

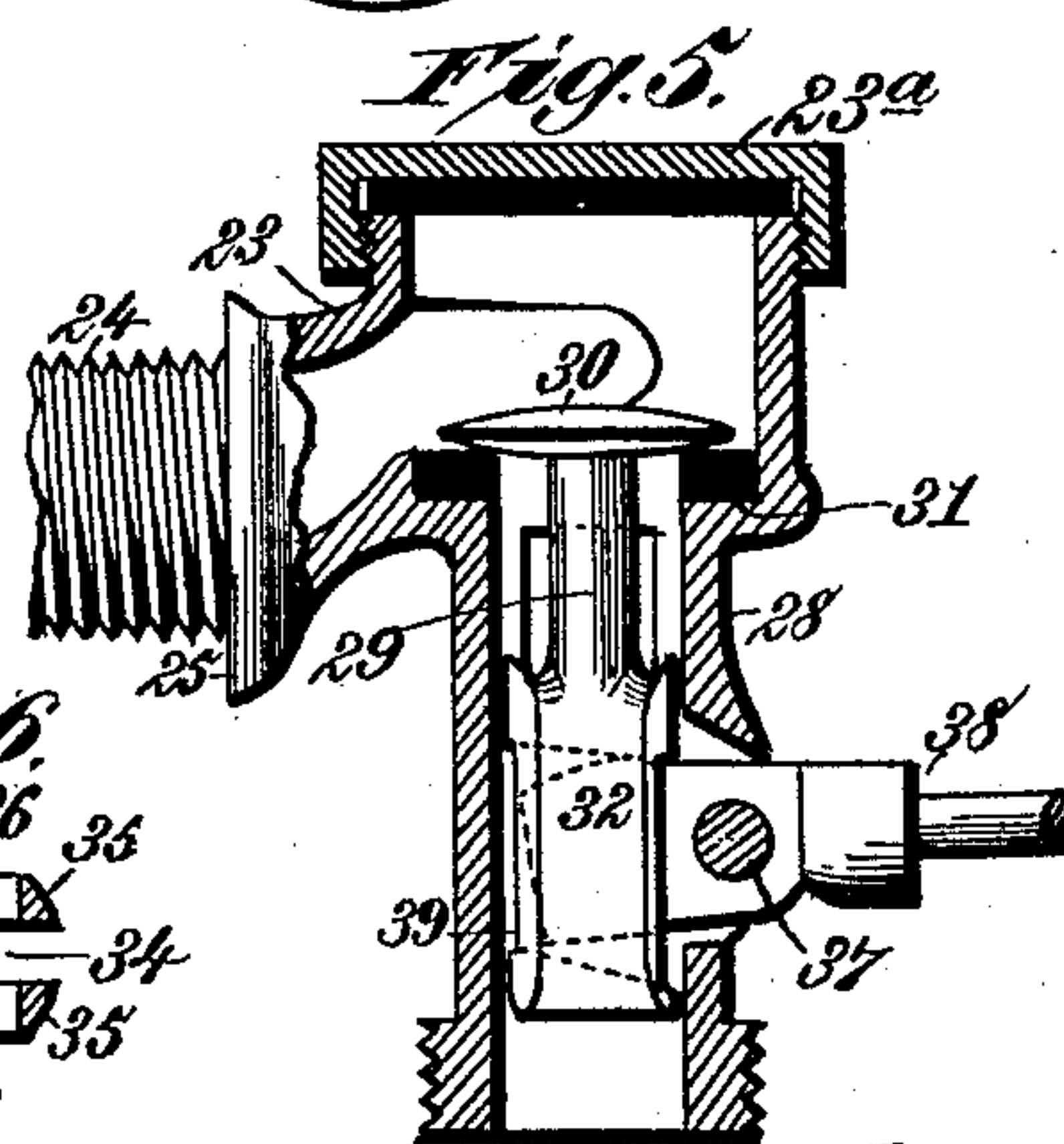
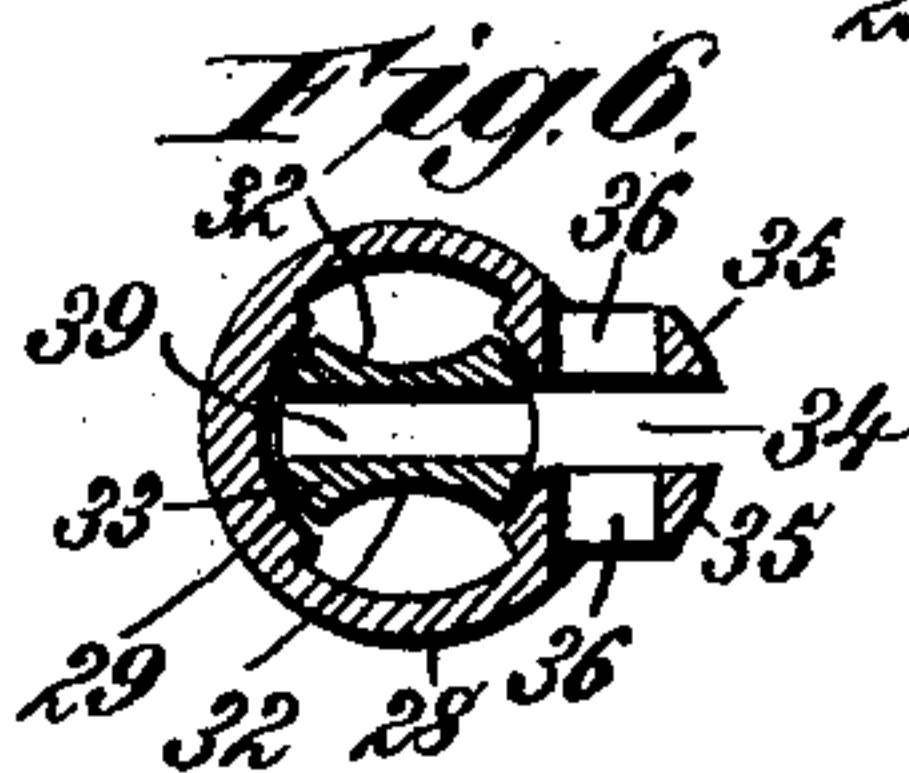
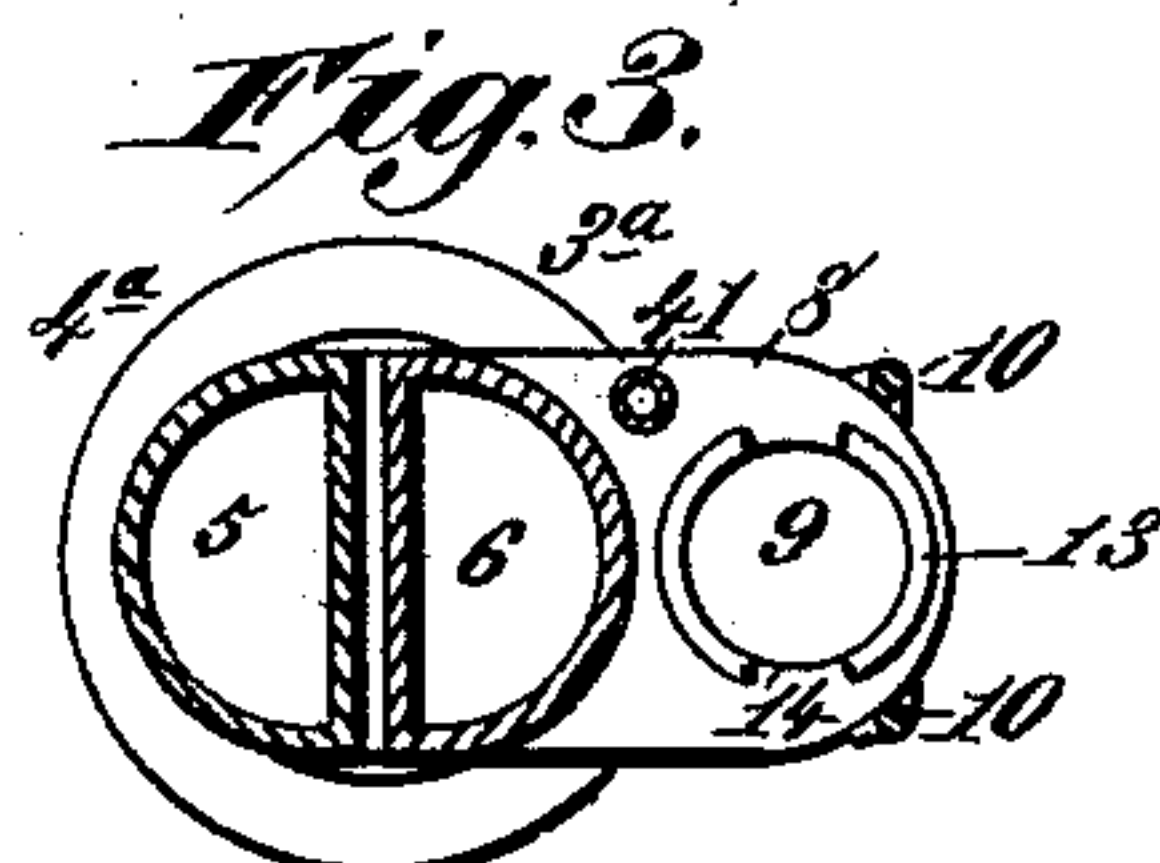
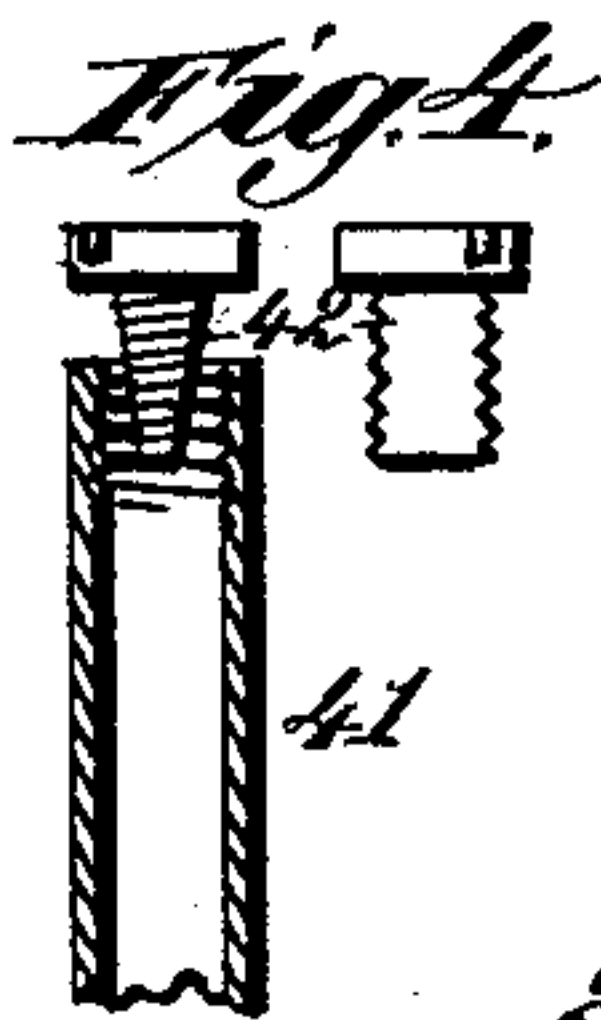
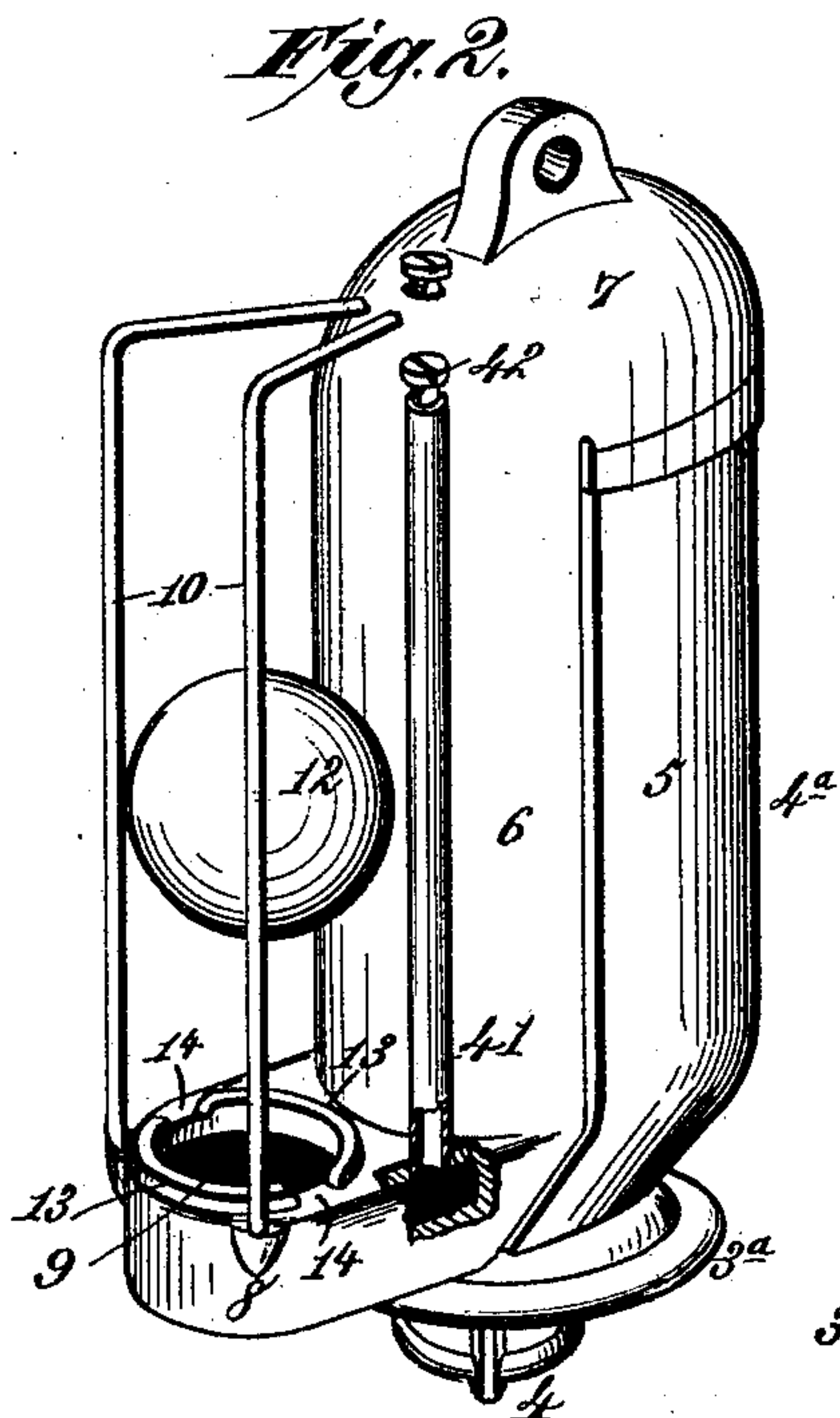
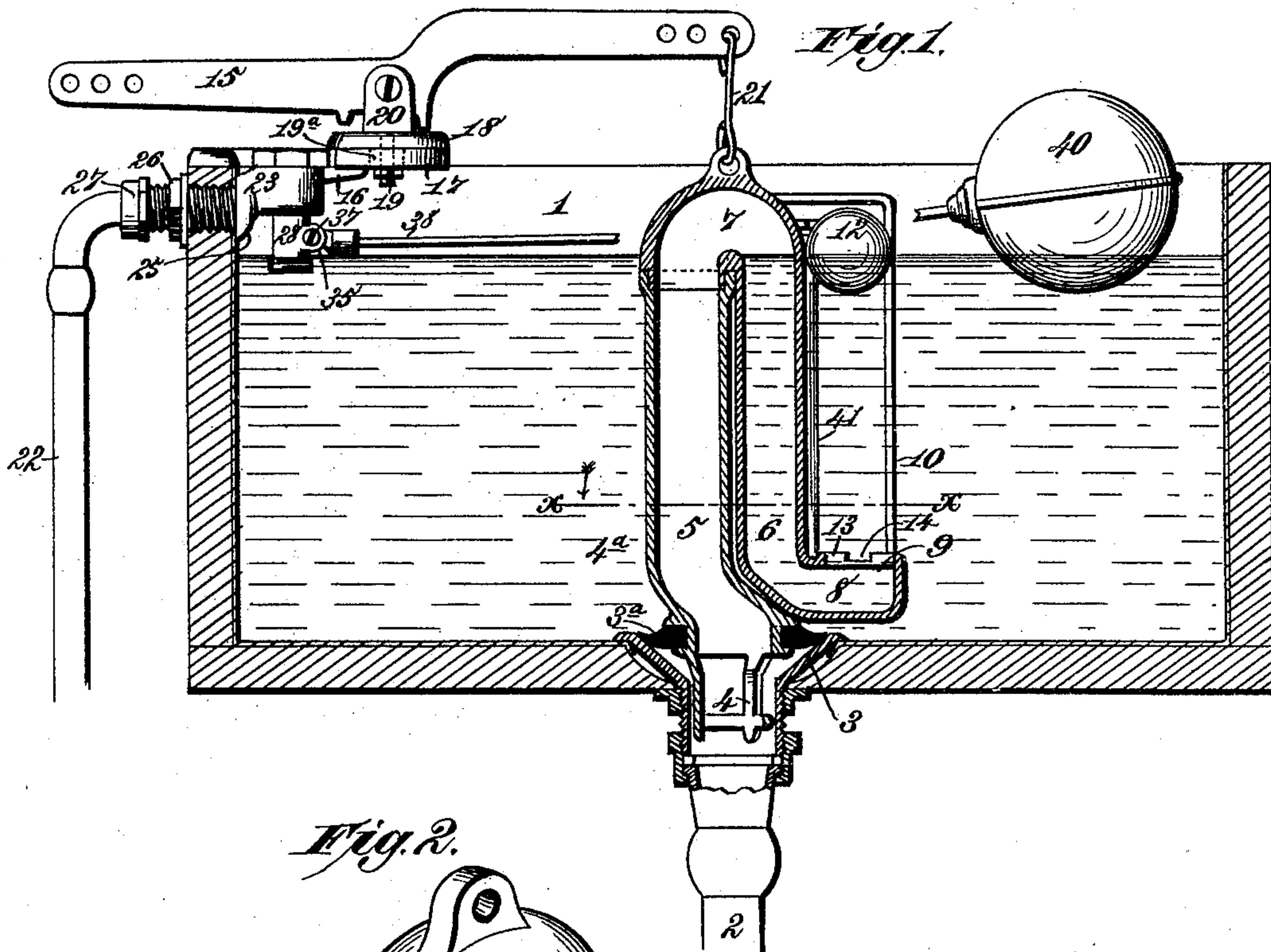
(No Model.)

C. A. BLESSING.

SIPHON VALVE FLUSHING APPARATUS FOR WATER CLOSETS.

No. 446,808.

Patented Feb. 17, 1891.



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UNITED STATES PATENT OFFICE.

CHARLES A. BLESSING, OF PHILADELPHIA, PENNSYLVANIA.

SIPHON-VALVE FLUSHING APPARATUS FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 446,808, dated February 17, 1891.

Application filed September 3, 1889. Serial No. 322,863. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BLESSING, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Siphon-Valve Flushing Apparatus for Water-Closets, of which the following is a specification.

My present invention relates to certain novel improvements in flushing-tanks or supply-tanks for water-closets, and in the means for automatically operating the same.

It is the purpose of my invention to provide a siphon-valve having a novel construction, whereby its manufacture is facilitated, and to combine with said valve automatic means for cutting off the ingress of air when the water sinks in the tank to the level of the siphon-opening, thereby effectually preventing the loud noise which is caused by the rush of air accompanying the break in the siphonage.

It is my further purpose to combine with a siphon-valve an air-inlet entering the short branch of the siphon and having an adjustable air-inlet valve or cock, whereby the apparatus may be adjusted to admit a given quantity of air to the siphon at each action of the valve.

It is my purpose, also, to provide a suitable bracket for flushing-tanks, having a pivotally-mounted fulcrum for the lever, whereby the latter may be adjusted to connect with the siphon-valve at whatever point the latter is placed.

The invention consists, to these ends, in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then defined in the claims annexed to this specification.

In order to enable others to make and use my said invention, I will describe the same in detail, reference being made to the accompanying drawings, wherein—

Figure 1 is a vertical longitudinal section of a flushing-tank illustrating my invention. Fig. 2 is a perspective view of the siphon-valve with its attachments removed from the tank. Fig. 3 is a horizontal section of the siphon-valve in the plane xx , Fig. 1. Fig. 4 is a detail section of the end of the air-pipe, showing also the form of the air-valve. Fig.

5 is a central longitudinal section of the inlet or valve cock, showing also the connection and attachment of the float-lever. Fig. 6 is a horizontal section of the inlet-valve, the float-lever being removed.

In the drawings, the reference-numeral 1 designates a flushing-tank, which is of any preferred construction, and the numeral 2 indicates the flushing-pipe leading to the bowl of the water-closet. This pipe connects with a valve-seat 3, which lies in an opening in the bottom of the tank 1. Within the valve-seat 3 is inserted the foot 4 of a siphon-valve 4^a, carrying a rubber seating-ring 3^a, the siphon being composed of two parallel branches of pipe 5 and 6, constructed in separate sections and united by a joint 7. The longer branch 5 is curved laterally at its lower end to bring the center of gravity over the center of the seat, and the foot of the short branch 6 is provided with a horizontal extension 8, having an inlet-opening 9 in its upper flat face.

Rising from the horizontal extension 8 are two or more wires 10, arranged around the circular inlet-opening 9 and rising to the upper part of the siphon, where their ends are bent horizontally toward the top of the siphon. These wires, with the siphon-pipe itself, form a sliding guide or cage, within which lies a ball-valve 12, formed of metal, wood, rubber, or other light suitable material having a less specific gravity than an equal volume of water. Surrounding the circular inlet-opening 9 is a flange 13, which forms a seat for the ball-valve, and at two or more points in this surrounding flange are formed channels 14, which remain open or partly open when the ball-valve seats over the inlet-opening.

The siphon-valve is raised and dropped by a flushing-lever 15, fulcrumed upon a support mounted on one of the walls of the tank. In the present instance this support consists of a bracket 16, projecting inwardly and provided upon its end with an oblong or oval horizontal support 17. Upon this support is mounted a disk 18, secured by a central pivot 19, which lies in an elongated slot 19^a in the support and is fastened by a nut. The disk is provided with vertical lugs 20, between which the flushing-lever is pivoted. One end

of this lever is connected to the siphon-valve by a link 21, and to the other end the chain, rod, or cord is attached and extended down within reach of the person using the closet.

5 The pivotal attachment of the fulcrum for the lever enables it to be swung around in either direction to bring its end over the valve, and the elongated slot 19 permits the
10 of the tank, so that the relative positions of the valve-seat 3 and the bracket 16 is a matter of little importance. By this construction, also, the bracket 16 may be mounted upon either end wall or upon either side wall of
15 the flushing-tank.

The numeral 22 denotes the water-supply pipe entering the tank near its top. The inlet or ball cock consists of a valve-casing 23, Fig. 5, closed by a screw-cap 23^a and having
20 a horizontal threaded neck 24, which is provided with a circular flange or shoulder 25, lying against the inner face of the tank. The threaded neck 24 is passed through an opening in the wall of the tank and receives upon
25 its outer end a nut 26, which is turned closely up against the outer face of the wall, thereby drawing the shoulder 25 against the inner face of the same wall. The service-pipe is connected to the neck 24 by a collar-nut 27. I may provide a construction of ball-
30 cock which can be attached to the edge of the wall of the tank and directly to the supply-pipe 22, and I do not limit myself to the specific form shown.

35 The valve-casing 23 is provided with a depending nozzle 28, within which lies a valve-stem 29, carrying a valve 30, resting upon a suitable valve-seat 31. The lower end of the valve-stem is provided with two opposite
40 channels 32 for the passage of the water, and between these two channels the stem fits and slides upon raised concave seats 33, Fig. 6. In the wall of the nozzle is formed a longitudinal slot 34, upon each side of which is a lug
45 35, having an aperture 36 for the fulcrum-pin 37 of the float-lever 38, the end of which is flattened and enters the slot 34, whence it passes into a slot 39 in the valve-stem. The upper
50 edge of the flat end of the lever is slightly beveled or rounded off on a curve, as seen in dotted lines in Fig. 5, and the upper end of the slot 39 in the stem is straight and very slightly inclined from a horizontal line. Thus
55 when the valve is seated the stem rests on the end of the lever at a point close to the fulcrum-pin 37, thereby enabling the lever to exert its greatest power in unseating the valve. As the latter is double convex, the moment it is unseated the water-pressure will aid in further opening the valve, while as soon as it
60 seats the whole power of the water-pressure assists in holding it down upon its seat. This action is due in part to the fact that the valve-casing 23 being raised above the level of the
65 neck 24 the valve-seat is brought in or nearly in the line of force of the entering current of water, and, acting upon the valve as the latter

lifts off its seat, it aids in raising it by the angular direction given to the current by the elevation of the valve-seat.

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By the peculiar construction and arrangement described and shown I obtain a practicable construction wherein the float-lever has a very short leverage connection with the valve, so that the valve can be opened against
75 a heavy water-pressure—say one hundred and fifty pounds. With this short leverage the valve would be impracticable were the acting surface of the lever 38 not beveled or rounded off to co-operate with the inclined
80 end of the slot in the valve-stem. This specific construction enables me to practically employ a very short leverage connection with the valve for prompt action of the latter against heavy water-pressure, and, further, by the peculiar form of valve 30 with a lower convex
85 seating surface, its opening movement is greatly facilitated by the water-pressure against such lower convex surface. In effecting the result stated the lower convex surface is important, in that when the valve is
90 closed, Fig. 5, the peripheral division-line between the upper and lower convex surfaces is held above the flat horizontal valve-seat, and therefore a limited water-pressure is always
95 preserved under the peripheral portion of the valve, which is instantly increased as the valve commences to leave its flat seat.

I may insert a small air-pipe 41 in the horizontal valve-extension 8, its upper end extending above the normal water-level. In the
100 open end of this pipe, which is threaded, a screw-valve 42 is inserted, beveled off upon two sides, as shown in Fig. 4. As this screw is turned in or out the air-openings formed
105 by the opposite bevels are enlarged or diminished, and the valve may be adjusted to admit exactly the quantity of air required. I may also accomplish the same result by inserting a screw-valve, similar to the one shown
110 at 42, in the top of the siphon-valve at a suitable point, as shown in Fig. 2, and dispensing with the air-tube 41, though I prefer the latter construction.

The operation of the parts is as follows:
115 When the valve is pulled, the water rushes down through the flushing-pipe and establishes the siphonage at once. As the water-level sinks, the ball-valve descends in its cage until it seats upon the flange surrounding the
120 inlet-opening 9. This checks, but does not break the siphonage altogether, the channels 14 permitting a sufficient flow to give an afterwash and fill the bowl or trap, as the case may be. As the suction from the water-closet
125 decreases and the air-suction through the air-valve increases, however, the column of water in the siphon breaks and the ball-valve is released, the air-pipe 41 admitting an inflow sufficient to allow the balance of water to descend in the flushing-pipe quietly and without the gurgling and rattling often heard.
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One purpose of the channels 14 is to prevent the sudden checking of the inflow, and

the consequent premature break of the siphonage at the moment that the ball-float reaches the inlet-opening. I do not confine myself to any particular shape or form in constructing my siphon-valve pipe, but make it to suit the purpose, either in one or more parts to which I attach the rubber valve-seat ring. These parts, together with the valve-seat in bottom of tank, I may make in any suitable shape. The air-tube and regulating-screw I may insert either near the valve-seat opening, as shown, or on top of the siphon-valve pipe, or any other part thereof to suit.

What I claim is—

1. In a flushing-tank, the combination, with a valve-seat, of a rising-and-falling siphon-valve having at the foot of its short arm a lateral hollow extension supporting vertical guide-wires, which at their upper ends are bent horizontally and secured to the siphon-valve, a float-valve moving against the siphon-valve and the said wires, and means for raising the siphon-valve, substantially as described.

2. In a flushing-tank, a rising-and-falling siphon-valve consisting of two sections having the end of one attached directly to the end of the other and at the foot of the short arm a lateral hollow extension, the apertured top wall of which supports vertical guide-wires having their upper ends bent horizontally and secured to the siphon-valve, and a float-valve moving against the siphon-valve and the said wires, substantially as described.

3. In a flushing-tank, the combination, with a valve-seat, of a siphon-valve carrying a seating-ring and having at the foot of one branch an inlet-opening, and a float-valve closing said opening as the water sinks in the tank, the siphon-valve being provided with

an air-inlet of small size, substantially as described.

4. In a flushing-tank, the combination, with a valve-seat, of a siphon-valve having an extension at the foot of one arm or branch, said extension provided with an inlet-opening on its upper face, having a valve seat or flange surrounding said opening and provided with one or more channels, a float-valve rising and falling in a cage on said extension, and means for raising the siphon-valve, substantially as described.

5. In a flushing-tank, the combination, with a valve-seat, of a siphon-valve having an extension at the foot of one arm or branch, said extension provided with an inlet-opening surrounded by a flange having one or more channels, a float-valve rising and falling with the water in a cage on said extension, and an air-inlet entering the siphon and having a graduated adjustable air-valve end, substantially as described.

6. In a flushing-tank, the combination, with a valve-seat, of a siphon-valve having an extension at the foot of its shorter arm or branch, said extension provided with an inlet-opening surrounded by a flange having one or more channels, an elastic float-valve rising and falling in a cage on the extension, an air-tube entering the latter and rising above the normal water-level, and a screw beveled off on two opposite sides and tapped into the open end of said air-tube, substantially as described.

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

CHARLES A. BLESSING.

Witnesses:

JOHN H. CRAVEN,

WILLIS W. REEDER.