

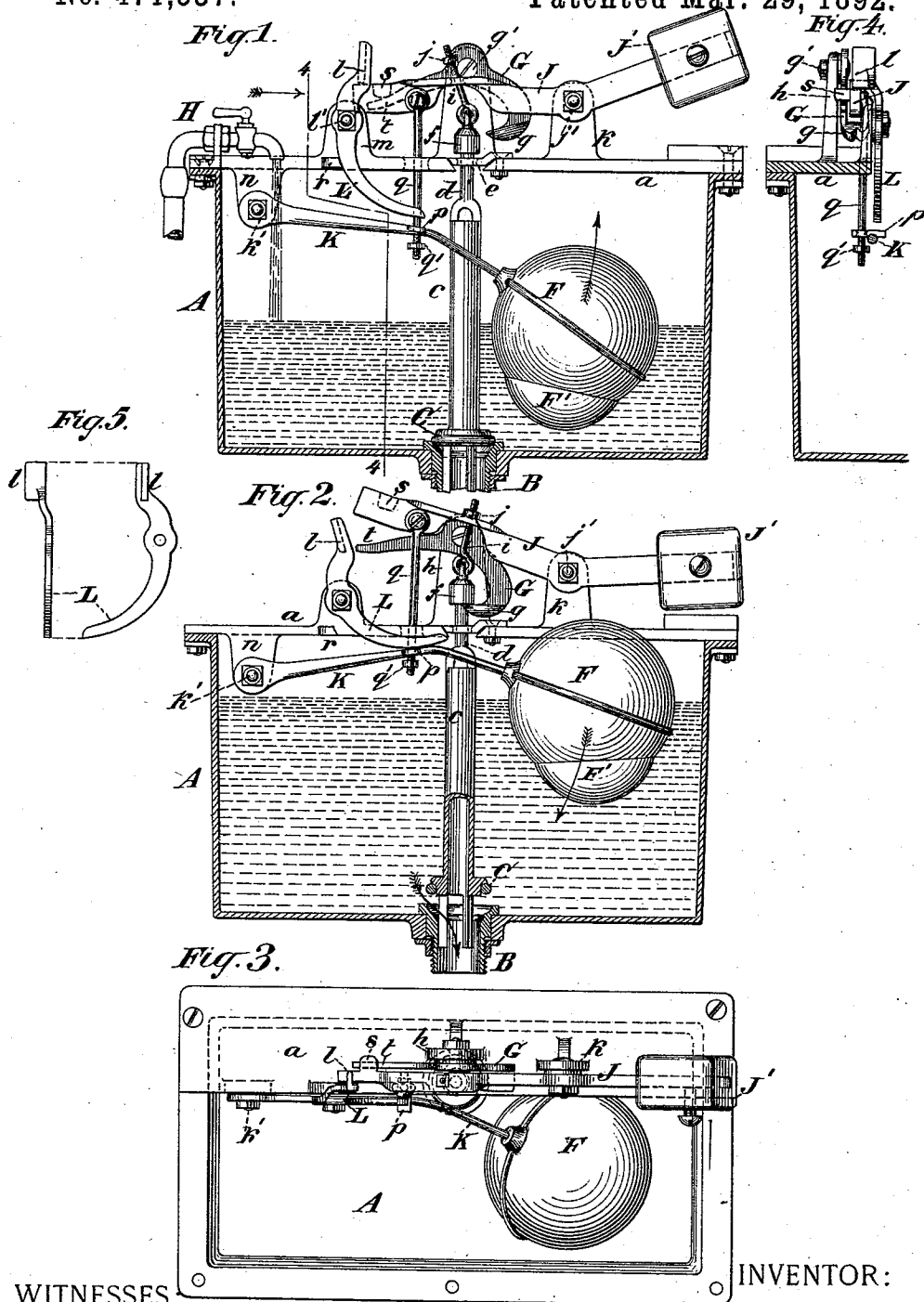
(No Model.)

2 Sheets—Sheet 1.

H. H. CRAIGIE.
FLUSHING TANK.

No. 471,537.

Patented Mar. 29, 1892.



WITNESSES:

John Becker
Geo. E. Gavin

INVENTOR:

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Arthur C. Braser & Co.

(No Model.)

2 Sheets—Sheet 2.

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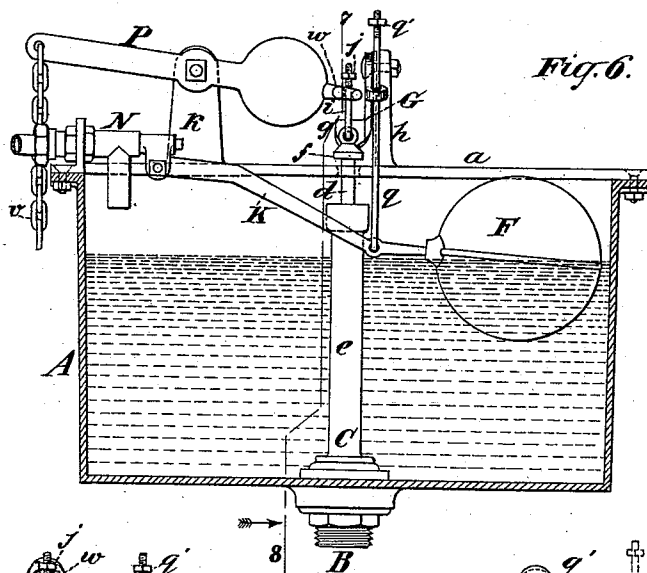


Fig. 6.

Fig. 7.

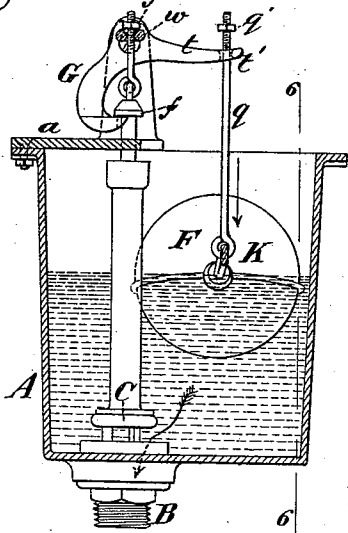


Fig. 8.

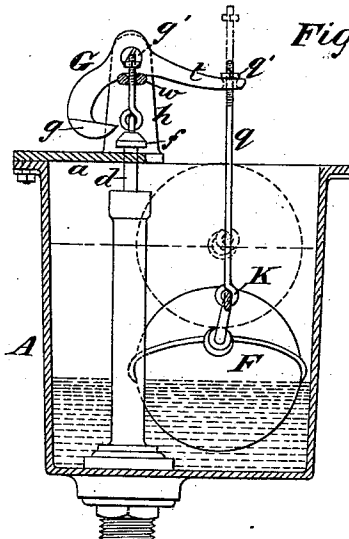
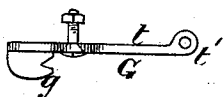


Fig. 9.



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UNITED STATES PATENT OFFICE.

HUGH H. CRAIGIE, OF STAMFORD, CONNECTICUT.

FLUSHING-TANK.

SPECIFICATION forming part of Letters Patent No. 471,537, dated March 29, 1892.

Application filed April 9, 1888. Serial No. 270,033. (No model.)

To all whom it may concern:

Be it known that I, HUGH H. CRAIGIE, of Stamford, Fairfield county, Connecticut, have invented certain new and useful Improvements in Flushing-Tanks, of which the following is a specification.

This invention relates to flushing-tanks for water-closets, urinals, &c., pertaining in part to automatic tanks giving a periodical flush and in part to tanks which are flushed by the pulling of a lever through the medium of a chain or other connection.

My improved tank is of that class discharging at each flush a measured quantity of water, the quantity of the discharge being determined by means of a float, which by its descent to a predetermined level effects the closing of the outlet-valve.

In my improved tank the valve when lifted to cause the outflow is held lifted by means of a catch, which engages the valve or stem connected with it and holds it off from its seat until the descent of the float acts to withdraw the catch and release the valve, whereupon the latter closes and the outflow of the flushing-water ceases. As the tank is refilled with water from the service-pipe the float rises to its normal position ready for the next operation. In an automatic tank the rising of the float acts to release the weighted lever, which in tilting raises the valve and starts the outflow, leaving the valve upheld by the said catch. In a manually-operated tank, however, the valve is lifted by an operating-lever, which is manipulated by pulling a chain or other connection, and remains upheld by the said catch until the latter is withdrawn by the descent of the float. The tank is then refilled through the usual float-valve or ball-cock, which is opened by the descent of the float and which upon the refilling of the tank is closed by the ascent of the float, leaving the tank full and in readiness for the succeeding operation.

Figures 1 to 5 of the accompanying drawings show my invention as applied to an automatic tank giving periodical flushes, and Figs. 6 to 9 illustrate it as applied to a manually-operated flushing-tank. Fig. 1 is a vertical longitudinal section of the periodical

tank, showing the tank during the process of refilling after a flush. Fig. 2 is a similar view showing the tank immediately after the lifting of the outlet-valve. Fig. 3 is a plan. Fig. 4 is a fragmentary transverse section cut on the line 4 4 in Fig. 1. Fig. 5 shows one of the parts in side and rear elevation. Fig. 6 is a vertical longitudinal section of the manually-operated tank, showing it full and ready to operate. Figs. 7 and 8 are transverse sections thereof cut on the line 7 8 in Fig. 6, Fig. 7 showing the tank during operation with the water running out and Fig. 8 showing it at the commencement of refilling. Fig. 9 is a plan of the catch-lever for upholding the valve.

I will first describe the automatic or periodical tank shown in Figs. 1 to 5. Let A designate the cistern or water-reservoir, B the outlet-pipe valve, C the outlet-valve, and F the float. The valve C is shown as provided with a tubular valve-stem *c*, which constitutes also an overflow-pipe, being open at its upper end slightly above the highest normal water-level in the tank. Above this tube *c* is a guiding stem or rod *d*, which passes up through an opening in a small guide-plate *e*, which is fastened to a plate or shelf *a*, which forms a cover for the cistern A and extends over the rear portion thereof. At the top of the stem *d* is a head *f*, which, when lifted, is caught by a projecting hook *g* on a catch-lever G, which is pivoted on a screw *g'* to a standard *h*, projecting up from the plate *a*. The top of the stem *d* above the head *f* is formed with an eye, to which is jointed an eye rod or link *i*, which passes loosely through a hole in a lever J and has screwed on its upper end a nut *j*. The lever J is fulcrumed at *j'* on a standard *k*, projecting up from the plate *a*, and on the opposite side of its fulcrum from the link *i* it carries a heavy counter-weight J'. This weight imparts to the opposite arm of the lever a tendency to move upward, which is normally resisted by the end of the lever being caught, as shown in Fig. 1, by an overhanging stop *l* on the back of a detent-lever L. (Shown detached in Fig. 5.) This lever is pivoted at *l'* to a standard *m*, projecting upwardly from the plate *a*.

The float F is ballasted by a weight F' and is mounted on the end of a lever K, which is fulcrumed at *k'* to a standard *n*, projecting downwardly from the plate *a*. The lever K is formed with a cross-bar *p*, which comes beneath the lower arm or tail of the detent-lever L.

In the operation of the tank when the float F rises this cross-bar bears upwardly against the tail of the lever L and tilts the latter from the position shown in Fig. 1 to that shown in Fig. 2, thereby moving its lug *l* out of engagement with the free end of the weighted lever J, and thereby permitting the latter to be thrown up by its counter-weight J' from its position shown in Fig. 1 to that shown in Fig. 2. In so doing the lever J encounters the nut *j* of the link *i* and carries the latter up with it, thereby jerking up the valve-stem and lifting the valve G, whereupon, or as soon as the valve is fully lifted, the hook *g* on the catch-lever G moves by its own weight underneath the head *f* into position to uphold the valve-stem. As soon as the valve is lifted the water commences to run out and the float F to descend. Shortly after commencing its descent the lever K encounters a nut *q'* on the end of a rod *q*, which passes through the cross-bar *p* and extends up through a slot in the plate *a* and is jointed at its upper end to the lever J. After the lever K encounters this nut *q'* the continued downward movement of the float pulls the rod *q* and through the latter draws downwardly on the lever J, and by the preponderating weight of the float, in connection with the advantage of leverage which it possesses, it gradually tilts the lever J back from the position shown in Fig. 2 to that shown in Fig. 1, at the same time releasing the detent-lever L, so that when the lever J reaches its farthest position its end which has been rubbing against the side of the lug *l* passes beneath the latter and the lever L, falling to its normal position against the stop *r* on the front of the plate *a*, brings the lug *l* over the free end of the lever J, thereby catching and holding the latter. When this downward movement of the lever J commences, the valve C is left upheld by the catch-lever G, which continues to hold it until the float reaches its lowest position. Toward the end of the downward movement of the float a lug *s*, projecting from the back of the lever J, strikes the tail *t* of the catch-lever G and tilts the latter, thereby gradually sliding the hook *g* out from under the head *f*, so that finally this hook clears the head *f* and allows the valve to drop back to its seat, whereupon the outflow ceases. The tank, which is thus nearly emptied, is then refilled in the manner usual with periodical tanks—that is to say, by the admission of a constant and reduced stream of water through a small cock or faucet H, Fig. 1. By permitting a more or less rapid stream to enter through this cock the flushes may be made to succeed one another with greater or

less frequency. During the refilling of the tank the float F ascends, and on reaching the limit of its upward movement it causes the detent-lever L to again release the lever J, thereby again opening the valve and repeating the cycle of operations already described. The automatic operation of the tank will thus continue as long as it is continuously supplied with water.

My improved construction of periodical tank may be modified somewhat without departing from what is essentially my invention. All that is necessary is that there should be a counter-weight or spring to lift the valve, a catch to hold it when lifted, a float so connected to the counter-weight and catch that in its descending movement it shall restore the counter-weight and withdraw the catch, and some kind of detent which will restrain the counter-weight from acting on the valve until the float at the termination of its ascending movement withdraws this detent, and thereby frees the counter-weight and permits it to lift the valve.

The construction of the manually-operated tank shown in Figs. 6 to 9, which I will now describe, embodies part of my present invention. The cistern A, outlet B, valve C, and float F are of the same construction as in the periodical tank already described. The float F is connected by its lever K to a float-valve or ball-cock N of any ordinary construction, through which when the float is depressed water is admitted into the tank and by which when the float is lifted to its highest position the inflow of water is arrested. The valve-stem *d* passes up freely through a guiding-hole in the top plate *a* of the cistern and is formed with a head *f*, adapted to be engaged by the hook *g* of lever G, (shown best in Figs. 7 and 8,) which is similar to the one already described. This lever is fulcrumed at *g'* to a standard *h*. It differs from the construction first described in that it is connected to the float-lever K by a direct connection instead of through the lever J, as in the construction first described. This connection is made, preferably, by means of a rod *q*, which passes freely through an eye *t* of the lever G. This rod *q* is inverted relatively to the rod *q* in the construction first described, being jointed to the float-lever at its lower end and having its nut *q'* screwed on its upper end. When the float is descending, as in Fig. 7, the rod *q* moves freely through the eye *t* until the nut *q'* encounters the tail *t* of the catch-lever *g*, as in Fig. 8, whereupon this lever is tilted by the weight of the float and its hook *g* is moved out from under the head *f*, thereby dropping the valve, as shown in Fig. 8. Thus the descent of the float acts upon its reaching a certain level to withdraw the catch G and close the valve, as in the previous construction, the only difference being that the float acts on the lever G through the rod *q* only instead of through the rod *q* and lever J, with its lug *s*, as before.

The valve is opened to give a flush by the operating-lever P, fulcrumed on a standard *k*, projecting upwardly from the plate *a*, which lever is counterweighted, as usual, on the arm 5 which engages the valve and is connected at its opposite arm to a chain *v* or a cord, wire, or other connection, which extends downward and is connected to a pull or to the seat or door of the closet or otherwise, so as to be operated manually to tilt the lever P and lift 10 the valve. The upper end of the valve-stem is connected by a link *i* with the lever P, its link passing freely through a hole or eye *w* in the end of the lever and having a nut *j* 15 screwed on it. When the lever is pulled, this eye *w* encounters the nut *j* and pulls upwardly on the link *i* and the valve-stem, thus lifting the valve until its head *f* comes above the hook *g*, whereupon the latter moves by its 20 own weight under the head and holds the latter after the lever P is released and drops back by its counter-weight to its normal position. In both constructions of tank the duration of the flush, or, more exactly, the quantity of water discharged at each flush, may be 25 varied by adjusting the nut *q'* up or down on the rod *q*.

I claim as my invention the following-defined novel features and combinations, substantially as hereinbefore specified, viz:

1. The combination, with a cistern A, of a plate *a* thereover, having standards *k* and *h* and constructed with an opening at the side of the latter, a valve C in the cistern, having 35 a guiding-stem *d* passing through said opening and having a head *f* above the latter, a lifting-lever for said valve flexibly connected to its upper end, a float F in said cistern, a pivoted float-lever K, a lever G, pivoted to the 40 side of said standard *h* above the head *f* of the valve-stem, constructed with a depending hooked end *g* at one side of and in proximity to said head *f* and adapted to pass beneath the latter when the valve is lifted and with 45 a tail end projecting at the other side of the valve, and a connection between said lever K and the tail end of lever G, constructed when the float falls to tilt the lever G and thereby remove its hooked end *g* from the path of said 50 head *f*, all constructed substantially as and for the purpose set forth, whereby when the valve is raised by its lifting-lever its head *f* will be engaged and suspended by the hooked end of lever G and its guiding-stem *d* within 55 said opening will prevent its escape therefrom and on the fall of the float the lever G will be tilted and the valve released to seat itself.

2. The combination, with a cistern A, of a 50 plate *a* thereover, having a standard *h* and an opening at the side of the latter, a valve in the cistern, having a guiding-stem *d* passing through said opening and a head *f* above the latter, a lifting-lever for said valve flexibly 65 connected to its head *f*, a lever G, pivoted to the side of said standard *h* above the head *f*

of the valve-stem and vertically thereover, constructed with a heavy depending end at one side of the head *f*, terminating in a laterally-projecting hook *g* in proximity to said 70 head and adapted to pass beneath the latter when the valve is lifted, and with a reduced tail end projecting at the other side of the valve, whereby said lever G normally tends to maintain its end in the path traveled by 75 said head *f* under the guidance of the stem *d*, a float F in said cistern, a float-lever K therefor, and a connection between the latter and the tail end of said lever G, constructed when the float falls to tilt the latter until its hooked 80 end *g* is removed from the path of said head *f*, all constructed substantially as and for the purpose set forth.

3. The combination, to form a periodical flushing-tank, of a cistern and its outlet-valve, 85 a counter-weight connected to the valve and constructed in its descent to lift the valve, a detent for restraining said counter-weight, a catch constructed to hold the valve when 90 lifted, and a float connected to said detent and catch, whereby on its ascent it acts to withdraw said detent and open the valve and on its descent to withdraw said catch and close the valve.

4. The combination, to form a periodical 95 flushing-tank, of a cistern and outlet-valve, a counterweighted lever connected to the outlet-valve and adapted on the falling of the weight to open the valve, a catch adapted to hold the valve open, a detent constructed to 100 restrain the counterweighted lever, and a float connected to the counterweighted lever and adapted in its descent to pull the latter down and release the catch and in its ascent to engage said detent and withdraw it to release the 105 counterweight-lever.

5. The combination, to form a periodical flushing-tank, of a cistern and outlet-valve, its stem having an overhanging head or shoulder, a catch-lever adapted to engage said head 110 and hold the valve when lifted, a counterweighted lever connected to the valve and adapted by the descent of the counter-weight to lift the valve and having a lug projecting into the path of said catch-lever, whereby the 115 restoring of said counterweight-lever withdraws said catch and releases the valve, a float connected to the counterweight-lever and adapted in its descent to pull down and restore said lever, and a detent arranged to engage 120 said lever when thus restored and connected to the float to be retracted and disengaged from said lever upon the ascent of the float.

6. The combination, to form a periodical 125 flushing-tank, of a cistern A, its valve C, and valve-stem *d*, having head *f*, with a catch-lever G, having tail *t*, a counterweighted lever J, engaging the valve-stem and having a projection to engage the tail of the catch-lever, 130 a detent-lever L for holding the counterweighted lever in its restored position, a float

F and its lever K, constructed in ascending
to engage and restore the detent L, and a rod
q, connecting the counterweight-lever with
the float and reservoir, whereby on the de-
5 scent of the float it pulls down and restores
the counterweight-lever.

In witness whereof I have hereunto signed

my name in the presence of two subscribing
witnesses.

HUGH H. CRAIGIE.

Witnesses:

CHARLES K. FRASER,
JNO. E. GAVIN.