

No. 638,900.

Patented Dec. 12, 1899.

J. A. WOODBURY.

FLUSHING APPARATUS FOR WATER CLOSETS.

(Application filed July 12, 1899.)

(No Model.)

Fig. 1.

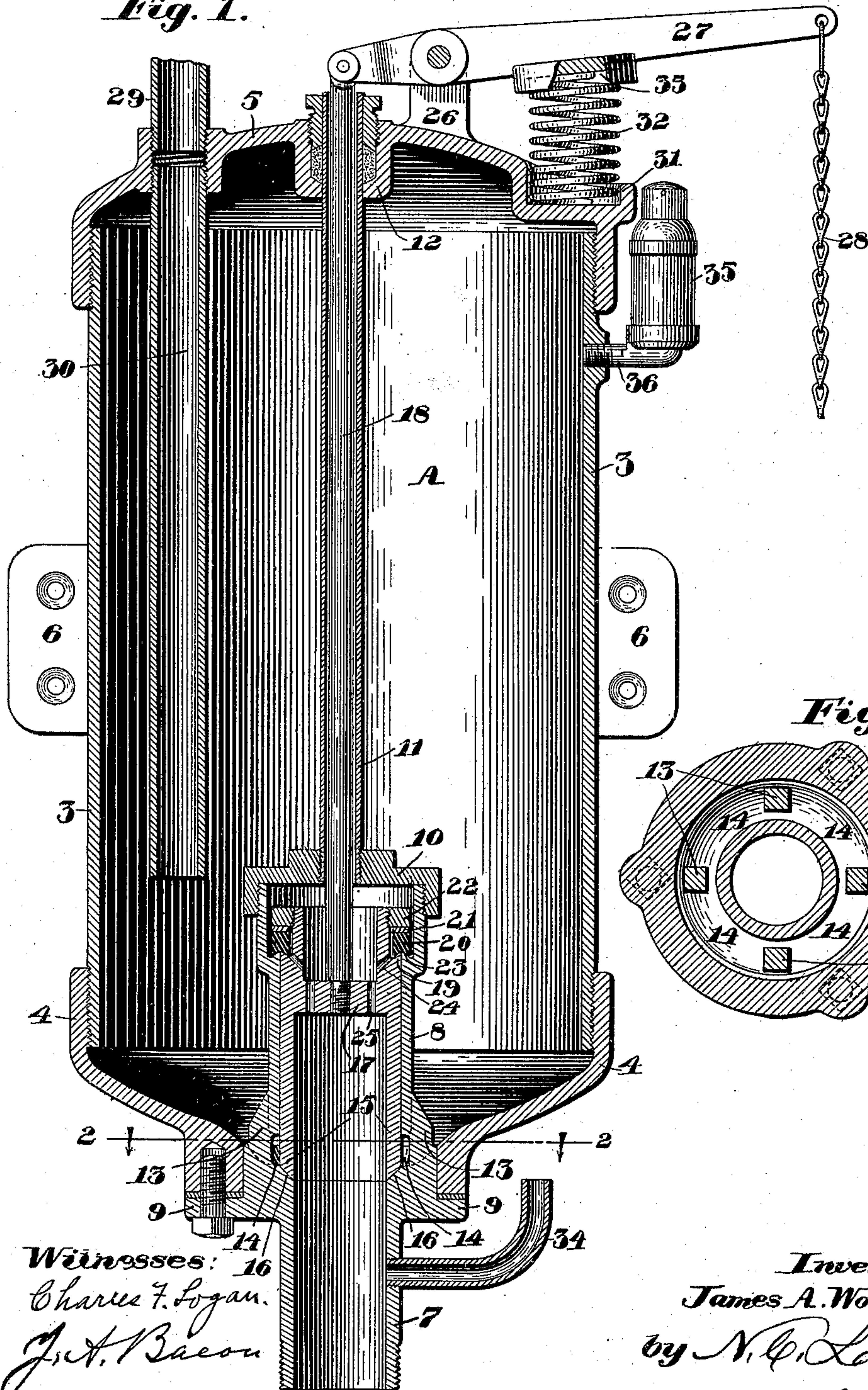
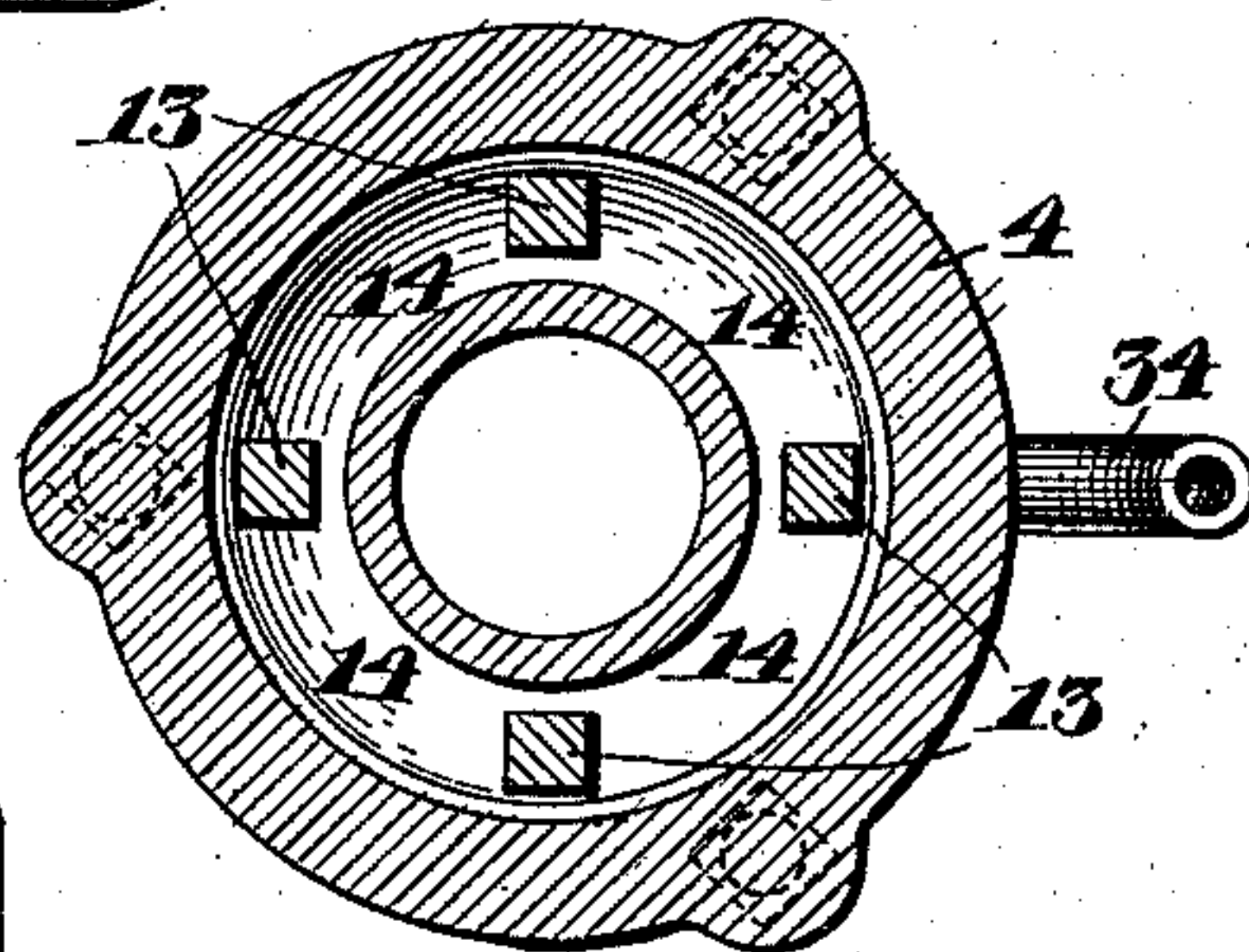


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES A. WOODBURY, OF WINCHESTER, MASSACHUSETTS.

FLUSHING APPARATUS FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 638,900, dated December 12, 1899.

Application filed July 12, 1899. Serial No. 723,569. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WOODBURY, of Winchester, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Flushing Apparatus for Water-Closets, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to flushing apparatus
10 for water-closets; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the accompanying drawings and to the
15 claims hereto appended and in which my invention is clearly pointed out.

Figure 1 of the drawings is a sectional elevation of a flushing apparatus, illustrating my invention. Fig. 2 is a horizontal section
20 on line 2 2 of Fig. 1.

In the drawings, A represents a supply-tank, composed of the cylinder 3 and the heads 4 and 5, and 6 6 are ears by which said tank is secured to the wall of the room where it is
25 to be used.

The head 4 has formed in its center a large opening, in which is fitted the discharge-pipe 7 and casing 8, formed integral and provided with the flange 9, which is firmly bolted to the hub of said head and suitably packed to
30 make a liquid-tight joint, as shown.

The casing 8 is made somewhat larger in diameter than the discharge end of the same casting marked 7 and is formed with an open
35 upper end, and a section of its upper end is made still larger in internal diameter and has screwed thereon the cap 10, in the center of which is screwed the lower end of the pipe 11, the upper end of which extends through the
40 stuffing-box 12 in the center of the head 5.

The barrel of the casing 8 is connected to the discharge-pipe 7 by any suitable number of ties 13, of which four are shown in the drawings, between which are passages 14,
45 through which the liquid in the tank may escape into the discharge-pipe 7, and thence to the closet-bowl when the valve is opened. The barrel of the casing is bored out and has fitted therein the chambered or cylindrical
50 valve 15, the lower end of which is frusto-conical to fit a correspondingly-shaped seat

16, formed on the upper end of the discharge-pipe 7 just below the passages 14, communicating with the tank A. The valve 15 has a partition 17 formed therein, in the center of
55 which is screwed the lower end of the rod 18, which extends upward through the pipe 11, as shown. A portion of the upper end of said valve 15 is reduced in diameter and has formed at the lower end of said reduction an
60 inwardly-inclined annular shoulder 19, and fitted thereon the annular packing-ring of elastic material 20, the annular washer 21, and the threaded compression-ring 22.

The lower end of the upper enlargement of
65 the casing 8 has formed thereon an outwardly-inclined annular shoulder 23, the upper edge of which is at the same level as the upper edge of the shoulder 19 on the valve when said valve is closed. The elastic packing-ring
70 20 is forced down upon the upper edges of the shoulders 19 and 23 by the adjustable nut-ring 22 to any desired pressure to prevent leakage over the valve when it is closed upon its seat.
75

The partition 17 is provided with the vent-holes 24 and 25, through which any water that finds its way upward between the valve and casing and passes the packing-ring 20 will find its way into the discharge-pipe 7 and be
80 discharged into the closet-bowl without doing any harm.

The head 5 has formed thereon two upwardly-projecting ears 26, only one of which is shown, to which is pivoted the lever 27, the
85 end of the short arm of which is pivoted to the upper end of the rod 18 and has connected to the end of its long arm a suitable chain or cord 28, by pulling upon which the valve 15 may be raised to permit the contents of the
90 tank A to escape into the discharge-pipe and thence pass to the closet-bowl to flush the same.

Water is supplied to the tank A through the service-pipe 29 and the pipe 30, screwed
95 into the head 5 and depending therefrom, as shown in Fig. 1.

The head 5 has formed in its upper side at or near its periphery a recess 31 to receive the lower end of the spring 32, the upper end
100 of which is inserted in a similar recess 33, formed in the under side of the disk-like ex-

pansion of the long arm of the lever 27, said spring serving to close the valve 15 when the pull upon the chain 28 is released.

A vent-tube 34 is inserted in the side of the discharge-pipe 7 below its valve-seat to admit air when the valve is closed and prevent the gurgling noise that would otherwise occur. An air-valve 35 is also connected by the pipe 36 to the interior of the tank A to control the inflow and outflow of air to and from said tank.

The construction of the air-valve 35 is not shown, as it is not of my invention and may be of any well-known construction.

The valve 15 and its casing 8 are made of metals that are not easily corrodible to obviate the liability of the valve sticking in the casing when it is desired to have it close upon its seat. In this connection it should be understood that the valve 15 may be fitted loosely or so as to move freely in its casing, as the packing-ring 20 will prevent any leakage over the top of the valve when said valve is closed upon its seat, and any leakage over said valve, if any should occur when said valve is raised, would do no harm, as it would be discharged into the discharge-pipe 7 and conveyed into the closet-bowl with the flushing-water, which at that time is being discharged from the tank A through said pipe 7. It will also be observed that the supply-pipe 29 is at all times in communication with the interior of the tank, and consequently when the valve 15 is closed the water in said tank is at all times, when said tank is full, subjected to the same pressure as the distributing-pipes of the water-supply system from which the water is drawn. When the valve is opened, the pressure in the tank is reduced to the ordinary atmospheric pressure because of the difference of area of the discharge and supply pipes.

The operation of my invention is as follows: Assuming that the compression-ring 22 is properly adjusted to give the requisite pressure upon the packing-ring 20 and the valve being closed and the tank being full of water, if it is desired to flush the closet the operator pulls the chain 28 to raise the valve against the tension of the spring 32. The pull upon the valve being in a direct line with its longitudinal axis the valve is easily raised, the water in the tank escapes through the passages 14 into the pipe 7, and is thence conveyed through an extension of said pipe (not shown) to the closet in a well-known manner. As soon as the water begins to escape from the tank water begins to flow into it through the pipes 29 and 30 and continues to so flow until the valve is closed and the tank is again filled. When the chain 28 is released, the reaction of the spring 32 closes the valve with comparative ease, because there is little or no friction to be overcome, except what there is between the valve and its casing, which being of comparatively non-corrosive metals and

loosely fitted will present but little friction to be overcome. The rod 18, passing through the tube 11, which has an internal diameter greater than the diameter of said rod, presents no obstruction to the movements of said valve in either direction and is not exposed to the corrosive action of the water, which is a great advantage as compared with mechanism for operating the valve from below and through the discharge-pipe 7, where, of a necessity, all the working parts would be subjected to corrosion from contact with the water. The spring 32 is for the same reason placed upon the exterior of the tank, as shown, instead of being placed within the tank or the casing 8, where it could act directly upon the valve, in which case the spring would have to be of an inferior material for the purpose, as brass; but by placing it upon the exterior of the tank it may be made of the best spring-steel.

The spring 32 may be arranged, as shown, between the tank and the long arm of the lever, but it may be located in any convenient position exterior to said tank where its reaction will tend to close the valve upon its seat.

The annular washer 21 is placed upon the elastic packing 20 to form a metal bearing for the compression-ring 22 and prevent injurious action of said compression-ring upon said packing when said compression-ring is being rotated to compress said packing-ring.

It is essential that the packing 20 bear with the greatest pressure directly above the joint between said valve and its casing, and it is obvious that this result may be obtained by making the shoulders 19 and 23 inclined in opposite directions, as shown, or by making said shoulders flat and making the under surface of the packing in the form of an obtuse V, the apex of which is directly over said joint.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a flushing apparatus for water-closets the combination of a closed tank or reservoir; a water-supply pipe communicating therewith; a discharge-pipe inserted in its lower end and provided with a suitable valve-seat; a valve-casing connected to said discharge-pipe above said seat and provided with suitable passages for the passage of water from said tank to said discharge-pipe, a cylinder-valve fitted to said casing and movable vertically therein; a tube extending from the upper end of said casing upward through the upper head of said tank with a liquid-tight joint; a rod connected at its lower end to said valve, and extending upward through said tube; means for raising said valve connected to the upper end of said rod; and a spring for closing said valve located exteriorly of said tank.

2. In a flushing apparatus for water-closets the combination with a closed tank and a supply-pipe communicating therewith, and a discharge-pipe provided with a valve-seat, of a

valve-casing connected to said discharge-pipe and having a closed upper end and provided with openings at its junction with said discharge-pipe for the passage of water from said tank to said discharge-pipe; a tube screwed into said casing and extending upward through the upper head of said tank with a liquid-tight joint; a cylindrical valve fitted to and movable vertically in said casing, engaging said seat; a rod connected to said valve and extending upward through said tube; means connected to the upper end of said rod for raising said valve and a spring for closing said valve.

3. In a flushing apparatus the combination with a closed tank and a supply-pipe communicating therewith, and a discharge-pipe provided with a valve-seat surrounding the discharge-passage, of a valve-casing extending upward from said discharge-pipe and provided with lateral openings, above said seat, for the passage of water from said tank to the discharge-pipe; a cylindrical valve fitted to said seat and to said casing and movable endwise therein; an annular shoulder formed upon the periphery of said valve near its upper end; a packing-ring of elastic material resting upon said shoulder; and an adjustable compression-ring fitted to said valve and arranged to compress said packing upon said shoulder.

4. In a flushing apparatus the combination with a closed tank, a supply-pipe communicating therewith and a discharge-pipe opening therefrom and provided with an annular valve-seat at its upper end; a valve-casing extending upward from said discharge-pipe, provided with lateral openings through its wall above said seat, and near its upper end with an outwardly-inclined annular shoulder 23; a cylindrical valve fitted to said seat and casing, and movable vertically to open and close said valve; an inwardly-inclined annular shoulder 19 formed on the periphery of said valve-cylinder, near its upper ends; a pack-

ing-ring of elastic material surrounding said valve and resting upon said shoulder 19 at all times, and upon the shoulder 23 when the valve is closed; an annular washer resting upon said packing-ring; and an adjustable compression-ring to press said packing-ring upon said shoulders.

5. In a flushing apparatus the combination of a closed tank; a supply-pipe; a discharge-pipe provided with a valve-seat a tubular extension thereof projecting upward therefrom through the upper head of said tank with a tight joint, and provided just above said seat with lateral openings 14; the valve 15 fitted to said seat and closing said openings 14; the valve-rod 18 extending upward from said valve through said tubular extension; the pivoted lever 27 connected at one end to the upper end of said rod 18; a spring interposed between the long arm of said lever and the tank-head to close said valve; and any suitable pull attached to the other end of said lever for opening said valve.

6. In a flushing apparatus the combination with a closed tank provided with supply and discharge pipes, of a valve-seat surrounding said discharge-pipe; a case surrounding said valve-seat and provided with openings for the passage of water from said tank to said discharge-pipe, and with an interior annular shoulder near its upper end; a cylinder-valve fitted to said casing and seat; a packing-ring of elastic material firmly secured to the exterior of said valve near its upper end, and arranged to engage the shoulder in said casing, when said valve is closed; and means for opening and closing said valve.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 11th day of July, A. D. 1899.

JAMES A. WOODBURY.

Witnesses:

N. C. LOMBARD,
J. A. BACON.