P. BALZE.

FLUSH TANK SIPHON.

APPLICATION FILED APR. 15, 1914.

**1,176,731.** Patented Mar. 28, 1916.

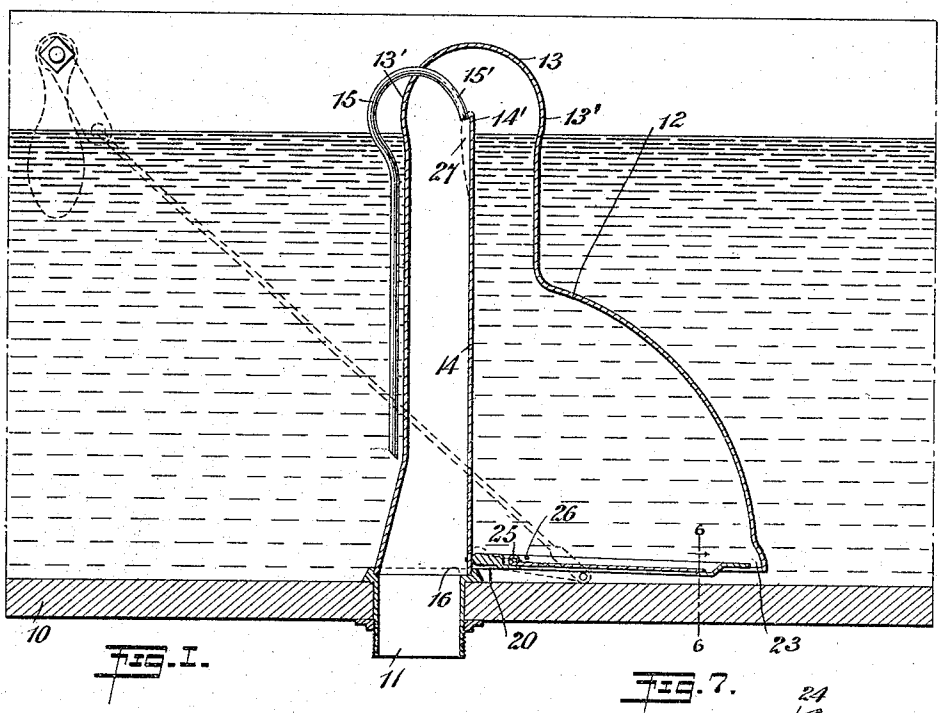



FIG. 1.

FIG. 7.

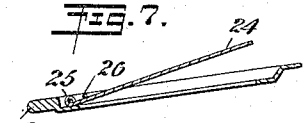
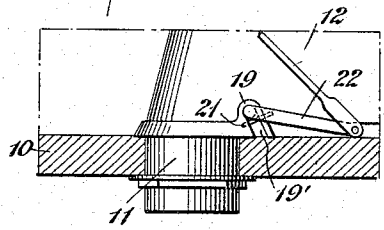



FIG. 2.



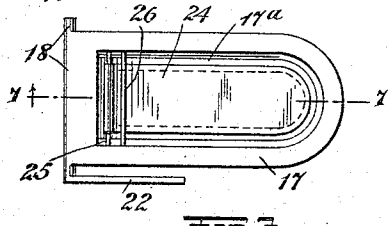




FIG. 3.

FIG. 5.

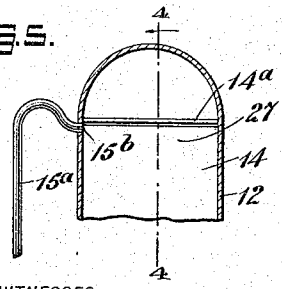
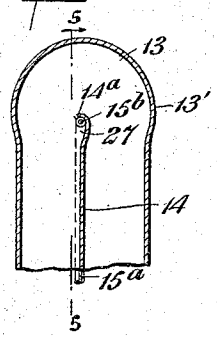



FIG. 4.



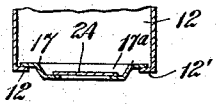




FIG. 6.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## FLUSH-TANK SIPHON.

1,176,731. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed April 15, 1914. Serial No. 831,988.

*To all whom it may concern:*

Be it known that I, PAUL BALZE, a citizen of the United States, and a resident of Leonia, in the county of Bergen and State of New Jersey, have invented a new and Improved Flush-Tank Siphon, of which the following is a full, clear, and exact description.

This invention relates to plumbing, and has particular reference to flush tanks for closet bowls of the nature set forth in my previous patent, dated March 17, 1914, No. 1,090,189.

Among the objects of this present invention is to provide certain features of novelty whereby the siphon starter possesses several features of advantage over all previous devices of a similar character.

More definitely stated, one of the objects is to so arrange the siphon breaking tube as to cause the air to be admitted into the siphon in such a manner as to render the action of the flush tank practically noiseless when designed either as a low-down or a high tank.

The foregoing and other objects of the invention will hereinafter be more fully described and claimed and illustrated in the drawings forming a part of this specification in which like characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a vertical longitudinal section of a portion of a flush tank having my improvements shown therein; Fig. 2 is a side elevation of the spud and adjacent part of the casing; Fig. 3 is a plan view of the vane detached; Fig. 4 is a vertical section of a modification on the line 4—4 of Fig. 5; Fig. 5 is a view of the same on the line 5—5 of Fig. 4; Fig. 6 is a sectional detail on the line 6—6 of Fig. 1; and Fig. 7 is a longitudinal section on the line 7—7 of Fig. 3, showing the relative positions of the parts of the vane while the vane is passing downwardly through the water.

The several parts of the device may be made of any suitable materials, and the relative sizes and proportions, as well as the general design of the mechanism, may be varied to a considerable extent without departing from the spirit of the invention hereinafter more fully set forth and specifically claimed.

Referring more particularly to the drawings, I show at 10 a flush tank adapted to be filled automatically by any approved means (not shown) and provided with an outlet spud 11 leading toward the bowl or the like. Within the tank 10 is a siphon comprising a casing 12 having a dome 13 of peculiar construction and provided with a vertical partition 14 forming, in connection with the dome 13, the two legs of the siphon. For the purpose of clearness of description and to identify the several parts of the casing or siphon structure, the up and down legs may be regarded as having their upper ends terminating at the level of the upper edge of the wall 14 and consequently the dome 13 may be described as having its bottom coinciding with the horizontal plane of the upper edge of the wall and the upper ends of the up and down legs.

At 15 I show an air tube extending from its lower end at a point sufficiently far above the bottom of the tank to initiate the breaking of the siphon at a time to stop the siphonic action within the bowl while there yet remains a sufficient quantity of water in the lower part of the tank to refill or reseal the bowl, making it unnecessary to provide any auxiliary refilling means, such as are commonly used in connection with the inlet pipe to refill the bowl. Said pipe 15 being of a very small caliber comparatively breaks the siphon gradually, that is to say, after the siphonic action is retarded in the tank, the action in the bowl is stopped, but the water continues to flow through the siphon in the tank at a slower speed until the tank is emptied to any desired depth, depending upon the height of the air tube inlet, but preferably prior to the unsealing of the lower end of the up leg of the siphon.

As in my previous patent, the upper end or edge 14′ of the partition 14 is preferably horizontal and straight whereby the water flows thereover initially in a thin sheet which falls or flows down the open face of the partition, striking upon a shelf or ledge 16 at the top of the spud, whence it splashes across the center of the spud, excluding the air and insuring the proper starting of the siphonic action even though the vane 17 may be operated slowly, or the water level be considerably below the level of the top of the partition. As indicated in Fig. 5, the

side walls of the casing 12 to which the vertical edges of the partition 14 are connected are substantially parallel, but, as viewed at right angles as shown in Fig. 4, the dome 13 has a swell or radial enlargement as indicated at 13′ whereby a freer flow of the water, when the siphon is operating at its full capacity, is obtained.

The vane 17 above referred to is provided with a horizontal axis 18 journaled in ears 19 and 20 on opposite sides of the spud. The ear 20 is closed and the adjacent end of the shaft or axis 18 is introduced thereinto from one side while the opposite end of the shaft or axis is inserted through the opening 19′ leading to the bearing ear 19 where it may be locked by a pin 21. The axis 18 of the vane terminates in a crank 22 to which the operating connections may be attached for swinging the vane upwardly around its axis 18. The bottom of the casing 12 but for the vane is normally open and is provided with side flanges 12′ upon which the side edges of the vane rest when the vane is down, as shown in Figs. 1 and 6. The vane is provided with a slight concavity 17ª which retains a small portion of water and thereby is restored to normal position with promptness after the operation of the siphon. While the vane does not fit the sides of the casing with particular nicety, there is slight space between the edges of the vane and the side walls of the casing. Hence, I provide an opening 23 formed at the lower point of the casing through which the water may enter the interior of the casing after the vane returns to normal position. While the provision of the horizontal ledge 14′ and the shelf 16 insures a satisfactory operation of the device in ordinary practice, it is possible for the vane to be moved so extremely slowly, that the siphonic action will not be initiated. In such a case, if the vane were solid or imperforate, the vane would gravitate downwardly through the water at a slow speed which would require a long time comparatively for it to be restored to a position where it would operate in the manner intended for it on a quicker movement of the operating connections. I, therefore, provide a valve 24 normally covering a large central opening through the vane. The valve is pivoted on a transverse pivot 25 and its swinging movement with respect to the vane is limited by a cross pin or bar 26, as shown in Fig. 7. Under ordinary operations, the valve 24 does not swing on its pivot but is held closed on the upward sweep of the vane by the weight of the water above the vane, and when the vane swings downwardly, the valve likewise gravitates with the vane and under normal conditions is held closed by the water flowing back from the short leg when the siphon breaks.

For the purpose of breaking the siphon gradually, the pipe may deliver air anywhere in the dome 13, but as a result of much study and many experiments I have discovered that by extending the pipe, as shown at 15′, so as to deliver the air adjacent the edge 14′ of the partition 14, or outside the body of water flowing over said edge, there is practically no gurgling or snorting sound resulting from the admission of air into the tube and mixing with the water. The tube 15, therefore, may be extended into the dome in any direction, and as shown in Figs. 4 and 5 the pipe 15ª leads into the dome from the side or substantially in the plane of the partition 14, opening at the point 15ᵇ beneath an overhanging lip 14ª directly adjacent the end of the edge, but as stated above, outside of and below the current of water. When the water flows over the ledge 14′ or lip 14ª in the normal operation of the siphon, the flow of water being most rapid at the circumference, permits the formation of a substantially unbroken or continuous air pocket 27 on the down side of the upper end of the partition beginning when the depth of water in the tank is sufficiently lowered to admit air into the lower end of the tube. By introducing air through the tube directly into this air pocket space, beneath the current of water and at a point of the upper end of the down leg nearest the up leg, the disagreeable snorting or gurgling sound, due to the air entering the water directly and mixing therewith, is avoided. The air pocket remains practically unbroken and increases in size as the admission of air continues, with a corresponding diminution of volume in the flow of water through the siphon, until the flow of water ceases due to the increase in volume of the air pocket in the down leg.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The herein described flush tank siphon comprising a casing including up and down siphon legs and a curved dome connecting them, means to start the flow of water through the casing to initiate the siphonic action, and means to introduce air directly into that portion of the down leg closest to the center of curvature of said dome.

2. In a flush tank, the combination of a siphon having up and down legs, and means to deliver air directly into the upper end of the down leg on the side thereof nearest the up leg.

3. In a flush tank siphon, the combination of a casing having a substantially vertical wall therein forming on opposite sides thereof up and down legs, a curved dome leading from the up leg to the down leg, said dome being larger in capacity than the capacity of the up and down legs whereby the water is caused to sweep freely along the curve of

the dome from one leg to the other, and an air pipe leading from the outside of the casing through the dome at a point above the level of the wall and across the down leg to a point adjacent said wall edge, substantially as shown and described.

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

PAUL BALZE.

Witnesses:
CHARLES HARBER,
GEO. L. BEELER.

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