

P. WHITE & J. C. KUPFERLE.

WATER-CLOSET VALVE.

No. 182,502.

Patented Sept. 19, 1876.

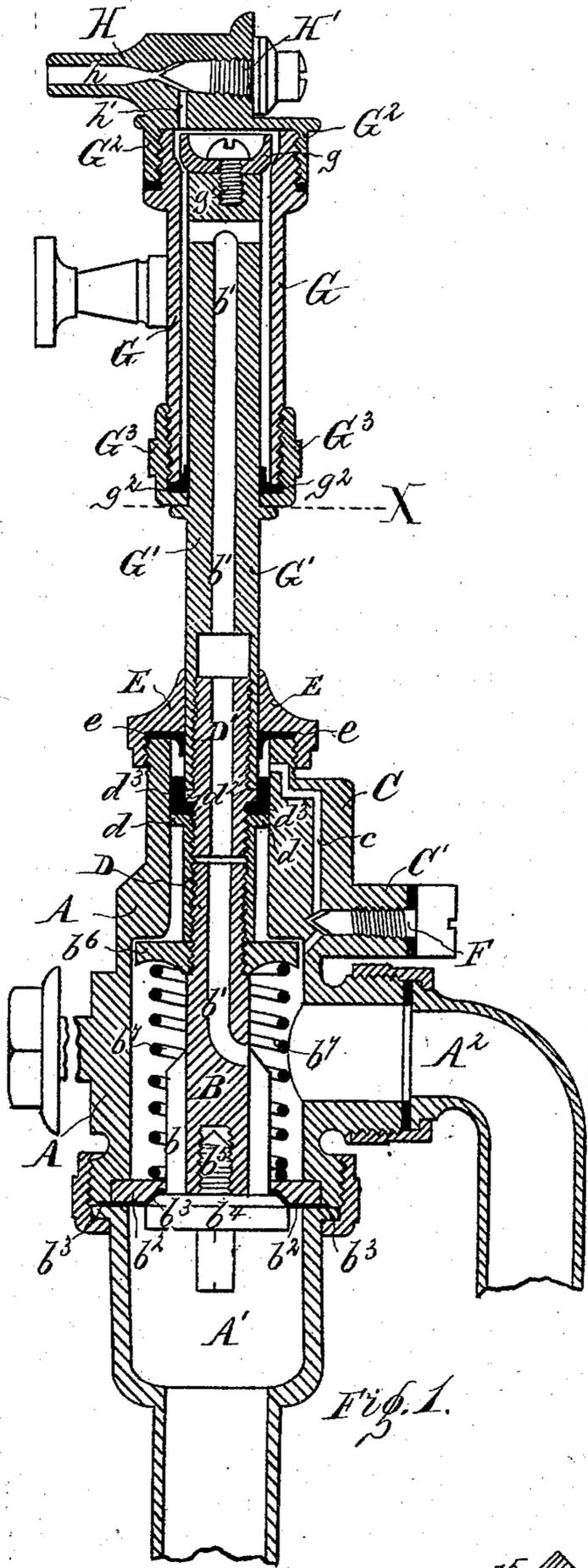


Fig. 1.

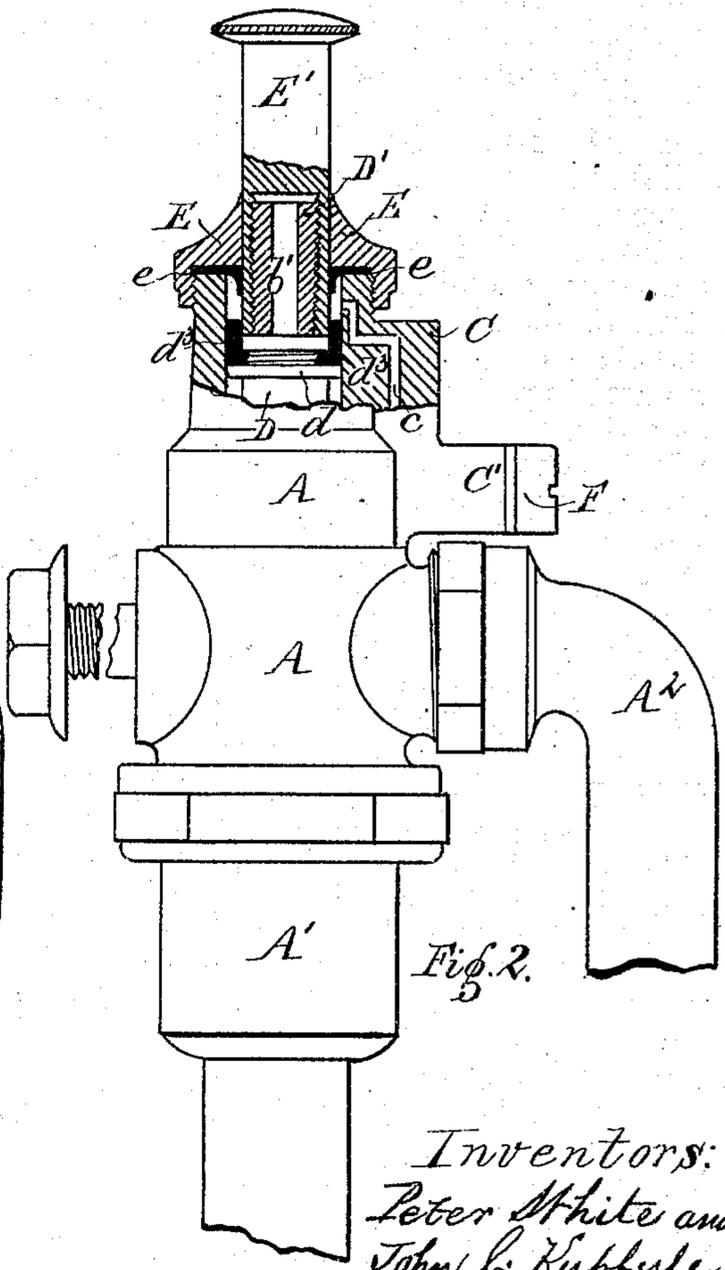


Fig. 2.

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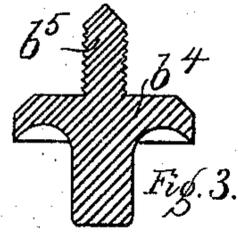


Fig. 3.

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UNITED STATES PATENT OFFICE.

PETER WHITE AND JOHN C. KUPFERLE, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN WATER-CLOSET VALVES.

Specification forming part of Letters Patent No. 182,502, dated September 19, 1876; application filed July 5, 1876.

To all whom it may concern:

Be it known that we, PETER WHITE and JOHN KUPFERLE, both of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improved Closet-Valve, of which the following is a specification:

This invention more specially relates to closet-valves for discharging fluids, but in general application is adapted for hydrant-valves, self-closing cocks, &c.

The nature of this invention consists in the improved features, and their combination and operation, as hereinafter described and pointed out in the claims.

Of the drawing, Figure 1 is a sectional elevation, showing our valve double-acting. Fig. 2 is a side elevation, showing our valve single-acting, the connection of its operating stem being shown in section. Fig. 3 is a detail, showing the construction of the valve and its stem.

A is the body. A¹ is the inlet-pipe. A² is the discharge-pipe, each of said pipes connecting to the body by screw-coupling. The body A otherwise has structural features, as will hereinafter appear. B is the valve-stem. This has the wings or ribs *b*, and a water-passage, *b*¹. Further, the upper and lower ends of the stem are threaded, all as shown in Fig. 1. The wings *b* are to create inlet-spaces for the water to enter the body or cylinder, the water-passage *b*¹ being to pass part of the entered water, as will hereinafter appear. The upper and lower threads are to connect to the valve-stem the other valve-gearing, in such a way that all the parts belonging to the stem can be inserted through the bottom in an operative position in the cylinder A. The said parts just alluded to are a removable seat, *b*², arranged between a shoulder in the body A and the packing *b*³, next to a shoulder of the inlet-pipe A. (See Fig. 1.) The seat *b*² and washer *b*³ are secured to valve-stem by the screw that at same time secures the valve proper. *b*⁴ is a valve, having its under face concave (see Fig. 3) to concentrate the water-pressure in the center of said valve-face, its upper face being beveled to form a tight joint against the seat and washer. Forming part of valve is its stem *b*⁵, which is threaded to engage the valve-stem B, while the lower end

is square-shaped. (See Figs. 1 and 3.) *b*⁶ is a shoulder or collar, its under face grooved (see Fig. 1) for the end of the spring. Said collar is secured to valve-stem to operate with same. Between this collar and the seat *b*² the valve-stem is provided with a coil-spring, *b*⁷, which assists the closing action of the valve.

All the parts described constituting the valve-gear, as stated, are inserted in operative position in the body from below, and so that the valve proper closes its seat, as shown in Fig. 1.

In order that the seating of the valve can be controlled, or its closing action be regulated to suit the pressure, the following further operating parts are provided: Forming part of the shell A is a rib, C, having a branch, C'. Through the ribs C C' a water-passage, *c*, is made, and so as to communicate with lower chamber of the cylinder A as well as with the top thereof. (See Fig. 1.) This water-passage is to allow the part of the water that has passed into upper part of the cylinder to waste, and return to the lower part or chamber thereof.

Within the upper chamber, and made to form part of the valve-stem, is a plunger consisting of the following parts:

D is a sleeve, internally threaded to engage the threads at top of valve-stem B. At top this sleeve has a shoulder, *d*, to form a seat. D' is a further stem, screw-threaded at both its ends. The lower end thereof screws into the sleeve D, and with it forms part of valve-stem B. At *d*² the stem D' has a shoulder, surrounding which is a leather washer, *d*³, made cup-shaped. The upper screw end of the stem D' is to make the further connection either to the hand-stem (see Fig. 2) or to a pump attachment. (See Fig. 1.)

E is the cap. It is internally provided with a cup-leather, *e*, to form the needed water-tight joint either with hand or pump stem. E' is the stem to complete the single-acting valve. (See Fig. 2.) This stem is passed through the cap, and is screwed to top of the plunger-stem D'. The stem E' also closes the center water-passage *b*¹. The parts all above stated constituting the single-acting device, Fig. 2, in operation, it will be noted, in case the valve is opened, that while the water is dis-

charging at A^2 , a part thereof will pass up or through the cylinder and by the cup-leather washer d^3 into the top chamber, between the said plunger and the cap E. Also, that in the attempt of the valve to seat itself by force of water-pressure and spring-power against the cup-leather washer d^3 , the action is counteracted by the cup-leather washer, which is forced against the cylinder. In case the water-passage c is closed, the water to one side or top of said plunger will be confined, and the valve is consequently prevented from closing.

Further, it is our object, in a more practical manner than has heretofore been done, to control and regulate the waste of this confined water to insure the required closing action of the valve, no matter what pressure may be against it, and to prevent the inconveniences arising where the closing action cannot be regulated. The control and regulation of the waste-passage we therefore accomplish by means of a set-screw, the point whereof is tapered, being a needle-point, and fitting in a tapering or V-shaped seat. Thus, F is this set-screw, made to engage in the branch rib C' . The inner end of the screw is made a needle-point, and the juncture of the water-passage c is likewise shaped, all as shown in Fig. 1. By means of the set-screw F the water-passage c can be entirely closed or opened, or said passage can be made so small that a slow and corresponding small discharge is effected. The closing action of the valve proper will therefore take place in accordance with the amount of discharge or waste permitted to take place, and which is determined by the degree that the needle-point of the set-screw engages the V-aperture of the water-passage c . The waste water returns, by way of the passage c , back into the shell or body A.

Besides the single-acting closet-valve thus made, our invention further consists in forming the device double-acting. The additional features to constitute the double-acting device are to guard against the disadvantages arising where the single-acting valve becomes inoperative, or where in case the pressure is too great, and otherwise to obtain and make most practicable the entire apparatus.

The additional features consist in a regulator-valve having a waste likewise controlled as previously described, and by means whereof, either by itself, or in conjunction with the single operating parts, the seating of the valve is accomplished, and the reaction of the water in the pipe can be avoided. Hence, G is the regulator-valve; G^1 , its plunger-stem, the lower end of this stem being connected to the valve-stem D' . The water-passage b^1 is continued through the stem G^1 , and so as to find outlet in the upper part of the stem, and into the cylinder G. The plunger-stem G^1 is provided with cup-shaped packing g , secured by a set-screw, g^1 . (See Fig. 1.) G^2 is a cap to close one end of the cylinder G, with intervening packing. Also, G^3 is a like cap, hav-

ing cup-packing g^2 , to close the other end of the cylinder G. The cap G^2 carries the waste-pipe H, in which the regulating-screw H' operates. This screw is similar in construction to that of F—viz., to have a needle-point to control a V-shaped waste-passage, h . (See Fig. 1.) h' is the passage from pump to waste out at h .

In operation, the water passes through the center passage b^1 into the cylinder G. From thence part of water passes between plunger g^2 and sides of said cylinder G, and in the act of the valve seating the said water between cap G^2 and plunger g^2 causes the latter to be forced outward and confine the water in the upper part of the pump. The only egress for this confined water is by the passages $h h'$. The screw H' being the means to regulate the opening of said passages, it is apparent that the seating of the valve must be in accordance with the time of the discharge of the waste.

To apply our invention, the closet-valve, with or without regulator-valve, is horizontally connected to the bowl or fluid-pan of the closet. The lever or pull attachment is made to connect with the operating-stem at X. (See Fig. 1.) The exhaust-pipe A' is to wash the bowl, and the waste of the regulator-valve is likewise made to connect with the bowl or a separate pan.

The complete device in Fig. 2 is serviceable as a hopper-valve.

As chief advantages for our invention, we can state that we entirely overcome the reaction in the pipe, which heretofore has been the cause of extra expense, time, and labor. We can so regulate the action of the valve as to exactly suit the pressure, shutting off gradually, and at same time guaranteeing a full pan of water. The regulator-valve further enables us to obtain the advantages of double action to suit our valve for high or strong pressures, and in all cases to avoid the reaction in the pipe.

What we claim is—

1. The combination of the removable seat b^2 , washer b^3 , valve b^4 , having stem b^5 , all said parts being constructed and arranged, as shown, with relation to valve-stem B and shell A, as and for the purpose set forth.

2. The stem D' , shoulder d^2 , cup-washer d^3 , in combination with sleeve D, having shoulder d , and the shell A, as and for the purpose set forth.

3. The stem B, seat b^2 , washer b^3 , valve b^4 , stem b^5 , collar b^6 , spring b^7 , sleeve D, stem D' , cup-washer d^3 , in combination with shell A and pipes $A^1 A^2$, all constructed in the manner herein shown and described, as and for the purpose set forth.

4. The combination of the stem B, seat b^2 , washer b^3 , valve b^4 , stem b^5 , collar b^6 , sleeve D, stem D' , cup-washer d^3 , cap E, packing e , stem E' , shell A, having ribs $C C'$, water-passage c , the regulating-screw F, and pipes $A^1 A^2$, all said parts being constructed and combined as

shown and described, as and for the purpose set forth.

5. The combination, in a regulator-valve, of a cylinder, G, having stem G^1 , with water-passage b^1 , cup-leather g , screw g^1 , cup G^3 , cup-leather g^2 , upper cap G^2 , having passage h' , water-pipe H, having passage h , the regulating-screw H' , all said parts being constructed and arranged to operate as shown and described, and for the purpose set forth.

In testimony of said invention we have hereunto set our hands in presence of witnesses.

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JOHN C. KUPFERLE.

Witnesses:

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CHAS. F. MEISNER.