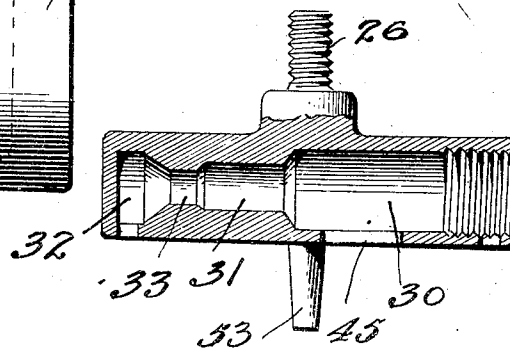
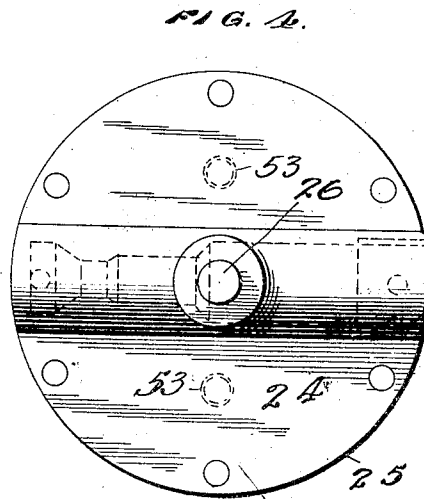
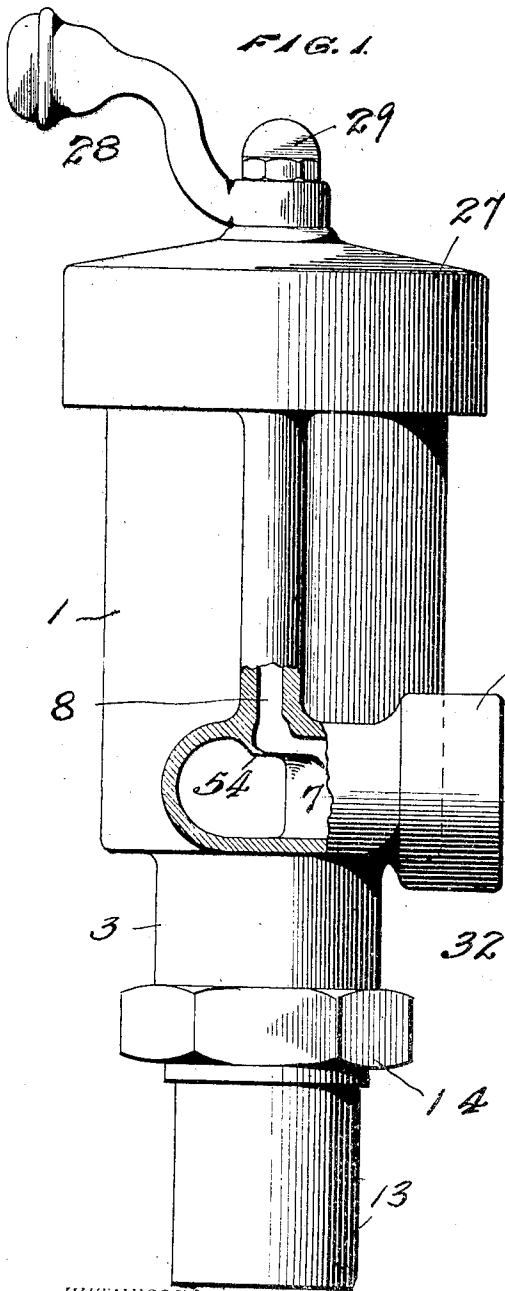


W. H. BOWMAN.
FLUSHOMETER.
APPLICATION FILED JUNE 1, 1908.

932,244.

Patented Aug. 24, 1909.
2 SHEETS—SHEET 1.

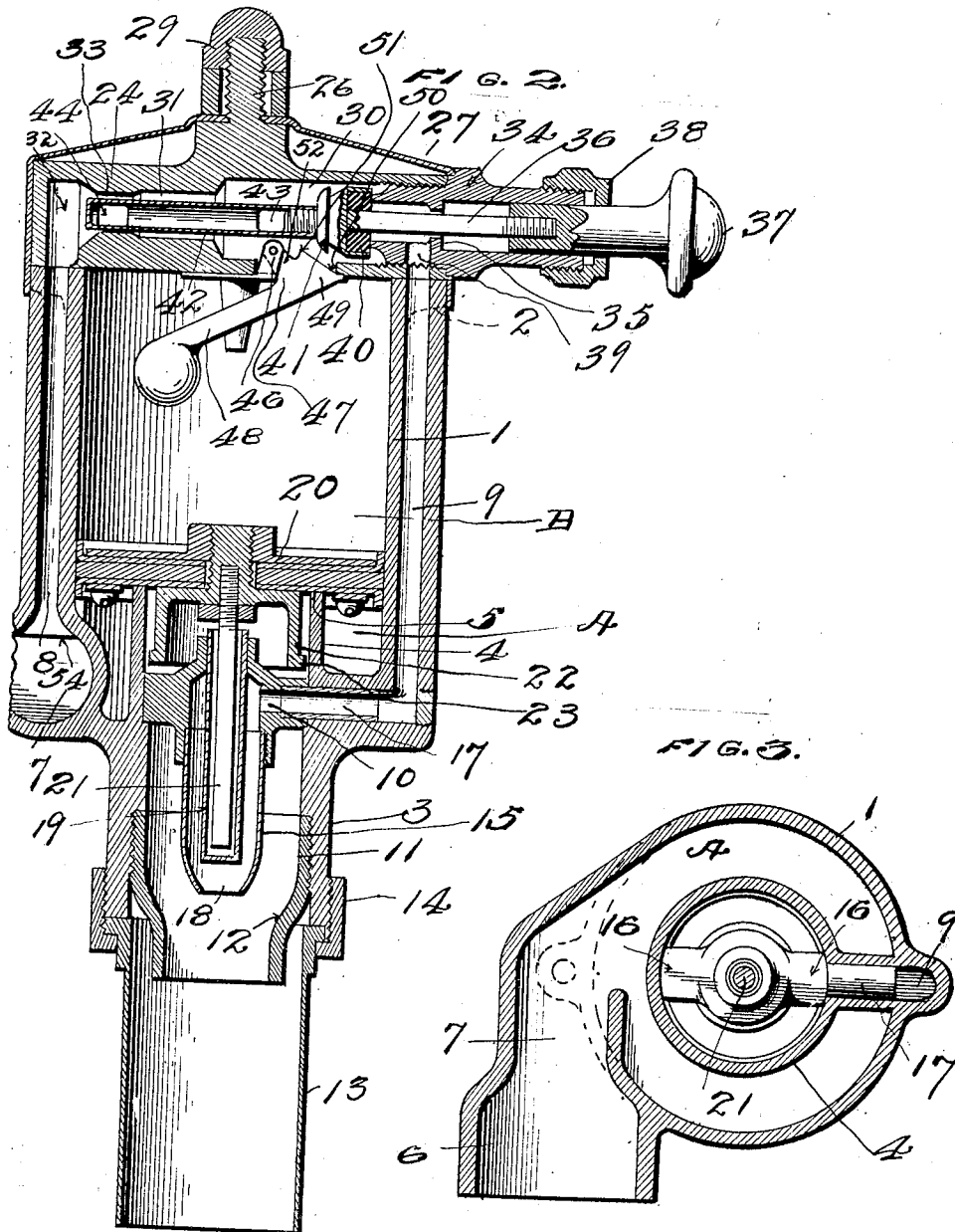


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UNITED STATES PATENT OFFICE.

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FLUSHOMETER.

932,244.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed June 1, 1908. Serial No. 436,111.

To all whom it may concern:

Be it known that I, WALTER H. BOWMAN, a citizen of the United States, residing at Elmhurst, in the county of Dupage and State of Illinois, have invented new and useful Improvements in Flushometers, of which the following is a specification.

The object of my invention is the provision of a valve mechanism for use in flushing closets, and for other purposes, which, when positively started into operation, will discharge a predetermined quantity of fluid and then automatically close; said mechanism to be adapted for freely discharging at the outlet all the fluid which can pass at the delivery inlet.

A further object is the provision of means for regulating the velocity of the main piston in its movements, and thereby varying the quantity of fluid discharged.

A further object is the provision of a mechanism which shall be of simple construction, cheap in first cost, light in weight, not liable to become deranged or clogged and hence inoperative, and which will effectively and with certainty perform the desired functions.

With these ends in view, my invention consists in certain novelties of construction and combinations of parts as substantially hereinafter set forth and claimed.

The accompanying drawings illustrate an example of the physical embodiment of the invention constructed according to the best mode I have thus far devised for the practical application of the principle.

Figure 1 is a view in elevation of the complete device. Fig. 2 is a vertical section of Fig. 1 in elevation. Fig. 3 is a horizontal section of Fig. 2 on line *x-x*. Figs. 4 and 5 are, respectively, top plan and sectional views of the cap.

Referring to the several figures, the numeral 1 designates the valve body consisting of a brass or other casting in the shape of a hollow cylinder; 2, a perforated flange at one end indicated by dotted lines below the cap in Fig. 2; 3, a hollow cylindrical extension of the casting of smaller diameter than the main body portion; 4, an upwardly extended flange from the bottom of the body portion which has an opening of the same diameter as the extension 3 below the same; 5, the seat for a piston at the end of the flange; 6, a projection or lug cast upon the lower outside of the body; 7, a delivery in-

let through the projection or lug to the interior of the cylindrical body; 8, an inlet by-passage within the wall of the body and leading from the delivery inlet upwardly; 9, an outlet by-passage within the wall of the body and which connects with the horizontal passage 10 as shown; 11, a tapering section of pipe, having the interior curved surface 12, detachably secured by screw threads to the interior surface of the cylindrical extension 3, the end of the pipe 11 projecting downwardly and forming a contracted passage for the fluid; 13, a flanged pipe secured to the end of extension 3 by a flanged clamping ring 14, and through the medium of screw threads; 15, an inverted cup; 16, two wings for supporting the cup, one of them having a passage therethrough; 17, a pipe with one end seated in the horizontal passage 10 and the other end within the passage through the supporting wing; 18, the contracted discharge outlet of the cup; 19, a tube with a closed bottom end supported within the cup and serving as a guide for the piston stem; 20, the piston of any approved construction; 21, the piston stem movable within the tube 19, as shown; 22, a tubular body with a flange 23 loosely fitting the interior surface of the upwardly extended flange 4, and secured in any suitable way to the lower surface of the piston and concentric therewith to partially shut off the water on the down stroke of the piston; 24, the cap which closes the top opening of the body; 25, the flange of the cap which engages the flange 2, both flanges being united by screws or bolts; 26, a threaded stem; 27, a nickel plated finishing cap with a hole through which passes the threaded stem 26, as shown; 28, a stop for a seat cover perforated at one end and which engages the said stem; 29, a clamping nut; 30, a horizontal passage in the body of the cap interiorly threaded; 31, a continuation of the passage, but of smaller diameter; 32, a chamber in communication with the inlet by-passage 8, as shown; 33, a narrow circular passage from the chamber 32 to the passage 31 of larger diameter; 34, a hollow plug screwed into the end of the passage 30 and projecting therefrom; 35, an inwardly projecting guide flange for the valve stem; 36, the valve stem; 37, a push button and stem secured to the valve stem; 38, a jam nut; 39, an opening through the wall of the plug and matching the outlet by-passage 9 at its upper end; 40, a packing

at the end of the valve stem which seats against the end of the plug and closes communication to the outlet by-passage; 41, a disk; 42, a tube with a closed end secured to the end of the valve; 43, an opening to the interior of the tube; 44, a second opening through the wall of the tube to the interior thereof, in this instance of the same dimensions as the first indicated opening 43 which is located within the passage 30 of the cap; 45, an opening from passage 30 to the interior of the body of the valve; 46, two perforated lugs located within the opening; 47, a lever; 48, the long and weighted arm of the lever; 49, the short arm of the lever having an inclined surface 50, and a catch 51 to engage and hold the disk 41 on the valve stem; 52, a lug or fulcrum which is pivoted between the two perforated lugs 46, as shown; 53 designates two downwardly extended stops to limit the upward movement of the piston; and 54 is a lip for deflecting the water upwardly to the inlet by-passage.

The piston divides the space within the interior of the body into two chambers A and B, the chamber A being in direct communication with the delivery inlet, and the chamber B, when the valve is operating, being in communication with the inlet by-passage and the outlet by-passage.

The several parts and elements which constitute the flushometer being in the relative positions shown by the drawings, and the delivery inlet 7 being connected with a fluid supply pipe, the chambers A and B will be filled with the fluid or water, the latter having access to the chamber B by way of the inlet by-passage and the open space between passage 33 and the tube 42 which may be 1/32 of an inch, more or less.

The *modus operandi* is as follows: The push button, being pressed inwardly carries the disk 41 against the inclined surface 50 on the short arm 49 of the lever and depresses the same, allowing the catch 51 to engage the edge of the disk. The weighted long arm 48 holds the catch in place. This action also advances the tube 42 so that the opening 44 is in the chamber 32 and water can pass freely through the openings 44 and 43 to the chamber B. The packing 40 has likewise been moved from its seat, opening up a free delivery of water to the outlet by-passage. As the water is discharged from the chamber B the water in chamber A under pressure lifts the main piston and allows water to pass to the discharge opening and around the inverted cup 15 creating a vacuum therein and facilitating the flow of water through the outlet by-passage which opens to the interior of the cup. The flow of water from the main delivery inlet to the main discharge outlet continues while the piston ascends and strikes the long arm of the lever

and disengages the catch from the disk. The force of the water entering through the inlet by-passage then closes the valve and prevents further flow of water through the outlet by-passage. The delivery of water to the chamber B still continues by way of the open space between the walls of the passage 33 and the tube 42, and as it cannot escape from the chamber B the main piston slowly descends till it engages its seat.

It will be observed that the openings 43 and 44 in the tube 42 and the outlet by-passage are so proportioned that the latter can discharge all the water entering by the tube 42 and that which is within the chamber B. This allows of the use of relatively large by-passages which will not become clogged by foreign substances in the water. The velocity with which the main piston will ascend will depend upon the capacity of the inlet and the outlet by-passage. By decreasing the size of the openings 43 and 44 the ascending velocity of the main piston obviously can be regulated. The return movement of the piston to its seat can also be regulated by changing the size of the opening around the tube 42 through which water passes to the chamber B.

An important feature of the invention is the non-stoppage of the by-passages by reason of their relatively large diameters and the velocity of the water passing through them, and, furthermore, because the tube 42 is movable at each operation of the valve, the passage around the same will not become clogged up and prevent water from passing to the chamber above the piston.

From the foregoing description taken in connection with the drawings it is clear that I have produced a valve mechanism which fulfils all the conditions set forth as the end and purpose of my invention.

What I claim is:

1. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a main piston dividing the cylinder into two chambers, an inlet by-passage for introducing fluid from the delivery inlet to the chamber back of the piston, an outlet by-passage from the chamber back of the piston to the discharge outlet, means for opening the outlet by-passage from the chamber back of the piston to the discharge outlet, and also simultaneously and completely opening the inlet by-passage from the delivery inlet to the chamber back of the piston, and means operated by the movement of the piston for closing the outlet by-passage, and partially closing the opening from the inlet by-passage to the chamber back of the piston.

2. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into

two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, means for closing and opening the outlet by-passage, and means for enlarging the passage for water from the inlet by-passage to the chamber B when the outlet by-passage is opened.

3. A valve mechanism having a main cylinder with an upwardly extended flange 4, a delivery inlet and a discharge outlet; a piston dividing the cylinder into two chambers A and B and provided with a tubular body 22 upon its under surface; an inlet by-passage from the delivery inlet to the chamber B; an outlet by-passage from the chamber B to the discharge outlet; a starting valve for opening the outlet by-passage; and means for holding the starting valve away from its seat, which means are operated by the piston to release the valve and allow it to close the outlet by-passage, the inlet by-passage being open to the chamber B under all conditions of service.

4. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, a starting valve provided with a stem and packing, an extension of the stem partially closing the inlet by-passage to the chamber B, and means for holding the starting valve away from its seat, which means are operated by the piston to allow the valve to return to its seat.

5. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, a starting valve provided with a stem and packing, and a tube carried by the stem and provided with two openings.

6. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, a starting valve having a stem, a packing, a disk and an extension located within the opening from the inlet by-passage to the chamber B, and a lever with a catch adapted to engage the disk of the starting valve which lever is operated by the piston in its ascending movement.

7. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, a starting valve, an inverted cup into which the outlet by-passage opens, and a tapering pipe located adjacent the lower end of the cup for the purpose of creating a vacuum in the cup when the discharge outlet is open.

8. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, a cap with a passage therein, a starting valve within said passage, and means for opening up a direct current of water from the inlet by-passage to the outlet by-passage when the outlet by-passage is open to the chamber B.

9. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers A and B, an inlet by-passage from the delivery inlet to the chamber B, an outlet by-passage from the chamber B to the discharge outlet, and a starting valve controlling the opening from the chamber B to the outlet by-passage and the opening from the inlet by-passage to the chamber B; the passage from the inlet by-passage to chamber B being open under all conditions of service, but the opening being enlarged when the starting valve is moved to provide an opening for the discharge of water from the chamber B to the outlet by-passage.

10. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet; a piston dividing the cylinder into two chambers A and B; an inlet by-passage, with a lip 54, leading from the delivery inlet to the chamber B; an outlet by-passage from the chamber B to the discharge outlet; and means closing the outlet by-passage which when moved opens the said passage and also permits fluid to pass from the inlet by-passage to said outlet by-passage simultaneously with the discharge of fluid from the chamber above the piston.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER H. BOWMAN.

Witnesses:

ALONZO G. FISCHER,
OTTO W. BALGEMANN.