

[54] **FLOAT CONTROLLED DISPENSERS**

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[58] Field of Search **4/227, 228; 222/50, 222/67, 319, 536**

[56] **References Cited**

UNITED STATES PATENTS

2,913,734	11/1959	O'Hare	4/227
2,967,310	1/1961	O'Hare	222/319
2,793,795	5/1957	Wilson et al.	222/536

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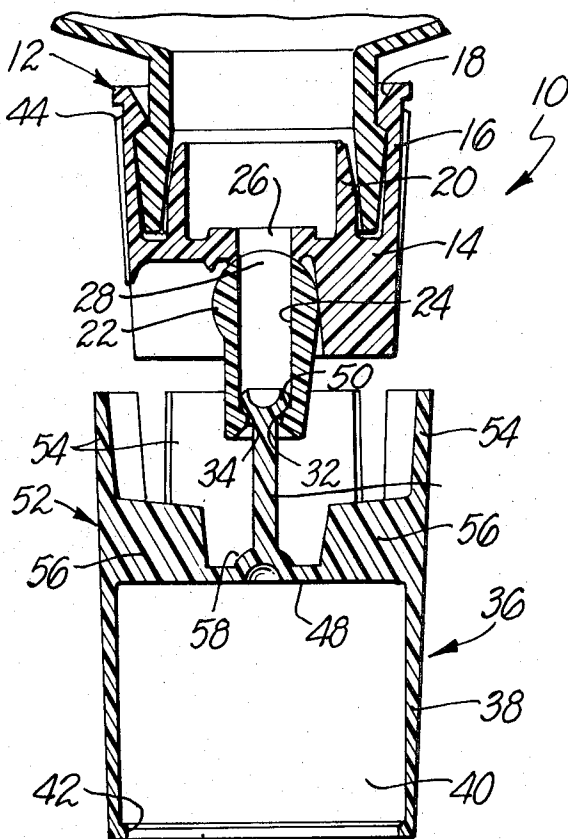
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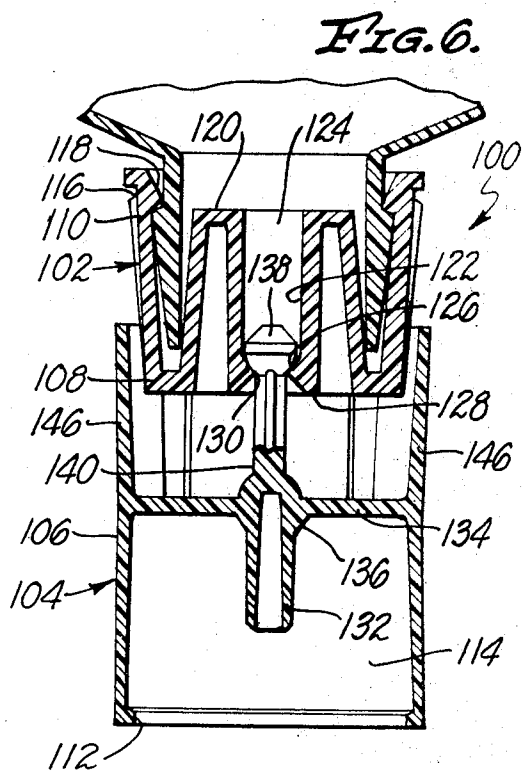
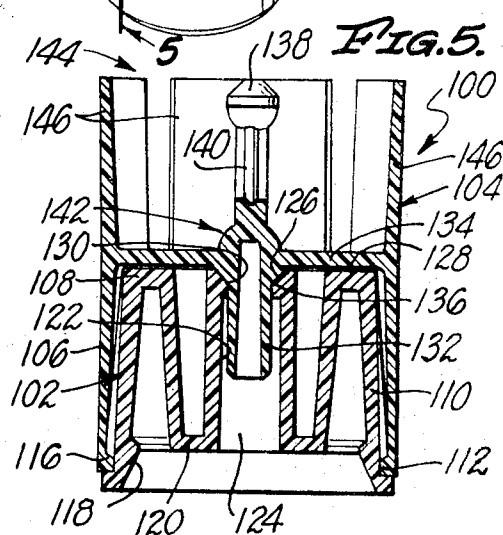
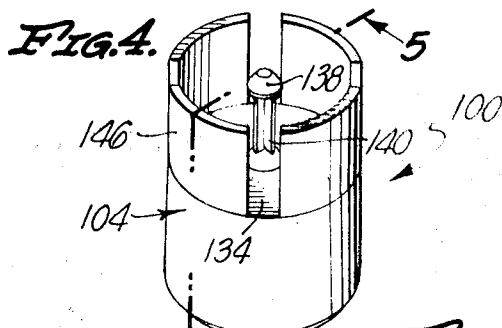
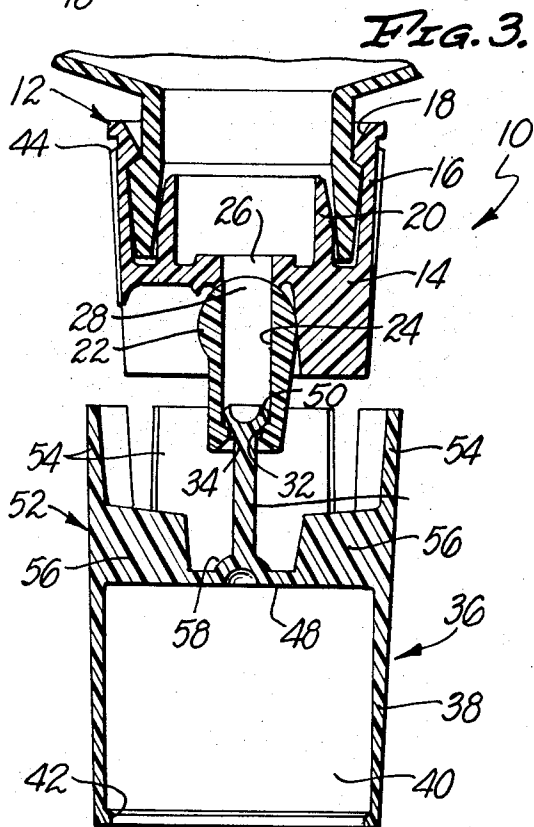
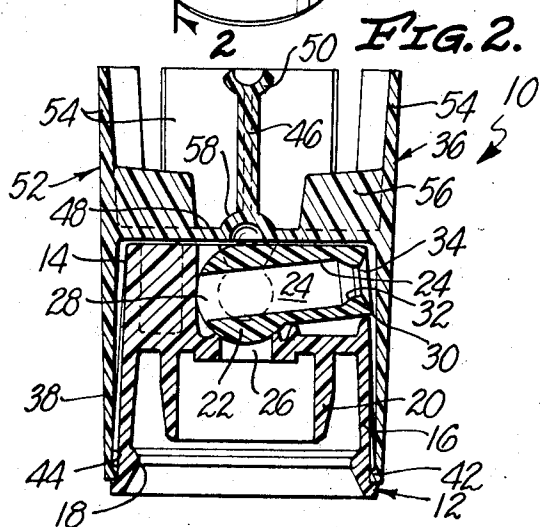
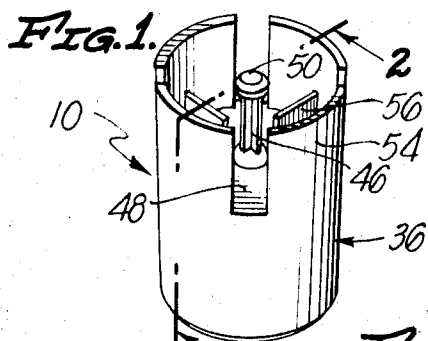
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ABSTRACT

A float controlled dispenser for use in dispensing the contents of a container into a body of liquid having a periodically varying level can be constructed utilizing a closure for the container formed so as to include a discharge passage having a valve seat at its end. Such a closure is used with a control member having a float structure, a valve stem extending from the float structure through the valve seat and into the passage and a valve member located on the float structure. When this dispenser is located with the float structure at its bottom the level of the float structure as determined by the level of the liquid within the body will move the valve member relative to the valve seat so as to open and close the complete dispenser.

2 Claims, 6 Drawing Figures





FLOAT CONTROLLED DISPENSERS

BACKGROUND OF THE INVENTION

It is frequently desired to use liquids such as germicidal compositions and/or compositions intended to mask odors in the water utilized in common flush toilets. A number of different types of devices have been designed for this purpose. Although a number of such prior structures have been widely utilized it is considered that there is a need for improvement in connection with dispensers utilized to dispense compositions as indicated into the water used in these common flush toilets.

This need is considered related to various factors. Certain prior devices for the purpose indicated are not considered to operate satisfactorily and reliably when installed in toilets. From a commercial standpoint, however, other factors are considered to be additionally significant. Preferably a liquid composition utilized in common toilets should be packaged in such a way that the package may be easily and conveniently used by even individuals with a minimum of mechanical aptitude and ability.

To a degree this latter is related to another important sales consideration. As a general rule purchasers of liquid compositions to be used in common flush toilets tend to dislike having to purchase a separate dispensing unit and a separate package of the material to be used with such a unit. From a point of sales-type consideration it is desirable to have both the package for the composition and the dispensing mechanism sold together as a single unit which can be easily installed. For a dispensing structure or mechanism to be sold in this manner it is necessary that this structure or mechanism be relatively inexpensive. More over, this structure or mechanism must operate reliably in order to promote repeat sales.

SUMMARY OF THE INVENTION

A broad objective of the present invention is to provide new and improved float controlled dispensers which are primarily intended to be utilized in dispensing germicidal compositions, compositions intended to mask odors or the like in connection with and into the water utilized in common flush toilets, but which are also capable of being utilized wherever it is possible to utilize a float control in connection with a body of liquid which periodically raises and lowers to control a dispensing operation.

A further objective of the present invention is to provide float controlled dispensers as described which may be easily and conveniently manufactured at a comparatively nominal cost; which may be easily utilized as the closures for containers such as bottles; which may be easily installed on such containers in an operative configuration or position; and which are capable of giving prolonged, reliable performance.

In accordance with this invention these and various related objectives of the invention are achieved in a float controlled dispenser which includes a closure for a container and a control member. The closure employed is constructed so as to include a closure body, means for attaching the closure to a container and a discharge passage leading through the body, this passage having an internal valve seat formed in it. The control member utilized includes a float structure, a valve

stem extending from the float structure and a valve member located on the float structure.

During the operation of a dispenser employing these parts the level of the float structure is determined by the level of the body of liquid so that the level of the body of the liquid regulates the position of the valve member relative to the position of the valve seat. The use and operation of a float controlled dispenser as herein described also involves other considerations than are specifically indicated in this brief summary of the concepts of the present invention.

BRIEF DESCRIPTION OF THE DRAWING

Further details of the present invention will be apparent from a careful consideration of the remainder of this specification, the appended claims and the accompanying drawing in which:

FIG. 1 is a perspective view of a presently preferred embodiment or form of a float controlled dispenser in accordance with this invention as it normally would appear when installed on a container such as a bottle;

FIG. 2 is a cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view similar to FIG. 2 showing the parts of the dispenser shown in FIGS. 1 and 2 as they would appear during the use of this dispenser on a container;

FIG. 4 is a perspective view of another embodiment or form of a float controlled dispenser in accordance with this invention as it normally would appear when installed on a container such as a bottle;

FIG. 5 is a cross-sectional view taken at line 5—5 of FIG. 4; and

FIG. 6 is a cross-sectional view similar to FIG. 5 showing the parts of the dispenser shown in FIGS. 4 and 5 as they would appear during the use of this dispenser on a container.

It is to be realized that the float controlled dispensers illustrated in the drawing are particular structures embodying the essential intangible concepts of this invention as defined in the appended claims. These concepts may be utilized in the construction of various other float controlled dispensers which differ from those illustrated through the use or exercise of routine engineering skill in the field of these devices.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

In FIGS. 1 through 3 of the drawing there is shown a float controlled dispenser 10 of the present invention which includes a closure 12 having the conventional elements of a rotatable spout dispensing closure. The particular closure 12 illustrated is of the type described in detail in the Wilson et al. U.S. Pat. No. 2,793,795 issued May 28, 1957 entitled "Dispensing Closure," but this closure 12 can also be constructed in other manners known to the dispensing closure industry.

The closure 12 utilized in the dispenser 10 includes a centrally located closure body or top 14 having an attached skirt 16 which carries conventional means 18 for securing the entire closure 12 to a conventional container such as a bottle. If desired, an internal plug seal 20 may depend from the body 14 within the skirt 16. This body 14 rotatably supports in a known manner as described in the aforementioned patent a rotatable spout 22 which is capable of being rotated relative to the clo-

sure 12 between a closed position as indicated in FIG. 2 and an open position as indicated in FIG. 3.

In this open position a passage 24 within this spout 22 is aligned with an opening 26 in the body 14 so that an inlet end 28 of the passage 24 is in direct communication with the interior of the skirt 16. In this open position an outlet end 30 of the passage 24 is aligned with this opening 30. This outlet end 30 is preferably provided with an annular valve seat 32 having an opening 34 extending through it. This opening 34 is of smaller dimension than the remainder of the passage 24.

The closure 12 is utilized in connection with a control member 36 which has a generally cup-shaped float structure 38. This float structure 38 has an open end 40 provided with an internal, annular bead 42. This float structure 38 is of such dimension as to be capable of fitting over and around the exterior of the closure 12 in a shipping position in which the bead 42 extends into a small groove 44 so as to secure the control member 36 in position. This control member 36 also includes a cruciform shaped stem 46 extending from the middle of the bottom 48 of the float structure 38 in a direction generally away from this float structure 38. The extremity of the stem 46 remote from this bottom 48 carries an enlarged head 50.

The bottom 48 of the float structure 38 also includes a crown-like distributor structure or means 52 consisting of a plurality of spaced upstanding walls 54 located around the periphery of the bottom 42. If desired, small webs 56 may be connected between these walls 54 and the bottom 48 for the purpose of supporting the walls 54. The bottom 48 also carries or includes a valve member 58 having much of the form of a boss which is adapted to seat against the valve seat 32.

It is considered preferable to manufacture the control member 36 and at least the spout 22 of the closure 12 out of a self-supporting inert, resilient material such as common grades of polyethylene used for injection molding purposes in the dispensing closure industry. Various other equivalent polymers can, of course, be employed. When at least these parts are formed of such a material the control member 36 may be easily snapped into place on the closure 12 as shown in FIGS. 1 and 2 of the drawing. The entire dispenser 10 may be then handled as a unit as essentially any other bottle closure or container closure so as to be installed upon a bottle or similar container.

When such a container with the dispenser 10 reaches the ultimate consumer the control member 36 may be easily popped off of the closure 12. Then the user will invert the control member 36 and by applying moderate pressure causing temporary material deformation will snap the head 50 through the opening 34. This head 50 is preferably dimensioned so that it will slide freely in this position within the passage 24.

This head 50 is, however, preferably slightly smaller than the interior of the passage 24 so that the contents of the container such as the fluid may pass around it. In order to permit such movement of the head 50 the stem 46 must be dimensioned so as to be smaller than the opening 34 so that it will move freely relative to this opening 34.

Once the dispenser 10 has been assembled in this manner the container upon which it is used is preferably attached to an appropriate supporting structure such as the interior of a toilet water tank by a hook or other equivalent means so that the float structure 38

faces downwardly at about the liquid level within the body of fluid present. The float structure 38 will thereafter operate so as to trap air within its interior as this level raises and lowers, as for example, when a toilet is flushed.

As this level changes the stem 46 will be guided by the opening 34 and the head 50 will be guided by the interior of the passage 24 so that the control member 36 can only move linearly. Thus, these parts operate essentially as a guide means to control the direction of movement of the control member 36. Such control is necessary so as to position the valve member 58 against the valve seat 32 each time the control member 36 is in an upward position so that the contents of a container will not be dispensed in this position.

Each time the level of the liquid indicated is lowered the control member 36 falls by gravity the contents of a container used with the dispenser 10 will flow through the passage 24 past the valve seat 32 to the distributor structure 54. This structure 54 will tend to distribute these contents so that they flow in different directions so that they are disbursed to a degree in the liquid present where the dispenser 10 is used.

In FIGS. 4 to 6 of the drawing there is shown a modified float controlled dispenser 100 of the present invention which is essentially quite similar to the dispenser 10 previously described. This dispenser 100 also utilizes a closure 102 and a control member 104. These parts are preferably formed of polyethylene or a related material as indicated in the preceding discussion so that a generally cup-shaped float structure 106 on the control member 104 may be snapped into place over and around the body 108 and a dependent skirt 110 on the closure 102.

When the control member 104 is snapped into place in this manner a small annular bead 112 on the interior of the float structure 106 adjacent to its open end 114 fits within a corresponding groove 116 adjacent to the bottom of the skirt 110. This skirt 110 carries conventional internal means 118 for attaching the entire closure 102 to an appropriate container such as a bottle.

The body 108 carries a plug 120 which is adapted to fit within the interior of such a container so as to form a seal with it. This body must carry or be formed to include an internal cylindrical passage 122 having an inlet 124 and a valve seat 126 adjacent to its outlet 128. This valve seat 126 is of an annular character and has an internal opening 130 of lesser diameter than the interior of the passage 122.

When the control member 104 is in a "prior to use as a dispenser" type position or configuration as indicated in FIGS. 4 and 5 of the drawing, a closure stem 132 on the bottom 134 of the float structure 106 fits closely within the opening 130 so as to form a plug-type seal with it. A small boss 136 around the closure stem 132 also preferably fits against the valve seat 126 so as to aid in the formation of a seal with it when the control member 104 is assembled as shown in FIG. 5. In this position the entire dispenser 100 can be handled as a unit and installed upon a container as a closure.

When the dispenser 100 is to be utilized as a dispenser the float structure 106 may be snapped off of the skirt 110 and pulled upwardly so as to remove the stem 132 from within the opening 130. The control member 104 is then inverted and a head 138 on a stem 140 extending from the bottom 134 is then popped through the opening 130. This head 138 is preferably

larger than the opening 130 so that it will serve to limit the movement of the control member 104. This stem 140 is preferably smaller than the opening 130 so as to be capable of sliding freely through it. The head 138 is preferably smaller than the interior of the passage 122 so that fluid may move past it in going through this passage 122. These parts operate as a guide means in the manner previously indicated.

Once a dispenser 100 has been assembled in this in use position, the container to which it is attached may be inverted and suspended as indicated in the preceding discussion so that the float structure 106 is about at a liquid level. Thereafter, as the liquid level decreases and increases, air will be trapped within the float structure 106 and this will cause the entire control member 104 to be moved relative to the closure body 102. When in an uppermost position, a boss appearing valve member 142 on the bottom 134 around the stem 140 will seat against the valve seat 126 so as to close off the passage 122. In other positions this valve member 142 will be spaced from the valve seat 126 in order to permit the flow of fluid through the dispenser 100.

When the control member 104 is spaced or positioned so as to permit such flow, material going through the passage 122 will tend to hit against the bottom 134 so as to be disseminated outwardly through a distributing structure 144 corresponding to the distributing structure 52 previously described. This distributing structure 144 consists of a plurality of walls 146 disposed in a locust of a cylinder and spaced from one another. In the dispenser 100 no webs corresponding to the webs 56 are used in connection with these walls 146 since the dispenser 100 is intended to be constructed utilizing sufficiently thick sections of material so that these walls 146 will be self-supporting.

This method of operation of the dispenser 100 is essentially the same as the dispenser 10. The essential difference between the dispensers 100 and 10 lies in the fact that the dispenser 10 incorporates a rotatable spout member or spout 22 which can be separately manipulated so as to achieve a valve action which is unrelated to the dispensing action achieved with the dispenser 100.

However, both of the dispensers 10 and 100 are preferably constructed as shown in the drawing so that an additional, separate type of valve action can be achieved with them which is useful in metering comparatively regulated amounts of material passing through these dispensers. In order to achieve this metering type of action, the head 50 in the dispenser 10 is preferably shaped as shown so as to also serve as a valve member and so as to seat against the valve seat 32 and the head 138 in the dispenser 100 is preferably shaped so as to do the same to seat against the valve seat 126. In both cases the valve seats 32 and 126 are shown as "double acting" valve seats. When these heads 50 and 138 are formed as shown, not only are valve actions achieved at the uppermost positions of the control members 36 and 102, but in addition valve actions are achieved at the lowermost positions of these control members. For some applications this is quite advantageous in dispensing reasonably regulated amounts of material.

From a careful consideration of the preceding, it will be realized that the dispensers 10 and 100 are relatively simple, effective devices which may be easily and con-

veniently manufactured at a comparatively nominal cost. These dispensers 10 and 100 can be easily installed as closures for containers. An ultimate user of such a container may easily position the parts of these dispensers 10 and 100 as described to an operative position in which they are capable of giving prolonged, reliable performance.

I claim:

1. A float controlled dispenser for use in dispensing the contents of a container into a body of a liquid the level of which periodically raises and lowers, which dispenser comprises:

a closure for use on a container for the composition to be dispensed,

said closure including a closure body, means for attaching said closure to said container and a spout rotatably mounted on said closure body so as to be capable of being rotated between a closed position and an open position,

said spout having a discharge passage extending therethrough, said passage having an inlet adapted to lead from the interior of said container when said spout is in said open position and an outlet which is remote from said closure body when said spout is in said open position,

said passage including a double acting valve seat having an opening extending therethrough, which opening is of smaller dimension than the remainder of the interior of said passage, said valve seat being located adjacent to said outlet,

a control member including a float structure, a stem extending from said float structure, a head member located on the extremity of said valve stem remote from said float structure and a valve member located around said stem adjacent to said float structure,

said valve stem being of smaller dimension than said opening, said head being of smaller diameter than said passage and of larger dimension than said opening,

said closure and said control member formed so that said head may be snapped through said opening so as to be positioned within said passage as a result of temporary material deformation,

said float structure has the shape of an open ended container and wherein,

said float structure being capable of fitting around the exterior of said closure body and said means for attaching said closure to said container prior to the use of said dispenser,

said closure and said control member being adapted to be located so that said inlet is above said outlet with said head within said passage and said stem extending through said opening,

said float structure being adapted to raise and lower said valve stem and said valve member relative to said passage between an uppermost position in which said valve member fits against said valve seat so as to close off said passage and a lowermost position in which said head member fits against said valve seat so as to close off said passage, said passage being open around said stem in other positions of said float structure other than said uppermost and said lowermost positions so that the contents of said container can move through said passage in accordance with the level of said liquid in said body,

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the portion of said control member around said stem on the side of said float member adjacent to said serving to distribute the contents of said container exteriorly of said dispenser wherever said valve member is not seated against said seat.

2. A dispenser as claimed in claim 1 wherein said

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control member includes distributing means located around said stem on the side of said float member adjacent to said stem for distributing the contents of said container in different directions whenever said valve member is not seated against said seat.

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