W. SMITH.

WATER CLOSET VALVES.

No. 177,023. Patented May 2, 1876.

Fig. 1

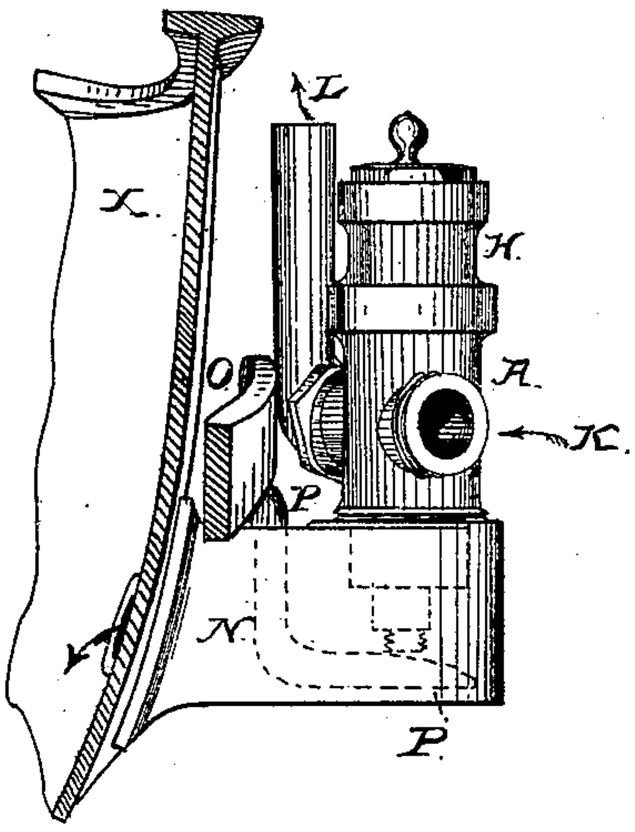
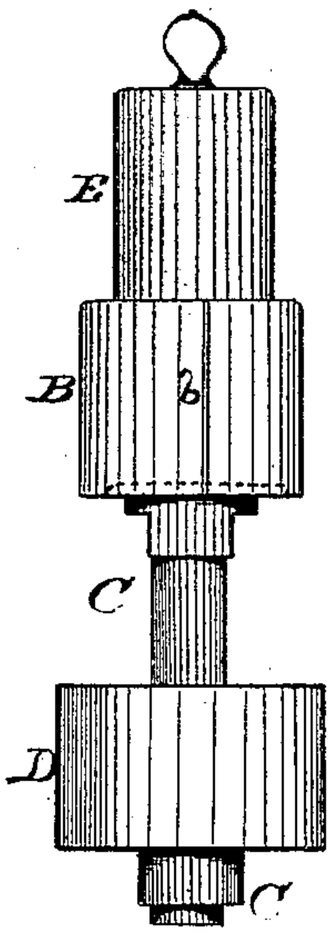


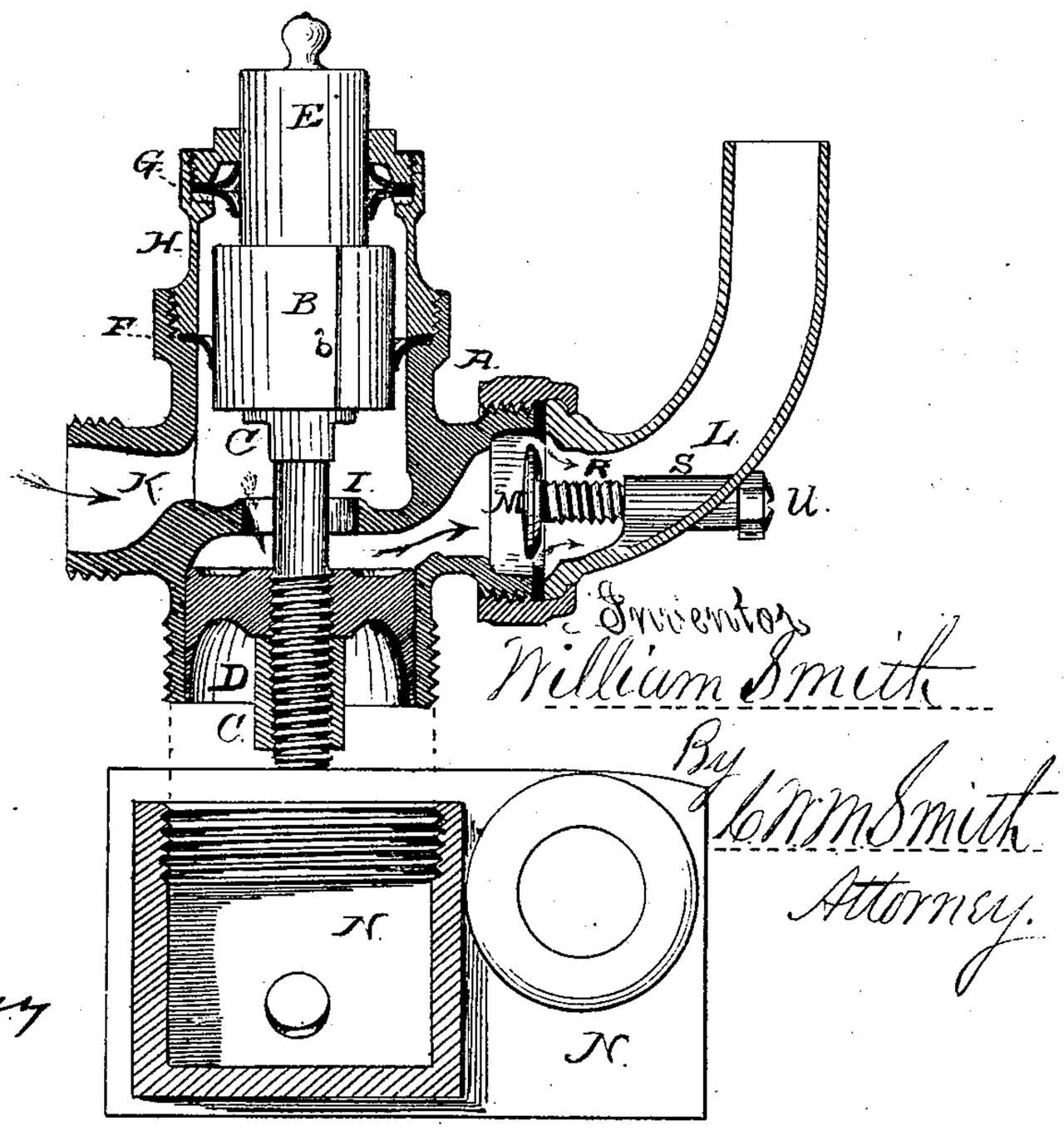
Fig. 3.



Witnesses:
Edward C. Osborn

Alf Anthony

Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN WATER-CLOSET VALVES.

Specification forming part of Letters Patent No. **177,023**, dated May 2, 1876; application filed March 13, 1876.

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of San Francisco, State of California, have invented an Improved Valve for Water-Closets, of which the following is a specification:

My invention relates to that class of water-closet valves, constructed with the object of automatically shutting off the supply of water to the receiver within a certain time, to prevent wasteful use, and of controlling the amount of water admitted to the hopper or receiver.

It consists, mainly, in the construction of a piston or plunger of peculiar shape, upon the area of whose face a pressure of water is caused to impinge, when the valve is opened, for the purpose of automatically closing it and shutting off the supply at the proper time without the use of a spring; also, in combination with such plunger in a water-closet valve, the arrangement of mechanism for governing the action of the piston, and for adjusting the supply of water to the receiver according to the pressure, as will hereinafter be more fully described.

Figure 1 is a front elevation of my improved valve and a portion of the receiver in section. Fig. 2 is a side elevation of the valve and the chamber that connects it with the receiver, the outer shell of the valve and the lower portion of the plunger being shown in section. Fig. 3 is a view of the plunger and its relief-piston removed from the valve.

A represents the outer shell of the valve; B, the plunger; C, the spindle, and D the auxiliary plunger. E is the relief-piston, and F G are annular flexible washers, the lower one, F, acting as a valve to govern the admission of the water to the chamber H. I is the valve-seat, K the inlet for the water, and L the outlet leading from the valve to the basin of the receiver X. M is the regulator for controlling the size of the stream of water through the conducting-pipe L. N is a chamber attached to the side of the receiver X, having a screw-thread opening to receive the end of the valve-body, and an inlet into the side of the receiver to allow the drippings from the valve to pass off. O is the lever, with an arm, P, for raising the valve from its seat. The valve-shell has a chamber, H, at its upper end, and a similar one at the lower end, but the upper one is made air-tight by means of the flexible washers F G and the water-pressure from below, while the lower one opens into the chamber N. Between these two chambers is situated the valve-seat I. The valve or plunger B moves up and down within the chamber above the valve-seat, and its upper end has a piston, E, of smaller diameter than the plunger, that works through an opening in the top of the chamber. The upper part of the valve B and the piston E thus move within a chamber that is made air-tight by the arrangement of the flexible washers G that surround the upper part of the piston, and the body of the plunger or valve B works through an annular washer, F, that operates as a valve to govern the flow of water into and out of this chamber H. The valve-spindle C carries an auxiliary plunger, D, that moves freely within the chamber at the bottom of the valve-body. The end of the spindle, when the valve B is down upon its seat, rests upon the arm P of the lever O within the chamber N, as shown by the dotted lines in Fig. 1. The area of the face of the auxiliary plunger is somewhat larger than the face of the plunger B above it, and the two being secured to the same spindle, it follows that, when the valve is raised from its seat I to admit the water, the auxiliary plunger rises toward this opening. The incoming stream of water in passing through the valve-opening thus meets and impinges upon the face of the plunger D, but it likewise presses against the face of the valve or plunger proper B; but the area of the face of the auxiliary plunger D is larger than the area of the valve B, so that the pressure of the water tends to move the plunger D away from the valve-seat I when the lever O is dropped, and thus bring the valve B down and shut off the water.

By this construction every time the lever O is lifted the valve is lifted, and when the lever is dropped the force of the water tends to close the valve in a gradual and regular manner.

As the chamber H is air-tight, the valve B cannot be drawn down by the pressure upon the face of the plunger D until the vacuum in the chamber is replaced by the water

that forces its way gradually into the chamber through the channel *b*, as the plunger B descends. Thus, in proportion as the water fills this chamber does the plunger B move toward its seat. When the valve is raised by the lever O, this water passes out from the chamber between the flexible washer F and the sides of the plunger B—this washer thus operating as a valve.

The lever O is pivoted at one end to the flange on the chamber N, and the other end is connected to the rod and handle for operating it. The lever has an arm, P, of such form as to extend beneath the end of the valve-spindle C, and thus raise the valve when the handle is pulled.

The chamber N is made to catch the drip from the valve. It is provided with an outlet leading into the receiver X, to allow the waste water to run off. It has a flange for securing it to the side of the receiver, as shown in Figs. 1 and 2, so that it serves both as a support for the valve A and as a drip-chamber to catch the waste due to the wear and leakage of the parts.

The means for graduating the size of the stream of water through the outlet to the receiver X consist of a screw-spindle, R, movable within a socket, S, and provided with a circular head, M, somewhat smaller than the mouth of the outlet L. This head is adjusted by means of the nut U upon the outside of the pipe L, and, by being set more or less within the orifice of the outlet, the size of the opening is contracted, as the water is obliged to pass out between the head M and the rim of the orifice in the discharge-pipe.

This regulator is used to adjust the size of the stream of water flowing into the receiver X according to the pressure of the water admitted through the valve, and this pressure varies with the position of the closet and the proximity of other receivers.

This arrangement of valve may be also used with self-acting water-closets where the valve is operated by the pressure or weight thrown upon the seat when in use, but in such case the valve A should be reversed, so that the spindle C will be uppermost, in order to have the pressure from above to open the valve. The auxiliary plunger D will then require a water-tight packing similar to the washers G that surround the piston E.

Having thus fully described my invention, I claim therein as new—

1. In a valve for water-closets, the relief-piston E attached to the water-valve B, and working within an air-tight chamber, constructed and operating substantially as described and specified.

2. In a valve for water-closets, the combination, with the spindle C, of the valve-seat I, the plunger B above the valve-seat, and the plunger D, of larger diameter, below such valve-seat, whereby the water is cut off by the pressure on the larger plunger without the use of a spring, substantially as described and shown.

3. The regulator M for reducing the size of the orifice of the outlet L of a water-closet valve, constructed and operating substantially as described and specified.

4. The chamber N, when combined with the valve and receiver of a water-closet, having an outlet through one end, and a flange for securing it to the side of the receiver, constructed and applied as and for the purposes described and specified.

Witness my hand and seal this 28th day of February, A. D. 1876.

WM. SMITH. [L. S.]

Witnesses:
EDWARD E. OSBORN,
PHILIP MAHLER.