No. 689,759. Patented Dec. 24, 1901.

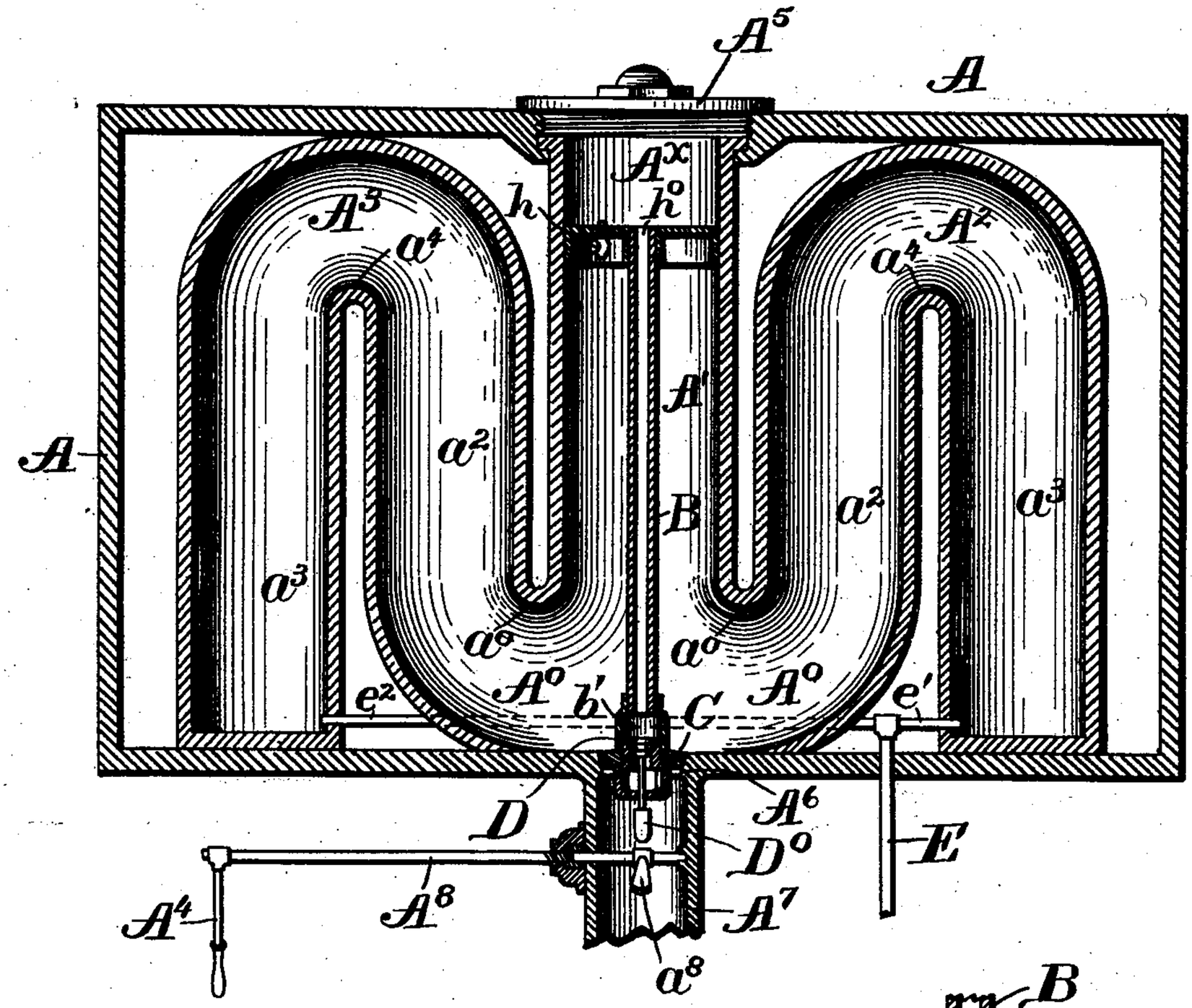
J. W. SNIDER.

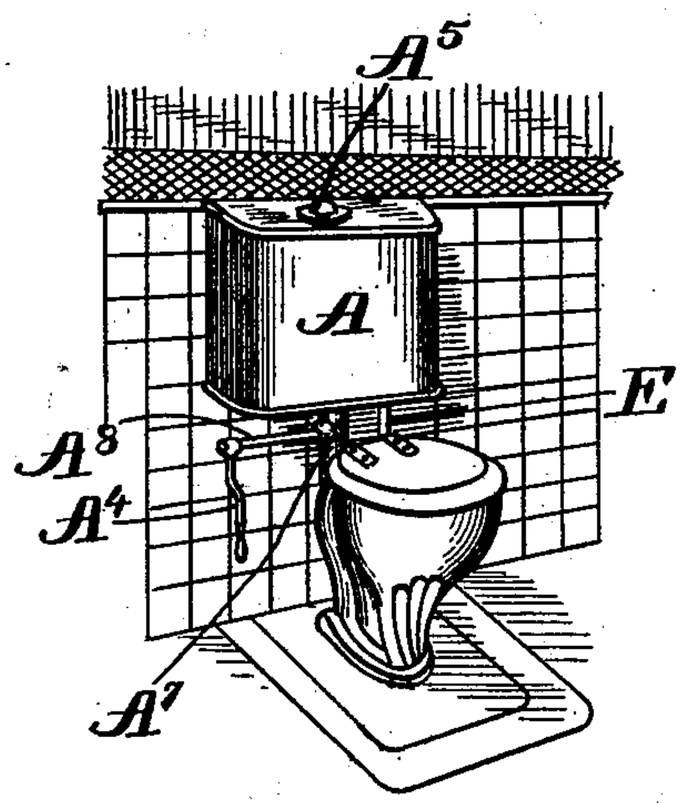
FLUSHING TANK.

(Application filed Aug. 13, 1900.)

(No Model.)

Fig. 1.





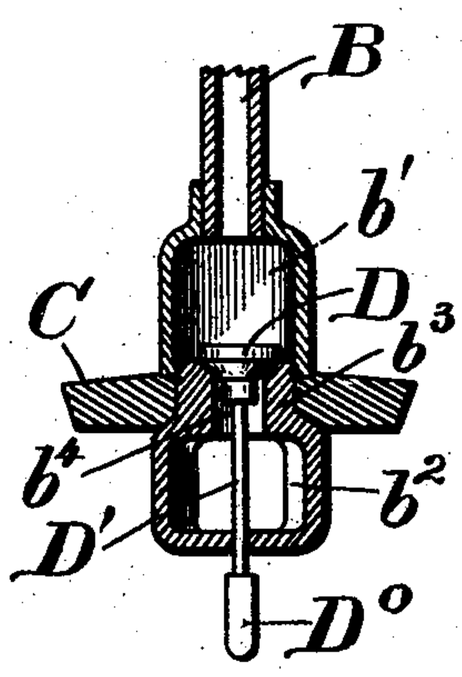


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN W. SNIDER, OF NEW ORLEANS, LOUISIANA.

FLUSHING-TANK.

SPECIFICATION forming part of Letters Patent No. 689,759, dated December 24, 1901.

Application filed August 13, 1900. Serial No. 26,781. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. SNIDER, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Flushing-Tanks; 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.

My invention relates to improvements in flushing-tanks; and it has for its object to provide a device for flushing a closet-fixture, such device to be simple and cheap in construction and effective in operation.

My invention consists in the novel devices hereinafter described and claimed and will be understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters of reference throughout the several views.

Figure 1 is a vertical central section through the flushing-tank. Fig. 2 is an enlarged detail sectional view of the outlet-valve, and Fig. 3 is a perspective view showing the invention as applied to a closet-fixture.

A represents an inclosing box or casing which serves both as a convenient case and to muffle the sound and in which is mounted the hollow shell A^0. This hollow shell A^0 has a central vertical chamber A′ and a pair of inverted-U-shaped chambers A^2 and A^3, arranged one on each side of the central chamber and having branches a^2, which connect with the lower end of the central chamber A′ through the bends a^0. The other branches a^3 of the U-shaped chambers extend downwardly parallel with the branches a^2 and have connected with their lower ends the inlet-pipes e' and e^2. These chambers A^2 and A^3 are otherwise closed except where they open into the central chamber A′. The central chamber A′, which is of preferably cylindrical form, is arranged with its upper end closely seated in an opening in the upper wall of the inclosing box or casing A and is closed by means of a removable screw-threaded cap or cover A^5. By removing this cap A^5 the valve may be easily removed for cleaning or for repairs.

The shell A^0 has an opening in its bottom directly below the central chamber A′, which registers with an opening A^6 in the bottom of the box or casing A, and the opening in the casing is fitted with a tubular outlet pipe or connection A^7. The opening A^6 is preferably tapered to form a seat for the main valve C, which valve is preferably of rubber. This valve, which is arranged to fit closely within the opening A^6, is mounted upon a hollow valve-stem B, which is connected at its upper end to a piston H, preferably in the form of a flanged plate or disk, as shown. The said plate or disk is provided with a central opening h^0, connecting with the passage through the said valve-stem, and is also fitted with a cock h, which is adapted to open or close a passage through the said piston H, as shown in Fig. 1.

The valve-stem B, Figs. 1 and 2, is fitted with a valve-casing b' at its lower end containing a relief-valve D. Referring particularly to Fig. 2, which shows the construction of this lower end of the valve-stem B and the arrangement of the valve-casing and valve, b' indicates a hollow tubular valve casing or section somewhat enlarged and screw-threaded onto the lower end of the valve-stem B. This section b' is provided with interior screw-threads at its lower end, into which is screwed a male section b^2. This section b^2 has a reduced and thickened neck b^3, which engages directly with the section b', and the said thickened neck b^3 of the section b^2 has its upper end formed into a seat for the valve D, which controls the lower passage from the valve-stem B. The main valve C is fitted over the neck b^3 and is retained in place by the binding effect of two sections b' b^2 when fitted together, as shown. The lower portion of the section b^2 is in the form of a skeleton frame, which constitutes a guide for the stem D′ of the air-valve D, and yet allows a free passage for the liquids to and from the opening b^4 through the neck b^3 of the section b^2. The bottom end of the valve-stem D′ is preferably provided with an enlargement or head D^0, which serves as a stop to limit the displacement of the air-valve D and also gives sufficient weight to the valve. When fitted in position, the valve-stem B, the piston H, and the connections at the lower end of the valve-stem keep the relative positions shown

in Fig. 1—that is to say, the piston H occupies the position in the upper portion of the air-chamber A′ and the main valve C fits in the opening A^6, the section b^2, which lies beneath the said stem B, and the valve-stem passing therethrough, extending through the opening A^6 into the outlet pipe or connection A^7.

The outlet pipe or connection A^7, which connects with the fixture to be flushed, is fitted with a cross shaft or spindle A^8, to which is connected an operating-arm A^4. Upon the spindle A^8 is rigidly mounted a trigger or arm a^8, arranged to engage beneath the enlarged end D^0 of the valve-stem D′ when the arm A^4 is turned for this purpose, and to thus cause the displacement of the air-valve D from its seat. The arrangement of the arm A^4 should preferably be such that when released it will fall of its own weight and turn the trigger a^8 downward out of engagement with the valve-stem, it being necessary in order to displace the valve to simply raise the handle of the arm A^4. The location of the operating-arm A^4 should be such as to render it convenient to be grasped.

The piston H should work freely, but closely, within the air-chamber A′, so as to cut off the flow of air around its periphery from the portion $A^\times$ of the central chamber A′ above said piston to the portion below, or vice versa.

F represents the water-inlet pipe, to which is connected pipes e' and e^2, which enter the lower ends of the branches a^3 of the chambers A^2 A^3, respectively. Through these pipes water is supplied to the flushing device. Water entering the chambers A^2 A^3 through these pipes will rise in the branches a^3, the air rising above it and entering the branches a^2 and the central chamber A′. When the water flows over the points a^4 and runs down the branches a^2, it will begin to rise in these branches and also in the central chamber A′, thus driving the air to the top of these chambers and compressing it there. This compression of air within the chamber A′, caused by the rising of the water therein, would tend to raise the piston M if no means were provided for the passage of the air thereby. The vent-cock h, which is provided with a plug for regulating the size of the opening therethrough, allows a portion of the air to pass through the piston H to the chamber $A^\times$, above the said piston, and thus preventing the pressure of the water entering the air-chamber A′ through the chambers A^2 and A^3 from causing the elevation of the piston and the consequent displacement of the main valve C from the outlet-opening. The water will continue to rise in the branches a^2 and central chamber A′ until the air in the tops of the chambers is compressed equal to the pressure in the water-main, at which time the water will stop flowing into the chambers, being unable to further compress the air. At this time the vertical branches a^2 of the chambers A^2 and A^3 and the central chamber A′ contain about fifty or sixty pounds of water, with the air above it compressed to the pressure of the water-main.

When it is desired to flush the fixture, the arm A^4 is turned to bring the trigger a^8 up against the bottom end of the valve-stem D′, thus first raising the air-valve D from its seat and allowing the air compressed in the upper portion of the central chamber A′ to find an outlet. As soon as the pressure in the chamber $A^\times$ is relieved the compressed air in the chambers A^2 and A^3, forcing the water against the under side of the piston H, which has a larger area than the valve C, will assist materially in raising the valve-stem B and valve C, and a continued movement of the arm A^4 in the same direction will easily open the valve C and allow the fifty or sixty pounds of water in the branches a^2 and central chamber A′ to flow through the outlet-pipe A^7, driven by its own weight and by the expansion of the compressed air in the upper part of the chambers a^2 and a^3, and this flush would take place independently of the pressure from the water-main. Even if the pipes e' and e^2 were closed the water would flow from the chamber A^0 just the same. As soon as the pressure in the chambers a^2 and a^3 begins to decrease the water from the main will begin to flow into these chambers through the inlet-pipes e' and e^2. Upon the arm A^4 being released the air-valve D will fall to its seat and will close the opening through the hollow valve-stem B to the upper side of the piston H, and the said piston and valve C will then be left free to fall. These parts will fall slowly by reason of the fact that the pressure beneath the piston-head H will tend to hold the same in its elevated position, and they will only fall as fast as the pressure above and below the piston becomes substantially equalized by the passage of air through the vent-cock h, as hereinbefore described. Fresh air will flow in past the valve C, bubbling through the outflowing water, as soon as the pressure inside falls below atmospheric pressure, and thus the system will be kept supplied with air to compensate for that let out from the part $A^\times$ of the chamber A′. As soon as the valve C closes the water entering through the inlet-pipes e' and e^2 will refill the system, as before described, thus charging the device for the next flush.

It will be noted that the piston H may be elevated quickly, as above described, by reason of the fact that the air confined in the chamber $A^\times$ above the said piston may escape by way of the opening h^0 through the hollow valve-stem B and downward into the escape-pipe A^7. In this manner it will be seen that the water will continue to flow out through the escape-pipe A^7 during the time it takes the valve-stem B and its connections to fall. The speed of these parts in falling may be regulated by adjusting the

turning-plug in the vent-cock *h* so as to insure a proper flushing of the fixture. It will furthermore be seen that by the arrangement of the water-chambers A^2 and A^3 above described a sufficient head of water is kept on hand to flush the bowl and at the same time produce enough pressure against the piston to prevent too immediate closing of the outlet-valve.

By using a central chamber A' and the inverted-U-shaped chambers A^2 and A^3 a very small, neat, and compact fixture is obtained in which sufficient water may be stored up under pressure for a powerful flush and in connection with which a very small inlet-pipe may be used. Another advantage of this fixture is the ease by which the valve may be removed for cleaning by simply removing the screw-cap A^5, which is directly above the valve.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a flushing device, the combination with a downwardly-inclined pipe or chamber, and means for supplying water under pressure to same, of a cylindrical air-chamber opening into said downwardly-inclined chamber near its base and provided with an opening at its bottom and a valve-seat, a piston mounted in the upper part of said air-chamber with a restricted air-passage therethrough, a hollow valve-stem opening upward through said piston, a main valve connected to said valve-stem, an air-valve carried by said main valve and adapted to release compressed air through said hollow valve-stem, and means operated by hand for temporarily lifting said air-valve, and thus releasing compressed air through said hollow valve-stem, substantially as described.

2. In a flushing-tank, the combination with an air-chamber; of inclined water-chambers connecting near their base with said air-chamber, the said air-chamber having an outlet-opening in its bottom; of a piston mounted in the upper part of said air-chamber, said piston having a restricted air-passage therethrough, a hollow valve-stem connected to the said piston, and opening therethrough, a closed valve-chamber at the lower end of said valve-stem, an air-valve mounted in the said valve-chamber, the main valve carried by the said valve-stem, means operated by hand for displacing the said air-valve, and a water-supply connection with the said water-chambers, substantially as described.

3. In a flushing-tank, the combination with an air-cylinder having a discharge-opening in its bottom, inverted-U-shaped water-chambers connected with the bottom of said air-cylinder and a water-supply connection with the said chambers, of a main valve for closing the said discharge-opening, a hollow valve-stem connected to the said valve and provided with a chamber therein, an air-valve in the said chamber, and a piston mounted upon the said hollow valve-stem, said piston having a vent-opening communicating with the passage through said hollow valve-stem, a vent-cock arranged to control the passage of air from one side of the said piston to the other, and external means for operating said air-valve, substantially as described.

4. In a flushing-tank, the combination with an air-chamber having an outlet in its bottom, of a hollow valve-stem in said chamber, a piston having a restricted air-passage therethrough, mounted on one end of said valve-stem and working in the upper part of said air-chamber, a main valve mounted near the other end of said valve-stem and controlling the opening through the said outlet, an air-valve carried by the lower end of said valve-stem and acting to control the passage of air through said valve-stem, means for operating said air-valve, a water-chamber in the form of a stand-pipe opening near its lower end into the lower end of said air-chamber, a second stand-pipe, and a water-supply pipe connected thereto, the first of said stand-pipes receiving the overflow-water from the second, substantially as described.

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

JOHN W. SNIDER.

Witnesses:
M. J. KANE,
H. ECKELMANN.