June 28, 1955 R. E. NORTON 2,711,618

COMBINATION FLUSH VALVE AND SEAT CLEANING MEANS

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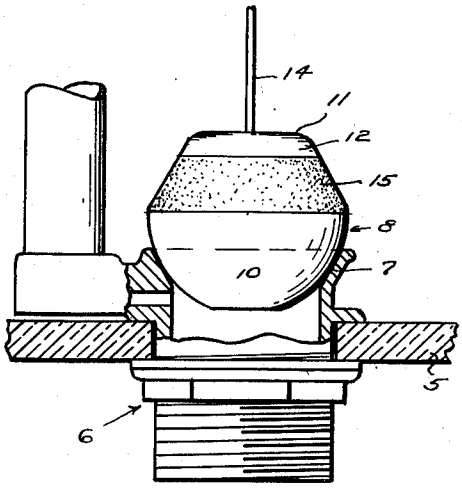


Fig. 1.

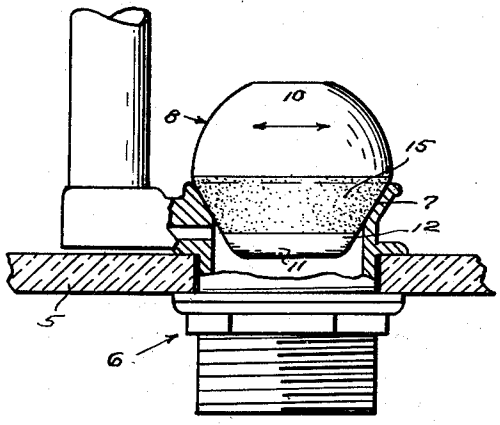


Fig. 2.

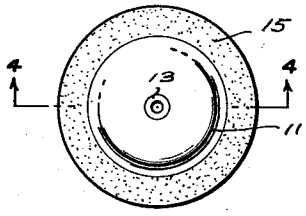


Fig. 3.

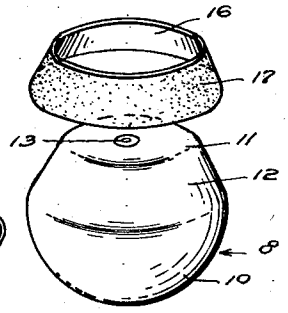


Fig. 5.

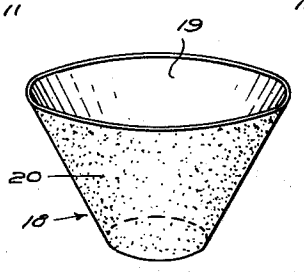


Fig. 7.

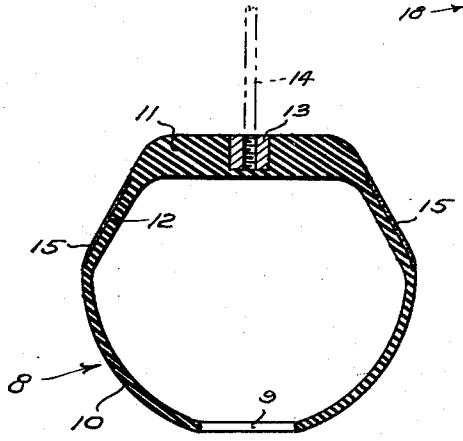


Fig. 4.

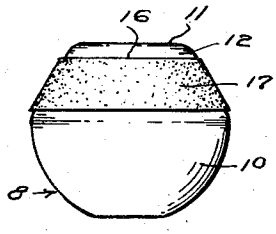


Fig. 6.

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COMBINATION FLUSH VALVE AND SEAT CLEANING MEANS

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2 Claims. (Cl. 51—186)

This invention relates to an improvement in toilet flush valves and has particular reference to novel means associated with the flush valve for conveniently and economically dressing the flush valve seat to remove accumulated chemical deposits that interfere with the proper and effective seating of the valve.

The invention has for its object to provide an abrasive surface associated with the conventional flush tank ball whereby the ball may serve in the capacity of a cleansing tool for the flush valve seat when inverted and engaged with the seat in an oscillatory manner.

Further objects of the invention reside in the novel manners of associating the abrasive surface with the tank ball, either as an integral assembly or, as a preformed and preshaped band to be permanently connected with the ball or supplied with the ball to be used in conjunction therewith when the seat is to be cleaned.

Other novel features of the invention, construction and operation thereof, will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings, wherein has been illustrated practical and effective forms of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

Figure 1 is a side elevation of a flush tank check ball embodying the invention and shown in normal use upon the conventional flush coupling,

Figure 2 is a similar view, but with the check ball inverted to seat cleansing position,

Figure 3 is a top plan view of the improved check ball,

Figure 4 is a central vertical section on an enlarge scale, taken substantially on line 4—4 of Figure 3,

Figure 5 is a perspective view of a modified form of the device wherein the abrasive unit is preformed and cemented to the ball,

Figure 6 is a side elevation of the structure of Figure 5, but with the abrasive unit permanently cemented to the ball and,

Figure 7 is a perspective view of an abrasive unit for use with the check ball in cleansing the valve seat.

Referring specifically to the drawings and particularly to Figures 1 and 2, the numeral 5 designates the bottom wall of the usual and well known vitreous toilet flush tank, apertured to receive the conventional flush coupling, indicated as a whole by the numeral 6. The flush coupling 6 includes the usual and well known bevelled check valve seat 7. The structure so far described is old and well known in the art and forms no part of the present invention.

Referring now to Figures 1 to 4 inclusive, a flush tank check ball is indicated as a whole by the numeral 8. The ball is formed in the usual manner of flexible material, such as rubber and is formed hollow, as shown in Figure 4 with the usual air opening 9. The lower or valve forming part of the ball, indicated at 10, is preferably formed semispherical, although it will be apparent that it can be successfully formed conical. While a novel form of ball has been illustrated, it should be here understood that the invention is applicable to other and well known forms of ball, the ball here illustrated being shaped for convenience in disclosing the invention. The upper portion 11 of the ball is preferably formed frusto-conical, with the angle of the side wall 12 being formed substantially on the recognized angle of the bevelled valve seat 7. The upper end of the body 11 has a flat top that is provided centrally thereof with an embedded threaded stud 13 of usual form, that has threaded connection with the usual and well known trip rod 14, employed to raise the check ball 8 from the seat 7. Preferably circumferentially molded into the side wall 12, is a band of abrasive material 15 which, at its greatest diameter, is greater than the greatest diameter of the valve seat 7, while the smallest diameter of the band 15 is less than the smallest diameter of the valve seat 7. While it is desirable that the abrasive band 15 shall be molded into the rubber of the ball, as shown, it will be apparent that the ball may be given an application of waterproof cement and the abrasive material applied thereto.

In the use of this form of the invention, when the valve seat 7 has become corroded or encrusted with chemical deposits to a degree which prevents the proper seating of the ball against leakage, the operator first shuts off the water, then removes the trip rod 14 in the usual manner. He then reaches into the tank, lifts the ball 8 and inverts it to the position shown in Figure 2. In this inverted position, the abrasive band is fully engaging the area of the seat 7. The operator then oscillates the ball, while at the same time exerting a slight downward pressure thereon. A few such oscillatory strokes will quickly clean the seat of the deposits and impart a smooth polished surface thereo. Obviously, the number of strokes necessary, will depend entirely upon the condition of the seat. After the seat has been cleaned, the ball is again inverted to its original check position of Figure 1 and the trip rod reengaged. The entire operation requires but a very few minutes and avoids the use of seat grinding tools in an area that is, at best, difficult to work in.

In the form of the device illustrated in Figures 5 and 6, the same ball 8 is employed, having the semi-spherical body 10, upper portion 11 and angular side wall 12. In this form of the invention, a preformed band of material 16 has its entire outer surface coated with abrasive material 17. The band 16 has an overall area substantially that of the band 15. The material forming the band 16 and a suitable adhesive to retain the abrasive material thereon, will obviously be formed of waterproof material. The band 16 is cemented or otherwise attached to the wall area 12 in the position illustrated in Figure 6. While there are numerous materials of which the band 16 may be formed, one practical manner would be for the band 16 to be formed of a material that might be vulcanized to the surface 12 against displacement. However, the invention is not limited to a precise method of application. The operation of the device as illustrated in Figure 6 is identical to that described in connection with the form of the device in Figures 1 to 4.

Figure 7 illustrates an adapter for use with the conventional check balls presently in use or with the form of the check ball illustrated in this application. The adapter, designated as a whole by the reference numeral 18, embodies a frusto-conical shell 19, open at both ends and formed of relatively stiff paper or cardboard and having its entire outer surface coated with an abrasive material 20. The angularity of the device 18 is substantially that of the well known conventional check valve seats now in use, although the device in use will readily conform to other valve seats when adequate pressure is exerted thereon. The device of Figure 7 is adapted to be sold as a kit with the check ball for use at such times

as the valve seat is to be cleaned. When the device **18** is to be used, the operator removes the trip rod **14** as before, then removes the ball **8** and inserts the ball into the largest open end of the shell **19**. Then, by grasping both the ball and the shell, the device is engaged with the valve seat **7**, with the smaller end projecting downwardly into the coupling. An oscillatory movement of the assembled ball and shell will quickly cleanse the seat, the ball exerting an even outward pressure upon the shell **19** to cause it to evenly engage the seat. The device **18** will last for a very considerable time and the infrequency of its use will extend its life to substantially that of the ball itself. After cleaning the seat, the reassembly is made as before.

It will be apparent from the foregoing, that a very simple and highly effective means has been provided to facilitate the cleaning of the conventional toilet flush valve seats. The device is most economical to manufacture and results in a very considerable saving in water costs and greatly prolongs the life of the check ball. The invention readily adapts itself to various forms of check balls at a minimum cost.

While the preferred forms of the invention have been illustrated and described, changes are contemplated as readily fall within the spirit of the invention or the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A toilet flush valve to engage with a valve seat, said flush valve being formed of rubber which is flexible and resilient, the upper portion of the flush valve being thicker and stiffer than the lower portion, the lower portion seating against the inner face of the valve seat when in use, means carried by the upper thicker portion for detachable engagement with a trip rod, and an annular strip of abrasive material secured to the circumference of the upper thicker portion of the flush valve and surrounding said circumference, said strip having a substantial width and terminating short of the lower flexible portion which engages the inner face of said seat, the arrangement being such that the flexible valve may be separated from the trip rod and inverted and the annular abrasive strip brought into engagement with the inner face of the valve seat to clean or grind the same, the flexibility of the upper thicker portion permitting the abrasive strip to readily conform to the shape of the inner face of the valve seat and being sufficiently stiff so that a desired amount of pressure may be applied to the face, the lower more flexible portion of said valve permitting of the convenient engagement of the upper end of the upper thicker portion for applying suitable pressure to the then inverted upper thicker portion.

2. A device for cleaning or grinding the valve seat of a toilet flush tank, said device comprising a generally spherical hollow member formed of rubber which is flexible and resilient, one end portion of the member being thicker and stiffer than the other end portion, the thicker and stiffer end portion having means for detachable connection with a rod, and an annular strip of abrasive material secured to the thicker and stiffer end portion and surrounding the circumference of the same, said strip having a substantial width and terminating short of the more flexible end portion, the arrangement being such that the thicker end portion may be separated from the rod and the annular abrasive strip brought into engagement with the inner face of the valve seat to grind or clean the same, the flexibility of the thicker and stiffer end portion permitting the abrasive strip to readily conform to the shape of the inner face of the valve seat and being sufficiently stiff so that a desired amount of pressure may be applied to said face, the more flexible end portion of said member permitting of the convenient application of the fingers to the end of the thicker and stiffer end portion for applying pressure thereto, the more flexible end portion being adapted for seating upon said valve seat when the member is used as a valve.

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