

(No Model.)

J. E. BOYLE.
TANK VALVE.

No. 249,577.

Patented Nov. 15, 1881.

Fig. 2.

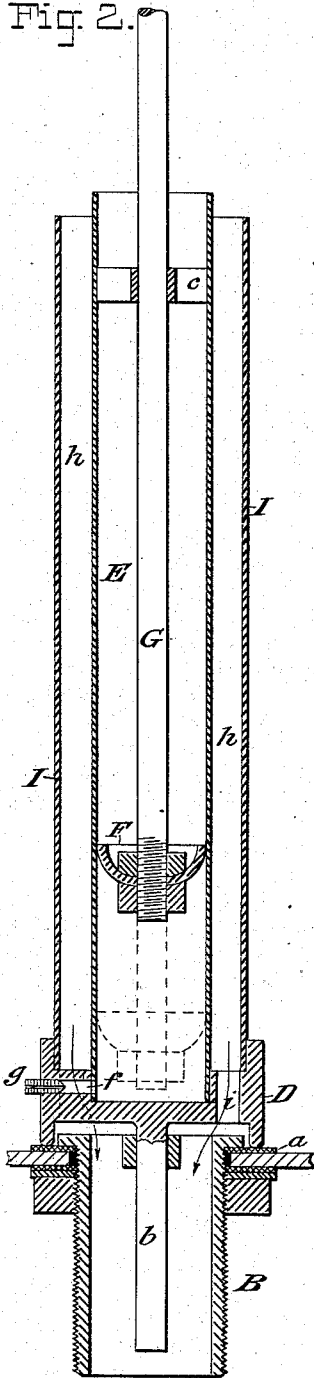


Fig. 1.

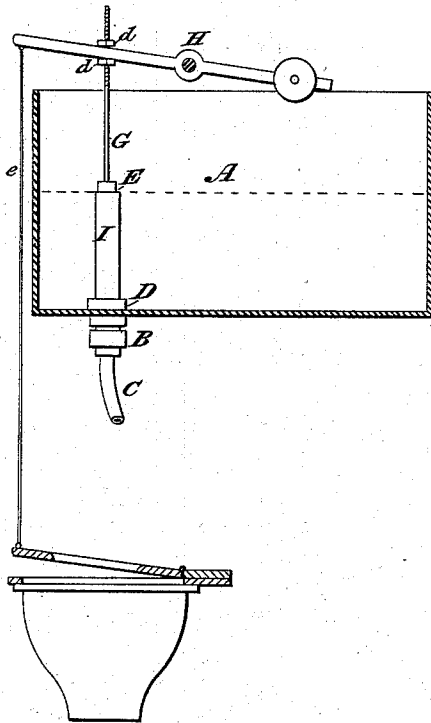


Fig. 3.

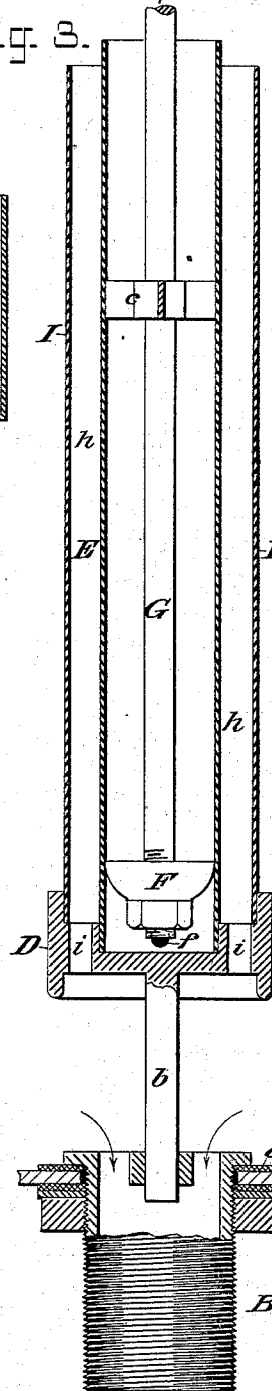
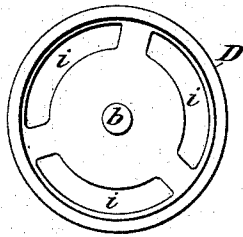


Fig. 4.



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TANK-VALVE.

SPECIFICATION forming part of Letters Patent No. 249,577, dated November 15, 1881.

Application filed June 2, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. BOYLE, a citizen of the United States, residing in Brooklyn, Kings county, New York, have invented certain Improvements in Tank-Valves for Water-Closets, of which the following is a specification.

This invention relates to a valve for use in connection with water-closets, its principal use being for the flushing of closets from a tank, whereby a service-box is dispensed with. I have shown it in the drawings as adapted to a closet wherein the seat is hinged and the closet is flushed automatically by the operation of the seat.

The novel features of my invention will be definitely set forth in the claims.

In the drawings, which serve to illustrate my invention, Figure 1 is a general sectional view of the tank, showing the arrangement of the valve on a small scale. Fig. 2 is a longitudinal mid-section of the valve, on a larger scale, showing the parts in their normal positions. Fig. 3 is a view similar to Fig. 2, but showing the valve lifted. Fig. 4 is a plan of the under side of the valve.

Let A represent an ordinary flushing-tank, which may be provided with an ordinary ball-cock to prevent overflow. Secured in the bottom of this tank is an outlet-nipple, B, to which is coupled a pipe, C, which leads to and is connected with the closet-bowl for flushing.

D represents the valve proper, which is seated on a soft or yielding packing ring or seat, *a*, and provided with a guide-stem, *b*, arranged to pass through a guide formed in the nipple B. To the valve D is secured a tube, E, in which is fitted a plunger, F, formed of a cup, of leather or other yielding material, clamped between nuts or plates, as clearly shown in Figs. 2 and 3. This plunger is secured to a stem or rod, G, which may have a guide, *c*, fixed thereon, to cause it to play truly in the tube. The stem G extends upward, and is connected with one arm of a weighted lever, H, pivoted on the tank, or above the same.

I prefer to connect the rod to the lever by passing it through a hole or slot in the lever, and confining it there by means of nuts *d d*, as shown in Fig. 1. To the end of the lever H is

affixed a wire, chain, or other connector, *e*, which leads down to the hinged seat of the closet, which is elevated normally by the weight on the lever.

So far as described the operation is as follows: The normal position of the valve and plunger is shown in Fig. 2. When the seat of the closet is depressed the plunger is pressed down to the position indicated by dotted lines in Fig. 2. If there be water under the plunger when it is depressed it will pass the yielding cup of the plunger. When the weight is removed from the closet-seat and the latter is allowed to rise the weighted end of the lever H falls, lifts the seat, and through the rod G lifts the plunger also; but the cup-shaped plunger produces a vacuum under it when it tends to lift, which causes it to lift the valve off its seat, as shown in Fig. 3. The water from the tank now rushes down through the pipe C and flushes the closet.

If means were not provided for reseating the valve all of the water in the tank would flow out through the pipe C. This I provide against by making a minute hole through the tube E, near or in its bottom, whereby the water from the tank may enter below the plunger and gradually break the vacuum. The valve will then slowly return to its seat. As a very minute hole is somewhat difficult to make, I generally drill a small hole, as at *f*, through the metal of the valve and drive therein a screw, *g*, with a fine groove cut in it longitudinally.

The stroke of the plunger governs the lift of the valve, and the lift of the valve and size of the inlet *f* govern the length of time the valve will remain open. The stroke of the plunger may be regulated by adjusting the nuts *d d* to or from the lever H, so as to give the latter play between them in a well-known way. By adjustment of these nuts the position of the plunger in the tube E may also be regulated. Outside of the tube E, and so as to leave an annular space between them, I arrange an overflow-tube, I, which is secured to the valve D in any good way. This tube extends up to the required level of the water in the tank, and should the water rise above that level from any cause, it will overflow into the annular space *h* between the tubes, out of this space

through openings *i* in the valve, (see Figs. 3 and 4,) and thence through the pipe C to the closet. Thus I dispense with a separate overflow and provide for utilizing the overflow to assist in flushing the closet.

The connection of the levers H with the hinged seat of the closet and the connection of the pipe C with closet-bowl present no novel features, and I have not thought it necessary to illustrate them fully. The former, however, is indicated in Fig. 1.

In lieu of the cup-plunger, as described, a plunger having a valve in it opening upward may be employed.

The nipple B may be secured to the tank in a well-known way, as shown.

I may employ the valve without the overflow, but prefer to connect them, as herein shown.

Where pan-closets are employed, or other closets where it is desired to start the flush by pulling a knob or lever, I fix the stem G rigidly in place and connect the valve with the lift. The pull of the operator then lifts the valve, and it slowly seats itself, as before described. If the pull-handle be immediately or promptly lowered by the operator the self-seating function of the valve will not be materially utilized; but if the handle be kept or left up-lifted the valve will shortly seat itself, and thus prevent waste of water. The operation in this case is precisely the same in principle as in the arrangement shown in the drawings.

Having thus described my invention, I claim—

1. A water-waste-preventing valve for water-closets, consisting of a valve proper provided with a tubular upward extension having a minute aperture at or near its bottom, a piston arranged to play in said extension, and a piston-rod adapted to be lifted and lowered during the use of the closet, these elements being combined and arranged substantially as set forth, whereby if the piston be lifted while the valve is seated it will lift the valve with it, and if it be upheld the valve will slowly descend and eventually reseat itself.

2. A tank-valve for controlling the flow of flush-water from the tank to a water-closet, comprising, as its elements, a valve proper to close the water-outlet, provided with a tubular upward extension having a minute aperture at or near its bottom, a piston arranged to

play in said extension, and a piston-rod connected with the seat of the closet, whereby when the seat is depressed the piston will be forced down, and when it rises said seat will lift the piston and the valve together, and thus allow the water to flow to the closet until the valve seats itself by gravity, substantially as set forth.

3. A tank-valve for controlling the flow of flush-water from the tank to a water-closet, comprising a valve proper adapted to cover the tank-outlet, provided with a tube having a small opening in it at or near its bottom, a plunger arranged to play in said tube, and a rod or stem, to which said plunger is attached, all arranged to operate substantially as set forth.

4. The combination, with the tank having an outlet in its bottom and a pipe leading therefrom to supply water for flushing a closet, of a valve to close said opening, provided with a vertically-arranged tube having a small aperture in it near the bottom to admit water from the tank, a plunger arranged to play in said tube, a rod to which said plunger is attached, a lever mounted on or above the tank, to one end of which the plunger-rod is connected, and the other of which is weighted, and a closet having a hinged lid, to which the end of said lever is connected, whereby when the seat of the closet is depressed the plunger will be driven down, and when released the weighted lever will lift the valve and plunger together, substantially as set forth.

5. The combination, with the tank having an outlet in its bottom for the escape of water to flush a closet, of the valve D, arranged to close over said opening, and provided with apertures *i i*, the tubes E and I, connected with said valve, the former tube having a minute aperture, *f*, in it near its bottom, the rod or stem C, connected with the lever H, the plunger F, attached to said rod, and the said lever H, all arranged to operate substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES E. BOYLE.

Witnesses:

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GEO. BAINTON.