

(No Model.)

3 Sheets—Sheet 1.

B. FITTS.

ROTARY METER.

No. 294,026.

Patented Feb. 26, 1884.

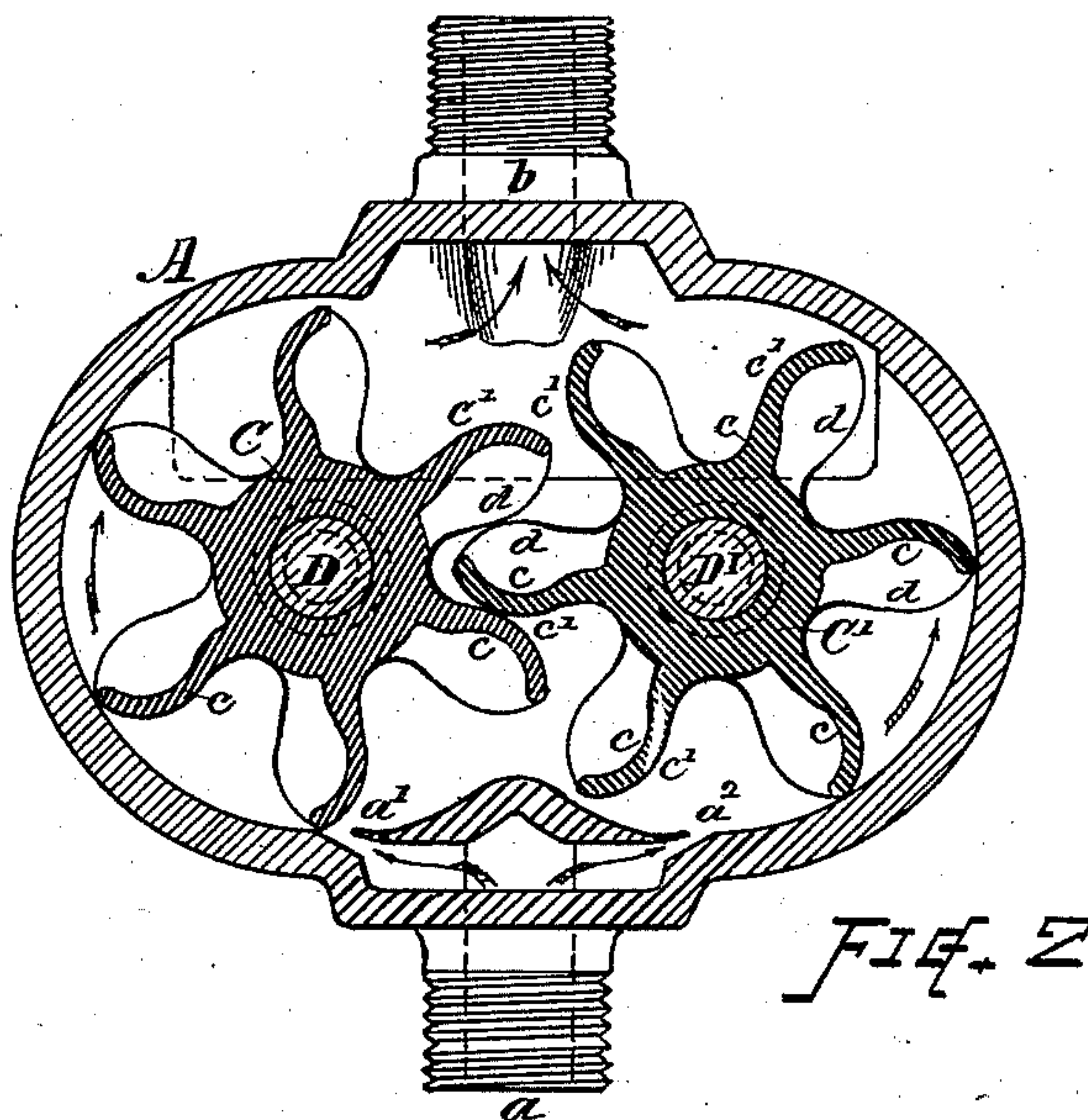


FIG. 2

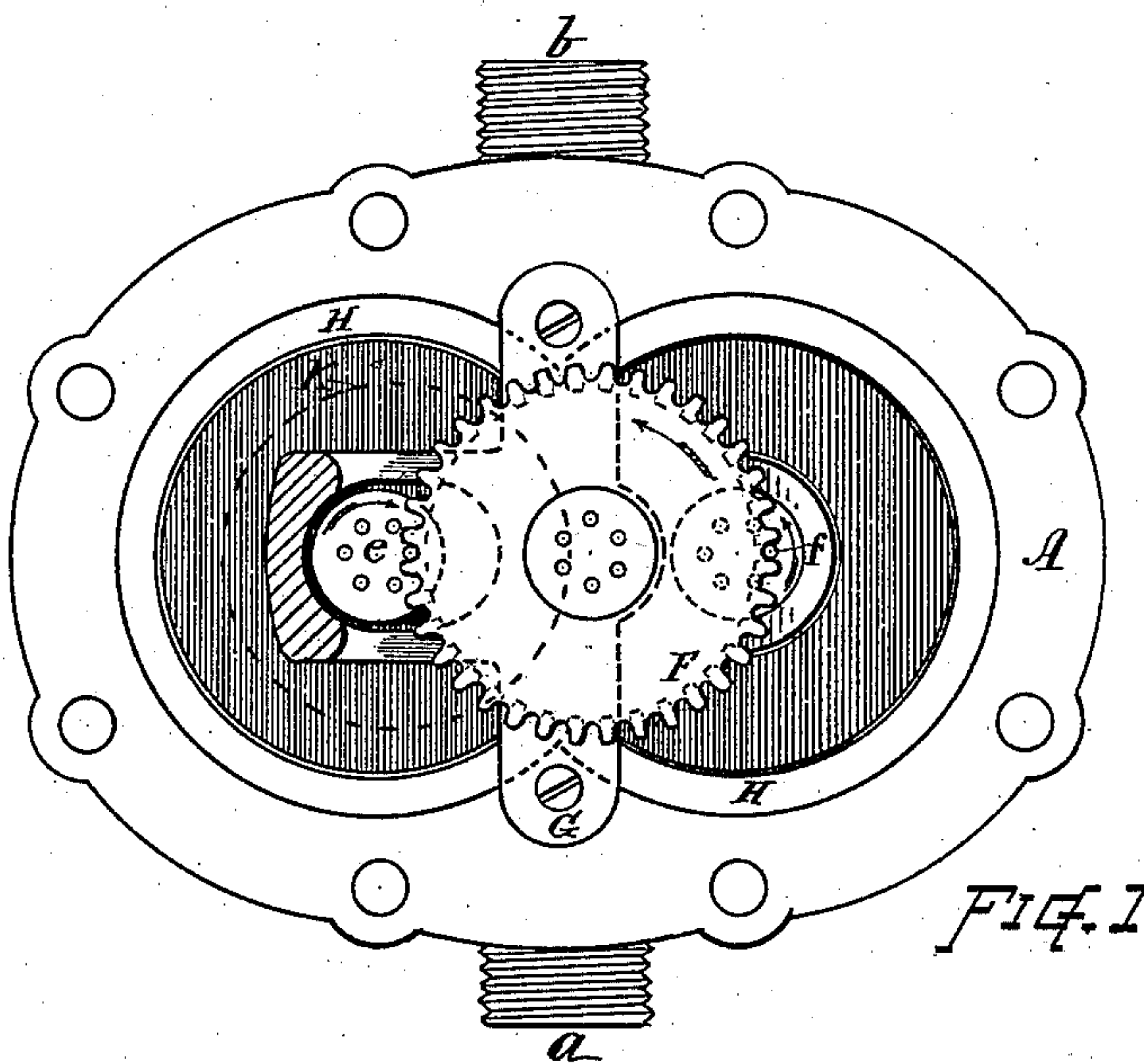


FIG. 1

WITNESSES..

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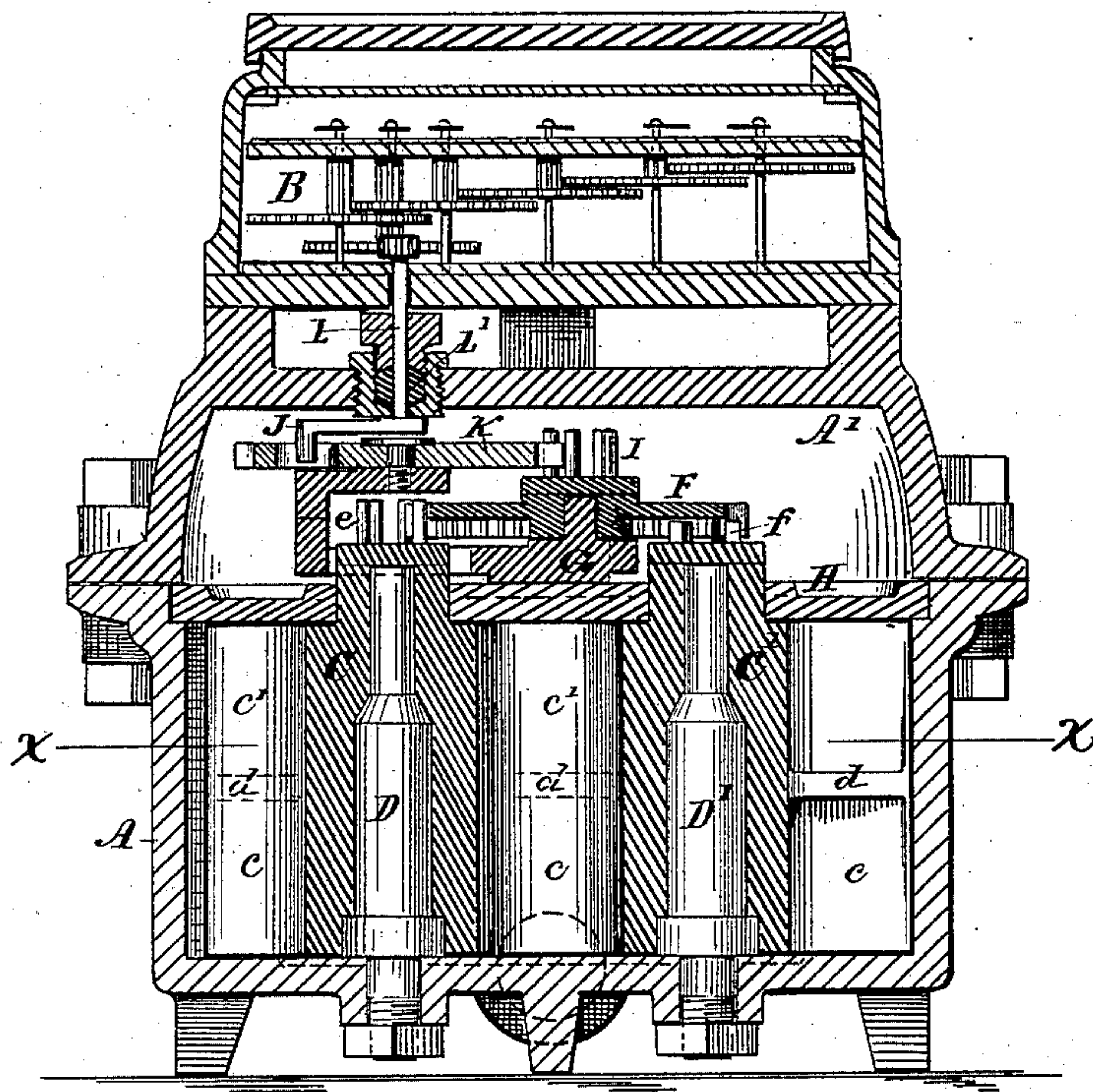


Fig. 3

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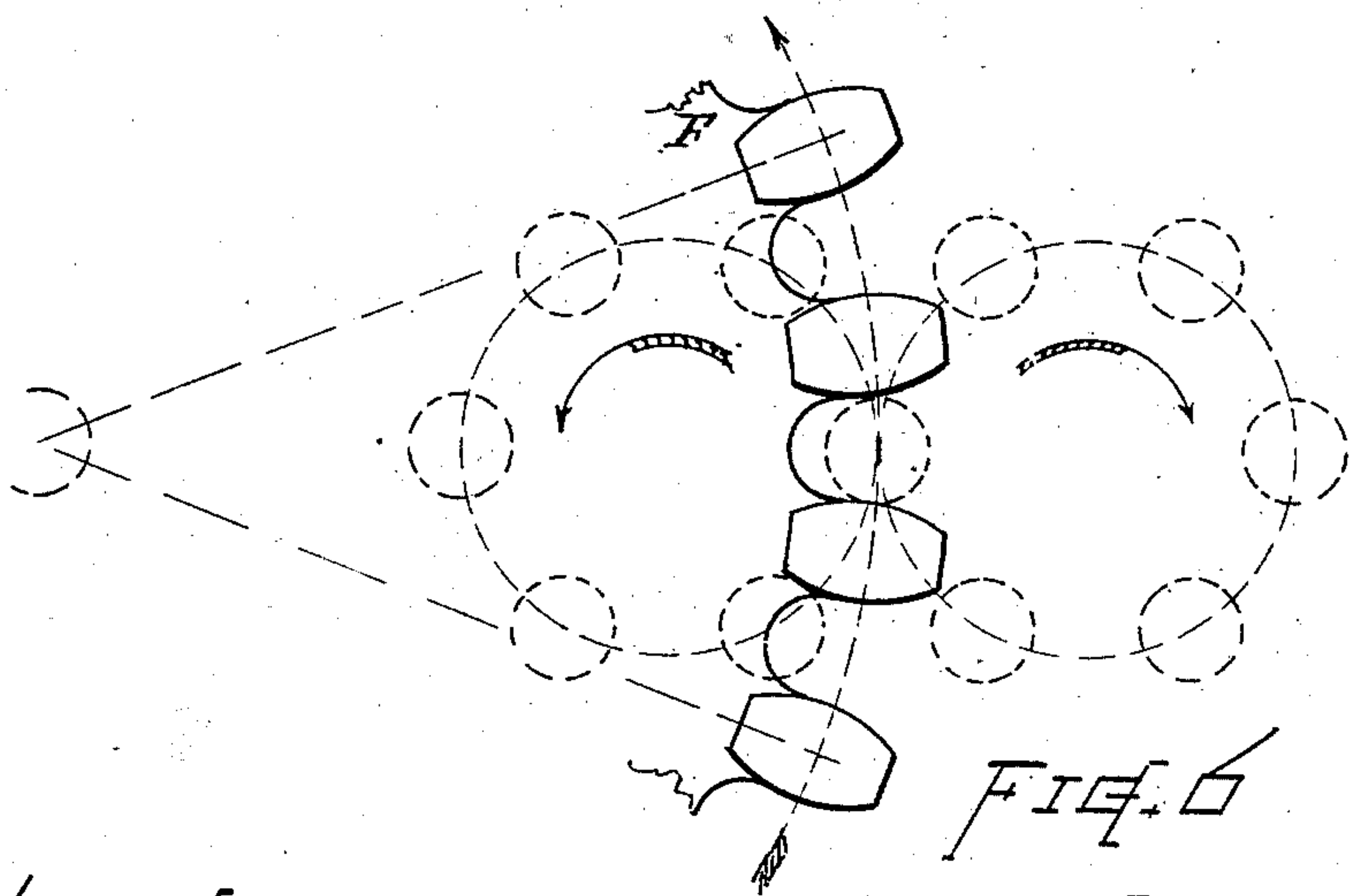
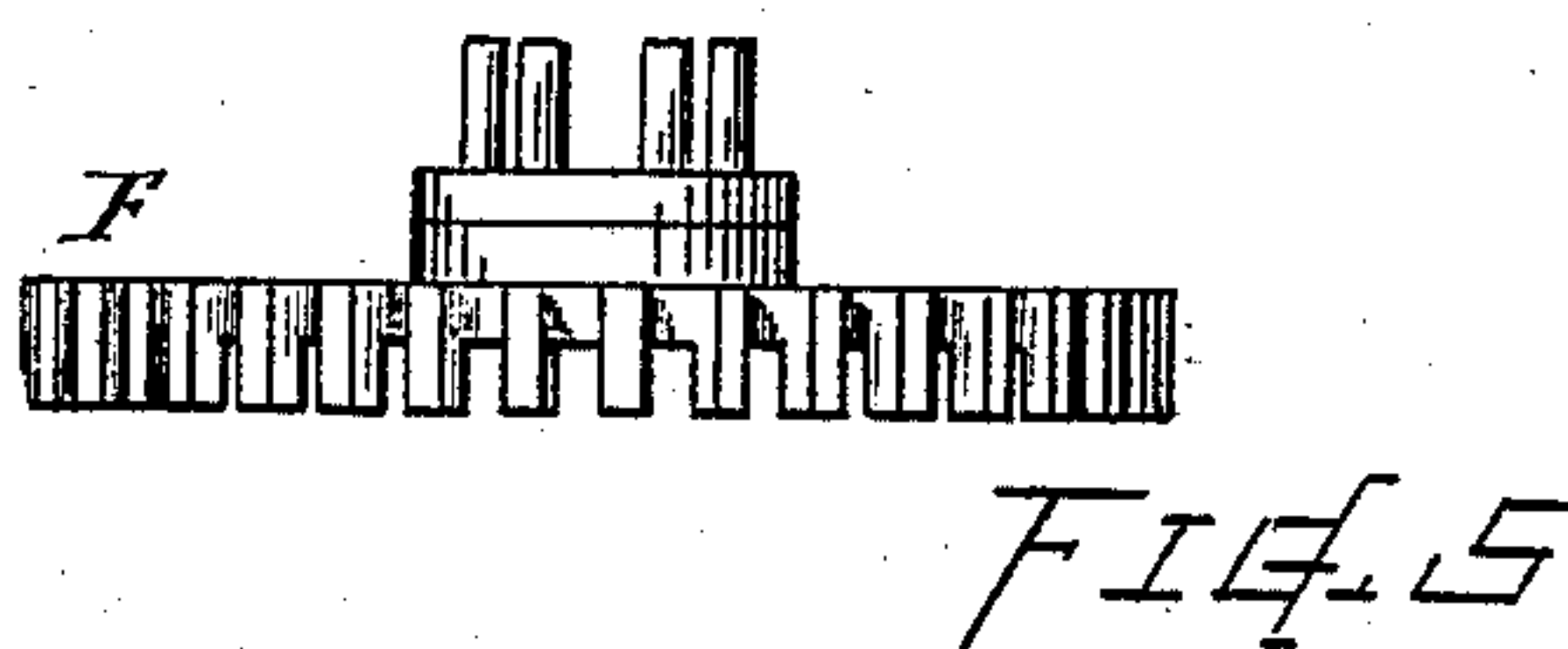
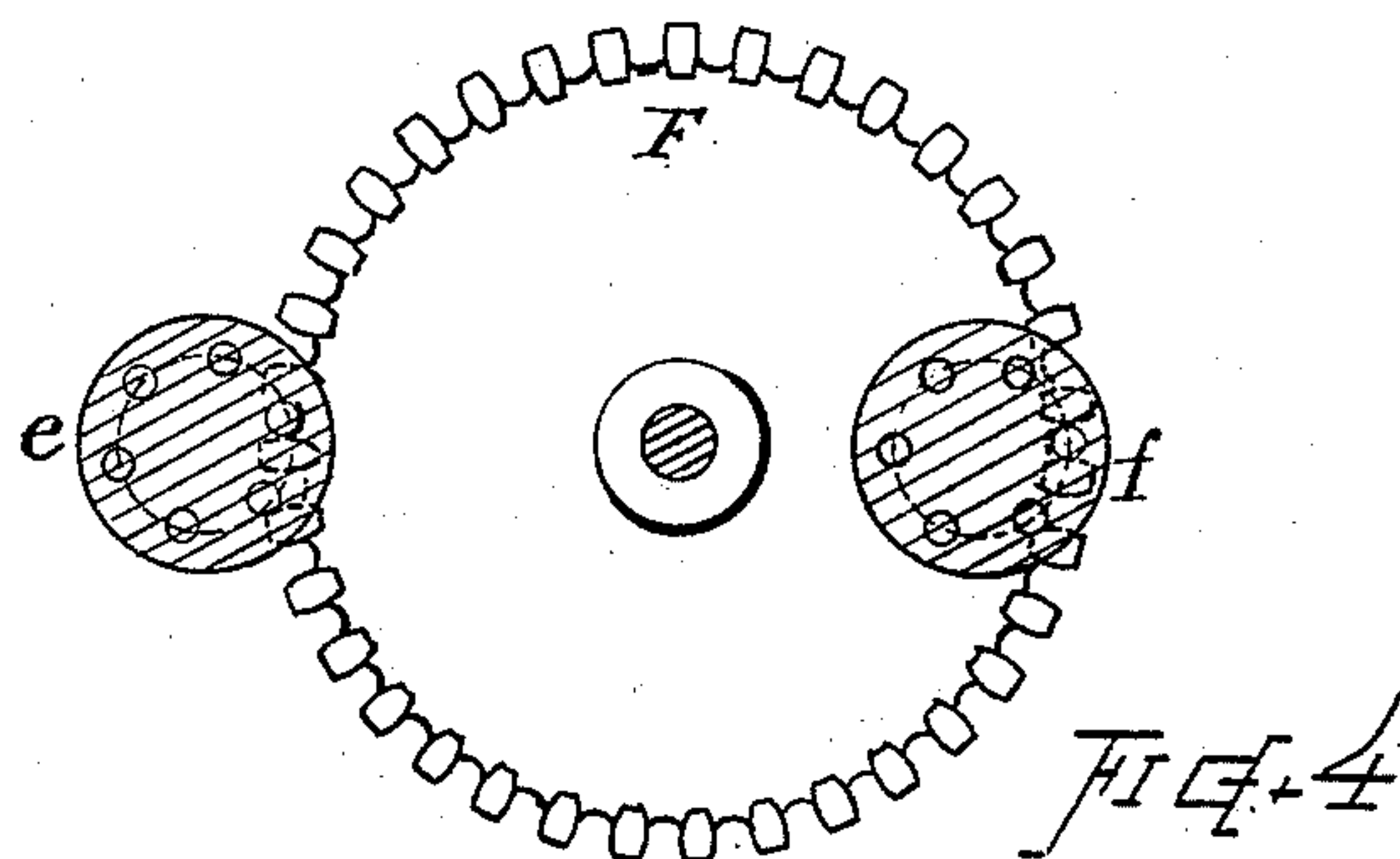
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ROTARY METER.

No. 294,026.

Patented Feb. 26, 1884.



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UNITED STATES PATENT OFFICE.

BENAI AH FITTS, OF WORCESTER, MASSACHUSETTS.

ROTARY METER.

SPECIFICATION forming part of Letters Patent No. 294,026, dated February 26, 1884.

Application filed October 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, BENAI AH FITTS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Rotary Meters; and I declare the following to be a description of my said invention, sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My present invention relates to improvements in the construction of that class of rotary meters in which two coacting rotating pistons having intermeshing parts are employed for measuring the water or liquid as it passes through the meter-chamber, in which said pistons are fitted in a manner to be revolved by the flow of liquid, and the motion of said pistons transmitted to a registering mechanism by a train of gear working in connection therewith.

The principal features of my invention are the improvements in the construction of the revolving pistons as employed in the meters, and the construction and arrangement of the gears or devices for receiving and transmitting the motion from the rotating pistons to the registering mechanism.

The nature and operation of these improvements are explained in the following description, and the particular subject-matter claimed is hereinafter definitely specified.

In the drawings, Figure 1 is a plan view, with the cap removed, of a rotary meter illustrating the nature of my invention. Fig. 2 is a horizontal section through the rotating piston at line xx ; and Fig. 3 is a vertical section, showing the arrangement of the pistons and register-operating gears. Fig. 4 is a view on larger scale, showing the bottom of the piston-connecting gear and sections of piston-pinions. Fig. 5 is a side view of the gear; and Fig. 6 is a diagram on larger scale, illustrating the arrangement of gear-teeth and the meshing therewith of the pinions, the pitch-circles of pinions being severally indicated at a single point of interaction with the gear, to facilitate comparison of their action.

In referring to parts, A designates the shell or case, provided with inlet and outlet passages a b , with suitable bosses for connecting the supply and delivery pipes, and having the cap A' , arranged for covering the gearing and supporting the registering mechanism B in the usual manner. The interior of the shell is properly chambered to receive the revolvable pistons C C', which are fitted within the chamber, as shown, the series of blades on the respective pistons being arranged to mesh with each other in the manner of gear-teeth as the pistons are revolved by the action of the liquid passing through the chamber in the direction indicated on Fig. 2.

D D' indicate the centers or studs on which the pistons C C' revolve. The pistons C C' are made with a series of thin curved wings or blades, c , extending outward in a radial manner from the central hub or core. The curvature of the face or side C' on the blades or wings c is made similar to the curvature on the working-surfaces of gear-teeth of corresponding pitch and diameter, so that adjacent faces c' on the respective intermeshed blades will make contact and roll against each other as the two pistons C and C' revolve in unison, one pair of blades maintaining the contact until after the next succeeding pair has come together, and so on in order throughout the revolutions, thus preserving a close connection between the pistons, and maintaining the proper division or separation between the entrance and exit sides of the meter-chamber. The backs of the blades are cut away or hollowed, so as to leave only a thin plate of material in the blade, thus making a comparatively light piston to be moved by the liquid. Transverse flanges or ribs d may be formed across the blades c , the edges of which are formed on a curvature corresponding with the faces c' . These flanges serve to give the full form of intermeshing gear-teeth at a narrow interval of the length of the piston, and support the parts in proper relation to each other. The inlet a is extended upward along the side of the case, and is divided so that the liquid enters the meter-chamber through two narrow ports or orifices, a' a'' , formed parallel with the axes of the pistons at some distance apart

from each other, and respectively directed toward the right and left, so that the inflowing liquid will impinge upon the blades of the respective pistons in a direction corresponding to the direction of the piston movement. The ports a' a^2 may extend from the bottom to the top of the chamber, or nearly so, thus giving the forward impetus to all of the liquid in the chamber.

For receiving motion from the pistons and transmitting it to the registering mechanical train or registering devices, I employ a duplex gear, F, arranged for action in the peculiar manner shown. Said gear F is provided with double teeth or cogs which project externally as a spur-gear, and also downwardly and inwardly as an internal gear. Both parts of said teeth are formed for action on the same pitch-circle, and the gear F meshes with the pinions or sets of pin-teeth e and f on both of the pistons C and C', thereby receiving its motion from both simultaneously, and at the same time serves to keep said pistons in regular movement and uniform positions with each other. The pinion e of the piston C meshes with the spur-teeth of the gear F, which acts in relation thereto as an external gear, while the pinion f of the piston C' meshes with the downward and inwardly extended portions of the teeth of said gear which acts in relation thereto as an internal gear. Thus the movement of the oppositely-revolving pinions e and f act to revolve the gear F in one direction, as indicated in Fig. 1. By the meshing of the gear-teeth on wheel F with both pinions e and f , the pistons C and C' are both confined to the same degree of movement and compelled to revolve in perfect unison, so that there can be no crowding or retarded action of one piston with the other by unequal friction or varying pressure of liquid against their blades. The gear F is mounted on a suitable axis or stud on a bar, G, arranged above the top plate, H, of the piston-chamber, and motion is transmitted to the second wheel, K, by a pinion or series of pin-teeth, I, fixed on the top of wheel F. From the second wheel, K, the motion is taken by a crank, J, on a shaft, L, which passes through the stuffing-box L' in the top of the cap to the train of gearing in the register B, which latter may be of ordinary or any suitable construction, and need not therefore be particularly described herein.

The gear F, for connecting both pistons by a single end gear, may be employed with rotating pistons of other form than those herein shown, if desired.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. The gear F, provided with teeth for internal and for external action on the same pitch-circle, in combination with rotating pistons having pinions which severally intermesh with said gear for simultaneously operating it, substantially as set forth.

2. The combination, with two rotating pistons provided with pinions or pin-teeth, of a gear adapted to be simultaneously actuated from both pistons, and means for transmitting motion therefrom to a mechanical train or registering mechanism, as set forth.

3. The combination, with two rotating pistons having a series of intermeshing blades which are adapted to make contact on their adjacent surfaces, of a single end gear intermeshing with pinions or studs on the piston-axes, and adapted for retaining said pistons and their interacting blades in uniform relation with each other as the pistons revolve, substantially as set forth.

4. The pistons C C', having series of thin blades c , with faces c' , curved as described, and provided with narrow transverse back ribs, d , the edges of which, in connection with the face-curve c' , give the contour of gear-teeth for close intermeshing action as said pistons are revolved in contact with each other, as set forth.

5. A water-meter having the shell or case A, provided with a divided inlet with ports a' a^2 , directed to the right and left, the rotating pistons provided with series of blades c , intermeshing with each other and making contact on adjacent curved faces c' , a train of spur-gears within the cap A, for receiving motion from said pistons, and a crank with shaft passing through a stuffing-box in said cap, for transmitting motion to the registering mechanism, as shown and described.

Witness my hand this 8th day of October, A. D. 1883.

BENAIAH FITTS.

Witnesses:

CHAS. H. BURLEIGH,
WILBER W. HOBBS.