

**Chapter 7 Law Information**

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**Renewable Energy**

Professional Energy and Process Improvement Consulting & Management

**CHAPTER 20****PUMPS**

*This chapter describes pumps up to and including the 350-GPM. For information on larger capacity pumps, see Chapters 6 and 7.*

**Section I. Hand-Operated Pumps****THE 1-QUART-PER-STROKE DISPENSING PUMP**

The 1-quart-per-stroke dispensing pump (NSN 4930-00-287-8293) is used chiefly to transfer lubricating oil. The pump can be attached to a 55-gallon drum or a 600-gallon tank.

**Description**

This pump as shown in (Figure 20-1) consists of a pump assembly, a suction pipe, and a discharge tube. It can be installed in a 1 ½/2- or 2-inch drum opening and on the 600-gallon, skid-mounted tank. The piston is raised and lowered by a gear-and-rack mechanism which is driven by a crank handle. Turning the handle to make one complete stroke of the piston delivers 1 quart of product. The handle must then be returned to its original position before more product can be delivered. The pump has an adjustable stop so that it does not deliver too much or too little product. Product is delivered through a nozzle, which is positioned to connect with an adjustable swing arm return tube. The return tube lets excess product drain back into the drum through a channel located in the pump base. If the work area is not under cover, the pump suction pipe and the drum vent plug must be tightened securely and protected with a waterproof cover when the pump is not in use. This keeps water from seeping through the drum openings and contaminating the product.

**Use.**

This pump is used chiefly to transfer lubricating oil from 55-gallon drums to smaller containers.

**THE 12-GPM DISPENSING PUMP**

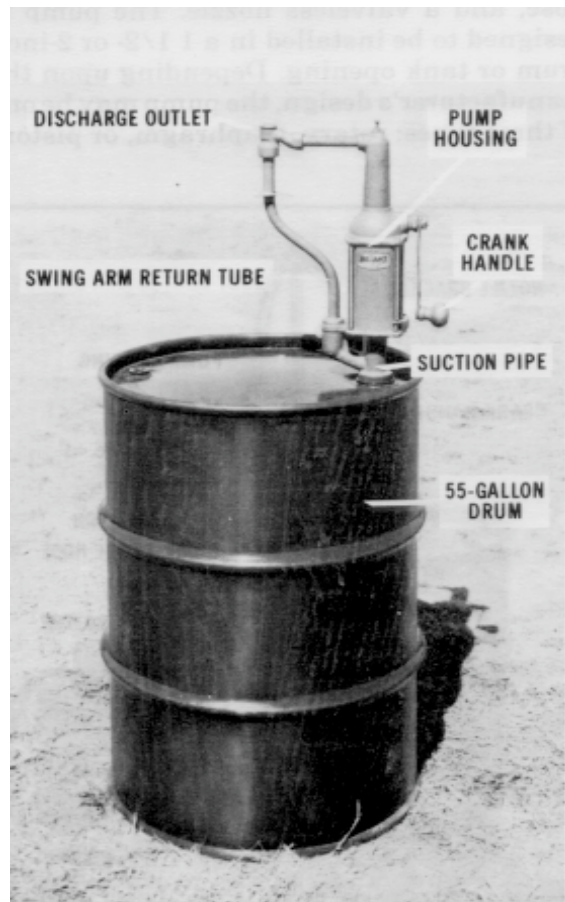
The 12-gallon-per-minute (GPM) dispensing pump (NSN 4930-00-263-9886) is used to transfer automotive gasoline, kerosene, fuel oil, and diesel fuel. The pump transfers these products from and to various containers.

### Description

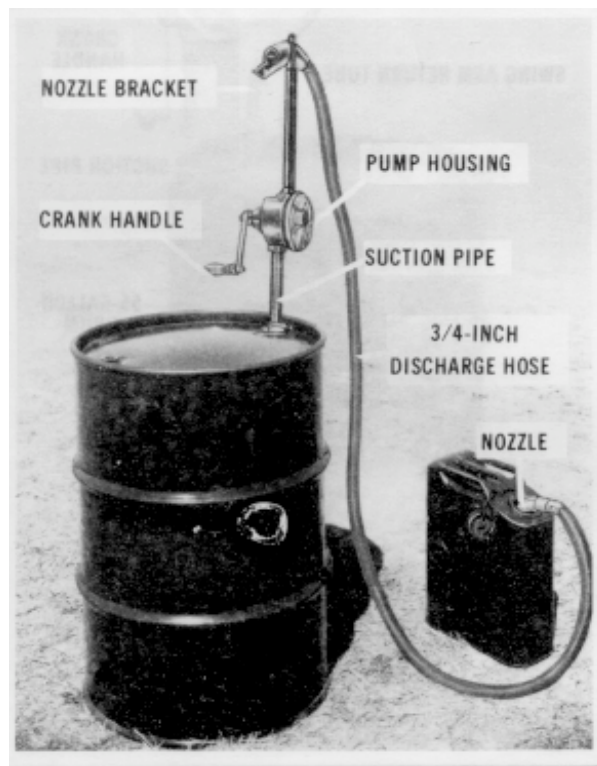
The 12-GPM pump as shown in (Figure 20-2) consists of a pump assembly, a suction pipe, a discharge hose, and a valveless nozzle. The pump is designed to be installed in a 1 ½1/2- or 2-inch drum or tank opening. Depending upon the manufacturer's design, the pump may be one of three types: rotary, diaphragm, or piston. The pump discharges through an 8-foot length of ¾-inch hose with nozzle. When not in use, the nozzle is placed in the nozzle bracket on the discharge fitting. The pump suction pipe must be tightened securely to the drum vent plug and protected with a waterproof cover when the pump is not in use.

### Use

The 12-GPM pump is used to transfer automotive gasoline, kerosene, fuel oil, and diesel fuel from 55-gallon drums; 600-gallon skid-mounted tanks; or other petroleum containers with a 1 ½1/2- or 2-inch standard treaded bung opening.



*Figure 20-1. The 1-quart-per-stroke dispensing pump mounted in a 55 gallon drum*



*Figure 20-2. The 12-GPM hand-driven dispensing pump installed in a 55-gallon drum*

### THE 15-GPM DISPENSING PUMP

The 15-GPM dispensing pump (NSN 4930-00-276-0087) is used to transfer fuel from 55-gallon drums or 600-gallon, skid-mounted tanks. This fuel can be pumped directly to equipment fuel tanks.

#### Description

This unit as shown in (FigureFigure 20-3, 20-4,) consists of a hand-driven, reciprocating pump; a suction stub assembly; a hose assembly; a nozzle; and a brace assembly. The pump body is mounted to the suction stub assembly, which fits into the 2-inch opening of the drum. The suction stub assembly includes a telescoping suction tube and a threaded bung adapter. The pump is operated by a push-pull action of the lever; the lever drives the piston within the pump, forcing fluid to the pump outlet. The pump discharges through a 20-foot length of 1-inch hose and a standard nozzle with a 100-mesh, wire-cloth strainer. A grounding wire equipment with alligator clamp and bonding plug is attached to the nozzle to permit electrostatic bonding between the nozzle and other equipment. The brace assembly is attached to the top of the pump and to the chime of the drum to hold the pump securely during pumping operations. The pump suction pipe of this pump must be tightened securely to the drum vent plug and protected with a waterproof cover when the pump is not in use.

## Use

The 15-GPM pump is used to transfer fuels from 55-gallon drums or 600-gallon, skid-mounted tanks direct to equipment fuel tanks. If no other aircraft refueling equipment is available, this pump may be used to refuel light aircraft if a 15-GPM filter/separator that qualified under Military Specification MIL-F-8901E is used with the pump.

## Section II. Power-Driven Pumps

### THE 50-GPM, GASOLINE-ENGINE-DRIVEN PUMPING ASSEMBLY FOR BULK TRANSFER OF FLAMMABLE LIQUIDS

The 50-GPM pumping assembly is used for bulk transfer of flammable liquids. If a 50-GPM filter/separator is used, this pump can be used to refuel aircraft. A 50-GPM electric pump used with the tank and pump unit is described in Chapter 249.

## Description

The 50-GPM pumping assembly as shown in (Figure 20-4) consists of a pump and engine assembly mounted on an oval aluminum base. The assembly has sections of suction and discharge hose, two 1 ½/2-inch dispensing nozzles, a drum-unloader suction stub, and two toolboxes containing tools and accessories. The pumping assembly is equipped with a carrying handle. It fits into a rectangular aluminum box that can be used as a carrying case. The box has an oval inner compartment to hold the mounting base of the pump and engine assembly. An outer compartment holds the coiled lengths of hose, the drum-unloader suction stub, the ground rod, and the muffler. The dispensing nozzles are stored in mounting brackets on the underside of the box lids. The pumping assembly must be bonded and grounded before operation. [TMs 5-4320-237-15](#) and [10-4320-202-15](#) contain information on the operation and maintenance of 50-GPM pumping assemblies.

- Pump. The pump is a self-priming, centrifugal pump. It is coupled to the engine by an intermediate adapter. The pump impeller is mounted directly on an extension of the engine crankshaft. Pump suction and discharge ports have 1 ½/2 inch, cam-locking coupling adapters with dust caps.
- Engine. A one-cylinder, four-cycle, air-cooled gasoline engine is used to power the pump.
- Hose and fittings. Two 25-foot sections of 1 ½/2-inch, wire-reinforced suction hose and two 50-foot sections of 1 ½/2-inch, collapsible discharge hose come with the pumping assembly. Each section of suction hose is fitted with a 1 ½/2-inch, female cam-locking coupling half on one end and a 1 ½/2-inch, male cam-locking coupling half on the other. The discharge hoses have 1 ½/2-inch, female cam-locking coupling halves on both ends. All cam-locking coupling halves are fitted with dust caps or plugs.

- **Hose and fitting kit.** The hose and fitting kit is used to adapt the 50-GPM pumping assembly to fill 5-gallon fuel cans and dispense directly into vehicle fuel tanks. The basic kit consists of two Y-wye branches; four 25-foot, collapsible discharge hoses; and four 1-inch dispensing nozzles. Dust caps and plugs are also supplied. When the kit is used with the pumping assembly, the two 1 ½1/2-inch nozzles are replaced by the two Y-wye branches. Four 1-inch hoses, each fitted with a discharge nozzle, are then attached to the Y-wye branches. The kit comes in a carrying case. The items in the case are four 1-inch dust caps; two 1 ½1/2-inch dust plugs; four 1-inch dust plugs; four collapsible discharge hose assemblies (each 1 inch in diameter by 25 feet long with a male and female cam-locking coupling half); four 1-inch, manually-operated, fuel- and oil-servicing nozzles; and two 1 ½1/2-inch Y-wye branches.

### Use

The 50-GPM, portable pumping assembly is used to transfer fuel from one bulk storage tank to another and from storage tanks, tank cars, and tank vehicles to 55-gallon metal drums, 500-gallon collapsible drums, vehicles, and aircraft. When therefueling aircraft or diesel vehicles are being refueled, the 50-GPM filter/separator must be used. With the suction stub attached to the suction hose, the pumping assembly can be used to empty 55-gallon drums. When equipped with a hose and fitting kit, it can be used to fill 5-gallon fuel cans and refuel vehicles. The pumping assembly is also issued as part of the can and drum cleaning machine.

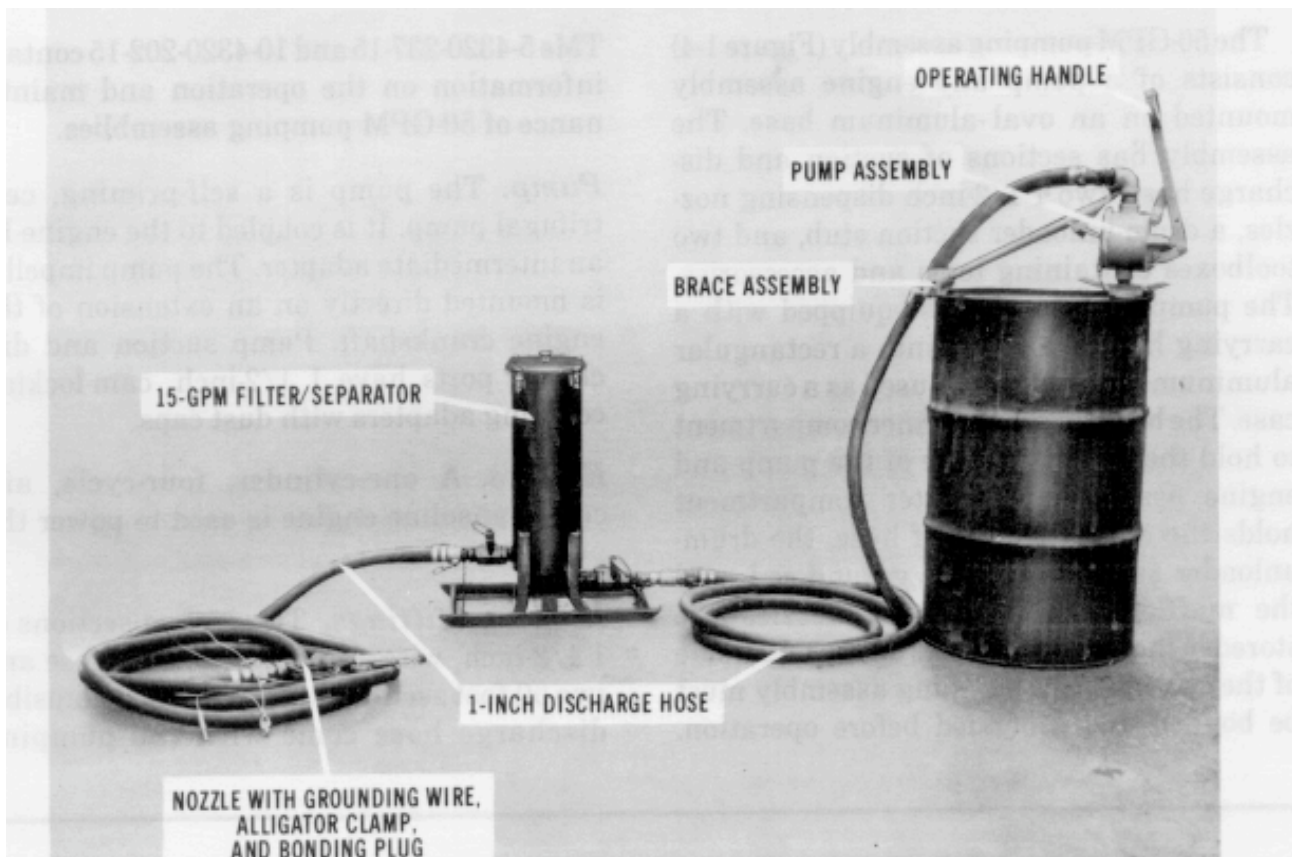


Figure 20-3. The 15-GPM, (mounted on a 55-gallon drum) and 15-GPM filter/separator connected for refueling hand-driven dispensing pump

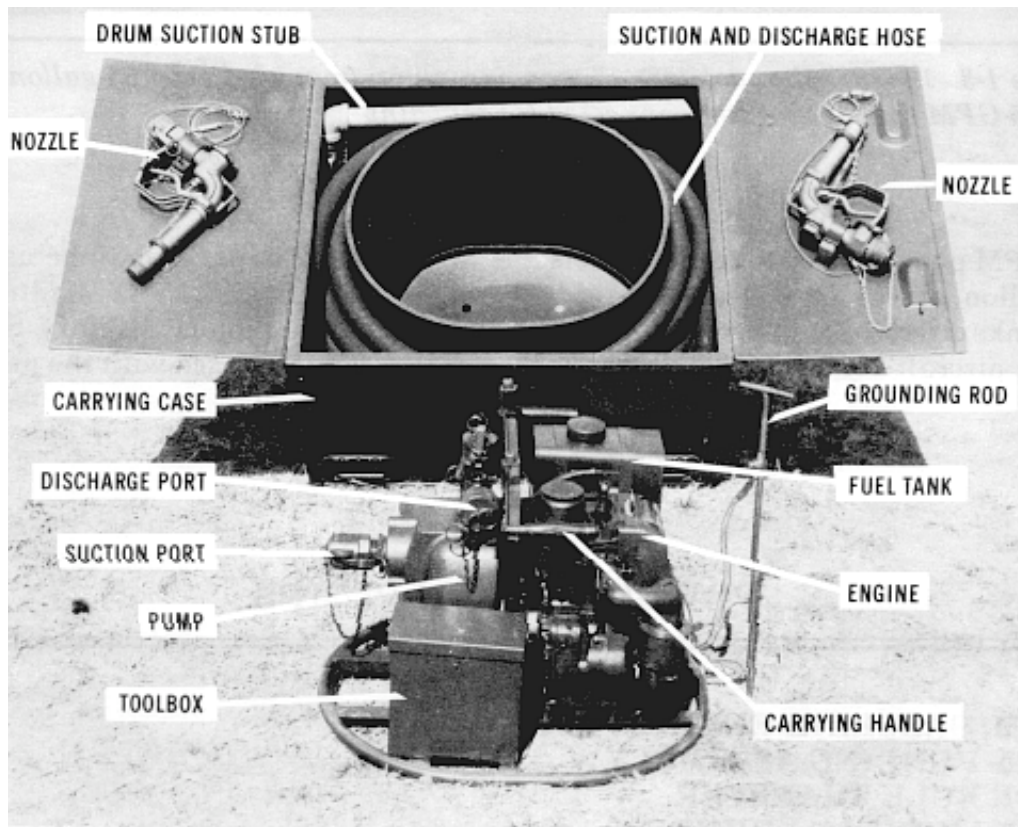


Figure 20-4. The 50-GPM pumping assembly

## THE 100-GPM, GASOLINE-ENGINE-DRIVEN PUMPING ASSEMBLY FOR BULK TRANSFER OF FLAMMABLE LIQUIDS

The 100-GPM pumping assembly is used to transfer fuel from storage tanks, tank cars, and tank vehicles to smaller capacity containers. These containers include 5-gallon cans, 55-gallon drums, and 500-gallon collapsible drums.

### Description.

The 100-GPM pumping assembly as shown in Figure 20-5, consists of a gasoline-engine-driven pump mounted on a frame, a rigid-wall suction hose, two discharge hoses, and two manually operated hose nozzles. The unit must be grounded before operation. [TM 5-4320-259-12](#) gives information on the operation and maintenance of the 100-GPM pumping assembly. Another 100-GPM pumping assembly is used as a component of the( FARE system.

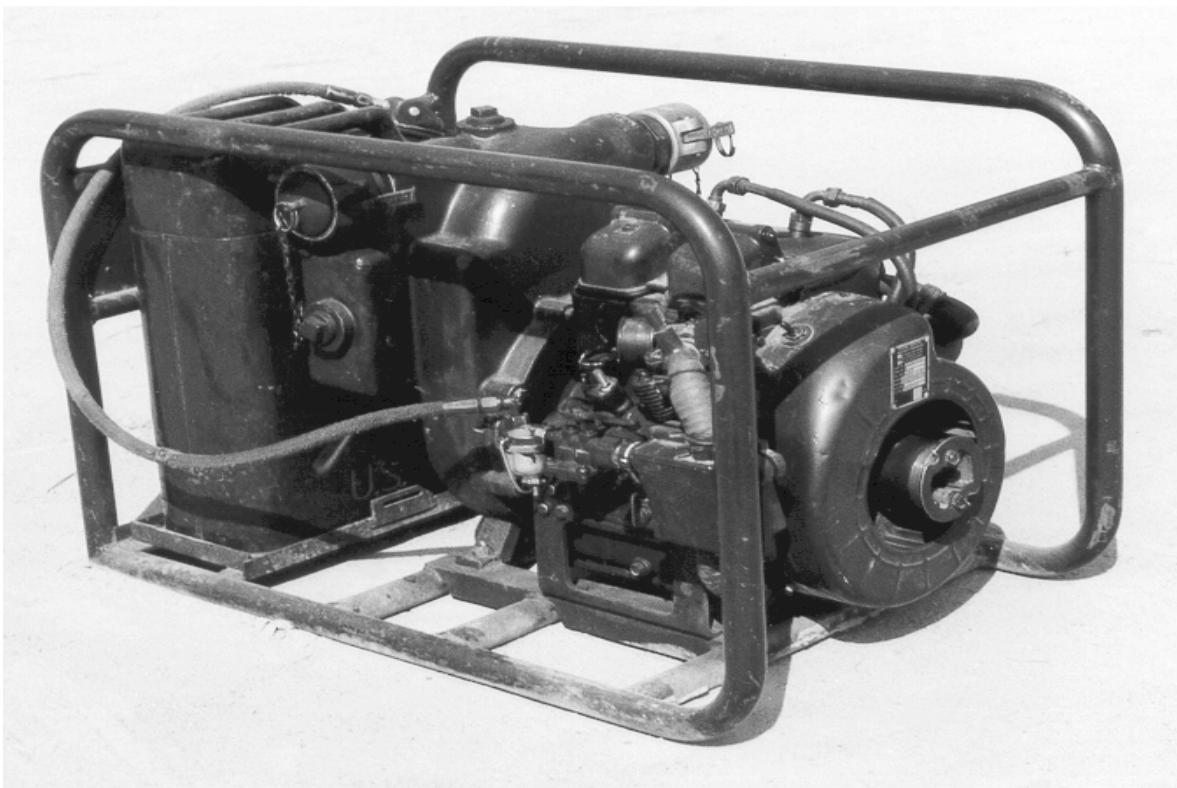
- Pump. The centrifugal pump is coupled directly to the engine. The pump impeller is mounted on the threaded end of the engine crankshaft. After it is primed the first time,

the pump is self-priming. The pump, which has a 1 ½1/2-inch suction port, discharges through a pipe cross. The two side ports of the pipe cross are used for hose connections while the upper port is used for priming. All ports on the pump are fitted with caps to keep out dirt when the pump is not in use.

- Engine. An air-cooled, one-cylinder, gasoline-driven, four-cycle engine is used to power the pump. It develops 2 ½1/2 horsepower at 3,600 RPM. Its speed is controlled by a mechanical governor which controls the opening and closing of the carburetor throttle. The engine is splash-lubricated.
- Hoses and nozzles. The 1 ½1/2-inch suction and discharge hoses have cam-locking fittings so that they can be easily attached to the related ports. The 10-foot section of suction hose is stored on top of the pumping assembly. The two 25-foot sections of discharge hose are stored in containers mounted on each side of the pump. Two manually operated nozzles to control the flow of liquid are attached to the ends of the discharge hoses. The 1 ½1/2-inch nozzles have cam-locking couplings.

### Use

The 100-GPM pumping assembly is used to transfer fuel from storage tanks, tank cars, and tank vehicles to 5-gallon cans, 55-gallon drums, and 500-gallon collapsible drums. It can also be used to refuel vehicles and aircraft. When aircraft or diesel vehicles are being refueled, the 100-GPM filter/separator must be used.



*Figure 20-5. The 100 GPM pumping assembly*

## THE 350-GPM PUMPING ASSEMBLY FOR BULK TRANSFER OF FLAMMABLE LIQUIDS

The 350-GPM pumping assembly is used mainly with the fuel system supply point (FSSP). It may also be used with the Army's collapsible tanks and with the assault hose line.

### Description

The 350-GPM pumping assembly as shown Figure 20-6, ((gasoline- or diesel-engine driven) is mounted on a two-wheel trailer. The assembly can be moved by a towing vehicle using the attached tow bar. However, it must be towed for only short distances at speeds not exceeding 20 miles per hour on surfaced roads. If the pumping assembly must be moved for a long distance, it should be loaded on a cargo vehicle or flatbed using a lifting device with at least a 2,000-pound capacity. The assembly must be moved on these vehicles. The gasoline-engine-driven pumping assembly is covered in [TMs 5-4320-218-15](#), [5-4320-242-14](#), [5-4320-272-12](#), [5-4320-272-34](#), and [5-4320-273-14](#). The diesel-engine-driven pumping assembly is covered in [TM 5-4320-226-14](#).

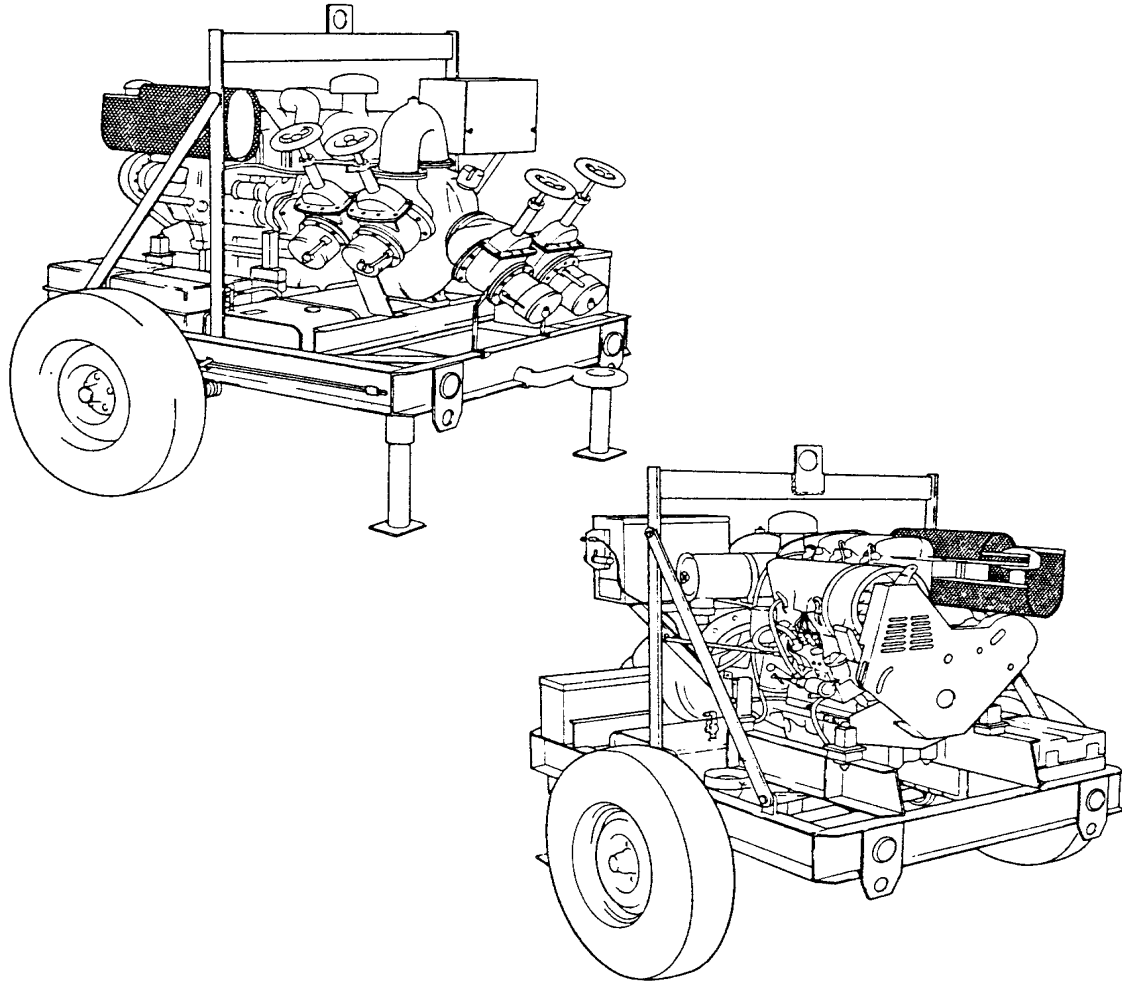
- Pump. The 4-inch, conventional-type, self-priming, centrifugal pump is designed to deliver 350 GPM at approximately 275 feet of head. It has two female inlet (suction) ports and two male outlet (discharge) ports. Gate valves control all the ports.
- Gasoline engine. The four-cylinder gasoline engine is air-cooled. The starter switch is on the instrument panel. Gages on the panel show engine vacuum, oil pressure, RPM, pump suction and discharge pressures, and hours of operation.

**NOTE:** When 350-GPM pumping assemblies are used with the 4-inch hose line outfit, they are equipped with a pressure regulator to control the flow of product through the hose line.

### Use

The 350-GPM pumping assembly is used mainly with the FSSP. It moves fuel from the source of supply to the tanks and from the tanks to the dispensing equipment. The pump may also be used with any of the collapsible tanks now used by the Army and with the 4-inch hose line outfit (assault hose line).





*Figure 20-6. The 350-GPM pumping assembly*