

W. A. WILLIAMS.
FLUSHING TANK.
APPLICATION FILED SEPT. 5, 1916.

1,225,691.

Patented May 8, 1917.
2 SHEETS—SHEET 1.

Fig. 1.

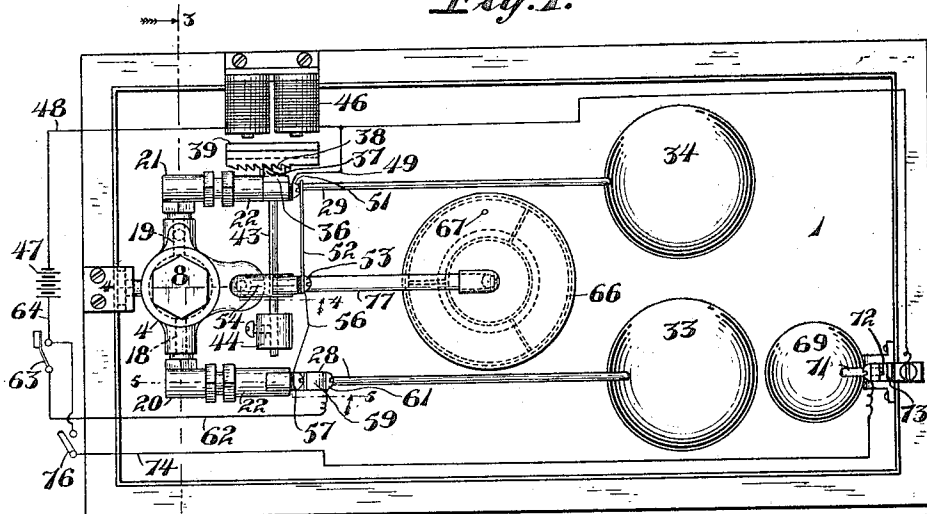
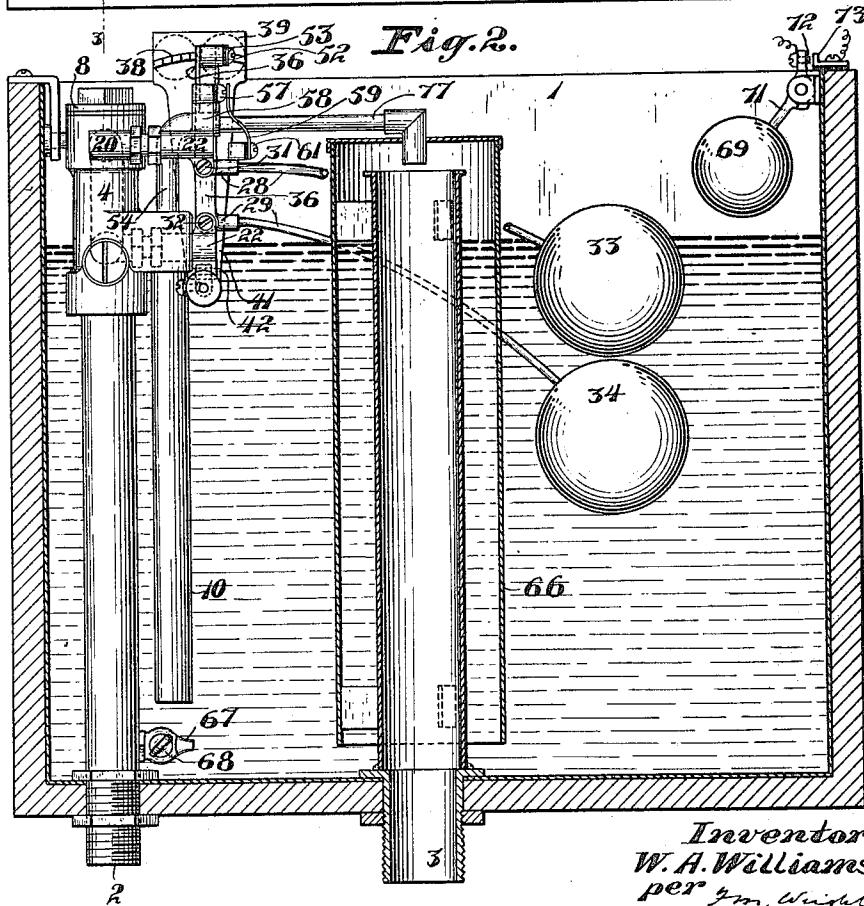


Fig. 2.

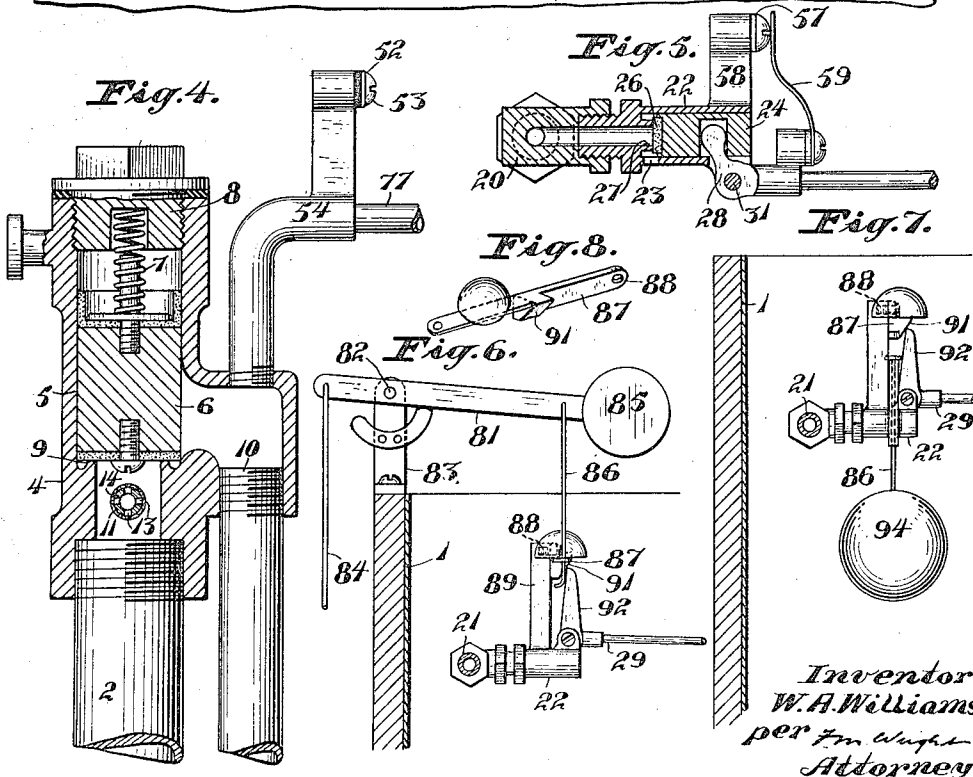
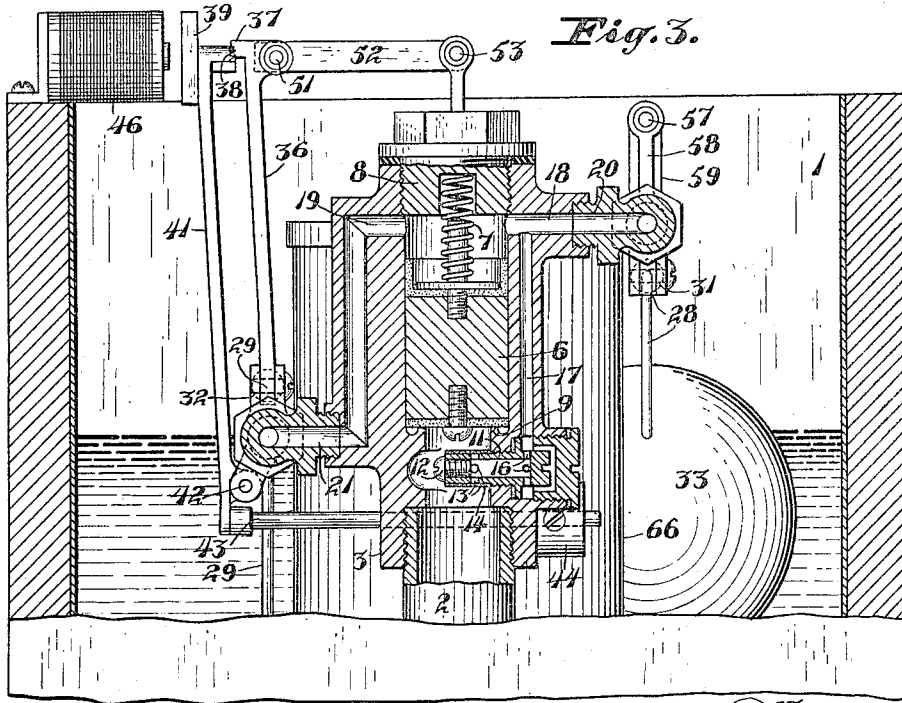


Inventor
W. A. Williams
per J. M. Wright
Attorney

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Inventor
W. A. Williams
per Jm Wight
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM A. WILLIAMS, OF SAN FRANCISCO, CALIFORNIA.

FLUSHING-TANK.

1,225,691.

Specification of Letters Patent.

Patented May 8, 1917.

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To all whom it may concern:

Be it known that I, WILLIAM A. WILLIAMS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Flushing-Tanks, of which the following is a specification.

The object of the present invention is to provide an improved flushing tank which can be operated either electrically or by hand, or automatically at predetermined intervals when desired, and in which the floats employed for its operation will be of small size and cost.

In the accompanying drawing, Figure 1 is a plan view of my improved flushing tank, certain electrical parts being shown diagrammatically; Fig. 2 is a longitudinal section thereof; Fig. 3 is an enlarged transverse section on the line 3—3 of Fig. 1; Fig. 4 is an enlarged detail vertical section on the line 4—4 of Fig. 1; Fig. 5 is a similar section on the line 5—5 of Fig. 1; Figs. 6 and 7 are sectional views of modifications of the invention; Fig. 8 is a perspective view of a detail.

Referring to the drawing, 1 indicates a tank through the bottom of which extend a supply pipe 2 and a discharge pipe 3. The top of the supply pipe 2 is screwed into a casting 4 comprising a cylinder 5, in which can reciprocate a piston 6, pressed down by a spring 7, compressed between the upper end of the cylinder and a plug 8 screwed into the top of the casting; said piston, when pressed on to a seat 9, closing the outlet to a pipe 10, (Fig. 4) of which the top is screwed into said casting and the bottom extends to within a short distance from the bottom of the tank. When the pressure of the liquid in the pipe 2 is sufficient to overcome the pressure above the piston, both of the liquid in the cylinder and of the spring, water will flow from said pipe 2 into said pipe 10 and thence into the tank.

Screwed into a side of the casting is a small cylinder 11, the inner end of which is closed by a screw 12 and which has in its side at its inner end holes 13, said side being surrounded by a filter screen 14. In the side of the outer end of the cylinder are holes 16 through which liquid entering

from the pipe 2 by the holes 13 can escape into a vertical passage 17 formed in the casting and thence into the top of the cylinder 5 and also into two conduits 18 and 19, leading in opposite directions from said cylinder. Into the outer ends of said conduits 18, 19 are screwed ends of tubular castings 20, 21 of similar construction, one only being shown in detail in Fig. 5, formed with cylinders 22 in sides of which are outlets 23, and in which cylinders can reciprocate plungers 24. Secured to the inner ends of the plungers are facings 26 of yielding material adapted to be seated by the inward pressure of said plungers against seats at the ends of tubes 27 of the castings, and closing the outer end of said tubes. These plungers 24 are actuated by short arms of levers 28, 29, pivoted, as shown at 31, 32, on the castings 20 and 21, to the outer ends of the long arms of which levers are secured floats 33, 34. The pivot 31 is located at the lower part of its casting 20, so that the short arm of the lever 28 extends upwardly, while the pivot 32 is located at the upper portion of its casting 21 so that the short arm of the lever 29 extends downwardly. The fall of the float 33 therefore tends to open the corresponding outlet 23, while the fall of the weighted float 34 tends to close the corresponding outlet 23.

When the tank is empty, water can escape from the upper end of the cylinder 5 by the small outlet 23 in the cylinder 22 corresponding to the lever 28, so that the pressure in said upper end, together with the pressure of the spring 7, is not sufficient to balance the pressure on the lower end of the piston 6, and said piston rises from its seat 9 and the water flows into the tank through the pipe 10. After the water rises to a certain height in the tank, the float 33 begins to rise by its buoyancy, thus preventing escape of the water from the outlet 23, and raising the pressure in the cylinder 5 on the top of the piston 6 until said pressure, together with the pressure of the spring 7, overcomes the pressure on the bottom of the piston, whereupon the piston 6 descends, and closes the seat 9, and shuts off the water from the pipe 10, and water no longer rises in the tank. The rise of the float 34 would allow water to escape through the outlet 23 corresponding to said float 34, but it is pre-

vented from rising by an arm 36, extending upwardly from the lever 29 and having at its upper end a tooth 37 which engages a curved rack 38 on the side of an armature 39 on the end of an arm 41, pivoted at 42, to swing to and from the tooth in a plane at right angles to the plane of vibration of the lever 29, said arm 41 being secured to an arm 43, on which is adjustably supported a weight 44. Said weight normally retains the armature at a distance from electro-magnets 46 and in a position in which it can be engaged by said tooth. Said electro-magnets are energized by electricity passing in a circuit from a battery 47 by a wire 48 extending around said electro-magnets, then by a wire 49 through an insulated contact screw 51 carried by the arm 36, which is normally in contact with the free end of a spring contact plate 52, secured to an insulated contact screw 53 carried by a bent tube 54 secured upon the casting 4, and communicating with the tube 10, and the purpose of which will be hereinafter explained, thence by a wire 56 to an insulated contact screw 57 carried by an upright 58 extending from the casting 20, which contact screw is in contact with the free end of a spring contact plate 59 extending upwardly from, and in contact with, an insulating contact screw 61 carried by the lever 28, thence by a wire 62 to a switch 63, and thence by a wire 64 to the battery.

Normally, when the tank is filled with water, this circuit is closed except at the switch 63. In that condition, the water rises into close proximity of the top of the discharge pipe 3 within a siphon tube 66 surrounding said discharge pipe 3, its open bottom being close to the bottom of the tank and its top being closed except for a small perforation 67 which does not interfere with the siphoning action. If a person wishes to discharge water from the tank through the discharge pipe 3, he closes the switch 63 and thereby energizes the electro-magnets 46 and attracts the armature, withdrawing the rack 38 from the tooth 37 and allowing the arm 36 carrying said tooth to move rearwardly under the pressure caused by the buoyancy of the float 34. The rise of the float 34 uncovers the corresponding outlet 23, and allows water to flow from the top of the cylinder, reducing the pressure in the top of the cylinder, so that it, and the pressure of the spring, are no longer sufficient to resist the pressure at the bottom of the piston, and the piston rises from off its seat, allowing water to flow through the pipe 10, raising the level of the water in the tank so that it overflows the top of the discharge pipe 3 and produces a siphoning action, siphoning all of the water in the tank until the level of the water descends below the bottom of the siphon tube 66

upon which the siphon is broken. Water then continues to flow through the pipe 10 filling the tank.

I also provide means whereby the tank will be emptied automatically at predetermined intervals. For this purpose there is provided, near the bottom of the pipe 2, a small jet pipe 67, which can be regulated by a valve 68, through which a small quantity of water continually flows. The amount of flow of water through this jet pipe can be regulated so that, at any time desired, the tank will be filled to a sufficient extent to raise a ball float 69, attached to a lever 71, pivotally supported upon a side of the tank, and the movement of which lever causes a contact 72 to contact with a contact 73 and closes a branch circuit leading from the wire 48 by a wire 74 having therein a switch 76 and leading to the battery around the switch 63. When the switch 76 is closed, this automatic device is in operation, and when it is opened, the automatic device is rendered inoperative.

To the tube 54 is connected a tube 77 which leads into the upper closed end of the siphon tube, and serves the purpose of sealing the bowl after the flushing has taken place.

In Figs. 6 and 8 is disclosed means whereby the device is actuated by means of a lever 81. Said lever is pivoted at 82 upon a standard 83 upon a side of the tank, and to its outer end is attached a wire 84 by which it may be actuated. To the inner end of the lever 81 is connected a weight 85 and near said weight is attached the upper end of a wire 86, of which the lower end is connected to the outer end of a weighted arm 87, pivoted, as shown at 88, upon a standard 89 upon the casting 21, the free end of said arm having a beveled portion 91 which can engage an arm 92 connected to swing with the float lever 29. Upon depressing the outer end of said lever 81, the float lever 29 is permitted to rise by the buoyancy of the float, thereby performing the operation before described.

In the modification shown in Fig. 7, the wire arm 86 is raised automatically by a float 94 attached thereto.

I claim:—

1. The combination of a tank, a supply pipe therefor, two means for controlling said supply pipe, floats for controlling the respective means, one of said floats being adapted by its descent to open the supply pipe, and the other to close it, means for preventing the rising of the latter float with the rise of the level of the water in the tank, and means for withdrawing said preventive means, controllable from the outside of the tank.

2. In a device for automatically operating flushing tanks, the combination of a

5 tank, a supply pipe therefor, two means for controlling said supply pipe, floats for controlling the respective means, one of said floats being adapted by its descent to open the supply pipe, and the other to close it, means for preventing the rising of the latter float with the rise of the level of the water in the tank, a jet for supplying a small quantity of water continuously to the flushing tank, a buoyant float, and means actuated by the rise of the latter float for withdrawing said preventive means. 10

WILLIAM A. WILLIAMS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."