(No Model.)

W. N. DECKER.

AUTOMATIC VALVE FOR WATER CLOSETS.

No. 288,167. Patented Nov. 6, 1883.

Fig. 1.

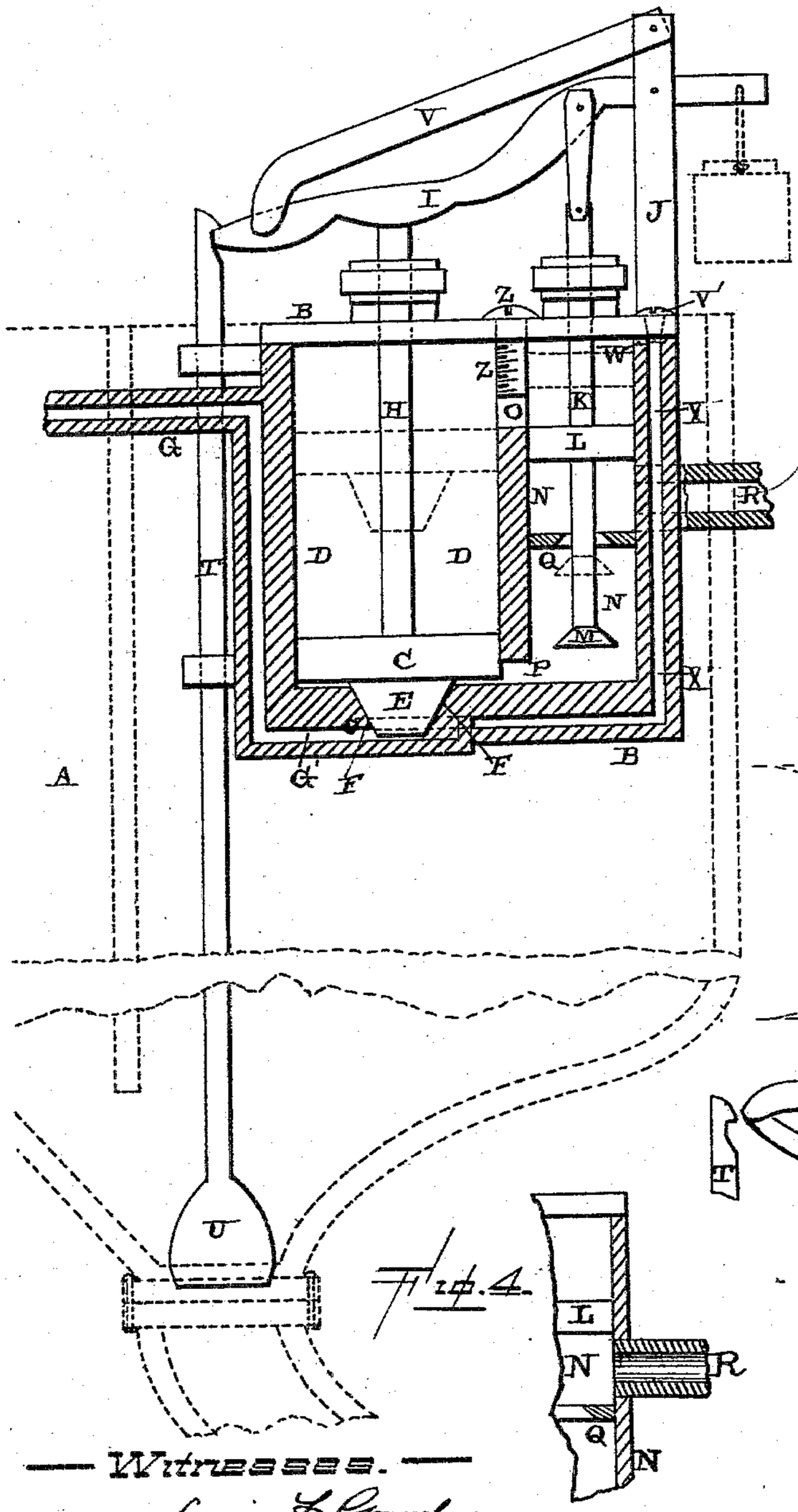


Fig. 2.

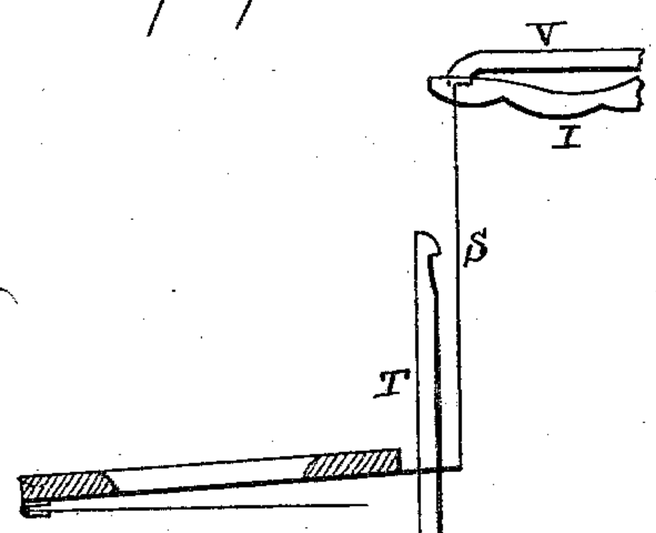


Fig. 3.

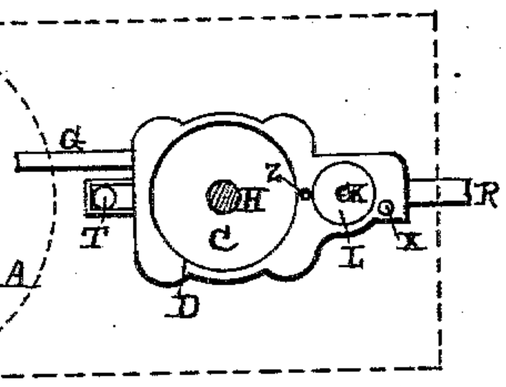
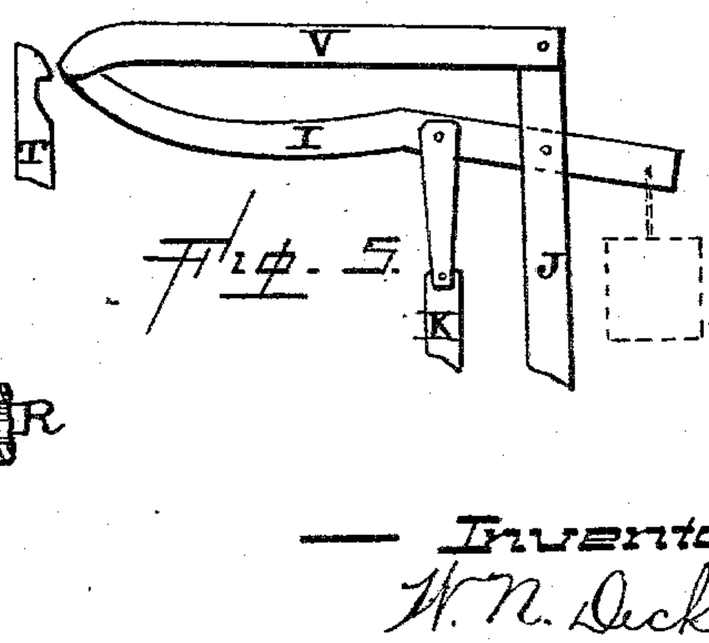


Fig. 4.

Fig. 5.



Witnesses.

Louis F. Gardner

E. D. York.

Inventor.

W. N. Decker,

per

F. A. Lehmann

Atty.

UNITED STATES PATENT OFFICE.

WILLIAM N. DECKER, OF COLUMBUS, OHIO.

AUTOMATIC VALVE FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 288,167, dated November 6, 1883.

Application filed November 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. DECKER, of Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Automatic Valves for Water-Closets; 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.

My invention relates to an improvement in automatic valves for water-closets; and it consists, first, in the combination of a piston which is provided with a valve upon its lower side and with a piston-rod upon its upper side, which rod projects through the top of the casing, so as to bear against the under side of the lever which operates the valve, for the purpose of forcing the valve back into position after it has been depressed by the seat; second, in the combination of a double valve which is attached at its upper end to the lever, which lever, when it has its free end depressed, catches in a notch in the side of the valve-rod, so that when the double valve is forced back into position by the piston the valve opens, so as to allow the water to flow from the bowl; third, in the arrangement and combination of parts, which will be more fully described hereinafter, whereby an automatic valve for water-closets is produced.

The object of my invention is to provide a valve that is operated entirely by the pressure of the water without the help of springs or floats of any kind, and which permits the water to flow through it only after the seat has been depressed.

Figure 1 is a vertical longitudinal section of a valve embodying my invention, showing the operating parts in different positions. Fig. 2 is a detail view of the seat and the operating-levers connected thereto. Fig. 3 is a plan view of the valve, shown in its proper relation to the water-closet bowl. Fig. 4 is a detail view, showing the connection of the inlet-pipe with the cylinder. Fig. 5 is a detail view, showing the position of the rods I V when forced upward.

A represents the bowl of the closet, which will preferably have the valve located as shown; but I do not limit myself to any particular location of the valve, for this may be applied to one side of the pipe, directly in the line of the pipe, and either above or below the seat, as may be preferred. When placed above the seat, a longer connecting-rod is used, but the operation is otherwise the same. The casing B, in which the piston and double valve are placed, may either be of the form here shown, or any other that may be preferred. The piston C moves vertically in the cylinder D, and has the valve E formed on its under side for closing the opening F, through which the water flows into the outlet-pipe G when the piston is elevated, as shown in Fig. 1 in dotted lines. As soon as the piston C begins to rise, the valve E opens the port F and the water begins to flow through the outlet-pipe G into the bowl, and this flow continues until the piston has again returned to its seat. Secured to the upper part of the piston is the piston-rod H, which is just long enough to project a short distance above the stuffing-box upon the top of the case when the piston is depressed. As the piston C is forced upward by the pressure of the water on its under side, this piston-rod H strikes against the lever I, which is pivoted on the standard J, as shown. To this lever I is fastened the rod K, which is provided with the two valves L M, which move vertically in the cylinder N.

Through the partition which divides the cylinders N D are made the two ports O P, through which the water passes for the purpose of operating the piston C and refilling the bowl.

In the cylinder N is placed a partition, Q, which has a conical port formed in its under side for the valve M. The rod K passes down through the opening in the partition Q, but does not fill it, nor does the valve M at any time entirely close the opening. The object of the rod K and the valve M is to regulate the amount of water that flows through the port P, for the purpose of causing a less pressure on the under side of the piston C while descending, and thus allow the pressure upon its top to cause it to return to its seat in the lower part of the cylinder D.

The water flows into the cylinder N be-

tween the valve L and partition Q through the pipe R, which should be about twice as large as the outlet-pipe G. This water bears against the under side of the valve L, but has no power to move it, except as the lever I allows it to slowly rise. The water, not being able at this time to get past the valve L, passes down through the opening in the partition Q, through the opening P, and under the piston C. The upward pressure of this water forces the piston C upward, as shown in dotted lines, and as the piston rises it forces the lever I upward, and this upward movement of the lever I carries the valve L upward with it until the valve rises above the port O. When the valve L is raised in the cylinder N above the port O, the water flows freely through the port O upon the top of the piston, so as to cause a sufficient downward pressure to force the piston to descend. This piston is caused to descend, because but a small quantity of water can pass through the partition Q as compared to what passes through the port O, and hence a greater pressure is brought to bear on the top than the bottom of the piston. The piston C will only rise as far as the port O, and the valve L can only rise just above it. While the valve L is depressed, as shown in Fig. 1, all flow of the water through the port O is stopped, while a sufficient pressure is kept in the cylinder below the partition Q to cause the piston C to rise upward as soon as it is free to move. When the seat is depressed, the rod S, which is fastened to it, pulls or bears down upon the lever I, which operates the two valves L M. This lever I, when used in connection with low pressure, will have a weight attached to it, so as to counterbalance the valve U that is located in the bowl; but when the pressure of the water exceeds about ten pounds no weight is needed, for the water then makes the operation of the valve automatic in every respect. When the rod I is depressed by the movement of the seat, it descends just far enough to rest upon the top of the piston-rod H and hold the piston upon its seat. At the same time that it strikes against the top of the piston-rod H the outer end of the rod I catches in a notch formed in the top of the valve-rod T. When the piston C forces the lever I upward, the lever raises the valve U from its seat in the bowl, so as to allow the water to flow out, and this upward movement of the valve U is continued until the pivoted lever V forces the end of the valve-rod T from off the end of the lever I, when the valve U instantly drops and allows the bowl to refill. As the lever I is forced upward by the piston it raises the valves L M into the position shown in dotted lines. As soon as the lever I begins to raise the valve L above the port O the water flows from the cylinder N upon the top of the piston C, and at the same time the valve M checks the flow of the water underneath the piston, and thus causes a heavier pressure of water upon the top than against the under side of the piston. When the piston C begins to rise, nearly all of the water that was contained in the cylinder D is forced through the small port W, and out through the passage X into the discharge-pipe G. The size of the port W is regulated by the set-screw V′, which is passed down through the top of the case for the purpose of controlling the ascent of the piston C. In order to regulate the descent of the piston C the set-screw Z is used, which may either nearly close the port O with its lower end, or the screw may have a sliding valve attached to it which will close the port. When the port has its diameter reduced, the water passes through it more slowly, and thus takes a longer time to cause the piston to descend. When the valve L begins to rise above the port O, the water in the top of the cylinder is forced through the port W.

When it is desired to regulate the point at which the valve U shall be released from the lever I, the free end of the lever V will be provided with a set-screw or an adjusting device of any kind which can be made to strike against the upper end of the valve-rod T at any desired point. By this construction the valve U can be held open any desired length of time.

When the parts are in their normal position, the seat is held in the raised position shown in Fig. 2 by the rod, wire, or cord S, and the lever I, and the piston C is held down upon its seat, so as to stop all flow of water through the port F while the valves L and M are raised into the positions shown by dotted lines. The water then flows through the pipe R into the cylinder N. A portion of this water flows through the partition Q down through the port P and under the piston C, but only a small portion of it. The pressure of the water above the partition forces the valve L up above the port O, and then flows into the cylinder D on top of the piston C. There being a greater pressure upon the top of the piston than there is against its bottom, it is held down in the bottom of the cylinder. There being no pressure upon the top of the valve L, the pressure of the water in the cylinder H keeps it in the elevated position shown in dotted lines. No water is now flowing through the valve into the bowl, for the ports F and W are both closed. As soon as the seat is depressed the rod or lever I is drawn downward until it strikes against the top of the rod H, so as to lock the piston C in place, and at the same time the valve L is depressed below the port O, as shown in solid lines. As soon as the seat is released the pressure of the water through the port P exceeds the mere weight of water on top of the piston C and begins at once to raise it in its cylinder. Nearly all of the water in the cylinder D, as the piston rises, is forced through the ports O W into the pipes X, and thence into the pipe G. As the piston rises the water passes freely through the perforated partition Q, ports P F, and the

pipe G into the bowl A, so as to wash it out. While the piston C is rising the valve L is also being raised, but much more slowly. As the piston C and valve L rise upward the rod or lever I, which has had its outer end to catch in a notch in the upper end of the valve-rod T, raises the valve U from its seat until the continued upward movement of the rod or lever I causes the rod V to force the valve-rod T from off the end of the rod or lever I, when the valve U at once drops and closes the bottom of the bowl. The piston C continues to rise until the valve L begins to rise above the port O, when a greater quantity of water flows into the cylinder D upon the piston C than can flow through the nearly-closed opening in the partition Q, when the piston begins to descend for the purpose of stopping all flow of water through the valve. In this manner the valve is operated entirely by the pressure of the water.

Having thus described my invention, I claim—

1. In a valve for water-closets, the combination of the two cylinders, which are placed side by side and connected together at their tops and bottoms, one of which is provided with a perforated partition, and which cylinders are provided with the inlets and outlets, as shown, with the pistons and their valves and piston-rods, one of the piston-rods being connected to the operating-lever, which lever is operated by the piston in the larger cylinder, a tripping device which operates in connection with the operating-lever, and the valve-rod which controls the valve in the water-closet bowl, substantially as shown.

2. In a valve for water-closets, the combination of the two cylinders D N, connected together by the ports O P, the pistons C L, provided with the valves E M, the piston-rods H K, lever I, operating device V, and the water-closet valve, the cylinder N being provided with the perforated partition Q, and both cylinders provided with the inlets and outlets, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WM. N. DECKER.

Witnesses:

B. LEWIS BLACKFORD,

F. A. LEHMANN.