

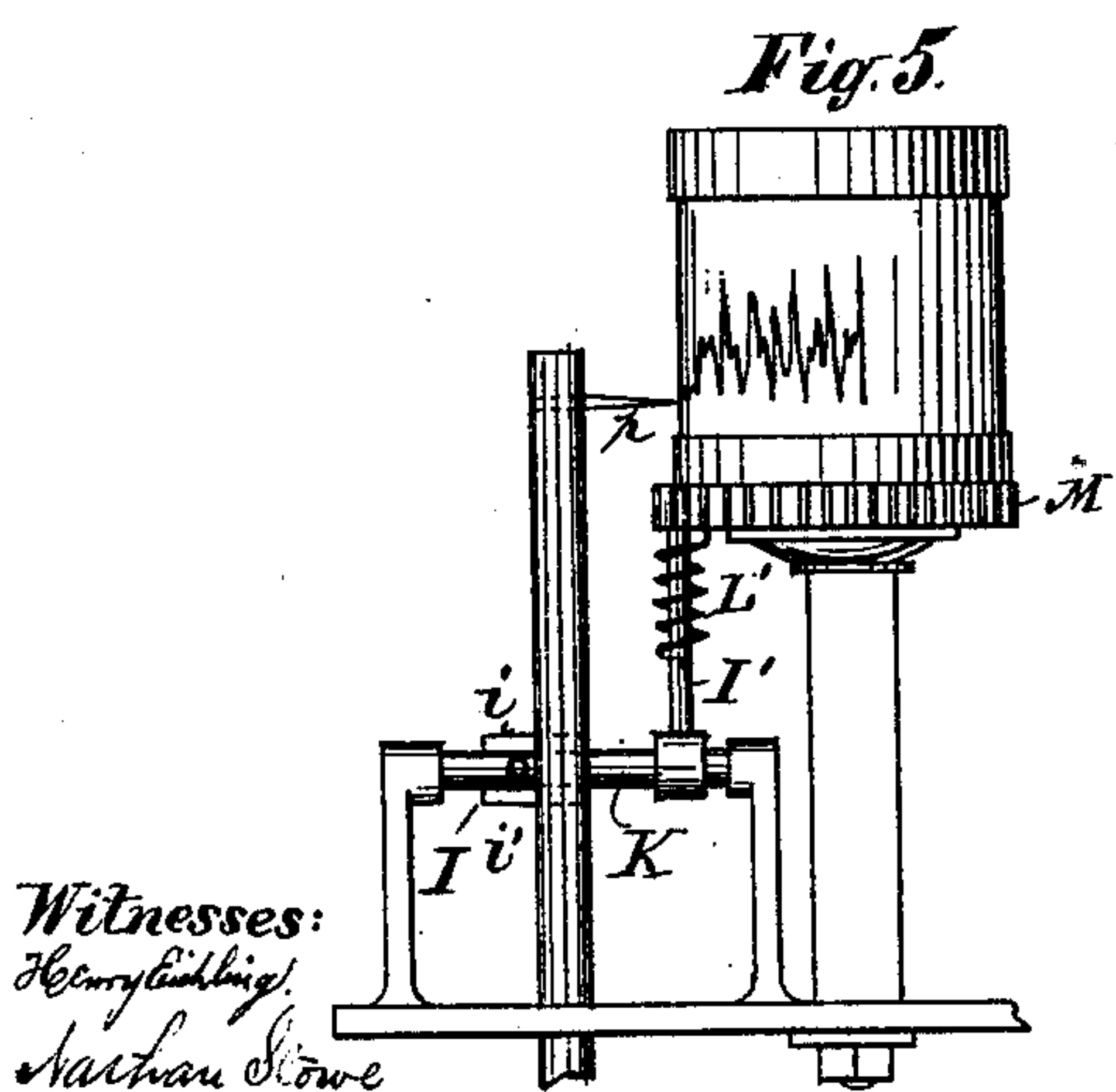
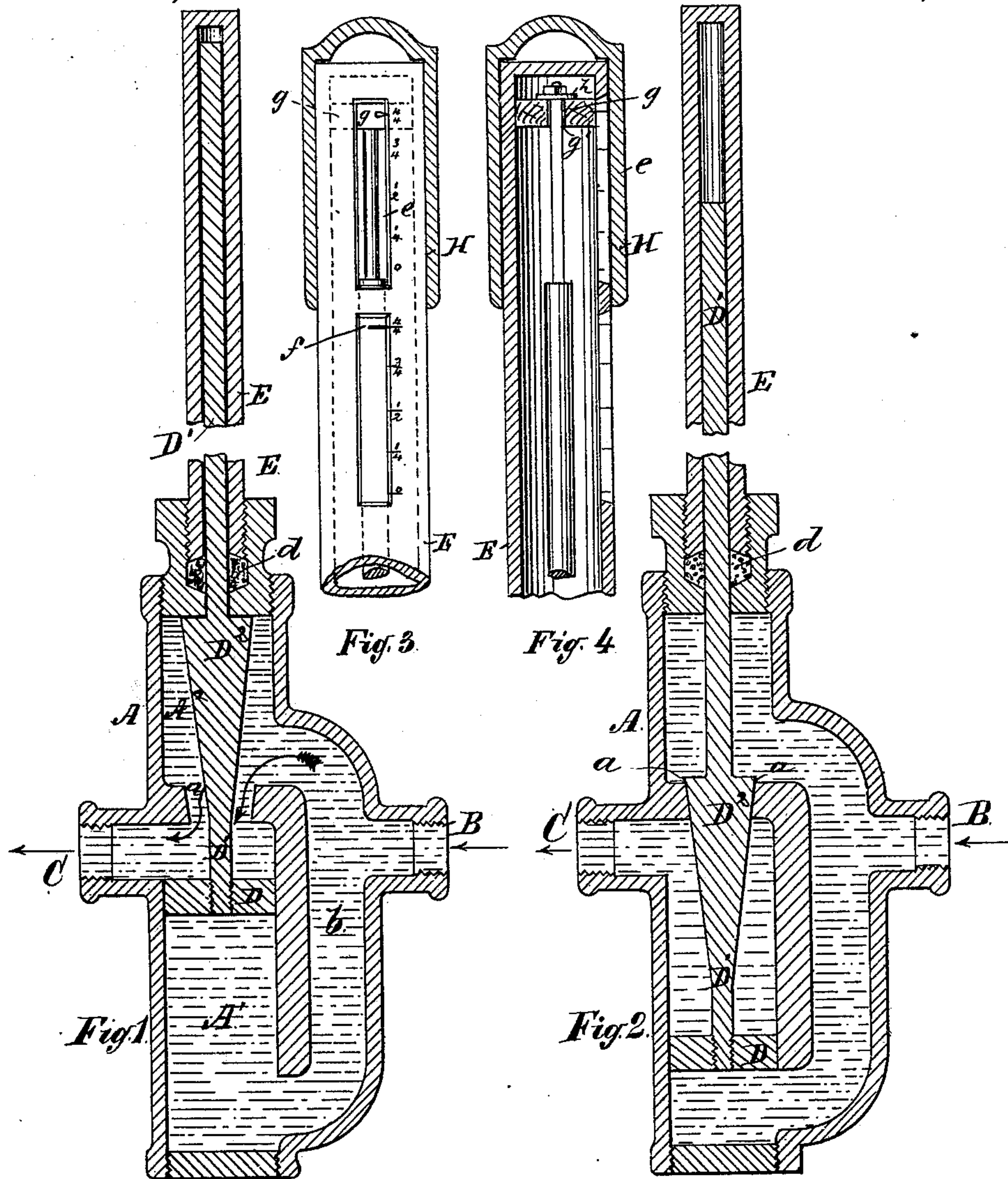
(No Model.)

B. L. STOWE.

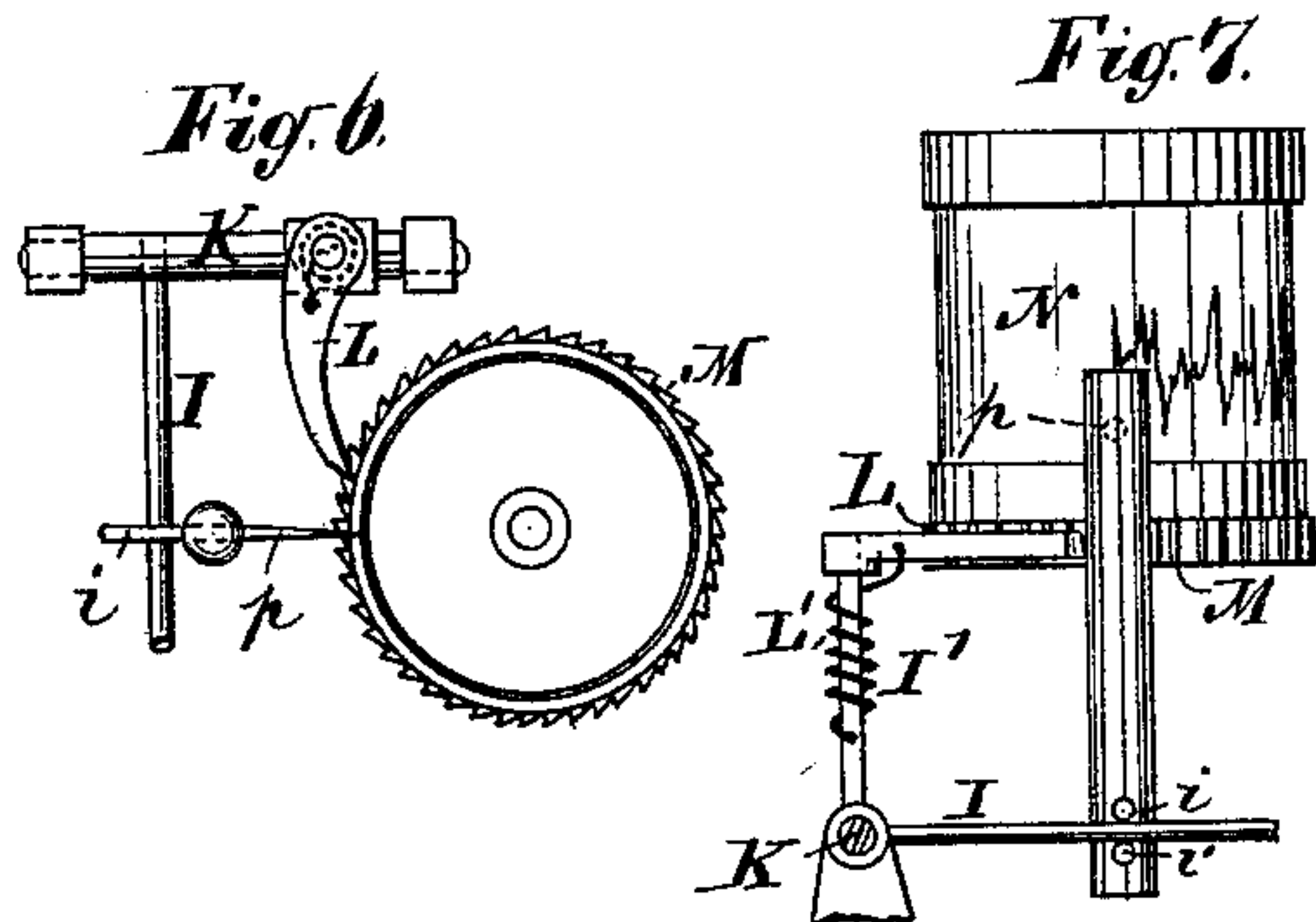
Mechanism for Detecting Waste of Water from Pipes.

No. 234,086.

Patented Nov. 2, 1880.



Witnesses:  
Henry L. Stowe  
Nathan Stowe



Inventor:  
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# UNITED STATES PATENT OFFICE.

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OF SAME PLACE.

## MECHANISM FOR DETECTING WASTE OF WATER FROM PIPES.

SPECIFICATION forming part of Letters Patent No. 234,086, dated November 2, 1880.

Application filed June 22, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN L. STOWE, of the city of New York, county and State of New York, have invented a new and useful Improvement in Indicators for Detecting Leakages or Waste of Water from the Pipes of Consumers of Public Water, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same.

This arrangement is intended to be connected with the supply-pipe of a house, store, or building where no meter is employed, but outside of the house and preferably near the line of the fence or rail in front of each building, should there be one, or near the curb of the street, and will show at any time, upon examination, how much water is being used at that particular time, or what is the minimum or maximum quantity that has been drawn since the last examination of the indicator, or may be made to indicate about what has been the average consumption of water during certain periods of time.

The purpose of this indicator is not to restrain the legitimate use of water, but it is to detect wastage of water from leaky pipes, taps, &c., or from being allowed to run to waste from carelessness, or, as is frequently done in cold weather to prevent pipes from freezing during the night, or at such other times as it may not be usual to consume it.

In the drawings, Figure 1 is a vertical central section of that portion of my improved indicator which is connected with the supply-pipe of the building. Fig. 2 is a similar view, showing a different position of the piston. Figs. 3 and 4 are views of the index arrangement. Figs. 5, 6, and 7 are views of another index arrangement.

A is a vertical cylinder, having a valve, *a*, of peculiar construction, near its center, which divides it into two chambers, and free water communication is established between these two chambers by means of a water-way, *b*, which the inlet-pipe enters. The outlet-pipe C communicates with the lower chamber, A'. The lower chamber, A', has a piston, D, fitted to slide between the lower end of the water-way and the outlet-pipe. The rod D', con-

nected with this piston, extends upward through the valve-seat and itself, forms a plug, D<sup>2</sup>, for the valve, then through the chamber A<sup>2</sup>, and up through a stuffing-box in the head of the cylinder, and into a vertical pipe, E, which reaches from the cylinder, when it is in its position in the ground, to above the surface of the street.

The plug D<sup>2</sup>, forming a part of the piston-rod, is tapered, so that while the piston is in its lowest position the upper end of the plug will entirely close the orifice *a*; but when the piston rises to its highest position the lower part of the plug will leave a space about it more than equal to the area of the inlet or outlet pipe. The pipe E, which extends to and above the ground, and incloses loosely the piston-rod, is intended to be brought up so that it may preferably enter into the fence or railing in front of the building or at the curb-line, where it may be attached to a lamp-post or any other vertical support that may be convenient, or it may be made strong enough to support itself.

The operation of this arrangement is as follows: When no water is being drawn through it the piston will fall, either by its own gravity or by the force of a spring, until it is in its lowest position, when the tapered plug will entirely close the orifice so that no water can pass through it. Now, if water be drawn from the outlet-pipe, and as none can pass through the valve, the pressure of water below the piston will force it up until the valve is opened sufficiently to allow as much water to pass through it as there is being drawn from the outlet, and the quantity of water passing through it will be indicated by the height to which the piston rises. The orifice when entirely open should be of somewhat greater area than the inlet or outlet pipe, in order that the water should not be throttled in its passage through it, as the pressure in the lower chamber below the piston ought not to exceed the pressure above the piston by much more than the difference necessary to sustain the piston while water is being drawn from the outlet. As it is this difference in the pressure above and below the piston, and not the actual pressure, which operates the piston, it



must rise to equal heights at all times to allow equal quantities of water to pass through it, and this without regard to the varying pressure upon the street-main. When no water is being drawn from the outlet the pressure above and below the piston will become equalized by means of the water-way, and the piston will fall until the valve is entirely closed.

Near the top of the pipe a narrow longitudinal slot, *e*, is cut as long as, or a little longer than, the greatest longitudinal motion of the vertical piston or rod.

A small mark is made at a certain point upon the piston-rod, and the piston being then placed at its lowest point a zero-mark, *o*, is made upon the side of the slot directly opposite the one already made upon the piston-rod. Now, if a certain quantity of water be drawn through the indicator in a given time, and the number of gallons be marked upon the side of the slot opposite the mark upon the piston-rod, which will have been caused to rise by the flow of water, a like flow of water will always cause the marks upon the piston and upon the side of the slot to correspond, and the quantity of water being consumed at the time of examination may be thereby determined.

When it is suspected that there is a continuous waste of water, the sliding button *g* (shown in the upper part of Figs. 3 and 4) is employed to determine whether the water has been entirely shut off at any time since a prior inspection. This button fits the inside of the pipe sufficiently close not to move of its own weight from any position in which it is placed, but is free to be moved by a gentle pressure from the piston-rod which it encircles, a portion of the piston-rod being turned smaller for a distance rather greater than the length of the travel of the piston-rod.

If it is desired to know if there is a continuous leak in the pipes the button should be placed as high as the head *h* upon the top of the piston-rod will allow it to go and left for a time, the cap *H* being placed over the top of the pipe and secured with any suitable locking device, so as to cover the slot and prevent meddling with the button. Upon a later examination, if the button be found at the zero-mark it proves that at some time since the former examination the water has been shut entirely off, and consequently there has been no continuous leakage; but, upon the other hand, if it is found not to have been drawn entirely down, the flow of water has not been interrupted altogether since the last inspection. As shown in Figs. 3 and 4 the piston-rod is in its highest position.

Figs. 5, 6, and 7 illustrate an attachment

that may be employed to determine about the average consumption of water. An arm, *I*, projects from a rocker-shaft, *K*, and is engaged by two pins, *i i'*, upon the piston-rod. Another arm, *I'*, extends upward from the rocker-shaft, and carries at its top a pawl, *L*, and a spring, *L'*, which causes the pawl to engage the teeth of a rack, *M*, upon the bottom of a vertical drum, *N*, arranged to turn upon a central support. The rising and falling movement of the piston-rod, occasioned by the varying quantity of water consumed, causes the drum to be revolved by means of the oscillatory motion of the rocker-shaft, arms, pawl, &c. A point or pencil, *p*, projecting from the end of the piston-rod, is in contact with paper or other substance placed about the drum, and each motion of the piston-rod causes the pencil or point to make a mark upon the paper or whatever is placed about the drum, and as the drum is revolved at every rising movement of the piston-rod the marks have a sort of zigzag course about the drum. If the mark comes frequently to the base it shows that the water is frequently shut off entirely; but if it never comes entirely down, it proves that the flow of water is never entirely stopped. The revolutions of this drum may be governed by clock-work, which shall cause it to revolve regularly, and thereby give an exact diagram upon the paper, showing the quantities of water consumed.

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

1. The combination of the cylinder *A*, possessing two divisions, *A'* and *A''*, and connecting water-way *b*, inlet-pipe *B*, and outlet-pipe *C* with the piston *D*, the tapered valve-plug *D'*, connected with said piston, and the tapered valve-orifice *a*, all as and for the purpose described.

2. The cylinder *A*, with its divisions, water-way, and pipes, piston-valve, and valve-plug, in combination with the vertical rod *D'*, stuffing-box *d*, vertical case or pipe *E* and its slots and marks, and cap *H*, sliding button *g*, and cap or head *h*, substantially as specified.

3. The cylinder *A*, with its various parts, attachments, and connections, in combination with the index arrangement shown in Figs. 5, 6, and 7, and consisting of the drum *N*, ratchet *M*, pencil *p*, pawl *L*, arms *I* and *I'*, rocker-shaft *K*, and pins *i i'*, substantially as specified.

In testimony whereof I have hereunto set my hand this 11th day of June, A. D. 1880.

BENJAMIN L. STOWE.

Witnesses:

NATHAN STOWE,  
ROBERT SCOBIE.