

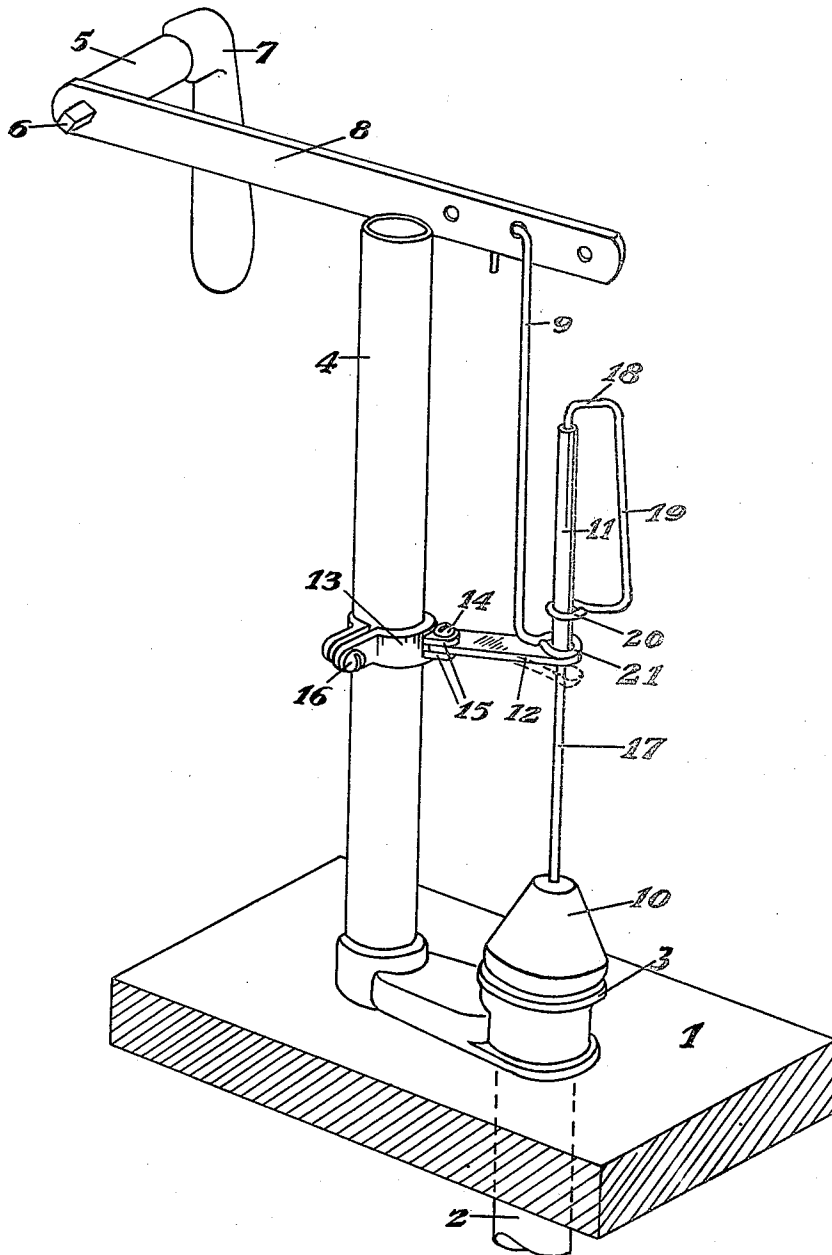
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FLUSH VALVE ACTUATING DEVICE

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FLUSH VALVE ACTUATING DEVICE

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This invention pertains to improvements in mechanism for guiding flush-valves of tanks into their seats.

A general object is to furnish a guide for a flush-valve that will center the same squarely and in line with the center of the valve-seat and positively seat it in that position under all conditions to which the valve may be subjected in use.

Another general object is to provide a valve actuating mechanism that shall be certain in its operation regardless of variations in force and swirling actions of the water leaving the tank, tending to make the float valve wobble and seat itself unevenly. By providing means to seat the valve accurately under all circumstances of use and to keep it tightly seated until the tank is again discharged, loss of water is avoided.

More specific objects are, to provide improved guide means for the stem of the float valve; to provide an improved valve stem structure co-operating with such guide means to produce greater or less frictional action between the guide and the stem, the object being to adjustably modify the up-and-down floatational action of the valve and thereby compensate for too much or too little buoyancy according to the circumstances of use, and to thereby avoid any necessity for altering the buoyancy of the float itself to suit any given installation.

Another object is to provide the valve stem with improved means for raising the valve whereby the upper end of the valve stem shall be kept from binding due to the action of the customary link rod that connects the valve stem to the operating lever of the flushing handle.

The link rod and the upper end of the valve stem have usually been connected by means of a sliding eye or loop device arranged so that when the flushing handle was operated the link rod would produce a sidewise thrust at the upper end of the stem and interfere with the desirable free up and down action of the stem, thereby tending to prevent free and dependable valve action.

Another object is to provide a simplified inexpensive float valve actuating device that can be applied to any existing flush tank equipment.

In the drawing, which is in perspective, my invention is shown in a preferred form applied to a conventional arrangement of a flush tank valve, an overflow pipe and an operating lever and handle.

A flush tank of usual type has at its bottom 1 a discharge pipe 2 connected to a valve seat 3. An overflow pipe 4 leads into the lower portion

of the seat 3. On a wall of the tank is a bearing 5 for a stub shaft 6 which carries an outer handle 7 and an inner operating lever 8 from the end of which is suspended the usual link rod 9 that actuates the stem 17 of the float valve 10.

Although shown assembled with conventional flush tank mechanism, my improved device may be used in conjunction with any other suitable tank equipment. Numeral 11 designates a tubular guide which is fixed to and projects upwardly from an arm 12. The arm is pivoted at its other end to a collar 13 so it can be swung in a horizontal plane for purposes of installation and alinement.

A pivot bolt 14 passes through two lugs 15 on collar 13, between which the arm 12 can be clamped. Collar 13 can be fastened at appropriate height on pipe 4, or to any similar support, by means of a clamping screw 16. The collar 13 and the pivoted arm 12 and tubular guide 11 together constitute a valve stem adjusting and locating device that permits the valve stem 17 to be placed coaxially with the valve seat. Such lateral adjustment can be made by loosening the screw 16 and the pivot bolt 14, and then rotating the collar 13 and swinging the arm 12 until the valve is brought into alinement with the axial center line of valve seat 3. Sometimes it is desirable to place the valve stem in a slightly tilted position to compensate for any inaccuracy in alinement of the other parts of the flush tank caused by warping or otherwise. For that purpose arm 12 is preferably made of flexible material such as brass, copper, or a bronze alloy so it can be bent, as indicated by the broken line.

When the outer handle 7 is actuated, the operating lever 8 lifts link rod 9 which in turn lifts valve stem 17 and unseats the float valve 10; and after handle 7 has been released the ball valve 10 will return to its seat 3 when the water in the tank has subsided to a predetermined level.

An outwardly bent laterally extending portion 18 of the valve stem 17 is spaced slightly above the top of the tubular guide 11 when the valve is on its seat. This bent portion preferably extends outwardly from the vertical portion of the stem and then downwardly outside the tubular guide substantially parallel with the stem 17. At its lower end the downwardly extending member 19 is arranged to travel along and may be guided by the outside of the tubular guide 11 as the float 10 moves up and down. The bottom end of the member 19 may be formed to present a member 20 that surrounds the tubular guide. Member 20 may be in the form of a loop or

eye that encircles guide 11 and slides up and down along the guide as the float rises and falls.

Sometimes it is necessary in flush tank installations to vary the buoyancy of the float 10 to suit particular conditions of current suction, eddying, rate of flow etc., entailing considerable work. The improvement avoids that difficulty. My valve stem and guide, arranged as above described, renders it unnecessary to change the buoyancy of the float, because member 19 can be sprung or bent laterally to cause the bearing portion 20, which engages the tubular guide 11, to exert more or less friction and thus retard or otherwise modify the buoyant action of the float.

Member 20 is raised and lowered by means of a corresponding loop or projection 21 on the lower end of the link rod 9. I have shown part 21 as a loop that loosely encircles the guide 11 below the member 20 on the valve stem.

The upper end of the link rod 9 has more or less lateral or sidewise motion, due to the action of the operating lever 8, although its lower end is guided in a straight vertical path by the tube 11. Hence its loop 21 can exert only a straight lifting action against the under side of member 20 on the valve stem 17, and the upper part of the stem 17 can never be subjected to any sidewise pull or displacement. The result is that under all conditions of use the float is capable of free vertical up-and-down movement without any likelihood of binding and there can be no binding or catching between the members 20 and 21.

To change the effective buoyant action of the float 10 as alluded to above it is only necessary to increase or decrease the friction of the loop 20 against the tubular guide 11 by adjusting the spring action of member 19 in the manner already described.

To install the device in an existing flush tank, the old valve lifting equipment is removed from the overflow pipe 4. The collar 13 and supporting arm 12 are assembled by inserting the arm between the lugs 15 on the collar and tightening the pivot bolt slightly. The link rod 9 is then slid over the tubular guide 11. The valve stem 17 is slid through the tubular guide 11 and the float valve 10 is attached to the bottom of the stem.

The assembled collar 13 with its arm 12 and tubular guide 11 in place is fitted to the overflow pipe 4 and the tubular guide 11 is adjusted sidewise until the float valve 10 seats perfectly. The pivot bolt 14 is then tightened. The collar 13 is raised or lowered on the overflow pipe so that the top 18 of the valve stem 17 is approximately $\frac{3}{8}$ inch above the top of the tubular guide 11; and the set screw 16 is then tightened.

If the overflow pipe 4 is not standing straight the float valve 10 might not seat properly. This condition may be corrected by slightly bending the supporting arm 12 with pliers so that the tubular guide 11 will be in proper alinement with the axis of the valve seat.

With the link rod 9 in vertical position and the outer handle 7 lowered, the upper end of link rod 9 is bent and inserted in a suitable hole in the operating lever 8 or flush arm, as shown.

Neither jarring, nor the surging of water can

now affect the valve in its travel to the seat. The valve stem 17 with its lifting members 20 and 19 merely "floats" vertically up and down. It can not deflect the valve out of its proper line of travel nor cause the stem 17 to bind in the guide 11, no matter what angular pull may be exerted by the operating lever 8.

To remove the stem 17 for inspection or repair it is only necessary to unscrew it from the float valve and pull it out.

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

1. A guiding and flotational control device for a float valve having means for raising and releasing the same, said control device comprising, in combination, an upright tubular guide mounted for tilting and sidewise alining adjustments, said guide slidably receiving the stem of said valve; said stem projecting above said guide and having a section extending laterally and downwardly outside the guide and presenting in the path of movement of said actuating means and near the bottom of the guide an abutment adapted to be slidably engaged with predetermined lateral pressure against the outer wall of the guide, and means for varying such pressure.

2. A guiding and flotational control device for a float valve having actuating means, said device comprising, in combination, an upright tubular guide slidably receiving the stem of said valve, said stem having a section extending downwardly outside the guide and presenting an abutment, in the path of movement of said actuating means, adapted to frictionally engage the outer wall of the guide.

3. A flush tank having a float valve and stem and lifting means therefor and having an upright tubular guide member coaxial with the valve; the said stem extending upwardly through the guide member and downwardly outside the same, the lower part of such downwardly extending portion being adjacent the lower part of the said guide member and slidable thereon and adapted to be engaged and actuated by said lifting means.

4. In a flush tank having a float valve and stem, guiding and actuating means for said stem comprising an upright tubular member, the valve stem extending through and projecting above said member, the stem having a flexible section extending outside the member and downwardly, the lower end of such flexible section engaging the lower portion of the guide and being slidable thereon in the path of movement of a lifting member on said float valve actuating means.

5. A stem for a flush tank float valve, comprising an upright member adapted to be secured at its lower end to the valve, said member having at its upper end a laterally extended portion, a section extending downwardly from the end of said lateral portion, being spaced from said upright member and substantially parallel therewith, the lower end of such downward section presenting, intermediate the ends of said upright member, an abutment which upon being lifted vertically raises the upright member and the float.

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