Dec. 27, 1955 J. E. IRION 2,728,087

CONTROL DEVICE FOR FLUSH TANK VALVES

Filed Feb. 28, 1955

Fig. 1

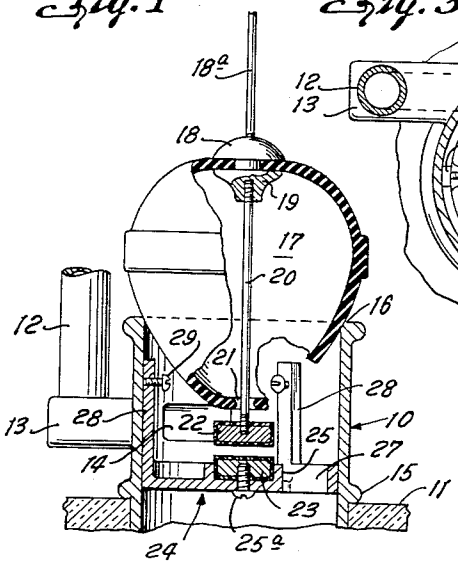


Fig. 3

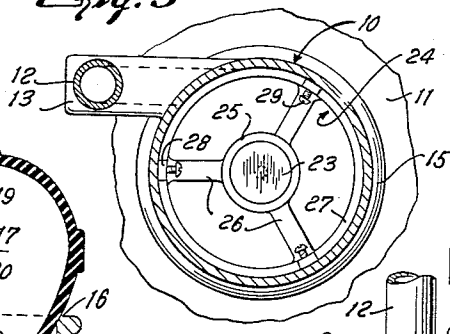


Fig. 2

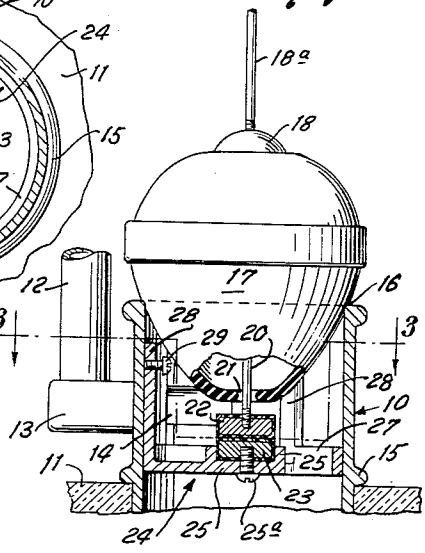


Fig. 4

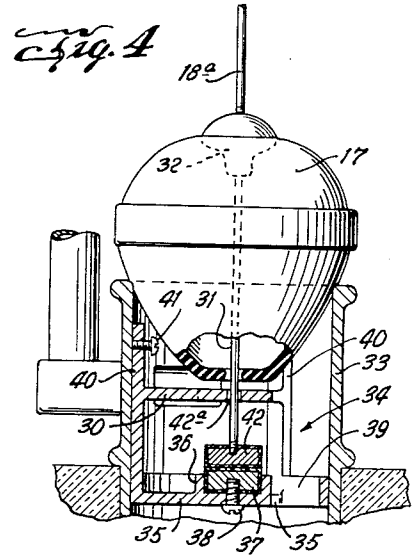


Fig. 5

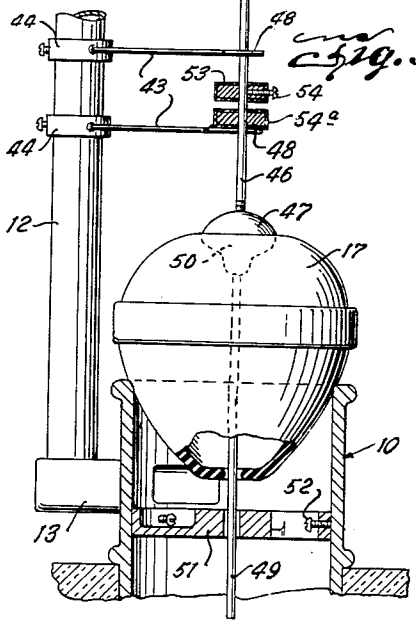
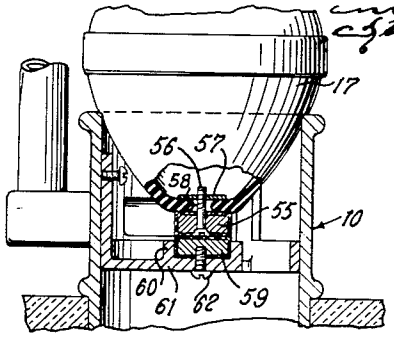


Fig. 6



Jim E. Irion
INVENTOR

BY

ATTORNEY

United States Patent Office 2,728,087 Patented Dec. 27, 1955

2,728,087

CONTROL DEVICE FOR FLUSH TANK VALVES

Jim E. Irion, Dallas, Tex.

Application February 28, 1955, Serial No. 490,720

8 Claims. (Cl. 4—57)

This invention relates to water toilet flush tanks and more particularly to improved means for controlling the water outlet valve for these flush tanks.

Faulty seating of water outlet valves for flush tanks has been the source of annoyance for many years and while numerous devices in the form of various types of guides for these valves have been advanced and produced, the problem has not been satisfactorily solved for the reason that, for the most part, the proposed guides have, as far as is known, been devoid of any medium by which the usual rubber ball type valve is brought compressedly into engagement with its seat to thus positively insure against leakage of water past the valve when seated.

It is the principal object of the present invention to positively meet and overcome the conditions sought to be corrected by precedent efforts through the provision of means, in addition to guides, for exerting a force beyond that imposed by the outflowing water, tending to bias the ball valve against its seat.

Another object of the invention is to provide a positive valve seating device for water toilet flush tanks including stationary magnets employed individually or in pairs suitably located in relation to the valve and its seat to exert a force greater than the head of water in the tank for biasing the valve against its seat.

Still another object of the invention is to provide valve seating magnets coated with a material immune to corrosion, rust or oxidation for the protection of the magnets which are subject to oxidation when submerged in water for long periods of time.

Other objects will appear as the description proceeds when considered with the annexed drawing, wherein:

Figure 1 shows the preferred form of the invention in vertical section showing a rubber ball valve in its normally closed position.

Figure 2 is a similar view showing the valve compressed against its seat by the invention.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

Figure 4 is a slightly modified form of the invention in vertical section.

Figure 5 is still another modified form of the invention, and

Figure 6 is yet another modification of the invention.

Continuing with a more detailed description of the drawing, reference is made primarily to Figures 1, 2 and 3 showing the preferred form of the invention. In these figures, reference numeral **10** denotes generally the water outlet pipe of a conventional commode flush tank shown fragmentarily and indicated by reference numeral **11**. While there are many different forms of water outlet pipes, valves and guides, they are generally of the same principle and in the present case, a water overflow pipe **12** is supported in vertical parallelism with the outlet pipe **10** by means of a lateral hollow bracket **13** by means of which overflow water passes from the overflow pipe **12** into the water outlet pipe **10** through the port **14** therein.

The water outlet pipe **10** has an annular shoulder **15** which bears against the bottom of the tank **11** about the opening therein through which the pipe **10** extends for connection with a waste pipe, not shown. The upper end of the pipe **10** provides a seat **16** for the more or less conventional rubber ball valve **17**.

In the form of the invention shown in Figures 1 to 3, the ball valve **17** has an outer integral boss **18** on its top into which is threaded the lower end of a valve guide rod **18***a* whose upper portion slides vertically through vertically spaced brackets attached to and extending laterally from the water overflow pipe **12**, thus to cause the valve **17** to move perpendicularly with respect to the plane of its seat **16**. The brackets are not shown in these figures but are revealed in the modification of the invention illustrated in Figure 5 and which will be described in sequence.

The ball valve **17** is further provided with an internal integral boss **19** into which is threaded the upper end of a rod **20**. The rod **20** extends downwardly and out of the valve through an opening **21** therein and carries on its lower end a permanent magnet **22**.

Below the magnet **22** is disposed a like magnet **23**, the north pole of the latter magnet being juxtaposed with the south pole of the companion magnet **22** for attraction.

To support the magnet **23**, a skeleton frame is provided and generally indicated by reference numeral **24**. This frame is preferably of cast metal and consists of a spider composed of a central receptacle **25** in which the magnet **23** is held by a screw **25***a* and which is supported by radial arms **26** formed integrally with a ring **27** whose outer diameter is equal to or smaller than the inner diameter of the water outlet pipe **10** in which it is suspended by means of vertical, annularly spaced arms **28** having set screws **29** threaded through apertures in their upper ends. These set screws bear against the inner wall surface of the outlet pipe **10** holding the frame **24** in a position to dispose the magnet **23** carried thereby in spaced relationship with the magnet **22** when the valve **17** is seated.

The relative spacing of the magnets **22** and **23** may vary but in any case, their spacing should be sufficiently close, after seating of the valve **17**, to cause the upper magnet **22** to be attracted to the lower magnet **23**, thus drawing the valve downwardly a distance slightly further than it would be depressed by the weight of water thereabove which is frequently insufficient for adequate seating of the valve, especially when the valve is not centrally disposed on its seat.

Referring now to Figure 4 showing a modification of the invention, the same reference numerals are employed to designate corresponding parts in the preceding figures relating to conventional elements since these are identical. However, the elements of the modification, while similar in many respects to the preferred form, there is provided a guide **30** for a rod **31** whose upper end is threaded into an internal integral boss **32** in the ball valve **17** which latter is suspended by the conventional guide rod **18***a* in the manner described for the preferred form of the invention.

Within the water outlet pipe **33**, a skeleton frame **34** is provided, consisting of a spider formed of radial arms **35** supporting a receptacle **36** for a lower magnet **37** which is held in position by a screw **38** threaded upwardly through an aperture in the receptacle **36** and into a threaded opening in the magnet. The radial arms **35** of the frame **34** are joined to a ring **39** having upstanding arms **40** in annularly spaced relationship thereon. Set screws **41** threaded through apertures in the upper ends of the arms **40** bear against the inner wall surfaces of the pipe **33** to hold the frame **34** in vertically adjusted position in the outlet pipe to correspondingly adjust the mag-

net 37 in relation to a similar magnet 42, supported on the lower end of the rod 31, previously referred to.

The sole difference between the modification of the invention shown in Figure 4 and the preferred form thereof resides in the provision of the guide spider 30 which is a duplication of the lower spider with the exception that instead of a magnet receptacle 36, the spider 30 has an aperture 42*a* in its center through which passes the lower rod 31 to serve as a guide to insure proper register of the magnet 42 with the stationary magnet 37. In this manner, the valve 17 is brought compressedly against its seat atop the water outlet pipe 33.

In the modification shown in Figure 5, the same conventional elements are illustrated, i. e., the water outlet pipe 10, overflow pipe 12 and the hollow bracket 13 through which water passes from the overflow into the outlet pipe. However, in this figure is shown guide brackets 43 of conventional design and secured to the overflow pipe by collars 44 and set screws 45. A primary guide rod 46 is threaded at its lower end into an integral boss 47 formed on the top of the ball valve 17. The rod extends upwardly through loops 48 formed at the outer ends of the brackets 43, thus to guide the valve 12 vertically towards its seat.

The guiding effect of the rod 46 by the brackets 43 has been found inadequate for properly seating the valve 17, hence a secondary guide rod 49 is threaded at its upper end into an integral internal boss 50 in axial alignment with the upper guide rod 46. A spider 51 is secured by set screws 52 within the outlet pipe 10 and has a central opening 53 through which the secondary guide rod 49 reciprocates as the valve 17 moves in relation to its seat. By virtue of both upper and lower guiding means as set forth, the valve is centered in relation to its seat.

However, notwithstanding the accuracy in seating the valve according to the foregoing, the valve may permit some by-passage of water, particularly if some corrosion or mineral deposits accumulate on and adjacent the valve seat. It is found to be highly effective against leakage to compress the valve on its seat. This is accomplished by means of a permanent magnet 53 which is bored to receive the primary guide rod 46 and is secured thereto by means of a set screw 54 in such position that it will be spaced slightly upwardly from a second magnet 54*a* which is affixed to the lower guide bracket 43 when the valve 17 is normally seated in the manner shown in Figure 5. Simultaneous with the seating of the valve 17, the magnet 53 will be attracted to the second magnet 54*a* and will, in effect, urge the valve compressedly against its seat thereby obviating any by-passage of water.

In the modification shown in Figure 6, the rubber valve 17 is shown seated on the water outlet pipe 10 in the conventional manner but is compressed against its seat by means of a magnet 55, held by a screw 56 to a plate 57 which latter is forced upwardly into the rubber valve by expanding the opening 58 in the bottom thereof.

Cooperating with the valve magnet 55 is a stationary magnet 59 which is held in a receptacle 60 of a spider 61 by means of a screw 62 which is extended through an opening in the bottom of the receptacle 60 and threaded into a threaded aperture in the magnet 59.

It will be observed in Figure 6 that the valve 17 is shown as having been drawn slightly downwardly below its normal position on its seat. This is due to the fact that the magnet support or spider 61 is set within the outlet pipe 53 to dispose the magnet 59 slightly below the magnet 55 when the valve 17 is normally seated, so that it will be moved further into its seat when its magnet 55 enters the magnetic field of the stationary magnet 59.

In order that the magnets in any of the several forms of the invention will not be exposed to oxidation, they are coated in any suitable manner with a plastic material which will withstand the deteriorating effects of water.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In a water flush tank, the combination with the water outlet pipe and valve therefor of means for seating said valve, comprising a rod axially disposed in and stationary with said valve and extending into said water outlet pipe, a first permanent magnet carried by the lower end of said guide rod, a second permanent magnet in said water outlet pipe and means supporting said second magnet at a point below said first magnet in normally seated position of said valve but within the magnetic field of said first magnet to attract the same to compress said valve on its seat.

2. In a water flush tank, the combination with the water outlet pipe and valve of said tank of a guide for said valve, a permanent magnet movable with said valve and means stationary in the path of movement of said valve and disposed in spaced relation to said magnet in normally seated position of said valve effective to attract said magnet and compress said valve on its seat.

3. In a water flush tank having a valve and water outlet pipe, means for compressedly seating said valve on said water outlet pipe comprising a magnet carried by said valve and means disposed in the path of vertical displacement of said valve and attractable by said magnet to force said valve against its seat.

4. The structure of claim 3, and means for adjusting said magnet attracting means to a position in spaced relation to said magnet in normally seated position of said valve but within the magnetic influence of said magnet to cause said valve to more firmly engage its seat when said magnet and attracting means are in contact.

5. In a water flush tank having a valve and an outlet pipe, a guide secured to said valve for centering said valve in relation to its seat on said outlet pipe, a frame supporting a spider in said outlet pipe below the top thereof, ferrous means supported by said spider in axial alignment with said valve guide, a permanent magnet carried by said valve guide and movable in closed position of said valve to a position spaced from said ferrous means whereby magnetic attraction between said magnet and ferrous means will cause said valve to be drawn tightly against its seat.

6. In a water flush tank having a valve and an outlet pipe, a guide secured by said valve for centering said valve in relation to its seat on said outlet pipe, a frame supporting a spider in said outlet pipe below the top thereof, first magnet supported by said spider in axial alignment with said valve guide, a second magnet carried by said valve guide and movable in closed position of said valve to a position spaced from said first magnet whereby magnetic attraction between said second magnet and first magnet will cause said valve to be drawn tightly against its seat.

7. The structure of claim 6, and means for vertically moving said frame to adjust the spacing of said first magnet in relation to said second magnet.

8. In a toilet flush tank having a water outlet pipe and a vertically movable rubber valve adapted to seat thereon, a guide rod extending axially through said valve and to which said valve is attached, a first magnet secured for vertical adjustment in and below the top of said outlet pipe and a second magnet secured to said guide rod below said valve and adapted for disposition in spaced relation to said first magnet when said valve is seated, said magnets being influenced together to draw said valve firmly against its seat.

No references cited.