A. BERGSTROM.

PISTON WATER-METER.

No. 173,579. Patented Feb. 15, 1876.

Fig. 1.

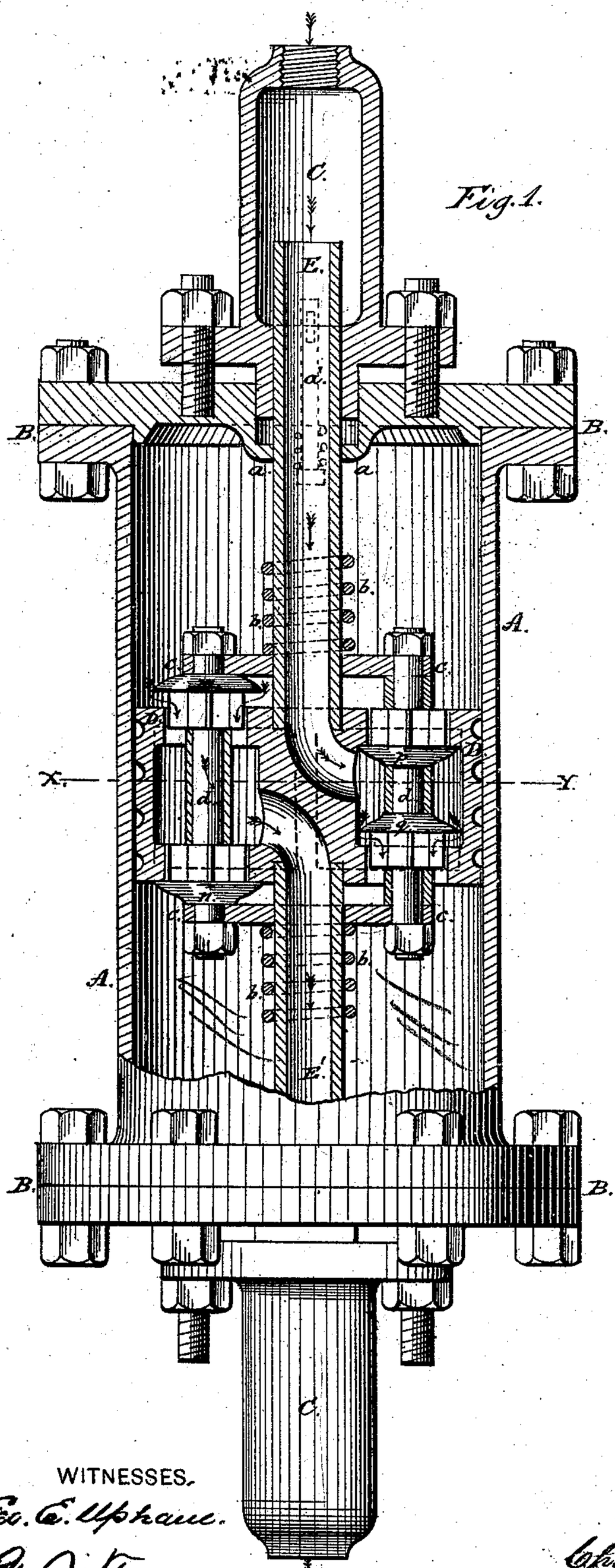
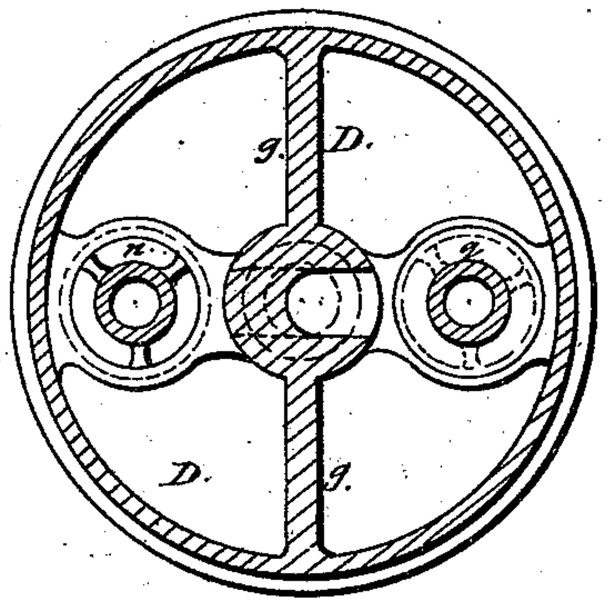


Fig. 2.



WITNESSES.

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ANDREW BERGSTROM, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN PISTON WATER-METERS.

Specification forming part of Letters Patent No. **173,579**, dated February 15, 1876; application filed January 13, 1876.

To all whom it may concern:

Be it known that I, ANDREW BERGSTROM, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and valuable Improvement in Piston Water-Meters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of longitudinal vertical section of my improved piston water-meter. Fig. 2 is a horizontal section in the line *x y* of Fig. 1.

My invention relates to improvements in that class of water-meters in which a piston is caused to reciprocate in a cylinder by the action or flow of water from the main; and it consists in the employment of a hollow piston reciprocating in a cylinder, and having a central diaphragm and puppet-valves, the stems of which are connected in pairs by yokes governed by elastic cushions or springs, and hollow piston-rods above and below the hollow piston through which the water flows, which open into the compartments formed in the piston by the diaphragm, whereby a reciprocating motion is given to the piston, as will be hereinafter more fully set forth.

In the accompanying drawings, A represents the cylinder of my improved meter, to the flanged upper ends of which the covers B, provided each with a central opening, are securely bolted. C is a stuffing-box, provided with a flange at its lower end, by means of which it is bolted to the upper cover B, as shown in the drawing. D is a hollow piston, divided by the diaphragm (see Fig. 2) into two compartments, one of which opens into the hollow piston-rod E′, the other being connected with the hollow piston-rod E, through which the water from the main passes, as shown by the arrows in Fig. 1. *m*, *n*, *p*, and *q* are puppet-valves on the valve-stems *d*, which are connected together by yokes *c*, on the upper faces of which elastic cushions, or spiral or other shaped springs, are applied. *a′* is a rod or bolt, slotted at its upper end for the reception of a lever, connected by suitable mechanism with a dial or indicator. The lower end of the rod *a′* is headed and encircled by a spiral spring bearing against the upper face of the bolt-head at its lower end, its upper end bearing against the lower face of the cylinder-head B. In the upward movement of the piston it strikes the head of the rod *a′* and causes a registration on the dial or indicator, and gives a similar indication or registration in the backward movement of the piston by the reaction of the spring.

The operation of my reciprocating water-meter is as follows: Water is introduced from the supply-pipe into the stuffing-box C, and passes thence through the hollow piston-rod E into one of the compartments in the hollow piston, and thence out of said piston into the lower part of the cylinder below the piston, the latter being supposed to move from the bottom of the cylinder A upward. Under this supposition the water above the piston D in the cylinder A is forced through the valve *m* into the interior of the piston D on opposite sides, and thence out through the hollow piston-rod E′, as indicated by the arrows, and at the same time the water enters the hollow piston through the upper end of the hollow rod E, and thence passes out through the valve *q* into the space below the piston until the elastic cushion or spring above the piston is compressed between the boss *a* on the inside of the head B and the yoke *c*, that connects the valves *m* and *p*. This action of the spring *b b* closes the valves *m* and *q* and opens the valves *n* and *p*. This movement of the valves reverses the direction of the movement of the piston D, which begins to descend. The water then passes from the cylinder below the piston up through the valve *n*, and thence out through the hollow rod E′, as indicated by the arrows in Fig. 1, and at the same time the water from the upper part of the hollow rod E passes into the interior of the piston and thence out through the valve *p* into the upper portion of the cylinder A. A reciprocating movement is thus given the piston in the cylinder, a registration on the dial being made at every stroke of the piston.

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

1. The hollow piston D, having the diaphragm *g*, and valves *m*, *n*, *p*, and *q* on the

valve-stems *d d*, connected by the yokes *c c*, substantially as described, and for the purpose set forth.

2. The hollow piston D, provided with the diaphragm *g* and valves *m*, *n*, *p*, and *q*, in combination with the hollow piston-rods E E′, substantially as described, and for the purpose set forth.

3. The hollow piston D, constructed as set forth, in combination with the elastic cushions or springs *b b*, bearing on the yokes *c*, and counterbalancing the pressure of the water by reversing the valves, substantially as described.

4. The cylinder A, provided with the stuffing-box C, in combination with the hollow piston D, having the diaphragm *g* and puppet-valves, connected by yokes, and springs *b b*, substantially as described, and for the purpose set forth.

5. The combination of a spring and puppet-valves, in a water-meter, whereby the spring cushions against said valves, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ANDREW BERGSTROM.

Witnesses:
P. O. CHILSTROM,
E. W. WILSON.