No. 701,548. Patented June 3, 1902.

C. B. DAY.

FLUSHING APPARATUS.

(Application filed Dec. 18, 1901.)

(No Model.) 2 Sheets—Sheet 1.

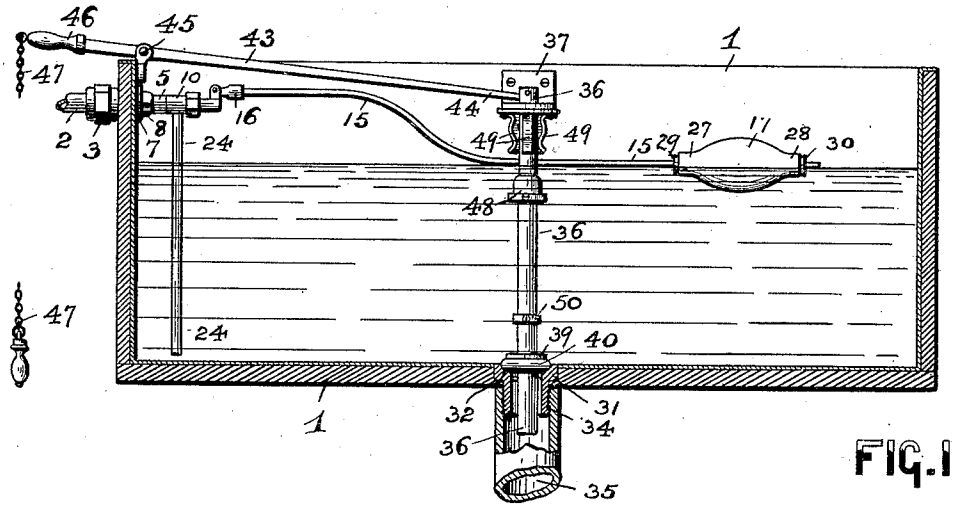


FIG. 1

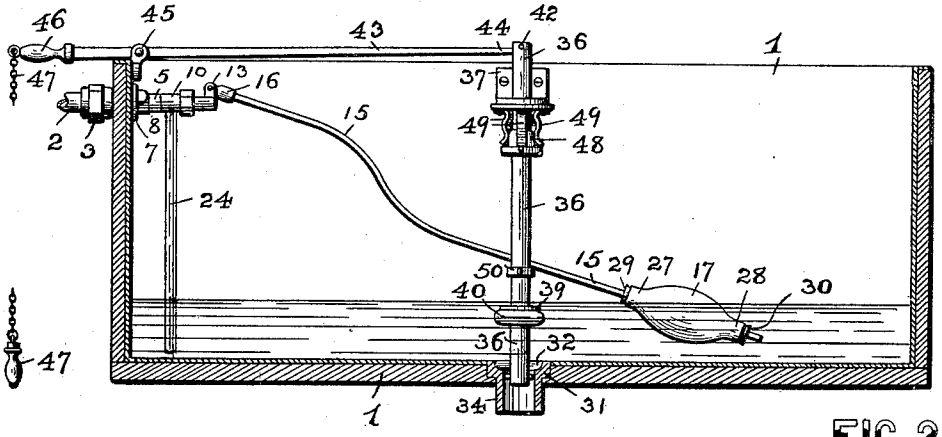


FIG. 2

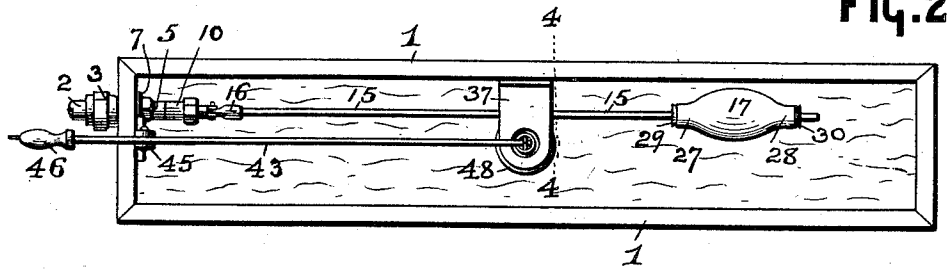


FIG. 3

WITNESSES:

Geo. L. Richards.

Susan Blewett

INVENTOR:

CHARLES B. DAY,

BY

Fred'k C. Fraentzel.

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 701,548. Patented June 3, 1902.

C. B. DAY.

FLUSHING APPARATUS.

(Application filed Dec. 18, 1901.)

(No Model.) 2 Sheets—Sheet 2.

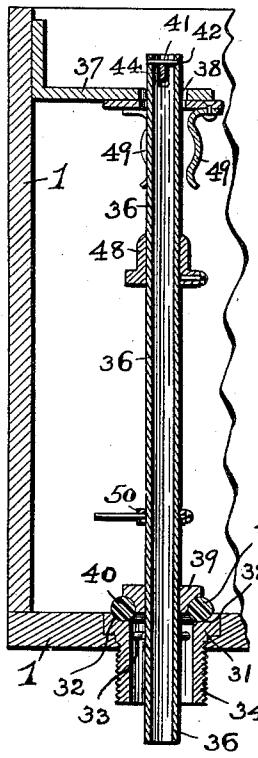


FIG. 4

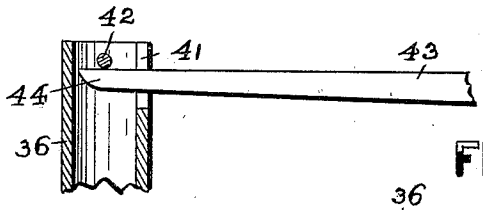


FIG. 5

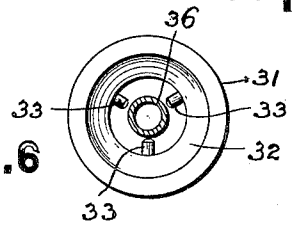


FIG. 6

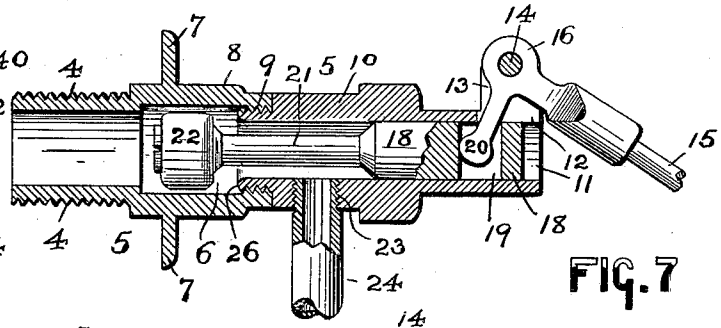


FIG. 7

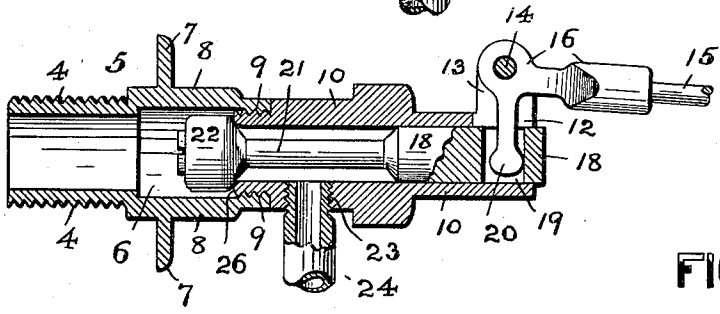
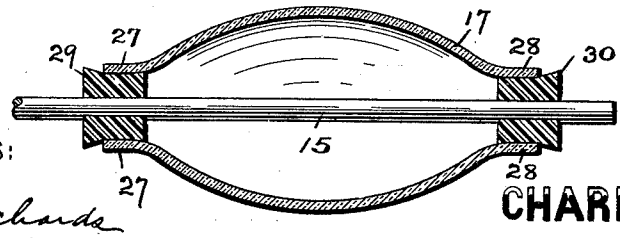


FIG. 8

FIG. 9



WITNESSES:

Geo. L. Richards

Susan Blewett

INVENTOR:

CHARLES B. DAY,

BY Fred'k C. Fraentzel,

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES B. DAY, OF EAST ORANGE, NEW JERSEY.

FLUSHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 701,548, dated June 3, 1902.

Application filed December 18, 1901. Serial No. 86,385. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. DAY, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Flushing Apparatus; and I do hereby 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, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

My invention has relation more particularly to improvements in flushing apparatus or tanks for water-closets, cisterns, urinals, and other similar devices; and the invention has for its principal purposes to provide an apparatus or device of the character stated the various arrangements of the mechanism and parts thereof being of a simple and inexpensive construction and the mechanism being arranged in such a manner that a noiseless discharge of the water from the tank is produced when the water is used for flushing purposes, and, furthermore, the parts being so arranged that a minimum volume of water is consumed during each flushing-out operation.

Other important features of this invention are, first, the novel construction and arrangement of an inlet-valve, which is automatically actuated and opened and closed by the falling and rising of a float upon the water in the tank, and, secondly, to provide a novel form and construction of outlet-valve provided with a vertical stem or rod, which is to be raised by means of a lever, the said outlet-valve normally resting by its own gravity upon an outlet or seat in the tank through which the water passes to the device which is to be flushed out, the said outlet or valve-seat in the tank being closed when the said stem or rod with which the outlet-valve is connected is released from a holding device or from clamping-fingers by the rod which actuates the inlet-valve when the float is being lowered upon the receding surface of the water in the tank.

A further object of this invention is to provide in connection with a flushing apparatus or device of the character stated a novel form of float, ordinarily of glass and preferably in the form of a bottle, which can be readily arranged upon or removed from the end of the inlet-valve-actuating lever or rod to admit of some water into this float, if necessary, or to remove any water therefrom in order that the said float may have the proper buoyancy to properly open and close the said inlet-valve, and thereby prevent leakage at the valve and a consequent waste of water.

Other objects of this invention not at this time more particularly specified will be clearly evident from the following detailed description of my present invention.

My invention therefore consists, broadly, in the novel flushing apparatus hereinafter set forth; and, furthermore, this invention consists in the various novel arrangements and combinations of the devices and the details of the construction thereof, all of which will be fully described in the following specification and then finally embodied in the clauses of the claim.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a water-tank and the controlling mechanism therein for operating the valves, the said mechanism and valves being represented in side elevation and the parts being shown in their normally inactive positions when all the valves are closed. Fig. 2 is a similar view of all the said parts indicated in said Fig. 1, but the various parts being represented in their operated positions when the valves of the mechanism are both opened and the outlet-valve in the bottom of the tank is just about to be closed; and Fig. 3 is a plan or top view of the various parts. Fig. 4 is a detailed vertical cross-section, on an enlarged scale, of the outlet-valve and its stem or rod and a portion of the tank, a bracket connected therewith, and a clamping or holding device on said bracket, said section being taken on line 4 4 in said Fig. 3; and Fig. 5 is a detail vertical section of the upper portion of said valve rod or stem and a portion of the lever for lifting the same. Fig. 6 is a plan or top view of the valve-seat for the outlet-valve in the tank. Figs. 7 and 8 are two longitudinal vertical sec-

tions of the inlet-valve, representing the parts of the valve respectively in their opened and closed positions; and Fig. 9 is a vertical section of a float and a portion of the valve-actuating rod or lever on which the said float is slidably and removably arranged.

Similar characters of reference are employed in all of the said above-described views to indicate corresponding parts.

Referring to the said figures of the drawings, the reference character 1 indicates any ordinary form and construction of tank or cistern, such as is used with water-closets, &c., provided at or near the top with a pipe 2 for admitting water into the said tank. The said pipe is held in its proper position preferably by means of a union 3, arranged upon said pipe and by means of which it is suitably connected with the screw end 4 of a valve-casing 5 of an inlet-valve, as illustrated. This valve is clearly illustrated in Figs. 7 and 8 of the drawings, and it consists, essentially, of a tubular casing provided with the said screw-threaded end 4, a valve-chamber 6, a flange 7, adapted to be fitted directly against the inner surface of the said tank 1 and with a nut-shaped part 8 for securely screwing the said screw end 4 of the valve-casing into the union 3. Suitably secured in a screw-threaded end 9 of the valve-casing is a tubular guide or box 10, which is preferably made with an open end, as 11, and has a slot or opening 12 and a pair of upwardly-extending perforated ears or lugs 13, between which is pivotally arranged upon a pin 14 an eye portion 16 of an actuating lever or rod 15, which carries a float 17 on the free end thereof. The said guide or box 10 has slidably arranged therein a plunger 18, which is provided with a slot or opening 19, into which extends a finger or other suitably-constructed projection 20, connected with the said eye portion 16 of the float lever or rod 15 for causing a reciprocatory movement of the said plunger or piston 18 back and forth in the cylindrical guide or box 10 as the water in the tank or cistern 1 is lowered or rises.

A rearwardly-extending rod 21 projects into the previously-mentioned valve-chamber 6, and this rod has attached to its free end in any suitable manner a suitably-constructed valve plug or disk 22, which is preferably made of a soft and flexible material, as rubber or the like. Connected with a suitably-disposed outlet or opening, as 23, in the said casing 5 is a pipe 24, which extends in a downward direction and terminates within and near the bottom of the tank 1, as clearly indicated in Figs. 1 and 2 of the drawings. These several parts are arranged in such a manner that when the water in the tank 1 is at high level and the float 17 and its lever or rod 15 are in the position indicated in Fig. 1 then the projection or finger 20, connected with the eye portion 16 of said lever or arm 15, will have moved the plunger or piston 18 toward the open end 11 of the said guide or box 10 until the valve plug or disk 22 is brought directly against a valve-seat 26, as indicated in Fig. 8. In this manner the inlet-valve is entirely closed and the supply of water from the supply-pipe 2 into the tank 1 is shut off. When, however, the level of the water in the tank 1 is lowered in the manner and for the purposes to be presently described, the float 17 and lever 15 assuming the positions indicated in Fig. 2, then the projection or finger 20 will move the plunger or piston 18 in the opposite direction, thus forcing the valve plug or disk 22 from the valve-seat 26, as indicated in Fig. 7 of the drawings. A new supply of water then immediately enters from the pipe 2 into the valve-casing 5 and by means of the pipe 24 into the tank 1, where it is delivered, without noise, at or near the bottom of the said tank.

The float 17 employed is usually made of glass, being preferably made in the shape of a bottle and having the opposite open ends or necks 27 and 28, in which are respectively arranged perforated stoppers 29 and 30, of rubber, cork, or any other suitable material and through which the free end of the said float arm or lever 15 is passed, so that the said float is removably as well as slidably arranged upon said lever or arm 15 for the proper buoyancy of the said float and the positive closing of the valve in the valve-casing 5 when the water in the tank is at its highest level.

Having thus described the construction of inlet-valve, I will now set forth more particularly the novel construction and arrangement of the mechanism for allowing the water in the tank 1 to pass out therefrom for flushing-out purposes. In the bottom of the said tank 1 is a suitably-arranged opening, in which I have secured in any suitable manner a valve-casing 31, the same being made with an annular seat 32 and suitably-disposed and inwardly-extending guides, preferably in the form of radially-extending pins or projections 33, for the purpose to be presently described. The said valve-casing 31 is made with the lower tubular portion 34, which extends from the bottom of the tank 1 and is for the purpose of securing thereto in any suitable manner the one end of a flushing-out pipe 35, as indicated in Fig. 1 of the drawings. Movably arranged between the said radial guides 33 of the valve-casing 31 is the lower end portion of a suitably-constructed stem or rod 36, preferably of a tubular cross-section, and the upper end of this stem or rod is likewise movably arranged in an opening or guide 38 of a bracket or support 37, which is secured to and extends from the one side of the tank-casing, as illustrated. Suitably secured to the lower end portion of the said stem or rod 36 at a point above the valve-seat 32 is a valve-disk 39, having a rubber or other flexible gasket or ring 40, which normally fits

upon the said seat 32, and thereby closes the water-outlet in the bottom of the said tank 1. Extending into and through a slot or opening, as 41, in the upper tubular end portion of the said stem or rod 36 and resting directly beneath a pin 42, as indicated more particularly in Fig. 5 of the drawings, is the end 44 of an operating-lever 43, which is fulcrumed upon a pivotal pin of a bracket 45, secured at the upper edge of the tank 1 and has a handle 46 or a chain or other flexible connection 47 for actuating the said lever 44, and thereby raising the said stem or rod 36 and the valve 39 and its ring 40 from the valve-seat 32, which permits of the discharge of the water from the tank 1 into the discharge or flushing-out pipe 35, as will be clearly understood. When the said rod or stem 36 is raised, a suitably-placed projection or enlargement 48 on said stem or rod 36 is forced in slidable holding engagement with a set of spring clamping-fingers 49 or other suitable holding means on the lower side of the said bracket 37, as indicated in Fig. 2 of the drawings, in which raised position the rod or stem 36 and the parts connected therewith are held until the receding level of the water brings the float arm or lever 15 forcibly against a suitable projection 50, extending from the side of the said stem or rod 36, whereby the enlargement 48 is forced from its held engagement with the spring clamping-fingers and the said rod or stem 36 and its valve-disk will then by their own gravity, as will be clearly evident, fully close the said outlet in the bottom of the tank 1 by again bringing the rubber gasket 40 down upon the valve-seat 32 in the casing 31. At this point the level of the water in the tank 1 is approximately that indicated in Fig. 2 of the drawings, and at this level the outlet-valve in the bottom of the tank closes. A certain volume of water is therefore maintained at all times in the tank 1, and hence there can be no objectionable noise due to suction when the last quantity of water passes through the outflow, as is now ordinarily the case with the constructions of flushing-tanks in present use. The inlet-valve being open a fresh supply of water is admitted into the tank and the rising float 17 finally closes the said inlet-valve when the height of the water (indicated in Fig. 1 of the drawings) has again been reached.

From the above description it will be clearly seen that a practical, efficient, and operatively-constructed device for the various purposes stated has been produced, and the many advantages and different uses to which the mechanism can be put are evident.

I am aware that changes may be made in the various arrangements and combinations of the devices and that the sizes and proportions as well as the shapes of the contrivances shown may be varied without departing from the scope of my present invention. Hence I do not limit my invention to the exact arrangements and combinations of the various devices as herein described and as illustrated in the accompanying drawings, nor do I confine myself to the details of the construction of any of the said parts.

Having thus described my invention, what I claim is—

1. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of the tank provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device and means on said stem adapted to be brought in sliding and holding engagement with said clamping device, for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing the said stem from its raised position with the said clamping device, to close said water-outlet, substantially as and for the purposes set forth.

2. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of the tank provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing the said stem from its raised position with the said clamping device to close the said water-outlet, consisting, essentially, of a float and a float-arm adapted to be brought in engagement with a part of the said stem, substantially as and for the purposes set forth.

3. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of the tank provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device and means on said stem adapted to be brought in sliding and holding engagement with said clamping device, for holding said stem in its raised position while the level of the water is being lowered, means actuated by the receding water for releasing the said stem from its raised position with the said clamping device to close the said water-outlet, and a water-inlet valve connected with said tank for admitting water into said tank when the outlet is closed, substantially as and for the purposes set forth.

4. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of the tank provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device for holding said stem in its raised position while the level of the water is being lowered, means actuated by the receding water for releasing the said stem from its raised position with the said clamping device to close the said water-outlet, consisting, essentially, of a float and a float-arm adapted to be brought in engage-

ment with a part of said stem, and a water-inlet valve connected with said tank, the valve being connected with and operated by the said float-arm, substantially as and for the purposes set forth.

5. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of said tank, a valve-casing in said outlet provided with a valve-seat, a guiding means in said valve-casing, a vertical stem and a valve-disk thereon, the lower portion of said stem extending down between the said guiding means, a pull device for raising said stem, a bracket provided with an opening in which the upper end portion of said stem is movably arranged, spring clamping-fingers extending from said bracket, and an enlargement on said stem adapted to be brought in holding engagement with said fingers for holding said stem in its raised position while the level of the water is being lowered, substantially as and for the purposes set forth.

6. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of said tank, a valve-casing in said outlet provided with a valve-seat, a guiding means in said valve-casing, a vertical stem and a valve-disk thereon, the lower portion of said stem extending down between the said guiding means, a pull device for raising said stem, a bracket provided with an opening in which the upper end portion of said stem is movably arranged, spring clamping-fingers extending from said bracket, an enlargement on said stem adapted to be brought in holding engagement with said fingers for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing said stem from its raised position to close the said water-outlet, substantially as and for the purposes set forth.

7. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of said tank, a valve-casing in said outlet provided with a valve-seat, a guiding means in said valve-casing, a vertical stem and a valve-disk thereon, the lower portion of said stem extending down between the said guiding means, a pull device for raising said stem, a bracket provided with an opening in which the upper end portion of said stem is movably arranged, spring clamping-fingers extending from said bracket, an enlargement on said stem adapted to be brought in holding engagement with said fingers for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing said stem from its raised position to close the said water-outlet, consisting, of a projection extending from the side of said stem, and a float and float-arm adapted to be brought in engagement with said projection, substantially as and for the purposes set forth.

8. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of said tank, a valve-casing in said outlet provided with a valve-seat, a guiding means in said valve-casing, a vertical stem and a valve-disk thereon, the lower portion of said stem extending down between the said guiding means, a pull device for raising said stem, a bracket provided with an opening in which the upper end portion of said stem is movably arranged, spring clamping-fingers extending from said bracket, an enlargement on said stem adapted to be brought in holding engagement with said fingers for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing said stem from its raised position to close said water-outlet, consisting, of a projection extending from the side of said stem, and a float and float-arm adapted to be brought in engagement with said projection, and a water-inlet valve connected with said tank for admitting water into said tank when the water-outlet is closed, substantially as and for the purposes set forth.

9. A flushing apparatus or the like, comprising, a tank, a water-outlet in the bottom of said tank, a valve-casing in said outlet provided with a valve-seat, a guiding means in said valve-casing, a vertical stem and a valve-disk thereon, the lower portion of said stem extending down between said guiding means, a pull device for raising said stem, a bracket provided with an opening in which the upper end portion of said stem is movably arranged, spring clamping-fingers extending from said bracket, an enlargement on said stem adapted to be brought in holding engagement with said fingers for holding said stem in its raised position while the level of the water is being lowered, and means actuated by the receding water for releasing said stem from its raised position to close the water-outlet, consisting, of a projection extending from the side of said stem, and a float and float-arm adapted to be brought in engagement with said projection, and a water-inlet valve connected with said tank, the valve being connected with and operated by the said float-arm, substantially as and for the purposes set forth.

10. In a flushing apparatus or the like, the combination, with a tank, a water-outlet, provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device for holding said stem in its raised position while the level of the water is being lowered, of a water-inlet valve arranged in the upper portion of said tank above the level of the water therein, comprising, a tubular casing, having a valve-chamber and a valve-seat, a plunger in said casing, a valve-plug connected with said plunger, an outlet-pipe connected with said casing, and means for causing a reciprocatory motion of said plunger and valve-plug, consisting, of a float and a float-arm connected with said plunger, said float-arm being adapted to be brought

in engagement with a portion of said vertical stem to release said stem from its raised position with said clamping device, substantially as and for the purposes set forth.

11. In a flushing apparatus or the like, the combination, with a tank, a water-outlet, provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device for holding said stem in its raised position while the level of the water is being lowered, of a water-inlet valve arranged in the upper portion of said tank above the level of the water therein, comprising, a tubular casing, having a valve-chamber and a valve-seat, a plunger in said casing, said plunger having a slotted end portion, a valve-plug connected with the opposite end of said plunger, an outlet-pipe connected with said casing, a float and a float-arm pivotally connected with said valve-casing, and means on said float-arm extending into the slotted end portion of said plunger for causing a reciprocatory motion of the said plunger and valve-plug, said float-arm being adapted to be brought in engagement with a portion of said vertical stem to release said stem from its raised position with said clamping device, substantially as and for the purposes set forth.

12. In a flushing apparatus or the like, the combination, with a tank, a water-outlet, provided with a valve-seat, a vertical stem and a valve-disk thereon movably arranged above said valve-seat, a pull device for raising said stem, a clamping device for holding said stem in its raised position while the level of the water is being lowered, of a water-inlet valve arranged in the upper portion of said tank above the level of the water therein, comprising, a tubular casing, having a valve-chamber and a valve-seat, a plunger in said casing, said plunger having a slotted end portion, a valve-plug connected with the opposite end of said plunger, an outlet-pipe connected with said casing, a pair of perforated ears on said valve-casing, arranged near the slotted end portion of said plunger, a pivotal pin in said ears, a float and a float-arm, an eye portion connected with said float-arm and pivotally arranged on said pivotal pin, and a finger on said eye portion extending into the slotted end portion of said plunger for causing a reciprocatory motion of said plunger and valve-plug, said float-arm being adapted to be brought in engagement with a portion of said vertical stem to release said stem from its raised position with said clamping device, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 16th day of December, 1901.

CHARLES B. DAY.

Witnesses:
FREDK. C. FRAENTZEL,
W. B. FRAENTZEL.