

July 20, 1926.

W. B. CAMPBELL

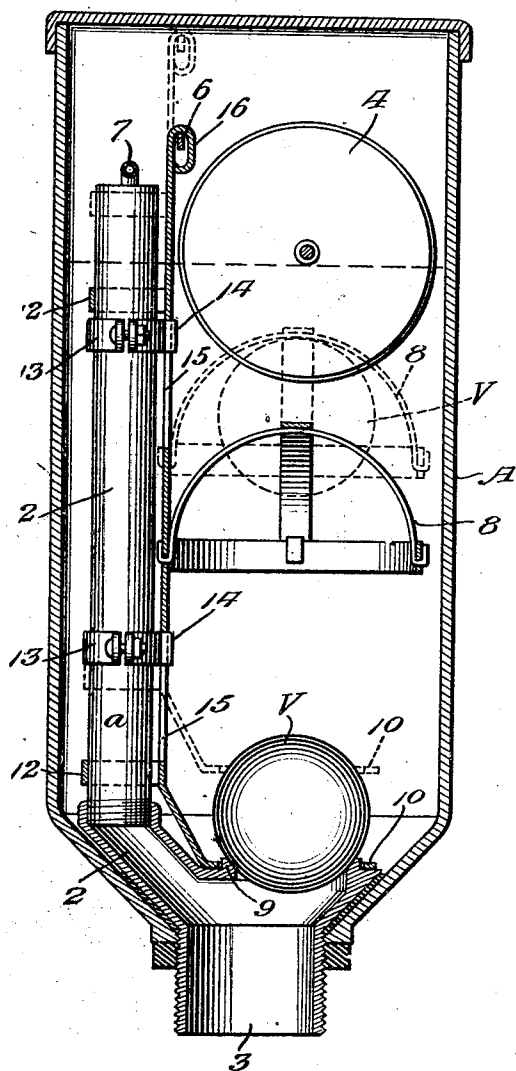
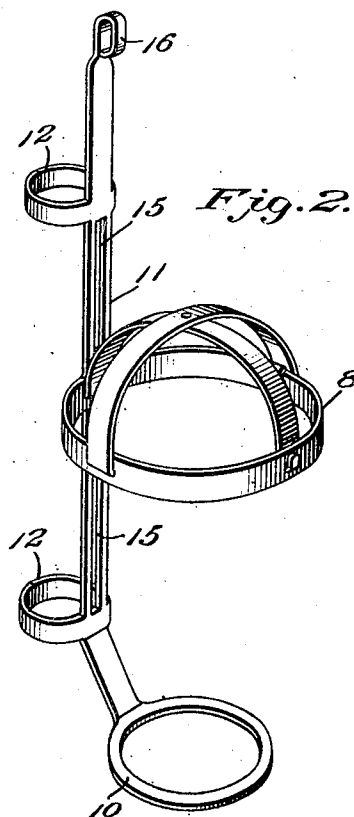
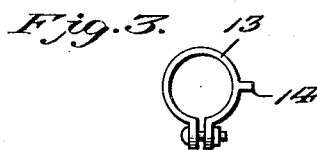
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VALVE MECHANISM FOR FLUSHING TANKS

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2 Sheets-Sheet 1

Fig. 1.



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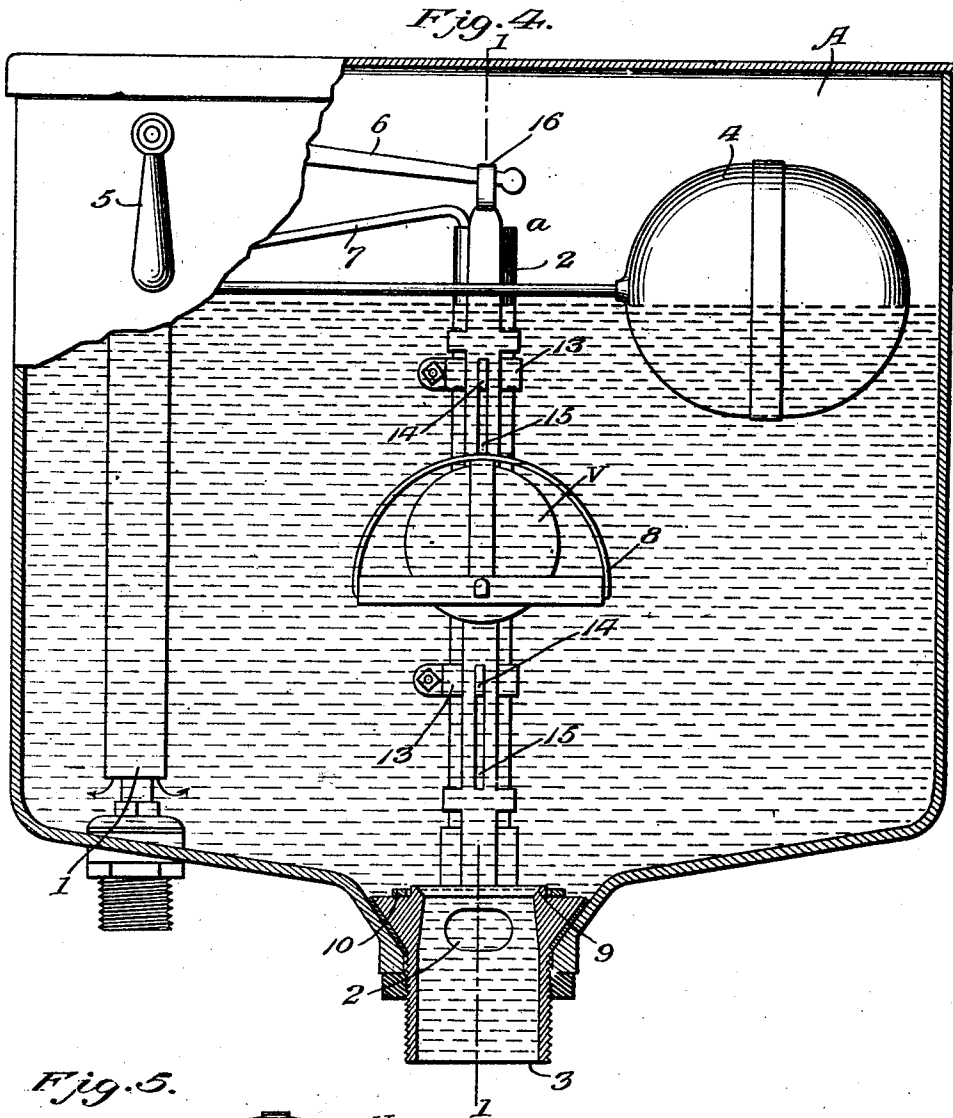
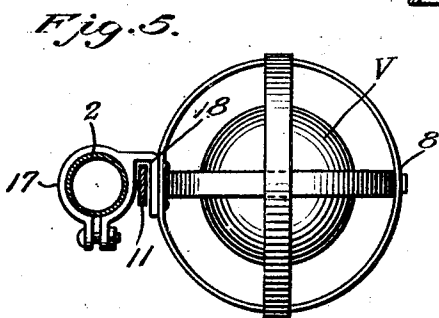
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VALVE MECHANISM FOR FLUSHING TANKS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM FOR FLUSHING TANKS.

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My invention relates to an improvement in valve mechanism for flushing-tanks.

One of the fundamental ideas of this invention is to provide for the discharge of substantially the entire contents of the tank with each flushing operation.

Another object is to provide a tank with a substantially unobstructed interior, so that a disconnected buoyant valve will control the discharge outlet.

This invention includes a buoyant valve, a valve-arrester in the upward path of the valve when it rises from its seat, with provision for unobstructed lateral movement of the valve, whereby it is prevented from returning to its seat until substantially the entire contents of the tank shall have been discharged.

In the accompanying drawings:—

Fig. 1 is a vertical cross section on the line 1—1 of Fig. 4;

Fig. 2 is a view in perspective of one form of the valve-arrester and lifter when made in a single fixture;

Fig. 3 is a detail of one of the clamps;

Fig. 4 is a view, mainly in section and partly in front elevation;

Fig. 5 shows an alternative form.

A, represents a tank with the usual ball-cock 1 and overflow pipe 2 leading to the discharge outlet 3 at the bottom of the tank.

The numeral 4 indicates the usual float; 5, the flush-lever handle; 6, the flush-lever; and 7, the afterfill.

V, represents a buoyant valve made of any suitable material. A valve-arrester 8 is located in the upward path of the valve, in practice preferably about five inches above the valve-seat 9, where it forms a stop to arrest or check the upward movement of the valve when removed from its seat 9 by the valve-lifter 10.

The arrester 8 may be made in any approved form, the only essential being that it obstructs the valve at the top only, or in its upward movement, leaving it free to move about in the tank with the flow of water, so that it will be above the influence of the suction due to the rapid escape of the water, through the discharge outlet 3.

In the fixture illustrated in Figs. 1 and 2, the valve-arrester 8 and valve-lifter 10 are both a part of, or connected with, the stem 11, thus maintaining a fixed relation between the arrester and lifter. In this form, the stem is provided with rings 12

which slidably embrace the overflow pipe 2, as viewed in Fig. 1.

This entire fixture is retained upon the overflow pipe 2 by clamps 13. These clamps 13 each have a lug 14 which enters one of the slots 15 in the stem, forming both a guide and stop, which limit the valve-arrester and lifter to a straight up and down movement, preventing it from turning, and also forming stops to limit the movement of the stem 11 to the length of the slots 15. The flush-lever 6 preferably extends through an opening 16 in the extreme upper end of the stem as shown in Figs. 1 and 4, so that the valve-lifter is raised and the valve lifted from its seat as the flush-lever is turned from its normal position.

Thus, in this illustrative form of my present invention, both the valve arrester and valve-lifter are slidably connected with the overflow pipe, and are raised and lowered with each operation of flushing the tank.

As an alternative form, the valve-arrester 8 might be entirely independent of the valve-lifter as shown in Fig. 5, in which construction the arrester is rigidly secured to the clamp 17, and the latter is adjustably secured at any desired elevation on the overflow pipe 2. The stem 11 of the valve-lifter slides freely in the recess 18 in the clamp.

The arrester 8 is all-important, and it is equally important that it be located in the direct upward path of the valve, and that the valve be obstructed from above only, and not at the sides or laterally. The object of this arrester is to prevent the valve from rising high enough in the tank to become lodged on any of the tank fittings. If space would permit, it would be unnecessary to arrest the valve in its upward movement. By the use of this valve-arrester, it is possible to use a minimum sized tank and consequently use a minimum amount of water, and to fit the same with standard fixtures now in use.

By locating the arrester directly above, or in the path of the valve, the arrester will always catch and hold the valve (upon being lifted from its seat above the suction) until the water shall have receded to a point below the arrester, after which the valve will float from beneath the arrester unobstructed around the tank under the influence of the water flowing in from the ball-cock.

Immediately upon being lifted from its seat, the valve assumes the position shown

in dotted lines in Fig. 1 and full lines in Fig. 4, where it remains until the water level recedes and it can float thereupon and still escape beneath the lower edge of the arrester, whereupon it is swept to one side by the inrush of the fresh supply of water from the ball-cock out of the way of the water discharging from the tank where it remains until substantially all of the water is drained out of the tank, at which time it moves back to its seat and assumes its position as shown in full lines in Fig. 1, where it remains until the operator again moves the handle and lifts the valve from its seat to flush the tank.

On account of the sloping bottom of the tank and the flush-valve not checking the flow of water passing from tank to bowl, the water flows with greater velocity and volume, thereby reducing friction and sluggish movement of the water on its way from the tank to the bowl, thereby greatly increasing the efficiency and operation of the bowl.

While I have endeavored to describe this invention as I have tested it out, and am now manufacturing it, at the same time I do not wish to limit myself to the construction shown, the essential features being a valve-arrester in the upward path of the valve with freedom of lateral movement for the valve. The valve is controlled by several separate, distinct influences:—

(1) The lifting from its seat against the suction due to the discharging water through the valve-seat;

(2) The arrest of its upward movement before it reaches the surface of the water which it seeks, due to its buoyancy;

(3) The lowering of the valve from beneath the arrester with the receding or lowering water level in the tank;

(4) Its lateral movement and play about the tank under the influence of the inrushing water from the ball-cock, all of which co-operate and proceed in orderly fashion to accomplish successfully the purposes of my present invention.

I claim:

1. In a device of the character described, a tank, a valve-seat at the bottom thereof, a buoyant valve, an open-sided valve arrester located vertically above the valve-seat and leaving a free and unobstructed path for the ball in a horizontal movement, and means for unseating the valve.

2. In a device of the character described, a tank with its bottom sloping to an outlet, a valve-seat at the outlet, and located below the major portion of the bottom, a buoyant valve, an open-sided valve arrester located vertically above the valve-seat whereby a free and unobstructed path is left for the valve in various horizontal directions, and means for unseating the valve.

3. In a device of the character described, a tank, a valve-seat at the bottom thereof, a buoyant valve, an open-sided valve arrester located vertically above the valve-seat, and a distance thereabove greater than the diameter of the valve whereby to allow the latter limited vertical movement and freedom of lateral movement during the flushing of the tank, and means for unseating the valve.

4. The combination of a tank having a discharge outlet, a valve for controlling the same, an overflow pipe, a ball-cock, a combined valve-arrester and valve-lifter slidably connected with the overflow pipe, and a flush-lever for moving the valve-lifter and arrester to unseat the valve and flush the tank.

5. A device of the character described including a tank, a ball-cock, a valve-seat, a buoyant valve, means for unseating the valve, means a predetermined distance above the valve for arresting the upward movement of the valve until the water level descends in the tank sufficiently to lower the valve and free it from the influence of the said device and expose it to the counter-influence of the incoming water from the ball-cock sufficiently to retard its immediate and direct return to its seat.

6. A device of the character described including a tank, a valve-seat, a buoyant valve, means for unseating the valve, a valve arrester located in the vertical path of the buoyant valve for momentarily arresting the valve in its ascent when unseated from the valve-seat until the water level in the tank descends to a position to lower the valve from the arrester, after which it is given freedom of lateral movement resulting from the inflow of water for re-filling the tank.

7. A device of the character described including a tank, a valve-seat, a buoyant valve, means for unseating the valve, a valve-arrester submerged below the normal water level of the tank whereby to catch and retain the buoyant valve until the water level in the tank lowers sufficiently to permit the valve to move laterally out of the direct vertical path from the valve-seat to arrester due to the inflow of the water which refills the tank.

8. In a tank having a sloping bottom and an outlet at the lowest point therein, the combination with a valve-seat, a buoyant valve, and means for lifting the valve from its seat, of an arrester placed in the direct vertical path of the valve as it rises upon being lifted from its seat, said arrester of such construction and so adapted that it will admit of the valve moving laterally out of the direct line of suction when the water level in the tank lowers to a point sufficiently below the arrester to permit its release therefrom, after which the valve comes under the

influence of the suction through the outlet and is returned thereby to the valve-seat.

than the diameter of the valve, the valve being free to move out of its direct up-and-down course when the water level in the tank descends below a predetermined height, thus 10
retarding the return of the valve to its seat.

9. In a flushing tank, a buoyant valve which has limited vertical movement with respect to the normal water level in the tank, a horizontally disposed arresting means in the direct vertical path of the valve a distance from the valve-seat greater

In testimony whereof I affix my signature.

WILLIAM B. CAMPBELL.