May 8, 1956 E. M. GRAM 2,744,261

TOILET FLUSH CONTROL

Filed April 23, 1954 3 Sheets-Sheet 1

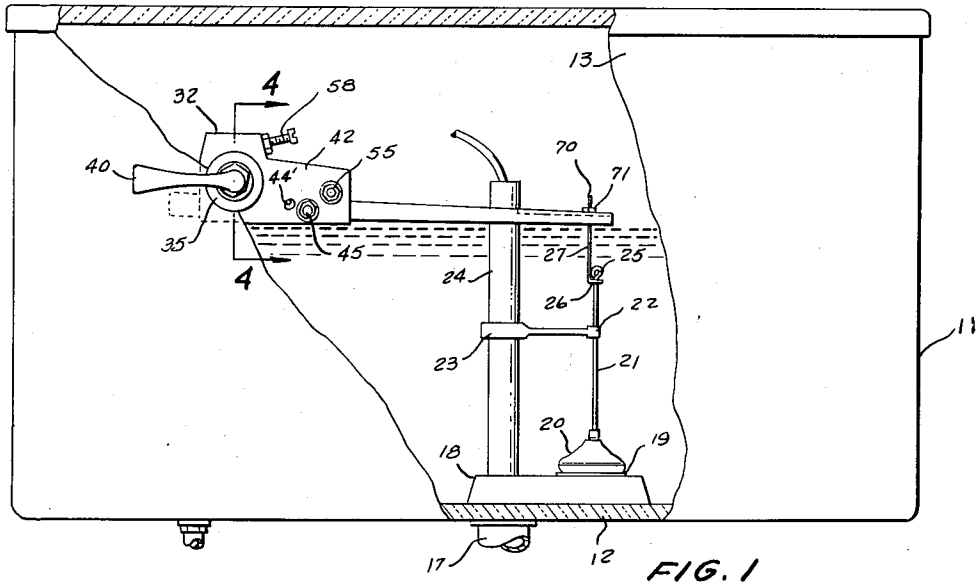


FIG. 1

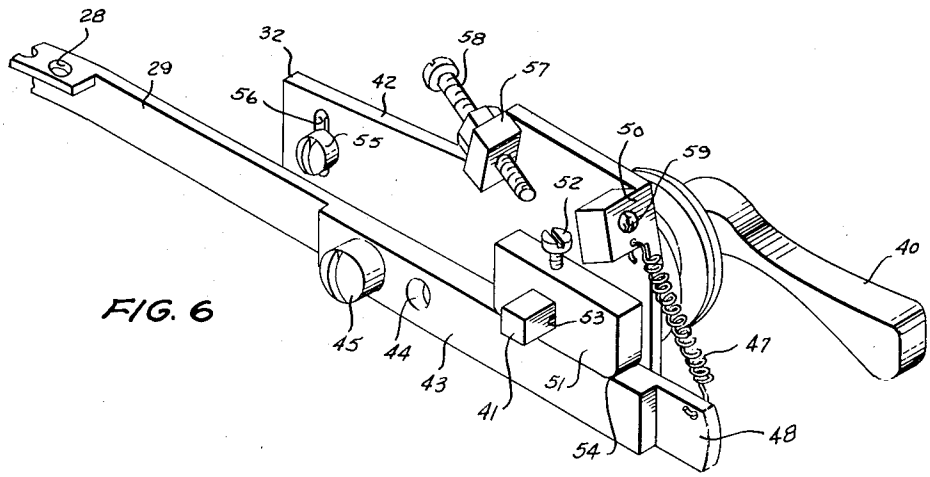


FIG. 6

INVENTOR.

EUGENE M. GRAM

BY

McMorrow, Berman & Davidson

ATTORNEYS

May 8, 1956 E. M. GRAM 2,744,261

TOILET FLUSH CONTROL

Filed April 23, 1954 3 Sheets-Sheet 2

FIG. 2

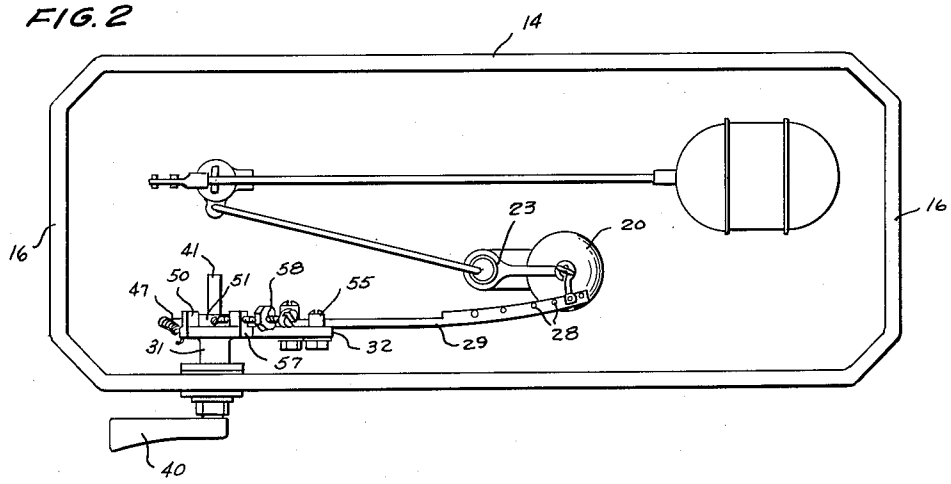


FIG. 3

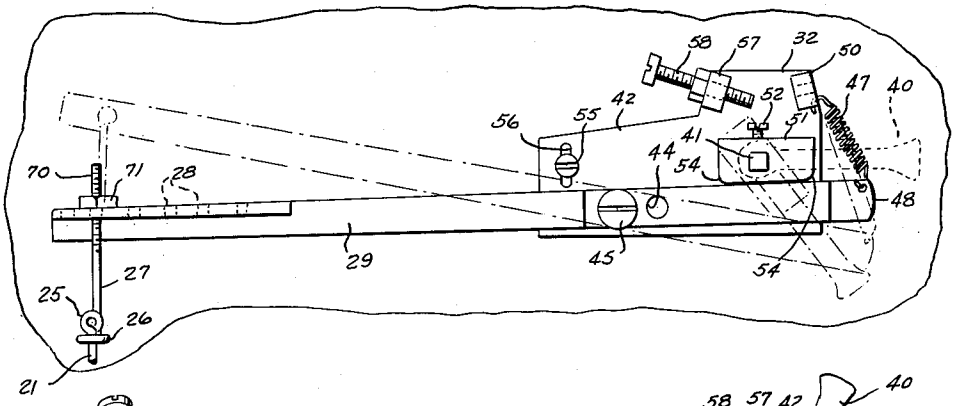


FIG. 4

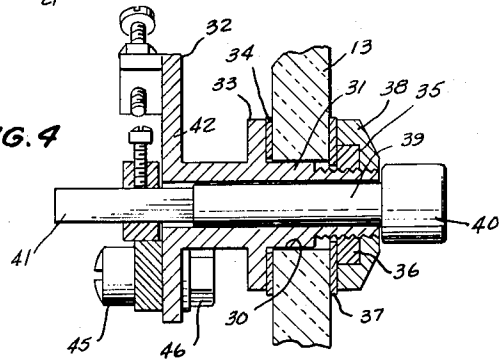
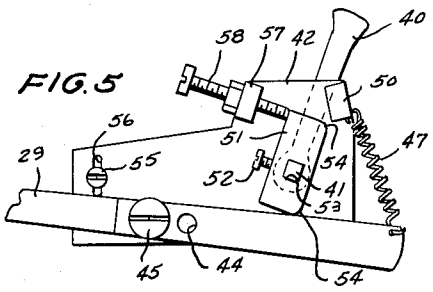


FIG. 5



INVENTOR.

EUGENE M. GRAM

BY

McMorrow, Berman & Davidson

ATTORNEYS

May 8, 1956 E. M. GRAM 2,744,261

TOILET FLUSH CONTROL

Filed April 23, 1954 3 Sheets-Sheet 3

FIG. 7

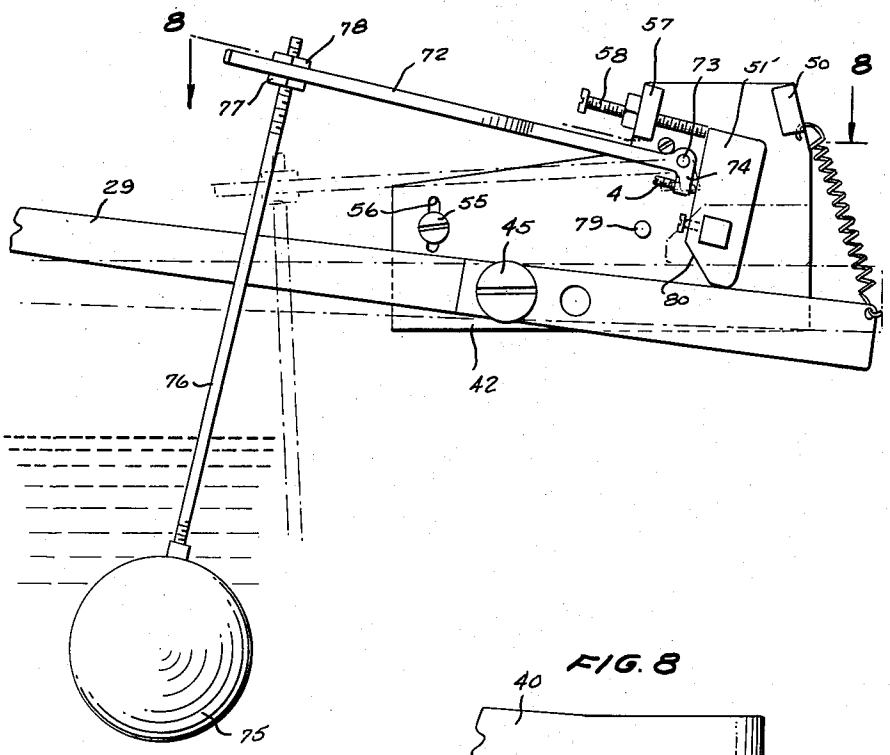
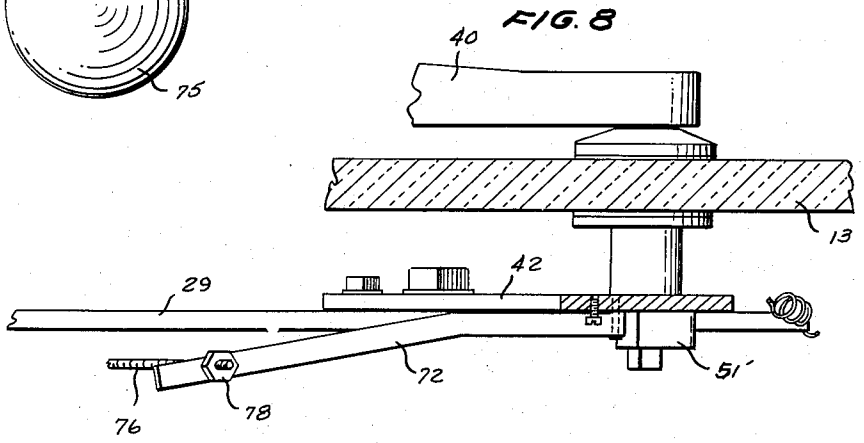


FIG. 8



INVENTOR.
EUGENE M. GRAM
BY

McMorrow, Berman & Davidson
ATTORNEYS

United States Patent Office

2,744,261

Patented May 8, 1956

2,744,261

TOILET FLUSH CONTROL

Eugene M. Gram, Scranton, Pa.

Application April 23, 1954, Serial No. 425,187

4 Claims. (Cl. 4—67)

This invention relates to flush valves and more particularly to an improved flush valve control structure for providing a controlled amount of discharge of water from a flush tank.

A main object of the invention is to provide a novel and improved flush valve control attachment for a flush tank, said attachment being simple in construction, being easy to install, and, when installed, providing effective control of the amount of water released from the tank, and being arranged so that when operated in one direction, a full flush condition is provided and when operated in an opposite direction, a reduced amount of discharge of water from the flush tank is provided.

A further object of the invention is to provide an improved flush valve control attachment for a flush tank, said attachment involving inexpensive components, being sturdy in construction, being adjustable to provide a wide range of different amounts of discharge of water from the flush tank, providing conservation of water, as only a desired amount of water can be discharged, reducing the noise accompanying the filling of the tank, because of the shorter flush, and being operable by the application of relatively small pressure on the operating handle thereof.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is an elevational view, partly broken away, of a flush tank provided with an improved flush valve control attachment according to the present invention.

Figure 2 is a top view of the flush tank of Figure 1 with the top cover removed.

Figure 3 is an inside elevational detail view of the flush valve control attachment employed in Figures 1 and 2.

Figure 4 is an enlarged vertical cross sectional detail view taken on the line 4—4 of Figure 1.

Figure 5 is a fragmentary elevational view of the attachment shown in Figure 3, with the valve control handle in elevated position.

Figure 6 is a fragmentary perspective view of the flush valve control attachment employed in Figures 1 and 2, showing the valve control handle in normal position.

Figure 7 is a fragmentary elevational detail view showing a modification of the present invention in which a float-controlled member is employed to return the flush valve cam arm to its normal position when the water level in the flush tank drops below a predetermined height.

Figure 8 is a horizontal cross sectional view taken on line 8—8 of Figure 7.

Referring to the drawings, 11 designates a flush tank having the bottom wall 12, the front wall 13, the rear wall 14, and the side walls 16, 16. Designated at 17 is the discharge conduit which is secured to the bottom wall 12, as by the conventional fitting 18, said fitting including a valve seat 19 engageable by a valve ball 20, the water in the tank being discharged into the discharge conduit 17 responsive to the elevation of the valve ball 20 from its seat.

The valve ball 20 is provided with the usual elevating rod 21 which extends slidably through a guide element 22 secured by an integral collar 23 to the overflow pipe 24. The top end of the rod 21 is formed with a loop 25, and the rod is engaged by a loop 26 carried at the lower end of a rod 27 whose threaded top end 70 is engaged through a selected aperture 28 in the end portion of the operating lever 29 and is supported thereon by a nut 71.

The front wall 13 of the tank 11 is formed with an operating shaft aperture 30 which receives the sleeve portion 31 of a bracket member 32. Sleeve 31 is formed with a flange 33 which engages against an annular gasket 34 surrounding the sleeve and positioned between the flange 33 and the inside surface of the wall 13. The outer portion of the sleeve is formed with the external threads 35 which receives a nut 36, said nut bearing against a washer 37 surrounding the sleeve and engaging the outer surface of the wall 13, as is clearly shown in Figure 4. A concave ornamental nut 38 is engaged on the threads 35 over the nut 36 and covers nut 36.

Designated at 39 is the valve operating shaft, said shaft extending rotatably through the sleeve 31 and having the valve handle 40 on its outer end. The inner end of the shaft 39 is formed with the squared portion 41 which projects a substantial distance beyond the vertical plate portion 42 of bracket member 32. Plate portion 42 is formed with a plurality of spaced pivot apertures 44'.

The valve operating lever 29 is formed with the thickened rear end portion 43 which is provided with a plurality of pivot apertures 44. The lever 29 is pivotally connected to the vertical plate portion 42 of bracket member 32 at a selected pivot aperture 44' in said plate portion and at a selected pivot aperture 44 in said lever by a suitable pivot bolt 45 which extends through the selected apertures 44 and 44' and which has a threaded shank portion extending through the lower portion of vertical plate element 42 and is secured thereto by a nut 46.

The operating lever 29 is biased counterclockwise, as viewed in Figures 3, 5 and 6 by a coiled spring 47 connecting the end lug 48 of lever 29 to a lug 50 formed on the adjacent top corner portion of the plate element 42.

Designated at 51 is a generally rectangular cam arm having a squared aperture receiving the squared portion 41 of the valve operating shaft 39. The cam arm 51 is rigidly secured to the squared shaft portion 41 by a set screw 52, as shown in Figure 6. The square aperture 53 in the cam arm 51 is spaced a substantial distance from the center of the cam arm 51 to provide opposed portions of different lengths on said arm, whereby the valve operating lever 29 will be rotated to different degrees for different directions of rotation of the cam arm 51, as will be presently explained.

The cam arm 51 is preferably formed with rounded lower corners 54 so that the lever 29 may be rotated to controlled angles by manually controlling the angle of rotation of the operating handle 40, thereby providing manually controlled amounts of discharge of water between the valve ball 20 and the valve seat 19. For example, the handle 40 may be rotated in the manner illustrated in Figure 5 to cause the shorter portion of the cam arm 51 to engage the thickened portion 43 of the lever 29 and cause the lever to be rotated to the position shown in Figure 5. This provides a controlled amount of discharge of water from the flush tank into the discharge conduit 17, which may be employed for rinsing the toilet bowl, or the like. Maximum discharge of water from the tank can be obtained by rotating the handle 40 clockwise, as viewed in Figure 3, to cause the longer portion of the cam arm 51 to elevate the valve ball 20 to allow

full discharge of water from the tank. The rotation of the lever **29** is limited by an adjustable stop bolt **55** which extends through a vertical slot **56** provided in the vertical plate portion **42** of bracket **32**, the bolt **55** being located above the lever **29**, as shown in Figure 6, and being adjustable in position so that the maximum upward movement of the outer portion of lever **29** may be regulated by adjusting the position of the bolt **55** in the slot **56**.

The top portion of the vertical plate element **42** is provided opposite the lug **50** with a similar lug **57** in which is threadedly engaged a stop screw **58**, the screw 58 being located in the same vertical plane as the cam arm **51** and the thickened portion **43** of lever **29**. As shown in Figure 6, the screw **58** is inclined downwardly toward the cam arm **51** and may be adjusted to limit counterclockwise rotation of said cam arm in the manner shown in Figure 5. As shown in Figure 5, by rotating the handle **40** counterclockwise, the shorter portion of the cam arm **51** is caused to engage the thickened portion **43** of lever **29**, and to cause the valve ball **20** to be elevated, resulting in a controlled amount of discharge of water from the flush tank. In its limiting position, the cam arm 51 engages the stop screw **58** at the end of the longer portion of said cam arm, as shown in Figure 5, causing a predetermined degree of rotation of the lever **29** from its normal position, shown in Figures 3 and 6, to provide a predetermined amount of discharge of water from the flush tank.

The lug **50** is provided with an internally threaded aperture **59**, arranged to at times receive the stop screw **58**, so that the cam arm **51** may be reversed on the squared shaft portion **41**, if so desired, to reverse the action of the handle **40**.

Thus, it will be seen, that by rotating the handle **40** in one direction, a full flush may be obtained, whereas by rotating the handle **40** in the opposite direction, a reduced amount of discharge of water from the flush tank may be obtained, for example, to provide only the required amount of water needed for rinsing the toilet bowl.

It will be readily understood that the attachment above described may be employed in place of the conventional handle used on a flush tank and to replace the usual mechanism for elevating the flush tank ball **20**.

It will be further apparent that the amount of flow of water obtained by operating the flush valve handle **40** may be adjusted to obtain any one of a number of different amounts by employing the various combinations of adjustments afforded by use of the different pivot openings **44'** in plate portion **42**, the different pivot apertures **44** in the valve operating lever **29**, and the adjustment of the stop bolt 55 in the slot **56** of plate portion **42**.

A first adjustment is obtained by adjusting stop bolt **55** so as to allow lever **29** to lift valve **20** off its seat one and a half inches or more. For this adjustment, stop screw **58** is adjusted to approximately the position thereof shown in Figure 5, so that the handle **40** will return to its normal position immediately upon release thereof.

A second adjustment is obtained from the arrangement of Figure 5, by adjusting stop screw **58** until the cam arm **51** is almost in a vertical position. The cam arm will remain in this position until the handle **40** is manually returned to its normal position.

A third adjustment is obtained from the second adjustment above described by adjusting the stop screw **55** so as to contact the top edge of lever **29** while the cam arm **51** is in the said almost vertical position.

A fourth adjustment is obtained by moving the pivot bolt 45 to the adjacent aperture **44** in Figure 5 and adjusting stop screw **55** as in the first and second adjustments above described and adjusting the stop screw **58** as in the first adjustment.

A fifth adjustment is obtained by adjusting stop screw **58** to the approximate position of Figure 5 (first adjustment above described). While holding cam arm **51** in the approximate position of Figure 5, the stop screw **55** is adjusted to contact the top edge of lever **29**.

A sixth adjustment may be obtained by employing a cam arm 51 wherein the longer end of Figure 5 is shortened to make both ends equal. With the cam arm held in an almost vertical position, the stop bolt 55 is adjusted so as to contact the top edge of lever **29**.

The right hand aperture **44** of lever **29** in Figure 5 is employed where a short lever arm at the right of pivot bolt 45 is required (and also in the fourth adjustment above described).

Because the proper functioning of the controlled flush depends on the valve being lifted the correct distance off its seat, it can readily be seen why the adjustment of the valve-lifting rod is of great importance. Therefore, the valve lifting rod **27** has a threaded top end **70** which is engaged through a selected aperture **28** in the end portion of lever **29**, and is provided with an adjustable nut 71 engaged on said threaded top end **70**.

In the form of the invention shown in Figures 7 and 8, a release lever **72** is pivoted at **73** to plate portion **42** adjacent cam arm **51'**. Lever **72** is formed with a depending arm **74** through which is threaded an adjustable abutment screw engageable with the edge of said cam arm. A float ball **75** is adjustably secured to lever **72** by a rod **76** and the adjustable fastening nuts **77** and **78**.

Float **75** is submerged when the tank is at its normal full level. As the water level drops to a height where it no longer supports float ball **75**, sufficient force is applied to cam arm **51'** by abutment screw **4** to release the cam arm and return same to its normal, or idle, position.

Nuts **77** and **78** are employed to adjust the float ball to set the desired amount of discharge and to lock rod **76** in place. A stop screw **79** is provided in plate portion **42** below lever **72** to halt the downward movement of release lever **72** when full flush is used. As is shown in Figure 7, a lower corner of cam arm **51'** is cut away at **80** to provide proper clearance when full flush is used.

While a specific embodiment of an improved valve operating attachment for a flush tank has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a flush tank, a valve seat in the bottom of the tank, a ball valve engageable on said seat and vertically movable therefrom, said tank being formed with an operating shaft aperture, a bracket member secured to the tank and extending through said aperture, a lever pivoted to said bracket member adjacent one end portion of said bracket member, means connecting said lever to said ball valve, an operating shaft journaled in the intermediate portion of said bracket member, a cam arm secured to said shaft and being engageable with said lever to rotate the ball valve responsive to rotation of said shaft, said lever being pivoted to the bracket member between said shaft and the ball valve and extending beneath said cam arm, said cam arm having opposed portions of different lengths, whereby the ball valve will be elevated by different amounts for different directions of rotation of said shaft, first adjustable stop means on the upper portion of said bracket member engageable with said cam arm to limit rotation thereof, said stop means comprising a stop screw threadedly engaged with said bracket member and located in the plane of the cam arm, second adjustable stop means on said one end portion of the bracket member engageable with the top edge of the lever to limit rotation of the lever, spring means biasing said lever into engagement with said cam arm, a float lever pivoted to said bracket member adjacent said cam arm, a depending float secured to said float lever, and release means on said float lever engageable with said cam arm responsive to downward

rotation of said float lever when said cam arm is in its ball valve-elevating position.

2. In a flush tank, a valve seat in the bottom of the tank, a ball valve engageable on said seat and vertically movable therefrom, said tank being formed with an operating shaft aperture, a bracket member secured to the tank and extending through said aperture, a lever pivoted to said bracket member adjacent one end portion of said bracket member, means connecting said lever to said ball valve, an operating shaft journaled in the intermediate portion of said bracket member, a cam arm secured to said shaft and being engageable with said lever to elevate the ball valve responsive to rotation of said shaft, said lever being pivoted to the bracket member between said shaft and the ball valve and extending beneath said cam arm, said cam arm having opposed portions of different lengths, whereby the ball valve will be elevated by different amounts for different directions of rotation of said shaft, adjustable stop means on the upper portion of said bracket member engageable with said cam arm to limit rotation thereof, said stop means comprising a stop screw threadedly engaged with said bracket member and located in the plane of the cam arm, spring means biasing said lever into engagement with said cam arm, a float lever pivoted to said bracket member adjacent said cam arm, a depending float secured to said float lever, and release means on said float lever engageable with said cam arm responsive to downward rotation of said float lever when said cam arm is in its ball valve-elevating position.

3. In a flush tank, a valve seat in the bottom of the tank, a ball valve engageable on said seat and vertically movable therefrom, a lever pivoted to said tank, means connecting said lever to said ball valve, an operating shaft journaled in said tank, a cam arm secured to said shaft and being engageable with said lever to elevate the ball valve responsive to rotation of said shaft, said cam arm having opposed portions of different lengths, whereby the ball valve will be elevated by different amounts for different directions of rotation of said shaft, a float lever pivoted to said tank adjacent said cam arm, a depending float secured to said float lever, and release means on said float lever engageable with said cam arm responsive to downward rotation of said float lever when said cam arm is in its ball valve-elevating position.

4. In a flush tank, a valve seat in the bottom of the tank, a ball valve engageable on said seat and vertically movable therefrom, a lever pivoted to said tank, means connecting said lever to said ball valve, said lever being rotatable upwardly to a first position elevating said ball valve sufficiently to provide full flush and being rotatable to a second position lower than said first position to provide limited flush, an operating shaft journaled in said tank, and a generally rectangular cam arm secured to said shaft and being engageable at its respective end edges with said lever to elevate the ball valve, the opposed portions of the cam arm being of different lengths, one of said portions being of sufficient length to elevate said lever to said first position when its end edge is in abutment with the lever, and the other portion being only of a length sufficient to elevate the lever to said second position when its end edge is in abutment with the lever.

References Cited in the file of this patent

UNITED STATES PATENTS

1,504,586	Thompson	Aug. 12, 1924
1,992,381	Lyons	Feb. 26, 1935
2,454,431	Crampton	Nov. 23, 1948
2,526,294	Stegeman	Oct. 17, 1950
2,645,780	Becker	July 21, 1953