No. 753,174. PATENTED FEB. 23, 1904.

J. H. SMITH.

FLUSHING APPARATUS FOR WATER CLOSETS, &c

APPLICATION FILED DEC. 31, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

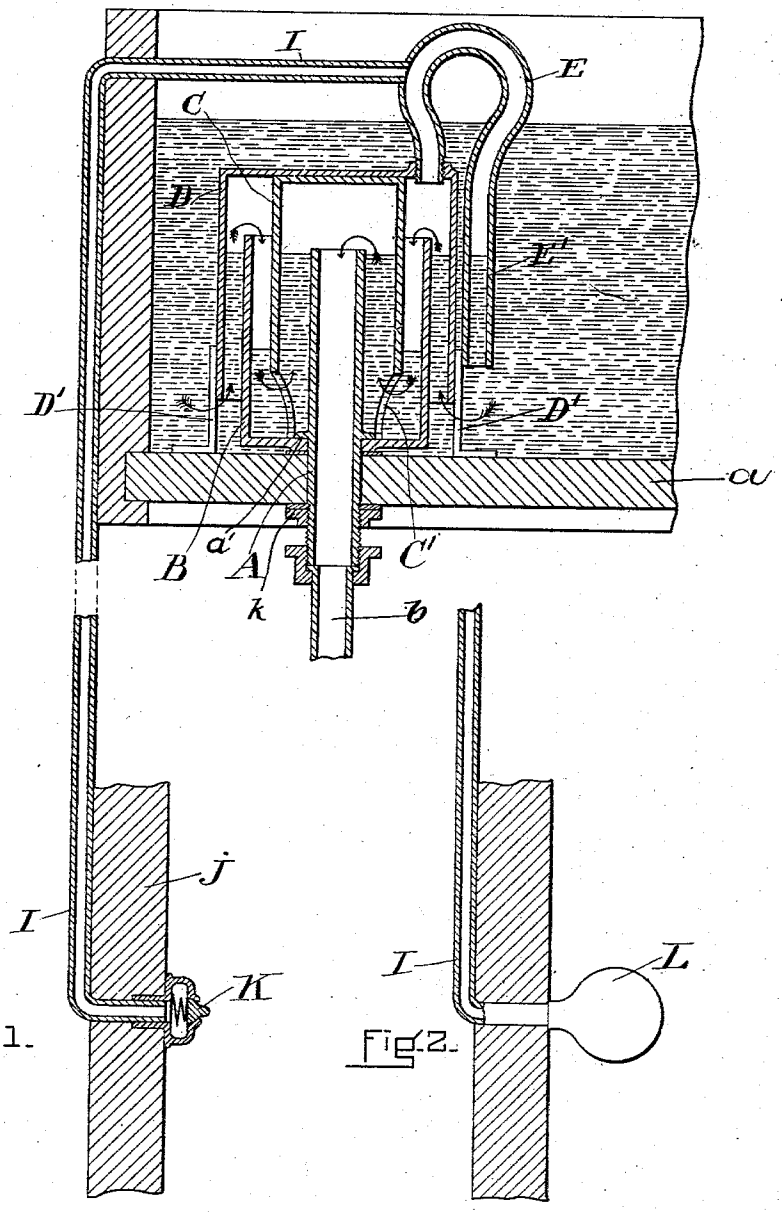


Fig. 1.

Fig. 2.

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

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

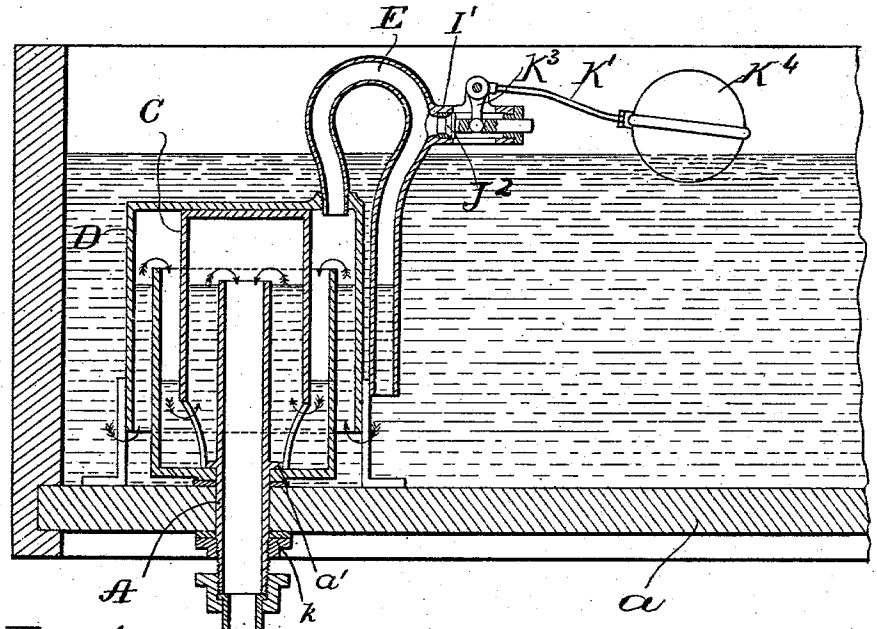


Fig. 4.

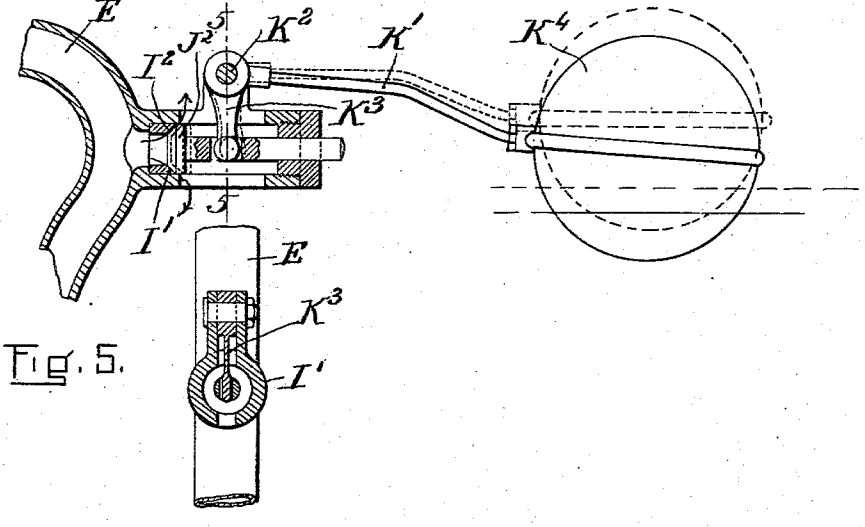


Fig. 5.

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No. 753,174. Patented February 23, 1904.

UNITED STATES PATENT OFFICE.

JOHN H. SMITH, OF REVERE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO GEORGE R. SACKETT, OF REVERE, MASSACHUSETTS.

FLUSHING APPARATUS FOR WATER-CLOSETS, &c.

SPECIFICATION forming part of Letters Patent No. 753,174, dated February 23, 1904.

Application filed December 31, 1902. Serial No. 137,236. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. SMITH, of Revere, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Flushing Apparatus for Water-Closets, &c., of which the following is a specification.

This invention has for its object to provide for use in supply-tanks for water-closet-flushing purposes a discharge-controlling device or valve which, while simple and inexpensive, is durable, has no movable parts, and therefore is not liable to get out of repair, and is certain in its operation.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical sectional view of an apparatus embodying my invention. Fig. 2 represents a view similar to a portion of Fig. 1, showing a modification. Fig. 3 represents a sectional view showing automatic means for opening and closing the air-outlet valve. Fig. 4 represents an enlargement of a portion of Fig. 3. Fig. 5 represents a section on line 5 5 of Fig. 4.

In the drawings and referring first to Figs. 1 and 2, *a* represents an ordinary supply tank or cistern, and *b* is the flush-pipe, which extends down to the closet. A is a stand-pipe extending up vertically from the flush-pipe into the tank and centrally into a preferably circular cup B, which is rigid with said pipe A and whose upper end is open and preferably somewhat higher than the upper end of the pipe A. D represents a fixed inverted vessel or bell larger in diameter than the cup B. This bell is rigidly supported by any suitable means, such as feet D′, affixed to the bell and to the bottom of the tank, the feet being separated from each other by open spaces. C is an inverted hood or trap, which is smaller in diameter than the cup B, is open at its lower end, and rests on the floor of the cup B, the said hood being located within the bell D. The upper end of the hood C is considerably higher than the open upper end of the cup B, and the lower portion of the hood C is cut out, and thus provided with passages C′, so that the hood, as here shown, rests on feet between the said passages or openings and is not attached to the bell. Secured to and extending through the upper end of the bell D is a curved tube E, which preferably extends a considerable distance above the bell and is then bent downward into the leg E′, which is open at its lower end and is below the high-water level in the tank. The tube E constitutes an air-inlet adapted to admit air to the bell to break the siphon, as hereinafter described. The stand-pipe A constitutes the longer leg of a siphon, the shorter leg of which is the annular space between the cup B and bell D. The upper portion of the bell above the cup B constitutes an air-chamber adapted to contain a cushion of air, which normally obstructs the crown of the siphon and prevents liquid from flowing through the same. The hood or trap C prevents communication between said air-chamber and the stand-pipe. I represents an air-outlet composed of a tube which communicates at its upper end with the upper portion of the air-chamber in the bell, the tube I being here shown as connected with the air-inlet tube E. The lower end of the outlet tube I may be located at any convenient point—for example, in a wall J at one side of or behind the water-closet seat. The lower end of the tube I is normally closed by a valve K, which may be held closed by a spring and provided with a push-knob or projection, whereby it may be opened. Prior to the flushing operation the water in the tank is above the upper end of the stand-pipe and above the lower end of the air-passage E E′. An air-cushion is now confined in the bell D and obstructs the crown of the siphon, so that no water can flow over the upper edge of the cup B. When the valve K is opened, enough air is permitted to escape from the air-chamber to permit the water to rise in the shorter leg of the siphon and flow over the upper edge of the cup B and to the stand-pipe through the hood C. A siphonic flow is thus started, which continues after the release and closing of the valve until the water in the tank falls below the lower end of the air-inlet E E′, and thus opens the air-chamber to the atmosphere, whereupon the water falls in the shorter leg and the siphon is broken. When the water again rises in the

tank, it seals the lower end of the air-passage, and thus causes the formation of another air-cushion in the crown of the siphon. The stand-pipe A is preferably externally screw-threaded at its lower portion to engage the coupling member which connects it with the pipe *b*. Above the threaded portion the stand-pipe is provided with a flange *a'*, which coöperates with a clamping-nut *k* in securing the stand-pipe to the bottom of the tank, the flange *a'* being above and the nut *k* below said bottom. The flange *a'* is preferably utilized also as a means for clamping the bottom of the cup B against the bottom of the tank. It will be seen, therefore, that provisions are made for conveniently applying the stand-pipe and the parts coöperating therewith to a tank and to the pipe leading from the tank to the closet. The air-inlet tube E E' constitutes a convenient means for breaking the siphon when the desired quantity of water has been discharged. The upward extension of the tube above the bell D adds to the area of the air-chamber and also makes the tube so flexible that it may be bent to raise or depress its lower end, thus decreasing or increasing the quantity of water that escapes during each operation, the tube or air-passage being therefore adjustable. The lower end of the tube or air-passage E E' must, however, be located at a point above the plane of the lower edge of the bell D, so that the siphon will be broken before the water subsides to the level of said edge. The adjustment of the lower end of said air-passage, as above described, enables the amount of siphonage before breaking to be determined according to the needs of the particular place to be flushed or the wishes of the party installing the device. The upward extension of the flexible pipe E above mentioned enables the adjustment of its lower end to be made without breaking the continuity of said pipe.

It will be seen that the air-outlet tube I and its normally closed valve K constitute a simple, durable, effective, and noiseless means for starting the flushing flow through the siphon. Said tube may be wholly concealed, so that, if desired, the only part of the flow-starting mechanism that is visible will be the valve-casing and push-piece, or, if desired, the casing may be entirely concealed, only the push-piece being visible. The push-piece may be located in the floor, so that it may be operated by foot-pressure.

The described apparatus is extremely simple, having no movable parts, (the valve K excepted.) Hence it is very durable and effective and is not liable to get out of order.

My invention is not limited to the details of construction and the particular form of siphon here shown and may be embodied in various other forms.

It will be seen that the air-outlet tube I and its valve K constitute a means for decreasing the pressure of the air in the air-chamber in the bell D by permitting the escape of air therefrom. I may, however, provide for a more rapid decrease of pressure in said chamber by exhausting the air or facilitating its withdrawal therefrom, and to this end I may connect with the air-tube I an air pump or exhausting device in place of the valve K and its casing. Said exhausting device may be a resilient bulb L, such as is employed in a syringe or in a bicycle-alarm, the bulb being connected with the tube I and provided with suitably-arranged valves which permit the escape of air from the bulb when the latter is compressed and enable air to be drawn from the tube I and from the air-chamber by the expansion of the bulb.

In Figs. 3 and 4 I show instead of the outlet-tube I extending to a point remote from the tank *a* a relatively short outlet-tube I', which is wholly contained within the tank and is provided at its inner portion with a valve-seat I^2. Within the outlet-tube I' is a valve J^2, adapted to close on the seat I^2. K^4 represents a float attached to a lever K', which is pivoted at K^2 to ears on the outlet-tube I' and has a short arm K^3 engaged with the stem of the valve J^2. The arrangement of the parts above described is such that when the water in the tank A rises above a given height it raises the float K^4 sufficiently to cause the lever to separate the valve J^2 from its seat, thus opening the outlet-tube I' and permitting air to escape from the air-chamber in the bell, whereupon the flushing flow of water commences. The subsidence of the water in the tank gradually lowers the float K^4 until the valve J^2 is again closed, thus stopping the flushing flow.

I claim—

1. A flushing apparatus comprising a siphon having an air-chamber in its crown communicating with the upper end of its shorter leg and sealed against communication with the longer leg, an air-outlet for permitting the escape of air from said chamber to start the siphon, a tube communicating with said air-outlet and capable of being bent and extending from said crown above the same and down to a point above the entrance to said siphon to break the siphon, and a valve controlling the outlet of air from said pipe.

2. A flushing apparatus comprising a siphon having an air-chamber in its crown communicating with the upper end of its shorter leg and sealed against communication with the longer leg, an air-outlet for permitting the escape of air from said chamber to start the siphon, a valve controlling said outlet, and an air-inlet opening at one end into the upper portion of said chamber, said air-inlet comprising a tube extending upward from said crown and down to a point above the entrance to said siphon, said tube being adjustable to vary its lower end relatively to the entrance to the siphon.

3. A flushing apparatus comprising a stand-

pipe adapted for attachment to a supply-tank and constituting the longer leg of a siphon, a fixed cup surrounding the upper end of the siphon, a fixed bell surrounding and extending above the cup, the space between the bell and cup constituting the shorter leg of the siphon, while the upper portion of the bell constitutes an air-chamber adapted to confine a cushion of air in position to obstruct the crown of the siphon, a hood or trap preventing communication between the said air-chamber and the stand-pipe, an air-outlet communicating with the air-chamber, a valve controlling said outlet, and a flexible tube extending upward from the top of the bell and down to a point above the lower edge of said bell to break the siphon.

4. A flushing apparatus comprising a tank, a siphon having an air-chamber in its crown communicating with the upper portion of its shorter leg and sealed against communication with the longer leg, a tube extending upward above the top of the bell and then downward below the high-water level in the tank, an air-outlet for permitting the escape of air from said tube to start the siphon, a valve controlling said outlet, and automatic means for opening and closing said valve.

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

JOHN H. SMITH.

Witnesses:

GEORGE R. SACKETT,

C. F. BROWN.