J. P. KENYON.
Water-Closet Valve.

No. 209,345. Patented Oct. 29, 1878.

Fig. 1.

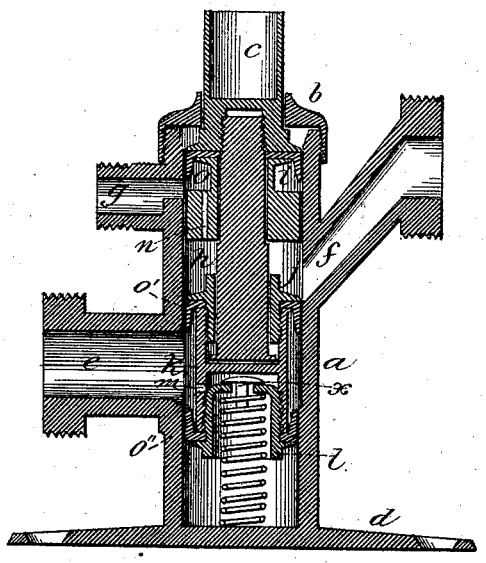


Fig. 4

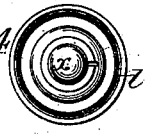


Fig. 2.

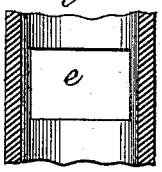
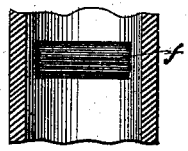


Fig. 3



Attest:
R. J. Reville.
W. P. Kenyon.

Inventor.
James P Kenyon

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES P. KENYON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN WATER-CLOSET VALVES.

Specification forming part of Letters Patent No. **209,345**, dated October 29, 1878; application filed June 17, 1878.

To all whom it may concern:

Be it known that I, JAMES P. KENYON, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Automatic Valves for Water-Closets, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The subscriber has sought in this invention to obviate a number of defects and inconveniences complained of in the make-up and use of related articles in this important sanitary department, and to produce a valve, first, that can be repaired without its removal or the mutilation of premises by simply taking off the cap and withdrawing the plunger; secondly, that has no spring, and needs none under ordinary and sufficient pressures, but yet so formed as to receive one where the pressure is weak and the flow languid; thirdly, in which there is no diaphragm, and yet which cannot leak externally, even after a considerable amount of internal wear; fourthly, in which no water shall waste till the cleansing-flow ceases; fifthly, in which the closing-check device is self-clearing at every stroke of the plunger; sixthly, in which the partial flow necessary before the cleansing-flow commences is determined and adapted to various pressures by a positive device unchanging in its action.

The devices by which these objects are accomplished are shown in Figure 1, which is a vertical section through the middle of the shell and the induction and eduction ports, in which *a* is the cylinder or shell of the valve; *b*, the cap; *c*, the tube to receive the lower end of a rod; *d*, the flange, through which four fastening-screws pass; *e*, the induction-port; *f*, the eduction-port; and *g*, the wasteway, which must be understood to be at right angles with the ports. The shell *a* is beveled out at its top to admit of the easy entrance of the leather cups, while the internal diameter of its lower end is contracted, as shown, in order that the inverted cup *o''*, during withdrawal, may pass with freedom the tops of the ports.

Fig. 2 shows the induction-port *e*, as seen from the inside of the cylinder, a little deeper than the stroke, to allow the receding water in the last part of the downstroke to get back through the port; Fig. 3, the eduction-port *f*, widened at the cylinder, and narrowing and terminating in a round port as it extends outward; Fig. 4, a top view of the puppet-valve seat, showing the fissure therein.

The plunger is composed as follows: Three cups, of leather or other suitable material, as shown at *o o' o''*; the spindle *h*, threaded at its top and shouldered midway of its length, with a flange at its lower end, all as shown; the choke-flange *i*, resting on the shoulder of *h* and tightened on *o* by the spindle-thread entering *c*; a jam-nut, *j*, flanged, as shown, as a support for *o'*; a cylinder, *k*, crossed, as shown, by a solid partition near the middle of its length; *l*, a hollow and flanged nut, with a very small fissure across one side of its upper face, which furnishes a seat for the puppet-valve and accommodation for a spring below, the space in which the puppet *x* operates being connected with the pressure by the hole in *k* at *m*. Six-sided holds for a wrench are provided on *b*, *j*, and *l*, while the latter has a recess in the upper part of its cavity to take the top coil of a spring (where one may be needed) and secure its withdrawal with the plunger.

In making up the plunger, first slip or screw *o'* onto *j*, then drop the latter onto *h*; screw *j* into *k*, then drop *i* onto *h*, followed by *o*, and screw *h* into *c*; attach cup *o''* as shown, drop puppet into nut *l*, and screw *l* into *k*; drop plunger into cylinder, and screw on cap *b*.

The valve is shown in a state of rest. When the weight is applied the plunger descends to the bottom of the cylinder, and if a spring be there it will be compressed into the cavity of *l*. From this position upward the plunger has three distinct motions—first, when the weight is lifted the pressure on *o* and *i* throws them up till the flange on *h* touches the jam-nut *j*. The top of *o* is then level with the bottom of the wasteway, and the lower edge of *i* has uncovered sufficient of the eduction-port to allow a free flow for the final cleansing. The next motion carries the plunger to a point at which *o'* cuts off the flow. This and the third motion, which latter completes the upstroke, are slow, regulated by the rate at which the space under *l* can fill through the fissure in the puppet-seat. During the early part of this slow motion there is ample time for all the water above *o* to run off before the wasteway is covered by

that cup, so that no ordinary leak can ever appear externally. Even should a little water leak past *o* during the rest of its upward motion, there is ample room for it in the space around the bottom of *c* till the next downstroke. In this upward movement of the plunger, *o'* cuts off the flow just as the lower edge of *o* reaches the bottom of the wasteway, so that no water is wasted save that which fills the pipe leading from the eduction-port to the bowl. When *o'* has fully closed the inlet and *o* has passed the bottom of the wasteway (while the upstroke is quietly continuing) the water begins to descend from the pipe just mentioned into the space between *i* and *j*, and thence passes through the perforation in *i* and around the circumference of the latter to the wasteway. While *i* covers the eduction-port, it overlaps equally the top and bottom of that opening, and permits the passage of just so much water (according to its diameter and the pressure) as will keep the bowl wet and prevent the too tenacious adhesion of more solid matter.

The closing device in this valve had to be different from that of any other known to the present applicant. There is so little space below *l* to be filled that a puncture in that part could not be made small enough to allow sufficient time for the flow, not to mention the liability of such an aperture to frequent choking. A spring being equally out of the question, except as an assistance to weak pressures, the combination of the present device was preferred, as in every downstroke of the plunger the refluent water will lift the puppet and form a kind of coronal swash around the head of *l*, removing any particle that might have interposed itself at the previous closure.

Having fully described the construction and operation of my improved valve, I claim as new, and desire to secure by Letters Patent, the following:

1. In combination with the cylinder *a*, provided with induction and eduction ports and a wasteway, as shown, the plunger, substantially as described, consisting of two main portions, each having a distinct function and a measurably independent action, as explained, said main portions being connected or swiveled together by the spindle *h*, all for the purposes set forth.

2. In combination with the cylinder and plunger aforesaid, the induction-port and wasteway, so arranged in relation to the traverse of *o* and *o'* as to prevent external leakage and the loss of any water save that intended to be used, as specified.

3. In combination with a plunger and cylinder, constructed and arranged substantially as shown, the choke-flange *i*, to permit and regulate a partial flow, as explained.

4. In combination with the cylinder and plunger, the nut *l*, provided with a small fissure across its face, and puppet *x*, to regulate the filling of the space below the nut, substantially as described.

JAMES P. KENYON.

Witnesses:
R. J. NEVILLE,
W. P. KENYON.