

F. WAGNER.

Piston-Meter.

No. 112,992.

Patented Mar. 21, 1871.

Fig. 1.

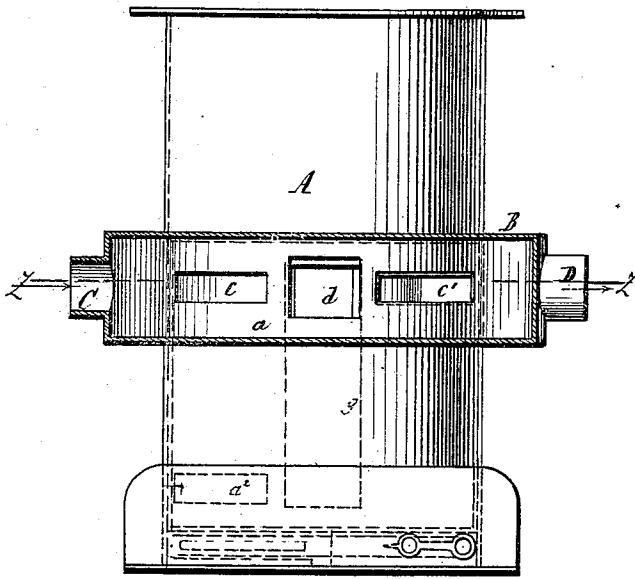


Fig. 3.

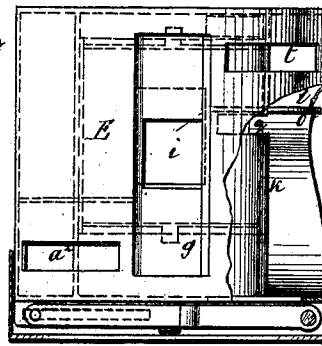


Fig. 4.

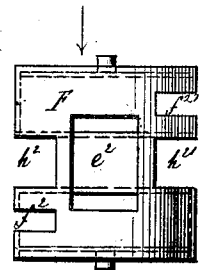


Fig. 2.

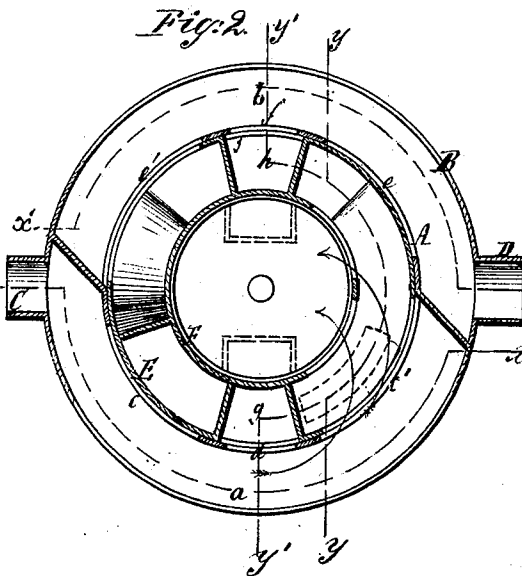


Fig. 5.

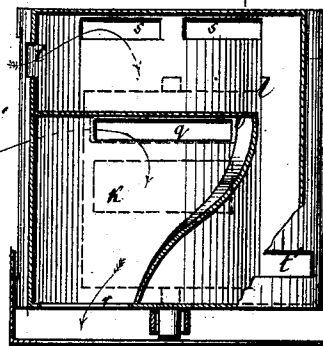
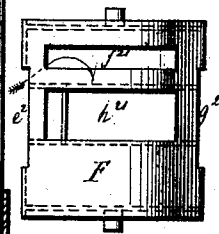


Fig. 6.



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Fig: 7.

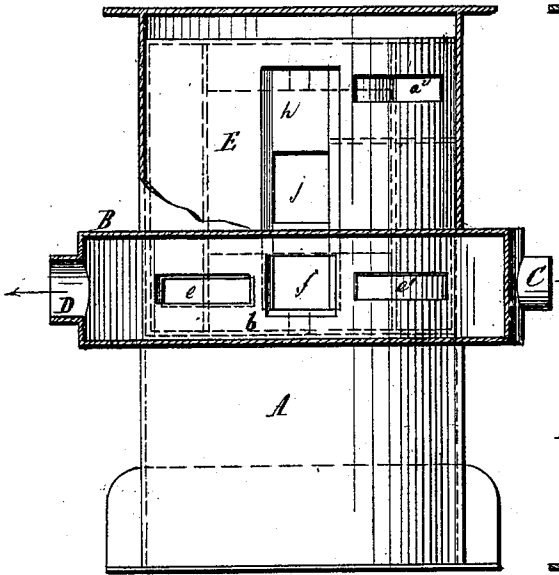


Fig: 8.

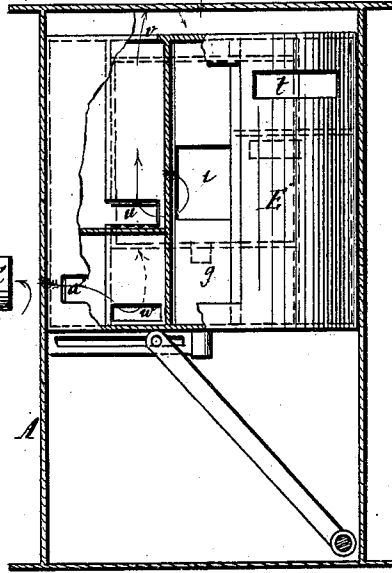


Fig: 9.

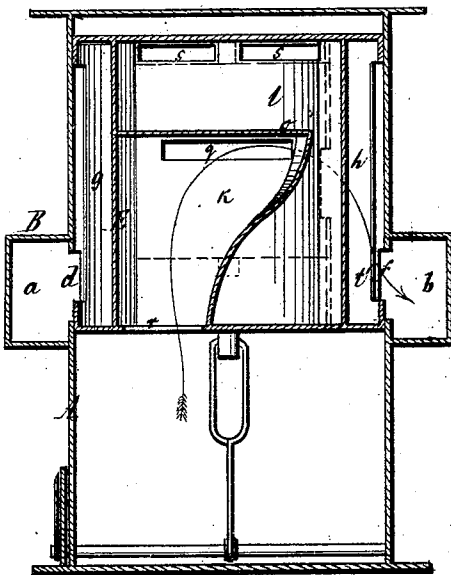


Fig: 10.

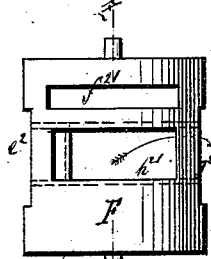


Fig: 11.

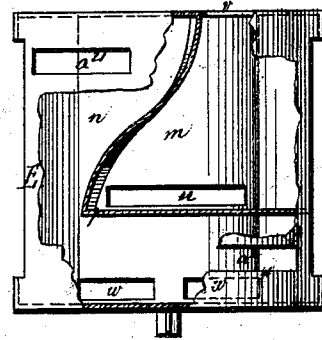
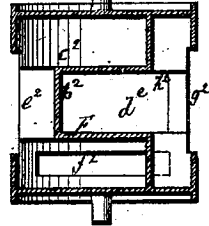


Fig: 12.



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FRANZ WAGNER, OF NEW YORK, N. Y.

Letters Patent No. 112,992, dated March 21, 1871.

IMPROVEMENT IN 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, FRANZ WAGNER, of the city, county, and State of New York, have invented a new and useful Improvement in Fluid-Meters; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a sectional front view of this invention, the line $x\ x$, fig. 2, indicating the plane of section.

Figure 2 is a horizontal section of the same in the plane indicated by the line $x\ x$, fig. 1.

Figure 3 is a front view of the piston, a portion being broken away to show the internal compartments.

Figure 4 is a detached view of the valve corresponding to the previous figure.

Figure 5 is a sectional view of the piston, the section being taken in the plane indicated by the line $y\ y$, fig. 2.

Figure 6 is a detached view of the valve, corresponding to the previous figure.

Figure 7 is a sectional rear view of the meter, the plane of section being indicated by the line $x'\ x'$, fig. 2.

Figure 8 is a front view of the piston, showing its position in the cylinder, corresponding to the previous figure.

Figure 9 is a transverse section of the meter in the plane indicated by the line $y'\ y'$, fig. 2.

Figure 10 is a detached view of the valve, corresponding to the previous figure.

Figure 11 is a detached sectional view of the piston, showing the side opposite to that shown in figs. 5 and 8.

Figure 12 is a longitudinal central section of the valve taken in the plane $z\ z$, fig. 10.

Similar letters indicate corresponding parts.

This invention relates to a fluid-meter with a single measuring-chamber or cylinder containing one piston, in the interior of which is situated a piston-valve, both the valve and the piston being provided with a series of ports, arranged in relation to each other and to the supply and discharge-chamber of the cylinder in such a manner that both the valve and the piston are moved entirely by the direct action of the fluid to be measured, the valve controlling the action of the fluid on the piston and the piston that on the valve.

In the drawing—

The letter A designates my measuring-cylinder, which is closed at both ends, and provided at its middle with an annular jacket, B, that is divided into two chambers, $a\ b$, best seen in fig. 2, of which the cham-

ber a communicates with the supply-pipe C, and the chamber B with the discharge-pipe D, the course of the fluid through the meter being indicated by arrows in the several figures.

The supply-chamber a is provided with three ports, $e\ e'\ f$; (see figs. 1, 2, and 7,) the object of each of which will be presently explained.

E is the piston, different views of which are shown in figs. 2, 3, 5, 8, 9, and 11. The interior of this piston forms a cylindrical chamber to receive the valve F, detached views of which are shown in figs. 4, 6, 10, and 12. The ends of the valve-chamber are closed by suitable heads.

The piston is provided with two chambers, $g\ h$, one opposite the other, (see figs. 3, 7, and 8, and particularly figs. 2 and 9,) and extending nearly throughout the entire length of said piston, so that, when the piston is placed into the cylinder, the chamber g communicates, through the port f , with the discharge-chamber b , (see figs. 2 and 9.)

Each of the chambers g and h is provided with a port, i and j , which lead in the valve-chamber.

The spaces between the chambers $g\ h$, on each side of the piston, are divided each in two chambers, k and l and $m\ n$, by means of partitions o and p , the chambers $k\ l$ and partition o , on one side of the piston, being shown in figs. 5 and 9, and the chambers m and n and partition p being shown in fig. 11.

The chamber k (see fig. 5) communicates, through a port, q , with the interior of the valve-chamber, and through a port, r , in the piston-head, with the space below the piston.

The chamber l communicates, through ports s , with the valve-chamber, and through a port, t , (see figs. 3 and 8,) with the supply-chamber a of the cylinder, whenever the piston comes in such a position that said port t stands opposite the port e' of the supply-chamber, and it also communicates, by a port, t' , fig. 5, with the discharge-chamber b of the cylinder, whenever the piston assumes such a position that said port t' is opposite the port e of the discharge-chamber.

The chamber m , fig. 11, communicates, through a port, u , with the interior of the valve-chamber, and through a port, v , in the piston-head, with the space above said piston.

The chamber n communicates, through ports w , with the interior of the valve-chamber, and through a port, a^2 , fig. 3, with the supply-chamber a of the cylinder, when this port comes opposite the port e in said supply-chamber, and it also communicates, through a port, a^2 , with the discharge-chamber b of the cylinder, whenever this port comes opposite to the port e in the discharge-chamber.

The valve F is made in the form of a piston fitted in the valve-chamber in the interior of the piston E. It is divided by a double L-shaped partition, b^2 , in two compartments or chambers, c^2 and d^2 , (see fig. 12.) The chamber c^2 is provided with three ports, $e^2 f^2 f'^2$, (see figs. 4, 10, and 12,) the port e^2 being so situated and of such a length that it stands opposite the port i in the supply-chamber g of the piston during the entire stroke of the valve, without covering any part thereof, and consequently the chamber c^2 of the valve is continually in communication with the supply-chamber and supply-pipe of the cylinder.

If the valve is clear down, occupying the position indicated in dotted lines in fig. 5, the port f'^2 of said valve corresponds with the port q in the chamber k of the piston, and if the valve is at the opposite end of its stroke the port f^2 corresponds with port u in the chamber m of the piston.

The chamber d^2 of the valve is also provided with three ports, $g^2 h^2 h'^2$, the port g^2 being so situated and of such a length that it stands opposite the port j in the discharge-chamber h of the piston during the entire stroke of the valve, and if the valve is clear down, occupying the position shown in dotted lines in fig. 5, the port h^2 stands opposite the port u in the chamber m of the piston, the port h'^2 being closed, and if the valve moves to the opposite end of its stroke, the port h'^2 comes opposite the port q in the chamber k of the piston.

The operation of my meter is as follows:

When the piston occupies the position indicated in dotted lines in fig. 1, (figs. 3 and 4 showing the piston and valve respectively in the same position,) the valve being at the upper and the piston at the lower ends of their strokes, the supply-chamber a of the cylinder communicates through ports d , i , and e^2 , (see figs. 1, 3, and 4,) with the chamber c^2 , fig. 12, of the valve and through ports f^2 of the valve, fig. 12, and ports u and v of the piston, fig. 11, with the space in the cylinder above the piston, so as to fill this space. At the same time the chamber l of the piston, figs. 3 and 5, communicates, through ports t and c^1 , (see figs. 3 and 1,) with the supply-chamber of the cylinder, and it also communicates, through ports s , s , fig. 5, with the top part of the valve-chamber, and consequently the valve is forced down in the direction of the arrow marked near it in fig. 4. As the valve moves down the fluid in front of it is driven out through ports w , w , fig. 11, chamber n , and port a^2 , which communicates, through port e^1 , with the discharge-chamber b of the cylinder.

When the valve has reached the bottom end of its stroke the port f'^2 , figs. 4 and 10, comes opposite the port q in the chamber k of the piston, and the fluid passes through ports d , i , e^2 , f'^2 , q , and r , (see figs. 1, 3, 4, and 5,) into the space of the cylinder below the piston, and the piston is forced up. At the same time

the fluid in front of the piston is forced out through port v , chamber m , fig. 11, and port u of the piston, and through ports h'^2 , chamber d^2 , and port g^2 of the valve, figs. 10 and 12, and through port j of the piston and port f of the cylinder (see fig. 7) into the discharge-chamber b .

When the piston has reached the upper end of its stroke, (see figs. 7, 8, and 9,) the port a^2 comes opposite the port c leading into the supply-chamber a of the cylinder, and the fluid passes through these ports and the ports w , w , figs. 5, 8, and 11, into the valve-chamber, and the valve is caused to rise, the fluid in front of it being forced out through ports s , s , chamber l , and ports t' and e , into the discharge-chamber b of the cylinder.

From this description it will be understood that the motion of the valve is controlled by the motion and ports of the piston, and the motion of the piston by the motion and ports of the valve, the direction in which the fluid acts on the piston being changed by the motion of the valve, and the direction in which the fluid acts on the valve being changed by the motion of the piston.

The piston connects by a slotted bar, k^2 , and lever F , (see figs. 3 and 8,) with a rock-shaft, m^2 , from which the motion is transmitted to a suitable registering mechanism, so that the number of strokes of the piston will be registered. This connection may, however, be changed in various different ways.

It is also obvious that the fluid, instead of being admitted to the meter through pipe C and discharged therefrom through pipe D, might be admitted through pipe D and discharged through pipe C without changing the operation.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a fluid-meter, the combination of a piston-valve, F, which reciprocates in the bore of a hollow piston, E, being moved by the direct action of the fluid, with a piston which reciprocates in a cylinder, A, by the direct action of the fluid, said piston-valve, piston, and cylinder being provided with suitable ports, substantially such as herein described, for the purposes set forth.

2. The piston E, provided with an internal valve-chamber and with chambers g h k l m n , communicating with said valve-chamber through ports i j q u s s w w , substantially as herein shown and described.

3. The piston-valve F, divided in two chambers, c^2 d^2 , the chamber c^2 being provided with ports e^2 f^2 f'^2 , and the chamber d^2 with ports g^2 h^2 h'^2 , substantially in the manner set forth.

This specification signed by me this 22d day of October, 1870.

Witnesses:

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E. F. KASTENHUBER.