

G.F. Blake, Piston Meter.

No 51,415.

Patented Dec. 12, 1865.

Fig. 1

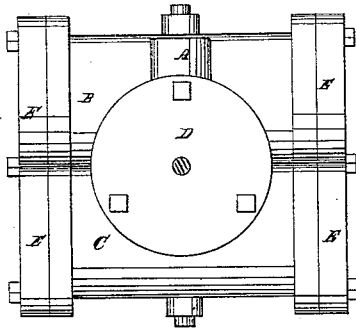


Fig. 5
Section on line Z, Z, of Fig. 1

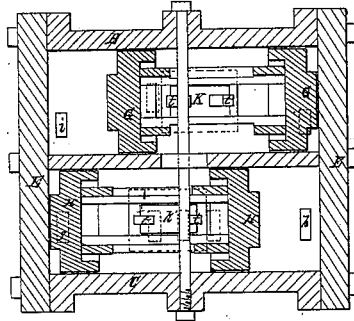


Fig. 10

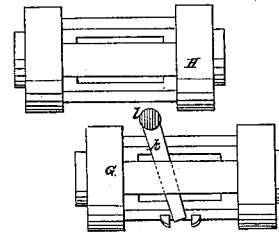


Fig. 2.

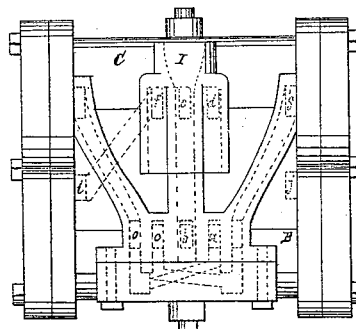


Fig. 6

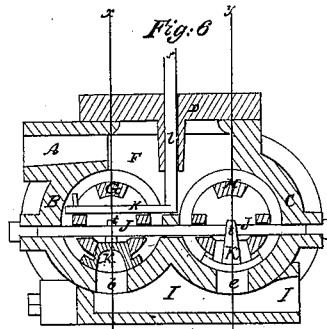


Fig. 8
Section on line X, X, of Fig. 6.

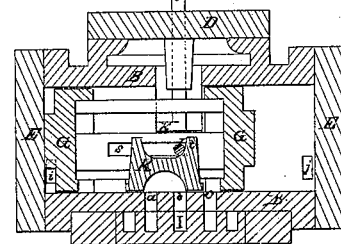


Fig. 7.

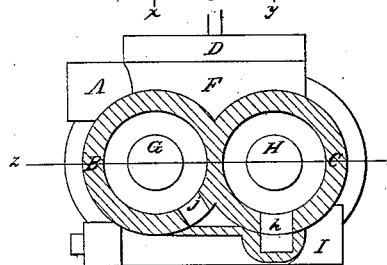


Fig. 9.

Section on line Y, Y, of Fig. 6.

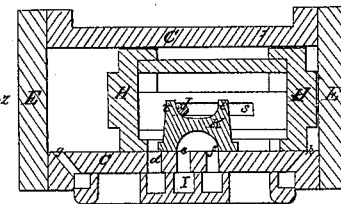


Fig. 3

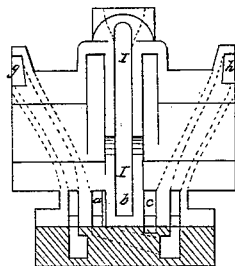
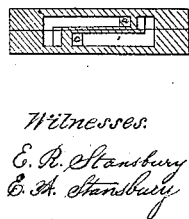


Fig. 4



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UNITED STATES PATENT OFFICE.

GEORGE F. BLAKE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. 51,415, dated December 12, 1865.

To all whom it may concern:

Be it known that I, GEORGE F. BLAKE, of the city of Boston, in the State of Massachusetts, have invented certain new and useful Improvements in Water-Meters; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of my improved meter; Fig. 2, a bottom view, showing the course of the water-ways. Fig. 3 is a horizontal section through the water-ways. Fig. 4 is a vertical section of a portion of the water-ways. Fig. 5 is a horizontal central section through the cylinders. Fig. 6 is a transverse vertical central section through the cylinders. Fig. 7 is a transverse vertical section near one end of the cylinders. Fig. 8 is a vertical longitudinal section through cylinder B and its plunger. Fig. 9 is a similar section of cylinder C and its plunger, and Fig. 10 shows the plungers G H in detail, separate views.

Whenever the same letter of reference occurs it indicates the same part.

The nature of my invention consists in the arrangement of the water-ways, and the construction and arrangement of the valves in the manner hereinafter more particularly set forth.

To enable others to make and use my improved meter, I will proceed to describe its construction and operation.

It mainly consists of two cylinders parallel and attached to each other, which contain oscillating plungers driven by the stream of water passing through the apparatus, and which operate two valves, one on the bottom of each cylinder, which valves reciprocally control the movements of the plungers, respectively, the valves and water-ways being so arranged with reference to each other that the plungers never get on "centers," but are always capable of certain operation whenever a stream of water is passing, however slowly, through the apparatus. Each stroke of the plunger indicates the passage of a definite quantity of water through the machine, and the number of strokes is recorded by a register of the usual construction, actuated by one of the plungers in the ordinary way.

Referring now to the drawings, A marks the the inlet-pipe, through which water passes to

the machine; B C, the cylinders; D, the top plate of the water-chamber, on which the registering apparatus is placed.

E marks the cylinder-heads, which are attached by bolts, as shown.

F is the water-chamber, into which the inlet-pipe A discharges.

G is the plunger which reciprocates in cylinder B, and H is the plunger which reciprocates in cylinder C. The construction of these plungers is clearly shown in Fig. 10. They consist each of two cylindrical heads, accurately fitting the cylinder in which they respectively move, said heads being united by two or more slotted bars. The ends of the plungers have bosses upon them, which prevent their coming into close contact with the ends of the cylinders. The object of the slots in the plungers is to receive a transverse horizontal rod, J, which prevents the plungers from turning on their longitudinal axes. There is a slot in the bars of cylinder G for the reception of the arm *k* of upright shaft *l*, which operates the registering apparatus. Said arm is moved back and forth at each stroke of plunger G.

I marks the outlet-pipe which connects with the exhaust-ports *b* and *e* of the cylinders.

K K' mark the valves, which are alike in form and construction as well as in position relatively to their respective cylinders and in their mode of operation. In form they are segments of cylinders, their faces corresponding in curvature with that of the cylinders in which they operate. They are cupped in the usual way, and have on their upper sides the horns *t t*, which project up far enough to engage the rod J at certain portions of their stroke, as clearly seen in Figs. 5, 6, and 8. The valve of each cylinder controls the movement of the plunger of the opposite cylinder.

Each cylinder has five ports, three near the middle at the bottom and one at each end. The ports of cylinder B are marked *a b c i j*. Those of cylinder C are marked *d e f g h*. The ports *b* and *e* connect with the outlet-pipe I. Port *a* connects by a bent water-way with port *h* at the right-hand end of cylinder C. Port *c* connects by a similarly-bent water-way with port *g* at the left-hand end of cylinder C. Port *d* connects by a straight water-way with port

i at the left-hand end of cylinder B, and port *f* likewise by a direct water-way with the port *j* at the right-hand end of cylinder B.

It will be observed that the ports are arranged in the same way in both cylinders. It has before been noticed that the valves are the same in construction, position, and mode of operation in both cylinders. This is not the case, so far as I am aware, in any other water-meter, and it is a very important feature in reference to facility of manufacture as well as to the operation.

The rod J (see Figs. 5, 6, and 8) performs two offices—one to keep the plungers from turning in their cylinders, and the other to control, or, rather, limit the movement of the valves. The horns *t* of the valves strike the rod as soon as the valves have got to the end of their stroke, and the rod prevents the valves from moving farther with the respective plungers. The valves do not have a stroke as long as that of the plungers. Their movement does not commence until the plungers have made the greater portion of their stroke, and it is arrested by the rod J before the plungers complete their stroke. Thus the plungers are caused to move in the same direction, one following the other at brief intervals, varying with the flow of the water through the meter.

The operation is as follows: Cylinder B, in moving to the right, takes water through port *i* from the water-way leading from port *d* to port *i*, and discharges through ports *j f e*, under valve K', into the outlet I. Cylinder C, in moving to the right, takes water through ports *c g* and their connecting water-way, and discharges through ports *h a b*, under valve K,

into the outlet I. When plunger G has got nearly to the end of its stroke toward the right-hand end of cylinder B, it moves valve K into a position to cover ports *b c*, and provides an outlet for the exhaust-water of cylinder C, while plunger H is driven to the left, its cylinder taking water through ports *a h*, and discharging through ports *g c b*. On the return-stroke cylinder B takes water through ports *f j*, and discharges through ports *i d e* into the outlet I.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the water-ways in the manner described.

2. In a water-meter having water-ways arranged substantially as hereinbefore described, giving to the valves of both cylinders the same size, form, construction, and mode of operation, as and for the purpose specified.

3. The rod J, arranged as described in relation to the cylinders B C, for the purposes set forth.

4. The arrangement for conjoint operation of the valves, water-ways, ports, and plungers, in the manner set forth, for the purpose of preventing the plungers from getting on centers, as specified.

The above specification of my said invention signed and witnessed at Boston this 8th day of April, A. D. 1865.

GEORGE F. BLAKE.

Witnesses:

M. J. BLAKE,
BAXTER E. PERRY.