W. ROSS.

Water-Closet Cistern.

No. 211,260. Patented Jan. 7, 1879.

Fig. 1.

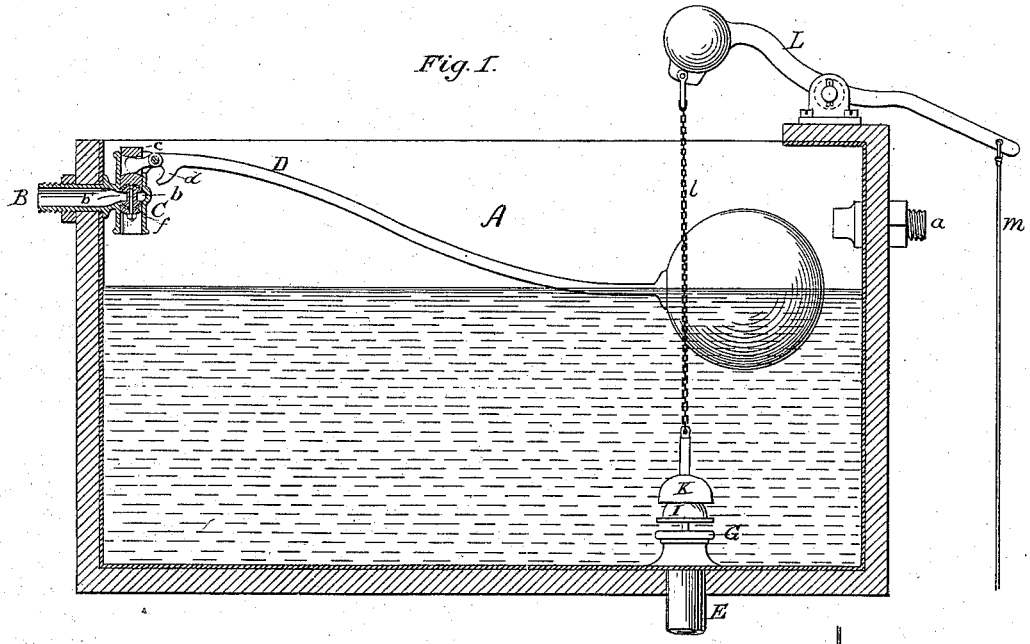


Fig. 3.

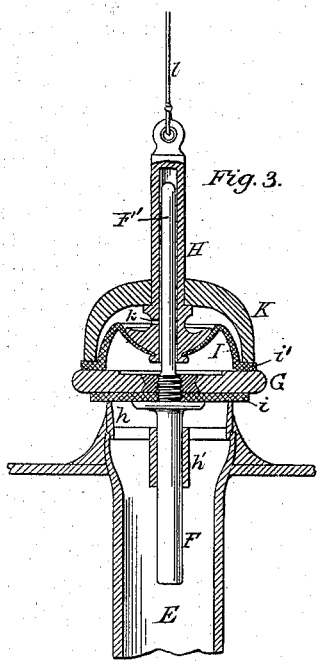


Fig. 4.

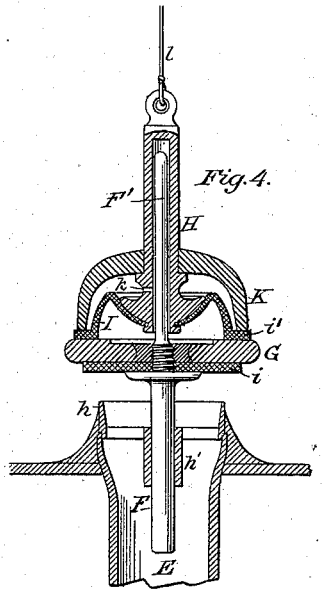


Fig. 5.

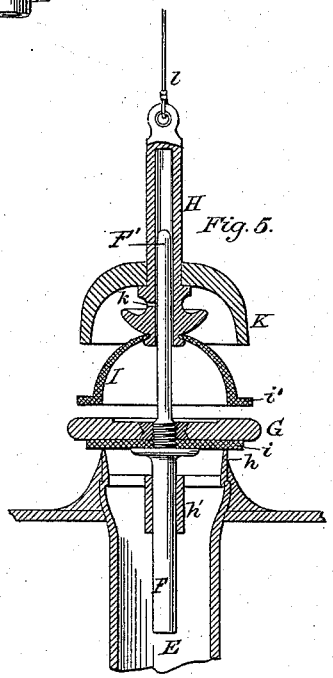
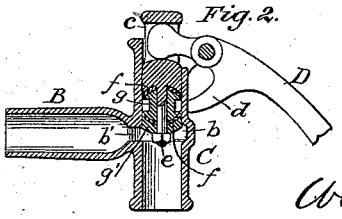


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM ROSS, OF GLASGOW, GREAT BRITAIN.

IMPROVEMENT IN WATER-CLOSET CISTERNS.

Specification forming part of Letters Patent No. **211,260**, dated January 7, 1879; application filed February 1, 1878; patented in England, February 7, 1877.

To all whom it may concern:

Be it known that I, WILLIAM ROSS, of Glasgow, in the county of Lanark, Great Britain, have invented certain new and useful Improvements in Valves for Water-Supply Cisterns, of which the following is a specification:

The object I have in view is to provide cisterns for supplying water to water-closets, urinals, and other vessels with valves for controlling the inlet and outlet of water, the valves for admitting water to such cisterns being balanced, so that they can be operated by small floats, and also being of simple, light, and durable construction, while the valves for governing the outflow of water from such cisterns allow a certain amount of water only to escape, and thus prevent waste, and are more simple and efficient in their action than those used before for the same purpose, and are portable and self contained, not requiring outer guiding cylinders or frames, as heretofore.

My invention therein consists, first, in the construction of the means for operating the outlet-valve; and, further, in the combination, in a cistern, of the peculiar outlet-valve and operating devices with the inlet-valve operated by a float-lever when the outlet-valve is opened, as more fully hereinafter explained.

In the drawings, Figure 1 is a sectional view of the cistern, the inlet-valve being shown in section as closed, and the outlet-valve in side elevation, with the sucker raised and the valve seated; Fig. 2, a sectional view of the inlet-valve opened and detached from the cistern, on a larger scale; Fig. 3, a view, in section, of the outlet-valve closed, with the sucker in position to raise the same from its seat; Fig. 4, a similar view of the valve opened; and Fig. 5, a view, in section, of the outlet-valve seated, with the sucker and weighted cap raised.

Like letters denote corresponding parts.

A is the cistern, of any ordinary form, having the overflow-pipe *a*. The inlet-pipe B projects through one end of the cistern near its top, and is screw-threaded for connection with the pressure service-pipe. The inner end of this pipe is connected to about the center of a short vertical valve-case, C, having open ends. The valve-case has a circular bore of uniform size, except that at the point where the inlet-pipe enters it is widened horizontally by a groove, *b*, the mouth *b'* of the inlet-pipe being contracted vertically to the width of this groove. The float-lever D is pivoted to lugs on the upper end of the valve-case C, and its short arm works in a slot in the stem *c* of the inlet-valve, which slides vertically in its case. The lever D has an arm, *d*, near its fulcrum, which strikes against the valve-case and prevents the further descent of the lever after the valve is fully opened. The stem *c* of the inlet-valve fits closely the bore of the valve-case, and from its lower concave end projects centrally a bolt, *e*, with screw-threaded end, to receive a nut. On this bolt two inwardly-cupped leather washers, *f*, are placed, separated by an intermediate thimble, *g*, the upper washer being held against the concave lower end of the stem *c* by the thimble, while the lower washer is secured between the lower convex end of the thimble and a concave metal plate, *g'*, all the parts being clamped together by the nut on the end of the bolt *e*.

When the inlet-valve, Fig. 1, is closed, the leather washers *f* will be situated one on either side of the groove *b*, and the water pressing equally on both washers, the valve will be balanced and can be easily operated. When the valve is opened, Fig. 2, the metal plate *g'* will be alone subject to the pressure of the inflowing water, and the valve will be protected from wear.

It is evident that this valve might be applied to other service-vessels—as to lavatories—and be worked by a hand-lever or shifting spindle and knob, either with or without a spring to keep the valve shut.

E is the outlet-pipe in the bottom of the cistern, connected with the water-closet or other vessel to be supplied with water. It has a valve-seat ring, *h*, set in its upper end, which is cast with a spider having a central eye, *h'*, to guide the valve-stem F. The valve-stem has a shoulder above the eye *h'*, and the heavy metal valve G, with leather washer *i* on its lower side, is secured on the stem against this shoulder. The valve-stem F is extended upwardly above the valve G, and has placed on its upper portion, F', the hollow lifting top H, fitted loosely to the stem. The rounded head, at the lower end of this top, is

attached to the bell-shaped india-rubber sucker I by stretching a hole in the crown of the sucker over a flange on the end of the top. The lower edge of the sucker I is turned outwardly to form a flange, *i'*, which (when the top is lowered) rests on the flat upper surface of the valve G, the upper face of the valve being preferably depressed at its center. A metal cap, K, is sleeved on the top H above a shoulder on the same, and presses on the flange *i'* of the sucker when the parts are lowered onto the valve. A small hole, *k*, is made in the top H below the cap K, and admits water to the interior of the sucker. The top H is connected, by a chain or wire, *l*, with the weighted end of a lever, L, whose other end is drawn down by a wire, *m*, led down to the hand of the person or connected with the acting lever of the closet.

The valve G being seated and the top sucker and cap lowered upon it, the crown of the sucker will be pressed in by the weight of the top and the water forced out of the sucker through the hole *k* till the parts assume the position shown in Fig. 3. Then, by raising the top H, the sucker will be drawn up from its crown, and the partial vacuum thus formed will raise the valve from its seat, Fig. 4. The valve will be held in an elevated position till the water, running in through the hole *k*, destroys the partial vacuum, (the sucker at the same time gradually assuming a bell or inverted-cup shape,) when the valve will drop to its seat and shut off the flow of water, Fig. 5, supplying the same amount of water each time the top is raised. When lever L is released, the sucker again drops upon the valve and the water is pressed out of it, ready to lift the valve, when the wire *m* is again pulled.

By this arrangement of the weighted lever and connecting-wires the india-rubber sucker remains compressed in its normal position when the valve is closed; but the weighted end of the lever L can be connected to a chain which is passed over a pulley before being attached to the wire *l*, so that when the weighted end of the lever is let down it will raise the sucker and allow it to assume its semi-spheroidal shape while standing with the valve closed. With this latter arrangement, when the wire *m* is pulled down to open the valve, the sucker will drop and be compressed, and when the wire *m* is released the sucker will lift the valve from its seat and remain in an elevated position after the valve has become detached and drops to its seat by the flow of the water into the interior of the sucker.

It is obvious that the flange *i'* of the sucker can be turned inwardly instead of outwardly, in which case the size of the sucker can be increased without enlarging the valve, and that, instead of extending the stem F above the valve, the top H can be provided with a downwardly-projecting spindle working in the valve-stem, without departing from the spirit of my invention.

I am aware that it is not original with me to provide a water-supply cistern with an outlet-valve, operated by hand, and with an inlet-valve operated by a float-lever when the outlet-valve is opened.

What I claim as my invention is—

1. In a supply-cistern, the valve-stem and valve F G, in combination with the top H, india-rubber sucker, and cap, substantially as described and shown.

2. The combination, in a water-supply cistern, A, of the outlet-valve G, operated by sucker I, top H, cap K, and rod *l*, and the balanced inlet-valve, constructed with inwardly-cupped washers, and operated by the float-lever D when the outlet-valve is opened, substantially as described and shown.

WILLIAM ROSS.

Witnesses:
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THOMAS RUSSELL.