

1,062,413.

FIG.1.

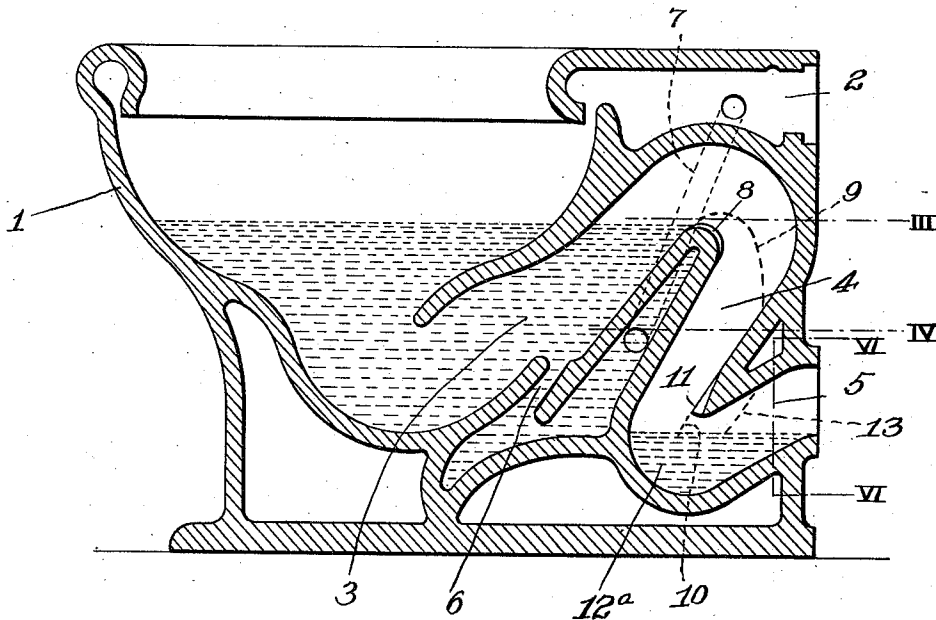


FIG.2.

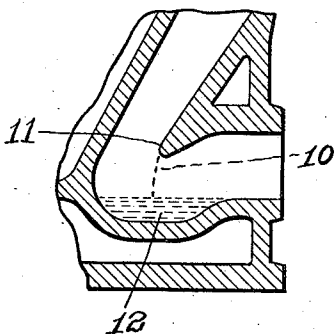


FIG.3.

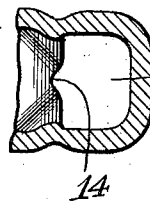


FIG.4.

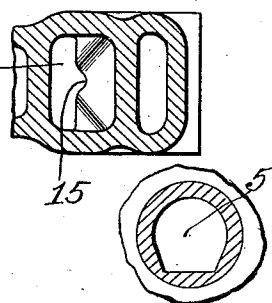


FIG.5.

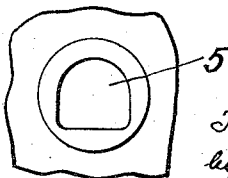
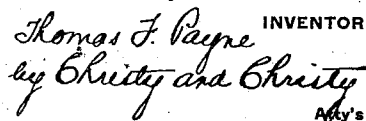


FIG. 6.



WITNESSES:

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WATER-CLOSET.

1,062,413.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed August 1, 1912. Serial No. 712,808.

To all whom it may concern:

Be it known that I, THOMAS F. PAYNE, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Water-Closets, of which improvements the following is a specification.

My invention relates to the construction of siphon water-closets having back-outlets, and has particularly to do with the shaping of the siphon passage of such closets.

The object of my invention is to so construct the siphon passageway that the discharging strength of the closet will be increased, while at the same time a proper quantity of water will remain in the bowl after each flushing operation.

In the accompanying drawing, which forms part of my specification, Figure 1 is a longitudinal sectional view of a back-outlet siphon closet in which my invention is embodied; Fig. 2 is a sectional view of a portion of the siphon passage of such closets as they have been usually constructed heretofore; Figs. 3 and 4 are sectional views of the siphon passage taken on the lines III and IV, respectively, of Fig. 1; Fig. 5 is a partial end view of the closet showing the siphon outlet; and Fig. 6 is a sectional view of the outlet channel taken on the line VI—VI, Fig. 1, showing the extent of the flat bottom of such channel rearward of the outlet orifice.

In the several figures like numerals are used to designate like parts.

The general construction of the water-closet shown herein is well known, and may be briefly described as consisting of a bowl 1, which normally holds a quantity of water, as indicated in Fig. 1. At the top of the closet there is a water-inlet chamber 2, which is suitably connected to a conduit (not shown) leading from a flushing tank or other means of supply. Extending from the bottom portion of the bowl 1 there is a tortuous passageway consisting of an up-leg 3, a down-leg 4 and an outlet channel 5, which empties into a sewer pipe (not shown).

A further detail of construction, usually embodied in such closets, is a priming jet

6 placed in the up-leg 3, as shown, whereby a stream of water, flowing from the chamber 2 through the conduit 7, becomes effective to assist in discharging the bowl of its contents.

In the first stage of the flushing operation of such water closets, water flows into the top of the bowl 1 from the chamber 2, and into the up-leg 3 from the jet 6, causing a sheet of water to spill over the bend or dam 8. This sheet of water, descending through the down-leg 4, carries with it a portion of the body of air in such leg and forms water seals (as indicated by the dotted lines 9 and 10) whereby air from the sewer pipe is kept from entering the legs 3 and 4. A difference in air pressures upon the body of water in the siphon passageway and upon that in the bowl 1 being thus established, the water will flow up the leg 3. The rate of such flow, which determines the discharging force of the water-closet, will depend largely upon the difference in the said pressures. After the initial siphonic action has been effected the flowing water becomes turbulent, and, in flowing through the passageway, carries with it additional pockets of air, so that the strength of the siphonic action tends to increase. I have found, however, that during this period of the flushing operation the water seals do not, on account of the usual construction of the passageway and the turbulent state of the water, completely prevent air from returning to the siphon leg; and that the strength of the siphonic action during this period is thereby correspondingly weakened. The water thus continues to flow through the passageway until practically all the water from the flushing tank has been emptied into the bowl 1, and at this time the water flows in a thin sheet over the dams 8 and 11, which are usually straight-edged and horizontally-disposed, and causes the siphonic action to continue slowly until practically all the water in the bowl has been drained therefrom. Since it is desirable to have the bowl normally filled with water up to the level of the dam 8, as shown in Fig. 1, it will be readily understood that this continued action of the

siphon is undesirable. In other words it is desirable to retain in the bowl 1 a certain quantity of the stream flowing therein from the source of supply, such quantity being
5 termed hereafter "refilling water".

From the foregoing description of the flushing action of back-outlet water-closets having siphons it will be seen that it is characteristic of the water seals that they fail
10 during the time they are most helpful to increase the discharge strength of the closet, and that they continue to act when they are in fact a hindrance to the successful operation of the closet.

15 Having reference first to the feature of my invention which concerns the increasing of the discharging strength of back-outlet closets, I have found that such strength may be very substantially increased by so
20 shaping the outlet channel 5 that a third seal is provided in such channel and the seal 11 strengthened; and by a further shaping such channel that the outlet orifice will have increased cross-sectional area. The
25 usual construction of the outlet channel 5 is shown in Fig. 2 of the drawing. At the bottom of the channel, and beneath the dam 11, a weir cavity or water-containing trough 12, is provided in order to assist in main-
30 taining the water-seal 10. The remainder of such channel is substantially horizontal and circular in cross-section. Of this construction it will be seen that the rim of the dam 11 is at a substantial distance from
35 the water in the trough 12, such distance being practically equal to the general width of the passageway at the side of the dam.

In order to provide a third water seal and to strengthen the seal 10, I preferably incline the outlet-channel 5 upwardly, as
40 shown in Fig. 1, so that there will be a relatively small space intervening between the water in the trough 12^a (see Fig. 1) and the rim of the dam 11, and further so that
45 the cross-sectional area of the siphon passageway in all planes adjacent to the rim of the said dam will be substantially the same. Also, I form the outlet orifice of the channel 5, and the portion of the chan-
50 nel adjacent to such orifice, so as to have a flat or plane faced bottom, as shown particularly in Fig. 5.

When the channel is so constructed I have found that a third water seal 13 is
55 formed; that the seal 10 is materially strengthened; and that the water escapes freely from the outlet orifice of the outlet-channel 5. As a result of this increase in strength and number of the water seals, the
60 discharging capacity of such water closets is greatly increased.

Referring now to the feature of my invention which concerns the stopping of the siphonic action of the closet before the re-

filling water has been drained therefrom by 65 the thin sheet of water flowing over the dams 8 and 11, I so shape the rims of the dams 8 and 11 that the sheet of water flow-
ing over them will be of uneven depth. As stated above, the rims of such dams are usu- 70 ally straight and horizontal so that an even sheet of water flows over them to form a seal. By interrupting the continuity of such dams with notches 14 and 15 as illus-
75 trated in Figs. 3 and 4, respectively, I find that the desirable effect of such straight edged dams is in no manner lost and that the undesirable feature of such dams, namely, the continued action of the siphon is eliminated. This is by reason of the fact 80 that the relatively small supply of water at the end of the flushing operation instead of flowing in a thin sheet over the dam, will flow through the depression or notch, there-
85 by making an air passageway from the sewer on each side of the notches to the leg 3. The siphon is thus completely broken and the refilling water is not drawn from the bowl.

I claim as my invention:

90 1. In a back-outlet siphon water-closet, the combination with a bowl and a tortuous siphon passage leading from said bowl and having an up-leg and a down-leg inclined beneath the said up-leg; of an outlet chan- 95 nel leading from the said passage inclined upwardly from the lower end of and beneath the said down-leg, the lowermost edge of the outlet orifice of the said channel being at the lower level than the rim of the 100 dam formed at the junction of the down leg and the said channel, the bottom of said outlet channel being plane faced at and adjacent to the outlet orifice thereof.

2. In a back-outlet siphon water-closet, 105 the combination of a bowl, a tortuous siphon passage extending from the said bowl and having the down-leg thereof inclined beneath the up-leg, a dam at a bend in the said passage and at one end of the said in- 110 clined leg, the rim of the said dam extending in a substantially straight horizontal line, and a depression interrupting the continuity of the said straight-lined rim and causing near the close of the siphoning op- 115 eration a break in the sheet of water flowing over the rim.

3. In a back-outlet siphon water-closet, the combination of a bowl, a tortuous siphon passage leading from said bowl and 120 having an up-leg and a down-leg inclined beneath said up-leg, an outlet-channel leading from and upwardly inclined beneath the said down-leg, a dam at the junction of said down-leg and outlet-channel, the 125 rim of the said dam extending in a substantially straight horizontal line having its continuity interrupted by a depression

therein, the lowermost edge of the outlet-
orifice of the said outlet-channel being at a
lower level than the said dam, and a trough
below said dam and of greater depth than
5 the difference in levels of the said dam and
lower edge of said outlet orifice.

In testimony whereof I have hereunto set
my hand.

THOMAS F. PAYNE.

Witnesses:

ALICE A. TRILL,
PAUL N. CRITCHLOW.

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