J. JOHNSON.
Water-Meters.

No. 197,859. Patented Dec. 4, 1877.

Fig. 1.

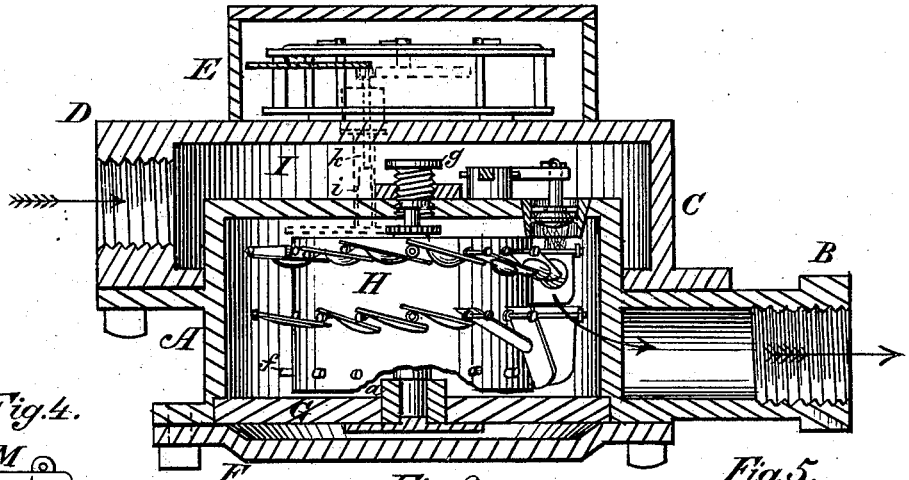


Fig. 4.

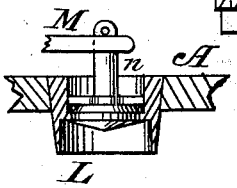


Fig. 2.

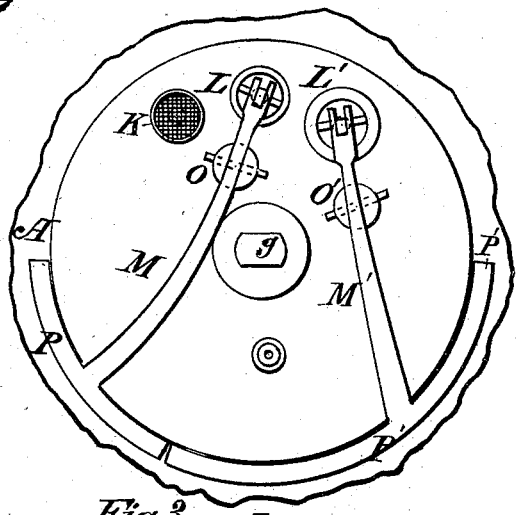
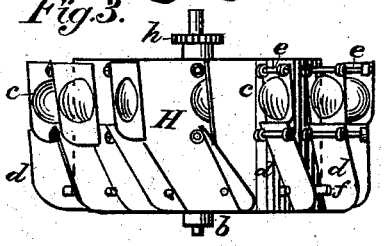


Fig. 5.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **197,859**, dated December 4, 1877; application filed March 3, 1877.

To all whom it may concern:

Be it known that I, JONATHAN JOHNSON, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Fluid-Meters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of this invention is to improve that class of meters commonly called "rotary meters" by so arranging the induction-openings as to cause the flow of liquid through the compartment containing the measuring-wheel to be always at nearly an equal velocity, and under substantially the same pressure, the quantity of fluid admitted to the compartment being exactly in proportion to the amount drawn from it; and the invention consists in the construction and arrangement of the induction valves and openings, and in other combinations of devices, which will be first fully described, and then specifically pointed out in the claims.

Figure 1 of the drawings is a vertical longitudinal section through the meter, showing the relative arrangement of the different parts. Fig. 2 represents a plan of the upper side of the internal case, exhibiting the arrangement of the inlet-valves and their balanced levers. Fig. 3 shows the measuring-wheel with its feathering floats. Fig. 4 is a sectional view of one of the inlet-valves; and Fig. 5 presents a section of the jet and its strainer.

The case A contains the wheel-chamber, and from it extends the outlet-duct B. Secured to the top of this case A, by bolts or other suitable means, is the casing C between which and the lower case is formed the receiving-chamber I, into which the water or other fluid comes through the inlet-pipe D. Surmounting this casing is the lid-covered dial-box E, which protects the registering-dials and the train of gearing by which they are operated. To the bottom of the case A is applied, and firmly secured, the plate F, thus completing an enumeration of the parts which cover and protect the mechanism employed in performing the work of measuring and registration, which will now be described.

Secured within suitable recesses formed in the case A, and crossing it diametrically, is the supporting-bar G, which carries the step or bearing *a*, within which rests the lower journal of the shaft *b*, carrying the measuring-wheel H. This wheel consists of a thin circular rim, connected to a hub upon the shaft *b* by suitable arms, and provided upon its periphery with a double series of hinged and feathering floats, *c* and *d*. The floats *c* are cup-shaped, and hinged upon a series of radially-projecting arms, *e*, in such a manner that, when the wheel rotates in one direction, their lower ends may rise to a horizontal position, thus allowing them to pass easily through any fluid in which they may be immersed when moving in that direction; but if an attempt be made to turn the wheel in the opposite direction they at once fall, their lower ends resting against the top of the lower series of floats *d*, and presenting their whole surface to the action of the fluid. This lower series of floats *d* are hinged to radial arms in the same manner as the upper series, but are not cupped, and in falling rest against the check-pins *f*, inserted into the rim of the wheel. The upper end of the shaft *d* does not pass upward through the case, but is journaled in an offset or adjustable bearing, *g*, secured to, or otherwise inserted into the top of the case A. A pinion, *h*, upon the shaft serves to convey the motions of the measuring-wheel to the train of registering mechanism in the dial-box E through the agency of a shaft, *i*, passing through and turning in a suitable journal-box inserted in the top of the case A. This shaft *i* is provided with a gear-wheel, gearing into the pinion *h* upon the shaft *b*.

In the upper end of the shaft *i* is formed a socket, which receives the lower end of the spindle *k*, the upper end of which carries a pinion, which gives motion to the train of gearing in the dial-box. This train of gearing, as well as the dials, are similar to those in common use for like purposes, and does not, therefore, require any specific description.

It will be observed that, by pivoting both ends of the measuring-wheel shaft within the wheel-chamber, the friction caused by the packing which would be required if the shaft passed

through the case directly into the dial-box is wholly avoided, while the small amount caused by the slow-revolving and slender spindle is scarcely appreciable, and does not affect the movement of the wheel.

The means by which the water reaches and acts upon the measuring-wheel is as follows: Entering the chamber I between the two cases under its initial pressure, it finds but a single orifice open for its passage to the wheel-chamber, viz., the jet K, which is formed of a short tube inserted into the case A, and projecting a short distance downwardly into the wheel-chamber. The lower end of this tube is stopped; but a small orifice, *m*, is formed through it at an angle of about forty-five degrees, and so placed that the jet of water passing through it shall strike directly upon the cup-shaped floats *c*, thus giving motion to the wheel and registering apparatus. Over the entrance to the tube is placed a strainer, which prevents the obstruction of the orifice *m* by extraneous matters.

It is evident the jet-tube would not allow a sufficient quantity of water to pass through for all the purposes required of a water-supply; therefore some provision must be made to furnish this increased quantity of water when it is desired. In order to do this I insert in the top of the case A two or more valves, L and L′. These valves are placed within a tubular casing, which extends a short distance within the wheel-chamber, the valves themselves being of any of the well-known conical-seated varieties, or others which are opened by a vertical movement.

Stems *n* are attached to them, which pass up through the ends of the bifurcated levers M and M′, a pin being passed through the end of each stem, so that when the valves are pressed upon they shall pull down upon the levers. These levers are pivoted at O, and provided at their outer ends with segment-shaped weights P and P′, which enter the annular recess between the casings.

It is evident that if so much water is drawn from the outlet-duct as to lower the pressure in the wheel-chamber sufficiently below that in the receiving-chamber to overcome the resistance of the weighted levers, the valves will open and allow a greater quantity of water to enter the wheel-chamber, and as they may be so weighted as to open with slightly-different pressures, they will only open sufficient to supply the demand made upon the meter. Further, when the induction-chamber is relieved of water by free eduction, the pressure thereby being unsubdued acts with such force upon the measuring-wheel that the registration would be excessive, to remedy which I have arranged for the discharge of varying quantities of water upon different sections of the measuring-wheel, so that the greater the flow and force, the shorter will be the time of its action upon the wheel, thereby causing the registration to correspond with the quantity of water that has passed through the meter, regardless of the time occupied in its passage.

I am aware that measuring-wheels of meters have been constructed with a single series of hinged floats placed diagonally about their peripheries; but this method of construction did not give to the face of the floats a double incline, so that the water should first impinge upon a surface of the float slightly inclined, but which inclination should increase as the force of the water became less. This could only be accomplished practically by using two sets of hinged floats, set at different inclinations, for if the single float were curved, or given a double inclination, its friction, while being dragged through the water, would be greater than the effect obtained by the change of shape.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The jet K, provided with the orifice *m* and strainer, and inserted in the case A of a fluid-meter, substantially as and for the purpose specified.

2. The receiving-chamber, weighter, inlet-valves, and jet K, in combination with the wheel-chamber and measuring-wheel, with its attached registering apparatus, substantially as and for the purpose specified.

3. A fluid-meter, provided with a measuring-wheel, H, having two sets of hinged floats, *c* and *d*, placed at different inclinations, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I hereunto affix my signature in presence of two witnesses.

JONATHAN JOHNSON.

Witnesses:
S. A. TERRY,
T. H. SCHOTT.