J. JOHNSON.
Rotary Water-Meter.

No. 202,827. Patented April 23, 1878.

Fig. 1.

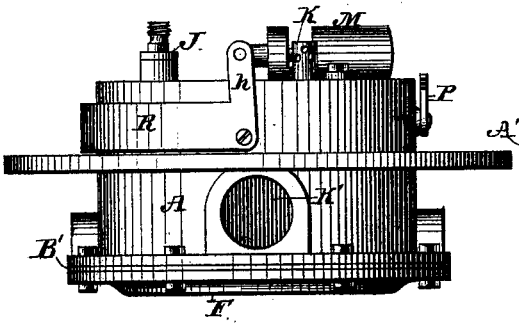


Fig. 2.

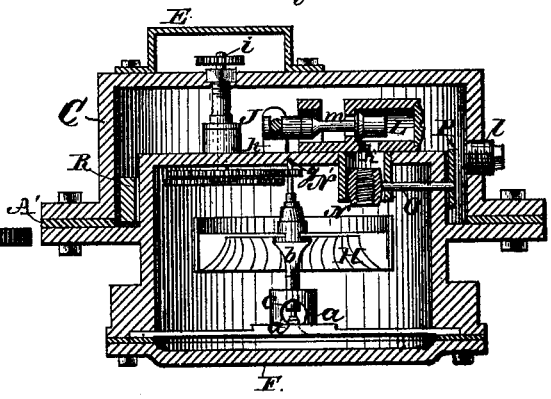


Fig. 3.

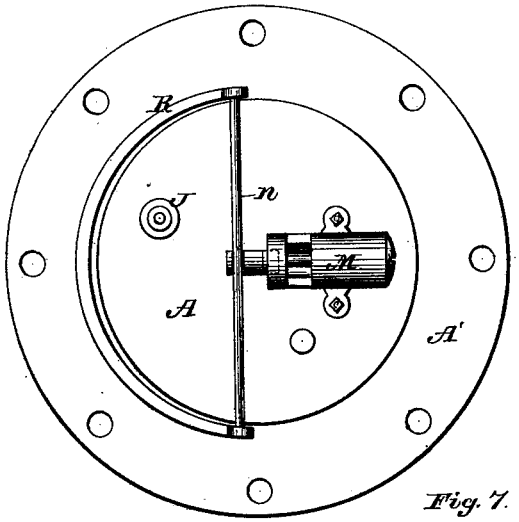


Fig. 4.

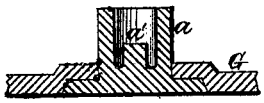


Fig. 5.

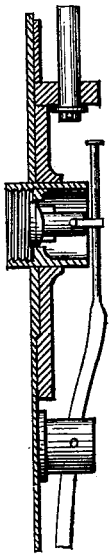


Fig. 6.

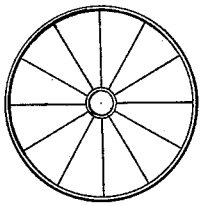
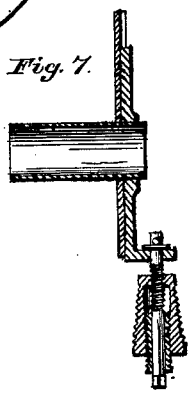


Fig. 7.



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IMPROVEMENT IN ROTARY WATER-METERS.

Specification forming part of Letters Patent No. **202,827**, dated April 23, 1878; application filed July 31, 1877.

To all whom it may concern:

Be it known that I, JONATHAN JOHNSON, of the city of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Water-Meters, of which the following is such a full and exact description as will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference placed thereon, similar letters indicating corresponding parts in the different figures.

The object of this invention is to improve that class of devices used for measuring the quantity of water or other fluid flowing through a pipe, and is of great use in determining the quantity of water taken by each of the users in the general distribution now so common in all cities, and enables the officers in charge to determine with perfect equality the rate or tax of each user; and the invention consists in the construction and arrangement of the adjustable chute through which the water passes on its way to the measuring-wheel; and, further, in the devices by which the water is admitted to the chute, and in other particulars of construction, which will be hereinafter fully described, and then specifically pointed out in the claims.

In the drawings, Figure 1 is a vertical view, showing the weight R and its valve-connection. Fig. 2 is a vertical section of the meter. Fig. 3 is a horizontal view of the top of the meter. Fig. 4 is a vertical section of the step and a portion of its supporting-bar. Figs. 5, 6, and 7 are detailed views, exhibiting modifications.

The metallic case A forms the chamber which contains the measuring-wheel and a portion of the train of registering-gears, and from it extends the outlet-duct B′. Two encircling flanges, A′ and B′, are placed, one at the bottom of the case, and the other, A′, midway of its height. To the latter is secured by bolts the outer casing C, the joint between them being made water-tight by the insertion of an annular strip of leather or other suitable packing. The space inclosed between the two cases forms the receiving-chamber, into which the water flows through the inlet-pipe D. Surmounting this casing C is the dial-box E, containing the registering-dials and a portion of the train of gearing by which their indexes are operated.

To the lower flange B′ of the case A is secured by bolts the bottom plate F, with suitable packing interposed to form a perfectly tight joint, thus completing the case, which incloses and protects the mechanism employed in measuring the water which passes through the apparatus, and in registering such measurement.

Secured within suitably-formed recesses in the lower flange of the case A, and diametrically crossing it, is the supporting-bar G, which carries the step or bearing *a*, within which rests the lower end of the shaft *b*. This step is bored out to receive loosely the end of the shaft, which rests upon the small pintle *a′*, leaving an annular space around it, through which the water flows uninterruptedly, entering by the orifice *c* on one side of the step, and passing out by a similar orifice on the opposite side, thus effectually lubricating the lower end of the shaft *b*, which carries the measuring-wheel H. This wheel consists of a thin peripheral rim, connected to a central hub by spirally-inclined floats, similar to those used in turbines. The upper end of the measuring-wheel shaft *b* is reduced in diameter, so as to avoid unnecessary friction, and revolves in a vertically-adjustable bearing, *g*, inserted into or otherwise secured to the top of the case A. A small pinion, *h*, secured upon the shaft *b* serves to convey the motion of the measuring-wheel to the train of registering mechanism in the case and dial-box E through the shaft *i*, which is inclosed in the tube J, and passes through suitable stuffing-boxes, so arranged as to prevent the passage of water from the case A to the dial-box around the shaft, but not to interfere to an appreciable extent with its free rotation. The train of gearing by which motion is conveyed from the measuring-wheel to the indexes as well as the dials, being similar to those in common use for like purposes, do not require any specific description.

The means employed for applying the water to the measuring-wheel will now be described.

Upon entering the chamber between the

two cases under its initial pressure it finds but a single orifice open for its passage to the wheel-chamber, which is through the jet-pipe K, formed of a short tube, inserted into the case A and projecting a short distance downward into the wheel-chamber, its lower end being stopped with the exception of a small orifice pierced through it at an angle, and so placed that the jet of water flowing through it shall strike squarely against the floats of the measuring-wheel, thus giving a slow rotation to the latter. The upper end of the jet-pipe is also closed, but is perforated with a series of small holes, thus forming a strainer, which prevents extraneous matters from entering and stopping up the jet-orifice.

It is evident the jet-tube would not allow sufficient water to pass for more than a limited supply. It therefore becomes necessary to provide means for greatly increasing the quantity of water which may be passed through the apparatus when desired, and this result is obtained through the agency of the weighted piston-valve L, which reciprocates in the valve-case M. This valve-case is secured to the top of the case A, and communicates with the wheel-chamber through an orifice, *k*, the lower end of which opens into the adjustable discharge-pipe N, inclosed in the case N′, depending from the under side of the case A over the floats of the measuring-wheel. A stem, O, attached to the pipe N, passes through the case A, and is provided at its outer end with the segment-gear P; or it may extend through to the outer casing and be provided with an index and pointer, by which its position relatively to the floats of the wheel may be varied. Access to this gear is obtained through an orifice in the case C, closed by the plug *l*.

It will be apparent that by changing the inclination of the pipe N the flow of water through it will be made to strike the floats of the measuring-wheel with more or less force as the angle formed by the floats with the jet of water approaches to or departs from a right angle, thus enabling the device to be readily adjusted, so as to measure correctly. Attached to the valve L is a stem, *m*, the outer end of which is notched to receive the rod *n*. This rod is secured at its opposite ends to the upwardly-projecting ears *p* of the semicircular pivoted weight R. This weight partly encircles the case A, and when at rest holds the piston-valve in the position shown in Fig. 2, thus preventing any flow of water through the valve-casing M; but if water be drawn in great quantity from the wheel-chamber, thereby reducing the pressure upon that side of the valve, the pressure of the water in the outer chamber will force backward the valve, and allow the water to pass through the pipe N to the wheel, which, of course, accelerates its motion, causing it to register correctly the increased amount of water passing through the apparatus.

Modifications of the measuring-wheel and devices for applying the water to it are shown in Figs. 4, 5, and 6 of the drawings, and may, either of them, take the place of the corresponding device in the machine, as heretofore described, without changing the conditions which govern its action or preventing a correct registration of the water passing through it.

It will be apparent that this apparatus affords the same facility of adjustment to give different speeds to its measuring-wheel that is found in all time-pieces. For instance, the watch has its balance-wheel running in a fluid—viz., air—a mainspring to give the power, and a regulator. So, in this apparatus, the measuring-wheel running loosely is the balance, the reservoir of water the power, and the adjustable chute forms the regulator, the whole forming a device capable of giving as exact a registration of the water or other fluid passing through as the watch does of passing time.

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

1. The weighted valve, in combination with the adjustable pipe N, as and for the purpose specified.

2. The adjustable pipe N, provided with stem O and segment-gear P, or their equivalents, in combination with the case N′, as and for the purpose set forth.

3. The supporting-bar attached to the case A, and carrying the step *a*, provided with pintle *a′* and openings *c*, substantially as and for the purpose specified.

4. In a water-meter, the combination of the constant jet, the weighted piston-valve, and the adjustable regulating-chute with the measuring-wheel and its attached registering devices, substantially as and for the purpose set forth.

5. In a meter for measuring water or other fluids, the measuring-wheel, constructed as shown and described, and running loosely in the chamber, in combination with adjustable chutes or supply-pipes, operating as set forth.

Lowell, July 17, 1877.

JONATHAN JOHNSON.

Witnesses:

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WM. H. EMERY.