

(No Model.)

J. CLIFFORD.
WATER CLOSET.

No. 357,908.

Patented Feb. 15, 1887.

Fig. 1.

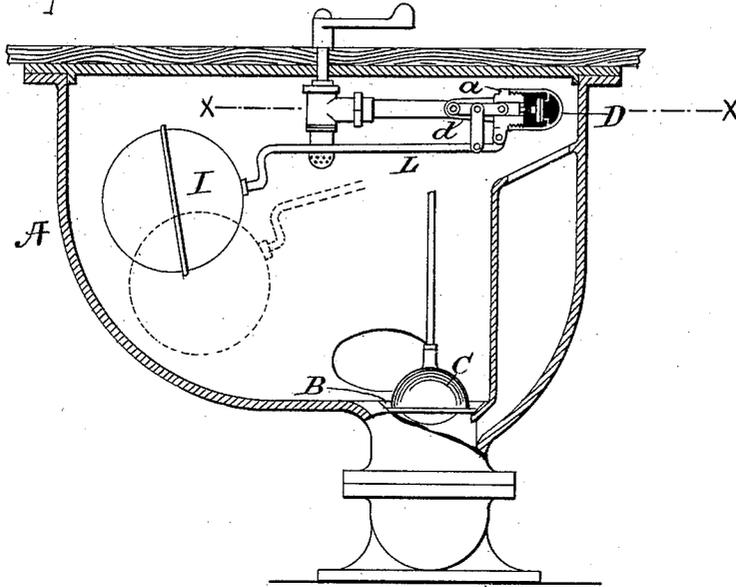


Fig. 2.

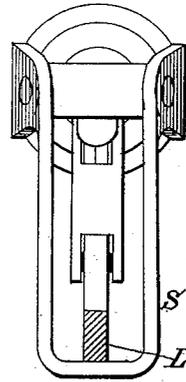
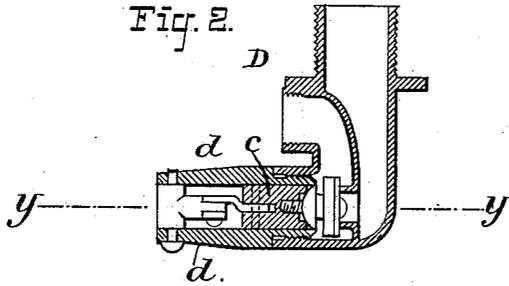
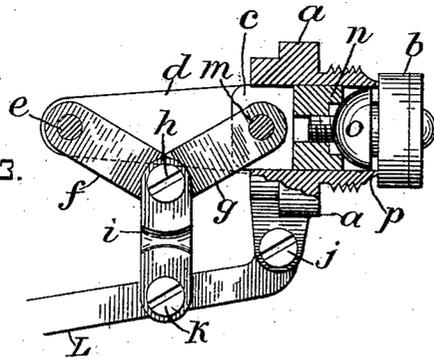


Fig. 4.

Fig. 3.



ATTEST:

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UNITED STATES PATENT OFFICE.

JOHN CLIFFORD, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE L. WOLFF
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WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 357,908, dated February 15, 1887.

Application filed December 12, 1885. Serial No. 185,460. (No model.)

To all whom it may concern:

Be it known that I, JOHN CLIFFORD, of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Water-Closets; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My present invention relates to a new and useful improvement in the valve of that kind of water-closet apparatus in which a "ball-cock" is used, the float or ball of which is located within the usual trunk or reservoir and plunger-receptacle with which the discharge-orifice of the bowl connects.

Previous to my invention such ball cocks or ball-valves have been made after the fashion of ball-cocks used in water-closet supply-tanks and other receptacles designed to be kept filled automatically; but all the prior constructions of such automatic valve contrivances (so far as my knowledge of such things extends) have been more or less inefficient in practical operation and in some particulars illy adapted to the purposes of a water-closet supply-valve.

I propose by my invention to provide for use a ball-valve more especially adapted for use in water-closet trunks or reservoirs, but capable of use with more or less advantage wherever any sort of ball-cock can be employed, that shall be more efficient and certain in its operations, which will always effect the complete opening of the valve with the necessarily limited extent of movement of the float in a water-closet trunk, and which at the same time will prevent the descent of the ball or float to any point at which it would be liable, as in the cases of such valvular contrivances now in use, to get fouled with the excrementitious matter discharged from the bowl into the reservoir or trunk of the closet.

To these main ends and objects my invention may be said to consist, essentially, first, in the use, in connection with the stem of the valve of a ball-cock and with the usual float-lever, (pivoted at one end to a fixed axis of motion,) of a toggle-joint device the extremities of which are coupled, respectively, to the valve-

stem and to a fixed pivot and the middle joint of which is coupled to the float-lever, whereby a very powerful leverage is obtained over the valve in the operation of closing it or seating it (against the water pressure) by the action of the float-lever, all as will be hereinafter more fully explained; second, in the use, in connection with the valve and the float-lever, of a device or means for limiting the descent of the ball of float whenever the water may be discharged from the trunk or reservoir of the closet, and thus preventing the ball from getting fouled with any excrementitious matter that may be in the lowermost part of the trunk in the vicinity of the plunger, all as will be hereinafter more fully described.

To enable those skilled in the art to which my invention relates to make and use it, I will now proceed to more fully describe the same, referring by letters to the accompanying drawings, which form part of this specification, and in which I have shown my invention carried out in that form in which I have so far practiced it and which is the best form now known to me.

In the drawings, Figure 1 is a vertical sectional view of the trunk or reservoir portion of a side-delivery water-closet and such connected portions of the closet apparatus as need to be shown for the purpose of clearly illustrating my present invention. Fig. 2 is a detail horizontal section at the line *xx* of Fig. 1. At Fig. 1 I have shown the float-lever and ball elevated to the level to which they are raised by the water in the trunk to close the valve, but have shown them also depressed in dotted lines to the lowermost point to which they can descend. Fig. 3 is a detail view showing merely a modification with reference to the second part or feature of my invention. Fig. 4 is a detail view showing a modification.

In the several figures the same parts will be found designated by the same letter of reference.

A is the water-closet trunk or reservoir, with which the discharge-opening of the bowl or basin communicates at B, and which is provided, as usual, with a plunger or discharge valve, C, and a water-supply-pipe connection,

as seen at D. Located within the trunk and connected to the water-supply pipe D in about the usual manner is the body *a* of the ball-valve. This body portion of the valve is constructed in the known approved manner, with the proper seat, water-ways, &c., and within is arranged and works the valve *b*, with its stem *c*, which latter is connected at its other end to a toggle-joint device in a manner and for purposes to be presently explained.

Projecting from the body portion *a* of the valvular device are ear-pieces or small stands *d d*, between the inner or adjacent sides of which is arranged a toggle-joint or a pair of flat links, *f* and *g*, which are pivoted together at *h*, and one of which, *f*, is pivoted at *e* to a pin or screw-stud that is supported by the outer ends of the ear-pieces *d d*, while the other, *g*, is pivoted at *m* to the slotted or bifurcated end of the valve-stem.

From the pivoted stud *h* of the toggle-joint depends a link or short bar, *i*, the lower end of which is pivoted at *k* to the float-lever L, which lever is hinged at *j* to the lug-like projections at the lower outer portion of the part *a* of the valve. The float lever L is of about the ordinary or known form, and has at its movable or free end the usual hollow metallic ball or float, I.

To control or determine the extent of downward motion of the lever L and its ball I, and so limit it that when the trunk shall be emptied the ball I cannot drop down into the lowermost portion of the trunk and get fouled up, but can descend only far enough to effect the complete opening of the valve *b*, I construct and relatively arrange the part *n* of the valve-stem (in the vicinity of the packing *o*) and the part *p* of the valve-body *a*, so that these parts will abut, as seen clearly at Fig. 3, when the valve *b* is clear off of its seat, and will thus form a stop to the movement of the toggle-joint or links *f g*, to prevent them from letting the link *i* descend beyond the predetermined position, and thus regulate the extent of downward vibration of the float-lever L. In lieu of this means for regulating the extent of downward movement of the lever L and its ball I, or, in other words, for preventing the descent of the lever beyond the point necessary for the proper opening of the valve, some other device may be employed—such, for instance, as a depending loop or yoke, *s*, (or its equivalent,) which will act as a stop merely to the descent of the lever L beyond the point necessary to effectually open the valve.

It will be seen that by the employment, in

combination with the valve-stem and the usual hinged lever, L, of a toggle-joint system of links, *f g*, arranged and operating as shown, to come nearly or quite into line (or so as to about straighten out) as the valve is forced fully home onto its seat, not only is the thrust on the valve-stem in the final valve-closing movement made in line with the stem, and thus so as to avoid all binding and squarely and evenly seat the valve, but the most powerful degree of leverage possible of the float-lever over the valve to be closed (against the water-pressure) is gained; and by this means a ball-valve contrivance is produced, which, under all the varying conditions of differences in water-pressure and in temperature, &c., (to which such valves are in practice subjected,) is easily the superior in principle of construction and mode of operation of any ball-cock heretofore made that I know of.

Of course, in carrying my invention into operation, either of the hereinbefore-described features of improvement may be used, with more or less advantage, separately from the other.

My improved mode of and means for effectually seating the valve through the ascending movement of the float-lever may be applied to ball-cocks for use anywhere, while that feature of my invention relating to controlling the extent of drop of the ball, and of advantage, mainly, in the case of ball-cocks employed in water-closet trunks, as shown, may be used in various forms in cases where the other primary feature of my invention may not be employed.

What I therefore claim as new, and desire to secure by Letters Patent, is—

1. In combination with the valve and the float-lever of a ball-cock for water-closets, the toggle-joint device or system of coupled links pivoted to the valve-stem and also to a fixed fulcrum in line with said stem and coupled to said float-lever, all substantially as and for the purposes hereinbefore set forth.

2. In combination with the trunk of a water-closet and the valve and float-lever of a ball-cock located within said trunk, a device for limiting the descent or fall of the float to keep the latter from getting fouled up.

In witness whereof I have hereunto set my hand this 7th day of November, 1885.

JOHN CLIFFORD.

In presence of—

JNO. T. WOLFF,
E. M. FORD.