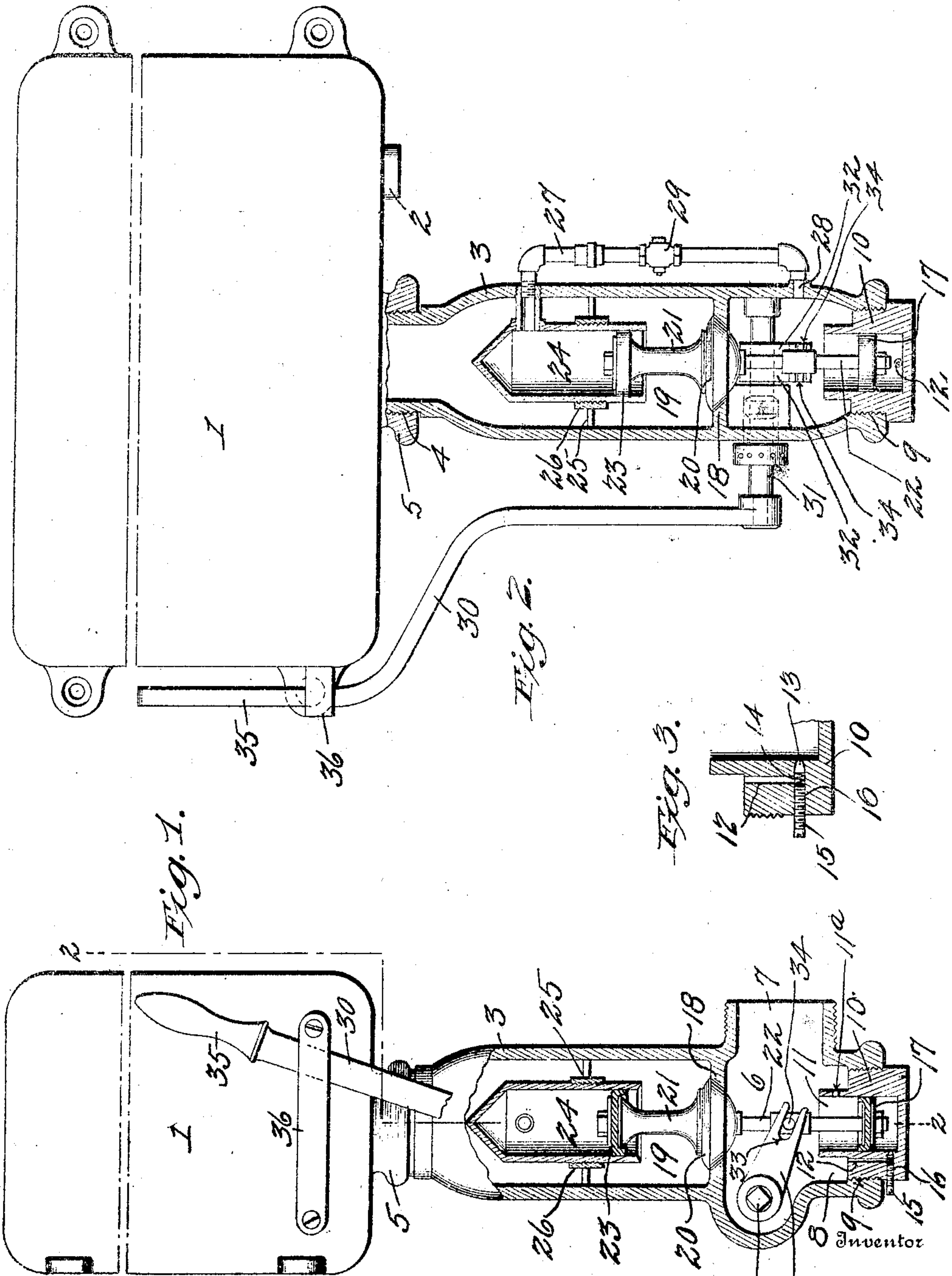


J. E. LONGSTREET.  
FLUSHING APPARATUS.  
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914,587.

Patented Mar. 9, 1909.



Witnesses  
J. E. Longstreet  
H. J. Longstreet

Judson E. Longstreet  
W. B. Curran  
Attorney



# UNITED STATES PATENT OFFICE.

JUDSON E. LONGSTREET, OF YOUNGSTOWN, OHIO.

## FLUSHING APPARATUS.

No. 914,587.

Specification of Letters Patent.

Patented March 9, 1909.

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*To all whom it may concern:*

Be it known that I, JUDSON E. LONGSTREET, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Flushing Apparatus, of which the following is a specification.

This invention relates to flushing apparatus for closets and analogous uses, and has special reference to an improvement in that type of valves or valve devices commonly termed closet valves and designed for use in connection with flushing tanks for water closets.

To this end the invention has in view the provision of a simple and practical construction of flushing valve device controlled through the medium of a conveniently arranged operating lever and arranged wholly exterior to the flushing or supply tank so as to provide an arrangement which does away entirely with the float and the more or less complicated and delicate mechanism and parts usually making up the valve mechanism of the ordinary types of flushing apparatus. In the ordinary float devices referred to the same are always more or less inaccessible besides being liable to easily get out of order, besides lacking durability. These objections to the ordinary float and equivalent mechanism are entirely obviated by the present invention.

With these and many other objects in view which will more readily appear as nature of the invention is better understood the same consists in the novel construction combination and arrangement of parts hereinafter more fully described and illustrated in the claims.

In the preferably embodiment of the invention the construction shown in the drawings is used, in which drawings—

Figure 1 is an end view of a flushing tank equipped with a flushing valve device constructed in accordance with the present invention, said device being shown in section. Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1. Fig. 3 is an enlarged detail view of the variable regulating relief valve for the dash-pot.

Like references designate corresponding parts in the several figures of the drawings.

In carrying out the present invention no

special kind or construction of flushing tank is required. This tank as shown in the drawings is designated by the numeral 1 and comprises an ordinary box tank of any design or capacity, but preferably provided at its bottom with an inlet fitting 2 designed for the connection therewith of a water supply pipe in constant open communication with the interior of the tank, thereby providing an arrangement wherein the pressure from the source of water supply is a constant force within the tank and is utilized in connection with the operation of the flushing valve device as will presently appear.

The tank referred to has associated therewith the improved flushing valve device forming the subject matter of this application. The said valve device includes in its organization a main valve body which may be properly termed a valve casing designated by the numeral 3 and arranged preferably in an upright position beneath the flushing or supply tank 1, said casing having a detachable threaded or equivalent connection 4 at its upper end with the outlet fitting 5 which is provided at the bottom of the tank and has an unobstructed constant communication therewith.

The upright valve casing is formed at its lower end with what may be termed an outlet chamber 6 provided at one side with a lateral pipe neck 7 forming the outlet opening for the valve device and designed to have coupled thereto the pipe leading to the closet bowl. At its bottom the said lower outlet chamber 6 of the valve casing is provided with a clean-out opening 8 having threads 9 to detachably receive therein the exteriorly threaded clean-out screw plug 10 which forms the bottom closure for the valve casing and is readily removable for clean-out purposes as will be readily understood by those familiar with this class of devices. The said bottom plug 10 is of a sufficient depth to permit of the formation therein, at its inner side, of an open-ended chamber 11 forming a bottom dash-pot the functions of which will presently appear. Through the shell or wall of this chamber 11 is a small port 11<sup>a</sup>, affording communication between chambers 6 and 11, through which water may pass slowly from the former to the latter when the plunger-head 17 is above the port. In



communication with the bottom or closed end portion of the dash-pot chamber 11 is one end of a relief vent 12 piercing the body of the plug 10 and whose other end is in open communication with the outlet chamber 6 of the valve casing. The end of said vent 12, in communication with the dash-pot chamber, is covered and uncovered through the medium of a relief valve 13 yieldingly held to its seat by a pressure spring 14 interposed between the same and a tension screw 15 adjustably mounted in a threaded opening 16 in one side of the bottom plug 10, and whose head is exposed on the exterior of the head for adjustment purposes to regulate the tension of the spring 14, and hence control the acceleration or retardation of the escape of water from the dash-pot beneath the plunger head 17 operating therein.

In addition to the elements mentioned the valve casing 3 is provided with an interior main valve seat 18 separating the outlet chamber 6 from the main valve chamber 19, within which latter operates the saucer-shaped, or equivalent, cut off valve 20 designed to close onto the seat 18 to cut off the flow of water through the outlet chamber 6. The cut off valve 20 has rigidly connected or formed therewith the upper and lower valve stem members 21 and 22 respectively, the latter of which is connected to and carries the plunger head 17 referred to. The upper valve stem member 21 is connected to and carries a piston head 23 slidably fitting within an auxiliary pressure cylinder 24. This cylinder is arranged within the valve chamber 19 in an upright position and is spaced from the walls of the valve chamber, said cylinder being closed at its upper end and open at its lower end. The said piston head 23 and plunger head 17 may conveniently be of duplicate construction and provided with the well known cup leather packing disks, although any equivalent construction would subserve the functions of the invention. However it is to be observed that the piston head 23 is of less diameter than the cut off valve 20 so that an excess or superior water pressure is exerted on said valve 20.

The pressure cylinder 24 may be conveniently supported in place by means of a spider or skeleton supporting frame 25 secured to the walls of the valve casing and having a threaded or equivalent collar 26 embracing the cylinder. Also, the closed end portion of the cylinder 24 has suitably connected therewith one end of a by pass relief pipe 27 the other end of which pipe is in communication with the outlet chamber 6, as at 28, and said pipe 27 is fitted between its ends with a suitable cut off or controlling valve 29.

The main cut off valve is lifted by a mechanical lifting device preferably consisting of a swinging operating lever 30, a rocker

shaft 31 and a pair of swinging lifting arms 32. The arms 32 are fitted to the rocker shaft 31 within the outlet chamber 6 and are provided with forked or bifurcated free ends 33 engaging the studs 34 rigidly carried by the lower valve stem member 22. Said shaft 31 is journaled in suitable bearings transversely of the valve casing, and one end of said shaft has fitted thereto the lower end of the lever 30, the upper end of which lever is provided with a suitable handle 35 and is confined within a guiding keeper 36 arranged on the tank.

Referring to the operation of the device it will be obvious that as the water enters the tank at 2 the air in the tank will be compressed until the water and air pressure equalize, when the inflow will cease, and the pressure from the tank will be exerted on the valve 20 and the piston head 22, but on account of the larger diameter of the valve 20 said valve will be held to its seat by its own weight assisted by the excess pressure thereon. When it is desired to flush, the lever 30 is swung in a direction to lift the arms 32 and hence lift the parts 17, 20 and 23, thus permitting the water to have free outlet through the chamber 6 and thence to the bowl. In this operation the lifting force required is quite slight, simply that necessary to overcome the excess pressure on the valve 20 plus the weight of the parts and the resistance of the air in the cylinder 24. After the tank has emptied itself the weight of the valve stem and its equipments, assisted by the pressure of the compressed air in the upper part of the cylinder 24 will close the valve 20 and the speed of closing will be regulated by the relief device described which is associated with the dash-pot 11. The time allowed for the valve 20 to close will be determined by the quantity of water which it is desired to have flow.

By opening the valve 29 in the by pass pipe 27 the cylinder 24 may be relieved of any accumulation of water through a lifting movement of the piston head 23, after which the valve is usually closed. Or, if desired, the valve 29 may be left slightly open to regulate the resistance offered to the upstroke of the piston head 23.

I claim:—

1. In a flushing device, the combination with the tank, of a valve casing communicating with said tank and having an interior valve seat, and an outlet chamber below the latter, a main cut-off valve having an upper and a lower stem member, a piston head carried by said upper stem member, a plunger head carried by the lower stem member, a separate closed air pressure cylinder supported in a stationary position above the valve seat and receiving said piston head, a valved relief connection providing communication between the air cylinder and



the outlet chamber of the casing, a dash pot arranged below the valve seat and receiving the plunger head, and an operating device for lifting the main cut-off valve and the parts carried therewith.

2. A flushing device comprising a valve casing having an interior valve seat and an outlet chamber, a main cut-off valve, a piston head carried with the main cut-off valve and arranged above the same, a closed air pressure cylinder separate from the casing and supported in a stationary position above the valve seat to receive said piston head, a valved pipe connection between said closed cylinder and the outlet chamber of the casing, a dash-pot arranged below the valve seat and provided with pressure regulating means, a plunger head carried with the cut-off valve and working in the dash-pot, and an operating device for lifting the main cut-off valve and the parts carried therewith.

3. A flushing device comprising a valve casing having an interior valve seat and an outlet chamber, a main cut-off valve work-

ing above and onto the valve seat, a piston head carried with the main cut-off valve and arranged above the same, a plunger head carried with the main cut-off valve and arranged below the same, an air pressure cylinder supported within the casing in spaced relation to the walls of the latter to admit of the passage of water thereabout, said cylinder being closed at the top and open at the bottom and receiving through its open end the said piston head, a relief connection providing communication between the air cylinder and the outlet chamber of the casing, a dash pot receiving said plunger head, and an operating device for lifting the main cut-off valve and the parts carried therewith.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JUDSON E. LONGSTREET.

Witnesses:

THEODORE A. JOHNSON,  
HERMAN BRANDMILLER, Jr.