W. SMITH.

Valve for Water-Closet.

No. 206,049. Patented July 16, 1878.

Fig. 1.

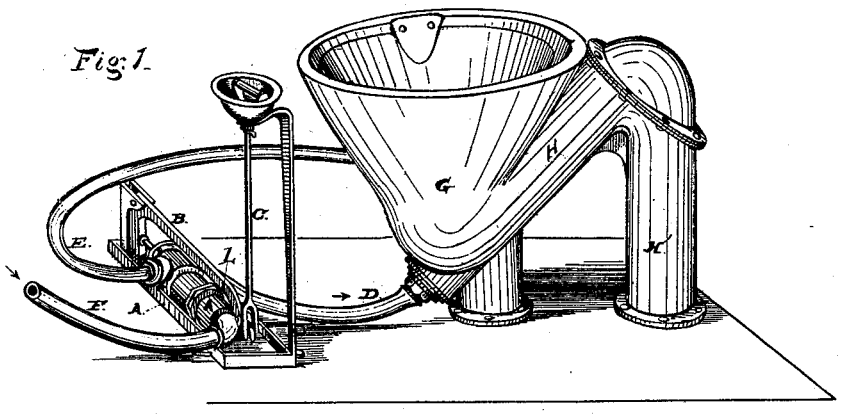


Fig. 2.

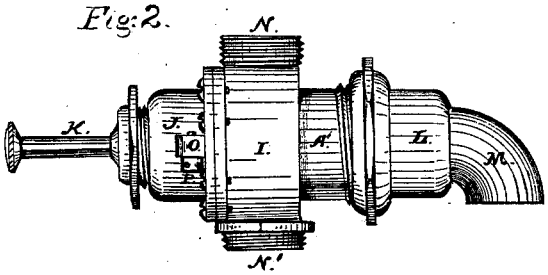


Fig. 3.

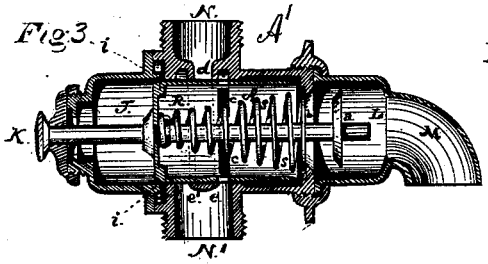


Fig. 4.

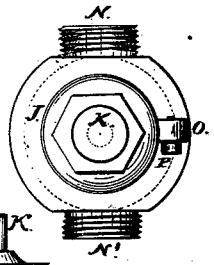


Fig. 5.

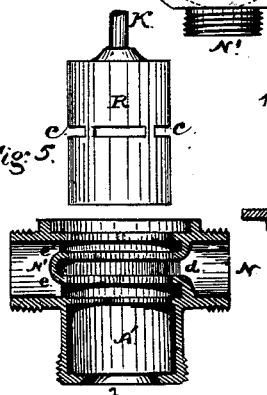
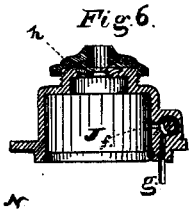


Fig. 6.



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UNITED STATES PATENT OFFICE

WILLIAM SMITH, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN VALVES FOR WATER-CLOSETS.

Specification forming part of Letters Patent No. **206,049**, dated July 16, 1878; application filed January 4, 1878.

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of the city and county of San Francisco, State of California, have invented a new and useful Improved Valve for Water-Closets, which invention is fully described and set forth in the following specification and accompanying drawings.

In the drawings herein referred to, Figure 1 is a perspective view of my improved valve as applied to a water-closet basin and worked by a pull-handle. Fig. 2 is a top view of the valve when it occupies a horizontal position. Fig. 3 is a longitudinal section through the valve-body and plunger, and it shows the position of the parts when the valve is open to admit the water. Fig. 4 is a view of the head of the valve. Fig. 5 is a sectional view of the body of the valve, and a view of the plunger that controls the admission of the water to the ways or channels in the body of the valve. Fig. 6 is a sectional view of the upper part or cap of the valve-shell.

My invention has for its object to produce a valve which, when opened, shall close automatically with the pressure of the water and control the supply to the basin, and shall operate to admit the water in a triple manner, or in three portions, first to the basin, next to the ejector-pipe, and last to the basin again.

It consists in the peculiar construction of a valve-shell, with ways or channels within it, communicating with the two outlets, a plunger-valve controlling the admission of the water to the several channels in regular order, and operated in one direction by pressure from a lever or a stem and in the opposite direction by a spring and the pressure of the water, and a valve proper connected with and operating at the same time as the plunger, as will be more fully set forth hereinafter.

Referring to the drawing, A′ represents the main portion of the valve-shell; L, the coupling, having the curved neck M, to which the supply-pipe is attached; and J, the cap or upper portion, within which the top of the plunger R works.

The chamber I of the valve-body has the two outlets N N′, one for the pipe E to supply water to the basin, and the other for the ejector-pipe D, that connects with the discharge-pipe H of the basin, to force the contents of the closet up the inclined pipe H and into the pipe H′ connecting with the sewer.

The basin represented in the drawing is formed of porcelain, in one piece, with a manhole and cover at the bend of the pipes to afford facilities for cleaning, and the valve is placed in a horizontal position within a drip-pan, and is operated by the pull-rod C and lever B, as will be readily understood from Fig. 1; but where this valve is used with closets in which the water is let into the basin by the action of a tilting seat, the valve will occupy a vertical position, or so that the pressure upon the seat can be applied directly to the head of the spindle K.

The interior of the valve consists of the water-chamber A I, in which are the valve-seat *b* at the bottom and the ways or channels *d e e′* at the upper part of the chamber I, and the chamber J for the upper end of the plunger R, in which is formed the outlet-tube *f g*, controlled by the plug O.

The parts within the valve for controlling the admission of the water are composed of the valve *a*, covering the seat *b*, the plunger R, governing the channels *d e e′*, that lead to the outlets N N′, and the coil-spring S, for returning the valve to its seat when the pressure upon the head of the spindle K is removed. The rod of the valve *a* screws into the end of the spindle K and through the head of the plunger R, so that these parts are all connected rigidly together, and the valve *a* and plunger R move up and down at the same time.

The plunger is provided with the openings or ports *c*, which, as the plunger moves upward within the chamber, admit the water in regular succession, first to the lowest channel *e*, then to the center one, *d*, and last to the upper channel *e′*.

When the plunger is in its lowest position and the valve *a* is open to its fullest extent, these ports *c* are in line with the channel *e*, as seen in Fig. 3, and the top of the plunger is just within the chamber J, it being surrounded by the washer *i*, that separates the chamber J from the valve-chamber A I. This washer acts as a valve to allow the water to pass above the washer into the chamber, but pre-

vents any backward flow between the valve-shell A′ and the plunger R, so that when the plunger and valve *a* are pressed down to a limit the water this upper chamber J becomes filled with water above the head of the plunger.

An outlet for this water is provided through the exhaust passage and tube *f g*, whereby it is discharged into the chamber I in a gradual manner, and these passages are controlled by the plug O, by which the flow is graduated. When the spindle K is relieved from the pressure upon it, the plunger and valve *a* are prevented from returning immediately into position by the presence of the water in the chamber J, which counteracts the pressure against the back of the valve *a* and the action of the spring S, and thus the valve *a* rises in a gradual manner to shut off the water, which, as the plunger rises, is directed first into the channel *e* and then into the channels *d* and *e′* until the valve *a* rises to its seat and closes the opening.

The rapidity at which the water in the chamber J is discharged regulates the time of closing of the valve *a*, and thus, by increasing or diminishing the outlet through the passage *f* and tube *g* by turning the plug O, the water admitted through the valve *a* and to the closet is increased or diminished in quantity as the plunger is caused to rise with a slower or quicker motion after the spindle K has been depressed and relieved.

The outlet N, connecting with the pipe D, constitutes the ejector, and the one N′ on the opposite side of the valve supplies water through the pipe E, and as these two outlets communicate with the channels *d e e′*, governed by the plunger R, the water passes first through the lowest channel *e* and to the basin to wet its contents, then through the channel *d* to the ejector D, and finally to the basin again through the channel *e′*, to fill up the basin with clean water ready for use again. A proper quantity of water is at this time supplied to the basin to cover the mouth of the inclined pipe H and effectually close it against the escape of any gases.

Where my improved valve is used with closets operating by means of a tilting or swinging seat, by which pressure is applied to the stem or spindle of the valve, I place the valve in a vertical position, so that when the seat is turned down for use and the weight of the person is thrown upon the spindle K the plunger R will be depressed and the valve opened; but in such case the plunger R must have a greater motion downward in order to cause it to cover the channel *e* and hold the water within the chamber A from passing out through the ports *c c*, which, while the closet is in use, must be in position below the first channel *e*, so that when the weight on the seat is removed the water will begin to flow as the plunger R rises.

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

1. The chamber A I, with a single inlet controlled by a valve, *a*, and two outlets, N N′, with detached channels *d e e′*, controlled by a plunger, R, in combination with the air-tight chamber J, having the outlet-passage *f g*, constructed to operate substantially as and for the purpose set forth.

2. In a water-closet valve, the three detached channels *d e e′* within the valve-chamber, connecting with the outlets N N′, in combination with the plunger R, having ports *c c*, constructed and applied to operate substantially as described and set forth.

3. In a water-closet valve having the inlet *b*, outlets N N′, detached channels *d e e′*, and pressure-chamber J, the valve *a* and plunger R, rigidly connected together and operated in one direction by pressure upon a stem or spindle, K, and in the opposite direction by the action of a spring and the pressure of the incoming stream of water, constructed and applied to operate substantially as herein described and set forth.

4. A valve for controlling the supply of water to the basin and trap or ejector of water-closets, having one inlet, *b*, controlled by a valve, and two outlets, N N′, communicating with the chamber of the valve through three detached channels, *d e e′*, controlled by a plunger, substantially as herein described, whereby the water admitted to the valve is directed first to the basin, then to the trap or ejector-pipe, and lastly to the basin again, for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 6th day of December, 1877.

WM. SMITH. [L. S.]

Witnesses:

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E. V. SUTTER.