

C. A. BLESSING.  
FLUSHING MECHANISM FOR WATER CLOSETS.

No. 420,327.

Patented Jan. 28, 1890.

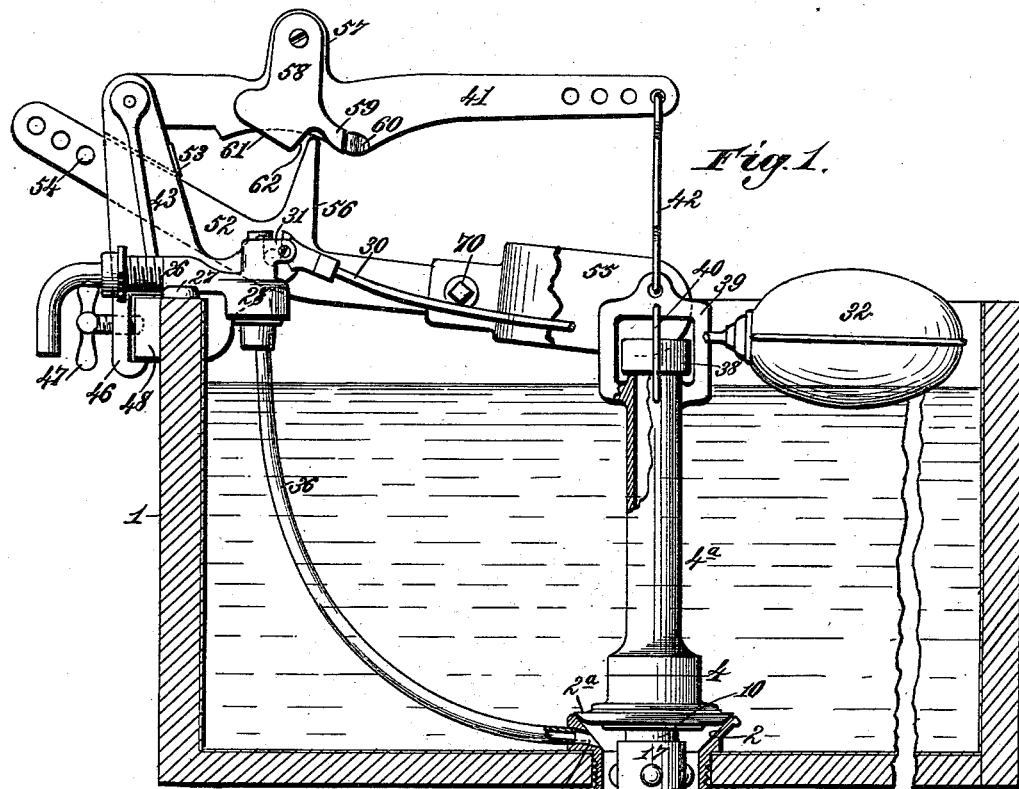


Fig. 1.

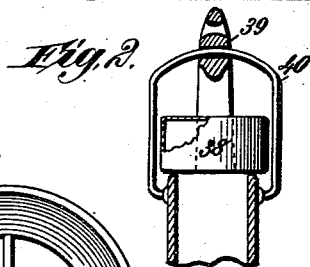


Fig. 2.

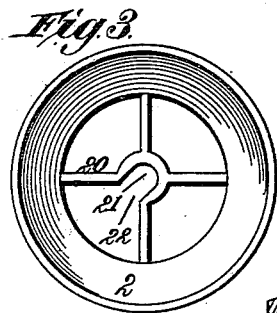


Fig. 3.

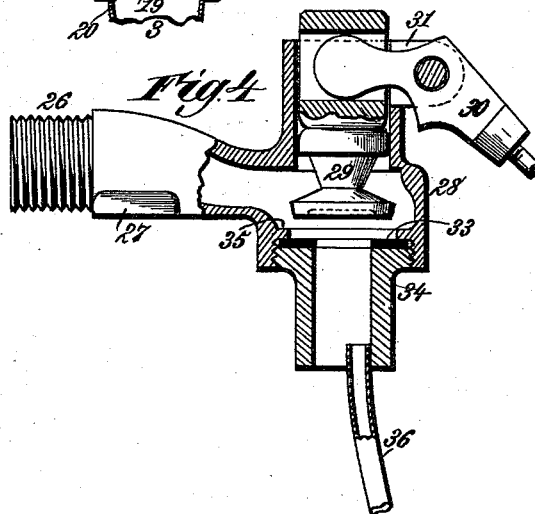
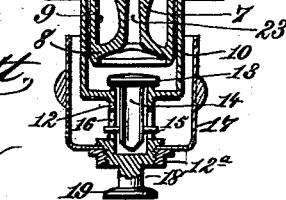


Fig. 4.

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(No Model.)

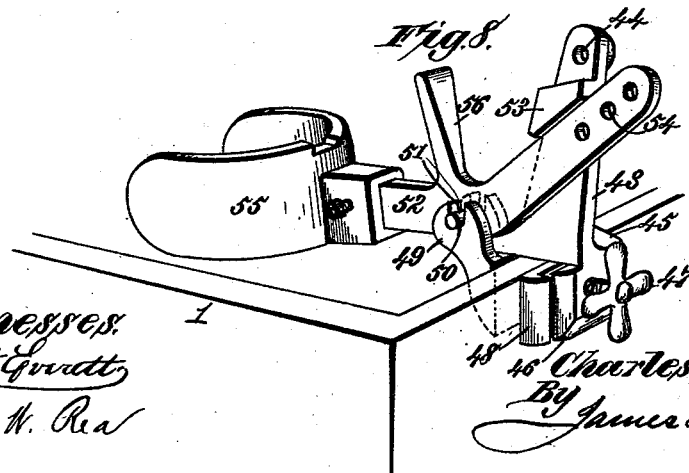
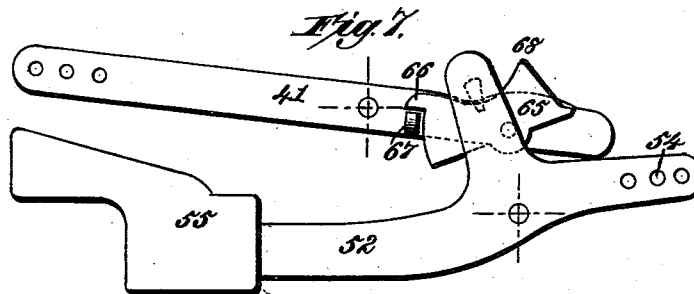
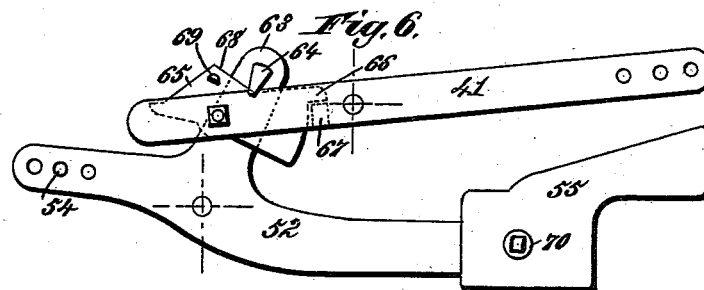
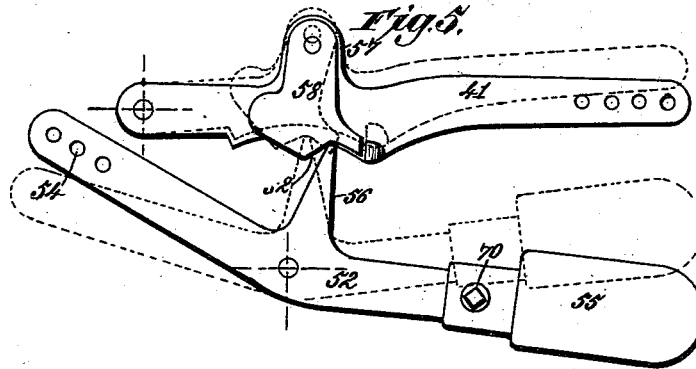
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# UNITED STATES PATENT OFFICE.

CHARLES A. BLESSING, OF PHILADELPHIA, PENNSYLVANIA.

## FLUSHING MECHANISM FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 420,327, dated January 28, 1890.

Application filed September 3, 1889. Serial No. 322,864. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. BLESSING, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Flushing Mechanism for Water-Closets, of which the following is a specification.

My present invention relates to apparatus for flushing water-closets in which automatic time-valves or valves of other forms are employed.

It is the purpose of my invention to provide simple means whereby the action of the valve may be adjusted to the particular necessities of each case by regulating the discharge from the valve-chamber, whereby it is caused to close after the desired quantities of water are discharged.

It is my purpose, also, to simplify and improve the construction of the automatic time-valves used in flushing-tanks, to provide an improved and simplified form of bracket for the support of the operating lever or levers, and to combine with the pulling-lever an adjustable weight balancing the weight of the closet-seat, by which the valves may be operated only when the pull or seat is released. It is my purpose, also, to provide means for producing an afterwash only, or both a beforewash and an afterwash when the seat or pull is used.

It is my further purpose to provide simple and inexpensive means whereby the discharge of water may be automatically controlled in accordance with the circumstances of each case, for preventing waste in places where the water-supply is not plentiful, for giving full long washes where water is abundant, for affording a small before or preliminary wash and a long afterwash, or for giving an afterwash only without any beforewash, as the user may prefer.

It is my purpose, also, to provide simple means whereby a continuous but small afterwash for filling the bowl and trap may be obtained without depending upon the action of the valve, such afterwash being supplied directly from the inlet or ball cock.

I also purpose combining with the water inlet or supply a valve or ball cock controlled by a float which, instead of being spherical,

as has heretofore been the custom, shall be flattened upon opposite sides to the form of an oblate spheroid, to enable it to discharge the maximum volume of water by quickly opening the water-cock with a slight fall of water-cock.

To these ends my invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then definitely pointed out in the claims following this specification.

In order to enable others skilled in the art to make and use my said invention, I will now describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of a flushing-tank, illustrating the invention in part. Fig. 2 is a sectional view of the universal automatic time-valve, overflow and air-valve, and its cage. Fig. 3 is a plan view of the spider supporting the time-valve attachment. Fig. 4 is a sectional view of the ball-cock and supply-pipe. Fig. 5 is a view showing one double-acting construction for obtaining a small preliminary or before wash and a full afterwash by the pull and release of the flushing-levers by means of a seat action, giving a beforewash sufficient to wet the water-closet and so fill bowl, and a long afterwash for thoroughly flushing the closet. Fig. 6 is a view showing a modified construction for a similar purpose working from the top of valve-lever. Fig. 7 is a view showing a construction whereby a full afterwash is given upon releasing the seat or lever without any beforewash. Fig. 8 is a perspective view showing the construction of the bracket, its attachment, and one form of flushing lever and weight.

In the drawings, the reference-numeral 1 denotes the flushing-tank, having any desired form and construction. The tank is provided with a valve-seat 2, having the usual communication with the flushing-pipe 3, leading to the bowl of the closet. Seating upon the valve-seat 2 is an automatic time-valve 4, having a tubular stem 4<sup>a</sup>, provided with open ends, within which is formed a spider 5, having a threaded central aperture, in which is inserted the threaded nipple of a yoke 6. This yoke is united to a central depending piece or stem 7, having a concavo-convex disk 8 on its lower end, from which rises a circular flange or open-

top shell 9, fitting closely, but sliding freely, within a cylindrical cup-shaped chamber or shell 10, closed at its lower end by a valve, hereinafter described, and open at its upper end, which rises into the lower open end of the tubular valve-stem 4<sup>a</sup>. On the lower closed end of the cylindrical cup 10 is a tubular stem 12, opening into the cup or chamber below the shell 9. This tubular stem is closed by a puppet-valve 13, having a stem 14 lying in the tubular stem 12, and provided with pins 15, projecting laterally from the valve-stem and lying in slots 16 in the tubular stem 12 to limit the upward movement of the valve. Upon the lower closed extremity of the tubular stem is mounted a cylindrical suction-cup 17, rising above and surrounding the lower portion of the cylindrical cup 10 at a little distance therefrom. Below this cup 17 the solid end of the stem 12 receives a jam-nut 12<sup>a</sup>, holding the cup 17, below which the stem is extended sufficiently to form a neck 18, below which is a collar or flange 19.

When in operative position, the parts are arranged as shown in Figs. 1 and 2, the neck 18 of the depending stem being inserted in a central aperture in a spider or cross 20, placed below the valve-seat 2. This spider consists of four or more cross-arms meeting at the center, where a circular aperture 21 is formed, having an opening 22 on one side to admit the neck of the stem and allow it to be readily removed.

The central depending piece or stem 7 is provided with a longitudinal opening 23, opening below into the cup or shell 10 and having in its upper end a minute aperture 24, immediately above which is a vertically-adjustable screw 25, tapped through the threaded nipple supporting the yoke 6, and having its point lying directly over the small aperture 24, by which the escape of air and fluid through the said aperture is regulated with great accuracy.

The operation of these parts is as follows: When the valve is pulled, the rise of the tubular valve 4 lifts the open-top shell 9, which moves with the valve-stem 4<sup>a</sup> and slides up in the cylindrical cup 10. This produces a suction in the lower part of the cup 10, lifting the valve 13 and drawing up water from the lower cup 17, which passes through the slots 16 and through the tubular stem 12 into the cup 10. As the upward movement ceases the valve 13 closes and the water contained in the cup 10 prevents the descent of the shell 9, save as the water escapes through the piece or stem 7. As this escape is very slow the tubular valve-stem 4<sup>a</sup>, which is sustained by the shell 9, sinks down gradually, giving ample time for the flow of the water through the flushing-pipe. By the raising or lowering the screws 25 the operation of the valve may be regulated with accuracy, and adjusted to discharge the desired quantity of water required in every case.

The flushing-tank is supplied by an inlet

26, which consists of a nozzle having a cross-head or plate 27, through which screws are passed into the edge of the wall of the tank. Upon the end of the nozzle is a valve-chamber 28, containing a valve 29, actuated by a lever 30, fulcrumed upon lugs 31, and having upon its end a float 32. The valve 29 descends upon a valve-seat 33, which lies upon a circular shoulder formed upon a hollow nipple 34, which is screwed into the lower end of the valve-chamber, holding the valve-seat between it and an interior flange 35. The ball-float 32, I construct in the form of an oblate spheroid and attach it to the lever in such manner that one of the flattened sides rests upon the water in the tank, whereby its immersion effects a greater displacement than would be possible with a spherical float, or one having the form of a prolate spheroid, at equal depths of immersion.

In closets where it is desirable or necessary that the bowl be filled after the flushing-valve closes, or where for other reasons a small long-continued run of water is wanted after the valve has cut off the escape through the flushing-pipe, I connect a tube 36 of suitable diameter with the tubular nipple 34, in such manner that its open end lies in the discharge-opening of said nipple, as seen in Fig. 4, the other end being inserted in an opening 37 in the valve-seat 2. By this arrangement a continuous small stream runs through the flushing-pipe into the bowl during the whole time the tank is filling.

Upon the upper open end of the tubular overflow and valve-stem 4<sup>a</sup> is mounted a hollow float-valve 38, confined in place by a cage formed by a yoke 39, cast on the stem, and one or more wire yokes 40, passing through the central part of the yoke 39, and having the ends thereof attached to the tubular stem. The float-valve 38 may be a section of a cylinder, as shown, or it may be a ball, and in either case it may be formed of metal, rubber, or other material, its specific gravity being such that it will rise and unclog the open end of the tubular stem should the water-level in the tank rise above the open end of the stem, thereby utilizing the latter as an overflow or waste pipe. The valve-stem 4<sup>a</sup> is made of a single casting or in two or more parts united, and is provided with a rubber valve-seating ring 2<sup>a</sup>.

The float 38 constitutes an air-valve and subserves two distinct purposes. One object is to stop the noise produced by air upon entering an open overflow-pipe after the valve in the bottom of the tank is closed. This noise is effectively prevented by the float-valve closing the top of the tubular overflow and valve-stem. The second purpose is to prevent the water from rushing too quickly down the flush-pipe, and to retain enough water therein to fill the basin and trap of the closet after it has been thoroughly flushed.

The tubular stem 4<sup>a</sup> is raised by a lever 41, connected at its end to the yoke 39 by means

of a link 42. At the other end this lever is pivotally mounted on a bracket, which is shown in detail in Fig. 8. It is composed of a standard 43, having an aperture 44 in its upper end to receive the pivot-pin of the flushing-lever, and upon its lower portion at one side is formed a lateral extension 45, forming a broad base to rest upon the edge of the tank. Upon opposite ends of this extension are formed jaws 46, lying on the outside and inside of the tank, a set-screw 47 being tapped through the outer jaw to bear against a pillow-block 48, inserted between the jaw and the wall of the tank. The edge of the standard extends inward and is curved slightly upward to form a lug, and a similar and parallel lug 49 extends from the end of the inner jaw, each lug having an open seat 50. In these seats are laid trunnion-pins 51, which project from the flat opposite sides of a weighted-lever 52, which lies between the lugs 49, its outer end being preferably bent or turned upward at an angle with the inner end. This upwardly-bent portion lies beside the standard 43 and against a lug 53 thereon. Holes 54 are formed in the lever for the attachment of the chain, wire, or other connection, which is attached to the seat or brought within reach of the person using the closet. Upon the inner end of the lever is mounted a crescent-shaped weight 55, between the ends of which lies the upper part of the tubular valve-stem 4<sup>a</sup>. Projecting from the lever 52 is a rigid arm 56, the end of which lies just beneath the edge of the lever 41, which is curved upon a line struck from the pivotal axis of the lever 52, as shown in Fig. 1. Above this curved portion or edge is a lug or projection 57, upon which is pivoted a dog 58, lying against the flat face of the lever 41. This dog is provided with a toe 59, which abuts against a stop 60 on the lever and arrests the pivotal movement of the dog in that direction, and on the lower edge of the dog is formed an angular cam 61, projecting below the curved edge of the lever 41. Between this cam and the toe 59 is a notch or recess 62, in which the end of the arm 56 normally lies, which operates the lever 41, and also holds it in its position when not operated.

The parts being constructed and arranged in the manner described, and the outer end of the lever 52 being connected to the seat of the closet in the usual manner, the weight of the person using the closet depresses the seat and raises the weighted end of the lever 52, vibrating the arm 56, by which the dog 58 is swung toward the standard 43 until its cam portion 61 passes above the curved edge of the lever 41, whereupon the dog swings back to normal position with its toe against the stop 60, the arm 56 remaining upon the other side of the cam 61. This action of the lever 52 produces no movement of the lever 41, but when the weight is removed from the seat of the closet the gravity of the weight 55 draws the end of the arm 56 against the inclined

edge of the cam 61, and as the dog 58 is unable to turn by reason of the stop 60 the lever 41 is raised by the arm and the time-valve is lifted off the valve-seat 2. A long full wash is thus obtained without any beforewash. This construction effectually prevents waste where water is not plentiful, as it gives but one full wash upon releasing the seat or the pull. It is often desirable, however, to have a small preliminary flush or beforewash to wet the closet and prevent the adhesion of soil, followed, upon the release of the seat, by a full flush or afterwash, and this arrangement is frequently advantageous in connection with automatic time-valves, and when the flushing apparatus is operated by seat-action instead of by a pull. For this purpose, therefore, I may employ the construction of parts shown in Fig. 5, which differs from that already described only in one feature—viz., in the depth of the notch or recess 62. By cutting this notch in such manner that it lies substantially flush with the curved edge of the lever 41, beneath which the end of the arm 56 vibrates, the dog 58, in swinging away from the stop 60, will project the notched portion below the curved edge of the lever and against the end of the arm 56, thereby raising the lever 41 slightly or about one-third its full stroke, thus affecting the beforewash by a slight rise of the valve and stem 4. Upon the release of the seat the arm will operate on the cam 61 on the dog in the manner already described, the two movements giving a small beforewash and a full afterwash. I may also use for the same purpose the arrangement of parts shown in Fig. 6. In this construction an arm 63 is formed on the weighted lever, said arm extending above the flushing-lever 41 and lying close beside the same, a cam-lug 64 being formed on the arm to extend over the upper edge of the lever 41. Upon the latter and between it and the arm 63 is pivoted a dog 65, having a toe 66, resting on a stop-lug 67 on the flushing-lever, and provided with an angular cam 68, which extends above the upper edge of the said lever. Near the angle of this cam is a stop-pin 69, projecting from the side or face of the dog which lies next the lever, and at such a distance from the angle that in order to ride over the cam the lug 64 must depress the end of the lever 41 sufficiently to slightly raise the end connected to the valve. When weight is placed upon the seat, or when the pull is operated, the weighted lever is tilted, the arm 63 moves, carrying the cam-lug 64 over the cam 68, and turning the dog 65 until the stop-pin 69 rests on the edge of the lever 41. The further movement of the arm then depresses the lever, thereby slightly lifting the end connected to the valve and giving a small beforewash. The release of the pull or seat gives a full afterwash by the cam-lug 64 riding over the cam 68 at its full height, the dog 65 being pivoted to fall by its own gravity after the cam-lug 64 has passed,

and bringing the toe 66 upon the stop-lug 67.

By removing the stop-pin 69 the construction shown in Fig. 6 is made to give a full afterwash without any beforewash. In this case I prefer to curve the edge of the lever 41, as shown in Fig. 7, in a line struck from the pivotal axis of the arm 63, Fig. 6, whereby the cam-lug 64 may ride on the edge and hold the lever motionless. In all other respects the construction shown in Fig. 7 is similar to that shown in Fig. 6, with the stop-pin 69 removed. In both the figures named, the action being overhead of instead of beneath the lever 41, the pivotal axis of the latter must be placed between the arm 63 and the end to which the valve is connected, said axis being suitably combined with a base-standard similar to the one shown in Figs. 1 and 8.

It is evident that the parts shown in Figs. 5, 6, and 7 may be used in connection with any form of valve preferred and operated by a pull or by seat action, as may be preferred. The weight 55 is rendered adjustable upon the lever 52 by means of a set-screw 70, to vary the power of the weight and to enable said weight to raise the water-closet seat when a seat action is used, and to also operate the lever for a single or double action, as the case may be. The same result may also be produced by a hand-pull.

If preferred, instead of connecting the lever to the seat by a chain or wire, the connection may be made with a door, which may be caused to do the work by means of links or pulley-rollers. This arrangement can be used to good advantage in school-houses, railway-stations, and other public places where a number of people have access to the closets, the doors all, of course, self-closing.

All the parts of this apparatus may be removed, separated, and again assembled without the necessity of exercising any special mechanical skill.

The ball-cock shown can be used for drawing liquids of any kind in addition to its use in a flushing-tank.

In an application filed by me of even date herewith I have shown a further construction of flushing-lever for giving a full preliminary wash and a full afterwash, said lever being used in connection with a bracket similar to that shown in this application.

The cage confining the float-valve 38 may be formed entirely of arms cast integral with the tubular stem of the time-valve. This cage, in conjunction with the valve, forms a strainer, preventing the stem from becoming choked with foreign matter, should any be present in the water.

What I claim is—

1. In a flushing-tank for water-closets, the combination, with a valve and with a flushing-lever or levers connected to said valve, of an operating-lever having an adjustable weight, and a dog pivotally mounted on the flushing-lever and provided with an angular

cam projecting beyond the edge of said flushing-lever, said dog being free to swing in one direction only under the impulse of an arm on the weighted lever.

2. In a flushing-tank for water-closets, the combination, with a valve and with a flushing-lever or levers pivoted upon a suitable support and connected to said valve, of a weighted lever having an arm, and a dog pivotally mounted on the flushing-lever and provided with an angular cam projecting beyond the edge of said flushing-lever, said dog being free to swing in one direction under the impulse of the arm on the weighted lever, and being prevented from swinging in the opposite direction by a stop-lug on the flushing-lever, the weighted lever being operated by the person using the closet, substantially as described.

3. In a flushing-tank for water-closets, the combination, with a valve and with a flushing-lever pivoted on a suitable support connected to said valve, of an operating-lever having its one end connected to an operating-chain and provided with an arm rising from said lever, and a dog pivotally mounted on the flat vertical face of the flushing-lever, and provided with an angular cam projecting beyond the edge of said lever and acted upon by the arm, said lever being provided with a lug arresting the swing of the dog in one direction and permitting it in the other direction, substantially as described.

4. In a flushing-tank for water-closets, the combination, with a valve and with a flushing-lever mounted on a suitable support and connected to said valve, of a weighted lever connected to an operating-chain, and having an arm rising beneath the flushing-lever, a dog pivotally mounted on the latter and provided with a toe abutting against a stop-lug on the flushing-lever, said dog having also a cam projecting beyond the lower edge of the flushing-lever, and a notch or recess between said cam and the toe in which the end of the arm normally lies, substantially as described.

5. In a flushing-tank for water-closets, the combination, with a valve-seat having a spider in its lower part, of a tubular valve-stem carrying a valve engaging the valve-seat, said stem having interior cross-arms 5, a central depending stem 7, connected to said cross-arms and carrying on its lower end a cup-valve 9, a cylindrical cup 10, within which the cup-valve 9 slides, having a tubular stem 12 at its lower closed end, a suction-cup 17, mounted by a jam-nut 12<sup>a</sup> on the lower end of the tubular stem, and a puppet-valve closing the open end of the tubular stem 12 and cup 10, the cup 10 rising into the lower end of the tubular stem 4<sup>a</sup>, and the stem 12 having slots 16, which receive pins 15 on the stem of the puppet-valve, substantially as described.

6. In a flushing-tank for water-closets, the combination, with a valve-seat having a spider in its lower part, of a tubular valve-stem

4, carrying a valve engaging the valve-seat, said stem having interior cross-arms 5, a central depending stem connected to said cross-arms, and carrying upon its lower end a cup-  
5 valve, a cylindrical cup within which the cup-valve 9 slides, having a tubular stem at its lower closed end connected to the spider in the valve-seat, a puppet-valve closing the open end of the tubular stem and cylindrical  
10 cup, and a suction-cup 17, mounted on the latter and partly surrounding the cylindrical cup, with which it communicates through the tubular stem, substantially as described.

7. In a flushing-tank for water-closets, the  
15 combination of the rising and falling valve-stem carrying the outlet-valve, a flushing-lever connected to the valve-stem and having

a cam-dog pivoted to swing upon the flat vertical face of said lever, a main operating-lever located under the flushing-lever and hav- 20  
ing an arm the point of which lies in a notch in the cam-dog to swing it in one direction without lifting the flushing-lever, the main operating-lever being swept by the weight thereon over the cam-edge of the said dog to 25  
trip the valve and flush the closet as the lever is released, and a weight on the main operating-lever, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES A. BLESSING.

Witnesses:

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L. V. RIGHTER.