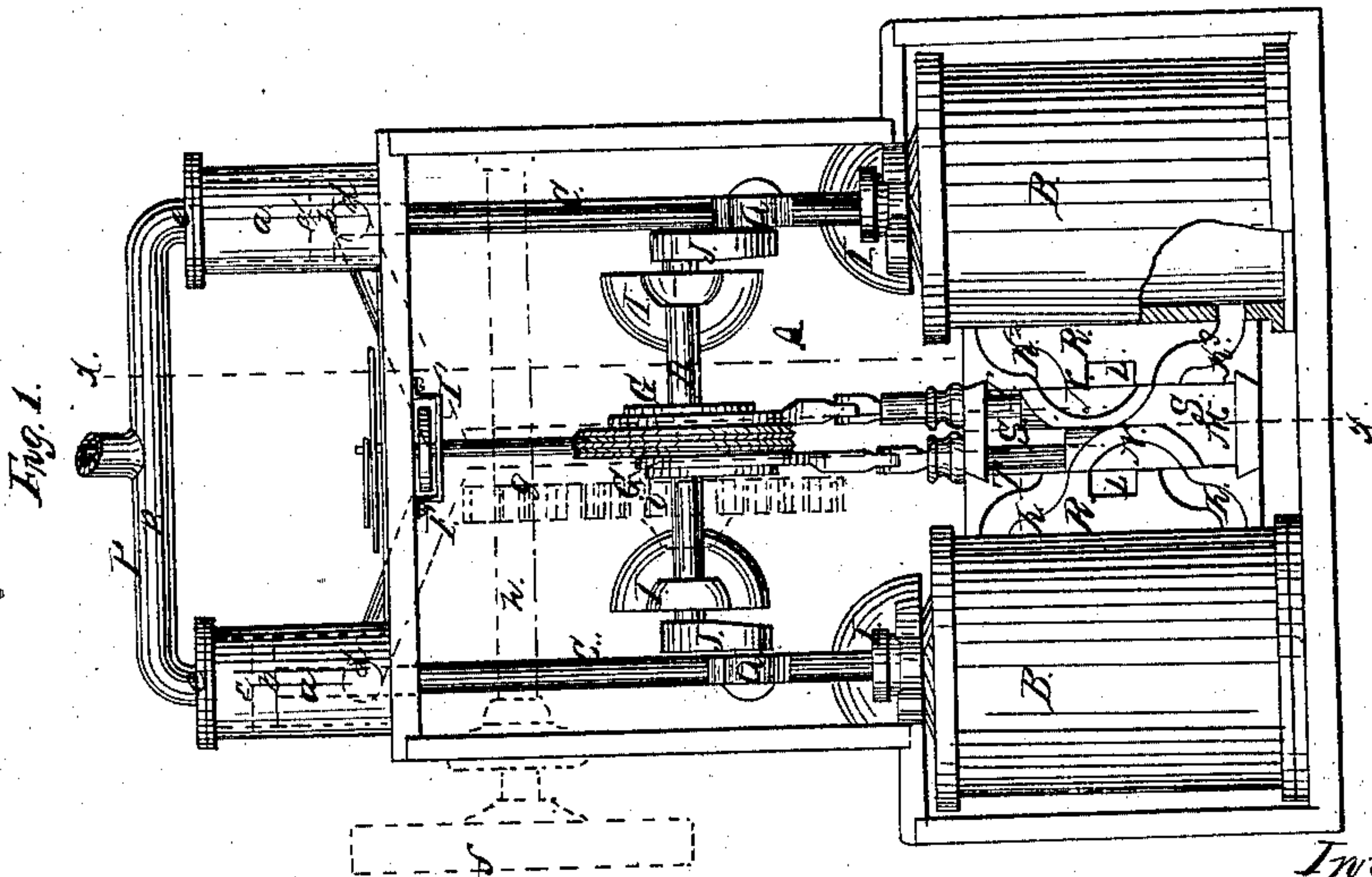
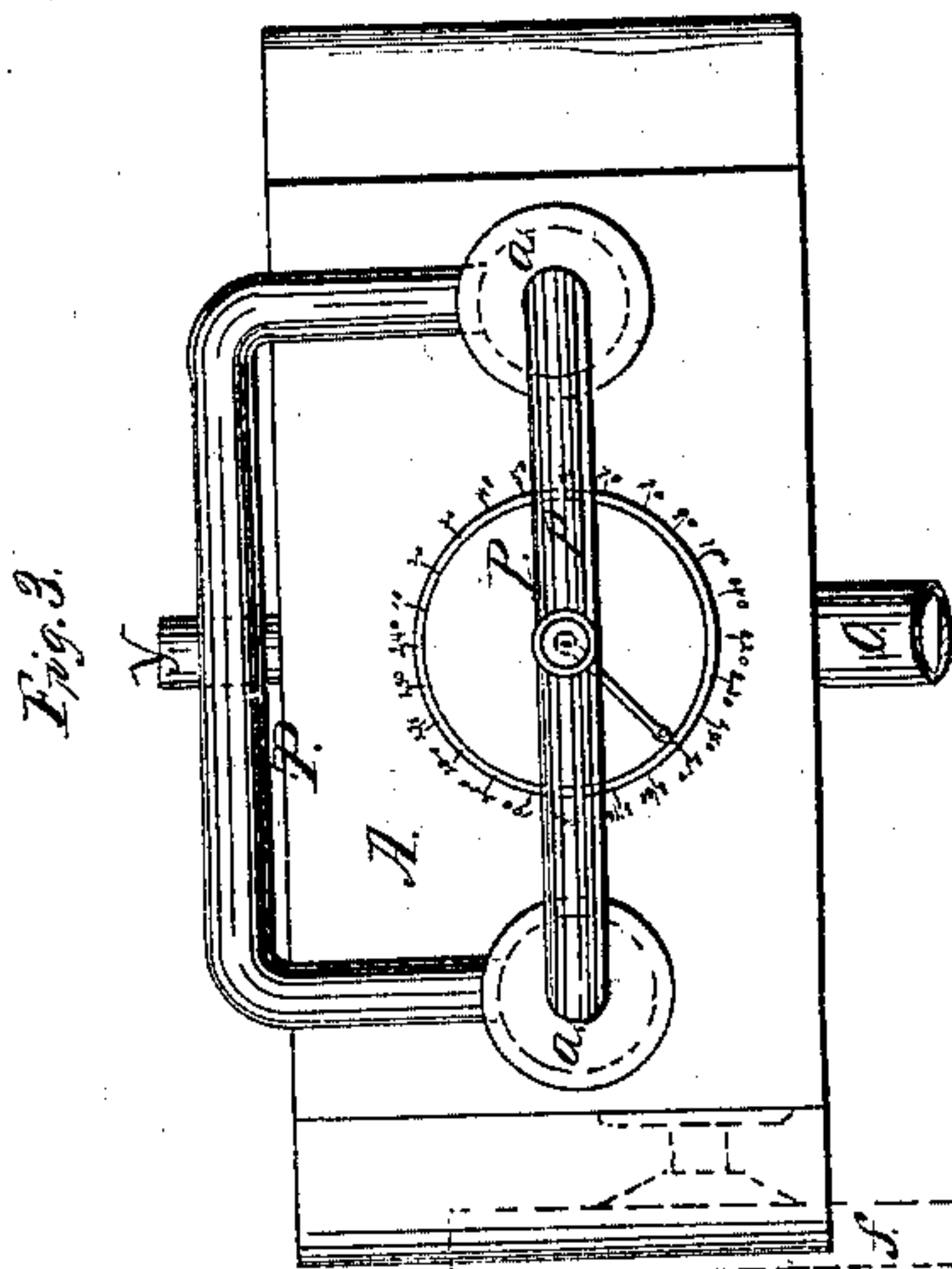
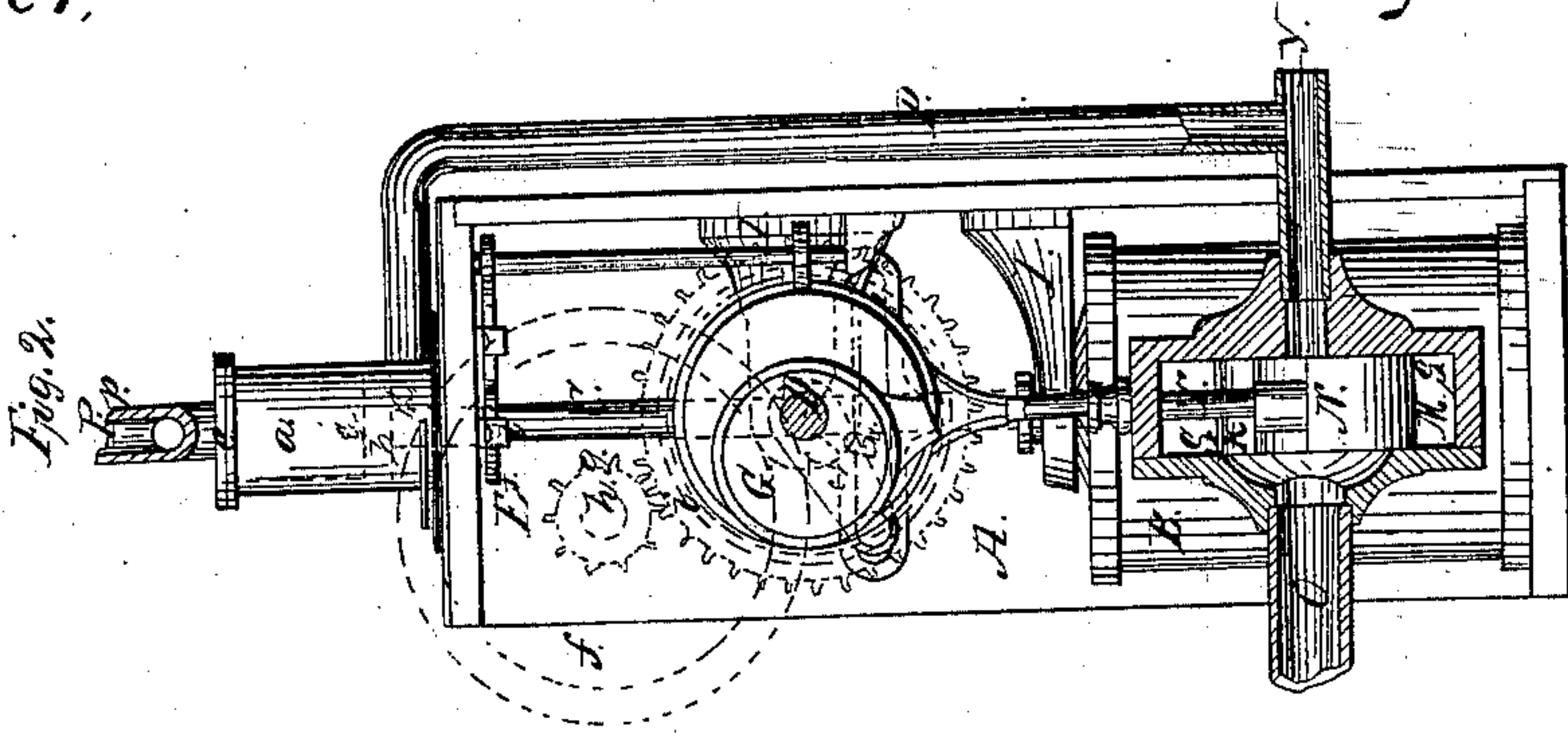


*E. Spencer,*  
*Piston Meter,*

N<sup>o</sup> 68, 127.

*Patented Aug. 27, 1867.*



Witnesses:  
A. N. K.  
Frank J. K.

Inventor:  
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# United States Patent Office

ELIHU SPENCER, OF ELIZABETH, NEW JERSEY.

*Letters Patent No. 68,127, dated August 27, 1867.*

## IMPROVEMENT IN COMBINED WATER-METERS AND FORCE-PUMPS.

*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, ELIHU SPENCER, of Elizabeth, county of Union, State of New Jersey, have invented an improved Combination of Water-Meter and Force-Pump; and do hereby declare that the following is a clear and exact description thereof, which will enable others skilled in the art to make and use my invention, reference being had to the accompanying drawings, of which—

Figure 1 is a front elevation of a water-meter, showing the force-pumps and gearing for the application of additional power in combination.

Figure 2 is a vertical cross-section in the plane indicated at *x x*, fig. 1.

Figure 3 is a plan or top view of fig. 1.

This invention relates to the adaptation of a force-pump to a water-meter, said meter being made the subject of Letters Patent granted by the United States of America to Elihu Spencer and E. L. Meyer, said Letters Patent bearing date June 12, 1866, and numbered 55,547.

The object of this invention is to combine the aforesaid water-meter with a force-pump in order that the combination of the true principles developed by the two instruments may be productive of two results, viz, measuring, and at the same time, and by the same motive power, elevating the fluid to a designated height. It will be admitted as a well-known fact that at certain seasons of the year, and under certain circumstances, the pressure of the water from the reservoirs is inadequate to elevate the fluid to certain desirable localities; consequently a great want of some simple mechanical power has long been felt to assist in elevating the fluid, and it is with a view of supplying this deficiency that this combination has been effected with the well-known and indispensable water-meter.

Having shown the object of this combination, I will now proceed to demonstrate the practicability and working of the same.

In this improved combination of water-meter and pump, I employ two cylinders and sliding-valves, the valves working in a valve-chamber common to both of them, and all being arranged together in a box, in whose rear side is placed the water-supply pipe. A crank-shaft, which is connected with the pistons by a yoke, gives motion, through a worm and gear-wheel, to a dial, which indicates through a fixed index, the quantity of water discharged.

Similar letters of reference indicate like parts.

The letter A designates a box which encloses on all sides except the front a portion of an apparatus made and arranged according to my invention. A water-supply pipe, O, passes through the back side of the box into a valve-chamber, M, which is between two pump-cylinders B B, that stand on the bottom of the box, as shown in the drawing. The letters I designate arms which are cast with the box A, and project from its inner side so as to form supports and guides for the piston-rods C C and bearings for the crank-shaft D. I' designates a stud upon which is formed a spindle that carries a gear-wheel, F, upon which spindle is placed a dial. Upon the point of the spindle is fixed an index which remains stationary, while the gear-wheel F which carries such dial rotates below it. R R are two valve-seats formed within the valve-chamber M, to which are fitted slide-valves, N, whose valve-stems, T, are suitably attached by links to eccentrics G G placed on the horizontal crank-shaft D, which is driven by the pitmen C C. J J are cranks placed on the shaft D, and working in oblong slots Q formed in the pitmen or piston-rods after the well-known method of converting a rectilinear into a rotary motion. K K<sup>1</sup> K<sup>2</sup> K<sup>3</sup> are ports which communicate with the upper and lower parts of each cylinder above and below its piston, and open through the valve-seats into the valve-chamber at such points that they may be alternately covered and uncovered by the slide-valves N. The letters L L designate channels which communicate with the feed pipe O and the ports K K, and through which the water enters the cylinders as the valves N N expose the injection ports, and when the said valves expose the ejection ports the water is discharged into one or other, as the case may be, of the spaces S, and through the discharge pipe to the force-pumps. Fig. 1 represents the force-pumps, which are situated directly above and in line with the cylinders B B. *b b* represent the plungers of the pumps *a a*. *c c* are valves in the plungers of the pumps *a a*. *d d* are valves operating in connection with the pipe P, through which the water from the meter is admitted into the pumps. *e e* represent the valves at the top of the pumps, through which the water passes into the elevating pipe P *p* above. *f* rep-

resents a pulley attached to the driving-shaft *h*. *g* is a pinion also attached to the driving-shaft *h*, which meshes into and gives motion to a gear-wheel, *i*, which in turn transmits the motion to the crank-shaft *D*. The pulley *f* and pinion *g*, before described, serve to increase the power of the meter when it is requisite to obtain a greater elevation of the water.

The operation of the combination is as follows: The water enters the cylinders in the manner before described, and forces up the piston-rods *C C*, and at the same time causes the plungers *b b* of the force-pumps *a a* to rise correspondingly, which, by the force of the water, opens the valves *e e* and forces the water into and through the elevating pipes *P p* above. There is a discharge pipe, *Y*, from the valve-chamber *M*, which conveys away the surplus water which the pumps *a a* cannot contain. Upon the completion of the upward stroke of the piston-rods *C C* the valves *e e* close, and the valves *c c* of the plungers *b b* open and allow the water which the pipe *P* has thrown in beneath them to pass through, thus completing the stroke, and forcing the contents of the force-pumps *a a* into the elevating pipe *P p* at each stroke.

*Claim.*

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

The attachment of the force-pumps *a a* to the water-meter, acting and operating in combination with each other substantially as and for the purpose specified and set forth.

In testimony whereof I have hereunto set my hand this second day of March, 1867.

ELIHU SPENCER.

Witnesses:

A. NEILL,  
FRANK J. TAFT.