W. H. BOWMAN.

FLUSHING VALVE.

APPLICATION FILED JULY 24, 1907.

**901,584.** **Patented Oct. 20, 1908.**

Fig. 2.

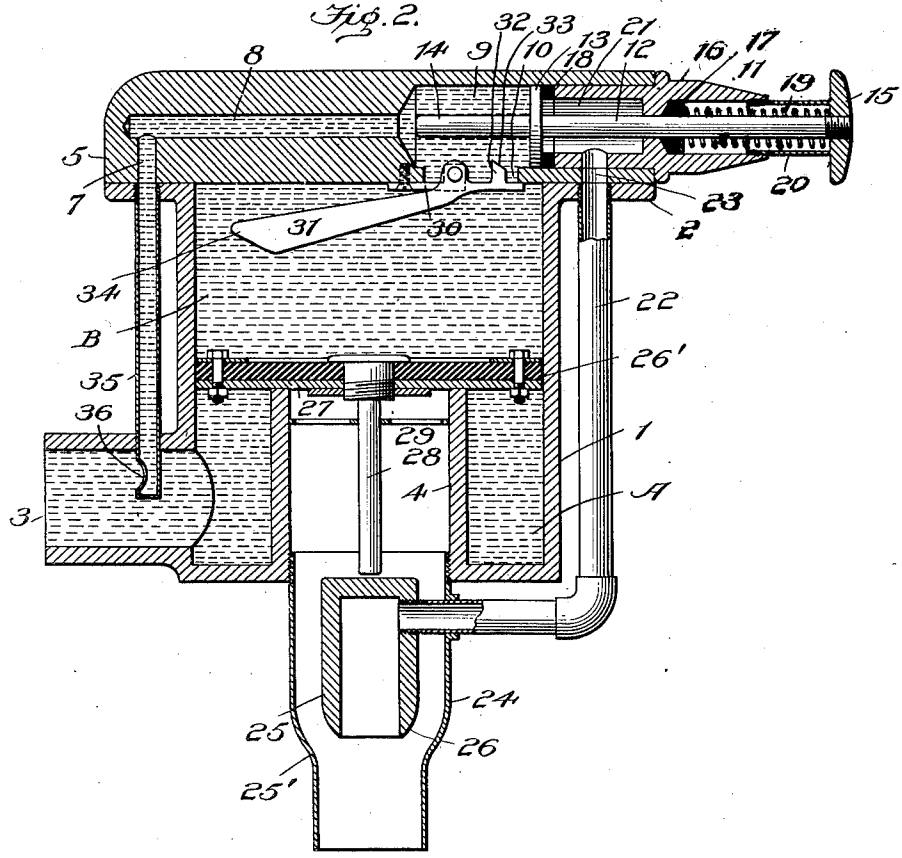
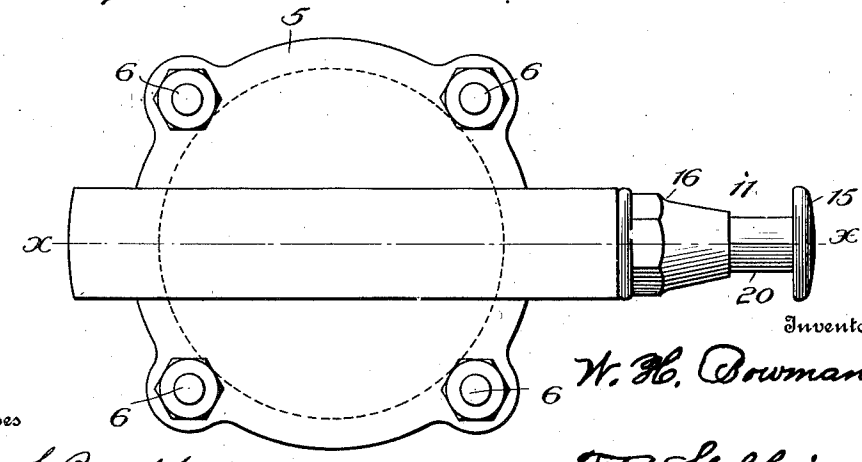



Fig. 1.




Witnesses

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# UNITED STATES PATENT OFFICE.

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## FLUSHING-VALVE.

No. 901,584. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed July 24, 1907. Serial No. 385,290.

*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 Flushing-Valves, of which the following is a specification.

The object of my invention is the provision of a valve mechanism for use in flushing urinals, closets, etc., 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 a mechanism which shall be of simple construction, cheap in first cost, comparatively light in weight, and not liable to become deranged 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 hereinafter set forth and claimed.

The accompanying drawing illustrates an example of the physical embodiment of the invention constructed according to the best mode I have so far devised for the practical application of the principle.

Figure 1 is a top plan view of the valve mechanism. Fig. 2 is a vertical section in elevation taken on line $x$—$x$ of Fig. 1.

Referring to the figures, the numeral 1 designates a hollow casting constituting a main cylinder provided with a top open end bounded by a flange 2, an inlet pipe or delivery inlet 3 adapted to be engaged by a delivery pipe, and an upwardly or inwardly extending cylindrical wall 4 which projects into the interior of the main cylinder, forming a secondary cylinder and with its top open end located above the delivery inlet pipe 3. The top end of the main cylinder is closed by a cap 5 through the medium of bolts 6 passed through the outer edge of the cap and the flange 2 of the cylinder. Within the body of the cap is a vertical passage 7 which connects with a horizontal passage 8, and the latter opens into an enlarged cylindrical opening 9 which is in communication with the interior of the main cylinder by an opening 10 in the wall, as shown.

The numeral 11 designates the starting valve as a whole comprising a stem 12, piston 13, plug 14, push button 15, gland 16, packings 17 and 18, retracting spring 19, and a guide flange 20. The gland has a chamber 21 at its inner end which communicates with a pipe 22 by a passage 23 extending through the cap and flange of the main cylinder. Screwed into the interior of the cylindrical wall 4 at the lower end is a discharge outlet pipe 24 and within this pipe is located an inverted cup 25, as shown. The outer surface of the cup at the lower edge 26 is curved and the pipe 24 adjacent thereto is reduced in diameter and provided with a curved inner surface 25′ so that the descending current of water will entirely surround the cup and cause a vacuum in the same and also in the pipe 22, which at its lower end passes through the walls of the pipe 24 and the inverted cup. Located within the main cylinder is a piston 26′ of any suitable construction with a packing 27 which engages the top edge of the wall 4 and also has a stem 28 guided by a hole in the spider 29 fixed upon the interior of the wall. Pivoted to the under surface of the top cap by a perforated lug 30 is a trigger or lever 31, the short arm of the lever being provided with a catch 32 having a beveled surface 33 over which the piston 13 can ride, and the long arm 34 of the lever extending obliquely downward into the main cylinder, where it can be engaged by the main piston 26 when it ascends. A pipe 35 at one end connects with the passage 7 in the cap and the other end passes through the wall of the delivery inlet pipe. This pipe 35 is closed at the lower end and has an opening 36 in the wall near the end adapted to freely receive water from the inwardly moving current. The main piston divides the interior of the cylinder into two chambers A and B.

The *modus operandi* is as follows: Assuming the several parts to occupy the relative positions shown by Fig. 2 and the chambers A and B to be filled with water and it is desired to discharge a determined quantity of water or other fluid: the starting valve-stem 12 is pushed inwardly till the piston 13 passes over the catch 32, where it is held

and the plug 14 enters and closes the passage 8 so water cannot enter. This action opens the chamber 21 in the gland so water from the chamber B above the main piston can flow by way of the pipe 22 to the inverted cup and the discharge outlet pipe. Pressure being reduced above the main piston, the water pressure in chamber A forces the piston upwardly, which allows the discharge of water from the chamber A, and as it passes downwardly around the inverted cup it creates a vacuum therein and also in the pipe and facilitates the flow of water from above the main piston through the said pipe 22, as is obvious. When the main piston strikes the long arm of the lever in ascending the short arm is lowered, releasing the piston and stem of the starting valve so that the spring can draw the plug out of the passage 8 and allow water to enter the chamber B by way of the pipe 35. The main piston now descends and closes the opening to the discharge outlet pipe. Obviously, the quantity of water discharged may be regulated by the size of the valve mechanism itself, or by the size of the pipes 22 or 35, or the size of the opening 36, or by the size of the several openings which communicate with the chamber B.

From the foregoing description taken in connection with the drawing it is clear that I have provided 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, a passage for introducing fluid from the delivery inlet to the chamber back of the piston, a passage from the chamber back of the piston to the discharge outlet, means for closing the passage from the delivery inlet to the said chamber, means for opening the passage from the said chamber to the discharge outlet, and means operated by the movement of the main piston for closing the passage from the chamber to the discharge outlet and opening the passage from the delivery inlet to the chamber.

2. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a main piston dividing the cylinder into two chambers, a passage from the delivery inlet to the chamber back of the piston, a passage from the chamber to the discharge outlet, a starting valve for simultaneously closing the passage from the delivery inlet to the chamber back of the piston and opening the passage from the said chamber to the discharge outlet, and means for holding the starting valve open and releasing it to close when said means for holding the starting valve open is engaged and moved by the piston in its upward travel.

3. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, the latter provided with an inverted cup, a main piston dividing the cylinder into two chambers, a passage from the delivery inlet to the chamber back of the piston, a passage from the chamber back of the piston to the inverted cup connected with the discharge outlet, and movable means for simultaneously closing the passage from the delivery inlet to the chamber back of the piston and opening the passage from said chamber to the discharge outlet.

4. A valve mechanism having a main cylinder with an upwardly projecting cylindrical wall 4, the top edge thereof constituting a seat for a piston; a delivery inlet and a discharge outlet; a sigle piston with a stem, said piston normally dividing the main cylinder into two chambers and seated upon the edge of the wall 4; means within the cylindrical wall 4 engaging and guiding the piston stem; a passage from the delivery inlet to the chamber back of the piston; a passage from the said chamber to the discharge outlet; a starting valve; means for holding the starting valve open; and means operated by the movement of the main piston for releasing the starting valve and allowing it to close.

5. A valve mechanism having a main cylinder with a delivery inlet and a discharge outlet, a main piston dividing the cylinder into two chambers, a passage from the delivery inlet to the chamber back of the piston, a passage from the said chamber to the discharge outlet, means for controlling the flow of liquid through the said two passages, and means in connection with the discharge outlet for creating a partial vacuum in the passage from the chamber back of the piston to the discharge outlet when the main piston is moved away from its seat and fluid is being discharged.

6. A valve mechanism having a cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers, a passage from the delivery inlet to the chamber back of the piston, a passage from the said chamber to the discharge outlet, a starting valve provided with a reciprocating stem and piston, and a pivoted lever with a catch adapted to engage the piston of the starting valve and also having an arm which is adapted to be moved by the main piston and release the piston of the starting valve from the catch.

7. A valve mechanism having a cylinder with a delivery inlet and a discharge outlet, a piston dividing the cylinder into two chambers, a passage from the delivery inlet to the

chamber back of the piston, a passage from the said chamber to the discharge outlet, a starting valve which in one position closes the passage from the chamber back of the piston to the discharge outlet and in another position opens said passage and closes the passage from the delivery inlet to the said chamber, and a pivoted lever adapted to hold the valve open and to release the same upon being engaged by the main piston in its movement.

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

WALTER H. BOWMAN.

Witnesses:
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F. W. M. HAMMERSCHMIDT.