

TM 5-4210-217-12

RETURN TO 60

**TECHNICAL MANUAL
OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
FOR**

**TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM
AND WATER, 750-GALLONS PER MINUTE CAPACITY
CENTRIFUGAL PUMP, POWER TAKEOFF DRIVEN,
400-GALLON WATER TANK,
40-GALLON FOAM CHEMICAL TANK, CLASS 530G
NONWINTERIZED
ENGINEERED DEVICES INC. MODEL 0814
ESN 4210-150-1426**

This copy is a reprint which includes current
pages from Changes 1 and 2.

**HEADQUARTERS, DEPARTMENT OF THE ARMY
DECEMBER 1972**

WARNING

Do not operate fire pump during fire fighting operation with Pressure Relief Valve ON-OFF Control (23 fig. 2-1) in the "OFF" position. Reference paragraphs 2-8s, 2-9v, 2-10s, and 2-11u.

WARNING

Do not refill foam tank while fire truck is in motion (Pump and Roll) Reference paragraph 2-13b.6.

CAUTION

When pumping from fire hydrant, the compound gage reading (36 fig. 2-1) should not be permitted to drop below 10 PSIG. This will permit a 5 PSIG error in gage accuracy without the danger of collapsing a water main. Reference paragraph 2-8u.

CAUTION

Do not open Auxiliary Cooler Valve Control (19 fig. 2-1) too quickly, or more than is necessary, as this will rapidly reduce engine coolant temperature below 160° F., and may damage engine. Reference paragraphs 2-8v and 2-9y.

CAUTION

The Fire Pump will heat up rapidly if pump is operated with all discharge valves closed. Prolonged operation will cause damage from overheating. Reference paragraphs 2-8w and 2-9z.

CAUTION

Do not operate Priming Pump Motor continuously for more than 30 seconds. Allow at least a two minute cooloff period before operating the motor again. Reference paragraphs 2-9p, 2-10m, and 2-11o.

CAUTION

To prevent damage to Fire Pump, do not operate fire truck in Pump and Roll mode unless Amber Indicator Light (3 fig. 2-3) is "ON". Reference paragraph 2-111.

CAUTION

When pumping from water tank-pump and roll mode, shut down fire pump when pressure gage (6 fig. 2-3) indicates "Zero", indicating that water tank is empty. Reference paragraph 2-11a.

CAUTION

To prevent damage to fire pump, do not operate engine over 1500 RPM's during pump and roll mode. Reference paragraph 2-11z.

CAUTION

When shutting down the fire pump, the Power-Takeoff Unit must be disengaged or damage to the fire pump will result. Reference paragraphs 2-14d and 2-15h.

CHANGE }
No. 1 }

DEPARTMENTS OF THE ARMY
AND THE MARINE CORPS
WASHINGTON, DC, 4 April 1975

Operator and Organizational Maintenance Manual
TRUCK, FIRE FIGHTING: POWERED PUMPER,
FOAM AND WATER, 750-GALLONS PER MINUTE
CAPACITY, CENTRIFUGAL PUMP, POWER
TAKEOFF DRIVEN, 400-GALLON WATER TANK,
40-GALLON FOAM CHEMICAL TANK,
CLASS 530C
ENGINEERED DEVICES, INC. MODEL 0814
NSN 4210-00-150-1426
AMERICAN AIR FILTER, INC. MODEL FT750
NSN 4210-00-106-7432
WINTERIZED
AMERICAN AIR FILTER, INC. MODEL FT750W
NSN 4210-00-106-7433

TM 5-4210-217-12, 11 December 1972, is changed as follows:

Title is changed as shown above.

Page 1-1. Paragraph 1-4 is superseded as follows:

1-4. Reporting of Errors.

You can improve this manual by calling attention to errors and by recommending improvements as follows:

a. Army. Use DA Form 2028 (Recommended Changes to Publications and Blank Forms) or by a letter and mail direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

b. USMC. Use form NAVMC 10772 and mail direct to Commandant of the Marine Corps (Code LMO), Washington, DC 20380.

Page 1-2, paragraph 1-7b (3). In line item 12, delete "Impeller Part Numbers 70418 and 70419".

In line item 15, change "200-2050 RMP's to read "2000-2050 RPM's".

Page 2-1. Paragraph 2-1 is superseded as follows:

2-1. Inspecting and Servicing the Equipment

a. Truck Chassis. Inspect and service the truck chassis in accordance with instructions contained in section I, chapter 2, TM 9-2320-209-10. Exclude road tests.

b. Apparatus. Upon completion of above, perform the following tasks:

(1) Fill water and foam tanks in accordance with paragraphs 2-16 and 2-17.

(2) Load vehicle with applicable fire fighting equipment set in accordance with paragraph 2-19.

(3) Assure that lubricant levels in pump gear case and pump priming tank are at levels as prescribed in LO 5-4210-217-12.

(4) Operate pump under the conditions as prescribed in paragraphs 2-8 through 2-15. Prior to operation, operator/crew should familiarize self with controls and procedures as specified in paragraphs 2-4 through 2-15.

(5) Upon completion of operational functions, correct any malfunctions which are within scope of operator capabilities. Report all other malfunctions and general condition of vehicle to fire chief.

Page 2-1, paragraph 2-4 *aa*. The title is changed to read: "*aa. Compound Gage Drain Valve Control (27).*"

Paragraph 2-4 *ab*. The title is changed to read: "*ab. Pressure Gage Drain Valve Control (28).*"

Paragraph 2-4 *ac*. The title is changed to read: "*ac. Right Discharge Valve Remote Control (29).*"

Paragraph 2-4 *ak* is superseded as follows:
ak. Manifold Drain Valve Control (37). The

Manifold Drain Valve provides a convenient means of draining the fire pump and related equipment. The control is located on the truck chassis below the left control panel. To open the valve, pull out the control knob. To close the valve, push in the control knob.

Paragraph 2-4 *as* is superseded as follows:
as. Discharge Connection (7). A male connection for connecting 2½ inch NH fire hose. Figure 2-1 is superseded as follows:

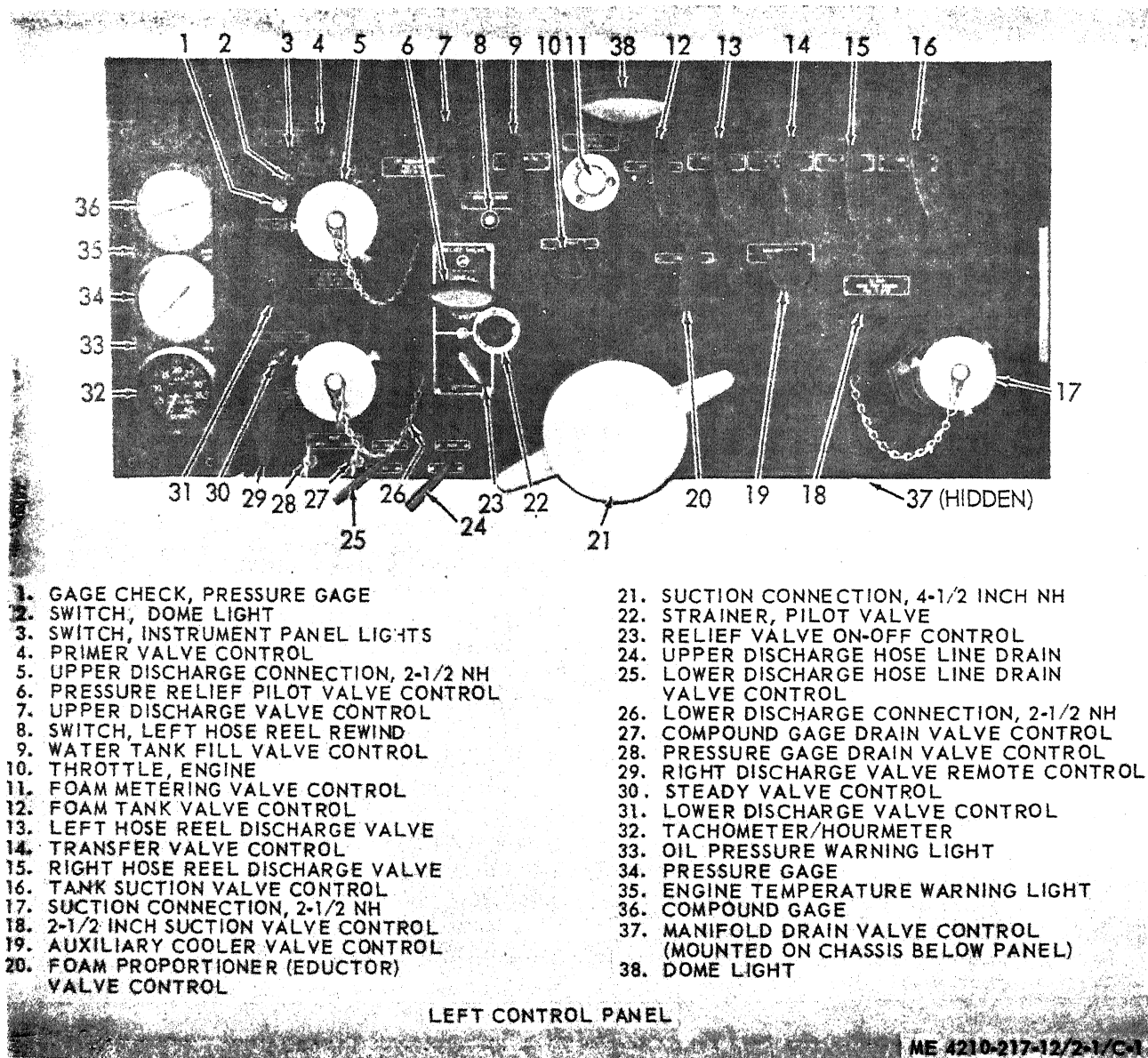


Figure 2-1. Left Control Panel.

Paragraph 2-4 *ba*. The title is changed to read: "*ba. Red indicator light (2).*"

Paragraph 2-4 *bb*. The title is changed to read: "*bb. Amber Indicator Light (3).*"

Paragraph 2-4 *bi*. The title is changed to read “*bi. Heater Switch (fig. 2-6)*”.

Paragraph 2-4 *bj*. The title is changed to read “*bj. Defroster Switch (fig. 2-6)*”.

Page 2-13, paragraph 2-5 *c*. In line 6, after “hose”, change “if” to read “is”.

Page 2-14, paragraph 2-8 *f*. In NOTE change line 3 to read: “discharge valves and in volume (parallel) posi-”.

Paragraph 2-8 *h* is superseded as follows:

h. Step 8. Be sure control switch (4, fig 2-3) is in stationary pumping position and green indicator light (1, fig 2-3) is “ON”.

Paragraph 2-8 *l*. In line 3, change “(4, fig 2-3)” to read “(2, fig 2-3)”.

Page 2-15, paragraph 2-9 *h*. In line 2, change “25” to “26”.

Paragraph 2-9 *i*. In line 2, after “control”, add “for pressure”.

Page 2-18, paragraph 2-11 *l*. In line 1, change “(1, fig 2-3)” to read “(4, fig 2-3)”.

Page 2-19, paragraph 2-13 *b* (3) (b). In line 2, change “GMP” to read “GPM”.

Paragraph 2-13 *b* (5), *Warning*. In line 1, after “refill”, add “foam”.

Page 2-20, paragraph 2-14 *d*. In line 3, change “(4, fig 2-3)” to read “(2, fig 2-3)”.

Paragraph 2-14 *i*. In line 2, after “5,”, add “17,”.

Page 2-22. Figure 2-12 is superseded as follows:

1. RAISE FRONT COMPARTMENT DOOR AND LOCK IN RAISED POSITION. OPEN FOAM FILL DOOR.
2. OPEN FOAM CONTAINER USING FOAM CONTAINER OPENER.
3. FILL FOAM TANK THROUGH STRAINER.
4. CLOSE FOAM TANK FILL DOOR AND FRONT COMPARTMENT DOOR.

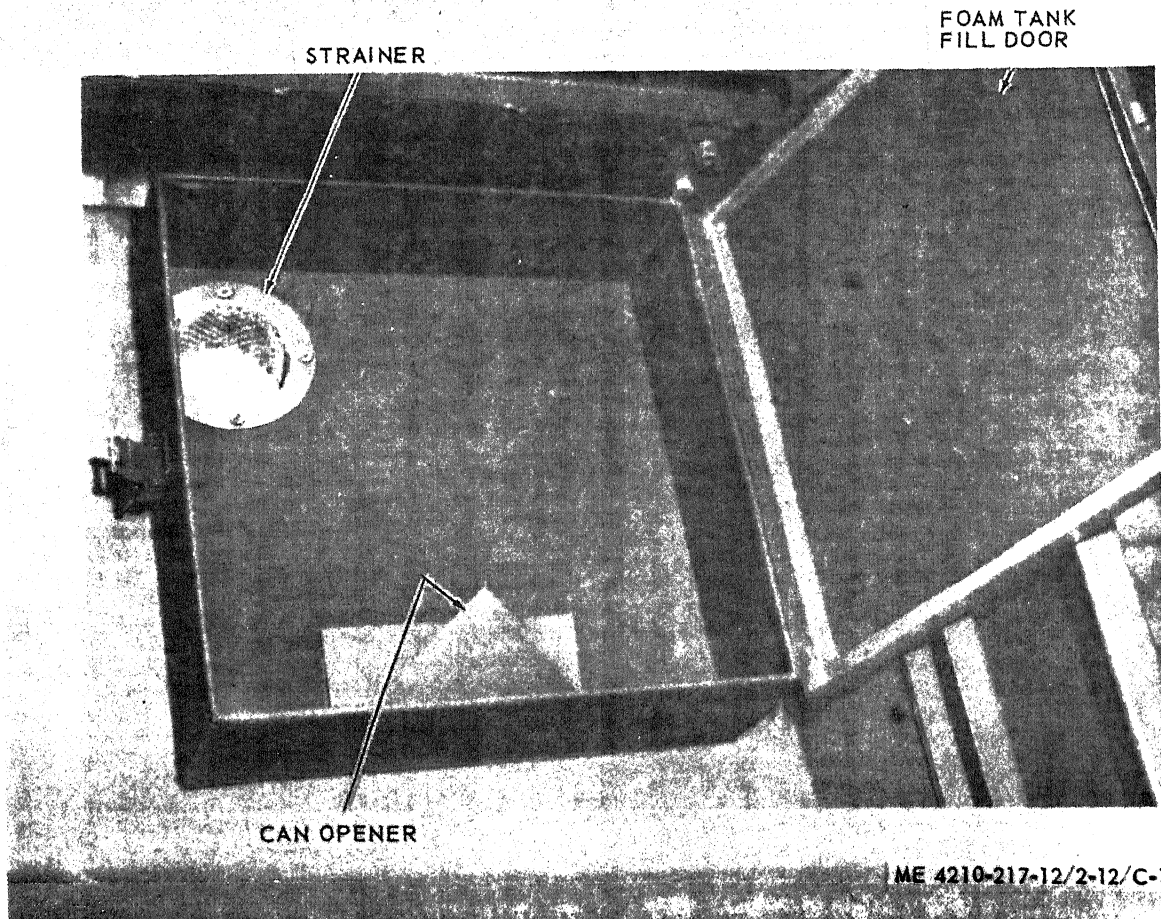


Figure 2-12. Foam tank fill.

Page 2-24. Paragraph 2-19 is superseded as follows:

2-19. General

Refer to figures 2-14 and 2-15 for suggested location and loading of equipment and accessories used in conjunction with Class 530C Fire Trucks.

Page 3-1, table 3-1. In item 5, change "(fig 4-21)" to read: "(2, fig 2-1 and 5, fig 2-2)".

In item 11, add "(fig 2-9)" to paragraph reference column.

In item 12, change "2-10q" to read "2-10p".

In item 17, add "(fig 2-11)" to "paragraph reference" column.

In item 20, change "strainer" to read "strainers". Add "fig 2-2" to "paragraph reference" column.

Page 3-2, table 3-1. In item 22, add "(fig 2-3)" to "paragraph reference" column.

In line 23, change "(fig 2-9)" to read "(fig 2-3)".

Page 4-1, paragraph 4-4. In line 4, change "paints" to read "points".

Table 4-1. Delete all figure references in "paragraph reference" column.

Change column heading "Monthly schedule (or quarterly)" to read "Monthly schedule".

In item 36, after "direct", add "support".

Page 4-3, table 4-2. In item 13b, change "thermometer" to read "tachometer".

In item 18a and item 18b, change "(para 4-29)" to read "(para 4-28)".

Page 4-4, paragraph 4-7a, Change "3-11" to read "4-1".

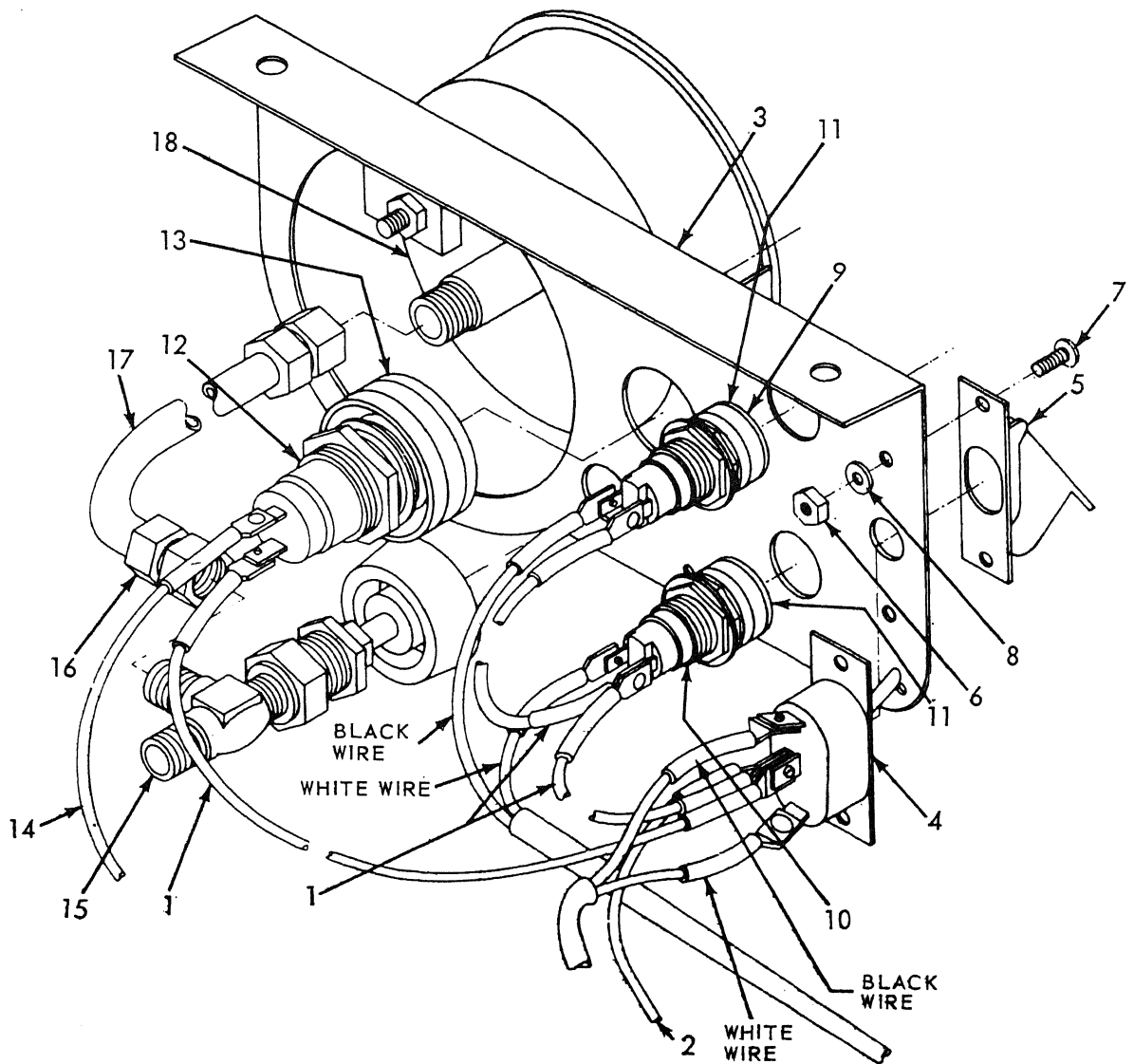
Page 4-7, figure 4-3. Change figure title to read "Figure 4-3. Fire pump packing adjustment".

Page 4-9, paragraph 4-15a (2). In line 3, change "four-way valve" to read "relief valve on-off control".

Page 4-11, paragraph 4-20a. In line 1, change "4-7" to read "4-8".

Paragraph 4-20b. In line 2, change "4-7" to read: "4-8".

Figure 4-7 is superseded as follows:



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- 1 Switch-to-indicator light wire
- 2 Control switch-to-ignition switch wire
- 3 Shift plate
- 4 Shift control switch
- 5 Switch guard
- 6 Nut
- 7 Screw
- 8 Lockwasher
- 9 Indicator light, stationary pumping

- 10 Indicator light, pump and roll
- 11 Light bulb
- 12 Indicator light, PTO engaged
- 13 Light bulb
- 14 Light-to-PTO switch wire
- 15 Needle valve
- 16 Tube connector
- 17 Tubing
- 18 Pressure gage

Figure 4-7. Electric shift control panel, removal and installation.

Page 4-15, paragraph 4-26 a (4). In line 1, change "4-27" to read "4-28".

Paragraph 4-26 a (5). In line 1, change "4-28" to read "4-27".

Page 4-20, paragraph 4-34d. In line 1, change "to reassemble" to read "and reassemble".

Page 5-1. Section I title is changed to read "Administrative Storage".

In Section II, line 4, change "(Mobility Equipment Command)" to read: "(Troop Support Command)".

Page 5-2. Chapter 6 is added as follows:

CHAPTER 6

WINTERIZATION SYSTEM

Section I. INTRODUCTION

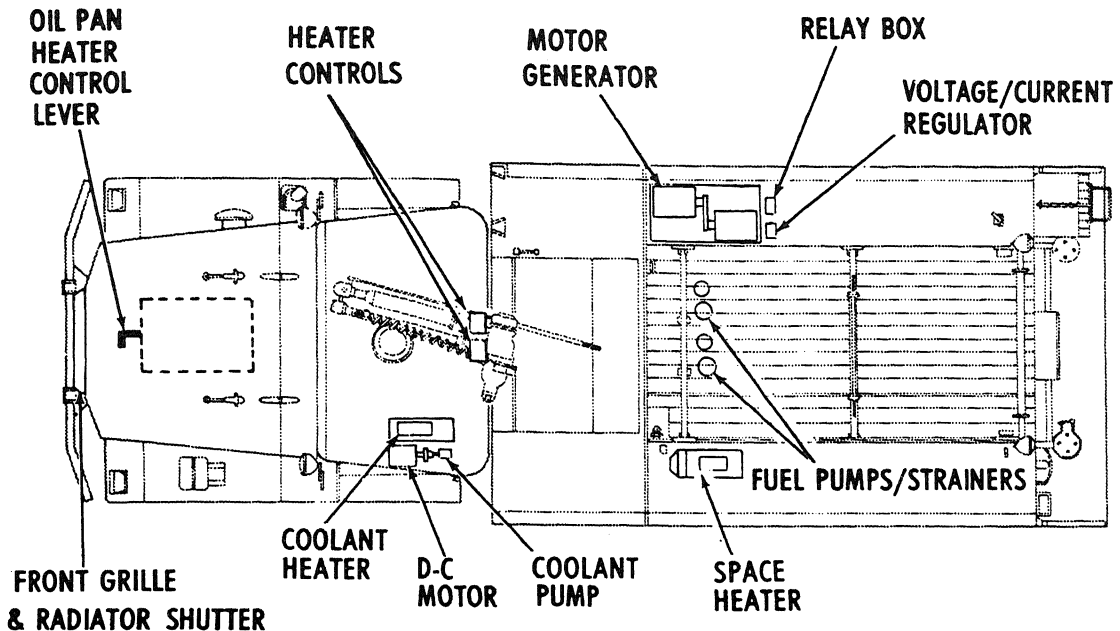
6-1. Purpose and Function

This chapter contains operation and maintenance instructions for the Winterization System installed on the Class 530C, Model FT750W Fire Fighting Truck. The Model FT750W Winterized Fire Truck is basically the same as the FT750 except that additional components are installed to enable continuous operation at minus 50° F. (-46° C.).

6-2. Description

Figure 6-1 illustrates the location of the major components comprising the winterization system. A modified grille and the radiator shutter are installed on the front of the M45A2 truck chassis. The coolant heater, dc motor, and coolant pump are installed on the left running board in the space occupied by the tool box on the FT750 fire truck.

A box is installed beneath the engine oil pan for supplementary heating supplied by the coolant heater. This supplementary heating is provided by the heater exhaust. A control rod is provided to allow the exhaust to be bypassed to atmosphere. The space heater is mounted in the forward storage compartment on the left side of the truck. The heater controls are located on the bulkhead in the rear of the cab. The motor/generator, relay boxes, and voltage/current regulator are located in the forward storage cabinet on the right side. Two fuel pumps and fuel strainers and additional fuel system components are located on the truck chassis cross member beneath the water tank and to the rear of the water pump.



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Figure 6-1. Location of Winterization System Components.

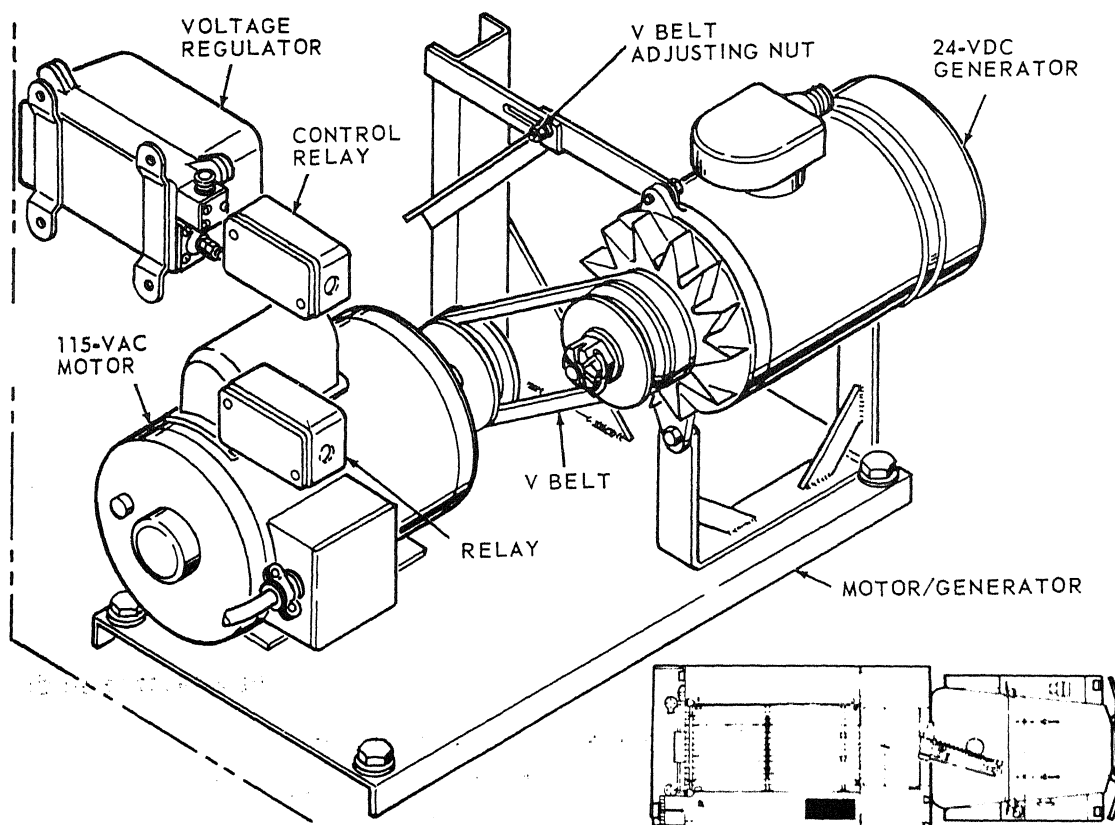
6-3. Major Components

a. Front Grille and Radiator Shutter. The radiator shutter and modified front grille (fig 6-1) are provided to restrict air flow across the radiator fins when operating in extreme low temperatures. The shutter opening can be manually adjusted by the operator from within the fire truck cab. A flexible adjustment shaft extending through the fire wall and dashboard is provided for this purpose.

b. Motor/Generator. The motor/generator (figs. 6-1 and 6-2) provides a source of 24 vdc for operation of the winterization system while the

fire truck is on standby in ambient temperatures of less than minus 25° F. (-31° C.). The unit operates on facility power of 115-volts, 60-Hertz, single-phase and consists of a 1½ horsepower 115-vac electric motor, a belt-driven 40-ampere 24 vdc generator and the necessary structure for installing the unit in the FT750W fire truck.

c. Voltage Regulator and Control Relays. The voltage regulator and control relays (figs 6-1 and 6-2) are provided to control the output of the generator at 24 volts dc nominal and to supply this 24 vdc output to components of the winterization system.

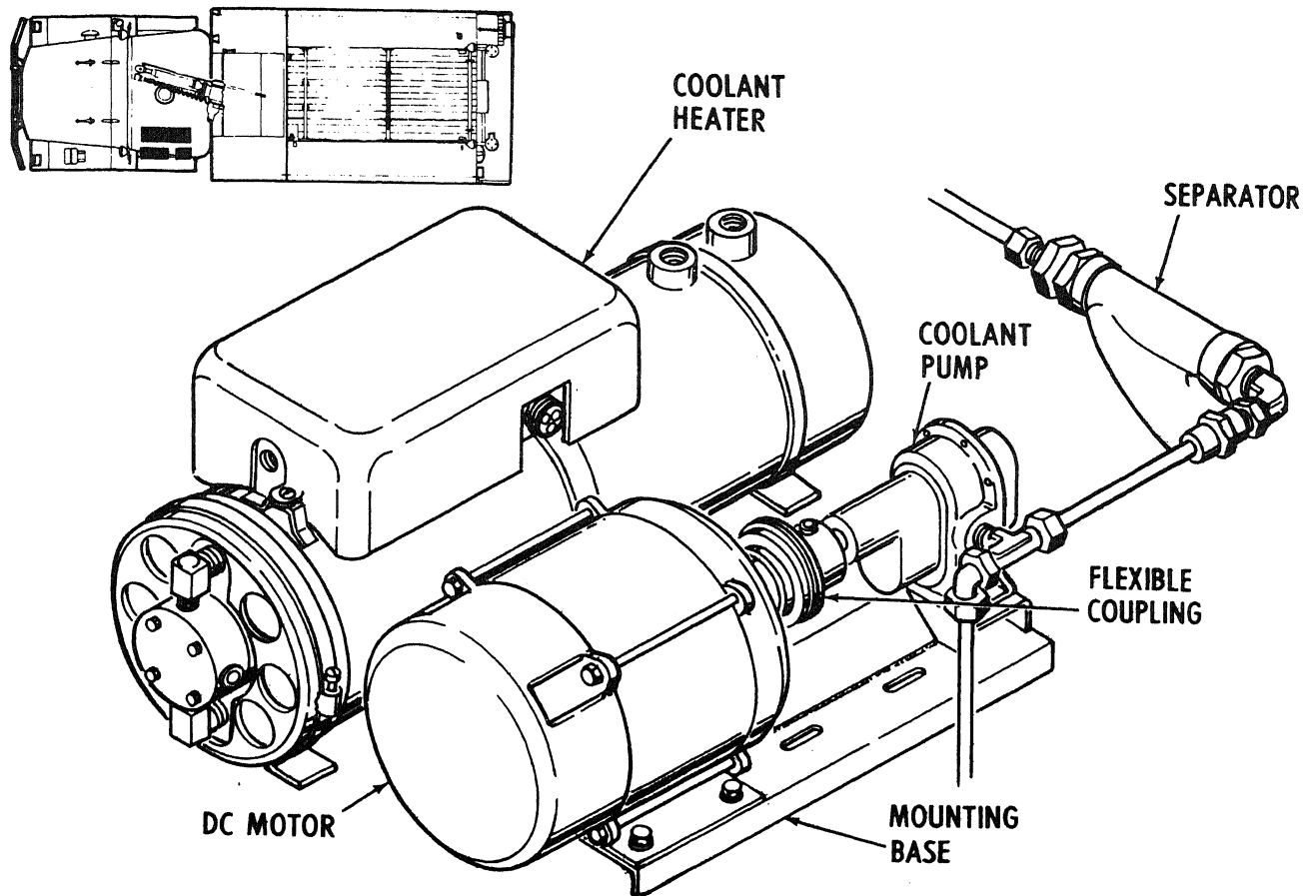


ME 4210-217-12/6-2 C1

Figure 6-2. Motor/Generator, Voltage Regulator and Control Relays.

d. **Coolant Heater.** The coolant heater (figs 6-1 and 6-3) is a lightweight compact liquid multifuel burning heater designed to preheat and maintain engine temperatures for starting and operating at low temperatures down to minus 65° F. (-54° C.). The heater will operate on all liquid fuels specified for low temperature engine operation without modification or adjustment to the fuel system. In addition to the coolant pump shown here, the heater has an integral pump which operates from the same motor that drives the combustion air fan. In the FT750W fire truck

application, heated coolant is circulated through the engine cooling system, the water tank heat exchanger, the battery box heat exchanger, and back to the heater. In addition, hot exhaust gases from the heater are routed to the engine oil pan for additional heat. A control rod and lever is provided to enable the operator to bypass this exhaust to atmosphere. The heater operates on 24 vdc supplied by the motor/generator in the standby condition and the truck batteries during actual operation of the fire truck.



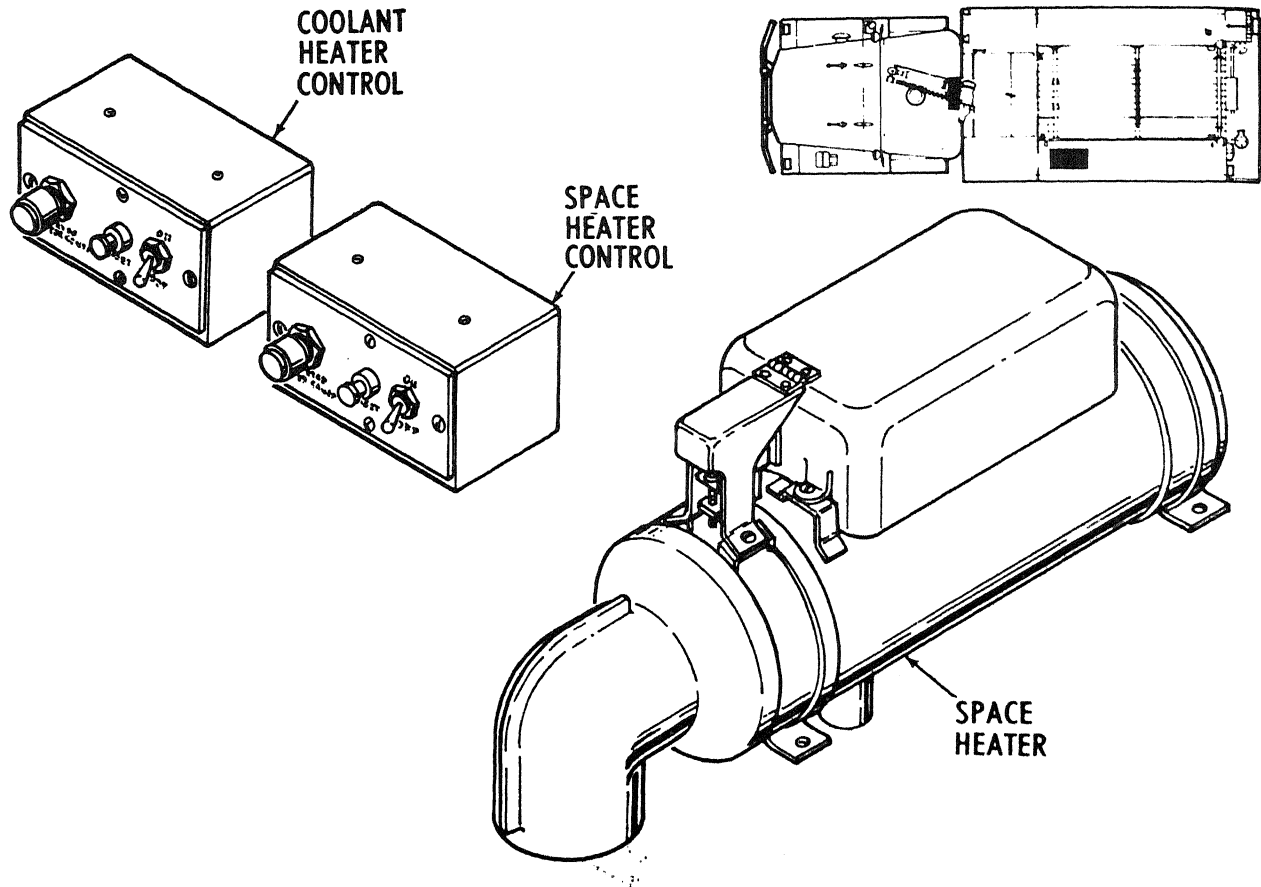
ME 4210-217-12/6-3 C1

Figure 6-3. Coolant Heater, Coolant Pump, and DC Motor.

e. Coolant Pump and DC Motor. The coolant pump (figs 6-1 and 6-3) is provided to circulate heated engine coolant as described previously. The pump is driven by a $\frac{1}{4}$ -horsepower, 24 vdc electric motor. A flexible coupling is provided as the interface between the pump and the motor. In normal operation, the rotary gear type pump will deliver 6.5 gallons per minute at 10 p.s.i.g. A separator is provided to eliminate any foreign products from being circulated throughout the coolant system.

f. Space Heater. The space heater (figs 6-1 and 6-4) is a lightweight compact liquid multifuel burning heater originally designed for installation in mobile equipment as a space heater and to preheat diesel and gasoline engines for starting at

low temperatures down to minus 65° F. (–54° C.). Like the coolant heater, the unit operates on all liquid fuels specified for low temperature operation. In the FT750W fire truck application, heated air is ducted to the pump compartment for heating the fire pump and related components. Return air is routed through the insulated compartment on the left side of the special purpose body and back to the heater inlet. In addition, hot exhaust gases from this heater are routed to the underside of the 400-gallon water tank to provide supplemental heating. The heater operates on 24 vdc supplied by the motor/generator in the standby condition and the truck batteries during actual operation of the fire truck.



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Figure 6-4. Space Heater and Heater Controls.

g. Heater Controls. Except for cable and thermostat lead lengths, the controls (figs 6-1 and 6-4) for the coolant and space heaters are identical. Located in the truck cab, these controls provide a means for operating and monitoring the heaters.

h. Fuel Pumps/Strainers. Two additional fuel pumps and strainers (fig 6-1) are provided for the winterized fire truck in conjunction with the space and coolant heaters. The pump and strainer on the right side serve the space heater, while the coolant heater is served by the pump and strainer on the left side. Both fuel pumps operate on 24 vdc supplied by the motor/generator in standby or the batteries during fire truck operation.

6-4. Tabulated Data

a. Motor/Generator.

Input	115 vac, 60 Hertz, single-phase
Output	24 vdc at 40 amperes
Temperature Limits	+115°F. (46°C.) to minus 50°F. (-46°C.)
Length	24 in.
Width	12 in.

Height	11 in.
Cube	1.83 cu. ft.
Weight	55 lb.
Belt Tension	4 lb. max. deflection ¼ in.
Motor Characteristics:	
Manufacturer	Howell Electric Motors
Model	38N4-7307-4
Speed	3450 r.p.m.
Voltage Input	115 vac, 60-Hertz, single-phase
Power Input	1½ horsepower at 3450 r.p.m.
Running current	16 amperes
Temperature limits	+115°F. (46°C.) to minus 50°F. (-46°C.)
Generator Characteristics:	
Manufacturer	Delco-Remy
Model	1117496
Specification	1815
Type	Automotive, belt-driven
Output voltage	24 vdc
Maximum current	40 amperes at 2000 r.p.m.
Torque requirements for	
drive pulley	55 to 65 ft. lbs.
Temperature limits	+115°F. (46°C.) to minus 50°F. (-46°C.)
Brush, spring tension	28 ounces
Field current at 24 vdc	0.85 to 0.89 amperes

b. Voltage/Regulator.

Manufacturer	Delco-Remy
Model	1118625
Type	Truck, Heavy Duty
Voltage Regulator Air Gap	0.084 in.
Current Regulator Air Gap	0.084 in.
Circuit Breaker Air Gap	0.042 in.
Circuit Breaker Point Opening	0.040 in.
Circuit Breaker Back Air Gap	0.008 in.
Actuating Relay Air Gap	0.037 in.
Actuating Relay Point Opening	0.037 in.
Actuating Relay Back Air Gap	0.008 in.
Overload Circuit Breaker	
Point Opening	0.020 in.
Overload C. B. Initial	
Contact Tension	7-9 oz.
Paralleling Relay Air Gap	0.013 in.
Paralleling Relay Point	
Opening	0.025 in.
Cutout Relay Closing Voltage	25-27 vdc
Actuating Relay Closing	
Voltage	25-27 vdc
Circuit Breaker Voltage Range	14-17 vdc
Voltage Regulator Setting	28.0 - 29.5 vdc
Current Regulator Setting	38-42 amperes
Temperature Limits	+115°F. (46°C.) to minus 50°F. (-46°C.)

c. Control Relays.

Manufacturer	Ward Leonard Electric Co.
Model	105-6510
Maximum Current	20 amperes
Operating Voltage	115 vac, 60-Hertz, single-phase
Temperature Limits	+115°F. (46°C.) to minus 50°F. (-46°C.)

d. Coolant Heater.

Manufacturer	Benmar Heater Division, Stacee Mfg. Co.
Model	CP-3050
Dimensions	6-7/32" w x 19-13/16" l x 10- 1/8" h
Weight	22 pounds
Fuel	Gasoline, JP4, or Arctic Diesel Fuel
Fuel Rate	21-23 cc per min. (approx. 0.35 GPH)
Output:	
(Transfer to coolant)	30,000 BTU/HR Max.
(Usable exhaust head)	10,000 BTU/HR Max.
Total Heat Input (max.)	45,000 BTU/HR (approx.)
Operating Voltage	24 volts dc
Operating Power Require- ments:	
Above +30°F. (-2°C.):	
Start	14.5 amp
Run	5.0 amp
Below +30°F. (-2°C.):	
Start	17.0 amp
Run	7.5 amp
Radio Interference Suppression	0.15 to 1000 MC (MIL-S- 10379A)
Fuel Pressure to Heater	3-15 PSI
Fuel Inlet Size	1/8 NPT
Electrical Connector	MS3102-18-11P
Exhaust Connection	1 1/2" OD
Coolant Circulation	80-100 GPH at 10 PSI

Pumping Medium	Water or Dimethoxy Ethanol (MIL-C-11755A)
Mounting	Horizontal
Control	Manual on-off, or thermostat
Duty Cycle	Continuous
Temperature Limits	+115°F. (46°C.) to minus 65°F. (-54°C.)

e. Coolant Pump.

Manufacturer	Oberdorfer Pump Division
Model	3000
Type	Rotary
Normal Rating	6 1/2 g.p.m., 10 p.s.i.g., at 1725 r.p.m.

f. Coupling.

Manufacturer	Morse Chain Co.
Model	252RD
Type	Flexible
Rating	3.6 horsepower at 1800 r.p.m.

g. DC Motor.

Manufacturer	Ohio Electric Motors
Model	22039
Input Voltage	24 vdc
Rating	1/4 horsepower at 1725 r.p.m.
Temperature Limits	+115°F. (46°C.) to minus 50°F. (-46°C.)

h. Space Heater.

Manufacturer	Benmar Heater Division, Stacee Mfg. Co.
Model	AP-3050-1
Dimension	6-7/32" w x 16-29/32" l x 10- 1/8" h
Weight (approx.)	20 pounds
Fuel	Gasoline, JP4, Arctic Diesel Fuel
Fuel Rate	21-23 cc per min.
Total Heat Output	30,000 BTU/HR
Operating Voltage	24 volts dc
Operating Power Require- ments:	
Above +30°F. (-2°C.):	
Start	15 amps
Run	5.5 amps
Below +30°F. (-2°C.):	
Start	17.5 amps
Run	8.0 amps
Radio Suppression	0.15 to 1000 MC (MIL-S- 10379A)
Heater Specifications	MIL-H-46792
Fuel Pressure to Heater	3-15 PSI
Fuel Inlet Size	1/8 NPT
Electrical Connector	MS3102-18-11P
Exhaust Connection	1 1/2" OD
Mounting Position	Horizontal
Control	Manual On-Off, or Thermostat

i. Heater Controls.

Manufacturer	Benmar Heater Division, Stacee Mfg. Co.
Model	B3250 and B3251
Maximum Current	15 amps
Switch P/N	AN3021-2
Circuit-Breaker P/N	MS25017-20
Lamp P/N	MS25231-313

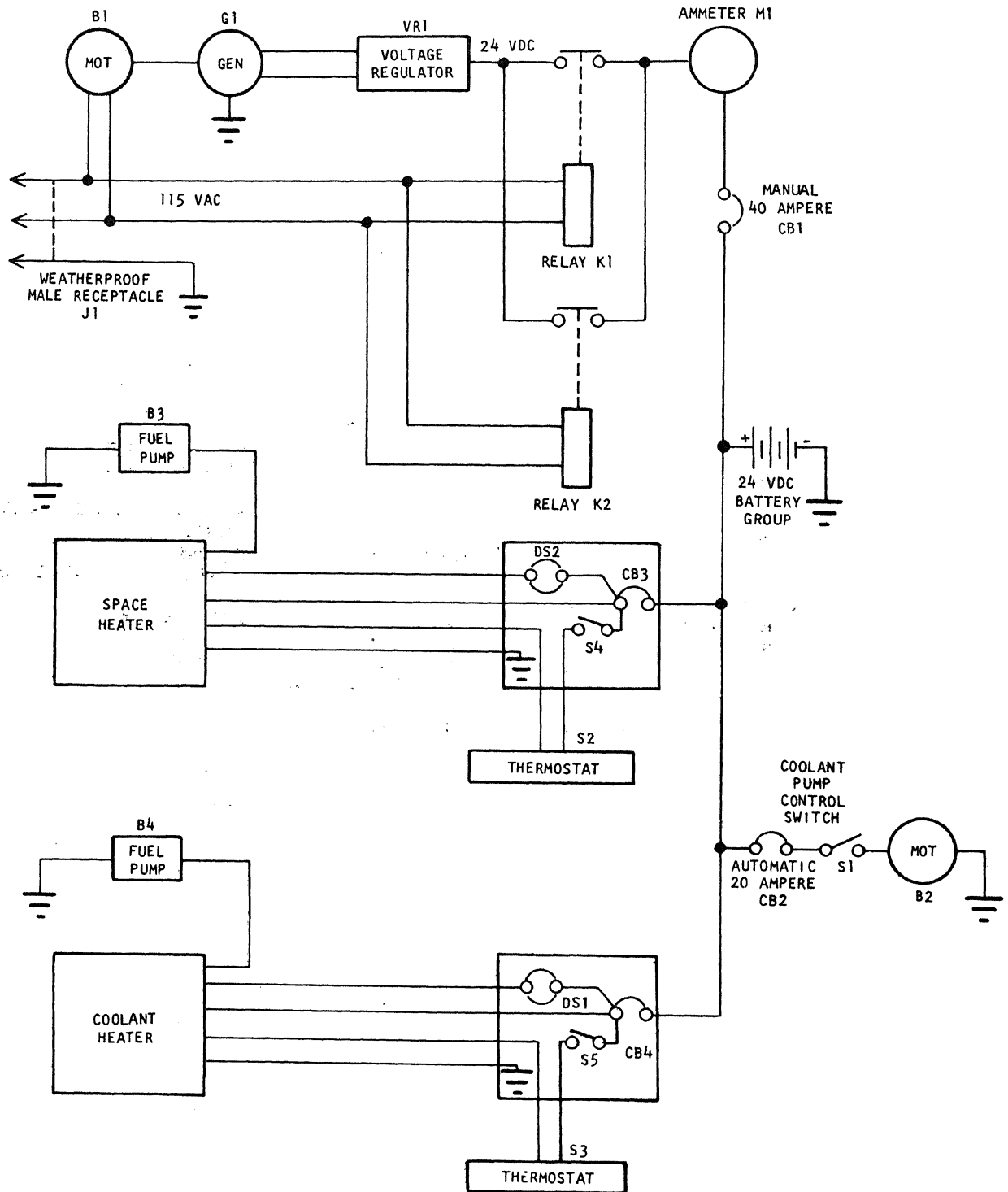
j. Fuel Pumps.

Manufacturer Bendix Automotive Division
 Model 477883 (MS51321-1)
 Power Requirement 24 vdc
 Capacity 25 g.p.h.

k. Fuel Strainers.

Manufacturer AC Spark Plug Div., General Motors
 Model 854391
 Type Gasoline

l. Electrical Schematic. Refer to figure 6-5.



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Figure 6-5. Electrical Subsystem Schematic.

Section II. OPERATING INSTRUCTIONS

6-5. General

This section provides instructions for startup, normal operation, and shutdown of the winterization system. These instructions include a detailed explanation of the use and functions of the controls and instruments required for operation of the winterization system. Also included are the initial adjustments and control settings required for startup and normal operation.

6-6. Controls and Instruments

The controls and instruments required for satisfactory operation of the winterization system are illustrated on figure 6-6 and described in the following paragraphs.

6-7. Heater Controls

The heater controls are located in the rear bulkhead of the cab above the seat.

a. The HEATER CONTROL SWITCHES are identical. Each is a single-pole, single-throw ON-OFF switch provided to control operation of the air and liquid circulating heaters.

b. CIRCUIT BREAKER RESET buttons are provided to reset the heater circuit breakers.

c. INDICATOR LIGHTS are provided on each control to give a visual indication that the respective heater is operating.

6-8. Shutter Control

The winterization shutter control is provided to manually open or close the winterization system shutter as required by ambient conditions. Rotating the control clockwise will close the shutter.

6-9. Coolant Pump Switch

The COOLANT PUMP SWITCH is a single-pole, single-throw toggle switch, installed on the FT750W fire truck which controls operation of the circulating pump.

6-10. Ammeter

The AMMETER is installed on the FT750W fire truck and provides a visual indication of motor generator output and/or battery charging current. Under normal operation conditions, the ammeter indication should not exceed 40 amperes.

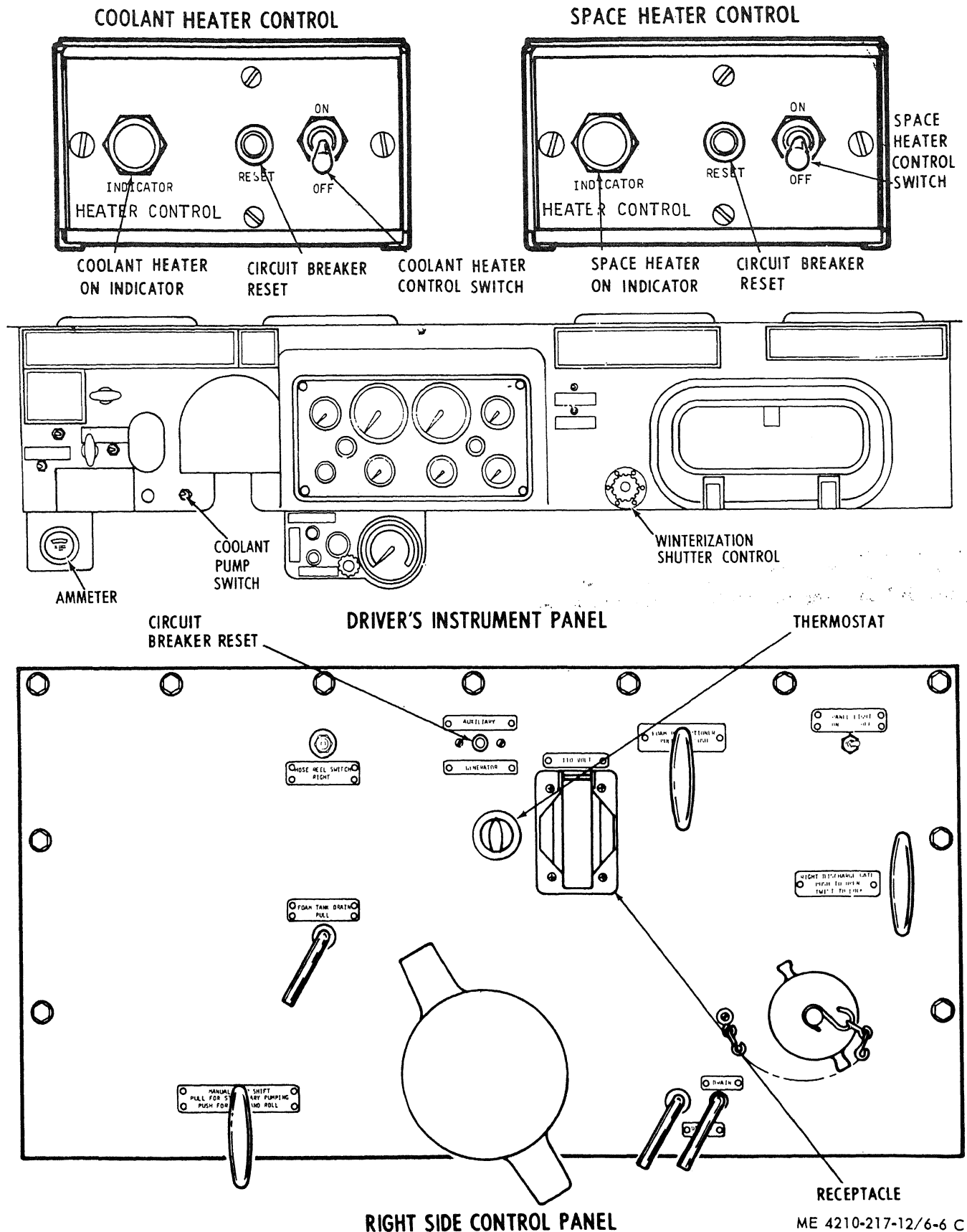


Figure 6-6. Winterization System Controls and Instruments.

6-11. Circuit Breaker Reset

The CIRCUIT BREAKER RESET provides a means to reset the winterization system circuit breaker. Although installed on both the FT750 and the FT750W fire trucks, this circuit breaker is non-functional on the nonwinterized configuration.

6-12. Thermostat Control

The THERMOSTAT installed on the FT750W fire truck provides a means to select and control temperatures within the pump compartment. Three settings are available on the thermostat:

LOW 34°F. (1°C.) MEDIUM 77°F. (25°C.)
HIGH 115° to 125°F. (46° to 52°C.)

6-13. 115 Volt Receptacle

The 115 VOLT RECEPTACLE provides a means for application of external power to the winterization system. Although installed on all Class 530C fire trucks, the receptacle is nonfunctional on the FT750 nonwinterized configuration.

6-14. Control Lever

The ENGINE OIL PAN BOX CONTROL LEVER (fig 6-1) is located beneath the engine compartment and provides a means to bypass the supplementary exhaust heating from the liquid circulating heater to atmosphere.

6-15. Start Up Instructions

a. The winterization system is started in the standby mode by connecting an external 115 volt ac, single-phase power source to the receptacle on the right side control panel (fig 6-6) and resetting the circuit breaker. A step-by-step procedure includes the following:

- (1) Connect 115 volt power cable.
- (2) Reset circuit breaker CB-1.
- (3) Set pump compartment thermostat to desired setting:

LOW 34°F. (1°C.) MEDIUM 77°F. (25°C.)
HIGH 115° to 125°F. (46° to 52°C.)

(4) Set coolant pump switch located on dashboard to ON.

- (5) Set space heater control switch to ON.
- (6) Set coolant heater control switch to ON.

b. To start winterization system on 24 volt dc

in ambient temperatures above minus 25° F. (-4° C.), the following procedures are performed:

- (1) Start truck engine.
- (2) Set pump compartment thermostat to desired setting:

LOW 34°F. (1°C.) MEDIUM 77°F. (25°C.)
HIGH 115° to 125°F. (46° to 52°C.)

(3) Set coolant pump switch located on dashboard to ON.

- (4) Set space heater control switch to ON.
- (5) Set coolant heater control switch to ON.

(6) Close radiator shutter and leave closed until engine temperature rises above 160° F. (71° C.). Then, adjust setting of radiator shutter to maintain temperature of 160° F. (71° C.). to 185° F. (85° C.).

(7) If required by ambient conditions, adjust oil pan control lever to bypass heater exhaust to atmosphere.

6-16. Operating Instructions

Operating the winterization system requires no special instructions other than those already discussed in starting the system (para 6-15). The ammeter should be checked occasionally when operating from the 115 volt receptacle. Also, the engine temperature gage and indicator light should be checked to insure that engine coolant temperature remains between 160° F. (71° C.), 185° F. (85° C.). If temperature is below 160° F. (71° C.), insure that coolant heater and coolant pump are on and that the radiator shutter is completely closed. If temperature rises above 185° F. (85° C.), open radiator shutter and adjust oil pan control lever as required. If high temperature condition continues, turn off coolant heater.

6-17. Shutdown Instructions

The winterization system is shutdown in the following manner:

- a. Set coolant heater control switch to OFF.
- b. Set coolant pump switch on driver's instrument panel to OFF.
- c. Set space heater control switch to OFF.
- d. If operating from 115 vac power source, disconnect electrical connector from receptacle on right side control panel.

Section III. OPERATOR AND CREW MAINTENANCE INSTRUCTIONS**6-18. General**

Operator/crew maintenance is limited to preventive maintenance, operational checks, visual inspections and maintaining general cleanliness.

6-19. Lubrication

Whenever practicable, operator/crew personnel will assist organizational maintenance personnel with performance of lubrication as specified on LO 5-4210-217-12.

6-20. Preventive Maintenance Checks and Services

Table 6-1 lists the PMCS required to insure

satisfactory operation of the winterization system and its components.

Table 6-1. Operator/Crew Preventive Maintenance Checks and Services

B—Before Operation Time required			D—During Operation	A—After Operation Time required	Work time (M / H)
Interval and Sequence No.			Item to be inspected Procedure		
B	D	A			
1			Heater Controls: Check for proper operation of indicator lights and control switches (para 6-21).		
2			Space Heater: Check for proper operation by setting control switch to ON (para 6-21).		
3			Coolant Heater: Check for proper operation by setting control switch to ON (para 6-21).		
4			DC Motor: Check for proper operation by setting control switch to ON (para 6-21).		
5			Radiator Shutter: Check for proper operation and freedom of movement (para 6-8).		
	6		Motor Generator: Check for proper output on ammeter (para 6-21).		
	7		Coolant Pump: Check for leakage at the water pump flange and pump body (para 6-21).		
		8	Radiator Shutter: Check for proper operation and freedom of movement.		

6-21. Operator/ Crew Maintenance

An operational test of the winterization system is required to verify system performance. To perform the operational test, proceed as follows:

- a. Connect the 115 volt power cable to the receptacle on the right side control panel (fig 6-6).
- b. Reset generator circuit breaker on control panel. Motor generator should begin operating (fig 6-6).
- c. Check ammeter on dashboard (fig 6-6) 35 to 40 amperes should be indicated.
- d. Set pump compartment thermostat (fig 6-6) to a setting above ambient temperature based on the following:
 - (1) The LOW setting corresponds to 34° F. (1° C.).
 - (2) The MEDIUM setting corresponds to 77° F. (25° C.).

(3) The HIGH setting corresponds to 115° F. (46° C.) to 125° F. (52° C.).

- e. Set coolant pump switch, located on dashboard (fig 6-6) to ON. Dc motor and pump should begin operating.
- f. Set coolant heater control switch (fig 6-6) to ON. Indicating light should illuminate and heater should begin operating.
- g. Set space heater control switch (fig 6-6) to ON. Indicating light should begin operating.

NOTE

If ambient temperature is above 34° F. (1° C.), the following check can be made during the operational test.

- h. Set pump compartment thermostat (fig 6-6) to a setting below ambient. Air heater should cycle off.
- i. Turn off control switches and disconnect 115-volt electrical power.

Section IV. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

6-22. Service Upon Receipt of Material

- a. Make a complete visual inspection of the winterization system; pay particular attention to components which might have been damaged or lost during shipment.
- b. Inspect all controls for proper operation, loose mounting, necessary or damaged handles or knobs. Report all deficiencies as required by TM 38-750.

6-23. Repair Parts, Special Tools and Equipment

- a. No special tools are required for organizational maintenance.

b. Repair parts are listed in TM 5-4310-217-25P.

6-24. Lubrication

Refer to LO 5-4310-217-20 for lubrication instructions.

6-25. Preventive Maintenance Checks and Services

Table 6-2 lists PMCS required to insure satisfactory operation of the winterization system and its components.

Table 6-2. Organizational Preventive Maintenance Checks and Services

Total man-hours required:

Sequence Number	Item to be inspected Procedure	Work time (M/H)
MONTHLY		
1	Heater Controls: Perform operational check (para 6-21); inspect for defective lamp.	
2	Fuel pumps: Check for proper operation. Check for leakage or other damage.	
3	Space Heater: Check for proper operation of space heater (para 6-21).	
4	Coolant Pump and DC Motor: Check for proper operation and pump leakage (para 6-21).	
5	Coolant Heater: Check for proper operation (para 6-21).	
QUARTERLY		
1	Motor/Generator, Relays, and Voltage Regulator Check for proper operation, voltage output, and current.	

6-26. Troubleshooting

a. This paragraph contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the winterization system. Each malfunction is followed by a list of probable causes and corrective action to take. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 6-3. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ZERO INDICATION ON AMMETER (fig 6-6)	Defective ammeter.	Replace ammeter (para 6-27).
2. COOLANT HEATER CONTROL PRESS-TO-TEST LAMP DOES NOT GO ON (fig 6-6)	Step 1. Burned out lamp.	Replace lamp (para 6-27).
	Step 2. Open circuit.	Check circuit (fig 6-5).
	Step 3. Circuit breaker open.	Reset circuit breaker.
3. COOLANT HEATER CONTROL SWITCH INOPERATIVE (fig 6-6).	Step 1. Dead battery.	Recharge or replace (para 4-42).
	Step 2. Circuit breaker open.	Reset circuit breaker.
	Step 3. Open circuit.	Check circuit (fig 6-5).
4. COOLANT HEATER STARTS, THEN GOES OUT	Lack of fuel.	Check fuel supply (TM 9-2320-209-10).
5. COOLANT HEATER CIRCUIT BREAKER POPS OPEN (fig 6-6)	Short circuit.	Disconnect basic components, one at a time, to isolate short; then check wiring (fig 6-5).
6. SPACE HEATER PRESS-TO-TEST LAMP DOES NOT GO ON (fig 6-6)	Step 1. Burned out lamp.	Replace lamp (para 6-27).
	Step 2. Open circuit.	Check circuit (fig 6-5).
	Step 3. Circuit breaker open.	Reset circuit breaker.
	Step 4. Dead battery.	Recharge or replace (para 4-42).
7. SPACE HEATER CONTROL SWITCH INOPERATIVE (fig 6-6)	Step 1. Dead battery.	Recharge or replace (para 4-42).
	Step 2. Circuit breaker open.	Reset circuit breaker.
	Step 3. Open circuit.	Check circuit (fig 6-5).
8. SPACE HEATER STARTS THEN GOES OUT	Lack of fuel.	Check fuel supply (TM 9-2320-209-10).
9. SPACE HEATER CIRCUIT BREAKER POPS OPEN (fig 6-6)	Short circuit.	Disconnect basic components, one at a time, to isolate short; then check wiring (fig 6-5).

6-27. Organizational Maintenance

a. Shutter assembly (fig 6-1).

(1) Inspect vanes for bends, cracks, or worn bushings.

(2) Inspect shutter control for proper operation.

(3) Refer deficiencies to DS maintenance.

b. Grille assembly (fig 6-1).

(1) Inspect brackets and bars for cracks, bends, distorted screw holes and rust.

(2) Remove rust and repaint.

(3) Refer other deficiencies to DS maintenance.

c. Space heater (figs 6-1 and 6-4).

(1) Inspect the space heater for loose or defective electrical leads, mounting hardware and brackets.

(2) Test the operation of the space heater by setting space heater control switch (fig 6-6) to ON. Indicating light should illuminate and space heater should begin operating.

(3) Refer deficiencies to DS maintenance.

d. DC motor (figs 6-1 and 6-3).

(1) Inspect DC motor for damage, defective brackets and mounting hardware or loose connections.

(2) Test DC motor by setting coolant pump switch (fig 6-6) to ON. DC motor and pump should begin operating.

(3) Refer deficiencies to DS maintenance.

e. Coolant heater (figs 6-1 and 6-3).

(1) Inspect the coolant heater for damage, loose connections or fitting, loose or defective mounting hardware.

(2) Test the heater by setting coolant heater control switch (fig 6-6) to ON. Indicating light should illuminate and heater should begin operating.

(3) Refer deficiencies to DS maintenance.

f. Motor/generator assembly (figs 6-1 and 6-2).

(1) Inspect the motor/generator assembly for damage, defective or loose connections, fittings or mounting hardware.

(2) Test the operation of the motor/generator by resetting generator circuit breaker (fig 6-6). Motor/generator should begin operating.

(3) Adjust the V-belt (fig 6-2) by loosening the V-belt adjusting nut and moving the DC generator. Belt should not slip on pulley when adjusted properly. Tighten V-belt adjusting nut. If the V-belt is worn or cracked, you may replace it with a new belt.

(4) You may replace a defective control relay as follows:

(a) Disconnect 115 V power cable from receptacle on right side control panel if connected.

(b) Remove cover from relay box.

(c) Tag and disconnect electrical leads.

(d) Remove attaching hardware and then remove relay from relay box. No repair is authorized.

(e) Install a new relay in reverse order of removal.

(5) You may replace a defective voltage regulator as follows:

(a) Tag and disconnect the power input leads.

(b) Remove 4 screws, washers and nuts securing regulator to truck compartment wall.

(c) No repair of the voltage regulator is authorized.

(d) Install a new voltage regulator in reverse order of removal.

g. Coolant Pump (figs 6-1 and 6-3).

(1) Inspect the coolant pump for damage, defective or loose connections and fitting, loose or defective mounting brackets and hardware or leads.

(2) Test operations of coolant pump as stated in paragraph d above.

(3) Refer deficiencies to DS maintenance.

h. Temperature Switch.

(1) Inspect the temperature switch for damage and operation.

(2) You may replace a defective switch as follows:

(a) Tag and disconnect wire leads, then unscrew the switch from the adapter.

(b) Install a new switch in reverse order of removal.

i. Ammeter (fig 6-6).

(1) Inspect the ammeter for damage and operation.

(2) You may replace a defective ammeter as follows:

(a) Tag and disconnect wire leads.

(b) Then separate the ammeter from its bracket.

(c) Install a new ammeter in reverse order of removal.

j. Heater Controls (figs 6-1 and 6-6).

(1) Inspect the heater controls for damage and proper operation.

(2) Repair of the control is limited to replacement of the lamp, circuit breaker and toggle switch.

(3) To replace the circuit breaker and toggle switch, remove the front panel, tag and disconnect wire leads and remove the circuit breaker and switch.

(4) Install new circuit breaker and toggle switch in reverse order of removal.

(5) Refer other deficiencies to DS maintenance.

k. Thermostat (fig 6-6).

(1) Inspect the thermostat for proper operation.

(2) Refer deficiencies to DS maintenance. *Page B-2*. In Section II, Maintenance Allocation Chart is superseded as follows:

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Assembly group	(3) Maintenance functions										(4) Tools and equipment	(5) Remarks				
		A	B	C	D	E	F	G	H	I	J			K			
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild			
01	Refer to MAC in TM 9-2320-209-20 covering truck chassis, 2½ ton, 6 x 6, Model M45A2																
	BATTERIES, CABLES, AND HOLDDOWN COMPONENTS	O 0.1	O 0.2	O 0.1								O 0.3					
02	LIGHTS																
	Light, Dome	O 0.1										O 0.8	O 0.2				A-B, Z-1
	Rear Spot Light Assembly	O 0.1										O 1.0	O 0.2				A-B, Z-1
	Underhood Light	O 0.1										O 0.2	O 0.1				A-B, Z-1
	Dome Light	O 0.1										O 0.8	O 0.2				A-B, Z-1
	Front Spot Light Assembly	O 0.1										O 1.0	O 0.2				A-B, Z-1
	Warning Light		O 0.1									O 0.8	O 0.3				A-B, AD-1
03	SIREN ASSEMBLY, FOOT SWITCH, SOLENOID, AND CIRCUIT BREAKERS																
	Foot Switch		O 0.1									O 0.8	O 0.2				A-B, AC-1
	Circuit Breaker		O 0.1									O 0.3					
	Solenoid		O 0.1									O 1.4					AE-B
	Electrical Leads		O 0.1									O 0.3	F 0.3				
04	NOZZLE ASSMEBLY, TURRET	O 0.1										F 1.0	F 3.5				
05	HOSE REEL ASSEMBLY	O 0.1		O 0.2								F 1.3	F 3.3				O-1
06	PROPELLER SHAFT ASSEMBLY	O 1.2		O 1.1								F 3.8	F 5.1				S-I
07	BODY COMPARTMENTS																
	Front											F 50.0	F 55.0				AG-I
	Left Side											F 17.0	F 22.0				AG-I
	Right Side											F 9.3	F 15.0				
	Doors	O 0.1		O 0.1								F 0.5	F 1.0				AG-I
	Handles	O 0.1		O 0.1								O 0.5					
	Locks	O 0.1		O 0.1								O 0.5					
08	LADDER SUPPORTS											F 1.8	F 2.8				AG-I
09	APRON, REAR AND ATTACHING COMPONENTS																
	Step, Rear											F 5.5	F 11.0				AG-I
	Support, Rear Step											F 0.5	F 3.0				AG-I
	Brackets, Fire Extinguisher	O 0.1										F 0.5					

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Assembly group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks				
		A	B	C	D	E	F	G	H	I	J	K						
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild						
09	APRON, REAR AND ATTACHING COMPONENTS—Continued																	
	Panel, Side; Rear Step Support											F	F					AG-I
	Hand Rail, Rear											0.8	1.8					AG-I
	Reflectors	O										F	F					
	Receptacle, Battery Charging	0.1										O						
10	APRON, Rear	O										F	F					AG-I
	FOAM TANK ASSEMBLY	0.1		O								37.0	39.0					
	Strainer	O		O								F	F					W-C, X-I
11	INSTRUMENT HOUSING GROUP	0.1		0.3								17.0	19.0					
	Gages, Pressure and Compound	O		O										O				Y-F
	Tachometer	0.1							O					1.5				
	Lights, Indicator	O												O				Z-I
	Gasket	0.1												O	O			
	Glass	0.2												1.3				
	Tubing	O												O	O			
	Switch, Temperature, Warning Light	0.1												1.3	0.2			
	Switch, Oil Pressure Warning Light	0.2												O	O			
		0.1												O	O			
12	CONTROL PANELS, OPERATOR																	
	Panel, Operator, Left Side													F	F			AG-I
	Panel, Operator, Right Side													8.2	9.9			AG-I
	Instruction Plates	O												F	F			AG-I
	Control Rods and Cables	0.1												O				
13	PIPING, WATER AND FOAM	O												F	F			
		0.1												0.2				
14	HEAT EXCHANGER AND HEATER																	
	Heater and Defroster													F	F			AF-I
	Hose, Heater	0.1												2.8	1.8			
	Heat Exchanger	O												F	F			
	Hose Heat Exchanger	0.1												O				
	Tubing, Piping and Fittings	0.1												F	F			
15	CONTROL VALVES																	
	Metering Valve													F	F			U-I

Refer to MAC in basic TM on page B-4.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Assembly group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J	K					
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild					
15	CONTROL VALVES—Continued																
	Valve Assembly, Ball, Foam Tank								F	F							V-I
									11.0	12.0							
	Valve Assembly, Ball								F	F							V-I
									22.0	23.0							
	Valve Check								F	F							U-I
									16.0	17.0							
	Valve Assembly, Ball, Foam Flush								F	F							V-I
									11.0	12.0							
	Valve Assembly, Ball, Turrent Nozzle, 2½ inch	O							F	F							
		0.1							3.3	5.3							
	Seal Assembly	O							F	F							U-I
		0.1							2.5	3.0							
	Valve Assembly, Ball, Hose Reel	O							F	F							
		0.1							3.0	4.0							
	Eductor Assembly								F	F							U-I
									22.0	23.0							
16	FIRE PUMP ASSEMBLY	O	O	O	O				H	H	H						A-B,
		0.3	0.5	3.1	1.0				80.0	138.0	200.0						B-D, C-I
	Impeller Assembly	H	O	O					H	H							E-C,
		0.5	0.4	1.0					62.0	72.0							F-D, G-H
	Actuator Assembly Manual Transfer Valve	O							F	F							G-I
		0.1							3.4	4.8							
	Gear Case Assembly	F		O					H	H							H-C,
		1.1		1.5					16.0	26.0							I-D
	Oil Cooler Assembly	F							F	F							J-I
		1.5							6.3	6.8							
	Valve Assembly, Ball, Discharge and Suction, 2½ in.	O		O					F	F							K-C
		0.1		0.3					16.0	18.0							
	Rod Assembly, Remote Control, Right Discharge Valve	O							F	F							G-I
		0.1							6.8	6.8							
	Caps and Plugs, Discharge and Suction Connections	O							O	C							L-I
		0.1							0.2	0.1							
	Strainer, Suction, 2½ and 4½	O							O								
		0.1							0.2								
	Relief Valve Assembly		O						F	F							A-B
			0.5						11.0	11.0							
	Pilot Valve Assembly		O	C					F	F							A-B,
			0.5	0.2					12.0	13.0							M-C
	Body Assembly	H		O					H	H							D-C
		0.5		0.1					100.0	100.0							
	Fittings, Discharge and Suctions	O							F								
		0.1							5.5								
	Tank, Priming	O		O					O								
		0.1		0.1					0.8								
	Priming Pump Assembly	F	O	O					F	F							A-B, N-C,
		1.2	0.1	1.2					12.0	15.0							G-I, O-I
	Electric Shift Assembly		O	O					F	F							A-B,
			0.1	1.2					3.3	5.3							Q-I
	Manifold Drain Valve Assembly	O							F	F							
		0.1							4.0	4.5							
	Priming Valve Assembly		O						F	F							A-B
			0.1						4.8	5.8							
	Manifold Drain Valve Tubing and Adapters	O							F	F							AI-I
		0.3							0.5	0.5							

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Assembly group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J	K					
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild					
17	TANK ASSEMBLY, WATER	O		O					F	F							W-C, X-I
18	BATTERY BOX AND SUPPORTS	0.2		0.4					17.0	19.0							AH-C
19	HOSE BED ASSEMBLY	O		1.3					1.8	2.8							
20	FRAME, COMPARTMENT MOUNTING AND MOUNTING BRACKETS, LIGHT GUARD, GRAB HANDLES	O							F	F							AG-I
21	WIRING HARNESS AND CABLES								0.2	1.0							
	Lead, Electrical, Positive and Negative Battery	F							F								
	Leads, Electrical	1.1							1.3								
	Harness, Wiring	F							F	F							AI-J
		1.1							2.2	1.0							
		F							F								
		0.5							3.3								
22	WINTERIZATION SYSTEM (Used on Fire Truck Model FT 750 Only)																
	Shutter Assembly	O							F	F							G-I
	Control Assembly, Shutter	0.1							1.4	0.8							
	Grille Assembly	O							F								
	Heater Assembly, Space	O	O		F				F	F							A-B
	Motor, D. C.	0.2	0.3		0.5				1.0	1.4							A-B, O-I
	Heater Assembly, Coolant	O	O		F				F								A-B
	Generator Assembly	0.2	0.1		0.2				3.0	1.4							A-B, O-I
	V-Belt	O			O				1.0								
	Motor, A. C.	0.1			0.3				O								A-B, O-I
	Relay	O	O						F								
	Regulator, Voltage and Current	0.1	0.3						1.0								
	Pump Assembly, Coolant	O			F				O								
	Switch, Temperature	0.1			0.5				0.5								
	Ammeter	O							F	F							AJ-I
	Control Assembly, Heater	0.2							1.0	0.6							
	Pump Assembly, Fuel	O							O								
	Strainer, Fuel	0.1							0.4								
	Thermostat	O							O								
	Valves	0.1							0.4								
	Fluid Lines and Fittings	O							F	O							G-I
		0.1							1.0	0.4							
		F							F	F							AK-I
		0.2							2.0	0.2							
		F							F	F							AK-I
		0.2							2.0	0.2							
		O							F								
		0.1							0.5								
		F							F								
		0.2							2.0								
		F							F								
		0.2							3.0								

Section IV. REMARKS

Reference code	Remarks
A-B	Operational test.
B-D	Adjust packing glands for proper leakage rate in accordance with LO 5-4210-217-12. Adjustment of the two adjusting screws and the interlock cable rod of gear case assembly will be performed by DS.
C-I	GS will perform complete repair of the fire pump assembly only when it is necessary to remove the fire pump assembly from fire truck.
D-C	Lubricate transfer valve in accordance with LO 5-4210-217-12.
E-C	Lubricate outboard bearing in accordance with LO 5-4210-217-12.
F-D	Adjust packing glands for proper leakage rate in accordance with LO 5-4210-217-12.
G-H	Replacement of impeller shaft packing will be performed by DS.
G-I	Repair by replacing unserviceable parts.
H-C	Lubricate gear case and interlock cable in accordance with LO 5-4210-217-12.
I-D	Adjust interlock cable rod for proper clearance in accordance with instructions contained in TM 5-4210-217-34. Also, adjust the two adjusting screws for proper operation of stationary pumping and pump and roll indicator lights (mounted on electric shift unit control panel) in accordance with instructions contained in TM 5-4210-217-34.
J-I	Repair by replacing unserviceable parts. Repair of oil pump assembly is not authorized.
K-C	Lubricate sector gear and gear rack in accordance with LO 5-4210-217-12.
L-I	Repair by replacing unserviceable gasket.
M-C	Clean the pilot valve strainer in accordance with instructions contained in TM 5-4210-217-12.
N-C	Lubricate motor in accordance with LO 5-4210-217-12.
O-I	Repair of motor is not authorized.
P-H	Drill ¼-inch hole in shaft of replacement motor for mounting motor coupling.
Q-B	Manually depress switch plunger. Illumination of pump engaged indicator light indicates switch is serviceable.
R-D	Adjust the position of switch so that pump engaged indicator light illuminates when power-takeoff shift lever is in the engaged position.
S-I	Repair by installing universal joint repair kit only.
T-C	Flush system after each operation and refill foam tank.
U-I	Repair by replacing unserviceable packing preformed (O-rings) only.
V-I	Repair by replacing unserviceable packing preformed (O-rings) and ball seats only.
W-C	Service by cleaning strainer; fill, drain, and flush tank.
X-I	Repair by replacing unserviceable parts, weld or patch tank.
Y-F	For pressure gage only: Install pressure gage of known accuracy in gage test port (1, fig 2-1). Operational test fire pump at 150 psig and compare the reading of the two gages. Replace the pressure gage if reading exceeds 5 psig, plus or minus, from that of test gage.
Z-I	Repair by replacing unserviceable lamps only.
AA-B	Submerge element of switch in water bath heated to 200°F. Perform continuity test between terminal connection and body of switch. Continuity of closed circuit indicates that switch is serviceable.
AB-B	Start engine and watch oil pressure gage on dash panel and the oil pressure warning light on instrument panel. The switch is serviceable if warning light goes to off position when oil pressure gage indicates 15 psig and above.
AC-I	Repair by replacing unserviceable lamp and flasher only.
AD-I	Repair by replacing unserviceable lamps, dome, and dome gasket only.
AE-B	Perform circuit breaker test indicated in table 5, TM 9-2320-209-20.
AF-I	Repair by replacing unserviceable motors only.
AG-I	Straighten, weld or patch.
AH-C	Lubricate sliding trays in accordance with LO 5-4210-217-12.
AI-J	Fabricate from bulk material.
AJ-I	Repair is limited to replacement of packing only.
AK-I	Repair is limited to replacement of element and gasket.
NOTE	
The work measurement time standards (WMTS) indicated in the MAC covers only one each of a particular assembly, subassembly or part installed on the fire truck. In those cases where more than one of the same assembly, subassembly or part are installed on the fire truck, increase the WMTS accordingly.	

Page I-1. Index is changed as follows:

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	C		
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	D		
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	F		
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	H		
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Tools and Equipment		4-2	4-1
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Winterization System		6-1	6-1

TM 5-4210-217-12 / TM 00664G-12, C1

By Order of the Secretary of the Army:

Official:

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TM 00664G-12-CH2
C2**

CHANGE }
NO. 2 }

**HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE U. S. MARINE CORPS
WASHINGTON, DC, 14 September 1977**

Operator and Organizational Maintenance Manual

**TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM AND
WATER, 750-GALLONS PER MINUTE CAPACITY, CENTRIFUGAL PUMP,
POWER TAKEOFF DRIVEN, 400-GALLON WATER TANK,
40-GALLON FOAM CHEMICAL TANK, CLASS 530C
ENGINEERED DEVICES, INC. MODEL 0814
NSN 4210-00-150-1426
AMERICAN AIR FILTER, INC. MODEL FT750
NSN 4210-00-106-7432
WINTERIZED AMERICAN AIR FILTER, INC. MODEL FT750W
NSN 4210-00-106-7433**

TM 5-4210-217-12, 11 December 1972, is changes as follows:

Page 4-3. Table 4-1, line 7, add, "When proper amount of oil (5 quarts) is present, oil will flow when pipe plug is removed on oil level check. When

plug is removed to check oil level and no stream is noted, oil should be added to gear box until oil flows from the check point."

By Order of the Secretaries of the Army, the Navy, and the Air Force:

Official;

BERNARD W. ROGERS
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OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

**TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM AND
 WATER. 750-GALLONS PER MINUTE CAPACITY
 CENTRIFUGAL PUMP, POWER TAKEOFF DRIVEN,
 400-GALLON WATER TANK,
 40-GALLON FOAM CHEMICAL TANK, CLASS 530C
 NONWINTERIZED.
 ENGINEERED DEVICES INC. MODEL 0814
 FSN 4210-150-1426**

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CHAPTER I INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions and the instructions contained in Technical Manuals 9-2320-209-10 and 9-2320-209-20 are published for use by personnel to whom the Fire Truck is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of major assemblies and their functions in relationship to other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains the maintenance allocation chart.

c. Numbers in the parentheses following nomenclature callouts on illustrations indicate quantity, numbers preceding nomenclature callouts indicate preferred maintenance sequence.

1-2. Forms and Records

a. Maintenance forms, records and reports which are to be used by maintenance personnel at all

maintenance levels are listed and prescribed by TM 38-750.

b. DA Form 2258 (Preservation and Depreservation Guide for Vehicles and Equipment). Applicable forms, excluding Standard Form 46 (United States Government Motor Vehicle Operator's Identification Card) which are required by the operator, shall be kept in a canvas bag mounted on equipment.

1-3. Equipment Serviceability Criteria

In accordance with AR 750-57, ESC technical manuals are not required for the Class 530C fire truck.

1-4. Reporting of Errors

You can improve this manual by calling attention to errors and by recommending improvements, using DA Form 2028 (Recommended Changes to Publications), or by a letter, and mail directly to Commanding General, U. S. Army Mobility Command, ATTN: AMSME-MPP, 4300 Goodfellow Blvd., St. Louis, Mo. 63120. A reply will be furnished directly to you.

Section II. DESCRIPTION AND TABULATED DATA

1-5. Description

a. *General.* The class 530C fire truck (fig. 1-1 and 1-2) is the Army's standard tactical fire fighting apparatus and is designed for combating structural, brush and aircraft crash fires in areas of combat operations. The fire fighting apparatus is mounted on the Army's standard 2½ ton, 6 x 6, truck chassis, model M45A2. The truck is powered by a multifuel engine with a five speed forward and one reverse speed transmission. The truck is designed for use over all types of roads, highways and cross-country terrain. For additional description of the Model M45A2 Truck Chassis, refer to TM's 9-2320-209-10 and 9-2320-209-20. The fire truck is equipped with a midship-mounted two stage (series parallel) centrifugal fire pump which is driven from a power take-off, connected to the transfer case. The fire truck has the capability of pumping, from a hydrant water supply, a draft water supply, (river, lake stream, etc.), a 400 gallon mounted water tank, a water tank truck, or from another fire truck. The fire truck also has the pump and roll capability, when pumping from the 400 gallon water tank. The fire pump is equipped with a pressure relief valve

to protect firemen from injury and to protect the engine, fire pump and hose lines against damage due to excessive pressure rise when one or more nozzles are shut-off. A priming pump is provided for priming the fire pump when pumping from a draft water supply. The fire truck is also equipped with an around-the-pump liquid foam proportioning system for use in extinguishing class B fires. The foam system consists of a 40 gallon foam tank, check valve, eductor, metering valve and related control valves and piping. A turret nozzle is provided for use when pumping from stationary mode (hydrant, draft or water tank) or pump and roll mode. The turret nozzle is designed to discharge a straight water or foam stream, a foam fog pattern, or a water fog pattern. The turret nozzle is manually operated from outside of the cab, it can be elevated or lowered and rotated 360 degrees. A special purpose truck body is provided for transporting personnel and fire fighting equipment to the scene of the fire. The nonwinterized model fire truck is suitable for operations within the temperature range of plus (+) 115 to minus (—) 25 degrees Fah-

renheit. Portable fire fighting equipment such as hoses, nozzles, ladders, etc., are not supplied with the fire truck but are supplied as components of the fire fighting equipment sets listed in Appendix A.

b. *Color.* The standard color for the class 530C fire truck when assigned to tactical use is semi-gloss olive drab, color chip X24087, FED. STD. 595, paint conforming to Specification TT-E-529. When the fire truck is assigned to a nontactical use or to facilities engineering activities, the vehicle will be painted gloss red, color chip 11136, FED STD 595, paint conforming to specification TT-E-489. Using organizations are responsible for repainting the fire truck to conform with the color requirements of AR 746-5.

c. *Modifications to Model M45A2 Truck Chassis.* In order to install the fire fighting apparatus, the following modifications were made to the model M45A2 truck chassis:

(1) The storage batteries were relocated from the right side to left side of truck.

(2) The two air reservoirs were relocated from the left side and installed in the battery compartment on the right side of truck.

(3) The trailer airbrake hose couplings at rear of truck were disconnected and removed.

1-6. Differences Between Models

This manual covers only the engineered devices incorporated model 0814 fire truck. No known differences exist for the model covered by this manual.

1-7. Identification and Tabulated Data

a. *Identification.* The fire truck has three major identification plates.

(1) Army data plate (MS 90495) — Mounted inside right door. Specifies the nomenclature, manufacturer model and serial numbers, vehicle registration number, contract number, federal stock number, and other data as indicated on the MS 90495 data plate.

(2) Truck Chassis plate. Mounted on the dash panel. Specifies the nomenclature, manufacturer, model and serial numbers, contract number, and the federal stock number.

(3) Fire Pump Plate. Mounted on top of pump housing. Specifies the manufacturer, model number, date of manufacture, serial number, gear ratio, capacity, and pressure rating.

b. Tabulated Data.

(1) Truck chassis (Government furnished).

Manufacturer	Kaiser Jeep Corporation
Model (Military)	M45A2 (Multifuel Engine)
Additional Data	See Chapter 1, Section IV, TM 9-2320-209-10

(2) Power-Takeoff unit (Government furnished).

Manufacturer	Rockwell Standard Corp.
Model	P-136B

(3) Fire pump.

Manufacturer	Waterous Company
Model	CME-750
Type	Centrifugal
Number of Stages	Two (Series-Parallel)
Power Source	Power-Takeoff (Transfer Case)
Gear Ratio:	
Low Speed (Stationary Mode)	1 to 1.85
High Speed (Pump & Roll Mode)	1 to 8.62
Inlets (suction)	3 ea.; 2 ea. 4½ inch diameter, 4 threads per inch NH (American National Fire Hose Coupling Threads) and 1 ea. 2½ inch diameter 7½ threads per inch NH
Outlets (discharge)	3 each 2½ inch diameter, 7½ threads per inch NH
Maximum Suction Lift	10 feet (through 20 feet of 4½ inch suction hose at 1000 feet elevation above sea level)
Impeller Part Numbers	70418 and 70419
Impeller Diameter	9 inches
Rated Performance:	

GPM	PSI	MODE	SER/PAR	RPM/MPH
750	150	Stationary	Parallel	200-2050 RPM's
525	200	Stationary	Parallel	2200-2250 RPM's
500	150	Stationary	Parallel	1900-1950 RPM's
375	250	Stationary	Series	1800-1850 RPM's
200	225	Pump and Roll	Series	3-3½ MPH
50	165	Pump and Roll	Series	3-3½ MPH
25	250	Pump and Roll	Series	3-3½ MPH

(4) Relief valve.

Manufacturer	Waterous Company
Model	80610
Type	Automatic
Pressure Range	50 to 300 PSI

(5) Pilot valve with four-way valve.

Manufacturer	Waterous Company
Model	80609
Type	Adjustable
Pressure Range	50 to 300 PSI

(6) Priming pump.

Manufacturer	Waterous Company
Model	HHE-281
Type	Positive-displacement, rotary-gear, vacuum pump
Displacement (CFM per revolution)	014
Maximum Rating	25 inches mercury vacuum
Motor Data	
Voltage (direct current)	24
Amperes	60 amperes no load 120 amperes at 23 inches 150 amperes pumping water

Duty Time	30 seconds
Type	Moisture and Fungus resistant
Priming Tank Capacity	4 quarts (engine oil)

(7) Priming valve.

Manufacturer	Waterous Company
Model	80682
Type	Manual-Electric

(8) Manifold drain valve.

Manufacturer Waterous Company
Model 71471
Type Manual (push-pull)

(9) Electric shift unit.

Manufacturer Waterous Company
Model 80680
Type Electro-Matic
Voltage (direct current) 24
Amperes 5 at 1/2 second

(10) Propeller shaft (power-takeoff to fire pump).

Manufacturer Spicer Dana Corporation
Part Number 905055-1

(11) Foam proportioning system.

Manufacturer Frecon Corporation
Model AP
Type Around-the-Pump
Solution Foam Liquid and Water
Proportioning Capacity:
Regular strength (6 percent) 200 GPM
Double strength (3 percent) 400 GPM
Maximum Operating Pressures:
Suction Pressure 10 PSI
Discharge Pressure 250 PSI

(12) Turret nozzle.

Manufacturer Frecon Corporation
Model FWV-200
Type Water or Foam
Rated Capacity 200 GPM at 150 PSI

(13) Turret nozzle control valve.

Manufacturer Waterous Company
Model 8860F4
Type Ball

(14) Foam tank.

Manufacturer Engineered Devices Inc.
Type of Material (stainless steel) 304L
Capacity 40 gallons

(15) Water tank.

Manufacturer Engineered Devices Inc.
Type of Material (stainless steel) 304L
Capacity 400 gallons

(16) Hose reels (2 required).

Manufacturer Clifford B. Hannay & Sons
Models EPF 32-19-20 RT, EPF 32-19-20 LT

Type Manual or Electric Rewind
Outlet connection (male) 1 inch dia., 8 threads per inch NH
Inlet connection (female) 1 inch NPT
Reel Capacity (1 inch chemical hose) 150 feet

Motor Data:

Manufacturer Ohio Electric Company
Model 1134-IX4876
Horsepower 1/4
Voltage (direct current) 24
Frame 48
Type PM
Amperes 36
Revolutions per minute 530
Rotation Clockwise or Counter-clockwise
Time Rating 5 minutes

(17) Pressure gage (operator's instrument panel).

Manufacturer U. S. Gage Company
Model P-500U
Dial Markings 0-400 PSI, 5 pound graduations
Diameter 3.719 inches

(18) Pressure gage (electric shift unit control panel).

Manufacturer Waterous Company
Model V1973
Dial Markings 0-400 PSI, 5 pound graduations
Diameter 3.730

(19) Compound Gage.

Manufacturer U. S. Gage Company
Model C-500U
Dial Markings 0-150 PSI, 3 pound graduations
0-30 inches mercury vacuum,
3 inch graduations
Diameter 3.719 inches

(20) Tachometer/Hourmeter.

Manufacturer Stewart Warne. Corp.
Part Number 503D
Military Standard Part No. MS 35916-2
Type Mechanical
Dial Markings 0-4000 RPM's, 000.0 Hrs.

(21) Siren.

Manufacturer Federal Sign & Signal
Model WLW
Type With Flasher Light
Military Specification MIL-S-3485B
Voltage (direct current) 24
Amperes (motor and lamp) 10
Lamp Trade Number 4880
Candlepower 6000

(22) Warning light.

Manufacturer Federal Sign and Signal Corp.
Model 17MS
Type Rotating (red)
Military Standard Part No. MS 51317-1
Voltage (direct current) 24
Amperes (motor and lamps) 8
Lamp Trade Number (2 required) 4505
Candlepower (each) 45,000

(23) Front spotlights (2 required).

Manufacturer Unity Manufacturing Co.
Model 15700
Type Splash Resistant
Military Standard Part No. 51307-2
Voltage (direct current) 24
Amperes 5.3
Lamp Trade No. 4530
Candlepower 130,000

(24) Rear spotlights (2 required).

Manufacturer Unity Manufacturing Co.
Model 15600
Type Splash Resistant
Voltage (direct current) 24
Amperes 5.3
Lamp Trade Number 4530
Candlepower 130,000

(25) Dome Lights (2 required).

Manufacturer	R. F. Dietz Company
Model	38M-24
Voltage (direct current)	24
Amperes	67
Lamp Trade Number	G. E. 307

(26) Engine lights (under hood—2 required).

Manufacturer	Culver-Stearns Mfg. Co.
Model	G-579A
Voltage (direct current)	24
Amperes	1.29
Lamp Trade Number	G. E. 311

(27) Battery, storage, lead-acid (4 required connected series and parallel).

Type	6TN
Military Standard Part No	MS 35000-3
Voltage	12
Ampere-hour rating (at 20 hour rate)	100
Type of Charge	Charged and Dry
Electrolyte (to fill one battery)	6.7 quarts
Ground	Negative

(28) Heater/defroster, vehicular compartment.

Manufacturer	Evans Product Company
Model	HV211794
Type	Hot Water (engine coolant)
BTU Rating	18,000
Motor Data:	
Number required	2 each
Voltage	24
Amperes	4.0 (each)
Speed	Single

(29) Engine heat exchanger.

Manufacturer	Sen-Dure Products Inc.
Model	1113-2
Type	Liquid

(30) Special purpose body.

Manufacturer	Engineered Devices Inc.
Compartments (fire fighting equipment)	7
Pump Compartment	1
Hose Reel Compartments	2
Suction Hose Compartments	2
Applicator Compartments	2
Height and Capacity:	
1½ inch fire hose	800 feet
2½ inch fire hose	1200 feet

(31) Overall dimensions & weights. (see fig. 1-1 for reduced shipping dimensions).

Overall Length	278 ¼ inches
Overall Width	96 ¾ inches
Overall Height:	
Without Turret	110 inches
With Turret	125½ inches
Net Weight Empty	17,825
Net Weight Filled (Water and foam tanks less fuel)	23,850
Shipping Volume	1,628 Cubic Feet
Shipping Weight	17,825
Shipping Tonnage (40 cubic feet = 1 Ton)	41 Tons

(32) Bridge weight.

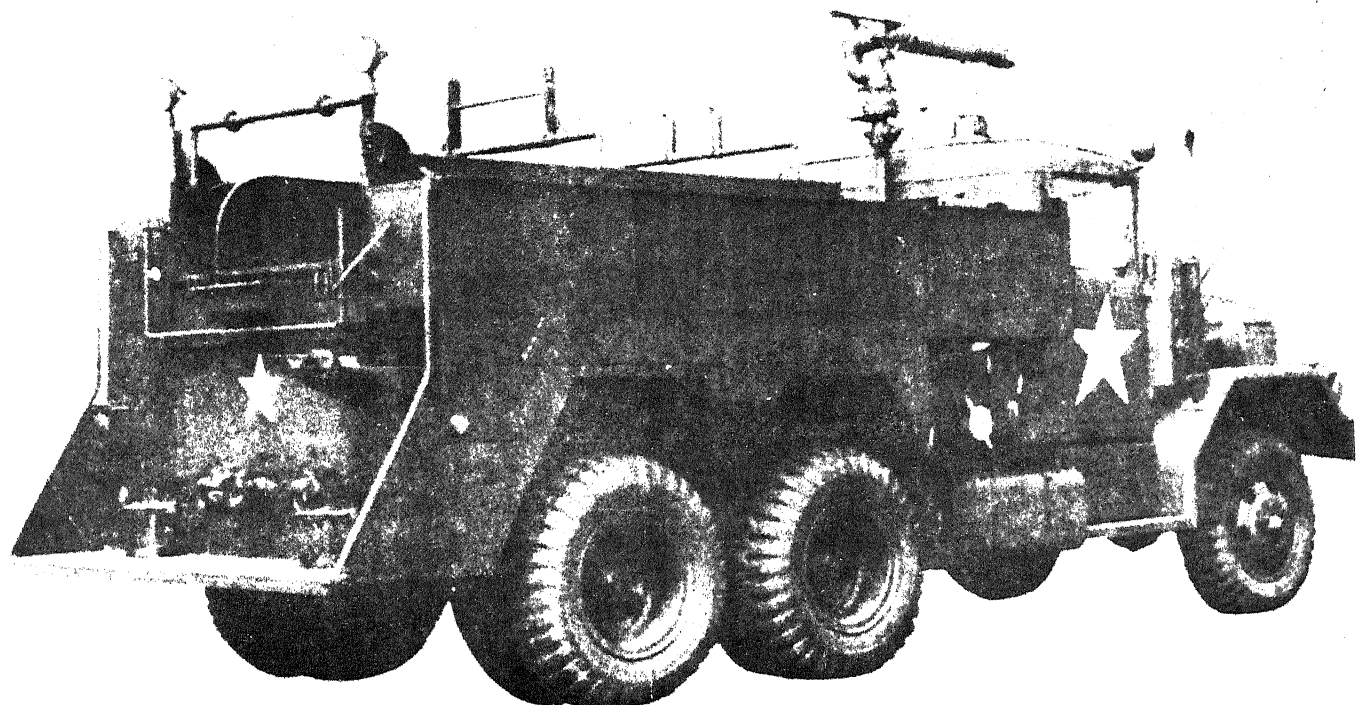
Classification	E9
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(33) Wiring diagram. Refer to F01, located in back of manual.

(34) Piping schematic. Refer to FO2, located in back of manual.

(35) Mobility data.

Angle of approach	48 Degrees
Angle of departure	24 Degrees
Ground Clearance	12 Inches

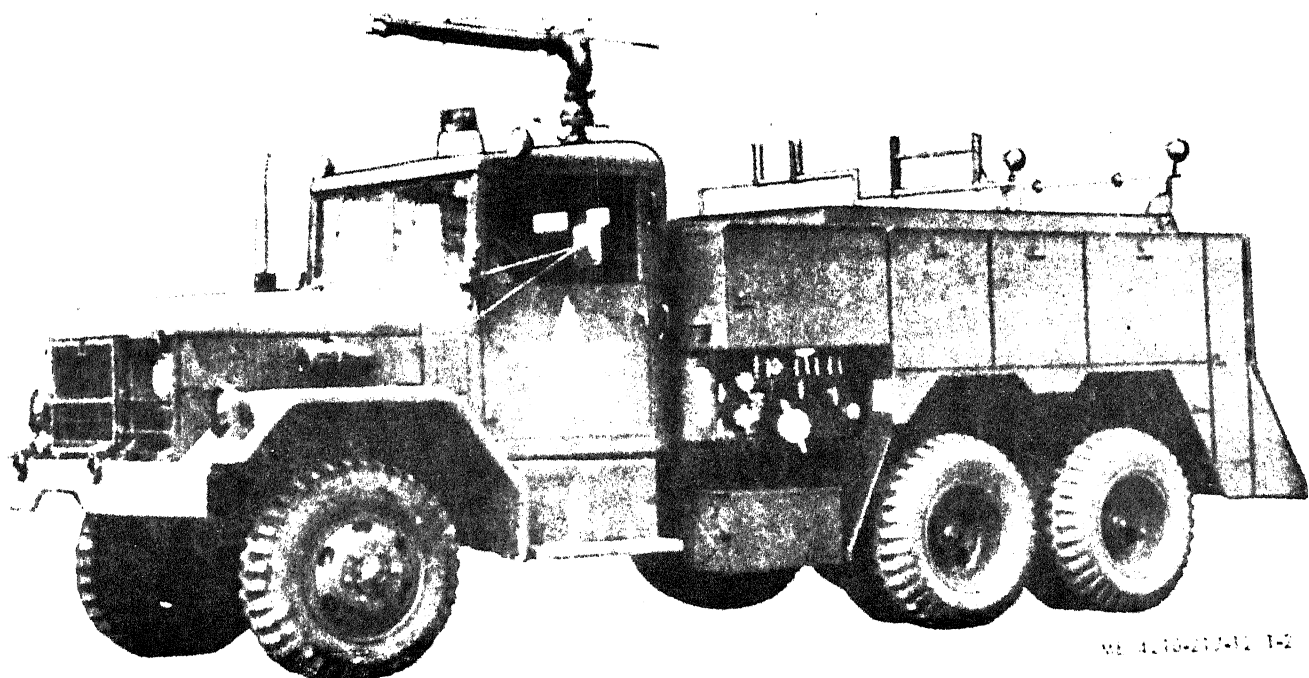


SHIPPING DIMENSIONS

LENGTH	278 1/4 INCHES
WIDTH	92 3/4 INCHES
HEIGHT	115 INCHES WITHOUT TURRET
WEIGHT	17,825 LBS

ME 4210-217-12 1-1

Figure 1-1 Fire truck, right rear, three quarter view with shipping dimensions



ME 4210-217-12 1-2

Figure 1-2 Fire truck, left front, three quarter view

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

2-1. Inspecting and Servicing the Equipment

a. *Truck Chassis.* Inspect and service the truck chassis in accordance with instructions contained in section I, chapter 2, TM 9-2320-209-10. Prior to road testing fire truck, accomplish the following tasks:

(1) Fill the water and foam tanks in accordance with paragraphs 2-16 and 2-17.

(2) Load fire truck with the appropriate fire fighting equipment—structural, brush or aircraft crash, in accordance with paragraph 2-27.

b. *Fire Pump.* Upon completion of road test, accomplish the following tasks:

(1) Check oil level of fire pump gear case and tank priming pump in accordance with LO 5-4210-217-12.

(2) Perform operational test of fire pump in accordance with instructions contained in paragraphs 2-8 through 2-15. Prior to operating fire

pump, the operator must become familiar with the controls and operation as contained in paragraph 2-4 through 2-15.

(3) During operational test of fire pump, check the leakage rate of both packing glands. Acceptable leakage rate is minimum of 10 drops to a maximum of 60 drops of water per minute.

c. *Road Test.* Upon completion of road test and operational test, correct those malfunctions within the scope of the operator/crew. All other malfunctions and the general condition of the fire truck, will be reported to the fire chief.

2-2. Installation

Filling the dry-charged storage batteries with electrolyte (to be furnished by using organization), connecting the battery cables, and installing the turret nozzle are the responsibility of organizational maintenance.

Section II. CONTROLS AND INSTRUMENTS

2-3. General

This section and section II of chapter 2, TM 9-2320-209-10 describes the various controls and instruments and provides the operator/crew sufficient information to insure proper operation of the truck, fire fighting, class 530C.

2-4. Controls and Instruments

a. *Gage Check (1, fig 2-1).* For use in checking the accuracy of pressure gage (34) by removing the ¼ inch NPT (American Standard Taper Pipe Thread) pipe plug and installing test gage.

b. *Switch, Toggle (2), Dome Light.* Controls operation of dome light (on or off).

c. *Switch, Toggle (3), Instrument Panel Lights.* Controls operation of the instrument panel lights (on or off).

d. *Primer Valve Control (4).* The primer valve controls operation of the priming pump. Also, the valve opens and closes the passage between priming pump and fire pump. When the valve is opened, the priming pump displaces air inside of fire pump, through the primer valve, to the atmosphere, creating a vacuum inside of fire pump. Atmospheric pressure then forces water through suction hose, priming the fire pump. After the pump is primed, the primer

valve is closed to prevent air from leaking into fire pump. To open primer valve and start priming pump, pull-out control knob and hold. To close primer valve and stop priming pump, release the control knob.

e. *Upper Discharge Connection (5).* A male connection for connecting 2½ inch NH (American National Fire-Hose Coupling Thread) fire hose.

f. *Pressure Relief Pilot Valve Control (6).* The pilot valve regulates the operating pressure of the main pressure relief valve within the range of 50 to 300 PSI (pounds per square inch). To increase discharge pressure, turn control clockwise. To decrease discharge pressure, turn control counterclockwise.

g. *Upper Discharge Valve Control (7).* The valve controls water flow from pressure side of the fire pump to upper discharge connection (5). Positive locking features permit locking the valve in any position between open and closed. To open valve, pull-out control. To close valve, push-in control. To lock or unlock valve in any position between open and closed, turn control 90 degrees clockwise or counterclockwise.

h. *Switch (8), Push, Left Hose Reel Rewind.* Controls the electric motor that drives the hose reel for rewinding 1 inch hose line.

i. *Water Tank Fill Valve Control (9)*. The valve controls water flow from pressure side of fire pump to water tank fill inlet. To open valve, pull-out control. To close valve, push-in control.

j. *Throttle Engine (10)*. For use in setting engine speed at any desired RPM (revolution per minute) during stationary pumping operation. To increase engine speed, turn control counter-clockwise. To decrease engine speed, turn control clockwise or push-in button on control knob.

k. *Foam Metering Valve Control (11)*. The foam metering valve meters the flow of liquid foam from foam tank to the eductor. To set metering valve, turn control clockwise for 3 or 6 percent solution in accordance with instructions on foam metering instruction plate, located near left control panel.

l. *Foam Tank Valve Control (12)*. The valve controls the flow of liquid foam from foam tank to metering valve (11). To open valve, pull-out control. To close valve, push-in control.

m. *Left Hose Reel Discharge Valve Control (13)*. The valve controls water flow from pressure side of fire pump to left hose reel. To open valve, pull-out control. To close valve, push-in control.

n. *Transfer Valve Control (14)*. The transfer valve controls the water flow through body of fire pump for pressure (series) or volume (parallel) operation. For volume operation, pull-out control. For pressure operation, push-in control.

o. *Right Hose Reel Discharge Valve Control (15)*. The valve controls water flow from pressure side of fire pump to right hose reel. To open valve, pull-out control. To close valve, push-in control.

p. *Tank Suction Valve Control (16)*. The valve controls water flow from water tank to suction side of fire pump. Positive locking features permit locking the valve in any position between open and closed. To open valve, pull-out control. To close valve, push-in control. To lock or unlock valve in any position between open and closed, turn control 90 degrees clockwise or counter-clockwise.

q. *Suction Connection (17)*. A swivel female connection, with strainer, for connecting 2½ inch NH fire hose or suction hose. For use in filling water tank from hydrant, or pumping from tank truck, or pumping from another fire truck.

r. *Suction Valve Control (18)*. The valve controls water flow through the 2½ inch suction connection (17). Positive locking features permit locking the valve in any position between open and closed. To open valve, pull-out control. To close valve, push-in control. To lock or unlock in any position between open and closed, turn control 90 degrees clockwise or counter-clockwise.

s. *Auxiliary Cooler Valve Control (19)*. The valve controls water flow from pressure side of fire pump,

through engine heat exchanger, to suction side of fire pump. For use in maintaining normal engine-operating temperature range of 160° to 185°F (Fahrenheit) when pumping from hydrant or draft water supply. To reduce engine temperature to 185°, open valve by gradually pulling-out control. To increase engine temperature above 160°F, close valve by gradually pushing-in control. Normally, the engine is operated with valve closed.

t. *Foam Proportioner (Eductor) Valve Control (20)*. The valve controls water flow from pressure side of fire pump, through the eductor (where the liquid foam and water are mixed), to the suction side of pump. To open valve, pull-out control. To close valve, push-in control.

u. *Suction Connection ¼4 inch (21)*. A male connection, with strainer, for connecting ¼ inch NH suction hose. For use when pumping from hydrant or draft water supply.

v. *Strainer, Pilot Valve (22)*. The strainer prevents foreign particles from entering pressure relief pilot valve.

w. *Relief Valve ON-OFF Control (23)*. A four-way valve, which places the pilot valve and main pressure relief valve in or out of operation. To place pressure relief valve out of operation, turn control to "OFF" position. To place pressure relief valve in operation, turn control to "ON" position.

x. *Upper Discharge Hose Line Drain Valve Control (24)*. Drains the hose line when the discharge valve is closed. Also, drains the upper discharge tube when discharge valve is open and capped. To open valve, turn control to 5 o'clock position. To close valve, turn control to 8 o'clock position.

y. *Lower Discharge Hose Line Drain Valve Control (25)*. Drains the hose line when the discharge valve is closed. Also, drains the lower discharge tube when discharge valve is open and capped. To open valve, turn control to 5 o'clock position. To close valve, turn control to 8 o'clock position.

z. *Lower Discharge Connection (26)*. A male connection for connecting 2½ inch NH fire hose.

aa. *Compound Gage (27)*. Drain Valve Control. Drains the compound gage. To open valve, turn control counterclockwise. To close valve, turn control clockwise.

ab. *Pressure Gage (28)*. Drain Valve Control. Drains the pressure gage. To open valve, turn control counterclockwise. To close valve, turn control clockwise.

ac. *Right Discharge Valve (29)*. Remote Control. The valve controls water flow from pressure side of fire pump to right discharge connection (7 fig. 2-2). Positive locking features permit locking the valve in any position between open and closed. To open valve, pull-out control. To close valve, push-in control. To

lock or unlock valve in any position between open and closed, turn control 90 degrees clockwise or counter-clockwise.

ad. Steady Valve Control (30). The valve eliminates fluctuation of pressure gage needle during pumping operation. To eliminate fluctuation, turn control clockwise all the way closing the valve, then turn control counter-clockwise and open valve until needle starts to fluctuate, then turn control clockwise until fluctuation is eliminated without completely closing the valve.

ae. Lower Discharge Valve Control (31). The valve controls water flow from pressure side of fire pump to lower discharge connection (26). Positive locking features permit locking the valve in any position between open and closed. To open valve, pull-out control. To close valve, push-in control. To lock or unlock in any position between open and closed, turn control 90 degrees clockwise or counter-clockwise.

af. Tachometer-Hourmeter (32). The tachometer indicates the RPM's (revolutions per minute) of the output shaft of the power-takeoff unit and the meter reading is considered to be the RPM's of the fire pump. Also, the meter reading is the same as engine's RPM's when transmission is in fourth gear. The hourmeter records the hours of operation of fire pump.

ag. Oil Pressure Warning Light (33). The light will illuminate if there is a loss in the engine's oil pressure system below 15 PSIG (pounds per square inch gage) during fire pump operation. Also, the light will illuminate when the accessory switch is in the "ON" position (engine off) indicating that the lamp (bulb) and electrical wiring are satisfactory. The light should go "OFF" when the engine is started.

ah. Pressure Gage (34). The gage indicates the desired discharge pressure of the fire pump.

ai. Engine Temperature Warning Light (35). The light will illuminate if the engine becomes overheated (200°F) due to operational conditions or low coolant level during fire pump operation.

aj. Compound Gage (36). This instrument is a combination pressure and vacuum gage. When pumping from hydrant, the gage indicates the water pressure at the suction inlet of pump. When the pump is operating, the gage reading is referred to as the "suction pressure" and when the pump is not operating, the gage reading is referred to as the "hydrant pressure". When pumping from a draft water supply, the gage indicates the Vacuum (inches of mercury) required to prime the fire pump.

ak. Manifold Drain Valve Control (37). The valve drains the suction side of fire pump. To open valve, pull-out control. To close valve, push-in control.

al. Dome Light (38). Illuminates operators control panel.

am. Switch Push, (1, fig 2-2), Push, Right Hose Reel Rewind. Controls the electric motor that drives the hose reel for rewinding 1 inch hose line.

an. Circuit Breaker (2) Auxiliary Generator. The control is nonfunctional on the non winterized class 530C fire truck.

ao. Receptacle (3), 110 Volts, AC (Alternating Current). The receptacle is nonfunctional on the non-winterized class 530C fire truck.

ap. Foam Flush Valve Control (4). The valve controls water flow from pressure side of fire pump, through foam system (metering valve, check valve, eductor, and related piping), to suction side of pump when flushing foam system. To open valve, pull-out control. To close valve, push-in control.

aq. Switch, Toggle (5), Dome Light. Controls operation of dome light (on or off).

ar. Discharge Valve Control (6). The valve controls water flow from pressure side of fire pump to discharge connection (7). The valve can also be operated by the remote control (29 fig. 2-1). Positive locking features permit locking the valve in any position between open and closed. To open valve, push-in control. To close valve, pull-out control. To lock or unlock valve in any position between open and closed, turn control 90 degrees clockwise or counter-clockwise.

as. Discharge Connection (7). A male connection for connecting 2½ inch fire hose.

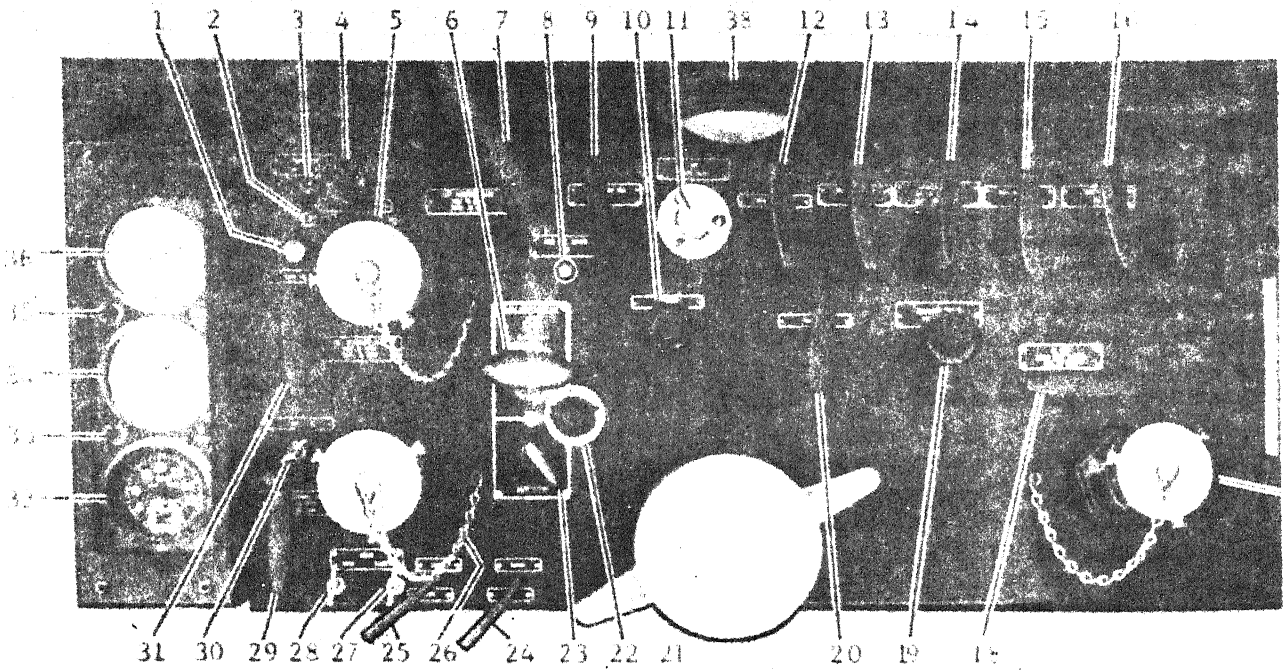
at. Right Discharge Hose Line Drain Valve Control (8). Drains the hose line when the discharge valve is closed. Also, drains the upper discharge tube when discharge valve is open and capped. To open valve, turn control to 7 o'clock position. To close valve, turn control to 10 o'clock position.

au. Relief Valve Drain Valve Control (9). The valve drains the main pressure relief valve. To open valve, turn control to horizontal position. To close valve, turn control to vertical position.

av. Suction Connection (10). A male connection, with strainer, for connecting 4½ inch NH suction hose. For use when pumping from fire hydrant or draft, when left suction connection (21 fig. 2-1) is not in use.

aw. Foam Tank Drain Valve Control (11). The valve drains the foam tank. To open valve, pull-out control. To close valve, push-in control.

ax. Manual Pump Gearshift Control (12). (Stationary or Pump and Roll). After the electric shift unit has been disengaged, this control permits manual shifting of fire pump drive gear from low-speed for stationary pumping to high-speed for pump and roll and vice versa. Push-in control to shift from stationary pumping to pump and roll.



- | | |
|---|--|
| <ol style="list-style-type: none"> 1. GAGE CHECK, PRESSURE GAGE 2. SWITCH, DOME LIGHT 3. SWITCH, INSTRUMENT PANEL LIGHTS 4. PRIMER VALVE CONTROL 5. UPPER DISCHARGE CONNECTION, 2-1/2 INCH 6. PRESSURE RELIEF PILOT VALVE CONTROL 7. UPPER DISCHARGE VALVE CONTROL 8. SWITCH, LEFT HOSE REEL REWIND 9. WATER TANK FILL VALVE CONTROL 10. THROTTLE ENGINE 11. FOAM METERING VALVE CONTROL 12. FOAM TANK VALVE CONTROL 13. LEFT HOSE REEL DISCHARGE VALVE CONTROL 14. TRANSFER VALVE CONTROL 15. RIGHT HOSE REEL DISCHARGE VALVE CONTROL 16. TANK SUCTION VALVE CONTROL 17. SUCTION CONNECTION, 2-1/2 INCH 18. 2-1/2 INCH SUCTION VALVE CONTROL 19. AUXILIARY COOLER VALVE CONTROL 20. FOAM PROPORTIONER (REDUCTOR) VALVE CONTROL | <ol style="list-style-type: none"> 21. SUCTION CONNECTION, 4-1/2 INCH NH 22. STRAINER, PILOT VALVE 23. RELIEF VALVE ON-OFF CONTROL 24. UPPER DISCHARGE HOSE LINE DRAIN VALVE CONTROL 25. LOWER DISCHARGE HOSE LINE DRAIN VALVE CONTROL 26. LOWER DISCHARGE CONNECTION, 2-1/2 INCH 27. COMPOUND GAGE BRAIN VALVE CONTROL 28. PRESSURE GAGE BRAIN VALVE CONTROL 29. RIGHT DISCHARGE VALVE REMOTE CONTROL 30. STEADY VALVE CONTROL 31. LOWER DISCHARGE VALVE CONTROL 32. TACHOMETER HOURMETER 33. OIL PRESSURE WARNING LIGHT 34. PRESSURE GAGE 35. ENGINE TEMPERATURE WARNING LIGHT 36. COMPOUND GAGE 37. MANIFOLD BRAIN VALVE CONTROL 38. DOME LIGHT |
|---|--|

LEFT CONTROL PANEL

ME 4210-217-12 2-1

Figure 2-1 Left control panel.

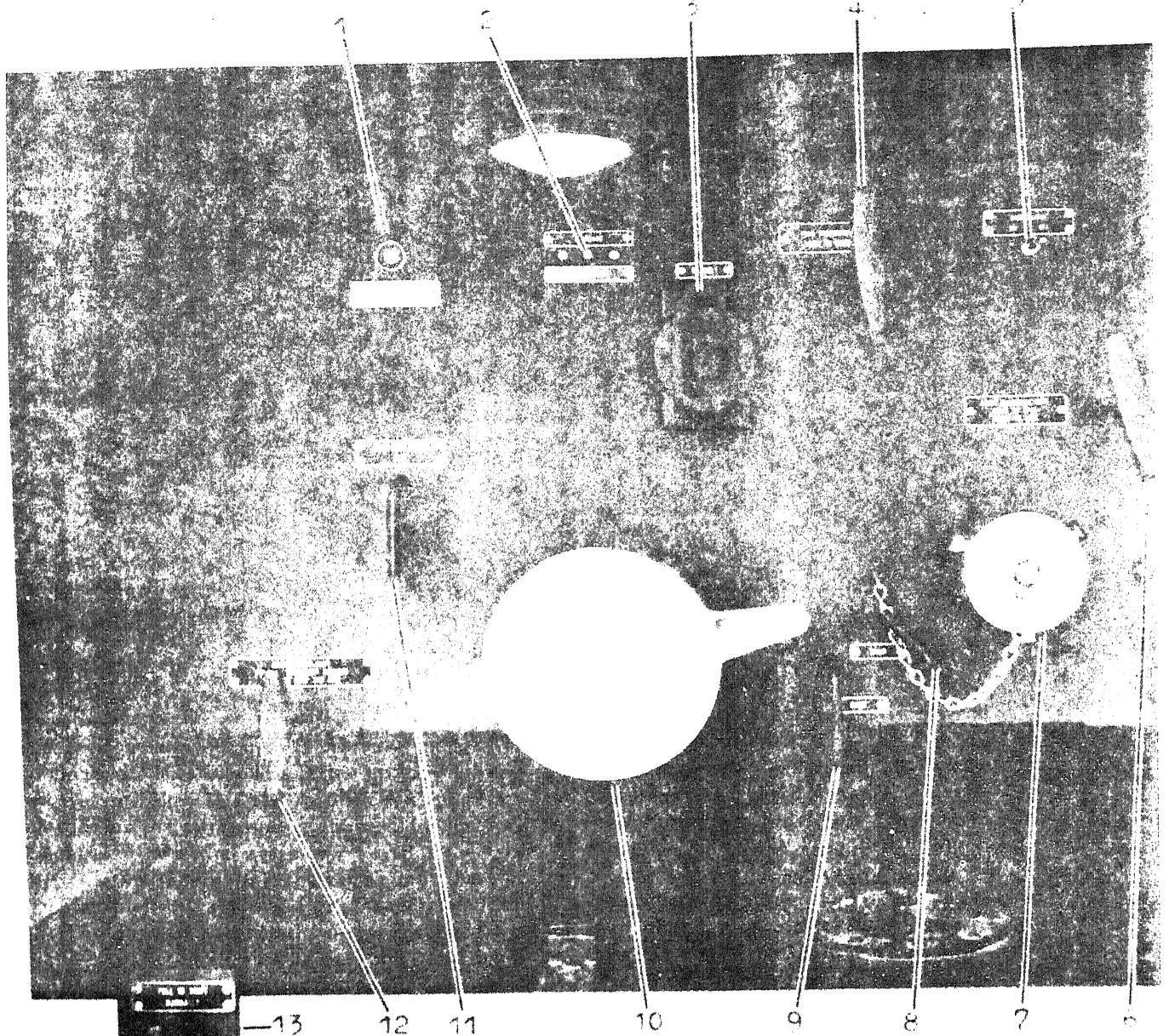
Pull-out control to shift from pump and roll to stationary pumping

ay. *Disengage Electric Shift Unit Control (13).* If the electric shift unit malfunctions, this control disengages the electric shift unit for manual shifting of fire pump gear. Pull-out control to disengage electric shift unit. Push-in control to engage electric shift unit.

az. *Green Indicator Light (1, fig. 2-3).* The light illuminates when the electric shift unit has actually shifted fire pump drive gear to low-speed for stationary pumping (or normal driving) mode. The light will not illuminate if the shifting was not com-

pleted, or if the collar shifting gear failed to mesh with pump low-speed drive gear. Normally, the light is always "ON", except when the electric shift unit is shifted to pump and roll mode, then the light goes "OFF".

ba. *Amber Indicator Light (2).* The light illuminates when the power-takeoff shift lever is in the "ENGAGE" position, indicating that fire pump gears will be engaged when engine clutch is engaged. Normally, the light is "ON" while the power-takeoff unit is engaged. The light is "OFF" when power-takeoff shift lever is in the disengaged position.



1. Switch, Right Hose Reel Rewind
2. Circuit Breaker, Auxiliary Generator
3. Receptacle, 110 Volts, Alternating Current
4. Foam Flush Valve Control
5. Switch, Dome Light
6. Discharge Valve Control
7. Discharge Connection, 2-1/2 inch NH
8. Discharge Hose Line Drain Valve Control
9. Relief Valve Drain Valve Control
10. Suction Connection, 4-1/2 inch NH
11. Foam Tank Drain Valve Control
12. Manual Pump Gearshift Control (Stationary or Pump and Roll)
13. Disengage Electric Shift Unit Control

ME 4210-217-12 2-2

Figure 2-2 Right control panel

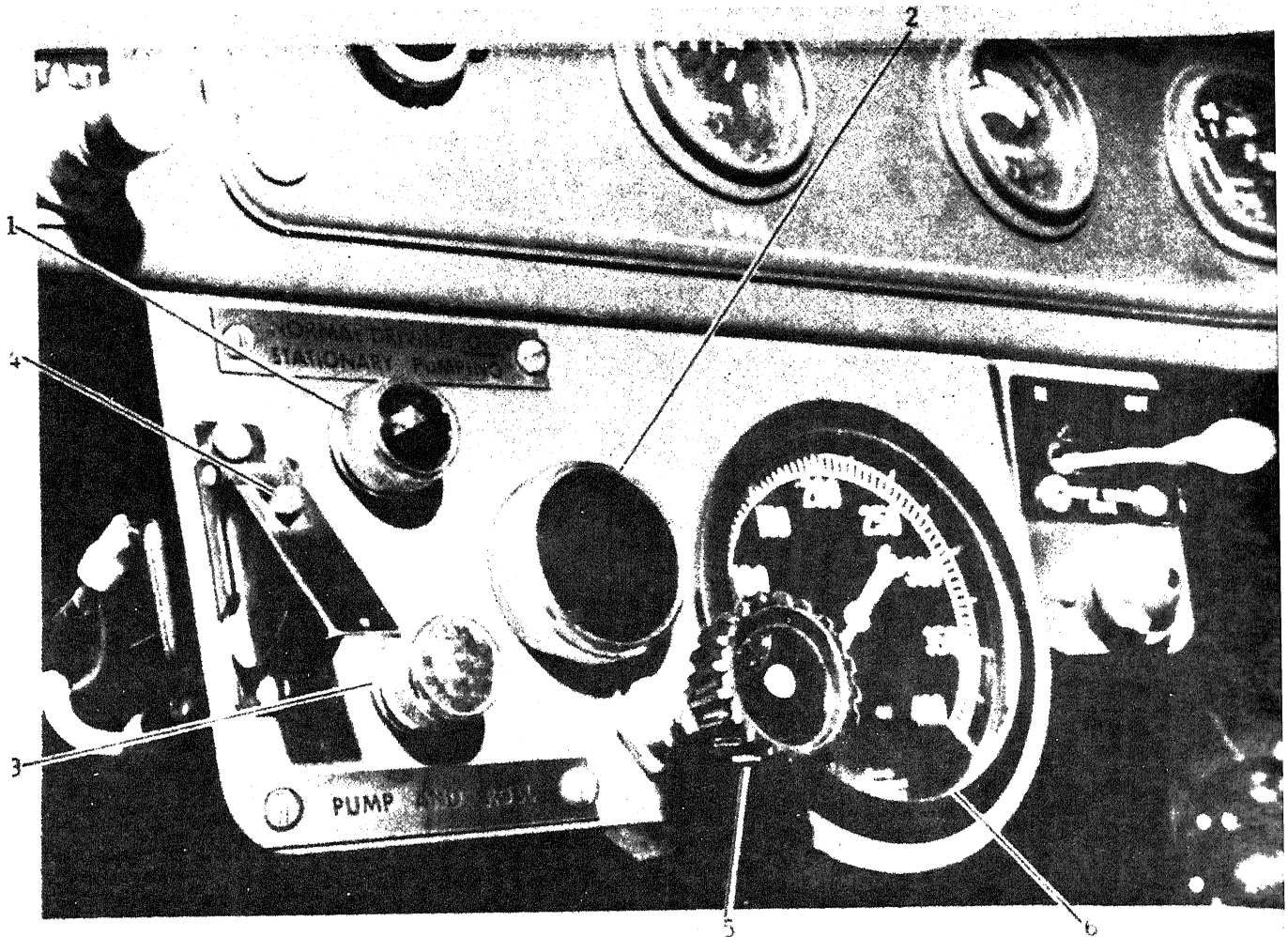
bb. *Red Indicator Light (3).* The light illuminates when the electric shift unit has actually shifted fire pump drive gear to high-speed for pump and roll mode. The light will not illuminate if the shifting was not completed, or if the collar shifting gear failed to mesh with pump high-speed drive gear, or if transmission gearshift lever is not in First (low) gear. Normally, the light is "ON" while the electric shift unit is in pump and roll mode. When the electric shift unit is shifted to stationary pumping (or normal driving) mode, the light goes "OFF"

bc. *Control Switch (4).* A two-position switch which permits the operator to select stationary pumping mode, or pump and roll mode, without leaving the cab. A safety guard over the switch prevents accidental shifting of the electric shift unit. Normally, the switch is always in the stationary pumping (or

normal driving) position. When the switch is in stationary pumping position, current is supplied from the accessory switch (fig. 32, TM 9-2320-209-10) when in "ON" position, to an automotive-type actuator of the electric shift unit, which shifts the fire pump drive gear to low speed (for stationary pumping). When the switch is placed in the pump and roll position, current is supplied to the same automotive-type actuator, which shifts the pump drive gear to high-speed (for pump and roll).

bd. *Steady Valve (5).* The valve eliminates fluctuation of pressure gage needle (6) during pump and roll operation. The operation of steady valve control is the same as steady valve control (30 fig 2-1)

be. *Pressure Gage (6).* The gage indicates the discharge pressure of fire pump during all operations

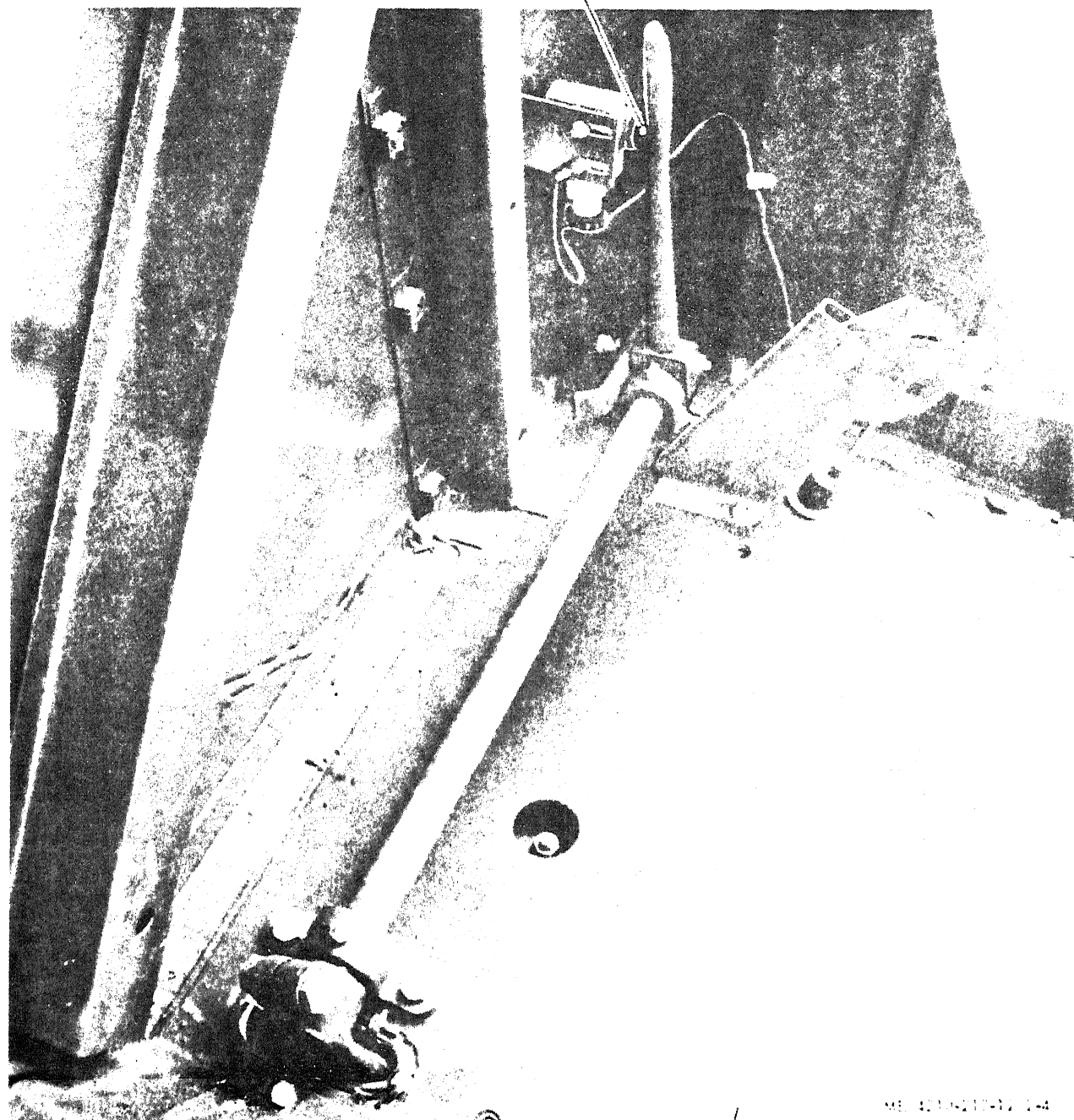


1. RED INDICATOR LIGHT
2. STATIONARY PUMPING MODE
3. CONTROL SWITCH
4. STEADY VALVE
5. PRESSURE GAGE

6. PRESSURE GAGE

ME 4310-209-10-2-1

Figure 2-3. Electric shift control panel



ME 1010210-17 1-4

Figure 2-4 Pump engaged red indicator light switch.

bf. Pump Engaged Switch (fig 2-4) A single pole, push switch, with ON-OFF positions, which controls operation of the indicator light pump engaged (2 fig 2-3). When the power-takeoff shift lever is in the "ENGAGE" position, the lever depresses the plunger of switch, closing the circuit and illuminating the red indicator light

bj. Spotlight Switch (fig 2-5) A single pole,

single throw toggle switch, with ON-OFF positions, which controls operation of the front and rear spotlights. Each spotlight is equipped with a switch for individual control of the light.

bh. Siren and Warning Lights Switch. A single pole, single throw toggle switch, with ON-OFF positions, which controls operation of the siren light and warning light.

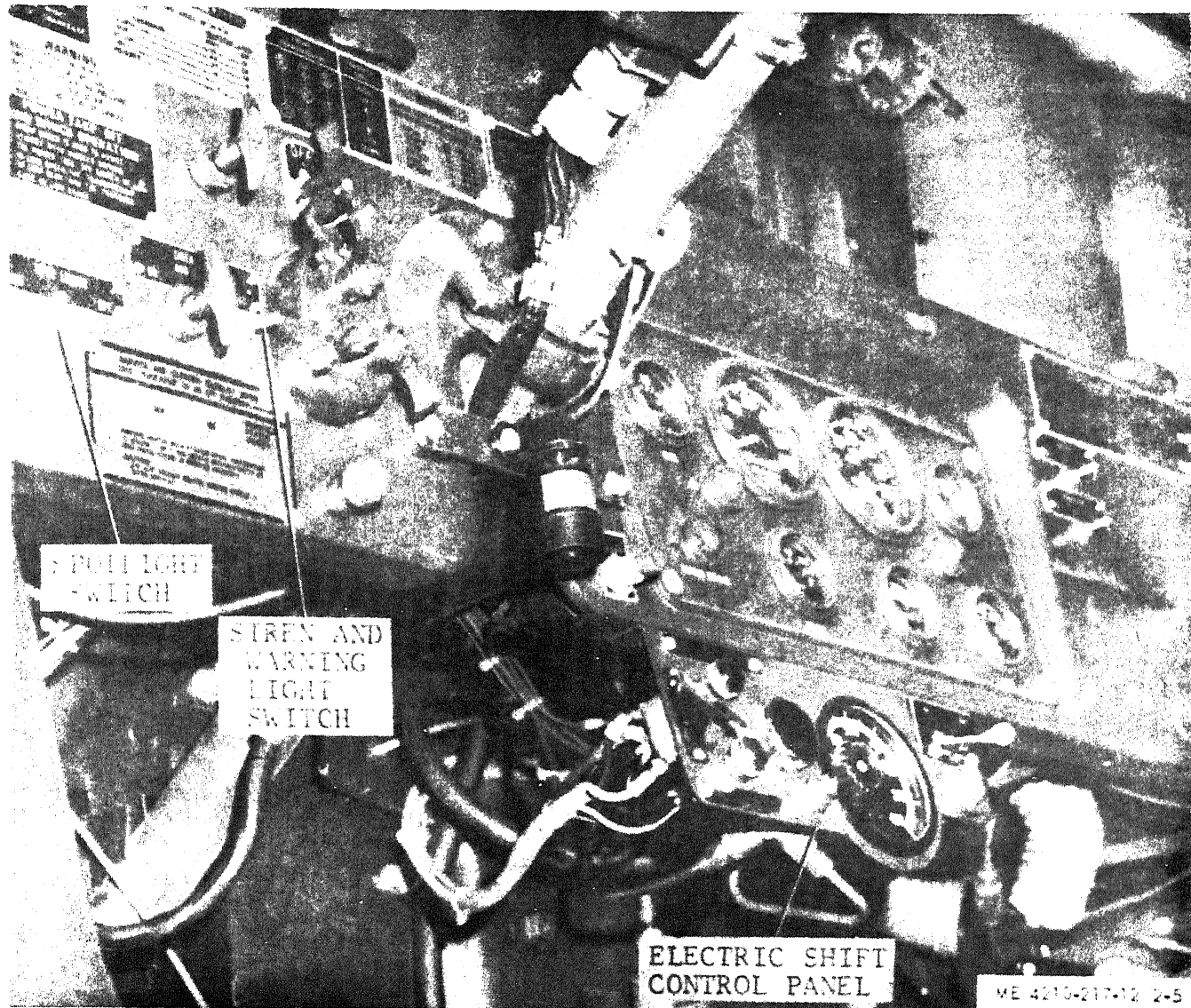


Figure 2-5 Controls and instruments

bi. Heater Switch. A single pole, double throw toggle switch, with FULL SPEED-OFF-HALF SPEED positions, which controls operation of the heater motor

bj. Defroster Switch. A single pole, double throw toggle switch, with FULL SPEED-OFF-HALF SPEED positions, which controls operation of the defroster motor.

bk. Siren Foot Switch. A single pole, push switch, with ON-OFF positions, which controls operation of the siren motor. The switch is operated by the passenger in cab.

bl. Siren Hand Switch. A single pole, push button switch, with On-Off positions, which controls operation of the siren motor.

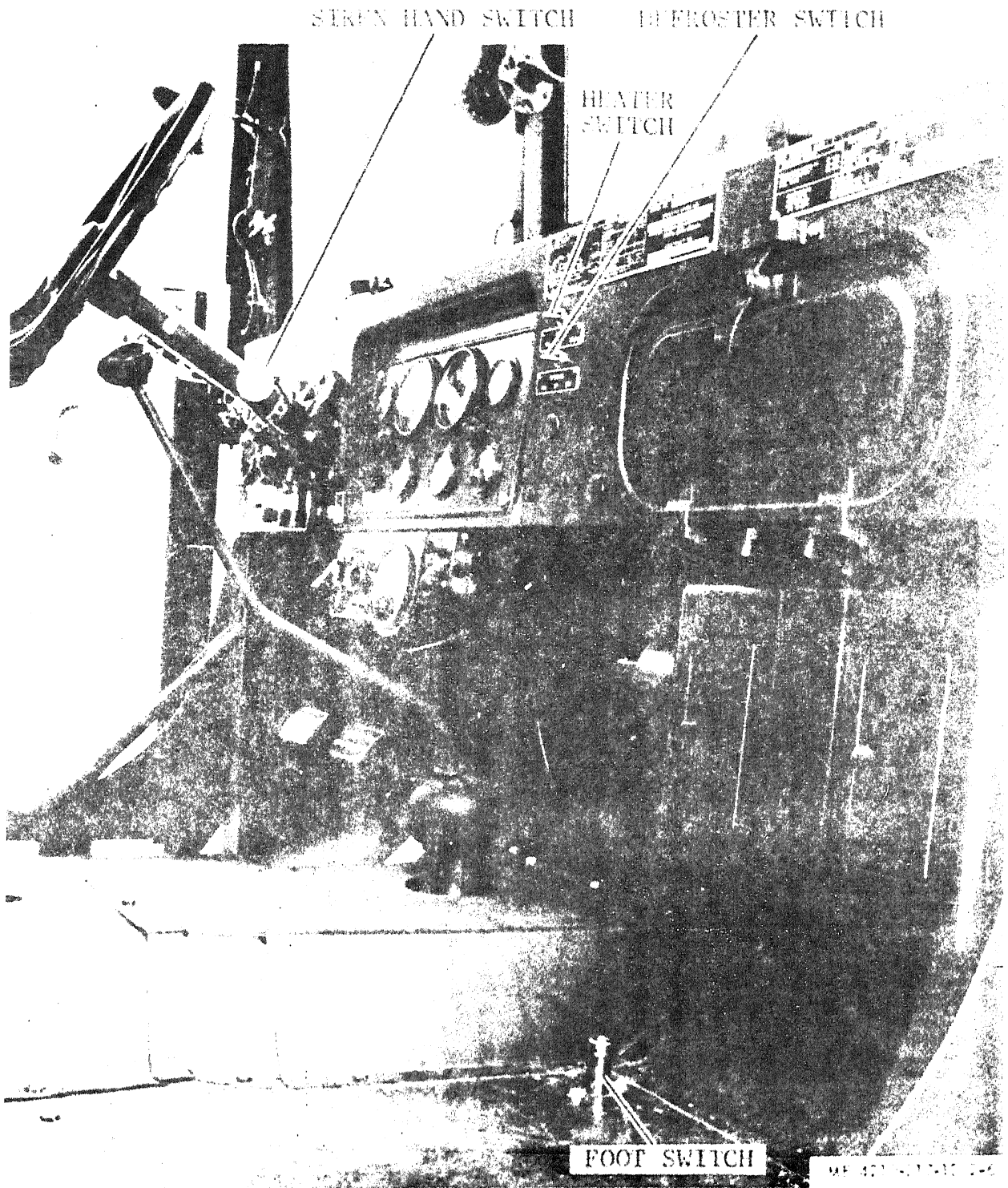


Figure 2-6. Instrument panel (right side inside cab).

Foam Tank Valve Remote Control (fig. 2-7). Valve controls the flow of liquid foam from foam tank to metering valve (11 fig. 2-1). To open valve, place control lever to 3 o'clock position. To close valve, place control lever to 6 o'clock position.

Turret Nozzle Discharge Valve Control. The control lever controls water flow from pressure side of fire pump to turret nozzle. To open valve, place control

lever in the rearward position. To close valve, place control lever in the forward position.

bo. Horizontal Friction Lock Control. The friction lock prevents manual rotation of the turret nozzle. To rotate the nozzle, turn control knob counter-clockwise. To lock the nozzle in the desired horizontal position, or in the storage position, turn control knob clockwise.

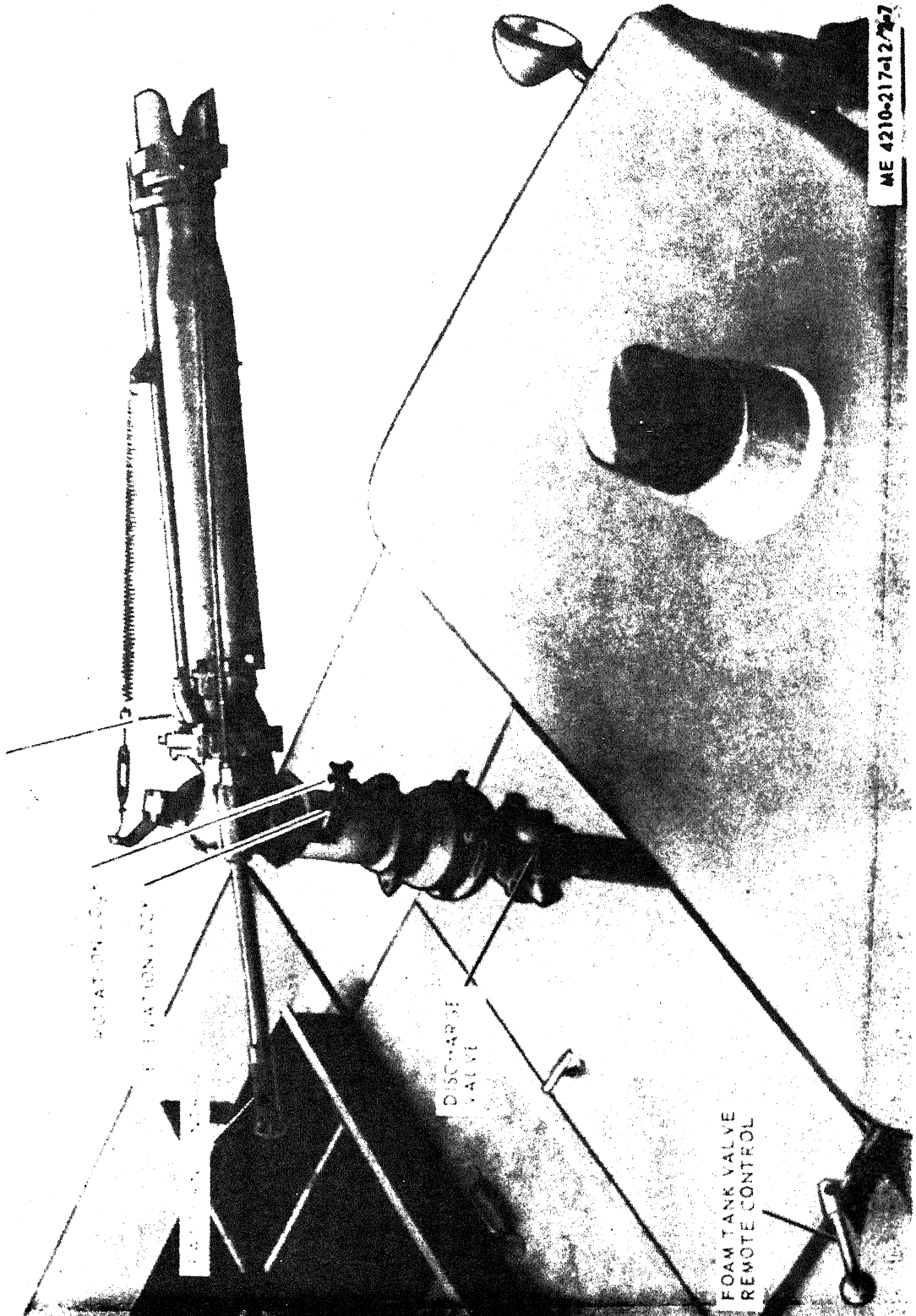


Figure 2-7. Turret assembly.

bp. Vertical Friction Lock Control. The friction locks prevents manual elevation or lowering of the turret nozzle. To elevate or lower the nozzle, place the control lever in the downward position. To lock the nozzle in the desired vertical position, or in the storage position, place the control lever in the upward position.

bq. Water-Foam Barrel Selector Valve. This control selects the barrel for the desired discharge combination for water stream, water fog, or fog foam, (left barrel). Set the selector valve on "WATER". For foam stream and foam spray, set the selector valve on "FOAM" (right barrel).

br. Discharge Stream Control. This is a twist-grip

control located on the handle of the turret nozzle. It controls the configuration of the discharge stream from either barrel. Turn the control clockwise or counter-clockwise until the desired stream is achieved.

bs. Brake Control (fig 2-8) The brake prevents the hose reel from unwinding. Also, the brake can be adjusted to apply a drag on the hose reel to prevent hose line from backlashing when unwinding. To apply brake, turn control clockwise. To release the brake or adjust for drag, turn control counter-clockwise.

bt. Crank. The crank is provided for use in rewinding hose reel when electric rewind motor is not used.

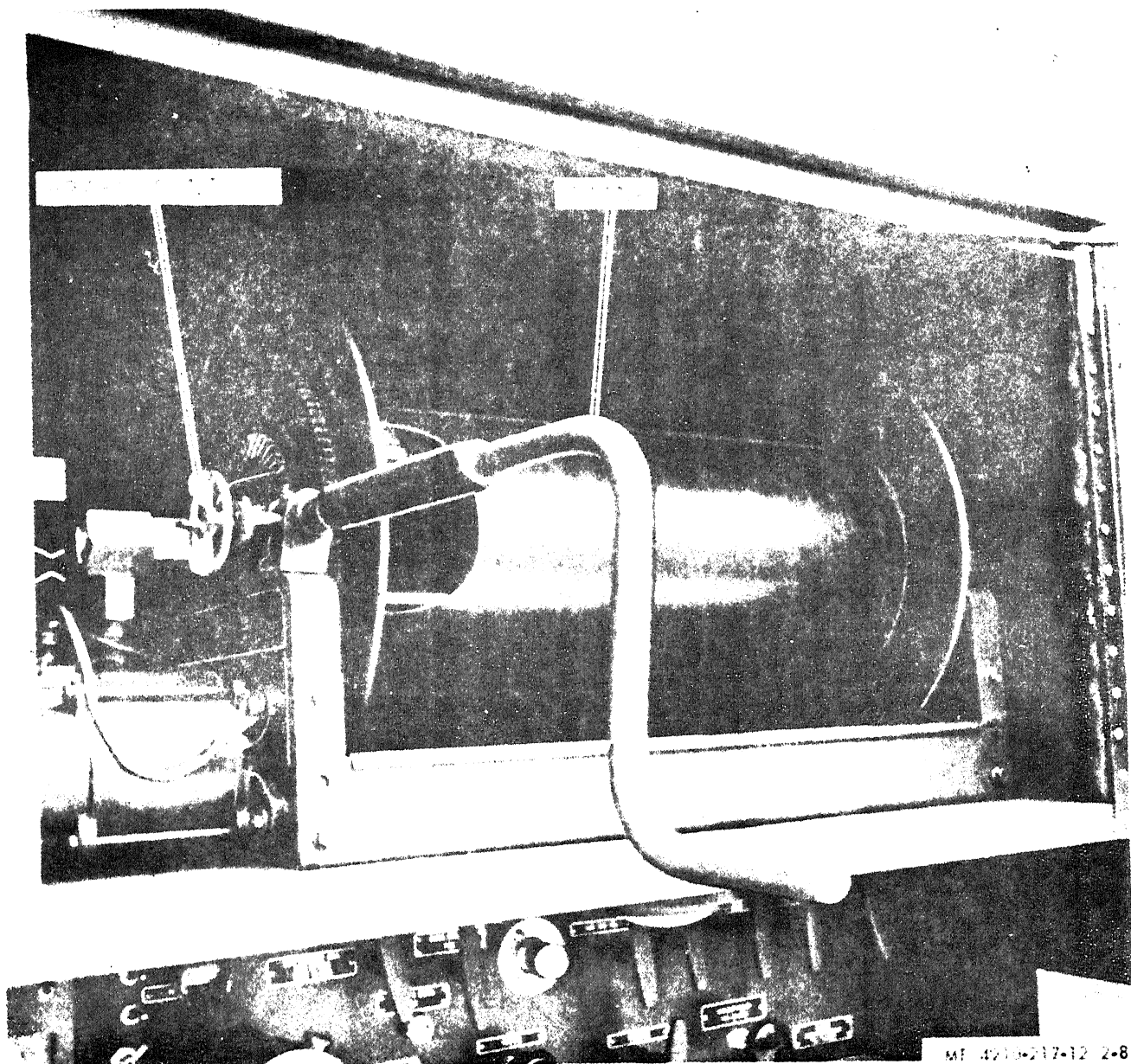


Figure 2-8. Hose reel, brake control and crank.

bu. *Water Tank Drain Valve Control (fig. 2-9).* The valve drains the water tank. To open valve, turn control counter-clockwise. To close valve turn control clockwise.

bv. *Battery Charging Receptacles (fig. 2-10).* Two 24 volt DC receptacles are located on right rear of

fire truck. The receptacles are for use in charging the storage batteries, and for use in slave starting the engine (refer to para 125, TM 9-2320-209-10). The round receptacle is for Army use and rectangular receptacle is for Air Force use.

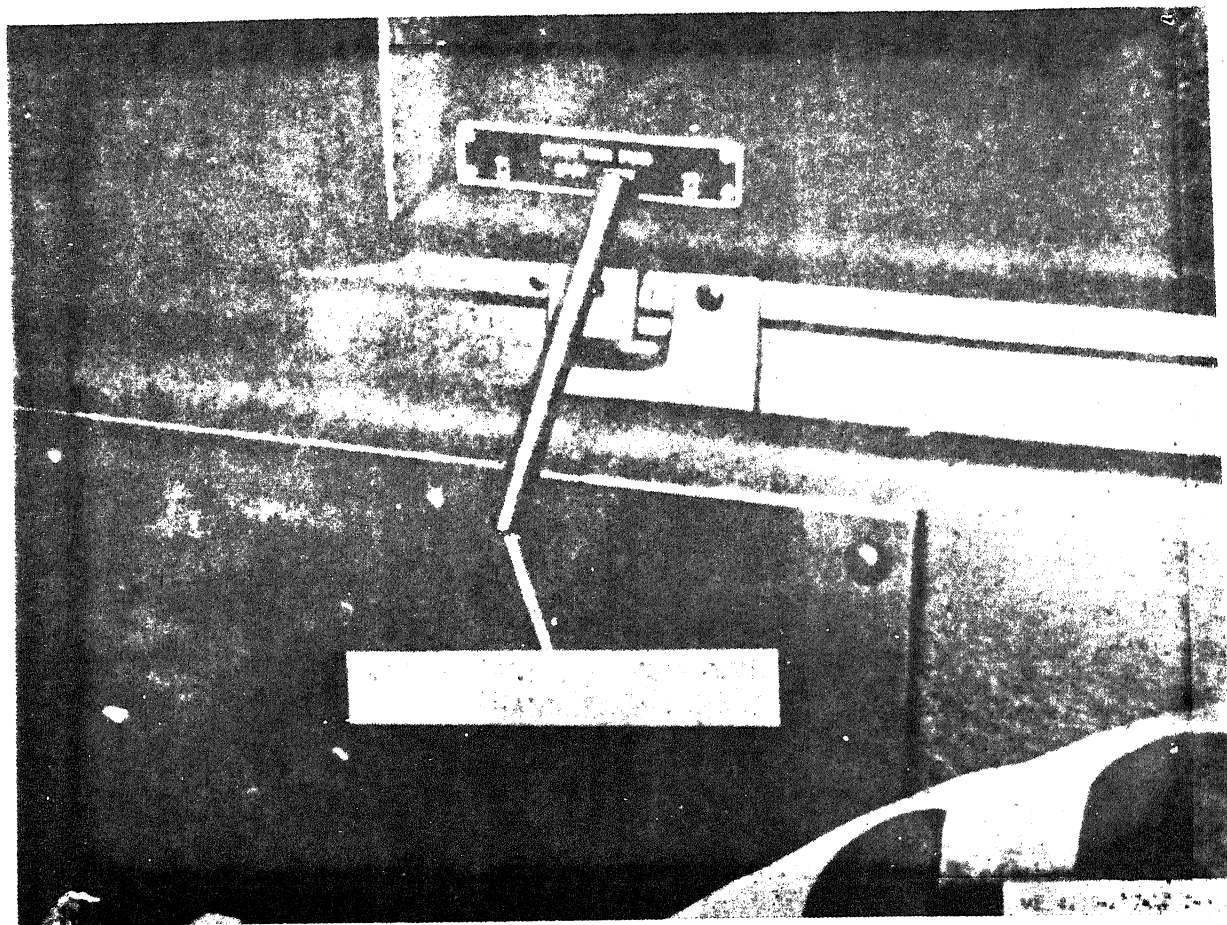


Figure 2-9. Water tank drain valve control.

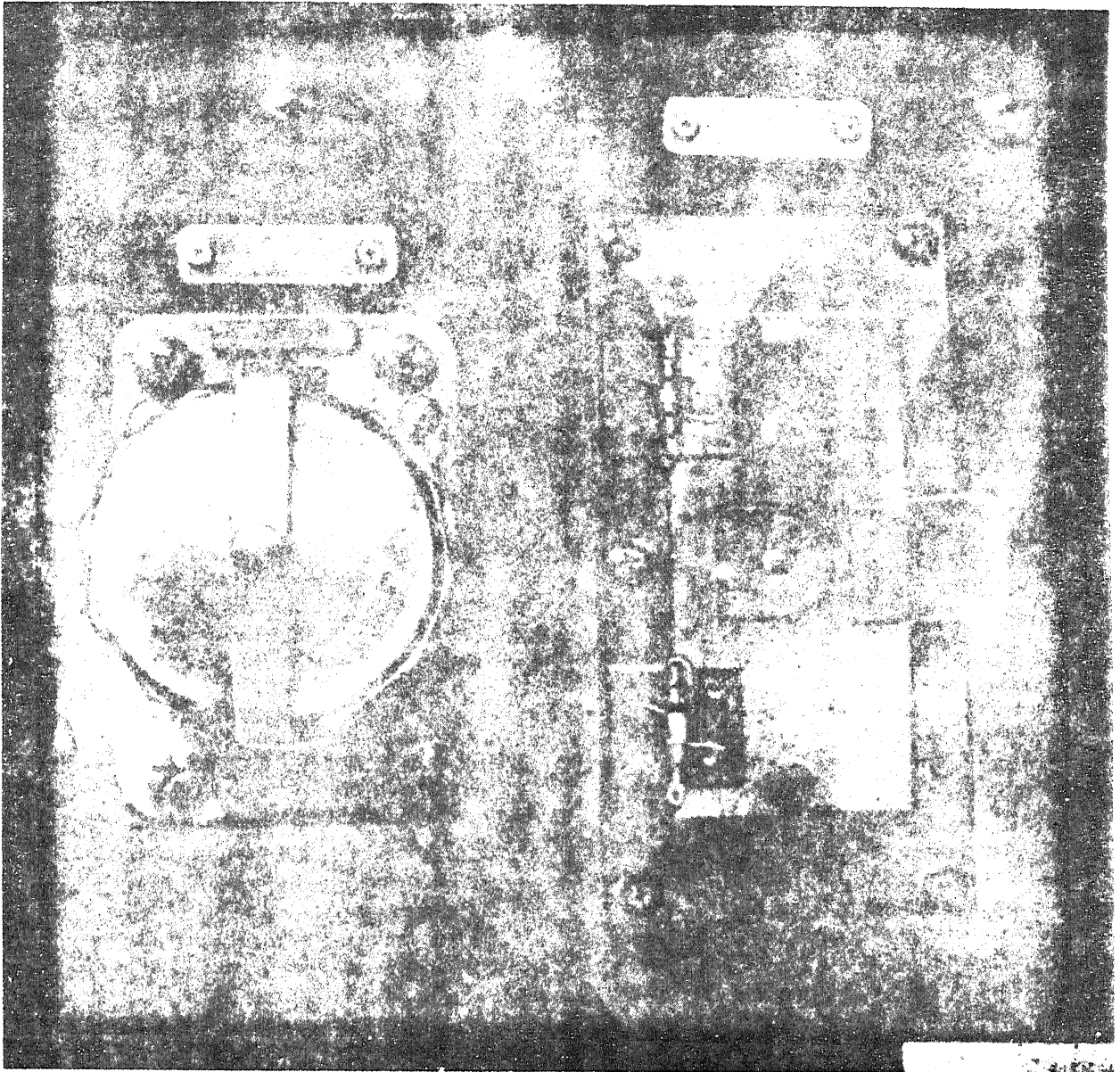


Figure 2-10 Battery charging receptacles

Section III. OPERATION UNDER USUAL CONDITIONS

2-5. General

a. The instructions in this section are for the information and guidance of personnel responsible for operation of the truck, fire fighting, class 530C.

b. The operator must know how to perform every operation of which the truck, fire fighting, class 530C is capable. This section and section III of chapter 2, TM 9-2320-209-10, contains instructions on starting and stopping the truck, fire fighting, class 530C, and on coordinating the basic motions to perform the

specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

c. The term "desired discharge pressure," indicated in paragraphs 2-8 through 2-11, is defined as the sum of the nozzle pressure (normally 50 PSI for water nozzles and 100 PSI for foam nozzles), plus the friction loss in any given hose layout, plus the back pressure if hose is layed or advanced to a level above dis-

charge outlet of pump. The desired discharge pressure is reflected as the pressure gage reading. Refer to TM 5-315 for method to use in computing friction loss and back pressure of hose lines.

2-6. Starting Engine and Fire Pump

a. Perform the daily maintenance checks and services prescribed in chapter 2, section III, TM 9-2320-209-10 before starting the engine.

b. Perform the daily maintenance checks and services prescribed in Table 3-1 before starting the fire pump.

c. Refer to paragraphs 43c and 155 of TM 9-2320-209-10 for starting the multifuel engine.

d. Refer to paragraphs 2-8 through 2-11, as applicable, for starting the fire pump.

2-7. Stopping Fire Pump and Engine

a. Refer to paragraph 2-14 or 2-15, as applicable, for shutting down the fire pump.

b. Refer to paragraph 47 of TM-2320-209-10 for stopping the multifuel engine.

c. Perform the "after operation" maintenance checks and services prescribed in table 3-1 for the fire truck.

d. Perform the "after operation" maintenance checks and services prescribed in table 12 of TM 9-2320-209-10 for the model M45A2 truck chassis.

2-8. Pumping From Fire Hydrant—Stationary Mode

a. *Step 1.* Start engine (para 2-6).

b. *Step 2.* Set parking brake by pulling the parking brake lever upwards firmly.

c. *Step 3.* Close all drain and control valves.

d. *Step 4.* Remove cap from left or right suction connection (21 fig. 2-1 or 10 fig. 2-2) and connect 4½ inch suction hose to suction connection and fire hydrant.

e. *Step 5.* Open hydrant valve slowly and observe compound gage (36 fig. 2-1) pressure reading

f. *Step 6.* Remove caps from discharge connections (5 and 26 fig. 2-1 and/or 7 fig. 2-2) and connect the required 2½ inch hose lines to discharge connections.

NOTE

As a general rule, keep the transfer valve control in pressure (series) position when using not more than two pumps. Discharge valves and in volume (parallel) position when using more than two discharge valves. During operations if it becomes necessary to change the position of transfer valve control, reduce pump discharge pressure to at least 75 PSIG for ease in operating the control.

g. *Step 7.* Place transfer valve control (14 fig. 2-1) in pressure or volume position. Push-in control for pressure or pull-out control for volume.

h. *Step 8.* Be sure control switch (1 fig. 2-3) is in stationary pumping position and green indicator

light (2 fig. 2-3) is "ON".

i. *Step 9.* Depress clutch pedal and complete steps 10 thru 13 in the sequence listed.

j. *Step 10.* Place transfer shift lever in NEUTRAL position.

k. *Step 11.* Place transmission gearshift lever in FOURTH gear.

l. *Step 12.* Release power-takeoff shift lever lock and shift PTO lever in ENGAGE position. Red indicator light (4 fig. 2-3) will illuminate indicating that power-take off unit will be engaged when clutch pedal is released.

m. *Step 13.* Release clutch pedal slowly engaging fire pump drive for stationary pumping mode.

n. *Step 14.* Adjust pressure relief valve for desired discharge pressure by completing steps 15 through 20 in sequence listed.

o. *Step 15.* Turn relief valve ON-OFF control (23 fig. 2-1) to the "OFF" position.

p. *Step 16.* Open at least one discharge valve and hose nozzle.

q. *Step 17.* Turn throttle control (10 fig. 2-1) counterclockwise to accelerate engine until pressure gage (34 fig. 2-1) indicates the desired discharge pressure.

NOTE

Do not close valve as this will effect pressure gage reading

r. *Step 18.* Turn steady valve control (30, fig. 2-1) clockwise to eliminate fluctuation of pressure gage needle.

WARNING

Do not operate fire pump during fire fighting operation with relief valve ON-OFF control in the "OFF" position.

s. *Step 19.* Turn relief valve ON-OFF control (23 fig. 2-1) to the "ON" position.

t. *Step 20.* Watch pressure gage (34 fig. 2-1) and adjust pressure relief pilot valve control (6 fig. 2-1) as indicated below:

(1) If gage reading drops below the desired discharge pressure, turn control (6) clockwise until pressure increases to desired value.

(2) If gage reading does not drop, slowly turn control (6) counter-clockwise until gage pressure drops about 5 or 10 PSIG below desired pressure. Then gradually turn control (6) clockwise until gage needle is steady at desired pressure.

(3) To readjust the relief valve at different pressure repeat the procedure in step 14.

CAUTION

As a precautionary measure, the compound gage reading (36, fig. 2-1) should not be permitted to drop below 10 PSIG. This will permit a 5 PSIG error in gage accuracy without the danger of collapsing a water main. It may be necessary to

sacrifice the discharge pressure in order to prevent damage to a water main.

u. *Step 21.* Open all discharge valves (7, 29 or 31 fig. 2-1) that are connected to hose lines.

NOTE

Do not open valve quickly, or more than is necessary, as this will rapidly reduce engine coolant temperature below 160°F, and may damage engine.

v. *Step 22.* Check periodically engine temperature gage, mounted on dash panel, for normal engine-operating temperature range of 160° to 185°F. If engine coolant temperature exceeds 185°F, pull-out gradually auxiliary cooler valve control (19 fig. 2-1) to open valve until temperature is reduced to within normal operating temperature range.

CAUTION

Fire pump will heat up rapidly if pump is operated with all discharge valves closed. Prolonged operation will cause damage from overheating.

w. *Step 23.* In the event it becomes necessary to close all discharge valves or hose nozzles while fire pump is operating, open a discharge hose line drain valve (24 or 25, fig. 2-1 or 8 fig. 2-2), and discharge a stream of water to prevent pump from overheating. If the discharge connection is capped, open the discharge valve before opening drain valve.

x. *Step 24.* Shut down fire pump (para 2-14).

2-9. Pumping From Draft— Stationary Mode

a. *Step 1.* Start engine (para 2-6).

b. *Step 2.* Position fire truck as near as possible to water supply.

c. *Step 3.* Set parking brake by pulling the parking brake lever upwards firmly.

d. *Step 4.* Close all drain and control valves.

NOTE

Make sure suction connections are tight. Avoid humps or sharp bends in suction hose. Make sure no part of hose is higher than pump suction inlet. Air pockets in suction hose will cause loss of prime, or erratic pump action, which will reduce pump capacity.

e. *Step 5.* Remove cap from left or right suction connection (21 fig. 2-1 or 10 fig. 2-2) and connect 4½ inch suction hose to suction connection.

f. *Step 6.* Attach strainer to intake end of suction hose.

g. *Step 7.* Immerse the suction strainer at least two feet below water surface to prevent pump from drawing air.

NOTE

Whirlpools forming above suction strainer indicates that strainer is too close to surface of water. Also, make sure suction strainer is far enough from bottom to prevent pumping sand, gravel and other foreign matter.

h. *Step 8.* Remove caps from discharge connections (5 and 25 fig. 2-1 and/or 7 fig. 2-2) and connect the 2½ inch hose lines to discharge connections.

NOTE

As a general rule, keep the transfer valve control in pressure (series) position when using not more than two pump discharge valves and in volume (parallel) position when using more than two discharge valves. During operations if it becomes necessary to change the position of transfer valve control, reduce pump discharge pressure to at least 75 PSIG for ease in operating the control.

i. *Step 9.* Place transfer valve control (14 fig. 2-1) in pressure or volume position. Push-in control or pull-out control for volume.

j. *Step 10.* Be sure control switch (4 fig. 2-3) is in stationary pumping position and green indicator light (1 fig. 2-3) is "ON".

k. *Step 11.* Depress clutch pedal and complete steps 12 through 15 in the sequence listed.

l. *Step 12.* Place transfer shift lever in NEUTRAL position.

m. *Step 13.* Place transmission gearshift lever in FOURTH gear.

n. *Step 14.* Release power-takeoff shift lever lock and shift PTO lever in ENGAGE position. Red indicator light (2 fig. 2-3) will illuminate indicating that power-takeoff unit will be engaged when clutch pedal is released.

o. *Step 15.* Release clutch pedal slowly engaging fire pump drive for stationary pumping mode.

CAUTION

Do not operate priming pump motor continuously for more than 30 seconds. If priming pump does not prime fire pump and discharge a solid stream of water in 30 seconds, stop both priming pump and fire pump, and check for leaks. Allow at least a two-minute cool-off period before operating the motor again.

p. *Step 16.* Pull-out primer valve control (4 fig. 2-1) and operate priming pump until it emits a solid stream of water through its discharge pipe.

q. *Step 17.* Adjust pressure relief valve for desired discharge pressure by completing steps 18 through 23 in sequence listed.

r. *Step 18.* Turn relief valve ON-OFF Control (23 fig. 2-1) to the "OFF" position.

s. *Step 19.* Turn throttle control (10 fig. 2-1) counter-clockwise to accelerate engine until pressure gage (34 fig. 2-1) indicates the desired discharge pressure.

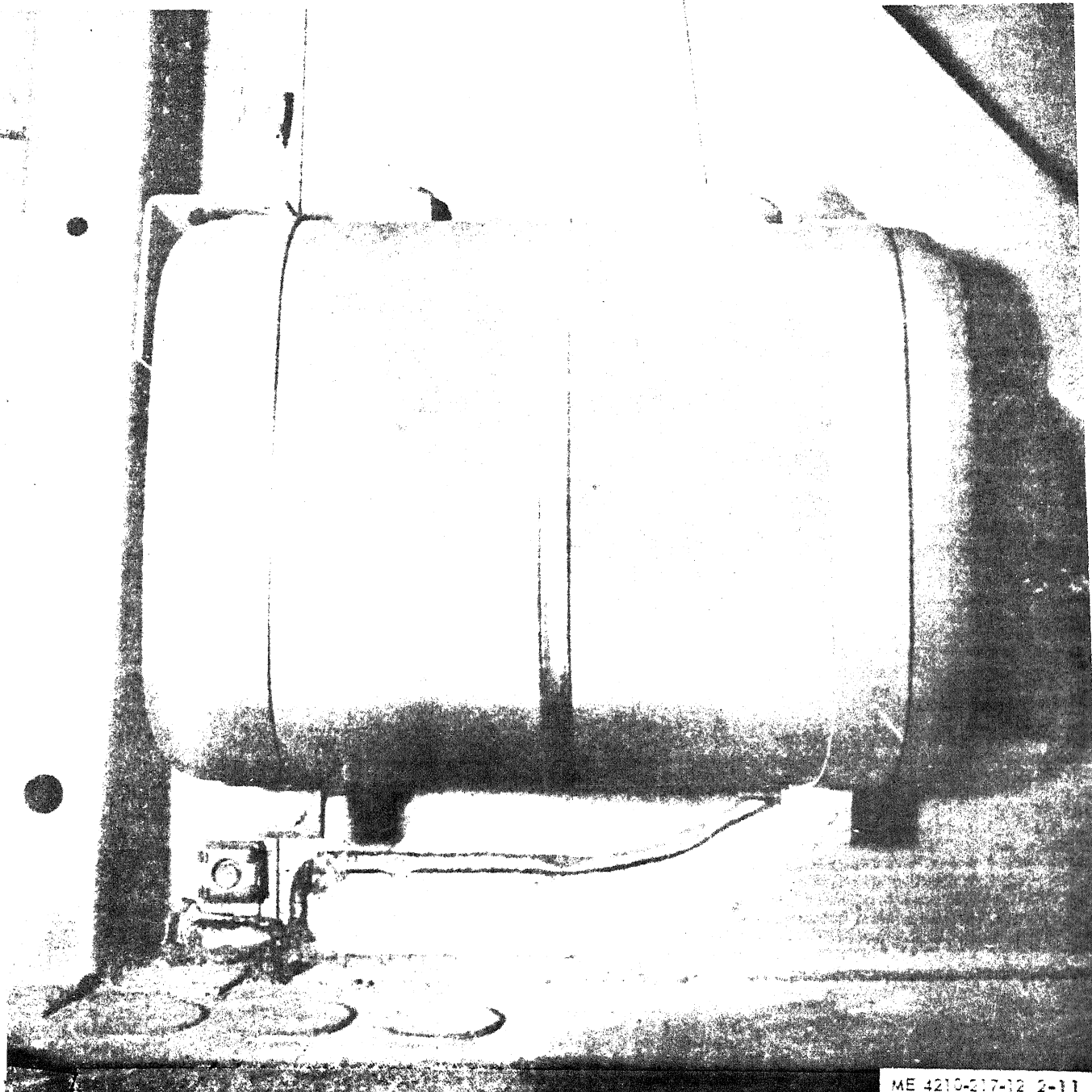
t. *Step 20.* As the engine is accelerated in Step 19, open at least one discharge valve and hose nozzle, or if applicable, slightly crack turret nozzle discharge valve.

NOTE

Do not close valve as this affects pressure gage reading.

u. *Step 21.* Turn steady valve control (30 fig. 2-1) clockwise to eliminate fluctuation of pressure gage needle.

PRIMING TANK FILL CAP



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Figure 2-11 Priming tank fill cap.

WARNING

Do not operate fire pump during fire fighting operation with relief valve ON-OFF Control in the "OFF" position.

v. Step 22. Turn relief valve ON-OFF Control (23 fig. 2-1) to the "ON" position.

w. Step 23. Watch pressure gage (34 fig. 2-1) and adjust pressure relief pilot valve control (6 fig. 2-1) as indicated below.

(1) If gage reading drops below the desired discharge pressure, turn Control (6) clockwise until pressure increases to desired value.

(2) If gage reading does not drop, slowly turn Control (6) counter-clockwise until gage pressure drops about 5 or 10 PSIG below desired pressure. Then, gradually turn Control (6) clockwise until gage needle is steady at desired pressure.

(3) To readjust the relief valve at different pres-

sure, repeat the procedure in Step 17.

x. *Step 24.* Open all discharge valves (7, 29 or 31 fig. 2-1) that are connected to hose lines.

NOTE

Do not open valve quickly, or more than is necessary, as this will rapidly reduce engine coolant temperature below 160°F, and may damage engine.

y. *Step 25.* Check periodically engine temperature gage, mounted on dash panel, for normal engine-operating temperature range of 160° to 185°F. If engine coolant temperature exceeds 185°F, pull-out gradually Auxiliary Cooler Valve Control (19 fig. 2-1) to open valve until temperature is reduced to within normal operating temperature range.

CAUTION

Fire pump will heat up rapidly if pump is operated with all discharge valves closed. Prolonged operation will cause damage from over heating.

z. *Step 26.* In the event it becomes necessary to close all discharge valve or hose nozzles while fire pump is operating, open a discharge hose line drain valve (24 or 25 fig. 2-1 or 8 fig. 2-2) and discharge a stream of water to prevent pump from overheating. If the discharge connection is capped, open the discharge valve before opening drain valve.

aa. *Step 27.* Shut down fire pump (para 2-14).

2-10. Pumping from Water Tank — Stationary Mode

a. *Step 1.* Start engine (para 2-6).

b. *Step 2.* Set parking brake by pulling the parking brake lever upwards firmly.

c. *Step 3.* Close all drain and control valves. Make sure suction caps (21 fig. 2-1 and 10 fig. 2-2) are tight and water tank is full.

d. *Step 4.* Unwind one or both 1 inch hose reel hose lines or firefighter man turret nozzle.

e. *Step 5.* Place transfer valve control (14 fig. 2-1) in pressure position.

f. *Step 6.* Open tank suction valve control (16 fig. 2-1) to allow water to flow from tank to pump.

g. *Step 7.* Be sure Control Switch (4 fig. 2-3) is in stationary pumping position and green indicator light (1 fig. 2-3) is "ON"

h. *Step 8.* Depress clutch pedal and complete steps 9 through 12 in the sequence listed.

i. *Step 9.* Place transfer shift lever in NEUTRAL position.

j. *Step 10.* Place transmission gearshift lever in FOURTH gear.

k. *Step 11.* Release power-takeoff shift lever lock and shift PTO lever in ENGAGE position. Red indicator light (2 fig. 2-3.) will illuminate indicating that power-take-off unit will be engaged when clutch pedal is released.

l. *Step 12.* Release clutch pedal slowly engaging fire pump drive for stationary pumping mode.

CAUTION

Do not operate priming pump motor continuously for more than 30 seconds. If priming pump does not prime fire pump and discharge a solid stream of water in 30 seconds, stop both priming pump and fire pump and check for leaks. Allow at least a two-minute cool off period before operating the motor again.

m. *Step 13.* Pull-out primer valve control (4 fig. 2-1) and operate priming pump until it emits a solid stream of water through its discharge pipe.

n. *Step 14.* Adjust pressure relief valve for desired discharge pressure by completing steps 15 through 20 in sequence listed.

o. *Step 15.* Turn relief valve ON-OFF control (23 fig. 2-1) to the "OFF" position.

p. *Step 16.* Turn throttle control (10 fig. 2-1) counter-clockwise to accelerate engine until pressure gage (34 fig. 2-1) indicates the desired discharge pressure.

q. *Step 17.* As the engine is accelerated in step 16, open at least one discharge valve (13 or 15 fig. 2-1) and hose nozzle, or if applicable, slightly crack turret nozzle discharge valve.

NOTE

Do not close valve as this will affect pressure gage reading.

r. *Step 18.* Turn steady valve control (30 fig. 2-1) clockwise to eliminate fluctuation of pressure gage needle.

WARNING

Do not operate fire pump during fire fighting operation with relief valve ON-OFF Control in the "OFF" position.

s. *Step 19.* Turn relief valve ON-OFF control (23 fig. 2-1) to the "ON" position.

t. *Step 20.* Watch pressure gage (34 fig. 2-1) and adjust pressure relief valve control (6 fig. 2-1) as indicated below:

(1) If gage reading drops below the desired discharge pressure, turn control (6) clockwise until pressure increases to desired value.

(2) If gage reading does not drop, slowly turn control (6) counter-clockwise until gage pressure drops about 5 or 10 PSIG below desired pressure. Then gradually turn control (6) clockwise until gage needle is steady at desired pressure.

(3) To readjust the relief valve at different pressure, repeat the procedure in step 14.

u. *Step 21.* Open the other hose reel discharge valve control (13 or 15 fig. 2-1) if required or if applicable, open turret nozzle discharge valve.

v. *Step 22.* Shut down fire pump (para 2-14.)

2-11. Pumping from Water Tank — Pump and Roll Mode

- a. *Step 1.* Start engine (para 2-6).
- b. *Step 2.* Set parking brake by pulling the parking brake lever upwards firmly.
- c. *Step 3.* Close all drain and control valves. Make sure suction caps (21 fig. 2-1 and 10 fig. 2-2) are tight and water tank is full.
- d. *Step 4.* Unwind one or both .1 inch hose reel hose lines or firefighter man turret nozzle.
- e. *Step 5.* Place transfer valve control (14 fig. 2-1) in pressure position.
- f. *Step 6.* Open tank suction valve control (16 fig. 2-1) to allow water to flow from tank to pump.
- g. *Step 7.* Be sure control switch (4 fig. 2-3) is in Stationary Pumping position and green indicator light (1 fig. 2-3) is "ON"
- h. *Step 8.* Depress clutch pedal and complete steps 9 through 26 in the sequence listed. Steps 15 through 23 should be performed by assistant operator or firefighter to avoid loss of time in operator dismounting and mounting vehicle.
- i. *Step 9.* Place transfer shift lever in NEUTRAL position.

NOTE

Electric shift unit will not shift pump drive gear to pump and roll unless transmission is in FIRST gear.

- j. *Step 10.* Place transmission gearshift lever in FIRST (LOW) gear.
- k. *Step 11.* Release power-takeoff shift lever lock and shift PTO lever in ENGAGE position. Red indicator light (2 fig. 2-3) will illuminate indicating that power-takeoff unit will be engaged when clutch pedal is released.

CAUTION

To prevent damage to fire pump, do not operate fire truck in Pump and Roll Mode unless Amber Indicator Light is "ON".

- l. *Step 12.* Place control switch (1 fig. 2-3) in PUMP and ROLL position. The green indicator light will go "OFF" and the amber indicator light (3 fig. 2-3) will illuminate to indicate that electric shift unit has shifted pump drive gear from low speed (for stationary pumping) to high speed for pump and roll operation.
- m. *Step 13.* If amber indicator light (3 fig. 2-3) does not come "ON", a butt-tooth condition between shifting collar and drive gear in pump gear may be the cause. To correct butt-tooth condition, proceed with (1) through (5) below:
 - (1) Place control switch (4) in stationary pumping position. The green indicator light (1) should come "ON"
 - (2) Release and quickly depress clutch pedal to allow pump gears to rotate.

(3) Wait momentarily for gears to stop rotating.

(4) Place control switch (4) in pump and roll position.

(5) If necessary, repeat the above procedure several times until amber indicator light (3) comes "ON". Then, if amber indicator light does not come "ON", have assistant operator or firefighter manually shift pump gears as indicated below:

(a) Pull-out shift lever control (13 fig. 2-2) to disengage the electric shift unit.

(b) Push-in gearshift lever control (12 fig. 2-2) to shift collar gear from low speed (for stationary pumping) to high speed for pump and roll operation.

n. *Step 14.* Release clutch pedal slowly engaging fire pump drive but not placing vehicle in motion.

CAUTION

Do not operate priming pump motor continuously for more than 30 seconds. If priming pump does not prime fire pump and discharge a solid stream of water in 30 seconds, stop both priming pump and fire pump and check for leaks. Allow at least a two-minute cooloff period before operating the motor again.

o. *Step 15.* Pull-out primer valve control (4 fig. 2-1) and operate priming pump until it emits a solid stream of water through its discharge pipe.

p. *Step 16.* Adjust pressure relief valve for desired discharge pressure by completing steps 17 through 22 in sequence listed.

q. *Step 17.* Turn relief valve ON-OFF control (2 fig. 2-1) to the "OFF" position.

r. *Step 18.* Turn throttle control (10 fig. 2-1) counter-clockwise to accelerate engine until pressure gage (34 fig. 2-1) indicates the desired discharge pressure.

s. *Step 19.* As the engine is accelerated in step 18 open one or both discharge valves (13 and/or 15 fig. 2-1) and open at least one hose nozzle. Or slightly crack turret nozzle discharge valve.

NOTE

Do not close valve as this effects pressure gage reading

t. *Step 20.* Turn steady valve control (30 fig. 2-1) clockwise to eliminate fluctuation of pressure gage needle. Simultaneously, the operator shall adjust steady valve control (5 fig. 2-3)

WARNING

Do not operate fire pump during fire fighting operation with relief valve ON-OFF control to the "OFF" position.

u. *Step 21.* Turn relief valve ON-OFF control (2 fig. 2-1) to the "ON" position.

v. *Step 22.* Watch pressure gage (34 fig. 2-1) and adjust pressure relief pilot valve control (6 fig. 2-1) as indicated below:

(1) If gage reading drops below the desired discharge pressure, turn control (6) clockwise until pressure increases to desired value.

(2) If gage reading does not drop, slowly turn control (6) counter-clockwise until gage pressure drops about 5 or 10 PSIG below desired pressure. Then, gradually turn control (6) clockwise until gage needle is steady at desired pressure.

(3) To readjust the relief valve at different pressure, repeat the procedure in step 16.

w. *Step 23.* Push throttle control (10 fig. 2-1) all the way in to reduce engine to idle speed.

x. *Step 24.* Depress clutch pedal and shift transfer shift lever from NEUTRAL position to LOW range.

y. *Step 25.* Release parking brake by pushing the parking brake lever downward.

CAUTION

To prevent damage to fire pump, do not operate engine over 1500 RPM's.

z. *Step 26.* Release clutch pedal slowly, accelerate engine and operate fire truck in pump and roll mode.

CAUTION

Shut down fire pump when pressure gage (6) indicates "ZERO", indicating that water tank is empty.

aa. *Step 27.* Monitor pressure gage (6 fig. 2-3) and tachometer, mounted on dash panel. Maintain speed necessary to obtain the desired discharge pressure but do not exceed 1500 engine RPM's. When the desired discharge pressure is reached, sound horn to signal firefighters to open hose nozzles, or if using turret nozzle, slowly open turret nozzle discharge valve to prevent loss of prime.

ab. *Step 28.* To stop fire truck and continue pumping while in pump and roll mode, use the following procedure:

(1) Depress service brake pedal and reduce truck speed to engine idling speed. Sound horn twice to signal firefighters to close hose nozzles or turret nozzle discharge valve.

(2) Depress clutch pedal when truck is about to come to a complete stop, release service brake pedal when truck has stopped, and set parking brake. Do not release clutch pedal until (3) below is completed.

NOTE

Do not attempt to shift transmission gearshift lever as the lever is locked in FIRST gear when electric shift unit is in pump and roll mode.

(3) While clutch pedal is depressed, shift transfer shift lever from LOW range to NEUTRAL position.

CAUTION

To prevent damage to fire pump, do not operate engine over 1500 RPM's while in pump and roll mode.

(4) Release clutch pedal and accelerate engine until pressure gage (6 fig. 2-3) indicates the desired discharge pressure. As the engine is being accelerated, this will signal firefighters to open hose nozzles or slightly crack turret nozzle discharge valve. When pressure gage (6) indicates the desired discharge pressure, sound horn to signal firefighter to slowly open turret nozzle discharge valve.

(5) To continue in pump and roll (vehicle in motion), reverse the above procedure.

ac. *Step 29.* Shut down fire pump (para 2-15).

2-12. Operation of Turret Nozzle

a. Place foam-water control (fig 2-7), in desired position. (left for water, right for foam).

b. Loosen rotation lock.

c. Slowly open turret nozzle valve.

d. While securely holding control handle, loosen elevation lock.

e. Select desired pattern by rotating control handle counter-clockwise for full dispersed pattern, clockwise for full straight stream. Varied patterns are obtained by rotating handle until desired pattern is obtained.

f. To shut down, close turret nozzle valve and tighten rotation and elevation locks.

2-13. Operation and Flushing Foam System

a. *General.* The foam system can be placed in operation while pumping from fire hydrant, draft, water tank-stationary mode, or water tank pump and roll mode. When operating foam system from water tank, due to large volume of water (approx. 60 gallons) required to flush the foam system, make no attempt to flush the system from water tank. Drive fire truck to fire hydrant or draft water supply to flush foam system.

b. *Operation of Foam System:*

(1) *Step 1.* Complete procedural steps listed in paragraphs 2-8, 2-9, 2-10, or 2-11, with procedural exceptions indicated below:

(a) When pumping from fire hydrant, reduce compound gage reading (36 fig. 2-1) to 10 PSIG by regulating hydrant valve.

(b) When pumping from fire hydrant or draft, use 1½ instead of 2½ inch hose lines indicated in paragraphs 2-8 and 2-9.

(c) When pumping from water tank-pump and roll mode and using just the 1 inch hose reel hose lines, complete steps 2 thru 5 below, before fire truck is placed in motion. Or if using just the turret nozzle, complete steps 2 thru 4 below, before fire truck is placed in motion.

(2) *Step 2.* Make sure foam tank is full.

(3) *Step 3.* Set foam metering valve control (11 fig. 2-1) for 3 or 6 percent foam solution in accordance

with instructions on foam metering instructions plate. Plate is located near left control panel. Reset control (11) each time flow rate is changed. The following clarifies the instructions on foam metering instructions plate:

(a) The hose layout date indicates standard 50 foot hose length. Example: 1-1 indicates one 50 foot length of 1 inch fire hose.

(b) The 200 GPM metering setting is not applicable to the 200 GPM turret nozzle. When using turret nozzle, set Control (11) so that foam solution will have a good consistency and be off-white in color.

(4) *Step 4.* Open foam proportioner (eductor) valve control (20 fig. 2-1) to place eductor in operation.

(5) *Step 5.* Open foam tank valve control (12 fig. 2-1) to allow liquid foam to flow from tank to eductor. When using just the turret nozzle, use remote control (fig. 2-7) to open foam tank valve.

WARNING

Do not refill tank while vehicle is in motion as this requires opening of the pump compartment door, which is also the turret operator's platform, leaving the operator without a platform on which to stand.

(6) *Step 6.* If necessary, refill foam tank during operation, except during pump and roll mode (para 2-17)

(7) *Step 7.* Close foam tank valve control (12 fig. 2-1) or remote control (fig. 2-7) upon completion of foam operation

c. Flushing the Foam System:

(1) *Step 8.* Reduce discharge pressure to 75 PSIG by turning throttle control (10 fig. 2-1) clockwise.

(2) *Step 9.* Open foam flush valve control (4 fig. 2-2).

(3) *Step 10.* Turn foam metering valve control (11 fig. 2-1) clockwise all the way to open and flush metering valve.

(4) *Step 11.* Wait until water is clear at all hose nozzles, then turn pressure relief pilot valve control (6 fig. 2-1) counterclockwise all the way to open and flush pressure relief valve.

(5) *Step 12.* Place transfer valve control (14 fig. 2-1) in volume position to flush transfer valve.

(6) *Step 13.* Open turret nozzle discharge valve control (fig. 2-7) to flush turret nozzle. Perform this step even though turret nozzle was not used during foam operation.

(7) *Step 14.* Open the following drain valve controls, one at a time, and leave each valve open until water is clear, then close valve: Compound and pressure gage drain valve controls (27 and 28 fig. 2-1), relief valve drain valve control (9 fig. 2-2), discharge

hose line drain valve controls (24 and 25 fig. 2-1 and 8 fig. 2-2) and related discharge valve controls (7, 29, 31 fig. 2-1) if discharge connections are capped, and manifold drain valve control (37, fig. 2-1).

(8) *Step 15.* Unwind both hose reel, hose lines and open both discharge valve controls (13 and 15 fig. 2-1) to flush hose lines. Perform this step even though hose lines were not used during foam operation.

(9) *Step 16.* Close foam flush valve control (4 fig. 2-2), foam proportioner (eductor) valve control (20 fig. 2-1), and foam metering valve control (11 fig. 2-1) upon completion of flushing operation.

(10) *Step 17.* Shut down fire pump (para 2-14).

2-14. Shutting Down Fire Pump — Stationary Mode

a. *Step 1.* Push throttle control (10 fig. 2-1) all the way into reduce engine to idle speed.

b. *Step 2.* Depress clutch pedal and complete steps 3 through 6 in sequence listed.

c. *Step 3.* Shift transmission gearshift lever from FOURTH gear to NEUTRAL position.

CAUTION

Power-takeoff unit must be disengaged or damage to fire pump will result.

d. *Step 4.* Shift power-takeoff shift lever to DIS-ENGAGE position and Lock the shift lever. Red indicator light (4 fig. 2-3) is "OFF" when shift lever is in disengage position.

e. *Step 5.* Shift transfer shift lever from NEUTRAL position to low or high range.

f. *Step 6.* Release clutch pedal slowly disengaging fire pump drive.

g. *Step 7.* Shut-off fire hydrant valve, if pumping from hydrant. Or close tank suction valve control (16 fig. 2-1), if pumping from water tank.

h. *Step 8.* Close all discharge valve controls (7, 29 or 31, fig. 2-1) and open hose line drain valve controls (24 or 25 fig. 2-1 or 8 fig. 2-2) or hose nozzles to relieve hose pressure.

i. *Step 9.* Disconnect suction and discharge hose lines and install caps (5, 21 or 26 fig. 2-1, or 7 or 10 fig. 2-2) on suction and discharge connections.

j. *Step 10.* Rewind hose reel hose lines, if used during pumping operation. Open hose reel discharge valve controls (13 and 15 fig. 2-1) and open hose nozzles to drain hose lines during rewind. Then, close discharge valve controls and hose nozzles.

NOTE

If transfer valve control was not operated during pumping operation, pull-out and push-in Control (14) several times.

k. *Step 11.* Place transfer valve control (14 fig. 2-1) in pressure position.

l. Step 12. Open the following drain valve controls and leave valves open until water stops flowing, the close valves: Compound and pressure gage drain valve controls (27 and 28 fig. 2-1), relief valve drain valve control (9 fig. 2-2), discharge hose line drain valve controls (24 and 25 fig. 2-1, and 8 fig. 2-2) and related discharge valve controls (7, 29, 31 fig. 2-1) and manifold drain valve control (37 fig. 2-1). To expedite draining fire pump, open turret nozzle discharge valve control to provide an air vent, and when pump has drained, close valve.

m. Step 13. Pull-out primer valve control (4 fig. 2-1) and operate priming motor until oil from priming tank drips out priming pump discharge pipe.

n. Step 14. Shut down engine (para 2-7).

2-15. Shutting Down Fire Pump — Pump and Roll Mode

a. Step 1. Depress service brake pedal and reduce truck speed to engine idling speed. When truck is about to come to a complete stop, depress clutch pedal, release service brake pedal when truck has stopped, and set parking brake. Do not release clutch pedal until step 9 is completed.

b. Step 2. While clutch pedal is depressed, complete steps 3 thru 10 in sequence listed.

c. Step 3. Shift transfer shift lever from LOW range to NEUTRAL position.

d. Step 4. Wait momentarily for pump gears to stop rotating.

e. Step 5. Place control switch (4 fig. 2-3) in stationary pumping (or normal driving) position. The amber indicator light will go "OFF" and green indicator light (1 fig. 2-3) will illuminate to indicate that electric shift unit has shifted pump drive gear from high speed (for pump and roll) to low speed for stationary pumping (or normal driving) operation.

f. Step 6. If green indicator light (1 fig. 2-3) does not come "ON", a butt-tooth condition between shifting collar and drive gear in pump gear case may be the cause. To correct butt-tooth condition, proceed with (1) thru (5) below:

(1) Place control switch (4) in pump and roll position. The amber indicator light (3) should come "ON".

(2) Release and quickly depress clutch pedal to allow pump gears to rotate.

(3) Wait momentarily for gears to stop rotating.

(4) Place control switch (4) in stationary pumping position.

(5) If necessary, repeat the above procedure several times until green indicator light (1) comes "ON". Then, if green indicator light does not come "ON", have assistant operator or firefighter to manually shift pump gears as indicated below:

(a) Pull-out shift lever control (13 fig. 2-2)

to disengage the electric shift unit.

(b) Pull-out gearshift lever control (12 fig. 2-2) to shift collar gear from high speed (for pump and roll) to low speed for stationary pumping or normal driving operation.

NOTE

Control switch (4 fig. 2-3) must be in stationary pumping (or normal driving) position before transmission can be shifted out of first (Low) gear.

g. Step 7: Shift transmission gearshift lever from FIRST (LOW) gear to NEUTRAL position.

CAUTION

Power-takeoff unit must be disengaged or damage to fire pump will result.

h. Step 8. Shift power-takeoff shift lever to DISENGAGE position and lock the shift lever.

NOTE

Red indicator light (2 fig. 2-3) is "OFF" when shift lever is in disengage position.

i. Step 9. Shift transfer shift lever from NEUTRAL position to Low or High range.

j. Step 10. Release clutch pedal slowly disengaging fire pump drive.

k. Step 11. Close tank suction valve control (16 fig. 2-1).

l. Step 12. Rewind hose reel hose lines, if used during pumping operation. Open hose reel discharge valve controls (13 and 15 fig. 2-1) and open hose nozzles to drain lines during rewind. Then close discharge valve controls and hose nozzles.

m. Step 13. Pull-out and push-in transfer valve control (14 fig. 2-1) several times.

n. Step 14. Open the following drain valve controls and leave valves open until water stops flowing, then close valves: Compound and pressure gage drain valve controls (27, 28, fig. 2-1), relief valve drain valve control (9 fig. 2-2). Discharge hose line drain valve controls (24, 25 fig. 2-1 and 8 fig. 2-2) and related discharge valve controls (7, 29, 31, fig. 2-1), and manifold drain valve control (37 fig. 2-1). To expedite draining fire pump, open turret nozzle discharge valve control to provide an air vent, and when pump has drained, close valve.

o. Step 15. Pull-out primer valve control (4 fig. 2-1) and operate priming pump motor until oil from priming tank drips out priming pump discharge pipe.

p. Step 16. Shut down engine (para 2-7).

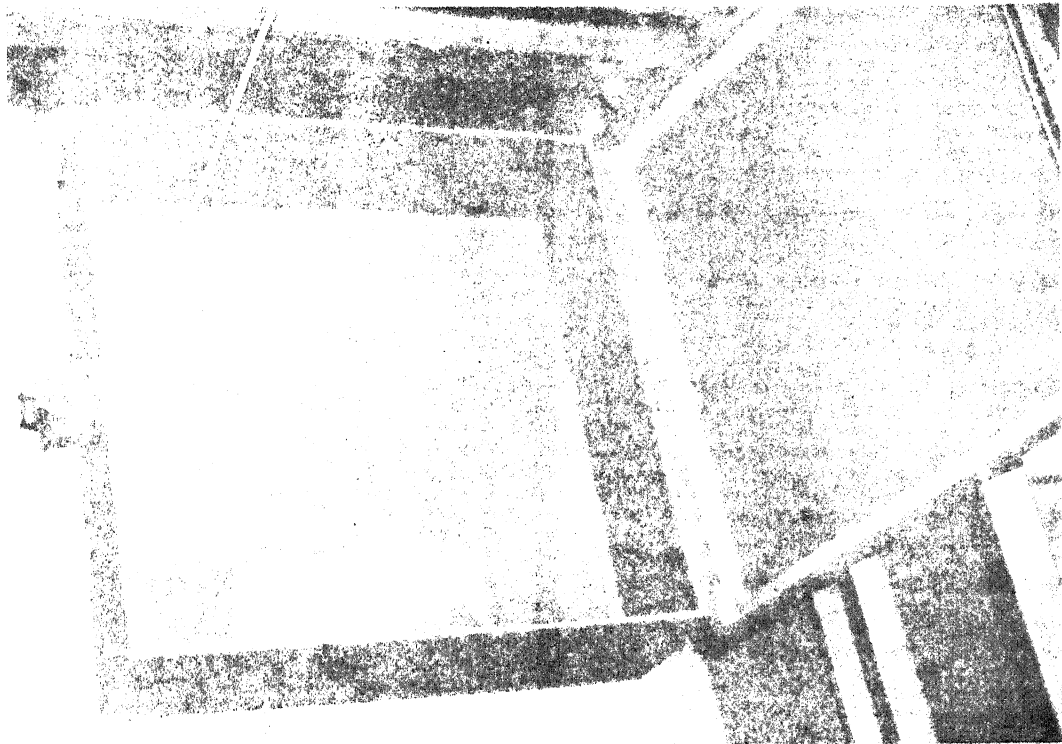
2-16. Filling Foam Tank

a. Step 1 Close foam tank drain valve control (11 fig. 2-2.)

b. Step 2. Unlatch and open pump compartment door and lock door in raised position.

c. Step 3. Unlatch and open foam tank fill door (fig. 2-12)

d. Step 4. Fill tank with liquid foam concentrate.



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Figure 2-12. Foam tank fill

conforming to Federal Specification O-F-555, or with aqueous film forming foam (light water), conforming to specification MIL-F-23905.

e. Step 5. Close and latch foam tank fill door and pump compartment door.

2-17. Filling Water Tank

a. From Fire Hydrant:

(1) *Step 1.* Set parking brake by pulling the parking brake lever upwards firmly.

(2) *Step 2.* Close all drain and control valves.

(3) *Step 3.* Remove cap from suction connection (21 fig. 2-1 or 10 fig. 2-2) and connect 4½ inch suction hose to suction connection and fire hydrant. Or remove cap from suction connection (17 fig. 2-1) and connect 2½ inch fire hose to suction connection and fire hydrant.

(4) *Step 4.* Open hydrant valve, and if applicable, open 2½ inch suction valve control (18 fig. 2-1). Reduce compound gage reading (36 fig. 2-1) to 10 PSIG by regulating hydrant valve.

(5) *Step 5.* Open water tank fill valve control (9 fig. 2-1) to fill water tank.

(6) *Step 6.* To shut-down, reverse the above procedure. Leave water tank drain valve control (fig. 2-9) closed.

b. From Draft Water Supply:

(1) *Step 1.* Complete Steps 1 thru 16 of paragraph 2-9.

(2) *Step 2.* Turn throttle control (10 fig. 2-1) counter-clockwise to accelerate engine until pressure gage (34 fig. 2-1) indicates 50 PSIG

(3) *Step 3.* As the engine is accelerated in step 2, open water tank fill valve control (9 fig. 2-1) to fill water tank.

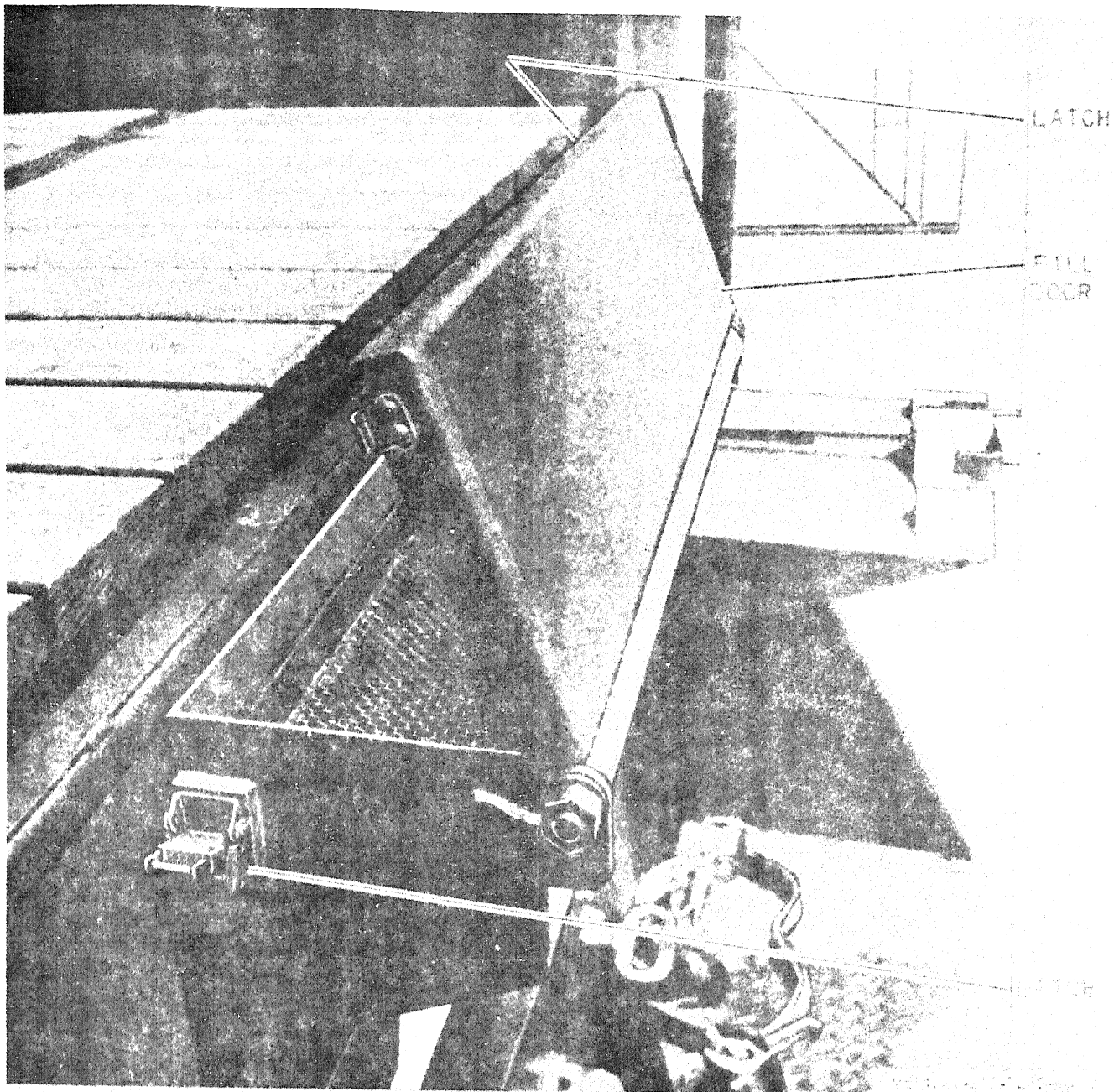
(4) *Step 4.* Open water tank fill door (fig. 2-13) to relieve pressure in water tank.

(5) *Step 5.* When tank is filled, close water tank fill valve control (9 fig. 2-1) and close water tank fill door (fig. 2-13).

(6) *Step 6.* Shut down fire pump (para 2-14).

c. Through Fill Door Opening:

(1) *Step 1.* Close water tank drain valve control (fig. 2-9), water tank fill valve control (9 fig. 2-1), and tank suction valve control (16 fig. 2-1).



1. Close water tank drain, fill, and suction valves.
2. Install suction line caps.
3. Release latches and raise cover.
4. Fill tank with water through fill box.
5. Close cover and secure latches.

Figure 2-13. Water tank fill.

(2) *Step 2.* Unlatch and open water tank fill door (fig. 2-13).

(3) *Step 3.* Fill tank with water using a bucket or hose.

(4) *Step 4.* Close and latch water tank fill door.

2-18. Draining the Fire Truck

a. Fire Pump. For operation under usual conditions, drain the fire pump after each fire fighting operation as indicated below:

- (1) Open turret nozzle control valve (fig. 2-7) to

- provide an air vent for draining the fire pump
- (2) Open manifold drain valve (37, fig. 2-1)
 - (3) Open compound gage drain valve, pressure gage drain valve, and steady valve (27, 28, and 30 fig. 2-1).
 - (4) Remove caps from suction connections (17, 21 fig. 2-1 and 10 fig. 2-2) and open 2½ inch suction valve (18 fig. 2-1).
 - (5) Remove caps from discharge connections (5

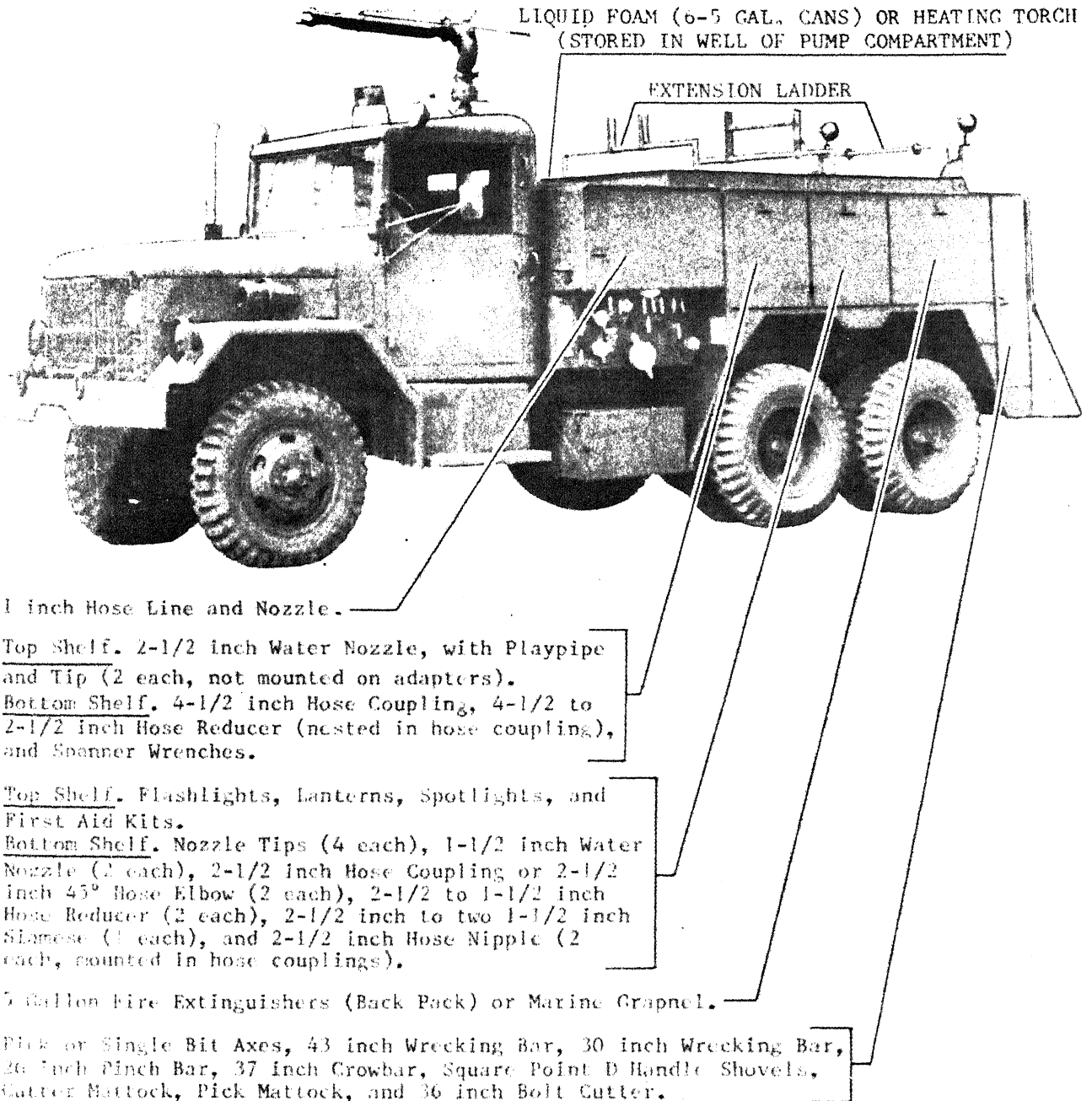
- 26 fig. 2-1 and 7 fig. 2-2) and open discharge valves (7, 29 and 31 fig. 2-1).
- (6) Open left and right hose reel discharge valves (13 and 15 fig. 2-1).
- (7) Open pressure relief drain valve (9 fig. 2-2).
- b. *Water Tank.* Open water tank drain valve (fig. 2-9) to drain the water tank.
- c. *Foam Tank.* Open foam tank drain valve (11 fig. 2-2) to drain the foam tank.

Section IV. LOADING PLAN

2-15. General

Refer to figures 2-14 and 2-15 for the location and

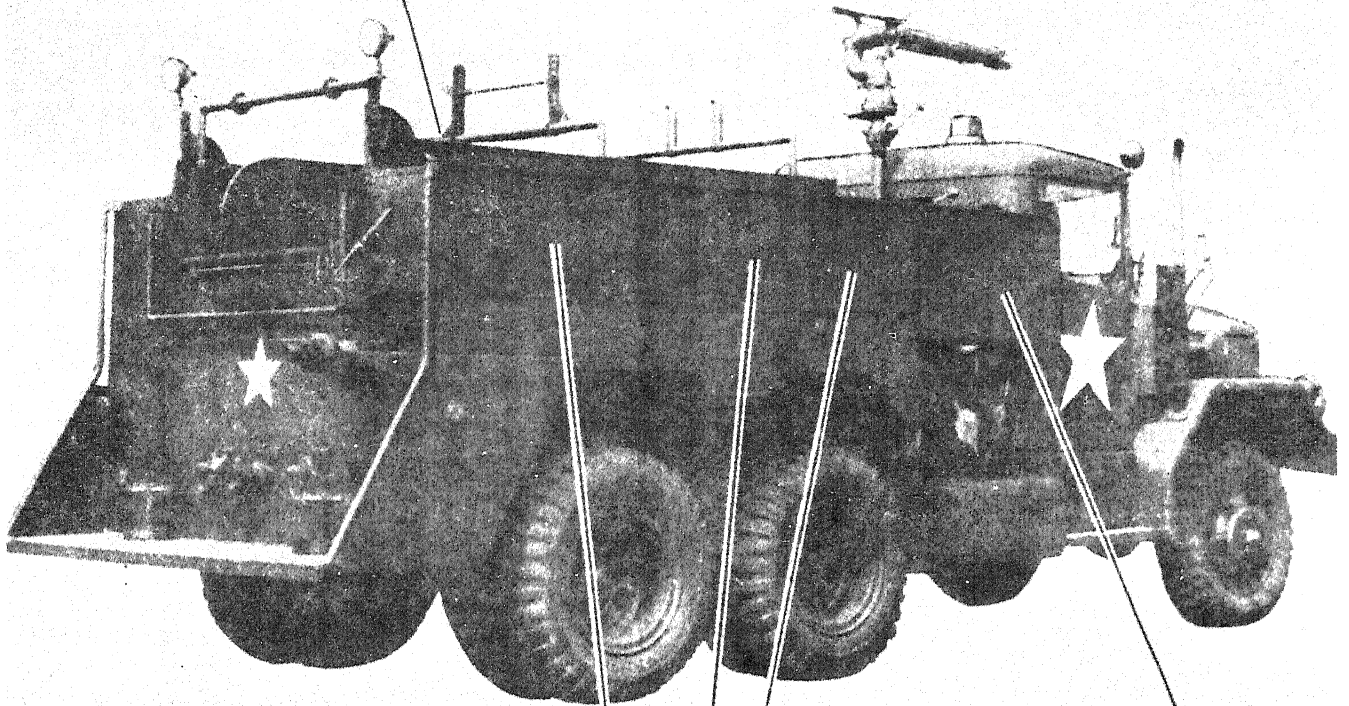
loading of all equipment and accessories used with the 530C fire truck.



MF 4210-217-12 2-14 (1)

Figure 2-14. Loading plan — left side fire truck. (sheet 1 of 2)

FOREST FIRE RAKES, BUSH HOOKS, GED CIRCULAR SAW KIT,
FAULIN AND BLACKSMITH'S TOOL CHEST (SEE NOTE BELOW)



1 inch Hose Line and Nozzle.

Empty Compartment.

Fire Extinguisher Antifreeze Charges
and Hose Gaskets.

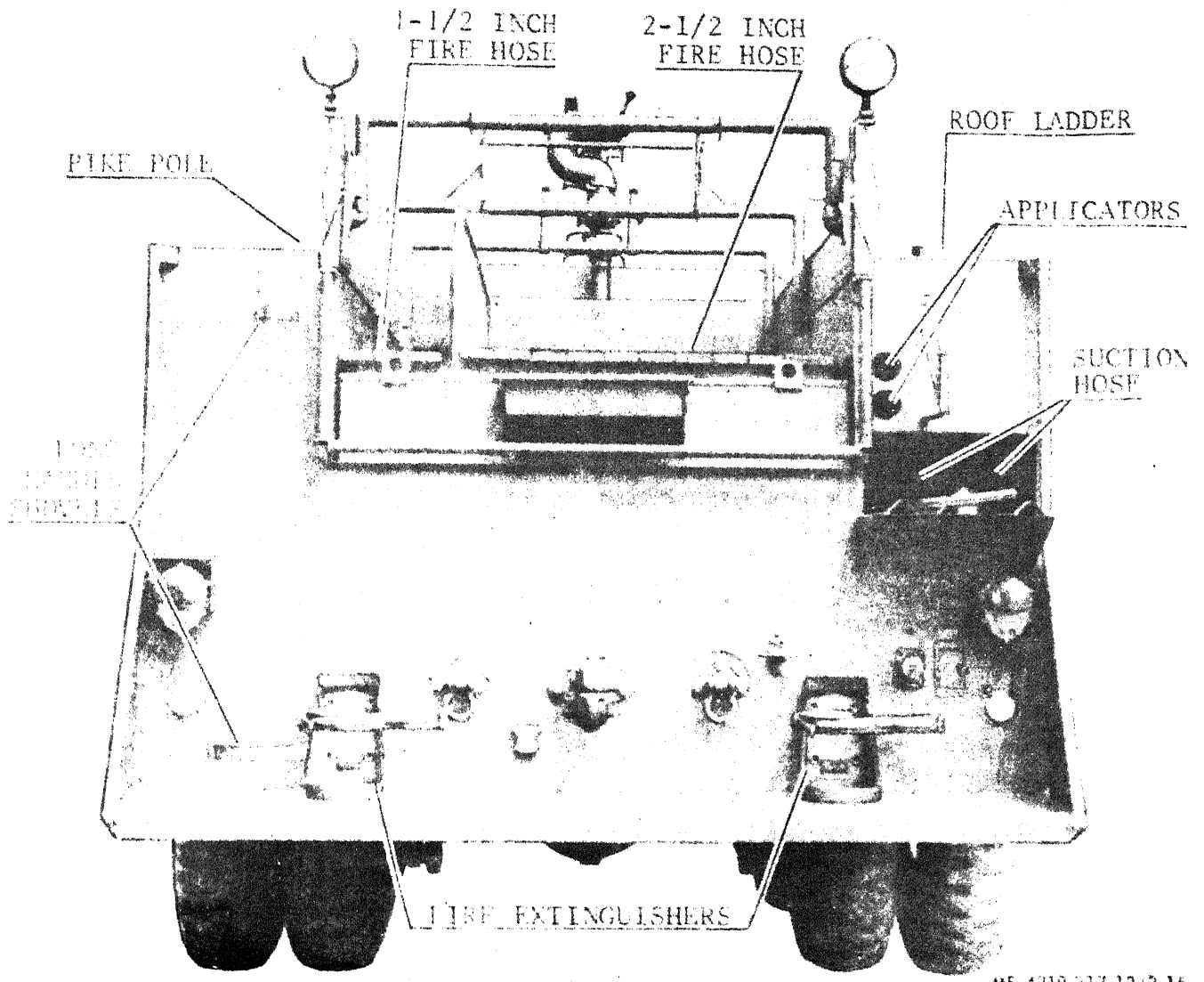
4-1/2 or 2-1/2 inch Hose Strainer,
1-1/2 inch Foam Nozzle (2 each),
Manila Rope, 3-1/2 gallon Pails,
Hose and Ladder Strap, and 22 inch
Cable Cutter.

ME 4210-217-12 2-14 ②

NOTE: THE FOLLOWING ITEMS
ARE STORED IN BLACKSMITH'S
TOOL CHEST: COLD CHISEL,
CRASH RESCUE KNIFE, HUNTING
KNIFE, LINEMAN PLIERS, SLIP
JOINT PLIERS, COMPASS SAW,
METAL CUTTING SHEARS, BLACK-
SMITH'S HAMMER, MACHINIST
HAMMER, AND HACKSAW FRAME
AND BLADES.

Figure 2-14. Loading plan — right side fire truck.

(sheet 2 of 2)



MF 4210-217-12/2-15

Figure 2-15. Loading plan - rear, fire truck

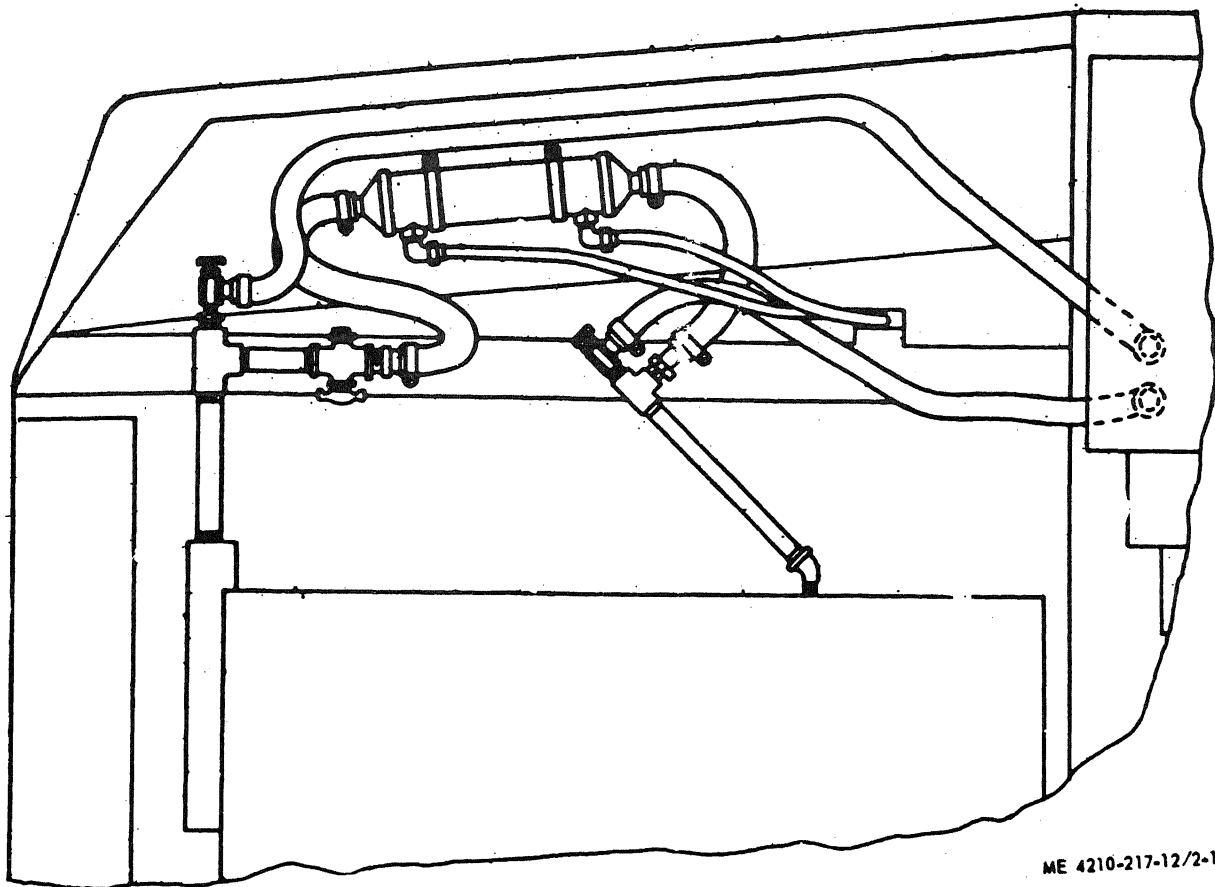


Figure 2-16. Auxiliary cooler assembly.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-20. Operation in Intermediate Cold (to minus 25° F.)

a. *General.* When operating in an intermediate cold climate, take the necessary precautions to prevent the fire truck from freezing. Immediately after each fire fighting operation, drain the water from the fire pump and the water tank, and drain the foam tank, unless the fire truck is kept in a heated shelter. In addition to the draining procedure indicated in paragraph 2-18, open the water tank fill valve (9 fig. 2-1), water tank suction valve (16 fig. 2-1), foam metering valve (11 fig. 2-1), discharge hose line drain valves (24, 25 fig. 2-1 and 8 fig. 2-2), and foam flush valve (4 fig. 2-2) to allow water to drain from fire pump piping. During the fire fighting operation, run the fire pump at least 20 minutes to warm up gear case and drive out moisture. Moisture accumulating in the pump gear case can damage the internal parts. Do not allow water to spray over the body of fire truck as the compartment doors will freeze shut. Lubricate the fire truck in accordance with LO's 5-4210-217-12 and 9-2320-209-12.

b. *Truck Chassis.* Refer to paragraphs 96 and 97 of TM 9-2320-209-10.

2-21. Operation in Extreme Heat

a. *General.* When operating in extreme heat, particular attention must be paid to the lubrication and cooling system. Protect the fire truck from the direct rays of the sun as much as possible. The fire pump is not affected by extreme heat, except for lubrication requirements. Lubricate the fire truck in accordance with LO's 5-4210-217-12 and 9-2320-209-12. Check the lubricant levels frequently.

b. *Truck Chassis.* Refer to paragraph 98 of TM 9-2320-209-10.

2-22. Operation in Dusty or Sandy Areas

a. *General.* When operating in dusty or sandy areas, keep all lubrication points clean and well lubricated. Lubricate sparingly but more frequently than under normal conditions. Wipe fittings thoroughly before applying grease. Clean all oily or

greasy surfaces. Lubricate the fire truck in accordance with LO's 5-4210-217-12 and 9-2320-209-12.

b. *Truck Chassis.* Refer to paragraph 99 of TM 9-2320-209-10.

2-23. Operation Under Rainy or Humid Conditions

a. *General.* When operating under rainy or humid conditions, the high humidity causes rusting and corrosive action on exposed metal surfaces. Coat all exposed metal surfaces with engine oil.

b. *Truck Chassis.* Refer to paragraph 98 of TM 9-2320-209-10.

2-24. Operation in Salt Water Areas

a. *General.* When operating in salt water areas, deterioration and corrosion of exposed metal surfaces is greatly accelerated. Coat all exposed metal surfaces with engine oil. When the fire truck has been partially immersed or sprayed with salt water, wash down with fresh water. After washing, lubricate the fire truck in accordance with LO's 5-4210-217-12 and 9-2320-209-12.

b. *Pumping Salt Water.* Do not use salt water except in case of extreme emergency. At the earliest opportunity after pumping salt water, flush the fire pump thoroughly with fresh water. After flushing, drain the fire pump in accordance with paragraph 2-18.

2-25. Operation in Snow

a. *General.* Operating in snow presents special problems due to snow collecting and freezing on

metal surfaces. At the earliest opportunity, remove snow from top of pump compartment, walkways on top of both equipment compartments, hose bed, and rear step.

b. *Truck Chassis.* Refer to paragraph 99 of TM 9-2320-209-10.

2-26. Operation in Mud

a. *General.* When operating in mud, particular attention must be paid to the overall cleanliness of the fire truck. At the earliest opportunity, wash the fire truck and remove the mud.

b. *Truck Chassis.* Refer to paragraph 99 of TM 9-2320-209-10.

2-27. Operation at High Altitudes

a. *General.* Operation at high altitudes presents special problems due to lower atmospheric pressure and a wide difference in temperature, which occurs during the day and night. Protect the fire truck at all time from the lowest anticipated temperature. Due to lower atmospheric pressure, engine horsepower decreases about 3 percent for every 1000 feet increase in altitude above sea level. This loss in engine horsepower may result in a loss in pump efficiency. To compensate for this loss in engine horsepower, it may be necessary to operate the fire pump at greater rpm's than when operating under normal conditions.

b. *Truck Chassis.* Refer to paragraph 99 of TM 9-2320-209-10.

CHAPTER 3

OPERATOR AND CREW MAINTENANCE INSTRUCTIONS

Section I. MAINTENANCE OF 530C FIRE TRUCK

3-1. General

Operator/crew maintenance is limited to preventive maintenance, operational checks, visual inspections and maintaining general cleanliness. With the excep-

tion of section VI, maintenance of the fire pump assembly and all maintenance procedures required on this level are described in tables 3-1 and 3-2.

Section II. LUBRICATION INSTRUCTIONS

3-2. General

Whenever practicable, operator/crew will assist organizational maintenance personnel with per-

formance of lubrication instructions specified on LO 5-4210-217-12 and LO 9-2320-209-12.

Section III. PREVENTIVE MAINTENANCE—CHECKS AND SERVICES

3-3. Description

a. General. To insure that the fire truck is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed as described in table 3-1. The item numbers indicate a sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for correction as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All discrepancies will be noted together with corrective action taken on DA Form 2404 as soon as possible.

tions for all major components list specific intervals for inspection, lubrication and adjustment. The intervals listed apply to normal operating conditions. Unusual weather, extremely dirty operating conditions and similar factors might mean increasing the frequency of certain maintenance procedures to compensate for the unusual conditions.

c. Visual Inspection. The primary function of all preventive maintenance performed on any major assembly or component is defined as: Inspect for physical and structural damage and general cleanliness. Insure equipment is free of rust and corrosion. Inspect for chipped, cracked, or peeling paint. Check for loose and leaky joints.

d. Preventive Maintenance. Preventive maintenance beyond the scope of operator/crew shall be reported to organizational maintenance.

b. Periodic Maintenance. The individual instruc-

Table 3-1. Preventive Maintenance Checks and Services

Operator Maintenance Category			Daily Schedule (or weekly)		
Interval and sequence no.			Item to be inspected	Procedure	Paragraph reference
Before	During	After			
Operation					
1			Siren Assembly	Check for operation, depress hand or foot switch	(fig. 2-6)
2			Warning Light	Check for operation, turn switch on	(fig. 2-5)
3			Spotlight	Check for operation, turn master & individual (4) switches on	(fig. 2-6)
4			Underhood Light	Check for operation, turn switch on	(fig. 4-20)
5			Dome Light	Check for operation, turn switch on	(fig. 4-21)
	6		Pump Packing	Check for proper leakage rate	(2-1b. (3)).
	7		Instrument Housing	Visually inspect for operation	(fig. 2-1)
			Gauges Tachometer and Lights		
	8		Instrument Housing Glass	Inspect for breakage	(fig. 2-1)

Operator Maintenance Category			Daily Schedule (or weekly)		
Interval and exposure to:			Item to be inspected	Procedure	Paragraph reference
Before	During	After			
Operation					
	9		Relief and Pilot Valve	Check for proper operation	(2-8 2-9, 2-10)
	10		Control Valves and Rods	Check for freedom of movement and operation	(fig. 2-1 and 2-8)
	11		Drain Valve	Visually check for leakage	
	12		Control, Push-Pull, Throttle	Check for ease of operation	(fig. 2-1) 2-8q 2-9s 2-10q
	13		Turret Nozzle and Valve	Check valve and attaching point for leakage	(fig. 2-7)
		14	Fire Pump Gear Case	Check for proper fluid level	If fluid level is low, report to organizational maintenance
		15	Foam Tank	Check for proper fluid level	2-16
		16	Water Tank	Check for proper fluid level	2-17
		17	Priming Tank	Check for proper fluid	If fluid level is low, report to organizational level
		18	Pilot Valve Strainer	Inspect and clean as necessary	(fig. 2-1)
		19	Discharge and suction caps	Inspect for defective gasket	(fig. 2-1, 2-2)
		20	Suction Strainer	Inspect for debris, clean as necessary	(fig. 2-1)
		21	Hose Reel Brake	Check for proper operation	(fig. 2-8)
		22	Switch, Pump Engaged Indicator Light	Check for proper operation	(fig. 2-4)
		23	Electric Shift Control Panel	Check for operation of gage, switch and lights	fig. 2-9 2-8 2-9 2-10
	W		Fire Pump	Check for proper performance inspect for leaks	3-5b.3
	W		Auxiliary Engine-Cooling System (Heat Exchanger)	Check for proper operation	2-8 v
	W		Heater Personnel during periods of normal operation only	Check for proper performance by actual operation check hose	(fig. 2-6)
	W		Special Purpose Body	Visually inspect for chipped or peeling paint, dents, rust, proper operation of compartment doors	Report defects to organizational maintenance
	W		Leads, Battery	Check for corrosion and tightness	4-42
	W		Fire Extinguisher (Cab Mounted)	Check for full charge by viewing gauge on bottom of extinguisher	Report defective extinguisher to organizational maintenance

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Fire Pump Capacity Drops	a. Engine RPM too low b. Fire pump loses prime	a. Adjust throttle (para 2-8) b. Check for air leaks. Submerge suction at deeper supply point. reprime pump. (para 2-9)

Table 3-1. Troubleshooting - Continued

Malfunction	Probable cause	Corrective action
2. Fire pump fails to deliver water upon starting	<ul style="list-style-type: none"> a. Fire truck too high to permit pump suction a. Lack of prime b. Lift required beyond pump's capacity 	<ul style="list-style-type: none"> c. Change position of Fire Truck a. Prime Pump. (para 2-9) b. Draw supply from different source or change position of truck
3. PTO is difficult to engage	<ul style="list-style-type: none"> a. Worn tooth condition 	<ul style="list-style-type: none"> Engage clutch momentarily to allow pump shift to complete its travel. (para 2-8) Use manual shift.
4. Electric shift does not operate	<ul style="list-style-type: none"> Electrical failure 	<ul style="list-style-type: none"> a. Open at least one discharge valve. (para 2-8, 2-9, 2-10)
5. Relief valve fails to maintain desired discharge pressure	<ul style="list-style-type: none"> a. All discharge valves closed b. Engine RPM too low c. Improper setting d. Foreign material in system e. Erratic pressure indication 	<ul style="list-style-type: none"> b. Increase engine RPM. (para 2-8, 2-9, 2-10) c. Adjust pilot valve (para 2-8, 2-9, 2-10) d. Switch four way valve on and off several times. (para 2-8, 2-9, 2-10) e. Switch steady valve back and forth (para 2-8, 2-9, 2-10)
6. Fire pump vibrates	<ul style="list-style-type: none"> a. Cavitation occurring b. Pump vapor bound and not fully loaded 	<ul style="list-style-type: none"> t. Check suction pressure relocate suction strainers when pumping from draft. Reprime the pump. (para 2-9) b. Temporarily reduce speed or partially close discharge valve (para 2-8)
7. Foam system fails to deliver adequate foam discharge	<ul style="list-style-type: none"> a. Foam concentrate is exhausted b. Foam tank valve is in closed position c. Improperly adjusted foam metering valve 	<ul style="list-style-type: none"> a. Refill foam tank (para 2-16) b. Open valve. (para 2-13) c. Adjust foam metering valve (para 2-13)
8. Foam does not have proper characteristics for effective use	<ul style="list-style-type: none"> a. Improperly adjusted foam metering valve b. Improper hose nozzle c. Foam concentrate liquid supply is diluted or contaminated 	<ul style="list-style-type: none"> a. Adjust foam metering valve. Change valve. (para 2-13) b. Change hose nozzle c. Drain and flush from system. Fill with concentrate of proper quality (para 2-13)

Section IV. MAINTENANCE OF FIRE PUMP ASSEMBLY

3-4. General

On this level, maintenance is limited to the performance of operational checks, visual inspections and minor adjustments.

3-5. Fire Pump Assembly

a. *Visual Inspection.* Inspect for physical and structural damage and general cleanliness. Insure equipment is free of corrosion. Inspect for chipped, cracked or peeling paint. Check for loose and leaky joints; tighten as necessary.

b. Weekly Tests.

(1) *Vacuum tests.* Close all discharge and drain valves. Operate priming pump to create a vacuum of about 22 inches Hg in pump. Stop primer and engine. Observe compound gage; if vacuum drops 10 inches Hg in 10 minutes inspect for air leaks around packing glands, gaskets, etc.

(2) *Pressure tests (hydrostatic).* Close all discharge and drain valves. Connect pump to hydrant (chapters 2-8d and e.) Open gated suction valve, and slightly open turret nozzle valve to expel air from pump. Close turret nozzle valve. Carefully examine

pump and accessories for leaks.

(3) *Running tests.* Test pump under normal operating conditions, and from draft, if possible. Drafting is best because the pump is then more sensitive to defects than when connected to a pressurized water source. Check the following:

(a) *Priming Ability.* If pump does not prime readily within 30 seconds, stop pump and determine cause.

(b) *Packing.* The stuffing boxes are designed to leak slightly during operation to cool and lubricate the packing. Acceptable leakage varies from 10 drops per minute to one or two drops per second. If the leakage rate is less than the specified amount, the packing will overheat and may damage the impeller shaft. If the leakage rate is more than the specified rate, it may make priming the pump difficult. The packing glands will dry out, and may lose their effectiveness if the pump is not operated at least once a week. Dried-out packings will not only result in excessive leakage, but may prevent the pump from priming. The pump should be operated,

therefore, each week for at least 10 minutes at a minimum pressure of 150 PSI, unless the pump has been used in normal service.

c. *Transfer Valve* (series-parallel pumps only). While pump is running switch valve from one position to the other several times to make sure it operates properly.

d. *Manual Shift Linkage*. Periodically, check shift linkage for freedom of movement, and clean as necessary. If linkage should bind or become very dirty,

it could prevent the gear case from shifting properly.

e. *Performance*. Check pump speed at rated pressure and capacity. Excessive speed indicates that impellers and/or wear rings may be worn (para 1-7b).

f. *Accessories*. Operate all discharge valves, the relief valve drain valves, priming system and associated accessories to make sure that they all function correctly.

CHAPTER 4 ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

4-1. Inspecting and Servicing

a. Inspecting.

(1) Make a complete visual inspection of fire truck, paying particular attention to components which might have been damaged and/or missing during shipment.

(2) Inspect all controls for proper operation, loose mountings and for missing and damaged handles, levers and knobs-correct or report all deficiencies as required by TM 38-750.

(3) Inspect the truck chassis in accordance with the instructions contained in TM 9-2320-209-20.

b. Servicing.

(1) Service the batteries in accordance with instructions contained in TM 9-2320-209-20

(2) Connect the battery cables in accordance with diagram on the inside of battery box front cover.

(3) Service the chassis in accordance with instructions contained in TM 9-2320-209-20.

Section II. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-2. Special Tools and Equipment

No special tools or equipment are required for maintenance on this level.

4-3. Maintenance Repair Parts

Repair parts are listed and illustrated in the TM 5-4210-217-20p (when printed) organizational maintenance repair parts and special tools list manual.

Section III. LUBRICATING INSTRUCTIONS

4-4. General

Lubrication instructions are covered in LO 5-4210-217-12. To provide access to the gear case, electric shift unit, manual linkage and PTO shaft lubrication

paints, it will be necessary for organizational maintenance to remove the bottom center panel (fig. 4-4). Refer to LO 9-2320-209-12 for lubrication instructions covering the chassis.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-5. General

a To insure that the fire truck is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The preventive maintenance checks and services to be performed are listed and described in table 4-1.

b Item numbers indicate the sequence of minimum inspection requirements. Defects discovered during

operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

Table 4-1. Preventive Maintenance Checks and Services

Organizational Maintenance Category		Monthly schedule (or quarterly)	
Sequence number	Item to be inspected	Procedures	Paragraph reference
1	Siren Assembly	Perform operational check inspect for defective lamps, flasher, switches and solenoid	(fig. 4-27)
2	Warning Light	Perform operational check inspect for defective lamps, dome and dome gasket	(fig. 4-33)
3	Spotlights, Front and Rear	Perform operational check inspect for defective lamps and switches	(fig. 4-35)
4	Underhood Lights	Perform operational check inspect for defective lamp	(fig. 4-46)
5	Dome Lights	Perform operational check inspect for defective lamp	(fig. 4-39)

Table 4-1. Preventive Maintenance Checks and Services — Continued

Organizational Maintenance Category		Monthly schedule (or quarterly)	
Sequence number	Item to be inspected	Procedures	Paragraph reference
6	Indicator light, Electric Shift Control Panel	Perform operational check inspect for defective lamps	(fig 4-18)
7	Switch, Control Electric Shift	Perform operational check	(fig 4-18)
8	Switch Assembly, Pump Engaged Light	Manually depress switch check for defective switch	(fig 4-20)
9	Circuit Breakers	Test for defective circuit breaker	(fig 4-44)
10	Extinguisher, Fire	View gauge on bottom of extinguisher to determine adequacy of charge	If undercharged replace cylinder only Refer to TB 5-4200-200-10 (fig 4-17)
11	Tank, Priming	Check for defective tank or leaking connection. Replace defective tank. Tighten loose connections. Check fluid level, if low, fill in accordance with lubrication instructions	
12	Catch, Safety, Foam Compartment Door	Inspect to assure proper function	Report defective catch to direct support
13	Turret Assembly and Valve	Inspect for leaks and/or defective parts	Report all deficiencies to direct support
14	Hose Bed Assembly	Inspect for cracked, warped, broken or missing slats	Report all deficiencies to direct support (fig 4-46)
15	Steps, Folding	Inspect for missing or broken steps	
16	Plates, identification	Inspect for missing or illegible plates replace as required	
17	Reflectors	Inspect for broken or missing reflectors	(fig 4-47)
18	Clips, Spring	Inspect for missing or broken clips	(fig 4-50)
19	Brackets and Retainers (For Mounting Fire Fighting Equipment),	Inspect for broken or missing brackets	(fig 4-51)
20	Door Assemblies	Inspect for dents, chipped or peeling paint, freedom of movement. Inspect for defective locks and/or handles	Report all deficiencies to direct support. Lubricate hinges in accordance with LO 5-4210-217-12 (fig 4-48, 4-49)
21	Receptacle Battery Slave	Inspect for broken or defective parts	Report all deficiencies to direct support
22	Control Valves and Rods	Check for freedom of movement and operation	Report all deficiencies to direct support. Lubricate sector gear and gear rack in accordance with LO 5-4210-217-12
23	Heat Exchanger and Hoses	Inspect for leaks, defective hose	Report all deficiencies to direct support (fig 4-42)
24	Batteries	For servicing refer to TM 9-2320-209-20	
25	Lead, Battery	Inspect for corrosion and loose terminals	(fig. 4-43)
26	Battery Box	Inspect battery tray slides for freedom of movement.	Lubricate slides in accordance with LO 5-4210-217-12. (fig. 4-23)
27	Hose Reel Assembly	Inspect for defective brake assembly and/or relay	(fig. 4-21) Report deficiencies to direct support.
28	Foam Tank assembly	Inspect for clogged or defective strainer. Visually inspect exterior of tank for leakage or signs of corrosion	
29	Valve Assembly, Foam Tank Drain	Inspect for leakage and ease of operation	Report deficiencies to direct support.

Table 4-1 Preventive Maintenance Checks and Services - Continued

Organizational Maintenance Category		Monthly schedule (or quarterly)	
Sequence number	Item to be inspected	Procedures	Paragraph reference
30	Water Tank Assembly	Inspect water tank fill door gasket for deterioration	Report deficiencies to direct support.
31	Instrument Housing	Inspect drain valve for leakage	(fig. 4-25)
32	Fire Pump Assembly	Inspect for clogged or defective strainer Perform operational test Check packing gland for proper leakage Check gear case for proper fluid level, fill as required	3-5b, 3 (fig. 4-11) LO 5-4210-217-12 (fig. 4-12)
33	Relief Valve and Pilot Valve Assemblies	Perform operational check Inspect relief valve strainer	(fig. 2-8, 2-9, 2-10) (fig. 4-15)
34	Suction Strainers	Inspect for debris and/or missing strainers	
35	Foam System	Perform operational check	(fig. 2-13)
36	Heater Assembly and Hoses (During Periods of Normal Operation)	Perform operational check, inspect for leaks, defective hoses and switches	Report all deficiencies to direct

Table 4-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. If one or more functions are inoperative due to electrical failure	Defective Circuit Breaker (s)	Refer to FO-1-Wiring Diagram, identify possible defective circuit breaker. Replace circuit breaker (para 4-44)
2. Excessive leakage from pump packing	Pump Packing Gland requires adjustment	Adjust Packing Gland (para 4-11)
3. Relief Valve fails to maintain desired pressure	Foreign matter in system	Remove and clean strainer (para 4-15)
4. Priming Pump inoperative	Electrical failure	Check battery connections. Remove bottom insulating panel, (para 4-12). Check wiring on priming pump motor.
5. Electric Shift does not operate	Electrical failure	Check battery charge, check wire for loose terminals and damaged insulation.
6. Manual shift lever is difficult to engage	Disconnected linkage	Engage.
7. Pump engage light does not light	a. Electrical failure b. PTO lever not contacting pump engage switch c. Defective switch d. Defective pump engaged lamp	a. Check wiring for loose terminals b. Adjust pump engage switch, (para 4-20) c. Replace switch (para 4-20) d. Replace lamp (para 4-19)
8. Pump engage light on when PTO not engaged	a. Defective pump engage switch b. Defective wiring	a. Replace switch (para 4-20) b. Check wiring for broken insulation
9. Transfer valve	Disconnected linkage	Connect linkage
10. Hose reel rewind function inoperative	a. Electrical failure b. Defective solenoid	a. Check wiring for loose terminals b. Replace solenoid (para 4-24)
11. Pressure gage inoperative	a. Loose tube connection b. Defective gage	a. Tighten b. Replace gage (para 4-26)
12. Compound gage inoperative	a. Loose cable connection b. Defective gage	a. Tighten b. Replace gage (para 4-26)
13. Tachometer inoperative	a. Loose cable connection b. Defective thermometer	a. Tighten b. Replace tachometer (para 4-26)
14. Oil pressure warning light does not light when accessory switch is turned on (with engine not running)	a. Burned out lamp b. Defective lamp holder c. Defective wiring d. Defective oil pressure warning switch	a. Replace lamp (para 4-26) b. Replace lamp holder (para 4-26) c. Check wiring for loose terminals d. Replace switch (para 4-26)
15. Temperature warning light does not light when wire is disconnected from switch and grounded	a. Burned out lamp b. Defective lamp holder c. Defective wiring	a. Replace lamp (para 4-26) b. Replace lamp holder (para 4-26) c. Check wire for loose terminals

Table 4-2. Troubleshooting — Continued

Malfunction	Probable cause	Corrective action
16. Temperature warning light does not light when engine temperature gage (cab instrument panel) indicates 200 deg F	Defective temperature switch	Replace switch (para 4-26)
17. Siren inoperative	a. Wiring defective b. Siren hand or foot switch defective c. Defective siren d. Defective solenoid	a. Tighten loose connections b. Replace defective hand or floor switch (para 4-30, 4-31) c. Replace defective siren (para 4-28) d. Replace solenoid (para 4-32)
18. Siren light inoperative	a. Burned out lamp b. Defective flasher c. Defective siren and warning light switch	a. Replace lamp (para 4-29) b. Replace flasher (para 4-29) c. Replace switch (para 4-29)
19. Warning light inoperative	a. Burned out lamps b. Defective siren and warning light switch c. Defective wiring d. Defective warning light	a. Replace lamps (para 4-34) b. Replace switch (para 4-29) c. Check wiring for loose terminals d. Replace warning light (para 4-34)
20. Spotlight inoperative	a. Burned out lamp (s) b. Defective wiring c. Defective spotlight Rear spotlight only d. Defective switch on rear spotlight (s)	a. Replace lamps (para 4-36, 4-38) b. Check wiring for loose terminals c. Replace spotlight (para 4-36, 4-38) d. Replace switch (para 4-38)
21. Spotlights (all) inoperative	Defective spotlight switch	Replace switch (para 4-37)
22. Dome light (s) inoperative	a. Burned out lamp b. Defective socket c. Defective wiring	a. Replace lamp (para 4-39) b. Replace entire assembly (para 4-39) c. Check wiring for loose terminals
23. Engine light (s) inoperative	a. Burned out lamp (s) b. Defective lamp holder and switch	a. Replace lamps (para 4-40) b. Replace entire assembly (para 4-40)

Section V. RADIO INTERFERENCE SUPPRESSION

4-6. General Methods Used to Attain

Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors. For general information on radio interference suppression, see TM 11-483.

4-7. Interference Suppression

Components

a. *Capacitors.* The fire truck has two capacitors located on the siren, and warning light. The capacitors are illustrated on figure 3-11.

b. *Secondary Suppression Components.* Tooth-type lockwashers are used to assure good metal-to-metal contact where electrical components are mounted.

4-8. Replacement of Suppression Components

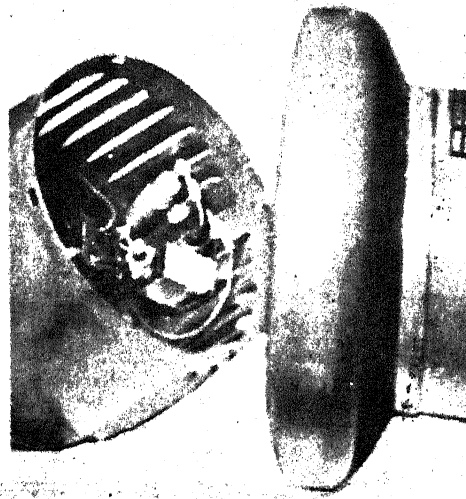
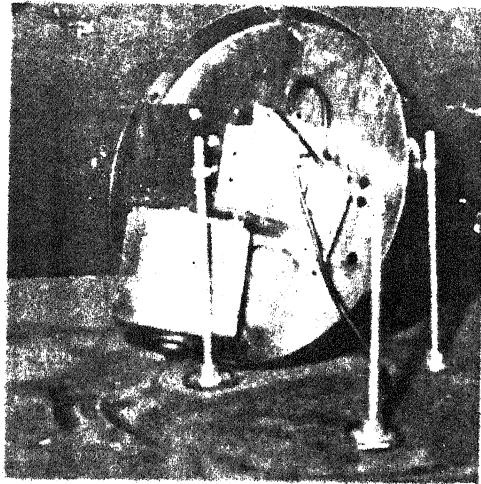
a. *Primary Suppression Components.* Replace

radio interference components with new components that are identical in size and have the same rating as the parts being replaced. It is essential that a good metal-to-metal contact is achieved to maintain proper radio interference suppression. To correct faulty suppression, substitute new interference suppression components until the faulty components are discovered.

b. *Secondary Suppression Components.* These components have radio interference suppression functions that are incidental or secondary to their primary functions; i.e., tooth-type lockwashers.

4-9. Testing of Radio Interference Suppression Components

Test capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate cause of interference by trial-and-error method of replacing each capacitor until cause of interference is located and eliminated.



ME 4210-217-12 4-1

Figure 4-1. Radio interference suppression.

Section VI. MAINTENANCE OF FIRE PUMP ASSEMBLY

4-10. General

Purpose of the fire pump assembly is to provide a means by which water is raised, transferred or compressed to facilitate control and extinguishment of fires. It performs in conjunction with other controls, valves and piping to accomplish this mission.

4-11. Packing Adjustment

Whenever the leakage rate becomes excessive, adjust packing glands in the following manner, (fig. 4-2 and fig. 4-3):

- a. Operate pump at a discharge pressure of 150 PSI.
- b. Tighten each adjusting nut 1/6 turn (one flat)

and check leakage rate. (Desired rate 10 to 60 drops per minute).

- c. After each adjustment, feel packing gland. If gland begins to heat up, back off adjusting nuts slightly, wait five minutes for gland to cool, and again check glands for overheating.

- d. If leakage rate is still excessive, gradually tighten adjusting nuts 1/6th turn at a time until obtaining desired leakage rate. Normally, 1/2 to 3/4 turn on adjusting nut is sufficient:

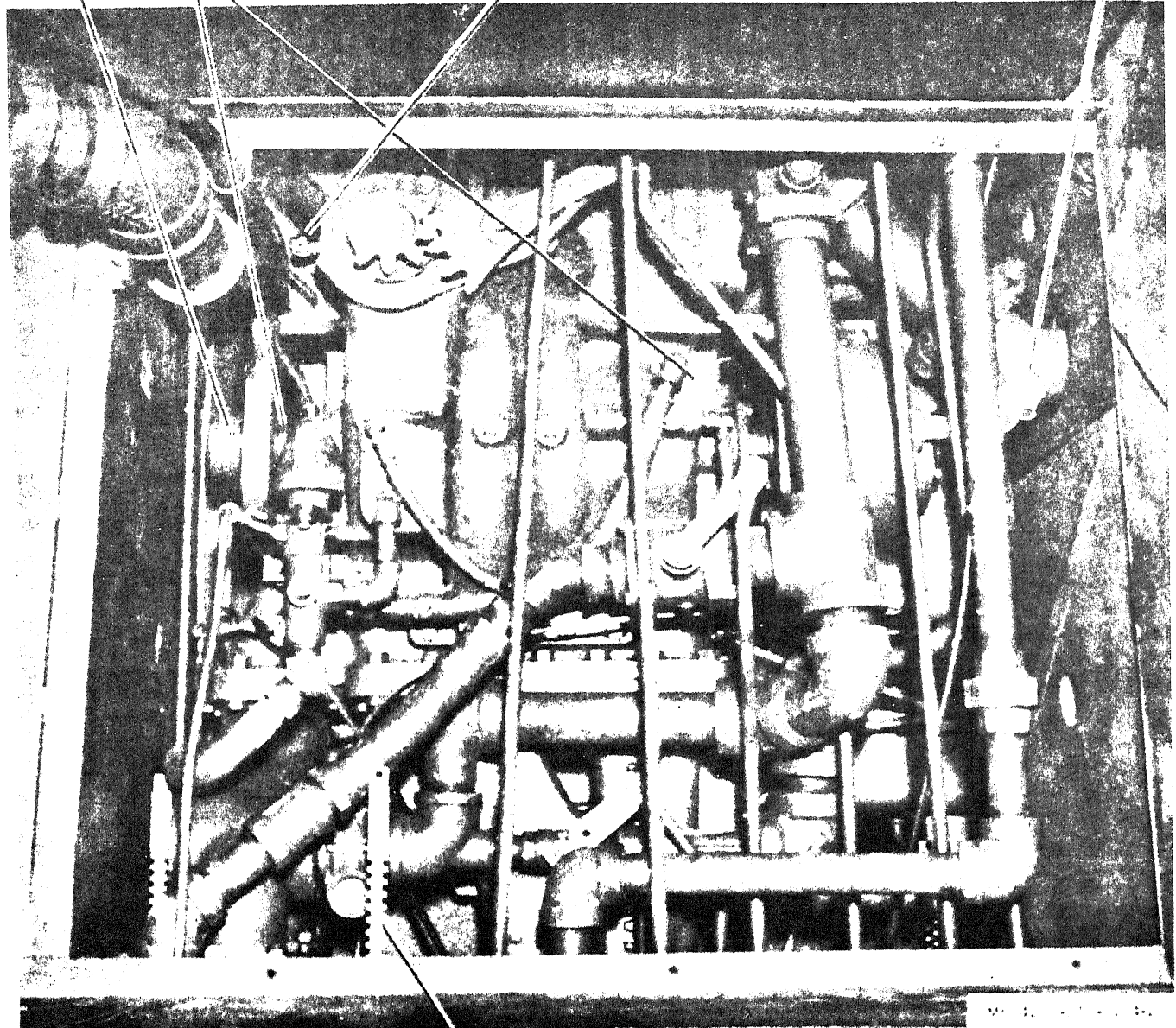
- e. If continuing adjustment does not reduce leakage to an acceptable rate, not less than 10 or more than 60 drops per minute, report deficiency to Direct Support Maintenance.

WATER PUMP BEARING (IMPELLER SHAFT)
LUBRICATION FITTING

FIRE PUMP HEAD
SAFE PULL CAP

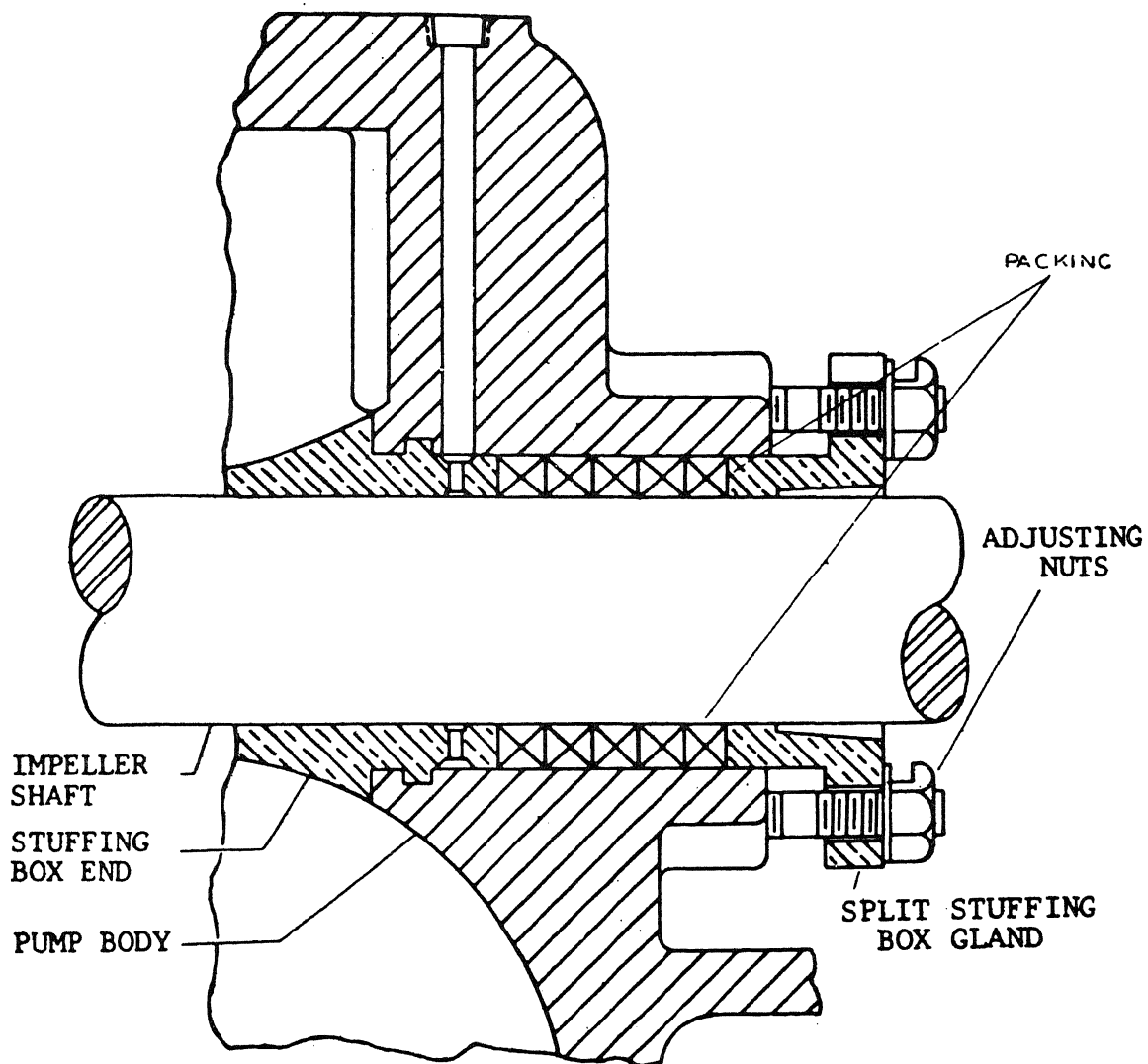
WATER PUMP PACKING

TRANSFER VALVE
LUBRICATION FITTING



GEAR SECTOR RACKS (5 EACH)

Figure 4-2. Fire pump



ME 4210-217-12/4-3

Figure 4-3. Fire pump packing, removal and installation

4-12. Panel, Center Bottom

Refer to figure 4-4 for removal and installation of bottom panel.

4-13. Drain, Gear Case and Breather, Oil Fill

- a. Refer to figure 4-2 and figure 4-5 for location of gear case drain and breather.
- b. To gain access to gear case drain, refer to figure 4-4 and remove center bottom panel.

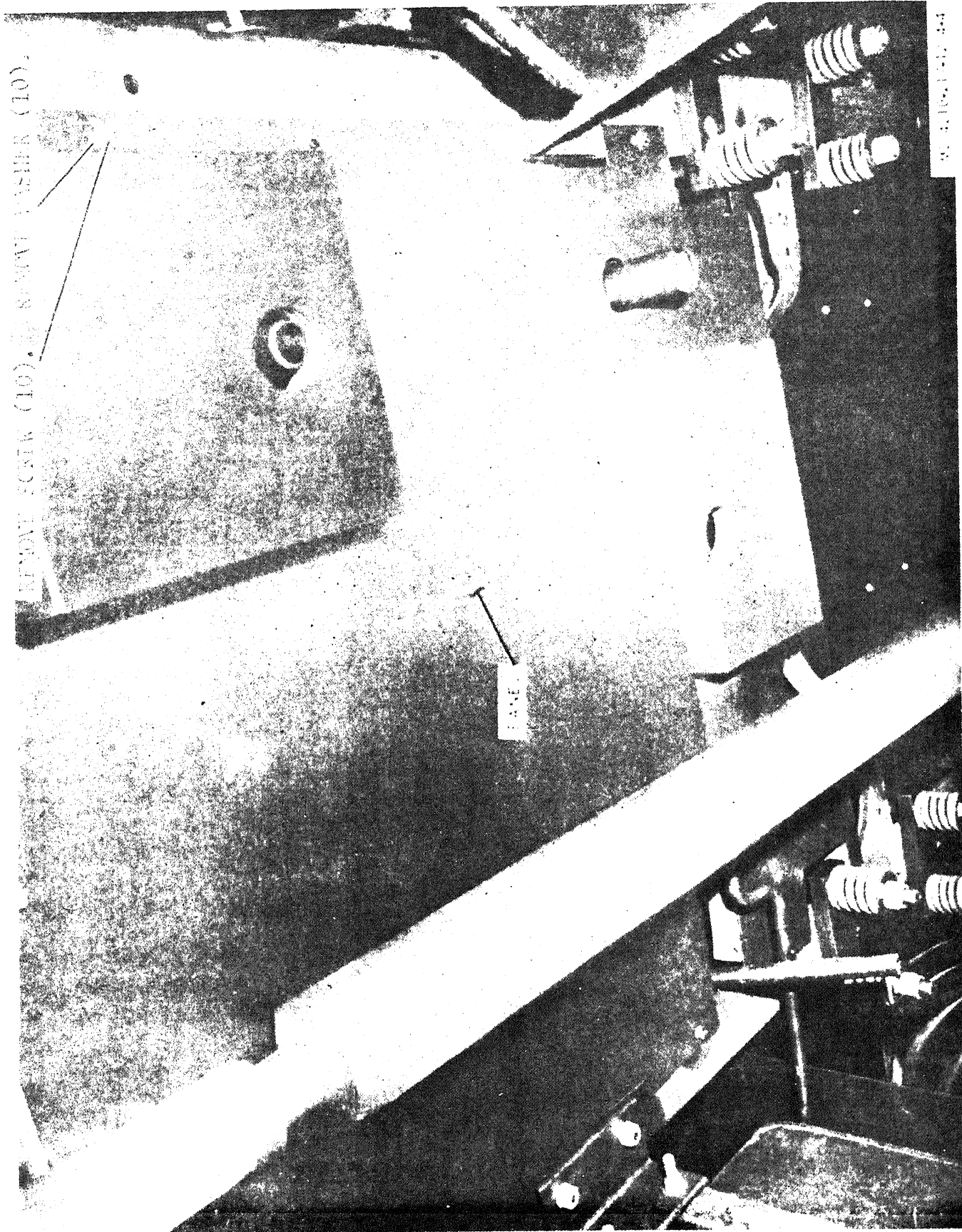
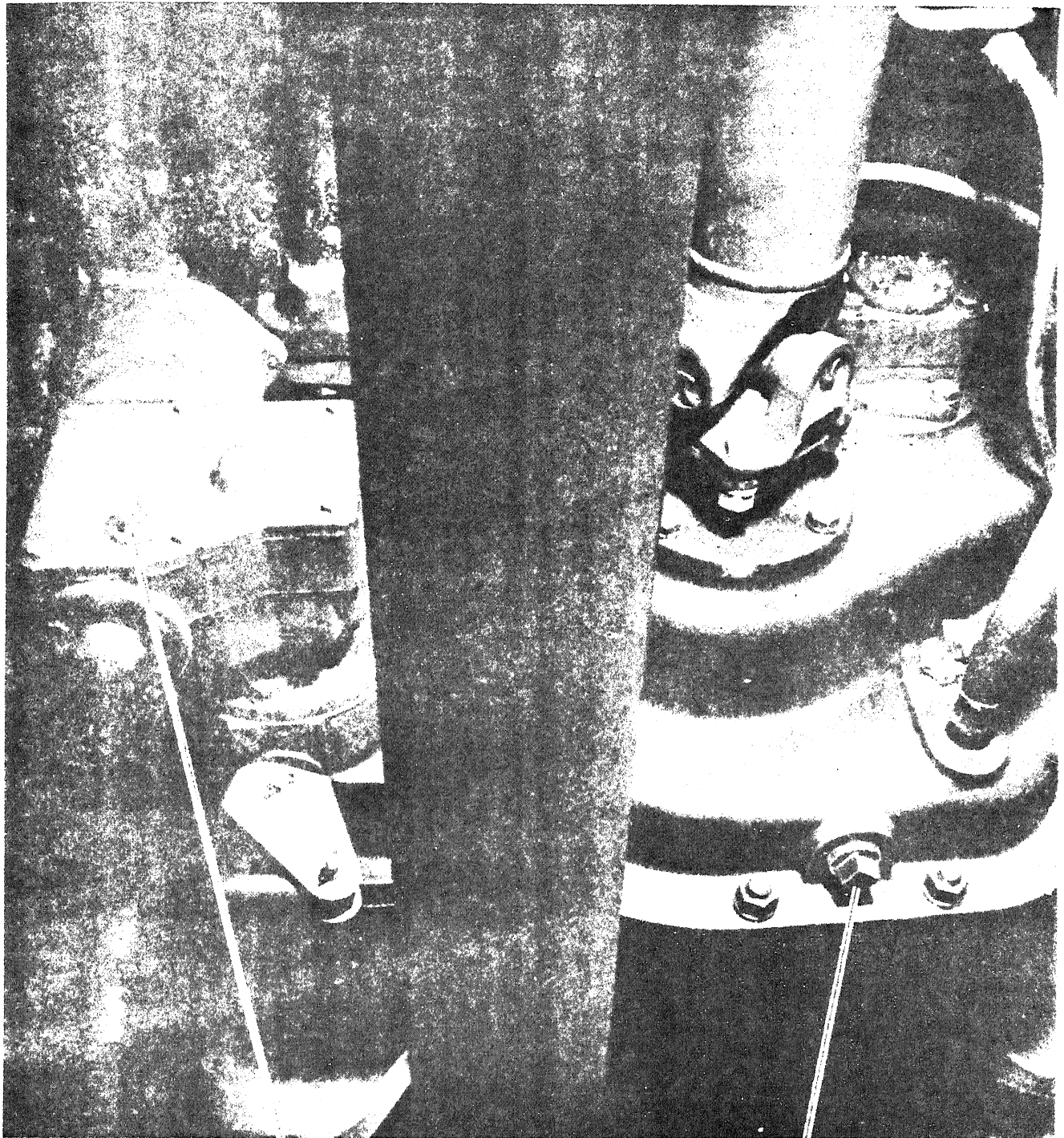


Figure 3-4. Panel, center bottom



PISTON SHIFT OIL LEVEL
AND FILL PLUG

FIRE PUMP BEARING
DRAIN PLUG

ME 4-15-1945 45

Figure 4-5. Electric shift and gear case (gear case and drain plug).

Section VII. MAINTENANCE OF PILOT VALVE ASSEMBLY

4-14. General

A panel mounted, adjustable valve which regulates the operation of the relief valve. A four-way valve and related fittings connect the pilot valve to the relief valve and pump.

4-15. Strainer, Pilot Valve

a. Removal

- (1) Refer to (22, fig. 2-1) for location of strainer.
- (2) Loosen hexagon head, capscrew and remove strainer. If necessary, strainer may be removed with

pump operating providing the four-way valve (23, fig. 2-1) is in the OFF position.

b. Cleaning and Inspection.

- (1) Clean strainer thoroughly with clear water.
- (2) Inspect for damage.

(3) Replace if defective.

c. Installation.

- (1) Install strainer.
- (2) Tighten sufficiently to seat packing and prevent leakage.

Section VIII. MAINTENANCE OF TANK ASSEMBLY, PRIMING

4-16. General

This tank acts as a reservoir to store sufficient oil which is necessary to provide lubrication and an air tight seal between the rotors of the priming pump assembly.

4-17. Tank, Priming

a. Removal. Refer to figure 4-6 and remove tank.

b. Cleaning and Inspection.

- (1) Clean by wiping with clean cloth.
- (2) Inspect for damaged or defective parts.
- (3) Replace or repair damaged or defective parts.

c. Installation. Refer to figure 4-6 and install tank.

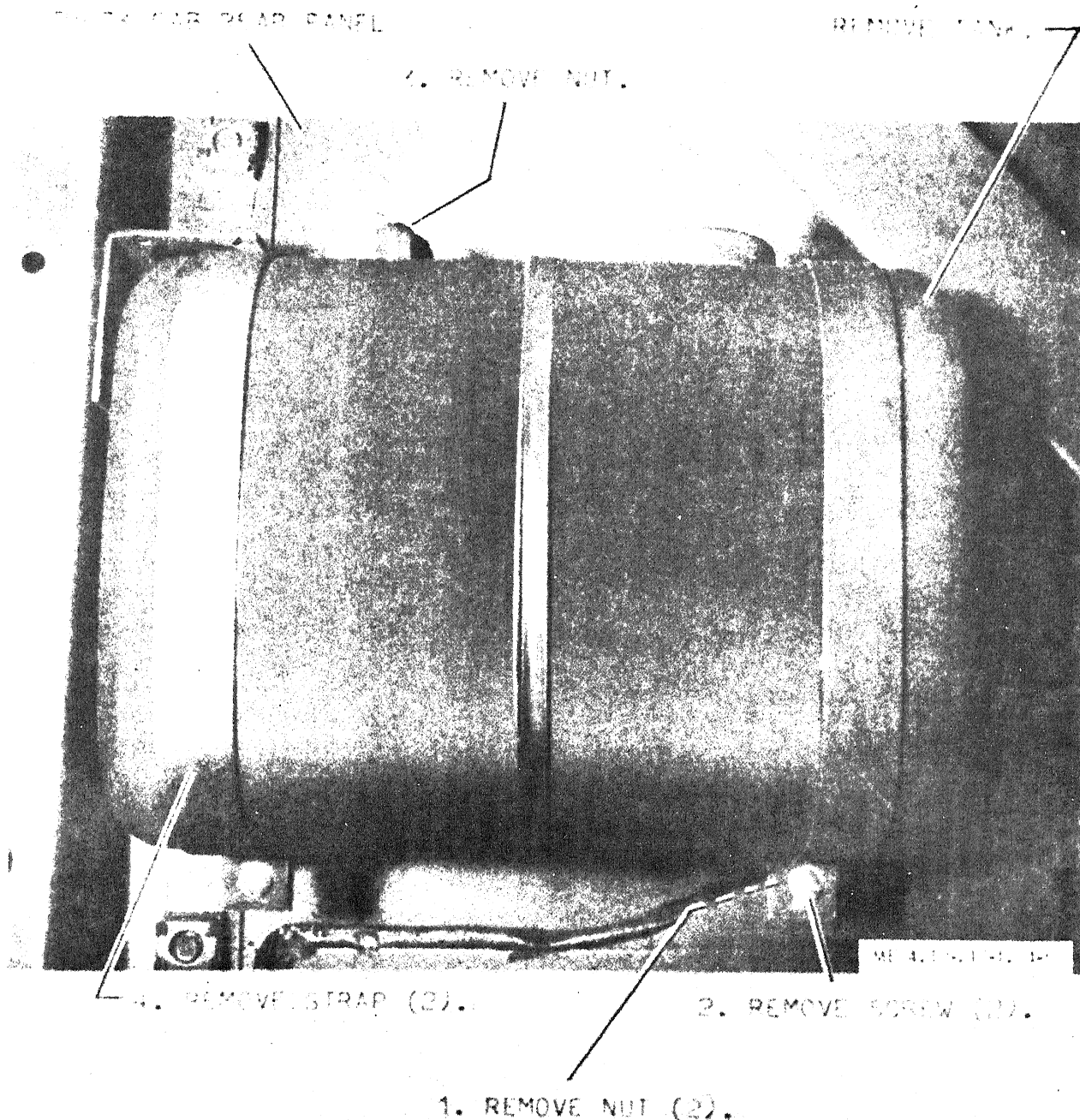


Figure 4-6. Priming tank assembly, removal and installation.

Section IX. MAINTENANCE OF ELECTRIC SHIFT CONTROL PANEL AND PUMP ENGAGED SWITCH

4-18. General

The electric shift permits electrically selecting either pump and roll or stationary operating positions without leaving cab. It permits positive shifting and eliminates the need for complicated mechanical linkage control. When the PTO lever is raised to the fullest point of travel, the lever depresses a button on switch which in turn causes the pump engaged light to illuminate.

4-19. Control Panel Assembly

a. Removal

- (1) Refer to figure 4-7
- (2) Disconnect and tag leads
- (3) Disconnect tubing leading to gage and steady valve
- (4) Remove hardware attaching panel to dash
- (5) In the event only one component is defective, remove that component only by disconnecting applicable lead or tubing and removing attaching hardware

6) To replace defective lamps remove jewel from front of panel only

b. Cleaning and Inspection

- (1) Clean by wiping with clean cloth
- (2) Inspect for damaged or defective parts.
- (3) Replace or repair damaged or defective parts.

c. *Installation.* Install by performing steps 1-4 above in reverse order

4-20. Pump Engaged Red Indicator Light Switch

a. *Adjustment.* Refer to figure 4-7 for adjustment of switch

b. *Removal and Installation.* If testing indicates defective switch refer to figure 4-7 for removal and installation

Key to Figure

1. Indicator light wire
2. Indicator light switch wire
3. Plug
4. Indicator switch
5. Plug
6. Nut
7. Washer
8. Indicator lamp
9. Indicator lamp
10. Indicator lamp
11. Indicator lamp
12. Indicator lamp
13. Indicator lamp
14. Indicator lamp
15. Indicator lamp
16. Indicator lamp
17. Indicator lamp
18. Indicator lamp
19. Indicator lamp
20. Indicator lamp
21. Indicator lamp
22. Indicator lamp
23. Indicator lamp
24. Indicator lamp
25. Indicator lamp
26. Indicator lamp
27. Indicator lamp
28. Indicator lamp
29. Indicator lamp
30. Indicator lamp

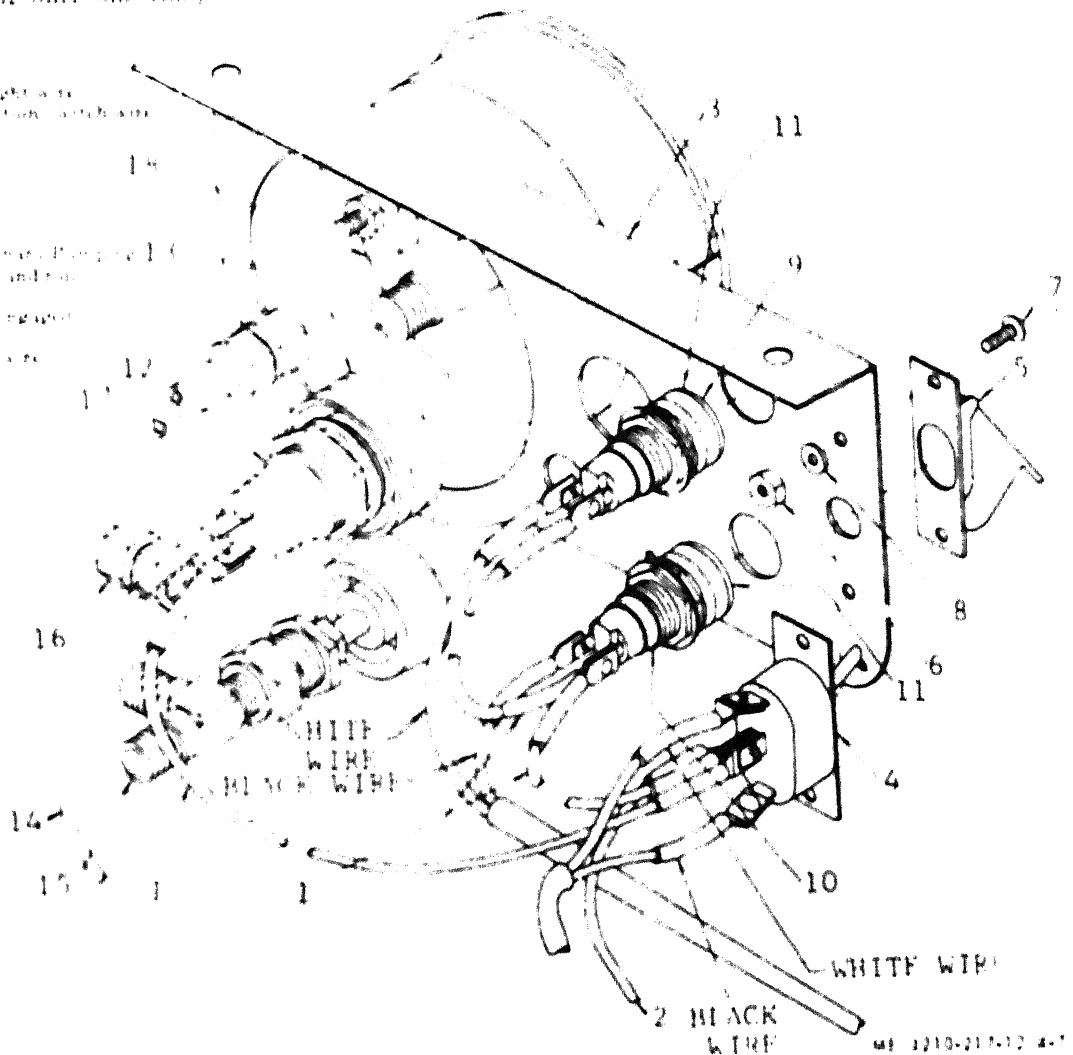
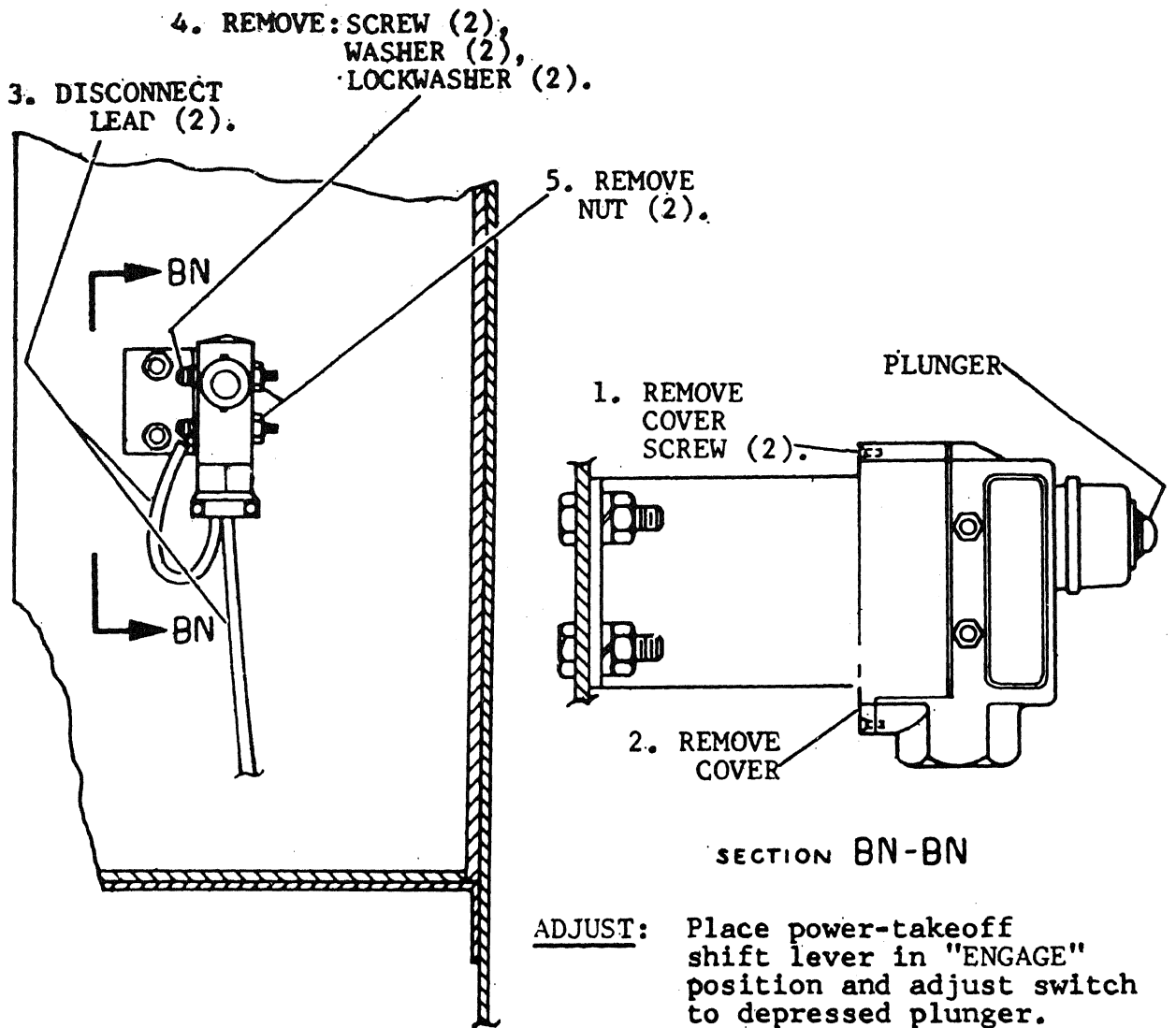


Figure 4-7. Electric shift control panel, removal and installation



ME 4210-217-12/4-8

Figure 4-8. Pump engaged red indicator light switch, removal and installation.

Section X. MAINTENANCE OF STRAINER ASSEMBLY, FOAM TANK AND VENT HOSE

4-21. General

Strainer is installed in the fill area of foam tank and is provided to prevent the entry of debris into the piping system of vehicle. The vent hose provides a vent to facilitate fitting of tank.

4-22. Strainer and Hose

a. Removal.

- (1) Refer to figure 4-9 and remove strainer.

- (2) Refer to figure 4-10 and remove vent hose.

b. Cleaning and Inspection.

- (1) Clean strainer by flushing with clear water.
- (2) Inspect wire mesh of strainer for large holes and deterioration.
- (3) Inspect hose for holes and/or dry rot.
- (4) Replace defective strainer or hose.

c. Installation

- (1) Refer to figure 4-10 and install vent hose.
- (2) Refer to figure 4-9 and install strainer.

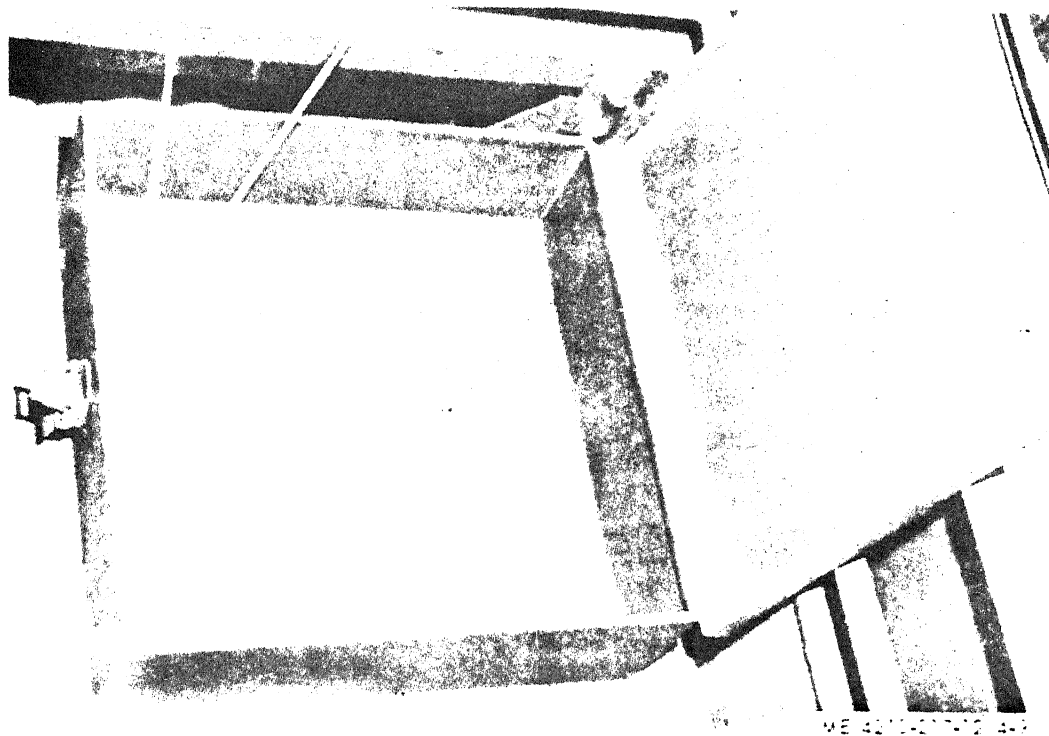


Figure 4-9. Foam tank strainer, removal and installation.

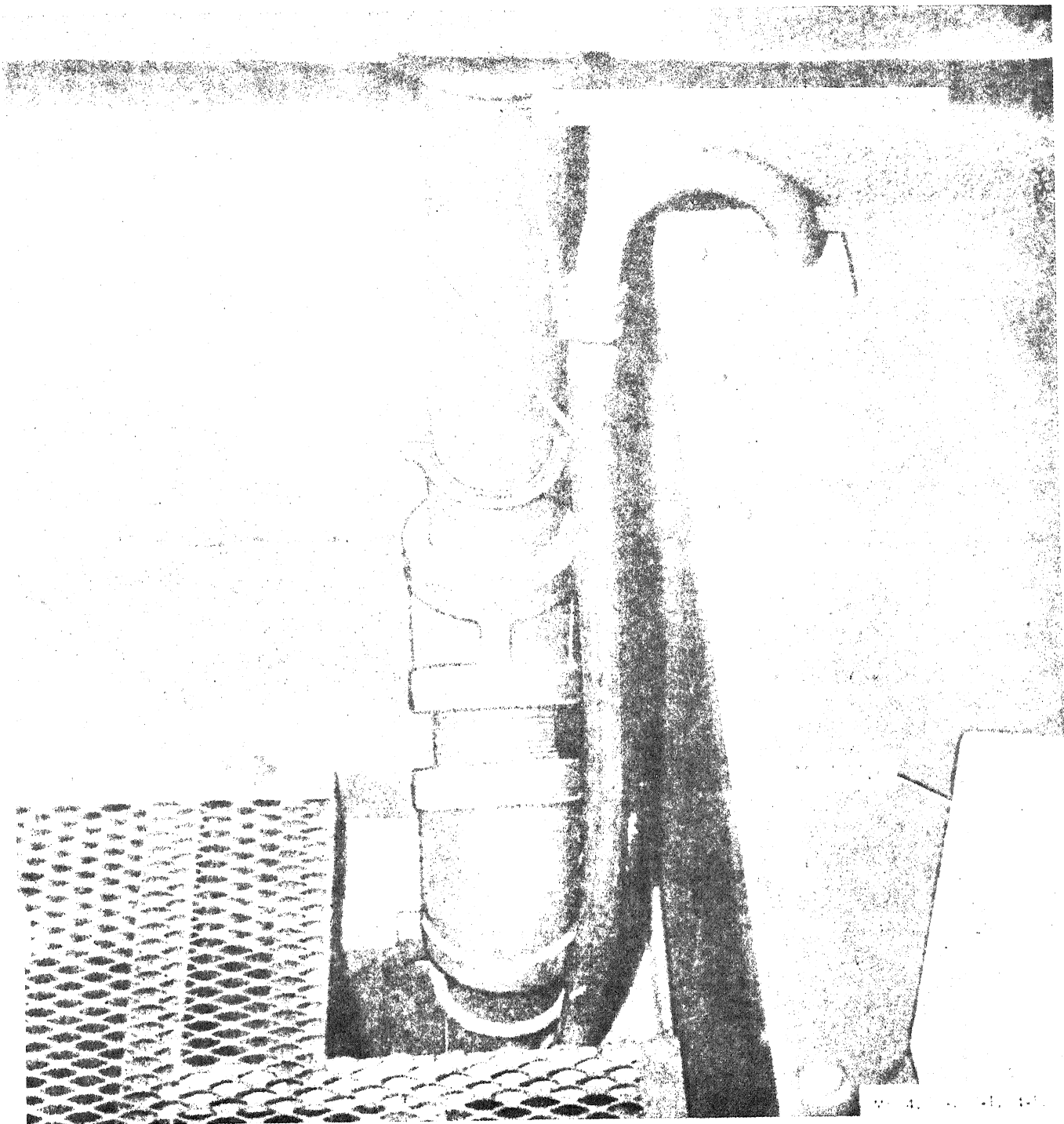


Figure 4-10. Foam tank vent hose, removal and installation.

Section XI. MAINTENANCE OF HOSE REEL BRAKE ASSEMBLY AND RELAY

4-23. General

These components are mounted on hose reel end brake and are provided for assistance with operation of hose reel.

4-24. Relay and Brake

a. Removal.

- (1) Refer to figure 4-11.
- (2) Disconnect and tag leads to solenoid.

(3) Remove solenoid and/or brake.

b. Cleaning and Inspection.

(1) Clean all parts with a clean cloth dampened with a clean cloth dampened with an approved solvent, and dry thoroughly.

(2) Inspect all parts for damaged or defective condition.

(3) Replace defective parts.

c. Installation. Install brake and solenoid by performing steps 2 and 3 in reverse order.



Figure 4-11. Hose reel relay and brake, removal and installation.

Section XII. MAINTENANCE OF INSTRUMENT HOUSING ASSEMBLY

4-25. General

The instrument housing contains the necessary gauges and warning lights that are required to keep the operator aware of conditions relating to engine RPM, pump discharge pressure, etc. during pumping operations.

4-26. Instrument Housing

a. Removal.

(1) Refer to figure 4-12.

(2) Remove the four round head screws, cover assembly, gaskets and light reflector. Remove the four flat head screws and withdraw the mounting plate.

(3) Disconnect and remove the gauges and tachometer. Tag the electrical leads and remove the indicator lights.

(4) Refer to figure 4-27. Disconnect and remove

the oil pressure warning switch.

(5) Refer to figure 4-28. Disconnect the engine temperature warning switch.

b. Cleaning, Inspection and Repair.

(1) Clean all parts thoroughly.

(2) Inspect for physical damage.

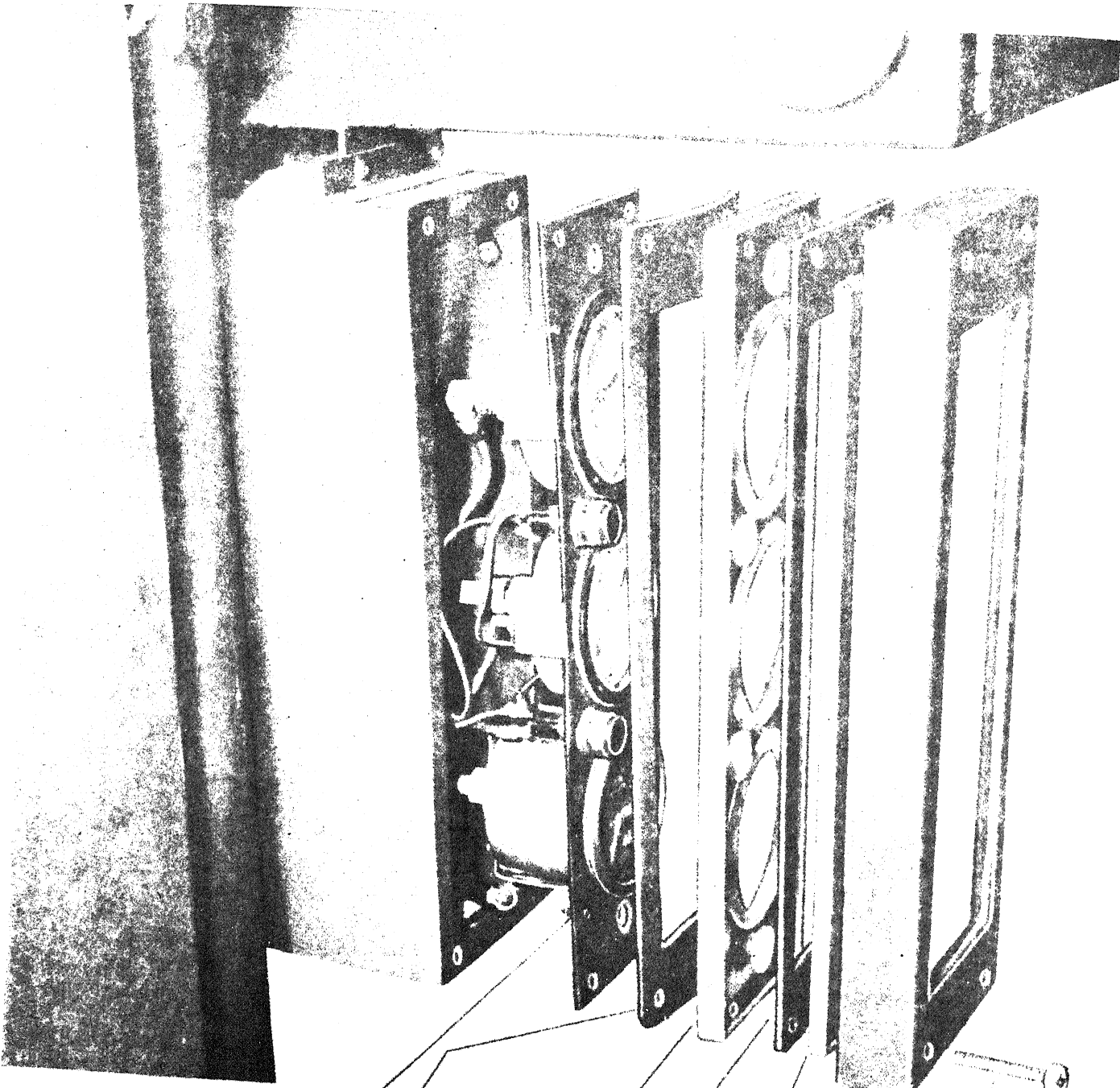
(3) Replace all defective parts. There are no maintenance provisions on the two pressure gauges, tachometer, associated wiring and tubing.

c. Assembly and Installation. Assemble and install the instrument housing assembly by reversing the procedures in paragraph 4-26.

d. Oil Pressure Warning and Temperature Warning Lights-check:

(1) Oil pressure warning light should light when accessory switch is on but engine is not running.

(2) Disconnect wire off temperature sensing unit and ground wire terminal. Temperature indicator light should come on.



- 7. REMOVE SCREW (4) AND MOUNTING PLATE.
- 6. REMOVE GASKET.
- 5. REMOVE LIGHT REFLECTOR.
- 4. REMOVE COVER GASKET.
- 3. REMOVE GLASS.
- 2. REMOVE COVER ASSEMBLY.
- 1. REMOVE SCREW (4).

ME 4210-517-12 4-12

Figure 4-12. Instrument panel assembly, removal and installation.

Section XIII. MAINTENANCE OF SIREN ASSEMBLY AND SWITCHES

27. General

The siren assembly provides a means of audio and

visual warning during travel to location of disaster. Switches are installed to allow operation of siren by personnel other than driver.

4-28. Siren

a. Removal.

- (1) Refer to figure 4-13.
- (2) Tag and disconnect siren leads.
- (3) Remove four (4) each screws, nuts and washers and remove mounting plate and siren.

b. Inspection and Repair.

- (1) Refer to figure 4-13, Sheet 2 and replace siren lamp.
- (2) Refer to figure 4-1 for location of siren flasher. Replace as required.

c. *Installation.* Refer to Paragraph 4-28 and install siren assembly in reverse order.

4-29. Siren Flasher and Warning Light Switch

Refer to figure 2-5 for removal and installation for switch.

4-30. Siren Foot Switch

Refer to figure 4-14 for removal and installation of siren foot switch.

4-31. Siren Hand Switch

Refer to figure 2-6 for removal and installation of switch.

4-32. Siren Solenoid Relay

Refer to figure 4-15 for removal and installation of relay.

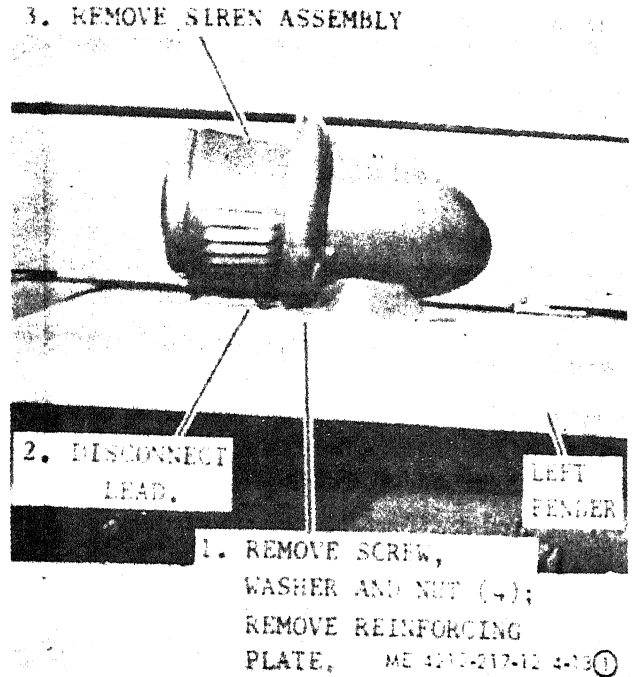


Figure 4-15. Siren and flasher light, removal and installation. (sheet 1 of 2)

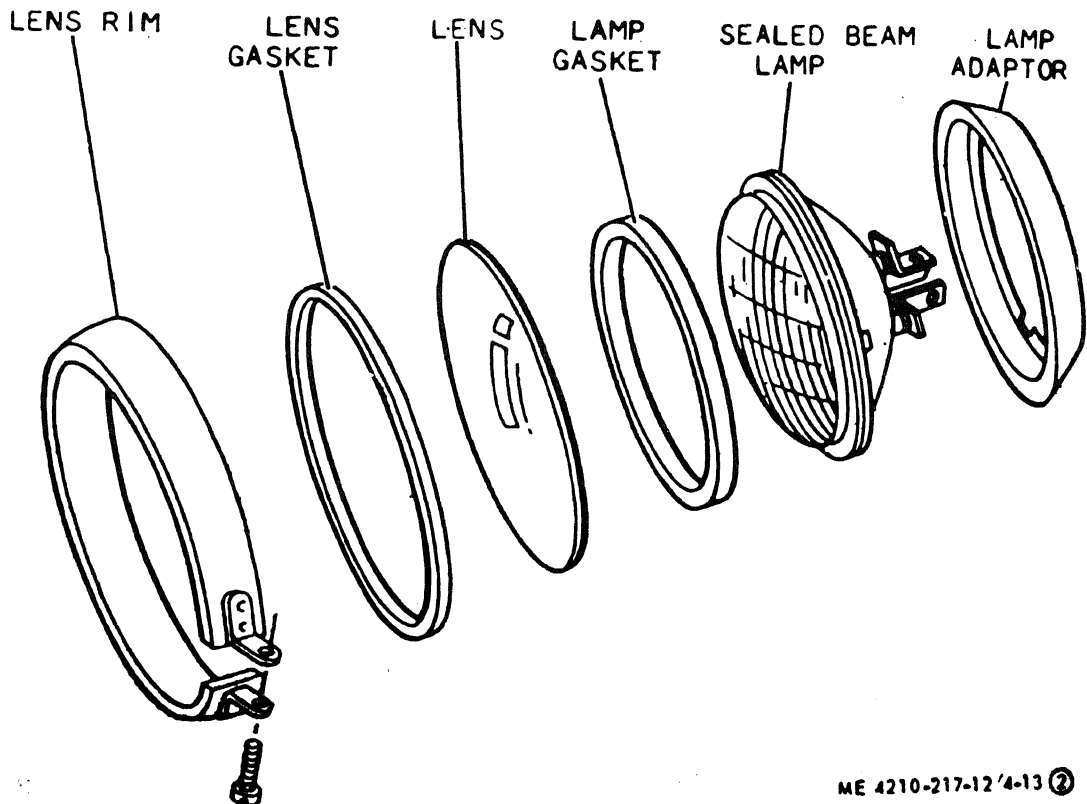
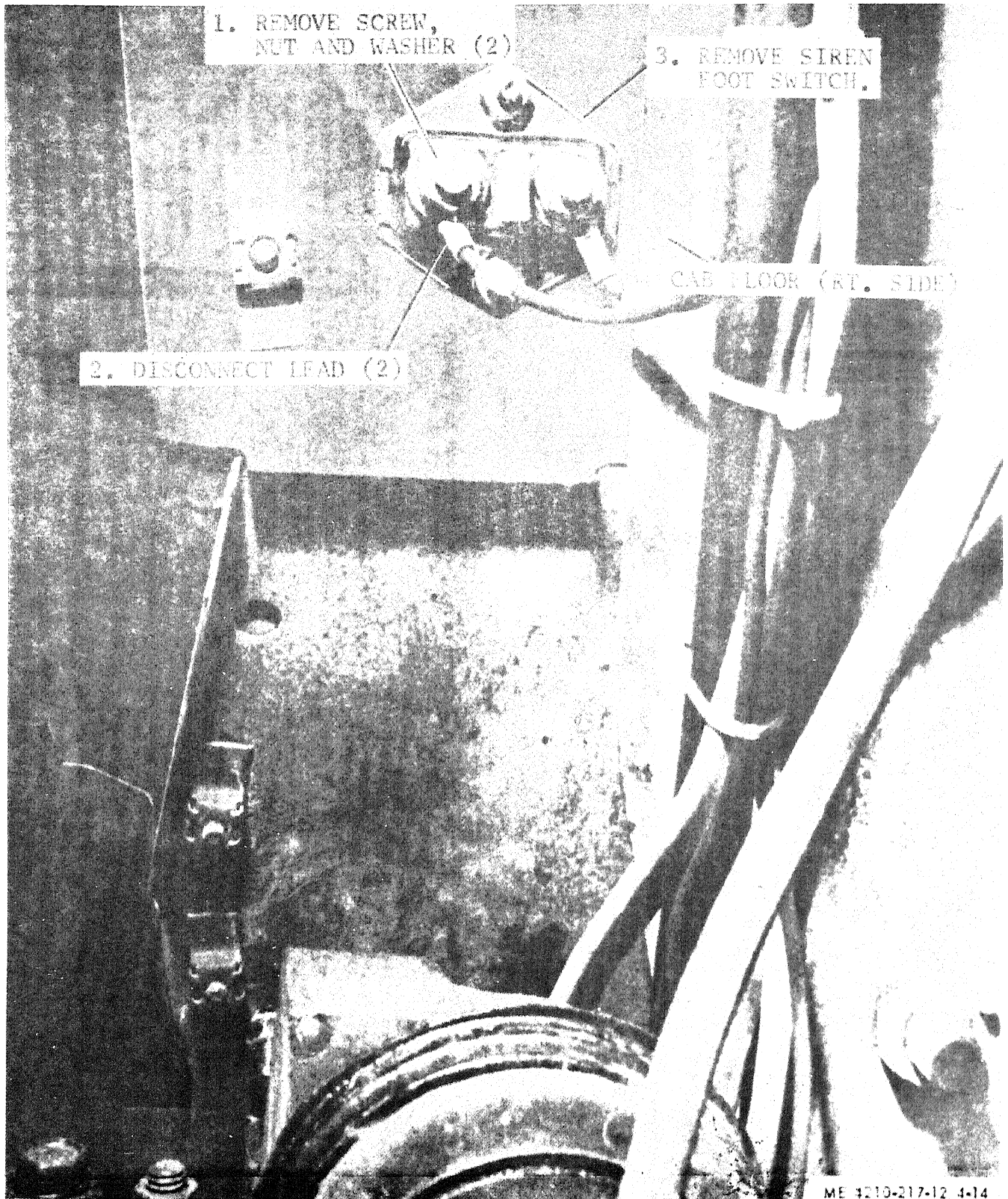


Figure 4-13. Siren and flasher light, removal and installation. (sheet 2 of 2)

ME 4210-217-12 4-13 ②



① 11-11-11-11-11

Figure 4-14. Siren foot switch, removal and installation.

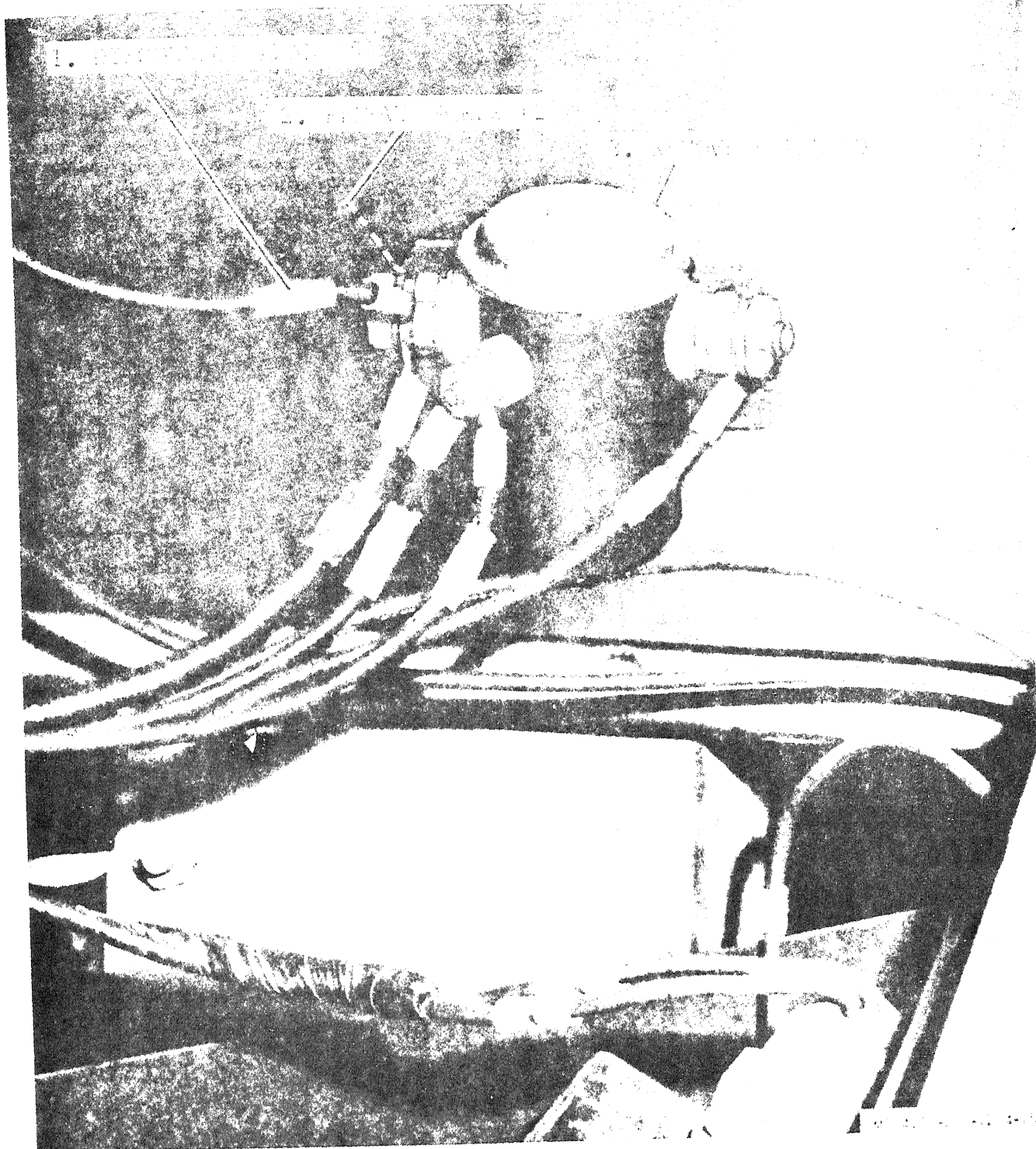


Figure 4-15 Siren solenoid relay, removal and installation.

Section XIV. MAINTENANCE OF WARNING LIGHT ASSEMBLY

4-33. General

A rotating type light used in conjunction with siren assembly to provide visual warning during travel to location of disaster and for use during operations to alert surrounding area to the existence of hazardous conditions.

4-34. Removal

a. *Removal.* Refer to figure 4-16, sheet 1, and re-

move the warning light from the fire truck.

b. *Disassembly.* Refer to figure 4-16, Sheet 2 and disassemble the warning light.

c. *Cleaning, Inspection and Repair.*

(1) Clean all parts thoroughly.

(2) Inspect for physical damage.

(3) Replace defective parts as necessary.

d. *Assembly.* Refer to figure 4-16 to reassemble the warning light in the reverse order.

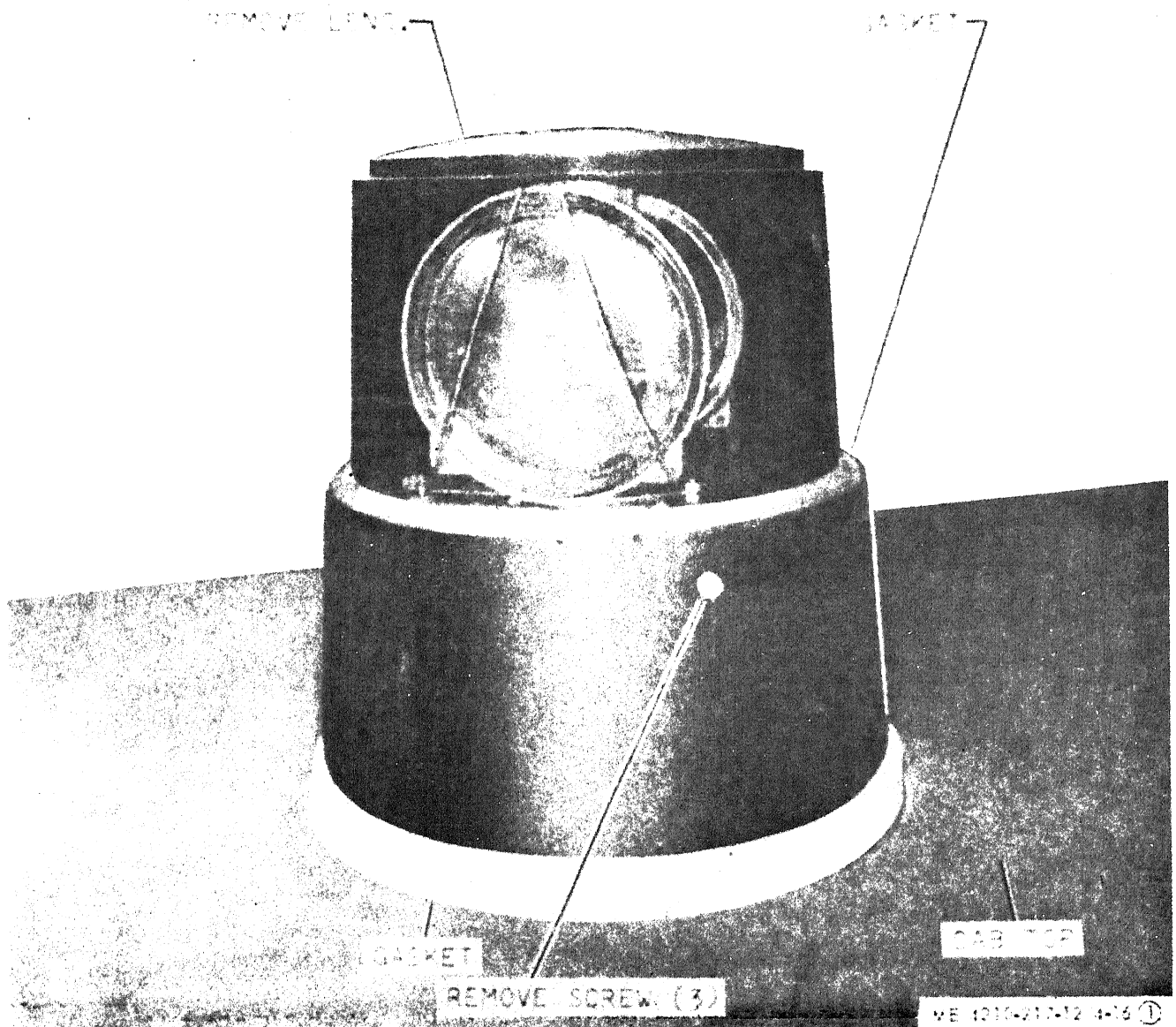


Figure 4-16. Warning light, removal and installation (sheet 1 of 2)



Figure 4-16 Warning light, removal and installation (Sheet 2 of 2)

Section XV. MAINTENANCE OF SPOTLIGHTS AND ACCESSORY LIGHTS

4-35. General

This section covers those lights that are provided to illuminate areas of operation during nighttime missions. It includes spotlights, mounted front and rear, operator panel dome lights, and engine (underhood) lights.

4-36. Front Spotlight

a. *Removal.* Refer to figure 4-17, Sheet 1, to remove

the spotlight from the fire truck cab.

b. *Lamp Replacement.* Refer to figure 4-17, Sheet 2, for replacement of lamps.

c. *Cleaning, Inspection and Repair.*

- (1) Clean all parts thoroughly.
- (2) Inspect for physical damage.
- (3) Replace defective parts as necessary.

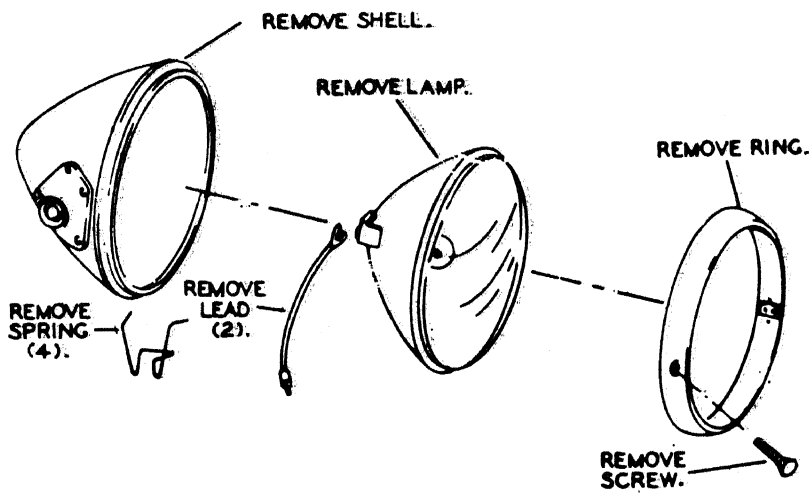
d. *Installation.* Refer to figure 4-17, Sheet 1, to install the spotlight on the fire truck cab.



CAB TOP

ME 4210-217-12 4-17 ①

Figure 4-17. Front spotlight, removal and replacement (sheet 1 of 2)



ME 4210-217-12/4-17 ②

Figure 4-17. Front spotlight, lamp, removal and replacement (sheet 2 of 2)

4-37. Spotlight Switch

Refer to figure 2-5 for replacement of defective spotlight switch

4-38. Rear Spotlight

a. *Removal.* Refer to fig. 4-18, sheet 1, to remove the rear spotlight from ladder support.

b. *Lamp Replacement.* Refer to figure 4-18, sheet 2, for replacement of lamp.

c. *Cleaning, Inspection and Repair.*

(1) Clean all parts thoroughly.

(2) Inspect for physical damage.

(3) Replace defective parts as necessary.

d. *Installation.* Refer to figure 4-18, Sheet 1, and install the rear spotlight on the fire truck body.

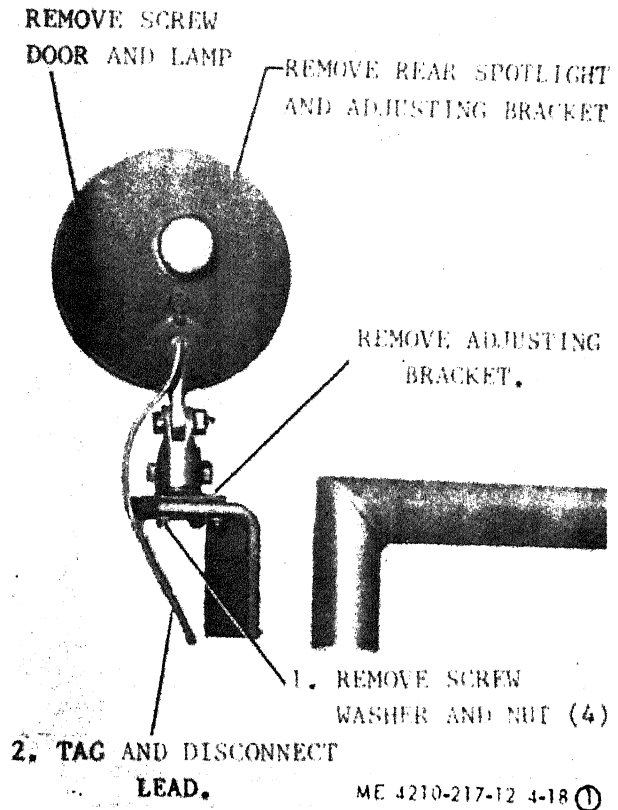


Figure 4-18. Rear spotlight, removal and installation. (sheet 1 of 2)

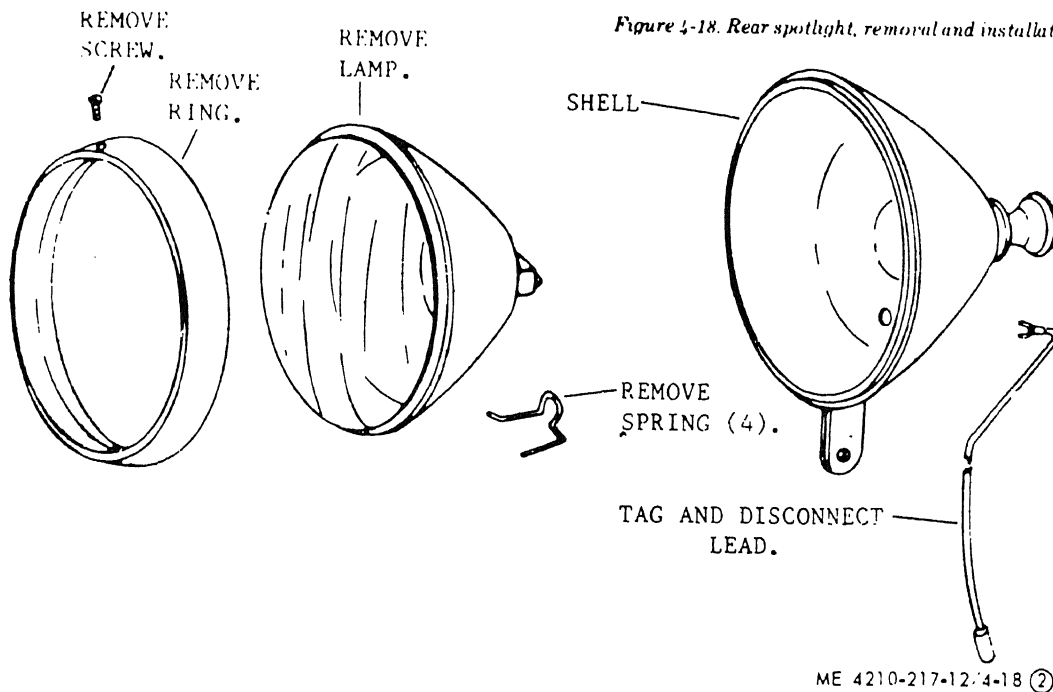


Figure 4-18. Rear spotlight, lamp and switch, removal and installation. (sheet 2 of 2)

4-39. Dome Lights

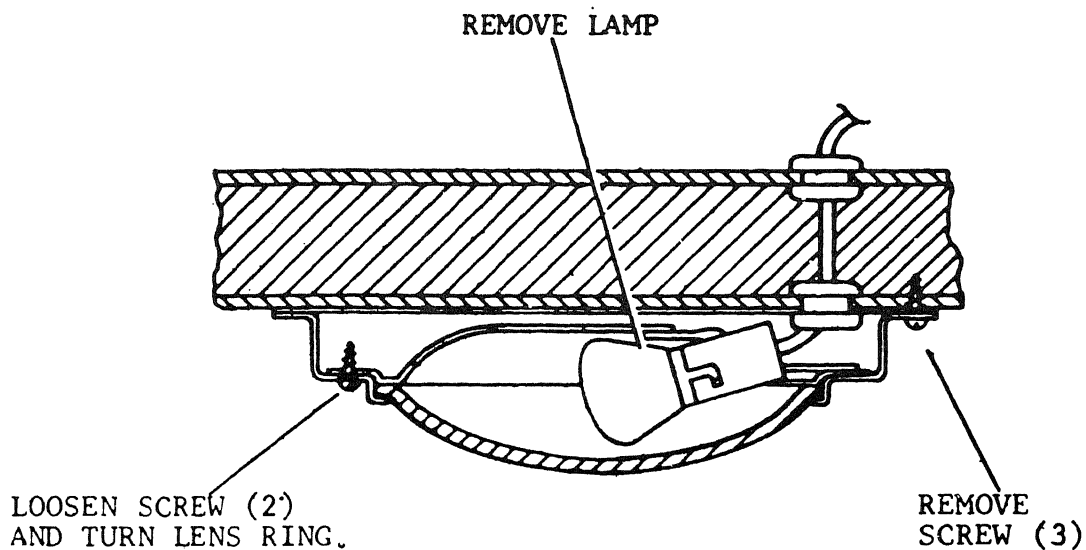
a. *Removal.* Refer to figure 4-19 for removal of light assembly.

b. *Inspection and Repair.*

(1) Inspect for physical damage (fig. 4-19).

(2) Replace defective lamp if necessary. If any part of the dome light is damaged replace entire dome light.

e. *Installation.* Refer to figure 4-19 for installation of light assembly.



ME 4210-217-12-4-19

Figure 4-19. Dome lights, removal and installation (left and right control panel).

4-40. Engine Light Assembly (Under Hood)

a. *Removal.* Refer to figure 4-20 to remove the under hood lights from the fire truck radiator mounting brackets.

b. *Cleaning, Inspection and Repair.*

(1) Inspect for physical damage.

(2) Replace defective lamp parts if necessary. If any part of the light assembly is damaged, replace entire unit.

c. *Installation.* Refer to figure 4-20 to install the under hood lights.

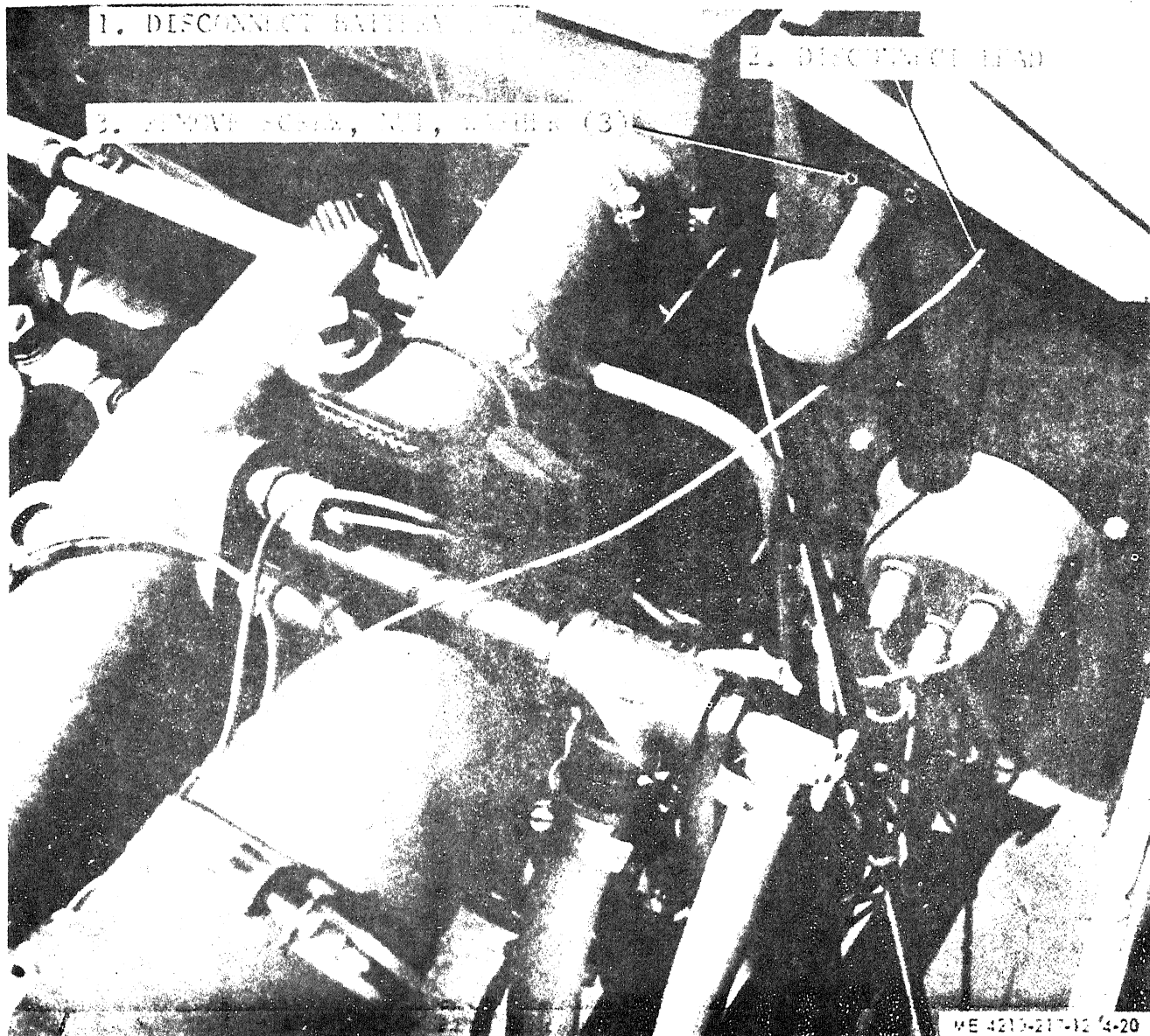


Figure 4-20. Engine light assembly (under hood). Removal and installation.

Section XVI. MAINTENANCE OF BATTERIES AND CIRCUIT BREAKERS

4-41. General

This section covers batteries and circuit breakers. Because of the additional amperage required to operate the components of the vehicle, four batteries have been provided. Circuit breakers have been installed in the main circuits to interrupt the electrical circuit under abnormal conditions.

4-42. Batteries

a. Removal. Refer to figure 4-21 for removal of batteries.

b. Cleaning and Inspection. Refer to TM 9-2320-209-20, section XIX, for servicing batteries.

c. Installation. Refer to figure 4-21 for installation of batteries.

4-43. Battery Leads

a. Removal. Refer to figure 4-21 for removal of defective leads.

b. Cleaning, Inspection and Repair.

(1) Clean all corrosion off lead terminals.

(2) Inspect leads for loose terminals, and broken insulation.

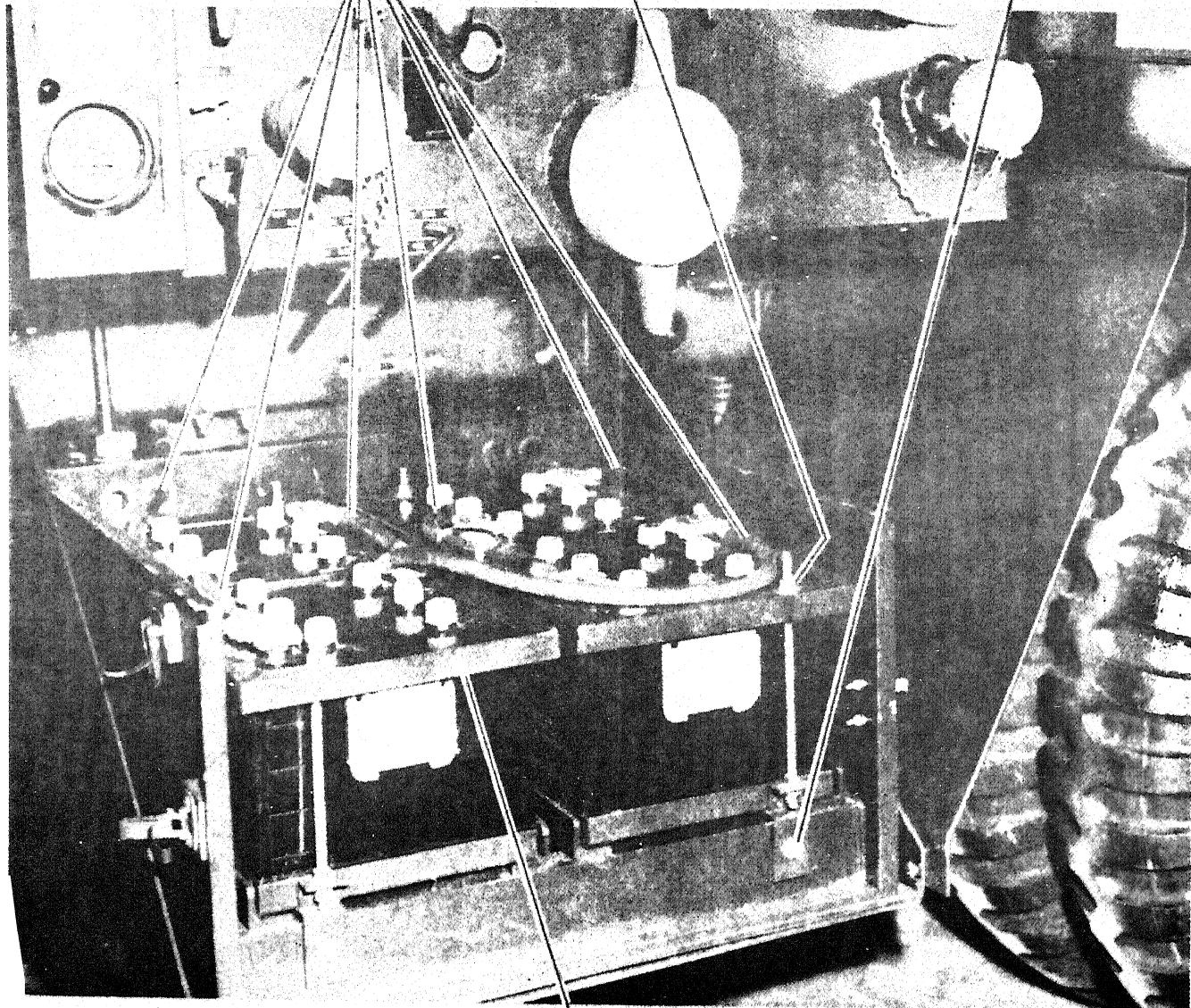
(3) Replace if necessary.

c. Installation. Refer to figure 4-21 and the battery orientation and wiring diagram plate on the inside of the side battery box cover for correct installation of battery leads.

REMOVE LEADS.

REMOVE NUT (4).

REMOVE SCREW (2);
PULL TRAY OUT.



LIFT FRAME (2).

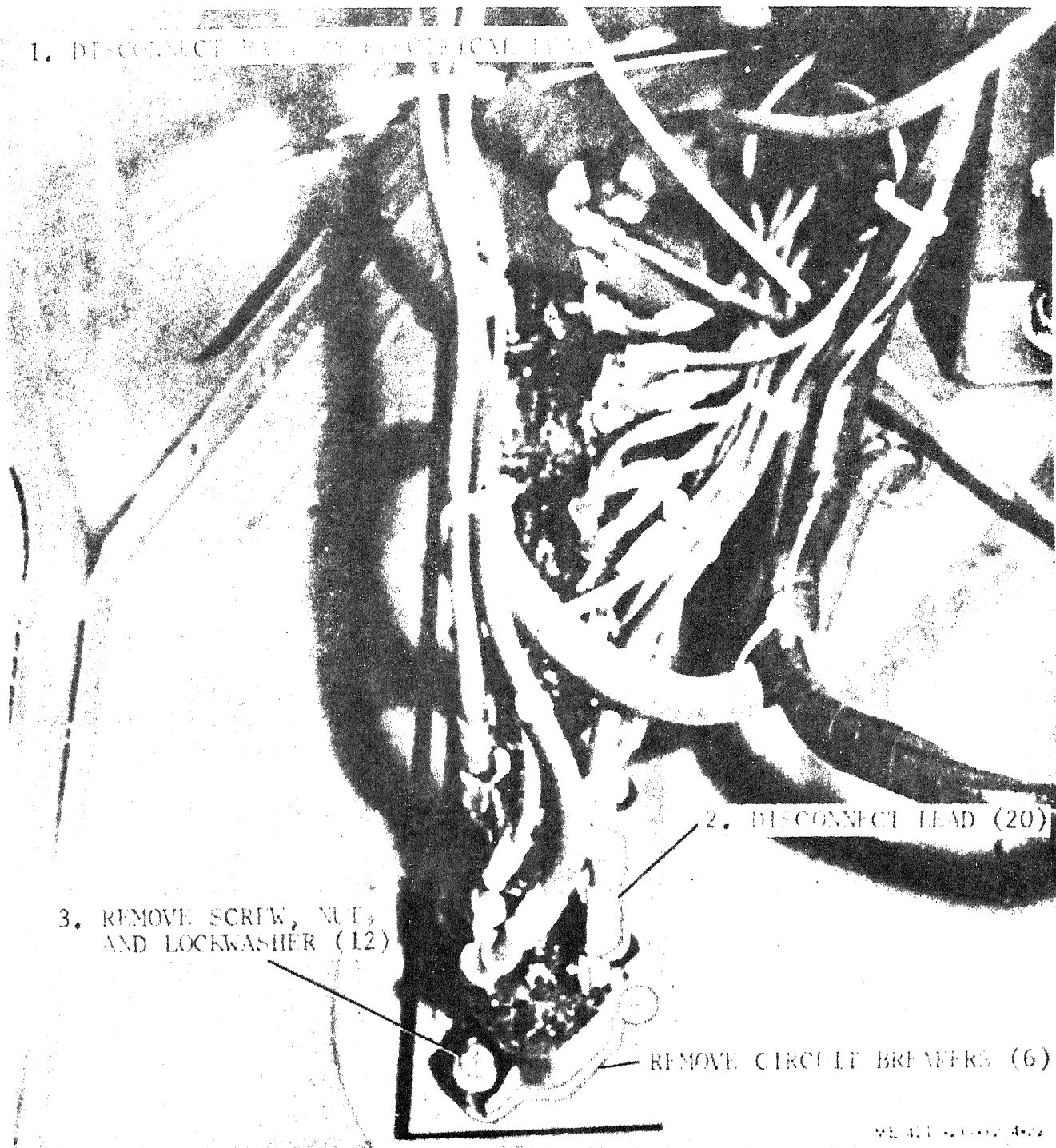
ME 4210-217-12 4-21

Figure 4-21. Batteries and battery leads, removal and installation.

4-44. Circuit Breakers

Refer to figure 4-22 for removal and installation of circuit breakers.

1. DISCONNECT WIRE FROM ELECTRICAL PANEL



2. DISCONNECT LEAD (20)

3. REMOVE SCREW, NUT,
AND LOCKWASHER (12)

REMOVE CIRCUIT BREAKERS (6)

Figure 4-22. Circuit breakers, removal and installation.

Section XVII. MAINTENANCE OF SPECIAL PURPOSE BODY

4-45. General

The special purpose body is a series of cabinets, brackets, platforms, etc. designed for efficient storage of components contained in the fire fighting

equipment sets listed in appendix A.

4-46. Folding Steps

Refer to figure 4-23 for the removal and replacement of folding steps.

4-47. Reflectors

Refer to figure 4-23 for the removal and replacement of reflectors.

4-48. Folding Handles

Refer to figure 4-24 for the removal and replacement of the folding handles.

4-49. Door Locks

Refer to figure 4-25 for the removal and replacement of door locks.

4-50. Spring Clips

Refer to figure 4-26 for the removal and replacement of spring clips.

4-51. Shovel Brackets

Refer to figure 4-26 for the removal and replacement of shovel brackets.

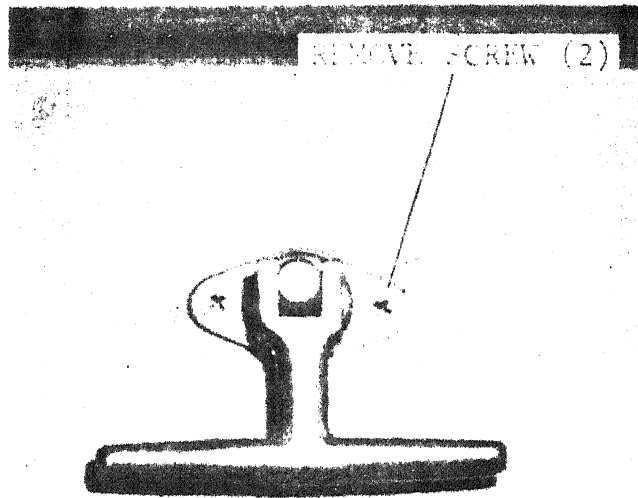


Figure 4-24. Folding handles, removal and installation.

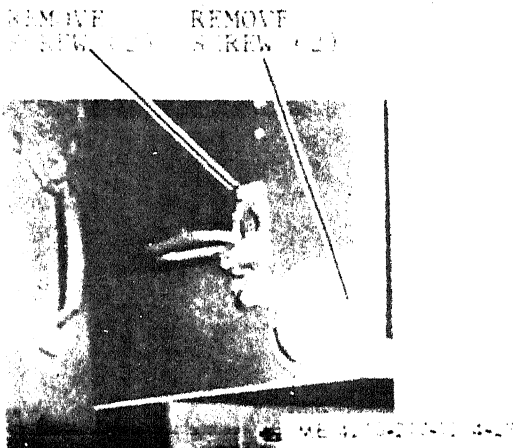


Figure 4-23. Folding steps and reflectors, removal and installation.

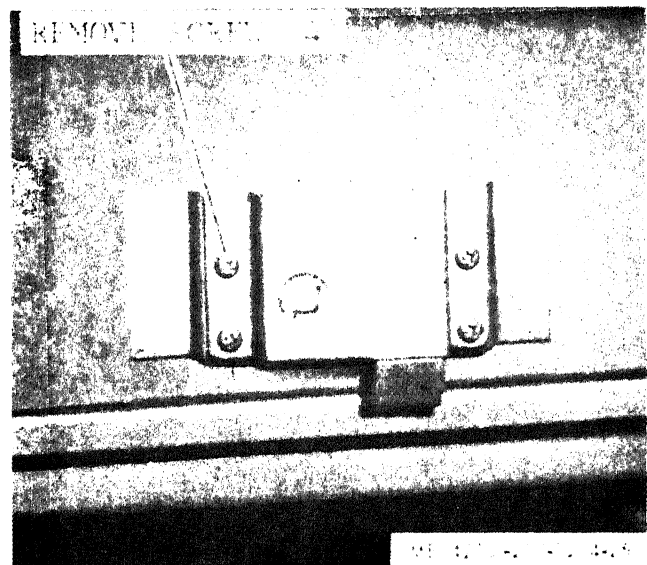


Figure 4-25. Compartment door locks, removal and installation.

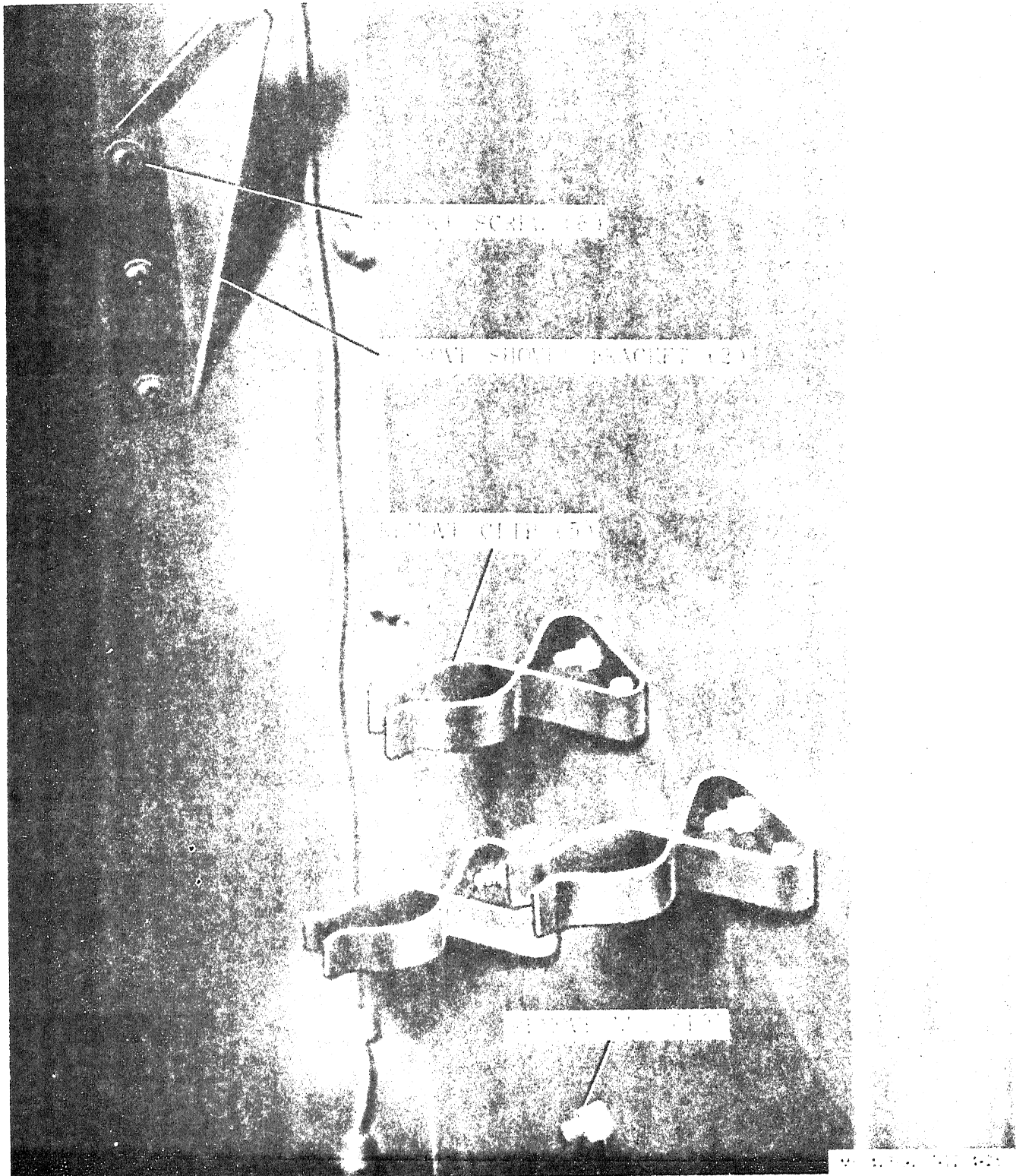
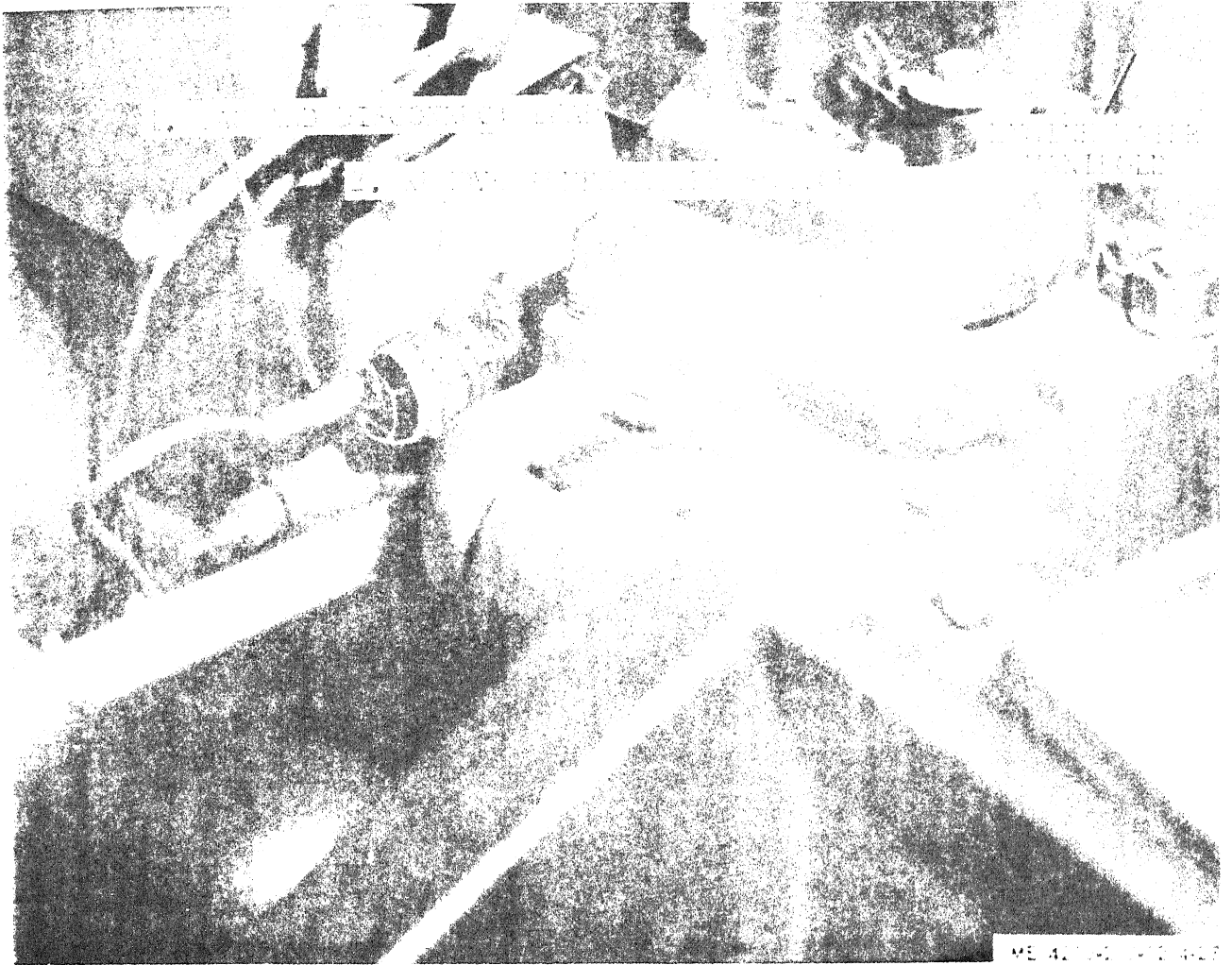
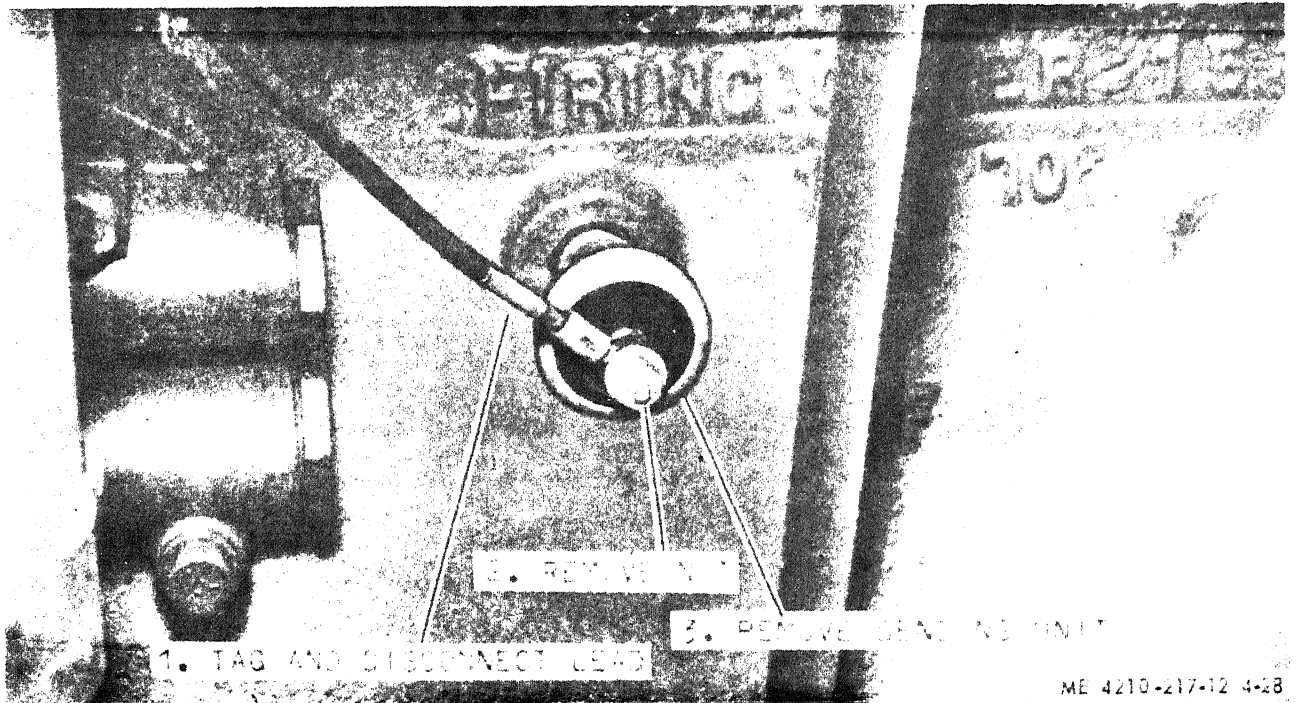


Figure 4-26 Clips and shovel bracket, removal and installation.



ME 4210-217-12 4-27

Figure 4-27. Engine temperature switch, removal and installation.



ME 4210-217-12 4-28

Figure 4-28. Engine oil pressure switch, removal and installation.

CHAPTER 5

ADMINISTRATIVE STORAGE AND INSTRUCTIONS FOR DESTRUCTION OF MATERIAL TO PREVENT ENEMY USE

Section I. ADMINISTRATION STORAGE

Preparation, care and removal of equipment in administrative will be in accordance with applicable

requirements of TM 740-90-1 (Administrative Storage of Equipment.)

Section II. DESTRUCTION OF MATERIAL TO PREVENT ENEMY USE

Instructions for destruction of material to prevent enemy use will be in accordance with TM 750-244-3

(Procedures for destruction of Equipment to Prevent Enemy Use). (Mobility Equipment Command).

APPENDIX A

REFERENCES

A-1. Fire Protection

TM 5-687

Repairs and Utilities: Fire Protection Equipment and Appliances; Inspection, operations, and Preventive Maintenance.
Hand Portable Fire Extinguishers Approved For Army Users.

TB 5-4200-200-10

A-2. Lubrication

C9100-IL

LO 5-4210-217-12

LO 9-2320-209-12

Identification List for Fuels, Lubricants, Oils and Waxes.
Truck, Fire Fighting: Pumper; Foam and Water Extinguishing Agents.
Truck, 2½-Ton 6x6 Chassis Model M45A2.

A-3. Radio Suppression

TM 11-483

Radio Interference Suppression

A-4. Maintenance

TB 750-651

Use of Antifreeze Solutions and cleaning Compounds in Engine Cooling Systems.

TM 9-2610-200-20

Organizational care, Maintenance and Repair of Pneumatic Tires and Inner Tubes.

TM 9-6140-200-14

Operator, Organizational, DS and GS Maintenance Manual: Storage Batteries Lead-Acid Type.

TM 38-750

The Army Maintenance Management Systems.

TM 5-4210-217-20P

Organizational Maintenance Repair Parts and Special Tools List: Truck, Fire Fighting: Powered Pumper, Foam and Water, 750 Gallons Per Minute Capacity Centrifugal Pump, Power Take-Off Driven, 400-Gallon Water Tank, 40-Gallon Foam Chemical Tank, Calss 530C Nonwinterized. FSN 4210-150-1426 (*When Printed*)
Operator's Manual for Truck, 2½-Ton 6 x 6 Chassis, Model M45A2.
Organizational Maintenance Manual for Truck, 2½-Ton, 6x6 Chassis, Model M45A2.

TM 9-2320-209-10

TM 9-2320-209-20

A-5. Shipment and Storage

TB 750-97-2

Preservation of USAMEC Mechanical Equipment for Shipment and Storage.

TM 740-90-1

Administrative Storage of Equipment.

A-6. Destruction to Prevent Enemy Use

TB 750-244-3

Procedures for Destruction of Equipment to Prevent Enemy Use.

A-7. Supply Publications

SC 4210-97-CL-E11

Fire Fighting Equipment Set, Brush.

SC 4210-97-CL-E12

Fire Fighting Equipment Set, Structural.

SC 4210-97-CL-E16

Fire Fighting Equipment Set, Aircraft Crash

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions or explanatory notes for a particular maintenance function.

B-2. Explanation of Columns in Section II.

a. *Column (1), Group Number.* A number is assigned to each group in a top down breakdown sequence. The applicable groups are listed on the MAC in disassembly sequence beginning with the first group removed.

b. *Column (2), Functional Group.* This column contains a brief description of the components of each numerical group.

c. *Column (3), Maintenance Functions.* This column lists the various maintenance functions (A through K). The lowest maintenance level authorized to perform these functions is indicated by a symbol in the appropriate column. Work measurement time standards (the active repair time required to perform the maintenance function) are shown directly below the symbol identifying the maintenance level. The symbol designations for the various maintenance levels are as follows:

- C—Operator or crew
- O—Organization maintenance.
- F—Direct support maintenance.
- H—General support maintenance.
- D—Depot maintenance.

The maintenance functions are defined as follows:

- A. *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards through examination.
- B. *Test.* To verify serviceability and detect inci-

dent failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

- C. *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean, to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- D. *Adjust.* To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.
- E. *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.
- F. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- G. *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- H. *Replace.* The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.
- I. *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, reventing, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
- J. *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publication. Overhaul is normally the highest degree of maintenance performed by the Army. Over-

haul does not normally return an item to like new condition.

K. *Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurement (hours/miles, etc.) considered in classifying Army equipment/components.

d. *Column (4), Tools and Equipment.* This column is provided for referencing by code the special tools and test equipment, (Sec. III) required to perform the maintenance functions (Sec. II).

e. *Column (5), Remarks.* This column is provided for referencing by code the remarks (Sec. IV) pertinent to the maintenance functions.

B-3. Explanation of Columns in Section III

a. *Reference Code.* This column consists of a number and a letter separated by a dash entered from column 4 on the MAC. The number references the

special tools and test equipment requirements and the letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. *Maintenance Category.* This column shows the lowest level of Maintenance authorized to use the special tools or test equipment.

c. *Nomenclature.* This column lists the name or identification of the tools or test equipment.

d. *Tool Number.* This column lists the manufacturer's code and part number, or Federal Stock Number of tools and test equipment.

B-4. Explanation of Columns in Section IV

a. *Reference Code.* This column consists of two letters separated by a dash, entered from column 5, Section II. The first letter references the Remark and the second letter references a maintenance function, column 3, A through K, to which the remark applies.

b. *Remarks.* This column lists information pertinent to the maintenance function being performed, as indicated on the MAC Section II.

Section II MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks	
		A	B	C	D	E	F	G	H	I	J	K			
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild			
	Refer to MAC in DATM 9-2320-209-20 covering Truck, Chassis, 2½ Ton, 6x6, Model M45A2.														
	01 Fire Pump Assembly														
0101	BODY ASSY (Sub-assy)	0 0.3 H 0.5	0 0.5	0 3.1 0 0.1	0 1.0					H 80 H 100	H .. H 100	H 138	200		A-B, B-D, C-I D-C
0102	IMPELLER ASSY (Sub-assy)	H 0.5	.. ..	0 0.4	0 1.0					H 62	H 72				E-C, F-D, G-H
0103	ACTUATOR ASSY, MANUAL TRANSFER VALVE (Sub-assy)	0 0.1	.. ..	.. ..	.. ..					F 3.4	F 4.8				G-I
0104	GEAR CASE ASSY	F 1.1	.. ..	0 1.5	F 1.5					H 16	H 26				H-C, I-D
0105	OIL COOLER ASSY (Sub-assy)	F 1.5	.. ..	.. ..	.. ..					F 6.3	F 6.8				J-I
0106	VALVE ASSY, BALL, DISCHARGE AND SUCTION 2½ Inch (Sub-assy)	0 0.1	.. ..	0 0.3	.. ..					F 16	F 18				K-C
0107	ROD ASSY, REMOTE CONTROL, RIGHT DISCHARGE VALVE (Sub-assy)	0 0.1	.. ..	.. ..	.. ..					F 6.8	F 6.8				G-I

SECTION II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)											(4)	(5)	
		Maintenance Functions													
		A	B	C	D	E	F	G	H	I	J	K			
Group No.	Functional group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Total Group Total	Remarks	
0108	CAPS AND PLUG, DISCHARGE AND SUCTION CONNECTIONS (Sub-assy)	0							0	C					L-I
0109	STRAINER, SUCTION, 2½ AND 4½ Inch (Sub-assy)	0.1							0.2	0.1					
0110	RELIEF VALVE ASSY (Sub-assy)	0							0.2						
0111	PILOT VALVE ASSY (Sub- assy)		0						F	F					A-B
02	PRIMING PUMP ASSY (Sub-Ay)	F	0	C					F	F					A-B, M-C
0201	PUMP (Sub-assy)	1.2	0.1	0.2					12	13					A-B, N-C
0202	MOTOR (Sub-assy)			0					12	15					G-I, O-I
03	TANK, PRIMING	0		1.2					12	15					P-H
04	PRIMING VALVE ASSY (Sub-Ay)	0.1		0					4.8						
05	MANIFOLD DRAIN VALVE ASSY (Sub-assy)	0	0.1	0					0						
06	ELECTRIC SHIFT UNIT (Sub-assy)	0.1		0.1					0.8						
07	CONTROL PANEL, ELECTRIC SHIFT UNIT		0						F	F					A-B
0701	GAGE, PRESSURE	0							4.8	5.8					
0702	LIGHT, INDICATOR	0.1							F	F					A-B, O-I
0703	SWITCH, TOGGLE		0.1	1.2					3.3	5.3					
08	SWITCH ASSY, SENSITIVE, PUMP ENGAGED LIGHT		0	0					F	F					A-B, O-I
09	PROPELLER SHAFT ASSY (PTO To Fire Pump Gear Case)	0			0				3.3	5.3					
10	CABLE CONTROL, PUSH PULL, THROTTLE	1.2		1.1					0	0					
11	FOAM SYSTEM	0.1							0	0					
1101	EDUCTOR ASSY	0	0	0					0	F					A-B, T-C,
1102	VALVE, CHECK	0.2	0.5	0.5					1.3	0.2					G-I
1103	VALVE, METERING								1.3	0.2					U-I
1104	VALVE ASSY, BALL, EDUC- TOR								1.3	0.2					U-I

SECTION II MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Equipment Group	(3) Maintenance Functions											(4) Tools and equipment	(5) Remarks	
		A	B	C	D	E	F	G	H	I	J	K			
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Reburn			
1105	VALVE ASSY, BALL, FOAM TANK								F 11	F 12					V-I
1106	VALVE ASSY, BALL, FOAM FLUSH								F 11	F 12					V-I
1107	TANK ASSY, FOAM	0 0.1		0 0.3					F 17	F 19					W-C, X-I
1108	VALVE ASSY, DRAIN, FOAM TANK	0 0.1							F 9.5						
12	NOZZLE ASSY, TURRET	0 0.1							0 1.0	F 3.5					
13	VALVE ASSY, BALL, TURRET NOZZLE, 2 1/2 Inch	0 0.1							F 3.3	F 5.3					
14	TANK ASSY, WATER	0 0.2		0 0.4					F 17	F 19					W-C, X-I
	Exception: Strainer, Water Tank								0						
15	HOSE REEL ASSY	0 0.1		0 0.2					F 1.3	F 3.3					O-I
1601	16 INSTRUMENT HOUSING GROUP GAGES, PRESSURE AND COMPOUND	0 0.1					0 1.0		0 1.5						Y-F
1602	TACHOMETER	0 0.1							0 1.3						
1603	LIGHTS, INDICATOR, PANEL AND WARNING	0 0.1							0 1.3	0 0.2					Z-I
1604	GASKETS, RUBBER	0 0.2							0 0.3						
1605	GLASS, INSTRUMENT	0 0.1							0 0.4						
1606	SWITCH, TEMPERATURE, WARNING LIGHT		F 1.0						0 0.3						AA-B
1607	SWITCH, OIL PRESSURE WARNING LIGHT		0 0.1						0 0.3						AB-B
17	SIREN ASSY		0 0.1						0 0.8	0 0.2					A-B, AC-I
18	LIGHT, WARNING, VEHICULAR		0 0.1						0 0.8	0 0.3					A-B, AD-I
19	SPOTLIGHTS (Front & Rear)		0 0.1						0 1.0	0 0.2					A-B, Z-I
20	LIGHT, DOME		0 0.1						0 0.8	0 0.2					A-B, Z-I
21	LIGHT, UNDER HOOD		0 0.1						0 0.2	0 0.1					A-B, Z-I
22	BATTERY, STORAGE, LEAD ACID	0 0.1	0 0.2	0 0.1					0 0.3						

SECTION II MAINTENANCE ALLOCATION CHART

(1) Group No	(2) Functional group	(3) Maintenance functions										(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J			K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild		
2301	23 MISCELLANEOUS ELECTRICAL EQUIPMENT GROUP LEAD, ELECTRICAL, SERIES AND PARALLEL, STORAGE BATTERY	0 0.1							0 0.2							
2302	LEAD, ELECTRICAL, POSITIVE AND NEGATIVE STORAGE BATTERY	F 1.1							F 1.3							
2303	RECEPTACLE, BATTERY CHARGING OR SLAVE, ARMY TYPE	0 0.1							F 3.3							
2304	CIRCUIT BREAKERS (Mounted on Fire Wall)		0 0.2						0 1.4							AE-B
2401	24 HEATER DEFROSTER ASSY, VEHICULAR COMPARTMENT HOSE, HEATER	0 0.1							F 2.8	F 1.8						AF-I
2501	25 AUXILIARY ENGINE COOLING SYSTEM HEAT EXCHANGER	0 0.1							F 1.0							
2502	HOSE, HEAT EXCHANGER	0 0.1							F 0.3							
2503	VALVE ASSY, BALL, AUX COOLER								F 11	F 12						V-I
2701	26 PIPING, WATER AND FOAM (Includes Drain Lines and Piping) 27 CONTROL VALVES VALVE ASSY, BALL, WATER TANK FILL, 1½ Inch	F 0.5							F 7.0							
2702	VALVE ASSY, BALL, HOSE FILL, 1½ Inch	0 0.1							F 12	F 13						
2703	VALVE ASSY, BALL, WATER TANK SUCTION, 2½ Inch	0 0.1		0 0.3					F 18	F 20						K-C
2901	28 RODS, OPERATING (Includes Handles Operating) 29 SPECIAL PURPOSE BODY FRAME, COMPARTMENT MOUNTING	0 0.1							F 7.0							
2902	COMPARTMENT, LEFT SIDE								H 49 17	H 54 22						AG-I AG-I

SECTION II MAINTENANCE ALLOCATION CHART

(1) Group No	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks			
		A	B	C	D	E	F	G	H	I	J	K					
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild					
2903	COMPARTMENT, RIGHT SIDE								F 9.3	F 15							
2904	COMPARTMENT, FRONT								F 50	F 55							AG-I
2905	PANEL, OPERATOR, LEFT SIDE								F 8.2	F 9.9							AG-I
2906	PANEL, OPERATOR, RIGHT SIDE								F 5.6	F 7.3							AG-I
2907	PANEL, BOTTOM, FRONT COMPARTMENT								F 1.0	F 2.0							AG-I
2908	DOOR ASSY, FRONT AND SIDE COMPARTMENTS	0 0.1		0 0.1					F 0.5	F 1.0							AG-I
2909	APRON, REAR								F 37	F 39							AG-I
2910	STEP, REAR								F 5.5	F 11							AG-I
2911	SUPPORT, REAR STEP								F 0.5	F 3.0							AG-I
2912	PANEL, SIDE, REAR STEP SUPPORT								F 0.8	F 1.8							AG-I
2913	BOX, BATTERY	0 0.1		0 1.3					F 1.8	F 2.8							AH-C
2914	HOSE BED ASSY	0 0.1							F 0.2	F 1.0							AG-I
2915	PARTITION, HOSE BED								F 0.5	F 1.0							AG-I
2916	SUPPORTS, LADDER								F 1.8	F 2.8							AG-I
2917	HAND RAIL, REAR								F 0.5	F 1.0							AG-I
2918	GUSSETS AND MUD GUARDS								F 0.5	F 1.0							AG-I
2919	BRACKETS AND RETAINERS (For Mounting Fire Fighting Equipment)	0 0.1							F 0.5								
2920	CLIPS, SPRING (For Mounting Flashlights and Tools)	0 0.1							0 0.5								
2921	REFLECTOR, CLEARANCE	0 0.1							0 0.2								
2922	CATCH, SAFETY, TOP DOOR, FRONT COMPARTMENT	0 0.1							F 0.5								
2923	STEP, FOLDING	0 0.1							0 0.5								
30	EXTINGUISHER, FIRE (Mounted in Cab)	C 0.1							0 0.2								
31	PLATES, IDENTIFICATION AND INSTRUCTION	0 0.1							0 0.2								

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance category	Nomenclature	Tool number
No special tools and test equipment are required to accomplish the maintenance functions indicated in the MAC for the Fire Fighting Equipment mounted on the Government Furnished Truck Chassis, 2½ Ton, 6X6, Model M45A2.			

Section IV. REMARKS

Reference code	Remarks
A-B	Operational Test.
B-D	Adjust Packing Glands for proper leakage rate in accordance with LO 5-4210-217-12. Adjustment of the two Adjusting Screws and the Interlock Cable Rod of Gear Case Assembly will be performed by DS.
C-I	GS will perform complete repair of the Fire Pump Assembly only when it is necessary to remove the Fire Pump Assembly from Fire Truck.
D-C	Lubricate Transfer Valve in accordance with LO 5-4210-217-12
E-C	Lubricate Outboard Bearing in accordance with LO 5-4210-217-12.
F-D	Adjust Packing Glands for proper leakage rate in accordance with LO 5-4210-217-12.
G-F	Replacement of Impeller Shaft Packing will be performed by DS.
G-I	Repair by replacing unserviceable parts.
H-C	Lubricate Gear Case and Interlock Cable in accordance with LO 5-4210-217-12.
I-D	Adjust Interlock Cable Rod for proper clearance in accordance with instructions contained in TM 5-4210-217-34. Also, adjust the two Adjusting Screws for proper operation of Stationary Pumping and Pump and Roll Indicator Lights (mounted on Electric Shift Unit Control Panel) in accordance with instructions contained in TM 5-4210-217-34.
J-I	Repair by replacing unserviceable parts. Repair of Oil Pump Assembly is not authorized.
K-C	Lubricate Sector Gear and Gear Rack in accordance with LO 5-4210-217-12.
L-I	Repair by replacing unserviceable Gasket.
M-C	Clean the Pilot Valve Strainer in accordance with instructions contained in TM 5-4210-217-12.
N-C	Lubricate Motor in accordance with LO 5-4210-217-12.
O-I	Repair of Motor is not authorized.
P-H	Drill ¼ inch hole in shaft of replacement motor for mounting motor coupling.
Q-B	Manually depress Switch Plunger. Illumination of Pump Engaged Indicator Light indicates Switch is serviceable.
R-D	Adjust the position of Switch so that Pump Engaged Indicator Light illuminates when Power-Takeoff Shift Lever is in the engaged position.
S-I	Repair by installing Universal Joint Repair Kit only.
T-C	Flush system after each operation and refill foam tank.
U-I	Repair by replacing unserviceable Packing Preformed (O Rings) only.
V-I	Repair by replacing unserviceable Packing Preformed (O Rings) and ball Seats only.
W-C	Service by cleaning Strainer; fill, drain, and flush tank.
X-I	Repair by replacing unserviceable parts, weld or patch tank.
Y-F	For Pressure Gage only: Install Pressure Gage of known accuracy in Gage Test port (1 fig. 2-1). Operational test Fire Pump at 150 psig and compare the reading of the two gages. Replace the Pressure Gage if reading exceeds 5 psig, plus or minus, from that of Test Gage.
Z-I	Repair by replacing unserviceable Lamps only.
AA-B	Submerge element of Switch in water bath heated to 200°F. Perform continuity test between terminal connection and body of switch. Continuity or closed circuit indicates that Switch is serviceable.
AB-B	Start Engine and watch Oil Pressure Gage on dash panel and the Oil Pressure Warning Light on Instrument Panel. The Switch is serviceable if Warning Light goes to off position when Oil Pressure Gage indicates 15 psig and above.
AC-I	Repair by replacing unserviceable Lamp and Flasher only.
AD-I	Repair by replacing unserviceable Lamps, Dome, and dome Gasket only.
AE-B	Perform Circuit Breaker Test indicated in Table 5, page 154, TM 9-2320-209-20.
AF-I	Repair by replacing unserviceable motors only.
AG-I	Straighten, weld or patch.
AH-C	Lubricate Sliding Trays in accordance with LO 5-4210-217-12.
	NOTE: The Work Measurement Time Standards (WMTS) indicated in the MAC covers only one each of a particular assembly, sub-assembly or part installed on the Fire Truck. In those cases where more than one of the same assembly, sub-assembly or part are installed on the Fire Truck, increase the WMTS accordingly.

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CREIGHTON W. ABRAMS
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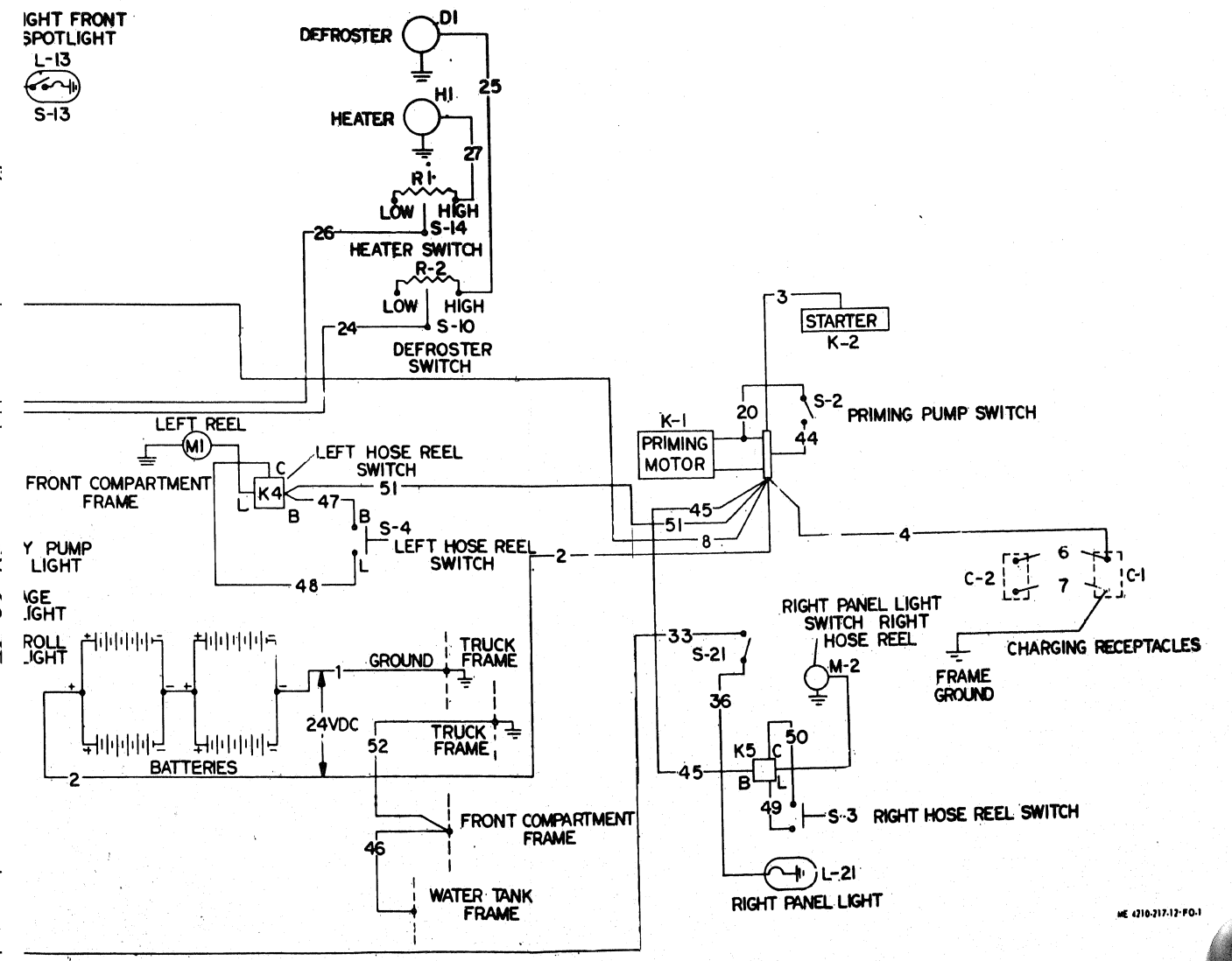
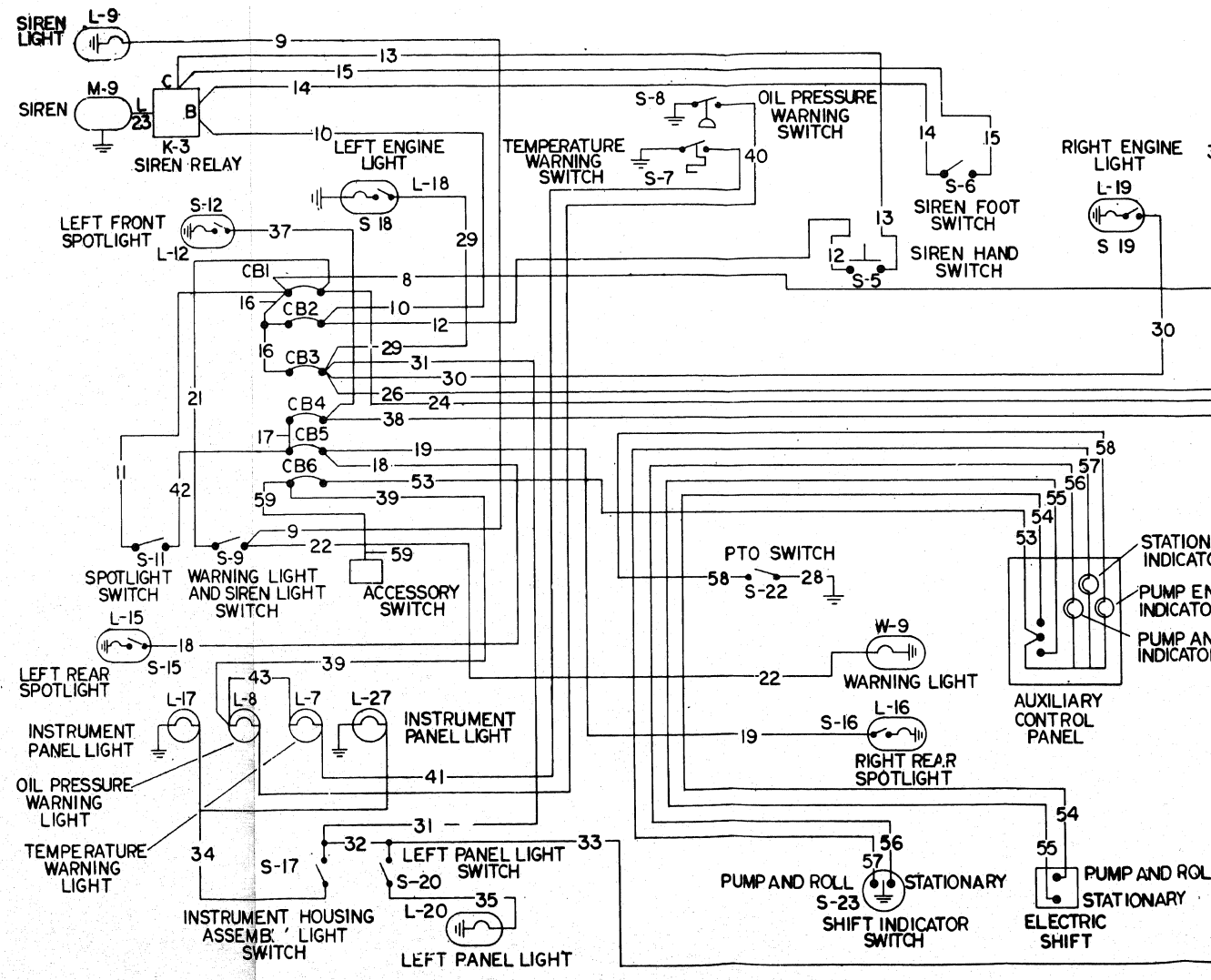
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1. Wiring diagram.

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