No. 667,951. Patented Feb. 12, 1901.

W. J. PINE.

FLUSHING VALVE.

(Application filed Mar. 12, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

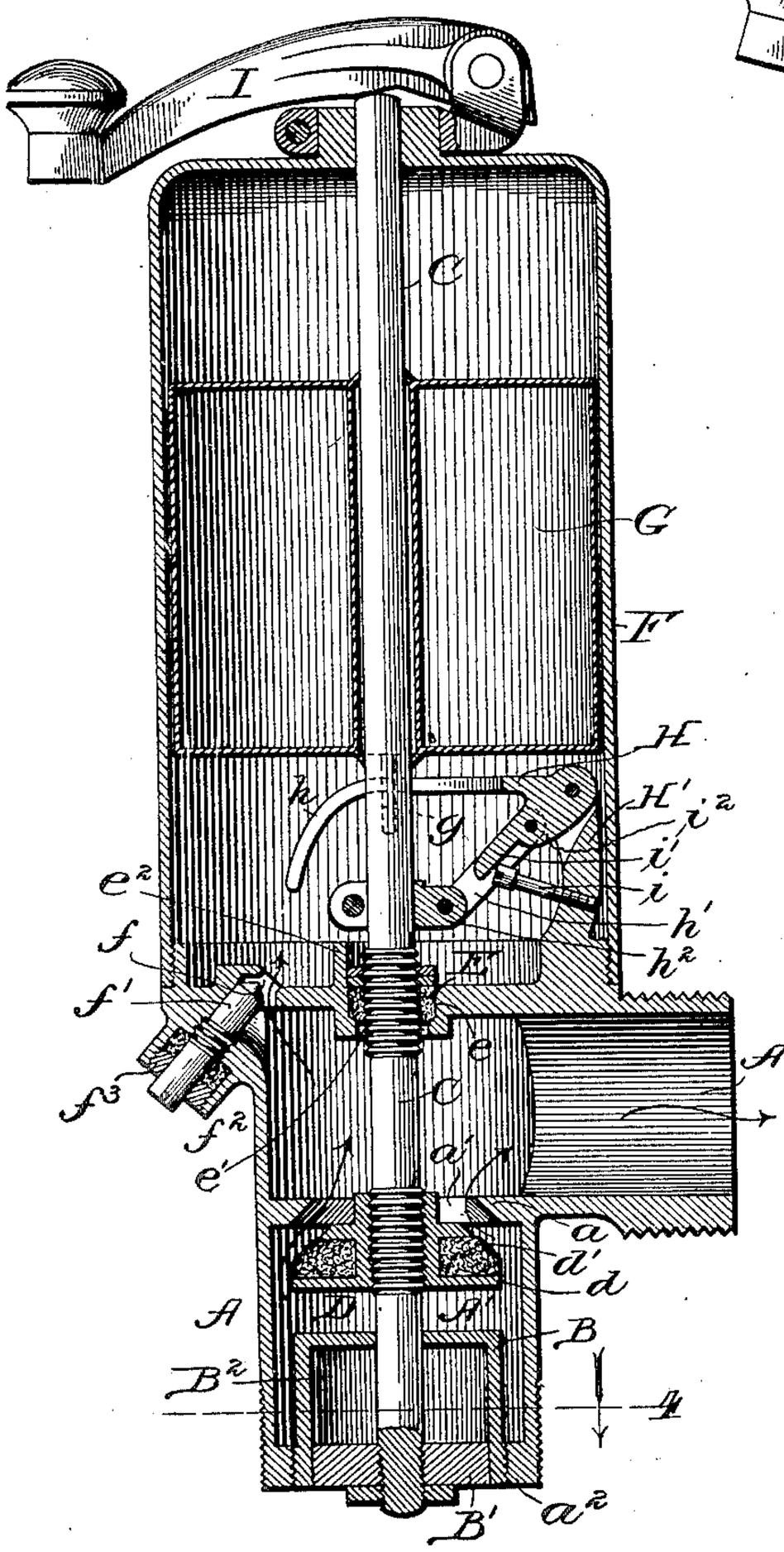
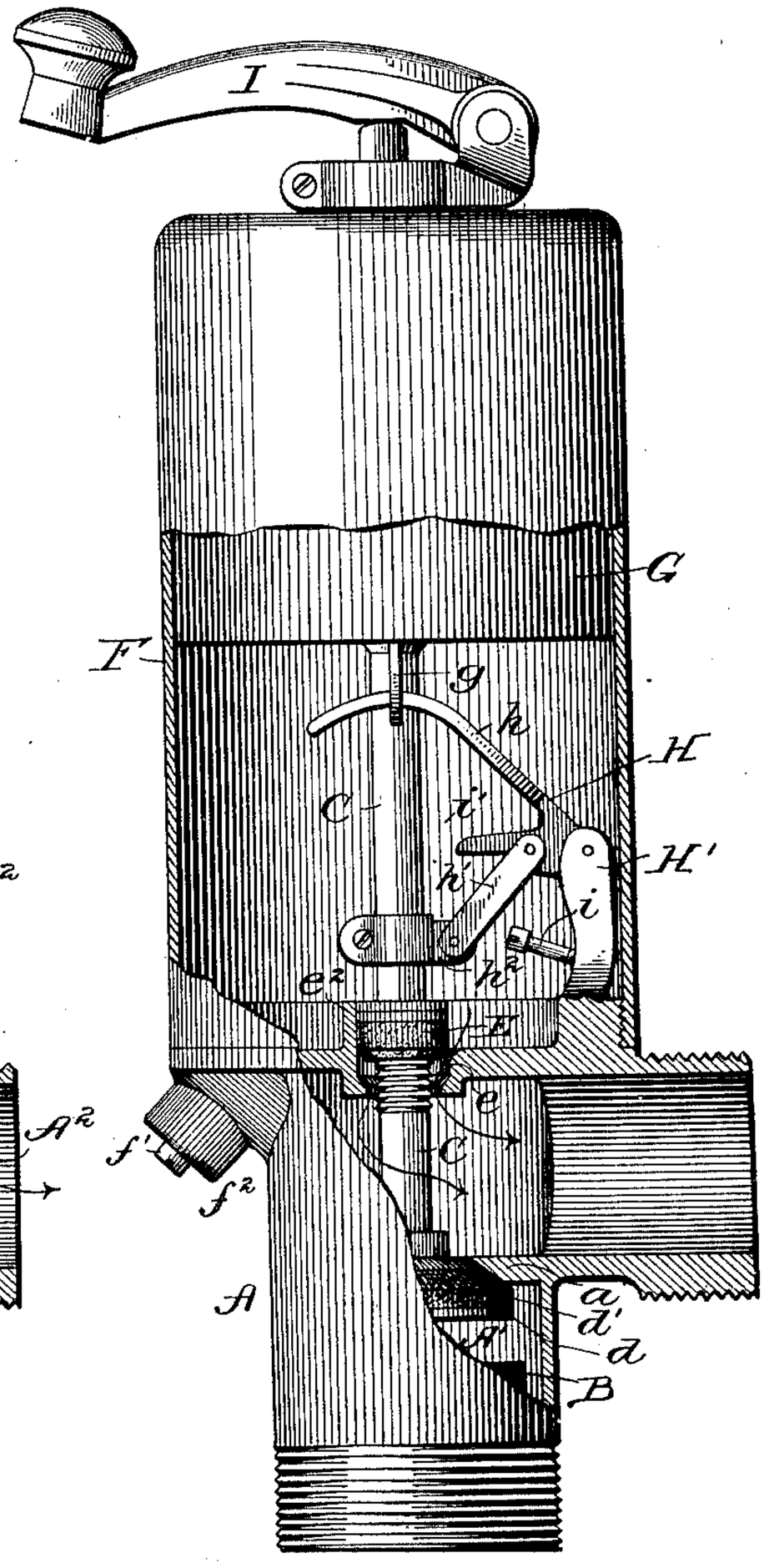


Fig. 2.



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

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Fig. 3.

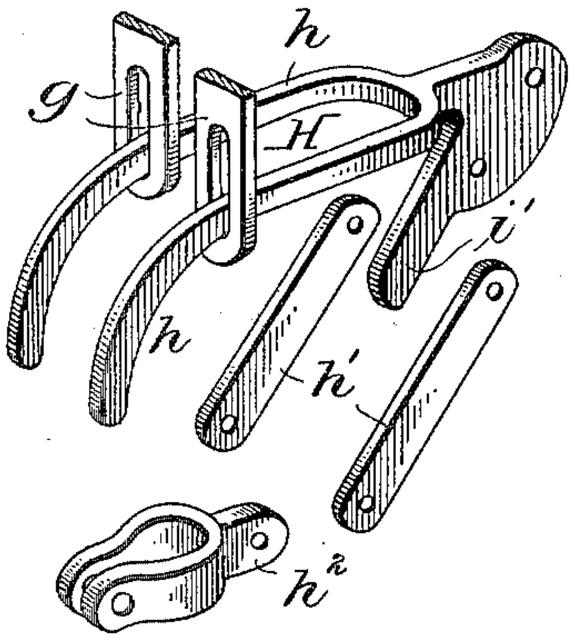

Fig. 4.

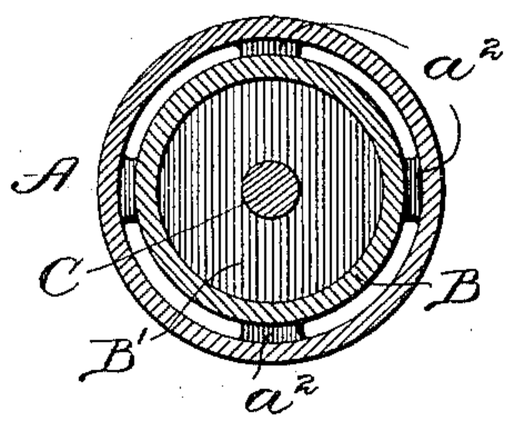

Fig. 5.

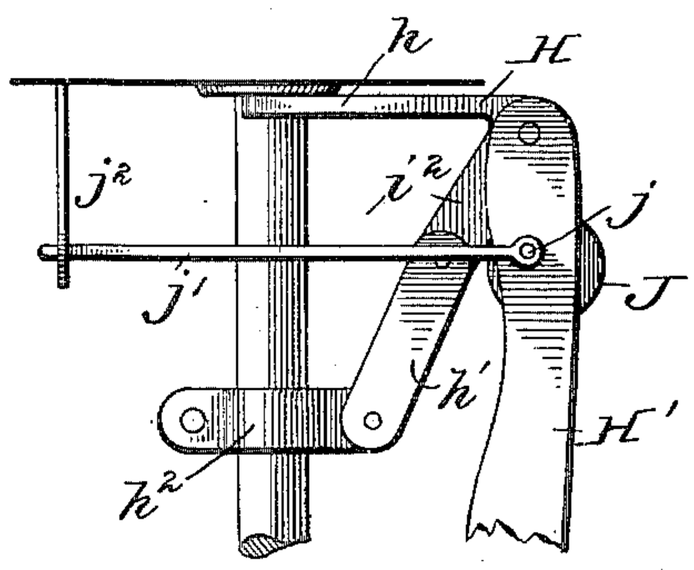

Fig. 6.

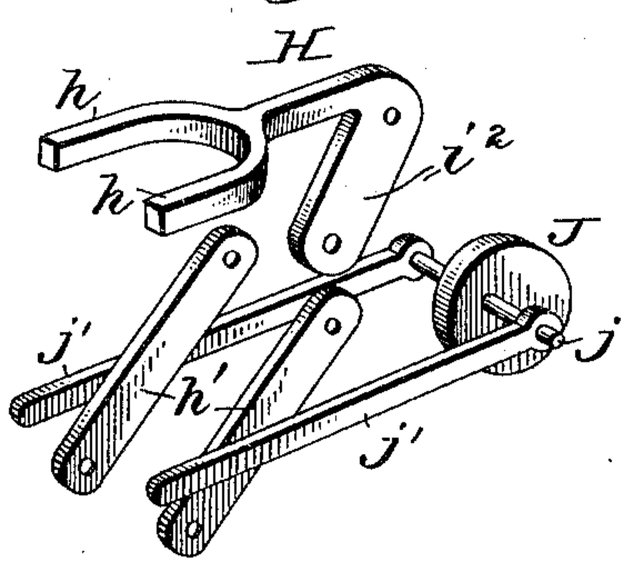

Fig. 7.

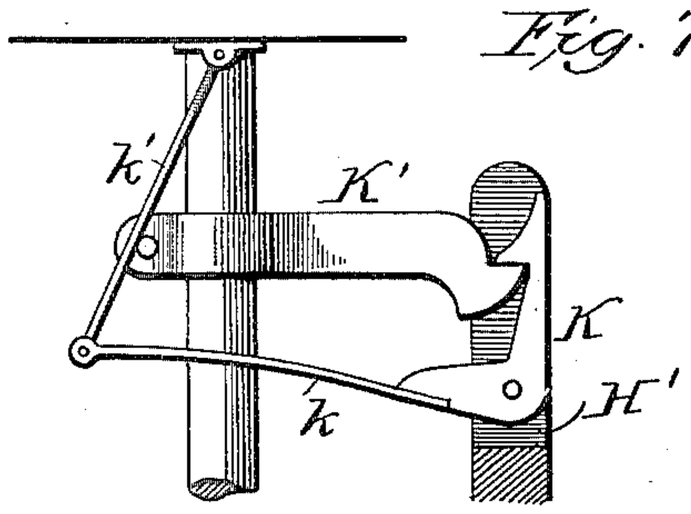

Fig. 8.

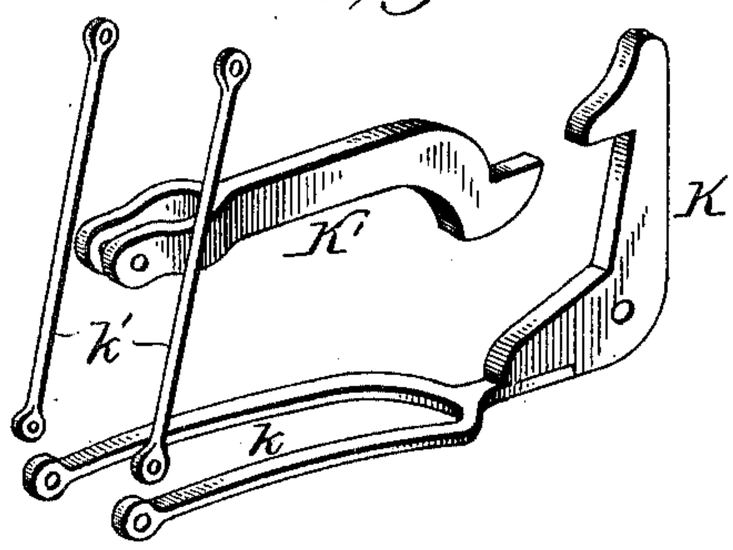

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Fig. 9.

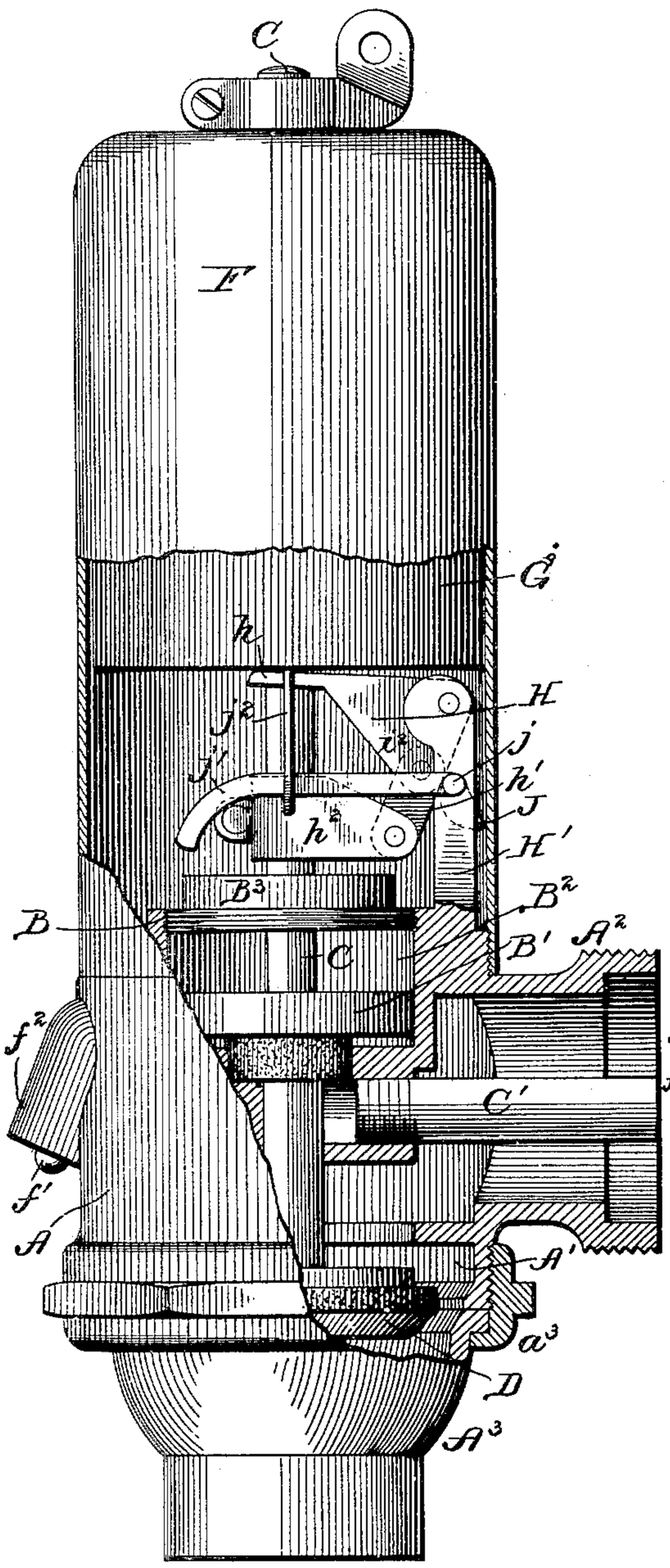
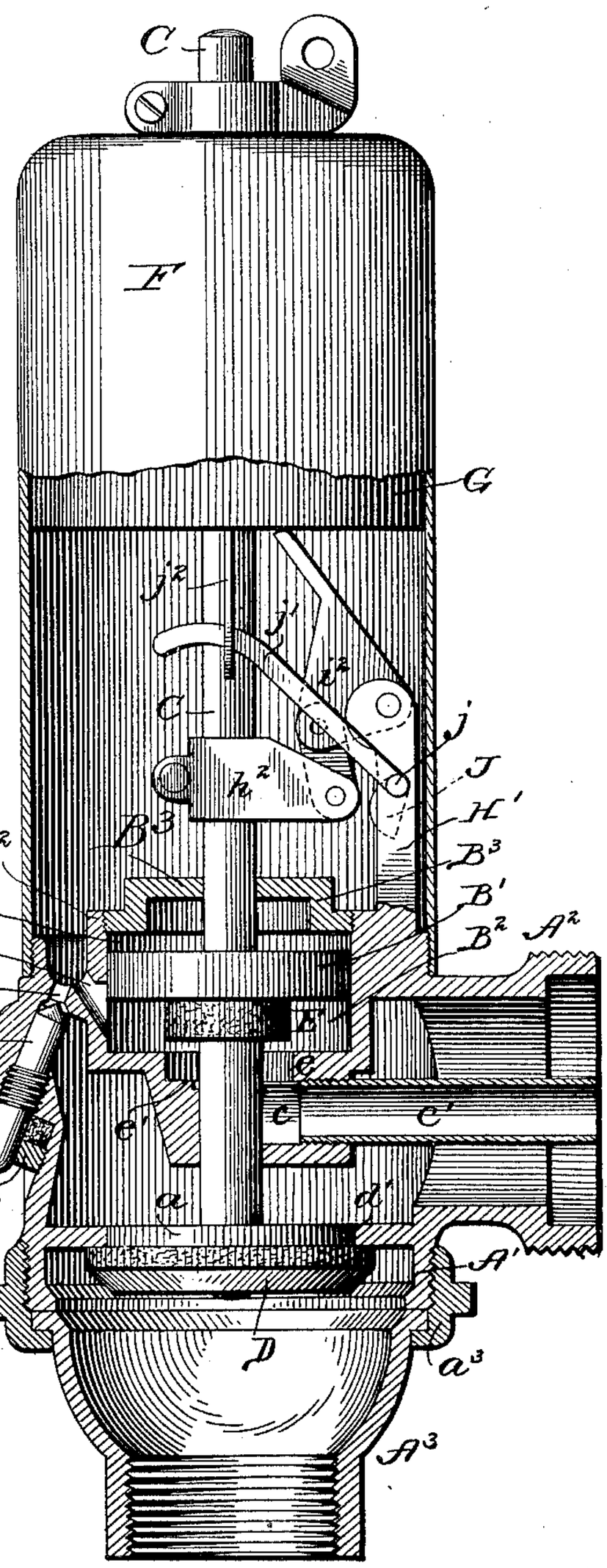


Fig. 10.



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

UNITED STATES PATENT OFFICE.

WILBER J. PINE, OF OSHKOSH, WISCONSIN, ASSIGNOR OF ONE-HALF TO L. FRANK GATES, OF SAME PLACE.

FLUSHING-VALVE.

SPECIFICATION forming part of Letters Patent No. 667,951, dated February 12, 1901.

Application filed March 12, 1900. Serial No. 8,343 (No model.)

To all whom it may concern:

Be it known that I, WILBER J. PINE, a citizen of the United States, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Flushing-Valves, of which the following is a specification.

The object of my invention is to provide a simple and efficient valve for flushing water-closets or other places where flushing is required; and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved flushing-valve; Fig. 2, an elevation, partly broken away, showing the upper disk open and the lower disk closed; Fig. 3, a perspective detail of the release and lock for the valve-stem, showing the parts separated; Fig. 4, a cross-section taken on line 4 of Fig. 1 looking in the direction of the arrow; Fig. 5, a detail showing a modification in the support and lock for the same; Fig. 6, a detail in perspective of the parts shown in Fig. 5, separated; Fig. 7, a detail showing a modification in the lock for the valve-stem; Fig. 8, a detail in perspective of the parts shown in Fig. 7; Fig. 9, a side elevation with the shell or casing partly broken away, showing the parts in position with the induction-passage open and showing a modification of the construction, arrangement, and location of the cushioning piston-chamber; and Fig. 10, a sectional elevation of the lower portion of the valve, showing the construction of Fig. 9 with the induction-passage closed and the relief-passage open from the float-chamber.

In constructing my improved flushing-valve I provide a casting or shell A, having an inlet or induction passage A′ and an outlet or eduction passage A^2. The shell around each of the passages has a wall or rim screw-threaded for the attachment of the valve to the supply and discharge pipes. The induction and eduction passages are separated by a wall having an opening a', and the mouth of the induction-passage has inwardly-projecting screw-threaded lugs a^2.

A casing B is screw-threaded into the lugs a^2, forming a chamber in which is located a piston B′, to which is secured the valve-stem C. The piston and its chamber furnish a cushion to prevent the main disk from being closed too forcibly. The main disk D, as shown, is formed of a metal portion d and a packing d', the packing seating against the edge of the opening a' in the wall a when the disk is closed. In the construction shown the main disk is screw-threaded onto the valve-stem C, so as to be adjustable thereon for properly seating the disk. The valve-stem also carries a second disk E, oppositely faced to the main disk D, which disk, as shown, is also screw-threaded onto the stem and is adjusted and held in position by nuts or otherwise. This second disk enters an opening e in the outer wall of the main shell and seats against a flange at the bottom of the opening, so as to close a port e', and, as shown, a guide and support against lateral pressure on the valve-stem is furnished by an annular rim or wall e^2, partially encircling the same and against which the faces of the adjusting and locking nuts bear in the movements of the valve.

A cylinder or shell F is screw-threaded onto the outer wall of the main shell or casing, forming a float water-chamber for the admission of water thereinto when the main disk is open, such admission being through a port f in the wall of the main casing. The port f is regulated and controlled as to the amount of water passed, in the construction shown, by a valve f', entered through a screw-threaded hole in the main shell or casing, which valve, as shown, is nicked at its outer end for the reception of a screw-driver or other tool, by means of which the valve can be advanced and receded to decrease or increase the size of the opening through the port f for the passage of water. The outer end of the valve is encircled by a rim or wall f^2, forming a packing-box for the reception of a suitable packing compressed by a screw-threaded plug f^3, so as to always insure a tight joint around the valve, which is of course necessary to prevent leakage in adjusting the valve.

The float water-chamber formed by the casing F has located therein a float G, which is loosely mounted on the valve-stem and free to rise and fall in the chamber. As shown in Figs. 1 to 3, the bottom of the float has secured thereto slotted pendants or lugs g, through the slots of which pass arm h of a lever H, forming one portion of a knuckle-joint

connection. The lever H is pivoted to a standard H′, extending up from the wall of the main shell or casing, and has pivoted thereto two links h', one on each side, which links in turn are pivoted to a collar h^2, secured around the valve-stem C. The lever H, with the links h' and collar h^2, constitutes a knuckle-joint connection and furnishes a lock for the valve-stem. The knuckle-joint connection should be free to break upward with the upward movement of the float, which releases the lock, and for this reason the pivots of the link to the valve-stem and to the releasing-lever and of the releasing-lever to its standard when the stem is pushed inward to open the valve should be in line, or approximately so, for the weight of the float when down to hold the stem and its disk against outward movement. The limit of the throw of the knuckle-joint downward should not be sufficient to produce a lock by the passing of the pivots beyond the dead-center that would not be released with the upward movement of the float to act on the releasing-lever, and to regulate and control the downward movement of the knuckle-joint, and from it the downward movement of the float, an adjusting-screw i is provided, that engages a stop i' on the lever H, limiting the point of descent or downward movement of the lever and link and the passing of the pivots beyond the dead-center, leaving the parts locked against a too-far-downward movement of the float and bringing the knuckle-joint connection in position to be readily released and have a free movement in an upward direction when the float rises.

The shell or casing F has mounted on its end a lever I, arranged to contact with the end of the valve-stem for moving such stem to open the disk D and close the disk E, opening the main supply for flushing purposes and closing the discharge from the float-chamber, and at the same time allow the main supply to pass through the port f into the float-chamber.

The operation is as follows: When it is desired to flush the basin, the lever I is pressed down, forcing down the valve-stem to open the disk D and close the disk E, which movement also carries the piston at the end of the stem downward. The water-supply for flushing purposes passes into the induction-passage A′ through the openings around the casing B and enters the eduction-passage through the opening or port a'. This supply passes out through the eduction-passage to the basin, and a proportionate quantity thereof, regulated by the valve f', passes through the port f and rises in the float-chamber, causing the float to rise. The upward movement of the float raises the lever H, releasing the knuckle-joint connection, so that the pressure entering the induction-passage strikes the bottom of the disk D, raises the disk, closes the opening a', and shuts off the supply to the eduction-passage and basin. The upward movement of the valve-stem lifts the disk E from its seat, opening the port or passage e' for the water in the float-chamber to discharge therefrom through the port into the eduction chamber and passage to flow out therethrough to the basin, thus relieving the float-chamber of the water and bringing the parts into position for the next operation of flushing, which operation is accomplished by again forcing down the valve-stem to open and close the respective disks. The upward movement of the valve-stem carries with it the piston B′, and such piston is forced against the water in the chamber of the casing B, the water furnishing a cushion to prevent any jar or concussion from the return of the stem and seating of the disk and allowing the disk to close gradually and only as the water escapes from the chamber surrounding the piston. As will be seen the main supply of water for flushing purposes also furnishes means for automatically operating the parts to shut off the supply through the medium of the float, and this automatic operation can be regulated as desired by simply adjusting the valve f' to admit more or less water to the float-chamber, thereby regulating the period and the amount of water for flushing.

The knuckle-joint connection forms a lock for holding the main disk open until the flushing is completed, which is determined by the release of the lock with the rise of the float. This lock instead of being of the construction shown in Figs. 1 to 3 can be of any suitable form of construction that will furnish a releasable lock by the rise of the float. A modified form of lock for this purpose is shown in Figs. 5 and 6, in which the lever H is forked and the float rests directly on the arms h of the fork. An eccentric or releasing cam J is mounted in the support or standard H′ and has secured to its pivot j arms which extend out and are connected with pendants j^2 from the bottom of the float. The rise of the float lifts the arms j' and rocks or oscillates the eccentric to engage the trip end i^2 of the lever H and lift the knuckle-joint, so that it passes the center free to rise, as in the arrangement shown in Figs. 1 to 3.

Another form of lock connection is shown in Figs. 7 and 8. A pivoted latch or catch K is mounted on the upright or standard H′ and is arranged to engage an arm K′, secured to the valve-stem. The latch has secured thereto arms k, which are connected with the bottom of the float by links k', so that with the upward movement of the float the links and arms will turn the catch or latch K and disengage it from the arm K′ for the pressure of the supply on the disk D to operate the parts and close the disk D and open the disk E, as already described. It is to be understood that the float acts to resist the pressure of the main disk only to the extent that its weight serves to hold the knuckle-joint connection in line to prevent the upward movement of the valve stem and disk to close the induc-

tion port or passage. Its office is to furnish a means by which the pressure of the water entering the float-chamber through the port *f* and acting on the bottom of the float will cause the float to rise and break the lock of the knuckle-joint, permitting the pressure to act on the valve-disk and close the induction port or passage. The float is not intended to open the valve against the pressure of water thereon, as such opening is from the lever I when forced downward, pushing the stem C downward or inward to open the disk D. The float never acts and could not act to open the main disk, as its only office is to retain the knuckle-joint in lock when the float is down and to release the knuckle-joint from its lock as the float rises.

The cushioning-piston and its chamber for holding the main disk against too-rapid return in closing instead of being located in the induction-passage of the main shell or casing could be otherwise located. A location for this chamber and its piston is shown in Figs. 9 and 10 as on the upper side of the main shell or casing and surrounded by the chamber of the float. In this arrangement the casing B is formed with the body of the main shell or casing, so as to inclose the cushion or liquid-pressure chamber B^2, in which is located the piston B′, attached to the reciprocating stem.

The cushion-chamber has communication with the float-chamber by means of a passage or port *b*, and in communication with the discharge-port *e*, which in the construction shown is located in the bottom of the cushion-chamber, is a chamber or passage *c*, which communicates with a discharge-pipe *c′*, leading out through the eduction-passage.

The operation, so far as cushioning effect is concerned, is precisely the same as described for the same parts in the construction of Figs. 1 and 2, except that the water to supply the resistance comes from the float-chamber and passes through the opening or port *b* into the cushion or pressure chamber and thence up around the edge of the piston to lie above the piston and by its slow discharge hold the main disk against rapid and quick closing. The piston or cushion chamber in the construction of Figs. 9 and 10 is open at the top and closed by a screw-threaded cap B^3, through which the valve-stem passes. This arrangement, it will be seen, leaves the induction-passage free from obstruction and so that the inflow of water will not be checked, and, as shown, the induction portion A^3 of the main casing is a separate piece attached to the neck A′ by means of a screw-threaded locking and retaining band a^3.

The valve as a whole in either form of construction and arrangement is to be attached as hereinbefore described, and its operation is in both cases the same so far as concerns controlling the inlet and outlet of the water for flushing purposes.

The principal advantages of my invention are that it eliminates the ordinary flushing-tank, that it can be connected up to a direct water-pressure, that it is self-regulating as to the quantity of water admitted for flushing purposes after its first adjustment and use, and that it is always certain and noiseless in operation.

I claim—

1. The combination, in a flushing-valve, of a float-chamber, a valve-stem, a float encircling the valve-stem, a regulated water-supply for raising the float, and a locking connection for the valve-stem released by the rise of the float from the inflow of water, substantially as described.

2. The combination, in a flushing-valve, of a stem carrying a controlling-disk for the induction water-passage, a lock for the stem, a float-chamber, a rising and falling float releasing the lock for the stem, and a regulated port supplying water to the float-chamber for raising the float to release the lock, substantially as described.

3. The combination, in a flushing-valve, of an eduction-compartment, a float-chamber, a regulating-valve between the eduction-compartment and the float-chamber and a float raised by a portion of the water diverted during the period of flush into the float-chamber for raising the float and permitting the shutting off of the inflow, substantially as described.

4. The combination, in a flushing-valve, of a float-chamber, a float in the chamber, a diverted water-supply from the inflow entering the float-chamber and raising the float, and a lock for the controlling-disk of the inflow, released by the rise of the float and automatically stopping the inflow of water, substantially as described.

5. The combination, in a flushing-valve, of an eduction-chamber receiving a supply of water thereinto, a disk controlling the water-supply, a float-chamber, a valve-controlled port leading from the eduction-chamber to the float-chamber, a float in the float-chamber, and a locking connection for the disk released by the rise of the water against the float, substantially as described.

6. The combination of a main shell or casing having an induction-passage and an eduction-passage, a reciprocating stem, a disk carried by the stem opening and closing the induction-passage, a second disk carried by the stem, a float-chamber mounted on the main shell or casing and having a regulated supply from the main supply and having a discharge controlled by the second disk of the stem, a float in the chamber, and a connection for the stem released by the rise of the float, substantially as described.

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