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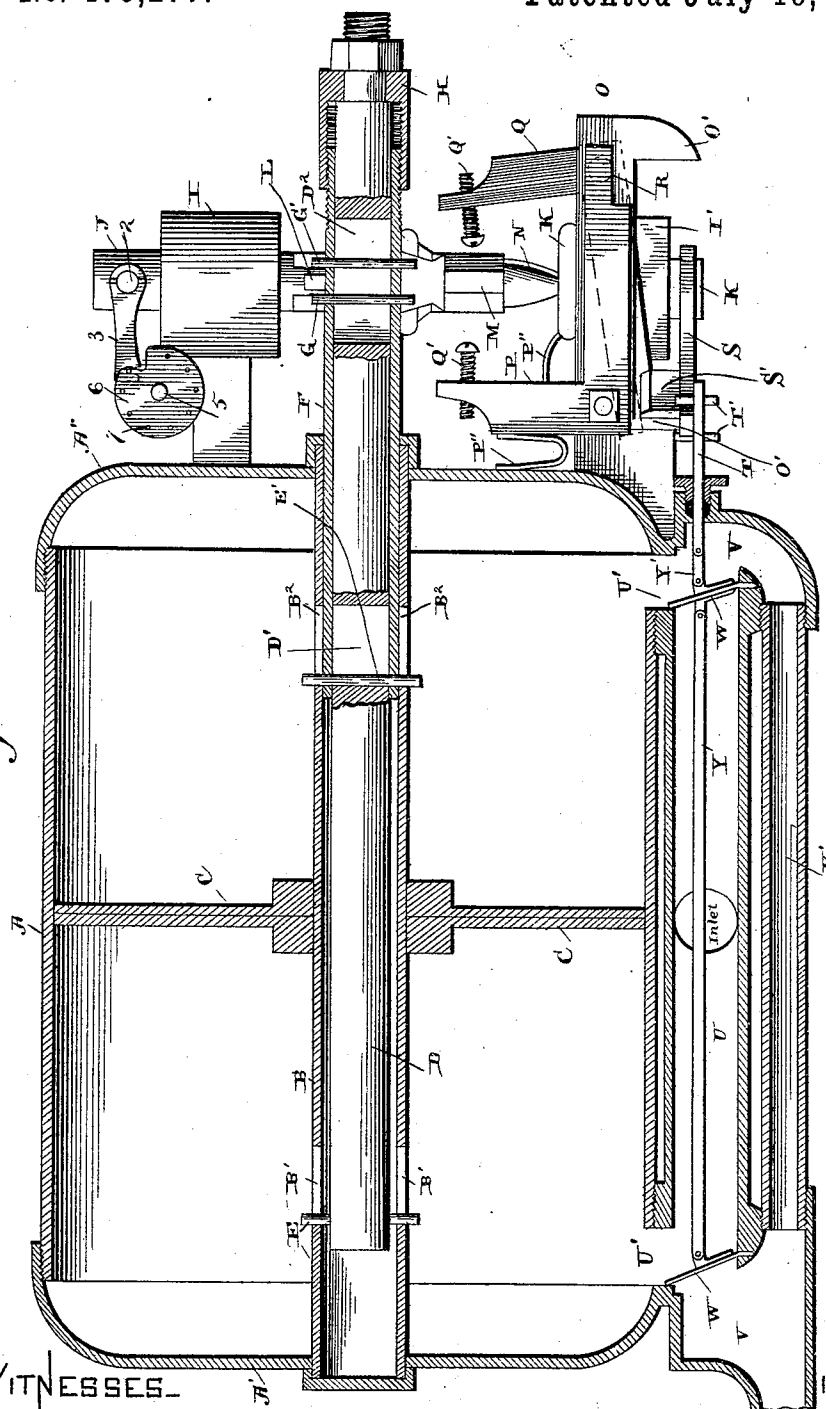
2 Sheets—Sheet 1.

F. W. HOLT.
FLUID METER.

No. 479,277.

Patented July 19, 1892.

Fig. 1.



WITNESSES—

Geo. C. Frech.
Robt. A. Fitzgerald

INVENTOR—

F. W. Holt
per
Lehmann Patterson & Resbit
attys

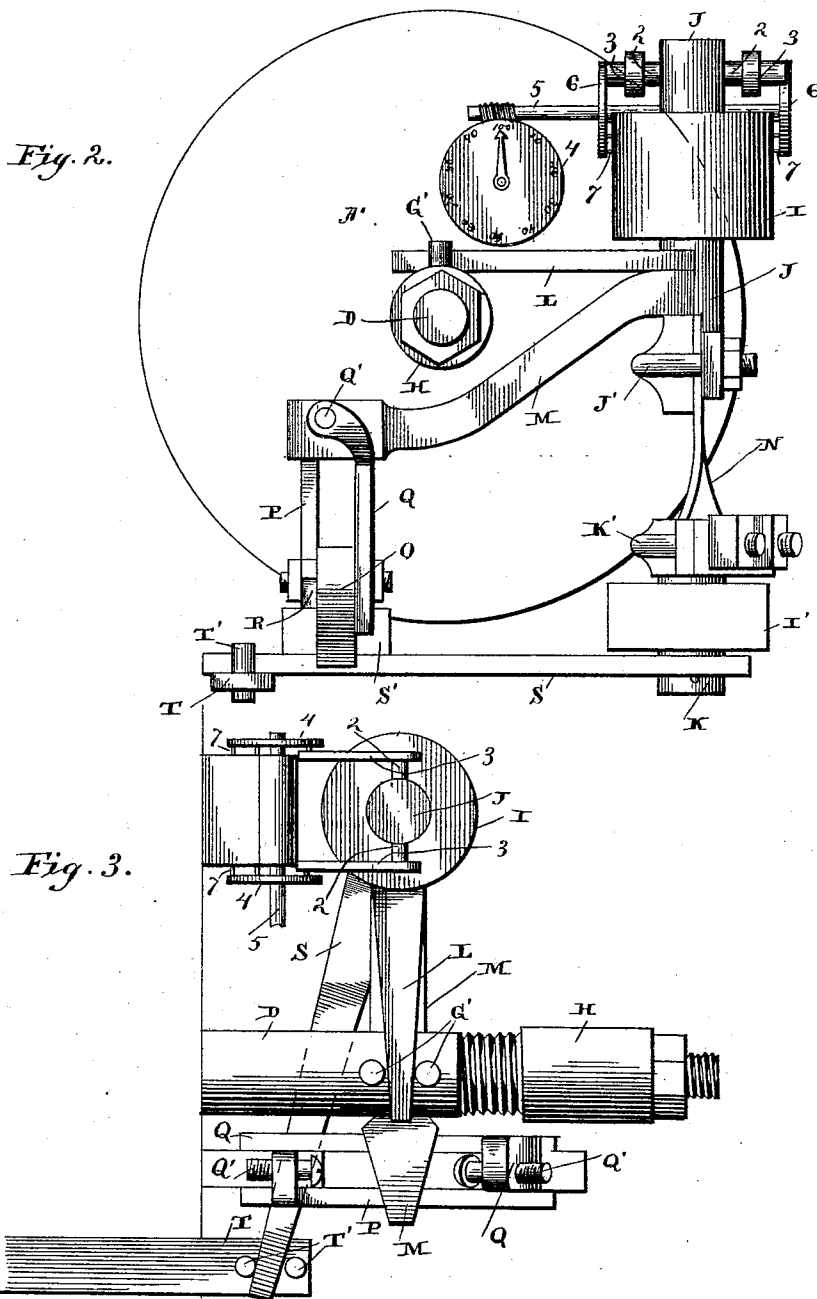
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UNITED STATES PATENT OFFICE.

FREDERIC W. HOLT, OF ST. GEORGE, CANADA.

FLUID-METER.

SPECIFICATION forming part of Letters Patent No. 479,277, dated July 19, 1892.

Application filed January 25, 1892. Serial No. 419,214. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC W. HOLT, of St. George, New Brunswick, Canada, have invented certain new and useful Improvements in Fluid-Meters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in fluid-meters; and it consists of a cylinder, a piston moving therein, an outwardly-projecting rod operated by the piston, and a registering and a valve-operating mechanism, which are set in motion by the rod, all of which will be more fully described hereinafter, and particularly referred to in the claims at the end of the specification.

My improved meter is of the piston type; and the invention therein contained refers more particularly to the novel manner in which the cylinder-valves are operated by the mechanism herein shown and described, in which the power for throwing the said valves is derived from a spring held in torsion.

The object of my invention is to construct a meter which will measure the quantity of fluid passing through it with great accuracy, the mechanism for accomplishing this result being extremely sensitive and capable of a very exact adjustment.

Referring to the accompanying drawings, Figure 1 is a side elevation of my improved meter, a portion of the same being shown in section. Fig. 2 is an end view of the same. Fig. 3 is a plan view of the registering and valve-operating mechanism.

A represents the cylinder, A' the cylinder-heads, and B the tubular piston-guide, which extends through the center of the cylinder and in which, between its center and each end, are formed the longitudinal slots B' B².

C represents the piston-head, which moves within the cylinder A upon the guide B. Within the guide B is the piston-rod D, having a transverse pin E secured to its inner end, which extends through the slot B' in the guide B. The said rod is constructed with a longitudinal slot D' near its center, and toward the outer projected end of the rod is

formed the slot D². Surrounding the outer end of the rod D and extending into the guide B past the slot B² is the sleeve F, and extending through said sleeve and the slot B² is the transverse pin E'. Also secured to the sleeve F and extending through the slot D² are the pins or projections G G'. The outer end of the sleeve F is screw-threaded, and swiveled, as shown, upon the outer end of the rod D is the inwardly-extending interiorly-screw-threaded cap H, which engages the said screw-threaded end of the sleeve F, and by this means the sleeve is adjusted on the rod D, and the distance between the pins E E' is thus regulated. The piston-head C, moving on the guide B, engages the said pins in its reciprocating movement, which moves the rod D back and forth, which in turn operates the valve-throwing mechanism, presently to be described.

From the above it will be observed the length of the piston-stroke will be regulated by the distance between the pins E E', and this distance is regulated as described above.

Extending outward from the end of the cylinder are the bearings I I', and journaled therein, respectively, and in a line with each other are the short shafts J and K. Rigidly secured to the shaft J is the horizontally-extending arm L, the free end of which passes between the pins G G' on the reciprocating valve-rod D. Also secured to the shaft J and extending downward and outward therefrom is the trip-operating arm M. The adjacent ends of the shafts J K are connected by the torsion-spring N, which is secured thereto at its upper and lower ends, respectively, by the clamps J' K'.

Extending outward from the lower edge of the end of the cylinder and opposite the bearing I' is the support O, having downwardly-projecting steps O' at its inner and outer ends, as shown. Pivoted to the opposite sides and ends of the support are the L-shaped trips or latches P Q, which are notched upward at their outer ends, as shown at R. These trips are pivoted at their angles to the support O, and the horizontal arms thereof being larger than the vertical arms their tendency is to sag downward, and thus draw the vertical arms toward each other. Springs P'' are also employed, as shown,

pushing the said vertical arms toward each other. When the horizontal arms thus sag, an angular space is formed by the notches R and the projections O'. Mounted in the upper ends of the vertical arms of the trips P
5 Q are the inwardly-projecting set-screws Q', and extending between these set-screws is the outer end of the arm M.

Secured to the lower end of the shaft K is the horizontal arm S, which extends outward beneath the supports O and the trips, and secured to the upper face of this arm, immediately below the support O, is the stop or projection S'.

15 T represents the valve-operating rod, which is provided with projections T' near its outer end, between which the outer end of the arm S extends. Located directly beneath the cylinder A is the inlet-chamber U, which communicates at its ends with the opposite ends of the cylinder through the ports U'. The vertical
20 passage V also places the ports in communication with the outlet-chamber V'. The valves W are pivoted at their lower ends to the bottom of the chamber U, directly beneath the centers of the ports U', so that by moving the upper ends of the valves to one side the cylinder and outlet-chamber are placed in communication, and by moving
25 them to the opposite side the cylinder and chamber are connected, as will be readily understood. The said valves are connected by a link Y, pivoted thereto at its opposite ends, and the inner end of the rod T, which
30 extends through the wall of the passage V, is connected to one of the valves by a short link Y', thereby completing the union between the valves and their operating mechanism.

Secured to the upper end of the shaft J is the transverse pin 2, and pivotally connected
40 to the ends of this pin, on opposite sides of the said shaft, are the arms 3, notched at their outer ends. Secured to the end of the cylinder is a registering mechanism 4 of any preferred construction, which is set in motion or operated by the horizontal worm-shaft 5. This shaft is mounted on the upper side of the bearing 1 and secured thereto are the heads 6, and upon the inner faces of these heads are the inwardly-projecting pins 7, which are engaged
50 by the notched ends of the pivoted arms 3. The shaft J being vibrated, the toothed drums will be pushed forward or rotated by one of the arms 3, while the other arm is being drawn backward for a new hold, and vice versa, so that in each vibration of the shaft J the worm-shaft 5 is caused to partially revolve, which movement actuates the registering mechanism. The operation of the meter being the same whether the fluid be admitted in the right or left hand end of the cylinder, the movement of the various parts will be followed when the inlet-chamber U is in communication with the left-hand end of the cylinder
60 and the cylinder's right-hand end connected with the outlet. The valves being thus placed, as shown in Fig. 1, the outer end of the valve-

throwing rod is drawn inward and with it the outer end of the arm S. While in this position the stop S' on said arm is confined in the
70 angular space formed by the notch R on the trip Q and the inner projection O'. The said arm is thus locked and prevented from moving to the right. Fluid entering the left-hand end of the cylinder forces the piston C to the right, bringing it in contact with the pin E', secured to the rod D. The pressure continuing, the rod is moved also to the right and with it the free end of the arm L. By this means the shaft J is partially rotated. The
80 shafts J and K being connected by the spring N and the last-named shaft being held rigid by the locked arm S, it will be seen that the shaft J being thus rotated will twist the spring. The arm M, being connected to the shaft J, 85 will have the same movement as the arm L, and in being carried to the right as the rod D moves in that direction its free end will be brought in contact with the screw Q' on the upper end of the trip Q. The movement continuing, the trip will be tilted and the free end of its horizontal arm raised, releasing the stop S' on arm S. The latter being thus freed will be thrown to the right by the contraction of the spring N, drawing outward with it the valve-rod, which movement throws the valves
90 so as to release the fluid contained in the left-hand end of the cylinder and place its right-hand end in communication with the inlet or supply. The operation is then reversed, the arm S being held to the extreme right by the trip P and outer stop O' until released by the inward movement of the arm M. The shaft J being oscillated, the registering mechanism is set in motion, as above described. 95

The object of the screws P' Q' is to regulate the tension of the spring, and this having been adjusted the length of the stroke of piston is made to conform thereto by means of the adjustable sleeve on the rod. 100

The amount of fluid required in either end to move the piston the length of its stroke can be calculated, and the registering mechanism being moved alike by every partial rotation of the shaft J it will be seen that the amount of fluid which has passed through the meter can be ascertained with precision. 105

To avoid noise, all the pins and loose connections are covered with washers or cushions of suitable yielding tubing. 110

Having thus described my invention, I claim— 115

1. In a meter, the combination, with a cylinder, a slotted hollow guide therein, and a piston moving on said guide, of a projecting rod, which reciprocates in the guide, a stop secured to the inner end of the rod, an adjustable sleeve on said rod, a stop secured to the sleeve, both of said stops being engaged by the piston, and a registering and a valve-throwing mechanism, which are operated by the rod, substantially as shown and described. 125

2. In a meter, the combination, with a cylinder, a slotted hollow guide therein, and a 130

piston moving on said guide, of a projecting rod which reciprocates in the guide, a stop secured to the inner end of the rod, a sleeve on said rod, a stop secured to the sleeve, both of said stops being engaged by the piston, an interiorly-screw-threaded cap swiveled to the outer end of the rod and which engages the outer end of the sleeve, whereby the latter is made adjustable in relation to the rod, and a registering and a valve-throwing mechanism, which are operated by the rod, substantially as shown and described.

3. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a shaft journaled to one side of the rod, an arm secured to said shaft, which is loosely connected to the rod, a registering mechanism, which is actuated by the shaft, and a valve-throwing mechanism which is also operated by the shaft, substantially as shown and described.

4. In a meter, the combination, with a cylinder, a reciprocating rod, a piston, and a partially-revolving shaft which is operated by the rod, of a laterally-projecting pin in the upper end of the shaft, arms loosely connected to the opposite ends of the said pin, a worm-shaft, heads secured thereon which are engaged alternately by the said arms, a registering mechanism which is operated by the worm-shaft, and a valve-throwing mechanism, substantially as shown and described.

5. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a shaft which is partially rotated by the rod, a second shaft adjacent to the first-named shaft, a spring which is clamped at its opposite ends to the adjacent ends of the shafts, a valve-throwing mechanism which is operated by the said shafts, and a registering mechanism, substantially as shown and described.

6. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a shaft J, which is partially rotated by said rod, arm M on said shaft, a shaft K, a spring which connects the adjacent ends of the shafts, arm S, secured to shaft K, a valve-throwing rod which is reciprocated by the arm S, a locking mechanism for said rod, which is operated by the arm M, and a registering mechanism, substantially as shown and described.

7. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a

shaft J, which is partially rotated by the said rod, arm M, shaft K, a spring connecting the adjacent ends of the shafts J K, arm S, a valve-throwing rod reciprocated by the arm S, pivoted latches which lock the said rod at the ends of its stroke and which are engaged by the arm S, and a registering mechanism, substantially as shown and described.

8. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a shaft J, which is partially rotated by said rod, arm M, shaft K, a spring which connects the said shafts, arm S, a valve-throwing rod which is operated by said arm, pivoted latches having notched ends which engage the arm S at the end of its throw, inwardly-projecting set-screws on the opposite ends of the latches and which are engaged by the arm M, and a registering mechanism, substantially as shown and described.

9. In a meter, the combination, with a cylinder, a reciprocating rod, and a piston, of a shaft J, which is partially rotated by said rod, arm M, shaft K, a spring connecting said shafts, arm S, a valve-throwing rod operated by said arm, support O, having projections O', L-shaped latches pivoted to said support and having notched lower ends which engage and hold the arm S at the ends of its throw, set-screws in the upper ends of the latches, which are engaged by the arm M, and a registering mechanism, substantially as shown and described.

10. In a meter, the combination, with a cylinder provided with ports at its opposite ends and an inlet and outlet chamber arranged beneath the cylinder, which are in communication with said ports, of valves pivoted to the bottom of said inlet-chamber directly beneath the ports and which are adapted to close either the inlet or outlet chamber, a link extending through the inlet-chamber and pivotally connected at its ends to the valves, an outwardly-extending valve-operating rod, a piston, a reciprocating rod, and a registering mechanism actuated by said rod, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

F. W. HOLT.

Witnesses:

J. SUTTON CLARK,
JOSEPH MEATING.