May 21, 1957 LA VERN N. SMITH ET AL 2,792,974

PUMP TYPE LIQUID DISPENSER

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Fig. 1

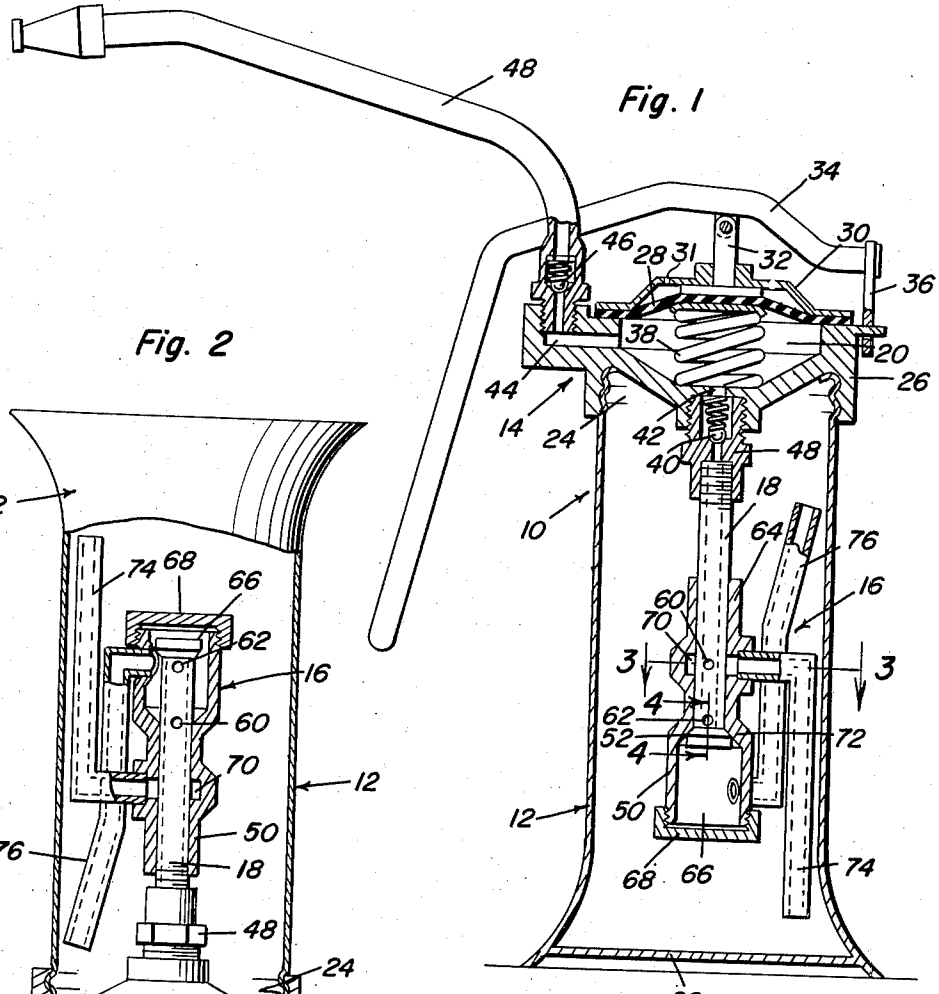


Fig. 2

Fig. 3

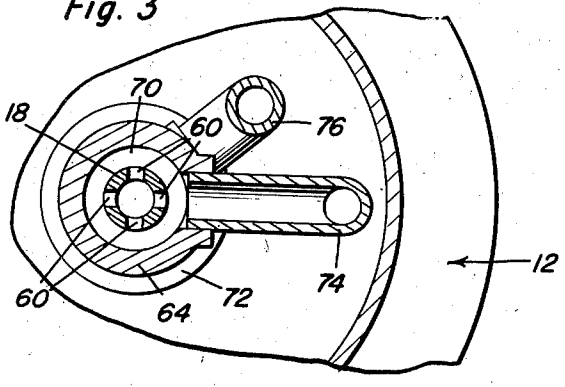
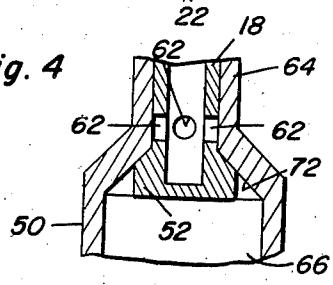


Fig. 4



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PUMP TYPE LIQUID DISPENSER

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3 Claims. (Cl. 222—376)

This invention relates to liquid dispensers, and particularly to improvements in oil cans which are supplied with pumps and which are capable of dispensing liquid in the inverted as well as upright positions.

The general object of this invention is to provide a liquid dispenser capable of emitting fluid in the upright, inverted or partially upright or inverted positions by actuation of a pump which is fitted with a special valve arrangement.

A more specific object of this invention is to provide an oil dispenser with a pump of the manually operable type, the pump having an inlet pipe which is supplied with ports that are controlled by a valve body having a first and a second suction line, one suction line being adapted to draw fluid from the bottom of the container during which time, the other suction line is closed, and the other suction line being adapted to draw fluid from the top part of the container, as when the container is inverted, at which time, the valve body slides on the pump inlet pipe to a position closer to the now lowermost part of the container, at which time, the other suction line is closed from communication with the ports of the inlet pipe.

A further object of this invention is to provide a liquid dispenser as described above in the foregoing stated object, which has both suction lines near one side or on one side of the valve body so that when the container is on its side, the valve body will rotate on the inlet pipe so that the open ends of the suction lines will be submerged in the liquid, provided there is a working amount of liquid remaining in the container.

A further object of this invention is to provide a pump type liquid dispenser which automatically, in response to inverting or partially inverting the dispenser, withdraws liquid from that part of the container which is lowermost.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a sectional view of a liquid dispenser embodying the principles of the invention;

Figure 2 is a fragmentary longitudinal sectional view of the dispenser of Figure 1, showing it in the inverted position;

Figure 3 is a fragmentary enlarged transverse sectional view taken on the line 3—3 of Figure 1 and in the direction of the arrows; and

Figure 4 is a fragmentary enlarged view taken substantially on the line 4—4 of Figure 1 and in the direction of the arrows, illustrating particularly one of the valve port assemblies in the pump inlet pipe.

In carrying out the principles of the invention, the liquid dispenser selected is designed primarily for forcibly ejecting oil. Accordingly, liquid dispenser **10** comprises,

in general, a liquid container **12**, a pump **14** thereon, together with a valve assembly **16** which is operatively connected with the pump inlet pipe **18** and designed to conduct liquid to the pump chamber **20** in response to pump demands at all positions of the container **12**. Container **12** serves as a reservoir for liquid, oil in this case, and has a bottom **22** and an open top **24** to which the pump housing **26** is separably connected.

Pump **14** consists of pump chamber **20** in housing **26** together with a diaphragm **28** which forms one wall of chamber **20**, a cover **30** over the diaphragm **28** and forming a guide for the push rod **32** which is used to deflect diaphragm **28**. Vent **31** is in cover **30**. An operating lever **34** is pivotally connected to push rod **32** and has a link **36** fastening one end thereof to the pump housing **26**. A main spring **38** seats upon a wall of the housing **26** and a part of the diaphragm **28**, opposing actuation of the diaphragm in one direction. When operating lever **34** is actuated, the diaphragm **28** makes smaller the chamber **20** and closes the spring loaded check valve **40** which controls liquid inlet passage **42**. At the same time, any fluid entrapped in chamber **20** is forced through the housing passageways **44** in order to open the spring loaded check valve **46** and urge the liquid through the pipe serving as a spout **48**.

When operating force is removed from the lever **34**, spring **38** returns the diaphragm **28** to the rest position, thereby applying a suction to normally close valve **40** which opens it, and thereby allowing the spring to return the normally closed valve **46** to the closed condition. Suction in the pump chamber **20** will aid the return of spring loaded valve **46** to the closed position.

Attention is now invited to the valve assembly **16** wherein in Figure 1 it is shown in operating condition for the liquid dispenser arranged in upright position. Valve **40** controls the passageway **42** which is formed in part within the coupling **48**, the coupling being threaded to the pump housing **26** and threadedly holding the inlet pipe **18**. In addition, the coupling **48** serves as a stop for limiting the travel of valve body **50** in one direction on the pipe **18** (Figure 2). Movement of the valve body **50** on pipe **18** in the opposite direction is limited by a stop **52** which is connected to the outer end of pipe **18**. Valve body **50** is movable on inlet pipe **18** by gravity, so that when the dispenser **10** is in the upright position (Figure 1), valve body **50** is gravity lowered.

The pipe **18** is provided with a first group of liquid inlet ports **60** and spaced therefrom, a second group of inlet ports **62**. Valve body **50** consists of a sleeve **62** which is slidable on the pipe **18** and which has an enlarged chamber **66** at one end. This chamber is closed at its outer end by cap **68** or a suitable equivalent. An annular groove **70** is formed in the sleeve **64** intermediate its ends and is so spaced from the outwardly flared shoulders **72** separating the bore of sleeve **62** from the enlargement **66** thereof, that when the outwardly flared portion **72** seats upon stop **52** (Figure 1), the annular groove **70** is in communication with the first ports **60**. At the same time, however, the valve body **50** closes the ports **62** (Figure 4).

A first suction line **74** is carried by the valve body and has one end in communication with the annular groove **70** that serves as a passage for liquid to enter ports **60** and inlet pipe **18**. The opposite end of the suction line **74** is directed toward the bottom **22** of the container **12**. A second suction line **76** is directed toward the top of the container **12** and is secured in communication with the valve chamber or enlargement **66** in valve body **50**.

In operation, when the dispenser is disposed as shown in Figure 1, and when liquid is dam ended in pump chamber **20**, suction is applied through inlet pipe **18**, ports **60**,

annular groove 70 and suction line 74. At this time, suction line 76 is closed inasmuch as ports 62 are closed by a part of the valve body.

When the liquid dispenser is inverted, as shown in Figure 2, the valve body 50 slides by gravity on pipe 18 to the stop 48. The liquid in container 12 flows toward the pump 14, and it is assumed that the liquid level is such that the suction line 74 is open. In this operational position, the suction path is through suction line 76, chamber 66 with which the suction line 76 communicates, ports 60 and 62 which are in communication with the chamber 66, inlet pipe 18 and ultimately through the pump. At this operational condition, the suction line 74 is closed for conduction of liquid in that the annular groove 70 with which it communicates fails to communicate with any port in the inlet line 18.

When the dispenser is at some inclination other than directly upright or directly inverted, it will also operate. Assume that it is on its side in the horizontal position. Then, the valve body 50 will rotate on pipe 18 until the heavier part, that is, the part having the suction lines 74 and 76 connected to it, are in the down position. This is the same location in the container 12 wherein there is the liquid to be dispensed. With the inlet ends of the suction lines submerged in the liquid, suction of pump 20 will draw liquid into pump chamber 20 for ultimate emission from spout 48.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A liquid dispenser comprising a liquid container, a pump connected with said container, a liquid inlet pipe connected operatively with said pump to conduct liquid from said container to said pump, and movable liquid conducting means on said inlet pipe having suction lines terminating near opposite ends of said container, said movable means including a valve body slidable longitudinally on said liquid inlet pipe, said pipe having ports which are selectively closed by said valve body in response to movement of said valve body on said pipe, and said suction lines being carried by said body and selectively arranged in registry with said ports to conduct liquid from selected ends of said container, and said body being rotatable on said pipe to follow by gravity the liquid in the container when the container is tilted.

2. A liquid dispenser adapted to dispense liquid in all inverted and upright positions, said dispenser comprising a liquid container, a closure for said container, a suction pump built in said closure at one end of said container to draw and expel liquid from said container, an inlet pipe communicating with said pump and disposed in said container, said pipe having a first inlet port and a second inlet port spaced therefrom, a valve body for said ports slidably mounted on said inlet pipe and movable toward opposite ends of said container, stops on said pipe for limiting the movement of said valve body on the pipe, a first suction line carried by said body and opening toward one end of said container, said valve body having a passage which connects said first suction line with said first port when the container is in the upright position and said body is gravity moved to a position on one of said stops whence the valve body closes the second port, a second suction line carried by said valve body and adapted to conduct liquid from the opposite end of said container into said pipe when said container is inverted, at which time said valve body slides on said pipe to the other of said stops and closes said first suction line.

3. In a liquid dispenser of the forced feed type and including a container having a pump operatively connected therewith, means operatively connected with said pump for delivering liquid thereto in all positions of the container, said delivering means comprising a liquid inlet pipe for said pump and disposed in said container, liquid inlet ports longitudinally spaced in said pipe, a valve body on said pipe and adapted to control said ports, a first suction line carried by said valve body and adapted to draw liquid from one end of said receptacle, a second suction line carried by said valve body and adapted to draw liquid from the opposite end of said container, and said suction lines being arranged to communicate with said valve body controlled ports so that said suction lines are selectively closed in response to the location of the valve body on said pipe, said valve body being both rotatably carried on said pipe and slidable on said pipe to alternately cover one port and uncover the other, said suction lines being secured to said valve body on one side of said valve body so that when said container is in the approximately horizontal position, the weight of said suction lines will rotate the valve body on said pipe so that the open outer ends of said suction lines are in the liquid of the container.

References Cited in the file of this patent

UNITED STATES PATENTS

1,325,134	Anthes	Dec. 16, 1919
1,557,127	Wilkins	Oct. 13, 1925
1,567,291	Novak	Dec. 29, 1925

FOREIGN PATENTS

240,512	Great Britain	Oct. 2, 1925