

(No Model.)

R. MORGAN.
SIPHON FOR WATER CLOSET TANKS.

No. 475,512.

Patented May 24, 1892.

Fig. 1

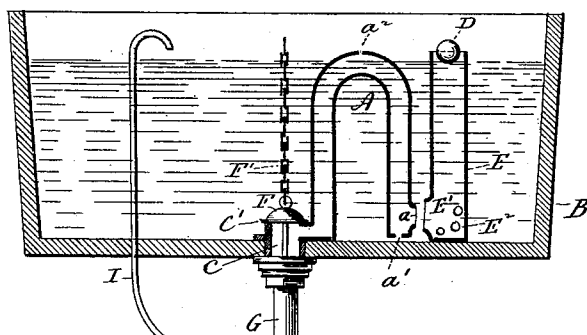


Fig. 6

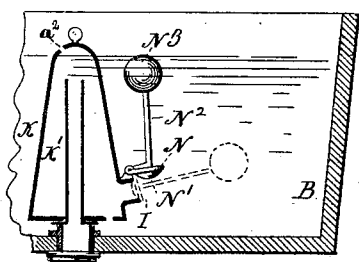


Fig. 2

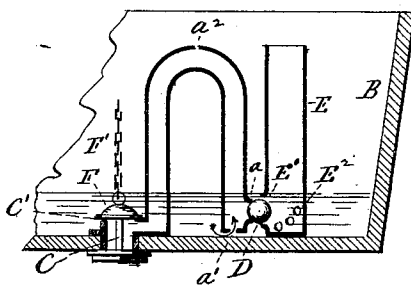


Fig. 3

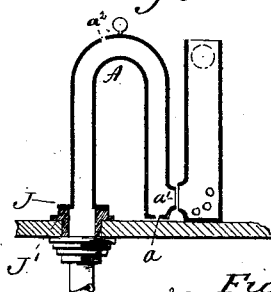


Fig. 4

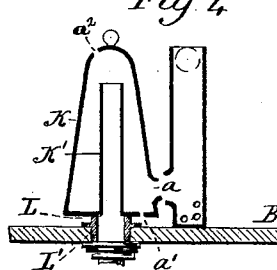
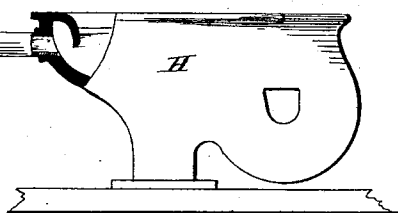
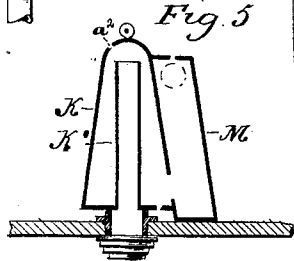


Fig. 5



Witnesses
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SIPHON FOR WATER-CLOSET TANKS.

SPECIFICATION forming part of Letters Patent No. 475,512, dated May 24, 1892.

Application filed May 18, 1891. Serial No. 393,138. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MORGAN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Siphons for Water-Closet Tanks; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view, partly in elevation and partly in vertical section, of the tank and bowl of a water-closet provided with a siphon constructed in accordance with my invention; Fig. 2, a broken view showing the action of the free ball-valve in closing the large inlet-opening of the siphon. Figs. 3, 4, 5, and 6 are modified forms which my invention may assume.

My invention relates to an improvement in siphons for water-closet tanks, the object being to produce a simple and reliable device, noiseless in its action, and securing the proper after-filling of the bowl of the closet.

With these ends in view my invention consists in the combination, with a tank, of a siphon having its short branch or leg constructed with a large and a small inlet-opening and a valve controlled by the water and adapted to close the large opening when the water in the tank has been nearly drawn off, so that the small opening is compelled to feed the siphon alone, the said large opening being a lateral opening and located in a vertical or substantially vertical plane.

My invention further consists in the combination, with a tank, of a siphon having its short branch or leg constructed with a large and a small inlet-opening, a free ball-valve floated upon the water in the tank, and a cage having a lateral opening for the said valve, whereby the same is directed to the large opening, which it closes when the water in the tank has been nearly drawn off, and thus compels the small opening to feed the siphon alone, the said large opening being a lateral opening and located in a vertical or substantially vertical plane.

My invention further consists in certain details of construction and combinations of

parts, as will be hereinafter described, and pointed out in the claims.

As shown in Fig. 1 of the drawings, the large inlet-opening *a* and the small inlet-opening *a'* of the siphon are formed in the free end of a neck constituting in effect the short branch or leg thereof and rigidly secured by its opposite end to the bottom of the tank B, which may be of any approved size and construction, the said fixed end of the neck opening into a valve-chamber C, mounted in the bottom of the tank. It will be observed that the small inlet-opening *a'* is located below the level of the large inlet-opening *a*, and this is for the reason that the small opening is designed to draw off the water when it gets very low in the tank. As herein shown and preferably, the said large and small openings are respectively arranged in vertical and horizontal planes. A free ball-valve D, adapted in size to fill and close the large opening and constructed to float upon the water, is guided so as to be brought into the range of the suction caused by the action of the siphon by means of an upright cylindrical guide tube or cage E, rigidly secured in place in the tank in any suitable manner and provided at its lower end with a lateral orifice E', located in a vertical plane arranged in alignment with the said opening *a* and adapted in size to permit the said ball to freely pass through it to the same, the tube or cage being placed so near to the free ends of the neck that the ball cannot escape into the body of the tank. The said tube or cage is also furnished at its lower end with several perforations E², which provide for a free circulation of water through it. At its extreme upper end the neck is provided with a pin-hole *a*², located above the level of the water in the tank when the same is filled. The function of this will be made clear later on. The valve-chamber C, before mentioned, is constructed at its upper end to form a valve-seat C', upon which the operating-valve F rests, the same being lifted by a chain F', the opposite end whereof is provided with a handle, which is not shown. A pipe G, constituting the long leg or branch of the siphon, leads from the lower end of the said valve-chamber to the bowl H, which may be of any desired construction. A small air-pipe I extends from

above the level of the water in the tank when the same is filled into and nearly to the lower end of the pipe G and supplies air to and takes it from the said pipe, as will be herein-
5 after explained.

The operation of my device, when constructed as above described, is as follows: Suppose the tank to be filled and the operating-valve to be lifted, the siphon will be started in operation, the water flowing from the tank into the inlet-openings a and a' through the neck B, the valve-chamber C, and thence through the pipe G into the bowl H. The air displaced from the pipe G by the water when it begins
10 to flow, as described, is in large part taken by the air-pipe I, whereby the rumbling noise made by the air if it is compelled to escape through the bowl is avoided. As the water is lowered in the tank, the ball-valve, guided
15 by the tube or cage E, falls with it. Then just before the water reaches the level of the upper edge of the large inlet-opening, the suction at this time being very strong, the ball is drawn to and closes the said opening before
20 there is any opportunity for water to be sucked into the same, whereby the sucking rumbling noise heretofore characteristic of closets of this class and making them objectionable is avoided. The closing of opening a , as described, does not occur, however, until the
25 water in the tank has been nearly drawn off, for the main part of the water in the tank is needed to flush the bowl. When the large opening is closed, the entire duty of feeding the siphon is transferred to the small inlet-opening a' , which now feeds it so slowly that
30 the water is discharged under a reduced force, whereby it is caused to remain in the bowl and fill the same. During the time that the water is entering the siphon through the two
35 openings the suction is so strong that air taken in through the pin-hole a^2 is not sufficient to break it; but when the power of the suction is reduced by the closing of the large inlet-opening a the air entering the siphon through
40 the said pin-hole and through the air-pipe I soon becomes sufficient to break the weak suction maintained through the small inlet-opening a' . As soon as this happens the
45 ball-valve D drops away from the large opening into its tube or cage, and is floated and lifted again therein when the tank is refilled. It will thus be seen that under my improvement the main body of water in the tank is
50 discharged freely in the usual manner and with sufficient force to perfectly flush the bowl; but that before the tank has been drawn down and the process of after-filling is begun the discharge of water is checked and the
55 water forced to flow through a small opening located very near the bottom of the tank, where it cannot take air, so that the disagreeable sucking noise attending the discharge of water from the tank is entirely obviated, the
60 air required to break the siphon not being taken in with the water from the surface thereof, but through the said pin-hole and air-pipe.

By locating the large water-inlet opening of the siphon in a vertical plane the ball is relieved from the direct and strongest suction
70 of the water, which is downward from a point directly above the opening, which under my construction is approached laterally, or virtually so, by the ball which, therefore, instead of being always in the line of direct suction,
75 is out of and only brought into the same just before it is seated. By gaging the separation of the cage from the orifice the action of the ball-valve may be regulated as desired.

In the construction shown by Fig. 3 of the
80 drawings, the inlet-openings a and a' are formed in one end of a neck corresponding in general construction to the neck A, but made vertically movable and constructed at its opposite end to form a valve J, which rests upon
85 a valve-seat J'. Under this construction the device operates exactly as before, except the neck is lifted to create the primary suction instead of an independent operating-valve.

As shown by Fig. 4 of the drawings, the inlet-openings a and a' are formed in the closed
90 lower end of a vertically-movable cone K, constructed with an interior upright pipe K', the said cone and pipe virtually forming the short branch of the siphon. The lower end of the
95 cone is constructed to form a valve L and normally rests upon a valve-seat L'. In this case the primary suction is established by lifting the cone.

The construction shown by Fig. 5 of the
100 drawings is substantially the same as that shown by Fig. 4, except that the tube or cage M of the free ball-valve is attached to one face of the cone and moves with the same.

In the construction shown by Fig. 6 of the
105 drawings, a vertically-movable cone provided with an interior vertical pipe is employed; but instead of using a free ball-valve to close the large discharge-opening, I employ a hinged valve N, having a convex rubber face N', and
110 provided with a stem N², carrying a float N³. Under this construction the valve is opened by the float N³ when the tank is filled. Then as the water is drawn from the tank the float
115 gradually drops and closes the large inlet-opening a , the same being entirely closed when the water in the tank has been reduced to the level at which the free ball-valve acts in the other constructions to check the feeding of the siphon.
120

All of these modified constructions operate upon the principle of checking the flow of water from the tank when the same has been nearly emptied and before the after-filling of the bowl is begun, and all of them having a
125 a small air-hole a^2 for breaking the siphon in opposition to the small water-inlet; but this air-hole is not limited in location to the neck of the siphon. All of these modified constructions are also constructed with their large
130 openings or orifices opening laterally into the siphon, or, in other words, standing in a vertical or substantially vertical plane. I would therefore have it understood that I do not limit

myself to the exact constructions herein shown and described, but hold myself at liberty to make such changes and alterations therein as fairly fall within the spirit and scope of my invention.

5 I am aware that a siphon having a large and a small water-inlet opening, the former closed by a caged ball-valve floating in the water in the tank is old, and I do not, therefore, claim that construction broadly.

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

15 1. In a water-closet, the combination, with a tank and a bowl, of a siphon located in part in said tank, having its long leg or branch extended in the form of a pipe connecting the tank and bowl and constructed with a large lateral water-inlet opening and a small water-
20 inlet opening located below the level of the same and a valve controlled by the water in the tank and moving laterally or virtually laterally in closing the said large opening when the water in the tank has been nearly
25 drawn off, one of the said parts having a small air-inlet opening for breaking the siphon in opposition to the small water-inlet opening, substantially as set forth, and whereby the
30 valve is relieved from the direct downward suction of the water and the siphon is fed at the end of its operation through the small water-inlet opening.

35 2. In a water-closet, the combination, with a tank and a bowl, of a siphon located in part in the said tank, having its long leg or branch extended in the form of a pipe connecting the tank and bowl and constructed with a large

lateral water-inlet opening standing in a vertical or substantially vertical plane and a small water-inlet opening located below the
40 level of the said large opening, a free valve floating in the water for closing the said lateral opening, and a cage located within the tank, adapted to receive the said valve and
45 having a lateral opening which is aligned with the lateral opening of the siphon, one of the said parts having an air-inlet opening for breaking the siphon in opposition to the said small water-inlet opening, substantially as described.

50 3. In a water-closet, the combination, with a tank and a bowl, of a siphon located in part in said tank, having its long leg or branch extended in the form of a pipe to connect the tank and bowl and constructed with a large
55 and a small water-inlet opening, a valve controlled by the water in the tank and adapted to close the said large inlet-opening when the water in the tank has been nearly drawn off, and an air-pipe extending above the level of
60 the water in the tank when the same is filled and down into the said pipe and nearly to the bowl, one of the said parts having a small air-inlet opening to break the siphon in opposition to the small water-inlet opening, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ROBERT MORGAN.

Witnesses:

J. H. SHUMWAY,
FRED C. EARLE.