DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

DEPARTMENT OF THE AIR
FORCE TECHNICAL ORDER

TM 9-1828A
TO 19-75CCB-1

TM 9-1828A/TO 19-75CCB-1—FUEL PUMPS—1952

FUEL PUMPS

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
DECEMBER 1952

AGO 1755B

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

FUEL PUMPS

TM 9–1828A
TO 19–75CCB–1
CHANGES No. 2

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D. C., *8 August 1962*

TM 9–1828A/TO 19–75CCB–1, 29 December 1952, is changed as follows:

Page 81.

66. Disassembly

(Fig. 43)

* * * * * * *

e. Disassemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Remove cover screw with its gasket and lift off the cover, cover gasket, screen retainer, and screen. Discard screen and screen retainer. The vacuum section screen serves no useful purpose and has been eliminated from later production pumps.

Page 83.

68. Assembly

* * * * * * *

d. Assemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Turn cover over and place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

* * * * * * *

Page 106.

84. Disassembly.

(Fig. 56)

* * * * * * *

e. Disassemble Vacuum Cover. (Superseded) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets. Remove cover screw and its gasket. Lift off cover, cover gasket, screen retainer, and screen. Discard screen and screen retainer. The vacuum section screen serves no useful purpose and has been eliminated from later production pumps.

Page 108.

86. Assembly.

(Fig. 56)

* * * * * * *

d. Assemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Turn cover over and place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

* * * * * * *

Page 111.

87. Disassembly

(Fig. 58)

* * * * * * *

e. Disassemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Remove cover plate screw with gasket. Lift off the cover, cover gasket, screen retainer, and screen. Discard screen and screen retainer. The vacuum section screen serves no useful purpose and has been eliminated from later production pumps.

Page 113.

89. Assembly

* * * * * * *

d. Assemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Turn cover over and place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

* * * * * * *

Page 115.

90. Disassembly

(Fig. 60)

* * * * * * *

(Added) *Disassemble Vacuum Cover.*

(1) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove cover plate screw with gasket. Lift off the cover, cover gasket, screen retainer, and screen. Discard screen and screen retainer. The vacuum section screen serves no useful purpose and has been eliminated from later production pumps.

Page 117.

92. Assembly

* * * * * * *

d. Assemble Vacuum Cover.

* * * * * * *

(2) (Superseded) Turn cover over and place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

* * * * * * *

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☆U. S. GOVERNMENT PRINTING OFFICE: 1962

TM 9-1828A/TO 19-75CCB-1

This manual supersedes TM 9-1828A, 9 March 1945

FUEL PUMPS

United States Government Printing Office
Washington : 1952

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This manual is correct to 13 October 1952

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

WASHINGTON 25, D. C., *29 December 1952*

TM 9-1828A/TO 19-75CCB-1 is published for the information and guidance of all concerned.

[AG 451.01 (28 Oct 52)]

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CONTENTS

CHAPTER 1

INTRODUCTION

1. Scope

a. These instructions are published for the information and guidance of personnel responsible for field and depot maintenance of this matériel. These instructions contain information on maintenance which is beyond the scope of the tools, equipment, or supplies normally available to using organizations. This manual does not contain information which is intended primarily for the using organization, since such information is available to ordnance maintenance personnel in the pertinent operators technical manuals or field manuals.

b. This manual contains a description of and procedures for removal, disassembly, inspection, repair, rebuild, and assembly of fuel pumps. The appendix contains a list of current references, including supply catalogs, technical manuals, and other available publications applicable to the matériel.

c. This manual differs from TM 9–1828A, 9 March 1945, as follows:

(1) Adds information on: AC fuel pumps series AM, BR, BZ, CF, CU, CY and Carter mechanical fuel pumps.

(2) Revises information on all models of AC fuel pumps and Carter electric fuel pumps.

2. Field and Depot Maintenance Allocation

The publication of instructions for complete disassembly and rebuild is not to be construed as authority for the performance by field maintenance units of those functions which are restricted to depot shops and arsenals. In general, the prescribed maintenance responsibilities will be reflected in the allocation of maintenance parts listed in the appropriate columns of the current ORD 8 supply catalog pertaining to those vehicles incorporating these items. Instructions for depot maintenance are to be used by maintenance companies in the field only when the tactical situation makes the repair functions imperative. Supply of parts listed in the depot guide column of ORD 8 supply catalogs will be made to field maintenance only when the emergency nature of the maintenance to be performed has been certified by a responsible officer of the requisitioning organization, and

upon express authorization by the chief of the service concerned. Those operations which can be performed as "emergency field maintenance" are specifically covered as such in this manual.

3. Forms, Records, and Reports

a. General. Responsibility for the proper execution of forms, records, and reports rests upon the officers of all units maintaining this equipment. However, the value of accurate records must be fully appreciated by all persons responsible for their compilation, maintenance and use. Records, reports, and authorized forms are normally utilized to indicate the quantity, and condition of matériel to be inspected, to be repaired, or to be used in repair. Properly executed forms convey authorization and serve as records for repair or replacement of matériel in the hands of troops and for delivery of matériel requiring further repair to ordnance shops in arsenals, depots, etc. The forms, records, and reports establish the work required, the progress of the work within the shops, and the status of the matériel upon completion of its repair.

b. Authorized Forms. The forms generally applicable to units maintaining this equipment are listed in the appendix. For current and complete listing of all forms, refer to current SR 310–20–6. Additional forms applicable to the using personnel are listed in the operators manual. For instructions on the use of these forms, refer to FM 9–10.

c. Field Reports of Accidents. The reports necessary to comply with the requirements of the Army safety program are prescribed in detail in the SR 385–10–40 series of special regulations. These reports are required whenever accidents involving injury to personnel or damage to matériel occur.

d. Report of Unsatisfactory Equipment or Materials. Any suggestions for improvement in design and maintenance of equipment, safety and efficiency of operation, or pertaining to the application of prescribed petroleum, fuels, lubricants, and/or preserving materials, will be reported through technical channels as prescribed in SR 700–45–5 to the Chief of Ordnance, Washington 25, D. C., ATTN: ORDFM, using DA Form 468, Unsatisfactory Equipment Report. Such suggestions are encouraged in order that other organizations may benefit.

Note. Do not report all failures that occur. Report only REPEATED or RECURRENT failures or malfunctions which indicate unsatisfactory design or material. However, reports will always be made in the event that exceptionally costly equipment is involved. See also SR 700–45–5 and the printed instructions on DA Form 468.

CHAPTER 2

PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR FIELD AND DEPOT MAINTENANCE

4. General

Tools and equipment and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units and depot shops for maintaining, repairing, and/or rebuilding the matériel.

5. Parts

Maintenance parts are listed in the pertinent Department of the Army supply catalogs, which are the authority for requisitioning replacements. Parts not listed in the ORD 8 catalogs, but required by depot shops in rebuild operations may be requisitioned from the listing in the corresponding ORD 9 catalog and will be supplied if available. Requisitions for ORD 9 parts will contain a complete justification of requirements.

6. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this matériel are listed in ORD 6 SNL J–8, section 12 and SNL J–10, section 8 and are authorized for issue by T/A and T/O&E.

7. Special Tools and Equipment

No special tools and equipment are required for the maintenance of AC or Carter fuel pumps.

8. Improvised Tool

The improvised tool listed in table I and the dimensioned detail drawing (fig. 32) furnished herein apply only to field and depot shops in order to enable these maintenance organizations to fabricate this tool locally, if desired. This tool is of chief value to maintenance organizations engaged in rebuilding a large number of identical components, however, it is not essential for rebuild and is not available for issue. The following data are furnished for information only.

Table I. Improvised Tool for Field and Depot Maintenance

Item	References		Use
	Fig.	Par.	
TOOL, vacuum diaphragm flexing.	32, 33	53e, 59e. 68e, 80e, 86e, 89e, and 92e.	Level vacuum diaphragm and permit flexing.

CHAPTER 3

TROUBLE SHOOTING

9. Purpose .

Note. Information in this chapter is for the use of ordnance maintenance personnel in conjunction with and as a supplement to the trouble shooting section in the pertinent operator's manual. It provides the continuation of instructions where a remedy in the operator's manual refers to ordnance maintenance personnel for corrective action.

Operation of a deadlined vehicle without a preliminary examination can cause further damage to a disabled component and possible injury to personnel. By careful inspection and trouble shooting such damage and injury can be avoided and, in addition, the causes of faulty operation of the vehicle or component can often be determined without extensive disassembly. This chapter contains inspection and trouble shooting procedures to be performed while a disabled component is still mounted in the vehicle.

a. The inspections made while the component is mounted in the vehicle are for the most part visual and are to be performed before attempting to operate the vehicle. The object of these inspections is to avoid possible damage or injury and also to determine the condition of and, when possible, what is wrong with the defective component.

b. Check the trouble shooting section of the pertinent operator's manual, then proceed as outlined in this chapter. These trouble shooting operations are used to determine if the fault can be remedied without removing the component from the vehicle.

c. Proper maintenance will eliminate many fuel pump failures. The following will usually remedy fuel pump failures and eliminate removal of pump from vehicle.

(1) *Drain fuel pump bowl.* Sediment and water will become trapped inside the fuel pump bowl. Drain and wipe dry the fuel pump bowl to remove sediment and water accumulation.

(2) *Clean filter.* Difficulty because of moisture accumulation is more likely to occur at low winter temperatures. To avoid this trouble, remove and clean the filter bowl and screen at intervals as instructed in the applicable vehicle operator's manual.

10. Trouble Shooting Procedure

a. General

(1) Always perform preliminary check while fuel pump is installed in the vehicle.

(2) Be sure there is fuel in the fuel tank.

b. Mechanical Fuel Pumps. Disconnect fuel-pump-to-carburetor line at the pump (or at the carburetor, whichever is more convenient). With the ignition switch off, use the starting motor to turn the engine over a few times. If fuel spurts from the pump (or open end of the line), the pump, gas line, and fuel tank are not at fault, and the trouble is in the carburetor, ignition, or engine. If no fuel flows, or if only a slight amount of fuel flows, the following defects may be the cause:

(1) *Fuel bowl gasket worn or damaged.* Replace gasket.

(2) *Fuel bowl strainer or screen clogged or corroded.* Clean or replace if badly corroded.

(3) *Fuel line connections loose or cracked.* Tighten or replace fuel lines and/or fittings.

(4) *Fuel line clogged.* Blow out with compressed air.

(5) *Diaphragm flange screws loose.* Tighten flange screws.

(6) *Flexible inlet line broken or porous.* Replace flexible line.

c. Electric Fuel Pumps. Remove outlet fuel line on top of fuel tank. Turn on master switch and fuel tank selector switch, if vehicle is so equipped. If no fuel flows, or if only a slight amount of fuel flows, the following defects may be the cause:

(1) *Faulty battery.* Check voltage output of battery.

(2) *Faulty wiring.* Check voltage output at fuel pump terminals. If battery voltage is normal, but voltage at fuel pump terminals is low or zero, check wiring for breaks and loose connections.

d. Replace Fuel Pump. If correction of six items (*b* above) for mechanical fuel pumps and two items (*c* above) for electric fuel pumps does not place the fuel pump in operating condition, it should be removed for replacement and rebuild.

CHAPTER 4

AC FUEL PUMPS

Section I. OPERATION

11. Fuel Pump Operation
(figs. 1 and 2)

a. Installation. The AC mechanical fuel pump is installed on the engine between the fuel tank and the carburetor. The suction side of the pump is connected to the fuel tank and the discharge side to the carburetor by tubing designed to carry the fuel. The purpose of the pump is to suck fuel from the supply tank and push it into the carburetor float bowl as required by the engine.

b. Identification. The pump part number is usually stamped on the edge of the mounting flange. Some high production pumps have the part number cast into the body beneath the diaphragm flange.

c. Operation.

(1) *Mechanical action.* Operation is accomplished through a rocker arm on the pump contacting an eccentric on the engine camshaft. Downward movement of the pump diaphragm, or the suction stroke, is caused by the rotation of an eccentric on the camshaft actuating the pump rocker arm. This pulls the diaphragm downward against the pressure of the diaphragm spring, producing a vacuum in the fuel chamber. Pressure in the outlet line forces the outlet valve closed against the vacuum and pulls the inlet valve open, atmospheric pressure in the supply tank forces fuel through the inlet, the filter screen, and the inlet valve into the vacuum of the fuel chamber. On the return stroke of the rocker arm, the diaphragm spring forces the diaphragm upward, the inlet valve closes, and the outlet valve is forced open, allowing fuel to flow through the outlet to the carburetor.

(2) *Link action.* The link is hinged to the rocker arm so that the link and the connected diaphragm can be moved down, but not up, by the rocker arm (fig. 1). The link and the diaphragm are moved upward only by the diaphragm spring. The pump, therefore, delivers fuel to the carburetor only when the fuel pressure in the outlet line is less than the pressure maintained by the diaphragm as a result of the force of the diaphragm

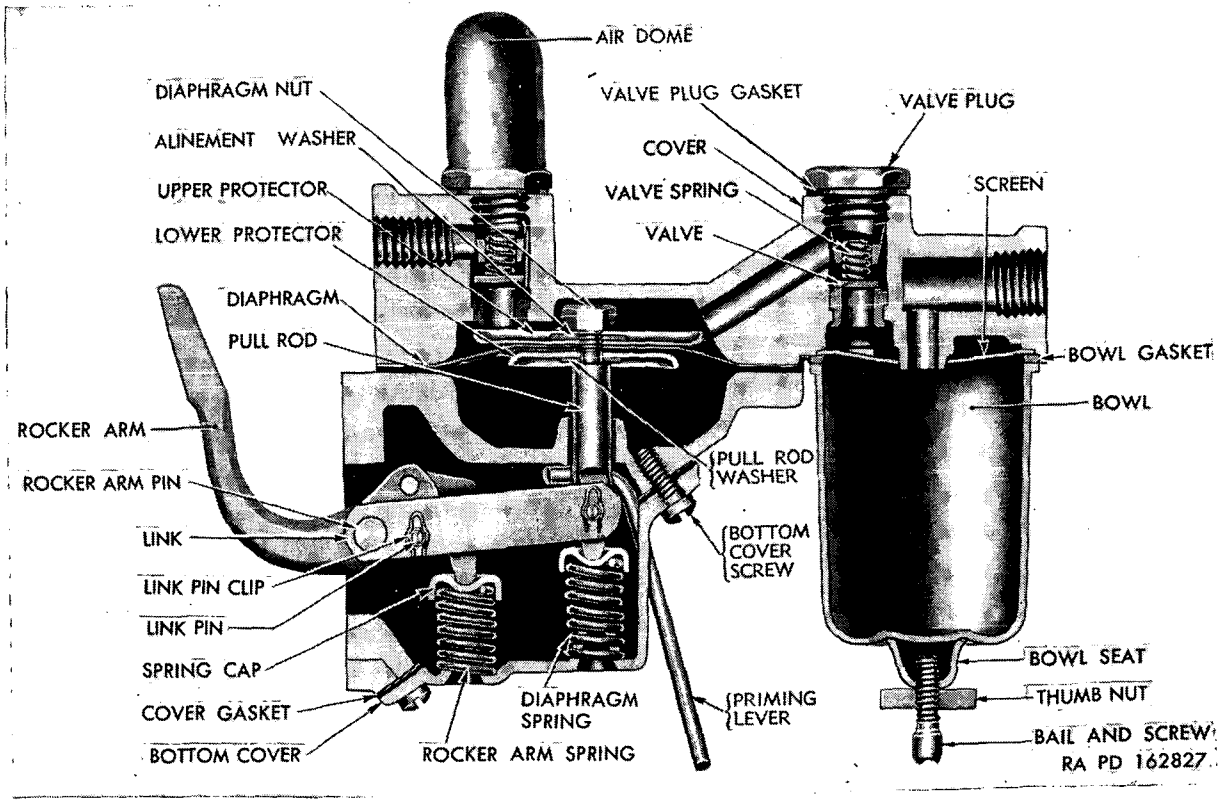

Figure 1. Fuel pump, series B—sectional view.

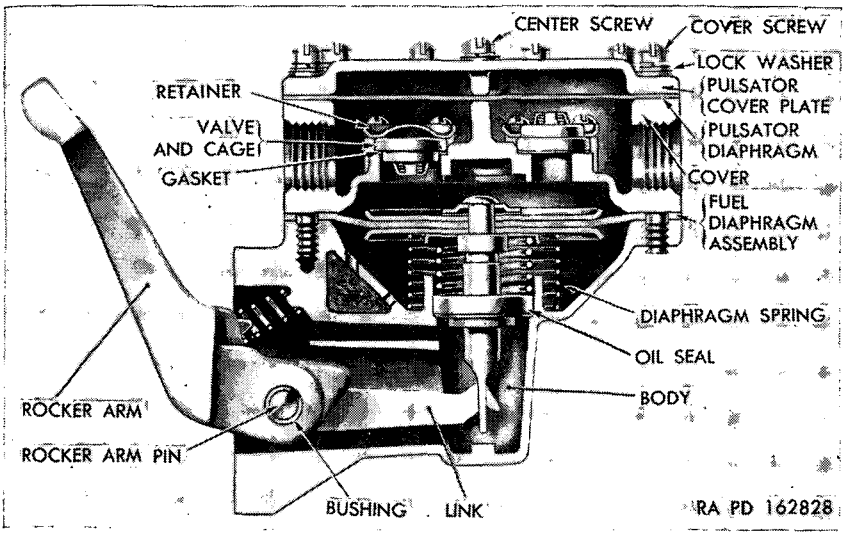

Figure 2. Fuel pump, series BF—sectional view.

spring. This condition arises when the float needle valve is not seated and the fuel passage from the pump into the carburetor float chamber is open. When the needle valve in the carburetor float chamber is closed and held in place by the pressure of the fuel on the float, the pump builds up pressure until the diaphragm spring remains compressed through the entire cycle. This pressure results in almost complete stoppage of diaphragm movement until more fuel is needed. The only function of the rocker arm spring is to make the rocker arm follow the camshaft eccentric.

(3) *Air dome and pulsator.* Most fuel pumps are equipped with air domes of integral or separate construction. Examples of integral air domes will be found in series G, R, and AF. Examples of separate construction will be found in series B and D. Fuel pumps such as the BF are equipped with diaphragm pulsators. These air domes and pulsators serve a dual purpose. They minimize flow variations experienced with two-cycle pump stroke and show increased flow characteristics up to 50 percent higher than for a fuel pump not so equipped. Both the air dome and pulsator provide a pocket in which fuel under pressure can compress a certain volume of air. When the pressure is relieved (pump on suction stroke), the pocket of compressed air pushes the fuel on to its destination. The pulsator, in addition, employs diaphragm cloth resiliency to store up energy to be used at the off pressure stroke interval.

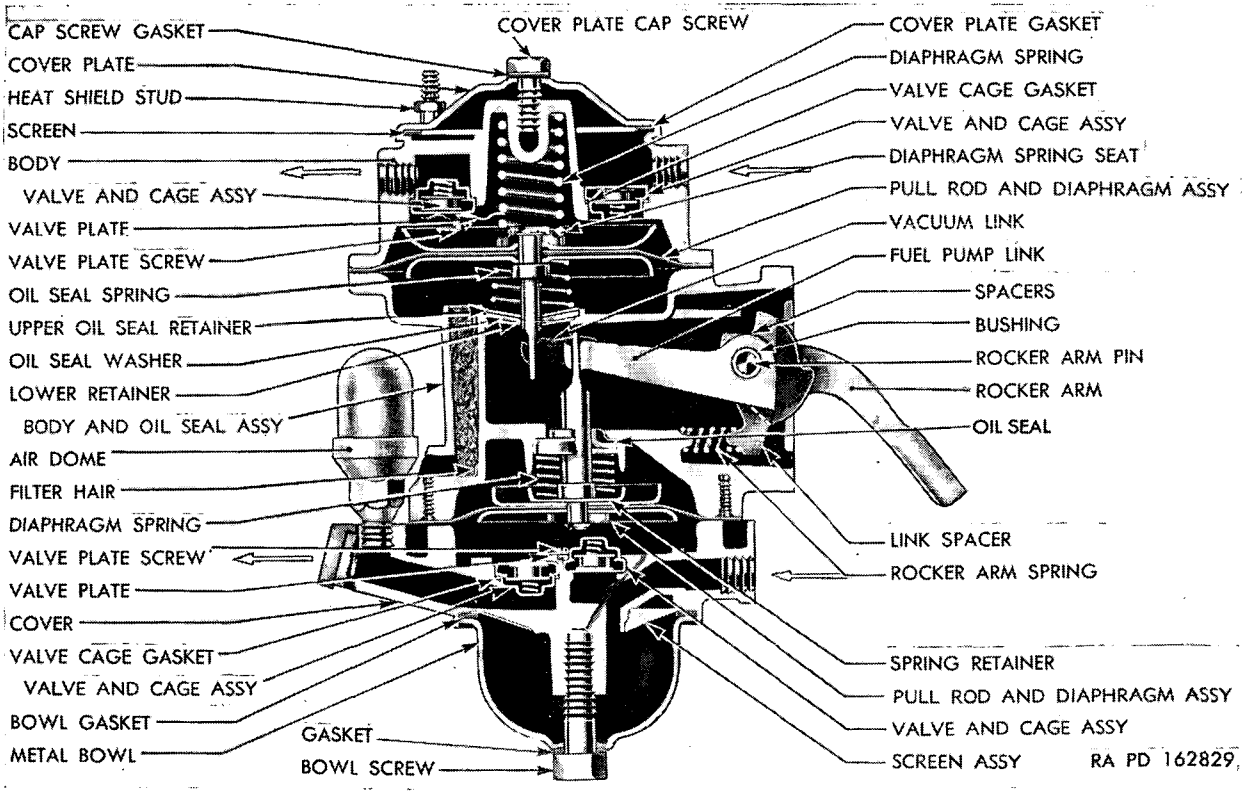

Figure 3. Fuel and vacuum pump, series AJ—sectional view.

12. Vacuum Pump Operation

(fig. 3)

a. Vacuum Booster. The vacuum suction acts as a booster to the intake manifold suction thus providing uniform operation of the windshield wiper at all engine speeds and loads. Both sections of the combination pump are actuated by a single rocker arm. The fuel section of a combination fuel and vacuum pump operates the same as a fuel pump alone.

b. Mechanical Action Two Valve Vacuum Sections. Force is applied to the rocker arm by an eccentric on the camshaft. Rocker arm movement, through the links and pull rod, pushes the diaphragm into the air chamber against spring pressure (60 to 80 lb.). Pressure created by the diaphragm movement expels air through the outlet valve and into the manifold. The return stroke (low point of cam) releases the compressed diaphragm spring, creating a vacuum and pulling air through the inlet valve from the windshield wiper.

c. Mechanical Action Four Valve Vacuum Section (fig. 4). Force is applied to the rocker arm by an eccentric on the camshaft. Rocker arm movement through the links and pull rod, pushes the diaphragm upward, expelling air from above the diaphragm, through the outlet valve into the manifold. On the same stroke, air is pulled through the valve between body and cover into the expanding area below the diaphragm from the windshield wiper motor. The return stroke (low point of cam) releases the compressed diaphragm spring, pushing the diaphragm down, expelling air from below the diaphragm, through staked valve in body, into the engine crankcase. On the same stroke, air is pulled through inlet valve, into the expanding area above the diaphragm, from the windshield wiper.

d. Link Action. When manifold vacuum is greater than that created by the pump, the stronger manifold vacuum pulls the diaphragm into the air chamber against spring pressure thus moving the links out of engagement with the rocker arm. Under this condition the rocker arm continues to move with the cam, but produces only a fluttering effect on the diaphragm. The windshield wiper then operates on manifold vacuum without assistance from the pump. When intake manifold vacuum is low, as on acceleration or at high speed, the vacuum created by the pump will assure adequate operation of the wiper.

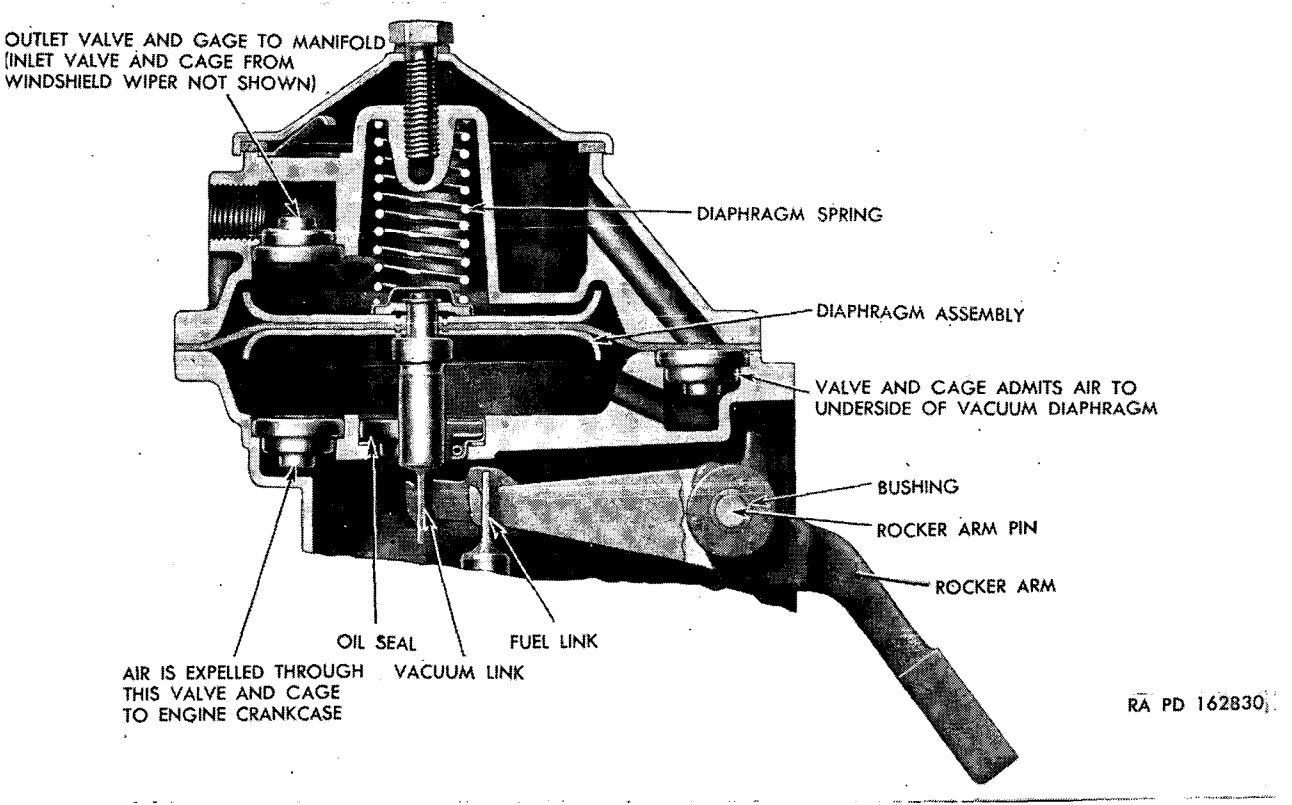

Figure 4. Mechanical action four valve vacuum section.

Section II. REPAIR PROCEDURE

13. Standard Ordnance Repair Kits

(fig. 5)

Standard ordnance repair kits must always be used when rebuilding AC fuel pumps. Each kit contains a comprehensive group of parts which have been selected to replace all the internal working parts of the pump. Use of the repair kit obviates the necessity of setting up intricate fixtures to test each part for wear. Their use also assures that all the necessary parts will be at hand when the rebuild operation is performed. Following is the complete list of fuel pumps used in ordnance vehicles, and the applicable standard ordnance repair kit. Use the series designation for direct reference to the applicable chapter as shown in the list of contents.

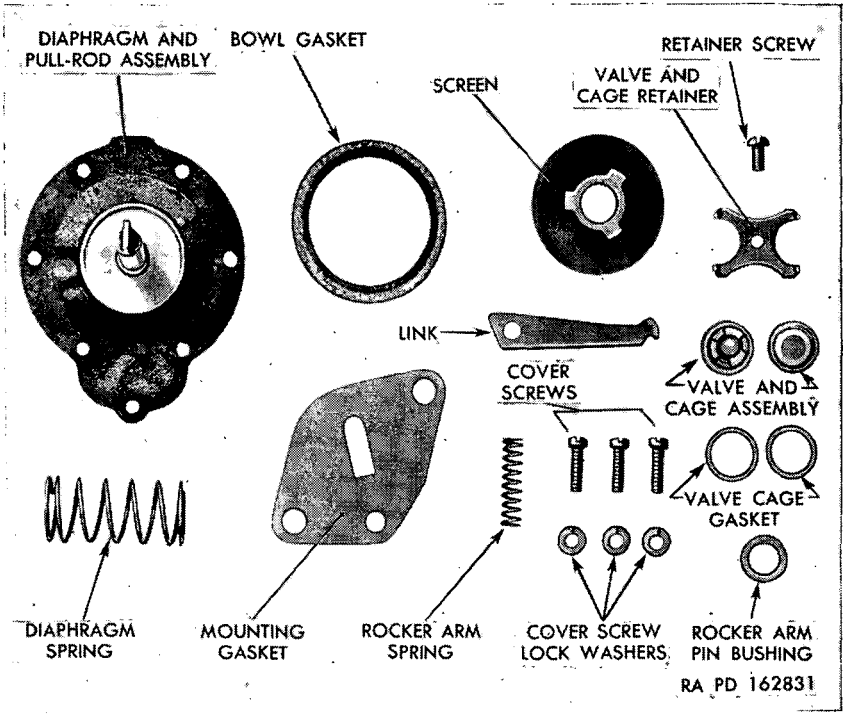

Figure 5. Typical repair kit contents.

Table II. Fuel Pump Repair Kits by Fuel Pump Number

AC fuel pump No.	Series	AC repair kit No.	Paragraph
855758	B	1538121	15–17
855885	D	1538160	15–17
856052	D	1538160	15–17
856065	D	1538160	15–17
856132	D	1538160	15–17
856195	D	1538160	15–17
856251	B	1538121	15–17
856256	B	1538121	15–17
856262	B	1538121	15–17
1521015	D	1538166	15–17
1521117	B	1538121	15–17
1521127	B	1538121	15–17
1521129	IHC SPEC	1538165	21–23
1521136	B	1538121	15–17
1521139	D	1538160	15–17
1521206	D	1538160	15–17
1521396	G	1538666	18–20
1521444	G	1538666	18–20
1521442	B	1538121	15–17
1521676	B	1538365	15–17
1521686	P	1538773	24–26
1521761	D	1538160	15–17
1521780	D	1538160	15–17
1521786	D	1538166	15–17
1521799	B	1538121	15–17
1521806	B	1538121	15–17
1521809	D	1538160	15–17
1521815	D	1538160	15–17
1521822	D	1538160	15–17
1521830	D	1538164	15–17
1521836	B	1538847	15–17
1521840	D	1538160	15–17
1521845	D	1538160	15–17
1521846	D	1538160	15–17
1521853	B	1538121	15–17
1522116	B	1538121	15–17
1522134	D	1538160	15–17
1522147	D	1538160	15–17
1522182	D	1538166	15–17
1522225	D	1538160	15–17
1522231	D	1538160	15–17
1522232	D	1538764	15–17
1522235	D	1538160	15–17
1522236	D	1538160	15–17
1522265	D	1538160	15–17
1522266	B	1538121	15–17
1522995	B	1538158	15–17
1522998	D	1538160	15–17
1523019	D	1538764	15–17

Table II. Fuel Pump Repair Kits by Fuel Pump Number—Continued

AC fuel pump No.	Series	AC repair kit No.	Paragraph
1523047	D	1538764	15–17
1523050	B	1538121	15–17
1523055	B	1538365	15–17
1523057	D	1538160	15–17
1523060	O	1538822	15–17
1523062	D	1538764	15–17
1523066	R	1538366	27–29
1523087	T	1538808	33–35
1523089	AF	1538172	42–44
1523133	B	1538121	15–17
1523135	B	1538121	15–17
1523170	D	1538160	15–17
1523187	D	1538160	15–17
1523224	R	1538473	27–29
1523256	D	1538160	15–17
1523307	R	1538276	27–29
1523308	D	1538139	15–17
1523342	B	1538121	15–17
1523343	B	1538121	15–17
1523363	AC	1538821	39–41
1523366	D	1538160	15–17
1523369	D	1538160	15–17
1523378	AG	1538770	45–47
1523379	D	1538160	15–17
1523387	D	1538166	15–17
1523389	B	1538121	15–17
1523429	AF	1538172	42–44
1523621	R	1538844	27–29
1523633	B	1538121	15–17
1523636	D	1538139	15–17
1523647	AT	1538177	60–62
1523758	B	1538121	15–17
1523762	D	1538164	15–17
1523767	T	1538808	33–35
1523771	D	1538160	15–17
1523785	B	1538121	15–17
1523798	B	1538121	15–17
1523812	W	1538367	36–38
1523816	AU	1538368	63–65
1523832	R	1538773	27–29
1523912	AT	1538177	60–62
1523929	R	1538773	27–29
1523971	B	1538847	15–17
1523974	W	1538367	36–38
1523981	D	1538160	15–17
1523985	AH	1538178	48–50
1523991	T	1538708	33–35
1537007	AH	1538178	48–50
1537008	B	1538121	15–17

Table II. Fuel Pump Repair Kits by Fuel Pump Number—Continued

AC fuel pump No.	Series	AC repair kit No.	Paragraph
1537037	D	1538160	15–17
1537041	IHC SPEC	1538165	21–23
1537067	AH	1538178	48–50
1537088	AX	1538180	66–68
1537094	AJ	5592533	51–52
1537147	P	1538709	24–26
1537166	R	1538366	27–29
1537171	D	1538120	15–17
1537172	D	1538160	15–17
1537188	B	1538121	15–17
1537189	B	5592534	15–17
1537203	D	1538160	15–17
1537227	B	1538121	15–17
1537228	AT	1538177	60–62
1537241	B	1538121	15–17
1537245	D	1538160	15–17
1537252	D	1538120	15–17
1537255	R	1538844	27–29
1537267	D	1538166	15–17
1537270	AF	1538172	42–44
1537272	AF	1538172	42–44
1537301	D	1538139	15–17
1537320	AF	1538170	42–44
1537342	AH	1538178	48–50
1537355	D	1538160	15–17
1537362	D	1538160	15–17
1537365	AT	1538156	60–62
1537383	R	1538176	27–29
1537396	D	1538166	15–17
1537417	D	1538166	15–17
1537421	R	1538775	27–29
1537426	S	1538872	30–32
1537438	B	1538121	15–17
1537439	B	1538121	15–17
1537445	AW	1538845	48–50
1537453	D	5592535	15–17
1537465	R	1538176	27–29
1537471	D	1538166	15–17
1537476	D	1538160	15–17
1537479	D	1538166	15–17
1537507	D	1538160	15–17
1537515	D	1538160	15–17
1537520	D	1538166	15–17
1537524	AJ	1538213	51–53
1537538	D	1538166	15–17
1537550	D	1538120	15–17
1537561	D	1538171	15–17
1537569	D	1538764	15–17
1537570	D	1538764	15–17
1537571	AF	1538172	42–44

Table II. Fuel Pump Repair Kits by Fuel Pump Number—Continued

AC fuel pump No.	Series	AC repair kit No.	Paragraph
1537572	D	1538160	15–17
1537579	AF	1538172	42–44
1537604	D	1538160	15–17
1537632	AF	1538170	42–44
1537635	B	5592536	15–17
1537657	IHC SPEC	1538165	21–23
1537637	D	5592537	15–17
1537662	D	1538160	15–17
1537666	AT	1538156	60–62
1537700	AH	1538178	48–50
1537702	W	5592538	36–38
1537704	D	1538160	15–17
1537712	B	1538121	15–17
1537713	D	1538166	15–17
1537714	AF	1538172	42–44
1537715	D	1538169	15–17
1537719	D	1538139	15–17
1537722	D	1538166	15–17
1537723	D	1538166	15–17
1537744	R	1538289	27–29
1537759	D	1538166	15–17
1537763	B	1538121	15–17
1537765	D	1538166	15–17
1537784	AW	1538845	48–50
1537808	B	1538121	15–17
1537814	D	1538120	15–17
1537897	AF	1538170	42–44
1537914	BE	1538375	69–71
1537919	AF	1538360	42–44
1537924	AH	1538178	48–50
1537936	B	1538121	15–17
1537957	R	1538370	27–29
1537964	D	5590068	15–17
1537966	AF	1538816	42–44
1537967	AF	1538172	42–44
1537984	AK	1538371	54–56
1538063	D	1538212	15–17
1538099	AJ	1538211	51–53
1538101	D	1538167	15–17
1538153	AG	1538239	45–47
1538190	D	1538171	15–17
1538219	AF	1538360	42–44
1538228	D	1538166	15–17
1538246	R	1538366	27–29
1538250	IHC SPEC	1538165	21–23
1538259	AK	1538371	54–56
1538265	D	1538166	15–17
1538274	BH	1538374	75–77
1538275	B	1538121	15–17
1538277	D	1538160	15–17

Table II. Fuel Pump Repair Kits by Fuel Pump Number—Continued

AC fuel pump No.	Series	AC repair kit No.	Paragraph
1538291	R	1539019	27–29
1538312	AF	1538360	42–44
1538376	BH	1538374	75–77
1538377	D	1538160	15–17
1538410	BK	1538587	78–80
1538412	IHC SPEC	1538373	21–23
1538449	BM	1538719	72–74
1538450	AX	1538180	66–68
1538528	AF	1538816	42–44
1538616	BF	5592274	72–74
1538638	BN	1538855	78–80
1538642	BF	5592274	72–74
1538665	AF	1538172	42–44
1538697	AF	1538360	42–44
1538701	BM	1538719	72–74
1538712	BF	1538719	72–74
1538726	D	1538160	15–17
1538731	BM	1538719	72–74
1538750	B	1538121	15–17
1538753	BF	5592274	72–74
1538754	BF	5592274	72–74
1538759	B	1538121	15–17
1538772	AF	1538172	42–44
1538779	B	1538121	15–17
1538813	O	1538822	15–17
1538860	BF	5592274	72–74
1538875	BM	1538719	72–74
1538880	AG	1538770	45–47
1538905	D	1538160	15–17
1538914	B	1538936	15–17
1538917	P	1538709	24–26
1538923	R	5592466	27–29
1538927	D	1538120	15–17
1538928	D	1538949	15–17
1538947	BH	1538969	75–77
1538986	BF	5592274	72–74
1538991	B	1538936	15–17
1539208	AT	5592532	60–62
1539314	AT	5592431	60–62
1539382	B	5592506	15–17
1539430	BF	5590433	72–74
1539435	R	5592398	27–29
1539484	W	5592507	36–38
1539542	CF	5592274	87–88
1539585	CU	5592342	90–92
1539615	CY	5592489	90–92
1539627	BF	5592490	72–74
1539643	R	5592513	27–29

14. Procedure

a. Cleaning Before Disassembly. Before proceeding with the disassembly, wash the outside of the unit with dry-cleaning solvent or volatile mineral spirits, and blow off with compressed air to remove loose grit and grease.

b. Disposal of Used Parts. Check fuel pump number on edge of mounting flange and select proper repair kit using specification list in *b* above. All parts in the standard repair kit must be installed when a fuel pump has been disassembled for rebuild. Open repair kit and exchange the new parts one by one with the old parts, placing the used parts in the empty package for later disposal.

Section III. SERIES B, D, AND O FUEL PUMPS

15. Disassembly

(fig. 7)

a. Identification. Series B, D, and O fuel pumps (fig. 6) are of similar construction. Series B and O use small diaphragms of 3¼-inch diameter, while series D uses a 4-inch diameter diaphragm.

b. Separate Body From Cover.

(1) Mark edges of top cover and body with a file. Mark at heat shield stud if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with light plastic hammer.

c. Disassemble Body.

(1) Remove three body bottom cover screws. Remove bottom cover, cover gasket, rocker arm spring and cap, and diaphragm spring and cap. Remove hand priming lever if held in place by bottom cover.

(2) Remove pull rod nut and remove lock washer, alinement, upper protector, diaphragm, lower protector, and pull rod washer.

(3) Clamp mounting flange of pump body in vise with riveted end of rocker arm up and with flange gasket surface against one jaw of vise. File small (upset or riveted) end of rocker arm pin flush with face of washer. Drive out the rocker arm pin from the pump body, driving on the filed end and using a pin punch. Remove the rocker arm pin washer. Remove rocker arm, links, pins, and pull rod assembly from the pump body. Remove pin clips from link pins and disassemble links and pull rod.

d. Disassemble Cover.

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover and remove bail screw nut. Remove strainer screen from top cover.

(2) Remove valve plug and gasket from top cover over strainer. Remove inlet valve spring and valve. Remove air dome (or valve plug) and gasket from top cover over diaphragm. Remove outlet valve spring and valve.

16. Cleaning and Inspection

a. Clean All Parts.

(1) Clean all metal parts in dry-cleaning solvent or volatile mineral spirits. Blow out all passages with compressed air. If difficulty is experienced in cleaning parts, use carbon remover solvent.

(2) Check fuel pump number on edge of mounting flange and select proper repair kit using table II. All parts in the standard repair kit must be installed when a fuel pump has been disassembled for rebuild.

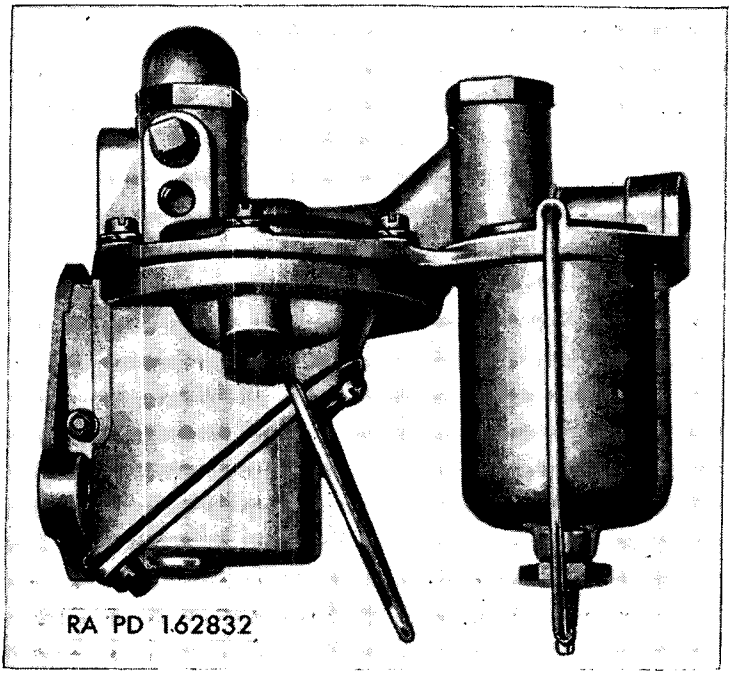

Figure 6. Fuel pumps, series B, D, and O.

b. Inspection. Make the following inspection of fuel pump parts which are not included in the repair kit:

(1) *Top cover.* Discard cover if cracked or broken, or if the diaphragm flange is warped more than 0.010 inch. If warped less than 0.010 inch, flatten with disk grinder. Discard cover if bowl gasket seat is warped more than 0.010 inch. Discard valve seat insert-type covers when any part of raised valve seat is worn flush with shoulder of valve. Stripped or crossed threads can sometimes be corrected with a thread chaser, or drilled out and retapped to a larger size.

(2) *Body.* Discard body if diaphragm flange is warped more than 0.010 inch. If warped less than 0.010 inch, refinish with disk grinder. Discard cover if threaded holes in diaphragm flange are stripped or crossed. Stripped or cross threads can sometimes be corrected with a thread chaser, or drilled out and retapped to a larger size. Discard body if rocker arm stop is broken.

(3) *Rocker arm.* Discard only if obviously worn or broken.

17. Assembly and Test

(fig. 7)

a. Assemble Body.

(1) Place pull rod between sheared ends of links and retain with link pin and two link pin clips. Install link pin through center holes in link and retain with two link pin clips.

(2) Place pull rod in hole of pump body with sheared edges on links toward body and threaded end of pull rod. Install rocker arm through hole in mounting flange so that hooked end lays between links and over center link pin.

(3) Clamp mounting flange of pump body in vise with gasket surface against one jaw or vise. Aline the holes in rocker arm and link with hole in pump body and drive in the rocker arm pin. Install the rocker arm pin washer on the pin and peen over the end of pin. Some arm pins are retained with wire clips.

(4) Lift pull rod out of hole and, if used, install priming lever in body grooves, open end around pull rod hole, and insert pull rod. Place diaphragm spring over inner boss and rocker arm spring over outer (recessed) boss in bottom cover. Place spring cap on each spring. Place gasket on bottom cover. Hold pump body by threaded end of pull rod to retain hand primer in place. Place bottom cover and gasket assembly against body with spring caps seated against pull rod and

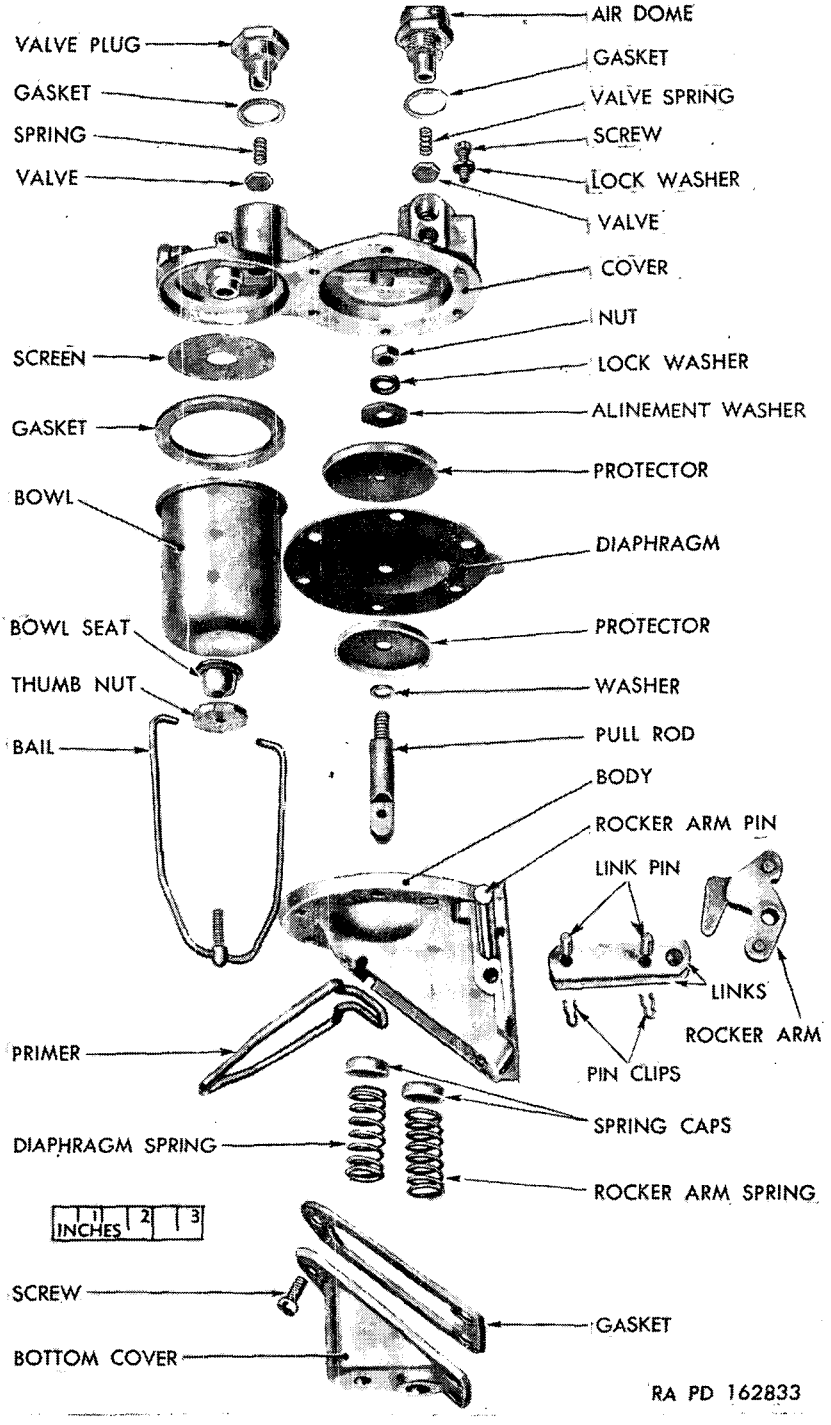

Figure 7. Fuel pump—disassembled (typical series B, D, and O construction).

rocker arm. Hold cover in place and install three bottom cover screws. Tighten securely.

(5) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place engine mounting flange of pump body in vise with diaphragm flange upward. On threaded end of pull rod, loosely assemble a washer, lower protector (dish down), diaphragm, upper protector (dish up), alinement washer, lock washer, and nut. Aline diaphragm holes with holes in body flange and maintain alinement by inserting two or three cover screws. Tighten pull rod nut securely, using another wrench to hold hex washer, thus preventing diaphragm distortion.

b. Assemble Top Cover.

(1) Install gaskets on air dome and valve plug. Place a drop of light oil on valve and install in valve chamber over diaphragm. Insert valve spring in air dome and tip into valve chamber. Tighten air dome securely. Place a drop of light oil on valve and install in chamber over strainer. Insert valve spring in plug and tip into chamber. Tighten securely.

(2) Install strainer screen and bowl gasket in top cover. Install bowl seat on bail screw and swing into position after installing bowl. Tighten thumb nut securely with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section IV. SERIES G FUEL PUMPS

18. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 9) of series G fuel pump (fig. 8) with a file. Mark at heat shield stud, if used.

The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Push in on diaphragm and turn 90 degrees in either direction to disengage diaphragm pull rod from link. Remove diaphragm assembly and spring.

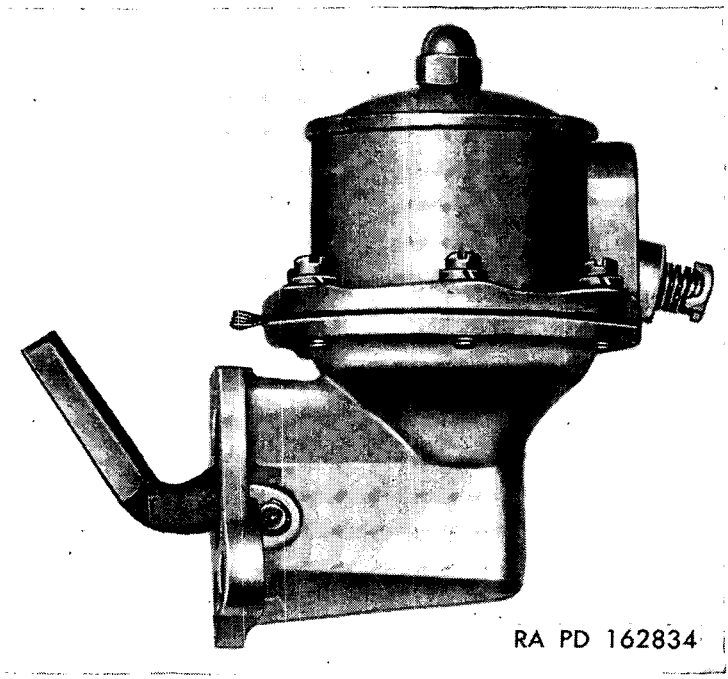

Figure 8. Fuel pump, series G.

(2) Remove diaphragm pull rod nut, thus disassembling lock washer, alinement washer, upper protector, diaphragm, lower protector, pull rod gasket, and pull rod.

(3) Remove retaining wire clips from rocker arm pin. Rest edge of pump body flange on edge of vise and drive rocker arm pin out with drift punch and hammer. Remove rocker arm, spring, and link.

c. Disassemble Cover.

(1) Remove cover plate nut to disassemble cover plate nut gasket, cover plate, cover plate gasket, and screen.

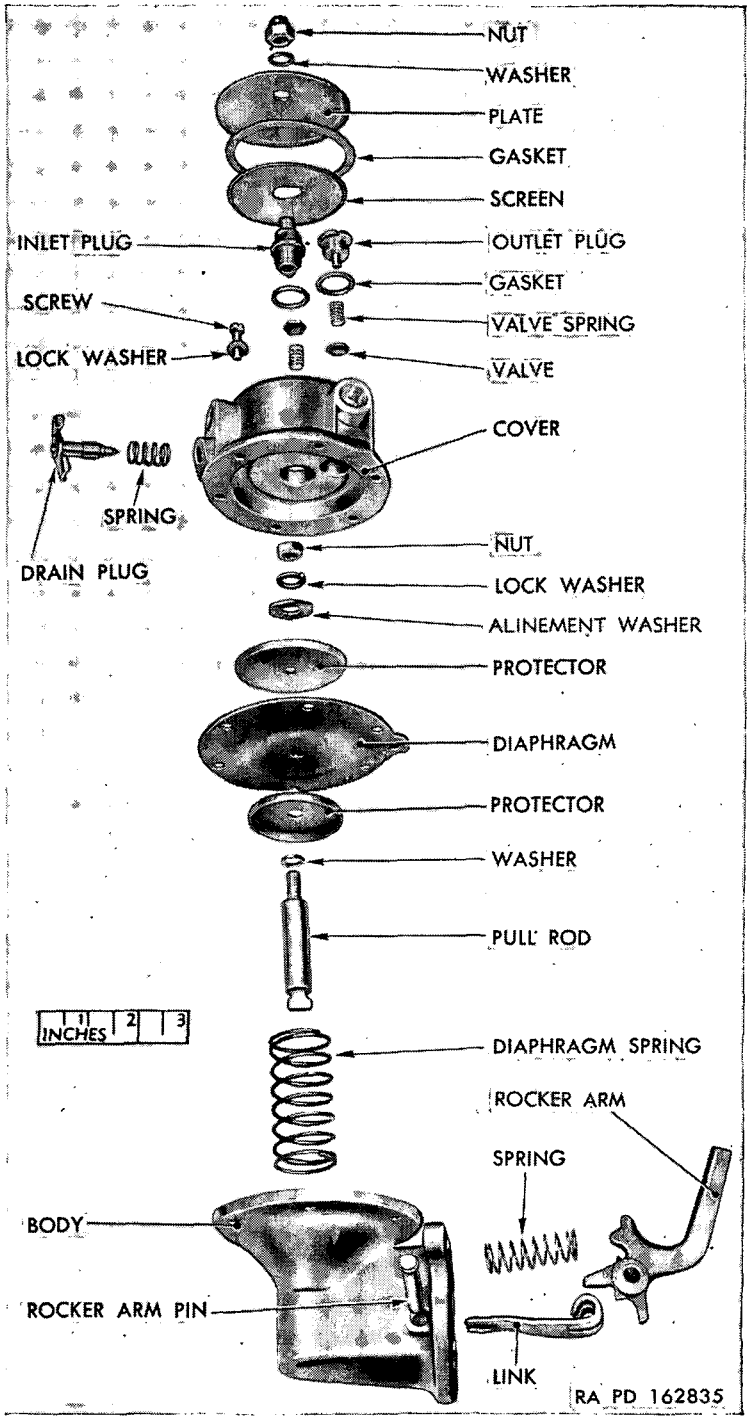

Figure 9. Fuel pump—disassembled (typical series G construction).

(2) Remove outlet valve plug with screw driver to disassemble valve spring and valve. Remove inlet valve plug with 1/8-inch drill rod to disassemble valve spring and valve.
(3) Remove drain plug and drain plug spring.

19. Cleaning and Inspection

For cleaning and inspection procedure in this series of pumps, refer to paragraph 16.

20. Assembly and Test

a. Assemble Body (fig. 9).
(1) Place link in body through rocker arm port. Loop of link should be up. Drive rocker arm pin into body just far enough to pick up one link loop. Install rocker arm with spring in position. Drive pin through rocker arm hole, remaining link loop, and body. Assemble washer on hollow end of pin and rivet edges of pin over washer.
(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Make an assembly of pull rod, gasket, lower protector (dish down), diaphragm, upper protector (dish up), alinement washer, lock washer, and nut. Aline any two opposite holes in diaphragm so they are parallel to flat at bottom of pull rod. Tighten pull rod nut while holding alinement washer with another wrench.
(3) Assemble diaphragm spring over pull rod well in body. Insert diaphragm pull rod through spring and well of body. Turn diaphragm so flat of pull rod will enter slot in link. Push down and secure by turning diaphragm 90 degrees in either direction.

b. Assemble Cover.
(1) Insert valve and spring in outlet position and retain with slotted-head outlet plug. Tighten with screw driver. Insert spring and valve in inlet position with stud head inlet valve plug. Tighten with short piece of 1/8-inch drill rod.
(2) Position screen and gasket over inlet valve stud, assemble cover plate, and retain in position with cover plate nut and gasket. Insert drain plug into spring and screw drain plug securely into cover.

c. Assemble Cover to Body.
(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock

washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section V. SERIES IHC SPECIAL FUEL PUMPS

21. Disassembly

a. Identification. Series IHC special fuel pumps (fig. 10) are provided with high bodies to avoid engine interference with the pump top cover. Example A in figure 10 uses a cover similar to the D series pumps and example B uses the 6-valve cover for extra volume and pressure characteristics.

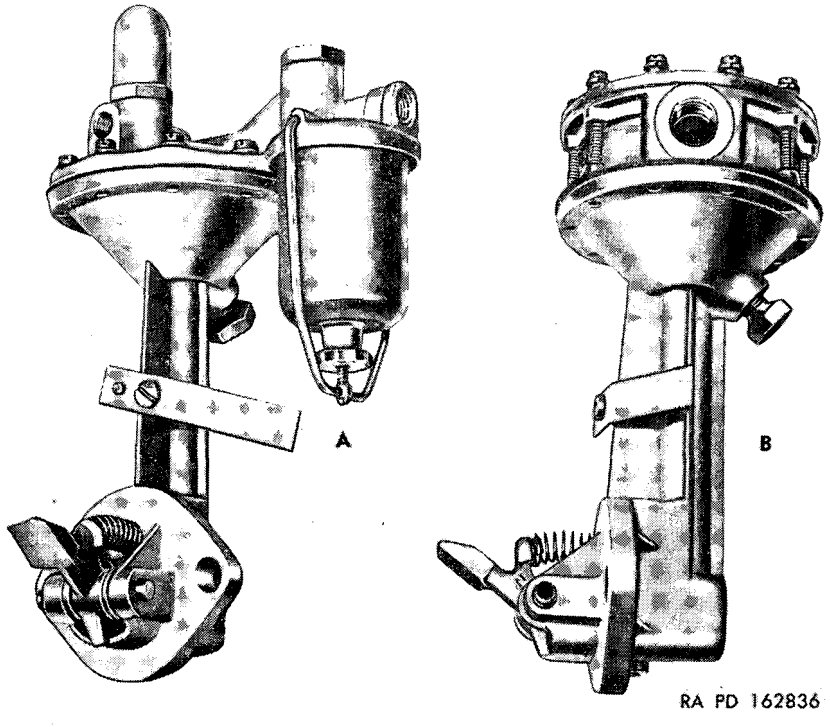

Figure 10. Special fuel pump, series IHC.

b. Separate Body From Cover.

(1) Mark edges of top cover and body with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

c. Disassemble Body.

(1) Remove diaphragm and pull rod assembly by pressing downward on diaphragm and then turning 90 degrees to disengage pull rod from link. Lift out diaphragm spring. Remove oil seal and oil seal retainer.

(2) Before disassembling diaphragm, note carefully the position of tab on diaphragm with relation to flats on pull rod so new diaphragm can be assembled in the same manner.

(3) Place pull rod in vise and remove pull rod nut, lock washer, alinement washer, upper protector washer, diaphragm, lower protector washer, and pull rod gasket in the order named.

(4) Remove retainer clips from rocker arm pin and drive out pin with drift punch and hammer. This will disassemble rocker arm spring, rocker arm, link, and link spacer washers. Remove priming handle pivot screw to disassemble priming lever and link actuator.

d. Disassemble Cover (A of fig. 10).

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover and remove bail screw nut. Remove strainer screen from top cover.

(2) Remove valve plug and gasket from top cover over strainer. Remove inlet valve spring and valve. Remove air dome (or valve plug) and gasket from top cover over diaphragm. Remove outlet valve spring and valve.

e. Disassemble Cover (B of fig. 10).

(1) Remove two center cover screws to disassemble pulsator cover plate. Remove three layers of pulsator diaphragm from cover assembly.

(2) Remove eight screws from two valve plates in cover. Lift out two valve plates, six valve and cage assemblies, and two gaskets.

22. Cleaning and Inspection

For cleaning and inspection procedure in this series of pumps refer to paragraph 16.

23. Assembly and Test

a. Assemble Body (fig. 11).

(1) Assemble link and rocker arm and install in pump body. Aline rocker and link holes with holes in body and drive in rocker arm pin. Retain the pin with a snap ring at each end. Install rocker arm spring.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound.

(3) Place flat end of pull rod in vise, and on the threaded end of rod, assemble a pull rod gasket, lower protector washer (dish down), diaphragm, upper protector (dish up), alinement washer, lock washer, and pull rod nut. Line up tabs of diaphragm with same relation to center line of flats on pull rod as existed before disassembling. Tighten pull rod nut in this position, using a second wrench to hold alinement washer.

(4) Assemble oil seal gasket, gasket retainer, and diaphragm spring in position over well in body. Insert pull rod through oil seal, push diaphragm down against spring pressure, and engage flat end of pull rod in slot of link. Turn diaphragm 90 degrees in either direction to lock in position.

b. Assemble Cover (A of fig. 10).

(1) Install gaskets on air dome and valve plug. Place a drop of light oil on valve and install in valve chamber over diaphragm. Insert valve spring in air dome and tip into valve chamber. Tighten air dome securely. Place a drop of light oil on valve and install in chamber over strainer. Insert valve spring in plug and tip into chamber. Tighten securely.

(2) Install strainer screen and bowl gasket in top cover. Install bowl seat on bail screw and swing into position after installing bowl. Tighten thumb nut securely with fingers only.

c. Assemble Cover (B of fig. 10).

(1) Insert two gaskets and six valve and cage assemblies in cover. Inlet valves should have 3-legged spider into cover and outlet valves should have 3-legged spider facing out of cover. Secure valve and cage assemblies by means of two valve plates and eight retainer screws.

(2) Assemble three layers of pulsator diaphragm on cover over the valve assemblies. Place cover plate on diaphragm and retain with two center screws and lock washers.

d. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock

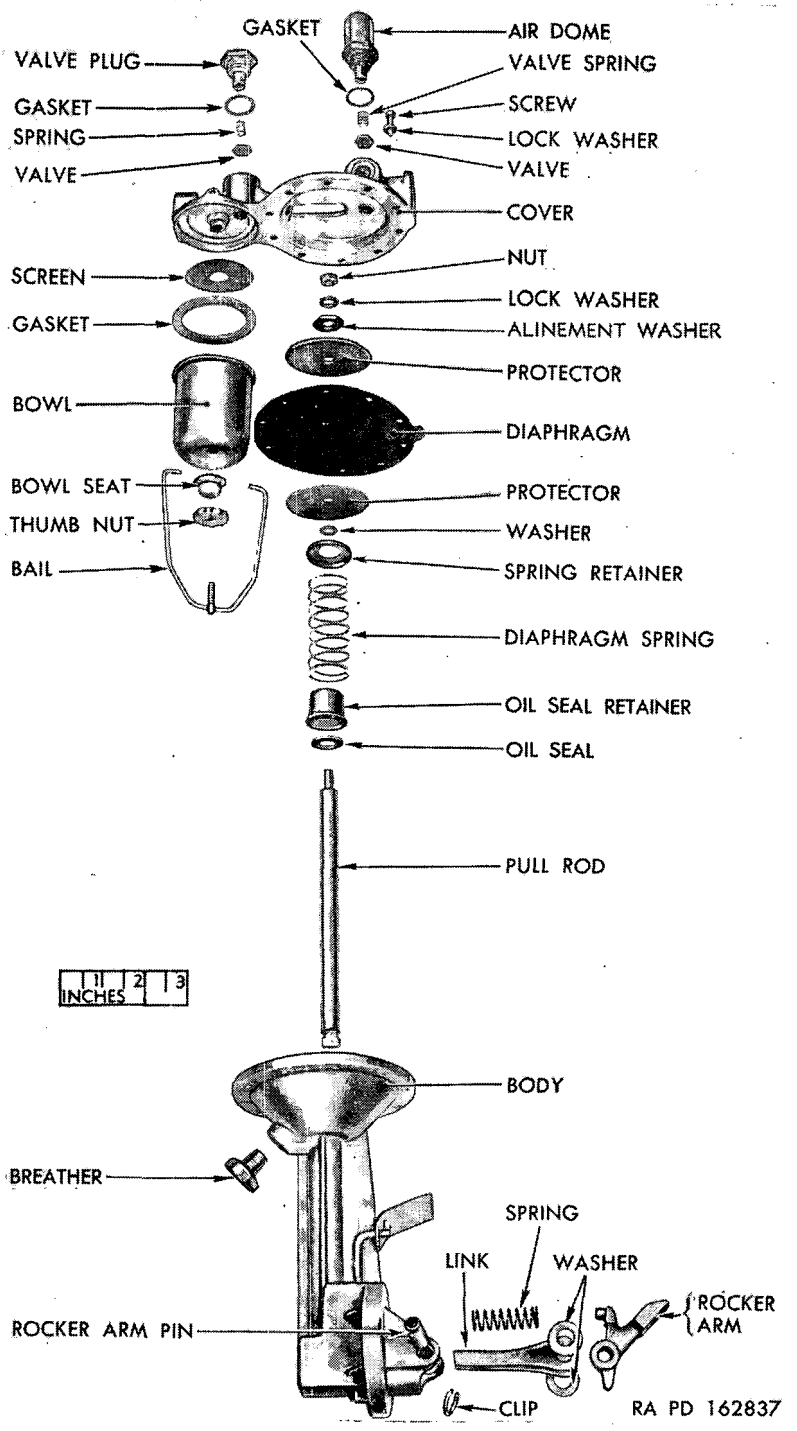

Figure 11. Fuel pump—disassembled (typical series IHC special construction).

washers loosely until screws just engage lock washers. Push rocker arm in full stroke, and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

e. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section VI. SERIES P FUEL PUMPS

24. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 12) with a file. Mark at heat shield stud, if used. The parts may then be disassembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Turn diaphragm assembly 90 degrees in either direction to disengage from link. Remove diaphragm assembly and spring.

(2) Remove rocker arm pin retainer clips and drive out pin with drift punch and hammer. Remove rocker arm, arm spring, and link from pump body.

c. Disassemble Cover.

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover and remove bail screw nut. Remove strainer screen from top cover.

(2) Remove valve plug and gasket from top cover over strainer. Remove inlet valve spring and valve. Remove air dome (or valve plug) and gasket from top cover over diaphragm. Remove outlet valve spring and valve.

25. Cleaning and Inspection

For cleaning and inspection in this series of pumps, refer to paragraph 16.

26. Assembly and Test

a. Assemble Body (fig. 13).

(1) Install rocker arm, spring, and link in body. Loop for pin in link should be up. Aline holes in rocker arm and link with arm pin hole in body and drive in rocker arm pin. Install washer over small end of arm pin and peen over end of pin.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place diaphragm spring over pull rod boss in body and insert diaphragm. Insert flat of pull rod through slot in link, and retain diaphragm by turning 90 degrees in either direction.

b. Assemble Cover.

(1) Install gaskets on air dome and valve plug. Place a drop of light oil on valve and install in valve chamber over diaphraghm. Insert valve spring in air dome and tip into valve chamber. Tighten air dome securely. Place a drop of light oil on valve and install in chamber over strainer. Insert valve spring in plug and tip into chamber. Tighten securely.

(2) Install strainer screen and bowl gasket in top cover. Install bowl seat on bail screw and swing into position after installing bowl. Tighten thumb nut securely with fingers only.

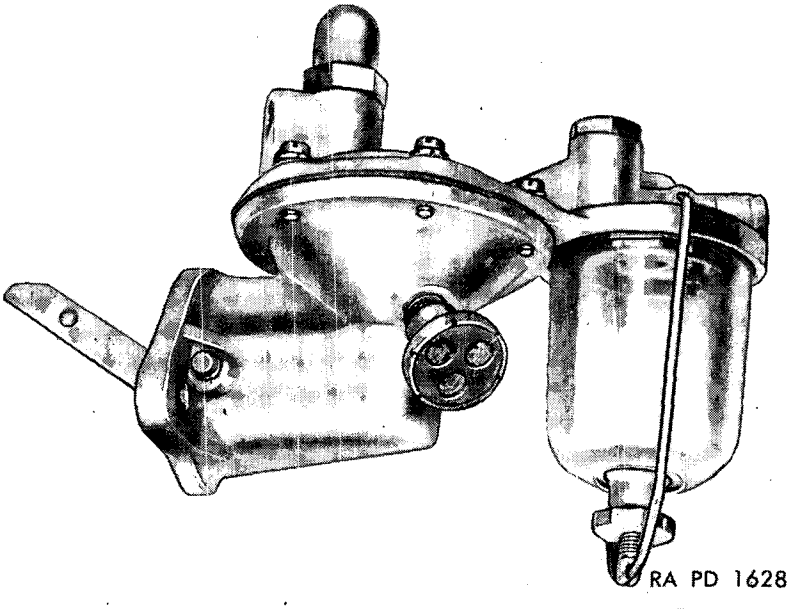

Figure 12. Fuel pump, series P.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm

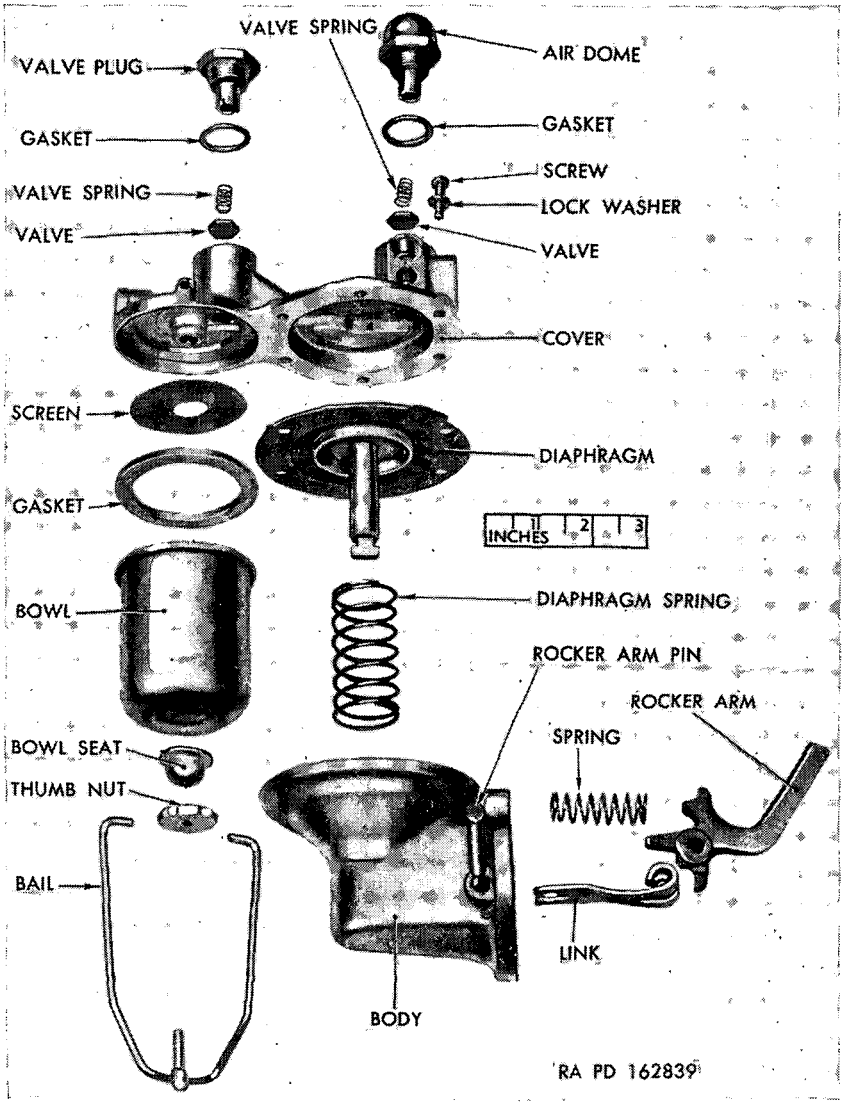

Figure 13. Fuel pump—disassembled (typical series P construction).

is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section VII. SERIES R FUEL PUMPS

27. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 15) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassembly Body. Rest pump body on edge of vise and drive out rocker arm pin with drift punch and hammer. Remove rocker

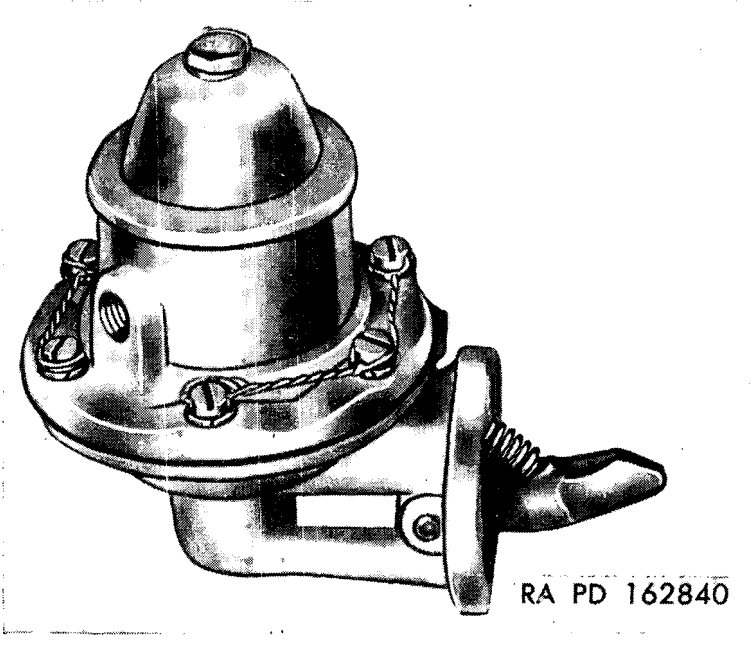

Figure 14. Fuel pump, series R.

arm, arm spring, and link. Remove link to arm bushing if used. Lift out the diaphragm assembly and diaphragm spring. Some pumps may be equipped with an oil seal assembly which is locked in place on the diaphragm pull rod. Disassemble by turning lower retainer until slot lines up with flat of pull rod. Remove lower retainer, two washers, upper oil seal retainer, and retainer spring.

c. Disassemble Cover Equipped With Separable Valves.

(1) Remove three screws holding valve plate. Some units will have lock washers under the screws. Lift out valve plate and gasket, two valves and valve springs, and one outlet valve spring retainer.

(2) Remove top cover plate cap screw and gasket. Remove cover plate and gasket. Remove strainer screen from top cover. Unscrew drain plug from side of top cover. Some units use a coil friction spring under the drain plug.

d. Disassemble Cover Equipped With Valve and Cage Assemblies.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Remove top cover plate cap screw and gasket, cover plate, gasket, and screen. Remove drain plug from side of top cover. Some units are equipped with a coil tension spring over the drain plug.

28. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

29. Assembly and Test

a. Assemble Body (fig. 15).

(1) Assemble link and rocker arm. Insert rocker arm bushing if used. Place rocker arm and link in body with link hook down. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin. Install rocker arm spring.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. If used, install oil seal spring, upper oil seal retainer, two oil seal washers, and lower retainer on the diaphragm pull rod. Turn the lower oil seal retainer 90 degrees to lock in place. Place diaphragm spring over pull rod well and install diaphragm assembly. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm

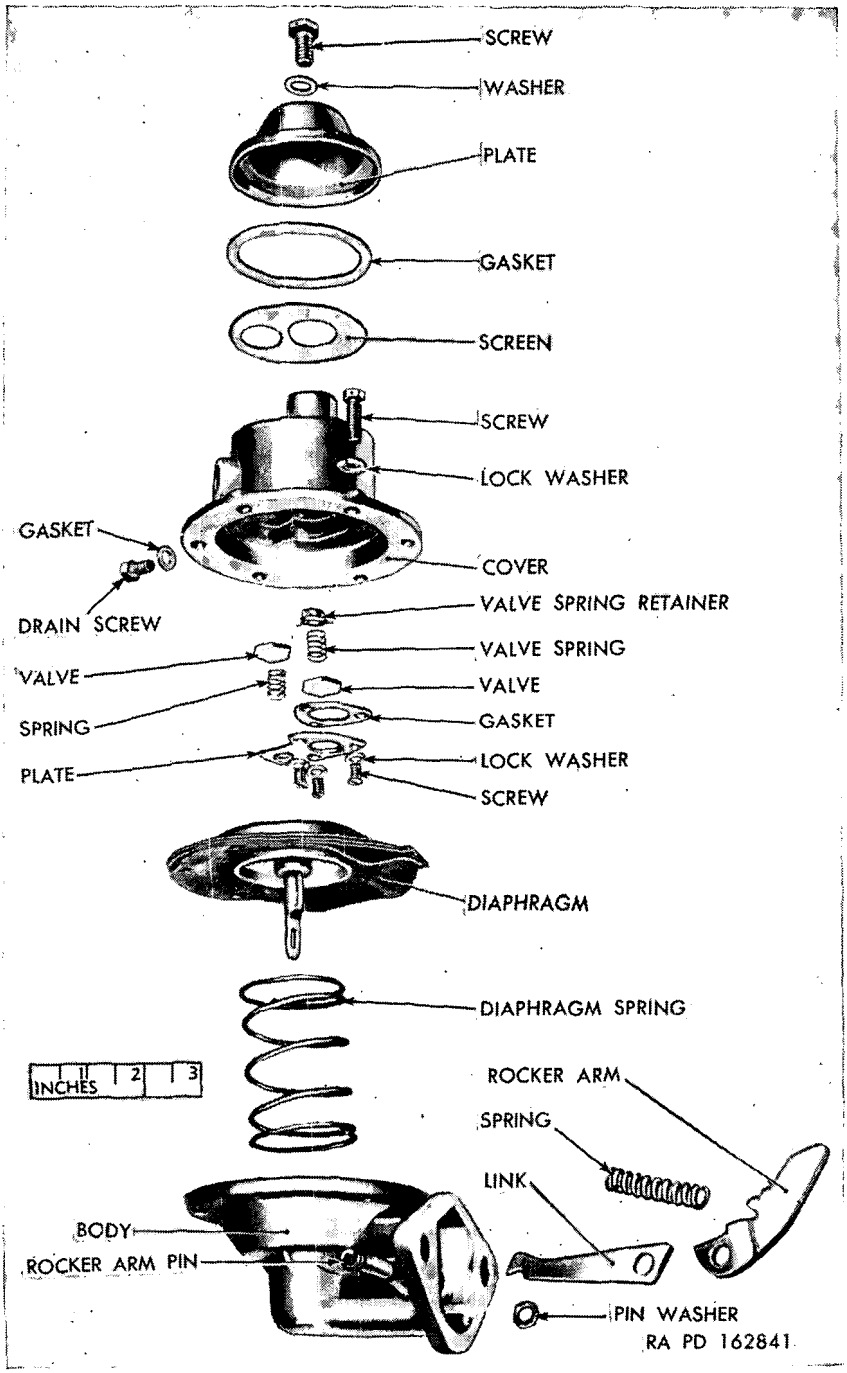

Figure 15. Fuel pump—disassembled (typical series R construction).

so pull rod angles away from link hook. Bring diaphragm back to level position and the link should engage the pull rod.

b. Assemble Cover Equipped With Separable Valves.

(1) Place 3-legged spring retainer in outlet valve hole, convex side into cover. Place gasket in recess of casting around outlet valve hole. Set valve spring on outlet valve retainer and valve on spring. Place a valve against inlet valve seat and a spring on top of valve. Secure valve assembly with valve plate, three screws, and three lock washers.

(2) Install screen, cover plate gasket, cover plate, and cover plate screw with gasket in the order named. Install drain screw with either a gasket or tension spring, depending on construction.

c. Assemble Cover Equipped With Valve and Cage Assemblies.

(1) Install valve and cage gasket and two valve and cage assemblies. Retain with valve retainer and two screws. Outlet valve must have 3-legged spider facing into cover, and inlet valve must have 3-legged spider facing out of cover.

(2) Install screen, cover plate gasket, cover plate, and cover plate screw with gasket in the order named. Install drain screw with either a gasket or tension spring, depending on construction.

d. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws, or pump will deliver too much pressure.

e. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section VIII. SERIES S FUEL PUMPS

30. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 17) of series S fuel pump (fig. 16) with a file. Mark at heat shield stud, if used.

The parts may then be assembled in the same relative position and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

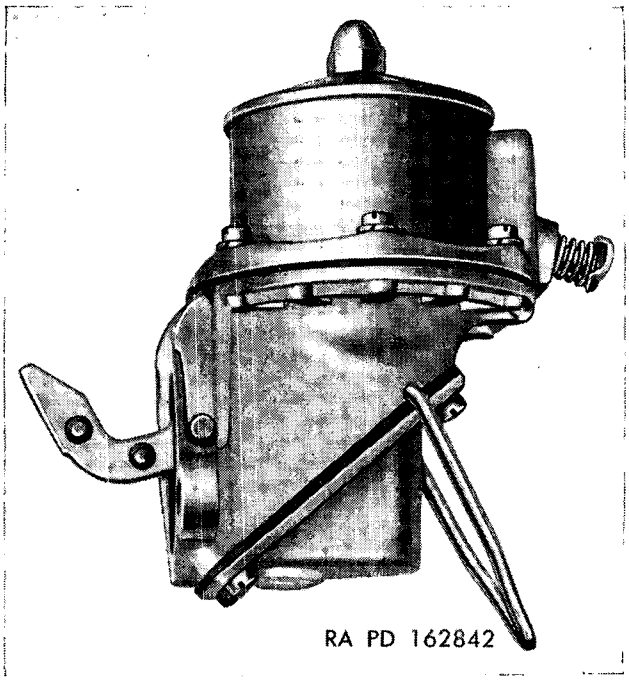

Figure 16. Fuel pump, series S.

b. Disassemble Body.

(1) Remove three screws from bottom cover and disassemble cover, diaphragm spring, rocker arm spring, two spring caps, and cover gasket. Also remove priming lever if used. Remove clips and pin from diaphragm to link connection; then lift diaphragm assembly out of body. Remove upper diaphragm spring if used.

(2) Remove clips from rocker arm pin and drive out rocker arm pin with drift punch and hammer. If rocker arm pin is riveted, file riveted end flush with washer. Drive out pin with drift punch and hammer. Remove rocker arm and assembled links from body. Disassemble links from pin by removing link pin clips.

c. Disassemble Cover. Remove cover plate nut to disassemble cover plate nut gasket, cover plate, cover plate gasket, and screen.

31. Cleaning and Inspection

For cleaning and inspection on this series of pumps, refer to paragraph 16.

32. Assembly and Test

a. Assemble Body (fig. 17).

(1) If used, assemble upper spring over diaphragm pull rod and push pull rod through hole in pump body. Assemble sheared ends of two links to flat of pull rod (sheared link corner toward top of pull rod) and retain with one link pin and two clips. Install link pin through center hole of link and retain with two clips.

(2) Install rocker arm between links with hooked end over center link pin. Assembly is correct when center link pin is below center line of links. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer over counterbored end of pin and spread pin at counterbore to retain in position.

(3) Place diaphragm spring over inner boss of lower cover and the rocker arm spring over outer (recessed) boss. Place spring caps over springs and gasket on lower cover. Suspend body with lower cover flange down (install priming lever if used) and place lower cover with associated parts against body. Spring caps must seat against bottom of pull rod and hook of rocker arm. Retain lower cover with three screws.

b. Assemble Cover.

(1) Insert valve and spring in outlet position and retain with slotted-head outlet plug. Tighten with screw driver. Insert spring and valve in inlet position and retain with stud head inlet valve plug. Tighten with short piece of 1/8-inch drill rod.

(2) Position screen and gasket over inlet valve stud, assemble cover plate, and retain in position with cover plate nut and gasket. Insert drain plug into spring and screw drain plug securely into cover.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

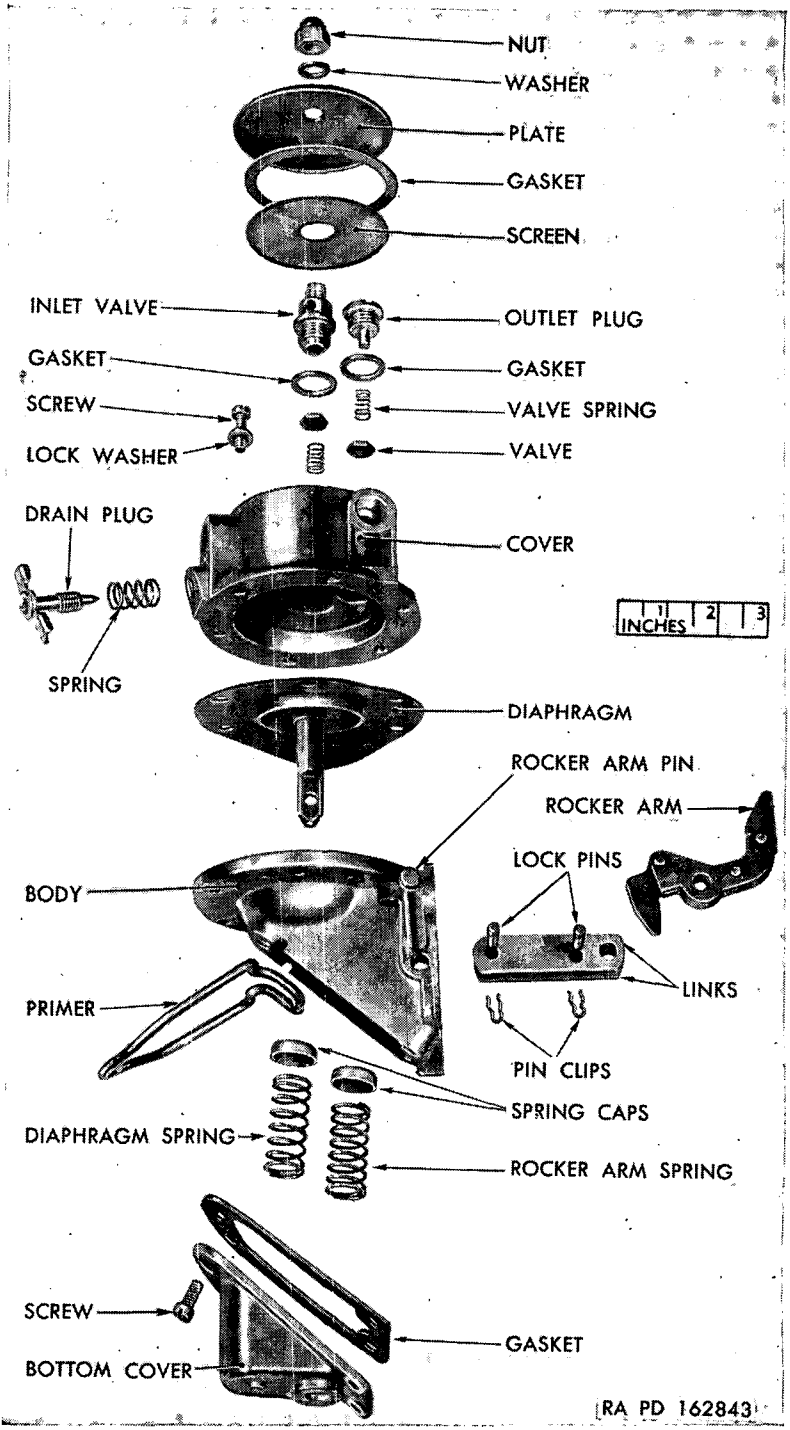

Figure 17. Fuel pump—disassembled (typical series S construction).

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage show 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section IX. SERIES T FUEL PUMPS

33. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 19) of series T fuel pump (fig. 18) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Turn diaphragm assembly 90 degrees in either direction to disengage from link. Remove diaphragm assembly and spring.

(2) Remove rocker arm pin retainer clip and drive out pin with drift punch and hammer. If rocker arm is of the riveted type, file riveted end of pin flush with washer, and drive out pin with drift punch and hammer. Remove rocker arm, arm spring, and link from pump body.

c. Disassemble Cover.

(1) Remove three screws holding valve plate. Some units will have lock washers under the screws. Lift out valve plate and gasket, two valves and valve spring, and one outlet valve spring retainer.

(2) Remove top cover plate cap screw and gasket. Remove cover plate and gasket. Remove strainer screen from top cover. Unscrew drain plug from side of top cover. Some pumps use a coil friction spring under the drain plug.

34. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

35. Assembly and Test

a. Assemble Body (fig. 19).

(1) Install rocker arm, spring, and link in body. Loop for pin in link should be up. Aline holes in rocker arm, link with arm

pin hole in body, and drive in rocker arm pin. Install washer over small end of arm pin and peen over end of pin.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used but do not use shellac or sealing compound. Place diaphragm spring over pull rod boss in body and insert diaphragm. Insert flat of pull rod through slot in link and retain diaphragm by turning 90 degrees in either direction.

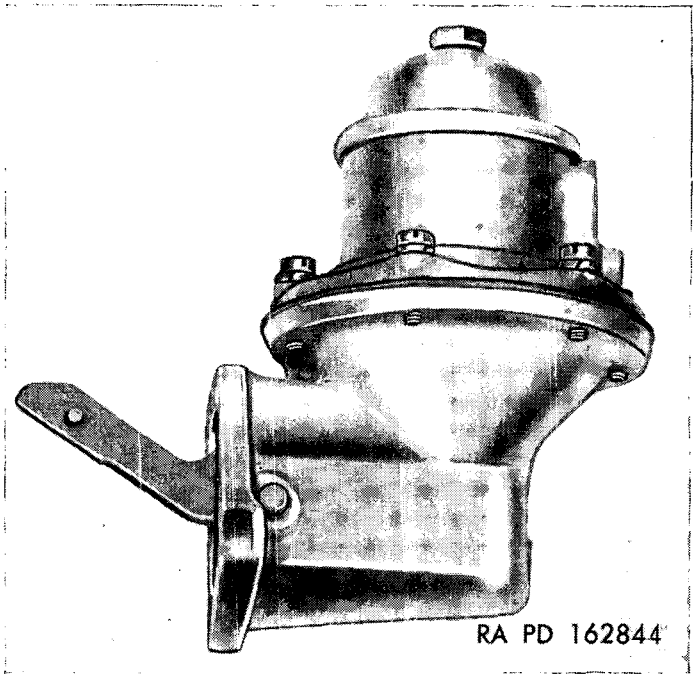

Figure 18. Fuel pump, series T.

b. Assemble Cover.

(1) Place 3-legged spring retainer in outlet valve hole, convex side into cover. Place gasket in recess of casting around outlet valve hole. Set valve spring on outlet valve retainer and a valve on spring. Place a valve against inlet valve seat and a spring on top of valve. Secure valve assembly with valve plate, three screws, and three lock washers.

(2) Install screen, cover plate gasket, cover plate, and cover plate screw with gasket in the order named. Install drain screw with either a gasket or tension spring, depending upon construction.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm

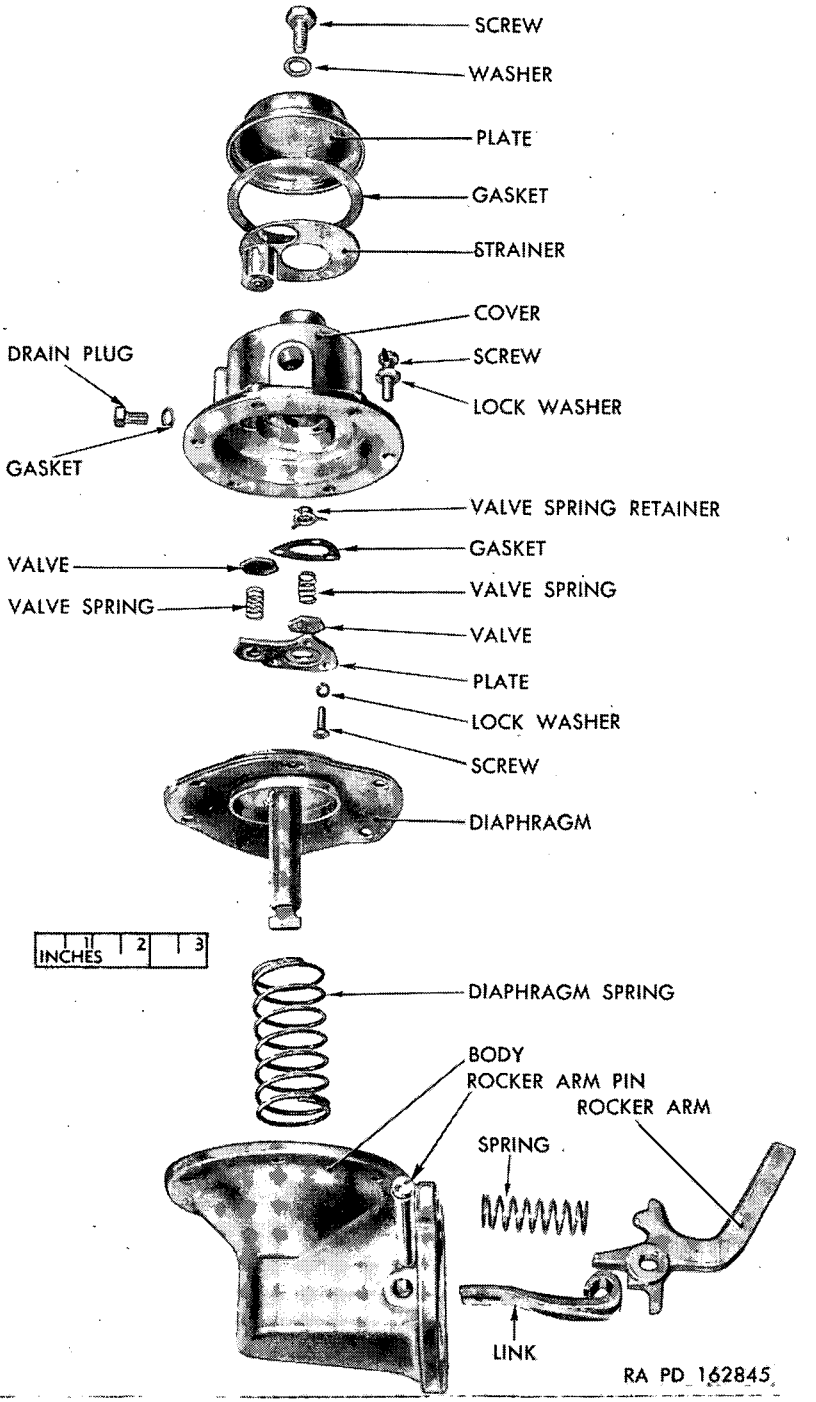

Figure 19. Fuel pump—disassembled (typical series T construction).

is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section X. SERIES W FUEL PUMPS

36. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 21) of series W fuel pump (fig. 20) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

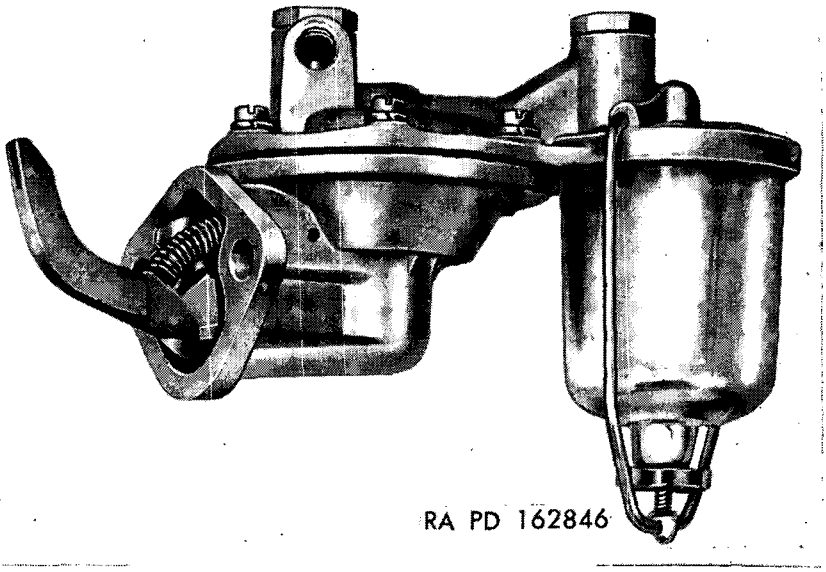

Figure 20. Fuel pump, series W.

b. Disassemble Body. Rest pump body on edge of vise and drive out rocker arm pin with drift punch and hammer. Remove rocker arm, arm spring, and link. Remove link to arm bushing, if used. Lift out diaphragm spring and assembly. Some pumps may be equipped with oil seal assembly which is locked in place on the diaphragm pull rod. Disassemble by turning lower retainer until slot lines up with flat of pull rod. Remove lower retainer, two washers, upper oil seal retainer, and retainer spring.

c. Disassemble Cover.

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover and remove bail screw nut. Remove strainer screen from top cover.

(2) Remove inlet valve plug and gasket from top-cover over strainer. Remove inlet valve spring and valve. Remove outlet air dome (or valve plug) and gasket from top cover over diaphragm. Remove outlet valve spring and valve.

37. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

38. Assembly and Test

a. Assemble Body (fig. 21).

(1) Assemble link and rocker arm. Insert rocker arm. Insert rocker arm bushing, if used. Place rocker arm and link in body with link hook down. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin. Install rocker arm spring.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. If used, install oil seal spring, upper oil seal retainer, two oil seal washers, and lower retainer on the diaphragm pull rod. Turn lower oil seal retainer 90 degrees to lock in place. Place diaphragm spring over pull rod well and install diaphragm assembly. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm so pull rod angles away from link hook. Bring diaphragm back to level position so that the link engages the pull rod.

b. Assemble Cover.

(1) Install gaskets on air dome and valve plug. Place a drop of light oil on valve and install in valve chamber over dia-

phragm. Insert valve spring in air dome and tip into valve chamber. Tighten air dome securely. Place a drop of light oil on valve and install in chamber over strainer. Insert valve spring in plug and tip into chamber. Tighten securely.

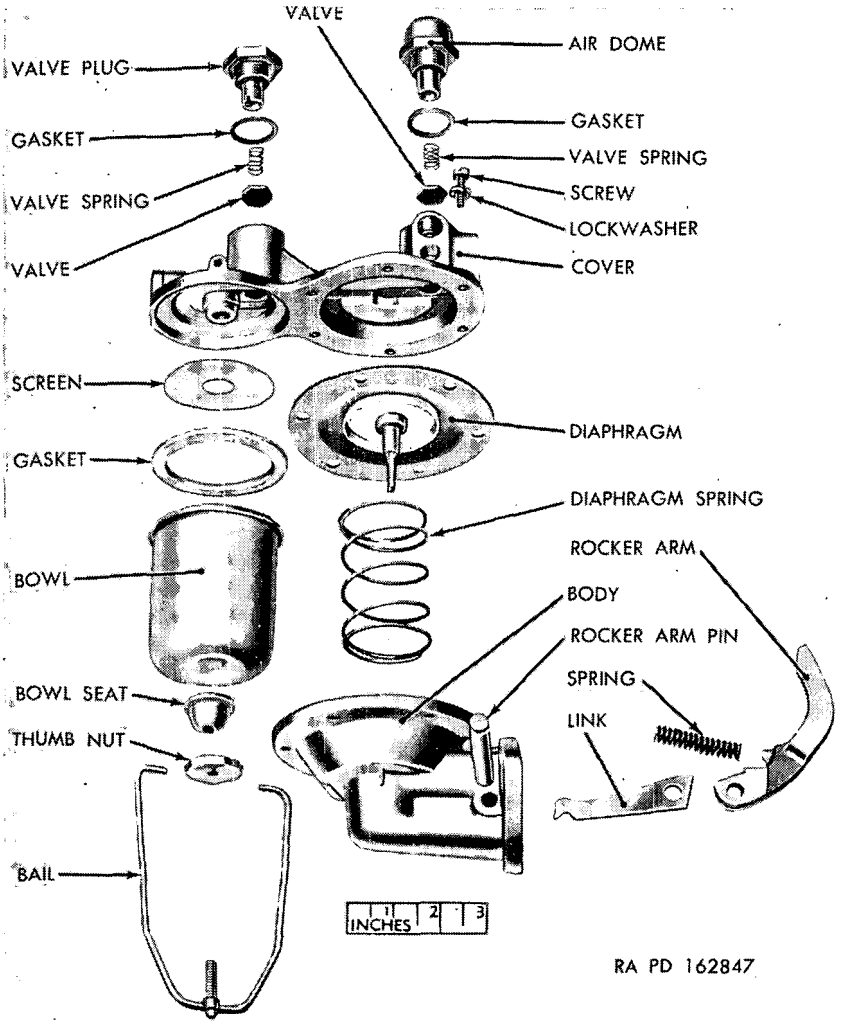

Figure 21. Fuel pump—disassembled (typical series W construction).

(2) Install strainer screen and bowl gasket in top cover. Install bowl seat on bail screw and swing into position after installing bowl. Tighten thumb nut securely with fingers only.

c. Assembly Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up presssure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XI. SERIES AC FUEL PUMPS

39. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 23) of series AC fuel pump (fig. 22) with a file. Mark at heat shield stud, if used.

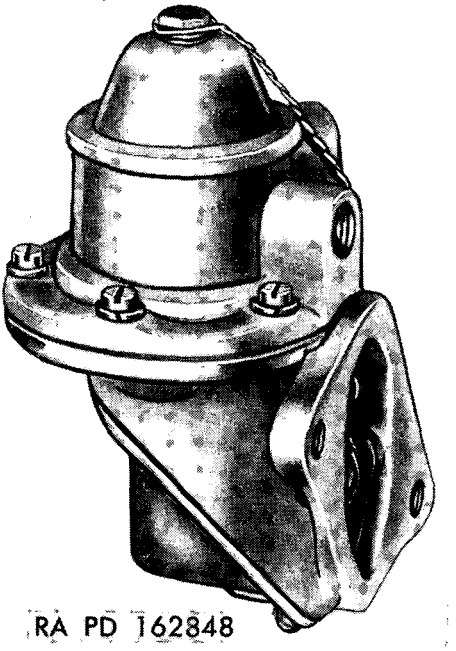

Figure 22. Fuel pump, series AC.

The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Remove three screws from bottom cover and disassemble cover, diaphragm spring, rocker arm spring, two spring caps, and cover gasket. Also remove priming lever if used. Remove clips and pin from diaphragm to link connection and then lift diaphragm assembly out of body. Also remove upper diaphragm spring if used.

(2) Remove clips from rocker arm pin and drive out rocker arm pin with drift punch and hammer. If rocker arm pin is riveted, file riveted end flush with washer. Drive pin out with drift punch and hammer. Remove rocker arm and assembled links from body. Disassemble links from pin by removing link pin clips.

c. Disassemble Cover.

(1) Remove three screws holding valve plate. Some units will have lock washers under the screws. Life out valve plate and gasket, two valves and valve springs, and one outlet valve spring retainer.

(2) Remove top cover plate cap screw and gasket. Remove cover plate and gasket. Remove strainer screen from top cover. Unscrew drain plug from side of top cover. Some units use a coil friction spring under the drain plug.

40. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

41. Assembly and Test

a. Assemble Body (fig. 23).

(1) Assemble upper spring (if used) over diaphragm pull rod and push pull rod through hole in pump body. Assemble sheared ends of two links to flat of pull rod (sheared link corner toward top of pull rod) and retain with one link pin and two clips. Install link pin through center hole of links and retain with two clips.

(2) Install rocker arm between links with hooked end over center link pin. Assembly is correct when center link pin is below center line of links. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer

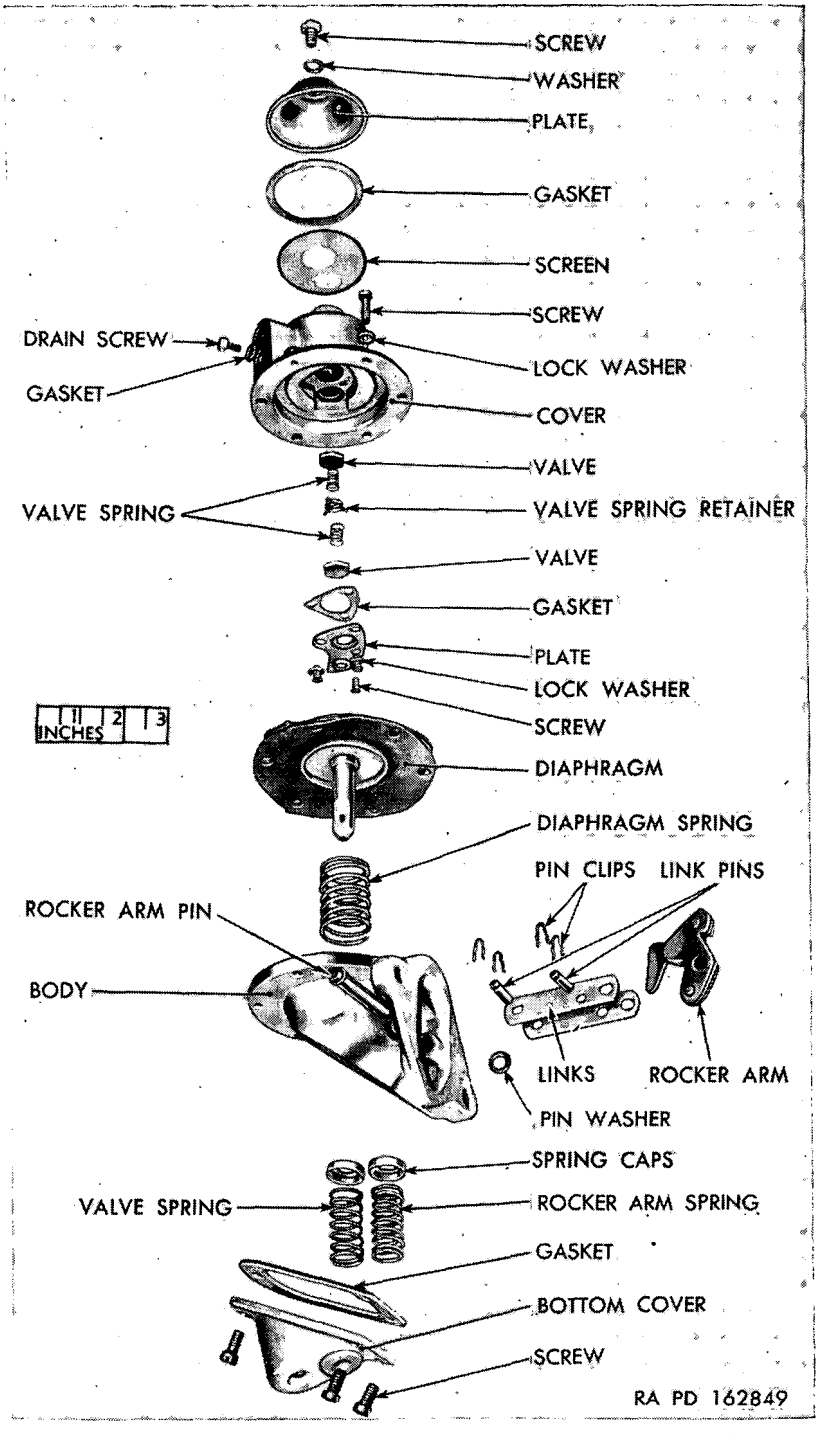

Figure 23. Fuel pump—disassembled (typical series AC construction).

over counterbored end of pin and spread pin at counterbore to retain in position.

(3) Place diaphragm spring over inner boss of lower cover and the rocker arm spring over outer (recessed) boss. Place spring caps over springs and gasket on lower cover. Suspend body with lower cover flange down (install priming lever if used) and place lower cover, with associated parts, against body. Spring caps must seat against bottom of pull rod and hook of rocker arm. Retain lower cover with three screws.

b. Assemble Cover.

(1) Place 3-legged spring retainer in outlet valve hole, convex side into cover. Place gasket in recess of casting around outlet valve hole. Set valve spring on outlet valve retainer and valve on spring. Place a valve against inlet valve seat and a spring on top of valve. Secure valve assembly with valve plate, three screws, and three lock washers.

(2) Install screen, cover plate gasket, cover plate, and cover plate screw with gasket in the order named. Install drain screw with either a gasket or tension spring, depending on construction.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body flange line up. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XII. SERIES AF FUEL PUMPS

42. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 25) of series AF fuel pump (fig. 24) with a file. Mark at heat stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

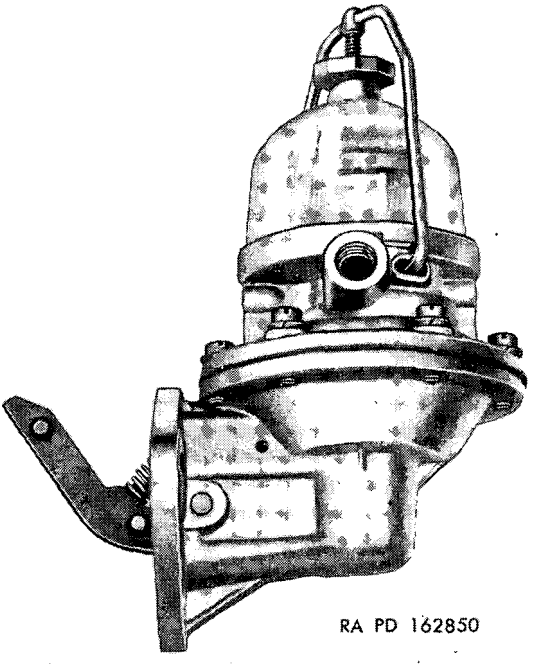

Figure 24. Fuel pump, series AF.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Drive out rocker arm pin with drift punch and hammer. Remove rocker arm, rocker arm spring, and link. Remove diaphragm spring and assembly.

(2) Some pumps are equipped with oil seal assembly which is locked on the diaphragm pull rod. Disassemble by turning lower oil seal retainer until slot lines up with flat of pull rod. Remove lower retainer, two oil seal washers, upper retainer, and retainer spring. A synthetic rubber oil seal is sometimes used. This seal fits snugly around the pull rod and over the body pull rod well. It is held in place by the diaphragm spring.

c. Disassemble Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in top cover. Remove strainer screen from top cover.

43. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

44. Assembly and Test

a. Assemble Body (fig. 25).

(1) Place rocker arm, link, and arm spring in body with link hook down. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound. If used, install oil seal spring, upper oil seal retainer, two oil seal washers, and lower retainer on the diaphragm pull rod. Turn the lower oil seal retainer to lock in place. If used, the rubber oil seal is positioned over the body pull rod well, and retained with the diaphragm spring.

(3) Place diaphragm spring over pull rod well and install diaphragm assembly. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm so the pull rod angles away from link hook. Bring diaphragm back to level position and link should engage the pull rod.

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and two screws. Outlet valve must have 3-legged spider facing into cover; inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Spring bail into retaining holes in cover. Swing bail into position to retain bowl. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up

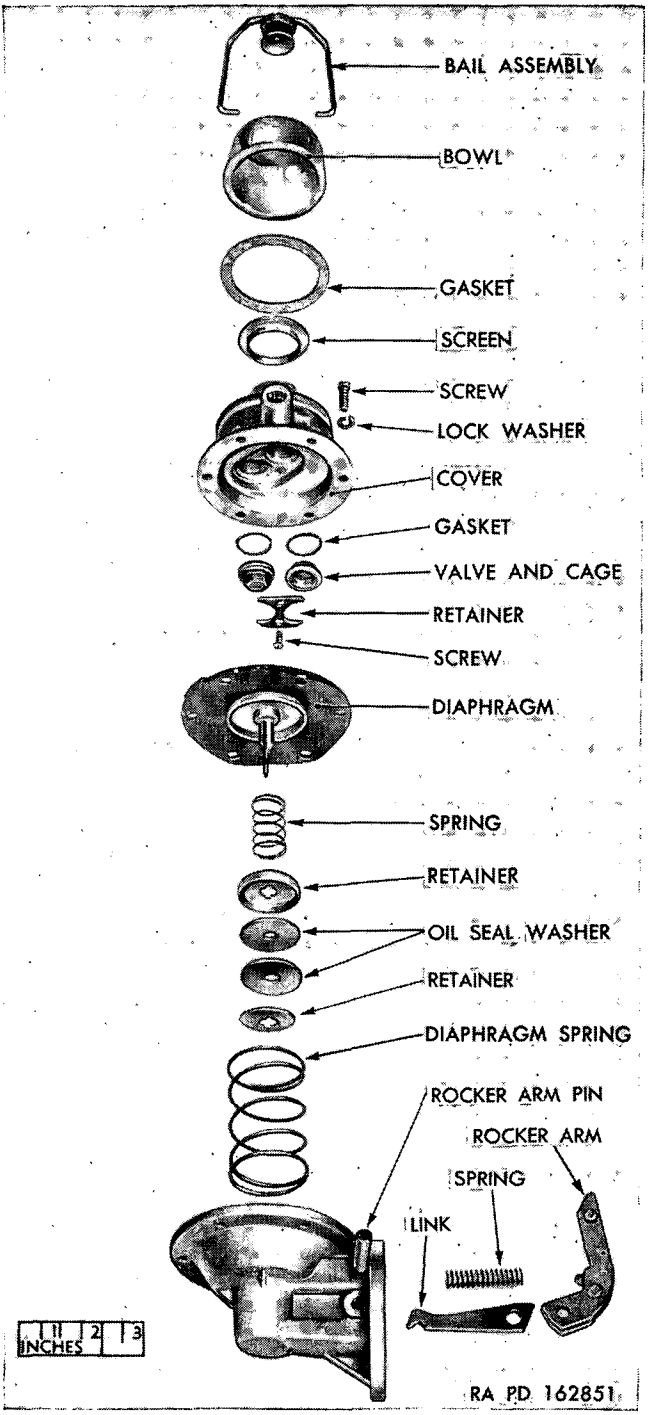

Figure 25. Fuel pump—disassembled (typical series AF construction).

pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XIII. SERIES AG FUEL PUMPS

45. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 27) of series AG fuel pump (fig. 26) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

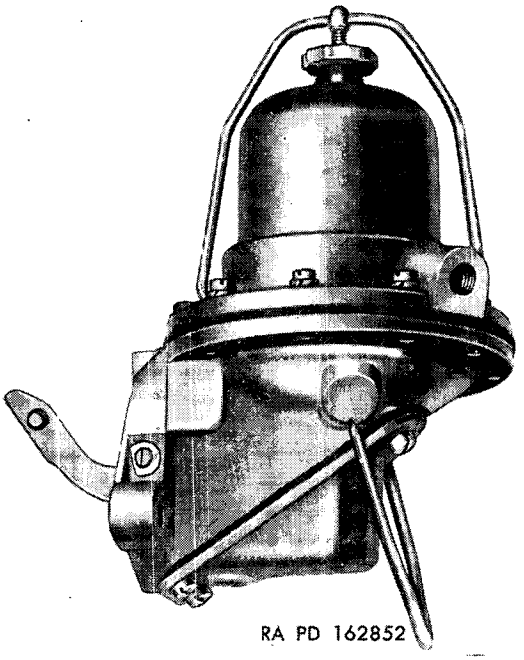

Figure 26. Fuel pump, series AG.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) Remove three screws from bottom cover. Disassemble cover, diaphragm spring, rocker arm spring, two spring caps, and cover gasket. Also remove priming lever if used. Remove clips and pin from diaphragm to link connection and then

lift diaphragm assembly out of body. Also remove upper diaphragm spring if used.

(2) Remove clips from rocker arm pin and drive rocker arm pin out with drift punch and hammer. If rocker arm pin is riveted, file riveted end flush with washer. Drive out pin with drift punch and hammer. Remove rocker arm and assembled links from body. Disassemble links from pin by removing link pin clips.

c. Disassemble Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in top cover. Remove strainer screen from top cover.

46. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

47. Assembly and Test

a. Assemble Body (fig. 27).

(1) If used, assemble upper spring over diaphragm pull rod, and push pull rod through hole in pump body. Assemble sheared ends of two links to flat of pull rod (sheared link corner toward top of pull rod) and retain with one link pin and two clips. Install link pin through center hole of links and retain with two clips.

(2) Install rocker arm between links with hooked end over center link pin. Assembly is correct when center link pin is below center line of links. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer over counterbored end of pin and spread pin at counterbore to retain in position.

(3) Place diaphragm spring over inner boss of lower cover and the rocker arm spring over outer (recessed) boss. Place spring caps over springs and gasket on lower cover. Suspend body with lower cover flange down (install priming lever if used) and place lower cover, with associated parts, against body. Spring caps must seat against bottom of pull rod and hook of rocker arm. Retain lower cover with three screws.

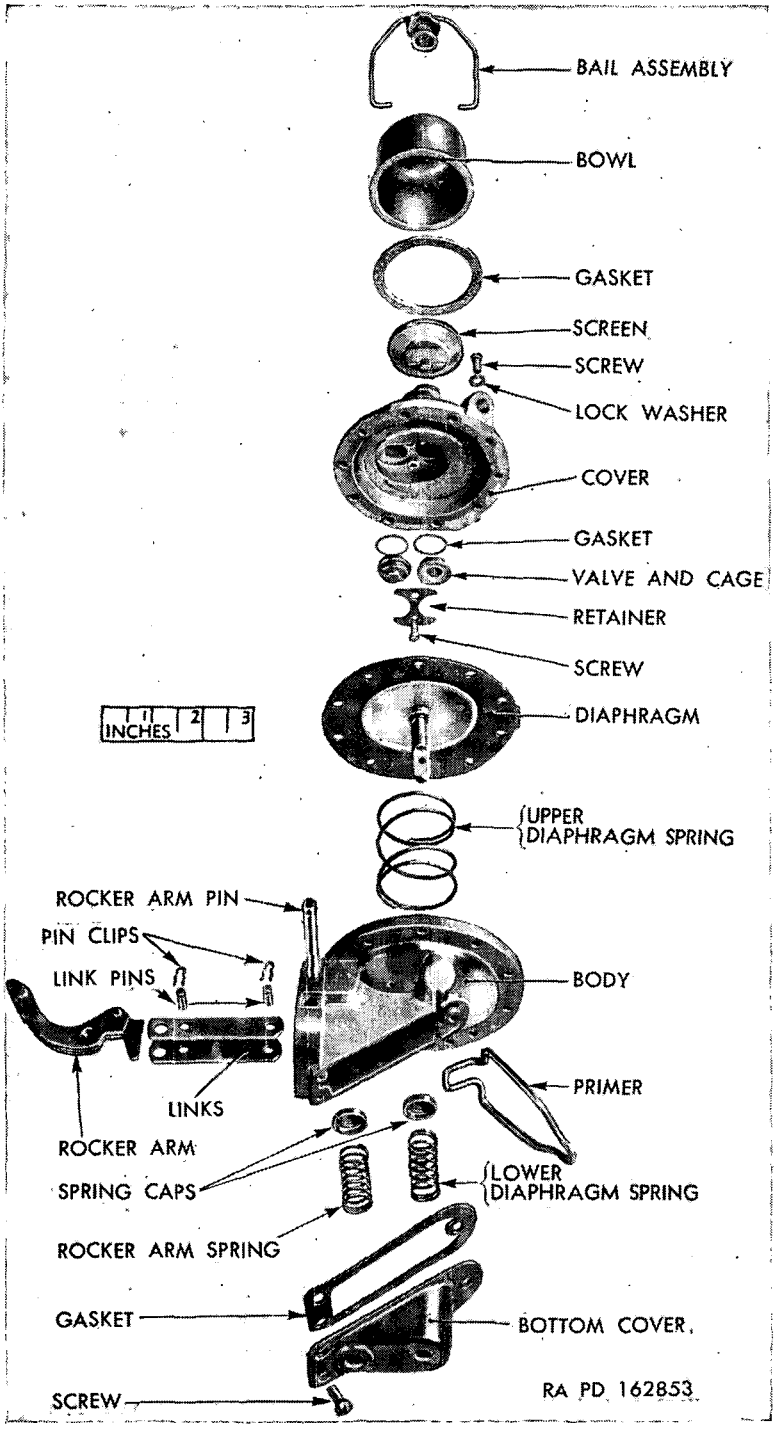

Figure 27. Fuel pump—disassembled (typical series AG construction).

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and two screws. Outlet valve must have 3-legged spider facing into cover; inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Install bail nut on bail. Spring bail into retaining holes in cover. Place bowl seat on bail screw, and swing bail into position to retain retain cover. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XIV. SERIES AH AND AW FUEL PUMPS

48. Disassembly

a. Separate Body From Cover.

(1) Mark edges of top cover and body (fig. 29) of series AH and AW fuel pump (fig. 28) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) File riveted end of rocker arm pin flush with washer. Drive out rocker arm pin with drift punch and hammer. Wiggle rocker arm to separate link from diaphragm pull rod and remove assembly from body. Remove rocker arm spacer washers if used. Remove bushing to disassemble link and rocker arm.

(2) Remove diaphragm by pulling straight out. Do not tilt excessively or staked-in oil seal will be damaged. Lift diaphragm spring and spring retainer from pump body. If used, priming lever is serviced as part of body casting assembly.

c. Disassemble Cover.

(1) Remove valve and cage retainer screw, and lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove bowl screw with gasket. Remove bowl, bowl gasket, and screen.

49. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

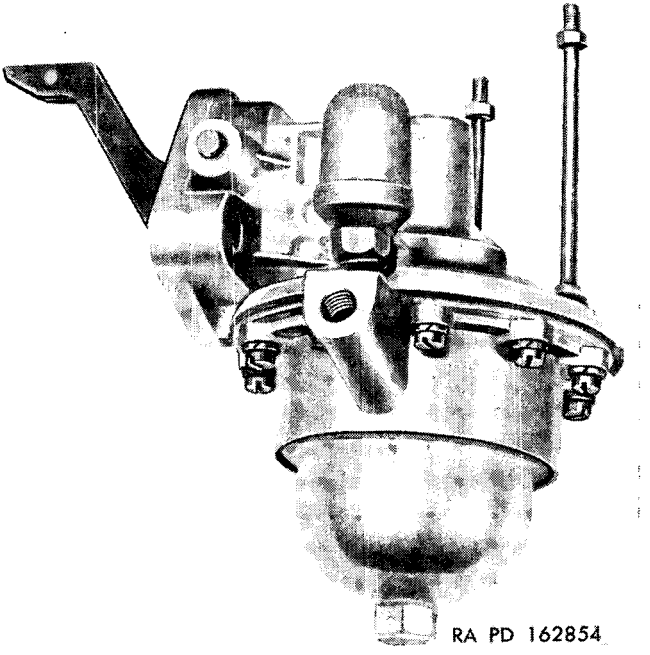

Figure 28. Fuel pump, series AH and AW.

50. Assembly and Test

a. Assemble Body (fig. 29).

(1) Make an assembly of rocker arm and link with bushing. If used, assemble one spacer on each end of bushing. Place assembly of rocker arm and link in body with link hook down.

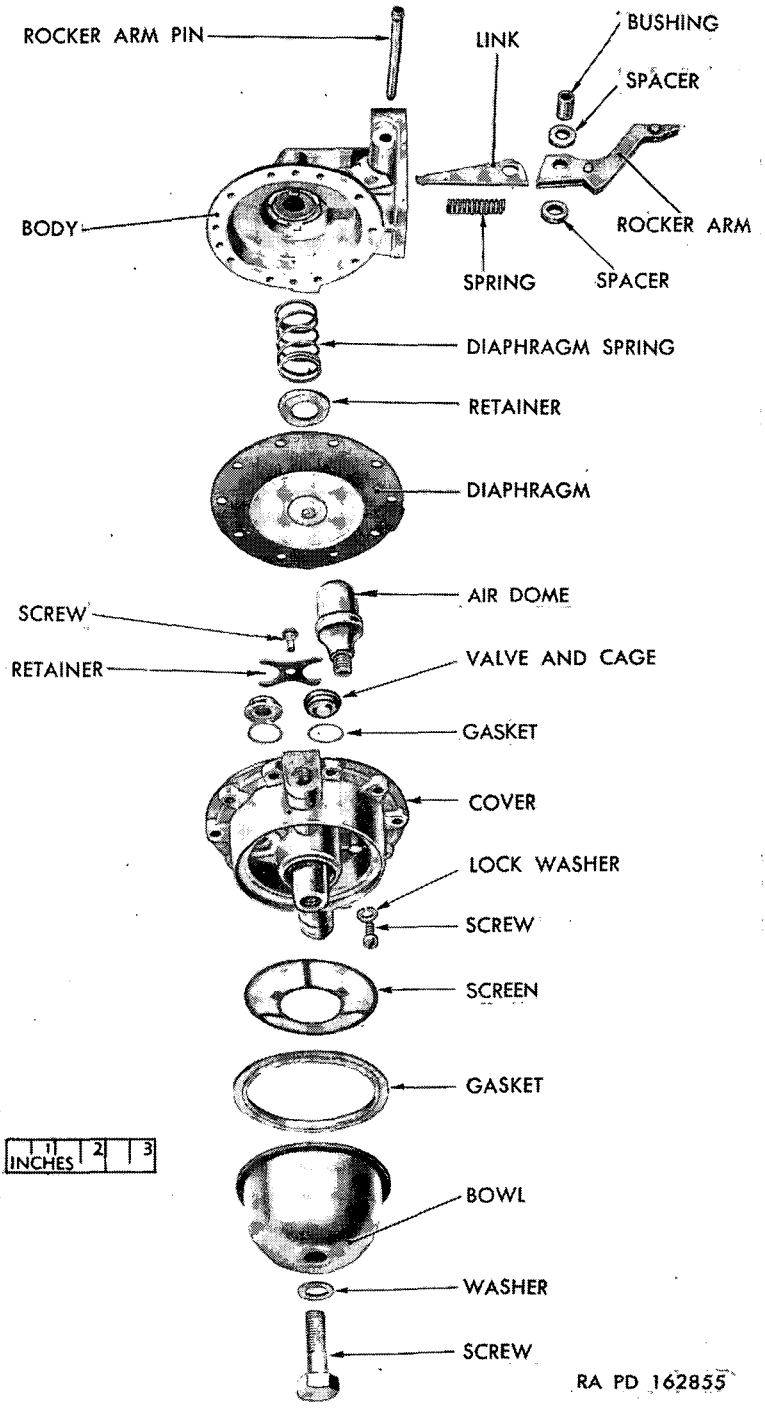

Figure 29. Fuel pump—disassembled (typical series AH and AW construction).

Aline rocker arm pin bushing hole with hole in body. Position rocker arm spring and temporarily retain assembly with a 4- or 5-inch length of 1/8-inch rod (an eightpenny nail can be used). Locate priming lever (part of body assembly) so that milled flat of priming lever shaft contacts the link.

(2) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place diaphragm spring (with retainer on top) over body pull rod well and insert diaphragm pull rod through spring and body oil seal. Tip diaphragm assembly so the flat of pull rod will angle slightly away from the hooked end of link. Hold pump upside down so link will fall into engagement with slot in pull rod.

(3) Remove temporary pin. Aline rocker arm and link bushing hole with hole in body, and drive in rocker arm pin. Install washer on small end of rocker arm pin, and spread end of pin.

b. Assemble Cover.

(1) Place valve and cage gasket or two separate gaskets in recesses provided. Place valve and cages on top of gaskets. Inlet valve must have 3-legged spider facing out of cover, and outlet valve must have 3-legged spider facing into cover. Secure valve assemblies with retainer and screw.

(2) Install strainer screen, cover gasket, cover, cover screw gasket, and cover screw in the order named. If used, install air dome in threaded hole in projection of casting for outlet.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XV. SERIES AJ AND AV FUEL AND VACUUM PUMPS

51. Disassembly

(fig. 31)

a. Separate Fuel Cover From Body.

(1) Mark edges of fuel cover and body diaphragm flanges of series AJ and AV fuel and vacuum pumps (fig. 30) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position. Note that the fuel diaphragm flange is symmetrical and the vacuum diaphragm flange has bulges where the screw holes occur.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover and substitute for them two No. 10–32 x 1½ fillister-head screws. Turn the two long screws all the way down and

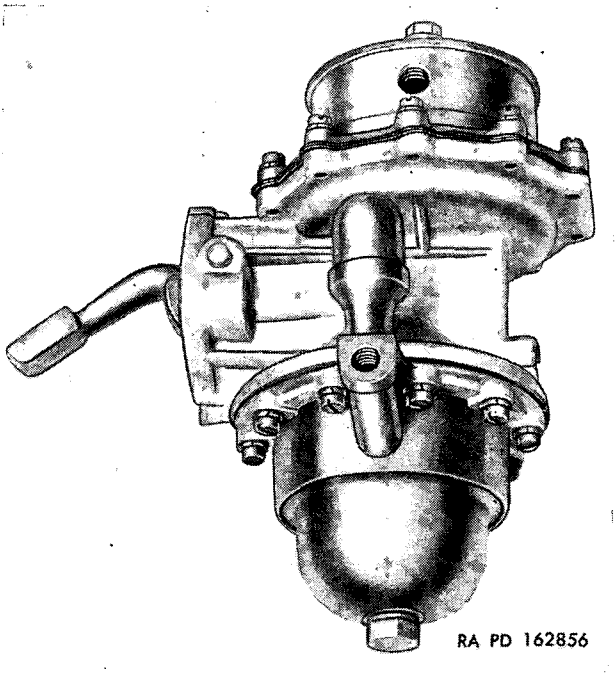

Figure 30. Fuel and vacuum pump, series AJ and AV.

then remove the remaining regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and retainer.

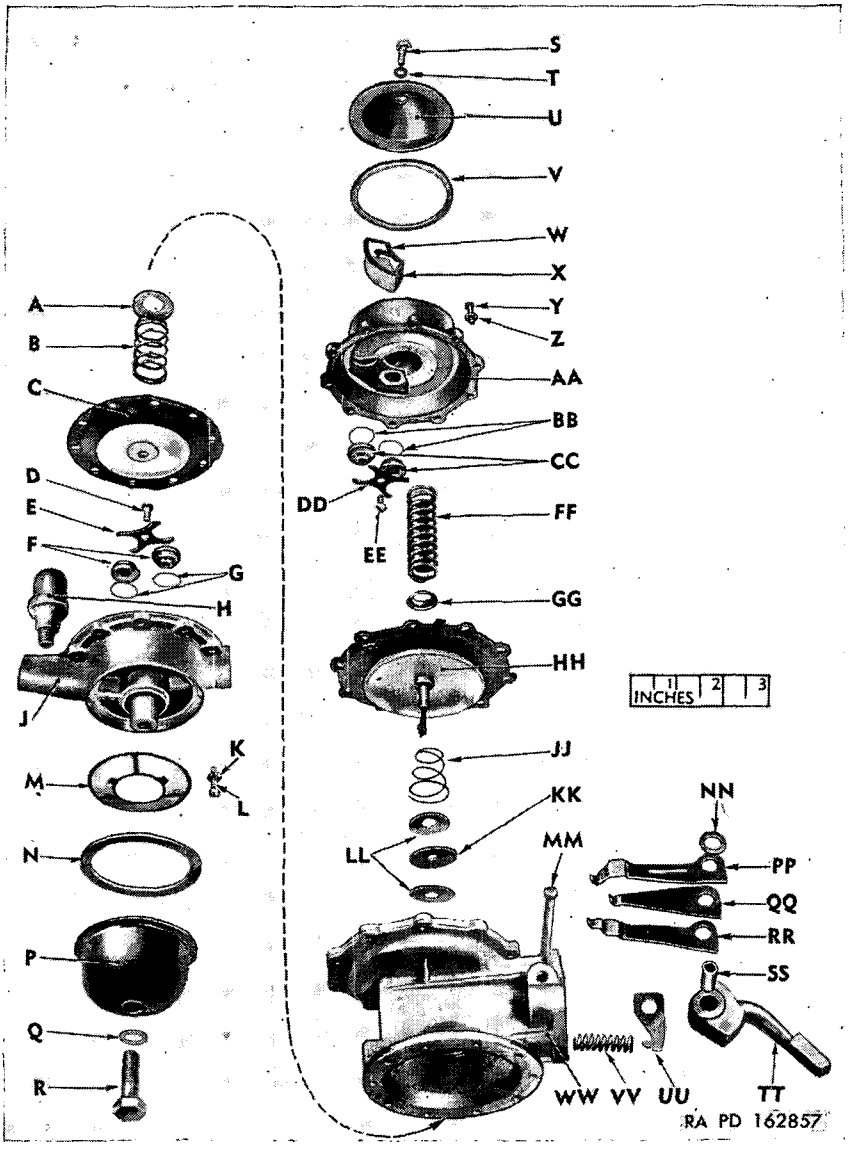

Figure 31. Fuel and vacuum pump—disassembled (typical series AJ and AV construction).

c. Disassemble Body.

(1) File riveted end of rocker arm pin flush with steel washer. Drive out rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Then remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers).

(3) Lift vacuum diaphragm out of body and remove lower oil seal retainer by turning until slot lines up with flat of pull rod. Remove oil seal washer, upper oil seal retainer, and oil seal spring.

(4) Remove fuel diaphragm by pulling straight out.

Caution: Do not tilt excessively or staked-in oil seal will be damaged.

Lift diaphragm spring and spring retainer from pump body.

(5) The diaphragm pull rod oil seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seal, it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding

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A—RETAINER
B—FUEL DIAPHRAGM SPRING
C—FUEL DIAPHRAGM
D—SCREW
E—VALVE RETAINER
F—VALVE AND CAGE
G—GASKET
H—AIR DOME
J—FUEL COVER
K—LOCK WASHER
L—SCREW
M—SCREEN
N—GASKET
P—FUEL BOWL
Q—WASHER
R—SCREW
S—SCREW
T—WASHER
U—PLATE
V—GASKET
W—SCREEN RETAINER
X—SCREEN
Y—SCREW
Z—LOCK WASHER
AA—VACUUM COVER
BB—GASKET
CC—VALVE AND CAGE
DD—VALVE RETAINER
EE—SCREW
FF—VACUUM DIAPHRAGM SPRING
GG—RETAINER
HH—VACUUM DIAPHRAGM
JJ—OIL SEAL SPRING
KK—OIL SEAL
LL—OIL SEAL RETAINER
MM—ROCKER ARM PIN
NN—WASHER
PP—VACUUM LINK
QQ—FUEL LINK
RR—VACUUM LINK
SS—BUSHING
TT—ROCKER ARM
UU—LINK SPACER
VV—ROCKER ARM SPRING
WW—BODY

Figure 31—Continued.

wheel. Pull seals out of body with hook shaped tool, being careful not to damage seal seat.

d. Disassemble Fuel Cover.

(1) Remove valve and cage retainer screw and lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove bowl screw with gasket. Remove bowl, bowl gasket, and screen.

e. Disassemble Vacuum Cover.

(1) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove cover plate screw with gasket. Lift off the cover, cover gasket, screen retainer, and screen.

52. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

53. Assembly

a. Assemble Body (fig. 31).

(1) Place fuel section gasket and seal in recess of body with dished portion of seal down. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Assemble link spacer over fuel link. Place one vacuum link on each side of the fuel link. The hook ends of the vacuum link should come together so that they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between lobes of rocker arm with one spacer washer on the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(3) Stand the pump body on the bench, fuel flange down. Set rocker arm spring in position with one end over cone cast into the body. Slide rocker arm and link assembly into body. Outer end of rocker arm spring slips over projection on link spacer; the open end of all link hooks must point toward vacuum flange. Temporarily retain rocker arm and link assembly with a 4- or 5-inch length of 1/8-inch rod.

(4) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Turn the pump body over so the fuel diaphragm flange is up. Set the diaphragm spring on the staked-in oil seal, and the retainer on top of the spring. Push diaphragm pull rod through retainer,

spring, and oil seal. Flat of pull rod must be at right angles to link. Hook diaphragm pull rod to fuel link.

Note. Fuel link is the short center link.

Caution: Do not tilt diaphragm pull rod excessively as this may damage the oil seal.

(5) Remove temporary pin, aline rocker arm bushing hole with hole in body, and drive in the rocker arm pin. Place washer over small end of pin and spread pin end.

b. Assemble Fuel Cover.

(1) Place valve and cage gasket or two separate gaskets in recesses provided. Place valve and cages on top of gaskets. Inlet valve must have 3-legged spider facing out of cover and outlet valve must have 3-legged spider facing into cover. Secure valve assemblies with retainer and screw.

(2) Install strainer screen, cover gasket, cover, cover screw gasket, and cover screw in the order named. If used, install air dome in threaded hole in projection of casting for outlet.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two gaskets and two valve and cage assemblies in cover. Inlet valve must have 3-legged spider facing out of cover; outlet valve must have 3-legged spider facing into cover. Secure valve and cages with retainer and screw.

(2) Turn cover over and set screen in recess over valve hole. Set screen retainer on screen. Place cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Assemble oil seal on vacuum diaphragm pull rod in the following sequence: oil seal spring, upper retainer, oil seal washer, and lower retainer. Turn lower retainer 90 degrees to lock in position.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding vacuum diaphragm in position, the body should be clamped in a vise, vacuum side up. Clamp on either side of the mounting flange. The vacuum diaphragm must be held level with body flange during the following operations. The diaphragm is held level by inserting a $\frac{3}{32}$-inch piece of metal between rocker arm stop and body. This tool (figs. 32 and 33) can be made from a piece of steel, $\frac{3}{16}$ x $\frac{3}{32}$ x 6. Bend one end to form a right angle hook three-eighths of an inch from bend to end.

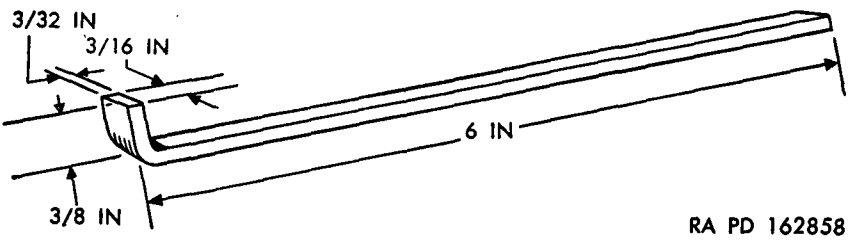

Figure 32. Tool, vacuum diaphragm flexing.

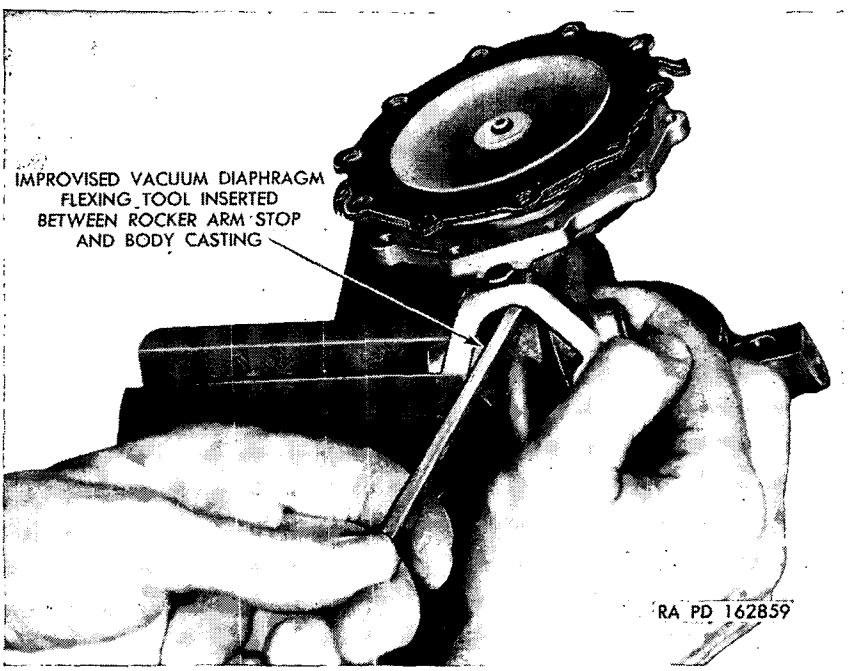

Figure 33. Vacuum diaphragm flexing tool in use.

(4) Place spring retainer on riveted end of diaphragm pull rod and the spring on retainer. Place vacuum cover over spring and aline the file marks.

(5) Insert two No. 10–32NF x 1½ screws in two opposite holes in cover flange. Turn these long screws down, alternating a few turns on each. Insert regular screws with lock washers and tighten until screws just engage lock washers. Replace two long screws with regular screws and lock washers.

(6) Remove 3/32-inch tool (fig. 33) from rocker arm position. This allows the heavy vacuum spring to push diaphragm into a flexed position. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

Section XVI. SERIES AK FUEL PUMPS

54. Disassembly

(fig. 35)

a. Separate Body From Cover.

(1) Mark edges of top cover and body of series AK fuel pump (fig. 34) with a file. Mark at heat shield stud if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

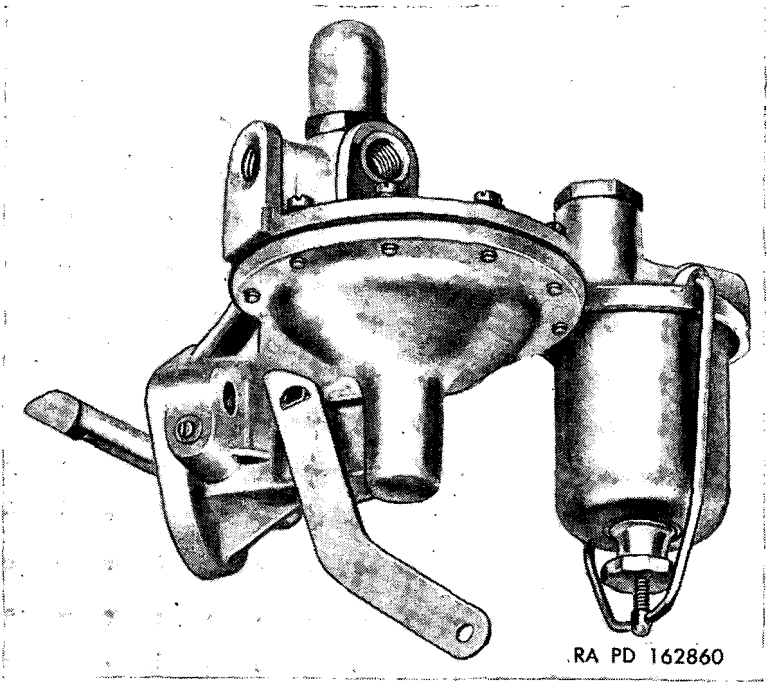

Figure 34. Fuel pump, series AK.

b. Disassemble Body. File riveted end of rocker arm pin flush with washer and drive out pin with drift punch and hammer. Wiggle rocker arm to disengage link from diaphragm pull rod. Remove rocker arm spring and disassemble rocker arm from link by sliding out the rocker arm bushing. Remove diaphragm and diaphragm spring from body. Remove oil seal if used. Priming lever is part of body assembly.

c. Disassemble Cover.

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover. Remove strainer screen from top cover.

(2) Remove inlet valve plug and gasket from top cover over strainer. Remove inlet valve spring and valve. Remove

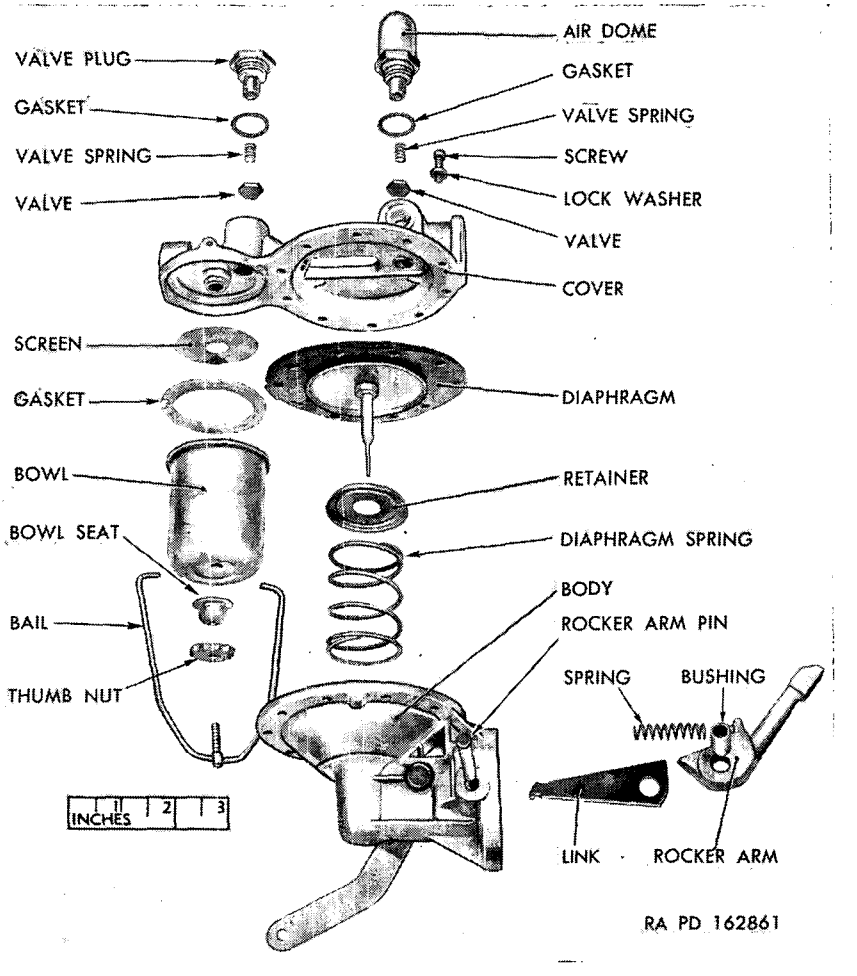

Figure 35. Fuel pump—disassembled (typical series AK construction).

outlet air dome (or valve plug) and gasket from top cover over diaphragm. Remove outlet valve spring and valve.

55. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

56. Assembly and Test

a. Assemble Body (fig. 35).

(1) Make an assembly of rocker arm and link with rocker arm bushing. Place rocker arm and link in body with link hook down. Insert rocker arm spring. Aline rocker arm pin bushing hole with hole in body and drive in rocker arm pin. Install washer on small end of pin and spread end of pin.

(2) Soak diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound. If used, place rubber oil seal over body pull rod well, set the diaphragm spring in position, and slide the diaphragm pull rod into body, hooking link to slot in flattened end.

b. Assemble Cover.

(1) Install gaskets on air dome and valve plug. Place a drop of light oil on valve and install in valve chamber over diaphragm. Insert valve spring in air dome, and tip into valve chamber. Tighten air dome securely. Place a drop of light oil on valve and install in chamber over strainer. Insert valve spring in plug and tip into chamber. Tighten securely.

(2) Install strainer screen and bowl gasket in top cover. Install bowl seat on bail screw and swing into position after installing bowl. Tighten thumb nut securely with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws, or pull will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XVII. SERIES AM FUEL AND VACUUM PUMPS

57. Disassembly

(fig. 37)

a. Separate Fuel Cover From Body.

(1) Mark edges of fuel cover and body diaphragm flanges of series AM fuel and vacuum pump (fig. 36) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position. Note that the fuel diaphragm flange is symmetrical and the vacuum diaphragm flange has bulges where the screw holes occur.

(2) Remove fuel cover screws and lock washers. Also remove heat shield stud if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover and substitute for them two No. 10–32NF x 1½ fillister-head screws. Turn the two long screws all the way down;

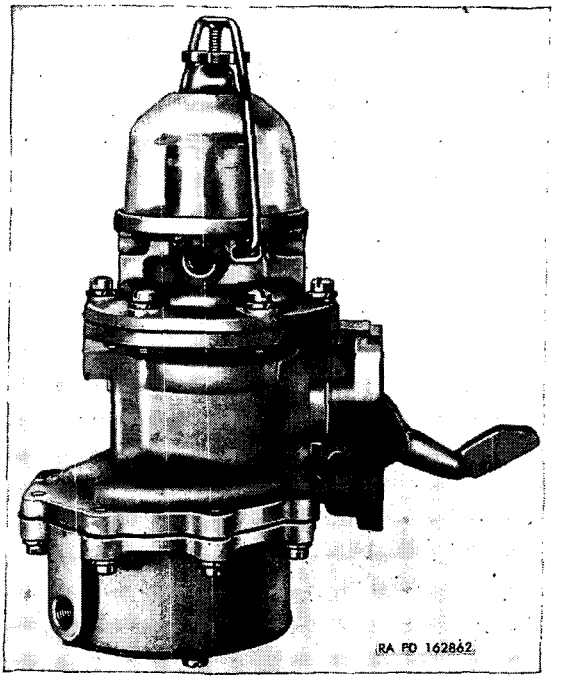

Figure 36. Fuel pump, series AM.

then remove the remaining regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and spring retainer.

c. Disassemble Body.

(1) File riveted end of rocker arm pin flush with steel washer or cut off end with 3/8-inch drill. Drive out rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers).

(3) Lift vacuum diaphragm out of pump body. Lift fuel diaphragm out of pump body and remove lower oil seal retainer by turning until slots line up with flat of pull rod. Remove oil seal washer, upper oil seal retainer, and diaphragm spring.

d. Disassemble Fuel Cover.

(1) Remove two screws holding valve and cage retainer screw, lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Loosen bail thumb screw, swing bail assembly to the side, and remove bowl, bowl gasket, and screen. Spring bail out of its retaining holes in fuel cover.

e. Disassemble Vacuum Cover.

(1) Remove four vacuum valve retainer screws. Lift out retainer, gaskets, and two valve and cage assemblies.

(2) Remove four vacuum cover plate screws. Lift off the cover, cover gasket, and screen.

58. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

59. Assembly and Test

a. Assemble Body (fig. 37).

(1) Assemble link spacer over fuel link. Place one vacuum link on each side of the fuel link. The hook ends of the vacuum link should come together so that they surround the fuel link. All link hooks should point in the same direction. Place as-

sembly of links and spacer between lobes of rocker arm with one spacer washer on the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(2) Stand the pump body on the bench, fuel flange down. Set rocker arm spring in position with one end over cone cast into the body. Slide rocker arm and link assembly into body. The outer end of rocker arm spring slips over a projection on the link spacer. The open end of all link hooks must point

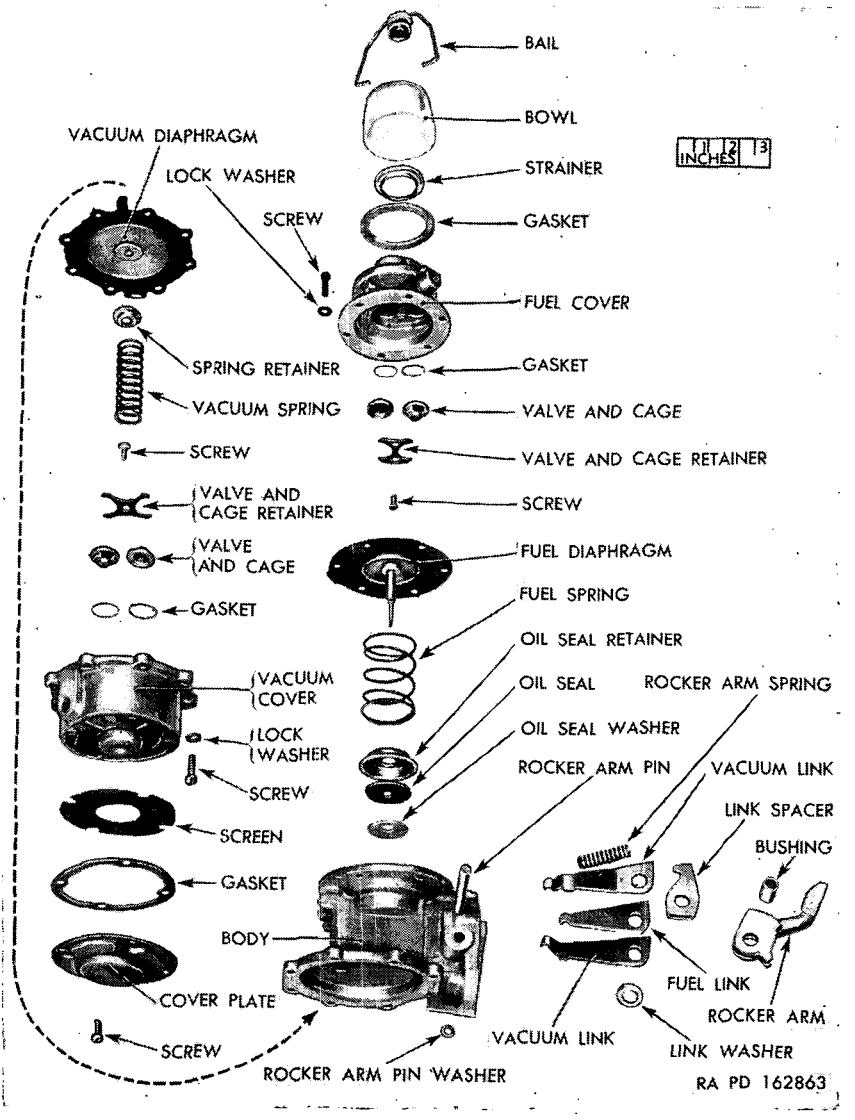

Figure 37. Fuel pump—disassembled (typical series AM construction).

toward vacuum flange. Aline rocker arm bushing hole with hole in body and drive in rocker arm pin. Place washer over small end of pin and retain by spreading small end of pin.

(3) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Turn the pump body over so the fuel diaphragm flange is up. Place spring over fuel section diaphragm pull rod. Retain spring by assembling components of oil seal and lock on pull rod by turning lower retainer one-half turn. Hook diaphragm to short center link.

b. Assemble Fuel Cover.

(1) Place valve and cage gasket in recesses provided in fuel cover. Place valve and cages on top of gaskets. Inlet valve must have 3-legged spider facing out of cover; outlet valve must have 3-legged spider facing into cover. Secure valve assemblies with retainer and screw.

(2) Install fuel strainer screen, bowl gasket, and bowl. Swing bail into position over bowl and tighten bowl thumb screw. Tighten bail nut with fingers only.

c. Assemble Fuel Cover to Body.

(1) Install fuel cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Position gaskets, valve and cage assembly, and valve and cage retainer in vacuum cover. Secure retainer with four screws.

(2) Turn vacuum cover over and install screen and gasket. Position cover plate and retain with four screws.

e. Assemble Vacuum Cover to Body.

(1) Soak vacuum diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding vacuum diaphragm in position, the body should be clamped in a vise, vacuum side up. Clamp on either side of the mounting flange. The vacuum diaphragm must be held level with body flange during the following operations. The diaphragm is held level by inserting a

3/32-inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel, 3/16 x 3/32 x 6. Bend one end to form a right angle hook, three-eighths of an inch from bend to end (fig. 32).

(4) Place vacuum spring over locator on upper diaphragm protector. Place vacuum cover over spring and aline the file marks.

(5) Insert two No. 10–32NF x 1½ screws in two opposite holes in cover flange. Turn these long screws down, alternating a few turns on each. Insert regular screws with lock washers and tighten until screws just engage lock washers. Replace two long screws with regular screws and lock washers.

(6) Remove 3/32-inch tool from rocker arm position. This allows the heavy vacuum spring to push diaphragm into a flexed position. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench tested.

Section XVIII. SERIES AT FUEL PUMPS

60. Disassembly

(fig. 39)

a. Separate Body From Cover.

(1) Mark edges of top cover and body of series AT fuel pump (fig. 38) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body.

(1) File riveted end of rocker arm pin flush with washer. Drive out rocker arm pin with drift punch and hammer. Remove rocker arm and link.

(2) Remove diaphragm by pulling straight out.

Caution: Do not tilt excessively or staked-in oil seal will be damaged.

Lift diaphragm spring and spring retainer from pump body.

(3) The diaphragm pull rod oil seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seal it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding wheel. Pull seals out of body with hook shaped tool, being careful not to damage seal seat.

c. Disassemble Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in top cover, remove bowl seat, and unscrew bail nut. Remove strainer screen from top cover.

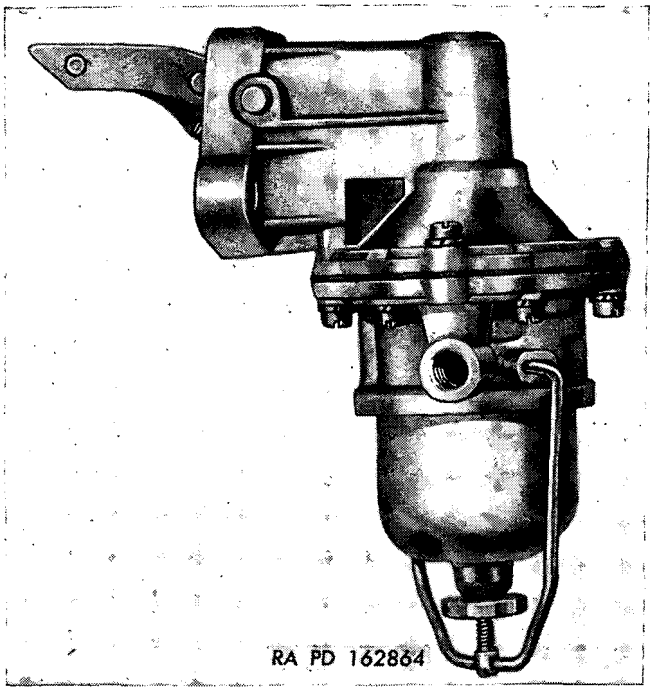

Figure 38. Fuel pump, series AT.

61. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

62. Assembly and Test

a. Assemble Body (fig. 39).

(1) Place fuel section gasket and seal in recess of body with a dished portion of seal down. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

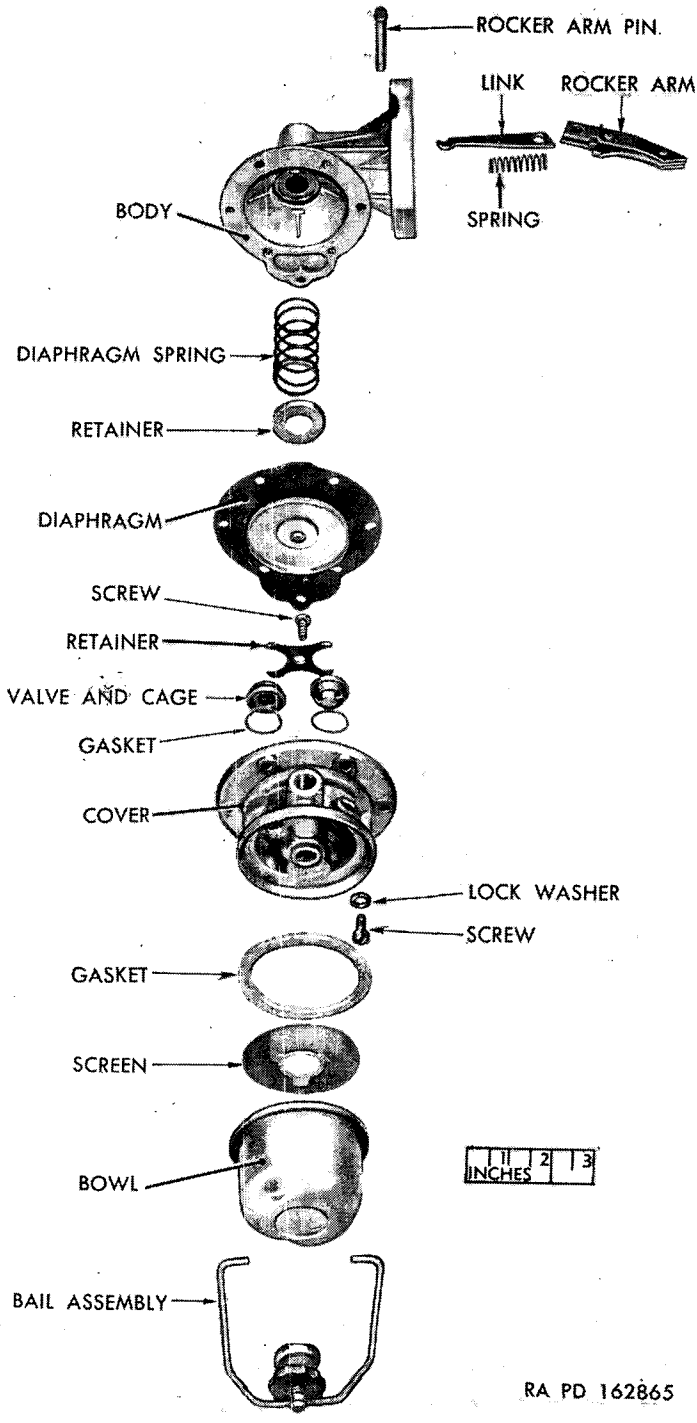

Figure 39. Fuel pump—disassembled (typical series at construction).

(2) Install rocker arm and link in pump body with link hook down. Position rocker arm spring and temporarily retain assembly with 4- or 5-inch length of 1/8-inch rod through body rocker arm pin hole.

(3) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place diaphragm spring, with retainer on top, over body pull rod well. Insert diaphragm pull rod through spring and body oil seal. Tip diaphragm assembly so the flat of pull rod will angle slightly away from the hooked end of link. Hold pump upside down so link will fall into engagement with slot in pull rod.

(4) Remove temporary pin. Aline rocker arm and link hole with hole in body and drive in the rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin.

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and screw. Outlet valve must have 3-legged spider facing into cover; inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Install bail nut on bail. Spring bail into retaining holes in cover. Place bowl seat on bail screw and swing bail into position to retain cover. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

63. Disassembly
(fig. 41)

a. Separate Body From Cover.

(1) Mark edges of top cover and body of series AU fuel pump (fig 40) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

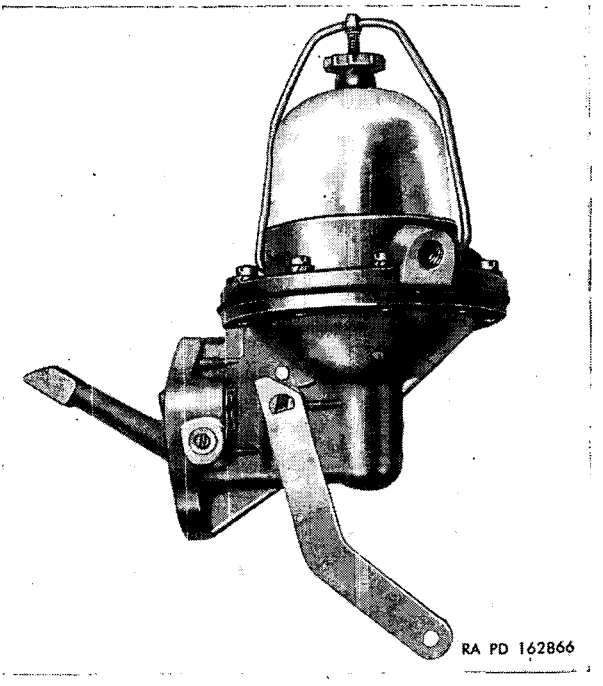

Figure 40. Fuel pump, series AU.

b. Disassemble Body.

(1) File riveted end of rocker arm pin flush with washer. Drive out rocker arm pin with drift punch and hammer. Wiggle rocker arm to separate link from pull rod and remove assembly from body. Remove bushing to separate link from rocker arm.

(2) Remove diaphragm assembly, spring retainer, and spring from pump body.

(3) The diaphragm pull rod oil seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seal, it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding wheel. Pull seals out of body with hook shaped tool, being careful not to damage seal seat.

c. Disassemble Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in top cover, remove bowl seat, and unscrew bail nut. Remove strainer screen from top cover.

64. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

65. Assembly and Test

a. Assemble Body (fig. 41).

(1) Place fuel section gasket and seal in recess of body with dished portion of seal down. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Make an assembly of rocker arm and link with bushing. Place assembly of rocker arm and link in body with link hook down. Aline rocker arm pin and bushing with hole in body, and drive in the rocker arm pin. Place washer on small end of rocker arm pin and spread end of pin.

(3) Soak diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound. Place diaphragm spring over pull rod well; then place the spring retainer on spring. Slide the pull rod of the diaphragm assembly through retainer and spring. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm so the pull rod angles away from link hook. Bring diaphragm back to level and link should engage pull rod.

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and two screws. Outlet valve must have 3-legged spider facing into cover; inlet valve must have 3-legged spider facing out of cover.

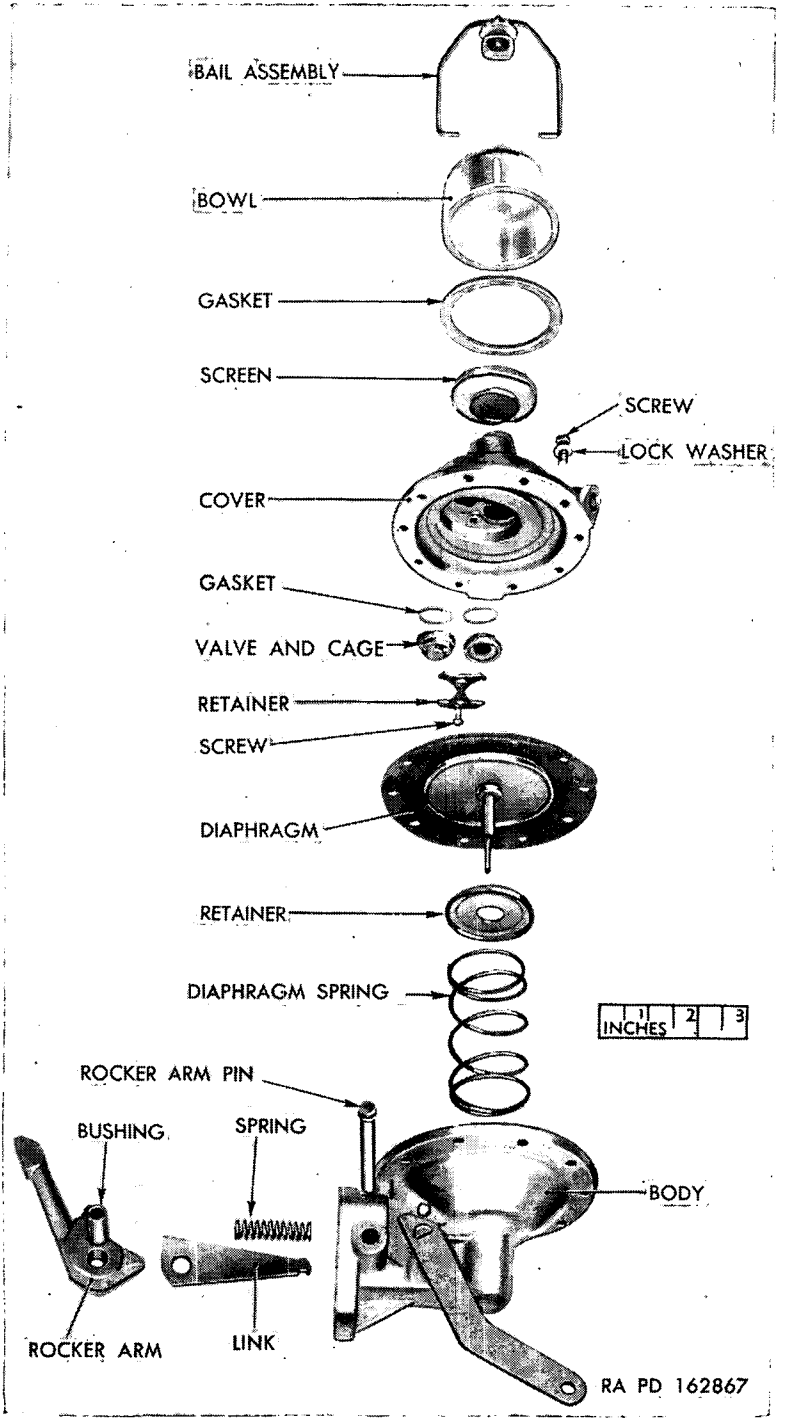

Figure 41. Fuel pump—disassembled (typical series AU construction).

(2) Install strainer screen, bowl gasket, and bowl. Install bail nut on bail. Spring bail into retaining holes in cover. Place bowl seat on bail screw and swing bail into position to retain cover. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XX. SERIES AX FUEL AND VACUUM PUMPS

66. Disassembly

(fig. 43)

a. Separate Fuel Cover From Body.

(1) Mark edges of fuel cover and body diaphragm flanges of series AX fuel and vacuum pump (fig. 42) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position. Note that the fuel diaphragm flange is symmetrical, and the vacuum diaphragm flange has bulges where the screw holes occur.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover and substitute for them two No. 10–32NF x 1½ fillister-head screws. Turn the two long screws all the way down; then remove the remaining regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is

no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and spring retainer.

c. Disassemble Body.

(1) File riveted end of a rocker arm pin flush with steel washer. Drive out the rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers).

(3) Lift vacuum diaphragm out of pump body. Lift fuel diaphragm out of pump body, and remove spring retainer and spring.

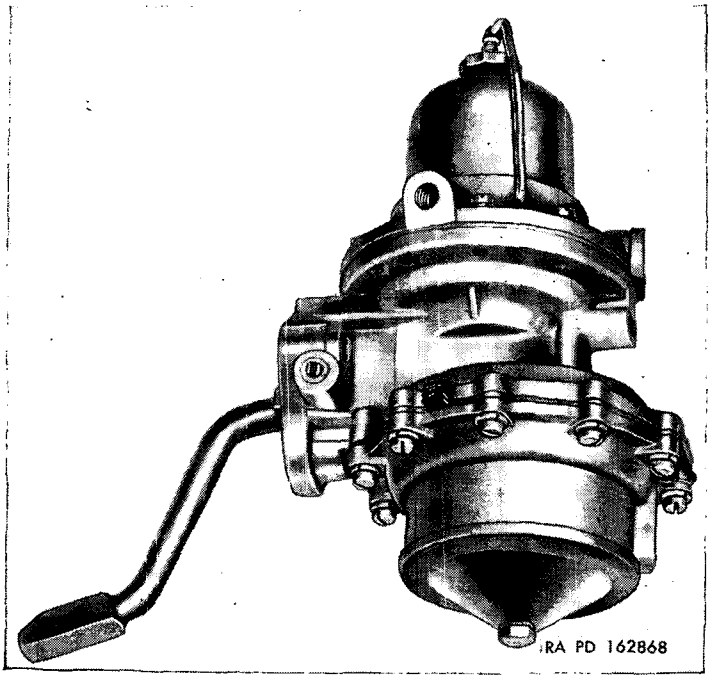

Figure 42. Fuel and vacuum pump, series AX.

d. Disassemble Fuel Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in

top cover, remove bowl seat, and unscrew bail nut. Remove strainer screen from top cover.

e. Disassemble Vacuum Cover.

(1) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove cover plate screw with its gasket and lift off the cover, cover gasket, screen retainer, and screen.

67. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

68. Assembly

a. Assemble Body (fig. 43).

(1) Assemble link spacer over fuel link. Place one vacuum link on each side of fuel link. The hook ends of the vacuum link should come together so that they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between holes of rocker arm with one spacer washer on outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(2) Stand the pump body on the bench, fuel flange down. Set the rocker arm spring in position with one end over the cone cast into the body. Slide rocker arm and link assembly into body. Outer end of rocker arm spring slips over the projection on link spacer; the open end of all link hooks must point toward vacuum flange. Aline rocker arm bushing hole with hole in body and drive in rocker arm pin. Place washer over small end of pin and retain by spreading end of pin.

(3) Soak fuel diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place fuel diaphragm spring and its retainer over body pull rod well and install the diaphragm assembly. Retain diaphragm by hooking to fuel link.

Note. Fuel link is the short center link.

b. Assemble Fuel Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and two screws. Outlet valve must have 3-legged spider facing into cover; inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Install bail nut on bail. Spring bail into retaining holes in cover. Place

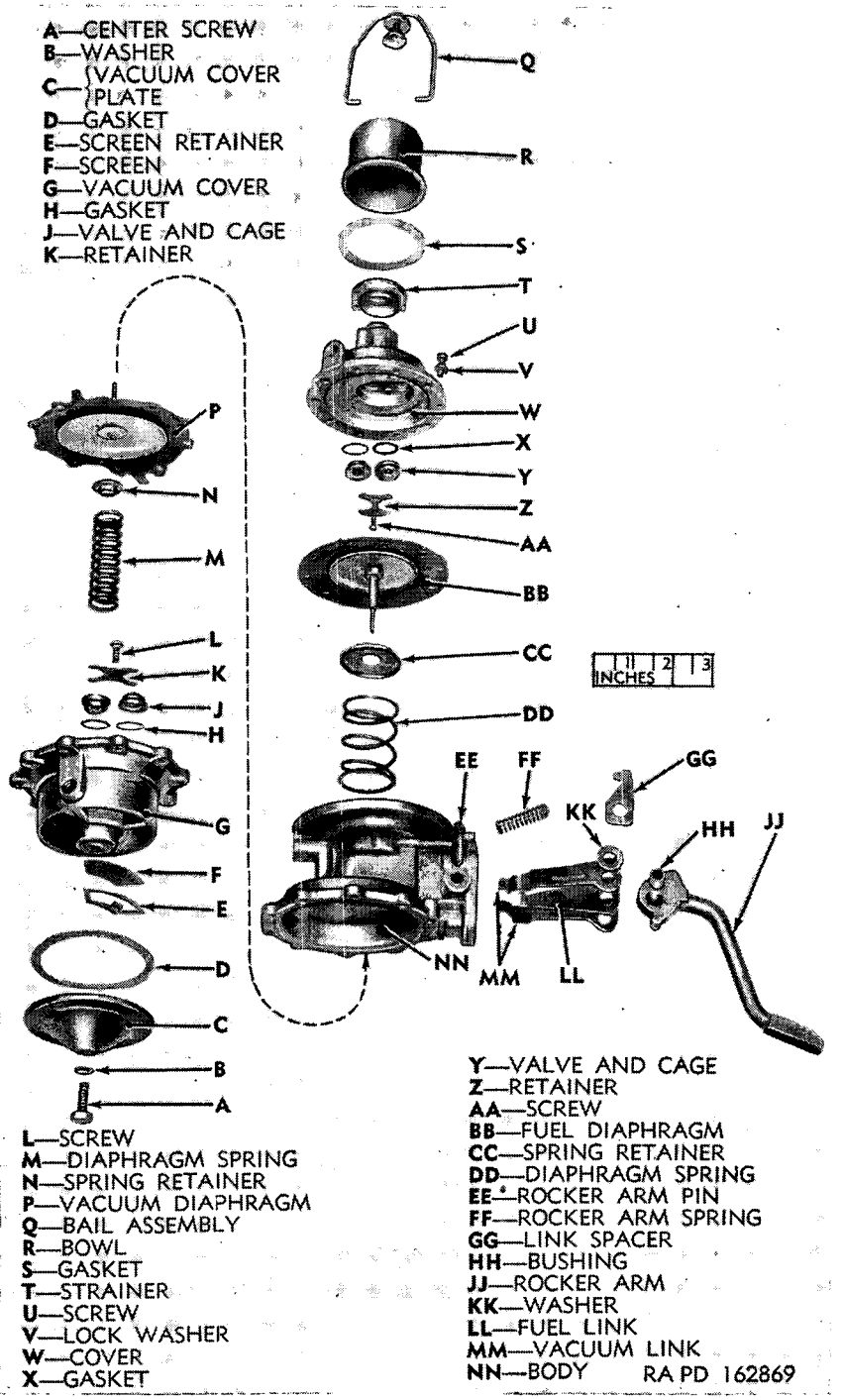

Figure 43. Fuel and vacuum pump—disassembled (typical series AX construction).

bowl seat on bail screw and swing bail into position to retain cover. Tighten bail nut with fingers only.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two gaskets and two valve and cage assemblies in cover. Inlet valve must have 3-legged spider facing out of cover; outlet valve must have 3-legged spider facing into cover. Secure valve and cages with retainer and screw.

(2) Turn cover over and set screen in recess over valve hole. Set screen retainer on screen. Place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding vacuum diaphragm in position, the body should be clamped in a vise, vacuum side up. Clamp on either side of the mounting flange. The vacuum diaphragm must be held level with body flange during the following operations. The diaphragm is held level by inserting a 3/32-inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel 3/16 x 3/32 x 6. Bend one end to form a right angle hook three-eighths of an inch from bend to end (fig. 32).

(4) Place spring retainer on riveted end of diaphragm pull rod and the spring on the retainer. Place vacuum cover over the spring and aline the file marks.

(5) Insert two No. 10–32NF x 1½ screws in two opposite holes in cover flange. Turn these long screws down, alternating a few turns on each. Insert the regular screws with lock washers and tighten until the screws just engage the lock washers. Replace two long screws with regular screws and lock washers.

(6) Remove 3/32-inch tool from rocker arm position. This allows the heavy vacuum spring to push the diaphragm into a flexed position. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

Section XXI. SERIES BE FUEL PUMPS

69. Disassembly

(fig. 45)

a. Separate Body From Cover.

(1) Mark edges of top cover and body of series BE fuel pump (fig. 44) with a file. Mark at heat shield stud, if used. The parts may then be reassembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with screw driver handle.

b. Disassemble Body.

(1) Remove cover plate screw to disassemble cover plate and gasket.

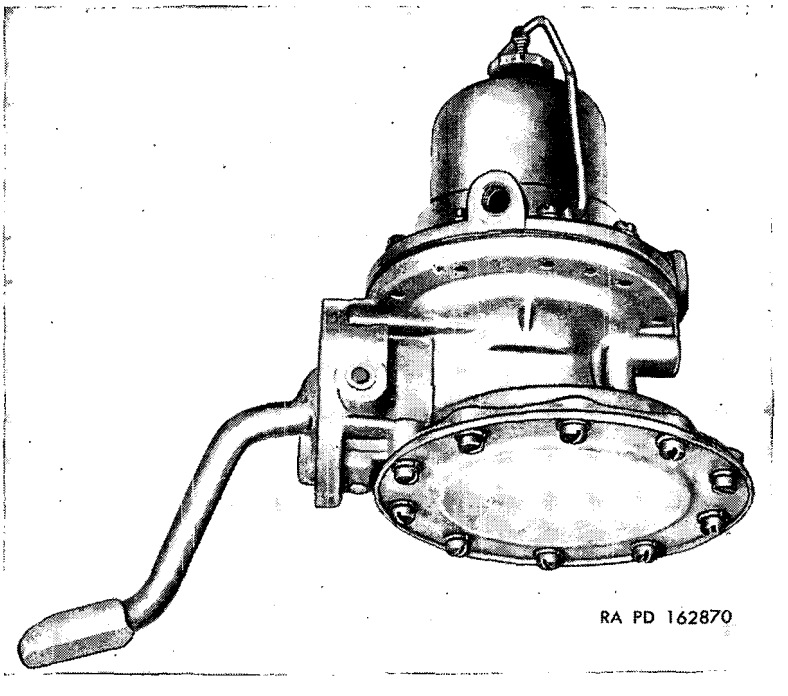

Figure 44. Fuel pump, series BE.

(2) File small end of rocker arm pin flush with washer and drive out rocker arm pin with drift punch and hammer. Wiggle rocker arm to separate link from pull rod and remove assembly from body. Remove rocker arm pin bushing to disassemble rocker arm, link, link spacer, and two spacer washers.

(3) Remove diaphragm assembly, spring retainer, and spring.

c. Disassemble Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Loosen bail screw nut, swing bail to the side, and remove bowl and bowl gasket. Spring bail out of its retaining holes in the top cover, remove bowl seat, and unscrew bail nut. Remove strainer screen from top cover.

70. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

71. Assembly and Test

a. Assemble Body (fig. 45).

(1) Assemble link spacer (also serves as arm spring stop) over link. Place one spacer washer on each side of link spacer. Slide assembly between lobes of rocker arm and retain in position with rocker arm bushing. Place rocker arm and link assembly in body with link hook pointing away from fuel diaphragm flange. Aline rocker arm bushing with hole in pump body, drive in the rocker arm pin, and spread end of pin.

(2) Soak diaphragm in clean kerosene. Fuel oil may be used but do not use shellac or sealing compound. Place diaphragm spring over pull rod well and place spring retainer on spring. Slide the pull rod of the diaphragm assembly through retainer and spring. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm so pull rod angles away from link hook. Bring diaphragm back to level so that link engages pull rod.

(3) Assemble gasket and cover plate on side of body opposite fuel diaphragm, and retain cover plate with 10 screws.

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Retain with valve retainer and two screws. Out-

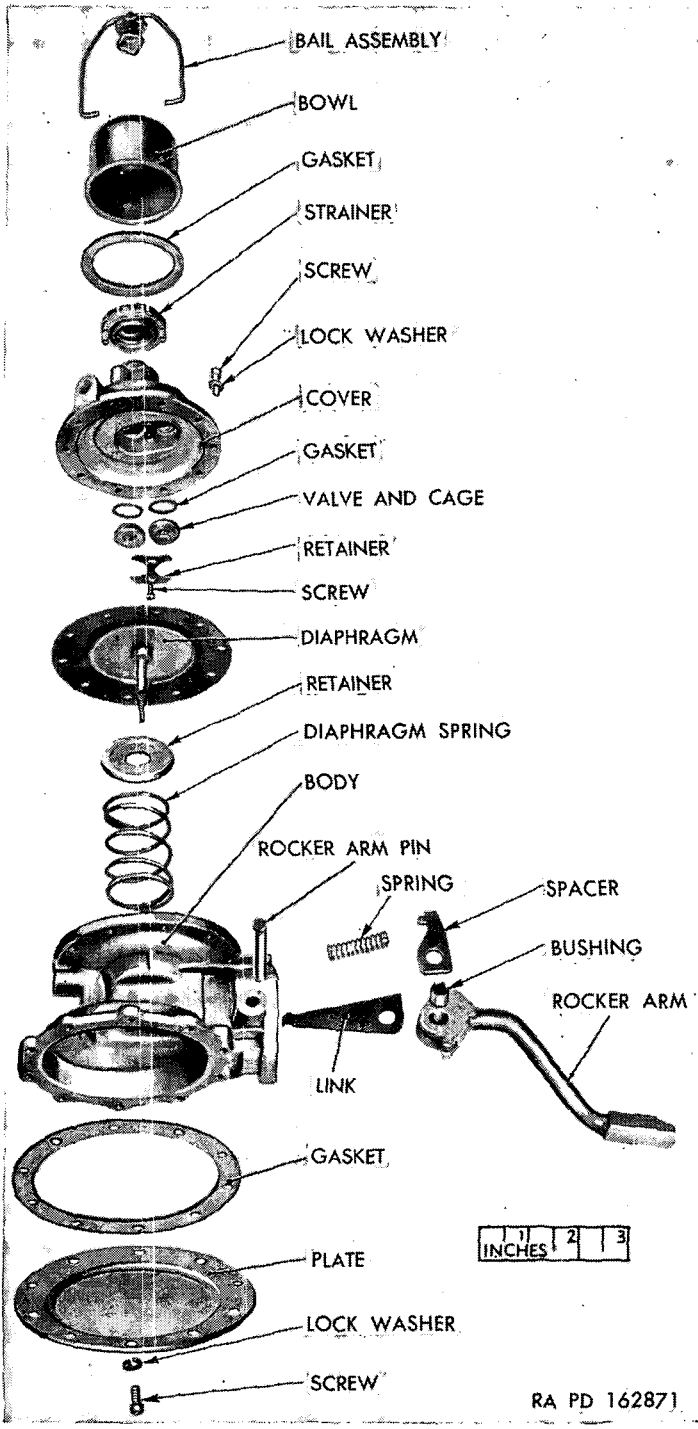

Figure 45. Fuel pump—disassembled (typical series BE construction).

let valve must have 3-legged spider facing into cover, and inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Install bail nut on bail. Spring bail into retaining holes in cover. Place bowl seat on bail screw and swing bail into position to retain cover. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XXII. SERIES BF AND BM FUEL PUMPS

72. Disassembly

(fig. 47)

a. Separate Body From Cover.

(1) Mark edges of cover and body of series BF and BM fuel pumps (fig. 46) with a file. The parts may then be assembled in the same relative positions.

(2) Remove only outer circle of screws and lock washers. Separate body from cover at diaphragm flange near body. If cover sticks, it can be jarred loose with a light plastic hammer.

b. Disassemble Body.

(1) File riveted end of rocker arm pin flush with washer. Drive out rocker arm pin with drift punch and hammer. Wiggle rocker arm to separate link from diaphragm pull rod and remove assembly from body. Remove rocker arm spacer washer if used. Remove bushing to disassemble link and rocker arm.

(2) Remove diaphragm by pulling straight out.

Caution: Do not tilt excessively or staked-in oil seal will be damaged. Lift diaphragm spring and spring retainer from pump body. If used, priming lever is serviced as part of body casting assembly.

(3) The diaphragm pull rod oil seal must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seal, it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding wheel. Pull seals out of body with hook shaped tool, being careful not to damage seal seat.

c. Disassemble Cover With One Center Screw.

(1) Remove three screws from valve plate. Lift out valve plate, gasket, six valve and cage assemblies and, if used, six valve and cage gaskets.

(2) Remove cover center screw and lift off pulsator cover plate and three layers of pulsator diaphragm.

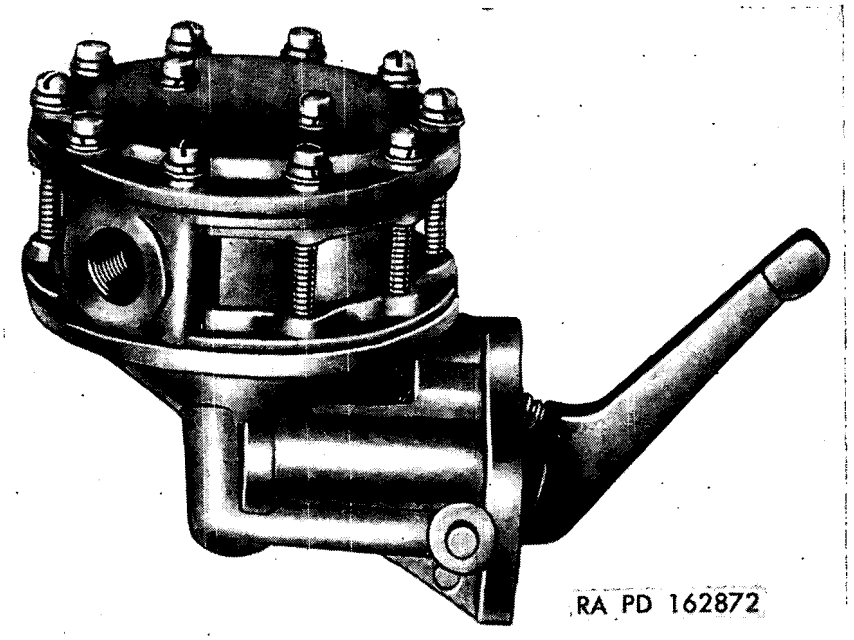

Figure 46. Fuel pump, series BF and BM.

d. Disassemble Cover With Two Center Screws. Remove two center cover screws and lock washers. Lift off the pulsator cover plate and three layers of pulsator diaphragm. Remove four screws from each of two valve and cage retainers. Remove two retainers, six valve and cage assemblies, and six gaskets.

73. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

74. Assembly and Test

a. Assemble Body (fig. 47).

(1) Place fuel section gasket and seal in recess of body with dished portion of seal down. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Make an assembly of rocker arm and link with bushing. If used, assemble one spacer on each end of bushing. Place assembly of rocker arm and link in body with link hook down. Aline rocker arm pin bushing hole with hole in body. Position rocker arm spring, and temporarily retain assembly with 4- or 5-inch length of 1/8-inch rod (an eightpenny nail can be used). Locate priming lever (part of body assembly) so that milled flat of priming lever shaft contacts the link.

(3) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place diaphragm spring (with retainer on top) over body pull rod well and insert diaphragm pull rod through spring and body oil seal. Tip diaphragm assembly so the flat of pull rod will angle slightly away from the hooked end of link. Hold pump upside down so link will fall into engagement with slot in pull rod.

(4) Remove temporary pin. Aline rocker arm and link bushing hole with hole in body and drive in rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin.

b. Assemble Cover With One Center Screw.

(1) Place six valve and cage gaskets in cover with six valve and cage assemblies on top of gaskets. Outlet valve and cages must have 3-legged spider facing into cover; inlet valves must have 3-legged spider facing out of cover. Set gasket over valve and cages and follow with valve plate which is retained with three screws.

(2) Note position of web across diameter of cover (fig. 48). Install three layers of pulsator diaphragm on cover. Follow with pulsator cover plate which must be positioned so that the web across its diameter matches the cover web. Insert cover center screw with lock washer and tighten securely.

c. Assemble Cover With Two Center Screws. Place six valve and cage gaskets in cover with six valve and cage assemblies on top of gaskets. Inlet valve and cages must have 3-legged spider facing into cover; outlet valve must have 3-legged spider facing out of cover. Retain each set of three valve and cage assemblies with one retainer and four screws. Place three layers of pulsator diaphragm on cover and follow with pulsator cover plate. Aline two center screw holes

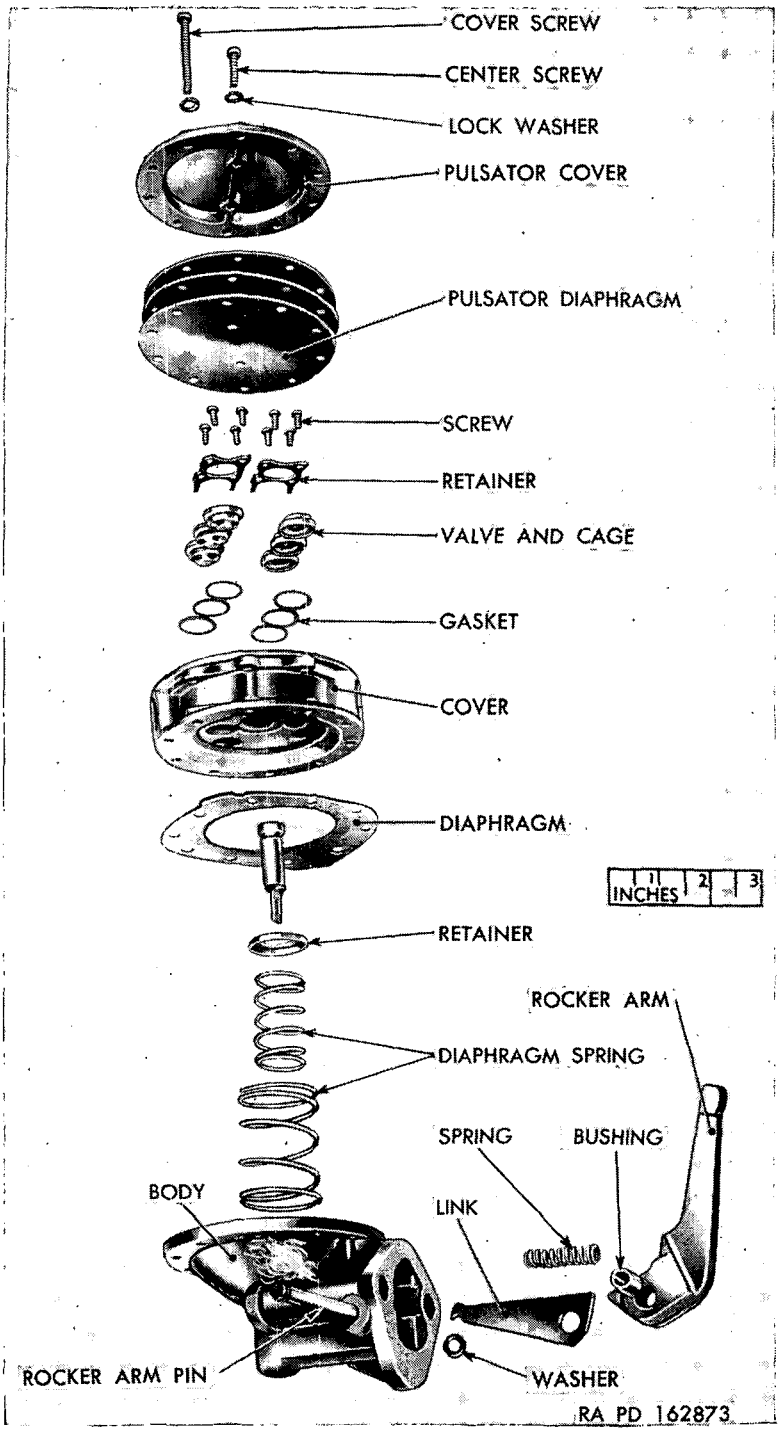

Figure 47. Fuel pump—disassembled (typical series BF and BM construction).

and insert two screws with lock washers through cover plate, pulsator diaphragm, and into pump cover. Tighten screws securely.

d. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

e. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

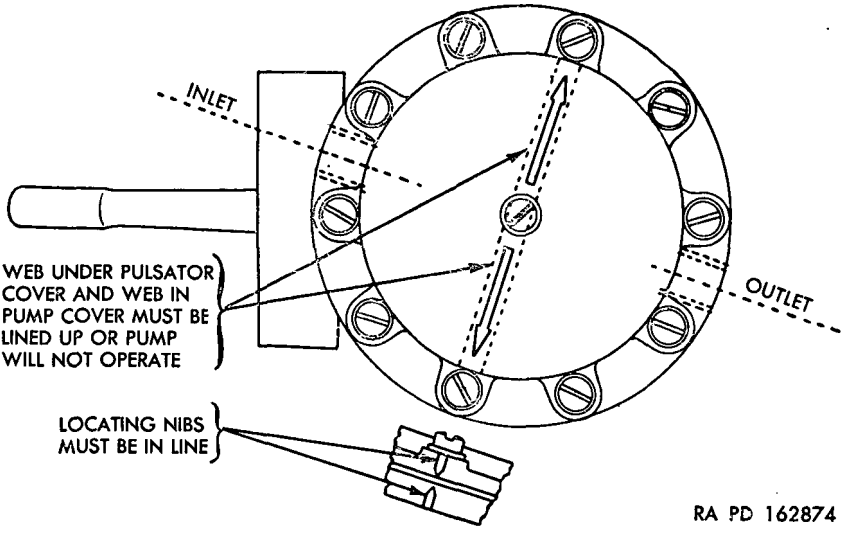

Figure 48. Showing correct assembly of cover with one center screw.

Section XXIII. SERIES BH FUEL PUMPS

75. Disassembly

(fig. 50)

a. Separate Body From Cover.

(1) Mark edges of cover and body of series BH fuel pump (fig. 49) with a file. The parts may then be assembled in the same relative positions.

(2) Remove only the outer circle of screws and lock washers. Separate body from cover at diaphragm flange near body. If cover sticks, it can be jarred loose with a light plastic hammer.

b. Disassemble Body.

(1) Remove three screws from bottom cover. Disassemble cover, diaphragm spring, rocker arm spring, two spring caps, and cover gasket. Also remove priming lever if used. Remove clips and pin from diaphragm to link connection; then lift diaphragm assembly out of body. Also remove upper diaphragm spring if used.

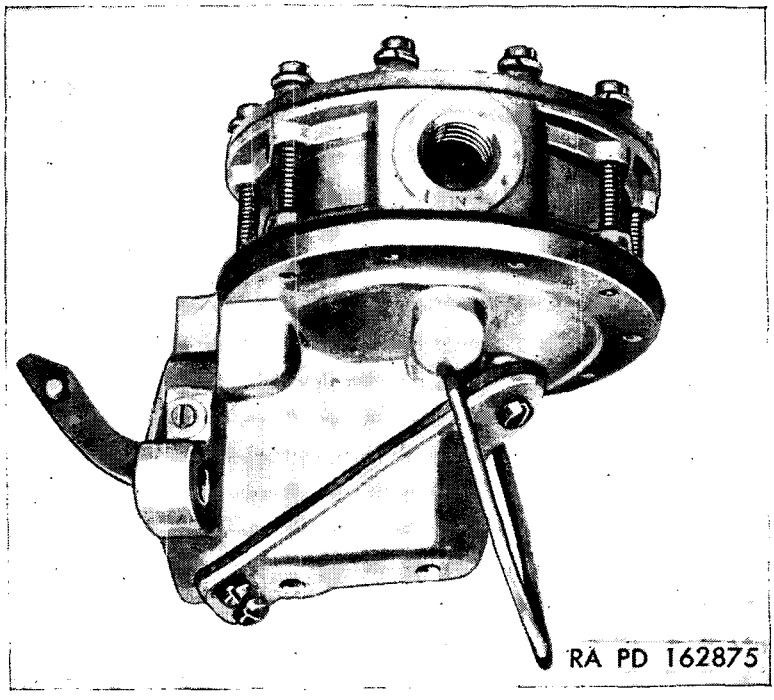

Figure 49. Fuel pump, series BH.

(2) Remove clips from rocker arm pin and drive out rocker arm pin with drift punch and hammer. If rocker arm pin is riveted, file riveted end flush with washer. Drive out pin with drift punch and hammer. Remove rocker arm and assembled links from body. Disassemble links from pin by removing link pin clips.

c. Disassemble Cover With One Center Screw.

(1) Remove three screws from valve plate. Lift out valve plate, gasket, six valve and cage assemblies, and, if used, six valve and cage gaskets.

(2) Remove center cover screw, and lift off pulsator cover plate and three layers of pulsator diaphragm.

d. Disassemble Cover With Two Center Screws. Remove two center cover screws and lock washers. Lift off the pulsator cover plate and three layers of pulsator diaphragm. Remove four screws from each of two valve and cage retainers. Remove two retainers, six valve and cage assemblies, and six gaskets.

76. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

77. Assembly and Test

a. Assemble Body (fig. 50).

(1) If used, assemble upper spring over diaphragm pull rod and push pull rod through hole in pump body. Assemble sheared ends of two links to flat of pull rod (sheared link corner toward top of pull rod) and retain with one link pin and two clips. Install link pin through center hole of links and retain with two clips.

(2) Install rocker arm between links with hooked end over center link pin. Assembly is correct when center link pin is below center line of links. Aline rocker arm pin hole with hole in body and drive in rocker arm pin. Install washer over counterbored end of pin and spread pin at counterbore to retain in position.

(3) Place diaphragm spring over inner boss of lower cover and the rocker arm spring over outer (recessed) boss. Place spring caps over springs and gasket on lower cover. Suspend body with lower cover flanged down (install priming lever if used) and place lower cover, with associated parts, against body. Spring caps must seat against bottom of pull rod and hook of rocker arm. Retain lower cover with three screws.

b. Assemble Cover With One Center Screw.

(1) Place six valve and cage assemblies in cover. Outlet valve and cages must have 3-legged spider facing into cover; inlet valves must have 3-legged spider facing out of cover. Set gasket over valve and cage assemblies and follow with valve plate which is retained with three screws.

(2) Note position of web across diameter of cover (fig. 48). Install three layers of pulsator diaphragm on cover. Follow with pulsator cover plate which must be positioned so that

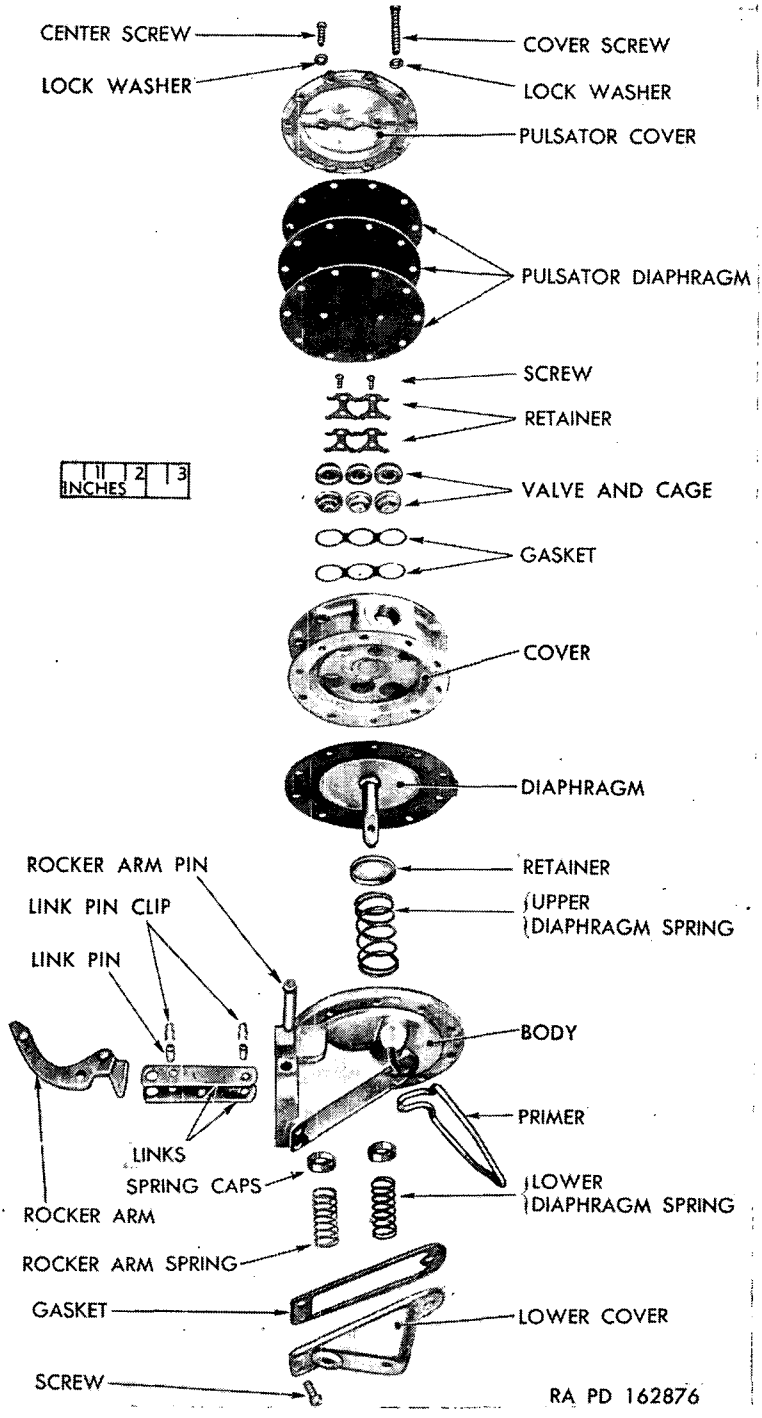

Figure 50. Fuel pump—disassembled (typical series BH construction).

the web across its diameter matches the cover web. Insert cover center screw with lock washer and tighten securely.

c. Assemble Cover With Two Center Screws. Place six valve and cage gaskets in cover with six valve and cage assemblies on top of gaskets. Inlet valve and cages must have 3-legged spider facing into cover; outlet valve must have 3-legged spider facing out of cover. Retain each set of three valve and cage assemblies with one retainer and four screws. Place three layers of pulsator diaphragm on cover and follow with pulsator cover plate. Aline two center screw holes and insert two screws with lock washers through cover plate, pulsator diaphragm, and into pump cover. Tighten screws securely.

d. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

e. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XXIV. SERIES BK AND BN FUEL AND VACUUM PUMPS

78. Disassembly

(fig. 52)

a. Separate Fuel Cover From Body.

(1) Mark edges of cover and body of series BK and BN fuel and vacuum pump (fig. 51) with a file. The parts may then be assembled in the same relative positions.

(2) Remove only the outer circle of screws and lock washers. Separate body from cover at diaphragm flange near body. If cover sticks, it can be jarred loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover and substitute for them two No. 10–32NF x 1½ fillister-head screws. Turn the two long screws all the way down; then remove the remaining regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and spring retainer.

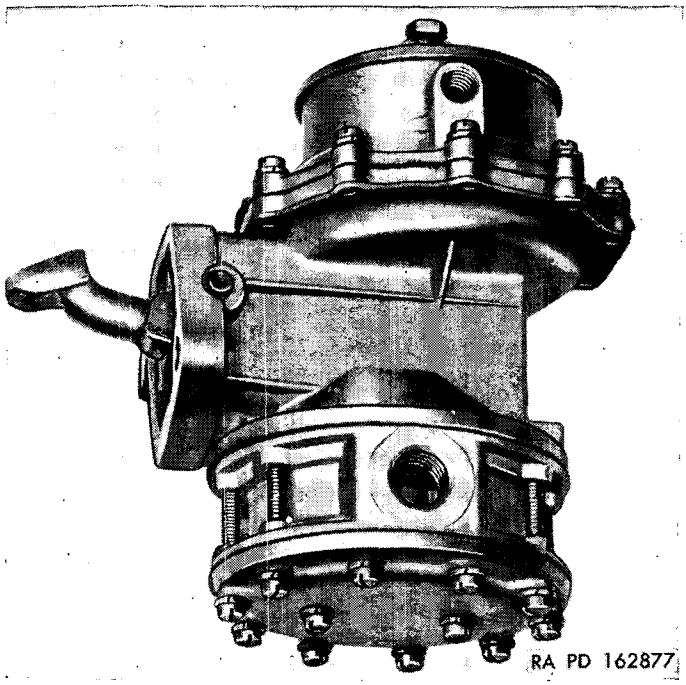

Figure 51. Fuel and vacuum pump, series BK and BN.

c. Disassemble Body.

(1) File riveted end of rocker arm pin flush with the steel washer. Drive out the rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two links).

(3) Lift vacuum diaphragm out of body and remove lower oil seal retainer by turning until slot lines up with flat of pull rod. Remove oil seal washer, upper oil seal retainer, and oil seal spring.

(4) Remove fuel diaphragm by pulling straight out.

Caution: Do not tilt excessively or staked-in oil seal will be damaged.

Lift diaphragm spring and spring retainer from pump body.

(5) The diaphragm pull rod oil seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seal, it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding wheel. Pull seals out of body with hook shaped tool, being careful not to damage seal seat.

d. Disassemble Fuel Cover. Remove two cover center screws and lock washers. Lift off the pulsator cover plate and three layers of pulsator diaphragm. Remove four screws from each of two valve and cage retainers. Remove two retainers, six valve and cage assemblies, and six gaskets.

e. Disassemble Vacuum Cover.

(1) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove cover plate screw with its gasket. Lift off the cover, cover gasket, screen retainer, and screen.

79. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

80. Assembly

a. Assemble Body (fig. 52).

(1) Place fuel section gasket and seal in recess of body with dished portion of seal down. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Assemble link spacer over fuel link. Place one vacuum link on each side of fuel link.

Note. Fuel link is the short center link.

The hook ends of the vacuum links should come together so that they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between lobes of rocker arm with one spacer washer on the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(3) Stand the pump body on the bench, fuel flange down. Set the rocker arm spring in position with one end over the cone cast into the body. Slide rocker arm and link assembly into

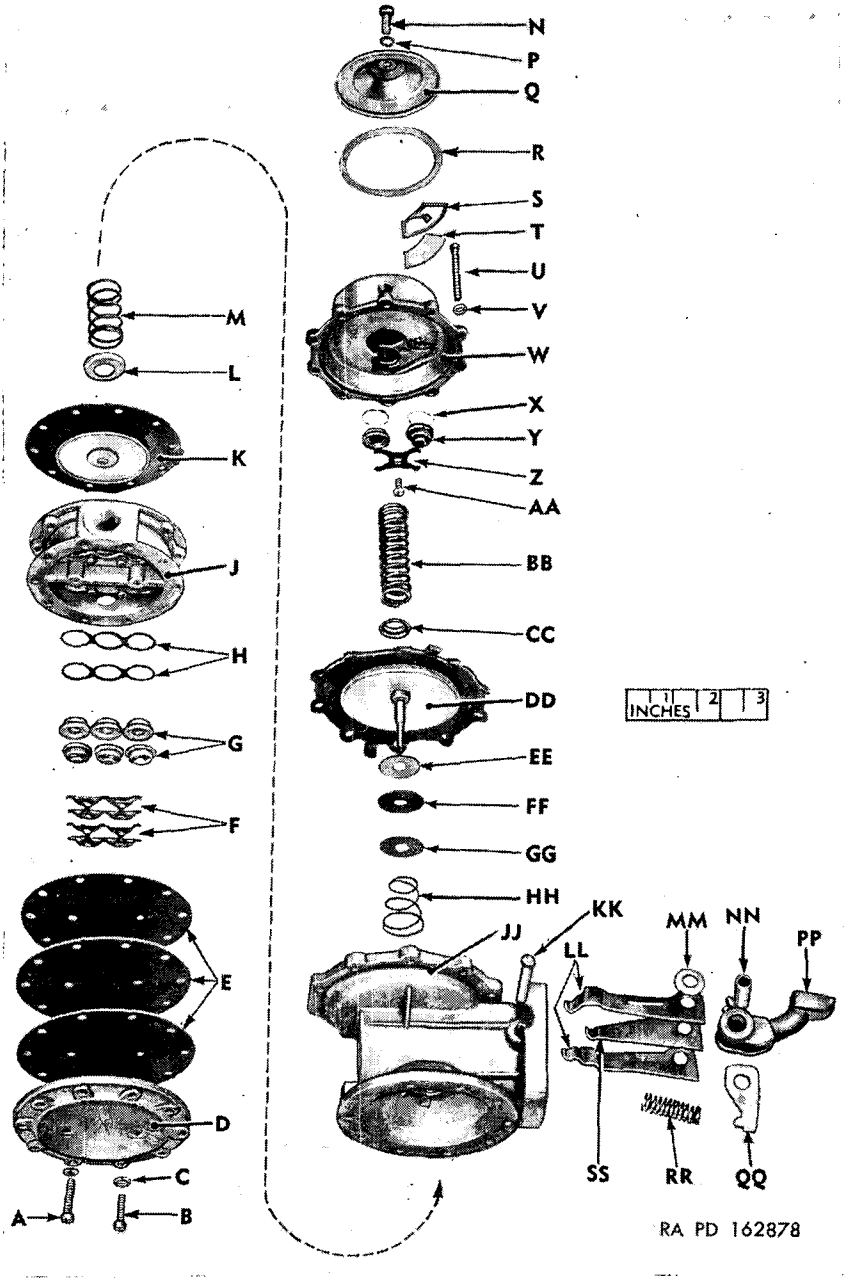

Figure 52. Fuel and vacuum pump—disassembled (typical series BK and BN construction).

body. Outer end of rocker arm spring slips over the projection on link spacer; the open end of all link hooks must point toward the vacuum flange. Temporarily retain rocker arm and link assembly with a 4- or 5-inch length of ⅛-inch rod.

(4) Soak diaphragm in clean kerosene. Fuel oil may be used; but do not use shellac or sealing compound. Turn the pump body over so the fuel diaphragm flange is up. Set the diaphragm spring on the staked-in oil seal and the retainer on top of the spring. Push diaphragm pull rod through retainer, spring, and oil seal. Flat of pull rod must be at right angles to link. Hook diaphragm pull rod to fuel link.

Caution: Do not tilt diaphragm pull rod excessively as this may damage the oil seal.

(5) Remove temporary pin, aline rocker arm bushing hole with hole in body, and drive in the rocker arm pin. Place washer over small end of pin and retain by spreading end of pin.

b. Assemble Fuel Cover. Place six valve and cage gaskets in cover with six valve and cage assemblies on top of gaskets. Inlet valve and cages must have 3-legged spider facing into cover; outlet valve must have 3-legged spider facing out of cover. Retain each set of three valve and cage assemblies with one retainer and four screws. Place three layers of pulsator diaphragm on cover and follow with pulsator cover plate. Aline two center screw holes and insert two screws with

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A—COVER SCREW
B—CENTER SCREW
C—LOCK WASHER
D—PULSATOR COVER PLATE
E—PULSATOR COVER
F—RETAINER
G—VALVE AND CAGE
H—GASKET
J—FUEL COVER
K—FUEL DIAPHRAGM
L—FUEL DIAPHRAGM SPRING RETAINER
M—FUEL DIAPHRAGM SPRING
N—SCREW
P—LOCK WASHER
Q—VACUUM COVER PLATE
R—GASKET
S—SCREEN RETAINER
T—SCREEN
U—SCREW
V—LOCK WASHER
W—VACUUM COVER
X—GASKET
Y—VALVE AND CAGE
Z—RETAINER
AA—SCREW
BB—VACUUM DIAPHRAGM SPRING
CC—VACUUM DIAPHRAGM SPRING RETAINER
DD—VACUUM DIAPHRAGM
EE—OIL SEAL RETAINER
FF—OIL SEAL
GG—OIL SEAL RETAINER
HH—OIL SEAL SPRING
JJ—BODY
KK—ROCKER ARM PIN
LL—VACUUM LINK
MM—WASHER
NN—BUSHING
PP—ROCKER ARM
QQ—SPACER
RR—ROCKER ARM SPRING
SS—FUEL LINK

Figure 52—Continued.

lock washers through cover plate, pulsator diaphragm, and into pump cover. Tighten screws securely.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two gaskets and two valve and cage assemblies in cover. Inlet valve must have 3-legged spider facing out of cover; outlet valve must have 3-legged spider facing into cover. Secure valve and cage assemblies with retainer and screw.

(2) Turn cover over and set screen in recess over valve hole. Set screen retainer on screen. Place the cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Assemble oil seal on vacuum diaphragm pull rod in the following sequence: oil seal spring, upper retainer, oil seal washer, and lower retainer. Turn lower retainer 90 degrees to lock in position.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding the vacuum diaphragm in position, the body should be clamped in a vise, vacuum side up. Clamp by one of the mounting flange ears. The vacuum diaphragm must be held level with the body flange during the following operations. The diaphragm is held level by inserting a $\frac{3}{32}$-inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel $\frac{3}{16}$ x $\frac{3}{32}$ x 6. Bend one end to form a right angle hook three-eighths of an inch from bend to end (fig. 32).

(4) Place spring retainer on riveted end of diaphragm pull rod and the spring on the retainer. Place vacuum cover over spring and aline the file marks.

(5) Insert two No. 10–32NF x $1\frac{1}{2}$ screws in two opposite holes in cover flange. Turn these long screws down alternating a few turns on each. Insert the regular screws with lock wash-

ers and tighten until screws just engage lock washers. Replace two long screws with regular screws and lock washers.

(6) Remove $^{3}/_{32}$-inch tool (figs. 32 and 33) from rocker arm position. This allows the heavy vacuum spring to push diaphragm into a flexed position. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

Section XXV. SERIES BR FUEL PUMPS

81. Disassembly

(fig. 54)

a. Separate Body From Cover.

(1) Mark edges of top cover and body of series BR fuel pump (fig. 53) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative positions and heat shield stud properly located.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Disassemble Body. Rest pump on edge of vise and drive out rocker arm pin with drift punch and hammer. Remove rocker arm, arm spring, bushing and link. Lift out diaphragm assembly and spring. Some pumps may be equipped with an oil seal which is locked in place on the diaphragm pull rod. Disassemble by turning lower retainer until slot lines up with flat of pull rod. Remove lower retainer, two washers, upper oil seal retainer, and retainer spring.

c. Disassemble Cover.

(1) Loosen bail screw nut and remove bowl, bowl gasket, and bowl seat. Spring bail out of retaining holes in top cover. Remove strainer screen from cover.

(2) Remove two valve plate screws and remove valve plate, two valve and cage assemblies, and gasket.

82. Cleaning and Inspection

For cleaning and inspection of this series of fuel pumps, refer to paragraph 16.

83. Assembly and Test

a. Assemble Body (fig. 54).

(1) Make an assembly of link and rocker arm by inserting bushing. Place assembly of rocker arm and link in body with link hook down. Aline rocker arm pin hole with hole in

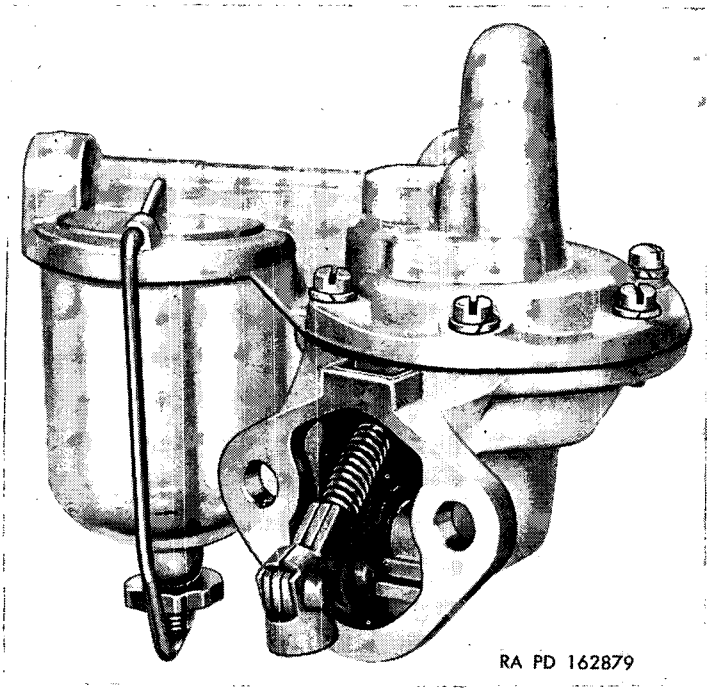

Figure 53. Fuel pump, series BR.

body and drive in rocker arm pin. Install washer on small end of rocker arm pin and spread end of pin. Install rocker arm spring.

(2) Soak new diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. If used, install oil seal spring, upper oil seal retainer, two oil seal washers and lower retainer on diaphragm pull rod. Turn lower retainer 90 degrees to lock in place. Place diaphragm spring over pull rod well and install diaphragm assembly. Hold pump body upside down and press diaphragm against spring. At the same time, tilt the diaphragm so pull rod angles away from link hook. Bring diaphragm back to level position so that the link engages the pull rod.

b. Assemble Cover.

(1) Install valve and cage gaskets and two valve and cage assemblies. Outlet valve must have 3-legged spider facing into cover and inlet valve must have 3-legged spider facing out of cover.

(2) Install strainer screen, bowl gasket, and bowl. Spring bail into retaining holes in cover. Place bowl seat on bail screw and swing bail into position to retain bowl. Tighten bail nut with fingers only.

c. Assemble Cover to Body.

(1) Install top cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install top cover screws and lock

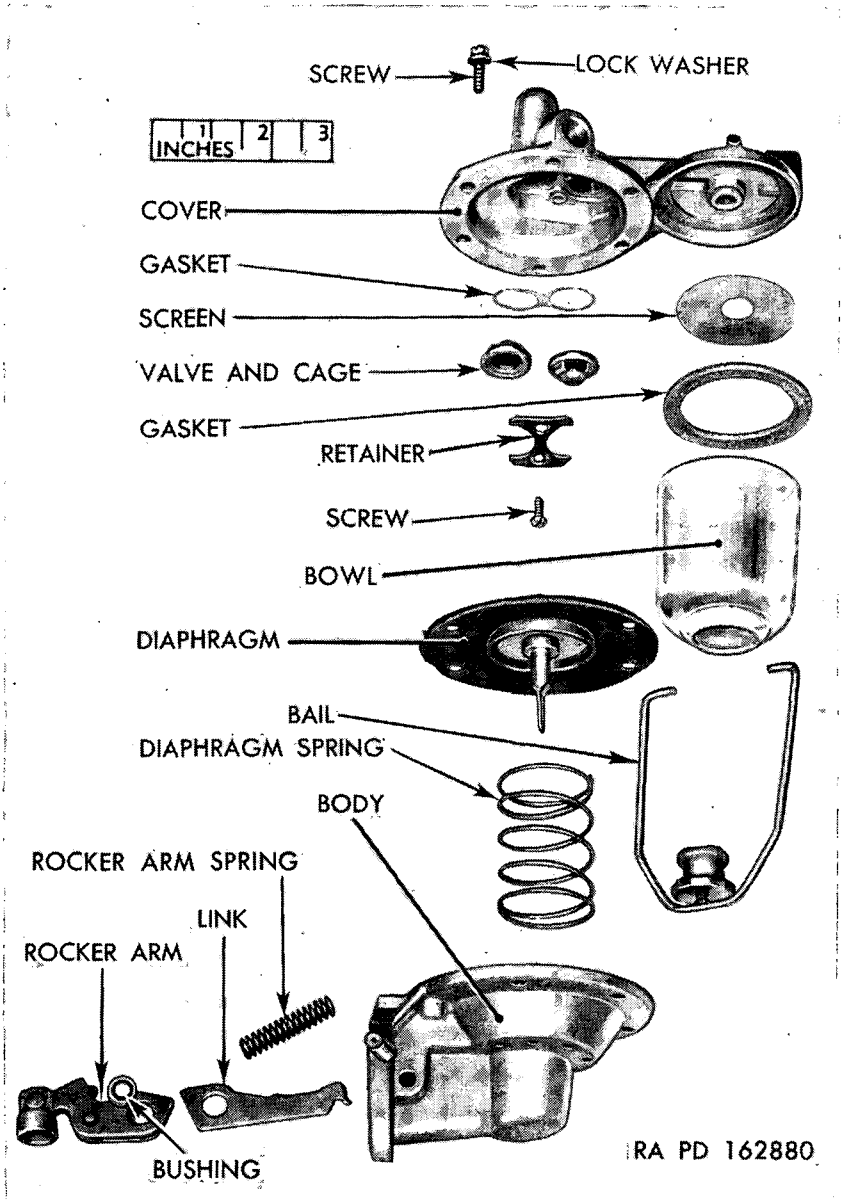

Figure 54. Fuel pump—disassembled (typical series BR construction).

washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in a flexed position while tightening cover screws, or pump will deliver too much pressure.

d. Test. Test operation of pump valves, diaphragm, and diaphragm spring by attaching pressure gage to pump outlet. Operate priming lever or rocker arm until gage shows 3 psi. Discontinue building up pressure and observe time required for gage pointer to drop from 3 to 2 psi. A time lapse of 5 seconds or more indicates a satisfactory pump.

Section XXVI. SERIES BZ FUEL AND VACUUM PUMPS

84. Disassembly

(fig. 56)

a. Separate Fuel Cover From Body.

(1) Mark edges of fuel cover and body diaphragm flanges of series BZ fuel and vacuum pump (fig. 55) with a file. The parts may then be assembled in the same relative position. Note that the fuel diaphragm is symmetrical and that the vacuum diaphragm has bulges where the screw holes occur.

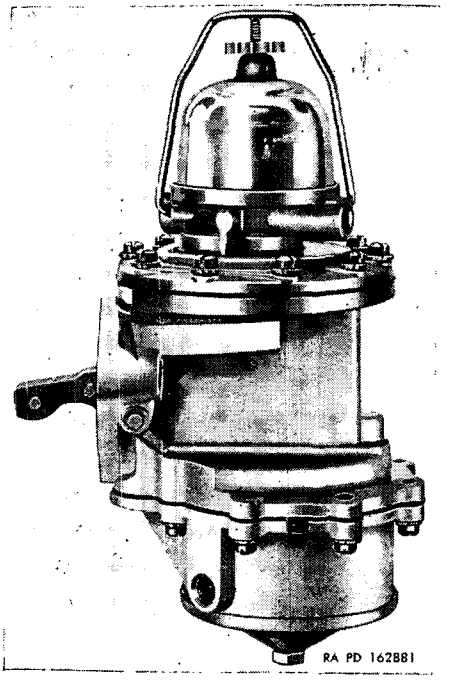

Figure 55. Fuel and vacuum pump, series BZ.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of cover and substitute for them two No. 10–32NF x 1½ fillister-head screws. Turn the two long screws all the way down; then remove the balance of the regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the diaphragm spring, and the spring retainer.

c. Disassemble the Body.

(1) File riveted end of rocker arm pin flush with steel washer, or cut off end with ⅜-inch drill. Drive out rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Then remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers).

(3) Lift vacuum diaphragm out of body. Remove fuel diaphragm by pulling straight out.

(4) The diaphragm pull rod seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seals, it is necessary to remove metal displaced by staking operation. Use a small chisel, round file, or small grinding wheel. Pull seals out of body with hook shaped tool being careful not to damage seal seats.

(5) Push the staked in valve off its seat with a thin rod or pencil. If the valve sticks to its seat under very light pressure, if it moves downward and does not rebound, or if the cage is damaged, the complete valve must be replaced. Remove staking with half round file and pull valve out with hook-shaped tool.

d. Disassemble Fuel Cover.

(1) Remove valve and cage retainer screw and lift out cover retainer (if used) two valve and cage assemblies, and gasket.

(2) Loosen bail nut, swing bail assembly to one side, and remove bail, bowl, gasket, and strainer.

e. Disassemble Vacuum Cover. Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two

gaskets. Remove cover screw and its gasket. Lift off cover, cover gasket, screen retainer, and screen.

85. Cleaning and Inspection

For cleaning and inspection of this series of pumps, refer to paragraph 16.

86. Assembly

(fig. 56)

a. Assemble Body.

(1) Place fuel section seal in recess of body with large dished portion of seal down. Press retainer down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Place gasket in recess for vacuum section pull rod seal and follow with seal, narrow diameter first. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(3) Place neoprene gasket in vacuum section valve recess next to oil seal and follow with valve and cage, spring and cage down. Firmly press valve and cage against neoprene gasket and retain by staking die cast in three places around valve.

(4) Assemble link spacer over fuel link. Place one vacuum link on each side of fuel link. The hook ends of vacuum links should come together so that they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between lobes of rocker arm with one spacer washer on the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(5) Place pump body on bench with fuel flange down. Set rocker arm spring in position with one end over cone cast into body. Slide rocker arm and link assembly into body. Outer end of rocker arm spring fits over projection on link spacer. The open end of all link hooks must point toward vacuum diaphragm flange. Temporarily retain rocker arm and link assembly with a 4- or 5-inch length of 1/8-inch rod.

(6) Soak fuel diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Turn pump body over so fuel diaphragm flange is up. Set the diaphragm spring on the staked-in seal and the retainer on top of the spring. Push diaphragm pull rod through retainer, spring, and oil seal. Flat of pull rod must be at right angles to fuel link. Hook diaphragm pull rod to short, center, fuel link.

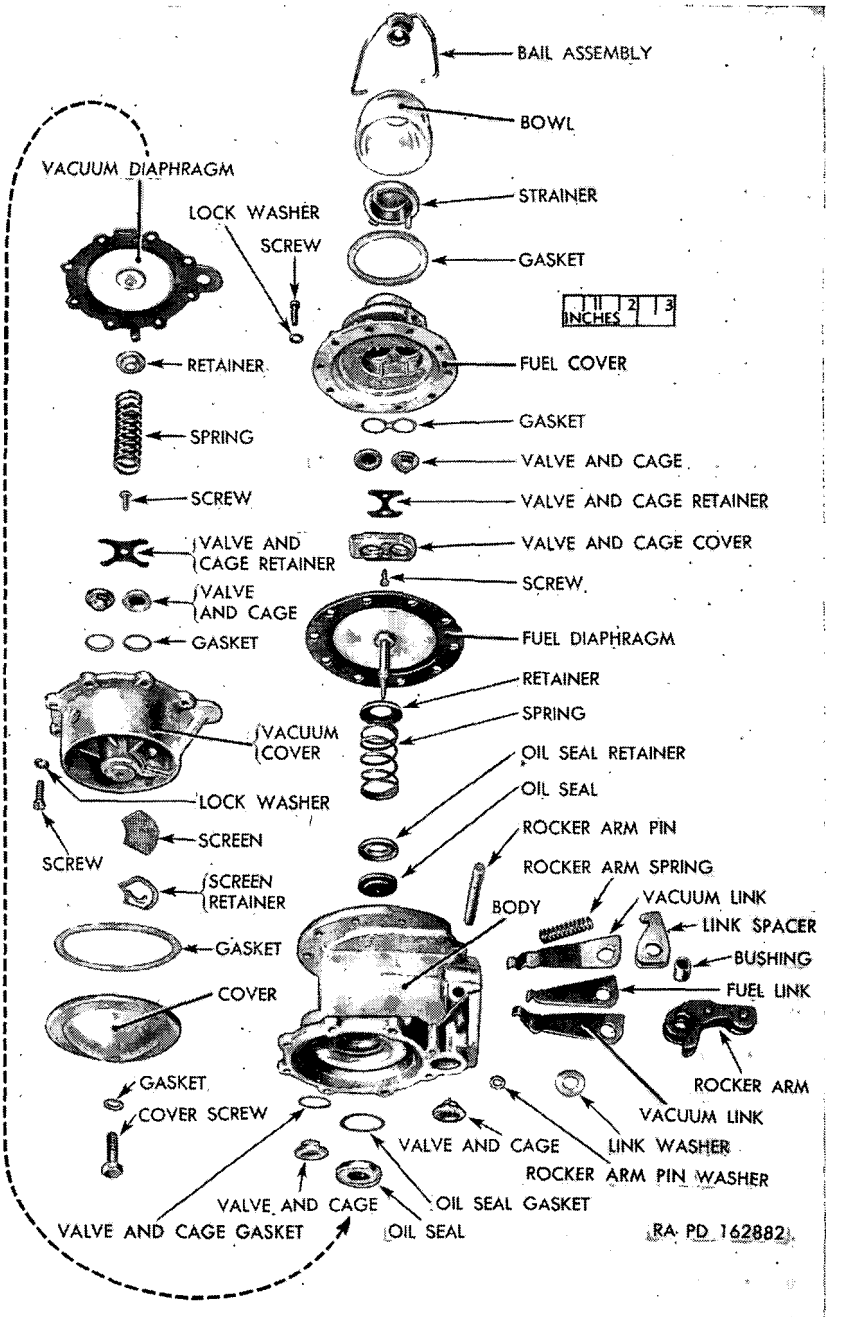

Figure 56. Fuel and vacuum pump—disassembled (typical series BZ construction).

(7) Drive temporary pin out with permanent pin. Place washer over small end of pin and spread pin end to retain washer.

b. Assemble Fuel Cover.

(1) Place valve and cage gasket in recess provided and valve and cages on top of gaskets. Secure valve assemblies with retainer and two screws.

(2) Install strainer, bowl gasket, and bowl. Swing bail assembly over bowl and finger tighten thumb nut against bowl.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker through its full stroke and hold in that position while tightening cover screws securely.

(2) Diaphragm must be flexed before tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two valve and cage gaskets in recesses provided and follow with two valve and cage assemblies. Secure valve and cages with retainer and screw.

(2) Turn cover over and set screen in recess over inlet valve hole. Set retainer on screen. Place cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Push diaphragm pull rod through oil seal with flat of pull rod at right angles to double vacuum links.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding the vacuum diaphragm in position, clamp flange of pump in vise with vacuum side up. The vacuum flange must be held level with the body flange during the following operations. The diaphragm is held level by inserting a $\frac{3}{32}$-inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel $\frac{3}{15}$ x $\frac{3}{32}$ x 6. Bend one end to form a right angle hook three eighths of an inch from bend to end (fig. 32).

(4) Lift diaphragm cloth and position valve and cage in recess close to mounting flange. No gasket is required because the diaphragm seals this valve cage.

(5) Place spring retainer on riveted end of diaphragm pull rod and place the diaphragm spring on the retainer. Place vacuum cover over spring and aline file marks.

(6) Insert two No. 10–32NF x 1½-inch screws in opposite holes in cover flange. Turn these long screws down, alternating a few turns on each screw. Insert regular screws and lock washers; tighten until screws just engage lock washers. Place two long screws with regular screws and lock washers.

(7) Remove 3/32-inch tool from rocker arm position. This allows the heavy vacuum spring to push diaphragm to flexing stop in body. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

Section XXVII. SERIES CF FUEL AND VACUUM PUMPS

87. Disassembly

(fig. 58)

a. Separate Fuel Cover From Body.

(1) Mark edges of fuel cover and body diaphragm flanges of series CF fuel and vacuum pump (fig. 57) with a file. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position. Note that the fuel diaphragm

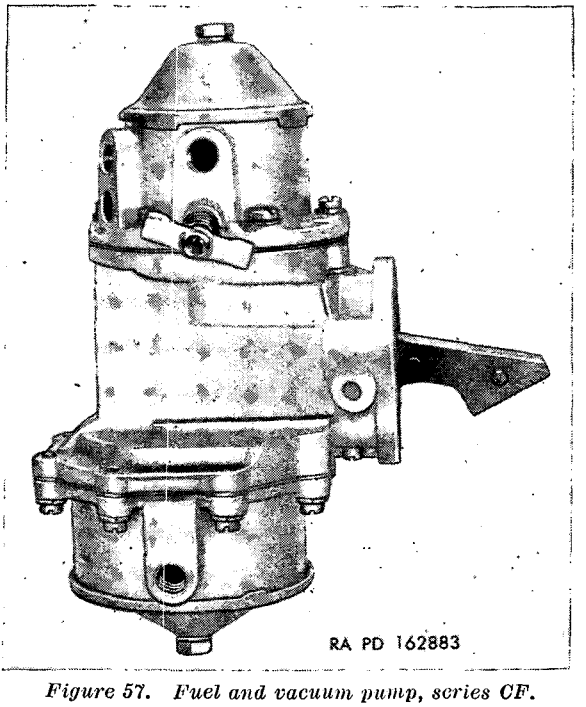

Figure 57. Fuel and vacuum pump, series CF.

flange is symmetrical and the vacuum diaphragm flange has bulges where the screw holes occur.

(2) Remove cover screws and lock washers. Also remove heat shield stud, if used. Separate cover from body by jarring cover loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover and substitute for them two No. 10–32 x 1½ fillister head screws. Turn the two long screws all the way down; then remove the balance of the regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and spring retainer.

c. Disassemble Body.

(1) File riveted end of rocker arm pin flush with steel washer. Drive out the rocker arm pin with a drift punch and hammer. Wiggle rocker arm until links unhook from both diaphragms. Remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm which disengages two vacuum links, one fuel link, link spacer, and link washers.

(3) Lift vacuum diaphragm out of pump body. Lift fuel diaphragm out of pump body and remove spring retainer and spring.

d. Dissassemble Fuel Cover.

(1) Remove two screws holding valve and cage retainer. Lift out valve and cage retainer, two valve and cage assemblies, and gasket.

(2) Remove bowl screw with gasket. Remove bowl, bowl gasket and screen.

e. Disassemble Vacuum Cover.

(1) Remove valve and cage retainer screw. Lift out retainer, two valve and cage assemblies, and two gaskets.

(2) Remove cover plate screw with gasket. Lift off the cover, cover gasket, screen retainer, and screen.

88. Cleaning and Inspection

For cleaning and inspection of this series pump, refer to paragraph 16.

89. Assembly

a. Assemble Body (fig. 58).

(1) Assemble link spacer over fuel link. Place one vacuum link on each side of the fuel link. The hook ends of the vacuum links must come together so they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between lobes of rocker arm with one spacer washer to the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(2) Stand the pump body on the bench, fuel flange down. Set rocker arm spring in position with one end over cone cast into the body. Slide rocker arm and link assembly into body. Outer end of rocker arm spring slips over projection on link spacer; the open end of all link hooks must point toward vacuum flange. Aline rocker arm bushing hole with hole in body and retain assembly by driving rocker arm pin through body and bushing. Place washer over small end of pin and retain by spreading end of pin.

(3) Soak fuel diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Place spacer in pull rod well of body casting. Set the diaphragm spring on the spacer and the spring retainer on top of the spring, dish side down. Hook diaphragm pull rod to center fuel link.

b. Assemble Fuel Cover.

(1) Place valve and cage gasket or two separate gaskets in recesses provided. Place valve and cages on top of gaskets. Inlet valve must have 3-legged spider facing out of cover; the outlet valve must have 3-legged spider facing into cover. Secure valve and cage assemblies with retainer and screw.

(2) Install strainer screen, cover gasket, cover, cover screw gasket, and cover screw in the order named.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two gaskets and two valve and cage assemblies in cover. Inlet valve must have 3-legged spider facing out of cover;

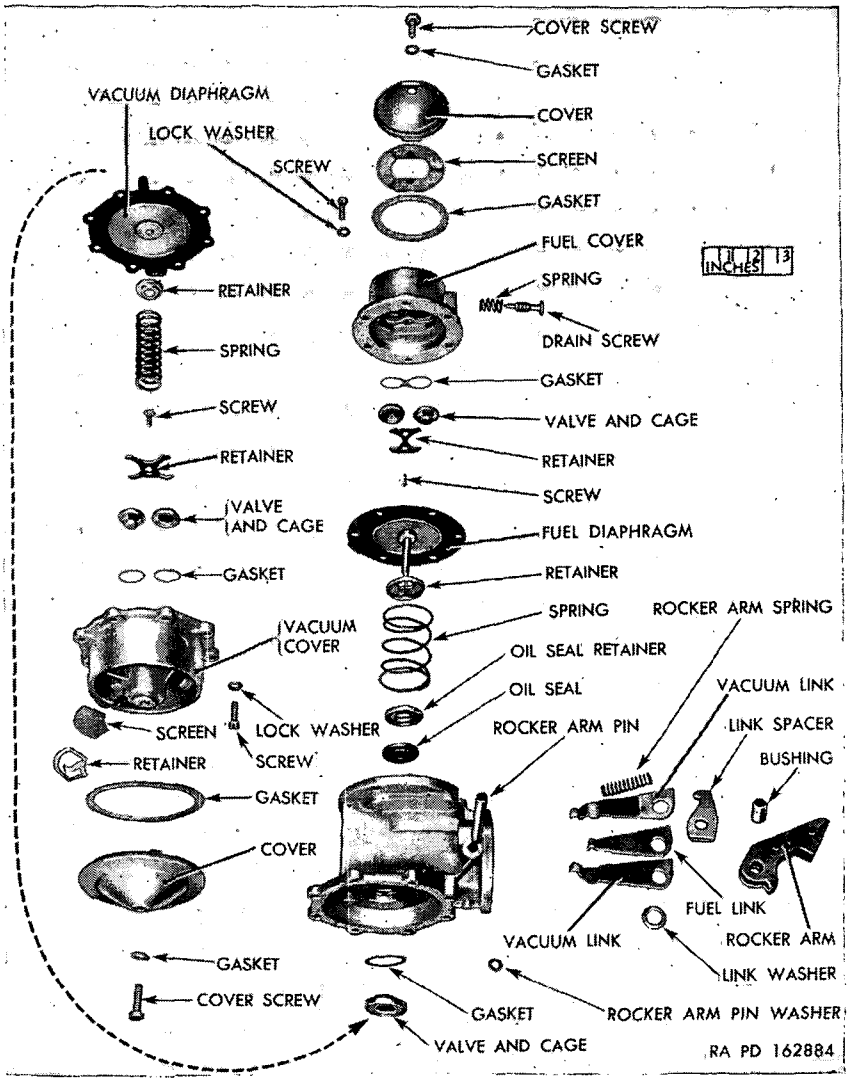

Figure 58. Fuel and vacuum pump—disassembled view (typical series CF construction).

outlet valve must have 3-legged spider facing into cover. Secure valve and cages with retainer and screw.

(2) Turn cover over, and set screen in recess over valve hole. Set screen retainer on screen. Place cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound.

(2) Lift the pump body above eye level, facing the vacuum diaphragm flange. The two vacuum links will swing down so that the diaphragm pull rod can be hooked to both links.

(3) While holding the vacuum diaphragm in position, the body should be clamped in a vise, vacuum side up. Clamp on either side of the mounting flange. The vacuum diaphragm must be held level with the body flange during the following operations. The diaphragm is held level by inserting a 3/32-inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel, 3/16 x 3/32 x 6. Bend one end to make a right angle hook three-eighths of an inch from bend to end (fig. 32).

(4) Place spring retainer on riveted end of diaphragm pull rod and the spring on the retainer. Place vacuum cover over spring and aline the file marks.

(5) Insert two No. 10–32 x 1½ screws in opposite holes in cover flange. Turn these long screws down alternating a few turns on each. Insert regular screws with lock washers and tighten until screws just engage lock washers. Replace two long screws with regular screws and lock washers.

(6) Remove 3/32-inch tool from rocker arm position. This allows the heavy vacuum spring to push diaphragm into flexed position. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

Section XXVIII. SERIES CU AND CY FUEL AND VACUUM PUMPS

90. Disassembly

(fig. 60)

a. Separate Fuel Cover From Body.

(1) Mark edges of cover and body of series CU and CY fuel and vacuum pump (fig. 59) with a file. The parts may then be assembled in the same relative positions.

(2) Remove only the outer circle of screws (long) and lock washers. Separate body from cover at diaphragm flange near body. If cover sticks, it can be jarred loose with a light plastic hammer.

b. Separate Vacuum Cover From Body.

(1) Mark edges of vacuum cover and body diaphragm flanges. Mark at heat shield stud, if used. The parts may then be assembled in the same relative position.

(2) Remove only two cover screws from opposite sides of the cover, and substitute for them two No. 10–32NF x 1½

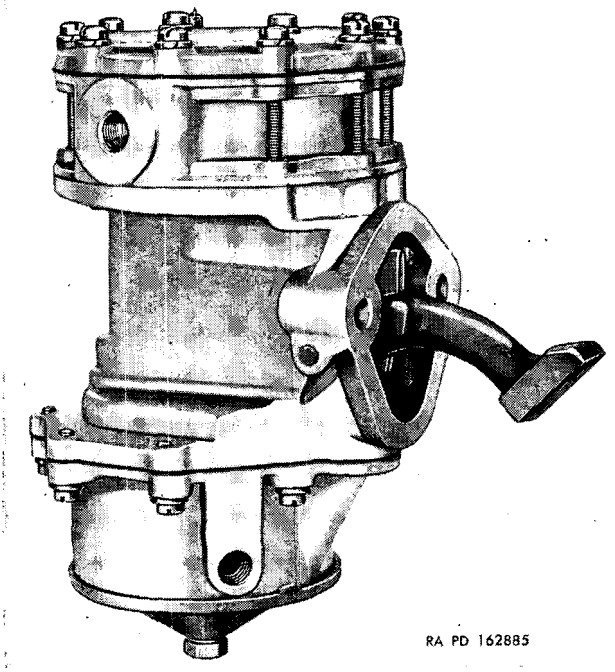

Figure 59. Fuel and vacuum pump—series CU and CY.

fillister-head screws. Turn the two long screws all the way down; then remove the balance of the regular cover screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer, if the flanges stick together. Remove the two long screws, the cover assembly, diaphragm spring, and spring retainer.

c. Disassemble the Body.

(1) File riveted end of rocker arm pin flush with steel washer, or cut off end with 3/8-inch drill. Drive out rocker arm pin with a drift punch hammer. Wiggle rocker arm until links unhook from both diaphragms. Remove rocker arm spring, rocker arm, and link assembly.

(2) Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers).

(3) Lift vacuum diaphragm out of body. Remove fuel diaphragm by pulling straight out.

(4) The diaphragm pull rod seals must be removed if they exhibit wear or the sealing surfaces are torn. To disassemble seals, it is necessary to remove metal displaced by staking

operation. Use a small chisel, round file or small grinding wheel. Pull seals out of body with hook-shaped tool, being careful not to damage seal seats.

(5) Push the staked-in valve off its seat with a thin rod or pencil. If the valve sticks to its seat under very light pressure, if it moves downward and does not rebound, or if the cage is damaged, the complete valve must be replaced. Remove staking with half round file and pull valve out with hook-shaped tool.

d. Disassemble Fuel Cover. Remove two cover center screws and lock washers. Lift off the pulsator cover plate and three layers of pulsator diaphragm. Remove four screws from each of two valve and cage retainers. Remove two retainers, six valve and cage assemblies, and six gaskets.

91. Cleaning and Inspection

For cleaning and inspection of this series of fuel pump, refer to paragraph 16.

92. Assembly

a. Assemble Body (fig. 60).

(1) Place fuel section seal in recess of body with large dished portion of seal down. Press retainer down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(2) Place gasket in recess for vacuum section pull rod seal and follow with seal, narrow diameter first. Press down firmly with flat end of 7/8-inch diameter round bar. Retain by staking die cast lip in four places.

(3) Place neoprene gasket in vacuum section valve recess next to oil seal and follow with valve and cage, spring and cage down. Firmly press valve and cage against neoprene gasket and retain by staking die cast in three places around valve.

(4) Assemble link spacer over fuel link. Place one vacuum link on each side of fuel link. The hook ends of vacuum links should come together so they surround the fuel link. All link hooks should point in the same direction. Place assembly of links and spacer between lobes of rocker arm with one spacer washer on the outer side of each vacuum link. Slide rocker arm bushing through holes in rocker arm, spacer washers, and links.

(5) Place pump body on bench, fuel flange down. Set rocker arm spring in position with one end over cone cast into body.

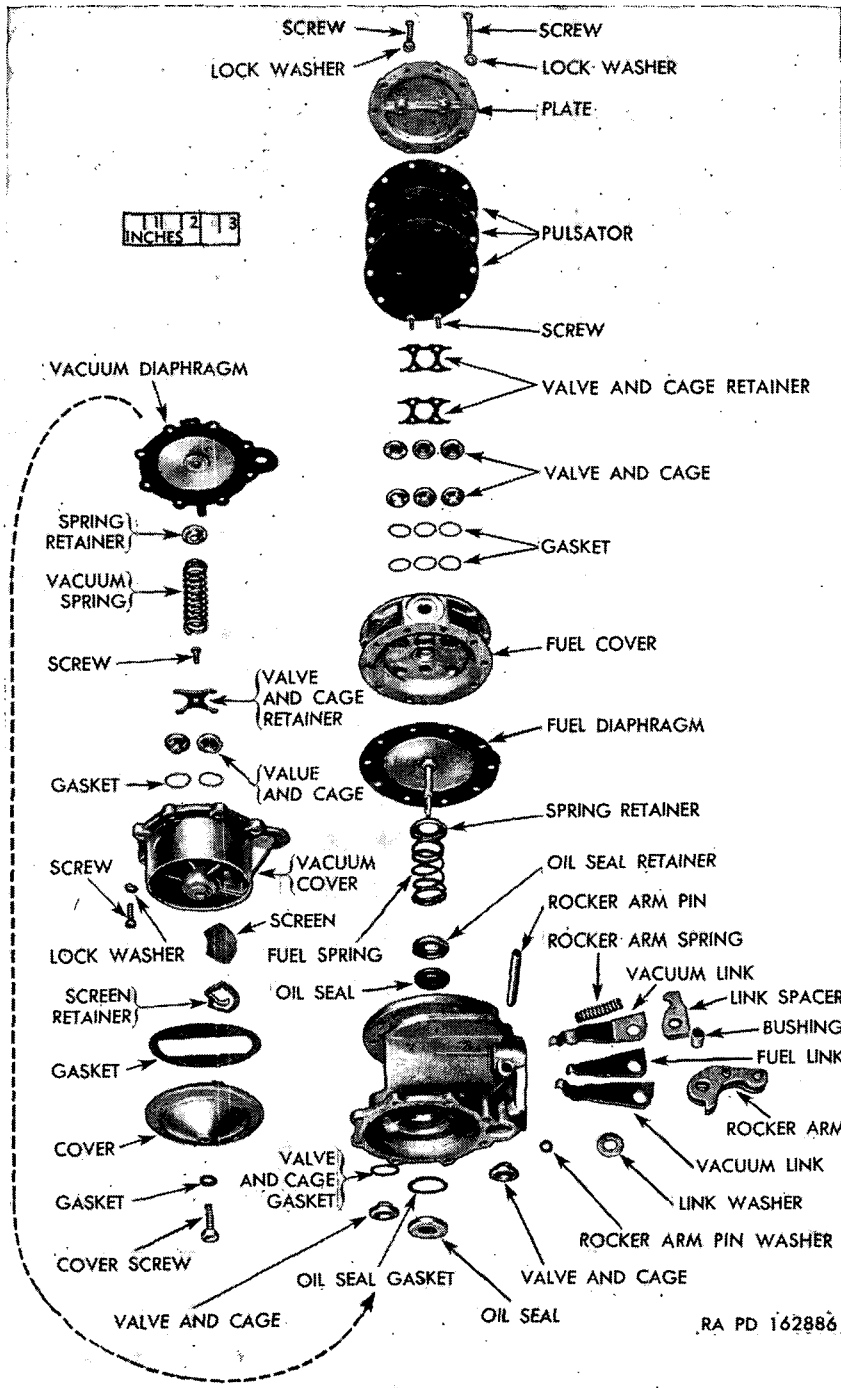

Figure 60. Fuel and vacuum pump, disassembled view (typical series CU and CY construction).

Slide rocker arm and link assembly into body. Outer end of rocker arm spring fits over projection on link spacer. The open end of all link hooks must point toward vacuum diaphragm flange. Temporarily retain rocker arm and link assembly with a 4- or 5-inch length of 1/8-inch rod.

(6) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Turn pump body over so fuel diaphragm flange is up. Set the diaphragm spring on the staked-in seal and the retainer on top of the spring. Push diaphragm pull rod through retainer, spring, and oil seal. Flat of pull rod must be at right angles to fuel link. Hook diaphragm pull rod to short, center, fuel link.

(7) Drive temporary pin out with permanent pin. Place washer over small end of pin and spread pin end to retain washer.

b. Assemble Fuel Cover. Place six valve and cage gaskets in cover with six valve and cage assemblies on top of gaskets. Inlet valve and cages must have 3-legged spider facing into cover; outlet valve must have 3-legged spider facing out of cover. Retain each set of three valve and cage assemblies with one retainer and four screws. Place three layers of pulsator diaphragm on cover, and follow with pulsator cover plate. Aline two center screw holes, and insert two screws with lock washers through cover plate, pulsator diaphragm, and into pump cover. Tighten screws securely.

c. Assemble Fuel Cover to Body.

(1) Install cover on body, making sure that file marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lock washers loosely until screws just engage lock washers. Push rocker arm in full stroke and tighten cover screws securely. Release rocker arm.

(2) Diaphragm must be held in flexed position while tightening cover screws, or pump will deliver too much pressure.

d. Assemble Vacuum Cover.

(1) Place two valve and cage gaskets in recesses provided and follow with two valve and cage assemblies. Secure valve and cages with retainer and screw.

(2) Turn cover over and set screen in recess over inlet valve hole. Set retainer on screen. Place cover gasket, cover, cover screw gasket, and cover screw in position in the order named. Tighten cover screw.

e. Assemble Vacuum Cover to Body.

(1) Soak diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound. Push diaphragm

pull rod through oil seal with flat of pull rod at right angles to double vacuum links.

(2) Clamp flange of pump in vise with vacuum section up. Place 12-inch section of pipe over rocker arm and rise vacuum links by moving rocker arm. Tilt diaphragm pull rod away from links, and as links are raised, bring pull rod back to vertical. Repeat until pull rod is securely hooked to both links.

(3) The vacuum flange must be held level with the body flange during the following operations. The diaphragm is held level by inserting a 3/32-inch piece of metal between rocker arm stop and body. This tool (figs. 32 and 33) can be made from a piece of steel, 3/15 x 3/32 x 6. Bend one end to form a right angle hook three-eighths of an inch from bend to end (fig. 32).

(4) Lift diaphragm cloth and position valve and cage in recess close to mounting flange. No gasket is required because the diaphragm seals this valve cage.

(5) Place spring retainer on riveted end of diaphragm pull rod and place the diaphragm spring on the retainer. Place vacuum cover over spring and aline file marks.

(6) Insert two 10–32NF x 1½ screws in opposite holes in cover flange. Turn these long screws down, alternating a few turns on each screw. Insert regular screws and lock washers and tighten until screws just engage lock washers. Replace two long screws with regular screws and lock washers.

(7) Remove 3/32-inch tool from rocker arm position. This allows the heavy vacuum spring to push diaphragm to flexing stop in body. Tighten all cover screws securely.

f. Test. Fuel and vacuum pumps cannot be bench-tested.

CHAPTER 5

CARTER MECHANICAL FUEL PUMPS

Section I. DESCRIPTION AND DATA

93. Description

a. Carter fuel pumps are of two kinds: those driven electrically and those driven mechanically. For details on electrically driven fuel pumps, refer to chapter 6. Of the mechanically driven kind, four general types of fuel pumps may be identified.

(1) Fuel pump with screen filter (pars. 97–99).
(2) Fuel pump with offset ceramic filter (pars. 100–102).
(3) Fuel pump with in-line ceramic filter (pars. 103–105).
(4) Fuel pump with vacuum booster (pars. 106–108).

b. All fuel pumps (*a* above) will be described together since they differ only with respect to the type of filter used and to the filter's loca-

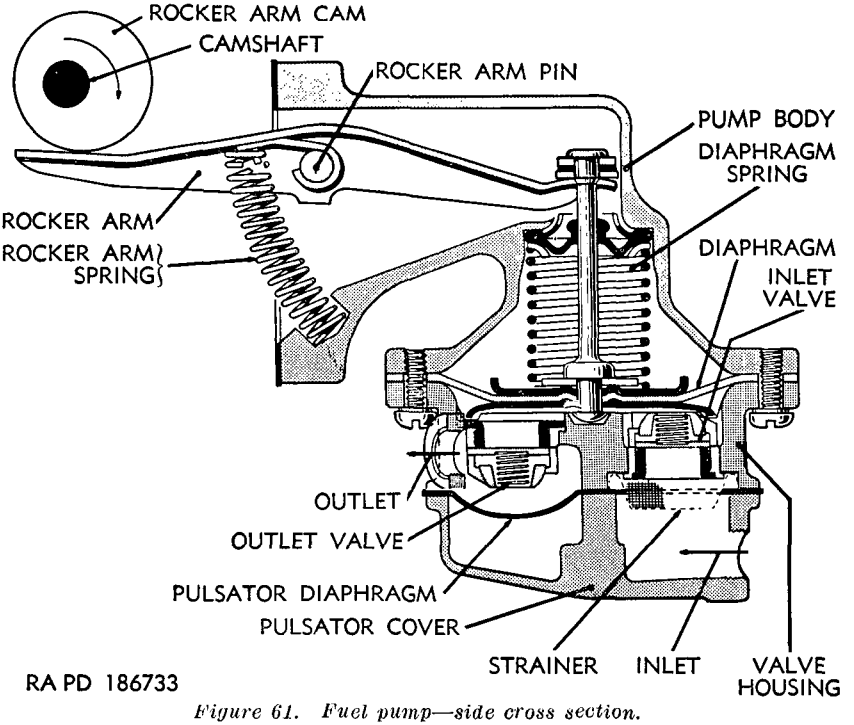

Figure 61. Fuel pump—side cross section.

tion. They consist of a pump body containing the rocker arm and the diaphragm assembly; a valve housing in which the inlet and outlet valves are seated; a pulsator cover; and a filter, either screen type or ceramic type variously located. Figures 61 and 62 show a cross section of a typical Carter mechanical fuel pump.

c. In addition to all the elements described (*b* above), the fuel pump with vacuum booster has an air vacuum booster (or air pump) attached to the fuel pump body, and is actuated by the same rocker arm.

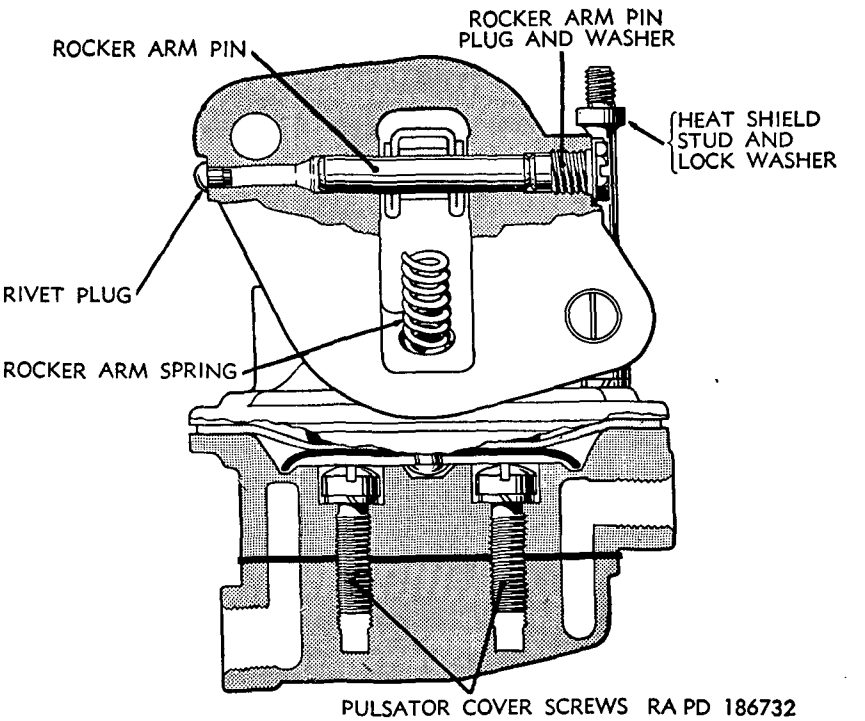

Figure 62. Fuel pump—front cross section.

Continuous operation of this booster insures a sufficient vacuum at the windshield wiper air motor at all times so that the wiper will function even during rapid acceleration and wide open throttle. Figure 63 shows a cross section of a typical Carter mechanical fuel pump with vacuum booster.

d. All the fuel pumps described in this chapter are located in the same relative position on the engine, namely, in the fuel line between the carburetor and the fuel tank.

e. Fuel pumps with vacuum booster have the addition of two air lines, one coming from the windshield wiper air motor and the other going to the engine intake manifold.

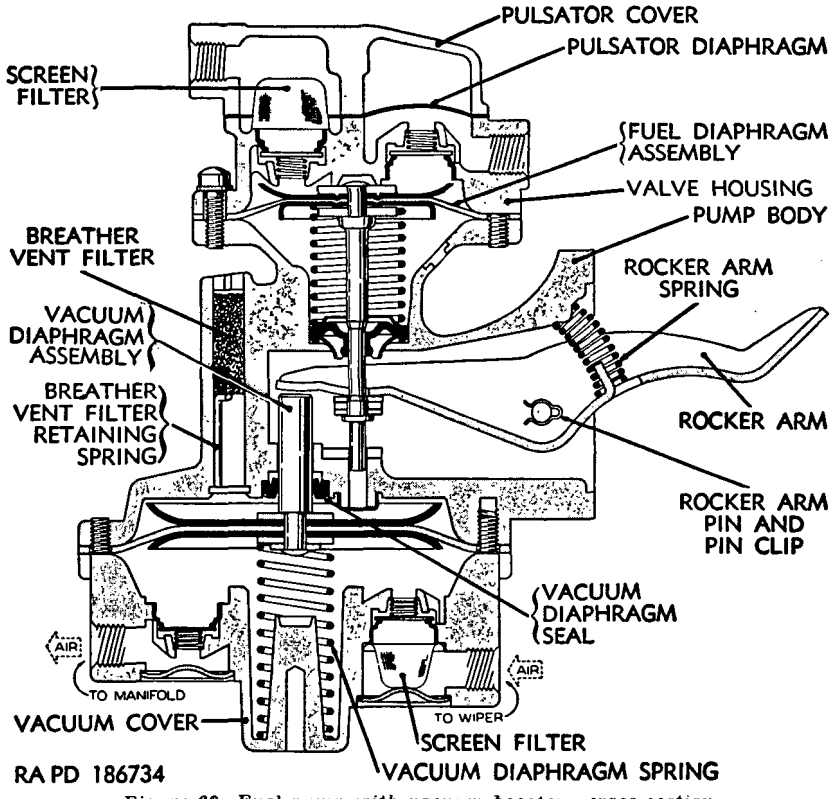

Figure 63. Fuel pump with vacuum booster—cross section.

94. Link Action

The construction of the end of the rocker arm in contact with the diaphragm assembly is highly important for understanding the operation of the Carter mechanical fuel pump. At the point of contact the rocker arm is slotted, having the appearance of a blunt fork. This construction permits the diaphragm stem to pass through the slot without any attachment. Thus, the rocker arm, by means of its two end forks, can lift the diaphragm stem on the up stroke only, the down stroke being accomplished not by the rocker arm, but by the diaphragm spring expanding from the up stroke compression. This type of pumping action is called *nonpositive* since the diaphragm is under positive control of the rocker arm only during one-half a cycle.

95. Data

a. Detailed Data.

Fuel volume delivery (aprx)__ 25 gal per hr at 1,000 rpm engine speed.
Suction vacuum_____ at least 10 in hg at 500 rpm engine speed.
Discharge pressure____ 3½ lb min to 5 lb max at 500 rpm engine speed.

b. Identification Data. Table III below includes all fuel pumps described in this chapter, arranged in part number sequence. Table IV is arranged by type of fuel pump.

Table III. Fuel Pumps in Part Number Sequence

Carter part No.	Type of fuel pump	Carter repair kit No.
M593S	Screen filter	M20004.
M594S	Screen filter	M20004.
M623S	Screen filter	M20004.
M639S	Screen filter	
M639SA	Screen filter	M20006A.
M639SL	Screen filter	M20006A.
M639SZ	Screen filter	M20006A.
M729SA	Screen filter	M20009A.
M729SL	Screen filter	M20009A.
M729SZ	Screen filter	M20009A.
M737S	In-line ceramic filter	M195–48U.
M748S	In-line ceramic filter	M195–49U.
M751S	Screen filter	M20007A.
M758S	Offset ceramic filter	M195–48U.
M772S	Screen filter	M20011A.
M774S	Screen filter	M20012A.
M778S	In-line ceramic filter	M195–49U.
M779S	Offset ceramic filter	M195–48U.
M797S	Vacuum booster	M20013B.
M798S	Vacuum booster	M20013B.
M807S	Screen filter	M20007A.
M809S	Vacuum booster	M20013B.
M816S	Screen filter	M20007A.
M825S	Offset ceramic filter	M20016.
M826S	Offset ceramic filter	M20015.
M840S	Screen filter	M20017.

Table IV. Fuel Pumps Arranged by Type

Type of fuel pump	Carter part No.	Carter repair kit No.
In-line ceramic filter	M737S	M195–48U.
In-line ceramic filter	M748S	M195–49U.
In-line ceramic filter	M778S	M195–49U.
Offset ceramic filter	M758S	M195–48U.
Offset ceramic filter	M779S	M195–48U.
Offset ceramic filter	M825S	M20016.
Offset ceramic filter	M826S	M20015.
Screen filter	M593S	M20004.
Screen filter	M594S	M20004.
Screen filter	M623S	M20004.
Screen filter	M639S	----------
Screen filter	M639SA	M20006A.
Screen filter	M639SL	M20006A.
Screen filter	M639SZ	M20006A.
Screen filter	M729SA	M20009A.
Screen filter	M729SL	M20009A.
Screen filter	M729SZ	M20009A.
Screen filter	M751S	M20007A.
Screen filter	M772S	M20011A.
Screen filter	M774S	M20012A.
Screen filter	M807S	M20007A.
Screen filter	M816S	M20007A.
Screen filter	M840S	M20017.
Vacuum booster	M797S	M20013B.
Vacuum booster	M798S	M20013B.
Vacuum booster	M809S	M20013B.

96. Mechanical Action

a. Rocker Arm Action. All mechanically driven models operate on the same principle. Refer to figures 61, 62, and 63 for a typical installation. When properly installed, the rocker arm of the fuel pump lies directly underneath and in contact with the camshaft rocker arm cam. Each revolution of the camshaft causes the fuel pump to go through one complete cycle in the following manner. The rocker arm cam depresses the rocker arm; the arm being pivoted on the rocker arm pin lifts the diaphragm in the pump body thereby compressing the diaphragm spring and inducing subatmospheric pressure at the inlet valve. Atmospheric pressure in the fuel tank forces fuel through the inlet, screen, and valve into the inlet valve pump body. When the diaphragm has reached its highest position the rocker arm cam swings away from the rocker arm, permitting the rocker arm spring to push the rocker arm back rapidly to its initial position.

Thus released, the compressed diaphragm spring thrusts the diaphragm down thereby forcing the fuel through the outlet valve, the fuel line, and into the open fuel inlet needle valve of the carburetor. The down stroke completes the pumping cycle for one revolution of the camshaft. When the fuel level in the carburetor float chamber reaches the maximum allowable, the float assembly closes the fuel inlet needle valve, stopping the flow of fuel. On the following up stroke, fuel enters the pump body as usual but no down stroke occurs. Instead, the diaphragm remains in the up position, the downward force of the spring being balanced by the upward force of the trapped liquid pressure spread over the diaphragm area. The rocker arm continues to move up and down, but since its action is nonpositive (par. 94) on the down stroke, it has no effect on the diaphragm assembly. When the fuel inlet needle valve opens, the pumping cycle is repeated.

b. Air Domes. The discharge of all single diaphragm pumps is pulsating unless some device is added to the pump to smooth out the discharge pressure variations. This device is a chamber filled with air placed at some convenient location on the discharge side of the pump. During the high pressure part of the down stroke the air in the chamber is compressed. As the diaphragm spring expands, the force it exerts decreases so that the liquid pressure begins to fall. The compressed air in the chamber now comes into play, expanding simultaneously so as to keep the discharged pressure up. In this way. pressure pulsation is dampened. In all types of mechanically driven fuel pumps considered here, the air chamber is built into the pulsator cover and is separated from the fuel by a diaphragm so that the air will not be lost by being absorbed in the passing fuel. An integral intake air dome is also maintained in the inlet side of the pump body in the form of a small pocket. The air in this pocket is compressed during the early part of the discharge stroke just before the inlet valve closes. During the following intake stroke this air expands allowing the atmospheric pressure in the supply tank to force fuel to the pump in a steady flow.

c. Mechanical Action at the Vacuum Booster. During idling and cruising speeds, the intake manifold is under high vacuum which is communicated to the vacuum side of the booster vacuum diaphragm by a tube. The reverse side of the diaphragm is always under atmospheric pressure since it opens to the air through the breather vent hole (protected by a filter). The differential pressure action on the diaphragm keeps it depressed against the strong upward force of the vacuum diaphragm spring. The rocker arm meanwhile oscillates through many cycles without touching the vacuum diaphragm stem. Hence the booster does not act. However, at wide open throttle conditions, when the engine is delivering maximum power, the intake

manifold vacuum falls (that is, the absolute pressure rises). The differential pressure is no longer strong enough to hold the diaphragm down. The spring then forces the diaphragm up against the rocker arm and the booster begins to operate, delivering air to the manifold and hence, creating a vacuum at the windshield wiper air motor.

Section II. FUEL PUMP WITH SCREEN FILTER

97. Disassembly

a. General. Repair and rebuild of all screen filter type fuel pumps are similar to the instructions contained in this section for the model M639S fuel pump (fig. 64). This model represents a typical screen

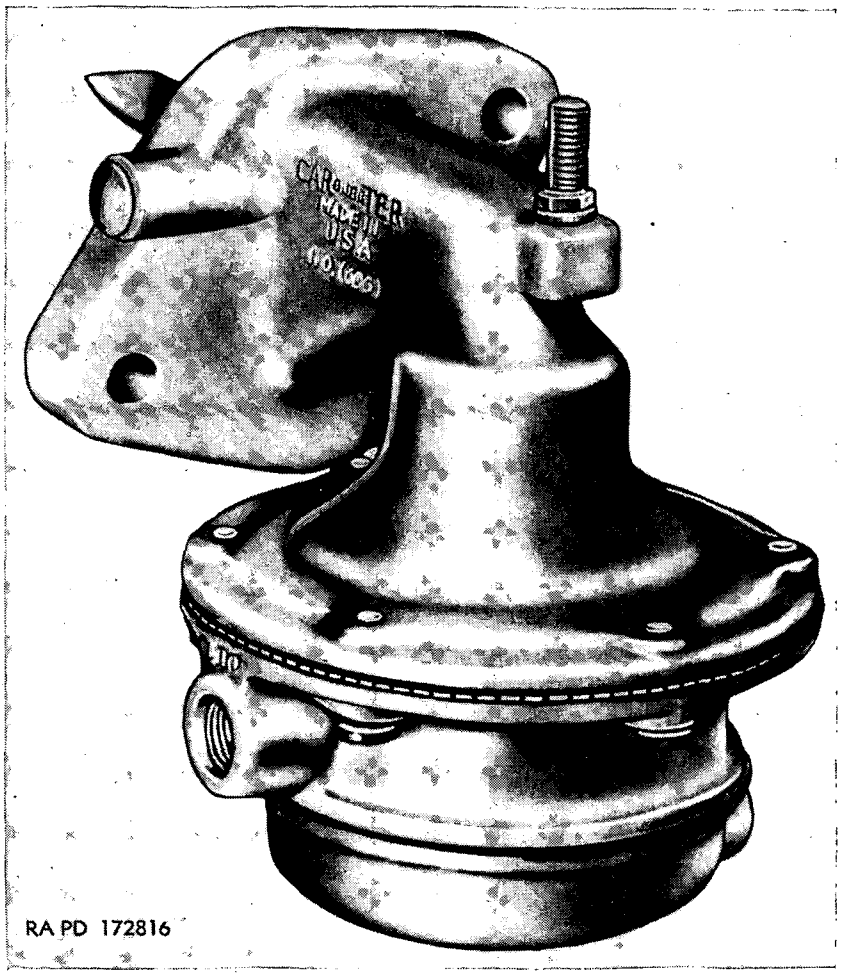

Figure 64. Fuel pump with screen filter (model M639S).

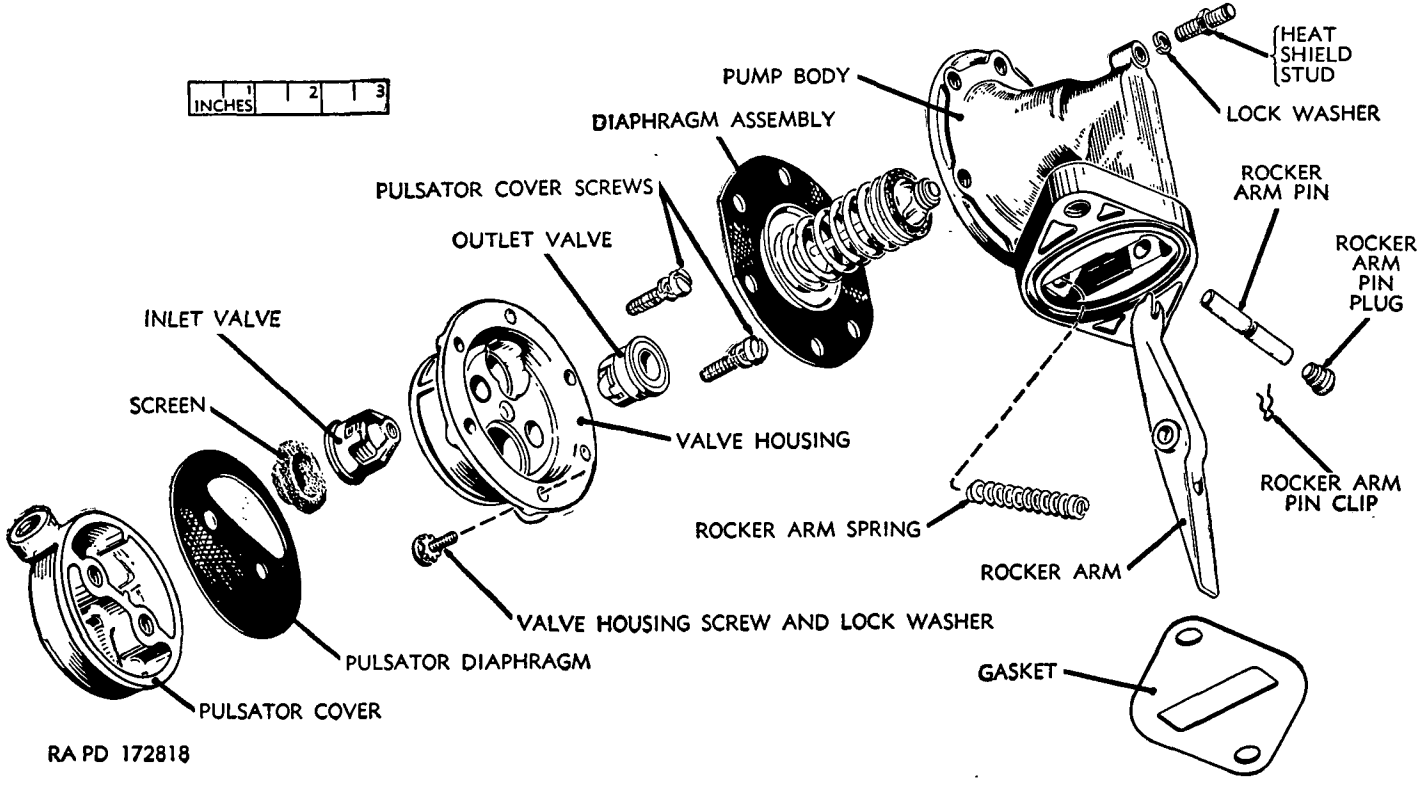

Figure 65. Fuel pump with screen filter (model M639S)—exploded view.

filter type fuel pump. Refer to figure 65 for disassembly and subsequent assembly procedures.

b. Preliminary. Mark edges of pump body and valve housing with a file. Mark at heat shield stud, if used. This will serve to show how the parts may be reassembled in the same relative positions, and the heat shield stud properly located.

c. Remove Pump Body. Remove rocker arm spring, rocker arm pin plug, rocker arm pin clip (if used), and rocker arm pin. Rocker arm will now slide freely out of pump body. Remove valve housing screws, lock washers, and when used, the heat shield stud, nut, and lock washer. Separate pump body from valve housing. Remove diaphragm assembly.

d. Remove Valve Housing Assembly. Remove two pulsator cover screws and lock washers. Separate valve housing from pulsator cover. Remove pulsator diaphragm and fuel screen.

e. Remove Valves. Remove inlet and outlet valves.

Note. Do not remove valves unless inspection reveals they are damaged or corroded.

98. Cleaning and Inspection

a. General. Check fuel pump number and select proper repair kit using table III or table IV (par. 95). All parts contained in repair kit should be used to replace parts removed from fuel pump. These parts are the diaphragm assembly, pulsator diaphragm, and rocker arm spring. On vacuum booster type fuel pumps, the vacuum diaphragm assembly, vacuum diaphragm seal, and breather vent filter are included. When rebuilding fuel pumps with ceramic filters, discard the filter and bowl gasket.

b. Cleaning. Clean all parts in dry-cleaning solvent or volatile mineral spirits and blow out with compressed air. Take special care to avoid damaging valves.

c. Inspection. Make the following inspection of fuel pump parts which are not included in the repair kit:

(1) *Covers.* Discard covers if cracked, broken, or if the diaphragm flange is warped more than 0.010 inch. If warped less than 0.010 inch, dress up with a disk grinder. Stripped or cross threads can sometimes be corrected with a thread chaser, or drilled out and retapped to a larger size.

(2) *Bodies and housings.* Discard body or housing if diaphragm flange is warped more than 0.010 inch. If warped less than 0.010 inch, dress up with a disk grinder. Stripped or cross threads can sometimes be corrected with a thread chaser, or drilled out and retapped to a larger size.

(3) *Rocker arm.* Discard if badly worn or broken.

99. Assembly

a. Valve Housing. Install inlet and outlet valves, if removed, in valve housing. Install new pulsator diaphragm, screen, and pulsator cover. Install the two pulsator cover screws.

b. Pump Body Assembly. Install new diaphragm assembly in pump body. Install valve housing assembly on pump body with file marks (par. 97*b*) alined. Start valve housing screws and lock washers but do not tighten. Install rocker arm, rocker arm pin, pin plug, and pin clip in pump body. Lift diaphragm assembly in full up position and hold in place while tightening body screws. Install rocker arm spring.

c. Install Heat Shield Stud. Install heat shield stud and lock washer, if used.

Section III. FUEL PUMP WITH OFFSET CERAMIC FILTER

100. Disassembly

a. General. Repair and rebuild of all offset ceramic filter type fuel pumps are similar to the instructions contained in this section for the model M779S fuel pump (fig. 66). This model represents a typical offset ceramic filter type fuel pump. Refer to figure 67 for disassembly and subsequent assembly procedures.

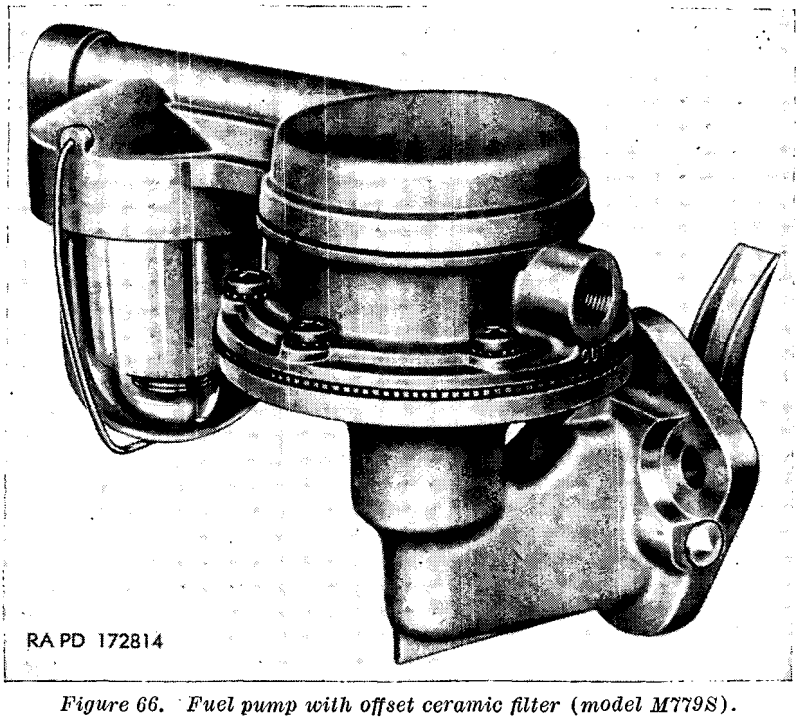

Figure 66. Fuel pump with offset ceramic filter (model M779S).

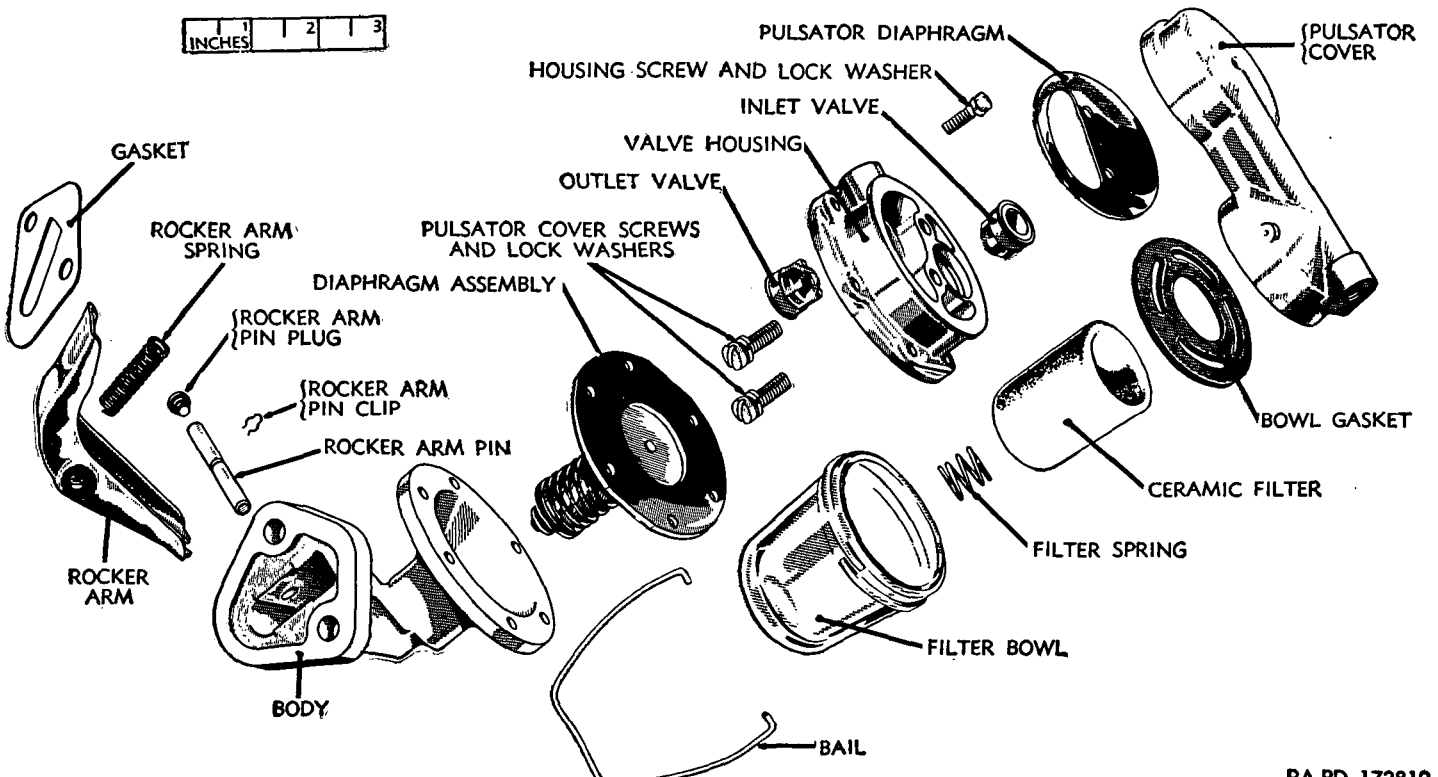

Figure 67. Fuel pump with offset ceramic filter (model M7798)—exploded view.

b. Preliminary. Mark edges of pump body and valve housing with a file. Mark at heat shield stud, if used. This will serve to show how the parts may be reassembled in the same relative positions, and the heat shield stud properly located.

c. Remove Ceramic Filter. Remove bail. Unscrew and remove filter bowl. Remove filter spring, ceramic filter, and bowl gasket from pulsator cover.

d. Remove Pump Body. Remove rocker arm spring, rocker arm pin plug, rocker arm pin clip (if used), and rocker arm pin. Rocker arm will now slide freely out of pump body. Remove valve housing screws, lock washers, and, when used, the heat shield stud, nut, and lock washer. Separate pump body from valve housing. Remove diaphragm assembly.

e. Remove Valve Housing Assembly. Remove two pulsator cover screws and lock washers. Separate valve housing from pulsator cover and remove pulsator diaphragm.

f. Remove Valves. Remove inlet and outlet valves.

Note. Do not remove valves unless inspection reveals they are damaged or corroded.

101. Cleaning and Inspection

For cleaning and inspection of fuel pump, refer to paragraph 98.

102. Assembly

a. Valve Housing. Install inlet and outlet valves, if removed, in valve housing. Install new pulsator diaphragm, screen, and pulsator cover. Install the two pulsator cover screws.

b. Pump Body Assembly. Install new diaphragm assembly in pump body. Install valve housing assembly on pump body with file marks (par. 100*b*) alined. Start valve housing screws and lock washers but do not tighten. Install rocker arm, rocker arm pin, pin plug, and pin clip in pump body. Lift diaphragm assembly in full up position and hold in place while tightening body screws. Install rocker arm spring.

c. Install Ceramic Filter. Place filter spring and new ceramic filter in filter bowl. Place new bowl gasket in pulsator cover and screw bowl into pulsator cover. Install bail.

d. Install Heat Shield Stud. Install heat shield stud and lock washer, if used.

Section IV. FUEL PUMP WITH IN-LINE CERAMIC FILTER

103. Disassembly

a. General. Repair and rebuild of all in-line ceramic filter type fuel pumps are similar to the instructions contained in this section

for the model M778S fuel pump (fig. 68). This model represents a typical in-line ceramic filter type fuel pump. Refer to figure 69 for disassembly and subsequent assembly procedures.

b. Preliminary. Mark edges of pump body and valve housing with a file. Mark at heat shield stud if used. This will serve to show how the parts may be reassembled in the same relative positions, and the heat shield stud properly located.

c. Remove Ceramic Filter. Remove bail. Unscrew and remove filter bowl. Remove filter spring, ceramic filter, and bowl gasket from pulsator cover.

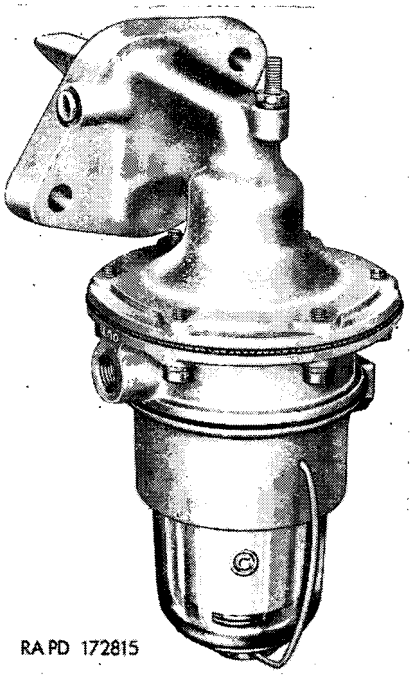

Figure 68. Fuel pump with in-line ceramic filter (model M778S).

d. Remove Pump Body. Remove rocker arm spring, rocker arm pin plug, rocker arm pin clip (if used), and rocker arm pin. Rocker arm will now slide freely out of pump body. Remove valve housing screws, lock washers, and, when used, the heat shield stud, nut, and lock washer. Separate pump body from valve housing. Remove diaphragm assembly.

e. Remove Valve Housing Assembly. Remove two pulsator cover screws and lock washers. Separate valve housing from pulsator cover and remove pulsator diaphragm.

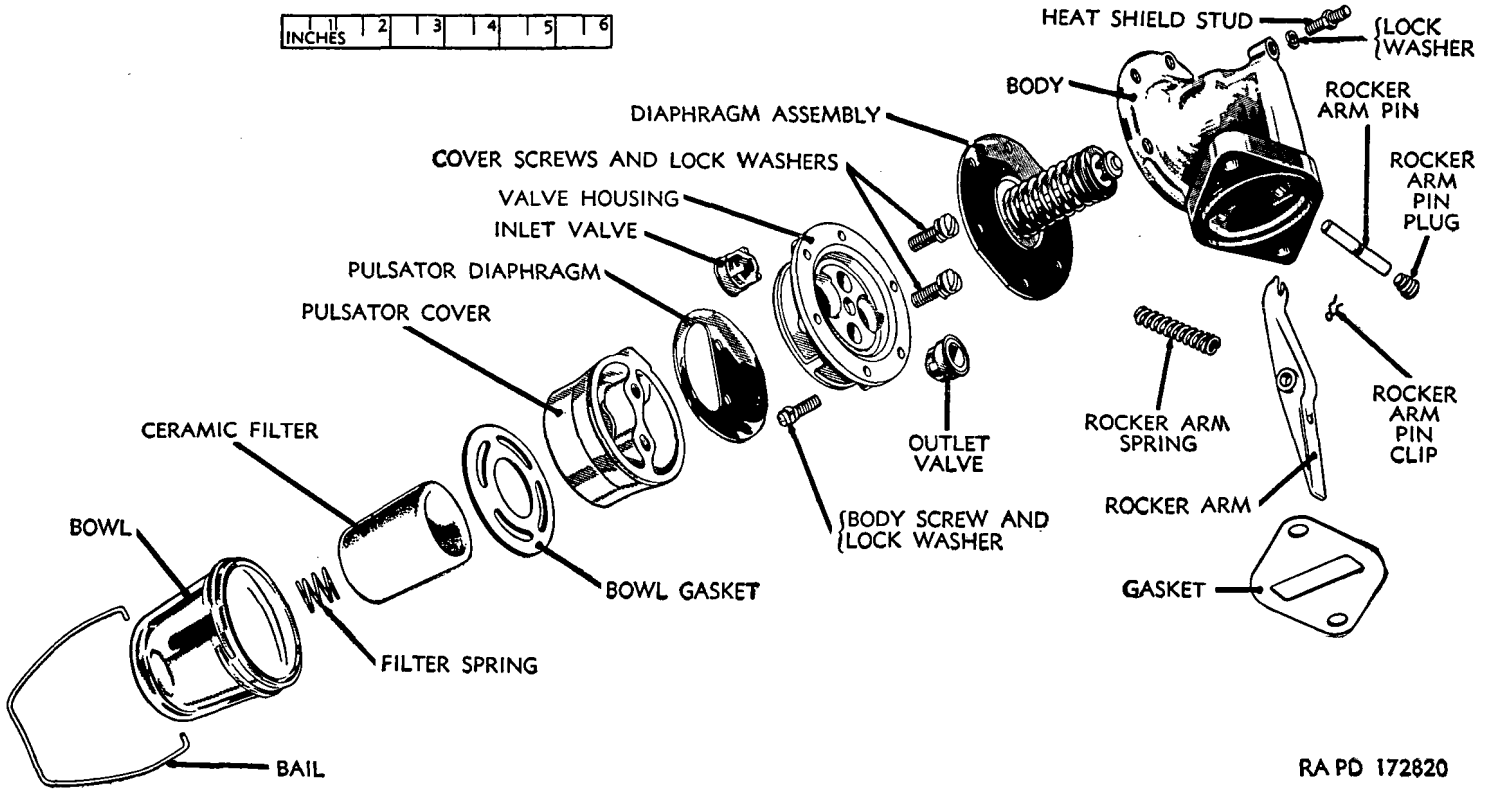

Figure 69. Fuel pump with in-line ceramic filter (model M7788)—exploded view.

f. Remove Valves. Remove inlet and outlet valves.

Note. Do not remove valves unless inspection reveals they are damaged or corroded.

104. Cleaning and Inspection

For cleaning and inspection of fuel pump, refer to paragraph 98.

105. Assembly

a. Valve Housing. Install inlet and outlet valves, if removed, in valve housing. Install new pulsator diaphragm, screen, and pulsator cover. Install the two pulsator cover screws.

b. Pump Body Assembly. Install new diaphragm assembly in pump body. Install valve housing assembly on pump body with file marks (par. 103*b*) alined. Start valve housing screws and lock washers but do not tighten. Install rocker arm, rocker arm pin, pin plug, and pin clip in pump body. Lift diaphragm assembly in full up position and hold in place while tightening body screws. Install rocker arm spring.

c. Install Ceramic Filter. Place filter spring and new ceramic filter in filter bowl. Place new bowl gasket in pulsator cover and screw bowl into pulsator cover. Install bail.

d. Install Heat Shield Stud. Install heat shield stud and lock washer, if used.

Section V. FUEL PUMP WITH VACUUM BOOSTER

106. Disassembly

a. General. Repair and rebuild of all vacuum booster type fuel pumps are similar to the instructions contained in this section for the model M797S fuel pump (fig. 70). This model represents a typical vacuum booster type fuel pump. Refer to figure 71 for disassembly and subsequent assembly procedures.

b. Preliminary. Mark pump body, valve housing, and vacuum with a file. Mark at heat shield stud, if used. This will serve to show how the parts may be reassembled in the same relative positions, and the heat shield stud properly located.

c. Remove Pump Body. Remove rocker arm spring, rocker arm pin plug, rocker arm pin clip (if used), and rocker arm pin. Rocker arm will now slide freely out of pump body. Remove valve housing screws and lock washers. Separate pump body from valve housing. Remove fuel diaphragm assembly.

d. Remove Valve Housing Assembly. Remove two pulsator cover screws and lock washers. Separate valve housing from pulsator cover. Remove pulsator diaphragm and fuel strainer.

e. Remove Valves. Remove inlet and outlet valves.

Note. Do not remove valves unless inspection reveals they are damaged or corroded.

f. Remove Vacuum Cover. Remove only two vacuum cover screws from opposite sides of the vacuum cover, and substitute for them two No. 10–32 x 1½ fillister-head screws. Turn these long screws all the way down. Remove remaining cover screws and lock washers. Alter-

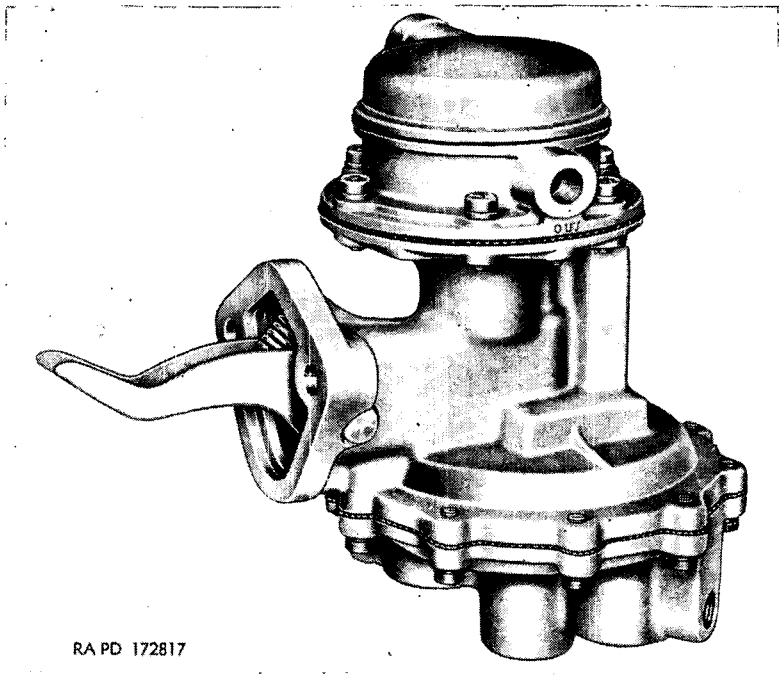

Figure 70. Fuel pump with vacuum booster (model M797S).

nately back off the two long screws, a few turns at a time, until the force of the vacuum diaphragm spring is no longer effective. Tap the cover with a light plastic hammer if the flanges stick together. Remove the two long screws, vacuum cover, vacuum diaphragm spring, vacuum diaphragm, and vacuum diaphragm seal. Remove the two plugs and one air strainer from the top of the vacuum cover.

g. Remove Breather Vent Filter. Remove from the pump body the breather vent plate, retaining spring, and vent filter.

107. Cleaning and Inspection

For cleaning and inspection of fuel pump, refer to paragraph 98.

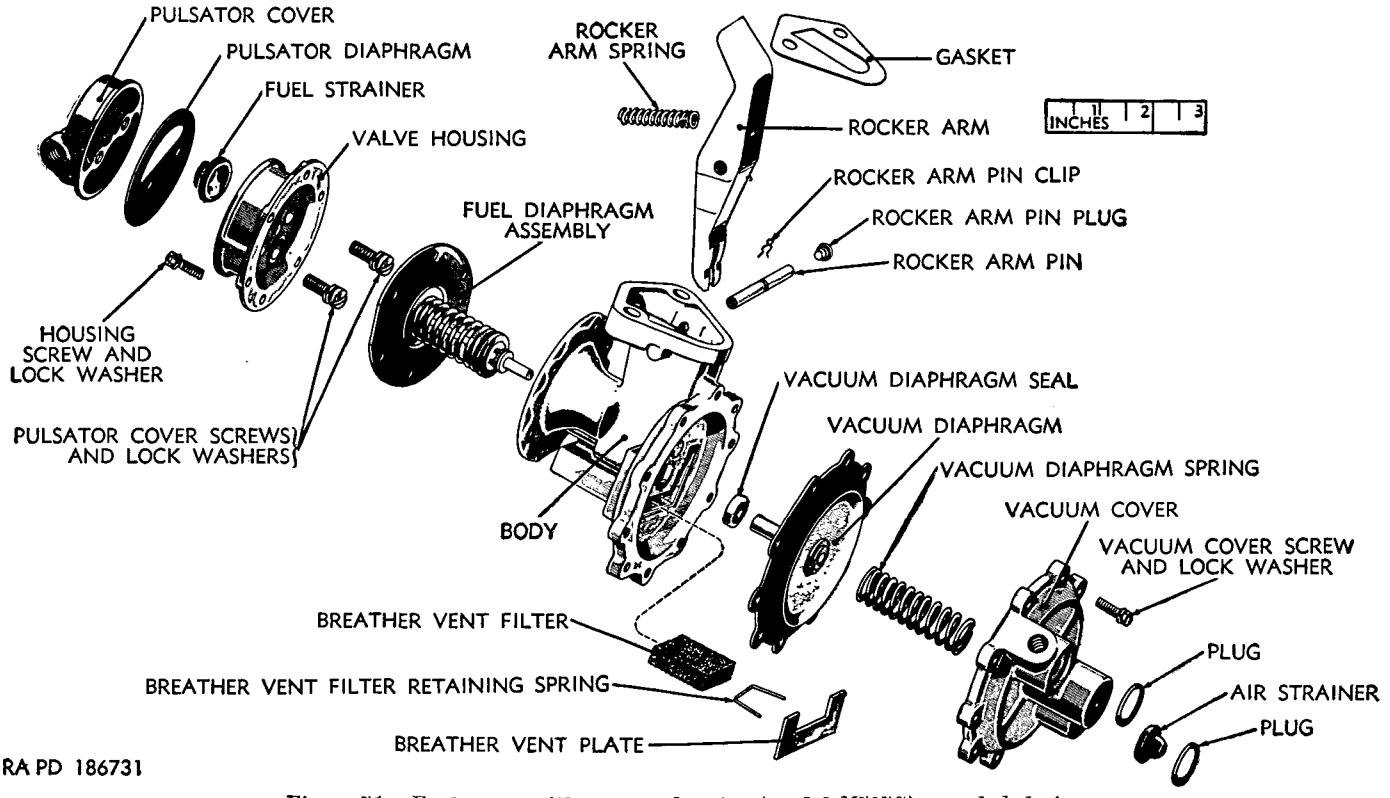

Figure 71. Fuel pump with vacuum booster (model M7978)—exploded view.

108. Assembly

a. Breather Vent Filter. Install new breather vent filter, the retaining spring, and vent plate.

b. Vacuum Cover. Install air strainer and the two plugs in top of the vacuum cover. Install vacuum diaphragm seal, vacuum diaphragm, and vacuum diaphragm spring between pump body and vacuum cover. Using two No. 10–32 x 1½ fillister-head screws on opposite sides of the vacuum cover, tighten cover to pump body. Install eight cover screws and lock washers. Remove the two long screws and substitute for them the two remaining cover screws and lock washers.

c. Valve Housing. Install inlet and outlet valves, if removed, in valve housing. Install new pulsator diaphragm, fuel strainer, and pulsator cover. Install the two pulsator cover screws and lock washers.

d. Pump Body. Install new fuel diaphragm assembly in pump body. Install valve housing assembly on pump body with file marks (par. 106*b*) alined. Install the housing screws and lock washers but do not tighten. Install rocker arm, rocker arm pin, pin plug, and pin clip in pump body. Lift diaphragm assembly in full up position and hold in place while tightening body screws. Install rocker arm spring.

e. Install Heat Shield Stud. Install heat shield stud and lock washer, if used.

CHAPTER 6

CARTER ELECTRIC FUEL PUMPS

Section I. DESCRIPTION AND DATA

109. Description

a. General. Carter electric fuel pumps (fig. 72) are of the centrifugal type. To operate properly, the pump must be located so that

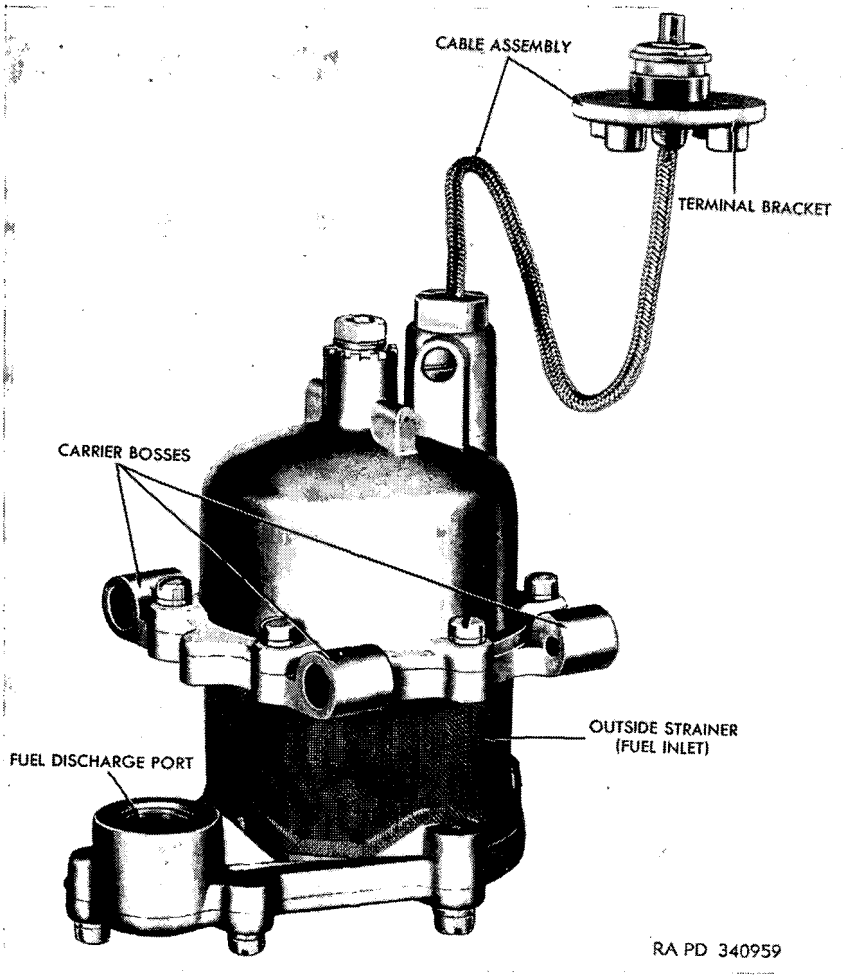

Figure 72. Typical Carter electric fuel pump.

it is submerged in fuel. The lubricant for the armature shaft bearings is fuel. Essentially, the pump is a direct-current shunt-wound electric motor which drives an impeller.

b. Construction. The pump consists of two principle parts; the cable assembly which includes the terminal bracket, and the pump assembly. The pump assembly in turn consists of four subassemblies; the field housing, bearing, and coil assembly; the armature assembly; the pump body assembly; and the impeller and ball assembly.

(1) *Cable assembly.* The cable assembly (C, fig. 76) includes the terminal bracket which is usually attached to the access hole cover of the fuel tank. The assembly provides an exterior connection for the feed wire carrying the electric current.

(2) *Field housing, bearing, and coil assembly* (D, fig. 76). This assembly consists of the upper armature shaft bearing and the field and pole piece assembly. Both of these assemblies are staked into the die-cast housing.

Note. Neither assembly can be removed without injuring the housing.

In the case of a worn upper armature shaft bearing or a defective field coil, the entire field housing with upper armature shaft bearing and field coil assembly must be replaced with a serviceable unit.

(3) *Armature assembly* (F, fig. 76). The windings of the armature are protected by pressed-on, die-cast shells. The silver commutator and armature shaft bearing journals are superfinished. If the commutator is worn or any of the windings are defective, the entire assembly must be replaced with a serviceable unit, since any disassembly will affect the dynamic balance of the assembly.

(4) *Pump body assembly* (V, fig. 76). The pump body assembly houses the lower armature shaft bearing and the positive and negative brushes.

Note. The lower armature shaft bearing is staked securely into the body and cannot be replaced without injuring the body.

A brush assembly consists of a brush with the brush spring slipped over the pigtail before a metal disk is soldered to the end of the pigtail. Positive and negative brushes are not interchangeable since they are of different materials. The positive brush is insulated from the body by means of a brush insulator made of plastic.

(5) *Upper and lower volute and impeller and ball assembly.* The upper volute (P, fig. 76) has a tapered hole for connecting the fuel line to the pump. The upper and lower volutes are die-cast, and are attached to each other by means of screws

with no gasket between the adjacent surfaces. The impeller and ball assembly (Q, fig. 76) is dynamically balanced, and is driven by the end of the armature shaft where a groove engages a tongue in the impeller. A hardened ball is pressed into the impeller to act as a thrust bearing, and bears against a steel plate which is staked to the lower volute.

110. Data

All Carter electrical fuel pumps are similar in appearance. The model number, battery voltage, and battery ground terminal are stamped on the upper part of the field housing as shown in figure 73.

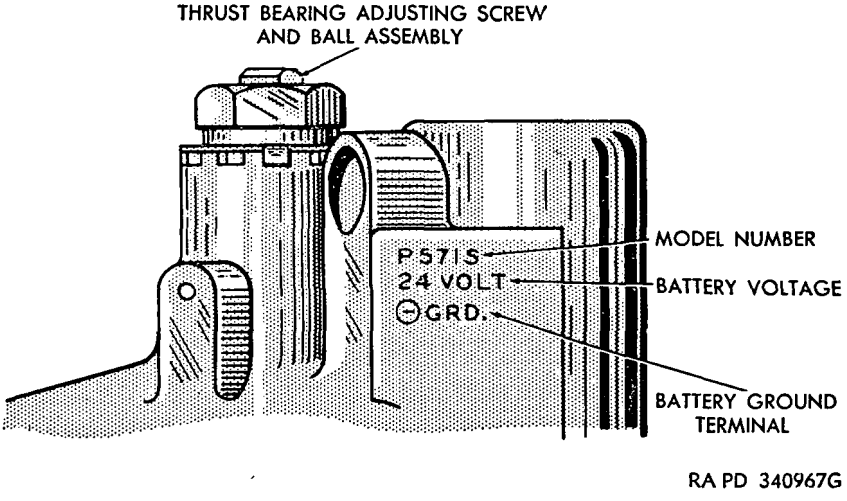

Figure 73. Model, voltage, and polarity identification.

It is essential to operate the pump with the correct polarity. In order to deliver the correct fuel pressure, the pump must be operated at the voltage for which they are designed. Table V contains data pertaining to Carter electric fuel pumps.

Table V. Carter Electric Fuel Pumps

Model No.	Repair kit No.	Voltage	Cable assembly	Min dead end pressure while running at designed voltage (PS 1)	Ground
P600S	P1359	6	(*)	2	Positive or negative.
P602S	P1371	12	(*)	3¾	Negative.
P603S	P1354	12	(*)	3¾	Positive.
P804S	P1589	12	(*)	3¼	Positive or negative.
P571S	P1339A	24	P217–10S	----------	Negative.
P576S	P1352A	12	P217–12S	----------	Negative.
P604S	P1574	24	P217–32S	3¾	Negative.

* Depending upon installation of fuel pump, any one of a number of cable assemblies may be used.

A—UPPER ARMATURE SHAFT BEARING
B—ARMATURE
C—FIELD HOUSING
D—BRUSH INSULATOR
E—POSITIVE BRUSH
F—OUTSIDE STRAINER
G—FUEL DISCHARGE PORT
H—UPPER VOLUTE
J—LOWER VOLUTE
K—IMPELLER
L—CIRCULAR PASSAGE
M—COMMUTATOR POCKET DRAIN PASSAGES
N—PUMP BODY
P—NEGATIVE BRUSH (GROUND)
Q—COMMUTATOR
R—INSIDE STRAINER
S—ANNULUS
T—{THRUST BEARING ADJUSTING SCREW AND BALL ASSEMBLY

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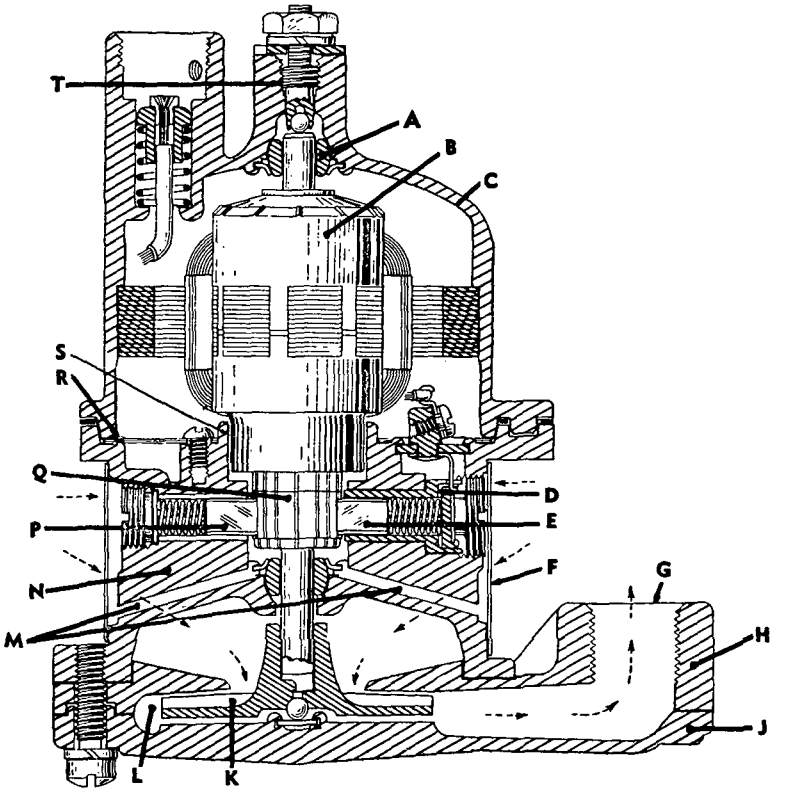

Figure 74. Main fuel circuit—cross sectional view.

Section II. OPERATION

111. Flow of Fuel Through Pump

a. Main Fuel Circuit (fig. 74). Fuel enters the pump through the outside strainer (F), and flows to the impeller (K) which forces the fuel by centrifugal action into the circular passage (L) formed by the upper and lower volute plates. This circular passage is connected to the discharge port (G) through which most of the fuel is discharged under pressure.

b. Cooling and Lubricating circuit (fig. 75). From the circular passage (L) a vertical passage (G) conducts a small quantity of fuel under pressure through the restriction (E). Part of this fuel passes through the inside strainer (D) into the field housing where it circulates around the armature and upper armature shaft bearing in the manner shown, cooling and lubricating moving parts. Upon returning from the field housing this fuel passes through the restriction (P) and escapes through the field housing drain passages into the tank. The remainder of the fuel that comes through restriction (E) circulates around the commutator and bowl armature shaft bearing eventually escaping either through the commutator drain passages

A—UPPER ARMATURE SHAFT BEARING
B—FIELD HOUSING
C—ARMATURE
D—INSIDE STRAINER
E—RESTRICTION
F—PUMP BODY
G—VERTICAL PASSAGE
H—UPPER VOLUTE
J—LOWER VOLUTE
K—IMPELLER
L—CIRCULAR PASSAGE
M—FIELD HOUSING FUEL OUTLET PASSAGE
N—OUTSIDE STRAINER
P—RESTRICTION
Q—COMMUTATOR
R—ANNULUS
S—THRUST BEARING ADJUSTING SCREW AND BALL ASSEMBLY

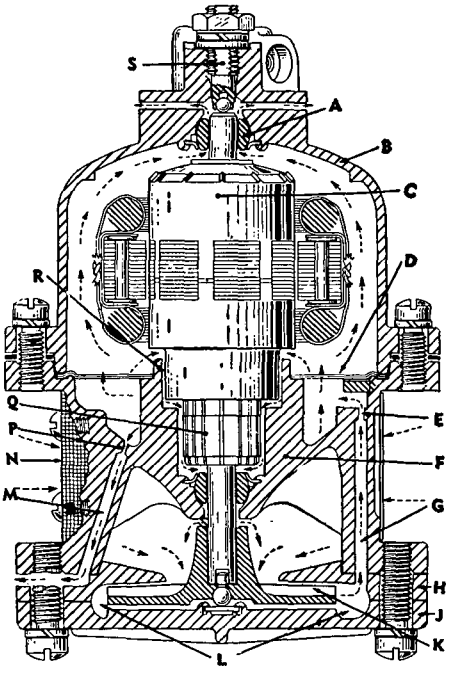

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Figure 75. Cooling and lubricating circuit—sectional view through vertical passage.

(M) to the outside, or through the armature shaft clearances to the pump body.

112. Test

a. Test of Pump in Vehicle. To test the performance of fuel pump in the vehicle, proceed as instructed in *b* and *c* below.

b. Open Master Battery Switch. Disconnect fuel line at suction side of engine driven fuel pump, or at carburetor if no engine driven fuel pump is present. Connect a pressure gage to fuel line.

c. Close Master Battery Switch. Operate each pump separately. If no undue noise or vibration is felt, and the fuel pressure on the gage is that specified for the vehicle being checked, the pump is satisfactory. If the specified requirements are not met, the fuel pump must be rebuilt. This test assumes the vehicle batteries are fully charged, the wiring is in good condition, and the fuel tanks are at least half full of fuel. During the test, it is very important that all fuel line valves connecting the pump of the tank under test with other fuel tanks remain closed. Otherwise, fuel may circulate from one tank to another and a true reading would not be obtained.

Section III. REBUILD

113. Disassembly

a. General. Before disassembling the fuel pump for servicing, obtain the proper repair package as listed in table V (par. 110). Refer to figure 76 for disassembly and subsequent assembly procedures.

b. Remove Cable Assembly From Pump. Remove cable lock screw (X) and lock washer (Y). Unscrew cable nut, and detach cable assembly (C) from the top of the field housing, bearing, and coil assembly (D).

c. Remove Outside Strainer. Remove strainer screws (M) from outside strainer (N) and discard strainer.

d. Remove Impeller. Remove four long and two short volute screws (S and T) with lock washers which attach upper and lower volutes (P and R) to pump body assembly (J). Remove lower volute (R). If impeller and ball assembly (Q) is stuck on armature shaft, use two screw drivers and, working from opposite sides with a twisting movement, remove impeller from armature shaft. Remove upper volute (P) from pump body.

e. Remove Brush Assemblies. Remove the larger of the brush screw plugs (U) from the side of the pump body. Lift out brush by insulated plate. This is the positive brush assembly (V). Remove negative brush screw plug (K) and brush assembly from opposite

A—CABLE TERMINAL SCREW
B—CABLE TERMINAL SCREW LOCK WASHER
C—CABLE ASSEMBLY
D—FIELD HOUSING, BEARING, AND COIL ASSEMBLY
E—FIELD HOUSING SCREW AND LOCK WASHER
F—ARMATURE ASSEMBLY
G—INSIDE STRAINER FRAME
H—INSIDE STRAINER
J—PUMP BODY ASSEMBLY
K—NEGATIVE BRUSH SCREW PLUG
L—NEGATIVE BRUSH ASSEMBLY (GROUNDED)
M—STRAINER SCREW
N—OUTSIDE STRAINER
P—UPPER VOLUTE
Q—IMPELLER AND BALL ASSEMBLY
R—LOWER VOLUTE
S—VOLUTE SCREW (LONG)
T—VOLUTE SCREW (SHORT)
U—POSITIVE BRUSH SCREW PLUG
V—POSITIVE BRUSH ASSEMBLY (INSULATED)
W—FIELD HOUSING GASKET
X—CABLE LOCK SCREW
Y—CABLE LOCK SCREW LOCK WASHER
Z—THRUST BEARING ADJUSTING SCREW AND BALL ASSEMBLY
AA—ADJUSTING SCREW LOCK PLATE
BB—THRUST BEARING ADJUSTING SCREW LOCK NUT LOCK WASHER
CC—THRUST BEARING ADJUSTING SCREW LOCK NUT
DD—INSIDE STRAINER SCREW
EE—PIGTAIL SCREW

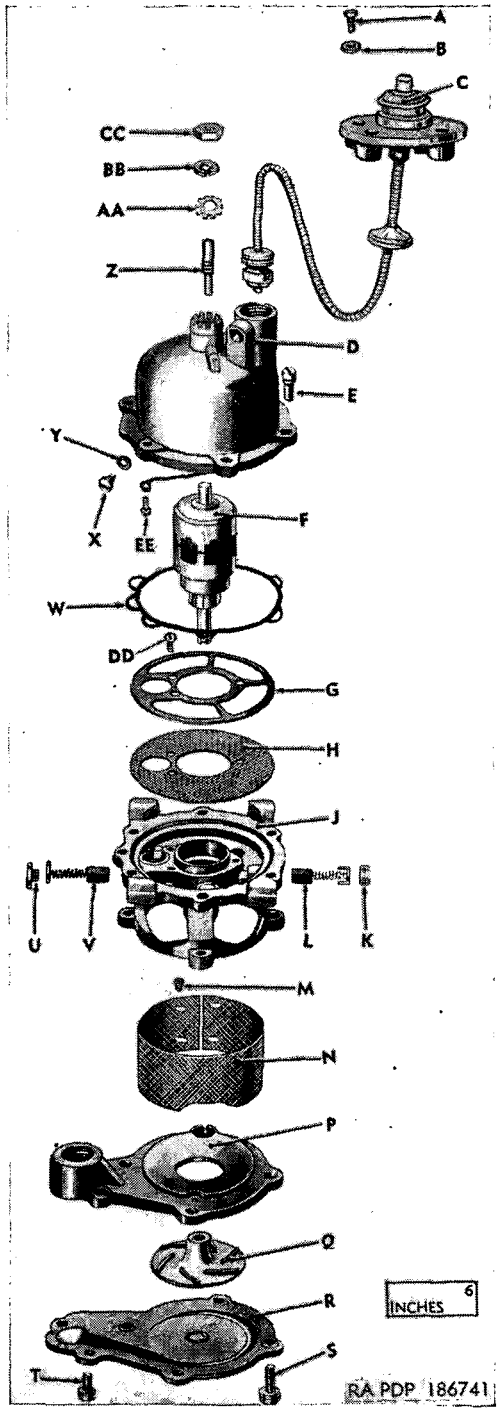

Figure 76. Typical Carter electric fuel pump—disassembled view.

side of pump body. This is the negative brush assembly (L) which is grounded.

f. Remove Armature. Remove thrust bearing adjusting screw lock nut (CC) and lock washer (BB), adjusting screw lock plate (AA), and thrust bearing adjusting screw and ball assembly (Z) from field housing in the order mentioned. If exterior of pump indicates presence of gum and the armature shaft cannot be rotated by hand, apply three or four drops of a cleaning solution consisting of alcohol, acetone, or a 50–50 mixture of both to each of the upper and lower armature shaft bearings.

Caution: Do not allow the cleaning solution to contact the brushes, windings of the field coil, or armature, because the cleaning solution will damage the insulation of the windings.

It may take 5 or 10 minutes for the cleaning solution to soften the gum deposit. Remove the six field housing screws with lock washers (E) which attach the field housing, bearing, and coil assembly to the pump body. Separate the field housing, far enough from the pump body to remove the pigtail screw (EE) attaching the field pigtail to the pump body terminal. Separate field housing assembly from pump body. Remove armature assembly (F).

g. Remove Inside Strainer. Remove inside strainer screws (DD) which attach the strainer frame (G) and inside strainer (H) to the pump body. Remove strainer frame and inside strainer.

114. Cleaning

Clean all parts in dry-cleaning solvent or volatile mineral spirits using a soft brush to remove sediment. Blow through all passages with compressed air to make sure they are open. Clean commutator slots with cardboard.

Caution: To avoid damage to commutator, do not use a metal tool. If parts are gummed, use cleaning solution (par. 113*f*) to wash them. Do not allow the cleaning solution to contact field coils or armature windings.

115. Inspection

a. Armature Assembly and Upper and Lower Armature Shaft Bearings. If armature shaft bearing journal and commutator are in good condition, test windings (par. 114*b*(2)). If armature shaft bearing journals or commutator are unserviceable for any reason, replace with a new or serviceable armature assembly.

Note. The armature assembly is in dynamic balance. Do not attempt to disassemble it for repairs.

If upper armature shaft bearing is unserviceable, replace with a new serviceable field housing, bearing, and coil assembly. If the lower

armature shaft bearing is unserviceable, replace with a new or serviceable pump body assembly.

b. Field Housing, Bearing, and Coil Assembly. For inspection of upper bearing, refer to *a* above. If field housing, coils, and threads in tapped holes appear to be in good condition, test coils (par. 116*a*). If field housing or coils are damaged, use a new or serviceable field housing, bearing, and coil assembly. If damaged threads in tapped holes cannot be made serviceable, replace with a serviceable assembly.

c. Pump Body Assembly. Inspect insulated staked-in block to which the field pigtail is attached. If it is not tight and in good condition, use a new or serviceable pump body assembly. If brush insulator is not in good condition, replace, using a new or serviceable body assembly. If possible, repair damaged threads in tapped holes of pump body; otherwise replace with a new or serviceable pump body assembly. For inspection of lower armature shaft bearing, refer to *a* above. If pump body assembly is damaged, warped, or otherwise unserviceable, replace with a new or serviceable pump body assembly.

d. Volutes and Impeller. Contacting surfaces of volute castings must be flat since no gasket is used between upper and lower volutes. If possible, repair damaged threads of discharge port; otherwise replace with a new or serviceable upper volute. If impeller or volutes are not in good condition, replace with new or serviceable parts.

e. Cable Assembly. If cable assembly appears to be in good condition, test as in *c*(3) below. If cable assembly is damaged or unserviceable and damaged threads cannot be repaired, use a new or serviceable assembly.

f. Miscellaneous Parts.

(1) *Gaskets.* Use new gaskets.

(2) *Strainers.* If old strainers are defective, use new strainers.

(3) *Brush assemblies.* The minimum brush length is three-sixteenths of an inch. Use new or serviceable brush assemblies if any doubt exists as to whether the brush length at the next overhaul will be less than three-sixteenths of an inch.

(4) *Screws, lock washers, and strainer frame.* Use new or serviceable parts as required.

(5) *Thrust bearing adjusting screw and ball assembly.* If threads are damaged or contact surface of ball is flat, use a new or serviceable assembly.

116. Test

a. Test Field Coil. Test field coil as illustrated in figure 77. If resistance of coil is not within limits stated below, use a new or serviceable field housing, bearing, and coil assembly. Field coil for 12-volt

pump should test 25–32 ohms, for 24-volt pump the coil should test 113 to 125 ohms.

b. Armature.

(1) *Test armature for ground.* Test armature as illustrated in figure 78. Use a 12- or 24-volt test lamp, depending on pump voltage, and fasten one lead of test lamp to armature shaft. Touch each commutator bar in turn with the other lead. If the lamp lights when any bar is connected to the test lamp, the armature is grounded and unserviceable. Do not attempt to repair a grounded or shorted armature since the armature is in dynamic balance and cannot be disassembled for repairs.

(2) *Measure resistance of each armature winding.*

(*a*) *Test A.* Measure the resistance of the windings between adjacent commutator bars of armature as illustrated in figure 79. If resistance is not within limits stated below, use a new or serviceable armature assembly. Windings between adjacent commutator bars for 12-volt pumps should test 0.70 to 1.00 ohms, for 24-volt pumps the resistance should be 3.0 to 3.85 ohms.

(*b*) *Test B.* Measure the resistance of the windings between alternate commutator bars as shown in figure 80. If resistance is not within limits stated below, use a new or serviceable armature assembly. Windings between alternate commutator bars for 12-volt pump should test 1.35 to 1.7 ohms, for 24-volt pumps the resistance should be 5.4 to 7.0 ohms.

c. Cable Assembly. Use a 24-volt battery and test lamp and test cable assembly wire for continuity of circuit and for ground. If circuit is grounded or not continuous, use a new or serviceable cable assembly.

117. Assembly

a. Install Armature Assembly in Pump Body. Position inside strainer (H) and strainer frame (G) on pump body and attach with screws. Install armature assembly (F) in pump body, commutator end first, making sure armature shaft enters lower armature bearing.

b. Install Volutes and Impeller to Pump Body. Hold armature in position and mount pump body. Position upper volute (P) on pump body, making sure semicircular bosses on volute fit into corresponding recesses in pump body. Install impeller and ball assembly (Q) on armature shaft, rotating impeller and holding armature until tongue in impeller engages slot in armature shaft. Position lower volute (R) on upper volute (P), attaching volutes to each other and to pump body with screws and lock washers.

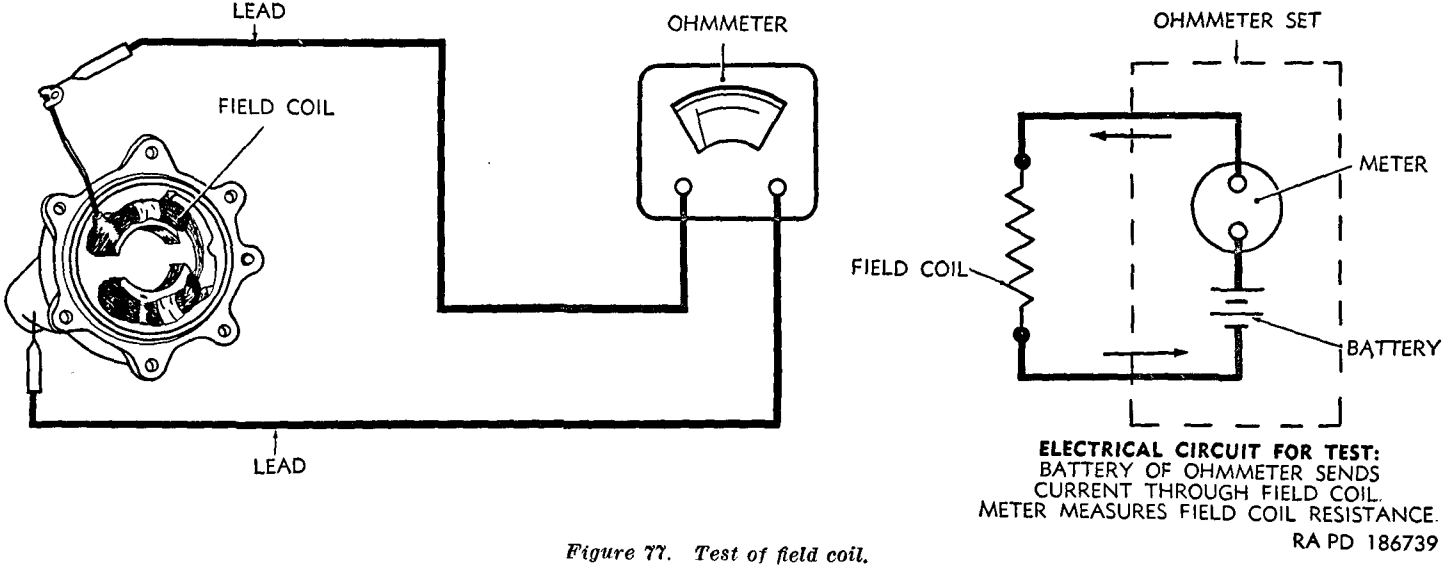

Figure 77. Test of field coil.

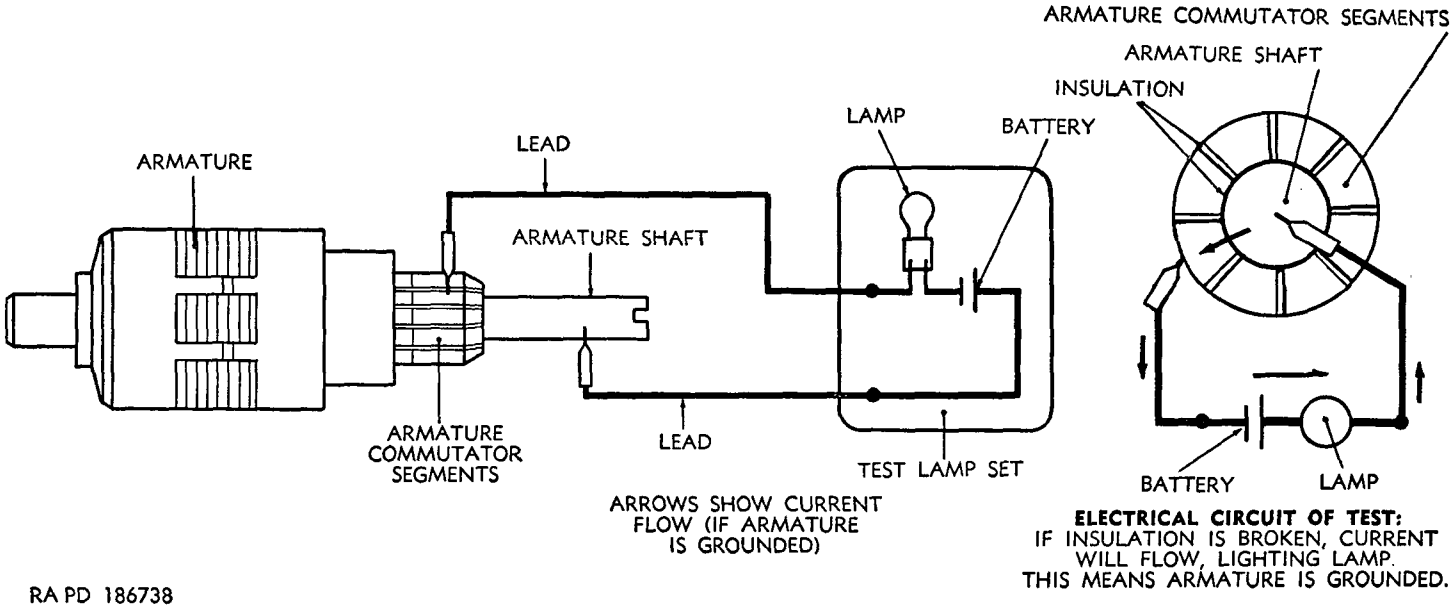

Figure 78. Test of armature for ground.

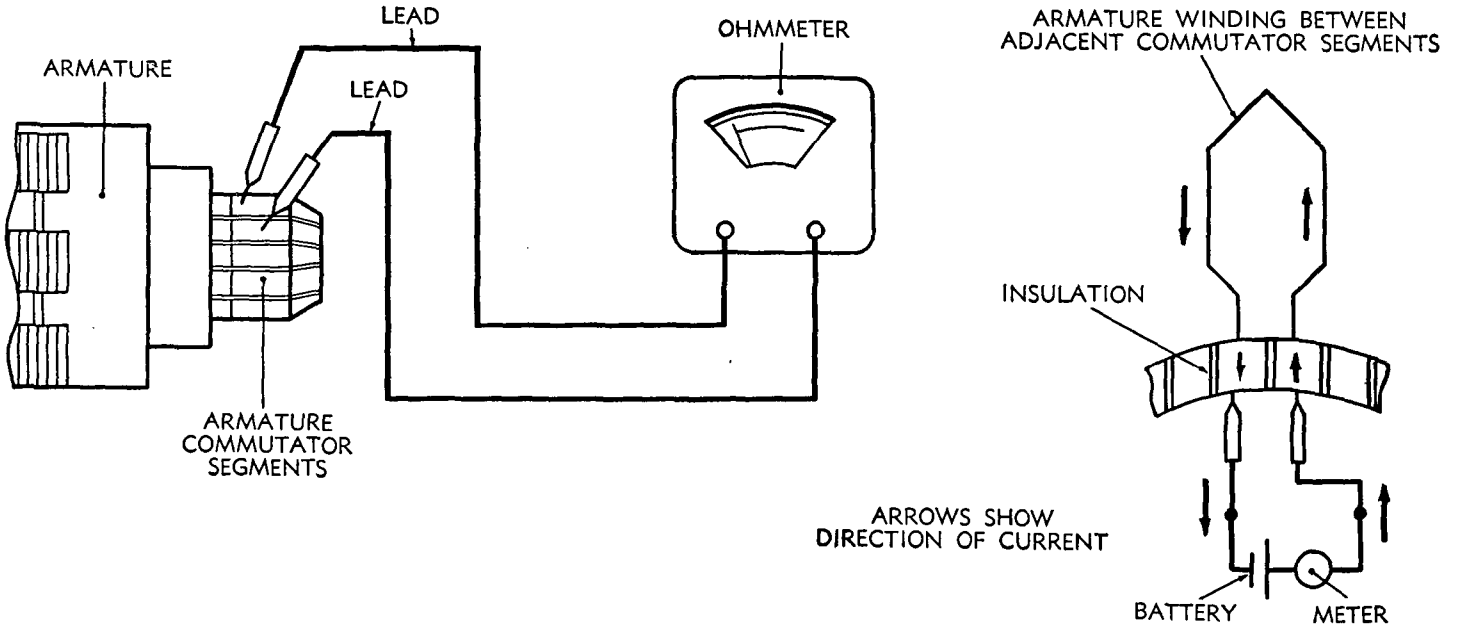

Figure 79. Test of armature windings between adjacent commutator bars.

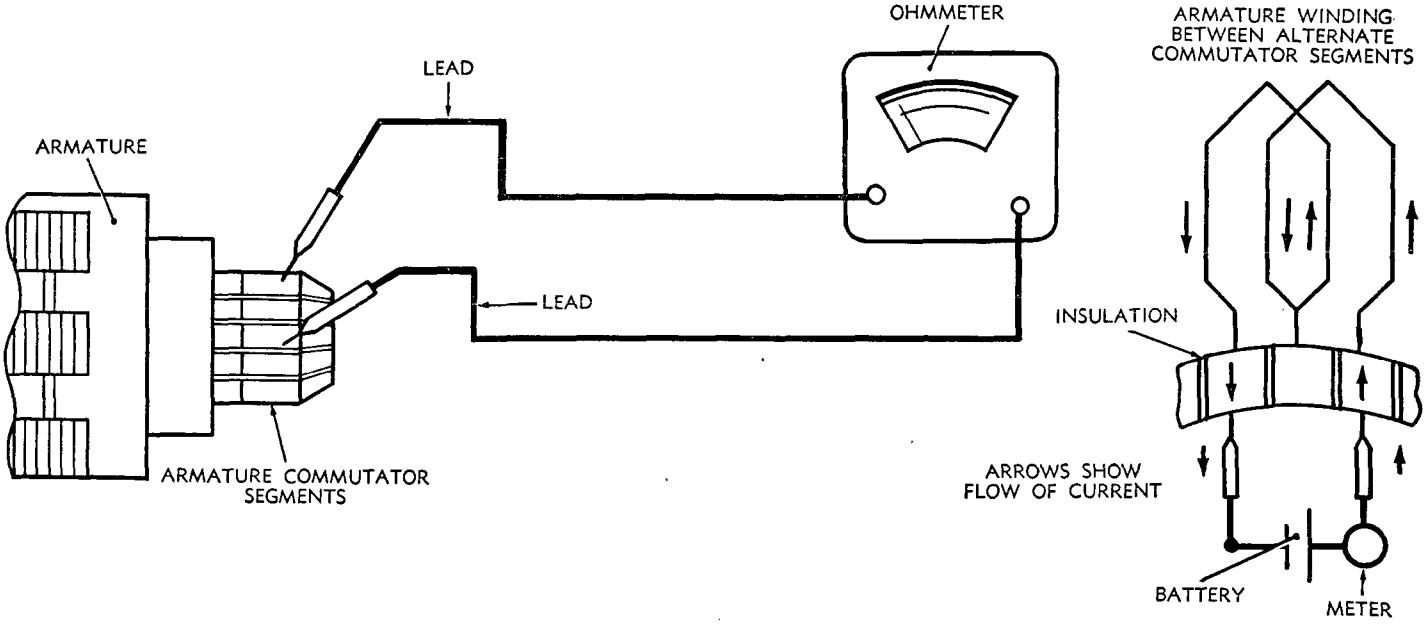

Figure 80. Test of armature windings between alternate commutator bars.

c. Install Field Housing to Pump Body. Position field housing gasket (W), if used, on pump body. Slide field housing over armature, allowing enough room to secure field pigtail to terminal block of pump body with the pigtail screw (EE).

Note. Position pigtail so that it is between field coil and field housing, and is not rubbing armature.

Attach field housing to pump body with screws and lock washers.

d. Install Brushes. Install positive brush assembly (V). The positive brush pocket is the pocket which has the insulator and the larger tapped hole for the positive brush screw plug (U). The positive brush is the brush having the bakelite insulator terminal. Turn pump on its base until you are facing positive brush pocket, and install positive brush assembly in pocket with the number stamped on side of brush toward left side of pocket. Install screw plug. Turn pump again until you face negative brush pocket. Install negative brush assembly (L) with number stamped on side of brush toward left side of pocket. Install negative brush screw plug (K). Jar pump assembly with heel of hand to position self-alining bearings with armature shaft.

e. Install Outside Strainer. Position outside strainer (N) on pump body, take up all slack in strainer, and attach to pump body with screws.

f. Install Thrust Bearing Adjusting Screw and Ball Assembly and Adjust Armature End Play. Install thrust bearing adjusting screw and ball assembly (Z) in field housing and turn down fingertight against end of armature shaft. Install adjusting screw lock plate (external-pronged washer) (AA). If prongs of lock do not fall into recesses of casting, loosen adjusting screw until prongs fall into nearest recesses; then loosen adjusting screw one more notch. Install thrust bearing adjusting screw lock nut and lock washer (CC and BB).

g. Install Cable Assembly. Attach cable assembly (C) tightly to field housing with nut on cable. Install cable lock screw (X) and cable lock screw lock washer (Y) to secure cable assembly.

118. Test

(fig. 81)

Attach a pressure gage to fuel discharge part of pump. Connect source of power to pump and submerge entire pump in a can of dry-cleaning solvent or volatile mineral spirits. Operate pump by closing switch. Regulate rheostat until voltmeter indicates the rated voltage of the pump. If no undue vibration is observed, and if pressure gage indicates a pressure of 3¾ psi (7½ in hg), the pump is satisfactory.

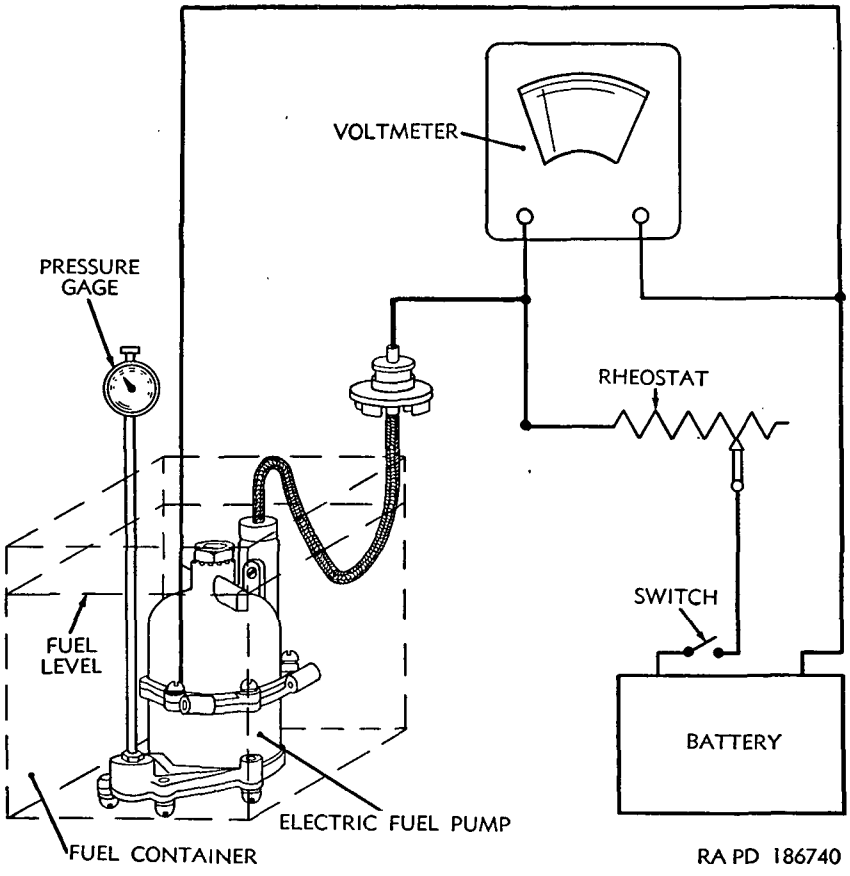

Figure 81. Test of electric fuel pump.

APPENDIX

REFERENCES

1. Publication Indexes

The following publication indexes and lists of current issue should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to matériel covered in this manual:

Index of Administrative Publications---------- SR 310-20-5
Index of Army Motion Pictures and Film Strips and Kinescope Recordings---------- SR 110-1-1
Index of Training Publications---------- SR 310-20-3
Index of Blank Forms and Army Personnel Classification Tests---------- SR 310-20-6
Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders--- SR 310-20-4
Tables of Organization and Equipment, Reduction Tables, Tables of Allowances, Tables of Organization, and Tables of Equipment----------SR 310-20-7
Introduction and Index (supply catalogs)---------- ORD 1
Military Training Aids---------- FM 21-8
Ordnance Major Items and Major Combinations and Pertinent Publications---------- SB 9-1

2. Supply Catalogs

The following catalogs of the Department of the Army Supply Catalog pertain to this matériel:

Cleaners, Preservatives, Lubricants, Recoil Fluids, Special Oils, and Related Maintenance Materials---------- ORD 3 SNL K-1
Items of Soldering, Metallizing, Brazing, and Welding Materials: Gases and Related Items---------- ORD 3 SNL K-2
Major Items and Major Combinations of Group G---------- ORD 3 SNL G-1
Miscellaneous Hardware---------- ORD 5 SNL H-2
Oil Seals---------- ORD 5 SNL H-13

Pipe and Hose Fittings---------- ORD 5 SNL H-6
Shop Set, Auto Fuel and Electrical System, Field Maintenance------- ORD 6 SNL J-8, Sec. 12
Standard Hardware---------- ORD 5 SNL H-1
Tool Set, Auto Fuel and Electrical System Repairman (MOS 3912)---------- ORD 6 SNL J-10, Sec. 8

3. Forms

The following forms pertain to this matériel:
WD AGO Form 9-1, Material Inspection Tag.
DA Form 9-3, Processing Record for Shipment and Storage of Vehicles and Boxed Engines (Tag).
WD AGO Form 9-71, Locator and Inventory Control Card.
WD AGO Form 9-72, Ordnance Stock Record Card.
DA Form 9-76, Request for Work Order.
WD AGO Form 9-77, Job Order Register.
WD AGO Form 9-78, Job Order.
DA Form 9-79, Parts Requisition.
WD AGO Form 9-80, Job Order File.
WD AGO Form 9-81, Exchange Part or Unit Identification Tag.
DA Form 447, Turn-In Slip.
DA Form 461-5, Limited Technical Inspection.
DA Form 446, Property Issue Slip.
DA Form 468, Unsatisfactory Equipment Report.
DA Form 811, Work Request and Job Order.
DA Form 811-1, Work Request and Hand Receipt.
WD AGO Form 865, Work Order.
WD AGO Form 866, Consolidation of Parts.
WD AGO Form 867, Status of Modification Work Order.
DD Form 6, Report of Damaged or Improper Shipment.

4. Other Publications

The following explanatory publications contain information pertinent to this matériel and associated equipment:
a. General.
Principles of Automotive Vehicles---------- TM 9-2700
Inspection of Ordnance Matériel in Hands of Troops- TM 9-1100
Instruction Guide: Operation and Maintenance of Ordnance Matériel in Extreme Cold (0° to −65° F.)---------- TM 9-2855
Military Vehicles---------- TM 9-2800
Precautions in Handling Gasoline---------- AR 850-20
Principles of Automotive Vehicles---------- TM 9-2700
Report of Accident Experience---------- SR 385-10-40

Supplies and Equipment: Motor Vehicles---------- AR 700–105
Supplies and Equipment: Unsatisfactory Equipment Report---------- SR 700–45–5

b. Repair and Rebuild.

Abrasives, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Matériel--- TM 9–850
Hand, Measuring, and Power Tools---------- TM 10–590
Lubrication---------- TM 9–2835
Maintenance and Care of Hand Tools---------- TM 9–867
Maintenance Supplies and Equipment: Maintenance Responsibilities and Shop Operation---------- AR 750–5
Modification of Ordnance Matériel---------- SB 9–38
Ordnance Field Maintenance---------- FM 9–10
Painting Instructions for Field Use---------- TM 9–2851
Parts Reclamation from Tactical and Administrative Vehicles---------- SR 750–130–10

c. Shipment and Limited, Stand-By, or Long-Term Storage.

Army Shipping Document---------- TM 38–705
Instruction Guide: Ordnance Packaging and Shipping (Posts, Camps, and Stations)---------- TM 9–2854
Marking and Packing of Supplies and Equipment: Marking of Oversea Supply---------- SR 746–30–5
Military Standard—Marking of Shipments--- MIL–STD–129*
Ordnance Storage and Shipment Chart—Group G---------- TB 9–OSSC–G
Preparation of Supplies and Equipment for Shipment: Processing of Unboxed and Uncrated Equipment for Oversea Shipment---------- AR 747–30
Preservation, Packaging, and Packing of Military Supplies and Equipment---------- TM 38–230
Processing of Motor Vehicles and Related Unboxed Ordnance Matériel for Shipment and Storage---------- SB 9–4
Protection of Ordnance General Supplies in Open Storage---------- TB ORD 379
Shipment of Supplies and Equipment: Report of Damaged or Improper Shipment---------- SR 745–45–5
Standards of Oversea Shipment and Domestic Issue of Ordnance Matériel Other Than Ammunition and Army Aircraft---------- TB ORD 385

*Copies may be obtained from Aberdeen Proving Ground, Aberdeen, Md.

INDEX

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