Aug. 5, 1941. W. L. HARROUN 2,251,357

FLUSH VALVE

Filed Sept. 12, 1940

FIG. 1.

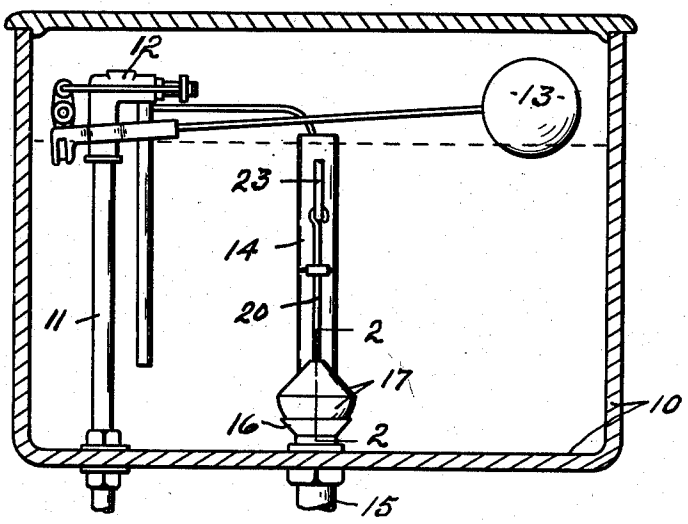


FIG. 2.

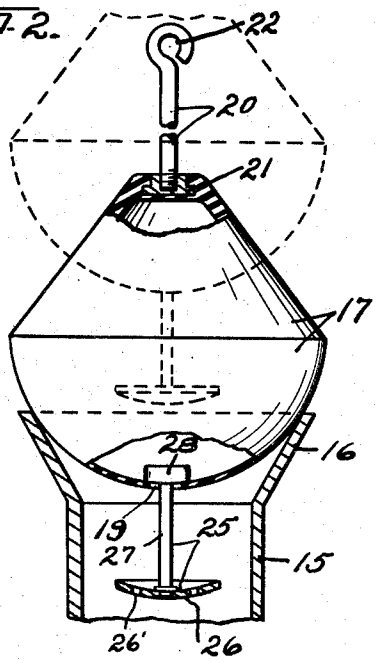


FIG. 3.

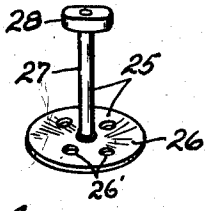


FIG. 4.

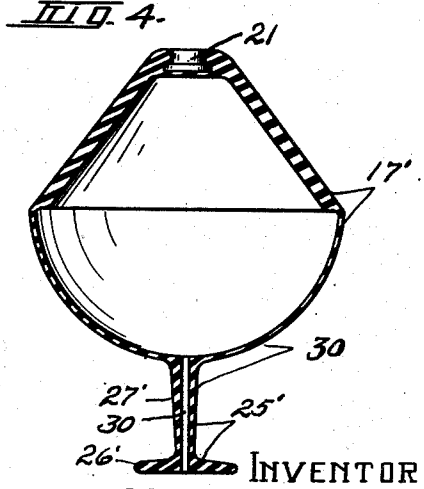
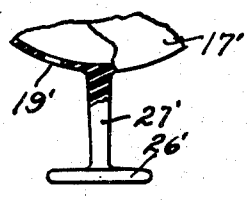


FIG. 5.



INVENTOR
WILLIAM L. HARROUN
BY Theodore L. Simonton
ATTORNEY

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FLUSH VALVE

William L. Harroun, Ellisburg, N. Y.

Application September 12, 1940, Serial No. 356,516

2 Claims. (Cl. 4—56)

My invention relates to improvements in flush valves or closet tank balls and pertains more particularly to an attachment adapted to be applied to a conventionally constructed closet tank ball or flush valve. This invention is an improvement on the structures disclosed in my Patents No. 1,374,655, dated April 12, 1921, and No. 1,530,720, dated March 24, 1925.

In each of my two patents above referred to, the flush valve or closet tank ball is of special construction particularly at the upper end of the hollow ball-like stopper element in that the same is arranged to be connected to the auxiliary valve stem passing through said element as well as to the lifting rod. For this reason, these closet tank balls are relatively expensive to manufacture.

The primary object of this invention is to provide an auxiliary valve attachment for a flush valve or closet tank ball adapted to aid in properly seating said ball following each flushing of the toilet and which may be readily attached to any conventionally constructed closet tank ball or stopper element whether said ball is new or is in use.

A more specific object of the invention is to provide an attachment for flush valves of the above mentioned type which is simple and economical in construction and operation.

I attain these objects by mechanism illustrated in the accompanying drawing, in which:

Figure 1 is a vertical sectional view through a water closet flush tank having a flush valve mounted therein provided with an auxiliary valve or seating means embodying the features of this invention.

Figure 2 is an enlarged detail vertical sectional view, partly in elevation, taken on the line 2—2, Figure 1, showing my novel auxiliary valve seating device operatively connected with the flush valve.

Figure 3 is a perspective view of the auxiliary flush valve seating device detached from the valve.

Figure 4 is a vertical sectional view of a modified form of flush valve showing the auxiliary valve or seating element formed as an integral part of the flush valve proper or stopper.

Figure 5 is a detail side elevation, partly in section, showing a slightly modified form of the flush valve shown in Figure 4.

In Figure 1 of the drawing, I have illustrated a flush tank 10 having a filling tube 11 and a ball cock 12 controlled by a float 13. 14 is the usual overflow pipe and 15 the usual flush or closet supply pipe connected with the bottom of the tank 10, said flush pipe having a flaring mouth or inlet 16 arranged in the interior of the tank providing a seat for a tank ball or stopper 17. The valve 17 is of conventional construction, being preferably composed of rubber and having an atmospheric opening 19 in its lower end and a valve stem or rod 20 connected to its upper end. The rod 20 is screw-threaded in a bushing 21 molded in the valve 17 and is provided with an eye 22 at the upper end thereof for receiving a connecting rod or link 23, said link being adapted to be connected with a hand lever (not shown) associated with the tank 10 by means of which the valve 17 may be lifted from its seat 16 when flushing the toilet.

When the flush valve 17 is lifted from its seat to an open position, as indicated by broken lines in Figure 2, the valve floats on the water owing to the buoyancy of the valve and gradually approaches its seat 16 as the water flows through pipe 15 from the tank 10. As the valve 17 approaches its seat 16, it comes into contact with the swirling stream of flushing water flowing downwardly through the flush pipe 15 which frequently causes the valve to move laterally and impinge against a side of its seat, with the result that the flushing is unnecessarily prolonged or else the discharge continues in a fine stream until the valve is restored to its proper seated position. In either case there is an excessive amount of water consumed and, in order to overcome this waste and the annoyance and inconvenience caused by the improper seating of the valve, I have provided an auxiliary valve or seating device 25 which may be constructed separately from the flush valve 17 and attached thereto at will.

This device 25, as shown in Figures 2 and 3, comprises a disk 26 of less diameter than the interior diameter of the flush pipe 15 so as to be readily received in said pipe. The disk 26 has secured thereto a stem 27 which projects from the upper side thereof and has secured to its upper end a head 28. The diameter of the stem 27 is less than the diameter of the atmospheric opening 19 in the valve 17 so as to readily extend through said opening and not completely close the same.

The head 28 is preferably of rectangular shape in plan view having a length substantially greater than the diameter of the opening 19 in the valve 17 and a width which is less than the diameter of said opening so that the head may be readily passed through the opening to the interior of the valve 17 and, at the same time, will not completely close said opening when in contact

with the inner wall of the valve adjacent opening 19.

The length of the stem 27 is such that when the valve 17 is in a raised position, as indicated by broken lines in Figure 2, the disk 26 will be spaced from the lower end of the valve to be engaged by the swiftly flowing water passing downwardly through the valve seat 16 and pipe 15, and thus cause valve 17 to be drawn downwardly by the action of the water thereon into engagement with its seat 16 prior to the normal time of engagement of the valve with its seat. This not only insures the flush valve being properly seated but also provides for an appreciable saving in the amount of water used without reducing the head of water in the tank 10 necessary for insuring proper flushing. In other words, instead of utilizing substantially a full tank of water at each flushing operation, only such a portion of the water in the tank is used as is necessary for flushing.

The disk 26 may, as shown, be provided with one or more apertures 26' whereby valve 17 will not be forced too hard on its seat 16 by the action of the water. It is to be understood, however, that the apertures are not necessary to the successful operation of my device and I do not wish to be limited thereto inasmuch as the effective size of the disk may be altered in other ways to produce the desired effect.

It will now be observed that the auxiliary valve 25 may be manufactured and sold independently of the flush valve 17 inasmuch as the same may be quickly and easily connected with said flush valve by merely inserting the head 28 through the atmospheric opening 19 of the flush valve.

In Figure 4, I have shown a modified form of flush valve as 30. In this figure, the auxiliary valve, as 25', is formed simultaneously with the forming of the stopper or valve proper 17' and comprises a disk 26' of less diameter than the interior of the flush pipe 15 and a stem 27' connecting said disk with the lower end of the valve 17'. The disk 26' and stem 27' may be constructed in general form substantially like disk 26 and stem 27 as shown, and is provided with an axial opening 30 for admitting atmospheric air to the interior of valve 17'.

In Figure 5, the valve stem 27' is shown formed solid and the atmospheric opening, as 19', may be provided in the lower end of the valve or stopper 17' at one side of the valve stem 27'. The valve 17', shown in Figures 4 and 5, is provided with an internally threaded bushing 21 to which the stem or rod 20 may be connected in the usual manner to effect lifting of the valve from its seat. The valve or stopper 17' functions in the same manner as the valve 17 when flushing the toilet and may be returned to its seat prior to a complete discharge of the water from the tank 10 by the engagement with disk 26' of the water flowing outwardly through the flush pipe 15 as disk 26' approaches the seat 16.

Although the construction and operation of my device are particularly simple, practical and efficient, I do not wish to be limited to the exact details shown as it is evident that various changes may be made therein without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. The combination with a flush pipe for water closets having a valve seat, and a flush valve comprising a hollow ball-like stopper element engageable with said seat, said stopper element having an actuating rod connected to its upper end for lifting it from said seat, and an atmospheric opening at its lower end, of pilot means for returning said stopper element to its seat including a substantially flat body member of less diameter than the bore of the flush pipe adapted to be readily moved through the seat to the interior of said flush pipe by contact of the flushing water therewith, a stem fixed to the body member and extending through the atmospheric opening in said stopper element, and a head member secured to the upper end of the stem at the interior of the stopper element extending across said atmospheric opening to removably secure the disk to the stopper element in spaced relation thereto, the width of said head and the diameter of the stem each being less than the diameter of the atmospheric opening whereby air under atmospheric pressure may readily pass through said opening to and from the interior of the stopper element.

2. A fluid operated device of the character described for returning the ball flush valve of a water closet to its seat comprising a disk member adapted to be engaged by the flushing water to be drawn through said seat thereby, an oblong head member of greater length than the diameter of the atmospheric opening in the lower end of the flush valve adapted to be pressed through said atmospheric opening to the interior of said valve, and a stem connecting the body member to the head in spaced relation thereto, the width of said head and the diameter of said stem each being less than the diameter of said atmospheric opening to provide a free passage for air through said opening when the device is operatively connected with the valve.

WILLIAM L. HARROUN.