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3,241,718

LIQUID DISPENSER

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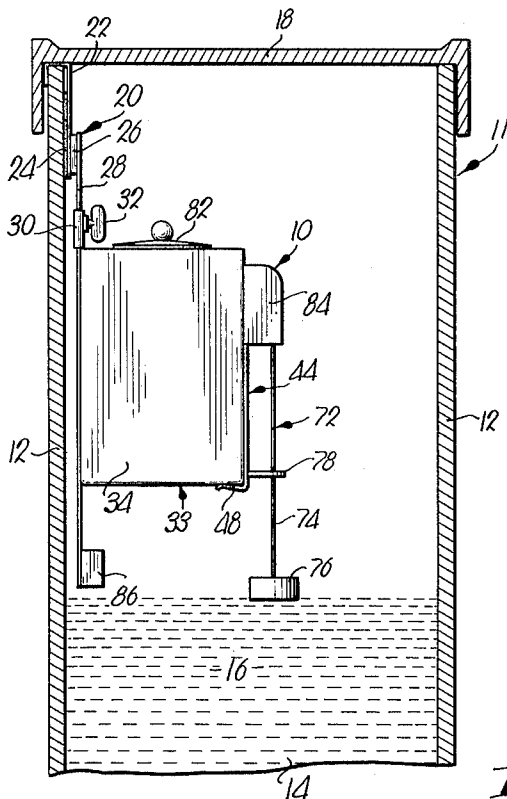


Fig. 1.

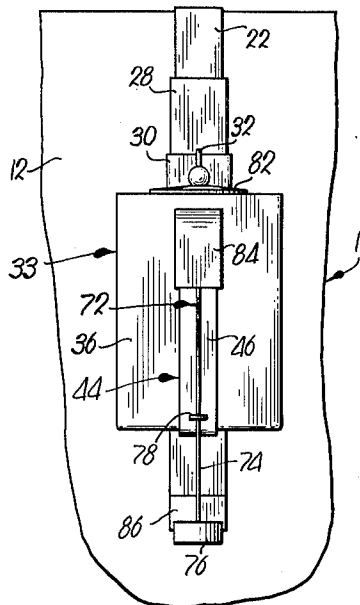


Fig. 2.

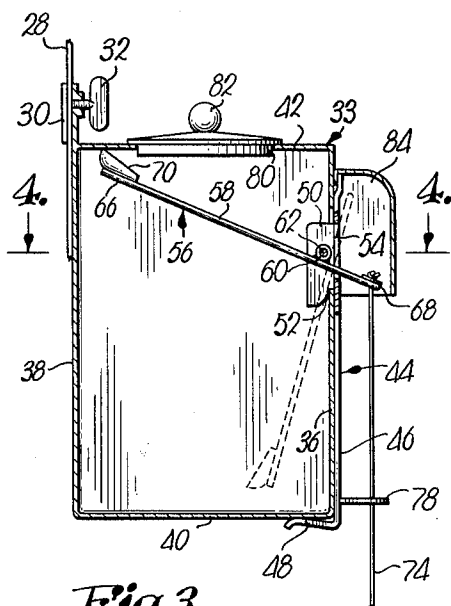


Fig. 3.

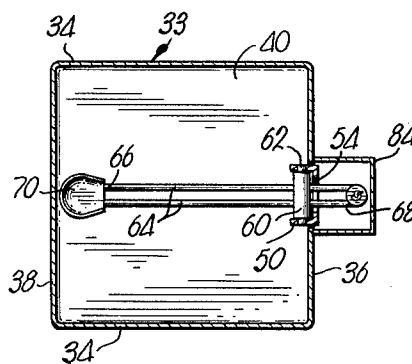


Fig. 4.

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LIQUID DISPENSER

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2 Claims. (Cl. 222-57)

This invention relates to liquid dispensing apparatus and, more particularly, to a disinfectant dispenser adapted for use within the flush tank of a toilet.

It is the primary object of this invention to provide a liquid dispenser which is designed primarily for use with a toilet flush tank, which dispenser contains disinfectant or the like which may be selectively discharged into the reservoir of the tank in intermittent response to the change in water level of the tank reservoir.

Novel means is provided for transferring the disinfectant from the dispenser to the tank reservoir, and efficient and trouble free action is assured. More specifically, my invention discharges a predetermined volume of disinfectant into the tank each time the latter is flushed, the volume delivered being constant regardless of the velocity of the change in water level of the reservoir.

Many previous dispensers have involved selective discharging of disinfectant in intermittent response to tank flushing, but generally they include a valve having a high and low position governed by the water level of the reservoir wherein the disinfectant is allowed to flow when the valve is between its extreme positions, i.e. when the water level is changing, and therefore the volume of disinfectant discharged will vary with the speed of ingress and egress of water to the tank and consequently will also vary with the type of flush tank utilized. This structure often does not deliver a sufficient amount of disinfectant for each flushing operation, and hence results in ineffective sanitation and deodorization. Conversely, more disinfectant than needed may be delivered which results in wasteful use thereof, and hence presents an undesirable economic factor.

Therefore, it is an important object of my invention to provide a liquid dispenser which delivers a predetermined volume of disinfectant to a toilet flush tank in intermittent response to the flushing of the latter, wherein the volume of disinfectant delivered is independent of the velocity of water flow within the tank. Hence, the dispenser may be interchangeably and universally used in any type of flush tank without any requirement for adjustment in relation to the specific velocity of water level change occurring during the flushing operation.

Some of the prior dispensers noted above are adjustable to assure delivery of a proper amount of disinfectant into the specific tank used (this usually being accomplished by varying the high and low positions of the valve), but my invention completely obviates the necessity of adjustment mechanism for volumetric measurement. Therefore, the user of my dispenser is not plagued with time consuming and sometimes difficult trial and error adjustments to determine optimum operating efficiency. Also, there is no assurance that the adjustment on the prior dispensers will remain fixed during prolonged use and therefore the adjustment must be periodically checked.

In my invention, the dispensing operation is actuated by ingress and egress of water to the tank, but is independent of the particular speed of water level change in the reservoir. More specifically, a delivery cup is operably associated with the water whereby it is in a fill position when the reservoir is at its upper level, and upon lowering of the level due to flushing of the tank, only the contents of the cup are discharged, and thus only the predetermined volume may be discharged irrespective of the tank utilized.

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An aim of the instant invention is to provide a liquid dispenser of the aforementioned character wherein a predetermined amount of disinfectant may be delivered to the tank without the use of any troublesome valve mechanism which must be designed to relatively strict specifications in order to assure proper operation. In valve assemblies, leakage problems are often present and this fault is particularly undesirable where the valve is designed to deliver only a small amount of liquid. Leakage can result in excessive amounts of disinfectant or the like being delivered to a toilet flush tank and consequently leads to wasteful use thereof. My invention obviates such problems by novel design features and hence provides a more economical and efficient operating device.

Another aim of this invention is to provide a liquid dispenser for use with a toilet flush tank in the manner described above wherein the discharge of disinfectant is delayed to assure maximum utilization of the sanitation and deodorization properties of the dispensed material. In general, prior liquid dispensers used in toilet flush tanks discharged the disinfectant arbitrarily into the tank reservoir, without any regard to its efficient utilization. By delaying the entrance of disinfectant into the tank, it is delivered to the incoming fresh water as the latter rises in the tank, and thus the disinfectant becomes thoroughly mixed and dispersed within the reservoir to obtain optimum utilization of the disinfectant properties.

Other objects include details of construction which will become apparent from the following specification and accompanying drawing, wherein:

FIGURE 1 is a side elevational view of a dispenser made pursuant to the teachings of my invention, showing the same mounted in operating position within a toilet flush tank;

FIG. 2 is a front view thereof;

FIG. 3 is a fragmentary, enlarged, substantially central longitudinal cross-section view, showing portions of the dispenser in elevation; and

FIG. 4 is a cross-sectional view taken along line 4-4 of FIG. 3.

The liquid dispenser of the present invention, broadly designated by the reference numeral 10, is particularly adapted for use with toilet flush tanks of the type shown fragmentarily in FIGS. 1 and 2 and designated by numeral 11, which tank is normally enclosed by a pair of opposed side walls 12 and a pair of opposed end walls 14. A fresh water reservoir 16 is maintained within the tank 11 and is replaced each time the tank is flushed. A lid 18 rests on the upper edges of walls 12 and 14 and overlies reservoir 16.

Dispenser 10 is positioned within tank 11 by a suitable mounting bracket 20. Bracket 20 includes a hook 22 which suspends dispenser 10 from side wall 12 of tank 11. An adhesive 24 interconnects the inner face of side wall 12 and the proximal surface of hook 22. A spacer 26 is secured to hook 22 in opposed relationship to adhesive 24, and has suspended therefrom a vertically extending elongated arm 28 which it holds in spaced relationship from the proximal side wall 12. Arm 28 is adapted to slidably receive a sleeve clip 30 which is rigidly attached to the upper edge of dispenser 10. Sleeve clip 30 is releasably secured to arm 28 by means of a set screw 32.

Receptacle 33 forms a portion of dispenser 10 and is defined by a pair of side walls 34, front wall 36, rear wall 38, bottom wall 40 and top wall 42. For purposes of illustration receptacle 33 is shown as having a substantially rectangular longitudinal cross-section and a substantially square transverse cross-section. Sleeve clip 30 is secured to receptacle 33 at the juncture of the rear wall 38 and top wall 42.

A clip assembly 44 is adapted to be positioned proximal to front wall 36 and includes an elongated front plate 46 having a leg 48 extending laterally from the lowermost edge thereof and a pair of spaced flanges 50 extending laterally from the upper portion of front plate 46. Each flange 50 has a notch 52 in the lower edge thereof. A rectangular opening 54 is formed in the upper central portion of front wall 36, the opening 54 having a vertical dimension somewhat smaller than the overall vertical dimension of flanges 50. Flanges 50 may be placed into opening 54 by initially inserting the lower notched edge into the opening and then allowing the upper edges of flanges 50 to pivot through the opening. Leg 48 is then snapped into position against bottom wall 40 to rigidly secure clip assembly 44 against the outer face of front wall 36.

Dispensing mechanism, generally designated by the reference numeral 56, is carried by clip assembly 44 and includes a lever 58 having a fulcrum 60 pivotally secured between flanges 50 by means of a pin 62 which interconnects flanges 50. Lever 58 comprises a pair of longitudinally extending parallel wires 64 which have one end 66 thereof disposed within receptacle 33, the other end 68 being disposed externally of receptacle 33 proximal to opening 54. End 66 has a measuring cup 70 secured at the upper edge thereof, while end 68 is connected to actuating means 72.

Actuating means 72 includes a vertically disposed connector string 74, the uppermost end of which is secured to end 68 of lever 58 and the lowermost end of which carries a float or cork 76. String 74 is guided through an extension 78 which extends outwardly from front plate 46 of clip assembly 44, there being a perforation therein (not shown) for receiving the string 74.

In use, receptacle 33 is positioned within tank 11 by placing hook 22 over the upper edge of side wall 12 beneath the lid 18. Disinfectant liquid is poured into receptacle 33 through an opening 80 which is formed in top wall 42 and has a lid 82 complementally received therein for covering purposes when the receptacle is not being filled. The upper level of the disinfectant liquid is maintained below opening 54 to protect against loss.

Receptacle 33 is vertically adjusted with respect to the upper level of reservoir 16 in tank by loosening set screw 32 and sliding sleeve clip 30 along arm 28 until receptacle 33 is in such a position that float 76 is supported by the upper level of reservoir 16 and has disposed dispensing mechanism 56 in the operating position shown in dashed lines in FIG. 3.

Thus, when tank 11 is flushed in the conventional manner, the level of reservoir 16 will be lowered and consequently float 76 will be lowered therewith. As float 76 is lowered, it acts through connector string 74 to pivot lever 58 through a vertical plane about fulcrum 60 whereby cup 70 is raised from its filling position to the upper position shown in full lines in FIG. 3. The engagement of cup 70 with the inner surface of top wall 42 halts the lowering of float 76.

As cup 70 is raised upwardly it receives a predetermined volume of disinfectant liquid which will gravitate from the cup to lever 58 when end 66 has been raised higher than end 68 of lever 58. The disinfectant then proceeds down wires 64, by capillary action and upon reaching end 68, the disinfectant glides down string 72 to float 76, from which the liquid drops into tank 11. It will be appreciated that the disinfectant liquid is delivered from receptacle 33 into tank 11 in a delayed manner, and is initially introduced into reservoir 16 when the latter is at its lowermost level. The disinfectant liquid will continue to drip into reservoir 16 as the level thereof rises due to incoming fresh water whereby the disinfectant liquid becomes thoroughly mixed and dispersed throughout reservoir 16. When the flushing operation is complete reservoir 16 is again at its uppermost level whereby

it engages float 76 to raise the same and dispose level 58 in its filling position.

For optimum control of the capillary delivering action, lever 58 is designed to pivot quickly about fulcrum 60, this end being recognized by positioning fulcrum 60 substantially closed to end 68 than end 66 of lever 58. Thus, when cork 76 is shifted vertically a relatively small distance, end 66 of lever 58 will travel through a relatively long arc and thus will rise rapidly upon lowering of float 76. This prevents drops of liquid disinfectant from clinging to wires 64 when they are raised upwardly through the liquid, all to the end that only the predetermined volume of disinfectant contained in cup 70 is delivered to the reservoir 16.

If it is desired to use different types of disinfectant which are optimally delivered at varied predetermined volumes, it may be desirable to construct cup 70 so that it is easily removable for interchangeability with cups of other sizes. This may also be preferred when the dispenser is being utilized for purposes other than toilet flush tanks.

If the water flow within reservoir 16 is somewhat turbulent, it may be desirable to place a shield 84 in overlying relationship to opening 54 but spaced therefrom to allow movement of lever 58. The shield prevents spray from the reservoir liquid from entering opening 54 and diluting the disinfectant liquid.

Another optional feature is the provision of a weight 86 at the lowermost end of arm 28 which aids in holding receptacle 33 in position when the latter is partially submerged in reservoir 16. Weight 86 is rarely needed as receptacle 33 will normally be adjustable to a position above the reservoir. Adhesive 24 also aids in firmly holding receptacle 33 in position by securing hook 22 to the inner face of side wall 12. Adhesive 24 also serves as a buffer against vibrating movements.

Thus it is seen that I have provided a liquid dispenser which will deliver a predetermined volume of disinfectant to a toilet flush tank, which volume is independent of the velocity of water level change of the tank reservoir when the latter is flushed. The dispensing mechanism is merely actuated by the change in reservoir water level and thus only a single cup of disinfectant is delivered. My dispenser avoids the use of troublesome valves which are prone to leakage and are not as economical as the present device. Also, the disinfectant is thoroughly mixed with the reservoir water to assure optimum utilization thereof and hence protects against wasteful use which occurs when disinfectant is arbitrarily discharged into the reservoir.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A liquid dispenser for use with a tank having a first liquid of variable levels therein, said dispenser comprising:

- a receptacle positioned proximal to said tank;
- a lever pivoted intermediate its ends for dispensing a second liquid from said receptacle into said tank upon a variation of the level of said first liquid, said lever comprising a pair of closely spaced parallel wires connecting one end of the lever with the other end thereof, said one end being immersible in said second liquid and having a cup thereon for receiving a predetermined quantity of said second liquid; and

actuating means coupled with the other end of said lever and responsive to a variation of the level of the first liquid to cause a swinging movement of said lever from a first position with said one end of the lever immersed in said second liquid to a second position with said one end of the lever higher than the other end thereof whereby said second liquid will gravitate from said cup to said lever for flow therealong by capillary action to deliver said second liquid to said tank.

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2. A liquid dispenser for use with a tank having a first liquid of variable levels therein, said dispenser comprising:

- a receptacle positioned proximal to said tank;
- a lever pivoted intermediate its ends for dispensing a 5 second liquid from said receptacle into said tank upon a variation of the level of said first liquid, said lever comprising an elongated member having a capillary transmission surface connecting one end of the lever with the other end thereof, said one end 10 being immersible in said second liquid and having a cup thereon for receiving a predetermined quantity of said second liquid; and
- actuating means coupled with the other end of said lever and responsive to a variation of the level of the first liquid to cause a swinging movement of said 15

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lever from a first position with said one end of the lever immersed in said second liquid to a second position with said one end of the lever higher than the other end whereby said second liquid will gravitate from said cup to said lever for flow by capillary action to deliver said second liquid to said tank.

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