Jan. 20, 1948. C. H. MUELLER ET AL 2,434,771

LIQUID DISPENSER

Filed March 2, 1946 2 Sheets-Sheet 1

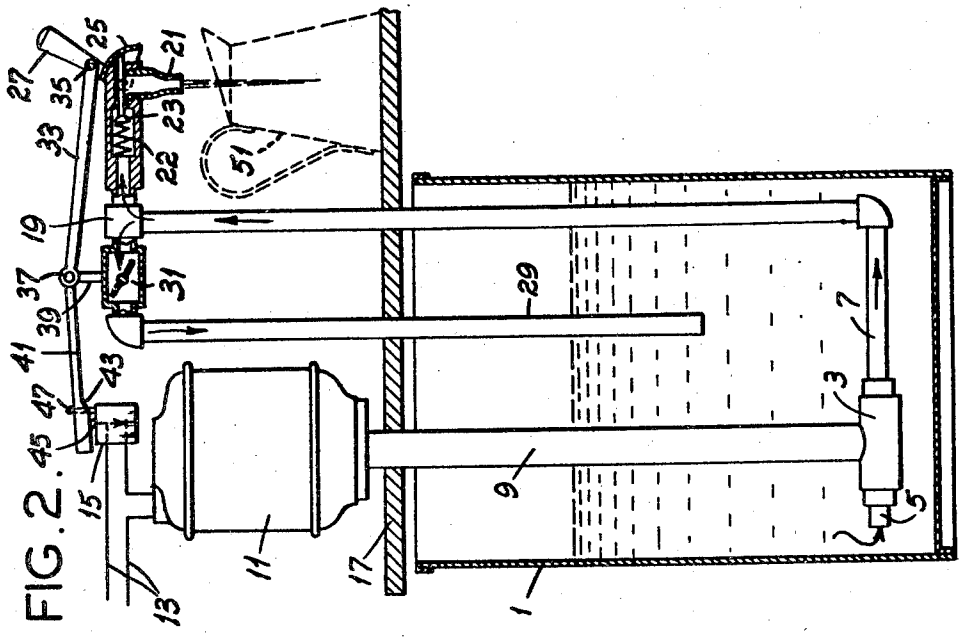


FIG. 2.

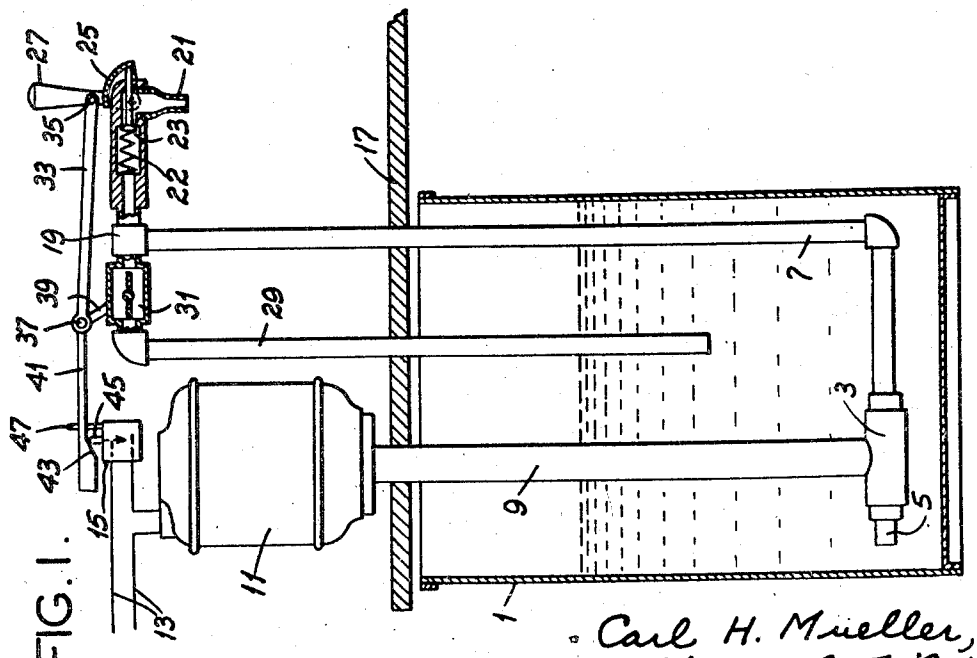


FIG. 1.

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FIG. 3.

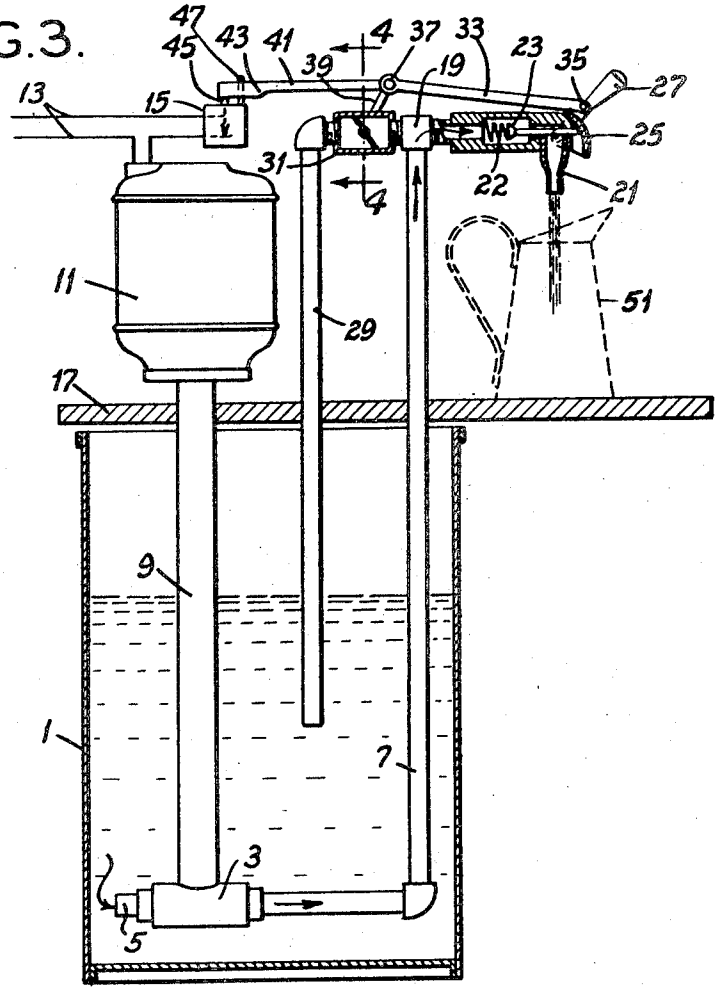
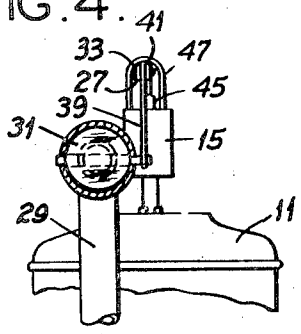


FIG. 4.



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2,434,771

LIQUID DISPENSER

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Application March 2, 1946, Serial No. 651,596

8 Claims. (Cl. 103—25)

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This invention relates to liquid dispensers, and with regard to certain more specific features, to dispensers for the retail sale of oil and similar liquid products.

The invention is an improvement upon that described in our United States patent application, Serial Number 583,912, filed March 21, 1945, for Liquid dispenser.

Among the several objects of the invention may be noted the provision of a dispensing apparatus for liquids such as lubricating oil or the like so constructed that upon starting a dispensing flow undesirable spurting action will be avoided and an easy flow obtained; the provision of apparatus of the class described wherein the desired flow action is controlled by the opening and closing of the dispensing control valve; and the provision of apparatus of the class described in which full-volume of flow is obtained in a minimum time without said undesirable spurting; the provision of apparatus of this class which upon stopping a dispensing flow liquid hammer effects are avoided; and the provision of a simple form of device for obtaining the desired ends. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a vertical section illustrating the invention in an "off" position;

Fig. 2 is a view similar to Fig. 1, showing an intermediate "starting" position;

Fig. 3 is a view similar to Fig. 1, showing a "full on" position; and,

Fig. 4 is a vertical section on line 4—4 of Fig. 3.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

In automotive service stations, hardware, grocery and similar stores, lift pumps are often used for transferring oil and other liquids from bulk containers to retailing containers. One of the undesirable features of such pumping apparatus is the spurt which usually occurs when the outlet valve is initially opened at the beginning of a dispensing operation. This occurs either when pressure is kept available behind the initially

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closed valve, or when pressure is built up too quickly just before the valve opens. In either case, the sudden release of pressure causes the spurt. On the other hand, if no pressure is maintained behind the closed valve and is then too slowly increased upon opening the valve, an undesirable time delay is introduced in attaining a full volume of flow. The ideal condition is a steady gain in the flow from the outlet valve, starting with a non-spurting condition.

Referring now more particularly to Figs. 1, 2, and 3, there is shown at numeral 1 a filled container such as supplied to the retailer. This constitutes a liquid sump. The top has been removed wholly or in part and in this condition the container is the equivalent of an open well, cistern, tank or the like. If desired, the container 1 or equivalent may be provided with a cover (not shown).

A pump 3, with inlet opening 5 and outlet pipe 7, is positioned as indicated. The pump 3 is preferably immersed near the bottom of the liquid supply and is driven by a shaft enclosed in a housing 9. The shaft is coupled with an electric driving motor 11. The power circuit 13 to the motor 11 includes a switch 15.

The container 1 may be located beneath a counter or platform 17, the shaft housing 9 extending upward to the motor 11 above the platform. The outlet pipe 7 also extends above the platform where it is supplied with a T-connection 19. One branch of the T-connection leads to a manually operated faucet 21. A spring-pressed valve 23 in the faucet 21 checks against outward flow (Fig. 1) but may be opened against the pressure of spring 22, by means of a control cam 25 (Figs. 2 and 3). The cam 25 is of the rotary type and is operated from a control handle 27.

The other branch of the T-connection 19 includes a return pipe 29 extending down through the platform 17 and into the container 1. In a horizontal portion of the return pipe and preferably in the same plane as the valve 23 is a butterfly return valve 31. This valve 31 is shown open in Fig. 1, allowing a substantially unrestricted return flow of liquid to the container 1 when the faucet valve 23 is closed. In Fig. 2 an intermediate position is shown, corresponding to an intermediate open position of the valve 23, which will allow a throttled flow from the pump both to the faucet valve 23 and to the return pipe 29. In Fig. 3 the butterfly valve 31 is substantially completely closed, directing substantially the entire flow of the pump 3 to the open faucet 21. The butterfly valve 31 is coordinated with the faucet valve 23

in the above manner by means of a link 33 pivoted at 35 to the handle 27 of the faucet valve. At its other end it has a pivoted connection 37 with an arm 39 connected to the butterfly valve. This arm also pivots a link 41, which extends rearward to a cam portion 43 for operating the motor switch 15. The switch has a bias toward open position and is shown open (motor not operating) in Fig. 1. It is of the so-called micro-switch variety, requiring little movement of the operating button 45 to operate it. When the cam portion 43 of the link 41 is moved to the right (when moving the handle 27 to the right to open the faucet valve 23) the cam will depress the button 45. This closes the switch and starts the pump motor 11. The cam portion 43 is guided by, and reacts against a bridge piece 47 through which the cam moves. Any suitable bracket or other supporting means may be used for the switch.

Other driving means than the electric motor 11 may be used to drive the pump 3, such as a pneumatic motor. In such a case an air-control valve would be substituted for the switch 15. In any event, the flow of liquid to the faucet valve 23 is instigated by movement of the handle 27.

Operation is as follows:

Assuming the container 1 to have a liquid therein to be dispensed, a receiving vessel 51 (shown dotted in Figs. 2 and 3) is placed beneath the faucet 21. The handle 27 is pulled forward (to the right from that position shown in Fig. 1). This initial movement closes the switch 15 which starts the motor and pump. The butterfly valve 31 is then practically wide open. As the pump accelerates any sudden initial impulses from the pump will effect some return through the butterfly valve to the return pipe 29. Undesirable spurting which would cause splashing will thus be avoided at the faucet 21.

As the handle is moved through the Fig. 2 position to the full-open position (Fig. 3), the initial conditions are reversed, the butterfly valve 31 closing as the faucet valve 23 opens. Thus the full force of the pumped liquid is smoothly built-up without spurting. When the desired amount of liquid has been drawn off, the handle is returned to the Fig. 1 (closed) position. The butterfly valve 31 will gradually open as valve 23 gradually closes, thus also preventing any liquid hammer effects.

At the end of the action of the handle 27, the linkage 33 and 41 will move the cam 43 from above the switch button 45 thus allowing the switch 15 to open the circuit to the pump motor 11.

It will be understood that the invention is also applicable to control of pressure flow from water supplies, such as cisterns, and wells.

The invention provides a freely open by-pass at the time the motor starts and as the outlet valve opens; and it also provides for gradually throttling and closing the by-pass as the outlet valve continues to open until full flow is obtained.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. Liquid dispensing apparatus comprising a supply connection leading from a liquid supply, forcing means adapted to be started and stopped for moving liquid from said supply into said supply connection, outlet and return connections branched from said supply connection, an outlet valve in the outlet connection and a return valve in the return connection, common control means for said valves and for starting and stopping said forcing means adapted to close the outlet valve and open the return valve when the forcing means is stopped, and to open the outlet valve and close the return valve when the forcing means is started.

2. Liquid dispensing apparatus comprising a supply connection leading from a liquid supply, forcing means adapted to be started and stopped for moving liquid from said supply into said supply connection, outlet and return connections branched from said supply connection, an outlet valve in the outlet connection and a return valve in the return connection, common control means for said valves and for starting and stopping said forcing means adapted to close the outlet valve and open the return valve when the forcing means is stopped, and gradually to close the return valve and open the outlet valve when the forcing means is started.

3. Liquid dispensing apparatus comprising a liquid sump, a supply pipe from the sump, a liquid pump adapted to force liquid from the sump into said supply pipe, a motor for driving said pump, control means for the motor, pipes branched from said supply pipe, one of said branched pipes having a liquid outlet and the other having a liquid return to the sump, an outlet valve in the outlet and a return valve in the return, and means for operating said valves and said motor so connected that as the operating means is actuated to stop the motor said return valve is opened and said outlet valve is closed, and when the operating means is actuated to start the motor said outlet valve is opened and said return valve is gradually closed to throttle the return flow through the return pipe after the motor has started.

4. Liquid dispensing apparatus comprising a liquid sump, a supply pipe from the sump, a liquid pump adapted to force liquid from the sump and into said supply pipe, a motor for driving said pump, control means for the motor, pipes branched from said supply pipe, one of said branch pipes having a liquid outlet and the other having a liquid return to the sump, a gradually controllable valve in the outlet pipe and a gradually controllable valve in the return pipe, and means for gradually operating said valves and for operating said motor control means so connected that as the control means is actuated to stop the motor said return valve is gradually opened and the outlet valve is gradually closed, and as the control means is actuated to start the motor said outlet valve is gradually opened and said open return valve is gradually closed to throttle return flow through the return pipe.

5. In apparatus of the class described, a liquid sump, a supply pipe from the sump, a liquid pump adapted to abstract liquid from the sump and force it into said supply pipe, an electric motor for driving said pump, a circuit for the motor, a starting switch in said circuit, pipes branched from said supply pipe, one of said branch pipes having a liquid outlet and the other having a liquid return to the sump, an outlet valve in the outlet pipe and a return valve in the return pipe, and means for operating said valves and said switch so connected that as the switch is opened said return valve is opened and the outlet valve is closed, and as the switch is

closed to start said motor the outlet valve is opened while the open return valve is gradually closed.

6. A liquid dispenser comprising a sump, a supply pipe from the sump, a pump adapted to drive liquid from said sump into the supply pipe, a normally deenergized motor for driving the pump, control means for motor energization, a branch pipe from said supply pipe and having an outlet, a second branch from said supply pipe and leading to the sump, a normally closed valve in said outlet branch checking outwardly and opening inwardly, a normally open butterfly-type valve in said return pipe, and means connecting said check valve with said butterfly valve and said motor energization control adapted when moved in one direction initially to start motor energization while gradually opening said check valve and gradually closing said butterfly valve, and when moved in an opposite direction gradually closing said check valve and gradually opening said butterfly valve with actuation of said energization control to deenergize said motor.

7. A liquid dispenser comprising a sump, a supply pipe from the sump, a pump adapted to drive liquid from said sump into the supply pipe, a normally deenergized electric motor for driving the pump when energized, a switch for motor energization, a branch pipe from said supply pipe and having an outlet, a second branch from said supply pipe and leading to the sump, a normally closed valve in said outlet branch checking outwardly and opening inwardly, a normally open butterfly-type valve in said return pipe, and commonly operable means connecting said check valve with said butterfly valve and said switch adapted when moved in one direction initially to close the switch for motor starting while opening said check valve and gradually closing said butterfly valve, and when moved in the opposite direction effecting closing of said check valve and gradual opening of said butterfly valve with final opening of said switch.

8. Liquid dispensing apparatus comprising a pump, a liquid supply line from the pump and having a normally closed valved outlet, a normally open valved by-pass from said supply line to the pump, normally inoperative starting means for the pump, common control means for the pump, valved outlet and valved by-pass, said control means and its controlled members being arranged that upon movement of the control means in one direction the pump is started as the valved outlet opens and the valved by-pass closes and upon movement in another direction the valved outlet closes and the valved by-pass opens as the pump is stopped.

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