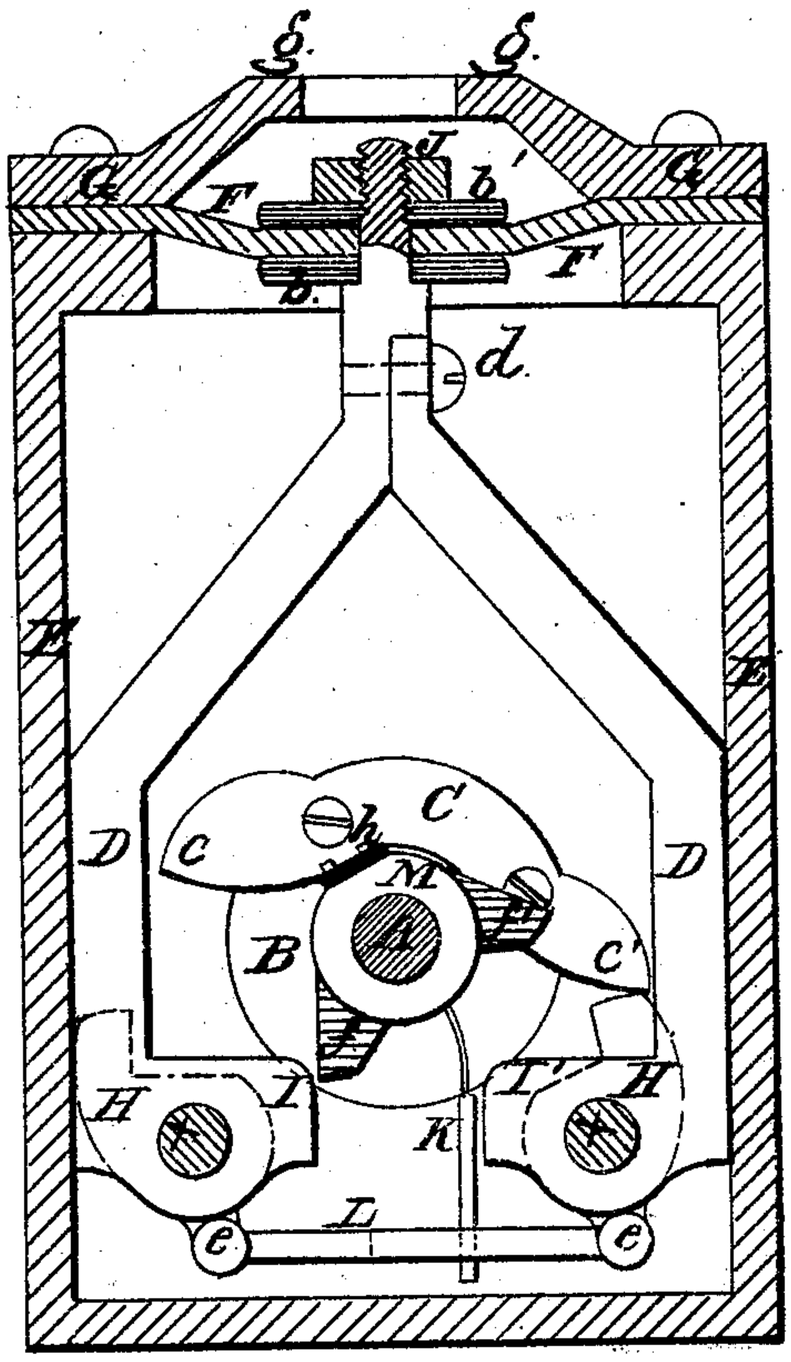
O. H. LANGDON.

Improvement in Valve-Operating Mechanisms for Water-Meters.

No. 116,200. Patented June 20, 1871.



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116,200

UNITED STATES PATENT OFFICE.

ORRIN H. LANGDON, OF HOMER, ASSIGNOR TO HIMSELF AND CHARLES W. KINNE, OF CORTLAND, NEW YORK.

IMPROVEMENT IN VALVE-OPERATING MECHANISMS FOR WATER-METERS.

Specification forming part of Letters Patent No. 116,200, dated June 20, 1871.

To all whom it may concern:

Be it known that I, ORRIN H. LANGDON, of the town of Homer, in the county of Cortland and State of New York, have invented an Improved Valve-Operating Mechanism for Water-Meters, of which the following is a specification:

This invention has for its object the production of mechanism for operating the valves of water-meters which shall be capable of being actuated to move the valve by means of the pressure of the water itself; and consists in the employment of a flexible or moving diaphragm forming one side of a water-chamber, in connection with suitable devices for moving the valve, as will be fully described hereinafter.

In the drawing, a view in elevation, partially in section, is shown of the flexible diaphragm and the mechanism for actuating the valves.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

This invention is designed to be operated in connection with the piston of the main diaphragm, which is common to all or nearly all water-meters.

A represents a rock-shaft connected in any proper manner to the piston or to the main diaphragm, (not shown,) which is employed to measure the volume of water passing through the meter. This connection should be so made as to transmit from the reciprocating movement of the piston, or the main diaphragm, an oscillating movement to the rock-shaft. *f f'* represent fingers located upon the shaft A, and loose thereon, which are free to move, however, only in one direction, their upward motion, when in place, being limited by means of shoulders in any proper manner. They are provided also with a small spring, by which means they are caused to return to their proper position after having been drawn back over the horizontal arms I I' by the return movement of the shaft A. D represents a yoke, which, for convenience, is made in two parts securely attached together by means of the bolt *d*, as clearly shown in the drawing. The upper end of the yoke terminates in a central projection, and is connected, by means of a nut, J, and washers *b b'*, to the flexible diaphragm F, which latter is secured by means of the cap G to the case E. The cap G is not designed for the purpose of a cover, but is extended over the diaphragm for the purpose of forming a stop to limit its upward movement in order that it may not be driven too far by the pressure of the head of water. The lower part of the yoke is provided with horizontal arms I I', as shown. H H' represent pawls which have a partial revolution upon the pins *x x* secured to the horizontal arms I I'. *e e* represent arms rigidly attached to the pawls H H', and connected together by means of the slotted connecting-rod L. These pawls are so arranged relatively to each other that when the projection of one pawl is thrown outward the other is thrown inward, as clearly indicated in the drawing. K represents a spring-bar, the upper end of which is attached directly or indirectly to the rock-shaft A, and the lower end of which rests in the slot of the bar L. B represents a rotary valve, which turns independently upon the shaft A, and is provided with a bar, C, rigidly attached thereto, having projections *c c'*, as shown.

The operation is as follows: The water is admitted from the supply-pipe into the valve and to the case E. As the water passes through the valve into the main diaphragm-chamber, it forcibly crowds the main diaphragm or the piston, as the case may be, of the meter to one side, in the usual well-known manner. This movement of the main diaphragm or the piston is communicated to the rock-shaft A by proper connections, and the latter is thus caused to turn in its bearings and make a partial revolution. This movement of the rock-shaft, in its turn, causes one of the fingers *f f'*, which, of course, revolve with it, to be brought into contact with one of the horizontal arms I I' of the yoke D, and the latter is consequently forced downward in the case E against the head of water, which exerts its pressure to crowd the diaphragm F upward. This downward movement of the yoke continues until the finger *f* or *f'* has been turned out of connection with the horizontal arm I or I' of the yoke by the revolution of the shaft A, when, of course, the yoke will be released, and will consequently be free to spring up again under the influence of the pressure of the head of water against its diaphragm F. During the downward move-

ment of the yoke, however, the rock-shaft in its revolution has carried with itself the spring-bar, K, and, through its instrumentality, actuated the slotted bar L. By means of the movement of the latter bar one of the pawls H H′ has been caused to turn inward, in which position it is necessarily brought into contact by the upward spring of the yoke with one of the projections or arms *c c′* of the valve-bar C. By this means one side of the valve-bar, of course, is carried upward, and the valve B being thereby revolved on the shaft A the flow of water is changed to the other side of the main diaphragm or piston. To state the operation more briefly, the position of the valve is changed at each upward movement of the yoke through the instrumentality of the pawls H H′, which strike alternately the arms *c c′* of the valve-bar C. The yoke is drawn down by the fingers *f f′* of the rock-shaft, which latter receives an oscillating motion from the reciprocating movement of the main diaphragm or the piston, as the case may be. The upward movement of the yoke is caused by the pressure of the head of water against its diaphragm F, this pressure being free to act when the finger of the rock-shaft revolves away from the horizontal arm I or I′. A special advantage is gained by the employment of the supplemental diaphragm F, from the fact that the power supplied by the head of water acting upon the diaphragm always bears the same relation to the resistance to be overcome in moving the valve. To illustrate, if there is fifty pounds' pressure to the square inch upon the valve, and, consequently, great resistance from the friction of the parts, there is also fifty pounds' pressure to the square inch upon the diaphragm, and thus ample power is provided to overcome the resistance occasioned by the heavy pressure. If the pressure upon the valve is less, the pressure upon the diaphragm is also less, the same pressure to the square inch being always exerted upon both the diaphragm F and the valve B. The machine described is simple in its construction and effective in its operation. No springs or weights are employed to operate the valve, and all its movements are positive. I do not limit myself to the specific construction of the parts for operating the valve, for these may be infinitely varied; nor do I limit myself to any particular arrangement or form of the case E. It may, if desired, be located in the main diaphragm-chamber; but

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

A valve-operating mechanism for water-meters, consisting of a water-case or division, one end or side of which is formed of a flexible or moving diaphragm to receive the direct impact of the water, within which case is placed a suitable device for tripping the valve, the said device being actuated by the pressure of the head of water and the throw of the diaphragm or the piston within the meter, substantially as described.

ORRIN H. LANGDON.

Witnesses:
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