

B. V. TROYANO
VALVE CONTROL MEANS

2 Sheets-Sheet 1

Fig 1

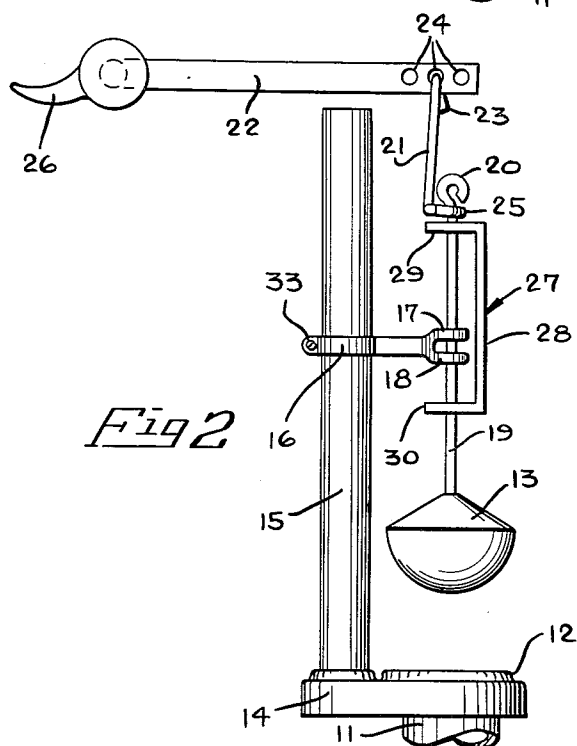
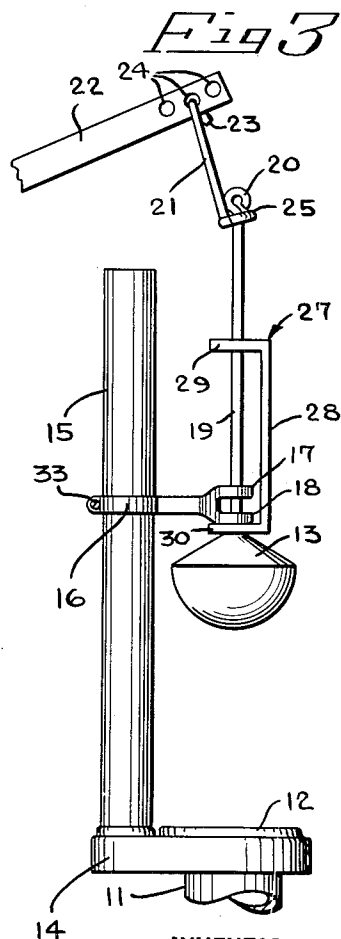


Fig 2



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B. V. TROYANO
VALVE CONTROL MEANS

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2 Sheets-Sheet 2

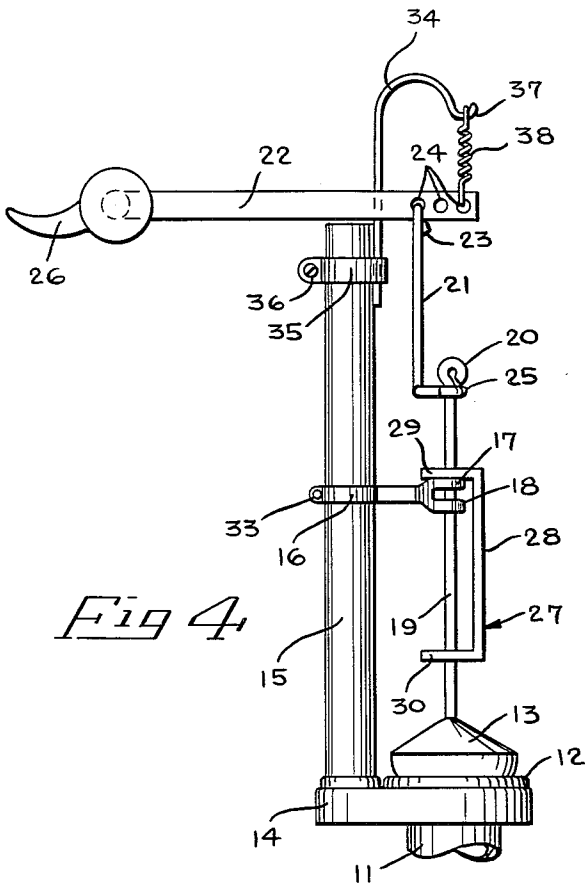


Fig 4

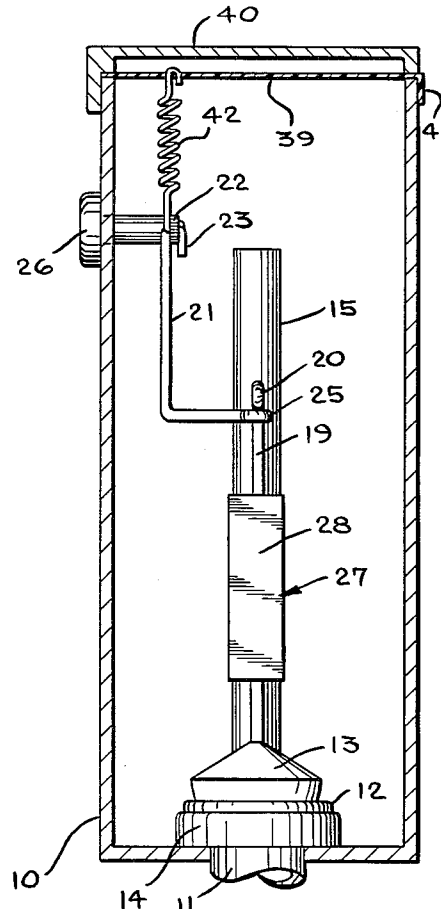


Fig 5

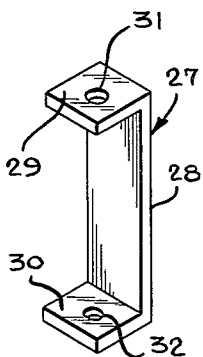


Fig 6

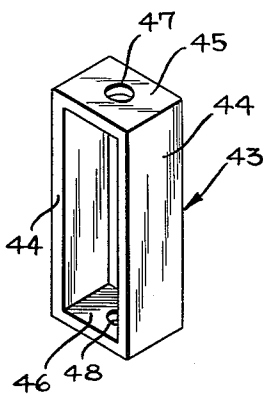


Fig 7

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VALVE CONTROL MEANS

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5 Claims. (Cl. 4—67)

This invention relates to valve control means for flush tanks for toilets.

During the flushing of conventional flush tanks, the level of the water contained therein must drop until it reaches the level of the valve seat of the flush outlet at the bottom of the tank before the buoyant valve drops into its seat, which latter action terminates the flushing operation. Thus, the entire contents of the tank is substantially discharged each time the tank handle is actuated. Such an arrangement suffers from the disadvantage in that means for regulating or controlling the amount of water discharged during a single flushing operation are not provided. In the course of a single flushing operation, approximately four gallons of water are used to flush the bowl each time the handle is actuated. Thus, an obvious waste of water occurs during the flushing operation in those instances where only a relatively small amount of water is required.

It is accordingly a principal object of the present invention to provide novel means for controlling the amount of water that can be flushed from a conventional water closet or flush tank for toilets, the means being effective to prematurely reset the buoyant valve at any point during the flushing operation.

It is another object of the present invention to provide means for controlling the amount of water that can be flushed from a conventional water closet to thereby eliminate overflowing bowls.

It is still another object of the present invention to provide means for controlling the amount of water that can be flushed from a conventional water closet which will conserve water by eliminating unnecessary waste thereof, to lower water bills, which means can be readily and easily installed without the aid of a plumber.

It is still another object of the present invention to provide means for controlling the amount of water that can be flushed from a conventional water closet which is adapted to be easily and readily employed with most types of water closet fixtures currently in use.

Other objects of the present invention are to provide means for controlling the amount of water that can be flushed from conventional water closets, bearing the above objects in mind, which are of simple construction, inexpensive to manufacture, have a minimum number of parts, are easy to assemble and use and efficient in operation.

For other objects and a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a fragmentary front elevational view, shown broken away, of a water closet for toilets and showing the invention in operative use, the buoyant valve being shown in the closed position;

Fig. 2 is a view similar to Fig. 1 but showing the buoyant valve in the raised, open position during an intermediate stage of the flushing action;

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Fig. 3 is a view similar to Fig. 2 but showing the buoyant valve in its extreme uppermost position;

Fig. 4 is a view similar to Fig. 1 but showing a modified form of the present invention;

Fig. 5 is a vertical section through the water closet looking from the right of Fig. 4 and showing a still further modified form of the invention;

Fig. 6 is a perspective view of one of the parts of the invention; and

Fig. 7 is a perspective view of a modified form of the part of Fig. 6.

Referring now more in detail to the drawing, 10 represents a conventional water closet or flush tank having a discharge or flushing outlet 11, substantially as illustrated. A seat 12 for buoyant valve 13 is provided at the upper end of the outlet 11 and includes a lateral extension 14 which mounts the lower end of the vertical overflow pipe 15.

A guide bracket 16 is suitably mounted on the pipe 15, the outer end of said bracket being yoke-shaped whereby to provide a pair of vertically aligned bearing members 17 and 18 through which slidably passes the vertically disposed valve stem 19. Thus, the bearing members 17 and 18 will retain the stem 19 in a vertical alignment with the center of the seat 12. The upper end of the buoyant valve 13 is provided with the usual internally threaded opening into which is screwed the externally threaded lower end of the stem 19, whereby when the valve stem 19 is raised, the buoyant valve 13 will be raised therewith. The upper end of the stem 19 is formed with the eye or stop 20. A wire link 21 is raised by the usual lever or valve trip arm 22, the upper end 23 of the link 21 being hook-shaped and inserted into a selected one of the longitudinally spaced openings 24 provided in the end of lever 22 whereby to connect the link 21 and lever 22. The lower end of link 21 is formed with a lateral eye 25 which slidably receives therethrough the valve stem 19, with the eye 25 being adapted to abut the eye 20 (Fig. 3) whereby to raise the stem 19 and buoyant valve 13.

The handle 26 is rotatably mounted in the tank 10 and is connected to the other end of the lever 22 whereby to actuate the same.

A follower indicated generally at 27 of plastic or other suitable material is provided and includes a vertical plate 28 integrally formed at each end with the horizontal end plates 29 and 30. As shown in Fig. 6, the end plates 29 and 30 are provided with the vertically aligned openings 31 and 32, respectively, through which passes the valve stem 19. In operation, to flush the tank 10 the handle 26 is rotated in a counterclockwise direction to raise lever 22 and thereby link 21 and stem 19 which raises the buoyant valve 13 from seat 12. The intermediate stages of the flushing operation are shown in Figs. 1 through 3. Thus actuated, the device will operate in the usual manner, with the buoyant valve 13 closing the valve seat 12 when substantially the entire contents of the tank 10 has escaped through the outlet 11.

It will be noted that the follower 27 during the regular flushing operation is raised (Fig. 3) when the top of the buoyant valve 13 contacts the lower end wall 30 of the follower 27. When it is desired to terminate the flushing operation at any convenient point, the handle 26 is rotated in a clockwise direction, which action lowers the lever 22 and link 21. The lateral loop 25 will then contact the upper end 29 of follower 27 to force the latter downwardly. The lower end 30 of the follower 27 will then force the buoyant valve 13 from the position of Fig. 3. This action moves the buoyant valve 13 into the vortex of the escaping water, whereupon the valve is drawn down into the seat 12. Thus the buoyant valve 13 is pre-

turely returned to its seat 12 at any convenient point, thus controlling the quantity of water flushed in accordance with the actual requirements.

The follower 27 is formed of suitable plastic, for example Lucite, Plexiglas or Bakelite or may be formed of any suitable metal. It will be noted that by unscrewing the stem 19 from the buoyant valve 13, the follower 27 may be easily and readily incorporated into the flushing apparatus without the assistance of a plumber. The bracket 16 may be adjusted vertically on pipe 15 by means of the screw 33, readily adapted to all sizes of water closets or flush tanks.

Referring now particularly to Fig. 4, there is shown a modified form of the invention wherein a hook-shaped wire 34 is secured to the upper end of the overflow pipe 15 in a plurality of vertically adjustable positions by means of a clamp 35 and screw 36, the wire 34 terminating in a hook 37. A spring 38 is suspended from the hook 37, the lower end of the spring engaging one of the openings 24 not occupied by the hook 23 of link 21. The spring 38 holds the lever 22 in a substantially horizontal position so that the loop 25 of link 21 normally remains a predetermined distance above the stationary bracket 16.

In other respects the form of the invention shown in Fig. 4 is the same as that shown in Figs. 1 through 3 and like reference numerals identify like parts throughout the several views.

Referring now particularly to Fig. 5, there is shown a still further modified form of the present invention wherein a transverse plastic strip 39 is supported intermediate the upper edges of the tank 10 and the tank cover 40, the innermost end of the transverse strip 39 being integrally formed with a flange 41 adapted to lie flush with the outer face of the tank. A spring 42 is suspended from the strip 39 in vertical alignment with the link 21, the lower end of the spring 42 engaging one of the openings 24 of lever 22 for the same purpose as the spring 38 of the previous form.

In other respects the form of the invention shown in Fig. 5 is the same as that shown in Figs. 1 through 3, and like reference numerals identify like parts throughout the several views.

The springs 38 and 42 serve to retain the loop 25 in contact with the loop 20 whereupon by depression of handle 26 lost motion will be eliminated and immediate raising of the buoyant valve 13 will be effected, and overcomes premature seating of the valve by link 21 and lever 22, which, if of excessive weight would force the follower against the valve.

Referring now particularly to Fig. 7, there is shown a modified form of follower indicated generally at 43 and adapted to be used with the invention in the same manner as the follower 27. The follower 43 includes a pair of vertical walls 44 integrally formed at their upper ends with a top wall 45 and at their lower ends with a bottom wall 46. The top and bottom walls 45 and 46 are provided with the vertically aligned openings 47 and 48, respectively, which receive therethrough the stem 19. The follower 43 serves the same purpose as the follower 27 with the additional advantage that the end walls are connected by two vertical walls instead of one providing greater strength.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. In a flush tank having a discharge outlet, valve means for controlling the discharge of water through said outlet, said means including a valve stem having its upper end provided with a stop, the improvement comprising manual means for moving the valve and its stem between the valve open and closed positions at will, said manual means including a pivoted lever and a depending link carried at one end thereby, said link having an offset lower end slidably mounted on the valve stem below said stop, said manual means being adapted to raise said stem towards its valve-open position by cooperation of said offset portion with said stop for normal flushing operation, and a follower slidably mounted on said stem having a side member and an upper and a lower end connected thereto, said upper end being adapted to abut said offset portion and the lower end being adapted to abut the valve and normally rest thereon, said follower being adapted to prematurely close the open valve by pressure engagement between said offset portion, said follower and the valve to thereby forcibly move the valve and its stem to the valve-closed position.

2. In a tank according to claim 1, the improvement including a stationary guide member slidably receiving said stem therethrough, the upper end of said follower resting on said stationary guide member and said offset portion resting on the upper end of said follower when said lever is in the inoperative valve-closed position, said stop being disposed directly above said offset portion.

3. The improvement according to claim 1, wherein said follower comprises a pair of substantially vertical, laterally spaced side portions, a horizontal upper end integrally formed at the upper ends of said vertical portions and a second horizontal portion integrally formed at the lower ends of said vertical portions, said first and second horizontal portions having vertically aligned openings there-through slidably receiving said stem.

4. The improvement according to claim 1, including an overhanging bracket, mounting means for securing said bracket in a plurality of vertically adjustable positions, and a spring suspended from said bracket, said spring being connected to the end of said lever and adapted to retain said lever in a substantially horizontal position with said offset portion displaced from the upper end of said follower in contact with said stop, said adjustably mounting means comprising a strap surrounding the overflow pipe of the tank, screw means securing the ends of said strap together, said bracket at the lower end thereof being secured intermediate said strap and the overflow pipe.

5. The improvement according to claim 1, including a transverse member at the top of the tank, and a spring suspended from said transverse member, the lower end of said spring being connected to said lever and adapted to retain said lever in a substantially horizontal position with said offset portion vertically spaced from the upper end of said follower in contact with said stop.

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