

J. E. BOYLE.

OPERATING TANK VALVES.

No. 266,963.

Patented Nov. 7, 1882.

Fig. 1.

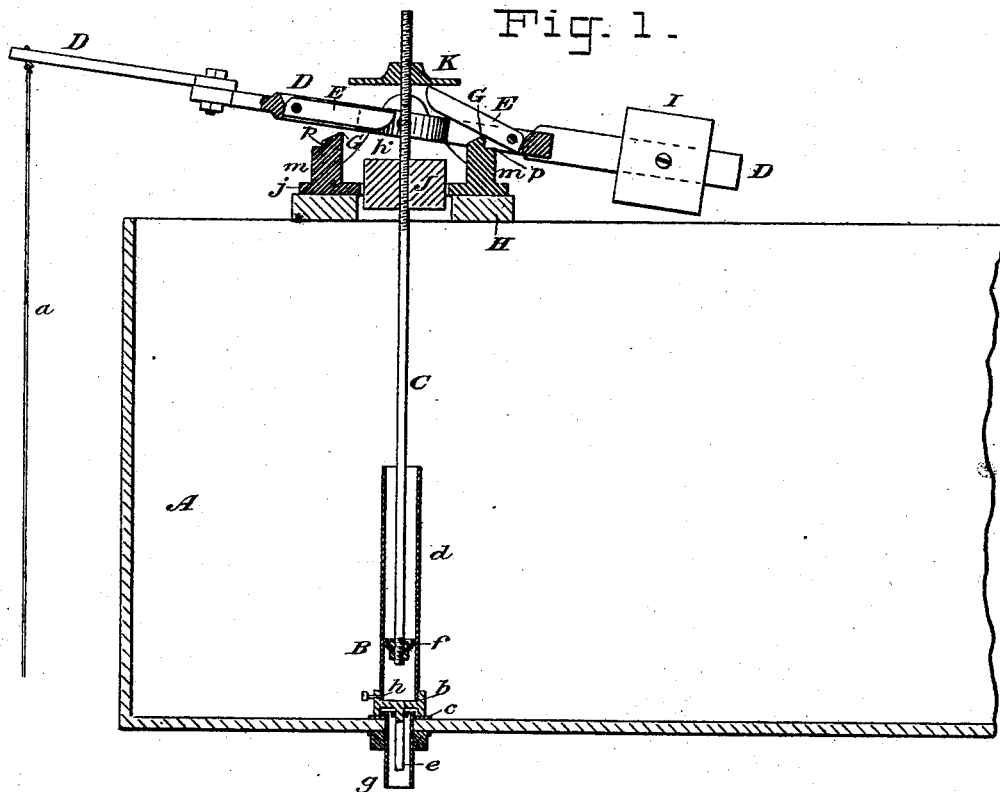


Fig. 2.

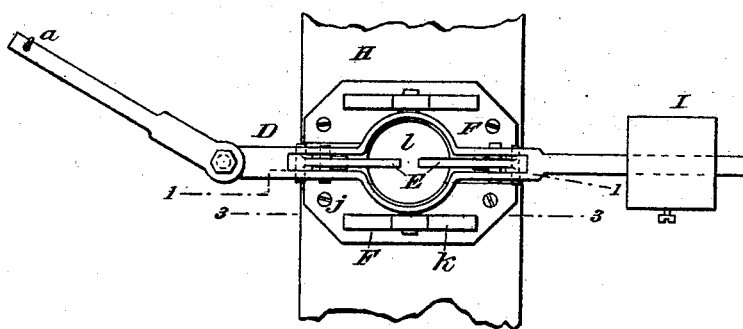


Fig. 6.

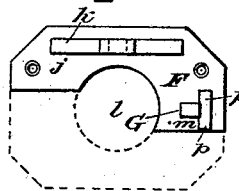
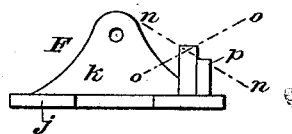


Fig. 7.



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INVENTOR:

*James E. Boyle*  
By his Attorneys,  
*Smith, Brown & Connors*

(No Model.)

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Fig. 3.

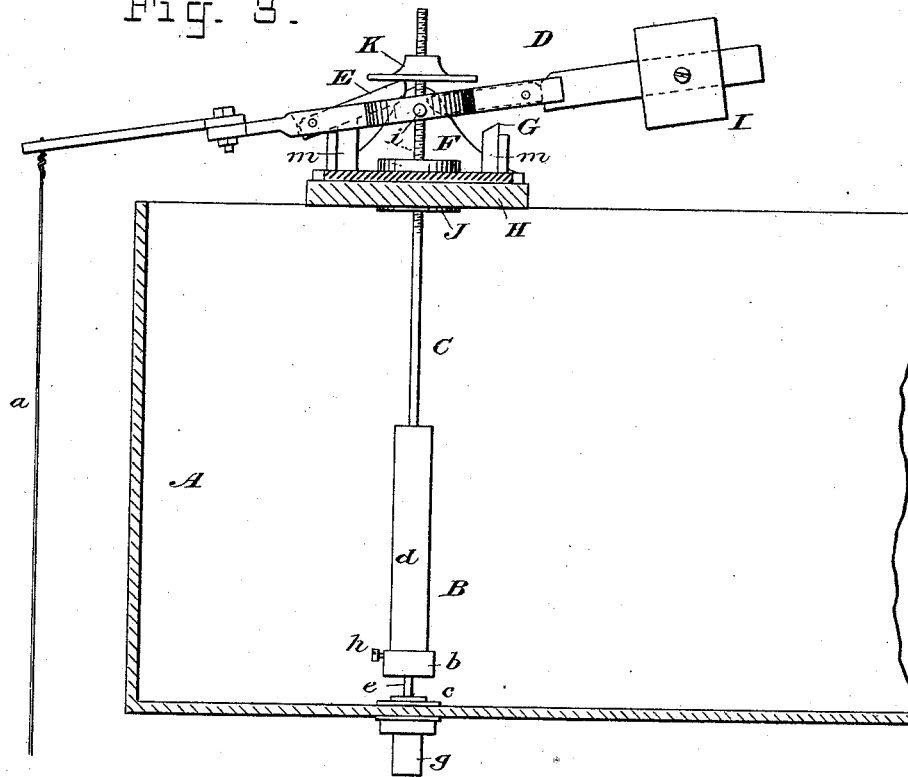


Fig. 4.

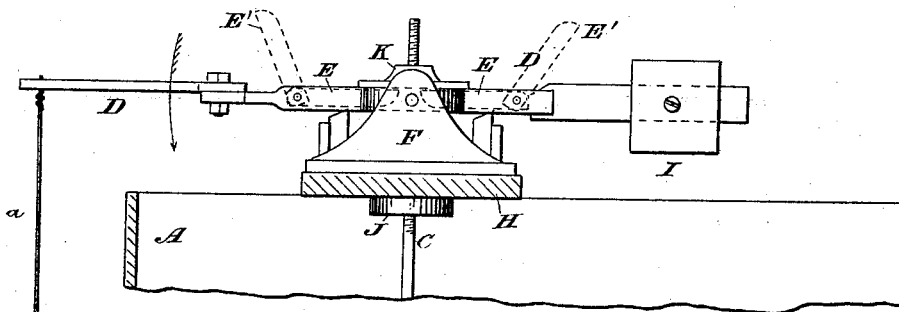
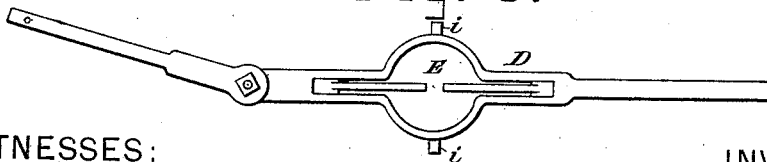


Fig. 5.



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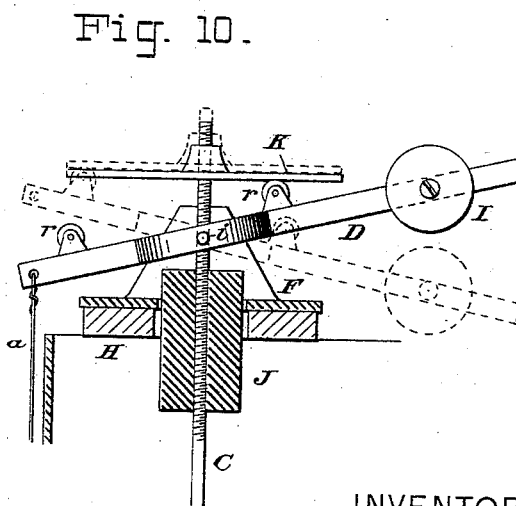
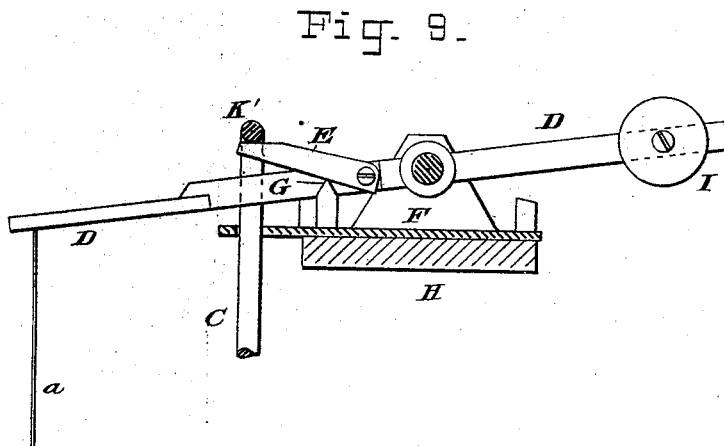
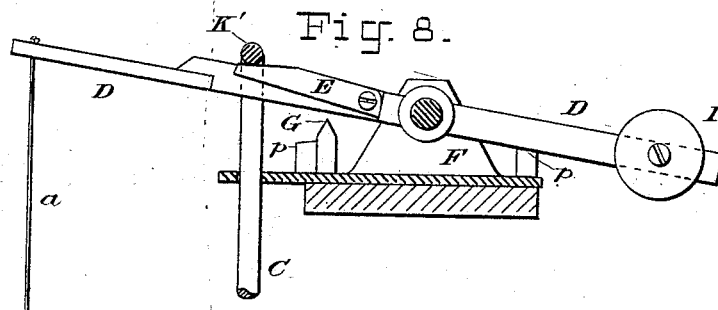
*Burke, Frazer & Bennett*

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WITNESSES:

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INVENTOR:

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# UNITED STATES PATENT OFFICE.

JAMES E. BOYLE, OF BROOKLYN, ASSIGNOR TO HENRY HUBER, OF NEW YORK, N. Y.

## OPERATING TANK-VALVES.

SPECIFICATION forming part of Letters Patent No. 266,963, dated November 7, 1882.

Application filed May 12, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES E. BOYLE, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Means for Operating Tank-Valves, of which the following is a specification.

In my Patent No. 249,577, dated November 15, 1881, I have shown a self-seating tank-valve, which, when lifted off its seat by the elevation of its stem, will gradually descend and eventually reseal itself, although its stem may be still upheld. My present invention is designed to operate a valve of this character, or any valve which, when opened by a movement of a rod or stem, will gradually close itself, its object being, when applied to a water-closet, to secure a double flushing thereof, as will be fully hereinafter explained.

In the accompanying drawings, Figure 1 is a vertical section of my invention as applied to an elevated flushing-tank for a water-closet, the section being cut in the plane of the line 1 1 in Fig. 2. Fig. 2 is a plan of the lever and its support, the valve-stem and its fittings being removed. Fig. 3 is a vertical section similar to Fig. 1, but showing the parts in a different position, and taken in the plane of the line 3 3 in Fig. 2. Fig. 4 is a side elevation, showing the lever at mid-stroke. Fig. 5 is a plan of the lever detached. Fig. 6 is a plan of one of the bearing-frames. Fig. 7 is a side elevation thereof. Figs. 8 and 9 are side elevations of a modification, partly in vertical section, showing the parts in different positions; and Fig. 10 is a vertical section of another modification.

Referring to Figs. 1 and 3, A is the tank. B is the self-seating valve, (shown in my said patent as a whole.) C is the stem thereof; and D is the weighted lever mounted above the tank, engaging said stem, and operated by a wire, cord, or chain, *a*, which extends downward, and is connected to the seat of the water-closet which is to be flushed from the tank. One method of so connecting the lever to the seat through the wire is shown in Fig. 1 of my said patent.

The valve B consists of a valve proper, *b*, working against a seat, *c*, and provided with an upwardly-projecting tube, *d*, and a downwardly-projecting guiding-stem, *e*. The valve-

operating stem C bears at its bottom end a cupped-leather piston, *f*, Fig. 1, which works in the tubular extension or cylinder *d*. When the stem C descends the piston *f* easily moves downward in the tube *d*; but when the stem is lifted it lifts the valve B with it, and if upheld the valve will slowly descend by a leakage of water into the tube *d* through an orifice, *h*, all as fully explained in my said patent. While the valve B is lifted the water from the tank A flows out through the seat *c* and descends through the pipe *g* to flush the closet.

My present invention relates to the construction of the lever D and its connection with the valve-stem C, whereby a double flush is secured, whereas with the arrangement shown in Fig. 1 of my said previous patent but a single flush is obtained, and that when the water-closet seat is released and rises after use. I now secure not only this flush, but also a shorter preliminary flush when the seat is first depressed.

I will first describe in detail the preferred form of my invention. (Shown in Figs. 1 to 7.) The lever D is made of annular form at its fulcrum, and has trunnions *i i* cast on opposite sides of the ring, as best shown in Fig. 5. Each arm of the lever is hollowed or slotted out for some distance from the annular portion, and in each recess so formed is arranged a dog, E, pivoted to the lever at the farther end of the recess, and its free end projecting toward the fulcrum of the lever and into the annular portion thereof, as best shown in Figs. 1 and 5. The trunnions *i i* have bearings in a fixed frame or casting, F, fastened to a board, H, which extends across the top of the tank, as usual, and on these trunnions the lever D rocks. On the frame F are formed two spurs, G G, which project up beneath the lever, and when the latter is in a horizontal position, as shown in Fig. 4, just touch the under sides of the two dogs E E. One spur is beneath each dog, and the point of the spur at the right in Figs. 3 and 4 is farther from the fulcrum of the lever than that of the left-hand spur. The dogs being pivoted equidistantly from the fulcrum the right-hand spur is nearer the pivot of the right-hand dog than is the left-hand spur to that of the left-hand dog. The weight I normally throws the lever into the position

shown in Fig. 1, and in assuming this position the dog E at the right hand encounters the spur G beneath it, and rocks on this spur as on a fulcrum, whereby it is tilted and its free end is lifted, as shown in Fig. 1. When the lever is tilted into the opposite position by the pull of the wire *a*, as in Fig. 3, the right-hand dog drops and the left-hand dog is tilted up in the same manner, but to a less height, owing to the different position of the spur beneath it relatively to its pivot. This result may be otherwise accomplished by arranging the spurs equidistantly from the fulcrum and pivoting the dogs at unequal distances from the fulcrum.

The upper portion of the stem C is screw-threaded, and on it is screwed a cylindrical weight, J, and above this a disk, K, as best shown in Figs. 1 and 3. In the base-plate *j* of frame F a circular hole, *l*, is formed, and a similar hole is made in the board H beneath, and in these holes the weight J is arranged to work vertically, forming a guide to the stem C. The disk K is arranged over the lever D, and as the lever is tilted up or down the end of one or other of the dogs will take under and lift it. The lever is normally in the position shown in Fig. 1, with the valve B closed. When the water-closet seat is depressed the lever D vibrates to the position shown in Fig. 3, and in so doing first assumes the intermediate position shown in Fig. 4. In moving thus far the valve-stem C and the parts which it bears drop to their lowest position, so that the piston *f* takes a fresh hold of the tube *d*. The function of the weight J, besides its incidental utility as a guide, is to cause the stem to drop with the requisite speed, it being heavy enough to cause the stem to drop as fast as the ends of the dogs will ever descend in ordinary usage. In completing its movement, or moving from the position shown in Fig. 4 to that shown in Fig. 3, the disk K is lifted by the end of the left-hand dog, thereby lifting the stem C and valve B a short distance, and giving a short preliminary flushing to the closet while the valve is descending. When the seat is released the weight I brings the lever back to its normal position. During the time the lever is performing the first half of its movement, and until it reaches the horizontal, the stem C descends as before, and during the remainder of the movement of the lever it is lifted by the action of the right-hand dog, and to a greater height than before, so that the valve B, being also lifted to a greater height, will take longer to descend, and consequently this flushing of the closet will be prolonged beyond the duration of the first flushing.

The frame F is made in two parts or halves, both cast from the same pattern, one of which is shown in Figs. 6 and 7. Each half consists of a base-plate, *j*, formed with a semicircular recess to make the hole *l*, and having a wall, *k*, projecting from its side and pierced with a hole to receive the trunnion *i*, and a post, *m*, projecting from one end. On one of the halves

the top of this post *m* is cut or filed off obliquely in the plane of the dotted line *n n* in Fig. 7, and on the other it is cut in the plane of the line *o o*. In this way the two spurs G G are formed so that when the two halves are fitted together one spur stands farther from the center than the other. The shoulders *p p* are stops to limit the movement of the lever D. In putting the parts together the two halves of the frame F are properly adjusted on the board H with the lever D. The frames are then screwed to the board, the stem C is withdrawn from the valve, the weight J and disk K are screwed on it, the dogs E E are then turned back, as shown in dotted lines at E' E' in Fig. 4, and the stem lowered within the annular portion of the lever, and its piston caused to enter the tube *d*, the dogs being finally turned down between the weight and disk. Any necessary adjustment can be effected by screwing the weight J and disk K up or down on the stem C. The device is then ready for use.

In Figs. 8 and 9 is shown a modified form of my lever. The like or corresponding parts to those already described are designated by the same letters of reference. The principal difference is in the employment of only one dog E and spur G, the lever D itself supplying the place of the other, and serving to lift the valve for the long flush, while the dog lifts it for the short flush. The stem C has its upper end, K', turned over the lever, in lieu of using the disk K, and is made heavy in order that the weight J may be dispensed with.

In Fig. 10 both dogs are omitted, the lever D alone serving to give the requisite motion to the valve-stem by being rocked through a greater arc and acting on a disk or cross-head K of greater diameter or length than that shown in Fig. 1. To reduce the friction the lever is provided with rollers *r r*, which take under the disk K.

Prior to my invention it has been necessary, in order to secure a double flushing from a tank, to employ two valves. I dispense with the second valve, and thus accomplish the result more simply and cheaply.

My invention, although designed primarily for use with the valve shown, and for flushing water-closets, is also applicable to other forms of self-seating valves, and may be used for any purpose where a double discharge of water from a tank or reservoir is desired—one discharge at each movement of the actuating-lever. If the first discharge is desired to be the longer one, the parts will be so proportioned as to lift the valve-stem higher when the lever is pulled than when it is released. This will be done for pan-closets where the lever is connected to the pull-handle, in order that the first discharge may flush the bowl while the handle is lifted, and the second may fill the pan after the handle is dropped.

I claim as my invention—

1. The combination, with a self-closing valve, of a lever and suitable intervening mechanism,

substantially as described, whereby at each vibration of said lever said valve will be opened, in the manner substantially as set forth.

2. The combination, as a means for operating  
5 a self-closing tank-valve to produce a double discharge from the tank, of the weighted tank-lever, a pivoted dog or small lever in connection therewith, a spur arranged under said dog at a point intermediate of its free and pivoted  
10 ends, whereby upon the tilting of the tank-lever the free end of said dog shall be elevated, and an overhanging portion, in connection with the valve, arranged over and to be lifted by the free end of the said dog, substantially  
15 as set forth.

3. The combination of lever D, pivoted dog E, spur G, valve-stem C, and overhanging portion connected to said stem, and arranged over and to be lifted by the free end of said  
20 dog, substantially as set forth.

4. The combination of lever D, dogs E E, pivoted thereto, bearing-frame F for said lever, and fixed spurs G G, substantially as set forth.

25 5. The combination of lever D, dogs E E, bearing-frame F, spurs G G, valve-stem C, and

disk K, adjustable on said stem, substantially as set forth.

6. The combination of valve-stem C, weight J, and disk K, with lever D, dogs E E, bearing-frame F, having hole *l*, and spurs G G,  
30 substantially as set forth.

7. The combination of lever D, having trunnions *i i*, and dogs E E, with frame F, formed in two parts, each consisting of a section of  
35 base-plate, *j*, a wall, *k*, pierced with a hole to receive one of said trunnions, and a post, *m*, on which is formed a spur, G, substantially as set forth.

8. The combination of lever D, dogs E E,  
40 pivoted thereto at equal distances from the fulcrum of the lever, and two fixed spurs, G G, arranged one under each dog, and the two unequally distant from said fulcrum, substantially as set forth.

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

JAMES E. BOYLE.

Witnesses:

ARTHUR C. FRASER,  
HENRY CONNETT.