

May 31, 1955

A. A. DOTY

2,709,263

DOUBLE-LEVEL VALVE DEVICE FOR TOILET TANKS

Filed June 25, 1953

FIG. 1.

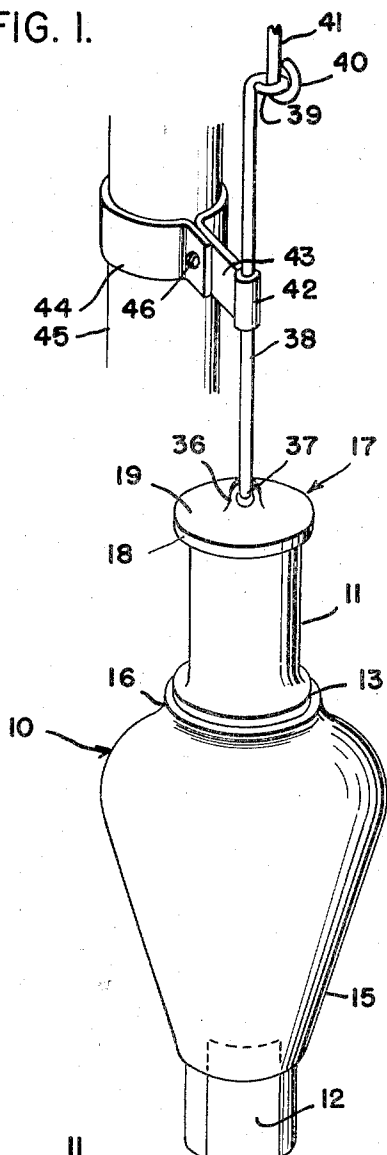
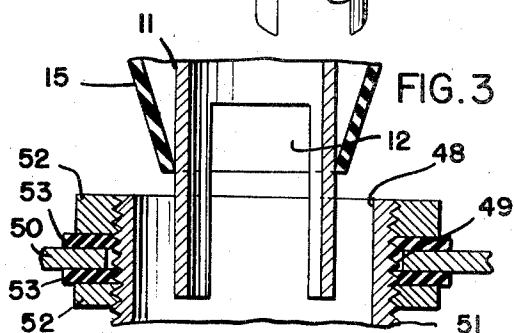
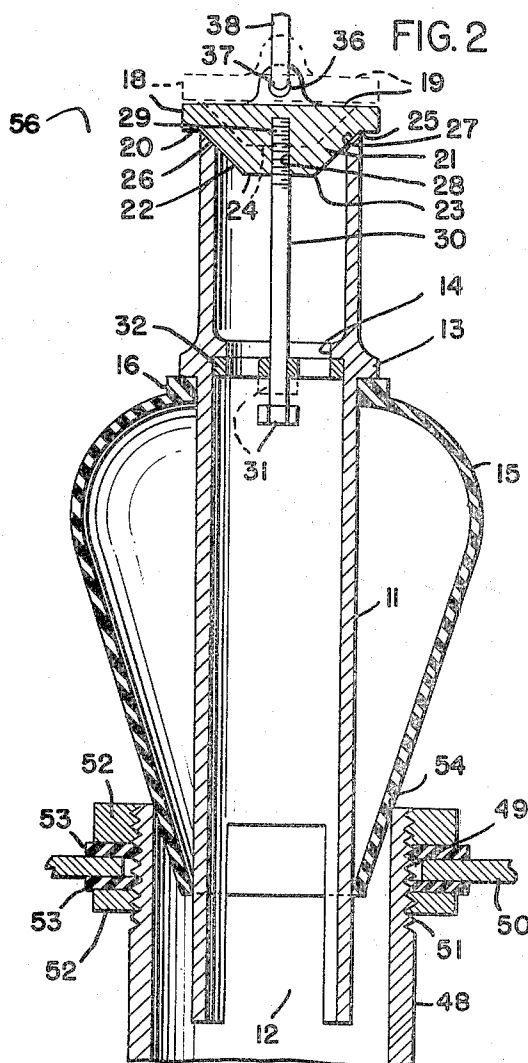
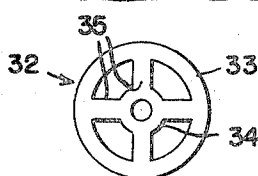


FIG. 4

INVENTOR

ARTHUR A. DOTY

BY

Thomas F. Healy

ATTORNEY

1

2,709,263

DOUBLE-LEVEL VALVE DEVICE FOR TOILET TANKS

Arthur A. Doty, Reno, Nev.

Application June 25, 1953, Serial No. 364,152

2 Claims. (Cl. 4—56)

The present invention relates to improvements in a double-level valve device for toilet tanks for the flush tanks of toilets and has for an object the provision of a device of this kind which will effect the saving of a substantial amount of water for each installation without reducing the efficiency of the toilet unit.

Another object of the present invention is to provide an improved device which may be substituted for the conventional buoyant outlet valve controlling the flow of water from the flush tank to the toilet bowl without altering the structure of the conventional flush tank unit.

A further object of the present invention is to provide an improved water saver device which upon initial movement of the flushing handle will permit the discharge of a portion only of the water from the flush tank into the toilet bowl for flushing and upon a further complete movement of the handle will permit the discharge of substantially all of the water from the flush tank into the bowl.

Still a further object of the present invention is to provide an improved device of this character which comprises relatively few parts which are so constructed and arranged that they will give a maximum efficiency and length of service.

In one of its broadest aspects the present invention contemplates the provision of a water saver device for the flush tank of a toilet which comprises a hollow member adapted to have its lower end portion received by the flush tank outlet pipe, a main valve member on said hollow member and adapted to seat on the discharge valve seat of said outlet pipe, a secondary valve member on said hollow member for closing the upper end of said hollow member and adapted to be operatively connected with the flushing lever of the flush tank so that said secondary valve member will be unseated upon initial operation of said flushing lever, and an operative connection between said secondary valve member and said hollow member, whereby said main valve member will be unseated upon further movement of said flushing lever.

In one of its more specific aspects the present invention contemplates the provision of an improved water saver device for the flush tank of a toilet bowl which comprises an elongated hollow vertically disposed tube adapted to have its lower end portion received by the flush tank outlet pipe, a rubber ball valve carried by said tube and adapted to seat on the discharge valve seat of said outlet pipe, a cap valve for seating on the upper end of said tube for closing said tube and adapted to be connected to the flush tank flushing lever so that said cap valve will be unseated upon initial operation of said lever, an abutment mounted on the interior of said tube and having an opening therethrough, and a rod carried by said cap valve and extending downwardly therefrom and through said opening in the abutment, said rod having a head on its lower end having a diameter larger than that of said opening so that said head is brought into engagement with said abutment upon initial move-

2

ment of said flushing lever and further movement of said flushing lever will cause said head to entrain said abutment and raise said tube and ball valve to effect the unseating of said ball valve.

With the foregoing and other objects in view, the invention will be hereinafter more fully described and more particularly pointed out in the appended claims.

In the drawings, in which the same parts are denoted by the same reference numerals throughout the several views:

Figure 1 is a perspective view of the improved device constructed in accordance with the present invention and showing it connected to the conventional valve operating rods;

Figure 2 is a vertical sectional view of the improved device illustrated as mounted in a toilet flush tank;

Figure 3 is a fragmentary vertical sectional view showing the device with the main valve in its open position; and

Figure 4 is a top plan view of the valve rod guide and abutment member.

Referring more particularly to the drawings, the improved device is generally indicated at 10 and comprises an elongated hollow member 11 which may be in the form of a tube having a through passageway and open at both ends and having its lower end portion cut away at two substantially diametrically opposite points to provide openings 12. Intermediate its upper and lower ends, the tube 11 has an annular shoulder 13 formed on its outer surface and an annular flange 14 formed on its inner surface.

A hollow main valve member 15 has a through bore through which extends the tube 11 so that the upper and lower end portions of the tube extend beyond the member 15. The inner faces of the upper and lower end portions of the member 15 frictionally grip the adjacent portions of the outer surface of the tube to maintain the member in its proper position on the tube. The upper end portion of the member 15 terminates in a thickened ring 16, the upper face of which engages against the lower face of the shoulder 13 to augment the resistance of the frictional engagement of the member 15 with the tube 11 to prevent upward movement of the member 15 on the tube 11. If desired, the member 15 may be secured to the tube in any other suitable manner.

A cap valve, generally indicated at 17, has an upper disk-like portion 18 having a flat top 19 and an under peripheral flat edge portion 20. The cap valve 17 has a lower portion 21, the outer part of the under surface 22 of which is inclined downwardly and inwardly to the point 23 and the inner part of the under surface 22 is substantially flat as indicated at 24. The inclined surface 22 merges with the flat edge portion 20 to form an angled recess 25 which receives the upper annular edge 26 of the upper end of the tube 11 which is formed by beveling the upper edge of the tube as indicated at 27. The inclination of the bevel 27 corresponds to that of the under surface 22 of the cap valve.

The cap valve 17 can be either floatable to a limited degree or non-floatable.

The cap valve 17 has a centrally disposed downwardly opening screw threaded socket 28 which receives the upper screw threaded end portion 29 of a valve guide rod 30. The lower end of the rod 30 carries a head 31. A guide and abutment member, generally indicated at 32, is secured to the inner surface of the tube 11 by a frictional fit therewith or by any other suitable method. The member 32 may be in the form of a spider and comprises a rim 33, a hub 34 having a through bore and arms or spokes 35 connecting the rim and hub. The upper face of the rim 33 abuts the lower face of the flange

14 to assist in anchoring the member 32 in the tube and preventing upward movement of the member 32 when the cap valve and head 31 of the rod 30 are moved upwardly as described later. The rod 30 extends through the bore of the hub 34 and the head 31 of the rod 30 is larger than the diameter of the bore in the hub so that the head engages the hub when the rod 30 is lifted.

An eye 36 extends upwardly from the central part of the upper flat top 19 of the cap valve 17 to be engaged by the hook 37 formed on the lower end of a conventional valve rod 38. The upper end portion of the rod 38 has an eyelet 39 which receives an eyelet 40 formed on the lower end of a valve operating rod 41. The upper end of the rod 41 is connected to the conventional type flush tank flushing lever which is not shown. The rod 38 extends through a guide sleeve 42 which is carried by the long arm 43 of a split ring clamp 44. The clamp 44 is supported by the conventional overflow pipe 45 to which it is secured by fastening means 46 which may be in the form of a screw extending through the short arm 47 and the long arm 43 of the clamp.

The lower end portion of the tube 11 extends into a flush tank discharge pipe 48 which may be of the conventional type. The pipe 48 extends through the usual opening 49 formed in the bottom 50 of a conventional flush tank and the upper end of the pipe 48 opens into the flush tank and the lower end of the pipe 48 communicates with the bowl of a conventional toilet not shown. The upper end portion of the pipe 48 is exteriorly screw threaded as at 51 and receives nuts 52 and gaskets 53 by which the pipe 48 is held in the opening 49 in water-tight relation to the bottom 50. The upper end of the pipe 48 provides a seat 54 for the member 15.

In order to install the device in the conventional flush tank, the conventional valve rod 38 will be removed from the conventional hollow rubber ball valve and its lower end bent to form the hook 37 which will be engaged with the eye 36 of the cap valve. The device will then be lowered in the flush tank until the lower end portion of the tube 11 and member 15 are received by the discharge pipe 48 and the valve member 15 is seated on its seat 54. The cap valve 17 will at this time be received by its seat 26, 27 so that water from the tank cannot flow into the discharge pipe 48 and the level of the water in the tank will be maintained at the height indicated at 55. At this time the parts will be in the full line position shown in Figure 2 of the drawings and the head 31 of the rod 30 will be out of engagement with the abutment 32.

An initial partial movement of the conventional flushing handle will move the flushing lever which in turn through the rods 38 and 41 will lift the cap valve from its seat 26, 27, as shown in dotted lines in Figure 2, and permit a portion of the water in the tank to enter the upper end of the tube 11 and flow therethrough and through the discharge pipe 48 into the toilet bowl to flush the same. When the water has receded to the level indicated at 56, which level is determined by the position of the upper end of the tube 11, the initial flushing action will cease. This initial movement of the flushing handle and cap valve will not cause the tube 11 and the valve member 15 to be lifted as the head 31 of the rod 30 will only come into contact with the hub 33 of the abutment 32, but will not exert any lifting force. The hub will act as a guide for the rod 30 in its up and down movements. The amount of water discharged from the tank by this operation will be quickly replaced in the usual manner by the conventional float controlled inlet valve, not shown. Upon release of the flushing handle, the cap valve will automatically return to its seat and prevent any further discharge of water until the next operation of the flushing handle.

If it is desired to utilize the entire contents of the tank for flushing the toilet bowl, the user will move the flushing handle to its limit of movement. Such action will initially unseat the cap valve 17 and bring the head 31 into contact with the abutment 32 and the head working

through the abutment 32 will lift the tube 11 and the valve member 15 so that the member 15 is unseated, as shown in Figure 3 of the drawings. The water from the tank will flow into the upper end of the tube 11, through the openings 12 of the tube 11 and between the lower end of the tube and the pipe 48 and into the toilet bowl. Upon release of the flushing handle the parts will return to the full line position of Figure 2 of the drawings and the tank will be filled in the conventional manner.

The rod 30 and the abutment 32 may be made of brass, the tube 11 and the cap valve 17 may be made of plastic and the valve member may be made of rubber. However, these materials are given by way of example only and it is to be understood that any other suitable materials or combinations of materials may be used. It will be noted that the improved device comprises only five parts, namely, the tube 11, the valve 15, the cap valve 17, the rod 30 and the abutment 32 and that the improved device may be substituted for the conventional ball valve by unscrewing the usual ball valve from the rod 38, bending the lower end of the rod 38 with a conventional pair of pliers, inserting the bent end through the eye 36 of the cap valve and closing the hook 37 with the pliers.

It is apparent that this invention provides a water saver device for the flush tank of a toilet comprising, an open ended vertically disposed tube having a through passage-way and a valve seat on its upper end, an annular shoulder on the outer surface of said tube, a main valve member on said tube, having its lower end portion adapted to seat on the discharge pipe of the flush tank and its upper end abutting said shoulder, an annular flange on the inner surface of said tube, a guide and abutment member secured to the inner surface of said tube and abutting said flange and having an opening therethrough, a cap valve adapted to be connected to the flushing lever of the flush tank and to seat upon the valve seat on the tube, and a rod depending from said cap valve and extending through the opening in said guide and abutment member and having a head at its lower end for entraining said guide and abutment member when the cap valve is lifted by the flushing lever.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departure from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What I claim is:

1. A double-level valve device for the flush tank of a toilet comprising, an open ended elongated rigid tubular member having a through passageway, said tubular member having a valve seat at one end thereof, said tubular member being cut away at the other end thereof to provide openings in the wall thereof; a hollow floatation rubber valve member disposed around said tube intermediate the ends thereof and partially covering said opening in the end portion of said tubular member, said rubber valve member being shaped at one end portion thereof to extend within the discharge pipe of the flush tank and have a portion of the outer wall thereof snugly engage the top edge of said discharge pipe, an annular shoulder on the outer surface of said tubular member, said rubber valve member having the other end thereof abutting said shoulder to prevent slippage of said valve member on said tubular member, an annular flange on the inner surface of said tubular member at the end portion thereof which carries said outer annular shoulder, a guide and abutment member secured to the inner surface of said tubular member, said guide and abutment member abutting said inner annular flange and having an opening therethrough, a cap valve adapted to be connected to the flushing lever of the flush tank and to seat upon the valve seat on said tubular member, a rod extending axially in said tubular member and being secured at one end thereof to said cap valve for movement

5

therewith, said rod extending through and beyond the opening in said guide and abutment member, a stop element carried by said rod at the end thereof remote from said cap valve which by engagement with said guide and abutment member limits the axial movement of said cap valve prior to the movement of said floatation valve away from the said discharge pipe.

2. A double-level valve device for the flush tank of a toilet comprising, an open ended elongated rigid tubular member having a through passageway, said tubular member having a valve seat at one end thereof, a hollow floatation rubber valve member disposed around said tube intermediate the ends thereof, said rubber valve member being shaped at one end portion thereof to extend within the discharge pipe of the flush tank and have a portion of the outer wall thereof snugly engage the top edge of said discharge pipe, an annular shoulder on the outer surface of said tubular member, said rubber valve member having the other end thereof abutting said annular shoulder to prevent slippage of said valve member on said tubular member, an annular flange on the inner

6

surface of said tubular member, a guide and abutment member within said tubular member and having an aperture therethrough, a cap valve adapted to be connected to the flushing lever of the flush tank and to seat upon the valve seat on said tubular member, a rod extending axially in said tubular member and being secured at one end thereof to said cap valve for movement therewith, said rod extending through the opening in said guide and abutment member, a stop element carried by said rod adapted to engage with said guide and abutment member to limit the axial movement of said cap valve prior to the movement of said floatation valve away from the said discharge pipe.

References Cited in the file of this patent

UNITED STATES PATENTS

1,620,964	Haas	Mar. 15, 1927
1,890,281	Dollinger	Dec. 6, 1932
2,511,545	Roselair	June 13, 1950