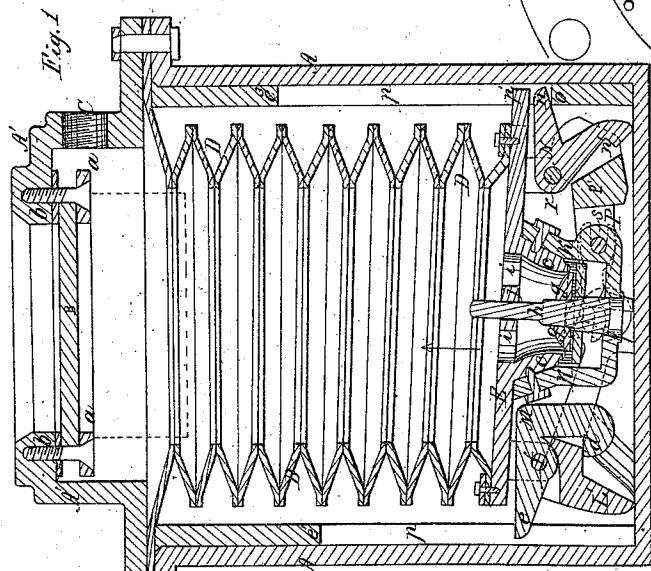
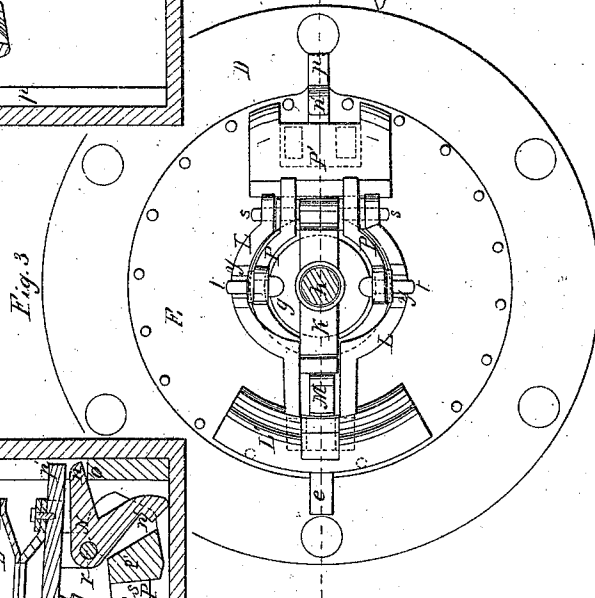
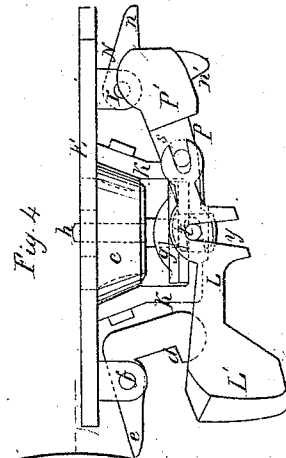
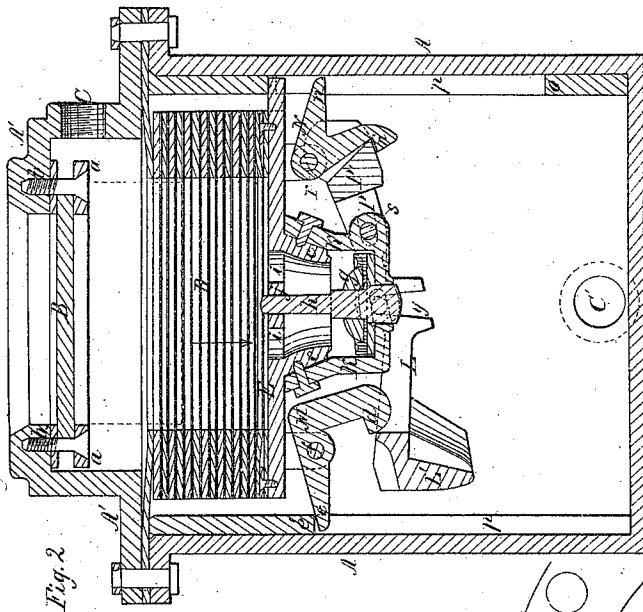


No. 90,123.

PATENTED MAY 18, 1869.

T. POORE.
FLUID METER.

2 SHEETS—SHEET 1.

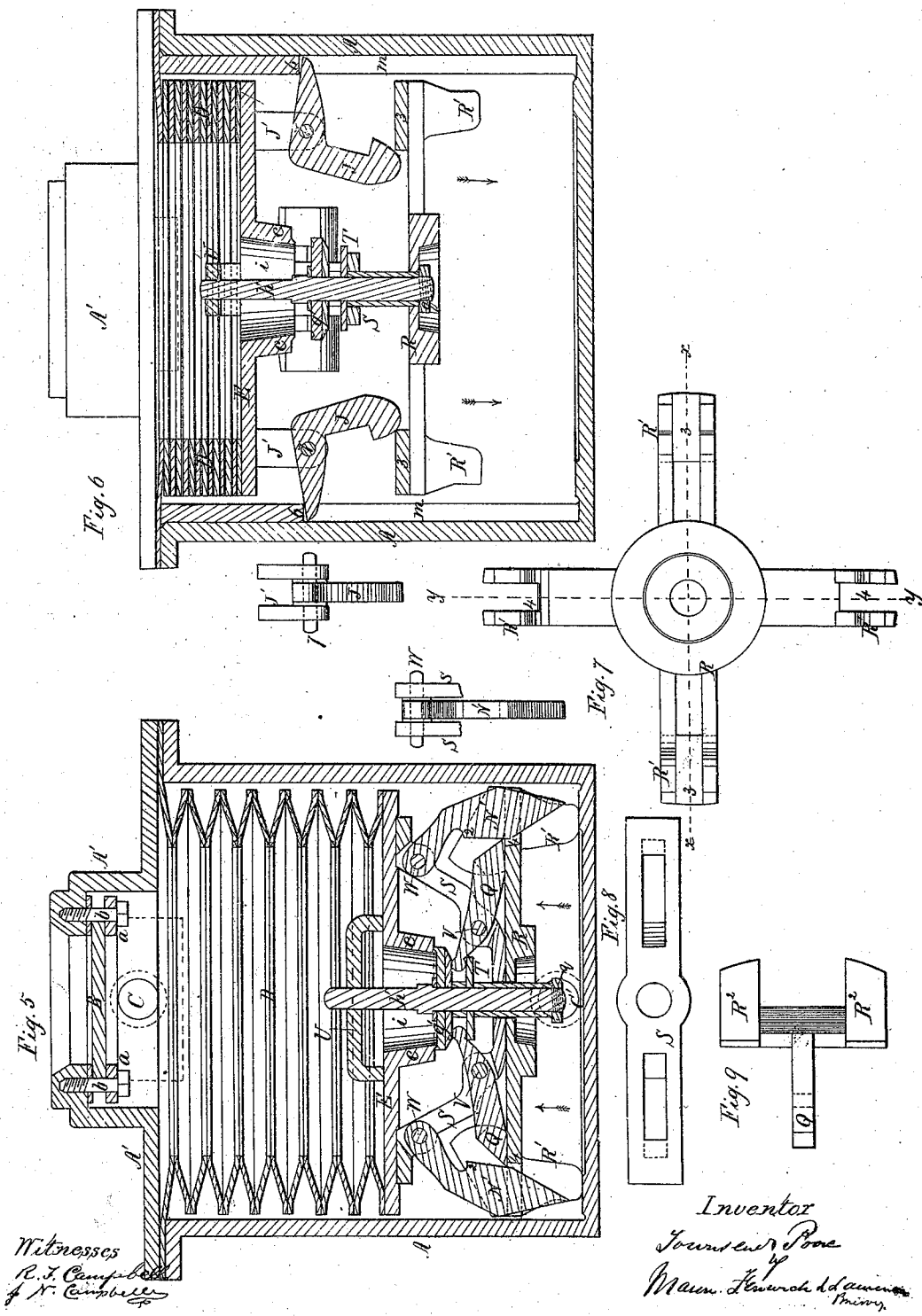


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2 SHEETS—SHEET 2.



United States Patent Office.

TOWNSEND POORE, OF SCRANTON, PENNSYLVANIA.

Letters Patent No. 90,123, dated May 18, 1869.

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, TOWNSEND POORE, of Scranton, in the county of Luzerne, and State of Pennsylvania, have invented certain new and useful Improvements on Fluid and Gas-Meters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, sheet 1, is a diametrical section through one form of my improved meter, showing the several parts which actuate the valve in the position they would occupy when the valve is closed, and its disk is about to rise and collapse the expansible receiver, or bellows.

Figure 2, sheet 1, is a similar view of the same parts, in their proper positions when the valve is open and the receiver about to expand and allow water to pass through the valve-opening.

Figure 3, sheet 1, is a bottom view of the valve and its mechanism.

Figure 4, sheet 1, is a side view of the valve and its mechanism.

Figure 5, sheet 2, is a diametrical section through a meter, the valve of which is controlled by mechanism differing somewhat in its construction from that shown on sheet 1. In this figure the valve is shut, and the parts in proper position for causing the receiver, or bellows to collapse, by the influx of water beneath it.

Figure 6, sheet 2, is a diametrical section, taken through the meter at right angles to the sectional plane of fig. 5, indicating the valve open, and the parts in position for allowing the receiver, or bellows to descend, by its own gravity, through the body of water beneath it.

Figures 7, 8, and 9, are details of three parts of the valve-mechanism of figs. 5 and 6.

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

This invention relates to certain novel improvements on the actuating-mechanism of meters, which are designed for indicating, by measure, the quantity of fluid or gas caused to pass through them.

The object of my invention is mainly to cause an uninterrupted current of water or other liquid, or a current of gas, under a head, to communicate a reciprocating motion, with regular strokes, to a disk, piston, or plate, arranged within a case through which the fluid is conducted; and to this end, I employ, within a case of suitable construction, an expansible receiver, or bellows, or the equivalent thereof, through the valve-opening of which fluid is required to pass, on its way to the outlet of said case; and I connect to the valve-stem and disk of said receiver, or bellows, certain levers, weights, and latches, which are so con-

structed and combined that they will automatically operate to open and lock open the valve, when the receiver has been properly collapsed by the pressure of entering fluid on one side of its disk, and thereby allow the receiver to dilate, by the gravity of its valve-disk and appendages, and also automatically operate to shut the said valve when the receiver has been properly dilated, and keep it shut until it is again collapsed. In this manner, I cause the valve-disk to receive a reciprocating motion, with regular strokes, which can be transmitted, in any convenient manner, to suitable mechanism that will record the strokes, and consequently the quantity of fluid passed through the case of the meter, all as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings—

A A' represent a case, within which work the improved devices, which I shall hereinafter describe.

This case is preferably constructed of a cylindrical form, but may be made of any other form, with a removable cap, or cover, A', secured, by flanges and bolts, to the upper end of the body, A, and having a glass plate, B, secured, air-tight, within its reduced cylindrical portion, through which registering-mechanism can at any time be seen.

The outlet-opening, C, is also made through this upper section, A', of the case.

The lower section, A, is constructed with an inlet, C', and also with vertical grooves, *p p*, arranged diametrically opposite each other, and designed to serve as guides, as will be hereinafter shown.

Within this case is a circular receiver, or bellows, which may be made of any suitable material, and which is confined, at its upper open end, between the flanges of the two parts A A', of the case, as shown in figs. 1 and 2, thereby making a packed joint at this point.

The lower end of the receiver, or bellows, is secured air-tight to the top of a circular plate, E, through the centre of which is an opening, *i*, for the passage upward of water or other fluid.

Surrounding this opening *i*, and extending down from the bottom of the disk E, is a collar, *c*, the lower end of which serves as a valve-seat for a vertically-movable valve, *g*.

This valve is prepared so that it will close tightly, and prevent the passage of water or gas when it is closed, and its stem, *h*, is held in proper position by the two bridges *j* and K, as shown in figs. 1 and 2.

In practice, I shall make valve-stem *h* of a substance which will not readily corrode, so that it will not work hard from this cause.

When the valve *g* is open, it rests upon a seat formed by the depressed bridge, or stirrup K, as shown in fig.

2; and when this valve is shut, it is held firmly in contact with the seat *c*, by the combined pressure of the inflowing water and a loaded lever, *P P'*, as shown in fig. 1.

The valve *g* has studs, *t t*, projecting from its circumference, diametrically opposite each other, as shown in fig. 3, to which studs the forked ends of a loaded lever, *P P'*, are loosely attached.

This lever is pivoted to the stirrup, or pendent bridge *K*, at *s*, so that when its loaded end *P'* is released from its hooked catch, *N'*, and it is not counterbalanced by a loaded lever, *L L'*, the weight *P'* will cause the valve *g* to rise to its seat, as shown in fig. 1.

The arms *P P'*, of the loaded lever, are arranged on opposite sides of the stirrup *K*, and curved outward, as shown in fig. 3, and the loose or forked connections of these arms *P P'*, to the studs *t t* of the valve *g*, will prevent the valve-stem *h* from liability to bend in consequence of being moved by arms which vibrate.

On the opposite side of the valve *g*, to the loaded lever *P P'*, and arranged in line therewith, is another loaded lever, *L L'*, the object of which is to open valve *g*, at the termination of the upward stroke of the valve-disk *E*, when the receiver, or bellows has fully collapsed.

This lever, like the one described for closing valve *g*, at the termination of the downward stroke of valve-disk *E*, is constructed of two arms, *L L'*, with a weight, *L'*, on their outer ends.

The arms *L L'* are curved around the arms *P P'*, as shown in fig. 3, and connected loosely to the pivot-pin *s*, which, as above shown, is the fulcrum of the loaded lever *P P'*, and by means of the forks *y y*, formed on arms *L L'*, these arms are loosely attached to the studs *t t*, on the valve-stem, so that when the catch *M* is tripped by the shoulder, or abutment *e'*, or its equivalent, on case *A*, and the lever *L L'* released, its loaded end, *L'*, will drop, and open the valve *g*, and also lift the loaded end of the lever *P P'* high enough to be caught and held by the hooked nose *n'*, catch *N'* thereby opening and locking open the valve, so that it cannot casually return to its seat until the proper time for it to do so.

The arms of lever *L L'* will rest upon the valve-studs *t t*, until the disk *E* descends far enough to allow the loaded end, *L'*, to land upon the bottom of the case *A*, when the disk will further descend, until the valve *g* is shut.

The valve *g* is shut by the force of the inflowing fluid through aperture *C'*, together with the weight *P'*, when this weight is released from its catch by the tail *n*, of the latter, coming in contact with the abutment *o*, near the bottom of case *A*, but this does not take place until the loaded end of lever *L L'* is engaged with the hooked nose *d*, of catch *M*, as shown in fig. 1.

Immediately upon the shutting of valve *g*, the disk *E* commences to ascend, by the pressure or the inflowing fluid against its bottom, and continues to ascend until the tail *e*, of catch *M*, impinges against the abutment *e'*, and thus releases the lever *L L'* from the hooked nose *d* of said catch, when its loaded end will drop, and open valve *g*, and lock it open again, as above described.

Both catches *M* and *N'* are so connected, by their respective pivots, to the bottom of disk *E*, that their hooked, or latching-ends preponderate, and will automatically catch under their respective levers at the proper times.

It will be seen, from the above description, that fluid cannot pass through the case *A A'* without first entering the receiver, or bellows *D*, through the valve-opening *i*, in order to do which the pressure of the fluid must raise the disk *E* to the full length of its ascending stroke, so as to open the valve *g*. When this is done, the weight of the said disk and its appendages will cause them to descend through the fluid until the valve is again shut, when the disk will again rise.

I have not represented mechanism for registering

the strokes of the disk *E*, as any well-known mechanism, adapted for such purpose, may be used, and connected in any convenient manner with the said disk.

I prefer to arrange such mechanism as may be adopted within a perforated case, depending from the cover *A'*, within the receiver *D*, and directly below or opposite the transparent plate *B*, although I do not confine myself thereto.

The perforated case is indicated by dotted red lines in figs. 1 and 2, and will act as a strainer, to prevent foreign substances in the fluid from entering and interfering with the working of the registering-mechanism. By thus having the registering-mechanism work within the water in the receiver, I avoid the objections attending a stuffing-box for the device used to transmit the strokes, or pulsations of the disk *E* to said mechanism.

The figures represented on sheet 2, of the drawings, show a contrivance which will effect the same results, and which operates upon the same principle as the contrivance above described.

A A' represent the case of the meter.

B, the glass plate, which is confined in the cover, *A*

C is the outlet for the fluid, and

C', the inlet therefor.

D is the expansible receiver, or bellows, and

E' is the disk to which its bottom edge is secured air-tight.

The valve-opening *i* and seat *c* are arranged in the centre of the disk *E*, and the valve *g* has a vertical movement in opening and closing.

All of these parts may be constructed as described for similar parts on sheet 1.

The valve-stem *h* is guided by the bridge *U* and the depressed stirrups *S*.

The bridge *U* should be depressed like the bridge *j*, in figs. 1 and 2.

Between the bottom of valve *g* and a disk, *T*, which is fast on valve-stem *h*, the rounded inner ends of two loaded levers, *Q R'*, *Q R''*, are placed so that when the loaded ends, *R' R''*, are released from catches *N' N''*, and drop, as shown in fig. 5, they will shut the valve *g* against its seat, and when the valve is opened, by a weight, *R*, as will be hereinafter shown, the loaded ends of said levers will be raised, and caught by the hooks *2 2*, of the catches *N' N''*.

The loaded levers are pivoted, at *V V*, to the slotted stirrup *S*, a top view of which is shown by fig. 8, and the catches *N' N''* are pivoted to said stirrup, at *W W*, shown in fig. 5.

The catches *N'* are both constructed alike, and each one is so pivoted, with relation to the catching portion of its loaded lever, as to automatically catch thereunder at the proper time for locking the valve *g* open at the termination of the ascending strokes of disk *E*.

To the valve-stem *h*, and beneath the stirrup *S*, a weight, *R*, is applied loosely, or so as to slide freely for a short distance on this valve-stem.

This weight *R* consists of a central hub, having four arms radiating from it, and arranged at regular distances apart; and from the bottom side of each arm at or near its outer extremity, are feet, *R'*, which support the weight upon the bottom of the case *A*, when in position shown in fig. 5.

Two of the arms of said weight *sa* slotted, at *4 4*, to receive through them the catches *N'*, as shown in figs. 5 and 7, and two of these arms are slotted, and provided with catching-pieces, *3 3*, as shown in figs. 6 and 7.

In fig. 6, *J J* are two hooked catches, which are connected to the disk *E*, by lugs, *J' J'*, and pivots, *7 7*, so as to catch under the pieces *3 3*, on two of the arms of weight *R*, when this weight is landed on the bottom of case *A*, and thus hold the valve *g* shut, and allow the said weight to be carried up with the disk *E*.

The outer ends, or tails of catches J, work in vertical grooves, *m m*, made in the case A, which grooves terminate, at their upper ends, at abutments, 6 6, against which the tails of these levers impinge, to release the weight R, and allow it to open valve *g'* by its gravity, as shown in fig. 6.

The catches J J are arranged in a vertical plane, at right angles to the plane of the two catches N' N', and therefore do not appear in the sectional view, fig. 5.

The operation of the parts shown in figs. 1 and 6 is as follows:

Water or other fluid being let into the case A, through inlet C, and valve *g'* being shut, as shown in fig. 5, the disk E will rise until the tails of catches J J impinge against the abutments 6 6, and release the weight R, when this weight will drop on a nut, or stop, *q*, on valve-stem *h*, far enough to open valve *g'*, as shown in fig. 6. When this takes place, the loaded ends R² of levers Q Q will be thrown up and caught by the gravitating-catches N' N', thus locking the valve *g'* open, and allowing the disk E to descend, while the water passes into the receiver, or bellows D, through the opening *i*.

The weight R first reaches the bottom of the case A, and as the disk E continues to descend further, the bevelled inner edges of the gravitating-catches N' N' will impinge upon the outer edges of arms 4 4, and these catches will be moved outward far enough to release the levers Q Q, and allow their loaded arms R² R² to assist the upward pressure of the fluid in shutting the valve *g'*. During this operation, and just before the valve *g'* is shut, the hooked ends of catches J J will fall under the plates 3 3, so as to carry up the weight R again when disk E rises.

In the meter shown upon sheet 1, the valve is opened by a loaded lever, and in the meter last described, the

valve is opened by a weight, R, which is applied loosely to the valve-stem, so as to drop, when released, upon a nut, *q*, on the lower end of said valve-stem, which latter plan I consider to be the equivalent of the loaded lever as arranged.

Having described my invention,

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

1. The loaded levers P, applied to disk E, or its equivalent, and so connected to valve *g* as to shut this valve at the termination of the down-strokes of said disk, substantially as described.

2. The loaded lever L, applied to disk E, or its equivalent, and provided with a gravitating-catch, M, and so connected to the valve *g*, and loaded lever P, as to open this valve at the termination of the up-strokes of the disk E, substantially as and for the purposes described.

3. The combination of loaded levers L and P, and their respective catches, with valve *g*, and reciprocating disk E, said parts being so constructed and arranged as to operate to shut valve *g*, at the termination of the down-stroke of disk E, and to open and lock open the valve at the termination of the up-stroke of said disk, substantially as described.

4. The combination of the gravitating-latches and catches, with a reciprocating valve-disk, E, of a fluid-meter, arranged and constructed so as to automatically open and lock open the valve of said disk, at the termination of its up-stroke, so that the valve cannot casually shut while the disk is descending by gravity, substantially as described.

TOWNSEND POORE.

Witnesses:

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