A. COCHRAN.

SIPHON WATER CLOSET.

APPLICATION FILED MAR. 22, 1911.

1,067,095. Patented July 8, 1913.

Fig. 1

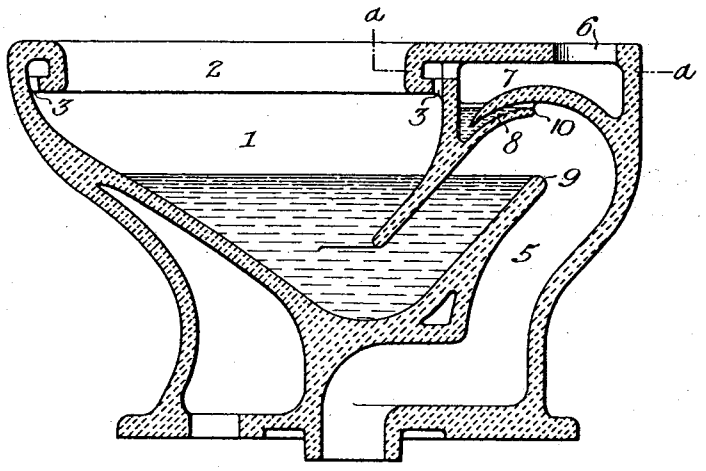


Fig. 2.

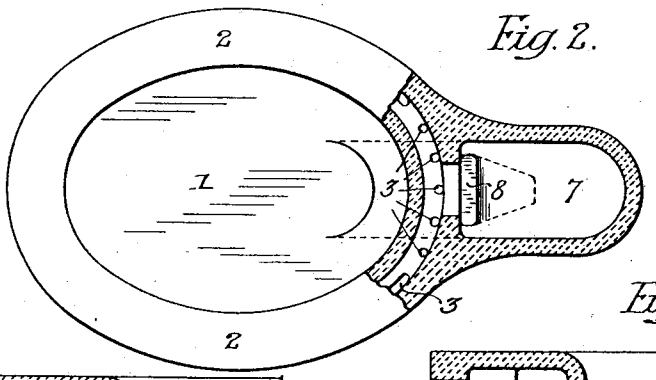


Fig. 3.

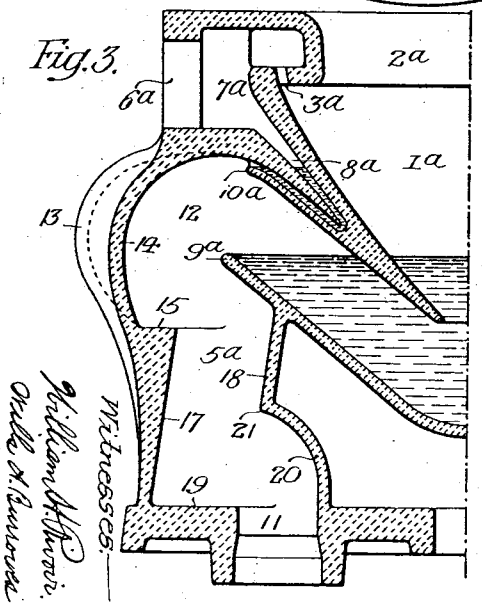
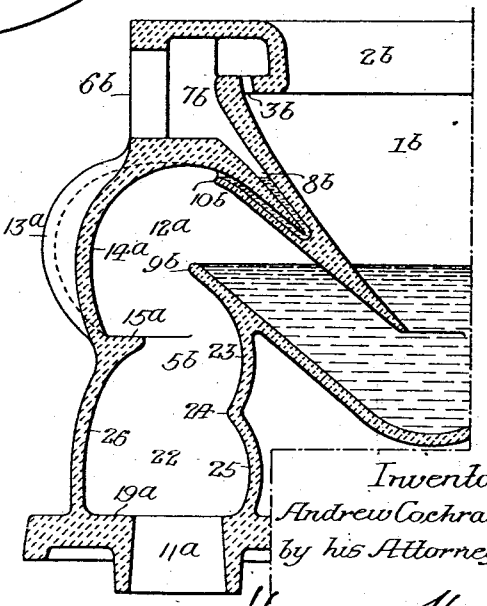


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SIPHON WATER-CLOSET.

1,067,095. Specification of Letters Patent. Patented July 8, 1913.

Application filed March 22, 1911. Serial No. 616,113.

To all whom it may concern:

Be it known that I, ANDREW COCHRAN, a citizen of the United States, and a resident of Trenton, Mercer county, New Jersey, have invented certain Improvements in Siphon Water-Closets, of which the following is a specification.

My invention relates to water closets of the siphon type, and my present improvements have been applied to water closet bowls of the type familiarly known as reversed trap bowls.

The principal object of my invention is to provide for the delivery of a strong stream of water for the initial flow or discharge through the down leg of the siphon passage and for this purpose I have equipped a siphon closet of this type with a simple form of jet which may be disposed in the rear wall of the bowl, above the level of water therein forming the seal, for the delivery of a portion of the flushing water to the chamber where the upper portions of the ascending and descending legs of the siphon passage meet. Such jet is arranged to be sealed by water flowing from the tank after the completion of the flushing operation and commonly known as the "after fill."

A further object of my invention is to provide a closet of this type having such concealed jet, with an enlarged chamber at the upper part of the ascending and descending legs of the siphon passage; the rear wall of the bowl having bulging projections forming an enlarged internal chamber partly divided and reduced in area by an inwardly projecting and centrally disposed rib.

These and other features of my invention will be more fully referred to hereinafter, reference being had to the accompanying drawings, in which:

Figure 1, is a sectional elevation of a water closet bowl made in accordance with my invention; Fig. 2, is a plan view partly in section on the line *a*—*a*, Fig. 1, and Figs. 3 and 4, are sectional views of modified forms of closet bowls embodying my invention.

The inducing of siphonic action by providing the descending leg of the siphon passage of a water closet bowl with projections is well known, and the closet bowl of the Frame and Neff patent and other closets embodying the same idea have been in use for many years. These closets while satisfactory in the main, have never proved as efficient in action when flushed with water from "low down" tanks as they have done with the high tanks, and the important feature of my invention is the provision of means in a siphon closet of the reversed trap type that will enable it to operate successfully with the water supply from a "low down" tank.

In Fig. 1 of the accompanying drawings, showing the preferred embodiment of my invention, 1 represents the main bowl of the closet, having a rim 2 with apertures 3 leading from said rim for discharging water into the bowl over the surface of the same. The ascending leg of the siphon passage is indicated at 4, while the descending leg of the siphon passage is indicated at 5.

The essential feature of my invention consists of a concealed passage at the rear of the bowl for delivering a jet of water into the upper part of the siphon passage under considerable force before the water from the bowl enters the same. Flushing water from a suitable tank enters the bowl structure through an inlet opening 6 leading to a chamber 7 at the rear of the bowl; part of such water going to the hollow rim 2, while the balance goes to a jet passage 8 leading from the forward end of the inlet chamber 7; such passage being curved so as to discharge into the upper part of the siphon passage; striking the curved wall and being deflected to the descending leg 5; and creating such a flow of water and under such pressure that siphonic action will be induced by the time the contents of the bowl flow over the weir 9 between the ascending and descending legs of the siphon passage and insuring a rapid and complete emptying of the bowl. The passage 8 is preferably contracted in the manner indicated by dotted lines in Fig. 2. The discharge outlet of the jet passage 8 is also provided with a weir 10, and this weir is so disposed that when the flow of water through the same ceases, sufficient water of the "after fill" will trickle in from the chamber 7 to insure the

desired seal; the height of which is governed by such weir.

In Figs. 3 and 4, I have shown other forms of closet bowls having concealed jet passages, such bowls, in addition presenting other features of invention forming the subject of a separate application for patent.

In Fig. 3, 1^a represents the bowl of the closet, having a rim 2^a with apertures 3^a leading from said rim for discharging water into the bowl and over the surface of the inner wall of the same. The ascending leg of the siphon passage is indicated at 4^a, while the descending leg of the siphon passage is indicated generally by the reference numeral 5^a, and it may have a series of zones or spaces between the weir 9^a and a discharge outlet 11, which will be more fully described hereinafter. The width of the ascending leg in one plane, for instance the plane of the section shown in Fig. 3, may be approximately three inches, while in a plane substantially at right angles to this, the width may be approximately five inches, and this width continues to the junction with the descending leg so that an enlarged chamber 12 may be provided at the top of said descending leg or at the junction of the same with the ascending leg of said siphon passage. This chamber may have a pair of enlargements 13 formed in the rear wall of the bowl, with a depressed central portion or rib 14; the inner surface of said enlargements being continuations of the curved wall at the top of the chamber leading from the upper wall of the ascending leg of the siphon passage. Within the descending leg of the siphon passage 5^a a zig-zag channel may be provided. To this end the rear wall of the structure may have a ledge or shelf 15, which may define the bottom of the enlarged chamber 12 and disposed substantially opposite a bend 16 in the bore of said descending leg, and from said shelf the passage, in this part substantially circular in cross section with paralleling walls 17 and 18, descends at a slight angle pointed rearwardly to a bottom shelf 19; which latter shelf is disposed rearwardly of the discharge outlet 11, while the forward wall of the said outlet is in line with a curved wall 20 of said passage extending to and joining the inclined wall 18 at the point 21. It will be seen, therefore, that the initial flow of water over the weir 9 will strike the shelf 15 and falling on the same will be deflected across the bore of the passage of said descending leg, cutting off the air, producing a partial vacuum and inducing siphonic action. The presence of the enlarged space at the top of the ascending leg gives space for a large volume of air, and consequently when the discharge from the bowl nears its end, the force of the flow will slow down, breaking the siphon and insuring sufficient water within the bowl as an after fill to make the desired seal; the height of which is governed by the weir 9.

In Fig. 4, 1^b represents the bowl of the closet, having a rim 2^b with apertures 3^b leading from said rim for discharging water into the bowl and over the surface of the inner wall of the same. The ascending leg of the siphon passage is indicated at 4^b, while the descending leg of the siphon passage is indicated generally by the reference numeral 5^b, and it may have a series of zones or spaces between the weir 9^b and the discharge outlet 11^a, which will be more fully described hereinafter. As in the structure shown in Fig. 3, the width of the ascending leg in one plane, for instance the plane of the section shown, may be approximately three inches, while in a plane substantially at right angles to this, the width may be approximately five inches, and this width continues to the junction with the descending leg so that an enlarged chamber 12^a may be provided at the top of said descending leg. This chamber may have a pair of enlargements 13^a formed in the rear wall of the bowl, with a depressed central portion 14^a; the inner surface of said enlargements being continuations of the curved wall at the top of the chamber leading from the upper wall of the ascending leg of the siphon passage.

In Fig. 4, I have shown a modified construction of the descending leg 5^b of the siphon passage in which I form an enlarged chamber 22 in the lower part of the same from which the discharge outlet 11^a leads. The wall opposite the ledge or shelf 15^a is curved as indicated at 23 and a projection 24 is provided substantially midway between the weir 9^a and the bottom of the chamber 22, which may have a shelf 19^a at the rear of the discharge outlet. Toward the front of said chamber 22, the wall is curved as indicated at 25, while the rear wall of said chamber below the ledge or shelf 15^a is also curved as indicated at 26. Water from the bowl flowing over the weir 9^b strikes the shelf or ledge 15^a and is deflected by the curved wall 22 where, striking the projection 24, it will be shot in the reverse direction and strike the bottom shelf 19^a. In this zig-zag course air will be cut off, creating a partial vacuum and inducing the desired siphonic action.

In each of the structures shown in Figs. 3 and 4, a concealed passage for the delivery of a jet of water to the chambers 12 and 12^a is present, such passages differing slightly from that shown in Fig. 1, however, in that they are formed in the rear wall of the bowl and are return passages, the outlets therefrom being at the top of the enlarged chambers 12 and 12^a. These passages, indicated at 8^a and 8^b respectively, lead from the

chambers 7^a and 7^b, having the water inlet openings 6^a and 6^b, and are of such a length and provided with weirs 10^a and 10^b that a proper seal may be afforded by the after fill.

I claim:

1. A water closet bowl of the siphon type having a hollow flushing rim, a siphon conduit leading from said bowl and comprising intake and discharge legs, a hollow chamber at the rear of the bowl above the siphon passages wholly within the body of the bowl, and an inlet for flushing water delivering to said hollow chamber, said hollow chamber having an outlet leading to the hollow flushing rim and a trapped outlet leading directly to the upper part of the discharge leg of the siphon conduit whereby water may be delivered thereto to induce siphonic action before the discharge leg of said siphon conduit fills from the bowl, said trapped outlet having a seal wholly free from and with an outlet disposed above the level of water in the bowl.

2. A water closet bowl of the siphon type having an outlet passage or conduit leading therefrom comprising intake and discharge legs, a hollow flushing rim, an inlet for flushing water, a chamber receiving the same, said chamber communicating with the hollow rim and being disposed at the rear of the bowl above the siphon passages and wholly within the body of the bowl, and the structure having an auxiliary passage also communicating with said chamber and leading to the outlet passage whereby the flushing water may be divided and a portion of the same discharged directly into the upper part of the descending leg of the siphon passage whereby siphonic action may be induced before said descending leg fills from the bowl, said auxiliary passage having a seal wholly free from and with an outlet disposed above the level of water in the bowl.

3. A water closet bowl of the siphon type having a hollow flushing rim, an outlet passage or conduit leading from said bowl and comprising intake and discharge legs, a hollow chamber in the wall of the structure at the rear of the bowl above the siphon passages and wholly within the body of the bowl, an inlet for flushing water leading to said hollow chamber, a passage for water leading from said hollow chamber to the hollow flushing rim, a separate passage leading to the discharge leg of the siphon conduit whereby water may be delivered thereto to induce siphonic action before the discharge leg of said siphon conduit fills from the bowl, and a seal for said latter passage wholly free from and having an outlet disposed above the level of water in the bowl, the water delivered from said passage being under substantially the full head from the inlet.

4. A water closet bowl of the siphon type having a hollow flushing rim, an outlet passage or conduit leading from said bowl and comprising intake and discharge legs, an inlet for flushing water, a chamber at the rear of the bowl receiving the same, said chamber communicating with the flushing rim and disposed wholly within the body of the bowl, and an auxiliary passage also communicating with said chamber and leading to the upper part of the discharge leg of the siphon conduit or outlet passage, such construction effecting a division of the flushing water whereby a portion of the same may be discharged under substantially full head directly into the upper part of the descending leg of the siphon passage and induce siphonic action before said descending leg fills from the bowl, said trapped outlet having a seal wholly free from and disposed above the level of water in the bowl.

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

ANDREW COCHRAN.

Witnesses:

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