No. 814,208. PATENTED MAR. 6, 1906.

M. HOGAN.

FLUSH TANK.

APPLICATION FILED SEPT. 23, 1895

Fig. 1

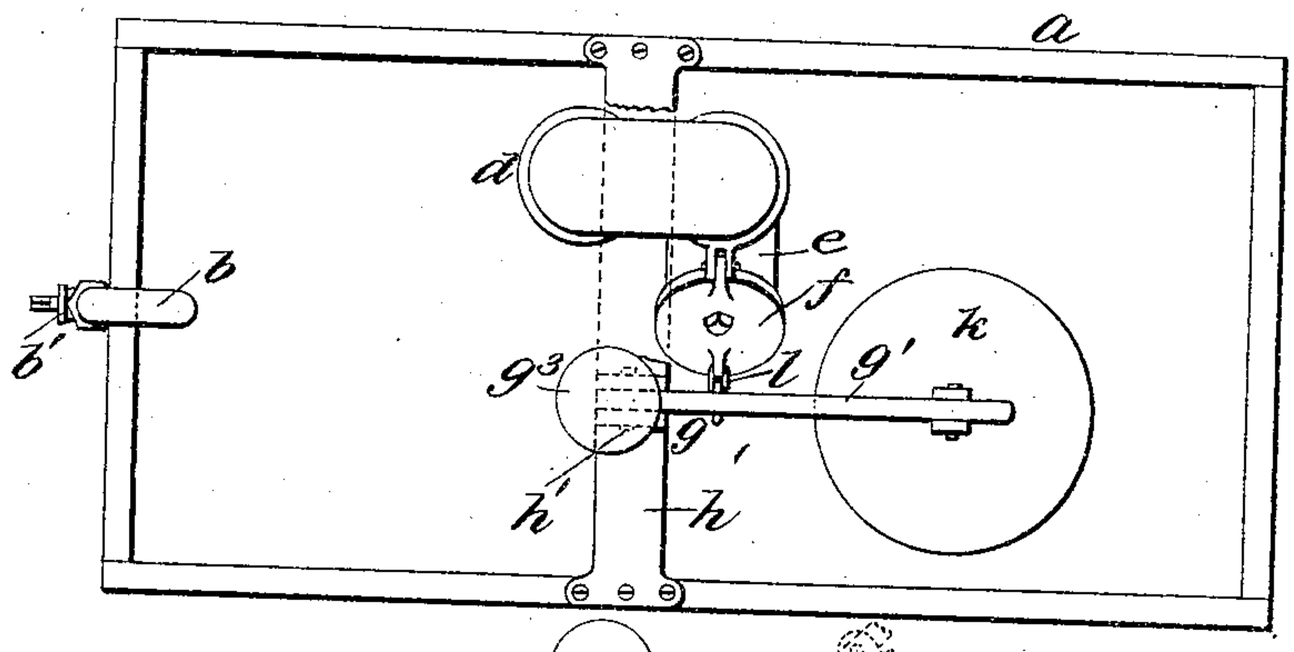


Fig. 2

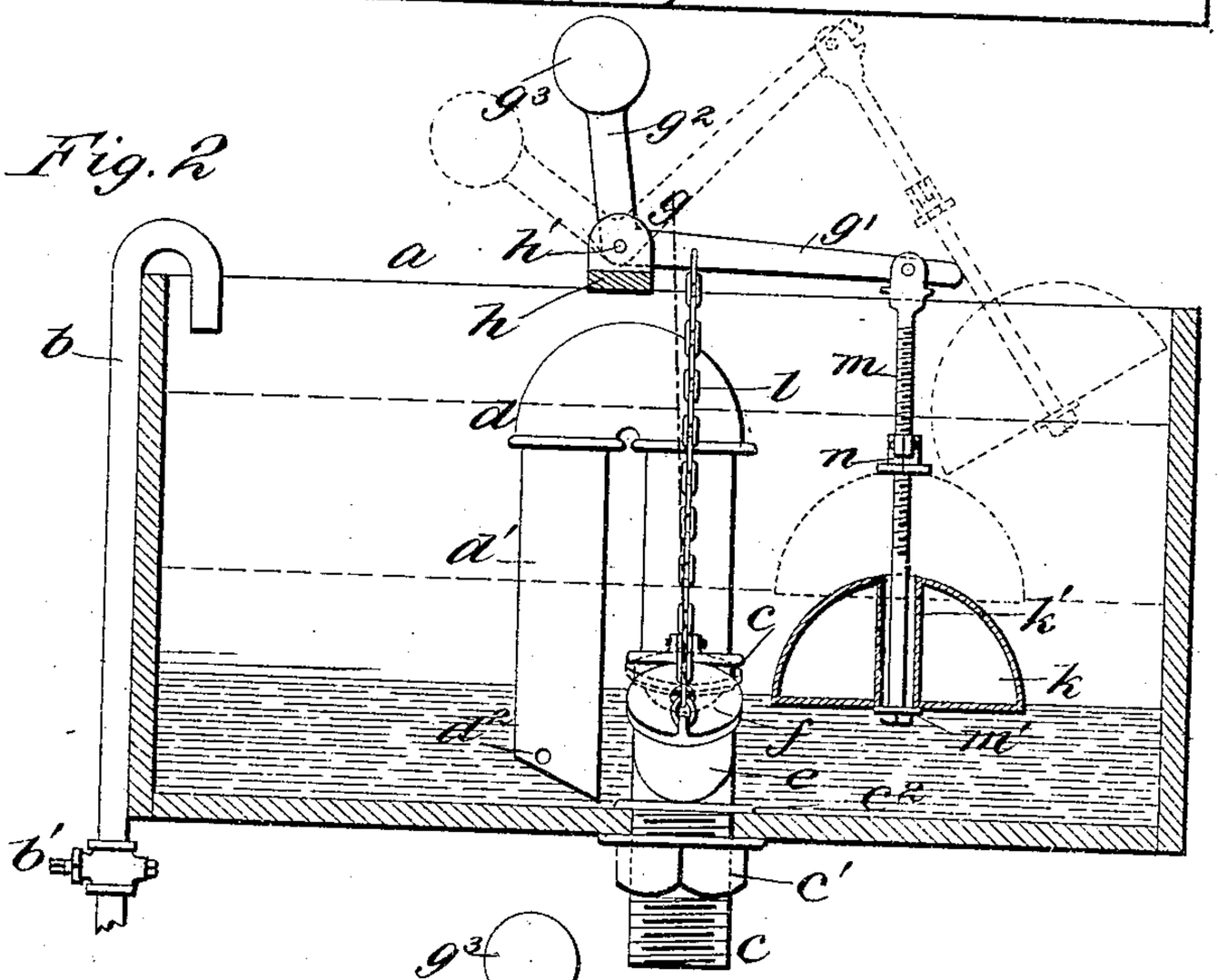
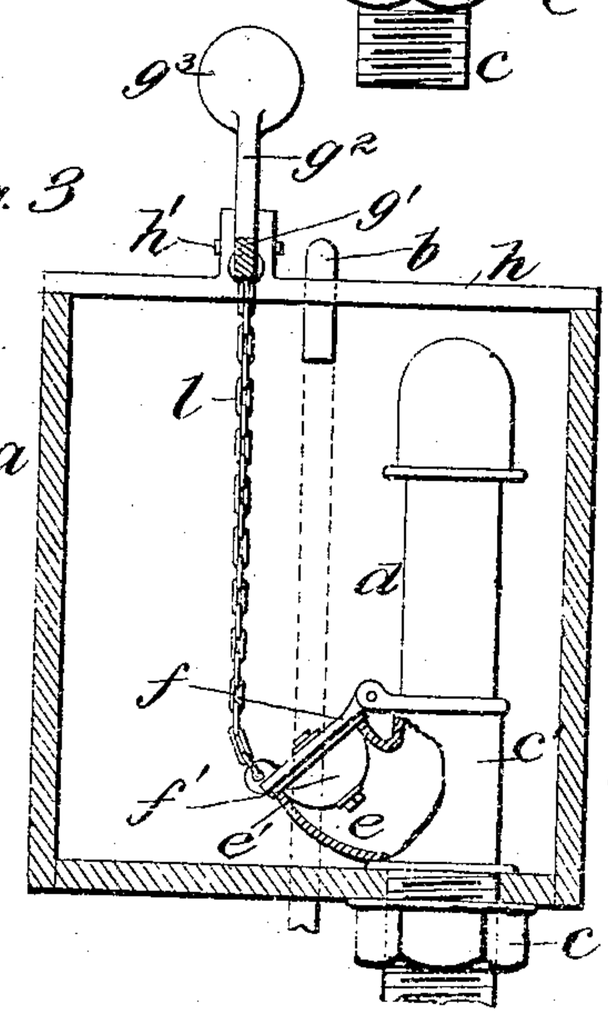


Fig. 3



Witnesses.

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FLUSH-TANK.

No. 814,208. Specification of Letters Patent. Patented March 6, 1906.

Application filed September 23, 1895. Serial No. 563,458.

To all whom it may concern:

Be it known that I, MATTHEW HOGAN, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Flush-Tanks, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a flush-tank with means whereby more or less of its fluid contents may be discharged at certain intervals of time; and to this end my invention consists in the details of the several parts making up the filling and flushing mechanism in combination with a tank, as hereinafter described, and more particularly pointed out in the claims.

My invention is more particularly intended and adapted for use in connection with a system of plumbing or piping connected with urinals and like sanitary apparatus which is used by persons incompetent to take proper care of the same after use; but it is obviously adapted for a variety of uses and for any of the conditions of use in which the automatic discharge of a quantity of water or other fluid is to be produced.

Referring to the drawings, Figure 1 is a top or plan view of a flush-tank embodying several features of my invention. Fig. 2 is a detail view, in vertical section, through the tank with the trip-lever shown in dotted lines in a raised position to open the discharge-valve. Fig. 3 is a detail view in cross-section through the tank and with parts broken away to show the discharge-pipe and its valve with the lever connection.

In the accompanying drawings, *a* denotes a tank, which may be of ordinary material and construction and of a size adapted for the special use for which it may be intended. *b* is a supply-pipe which may enter the tank or discharge into it at any convenient point, the inlet-valve *b'* being arranged to control the flow or supply of fluid to the tank.

A discharge-outlet from the tank is provided in a convenient place, usually through the bottom, and a discharge-pipe *c*, secured in the outlet, as by means of a lock-nut *c'*, which clamps the bottom part of the tank between the nut and a flange or shoulder c^2 on the pipe.

In the form of the invention herein shown the discharge-pipe is in form of a siphon *d*, one arm *d'* opening near the bottom of the tank and the other arm communicating with the outlet-pipe *c*. The top of the siphon is arranged at any convenient height, but preferably at some little distance below the upper edge of the tank, so as to prevent any accidental overflow of the contents. A branch *e* from the discharge-pipe *c* has a valve *f* at its open end, which is located preferably at an angle with a vertical line, as shown in Fig. 3 of the drawings. The mouth of this branch *e* is covered by the valve *f*, pivoted to a fixed part of the discharge-pipe or branch and held closed, preferably, by the weight of the valve which overlies the valve-seat and is provided with any suitable packing. The valve has on its under side a weight *f'*, which causes it to close with some little force against the seat.

If the inlet-valve *b'* in the supply-pipe is left open, the tank will fill with water or other fluid until it reaches the level of the top of the lower wall of the siphon, over which it will flow through the discharge-pipe, thus providing against any accidental overflow of the tank. This outflow of water or other fluid from the tank will, however, be comparatively slight and will not have the desired force as a flush-discharge.

In order to provide for a sudden discharge of fluid from the tank a trip-lever *g* is pivoted in a convenient position on the top of the tank, as on the bar *h*, the lever operating in a substantially vertical plane. This trip-lever *g* has two arms, the one, *g'*, being in its usual position nearly horizontal, while the arm g^2 is upright and supports or terminates in a counterpoise-weight g^3. The weighted arm g^2 overhangs the pivot *h'* on one side to a degree sufficient to about balance the weight of the arm *g'* and the float *k*, suspended from the arm. A flexible connection *l*, which is preferably a chain, connects the arm *g'* and the discharge-valve *f*. The float *k* has a tubular opening *k'* through it, and it is suspended from the arm *g'* of the trip-lever by a rod *m*, which extends through the float and has on its lower end a shoulder or washer *m'* on which the float rests. On the rod *m* and at a distance above the float is arranged a stop *n*, which is preferably adjustable and may consist of a nut screwed onto a threaded portion of the rod.

The trip-lever is so arranged that when turned on its pivot *h'*, as by the lifting of the

arm g', it will move slowly until that position is reached in which the weight g^3 counterbalances the weight of the arm g' and the rod m extending through the pendent float, when the counterpoise-weight swings suddenly downward and pulls open the valve f. This sudden opening of the discharge-valve provides for a quick rush and outflow of water or other fluid from the tank and down through the discharge-outlet.

The trip-lever is operated to open the discharge-valve by the rising of the fluid as it flows into the tank, this inflow lifting with it the float k until its upper surface strikes the stop n, when the further rising of the fluid thrusts the float upward, together with the arm g', and trips the lever, as described. By this construction a device is provided in which a sudden pull or yank upon the valve of the discharge-pipe is exerted. The pivoted rod m is so constructed that when the trip-lever g is tilted to open the valve the rod m and the float assume the position shown in dotted lines in Fig. 2. The float may easily rise and fall on the rod, but when the lever is tilted the float is carried outward to a distance farther away from the fulcrum than the position occupied when the lever is in its normal position. This position of the float assists to overbalance the weight and return the parts to position to close the valve.

It is evident that by placing the adjustable stop n at different positions along the rod m the time when the lever will be tripped or the point beyond which the further rising of the fluid may be prevented can be determined by this adjustment of the stop. After the discharge-valve has been opened by the tilting of the trip-lever the discharge lowers the level of the fluid, and the float k falls downward until its bottom encounters the shoulder m', and this brings the whole weight of the float upon the arm g' of the lever and resets the trip device by tilting it into the position in which the weight of the arm g' and of the pendent float overbalances the leverage of the arm g^2 and its weight. The chain or flexible connection l is slack, so that the valve f will close soon after the resetting of the trip-lever begins.

In order to enable the siphon to aid in the discharge of the fluid from the tank, the point at which the float trips the lever is located below the level of the lower surface of the bend in the siphon, and as a result the sudden discharge of fluid by the opening of the discharge-valve f causes an outflow of water in the arm d', which continues after the valve f has been closed and until the fluid reaches a level below the open mouth of the arm d' or of the vent d^2, which is a hole through the wall of the tube for the passage of air into it for the purpose of breaking the flow through the siphon.

The several parts of the apparatus will remain in the position described and as shown in full lines in Fig. 2 of the drawings until the inflow of fluid through the supply-pipe shall have raised its level in the tank to a height sufficient to again trip the lever g, which will result in the quick discharge of all or the greater part of the fluid contents of the tank.

It is obvious that the tripping and resetting of the lever which controls the discharge-valve are automatic and that the opening of the discharge-valve will take place at those predetermined intervals of time determined by the rate of inflow of fluid which, if regular, will fill the tank at regular intervals, the quantity flowing in through the supply-pipe in any given period of time under a certain pressure being controlled by the inlet-valve, which can be set to allow any desired quantity to flow, from a few drops at a time to a steady stream.

The within-described apparatus for opening and closing the valve automatically operates mainly by the action of gravity, which changes the equilibrium of one arm or the other of the lever, causing it to rock first to one side, then to the other, and on its supporting-pivot, and it is obvious that other means than those described for effecting this change of equilibrium and tripping and resetting the lever may be embodied in a valve-operating mechanism differing in many of its details from those herein described or without departing from my invention or requiring more than the exercise of mere mechanical skill. For this reason I do not limit myself to the particular form of valve-operating mechanism herein described, as it may be varied in form or proportion and in the relative arrangement of parts and also in the operation of the trip device without involving any invention as contrasted with that within described.

I claim as my invention—

1. In combination with a tank or like vessel for holding fluid, a supply-pipe for introducing fluid to the tank, a discharge-pipe, a discharge-valve appurtenant to the discharge-pipe, a rocking trip-lever of angular form having a weight on one arm, a flexible connection intermediate said lever and the discharge-valve, a pivoted support arranged at or near the end of the lever opposite the weight, and a freely-movable float arranged upon said support whereby it is inactive with respect to the support and lever during a predetermined rise of the fluid in the tank, and means appurtenant to the pivoted support and lever for carrying the float outward and beyond the pivot of the support for the purposes specified.

2. In combination with a tank or like vessel for holding a fluid, a supply-pipe for providing fluid in the tank, a discharge-pipe, a discharge-valve appurtenant to the discharge-pipe, a rocking lever operatively arranged

with relation to the tank and valve and provided with a weight, a flexible connection between said lever and the valve, a float, a support for said float pivoted to the lever, and means for maintaining a fixed angular position between the float, float-support and lever, with the float carried outward and beyond the pivot of the support when the latter is pulled upward by the weight.

3. In combination with a tank or like vessel for holding fluid, a supply-pipe for introducing fluid to the tank, a discharge-pipe, a discharge-valve appurtenant to said pipe a rocking trip-lever having a weighted arm and a float-supporting arm, a flexible connection intermediate the float-supporting arm and discharge-valve, a pivoted float-support, a float having limited independent movement on said float-support, and means for maintaining a fixed angular relation between the float-support arm of the lever, its weight, and pivoted float-support during the movement of the parts, whereby the float reacts as a counterbalance in opposition to the weight.

4. In combination with a tank, a fluid-supply pipe, a discharge-pipe and a valve appurtenant to said discharge-pipe, a weighted lever adapted to open said discharge-valve upon a predetermined rise of level of the fluid within the tank, a float having a movement independent of said lever and arranged to tilt the latter at predetermined points, said float connected to the lever by connections arranged to maintain the float in fixed angular position with reference to the lever, whereby when the parts are tilted by the weight the float assumes a position at a greater distance from the fulcrum and in the normal position of the parts.

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Witnesses:
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