(No Model.)

E. DOUGLAS.

FLUSHING WATER CLOSET BOWLS.

No. 562,951. Patented June 30, 1896.

Fig. 1.

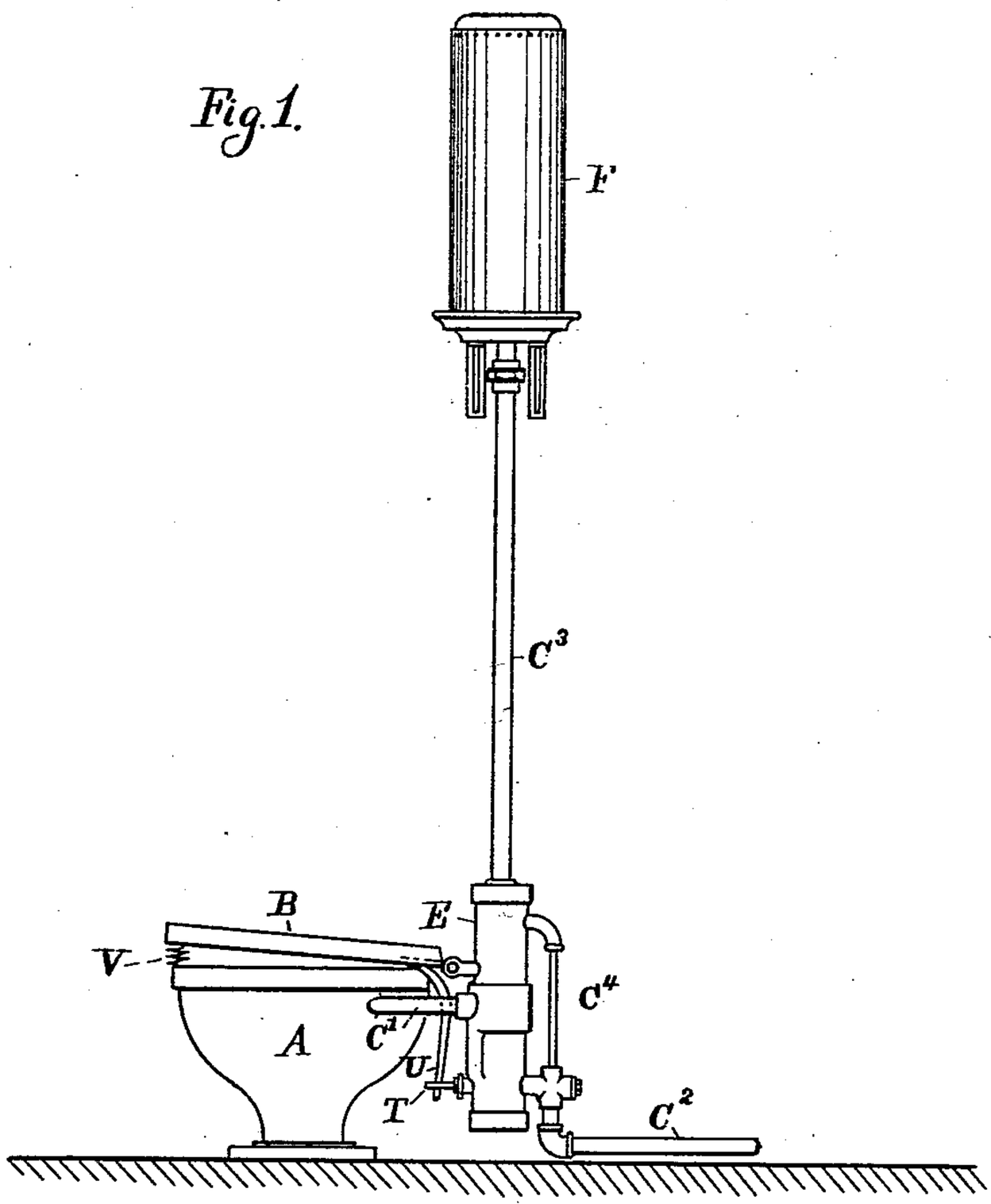
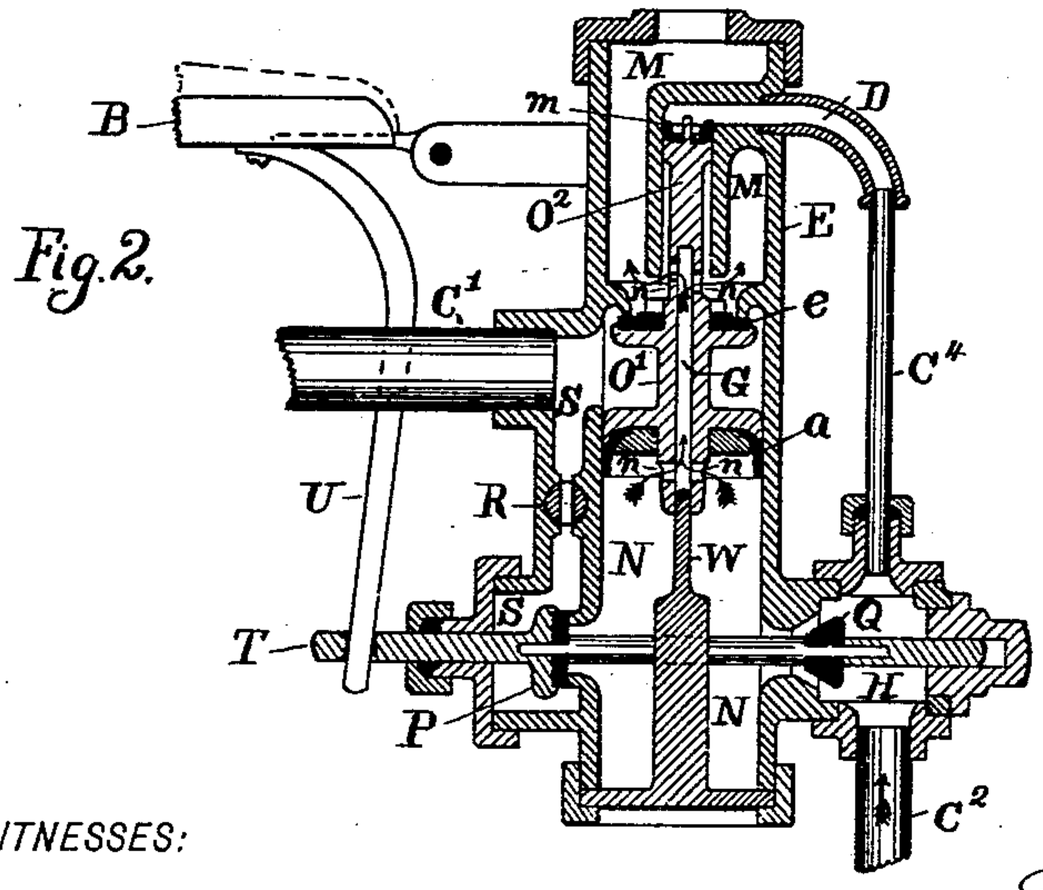


Fig. 2.



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FLUSHING WATER-CLOSET BOWLS.

SPECIFICATION forming part of Letters Patent No. 562,951, dated June 30, 1896.

Application filed August 9, 1895. Serial No. 558,775. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DOUGLAS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Flushing Water-Closets; and I hereby declare the following specification and the drawings therewith to constitute a full, clear, and exact description of my invention and the method of applying the same.

My invention relates to flushing water-closets, and to apparatus for regulating automatically the amount, period of flow, and intensity of the flushing-water.

My improvement consists of a valve operated by water-pressure and by movement of the seat or top of the closet, so that each time the seat is depressed a predetermined quantity of flushing-water will be discharged into the bowl with an increasing force, the valve closing and the flow ceasing by action of the supply-water, and without any connection other than the movement of the seat or top.

The object of my invention is to combine within a small space all the mechanism and functions required in flushing, and control the nature and quantity of the flow by the action of the seat, hence automatically. To this end I construct apparatus as shown in the drawings herewith, forming part of this specification.

Figure 1 is an elevation showing the several parts connected and in their relative positions, and Fig. 2 a vertical central section through the valves and water-controlling elements.

Similar letters of reference on the two figures indicate corresponding parts.

The bowl A can be of any of the well-known forms, provided with a hinged cover or seat B, and connected by a flushing-inlet pipe C′ to the water supply.

C^2 is a water-supply pipe extending to any suitable source of water under pressure, commonly the street-service in cities, or to a tank set high enough to afford the required head and pressure.

E is a vessel or chamber containing the water-controlling elements, and F a receiver to accumulate a relay-charge of water, which in flushing the bowl A descends through the pipe C^3, as will now be explained.

The vessel E contains two chambers M and N, separated by a movable piston O′, as seen in the section, Fig. 2. In the lower chamber N are two valves P and Q, the former opening connection between the chamber N and the passage S, and through the cock R to the flushing-pipe C′. The other valve, Q, opens communication between the chamber H and the water supply in the pipe C^2 and the chamber N. These valves are on a continuous spindle T, and operate coincidently by means of a lever U, attached to the seat B.

The chamber H is constantly filled under pressure of the static head, and from this chamber a pipe C^4 leads up to the chamber D and the small piston O^2, the latter formed integrally with the main piston O′, and differential in respect to the section *a*, as seen in Fig. 2. The main piston O′ is provided with packing-leather *a*, filling and closing the top of the chamber N, and a valve *e*, closing the bottom of the chamber M, also has a central passage G and side perforations *n*, that permit a flow of water from the chamber N to the chamber M, and from thence up the pipe C^3 into the receiver F. These being the main elements of my invention, I will now proceed to describe the manner of their operation in use.

Referring to Fig. 2, the seat B being depressed it will be seen that the valve P is closed by means of the lever U, and that there is free communication for the supply-water from the pipe C^2 through the valve Q into the chamber N, and from there through the apertures *n* and passages G to the chamber M, consequently to the pipe C^3 and the receiver F, so the latter will be filled, less the volume of air therein compressed, while the seat B is held down. The piston O′ being at *a* larger in diameter or area than the valve at *e*, the latter is held firmly closed by the water-pressure in the chamber N against the pressure in the receiver F and chamber M. When the seat B rises by reason of the flexure of the lever U or a spring V applied at the front, the stem T is moved forward, closing the valve Q and opening the valve P, so the water contained in the chamber M can escape through

the cock R and passage S into the flushing-pipe C′, relieving the pressure beneath the packing *a* and permitting the piston O′ to descend, discharging a flood of water from the chamber M through the valve *e* into the pipe C′ and the bowl A. During the time the water is escaping from the chamber N through the valve P and cock R, there will be an inflow to the chamber N from the chamber M through the passage G and orifices *n*, but the area of these I make small enough so the volume admitted is less than is escaping through the valve P and the cock R, so the proportion in these respective areas determines the time or rate at which the piston O′ moves downward. This time or rate, and consequent rate of flow in the pipe C′, it will be seen, can be controlled at will by adjusting the cock R, and may be slow or rapid, as desired, or as the head and pressure of the supply-service may render necessary. I also provide means to regulate the range of the movement. When the piston O′ starts to move downward in the manner just described, the first flow through the valve *e* is under full force of the supply-head, sustaining elastic pressure from the air compressed in the top of the receiver F, this pressure falling as the contents are discharged into the bowl A. It is therefore desirable that the piston O′ keeps on moving, opening wider the valve *e* as the pressure falls and as the compressed air in the receiver F is expanded. This I accomplish by means of the auxiliary piston *m*, subject to continual pressure through the pipe C, connecting to the chamber H. The pressure on this piston *m* being constant, continues to force the piston O′ downward after the pressure and flow through the valve *e* is not sufficient for that purpose. As the main piston O′ is descending there is a flow of water from the chamber M to the chamber N through the passage G, but, as before explained, not enough to equal the discharge through the cock R, but this flow through the passage G ceases as soon as the guide-stem W has entered within the passage G far enough to cover the lower ports or inlets *n*, so the various waterways and controlling-valves therein are compensating, causing a uniform flushing flow of water, and act one with another automatically after the initial movement of the seat B and the lever U. As will be seen, these operations would go on much the same, but with some waste of water, if the valve P were omitted. Hence the latter is not an essential but is a desirable feature in applying my invention.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a flushing water-closet bowl, a main water-moved piston, differential in area at its ends, sustaining and closing the flushing-inlet valve, and sustaining intermittent pressure on the bottom, and a central passage with a guide-stem to close the same in the axis of the piston through which a supply of water can pass to a receiver when the flushing-valve is closed, substantially as described.

2. In a flushing water-closet bowl, a differential water-moved piston to control the flushing-inlet way; a chamber beneath the piston having inlet and outlet valves operated coincidently by the seat, a lever and stem, in the manner substantially and for the purposes specified.

3. In a flushing water-closet bowl, a differential water-moved piston to close the flushing-inlet by pressure of the service-head; an inlet-valve operated by the seat to admit water beneath the piston, and an escape-way to relieve the pressure and to open the flushing-inlet, and an auxiliary piston to assist and complete the opening movement of the differential piston, in the manner substantially as described.

4. In a flushing water-closet bowl, a main containing valve-chamber, a differential water-moved piston therein, opening and closing the flushing-inlet way, in the manner described; integral therewith a supplementary piston continually subject to the service-pressure, and connected therewith by a pass-over pipe external to the main valve-chamber, substantially as described.

5. In a flushing water-closet bowl, a differential water-moved piston, having thereon a valve to close the flushing-inlet way, a piston subject to continual pressure of the service-head, and a larger piston to perform the closing movement, the latter controlled by valves operated by the bowl-cover or seat; an escape-way and regulating-cock communicating with the flushing-pipe, in the manner substantially as described.

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

EDWARD DOUGLAS.

Witnesses:
ALFRED A. ENQUIST,
WILSON D. BENT, Jr.