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FLUSHING APPARATUS.

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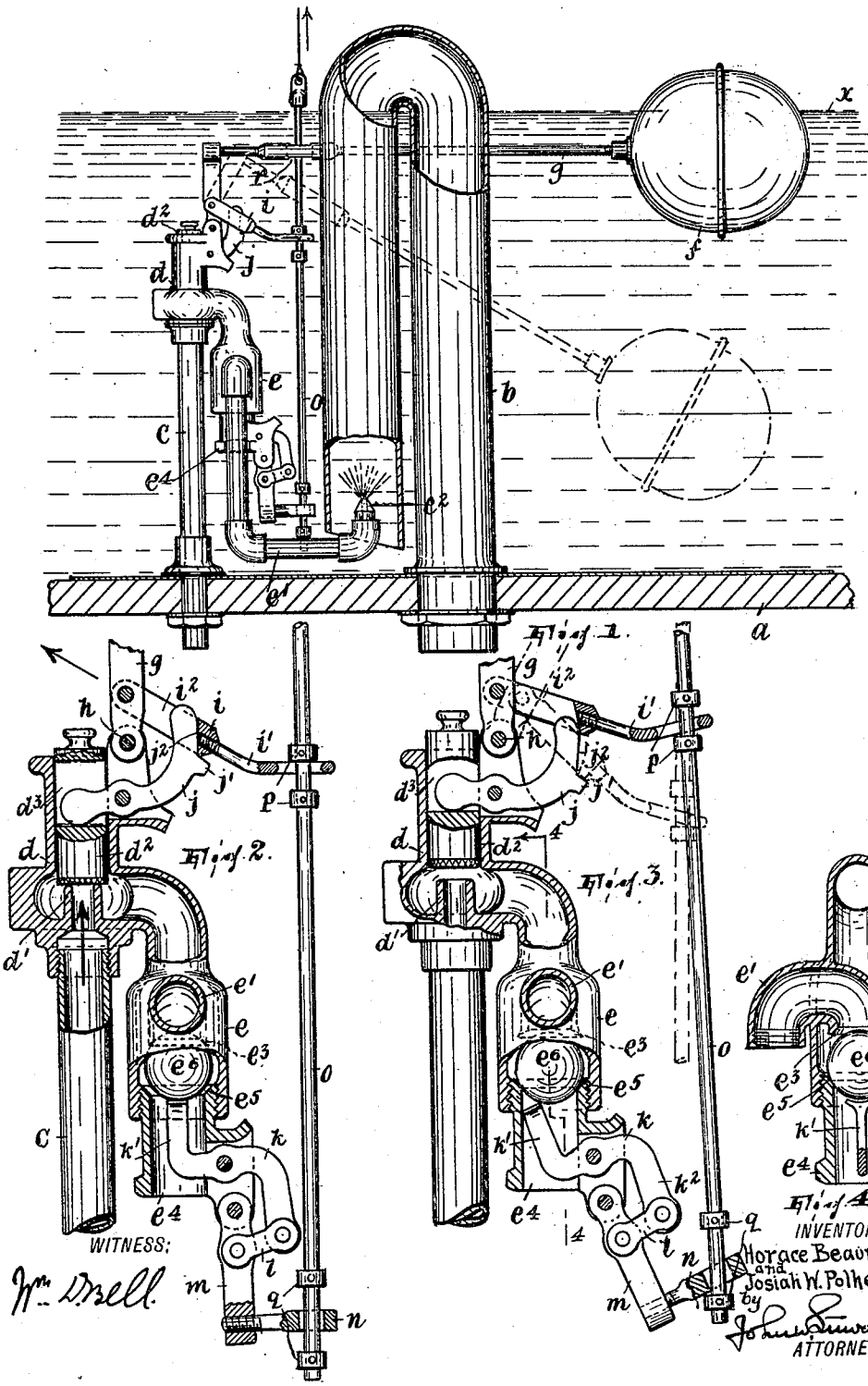
1,402,137. Patented Jan. 3, 1922.



UNITED STATES PATENT OFFICE.

HORACE BEAUMONT AND JOSIAH W. POLHEMUS, OF PATERSON, NEW JERSEY.

FLUSHING APPARATUS.

1,402,137. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed April 5, 1920. Serial No. 371,362.

To all whom it may concern:

Be it known that we, HORACE BEAUMONT and JOSIAH W. POLHEMUS, citizens of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Flushing Apparatus, of which the following is a specification.

This invention consists in an improved water closet siphon flushing apparatus of the kind constructed so as to avoid the employment of a movable siphon outlet member, and its object is to simplify the mechanism and avoid wastage of water not only by leakage but by excessive delivery at flushing.

In the drawing,

Figure 1 shows the improved apparatus, the tank appearing in section and the other parts in side elevation, partly broken away;

Figure 2 shows partly in side elevation and partly in vertical section the inlet means and its controlling mechanism, the parts being in the position where the inflow of water is checked;

Figure 3 shows, in side elevation, partly in section, the parts shown in Figure 2 but in the position to allow the inflow and direct it into the siphon; and

Figure 4 is a sectional view on the line 4—4, Figure 3.

a designates the tank and *b* a siphon whose long leg is rigidly secured to the bottom of the tank.

c is an inlet pipe for the water under pressure, rigidly secured in the bottom of the tank.

On the upper end of the pipe *c* is secured, as by being screwed thereon, a hollow structure including an upper valve chamber *d* and a lower valve chamber *e*. The valve chamber *d* has communication with pipe *c* through a valve seat *d'* upstanding in the space of the chamber *d* and on this valve seat seats a vertically movable valve d^2 suitably guided in the valve chamber. The valve chamber *e* has a pipe *e'* extending therefrom and terminating at one end in a jet e^2 delivering upwardly into the short leg of the siphon *b*, the other end of the pipe forming a valve seat e^3 within the valve chamber *e*, facing downwardly; besides the outlet formed by the pipe *e'* valve chamber *e* has an outlet formed by a nozzle e^4 screwed therein, the inner end of which forms a valve seat e^5 directly under the valve seat e^3. e^6 is a ball valve movable up and down to seat on the one or the other of the valve seats e^3 and e^5.

To hold the valve d^2 against its seat, thus to check the water inflow, there is a float *f* rigidly attached to one end of an arm or lever *g*, the other end of which extends downwardly and is fulcrumed at *h* in a part of the valve chamber *d*; a slotted link *i* which is pivoted to the arm *g* above its fulcrum *h* and has a projecting loop *i'*; and a lever *j* fulcrumed in said part of the valve chamber and having one end bearing down on the valve d^2 (being received in a slot d^3 thereon) and the other end upturned and engaged in the slot i^2 of the link, *i*, preferably having a shoulder *j'* on which the link normally rests. The float being in the position shown in Figure 1 the link *i*, by bearing at the end of its slot i^2 against the surface j^2 of the lever *j* exerts pressure on the lever substantially in the direction of the arrow shown in Figure 2 and so through the lever *j* holds the valve against its seat; but since the end of the slot i^2 which bears against the surface j^2 is movable around the fulcrum of the link in a path which diverges with respect to the surface j^2 it will be obvious that if the link is raised on its fulcrum the lever will be free to move in the other direction under the pressure of the valve, in turn subject to the pressure of the water in pipe *c*, the parts taking the position shown in Figure 3.

Ball e^6, which tends to rest on the valve seat e^5, closing off the flow therethrough and leaving the flow to take place through valve seat e^3, is elevated by a lever *k* which is fulcrumed in a part of the nozzle e^4 and has within the nozzle an upstanding arm *k'*, which moves in an upward curve, and outside of the nozzle a depending arm k^2. Arm k^2 is connected to a link *l* which in turn is connected to a lever *m* fulcrumed in said part of the nozzle e^4 and having a laterally projecting rigid loop *n*.

The loops *i'* and *n* are substantially vertically alined and they are penetrated by an actuating rod *o* which may have a chain or equivalent for elevating it. On the rod are fixed collars *p* above and below the loop *i'* and collars *q* above and below the loop

n; the collars in both pairs are set to allow some vertical lost motion of the rod with respect to the loops, and the collars q permit somewhat more of this lost motion than the collars p.

The inlet c is subject to city pressure, and when the delivery is by the pipe e' the jet delivered at e^2 acts as an ejector to raise the column of water in the short leg of the siphon over the bend thereof to start the siphoning action. The delivery capacity of the siphon of course exceeds that of the inlet, as usual in flushing apparatus.

With the tank full—the liquid level then being indicated at x—the parts stand as shown in Figures 1 and 2. The pressure of the liquid in the tank is then being applied to check flow through inlet e by means of closing means d^2 j, the float f g, and the manually withdrawable pressure transmitting device i interconnecting these two means. Valve e^6 is then held by lever k seated at e^3, its normal position (Figure 2). When rod o is lifted it acts (through its lower collars p q) to withdraw device i, and to liberate lever j, so that the closing means d^2 j opens in response to the pressure in c, and to shift lever k, so that valve e^6 closes nozzle e^4 and opens pipe e', wherefore the jet delivered at e^2 starts the siphon and the tank begins to empty, the float member f g swinging down on its fulcrum. The rod as soon as released, which is usually at once, falls, first encountering the loop i and pushing it down against stop j' (as member f—g descends and the loop consequently shifts to the right), and then coming to rest with its upper collar q supported on loop n of lever m, which is kept by valve e^6 (now held seated at e^5 by the pressure in chamber e) in the position shown in Figure 3 until, as will appear, the float member approaches its lowest limit, the jet e^2 by this arrangement being maintained in action as long as possible so as to insure complete emptying of the tank by siphoning. When the float member approaches its lowest limit and engages upper collar p (arm g is penetrated by the rod o at r) the weight of both parts f g and o acting on lever k overcomes the liquid pressure on valve e^6 and shifts it to its seat e^3, so that the flow is switched from the siphon to the tank. Though it is preferable to delay the shifting of the valves e^6 and consequently continue jet e^2 operating until the tank is approximately empty, as by constructing the rod o so that of itself it will not when it falls shift the valve e^6 and stop the action of the jet, this is not indispensable. The siphoning action of course stops when the level in the tank uncovers the lower end of the short leg of the siphon, whereupon as the tank refills the rising float member f g through device i, which is caused to move in substantially the direction of the arrow in Figure 2, effects closing movement of the closing means d^2 j.

Device i in effect constitutes a manually releasable latch means to couple together the means d^2 j and f g, by dogging the former upon the latter being depressed, and thereby during the rise of the second means as the tank fills transmit closing movement to the first means (d^2 j), its release resulting in release of the liquid pressure in c and the described series of operations incident to flushing.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In combination, a supporting structure including a tank and an inlet to the tank for liquid under pressure, and mechanism to apply the pressure of the liquid in the tank to check the flow at the inlet including an inlet closing means, a liquid-elevated means in the tank, each of said means being movable in said structure and supported therein independently of the other, and a coupling operatively connecting said means and manually disconnective from one of them.

2. In combination, a supporting structure including a tank and an inlet to the tank for liquid under pressure, and mechanism to check the flow at the inlet on filling of the tank including an inlet closing means, a liquid-elevated means in the tank, each of said means being movable in said structure and supported therein independently of the other, and a manually releasable coupling carried by one of said means and adapted to dog the other during rise of the liquid-elevated means.

3. In combination, a supporting structure including a tank and an inlet to the tank for liquid under pressure, and mechanism to apply the pressure of the liquid in the tank to check the flow at the inlet including a valve for the inlet, a valve-closing member movable in an upright plane and having an upstanding portion; a liquid-elevated means in the tank, said member and means being each supported by said structure independently of the other, and a coupling movably connected with said means and releasably engaged with the upstanding portion of said member.

4. In combination, a supporting structure including a tank and an inlet to the tank for liquid under pressure, and mechanism to check the flow at the inlet on filling the tank including a valve for the inlet, a valve-closing member movable in an upright plane and having an upstanding portion, a liquid-elevated means in the tank, said member and means being each supported in said structure independently of the other, and a manually releasable coupling movably connected with said means and adapted to dog said upstand-

ing portion and move said member during rise of said means.

5. In combination, a tank for a flushing body of liquid, said tank having an inlet for liquid under pressure and a siphon outlet having a capacity exceeding that of the inlet, means to apply the pressure of the liquid in the tank to check the flow at the inlet having a collapsible joint, said inlet having outlets delivering one to the siphon and the other to the tank exterior of the siphon, means normally closing the outlet to the siphon and movable to open the same, and manual means to collapse said joint and move the last means to open position.

6. In combination, a tank for a flushing body of liquid, said tank having an inlet for liquid under pressure and a siphon outlet having a delivery capacity exceeding that of the inlet, a pressure-opened closing means for the inlet, liquid-elevated means movable up and down in the tank, latch means to lock the first two means together when the second means is depressed and unlockable only when the second means is elevated, said latch means thereby during rise of the second means transmitting closing movement to the first means, said inlet having outlets delivering one to the siphon and the other to the tank, means to switch the flow to one or the other of the latter outlets, and manual means, controlling the switching means, for unlocking the latch means.

7. In combination, a flush tank having a siphon outlet, an inlet for liquid under pressure, means, including a float in the tank, to control the flow through the inlet, said inlet having outlets delivering one into the siphon and the other into the tank exterior of the siphon, and means controlled by the float, to switch the flow in the inlet from one to the other of its outlets.

8. In combination, a flush tank having a siphon outlet, an inlet for liquid under pressure, means, including a float in the tank, to control the flow through the inlet, said inlet having outlets delivering one into the siphon and the other into the tank exterior of the siphon, and back and forth movable means, adapted to be moved in one direction manually and in the other direction by the float, to switch the flow in the inlet from one to the other of its outlets.

9. In a flushing apparatus, the combination of a tank having a siphon outlet, an inlet for liquid under pressure having a valve chamber, upper and lower valve seats in said chamber and outlets leading through said seats from the chamber and delivering one into the siphon and the other into the tank exterior of the siphon, a valve in the chamber, and means to shift the valve from one to the other of said seats, the valve being movable independently of said means.

In testimony whereof we affix our signatures.

HORACE BEAUMONT.
JOSIAH W. POLHEMUS.