

G. Sichel's.

Water Meter.

N^o 88,221.

Patented Mar. 23, 1869.

Fig. 1.

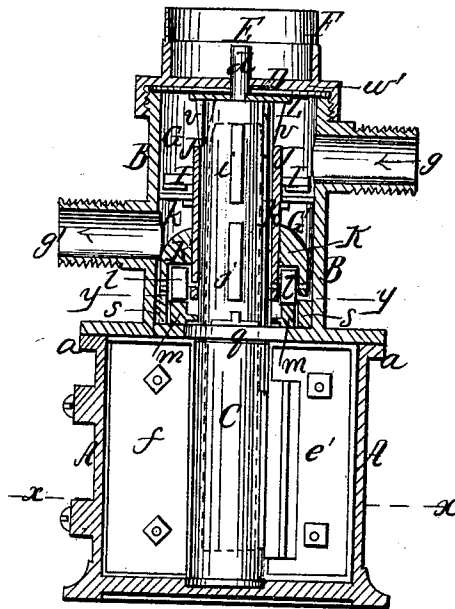


Fig. 2.

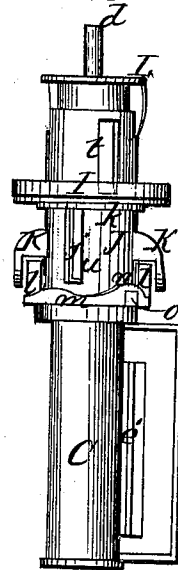


Fig. 3.

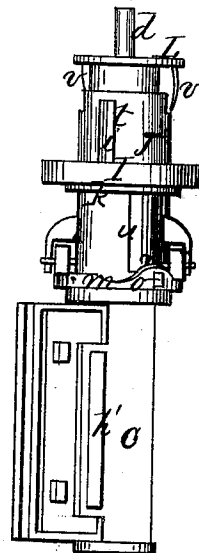


Fig. 6.

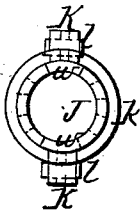


Fig. 5.

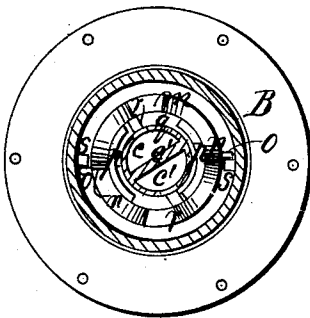
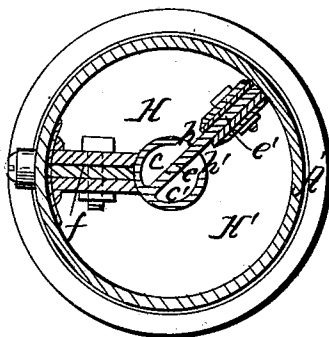


Fig. 4.



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GERARD SICKELS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **88,221**, dated March 23, 1869.

To all whom it may concern:

Be it known that I, GERARD SICKLES, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Water-Meters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a central vertical section of my improved water-meter. Fig. 2 is a perspective view of the upright hollow shaft in one position. Fig. 3 is a similar view of the same in another position. Fig. 4 is a horizontal section on the line *x x* of Fig. 1. Fig. 5 is a section on the line *y y* of Fig. 1. Fig. 6 represents views of detached parts of the apparatus. Fig. 7 is a modification of my invention.

Similar letters indicate like parts in the several figures.

The object of my invention is to provide a simple, cheap, and effective apparatus for accurately measuring the flow of water; and the invention consists in so constructing a valve, piston, or sleeve, resting on a ring provided with double inclines, that as the water is let in above the piston or sleeve will be pressed downward, thus causing a downward spiral movement to the same, the said piston or sleeve being provided with slots or ports on its sides, so arranged in relation to ports in a hollow shaft (or in an outside cylinder, as the case may be) as to change the direction or current of the water from one side to the other of the movable wing in the lower cylinder, whereby a semi-rotating motion is imparted to the shaft in opposite directions, the said shaft in turn acting upon the cone-ring, so as cause a change in the position of the cone-ring relatively to the sleeve or piston.

Referring to the drawings, A represents a cylinder of any suitable metal, open at the top and provided with a flange, *a*, upon which rests the bottom of an upper cylinder, B, of smaller diameter than A, the two being properly secured together.

The cylinder B is divided into two chambers by means of a diaphragm, I, in the upper one of which is the induction-pipe *g*, and in the lower the eduction-pipe *g'*. Upon the top of cylinder B is screwed the cap D, provided with

an upwardly-projecting flange, so as to form a chamber or space in which the proper registering apparatus may be placed.

C represents a hollow shaft, which has its lower bearing in a depression in the bottom of the cylinder A, its upper end being provided with a pintle, *d*, passing through the cap D, and which may be connected with the register.

The shaft C is made to fit snugly, but so as to move freely, in the bottom of cylinder B. It is divided into two chambers, *c c'*, Figs. 4 and 5, by means of a partition, *e*, which extends the whole length of the shaft, and also extends through a slot in that part of the shaft C which is in cylinder A, so as to form a wing, *e'*, on each side of which, and extending beyond its edges, are pieces of leather or other suitable material extending to the top, bottom, and periphery of chamber H H' in cylinder A, so as to render the wing water-tight at its edges, and still allow it to move freely in the cylinder A.

On each side of the wing *e*, in shaft C, is an opening, *h h'*, so as to allow of the entrance and exit of the water.

On the inner side of the cylinder A is the stationary partition *f*, bearing against the shaft C, and made water-tight, thus dividing the cylinder A into two chambers or compartments, H H', to which water is admitted through chambers *c c'* and openings *h h'*, respectively.

The upper part of the hollow shaft C, in chambers G G', is provided with openings or upper ports, *i*, and lower ports, *j*, communicating through chambers *c c'* to chambers G G', respectively.

Around the portion of the shaft C, in cylinder B, is a sleeve, J, provided with a flange, *k*, which bears against the under side of diaphragm I, and also with downwardly-extending arms K, in the lower ends of which are arranged rollers *l*. These rollers rest upon and over a loose circular rim, *m*, provided with double inclines *n*, Figs. 2 and 3, on its upper surface, and short projections *o* on the outer periphery, while on its inner periphery it has two flanges, *p*, which rest on a flange, *q*, around the shaft C, the movement on the rim *m* on the flange *q* being limited to the distance between the ends of flanges *p* by means of short projections *r* on flange *q*. The movement of the

rim with the shaft in cylinder B is also limited by projections *s*, against which projections *o*, on the outer periphery of rim *m*, strike when the latter is moving around its center.

The sleeve J is provided with upper slots or ports, *t*, and lower ones, *u*. The latter are situated, one on each side of the sleeve, between the arms *k*, in such a manner that both are nearer to one and the same arm *k* than to the other, while the upper openings, *t*, are similarly arranged on the opposite side of the sleeve. By this arrangement of slots the ports *i* of chamber *c* and port *j* of chamber *c'* will be open, while the port *i* of chamber *c'* and port *j* of chamber *c* will be closed.

L represents a circular plate fitted over the pintle *d*, and provided with two downwardly-projecting pieces, *r*, which slide in grooves in the shaft C, and limit the play of sleeve J to the space between the edges of square open slots or recesses *w* in the upper portion of the sleeve.

Chamber G is made water-tight by a packing, *w'*. Diaphragm I is also provided with a suitable water-tight packing, and moves up and down with the sleeve J.

The operation is as follows: The sleeve J being in such position relatively to the shaft C that the port *i* of chamber *c* is open, as well as the port *j* of chamber *c'*, the wing *e'* in such position in relation to partition *f* so as to make chamber H very small, and the rollers *l* of sleeve J in the hollow of rim *m*, as shown in Fig. 2, water is then admitted through induction-pipe *g* into chamber G, and, passing through the port *i* into chamber *c* of shaft C, (port *i* of chamber *c'* being closed by sleeve J,) enters, through opening *h*, into chamber H, and forces wing *e'* to one side, turning the shaft C (all the parts attached to it retaining their relative positions) until the projection *o* on rim *m* strikes against pins *s* and arrests the rim, the shaft continuing to turn, and the pieces *u* on plate L forcing the sleeve J to turn with the shaft, and the rollers *l* to ascend the incline *n* on rim *m*, thereby raising sleeve J until the projections *r* on flange *q* of shaft C strike against the ends of the rims *p*, at which moment the sleeve J (the rollers *l* of which have reached the highest points of inclines *n*) is forced down the other side of the inclines *n* by the pressure of the water on diaphragm I and flange *k*, and, moving around shaft C a distance equal to the width of slot *w*, closes the port *j* of chamber *c'*, at the same time open-

ing port *i* of chamber *c'* and port *j* of chamber *c*. At this moment the wing *e'* is in such position relatively to partition *f* as to make chamber H' very small, the chamber H being filled with water. The shaft and sleeve are now in position, as shown in Fig. 3. The water, continuing to flow through induction-pipe *g* into chamber G, now enters the chamber *c'* through its port *i*, and flows into chamber H', forcing the wing *e'* back to its original position. The wing *e'* forces the water in chamber H back into chamber *c* of shaft C, from whence it escapes through port *j* of chamber *c*, which is now open, (its port *i* being closed,) into chamber G and out at the eduction-pipe *g'*, and so the operation is repeated.

A registering device may be attached to the pintle *d*, each movement of the latter indicating the amount of water passing through the meter.

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

1. The reciprocating vertical hollow shaft C, provided with the partition *e*, extending through the entire shaft, and the wing *e'*, and openings and ports, substantially as and for the purposes set forth.

2. In combination with the reciprocating hollow shaft C, the moving sleeve J, constructed and operating as and for the purpose specified.

3. The combination of the rollers *l* and moving double incline *m m* with the sleeve or piston J, as and for the purpose set forth.

4. The stationary diaphragm I, in combination with the sleeve J, as specified.

5. In combination with the vertical-chambered reciprocating shaft C, extending through both cylinders, the openings *h h'*, and wing *e'*, substantially as and for the purpose described.

6. The combination of the vertical shaft C, constructed as described, wing *e'*, and partition *f*, as and for the purpose set forth.

7. The combination of the cylinders A B, the hollow chambered shaft C, and sleeve J, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GERARD SICKELS.

Witnesses:

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