C. Weed,

Piston Meter,

No. 53,509. Patented Mar. 27, 1866.

Fig. 4.

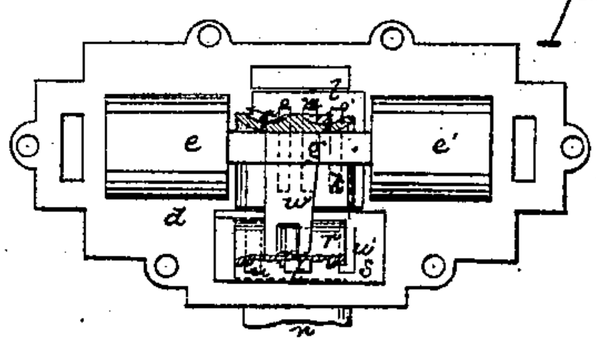


Fig. 3.

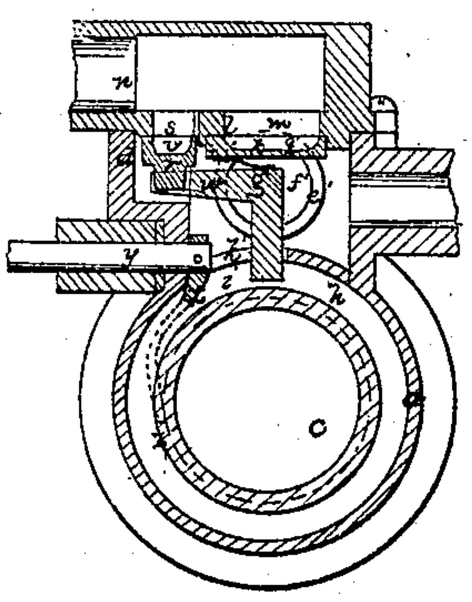


Fig. 1

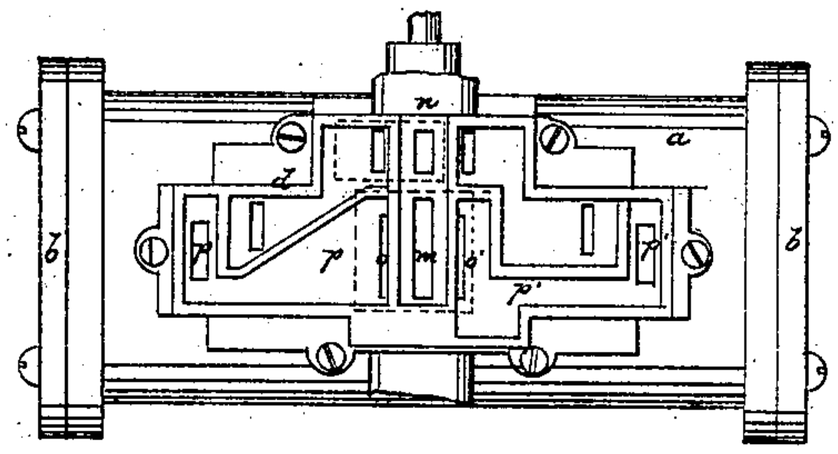
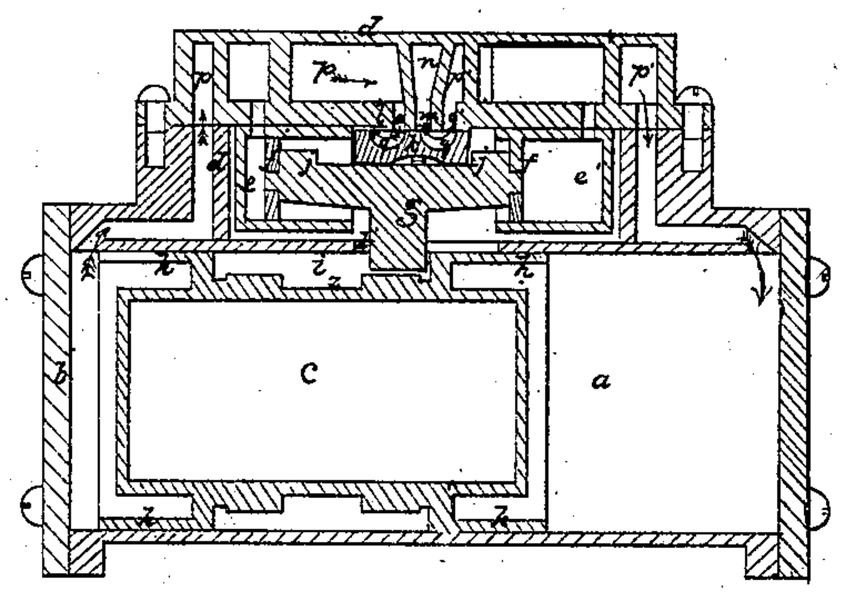


Fig. 2.



Witnesses

S. W. Hidden

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Inventor

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UNITED STATES PATENT OFFICE.

CHARLES WEED, OF BOSTON, ASSIGNOR TO HIMSELF AND J. S. SHAILER, OF ROXBURY, MASSACHUSETTS.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **53,509,** dated March 27, 1866.

To all whom it may concern:

Be it known that I, CHARLES WEED, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Water-Meter; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The invention relates to the construction of meters for measuring the water drawn from service-pipes, in cities and other places, for domestic consumption and for manufacturing and other purposes.

The object is to produce a cheap, simple, and effective meter, which will measure the water accurately and will not get out of order.

More particularly the invention relates to that class of meters in which a main or primary cylinder is employed to measure the water, said cylinder having a piston working in it from end to end, the water filling the opposite ends of the cylinder and exhausting from one end as the other fills, and the piston being worked by the action of the water.

The invention consists in the method of changing the valves to permit the pressure of the water as each end of the cylinder fills, to open the exhaust-valve passage and allow the escape of such water, and to open the valve of the opposite end to allow the ingress of the water.

The drawings represent a meter embodying the invention, Figure 1 showing a plan of the same with the upper plate or portion of the valve-chest removed; Fig. 2, a vertical, central, and longitudinal section of it; Fig. 3, a central cross-section; Fig. 4, a reverse plan of the valve-chest and valves.

a denotes the main cylinder, having a water receiving and measuring chamber at each end formed by the sides of the cylinder, the heads *b*, and the opposite ends of the piston *c*. Over the cylinder *a* is a valve-chest, *d*, in the lower part of which are two small cylinders, *e e'*, in which pistons *f f'*, attached to a cross-head or tappet, *g*, work.

The piston *c* is formed of a central part or double head, *c*, and two end pieces, *h*, which are ground to accurately fit and slide in the cylinder, there being a space, *i*, between their parts, into which the tappet *g* projects through an opening, *k'*, in the top of the cylinder, the piston, near the termination of its stroke in either direction, striking the tappet, and during the remainder of its stroke moving such tappet in such manner or to such extent as to shift the valves of the auxiliary cylinders *e e'*.

k denotes the valve of the main engine; *l*, the valve-seat thereof, having a central port, *m*, communicating directly with the inlet-pipe *n*, and two side ports, *o o'*, of the passages *p p'*, opening into the opposite ends of the main cylinder. The valve *k* has two recesses, *q*, which, by the movement or change of the valve, alternately form and break the communication between the port *m* and the ports *o* and *o'*, the movement of the valve which opens communication between the port *m* and either port *o* or *o'* also opening communication with the other port *o* or *o'* and the valve-chest and the outlet-pipe of the meter, allowing the exhaust of the end of the cylinder which has been filled.

The valve *r* of the auxiliary cylinders rests upon a valve-seat, *s*, in which are three ports, the central one, *t*, of which opens into the inlet pipe or passage *n*, and the side ports, *u u'*, into passages leading into the ends of the cylinders *e e'*. The valve *r* has a long recess, *v*, which, by movement of the valve, alternately establishes and breaks communication between the inlet-pipe and the opposite cylinders *e* and *e'*. This valve is actuated by an arm, *w*, which extends from the tappet *g*, as seen in Fig. 4, so that as the tappet *g* is struck and moved by the piston *c* the valve *r* will be slid upon its seat.

A crank or lever, *x*, extends from a shaft, *y*, down into a recess, *z*, between the parts *h* of the main cylinder, this shaft extending through the side of the box, and being connected with any suitable ratchet or index mechanism, by which the alternate vibrations or strokes of the crank-arm produced by the alternate movements of the piston shall be registered.

The change of the valves by which the piston *c* is operated and the opposite ends of the cylinder are alternately filled and discharged will be best understood from a description of the operation.

Suppose the parts to be in the position seen

in Figs. 1 and 4, in which it will be observed that the port *m* of the main valve-seat communicates with the port *o'* and the port *o* with the valve-chest and outlet-pipe. In this condition of things the end of the cylinder with which the port *o'* communicates will be filled with and the opposite end exhausted of water. The movement of the piston *c* from the opposite end of the cylinder toward the position shown will cause the arm *w* to slide the valve *r* and open communication between the port *t* and the port *u* leading to the auxiliary cylinder *e*, and as the main piston-chamber becomes filled the pressure of the water through the inlet-pipe and ports *t* and *u* and behind the piston *f* will drive said piston forward until one of the projections *j* on the tappet *g* strikes the main valve and shifts such valve, so that the ports *m* and *o* are thrown into communication and the port *o'* into connection with the outlet-pipe. The water from the inlet-pipe will then rush through the ports *m* and *o* behind the main piston and drive it to the opposite end of the cylinder *a*, in doing which the valve *r* will be again charged, the main valve will be again shifted, and so on, causing the opposite ends to be alternately filled and discharged, each throw of the piston being registered by the index mechanism operated by the shaft *y*. It will thus be seen that the movement of the main piston changes the valve of the auxiliary cylinder, and that the movement of each auxiliary piston changes the valve of the main cylinder, and that the arrangement by which this is effected is very simple and reliable, the construction enabling a meter to be used in all cases where the quantity of water used is so great as to render it advisable to measure its consumption.

It will also be observed that the valve of the auxiliary cylinders is operated by the movement of the main piston and the valve of the main cylinder by the movement of the auxiliary pistons, thus making the parts very few in number and the movements of the main piston creating the alternate filling and discharging of the measuring-chambers certain and accurate.

I claim—

The arrangement of the primary and auxiliary cylinders and valves by which the main piston, driven by the pressure of the water, operates the valve of the auxiliary cylinders and brings it into position to cause the pressure of water to operate alternately the pistons of the auxiliary cylinders, which in turn operate the valve of the main cylinder, substantially as described.

In witness whereof I have hereunto set my hand this 12th day of December, A. D. 1865.

CHARLES WEED.

Witnesses:

FRANCIS GOULD,

S. B. KIDDER.