(No Model.) 3 Sheets—Sheet 1.

L. MORFORD & L. E. & C. F. PIKE.

FLUSH TANK FOR WATER CLOSETS, &c.

No. 511,540. Patented Dec. 26, 1893.

Fig 1

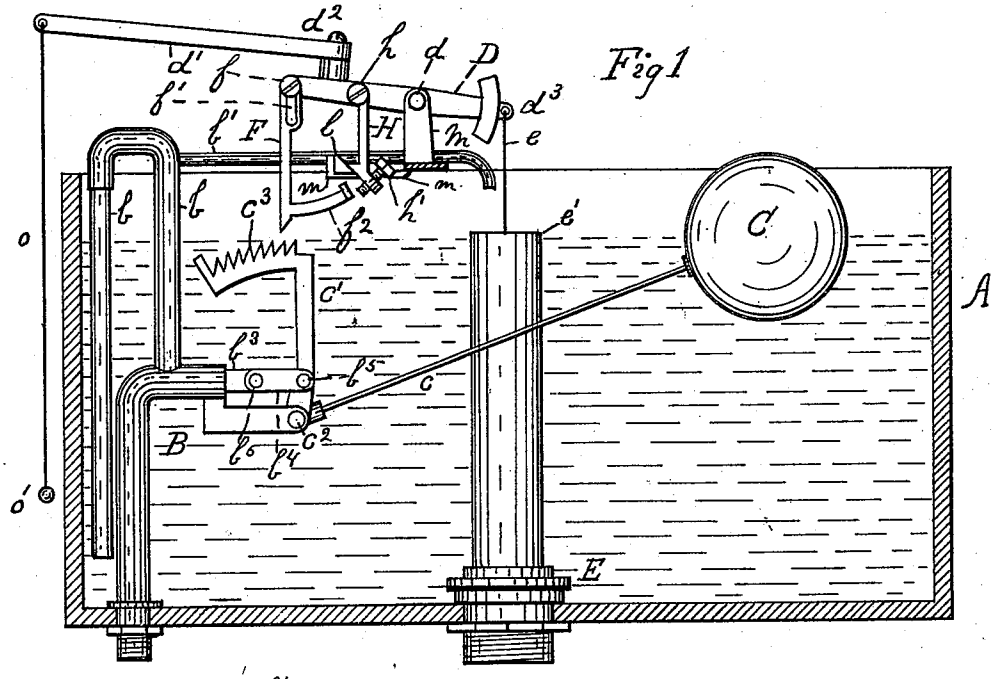

Fig 2

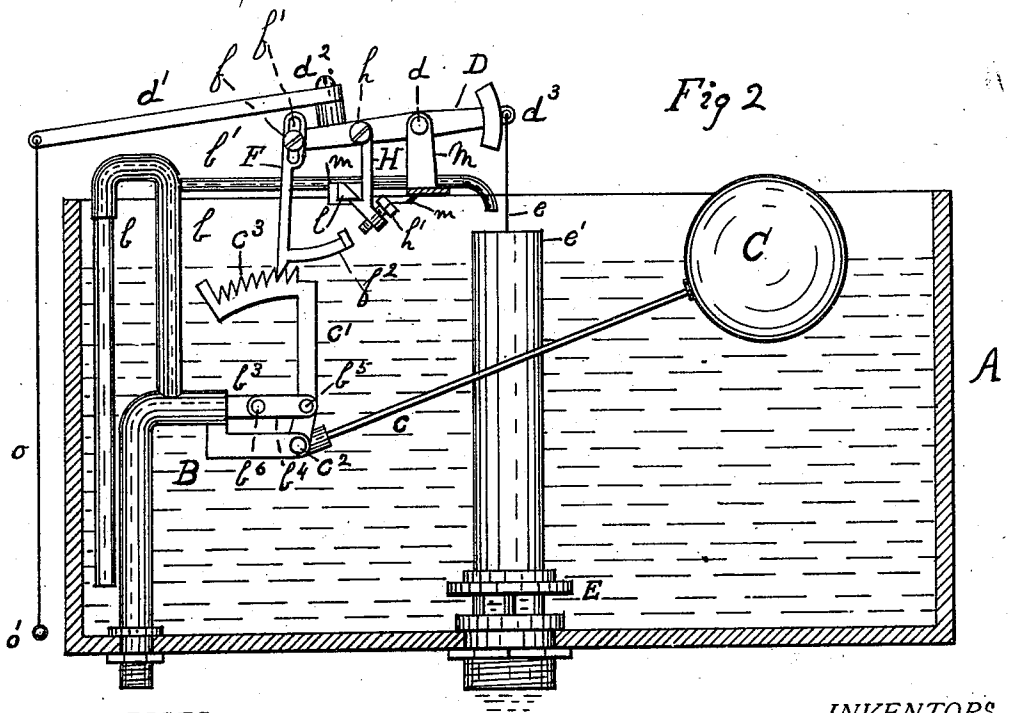

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Fig 3

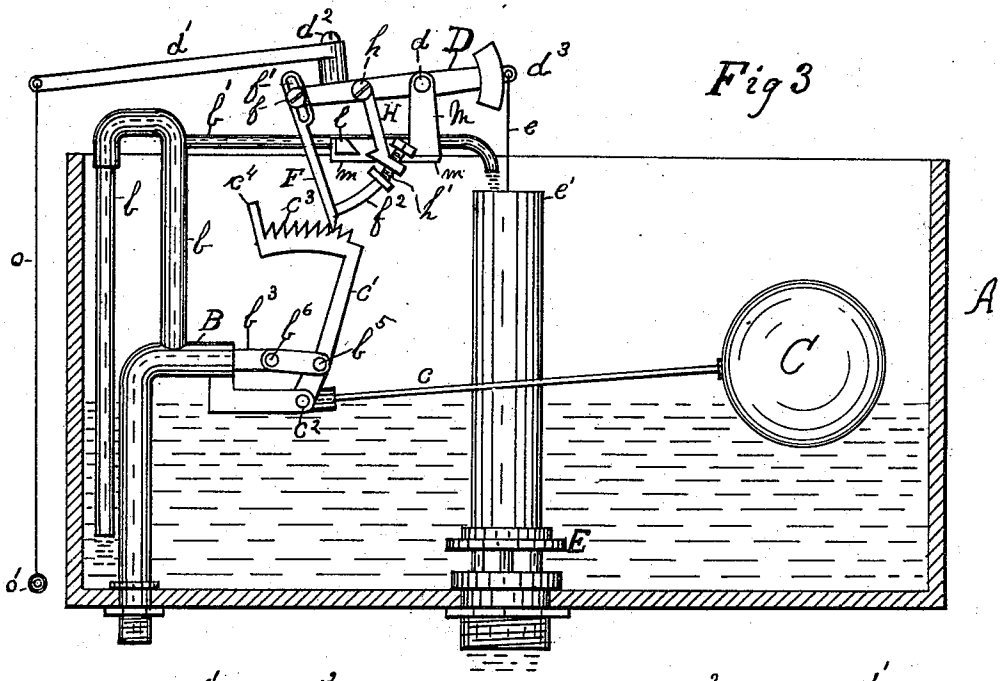

Fig 4

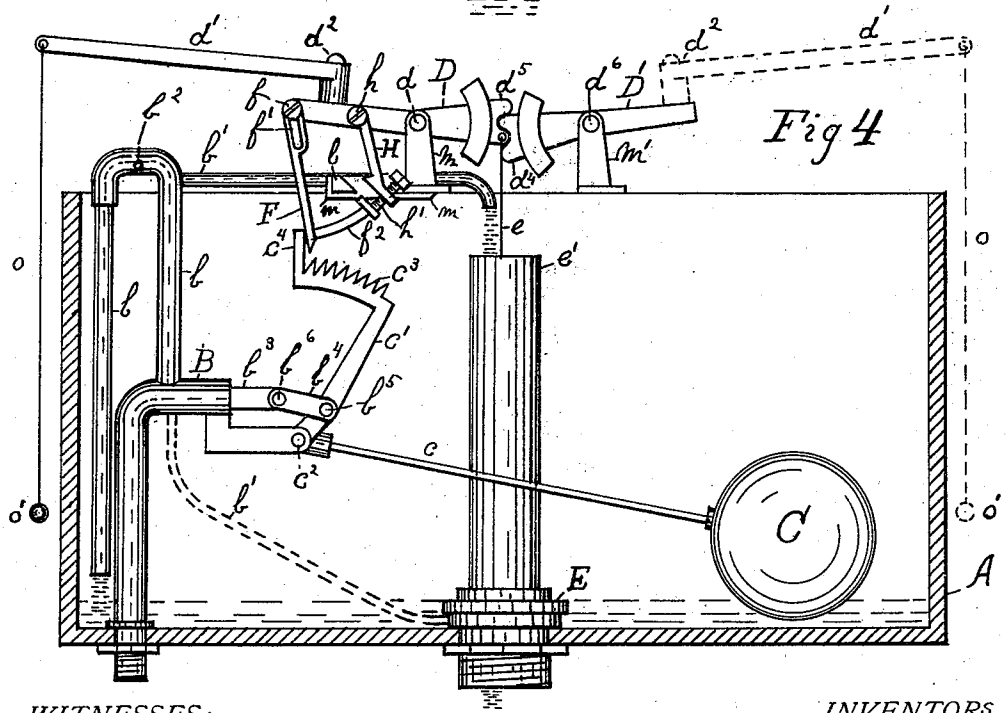

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Fig 5

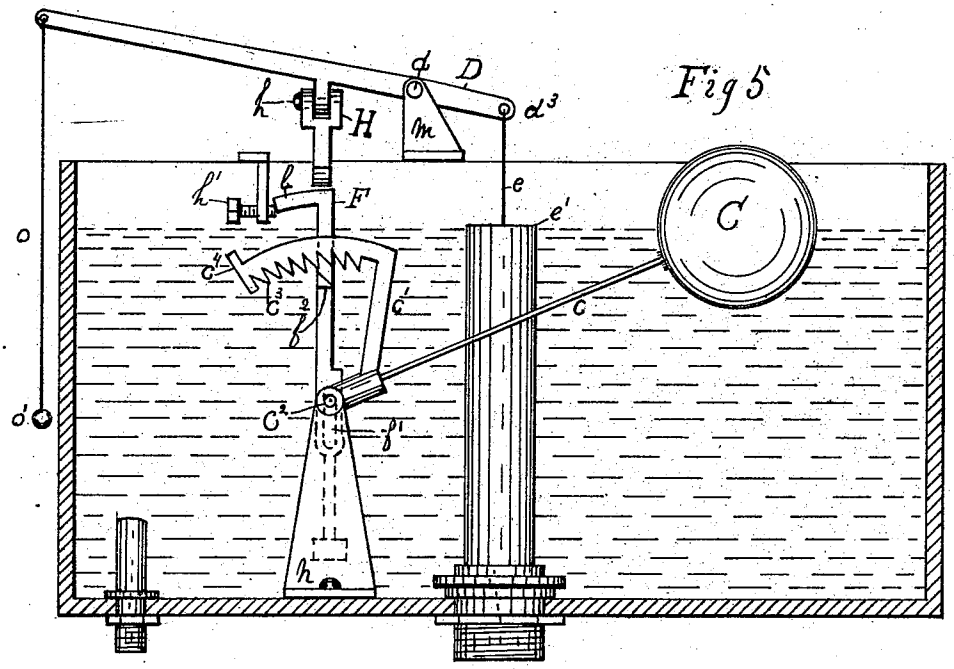


Fig 6.

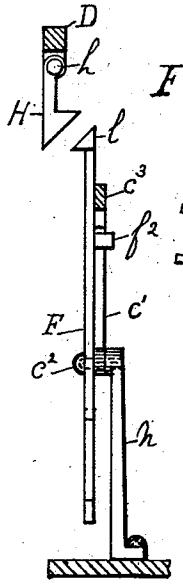


Fig 10

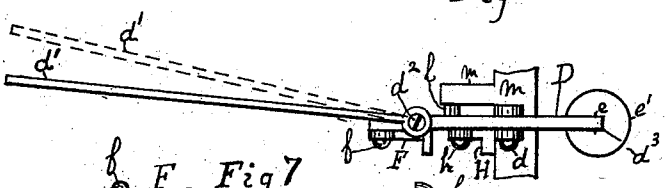


Fig 7

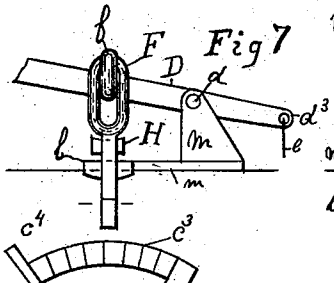
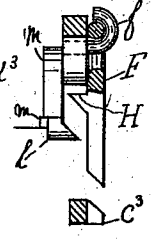


Fig 8



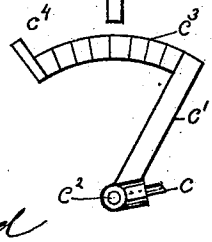


Fig 9

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LEWIS MORFORD, LOUIS E. PIKE, AND CHARLES F. PIKE, OF PHILADELPHIA, PENNSYLVANIA.

FLUSH-TANK FOR WATER-CLOSETS, &c.

SPECIFICATION forming part of Letters Patent No. 511,540, dated December 26, 1893.

Application filed December 28, 1891. Serial No. 416,372. (No model.)

To all whom it may concern:

Be it known that we, LEWIS MORFORD, LOUIS E. PIKE, and CHARLES F. PIKE, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Flush-Tanks for Water-Closets and Urinals; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to flush tanks for water-closet urinals, &c., in which a tripping device is employed to regulate the discharge of water, and an after flow of water provided to re-seal the closet and traps. In flush tanks of this class as heretofore constructed the tripping device is secured to the float connections, the result being, that when the trip is engaged to hold the discharge valve open, it does not trip to cause the discharge valve to close, until the water has reached a predetermined point. When this point has been reached and the trip has caused the discharge valve to close, the trip cannot be re-engaged to hold the discharge valve open for a second flush until the level of the water has been restored by an additional supply. We overcome this objection by employing a liberated trip which not only allows the trip to re-engage to hold the discharge valve open for a second flush, but will cause a predetermined amount of water to be discharged regardless of the water level. In flushing with the discharge valve held open a more effective flush is obtained, but the rush of water sometimes siphons the traps. To overcome this we have provided an after-flow of large volume, slowly supplied. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, Plate 1, is a vertical longitudinal section of the tank, showing the mechanism with the tank full of water. Fig. 2, is a like view showing the position of the mechanism when the discharge valve is held open. Fig. 3, Plate 2 is a like view showing the position of the mechanism to allow the discharge valve to close. Fig. 4, is a like view showing the position of the mechanism when the tank is empty. Fig. 5, Plate 3, is a like view showing a modification. Fig. 6, is an end elevation of the modification shown in Fig. 5. Fig. 7, is a side elevation of another modification. Fig. 8, is an end elevation of Fig. 7. Fig. 9, is a plan of the rack and a section of the liberated trip. Fig. 10 is a plan of lever D and adjustable extension bar d'.

Similar letters refer to similar parts throughout the several views.

In Fig. 1, A is the tank, B is the supply valve, b is the discharge tube for the supply valve, b' is the tube through which the water for the after seal flows. C is the float to operate the supply valve B. c is the float rod connecting the float with arm c' which is pivoted at c^2 and in turn is connected with valve stem b^3 of valve B by the link b^4 which is pivoted at b^5 and b^6. The arm c' is provided with the ratchet c^3. D is a lever pivoted at d to the stand m, which is secured to the tank A. d' is an adjustable extension bar, secured to the lever D by the bolt d^2 and extends beyond the tank A, and has attached the pull wire o and handle o'. The discharge valve E is connected to the end d^3 of lever D by means of wire e and is provided with the overflow pipe e'. The liberated trip F is pivoted to the opposite end of the lever D by the pivot f, upon which it oscillates freely and is provided with the slot f' to admit of a vertical movement, and the contact arm f^2 of the latch H is also pivoted to the lever D by means of the pivot h, and has the regulating screw h'. The catch l is secured to the extension m of the stand M.

When the tank is full of water as shown in Fig. 1 and a flush is required, the handle o' is pulled down, and through the medium of pull wire o and adjustable extension bar d' the lever D is oscillated upon the pivot d raising the discharge valve E off of its seat and causes the latch H to become engaged with the catch l holding the discharge valve open. The liberated trip F is engaged with the ratchet c^3 as shown in Fig. 2. As the water passes out to give the required flush float C falls oscillating the arm c' and its ratchet c^3 moving the liberated trip F toward the latch H.

This movement continues until the contact arm f^2 comes in contact with and moves the latch H off of the catch l as shown in Fig. 3, allowing the lever D to return to its original position, closing the discharge valve; liberated trip F and latch H also return to their original positions, as shown in Fig. 1. It is evident that if the handle o' were pulled down again, the water level being as shown in Fig. 3, the latch would become engaged with the catch and the liberated trip with the ratchet, the operation being repeated a second flush would be obtained. It is also plain that a flush can be obtained regardless of the water level; the projection c^4 Fig. 4 prevents the latch from engaging to hold the discharge valve open if the handle o' is pulled down when the tank is empty, as shown in Fig. 4. The supply valve B is opened by the fall of the float C to refill the tank; its discharge tube b extends upward and is bent at a point above the top of the over-flow pipe, that being the highest water level, and extends downward to near the bottom of the tank; or in other words, the discharge pipe b is deflected from above the normal water level in the tank so as to discharge below said level. The tube b' is connected with tube b at a point below the bend or at any other suitable location and extends to overflow pipe e'. As long as the valve B is open and water is being discharged through pipe b a part of the flow of water in pipe b will pass through the tube b' and be discharged into the overflow pipe e', from thence to the traps resealing them. The size of tube b' is regulated to give the proper quantity of water for the after-seal. The tube b' may be connected with the seat of the discharge valve, as shown in Fig. 4 in dotted lines; in this case a small vent hole b^2 is made in the bend to admit air, to prevent the water being siphoned out of the tank. It will be observed therefore that whether the outlet or discharge end of tube b' terminates directly in the overflow pipe e' or in the seat of the discharge valve as stated, the flow through the tube b' finally enters the overflow pipe e' to produce the after seal. Hence the tube b' may communicate with overflow pipe e' in any suitable manner to discharge the after seal into the same.

In Fig. 4 a second lever D' is shown, which is pivoted at d^6 and has cogs d^4, formed on its inner end, in gear with similar cogs d^5 formed on lever D; the object of this is to make the tank right or left handed, which is accomplished by removing the adjustable extension bar d' from the lever D and securing it to lever D' as shown in dotted lines. The adjustable bar d' is adjusted to bring the wire o and handle o' to or from the wall, against which the tank is placed by loosening the bolt d^2 moving the bar d' to the desired position, then tightening the bolt d^2 as shown in dotted lines Fig. 10.

In the modification shown in Figs. 5 and 6, the float C does not operate the supply valve B, being connected by the float rod c with the arm c' which is pivoted to the stand N by the pivot c^2, upon which the liberated trip F rests and oscillates; the ratchet c^3 has its teeth pointing toward pivot c^2. The catch l is found on the upper end of the liberated trip F. The only part pivoted to lever D is the latch H and it is pivoted to oscillate at right angles with the lever D. In this construction when the lever D is oscillated and the force is removed from the handle o' lever D starts to return to its original position. The latch H which has become engaged with the catch l lifts the liberated trip F until its contact arm f^2 becomes engaged with the ratchet c^3 when the return motion of lever D is checked holding the discharge valve open. As the float C falls the catch l is carried away from the latch H until it is released, when the lever D resumes its return motion, returning to its original position. Trip F and latch H also return to their original positions.

In the modification shown in Figs. 7, 8, and 9 the teeth of ratchet c^3 are formed on the side and the liberated trip is pivoted to oscillate either parallel to or at right angles with lever D, and its lower end adapted to engage with the teeth of ratchet c^3; the latch H is formed upon the liberated trip F and the catch l is secured to the extension m of the stand M. In this case when lever D is oscillated the liberated trip oscillates at right angles to lever D to allow the latch H to pass below the catch l, Fig. 8, when it returns to its vertical position becoming engaged with the ratchet c^3 as the float C falls giving motion to the ratchet; the liberated trip is oscillated parallel to the lever D until the latch H is moved away from the catch l, Fig. 7, when the lever D returns to its original position; the quantity of water discharged can be regulated by the regulating screw h'. If the screw h' is screwed in toward the contact arm f^2 the latch will be moved off of the catch sooner and less water discharged. If the screw h' is screwed away from the contact arm the latch will not be moved off as soon and more water will be discharged. The screw h' can be omitted and the amount of water discharged will always be the same, a construction we prefer.

It is plain that the construction of the liberated trip F and the means for operating it may be greatly varied.

What we claim as our invention is—

1. In a flush-tank provided with a source of water supply, the combination with a discharge valve of an operating lever therefor, a latch for retaining the latter in position to hold the valve open, and a trip for releasing said latch free to move to its normal position independently of other parts when the valve is closed, and means for operating said trip when the valve is open, whereby the valve may be held open for a limited time whatever the quantity of water in the cistern or tank, substantially as set forth.

2. In a flush tank, the combination of a water supply valve, a discharge pipe for said water supply valve extending from the valve to above the normal level of the water in the tank and deflected to discharge below said level, a branch connected with said discharge pipe at a point below the line of its deflection and discharging into an overflow pipe to produce an after-seal, substantially as set forth.

3. In a flush tank, the combination of a water supply valve, a discharge pipe for said water supply valve extending upward then bent and extending downward, and a pipe connected with said discharge pipe at a point below said bend, extending to and discharging into the overflow pipe, substantially as set forth.

4. In a flush tank, the combination of a water supply valve, a discharge pipe for said valve extending from the valve to above the normal level of the water in the tank and deflected to discharge below said level, a discharge or flush pipe leading from said tank, and a branch pipe connected at one end with said valve deflected discharge-pipe at a point below the line of its deflection and communicating with said tank flush or discharge pipe to produce an after flow or seal through the tank discharge or flush pipe, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

LEWIS MORFORD.
LOUIS E. PIKE.
CHARLES F. PIKE.

Witnesses:
J. J. GOULD,
F. VAN GUNTEN.