

W. C. RANSON.  
FLUSHING APPARATUS.  
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1,046,492.

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Fig. 1.

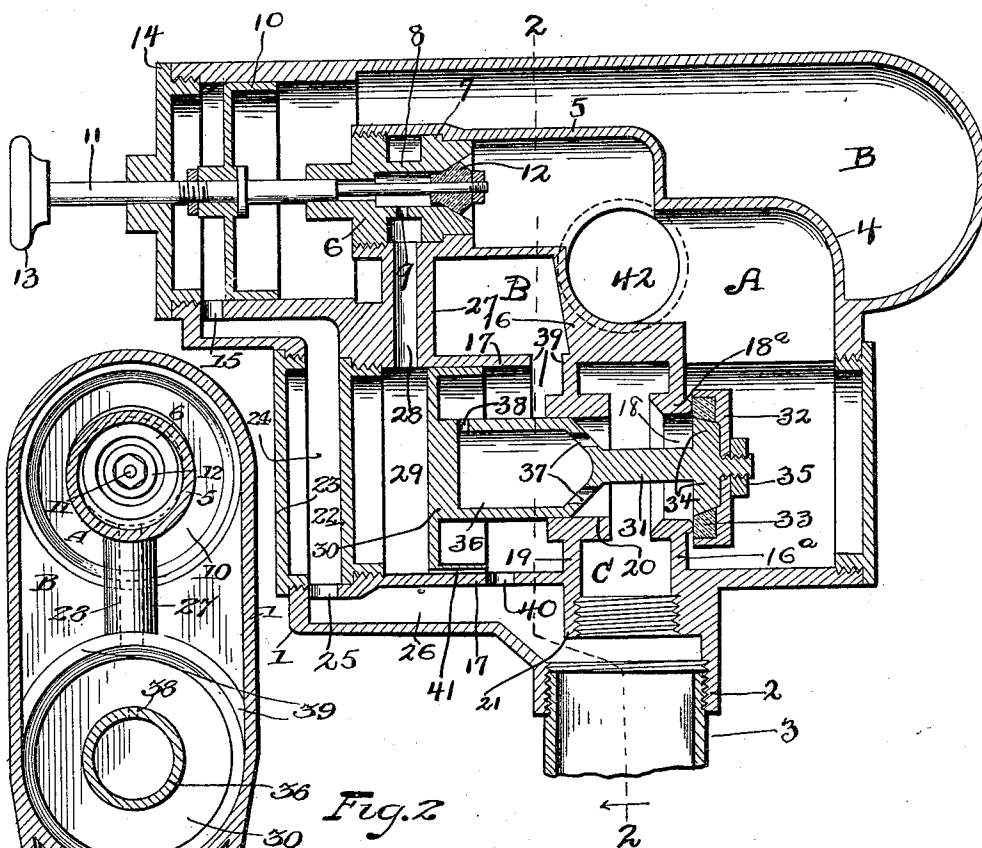


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## FLUSHING APPARATUS.

1,046,492.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed November 14, 1907. Serial No. 402,132.

*To all whom it may concern:*

Be it known that I, WALTER CHISHOLM RANSON, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Flushing Apparatus; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to flushing apparatus for closets, and has for its objects to provide a device of this character which will automatically regulate the length of time that the device shall operate by the provision of a storage chamber which, when filled, will cut off the water supply to the closet; to render devices of this character simple, certain and positive in operation; to provide means whereby the storage chamber, after the flushing operation is finished, may be drained to seal the closet bowl.

Generally speaking, the invention may be defined as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein—

Figure 1 represents a longitudinal sectional view through an apparatus constructed in accordance with my invention and Fig. 2 represents a vertical section on the correspondingly-numbered line of Fig. 1.

Describing the parts by reference characters, 1 denotes the shell or casing of my flushing device. This shell is of generally oblong shape and is relatively narrow in width. It is provided at its lower end with a threaded connection 2 for the reception of the flushing pipe 3, leading to the closet bowl (not shown). The shell has cast therewith a number of tubular and other partitions dividing the shell into three general chambers and providing valve seats and cylinders for pistons. A partition 4 extends from the right hand side of the shell and from side to side thereof for a portion of the length of the shell, where it merges with a tube 5, the left hand end whereof is enlarged and provided with a thread for the reception of the valve seat 6. The front or right hand end of the valve seat is provided with a ledge 7 adapted to engage a similar ledge or shoulder in tube 5 and is provided, be-

tween ledge 7 and the rear threaded portion thereof, with a restricted integral connecting portion 8 provided with a port 9.

The left hand end of the upper portion of shell 1 is tubular or cylindrical in configuration to receive a piston 10 which carries the valve stem 11 and serves as a motor to operate the valve 12 carried by the front end of the valve stem, said stem being provided at its rear end with an operating handle 13. Valve 12 is provided with a tapered surface adapted to fit the correspondingly tapered surface of the valve seat. The tubular or cylindrical portion of the casing is provided with a removable head 14 through which the valve stem extends and, between the rear face of the piston 10 and said head, with the drain port 15. Tube 5 has cast with the lower surface thereof a transverse wall 16, said wall extending across the shell and having formed therewith a pair of transverse partitions and a cylindrical or tubular member 17. The front partition 16<sup>a</sup> has a port 18 provided with a valve seat 18<sup>a</sup>. The rear partition 19 is parallel with the front partition and is provided with a cylindrical guide way 20, the said partitions merging at their lower ends and there being provided with a tubular discharge outlet 21, which may be threaded for the reception of a bushing. The rear end of 17 is closed by a removable head 22, threaded thereinto, and the end of the casing at the rear of 22 is also closed by a removable head 23. Between heads 22 and 23 there is formed a passageway 24 communicating with port 15 and having at its bottom a port 25 communicating with passageway 26, which itself communicates with the outlet connection 2.

The rear end of tube 5 is supported from the upper end of member 17 by a tubular connection 27 cast therewith and with the shell 1 and provided with a passageway 28 communicating at one end with tube 5 between the front and rear flanges of the valve seat and at the other end with the chamber 29 formed between head 22 and a piston 30. Piston 30 is mounted in the cylindrical member 17 and is provided with a stem 31 to the front end of which is secured a valve, the piston serving as a motor to operate said valve. This valve may be of any approved construction and is shown as formed by a cup 32, which is threaded onto

the end of the stem, with packing 33 inserted into an annular recess formed between the outer wall or flange of the cup and the adjacent outer surface of a flange 34 carried by the stem. The cup is detachably secured in place by means of a nut 35. The proportions of parts are such that the packing 33 will engage the valve seat 18 when the valve is seated.

10 The rear end of stem 31 is enlarged to form a cylindrical chamber 36, which is of a size to fit the cylindrical guide-way 20. The front end of chamber 36 is tapered and is provided with one or more ports 37 in the tapered wall thereof. At its rear end, chamber 36 is provided with a port 38. The cylindrical member 17 is provided with a slotted port 39 in the upper surface thereof and with a port 40 in the lower surface thereof, and the lower periphery of piston 30 is provided with a restricted port 41 extending longitudinally from end to end thereof.

42 denotes an inlet connection by means of which water is supplied to the flushing device.

By the construction described, there are provided an inlet chamber A, extending between valves 12 and 32, a storage chamber B and a chamber C, which will be designated as a "supply" chamber and from which water which enters the inlet chamber may be supplied to storage chamber B in the manner to be described hereinafter.

35 With the parts arranged as described, the operation will be as follows:—Under normal conditions, the inlet chamber A is filled with water under the pressure of the water main or house service pipe and the flushing valve is closed. To operate the flushing device, the stem 11 of the operating valve 12 is pushed inwardly. Water from chamber A flows through port 9 and passageway 28 into the chamber 29 at the rear of piston 30. The area of port 41 being far less than the area of port 9, the chamber 29 is soon filled, causing piston 30 to be moved to the right, opening the flushing valve attached thereto and covering port 40. Water then flows from chamber A through the flushing valve proper into chamber C, whence it is discharged through outlet 21 into flushing pipe 3. It will be observed that the diameter of outlet 21 of chamber C is less than the diameter of the inlet port 18. The result will be that part of the water supplied to chamber C will pass through ports 37, 38 and 39 into the storage chamber B, the lower end of piston 30 covering port 40 when the flushing valve is open. When chamber B has been filled, through the influx of water through the ports 37, 38 and 39, the pressure therein acting on piston 10 will seat the operating valve 12, cutting off the supply of water to the rear of piston 30.

The draining of chamber 29 through ports 41 and 40 will reduce the pressure on the rear of the piston, whereupon the unbalanced pressure acting on the main valve moves the same rearwardly and closes the flushing inlet. After the flushing valve has been thus closed, the water in the storage chamber B will escape through ports 39 and 40 into the flushing pipe and seal the bowl. By means of port 15, passageway 24 and port 25, any water which may leak around piston 10 may escape into the flushing pipe.

From the construction above described, it will be apparent that I have produced a comparatively simple but extremely efficient flushing device wherein the time during which the flushing action shall continue may be accurately predetermined and wherein, by extremely simple means, this length of time may be varied to accommodate the device to the varying conditions and incidents of use.

Having described my invention, I claim:

1. In a flushing device, the combination of a casing having an inlet connection and a flushing connection, a storage chamber in said casing, a valve interposed between the inlet and flushing connections, means controlled by said valve for supplying water to the storage chamber, and means operated by the pressure of water in said chamber for automatically causing the pressure of water in said casing to close said valve.

2. In a flushing device, the combination of a casing having an inlet connection and a flushing connection, a main valve interposed between said connections, a storage chamber in said casing, a main piston for operating said main valve and arranged to be itself operated by the liquid supplied through the inlet connection, an auxiliary valve arranged to control the flow of liquid from the inlet connection to said main piston, means for diverting a portion of the liquid flowing through the main valve into the storage chamber, and a motor for said auxiliary valve arranged to be operated by the liquid accumulating in the storage chamber to thereby close the auxiliary valve, substantially as specified.

3. In a flushing device, the combination of a casing having an inlet connection and a flushing connection, a main valve interposed between said connections, a storage chamber in said casing, a main piston for operating said main valve, an auxiliary valve arranged to control the flow of liquid from the inlet connections to the said main piston to thereby open the main valve, means for diverting a portion of the liquid flowing through the main valve into the storage chamber, an auxiliary piston on the auxiliary valve, and a connection for supplying liquid from the storage chamber to the auxiliary piston to close the auxiliary valve by

the accumulation of liquid in said storage chamber, substantially as specified.

4. In a flushing device, the combination of a casing having an inlet connection and a flushing connection, a main valve interposed between said connections, a piston carried by said main valve, an auxiliary valve interposed between the inlet connection and said piston and adapted when open to admit liquid to said piston, a storage chamber in said casing, means for diverting part of the liquid passing through the main valve into said chamber, and means operated by the pressure of the liquid in the storage chamber for seating the auxiliary valve, substantially as specified.

5. In a flushing device, the combination of a casing having an inlet chamber, a storage chamber and a chamber interposed therebetween, the intermediate chamber being provided with a valve-controlled inlet and an outlet, the outlet being of smaller area than the inlet, one or more ports establishing communication between the intermediate chamber and the storage chamber, a main valve, a piston carried by said main valve, an auxiliary valve interposed between the inlet chamber and said piston and adapted when open to admit liquid from the inlet chamber to said piston to thereby open the main valve, and means operated by the pressure of liquid in the storage chamber for closing the auxiliary valve, substantially as specified.

6. In a flushing device, the combination of a casing having an inlet chamber, a storage chamber and a chamber interposed between the inlet and storage chambers, the last-mentioned chamber being provided with an inlet, and an outlet of less capacity than said inlet and with ports establishing communication with the storage chamber, a main valve for controlling said inlet, a piston connected with said main valve to open the same, an auxiliary valve interposed between the inlet chamber and said piston and adapted when open to admit fluid to said piston to move the same in a direction to open the main valve, means operated by the pressure in the storage chamber for closing the auxiliary valve and means for relieving the pressure from behind said main piston.

7. In a flushing device, the combination of a casing having an inlet connection, a flushing connection and a storage chamber, a valve interposed between said connections, means for diverting a portion of the liquid passing through said valve into the storage chamber, means adapted to be actuated by the pressure of liquid in said chamber to aid in closing said valve and means for draining said chamber after the closing of said valve, substantially as specified.

8. In a flushing device, the combination of a casing having inlet and flushing connec-

tions, said casing having formed therewith a pair of cylinders, a main piston and an auxiliary piston in said cylinders respectively, a main valve connected to said main piston and controlling the flow from the inlet to the flushing connection, an auxiliary valve connected to said auxiliary piston and adapted to admit liquid from the inlet connection to the main piston to open said main valve, a storage chamber communicating with the second cylinder, the arrangement being such that the pressure in said storage chamber will operate the auxiliary piston to close the auxiliary valve, and means for relieving the pressure from behind the main piston, substantially as specified.

9. In a flushing device, the combination of a casing having inlet and flushing connections, a main valve interposed between said connections, a piston for said valve, a cylinder for said piston, a tubular connection communicating with said inlet connection, an auxiliary valve in said tubular connection, a passageway extending from the auxiliary valve to the cylinder, a storage chamber adapted to receive liquid which has passed through the main valve, means operated by the pressure in the storage chamber for closing said auxiliary valve, and means for relieving the pressure on said piston tending to open the main valve, substantially as specified.

10. In a flushing device, the combination of a casing having an inlet and a flushing connection, a main valve interposed between said connections, a main piston for said main valve, a cylinder for said main piston, a tubular connection communicating with the inlet connection, an auxiliary valve in said tubular connection, a passageway extending from said auxiliary valve to the cylinder, an auxiliary piston for operating said auxiliary valve, a cylinder for said auxiliary piston, a storage chamber surrounding the tubular connection and adapted to receive liquid which has passed through the main valve and communicating with the second cylinder, and means for relieving the pressure on the main piston tending to open the main valve, substantially as specified.

11. In a flushing device, the combination of a casing having inlet and flushing connections and provided with a chamber interposed between said connections, said chamber having parallel walls, one of said walls being provided with a valve seat and the other with a guide, a valve coacting with said valve seat and having a stem extending through the guide in the other wall, a piston for operating said valve, means for supplying fluid from the inlet connection to said piston to open said valve, a storage chamber, one or more ports establishing communication between the storage chamber and the first-mentioned chamber, and means for ad-

mitting liquid from the storage chamber to the piston to operate the same in a direction to seat the valve, substantially as specified.

12. In a flushing device, the combination  
5 of a casing having an inlet chamber, an inlet connection communicating with said chamber, a flushing connection, and a chamber interposed between the inlet chamber and the flushing connection, the latter chamber  
10 being provided with a pair of parallel walls, one of said walls being provided with a valve seat and the other wall being provided with a tubular guide, a valve coacting with the valve seat and having a stem provided  
15 with a hollow cylindrical portion fitting said guide and provided with ports, a piston

connected with said stem for operating said valve, a storage chamber adapted to receive liquid from said ports, means for supplying liquid directly from the inlet chamber to one side of said piston, and means for supplying liquid from the storage chamber to the opposite side of said piston, substantially as specified.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

WALTER CHISHOLM RANSON.

Witnesses:

VICTOR C. LYNCH,  
N. L. McDONNELL.

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