No. 785,288. PATENTED MAR. 21, 1905.

F. BRÜCKERT.

ROTARY PUMP.

APPLICATION FILED JAN. 3, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

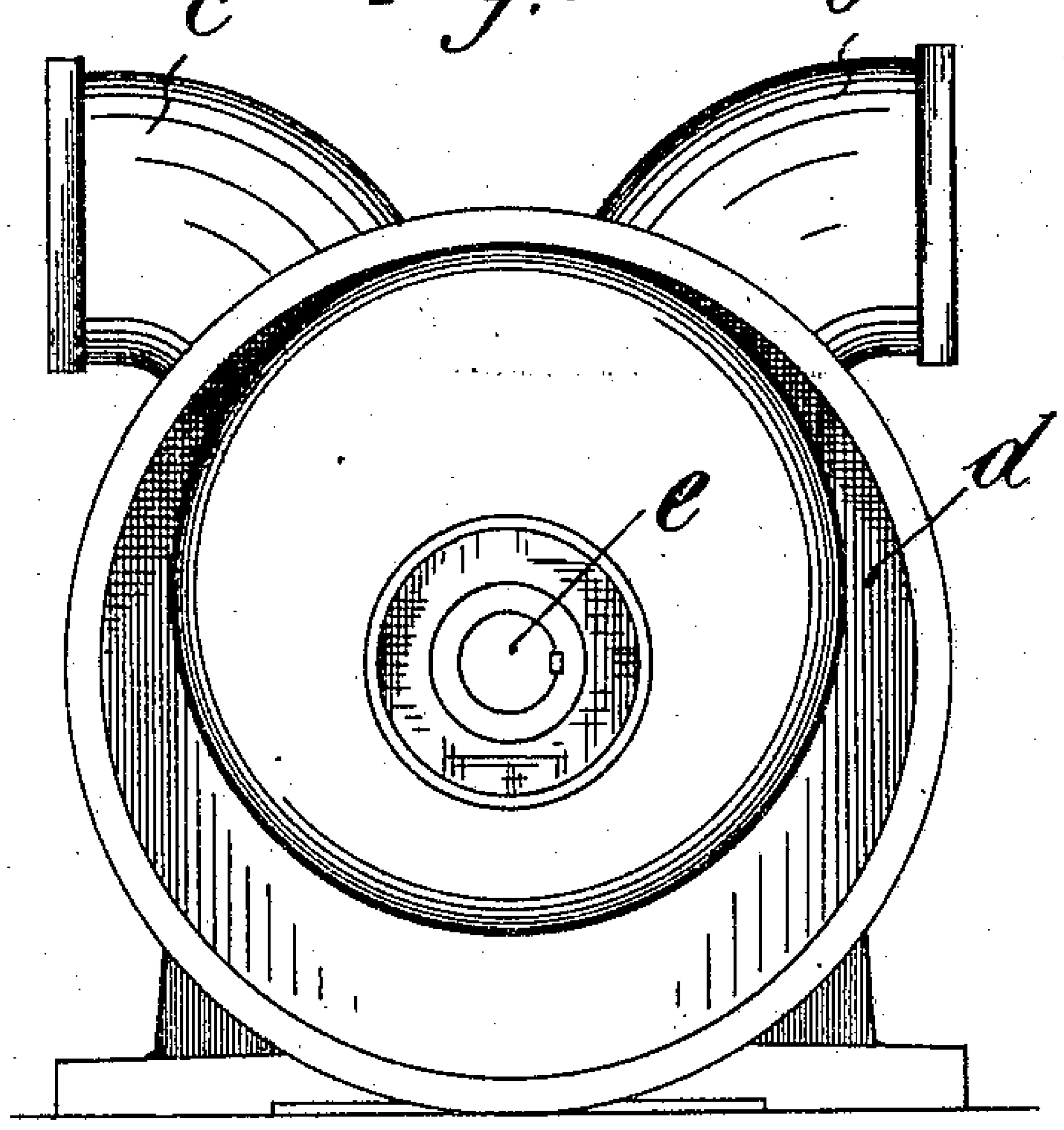


Fig. 2.

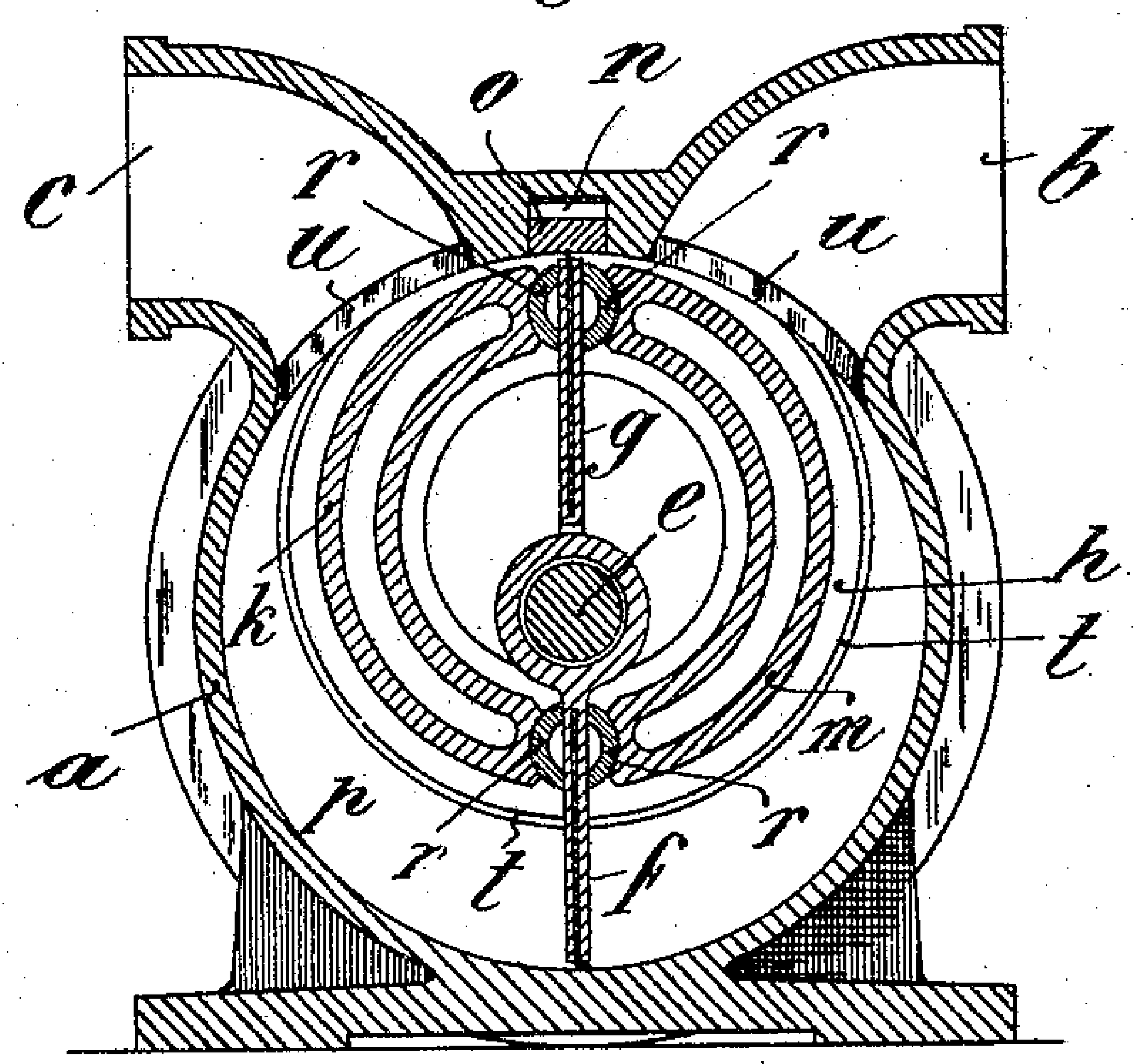


Fig. 3.

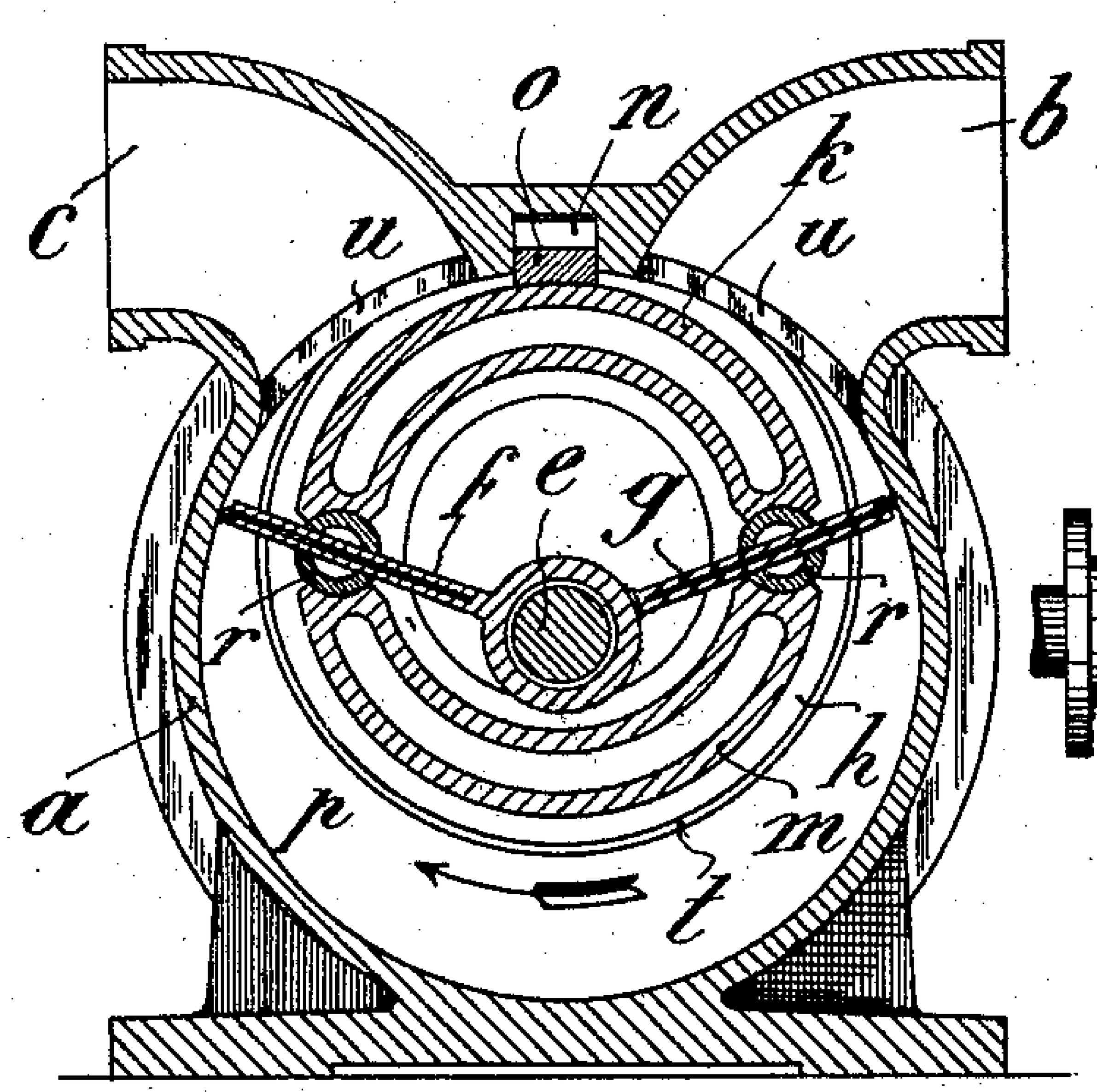
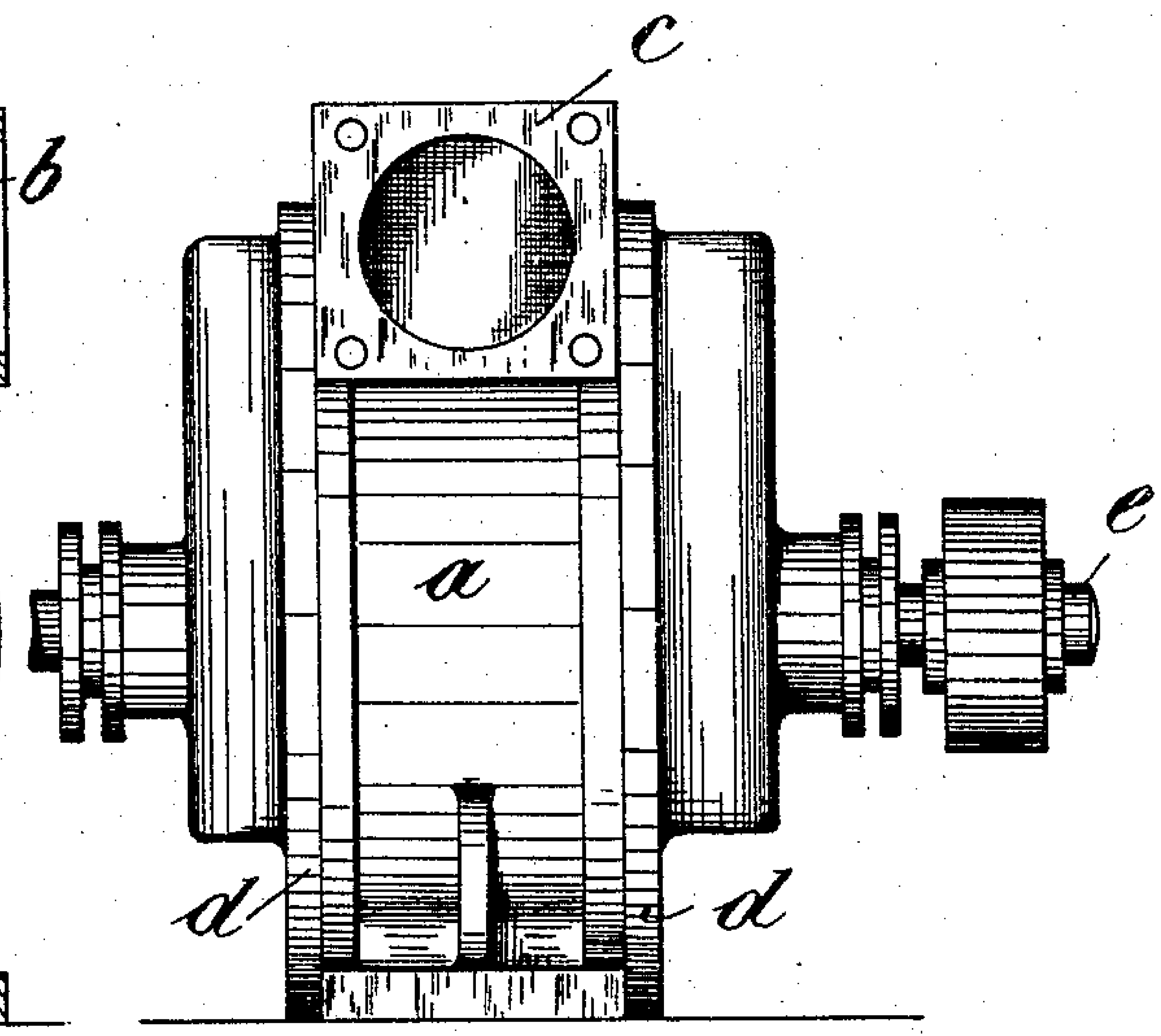


Fig. 4.



Witnesses:

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2 SHEETS—SHEET 2.

Fig. 5.

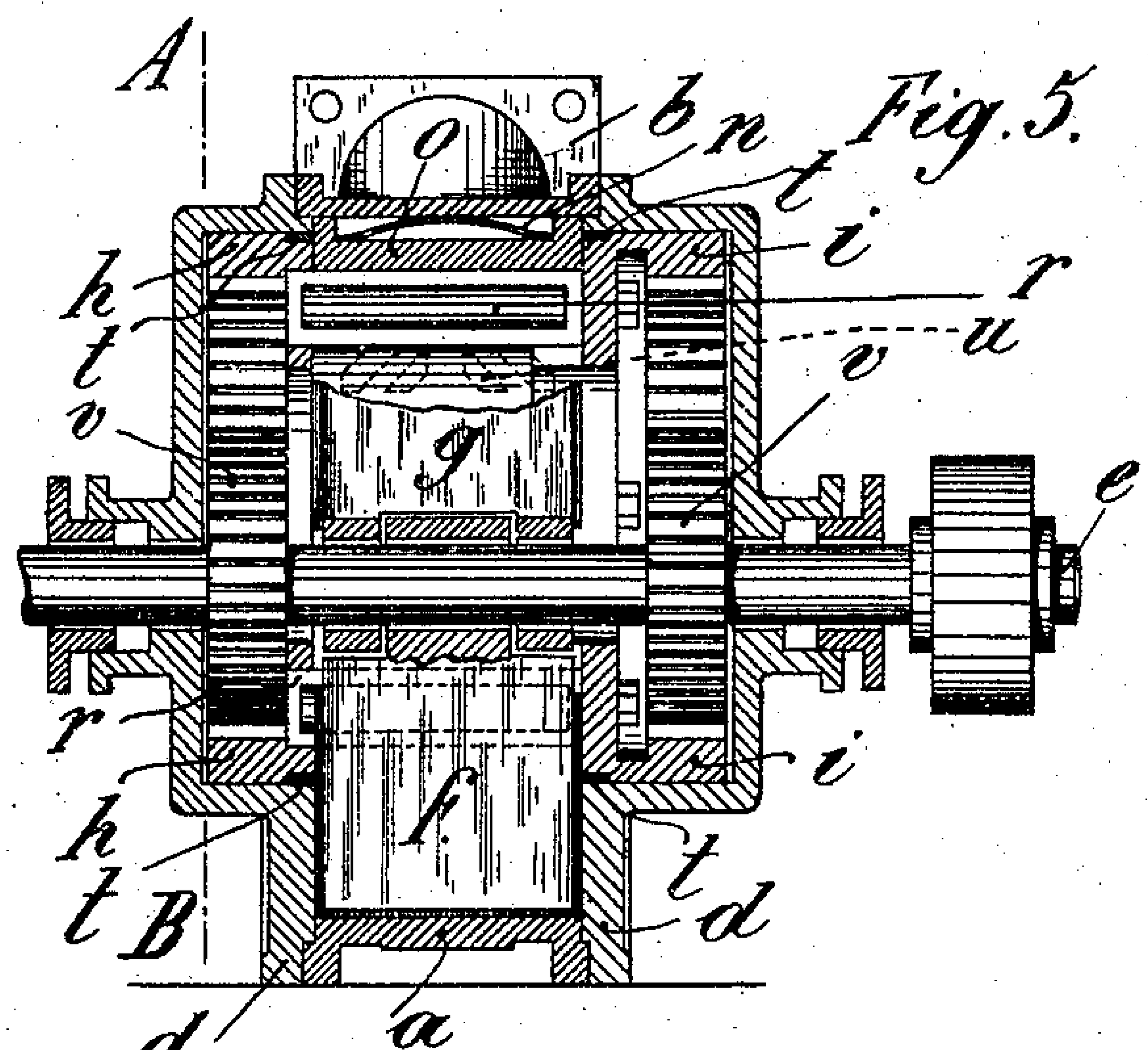


Fig. 6.

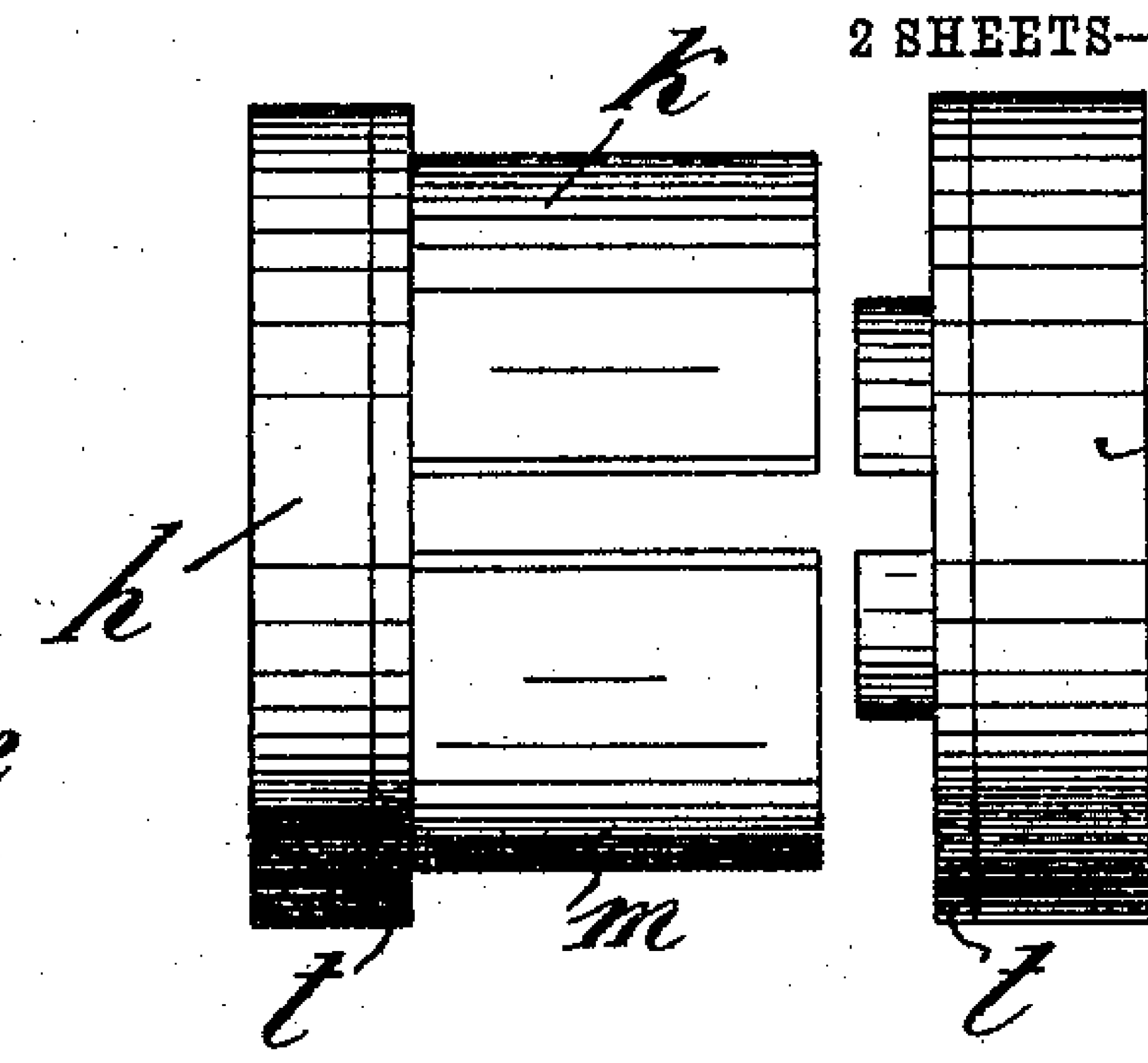


Fig. 7.

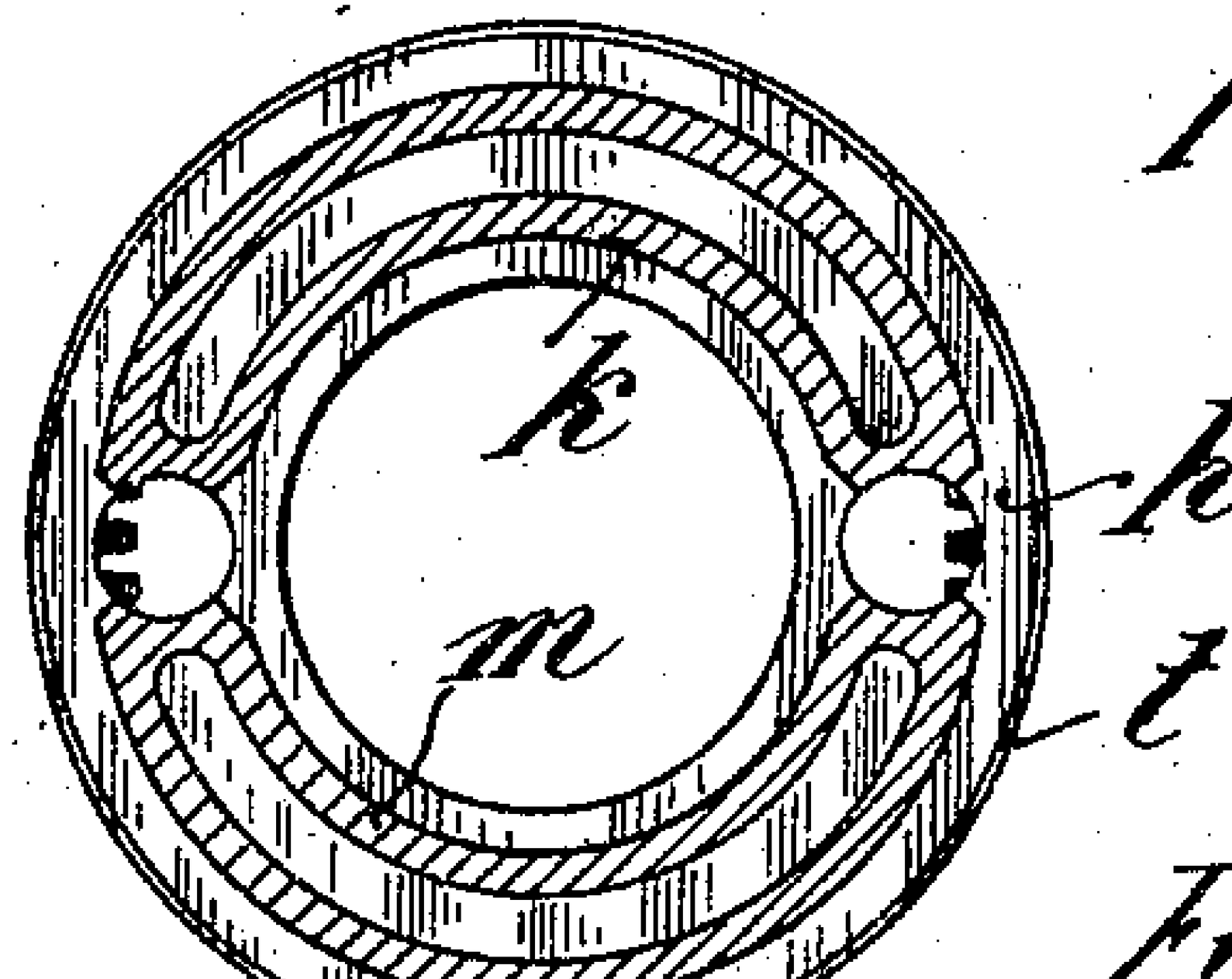


Fig. 8.

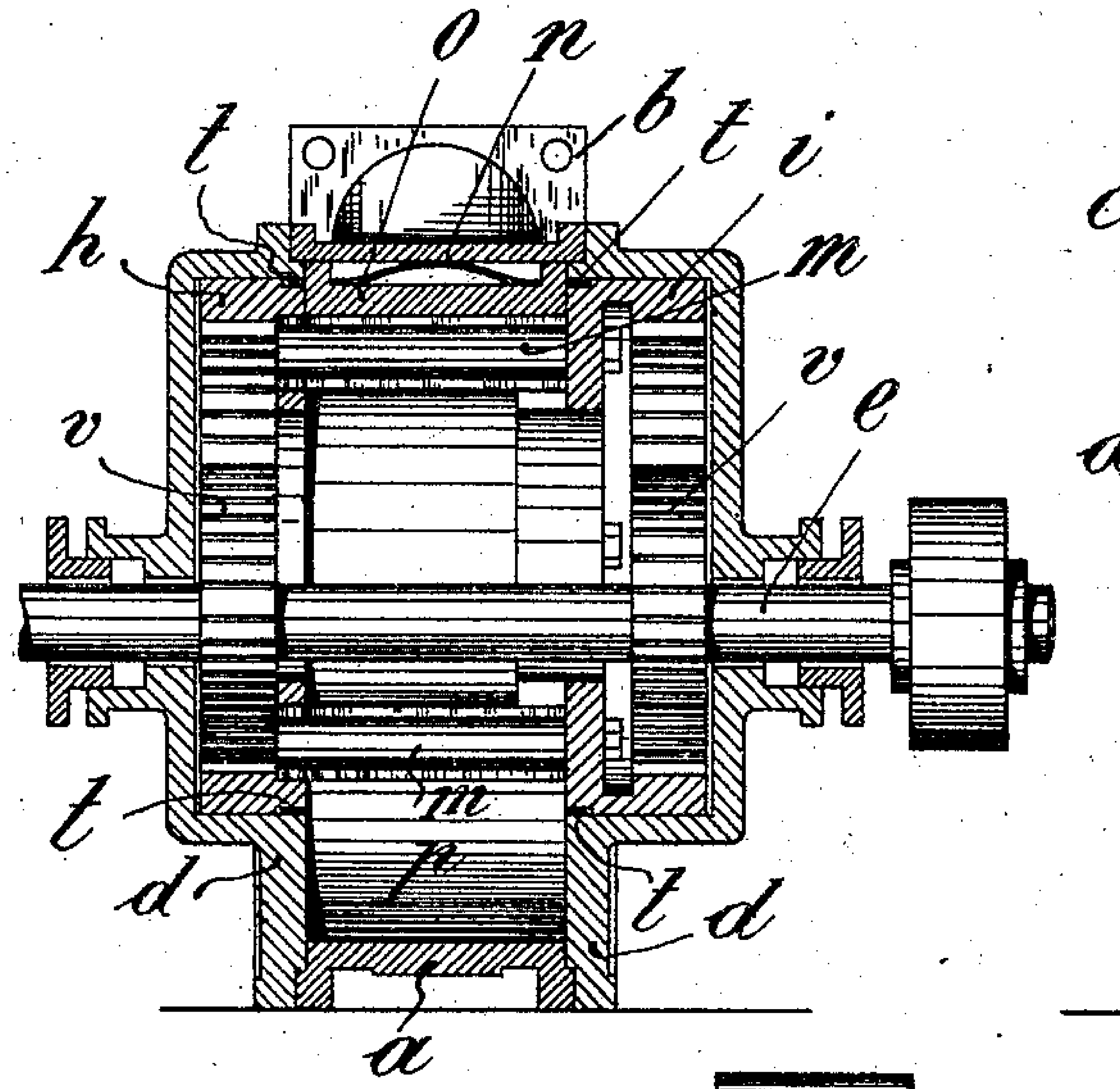


Fig. 9.

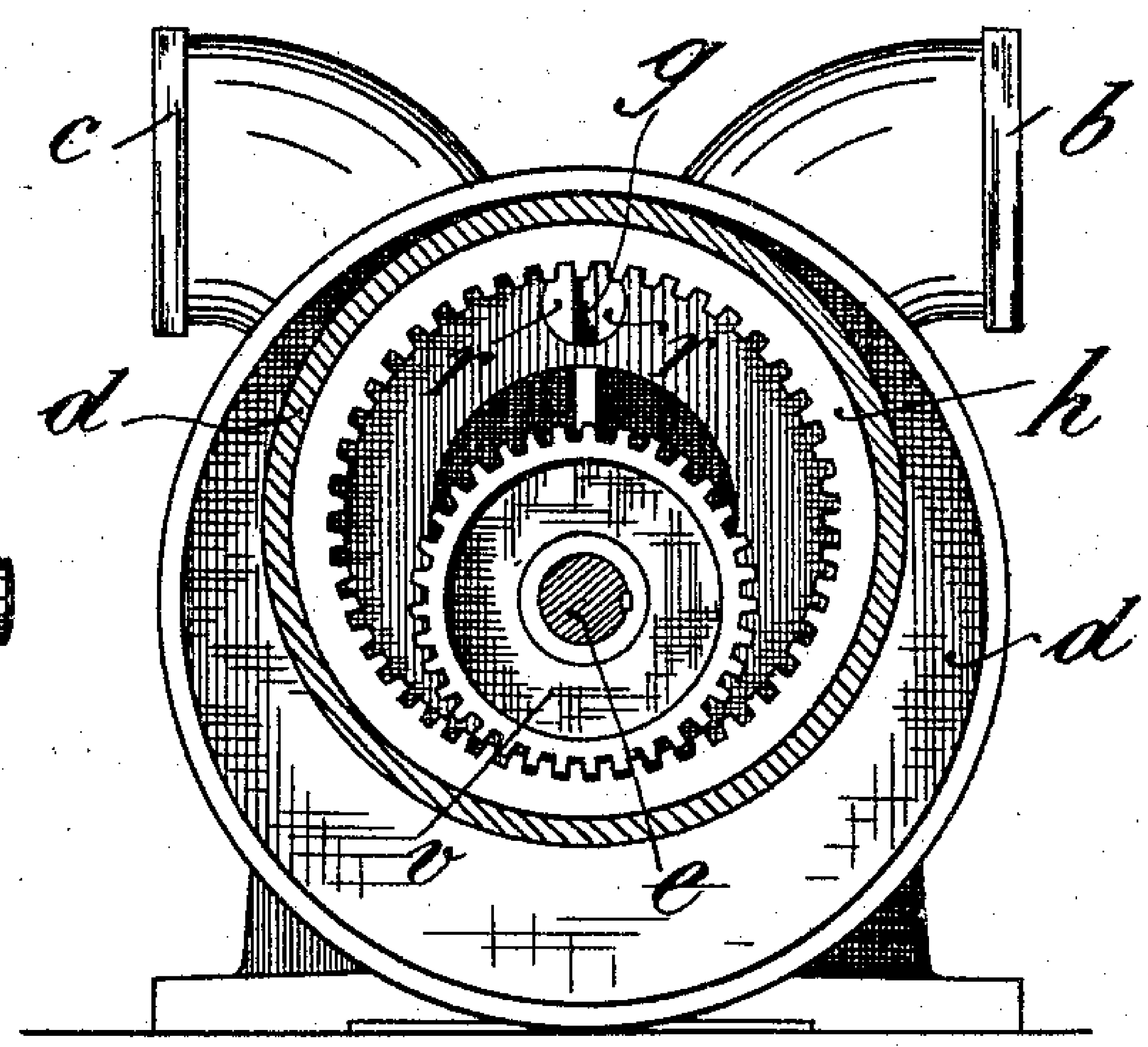


Fig. 10.

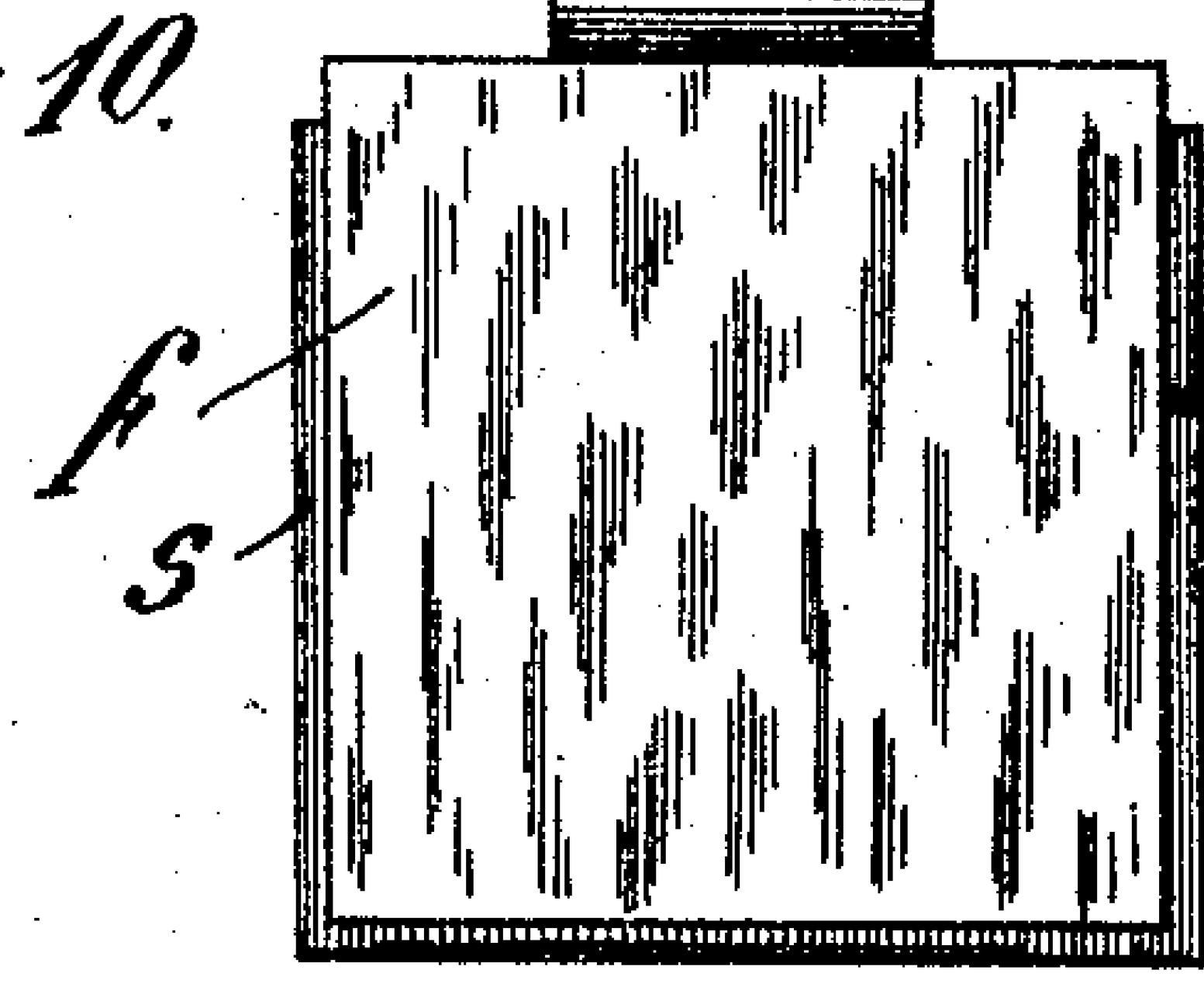
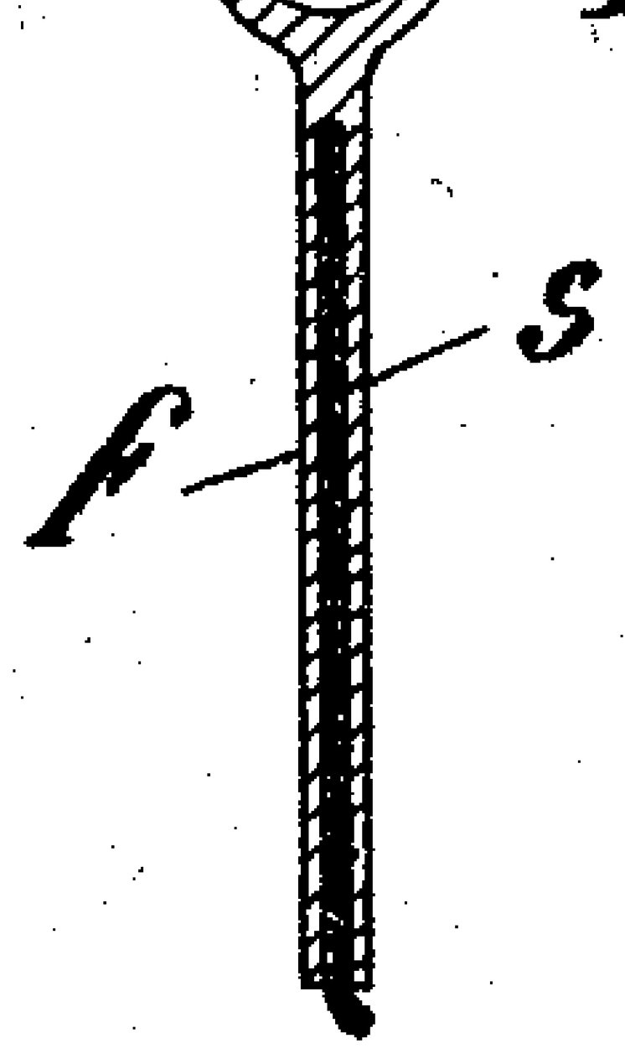


Fig. 11.



Witnesses

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No. 785,288. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

FIRMIN BRÜCKERT, OF ROUSIES-MAUBEUGE, FRANCE.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 785,288, dated March 21, 1905.

Application filed January 3, 1903. Serial No. 137,691.

To all whom it may concern:

Be it known that I, FIRMIN BRÜCKERT, engineer, a citizen of the French Republic, and a resident of Rousies-Maubeuge, in the French Republic, have invented certain new and useful Improvements in Rotary Pumps or Motors, of which the following is a specification.

This invention relates to a pump or motor adapted to impart motion to liquid by means of blades or wings which rotate in a cylinder.

The essential feature of the pump or motor consists, substantially, in the fact that the relative positions of the said blades with regard to the supply and exhaust ports of the pump or motor cylinder or outer stationary ring are so controlled by an inner eccentric rotary drum or ring, with bearings in the cylinder-covers, that the blades or wings force the liquid through a sickle or crescent shaped chamber entirely without reaction and in continuous flow.

The annexed drawings represent one form of the pump.

Figure 1 is a side view; Fig. 2, a vertical cross-section; Fig. 3, a vertical cross-section in another position; Fig. 4, a front view, and Fig. 5 a vertical longitudinal section. Fig. 6 shows a top plan, and Fig. 7 a vertical cross-section, of the inner rotary body or ring. Fig. 8 shows a vertical longitudinal section of the pump or motor with the blades or wings removed. Fig. 9 is a cross-sectional view on line A B of Fig. 5. Fig. 10 is a front view, and Fig. 11 a cross-section, of one of the blades or wings on a larger scale.

The pump-cylinder or outer ring *a* has a supply port or passage *b* and an exhaust port or passage *c*. Covers *d* close the said cylinder or outer ring at both ends. Through the center of the cylinder or ring a shaft *e* passes, with bearings in the covers *d* and adapted to be driven by any suitable means. Within the cylinder or ring *a* two blades or wings *f* and *g* are mounted on the said shaft. These blades extend to the lateral walls of the cylinder and also to the cylinder-covers. The said blades *f* and *g* pass through a hollow eccentrically-mounted rotary drum or ring, which surrounds the shaft *e* and consists of the two semicircular parts or segments *k* and *m* and the circular disks *h* and *i*, Figs. 6 and 7, the latter having bearings in the cylinder-covers *d*. At the apertures through which the blades or wings pass through the walls of the drum trough-like or swivel bodies *r* are provided at the sides of the blades or wings. These bodies or swivels *r* form packing between the interior of the drum and the chamber *p* and also allow of a rocking movement, as well as a longitudinal movement, of the blades or wings in the apertures of the drum.

To form packing between the edges of the blades or wings and the sides and ends of the cylinder or outer ring, packing-plates, washers, or the like *s* can be inserted into the blades in the manner shown in Figs. 10 and 11, so that the said plates project somewhat beyond the edges of the blades or wings and are adapted to slide on the surface of the cylinder or outer ring. For these packing-plates a comparatively soft metal, such as sheet-brass, is preferably used, but leather or any other suitable material material can be adapted for the purpose. The disks *h* and *i* are provided with metal packing-rings *t*.

The position of the drum or inner ring *k m* in the cylinder or outer ring *a* is such that the circumference of the former impinges on that of the latter at a point between the supply and exhaust ports or passages *b* and *c*. At this point a plate *o* is pressed by a spring *n* against the drum or inner ring to render the contact tight. The eccentric drum or ring thus forms a partition between the supply and exhaust ports and a sickle or crescent shaped chamber *p* is produced.

The wings or blades *f* and *g* are hinged loosely on the central shaft *e*, and the drum or eccentric ring *k m* is driven by means of toothed wheels *v*, fixed to the central shaft and in gear with teeth on the disks *h* and *i* of the said eccentric ring. Since the wings or blades *f* and *g* extend through the eccentric ring, they will be caused to rotate by the rotation of the said eccentric ring. Thus the wings or blades *f* and *g* are so operated that one wing or blade takes up the forcing of the liquid when the other wing or blade has cleared the exhaust-

port, the said wings or blades acting alternately and only one acting at a time.

In the position shown in Fig. 3, for instance, the blade or wing *g* has just cleared the supply port or passage *b* of the cylinder or outer ring and is about to begin the sucking in the liquid through the said port or passage, at the same time forcing forward in the direction of the arrow the liquid in the chamber *p*. At this moment the blade or wing *f* is in front of the exhaust port or passage *c* of the cylinder or outer ring and has exactly the same velocity as the blades or wing *g*, so that neither a compression of the liquid nor a vacuum is produced in the chamber *p*. The movement of the liquid therefore takes place without any reaction whatever. During the continued travel of the blade or wing *g* in the direction of the arrow, Fig. 3, the velocity of the said blade or wing first increases and then decreases in relation to that of the blade or wing *f*, since both blades or wings are connected to the eccentric drum or ring. The blade or wing *g* will therefore travel to the position occupied by the blade or wing *f* in Fig. 3 in the same time which the blade or wing *f* will require to clear the exhaust and supply ports or passages and travel through the much shorter distance to the position occupied in Fig. 3 by the blade or wing *g*.

For the perfect action of a pump or motor of this kind it is especially important that the drum or ring *k m* eccentric to the shaft *e* should be constructed of as few as possible separate parts. The disks *h* and *i* can be made in one piece with the drum or ring segments *k* and *m* or can be rigidly connected to the same in a suitable manner. In the drawings the ring disk *h* is in one piece with the segments *k* and *m*, whereas the disk *i* is screwed to the said segments. This method facilitates the building of the pump, since the disk *i* can be removed for the purpose of inserting the blades or wings *f* and *g*.

In order to give the blades or wings a sure bearing or guide in the cylinder or ring *a* while they are passing the supply and exhaust ports or passages, the wall of the cylinders is preferably only slotted in the manner of a grate or the like at *u*, the direction of the slots being inclined to the direction of travel of the blades.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a rotary motor, an outer stationary ring, an inner eccentric rotary ring in contact therewith, a central shaft in engagement with the eccentric ring, and wings hinged loosely to the central shaft and extending to the outer ring, said wings passing through the eccentric ring and having freedom of motion therein in the plane of rotation.

2. In a rotary motor, a stationary ring, an internal rotary ring in contact with and eccentric to the same, a central shaft geared to the eccentric ring, wings connected to the said shaft and extending through the eccentric ring to the stationary ring, and swivels seated in the eccentric ring through which said wings pass.

3. In a rotary motor, a stationary ring, an internal rotary ring in contact with and eccentric to the same, a central shaft geared to the eccentric ring, wings hinged to said shaft and extending through the eccentric ring to the stationary ring, and swivels seated in the eccentric ring through which said wings pass.

4. In a rotary motor, a stationary ring, an inner rotary ring eccentric relatively thereto, a central shaft geared to the eccentric ring, and wings loosely connected to the central shaft and passing loosely through the eccentric ring.

5. In a rotary motor, a stationary ring, recessed casing-heads secured thereto, a two-part eccentric ring within and in contact therewith, a central shaft, pinions on said shaft, and spur-gears secured to the parts of said eccentric ring, and held within the recesses of the casing-heads and engaging with said pinions.

6. In a rotary motor, a two-part ring adapted to form an eccentric abutment within a stationary casing, annular internally-toothed gears secured to said ring and forming with it a rotary structure, swivel-joints held and working between the approaching ends of said two-part ring, a shaft having pinions engaging said internally-toothed gears, and wings connected to said shaft and passing through said swivels.

7. In a rotary motor, two rings, one external and stationary and the other internal, rotary and relatively eccentric, a shaft geared to the internal ring, inlet and discharge passages opening through the stationary ring, and wings or pistons hinged upon the shaft and swiveled in the eccentric inner ring.

8. A pump comprising a cylinder, two blades mounted upon a shaft, a hollow rotatory body surrounding the shaft eccentrically, the blades passing through the said body, means driving the rotatory body by the shaft, whereas the rotatory body is operating the said blades.

The foregoing specification signed at Paris, France, this 20th day of December, 1902.

FIRMIN BRÜCKERT.

In presence of—

EDWARD P. MACLEAN,
GEORGE E. LIGHT.