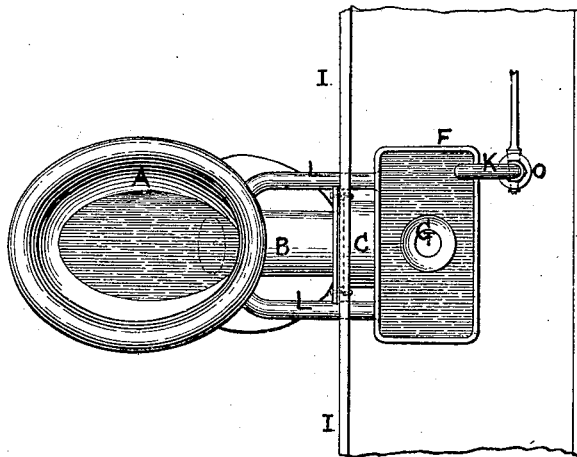
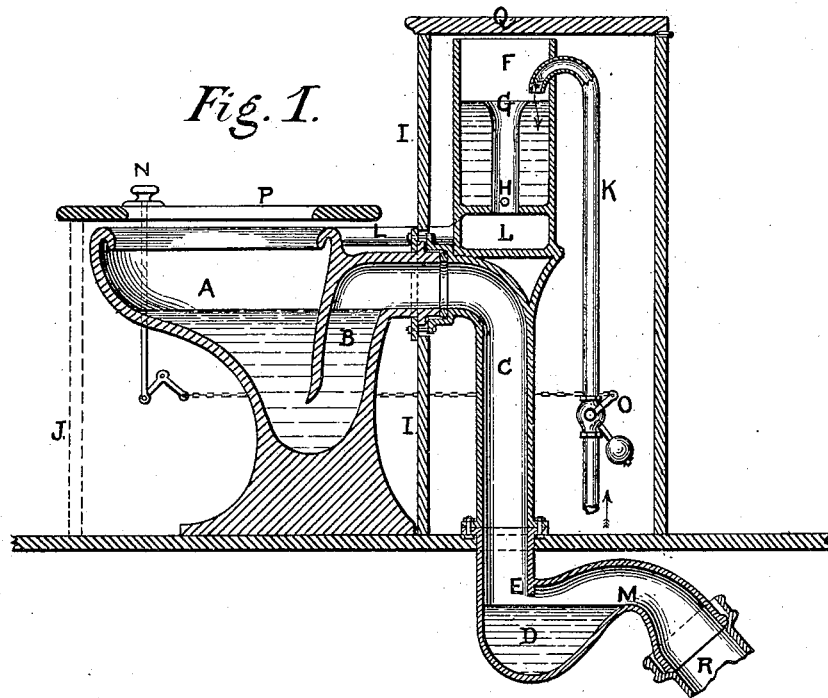


(No Model.)

G. E. WARING, Jr.
WATER CLOSET AND URINAL.

No. 266,404.

Patented Oct. 24, 1882.



Witnesses :

Harry Tiffany
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UNITED STATES PATENT OFFICE.

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WATER-CLOSET AND URINAL.

SPECIFICATION forming part of Letters Patent No. 266,404, dated October 24, 1882.

Application filed January 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. WARING, Jr., of Newport, county of Newport, State of Rhode Island, have invented a new and useful Improvement in Water-Closets, Urinals, and Slop-Hoppers; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improved method for supplying water to water-closets or urinals for discharging their contents and for refilling them with clean water after such discharge. The form of these vessels when constructed according to my invention is such that they retain water to a considerable depth, this depth being regulated by the height of the overflow-point or bend of the outlet-pipe or siphon. The vessel standing full with water or liquid wastes to this overflow-point, the outlet-pipe is made to act as a siphon by adding a sufficient volume of water. It then withdraws the contents of the vessel by siphon action.

I am aware that prior to my invention water-closets, &c., were constructed to hold water to a considerable depth by an elevation of the outlet-pipe; but the contents of such closets were discharged either by the velocity of a strong jet of water, and without a true siphon action, or by introducing into the outlet-limb of the exit-pipe a jet of water or a current of air, which while it may have produced a true siphonage did so by means different from those which I employ. I am aware also that prior to my invention automatic flush-tanks having for their object the cleansing of drains were constructed to be discharged by the operation of siphons; but such flush-tanks were not intended to be used as water-closets or urinals, nor were they suited for such use. Such an automatic flush-tank is that invented by Rogers Field, and described in the English Patent No. 3,348 of 1872; but this tank is not a water-closet, nor is it capable of being applied to that use.

I am also aware of the English Patent No. 577 of 1870, of which the drawings indicate a closet somewhat resembling my invention in its general construction, and of which the speci-

fication asserts that when the water is discharged into the bowl the overflow causes the lower end of the siphon to be sealed and causes a siphon action to be set up by which the contents of the bowl are withdrawn. In this case the similarity of form, as shown by the drawings, is only accidental, the closet there shown being emptied by the force of the supply-stream thrown into it, and not by siphon action. The assertion set forth in the specification that the lower end of the siphon is sealed and that the contents of the bowl are withdrawn by siphon action is an error on the part of the inventor. Such sealing cannot take place under the circumstances indicated, nor can the contents of the bowl be withdrawn by siphon action, the apparatus being constructed as described and shown, the more especially as the intake would admit air as soon as the discharge began. In order to facilitate siphon action in my invention, I do not increase the diameter of the discharging-limb of the siphon as it descends, but maintain the same diameter throughout, that the space to be closed against the admission of air may be kept as small as possible.

The principle of my invention is as follows, reference being had to the accompanying drawings, and a water-closet being taken as an illustration:

In the drawings, Figure 1 represents a vertical section through the closet, water-supply, siphon, and weir-chamber, showing the relation of the different parts to each other. Fig. 2 is a top view or plan of the closet and its attachments.

The water-closet A B F, constructed of earthenware or of metal, consists of two compartments—one the bowl A, the other the water-chamber F. The water-chamber F is elevated slightly above the bowl A. It is connected with the supply-pipe K, and has an overflow-pipe, G, which communicates through the chamber L with the bowl A. The overflow-pipe G has a small hole, H, near its lower end. Connected with the bowl A is an exit channel or pipe, B, which is connected with an extension of the exit-pipe C, delivering into the weir-chamber D in such a manner that the pipes B and C constitute a siphon, of which B is the receiving-limb and C the discharging-limb. The dis-

charging-limb delivers into a weir-chamber, D, which has its overflow M at an elevation lower than the lower end of the discharging-limb C, where this lower end crosses the weir-chamber D. The depth to which water is held in the bowl A is regulated by the height of the bend between the receiving-limb B and the discharging-limb C, and it may be of greater or less height, according to the depth to which it is desired to retain the water, without thereby affecting the operation of the closet. In an ordinary water-closet I find it desirable to hold water to a depth of about nine inches, giving a positive seal of six inches between the intake of the receiving-limb and the surface of water in the bowl. This depth should always be so much that the water remaining in the receiving-limb B, on dropping back after the siphon "breaks," will suffice to furnish a considerable seal at the intake. It is desirable that this depth of water, constituting what is technically known as the "depth of seal" or the "dip," should be at least as great as the greatest diameter of the siphon, so that air may not enter the intake until full siphonage is set up, and so that an immediate resealing may be insured after accidental siphonage. When the weir-chamber D is filled with water to its overflow-point there is a space between the surface of the water and the lower end of the discharging-limb at E. This space brings the air in the siphon B C into free communication with the air of the soil-pipe; but this open space at E is so restricted that the introduction of a small quantity of water into the weir-chamber D causes its contents to well up, so as to come into contact with the bottom of the discharging-pipe E, thus separating the air of the discharging-pipe from the air of the soil-pipe. This being done, a continuance of the flow through the discharging-limb C carries with it a portion of the confined air of the siphon, and so lessens the resistance of its atmosphere to that of the atmospheric pressure in the bowl A and induces an increased flow into the receiving-limb B. As the flow increases the withdrawal of air from the siphon increases also, and a true siphon action is soon set up, which continues until the water in the bowl A descends to the intake of the receiving-limb B, when it is followed by air, which arrests the siphon action. The contents of the weir-chamber D continue to escape at the overflow-point M until the surface of its water drops away from the lower end of the discharging-limb at E, admitting air from the soil-pipe. The siphon is then completely emptied of its water, and so much of its contents as remained in the receiving-limb B drops back through the intake and seals the exit from the closet.

Having thus described the principle on which the closet works, I now proceed to explain its operation in practice.

The water-chamber F is empty, the bowl A is full to its point of overflow between B and C, and the weir-chamber is full to its point of overflow at M. The handle N being lifted,

the cock O is opened and water rushes through the supply-pipe K into the chamber F much more rapidly than it can escape through the hole H. The chamber being filled, it overflows at G and passes through the compartment L into the bowl A. Water rises in the receiving-limb B, overflows through C, raises the water-level in the weir-chamber D until it reaches the lower end of the discharging-limb at E and imprisons the air of the siphon. The flow into the bowl A continuing, the movement of water through this confined atmosphere continues and carries with it, as its delivery increases, an increased volume of this confined atmosphere, until a strong siphon action is established, withdrawing from the bowl A not only the water which it originally contained, and which may have been fouled by use, but also the clean water flowing from the chamber F. When the emptying of the bowl is indicated by the suction of air at the intake of the limb B the handle N is dropped and the water-supply is shut off. The air taken into the siphon when the bowl became emptied arrests the siphon action, the contents of the pipe C fall into the weir-chamber D and overflow into the soil-pipe, and the contents of the receiving-limb B fall back and seal the intake. The bowl A is now slowly filled by the discharge of the contents of the chamber F through the hole H. The weir-chamber discharges its surplus water over the overflow and unseals the vent at E, so that there can be no further withdrawal of water from the bowl A until a sufficient volume of water is again delivered into it to cause another sealing of the vent E. This can take place only when the supply-valve O is again opened, or when water in considerable quantity is delivered into the bowl A by other means. Other means of water-supply may be used to effect the same ends. For the lowering of the water-level in the weir-chamber D, I do not wish to confine myself to a depression of the overflow-point M. This point may be higher than the lower end of the discharging-limb E, and the contents of the weir-chamber D may be lowered by the action of a subsidiary siphon leading from the weir-chamber over the point M and delivering to the outlet. Neither do I wish to confine myself to a weir-chamber of the form indicated in the drawings. The same effect may be secured by other forms of obstruction at the mouth of the siphon which will prevent the entrance of air into it during its flow.

The foregoing is a description of a water-closet intended to perform the office of water-closets as usually constructed. The apparatus may be made smaller and adapted for use as a urinal, or it may be made much larger, so that the bowl would constitute a slop-hopper sufficiently large to hold the daily product of liquid wastes of a small family. For such use the water-chamber F may be dispensed with, and the chamber A may receive, in addition to its use as a water-closet, all of the liquid wastes of the family. When by repeated additions it

has been filled to the height of the overflow-point of the siphon between B and C the delivery into it of an additional pailful of water will cause its contents to be discharged as described.

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

1. A water-closet or urinal of which the contents are discharged by the action of a valveless siphon having a depth of seal or dip greater than the greatest diameter of the siphon.

2. In combination with the bowl of a water-closet or urinal whose contents are discharged by the action of a valveless siphon, a siphon which is of uniform diameter throughout its length, substantially as shown.

3. In combination with the bowl of a water-closet or urinal, a discharging-siphon, the mouth of whose discharging-limb delivers to a weir-chamber or a false trap or other form of obstruction so constructed that when the outflow of the siphon is greater than the capacity of the free space between the mouth of the siphon and the bottom of the overflow of the weir-chamber or false trap, or between the mouth of the siphon and the obstruction, the mouth of the siphon becomes sealed or closed against the admission of air, substantially as set forth.

4. In combination with the bowl of a water-closet or urinal and a siphon by which the same is discharged, a weir-chamber or false trap so constructed that the water discharged into it wells up so as to seal or close the mouth of the outlet at the beginning of the flow, and from which a portion of the water remaining at the end of the flow is discharged, so as to unseal or open the mouth of the outlet, substantially as set forth.

5. In combination with the bowl of a water-closet or urinal and a siphon for discharging its contents, a weir-chamber or false trap or other obstruction so constructed that the mouth of the siphon is sealed at the beginning of the flow and is unsealed after the flow ceases, substantially as set forth.

6. A water-closet or urinal of which the contents are discharged by the action of a valveless siphon so constructed that the mouth of the receiving-limb of the siphon is not opened for the admission of air until after the water in the bowl is lowered to less than one-half its normal depth, substantially as set forth.

GEO. E. WARING, JR.

Witnesses:

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