(No Model.) 2 Sheets—Sheet 1.

W. T. TRAVIS.

WATER METER.

No. 264,375. Patented Sept. 12, 1882.

Fig. 1.

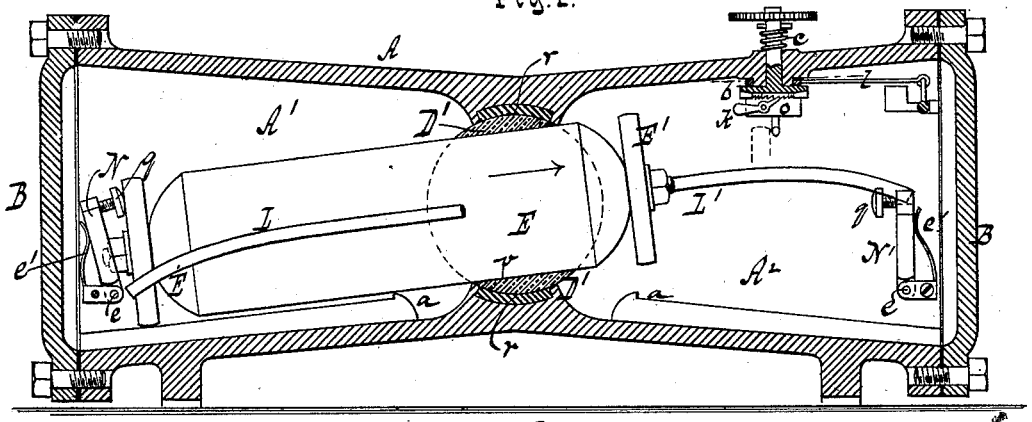
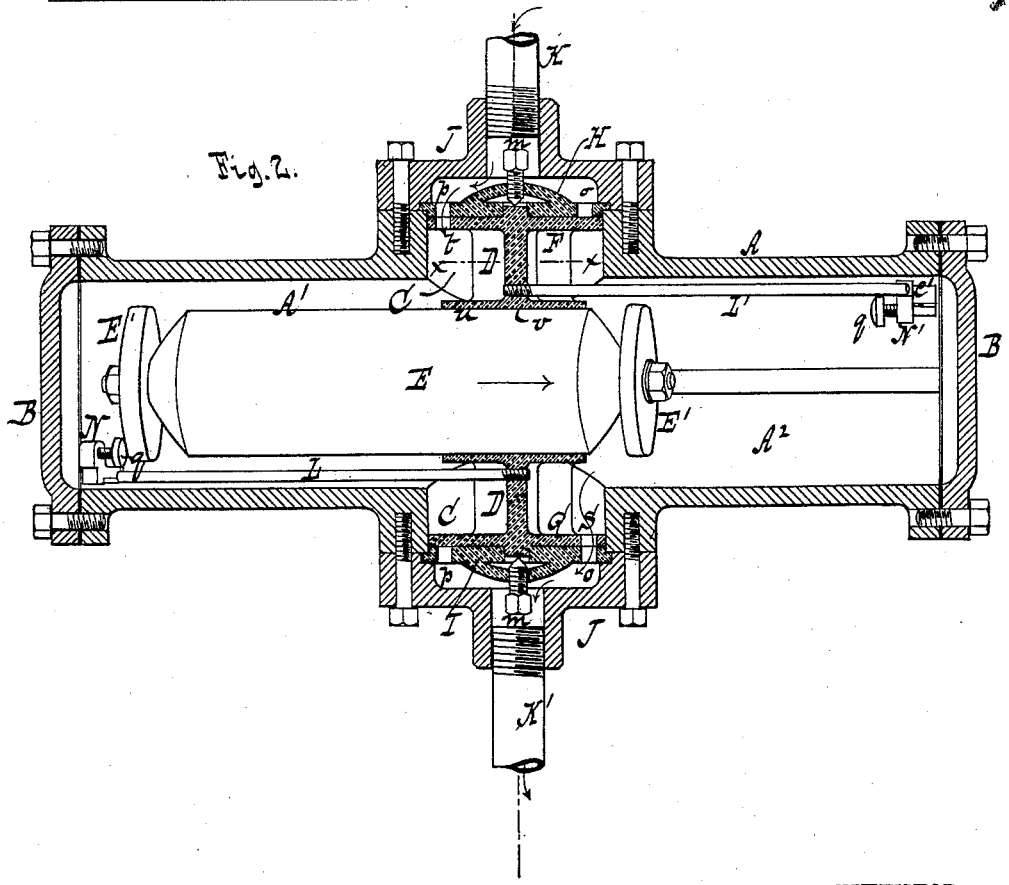


Fig. 2.



WITNESSES:

Otto Hufeland

William Miller

INVENTOR

William T. Travis

BY Van Santvoord & Hauff,

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

W. T. TRAVIS.

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Fig. 3.

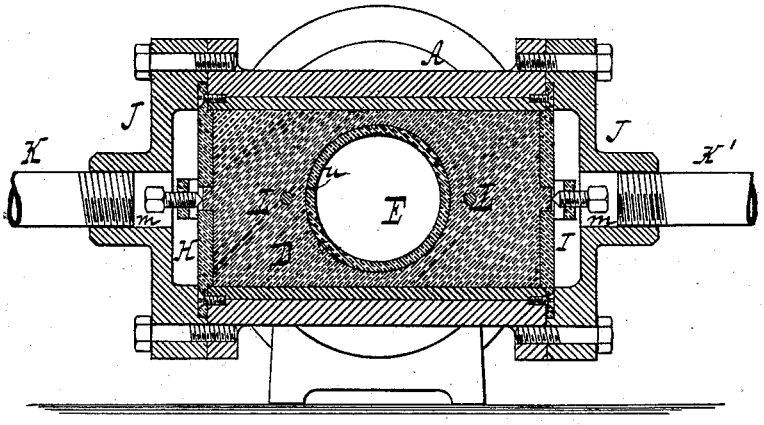


Fig. 4.

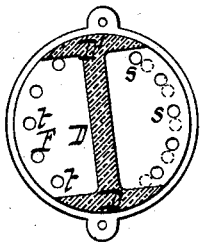


Fig. 6.

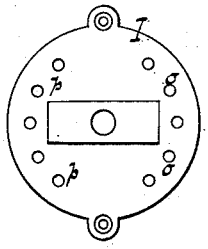
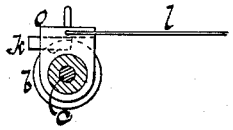


Fig. 5.



WITNESSES:

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BY Van Santvoord & Hauff

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM T. TRAVIS, OF BROOKLYN, NEW YORK.

WATER-METER.

SPECIFICATION forming part of Letters Patent No. 264,375, dated September 12, 1882.

Application filed May 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. TRAVIS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Water-Meters, of which the following is a specification.

This invention consists in a water-meter wherein the liquid acts on a detached reciprocating plunger fitted into a hub centrally of an oscillating diaphragm, which is arranged in the meter-casing and operates induction and eduction valves to admit and discharge the water alternately on opposite sides of the diaphragm, and wherein a reversing mechanism operates to release the plunger and permit it to fall at its leading end by gravity, in both strokes thereof, for giving motion to the diaphragm, and wherein the plunger actuates a registering mechanism, as hereinafter more fully set forth.

This invention is illustrated in the accompanying drawings, in which Figure 1 represents a vertical longitudinal section. Fig. 2 is a horizontal section. Fig. 3 is a vertical central cross-section. Fig. 4 is a cross-section of the diaphragm on the line *x x*, Fig. 2. Fig. 5 is a detail view of the registering mechanism, and Fig. 6 is a detached view of one of the valve-seats.

Similar letters indicate corresponding parts.

The letter A designates the meter-casing, which is cylindrical in its horizontal section, as shown in Fig. 2, and diverges toward the opposite ends in its vertical section, as shown in Fig. 1, to permit the required motions of the plunger, hereinafter explained. The opposite ends of this casing are closed by removable heads B, and at about midway between the ends thereof are transverse coincident openings C to admit the diaphragm and concomitants.

The letter D indicates the diaphragm, which is opposite the center of the case-openings C, and hence is at or near the mid-length of the casing. The upper and lower edges of the diaphragm are made in form of segments D′, and in the required portions of the casing are formed bearings *r* for such segments, whereby the diaphragm is adapted to receive an oscillating or rocking motion. In the center of the diaphragm is a circular opening, *v*, having a ring or cylinder, *u*, upon its edge, forming a hub, and into this hub is fitted the plunger E, the latter being left detached from any other part and sliding freely in the hub.

The letter F designates the induction-valve, and G the eduction-valve, each composed of a disk having two series of ports, *t s*, and both fixed to the diaphragm concentric with the segments D′—namely, at the opposite ends of the diaphragm. It is preferred to cast the valves F G, as well as the hub *u*, in one piece with the diaphragm, and the point at which the valves are applied to the diaphragm is between the said two series of valve-ports *t s*, as shown in Fig. 4. The letters H I denote two disks or plates, forming seats for the valves F G. These valve-seats are arranged side by side with the valves, respectively, and abut against the edges of the case-openings C by means of flanges formed thereon, they being held in position by caps J, which are secured to the casing by a water-tight joint. Pivots *m* are arranged in the valve-seats for centering the valves.

To the caps J respectively are connected a water-supply pipe, K, and a water-discharge pipe, K′, one corresponding to the induction-valve and the other to the eduction-valve.

In the valve-seats H I are two series of ports, *p o*, which are adapted to register alternately with the valve-ports *t s*—that is to say, when one series of ports of either valve and seat register the other series of the same valve and seat are out of registration. The arrangement of the two series of ports of either valve and seat, moreover, is such relatively to the other that the valves open on opposite sides of the diaphragm—namely, by means of the ports—in the working of the apparatus, as indicated in Fig. 2.

Projecting from the diaphragm in opposite directions are two rods, L L′, and within the casing are two steps or catches, N N′, for supporting such rods. These steps are respectively hung on a pivot, *e*, and subjected to the action of a spring, *e′*, or a weight, having a tendency to bring and retain the same in a vertical position while they are arranged near the opposite ends of the casing in position to be displaced by the plunger, each step, moreover,

being provided with a set-screw, *q*. When the plunger is in the compartment A′ of the casing, as shown in the drawings, the ports *t* of the induction-valve and the ports *s* of the eduction-valve register with the appropriate ports of the valve-seats, to admit water to the compartment A′ and allow its discharge from the compartment A^2 while the rod L′ of the diaphragm rests on the step N′. The water entering the compartment A′ displaces the plunger, forcing it toward and into the compartment A^2, and when the plunger meets the step N, which is the end of one of its strokes, it pushes the step back against the action of its spring or weight a sufficient distance to clear and release the free end of the rod L. In this manner the leading end of the plunger is permitted to fall by gravity, and it thus changing its position or angle, the plunger acts on the valves F G through the medium of the diaphragm D to reverse the valves. The water now enters the compartment A^2 and discharges from the compartment A′, while the rod L takes its position on the step N, and when, by the action of the water, the plunger has been brought to the end of the ensuing second stroke, it displaces the step N, and, falling, again reverses the valves. The plunger then moves in the direction first named, and so on as long as the flow of water continues. In one stroke of the plunger E it acts on a pawl-arm, O, (see Figs. 1 and 5,) which is mounted on an arbor, *c*, carrying a cog-wheel, *f*, to connect with a train of gearing arranged to form a registering mechanism. The pawl *k* of the pawl-arm engages a ratchet-wheel, *b*, fixed to the arbor *c*, to impart a step-by-step motion to such wheel, and from the pawl-arm extends a link, *l*, whereby it is connected to a pivoted return-weight, *l′*, the whole being arranged in the top of the meter-casing. Supplementary heads E′ are secured to the opposite ends of the plunger, for its action both on the steps N N′ and the pawl-arm O of the registering devices, and stops *a*, arranged on the bottom of the casing in the path of these heads, serve to prevent an excessive motion of the plunger.

It should be remarked that valves independent of the diaphragm, but in engagement therewith, can be used instead of the disks F G; also, that other reversing mechanism can be devised and used in lieu of the reversing-rods and supporting-steps, and the desired purpose can be attained by making grooves of suitable shape in the sides of the meter-casing and providing the plunger with studs to engage the grooves. The registering mechanism, moreover, can be modified as circumstances may render expedient.

The diaphragm, plunger, and valves herein described can also be applied with suitable modifications to steam-engines, and I reserve the right to make such feature the subject-matter of a separate application for Letters Patent.

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

1. The combination, substantially as hereinbefore set forth, of the meter-casing, the oscillating diaphragm having a central hub, the induction and eduction valves arranged on opposite sides of the casing in engagement with the diaphragm, the detached reciprocating plunger fitted into the diaphragm-hub, the reversing mechanism operating to automatically release and permit the leading end of the plunger to fall by gravity in both strokes thereof, and the registering mechanism arranged to be actuated by the plunger.

2. The combination, substantially as hereinbefore set forth, of the meter-casing, the induction and eduction valves, each composed of a disk having two series of ports, the oscillating diaphragm having the disks fixed to it between their said two series of ports, the valve-seats having two series of ports adapted to register alternately with those of the disks, the detached reciprocating plunger, the reversing mechanism, and the registering mechanism.

3. The combination, substantially as hereinbefore set forth, of the meter-casing plunger, the oscillating diaphragm, the rods projecting from the diaphragm, the steps for supporting such rods, arranged to be displaced by the plunger, the induction and eduction valves, and the registering mechanism.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

WILLIAM T. TRAVIS. [L. S.]

Witnesses:
W. HAUFF,
CHAS. WAHLERS.