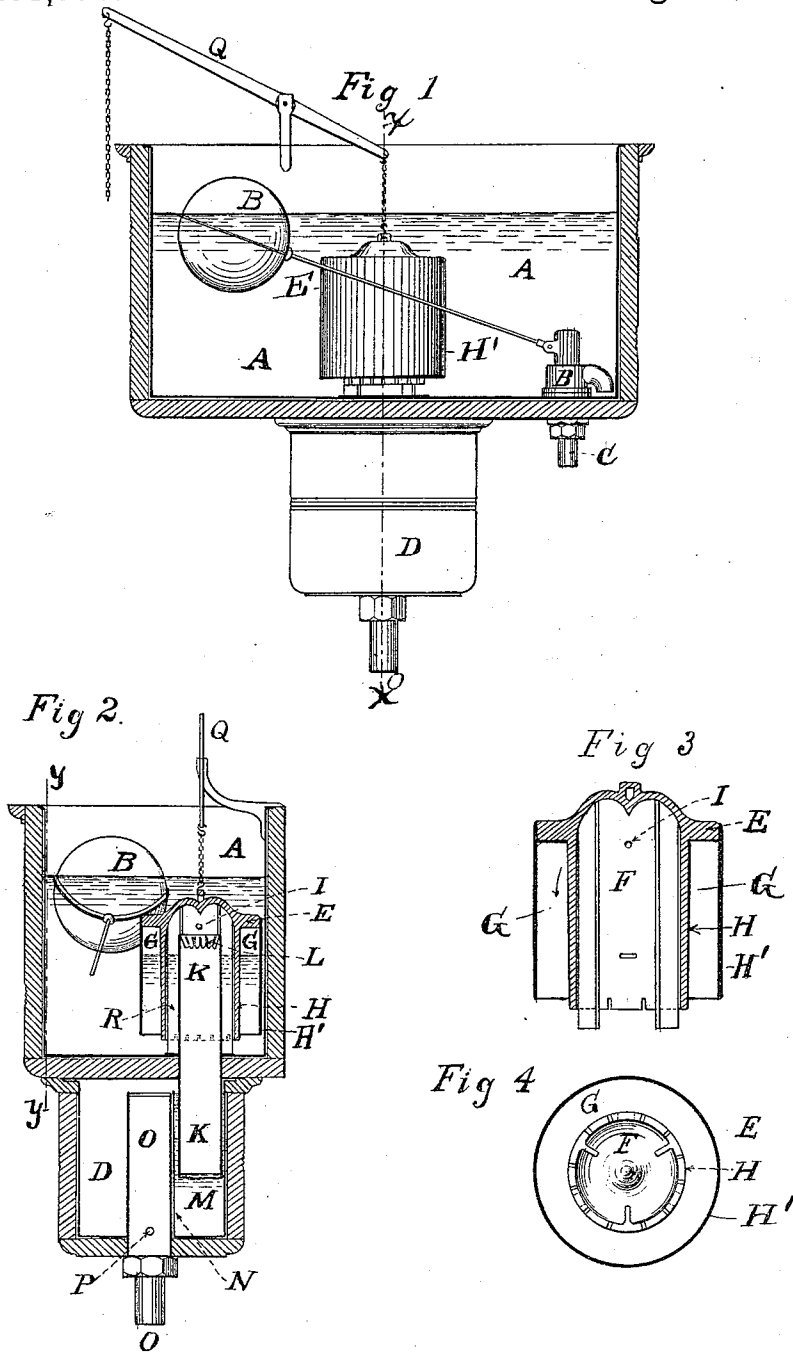


(No Model.)

B. WILLIAMS & C. POORE.
FLUSH TANK.

No. 481,710.

Patented Aug. 30, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

BENEZETTE WILLIAMS AND CHARLES POORE, OF CHICAGO, ILLINOIS.

FLUSH-TANK.

SPECIFICATION forming part of Letters Patent No. 481,710, dated August 30, 1892.

Application filed September 19, 1891. Serial No. 406,286. (No model.)

To all whom it may concern:

Be it known that we, BENEZETTE WILLIAMS and CHARLES POORE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flush-Tanks, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 shows a longitudinal vertical section of our improved flush-tank, taken on a plane *yy* shown in Fig. 2. Fig. 2 shows a vertical cross-section of said device, taken on the plane *xx* in Fig. 1. Fig. 3 shows a central vertical section of the bell E (shown in Figs. 1 and 2) on an enlarged scale. Fig. 4 shows said Fig. 3 as seen on its under side.

Like letters of reference denote like parts.

Our invention relates to flush-tanks for water-closets; and it consists of a reservoir fed by a stream of water through a ball-cock and a trapped siphon connecting said tank with a supplementary tank, which in turn is connected with a water-closet; and it consists, more particularly, in connecting with the upper end of the intaking-limb of a siphon an air-chamber, which is open at the bottom and wherein said opening is closed and opened by the rise and fall of water in a tank which holds our device and into which the flow of water is governed by a ball-cock or equivalent device, and an air-passage from the top of said air-chamber which connects the intaking and discharging limbs of a siphon, said intaking-limb of the siphon being herein shown as a reciprocating bell, our object in the said latter arrangement being to effectually break the siphon, so as to prevent any secondary or further action liable to occur without our device. The fact that the bell is actuated by a pull or is reciprocating is only material as a convenience, as the device will work quite as well if the bell is fixed, provided the water in the tank is raised high enough to start the siphon, said siphon being so constructed that a column of air is confined within the siphon by the rise of the water in the tank, by means of which a difference of fluid-level is produced within and without the intaking-limb of said siphon when the tank is full, said ball-cock being adjusted

to shut off the feeding stream before the water can overflow the discharging-limb of the siphon. Said automatically-filling tank is shown at A filled to its full height.

Connected to A and under it is a supplementary tank D, provided with a discharge-pipe O, attached to the bowl of a water-closet. (Not shown.) Said pipe O projects into said tank D to near its top and to about the same height as a partition N, which divides said tank into two compartments, of which one forms a trap to the lower end of the pipe K. The space in the tank D outside of the trap M is made large enough to hold a sufficient quantity of water to supply an after-flush to the bowl of a water-closet after the same has been emptied. A hole P near the bottom of the chamber D supplies from it the said after-flush to the water-closet. The upper end of said pipe K has an annular inturned and corrugated lip L, and over said pipe is placed a bell E, having the annular walls H and H', forming the annular space G and the central space F, which open into each other through a small hole I at the top of the space G. The lower edge of said shell H has notches and also openings through its sides which form sniff-holes, and on the walls of the space F are radial guides which extend below the shelf H far enough to leave a sufficient space to pass all the water necessary to fill the pipe K, and the inner edges of said guides touch and move on the outside of the pipe K.

The bell E is hung to one end of a lever, which has a pulling-cord at its other end to raise said bell, and said lever is fulcrumed between its ends.

Between the shell H and pipe K is an annular space R, which forms the intaking-limb of the siphon, of which the pipe K forms the discharging-limb.

The operation of said device is substantially as follows, namely: The trap M is first filled with water, as this water forms a part of the operating mechanism of our device. Then water is admitted through the pipe C and ball-cock B into the tank A. As the water rises above the lower edge of the shell H' it confines the air in the intaking-limb R, the discharging-limb K, and the annular chamber G, because the lower end of the pipe K is closed by the trap M. The air thus confined

causes the water in the tank A to rise as high above the top of the water in the space G as the height between the lower end of the pipe K and top of the wall N. Before the water in the space R has reached the top of the discharging-limb K the inflow of water to the tank A is shut off by the ball-cock B, but not until the water in the tank A has submerged the bell E. The air inside and the water outside of the siphon remain in this state of equilibrium until the bell E is raised, and with it the confined water rises and overflows the pipe K. This operation starts the siphon. The water rising through the annular space R passes down through the pipe K, which overflows the trap M and fills the tank D, which in turn overflows through the pipe O into the bowl of the water-closet, said discharge continuing until the surface of the water in the tank falls below the lower end of the intaking-limb or upon shell H', which air enters through the sniff-holes, and thus breaks the siphon and fills the chamber G with air which the flow of water had exhausted, after which the tank A again becomes filled as before, and the air thus confined in the chamber G is passed through the hole I to the siphon, whereby any deficiency of air required in the first operation to fully break the siphon is thereby supplied. The siphon is first broken by the fall of the water in the tank below the end of the shell H, although it might be broken through the sniff-holes, if made large and numerous enough. It is preferably not thus constructed, the sniff-holes only serving to make the action less noisy. As the shell H' is shorter than the shell H it is first opened and filled with air. When the water again rises, the siphon end is first closed, and any further supply of air required to completely break the siphon is supplied through the sniff-holes and hole I and finally alone through the hole I. After the water in the pipe K and trap M has come to rest and the water in the tank has closed the air-chamber G the contained air will begin to compress and resist the rise of the water in the spaces G and R, which will be under equal head, owing to the equilibrium produced through the hole I, and will thus prevent the overflow and starting of the siphon, even though the head of the water in the tank should rise beyond the bend of the siphon.

It is evident that the chamber G, which in the drawings is annular and surrounds the limb of the siphon, may have any other shape and may be built on one side of the chamber F or be a separate and detached chamber, communicating with it by means of a tube used in place of the opening I, the desired end being accomplished by the use of any chamber apart from the siphon, however constructed, which fills alternately with air and water as the tank is emptied and filled, and which communicates with the siphon in such a manner as to supply the necessary amount of air to fully break it. It may be observed that said bell E must be of sufficient weight to remain in place against the water-pressure, and that it only need be raised high and long enough to fairly start the siphon, after which it may be allowed to drop to its place, because the water will then continue to flow until the entrance of air through G and I breaks the siphon, the previously-contained air in said parts having been completely exhausted by the action of the siphon. The bell E may also be immovable and the siphon started in such case by allowing the water to rise in the tank A until it overflows the top of the siphon.

What we claim is—

1. The combination, with an automatically-filling tank containing the intaking-limb of a siphon, of an independent open-bottomed and voluminous air-chamber connected near its top with the bend of said siphon by means of a small air-passage and sealed and unsealed by the rise and fall of water in said tank through the action of said siphon and the action thereof permanently broken through said enlarged air-chamber and air-passage, substantially as specified.

2. The combination, with an automatically-filling tank containing both the intaking-limb of a siphon and an independent open-bottomed and voluminous air-chamber and an air-passage connecting said chamber and bend of said siphon, of a tank provided with a discharge-pipe and a trap to the discharging end of said siphon, substantially as specified.

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