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FLUSH TANK VALVE CONTROLS

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This invention relates to new and useful improvements and structural refinements in actuating means for flush tank valves, and the principal object of the invention is to provide an actuating means for operating the flush valve ball so that the same is efficiently seated to prevent leakage, yet may be easily raised to facilitate flushing.

An important feature of the invention resides in the provision of a flexible element for operatively connecting the flush valve ball to the flushing lever of the tank and to the usual standpipe in the tank, the flexible connecting element permitting proper movement of the ball in seating and unseating, as above outlined.

Another important feature of the invention resides in the construction of the valve ball itself, the same including a cone-shaped base or lower portion which is movably disposed at all times within the flush valve port and functions as a guide in assuring proper seating of the ball.

Some of the advantages of the invention reside in its simplicity of construction, in its efficient operation and in its adaptability for installation in both new tanks and those already in existence.

With the foregoing more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention resides in the arrangement of parts and details of construction substantially as shown in the accompanying drawings, wherein like characters of reference are employed to designate like parts and wherein:

Figure 1 is a fragmentary vertical sectional view of a flush tank having the invention embodied therein;

Figure 2 is a fragmentary top plan view thereof;

Figure 3 is an elevational view, partly in section, of the valve ball per se;

Figure 4 is a fragmentary detail illustrating a slightly modified form of the invention; and

Figure 5 is a fragmentary detail showing the connecting means of the ball to the chain in the arrangement of Figure 4.

Referring now to the accompanying drawings in detail, particularly Figures 1–3 thereof, the general reference numeral 10 designates a conventional flush tank provided in the bottom thereof with a fitting 11 which is formed to provide a flush valve port 12 and which also supports a standpipe 13 in accordance with the usual practice. The flushing lever of the tank is illustrated at 14.

The essence of novelty in the invention resides in the provision of novel means for actuating and controlling the movement of the flush valve ball 15, these means being in the form of a flexible element such as a length of chain 16. One end of this chain is provided with a hook 17 for adjustable connection to the lever 14. For this purpose the lever 14 is provided with a plurality of apertures 18 to selectively receive the hook 17, as will be clearly apparent.

The chain 16 may be of the elongated, closed link type as shown in Figures 1 and 2, and the link at the other or lower end of the chain is attached to a hook 19 secured to a resilient C-clamp 20 which, in turn, is frictionally mounted on the lower portion of the standpipe 13 adjacent the fitting 11.

The valve ball 15 comprises a substantially spherical main body portion 15a and a substantially cone-shaped base portion 15b which is integral with and depends from the portion 15a, as shown. The base portion 15b is movable in and at all times extends into the flush valve port 12, and thereby serves as a guide to assure proper seating and unseating of the valve ball.

The body portion 15a of the valve ball is provided at the top thereof with a hook 21 having a disc-shaped base 22 embedded in the material of the body portion 15a, the hook 21 also having a flange 23 which abuts the upper surface of the portion 15a and serves to firmly retain the hook in place on the ball. The hook 21 is attached to an intermediate portion of the chain 16 by passing the same through one of the links of the chain, as illustrated.

The chain 16 is of such length and the hook 21 is attached to the chain at such a point that when the lever 14 is raised to effect the flushing operation, the ball 15 is lifted and unseated from the valve seat 12. Conversely, when the lever 14 is permitted to return to its initial position, the chain 16 is slackened and the valve ball returns to its seat.

It is to be noted that by virtue of its flexibility, the chain 16 affords the valve ball 15 a freedom of movement which is not restricted by friction or binding such as usually occurs when the ball is operatively connected to the flush lever with conventional rods or links. Moreover, the use of a sliding guide, conventionally employed for the valve ball, is completely eliminated and the freely movable ball assures easy unseating and proper seating in the instant invention.

Excessive raising of the ball 15 with respect to the seat 12 is prevented by the length or portion of the chain 16 extending between the hook 21 on the ball and the hook 19 on the clamp 20, the length of this chain portion being sufficient to permit the ball to raise enough for proper flushing, but being insufficient to permit the ball to raise to an extent which would withdraw the base portion 15b of the ball from the valve port or seat 12. As will be readily apparent, the point of attachment of the ball to the chain may be easily varied by simply engaging the hook 21 with the different links of the chain 16. In addition, the location of the hook 19 relative to the ball 15 may be adjusted in a vertical direction by simply sliding the clamp 20 upwardly or downwardly on the standpipe 13.

The slightly modified form of the invention shown in Figures 4 and 5 is similar to that already described, with the exception that the elongated, closed link chain 16 is substituted by a ball type chain 25, consisting of a plurality of ball elements 25a connected together by rod-shaped links 25b. In this instance the standpipe clamp 20 is provided with a suitable socket 26 to receive the ball element at the lower end of the chain 25, and any suitable connection is employed for connecting the chain to the flush lever.

The attachment hook 21 in this instance is substituted by a plate-shaped connecting member 27 having a transverse aperture 28 therethrough to receive the chain 25 and also provided with a set screw 29 extending into the aperture 28 for clamping one of the chain links 25b, as is best shown in Figure 5. The point of attachment of the ball to the chain may be varied by simply loosening the set screw 29 and sliding the chain through the aperture 28.
While in the foregoing there have been described and shown the preferred embodiments of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure and various modifications may be resorted to, such as may lie within the spirit and scope of the appended claims.

What is claimed as new is:

1. In a flush tank including a flush valve port, a stand-pipe adjacent thereto and a flush lever, the combination of a flush valve ball engageable with said port, and a flexible actuating element connected at one end thereof to said lever and connected at its other end to said stand-pipe, said valve ball being attached to an intermediate portion of said element.

2. The device as defined in claim 1 wherein said flush valve ball comprises a substantially spherical main body portion and a substantially cone-shaped base portion integral with and depending from said main body portion, said base portion being movably disposed in said valve port.

3. In a flush tank including a flush valve port, a stand-pipe adjacent thereto and a flush lever, the combination of a flush valve ball engageable with said port, a chain connected at one end thereof to said lever and connected at its other end to the lower portion of said stand-pipe, and connecting means provided at the top of said valve ball for attaching the same to an intermediate portion of said chain.

4. The device as defined in claim 3 together with a clamp provided at said other end of said chain for connecting the same to said stand-pipe.

5. The device as defined in claim 3 wherein said flush valve ball comprises a substantially spherical main body portion and a substantially cone-shaped base portion integral with and depending from said main body portion, said base portion being movably disposed in said valve port.

No references cited.