F. J. WOLFF.

FLUSHING DEVICE.

APPLICATION FILED OCT. 23, 1914.

1,298,849.

Patented Apr. 1, 1919.

2 SHEETS—SHEET 1.

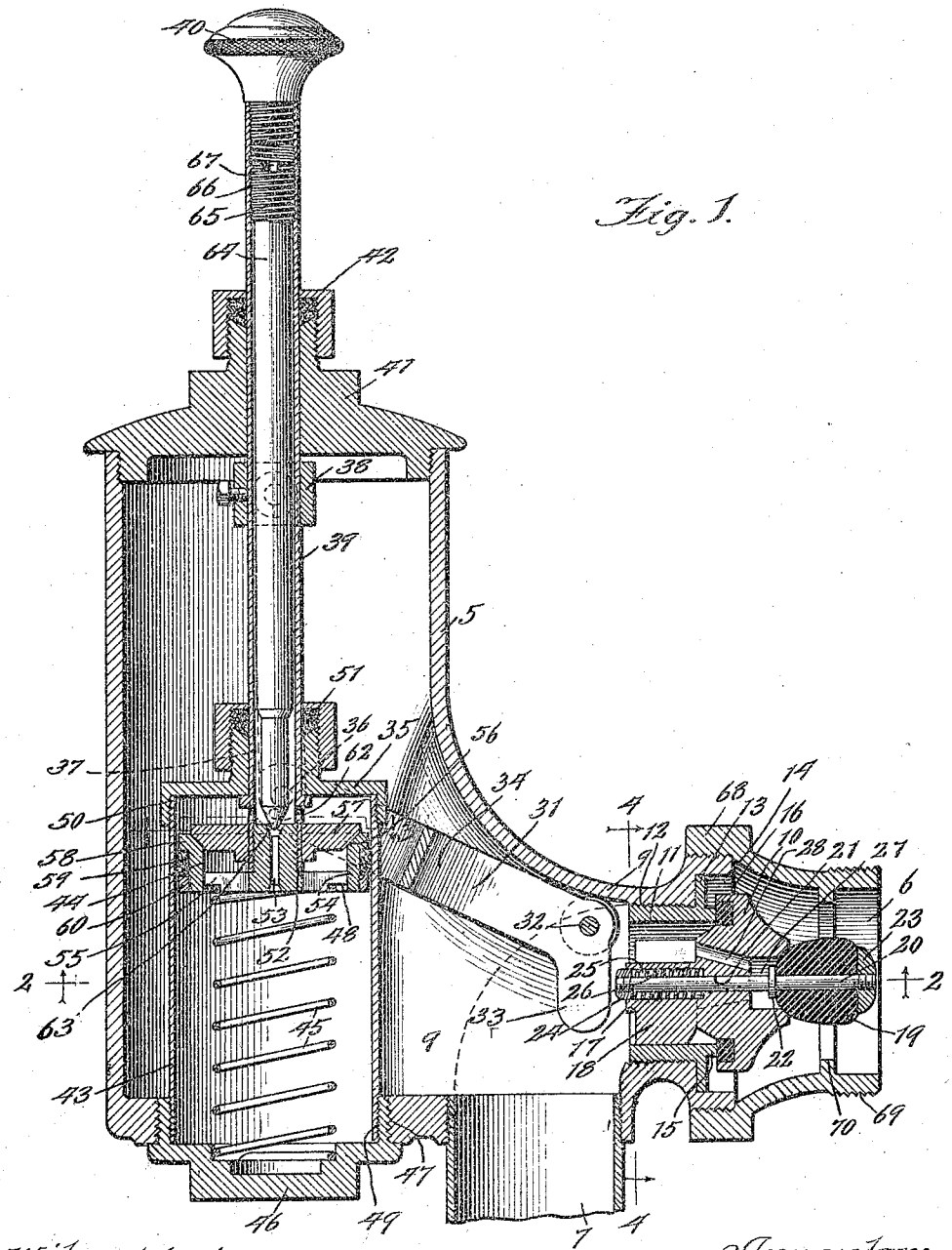


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

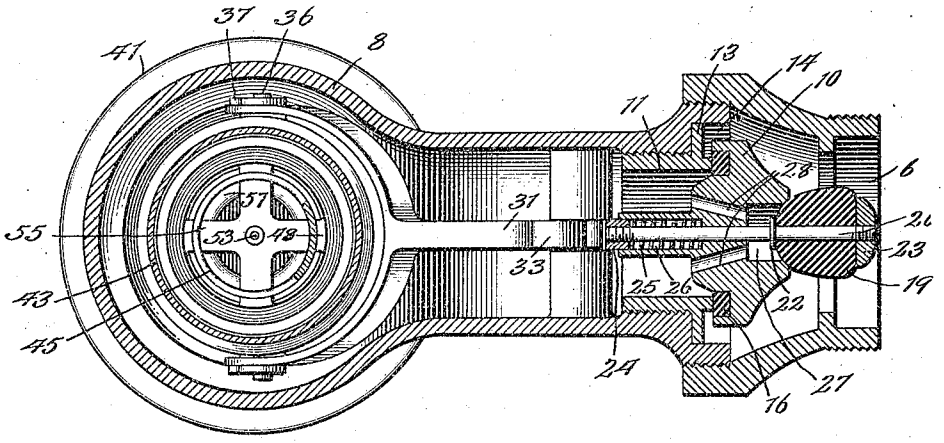


Fig. 4.

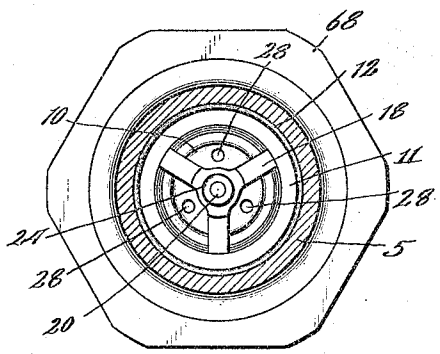
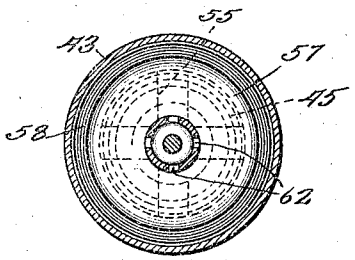


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANKLYN J. WOLFF, OF CHICAGO, ILLINOIS, ASSIGNOR TO L. WOLFF MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FLUSHING DEVICE.

1,298,849. Specification of Letters Patent. Patented Apr. 1, 1919.

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To all whom it may concern:

Be it known that I, FRANKLYN J. WOLFF, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Flushing Devices, of which the following is a specification.

My invention relates in general to automatic flushing valves for closet bowls, and more particularly to valves of the regulating and measuring type which are adapted to deliver a predetermined quantity of water by merely pressing a button or pulling upon a lever to give the valve its initial opening.

A principal object of the invention is the provision of a valve of this character adapted to be quickly and easily opened to permit flushing of the closet bowl and to be more slowly closed when the operating member is released, the slow rate of closing permitting the admission to the bowl of the desired quantity of water for flushing, and this with the presentation of minimum resistance to the passage of the water.

A further object of the invention is the provision of such a device in which all of the moving and controlling parts will be of much simplified form and greatly reduced number and all incased in a compact and easily constructed housing or shell.

A further object of this invention is to construct a valve of this character in which will be eliminated all cams, crank actions, and other complicated and expensive machine parts.

Still another object of the invention is the provision of a flushing valve wherein all the moving parts except the valve member itself may be readily removed after having been installed without shutting off the water and without removing the valve casing from position.

And still another object of the invention is the provision of a flushing valve which when installed in exposed position will present only the casing to be periodically polished to keep the fixture in bright condition.

Other objects and advantages of the invention will be apparent as it is better understood from the following description when considered in connection with the accompanying drawing illustrating a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a transverse sectional view of a valve embodying my invention;

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

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1; and

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 1.

The valve embodying my invention shown on the drawings comprises a casing or housing 5 in which the various moving parts are arranged, as will be later described, and which has a water inlet at 6 and an outlet to the closet bowl at 7. The casing 5 consists, in the present instance, of a relatively large cylindrical portion 8 having a laterally extending elbow 9, in the end of which the inlet 6 is provided and through the bottom of which the water passes to the outlet 7. The inlet 6 is adapted to be closed by a main valve 10 coöperating with a seat member 11. The seat member in the present instance consists of a cylindrical hollow sleeve threaded at 12 for internal engagement with the open end of the elbow 9 and having an outwardly extending shoulder 13 adapted to rest in a recess 14 in the end of the elbow 9, the shoulder 13 pressing against the bottom of the recess where it is held in tight engagement by the threads on the seat member and inside the elbow. Beyond the shoulder 13 an outwardly extending rib 15 is provided to engage the valve, a suitable gasket 16 being provided in the adjacent face of the valve itself. The valve is guided in its movement by a stem 17 extending into and through the seat member when the valve is closed, and this stem has a plurality (3 in the present instance) of radially extending webs 18 adapted to engage the inner surface of the valve seat member to steady the valve in its movement and yet permit the ready flow of water. The valve 10 carries an auxiliary valve 19, of any suitable soft material, mounted upon a stem 20 which extends through a suitable aperture 21 in the valve 10, the valve 19 being held between a shoulder 22 and a cap 23 on the stem 20. The stem extends clear through the valve 10 and projects inwardly of it, as seen in Figs. 1 and 2, the inner end of the stem being provided with a nut or head 24 which is readily slidable in an enlarged recess 25 in the valve stem 17 of the valve 10. In this recess and

normally holding the valve in seated position shown, is a spring 26 adapted to be compressed by pressure exerted upon the nut or head 24 of the valve stem 20. The valve 19 closes a recess 27 which otherwise communicates with the inlet and this recess, through suitable by-passes 28, is in communication with the interior of the casing 5. The purpose of this auxiliary valve is two-fold. When the valve is operated, as will be later described, it will be seen that the valve 19 opens before the valve 10 and breaks the pressure sustained by the valve 10 from the water main connected with the inlet, and it will also be manifest that the valve 19 closes later than the valve 10 and thereby provides for refilling the closet bowl after flushing.

Both valves are adapted to be operated by a bell crank lever 31 mounted within the housing or casing 5 and pivoted at 32 just above and rearwardly of the inner ends of the valve stems 17 and 20. One arm 33 of this lever extends downward behind the ends of these stems in position to engage successively first the valve stem of the auxiliary valve 19 and later the valve stem of the main valve 10. The other arm 34 of this lever is of stirrup or bifurcated formation and in the present instance extends about an oil cylinder 35. The two portions of this end are pivotally connected at 36 with the lower ends of two links 37 which are connected at their upper ends to a cross member or yoke 38 secured upon a hollow vertically movable rod 39. The rod 39 carries at its upper end a button 40 adapted to be pressed to open the valves and flush the closet bowl. The button 40 is located above and out of the casing or housing 5, the rod 39 passing through a removable head 41 provided with a suitable stuffing box 42 to prevent leakage around the rod. The rod 39 and button 40 are normally held in upper position by the oil cylinder and its attendant parts, as will now be described.

The oil cylinder consists of a cylindrical chamber or casing 43 in which moves a plunger or piston 44 secured to the lower end of the rod 39. A spring 45 is placed within the cylinder beneath the piston with one end resting in or against a plug 46 screwed into the casing at 47 and the other end resting in an annular recess 48 in the lower face of the piston. The casing 43 is secured in threaded engagement at 49 with the plug 46 at the lower end and at the upper end in threaded engagement with a head or closure 50 through which the rod 39 extends, a suitable stuffing box 51 being provided. The piston in the present instance consists of a central hub 52 perforated centrally at 53 and a rim 54 connected by radially extending spokes or webs 55 with the hub. The upper portion of the rim is beveled internally to provide a valve seat 56 for a valve 57 slidably mounted on the rod 39 and is provided on its outer face with a circumferentially extending shoulder 58 against which a yielding packing 59 is held by a ring 60 threaded onto the lower portion of the piston, the ring 60 being adapted to be turned to bring the packing against the internal surface of the cylinder to form a liquid-tight fit. Above the valve 57 a plurality of apertures 62 are provided through the rod 39 to establish communication between the upper portion of the cylinder and its lower portion through the perforation 53.

When the valve embodying my invention and just described is installed, the cylinder 35 is filled with oil or any other suitable liquid and pressure exerted upon the button 40 downwardly will force the piston toward the bottom of the cylinder, compressing the spring and driving the oil up between the valve 57 and its seat 56 at great rapidity, the movement of this valve against the pressure of the oil in the lower half of the cylinder holding it well above the seat to provide a large passage for the oil. This downward movement of the piston causes the operation first of the auxiliary valve 19 and immediately thereafter of the main valve 10 under the action of the bell crank lever 31. When the button 40 has been pushed down and is released, expansion of the spring 45 causes the valve 57 to seat in the piston and the oil that has been disposed above the piston must pass back into the lower portion of the cylinder through the apertures 62 in the rod 39 and then through the perforation 53. In order that this flow of oil may be regulated a needle valve 63 within the rod 39 is provided, this valve being mounted upon the end of a stem 64 having a threaded head 65 in engagement with threads 66 in the upper end of the rod 39 and just below the button 40, this valve being capable of regulation by merely removing the button 40 and engaging a screw driver or other suitable tool in a slot 67 in the upper end of the needle valve rod 64.

In order that the valve embodying my invention just described may be supplied to the trade without danger of damaging the parts, I provide a protective bushing 68 threaded on the end of the elbow 9, this bushing having suitable threads 69 to receive an ordinary pipe joint. Inside it is provided with an inwardly extending shoulder 70 adapted to prevent the main valve 10 from falling out, and this bushing is given length sufficient to protect the auxiliary valve when the parts are packed in retracted position for shipment.

It will be manifest that the oil cylinder, levers and plunger rod operate wholly within the casing or housing 5 and may be readily removed therefrom by merely unscrewing the plug or cap 46 and button 40. This

operation may be accomplished without shutting off the water if removal of these parts is desired for repair. The pressure of the water in the main is against both the auxiliary valve 19 and the main valve 10, so that these valves are held upon their seat independently of the lever 31 or any of the other moving parts. The valve may be placed in any position, that is to say the rod 39 may be disposed vertically or horizontally, as may be desirable, without affecting the efficiency of the device. Few moving parts are necessary in the construction of the valve and these may be made at little expense. The casing or housing may be of smooth and simple construction, easily cast, finished and polished and when the valve has once been installed only the casing itself needs occasional polishing to keep the fixture in presentable and attractive condition. Any leakage of oil from the oil cylinder is into the water chamber and the oil leaking will therefore be carried into the closet chamber and cannot be smeared over the casing where it might collect dust or soil the clothes of persons using the seat.

It will be manifest also that the flushing device embodying my invention and shown on the drawing presents a minimum obstruction to the free passage of the water in flushing and presents also minimum frictional resistance thereto. The water enters and passes around a sharp curve to the outlet. Little friction is interposed to this passage by reason of the fact that on the greater side of the curve the stream flows against a water wall formed at or about the dotted line shown in Fig. 1 by the water driven into the body of the casing 5, the only friction being present at the short side of the turn, away from which the water tends to flow by centrifugal action in moving from the inlet to the outlet.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be obvious that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:—

1. A flushing valve comprising a cylindrical casing having a lateral extension, the end of said extension providing an inlet opening and the base an outlet opening, a valve adapted to close against the end of said extension, a lever disposed wholly within said casing, a retarding device within and independent of said casing and connected with said lever and means for actuating said lever and said retarding device to open said valve for a predetermined period.

2. A flushing valve comprising a one-piece single chamber casing open at its top and bottom, closures for said top and bottom, said casing being provided with inlet and outlet openings, a valve for closing said inlet opening, a bell crank for moving said valve to open position and for controlling its subsequent closing movement, a retarder for delaying movement of said lever to permit the valve to close, a push rod disposed through said closure for the top of said casing and connections between said retarding device, said push rod and said lever, said retarding device and said lever and all of said connections being disposed within a single chamber within said casing.

3. A flushing valve comprising: a single chamber casing having inlet and outlet openings, a valve for closing one of said openings, a lever for moving said valve to open position, a retarder for delaying movement of said lever in permitting said valve to close, a push rod extending into said casing for operating said lever, connections between said retarder, said rod and said lever, and all of said connections being disposed in said single chamber of the casing.

4. A flushing valve comprising: a single chamber casing having inlet and outlet openings, and open at its top and bottom, a valve for closing one of said openings, a lever disposed within the casing for operating said valve, closures for the open top and bottom of said casing, one of said closures carrying a retarding device within the casing, said retarding device being connected with said lever and for delaying the closing action of said valve.

5. A flushing valve comprising: a single chamber casing having inlet and outlet openings, a valve for closing one of said openings, a lever for moving said valve to open position, a retarder for delaying movement of said lever in permitting said valve to close, means extending into the casing for operating said lever, and connections between said retarder, said means and said lever, said retarder, said means and said lever and said connections being disposed within a single chamber of said casing and removable therefrom without affecting the position of said valve.

6. A flushing valve comprising a chamber having inlet and outlet openings, a bell-crank pivoted within said chamber, a valve having a stem disposed adjacent one arm of said bell-crank for closing said inlet opening, a retarding device mounted within said chamber, a longitudinally movable rod for actuating said retarding device and connections between said rod and the other arm of said bell-crank for connecting said bell-crank with said retarding device and with said rod whereby downward pressure of the rod will move the bell-crank to open the

valve and the retarding device will delay return movement of said bell-crank to permit closing of the valve.

7. A flushing valve comprising a casing having inlet and outlet openings, a valve adapted to close said inlet openings, a bell-crank having an arm bifurcated and the other arm disposed in position to engage and move said valve, links connected to the bifurcated arm of said bell-crank, a push rod, a yoke connecting said push-rod with said links and a retarding device operable by said push-rod and disposed in the bifurcated arm of said bell-crank, said bell-crank, retarding device, yoke and links being disposed within said casing.

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