

J. Harris.

Water Meter.

N^o 88,475.

Patented Mar. 30, 1869.

Fig. 1.

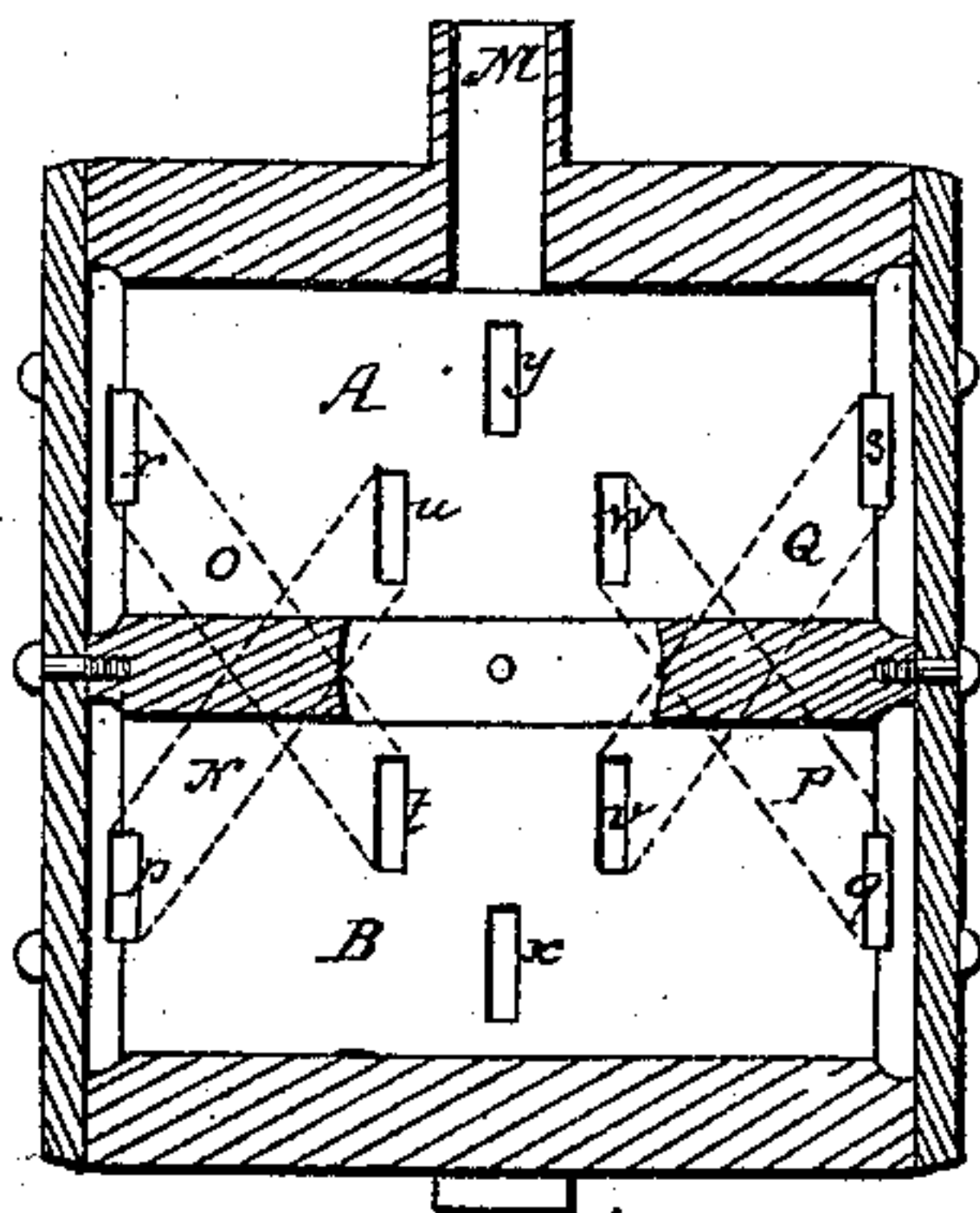


Fig. 3.

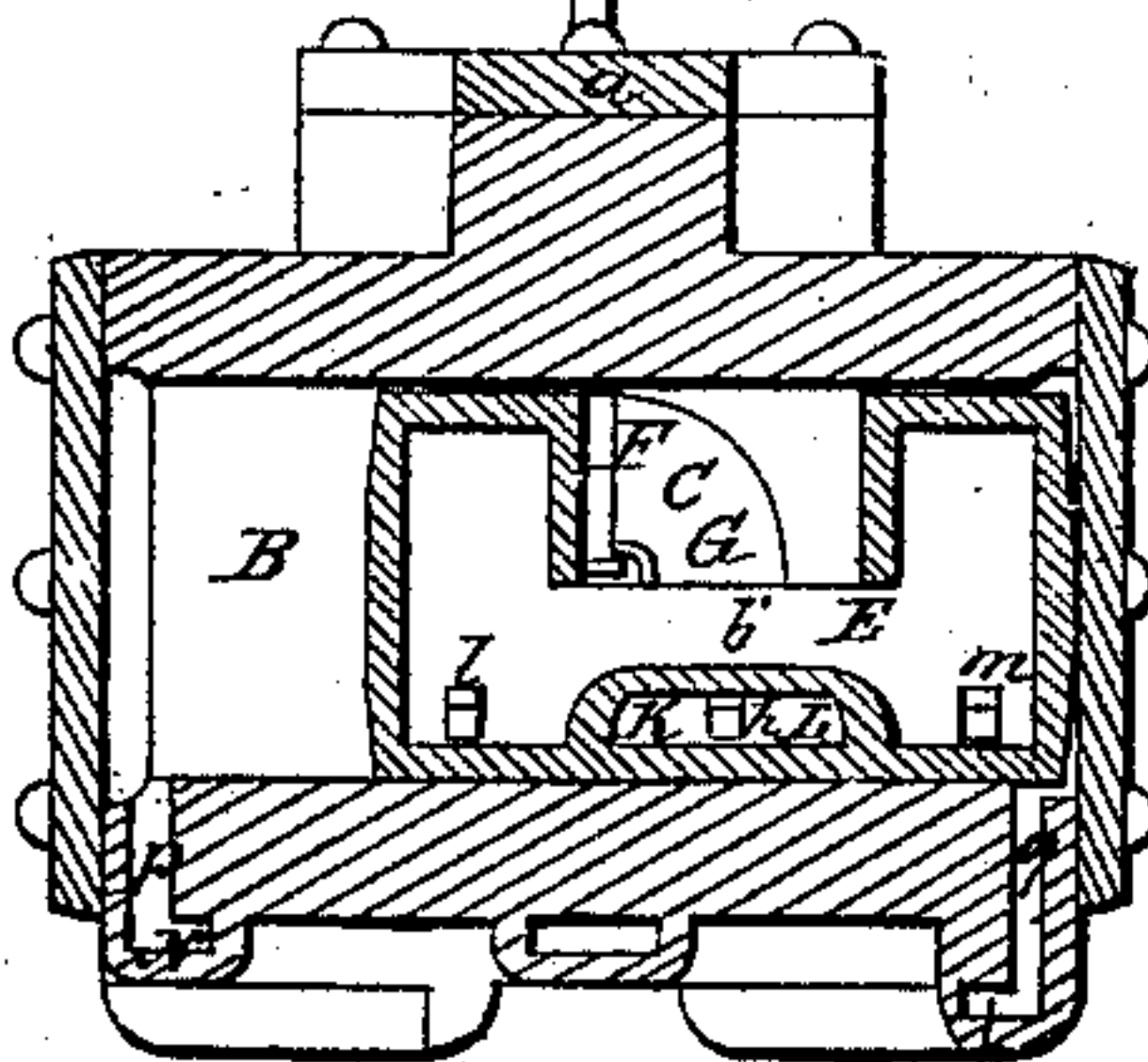


Fig. 7.

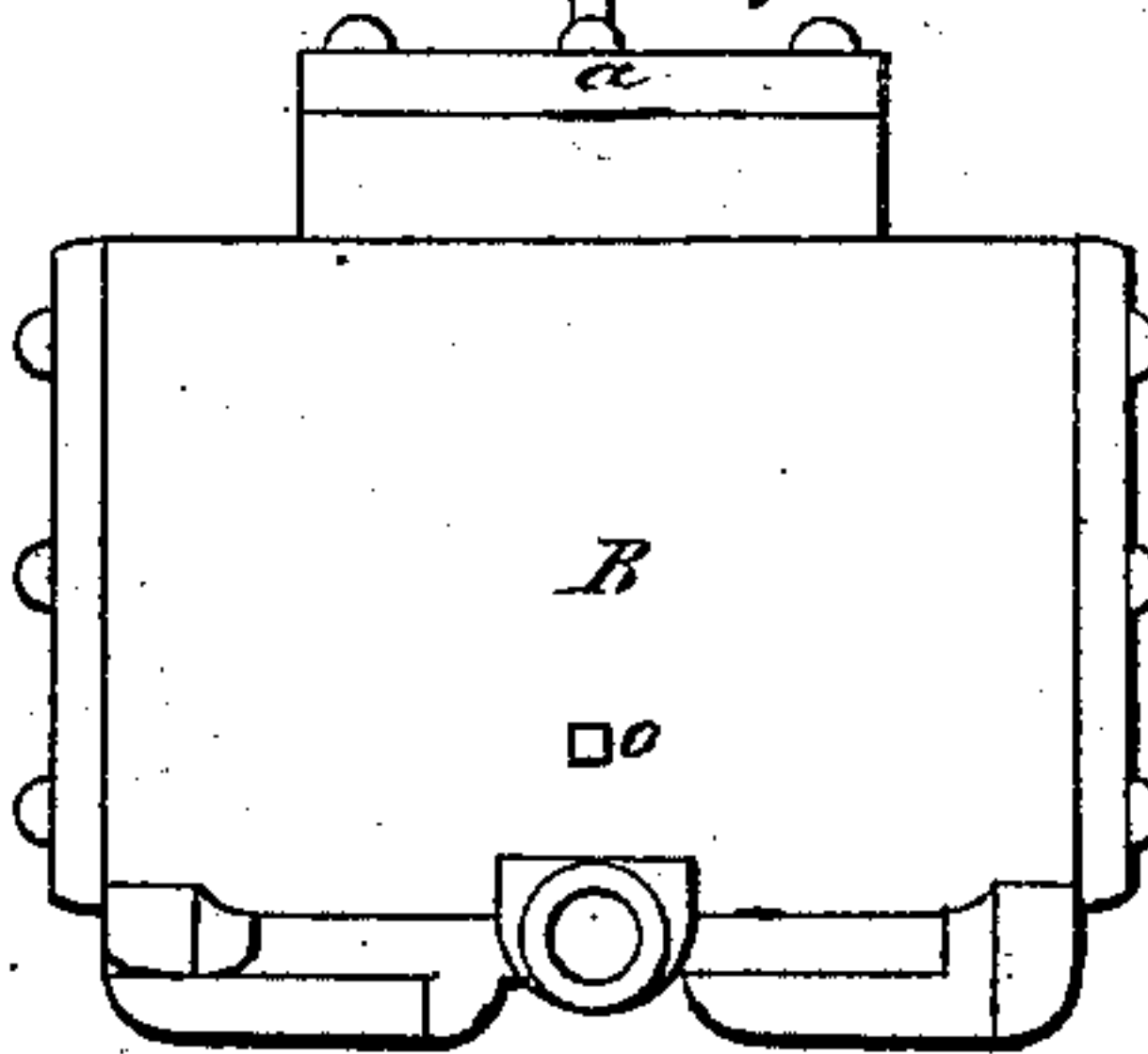


Fig. 4.

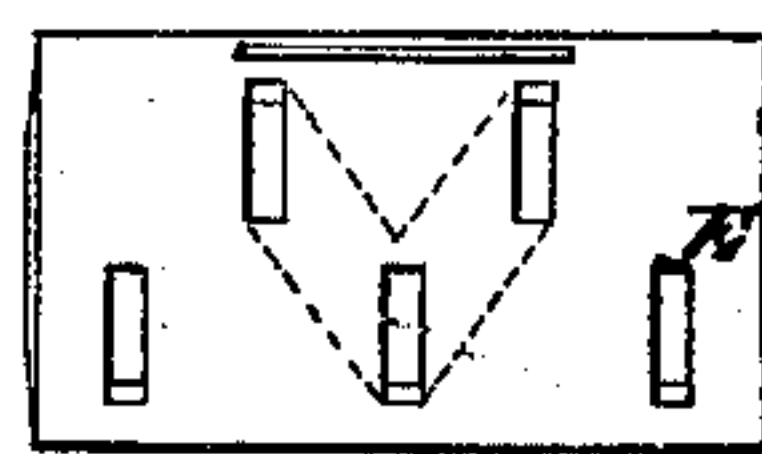


Fig. 6.

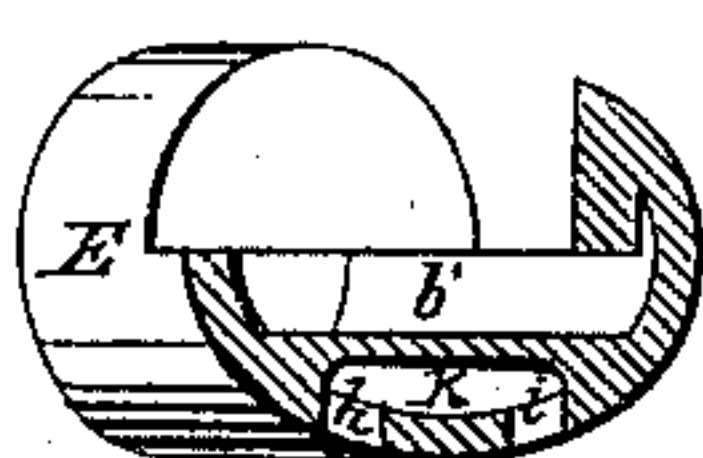


Fig. 5.

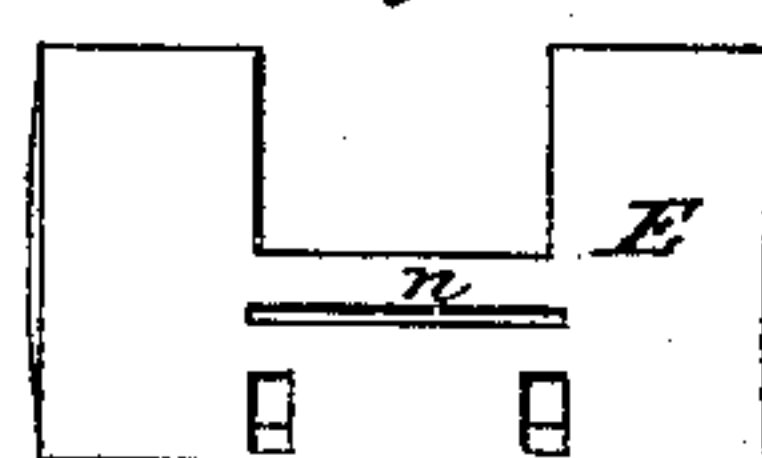


Fig. 2.

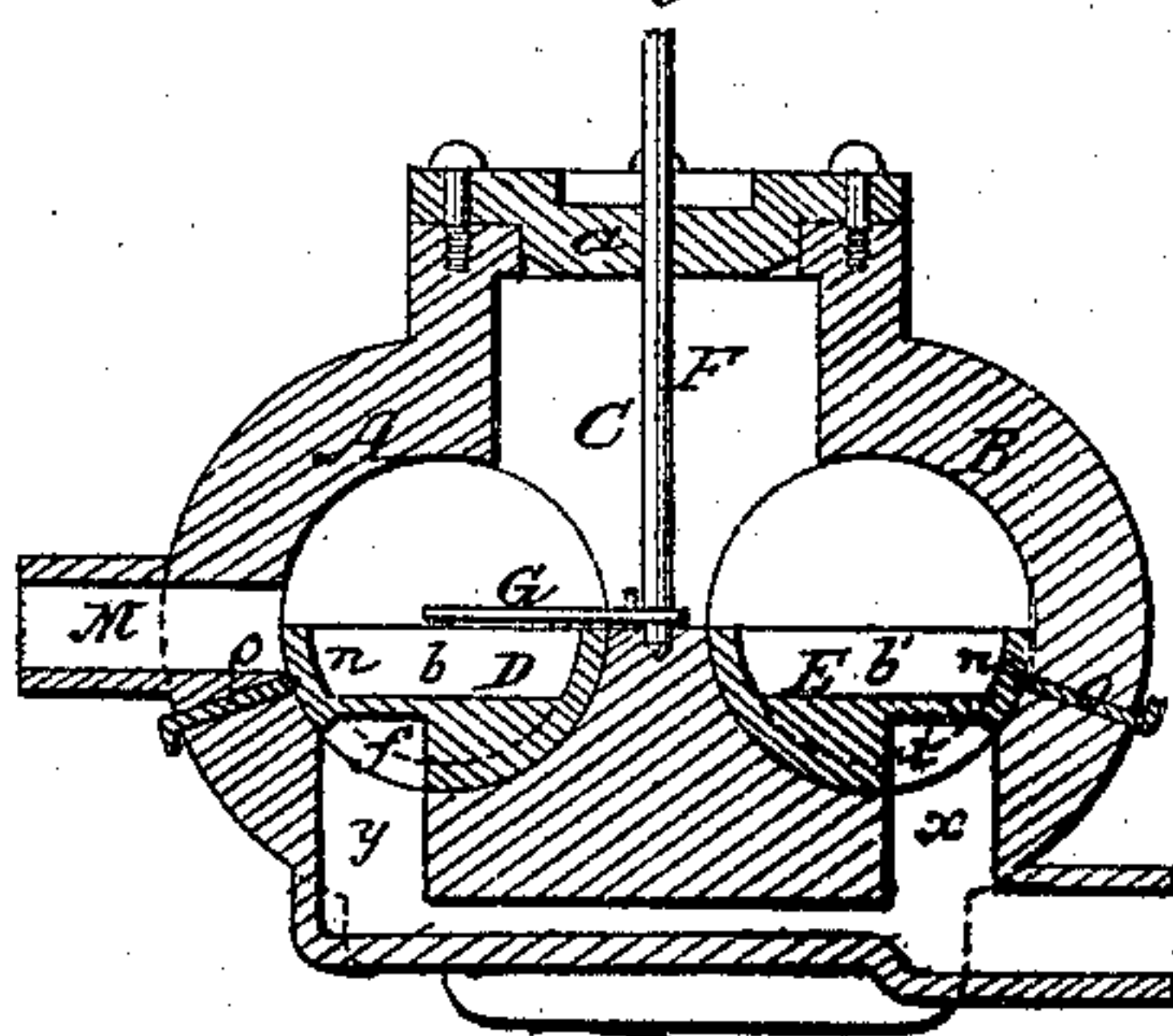


Fig. 8.

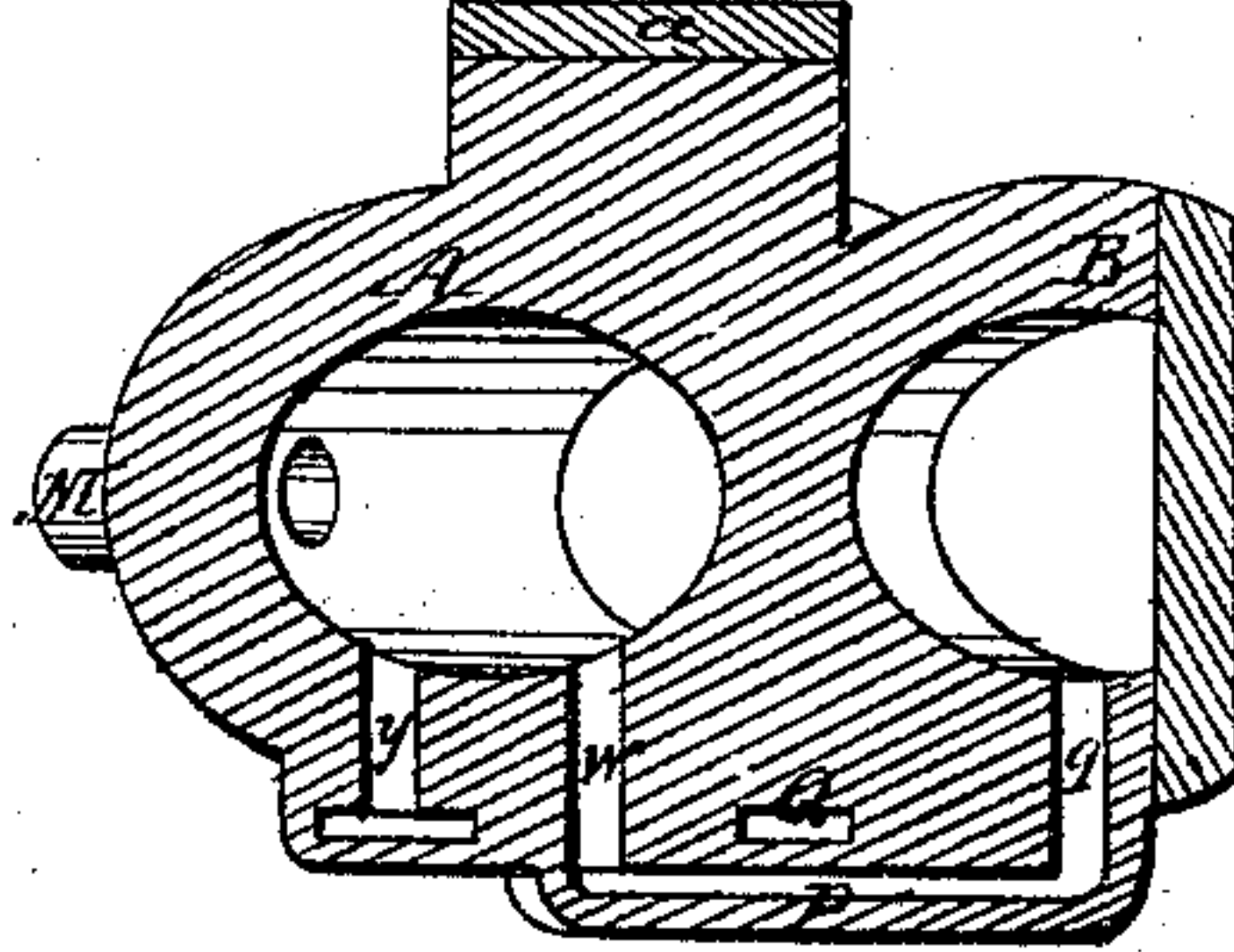


Fig. 9.

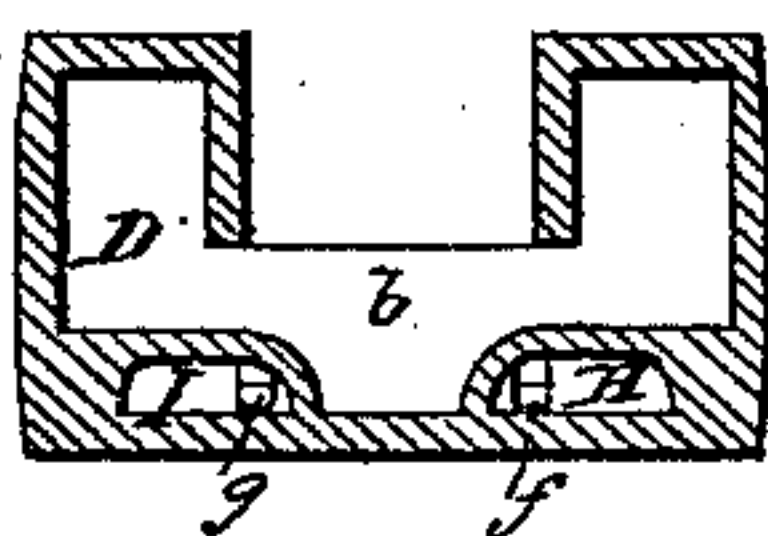


Fig. 11.

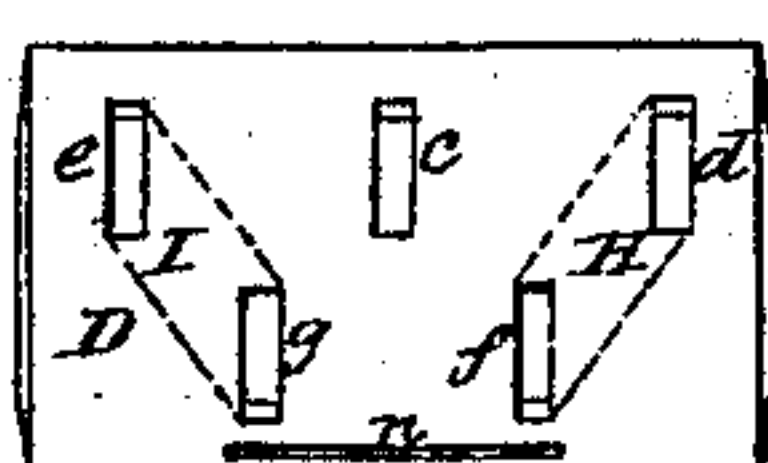


Fig. 10.

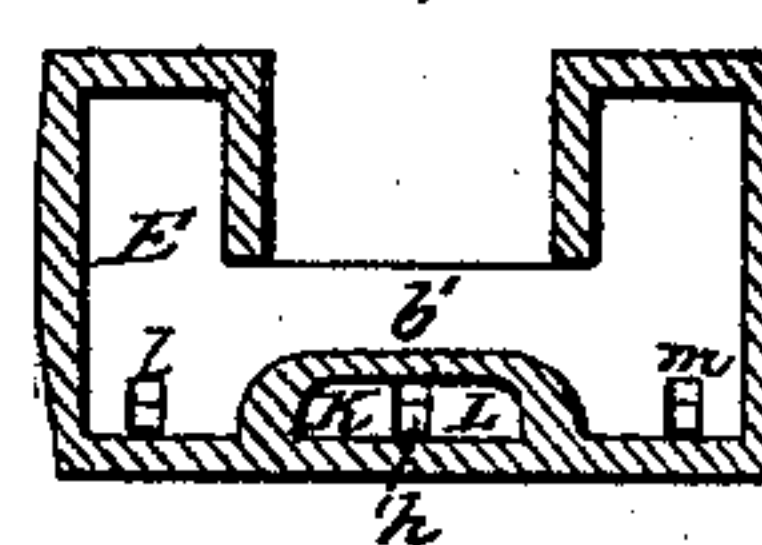
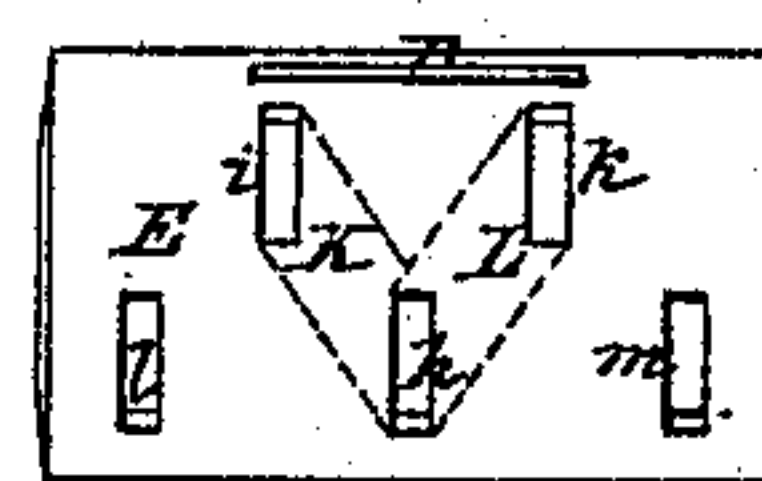


Fig. 12.



Witnesses.

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JAMES HARRIS, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 88,475, dated March 30, 1869.

IMPROVEMENT IN METERS.

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

To all persons to whom these presents may come:

Be it known that I, JAMES HARRIS, of Boston, in the county of Suffolk, and State of Massachusetts, have made a new and useful Improvement in Water-Meters; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 denotes a horizontal section of my water-meter case, without its pistons or valves.

Figure 2 is a transverse section of the meter.

Figure 3 is a longitudinal section taken through one of the pistons and its chamber.

Figure 4 is an under-side view, and

Figure 5, a side elevation of one of the valves or pistons.

Figure 6 is an oblique section of such valve, or piston, the plane of section being through one of its oblique water-passages.

Figure 7 is a side elevation of the meter.

Figure 8 is an oblique section of the water-case, it being taken through one of the oblique passages leading from one piston-cylinder to or about to the end of the other.

On May 23, 1865, Letters Patent, No. 47,893, were granted on a water-meter, invented by George F. Blake, the plungers, or pistons of such meter being constructed so as to enable them to perform the functions, or double duties of pistons and valves, thus saving the necessity of having valves separate from the plungers, as had previously been the practice in meters provided with two plungers, or cylinders, arranged in parallel cylindrical chambers, in manner as represented in the accompanying drawings.

I have found that when the ports, or mouths of the water-passages, leading from the wearing-surfaces of the pistons and cylinders, are arranged closely together, there is great liability of wear of the intervening surfaces so as to cause leakage. The greater the intervening surface between any two of such mouths, whether of the cylinder or plunger, the less will be the liability of wear and consequent leakage.

The arrangement of the ports of the aforementioned patented meter, renders it particularly liable to soon wear and leak, so as to make it an unfaithful measurer of the flowage, the principle of the meter, that is, the plungers operating as plungers and valves, rendering it specially useful in other respects.

I have, therefore, endeavored to produce, or invent such a new arrangement of the valve-passages and their mouths, with respect to the rubbing cylindrical surfaces of the plungers and their case, as would materially, if not entirely, diminish the chance of wear of the rubbing-surfaces between the ports. This arrangement constitutes my present invention, or improvement, and I particularly disclaim the principle, or principles of construction, as claimed in the said patent.

In the drawings—

A and B denote the two cylinders, arranged side by side, each being provided with a piston, D, or E, made to open laterally into a cylindrical chamber, C, arranged at right angles to them, and provided with a cap, or cover, *a*, such being as represented.

Each piston, D, or E, has a chamber, *b*, or *b'*, extending transversely across it; and there is arranged within the chamber C, and pivoted to the bottom thereof, a shaft, F, having an arm, G, extended from it into one of the said chambers *b* or *b'*. This shaft projects through the cap *a*, and is the impelling-shaft of a registering-mechanism, to be placed on the meter-case.

Figure 9 is a longitudinal section of the piston D, and Figure 10, a longitudinal section of the piston E.

The piston D has one port, *c*, leading through it from its chamber *b*. It also has two passages, H I, leading obliquely through it, the mouths, or ports of which are shown at *d*, *e*, *f*, and *g*. The two extremes, or mouths of the passage H are *d* and *f*, and those of the passage I are *e* and *g*.

Figure 11 is an under-side view of the piston D, and Figure 12 is a similar view of the piston E.

The said piston E has two ports, *l m*, opening out of the chamber *b'*, and arranged near the two ends of the piston. Midway between the two ports *l m*, is a port, *h*, from which two passages, K L, lead obliquely, in opposite directions, and open through the circumference of the piston at *i* or *k*.

Furthermore, each piston has a long groove, *n*, made in one side of it, to receive a stud, *o*, projecting from the inner side of the cylinder of the piston, the purpose of the stud and groove being to prevent the piston from turning around out of place in its cylinder, while in motion therein.

An inlet-pipe, M, leads into the side of the cylinder A. At the bottom of each cylinder, and close to its ends, are two ports, they being arranged as shown at *p q*, in the cylinder B, and at *r s*, in the cylinder A.

Besides these ports, there are three other ports to each cylinder, they and their arrangement being shown at *w*, *u*, and *y*, for the cylinder A, and at *v t x*, for the cylinder B.

The two ports, *x* and *y*, are outlets, and may lead into a common discharge, or eduction-pipe.

The four ports, *t*, *u*, *v*, and *w*, are inlets, and each of them communicates, by a separate oblique passage, with one of the ports *p q r s*; that is to say, the ports *p* and *u* are the termini of one oblique passage, N; the ports *r* and *t* are the termini of another oblique passage, O; the ports *q* and *w* are the termini of an oblique passage, P; and, finally, the ports *s* and *v* are the termini of another oblique passage, Q.

Each outlet, *x* or *y*, is not placed directly between the next two inlets, *t v*, or *u w*, the space between two of such inlets being uninterrupted by a port, as the outlet-port next to such space is arranged wholly on one side of it, as represented in the drawings, and

thus, by such arrangement, we get a long space, or bridge between the ports *t* and *v*, or *u* and *w*; whereas, were there an outlet-port, *x* or *y*, in such space, there would be two bridges, or spaces between it and its next adjacent inlets, and these, during the operation of the piston, would be liable to be worn away very much faster than the single space.

By my arrangement of the ports of each cylinder, the two end ports are in the vertical plane passing through axis of the cylinder, while the two inlet-ports are on one side of such plane, and the outlet-port is on the other side of it, the connections of the inlet-ports with the end ports being by oblique passages, *N O P Q*, leading through the body of the case.

It will also be seen, that in further carrying out my invention, or improvement, the ports of the lower surface of each of the pistons have such an arrangement that two, (viz, *i k*, or *f g*), which are in one line with each other, do not extend between the next adjacent three, *l h m*, or *e c d*, but, with them, are on opposite sides of a medial line, such arrangement being highly favorable for the production of long bridges, or spaces between the ports.

Each of the pistons, while in operation, has an intermittent motion, its stoppages, or periods of rest being while the other piston is in motion, and being for the purpose of completing the passages by which the water, for actuating the moving piston, is led to it, and the water, discharged by it from the case, is led into the outlet, or port of discharge.

My improved arrangement of ports and passages, in the cylinders and pistons, will not only effect such movements of the pistons, under the pressure of a column of water let into the case, but cause the pistons and cylinders to work together with very little wear and leakage in comparison to what would result from the arrangement of ports and passages of the patented meter hereinbefore mentioned.

Therefore, in carrying out my new arrangement, substantially as described, of the ports and water-passages of the two cylinders and their pistons, the middle inlet and outlet-ports of each cylinder are to be on opposite sides of the medial line running through the two end ports of such cylinder, and the two inlet-ports of one cylinder are to be connected with the two end ports of the other cylinder, by separate oblique passages. One piston is to have two ports, and the other, but one port, communicating with its middle chamber. Two of the ports, in each piston, are on one side of the medial line, and the other three ports are on the opposite side of such line, and the two ports *f g*, of one piston, are connected with the ports *e d* thereof, by oblique passages, *H I*. The port *h*, of the other piston, is connected with the two ports *i k* thereof, by two oblique passages, *K L*, made in the piston.

I make no claim to the broad combination of cylinders, pistons, piston-chambers, ports, and connecting water-passages, as hereinbefore specified, my claim to invention resting on an arrangement rather than a combination of such parts. Therefore,

What I claim as my invention, or improvement, is—

My new arrangement, substantially as described, of the piston-chambers *b b'*, and the several ports, and the connecting oblique water-passages of the two pistons and their cylinders, the two end ports, under such arrangement, being in a vertical plane passing through the axis of the cylinder, while the two inlet-ports are on one side of such plane, and the outlet-port is on the other side of it, and the connections of the inlet-ports with the end ports are effected by the oblique passages *N O P Q*, leading through the body of the case, all as set forth.

JAMES HARRIS.

Witnesses:

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F. P. HALE, Jr.