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FLUID DISPENSING MEANS

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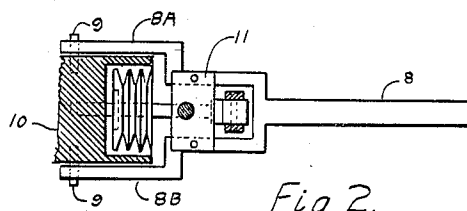


Fig. 2.

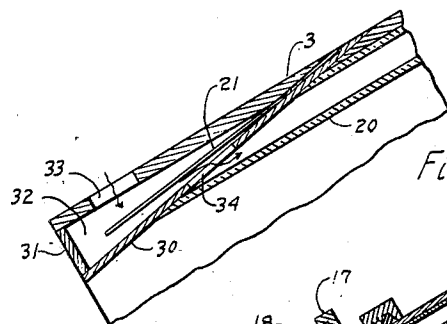


Fig. 3

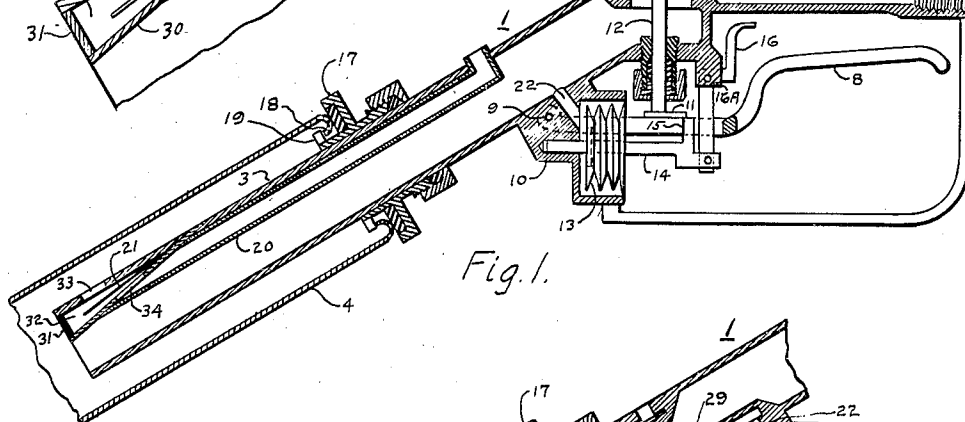


Fig. 1.

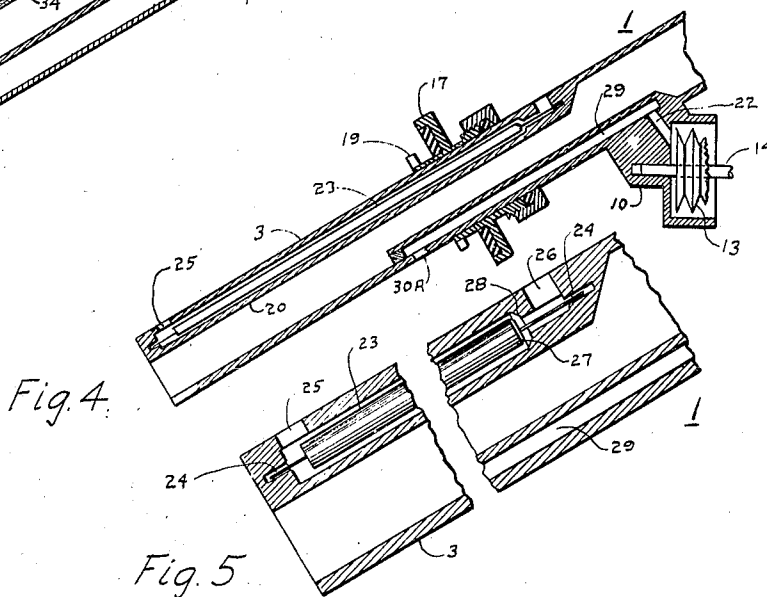


Fig. 4.

Fig. 5.

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23

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FLUID DISPENSING MEANS

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11 Claims. (Cl. 226—120)

This invention relates to apparatus for filling a receptacle or container with a fluid. More particularly this invention relates to apparatus for filling closed containers, such as tank cars, tank wagons, storage tanks, storage batteries, automobile gasoline tanks, and the like.

One object of my invention is to provide a device for filling a container with a fluid which will automatically shut off the flow of fluid when the container becomes filled or the level of the fluid therein reaches a predetermined height.

A further object of my invention is to provide a filling device of this type wherein the mechanism for shutting off the flow of fluid to the container is carried by the device itself, and no auxiliary mechanism or parts are required.

A further object of my invention is to provide a filling device of this type of rugged construction having a minimum of moving parts and capable of withstanding the normal wear and tear met with in commercial usage.

Further objects and advantages of my invention will be apparent from the description to follow and from the drawing in which:

Fig. 1 is a side elevation partially in section of one form of my invention.

Fig. 2 is a plan view of a part of the latching mechanism shown in Fig. 1.

Fig. 3 is a fragmentary view to larger size of a part of Fig. 1.

Fig. 4 is a fragmentary side elevation view in section showing a modified construction of a part of the device shown in Fig. 1.

Fig. 5 is a fragmentary view to larger size of a part of Fig. 4.

I have illustrated my invention in a form particularly adapted to the filling of automobile tanks with gasoline. As known, the usual filling means now employed consists of a flexible hose, one end of which is attached to a suitable pump and the other to a nozzle adapted to be inserted in an opening in the gasoline tank. The nozzle is ordinarily provided with a normally closed valve, which it is necessary for an attendant to manually hold in the open position during the filling operation. With the nozzle in place it is impossible for the attendant to know when the gasoline tank is filled, and in order to prevent overfilling it is necessary to stop the flow of gasoline and remove the nozzle several times as the level of gasoline approaches the top of the tank in order to observe the condition of the tank. Thus the filling operation as now performed consumes considerable time which the attendant could otherwise put to good advantage.

Furthermore, even with the utmost care the attendant is likely to overestimate the remaining capacity of the tank and permit the tank to overflow, thus wasting considerable gasoline and creating a fire hazard. I have chosen to illustrate and describe this particular form of my invention solely because of the awareness of practically everyone to this condition. My invention, as will be evident, as the description proceeds, is however adaptable to a wide variety of other uses.

Referring to Fig. 1, I therein show a nozzle generally indicated at 1, the inlet 2 of which may be connected to a suitable source of gasoline supply under pressure, such as a gasoline pump (not shown) by means of a flexible hose or pipe. The discharge end 3 of the nozzle is adapted to be inserted in the opening provided in the gasoline tank. Usually the gasoline tank is provided with a filler spout such as illustrated at 4, and in which I show the discharge end 3 of the nozzle inserted.

In the nozzle 1 between the inlet and discharge ends is a valve 5 normally urged by a compression spring 6 to a closed position against an annular seat 7. The valve 5 may be lifted to an open position, however, by a manually operable lever 8. As shown more clearly in Fig. 2 the lever 8 has a bifurcated section, the legs 8A and 8B of which are pivotally mounted by pins 9 on opposite sides of a housing 10 which preferably is formed integral with the nozzle 1. The bifurcated section of the lever 8 carries a platform 11 which upon the lever 8 being moved upwardly engages a stem 12 adapted to lift the valve 5 from its seat 7 to an open position.

With the usual filling nozzle throughout the filling operation, it is necessary for an attendant to manually hold a shut off valve corresponding to the valve 5 in open position. However, in accordance with my invention I provide a latching means which holds the valve 5 in a wide open position until released by means hereinafter to be described. In the specific embodiment of my invention illustrated in Fig. 1 the latching means is shown as comprising a plunger 14, normally urged to the left as shown in the drawing by the inherent resiliency of an expansible bellows or Sylphon 13 mounted in the housing 10, and having an upwardly extending finger 15. Upon the platform 11 being manually positioned upwardly by means of the lever 8 until it clears the finger 15 the plunger 14 will shift to the left under the influence of the Sylphon 13 carrying the finger 15 under the platform 11 so that

thereafter the valve 5 will remain in the wide open position.

One end of the plunger 14 is loosely journaled in a wall of the housing 10 and the other end pivotally supported by a manually operable trigger 15 pivotally fastened to a lug 16A formed integral with the nozzle 1. The trigger 16 provides an auxiliary or emergency release for tripping the latching means so that the valve 5 may be returned to the closed position. Upon the trigger 16 being positioned in a counter-clockwise direction the plunger 14 will be positioned to the right so that the finger 15 will slip from under the platform 11 thus permitting the stem 12 to move downwardly and the valve 5 to closed position.

It is evident that by virtue of the fact that the pivot connection between the plunger 14 and trigger 16 is immediately adjacent the finger 15 the lateral thrust of the plunger 14 against the wall of the housing 10 in which it is journaled will be insignificant, so that friction will not impede the positioning of the plunger 14 by the bellows or Sylphon 13. It is further evident however that the natural resiliency of the Sylphon 13 urging the plunger 14 to the left may be fortified by a compression spring or other suitable means as will be evident to those skilled in the art.

The outlet 3 of the nozzle 1 is provided with a closure member 17 for sealing the opening in the gasoline tank when inserted therein. The opening of the usual gasoline tank is provided with a bayonet fitting comprising spaced, sloping projections, such as illustrated at 18. The closure member 17 may therefore conveniently be provided with lugs 19 adapted to engage the projections 18 and upon angular movement of the closure member 17 relative to the outlet 3 force the former against the annular seating surface surrounding the opening. As illustrated the closure member 17 may be provided with a suitable packing to engage the seating surface of the opening, so that a substantially air or gas tight connection may be quickly and conveniently formed between the outlet 3 and opening in the tank.

During the filling operation, that is, while fluid is being discharged into the tank, air or gas within the tank displaced by the fluid is vented through a suitable vent pipe 20 leading from the outlet of the discharge end 3 to the atmosphere above the closure member 17. As shown in Fig. 1 and in Fig. 3 to larger size the lower end of the vent pipe 20 is closed by a sloping wall 30 which is likewise closed at its lower end by a piece 31 thus forming a pressure tight chamber 32. Air or gas vented from the receptacle being filled is admitted to the chamber 32 through an orifice 33 in the wall of the outlet 3 and discharged therefrom into the vent pipe 20 through an orifice 34 in the wall 30.

The orifice 34 is provided with a closure member comprising a flexible reed 21 adapted to close the orifice upon the fluid being discharged into the tank or receptacle entering the chamber 32 through the orifice 33. The reed 21 is of sufficient length so that the fluid entering the chamber 32 through the orifice 33 impinges directly thereupon. So long as air or gas is being vented the force produced by the jet striking the reed is insufficient to move it against the orifice 34, however, upon a jet of heavier fluid such as gasoline striking the reed 21 the force will be suffi-

cient to move it against the orifice 34 and seal the same so that thereafter no fluid may escape through the vent pipe 20.

Upon the sealing of the orifice 34 by the reed 21 the pressure within the tank and discharge end 3 of the nozzle will increase. This will be evident from the fact that the closure member 17 forms a pressure tight connection with the filler spout 4 and that the valve 5 is open so that fluid is being discharged into the tank. In accordance with my invention I utilize such increase in pressure to automatically release the latching means thereby closing the valve 5 and stopping further flow of fluid into the tank whereby overfilling is prevented.

Referring to Fig. 1 it will be noted that the bellows 13 forms with the interior wall of the housing 10 a pressure tight chamber in communication with the nozzle 1 through a channel 22. The natural or inherent resiliency of the bellows 13 is such that with the normal pressure existing within the nozzle 1 while fluid is flowing therethrough and the vent pipe 20 is open the plunger 14 is urged to the left. When, however, the vent pipe 20 is closed causing the heretofore described increase in pressure within the nozzle 1 which is communicated to the bellows 13 through channel 22 a sufficient force is created to position the bellows and plunger 14 to the right thereby releasing the latching means and permitting the valve 5 to move to closed position. It will be observed that by my invention after an operator has initially started the filling operation by operating the lever 8 no further attention on his part is required, the mechanism acting to automatically shut off the flow of fluid when the tank becomes filled or the level therein reaches a predetermined height as determined by the position of the orifice 33 relative to the opening in the filler spout 4. It will further be observed that the trigger 16 provides a means for stopping the flow of fluid to the tank or receptacle being filled at any time prior to the complete filling thereof.

It will be evident that various other types of closure members for the vent pipe 20 may be utilized, and in Figs. 4 and 5 I illustrate an alternate form comprising a float valve 23 having pin projections 24 journaled in suitable bearings formed in the vent pipe 20. Normally the float valve 23 is by gravity positioned toward the outlet of the discharge end 3 so that air displaced by the fluid passes through an orifice 25 into the vent pipe and is exhausted to the atmosphere through an opening 26. When, however, gasoline passes through the orifice 25 into the vent pipe 20 thereby increasing the buoyancy of the float valve 23, it is positioned upwardly so that its upper end 27 seats against a suitable surface 28 formed in the vent pipe 20, thereby sealing off communication with the atmosphere and causing the pressure within the tank and nozzle 1 to increase.

In the construction shown in Fig. 4 I also provide a means whereby the Sylphon 13 does not come into direct contact with the fluid being discharged into the tank. Such a construction, it will be evident, is particularly valuable where the fluid being discharged would have a deleterious effect upon the Sylphon 13 and other associated parts. Therein I show the channel 22 communicating with a pipe 29 leading to an opening 30A in the discharge end 3 of the nozzle below the closure member 17 but above the ori-

5 fice 25. The arrangement is such that prior to the time that the fluid reaches the level of the opening 30A the pressure within the tank will increase sufficiently to cause the plunger 14 to be positioned to the right, thereby permitting the valve 5 to move to the closed position.

While I have shown the vent pipe 20 as being within the nozzle 1 it will be apparent that if desired it may form a separate connection to the tank automatically or manually closed upon the level of the fluid therein reaching a predetermined height. Likewise I may provide other designs of latching arrangement releasable upon the pressure within the tank reaching a predetermined value. Such modifications will be obvious to those skilled in the art and it will be evident that other changes as well may be made without departing from the scope or spirit of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. Apparatus for filling a substantially air tight container having an opening through which liquid may be admitted, in combination, a closure member adapted to substantially seal said opening and provided with a nozzle through which the liquid to be discharged into the container passes, a normally closed valve in said nozzle, manually operable latching means for holding said valve in the open position, a vent pipe in said nozzle having an opening to the atmosphere for releasing the air from the container displaced by the liquid discharged therein, means responsive to the level of liquid in said container for closing said vent and thereby causing the pressure in said container to increase, pressure sensitive means for releasing said latching means to close said valve, and a pressure transmitting connection between said nozzle and pressure sensitive means.

2. A filling device, in combination, a conduit, a normally closed valve in said conduit, a latching means for holding said valve in open position, a pressure sensitive device for automatically releasing said latching means to permit the valve to return to closed position, a pressure transmitting connection between said conduit and pressure sensitive device, a vent pipe having an opening to the exterior of said conduit, and liquid level responsive means for sealing said vent pipe.

3. A filling device, comprising in combination, a conduit, a normally closed valve in said conduit, latching means for holding said valve in the open position, a pressure sensitive device for automatically releasing said latching means to permit said valve to return to the closed position, a pressure transmitting connection between said conduit and said pressure sensitive device, a vent pipe having an opening to the exterior of said conduit, and valve means for closing said vent pipe.

4. A filling device, comprising in combination a manually closed valve, a discharge nozzle connected to the outlet of said valve, manually operable latching means for holding said valve in the open position, pressure sensitive means for releasing said latching means to permit said valve to return to the closed position, a pressure transmitting connection between said pressure sensitive means and said discharge nozzle, a vent pipe within said nozzle extending from the end of said discharge nozzle remote from said valve and opening to the exterior of said nozzle at a point adjacent said valve, and a flexible closure member for said vent pipe adapted to seal the

end of said vent pipe adjacent the said remote end of said nozzle.

5. A filling device comprising in combination, a manually closed valve, a discharge nozzle connected to the outlet of said valve, a latching means for holding said valve in open position, pressure sensitive means for releasing said latching means to permit said valve to return to the closed position, a pressure transmitting connection between said pressure sensitive means and said discharge nozzle, a vent pipe within said nozzle having an opening to the exterior of said nozzle, and liquid level responsive means for sealing said vent pipe.

6. Apparatus for filling a substantially air tight container having an opening through which liquid may be admitted, in combination, a closure member adapted to substantially seal said opening and provided with a nozzle through which the liquid to be discharged into the container passes, a normally closed valve in said nozzle, manually operable latching means for holding said valve in the open position, a vent pipe having an opening to the atmosphere for releasing the air from the container displaced by the liquid discharged therein, means responsive to the level of the liquid in said container for closing said vent and thereby causing the pressure in said container to increase, pressure sensitive means for releasing said latching means to close said valve, and a pressure transmitting connection between said nozzle and pressure sensitive means.

7. A filling device comprising in combination, a normally closed valve, a discharge nozzle connected to the outlet of said valve, a latching means for holding said valve in the open position, pressure sensitive means for releasing said latching means to permit said valve to return to the closed position, a pressure transmitting connection between said pressure sensitive means and said discharge nozzle, a vent pipe having an opening to the exterior of said nozzle, and liquid level responsive means for sealing said vent pipe.

8. Apparatus for filling a substantially air tight container having an opening through which a liquid may be admitted, in combination, a closure member adapted to substantially seal said opening, a nozzle in said closure member through which the liquid to be discharged into the container passes, a normally closed valve for regulating the flow of liquid through said nozzle, manually operable latching means for holding said valve in the open position, a vent pipe carried by said nozzle having an opening to the atmosphere for releasing the air in said container displaced by the liquid discharged therein, a closure member for said vent pipe comprising a reed positioned adjacent the opening in said vent pipe within said nozzle and adapted to permit the escape of air through said vent pipe but sealing said vent pipe upon liquid entering therein, a pressure responsive element sensitive to the pressure within said container for releasing said latching means to close said valve, and a pressure transmitting connection between said pressure responsive element and said nozzle.

9. A filling device comprising in combination, a conduit, a normally closed valve in said conduit, a latching means for holding said valve in open position, a pressure sensitive device for automatically releasing said latching means to permit the valve to return to closed position, a pressure transmitting connection between said conduit and pressure sensitive device, a vent pipe within said conduit having two openings to the exterior of said conduit, and liquid level

responsive means for sealing one of said openings.

10. A filling device comprising in combination, a conduit, a normally closed valve in said conduit, a latching means for holding said valve in open position, a pressure sensitive device for automatically releasing said latching means to permit the valve to return to closed position, a pressure transmitting connection between said conduit and pressure sensitive device, a vent pipe within said conduit having two openings to the exterior of said conduit, and a closure member for said vent pipe comprising a reed positioned adjacent one of the openings in said vent pipe and adapted to permit the escape of gas through said vent pipe but sealing said vent pipe upon liquid entering therein.

11. Apparatus for filling a substantially air tight container having an opening through which a liquid may be admitted, in combination, a closure member adapted to substantially seal said opening, a nozzle in said closure member

through which the liquid to be discharged into the container passes, a normally closed valve for regulating the flow of liquid through said nozzle, manually operable latching means for holding said valve in the open position, a vent pipe having an opening to the atmosphere for releasing the air in said container displaced by the liquid discharged therein, means adapted to permit the escape of air through said vent pipe but preventing the escape of liquid therethrough comprising a chamber having a first orifice opening into said container and a second orifice opening into said vent pipe through which the air to be discharged through said vent pipe passes and a flexible reed disposed in said chamber between said orifices so that liquid discharged from said first orifice causes said reed to seal said second orifice; and a pressure responsive element sensitive to the pressure within said container for releasing said latching means to close said valve.

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