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PATENTED AUG. 18, 1903.

W. U. GRIFFITHS.

FLUSHING TANK FOR WATER CLOSETS OR OTHER STRUCTURES.

APPLICATION FILED MAR. 19, 1901.

NO MODEL.

FIG. 1.

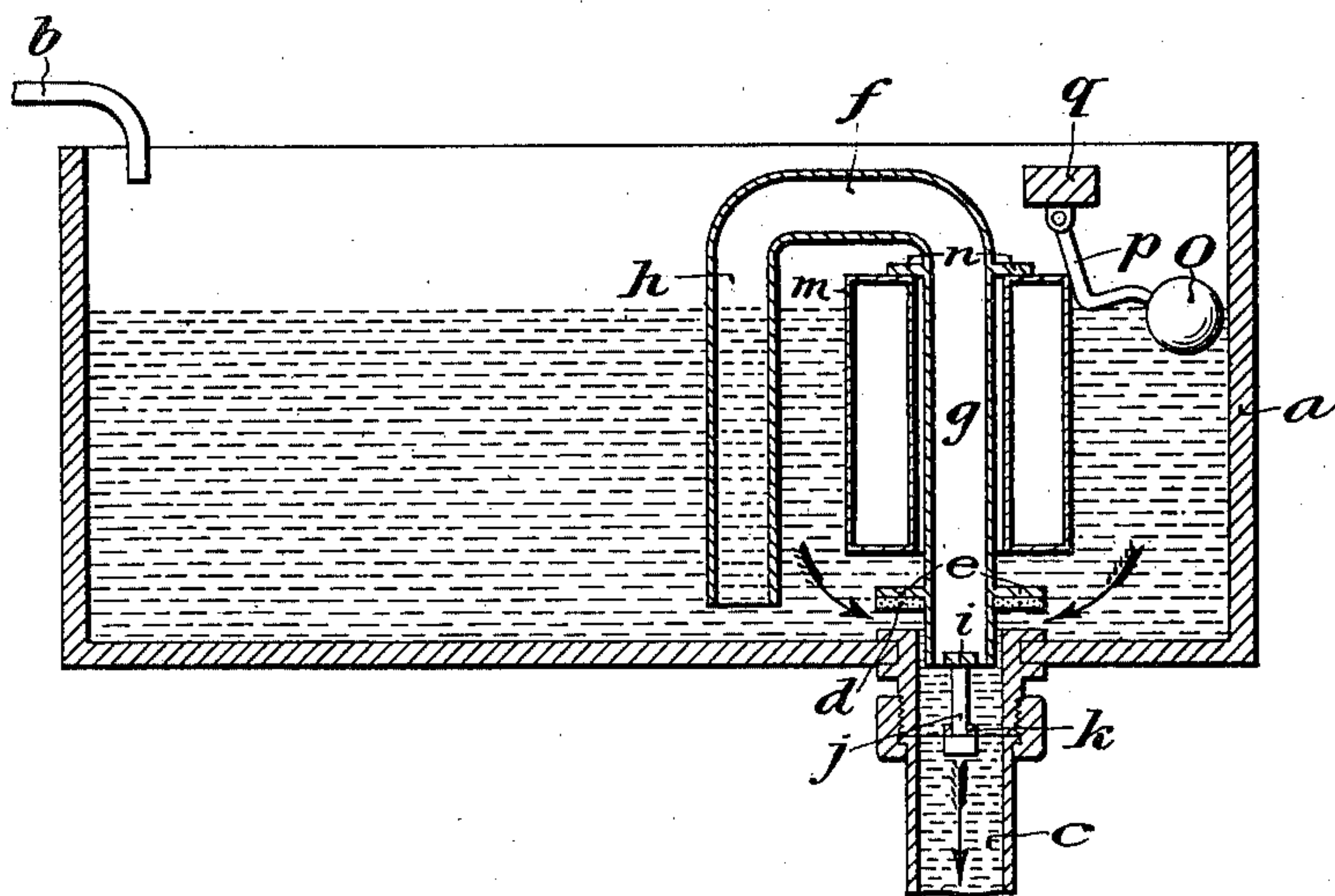
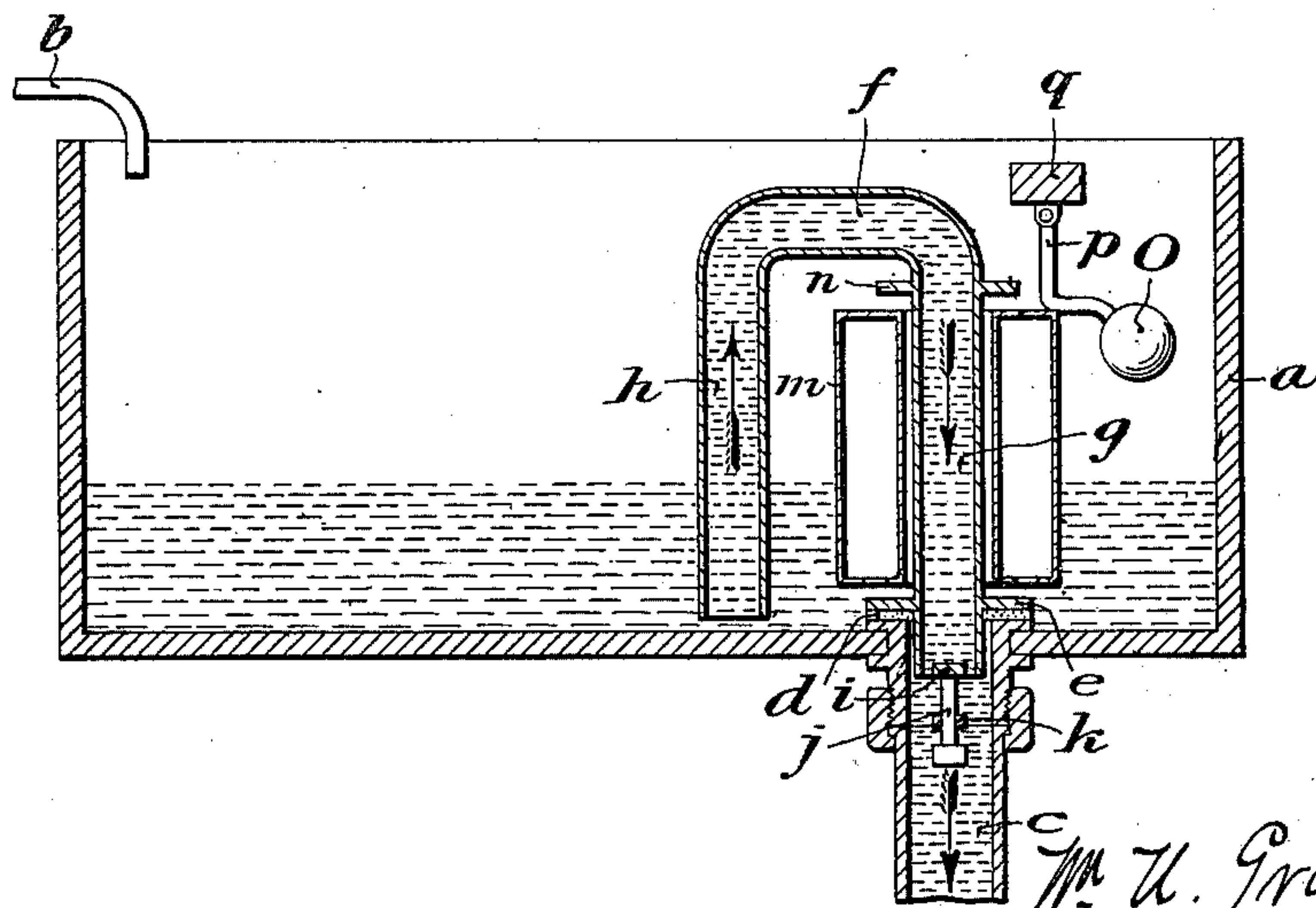


FIG. 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM U. GRIFFITHS, OF PHILADELPHIA, PENNSYLVANIA.

FLUSHING-TANK FOR WATER-CLOSETS OR OTHER STRUCTURES.

SPECIFICATION forming part of Letters Patent No. 736,516, dated August 18, 1903.

Application filed March 19, 1901. Serial No. 51,844. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM U. GRIFFITHS, a citizen of the United States, residing in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Flushing-Tanks for Water-Closets or other Structures, of which the following is a specification.

My invention relates to apparatus designed to automatically occasion the periodic flushing of closets and other apparatus, and more particularly such closets as are employed in factories, institutions, and places of public resort.

My improvement relates especially to such an apparatus of the foregoing class as includes in its construction a suitably supplied tank, an outlet pipe connective of said tank and the closet or structure to be flushed, and a siphon structure within said tank, having a siphon channel and adapted to be established in such relation to the tank and outlet pipe as to occasion the setting up of an intermittent periodic siphoning action to discharge or convey to the closet the volume of water accumulated in the tank.

It is the object of my invention to provide an apparatus of the foregoing character in which the flushing action shall take place automatically and positively at predetermined intervals, and operative although but a minute flow of water be discharged into the tank.

In the accompanying drawings I show, and herein I describe, a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is a longitudinal, vertical, sectional, elevation of an apparatus embodying my invention, the parts being shown in the position they occupy when the water is discharging from the tank directly into the outlet pipe.

Figure 2 is a similar view, the parts being shown in the position they occupy when the siphon is down upon its seat and the water passing out through the siphon and outlet pipe. The parts normally occupy the posi-

tion shown in Figure 2, during the times when no water is flowing out of the tank.

Similar letters of reference indicate corresponding parts.

In the drawings,

*a* is the tank; *b* the inlet pipe; *c* the outlet or discharge pipe, the upper end of which pipe or a connection thereof is preferably provided with a circumferential flange resting upon the floor of the tank and forming a convenient seat for the closing annulus *e*.

The lower face of said annulus is preferably provided with a ring of rubber or other material, *d*, to insure a water tight connection with the flange of the outlet pipe.

*f* is the siphon, the same being conveniently formed as a U-shaped tube or pipe of any desired dimensions, the longer leg *g* of which extends within the throat of the discharge pipe, and the shorter leg *h* of which is of such length that its free end is above the floor of the tank in all positions of the siphon, said siphon being in the embodiment of my invention illustrated free for limited vertical movement with respect to the tank. Said siphon, furthermore, has a channel of fixed and unchanging diameter or dimensions from end to end.

The siphon channel provided in the construction illustrated by the U-shaped pipe may, of course, be formed in a structure differing in construction from that shown.

The closing annulus *e* surrounds the longer leg of the siphon near its lower end, and is adapted, when the siphon is in its normal position, to rest upon the flange of the outlet pipe to seal the latter against the entrance of water directly thereinto from the tank.

As a convenient means for guiding and limiting the vertical movement of the siphon I provide its longer leg with a cross bar *i* from which depends a leg *j* extending through a suitable opening in the cross bar *k* and having below such cross bar *k* a suitable head.

The contact of said head against the cross bar *k* limits the upward movement of the siphon and prevents it from being drawn out of proper position with relation to the discharge pipe.

The parts are normally in such position that the escape of water from the tank di-

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rectly into the outlet pipe, and without first passing through the siphon, is precluded.

I employ means which when any desired predetermined volume of water has accumulated in the tank, are by the action of the accumulated water, operated to open the entrance to the outlet or discharge pipe so that a considerable flow of water directly into such pipe (and without passing first through the siphon), and sufficient, when the parts are restored to their normal position, to establish the flow of water through the siphon, is permitted or occasioned.

The buoy *m* employed to impart the elevating movement to the siphon, is, in the form illustrated, an annular hollow casing or boxing encircling the longer leg of the siphon, and in the form of apparatus shown, free for limited vertical movement independent of the siphon.

*n* is a stop conveniently provided as an annular rib or shoulder formed upon the longer leg of the siphon near its upper end.

*p* is a curved rigid hanger arm, the upper end of which is pivotally connected to a cross bar *q* mounted in the tank. The hanger arm may itself be buoyant or rendered so by the attachment of a suitable float *o*.

Said hanger arm *p* is approximately L-shaped, somewhat, however, rounded at its bend, and its point of pivotal attachment to the bar *q* is so located that the hanger arm is normally suspended in a position in which its cross arm or lower portion rests upon the upper edge of the buoy *m*, as shown in Figure 2, and holds it down, as illustrated in said figure, even after the water reaches such elevation in the tank as would cause said buoy, if not restrained, to rise with it.

When, however, the water reaches such elevation as to partially submerge the float *o*, said float thereupon rises in the continued rise of the water; inasmuch, however, as the hanger *p* is rigid said float cannot rise vertically but must rise in a line concentric with respect to the point of pivotal attachment of the hanger to the support *q*, and, in such rising movement, said hanger is carried off of the top of the buoy.

The operation of the apparatus will be readily understood.

The parts being assumed in the position shown in Figure 2, with no water however in the siphon except in the lower portion of its shorter leg, the steady inflow of water through the pipe *b* occasions the constant elevation of the water level in the tank.

When the water level reaches a certain point the buoy *m* of course tends to rise but is for a time held against rising by the hanger arm *p*.

When, however, the water level rises to and about the float *o* the latter is carried upon its surface and moves off to the right as shown in Figure 1, releasing the buoy.

The accumulation of water in the tank be-

ing now higher than is necessary to float the siphon and buoy, the latter, of course, rises with an abrupt and considerable movement, and, encountering the projection *n*, carries the siphon up with it, thus carrying the annulus *e* away from its seat and permitting the escape of a considerable quantity of water directly into the outlet or discharge pipe *c*.

As the liquid level in the tank is thereupon lowered, the siphon gradually comes downward with it and places the annulus *e* upon its seat in the position shown in Figure 2, shutting off the escape of water directly into the outlet or discharge pipe but immediately the volume or head of water in the discharge pipe *c* sets up the desired siphoning action in the siphon, and this action continues and the water flows out until the level of the water in the tank reaches the lower end of the shorter leg of the siphon.

In the lowering of the water level the buoy, of course, is correspondingly lowered, the hanger arm automatically resuming its seat thereon as shown in Figure 2.

As soon as air enters the shorter leg of the siphon of course the siphoning action ceases, and thereupon the water flowing into the tank again raises the level therein, with the result above described.

The arrangement of my apparatus insures such elevation of the hanger arm and its float when the water reaches a predetermined point as will enable said hanger arm to make or permit such a set of the parts as will insure the escape of such sufficient volume of water directly into the discharge pipe as to produce with certainty the required siphoning action.

As will be understood, the amount of water which shall be present in the tank when the hanger arm and float are moved by it, and the lead is given to such water directly into the outlet pipe, is a matter determined by the proportioning of the parts.

It is, of course, obvious, that the longer the restraint is continued after a given water level is reached and water continues to flow into the tank, the more violent and positive will be the upward movement of the buoy and siphon.

It will be understood that the operation of my apparatus is uniform and invariable whether a large volume of water or a very minute inflowing stream is supplied through the pipe *b*.

When I refer herein to the buoy as being supported upon the siphon structure, I emphasize that feature of the construction which resides in supporting said buoy or float on said siphon structure generally, as opposed to connecting it by a swinging arm to the wall of the tank, or otherwise supporting it upon said wall. In employing the expression referred to I do not, of course, mean to limit myself to the precise arrangement shown, in which said buoy encircles one leg of the si-



phon, as it is manifest that said buoy may be supported upon the siphon structure without directly engaging one of the legs of the siphon.

Having thus described my invention, I claim—

1. In a flushing apparatus, in combination, a tank, an outlet pipe, a siphon structure, the siphon channel of which is adapted to discharge into said outlet pipe, the entrance to which outlet pipe except through the siphon is normally closed, and means to occasion the temporary opening of the entrance to said outlet pipe for the discharge of water directly thereinto for the establishment of a siphoning action through the siphon and outlet pipe, said means consisting of a buoy, supported upon the siphon structure and independently of the walls of the tank and directly in contact with and subjected to the action of the mass of water in the tank during the time such water is abreast of said buoy, the elevation of which buoy beyond a certain point occasions through suitable means the opening of the entrance to said outlet, and means for restraining said buoy from elevation until the water reaches a selected level, substantially as set forth.

2. In a flushing apparatus, in combination, a tank, an outlet pipe, a siphon structure, the siphon channel of which is adapted to discharge into said outlet pipe, the entrance to which outlet pipe except through the siphon is normally closed, and means to occasion the temporary opening of the entrance to said outlet pipe for the discharge of water directly thereinto for the establishment of a siphoning action through the siphon and outlet pipe, said means consisting of a buoy, directly in contact with and subjected to the action of the mass of water in the tank during the time such water is abreast of said buoy, and supported upon the siphon structure and independently of the walls of the tank free for limited vertical movement independent of said structure, the elevation of which buoy beyond a certain point is directly operative to occasion through suitable means the opening of the entrance to said outlet, and a

hingedly supported buoyant arm normally depending in position to encounter and hold down said buoy but adapted when floated by the body of liquid in the tank to release or permit the ascent of said buoy, substantially as set forth.

3. In a flush tank, in combination with a movable siphon having a channel of fixed dimensions adapted to discharge into an outlet pipe, entrance to which except through the siphon is normally closed, as a means to occasion the temporary opening of the entrance to said outlet pipe for the discharge of water directly thereinto, a buoy mounted on a leg of the siphon, and free for limited movement thereon, and directly in contact with and subjected to the action of the mass of the water in the tank during the time said water is abreast of said buoy, the elevation of which buoy beyond a certain point occasions the movement of the device which controls the entrance to said outlet, and a float provided arm pivotally supported and normally depending in position to encounter and hold down said buoy, but adapted, when floated by a volume of liquid to release or permit the ascent of said buoy, substantially as set forth.

4. In a flushing apparatus, in combination a tank having an outlet, a vertically movable siphon, arranged to control said outlet and having a channel of fixed dimensions, a buoy subjected to the action of the whole mass of water in the tank, which buoy encircles the leg of said siphon and is free for limited vertical movement independent of said siphon, a stop on said siphon adapted to be engaged by said buoy, and a pivotally supported buoyant device arranged to normally hold down the buoy but when floated to release said buoy to permit its ascent.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 11th day of March, A. D. 1901.

WM. U. GRIFFITHS.

In presence of—

S. SALOME BROOKE,  
THOMAS K. LANCASTER.