No. 758,970. PATENTED MAY 3, 1904.

F. JACKSON.

CLOSET CISTERN AND VALVE THEREFOR.

APPLICATION FILED MAY 4, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

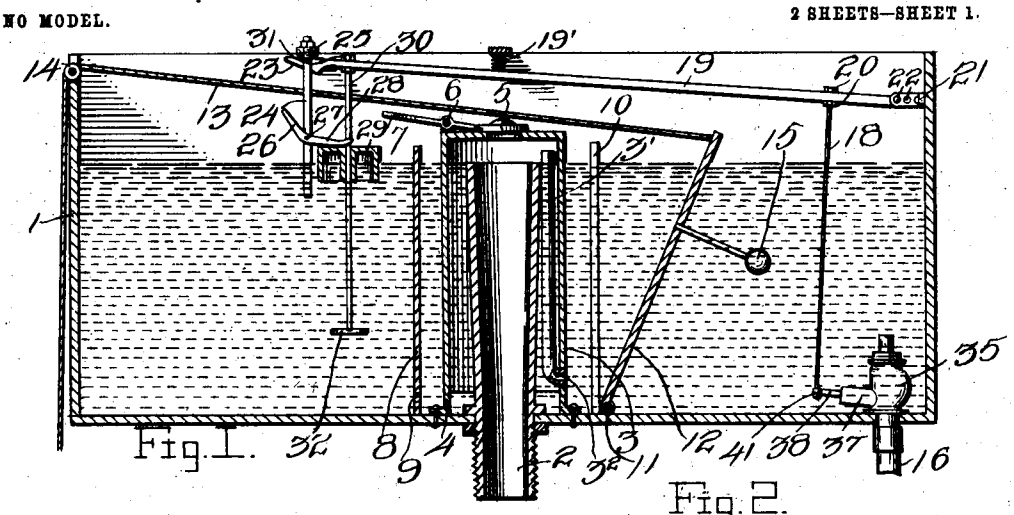


Fig. 1.

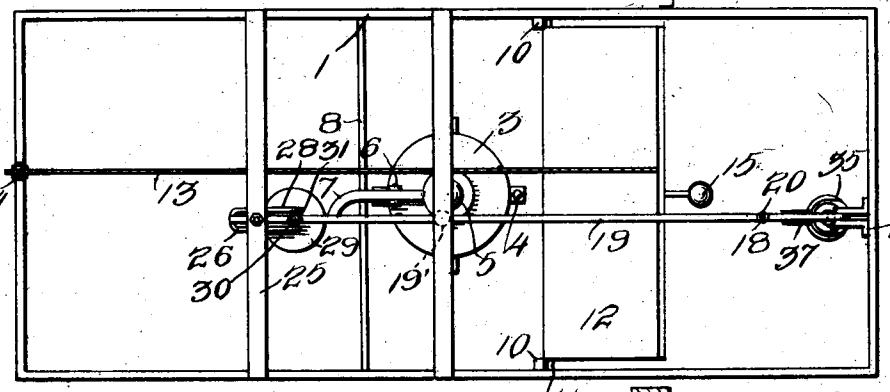


Fig. 2.

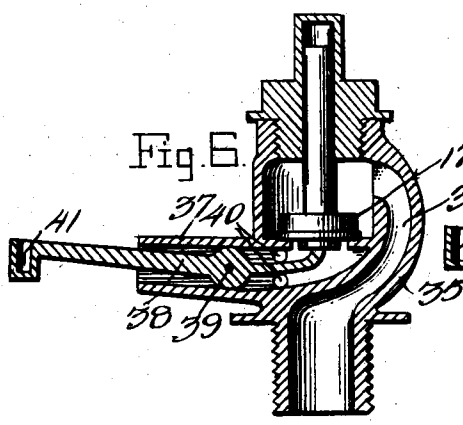


Fig. 6.

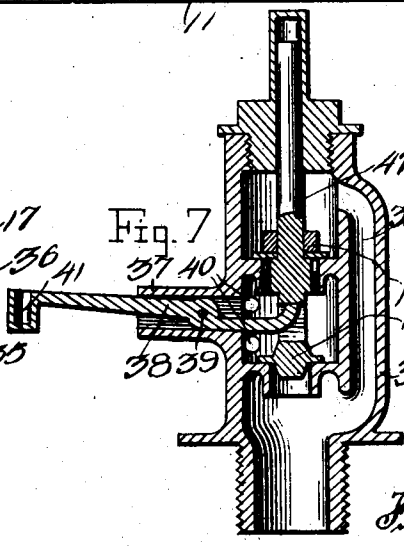


Fig. 7.

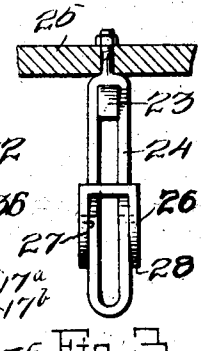


Fig. 3.

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F. JACKSON.

CLOSET CISTERN AND VALVE THEREFOR.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

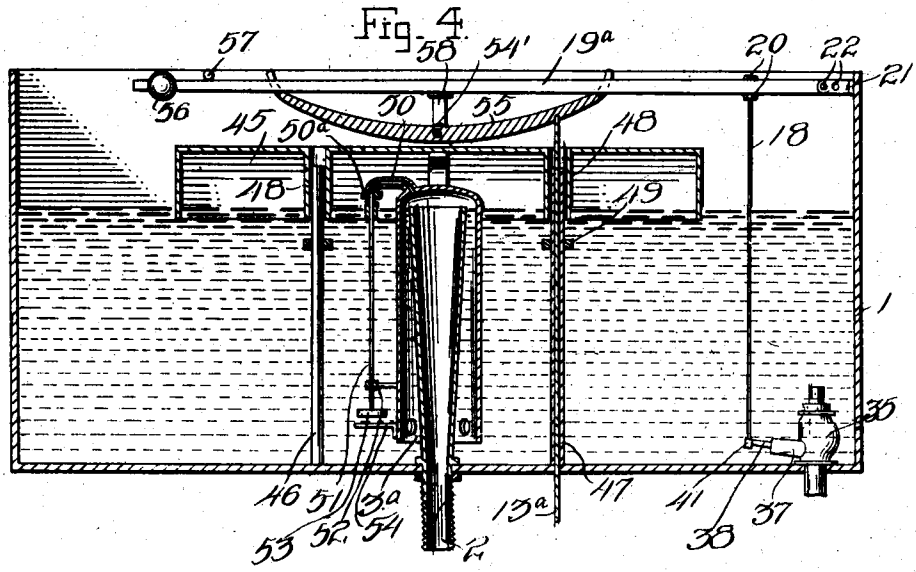
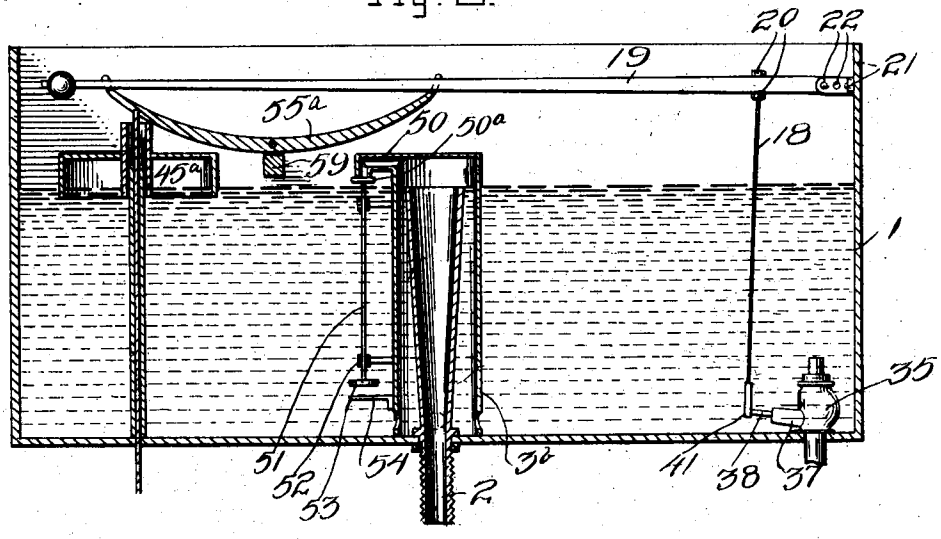


Fig. 5.



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No. 758,970. Patented May 3, 1904.

UNITED STATES PATENT OFFICE.

FRANCIS JACKSON, OF OAKLAND, CALIFORNIA.

CLOSET-CISTERN AND VALVE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 758,970, dated May 3, 1904.

Application filed May 4, 1903. Serial No. 155,614. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS JACKSON, a subject of the King of Great Britain, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Closet-Cisterns and Valves Therefor; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to cisterns and flushing-valves for water-closets; and its objects are to provide a device of this character which shall be simple of construction, cheap to manufacture, durable in use, and not liable to get out of order and one in which a waste of water is obviated and the gurgling noise caused by the inrush of air prevented.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through my improved closet-cistern. Fig. 2 is a top view of the same. Fig. 3 is a detail view of the latch for holding the inlet-valve open. Fig. 4 is a section through a modified form of cistern. Fig. 5 is a section through a cistern, showing a slight modification of the form shown in Fig. 4. Fig. 6 is a sectional view through the inlet-valve of the cistern. Fig. 7 is a similar view through a modified form of inlet-valve.

Referring more particularly to the first three figures of the drawings, 1 denotes the cistern or tank, which may be mounted upon any suitable support, and 2 the flushing or outlet pipe projecting vertically up through the bottom of the cistern to the normal level of the water, which is denoted by the dotted line in Fig. 1. The inverted cylinder or casing 3, surrounding the open upper end of the pipe 2, coacts with the latter to form a siphon. The cylinder 3 is supported and spaced above the bottom of the tank by the legs 4 and is provided in its top with an opening for admitting air to break the siphon. Said opening may be closed by the valve 5, which is hinged at 6 to the cylinder and provided with an extension or arm 7.

3′ denotes an air tube or pipe within the cylinder 3, having its upper end extending slightly above the upper end of the flushing-pipe 2 and having its lower end communicating with the outside of the cylinder through the opening 3^2.

To one side of the cylinder 3 is a transverse vertical partition or wall 8, which extends above the normal water-level and separates the cistern into two compartments, which are in communication through the openings or apertures 9 in the bottom of the partition.

Secured to the side walls of the cistern are vertical strips or stops 10, to the lower ends of which is hinged at 11 the swinging partition 12, which is operated by a cord or chain 13, secured to its upper end and passed over a convenient pulley 14, mounted on the cistern, and from thence extends downwardly and is provided with the usual hand piece or grip. A weight 15 is secured to the moving partition to return it to its normal position.

16 denotes the supply or inlet pipe, which is coupled to the lower end of the casing of the inlet-valve 17. The valve 17, as shown in Fig. 6, is slidably mounted in the upper portion of the casing 35 and is adapted to be closed or forced down upon its seat by the pressure of the water above it. A passage 36 in the casing permits the water to pass from the inlet-pipe 16 to a point in the casing above the valve. In said casing at a point below the valve-seat is formed a slotted projection 37, in which the operating-lever 38 is pivoted at 39. The inner end or toe of this lever is adapted to engage the under side of the valve 17 to elevate the same and permit the water to pass from the passage 36 under the valve 17 and then out into the tank through the perforations 40 in said casing below the valve-seat. The outer end of the valve-operating lever 38 is formed with socket or cup 41, in which the lower end of a vertical rod or link 18 is adapted to seat. Said rod 18 has its upper end adjustably secured to a pivoted lever 19 by means of the nuts 20. The lever

19 is pivoted at one end in the bracket 21, which is provided with a series of apertures 22, whereby the fulcrum of the lever may be changed. The free end of the lever 19 is tapered and provided with an enlarged beveled end 23, which is adapted to operate in a slotted guide 24, supported by a cross-bar 25. A coil-spring 19′ holds the lever 19 elevated.

26 denotes a U-shaped latch pivoted at 27 to the guide 24. The arms 28 of the latch are adapted to be engaged and operated by the float 29, which slides upon a guide-rod 30, adjustably secured to the free end of the lever 19 by the nuts 31. The float 29 may be of any desired construction, that illustrated in the drawings being hollow and formed with an open bottom. If desired, I may use an open top float or a sealed float. The lower end of the guide-rod 30 is provided with a stop or plate 32 to engage and limit the movement of the float.

In the modification of the inlet-valve shown in Fig. 7 I have provided a balance-valve. Two valves 17^a and 17^b are formed upon the same valve-stem 42, which stem when elevated by the lever 38 will raise said valves from their seats and permit the water to pass upwardly between the valve 17^b and its seat and downwardly between the valve 17^a and its seat.

The operation of the device shown in Figs. 1, 2, and 3 is as follows: When the cord or chain 13 is pulled down, the moving partition 12 is swung up until it is stopped by the strips 10. The movement of the partition 12 forces the water confined between itself and the fixed partition 8 to a level above the upper end of the flushing-pipe 2, and the water rushing down the said pipe will start the siphon. The weight 15 will return the partition 12 to its normal position when the cord 13 is released. The water in both compartments of the cistern will be discharged through the pipe 2, which, as shown, has a flared upper end, until the continued lowering of the float 29 after it contacts with the stop 32 upon the guide-rod 30 draws the lever 19 down until it contacts with the arm 7 and raises the air-inlet valve 5 to admit air into the cylinder 3 to stop or break the siphon. The instant that the valve 5 is opened the water in the tank is below the opening 3^2 in the pipe 3′, and air also enters the cylinder through said pipe. The lowering of the lever 19 forces the valve-lever 38 down to open valve 17 and allow water to enter the tank to refill the same. The bevel end 23 of the lever 19 as the same lowers acts on the upper portion 26^a of the U-shaped catch, rocks the latter on its pivot 27, passes below the said upper end 26^a of the latch, and becomes engaged thereby, the arm 28 of the latch holding the upper end 26^a thereof in engagement with the lever and locking the latter in a lowered position, and hence keeping the inlet-valve 17 and the air-valve 6 open. As the tank refills the float 29 rises with the level of the water until it contacts with the arm 28 of the latch 26, rocks the latter in the reverse direction to disengage its upper end 26^a from the end of the lever 19, and hence releases said lever. As soon as the lever is free the coil-spring 19′ draws it up, and thereby releases the valve-lever 38 to permit the pressure of the water to close the inlet-valve 17. The valve 5 is also permitted to drop to its seat and close the cylinder 3. The chamber formed by the partition 8 and in which the float is located prevents the float from being affected by the action of the wave-making partition 12.

In the modified construction illustrated in Fig. 4 of the drawings I dispense with the partitions 8 and 12, and in order to start the siphon I raise the level of the water in the entire tank by submerging or partially submerging the large float 45. Said float is in the form of an inverted tray or a box with an open bottom and is of sufficient size to displace enough water to start the siphon. It is adapted to float upon the surface of the water and is guided and limited in its vertical movement by guide rods or tubes 46 and 47. These guides project vertically from the bottom of the tank, and their upper ends are adapted to enter the guide-tubes 48, secured in the float 45. Shoulders or lugs 49 upon the guides 46 and 47 limit the downward movement of the float as the water lowers in the tank. The guide 47 is preferably tubular in order to permit the operating-cord 13^a to pass through the same and the float. Instead of having the siphon-cylinder 3^a fixed as in Fig. 1 I attach the cylinder to the float 45 so that it will rise and fall with the same. The air-inlet to said cylinder for the purpose of stopping the siphoning action comprises the laterally-projecting tube 50, the downturned open end of which forms a valve-seat. A valve 50^a upon the upper end of the vertically-sliding rod or stem 51 is adapted to coact with said seat to close the air-inlet. Said rod slides in suitable guides 52 and carries upon its lower end a small float 53. The buoyancy of this float holds the valve upon its seat, and when the water lowers to a certain point the said valve will become unseated to admit air into the cylinder 3^a to break the siphon, as will be readily understood. A projection or stop 54 limits the drop or downward movement of the float 53. Suitably pivoted in the bracket or lugs 54 upon the top of the large float 45 is a lever 55, having both of its ends forked to engage the lever 19^a. The operating-cord 13^a is attached to one arm of this lever and passes downwardly through the float 45, the guide-tube 47, and the tank. The lever 19^a, which corresponds to the lever 19 in Fig. 1, has its free end provided with a weight 56, and its upward movement under the action of the lever 55, as hereinafter explained, is limited by the projection or lug 57. In the operation of this

form of my invention a downward pull upon the operating-cord 13^a will force the float 45 downwardly to the limit of its movement, since one end of the forked lever 55 will be prevented from being elevated, owing to its engagement with the lever 19^a, which is held down by the stop 57. The downward movement of the float will elevate the level of the water in the tank, and thus start the siphon to discharge the water from the flushing-pipe 2^a. The release of the cord 13^a will permit the lever 19^a to drop and open the inlet-valve 17. As the water in the tank lowers the float 53 will be operated to open the air-inlet to the cylinder 3^a and stop or break the siphon, as previously explained. As the water rises said air-inlet will be closed again by the valve 50^a. When the water elevates the float 45, the vertical projection or stud 58 will raise the lever 19^a to release the valve-lever 38 and permit the water-pressure to close the water-inlet valve 17.

The modified form of the invention shown in Fig. 5 is very similar to that shown in Fig. 4. The siphon-cylinder 3^b is fixed or stationary, as in Fig. 1. The float 45^a is smaller than the one shown in Fig. 4, and the forked lever 55^a is pivoted to a cross-bar 59. With these exceptions the construction and operation of the parts shown are the same as those previously described. It will be seen that this arrangement of the various parts makes the apparatus strong, durable, and efficient in operation, and there is little liability of the parts getting out of order, as there are no valves in the flushing-pipe below the water-level and no valve is necessary to start the siphon.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved cistern and flushing-valve will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A flushing device of the class described, comprising a vessel, a supply-pipe thereto having an inlet-valve, a lever connected to the valve to operate it, a spring to raise the lever to close the valve, a float to lower the lever to open the valve, and having limited vertical movement independent of the lever, a siphon to discharge from the vessel, a valve to admit air to break the siphon and opened by the descent of the lever, and means to lock the lever when lowered, said lever-locking means being released from the lever by the ascent of the float.

2. In apparatus of the class described, the combination of a vessel, a water-supply therefor having a valve, a lever to operate the valve and having a bevel 23 on its under side at its outer end, a float, a guide therefor, and a pivoted latch having means to engage the float and means operated by the downward movement and the bevel of the lever, to engage and detain the latter when the latch is disengaged from the float.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANCIS JACKSON.

Witnesses:
WM. P. GRANT,
R. GRAHAM.