

[54] **DISPENSER**
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[52] U.S. Cl. **4/228, 4/222, 248/360**
[51] Int. Cl. **E03d 9/02**
[58] Field of Search **4/227, 228, 231; 248/359, 360, 329, 330, 308; 211/1.3**

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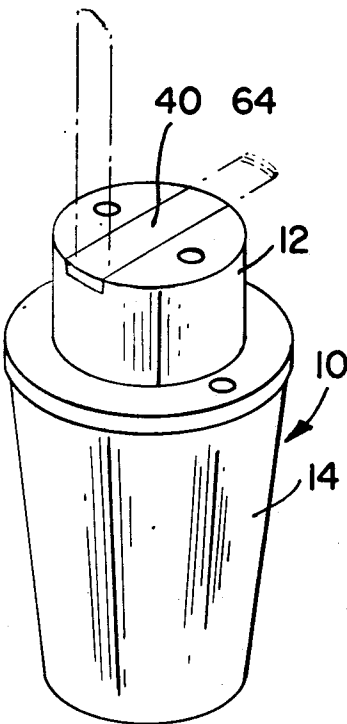
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Attorney—Fryer, Tjensvold, Feix, Phillips & Lempio

[57] **ABSTRACT**

An automatic device of the form of a dispenser adapted to be placed in the water tank of a toilet is provided. The dispenser includes an extensible hanger strap which is conveniently stored in folded condition in a chamber contained within the dispenser and which may be extended for use and conformed over the top edge of a toilet tank in order to suspend the dispenser in an operative position within the water contained in the tank. The dispenser includes a dispenser top which is snap-fitted to a dispenser bottom in the form of a cup-shaped member adapted to contain therein a cake of disinfecting and deodorizing cleaner. The normal flushing action of the toilet automatically dispenses a metered amount of dissolved cleaner into the water tank whereupon it mixes with the tank water and is ejected therewith into the toilet bowl to perform its disinfecting, deodorizing, and cleaning function.

9 Claims, 5 Drawing Figures



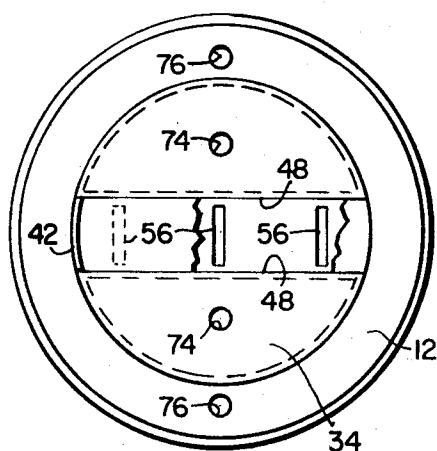


FIG_3

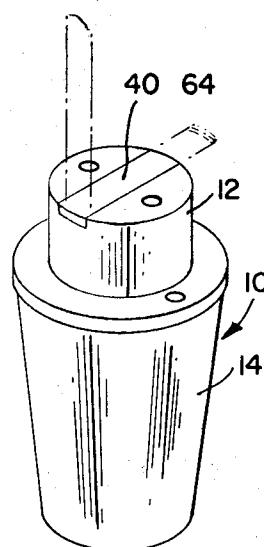


FIG_1

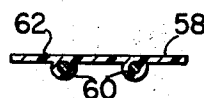


FIG_5

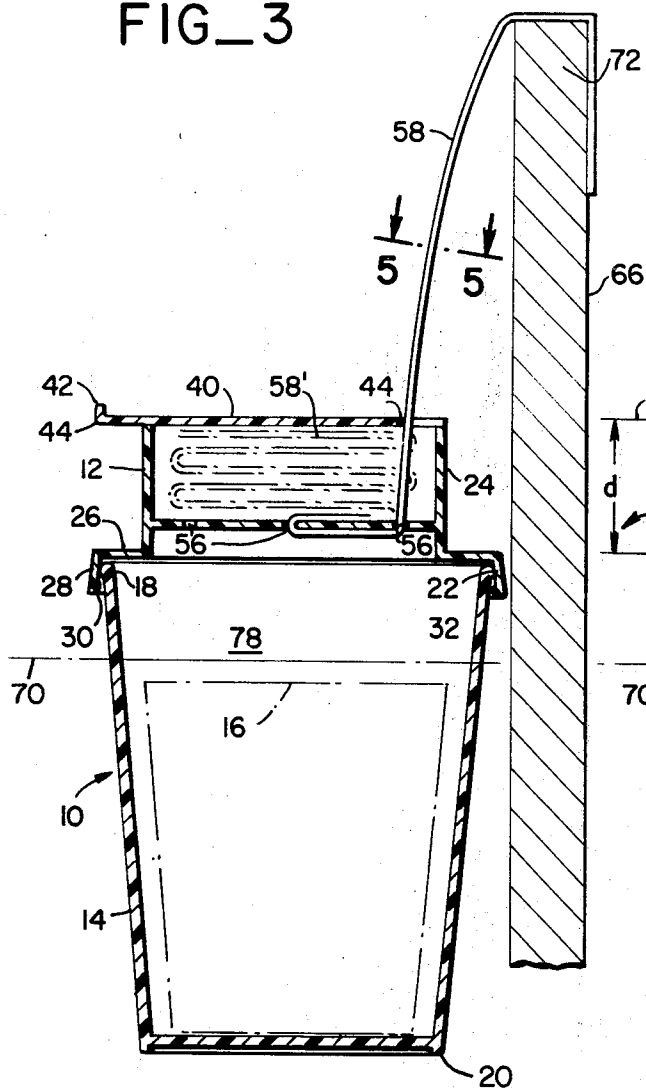


FIG_2

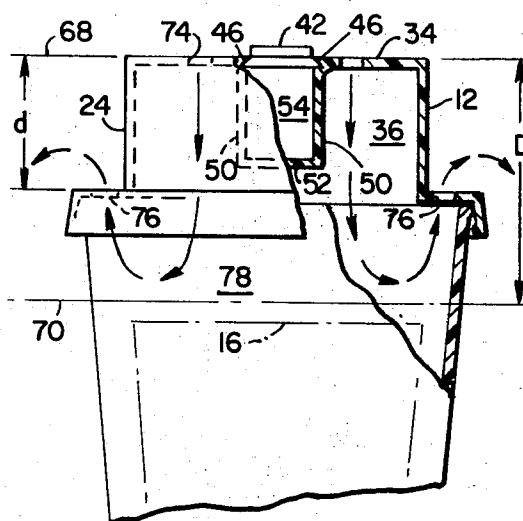


FIG_4

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DISPENSER

BACKGROUND OF THE INVENTION

This invention relates to an automatic device for dispensing a metered amount of disinfecting and deodorizing cleaner into a toilet bowl. More particularly, this invention is directed to a dispenser which dispenses a metered amount of cleaner as a direct result of the normal flushing of a toilet in which the dispenser is operatively installed.

The problem of toilet bowl sanitation has been a problem since the invention of the flush toilet. Early attempts at sanitation relied upon manual methods of cleaning. In addition to being a most odious chore, it required the expenditure of a considerable amount of human time and labor. This gave rise to the later advent of the automatic toilet-bowl cleaning device.

Currently, there are many such automatic toilet-bowl cleaning devices on the market. However, these devices have proved to be lacking in many respects.

One such device consists of a container of liquid cleaner having a float valve which is operatively placed in the water tank of a conventional toilet. The float valve which is actuated by the normal flushing of the toilet consists of a rather complicated structure which is relatively costly to produce.

More recently, devices have appeared which utilize water-soluble cakes of cleaner. These devices are placed either in or at some level within the water tank. Typically, the cake of cleaner is contained within a container having one or more apertures therein. The basic problem with these devices is that the cake of cleaner material will dissolve to the limit of solubility of the entire amount of water in the tank. Since this is typically a volumetric quantity in the order of several gallons in the conventional toilet, too great an amount of cleaner is discharged during the normal flushing of the toilet. This is both costly and wasteful.

If the container apertures are made smaller to inhibit the dissolving process, too little cleaner will be discharged since there is no positive means for discharging the solution from the container.

In addition, the hanging straps provided on these devices tend to be too complicated and, therefore, costly to construct as well as lacking the necessary adjustability to accommodate different water levels commonly encountered with different toilets. This latter disability is especially severe in view of the fact that proper operation of the devices requires proper positioning in the water tank.

OBJECTS OF THE INVENTION

It is, therefore, an object of this invention to provide a dispenser for automatically metering a dissolved substance.

It is also an object of this invention to provide a dispenser for automatically metering a dissolved substance into a body of fluid in response to the change in the level of the body of fluid.

It is a further object of this invention to provide an automatic dispenser for metering the finite and reproducible amount of dissolved soluble substance into a tank of fluid containing the dispenser, which dispenser has no moving parts.

It is a further object of this invention to provide an automatic toilet-bowl dispenser which meters a reproducible volume of disinfecting and deodorizing cleaner

into the water tank of a toilet in response to the normal flushing action of the toilet.

It is a further object of this invention to provide a toilet bowl dispenser having an improved hanger means.

It is a still further object of this invention to provide a toilet-bowl dispenser having an improved hanger means which may be conveniently stored within the dispenser and thereafter extended for use.

It is a still further object of this invention to provide a toilet-bowl dispenser having a hanger strap which is fully adjustable to suspend the dispenser at any level in the water tank of the toilet.

Other objects and advantages of the present invention will become apparent from the following description and claims and as illustrated in the accompanying drawing, which, by way of illustration only, shows a preferred embodiment of the present invention and the principles of operation thereof. It is to be understood that the scope of the invention is not to be limited thereto, but is to be defined by the scope of the appended claims.

It should be further understood that while this discussion speaks in terms of a toilet-bowl dispenser, the dispenser of this invention could be used for dispensing any soluble substance into a fluid medium.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top-quarter, overall, isometric view of the dispenser of this invention;

FIG. 2 is an elevation view of the dispenser in its operative, water tank environment;

FIG. 3 is a top plan view of the dispenser of this invention with the hanger strap removed and the sliding cover partially cut away, for the purpose of clarity;

FIG. 4 is a partial side elevational view in partial cross section of the dispenser of this invention rotated 90° from the direction of viewing of FIG. 2;

FIG. 5 is a cross-sectional view of the hanger strap of FIG. 2 taken in direction 5—5.

DETAILED DESCRIPTION OF THE DRAWING

Referring to FIGS. 1 and 2, there is shown generally at 10 an automatic dispenser embodying the subject invention. The dispenser comprises a dispenser top 12 which is snap-fitted to a dispenser bottom 14. The dispenser may be conveniently made of any flexible material such as polyethylene plastic. Adapted to be contained with dispenser bottom 14 is a cake of soluble substance 16. This soluble substance may be a cake of cleaner comprising chemicals which effect cleaning, disinfecting, deodorizing, and even coloring of the toilet-bowl water. These cakes of cleaner are commercially available and are typically colored blue so as to produce a pleasing blue tint to the toilet-bowl water. The blue tint also serves the useful purpose of indicating when refilling of the dispenser is required by the absence of such tint in the toilet-bowl water.

In the alternative, cake 16 might be replaced with a cake of soluble cleaner substance which may be cast into a disposable cup, which cup may be itself inserted into dispenser 14 or made of such size as to replace dispenser bottom 14. In this case, dispenser bottom 14 would not be used.

Dispenser bottom 14 is a cup-shaped container having an open and a closed end. Dispenser bottom 14 is conveniently shown to be of generally cylindrical, frustoconical configuration having a larger diameter end

18 and a smaller diameter end 20. In this form, the dispenser bottom defines a longitudinal central axis. Circumferentially located around the larger diameter end is a radial flange 22 which is radially outwardly directed to define outer diameter.

Dispenser top 12 is also in the form of a generally cylindrical body having an open and a closed end. The dispenser top has a cylinder portion 24 which also defines a longitudinal axis. A circumferential radial flange 26 extends radially outwardly from the bottom end of the dispenser top. Depending from the peripherally outer-most portion of the radial flange 26 is a generally axially-directed flange 28. At the axially-depending extremity of flange 28 is a radially-inwardly directed peripheral flange 30, which flange defines an inner diameter. The inner diameter of flange 30 is slightly less than the outer diameter of flange 22 such that deformation of flange 28 and/or flanges 22 and 30 is required to snap-fit the dispenser bottom 14 into operative sealing engagement with dispenser top 12 in the circumferential groove 32 defined by flanges 28 and 30.

In this position, the open end of dispenser top 12 is in communication with the open end of dispenser bottom 14. As best seen in FIG. 4, the top end dispenser top 12 is closed by top wall 34 so as to define a measured volume 36 by said top wall and cylinder portion 24. Centrally disposed in top wall 34 is an opening or aperture means in the form of an elongated slot 38 having a sliding cover 40 with a raised flange 42 at one end for movement thereof. Sliding cover 40 is of generally rectangular shape having the general configuration of elongated slot 38. That is to say, cover ends 44 are semicircular in shape and the lateral side edges 46 are dovetailed to correspond with the lateral side edges 48 of slot 38.

Axially depending into chamber 36 are a pair of spaced, transverse side walls 50 which span the internal distance of cylinder 24 in chord-like fashion and which side walls are bridged by a bottom wall 52 which similarly spans the cylinder distance. Walls 50 and 52 combine with cover 40 to define a storage chamber 54.

As best seen in FIG. 3, three transverse slots 56, in the form of openings through the bottom wall 52, are provided for a purpose to be hereinafter described. Turning now to FIG. 2, a hanger strap 58 is threaded through one of the two radially outer-most slots 56 and the end thereof brought up through the central-most slot 56 and is crimped over as shown in parallel relation abutting the bottom wall 52. Hanger strap 58' denotes how the hanger strap may be folded back upon itself in serpentine fashion for complete storage in chamber 54.

The hanger strap may be made of any flexible material which will hold its shape upon being bent to conform to an object. FIG. 5 shows in cross section a strap especially suitable for the purpose. This strap is made from a pair of metal wires 60 which are longitudinally fixed to a thin strip of flexible material such as plastic by placing such wires adjacent the surface of the strip and dipping the combination into liquid plastic and allowing the liquid plastic to then harden. An integral structure is thus produced which effectively coats the wires and thereby prevents contact with water which might otherwise produce corrosion, etc.

The wire may be of any flexible, deformable metal such as steel, or copper wherein the yield point may be easily exceeded by manipulation such that the wire conforms to and retains the deformed shape.

The operation of the device is as follows, referring to FIG. 1. Sliding cover 40 is slid in the direction of raised indicia 64 by means of flange 42 to give access to the hanger strap contained within the dispenser. The end of the hanger strap is gripped and pulled from its folded to an elongated condition as shown in phantom.

Referring now to FIG. 2, the sliding cover 40 is slid back until it contacts hanger strap 58. The dispenser 10 is then placed within tank 66 such that the entire unit is submerged in fluid which, in the case of a toilet, would be water. The maximum water level in the tank 68 is separated from the minimum water level after flushing 70 by distance D, as best seen in FIG. 4. While the top wall 34 of the dispenser may be placed even with the maximum water level 68, it may also be placed beneath that water level and still result in operation of the device. Hanger strap 58 is then bent to conform to the toilet tank top edge 72, upon immersion of the dispenser 10.

As best seen in FIG. 4, a plurality of apertures are located in the dispenser top for entry of water. A pair of top apertures 74 are located in top wall 34 while a pair of bottom apertures 76 are located in radial flange 26. As seen in FIG. 3, these apertures may be conveniently located in radial alignment on opposite sides of the central axis of the dispenser.

Upon immersion, water flows into chambers 36, 54 and 78, the latter being the chamber defined by dispenser bottom 14. The soluble substance 16 in the form of a cake of cleaner thereupon begins to dissolve into the water which surrounds and contacts it. The soluble cleaner substance will continue to dissolve until the limit of solubility of the water within the dispenser 10 is reached. Upon reaching this saturation limit, further dissolving of the soluble substance will be arrested.

It may be noted that while chambers 36, 54 and 78 do remain open to the surrounding water in the tank by means of apertures 74 and 76, their small size precludes any appreciable amount of cleaner solution being transferred to the tank water. In addition, the relatively small size of slots 56 as well as their almost complete obturation by the hanger strap passing therethrough, effectively preclude any appreciable amount of cleaner solution being transferred into chamber 54 and thence to the tank water. In fact, sliding cover 40 may be discarded prior to operative installation of the dispenser and not inhibit the operation thereof.

When the toilet is flushed, the water level in the tank conventionally recedes from its maximum at 68 to its minimum at 70. During this process, air enters apertures 74 and a fluid volume of cleaner in water solution will flow out of the dispenser through apertures 76 and into the water tank where it is mixed with the tank water and ejected into the toilet bowl during the flushing process. The location of apertures 76 on the radial flange 26 produces a flow path somewhat as shown by the arrows. The same amount of soluble substance or cleaner in solution will be metered each time due to the fact that only a volume of fluid defined by chamber 36 including that in chamber 54 through slots 56 will be expelled by wellknown hydraulic principles. This volume is defined by the vertical separation of apertures 74 and 76 by means of distance d. Upon completion of the cycle, a new cycle begins as the water level rises from a minimum to the maximum through the distance D and the dispenser is again filled through the apertures.

Upon exhaustion of the cake of cleaner, the dispenser may be removed from its operative position in the tank and a new cake inserted. In the alternative, if disposable dispenser bottoms are used, empty dispenser bottoms would be replaced by one containing a new cake of cleaner.

It is to be understood that the foregoing description is merely illustrative of a preferred embodiment of the Applicant's invention, and that the scope of the invention is not to be limited thereto, but is to be determined by the scope of the appended claims.

What is claimed is:

1. An automatic dispenser for metering a finite amount of dissolved soluble substance into a tank of fluid containing said dispenser, said dispenser comprising a body having an upper, top portion and a lower, bottom portion, said lower portion having an open lower chamber therein for containing said soluble substance, said upper portion mounted on said lower portion so as to close said lower chamber, said upper portion having a chamber means therein, fluid-level responsive means for automatically metering said finite amount of dissolved soluble substance defined by the volume of said chamber means from said chamber means to the exterior of said body in response to a change in fluid level of the fluid medium within which the dispenser is used, and hanger means comprising an elongated hanger strap of thin, flexible material which retains a shape to which it may be deformed, thereby enabling said hanger strap to be conformed over a support structure, on said tank to support said body, a storage chamber carried by the upper portion of said body, said hanger strap chamber, stored substantially within said storage chamber said storage chamber comprising a means for fastening one end of said hanger strap to said body, the other end of which hanger strap is extendible from said storage chamber to support said body in its operative position within said fluid medium.

2. The invention of claim 1 wherein the hanger strap is folded back-and-forth upon itself in serpentine fashion so as to be contained substantially within said storage chamber.

3. The invention of claim 1 wherein said hanger strap comprises an elongated strip of plastic material having at least one deformable metal wire covered with plastic material and secured thereto in its elongated direction.

4. The invention of claim 1 wherein said storage chamber means comprises a bottom wall and wherein said means for fastening said hanger means comprises a plurality of slots through said bottom wall.

5. The invention of claim 1 wherein said storage chamber further comprises an aperture means through which said one end of said hanger strap may be ex-

tended and further including a removable cover means for obturating said aperture means.

6. The invention of claim 5 wherein said aperture means comprises a generally rectangular slot defining a pair of lateral side edges and wherein said cover means comprises a generally rectangular cover defining a pair of lateral side edges, and wherein the lateral side edges of said slot and said cover are dovetailed so as to enable said cover to be slid away from its position obturating said aperture and allow said hanger strap to be extended from said storage chamber.

7. The invention of claim 6 further including indicia on said cover to indicate the direction in which said cover is to be slid to expose said hanger strap and flange means on said cover to facilitate movement thereof.

8. An automatic dispenser for metering a finite amount of a dissolved soluble substance into a tank of fluid containing said dispenser, said dispenser comprising a body having an open chamber means therein for containing said dissolved soluble substance, fluid-level responsive means for automatically metering said finite amount of dissolved soluble substance defined by the volume of said chamber means from said chamber means to the exterior of said body in response to a change in fluid level of the medium within which the dispenser is used, and wherein said fluid-level responsive means comprises at least one top aperture and at least one bottom aperture which are vertically spaced from each other and which apertures fluidly communicate a chamber defined by said chamber means with the exterior of said body, a storage chamber carried by the upper portion of said body, and hanger means being stored substantially within said storage chamber which hanger means having one end thereof affixed to said body and the other end thereof extendible from said storage chamber to support said body in its operative position within said fluid medium.

9. The invention of claim 8 wherein said body comprises a generally cylindrical dispenser top having a closed end in the form of a top wall and an open end, said dispenser top defining said chamber, said top aperture being located in said top wall, said open end of said dispenser having a radial flange, said bottom aperture being located in said radial flange, a dispenser bottom of generally cylindrical configuration having a closed end and an open end so as to define a chamber for receiving a cake of soluble substance therein, and means sealingly engaging said top and bottom of said dispenser at their open ends whereby said chamber and said cake receiving chamber are in fluid communication.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,769,640 Dated November 6, 1973

Inventor(s) Robert Castronovo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract, change "deodoring" to --deodorizing--.

In Claim 1, line 33, change "chamber," to --being--.

In Claim 1, line 34, insert a comma between "chamber" and "said".

Signed and sealed this 9th day of July 1974.

(SEAL)

Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents