Nov. 10, 1964 J. M. KATZ 3,156,384

DISPENSERS FOR LIQUIDS, WITH MEASURED DISCHARGE

Filed Sept. 27, 1962

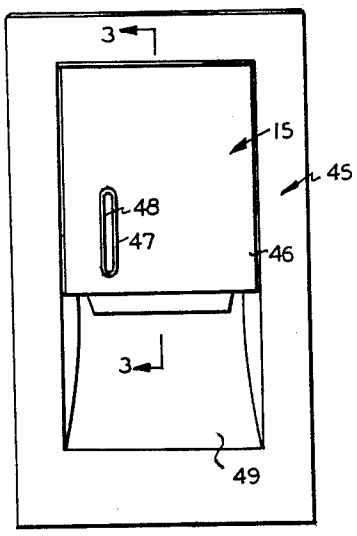


FIG.1

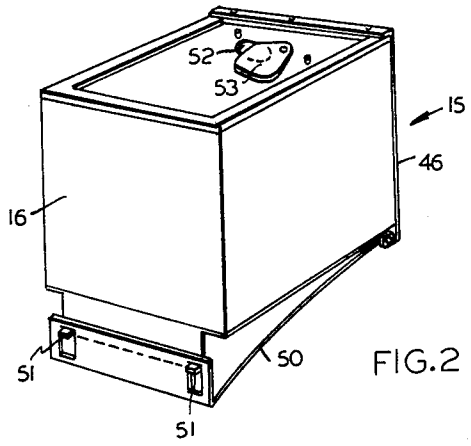


FIG.2

FIG.3

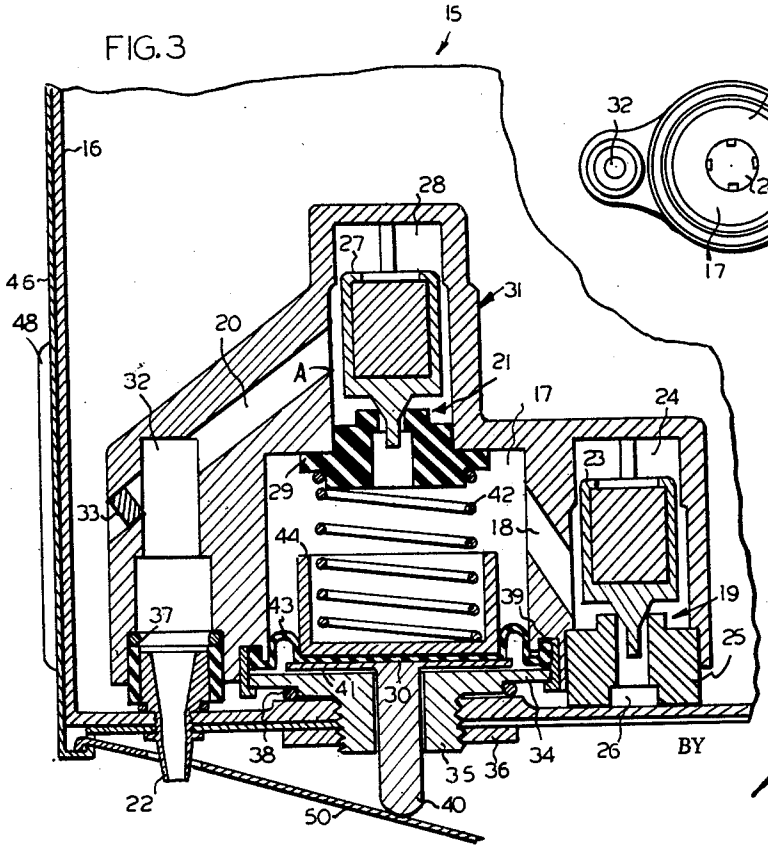
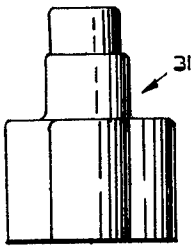


FIG.4

FIG.5



INVENTOR,
JACOB M. KATZ,

BY

ATTORNEY

United States Patent Office 3,156,384 Patented Nov. 10, 1964

3,156,384

DISPENSERS FOR LIQUIDS, WITH MEASURED DISCHARGE

Jacob M. Katz, 357 E. 57th St., New York, N.Y.

Filed Sept. 27, 1962, Ser. No. 226,656
3 Claims. (Cl. 222—207)

The present invention relates to liquid-dispensing devices adaptable for example, for use as liquid soap dispensers, an embodiment of which is herein illustrated.

An object of this invention is to provide a novel and improved liquid-dispenser which will discharge equal amounts at each operation thereof, or at least in amounts which do not exceed a given quantity.

A further object thereof is to provide a novel and improved dispensing device of the character described, whose quantity of discharge is dependent on the extent of movement of its operating member from normal rest position, but in no manner affected by the time the operating member is allowed to stay at any moved position.

A further object thereof is to provide a novel and improved liquid-dispensing device of the nature set forth, whose discharge is valve-controlled and is accomplished by a novel mode of operation and construction in which there is no mechanical connection between the operating member and the valve means.

Still another object of this invention is to provide a novel and improved liquid-dispensing device having the attributes mentioned, which is reasonable in cost, easy to use and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

For the practice of this invention, one form it may assume is to have a comparatively small auxiliary tank in and mounted at the bottom of a supply tank. The bottom wall of the auxiliary tank is preferably a resilient diaphragm which is deformable upwardly by the upward push of an externally excessible operating stem, whereupon the capacity of said auxiliary tank is decreased. Spring means biases said operating member to return to its normal rest position, so that when the hold on said operating member is released, the diaphragm will automatically return to its normal form and position, thereby restoring the auxiliary tank to its normal capacity. The auxiliary tank includes structure offering a discharge passage from its top, to a point outside the supply tank where such passage terminates as a delivery spout. A normally closed check valve controls the top opening of the auxiliary tank. Said auxiliary tank also includes structure offering an intake passage communicative with the supply tank and there is a normally closed check valve controlling said intake passage. The said valves are so disposed that the one at said top opening is automatically opened by fluid pushed out of the auxiliary tank, and the valve at intake is automatically opened by the action of the atmospheric pressure when the operating member returns to its normal rest position, as will be explained. In the preferred embodiment illustrated herein, the valves are operated by gravity to assume closed conditions. This obviates the use of springs therefor. It is to be noted, that the function of the diaphragm is like that of a piston, but its use permits a construction which easier affords maintenance against leakage.

In the accompanying drawing forming part of this specification, similar characters of reference indicate corresponding parts in all the views.

FIG. 1 is a front view of a liquid soap dispenser embodying the teachings of this invention. This device is here shown in assembly with a frame box which is to be mounted in a wall recess over a sink, as for instance, in a bathroom or washroom.

FIG. 2 is a rear perspective view of the dispensing device per se.

FIG. 3 is an enlarged section taken at line 3—3 in FIG. 1. This view is fragmentary.

FIG. 4 is a bottom view of the mechanism unit's body, meaning the body which offers the auxiliary tank, its associated passages and the valve housings.

FIG. 5 is an end view of said body.

FIGS. 4 and 5 are drawn to a reduced scale.

In the drawing, a preferred embodiment of this invention is shown as the liquid soap dispenser designated generally by the numeral **15**, which comprises an outer supply tank **16**, holding therein at the bottom thereof, the comparatively small auxiliary tank **17** which has a side inlet passage **18** controlled by a gravity-closed check valve indicated generally as **19**, and a top outlet passage **20** controlled by a gravity-closed check valve denoted generally as **21**. The valve **19** which is normally closed, interrupts the flow of supply liquid from the main tank **16** to the auxiliary tank **17**. The valve **21** which is normally closed, interrupts flow of liquid from the auxiliary tank **17** to a downwardly-directed discharge nozzle **22**. The valve member **23**, rides vertically within an inverted socket **24** serving as its housing, and seats itself within the rubber bushing **25** which is mounted part way into the mouth of said socket **24**; said bushing having a central slot **26** across its bottom end so liquid from the supply tank **16** can pass into the intake passage **18** of the auxiliary tank, when the valve **19** is open. This slot is provided, because in the embodiment shown, said bushing **25** rests on the floor of the supply tank **16**. The valve member **27**, rides vertically within an inverted socket **28** serving as its housing, and seats itself within the rubber bushing **29**, which is mounted through the top wall of the auxiliary tank **17** and into the mouth of said socket **28**. The bottom wall of the auxiliary tank **17** is a resilient diaphragm **30**.

I have a single body preferably molded of a rigid plastic, designated generally by the numeral **31**, to have the voids **32**, **24** spaced from the aligned communicative voids **17** and **28**. The mouth of the void or inverted socket **32** is for mounting the discharge nozzle **22**. The passage **20** is drilled in the plastic body to make the voids **32** and **28** communicative. Then the open end of such drilled hole is closed by a plug **33**. The passage **18** is also drilled in said body to make the voids **17** and **24** communicative; the drill being inserted through the mouth of the void or inverted socket **24**, to make said passage **18**. Below the diaphragm **30**, the mouth of the inverted socket **17** is closed by the upper outward flange **34** of an exteriorly threaded bushing **35**, which is screwed water-tight through the bottom wall of the supply tank **16** and the assembly maintained by the nut **36**. The discharge nozzle **22** is also mounted water-tight through said supply tank wall, and O-rings **37**, **38**, and the O-ring construction **39** as provided at the diaphragm's periphery, serve to maintain water-tight connections. A shank **40**, which serves to actuate the soap dispenser **15**, extends through and downwardly out of the bushing **35**, and at top end, has the disc head **41** which is positioned directly against the underside of the diaphragm **30**, so upon manually pushing said shank upwardly, the said diaphragm will be distorted upwardly and thereby decrease the capacity of the auxiliary tank **17**. Upon release of said shank **40**, the tensed coil spring **42**, will restore normal rest condition as shown in FIG. 3. Said diaphragm, slightly inward of its perimetral integral O-ring **39**, may have an upwardly standing, inverted annular channel **43**, to surround and position a cup **44** to hold the lower part of the coil spring **42**.

In installations of the modern trend, a soap dispenser as **15**, is to be installed recessed and releasable from a

framed cabinet 45 mounted on a wall. So I have shown such in FIG. 1 where the soap dispenser is releasably mounted as a drawer into such recessed cabinet; the exact manner of such provision being easily understood by those versed in the art, and being no part of this invention, details of such mounting are omitted. But I may mention that the exposed wall of the supply tank 16 is faced say with a sheet 46 of stainless steel, the material of such cabinet and its frame, to enhance the appearance of this appliance. A vertical slot 47 in said front metal facing 46, admits a forward channel 48 formed in the translucent front wall of the supply tank 16, so the level of liquid soap in such tank can be observed. The cabinet may be provided with a splash plate 49, and the tank is preferably provided with a hinged operating member 50 to actuate the shank 40. Release of such operating member will cause it to be moved downward by action of the spring 42 and the extent of such movement shall be determined by the most downward position of said shank 40 and limited by the lug-in-slot arrangement provided at 51. The supply tank 16 is provided in its top wall with an opening 52 to refill it and with a pivoted closure element 53 for such opening.

The normal rest condition of the soap dispenser 15 is shown in FIG. 3; both the intake check valve 19 and the discharge check valve 21 which control the flow to and from the auxiliary tank 17, being closed due to the action of gravity on the members 23 and 27. After filling the tank 16 with a supply of liquid soap, manipulate the operating member 50 for shank 40 to be reciprocated. At every upward movement of said shank, the diaphragm 30 will rise in the auxiliary tank 17, thereby decreasing the latter's capacity. The resulting increase in pressure on the air within said auxiliary tank, will cause the valve 21 to open, and air will be expelled through the discharge nozzle 22. At every downward movement of the shank 40, the components will assume the condition shown in FIG. 3, and due to the rarefied condition caused in the auxiliary tank 17, the action of the atmospheric pressure will cause liquid from the supply tank 16, to enter the auxiliary tank, while of course, the action of the atmospheric pressure will cause the valve 19 to open, to cause said flow from the across-slot 26, through the bushing 25, through the open valve 19, thence through the passage 18 and into the auxiliary tank 17. After a few such manipulations of the operating member 50, the auxiliary tank 17 will be filled with liquid, and also the housing 28 to the level of point "A". Every further upward movement of the operating member 50, will cause an ejectment of liquid in a measured amount to issue from the discharge nozzle 22, and at every downward movement, the auxiliary tank 17 will be replenished with an equal amount from the supply tank 16.

This invention is capable of numerous forms and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiment shown herein be deemed illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claims rather than to the specific description herein, to indicate the scope of this invention.

I claim:

1. In a dispenser for liquids, a supply tank, a body member positioned within said tank near the bottom thereof; said body member having first, second and third sockets extending upwardly in said body from the bottom surface thereof, a resilient diaphragm closing the mouth of the first socket, a first tubular member fitted in the first socket intermediate its ends, dividing said first socket into an upper region and a lower region, a first valve member positioned in the upper region of the first socket and freely slidable up and down therein; said first tubular member serving as a seat for said first valve member and normally closed thereby due to the action of gravity on said first valve member, a second tubular member fitted in the mouth end of the second socket, a second valve member positioned above said second tubular member and within the second socket and freely slidable up and down in said second socket, said second tubular member serving as a seat for said second valve member and normally closed thereby due to the action of gravity on the second valve member; said second tubular member being communicative with the supply tank, a discharge nozzle fitted in and communicatively with the third socket and extending downwardly therefrom in water-tight engagement with the bottom wall of the main tank, through said tank wall and outwardly of said supply tank, spring means within the lower part of the first socket, biasing the diaphragm downwardly, an element positioned below the diaphragm, a shank extending downwardly from said element which is below the diaphragm, through the bottom wall of the supply tank and outwardly of said supply tank, adapted to be pushed manually upwardly whereupon said element associated therewith will shift the diaphragm upwardly into the first socket, means securing said body member to the bottom wall of the supply tank and means preventing leakage from the supply tank around said shank; said body member having a bore communicatively connecting the third socket with the upper part of the first socket when the first valve member is raised off its seat to open the first tubular member; said body member also having a bore communicatively connecting the upper portion of the lower part of the first socket with the second socket above the second tubular member whereby when the second valve member is raised off its seat to open the the second tubular member, the lower portion of the first socket is made communicative with the supply tank.

2. A dispenser as defined in claim 1, wherein the body member is of plastic and the first and second tubular members are of rubber.

3. A dispenser as defined in claim 1, wherein the diaphragm is of substantially uniform thickness and provided with an annular channel in its bottom face thereby forming an upward ring on the upper face of the diaphragm and said dispenser includes an upright cup fitted within said ring; the mentioned spring means being a compression coil spring entered in said cup.

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