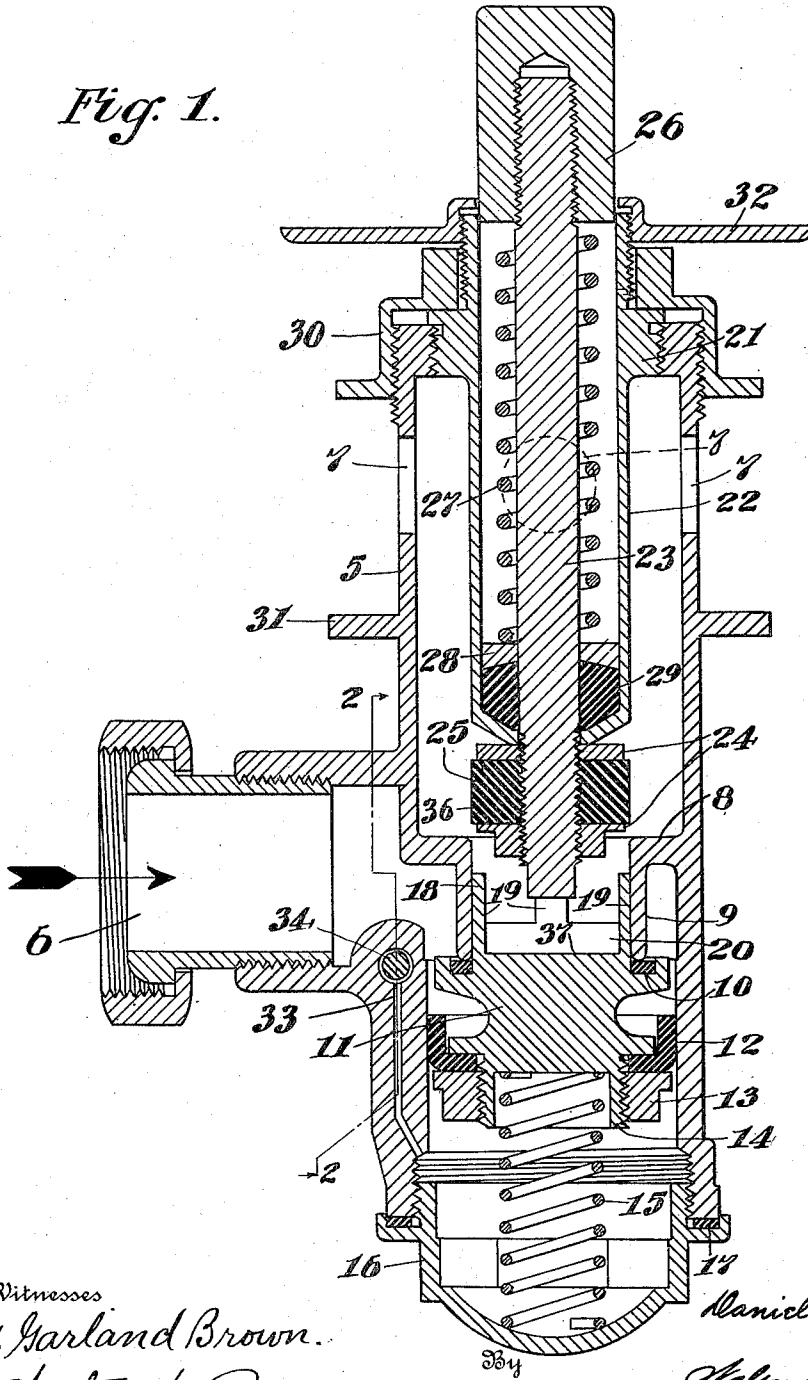


D. W. McNEIL.
 FLUSH VALVE FOR WATER CLOSETS.
 APPLICATION FILED JUNE 4, 1915.

1,225,987.

Patented May 15, 1917.
 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
G. Garland Brown.
W. Thornton Bogert

Inventor
Daniel W. McNeil
Walter J. Murray
 Attorney

D. W. McNEIL.
 FLUSH VALVE FOR WATER CLOSETS.
 APPLICATION FILED JUNE 4, 1915.

1,225,987.

Patented May 15, 1917.

2 SHEETS—SHEET 2.

Fig. 4.

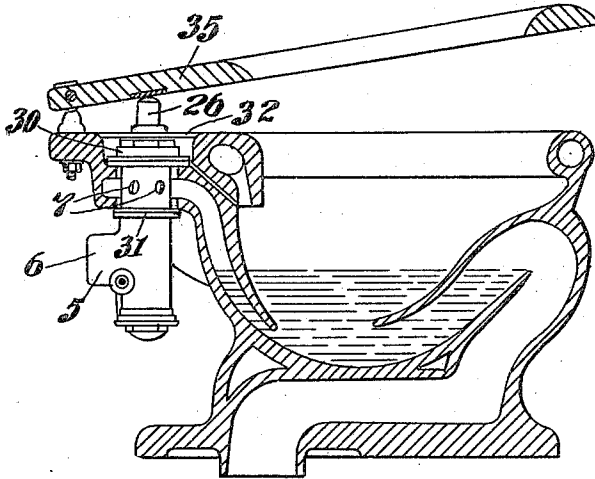


Fig. 3.

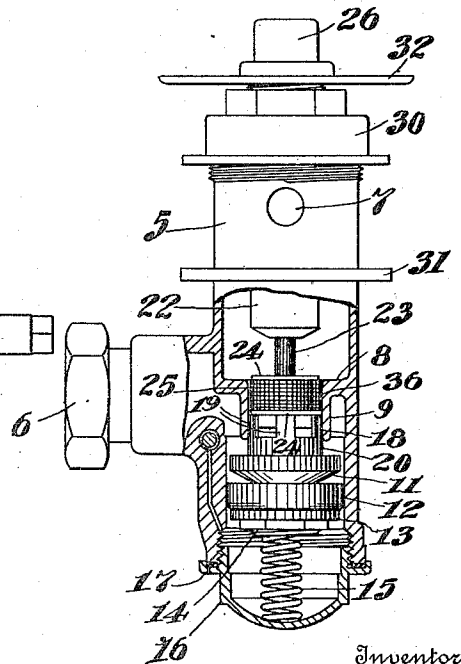
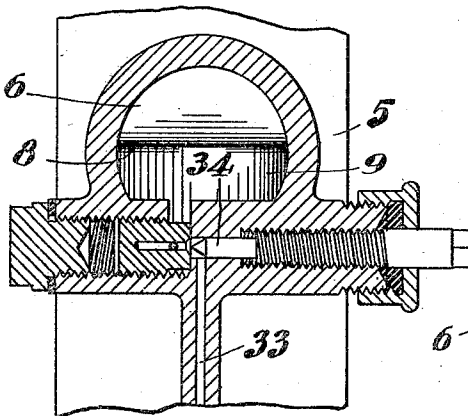


Fig. 2.



Inventor

Daniel W. McNeil

Witnesses

H. Garland Brown.

W. Thornton Rogers

By

Walter D. Murray

Attorney

UNITED STATES PATENT OFFICE.

DANIEL W. McNEIL, OF CINCINNATI, OHIO, ASSIGNOR TO THE JOHN DOUGLAS COMPANY,
OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

FLUSH-VALVE FOR WATER-CLOSETS.

1,225,987.

Specification of Letters Patent.

Patented May 15, 1917.

Application filed June 4, 1915. Serial No. 32,083.

To all whom it may concern:

Be it known that I, DANIEL W. McNEIL, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Flush-Valves for Water-Closets, of which the following is a specification.

This invention relates to improvements in flush valves and particularly to flush valves of the type adapted to be operated by a motion of the closet seat with which they are operatively associated.

An object of my invention is to produce a valve of more compact construction than valves of the same type heretofore employed.

An object is to produce an improved flush valve in which a construction is provided which eliminates the necessity of extreme accuracy of construction.

A further object is to produce an improved flush valve in which the main valve may be readily removed for purposes of repair, without dismantling the entire valve.

These and other objects are attained in the valve described in the following specification and illustrated in the accompanying drawings, in which,—

Figure 1 is a longitudinal sectional view of a valve embodying my invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is an elevation upon a somewhat reduced scale, of a valve embodying my invention, with certain portions broken away to show the operating portions of the valve in different positions from those shown in Fig. 1.

Fig. 4 is a sectional view showing the position occupied by my improved valve, when properly mounted on a closet bowl.

In valves of the type adapted to be automatically operated, and in which the push rod is separately operated to return it to its normal position, the push rod and operating means are located outside the valve casing.

This results in a valve construction which necessitates an elongated structure occupying a great amount of space, and thus defeats one of the principal objects for which valves of this type are provided.

It is to overcome this and other objections to valve constructions of this type that I

have devised the improved valve herein set forth. The valve embodying my invention consists of a casing 5 having an inlet port 6 and a series of discharge ports 7 spaced apart around the upper portion of the valve casing. On the interior of the casing adjacent to the inlet 6 is a bridge 8 having a depending annular flange 9 surrounding a port in the bridge and at its lower end adapted to form a seat for the packing 10 of the main valve 11 reciprocally mounted in the lower end of the casing. The lower portion of the valve 11 is provided with a cup leather 12 which is secured in position by a lock nut 13 mounted on the screw threaded lower end 14 of the valve. This screw threaded end 14 is provided with a recess adapted to receive the upper end of the coil spring 15, which rests at its lower end upon a cap 16 secured to and adapted to close the lower end of the valve casing 5. A packing 17 is provided on the cap 16 for the purpose of closing the casing against leakage at its lower end. At the upper end of the valve 11 an upwardly extending annular flange 18 is provided to enter and reciprocate within the downwardly extending annular flange 9 formed on the bridge 8. The annular flange 18 is however, provided with a series of notches which leave a series of circumferentially alined projections for the purpose of guiding the valve 11 in its motion. The notches are not made the entire depth of the flange 18 so that the portion 20 is left to positively close the opening surrounded by the flange 9 when the main valve 11 is moved to substantially its closed position.

At the top of the casing a screw threaded plug 21 having a downwardly extending hollow cylindrical extension 22 is provided, the extension 22 having an aperture at its lower end adapted to permit the push rod 23 to pass therethrough. The lower end of the push rod 23 is screw threaded and is provided with screw threaded collars adapted to retain a packing 25 between them for the purpose of closing the port surrounded by the flange 9, when the push rod is forced downwardly into engagement with the main valve, to open the main valve. The packing 25 and the flanges 24 form an auxiliary valve 36, the purpose of which is to prevent the water from passing from the

inlet 6 upwardly through the casing and out through the discharge passages 7 when the main valve is opened by the push rod 23. At the upper end of the push rod a knob 26 is secured, the knob being of a diameter adapted to reciprocate within the cylindrical portion 22 of the plug 21 when the auxiliary valve is moved within the flange 9. For the purpose of returning the push rod and the auxiliary valve to their normal positions and also for the purpose of affording a water tight joint at the point where the push rod 23 passes through the casing 22, a spring 27 is provided between the under face of the knob 26 and a collar 28 mounted on the push rod, together with packing material 29 for the purpose of forcing the packing into contact with the surface of the valve stem to prevent water entering the cylindrical extension 22 and to return the auxiliary valve to its normal position as shown in Fig. 1. At the top of the casing a cap 30 is provided, which in cooperation with the outwardly extending flange 31 formed beneath the discharge ports 7 is provided for securing the valve in position on the closet bowl as shown in Fig. 4. In addition to the cap 30, an ornamental cap 32 is provided for closing the recess in which the valve is located.

The spring 15 which closes the main valve 11 is of such a tension that it will close the valve when the pressure on top of the valve and the pressure on the under side of the valve are equal. If however, the pressure on the under side of the valve is reduced the valve will remain open because of the overbalancing pressure of water on its upper surface, and thus permit the water to pass through the port surrounded by the flange 9 and upwardly through the casing 5 and out of the discharge passages 7. For the purpose therefore of permitting the valve 11 to close, a by-passage 33 is formed in the side of the valve casing, the upper end of the passage being constricted by a needle valve 34 which is in communication with the inlet passage 6, while the lower end of the by-passage communicates with the chamber beneath the valve 11 so that the water may pass through the passage 33 to create an equal pressure on the top as well as the under side of the main valve. Under these conditions the valve will close under the pressure of the spring 15.

In use:

After the valve has been properly mounted, the knob 26 will be retained against the under side of the closet seat 35 and will normally hold the seat in a slightly raised position as shown in Fig. 4, under the pressure of the spring 27. This position of the knob under the pressure of the spring 27 also holds the auxiliary valve 36 above the

port surrounded by the flange 9 and away from the main valve 11. In this position the main valve will be retained in its closed position, thereby preventing the passage of water through the port surrounded by the flange 9 and upwardly through the casing 5 and out of the discharge ports 7.

When the seat is moved downwardly, the knob 26 will be pressed down under the influence of the spring 27 and will carry the auxiliary valve 36 through its connection with the rod 23, into the port surrounded by the flange 9. After this port has been closed, the end of the valve stem will be brought into engagement with the top surface 37 of the main valve 11, and will force the valve downwardly, the water beneath the valve being forced back through the by-pass 33 and also around the packing 12 of the main valve, thereby permitting the water to pass from the lower end of the casing to a point above the valve 11 where it will be discharged with the water entering the port surrounded by the flange 9, upwardly through the valve casing and out of the discharge ports 7. Passage of the water beyond the auxiliary valve 36 is prevented however, since the auxiliary valve plugs the port in the flange 9 and prevents it from passing upwardly through the casing. The main valve and the auxiliary valve will be retained in this position and the water will not be permitted to be discharged until the seat is released and the valve stem and auxiliary valve is raised by the spring 27 to leave the port in the flange 9 and permit the water from the inlet port to pass there-through. With the auxiliary valve lifted the water will pass upwardly through the casing and out of the discharge ports 7. The discharge of water through the valve will continue until the main valve 11 is seated against the lower end of the flange 9. This seating operation of the valve 11 is caused by gradual seepage of the water which passes the needle 34 and through the by-pass 33 to the chamber beneath the valve 11. As the water is permitted to pass to the under side of the valve 11 it will become gradually raised under the influence of the spring 15 until the portion 20 of the flange 18 has been brought to close the opening in the flange 9. In this position all of the water is substantially cut off and prevented from discharging through the valve, but to positively seal the port the valve is gradually raised until the packing 10 is brought into engagement with the lower end of the flange 9. With the valve in this position the pressure of its upper face is materially reduced over the pressure on its under face since the area covered by the flange 9 is taken from the total top surface area of the main valve thereby creating a much greater pressure on the under face in proportion

to that now existing on the upper face. As soon as the portion 20 of the flange 18 has been brought to register with the flange 9 as above described it will be seen that the spring 15 is aided materially in not only moving the valve toward but in also retaining the valve in its closed position. In fact the spring 15 may be said to have been provided principally for the purpose of returning the valve to the position in which the flange 20 registers with the flange 9, so that the pressure on the upper face of the valve could be reduced in order to permit of the pressure on the under face of the valve to act solely in retaining the valve in its closed position. Another feature to which I desire to call attention is that because of the portion 20 of the flange 18, the main valve 11 will have to be moved but a short distance against the pressure existing on the under face thereof, to the point where the portion 20 will be removed from the flange 9, at which point the pressure on its upper face will be completely restored to equal the pressure on its under face, so that the valve will only have to be moved against the pressure of the spring 15, which pressure is negligible.

Having thus described my invention, what I claim is:

In a flush valve, the combination of a casing closed at its lower end and having, upon its interior intermediate its ends, an annular flange, an outlet port near the upper end of the casing and an inlet port below the flange, a cap for the casing having a hollow cylindrical extension projecting into the casing, a push rod extending through the cylindrical extension, an auxiliary valve upon the lower end of the push rod and adapted to fit within the annular flange, a spring within the cylindrical extension and adapted to hold the push rod in a position with the auxiliary valve above the annular flange, a main valve normally contacting with the lower end of the annular flange, and means for permitting seepage of water between the main valve and the lower end of the casing.

In testimony whereof, I have hereunto subscribed my name this 2nd day of June, 1915.

DANIEL W. McNEIL.

Witnesses:

WALTER F. MURRAY,
W. THORNTON BOGERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."