J. H. QUINN.
Water-Closet Valve.

No. 205,903. Patented July 9, 1878.

Fig. 1.

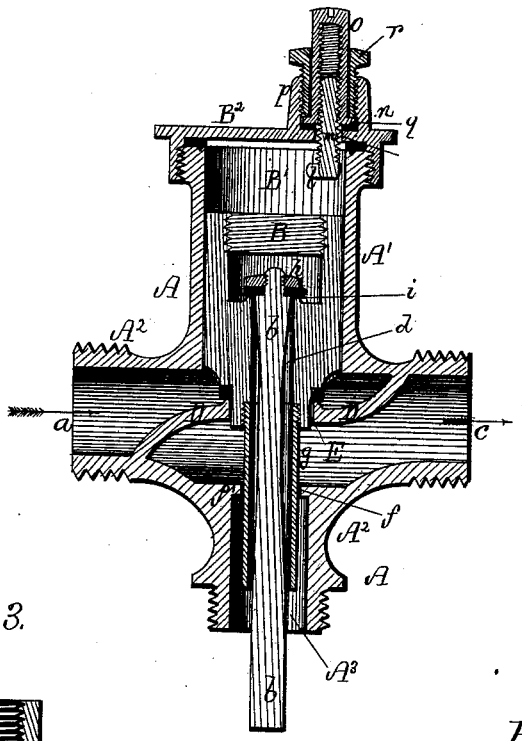


Fig. 3.

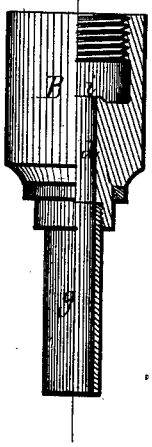
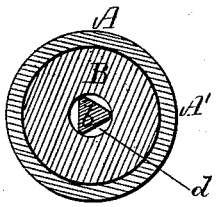


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN H. QUINN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN WATER-CLOSET VALVES.

Specification forming part of Letters Patent No. **205,903**, dated July 9, 1878; application filed May 27, 1878.

To all whom it may concern:

Be it known that I, JOHN H. QUINN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Water-Closet Valves, of which the following is a specification:

My present improvements relate to a class of valves employed in water-closets for regulating the amount of water admitted to the bowl of such closet to clean it of its contents, the class of valve to which my improvements relate being that shown in Letters Patent of the United States issued to myself on the 27th day of November, 1877, in which a gravitating valve, contained in a tubular case and closing down on a seat, is the agent employed to admit and shut off the supply of water, the valve being closed upon its seat by the superior pressure of water above it, and the case being provided at bottom with a vent, by means of which, when open, the pressure is removed from over the valve and the pressure of water in the supply or service pipe permitted to raise the valve and admit the desired quantity, and when the vent is closed the pressure returns to the top of the valve, and the latter is closed to further admission of water from the supply-pipe.

My present improvements consist in creating an axial passage in the valve proper, and in the employment, in connection with such passage, of a secondary valve, which closes down upon such opening, and whose stem extends downward to a point where it and the valve can be raised or lowered by a suitable connection between it and the trip-lever, which is actuated by the handle that operates the pan of the closet, the auxiliary valve referred to constituting a vent to relieve the valve proper of the pressure above it, and the whole operating substantially as hereinafter described.

My improvements consist, secondly, in the arrangement of an adjustable stop for determining the height to which the valve proper shall rise in the act of admitting water to the case; and, as said stop is accessible from the outside of the case, the labor of opening the case to get access to such stop, as has heretofore been necessary, is avoided.

The drawings accompanying this specification represent, in Figure 1, a vertical section, and in Fig. 2 a horizontal section, of a valve containing my invention. Fig. 3 is a sectional elevation of the plunger or main valve, to be explained.

In the above-named drawings, A denotes the case of the valve, the same being practically cruciform in shape and composed of an upright portion, A^1, and lateral portion A^2, the upper part of A^1 constituting the valve-chamber B^1, which is covered by a cap, B, and the lower portion A^3 constituting the passage whereby water which has passed the valve and basin of the closet escapes to the reservoir below such bowl.

The portion A^2 of the valve-case is intersected by the portion A^1, and at the junction of the two the portion A^2 is divided by an oblique partition, D, in which is an orifice or valve-seat, E, such valve-seat being disposed axially with respect to the bore of the valve-chamber B^1, and constituting the passage between the inlet-port *a* and discharge-port *c* of the case.

The valve proper is shown at B as a cylinder which loosely fills the lower part of the chamber B^1, the joint between the two being sufficient to permit water from the supply-inlet *a* to pass upward about the valve and fill the chamber B over such valve, it being observed that the horizontal area of the valve is considerably greater than that of its seat, in order that the superior pressure upon the top of the valve shall serve to close it upon its seat.

h in the drawings represents the valve which governs the vent of the valve B, such valve *h* operating with an axial opening or bore, *d*, in the said valve B, the top of which terminates in a valve-seat, *i*, while the stem *b* of the valve *h* extends downward below the bottom of the portion A^3 of the valve-case and into such position with respect to the mechanism that operates the pan of the water-closet that, upon raising the handle which operates such pan, the stem *b* and valve *h* shall be raised and vent the valve B, and when the said handle is released the valve *h* shall settle back to its seat by its own gravity.

The stem *b* passes loosely through an orifice, *f*, created in a horizontal shelf, *f'*, which spans the top of the outlet A^3, while, to pre-

vent water from forcing its way upward from A^3 through *d* into the chamber B^1 and neutralizing the pressure upon the valve B, I add to the lower part of the said valve B a tube, *g*, which passes through the opening *f* and extends considerably below the shelf *f'* and receives loosely the stem *b*, the bore of the tube *g* being practically a continuation of the bore *d*.

The outlet *c* of the valve-case connects with the bowl of the closet above the pan, while the final outlet A^3 connects with the receiver, which is below the pan, and receives the contents of the bowl when the pan is tipped.

The operation of this device is as follows, it being understood that water under pressure fills the inlet *a* and chamber B^1, and the valves B and *h* are closed upon their seats, in which case the said valve B is closed by the superior pressure of the water in the chamber B^1, and will remain thus closed until this pressure finds a vent: When the handle which operates the pan of the closet is raised in the act of tipping the pan the stem *b* and valve *h* are raised and the bore or passage *d* permits of escape of water from above the valve B, thereby providing a vent, and lowering, to a great extent, the pressure on such valve, so that the pressure of water entering by *a* shall raise the valve and permit water to flow through the opening E into outlet *c*, and thence into the basin or bowl of the closet.

When the user of the closet lowers the handle and restores the pan to its normal position, the valve *h* drops to its seat by its own gravity, thereby closing the vent *d* and restoring the pressure to the chamber B^1, thus enabling the pressure of water entering said chamber from the inlet *a* to compel the valve to settle slowly back to its seat and shut off flow of water to the closet-bowl.

The water escaping from the chamber B^1 when the valve *h* is raised to provide a vent finds its way directly downward through the bore or passage *d* into the water-closet.

The rapidity with which the valve B drops upon its seat, and consequently the amount of water admitted to the closet-bowl, in connection with the height to which the valve is permitted to rise, is determined by the amount of space between the inner wall of the chamber B^1 and the exterior of the valve.

In order to determine the height to which the valve B shall rise, and thereby regulate the amount of water entering through the port *a*, I provide an adjustable stop or gage, *l*, which enters the upper part of the chamber B^1, such stop constituting the lower end of a rod, *m*, upon which is cut a screw-thread, and extending upward through an opening, *n*, in the cap B^2 of the valve-case, and screwing into a tubular rod, *o*, which is received within a tubular boss, *p*, erected upon the top of the said cap B^2 and about the opening *n*.

The rod *m* is prevented from rotating by the shape of its top portion *l*, which fits the interior of the chamber B^1; consequently, when the tubular rod or screw *o* is turned in one or the other direction, the stop is raised or lowered, and the altitude of the valve determined.

To prevent clandestine escape or leakage of water by way of the opening *n*, I form upon the lower end of the rod *m* a collar, *q*, and I screw into the boss *p* a screw-plug, *r*, and by screwing this plug down upon the collar *q* such collar is pressed tight upon the seat surrounding the said opening *n*, thereby shutting off escape of water.

As the feed or regulating screw *o* extends above the top of the cap of the valve-case, it is readily accessible, thereby enabling it to be raised or lowered without removing such cap or the necessity of getting access to the interior of the case, as has heretofore been necessary.

Having thus described the nature, purposes, and advantages of my invention, I claim, and desire to secure by Letters Patent of the United States, as follows:

1. The combination, with the valve-case and its contents, of the regulating-screw *o*, under the arrangement substantially as described, whereby such screw is accessible from the outside of the valve-case, substantially as and for purposes stated.

2. In combination with the screws *m* and *o* and the orifice *n*, through which the screw *m* passes, the check-nut or tubular screw-plug *r*, substantially as and for purposes stated.

3. The combination, with the valve-case and the valve B, of the screws *m* and *o* and the plug *r*, the screw *m* being raised or lowered by the screw *o*, and the plug *r* serving to clamp the screw *o* to the cap of the valve-case, and the whole being substantially as and for purposes stated.

4. The combination, with the case A and valve B and tube *g*, fixed to and moving with said valve, of the valve *h* and stem *b*, substantially in manner as shown and described.

5. The combination, with the case A and its shelf *f'*, and valve B, with its bore *d*, of the valve *h*, stem *b*, and tube *g*, essentially as described, whereby water is shut out from access to the chamber B^1 after passing the valve-opening E, substantially as and for purposes stated.

J. H. QUINN.

Witnesses:
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