

W. HENDERSON.  
Valve.

No. 205,861.

Patented July 9, 1878.

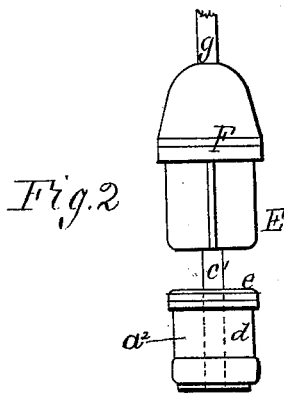
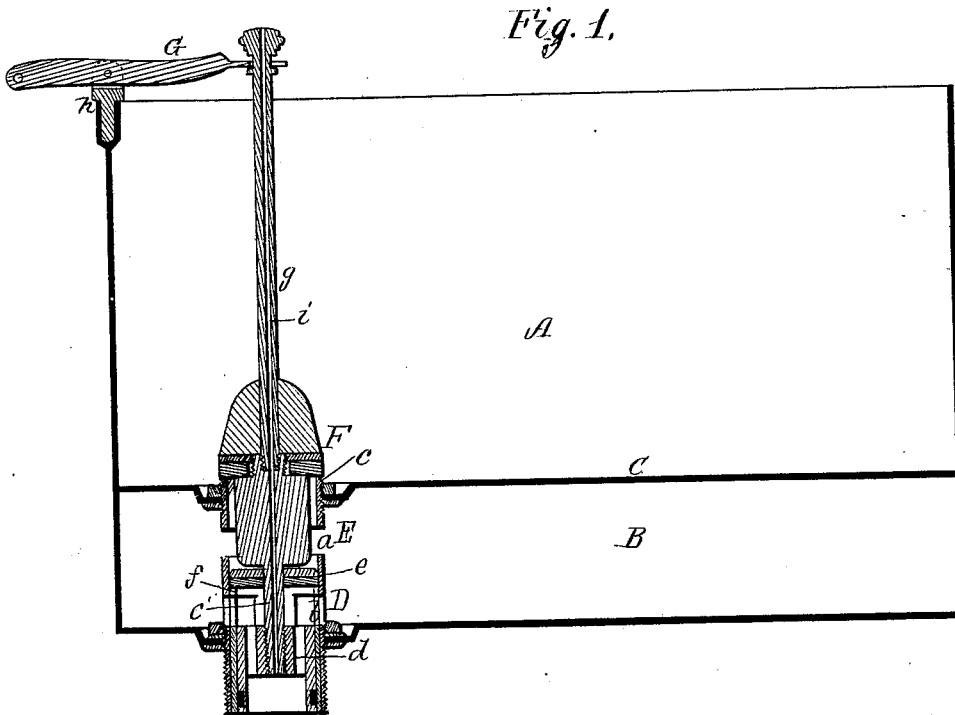
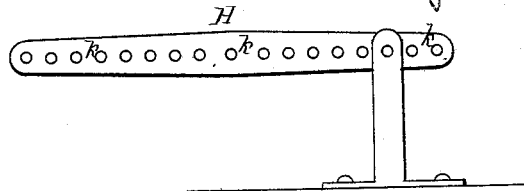


Fig. 3.



*View of bar which connects the valve with the chest.*

Witnesses.  
Louis A. Curtis  
Thos. Small Andrews Jr.

Inventor.  
Wm. Henderson,  
J. Curtis, Atty.

# UNITED STATES PATENT OFFICE.

WILLIAM HENDERSON, OF EAST CAMBRIDGE, MASSACHUSETTS.

## IMPROVEMENT IN VALVES.

Specification forming part of Letters Patent No. 205,861, dated July 9, 1878; application filed June 17, 1878.

*To all whom it may concern:*

Be it known that I, WILLIAM HENDERSON, of East Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Valves, of which the following is a specification:

This valve is designed to govern the escape of water from a tank or other source of supply under pressure, and is designed more especially for water-closet tanks, in which a "service-chamber," so called, is combined with the tank, and situated between the latter and the bowl of the closet, to measure the amount of water admitted to such bowl.

My present valve is operated by the raising and lowering of the seat of the closet, and is a compound one—that is to say, it embraces in one valve two portions, one of which governs the outlet of the supply-tank, while the other, which is carried by the first, governs the outlet of the measuring or service chamber, the whole being operated by one stem, substantially as hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a vertical section of a device embodying my invention. Fig. 2 is an elevation of the valve. Fig. 3 is a view of the lever which connects the device with the seat of the closet. Fig. 4 is a cross-section of the valve.

In the said drawings, A represents a tank, such as is or may be employed in connection with a water-closet, to contain the water necessary to cleanse the latter, such tank having at bottom a box, B, which constitutes the service-chamber, before named, and which is separated from the tank by a partition, C.

In carrying my invention into practice, I employ a tube, D, which extends from the interior of the tank A downward through the measuring-chamber B and through the bottom of the latter, and leads, by a suitable connection, into the bowl of the closet, in order that water passing through it shall flow into such bowl.

The portion of the tube D which is disposed within the chamber B has two peripheral openings or series of openings, *a* and *b*, the first named being disposed at the upper

part of the chamber, and serving to govern the escape of water from the tank A to the said chamber, while the opening *b* serves to govern the escape of water from the chamber, the arrangement of these openings with respect to the valve being such that when the upper ones are open, and water is being discharged into the said chamber, the lower ones are closed, to prevent escape of water from such chamber.

The valve is shown in the accompanying drawings, at E, as composed, first, of an ordinary drop-valve, F, which covers and closes the upper end of the tube D or the outlet *c* of the tank A, with which such tube connects, while below such valve, and supported by a rod or bar, *c'*, depending from it, I employ a tubular plunger-valve, *d*, having a peripheral packing of leather, rubber, or other suitable material, which closely fits the bore of the tube D, and serves to prevent passage of water between the valve *d* and said tube.

When the upper valve E is closed upon its seat, the valve *d* is below the discharge openings or ports *b*, and the latter allow the water in the chamber B to flow downward through the center of the said valve *d* into the tube D below it, and thence to the bowl of the closet.

To prevent flow of water from the tank A through the valve *d* while the valve F is being raised, I employ a circular drop-valve, *e*, which slides feely upon the rod *c'* and independent of the other two, and operates with an annular valve-seat, *f*, formed upon the interior of the tube D, at a point intermediate between the ports *a* and *b*.

The valve *e* is disposed at such a distance above the lower valve *d* that the rod *c'* is allowed to rise with the movements of the valves F and *d* without effect upon such valve *e* until the lower valve has raised sufficiently to cover the ports *a* and *b*.

An equivalent for the valve *e* and its seat would be a shelf located in the tube D, with an axial passage, through which the rod *c'* would pass with a close joint; but this would entail more friction, necessitate a more expensive construction, and the parts could not be as easily cleaned.

The valve E is provided with a stem, *g*,

which is erected upon the top of the valve F, and is connected at its upper end with one end of a lever, G, pivoted to the adjacent part of the tank A by a standard, *h*, while the opposite end of this lever is in turn connected by suitable intervening mechanism with a second lever, connected to and operated by the seat of the water-closet, in such manner that when the seat is lowered by the weight of the occupant the action of the last-named lever shall raise the inner end of the lever G, and consequently the valve E, and when the occupant rises from the seat the lever G and valve E descend.

The operation of my valve is, briefly, as follows: As the valves F and *d* are raised by the lowering of the seat of the closet, the escape-port *c* of the water-tank is opened, and water flows from such tank through the ports *a* into the service-chamber B, and the latter is filled, the intermediate drop-valve *e*, as before stated, serving to prevent flow of water downward through the tube D and valve *d* into the lower part of said tube.

The ascent of the two valves F and *d* by the lowering of the seat is a quick movement, so that during the interval of time that the lower valve is raising sufficiently to close the ports *b* the amount of water escaping through the latter would be trifling.

When the occupant rises from the seat the two valves F and *d* drop with a quick movement and the upper ports *a* are closed, and flow of water from the tank A through them is shut off, while simultaneously therewith the lower ports *b* are opened, and the water in the chamber B is discharged through the center of the lower valve *d* and the tube D into the bowl of the closet.

Heretofore two distinct valves have been employed in water-closets, in which the supply of water is governed by the lowering and raising of the seat. I employ but one valve; hence its operation is always certain and regular, as the two portions of the valve must necessarily move in unison, and for the same reason the service-chamber is sure to be filled and discharged at each occupation of the closet, and no water is wasted.

In some instances the seats of self-acting water-closets are hinged at front in lieu of at the rear. In such cases the action of the water would interfere with the proper working of the valve E, as the pressure would in many cases be equal above and below it. To avoid this I create through the entire length of the valve-stem *e g* a passage, *i*, by means of which air may have access to the upper side of the said valve E.

My valve is easily applied, may be readily cleaned, is certain in operation, and is durable.

In Fig. 3 of the drawings I have shown at H a lever which I propose to use as a means of connecting the seat of the closet with the lever before named.

In this instance the lever H is provided with a series of holes, *k k*, &c., extending from end to end, by means of which its fulcrum may be changed to increase or diminish the throw of the valve E.

To permit a small amount of water to trickle into and over the surface of the closet-bowl while the occupant is on the seat, and by keeping such surface damp prevent foul water adhering to it, I bore a small hole, *a<sup>2</sup>*, through the periphery of the lower valve *d*, as shown in Fig. 2. This hole permits of flow of a small quantity of water from the chamber B down through the center of the valve *d* and into the bowl and over its interior surface.

Having thus described the nature and operation of my invention, I claim, and desire to secure by Letters Patent, the following:

1. The combination, with the tank A and chamber B, of the tube D, with its two series of ports, *a* and *b*, and the valves F and *d*, operated by one stem, substantially as and for purposes stated.
2. In combination with the tube D and valves F *d*, the valve *e* or its equivalent, for estopping flow of water through the tube D and valve *d*, substantially as and for purposes stated.

WILLIAM HENDERSON.

Witnesses:

W. E. BOARDMAN,  
LOUIS A. CURTIS.