DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL

**PUMP ASSEMBLY, FLAMMABLE LIQUID;
BULK TRANSFER;
GASOLINE ENGINE DRIVEN;
350-GPM CAPACITY AT 190
FOOT HEAD; WHEEL MOUNTED
(GORMAN-RUPP MODEL 84C15-4A084)
FSN 4320 - 916 - 9172
AND (BARNES MODEL US36ACG) FSN 4320-407-2583**

This copy is a reprint which includes current pages from Changes 1 through 3.

HEADOUARTERS, DEPARTMENT OF THE ARMY

AUGUST 1972

WARNING

Take particular heed to specific cautions and

warnings throughout this manual

DEATH

or severe injury may result if personnel fail

to observe safety precautions.

Do not allow smoking near pump assembly.

Adequate NO SMOKING signs must be posted.

Do not operate the pump assembly in an enclosed building.

Ground pump assembly before operating.

Do not use a lifting device of less than 2000 lb. capacity.

Fill fuel tank with water before welding

to eliminate all fumes which may cause explosion.

Changes in force: C1, C2 and C3

CHANGE
NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 10 October 1990

Operator, Organizational, Direct and General Support
Maintenance Manual

PUMP ASSEMBLY, FLAMMABLE LIQUID; BULK TRANSFER;
GASOLINE ENGINE DRIVEN; 350 GPM CAPACITY AT 190
FOOT HEAD; WHEEL MOUNTED
(GORMAN-RUPP MODEL 84C154A084)
NSN 4320916-9172
AND (BARNES MODEL US36ACG)
NSN 432007-2583

Approved for public release; distribution is unlimited

TM 5-4320242-14, 2 August 1972, is changed as follows:

Page 2-11, para 2-6, add (d):

d. Battery. Increase battery PMCS frequency (TM 96140200-15).

Page 34, Table 3-2, Item 3 Battery, add to paragraph, "(TM 9-6140200-15)."

Page 4-1, paragraph 4-3(b)(4), Battery, add to paragraph, "(TM 9-6140200-15)."

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, (qty rqr block no. 1339)

Changes in force: C1 and C2

CHANGE
NO.2

HEADQUARTERS
DEPARTMENT OF THE ARMY,
WASHINGTON, DC, 16 *December 1977*

**Operator, Organizational, Direct and
General Support Maintenance Manual**

**PUMP ASSEMBLY, FLAMMABLE LIQUID; BULK TRANSFER;
GASOLINE ENGINE DRIVEN; 350 GPM CAPACITY AT 190
FOOT HEAD; WHEEL MOUNTED
(GORMAN-RUPP MODEL 84C15-4A084)
NSN 4320-00-916-9172
AND (BARNES MODEL US36ACG)
NSN 4320-00-407-2583**

TM 5-4320-242-14, 2 August 1972, is changed as follows:

Page ii. Line 7, Table of Contents will be changed to read:

APPENDIX	A	References	A-1
	B	Components of End Item List	B-1
	C	Maintenance Allocation Chart	C-1
	D	Expendable Supplies and Materials List	D-1

Page 3-1, Paragraph 3-2d, line 1, "OES oil" is changed to "OEA/APG-PD-1 oil."

Page B-1. Appendix B is superseded as follows:

**APPENDIX B
COMPONENTS OF END ITEMS LIST
Section I. INTRODUCTION**

B-1. Scope

This appendix lists integral components of and basic issue items for the Pump Assembly to help you inventory items required for safe and efficient operation.

B-2. General

The Components of End Item List is divided into the following sections:

a. Section II Integral Components of the End Item. These items, when assembled, comprise the Pump Assembly and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

b. Section III Basic Issue Items. These are minimum essential items required to place the Pump Assembly in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the Pump Assembly during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is you authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

B-3. Explanation of Columns.

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number (NSN). Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number (P/N). Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item

name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during inventory. Under the Rcv'd column, list the quantity you actually received on your major item. The Date columns are for use when you inventory the major item at a later date; such as for shipment to another site.

Section II. INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIG NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO. & FSCM	DESCRIPTION	LOCA-TION	USABLE ON CODE	QTY REQ	RCV'D	DATE	DATE	DATE
15	8	5315-00-842-3044	MS24665-283 (96906)	Pin, Cotter	NAR		1				
15	9	5310-00-889-2606	MS35425-42 (96906)	Nut, Wing	NAR		1				
15	10	5340-00-420-9693	13085 (25567)	Clamp, Grounding Rod Mounting	NAR		1				
15	11	5995-01-032-5572	28006SA (05748)	Cable Assembly, Ground Rod	Y11		2				
15	12	5975-00-577-8825	15675 (05748)	Rod, Ground	NAR		2				
4	9	6140-00-059-3528	MS75047-1 (96906)	Battery, Storage	NAR		1				

Section III. BASIC ISSUE ITEMS

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIG NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO. & FSCM	DESCRIPTION	LOCA-TION	USABLE ON CODE	QTY REQ	RCV'D	DATE	DATE	DATE
				LO5-2805-259-12			1				
				TM5-2805-259-14			1				
				TM5-4320-242-14			1				
		5120-00-900-6103		Hammer, Hand	NAR		1				
		5120-00-449-8083		Wrench, Open End Adjustable	NAR		1				

Add Appendix D as follows:

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists Expendable Supplies and Materials you will need to operate and maintain the Pump Assembly. These items are authorized to you by CTA50-970, Expendable Items (except Medical, Class V, Repair Parts and Heraldic Items).

D-2. Explanation of Columns:

a. Column 1 Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material.

b. Column 2 Level. This column identifies the lowest level of maintenance that requires the listed item.

c. Column 3 National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code Manufacturer (FSCM) in parenthesis, if applicable.

e. Column 5 Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical (e.g., each (ea), inch (in), pair (pr), etc). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) LOCATION	(6) U/M
		6850-00-281-1986	Solvent, Cleaning	NAR	gal
		9150-00-402-4478	Oil, Engine, Subzero	NAR	qt
		9150-00-186-6681	Oil, Engine, OE-30	NAR	qt
		9150-00-160-1818	Gasoline, Combat	NAR	bulk

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for Petroleum Distribution.

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *1 May 1974*

Operator, Organizational, Direct and General Support Maintenance Manual
PUMP ASSEMBLY, FLAMMABLE LIQUID; BULK TRANSFER; GASOI,INE ENGINE DRIVEN; 350 GPM CAPACITY AT 190 FOOT HEAD; WHEEL MOUNTED
(GORMAN-RUPP MODEL 84C15-4A084)
FSN 4320-916-9172
(ND BARNES MODEL US36ACG)
FSN 4320-407-2583

TM 4320--24214. 2 August 1972, is changed as follows:

Inside Front Cover. Add the following warnings to the list of safety precautions.:

WARNING

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

WARNING

Dry cleaning solvent, PD-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. -138°F.

Page 1-1. Paragraph 1-3 is superseded as follows:

1-3. Recommendation for Maintenance Publications Improvements. You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter or DA Form 2028 (Recommended Changes to Publications and '"lank Forms) should be mailed direct to: Commander, US Army Troop Support Command, ATTN: AMSTSMPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

Page 2-1. Immediately after Section I title, add the following warning:

WARNING

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

Page 4-1. Immediately after Chapter 4 title. add the following warning:

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. 138°F.

Page A-1, paragraph A-4. Appendix A, References. add the following: "TB MED 251, Noise and Conservation of Hearing".

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Antsy
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A (qty rqr block No. 154), Operator requirements for Petroleum Distribution.

TECHNICAL MANUAL

NO. 5-4320-242-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 2 *August 1972*

OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL PUMP ASSEMBLY, FLAMMABLE LIQUID; BULK TRANSFER; GASOLINE ENGINE DRIVEN; 350-GPM CAPACITY AT 190 FOOT HEAD; WHEEL MOUNTED (GORMAN-RUPP MODEL 84C15-4A084) FSN 4320-916-9172 AND (BARNES MODEL US36ACG) FSN 4320-07-2583

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			Paragraph	Page
LIST OF ILLUSTRATIONS				iii
CHAPTER	1.	INTRODUCTION		
Section	I.	General	.1-1 - 1-6	1-1
	II.	Description and data	1-7 - 1-9	1-1 - 1-4
CHAPTER	2.	OPERATING INSTRUCTIONS		
Section	I.	Operating procedures	2-1 - 2-4	2-1 - 2-10
	II.	Operating under unusual conditions	2-5 - 2-10	2-11, 2-12
CHAPTER	3.	OPERATOR/ CREW MAINTENANCE INSTRUCTIONS		
Section	I.	Lubrication instructions	3-1, 3-2	3-1
	II.	Preventive maintenance checks and services	3-3. 3-4	3-3
	III.	Troubleshooting	3-5. 3-6	3-4
	IV.	Maintenance of fuel tank cap and strainer		3-5
CHAPTER	4.	ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section	I.	Service upon receipt of equipment	4-1 - 4-5	4-1, 4-2
	II.	Movement to new worksite	4-6. 4-7	4-2
	III.	Repair parts, special tools, and equipment	4-8. 4-9	4-2
	IV.	Preventive maintenance checks and services	4-10, 4-11	4-2
	V.	Troubleshooting	4-12, 4-13	4-3
	VI.	Radio interference suppression.		
	VII.	Fuel system	4-14 - 4-16	4-4
	VIII.	Gages and panel	4-17 - 4-23	4-7 - 4-11
	IX.	Pump assembly	4-24 - 4-26	4-12 - 4-17
	X.	Trailer assembly	4-27 - 4-35	4-18 - 4-25

***This manual supersedes TM 54320-242-15, 27 March 1967, including all changes.**

			Paragraph	Page
CHAPTER	5.	DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS		
Section	I.	Repair parts, special tools, and equipment	5-1	5-1
	II.	Troubleshooting	5-2	5-1
	III	Removal and installation of major components and assemblies	5-3 - 5-7	5-1 - 5-8
CHAPTER	6.	REPAIR OF PUMP ASSEMBLY		
Section	I.	Pump assembly components	6-1 - 6-7	6-1 - 6-8
APPENDIX	A.	REFERENCES		A-1
	B.	BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED		B-1
	C.	MAINTENANCE ALLOCATION CHART		
INDEX				I-1

LIST OF ILLUSTRATIONS

Number	Title	Page
1-1	Pump assembly, right-front, three-quarter view	1-2
1-2	Pump assembly, left-rear view	1-3
1-3	Wiring diagram	1-5
2-1	Controls and instruments (Sheet 1 of 4)	2-1
2-1	Controls and instruments (Sheet 2 of 4)	2-2
2-1	Controls and instruments (Sheet 3 of 4)	2-3
2-1	Controls and instruments (Sheet 4 of 4)	2-4
2-2	Starting the pump (Sheet 1 of 2)	2-6
2-2	Starting the pump (Sheet 2 of 2)	2-7
2-3	Stopping the pump (Sheet 1 of 2	2-8
2-3	Stopping the pump (Sheet 2 of 2)	2-9
2-4	Performance curve	2-11
3-1	Lubrication chart (Sheet 1 of 2)	3-2
4-1	Fuel tank and fuel lines, removal and installation	4-5
4-2	Fuel filter, removal and installation (Sheet 1 of 2)	4-6
4-2	Fuel filter, removal and installation (Sheet 2 of 2)	4-7
4-3	Throttle cable, removal and installation (Sheet 1 of 2)	4-8
4-3	Throttle cable, removal and installation (Sheet 2 of 2)	4-9
4-4	Gages and panel, removal and installation (Sheet 1 of 2)	4-10
4-4	Gages and panel, removal and installation (Sheet 2 of 2)	4-11
4-5	Suction screen, removal and installation (Sheet 1 of 2)	4-12
4-5	Suction screen, removal and installation (Sheet 2 of 2)	4-13
4-6	Air eliminator, removal and installation	4-14
4-7	Air eliminator, exploded view	4-16
4-8	Discharge and suction gage valve, removal and installation	4-17
4-9	Packing discharge and suction gage valves	4-18
4-10	Front stand, removal and installation	4-19
4-11	Pintle hook and reflectors. removal and installation	4-20
4-12	Drawbar assembly, removal and installation	4-21
4-13	Toolbox and battery box, removal and installation	4-22
4-14	Wheel and tire assembly, removal and installation	4-23
4-15	Hub and axle assembly, exploded view	4-24
4-16	Lifting frame assembly, removal and installation	4-25
4-17	Lifting frame assembly, exploded view	4-26
4-18	Pulley and muffler guard, removal and installation	4-27
5-1	Suction manifold and strainer body assembly, removal and installation Model 84C15-4A084 serial numbers 371201 through 371346 383791 through 383810 400424 through 400459 405143 through 405365 415480 through 415493 (Sheet 1 of 2)	5-2
5-1	Suction manifold and strainer body assembly, removal and installation Model 84C15-4A084 serial numbers 419501 through 419959 (Sheet 2 of 2)	5-3
5-2	Discharge manifold elbow and check valve, removal and installation	5-4
5-3	Engine, removal and installation (Sheet 1 of 2)	5-6
5-3	Engine, removal and installation (Sheet 2 of 2)	5-7
5-4	Pump, removal and installation	5-8
6-1	Pump and intermediate housing, exploded view	6-2
6-2	Suction and discharge gate valves, exploded view Model 84C15-4A084 serial numbers 371201 through 371346 383791 through 383810 400424 through 400459 405143 through 405365 415480 through 415493 (Sheet 1 of 2)	6-5
6-2	Suction and discharge gate valves, 4 inch; exploded view serial numbers 419501 through 419959 (Sheet 2 of 2)	6-6
6-3	Discharge check valve, exploded view	6-7
6-4	Suction strainer, 4 inch; exploded view	6-8

CHAPTER 1
INTRODUCTION

Section 1. GENERAL

1-1. Scope

These instructions are published for your use in operating and maintaining the Gormann-Rupp pump assembly, model 84C15-4A084. or Barnea pump assembly, model US36ACG.

1-2. Forms and Records

Maintenance forms, records, and reports, which are to be used by maintenance personnel at all maintenance levels, are listed in and prescribed by TM 38-750.

1-3. Reporting of Errors

Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120. A reply will be furnished directly to you.

1-4. Equipment Serviceability Criteria (ESC).

There are no ESC's applicable to this equipment.

1-5. Destruction of Army Materiel to Prevent Enemy Use

Refer to TM 750-244-3 for information pertaining to destruction of equipment to prevent enemy use.

1-6. Administrative Storage

Refer to TM 730-90-1 for information and instructions pertaining to administrative storage.

Section II. DESCRIPTION AND DATA

1-7. Description

a. General. The Gormann-Rupp pump assembly, model 84C15-4A084 or Barnes pump assembly, model US36ACG (fig. 1-1 and 1-2) is a self-contained, wheel mounted, self-priming unit designed for bulk transfer of flammable liquid petroleum fuels. It is powered by a four-cylinder gasoline engine directly coupled to the pumping assembly. Instruments and controls necessary for operation of the unit are mounted on the instrument panel. Additional controls include two suction valves, two discharge valves, air -venting valve, and discharge check valve.

b. Engine. Refer to TM 5-2805-259-14 for a description of the Military Standard engine, model 4A084-111.

c. Pump Assembly. The pump assembly is a four-inch conventional type self-priming centrifugal pump designed to deliver 350 gpm (gallons per minute) with a 190 ft. head.

d. Trailer. The trailer is constructed of welded steel members and is equipped with two wheels for towing at speeds up to 20 miles per hour on surfaced roads. A collapsible stand is provided at the rear of the trailer to support the unit during operation. The trailer is provided with a removable drawbar assembly. A pintle hook is added for towing additional equipment.

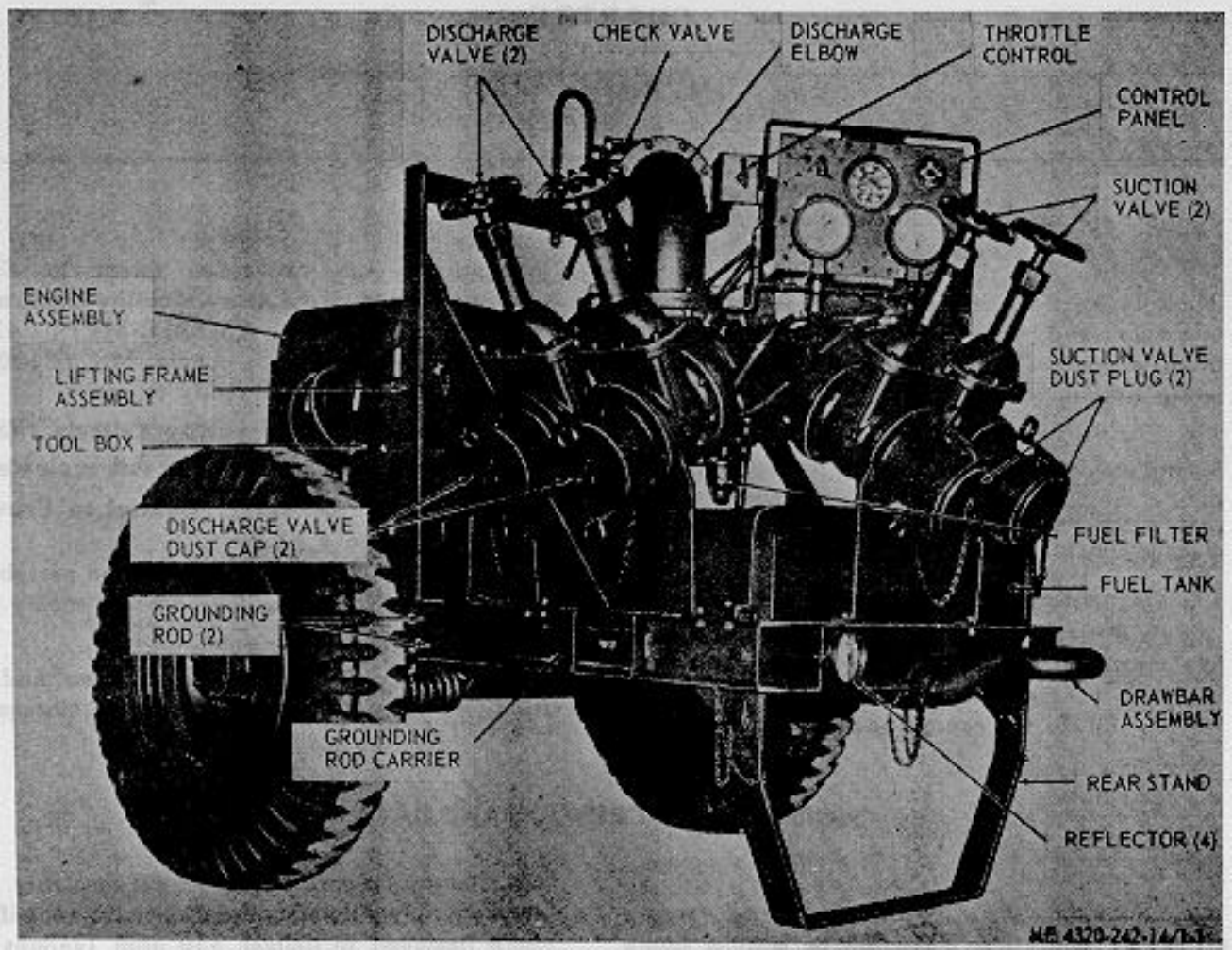


Figure 1-1. Pump assembly, right-front, three-quarter view.

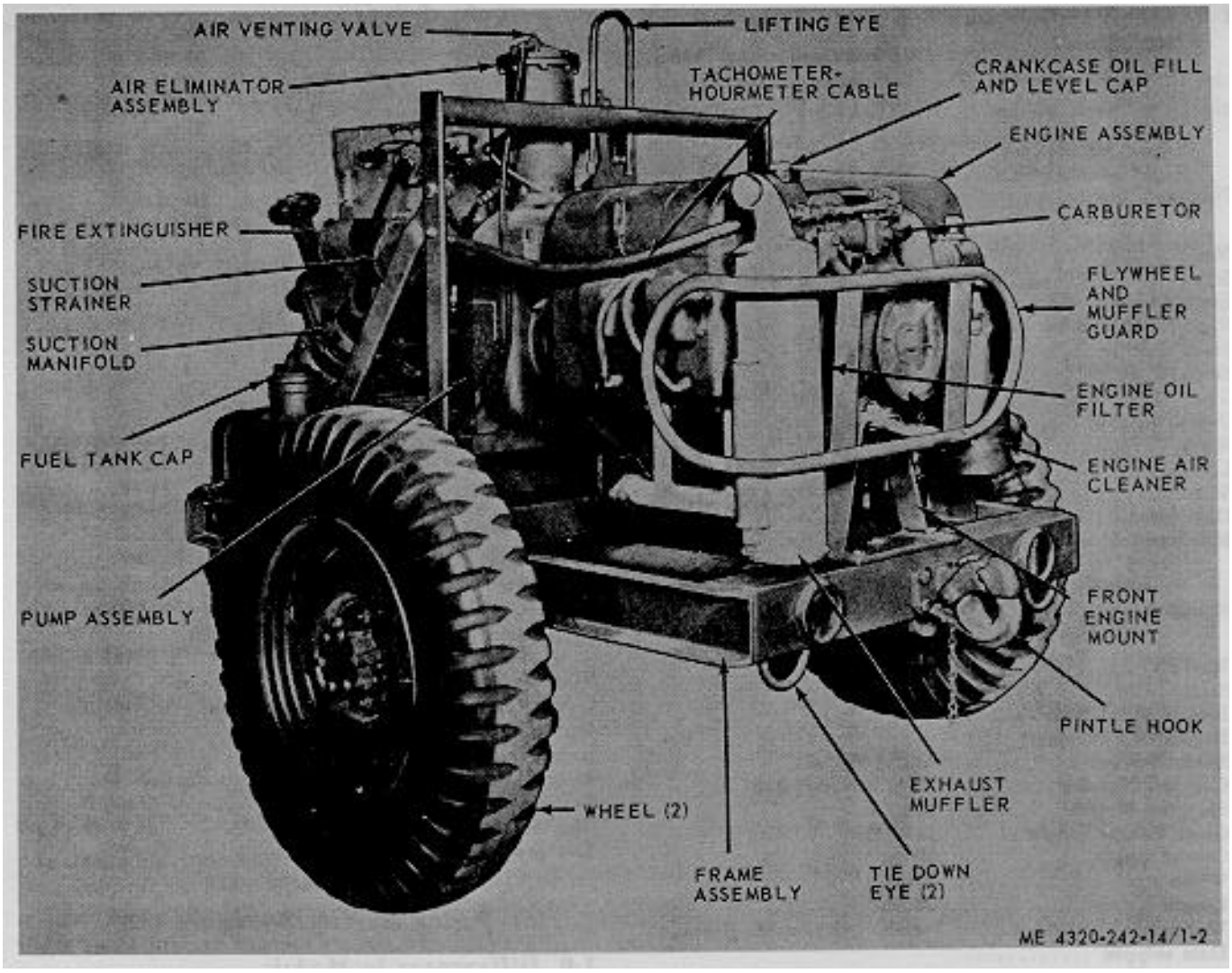


Figure 1-2. Pump assembly, left-rear view.

1-8. Identification and Tabulated Data

a. Identification. The pump assembly has three identification plates. The information on these plates is listed below.

(1) *U. S. Army plates*.

(a) Gorman-Rupo model 84C154A084.

Nomenclature ..... Pump, Centrifugal .350 GPM @ 190 THD GED
Model 84C15-4A084
Serial .....
Engine serial number ...
Registration number.....
Stock number 4320-916-9172
Shipping weight ..... 1295 lb.
Gross vehicle weight ... 1135 lb.
Overall height ..... 60 in.
Width ..... 59 in.
Length ..... 81 in.
Warranty ..... 12 mo.
Date shipped.....
Manufactured by ..... The Gorman-Rupp Co.

(b) Barnes model US36ACG.

Nomenclature ..... .Pump, Centrifugal, 350 GPM @ 1930 THD GED
Model JS36ACG
Serial. .....
Engine Serial Number. .
Registration N umber ...
Stock Number 4320-407-2583
Contract Number ..... DSA 70070-C-9187
Shipping Weight ..... 1300 lb.
Gross Vehicle weight ... 1140 lb.
Overall height ..... 60 in.
Width ..... 59 in.
Length ..... 81 in.
Warranty.....
Date shipped.....
Manufactured by ..... Barnes Manufacturing Co.

(2) *Engine plates*.

NOTE

Engines are Military Standard on both the Gorman-Rupp Co. Pump and Barnes Mfg Co. Pump; Refer to TM 5-2805-259.14.

(3) *Pump assembly plates*.

(a) Gorman-Rupp Co.

Type ..... Self-priming, centrifugal
Manufacturer ..... The Gorman-Rupp Co.
Serial No.....
Model No 84C15-4A084

(b) Barnes Manufacturing Co.

Type ..... Self-priming, centrifugal
Manufacturer ..... Barnes Mfg. Co.
Serial No.
Model No US36ACG

b. Tabulated Data.

(1) *Pumping assemblies*.

(a) Gorman-Rupp Co.

Serial Numbers ..... 371201 thru 271346
383791 thru 383810
400424 thru 400549
405143 thru 405365
415840 thru 415493
419501 thru 419959

(b) Barnes Manufacturing Co.

Serial Numbers 37044-001 thru 37044240

(2) *The following data applies to both pump assemblies*.

Type .....Self-priming, centrifugal
Number of stages .....One
Rated flow .....350 GPM
Rated total dynamic head ...190 feet
Suction size .....4 in.
Discharge size .....4 in.

(3) *Capacities*.

Fuel tank 20 gal.

(4) *Nut and bolt torque data*.

Size	*Foot-pounds*
1/ 4.20	6-8
5/ 16-18	11-13
3/ 8-16	20-22
3/ 4-24	22-24
1/ 2-13	45-47
1/ 2-20	47-49
5/ 8-11	104-106

(5) *Dimensions and weight (operating configurations)*.

Length .....81 in.
Width .....59 in.
Height .....60 in.
Weight .....1135 lb.
Volume .....166 cu. f
Tire size .....7.00 x 16, 6 ply
Tire pressure .....45 psi

(6) *Wiring diagram. See figure 1-3.*

1-9. Differences in Models

a. The suction and discharge gate valves and suction strainer assembly used on model 84C154AU84 serial numbers 419501 and up were manufactured by a different vendor than the gate valves and strainer assembly used on pumping assemblies model 84C15-4A084 serial numbers 471201 through 415493 and model US36ACG serial numbers 37044-001 through 47044-240. The configuration of these parts is slightly different and the suction strainer is mounted at a different angle on the equipment.

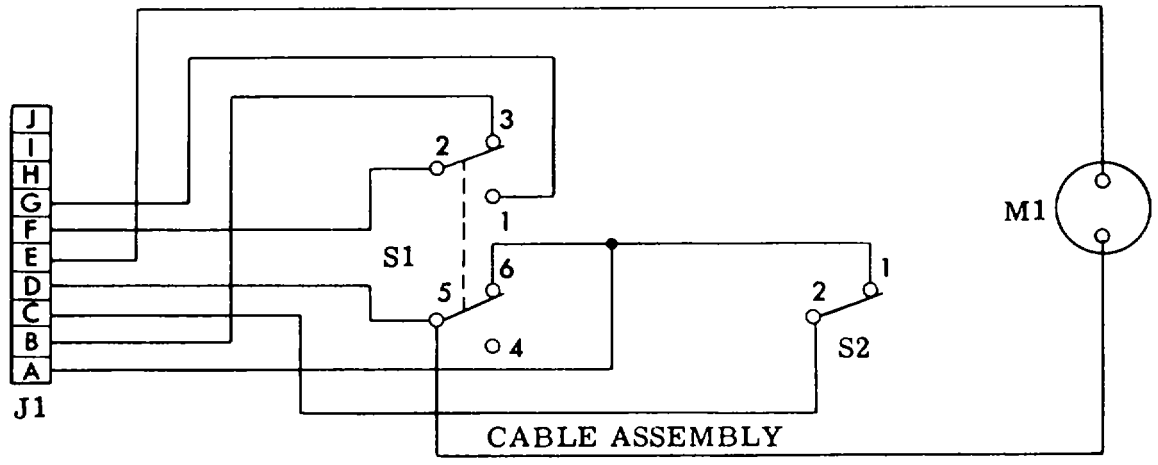
b. The configuration of the volute casing 'of the model US36ACG is somewhat different than that of the model 84C15-4A084.

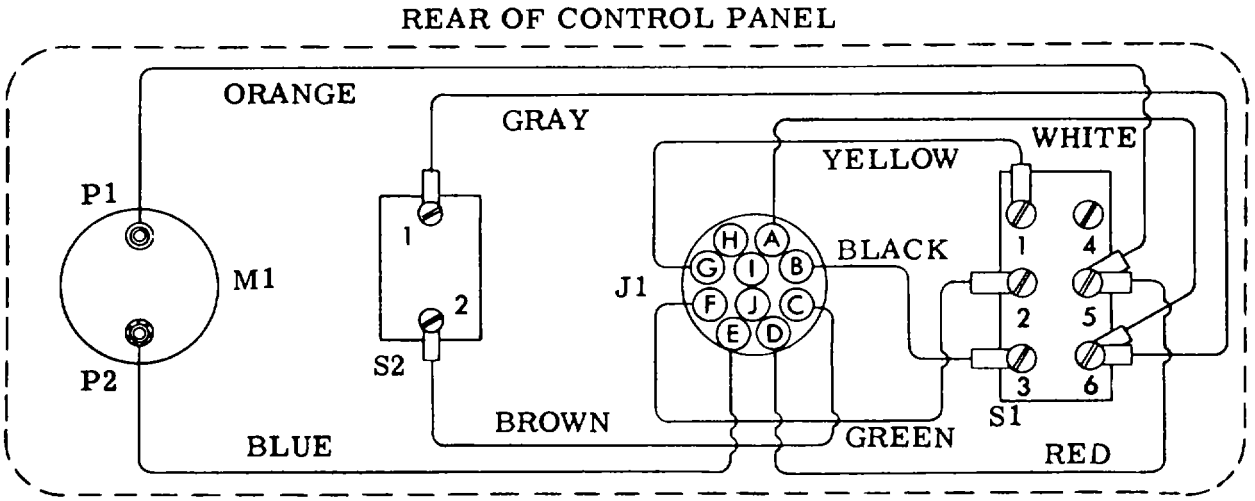
c. The configuration of the fuel system parts of the model US36ACG is slightly different from that of the model 84C15-4A084. The differences include the mounting position of the three-way valve and the construction of the fuel tank straps.

d. There are several minor internal differences in the pumping unit. These include the method of mounting the wear plate and several other mounting hardware differences.

CAUTION

Parts of the pump unit of Gorman-Rupp model 84C15-4A084 are not interchangeable with those of Barnes model US36ACG. Refer to the applicable RPSTL for parts information.





REFERENCE DESIGNATION	
SYMBOL	DESCRIPTION
J1	CONNECTOR, RECEPTACLE
M1	INDICATOR, PRESSURE
P1	CONNECTOR, PLUG, MALE
P2	CONNECTOR, PLUG, MALE
S1	SWITCH, TOGGLE
S2	SWITCH, TOGGLE

ME 4320-242-14/1-3

Figure 1-3. Wiring diagram.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. OPERATING PROCEDURES

WARNING

If equipment fails to operate refer to troubleshooting procedure in Chapter 3.

2-1. General

a. Instructions in this section are published for information and guidance of personnel responsible for operation of the pump assembly.

b. The pump assembly is integrally self-priming, after initially filling the case to the level of the priming plug (fig. 2-1).

c. The controls and instruments and their normal and maximum reading are illustrated in figure 2-1.

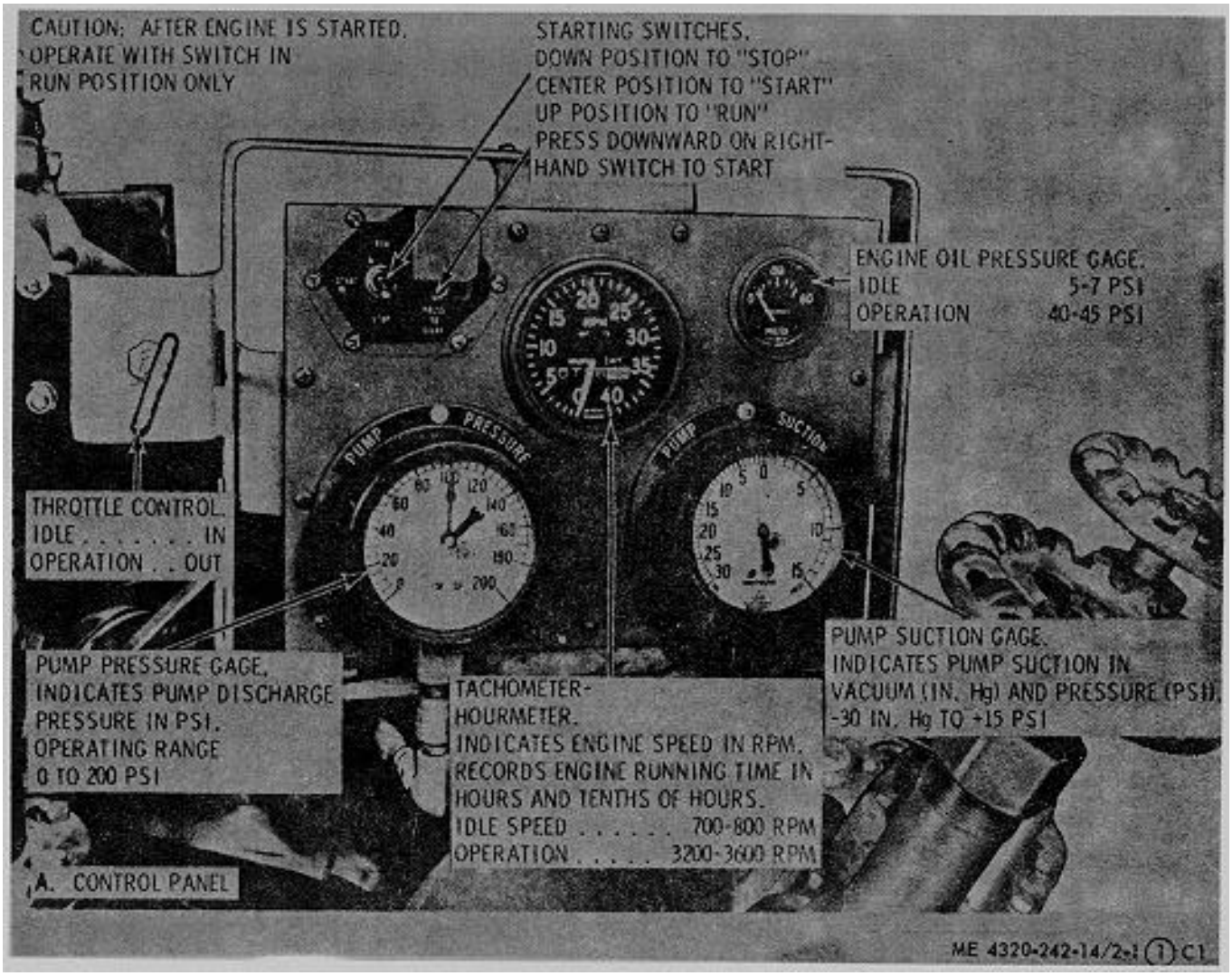


Figure 2-1. Controls and instruments (Sheet 1 of 4)

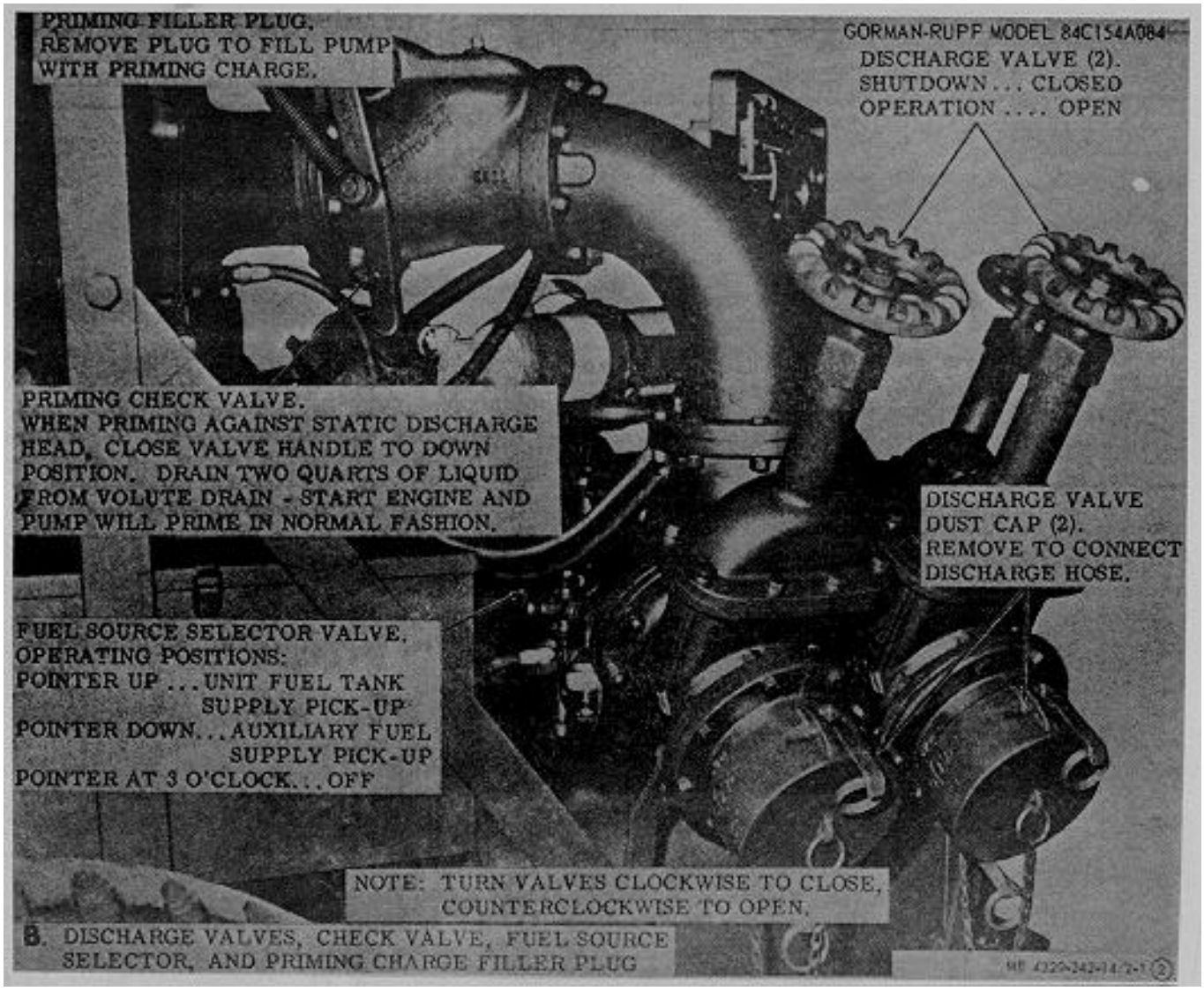


Figure 2-1. Controls and instruments (Sheet 2 of 4)

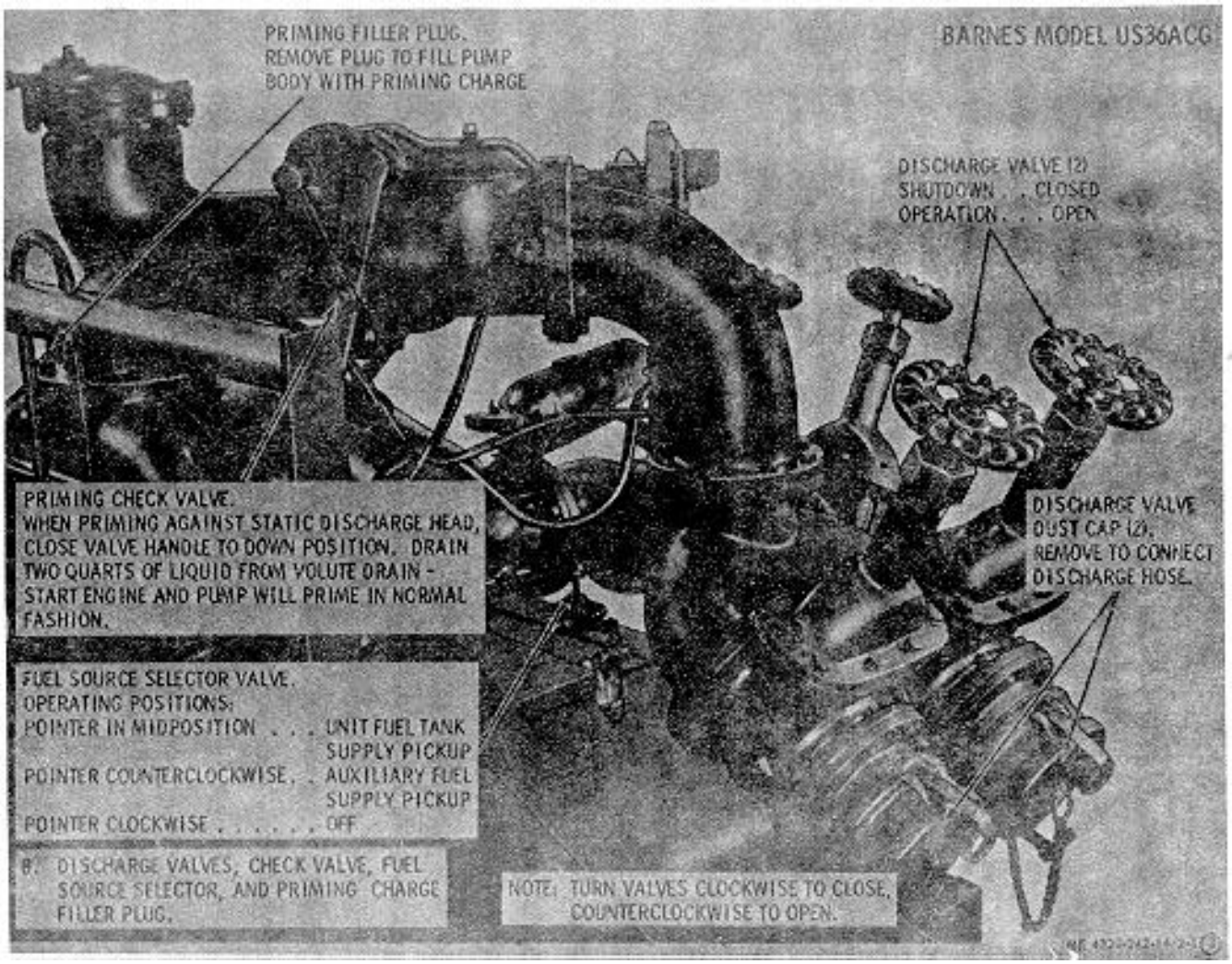


Figure 2-1. Controls and instruments (Sheet 3 of 4)

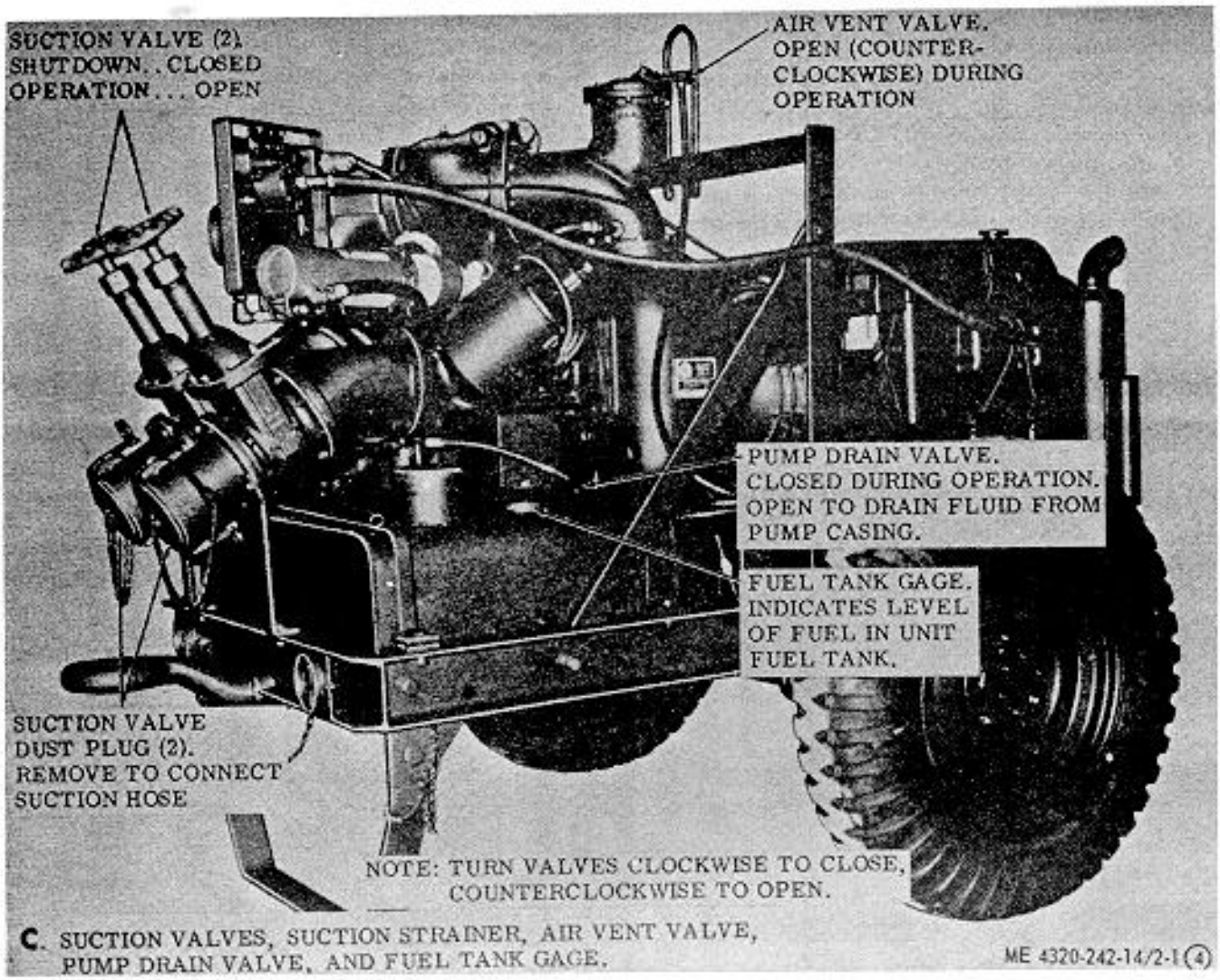


Figure 2-1. Controls and instruments (Sheet 4 of 4)

2-2. Starting

a. Preparation for Starting.

(1) Perform the daily preventive maintenance service (para 3-4).

(2) Refer to TM 5-2805-259-14 for engine pre-starting instructions.

b. Initial Operation. Prior to placing a new pump assembly into continuous and full-load operation, perform the following prescribed procedure:

(1) Start the pump assembly as prescribed in c below.

(2) Operate the pump assembly for one hour at 1,000 rpm (revolutions per minutes).

(3) Increase operation to 1,500 (revolution per minute) for one-half hour.

(4) Increase operation to 2,000 (revolutions per minute) for one-half hour.

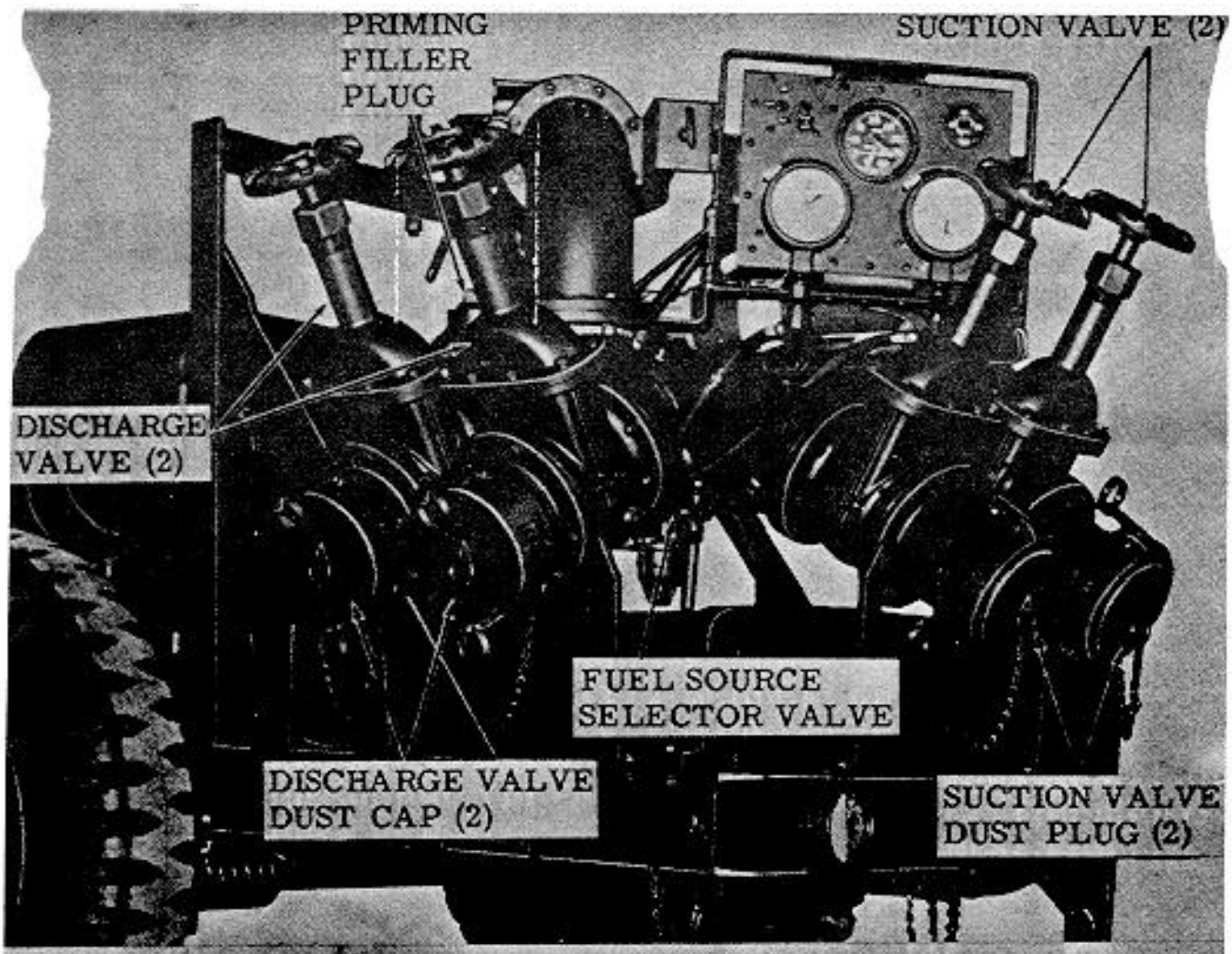
c. Starting. Refer to figure 2-2 and start the pumping assembly.

CAUTION

Inspect to see that the unit has been properly grounded prior to starting.

CAUTION

Never operate the pump assembly without priming charge in the pump casing or serious damage will result.



STEP 1. TURN FUEL SOURCE SELECTOR VALVE TO PROPER POSITION CONNECT AUXILIARY FUEL LINE, IF REQUIRED.

STEP 2. REMOVE SUCTION VALVE DUST PLUGS, DISCHARGE VALVE DUST CAPS; CONNECT SUCTION AND DISCHARGE HOSES.

STEP 3. OPEN SUCTION AND DISCHARGE VALVES.

STEP 4. OPEN AIR VENTING VALVE ON AIR ELIMINATOR ASSEMBLY.

CAUTION: IF PUMP IS NOT ALREADY FILLED (SUCH AS AT INITIAL STARTING), REMOVE PRIMING FILLER PLUG AND FILL PUMP WITH PRIMING CHARGE. MAKE CERTAIN THAT PUMP DRAIN VALVE IS CLOSED. REINSTALL FILLER PLUG.

WARNING: DO NOT START PUMP WITH FILLER PLUG OUT.

ME 4320-242-14/2-2 (1)

Figure 2-2. Starting the pump assembly (Sheet 1 of 2)

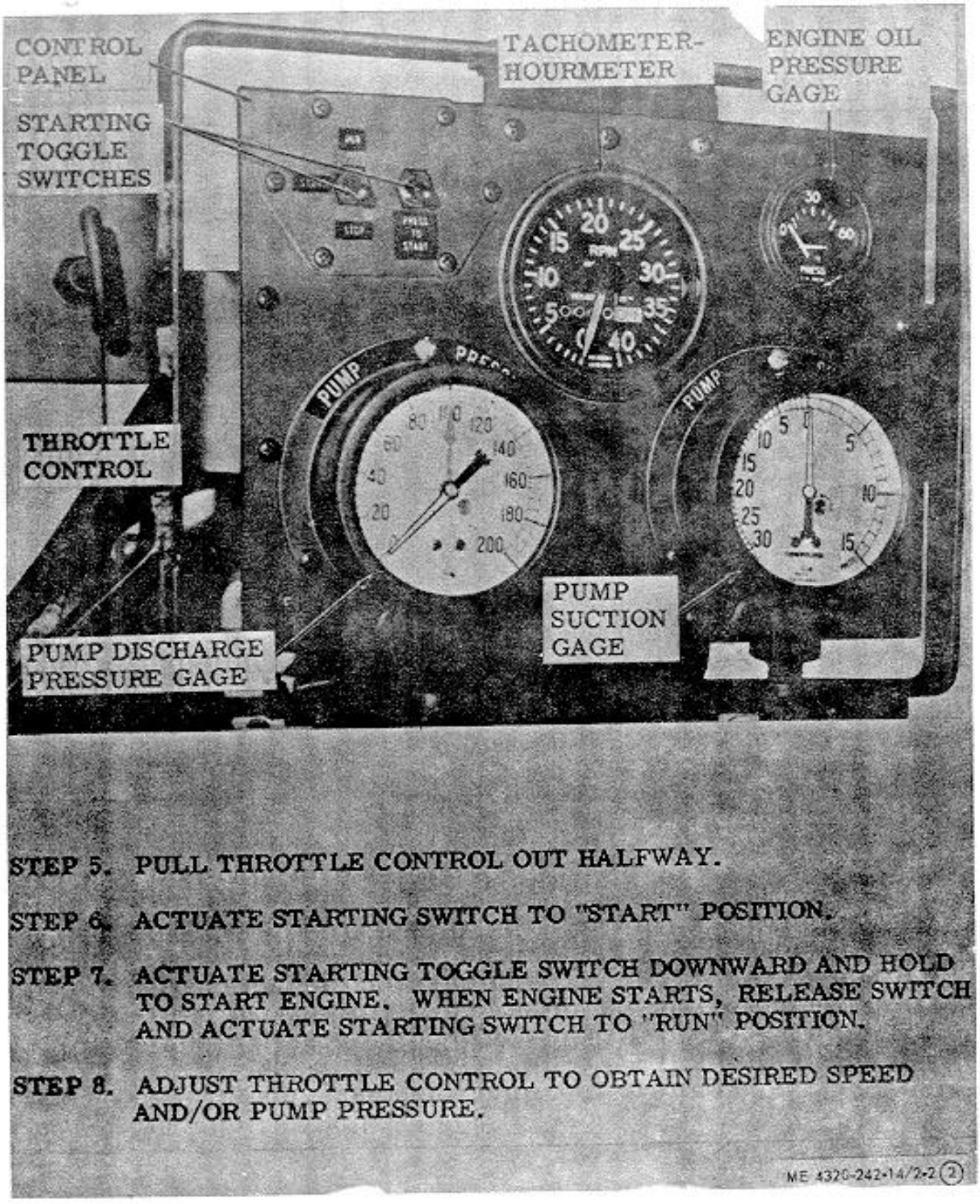


Figure 2-2. Starting the pump assembly (Sheet 2 of 2)

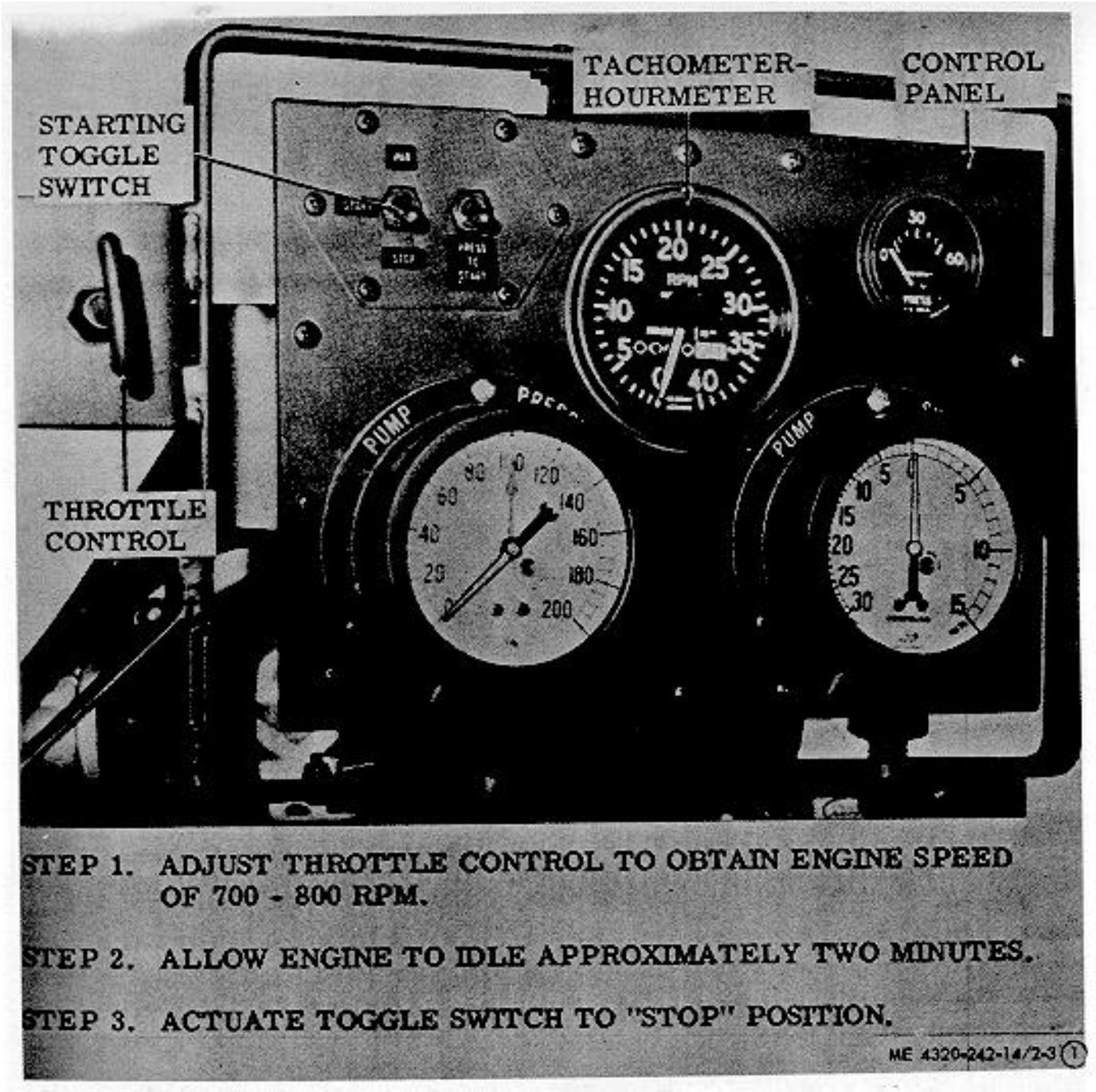


Figure 2-3. Stopping the pump assembly (Sheet 1 of 2)

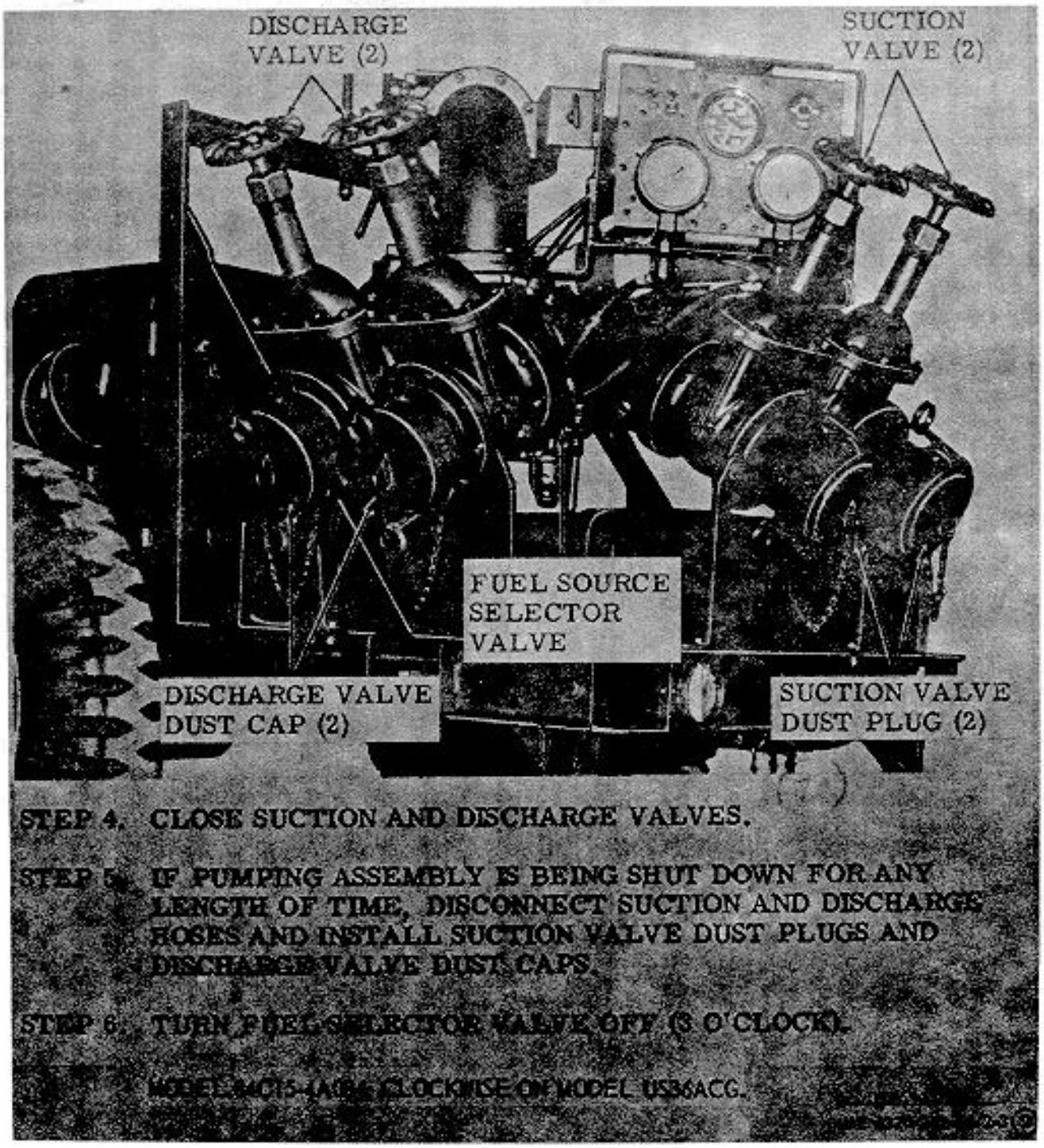


Figure 2-3. Stopping the pump assembly (Sheet 2 of 2)

2-4. Operation Under Usual Conditions

a. General.

(1) When the pump is in operation, check for normal instrument readings shown in figure 2-1.

(2) The engine governor is adjusted to limit maximum speed to 3600 revolutions per minute when pumping.

(3) The throttle control permits selection of power settings from idle speed (700-800 rpm) to maximum governed speed.

b. Operation.

(1) *Starting*. Start the pump assembly, paragraph 2-2.

(2) *Priming cycle*. When the pump and hose system are initially installed the priming charge is in pump body; and the engine is started; the throttle should be adjusted to 3300 rpm. The pump will operate for a short priming cycle period during which the pump is evacuating the air from the suction hose. During this period it will not be pumping liquid.

CAUTION

After pump has primed and is pumping, adjust throttle setting to 1800 rpm until discharge, hose system has filled.

CAUTION

When suction must be primed and the discharge lines lie on a grade considerably higher than the pump and are full of liquid, follow the procedures prescribed in figure 2-1 regarding priming check valve before starting engine.

(3) *Flow rate*. Flow rate increases with increased throttle control setting. It reaches maximum at full throttle (maximum governed engine speed of 3600 rpm); and when cavitation occurs at impeller inlet.

(4) *Cavitation*. Cavitation will occur when there are air leaks in the suction side of the pump, suction lift is too high, or the suction end of the line is not sufficiently submerged to prevent whirlpools. It produces an effect similar to a slipping clutch and a noise that sounds like loose pebbles ricocheting inside of the pump casing.

CAUTION

Cavitation is harmful to the pump assembly. Avoid at all times.

c. Performance Characteristics.

(1) Engine horsepower required to drive the pump varies with the weight of the liquid being pumped and the capacity or rate of pumping. To avoid overloading, adjust throttle control to maintain the desired flow rate.

(2) A composite pump performance curve is shown in figure 2-4.

a. Pump capacities are shown in gallons per minute. Pump discharge pressures are shown in pounds per square inch and in feet of head of the liquid pumped.

b. Lines of constant brake horsepower represent the loading of the engine. The engine will give satisfactory life and performance when normal operation does not exceed the continuous duty brake horsepower for the speed at which it is operated.

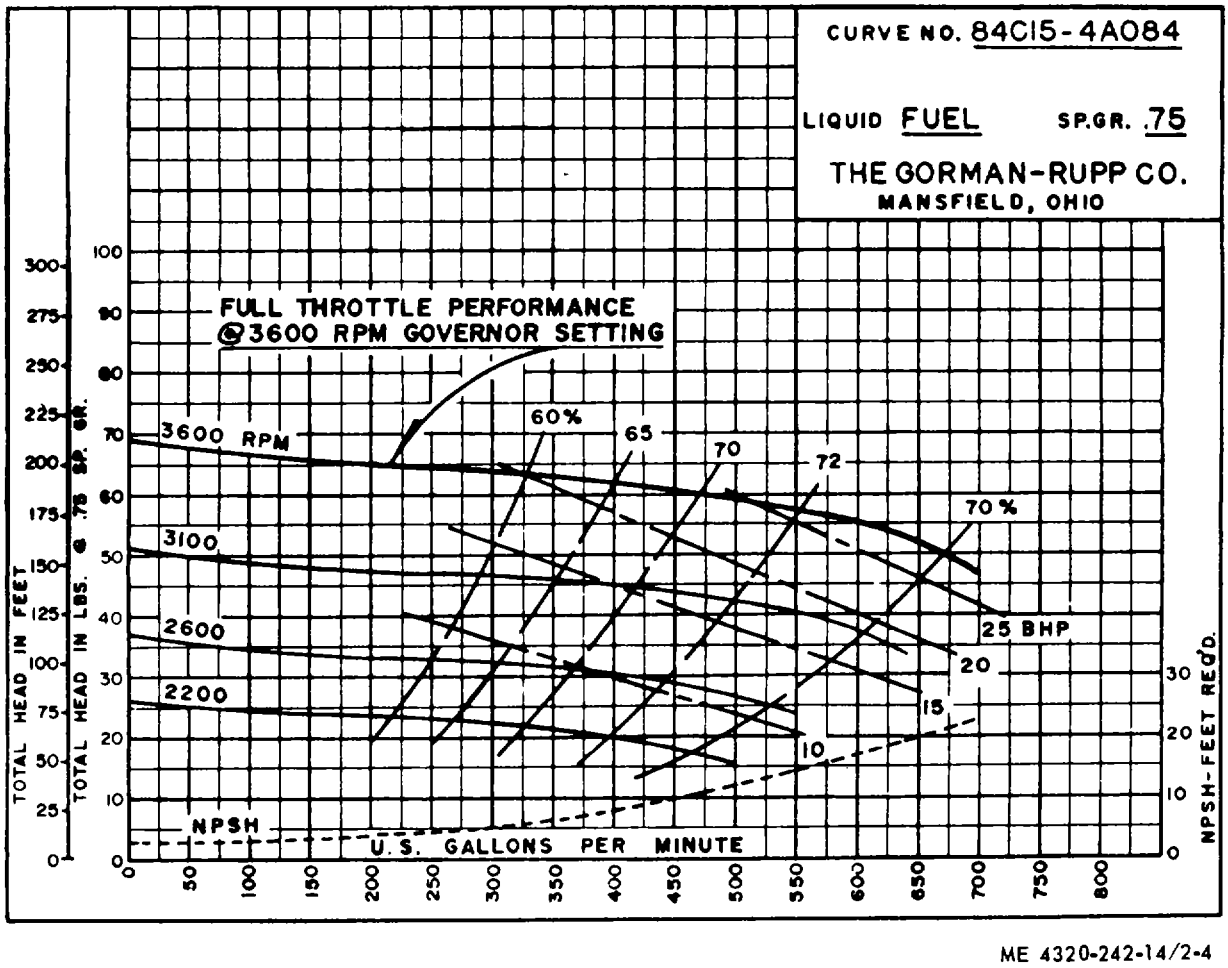


Figure 2-4. Performance curve.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

2-5. Operation in Extreme Cold (Below 0°F)

a. Lubrication. Refer to LO 5-2805-259-14 for engine lubrication. Lubricate pump and trailer in accordance with lubrication chart (fig. 3-1).

b. Fuel System.

(1) Keep the fuel tank full at all times to prevent condensation.

(2) Remove all ice crystals from the fuel tank strainer immediately before filling the fuel tank.

(3) Service the fuel filter frequently (para 3-24).

(4) After starting, allow the engine to reach normal operating temperature before full load operation.

(5) Keep the fuel tank cap free from ice, snow, and moisture.

c. Electrical System. Do not disturb electrical leads or wiring in extreme cold unless repair is indicated by broken insulation, terminals, wire, or short circuit.

2-6. Operation in Extreme Heat.

a. Lubrication. Refer to LO 5-2805-259-14 for engine lubrication. Lubricate pump and trailer in accordance with lubrication chart (fig. 3-1).

b. Fuel System.

(1) Do not overfill the fuel tank; allow room for expansion of fuel.

(2) Make sure the fuel tank cap is on tight and that the cap vent is open.

c. Engine Cooling Fins and Air Shrouds.

(1) Check the air shrouds for loss or damage that would prevent circulation of cooling air.

(2) Check the cooling fins on the cylinders frequently to make sure they are clean and not damaged.

2-7. Operation in Dusty or Sandy Areas

a. General. Keep the pump assembly covered when not in use. Take advantage of natural barriers where possible or erect a shelter.

b. Lubrication.

(1) Refer to, LO 5-2805-259-14 for Engine Lubrication. Lubricate trailer in accordance with lubrication chart (fig. 3-1).

(2) Clean all lubrication points before applying lubricants. Wipe spilled lubricants from the unit to avoid collecting dust and sand, clean the area around the oil fill cap and level gage before checking or adding lubricants.

(3) Clean the cooling fins so they are free of any spilled lubricants to prevent collection of dirt.

(4) Make sure the crankcase oil fill and breather cap is always clean.

c. Fuel Systems.

(1) Use care when adding fuel to prevent sand and dirt from entering the fuel system. Keep the fuel tank cap tight at all times.

(2) Store fuel in clean containers and protect them from dust and sand.

(3) Service the air cleaner and fuel filter daily (refer to engine manual, TM 5-2805-259-14).

(4) To prevent improper operation the system must be kept clean.

d. Electrical System.

(1) Wipe wiring and magneto with a clean, dry cloth.

(2) Check all gages for loose or broken lenses which might permit entry of dust and sand. Use transparent tape to prevent entry of foreign matter.

e. Engine Cooling Fins and Air Shrouds.

The engine assembly must be kept clean at all times to prevent overheating during operation.

2-8. Operation Under Rainy or Humid Conditions

a. General. When the pump assembly is operated outdoors, erect a suitable shelter. Keep the toolbox lid closed. During dry periods, remove the canvas cover to allow the unit to dry out.

b. Lubrication.

(1) Refer to LO 5-2085-259-14 for engine lubrication. Lubricate trailer in accordance with lubrication chart (fig. 3-1).

(2) Keep rain from entering the system when lubricating the unit.

(3) Keep the crankcase oil fill, breather cap, and the level gage, tight at all time.

c. Fuel System.

(1) Keep the fuel tank full at all times to prevent condensation.

(2) Keep the fuel tank cap tight at all times.

d. Electrical System.

(1) Check electrical leads for cracked or frayed insulation.

(2) Check all gages for loose or broken lenses which might permit entry of moisture. Use trans parent tape to prevent entry of foreign matter.

2-9. Operation in Salt-Water Areas

a. General. Salt water causes corrosive action on metal. Wash the unit frequently with fresh, clean water.

b. Lubrication.

(1) Steam clean the entire unit, if such equipment is available, before lubricating.

(2) Clean and dry all fittings before lubricating.

(3) Refer to LO 5-2805-259-14 for engine lubrication. Lubricate trailer in accordance with lubrication chart (fig. 3-1).

c. Fuel System.

(1) Keep the fuel tank cap tight at all times.

(2) Service the fuel strainer daily (para 4-20).

(3) Store the fuel in clean containers.

d. Electrical System.

(1) Clean and dry all electrical connections and check for corrosion.

(2) Check all gages for loose or broken lenses which might permit entry of moisture. Use transparent tape to prevent entry of foreign matter.

e. Painting. Paint all exposed, non-polished surfaces (refer to TM 9-213). Coat all exposed polished surfaces with standard issue, rust-proofing material, or cover with a light coat of grease.

2-10. Operation at High Altitudes

The pump assembly will operate normally at elevations up to 5,000 feet above sea level. However, the percentage of efficiency decreases approximately 3% at 1,000 feet, 7% at 2,000 feet. 12% at 3,000 feet, 15% at 4,000 feet and 18% at 5,000 feet.

CHAPTER 3

OPERATOR / CREW MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. General Lubrication Information

This section contains supplemental cleaning and lubrication instructions, refer to lubrication chart (fig. 3-1) for trailer lubrication points, and LO 5-2805-259-14 for engine lubrication points.

3-2. Detailed Lubrication Information

a. General. Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dust and grease. After lubrication, wipe all lubrication points clean to prevent accumulation of foreign matter.

c. Points of Lubrication, Trailer. Service the lubrication points at proper intervals as illustrated in figure 3-1.

NOTE

Refer to TM 5-2805-259-14 for engine lubrication points and related information.

d. OES Oil.

(1) Crankcase oil level must be checked frequently, as oil consumption may increase.

(2) Under cold weather operation conditions, oil may require changing more frequently than usual because contamination by dilution and sludge formation will increase.

e. Engine Oil Filter Service. Refer to TM 5-2805-259-14 and service the engine oil filter.

LUBRICATION CHART

PUMPING ASSEMBLY, FLAMABLE LIQUID, BULK TRANSFER, GASOLINE ENGINE DRIVEN, 350 GPM CAPACITY AT 190 FEET TOTAL HEAD, WHEEL MOUNTED (GORMAN-RUPP MODEL 84C15-4A084) W/MILITARY STANDARD ENGINE MODEL 4A084-III

Intervals are based on normal operation. Adjust to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

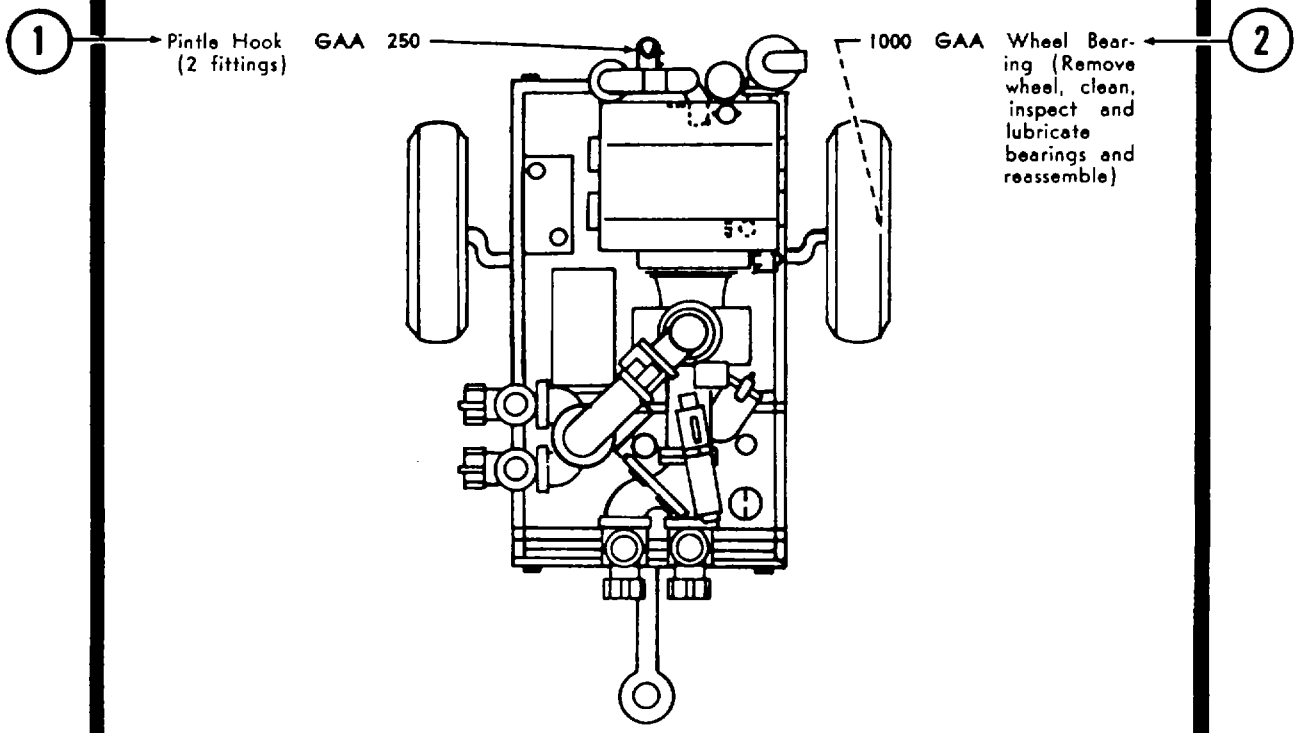
Relubricate after washing or fording.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

LUBRICANT - INTERVAL

INTERVAL - LUBRICANT



ME 4320-242-14/3-1

Figure 3-1. Lubrication chart.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-3. General

To insure that the pump assembly 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 preventive maintenance services to be performed are listed and described in paragraph 3-4. Item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the correction action taken on DA Form 2404 Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3-4. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to tables 3-1 and 3-2 for the operator/crew preventive maintenance checks and services.

Table 3-1. Operator/ Crew Preventive Maintenance Checks and Services

B—Before operation D—During operation A—After operation

Interval and sequence No.			Item to be inspected procedure	Work time M / H
B	D	A		
	1.		MUFFLER Inspect for loose mounting, holes, and other damage. Check condensation drain plug for secure installation.	.1
	2.		ENGINE OIL FILTER Inspect for secure mounting. With engine running, inspect for leaks or other damage. Service as required (para 3-2).	.1
	3.		CRANKCASE FILL AND LEVEL CAP Inspect for insecure mounting and proper fit. Check crankcase oil level. Service as required. Inspect level gage for cracks and bend (para 3-2).	.1
	4.		AIR CLEANER Inspect for loose mounting or damage.	.1
	5.		TIRES Inspect for proper inflation (45 psi) cuts, breaks, blisters, and flat spots. Inspect valve stems for leaks. Replace missing valve caps.	.1
	6.		FUEL TANK Check fuel level. Inspect strainer for holes and damage. Replace a damaged strainer.	.1
	7.		VALVES Inspect for a loose mounting and improper operation.	.1
	8.		HOSE CONNECTIONS, DUST CAPS, AND PLUGS Inspect hoses for secure connection. When hoses are disconnected make certain that dust caps and plugs are installed.	.1
	9.		CONTROLS AND INSTRUMENTS Inspect for damage and insecure mounting. Inspect for defective wiring, leaking line connections and improper operation of valves, levers, and linkages. With unit operating inspect for improper operation of all controls and instruments.	.1
	10.		TOOLBOX Inspect for loose mounting and damage to box and cover hinge.	.1
	11.		GROUNDING COMPONENTS Inspect to see that the pump assembly is properly grounded and that all connections are secure.	.1

Table 3-2. Operator/ Crew
Preventive Maintenance Checks and Services

D-Daily
Time required 1.1

W-Weekly
Time required .3 hrs.

Interval and sequence No.		Item to be inspected procedure	Work time M/H
D	W		
	1	AIR SHROUD Inspect air shrouds for insecure mounting, trends, or cracks. Inspect flywheel vanes for cracks or breaks.	.1
	2.	FUEL STRAINER Inspect for loose mounting, leaks, and cracked bowl. Drain water and dirt from strainer.	.1
	3.	BATTERY Tighten loose cables and mountings. Remove corrosion. Fill electrolyte to 3/8 in. above plates. In freezing weather run engine a minimum of one hour after adding water. Clean vent hole in filler cap.	.1

Section III. TROUBLESHOOTING

3-5. General

This section describes malfunction which might occur during operation of the pump assembly along with the test or inspection given and the corrective action taken. Only those malfunctions which are within the maintenance scope of the operator / crew are included in this chart. If the corrective actions given in this chart do not correct the malfunction, report the trouble to organizational maintenance.

3-6. Operator / Crew Troubleshooting

See table 3-3 for troubleshooting the pump unit.
Refer to TM 5-2805-259-14 for engine troubleshooting instructions.

Table 3-3. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1 PUMP ASSEMB3LY FAILS TO PRIME
- Step 1. Check to see if pump has been primed.
  Prime pump, refer to figure 2-2 (1).
- Step 2. Check to see if suction lift is too high.
  Place the pump assembly closer to level of supply if possible.
- Step 3. Check to see if engine is running at rated speed.
  Increase engine speed.

2. PUMP FAILS TO DELIVER CAPACITY
- Step 1. Check to see if suction lift is too high.
  Place the pump assembly closer to level of supply if possible.
- Step 2. Check to see if discharge head is too high.
  Reduce total head.
- Step 3. Check to see if engine is running at rated speed.
  Increase engine speed.
- Step 4. Check to see if suction or discharge valve is partially closed.
  Adjust valves (fig. 2-1).

3. NOISY PUMP OPERATION
- Check for proper installation.
  Relocate pump assembly.

4. PUMP OVERHEATS
- Check to see if suction or discharge valves are closed.
  Open valves (fig. 2-2).

5. NOT ENOUGH PRESSURE
- Step 1. Check to see if engine is running at rated speed.
  Increase engine speed (fig. 2-1).
- Step 2. Check to see if valves are fully opened.
  Open valves (fig. 2-2).

Note. Suction and Discharge hoses, valves, fittings and connections must be free of leaks to attain rated capacities

Section IV. MAINTENANCE OF FUEL TANK CAP AND STRAINER

Remove the fuel tank cap.. Raise strainer in fuel tank neck, then rotate counterclockwise and lift strainer from neck. Inspect for cracks, breaks, dents, and other defects.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

4-1. Unloading Equipment

a. Remove any tiedown and blocks that secure the pump assembly to the carrier.

b. Attach a hook from an overhead hoist or crane to the lifting frame assembly or use suitable ramp and prime mover and tow the unit from the carrier.

WARNING

Do not use a lifting De vice with a capacity of less than 2,000 pounds. Do not allow the pumping assembly to swing back and. forth when it is suspended in the air. Failure to observe this warning can result in damage to the equipment and in severe injury or death to personnel.

4-2. Unpacking Equipment

a. Remove the crating and protective barrier material, taking care not to damage the equipment.

b. Wipe the preservatives from the following items with cleaning solvent:

(1) Control wires and linkage.

(2) All other parts coated with a preservative material.

c. Drain all preservation from the following items:

(1) Fuel tank.

(2) Crankcase.

(3) Pump assembly.

d. Remove the pressure sensitive tape from the following items:

(1) Gages and meters on the control panel.

(2) Air cleaner assembly.

(3) Muffler openings.

(4) All valves.

e. Make a thorough inspection of the equipment and remove any other preservative material and pressure sensitive tape.

f. Inspect tires for improper inflation, cuts, breaks, blisters, and flat spots. Inspect valve stems for leaks. Replace missing valve caps.

4-3. Inspection and Servicing

a. Inspecting the Equipment.

(1) Inspect the pump for loose components or damage which may have occurred during shipment.

(2) Inspect all lines, hoses, fittings, and plugs to see that they are secure and tight.

(3) Inspect and tighten or replace any loose or missing nuts, bolts, or screws.

(4) Inspect the controls, instruments, gages, and valves for damage, loose mounting, or binding. Replace damaged parts, tighten loose mountings, and free-up any binding of levers and linkage.

(5) Inspect all accessible wiring for loose connections, cuts, burns, frayed insulation, and damaged terminals and shielding. Replace damaged wiring or terminals.

(6) Inspect the engine air cooling system for bent or missing air shrouds.

(7) After servicing as prescribed below, crank the engine several times to make sure the engine and magneto are free.

(8) Inspect publications for completeness. Inspect toolbox for damage and loose mounting. Inspect toolbox cover for tight closure.

(9) Inspect to be sure that the fire extinguisher is fully charged and in operating condition.

(10) Inspect muffler for holes, corrosion and loose mounting.

b. Servicing the Equipment.

(1) *Lubrication.* Refer to LO 5-2805-259-14, for engine lubrication. Lubricate trailer in accordance with lubrication chart (fig. 3-1).

(2) *Preventive maintenance.* Perform the daily preventive maintenance services (para 3-4).

(3) Engine. Refer to TM 5-2805-259-14.

(4) *Battery*. Fill the battery with electrolyte until 3A inch above plates. Specific gravity must be 1.250 or higher. checked with hydrometer.

WARNING

Take precautions against spilling electrolyte on clothing or allowing to come in contact with skin as burns may occur. Use rubber gloves when filling battery.

(5) *Cold weather servicing*. For cold weather operation, lubricate equipment in accordance with lubrication chart (fig. 3-1). Refer to TM 5-2805259-14 for engine servicing.

4-4. Installation

a. Location. Where installation conditions permit, avoid a muddy, sandy, or dusty site. If it is necessary to install the unit on soft ground, arrange a foundation of planking, logs, or concrete.

b. Indoor Installation. Make sure the floor is sufficiently strong to support the unit. Provides at least four feet of space on all sides of the unit to provide accessibility. Make sure the area is well ventilated. Pipe the exhaust of the engine outside the building. Arrange the piping with aluminum of bends, and make sure all connections are tight.

WARNING

Do not operate the pump assembly in an enclosed area unless exhaust gases are piped to the outside. Inhalation of exhaust fumes will result in serious illness or death.

c. Leveling. Keep the unit as level as possible.

d. Grounding. The pump must be grounded prior to operation. Remove the ground rods from the ground rod carrier (fig. 1-1) and drive into the ground approximately two feet, connect the ground wire assembly securely to the ground rod and the trailer frame.

e. Suction and Discharge Lines. Remove the suction and discharge connection dust plugs and caps (fig. 1-1), and connect the suction and discharge lines.

f. Auxiliary Fuel Hoses. If an auxiliary fuel supply is to be used, connect the auxiliary fuel line to the fuel source selector valve (fig. 2-1).

4-5. Equipment Conversion

This pump assembly is designed to be used in conjunction with the Class III fuel supply system, but it can be used as an individual pump assembly.

Section II. MOVEMENT TO NEW WORKSITE

4-6. Dismantling for Movement

a. Preparation for Movement.

(1) Disconnect suction and discharge lines and remove auxiliary fuel line if connected to the unit. Install dust plugs and dust caps to suction and discharge fittings.

(2) Disconnect ground cable from the trailer. Install the ground rods in carrier (fig. 1-1) and stow the cable assemblies in the toolbox.

(3) Refer to Appendix B. and make sure that the items listed are on or with the equipment.

(4) Disconnect the exhaust pipe extension, if used.

(5) If the pump is to be moved by common carrier, drain the fuel tank and the pump casing.

(6) Close and secure the toolbox cover.

b. Movement.

(1) If the pump assembly is to be moved only a short distance, raise the rear stand (fig. 1-1), connect the drawbar (fig. 1-1), to the towing vehicle and tow to the new location.

(2) For longer distances or over rough terrain, lift the pump with a suitable hoist onto the carrier. Securely block the pump on the carrier. Use tiedowns or other suitable means to prevent shifting during transport.

4-7. Reinstallation After Movement

a. Refer to paragraph 4-4 and install the pump.

b. Perform the inspection and service prescribed by paragraph 4-3.

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-8. Special Tools and Equipment

No special tools or equipment are required for organizational maintenance of the pump.

4-9. Maintenance Repair Parts

Repair parts and equipment are listed in the repair parts and special tools list, TM 5-4320-242-24P and TM 5-2805-259-24P.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-10. General

This section lists the preventive maintenance checks and service which shall be performed on a quarterly basis by organizational maintenance personnel. A quarterly interval is equal to 3 calendar months.

4-11. Preventive Maintenance Checks and Services

Refer to table 4-1 for a listing of the preventive maintenance checks and services. Service the engine as directed in TM 5-2805-259-14.

Table 4-1. Preventive Maintenance Checks and Services

Q - Quarterly
Total manhours, .5

Sequence No.	Item to be inspected procedure	Work time M/H
1	SUCTION STRAINER Inspect strainer for holes, dirt, and other damage. Inspect gaskets for damage. Service as required. Inspect cap for loose mounting.	.1
2.	TRAILER FRAME AND MOUNTING HARDWARE Inspect for damage. Tighten all loose components and mounting hardware.	.1
3.	REFLECTORS Inspect for broken lens or insecure mounting.	.1
4.	DRAWBAR Inspect for insecure mounting and bent or broken parts.	.1
5.	PINTLE HOOK Inspect for insecure mounting, bent, broken or missing parts, and for improper operation.	.1

Section V. TROUBLESHOOTING

4-12. General

This section describes the malfunctions which might occur during operation of the pump assembly along with the tests and inspections to be performed so that the malfunction can be isolated and corrective actions taken.

4-13. Troubleshooting

Refer to table 4-2 for troubleshooting.

Table 4-2. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. PUMP ASSEMBLY FAILS TO PRIME
Step 1. Inspect for leak in suction line or connections.
Tighten or replace hose or piping.
Step 2. Check to see if suction line is clogged.
Remove and clean line and strainer.
2. PUMP FAILS TO DELIVER TO CAPACITY
Step 1. Inspect lines of suction hose, to see if it has collapsed.
Replace suction hose.
Step 2. Inspect impeller to see if it is clogged with sediment.
Clean and flush the pump assembly.
Clean and replace suction strainer if damaged.
3. NOISY PUMP OPERATION
Inspect suction strainer to see if it is clogged.
Remove and clean strainer.
4. NOT ENOUGH PRESSURE
Step 1. Inspect for leak in hose.
Replace hose.
Step 2. Inspect suction line for loose connection.
Tighten connection.

Note. Suction and discharge hoses, valves, fittings and connections must be free of leaks to attain rated capacities.

Section VI. RADIO INTERFERENCE SUPPRESSION

Refer to TM 5-2805-259-14 for radio interference suppression.

Section VII. FUEL SYSTEM

4-14. General

Refer to engine manual TM 5-2805-259-14 for a description of the engine fuel system. The components furnished and / or installed by the end item manufacturer are described in paragraphs 415 and 4-16.

4-15. Fuel Tank and Fuel Line

a. Removal. Refer to figure 4-1 and remove the fuel tank and fuel line.

b. Cleaning and Inspection.

(1) Wash all parts with cleaning solvent PD680. Dry thoroughly.

(2) Inspect for breaks, cracks, dents, loose or missing mounting hardware, damaged threaded areas, or other defects.

(3) Replace a damaged or defective tank or fuel line as necessary.

c. Installation. Refer to figure 4-1 and install the fuel tank and fuel line.

4-16. Fuel Filter

a. Removal and Disassembly. Refer to figure 4-2 and remove the fuel filter. Refer to engine manual TM 5-2805-259-14 and disassemble the fuel filter.

b. Reassembly and Installation. Refer to TM 52805-259-14 and reassemble the fuel filter. Refer to figure 4-2 and reinstall the fuel filter.

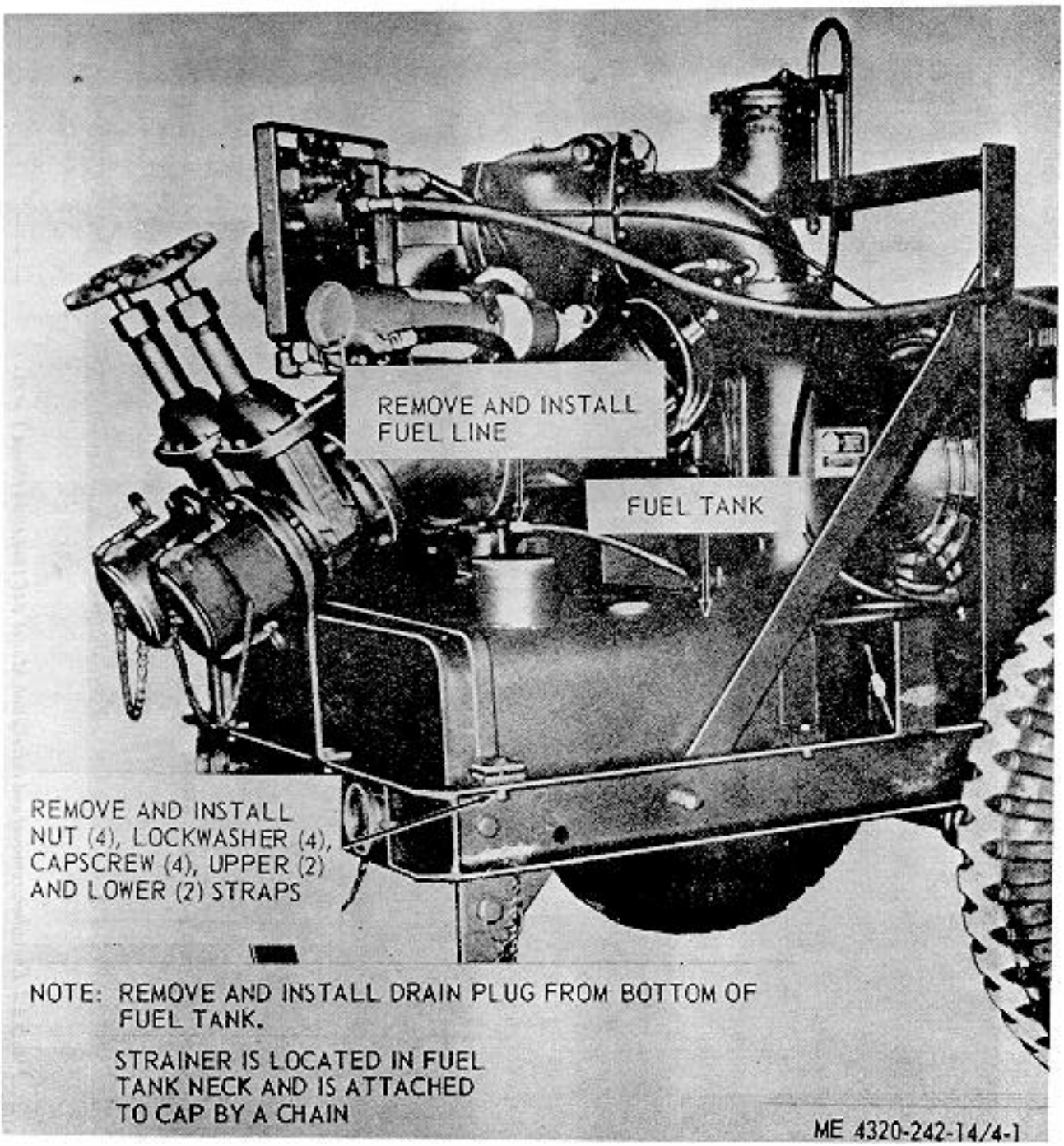


Figure 4-1. Fuel tank and fuel lines, removal and installation.

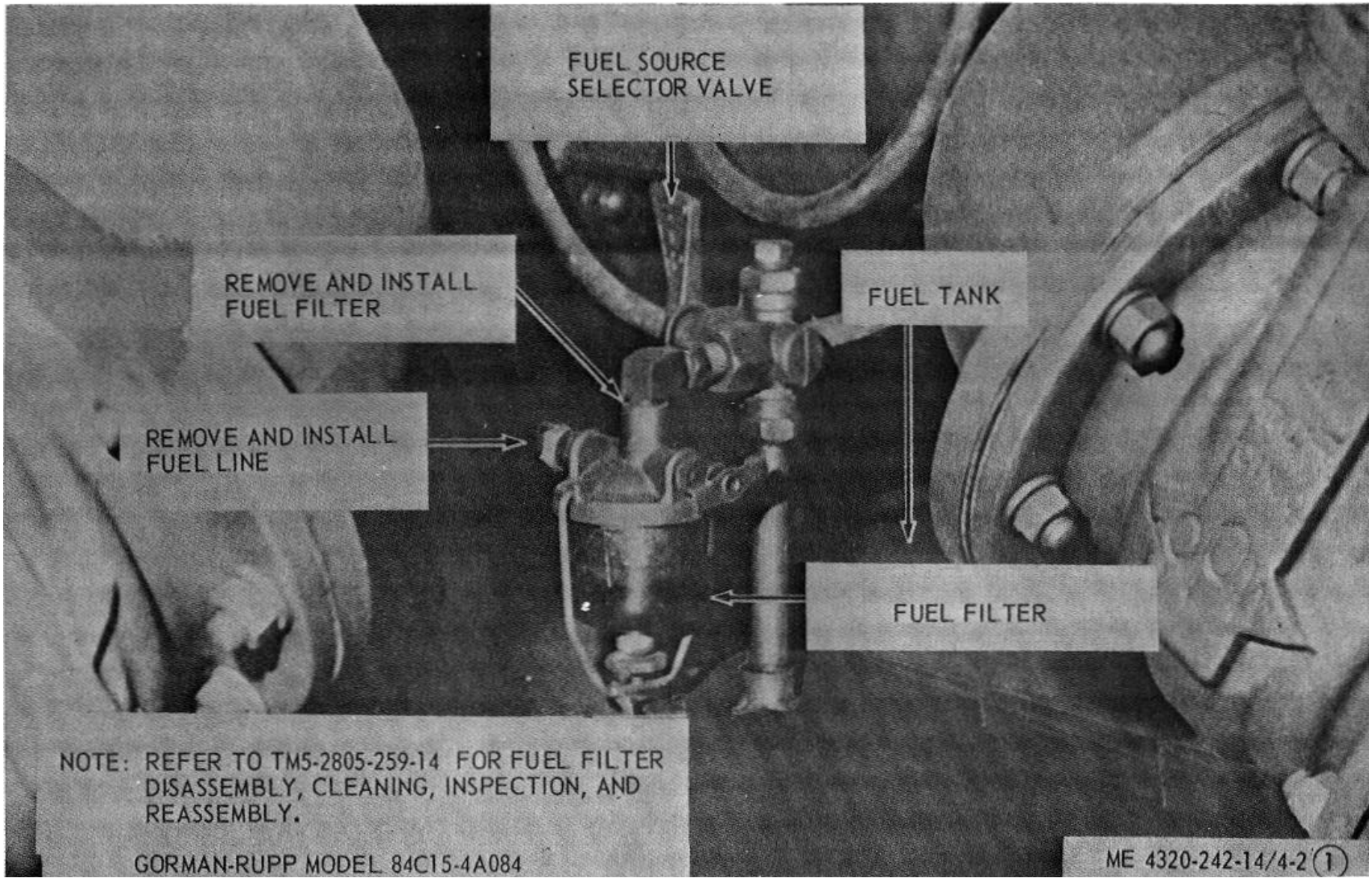


Figure 4-2. Fuel filter, removal and installation Model 84C15-4A084. (Sheet 1 of 2).

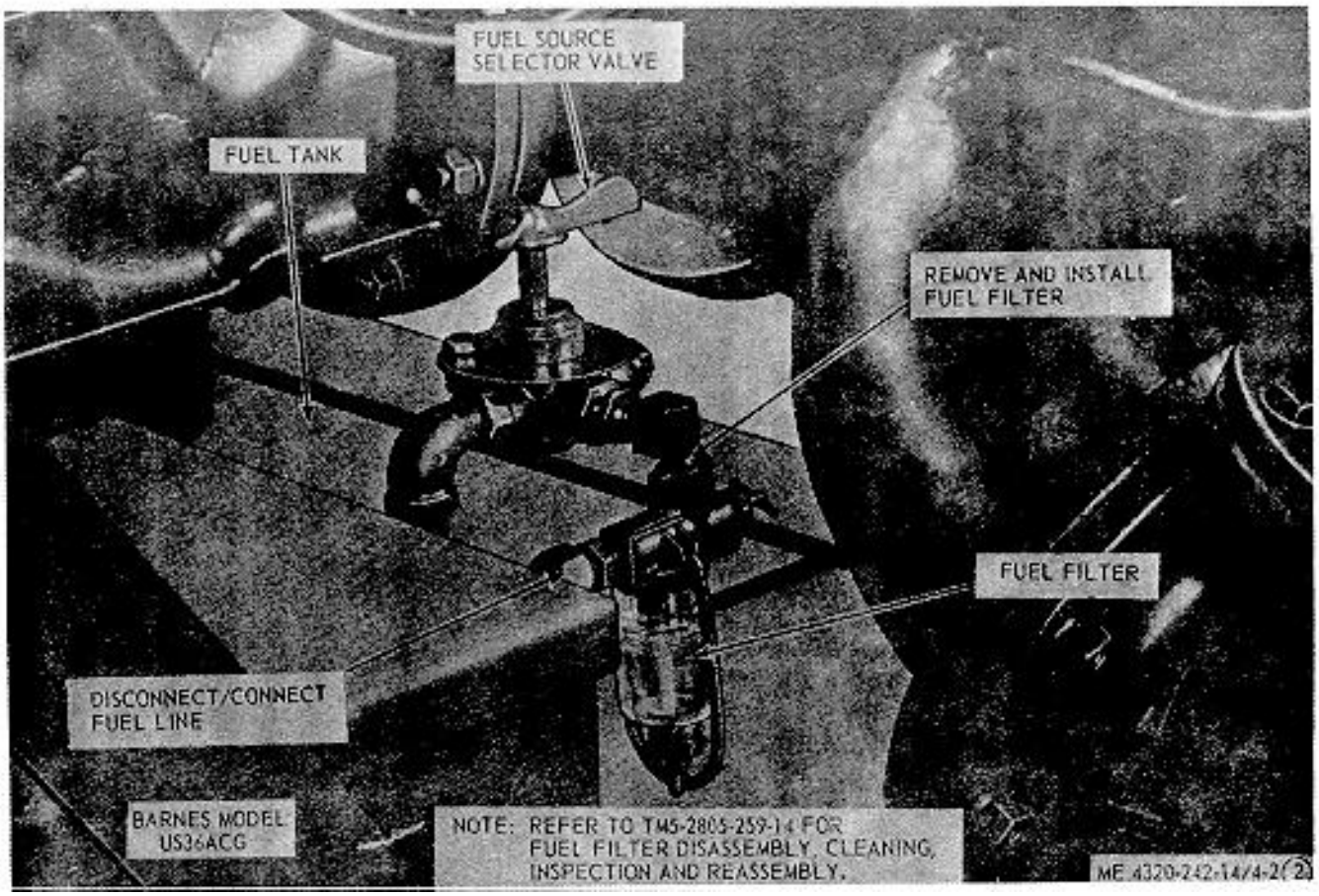


Figure 4-2. Fuel filter, removal and installation Model US36ACG. (Sheet 2 of 2).

Section VIII. GAGES AND PANEL

4-17. General

This section provides information useful in the repair and maintenance of the gages and mounting panel necessary to operate the pump and engine.

4-18. Throttle Cable

a. Removal. Refer to figure 4-3 and remove the throttle cable.

b. Cleaning and Inspection.

(1) Wipe the throttle cable with a clean cloth dampened with cleaning solvent PD-680. Dry thoroughly.

(2) Inspect for breaks, bends, rust, loose or missing mounting hardware, or other defects.

(3) Replace defective throttle cable.

c. Installation. Refer to figures 4-3 and install the throttle cable.

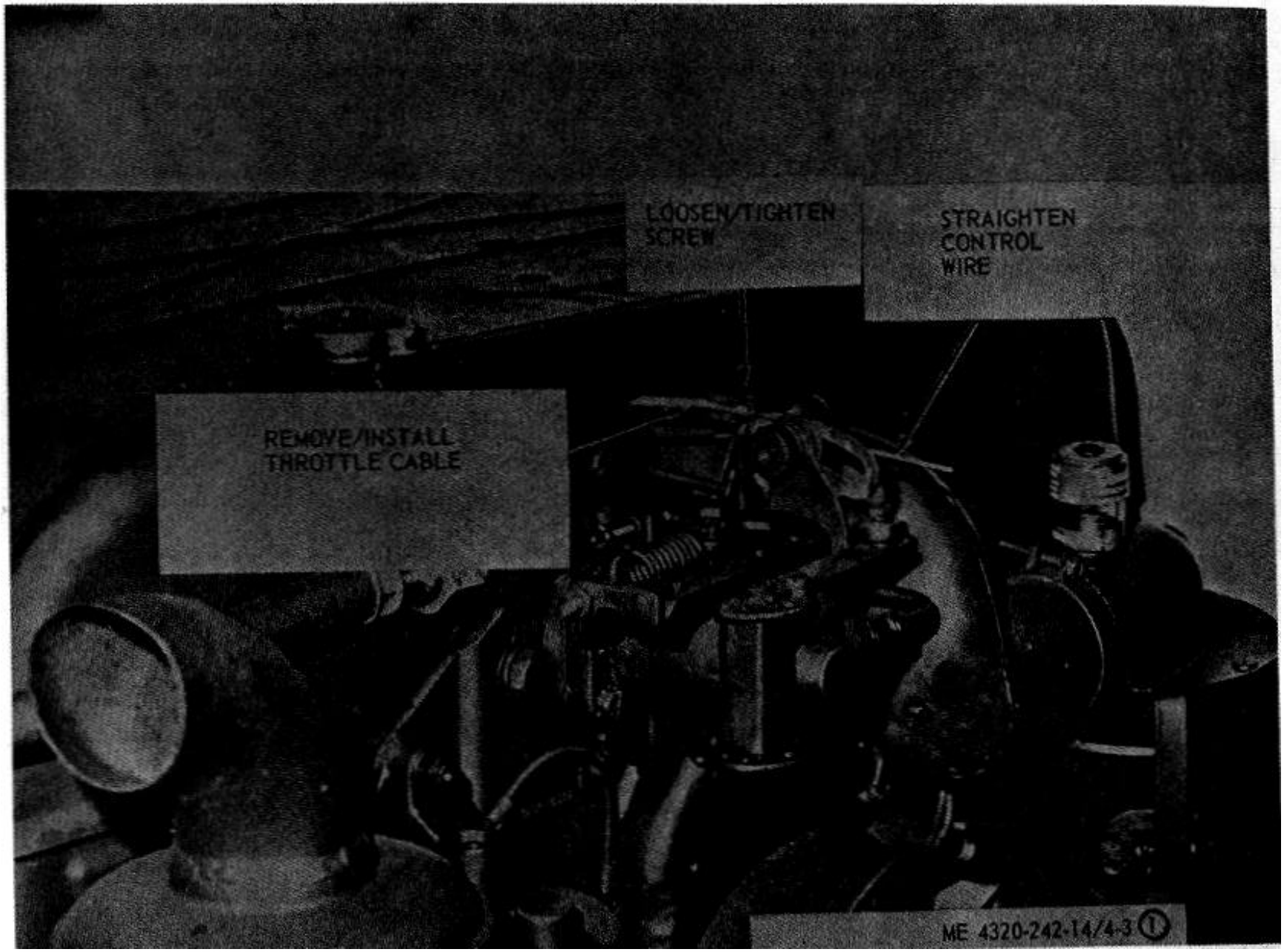


Figure 4-3. Throttle cable, removal and installation. (Sheet 1 of 2).

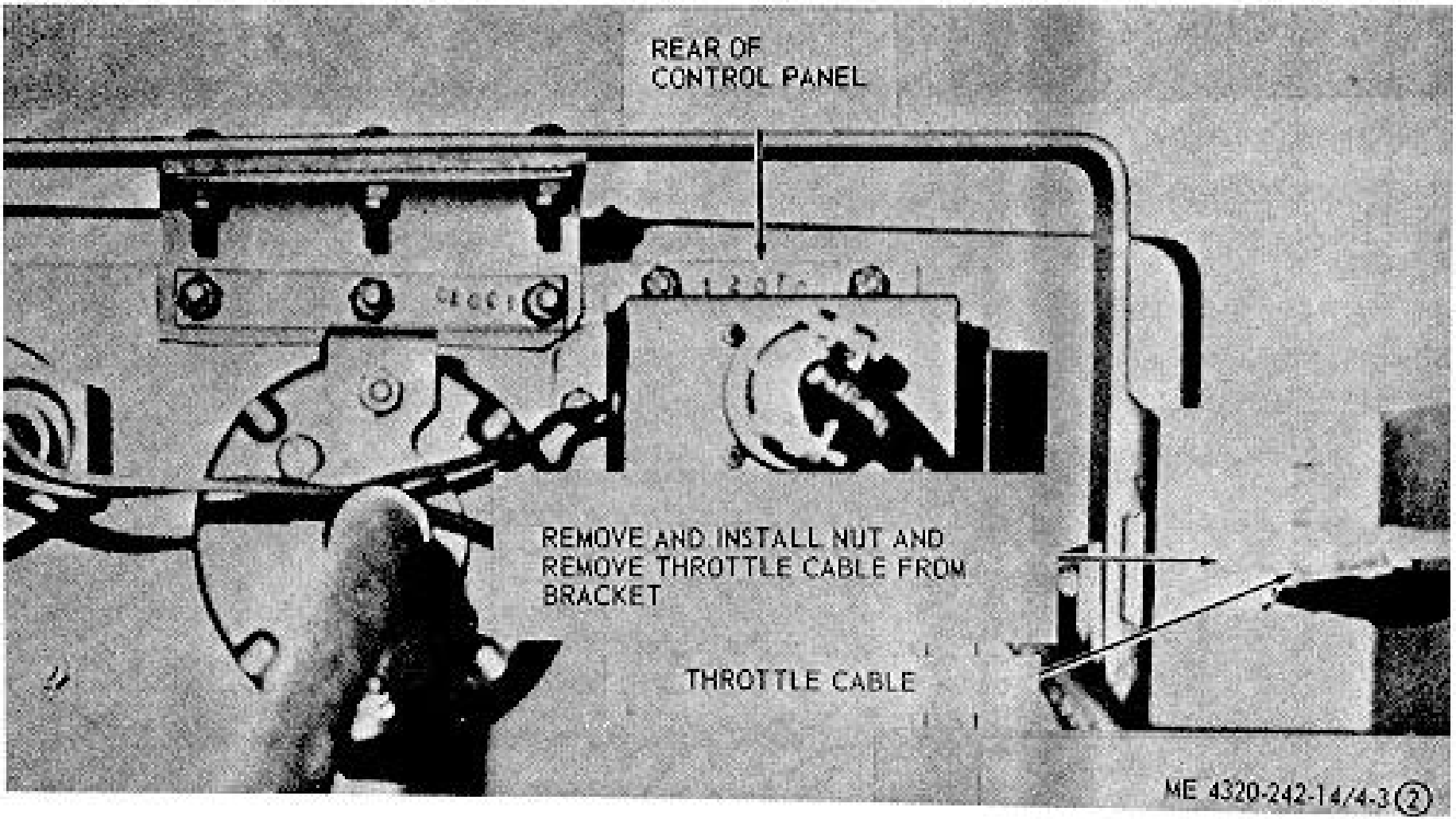


Figure 4-3. Throttle cable, removal and installation. (Sheet 2 of 2).

4-19. Starting Switch

a. Removal. Refer to figure 4-4, and remove the starting switch.

b. Cleaning and Inspection.

(1) Wipe the starting switch with a clean dry cloth.

(2) Inspect for breaks, cracks, corrosion, or other defects.

(3) Replace a damaged or defective starting switch as necessary.

c. Installation. Refer to figure 4-4 and install the starting switch.

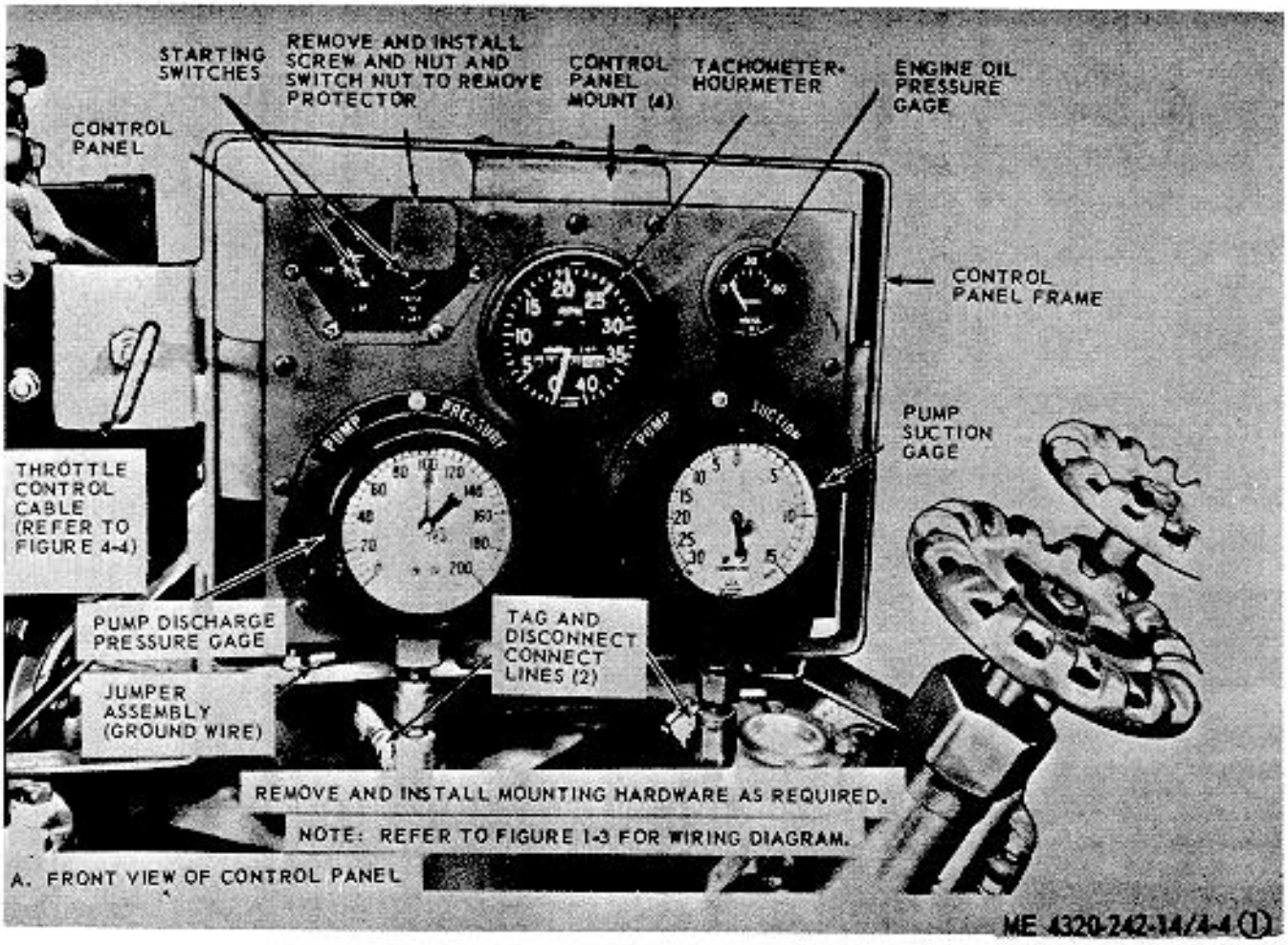


Figure 4-4. Gages and panel, removal and installation. (Sheet 1 of 2).

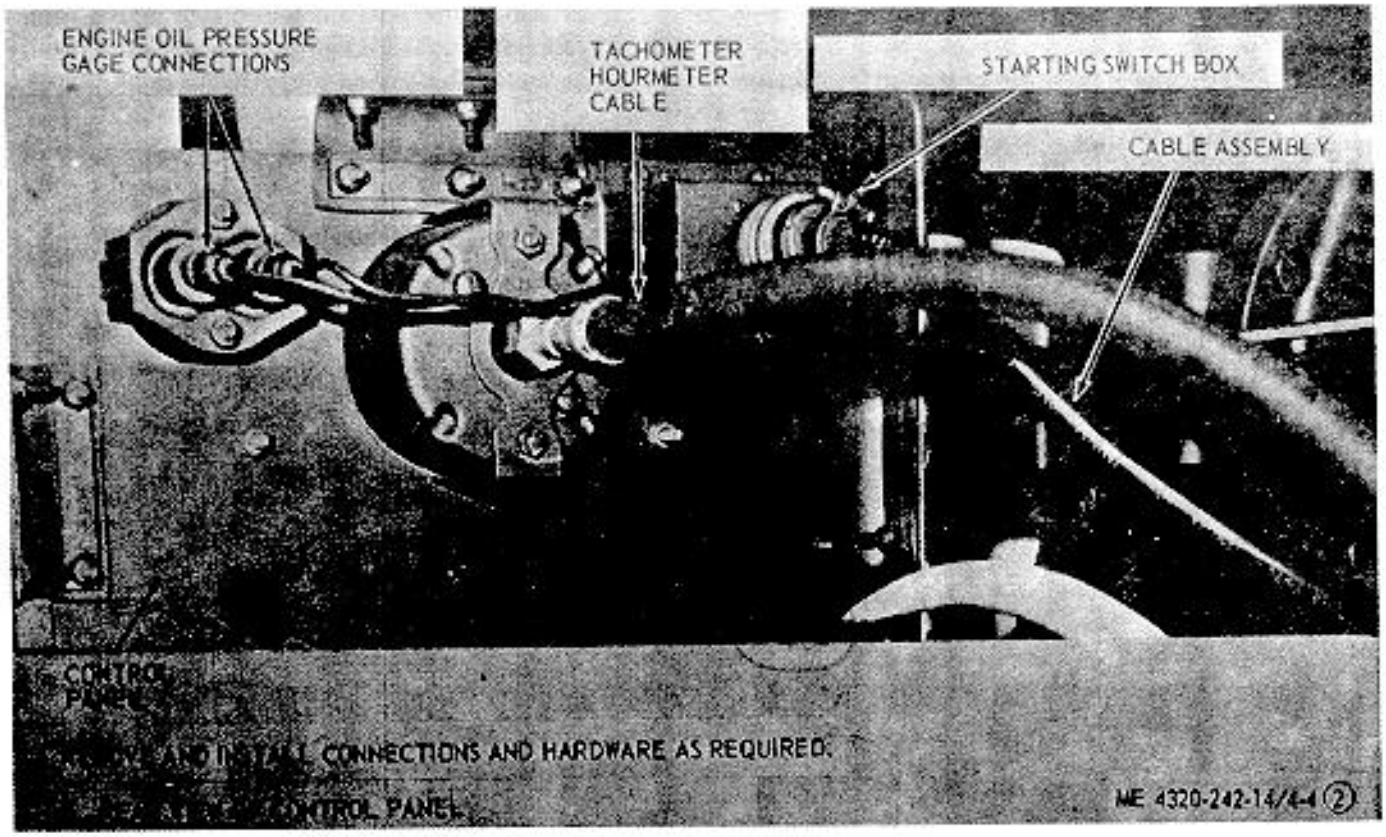


Figure 4-4. Gages and panel, removal and installation. (Sheet 2 of 2).

4-20. Tachometer-Hourmeter

a. Removal. Refer to figure 4-4 and remove the tachometer-hourmeter.

b. Cleaning and Inspection. Clean with cleaning solvent PD-680 and inspect all parts. Replace a defective tachometer-hourmeter.

c. Installation. Refer to figure 4-4 and install the tachometer-hourmeter.

4-21. Engine Oil Pressure Gage

a. Removal. Refer to figure 4-4 and remove the engine oil pressure gage.

b. Cleaning and Inspection. Clean all parts with cleaning solvent PD-680. Inspect the case for cracks and dents. Inspect threads for damage. Replace a defective engine oil pressure gage.

c. Installation. Refer to figure 4-4 and install the engine oil pressure gage.

4-22. Pump Gages and Lines

a. Removal. Refer to figure 4-4 and remove the pump discharge pressure gage, pump suction gage, and lines.

b. Cleaning and Inspection.

(1) Clean and inspect all parts. Replace a defective gage.

(2) Clean and inspect hoses and fittings. Replace a hose assembly if hose is defective or fitting is cross-threaded.

c. Installation. Refer to figure 4.4 and install the pump gage and lines.

4-23. Panel and Frame

a. Removal.

(1) Remove the throttle cable (fig. 4-31.

(2) Remove the starting switches (fig. 4-4).

(3) Remove the tachometer-hourmeter (fig. 4-4).

(4) Remove the engine oil pressure gage (fig. 4-4).

(5) Remove the pump discharge pressure gage (fig. 4-4).

(6) Refer to figure 4-4 and remove the panel and frame.

b. Cleaning and Inspection. Clean and inspect all parts. Replace a defective part.

c. Installation. Refer to figure 4-4 and install the panel and frame.

(1) Install the pump discharge pressure gage, pump suction gage, and lines (fig. 4-4).

(2) Install the engine oil pressure gage (fig. 4-4).

(3) Install the tachometer-hourmeter (fig. 4-4).

(4) Install the starting switches (fig. 4-4).

(5) Install the throttle cable (fig. 4-3).

Section IX. PUMP ASSEMBLY

4-24. Suction Screen

Refer to figure 4-5 and remove, clean, inspect, and install suction screen.

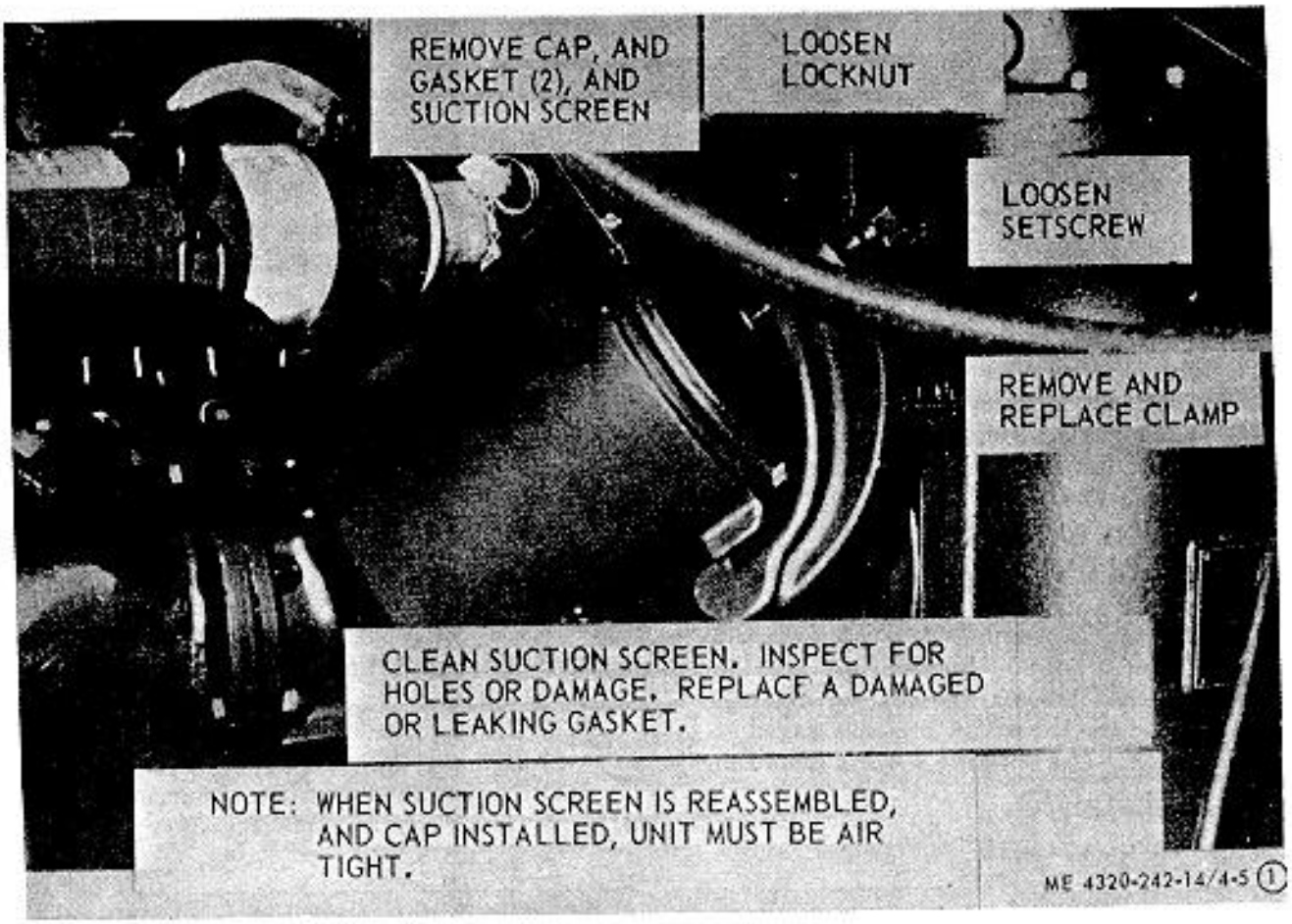


Figure 4-5. Suction screen, removal and installation. Serial numbers 371201 through 415493 and model US36ACG Serial numbers 37044-001 through 37044-240. (Sheet 1 of 2).

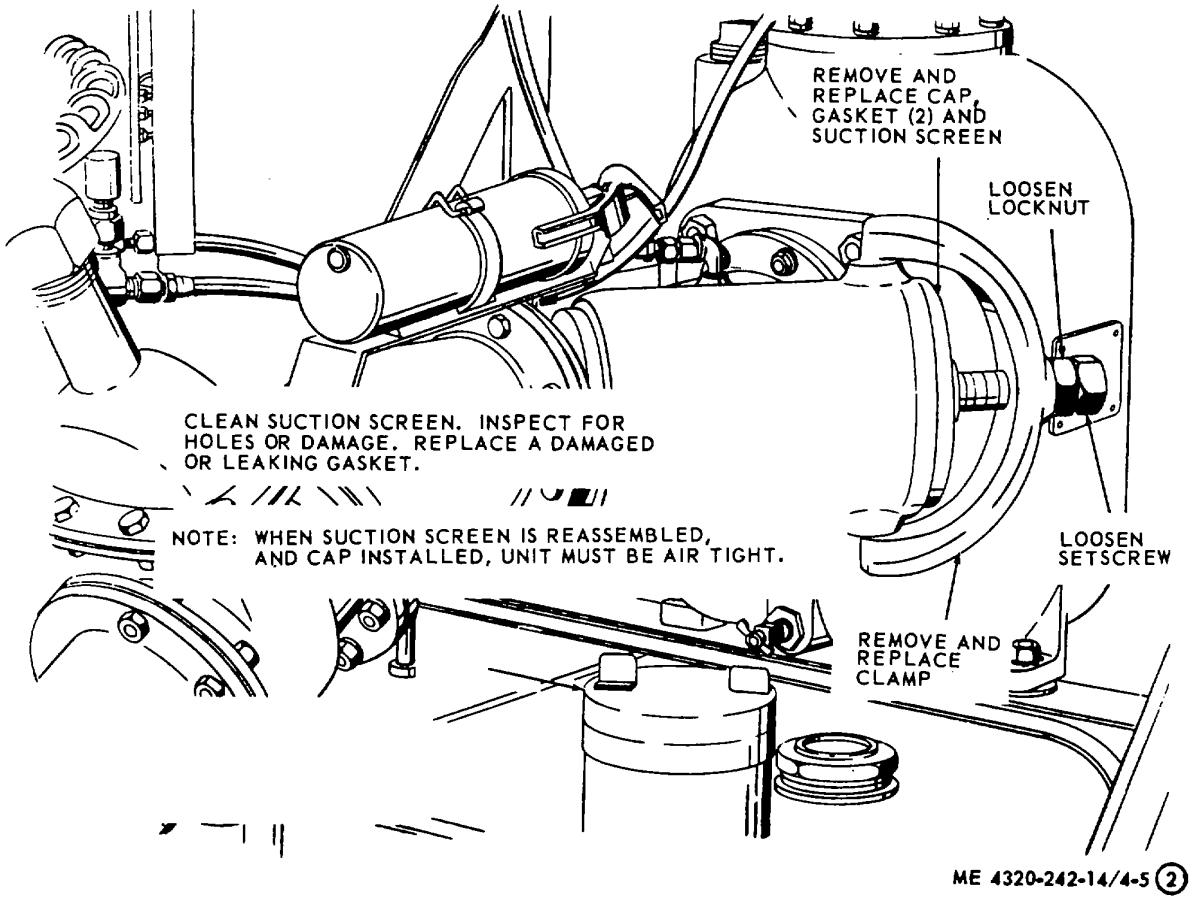


Figure 4-5. Suction screen, removal and installation. Serial numbers 419501 through 419959. (Sheet 2 of 2).

4-25. Air Eliminator Assembly

a. Removal. Refer to figure 4-6 and remove the air eliminator assembly.

b. Disassembly.

(1) Remove hose (10, fig. 4-7), hose clamp (9), air venting valve (8), pipe coupling (7), pipe nipple (6), pipe plug (4), and ball (3).

(2) Remove nuts (20), lockwashers (21), and capscrews (1 and 51.

(3) Remove cap assembly from discharge elbow (19). Remove gasket (11).

(4) Remove valve retainer (17), pivot (13), and valve (15).

(5) Remove screw (22), separating valve lever (161 and float assembly (18).

(6) Remove seat (14) and valve lever clip (12) from cap (2).

c. Cleaning and Inspection.

(1) Clean all parts with cleaning solvent PD680 and wipe dry with a clean, lintless cloth.

(2) Inspect the cover for cracks and breaks. Replace a defective cover if necessary.

(3) Inspect the float assembly for holes and cracks. Replace a defective float assembly.

(4) Inspect all fittings and screws for damage. Replace any defective parts as necessary.

(5) Discard the gasket and use a new gasket for reassembly.

(6) Inspect the valve and seat for wear, grooves, or ridges. Replace the valve and seat as an assembly if worn or damaged.

d. Reassembly.

(1) Assemble valve lever clip (12, fig. 3-11) and seat (14) to cap (2).

(2) Assemble valve lever (16) to float assembly (18) with screw (22).

(3) Install valve (15), valve retainer (17), and pivot (13).

(4) Install a new gasket (11) and cap assembly on discharge elbow (19).

(5) Install capscrews (1 and 5), lockwashers (21), and nuts (20).

(6) Install ball (3), pipe plug (4), pipe nipple (6), pipe coupling (7), air venting valve (8), hose (10), and hose clamp (9).

e. Installation. Refer to figure 4-6 and install the air eliminator assembly.

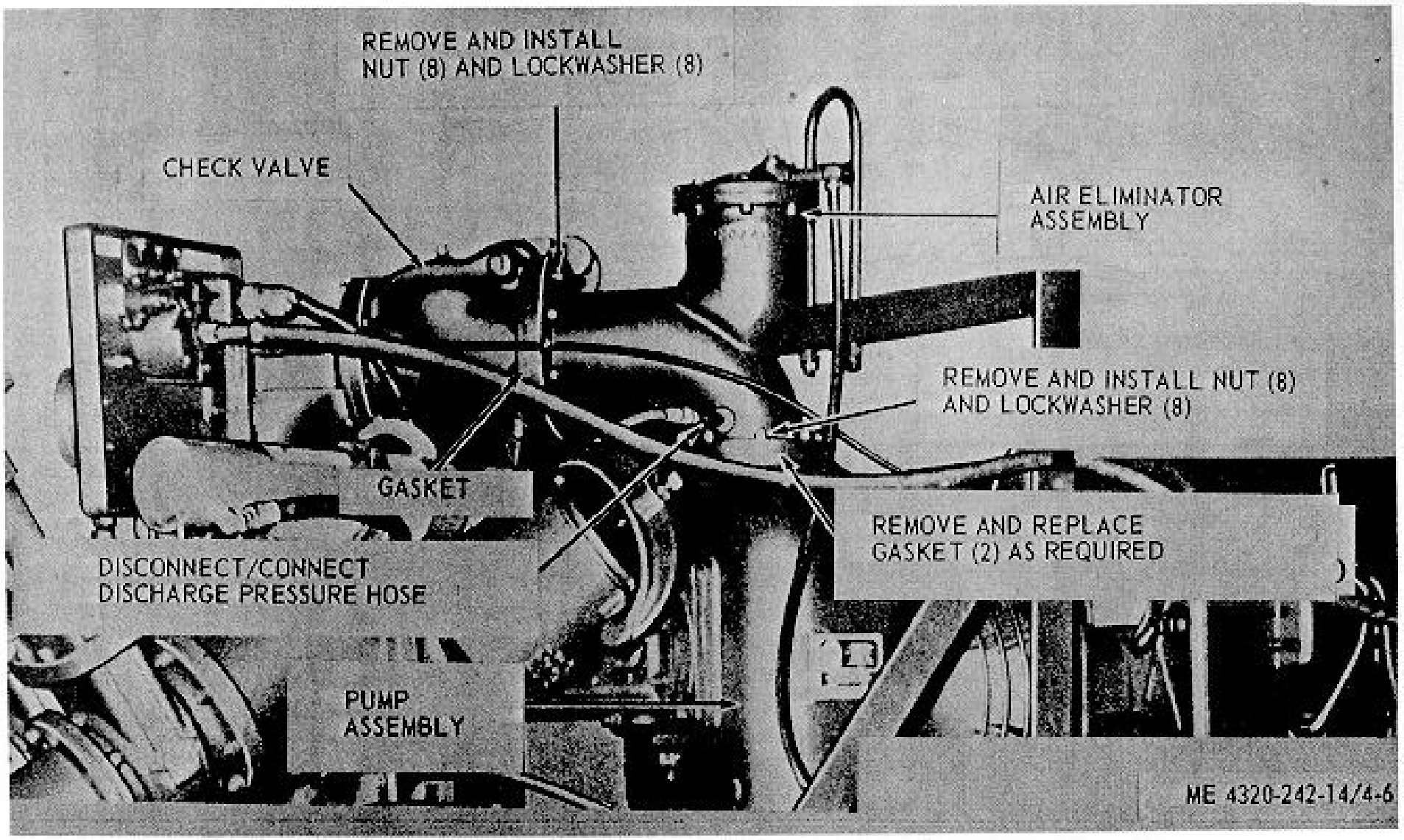
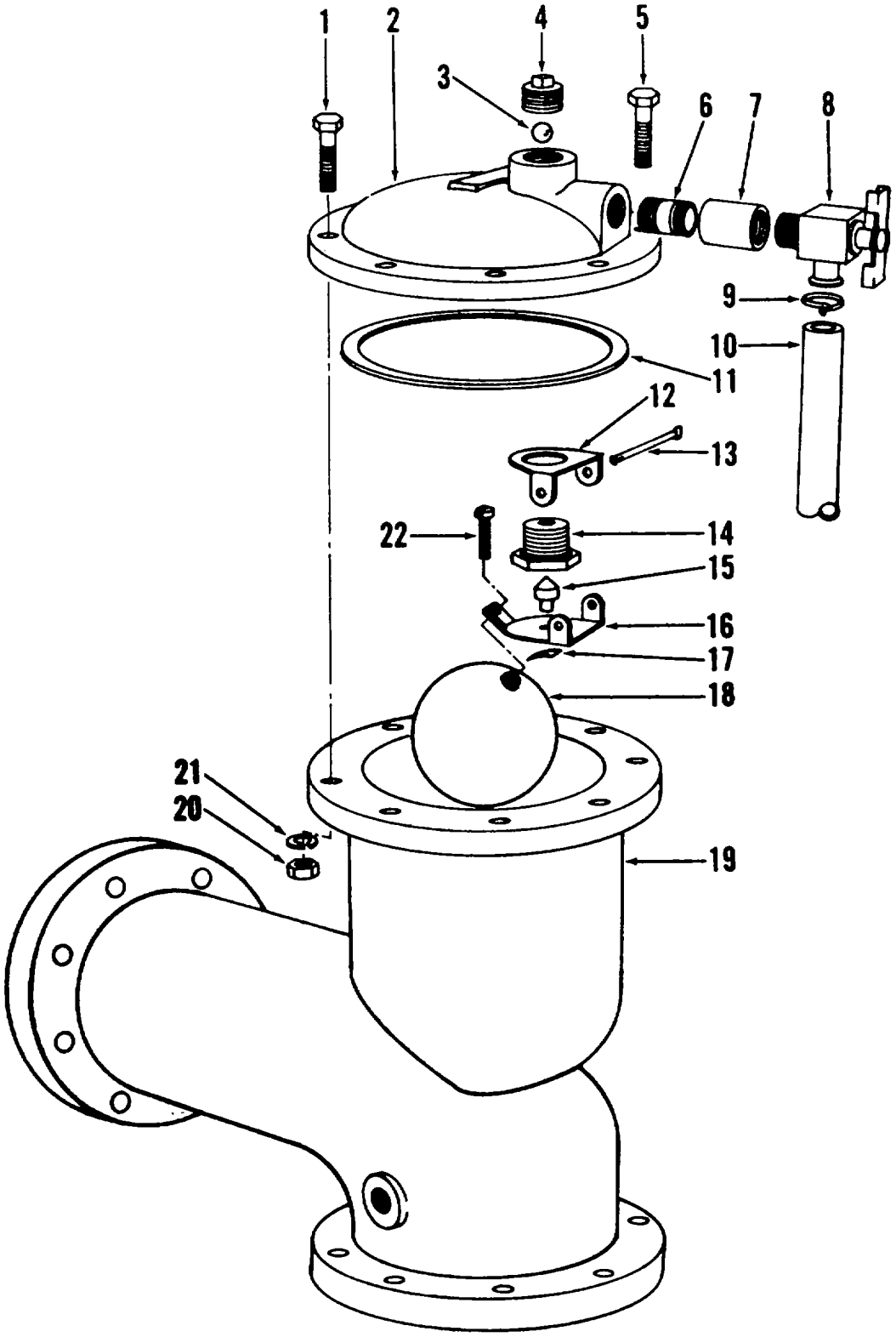


Figure 4-6. Air eliminator, removal and installation.



ME 4320-242-14/4-7

Figure 4-7. Air eliminator, exploded view.

Key to fig. 4-7:
1. Capscrew
2. Cap
3. Ball
4. Plug, pipe
5. Capscrew
6. Nipple, close pipe
7. Coupling, pipe
8. Valve, air venting
9. Clamp, hose
10. Hose
11. Gasket
12. Clip, valve lever
13. Pivot
14. Seat
15. Valve
16. Lever, valve
17. Retainer, valve
18. Float assembly
19. Elbow, discharge
20. Nut
21. Washer, lock
22. Screw

4-26. Discharge and Suction Gate Valves

a. Removal. Refer to figure 4-8 and remove the discharge and suction gate valves.

b. Packing Discharge and Suction Gate Valves. Refer to figure 4-9 and pack the valves.

c. Installation. Refer to figure 4-8 and install the discharge and suction gate valves.

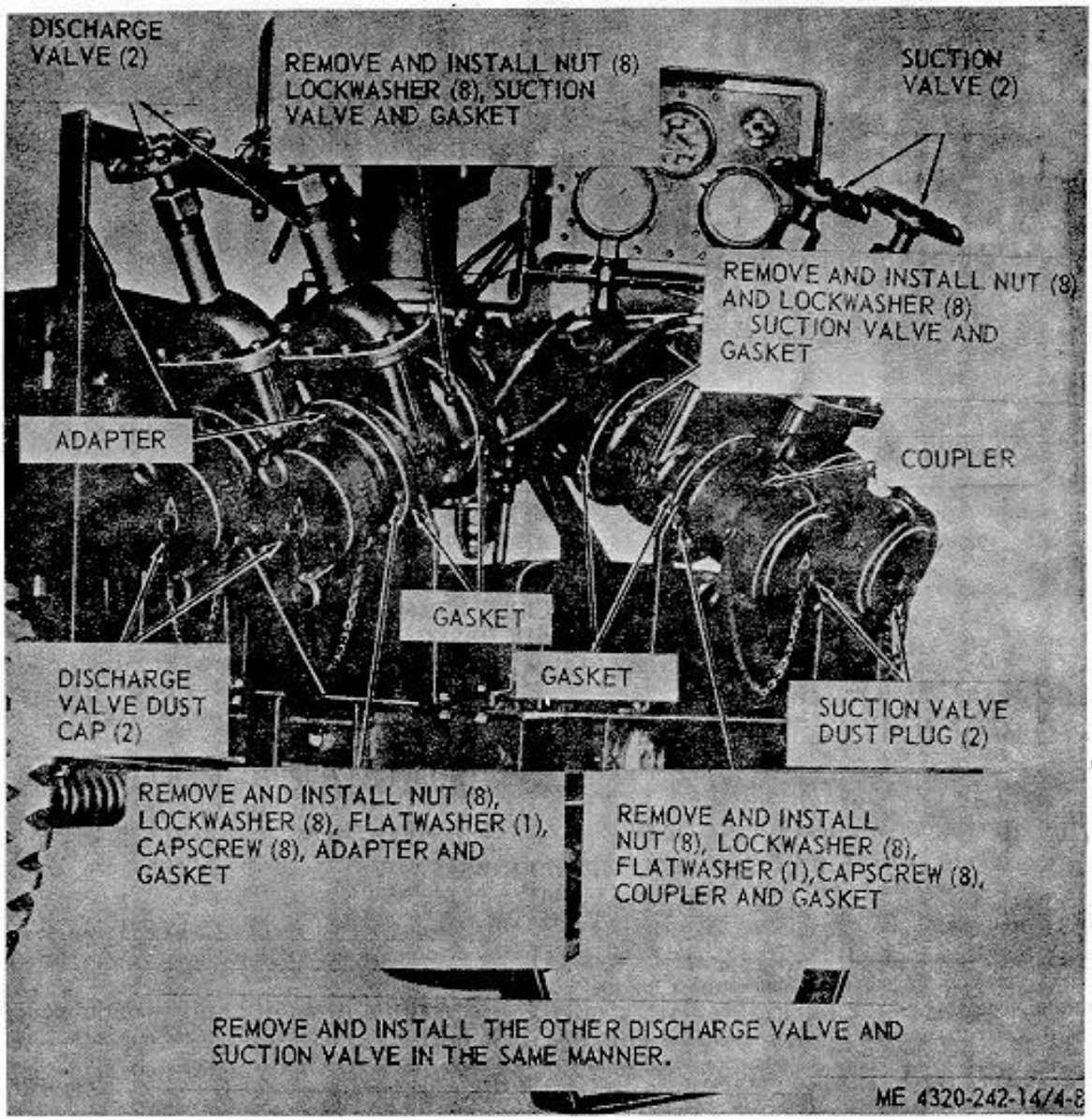


Figure 4-8. Discharge and suction gate valves, removal and installation.

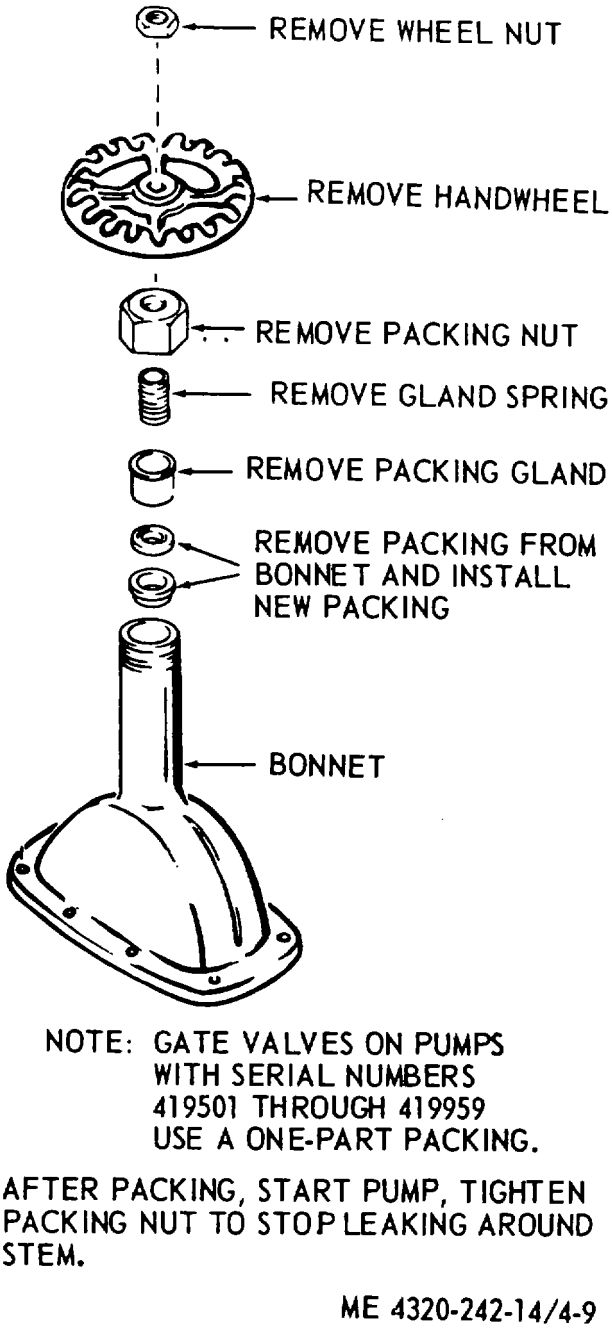


Figure 4-9. Packing discharge and suction gate valves.

Section X. TRAILER ASSEMBLY

4-27. Front Stand

a. Removal.

(1) Block up or provide other support for the pumping assembly.

(2) Refer to figure 4-10 and remove the stand.

b. Cleaning and Inspection. Clean and inspect all parts. Replace a defective part.

c. Installation.

(1) Refer to figure 4-10 and install the stand.

(2) Remove blocking or other support.

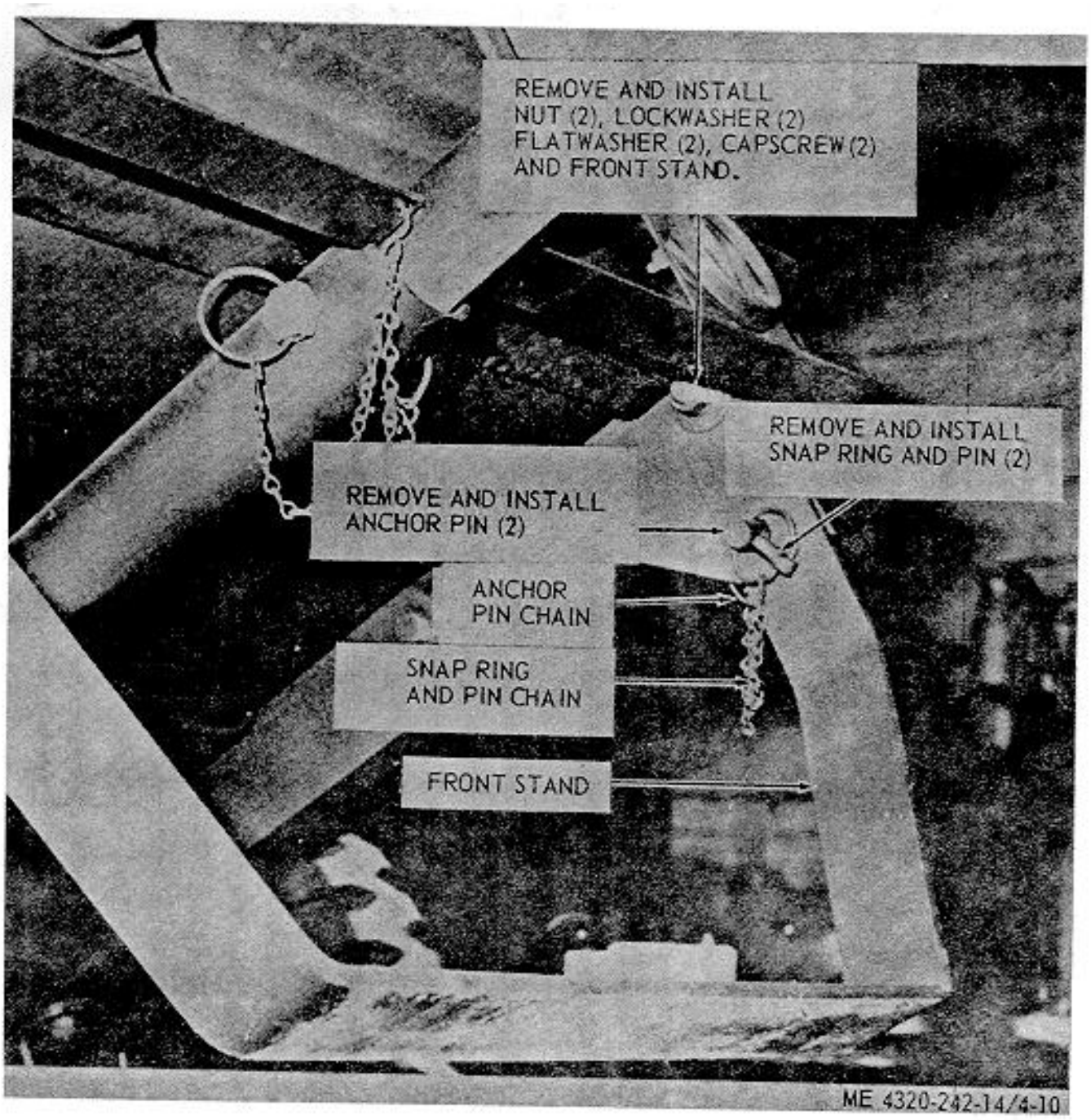


Figure 4-10. Front stand, removal and installation.

4-28. Pintle Hook

a. Removal. Refer to figure 4-11 and remove the pintle hook.

b. Cleaning and Inspection. Clean and inspect the pintle hook. Replace a defective pintle hook.

c. Installation. Refer to figure 4-11 and install the pintle hook.

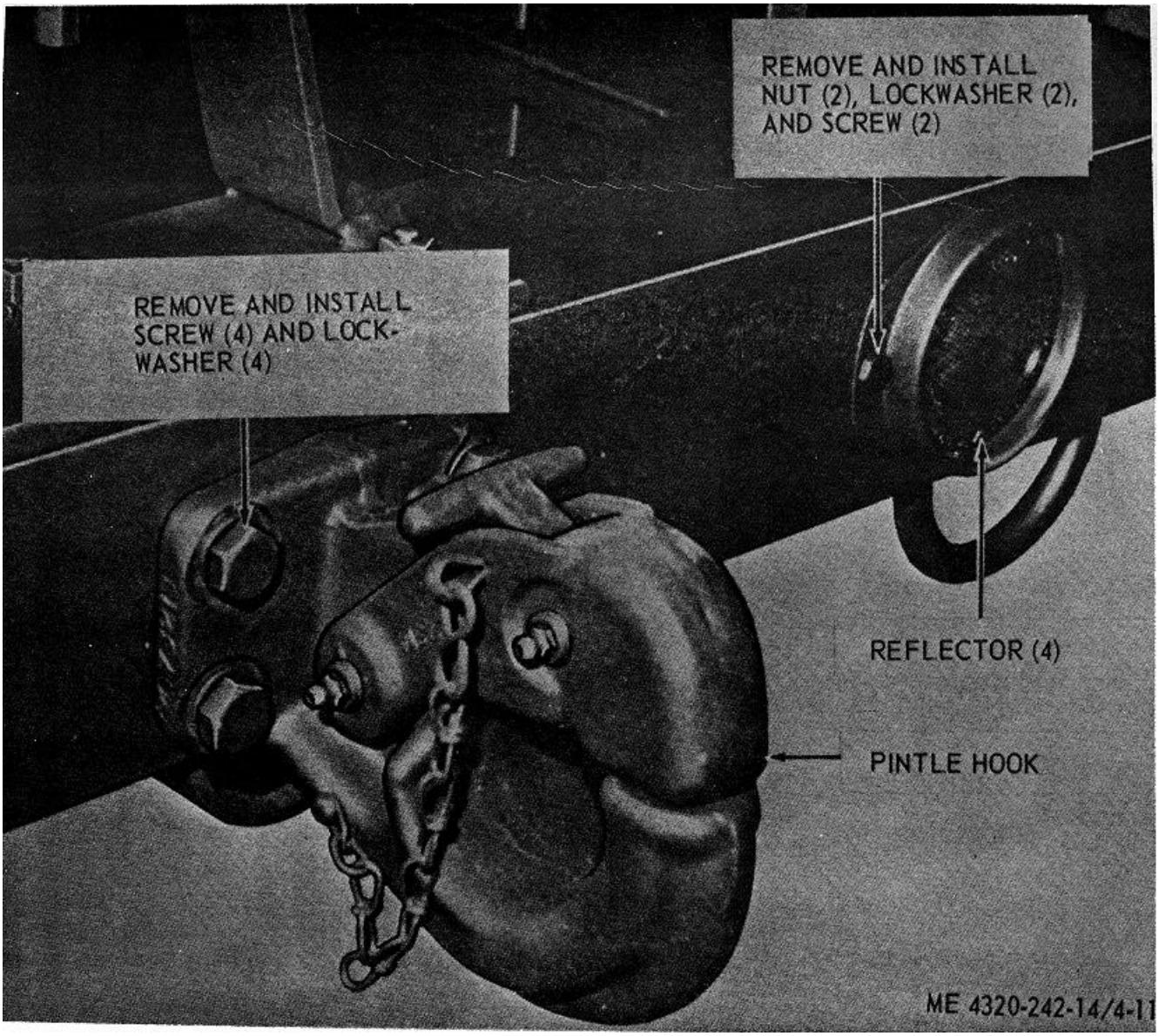


Figure 4-11. Pintle hook and reflectors, removal and installation.

4-29. Reflector

a. Removal. Refer to figure 4-11 and remove damaged reflectors.

b. Cleaning and Inspection. Clean and inspect the reflectors. Replace a defective part.

c. Installation. Refer to figure 4-11 and install reflector.

4-30. Drawbar Assembly

a. Removal. Refer to figure 4-12 and remove the drawbar assembly.

b. Cleaning and Inspection. Clean and inspect the drawbar assembly. Replace a defective part.

c. Installation. Refer to figure 4-12 and install the drawbar assembly.

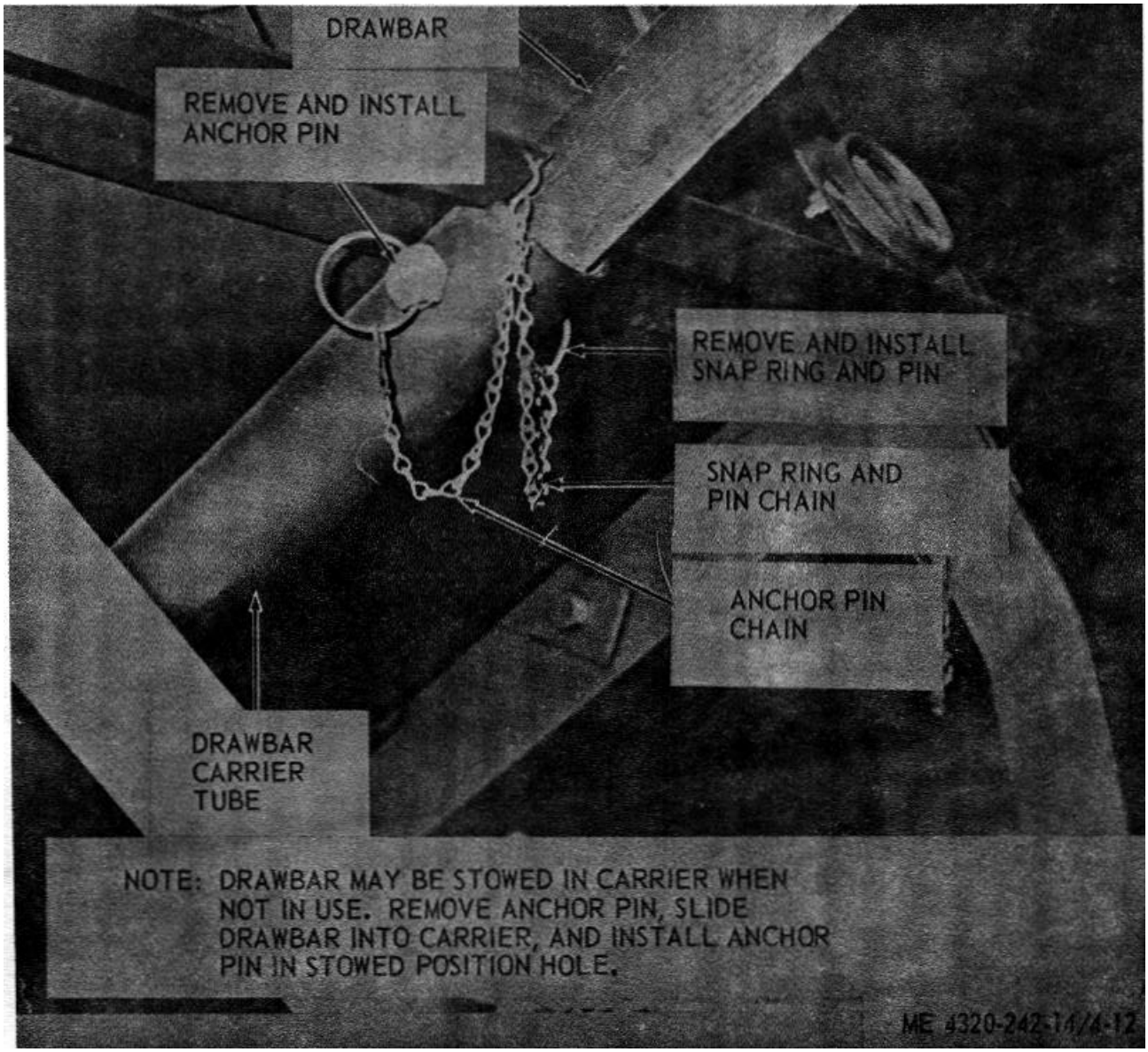


Figure 4-12. Drawbar assembly, removal and installation.

4-31. Toolbox and Battery Box

a. Removal. Refer to figure 4-13 and remove toolbox and battery box.

b. Cleaning and Inspection. Clean and inspect all parts. Replace a defective part

c. Installation

(1) Refer to figure 4-13 and install toolbox and battery box.

(2) Return contents to toolbox, close and secure cover.

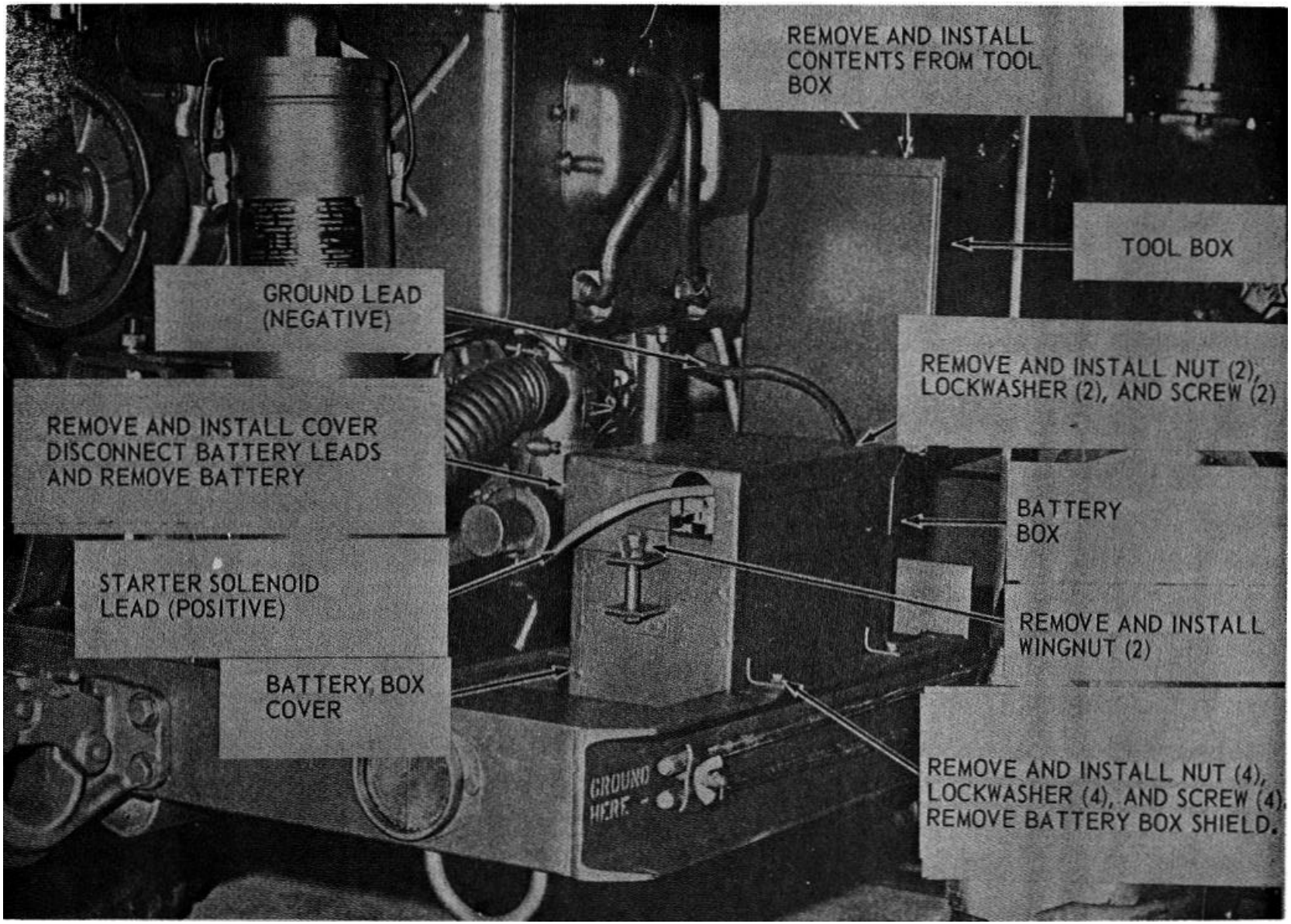


Figure 4-13. Toolbox and battery box, removal and installation.

4-32. Wheel and Tire Assembly

a. Removal. Refer to figure 4-14 and remove the wheel and tire assembly.

b. Cleaning and Inspection.

(1) Clean tires and wheels with fresh, clean water.

(2) Remove foreign material imbedded in the tire. If nails or other penetrating objects are removed, inspect for puncture of the tube.

(3) Inspect wheel and rim for damage. Inspect tire for cracks, deep cuts, or separated tread.

(4) Repair or replace a defective part.

c. Installation. Refer to figure 4-14 and install the wheel and tire assembly.

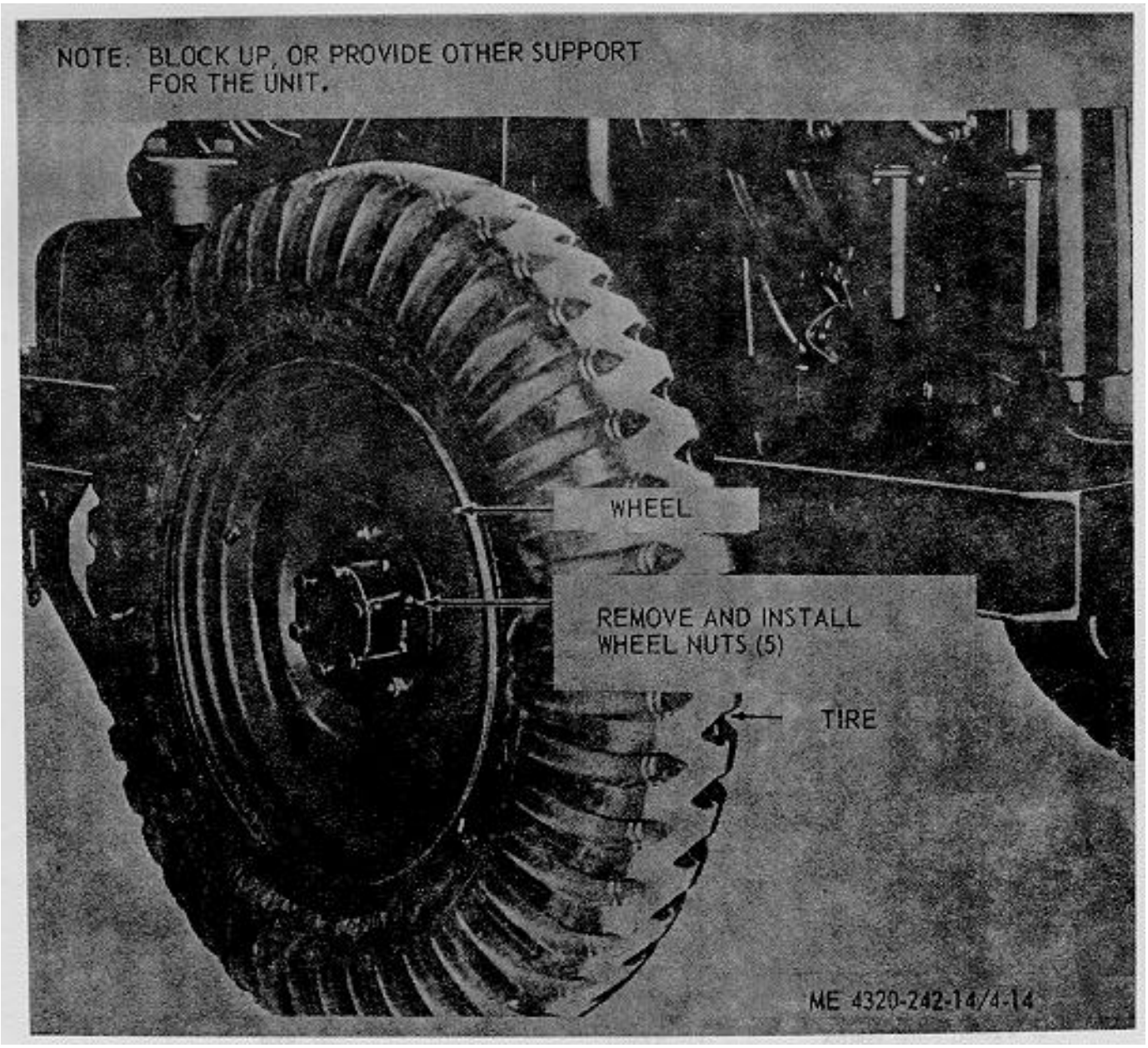


Figure 4-14. Wheel and tire assembly, removal and installation.

4-33. Hub Assembly, Bearing, and Seals

a. Removal and Disassembly. Refer to paragraph 4-32 and remove wheel assembly. Refer to figure 4-15 and remove and disassemble the hub assembly, bearings, and seals in the numerical sequence indicated.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with solvent. Dry thoroughly.

(2) Inspect bearing cones and cups for pitting, grooving, excessive wear, and inspect bearings for free rotation.

(3) Inspect nuts and axle for thread damage.

(4) Refer to lubrication chart and pack bearings with prescribed grease (fig. 3-1).

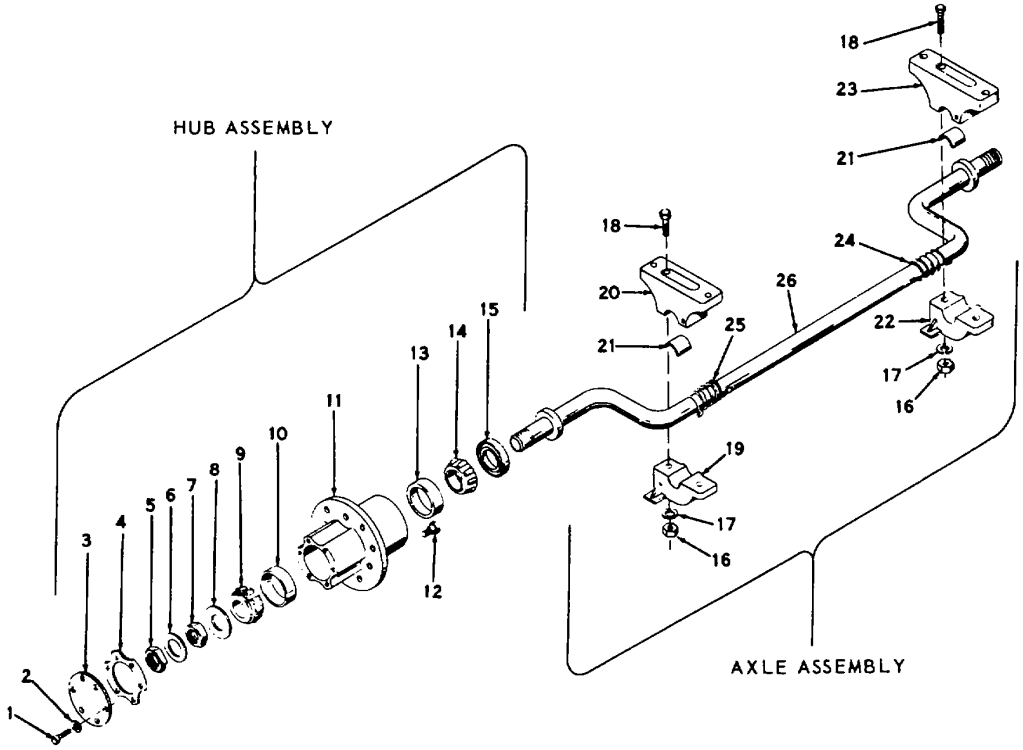
(5) Install new gasket and seal. Replace any defective part.

c. Reassembly and Installation.

(1) Refer to figure 4-15 and reassemble and install the seal, bearings, and hub assembly.

(2) Tighten nut (7) until the wheel bearing binds slightly when wheel is rotated, then back off nut slowly until wheel rotates freely. Bend tang on washer (6) to lock the nut (7) in position.

(3) Complete reassembly and installation.



NOTE

DO NOT REMOVE BEARING CUPS (10,13) UNLESS DAMAGED OR WORN. WHEN INSTALLING NEW CUPS, EXERCISE CARE NOT TO BUR OR DAMAGE CUP. DO NOT REMOVE BOLTS (12) FROM HUB ASSEMBLY (11) UNLESS DAMAGED.

ME 4320-242-14/4-15

1. Capscrew
2. Lockwasher
3. Cap, grease
4. Gasket
5. Nut
6. Washer, nut lock
7. Nut
8. Washer, wheel bearing
9.. Bearing cone
10. Bearing cup
11. Hub
12. Bolt
13. Bearing cup
14. Bearing cone
15. Seal
16. Nut
17. Washer
18. Screw
19. Bracket, top, rh
20. Bracket, base, rh
21. Insert
22. Bracket, top lh
23. Bracket, base, lh
24. Spring, lh
25. Spring, rh
26. Axle

Figure 4-15. Hub and axle assembly, exploded view.

4-34. Axle Assembly

a. Removal and Disassembly.

(1) Remove the wheel and tire assemblies (fig. 4-14) and hub assemblies (fig. 4-15).

(2) Refer to figure 4-15 and remove and disassemble the axle assembly in the numerical sequence indicated.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with solvent. Dry thoroughly.

(2) Inspect inserts for pitting, grooving, and excessive wear. Inspect springs for cracks, breaks, and loss of tension.

(3) Inspect brackets and axle for cracks, breaks and other damage. Replace damaged and missing hardware. Replace a defective part.

c. Reassembly and Installation.

(1) Refer to figure 4-15 and reassemble and install the axle assembly.

(2) Install the hub and drum assemblies (fig. 4-15) and install the wheel and tire assembly (fig. 4-14).

4-35. Lifting Frame Assembly

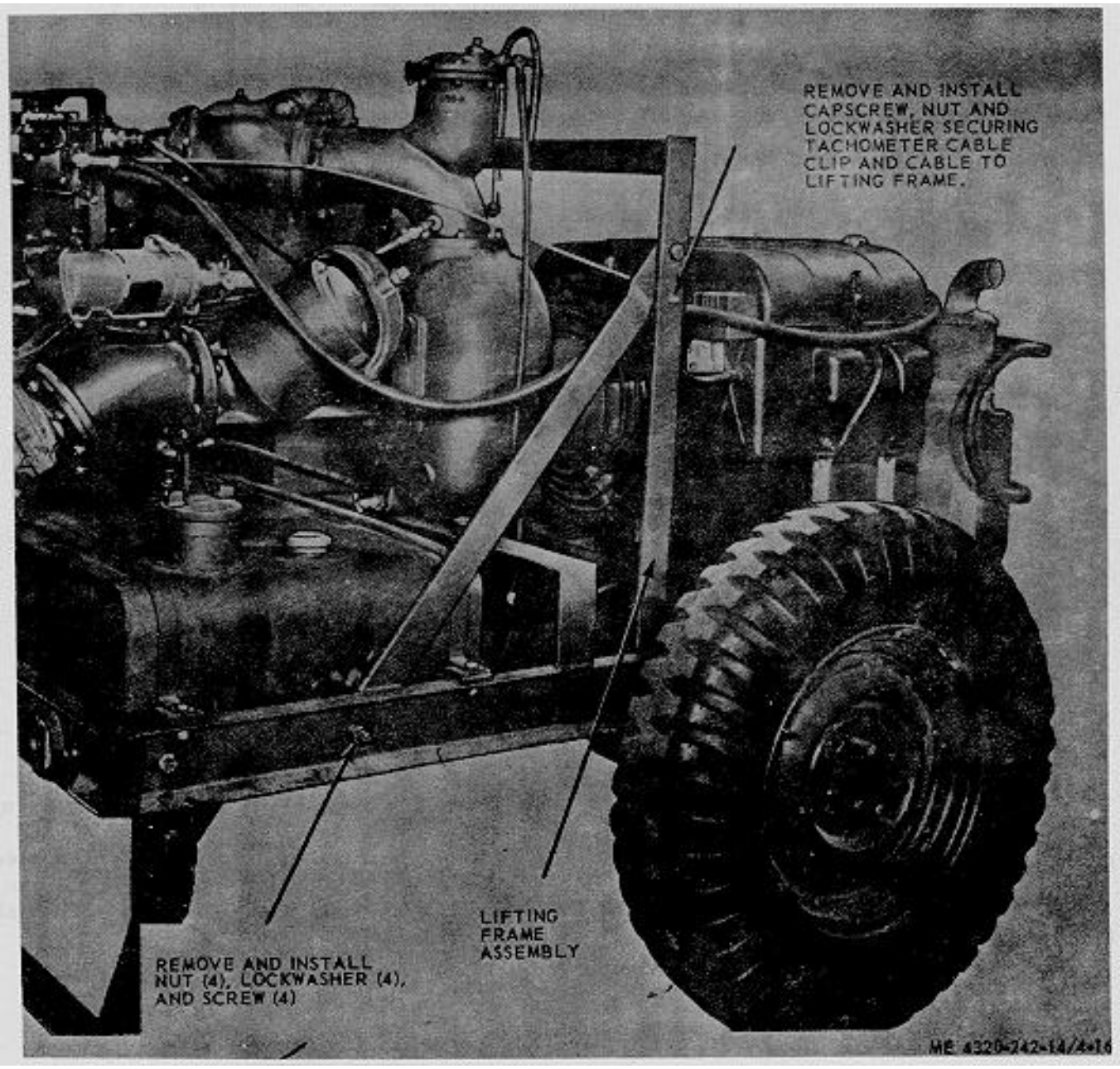
a. Removal. Refer to figure 4-16 and remove the lifting frame assembly.

b. Disassembly. Refer to figure 4-17 and disassemble the lifting frame assembly.

c. Cleaning and Inspection. Clean with cleaning solvent, Inspect all parts for damaged threads, bends, and cracks. Replace a defective part.

d. Reassembly. Refer to figure 4-17 and reassemble the lifting frame assembly.

e. Installation. Refer to figure 4-16 and install the lifting frame assembly.



1. Nut, jam
2. Ring, lift
3. Frame, lifting
4. Brace
5. Screw
6. Washer

Figure 4-16. Lifting frame assembly, removal and installation.

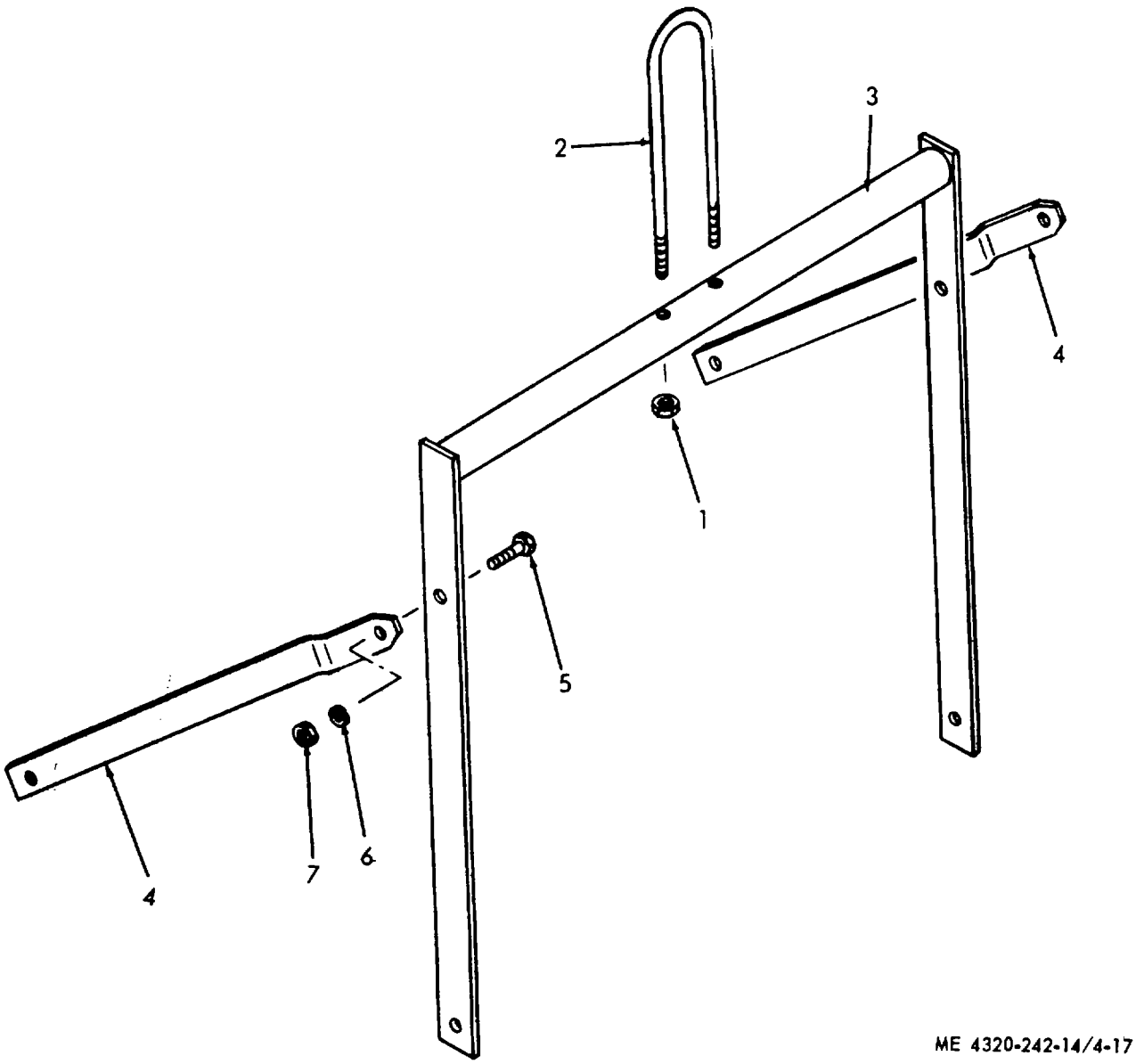


Figure 4-17. Lifting frame assembly, exploded view.

4-36. Pulley and Muffler Guard

a. Removal. Refer to figure 4-18 and remove pulley and muffler guard.

b. Cleaning and Inspection.

(1) Clean guard with cleaning solvent PD-680; dry thoroughly.

(2) Inspect guard for breaks, bends, and other damage. Straighten bends and repair breaks or cracks by welding.

(3) Inspect mounting hardware for damaged threads. Replace damaged mounting hardware.

c. Installation. Refer to figure 4-18 and install pulley and muffler guard.

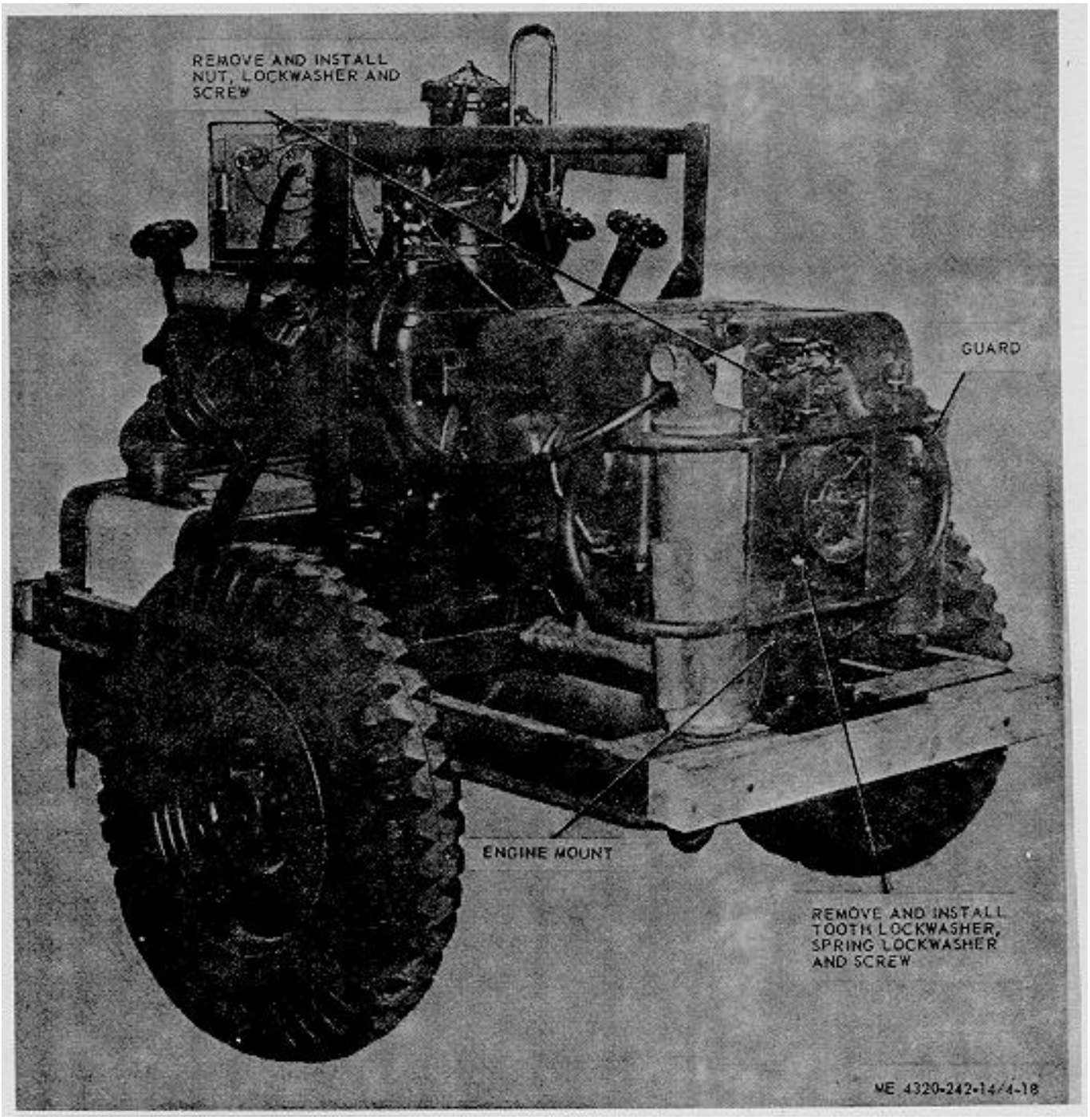


Figure 4-18. Pulley and muffler guard, removal and installation.

CHAPTER 5

DIRECT SUPPORT AND GENERAL

SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

5-1. Special Tools and Equipment

No special tools and equipment are required to perform direct and general support maintenance on the pump assembly. Repair parts and special tools required for direct and general support maintenance of this equipment will be found in TM 5-4320-242-24P and TM 5-2805-259-24P.

Section II. TROUBLESHOOTING

5-2. General

This section describes malfunction which might occur during operation of the pump assembly along with the tests or inspections to be performed so that the malfunction can be isolated and corrective actions taken. Refer to TM 5-2805-259-14 for engine troubleshooting instructions.

Table 5-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. PUMP FAILS TO DISCHARGE, CAPACITY DECREASES OR PRESSURE DROPS.
   - Check to am if engine lacks power.
     - If engine lacks power refer to TM 5-2805-259-14.
   - Check to see if gate valves are defective.
     - Repair or replace gate valve (para 6-5).
   - Check to see if suction manifold gaskets are defective.
     - Replace gaskets (para 5-4).
   - Check to see if suction manifold assembly hardware is loose.
     - Tighten suction manifold assembly hardware (para 5-4).
   - Inspect to see if suction strainer cover is loose or defective.
     - Tighten or replace suction strainer cap clamp. (para 5-4).
   - Check for damaged or broken impeller.
     - Replace impeller (para 6-3).
   - Inspect volute housing for a damaged or cracked condition.
     - Replace volute housing (para 6-4).
   - Inspect seal assembly for a defective condition.
     - Replace seal assembly.
   - Check intermediate housing for a cracked or defective condition.
     - Replace intermediate housing (para 6-3).
   - Inspect for loose suction hose connection.
     - Tighten hose connections.
2. PUMP VIBRATES OR DEVELOPS EXCESSIVE NOISE.
   - Inspect impeller for a damaged or broken condition.
     - Replace impeller (para 6-3).
   - Inspect for defective impeller shaft bearing.
     - Replace bearing (para 6-)1.

Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND ASSEMBLIES

5-3. Suction Manifold and Strainer Body Assembly

a. Removal. Refer to figure 5-1 and remove the suction manifold and strainer body assembly.

b. Installation. Refer to figure 5-1 and install the suction manifold and strainer body assembly.

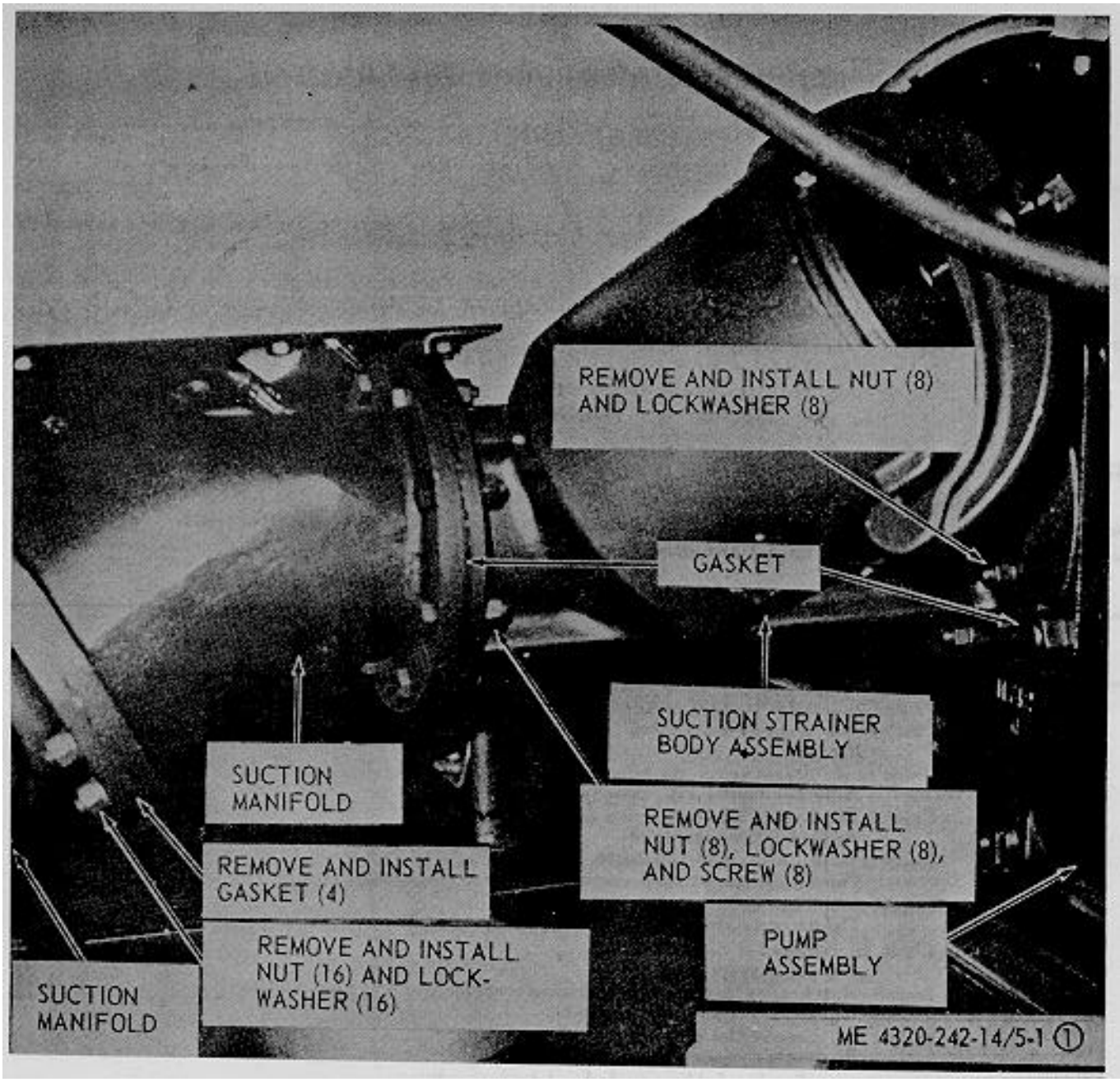


Figure 5-1. Suction manifold and strainer body assembly. removal and installation. Model 84C15-A0484, serial numbers 371201 through 415493 and Model US36ACG, serial numbers 37044-001 through 37044-240. (Sheet 1 of 2)

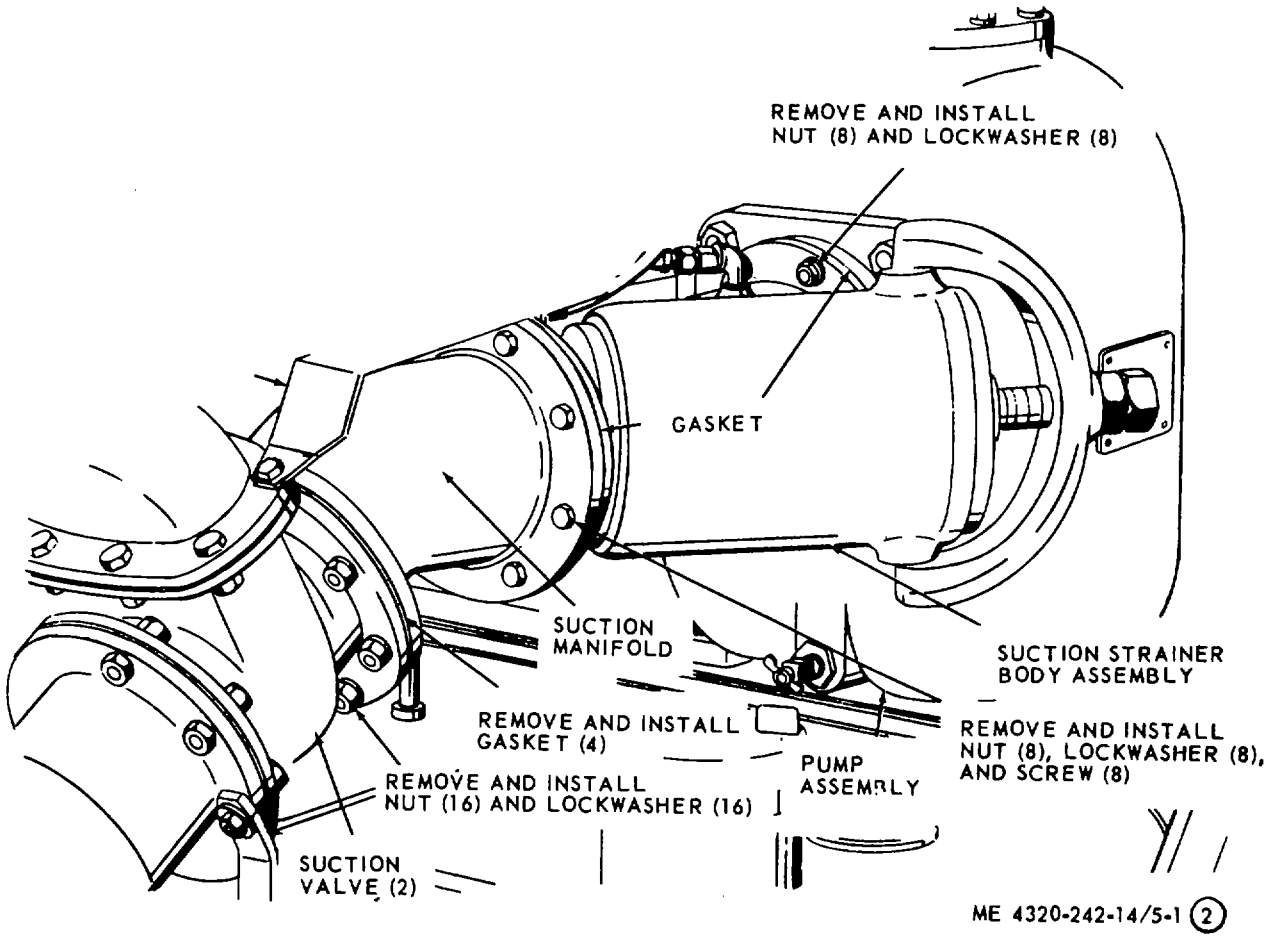


Figure 5-1. Suction manifold and strainer body assembly, removal and installation. Model 84C15-4A084, serial numbers 419501 through 419959. (Sheet 2of 2)

5-4. Discharge Manifold, Elbow, and Check Valve

a. Removal. Refer to figure 5-2, and remove the discharge manifold, elbow, and check valve.

b. Installation. Refer to figure 5-2, and install the check valve, elbow, and discharge manifold.

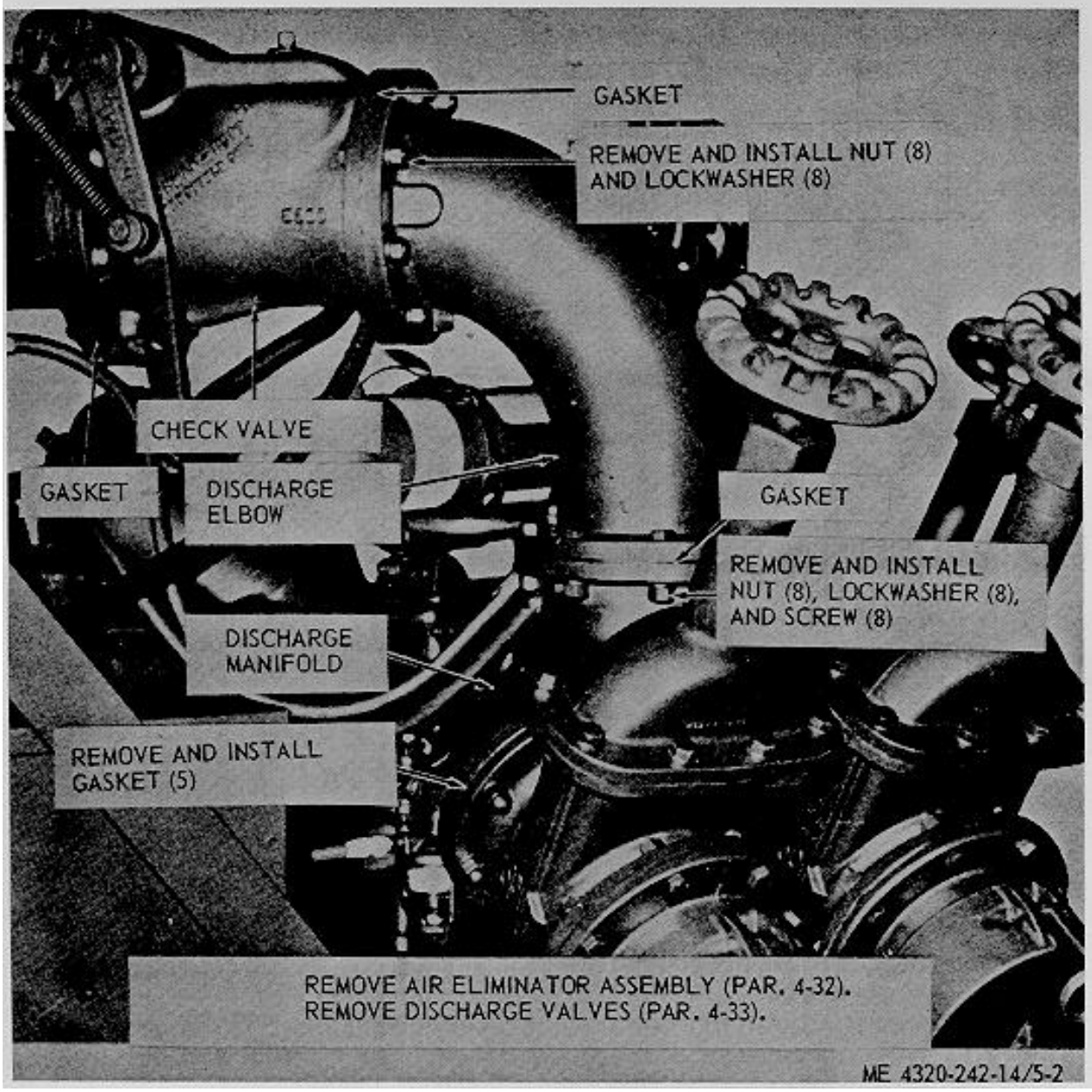


Figure 5-2. Discharge manifold elbow and check valve. removal and installation.

5-5. Engine

a. General. The pump is directly coupled to the engine and the pump impeller is driven by a spliced shaft and a coupling bolted to the engine flywheel. When removing the pump or engine, either pump or engine may be removed from the trailer frame as a separate unit.

b. Removal.

(1) Remove engine cover.

(2) Remove fuel line (fig. 4-1).

(3) Remove tachometer-hourmeter cable and clip (fig. 4-4).

(4) Remove engine oil pressure lines.

(5) Remove throttle control line, (fig. 4-3).

(6) Remove starting switch electric cable (fig. 4-4).

(7) Remove engine mounting bolt external tooth lockwasher and spring lockwasher.

(8) Remove battery cable (fig. 4-13).

(9) Remove bolts and -washers from the intermediate housing and flywheel guard (fig. 5-3 (2)).

(10) Remove muffler and pulley guard. fig. 4-18).

(11) Pull engine from pump assembly and lift from trailer frame.

(12) Remove the four screws and lockwashers securing the spline coupling to the engine flywheel and remove the spline coupling. Remove the pilot bushing from the spline coupling.

c. Installation. Installation of engine is reverse procedure of removal.

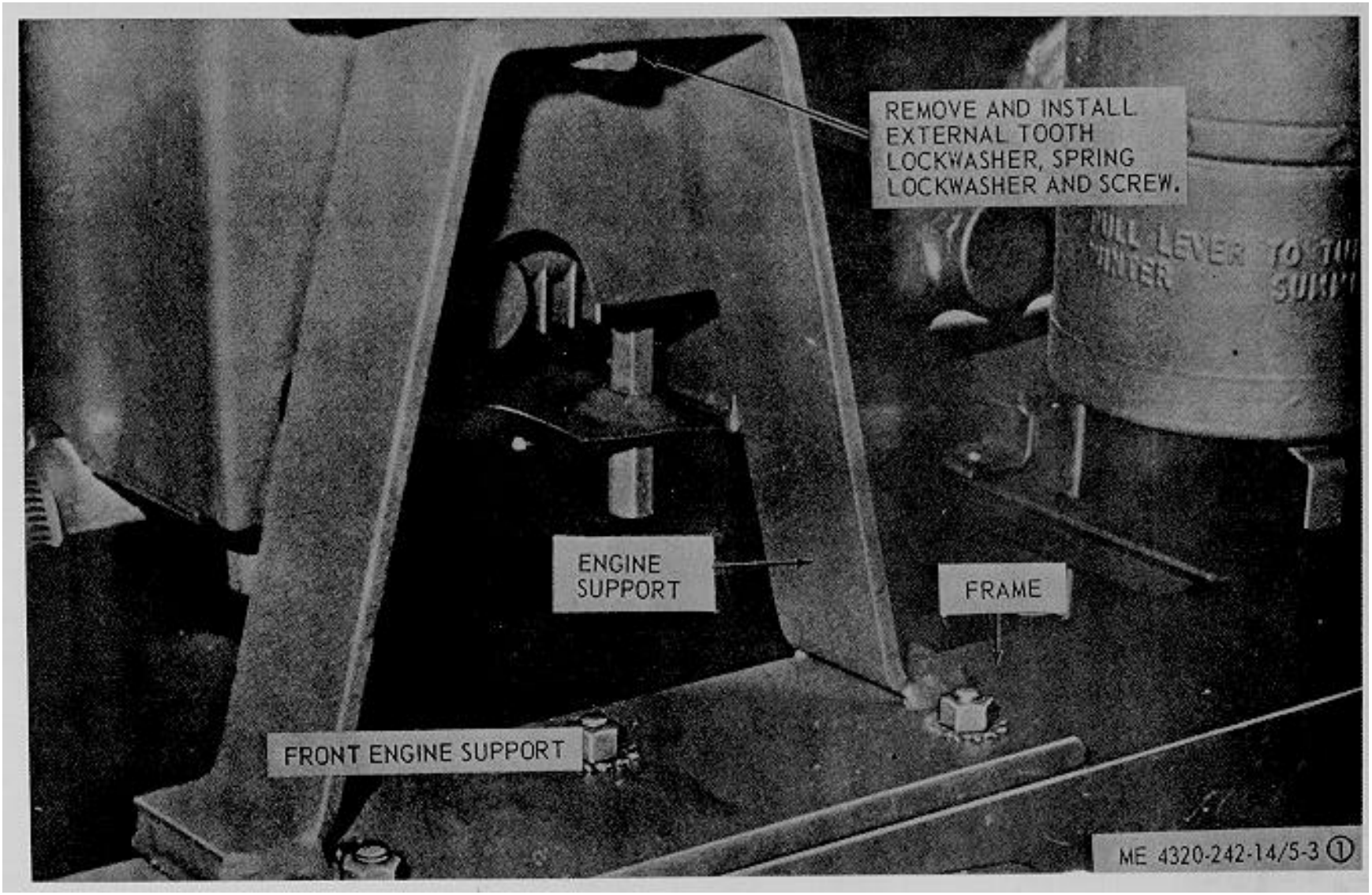


Figure 5-3. Engine, removal and installation (Sheet 1 of 2).

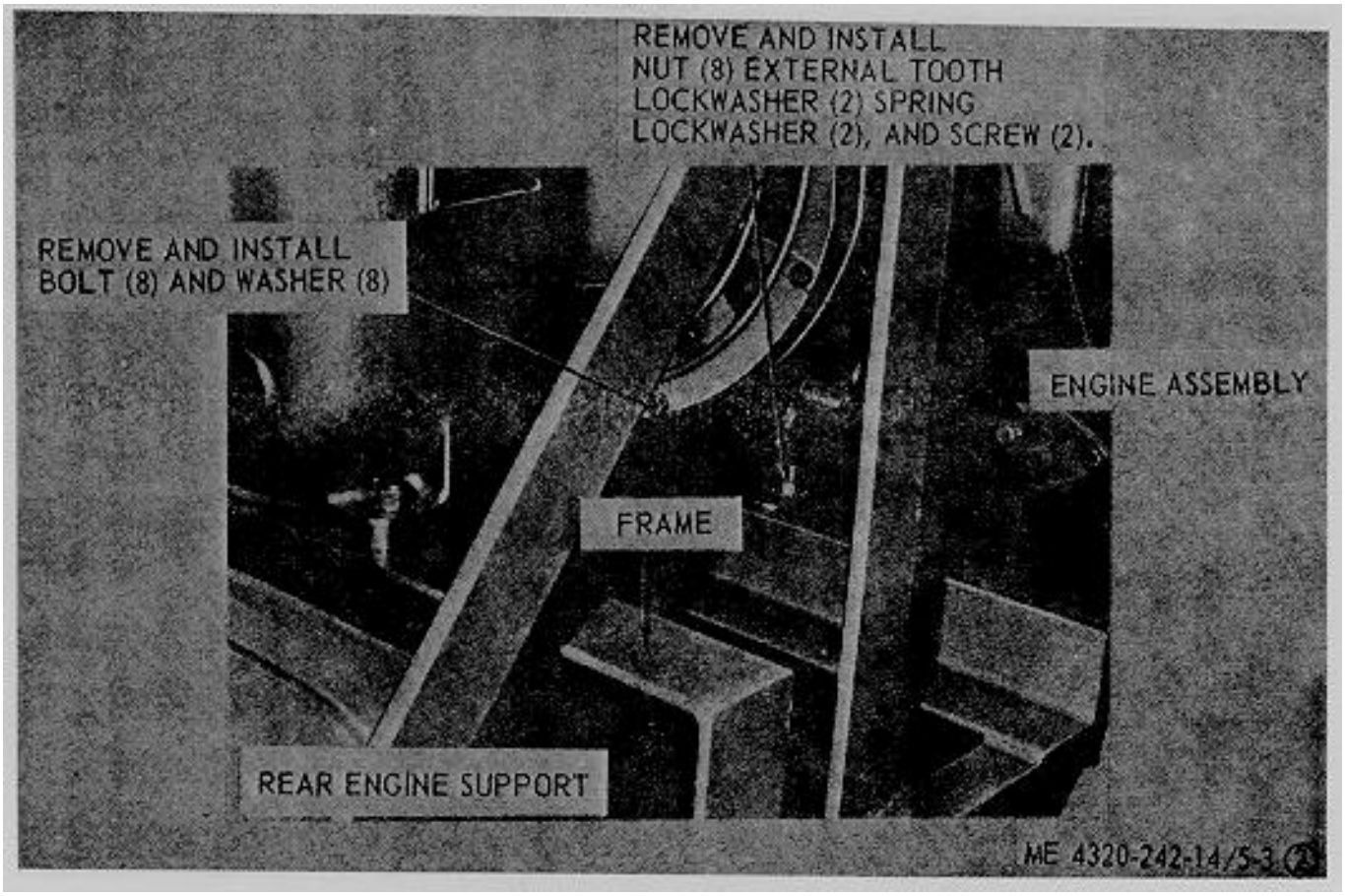


Figure 5-3. Engine, removal and installation (Sheet 2 of 2).

5-6. Pump

a. General. The pump or engine may be removed from the trailer frame separately.

b. Removal.

(1) Remove starting switches electric cable (fig. 4-4).

(2) Remove throttle control line.

(3) Remove tachometer hourmeter cable and clip.

(4) Remove pump suction line.

(5) Remove pump pressure line.

(6) Remove engine oil pressure lines.

(7) Remove instrument panel.

(8) Remove bolt lockwasher from intermediate housing and flywheel guard.

(9) Remove the suction manifold and strainer body assembly (fig. 5-1 (1)).

(10) Remove the discharge manifold, elbow and check valve. (fig. 5-2).

(11) Remove the tank to carburetor fuel line (para. 4-15 and 4-16).

(12) Connect a suitable lifting device to the pump.

(13) Disconnect battery cables.

(14) Refer to figure 5-4 and remove the mounting hardware and lift the pump assembly from the trailer frame assembly.

c. Installation. Installation of pump assembly is reverse procedure of removal.

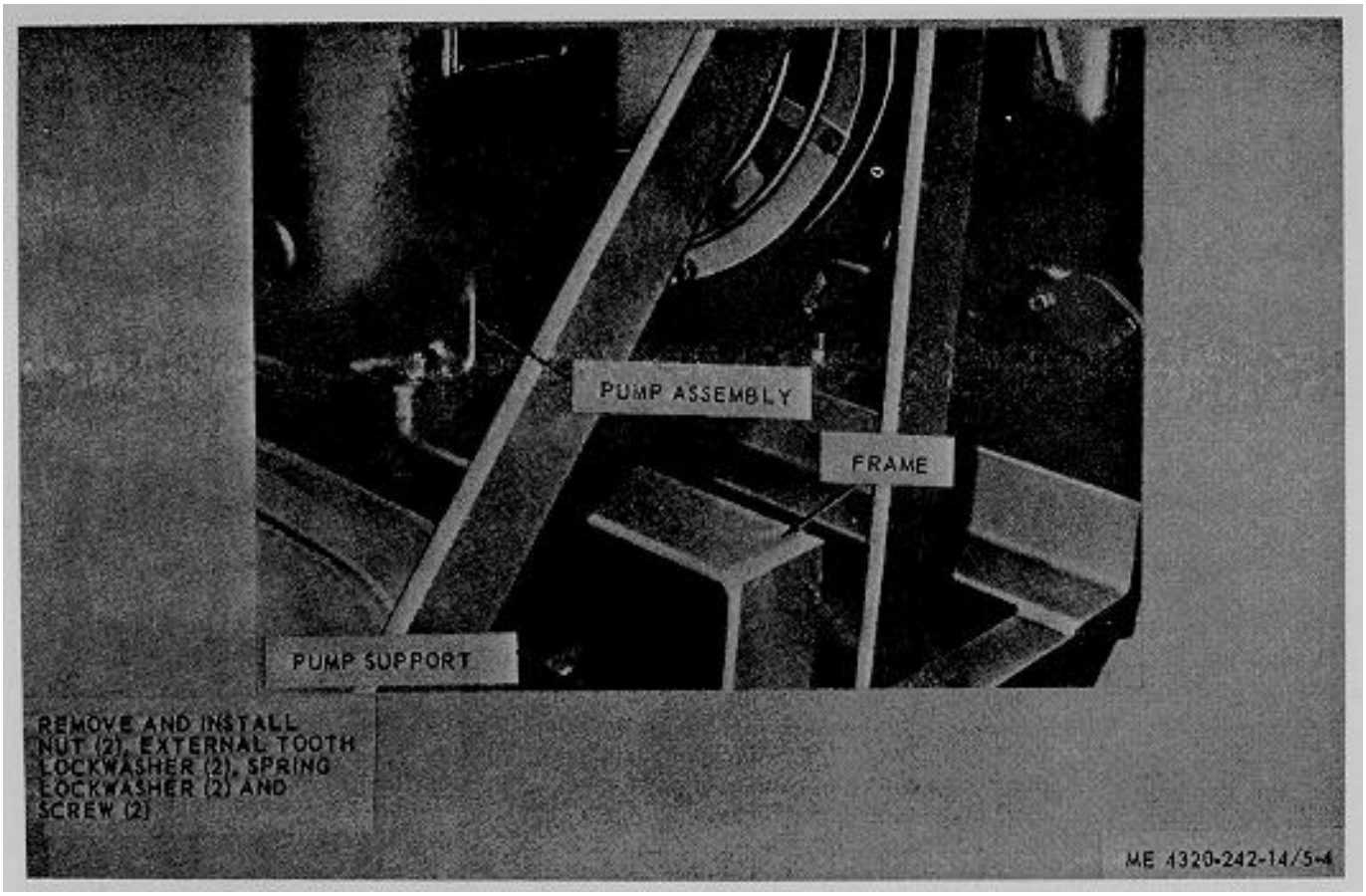


Figure 5-4. Pump, removal and installation.

5-7. Trailer Assembly

a. Removal.

(1) Remove the engine assembly (para 5-5).

(2) Remove the pump assembly (para 5-6).

(3) Remove the toolbox and battery box (para 4-38).

(4) Remove the fuel tank (para 4-19).

b. Installation.

(1) Install the fuel tank (para 4-19).

(2) Install the tool box and the battery box (para 4-31).

(3) Install the pump assembly (para 5-6).

(4) Install the engine assembly (para 5-5).

CHAPTER 6

REPAIR OF PUMP ASSEMBLY

Section I. PUMP ASSEMBLY COMPONENTS

6-1. General

This section contains repair instructions for those items which are considered components of the pump assembly.

6-2. Pump Assembly

a. Remove the pump assembly (para 5-6).

b. Remove the eight nuts (37, fig. 6-1) securing the volute casing (49) to the intermediate housing (35). Remove the volute casing from the intermediate housing. Remove the volute gasket (21).

NOTE

On Model US36ACG, lockwashers are used with the eight nuts (37) and washer (36) that secure the volute casing (49) to the intermediate housing (35).

CAUTION

Carefully maintain alignment when separating the volute casing (49) from the intermediate housing (35). Damage to the impeller will result in the volute casing is allowed to sway or turn during removal.

c. Insert a piece of wood between any two ribs of the impeller (17) and strike the wood with a mallet in such a manner as to turn the trailing edge of the impeller blades counterclockwise. This will break the contact between the thread in the impeller and the thread of the impeller shaft (29).

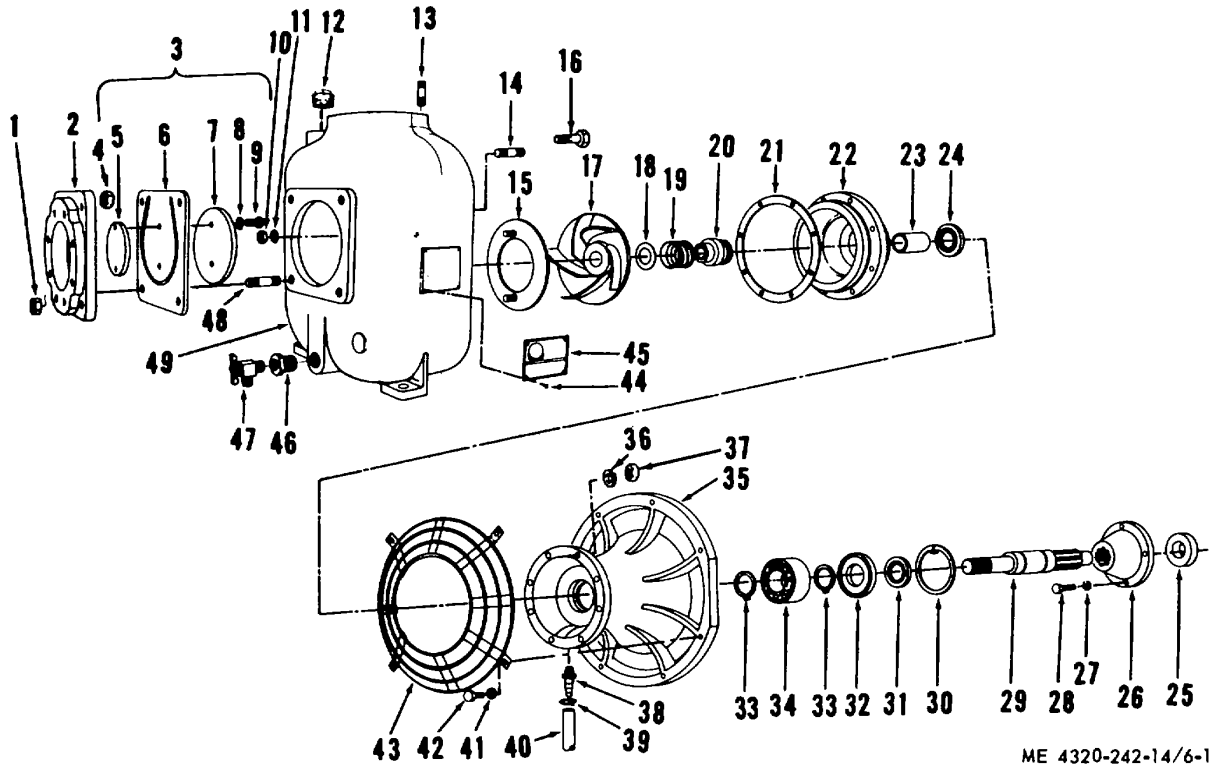
NOTE

The impeller shall be dynamically balanced to a maximum out-of-balance condition of 0.25 inch-ounce at 3600 RPM.

d. Unscrew and remove the impeller (17), the spacer shims (18), and the shaft sleeve (23) with the seal rotary elements (19) from the impeller shaft (29).

CAUTION

If the original impeller (17) shaft sleeve (23) seal plate (22) and impeller shaft (29) are to be used on reassembly, use of the original spacer shims (18) in the same quantity and thickness will assure proper impeller spacing at reassembly.



1. Nut
2. Adapter, suction
3. Valve assembly, flap
4. Nut (8) (Barnes model only)
5. Weight, valve, small
6. Gasket, flap valve
7. Weight, valve, large
8. Washer, lock
9. Screw, hex. head
10. Nut
11. Washer, lock
12. Plug, pipe
13. Stud
14. Stud
15. Wear plate
16. Screw, machine, flathead (2) (Barnes model only)
17. Impeller
18. Shim set
19. Seal, rotary elements
20. Seal, stationary elements
21. Gasket
22. Seal plate
23. Sleeve shaft
24. Seal, oil
25. Bushing, pilot
26. Coupling, spline
27. Washer, lock
28. Screw, hexhead
29. Shaft, impeller
30. Ring, retainer
31. Seal, oil
32. Retainer, bearing
33. Ring, retaining
34. Bearing ball
35. Housing, intermediate
36. Washer, lock (Barnes model only)
37. Nut
38. Nipple, hose
39. Clamp, hose
40. Hose
41. Washer, lock
42. Capscrew, hex. head
43. Guard, intermediate
44. Drive screw
45. Nameplate
46. Bushing, pipe
47. Drain cock
48. Stud
49. Casing, volute

Figure 6-1. Pump and intermediate housing, exploded view.

6-3. Intermediate Housing

a. Removal. Refer to paragraph 6-2 and remove the intermediate housing.

b. Disassembly.

(1) Remove retaining ring (30, fig. 6-1) pull out impeller shaft (29). Remove oil seal (31), and bearing retainer (32) from shaft (29).

(2) Remove retainer rings (33) and bearing (34) from impeller shaft (29).

(3) Remove oil seal (24) from intermediate housing (35)

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with cleaning solvent PD-680. Dry thoroughly.

(2) Inspect parts for cracks, breaks, damaged threads, and other damage. Inspect bearing for free and smooth rotation.

(3) Replace bearing if any roughness is detected, replace oil seals.

(4) Rechase threads or replace hardware as needed.

(5) Inspect the shaft and coupling splines.

Replace all components that are worn, chipped or damaged.

d. Reassembly.

(1) Install oil seals (24 and 31) in intermediate housing (35) and bearing retainer (32) respectively.

(2) Position bearing (34) on impeller shaft (29), install retainer rings (33) and install bearing retainer (32) on impeller shaft (29).

CAUTION

Lubricate bearing with grease conforming to MIL-G-23827 prior to assembly. Apply grease lightly to impeller shaft surfaces before installation.

(3) Install impeller shaft (29) into intermediate housing (35). Secure with retaining ring (30).

e. Installation.

(1) Install the stationary element (20) into the seal cavity of the seal plate (22).

CAUTION

The seal plate should be clean and the seal cavity bore lightly lubricated with oil MIL-L-2104 grade 10. The seal stationary element and the O-ring should be clean and free from dust and lightly lubricated in its entirety with oil MIL-L-2104 grade 10. The stationary element should be installed in the seal plate with the lapped face towards the pump. Extreme care should be used to make sure the lapped face is not marred when installing. Care should also be used to make sure that the stationary seal element is installed into the complete depth of the seal cavity bore. If this is not done, or the lapped surface is marred or dirty, the seal will leak.

(2) Install seal plate (22) on intermediate housing (35).

CAUTION

Use care not to displace the seal stationary component when placing seal plate over shaft (26).

(3) Lubricate with oil MIL-L-2104, grade 10 the internal diameter of the rubber sleeve portion of the seal rotary element (19) and insert shaft sleeve (231 (so that the internally beveled end will be towards engine) into rubber sleeve bore until sleeve end is approximately even with lapped face of the seal rotary element.

(4) Install the shaft sleeve (23) on shaft (29) so that lapped surface of seal rotary element and beveled end of sleeve is toward shaft intermediate housing (35). Push shaft sleeve until it seats on shaft shoulder.

CAUTION

Before this operation be sure that lapped surfaces of the seal rotary and stationary components are free of dust and foreign material and are lightly lubricated with MIL-L-2104 grade 10 oil.

(5) Install shim set (18) on shaft (29). Refer to paragraph 6-2d caution remark.

CAUTION

The total thickness of shims should allow an initial clearance of .030-to .050-inches between the face of the seal plate and the adjacent face of the impeller when the impeller is tightly screwed on the shaft.

(6) Screw impeller (17) onto impeller shaft (29).

(7) Aline and install the intermediate housing (35) and intermediate guard (43) on the pump and secure with eight lockwashers (41) and capscrews (42).

6-4. Volute Casing

a. Removal. Refer to paragraph 6-2 and remove the volute casing.

b. Disassembly.

(1) Remove the four nuts (1, fig. 6-1), and remove the suction adapter (2) and the check valve assembly (31).

(2) Remove the two screws (9) and lockwashers (8) and separate the large valve weight (7), small valve weight (5) and check valve gasket (6).

NOTE

On model US36ACG, two nuts (4) are used with the screw (9) and lockwasher (8) that secure the large valve weight (7) and small valve weight (5) to the check valve gasket (6).

(3) Remove the two nuts (10) and lockwashers (11) and remove the wear plate (15).

NOTE

On model US36ACG, the wear plate (15) is secured with two flathead screws.

(4) Remove the drain cock (47), reducing bushing (46), four studs (48), eight studs (13), and eight studs (14), if necessary, from the volute casing (49).

(5) Nameplate (45) and drive screws (44) need not be removed from casino (49).

c. Cleaning, Inspection. and Repair.

(1) Clean all parts with cleaning solvent PD680. Dry thoroughly.

(2) Inspect parts for cracks, breaks, damaged threads, and other damage.

(3) Replace gaskets.

(4) Inspect all threads for damage. Rechase threads or replace as necessary.

d. Reassembly.

(1) Install the eight studs (13), eight studs (14), four studs (48), reducer bushing (46) and drain cock (43) on the volute casing (49).

(2) Install the wear plate (15) and secure with two lock-washers (11) and nuts (10).

NOTE

On model US36ACG. the wear plate (15) is secured with two flat head machine screws.

(3) Install the small valve weight (5) and large valve weight (7) on the flap valve gasket (6), secure with two lock-washers (8) and screws (9).

NOTE

On model US36ACG, two nuts (4) are used with the screws (9) and lockwashers (8) that secure the large valve weight (7) and small valve weight (5) to the flap valve gasket (6).

(4) Install the flap valve assembly (3) and the suction adapter (2), secure with four nuts (1) to the volute casing (49).

e. Installation.

(1) Position gasket (21) on volute casing (49).

(2) Aline the volute casing (49) against the intermediate housing (35) carefully. Do not damage the gasket (21) impeller (17) or studs (14).

(3) Secure the volute casing to the intermediate housing with eight nuts (37).

NOTE

On model US36ACG, lockwashers are used with the eight nuts (37) that secure the volute casing (49) to the intermediate housing (35).

CAUTION

When tightening the first two nuts, rotate the impeller shaft to determine the possibility of the impeller rubbing on wear plate. With all nuts tight, clearance between impeller face and wear plate face should be approximately .008 to .015 inches. If rubbing occurs, two volute gaskets (21) will be required and additional shims (18) must be added between impeller (17) and sleeve (23) to get proper clearance between impeller face and wearplate face.

(4) Install the engine and pump assembly (para 5-5 and 5-6).

6-5. Suction and Discharge Gate Valves

a. Removal. Refer to paragraph 4-26 and remove the suction and discharge gate valves.

b. Disassembly. Refer to figure 6-2 and disassemble the suction and discharge gate valves.

c. Cleaning, Inspection, and Repair.

(1) Wash all parts with cleaning solvent-PD680. Dry thoroughly.

(2) Inspect body for cracks and breaks. Inspect valve seats for pitting, grooves, cracks, and excessive wear. If seats are slightly pitted, dress up with emery cloth. Clean surfaces evenly to assure proper seating of the disc.

(3) Inspect discs for wear and damage.

(4) Inspect valve stem for bends and thread damage.

(5) Replace a defective part.

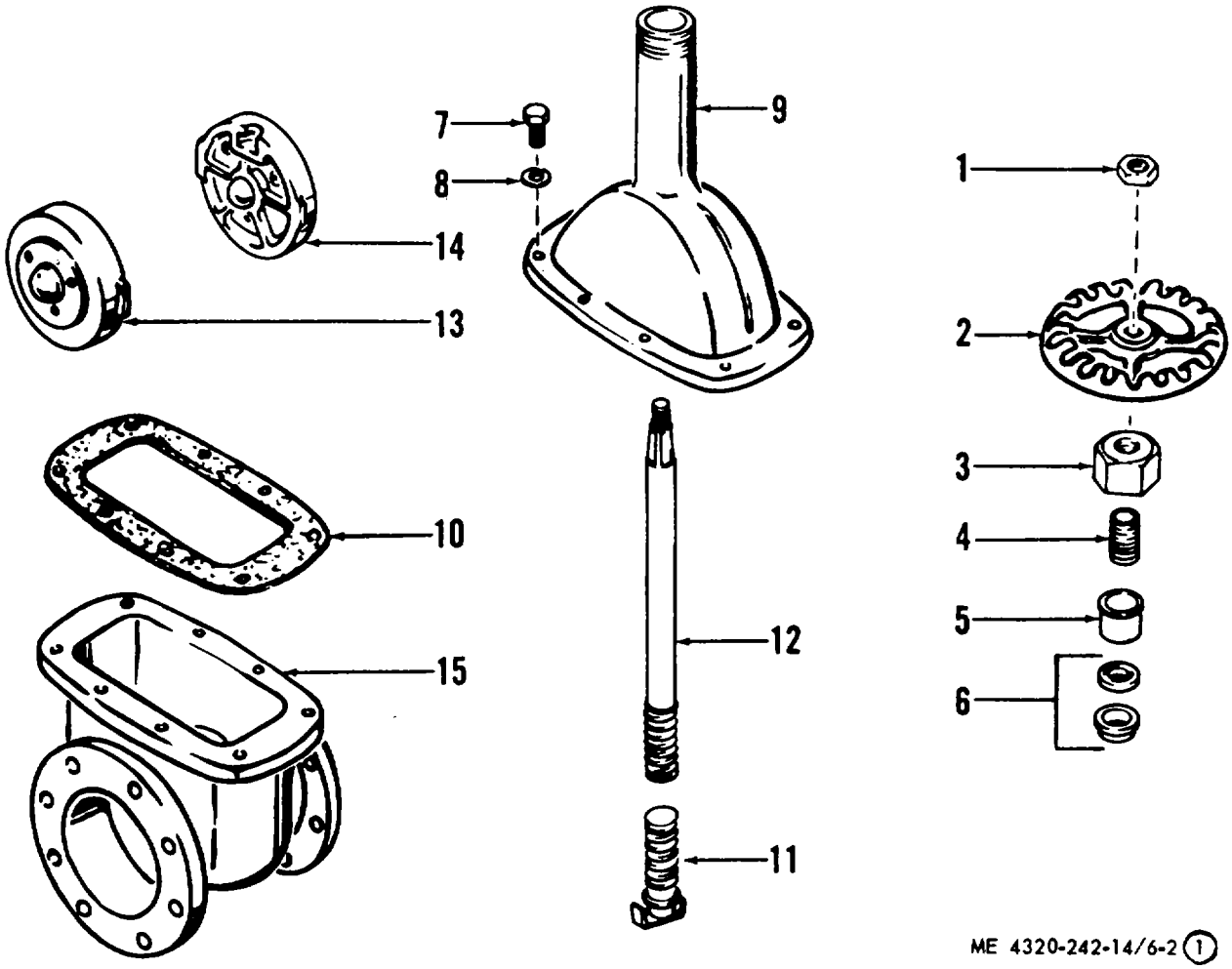
(6) Discard gasket and packing.

d. Reassembly.

(1) Refer to figure 6-2 and reassemble the suction and discharge gate valves.

(2) Use new gasket and packing during reassembly.

e. Installation. Refer to paragraph 4-26 and install the suction and discharge gate valves.



1. Nut, handwheel
2. Handwheel
3. Nut, packing
4. Spring, plane
5. Gland, packing
6. Packing
7. Capscrew
8. Washer
9. Bonnet
10. Gasket
11. Stem, bonnet
12. Stem, disc
13. Disc, male
14. Disc, female
15. Body

Figure 6-2. Suction and discharge gate valves, exploded view Model 84C15-4A084 serial number 371201 through 415493 and Model US36ACG serial numbers 37044-001 through 37044-240. (Sheet 1 of 2)

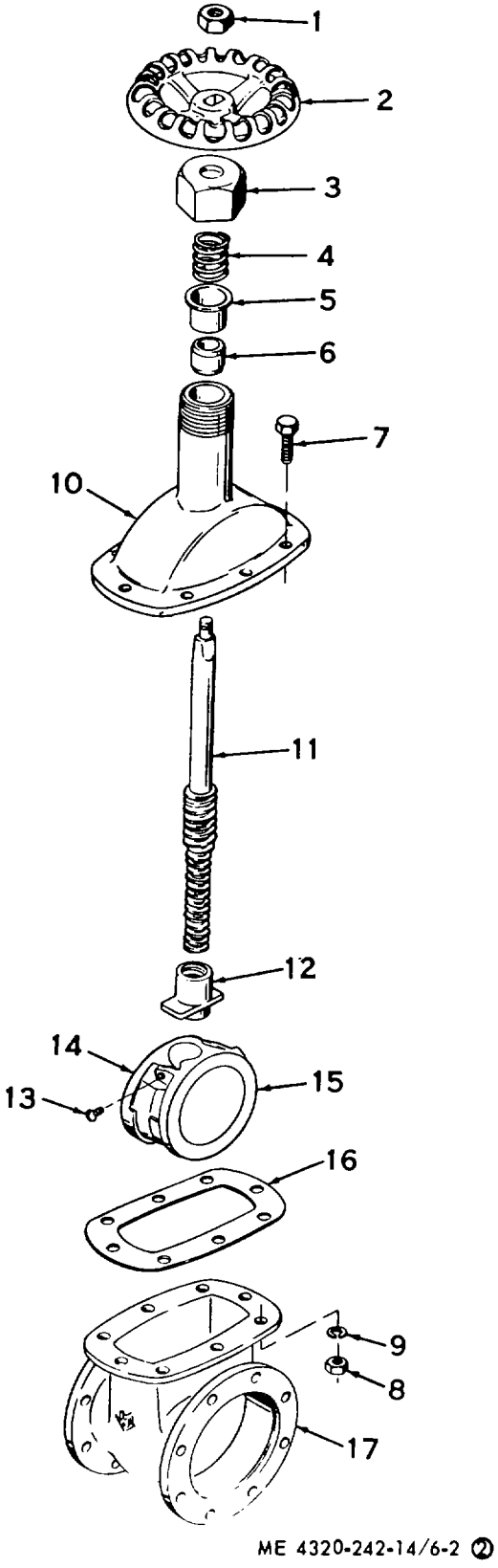


Figure 6-2. Suction and discharge gate valves, 4 in. exploded view. Serial numbers 419501 through 419959. (Sheet 2 of 2)

1. Nut, handwheel
2. Handwheel
3. Nut, packing
4. Spring, gland
5. Gland, packing
6. Packing
7. Capscrew
8. Nut
9. Washer, lock
10. Bonnet
11. Stem
12. Pullnut
13. Machine, screw
14. Disc, half
15. Disc, half
16. Gasket
17. Body

6-6. Discharge Check Valve

a. General. The discharge check valve is spring loaded in the open position. It must be closed manually.

b. Removal. Remove the check valve (para 5-4.).

c. Disassembly.

(1) Remove the capscrews (21, fig. 6-3), lockwashers (20), flat washers (19), and sleeves (18). Disconnect the spring (22) from the handle (17).

(2) Remove the capscrews (24 and 25), lockwashers (20), flat washer (19), and remove the bracket (26).

(3) Unscrew the setscrew (23) and remove the handle (17) from the shaft (15). Remove the key (16).

(4) Remove the packing nut (13) and packing (12) from the check valve body (8).

(5) Unscrew the setscrew (4) and slide the weight arm (5) on the shaft far enough to remove the key (14). Remove the key and pull out the shaft (15); remove the weight arm (5) and valve weight (3) from the check valve body (8).

(6) Remove the cotter pin (7), slotted nut (2), and shoulder screw (6). Remove the weight (3) from the weight arm (5).

(7) Remove the plugs (9 and 10) from the check valve body (8).

d. Cleaning and Inspection.

(1) Wash all parts with cleaning solvent and dry thoroughly with compressed air or a clean cloth.

(2) Inspect the shaft for wear and damage. Replace a defective shaft.

(3) Inspect the check valve body for cracks and breaks; replace if necessary.

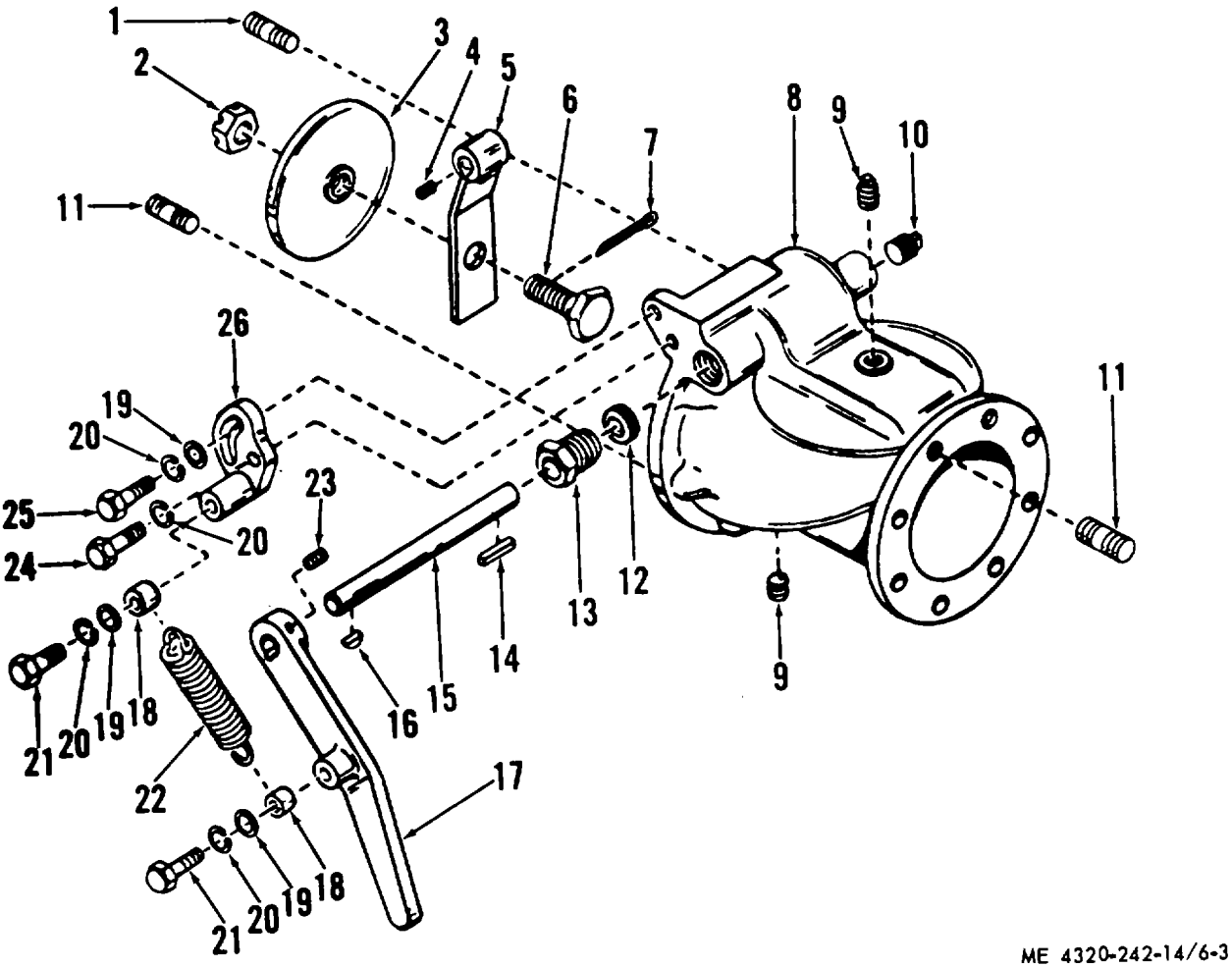
(4) Inspect all mounting and assembly screws and studs for stripped or damaged threads. Replace damaged screws or studs as necessary.

(5) Replace a broken or cracked spring.

(6) Discard the gaskets; use new gaskets for reassembly and installation.

e. Reassembly. Refer to figure 6-3 and reassemble the check valve.

f. Installation. Refer to paragraph 5-4 and install the check valve.



1.	Stud	14.	Key
2.	Nut, slotted	15.	Shaft
3.	Weight, valve	16.	Key, woodruff
4.	Setscrew	17.	Handle
5.	Arm, weight, valve	18.	Sleeve spacer
6.	Screw, shoulder	19.	Washer, flat
7.	Pin, cotter	20.	Washer, lock
8.	Body	21.	Capscrew
9.	Plug, pipe	22.	Spring
10.	Plug, pipe	23.	Setscrew
11.	Stud	24.	Capscrew
12.	Ring, packing	25.	Capscrew
13.	Nut. Packing	26.	Bracket, spring

Figure 6-3. Discharge check valve, exploded view.

6-7. Suction Strainer Assembly

a. Removal. Refer to paragraph 5-3 and remove the suction strainer assembly.

b. Disassembly. Refer to figure 6-4 and disassemble the suction strainer.

c. Cleaning and Inspection.

(1) Wash all parts with cleaning solvent, dry thoroughly.

(2) Inspect the cover (1) and body (7) for cracks, distortion, dents, and other damage; replace damaged parts.

(3) Inspect the screen (6) for tears, holes, distortion, and clogging; replace damaged screen.

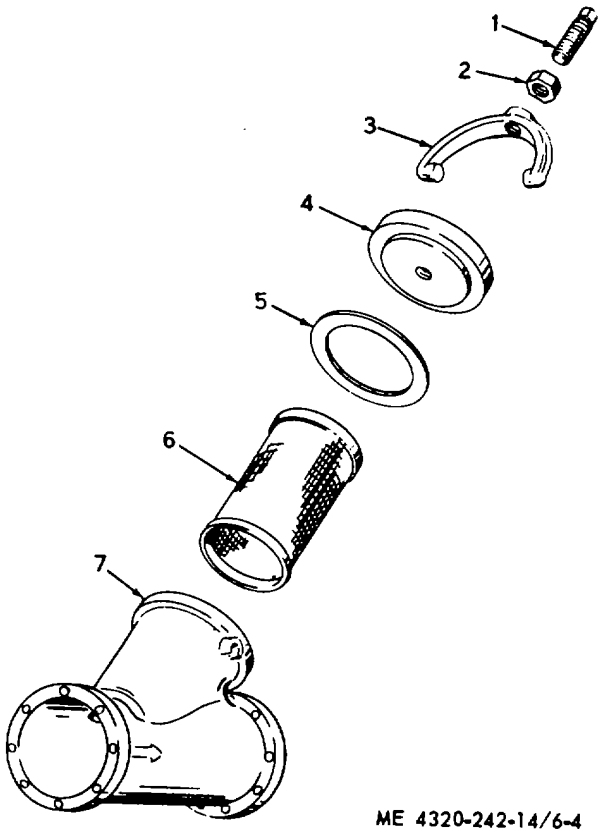
(4) Inspect the yoke for cracks, misalignment, and damaged threads; replace damaged yoke.

(5) Inspect gasket for damage and deterioration; replace damaged gasket.

(6) Inspect the screw and nut (7) for cracks and for damaged threads; replace damaged parts.

d. Reassembly. Refer to figure 6-4 and reassemble the suction screen assembly.

e. Installation. Refer to paragraph 5-3 and install the suction screen assembly.



1. Setscrew
2. Jam, nut
3. Yoke
4. Cover
5. Gasket
6. Screen
7. Body

Figure 6-4. Suction strainer, 4 inch; exploded view (Serial numbers 419501 through 419959).

APPENDIX A

REFERENCES

A-1 Fire Protection	
TB 5-4200-200-10	Hand Portable Fire Extinguisher, approved for Army Users
A-2 Lubrication	
C-9100-IL	Identification List for Fuels, Lubricants, Oils, and Waxes
LO 5-2805-259-14	Engine, Gasoline, Military Standard (Model 4A-084-111, 20HP)
A-3 Radio Suppression	
TM 11-483	Radio Interference Suppression
A-4 Maintenance	
TM 9-1870-1	Care and Maintenance of Pneumatic Tires
TM 38-750	The Army Maintenance Management System
TM 5-2805-259-14	Military Standard Engine, 20 HP, 4A-084-111.
TM 5-2805-259-24P	Special Tools List, Military Standard Engine, 20 HP, 4A-084 111.
TM 9-6140-200-15	Storage Batteries, Lead-Acid Type
A-5 Shipment and Storage	
TM 740-90-1	Administrative Storage of USAMEC Mechanical Equipment
TB 740-97-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
A-6 Destruction to Prevent Enemy Use	
TM 750-244-3	Procedure for Destruction of Equipment to Prevent Enemy Use

APPENDIX B

BASIC ISSUE ITEMS LIST AND ITEMS

TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1 Scope

This appendix lists items required by the operator for operation of the pump assembly.

B-2 General

This list is divided into the following sections:

a. Basic Issue Items List Section II. (Not applicable).

b. Items Troop Installed or Authorized List Section III. A list of items in alphabetical sequence, which at the discretion of the unit commander may accompany the pump assembly. These items are NOT SUBJECT TO TURN-IN with the pump assembly when evacuated.

B-3 Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II and Items Troop Installed or Authorized, Section III.

a. Source. Maintenance, and Recoverability Code(s) (SMR):

(1) Source code indicates the source for the listed item.

Source codes are:

Code	*Explanation*
P	Repair parts, special tools, and test equipment supplied from GSA/ DSA or Army Supply system and authorized for use at indicated maintenance levels.
P2	Repair parts, special tools, and test equipment which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.

(2) Maintenance code indicates the lowest level of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Crew / Operator

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable.

Recoverability codes are:

Code	*Explanation*
R	Applied to repair parts (assemblies and components), special tools, and test equipment which are considered economically reparable at direct and general support maintenance levels.
S	Repair parts, special tools, test equipment, and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Furnished with Equipment (BIIL). (Not applicable).

f. Quantity Authorized (Items Troop Installed or Authorized). This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEAS	(5) QTY AUTH
PC	7520-559-9618	CASE, maintenance and operation manuals	EA	1

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-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. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III. (Not applicable).

d. Section IV contains supplemental instructions or explanatory notes required for a particular maintenance function.

C-2. Explanation of Columns in Section II

a. Group Number, Column (1). The assembly group number is a numerical group assigned to each assembly. The assembly groups are listed on the MAC in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Assembly Group, Column (2). This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column (3). This column lists the various maintenance functions (A through K). The upper case letter placed in the appropriate column indicates the lowest maintenance level authorized to perform these functions.

The symbol designations for the various maintenance levels are as follows:

C-Operator or crew
O-Organizational 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.

B-Test: To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C-Service: To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air.

D-Adjust: To rectify to the extent necessary to bring into proper operating range.

E-Aline: To adjust specified variable elements of an item to bring to optimum performance.

F-Calibrate: To determine the corrections to be made in the readings of instruments of test equipment used in precise measurement. Consists of the comparison 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 with the certified standard.

G-Install: The set up for use in an operational environment such as an emplacement, site, or vehicle.

H-Replace: To replace unserviceable items with serviceable like items.

I-Repair: Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each level of maintenance.

J-Overhaul: Normally, the highest degree of maintenance performed by the Army in order to minimize time work is in process consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

K-Rebuild: The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramoung factors and then only at the depot maintenance level. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

d. Work Measurement Time. The active repair time required to perform the maintenance function is included directly below the symbol identifying the level of maintenance. This time includes preparation time, fault isolation / diagnostic time, and QA / AC time in addition to the time required to perform specific maintenance functions identified for tasks authorized. The time is expressed in man-hours and carried to one place (tenths of hours).

e. Tools and Equipment, Column (4). This column is provided for referencing by code the special tools and test equipment (sec. III) required to perform the maintenance functions (sec. II).

f. Remarks, Column (5). This column is provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions.

C-3. Explanation of Columns in Section III (Not applicable).

C-4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash (entered from Column (5) of sec. II The first letter references alpha sequence in column 5 and the second letter references a maintenance function, column (3), A through K.

b. Remarks. This column lists information pertinent to the maintenance function to be performed (as indicated in sec. II).

Section II. MAINTENANCE ALLOCATION CHART

NOTE: All (MAC) Functions for the Engine Assembly are contained in TM 5-2805-259-14.

(1) GROUP NUMBER	(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.	ENGINE EXHAUST SYSTEM	C	..	..	..	..	..	..	O	..	..	..		
		.5	..	..	..	..	..	..	.4.0	..	..	..		
02.	FUEL SYSTEM	C	O	C	..	..	..	..	O	..	..	..		A-B
		.1	.2	.2	..	..	..	..	1.0	..	..	..		
03.	BATTERY BOX AND CABLES	C	O	O	..	..	..	..	F	F	..	..		B-B
		.1	..	.3	..	..	..	..	.5	1.0	..	..		
04.	CONTROL PANEL AND GAGES	C	O	..	O	..	..	..	O	O	..	..		
		.1	.2	..	.3	..	..	..	.8	1.0	..	..		
05.	PUMP, STRAINER, GATE VALVE	C	F	..	..	..	..	..	..	F	..	..		C-B
	CHECK VALVE ASSY AND	.3	1.2	..	..	..	..	..	..	2.0	..	..		
	MANIFOLD	C	..	C	..	..	..	..	O	O	..	..		
06.	AIR ELIMINATOR	.2	..	.5	..	..	..	..	1.5	1.5	..	..		
		C	F	C	..	..	..	..	O	F	..	..		
07.	WHEELS, AXLE, FRAME AND LIFT-	.2	.2	1.0	..	..	..	..	1.5	1.0	..	..		D-B
	ING COMPONENTS													

Section IV. REMARKS

Reference Code	Remarks
A-B	Requires a hydrostatic test of the fuel tank.
B-B	Constitutes testing the battery with a hydrometer.
C-B	Requires a hydrostatic test of the pump, suction and discharge assemblies.
D-B	Test tires with inflation pressure gage.

INDEX

	Paragraph	Page
A		
Air eliminator assembly	4-25	4-13
Axle assembly	4-34	4-24
D		
Description	1-7	1-1
Destruction of Army material to prevent enemy use	1-5	1-1
Differences in models	1-9	1-4
Discharge and suction gate values	4-26	4-17
Discharge check valve	6-6	6-6
Discharge manifold, elbow and check valve	5-4	5-4
Dismantling for movement	4-6	4-2
Drawbar assembly	4-30	4-20
E		
Engine	5-5	5-4
Engine oil pressure gage	4-21	4-11
Equipment conversion	4-5	4-2
Equipment serviceability criteria	1-4	1-1
F		
Flywheel and muffler guard	4-36	4-26
Forms and records	1-2	1-1
Front stand	4-27	4-18
Fuel filter	4-16	4-4
Fuel system, general	4-14	4-4
Fuel tank and fuel lines	4-15	4-4
G		
Gages and panel, general	4-17	4-7
H		
Hub assembly, bearing and seals	4-33	4-23
I		
Identification and tabulated data	1-8	1-4
Inspecting and servicing the equipment	4-3	4-1
Installation	4-4	4-1
Intermediate housing	6-3	6-2
L		
Lubrication information, detailed	3-2	3-1
Lubrication information, genera	3-1	3-1
Lifting frame assembly	4-35	4-25
M		
Maintenance repair parts	4-9	4-2
O		
Operating instructions, general	2-1	2-1
Operation in dusty or sandy areas	2-7	2-12
Operation in extreme cold (below 0° F)	2-5	2-11
Operation in extreme heat	2-6	2-11
Operation in high altitudes	2-10	2-12
Operation in salt water areas	2-9	2-12
Operation in rainy or humid conditions	2-8	2-12
Operation under unusual conditions	2-4	2-10
Operator/crew troubleshooting chart	3-6	3-4
Organizational troubleshooting	4-13	4-3
P		
Panel find frame	4-23	4-11
Pintle hook	4-28	4-19
Preventive maintenance checks and services	4-10,4-11	4-2
Preventive maintenance checks and services, general	3-3,3-4	3-3
Pump	5-6	5-7
Pump assembly	6-2	6-1
Pump assembly components, general	6-1	6-1
Pump gages and lines	4-22	4-11
R		
Reflector	4-29	4-20
Reinstallation after movement	4-7	4-2
Reporting of errors	1-3	1-1
S		
Scope	1-1	1-1
Special tools and equipment	4-8,5-1	4-2,5-1
Starting	2-2	2-5
Starting switches	4-19	4-10
Stopping	2-3	2-8
Suction and discharge gate valves	6-5	6-4
Suction manifold and strainer body assembly	5-3	5-1
Suction screen	4-24	4-12
Suction strainer assembly	6-7	6-8
T		
Tachometer-hourmeter	4-20	4-11
Throttle cable	4-18	4-7
Toolbox and battery box	4-31	4-21
Trailer assembly	5-7	5-8
Troubleshooting, general	3-5,4-12	3-4,4-3
	5-2	5-1
U		
Unloading equipment	4-1	4-1
Unpacking equipment	4-2	4-1
V		
Volute casing	6-4	6-3
W		
Wheel and tire assembly	4-32	4-23

By Order of the Secretary of the Army:

BRUCE PALMER, JR.
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Acting Chief of Staff

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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