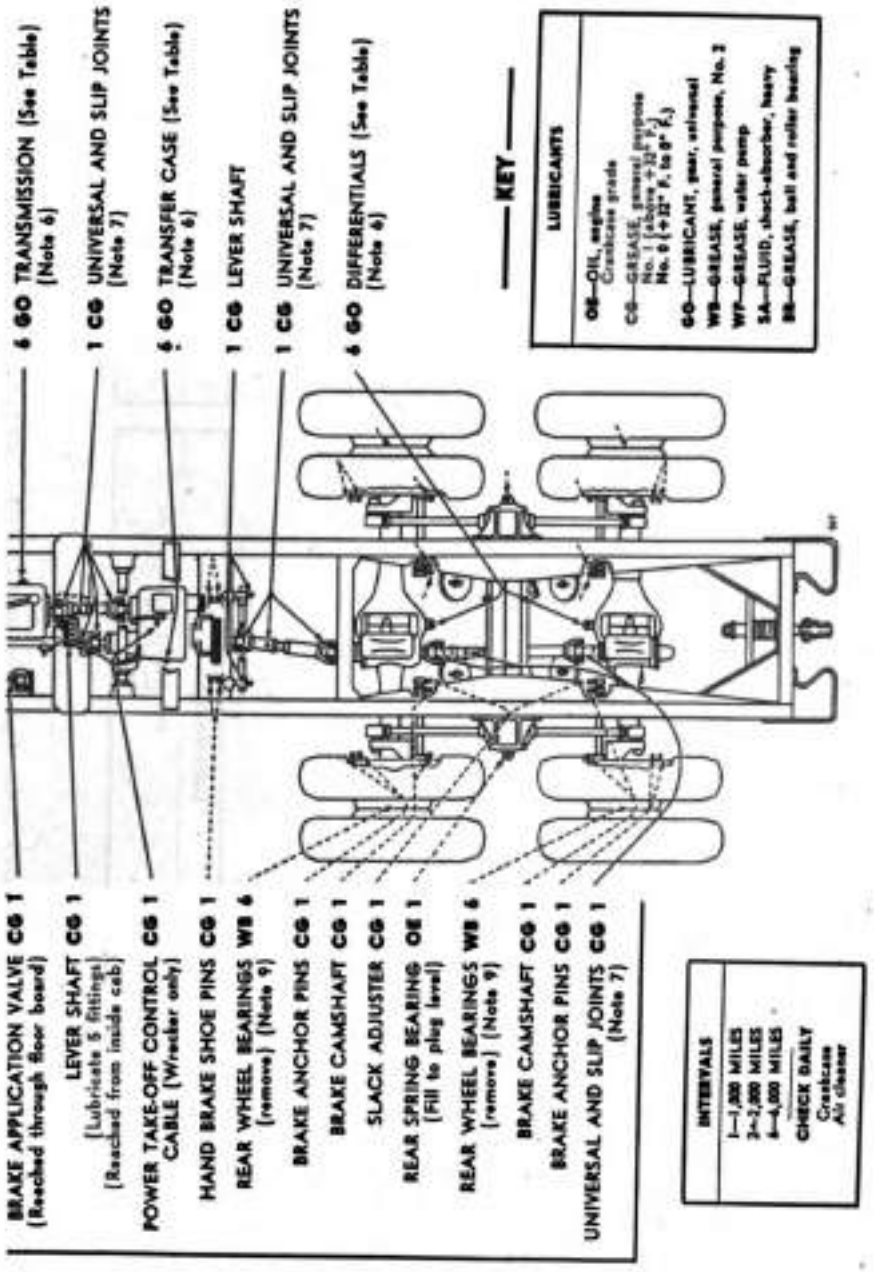

Figure 33—Lubrication Guide

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

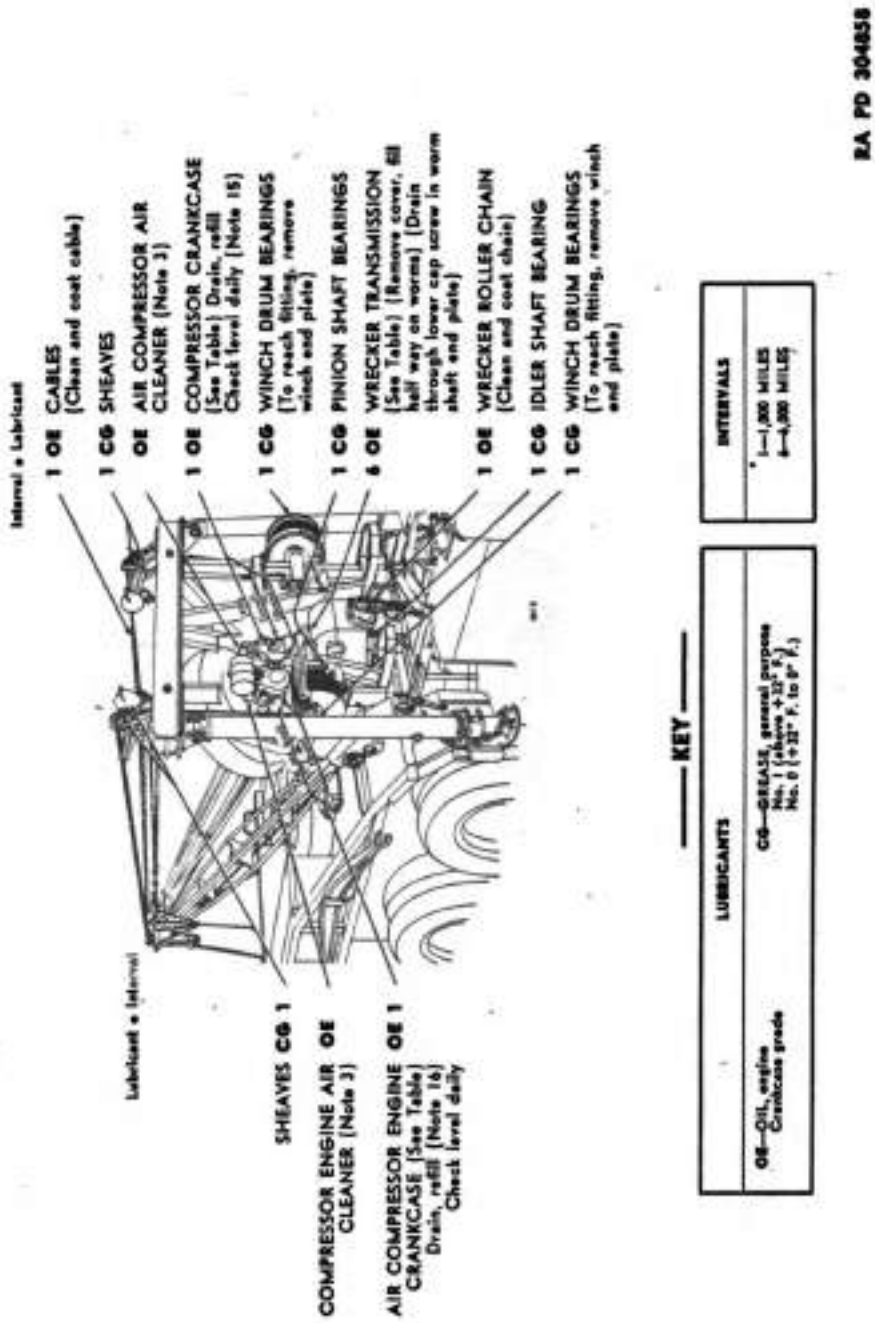

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Figure 34—Lubrication Guide—Wrecker

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LUBRICATION

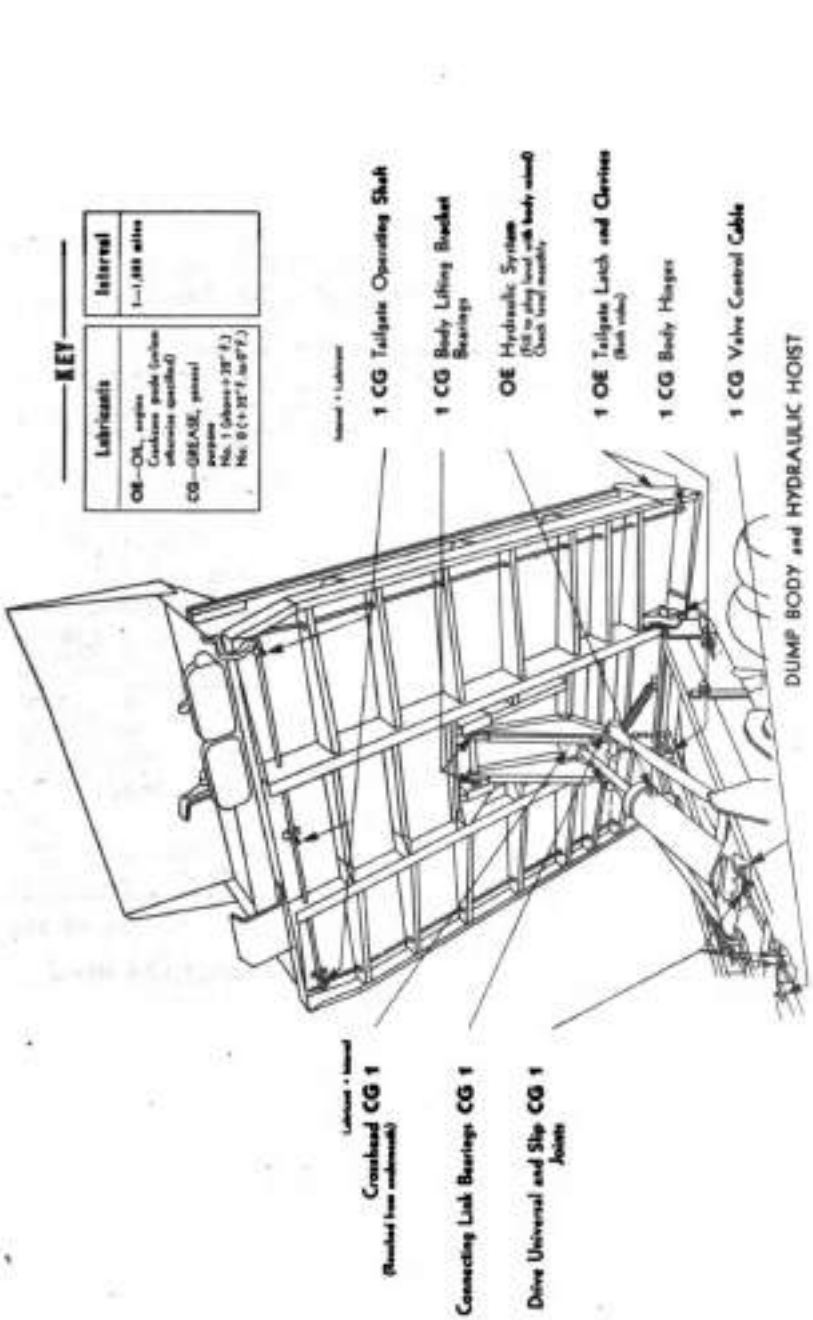

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Figure 35—Lubrication Guide—Dump

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cleaner has felt disk; remove thin felt layer instead of washing. Proper maintenance of air cleaners is essential to prolonged engine life.

(4) CRANKCASE. Drain only when engine is hot. Refill to "FULL" mark on gage. Run engine a few minutes and recheck oil level. CAUTION: *Be sure pressure gage indicates oil is circulating.* The viscometer reading should be in normal range with engine completely warm and running at a speed slightly in excess of idling.

(5) OIL FILTERS. Every 2,000 miles, or more often if necessary, drain the filters through drain plugs. Remove filter element and clean case. Every 6,000 miles, or more often if filter becomes clogged,

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		+32° F. and above	+32° F. to 0° F.	Below 0° F.
Crankcase	16 qt	OE SAE 30	OE SAE 10	
Transmission with Power Take-off	19 qt			
Transmission without Power Take-off	10½ qt			
Transfer Case	Model P67, 5 qt; others, 7½ qt	GO SAE 90	GO SAE 80	
Front Differential	7½ qt			
Rear Differentials (Each unit)	3¾ qt			Refer to OPSG [illegible]
Winch Worm Housing	1½ qt			
Wrecker Air Compressor: Kellogg	½ qt			
Wrecker Air Compressor: Curtis	½ qt			
Wrecker Air Compressor: DeVilbiss	½ qt	OE SAE 30	OE SAE 10	
Wrecker Air Compressor Engine Crankcase	½ qt			
Wrecker Transmission	½ qt	OE SAE 50	OE SAE 30	
Dump Hydraulic System	4 qt	OE SAE 10	OE SAE 10	

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Figure 36—Table of Capacities and Lubricants to be used

renew the element. After renewing the element, refill crankcase to "FULL" mark on gage. Run engine a few minutes, recheck level and add oil to "FULL" mark.

(6) GEAR CASES. Weekly, check level with truck on level ground and, if necessary, add lubricant to within ½ inch of plug level when cold, or to plug level when hot. Drain, flush and refill as indicated at points on Guide. When draining, drain immediately after operation.

(a) Breathers or vents. Axle housings, transfer case and steering gear breathers must be cleaned and kept open. Check each time oil is checked and each time truck is operated under extremely dirty or muddy conditions.

(b) Transfer case declutching unit, power take-off, front axle double reduction gear case. Upon reassembly of cases, fill through plug opening with LUBRICANT, gear, universal, seasonal grade. To flush, fill cases to about one-half capacity with OIL, engine, SAE 10. Operate mechanism within cases slowly for several minutes and re-

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drain. Replace drain plugs and refill cases to correct level with lubricant specified on Guide.

(7) UNIVERSAL JOINTS AND SLIP JOINTS. Apply GREASE, general purpose, seasonal grade, to universal joint until it overflows at relief valve, and to slip joint until lubricant is forced from vent at universal joint end of spline.

(8) UNIVERSAL JOINTS (FRONT WHEELS). With truck on level ground, remove inspection plug in rear of joint, and plug in stub shaft. Insert fitting in stub shaft and fill until lubricant comes out inspection plug hole. Replace plugs.

(9) WHEEL BEARINGS (FRONT AND REAR). To clean and pack bearings properly, they must be removed from the hub. Follow the procedure below:

(a) Remove bearings from hub (par. 138) and wash in SOLVENT, dry-cleaning, until all the old lubricant is removed from both inside and outside of cage.

(b) Lay the bearing cones aside to dry and wash inside of hub and spindle with dry-cleaning solvent.

(c) When bearings are thoroughly dry, coat lightly with OIL, engine crankcase grade, and pack races with GREASE, general purpose No. 2, and reassemble in hub. To satisfactorily pack a bearing it is necessary to knead lubricant in by hand or to pack into space between the cage and inner race. Coat inside of hub and spindle with a thin coat of grease to prevent rusting. The lubricant packed in bearing races is sufficient to provide lubrication until the next service period. An excess may result in leakage of lubricant into the brake drum.

(d) Replace wheel and adjust bearings according to instructions in paragraph 138.

(10) FUEL FILTER. Every 100 to 1,000 miles, depending on operating conditions, remove plug and drain. Every 1,000 miles, remove filter bowl and wash element.

(11) CLUTCH PILOT BEARING. At time of disassembly of clutch for inspection, replacement or overhaul, clean and repack bearings with GREASE, ball and roller bearing.

(12) CRANKING MOTOR. Every 6,000 miles, remove cranking motor, clean and lubricate Bendix drive with 6 or 8 drops of OIL, lubricating, preservative, special. When cranking motor is disassembled, wash bushings and soak in OIL, engine, crankcase grade.

(13) DISTRIBUTOR. Every 2,000 miles, wipe distributor breaker cam lightly with GREASE, general purpose, seasonal grade, and lubricate breaker arm pivot with one or two drops of OIL, engine, crankcase grade.

(14) BRAKE GOVERNOR. Every 20,000 miles, remove cover plate on brake governor, located under hood, and lubricate the valve stem with OIL, lubricating, preservative, special.

(15) WRECKER AIR COMPRESSOR CRANKCASE. Drain only when compressor is hot. Refill to correct level. The Kellogg model has a dip stick to determine proper oil level. The correct level for the

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Curtis model is to overflow level at filler plug. The DeVilbiss model has an oil level glass.

(16) WRECKER AIR COMPRESSOR ENGINE CRANKCASE. Drain only when engine is hot. Refill to level of filler plug on Johnson and Briggs and Stratton engines.

(17) WRECKER AND WINCH SNATCH BLOCKS. Every 1,000 miles, lubricate sheaves through fittings on snatch blocks with GREASE, general purpose, seasonal grade.

(18) OILCAN POINTS. Every 1,000 miles, lubricate throttle and accelerator linkage, power take-off control linkage, transfer case shift linkage, transfer shaft, winch clutch control handle, ratchet and pawl on winch boom, tow bar, wrecker block and tackle, hinges, latches, air compressor rocker arm, pintle, wrecker controls and linkage with OIL, engine, crankcase grade.

(19) RUBBER BUSHINGS. Every 1,000 miles, apply FLUID, brake, hydraulic, to spring shackles and torque rod bushings. CAUTION: *Do not use oil.*

(20) POINTS REQUIRING NO LUBRICATION SERVICE. Springs, brake air compressor, clutch release bearing.

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Section VIII

TOOLS AND EQUIPMENT STOWAGE ON VEHICLES

	Paragraph
General	27
Vehicle tools	28
Vehicle equipment	29
Vehicle spare parts	30
Care of tools and equipment	31

27. GENERAL.

a. Each vehicle is equipped with a set of tools, equipment and spare parts, which are adequate for making minor adjustments, changing tires, removing wheels and other maintenance operations which may be performed by the driver in the field.

28. VEHICLE TOOLS.

a. The following tools (one of each) are supplied with all Diamond T 4-ton, 6 x 6 vehicles (fig. 37):

Tool	Where Carried
BAG, tool	Rear tool compartment*
HAMMER, ball peen, 16-oz	Tool bag
PLIERS, 6-in.	Tool bag
SCREWDRIVER, 6-in. blade	Tool bag
WRENCH, spark plug, w/handle, 14mm.	Tool bag
†WRENCH, water pump	Tool bag
WRENCH, crescent, 12-in.	Tool bag
WRENCH, adjustable automotive, 15-in.	Tool bag
WRENCH, open-end, 3/8-in. and 7/16-in.	Tool bag
WRENCH, open-end, 1/2-in. and 9/16-in.	Tool bag
WRENCH, open-end, 5/8-in. and 11/16-in.	Tool bag
WRENCH, open-end, 3/4-in. and 13/16-in.	Tool bag
WRENCH, open-end, 7/8-in. and 15/16-in.	Tool bag
WRENCH, wheel bearing, front	Rear tool compartment*
WRENCH, wheel bearing, rear	Rear tool compartment*
WRENCH, wheel nut	Rear tool compartment*
HANDLE, wheel nut wrench	Rear tool compartment*

b. In addition, the following tool is supplied with Diamond T 4-ton, 6 x 6 cargo and ponton trucks only (fig. 38):

Tool	Where Carried
SCREWDRIVER, recessed head, No. 4	Tool bag

*There is no rear tool compartment on the dump body, and so all items marked with an asterisk are stowed in a carton in the cab.

†Not supplied with packless-type water pump.

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

A	REAR WHEEL BEARING NUT WRENCH	I	OPEN END WRENCH, 1/2" x 19/32"
B	FRONT WHEEL BEARING NUT WRENCH	J	OPEN END WRENCH, 3/8" x 7/16"
C	TOOL BAG	K	SPARK PLUG WRENCH
D	WHEEL NUT WRENCH	L	PLIERS
E	WHEEL NUT WRENCH HANDLE	M	ADJUSTABLE AUTOMOTIVE WRENCH
F	OPEN END WRENCH, 3/4" x 7/8"	N	ADJUSTABLE CRESCENT WRENCH
G	OPEN END WRENCH, 5/8" x 25/32"	O	BALL PEEN HAMMER
H	OPEN END WRENCH, 9/16" x 11/16"	P	SCREW DRIVER

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Figure 37—Tools Supplied with all 4-Ton, 6 x 6 Vehicles

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TOOLS AND EQUIPMENT STOWAGE ON VEHICLES

c. In addition, the following tools (one of each) are supplied with Diamond T 4-ton, 6 x 6 vehicles equipped with the open-type cab (fig. 38):

Tool	Where Carried
SCREWDRIVER, recessed head, No. 2	Tool bag
SCREWDRIVER, recessed head, No. 3	Tool bag

d. In addition, the following tool is supplied with Diamond T 4-ton, 6 x 6 dump trucks only (fig. 38):

Tool	Where Carried
WRENCH, cylinder plug (½-in. square)	Tool bag

e. In addition, the following tools (one of each) are supplied with Diamond T 4-ton, 6 x 6 wrecker trucks only (fig. 38):

Tool	Where Carried
WRENCH, open end, 11/16-in. and 9/16-in. opening	On compressor
WRENCH, socket head set screw (⅛-in. hex.)	On compressor

29. VEHICLE EQUIPMENT.

a. All Diamond T 4-ton, 6 x 6 vehicles are equipped with the following materiel (fig. 39):

Item	Number Carried	Where Carried
OILER, (½ pt)	1	Rear tool compartment*
EXTINGUISHER, fire (1 qt carbon tetrachloride)	1	In cab
CRANK, starting	1	Rear tool compartment*
GUN, lubrication, Zerk (16 oz.)	1	Rear tool compartment*
JACK, hydraulic (5-ton), w/handle	1	Rear tool compartment*
CHAIN, tire, front (set)	1	Right side compartment
CHAIN, tire, rear (sets)	2	Right side compartment
GAGE, tire-inflation	1	Tool bag
HOSE, tire-inflation (26½ ft)	1	Rear tool compartment*
HOSE, coupling	1	Rear tool compartment*
MANUAL, operator's	1	Rear tool compartment*
CATALOG, service parts	1	Rear tool compartment*
KEYS (tool compartment—right side and padlocks	2	In bag
KEYS, tachometer lock	3	In bag
WHEEL, spare, w/tire and tube	2	Mounted on body†
PADLOCKS (spare tire and rear tool compartment)	‡	Tire carriers and tool compartment

*There is no rear tool compartment on the dump body, and so all items marked with an asterisk are stowed *in a carton in the cab.*

†Only one spare wheel is supplied with the dump truck.

‡Quantity is 3 for cargo truck, 5 for wrecker truck, 3 for ponton truck and none for dump truck.

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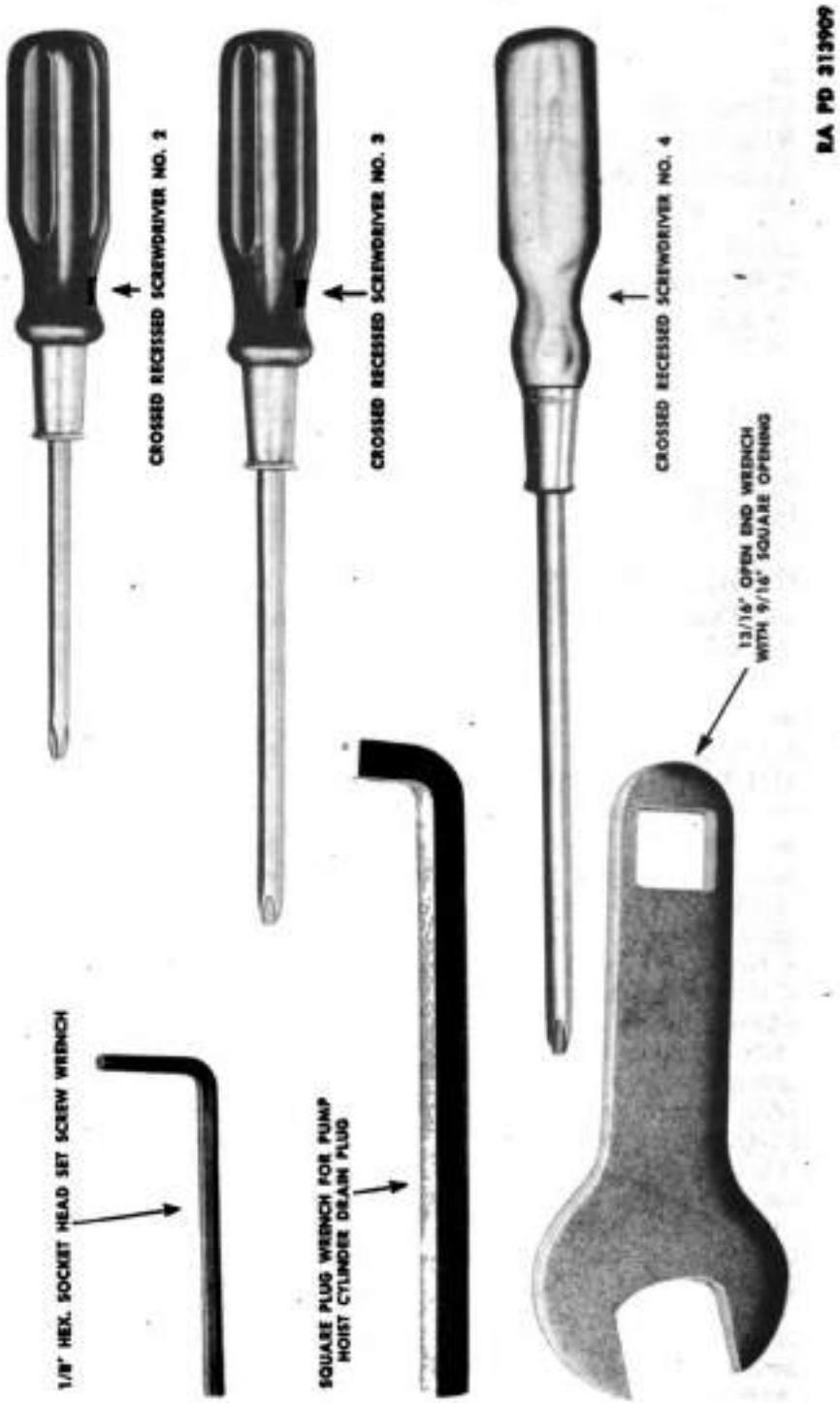

Figure 38—Miscellaneous Tools

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TOOLS AND EQUIPMENT STOWAGE ON VEHICLES

b. In addition, the following materiel is supplied with Diamond T 4-ton, 6 x 6 cargo, wrecker and ponton trucks only (winch-equipped) (fig. 40):

Item	Number Carried	Where Carried
BLOCK, snatch	1	Right side compartment*
CHAIN, tow (20 ft x ⅝-in. dia)	1	Right side compartment*

*Stowed in left body box on wrecker vehicles.

c. In addition, the following materiel is supplied with Diamond T 4-ton, 6 x 6 cargo trucks only (fig. 41):

Item	Number Carried	Where Carried
BOWS, top	5	Stowed in cargo body
CURTAIN, end	2	Stowed in cargo body
SEATS, troop (sets)	2	Stowed in cargo body
STRAP, safety	1	Stowed in cargo body
TARPAULIN, body	1	Stowed in cargo body

d. In addition, the following materiel is supplied with Diamond T 4-ton, 6 x 6 wrecker trucks only (fig. 42):

Item	Number Carried	Where Carried
CHAIN, tow (20 ft x ⅝-in. dia)	1	Left body box
CHAIN, tow, utility (16 ft x ⅞-in. dia)	1	Left body box
CROWBAR (6 ft)	1	On body
SET, block and tackle	1	
Includes:		
Blocks	2	Left body box
Rope (300 ft—1-in. dia)	1	On body
TOOL SETS, pioneer (ax, pick, mattock and shovel)	2	On top body boxes
COMPRESSOR, air (3 cu ft)	1	On body
SET, ground anchor	1	
Includes:		
Stakes	10	Right body box
Anchors	3	Right body box
Sledge hammer	1	Rear tool compartment
BAR, tow	1	Right body box
CLAMP, steering gear	2	Right body box
HEAD, tow bar	1	Right body box
TOOL SET, welder's	1	
Includes:		
Box, tool	1	Left body box
Brush, steel	1	Tool box
Chisel (¼-in. x 7-in.)	1	Tool box
Chisel (½-in. x 6-in.)	1	Tool box

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

A	SPARE TIRES	I	SPARE TIRE LOCKS AND KEYS
B	REAR TIRE CHAINS	J	TACHOMETER LOCK KEYS
C	FRONT TIRE CHAINS	K	OPERATOR'S MANUAL
D	HYDRAULIC JACK	L	SERVICE PARTS CATALOGUE
E	OIL CAN	M	GREASE GUN
F	FIRE EXTINGUISHER	N	CRANK
G	TIRE GAGE	O	JACK HANDLE
H	INFLATION HOSE	P	TRAILER COUPLING HOSE

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Figure 39—Equipment Supplied with all 4-Ton, 6 x 6 Vehicles

Item	Number Carried	Where Carried
Chisel (⅜-in. x 6-in.)	1	Tool box
Clamp, C- (1¼-in.)	2	Tool box
Clamp, C- (4-in.)	2	Tool box
File, flat (10-in.)	1	Tool box
File, half-round (10-in.)	1	Tool box
File, mill (12-in.)	1	Tool box
File, round (12-in.)	1	Tool box
Gloves, welder's (pr)	2	Tool box
Goggles (pr)	1	Tool box
Hammer (32-oz ball peen)	1	Tool box
Handle, tool (1½-in. dia)	2	Tool box
Handle, tool (1¼-in. dia)	2	Tool box
Igniters (with 3 extra tips)	1	Tool box

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TOOLS AND EQUIPMENT STOWAGE ON VEHICLES

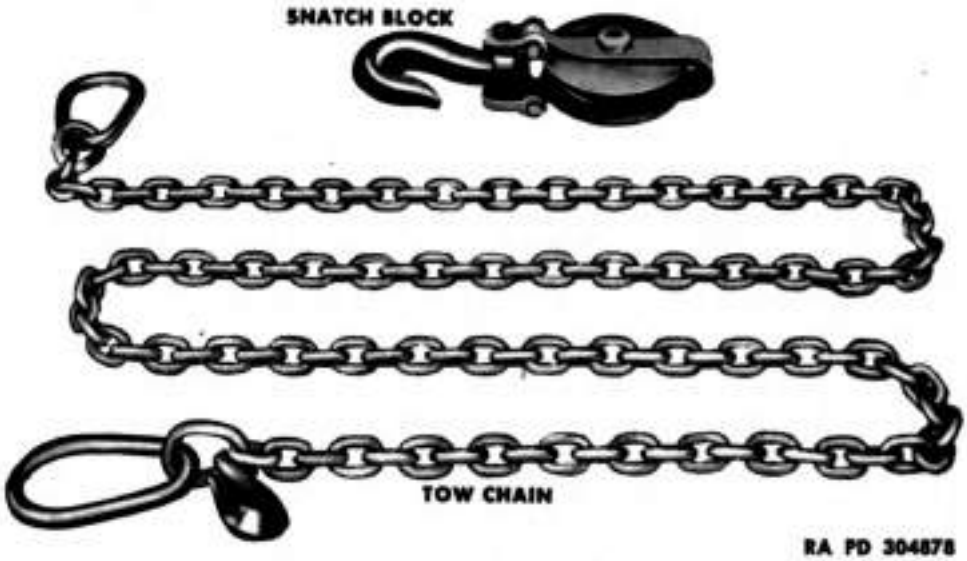

Figure 40—Equipment Supplied with Vehicles Equipped with Winch

Item	Number Carried	Where Carried
Pliers (6-in.)	1	Tool box
Rule, folding (36-in.)	1	Tool box
Wrench, crescent (8-in.) . . .	1	Tool box
Wrench, monkey (12-in.) . .	1	Tool box

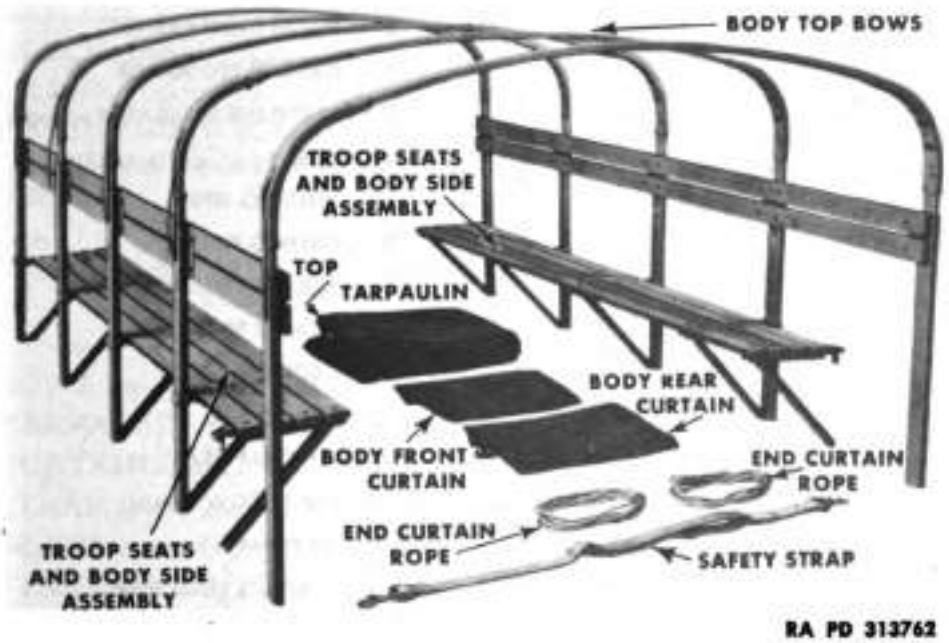

Figure 41—Equipment Supplied with Cargo Trucks Only

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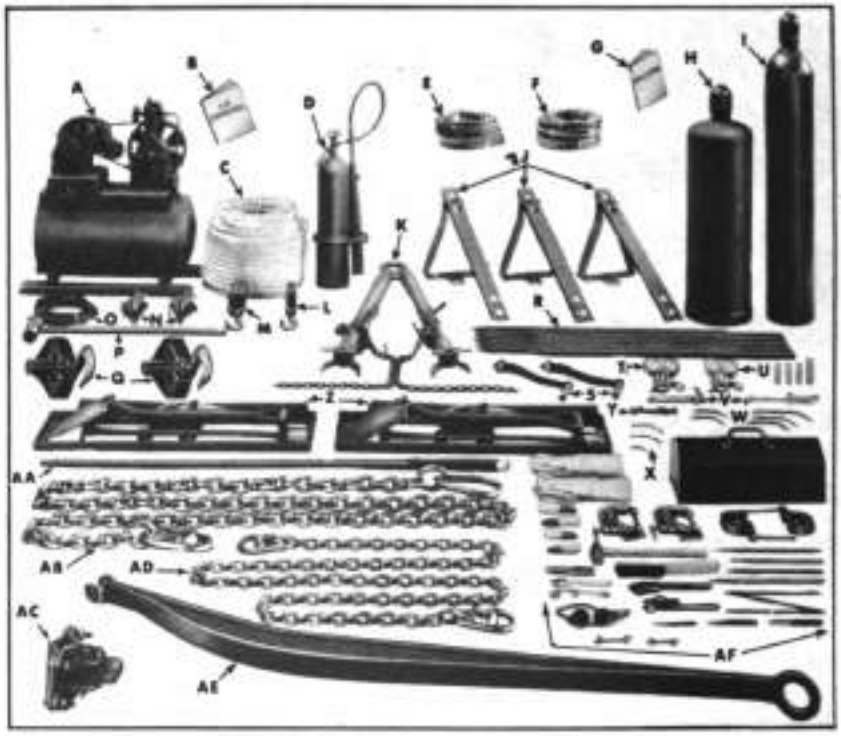
4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)



A	AIR COMPRESSOR UNIT	P	SLEDGE HAMMER
B	AIR COMPRESSOR OPERATION MANUAL	Q	SNATCH BLOCKS
C	ROPE FOR BLOCK AND TACKLE SET	R	GROUND ANCHOR STAKES
D	FIRE EXTINGUISHER	S	BOOM DRUM CRANKS
E	OXYGEN HOSE	T	OXYGEN REGULATOR
F	ACETYLENE HOSE	U	ACETYLENE REGULATOR
G	WELDING INSTRUCTION BOOK	V	TORCH
H	ACETYLENE TANK	W	WELDING TIPS
I	OXYGEN TANK	X	CUTTING TIPS
J	GROUND ANCHORS	Y	TORCH WRENCH
K	V TOW BAR	Z	PIONEER TOOL SET
L	SINGLE BLOCK FOR BLOCK AND TACKLE SET	AA	CROW BAR
M	DOUBLE BLOCK FOR BLOCK AND TACKLE SET	AB	TOW CHAIN
N	STEERING GEAR CLAMPS	AC	TOW BAR HEAD
O	AIR COMPRESSOR HOSE	AD	UTILITY TOW CHAIN
		AE	TOW BAR
		AF	WELDER'S TOOL SET

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Figure 42—Equipment Supplied with Wrecker Trucks Only

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TOOLS AND EQUIPMENT STOWAGE ON VEHICLES

Item	Number Carried	Where Carried
Wrench, pipe (10-in.)	1	Tool box
Wrench, open-end, 1⅛-in.	1	Tool box
Wrench, open-end, ¾-in.—1 1/16-in.	1	Tool box
Wrench, acetylene torch	1	Tool box
WELD SET, unit equipment	1	
Includes:		
Acetylene cylinder (225 cu ft)	1	On body
Oxygen cylinder (200 cu ft)	1	On body
Torch Assembly:	1	Left body box
Acetylene hose (25 ft)	3	Left body box
Oxygen hose (25 ft)	3	Left body box
Acetylene regulator	1	Left body box
Oxygen regulator	1	Left body box
Torch	1	Left body box
Wrench, oxy-acetylene torch	1	Left body box
Welding tips	5	Left body box
Cutting tips	3	Left body box
Welding instruction book	1	Left body box
INSTRUCTIONS, air compressor	1	Tied to air compressor
BAR, tow, V-	1	Right body box
BLOCK, snatch	2	Right body box
CRANK, boom	2	Right body box
EXTINGUISHER, fire (carbon dioxide)	1	Right running board
HOSE, air	1	Tied on air compressor

e. In addition, the following materiel is supplied with Diamond T 4-ton, 6 x 6 ponton trucks only (fig. 43):

Item	Number Carried	Where Carried
BOWS, top	5	Stowed in ponton body
TARPAULIN, body	1	Stowed in ponton body
CURTAINS, end	2	Stowed in ponton body
STRAP, safety	1	Stowed in ponton body
SEATS, troop (sets)	2	Stowed in ponton body
STAKE assembly, front	1	Stowed in ponton body

f. In addition, the following materiel is supplied with Diamond T 4-ton, 6 x 6 vehicles with the open type cab (fig. 44):

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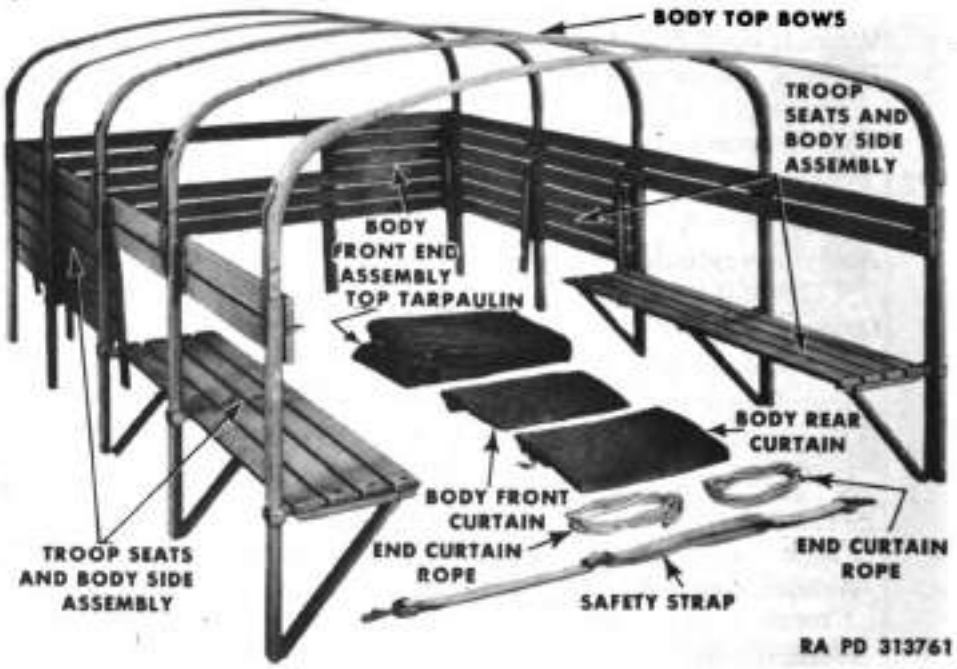

Figure 43—Equipment Supplied with Ponton Trucks Only

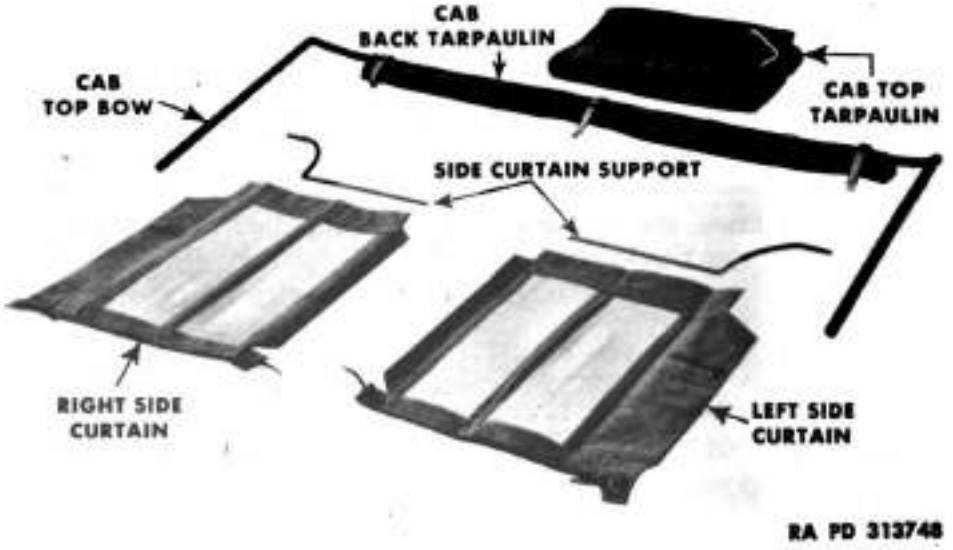

Figure 44—Equipment Supplied with Vehicles with Open Type Cab

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A SPARE PARTS BOX
B BLACKOUT TAIL LAMP UNIT
C TAIL LAMP UNIT
D BLACKOUT STOP LAMP UNIT
E FAN BELTS
F WINCH SHEAR PINS
G IRON BALING WIRE
H BOX OF TIRE VALVE CAPS
I BOX OF TIRE VALVE CORES
J BLACKOUT MARKER LAMP BULB
K SPARK PLUG
L FRICTION TAPE
M BOX OF ASSORTED COTTER PINS

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Figure 45—Vehicle Spare Parts

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4-TON, 6 x 6 TRUCKS (DIAMOND T MODELS 968A CARGO, 969A WRECKER, 970A PONTON, AND 972 DUMP)

Item	Number Carried	Where Carried
TARPAULIN, top	1	Roll on top of windshield or stow in cab compartment
TARPAULIN, rear	1	Roll on top rear bow
CURTAINS, side	2	In cab compartment
RODS, curtain	2	In cab compartment
BOW, top	1	Lowers in saddle clamps

30. VEHICLE SPARE PARTS (fig. 45).

Item	Number Carried	Where Carried
BOX, spare parts	1	*
BELT, fan	2	Spare parts box
SET, tire valve cap	1	Spare parts box
SET, tire valve core	1	Spare parts box
BULB, blackout marker lamp	1	Spare parts box
PINS, cotter (set)	1	Spare parts box
PIN, shear (winch vehicles only)	4	Spare parts box
PIN, cotter (for shear pins)	4	Spare parts box
PLUG, spark, w/gasket	1	Spare parts box
TAPE, friction (roll)	1	Spare parts box
WIRE, iron (roll)	1	Spare parts box
SEALED UNIT, blackout tail lamp	1	Spare parts box
SEALED UNIT, blackout stop and tail lamp	1	Spare parts box
SEALED UNIT, service stop and tail lamp	1	Spare parts box

31. CARE OF TOOLS AND EQUIPMENT.

a. Tools and equipment supplied with these vehicles must be kept clean and in good condition. Keep all of this materiel properly stowed to facilitate its use. Replace all broken or damaged material as soon as possible.

*Carried, loose under seat in closed type cab, and is permanently attached in open type cab.

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PART TWO—VEHICLE MAINTENANCE INSTRUCTIONS

Section IX

FSMWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD

Paragraph
FSMWO and major unit assembly replacement record 32

32. FSMWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD.

a. Description. Every vehicle is supplied with a copy of A.G.O. Form No. 478, which provides a means of keeping a record of each FSMWO completed or major unit assembly replaced. This form includes spaces for the vehicle name and U. S. A. Registration Number, instructions for use, and information pertinent to the work accomplished. It is very important that the form be used as directed, and that it remain with the vehicle until the vehicle is removed from service.

b. Instructions for Use. Personnel performing modifications or major unit assembly replacements must record clearly on the form a description of the work completed, and must initial the form in the columns provided. When each modification is completed, record the date, hours and/or mileage, and FSMWO number. When major unit assemblies, such as engines, transmissions, transfer cases, are replaced, record the date, hours and/or mileage and nomenclature of the unit assembly. Minor repairs and minor parts and accessory replacements need not be recorded.

c. Early Modifications. Upon receipt by a third or fourth echelon repair facility of a vehicle for modification or repair, maintenance personnel will record the FSMWO numbers of modifications applied prior to the date of A.G.O. Form No. 478.

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Section X

ORGANIZATIONAL TOOLS AND EQUIPMENT

	Paragraph
Special tools	33

33. SPECIAL TOOLS.

Tools	Federal Stock Number	Mfr's. Number
EYE, engine-lifting, ½-in., 13-NC	41E-628	TEC 9-113
PULLER, clutch pilot bearing	41P-2906-15	J 164
PULLER, torque rod pins	41P-2956-8	TEC 6-428
WRENCH, engineers' ¾-in. (opening each end, 15 and 60-degree angle, internal and external manifold nuts.)	41W-1468-475	TEC 6-117