

N. W. KNOWLTON.

Water-Meter.

No. 159,419.

Patented Feb. 2, 1875.

Fig. 1.

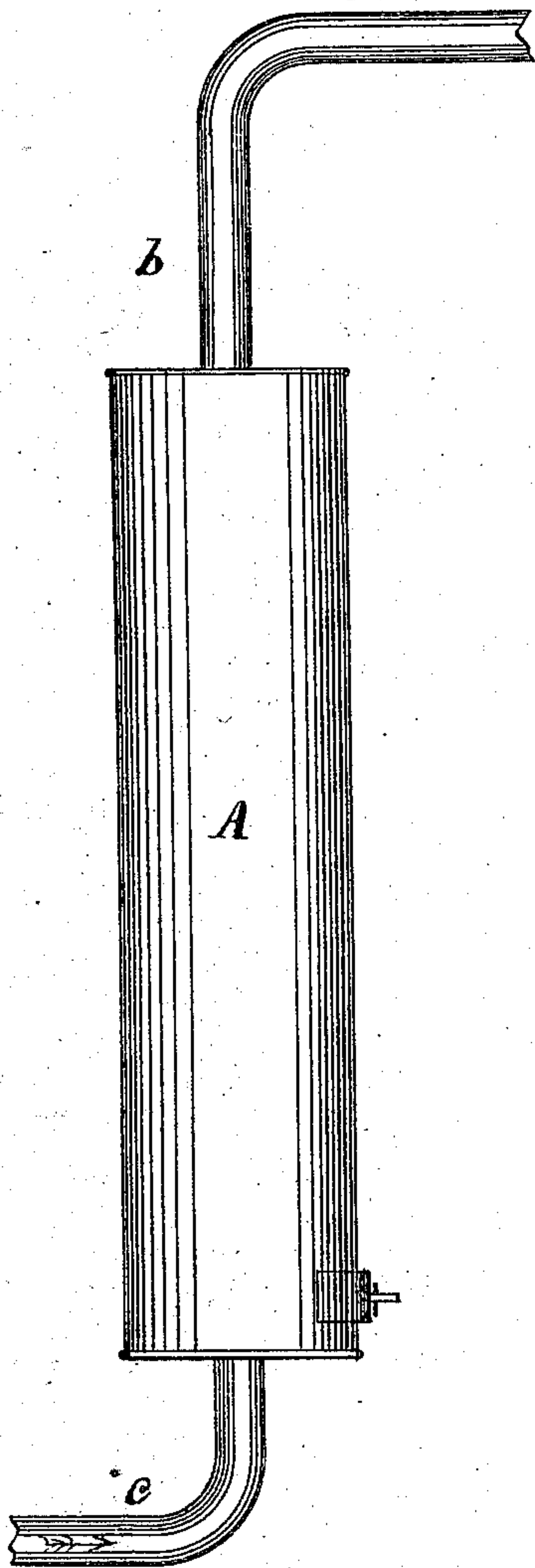
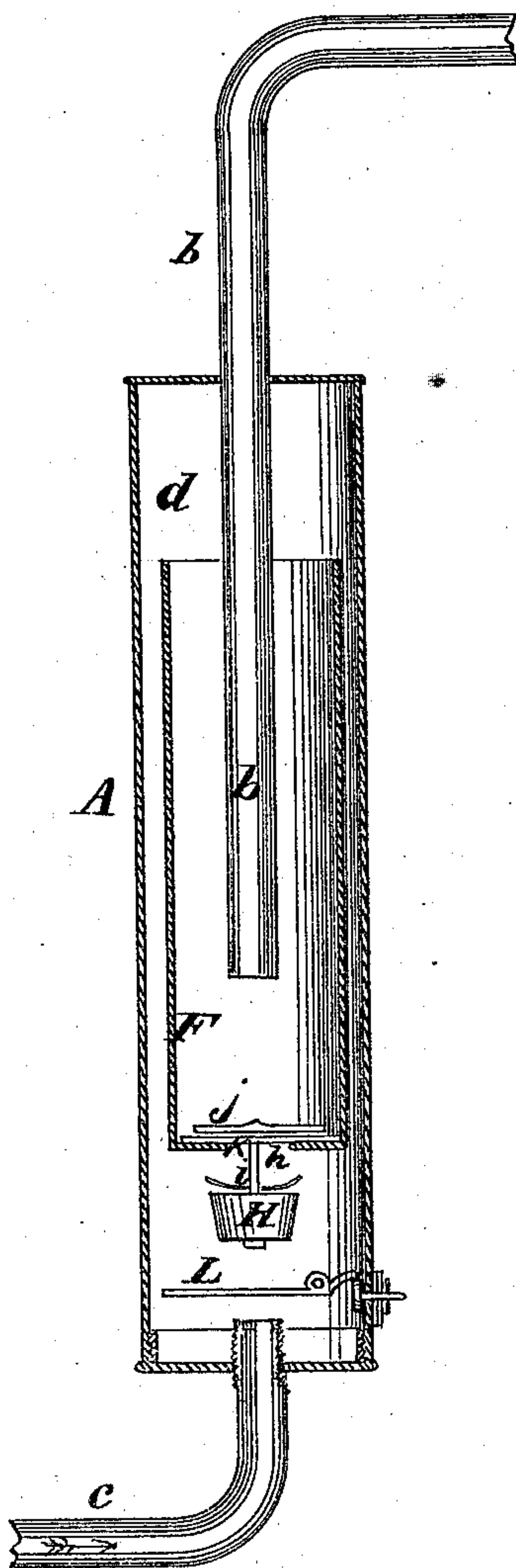


Fig. 2.



Witnesses

Geo. H. Strong,
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UNITED STATES PATENT OFFICE.

NATHANIEL W. KNOWLTON, OF NEVADA CITY, CALIFORNIA.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. 159,419, dated February 2, 1875; application filed November 6, 1874.

To all whom it may concern:

Be it known that I, NATHANIEL W. KNOWLTON, of Nevada City and county, State of California, have invented an Improved Water-Meter; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to a cheap, simple, and effective water-meter, which is fully described in the following specification, in which reference is had to the accompanying drawings.

Figure 1 is an outside view of my meter. Fig. 2 is a longitudinal section, showing the interior.

A is a cylindrical case, which is larger in diameter than the water-pipe with which it is to be connected. This case can be made of any desired size or form. This cylinder I secure at some suitable point in the length of the water-pipe, so that it shall stand in an upright position. The water-pipe *c*, which connects with the main or reservoir, is secured to the lower head of the cylinder, so as to deliver the water to its interior, while the pipe *b*, which leads to the discharge or exhaust, is attached to its upper head.

I shall usually construct the lower head so that it can be screwed into the lower end of the cylinder, as shown, for the purpose of allowing it to be readily removed when it is desired to examine or repair the meter.

The pipe *b* passes through the upper head of the cylinder, being made water-tight where it passes through, and extends longitudinally about half-way through it, so as to terminate at or near its middle. Being of less diameter than the case A, it is evident that an annular space, *d*, will exist between the pipe and case. F is the inside cylinder or measuring-vessel. This cylinder is shorter than the cylinder A, and is open at its upper end, so that it can slip inside of the cylinder A from the bottom, and move freely between the pipe *b* and cylinder A. The lower end of the cylinder F has a head, in the center of which is an opening, *h*. H is a valve, which has a long spindle, *i*. This spindle passes through the opening *h*,

and carries a cross-bar, *j*, at its end inside of the cylinder, which prevents it from coming out. If desired, a bar, K, can be secured across the opening, and the valve-spindle can pass through a hole in its middle, as shown; but this is not necessary. The valve will thus have a movement up and down equal to the length of the spindle. When it is up so as to fit against the head around the opening, the valve will be closed; but when it is down, so that the cross-bar *j* rests on the head inside of the opening, the valve will be open. The cylinder F is made of thin metal, so that it will be quite light, while the valve H is made heavy.

This meter is operated automatically by the flow of water through the pipes. The annular space *d* between the pipe *b* and case A will form an air-chamber for preserving a uniform pressure in the case, and keeping up a continuous flow of water. When the water in the case A is still, the cylinder F will drop down until the valve strikes the lower end of the case A, and the cylinder will settle down, so as to bring the valve to its seat and close the opening. When the water is allowed to flow from the discharge-pipe *b*, the current or flow of water upward will lift the cylinder until the cross-bar *j* on the inner end of the valve-spindle strikes the lower end of the pipe *b*, and forces the valve open. When the valve is thus opened, the cylinder will again settle downward and fill, to be forced upward again by the current of water. The cylinder will thus continue filling and emptying by a rising-and-falling operation, as long as the water is drawn off through the discharge-pipe. L is the arm of a register, which projects to the inside of the case A near its lower end, so that the cylinder F will strike it and operate the register each time it descends, thus registering the number of times the cylinder is emptied. Any suitable register can be used in connection with this meter.

The water-pipe *c*, which enters the lower head of the case A, is provided with screw-threads where it passes through the head, so that it can be screwed farther into the case when it is desired to shorten the stroke of the cylinder. This will be necessary when there is a very heavy water-pressure in the case, as

the measuring-vessel will then work quicker than when the pressure is less. By this means I provide a simple, cheap, and effective hydrometer, which will measure water with sufficient accuracy for all ordinary purposes.

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

The upright case A, with its water-pipes *b* *c*, having the pipe *b* passing through its upper end, and terminating near its middle, in com-

bination with the cylinder F, with its valve H, said valve having the spindle *i* and cross-bar *j*, the whole combined and arranged to operate in connection with a register, L, substantially as and for the purpose above described.

In witness whereof I hereunto set my hand and seal.

NATHANIEL W. KNOWLTON. [L.S.]

Witnesses:

JNO. L. BOONE,

C. M. RICHARDSON.