Sept. 7, 1954 I. SCHLATTER 2,688,140

FLUSH TANK VALVE GUIDE

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Fig. 1.

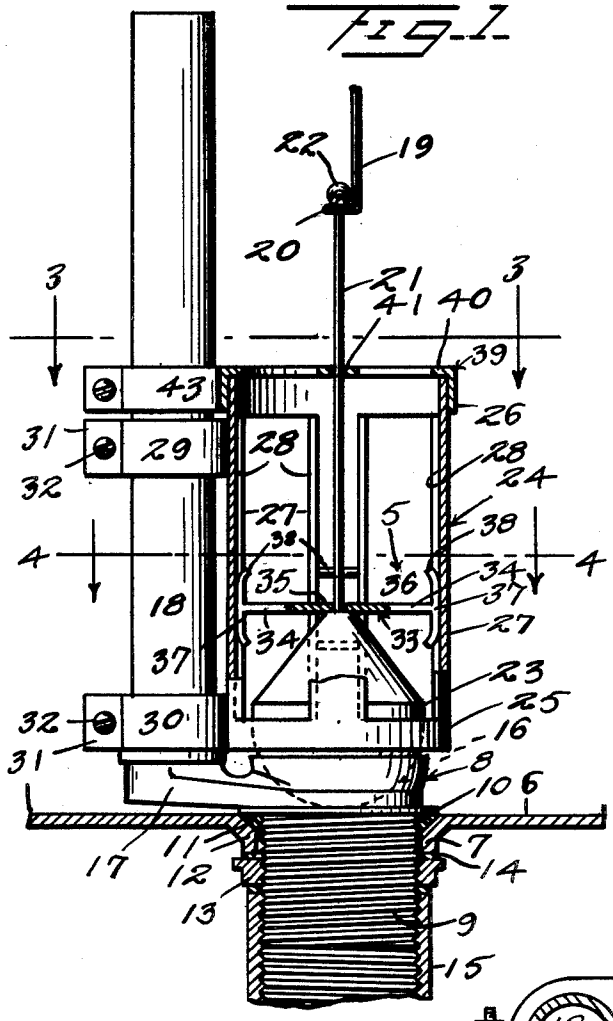


Fig. 2.

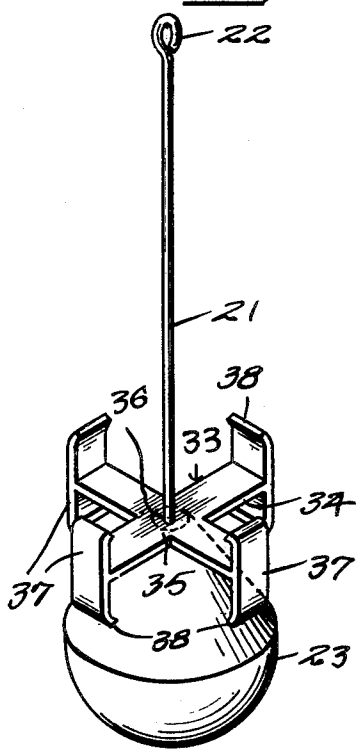


Fig. 3.

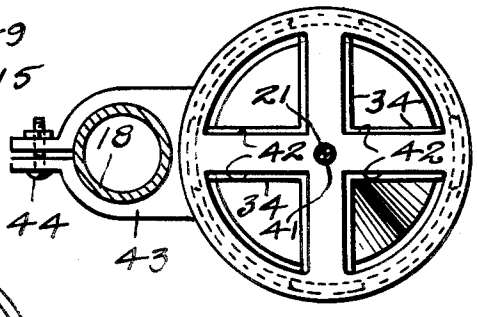
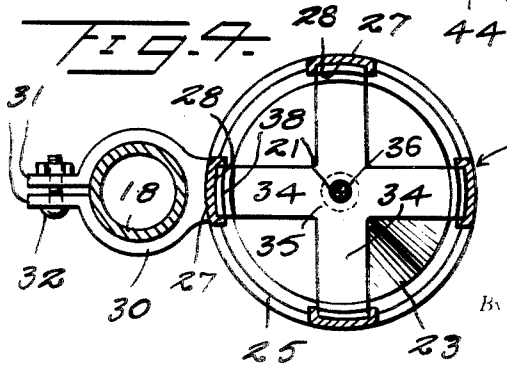


Fig. 4.



Inventor

Isaac Schlatter

By John N. Randolph

Attorney

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FLUSH TANK VALVE GUIDE

Isaac Schlatter, Los Angeles, Calif.

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8 Claims. (Cl. 4—57)

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This invention relates to an improved guide for guiding the movement of a rubber bulb type flush tank valve to and from an open and closed position and which will effectively function to insure a proper seating of the valve as it moves downwardly to a closed position and which will positively prevent the valve from seating incorrectly and thereby effectively preventing leakage between the valve and valve seat and thus eliminate the common operation of repeatedly lifting a flush tank valve in an effort to cause it to seat properly and stop leakage from a flush tank and the noise which results therefrom.

Another object of the invention is to provide a valve guide including a moveable guiding element which is urged downwardly by gravity above the valve and which will effectively function to guide the movement of the valve toward and away from the valve seat and will additionally function to urge the valve toward and into engagement with the valve seat to eliminate the common "rattling" sound frequently occurring with flush tank valves as they approach a seated or closed position.

A further object of the invention is to provide a valve guide capable of being detachably mounted on the overflow pipe of a standard or conventional flush valve and which is adjustable with respect thereto for properly positioning the guide relatively to the flush valve fitting and so that the flush valve will be correctly disposed to engage and close the seat of the flush valve fitting when applied to the guide.

A further object of the invention is to provide a novel guide including a stationary guide portion and a moveable guide portion which is moveable with the valve toward and away from the valve seat and whereby the valve stem is guided at two longitudinally spaced points to insure correct movement of the valve directly toward and away from the valve seat.

Another object of the invention is to provide a flush valve guide including a cage in which the valve is movably disposed and which cooperates with the valve seat to prevent removal of the valve from the cage without disassembling of the cage.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view, partly in vertical section showing a portion of a flush tank equipped with a conventional flush valve unit and showing the guide attached thereto in an applied and operative position;

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Figure 2 is a perspective view of a portion of the guide shown applied to the stem of the flush valve, and

Figures 3 and 4 are horizontal sectional views taken substantially along planes as indicated by the lines 3—3 and 4—4, respectively, of Figure 1.

Referring more specifically to the drawing, for the purpose of illustrating a preferred application and use of the flush tank valve guide, designated generally 5 and comprising the invention, a portion of the bottom 6 of a conventional flush tank or water closet tank is illustrated in Figure 1. The tank 6 is provided with an opening having a depending flange 7. A standard flush valve fitting 8 has a depending threaded outlet 9 which extends downwardly through the flanged opening 7 and includes a collar 10 at its upper end which rests upon a sealing gasket 11 which seats in an internally flared upper portion 12 of the flanged opening 7. A nut 13 threadedly engages the outlet 9 and is advanced upwardly against a washer 14 which is clamped between said nut and the lower end of the annular flange 7, so that when the nut 13 is tightened the gasket 11 will be compressed between the collar 10 and the flared flange portion 12 to provide a liquid tight seal between the flanged opening 7 and the outlet 9. The upper end of a conduit 15 leading from the fitting 8 threadedly engages the outlet 9 below the nut 13. The fitting 8 is provided with an upwardly facing valve seat 16 and includes a laterally extending tubular overflow connection 17 disposed above the tank bottom 6 and which is provided with an upwardly extending overflow pipe 18 which extends upwardly therefrom in laterally offset relationship to the valve seat 16. Figure 1 also illustrates the lower portion 19 of a conventional valve operating rod having an eye 20 disposed at a right angle to the axis thereof which slidably engages the upper portion of a valve stem 21 below an eye or enlargement 22, formed at the upper end of said stem 21 above the eye 20 and which is sufficiently large so that it may not pass through the eye 20. The opposite, lower end of the stem 21 is connected in a conventional manner to the upper end of a conventional rubber bulb type flush tank valve 23 the lower end of which is shaped to properly seat in and close the valve seat 16. The parts 6 to 23, previously described, constitute no part of the present invention but are conventional parts of a water closet tank and flush valve unit.

The valve guide 5, comprising the invention, includes a cage, designated generally 24, including a lower ring 25, an upper ring 26 and a plurality, preferably four, bars 27 extending between and

connecting the rings 25 and 26 and which are preferably formed integral therewith. The bars 27 are channel shaped in cross section to define inwardly facing guide channels 28. A pair of split clamps 29 and 30 are secured to and project from the cage 24, the upper clamp 29 being secured to the outer side of one of the bars 27 and the lower clamp 30 being secured to the lower portion of the same bar 27 and to a portion of the bottom ring 25, said clamps 29 and 30 preferably being formed integral with the case 24 and having split portions disposed remote thereto defined by outturned spaced apertured ears 31, as best seen in Figure 4, which are detachably connected by nut and bolt fastenings 32 associated with each of said clamps. It will be readily apparent that with the fastenings 32 loosened the clamps 29 and 30 may be applied over the upper end of the overflow pipe 18 with the clamp 30 disposed below the clamp 29 and the axis of the cage 24 may then be positioned above and in alignment with the valve seat 16, after which the fastenings 32 may be tightened for securing the clamps 29 and 30 to the overflow pipe 18 to thus rigidly secure the cage 24 in its correctly applied position of Figures 1, 3 and 4.

The valve guide 5 also includes a moveable guide member 33 which is substantially spider shaped and in the form of a cross having four equally spaced arms 34 extending radially from a central or hub portion 35 thereof. The hub portion 35 is provided with a central guide opening 36. Each arm 33 is provided at its outer end with a runner 37 which is preferably formed integral with its respective arm 34 and which connects therewith intermediate of the ends of the runner 37. The runners 37 are disposed in upright positions perpendicular to the plane of the arms 34 and have inwardly curved upper and lower end portions 38. The moveable guide member 33 is sized to fit in the cage 24 and the runners 37 are each of a width to slidably fit one of the guide channels 28 so that the moveable guide 33 is slidably disposed in the guide cage 24 and is of sufficient size so that the runners 37 are retained against movement relatively to the cage 24 except longitudinally thereof, as clearly illustrated in Figures 1 and 4. Likewise, as illustrated in Figure 1, the stem 21 extends loosely through the opening 36 of the moveable guide member 33, said stem ordinarily being detachably secured at its lower end to the valve 23 in a conventional manner as by a threaded connection. Accordingly, the valve 23 being disposed below the moveable guide 33 normally supports said guide with the central portion 35 thereof resting on the upper end of the valve 23. The opening 36 is only sufficiently large to allow the stem 21 to slide therethrough and is of insufficient size to permit any lateral movement of the stem 21 and valve 23 relatively to the cage 24.

The valve guide 5 also includes a cap or cover 39 which fits over the upper ring 26 and has a top wall 40 provided with a central opening 41 of substantially the same size as the opening 36 and in alignment therewith through which another portion of the stem 21 slidably extends. The top wall 40 is provided with a plurality of relatively large openings 42 disposed around and spaced from the opening 41. A clamp 43 projects radially from a peripheral portion of the member 39 and is disposed detachably on the overflow pipe 18 above the clamp 29. The clamp 43 corresponds to the clamps 29 and 30 and is detachably clamped to the overflow pipe 18 by

means of a nut and bolt fastening 44 for securing the member 39 on the upper end of the cage 24, after the valve 23 and moveable guide 33 has been positioned in the cage.

From the foregoing it will be readily apparent that when a conventional actuator, not shown, is operated to lift the rod portion 19, the said rod in moving upwardly will elevate the valve stem 21 and valve 23 due to engagement of the actuator eye 20 with the enlargement 22 of the stem 21, in a conventional manner. As the valve 23 moves upwardly to an open position, the moveable guide 33 will be displaced upwardly with the valve 23 to maintain said valve in a position above and in alignment with the valve seat 16 so that after the water has escaped from the flush tank through the outlet 9 and the actuator 19 has returned to a lowered position, the valve 23 will move downwardly by gravity back to a properly seated position on the valve seat 16 for closing the outlet of the fitting 8. It will also be apparent that the moveable guide 33 will slide downwardly in the cage 24 back to its position of Figure 1 as the valve 23 returns by gravity to a closed position so that the valve stem 21 will be guided by the opening 41 of the member 39 and likewise by the moveable guide member 33 at a point substantially below the stationary guide member 39 to insure proper seating of the valve 23 on the seat 16, to prevent leakage through the fitting 8 and to prevent improper seating of the valve 23 which would permit leakage past the valve seat 16. It will be readily apparent that water from the flush tank may pass through the open spaces of the cage 24 between the bars 27 or beneath said cage to the outlet of the fitting 8.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. The combination with a water closet flush tank outlet fitting having an upwardly facing valve seat, an upwardly extending overflow pipe laterally offset relatively to said valve seat and a rubber bulb type valve normally seated in the valve seat for closing the outlet fitting and having an upwardly extending valve stem, of a valve guide attachment comprising an openwork cage, means detachably connecting the cage to the overflow pipe for adjustably supporting the cage above the valve seat, and a moveable guide member slidably disposed in and engaging said cage and guided thereby for sliding movement directly toward and away from the valve seat, said moveable guide member having a centrally disposed opening through which the valve stem extends and providing a relatively slight clearance around the valve stem for maintaining the valve in alignment with the valve seat and to cause the valve to move in a straight line directly toward and away from the valve seat in its travel toward and away from a closed position, said guide member being of larger diameter than the valve to cooperate with the stem and cage to maintain the valve out of contact with the cage during movement of the valve toward and away from the valve seat.

2. A flush tank valve guide as in claim 1, said cage having a plurality of spaced upright inwardly opening guide channels receiving and slidably engaging portions of the moveable guide member.

3. A flush tank valve guide as in claim 2, said

moveable guide member comprising a central hub portion provided with the opening through which the stem extends and having a plurality of arms radiating therefrom, each of said arms having a runner at its outer end disposed perpendicular thereto, said runners constituting the portions which slidably engage the guide channels of said cage.

4. A flush tank valve guide as in claim 3, each of said runners extending above and below the plane of said arms and having inwardly curved terminal portions.

5. A flush tank valve guide as in claim 1, said cage comprising a bottom ring member, a top ring member, and a plurality of circumferentially spaced upright bars extending between and connecting said ring members, each of said bars having inturned side edge portions defining inwardly opening guide channels in which portions of the moveable guide member slidably engage for guiding said moveable guide member in its movement toward and away from the valve seat.

6. A flush tank valve guide as in claim 1, the opening of the moveable guide member providing a sliding engagement of the guide member with the valve stem whereby said guide member is supported on the upper end of the valve.

7. A flush tank guide comprising an elongated cage, means demountably and adjustably supporting the cage in a flush tank in a centered position over the valve seat of the tank outlet, and a moveable guide member slidably disposed in and engaging the cage and guided thereby for

sliding movement directly toward and away from the valve seat, said guide member having a central opening through which a valve stem extends for maintaining a bulb type valve, connected to the lower end of the stem, in a centered position in engagement with or above the valve seat and to cause the valve to move in a straight line directly toward or away from the valve seat, said guide member being of larger diameter than the valve and the central opening thereof providing a relatively slight clearance around the valve stem whereby said stem cooperates with the guide member and cage for maintaining the valve out of contact with the cage during travel of the valve toward and away from the valve seat.

8. A valve guide as in claim 7, said guide member normally resting on and being supported by the valve and slidably engaging the valve stem.

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