March 6, 1934. M. E. ZIMMERER 1,949,639

LIQUID DISPENSER

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Fig. 1.

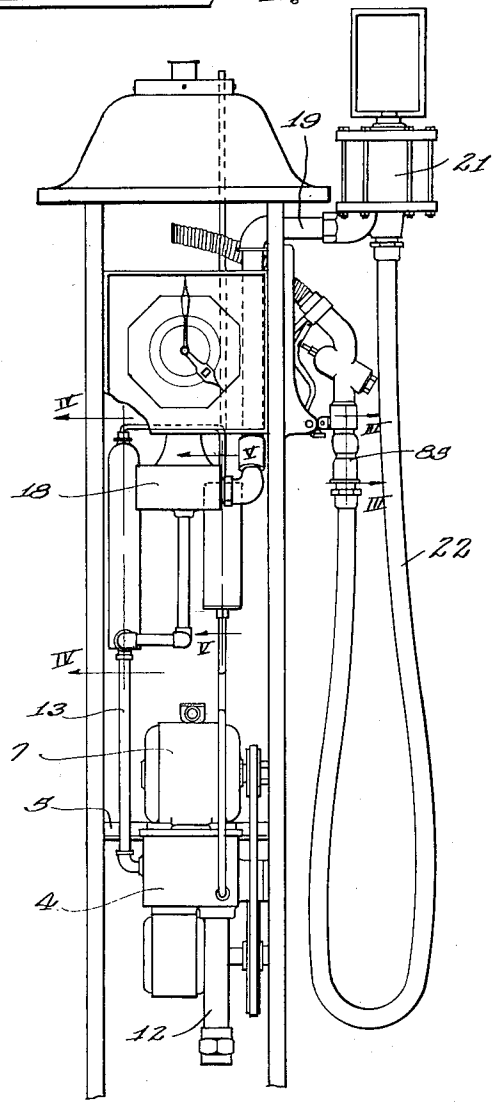


Fig. 2.

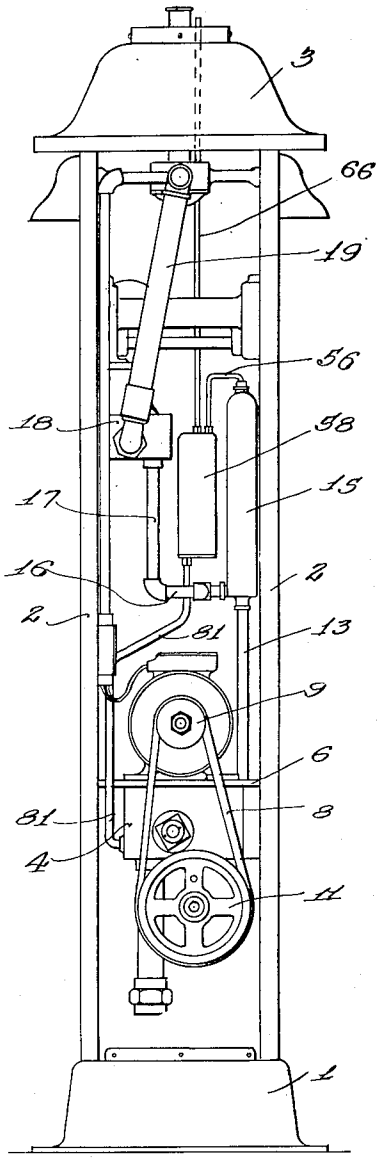
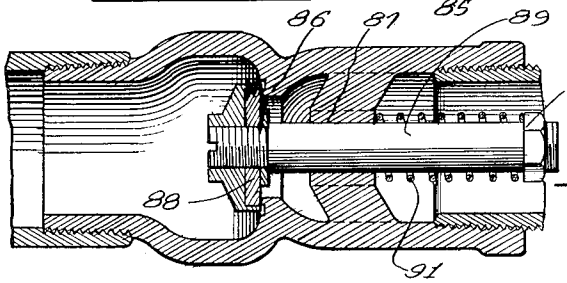


Fig. 3.



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Fig. 4.

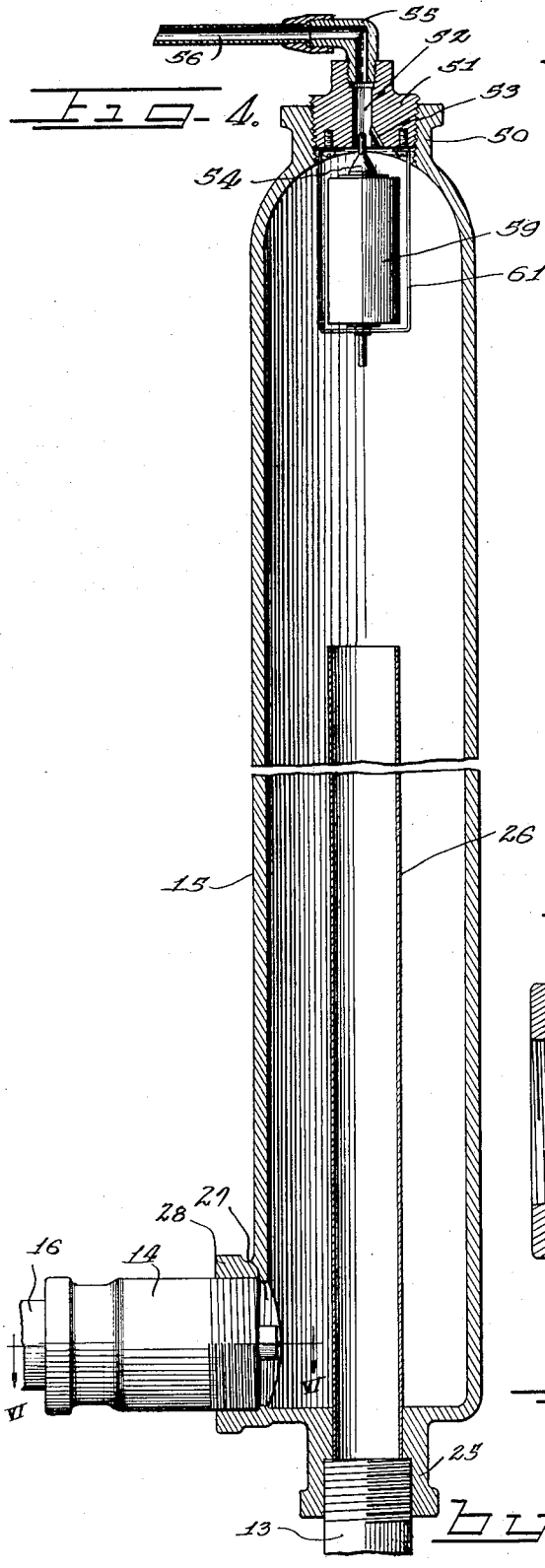


Fig. 5.

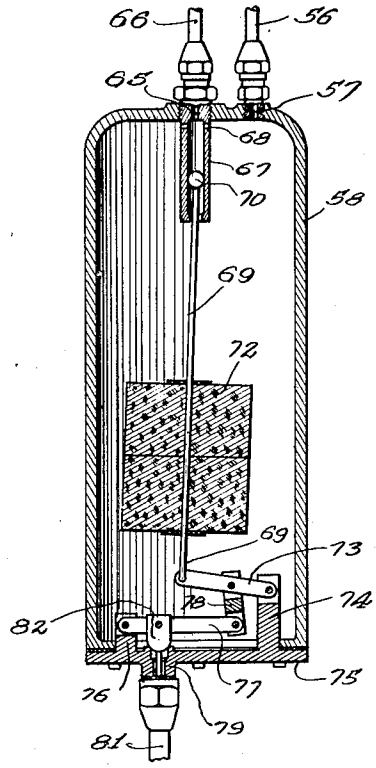
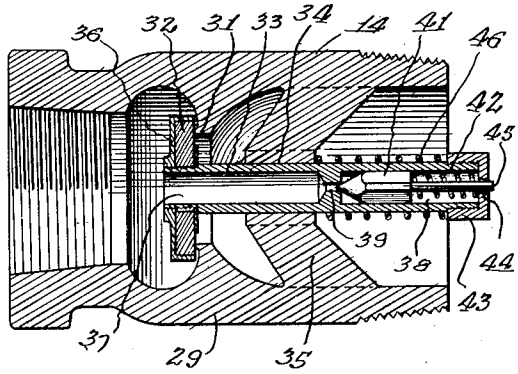


Fig. 6.



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Patented Mar. 6, 1934 1,949,639

UNITED STATES PATENT OFFICE

1,949,639

LIQUID DISPENSER

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Application April 21, 1932, Serial No. 606,548

4 Claims. (Cl. 221—95)

This invention relates to a liquid dispenser. It will be described as incorporated in a dispenser of the general type used extensively for the dispensing of gasoline and the like.

An object of this invention is the provision of a liquid dispenser having improved means associated therewith for separating and eliminating air and gases from the liquid prior to the passage of the liquid through a meter for registering the quantity dispensed.

Another object is the provision of an improved gas separator for a liquid dispenser which is more efficient in the elimination of gas from the liquid and permits the use of a relatively low pressure for dispensing the liquid.

Other objects and advantages of this invention will become apparent from the following description with reference to the accompanying drawings.

On the drawings:

Figure 1 is a front elevational view of a liquid dispenser incorporating my invention, the lower end being broken away.

Figure 2 is a side elevation of that disclosed in Figure 1 and including the base portion.

Figure 3 is a longitudinal section through a check valve used in the dispensing hose and is taken on the line III—III of Figure 1.

Figure 4 is a vertical section through the separating chamber included in my invention and is taken on the line IV—IV of Figure 1.

Figure 5 is a vertical section through the gas eliminator chamber and taken substantially on the line V—V of Figure 1.

Figure 6 is a horizontal section through a check and release valve and is taken on the line VI—VI of Figure 4.

As shown on the drawings:

The liquid dispensing device herein illustrated comprises a base 1, corner frame members 2 and a top 3 connected to the corner frame members and forming a cover for the mechanism therebeneath. A pump 4 of any conventional design is supported by cross frame members 5 and 6 suitably fixed to the corner frame members, for rigidly supporting the pump in position. A motor 7 is mounted on the pump and has driving connection therewith by a belt 8 trained over the pulley 9 on the motor and the driver wheel 11 of the pump.

Fluid such as gasoline and the like including perhaps a small amount of gas and air is drawn into the pump through the conduit 12 and discharged from the pump through the conduit 13 leading to the bottom of the separator tank or chamber 15 illustrated in detail in Figure 4. Liquid is discharged from the chamber 15 through the check valve assembly 14 and conduits 16 and 17 which lead to a suitable meter 18 and from the meter 18 through a conduit 19 to a transparent hermetically sealed bowl 21 and from thence through the dispensing hose 22 to the point of discharge.

Because of the fact that gasoline is somewhat volatile and because air and other gases unavoidably become entrained with gasoline and the like when it is being drawn from a supply tank to be dispensed through a meter, it is necessary that all such gases be removed from the liquid before it passes through the meter if an accurate measuring of the dispensed liquid is to be registered. The chamber 15 is provided at the base with a boss 25 into which is threaded the conduit 13 for introducing liquid under pressure into the chamber. A tube 26 which extends from the boss 25 and in which it is tightly fitted receives liquid from the conduit 13 and introduces it into the main portion of the chamber 15 at a point well above the bottom such that in case the conduit 13 should be removed there is constantly maintained a level of liquid in the chamber 15 well above the dispensing outlet 27 through the boss 28 into which is threaded the check valve assembly 14 illustrated more in detail in Figure 6.

The check valve assembly 14 comprises a casing 29 including an inwardly extending flange 31 forming a valve seat for the valve packing 32 on a longitudinally movable valve stem 33 which is guided in a bore 34 through the spider 35 formed integral with the casing 29. The forward side of the packing 32 is reinforced by a cup 36 having threaded engagement with the forward end of the valve stem 33. The valve stem 33 is preferably hollow having a bore 37 therein at one end and a bore 38 at the other end, connected by a smaller bore 39. A valve element 41 is normally urged by a coil spring 42 against the valve seat formed by the bottom of the bore 38 and in a position to normally close the bore 39. A guiding cap 43 has threaded engagement with the end of the valve stem opposite the valve packing 32. The valve cap 43 has a bore therethrough at 44 to provide a guideway for the stem 45 on the valve element 41. The bore 44 is larger than the stem 45 to provide a clearance through which fluid may pass. The valve element 41 is preferably non-cylindrical to provide clearance through which fluid may pass after it has passed through the bore 39. A coil spring 46 is interposed between the forward edge of the cup 43 and

the rearward edge of the spider 35 to normally urge the valve packing 32 against the valve seat 31 to prevent the return flow of liquid toward the chamber 15, but in case the pressure in the liquid becomes excessive due to expansion by heat or for any other reason, the valve element 41 will yield to allow a small amount of return flow and relieve the excess pressure.

The chamber 15 is provided with a boss 50 at the top into which is threaded a plug 51 having therethrough a small bore 52. A still smaller bore 53 is formed at an angle to the bore 52 and leads therefrom to the inner surface of the plug 51 in such a position that when the inner end of the bore 52 is closed by the valve 54, the bore 53 remains open and permits a limited discharge of gas and liquid from the top of the tank 15 outwardly through the elbow 55 and the conduit 56 leading to the inlet opening 57 at the top of the eliminator tank 58 shown in Figure 5. The valve 54 for closing the inner end of the bore 52 is secured to a float 59 which is in turn slidably mounted in a frame 61 secured at its upper end by suitable screws to the lower end of the plug 51. The valve 54 is adapted to close the inner end of the bore 52 when liquid in the chamber 15 rises to a point sufficiently high to lift the float 59, after which the smaller bore or duct 53 provides the only means of discharge leading from the top of the chamber 15 to the conduit 56.

The gas eliminating tank 58 is provided with a gas discharge outlet 65 leading to a conduit 66 which is normally open to the atmosphere. A tube or valve rod guiding member 67 has threaded engagement in the upper end of the chamber 58 and has radial openings 68 therethrough to permit the escape of gas from the top of the chamber to the discharge outlet 65. A valve rod 69 having a ball valve 70 on the upper end is adapted when actuated to open and close the discharge outlet 65. Upon the rod 69 is tightly mounted a float preferably of cork or the like 72 for raising and lowering the rod 69 in response to the increase and decrease of liquid in the chamber 58 to predetermined levels. The lower end of the rod 69 is connected to a bar 73 pivotally fixed at one end to an upstanding lug 74 on the bottom closure 75 of the chamber 58. A similar lug 76 has pivoted thereto one end of an arm 77, the other end of which is pivoted to an arm 78 the upper end of which is pivotally connected with an intermediate point on the arm 73. The bottom cover member 75 on the chamber 58 is provided with a discharge opening 79 leading to a conduit 81 which conduit is adapted to return liquid from the chamber 58 to the intake side of the pump 4 as shown in Figure 2. The discharge outlet 79 is normally closed by a valve element 82 pivotally mounted on the arm 77 and adapted to be raised from its seat and lowered thereonto by upward and downward movement of the rod 69 which is actuated by the float 72 fixed on the valve rod.

It will be appreciated from the foregoing description that as liquid in the eliminator tank 58 reaches a predetermined point, the float 72 will begin to lift the rod 69, and cause the valve 82 to raise from its seat a slight amount. If the liquid in the chamber 58, continues to rise, the float will continue to lift, causing the valve 82 to open wide and eventually closing the valve element 70 upon the end of the gas discharge outlet 65 to prevent the escape of liquid from the top of the tank in case the liquid continues to rise.

Under normal operating conditions, the float 59 in the chamber 15 is lifted by liquid in the chamber 15 and holds the valve 54 in a position to close the lower end of the bore 52, leaving only a small duct 53 through which air or gas may pass from the upper end of the chamber 15 to the conduit 56. In case of any leakage which would cause air to be pumped up into the top of the chamber 15 in large quantities, the air will displace the liquid and allow the float to drop causing the valve to open the bore 52 at the lower end, allowing air to be dispelled with less effort. By this mechanism, it is permissible to cut down the pump pressure approximately one half. It is decidedly advantageous to have a dispensing mechanism which operates successfully on a low pump pressure, because a high pressure reduces the efficiency of the usual commercial pump and cuts down the flow. It is therefore an obvious advantage of my invention that the pressure may be low thereby increasing the efficiency of the pumping outfit and increasing the gallons per minute which may be dispensed from a liquid dispenser of a given size.

In Figure 3 is shown a check valve as used adjacent the nozzle in the dispensing hose which comprises a casing 85 having formed integrally therewith a valve seat 86 and a spider 87. A valve member 88 mounted on the valve stem 89 is normally urged against the valve seat 86 by a coil spring 91 interposed between the spider 87 and the tension adjusting nut 92 on the valve stem 89. This valve is placed as near as possible to the nozzle because, after the liquid has passed the point of highest pressure and dispenses into a medium of lower pressure, there is some expansion of the liquid and consequently this is the most advantageous point for the pressure to be released.

Although I have herein described only one preferred form of my invention, it will be understood by those skilled in the art that the device as described is subject to variations and modifications without departing from the principles of my invention, and I desire, therefore, that the patent to be granted hereon shall not be limited in any manner except as necessitated by the prior art.

I claim as my invention:

1. In a liquid dispenser, conduit means for delivering liquid under pressure to be dispensed, said conduit means including a separator chamber, a gas eliminator chamber, said separator chamber having an opening communicating with said eliminator chamber, a float controlled valve adapted to close said opening in response to a predetermined level of liquid in said separator chamber, said eliminator chamber having a gas discharge outlet normally open to the atmosphere and a liquid discharge outlet below the level of the gas discharge outlet, a valve for the gas discharge outlet and means responsive to a predetermined level of liquid in said eliminator chamber for actuating said valve to closed position.

2. In a liquid dispenser, conduit means for delivering liquid under pressure to be dispensed, said conduit means including a separator chamber, a gas eliminator chamber, said separator chamber having a small opening at the top communicating with said eliminator chamber, said eliminator chamber having a gas discharge outlet and a liquid discharge outlet below the level of the gas discharge outlet, valve means for closing said gas discharge outlet, valve means for closing said liquid discharge outlet, means operably

connecting both of said valve means whereby closing movement of either of said valve means causes opening movement of the other valve means, and means responsive to an increase in liquid to a predetermined level in said eliminator chamber for actuating said connecting means, and a float controlled valve adapted to close the opening at the top of the separator chamber in response to a predetermined level of liquid in said separator chamber.

3. In a liquid dispenser, conduit means for delivering liquid under pressure to be dispensed, said conduit means including a separator chamber, a gas eliminator chamber, said separator chamber having a small opening at the top communicating with said eliminator chamber, said eliminator chamber having a gas discharge outlet and a liquid discharge outlet below the level of the gas discharge outlet, valve means for closing said gas discharge outlet, valve means for closing said liquid discharge outlet, means responsive to an increase in liquid in said eliminator chamber to a predetermined level to open the valve means for the liquid discharge outlet and responsive to a further increase in the liquid to another predetermined level to close the valve means for the gas discharge outlet, and a float controlled valve adapted to close the opening at the top of the separator chamber in response to a predetermined level of liquid in said separator chamber.

4. In a liquid dispenser, a gas separator comprising a separator chamber, said separator chamber having a dispensing opening adjacent the bottom, means for introducing fluid under pressure into said separator chamber at a point above the dispensing opening, said separator chamber having a relatively small outlet at the top for the discharge of gas and liquid under pressure, means responsive to the increase in the liquid to a predetermined level for reducing the capacity of the small outlet to a predetermined minimum, a gas eliminator chamber communicating with the small outlet in the separator chamber to receive gas and liquid therefrom, said eliminator chamber having a plurality of discharge outlets, and automatic means adapted to selectively open and close said outlets to discharge liquid exclusively from one outlet and gas from the other.

MARK E. ZIMMERER.