Oct. 6, 1959 L. C. HARRIS 2,907,050

MAGNETIC FLUSH VALVE

Filed May 14, 1956

Fig. 1

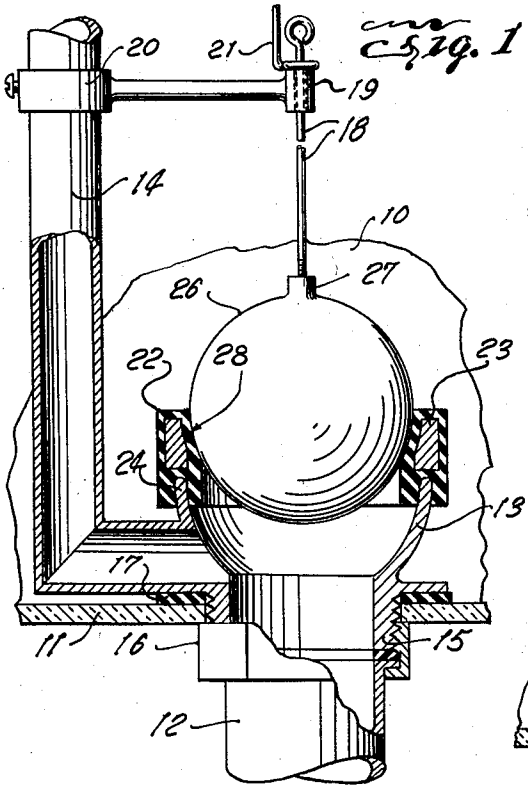


Fig. 2

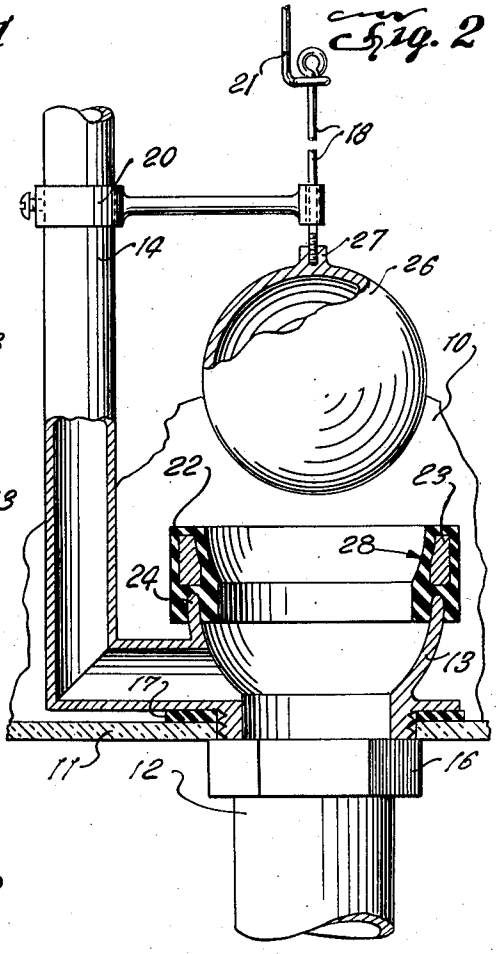
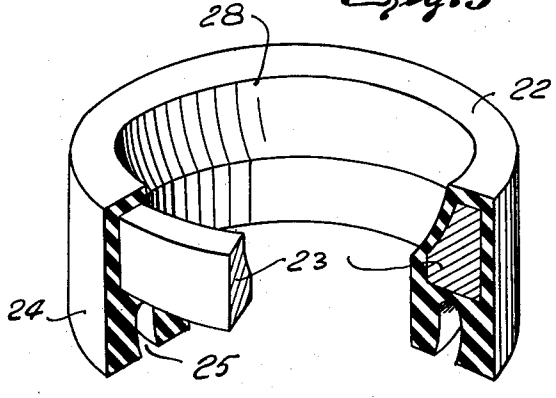


Fig. 3



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MAGNETIC FLUSH VALVE

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1 Claim. (Cl. 4—56)

This invention relates to flush valves, especially of the type used in water closets.

The principal object of the invention is to obviate the constant annoyance and waste caused by water by-passing the outlet valve in toilet flush tanks. Leakage of water from these tanks is usually due to improper seating of the conventional rubber ball valve, especially after it has become worn or is softened by long submergence in water, resulting in its failure to adequately close the outlet opening. The invention seeks to provide a medium compelling a spherical ball to bear compressedly on its seat and thus preclude any possibility of leakage.

Another object of the invention is to provide a flush tank valve composed of a spherical valve of ferrous material which is attractable by a magnet or magnets embedded in an annular seat of compressible or resilient material such as natural or synthetic rubber, so formed as to detachably conform to the open end of the water outlet pipe of a toilet commode tank, with provision for holding the ball valve within limits in its vertical travel perpendicular to the seat so that it will be attracted to and bear compressedly on the seat under the influence of the magnet when the flush water has passed from the tank.

Another object of the invention is to provide a valve seating device for toilet flush tanks which is inexpensive, highly efficient in operation and easily installed in all standard makes of flush tanks.

In the drawing:

Fig. 1 is a fragmentary view of a toilet flush tank with parts in section, showing the improved flush valve installed therein.

Fig. 2 is a view similar to Fig. 1 but showing unseated position of the valve, and

Fig. 3 is a detail perspective view of the removable valve seat shown broken away to reveal the ring magnet embedded in the seat.

The use of stationary magnets for aiding in the seating of various types of valves is not broadly new but the invention is designed to successfully overcome the disadvantages of these earlier attempts to magnetically influence a valve toward its seat. Among these disadvantages is the cost of production, complexities of installation which latter gives rise to operational failures since installation is usually left to the householder who lacks the skill of the professional plumber. It will become evident presently that the invention requires little skill to install properly since it is highly improbable that the ball and seat can be installed other than as intended.

Continuing with a more detailed description of the drawing, reference numeral **10** denotes a flush tank which is fragmentarily shown and through the bottom **11** of which extends the flush water outlet pipe **12**. In standard practice, the conventional valve seat **13** is formed as an integral part of the overflow pipe **14**, also fragmentarily shown and which incorporates a threaded portion **15** which extends through an opening in the tank

bottom **11** and is engaged by a union **16** which joins the water outlet pipe **12** with the assembly consisting of the valve seat **13** and overflow pipe **14**. A rubber washer **17** is interposed between the said assembly and the bottom **11** of the flush tank **10**.

Conventionally, the guide rod **18**, slidably supported by the guide sleeve **19**, and the adjustable arm **20**, is required to have a certain amount of lateral play during its vertical travel when lifted by the link **21**, connected with the flush lever, not shown. Such play is necessary to give the valve sufficient freedom that it will settle on its seat without restraint as the last of the flush water leaves the tank. When the rubber of the conventional valve is new and live and until it becomes water-logged, the valve will seat uniformly and prevent leakage of water through the outlet pipe **12**. However, after a period of time, the rubber ball will foul its seat and tend to rest on the side of the seat **13**, or will fail to bear against the seat with sufficient force to preclude passage of water.

The present invention is comprised of a resilient annulus or seat **22**, which is molded about an annular permanent magnet **23**. Formed in the bottom edge **24** of the annulus **22** is an annular groove **25** (Fig. 3) which received the conventional seat **13**. The seats **13** are generally of standard dimensions, hence the substitute rubber seat **22**, will be applicable to virtually all flush tanks of conventional manufacture.

A ball valve **26** of ferrous metal is provided with a threaded boss **27** by which it is connected to the guide rod **18** and it functions in a manner identical to that of the conventional rubber valve except that the valve **26**, being ferrous, is attracted by the magnet **23** to a degree sufficient to draw the ball against the seat **22** after the flush water escapes through the pipe **12** and hold the same compressedly thereon with a force only great enough to prevent too ready displacement but not so great as to attract the ball until the water has reached a level corresponding to the height of the seat **22**. Being spherical, any rotative or lateral displacement of the ball **26** permitted by the looseness of the guide rod **18** in its guide sleeve **19** will not interfere with positive seating of the ball **26**.

The rubber seat **22** is formed with an annular internal bevel **28** at its upper edge corresponding to the spherical body of the ball **26** and is calculated to produce a more positive seal than an unbeveled seat, although the construction of the seat is not limited to such a beveled recess.

When its flush lever is actuated, the ball **26** will break contact with its magnetized seat **22**. Buoyancy of the ball will cause the latter to move toward the top of the water tank and as the water recedes in the tank, the ball will follow the level of the water and as it nears the magnetic seat, the ball will be attracted by the magnet to be compressedly held on the seat, as explained.

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 claim is also considered to be within the spirit and intent of the invention.

What is claimed is:

In combination with a toilet flush tank having a bottom outlet and a conventional valve seat in the outlet extending upwardly above the bottom of the tank, a supplemental valve seat supported on the upper rim of the first valve seat, the second valve seat comprising an annulus formed of resilient material having an annular groove in its under side, the annulus extending substantially above the annular groove and having a seating surface in its upper portion, and an annular magnet embedded in the annulus surrounding the seating surface, the upper rim

of the first valve seat being received in the annular groove whereby the second valve seat is removably secured to the first valve seat, and a hollow, buoyant valve element formed of ferrous metal movable reciprocally above the second valve seat and adapted to be seated thereon, the arrangement being such that the valve element is adapted to be positively secured in engagement with the second valve seat by the action of the magnet.

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