

L. Allen.
Fluid-Meter.
No 75342 Patented Mar. 10, 1868

Fig. 1.

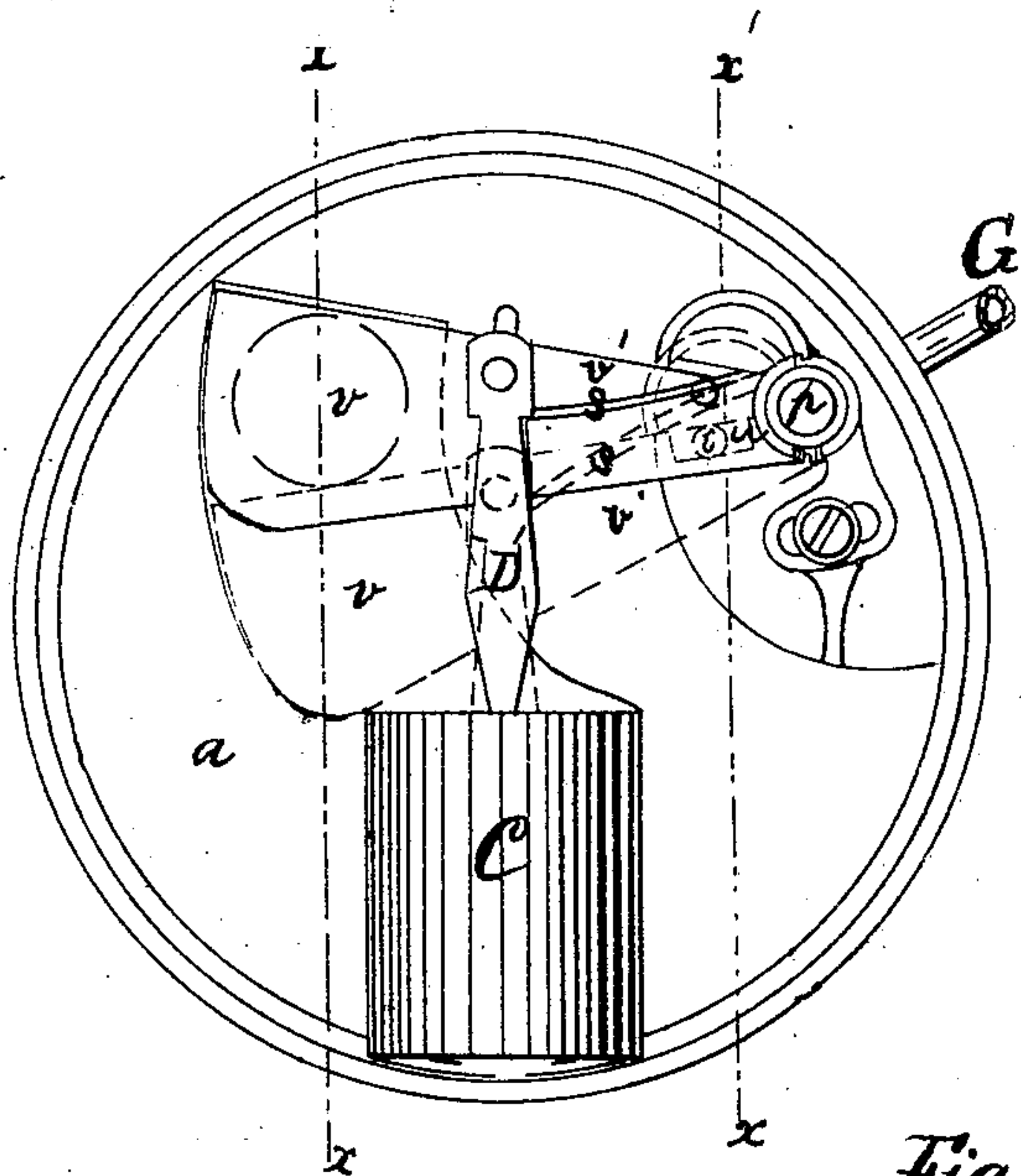


Fig. 2.

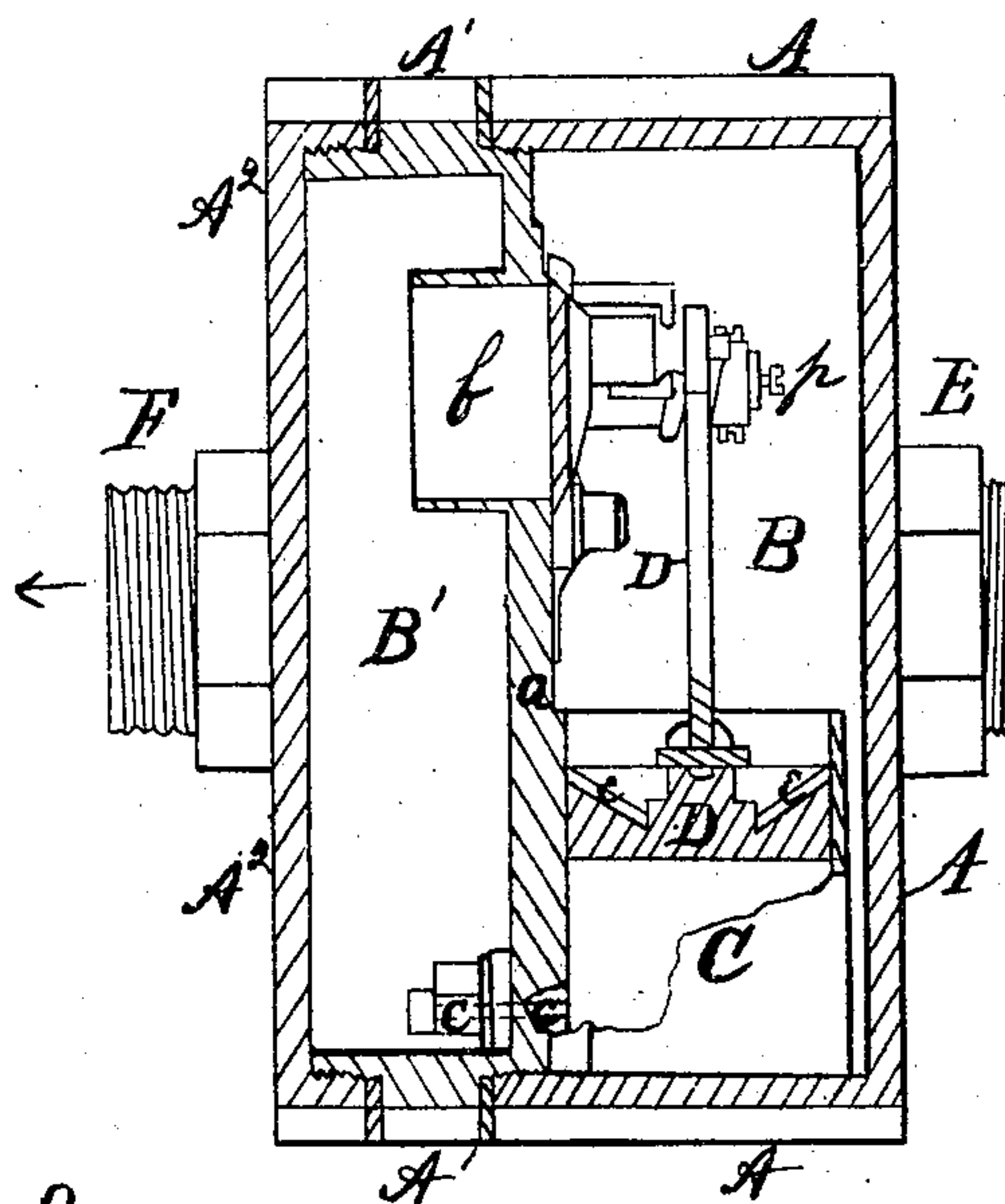
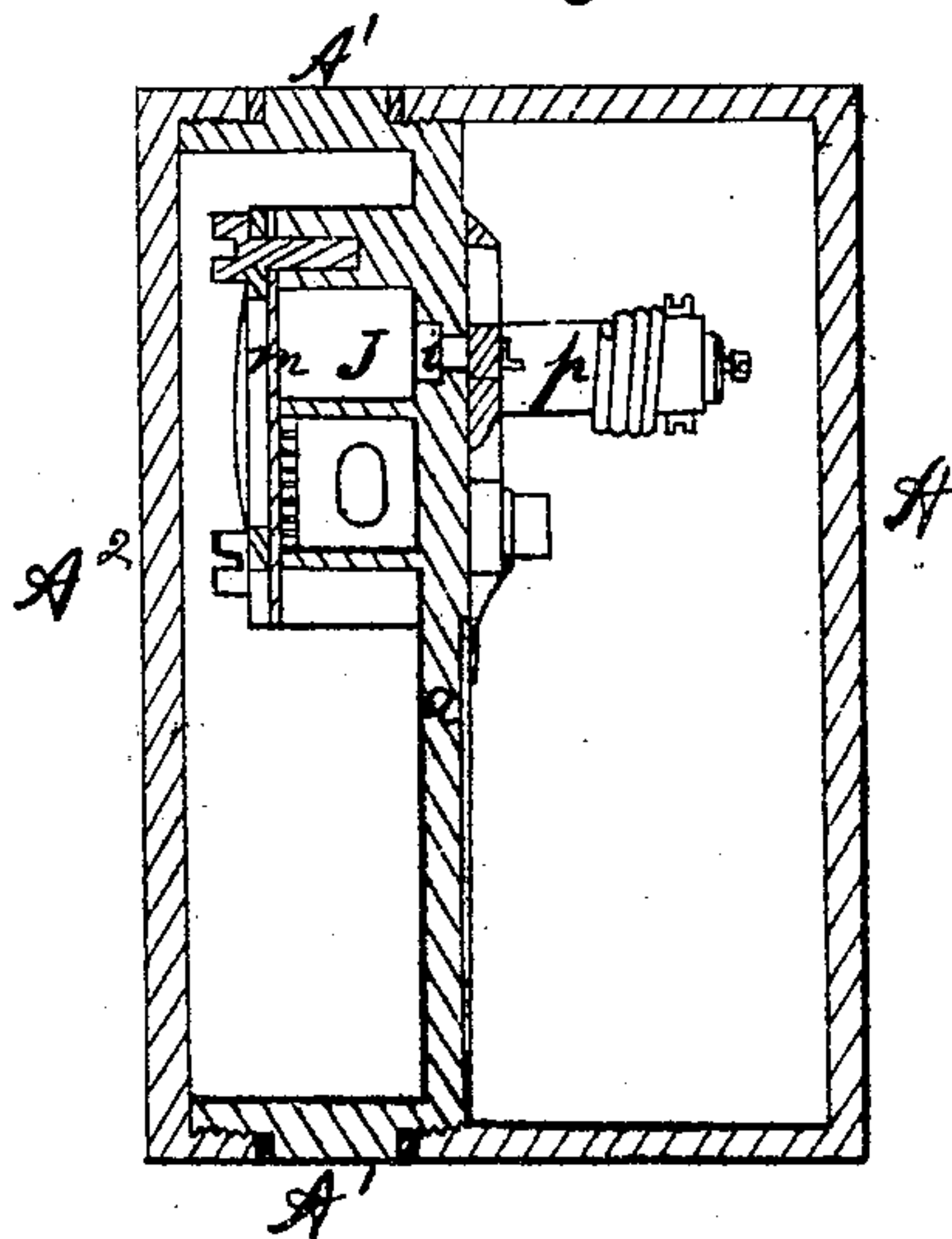


Fig. 3.



Witnesses.

S. E. Kemou
C. A. Peto

Inventor. Lester Allen
By *Hunt & Co*
Attorneys.

United States Patent Office.

LEICESTER ALLEN, OF NEW YORK, ASSIGNOR TO HIMSELF AND SOLOMON
P. SMITH, OF WATERFORD, N. Y.

Letters Patent No. 75,342, dated March 10, 1868.

IMPROVEMENT IN FLUID-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, LEICESTER ALLEN, of New York, in the county of New York, and State of New York, have invented a new and improved Fluid-Meter; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a plan of my invention, as seen when the part A of the case or shell is removed.

Figure 2 is a cross-section of my invention through the line x of fig. 1; and

Figure 3 is a similar section through the line x' of fig. 1.

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

In this invention a piston is balanced by a spring in such a manner that the piston, actuated by the flow of water, will open a valve, and give free passage to the water as long as there is no back flow, and, when there is any back action, will close, or partially close the valve, and stop the flow. A registering-apparatus records the amount that has passed through the valve.

In the drawings, A A' A'' represent the different pieces which, being screwed together as indicated by the serrated lines, form the case or shell which encloses the working-mechanism of the meter. Its interior is divided into two nearly equal chambers, B and B', by means of a partition, a . The water flows into the meter through the pipe E, enters the chamber B, passes thence, through the opening b , into the chamber B', from which it finally escapes through the exit-pipe F. In the chamber B is a cylinder, C, provided with a piston, D, packed tight, as shown at $e e$, and connected, by a piston-rod, D', with a valve, v , fixed to a pivoted arm, v' , which allows the valve to slide back and forth upon the flat surface of the partition a , and open or close the aperture b , which leads from one chamber to the other. A spring, s , is attached, so as to operate against the arm v' , and keep the valve closed, the force of the spring being exerted in a direction from the cylinder. The chamber of the cylinder C communicates with the chamber B' through a small passage, c , which opens into the cylinder behind or under the piston, as shown in fig. 2.

I will now describe the action of the parts thus constructed. The water first entering the chamber B, finding the valve v closed by the action of spring s , and no escape possible, exerts its force against the piston D, forcing it down in the cylinder, and opening the valve v , by means of the piston-rod and arm v' above explained. The valve thus being opened, the water flows through the passage b , fills the lower chamber B', and passes away through pipe F. As long as the cocks or taps are open for the water that passes into the pipe F to escape freely, so that a continual flow takes place, the water in the meter will keep the piston down in the cylinder, and the valve open. When, however, the outlet-cock is closed, and the water ceases to flow through the escape and begins to exert "back-action," the force of the returning water in chamber B' is communicated through the opening c , behind the piston, to the interior of the cylinder C, where it counteracts and neutralizes the force of the water acting in chamber B, outside of the cylinder, and allows the spring s to resume control of the piston, and again close the valve v . The force of the spring is to be adjusted according to the "head" of water, so that when the pressure is equal on each side of the piston D it will close the valve, and when there is no pressure behind the piston, in consequence of the water's escaping freely from chamber B' through pipe F, the force of the water entering chamber B will overcome the force of the spring and open the valve.

Such being the construction and operation of the main working parts of the meter, it now remains to describe the means by which the current flowing through passage b is at all times accurately measured and recorded. This is done by diverting from chamber B a small rill of the fluid, which shall at all times bear a certain fixed proportion to the amount escaping through the passage b . In the drawings, G shows a pipe through which such rill is conducted away, being fed from chamber B, through the small opening i , seen in figs. 1 and 3. The opening i , shown in the drawings, has a diameter equal to one-tenth part of the diameter of the large opening, b , and, consequently, will discharge an amount of water equal to the one-hundredth part of the water passed through the opening b . Being made thus to bear a fixed relation in size to the large opening, it is situated in a direct line between the latter and the pivot p , upon which the arm v' turns, and so arranged as to be opened or

closed by a small valve, v'' , attached to the arm v' , at the same time and in the same proportions as the large opening b is opened or closed by the valve v . Consequently, when the passage b is wide open and discharging to its full capacity, the opening i is the same. When the passage b is half closed, the opening i is also half closed, and when the passage b is entirely closed the opening i is likewise closed.

In this way the water escaping through the pipe G will always be an accurate index of the amount passed through the pipes $E F$. By collecting it in vessels and measuring it, or by measuring it by any common meter, an accurate register of the water used in the establishment may be had. The amount of water thus employed for the purpose of registering the flow through the pipes will be a mere trifle, one gallon in a hundred, or even one in a thousand being sufficient when the meter is properly made.

In order that the back action of the water may not in any way affect the flow into the pipe G , a chamber, J , is formed between the opening i and the pipe G , through which the registering-water is obliged to pass on its way to the pipe. This chamber is provided on its under side with a flexible diaphragm, m , which receives the force of the back action in chamber B' , and communicates it to the water in chamber J , forcing it back through valve i just at the same instant and in the same proportion that the water is forced back through the opening b , before the spring has had time to close the valve v upon the latter. The direct back action of the fluids in the meter is thus always rendered perfectly uniform and even upon all the parts of the instrument, enabling its working and registering-mechanism to move without interruption or inequality from either cause.

It will be observed that this instrument feeds the water to the pipe F just in the proportion required. If the person who is drawing off the water opens the cock at the faucet, so as to draw to the utmost capacity of pipe F , the back action in chamber B' will be destroyed, and the valve v will open to its fullest extent. If, on the other hand, the person opens the cock, so as to only draw to half the capacity of the pipe F , the partial back action will half close the valve v . Thus the operation of the cock at the faucet controls and exactly determines the operation of the mechanism of the meter, and the flow of water through the meter.

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

1. The combination of the openings b and i , with valves fixed to a pivoted arm, v' , in such a manner that by the movement of the arm the openings shall always be proportionately uncovered or closed, when this combination is used in a fluid-meter, substantially as and for the purposes specified.
2. The cylinder C , provided with the piston D and the opening e , or their equivalent, when used in a fluid-meter, substantially as and for the purpose specified.
3. The chamber J , provided with the diaphragm m , substantially as and for the purpose specified.
4. The arrangement, in a fluid-meter, of the chambers $B B'$, cylinder C , piston and rod $D D'$, arm v' , and valves $v v''$, substantially in the manner and for the purposes set forth.

LEICESTER ALLEN.

Witnesses:

G. M. OWEN,
H. K. HEYDON.