

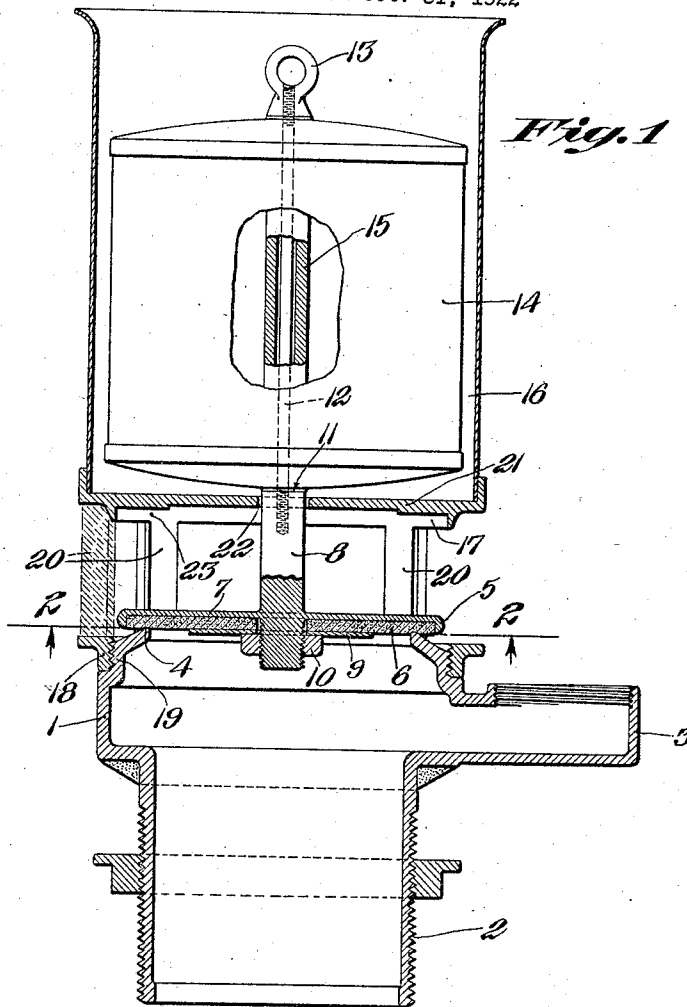
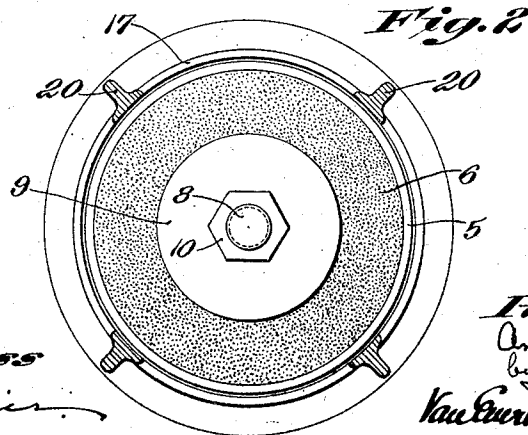
May 5, 1925.

1,536,078

A. F. CURTIN

FLUSHING VALVE FOR WATER CLOSETS

Filed Oct. 31, 1922



Witness
M. E. Orgin

Inventor
Andrew F. Curtin
by his attorneys
Kauferman, Fish, Hill & Kany

UNITED STATES PATENT OFFICE.

ANDREW F. CURTIN, OF MEDFORD, MASSACHUSETTS.

FLUSHING VALVE FOR WATER-CLOSETS.

Application filed October 31, 1922. Serial No. 598,122.

To all whom it may concern:

Be it known that I, ANDREW F. CURTIN, a citizen of the United States, residing at Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Flushing Valves for Water-Closets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to flushing valves for water-closets and more particularly to flushing valves of the type illustrated in the patent to Curtin, No. 1,283,473, Nov. 5, 1918.

The object of the invention is to provide an improved and simplified construction of valve designed to insure against the binding of any of the moving parts thereof during its operation and to provide a construction which may be easily and conveniently assembled and taken down.

With this and other objects in view, as will hereinafter appear, the invention consists in the valve hereinafter described and particularly defined in the claim. In the accompanying drawing illustrating the preferred embodiment of the invention, Figure 1 is a vertical sectional view of the improved flushing valve, and Figure 2 is a sectional view taken on line 2—2 of Fig. 1.

The hollow body portion of the outlet, which is indicated at 1, is open at the top and has depending therefrom a spud 2 adapted to project through a hole in the bottom of the flushing tank and which is externally threaded for connection with a flushing pipe leading to the closet bowl. As usual, the open top of the outlet member comprises the inlet and the opening of the lower end of the spud, the outlet of the valve. A hollow arm 3 projects laterally from the outlet member and is provided at its top with a threaded opening to receive the lower end of the overflow pipe. The tank, overflow pipe and flushing pipe are of the usual type and are not shown in the drawing. The top of the outlet member is tapered inwardly, as shown, and terminates in a valve seat 4 against which the valve 5 is adapted to be normally seated. The valve 5 carries a leather washer 6 which is received in a recess on the side of the

valve disk 7. The edges of the valve disk are rounded, for a purpose to be referred to later. The valve stem 8 is formed integral with the valve disk 7 and projects downwardly from the center of the disk through the washer 6, where it is threaded and receives the valve washer 9 and nut 10, by which the leather washer 6 is held in place. The valve stem 8 is shouldered at 11 and the reduced portion 12 of the valve stem extends upward therefrom. This reduced portion 12 of the valve stem is screwed into the upper end of the valve stem 8 and it is not intended to be removed therefrom. The upper end of the reduced portion 12 of the valve stem is screw threaded and receives an eye nut 13 which is screwed on it. Between the eye nut and the shoulder 11 of the valve stem the float 14 is carried. This float is a cylindrical hard rubber body provided with a hollow spindle 15 in its center which is integrally connected with the body of the float at both its top and bottom, so that the pillar is water-tight and water is not permitted to enter the float through the hollow opening in the pillar. By tightening the eye nut on the valve stem the float is securely attached to the pillar and the pillar enables the eye nut to be screwed up tight on the reduced portion 12 of the valve stem, so that the float is rigidly attached to the stem. The float and valve are carried in a float chamber 16 and valve cage 17, respectively. The valve cage 17 is provided at its lower end with a screw-threaded ring 18 which screws on to a reduced portion 19 of the outlet member. The opening through the ring 18 is of sufficient size to permit the passage of the valve through it. Rising from the ring 18 are four column guide bars 20 which comprise the bars of the valve cage. They are shown in horizontal section in Fig. 2, as well as in elevation in Fig. 1. In addition, one of the bars 20 is shown in dotted lines revolved into the plane of the section in Fig. 1. The valve cage 17 is provided with a top 21 which forms the bottom of the valve chamber 16. The lateral walls of the valve chamber 16 are received within the upturned flange of the plate 21. An opening 22 is provided in the center of this plate 21, through which the valve stem 8 is adapted to pass. When the valve 5 is seated on the valve seat 4, the pressure of

the water on the upper surface of the valve holds the valve to its seat, notwithstanding the tendency of the float 14 to lift the valve therefrom. When the valve is lifted off its seat the float is raised in the float chamber and, the whole being submerged, water flows down between the sides of the float and walls of the float chamber under the float, and the buoyant float then holds the valve in its raised position in the recess 23 on the underside of the plate 21, thereby removing the valve from the path of motion of the water to the valve opening. As the water in the tank falls below the level of the top of the float chamber, the water in the float chamber begins to flow out around the opening in the valve stem, but it flows out of the float chamber more slowly than the level of the water on the outside falls, as a consequence of which the valve is maintained in raised position until the water level in the tank falls to the level of the valve inlet opening. Finally the water in the float chamber falls to a level such as to no longer sustain the float and valve and the valve closes the inlet opening. The bottom of the float chamber is provided on its underside with lugs which project downwardly about $\frac{1}{2}$ of an inch and extend inwardly about half way from the guide bars to the central opening. These lugs are narrow and serve to space the valve away from the bottom of the float chamber and thereby secure a free passage of water from the float chamber down through the stem opening in the float chamber bottom, over the top of the valve and down its edges into the tank. The recess 23 is made slightly larger than the diameter of the valve 5, so that its surrounding edge will not engage the sides of the valve and will thereby permit the flow of water from the valve chamber to the tank.

In the construction of said patent the size of the stem being considerably larger than the size of the stem employed in the present construction, the space between the stem and the edges of the opening in the bottom of the float chamber is considerably less than in the present construction, with the result that sometimes the stem cramps in the opening and the valve is suspended and remains open. The sizes of the parts of the present device are such that the float prevents the contact of the stem with the edges of the opening in the bottom of the float chamber, thereby preventing the cramping of the valve stem in the opening and its sticking. Also the rounded edge of the valve 5 contributes to prevent any sticking of the valve or accidentally holding it open.

The present construction has features of substantial advantage over the construction of the said patent. In the first place, the

valve cage is screwed on to the outlet member finger tight, so that it may be readily unscrewed and removed if for any reason it becomes necessary as, for example, in case of the necessity of a new float or for cleaning out the float chamber. Again, in the construction of said patent in order to replace the float it was necessary to remove the valve from the valve stem. Although the construction seemed to indicate that the removal of the nut would remove the float, such was not the case, as it was required to remove the valve from the valve stem and then to lift the float out of the float chamber carrying the valve stem with it. In the present construction, however, in case it is desired to replace the float with a new one or to clean the float chamber, the valve cage and float chamber will be unscrewed from the outlet member and taken out of the tank, and thereupon by simply unscrewing the eye nut the float may be removed and the valve taken out through the bottom of the cage and any part of the float chamber may be removed or a new leather washer may be inserted or a plate may be put in place. The turned or rolled edge of the valve tends to prevent its catching on the guide bars of the cage. The inner surfaces of these guide bars, it may be mentioned, are finished so as to remove all roughnesses or irregularities therefrom. Furthermore, the relative sizes of the float and float chamber, valve stem and valve stem hole in the bottom of the chamber, and of the valve cage and valve contribute to the certainty of operation of the valve. In addition to the foregoing advantages, it is to be remarked that the assembly of the unit is simple and convenient. Thus, the leather washer may be put in place and be secured by the washer 9 and nut 10, the valve stem may then be inserted through the bottom of the float chamber, the float dropped on the reduced portion of the valve stem, and the eye nut screwed down to hold it in place. Conditions of handling and installation of apparatus of this kind indicate additional advantages. In shipping tanks with valves installed, protecting material, such as straw or excelsior, is sometimes allowed to fall into the float chamber and to get under the float, which thereby interferes with the closing of the valve and with the flowing of the water out of the float chamber. Also in building construction some times it happens that a tank will be installed before plastering operations have been completed and some particles of plaster or debris of other sort may easily fall into the valve float chamber and prevent good operation of the valve. The present construction offers a simple manner of removing any such dirt by removing the float chamber and valve cage and taking

the float off the valve stem, whereby access may be had for cleaning. In addition, in some places of use, water contains an alkali which forms scums that in time by accumulation will tend to obstruct the operation of the valve and the simple dismantling of this is sufficient to clean it and put it back in good condition.

One of the features of the present invention consists in making the valve integral with the valve stem. This reduces the cost of manufacture and improves the construction. The float construction is desirable because the stresses to which it is subjected by screwing down the eye nut are taken up by the pillar or stem in the center of the float, as a result of which the float will not be collapsed by the pressure due to screwing up the eye nut.

What is claimed is:—

A flushing valve for water closets having, in combination, a hollow body portion having an inlet and an outlet, a float chamber located above the inlet having a hole in its bottom, the under side of the bottom of the float chamber being provided with narrow lugs which serve to space the valve away from the bottom of the float chamber, said float chamber being supported from the body portion by spaced bars affording openings between them for the passage of water to the inlet, a valve for closing the outlet having an integral stem extending through the hole in the bottom of the float chamber, and a float supported on the valve stem in the float chamber.

ANDREW F. CURTIN.