

No. 637,357.

Patented Nov. 21, 1899.

L. B. SMITH.
WATER CLOSET FLUSHING VALVE.

(Application filed Apr. 24, 1899.)

(No Model.)

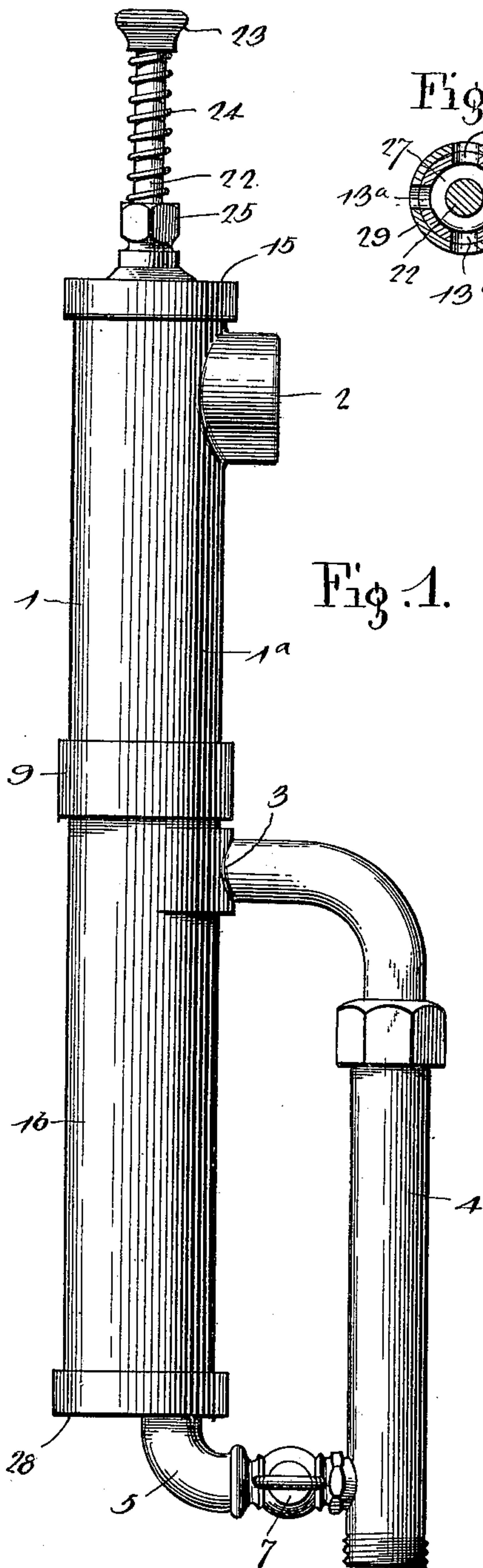


Fig. 1.

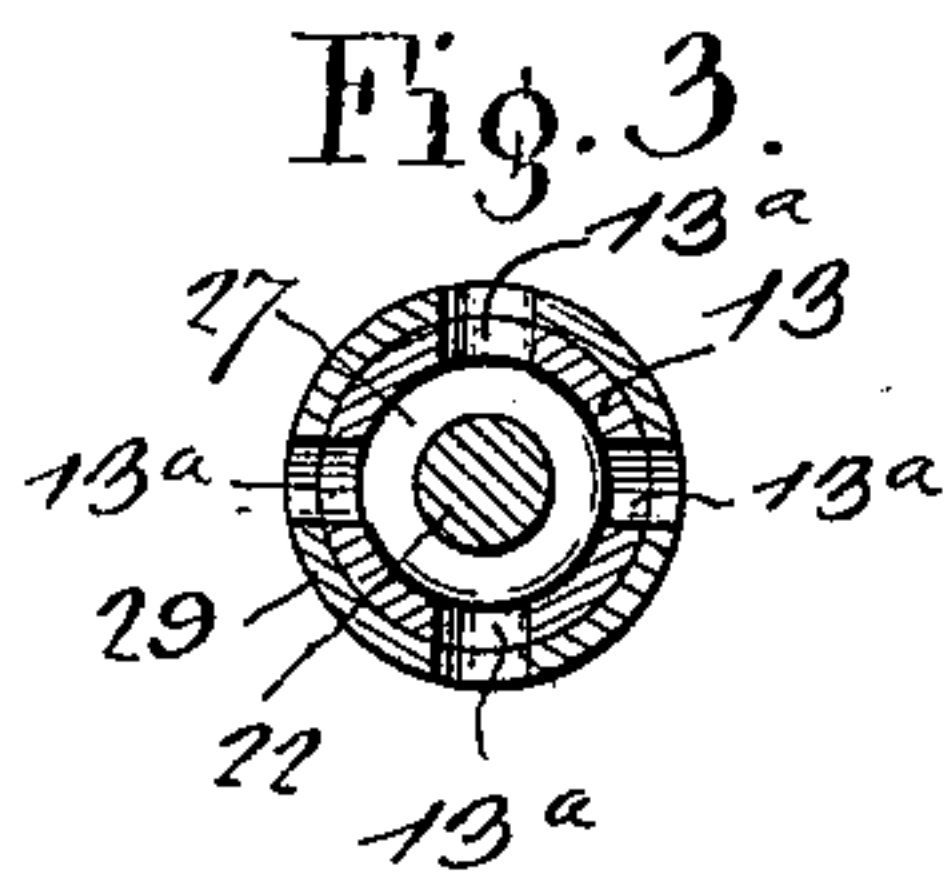


Fig. 3.

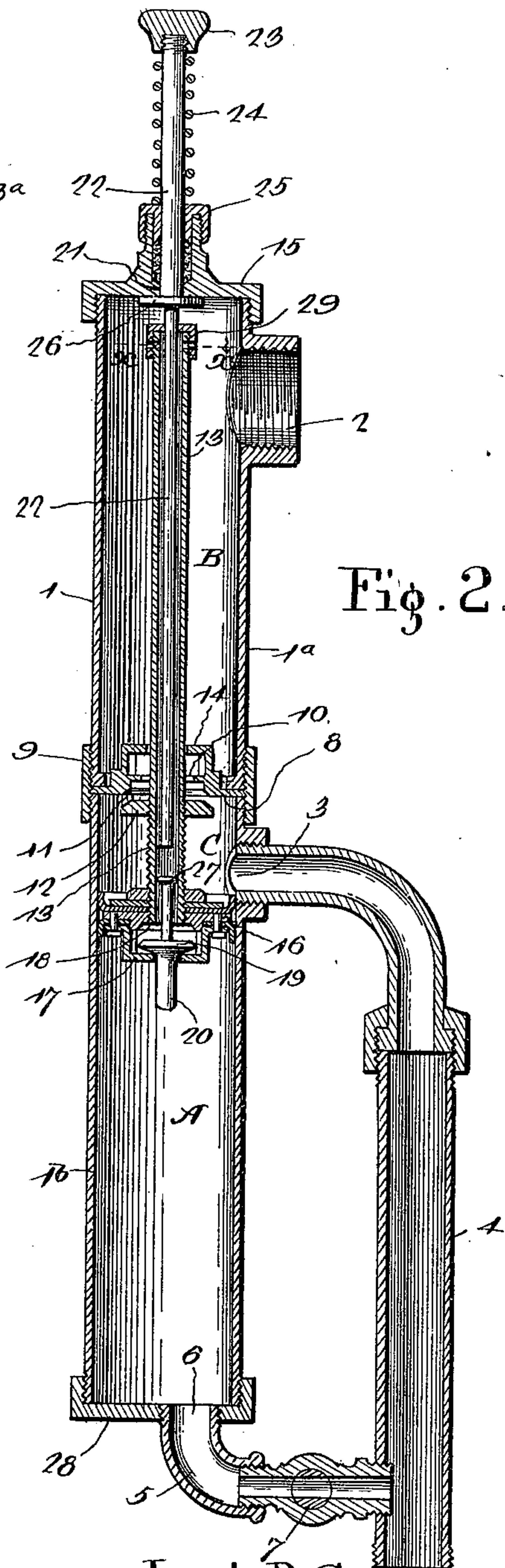


Fig. 2.

Witnesses

J. Traub, Culverwell, By his Attorneys,
[Signature]

Louis B. Smith, Inventor.

Ca. Snow & Co.

UNITED STATES PATENT OFFICE.

LOUIS B. SMITH, OF JAMESTOWN, NEW YORK, ASSIGNOR OF ONE-HALF TO
ELOF ROSENCRANTZ AND CARL A. LUNDQUIST, OF SAME PLACE.

WATER-CLOSET FLUSHING-VALVE.

SPECIFICATION forming part of Letters Patent No. 637,357, dated November 21, 1899.

Application filed April 24, 1899. Serial No. 714,207. (No model.)

To all whom it may concern:

Be it known that I, LOUIS B. SMITH, a citizen of the United States, residing at Jamestown, in the county of Chautauqua and State of New York, have invented a new and useful Water-Closet Flushing-Valve, of which the following is a specification.

My invention relates to flushing-valves for water-closets, and has for its object to provide a simple, inexpensive, and efficient construction and arrangement of parts whereby a continuous flow of water from a supply-pipe into the closet-bowl is maintained for a sufficient length of time to insure the proper cleansing thereof, the only manipulation necessary to cause the operation of the valve being the unseating of a graduating or check valve.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of a valve constructed in accordance with my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a horizontal section of the upper end of the conveyer to show the regulating-valve thereof.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

The illustrated valve is provided with a tubular casing 1, provided at a point near one end with an outlet 2 for communication with a closet-bowl (not shown) and provided at an intermediate point with a lateral port 3, which is in communication with a supply-pipe 4, in which water is maintained under a constant pressure by any suitable supply system. Also this supply-pipe is provided with a branch, forming a feeder 5, which communicates with a feed-port 6 in the end of the cylinder or casing opposite to the outlet 2. Said feeder is provided with a controlling valve or cock 7.

Arranged within the casing at an intermediate point is a transverse partition 8, which may be peripherally secured in the joint between the adjacent extremities of

separable sections 1^a and 1^b of the casing, a coupling-sleeve 9 serving to connect said sections, and said partition constitutes a reducer in that it is provided with a port 10 of an area less than the cross-sectional area of the casing. Adjacent to this reducing-port is a valve-seat 11 for the reception of a cut-off valve 12, carried by a tubular conveyer 13, which forms a hollow stem for said cut-off valve. This conveyer extends upward through the port 10, is fitted in an arched guide 14, spanning said reducing-port, and terminates (when the parts are in their normal position) at a point near the cap 15, which closes the upper end of the cylinder. The conveyer 13, which also forms a stem for the cut-off valve 12, is attached at its lower end to a piston 16, fitted snugly in the portion of the cylinder between the lateral inlet-port 3 and the feed-port 6, said conveyer being extended through the piston to communicate with the interior of the cylinder below the plane of the piston and being adapted to convey water from the lower chamber A of the cylinder to the chamber B, which is located above the reducing-port. The piston is limited in its upward movement by the contact of the cut-off valve 12 with the seat 11, and hence the supply-port 3 is permanently in communication with the intermediate chamber C between the piston and the partition 8.

Arranged in a suitable guide or cage 17 and in operative relation with a seat 18, which is in communication with the lower end of the conveyer 13, is a graduating or check valve 19, having a projecting tappet-stem 20, by contact with which the valve may be seated to close the conveyer, and thus cut off communication between the feed-chamber A and the exhaust-chamber B.

Mounted for limited vertical reciprocatory movement in a guide 21 in the upper head or cap 15 of the casing is an operating stem or pin 22, provided at its upper end with a grip or pressure knob 23 and yieldingly held in an elevated position by means of a return-spring 24. Said stem preferably extends through a stuffing-box 25, is provided with a stop 26, whereby its upward movement under the tension of the spring 24 is checked, and extends

downward into the conveyer 13 to a point adjacent to a trip-stem 27 of the graduating or check valve.

The parts being in the normal positions indicated in Fig. 2, it is necessary in order to flush a closet-bowl to depress the grip or knob 23 sufficiently to unseat the graduating or check valve, and thus relieve the pressure at the lower side of the piston by establishing communication between the feed-chamber A and the exhaust-chamber B. The relief of this pressure causes a preponderance of pressure upon the upper side of the piston, and hence causes a downward movement of the piston. During the descent of the piston, after its motion has unseated the cut-off valve 12, water is flowing from the intermediate or supply chamber C through the reducing-port into the exhaust-chamber, and thence through the exhaust-port, and at the same time water is flowing from the feed-chamber A through the conveyer 13 and discharging through a series of radial openings 13^a, formed in the upper end of the conveyer, and into the exhaust-chamber. This motion continues until the extremity of the tappet-stem 20 comes in contact with a fixed object or stop, which in the construction illustrated consists of the lower head 28 of the cylinder, whereupon a still further movement of the piston causes the seating of the graduating-valve. The moment this valve is seated to cut off communication between the feed-chamber A and the exhaust-chamber B an excess of pressure is applied to the lower side of the piston, owing to the greater area thereof, and hence an upward movement of the piston is initiated. This upward movement continues until the cut-off valve 12 is seated, and obviously during the upward movement of the piston and before the valve 12 reaches its seat there is a continuous flow of water from the supply-port through the reducing-port to the exhaust-chamber B, and thence to the bowl which is being flushed. Hence from the moment of unseating the graduating-valve by the depression of the operating stem or pin 22 until the piston, after descending to the lower end of the cylinder, has returned to its normal position to seat the cut-off valve 12 there is a continuous flow of water through the exhaust-port. Furthermore, it will be seen that owing to the slight difference in pressures applied to opposite sides of the piston, both being due to the pressure in the supply-pipe 4, the movement of the piston is comparatively slow; but in order that its rapidity of movement may be accurately controlled I provide the feed-pipe 5 with the feed-valve 7, above described. Furthermore, it will be seen that owing to the small area of the graduating-valve it may be unseated with a comparatively slight effort upon the part of the operator, and after the unseating of this graduating-valve the operation of the device is automatic until the cut-off valve is returned to its seat to close the reducing-port, and thus cut off communica-

tion between the supply-port and the exhaust-chamber.

In connection with the conveyer 13 I preferably employ a regulating valve or cap 29 for controlling the rapidity of outlet from the conveyer during the discharge of the contents of the chamber A. In the construction illustrated the cap is threaded upon the upper end of the conveyer and is provided with openings or perforations adapted to register with the openings 13^a in the wall of the conveyer.

Various changes in the form, proportion, size, and minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. In a flushing mechanism, the combination, with two cylinders, one of which is provided with an outlet and the other one is provided with two inlets, of a partition between said cylinders provided with a valve-seat, a piston between the inlets provided with a valve-seat, an open-ended tubular stem communicating with said valve-seat on the piston and projecting through the partition, a valve adjustably secured to the lower end of said stem in position to close the partition when the piston is at the limit of its upward movement, a gravity-valve at the lower end of the stem provided with means for engaging with the end of the cylinder, and a push-rod through the stem for unseating said valve.

2. In a flushing device, the combination with two cylinders, one of which is provided with an outlet and the other one is provided with two inlets, a partition between said cylinders provided with a valve-seat and a guide, of a piston between the inlets provided with a valve-seat, an open-ended tubular stem, the lower end of which is screw-threaded, and extends through the guide and the piston and communicates with the valve-seat of the piston, a valve adjustably secured upon the screw-threaded portion of the stem in position to engage with the valve-seat in the partition when the piston is at the limit of its upward movement, a gravity-valve at the lower end of the stem provided with means for engaging with the end of the cylinder, and a push-rod through the stem for unseating said valve.

3. In a flushing device, the combination, with two cylinders, one of which is provided with an outlet and the other one is provided with two inlets, a partition between said cylinders provided with a valve-seat, of a piston between the inlets provided with a valve-seat and a bail upon its under side, an open-ended tubular stem projecting through the partition and the piston and provided with a valve, a valve, each side of which is provided with a stem, one of which extends into the tubular stem and the other one extends through the

bail in position to engage with the end of the cylinder, and a push-rod through the stem for unseating said valve, substantially as specified.

5 4. In a flushing device, the combination, with two cylinders, one of which is provided with an outlet and the other one is provided with two inlets, of a partition between said cylinders provided with a valve-seat and a
10 guide, an open-ended tubular stem through said guide, the upper end of which is provided with a regulator and the lower end is provided with a valve and a piston, said piston being located between said inlets, a gradu-
15 ating-valve on the piston, and a push-rod through the stem, the lower end of which is adapted to unseat said graduating-valve.

5. In a flushing device, the combination, with two cylinders, one of which is shorter
20 than the other one and provided with an outlet and the longer cylinder is provided with two inlets, one of the inlets being located substantially midway of the length of said cylinders, of a partition between the cylinders,
25 a piston between said inlets provided with a valve and a tubular stem, said stem projecting through the partition and extending above the same substantially the same distance that the piston is above the opposite end of the
30 cylinder when at the limit of its movement in an upward direction, the upper end of the stem being provided with graduated openings, a graduating-valve on the piston in position to engage with the end of the cylinder,

and a spring-actuated push-rod through the 35 end of the cylinder and projecting through the stem to a point below the partition in position to engage with and unseat the graduating-valve.

6. A flushing apparatus for water-closet 40 bowls having a cut-off valve provided with a tubular stem in communication at one end with an exhaust, a fluid-operated valve-actuating piston attached to said stem and having a port in communication with the interior 45 thereof, a graduating-valve for controlling said port, a piston-cylinder having feed and supply chambers separated by the piston and exposed to supply-pressure, the supply-chamber being in communication with a port controlled by said cut-off valve, and said gradu- 50 ating-valve of the piston being in communication with the feed-chamber, means for automatically seating the graduating-valve at the limit of inward movement of the piston, 55 and a spring-retained operating rod or pin extending through said tubular valve-stem, and adapted for contact with the graduating-valve to unseat the same, substantially as specified. 60

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LOUIS B. SMITH.

Witnesses:

GERTRUDE A. TOWNSEND,
JAMES L. WEEKS.