

(No Model.)

P. W. DOHERTY.

OPERATING MECHANISM FOR VALVES OF WATER CLOSET OR OTHER TANKS.

No. 403,926.

Patented May 28, 1889.

Fig. 2.

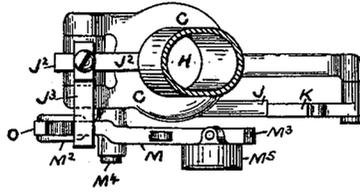


Fig. 3.

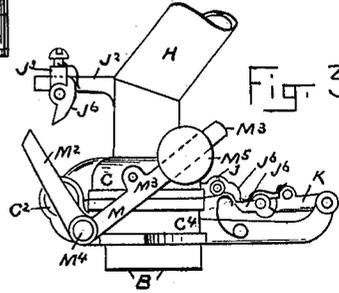
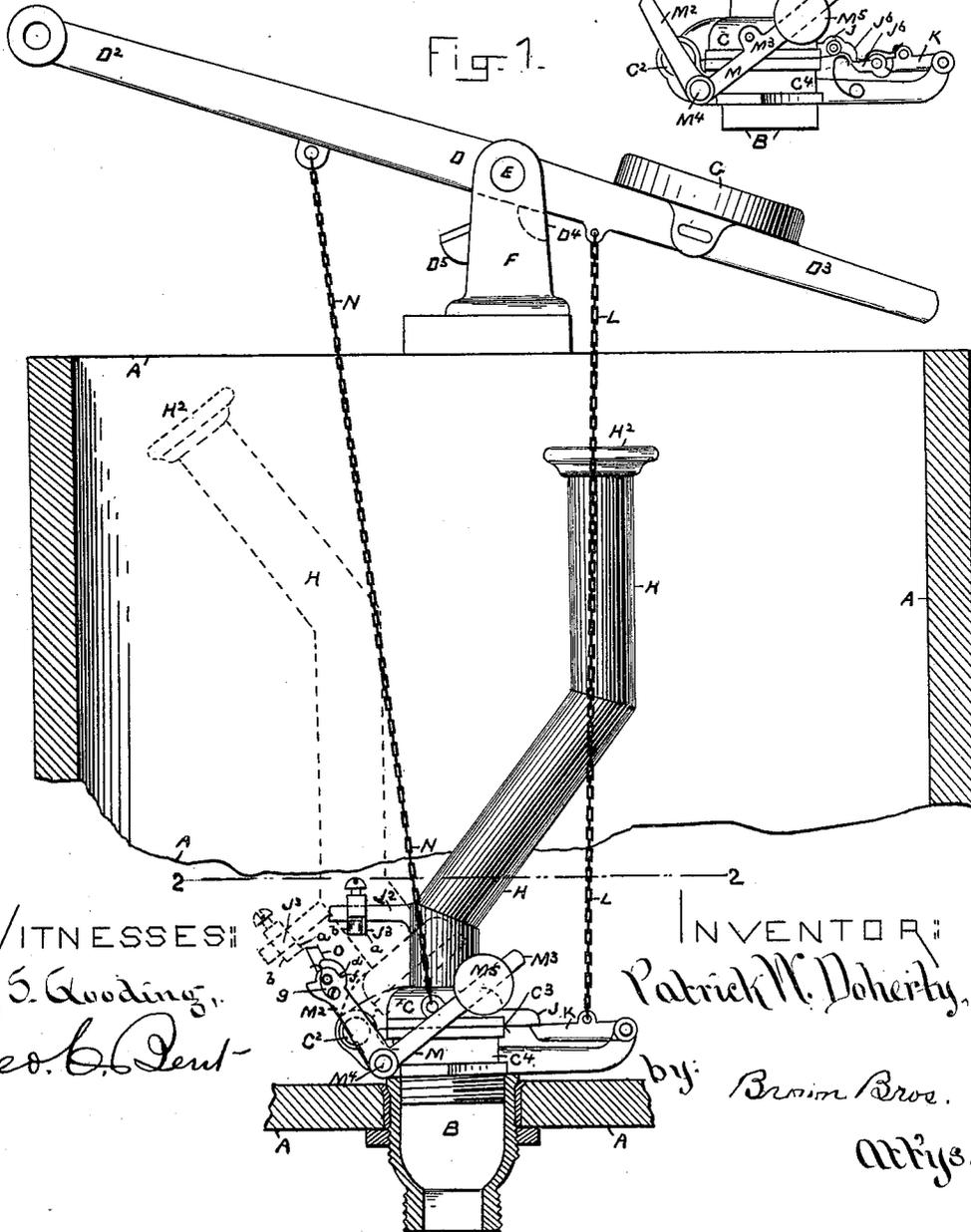


Fig. 1.



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# UNITED STATES PATENT OFFICE.

PATRICK W. DOHERTY, OF BOSTON, MASSACHUSETTS.

OPERATING MECHANISM FOR VALVES OF WATER-CLOSET AND OTHER TANKS.

SPECIFICATION forming part of Letters Patent No. 403,926, dated May 28, 1889.

Application filed August 22, 1888. Serial No. 283,472. (No model.)

*To all whom it may concern:*

Be it known that I, PATRICK W. DOHERTY, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Operating Mechanisms for Valves of Water-Closet and other Tanks of which the following is a full, clear, and exact description.

This invention relates to mechanism for operating valves of water-closet and other tanks to secure their opening and closing.

Under this invention, in substance, there is combined with an opening and closing valve, which may be otherwise of the usual or any other suitable construction or arrangement, and a lever which is fulcrumed on a suitable support or equivalent mechanism therefor and suitably adapted to be operated, preferably two levers, each separately fulcrumed and each arranged and adapted to work independently, and suitably operated to open the valve and then to leave it free to close, and both connected to and operated from a common operating mechanism, and all so that in one direction of movement of said operating mechanism the valve is opened by one of said levers and left free to close, while at the same time the other lever is placed in position for operation on the valve to open it and in the other direction of movement of said operating mechanism, and then by the other of said levers, and the one previously placed, as stated, in operative position, the valve again opened and left free to close, all substantially as hereinafter described.

In the drawings, forming part of this specification, Figure 1 is a longitudinal vertical section of a water-tank and its discharge-pipe and a side elevation of the valve closed and mechanism of this invention to secure an opening of the valve on both movements of the operating-lever and to allow the valve after each opening to close. The valve is also shown, in dotted lines, closed. Fig. 2 is a horizontal section, line 2-2, Fig. 1. Fig. 3 is a view in detail of modifications hereinafter explained.

In the drawings, A is a tank.

B is a discharge-pipe leading from the bottom of the tank.

C is a valve for opening and closing the discharge-pipe at the tank and at one side, C<sup>2</sup>, hinged to a suitable stationary support and seat, C<sup>3</sup>, and D is a lever having a fulcrum, E, of a stationary support, F, of the tank, and at one end, D<sup>2</sup>, suitably connected by a chain and pull (not shown) or otherwise, (not shown,) as well known, so as thereby to be moved in one direction, and at its other end, D<sup>3</sup>, weighted at G, or otherwise suitably adapted, and as well known, so as thereby to be moved in the other and opposite direction, and on a release of the power or force applied to its end D<sup>2</sup> to move it and all otherwise, except as to the features of this invention, as well known in water-tank systems of dwelling-houses, buildings, &c., or otherwise suitably, and therefore needing no more particular description herein.

H is an upright or vertical arm or extension of the valve C, and, as shown, constituting the overflow-pipe of the tank, opening (not shown) at the upper end, H<sup>2</sup>, to the water-space of the tank and at its lower end (not shown) having communication through the thickness of the valve with the discharge-pipe B, and all in itself, neither as a whole, nor as to its separate parts, forming any part of this invention.

J and J<sup>2</sup> are two arm projections on opposite sides of the valve C and its extension H, and in different horizontal planes, one above the other.

K is a horizontal valve-lever, which is above and has its fulcrum on a horizontal extension of the casing C<sup>4</sup>, making the valve-seat C<sup>3</sup>, and at its opposite end and in the normal position of the lever projects under and has its upper edge in contact with the under side of the arm projection J of the valve.

L is a chain or other line, of flexible or suitable character, and at one and its lower end connected to said valve-lever K between its fulcrum and its bearing on the valve-arm J, as above stated, and at its other and upper end connected to the end portion, D<sup>3</sup>, of the operating-lever D. This chain L, in its normal as also

the normal positions of operating the valve-levers D K and closed position of valve, is taut.

M is a vertical angular valve-lever, which at its angle has a fulcrum on the valve-seat casing C<sup>4</sup>. This angular valve-lever M in its normal position has both arms M<sup>2</sup> M<sup>3</sup> projecting upward, and the arm M<sup>2</sup> toward and the arm M<sup>3</sup> away from the upper horizontal arm projection, J<sup>2</sup>, of the valve-extension H, and in the swing of the angular valve-lever M on its fulcrum M<sup>4</sup>, the upper and outer end of its arm M<sup>2</sup>, the arm the nearer to the arm projection J<sup>2</sup> of the valve moves through the vertical plane of a block, J<sup>3</sup>, which is attached by set-screw to and thus made capable of being adjusted lengthwise on the arm projection J<sup>2</sup> of the valve.

The block J<sup>3</sup>, attached, as stated, extends downwardly and presents a vertical working-face, a, at one side and a non-working face, b, at its other side, to the arm M<sup>2</sup> of the angular valve-lever M, as will hereinafter appear. The opposite arm, M<sup>3</sup>, of the angular valve-lever is weighted, as at M<sup>5</sup>, and it is connected to the lower end of a chain, N, or other line, of flexible or suitable character, which at its upper end is connected to the operating end portion, D<sup>2</sup>, of the operating-lever D, and in the closed position of valve and the normal positions of operating and angular valve-levers D M is taut.

The angular valve-lever M in its normal position has both arms vertical, and its arm to work on the abutment-block of valve-extension H is then at one side of and opposite to the non-working face b of the block, as will hereinafter more fully appear.

The working end of the arm M<sup>2</sup> of the angular valve-lever consists of a hinged or swinging toe-piece, O, which has a shoulder, d, in position to abut against an opposed shoulder, f, of the lever-arm, and is provided with a bent spring, g, one end secured to the lever and at its other and free end resting on the toe-piece, and all so that the toe in its normal position rests by its shoulder d against the shoulder f of the lever, and on the swing of the angular lever in one and a direction toward and to bring the toe into abutment against the working face a of the abutment-block J<sup>3</sup> of the valve-extension H, said toe bearing against block thereby swings the valve on its hinge C<sup>2</sup> and opens it, until by the continued swing of valve and angular levers the toe and said abutment-block are made to escape from each other, leaving the valve free to close and the angular lever to continue its swing on its fulcrum in the same direction. On the swing of the angular lever in the other and a direction opposite to that just above stated, the toe then coming to a bearing against the non-working face b of the abutment-block J<sup>3</sup> of the valve-extension, yields thereto and passes under the end of the abutment-block, all without effect on

the valve, and finally comes to its normal position, in which position it is out of contact with and situated in relation to the non-working face b of said abutment-block, as before explained.

An arrangement of valve-levers K M and an application thereof to a valve, in combination with an operating-lever common and connected to both, all as has been described, secures from the movement of the operating-lever in each direction an opening and a close of the valve, and the opening of valve in such case, is positively accomplished and the closing is secured from the weight of the valve, the valve being left free to close after each opening. By this means two separate discharges of water from the water-tank are secured in one complete operation of the operating-lever; and in order that the second discharge shall be the greater in quantity, thus giving the "afterwash," as it is termed, to the bowl of a water-closet in connection with the discharge-pipe of the tank, the first discharge given thereto being the "preliminary wash," as it is termed, the valve-levers and the parts of the valve on which each lever works, as has been described, and all otherwise, are arranged and applied together, so that the valve is opened to the greater distance in the operation thereon of the angular valve-lever. In the operation of each valve-lever on the valve the chain connecting it to operating-lever is taut, and the chain connecting the other and the non-working valve-lever is slack or loose. The valve-lever K, in working on the valve to open it, escapes from the valve projection J, when, or about when, the operating-lever has reached the limit of its movement in the direction to operate said lever, and on the following opening of the valve in the return-movement of the operating-lever by the angular valve-lever M the valve-lever K is then thereby allowed to return to its normal position. Stops D<sup>4</sup> D<sup>5</sup> for the operating-lever D, in each direction of movement thereof, are preferably provided.

A hinged or pivoted toe-piece, J<sup>6</sup>, Fig. 3, may be provided for the abutment-block J<sup>3</sup> of the angular valve-lever, and also for the valve-arm J and valve-lever K, working on said arm, and if the abutment-block J<sup>3</sup> has such a toe-piece the toe-piece of the angular valve-lever may be either dispensed with or may be used with it. Again, the valve-arm J and valve-lever K may each or either one have a toe-piece, as described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

The combination, with a tank for liquid, an outlet-pipe for the liquid, and an opening and closing valve to the outlet-pipe hinged at one side, of an operating-lever, D, fulcrumed on a stationary support, lines L N—such as chains—connected to it on opposite sides of

its fulcrum, a lever, K, fulcrumed on a stationary support and having said line L connected to it, an abutment, J, of the valve or part moving with it for said lever K, an angular lever, M, fulcrumed at its angle on a stationary support and weighted at its arm M<sup>3</sup>, and an abutment, J<sup>3</sup>, of the valve or part moving with it for the arm M<sup>2</sup> of angular lever M, substantially as described, for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PATRICK W. DOHERTY.

Witnesses:

ALBERT W. BROWN,  
GEO. C. BENT.