

No. 660,178.

Patented Oct. 23, 1900.

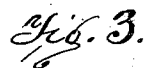
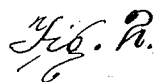
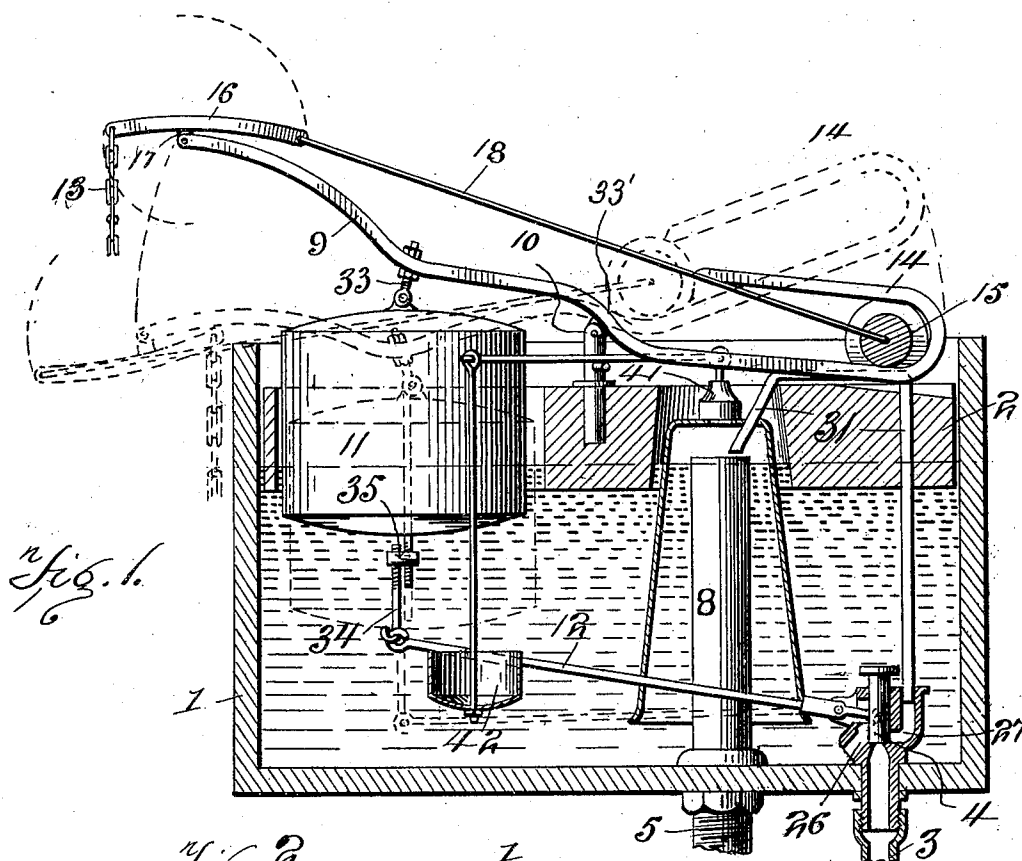
C. J. BALL.

FLUSHING TANK FOR WATER CLOSETS.

(Application filed May 11, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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2 Sheets—Sheet 2.

Fig. 4.

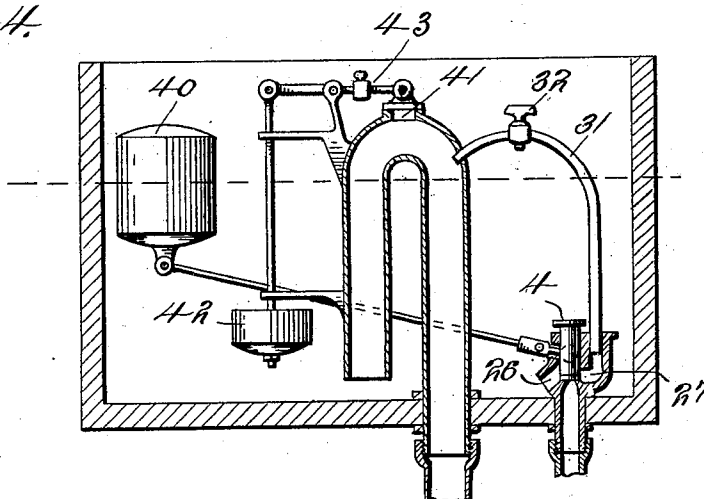


Fig. 7.

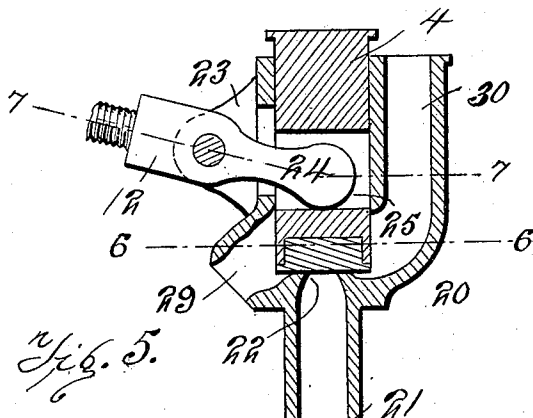
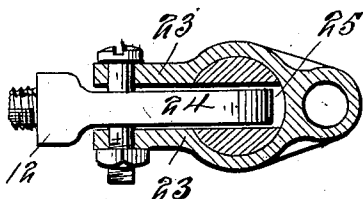
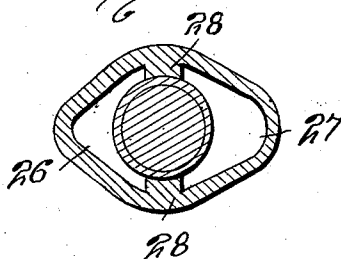


Fig. 5.

Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

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FLUSHING-TANK FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 660,178, dated October 23, 1900.

Application filed May 11, 1900. Serial No. 16,325. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. BALL, a resident of Los Angeles, California, have invented a new and useful Improvement in Flushing-Tanks for Water-Closets, which invention is fully set forth in the following specification.

My invention relates to flushing-tanks for water-closets and like purposes, and more particularly to the inlet-valve controlling the supply of water to the tank and the mechanism governing the operation of said valve, together with means for securing an after-flow of water in the closet-bowl after the same has been flushed.

The particular objects of the invention are to provide an inlet-valve which shall control the supply of water to the tank and at the same time secure an efficient afterflow and to provide efficient and noiseless means for operating said valve to open and close the same.

In United States Letters Patent No. 630,437, granted to me August 8, 1899, I have shown an inlet-valve combined with a plunger-float which initiates siphonic action in flushing the closet-bowl, and a shifting weight which operates at the proper moment to promptly close and retain the inlet-valve on its seat, and the present invention is designed as an improvement on the construction described in said patent. In the use of the plunger-float and inlet-valve mechanism of the patent referred to the shifting weight for operating the inlet-valve produces more or less disagreeable noise and shock by bumping of the shifting weight at either limit of its travel. By the present invention means are provided whereby the weight is brought gently and quietly to rest and shock and noise are practically eliminated. Furthermore, the office of the inlet-valve in the patent referred to was simply to control the inflow of water to the flushing-tank, whereas by the present invention the inlet-valve performs the additional function of directing and controlling the supply of water required to secure an afterflow in the closet-bowl after the flushing action has ceased.

The inventive ideas involved in my invention may receive various mechanical expressions without departing from the spirit or

principle of the invention. One such mechanical expression I have shown in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through a flushing-tank having my invention applied thereto, parts being shown in elevation. Fig. 2 is a plan view of Fig. 1 on a reduced scale. Fig. 3 is a view in side elevation of a modification of the main or operating lever and shifting weight. Fig. 4 is a vertical section of a flushing-tank, showing my improved inlet-valve and afterflow device coöperating with parts differing from those shown in Fig. 1. Fig. 5 is a vertical central section through the inlet-valve and its casing. Fig. 6 is a horizontal section on the line 6 6, Fig. 5; and Fig. 7 is a section on the line 7 7, Fig. 5.

Referring to Figs. 1 and 2 of the drawings, 1 is a flushing-tank, which may be, and in this instance is, provided with a closure-block 2, of the same general character described in my patent aforementioned. Said tank is connected to a source of water-supply by the inlet-pipe 3, controlled by the inlet-valve 4, while 5 indicates the flushing-pipe, and 8 the siphon for securing the flushing action. The main operating-lever 9 is fulcrumed in any suitable manner, as on a pin 10, supported by the block 2, and said lever is flexibly and adjustably connected to the plunger-float 11, which is in turn adjustably connected to the long arm of the lever 12, whose short arm is in operative engagement with the inlet-valve 4. The connection of the lever 9 to the float is secured by a link or bolt 33, pivoted at one end to the top of the plunger-float, while the opposite end passes through the lever and is secured by nuts above and below the same. As a convenient means of connecting the plunger-float to the valve-lever 12 a link 34 is flexibly secured to said lever and has a two-eyed nut 35 on its upper end, said link being screw-threaded to enter one of said eyes, while the other receives the screw-threaded end of a rod projecting downward from the float. The operating-lever 9 is preferably a bent bar having the pull-chain 13 connected thereto by means of an auxiliary lever 16 at one end and the other end bent, as at 14, to form a guide for the rolling weight 15, which travels on the lever as a track or way. The

auxiliary lever 16 is provided with an ear 17, mounted to turn on a pivot in a slot formed in the end of the lever 9, and has its inner end connected to the rolling weight 15 by the bifurcated rod 18, whose opposite arms are turned in at their ends 19 19 and engage the rolling weight at its axis. The length of the rod 18 is such that when the parts are in their normal position (shown in full lines in Fig. 1) the weight is held out of contact with the curve at the end of the lever 9, as is clearly shown in Figs. 1 and 3.

Referring to Figs. 5, 6, and 7, 20 is the casing of the inlet-valve 4, which casing has a duct 21, by means of which it is attached to the inlet-pipe 3. This duct has a valve-seat 22 formed at its inner end, upon which seat the valve 4 is firmly seated by the action of the lever 12, which is pivoted to ears 23 on the side of the casing and has its short arm 24 projecting through the side of the valve-casing and engaging in a slot 25, formed in the valve. Above the valve-seat 22 the valve-casing is provided with two chambers 26 and 27, Fig. 6, which are normally separated from each other by the seated valve and two inwardly-projecting partitions 28 28. The chamber 26 communicates through a spout 29 directly with the interior of the flushing-tank, and the chamber 27 opens into an upwardly-projecting duct 30, to which the afterflow-pipe 31, Figs. 1 and 4, is connected. This pipe 31 leads to the flushing-pipe either through the crown of the siphon, as shown in Figs. 1 and 4, or at some other convenient point. Preferably the afterflow-pipe is carried above the normal level of the water in the tank before discharging into the flushing-pipe, thereby avoiding any liability of leakage from the tank around the valve and through the pipe 31 into the flushing-pipe.

The operation of the device as thus far described is as follows: The parts being in the position shown in Fig. 1, a pull on the chain 13 first operates to turn the auxiliary lever 16 on its pivot 17, thereby drawing the weight 15 toward, but not to, the fulcrum 10 of the operating-lever 9, which last-named lever has not as yet turned about its fulcrum. When the pull on the chain has turned the auxiliary lever into an approximately-vertical position, the movement of the weight 15 toward the fulcrum 10 of the lever 9 is arrested, and the continued pull on the chain depresses the arm of the lever 9, to which the plunger-float is connected, and elevates the arm supporting the weight 15. The depression of the plunger-float initiates siphonic action and at the same time depresses the long arm of the valve-lever 12 and raises the short arm thereof, thereby lifting the inlet-valve from its seat, whereupon water enters the valve-casing from the inlet-pipe and dividing flows into chambers 26 and 27. From chamber 26 the water is emptied through spout 29 into the tank, and from chamber 27 the water passes through pipe 31 into the flushing-pipe

and is thence conducted to the bowl. The flow of water through pipe 31 may be determined by the size of the pipe, as in Fig. 1, or a cock 32 may be provided for that purpose, as in Fig. 4. When the lever 9 has been fully depressed and the siphonic action initiated, the chain is released and, the lever being tilted into the position shown in dotted lines in Fig. 1, the weight 15 continues its movement toward the fulcrum 10, thereby throwing the auxiliary lever 16 into the dotted-line position of Fig. 1. When the auxiliary lever reaches this last last-named position, the rolling weight 10 is again arrested, this time just before it comes in contact with the curved portion 33' of the lever 9, in which position it is so close to the fulcrum 10 that its weight does not overcome the weight of the opposite arm of the lever 9 and the parts connected thereto until the rise of the water in the tank tilts the lever, so that the arm bearing the weight 15 is slightly inclined away from the fulcrum 10, when the weight 15 quickly returns to its normal position (full lines, Fig. 1) and operates through the lever 9, plunger-float 11, and lever 12 to firmly seat the inlet-valve. When the weight thus returns to its normal position, it is prevented from striking against the curved end of its track on the lever 9 by the forked rod 18, which arrests it just before it reaches the end of its track. It will thus be seen that the weight is brought to rest at both extremes of its movement quietly and without shock. It will also be observed that the afterflow continues during the entire time the tank is being filled and at any desired rate, so that if the bowl has been emptied or the trap-seal broken by the flushing action sufficient water will be supplied after the flushing action has ceased to close the seal and leave the desired amount of water in the bowl. When the inlet-valve is closed, the chambers 26 and 27 are entirely shut off from each other, being separated by the partitions 28 28 and the valve 4. In the absence of packing there may be a leakage past the valve from one chamber to the other; but where the afterflow-pipe is carried to a point above the high-water level in the tank such leakage from one chamber to the other cannot result in any flow of water through the afterflow-pipe to the flushing-pipe after the inlet-valve is closed. If, however, the afterflow-pipe is not carried above the high-water level in the tank before communicating with the flushing-pipe, a leakage is liable to occur unless the inlet-valve is packed.

In Fig. 3 I have shown a modification of the weight-controlling device in which, instead of the auxiliary lever 16 I employ a flexible cord 36, passing over a pulley or roller 37 on the end of lever 9, one end of the cord being connected to the chain 13 and the other end to a bail 38, attached to a roller 39, moving on the outward arm of the lever 9. The forked rod 18 is attached to the roller 39, and

when a downward pull is exerted on the chain 13 the parts assume the dotted-line position and the rigidity of the rod 18 prevents any bumping of the weight 15 at the fulcrum 10.

5 While in Figs. 1, 2, and 3 I have shown my improved inlet-valve and afterflow mechanism operating in connection with a lever, a plunger-float, and shifting weight I do not desire to be understood as limiting my in-
10 vention to this specific combination, as siphonic action may be initiated in any practical manner and a float—such as float 40, Fig. 4—relied upon to open the inlet-valve by its descent with the water and to close
15 said valve by its buoyancy as the tank is again filled with water.

I have also shown in Figs. 1 and 4 an air-valve 41, communicating with the siphon at a point above any water that may be in said
20 siphon, and a weight 42, connected by suitable leverage with said valve in such way that the weight will act to lift the valve and break the vacuum in the siphon just before the water-level in the tank sinks below the mouth
25 of the short leg of the siphon, thereby avoiding the disagreeable gurgle and suction occurring at the close of the flushing action. The air-valve is closed by its own weight when the rise of the water in the tank acts
30 to partially support the weight 42, the weight of the valve 41 being supplemented, if necessary, by an adjustable weight 43, Fig. 4, to enable it to overbalance the weight 42 when the latter is in the water. While I have
35 shown this air-valve and its connected parts, I have not claimed it herein, as the same forms the subject-matter of my accompanying application, Serial No. 16,326.

It will be understood that while I have
40 herein described my improved device with minuteness and in detail, I have done so only for the purpose of clearly explaining my invention and do not desire to limit myself to the specific arrangement and proportions of
45 parts, as these may be varied without departing from the spirit or principles of the invention.

Having thus described my invention, what I claim is—

50 1. The combination with a flushing-tank, of an inlet water-valve, a casing therefor having two separate chambers communicating when said valve is open and separated by the inlet-valve when the latter is closed, and
55 means automatically opening and closing said valve.

2. The combination with a flushing tank and pipe, of an inlet-valve casing having two separate chambers, a valve simultaneously
60 admitting water to both chambers when open but separating the chambers when closed, an outlet from one chamber to the tank, and an outlet from the other chamber to the flush-
ing-pipe.

65 3. The combination with a flushing tank and pipe, of an inlet-valve casing having two chambers therein, an inlet-pipe communicat-

ing with said chambers, an inlet-valve controlling the admission of water from said pipe and preventing communication between said
70 chambers when the valve is closed, means automatically opening and closing said valve, and a discharge-opening from one of said chambers into the tank and from the other chamber into the flushing-pipe.

4. The combination with a flushing-tank,
75 of means discharging water therefrom, devices admitting water thereto, a main operating-lever controlling said means and devices, a shifting weight on said lever, an aux-
80 iliary lever fulcrumed on said main lever and connections between said weight and auxiliary lever.

5. The combination with the flushing tank and pipe, of an inlet-valve casing, a spout
85 leading therefrom to the tank, an afterflow-pipe leading from said casing to the flushing-pipe, an inlet-valve in said casing, a lever connected to said valve, a plunger-float connected to said lever, a main operating-lever
90 connected to said plunger-float, a shifting weight on one arm of said main lever and an auxiliary lever fulcrumed on the other arm, connections between said weight and auxil-
95 iary lever, and a pull-chain also connected to said auxiliary lever.

6. The combination with a flushing-tank, and its operating mechanism, of a main oper-
ating-lever having a shifting weight on one arm, an auxiliary lever fulcrumed on the
100 other arm, and connections between said weight and auxiliary lever.

7. In a flushing-tank the combination with the main operating-lever, of a shifting weight
on one arm of said lever, means for tilting
105 said lever, and means controlling the shifting movements of said weight when the lever is tilted.

8. The combination with the main operat-
ing-lever, of a shifting weight on one arm of
110 said lever, a rod connected to said weight and means controlling the shifting movements of said rod and weight.

9. The combination with the main operat-
ing-lever, of a shifting weight on one arm of
115 said lever, an auxiliary lever fulcrumed on the other arm thereof, and a bifurcated rod connected to said auxiliary lever and embracing said weight.

10. The combination with the main oper-
ating-lever, of a shifting weight on one arm
120 of said lever, an auxiliary lever pivoted on the other arm thereof so as to lie above or below the same, a rigid connection between the weight and auxiliary lever, and a pull-chain
125 connected to the auxiliary lever.

In testimony whereof I have signed this specification in the presence of two subscrib-
ing witnesses.

CHAS. J. BALL.

Witnesses:

D. C. WHEARTY,
WM. W. STROUSE.