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DOUBLE FLUSH VALVE FOR TOILET TANK

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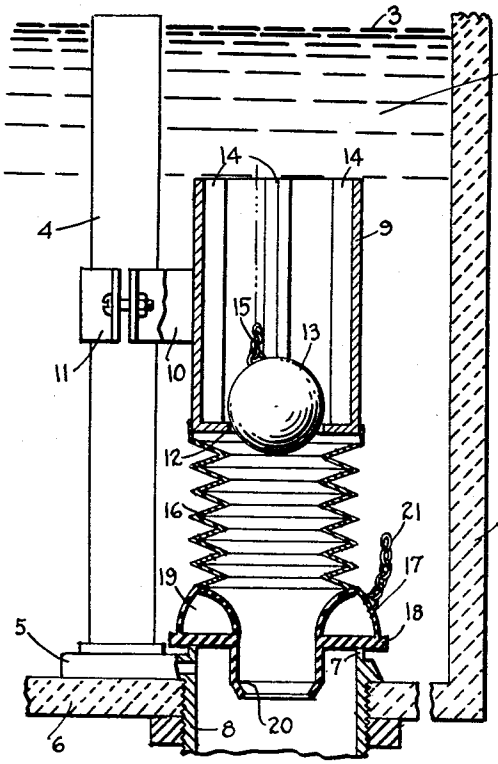


FIG 1

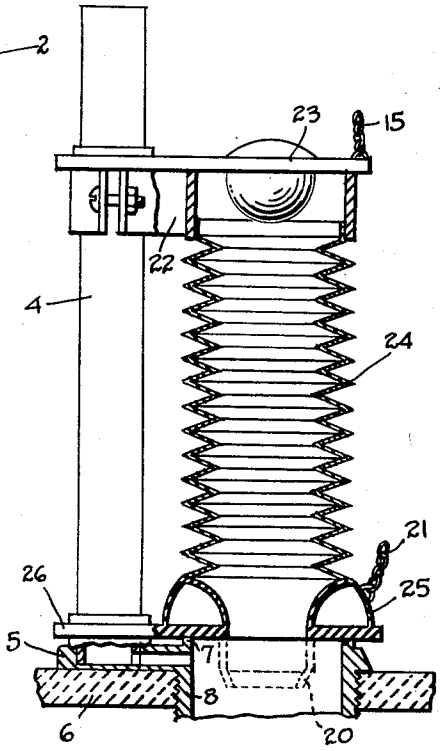
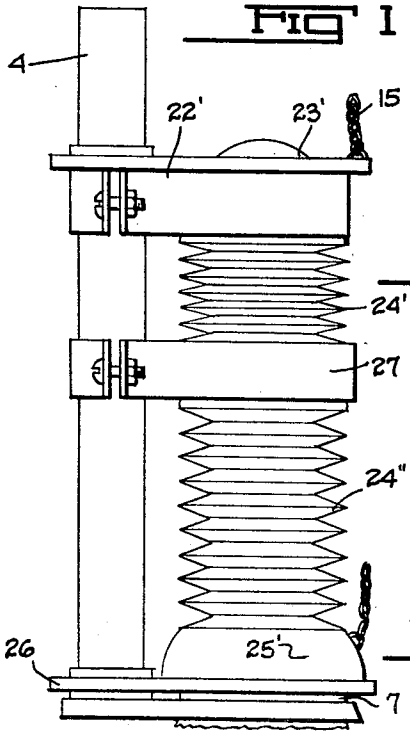


FIG 2



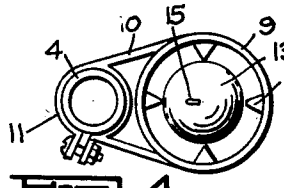
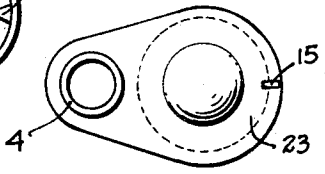


FIG 4

FIG 5



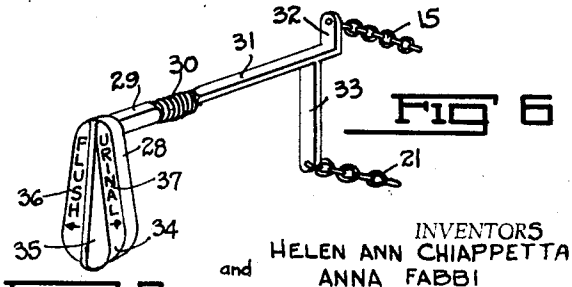


FIG 6

FIG 3

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DOUBLE FLUSH VALVE FOR TOILET TANK

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4 Claims. (Cl. 4—57)

This invention relates in general to flush valves for toilet flush tanks and in particular to a double valve for releasing all or a portion of the water in the flush tank.

With present day construction of flush tanks it is possible only to release the entire contents of the tank even though when the toilet is used for urinating purposes only a small portion of the entire water supply in the flush tank is necessary to flush the toilet.

Not only is the present system of flushing wasteful of water, it throws an unnecessary burden on sewerage systems, particularly where septic tanks are in use.

We are aware that the prior art shows other systems of double flush valves but insofar as we are aware none of them have been so designed and constructed that they can be considered simple in construction or in manner of installation. With the present day trend toward "do it yourself," simplicity is an important factor in the successful commercializing of a product. It must be easy to install with a minimum of alteration to the existing structure.

With the above in mind it is the first object of our invention to provide a double flush system for toilet flush tanks in which a pair of valves are carried by the overflow pipe and selectively operated to release all or a portion of the water in the flush tank.

It is a second object of our invention to support the double valves on the existing overflow pipe in the flush tank.

The third object of our invention is to provide a water discharge duct having a flexible portion with a valve at both ends thereof whereby the flexible portion and the lower valve can be unseated for complete flushing and the upper valve can be unseated for urinal flushing.

And the fourth object of our invention is to provide means for adjusting the position of the upper valve for varying the amount of water discharged.

Fifth; to provide one form of our invention in which the duct has a combined upper rigid portion and a flexible lower portion with a valve in the upper portion and a valve in the lower end of the flexible portion and a clamp on the upper portion supporting same for adjustable relation to the overflow pipe and the water level.

Sixth; to provide an alternate form in which a flap type valve is used on an upper rigid seat carried by the overflow pipe, and a long bellows type flexible duct extending to the lower seat with the lower end of the bellows having a valve formed integrally therewith.

Seventh; to provide another alternate form in which the long bellows is supported to the overflow pipe at a point intermediate its ends and the upper end of the bellows adjustably carried by the overflow pipe.

Eighth; to provide a flushing handle and valve control mechanism operable in one direction for complete emptying of the water in the tank and operable in the opposite direction for partial emptying of the tank, the handle being weighted to facilitate its return to normal position after each flushing.

These and other objects and advantages as well as the

construction and operation of our invention in its various forms will be apparent by reference to the following description in connection with the accompanying drawing in which:

Fig. 1 is a side vertical view partly in section and partly in elevation showing one form of our invention employing a combination rigid and flexible duct with a ball valve in the rigid duct.

Fig. 2 is a similar view of another form of the invention in which the full length flexible duct is adjustably supported at its upper end to the overflow pipe.

Fig. 3 is another similar view wherein the flexible duct is rigidly supported intermediate its ends and adjustably supported at its upper end.

Fig. 4 is a top plan view of the form of our invention shown in Fig. 1.

Fig. 5 is a top plan view of the form of our invention shown in Figs. 2 and 3.

Fig. 6 is an isometric view of the flush valve control handle and shaft.

Referring now to the drawing by numerals of reference, 1 designates a portion of the flush tank in which water 2 is carried at a normal level indicated by line 3.

The conventional overflow pipe 4 is suitably carried in fitting 5 at the bottom 6 of the flush tank said fitting having valve seat 7 and discharge extension 8 to the toilet fixture.

In the form of our invention shown in Figs. 1 and 4 a rigid valve cage or supporting member 9 has bracket extension 10 suitably held to overflow pipe 4 by clamp 11. The cage may be adjusted vertically on pipe 4 for release of any desired amount of water.

The lower end of cage 9 forms a valve seat 12 on which ball valve 13 may be seated, internal ribs 14 guiding the ball in its vertical movement. A chain 15 or other suitable connecting mechanism extends from the ball to the control handle as will be hereinafter described.

Secured to the lower end of cage 9 is a flexible or bellows type conduit or duct 16 the lower end of which has a valve 17 formed with flat valve face 18 and annular air chamber 19 to provide buoyancy when released from its seat. Hollow guide extension 20 projects from the bottom of the valve 17 for directing same into position on the valve seat 7. A chain or control linkage 21 connects to one side of the valve 17 and to control handle as hereinafter described.

In the alternate form of our invention shown in Fig. 2 the upper valve supporting member 22 is adjustably carried by the overflow pipe 4 and a flat type valve 23 similar to that now marketed under the trade name "Corky" may be used, the valve and valve supporting member being adjustable in relation to the water level in the flush tank for releasing any desired amount of water.

A long flexible bellows type duct 24 depends from upper valve supporting member 22 and carries at its lower end a valve similar to that shown in Fig. 1; or as shown in Fig. 2, the valve 25 may have extension 26 carried by overflow pipe 4, the hollow guide extension 20 being used or not as desired.

In the modification shown in Fig. 3, the bellows may be supported at a point intermediate its ends, the support 27 being fixed to overflow pipe 4 and generally not requiring adjustment after its initial installation. This support separates the flexible tube into parts 24' and 24''. The upper part of the flexible tube 24'' is secured to valve supporting member 22' carrying upper valve 23'. With this arrangement, once bracket 27 is fixed it is not changed but upper valve supporting member 22' may be adjusted until the desired amount of water is obtained for suitable urine flushing purposes. Low-

er valve 25' may be similar to the valve 17 of Fig. 1 or valve 25 of Fig. 2.

The flushing or control handle 28 has the usual square shank 29 and threaded portion 30 on its stem 31, the end of the stem terminating in oppositely disposed transverse projections 32 and 33.

Transverse projection 32 receives one end of link or chain 15, the other end of which connects in any suitable manner to ball valve 13 in Fig. 1 or flap valve 23 or 23' in Figs. 2 or 3. Control linkage or chain 21 is suitably connected to projection 33 and to the lower valve 17 in Fig. 1, or valve 25 or 25' of Fig. 2 or 3.

The handle 28 may be weighted at bottom 34 to facilitate its gravitation to normal position and a central web 35 aids in its manual movement in either direction, suitable indicia and arrows 36 and 37 clarifying its direction of movement for desired flushing functions.

The operation of all the forms of our invention is simple. Movement of the handle toward "Urinal" direction will raise ball valve 13 or valve 23 or 23' off its seat and only the water above valve seat or cage 9, or supporting members 22—22' will be released, the quantity of water being determined by the adjusted position of the cage or upper valve supports and being sufficient to flush the toilet when used only for urinating purposes. The lower valve will not be disturbed and the water will pass through flexible duct 16 or duct 24—24' and through hollow guide extension 20. The valve will remain unseated until the water has been discharged to its proper level at which time the valve will seat itself and the flush tank will refill in the usual and normal manner.

When desiring to flush with the entire contents of the flush tank the handle is moved in the direction of the arrow marked "Flush" and by means of linkage 21 connected between projection 33 and the lower valve 17 of Fig. 1 or valve 25 or 25' of Fig. 2 or 3, said valve is raised off its seat, the air in the valve facilitating its buoyancy to remain off the valve seat until all the water in the tank has been discharged at which time the valve will reseat itself.

In the form shown in Fig. 1 the valve is free floating, the flexible bellows permitting its complete removal from the valve seat. It will be guided back to its seat by the hollow guide extension 20, by gravitation, and by the pull of the water, as well as by its inherent form.

In the forms shown in Figs. 2 and 3, the lower valve 25—25' may be captive similar to the "Corky" valve so that it will not need a guide but will always return to its original position on the valve seat.

It will be seen that with any of the forms shown, we have devised a simple and efficient double valve for flush toilets which can be quickly and easily installed in existing flush tanks with no alterations or modifications of the tank and which will permit partial or complete emptying of the tank as occasion demands.

Obviously, changes in form, proportion, and details of construction may be resorted to without departing from the spirit of our invention and we reserve all rights to such changes as come within the scope of these specifications and the claims which follow.

What we claim as new and desire to secure by Letters Patent is:

1. A double flush valve assembly for toilet flush tanks, in combination with the overflow pipe and valve seat of the flush tank, a valve duct carried by the overflow pipe, a valve on the seat in the flush tank, and a flexible portion in the valve duct secured to said valve, a second valve seat in the duct above the first mentioned valve, a valve on said second valve seat, and means for independently operating either of the two valves, said means including means deforming the flexible portion in the valve duct when the valve on the seat in the flush tank is unseated.

2. The structure as specified in claim 1, and a fixed duct support intermediate the ends of the flexible portion of the valve duct separating said valve duct into an upper portion and a lower portion, the lower portion being deformable upon actuation of the valve duct deforming means, and the upper portion being extendible for adjustment of the water level at the upper end of the valve duct.

3. A double flush valve assembly for toilet flush tanks, in combination with the overflow pipe and valve seat of the flush tank, an elongated bellows valve duct, an adjustable mounting for the upper end of said bellows valve duct carried by the overflow pipe, a valve seat at the upper end of said bellows valve duct, a valve on said seat, a valve carried by the lower end of said bellows valve duct and received by said first mentioned valve seat, a passage through said last mentioned valve, a support secured to the bellows valve duct intermediate the ends thereof, said support being adjustably carried by the overflow pipe for longitudinal adjustment of the bellows valve duct and adjustment of the distance between the two valve seats, and means for independently operating either of the valves.

4. A double flush valve assembly for toilet flush tanks, in combination with the overflow pipe and the valve seat adjacent the bottom of the flush tank, a valve on the seat in the flush tank, an upper valve supporting member adjustably carried by the overflow pipe, a hollow bellows connecting member between the valve and the upper valve supporting member forming a continuous fluid passage from the valve seat to the upper valve supporting member, a second valve seat in the upper valve supporting member, a valve on said second valve seat, and means for independently operating either of the two valves, said hollow bellows providing means for longitudinal adjustment between the two valve seats, the hollow bellows being deformable upon actuation of the first mentioned valve.

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