

J. B. WILLIAMS.
 REVERSIBLE FLUSH VALVE.
 APPLICATION FILED JUNE 3, 1912.

1,062,868.

Patented May 27, 1913.

Fig. 1.

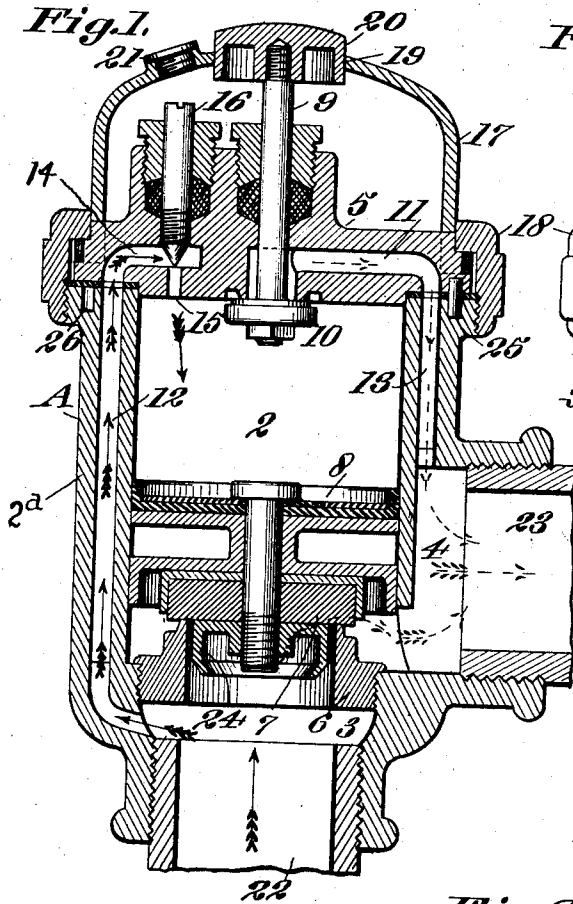


Fig. 2.

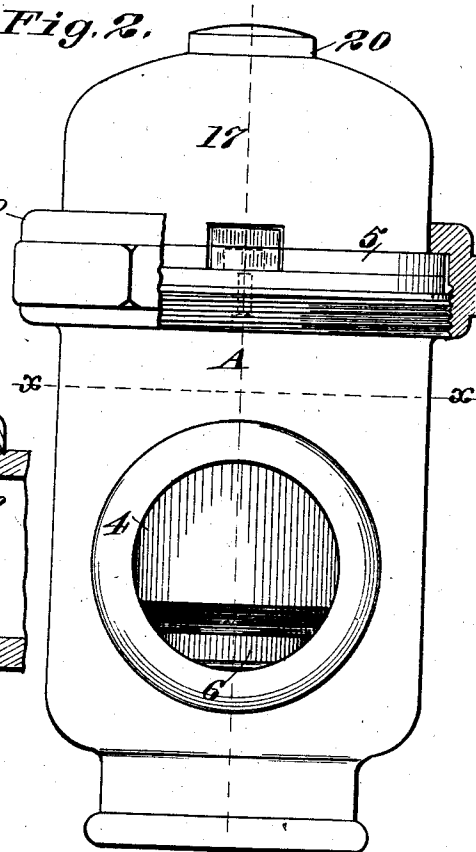


Fig. 4.

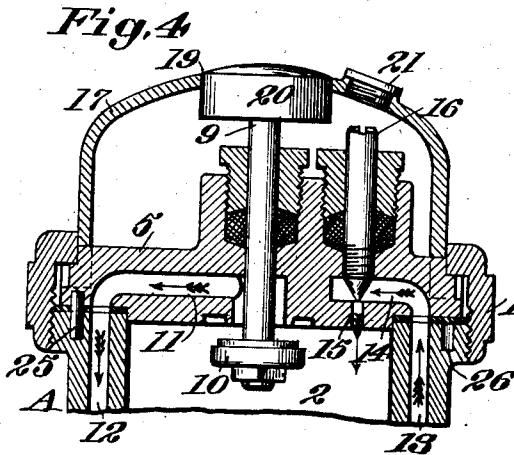
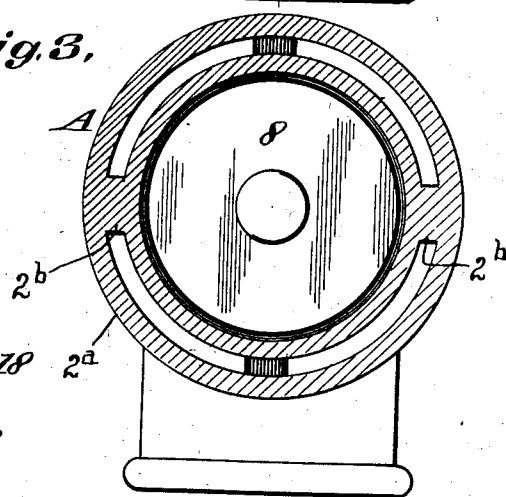


Fig. 3.



WITNESSES:

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JOHN B. WILLIAMS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
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REVERSIBLE FLUSH-VALVE.

1,062,868.

Specification of Letters Patent.

Patented May 27, 1913.

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REISSUED

To all whom it may concern:

Be it known that I, JOHN B. WILLIAMS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Reversible Flush-Valves, of which the following is a specification.

This invention relates to a flushing apparatus for use in connection with toilets and the like.

The object of the invention is to provide a flushing valve which is reversible, that is, one in which the water connections may be easily reversed so that the intake and discharge ports are readily interchangeable, thereby facilitating installations under varying conditions; and which valve is simple and substantial in construction, and by the use of which a storage tank, or like appliance, may be eliminated, thereby lowering the cost of installation and reducing the space required to a minimum.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the valve. Fig. 2 is a side elevation of same, partly broken away. Fig. 3 is a cross section on the line X—X of Fig. 2. Fig. 4 is a vertical section of the upper portion of the valve, showing the cylinder head in the reverse position.

This invention relates to a flushing apparatus for use in connection with toilets and the like.

The main object of the invention is to construct a flush valve which is simple and compact in construction, and which valve may be adjusted to reverse the flow of water through the intake and discharge connections when so desired to make the intake connection the discharge and the discharge connection the intake, or vice versa; this is a very desirable feature, as it provides a flush valve that can be installed in combination with almost any make of water closet, and which can be installed in any position when it is necessary to reduce space to a minimum.

The flush valve, as shown in the accompanying drawings, is a device with the aid of which water, in large enough quantities, is admitted to operate the toilet; the flush

valve being automatic and adjustable to allow any desired quantity, within certain limits, to flow.

The flush valve consists of a casing A, having an interior cylindrical portion 2, and an outer casing 2^a, the interior cylindrical portion and the outer casing being joined together by partitions 2^b which are integral with the cylindrical portion and the outer casing. The casing A is provided with intake and discharge openings 3 and 4, which may be changed to discharge and intake openings, by changing the position of a set of valve ports in a cylinder head 5, which will later be described.

The lower end 3 of the valve casing which opens into the cylinder 2, is provided with a brass bushing 6, which forms a seat for the valve 7 carried by a piston 8, which latter operates in the cylinder 2. The upper end of the cylinder is closed by the cylinder head 5, through which passes a stem 9, the inner end of which carries a valve 10, which normally closes a radial discharge port 11 in the cylinder head. This port 11 is adapted to register with either one or the other of a pair of vertically disposed ports 12 and 13; in Fig. 1 of the drawings I have shown it as registering with port 13, which connects with the opening 4. I have also shown a second radial port 14 in the cylinder head, which is provided with a small outlet opening 15, leading into the cylinder 2. The area of the outlet opening is regulated by a needle valve 16, mounted in the cylinder head, which is adjustable to regulate the flow of water from the radial passage into the cylinder. The radial passage 14 is disposed exactly opposite to the passage 11, or at an angle of 180°, and registers with the vertical port 12, which connects with the opening 3.

The cylinder head is incased by a cover portion 17, which together with the cylinder head is clamped to the valve casing by the lock ring 18. The outer cover 17 is shown as provided with an opening 19, through which passes the stem 9, which is provided with a push-button 20 on its outer end. I have also shown the cover provided with a screw plug 21 which may be removed when it is desired to adjust the needle valve 16.

With the parts assembled and suitable connections made with the main 22 and the discharge pipe 23, which may connect with a

water closet or the like, not here shown, the operation is as follows: Normally, valve 7 is closed to interrupt the flow of water from the supply main 22 to the discharge pipe 23. Since the cylinder chamber 2 above the piston 8 remains always in communication with the main, through the ports 12, 14, and 15, and the piston being of larger area than the valve 7, the pressure on the top-side of the piston will be more than sufficient to hold the valve 7 closed. When it is desired to flush the bowl, it is only necessary to push in on the button 20. This action opens valve 10, which instantly relieves the pressure on the top of the valve piston 8, and throws it into an unbalanced state by allowing the water in the cylinder chamber 2, to empty into the discharge opening 4 through ports 11 and 13; the inlet opening 15 from port 14 being comparatively much smaller than the outlet through valve 10, will have very little effect in retarding the upward movement of the piston, which jumps almost instantly to the top of the cylinder on the operation of the push-button. The valve 10 is closed by the piston striking the valve, and the cylinder chamber above the piston 8 will immediately begin to fill through the inlet opening 15, and force the piston back to its normal closed position. The flushing of the water closet takes place during the period that it takes the piston to travel back and reseal the valve 7. By adjusting the needle valve 16 more or less, this period may be prolonged or shortened as the needs of a particular case require. This operation insures the prompt working of the closet, for the sudden rush of a small quantity of water under pressure is much more effective in flushing than a large quantity of water run in at a slower rate from a tank.

In flushing the bowl of a toilet it is always desirable to choke off the inrushing water after the actual flushing of the bowl has been accomplished, so as to leave the bowl part of the toilet full of water, which is accomplished in this instance by providing the valve 7 with a cylindrical extension 24, which also acts as a nut to hold the valve 7 in position against the piston 8. It can plainly be seen that as the piston moves down to seat the valve 7, the cylindrical extension 24 will enter the circular opening of the valve seat 6, and gradually decrease the volume of water coming from the main 22, thus producing the desired action, which allows the bowl of the toilet to refill.

The important feature of this invention is the provision of means whereby the flow of water through the casing may be reversed so that it will be possible to connect either of the connections 3 or 4 with the main or supply pipe 22, or the discharge pipe 23, which connects with the bowl of the toilet. This is a very desirable feature as it pro-

vides a flush valve that can be installed in any position or in combination with almost any make of water closet.

In Fig. 1 of the drawings I have shown the flush valve connected with the main or supply pipe 22 through the opening 3, and discharging through the opening 4, but however, if a flush valve should be installed in a position where it would prove more practical or convenient to connect it with the main or supply pipe 22 through the opening 4, (which has previously been described as the discharge opening), and connect the opening 3, (which has previously been described as the intake opening), with the discharge pipe, it will only be necessary to change or reverse the position of the cylinder head 5, to make the intake port 14 register with the port 13, which now communicates with the intake side of the flush valve, and the discharge port 11, register with the vertical port 12, which now communicates with the discharge pipe. The reversed position of the cylinder head is shown in Fig. 3 of the drawings. The reversing of the cylinder head is accomplished by unscrewing the lock ring which leaves the cover portion and cylinder head free to be turned or reversed from one position to another. One advantage of this construction is that it makes it possible to connect the toilet directly to the source of water supply through the usual pipe connections, thereby eliminating the use of a tank either in the toilet or in any other part of the building, as is now generally used, thus saving extra piping as well as special apparatus.

The flush valve is neat in appearance, prompt and reliable in its actions, and takes no more space than the stool alone. The materials and finish of the several parts of the apparatus are such as experience and judgment of the manufacturer may dictate.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claim, and that I do not wish to limit myself to the specific design and construction here shown.

When changing the position of the cylinder head to reverse the flow of water through the valve casing, and in order to make the connecting ports to register, it is desirable to provide means by which a positive registering of the ports may be secured. To this end I have provided a dowel pin 25, secured to the cylinder head, which will register or seat itself in the openings 26 in the casing, provided for that purpose.

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

A device of the class described comprising an outer casing, a cylindrical portion within said outer casing, intake and dis-

charge connections attached to said casing and communicating with the lower end of said cylinder, a valve seat provided in the lower portion of said cylinder, a piston valve
5 arranged to close on said valve seat to shut off communication between the intake and the discharge connections, partitions connecting said outer casing and cylindrical portion in such manner as to provide two
10 ducts, one being connected with the intake opening and the other being connected with the outlet opening, a cylinder head closing with the upper end of the cylinder and provided with diametrically oppositely disposed pas-
15 sage ways opening into said cylinder and each communicating with one of said ducts, a needle valve carried by said cylinder head

and adapted to control one of said passage ways, and a control valve carried by said cylinder head and provided with a push
20 button, said cylinder head being formed with the passage ways constructed to permit the cylinder head to be reversed whereby the relationship of said passage ways to the ducts is interchanged, substantially as
25 described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN B. WILLIAMS.

Witnesses:

JOHN H. HERRING,
GENEVIEVE S. DONELIN.