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JOHN S. BARDEN.

Water Meter.

PATENTED JUL 18 1871

Fig. 1.

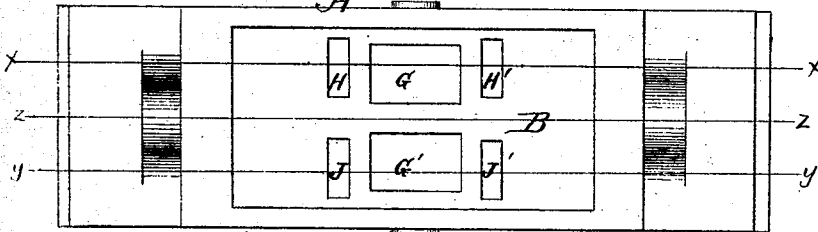


Fig. 2.

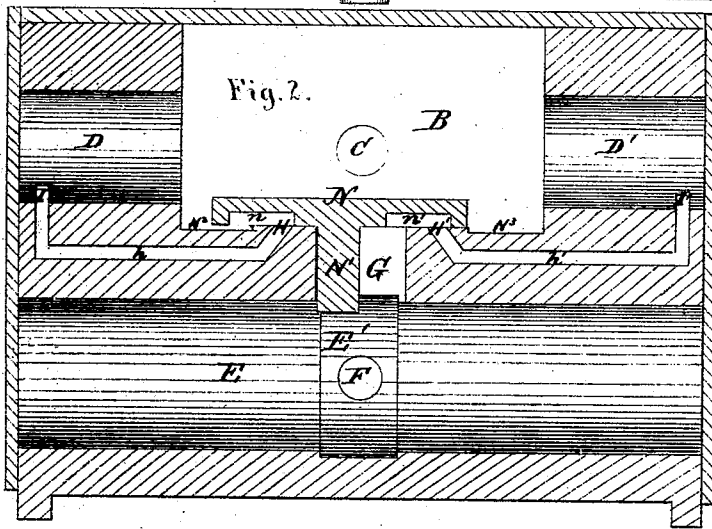


Fig. 3.

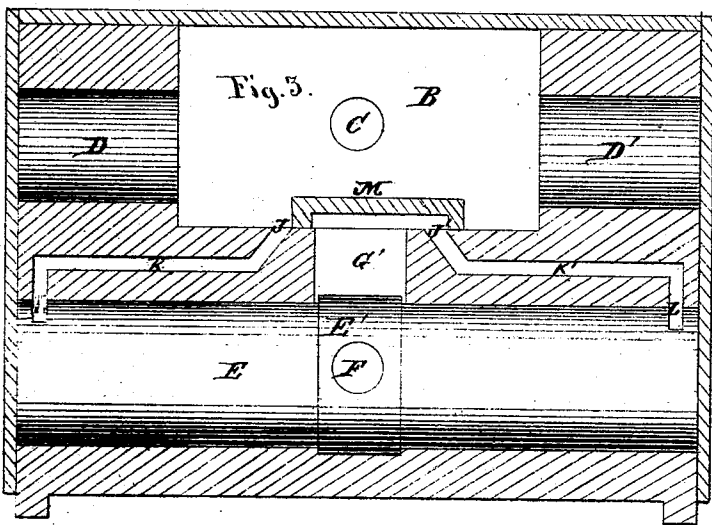
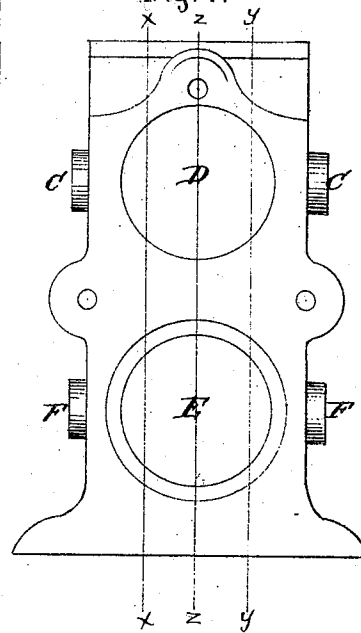


Fig. 4.



Witnesses.

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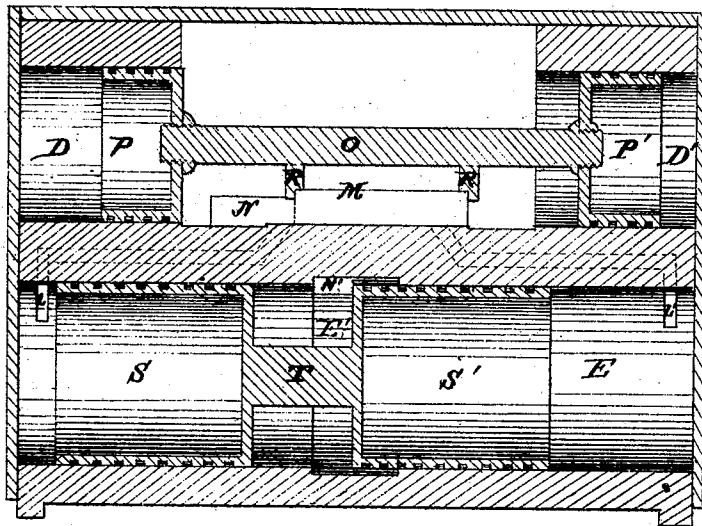
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Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN S. BARDEN, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. 117,035, dated July 18, 1871.

To all whom it may concern:

Be it known that I, JOHN S. BARDEN, of Providence, in the county of Providence and State of Rhode Island, have invented certain Improvements in Water-Meters, of which the following is a specification:

Figure 1 is a plan view of my invention with the top plate, pistons, and valves removed. Fig. 2 is a longitudinal vertical section through line *x x*, Figs. 1 and 4. Fig. 3 is a similar section through line *y y*. Fig. 4 is an end elevation with the end plate removed; and Fig. 5 a longitudinal vertical central section through line *z z*, Figs. 1 and 4.

This invention relates to that class of water-meters which employs two reciprocating pistons; and it consists in an arrangement of ports and valves, as will hereinafter more fully appear.

In the drawing, A represents the casing of the meter, in the upper portion of which is the chamber B, into which open the induction-ports C. D D' represent circular chambers opening into chamber B, and extending therefrom to the ends of meter A. E represents a circular chamber running from end to end of meter A below chambers B D D', and communicating with eduction-ports F. The chamber E is provided at its center with an enlargement, E'. G G' represent ports connecting chamber B to chamber E. H H' represent smaller ports in the bottom of chamber B, which ports communicate, through passages *h h'* and ports I I', with the outer ends of chambers D D'. J J' represent similar ports leading from the bottom of chamber B, through passages K K' and ports L L', to the ends of chamber E. M represents a D-valve, which is located on the bottom of chamber B, and is of sufficient length to connect either of the ports J J' with the port G', leaving the other port in open communication with chamber B, as shown in Fig. 3. N represents another valve, located beside valve M, and provided on its under side with a stem or projection, N¹, which extends downward through port G into chamber E. The valve N is provided on its under side with the passages *n n'*, which act to connect port G alternately with ports H H'. The bottom of chamber B is provided with recesses N² N³, which connect ports H H' alternately with the chamber B through passages *n n'* of valve N, as shown in Fig. 2. O represents a shaft connecting pis-

tons P P' which travel in the chambers D D' and are provided with annular grooves on their peripheries for water-packing. The shaft O engages with the valve M by means of projections R R, as shown in Fig. 5. S S' represent longer hollow pistons, which traverse chamber E and are connected by the neck T. The inner ends of pistons S S' impinge on the stem N¹ of valve N and reverse the position of the same with relation to ports G H H' and recesses N² N³ at every stroke of said piston.

In Figs. 2, 3, and 5 the connections of the parts are shown, as follows: The chamber D is connected, through port I, passage *h*, port H, passage *n*, and recess N², with the interior of chamber B, while the chamber D' is connected, through port I', passage *h'*, port H', passage *n'*, and port G', with the center of chamber E. At the same time the left-hand end of chamber E is connected, through port L, passage K, and port J, with chamber B, while its opposite end is connected with the induction-pipes F through port L, passage K', port S, valve M, and port G'. It will thus be readily seen that water entering chamber D through induction-ports C passes directly into chamber D through passage *h*, port I, &c., and, impinging against piston P, forces the same, together with piston P', toward the right-hand end of chamber D', displacing the water in the latter, which finds egress through port I', passage *h'*, &c., into the annular space E, and out at the eduction-ports F. Meanwhile the pistons P P', in making their right-hand stroke, carry valve M along to the position shown in Fig. 3, thus admitting water through port J, &c., to the left-hand end of chamber E, which forces pistons S S' toward the opposite end of the same, the water displaced by piston S' passing through port L', passage K', valve M, and port G', to the eduction F. The piston S, in making the above stroke, impinges against the stem or projection N¹ of valve N and carries the same along with it toward the right-hand end of the machine, and, when its stroke is completed, leaves said valve in a position the reverse of that shown in Fig. 2—that is, connecting chamber D', through passages *h' n'*, recess N³, &c., with chamber B, and connecting chamber D, through passages *h n* and port G, with the eduction F—thus admitting induction-water to chamber D' and driving pistons P P' toward the left-hand end of chamber D, the

exhaust from which passes out through passage *h*, &c. In this operation the pistons *P P'*, through their shaft *O*, reverse the position of valve *M*, connecting the right-hand end of chamber *E*, through passage *K'* and ports *L' J'*, with chamber *B*, and the opposite end, through ports *L J*, passage *K*, and valve *M*, with the eduction *F*, thus admitting water to chamber *E* through passage *K* and impelling pistons *S S'* toward the left, and piston *S'*, striking the stem *N'* of valve *N*, causes the latter to resume the position shown in Fig. 1. The operation is thus continued, the pistons *P P'* operating valve *M* in such manner as to reverse pistons *S S'*, and vice versa.

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

1. The chambers *B D D'*, in combination with chamber *E*, the latter being connected to chamber *B* by ports *G G'*, substantially as described.

2. The combination of port *G'*, valve *M*, ports *J J' L L'*, passages *K K'*, and pistons *P P' S S'*, with chambers *B, D, D'*, and *E*, substantially as described.

3. The combination of ports *H H'*, passages *h h'*, recesses *N² N³*, with pistons *P P' S S'* and valve *N*, substantially as set forth.

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

JOHN S. BARDEN.

Witnesses:

CARROLL D. WRIGHT,

CHARLES F. BROWN.