

Feb. 28, 1956

F. C. MAJO

2,736,039

DISINFECTANT DISPENSER

Filed Feb. 19, 1952

3 Sheets-Sheet 1

Fig. 1

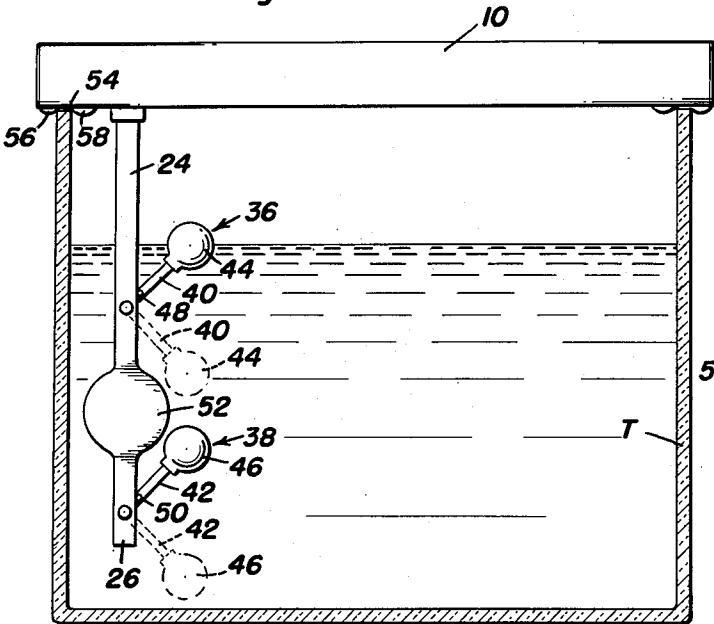


Fig. 2

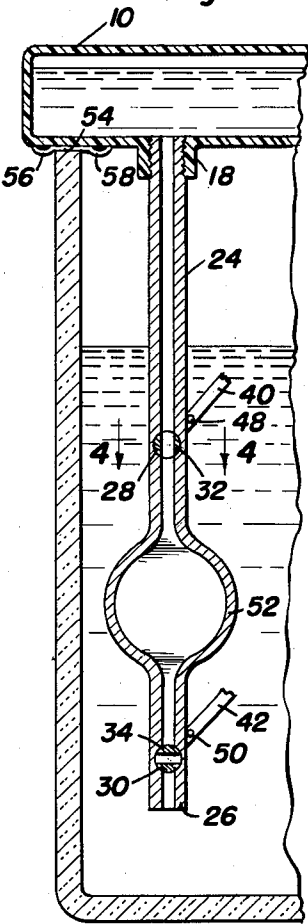


Fig. 3

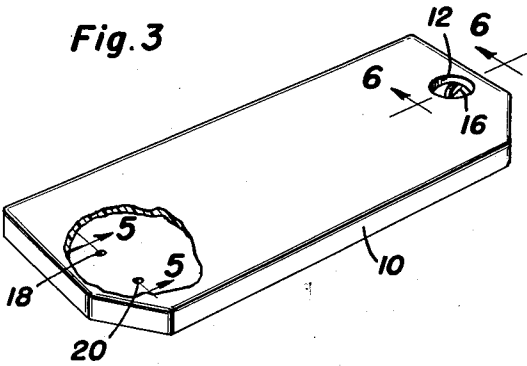
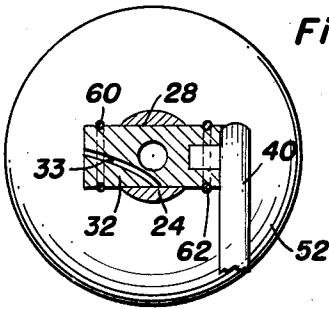


Fig. 4



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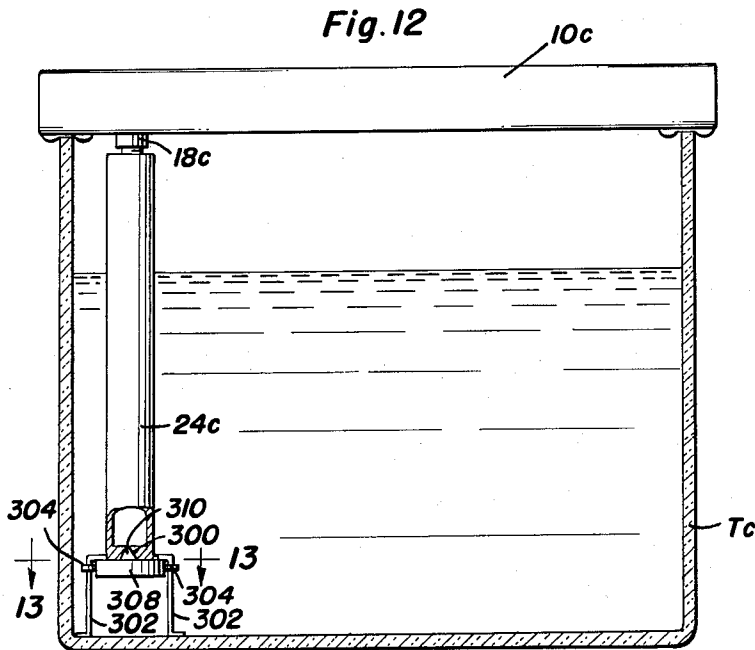
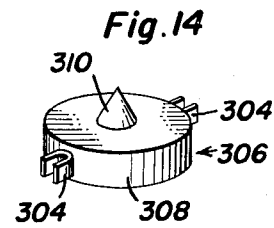
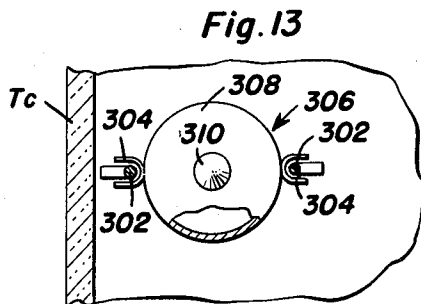
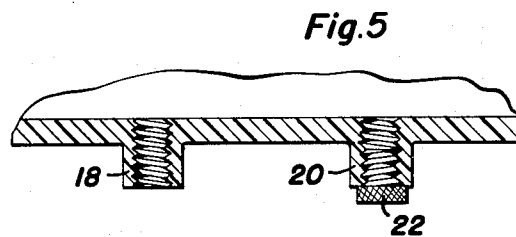
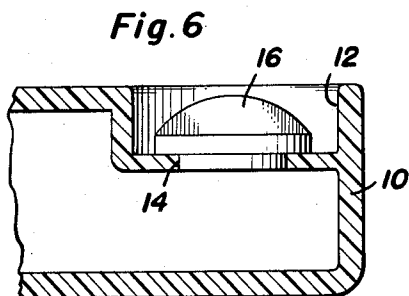
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3 Sheets-Sheet 2



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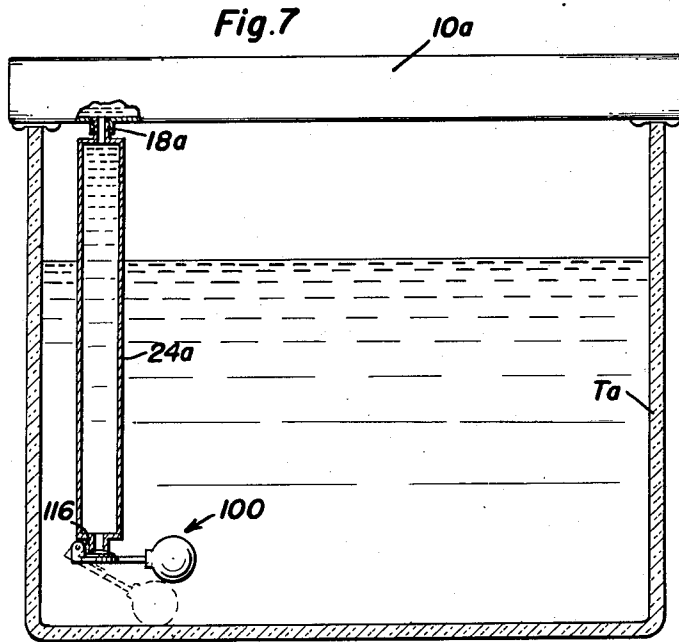
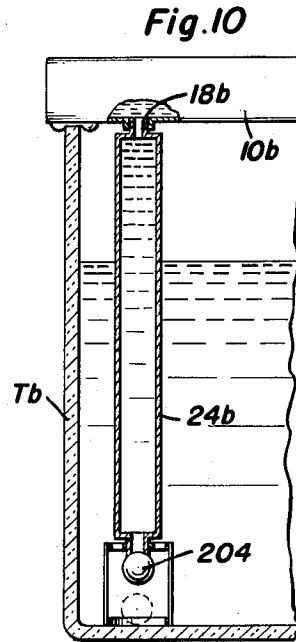
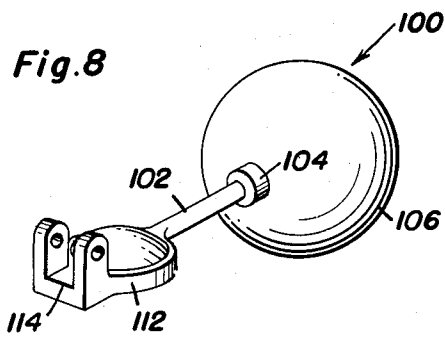
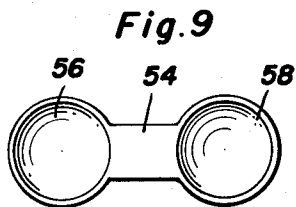
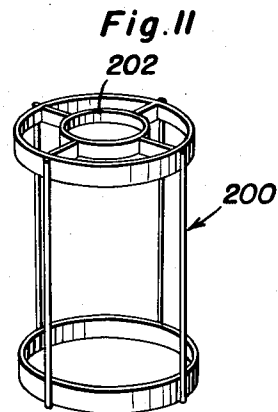
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3 Sheets-Sheet 3



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2,736,039

DISINFECTANT DISPENSER

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7 Claims. (Cl. 4—227)

This invention relates to new and useful improvements in devices for supplying detergent to water supply apparatus and the primary object of the present invention is to provide a means for supplying a detergent to the water within a flush tank.

Another important object of the present invention is to provide a detergent dispenser that is automatically actuated to supply a detergent in response to the lowering of the liquid level in a flush tank as the water in the tank is employed during a flushing operation.

A further object of the present invention is to provide a detergent dispenser for flush tanks that is quickly and readily applied to the top of a flush tank to replace the conventional top wall or closure for a flush tank.

A still further aim of the present invention is to provide a disinfectant dispenser of the aforementioned character that is simple and practical in construction, strong and reliable in use, small and compact in structure to occupy very little space within a flush tank, inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a vertical sectional view of a flush tank and showing one form of the invention applied thereto and with the upper and lower valves shown in their raised position by full lines and in their lowered position by dotted lines;

Figure 2 is an enlarged fragmentary view of Figure 1 but showing the present invention in vertical section;

Figure 3 is a perspective view of the tank top or reservoir forming portion of the invention and with parts broken away for the convenience of explanation;

Figure 4 is an enlarged horizontal sectional view taken substantially on the plane of section line 4—4 of Figure 2;

Figure 5 is an enlarged detail sectional view taken substantially on the plane of section line 5—5 of Figure 3;

Figure 6 is an enlarged detail sectional view taken substantially on the plane of section line 6—6 of Figure 3;

Figure 7 is a vertical sectional view of a flush tank and showing the invention in modified form, partly in section and partly in elevation applied to the tank;

Figure 8 is a perspective view of the valve member shown in Figure 7;

Figure 9 is a plan view of one of the suction cup elements used in the invention;

Figure 10 is a fragmentary vertical sectional view of a flush tank and showing the invention in modified form applied thereto and partially shown in section;

Figure 11 is a perspective view of the valve cage employed in the construction shown in Figure 10;

Figure 12 is a vertical sectional view of a flush tank and showing the invention in further modified form applied thereto and with parts broken away and shown in section;

Figure 13 is an enlarged horizontal sectional view taken substantially on the plane of section line 13—13 of Figure 12; and

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Figure 14 is a perspective view of the valve member used with the form of the invention shown in Figures 11 and 12.

Referring now to the drawings in detail, and more particularly to Figures 1 through 6, inclusive, wherein for the purpose of illustration, there is disclosed one embodiment of the present invention, the numeral 10 represents a substantially rectangular flush tank cover or reservoir having a recess 12 at one end that is provided with a filling opening 14 normally closed by a closure plug 16, as shown best in Figure 6 of the drawings.

The bottom wall of the reservoir 10 is provided with two internally threaded nipples 18 and 20 that are selectively capable of receivably engaging a closure plug 22. The nipples 18 and 20 are also capable of receiving the upper externally threaded end of a vertical tube or conduit 24 having a lower discharge end 26.

Upper and lower transverse bores 28 and 30 are provided in the conduit 24 and rotatably receive therein the cylindrical transversely apertured portions 32 and 34 of upper and lower valve members 36 and 38. The valve members 36 and 38 include laterally projecting shank portions 40 and 42 whose outer ends carry floats 44 and 46. The shank portions 40 and 42 also carry stop pins 48 and 50 that limit vertical swinging movement of the valve members.

Conduit 24 is provided with an enlarged bulb-like intermediate portion 52 that forms an auxiliary reservoir and this enlarged portion is located between the upper and lower valve members as shown best in Figure 2 of the drawings.

A plurality of straps 54 rest against the undersurface of the bottom wall of the reservoir 10 and suction cups 56 and 58 are suitably attached to or are integrally formed with the ends of the straps and removably adhere to the reservoir 10. The cups 56 and 58 of each strap are spaced apart sufficiently to receive the upper edge of the peripheral wall of the flush tank T, and thereby confine the reservoir over the tank.

The reservoir is preferably constructed of a material resistant to the harmful characteristics of a detergent, such as plastic, thereby prolonging the useful quality of the reservoir.

The transverse opening in the valve portion 32 is so disposed that it will align the tube 24 when the float 44 is raised, whereas the opening in the transverse opening in the valve portion 34 is so located as to align the tube 24 only when its associated float 46 is lowered.

In practical use of the invention, shown in Figures 1 through 6, inclusive, a suitable detergent, of liquid form or a soluble dissolved in liquid, is placed in the reservoir through the filling opening 14. Both floats 44 and 46 are raised since the water in the flush tank is at its normally high level. Therefore, the upper valve member 36 is in its open position and the lower valve member 38 is in its closed position.

The detergent in reservoir 10 will gravitate into the tube 24 past the valve portion 32, into chamber 52 and will be retained above closed valve member 38. However, as the flushing operation occurs, the level of the water in tank T will recede below the valve portion 34 and both floats 44 and 46 will move downwardly, due to their weight, in order to close the valve portion 32 and open the valve portion 34. During this phase, the detergent between the valve portions 32 and 34 will pass into the tank to mix with the water as the water assumes its normal level. Furthermore, as the water in the tank T assumes its normal level, valve portion 32 will be moved by float 44 to its open position and valve portion 34 will be moved by its float 46 to a closed position.

Obviously, suitable means is employed for retaining the valve portions relative to the tube 24. This means may

assume the form of a pair of spaced, split rings 60 and 62 yieldingly received in grooves in the valve portions so as to restrict axial movement of the portions 32, 34. Portion 32 includes a passage forming an air vent to the interior of tube 24 below portion 32 when portion 32 is moved to its closed position.

Attention is now directed to Figures 7, 8 and 9 wherein there is illustrated the present invention in modified form. In this embodiment, the valve member is designated by the numeral 100 and comprises a rigid shank 102 having a threaded connection with the socket portion 104 of a float 106.

The end of shank portion 102 remote from the float 106 is formed with an attaching element 112 having a bifurcated portion 114 that is pivoted to an ear 116 at the lower end of the vertical tube 24a.

Again, the upper end of the tube 24a is coupled to a discharge or outlet nipple 18a of a reservoir or flush tank cover 10a which is filled with a detergent or detergent solution.

When the liquid in the tank Ta, covered by the reservoir 10a, is raised to its normal level, as shown in Figure 7, the valve member 100 will be raised to its closed position to prevent the detergent from passing into the tank. However, during the flushing operation, the level of water will recede and permit opening of the valve member so that the detergent will pass into the tank until the float 106 is raised in response to the liquid in the tank.

The form of the invention illustrated in Figures 10 and 11 is next to be considered. In this embodiment, the vertical tube 24b is again attached at its upper end to the discharge nipple 18b of a reservoir 10b that is retained on the upper edge of the flush tank's peripheral wall Tb.

A cage element 200 is formed at its upper end with an inner ring portion 202 that encircles the reduced end of the tube 24b to restrict upward movement of the cage element. The valve comprises a floatable ball 204 confined within the cage that will close the lower end of the conduit when the water level is raised to its normal position and which will open the lower discharge end of conduit 24b when the water descends to its lower level during the flushing operation, in order that the detergent may pass into the tank Tb.

Figures 12, 13 and 14 show the invention in still further modified form. In this embodiment, the vertical supply tube 24c is attached at its upper end to the delivery nipple 18c of the flush tank cover or reservoir 10c and the lower end of tube 24c is formed with a conical discharge orifice 300.

A guide composed of two vertical rods 302 is attached at their upper ends to the lower end of tube 24c and slidably receive channels 304 secured to diametrically opposite sides of a valve member 306 having a hollow floatable disk 308 that supports a conical element 310.

When the liquid level of the tank Tc is normal, element 310 enters aperture 300 to close the same, however, as the liquid level lowers, as a result of the flushing operation, valve member 306 will slide downwardly to its open position to permit detergent in tank 10c to pass into the tank to mix with the flush tank water as the latter rises in the tank.

Having described the invention what is claimed as new is:

1. In a flush tank, a reservoir supported on the upper end of the tank and having an outlet, a vertical tube attached to and depending from said outlet and having a lower discharge end, upper and lower rotatable valve members carried by the conduit, and said valve members each including a float responsive to the level of water in the tank for movement of the valve members to their open or closed position, said lower valve member being closed when the float thereof is raised and open when the float thereof is lowered, said upper valve being open when its float is raised and closed when its float is lowered.

2. In a flush tank, a reservoir supported on the upper

end of the tank and having an outlet, a vertical tube attached to and depending from said outlet and having a lower discharge end, upper and lower rotatable valve members carried by the conduit, and said valve members each including a float responsive to the level of water in the tank for movement of the valve members to their open or closed position, said lower valve member being closed when the float thereof is raised and open when the float thereof is lowered, said upper valve being open when its float is raised and closed when its float is lowered, said tube having an enlarged portion disposed between said upper and lower valve members to form an auxiliary reservoir.

3. In a flush tank having a high liquid level and a low liquid level, a vertical conduit within the tank and having a lower discharge end disposed above the low liquid level of the tank, upper and lower valve members carried by the conduit and disposed between the upper and lower liquid levels, each of said valve members including a float, said upper valve member being in its open position when its float is raised and closed when its float is lowered, said lower valve member being open when its float is lowered and open when its float is raised, and a detergent supply connected to the upper end of the conduit for supplying a detergent into the conduit past the upper valve member and up to the lower valve member when the water in the tank is up to its high liquid level, said upper valve member being closed and said lower valve member being open as the water in the tank recedes to its low level, whereby a detergent retained between the valve members will pass into the tank as the water in the tank recedes to its low liquid level.

4. For use with a flush tank, a reservoir forming a top for the tank and having a filling opening and an outlet, a conduit attached to and depending from the outlet, said conduit having a lower discharge end disposed close to the bottom of the tank, and a float valve at the lower end of the conduit, said valve being movable to its open position as the level of water in the tank goes below the lower end of the conduit, whereby a detergent in the reservoir may pass into the tank and be mixed with water as the tank is refilled and a plurality of straps at the undersurface of said reservoir, a suction cup at each end of each strap and engaging the undersurface of the reservoir, the upper edges of the walls of the tank being received between the suction cups of each strap.

5. The combination of claim 4 wherein said float valve comprises a ball located below the lower end of said conduit, and a cage at the lower end of said conduit and comprising the ball therein.

6. The combination of claim 4 wherein said float valve comprises a disk and a pair of diametrically opposed channels fixed to the disk, and a guide engaged with the lower end of the conduit and including a pair of vertical rods slidably receiving the channels.

7. The combination of claim 4 wherein said conduit is provided with an upper float valve, said upper float valve being movable to closed position when the flush tank is filled with water.

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