2 Sheets—Sheet 1.

H. C. SERGEANT.

Liquid-Meter.

No. 106,878.

Patented Aug. 30, 1870.

Fig. 1.

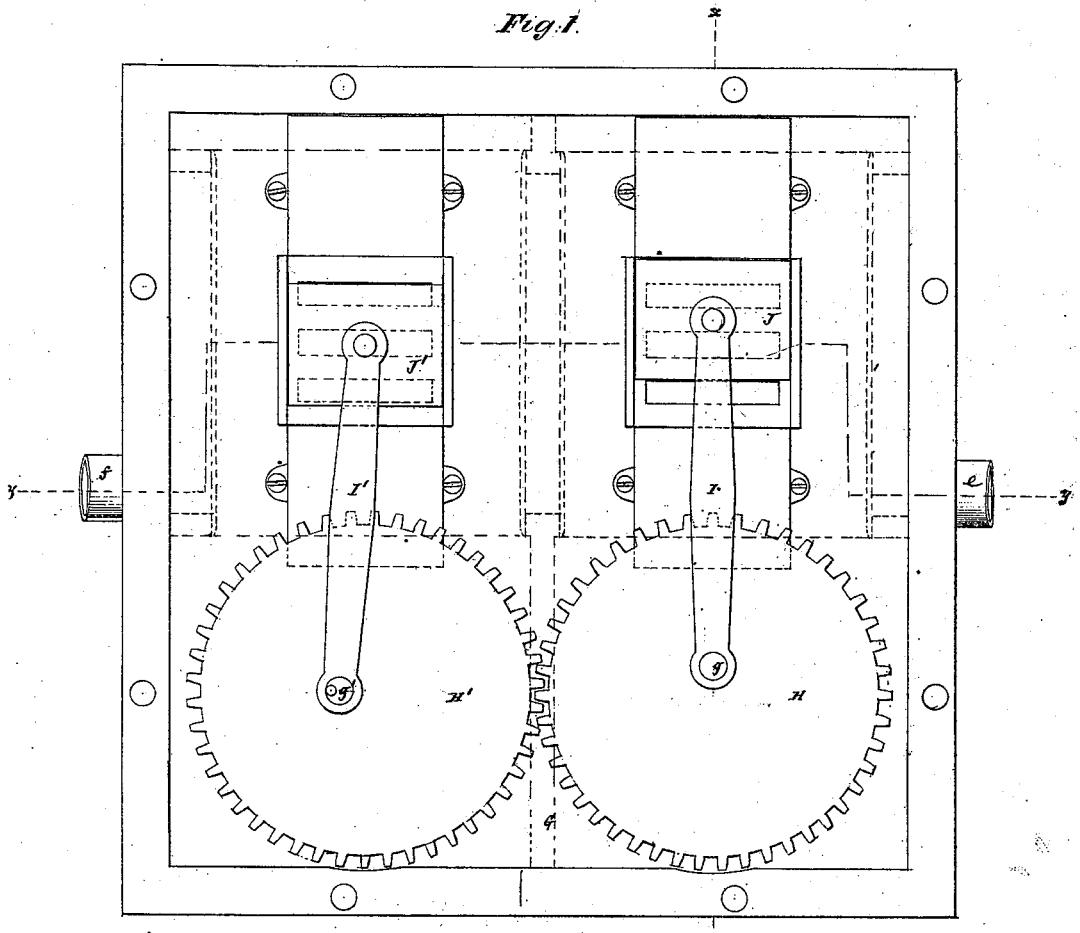
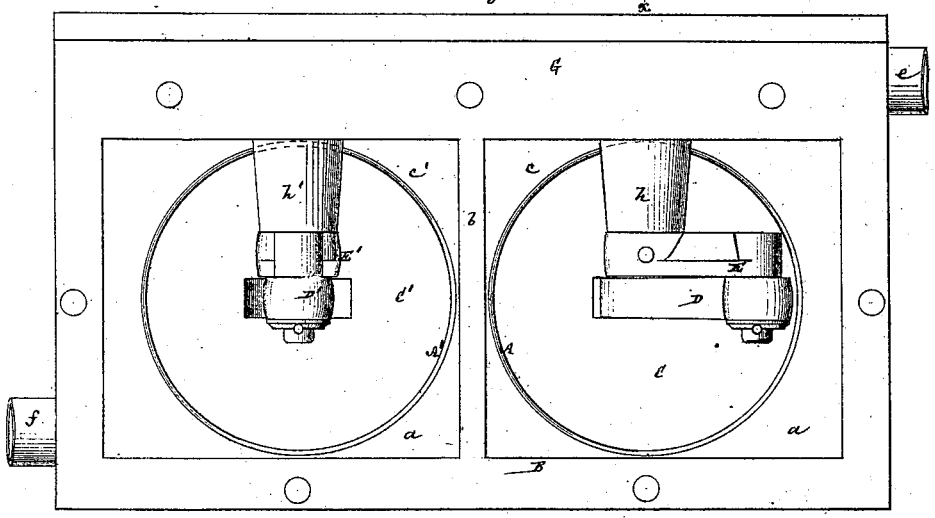


Fig. 2.



Witnesses:
Fred. Haynes
R. R. Rabeau

Henry C. Sergeant

2 Sheets—Sheet 2.

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Fig: 3.

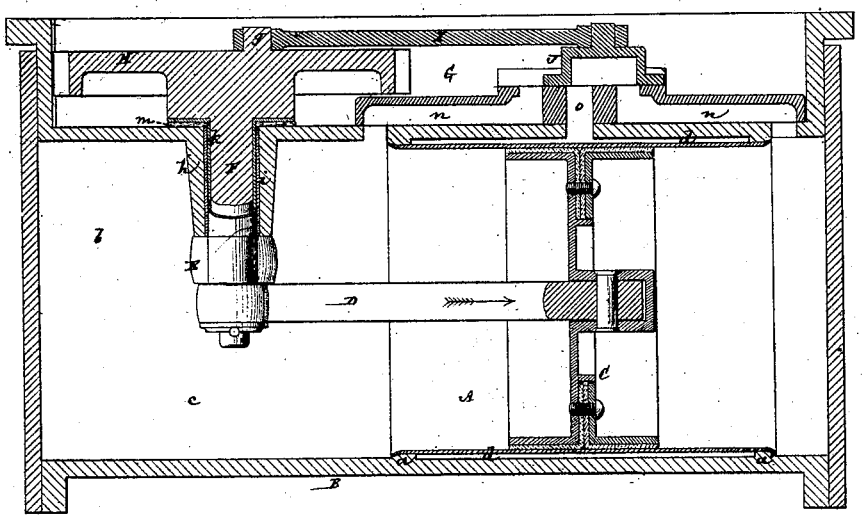
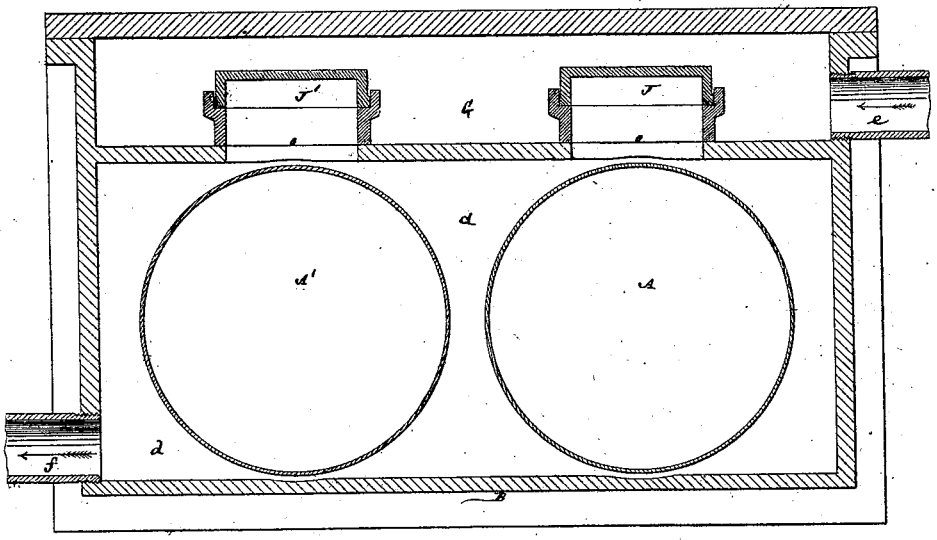


Fig: 4.



Witnesses:
Fred. Haynes
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United States Patent Office.

HENRY C. SERGEANT, OF NEWARK, NEW JERSEY, ASSIGNOR TO WILLIAM TOBIN, OF NEW YORK CITY.

Letters Patent No. 106,878, *dated August* 30, 1870.

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 Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Liquid-Meters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a plan of my improved meter, with the top removed;

Figure 2, a front or end view of the same, with the outer portion of the case removed;

Figure 3, a vertical section, taken, as denoted by the line *x x*, longitudinally through the center of one of the cylinders or measuring-chambers; and

Figure 4, a vertical section, taken at right angles to fig. 3, and as indicated by the irregular line *y y* in fig. 1.

Similar letters of reference indicate corresponding parts.

My invention relates to meters which employ two or more reciprocating pistons working in adjacent cylinders, and controlled by valves operated by the pistons; and

It consists in a certain combination of such devices whereby each piston is made to operate a separate crank-shaft that is connected by gearing with the crank-shaft of the adjacent piston, and the valves are operated by the pistons which they respectively serve to control.

By such arrangement or combination cross-passages from the valves to the cylinders are dispensed with, and, although the crank-shafts are geared to make them work in time, and to carry the cranks over the dead-centers, yet each piston, with its crank-shaft and valve, is separate and distinct from the other, so that said parts are made to maintain their proper relative position in case of wear at the joints or bearings of the connections which couple either position with its respective valve.

Furthermore, the arrangement is such that leakage from the one cylinder to the other is avoided, and the gear-wheels that serve to couple said shafts operate, by lateral pressure of the fluid on them, to make close or water-tight the bearings through which the crank-shafts revolve.

The invention also includes a novel arrangement of passages and peculiar construction of the cylinders whereby cheapness and simplicity are secured, and the cylinders, which are formed out of tubes, are retained in position by merely swelling or riveting down their ends.

A meter constructed in accordance with this invention may be gotten up cheap, and will be found efficient and correct under both light and heavy streams.

Referring to the accompanying drawing, the meter there represented will be described exclusively with reference to measuring water.

In the said drawing—

A and A′ are two horizontal cylinders arranged side by side, and open at their opposite ends.

These cylinders are formed of brass, or other suitable tubes, which may be cut to their required lengths from one and the same piece of tubing, ready, without boring or dressing, for insertion in their places within an outer water-case or box, B, by slipping them within or through ribs *a a′*, arranged to project internally from the case B, that is, divided longitudinally, as by a partition, *b*, beyond or outside of both ends of the cylinders, and by the ribs or flanges *a a′*, within which the ends of the cylinders fit, to form independent or separated water-spaces *c c′* at opposite ends of the cylinders.

The space *d*, between the ribs *a a′* of both cylinders, is open and continuous, and forms an exhaust-chamber for both cylinders, and said ribs or flanges are so disposed, relatively to the ends of the cylinders, that the latter are secured therein by simply swelling out or riveting down the ends of the cylinders thereon, as represented in fig. 3, such ribs being preferably bored or reamed out to secure truth and proper fit of the cylinders.

This is at once a cheap, simple, and efficient way of constructing and securing the cylinders, and of providing for an exhaust-passage all around and between them.

Each cylinder A A′ is fitted with a reciprocating piston, C or C′, the rods D D′ of which are connected to cranks E E′, on independent vertical shafts F F′, which project up into a valve-box or chamber, G, that has the inlet *e* connected with it, the outlet *f* from the meter being in connection with the exhaust-chamber *d*.

The crank-shafts F F′ have mounted on their upper ends, within the valve-box G, spur-wheels H H′, which mesh into one another, to secure a timely action of the independent pistons, and to aid the cranks E E′, which are set at different angles, in passing their dead-centers; otherwise the two pistons and their working-connections, including the valves, are disconnected and separate and distinct from each other, either piston operating the valve which controls it, as by rods I I′, operated by eccentric pins *g g′* on the wheels H H′, and attached, at their opposite ends, to the valves J J′, which latter may be ordinary slide D-valves arranged over the cylinders, the pistons of which they respectively control, and in communication, by suitable passages *n n* and *o*, with the ends of the cylinders, and with the exhaust-chamber *d*. I do not restrict myself, however, to any particular form of valve.

By this combination and arrangement of parts, all complicated or tortuous cross-passages are avoided, and each piston being controlled by the valve it operates, and through separate crank-shafts as regards both pistons, the valves, with their respective pistons and connections, are made to maintain their proper relative positions and actions in case of wear at the joints or bearings of the connections which couple either piston with its respective valve.

The crank-shafts F F′ work through downwardly-projecting bearings *h h′*, from the upper portion of the case A, or front chambers *c c′* thereof, said bearings preferably being lined with light brass bushes *i*, and each shaft protected by a brass sleeve, *k*, formed into a flange below the spur-wheel H or H′, mounted on said shaft.

A leather or other suitable packing-ring, *m*, is interposed between the under surface of said wheel and bottom of the valve-box, around the shaft or its sleeve *k*.

By these means the bearings are protected from corrosion, and the lateral pressure of the fluid on the upper surface of the wheels H H′, makes close or secure the joints at the ends of the bearings, and prevents leakage past the independent crank-shafts of the meter.

The registering mechanism may be operated by one of the eccentric pins *g g′*, or in any other suitable manner.

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

1. The combination of the independent crank-shafts F F′ and gear-wheels H H′ with the pistons C C′, the cylinders A A′, and the valves J J′, operating essentially as shown and described.

2. The cylinders A A′, made of tubing, and fitted at their ends within ribs or flanges *a a′*, said ribs being arranged to project from the interior of the box or case B, and secured therein by swelling out or riveting down the ends of said tubes over or on the ribs which carry them, essentially as described.

3. The arrangement of the exhaust-passage or chamber *d*, relatively to the cylinders A A′ and ribs or flanges *a a′*, in combination and with the valves and their passages and inlet and outlet, substantially as herein set forth.

4. The arrangement, relatively to the bearings *h h′* or outside ends thereof, through which either crank-shaft passes, of the wheels H H′, together with their intervening washers or packings *k*, essentially as described, and whereby leakage past the crank-shaft is prevented by lateral pressure of the fluid on the wheels, as herein set forth.

HENRY C. SERGEANT.

Witnesses:
FRED. HAYNES,
R. F. RABEAU.