Dec. 29, 1925. 1,567,570

J. J. CATRON

LIQUID DISPENSING SYSTEM

Filed August 8, 1924

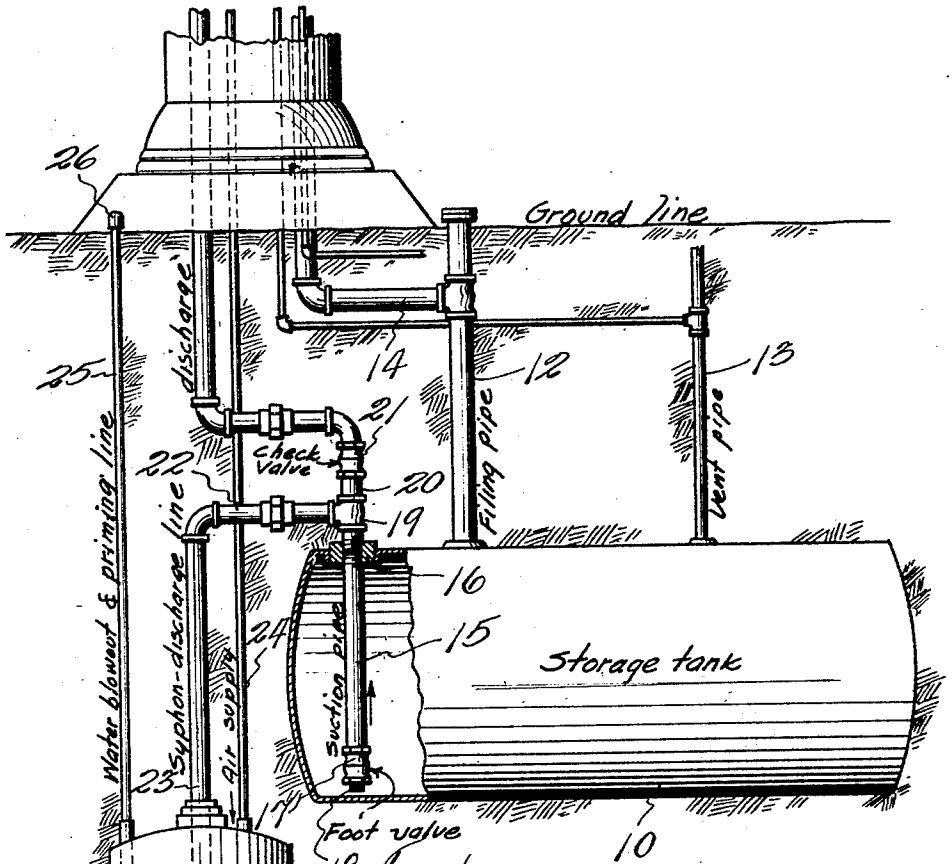
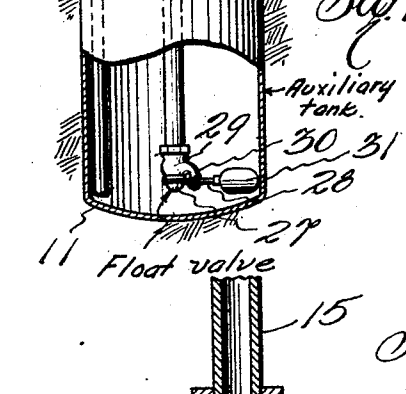


Fig. 1.



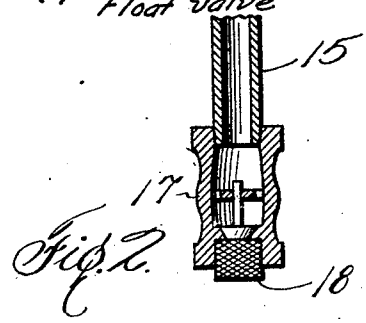


Fig. 2.

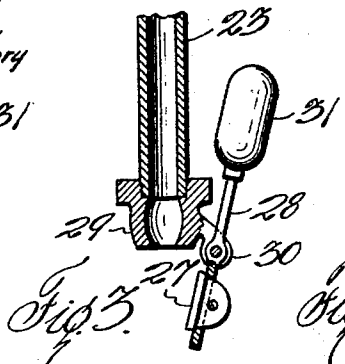


Fig. 3.

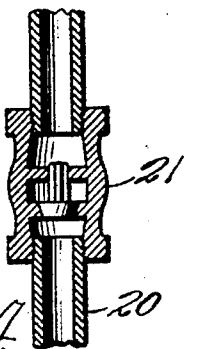


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN J. CATRON, OF BONHAM, TEXAS, ASSIGNOR TO CATRON MANUFACTURING COMPANY, OF BONHAM, TEXAS, A CORPORATION OF TEXAS.

LIQUID-DISPENSING SYSTEM.

Application filed August 8, 1924. Serial No. 730,977.

To all whom it may concern:

Be it known that I, JOHN J. CATRON, a citizen of the United States, residing at Bonham, in the county of Fannin and State of Texas, have invented certain new and useful Improvements in Liquid-Dispensing Systems, of which the following is a specification.

This invention relates to new and useful improvements in liquid dispensing systems.

The invention has particularly to do with means for storing and supplying liquid, such as gasoline, to the measuring and dispensing elements of a liquid dispenser by means of compressed air, and relates more especially to that type known as siphonic.

The object of the invention is to provide an auxiliary or pressure dispensing tank in connection with a main or storage tank and at a lower level whereby the liquid may be siphoned from the storage tank to the pressure tank; together with means controlled by the level of the fluid in the pressure tank for preventing breaking of the iphon, should the liquid in the pressure tank reach a predetermined low level.

A particular object of the invention is to provide means for releasing air, automatically, from the siphoning and liquid discharge pipes, whereby air traps will be eliminated and the siphon will be automatically maintained.

An important object is to provide means in the pressure tank controlled by the level of the liquid therein to close the lower end of the siphon line, when the storage tank becomes empty, thereby supporting liquid in the siphon line and automatically priming the siphon line when the storage tank is again filled.

A further object of the invention is to arrange the junction between the siphon pipe and the discharge pipe directly over the suction pipe of the siphon line, whereby liquid discharged from the pressure tank through the siphon pipe, will fill the suction pipe, thus automatically priming the siphon line.

Another object of the invention is to provide means controlled by the level of the liquid in the pressure tank for automatically closing the lower end of the siphon line to exclude compressed air and liquid therefrom when the liquid in the pressure tank reaches a predetermined low level or when the liquid and sediment are expelled through the clean-out pipe.

A construction designed to carry out the invention together with other novel features of the invention will be hereinafter more particularly described.

The invention will be more readily understood from a reading of the following specification in which an example of the invention is shown and wherein:

Fig. 1 is a vertical sectional view of the parts of a system involving my invention,

Fig. 2 is an enlarged sectional view of the float valve,

Fig. 3 is an enlarged sectional view of the foot valve, and

Fig. 4 is an enlarged sectional view of the check valve.

In the drawings the numeral 10 designates a horizontally disposed underground storage tank and 11 a relatively small auxiliary or pressure tank. The pressure tank is located below the storage tank as is shown in Fig. 1, so that liquid may be readily siphoned from the tank 10 into the tank 11. A liquid filling pipe 12 extends from the tank 10 to the groud line as does also, a vent pipe 13. The filling pipe is connected with the overflow pipe 14 of the dispenser (not shown). This system is particularly adapted to be used in connection with the dispenser shown in my application Ser. No. 660,480, but is not limited to such use.

A suction pipe 15 extends vertically at one end of the storage tank, passing through a suitable plug 16 at the top of the tank. On the lower end of the suction pipe is screwed a foot valve 17 of suitable construction (Fig. 3) and closing against a return or downward flow. A strainer 18 is mounted at the inlet of the foot valve and is immediately above the bottom of the tank. It will be seen that while liquid may be freely drawn up through the suction pipe, or a column of liquid supported therein, neither air or liquid can enter the storage tank through the suction pipe and foot valve.

Just above the plug 16 the pipe 15 enters the bottom of a T 19 and this is a very important feature of the invention. From the upper end of the T a liquid discharge pipe 20 leads to the dispenser (not shown) and includes a check valve 21 (Fig. 4), closing against a back pressure above it. From the

side of the T 19 a siphon and discharge line leads, being composed of a horizontal pipe 22 connected to the upper end of a vertical pipe 23 extending down through the top of the tank 11, which latter is air-tight. Attention is called to the fact that liquid is siphoned from the storage tank 10, through the pipes 22 and 23 to the pressure tank 11, and is also expelled by compressed air through said pipes to the T 19 and the pipe 20. When the liquid from the pipe 22 enters the T 19, it will fall in the suction pipe 15, unless the latter is filled with liquid, but air will pass up into the pipe 20, useat the check valve 21, and escape, this prevents air traps and assures the continuity of the siphon.

A compressed air supply pipe 24 enters the top of the pressure tank 11. A water blow-off pipe 25 extends from the ground line down into the pressure tank and terminates near the bottom thereof. The upper end of the pipe 25 is closed by a cap 26. By removing the cap, water, sediment or other foreign matter may be expelled through the pipe 25 by the compressed air supplied to the tank 11.

A very important feature of the invention resides in a float valve 27 mounted on a lever 28 carried by a collar 29 screwed on the lower end of the pipe 23. The lever is pivoted intermediate its ends on a bracket 30 depending from the collar so that the valve may seat against the underside of the collar, when the lever is brought to a horizontal position. On the opposite end of the lever from the valve, is mounted a float 31 of sufficient buoyancy to rise with the level of the liquid and hold said valve normally open, both when the liquid is under pressure and when it is free from pressure. The liquid is discharged from the tank 11 through the pipes 22 and 23, as heretofore explained.

It will be apparent that if the float valve was not provided, the siphon line would always be open, either to the admission of fluid under pressure or air under pressure. When it is desired to clean out the pressure tank the liquid is lowered to permit the valve 27 to close the lower end of the pipe 23 and the cap 26 is removed from the upper end of the pipe 25, thus when air under pressure is admitted from the pipe 24, the water, sediment and foreign matter will not be forced up into the pipe 23, but will be expelled through the blow-off pipe 25. If the pipe 23 was not closed it would be filled with foreign matter.

The most important function of the float valve, however, is to close the lower end of the siphon-discharge pipe 23 when the liquid in the tank 11 reaches a low level from any cause, such as the storage tank 10 becoming empty, thereby retaining a column of liquid in the pipes 22 and 23 and maintaining the siphon. By this arrangement just as soon as the air pressure is relieved, the weight of the column of liquid in the pipe 23 unseats the valve 27, so that the liquid from the siphon line flows back into the pressure tank, the pipe 24 becoming an air vent. The capacity of the pipes 22 and 23 is much greater than that of the suction pipe 15 and consequently when air pressure is again applied to the liquid in the pressure tank, which has returned to said tank, said liquid will be forced into the suction line and the suction pipe 15, thus filled. The float will again close so that the siphon is primed.

It is obvious that if the float valve was not provided the air under pressure would clear the pipes 22 and 23 and the pipe 20 of liquid, up to the check valve 21 or above the same, thus breaking the siphon. The arrangement of T 19 directly over the suction pipe 15 and the check valve 21 above the T, assures that liquid entering the T from the pipe 22 will first fall and fill the pipe 15 and air will pass up through the check valve, thus relieving any air trap and providing a solid column of liquid.

In the operation of the system liquid, such as gasoline, is introduced through the blow-off pipe 25 after the storage tank 10 has been filled. The pressure tank 11 being filled, the float valve 27 will open. Air under pressure is then admitted from the pipe 24. The liquid is displaced from the tank 11 up through the pipe 23, pipe 22 to the T 19, from which it fills the suction pipe 15, after which liquid passes up through the pipe 20 and check valve 21 to the dispenser (not shown). The foot valve 17 supports the liquid in the pipe 15.

The pressure tank 11 is of course, given a capacity considerably greater than that of the measuring receptacle of the dispenser, perhaps twice as much. Under ordinary circumstances the liquid in the pressure tank will not reach such a low level as to close the valve 27. Thus each time after the measuring receptacle is filled the siphon in the line will set up a flow of liquid from the tank 10 to the tank 11, just as soon as the air pressure is relieved, whereby the tank 11 is filled.

When the storage tank 10 becomes empty or for any other reason, such as holding the air line open so that the liquid is carried back from the measuring receptacle through the overflow pipe 14, the liquid in the tank 11 reaches a low level, the float 31 will drop and close the valve 27, thereby preventing further discharge of either liquid or air through the pipe 23 and leaving the entire siphon filled with a solid column of liquid.

Just as soon as the air pressure in the tank 11 is relieved, the pipe 24 will become a vent and the weight of the column of fluid in the pipe 23 will unseat the valve so that the liquid supported in the pipes 22 and

23, will flow back into the tank 11 and siphon the liquid from the pipe 15 also. If the tank 10 is empty, it is of course refilled. The next time compressed air is admitted to the pressure tank, it will discharge the returned liquid through the pipes 23 and 22 to the T 19 and fill the pipe 15, thus automatically restoring the siphon by the priming of the line. The valve 27 will of course again close when the liquid is lowered by restoring the siphon, but as soon as the pressure in the tank 11 is relieved the liquid will start flowing back into the tank 11 and siphon the liquid from the tank 10. The foot valve 17 functions to prevent any liquid passing back into the tank 10 and the check valve 21 permits trapped air in the siphon to escape, but not to enter.

It is pointed out that the maintaining and restoring of the siphon is entirely automatic and so long as sufficient liquid is held in the line it will not be necessary to prime the system. Whenever the system is primed the cap 26 is restored, but when it is desired to clean out the tank 11 the cap is removed and compressed air is admitted to said tank. The pipe 25 being open, the water, sediment and foreign matter from the bottom of the tank will be blown out through said pipe. When the liquid reaches a low level the pipe 23 will be closed by the valve 27, so that the air cannot enter.

Various changes and alterations as well as modifications may be made in carrying out the system, all within the scope of the appended claims.

This application is in part a continuation of my application filed January 22, 1921, Ser. No. 439,138.

What I claim, is:

1. In a liquid dispensing system, the combination of a liquid storage tank, a pressure tank at a level below the storage tank, a siphon line extending from the storage tank to the pressure tank, a portion of the siphon line serving as a pressure discharge line for the pressure tank for conveying liquid therefrom, and means at the lower end of the siphon line in the pressure tank controlled by the level of the liquid in the pressure tank for closing the lower end of the siphon line when the liquid reaches a predetermined low level in the pressure tank and thus maintaining a siphon in the line.

2. In a liquid dispensing system, the combination of a liquid storage tank, a pressure tank at a level below the storage tank, a vertical section pipe extending through the top of the storage tank, a foot valve on the lower end of the suction pipe near the bottom of the storage tank for admitting liquid and suporting a column thereof in the suction pipe, a T-connection mounted on the upper end of the suction pipe, a discharge pipe leading from the top of the T-connection, a check valve in the discharge pipe above the T-connection, a fill pipe entering the storage tank, a vent pipe leading from the storage tank, a vertical siphon line extending through the top of the pressure tank and having a lateral branch connected with the side of the T-connection, a float valve on the lower end of the suction line in the pressure tank, a compressed air supply pipe entering the top of the pressure tank, and a blow-off pipe extending into the pressure tank and terminating near the bottom thereof.

3. In a liquid dispensing system, the combination with a liquid storage tank, an auxiliary tank, a siphon line extending from the storage tank into the auxiliary tank and having its longer leg in the latter, a valve operating to close said siphon line when the liquid reaches a predetermined level in said auxiliary tank, and an air supply pipe connected with said auxiliary tank.

In testimony whereof I affix my signature.

JOHN J. CATRON.