

HENRY CHANDLER. Improvement in Meters.

119,076.

Patented Sep. 19, 1871.

Fig. I.

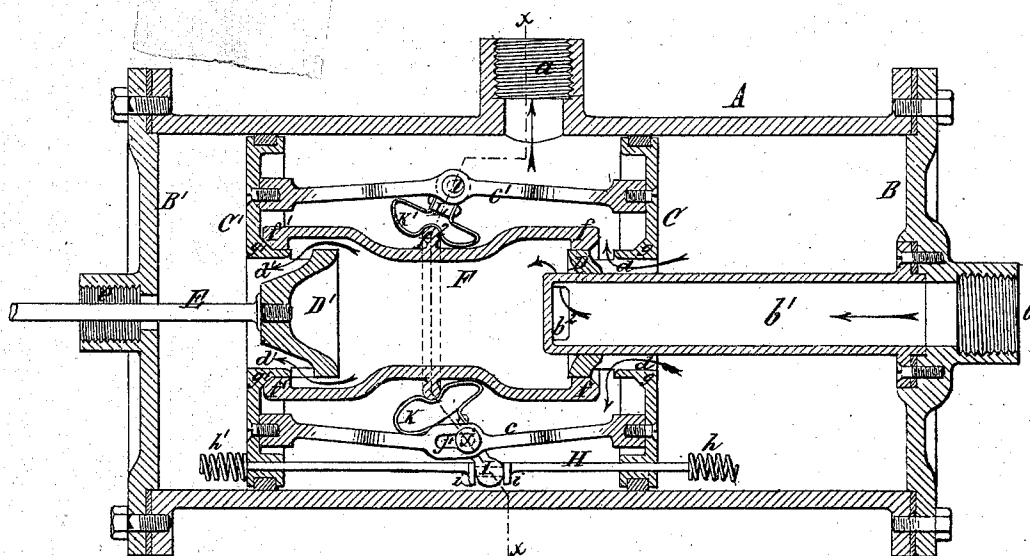


Fig. V.

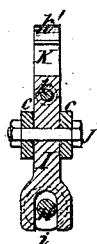
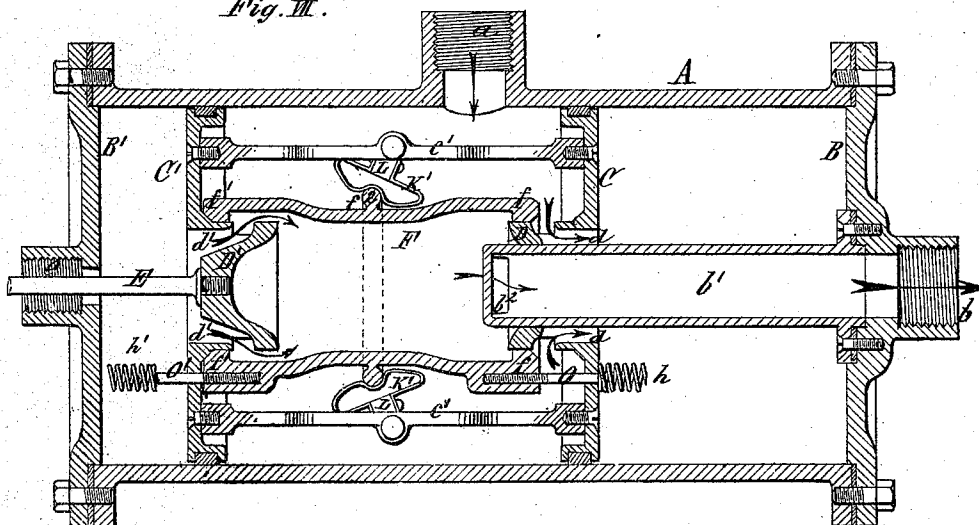


Fig. III.



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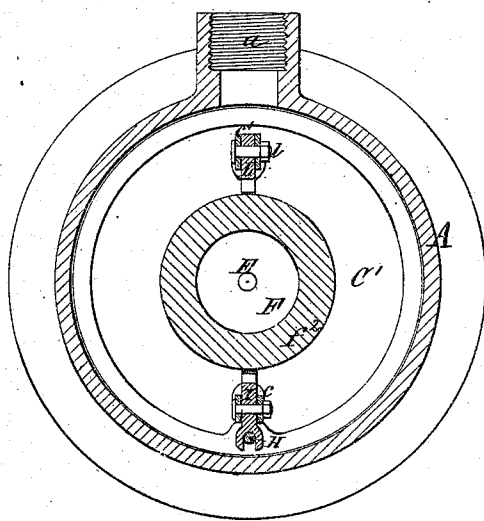


Fig. III.

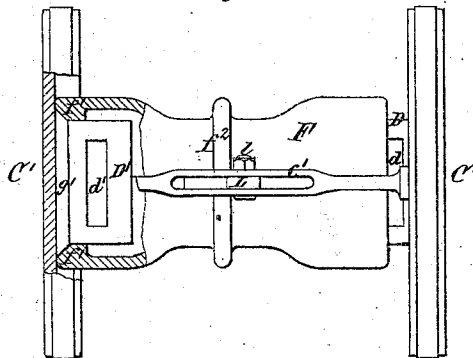
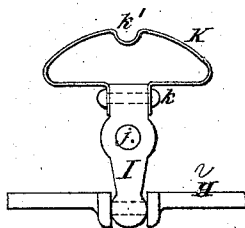


Fig. IV.



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Fig. VIII.

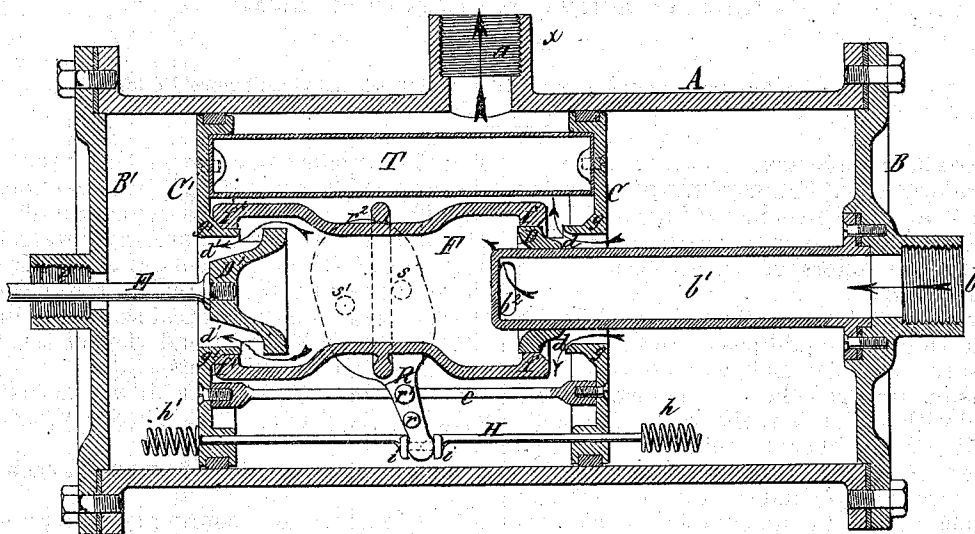


Fig. X.

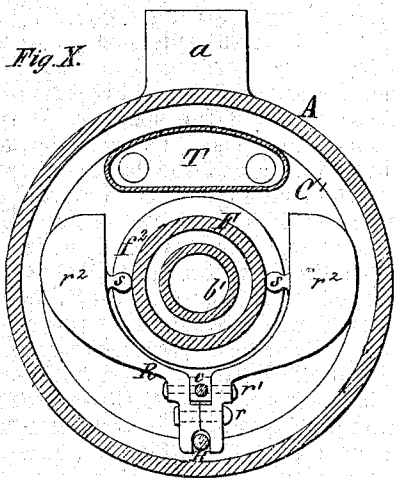


Fig. IX.

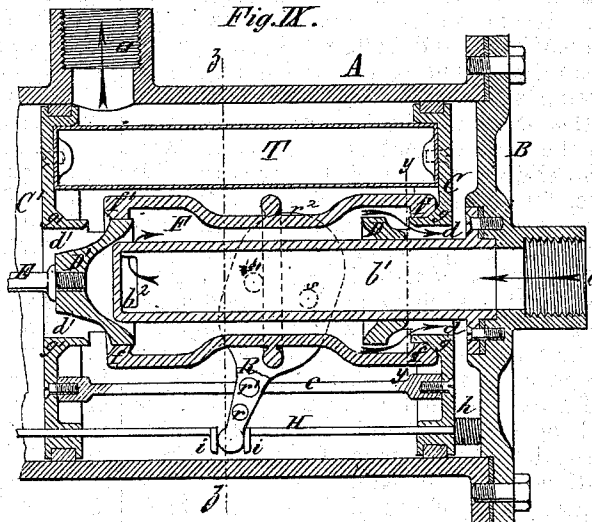


Fig. XI.

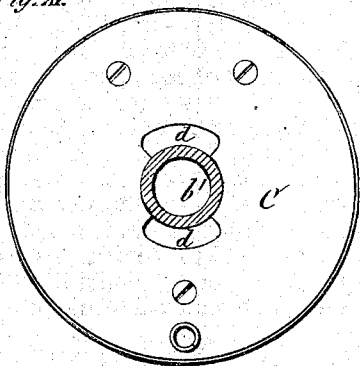
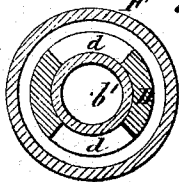


Fig. VII.



Henry Chandler Inventor
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Jas. J. Bonner Witnesses

UNITED STATES PATENT OFFICE.

HENRY CHANDLER, OF BUFFALO, NEW YORK.

IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 119,076, dated September 19, 1871.

To all whom it may concern:

Be it known that 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 invention relates to that class of liquid-meters in which the liquid passes through a single measuring-cylinder and actuates a reciprocating piston arranged therein, the piston being connected with a suitable registering mechanism for recording the number of strokes of the piston. My invention consists: First, in the combination with the measuring-cylinder, provided with an axial induction-pipe and an eduction-spout in its side, of a hollow piston and a hollow valve arranged in the latter, substantially as hereinafter set forth. Second, in the combination, with the measuring-cylinder and hollow valve arranged in the piston, of a sliding rod and spring-lever for operating said valve in such manner as to reverse the same at the end of each stroke. Third, in the arrangement of a spring at each end of the sliding rod, which operates the hollow valve, for the purpose of accelerating the reversing movement. Fourth, in the combination, with a hollow valve, of a spring-arm pivoted to a stay-piece of the piston and engaging with said valve in such manner as to aid in reversing and retaining the same against longitudinal displacement. Fifth, in the combination and arrangement, with the heads of the hollow piston, of hubs provided with passages or ports alternately opened and closed by the hollow valve so as to regulate the passage of the liquid from the induction-pipe to the eduction-orifice. Sixth, in the arrangement of the pivot of the spring-lever connecting the sliding rod with the valve in a slot in the respective stay-pieces of the piston, in the manner and for the purpose hereinafter fully set forth.

In the accompanying drawing, Figure I is a longitudinal sectional elevation of my improved cylinder and piston for water-meters. Fig. II is a vertical section in line *x x*, Fig. I. Fig. III is a partly sectional top-plan view of the piston and valve. Fig. IV is a side elevation of the spring-lever which operates the valve. Fig. V is a vertical section of the same. Fig. VI is a section in line *y y*, Fig. IX. Fig. VII is a sectional eleva-

tion of a cylinder and valve-piston, through which the water passes in the opposite direction, as in Fig. I. Fig. VIII shows a cylinder and piston, in which the valve is operated by a weighted lever. Fig. IX is a fragmentary sectional elevation representing the piston at the end of the stroke. Fig. X is a vertical section in line *z z*, Fig. IX. Fig. XI is an end view of the piston with the induction-pipe in section.

All of these figures are drawn at half size with the exception of Figs. IV and V, which are of full size.

Like letters designate like parts in each of the figures.

A represents the measuring-cylinder, provided with two heads or bonnets, B B', which latter are tightly secured to its ends in the usual manner. *a* is the discharge-nozzle, arranged centrally between the heads B B' in the side of the cylinder. *b* is the induction-spout, arranged in the center of the bonnet B, and *b'* is the induction-pipe, forming a continuation of the spout *b*. It runs in the direction of the axis of the cylinder, and terminates in the center of the latter, where it is provided with orifices *b''*. C C' are two disks or heads connected by stay-pieces *c c'* and forming a hollow piston, which moves tightly in the cylinder A. D is a hub cast with the head C and fitting snugly on the induction-pipe *b'*, so as to slide thereon. *d* represents two or more ports provided in the hub D, so as to form a communication from the end of the cylinder on its interior to the space between the disks C C', and thence to the eduction-passage *a*. D' is a similar hub arranged on the inside of the disk C', and provided with ports *d'* corresponding with the ports *d*. The disks C C' are arranged at such a distance that, in any position which the piston may assume in the cylinder, the said disks will prevent communication of either end of the cylinder with the discharge-orifice *a*, except through the ports *d d'*. E is a piston-rod screwed into the hub D' and passing through the bonnet B', which latter is provided with an orifice, *e*, for that purpose. The rod E connects the piston with a registering mechanism of any common and well-known construction. F is a hollow cylindrical valve arranged between the disks C C', with its ends *f f'* fitting on the hubs D D' so as to slide thereon. The said ends are provided

with beveled faces fitting on seats g g' formed at the base of the hubs D D' . The valve F is of such length that when the ports d' have full communication with the interior of the valve, as shown in Fig. I, the ports d are fully opened to communicate with the interior of the piston and discharge-orifice a , and vice versa. f^2 is an outwardly-projecting collar or flange arranged around the valve in the middle, with which engages the mechanism that operates the valve. H is a rod passing through both the disks C C' and sliding therein. It carries at its ends, projecting outside of the piston, two springs, h h' , forming a continuation of the rod. This rod is provided at the center with two shoulders, i , between which engages therewith the lower slotted end of a lever, I , that is pivoted to the stay c at j . The upper end of this lever consists of an elliptical spring, K , riveted to the lever proper at k , and provided with a central depression, k' , by means of which it engages with the collar f^2 of the valve. The pivot j of the lever I is arranged in a horizontal slot, j' , formed with the stay c for a purpose presently to be explained. L is an arm pivoted to the stay c' at l , and provided with a spring, K' , corresponding with the spring K and engaging with the collar f^2 of the valve.

The operation of the above-described device is as follows: The water enters the measuring-cylinder through the spout b in the direction of the arrow, Fig. I, and passes through the orifices b^2 of the induction-pipe into the interior of the valve F . The latter being in the position represented in Fig. I, the water passes through the ports d' , fills the space between the bonnet or head B' and the piston, and forces the latter toward the opposite end of the cylinder. The water contained in the space between the bonnet B and the piston is forced through the ports d into the interior of the latter outside of the valve, and through the discharge-nozzle a . When the piston arrives near the bonnet B the spring h of the sliding-rod H touches said bonnet and gradually becomes compressed, at the same time moving the lever I with its pivot j to the opposite end of the slot j' , whereby the lever I attains a vertical position and the spring K becomes compressed. A further movement of the piston, assisted by the reaction of the springs h and K , causes the lever I to turn rapidly on its pivot, thereby changing the position of the valve F , and bringing it against the seat g , thus opening a communication from the induction-pipe and interior of the valve through the piston to the opposite end of the cylinder, and reversing the movement of the piston. The dead movement of the pivot j in the slot j' enables the respective spring at the end of the rod and the spring K to become compressed before the valve begins to move, so that when the valve begins to change its position the reaction of the springs will insure a complete reversal and prevent the valve stopping while covering the ports, which might otherwise occur, and whereby the movement of

the piston would be entirely arrested. The slot j' , furthermore, enables the lever I to assume a position of considerable inclination when the valve is at rest, thereby better securing the same against longitudinal displacement. When the return stroke of the piston is completed the valve is again shifted in the same manner.

In the device represented in Fig. VII the water enters the measuring-cylinder at the side, and is discharged through the opening in the bonnet. a is the induction-spout, and b' the discharge-pipe. The valve F is in this case operated directly by means of two rods, O O' , provided with spiral springs h h' . The shifting of the valve is accelerated and the valve held in place during the stroke of the piston by two arms, L L' , pivoted to stays c' c' , and provided with springs K' K' , which engage with the collar f^2 of the valve. The course of the water is indicated by arrows in the figure, and the operation of the device is obvious from an inspection of the latter.

Instead of the spring-lever a weighted lever may be used, in connection with the sliding rod H , for operating the valve, as shown in Figs. VIII to XI. In these figures R is a bifurcated lever, preferably made in halves, riveted together at r . It is pivoted at r^1 to the stay c , and straddles with its upper ends r^2 the valve F . The ends r^2 are made of considerable weight, so as to preponderate, and are provided each with two projections, s s' , which alternately engage with the collar G of the valve. The lower end of the lever R straddles the sliding rod H , and fits between the shoulders i formed thereon, and by which it is operated. T is an air-chamber secured between the heads C C' diametrically opposite the sliding rod H , for the purpose of reducing the weight of the piston and to serve as a float to prevent the piston from turning and to retain the lever R in a vertical position.

In shifting the valve the action of the respective spiral spring at the end of the sliding rod H causes the weighted lever R to assume a vertical position before the ports are closed by the valve, when the reaction of the said spiral spring, in connection with the preponderating upper ends of the lever R , will quickly cause a reversal of the position of the valve. The lever R retains the valve in place during the stroke in an obvious manner.

By supplying my improved cylinder with steam it may be used as a motive power in place of the ordinary steam-engine.

I claim as my invention—

1. The combination, with the cylinder A , pipe b^1 , and spout a , of the piston C C' and valve F , substantially as hereinbefore set forth.
2. The combination, with the cylinder A , piston C C' , and valve F , of the sliding rod H , lever I , and spring K , substantially as hereinbefore set forth.
3. The combination and arrangement of the springs h h' with the sliding rod H , spring-lever I K , valve F , piston C C' , and cylinder A , as hereinbefore set forth.

4. The combination of the spring-arm K' L with the valve F, projection f^2 , stay-rod c' , and piston C C', as hereinbefore set forth.

5. The combination in a cylinder, and with the piston C C', valve F, and induction-pipe b^1 , of the hubs D D' provided with ports $d d'$, arranged so as to operate as hereinbefore set forth.

6. The pivot-slot j' in the rod c , arranged with the valve-shifting spring-lever I K, valve F, and sliding rod H, as hereinbefore set forth.

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Witnesses:

JAY HYATT,

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(39.)