S. ECKERT.

WATER-CLOSET VALVE.

No. 192,642. Patented July 3, 1877.

Fig. 1.

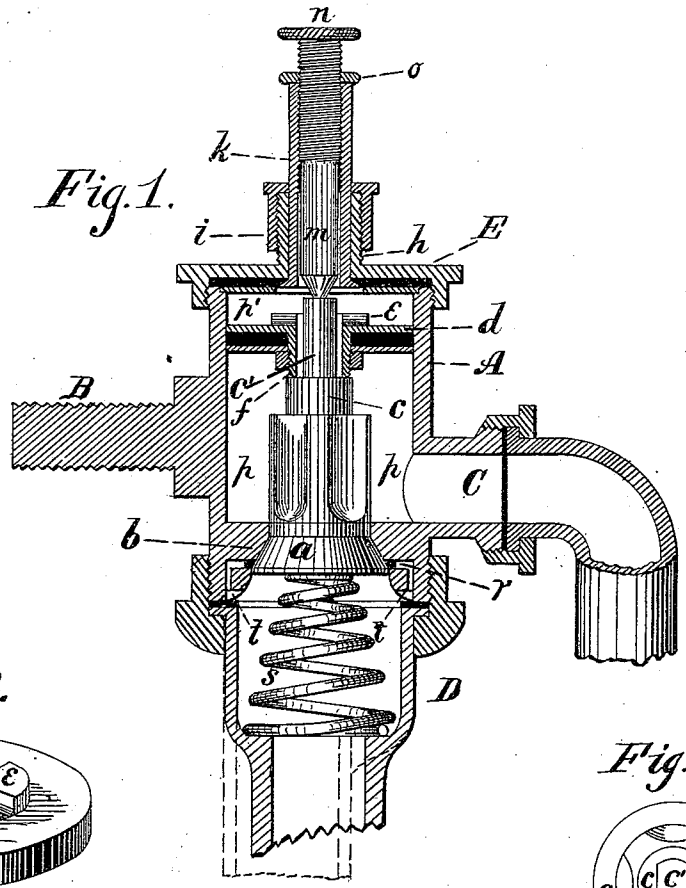



Fig. 2.

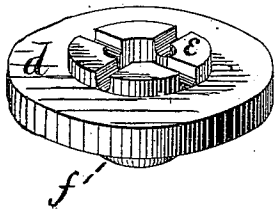



Fig. 4.

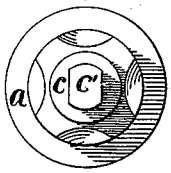



Fig. 5.

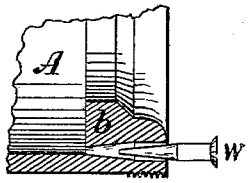
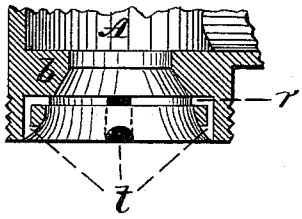



Fig. 3.




Witnesses

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN WATER-CLOSET VALVES.

Specification forming part of Letters Patent No. **192,642**, dated July 3, 1877; application filed November 16, 1876.

*To all whom it may concern:*

Be it known that I, SEAYRS ECKERT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Water-Closet Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a sectional elevation, showing the valve in closed position. Fig. 2 is a detail of piston. Fig. 3 is a detail section, showing construction of seat. Fig. 4 is a top view of valve-stem. Fig. 5 is a detail section, showing puppet and seat.

This invention relates to improvements in the construction of water-closet valves; and consists in the construction and combination of parts, as hereinafter fully described and claimed.

A designates the barrel, having the usual nipple or projection B for attachment to the bowl, and C is the outlet-pipe through which water passes to the closet-bowl when the valve is opened. The supply-pipe D is coupled on in the usual manner, and has an interior shoulder or abutment to support a coiled spring, *s*, which bears up against the valve *a*, whose bearing-surface may be conical or otherwise shaped, as desired, though I prefer the former. The barrel A is constructed, as seen, with a valve-seat, *b*, corresponding in form to the valve *a*. The stem of valve *a* above its seat is grooved or flattened, to afford water-way, as seen in Fig. 4. Above the grooved portion the stem is reduced in section to a cylindrical or other shaped portion, *c*, whose upper surface is squared off accurately to form a seat, as described further on. Above the seat *c* the valve-stem is again reduced in section, and takes the grooved or flattened form shown by *c'*, which, at its upper end, is squared off. Placed in the barrel A, near its upper end, is a movable but tight-fitting piston, *d*, which has an annular boss, *e*, projecting as seen, and having grooves or openings cut radially in it, and from its opposite face depends a deep annular boss, *f*, with its edge true and even, so as to make a tight joint when in contact with the seat *c* on the valve-stem. Normally the valve-stem projects upward through the opening in the piston *d*, and its end stands above the boss *e*, as seen in Fig. 1. Observing this figure, it will be seen that by depressing the valve-stem slightly the grooves or flat portions of *c'* are exposed beneath boss *f* on piston *d*, and water can pass up or down, as the case may be. The object is to get water to fill the space between piston *d* and the cap of barrel A, to effect a purpose hereinafter explained.

The cap E of barrel A has a central opening, cylindrical and smooth, from which extends upwardly a bushing, *h*, threaded exteriorly. A nut, *i*, works on this, as seen. Passing through the opening in cap E, and accurately fitting therein, is a cylinder, *k*, smooth outside, and threaded inside at or near the top. At its lower end it is made with a collar, *k'*, to keep it from being pushed up through the cap. Working inside cylinder *k*, and threaded to correspond, is a screw, *m*, provided with a milled head, *n*. It is also provided with an adjusting thumb and jam nut, *o*, traveling on its threads, as seen in Fig. 1.

The operation is as follows as regards this much of my invention: To open the valve temporarily, the head *n* of screw *m* is depressed, which carries cylinder *k* with it. The lower end of screw *m* impinging, in its descent, upon the top of the stem of valve *a*, pushes it away from its seat, and the water then rushes in and first fills the part *p* of barrel A, whence it passes out and feeds the bowl; but by the depression of the valve-stem its shoulder *c* is moved away from the edges of *f*, and consequently the pressure of the water forces it into the part *p'* of barrel A above the piston *d*. Now comes the object of this piston *d*; for when the pressure is released from the head of screw *m* the valve *a*, which is otherwise free to follow the motion given by spring *s*, cannot instantly close, for the space *p'* being full of water, which is incompressible, prevents the valve-stem from moving into it, while at the same time the latter constantly tends to close, being forced by the spring. The result is a gradual and

easy return of the valve to its seat during the emptying of space $p'$ through the grooved boss $e$ and grooves or flat portions $c'$ of the valve-stem. It is a perfect check and cushion for the valve, and hence there can be no "knocking" or liability to damage. It will be observed in this connection that the valve $a$ and its stem are independent of every other part of the device, there being no screw-connections whatever to effect adjustment so as to produce the above results. It is entirely automatic. To regulate the amount of temporary supply the nut $i$ is raised or lowered. It affords a stop or check to the nut $o$, thus placing a limit to the downward stroke of screw $m$, and thence on valve $a$, admitting a greater or less supply of water. The length of stroke may also be differentiated by nut $o$ on screw $m$ acting in connection with nut $i$.

Besides this, I can cause a steady stream of water, from a few drops up to the full area of the valve, to flow into the bowl.

This is effected by screwing the screw $m$ down upon the stem of valve $a$ as far as desirable, thus pushing the valve open and keeping it open, the jam-nut $o$ preventing $m$ from working loose. And at any time during the flow of such steady stream of reduced area, I can let on a full head of water by depressing the screw $m$, thereby opening the valve $a$ to its full extent.

It must be observed that besides the function exercised by screw $m$ in depressing the valve-stem, the cylinder $k$ also pushes down the piston $d$, so as to give greater space for the water-check. And this also is capable of regulation in the same manner as the steady stream, for if the end of screw $m$ be far in advance of $k$, the latter can push piston $d$ but a short distance, and vice versa; hence the valve can be regulated to close within a certain given number of seconds after pressure is released.

In the event of a steady stream, only a small supply usually being wanted, I construct my valve-seat $b$ with a circumferential groove, $r$, into which deliver openings $t$, coming from the side next the supply. By this means the slightest pressure on valve $a$ lowers it below the openings $t$, whence the water finds its way into the barrel. Thus arranged, there is still something wanting, for in winter there is liability to freezing on the part of the water which remains in the barrel A when it is used in a horizontal position. To supply this defect, I cut an opening through bearing $b$, as seen in Fig. 5, and in it place a loose puppet, $w$, so arranged that when the pressure is on it will close tightly, and when the pressure is off the weight of the water in barrel A will cause it to open and give egress to the water, thus draining the device and preventing freezing. Of course this requires that the water be previously shut off at its source. Also, the supply D should be made to conform to the dotted lines of Fig. 1, to assist the draining.

Thus constructed, the valve is complete, and fulfils every purpose that can be required of it; will work in any position; is very simple, and the parts are replaceable in case of breakage or wear; gives the plumbers no trouble in adjusting the feed to suit any circumstances whatever; and, when once adjusted, it cannot get out of order.

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

1. The combination of an adjustable threaded operating stem, $m$, and a threaded cylinder, $k$, with the valve-stem, whereby a constant stream of any desired size may be admitted to the bowl, substantially as set forth.

2. The combination of nut $o$, screw-stem $m$, cylinder $k$, and nut $i$, substantially as shown.

3. The combination of the valve $a$, and the seat $b$, constructed with inlets $t$, one or more, and with or without groove $r$, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of November, 1876.

SEAYRS ECKERT.

Witnesses:
THOS. J. MCTIGHE,
SAML. ANDERSON.