(No Model.)

H. S. MILLER,

WATER CLOSET CISTERN.

No. 385,130. Patented June 26, 1888.

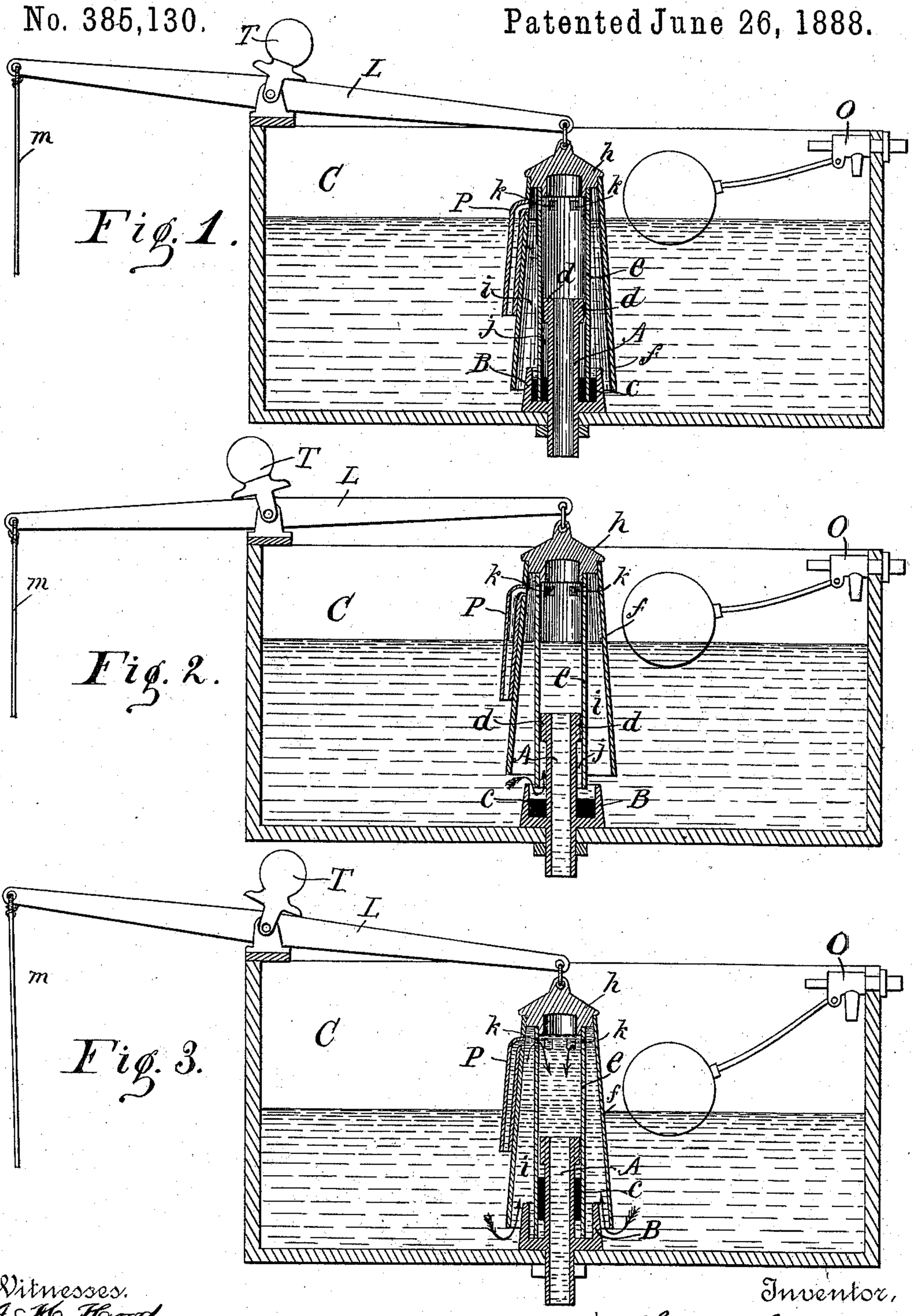

Fig. 1.

Fig. 2.

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

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WATER-CLOSET CISTERN.

SPECIFICATION forming part of Letters Patent No. 385,130, dated June 26, 1888.

Application filed October 18, 1887. Serial No. 252,699. (No model.)

To all whom it may concern:

Be it known that I, HARRISON S. MILLER, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Water-Closet Cisterns, of which the following is a specification.

My invention relates to an improvement in the means for discharging the water from the cistern to the closet-bowl in that class of water-closet cisterns which are arranged to hold sufficient water for once flushing the bowl.

The object of my improvement is to prevent the wastage of water incident to the leakage of ordinary valves, to avoid the necessity of the operator holding the valve open during the discharge of the water from the cistern, and to avoid the noise of regurgitation at the end of the discharge, all as hereinafter fully set forth.

The accompanying drawings illustrate my invention.

Figure 1 represents a central vertical section showing the position of the parts when at rest and the cistern charged. Fig. 2 represents a like section showing the position of the parts at the commencement of the discharge. Fig. 3 represents a like section showing the parts in the same position as in Fig. 1 and the course taken by the water during the remainder of the discharge.

The discharge-pipe consists of a central tubular portion, A, having surrounding its base an annular cup, B, partly filled with mercury, *c*. The upper end of the tubular portion A is provided with narrow external ribs, *d d*, which serve as guides to hold the valve concentric with the tube. The lower end of portion A extends through the bottom of the cistern C, and is coupled in the ordinary manner to the pipe connecting the cistern with the closet-bowl. (Not shown.)

The valve consists of an inner tube, *e*, adapted to fit loosely over the guides *d d*, leaving an annular space, *j*, between the tubes *e* and A, and an outer tube, *f*, of larger diameter than tube *e*. The upper ends of tubes *e* and *f* are secured concentrically to a cap, *h*, thus closing that end and leaving an annular space, *i*, between the two tubes. The lower ends of both tubes are open, and they are inverted over the discharge-pipe, the lower edge of tube *e* dipping into the mercury *c* and resting on the bottom of cup B, thus sustaining the lower edge of tube *f* a short distance above the bottom of the cistern. Communication is established between the interiors of tubes *e* and *f* through a series of openings, *k k*, through the sides of tube *e* at the upper end.

P is a small tube, open at both ends, arranged along tube *f* on the outside. Its upper end communicates with the interior of tube *f* and its lower end extends a little below the top of the discharge-pipe A. Pivoted to a suitable support on the upper edge of the cistern is a lever, L, one end of which is attached to the valve, and the other end is provided with a chain or cord, *m*, which extends to the closet. Pivoted to the fulcrum of the lever is a tilting counterpoise, T, arranged to engage the lever alternately on opposite sides of the center.

O is a ball-cock arranged to control the supply of water to the cistern in the usual well-known manner.

The operation of my device is as follows: The parts being at rest and the cistern filled with water to a point considerably above the top of the discharge-pipe, as shown in Fig. 1, the operator pulls on cord *m* and raises the valve until the lower edge of tube *e* is raised above the surface of the mercury in cup B. The first movement of the lever tilts the counterpoise T toward the outer end of the lever, and the counterpoise operates to insure the sufficient movement of the lever and to hold the valve suspended when the cord is released. The water at once flows under the edge of tube *e* and up along and down over the top of the tube A to the bowl. The column of water falling down the discharge-tube causes a partial vacuum to be formed in the upper parts of tubes *e* and *f*, and the pressure of the atmosphere overbalances the counterpoise T and forces the valve to its seat in the mercury-cup B, where it is held by the counterpoise tilting inward. This cuts off the flow of water under the lower edge of tube *e;* but a siphon is thus formed having the discharge-pipe and the upper part of tube *e* for its longer leg and the

space *i* between the tubes *e* and *f* for its shorter leg, and the water continues to flow until the surface of the water in the cistern falls to the lower end of tube P, when air enters through said tube to the bend in the siphon and the flow stops.

It will be observed that the valve has been seated for some time when the flow of water ceases in such a manner that no leakage is liable to occur through the wearing of the parts, and that no air is admitted to the discharge-pipe until the flow of water through the short leg of the siphon has ceased; consequently there is neither a sudden shock nor any regurgitations in the pipe when the flow of water ceases.

It has been found in practice that after the valve has fallen to its seat the mercury is at first raised by the action of the siphon from cup B into the space *j*, and it is essential that the top of tube A be high enough above the cup to prevent the overflow of the mercury into the tube until an equilibrium is established.

I claim as my invention—

1. In a water-closet cistern, the combination of the discharge-pipe arranged to project above the bottom of the cistern, the annular cup surrounding the base of said discharge-pipe, the mercury seal in said cup, and the tubular valve having double walls, the inner one of which enters at one end the annular cup and has openings at the other end communicating with the space between the walls, all arranged to co-operate substantially as and for the purpose specified.

2. In a water-closet cistern, the combination of the discharge-pipe arranged to project above the bottom of the cistern, the annular cup surrounding said discharge-pipe, the mercury seal in said cup, the tubular valve having double walls, the inner one of which enters at one end the annular cup and has openings at the other end communicating with the space between the walls, and the tube extending along the outer wall of the valve, open at both ends, and connecting the interior of the valve near its upper end with the exterior near its lower end, all arranged to co-operate substantially as and for the purpose specified.

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