J. N. DECK.

Improvement in Self-Acting Water Valves.

No. 123,771. Fig. I. Patented Feb. 20, 1872.

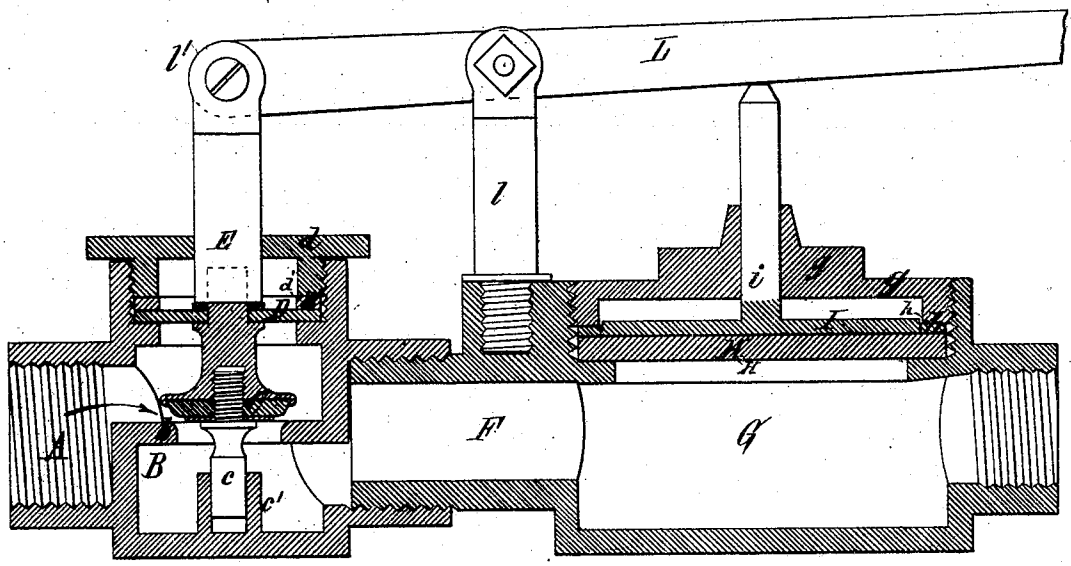


Fig. II.

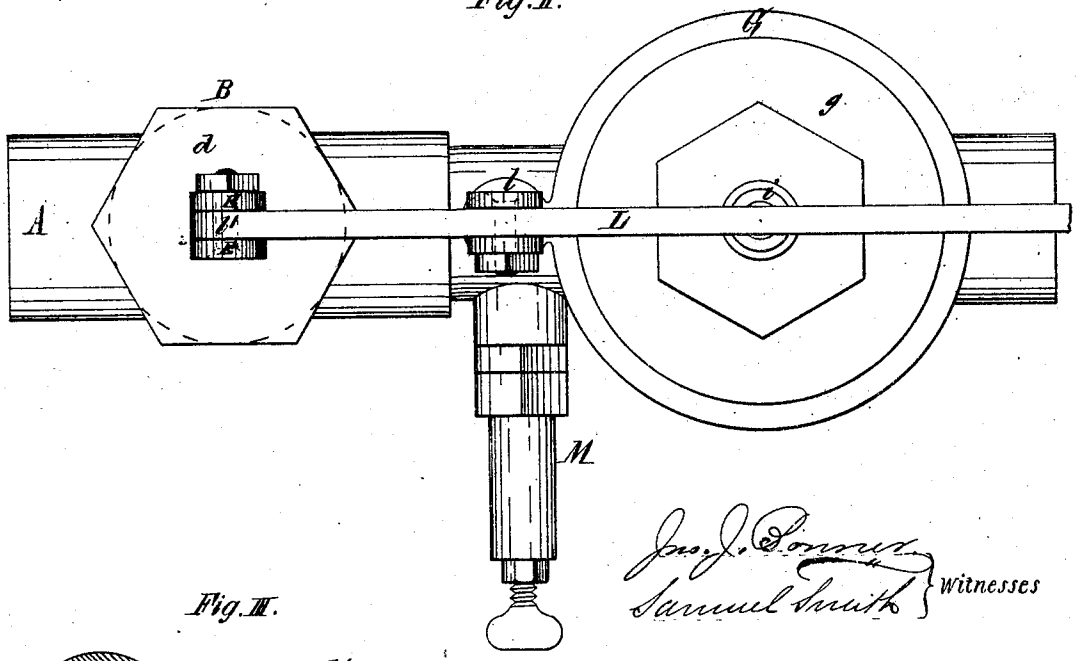
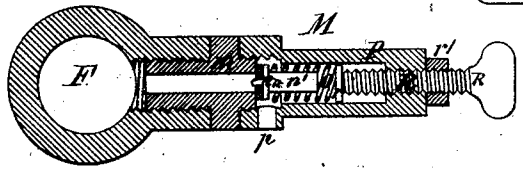


Fig. III.



Witnesses
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UNITED STATES PATENT OFFICE.

JACOB N. DECK, OF BUFFALO, NEW YORK.

IMPROVEMENT IN SELF-ACTING WATER-VALVES.

Specification forming part of Letters Patent No. 123,771, dated February 20, 1872; antedated February 17, 1872.

SPECIFICATION.

I, JACOB N. DECK, of the city of Buffalo, in the county of Erie, and State of New York, have invented certain new Improvements in Self-Acting Water-Valves, of which the following is a specification:

My improvements relate to those devices which are employed for regulating the pressure in the service-pipes supplying houses with water, and in which the valve controlling the flow of water is actuated by a weighted lever and other intermediate parts from a flexible diaphragm exposed to the pressure in the service-pipes. My improvements refer more particularly to that class of water-valves in which the valve is so arranged that it opens against and closes with the pressure in the main pipe. In valves of this kind, it frequently happens, when a great pressure is suddenly applied to the main pipes, as, for instance, in case of a fire, that the valve closes under the excessive pressure, thereby shutting off the supply of water to the house entirely so long as the high pressure is maintained in the main pipes. To remedy this defect is the object of my improvements. My invention consists in the combination, with the induction and eduction water-pipes, partitioned valve-chamber, and mechanism for automatically actuating said valve, of a second flexible diaphragm, connected with the valve, and so arranged as to counterbalance the pressure on the valve of the water in the main pipe, whereby the valve is left free under the varying pressure on the main pipe to be moved in either direction by the actuating mechanism, and a flow of water in the service pipe insured at all times, however great the pressure in the main may be, all as hereinafter fully described.

In the accompanying drawing Figure I is a longitudinal sectional elevation of my improved water-valve. Fig. II is a plan view of the same. Fig. III is a transverse section in line *x x*, Fig. II.

Like letters designate like parts in each of the figures.

A is the induction-pipe; B the valve-chamber, divided into two compartments by a diaphragm, *b*, in which the valve-seat is formed. C is the valve, and *c* the valve-stem, fitting into a socket, *c'*, in the bottom of the valve-chamber. D is a flexible rubber diaphragm secured in the upper portion of the valve-chamber by means of a screw-nut, *d'*. E is a rod extending above the diaphragm D and forming an upper stem of the valve C. The upper end of the latter is provided with a screw-thread, and passes through the diaphragm D, and screws into the lower end of the stem E, in such manner that the rubber diaphragm D is clamped between the two parts. The exposed surface of the diaphragm D should be a little greater than the area of the valve. F is the eduction-pipe, and G a cylindrical water-chamber, arranged therein, near the valve-chamber B. H is a rubber diaphragm, secured to the top of the water-chamber G by means of a screw-nut, *g*, and ring *h*. I is a circular plate, resting on the flexible diaphragm H, and cast at the center with an upwardly projecting stem *i*. The latter passes through a perforation in the screw-nut *g*, and is guided therein in its movements. L is a weighted lever, pivoted to a standard *l*, attached to the eduction pipe, and taking hold of the valve-stem E at *l'*. The weighted arm of the lever L rests on the pin *i*. M is a safety-valve, arranged in the eduction-pipe, preferably between the valve-chamber B and water-chamber G. It is constructed in the following manner: *m* is a hollow plug, screwed horizontally into the eduction-pipe, the outer end of this plug forming the valve-seat. *n* is the valve of any suitable form, and *n'* is the stem of the same. O is a spiral spring surrounding the stem *n'*, and holding the valve *n* against its seat. This valve and spring are inclosed in a hollow plug, P, screwed onto the end of the plug *m*, and provided with a discharge orifice, *p*. R is a set-screw, working in the outer end of the plug P, and bearing, by means of a washer, *r*, against the spring O, whereby the tension of the latter is regulated. *r'* is a screw-nut by which the screw R can be secured in any desired position.

The operation of my improvements is as follows: The exposed surface of the diaphragm D, being of the same size, or nearly that, of the valve, the water in the main or induction-pipe, independent of the other parts, will press equally, or nearly so, in opposite directions against the valve and the diaphragms balancing the former. When combined with the other parts, and the lever L being adjusted to the degree of pressure required in the service-pipes, the

pressure of the water in the service-pipe, when it exceeds the prescribed limit, will be sufficient to raise the diaphragm H and weighted arm of the lever, and thereby close the valve. As the water is drawn from the service-pipe, so as to reduce the pressure therein, the diaphragm and weighted arm of the lever will subside, and the valve, counterbalanced, as above stated, immediately opens, and thus permits a supply of water to flow into the service-pipe, however great the pressure in the main may be. If the valve were not thus counterbalanced it is evident that after it had been once closed, the pressure of the water against it in the main, might, in extreme cases, be sufficient to counterbalance the action of the weighted lever, and thus prevent the valve opening, and thereby entirely cut off the supply of water to the service-pipe. Furthermore, in such case, the varying pressure of the water in the main pipe, on the unbalanced valve, would require a greater or less pressure in the service-pipe in order to close the valve, thereby preventing a uniform pressure being maintained in the service-pipe. The safety-valve M prevents any leakage of the valve C, from injuring the service-pipes, by letting the pressure in the main pipes gradually work into the latter.

The tension of the spring O in this valve is so regulated that when the pressure in the service-pipes exceeds a certain limit, the valve *a* will be opened, and the surplus of water discharged through the orifice *p*, thus preventing the pressure in the service-pipe rising above the regular pressure required in the same.

I claim as my invention—

The combination, with the induction and eduction pipes, partitioned valve-chamber B, valve C, and mechanism for automatically actuating the valve of the flexible diaphragm D, constructed and arranged to counterbalance the pressure on the valve of the water in the induction-pipe, and thereby insure a supply of water in the service-pipe under all degrees of pressure in the main as hereinbefore set forth.

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Witnesses:

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