(Model.) 3 Sheets—Sheet 1.

L. H. NASH.

OSCILLATING WATER METER.

No. 300,629. Patented June 17, 1884.

Fig. 1.

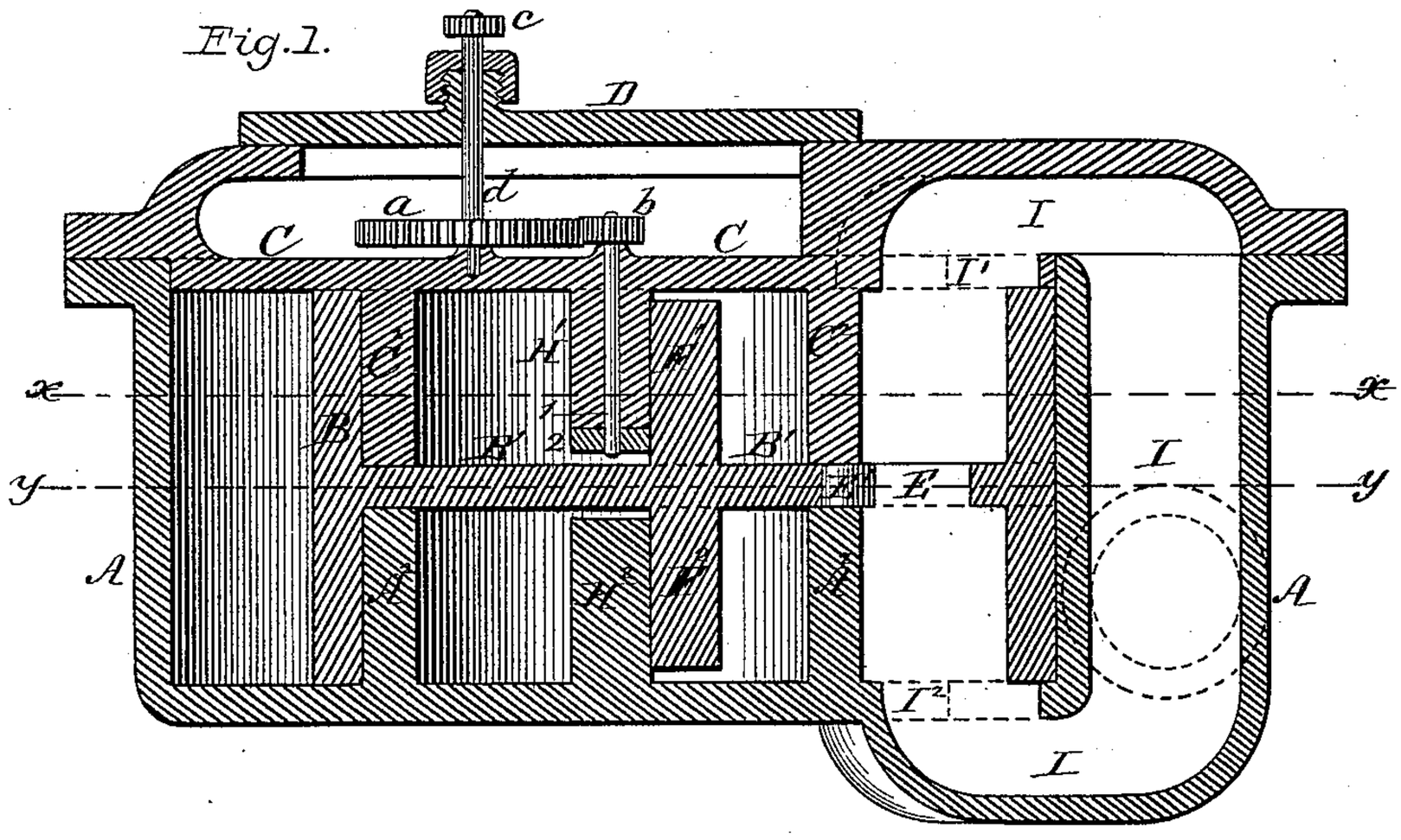
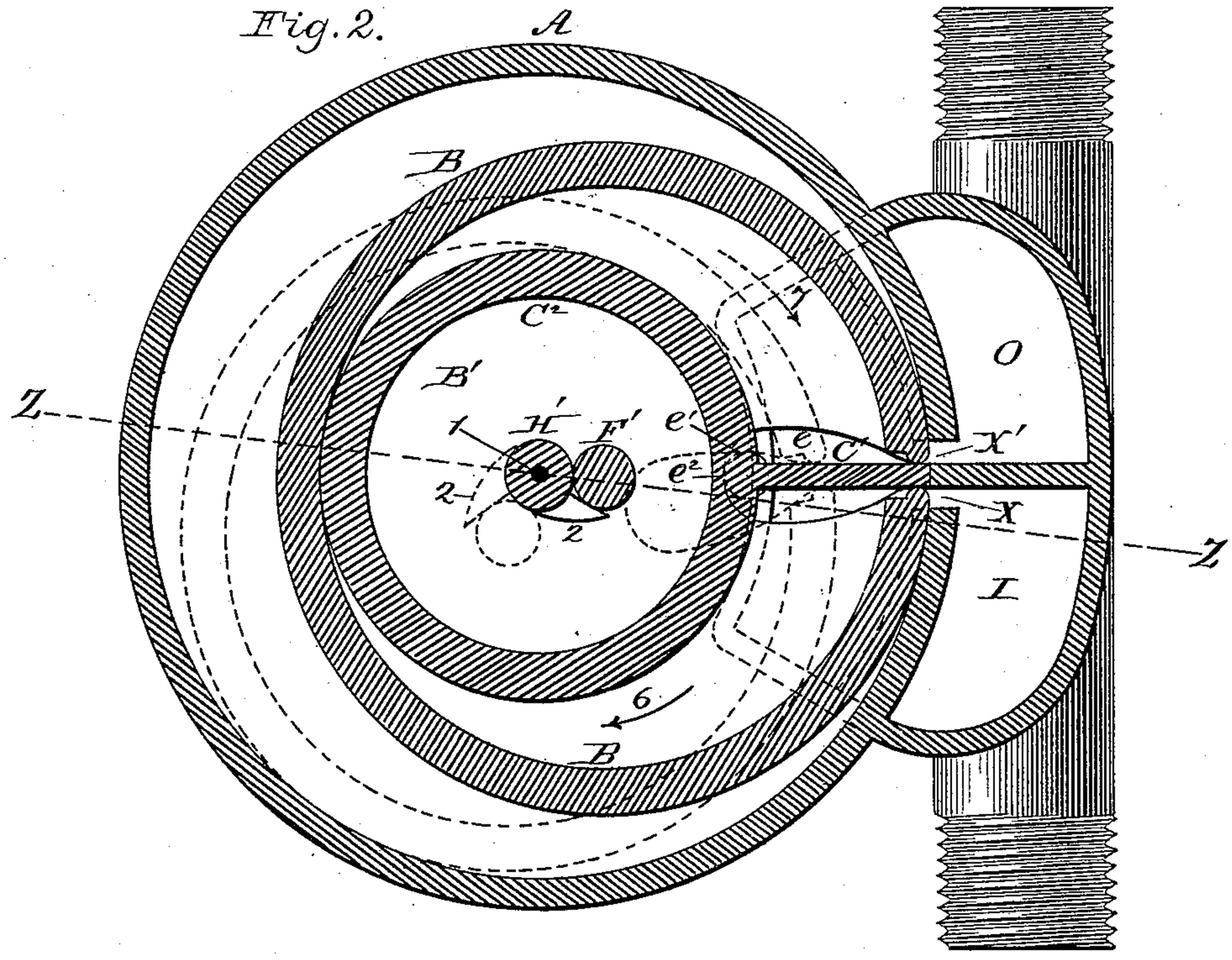


Fig. 2.



Attest:
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Howell Bartle.

Inventor:
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by Johnson & Johnson
Attys.

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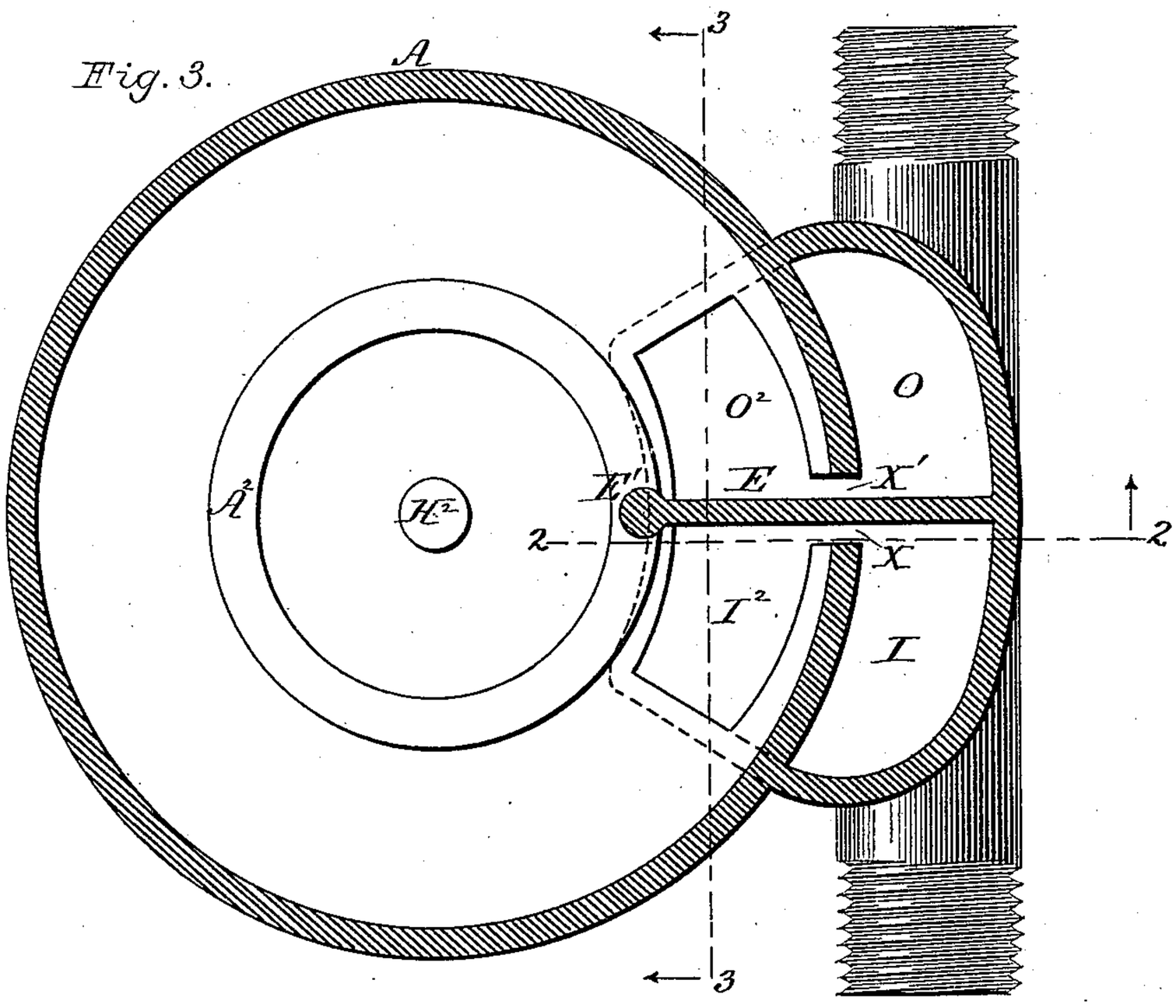
Fig. 3.



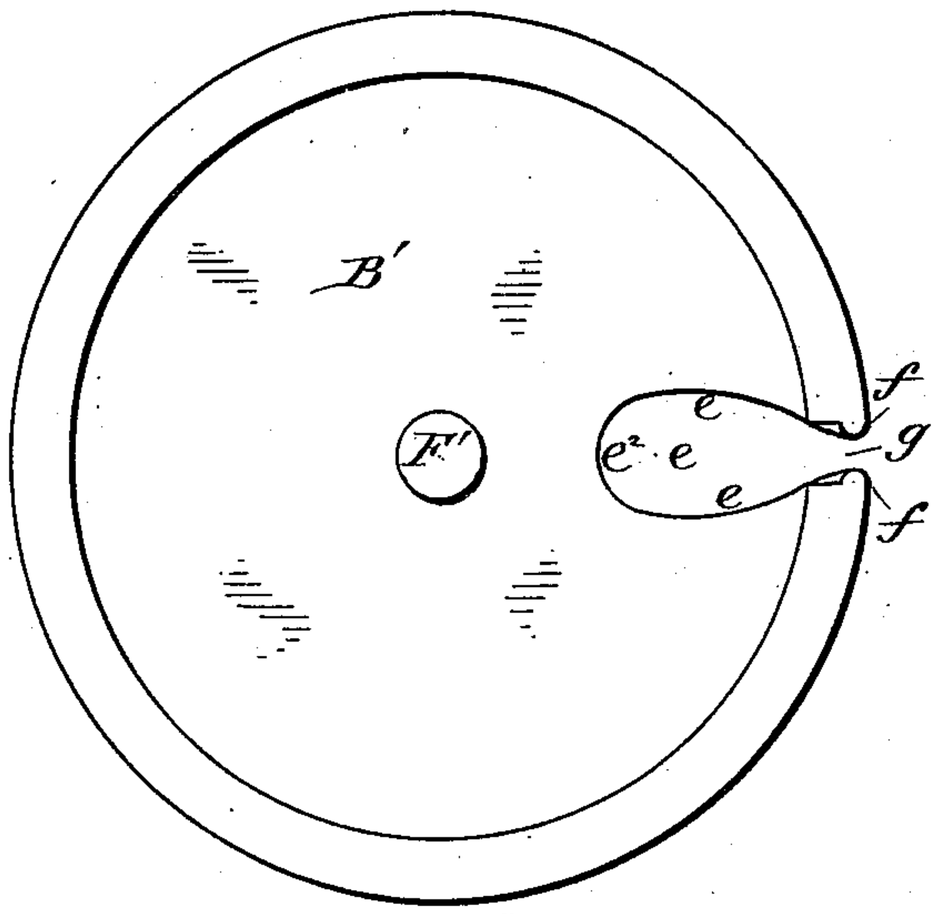


Fig. 4.

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(Model.)

3 Sheets—Sheet 3.

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OSCILLATING WATER METER.

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Fig. 5.

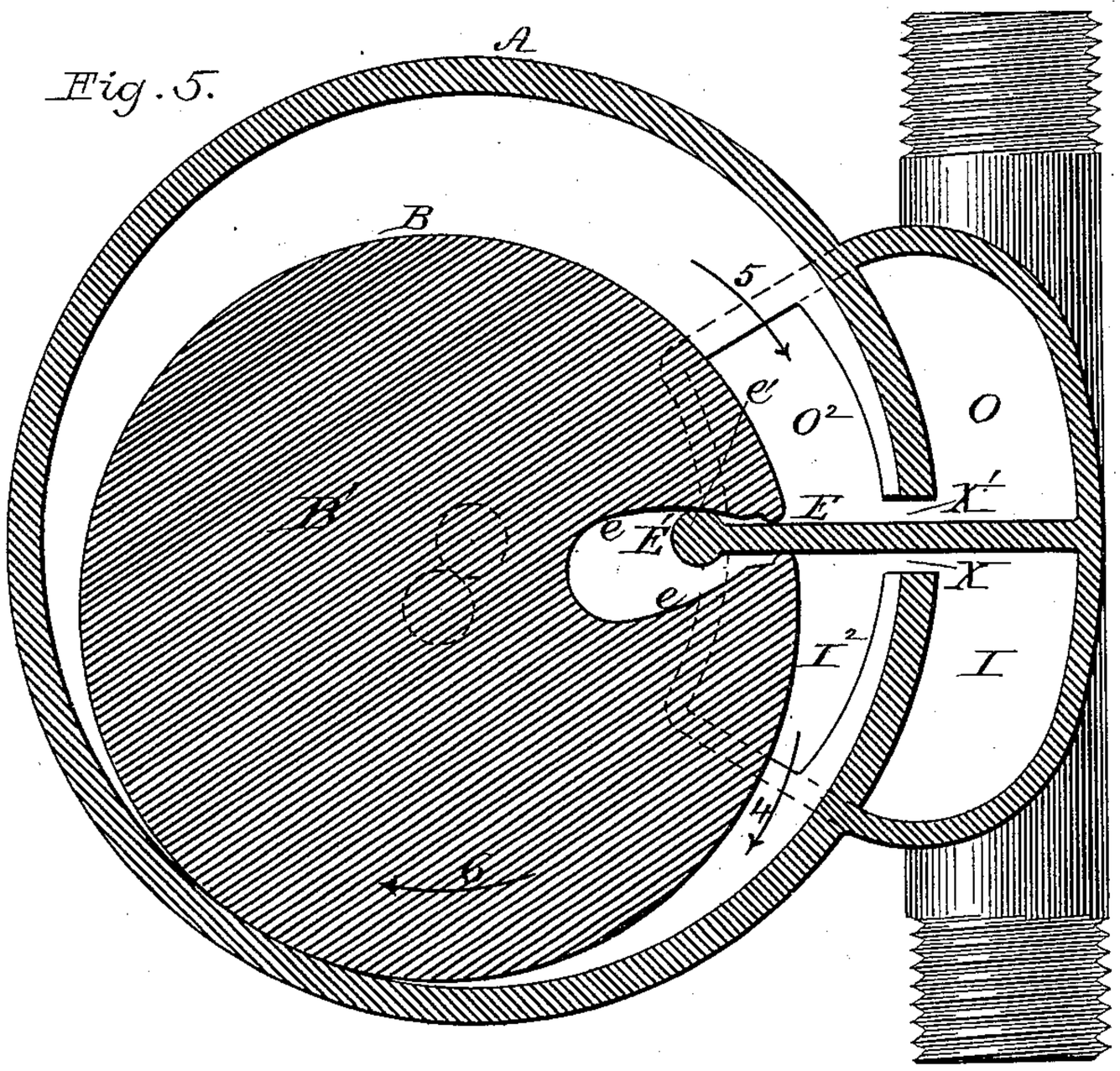


Fig. 6.

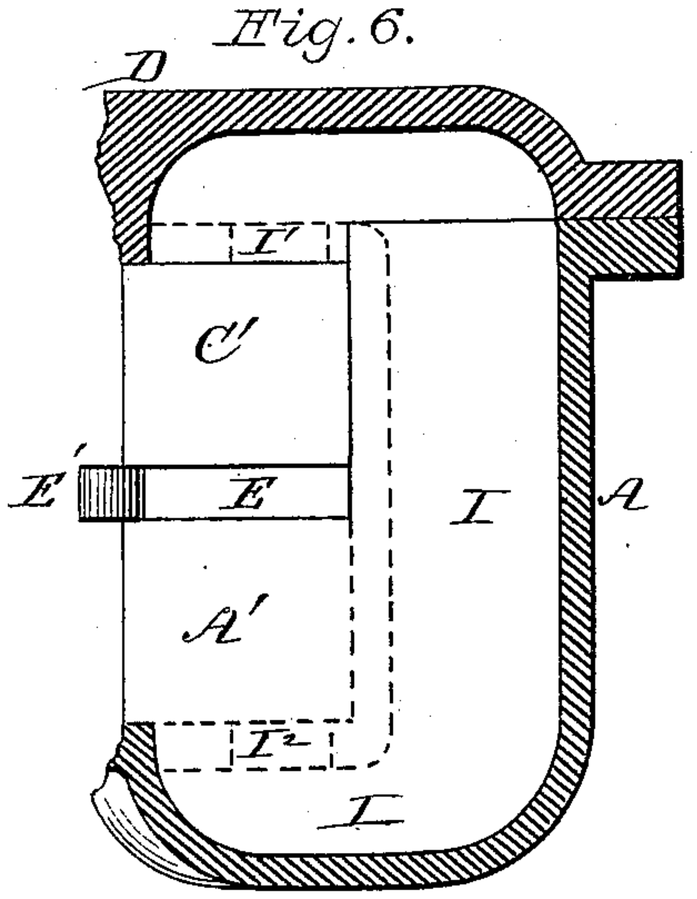
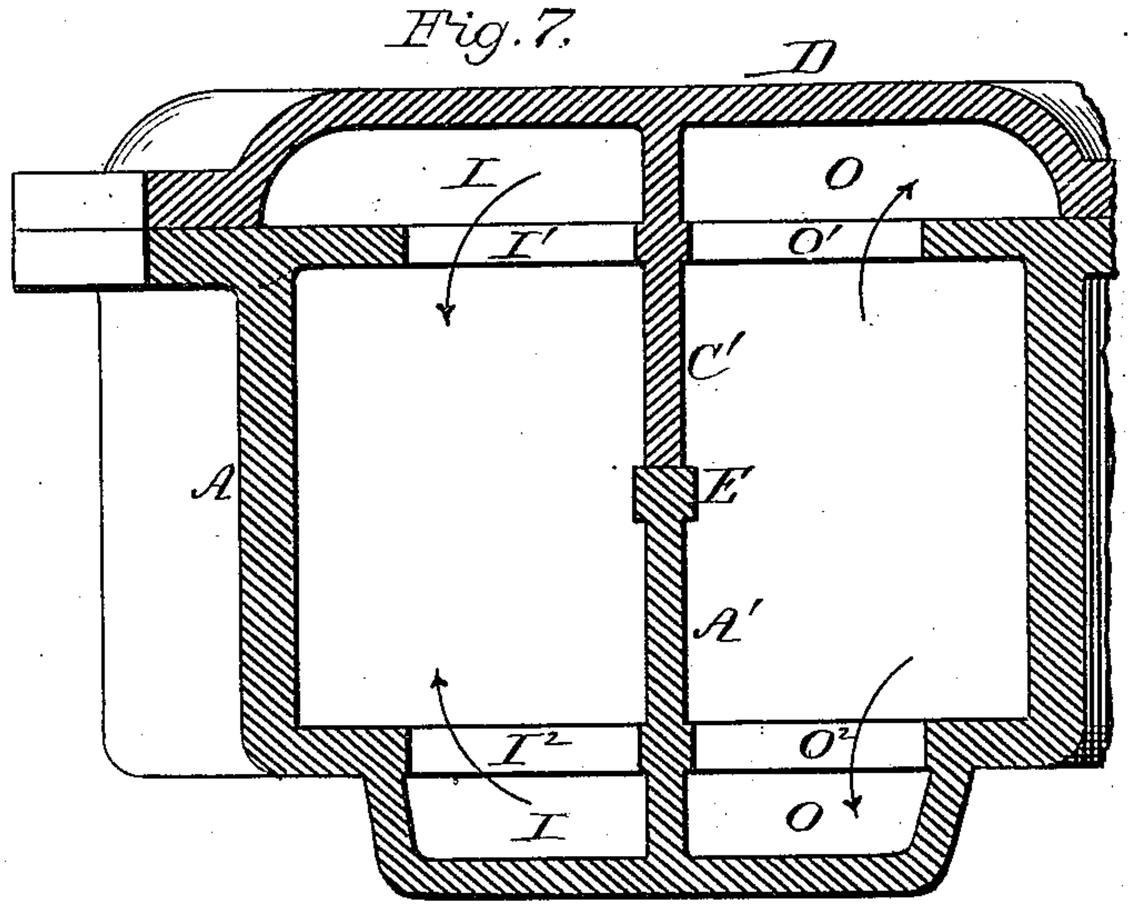


Fig. 7.



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Inventor:
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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 WATER-METER.

SPECIFICATION forming part of Letters Patent No. 300,629, dated June 17, 1884.

Application filed February 27, 1884. (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 Oscillating Water-Meters, of which the following is a specification.

In an application for a patent for improvements in water-meters, filed December 18, 1883, under Serial No. 114,919, I have described the object and scope of the invention to which my present improvement relates. The construction of the meter embraced in my said application involves means for controlling the eccentric movements of the piston, consisting of co-operating fixed studs of the case and studs of the piston, and an abutment upon which the piston rocks; and I do not, therefore, broadly claim herein such means of controlling the path of the piston, nor any combination of devices or matter shown in my said above stated application. A feature of improvement and novelty in the above-mentioned application embraces an eccentrically-moving piston having a transverse dividing plate or web, combined with a radial abutment, central ring projections within the piston, and a movable abutment-section coincident with the web of the piston, forming a joint with it and with the fixed abutments, and moving with the piston in such joint-forming function.

The improvement claimed herein consists in combining with the eccentrically-moving piston having a transverse dividing plate or web and a longitudinal slot at its side opening into an oval slot in the piston-web with an inclosing-case having a non-moving radial abutment adapted to form a joint with the dividing-web in every position in the movement of the piston—that is to say, my present improvement dispenses with the movable joint-forming abutment in using a divided piston, and thus saves the trouble and expense required in fitting and adapting the case to receive a movable abutment, and avoids the friction due to a joint-forming sliding part controlled by the piston.

Referring to the accompanying drawings, Figure 1 represents a vertical section of the meter on the line *z z* of Fig. 2, which is a horizontal section of the meter on the line *x x* of Fig. 1; Fig. 3, a horizontal section of the case on the line *y y* of Fig. 1, the piston being removed, showing the portion of the fixed abutment which terminates in the bearing-point; Fig. 4, a top view of the piston; Fig. 5, a horizontal section of the meter on the line *y y*, showing particularly the joint-forming bearing of the piston-web B′ with the non-moving abutment E; Fig. 6, a vertical section taken on the line 2 2 of Fig. 3, showing the radial abutment in elevation; and Fig. 7, a vertical section on the line 3 3 of Fig. 3.

The meter-case A is cylindrical in form, and has a smaller ring projection, A^2, extending inward from the lower fixed head of the case. The other head, C, which is removable, has a similar ring projection, C^2, corresponding with A^2, and both form a joint by the contact of their ends upon the upper and lower sides of the dividing web or plate B′ of the piston B. Within both of these ring projections is placed a central stud, H′ and H^2, extending from the case-heads to the dividing-web of the piston.

The piston B consists of a cylinder divided transversely by a web, B′, while at one side the cylinder is provided with a longitudinal slot, *e g*, having a width, length, and form adapted to form a joint upon the bearing-point E′ of the fixed abutment E in any position of the piston. The piston-web has two studs, F′ F^2, similar to those of the case, around which and in contact wherewith said piston-studs revolve, and thus maintains a close contact of the piston with the inner wall of the case, as shown in Fig. 2. The case has a radial abutment, C′ A′, secured to it at the side next the inlet and the outlet, with which the piston forms a joint at the slot-points *f f*, and upon the non-moving projecting end of the abutment E, which is in the same vertical plane with the abutment C′ A′. This abutment E terminates in a cylindrical end, E′, which extends inward beyond the inner edges of the radial dividing parts C′ A′, as in Fig. 6, so as to stand between the inner ends of the ring projections C^2 A^2 and form the joint with the web of the piston, so that the latter can move eccentrically. To allow such movement of the piston upon the fixed abut-

ment E the piston-web B′ has an oval slot, *e e*, which is of such form that in any position of the piston it will bear upon and form a joint with the projecting end E′ of the abutment E. The forming of this joint by a piston having a dividing-web upon a non-moving abutment is the specific improvement which I claim, and which I will now more particularly describe.

In the position shown in Fig. 2, the piston makes contact with the wall of the case at the point of inlet and outlet above the piston-web. The inner wall of the piston makes contact with the outer side of the ring-abutment C^2, while below the piston-web the inner wall of the piston makes contact with the ring-abutment A^2 of the case, the ends of said abutments making contact with the piston-web. The only remaining surfaces to complete the joint of the interior of the piston upon the abutment is that between the web B′ and the projecting end portion, E′, of the abutment, which corresponds in thickness and in horizontal plane with the piston-web. In the position of the piston shown in full lines its point of contact with the projecting end of the abutment is at the inner end e^2 of the oval slot, while in the other extreme movement of the piston shown by dotted lines the contact is made at the side e' near the open end of the oval slot. In whatever position the piston assumes this joint will be made with some portion of the edge of its web in the oval slot, and in every such position the oval slot will make communication with the piston-chambers on both sides of its web, and thus equalize the pressure within the piston.

At one side of the case, on one side of the abutment, is arranged the inlet-passage I, which conveys water to the inlet-ports I′ and I^2, the discharge being effected on the other side of the abutment, through the ports O′ and O^2 and the passage O. The inlet and the outlet ports are divided by the radial abutment C′ A′ E, and these ports are increased in their capacity by the passages X X′, formed in the wall of the case on each side of the abutment, extending between the case-heads, and communicating with the chamber of the case on each side of the abutment.

In the stud H′ of the head C is journaled a shaft, 1, having at its inner end a crank-arm, 2, adapted to bear upon the stud F′, while the outer end of said shaft extends through the head C, and carries a pinion, *b*, which meshes with a gear-wheel, *a*, on the shaft *d*, which is stepped in the head C, and, passing through the stuffing-box of a covering-plate, D, has a gear-wheel, *c*, which engages with and operates the registering mechanism by which the revolutions of the piston are indicated.

Referring to the radial abutment, the upper part, C′, may be separately fitted in place, or cast with the upper head-ring projection; and the part E E′ may be a separate piece, or cast with the lower head and its ring projection; but however formed, the three parts, in fact, constitute a single fixed abutment, from the inner vertical edge of which the cylindrical end E′ must project in a plane coincident with the web of the piston and occupy a position between the inner ends of the ring projections at the side of the case next the inlet and outlet ports, as shown in Fig. 1.

In the operation of the meter the piston B, being in the position shown in Fig. 2, forms a joint upon the meter-case, the central ring projections, A^2 C^2, and the radial abutment A′ C′, while the abutment E forms the joint with the piston-web at the inner end of its oval slot. The inflowing water will then enter the interior of the piston through the ports I′ and I^2, and press against and force it in the direction of the arrow 6, while the water discharges from the interior of the piston in the direction of the arrow 7, through the ports O′ and O^2. When the piston has moved to the position shown in Fig. 5, and in dotted lines in Fig. 2, the water will enter the chamber of the case from the inlet-ports I′ and I^2, as shown by the arrow 4, and, pressing against the outer side of the piston, continues to force it in the same direction, while the water discharges from the opposite side of the chamber in the direction of the arrow 5, through the ports O′ and O^2. In this movement of the piston, its studs F′ F^2 revolve around and in contact with the studs H′ and H^2 of the case, whereby the movement of the piston is made eccentric, maintaining always a guiding-bearing upon the abutment, over which it moves, and is allowed such movement by reason of the oval form of the slot in its web. The revolution of the piston-studs will push forward the crank-arm 2, and thus operate the registering-gearing, which is not shown, to measure the flow of the water.

I have shown and described the piston as being guided and controlled in its rocking movements by the contact of the studs; but it is obvious that the piston might be controlled by a direct crank-connection with the shaft 1 without the studs F′ F^2, in which case the joint-contact of the piston with the case would be maintained in the same manner, and the registration effected through the gears *b* and *a* in the same manner. To provide for a more effective control of the piston, I may hold the parts F′ and H′ in contact by a loop embracing them. The division of the piston into upper and lower chambers by its web gives the advantage of balancing the piston in its movements; but the meter may be constructed so that the piston will operate with one chamber on the side of its web, the functions and co-operations of all the parts being the same. The registering mechanism may be dispensed with and the machine used as a pump or engine.

I claim—

1. The combination of an eccentrically-moving piston having a transverse dividing-web, B′, and a longitudinal side slot opening into a slot in said web, with an inclosing-case

having ring projections extending inward from each head, and means co-operating with means carried by the piston-web to control the movements of said piston, with a non-moving radial abutment co-operating with said piston-web, substantially as described, for the purpose specified.

2. A meter-case having ring projections and a non-moving radial abutment, combined with an eccentrically-moving piston having a transverse dividing-web, a longitudinal side slot, and a web-slot, and means, substantially such as described, carried by said piston-web and the case, for controlling the movements of the piston.

3. The combination of an eccentrically-moving piston having a transverse dividing-web, B′, and a longitudinal side slot opening into an oval slot in said web, with an inclosing-case having ring projections, and a non-moving radial abutment adapted to form a joint with the piston-web, and a shaft having a bearing within the case driven by the piston to operate the registering mechanism, substantially as described.

4. The combination of the inclosing-case having concentric ring projections, and a non-moving radial abutment having the projecting joint-forming end E′, with an eccentrically-moving piston having a transverse dividing-web, B′, and a longitudinal side slot, *g*, opening into an oval slot in said web, the said oval slot having a form adapting the piston to move over the said non-moving abutment and to form a joint therewith in every position of the movement of the piston, substantially as herein set forth.

5. The inclosing-case provided with a fixed radial abutment terminating in a hollow enlarged end in the center of said case, and a piston having a transverse dividing-web provided with an oval slot, combined with a fixed joint-forming abutment, E′, adapted to form a joint with the walls of said slot, for the purpose described.

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

LEWIS HALLOCK NASH.

Witnesses:
H. W. BRINCKERHOFF,
CHRISTOPHER C. WHITTEMORE.