3. Sheets. Sheet. 1.

F. Wagner,

Fluid Meter.

No. 109359. Patented Nov. 15. 1870.

Fig: 1

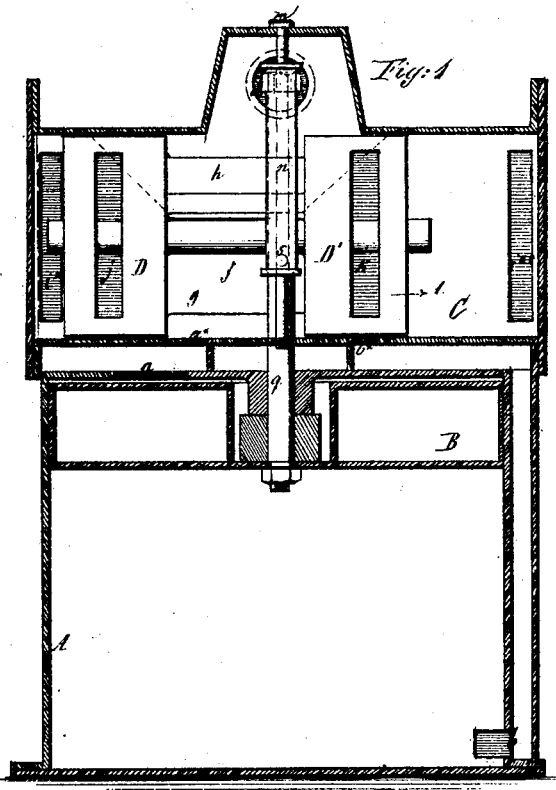
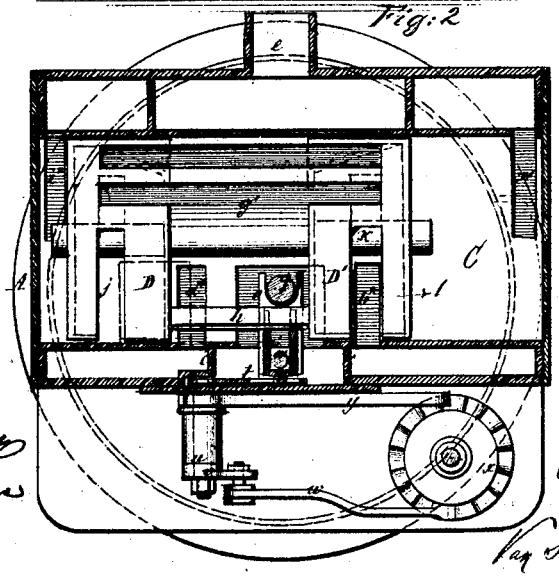


Fig: 2



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3 Sheets. Sheet 2.

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Fluid Meter.

No. 109,359. Patented Nov. 15. 1870.

Fig: 3

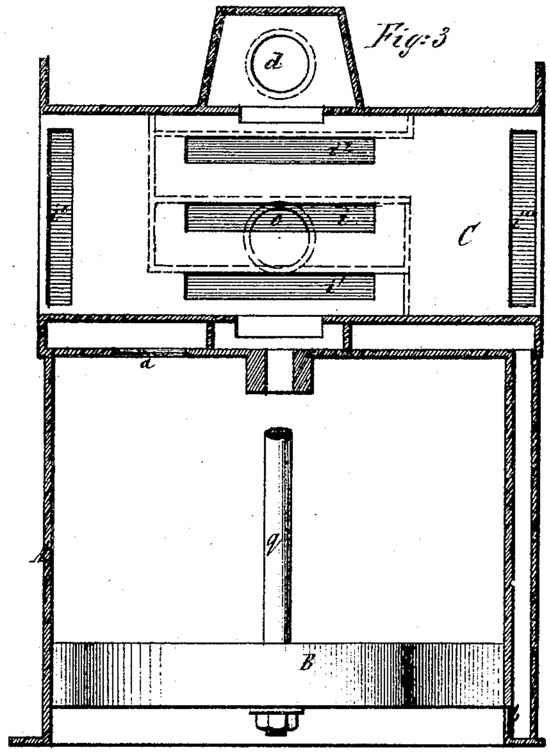
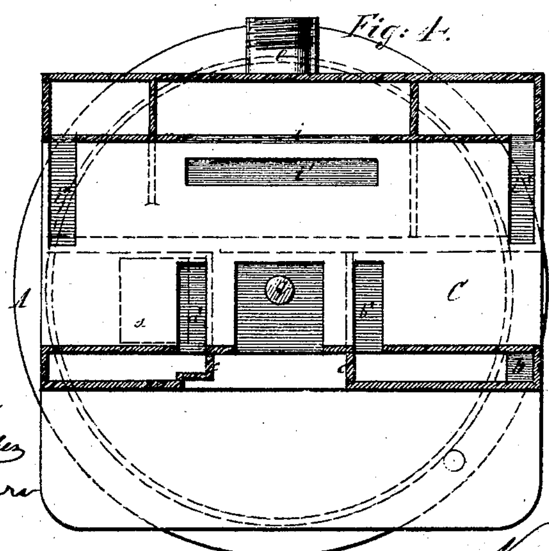


Fig: 4.



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F. Wagner, 3. Sheets, Sheet 3.

Fluid Meter.

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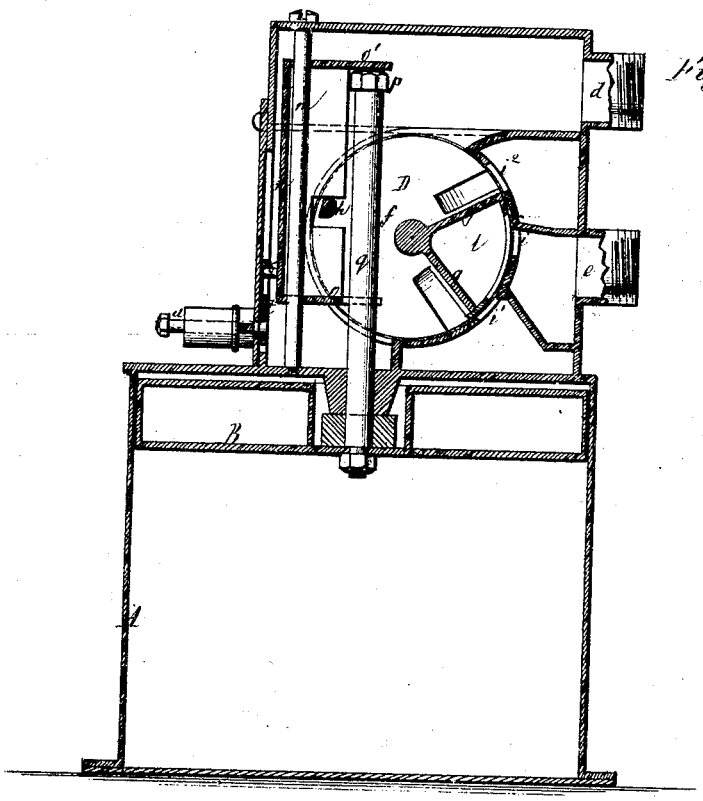
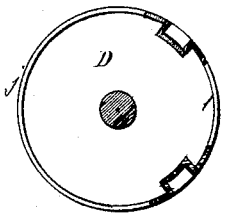


Fig: 5

Fig: 6.



Witnesses.
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UNITED STATES PATENT OFFICE.

FRANZIS WAGNER, OF NEW YORK, N. Y.

IMPROVEMENT IN FLUID-METERS.

Specification forming part of Letters Patent No. **109,359**, dated November 15, 1870.

To all whom it may concern:

Be it known that I, FRANZIS 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 vertical central section of this invention with the valve mechanism. Fig. 2 is a horizontal section of the same, showing valve mechanism and its connection with the registering apparatus. Fig. 3 is a vertical central section of the apparatus without the valve. Fig. 4 is a horizontal section of the same without the valve. Fig. 5 is a transverse section of the same with the valve mechanism. Fig. 6 is a transverse section of the piston-valve detached.

Similar letters indicate corresponding parts.

This invention relates to a single piston-meter, the valve of which receives a reciprocating motion by the action of the liquid to be measured, and a partially-revolving motion by the action of the piston of the measuring-cylinder, in such a manner that a valve mechanism for a single piston-meter is obtained in which the use of springs or weights is dispensed with, and the motion of which depends entirely upon the action of the liquid to be measured.

In the drawing, the letter A designates the measuring-cylinder, which is fitted with a piston, B, and which communicates through ports *a b* with the cylindrical valve-chamber C. This valve-chamber communicates with the port *a* through the port *a**, (see Figs. 2 and 4,) and with the port *b* through the port *b**, the ports *a* and *b* leading into the measuring-cylinder being separated from each other by partitions *c*. The valve-chamber communicates by an aperture, *d*, with the supply-pipe, and by an aperture, *e*, with the discharge-pipe of the meter; and the liquid, on passing in through the supply-aperture *d*, fills a space, *f*, which is situated between the two piston-valves D D′, which occupy the valve-chamber, and are connected together by a V-shaped partition, *g g′*, on one, and by a bar, *h*, on the opposite side. (Best seen in Fig. 5.) The discharge-aperture *e* does not lead directly into the valve-chamber, but it communicates with the same through a port, *i*, which is parallel to and situated between two other ports, i^1 i^2, which communicate with the opposite ends of the valve-chamber, the port i^1 being in communication with the port *i**, and the port i^2 with the port *i***. (See Fig. 3.) The piston-valves are provided each with a port, *j* or *k*, (see Fig. 1,) and these ports communicate both with the space *l*, between the V-shaped partition *g g*. (See Fig. 6.) Through the valve-chamber, near one end of the same, extends a rod, *m*, which forms a guide for a slide, *n*, which is provided with two lips, *o o′*, the lip *o* to catch below a nut, *p*, secured to the end of the main piston-rod *q*, while the lip *o′* is at such a distance from the lip *o* that the main piston has to travel over a large portion of its stroke before the slide *n* is moved. Said slide is provided with a notch, *r*, which straddles the connecting-bar *h* of the two piston-valves. (See Fig. 5.)

The action of the meter is as follows: If the position of the piston-valves and of the main piston is that shown in Figs. 1 and 2, the supply-opening *d* communicates with the space *f* between the piston-valves, and the fluid passes through the ports *a** and *a* into the upper part of the measuring-cylinder, and the main piston B is forced down. The lower part of the measuring-cylinder communicates, through the ports *b* and *b**, with the port *k* in the piston-valve D′, and, through this port, with the space *l* between the V-shaped partition *g g′*, and with the port *i* and discharge-opening *e*. As the main piston is forced down, therefore, the fluid in the lower part of the measuring-cylinder discharges. At the same time the ports i^2 and *i*** of the valve-chamber are in communication with the supply-opening *d*, while the ports i^1 *i** communicate with the discharge-opening *e*. When the main piston approaches the lower end of its stroke, the slide *n* imparts to the piston-valves a partially-revolving motion, whereby the ports i^1 *i** are brought in communication with the space *f* and supply-opening *d*, and the ports i^2 *i*** with the discharge-opening *e*. The fluid, therefore, presses on the outer end of the piston-valve D, and forces the same in the direction

of arrow 1, (Figs. 1 and 2,) and by the time the main piston has reached the bottom end of its stroke the port b^* is brought in communication with the supply-opening d, and the port a^* in communication with the discharge-opening e, the main piston begins to rise, the liquid in the upper part of the measuring-cylinder discharges, the piston-valves are partially revolved, and the supply and discharge are again changed.

From this description the operation of the measuring devices will be readily understood, and it remains to explain the connection between the measuring mechanism and the registering apparatus.

From the slide n projects a stud, s, which catches in a slotted lever, t, secured to the inner end of a rock-shaft, u. On the outer end of this rock-shaft is mounted a lever, v, which carries a pawl, w, that engages with the teeth of a ratchet-wheel, x. A stop-pawl, y, prevents this ratchet-wheel from turning in the wrong direction. By these means the ratchet-wheel x is propelled, one tooth for each double stroke of the main piston, and the motion of the ratchet-wheel is communicated, by suitable gear-wheels, to the registering mechanism, which is inclosed in a case secured to the side of the valve-chamber.

It is obvious that, in this fluid-meter, the supply and discharge opening can be changed—that is to say, either of the openings d and e can be used as the supply or as the discharge opening without changing the result.

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

1. The arrangement of piston-valves, having a reciprocating motion imparted to them by the direct action of the fluid to be measured, and a partially-revolving motion imparted to them by the action of the fluid to be measured on the main piston in the measuring-cylinder, substantially as herein shown and described.

2. The piston-valves D D′, provided with ports j k, and a V-shaped space, l, in combination with ports i i^1 i^2 i^* i^{**}, inlet and outlet openings d e, ports a^* b^* a b, and a measuring-cylinder, A, all substantially as herein set forth.

3. The slide n, in combination with the main piston B and with the piston-valves D D′, substantially as described.

4. The lever t, rock-shaft u, lever v, pawl w, and ratchet-wheel x, in combination with the slide n and piston B, substantially as set forth.

This specification signed by me this 30th day of April, 1870.

FRANZIS WAGNER.

Witnesses:
W. HAUFF,
C. WAHLERS.