

W. F. LAWRENZ.
FLUSH TANK FOR WATER CLOSETS.
APPLICATION FILED OCT. 24, 1910.

1,053,303.

Patented Feb. 18, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

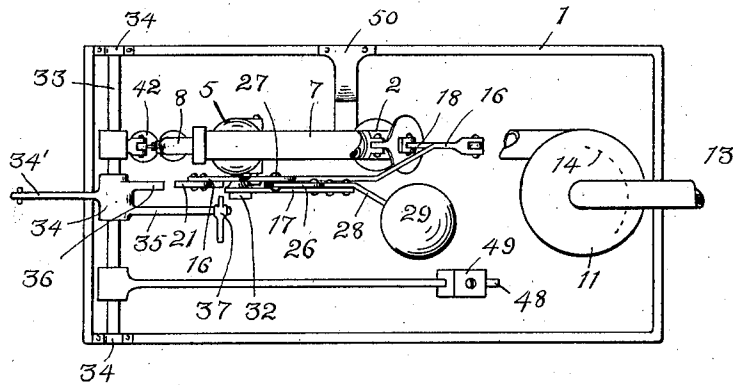
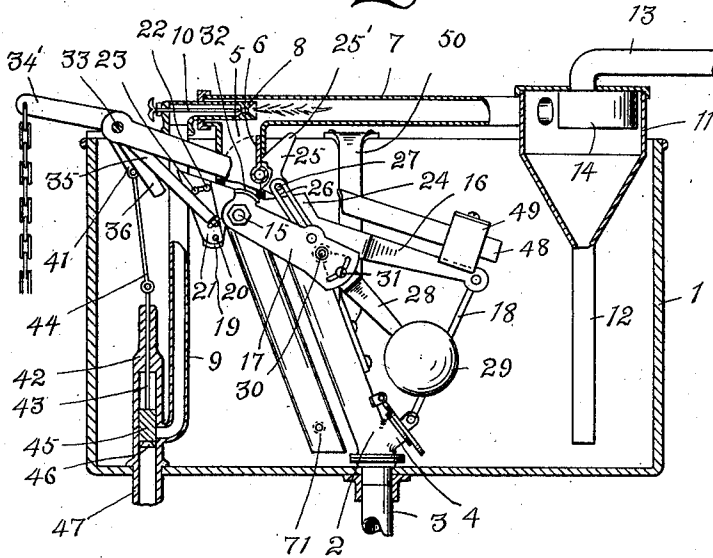


Fig. 2.

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2 SHEETS—SHEET 2.

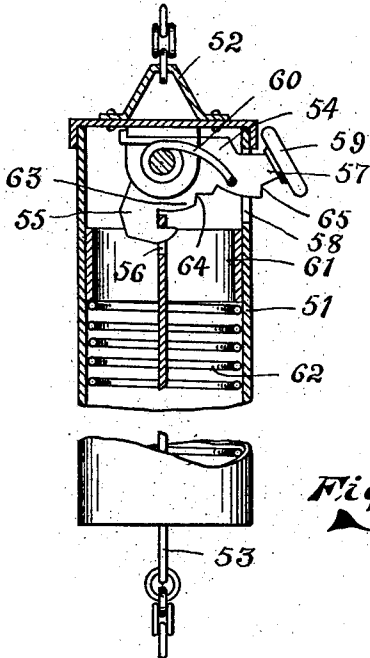


Fig. 3.

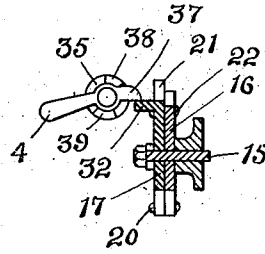


Fig. 5.

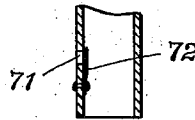


Fig. 6.

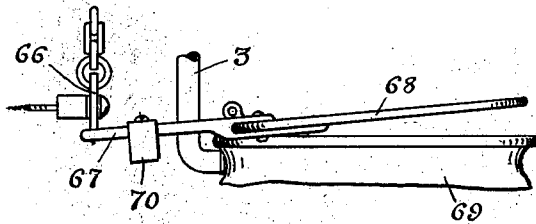


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM F. LAWRENZ, OF DULUTH, MINNESOTA.

FLUSH-TANK FOR WATER-CLOSETS.

1.053,303.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed October 24, 1910. Serial No. 588,912.

To all whom it may concern:

Be it known that I, WILLIAM F. LAWRENZ, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Flush-Tanks for Water-Closets, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in flush tanks for water closets.

The object of my invention is to provide a tank of this character in which the water entering the tank causes a suction of air up through the water supply pipes from the closet out through the ventilating pipe.

Another object of my invention is to provide a tank of this character in which a determined amount of water is retained or retarded in the tank to fill the trap after the closet has been flushed.

Another object of my invention is to provide means whereby the tank is flushed by the seat of the closet and in which means is provided whereby the seat will not flush the closet if so desired, and also providing means whereby the tank will not flush if operated by the seat before it is full, but will flush after it is full if operated before it is filled.

A still further object of my invention is to provide a device of this character having certain details of structure hereinafter fully set forth.

In the accompanying drawings—Figure 1 represents a vertical sectional view of a closet tank equipped with my improved ventilator, it being shown partly in section and partly broken away for convenience in illustration. Fig. 2 is a top view of the same. Fig. 3 is a partly broken vertical section of the chain releasing mechanism. Fig. 4 is a side elevation of the closet seat and attachment. Fig. 5 is a vertical section through the lever shaft, showing the end view of the tripping dog, and Fig. 6 is a vertical section of the vent port in the lower end of the siphon.

1 represents the rectangular-shaped tank for flushing the closet and in which is mounted the inverted U-shaped siphon 2, which is common in such flushing tanks, one end of which connects with the flushing pipe 3 and is provided with the usual lever operated valve 4, adjacent its connection with

the flushing pipe 3. Upon the upper end of the siphon 2 is formed the enlarged vertical chamber 5 within which is pivoted the flap valve 6. The upper end of the chamber 5, terminates in the elongated horizontal cylindrical-shaped pipe 7, within which and from the opposite side of the chamber 5 extends the siphon nozzle 8, connected to the water supply of the closet by the pipe 9, having a finger operative regulating rod 10 for regulating the size of the nozzle and thereby the ventilating capacity of the device.

The outer end of the pipe 7 communicates with the conical-shaped vertical chamber 11, which has the water down pipe 12 leading within the tank 1, and extending within close to the bottom thereof, and the air discharge 13 from the top of the chamber 11 to the ventilating flue of the house or to the outer air. Within the upper portion of the chamber 11, and attached to the under side of the top thereof is the crescent-shaped baffle plate 14, the object of which is to divide the discharge of air and water mingled from the pipe 7 and divert the water to a spiral course in descending the discharge pipe 12, to allow the air to separate more freely from the water and be discharged through the air pipe 13.

A pin 15 is securely fixed to the side of the siphon 2, just below the chamber 5, and upon which are pivoted the valve operating lever 16 and the float lever 17. The outer end of the lever 16 is connected to and operates the cover of the valve 4, by means of the rod 18, while at its opposite end the lever 16 is formed with the depending portion 19 upon the side of which is pivoted at 20 the catch 21, which is yieldably held in position by means of the pin 22 within the slot 23 thus admitting of its being engaged from the under side of its extreme point without affecting the lever 16, but when engaged from above, to become a rigid portion of said lever as will be more fully described in the operation of the device. The lever 16 is also formed with the upwardly projecting shoulder 24 which engages and operates the valve lever 25 when the outer end of the lever 16 is raised, the valve lever 25 having an upwardly projecting counter-weight 25' arranged in such a manner as to keep the valve normally closed or opened, as the case may be. The lever 17 also engages the valve operating lever 25 through the medium

of the pivoted link 26, though only in its downward motion as clearly seen by the open link engaging the pin 27. The lever 17 carries upon its outer end the adjustable extension 28, which carries the float 29, the extension being pivoted at 30 and adjustable at 31 for the purpose of gaging the amount of water in the tank, as clearly shown in Fig. 1. A small laterally projecting quadrant catch 32 is formed upon the lever 17 just above the pin 15.

The shaft 33 is journaled in suitable boxes 34 across the end of the tank 1 and carries securely attached thereto the hub 34 having the chain operating arm 34' formed integral therewith and projecting out beyond the tank and to which the operating chain is attached, and the two inwardly projecting arms 35 and 36, the former having pivoted upon its outer end the gravity dog 37, which is designed to engage the quadrant catch 32, when the float 29 is in an elevated position.

Two stops 38 and 39 are fixed to the end of the arm 35 on opposite sides of the center of the dog 37 to govern its movement so that it is normally held in an engaging position by its gravity end 40. The end of the arm 36 is formed to suitably engage the catch 21. A pitman arm 41 is also securely fixed to the shaft 33 directly over the valve 42 and is connected with the valve stem 43 thereof by means of the pitman 44.

The valve plunger 45 is not connected to the stem 43, but simply held in position thereby thus admitting of a free movement of the pitman vertically beyond that required for the raising of the valve plunger, which is necessary when the shaft 33 is being operated by the levers in connection with float 29, the valve 45 being raised from its seat 46 by the water pressure within the supply pipe 34 soon as the valve stem 43 is raised, thus admitting water to the pipe 9.

A weighted arm 48 is fixed to the shaft 33, it having the slidably adjustable weight 49 attached thereto for the purpose of counterbalancing the weight of the operating chain and the lifting effect of the valve 42 and to hold the levers on the inside of the tank 1 depressed normally.

A brace 50 is attached to the siphon 2 in any convenient manner, the opposite end of which is attached to the upper edge of the tank 1 to act as an additional support to the siphon and its mechanism especially in the event of the ventilator being attached to an already installed tank, whereas, in a new equipment, the siphon might become a fixed portion of the flushing pipe 3 and not require any additional bracing.

51 represents the chain releasing mechanism interposed upon the operating chain in a convenient location between the closet

seat and the flushing tank, the chain being attached to the bracket 52 at the top of the releasing cylinder 51 and to the outer end of the spring operated rod 53 within the cylinder 51. To the under side of the top of the cylinder 51 is pivoted the catch 54, the vertical portion 55 of which is formed into a hook to catch within the opening 56 in the upper end of the rod 53, and the horizontal portion 57 of the catch extends without the cylinder 51 through the slot 58 and terminates in the thumb-key 59, and the catch is designed to be held normally in the position shown by the small spiral spring 60.

The upper end of the rod 53 is surrounded and securely attached to the ring 61, which slidably fits within the cylinder 51 and against which the spiral spring 62 impinges in an effort to keep it in its uppermost position. A depending projection 63 is formed on the catch 54 adjacent the notch 64 in such a manner that when the catch is depressed by the action of a finger or thumb on the key 59, it will force the end of the rod 53 together with the ring 61 slightly downward until the hook has entirely disengaged the rod 53 when the latter will finally slip up into the notch 64, at which time the notch 65 will have appeared directly over the upper edge of the ring 61. Now when the pressure is released from the key 59, the notch 65 will engage the edge of the ring 61 which will prevent the former from being restored to its normal position by the spring 60. If the rod 53 is now drawn downward by the action of the chain below, it will freely pass the hook in the catch and will simply compress the spring 62 without operatively affecting the chain connected to the upper end of the cylinder, this provision being made against a time when it is desired to use the closet without operating the flushing mechanism. When the downward draft is released from the chain attached to the rod 53, it will immediately return to its uppermost position by the action of the spring 62, and again engage the hook of the catch 54 which returned to its normal position by the action of the spring 60 when the ring 61 was withdrawn from the notch 65 on its downward course. Thus it is readily seen that if the thumb key is not depressed, as above described, any downward action of the lower chain will similarly affect the upper chain and the result appear as though no releasing mechanism existed.

The chain from the lower end of the releasing cylinder 51 is attached to one end of the centrally pivoted lever 66, mounted upon the wall just back of the cover of the closet, the opposite end being directly over the outer end of the lever 67 attached to the seat 68 of the closet 69. This latter lever is provided with a slidably adjustable weight 70

which may be readily set to counterbalance the weight of the seat so that it will remain in a slightly lifted position at all times, that the action of a person sitting upon it will

5 raise the outer end of the lever 67 and thereby raise the opposite end of the lever 66 to that to which the chain is attached, which will draw the flushing chain downward.

A vent 71 is formed in the free leg of the
10 siphon near the foot thereof and covered internally with the thin spring clap 72, the object of which is not to allow all the water to discharge from the tank at once and thus leave none for filling the trap below the
15 closet which is essential and the object is accomplished in the following manner: When the water is discharged to a point level with the vent 71, just enough air will be sucked in past the valve 72 to break the
20 effect of the full flow of water and the vacuum of the full pipe of water descending is destroyed so that the subsequent slight flow of water is free to remain in the trap.

Assuming the flushing tank to be empty
25 and the mechanism in the position shown in the drawings, the operation of my device is as follows: The seat of the closet having been depressed by the action of a person sitting thereon, a downward pull of the flushing
30 chain will be produced which will rock the shaft 33, which will raise the arms 48, 35, 36 and 41 and in so doing, the latter arm will release the valve 45 and admit water from the supply 47 into the pipe 9, through
35 the siphon nozzle 8 into the pipe 7, the action of which discharge will produce a suction of air up through the siphon 2 and force the air and water combined through the pipe 7 into the chamber 11 where they will be separated as before described, the water being
40 discharged into the tank 1 and the air forced out through the pipe 13. This it is evident will produce a suction or forced draft upward through the flushing pipe 3, from under
45 the seat of the closet, thoroughly ventilating the same so long as water continues to flow through the siphon 8, which will continue till checked by the action of the float 29, this latter having held the valve 6 open
50 while depressed. The arm 36 is raised during the above described operation to a point just above the catch 21 on the lever 16, the catch having receded to let the end of the lever 36 pass up and engage it from above.
55 At the same operation the lever 35 was raised till the dog 37 catches and rests upon the quadrant catch 32, which pressure holds the shaft 33 from returning to its normal lowermost position by the action of the
60 weighted lever 48. As the tank 1 is filling with water which enters through the pipe 12, as before stated, the float 29 will gradually raise to a predetermined point, at the same time releasing the hold of the link 26 upon
65 the pin 27 of the valve 6 and leaving it un-

restrained except by the weight 25', till such point of elevation of water is reached when the quadrant catch 32 will have passed out from under the dog 37, the entire strain of the weighted shaft 33 being at all times
70 upon the flushing chain when held taut by the continued presence of the person on the closet seat. Now when the pressure is removed from the seat and it is allowed to come up, the chain will be released, the shaft 33 rotate back to normal which will cause
75 the lever 36 to press heavily upon the catch 21, and thus depress the same, which will raise the opposite end of the lever 16, and thus open the valve 4 and admit the water from the tank into the flushing pipe 3. At the same time the shoulder 24 on the lever 16 will have kicked the valve 6 over during
80 its upward movement and shut it, which establishes the circulation through the siphon 2 and perfectly flushes the closet in the usual manner, the vent 71 acting to prevent all the water from being removed at once as before described. The water now
85 having discharged from the tank, the float 29 will descend, carrying with it the lever 17 and by the link connection 26 again open the valve 6 and the device is ready for another operation. However, in the event of the pressure being removed from the closet
90 seat before the tank is sufficiently full of water to flush, the dog 37 on the end of the lever 35 will descend slightly and engage the quadrant catch 32 and there rest and hold the shaft 33 from rotating till such
95 time as the tank is properly filled and the catch 32 disengaged from the dog when the flushing operation will proceed as before. And in case the pressure is not removed from the seat till after the tank is filled,
100 then the water will continue to flow through the nozzle 8 and the upward ventilation continue though the small amount of water entering will overflow through the siphon 2, into the flushing pipe 3.
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Thus it is seen that I have provided a perfect ventilating means for water-closets and one that will cause a forced draft up from under the seat during the entire period of the depressed seat cover and one that may be
110 readily adjusted to flush or not as desired.

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

1. A ventilator for water closets, comprising a flushing tank, a siphon therein and in communication with the flushing pipe, a chamber in communication with the upper end of the siphon, means for closing the communication between the chamber and
120 siphon and a water supply pipe for said chamber and injecting the water across the upper end of the siphon causing an upward suction of air through a portion of the siphon and the flushing pipe.
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130

2. A ventilator for water-closets, comprising a flushing tank, a siphon therein and in communication with the flushing pipe, a horizontal chamber extending across the upper end of the siphon, means for closing the communication between the chamber and siphon, a water injection pipe injecting the water into the chamber across the upper end of the siphon, and means for allowing the air to escape from the chamber and the water thereto the tank.

3. A ventilator for water-closets, comprising a flushing tank, a siphon therein and in communication with the flushing pipe, a horizontal chamber extending across the upper end of the siphon and terminating in an enlarged chamber having an air pipe at its upper end and a water discharge pipe at its lower end discharging into the tank, a water supply pipe injecting the water into the horizontal chamber across the upper end of the siphon and causing an upward draft of air through one leg of the siphon from the flushing pipe and means for closing the communication between the siphon and the chamber.

4. A ventilator for water-closets, comprising a flushing tank, a siphon therein and in communication with the flushing pipe, a horizontal chamber extending across the upper end of the siphon and in communication therewith, a valve communicating with the siphon below the chamber, a float closing the valve for preventing the tank from overflowing, a water injecting pipe feeding the water to the tank through the horizontal chamber to cause a suction therethrough from the flushing pipe and means for closing the communication between the siphon and the chamber, and means operated by the float valve for controlling the supply of water when the tank is filled.

5. A ventilator for water closets, comprising a flushing tank, a siphon therein, a flushing pipe in communication with the siphon, a chamber in communication with the siphon, a water supply pipe in communication with the chamber and injecting the water across the upper end of the siphon, a float valve controlling said water supply, a valve in the siphon below the chamber, means carried by the float for controlling the valve in the siphon, a valve for flushing the closet through the siphon and means for operating the valve for flushing the closet, and means whereby said valve operating means will not flush the tank until the tank is full.

6. The combination with a flushing tank, of a siphon therein, a water supply pipe in communication with the siphon for the tank whereby a suction of air through one leg of the said siphon is caused by the incoming water, means for controlling the water in the supply pipe, and means for simultane-

ously closing the upper end of the siphon and opening the lower.

7. The combination with a flushing tank, of a siphon therein having an open upper end, a valve for controlling said siphon, a lever operating said valve, a water supply pipe extending across and in communication with the upper open end of the siphon for causing a suction through the siphon, means connected to the water supply pipe and the lever for controlling the flow of water from said supply, and a valve in said water supply pipe.

8. The combination with a flushing tank, of a siphon therein, having an open upper end, a water supply pipe through which water passes for causing a suction through the open upper end of the siphon, a lever for opening said water supply pipe, means for closing the open upper end of the siphon, a valve for closing said water supply pipe and connected to the lever, a valve for allowing the water to pass from the tank into the siphon and means connecting said valve and the lever for operating the valve.

9. The combination with a flushing tank, of a siphon therein having an open upper end, a water supply pipe for filling the tank in communication with and causing a suction of air through the open upper end of the siphon, a valve controlling said water supply pipe, a lever operatively connected to the valve for opening the water supply pipe, a float for releasing the closing means for said water supply pipe valve, means for closing the open upper end of the siphon, a valve adapted to allow the water to pass from the tank into the siphon, means connecting said valve and the lever, whereby the valve may be opened, and a weight carried by the lever and normally holding the water supply pipe and siphon valves in a position whereby they may be opened.

10. The combination with a flushing tank, of a siphon therein having an open upper end, a valve at the upper end of the siphon, a valve at the lower end of the siphon, a water supply pipe in communication with and causing a suction of air upwardly through the open upper end of the siphon, a valve in said water supply pipe, means for closing the open upper end of the siphon, a rock shaft carried by the upper end of the flushing tank, an operative lever carried by the shaft, an arm carried by the shaft and having a link connection with the water supply pipe valve, an intermediately pivoted lever, an arm carried by the rock shaft and in the path of travel of one end of the intermediately pivoted lever, means connected to said intermediately pivoted lever for operating the upper and lower valves carried by the siphon, substantially as shown and described.

11. The combination with a flushing tank,

of a siphon therein and having a valve at its upper and lower ends, a water supply pipe for said tank in communication with and adapted to cause an upward suction of air through the valve in the open upper end of the siphon, a valve in said water supply pipe, a rock shaft mounted upon the end of the flushing tank and operating arms secured to the rock-shaft, another of said arms pivotally connected to the water supply pipe valve, an arm carried by the rock shaft and having a weight secured to its outer end whereby the rock shaft is normally held in position with the water supply valve closed, an intermediately pivoted lever within the tank, a float pivotally carried by one end of the lever, a third of said arms operatively connected to the opposite end of the lever, and means carried by the lever whereby the upper valve is opened.

12. The combination with a flushing tank, of a siphon therein, a valve at the upper and lower ends of the siphon, a water supply pipe for the tank in communication with and adapted to cause an upward suction of air through the upper valve in the siphon, a valve in said water supply pipe, a rock shaft pivotally carried by the upper end of the flushing tank, an operating arm rigidly carried by the rock shaft, an operative connection between the rock shaft and the water supply valve, a lever adapted to control the lower valve, a pivoted catch carried by the upper end of the lever, an arm carried by the rock shaft and in the path of travel of the pivoted catch, an intermediately pivoted float lever, means carried by the upper end of the float lever for operating the upper valve, substantially as shown and described.

13. The combination with a flushing tank, of a siphon therein having an open upper

end, a water supply pipe for the tank in communication with and passing across the upper open end of the siphon for causing an upward suction through one leg of the siphon, a valve closing the upper open end of the siphon, a valve in the water supply pipe, a lever operatively connected to the water supply valve for opening the same, a float lever for opening said upper valve and a weighted lever normally holding the water supply valve closed.

14. The combination with a flushing tank, of a siphon therein and having an open upper end, a valve adapted to close said open upper end, a water supply pipe for the tank and discharging the water across the open upper end of the siphon to cause an upward suction of air through one leg of the siphon, a second valve communicating the lower end of the siphon with the tank, and means for opening one of said siphon valves and closing the other substantially as shown and described.

15. The combination with a flushing tank, of a siphon therein, and having an open upper end, a valve closing said open upper end of the siphon, a water supply pipe for the tank and discharging water across the open upper end of the siphon to cause an upward suction through one leg of the siphon, a valve communicating the lower end of the siphon with the tank, levers for operating said valves and a float and weight for operating said levers, substantially as shown and described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WILLIAM F. LAWRENZ.

Witnesses:

H. A. DANCER,
LEILA SPARKS.