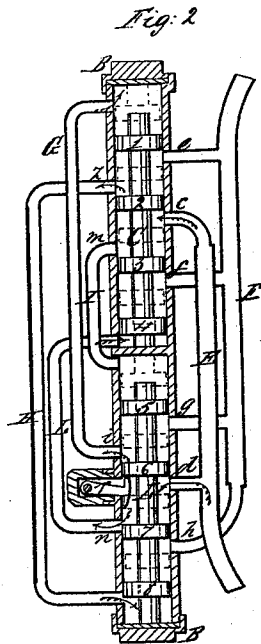
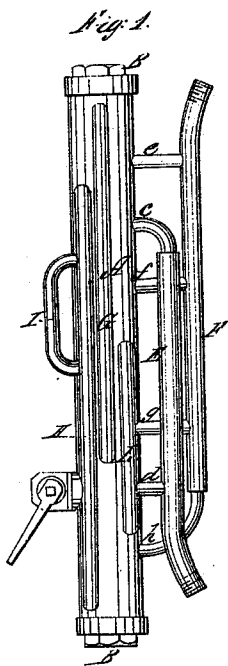


A. Heaton,

Piston Meter,

N^o 80,109.

Patented July 28, 1868.



Witnesses:
Michael Ryan
W. J. Abbott

Inventor:
Abram Heaton

By his Attorney:
John E. Earle

United States Patent Office.

ABRAM HEATON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO HIMSELF
AND BRADBURY & GOODSSELL, OF SAME PLACE.

Letters Patent No. 80,409, dated July 28, 1868.

IMPROVEMENT IN WATER-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, ABRAM HEATON, of Bridgeport, in the county of Fairfield, and State of Connecticut, have invented a new Improvement in Water-Meters; and I do hereby declare the following, when taken in connection with the accompanying drawings, and letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view, and in

Figure 2 a central section.

This invention relates to an improvement in meters for ascertaining the quantity of water flowing through pipes, the meter to be placed in such connection with the pipes that the water passing through the pipes will also pass through the meter; and the invention consists in the arrangement of pistons within a cylinder, and communicating with the opposite sides of the pistons by connections from one portion of the cylinder to another, so that passing the fluid causes a reciprocating movement of the pistons, and, being in connection with competent mechanism, indicates the number of movements of the piston, (the quantity discharged at each movement of the pistons being known,) and consequently the quantity of fluid which has passed through the meter.

In order to the clear understanding of my invention, I will fully describe the same as illustrated in the accompanying drawings.

A is a cylinder, of suitable material, and of a diameter and length proportionate to the quantity of fluid which is required to be passed through the meter, the said cylinder closed at both ends by suitable caps B, and divided at its centre into two parts by a partition, *a*, each of the two parts being bored out or finished smoothly on the inside, to receive and allow the free play of the pistons to be placed within the cylinder. Into one end of the cylinder, pistons 1, 2, 3, and 4, upon a common rod, C, are placed, the said pistons being fixed firmly to the rod, and the rod a little shorter than the length of the cylinder, so that the four pistons and rod may play freely within the cylinder, as more clearly hereafter shown. In the opposite end of the cylinder, similar pistons, 5, 6, 7, and 8, are arranged upon a rod, D, in like manner.

E is the inlet-tube, connecting with the water-pipe, and connecting at *e* with the part C of the cylinder, and at *d* with the part D of the cylinder. F is the outlet-pipe, connecting at the two points *e* and *f* with the part C of the cylinder, and at *g* and *h* with the part D of the cylinder. The connections from the inlet-pipe are between the two centre pistons, in each part of the cylinder, and the outlet-pipe between each two of the extreme pistons, in both parts of the cylinder, and the length of the piston-rod is such that the pistons can move only so far, that the piston upon each side of the outlet and inlet will never pass over either the outlet and inlet to change the chambers formed by the pistons; therefore the space between the two centre pistons, in each part of the cylinder, may be termed inlet-chambers, and the two spaces between the extreme pistons in each cylinder may be termed outlet-chambers.

From a point above the highest point at which the piston 1 may rise, a communication is formed through a tube, G, to a point near the second piston 6, in the other cylinder, as at *i*, so that the movement of the piston 6 to the position denoted in blue, passes over the opening *i* into the tube G, thus changing the chamber from which the tube G opens; a similar tube, H, communicating in like manner from a point below the lower piston 8, to a point in the other cylinder above the piston 2, so that in the movement of the said piston 2 over the opening *l*, the action is the same as described for the piston 6. From a point immediately below the partition *a*, a connection, I, leads to a point above the piston 3, at *m*, so as to open into the cylinder, and so that the piston 3, in its movement, will pass over the opening *m* in like manner as described for the openings *l* and *i*. From a point immediately above the partition *a*, a pipe, L, communicates with the other part of the cylinder at *n*, immediately above the piston 7, so that the said piston 7 will operate over the opening *n*, in like manner as described for the other openings.

Thus constructed, and the pistons in the position denoted in fig. 2, the fluid admitted into the pipe E passes immediately into the cylinder below the piston 6, as denoted in the arrow in blue, thence through the pipe I below the piston 4, which causes all the pistons in the upper cylinder to rise to the point denoted in red, where they are arrested in that position. In this movement, the piston 2, it will be seen, has passed above the opening *l* of the connection H, therefore communication is now opened, so that the fluid, as denoted by the red arrows, will pass through the upper part of the cylinder, through the connection H, below the lower piston 8, which will force all the pistons in that portion of the cylinder to rise, as denoted in blue. Thus rising, the piston 7 will have passed up over the opening *n*, and the piston 6 over the opening *i*. Communication is now opened, as denoted by the black arrows, from the inlet *d*, through the pipe G, to the upper cylinder, above the piston 1, and also from below the piston 4 communication is open to below the piston 7, so that the fluid below the piston 4, which caused the rise of the pistons, may pass freely out through the opening *h* to the outlet, and permit the inflowing fluid above the piston 1 to return the pistons in that part of the cylinder to their first position. This return opens the tube I to receive the fluid from the inlet *c*, and conduct the fluid to above the piston 5, so as to force the pistons in the lower part of the cylinder to return to their first position. The piston 2 having returned below the opening *l* of the connection H, the fluid, which first forced the pistons in the lower part of the cylinder upward, passes through the connection H and outlet *e* to the tube F, then, as before, the fluid passes below the piston 4, to cause the pistons in that part of the cylinder to again rise, which will force the fluid above the piston 1 to return through the tube G and opening *i* into the other cylinder, thence through the opening *g* to the outlet-pipe F; then, in like manner, the lower pistons are again raised, and the fluid above the upper piston passes through the tube I to the other part of the cylinder, thence through the opening *f* into the outlet-tube F.

I have represented the connections as being made by the tubes as the most convenient manner of illustration, but the cylinder, with the outlets and inlets, may be all cast together, or formed in any convenient manner.

In order to ascertain the number of movements of the pistons, I arrange a lever, *r*, which extends into the cylinder, between any two of the pistons, (here represented as between 6 and 7,) the said lever being constructed so that each movement of the pistons turns the lever, that is, moving in one direction, the lever is turned in that direction, and, on the return of the pistons, the other piston returns the lever. Thus each full movement of the pistons gives a full vibration of the said lever. Other arrangements may, however, be applied for denoting the movements of the pistons.

I have illustrated the cylinder as in two parts, and this, generally, I believe to be the better plan, but, if preferred, the two parts of the cylinder, as here represented, may be separated, so as to form two distinct cylinders, the connections, however, in all cases, and the arrangement of the piston, being the same.

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

The arrangement of the two pistons or series of pistons, each piston or series of pistons upon its independent rod, and operating in its respective cylinders, and the said cylinders connected by passages in the manner described, and provided with inlet and outlet-connections, so that the pistons operate in their respective cylinders substantially in the manner herein set forth.

ABRAM HEATON.

Witnesses:

A. J. TIDBITS,
MICHAEL RYAN.