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Keimig

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[54] **APPARATUS FOR DISPENSING METERED QUANTITY OF LIQUID**

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[52] **U.S. Cl.** **4/224;** 4/225; 4/227; 4/228

[51] **Int. Cl.²** **E03D 9/02**

[58] **Field of Search** 4/222, 227, 228, 231, 225, 4/224; 222/56, 57, 445, 446, 447, 358, 450

[56] **References Cited**

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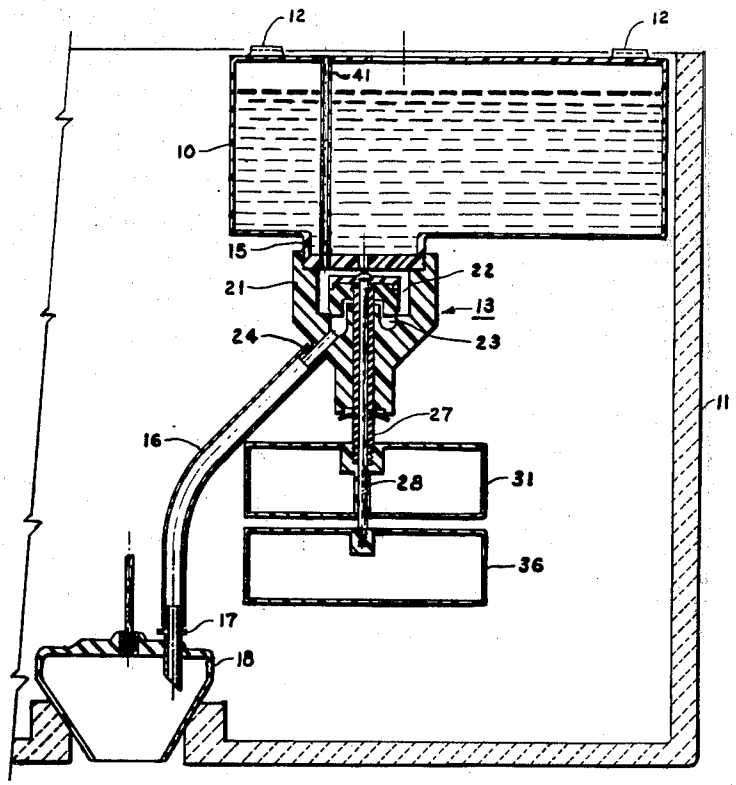
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Primary Examiner—Henry K. Artis

[57] **ABSTRACT**

Apparatus for dispensing a metered quantity of deodorizing and/or cleansing liquid into a toilet bowl. The apparatus comprises a liquid-containing reservoir which fits inside the toilet tank. The reservoir includes a metering chamber with input and exit ports respectively actuated by a pair of nested floats which extend downwardly into the toilet tank and which are actuated, seriatim, by the rising level of water in the tank after each flush.

5 Claims, 2 Drawing Figures



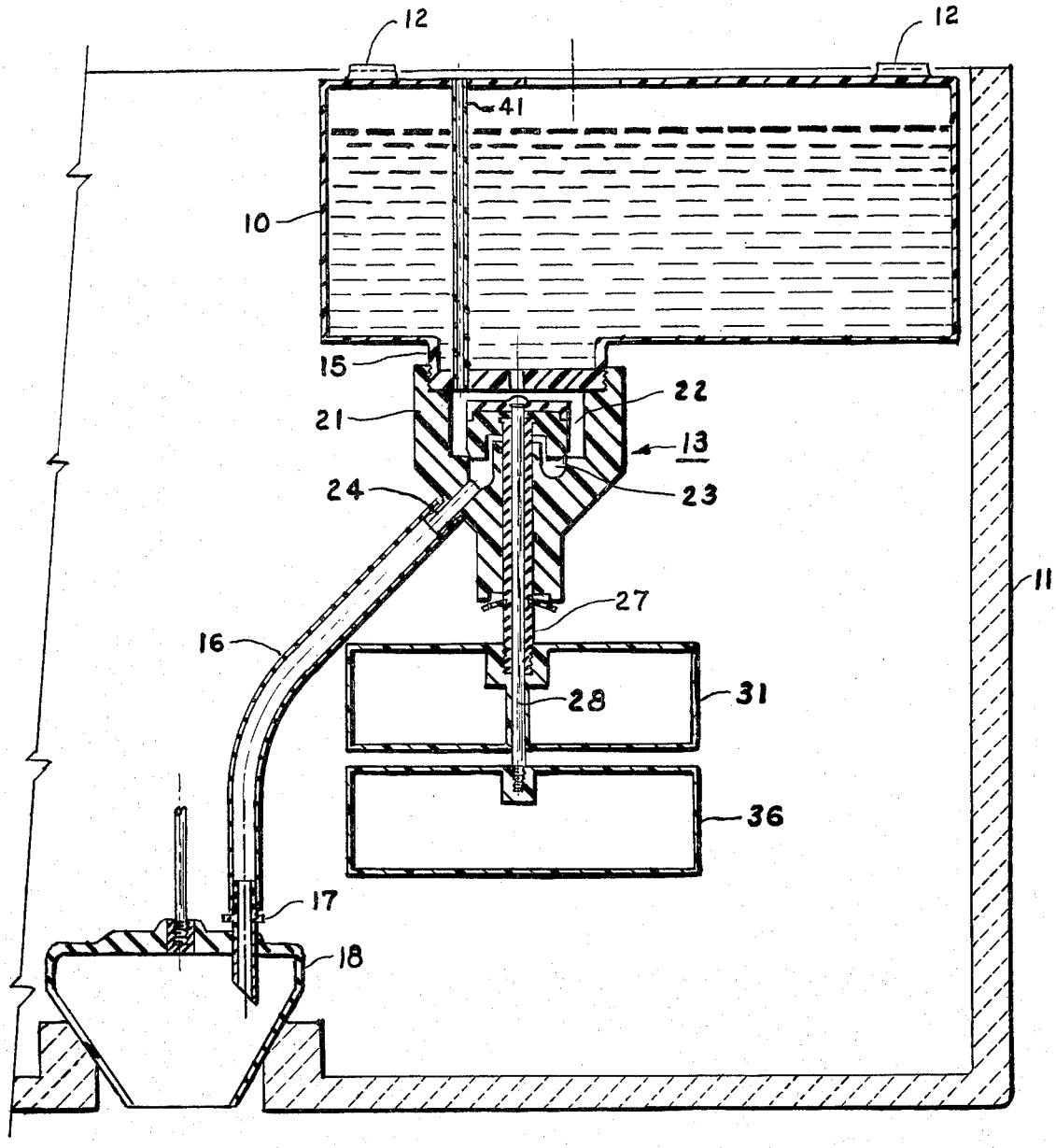


FIG. 1.

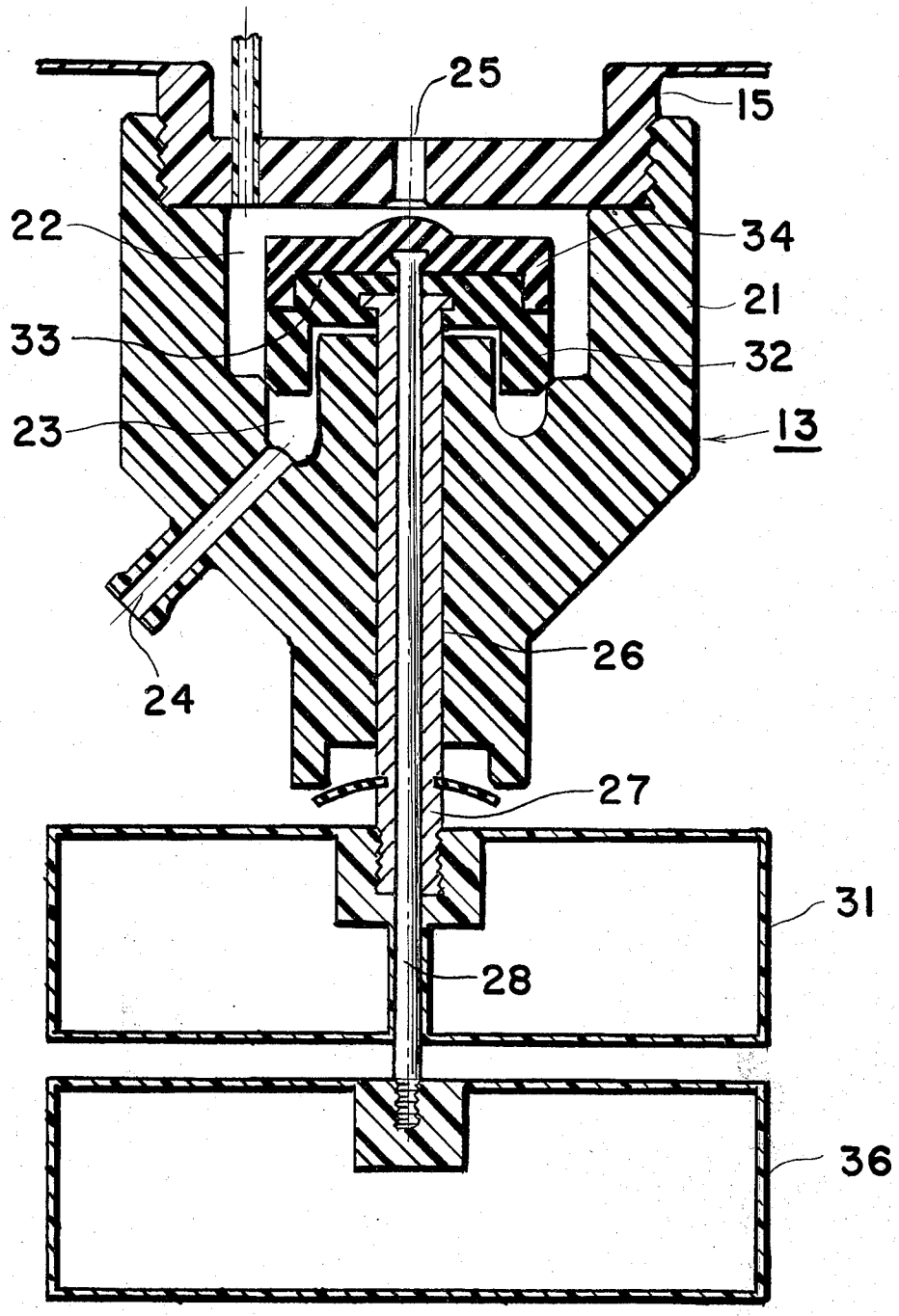


FIG. 2.

APPARATUS FOR DISPENSING METERED QUANTITY OF LIQUID

BACKGROUND OF THE INVENTION

1. Field of the Invention

Broadly speaking, this invention relates to an apparatus for dispensing a metered quantity of liquid. More particularly, this invention relates to an apparatus for dispensing a metered quantity of colored, deodorizing liquid into the bowl or tank of a water closet toilet.

2. Discussion of the Prior Art

As is well known, in recent years it has become quite fashionable to have a colored, typically blue, liquid in the bowls of domestic toilets. Sometimes the liquid is scented, but usually it is merely colored. Most likely, the practice arose in simulation of the colored disinfectant widely used in the toilets of airplanes and railroads, but heretofore it has not been possible to employ a colored disinfectant in the ordinary domestic toilet.

The prior art domestic devices previously mentioned typically employ a bag containing a powdered dye, or a solid cake, which is suspended in the water tank of the toilet. The dye slowly dissolves and is dispensed into the toilet bowl each time that the toilet is flushed.

There are several obvious disadvantages to this arrangement, one being that the solution dispensed into the toilet gets weaker and weaker after each flush, eventually fading away to clear water. Also, it is difficult, if not impossible, to incorporate a true disinfectant with the powdered or caked dye, due to the fact that it must be a solid, and also due to the fact that it must be considerably diluted for long periods of time between flushes, thereby reducing its effectiveness.

SUMMARY OF THE INVENTION

As a solution to these and other problems, I have invented an apparatus for dispensing a metered quantity of liquid into a toilet bowl or the like. The apparatus includes a reservoir for said liquid and means, connected to the reservoir, for supporting the reservoir within the tank of the toilet. The apparatus further includes means, actuated by a fall in the level of water in the tank, for admitting liquid from the reservoir into a recess of predetermined capacity connected thereto. The apparatus also includes means, also actuated by the fall in the water level, for inhibiting discharge of the liquid in the recess into a discharge tube communicating with the toilet bowl. The admitting and inhibiting means are actuated, seriatim, by a rising level of water in the tank to first terminate admission of liquid into the reservoir and, second, to permit the liquid in the recess to flow into the tube and, hence, into the toilet bowl.

The invention and its mode of operation will be more fully understood from the following detailed description, and the appended drawings, in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of an illustrative embodiment of the invention; and

FIG. 2 is a cross-sectional view of a portion of the apparatus shown in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

As shown in FIG. 1, the invention comprises a liquid-containing reservoir 10 adapted for mounting within the tank 11 of a flush toilet (not shown), for example, by means of tabs 12 which protrude from reservoir 10 to engage the upper end of the walls of tank 11.

A metering valve 13 is threadably mounted to a downwardly extending portion 15 of reservoir 10. The valve 13 dispenses a metered quantity of the liquid in reservoir 10 into a tube 16 which connects to a dispensing nozzle 17 slideably fitted into the flush-valve 18 of the toilet.

FIG. 2 depicts metering valve 13 in greater detail. As shown, the valve comprises a main portion 21 having a central annular recess 22 into which the liquid to be dispensed is received via an inlet port 25 extending into reservoir 10. Recess 22 communicates with a second annular recess 23 from which the liquid flows into the tank or bowl of the toilet by means of an exit port 24 connected thereto.

A central bore 26 receives a pair of co-axially nested valve rods 27 and 28. Rod 27 is connected at one end to a first float 31 and at its other end to a first valve washer 32.

Valve washer 32 has a stepped portion 33 which engages a mating recess in a second valve washer 34. Valve washer 34, in turn, is fastened to one end of the inner rod 28 which at its lower end is connected to a second float 36.

In operation, when the toilet is flushed, tank 11 is emptied. Thus, floats 31 and 36 fall to the position shown in FIG. 2. This permits liquid from reservoir 10 to flow into annular recess 22, via input port 25, but because washer 32 has sealed recess 23, the liquid in recess 22 cannot escape therefrom.

As the water level in tank 11 begins to rise, float 36 will move rod 28 upwardly, thereby pressing washer 34 against port 25 and preventing any further flow of liquid from the reservoir into the annular recess 22. Float 31, however, remains in its lowermost position and washer 32, thus, continues to seal recess 23.

As the water level in tank 11 continues to rise, float 31 will rise which, in turn, will cause rod 27 to move washer 32 out of engagement with recess 23. This, in turn, causes the metered quantity of liquid, which is stored in recess 22, to flow through exit port 24 into dispensing tube 16. A second pipe 41, open to the atmosphere at one end, extends into recess 22 to break the vacuum which would otherwise exist therein.

As shown in FIG. 1, dispensing tube 16 connects to the flush valve 18 but if desired it can dispense the metered charge of liquid directly into tank 11. Or, the tube may be connected directly into the flush bowl, bypassing flush valve 18 entirely.

The liquid in reservoir 10 is advantageously a colored disinfectant and/or deodorant. If desired, the liquid may also include a suitable cleaning agent, such as a detergent or soap, to assist in the cleansing action of the flush in the toilet bowl. Because this liquid remains undiluted until the very moment of use, the problems experienced with deterioration of prior art concentrated disinfectant/deodorants is entirely avoided.

One skilled in the art may make various changes and/or substitutions to the arrangements shown, without departing from the spirit and scope of the invention.

What is claimed is:

1. Apparatus for dispensing a metered quantity of liquid into a toilet bowl or the like, which comprises:

a reservoir for containing said liquid;

means, connected to said reservoir, for supporting said reservoir within the tank of said toilet;

a downwardly extending member fastened to said reservoir and having a first, annular recess formed therein communicating with said reservoir by means of an inlet port;

a downwardly extending first rod passing through a bore in said member;

a first float secured to the lower end of said first rod;

a first washer attached to the other end of said rod, said washer being pressed into sealing engagement with said inlet port when the water level in said tank rises, said first float being actuated by a fall in the level of water in said tank to cause said first rod, and hence said first washer, to admit liquid from said resevoir into said first annular recess; and

means, actuated by said fall in water level, for inhibiting discharge of the liquid in said recess into a discharge tube communicating with said toilet bowl, said admitting and inhibiting means being actuated, seriatim, by a rising level of water in said tank to first terminate the admission of liquid into said recess and, second, to permit the liquid in said recess to flow into said tube, hence, to said toilet bowl.

2. The apparatus according to claim 1 wherein said downwardly extending member further includes a second annular recess having an exit port connected thereto, said inhibiting means comprising:

a second downwardly extending rod, co-axial with and nested about said first rod;

a second float fastened to the lower end of said second rod; and

a second washer attached to the other end of said second rod, said washer being pressed into sealing engagement by gravity with said second annular recess when the water level in said tank falls.

3. The apparatus according to claim 2 wherein said exit port is connected, via a tube, to the flush valve of said toilet.

4. The apparatus according to claim 2 wherein said exit port connects directly to the tank of said toilet.

5. The apparatus according to claim 2 wherein said exit port connects, via a tube, directly to the bowl of said toilet.

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