

HENRY CHANDLER.

Improvement in Liquid-Meters.

No. 126,623.

Patented May 14, 1872.

Fig. I.

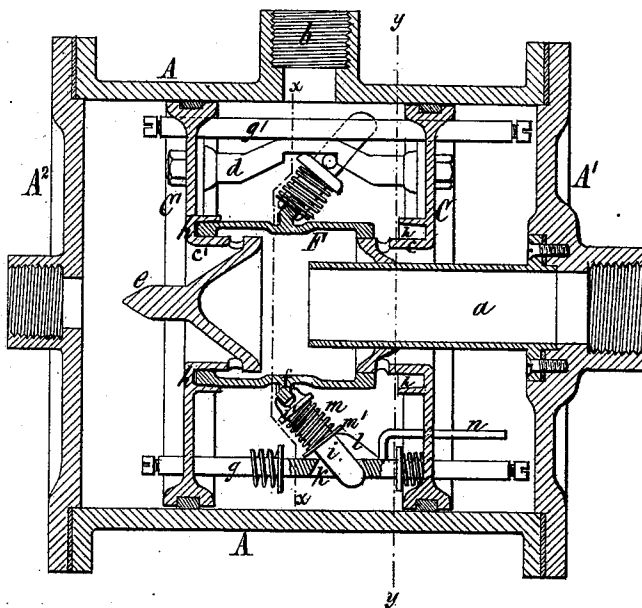


Fig. II.

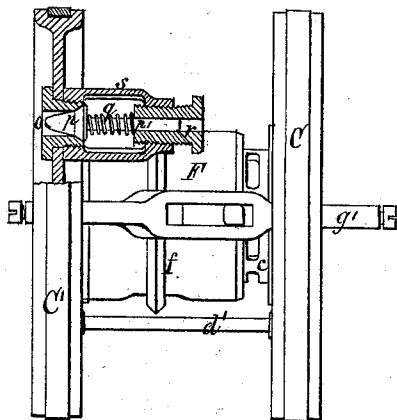


Fig. III.

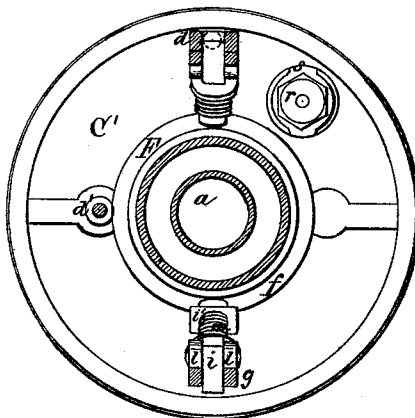
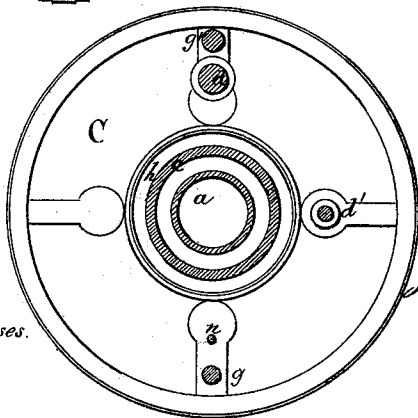


Fig. IV.



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Witnesses.

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IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 126,623, dated May 14, 1872.

SPECIFICATION.

I, HENRY CHANDLER, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Liquid-Meters, of which the following is a specification:

My improvements relate more particularly to a liquid-meter secured to me by Letters Patent of the United States, dated September 19, 1871, and numbered 119,076. The meter described in said patent consists generally of a single measuring-cylinder, in which reciprocates a hollow piston provided with a hollow valve, by which the passage of the water through the cylinder is regulated, for a full description of which reference is here made to the specification forming part of my said Letters Patent. My invention consists, first, in the combination, with the hollow valve and the heads of the hollow piston, of an annular groove or recess, arranged in each of the piston-heads, so that the hollow valve will enter with its respective end one of said grooves or recesses, at either extreme of movement, the water in said recesses operating as a cushion or buffer to lessen the concussion between the valve and piston-heads; second, in the combination, with the hollow valve and the sliding rod and arm by which the same is operated, of a spiral spring arranged around said arm, for keeping the same in contact with the valve, and two inclined bearings or lugs, against which said spiral spring abuts, so as to securely hold the valve in position, while allowing of a ready reversal of the same, as hereinafter more fully set forth; third, in the combination, with one or both of the heads of the hollow piston, of one or more automatic valves, arranged so as to allow a portion of the water, while actuating the piston, to pass directly to the discharge-nozzle, whereby the meter is enabled to pass a greater quantity of water than when provided with solid piston-heads, as hereinafter more fully described.

In the accompanying drawing, Figure I is a sectional elevation of the cylinder and piston of my improved liquid-meter. Fig. II is a partial sectional view of the piston. Fig. III is a section on line *x x*, Fig. I; and Fig. IV is a section on line *y y*, Fig. I.

Like letters designate like parts in each of the figures.

A is the measuring-cylinder; A^1 A^2 , the heads or covers thereof; *a*, the induction-pipe; and *b*, the discharge-nozzle. C C' are the heads of the hollow piston, and *c c'* their central hubs, provided with ports for the passage of the water. *d d'* are the stay-pieces which connect the heads C and C'. *e* is the pin or projection formed with the hub of the head C' for operating the registering mechanism. F is the hollow valve, sliding with its ends on the hubs *c c'*, and *g g'* the sliding rods by which the valve F is operated. *h* represents an annular groove or recess formed in the heads C C' around each of the hubs *c c'* in such manner that the valve F will enter with its respective end one of the grooves *h* at either extreme of its movement, as clearly shown in Fig. I. The grooves *h* are made of such width that an open space is left around the end of the valve when inserted in the groove, said space being proportionally small, so that the water cannot pass instantaneously through the same as it is being displaced by the valve entering the groove. The motion of the valve during its reversal is sudden, and if unchecked, as heretofore, it causes the valve to strike hard against either head of the piston. In entering the groove *h* the valve expels the water gradually therefrom, whereby its motion is retarded and the concussion greatly lessened. *i* is the arm which connects the sliding rod *g* with the valve F. Its upper end engages with the collar *f* of the valve, while its lower end fits loosely in a longitudinal slot, *k*, formed in the middle of the sliding rod *g*. *l* are two projecting bearings arranged on the rod *g* on each side of the slot *k*, their sides inclining toward each of the heads C C', as clearly shown in Fig. I. *m* is a spiral spring arranged around the arm *i*, bearing against a shoulder, *i'*, of the same, and resting, preferably by means of a washer, *m'*, on the lugs *l*. *n* is a rod attached to the rod *g* so as to pass through the head C, in order to prevent the rod *g* from turning. When the rod *g* strikes one of the cylinder-heads it is pushed back by the continued movement of the piston, and the spring *m* is compressed until the arm *i* has passed the vertical position, when the spring *m*, by its reactive force, reverses the valve, and, by engaging with the other incline of the bearings *l*, securely holds the valve in this position until it is again re-

versed. *o* in Fig. II represents an opening provided in the head *C'* of the piston so as to form a passage between the end of the cylinder and the space between the piston-heads, and *p* is an automatic valve which closes this opening. This valve is held against its seat by a spiral spring, *q*, arranged around the stem *p'* of the valve, so as to bear against a plug, *r*, which screws into the frame *s* secured to the head *C'*. By turning the screw-plug *r* the tension of the spring *q* can be regulated. One or more of these valves may be arranged in both of the heads of the piston.

The pressure of the water against the piston-head, in propelling the piston, opens the valve *p*, whereby a portion of the water flowing into the cylinder is allowed to pass directly through the orifice *o* into the space between the heads *C C'* and through the discharge-nozzle *b*. When the movement of the piston is reversed the ports in the hub *c'* are opened for the passage of the water, the pressure on the head *C'* is reduced, and the spring *q* closes

the valve. The capacity of the meter is in this manner increased without necessitating a proportionate increase of its dimensions, the apparatus operating in this case in the manner of a proportional meter.

I claim as my invention—

1. The combination, with the hollow valve and piston-heads, of the annular grooves formed in the latter, substantially as and for the purpose hereinbefore set forth.

2. The combination of the hollow valve *F*, sliding rod *g*, arm *i*, double-inclined bearings *l*, and spiral spring *m*, substantially as and for the purpose hereinbefore set forth.

3. The combination of the automatic valve *p* with the head of the hollow piston, substantially as and for the purpose hereinbefore set forth.

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Witnesses:

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