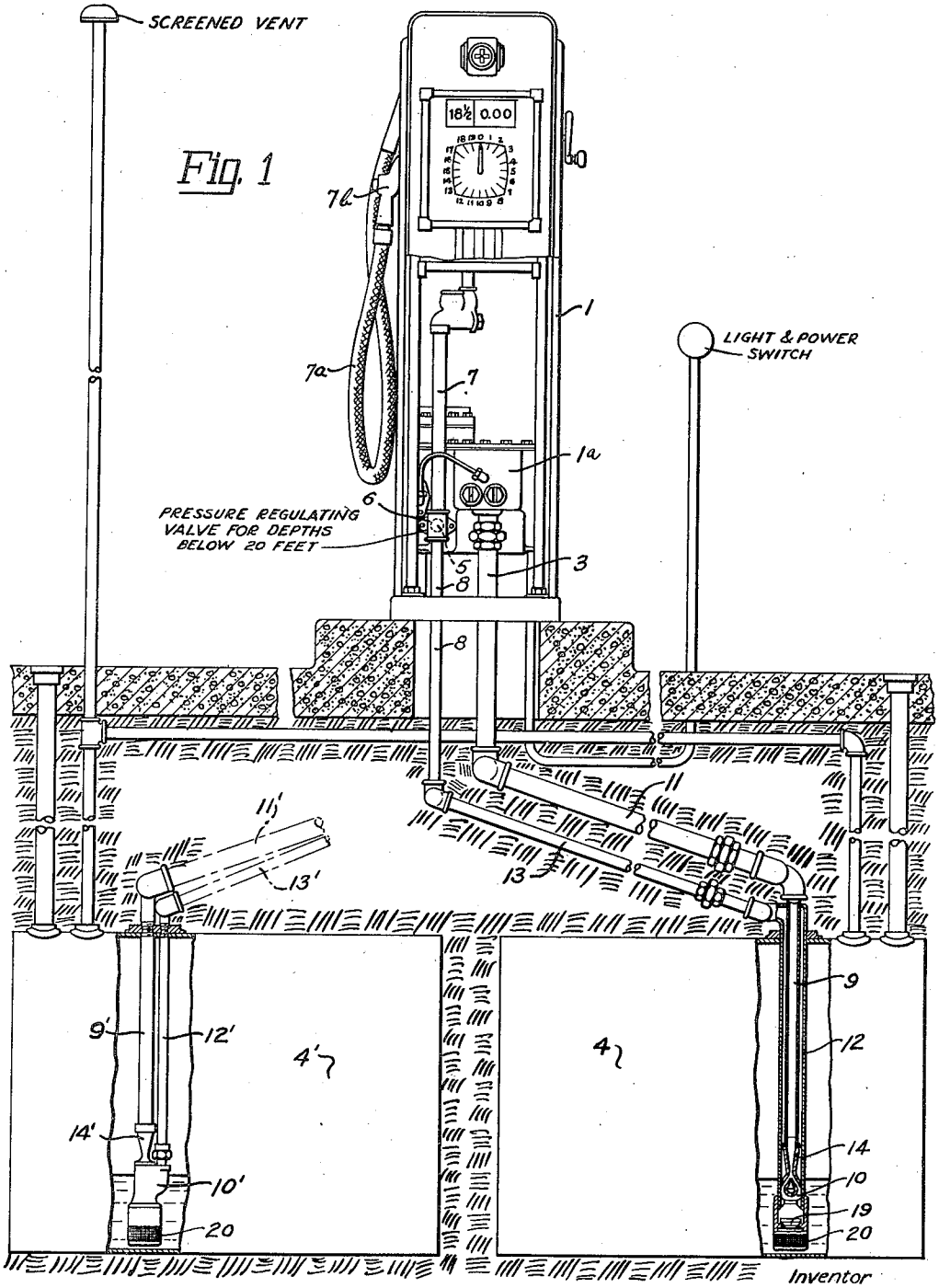
June 16, 1942. E. E. EICKMEYER 2,286,476

GASOLINE DISPENSING PUMP

Filed May 23, 1938 4 Sheets-Sheet 1

Fig. 1



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GASOLINE DISPENSING PUMP

Filed May 23, 1938 4 Sheets-Sheet 2

Fig. 2

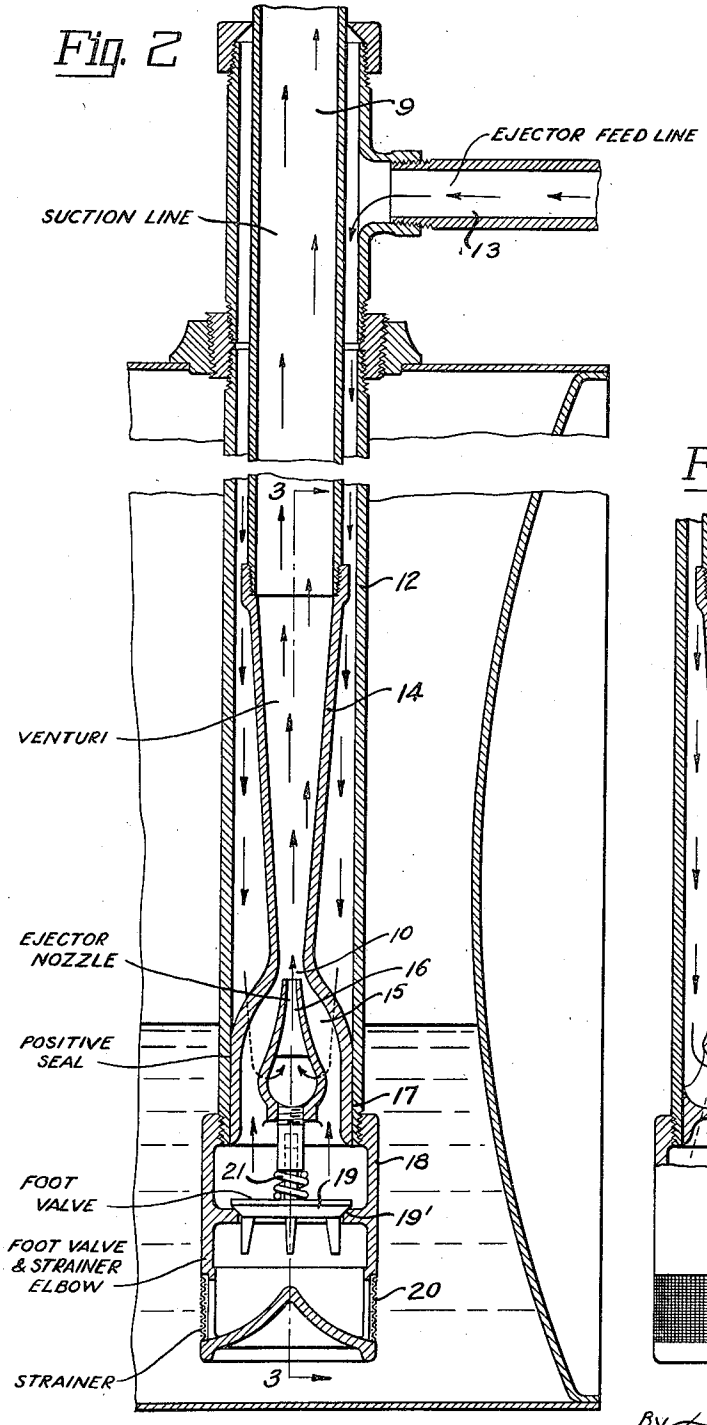
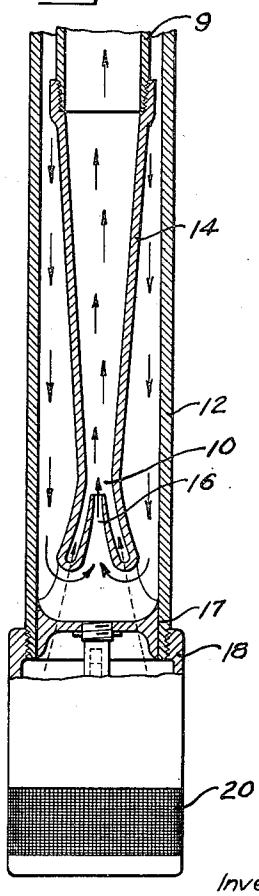


Fig. 3



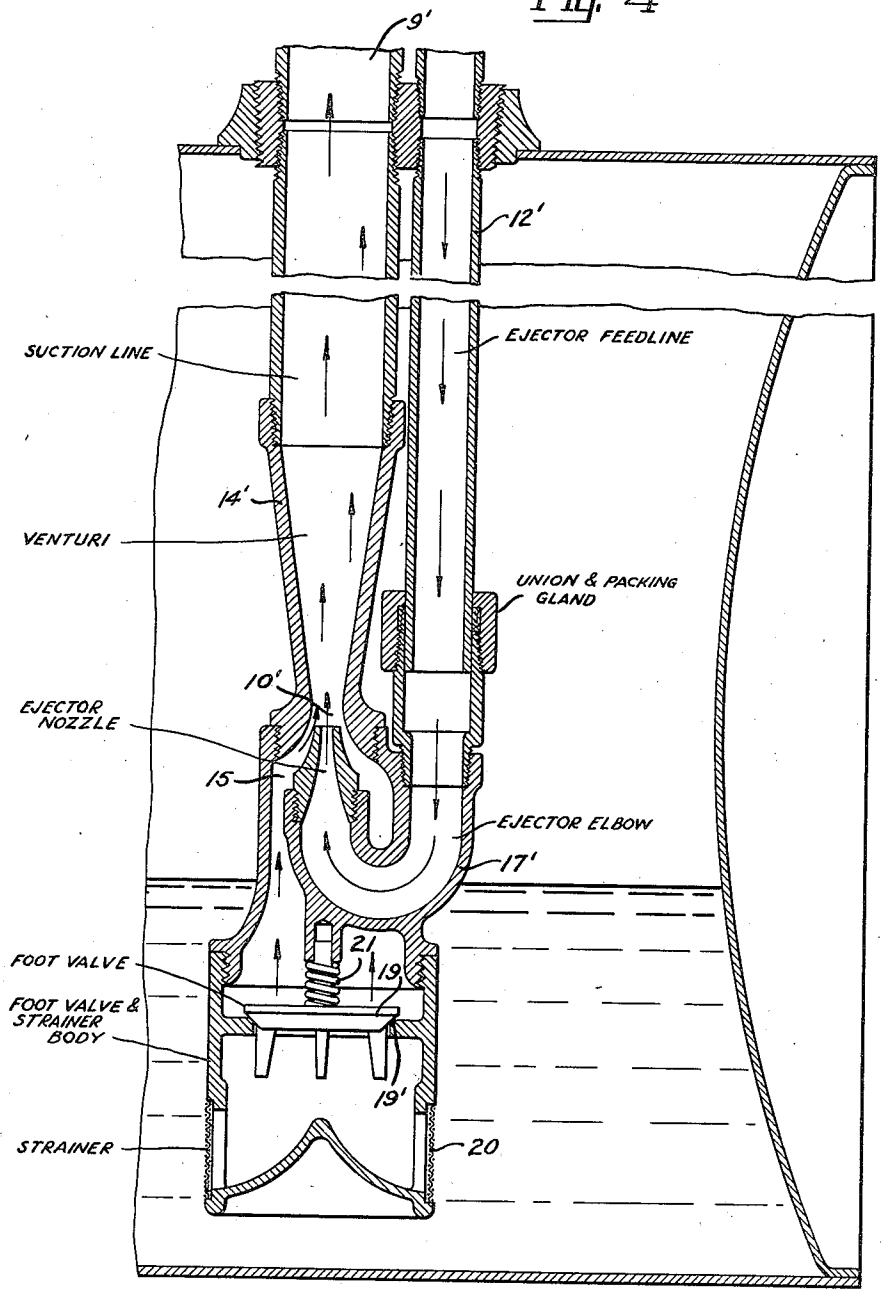
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Filed May 23, 1938 4 Sheets-Sheet 3

Fig. 4



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Filed May 23, 1938 4 Sheets-Sheet 4

Fig. 5

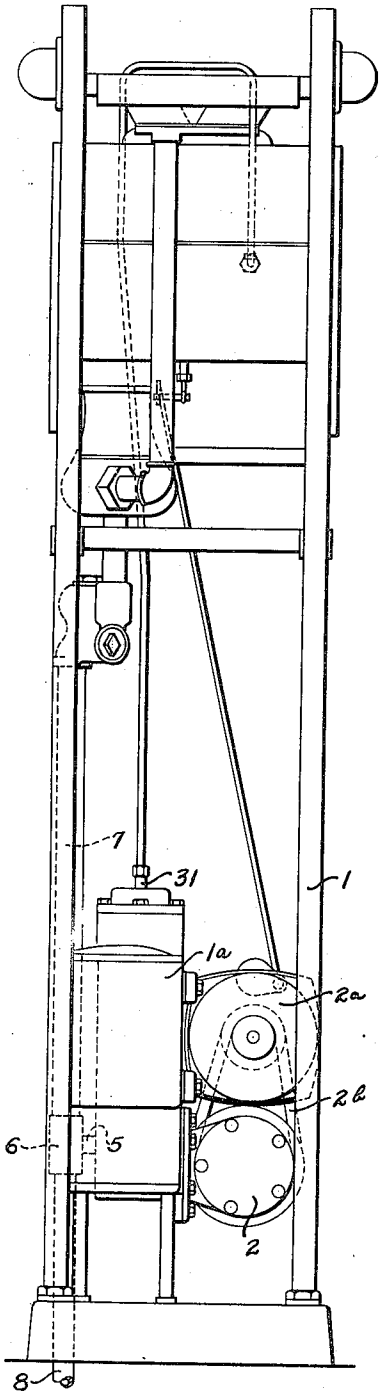


Fig. 7

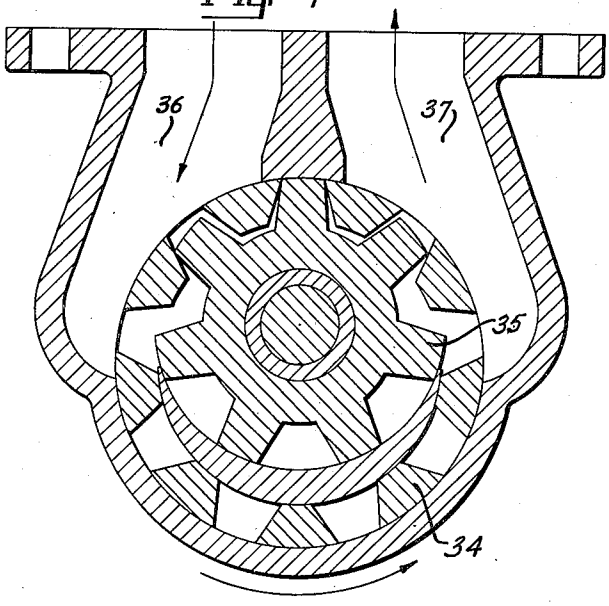
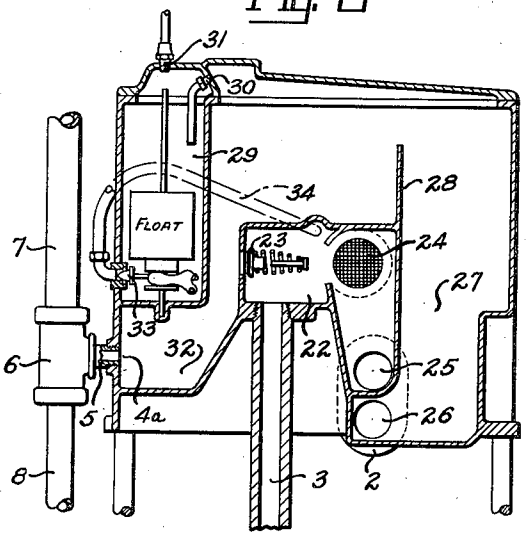


Fig. 6



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UNITED STATES PATENT OFFICE

2,286,476

GASOLINE DISPENSING PUMP

Earl E. Eickmeyer, Dayton, Ohio, assignor to The Dayton Pump and Manufacturing Company, Dayton, Ohio, a corporation of Ohio

Application May 23, 1938, Serial No. 209,459

2 Claims. (Cl. 221—95)

This invention relates to jet type pumps, and in particular jet pumps adapted for use in connection with gasoline and equivalent fuel metering and dispensing systems, such as commonly employed for measuring and dispensing gasoline and the like.

It is an object of this invention to provide an efficient, simple and economical jet pump means for assisting the dispensing pump in dispensing gasoline, kerosene, oil and the like liquid fuels.

It is a further object of this invention to provide in a dispensing system mentioned a jet pump particularly adapted for disposition in a fuel supply tank or reservoir disposed beneath the dispensing means. High pressure fluid is supplied to the ejector nozzle of the jet pump from the outlet or delivery side of said dispensing pump, whereas the inlet or suction side of said dispensing pump communicates with the fluid delivery passageway of said jet pump.

It is a further object of this invention to employ either a single or double pipe jet pump structure for positioning in, or insertion in, a tank or reservoir from which gasoline or liquid fuel is to be withdrawn by the fuel dispensing pump. The jet pump works in cooperation with the main dispensing pump in order to aid in lifting the liquid from the storage tank to the dispensing pump and delivery means.

Another object of this invention is to provide in a gasoline dispensing system the jet pump operated in connection with the dispensing pump with or without the use of a pressure regulator.

Another object is to provide a jet pump having concentric suction and ejector feed line pipes, so that a novel, simplified, unitary jet pump structure is produced.

These and other objects and advantages will appear from the following description taken in connection with the drawings.

In the drawings:

Figure 1 is a diagrammatic view of a gasoline or liquid fuel dispensing device wherein two types of jet pumps are illustrated;

Figure 2 is a cross sectional view of a jet pump adapted for use wherein the ejector feed line pipe encloses the discharge pipe in concentric relationship, presenting a unitary jet pump structure;

Figure 3 is another cross section showing of the jet pump of Figure 2, taken along the line 3—3 of Figure 2, looking in the direction of the arrows;

Figure 4 is a cross sectional view of a jet pump similar to Figure 2 wherein two separate pipes are employed as the ejector feed line and suction conduit;

Figure 5 is a side view of the liquid dispensing and metering device shown in Figure 1;

Figure 6 is a detail side elevation view partly in section of the air separator and pump mounting; and

Figure 7 is a detail section view of the rotary gear pump of the liquid dispensing device.

In employing the jet pump means of this invention in liquid fuel dispensing systems, no moving parts are disposed below the ground level and an exceedingly rapid and high volume rate of liquid is obtained. The only moving part below the ground level is the foot valve of the jet pump which also acts as a check valve for preventing the fluid from flowing downward and out into the reservoir when the dispensing pump means is stopped.

The dispensing pump and other parts of the system may be spaced at a substantial distance from the storage or reservoir tank without interfering with the efficient operation of the jet pump. The jet pump is disposed in the storage reservoir tank in the manner shown in Figure 1 and operates to aid in maintaining the suction pipe full of liquid and force the same upward into the dispensing apparatus.

Due to the simplified structure of the jet pump, it may be readily inserted in the tank having an opening of relative small diameter and is provided with a single suction line which is connected to the inlet of the pump and air separator means. Further in ordinary installations, up to twenty feet suction lifts, the pressure regulating valve may be omitted. The use of such a valve will be necessary only beyond suction lifts of twenty feet to forty or fifty feet if desired.

This invention enables the user to place the electric motor remote from the gasoline tank and above ground where it can be ventilated and away from the gasoline fumes and vapors. The motor is therefore accessible and there is a minimum of fire risk.

In particular, the advantage of the invention is the ability to pump highly volatile gasoline without any mechanical agitation of the gasoline, as by a pump impeller and without aeration of the gasoline, because a solid column of liquid can be maintained between the tank and the dispensing apparatus. This eliminates evaporation losses, particularly in hot weather, and insures accuracy in metering and measuring as it provides a constant, uniform gasoline flow.

A further advantage is in the ability to utilize

a single pump for supplying gasoline to multiple pieces of dispensing apparatus, or a single pump can be utilized for supplying gasoline from multiple tanks through one or more pieces of dispensing apparatus. Referring to the drawings in detail, in which like reference characters indicate similar parts throughout the figures, a computing gasoline meter pump casing 1 houses the air separator 1a and dispensing rotary pump 2. The rotary pump 2 is driven by the motor 2a through the belt 2b. A suction pipe 3 extends from the inlet side of the pump into the storage tank 4. On the outlet pressure side of the dispensing pump 2 and air separator 1a is a discharge outlet 4a to which is connected a discharge pipe 5. This pipe communicates with the pressure regulating valve 6 and the pipe 7 to the metering part of the device. The liquid is dispensed through the flexible hose 7a and nozzle valve 7b attached to the fluid dispensing device 1 as illustrated in Figure 1.

As heretofore mentioned, the pressure regulating valve 6 may be omitted when the suction height for the liquid to be drawn is twenty feet or less. For installations wherein more than twenty feet suction lift is used it is preferable to install the pressure regulator valve in the service or delivery pipe line.

Communicating with the discharge lines 5 and 7 is a jet pump feed line 8 for supplying liquid to the jet pump 10 disposed in the storage tank 4. The ejector feed line 8 may be of smaller diameter than the service delivery pipe line 7.

The suction pipe 3 on the inlet side of the dispensing pump 2 is connected to the pipe 9 and the jet pump 10 disposed in the storage tank 4 by way of one or more pipe sections 11. The jet pump feed line 8 communicates with the delivery or pressure pipe line 5 of the pump 2 and the pipe 12 of the jet pump 10 by means of one or more pipe sections 13, as illustrated in Figure 1.

Further the jet pump feed line 12 is enlarged to form a casing around the suction pipe 9 so that the outside wall of the suction pipe 9 forms the inner wall of the jet pump feed line 12. The jet pump construction 10 eliminates the use of the two-pipe structure as illustrated by the jet pump 10' at the left in Figure 1. The jet pump shown at 10' comprises the suction pipe and feed line conduit 9' and 12' respectively which may be connected to the dispensing device 1 by means of the pipe sections 11' and 13', similarly as disclosed for jet pump 10 of Figure 1.

The details of the assembly arrangement of the jet pump 10 are illustrated in the enlarged cross sections of Figures 2 and 3. In the construction illustrated in Figures 2 and 3 the lower end of the suction pipe 9 of the jet pump 10 has screw threaded thereon or otherwise detachably mounted a frusto-conical Venturi shaped pipe section 14 which is flared outward at the lower end to form a chamber 15 for the jet pump ejector nozzle 16 centrally disposed therein. The flared lower section of the member 14 forms a fluid seal with the inner wall of the ejector feed line pipe 12, as shown at 17, Figures 2 and 3. The jet nozzle 16 is ordinarily formed integral with the section 14 which is detachably mounted onto the end of the suction pipe 9, as shown in Figure 2.

Threaded to the ends of the feed line pipe section 12 below the seal 17 is an elbow member 18 which contains the foot valve 19 and strainer 20. The foot valve 19 is mounted to move upward against the spring 21 which maintains it on the valve seat 19' when suction is not created in the pipe 9.

Figure 4 illustrates a two-type jet pump construction as shown at the left side of Figure 1. In this modification the action of the jet pump is similar to that described in the jet pump 10. The suction conduit and jet pump feed lines 9' and 12' are separate and distinct. The Venturi section 14' is attached to the suction pipe 9', and the ejector feed line elbow 17' is arranged to reverse the flow of liquid and discharge it upward through the ejector nozzle of the jet pump 10', similarly as in jet pump 10.

In operation, referring to Figures 1, 2 and 4, the dispensing pump 2 is started and primed to create sufficient suction in the conduits 3, 9 and 10 to permit the fluid to lift the foot valve 19 and pass upward into the chamber 15 and into pipe 9 to the inlet side of the pump 2 where it is discharged outward through the delivery lines 5 and 7. A portion of the liquid delivered to the lines 5 and 7 is recirculated back through the ejector feed lines 8 and 12 to start the action of the jet pump 10. By means of this circulating fluid as indicated by the arrows in Figures 2, 3 and 4 the fluid is forced downward through the feed pipe 12 and upward through the ejector nozzle 16 so that the jet pump creates an added upper force by reason of the Venturi shaped passageway 14 and restricted passageway adjacent the nozzle 16. The jet pump action thus adds to the upward suction force applied to the fluid in the conduit 9 and greatly increases the volume rate of liquid delivered to the pump 2 for dispensing to the metering and delivery part of the system.

The arrangement of the air separator 1a and rotary pump 2 is shown in detail in Figure 6. The suction pipe 3 is connected to an inlet chamber 22 containing a by-pass valve 23 and strainer 24. After the gasoline or other fluid being dispensed passes through the strainer 24 it enters the inlet of the rotary pump 2 at 25 and is discharged through the outlet 26 into the air separating chamber 27.

The gasoline fluid and entrained air is forced upward in the chamber 27 over the baffle plate 28 and the vapor and air separates from the liquid and passes upward and thence into the float chamber 29 through the restricted inlet 30. The float chamber 29 is vented to the atmosphere at 31. Pure gasoline separated from vapor by means of the settling chamber 32 passes out the discharge 4a and pipe 5 to the metering and dispensing part of the device. Air laden gas condenses in the float chamber 29 and accumulated liquid operates the foot valve 33 permitting the gasoline to be drawn through the tubing 34 to the suction side of the pump 2.

The rotary pump construction is shown in Figure 7 and comprises a positive acting simple gear type pump with only two moving parts, the rotor assembly 34 and the idler gear 35. There are no sticking blades to get stuck as in the rotary vane type of pump or valves to get noisy as in the rotary eccentric type pump. On rotating the rotor and idler counterclockwise, fluid is drawn in through the passageway 36 and forced out through the passageway 37.

It is to be understood, of course, that my invention is not limited to the exact details of construction of the jet pump and arrangement of the dispensing device, since obvious modifications

within the scope of this invention may be made by those skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination in a liquid dispensing apparatus, a liquid fuel storage tank, a liquid dispensing pump and motor for operating same remote from said tank, means communicating with said pump for measuring the liquid dispensed, a main feed line connecting said tank to said pump, a jet pump disposed in said tank and communicating with the discharge side of said dispensing pump and main feed line, a dispensing conduit and nozzle connected to said liquid dispensing pump, and means comprising a foot valve disposed on the lower end of said main feed line in said tank and adapted to prevent the return of liquid from the main feed line back into said tank to maintain the main feed line, jet pump and dispensing pump filled with liquid.

2. In a gasoline dispensing apparatus, a liquid storage tank, gear pump means for pumping liquid from said storage tank, a jet pump located in said tank and communicating with the suction and delivery line of said gear pump, a liquid metering means connected to the delivery side of said gear pump, said jet pump comprising an outer casing, a suction conduit concentrically positioned in said casing, an ejector nozzle disposed therein and communicating with said outer casing and discharging into said suction conduit, conduit means connecting said outer casing chamber with a fluid pressure means, the lower end of said suction conduit being sealed to the inner wall of said casing, and means comprising a fluid inlet chamber communicating with said ejector nozzle and suction conduit below said sealed section.

EARL E. EICKMEYER.