

Improvement in Liquid-Meters.

Patented May 2, 1871.

Fig:4.

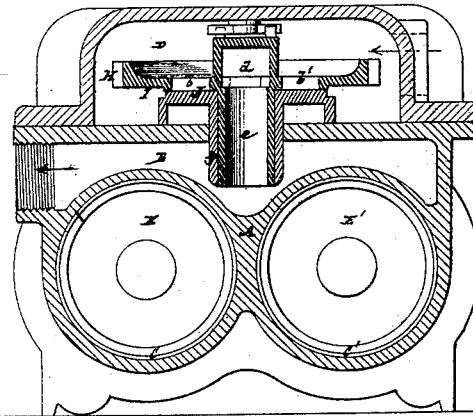


Fig:2.

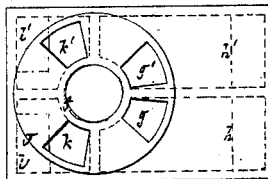
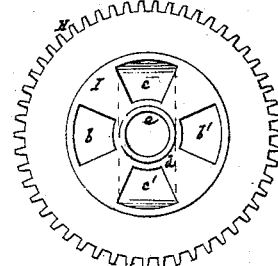


Fig: 5.



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Letters Patent No. 114,480, dated May 2, 1871.

IMPROVEMENT IN LIQUID-METERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, HENRY C. SERGEANT, of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Liquid-Meters; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a plan of a meter constructed in accordance with my improvement, with a valve-box or chamber that serves to receive the incoming liquid removed;

Figure 2 is a similar view, in part, with the valve removed;

Figure 3, a longitudinal section through the meter, taken mainly as indicated by the line *x x* in fig. 1; and

Figure 4, a transverse section through the line *y y*.

Figure 5 is an under or face view of the valve with gear-wheel attached, by which it is operated.

Similar letters of reference indicate corresponding parts throughout the several figures.

My invention relates to meters which employ two or more-reciprocating pistons, arranged to work in adjacent cylinders, said cylinders, of which it is proposed to use two, preferably, being disposed side by side, and the motions of the pistons in them being controlled by a revolving valve driven by the pistons.

While such is the general description of meter to which my invention relates, it is more particularly designed to be applied to meters constructed substantially as described in Letters Patent of the United States, No. 106,878, issued to William Tobin, as assignee of myself, August 30, A. D. 1870, so far, at least, as regards the connection of the pistons with separate revolving crank-shafts, and the gearing of the latter together, to work in timely relation with, although independently of one another; but in my present invention an intermediate gear-wheel or wheels is or are used in establishing the connection of the two crank-shafts, and such intermediate gear is further employed to revolve the valve, by which the motions of the pistons are controlled; and a leading feature of my invention consists in a peculiar construction of the revolving valve and arrangement of its ports and passages over which it travels, whereby I am enabled to rotate the valve only once to two revolutions of the crank-shafts, which are operated by the pistons, and the cranks of which are set at right angles to each other or thereabout.

In the accompanying drawing—

A represents the outer case of the meter closed at its ends, and formed with an exhaust-passage, B, extending across it between the cylinders C C, and the valve-box or chamber D for the incoming liquid.

The case A is also divided longitudinally by a web or webs, or otherwise, to prevent the liquid passing from one cylinder to the other. Said cylinders, which are preferably left open at their ends, may be composed of light metal tubes inserted loosely within cylindrical chambers in the case, and with which they are united or secured to their places by brimstone introduced in a fluid state between the tubes and walls of the chambers which receive them.

This mode of securing the tubes allows of after chipping or fitting without breaking the setting or disturbing the parts thus united, and, consequently, is superior in this respect to fixing the tubes by hydraulic cement.

E E' are the pistons, which are connected by pitmen or otherwise, respectively, with separate crank-shafts F F', that project up through suitable boxes or bearings into the chamber D, and that are caused to revolve by the pistons.

These shafts have arranged on their upper or outer ends spur-wheels G G', which are connected by intermediate gear; as, for instance, by a single third wheel, H, which is proportioned to make but one revolution for every two rotations of the crank-shafts, and which, in addition to its function of coupling the crank-shafts to work in unison and steadying, as an intermediate device, the run of the gears G G', also answers to rotate the valve I.

This valve I may be of a disk construction, and be made of one and the same piece with the spur-wheel H, which is the construction here shown, the valve, by the arrangement of teeth around its periphery, forming the wheel.

Said valve has two oppositely-arranged ports, *b b'*, through it, and two intermediately-arranged opposite cavities, *c c'*, uniting in a common and connecting exhaust-cavity, *d*, which in its turn is in communication with a central exhaust-passage, formed by the hollow shaft *e* of the valve, that rotates within a sleeve or bearing, *f*, and that is in open connection with the general exhaust-passage, B.

The valve-seat J has a corresponding number of ports or passages through it, but differently arranged to the ports and cavities in the valve.

Thus it has two closely-arranged ports, *g g'*, arranged to connect respectively by passages *h h'* with the same ends of the two cylinders, C C', and two more distantly-arranged ports, *k k'*, arranged to connect respectively by passages *l l'* with the two cylinders at their opposite ends. (See figs. 2 and 3.)

By this construction of the valve and arrangement of its ports and cavities relatively with the ports in the valve-seat, through which the liquid both enters and discharges, I am enabled to revolve the meter-shafts only twice for every one revolution of the valve,

and yet maintain a proper opening and closing of the ports to keep up a reciprocating action of the pistons, with their cranks arranged at right angles to each other.

Motion for operating the registering mechanism may be taken from the revolving valve or in any other suitable manner.

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

1. The combination of the intermediate gear H with the gear-wheels G G', crank-shafts F F', and pistons E E' of the meter, substantially as specified.

2. The revolving valve I, with its ports *b b'* and exhaust-cavities *c c'*, in combination with the valve-seat J, having its ports *g g'* and *k k'* arranged in relation with each other and with the ends of the cylinders to which they respectively belong, essentially as shown and described.

3. The combination with the separate crank-shafts F F', having their cranks at right angles, or thereabout, of a valve for controlling the motions of the pistons, by which said shafts are driven, constructed to make but one revolution for each two revolutions of either shaft, substantially as specified.

4. The combination of the gear-wheels G G' and H with the revolving valve I and its ports and cavities, the valve-seat J with its ports or passages, the independent crank-shafts F F', and the pistons E E', essentially as described.

5. The arrangement of the exhaust-passage B, the hollow valve-shaft *e*, the cylinders C C', and the inlet-chamber or valve-box D, substantially as specified.

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Witnesses:

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