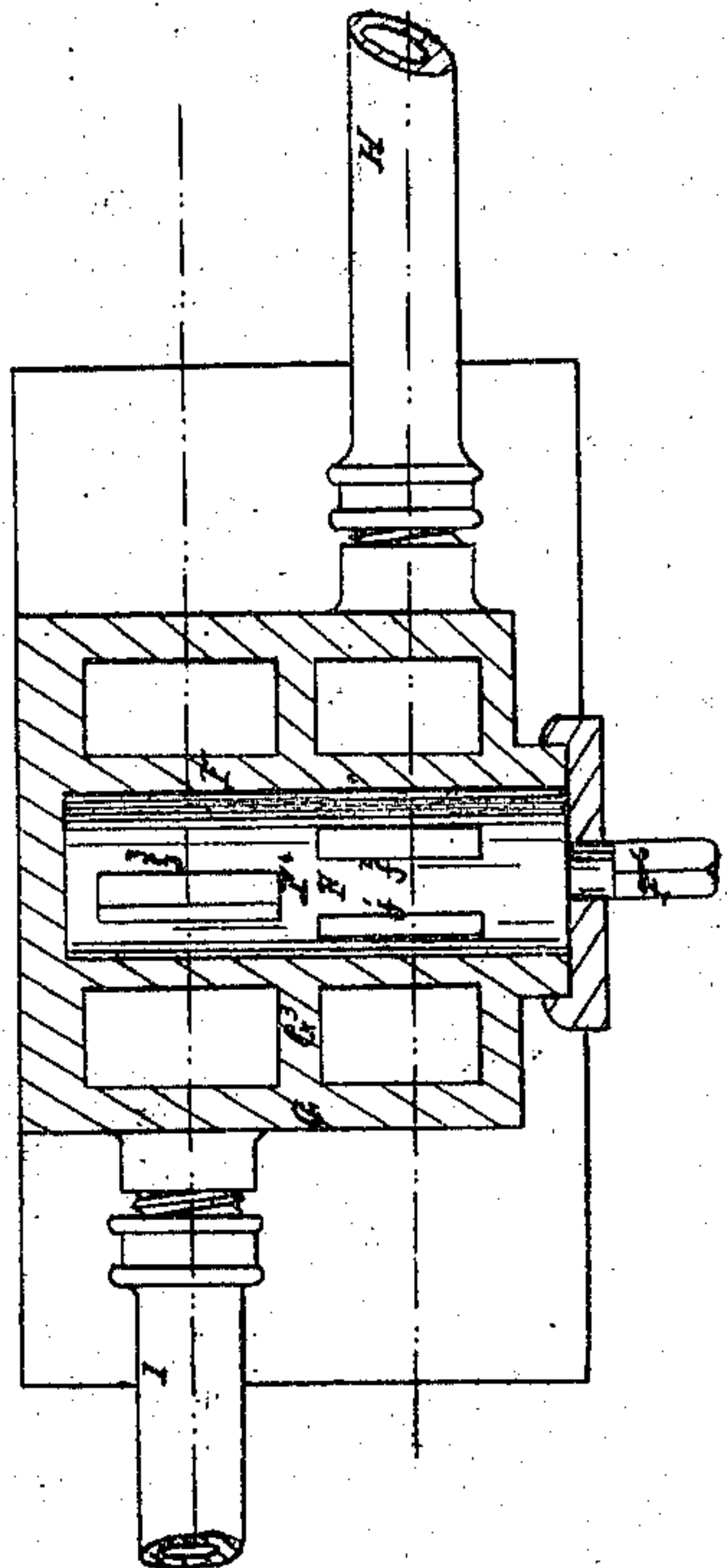
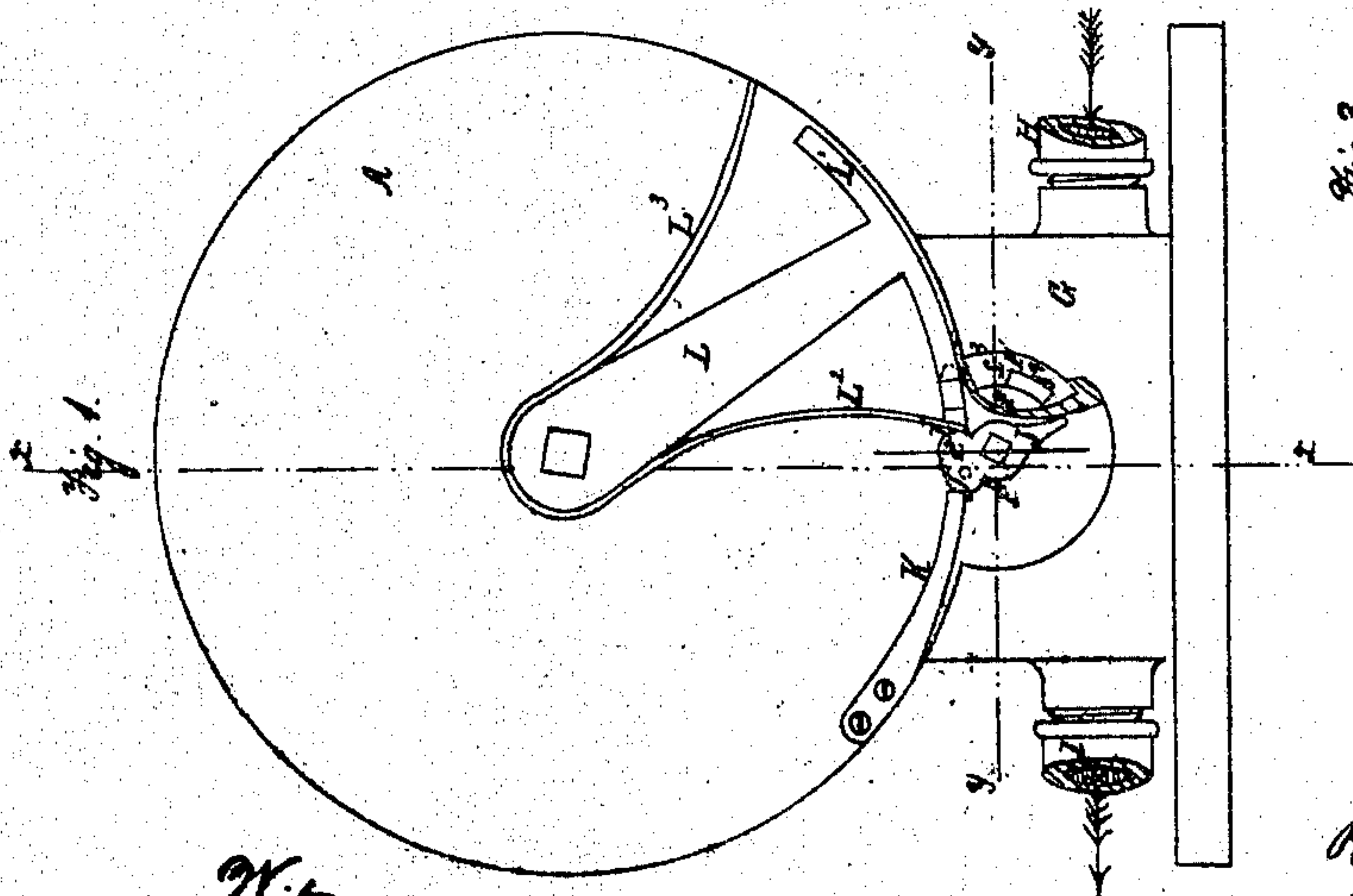
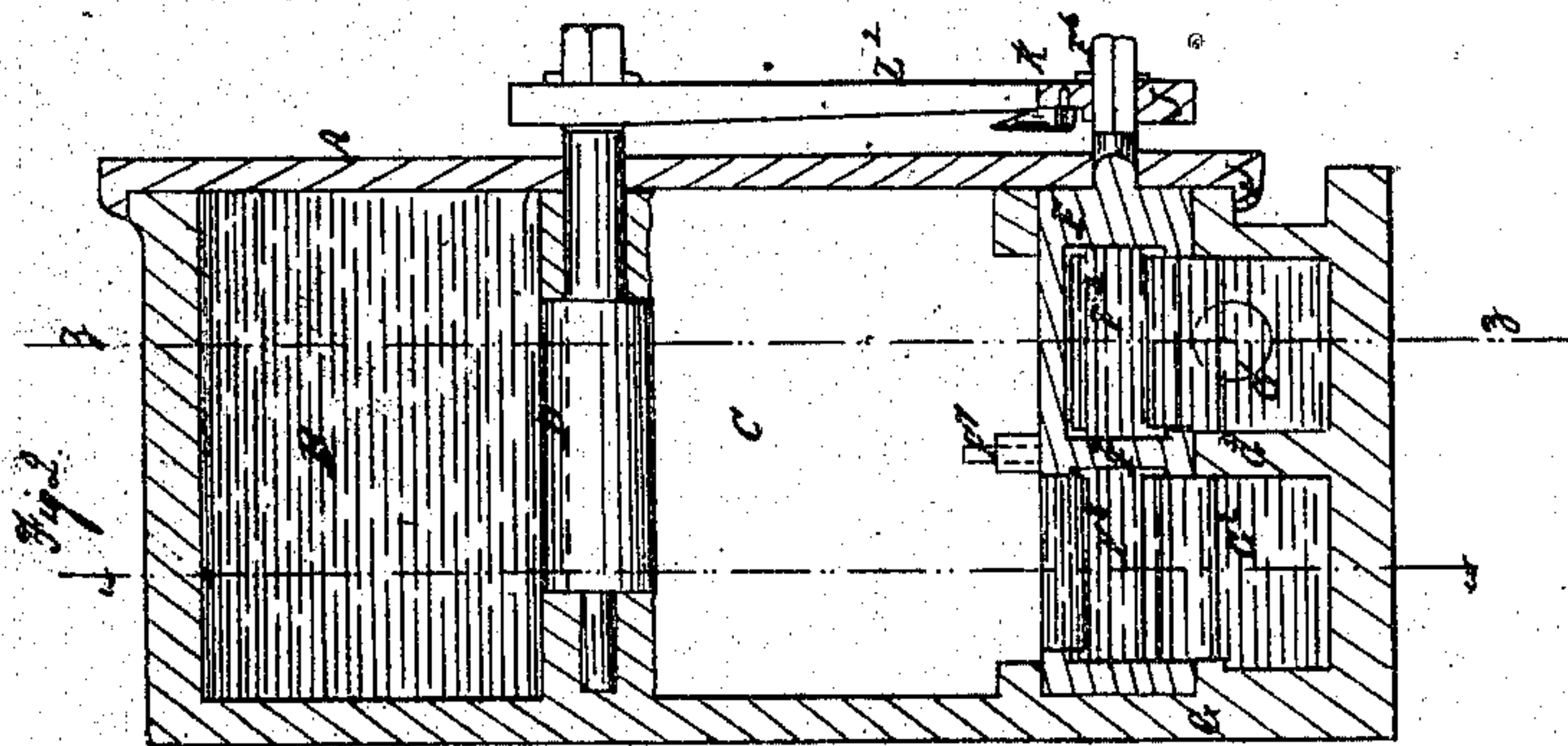
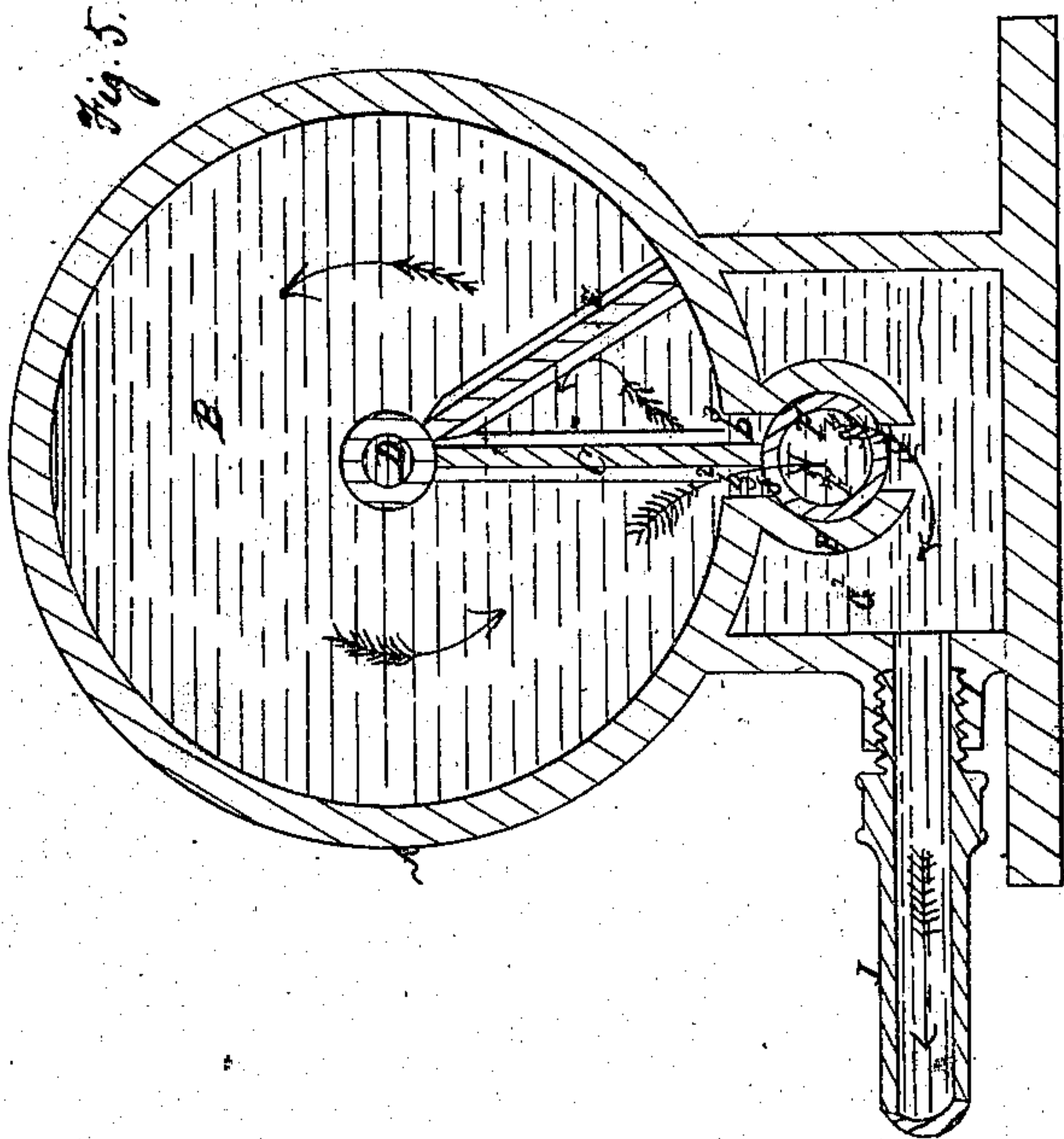
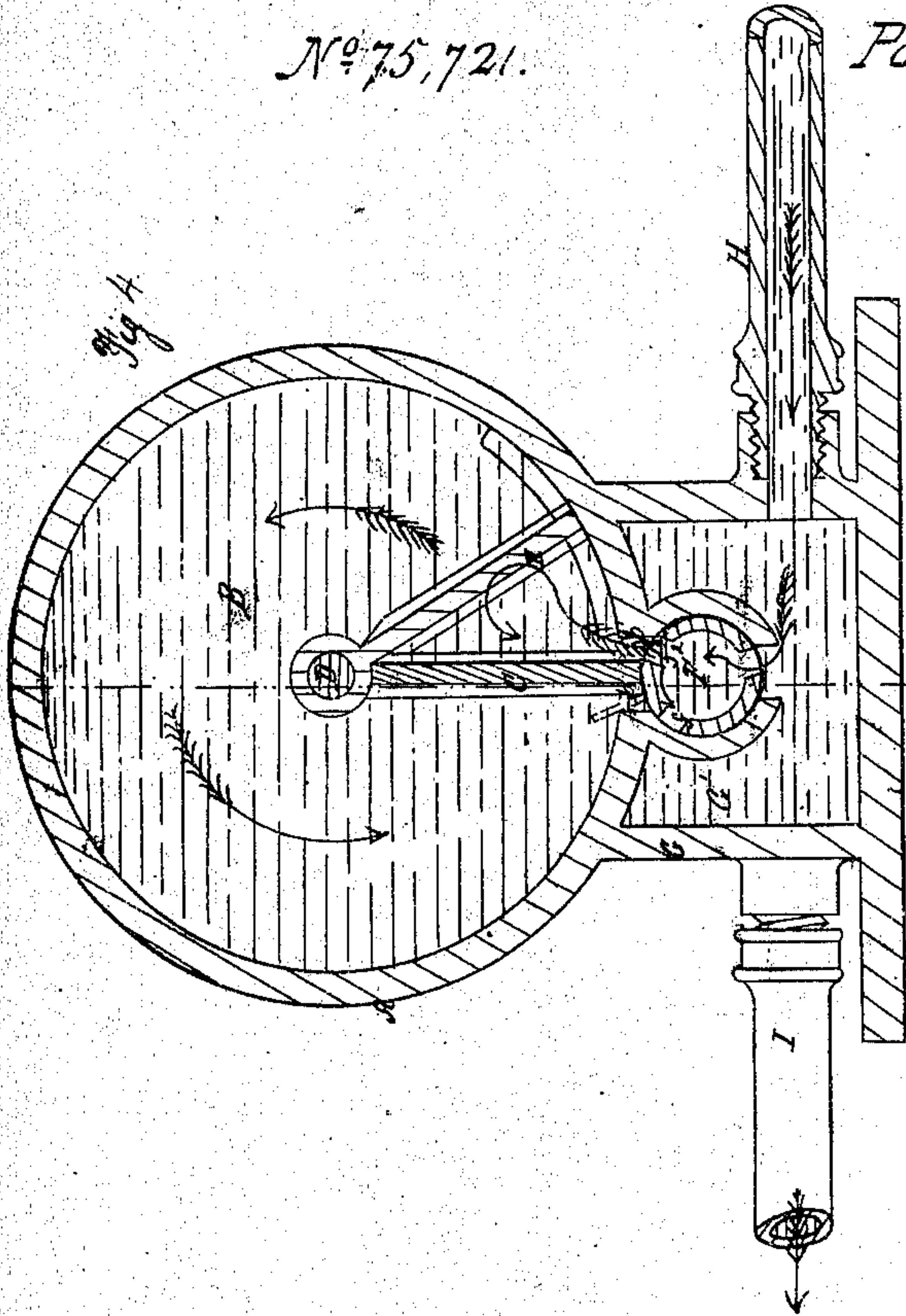


*R. H. Atwell,
Water-Meter*

Nº 75,721.

Patented Mar. 24. 1868.



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United States Patent Office.

RICHARD H. ATWELL, OF BALTIMORE, MARYLAND.

Letters Patent No. 75,721, dated March 24, 1868; antedated March 7, 1868.

IMPROVEMENT IN LIQUID-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, RICHARD H. ATWELL, of the city and county of Baltimore, and State of Maryland, have invented a new and useful Improvement in Water-Meters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which are made a part of this specification.

This meter consists essentially of a cylindrical box or measuring-chamber, containing an oscillating-wing or piston, which imparts its motion to the central shaft whereby the register is actuated, and which, at the completion of each movement, reverses an oscillating-valve, so as to cause the water to alternately enter and discharge from the measuring-chamber at the opposite sides of an internal partition, the arrangement admitting of a continuous unintermitting operation.

Figure 1 is a side elevation of my improved meter, a portion being broken away to exhibit the arrangement of the valve which controls the entrance and exit of the water.

Figure 2 is a vertical section on the line *x x*, fig. 1.

Figure 3 is a horizontal section on the line *y y*, fig. 1.

Figure 4 is a section on the line *z z*, fig. 2; and

Figure 5 is a section on the line *w w*, fig. 2.

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

A is a cylindrical box, whose interior forms a measuring-chamber, B. C is a vertical stationary partition, closing the space between the central shaft D and the subjacent wall of the chamber B. E is a wing or piston, keyed to the shaft D, and working snugly against the wall of the chamber B. F is a hollow cylindrical valve, oscillating within a valve-box, F¹, which is situated within a box, G, divided by an internal partition, G³, to form two chambers G¹ G². The valve F is likewise divided by a partition or diaphragm, F⁴, into two chambers, F² F³, communicating respectively with the chambers G¹ G² of the box G. H is the supply-pipe, which communicates with the chamber G¹, and I the discharge-pipe, communicating with the chamber G². The chamber F² of the oscillating-valve F is provided with openings, *f f*¹ *f f*², the lower one, *f*, having constant communication with the receiving-chamber G¹ of box G, and the two upper openings, *f*¹ *f*², being made to alternately communicate with the measuring-chamber B through the openings *b b*¹ at either side of the lower end of partition C. The chamber F³ of the valve F has openings, *f*³ *f*⁴, the lower opening, *f*⁴, admitting of a continuous discharge of liquid from the valve F into chamber G², and the upper opening, *f*³, being alternately brought into coincidence with the openings *b*² *b*³ at either side of the partition C. J is a latch, fixed upon the square stud-shaft F⁶, projecting from the end of the valve F. This latch has two holes, *j j*, fig. 1, engaged alternately by the pin *k* of the spring K, which is fastened at one end to the outside of one of the heads of A. The projecting end of the shaft D has fixed upon it an oscillating-arm, L, which has a curved piece, L¹, rigidly fixed to its free extremity, and which carries two springs, L² L³, one at either side. The parts last described are employed to operate the valve, as will be presently explained. The motion of the valve F in either direction is limited by its pin *f*⁵ working in the recess *f*⁹ of the valve-seat F¹, (see fig. 1.)

The operation is as follows: Liquid from the supply-pipe H first enters the chamber G¹, and thence passes directly into the valve F, supposing which to be in the position represented in fig. 4, the coincident openings *f*² *b*¹ afford communication between the chambers F² and B, while the openings *f*³ *b*² form an exit-passage from B to chamber G². Hence the liquid entering B acts to force the piston E around upon its axis, as indicated by the arrows in fig. 4, and the liquid previously occupying B is expelled or allowed to escape therefrom, the course of the escaping liquid being through *b*², *f*³, F, *f*⁴, and G², into discharge-pipe I, as represented by the arrows in fig. 5. When the piston E is about to complete its movement in the direction indicated, the spring L³ comes in contact with the latch J, which, being released from the pin *j* by the action of L¹ upon an incline on the spring K, is vibrated sufficiently to reverse the position of the valve F, and thus bring the openings *f*¹ and *b*, and *f*³ and *b*² into coincidence. The incoming water now acts to move the piston E in the opposite direction, and when the piston reaches the position first referred to, the valve F is reversed by the action of L¹ L² upon the spring K and latch J respectively. When the latch J is released by pin *k*, and moved sufficiently to

reverse the valve, the said pin takes into the other hole, *j*, and holds the valve immovable in its new position. At every oscillating movement of the piston E, its shaft D actuates the register, to record a specific quantity.

It is obvious that by a mere modification, the parts for operating the valve may be all enclosed. Thus, a piece corresponding with L¹ may be applied to the free extremity of the piston E, so as to project at either side thereof, and the springs adapted thereto. In the central part, F⁷, of the valve-box F, slots may be cut, one of said slots being at either side of the partition or diaphragm C, and each permitting the requisite play of a strong pin projecting from the valve F, and enabling the latter to be reversed.

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

1. I claim the arrangement, within a measuring-chamber, B, of the oscillating-piston E, and diaphragm or partition C, with a reversible valve, automatically operated by the same mechanism that moves the piston, substantially as and for the purpose set forth.

2. I claim the oscillating-arm L L¹, and springs L² L³, in combination with the latch J and spring K, or their equivalents, substantially as and for the purpose specified.

3. I claim the valve F, having separate chambers, F² F³, in combination with the receiving and discharge-chambers G¹ G², substantially as and for the purpose described.

To the above specification of my improvement in the construction of water-meters, I have signed my hand, this ninth day of July, 1867:

R. H. ATWELL.

Witnesses:

E. J. W. FACHTZ,

A. M. FACHTZ.