

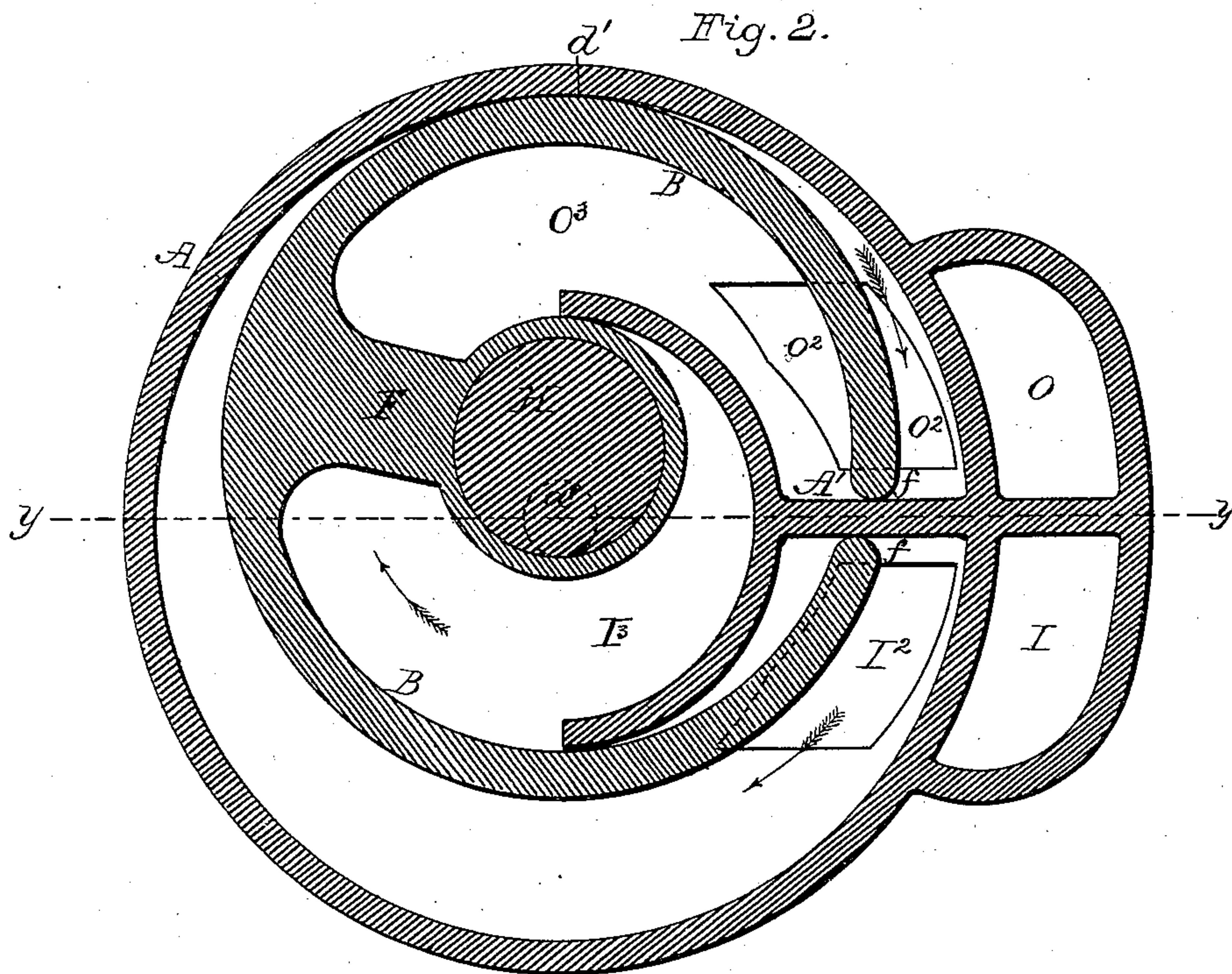
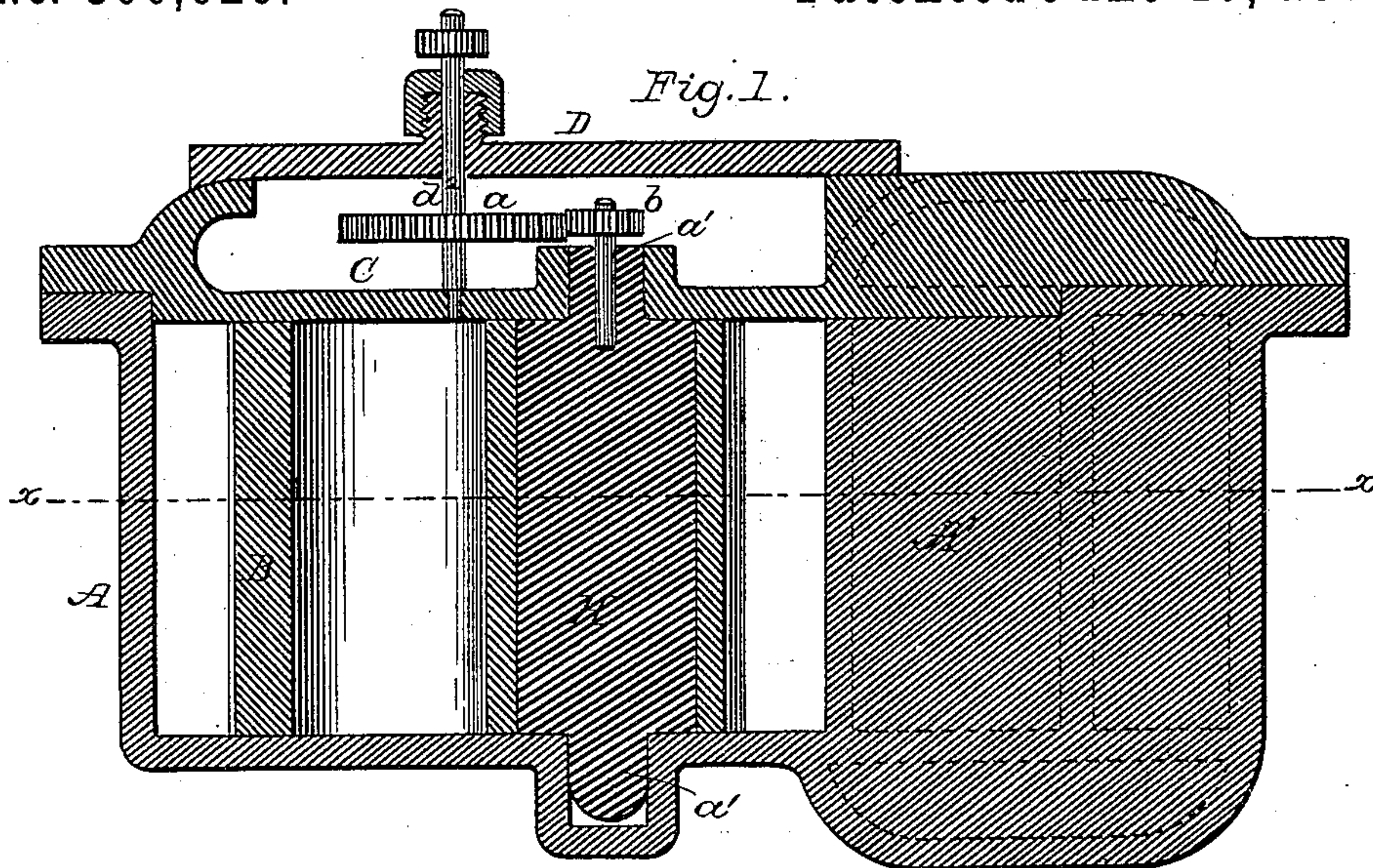
(No Model.)

3 Sheets—Sheet 1.

L. H. NASH.
OSCILLATING METER.

No. 300,626.

Patented June 17, 1884.



Attest:
Howell Bartle
Lucius Morris.

Inventor:
Lewis Hallock Nash,
by Johnson & Johnson
Attys.

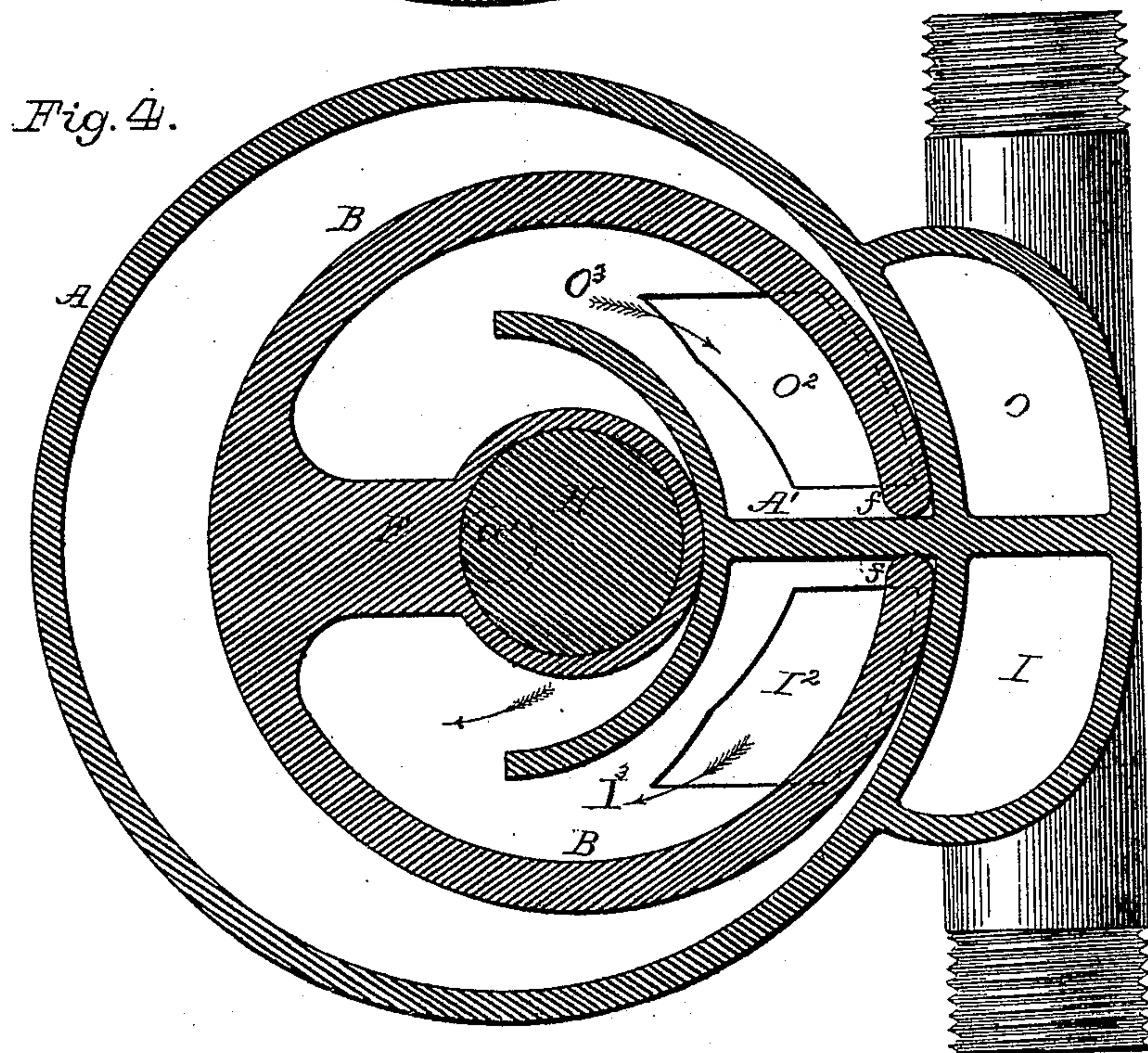
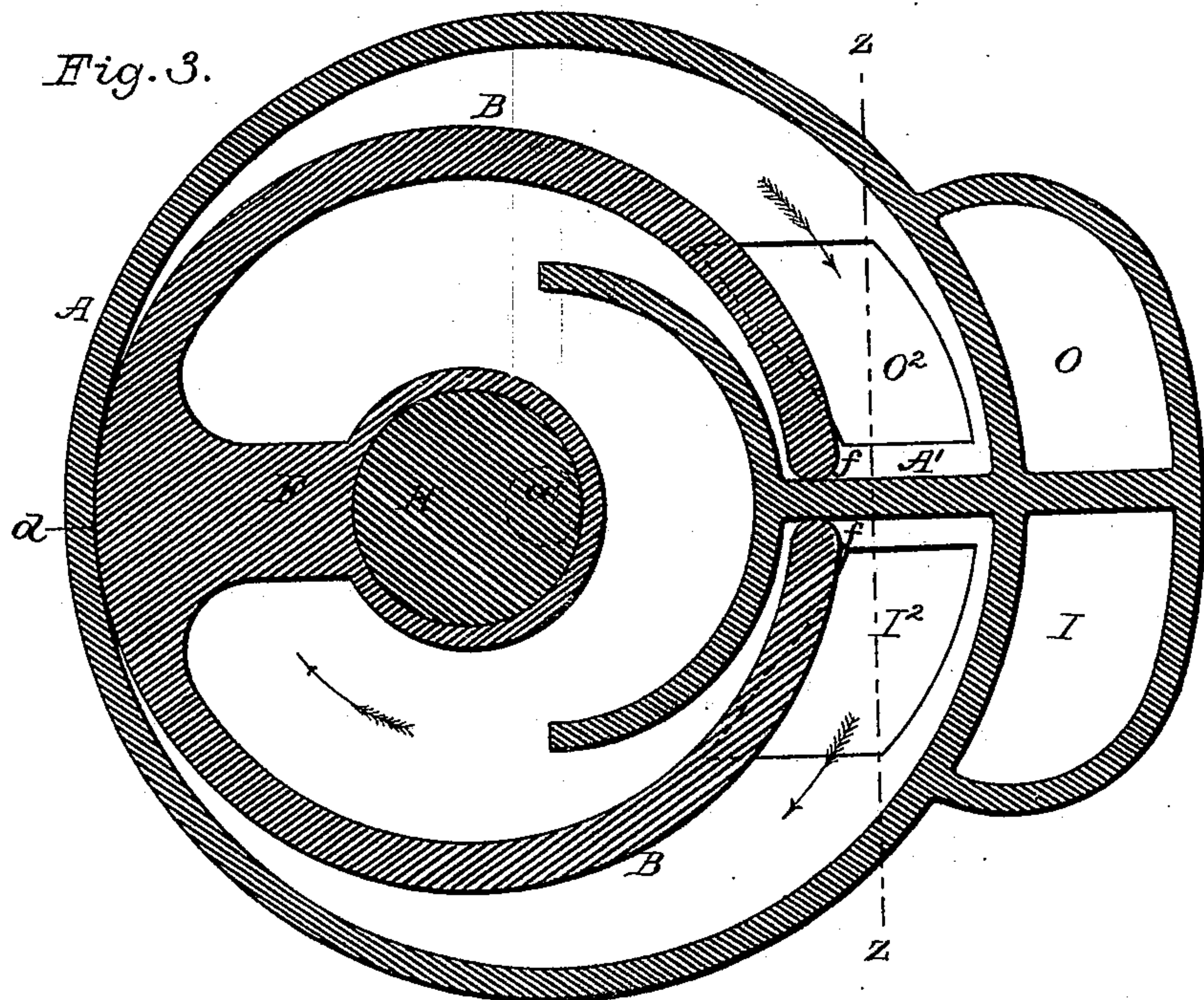
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3 Sheets—Sheet 2.

L. H. NASH.
OSCILLATING METER.

No. 300,626.

Patented June 17, 1884.



Attest:
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3 Sheets—Sheet 3.

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Fig. 5.

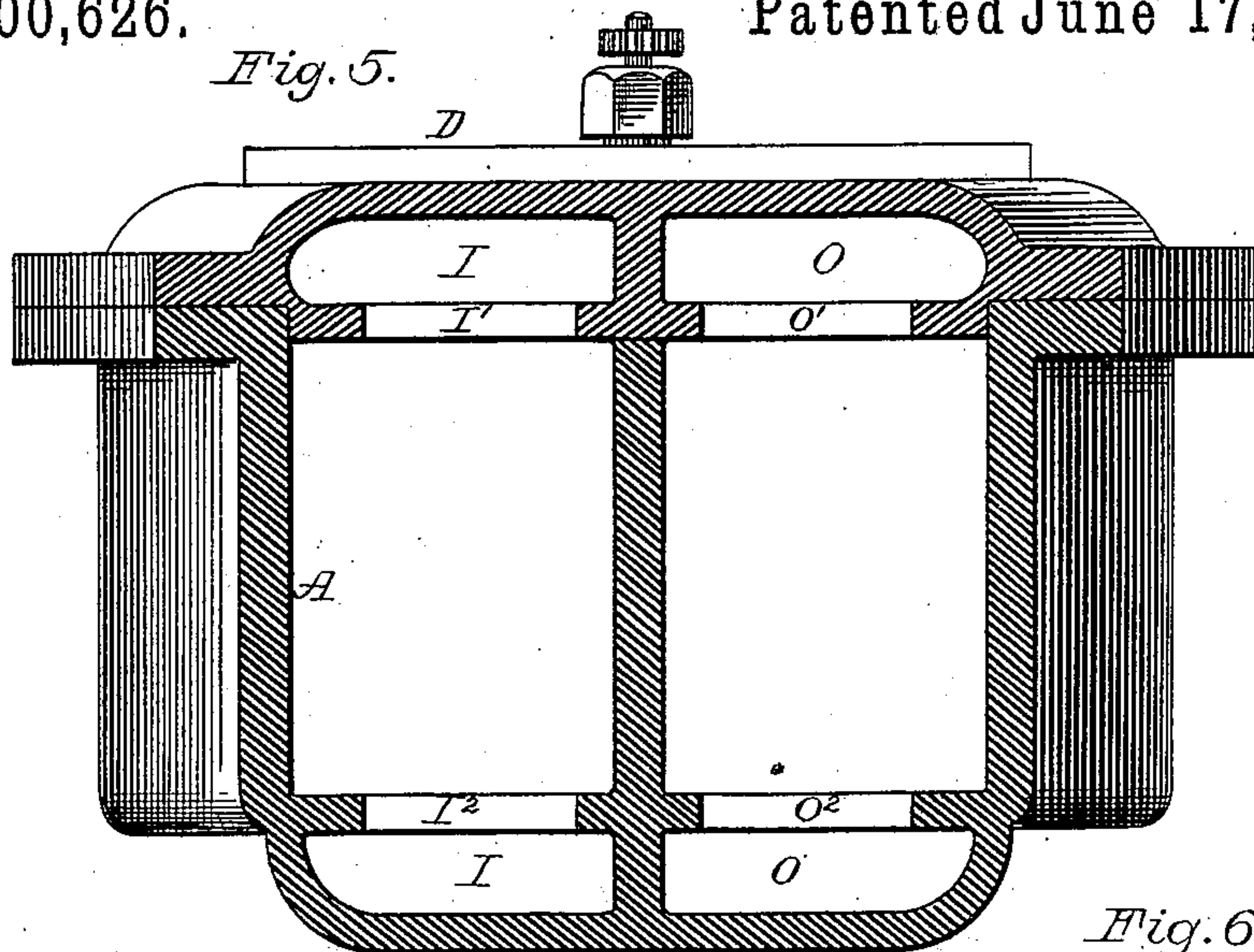


Fig. 6.

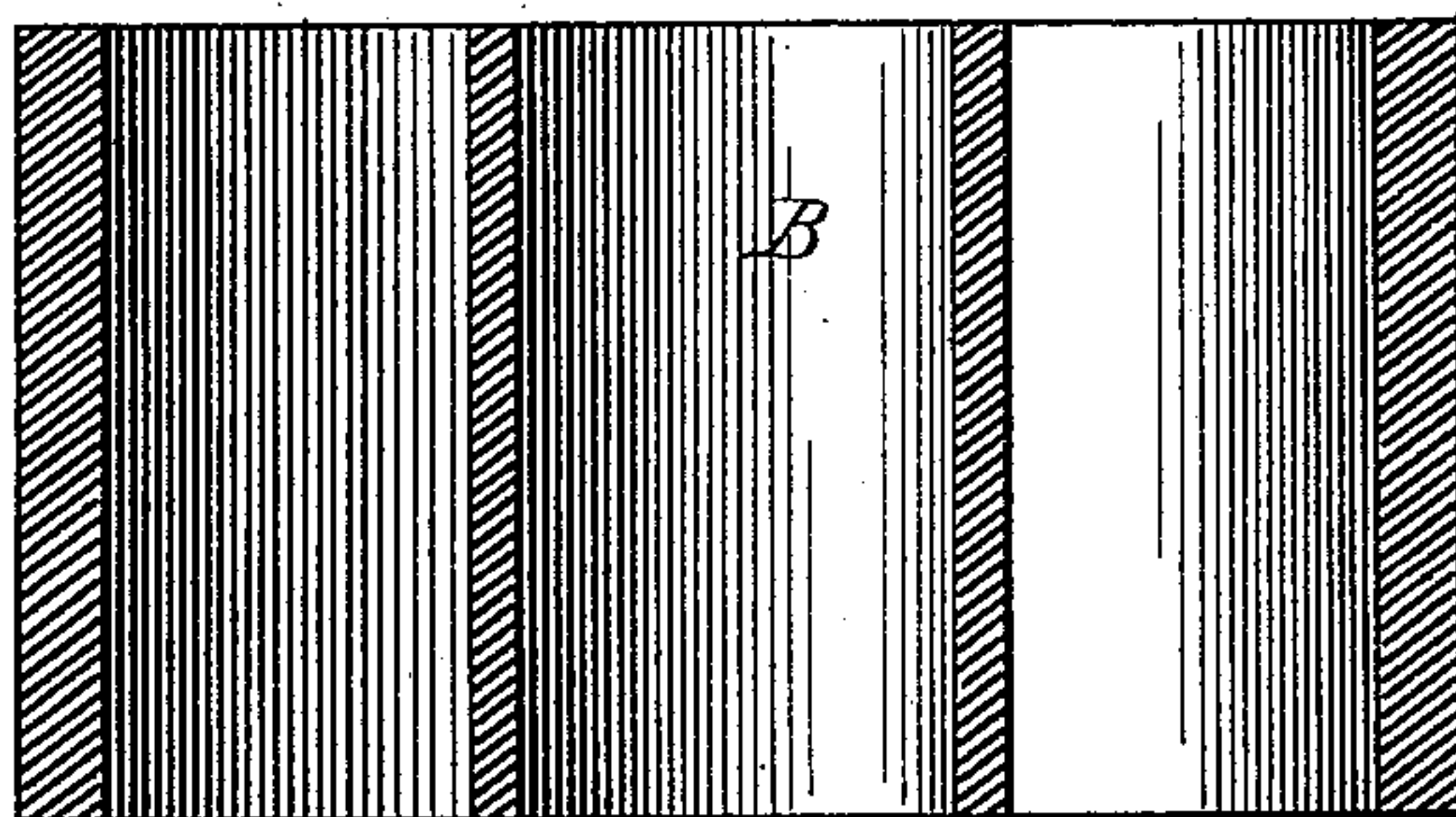
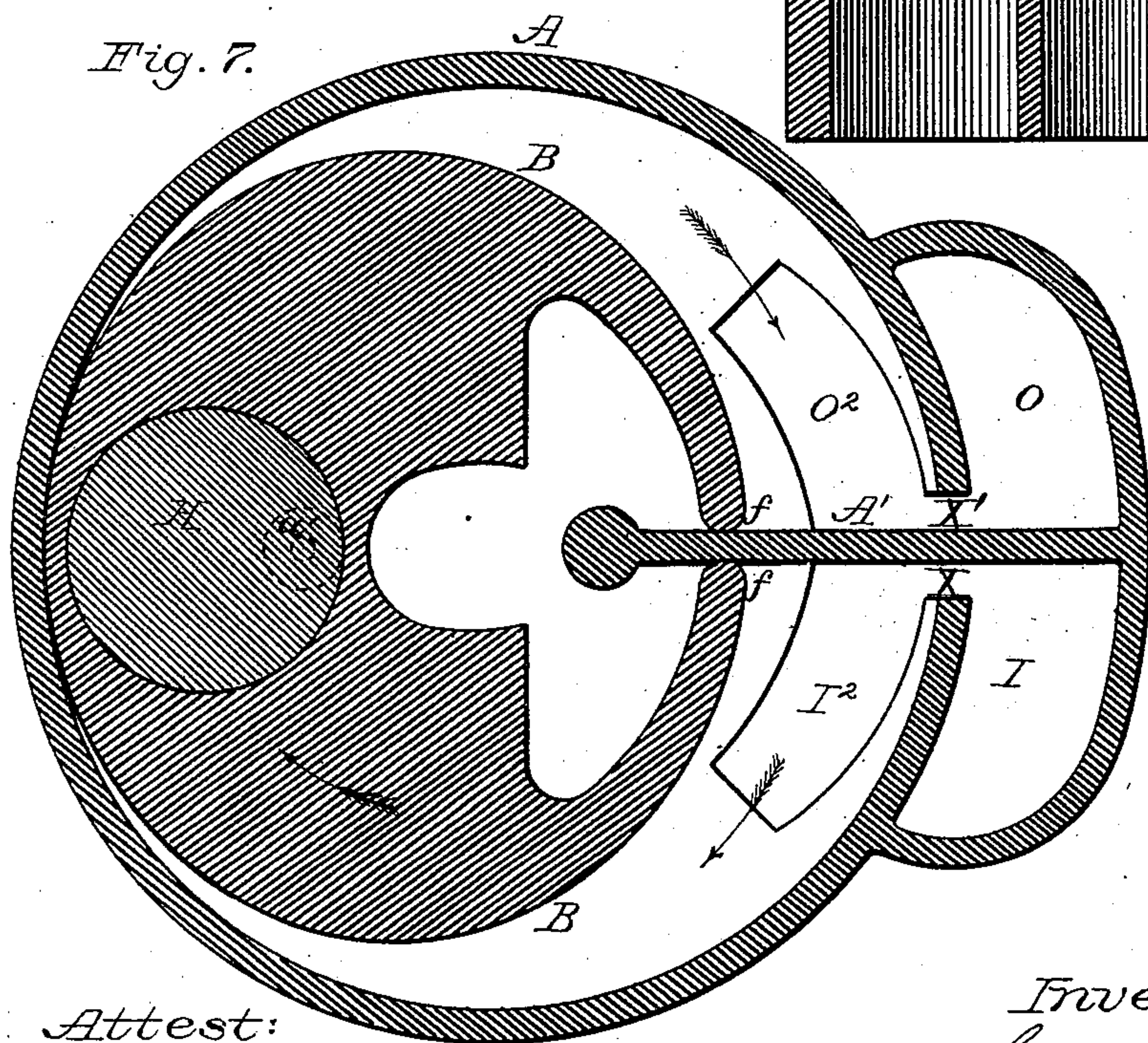


Fig. 7.



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UNITED STATES PATENT OFFICE.

LEWIS HALLOCK NASH, OF BROOKLYN, ASSIGNOR TO THE NATIONAL
METER COMPANY, OF NEW YORK, N. Y.

OSCILLATING METER.

SPECIFICATION forming part of Letters Patent No. 300,626, dated June 17, 1884.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, LEWIS HALLOCK NASH, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Rotary Water-Meters, of which the following is a specification.

Steam-engines have been constructed upon the plan of an eccentrically-moving piston adapted to rock upon a radial abutment within an inclosing-case, to divide said case into receiving and discharging spaces, the center of the piston describing a circle around the center of the case. A piston adapted to have such a motion I use in my improved water-meter; and the objects of my improvement are to simplify the construction and perfect the operation of the meter, to effect accuracy of measurement of the water, and to produce a meter, pump, or motor in which the eccentrically-moving piston operates without a dead-center, and thus obtain the advantage of a uniform movement without using a transverse divided piston.

In another application, Serial No. 114,916, for a patent for a water-meter, filed by me of even date herewith, I have described and claimed an eccentrically-moving piston open from end to end, having a longitudinal side slot, an inclosing-case having a radial abutment extending from head to head of the cylinder, having an enlarged end extending through and forming a joint within the piston in every position of the latter, while said piston forms a joint with the case, and suitable means for registering the movements of the piston; and I do not claim herein, broadly, such a thing, nor any combination of devices or matter shown and described in my said application.

The specific matters of improvement herein consist in a novel means for controlling the eccentric movements of the piston, in connection with a case-dividing abutment, dividing also the interior of the piston, and in such a construction and relation of the piston and the abutment that the joint is intermittently formed by the abutment within the interior of the piston at such positions in its movements as will bring its interior in communication

with the inlet and outlet ports of the case, so that the water shall act upon the inner side of the piston to drive it when the external pressure has ceased to act by reason of the piston having momentarily covered the inlet and outlet ports opening into the case outside of the piston.

My improvement also consists of matters of construction and of combinations, which will be made the subject of specific claims.

Referring to the accompanying drawings, Figure 1 represents a vertical section on the line $y y$ of Fig. 2; Fig. 2, a horizontal section on the line $x x$ of Fig. 1. Figs. 3 and 4 are similar sections showing different positions of the piston; Fig. 5, a section through the ports and passages on the line $z z$ of Fig. 3. Fig. 6 is a section of the piston, and Fig. 7 a modification of my invention.

The cylinder or case A has at one side an extension or chamber divided by a partition, and forming the inlet and outlet passages I and O, which connect by passages on the outside of the cylinder with the inlet and outlet ports I' I'' and O' O'' in the cylinder-heads. The partition or abutment A' extends from one head of the cylinder to the other radially into the interior of the piston, wherein it terminates in an enlargement of semicircular or other form suitable for maintaining a joint upon the inner wall of the piston. Within said cylinder is placed a shaft, H, having eccentric bearings or journals $a' a'$ in a hub on each head, one of the heads being made movable. Upon this shaft the eccentrically-moving piston B is supported so as to turn freely thereon and be controlled in its eccentric movements. At one side the piston is provided with a slot, $f f$, extending longitudinally across its entire face, passing over the abutment A' , and with its sides forming a joint or bearing on the abutment. The exterior surface of the piston bears against the interior surface of the cylinder, as shown at d and d' in Figs. 2 and 3; hence the pressure of the inflowing water will tend to move the piston in the direction of the arrow. The interior wall of the piston forms a joint with the enlarged end of the abutment during a portion of the movement of the piston, and

divides its interior into receiving and discharging spaces, (shown in Figs. 2 and 4,) when the water will enter the interior of the piston and force it in the same direction of the arrow in this figure as in Fig. 2. The water on the other side of the abutment will of course be forced out of the discharge-ports O' O^2 and passage O as they are opened. The inlet and outlet ports are both double.

In one end of the shaft H is secured a pin provided with a pinion, b , which meshes with a gear-wheel, a , on the shaft d^2 , that is journaled in the head C with one end, while the other end passes through a stuffing-box on the auxiliary head or plate D . On the outer end of shaft d^2 is secured a gear-wheel, which meshes with suitable gearing of a registering apparatus, by which the number of revolutions of the piston are indicated.

In Figs. 1, 2, 3, and 4 the eccentric shaft H is placed in the center of the case, and the piston is mounted upon it by a sleeve formed upon the end of a radial arm or web, F , joining the interior wall of the piston, so that the outer surface of the sleeve practically forms a part of the interior wall of the open piston. The shaft is mounted so as to turn loosely in its eccentric bearings, and the piston is mounted upon the shaft so as to be controlled by it in its eccentric movements about the case.

In Fig. 7 the piston is shown as mounted upon its eccentric shaft out of the center of the case, and the shaft has its bearing in the body of the piston. This arrangement causes the center of the piston to describe an elliptical path around the center of the case; but the dividing function of the piston is the same as if it described a circle around said center. The abutment is shown as terminating in a cylindrical bearing, and the piston has an internal conformation adapted to make a joint upon the abutment in certain positions of the piston, as before stated.

The operation is as follows: The piston being in position shown in Fig. 3, water enters through the inlet-passage I , passes to both ends of the cylinder, and thence through ports I' I^2 , and presses against the exterior surface of the piston, which will then move in the direction of the arrow and allow the escape of the water through the ports O' O^2 to the passage O . It will be observed that the piston constantly forms a joint with its exterior surface against the interior surface of the cylinder, and with the sides $f f$ of the slot against the sides of the abutment. When the piston has reached the position shown in Fig. 2, the sleeve of the web F of the piston forms a joint with the enlarged end of the abutment A' , and divides the interior of the piston into receiving and discharging spaces I^3 and O^3 . In this position of the piston the outlet-ports O' O^2 open communication with the interior discharging-space, O^3 , of the piston, and the inlet-ports I' I^2 are just on the point of opening communication with the interior receiving-space, I^3 , of the piston. From this position the

piston passes to the position shown in Fig. 4, during which the water enters the piston-space I^3 through the ports I' I^2 , forcing the piston on its return movement, the water in the meantime discharging from the piston-space O^3 . In the construction shown in this figure the joint is formed intermittently by the sleeve-bearing of the piston bearing against the interior side of the semicircular part of the abutment, while the sides $f f$ of the slot will bear on the sides of the central radial part of the abutment, and thus divide the interior of the piston, while in this position, into receiving and discharging spaces communicating with the inlet and outlet ports, so that during the momentary cessation of the pressure upon the outer surface of the piston by the closing of the inlet and outlet ports the motion of the piston is continued by the interior pressure.

In Fig. 7 the piston is shown of oval form; but whatever its form it must be adapted to make the dividing-joint with the case, and the latter must be of such form as to co-operate with the piston in forming the joint. In this modification I have shown the inlet and outlet ports as communicating with the cylinder-chamber by the passages X X' in its wall on the opposite sides of the abutment, for the purpose of increasing the capacity of the inlet and outlet ports, such passages extending from the top to the bottom of the case.

The mounting of the piston upon an eccentric shaft adapts the machine to be used either as a pumping-engine by applying power to the eccentric shaft or as a motor by transmitting the power from the piston-shaft, the function of the piston to drive the eccentric shaft being the same as the action of a crank-shaft.

I claim—

1. The combination of a case or cylinder having a radial abutment extending within the piston from head to head of said case, and suitable inlet and outlet ports, with an eccentrically-moving piston open from end to end, having a longitudinal slot in its side, and an eccentric shaft having bearings in the cylinder head or heads and in the piston, whereby the action of the eccentric shaft adapts the piston to constantly maintain a dividing-joint with the case, and to intermittently maintain a dividing-joint with the interior of the piston, substantially as described.

2. The combination, in a water-meter, of a case or cylinder having a radial abutment extending within the piston from head to head of said case, and suitable inlet and outlet ports, with an eccentrically-moving piston open from end to end, having longitudinal side slot, an eccentric shaft having bearings in the cylinder head or heads and in the piston, and suitable means connecting said eccentric shaft with the registering mechanism by intermediate speed-reducing gearing, substantially as described.

3. The combination of a case or cylinder

having a radial abutment extending within the piston from head to head of said case, and suitable inlet and outlet ports, with an eccentrically-moving piston open from end to end, 5 having a longitudinal side slot and an interior radial arm or web terminating in a central sleeve-bearing, and an eccentric shaft having a bearing within said sleeve and within the heads of the case, substantially as described, 10 for the purpose specified.

4. The combination of a case or cylinder having a radial abutment extending within the piston from head to head of said case, and suitable inlet and outlet ports, with an eccentrically-moving piston open from end to end, 15

having a longitudinal side slot, and means, substantially such as herein described, whereby the dividing-joint of the case is maintained in all positions of the piston, and maintained within the interior of the piston during a portion only of the period of its motion, substantially as herein described, for the purpose specified. 20

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 25

LEWIS HALLOCK NASH.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.