2 Sheets--Sheet 1.

JOHN P. LINDSAY.

Improvement in Water-Meters.

No. 114,694. Patented May 9, 1871.

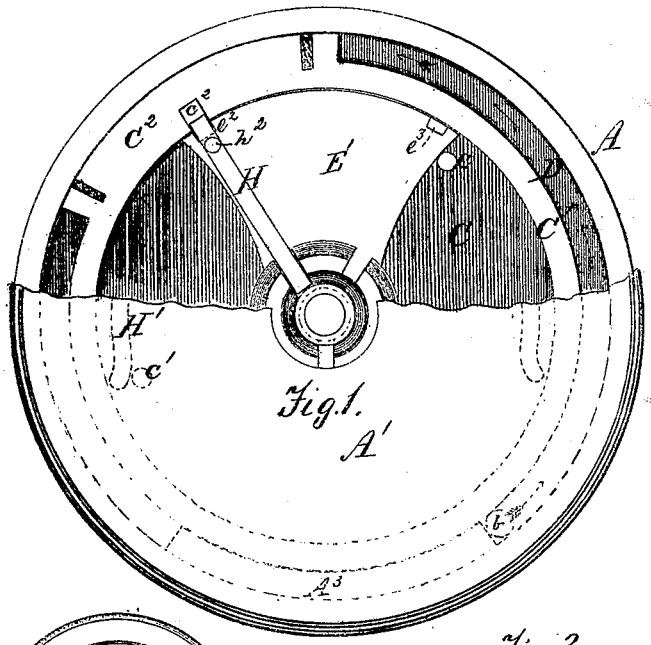


Fig. 1.

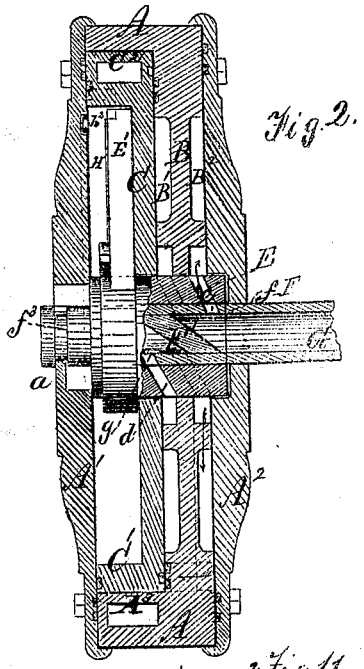


Fig. 2.

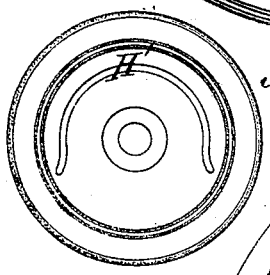


Fig. 4.

Fig. 3.

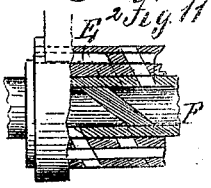
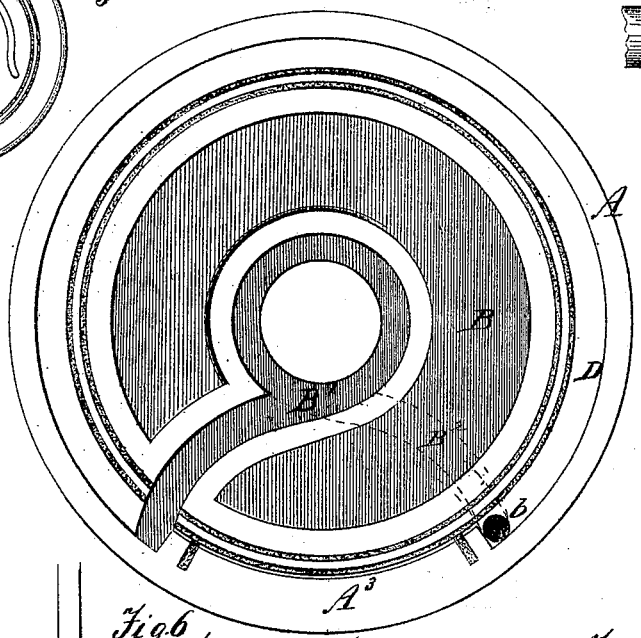


Fig. 11



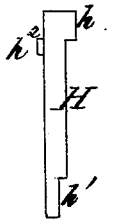


Fig. 5.

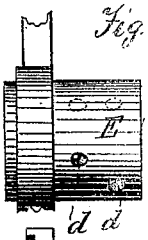


Fig. 10

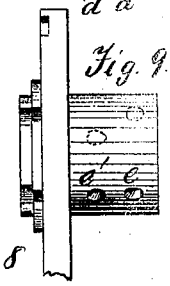


Fig. 9

Witnesses.
A. Ruppert
W. H. Gray

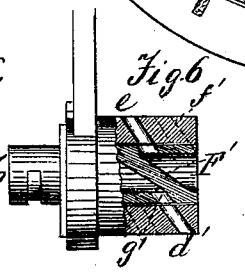


Fig. 6

Fig. 7

Fig. 8

J. P. Lindsay
Inventor
D. P. Holloway & Co
Attys

2 Sheets--Sheet 2.

JOHN P. LINDSAY.

Improvement in Water-Meters.

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Fig. 12.

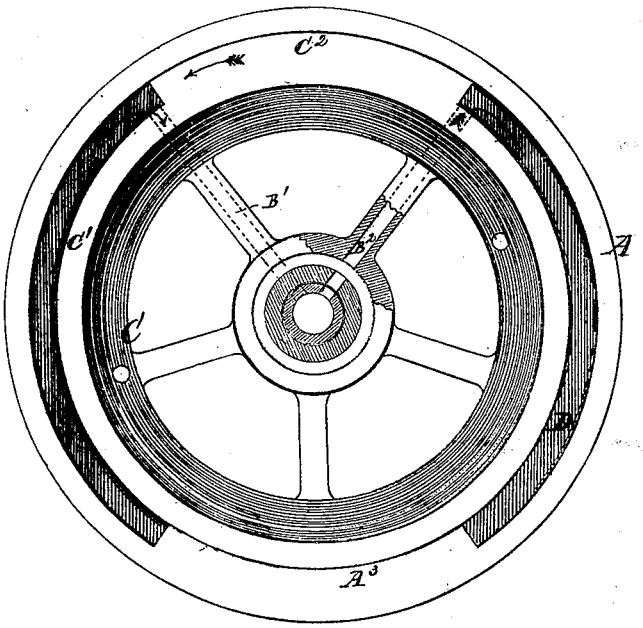
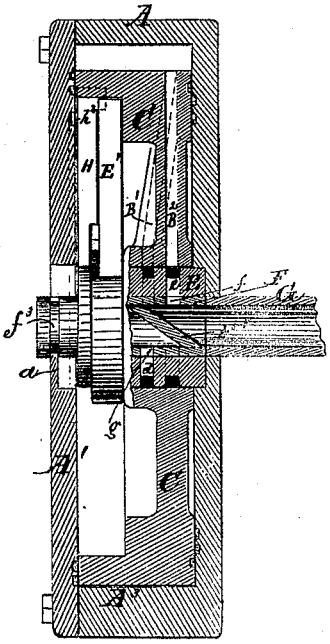


Fig. 13.



Witnesses.
A. Ruppert.
W. H. Grey

L. P. Lindsay
Inventor.
D. R. Holloway & Co
Att'ys

UNITED STATES PATENT OFFICE.

JOHN P. LINDSAY, OF NEW YORK, N. Y.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **114,694**, dated May 9, 1871; application filed April 20, 1871.

To all whom it may concern:

Be it known that I, JOHN P. LINDSAY, of the city, county, and State of New York, have invented certain Improvements in Water-Meters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawing making a part of this specification, in which—

Figure 1 represents a front elevation of the meter, portion of the front head being broken away to show the interior arrangement of the parts. Fig. 2 is an axial section, showing the valve partly in elevation. Fig. 3 is a rear elevation, the rear head and the valve being removed to show the water-channels in the diaphragm of the case. Fig. 4 is an elevation of the front head of the case, showing the inner side. Figs. 5 to 10 are illustrations in detail of the valve and trigger, to be hereinafter referred to. Fig. 11 represents a modification in the construction of the valve. Fig. 12 is an elevation, partly in section, showing a modification in the construction of the meter. Fig. 13 is an axial section of the meter, shown in elevation in Fig. 12.

The same letters of reference are used in the different figures in the designation of identical parts.

This invention, relating to water-meters, consists in various novel features of construction, combination, and arrangement of parts, which will be generally described in the following description, and specifically pointed out in the claims.

The operative parts of the meter are inclosed in a short cylindrical case, A, closed by heads at each end, the front one of which is marked A^1, and the rear one A^2. A solid diaphragm, B, is formed in the rear end of the case, coming in contact with the rear head A^2, as indicated in Fig. 2. In the space between this diaphragm and the front head A^1 an oscillating disk, C, is arranged, which is constructed with a circumferential flange, C^1, of such width as to snugly fit between the diaphragm and head of the case. The diameter of this disk is considerably less than that of the bore of the case, so as to form an annular chamber, D, between the two. This chamber is divided by a partition, A^3, secured to the rim of the case, and an enlargement or wing, C^2, on the oscillating disk. In the diaphragm B are formed channels B^1 and B^2, one upon each side, which encircle the valve passing through the center, and pass thence outward, and communicate with the water-chamber D, upon opposite sides of the partition A^3, a port, *b*, being bored through the diaphragm to connect the channel B^2 upon its rear side with the said chamber upon the opposite side. The flow of the fluid passing through the meter is controlled by a valve, which passes through the center of the case and oscillating disk, forming the axis upon which the latter turns. The valve is composed of a cylindrical hollow case, E, fitted with a tubular plug, F, which communicates at one end with the eduction-pipe G, and at the other end with the eduction-pipe not shown. The tubular plug is constructed with a solid diagonal partition, F′, and the end connecting with the pipe G has two induction-ports, *f* and f^1, cut through the shell, while upon the other side of the partition are formed the eduction-ports *g* and *g′*. The induction and eduction ports are formed upon opposite sides of the plug. Corresponding induction-ports *e* and e^1 and eduction-ports *d* and *d′* are cut through the case E, which upon the outside communicate with the annular portion of the channels B^1 and B^2, respectively. The arrangement of these ports in the plug and its case with reference to one another is such that when the induction-ports *fe* coincide so as to admit the fluid into the channel B^2, as shown in Fig. 2, the induction-ports f^1 and e^1 do not communicate; at the same time the induction-ports *d* and *g* coincide to discharge the fluid from the channel B^1, while communication between the eduction-ports *d′* and *g′* is shut off. In reversing the valve the ports assume the position shown in Fig. 6, and water now flows into the channel B^1, and is discharged from the channel B^2. That portion of the case E of the valve which protrudes through the oscillating disk C is constructed with a weighted wing or arm, E^1, by means of which the case is oscillated on the hollow plug, held stationary, for the time being, at the end of each stroke of the oscillating disk to change the position of the ports, and, consequently, reverse the flow of

the water through the meter. The extent of movement of the valve-case on the plug is controlled by studs c and c^1 on the disk. The valve E F turns during the greater portion of the stroke with the oscillating disk, to which it is, during that time, locked by means of a trigger, H, the enlarged end h of which enters the recess c^2 in the rim of the disk, and one or the other of corresponding recesses c^2 and c^3 in the weighted arm E^1 of the valve-case, while its reduced end h^1 projects into a notch, f^2, cut in a collar of the plug F. The trigger is constructed with a projecting stud, h^2, which plays in a groove, H′, formed in the interior side of the head A^1. This groove is of the proper length to permit of the required oscillations of the disk C, and is for the greater portion concentric with the axis of the latter; but near each end it is turned outward, as best seen in Fig. 4, in order to slide the trigger outward until both the plug and its case are unlocked from the disk. The meter being always arranged in the position substantially as shown in Fig. 1, the moment the valve-case is thus released from the oscillating disk its weighted arm E^1 will cause it to turn on the plug to the extent permitted by one or the other of the studs c or c^1, by which the farther movement of the arm is stopped. The valve having thus been reversed, the oscillating disk begins to move in the opposite direction, and the plug and valve-case are again locked to it, and travel with it to the end of the return stroke. A projection, a, on the head A^1, extends into a groove, f^3, in the plug F, as shown in Figs. 2, 7, and 8. The ends of this groove do not meet, it being only made of just sufficient length to permit the plug to travel with its inclosing-case up to the moment when it is released from the disk C. At that moment the projection a comes in contact with the metal between the ends of the groove f^3, and holds the plug stationary while the case turns on it.

In the modification shown in Figs. 12 and 13 the diaphragm in the case is dispensed with, and the channels B^1 and B^2 are formed in the oscillating disk, which is shown as constructed in the form of a wheel with spokes, two of which are made hollow to constitute the water-passages. In this case the ports of the valve-case open into an annular groove formed either in the case itself, as shown, or in the hub of the wheel, so that the ports will always communicate with the channel B^1 and B^2. These now open into the water-chamber D on opposite sides of the wing C^2 of the oscillating disk C.

The valve shown in Fig. 11 differs from that heretofore described, in having an annular chamber, E^2, formed in the metal of the case, into which chamber the water is discharged instead of into the other end of the plug. In the position of the parts shown in Fig. 2, the water flows from the induction-pipe G, through the ports e and f of the valve and channel B^2, into the water-chamber D, driving the oscillating disk in the direction of the arrows in Fig. 1, so as to force the water upon the other side of the wing C^2, through the channel B^1 and ports d and g of the valve, into the exhaust end of the plug F. On arriving at the end of the stroke in this direction, the valve is reversed in the manner set forth, and the water then flows, through the ports f^1 and e^1 and channel B^1, into the opposite end of the water-chamber D, driving the oscillating disk in the opposite direction to that indicated in Fig. 1, and causing it to force out the water before its wing C^2, through the channel B^2 and ports d' and g'. The water-chamber D must be made to hold a definite quantity of water, by weight or measure; and a suitable registering apparatus is to be connected with one of the moving parts of the meter to indicate the number of oscillations of the same, and the quantity of water passed through meter.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A water-meter containing a circumferential measuring-chamber, D, formed between the case and an oscillating disk, C, into which chamber the water flows alternately on one side or the other of a partition, A^3, to be discharged by the wing C^2 of the oscillating disk at the opposite side of such partition, substantially as set forth.

2. A water-meter containing the circumferential divided water-chamber A A^3, in which an oscillating wing, C^1, operates, and a valve arranged centrally within the chamber D to induct the water from the center to the circumference, and discharge it from the circumference through the center of the meter, substantially in the manner set forth.

3. The valve, composed of the hollow case E and tubular plug F divided by a partition, F^1, and containing two sets of induction-ports, $e\,f$ and $e^1\,f^1$, and two sets of eduction-ports, $d\,g$ and $d'\,g'$, to operate substantially as set forth.

4. The combination of the oscillating disk C, valve-case E, and tubular-divided plug F F′, arranged relatively to one another, as set forth, so that they will move conjointly during the greater portion of each stroke of the disk, and be released from one another near the end of each stroke, to permit the valve-case to turn on the plug held stationary for the time being to reverse the position of the stroke.

5. In combination with the notches e^2 and e^3 in the arm E^1 of the valve-case E, and notch f^2 in the plug F, the trigger H and cam-groove H′ in the head A^1 of the case, all arranged to operate substantially as set forth.

6. The combination of the oscillating disk C, wing C^2 thereon, and partition A^1 in the water-chamber D, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN P. LINDSAY.

Witnesses:
B. EDW. J. EILS,
C. N. CLAUSEN.