W. A. VAN DEUSEN.

FLUSHING APPARATUS.

APPLICATION FILED FEB. 2, 1917.

1,308,382.

Patented July 1, 1919.

2 SHEETS—SHEET 1.

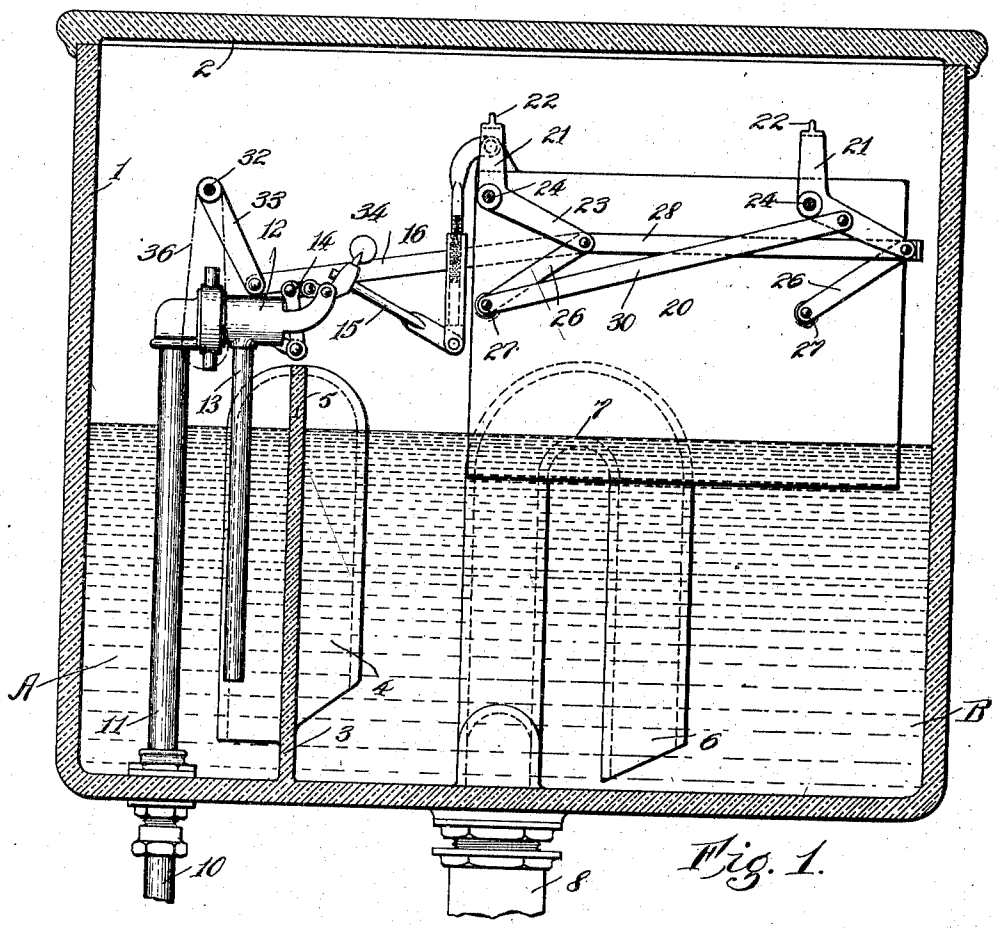


Fig. 1.

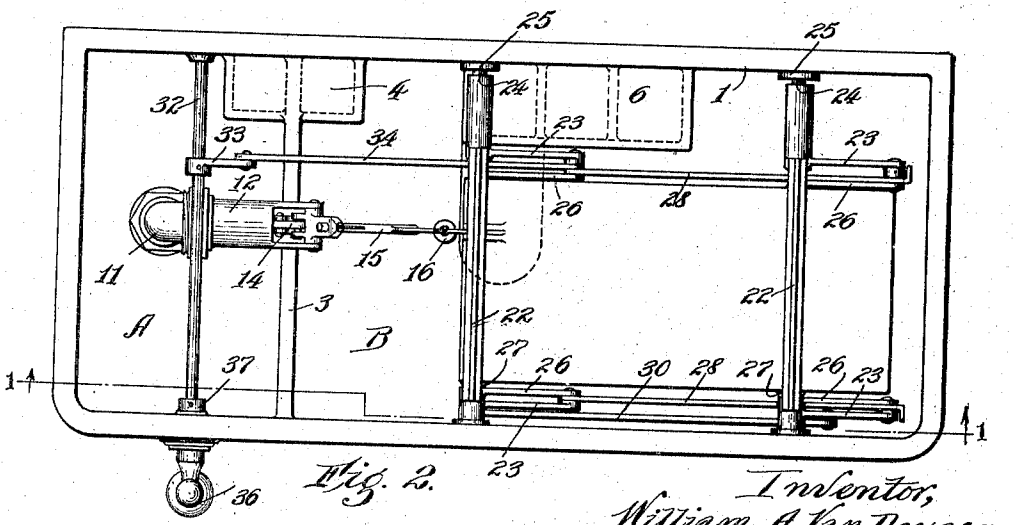


Fig. 2.

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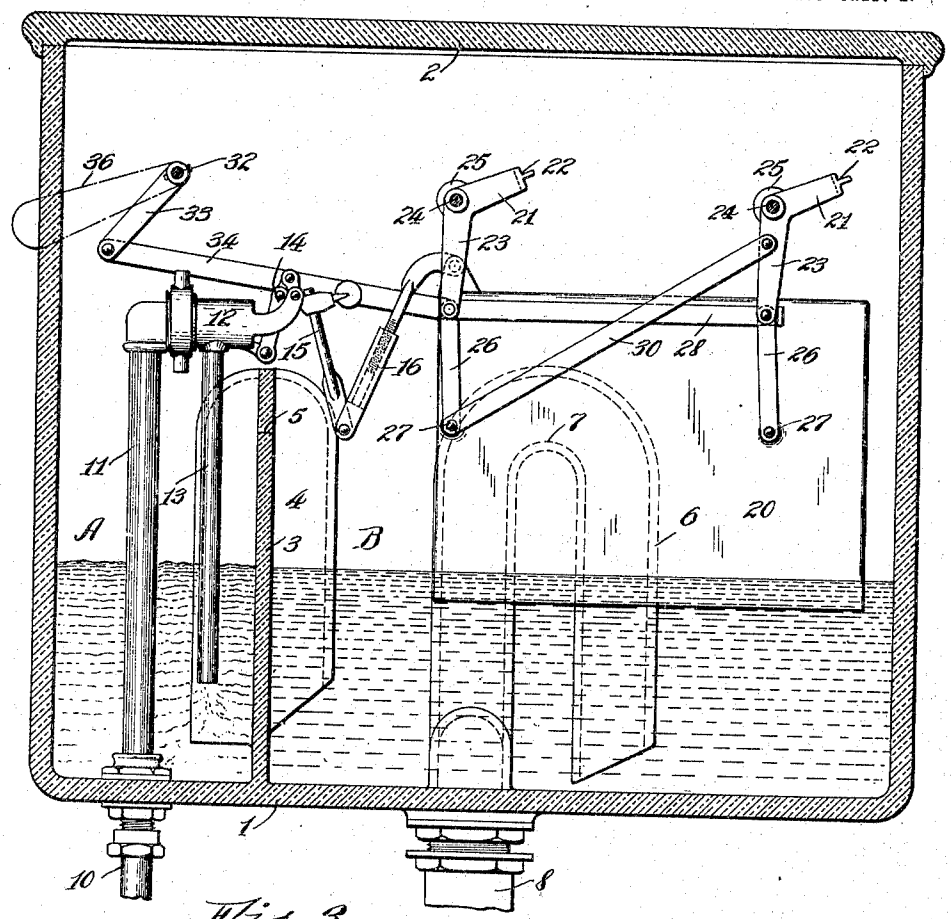


Fig. 3.

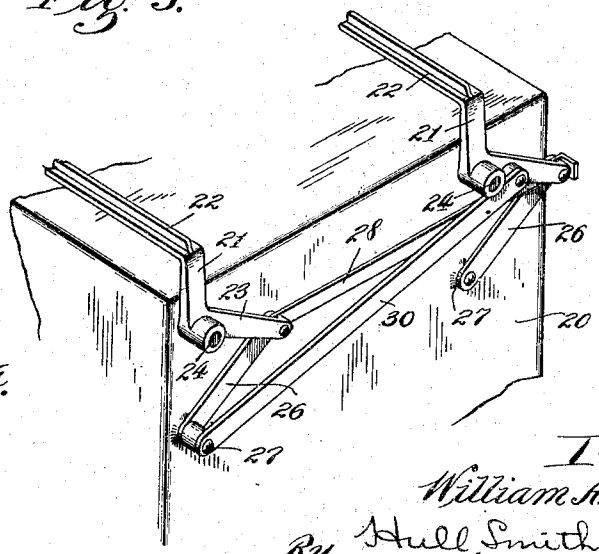


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM A. VAN DEUSEN, OF CLEVELAND, OHIO.

FLUSHING APPARATUS.

1,308,382. Specification of Letters Patent. Patented July 1, 1919.

Application filed February 2, 1917. Serial No. 146,049.

To all whom it may concern:

Be it known that I, WILLIAM A. VAN DEUSEN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Flushing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to improvements in flushing apparatus; and it has for its objects the production of a comparatively simple yet very durable apparatus of this character which is positive of operation; is sanitary; and wherein the working parts are readily accessible for inspection or adjustment.

To the attainment of these desirable ends, my invention consists in providing a tank, preferably of vitreous china or porcelain, having the necessary siphon or siphons formed integral therewith; the employment of an open bottom float, thus obviating the difficulties incident to the use of hollow water tight floats; and the inclusion of suitable mechanism for maintaining the float with its open bottom substantially horizontal throughout the extent of its movement.

In order to do away with the objectionable valves for closing the outlet of the tank, I desire to use a siphon as the outlet, and to follow the principle of starting the siphonic action by depressing the float to elevate the water level above the crown of the siphon. To insure a positive initiation of such action, it is a further purpose of my invention to provide a novel arrangement for maintaining the float depressed until the siphonic action is well under way.

A still further object of my invention is to provide a flushing tank, having a filling and a flushing compartment, with a siphon through which the former compartment may supply the latter, and wherein the siphonic action is broken or interrupted when the water level in the flushing compartment has fallen to a given point so that the filling compartment may continue to receive a supply of water without such supply having the effect of unduly prolonging the flushing action by uninterruptedly continuing to supply water to the flushing compartment.

Expressed in general terms my invention may be defined as consisting of the combinations of elements set forth in the annexed claims and illustrated in the accompanying drawings which form a part hereof and wherein Figure 1 is a sectional front elevation of a flushing tank constructed in accordance with my invention; Fig. 2 is a plan thereof, with the cover removed; Fig. 3 is a view, similar to Fig. 1, with the float depressed; and Fig. 4 is a fragmentary perspective view of the float and float suspension means.

Referring to the parts illustrated in the drawings by the use of reference characters, 1 represents a tank, preferably of vitreous china or porcelain, having a cover 2, and divided into a filling compartment A and a flushing compartment B by means of a partition 3. A siphon 4 is provided through which the compartment A may discharge, under certain circumstances, into the compartment B, and for sanitary reasons, as well as economy and convenience, the siphon 4 and partition 3 are preferably formed integral with the tank. It will be observed that the crown 5 of the siphon 4 is some distance below the upper edge of the partition 3.

The flushing compartment B, contains an outlet siphon 6 which is also preferably formed integral with the tank for the reasons named above.

The principle of the siphon is well known, it being common knowledge that when air is admitted to the siphon in sufficient quantity to prevent the water discharging from the siphon to continue to draw water into its inlet end, the siphonic action will be interrupted or discontinued. This interruption or discontinuation of the siphonage is often referred to as the "break" as is also the means whereby such break is accomplished. Various means have been employed for obtaining the break, such as holes formed in the wall of the siphon near its inlet end or in the vicinity of its elbow, while in my present construction I prefer to obtain the break by forming the end of the siphon inclined so that one of its edges is higher than the other, the higher edge thus constituting what I shall term "the siphon break." "Break," therefore, will be understood to mean the edge of the inlet end of the siphon, or any reasonable equivalent thereof, used for breaking the siphonic action. The outlet end of the siphon 6 opens through the bottom of the tank and has connected to it a flush pipe 8 which leads to the bowl.

A supply pipe 10 is connected to the lower end of a pipe 11 which rises within the fill-

ing compartment A and has connected to its upper end a valve 12 that has an outlet tube 13 directed toward the bottom of the filling compartment. The valve is operated through lever mechanism, designated 14, a rod 15 and an adjustable link 16, from the float 20, to which said link is pivotally connected.

The float suspension means will now be described. 21, 21 are yokes each constituting a rigid structure and comprising a cross-beam 22 and opposed end members 23 of bell-crank formation, each end member having at its angle, a trunnion 24 which is journaled within a thimble 25, set into the adjacent wall of the tank. The lower ends of the members 23 have pivotally connected to them the upper ends of links 26, which links, in turn, have their lower ends pivoted, at 27, to the sides of the float. Thus it will be seen that the lower branch of each bell-crank member 23, and the corresponding link 26 constitutes a toggle joint which suspends the float from the tank (it being understood that the members 21 have no connection with the float other than through the links 26). The knees of the two toggle joints occurring on both sides of the float are shown as connected by links 28, so that the joints are compelled to act in unison. In order to restrict the float to a substantially vertical path, I connect the float, at the lower end of the left hand link 26, through a connecting link or guide 30, with the lower arm of the right hand bell-crank member 23 at a point some distance from the trunnion of such member so that when the member swings, it will maintain the left hand end of the connecting link and consequently the float in a substantially vertical path. In view of the rigidity of the members 21, it is deemed necessary to employ a connecting link or guide 30 on only one side of the float.

A shaft 32 is journaled within the front and rear walls of the tank near its left hand end, and an arm 33, which is secured to the shaft, has its outer end connected, through a strap 34, with the knee of the left hand toggle on the rear side of the float. The shaft 32 extends through the front wall of the tank and has attached to it therebeyond an operating handle 36; and the shaft is held against longitudinal movement within its bearings by a collar 37.

When the operating handle 36 is thrown to the left, as indicated in broken lines in Fig. 3, it will pull upon the strap 34 and swing all the toggle joints to the positions shown in Fig. 3, thereby depressing the float. The float, being suddenly depressed, elevates the water level considerably above the crown 7 of the outlet siphon 6 and initiates the siphonic action. It will be observed that the knees of the toggle joints are thrown sufficiently beyond alinement with the pivoted ends of their links, to prevent their return to normal position and the rebound of the float. The toggles are held against undue movement in the float depressing direction by the overturned right hand ends of the links 28 which engage the sides of the arms of the adjacent bell-crank members 23. Therefore, the parts will remain in the position shown in Fig. 3 until the water level has been lowered to such an extent that the float will swing freely upon its suspension means, when the weight of the operating handle 36 will tend to break the toggle joints in the opposite directions so that, upon a subsequent filling of the flushing compartment B, the float will readily return to normal position.

When the float is depressed, the valve 12 will be opened through its aforesaid connection with the float, and water will be immediately delivered to the filling compartment A. Returning now to the flushing compartment B, as the water level is lowered in this compartment, it will draw water through the siphon 4 from the filling compartment A until the water level in the latter compartment is reduced to a point below the break of the siphon 4. Upon such break, the flow from the filling to the flushing compartments will cease, and the outlet siphon 6 will continue to act until it is interrupted by the lowering of the water level below its break. Having no opportunity to immediately obtain a supply from the filling compartment A, the action within the siphon 6 will be completely broken, and not until the filling compartment A and the inlet side of the siphon 4 have been refilled to the crown of the siphon 4, will the flushing compartment begin to receive a new supply of water. The water flowing over the crown of the siphon 4 and down through the outlet end thereof will start the siphonage between the two compartments so that the flushing compartment will be supplied with water to the elevation of the crown of the outlet siphon 6. When this is reached, the float 20 will have resumed its normal position, and the valve 12 will have been closed.

Having thus described my invention, what I claim is:—

1. In flushing apparatus, the combination with a tank, of an open bottom float within the tank, means for maintaining the open bottom of the float constantly horizontal while permitting the float to rise and fall, said means serving to hold the float depressed at a given depth against rebound, a supply valve, operative connections between the float and valve, and means for depressing the float, said depressing means acting to render the aforesaid means ineffective in holding the float depressed when the water ceases to sustain the float.

2. In flushing apparatus, the combination with a tank, of a float within the tank, a supply valve, operative connections between the valve and float, and means for depressing the float and maintaining the same depressed against rebound until the water ceases to sustain the float, said means thereafter acting to release the float.

3. In flushing apparatus, the combination with a tank, of a float within the tank, toggle link connections between the float and tank, means for swinging the toggle links from normal position to a position beyond the alinement of their links thereby to depress the float and hold the same depressed against rebound, said means involving an element for initiating the movement of the toggle links toward normal position when the water ceases to sustain the float, a supply valve, and connections between said valve and the float.

4. In flushing apparatus, the combination with a tank, of an open bottom float within the tank, a toggle joint connecting the float and tank, connections for swinging the toggle joint from normal position to a position beyond the alinement of its links thereby to depress the float and hold the same depressed against rebound, said connections involving means for initiating the movement of the toggle links toward normal position when the water ceases to sustain the float, a guide for maintaining the float with its open bottom substantially horizontal, a supply valve, and connections between said valve and the float.

5. In flushing apparatus, the combination with a tank, of an open bottom float, two sets of toggle joints through which the float has connection with the tank, links connecting the knees of the toggle joints of one set with the knees of the toggle joints of the other set whereby both sets will be maintained constantly in like condition, connections between the two sets of toggle joints for causing them to maintain the float in upright position with its open bottom substantially horizontal, when the float is depressed by straightening out the toggle joints, means for swinging the toggle joints from normal position to a position beyond the alinement of their links whereby the float will be held depressed against rebound, said means initiating the movement of the toggle joints toward normal position when the water ceases to sustain the float, a supply valve, and connections between said valve and the float.

6. In flushing apparatus the combination with a tank, of an open bottom float, a pair of yokes having each its opposite ends pivotally supported adjacent the opposed walls of the tank, the ends of the yokes constituting arms, a link having one of its ends pivoted to the free end of one of the arms of the respective yokes, the opposite ends of said links being pivotally connected to the float, a link connecting the pivotal connection of one yoke and link to the corresponding parts of the other yoke and link, connections between one yoke and the float whereby the open bottom of the float is maintained substantially horizontal, means for actuating the yokes to depress the float, a supply valve, and operative connections between said valve and float.

7. In flushing apparatus, the combination with a tank, of an open bottom float, a pair of yokes having each its opposite ends pivotally supported adjacent the opposed walls of the tank, the ends of the yokes constituting arms, a link having one of its ends pivoted to the free end of one of the arms of the respective yokes, the opposite ends of said links being pivotally connected to the float, a link connecting the pivotal connection of one yoke and link, to the corresponding part of the other yoke and link, a guide for maintaining the open bottom of the float substantially horizontal, means for actuating the yokes to depress the float, a supply valve and operative connections between said valve and float.

8. In flushing apparatus, the combination with a tank, of an open bottom float, a pair of yokes pivotally supported in the tank, each yoke terminating at each end in a depending arm, links connecting the free ends of the arms with the float, said arms and said links constituting toggle joints, a link connecting the knees of the toggle joints which occur on the same side of the float whereby said toggle joints are caused to operate in unison, connections between one of said yokes and the float whereby the float is maintained with its open bottom substantially horizontal at all times, means for swinging the toggle joints from a normal to a position beyond the alinement of their respective links whereby the float is held against rebound, means for preventing the toggle joints from undue movement in such direction, means for initiating a movement of the toggle joints toward normal position when the water ceases to sustain the float, a supply valve, and connections between said valve and said float.

9. In flushing apparatus, the combination with a tank, of an open bottom float within the tank, toggle joints connecting the float and tank, connections for swinging the toggle joints to depress the float, a guide for maintaining the float with its open bottom substantially horizontal, a supply valve, and connections between said valve and the float.

10. In flushing apparatus, the combination with a tank, of an open bottom float, two sets of toggle joints through which the float has connection with the tank, links connecting the knees of the toggle joints of one

set with the knees of the toggle joints of the other set whereby both sets will be maintained constantly in like condition, connections between the two sets of toggle joints for causing them to maintain the float in upright position with its open bottom substantially horizontal when the float is depressed by straightening out the toggle joints, means for straightening out the toggle joints thereby to depress the float, a supply valve, and connections between said valve and the float.

In testimony whereof, I hereunto affix my signature.

WILLIAM A. VAN DEUSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."