No. 111,234. PATENTED JAN. 24, 1871.

C. MOORE.

LIQUID METER.

Fig. 1

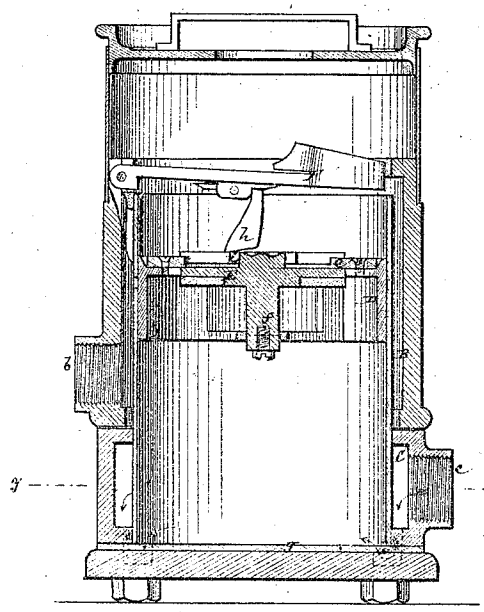


Fig. 2

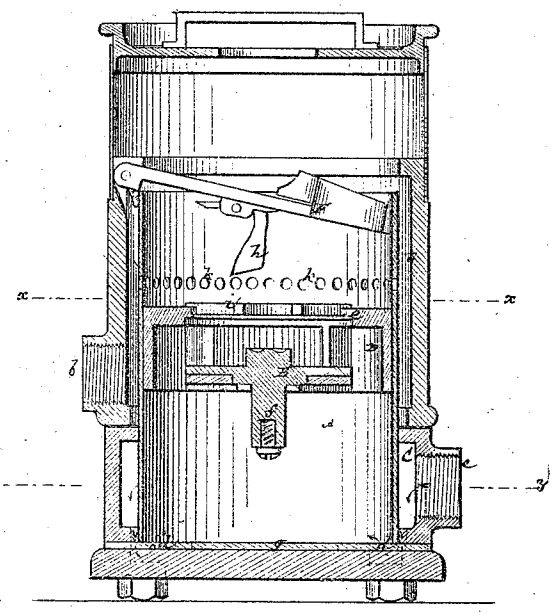


Fig. 3

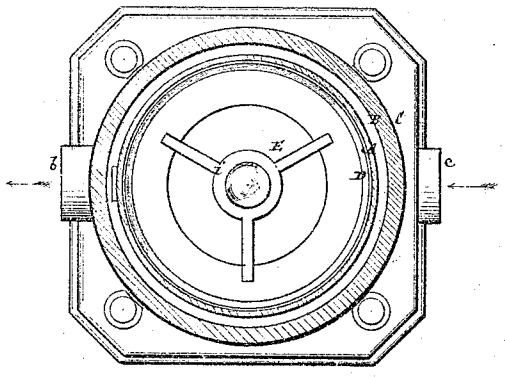


Fig. 4

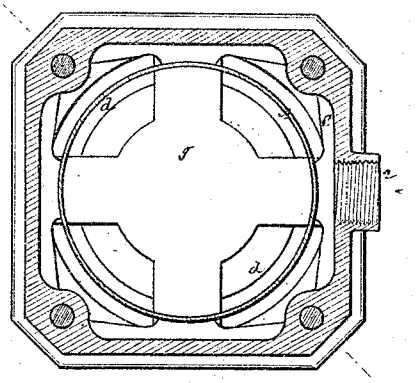
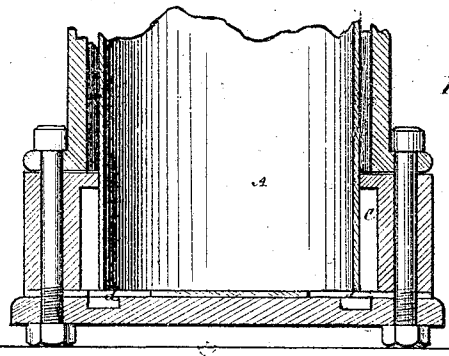


Fig. 5



Witnesses

Fred. Haynes

Ford Funch

Charles Moore

C. Moore,

Liquid Meter.

No. 111,234. Patented Jan. 24. 1871.

Fig. 1.

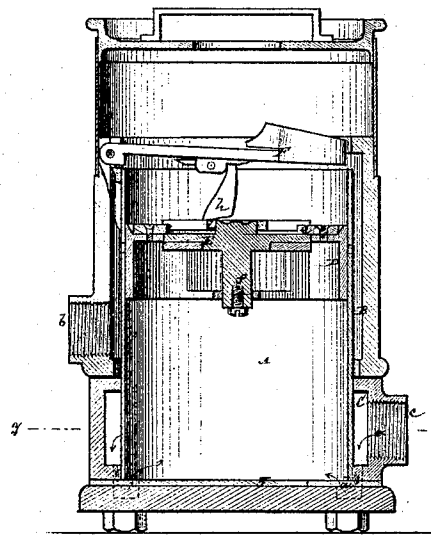


Fig. 2.

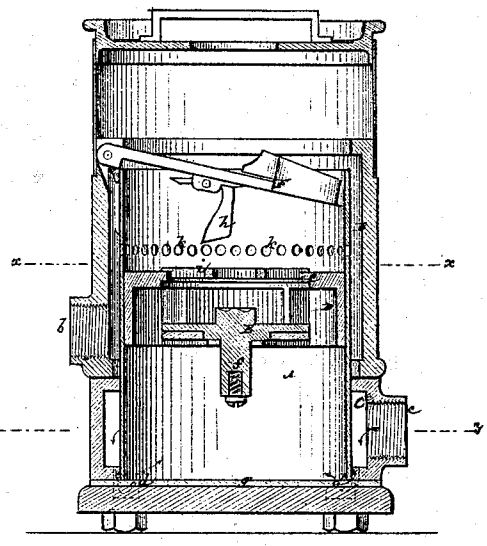


Fig. 3

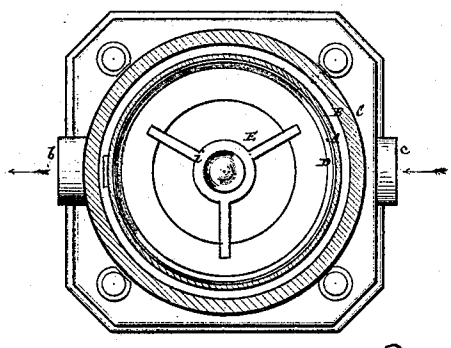


Fig. 4

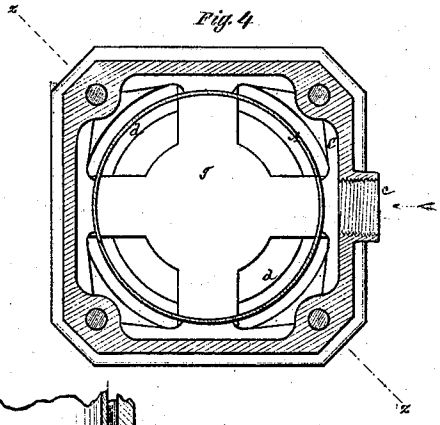
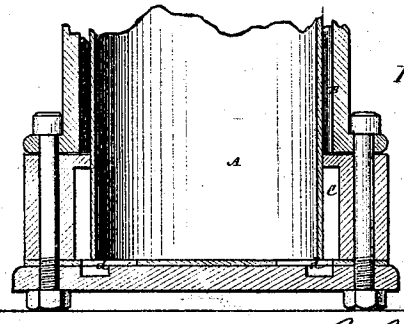


Fig. 5



Witnesses

Fred. Haynes

Fred. Haynes

Charles Moore

UNITED STATES PATENT OFFICE.

CHARLES MOORE, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM TOBIN, OF SAME PLACE.

IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. **111,234**, dated January 24, 1871.

To all whom it may concern:

Be it known that I, CHARLES MOORE, of the city, county, and State of New York, have invented a new and useful Improvement in Liquid-Meters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification, and in which—

Figures 1 and 2 represent vertical sections of my improved meter; Fig. 3, a horizontal section of the same through the line *x x* in Fig. 2; and Fig. 4, a further horizontal section through the line *y y* in Figs. 1 and 2. Fig. 5 is a vertical section, in part, through the line *z z* in Fig. 4.

Similar letters of reference indicate corresponding parts.

My invention, although mainly designed for measuring water, and it will here be described accordingly, is equally applicable to measuring other liquids or fluids.

The leading feature of novelty consists in a piston arranged to reciprocate in a free or independent manner, as regards any controlling mechanical attachments, within a vertical cylinder, and fitted with a valve that, when open, admits of the passage of the water through the piston from below, and which is only open in the descent of the piston, the latter being lifted by the pressure of the ingress-water, but falling by its own weight, and, by its action, in common with its valve, causing the passage of the water through the cylinder to be always in the same direction.

To effect such action the invention includes certain automatic devices or arrangements for closing the valve when the piston arrives at the bottom of its stroke, and for keeping it closed in its ascent, and for opening the valve when the piston arrives at the top of its stroke, and keeping it open during the descent of the piston.

The cylinder, which communicates at or near its top with an exhaust passage or chamber, may also be provided with an escape opening or openings at or about the extremity of the top stroke of the piston, to provide against injury to the meter in case of the valve carried by the piston sticking or not being opened at the proper time.

Referring to the accompanying drawing, A represents a vertical cylinder, that may be made of sheet-metal tubing. This cylinder is open to or in communication at its top with an outer water-case, B, which forms an exhaust-chamber, and has connected with it an outlet, *b*. The lower portion of the cylinder A is fitted within a base-chamber, C, which receives the inlet-water by a branch, *c*, and from which said water is introduced to the cylinder through its bottom by passages *d*, made in the base portion of the meter. The upper portion of the meter is formed by an extension of the case B, and in it may be arranged the registering mechanism, which may be of any suitable description and be operated either directly or indirectly by the piston of the meter. D is said piston, arranged to work within the cylinder A, and provided with a valve, E, opening downward, *e* being the valve-seat. This valve should be of such area and the piston be so constructed that when the valve is down or open, a free escape is afforded for the water through the piston from below to the chamber B.

The piston D is made of greater weight than the valve E, so that when said valve is closed against its seat *e*, as it is during the ascent of the piston, the weight of the latter will tend to keep the valve closed. Such valve is closed as the piston in falling approaches and reaches the bottom of its stroke by the stem *f* of the valve, or a lower attachment thereto, coming in contact with the upper face of the base-plate of the meter, or of a rubber cushion and packing, *g*, thereon. Thus or otherwise suitably closed, the valve E is kept shut in or during the ascent of the piston by the superior weight of the latter, the inlet-water in lifting the piston, when draft is made upon the exhaust, acting both upon the piston and valve, in such manner as not to disturb their closed relation. Upon the piston D, however, approaching the end of its upstroke it is made to receive upon it and lift a weighted lever, F, by means of a pivoted foot-piece, *h*, which, as the weight is lifted by the piston, rides over an inner rail or surface, *i*, on the piston, and finally rests upon the valve E inside of said rail, thus transferring the weight of the lever F from the piston D to the valve E. By this addition of the movable and transferable weight to the valve, the weight of the latter

is made superior to that of the piston, which causes the valve to drop or open, when the water freely rushes through the piston from below and the piston falls, carrying the valve in an open condition down with it till said valve is again closed by striking the bottom of the cylinder or surface constituting said bottom, when the piston ascends as before, again expelling the water above it. In this way a continuous discharge of water is kept up always in one or an upward direction through the cylinder A, and by properly estimating the area of the inlet relatively to the cylinder, and of the latter relatively to the opening in the piston covered by the valve, it will be easy to adjust the registering mechanism to record the quantity of water passing through the piston or out of the meter.

To provide against accident or injury to the meter, consequent upon the valve sticking or not opening as it should when the piston reaches the top of its stroke, I make in the cylinder A, at about the extremity or limit of the upstroke of the piston, one or more safety-openings, *k*, which, should the piston pass them, allow of water to pass off from below the piston, and thereby to arrest the motion of the piston.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination, with the cylinder A, of the meter, having inlet and outlet passages arranged to receive the liquid below and to discharge it above, with the free or independent piston D, provided with a valve, E, opening downward for operation, substantially as described.

2. The combination of the weighted lever F with the piston D and the valve E, closed at or toward the termination of the downstroke of the piston, as described, and opened by the weight or weighted lever F toward the termination of its upstroke, essentially as specified.

3. The arrangement of the safety opening or openings *k* in the cylinder A, in combination with the valvular piston D, substantially as specified.

CHARLES MOORE.

Witnesses:
FRED. HAYNES,
FERD. TUSCH.