

No. 731,155.

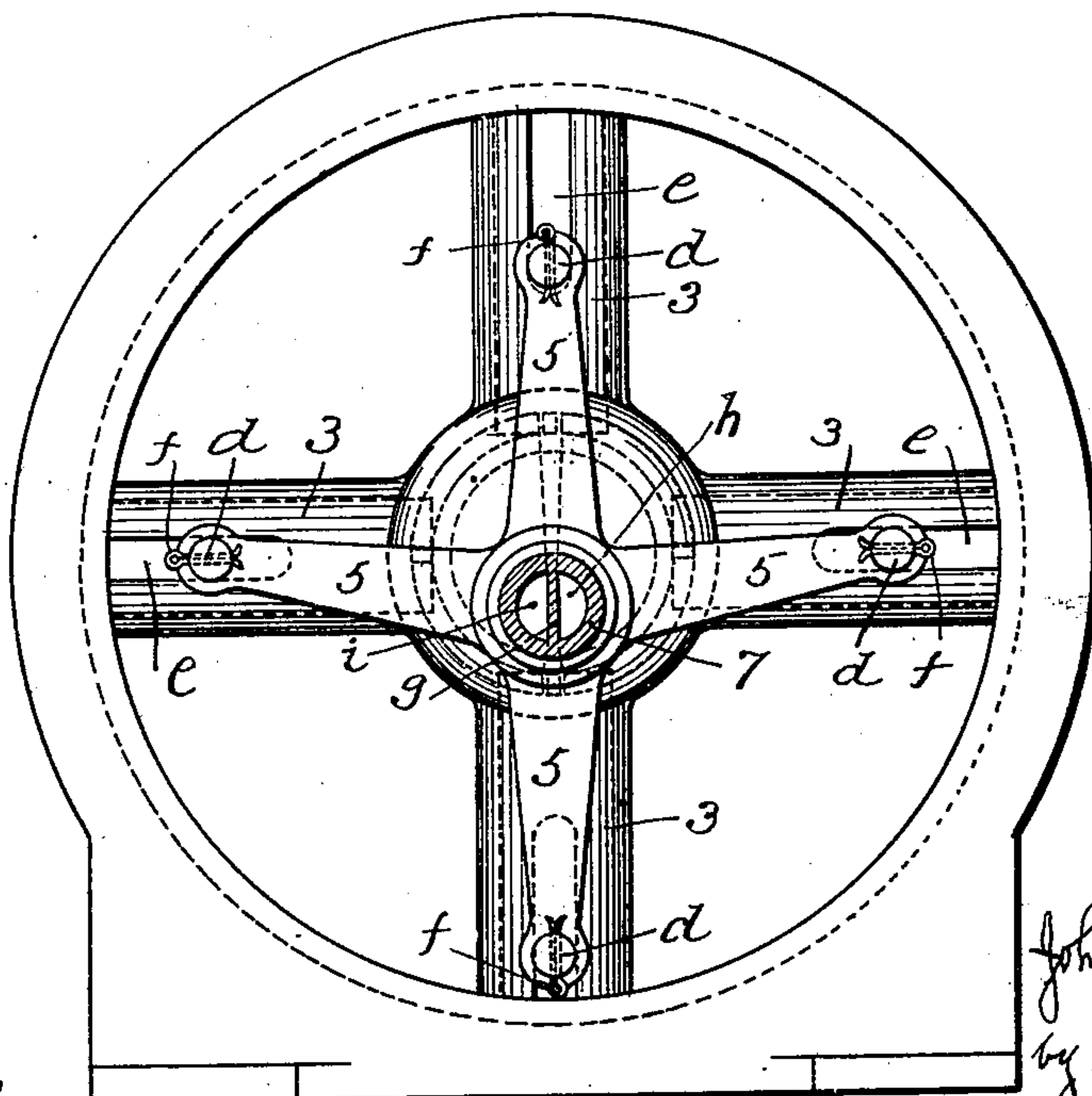
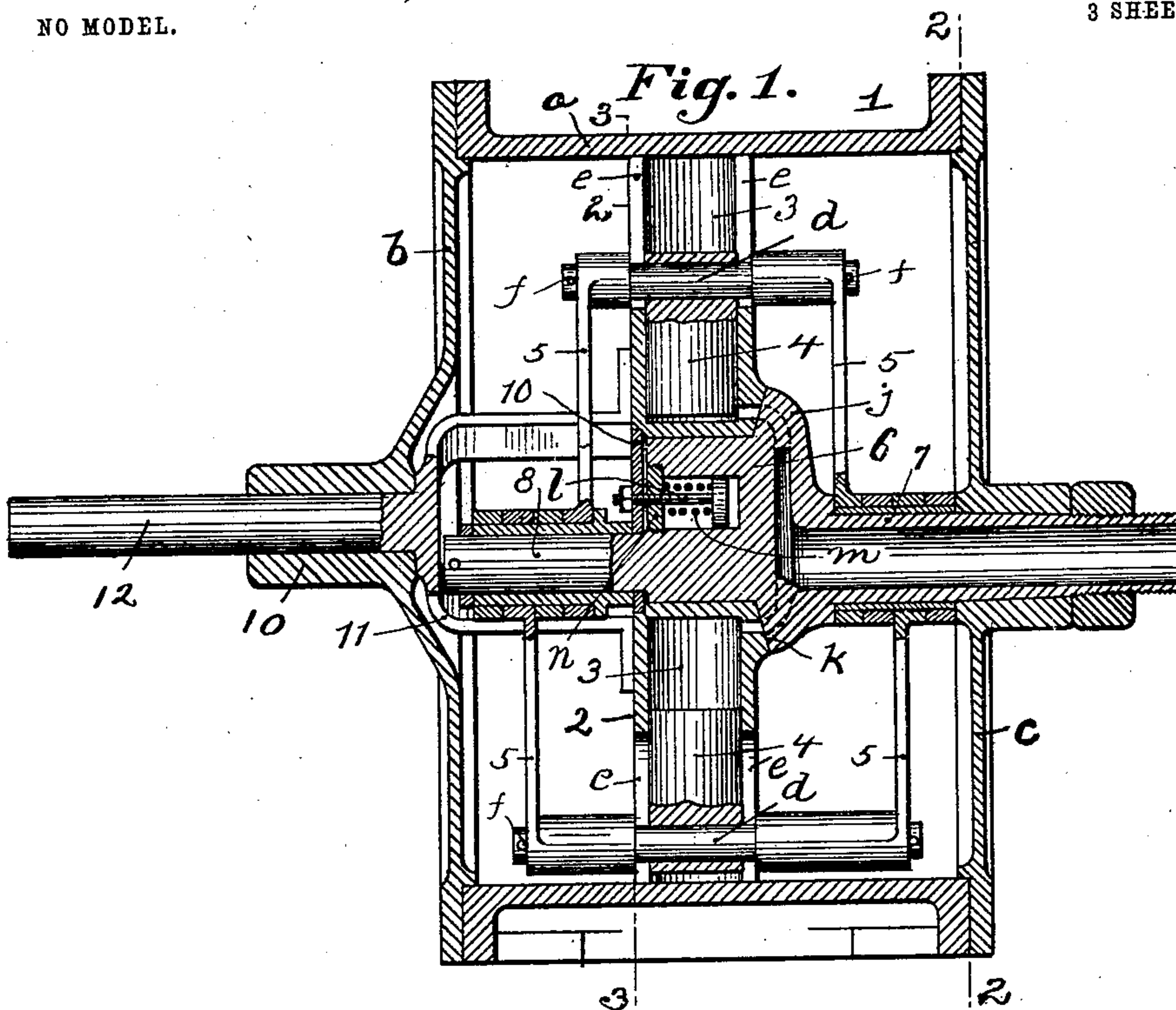
PATENTED JUNE 16, 1903.

J. C. BECKFIELD.
ROTARY ENGINE.

APPLICATION FILED JUNE 20, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

R. Williams
James C. Heron.

Fig. 2.

Inventor:
John C. Beckfield
by John H. Roney
his
Attorney.

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3 SHEETS—SHEET 2.

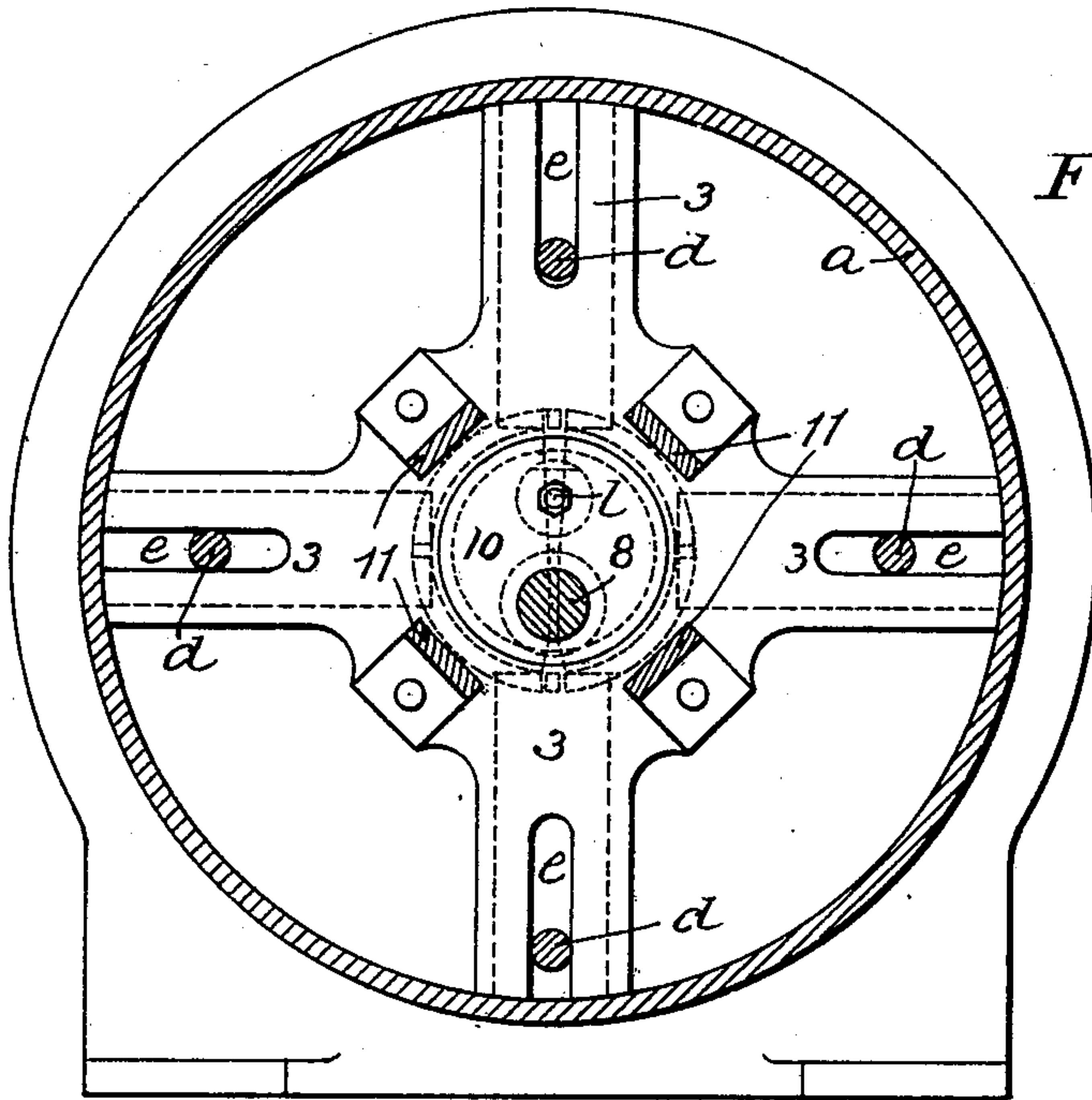


Fig. 3.

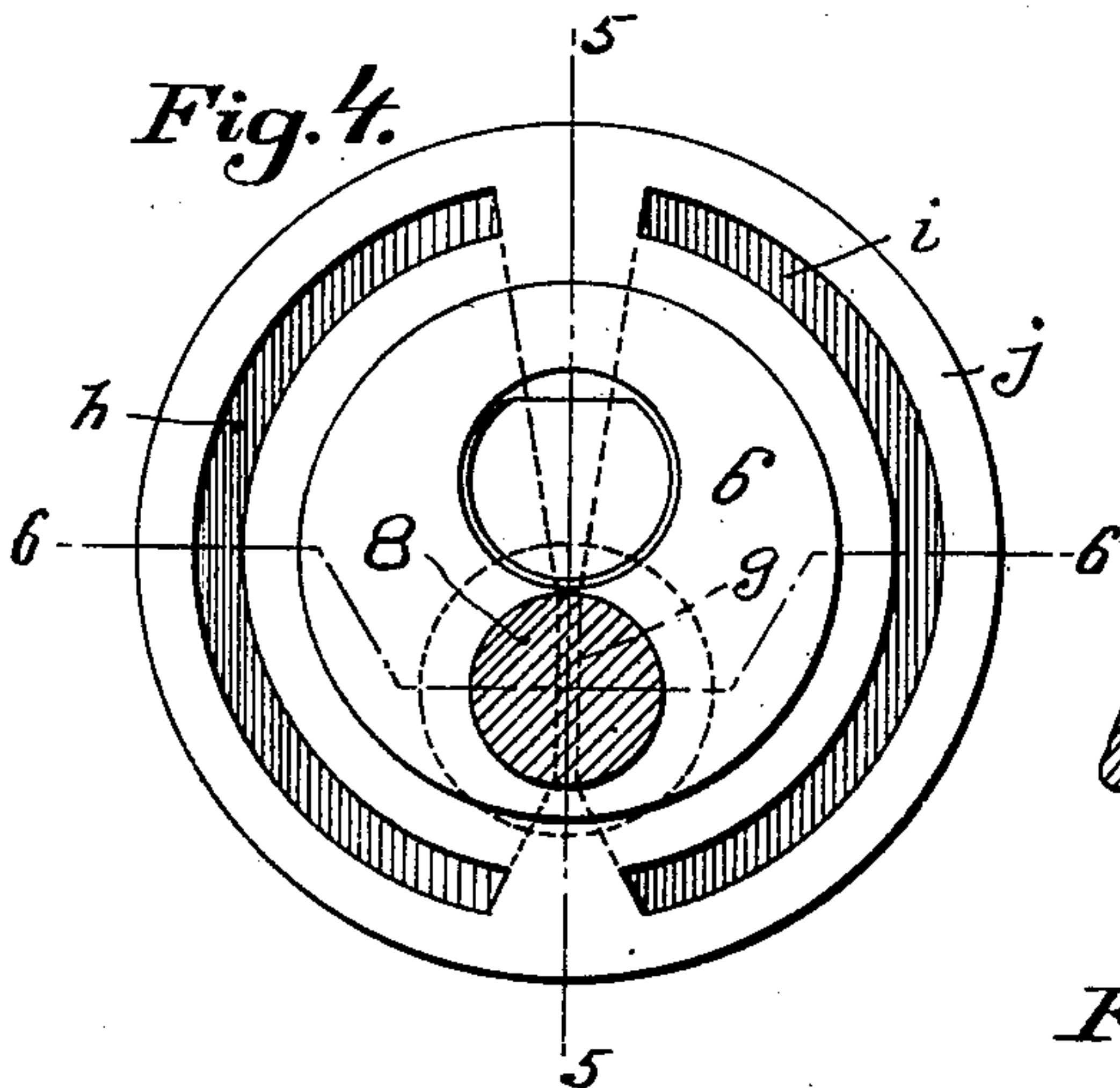


Fig. 4.

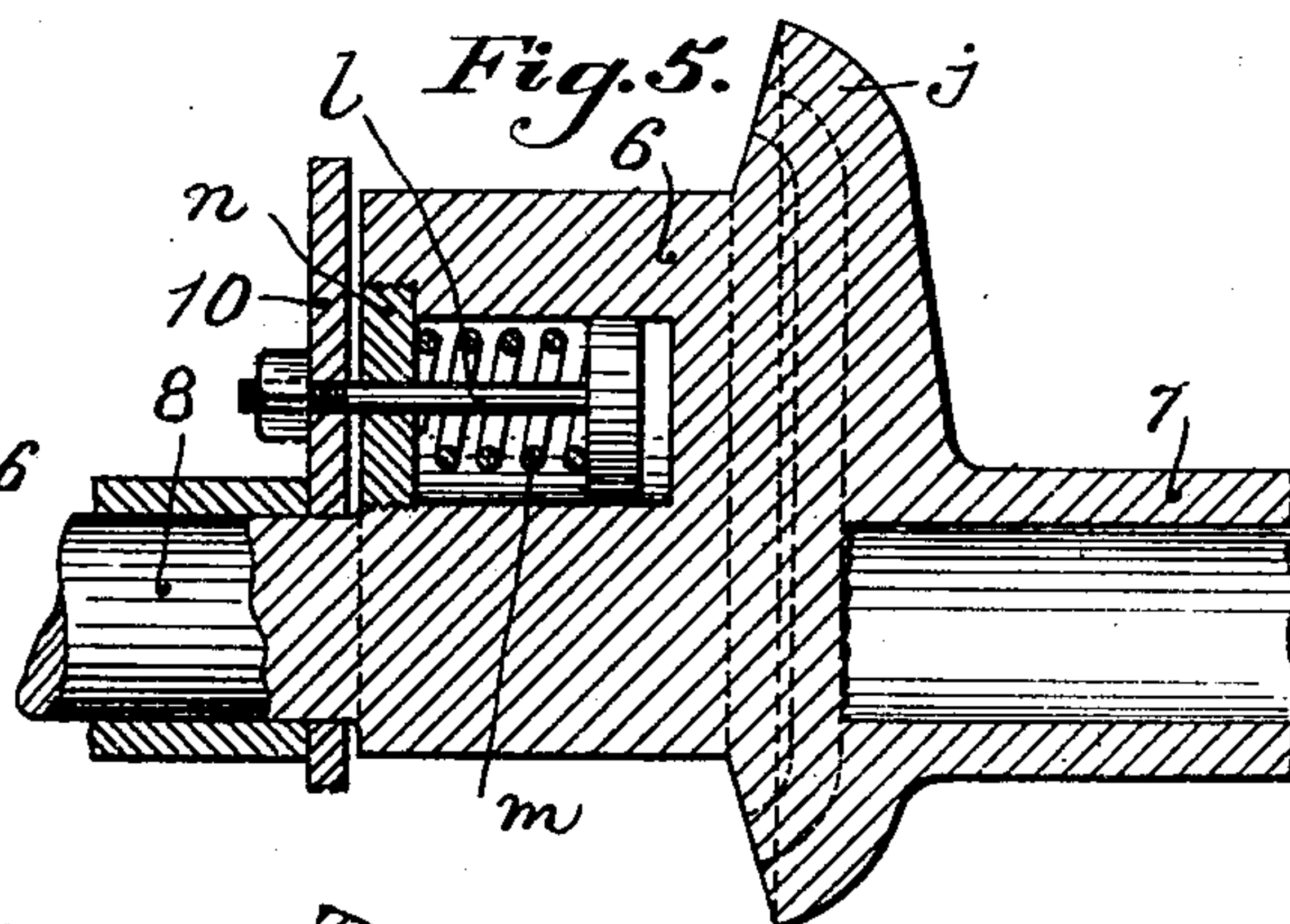


Fig. 5.

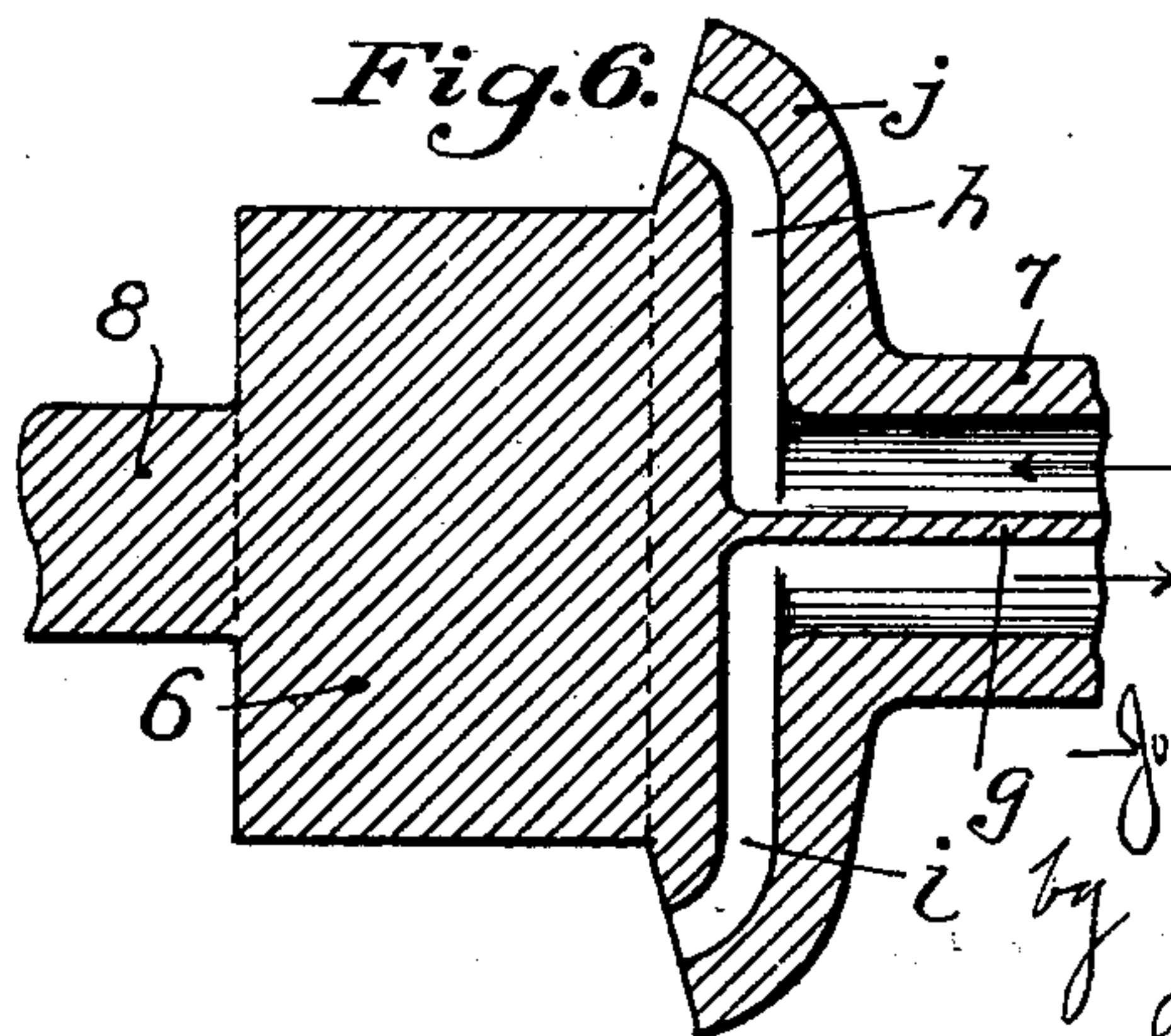


Fig. 6.

Witnesses:

R. Williams
James C. Herron.

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John C. Beckfield
by John H. Roney
his Attorney.

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3 SHEETS—SHEET 3.

Fig. 7.

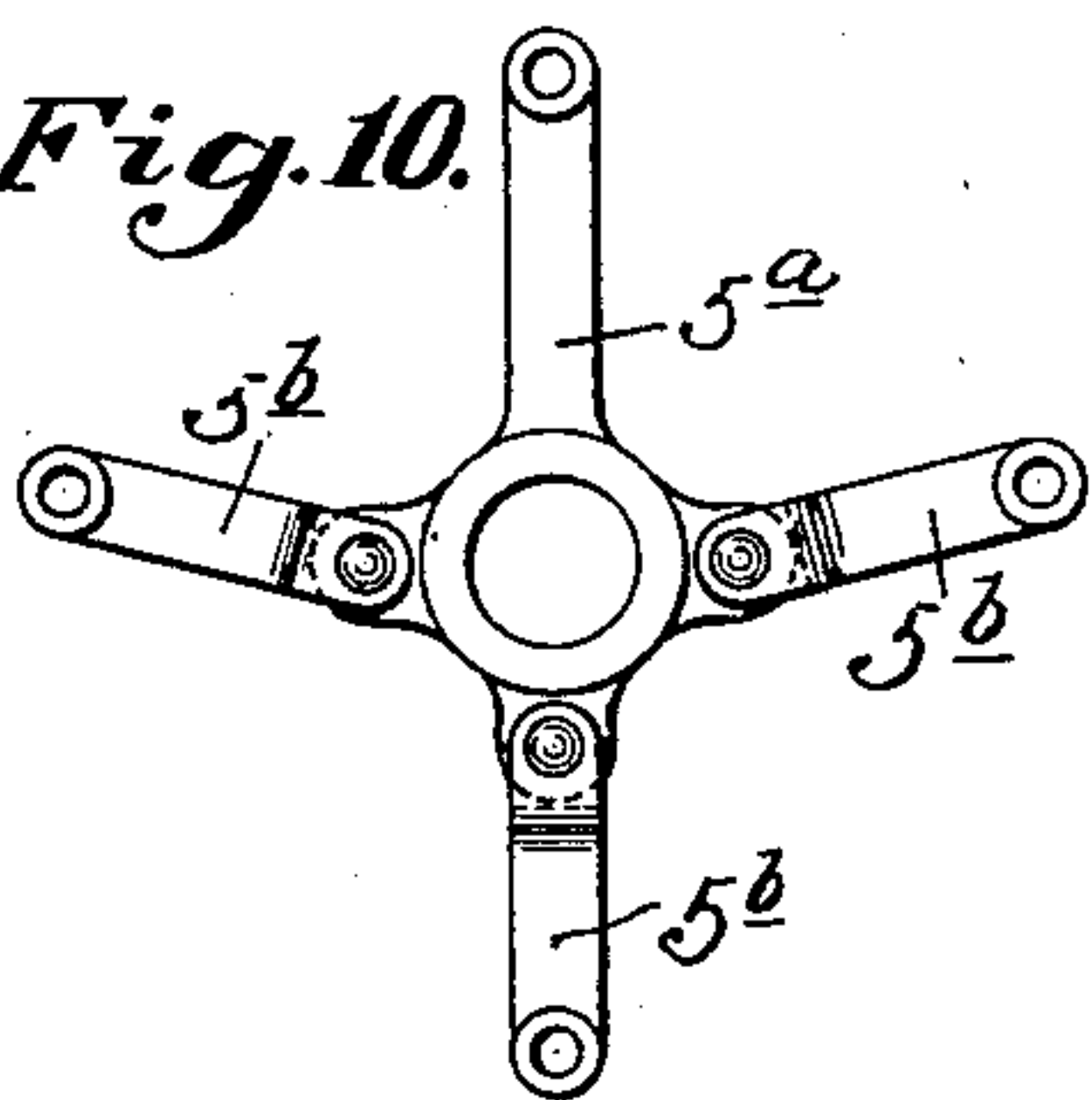
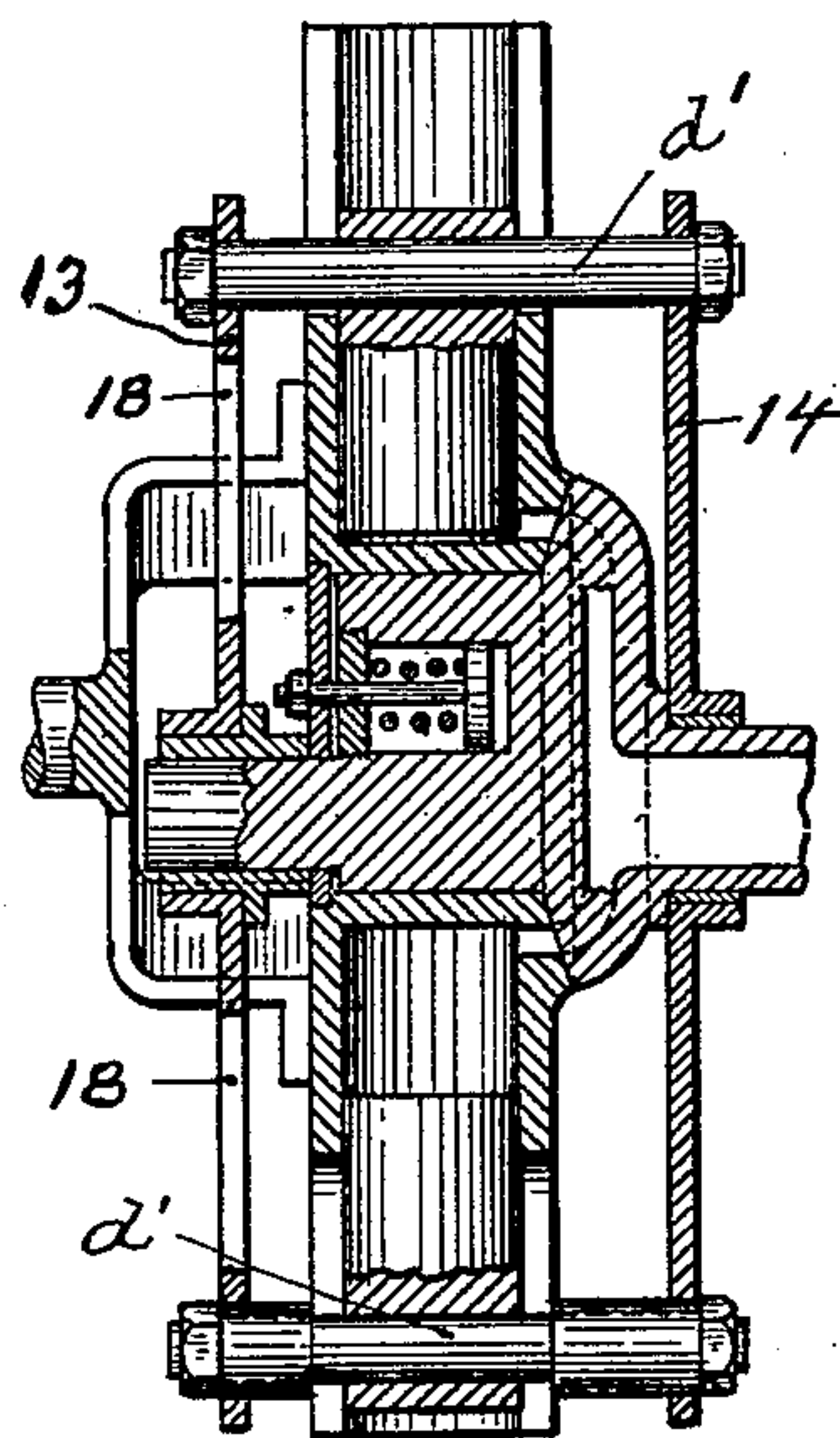
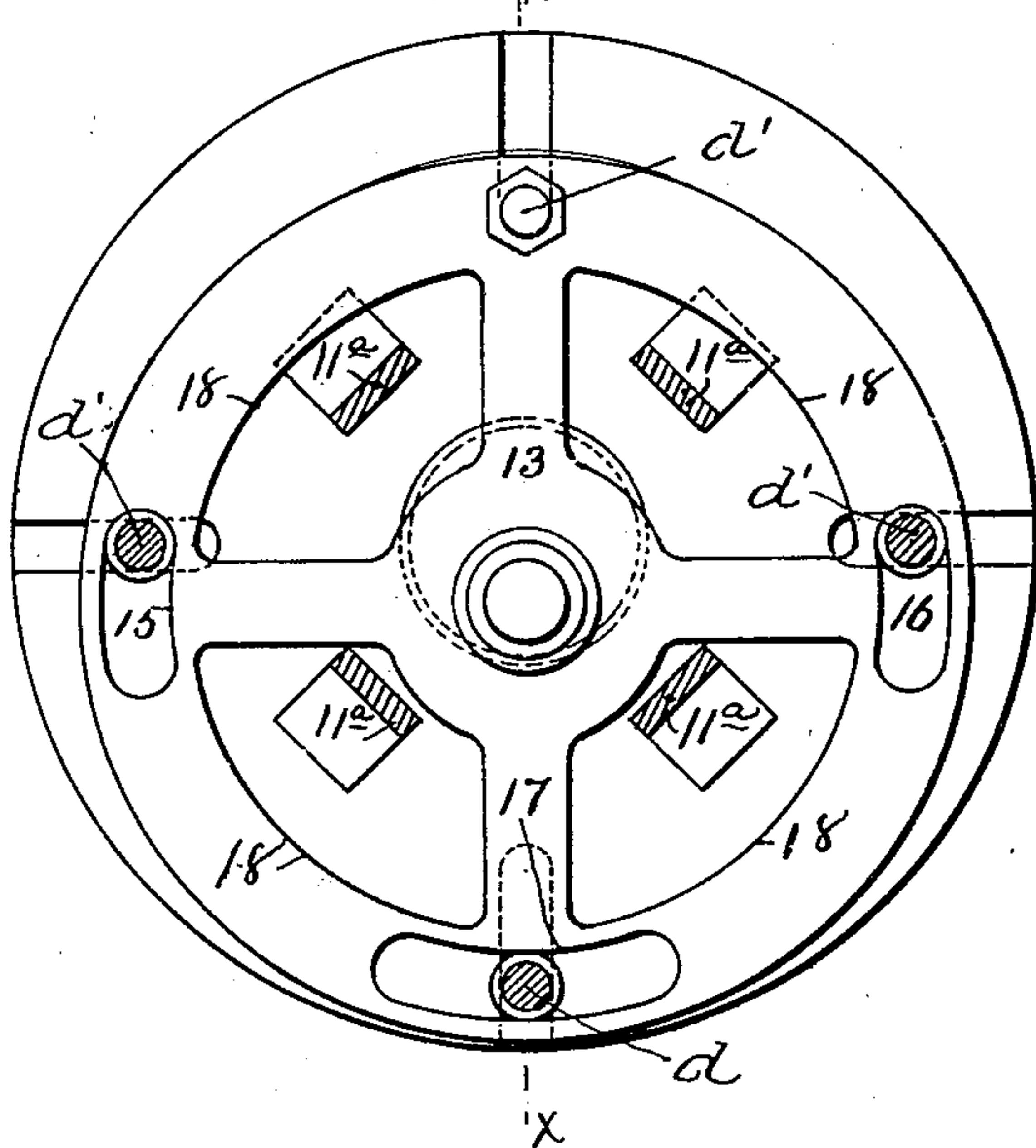


Fig. 9.

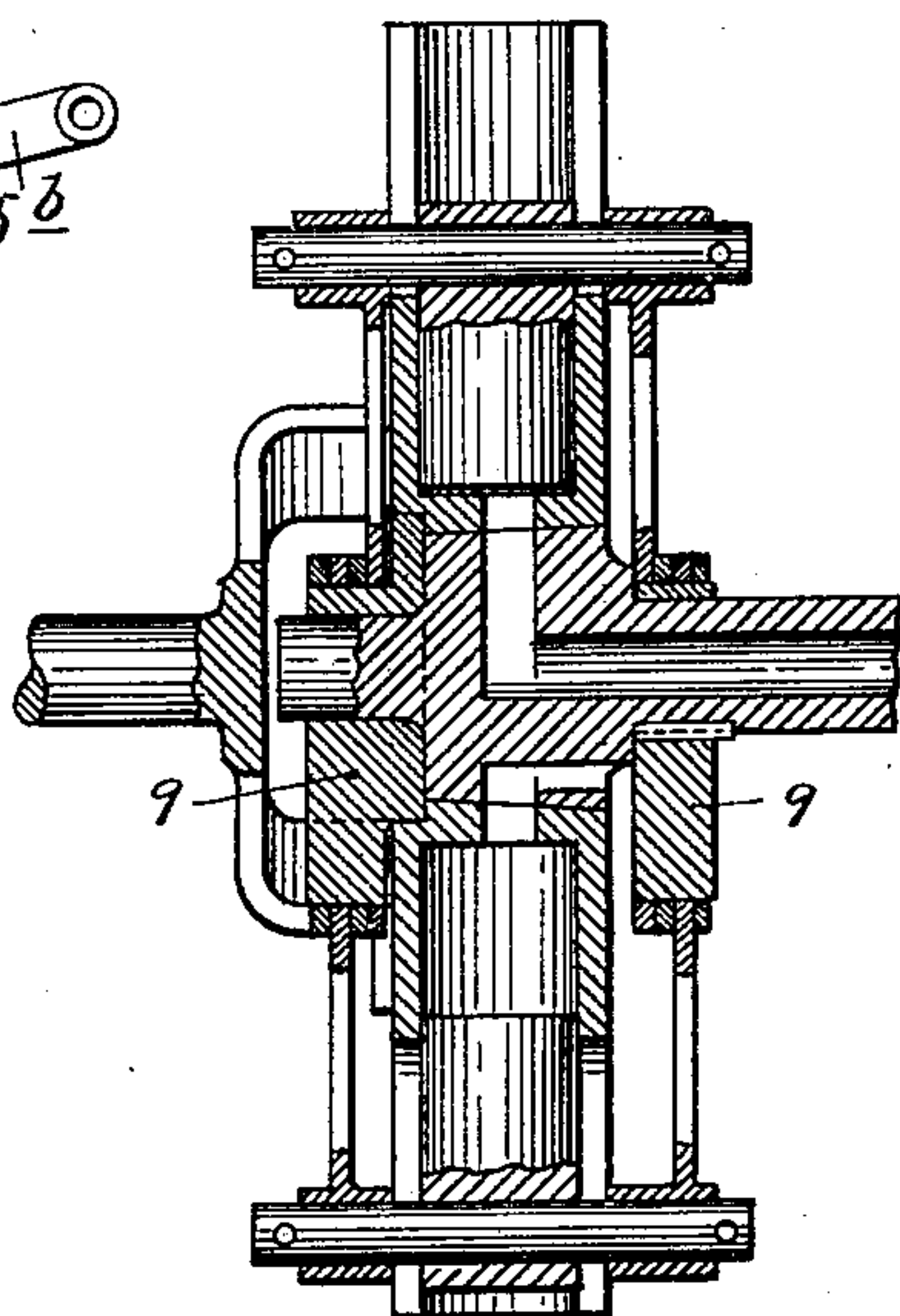
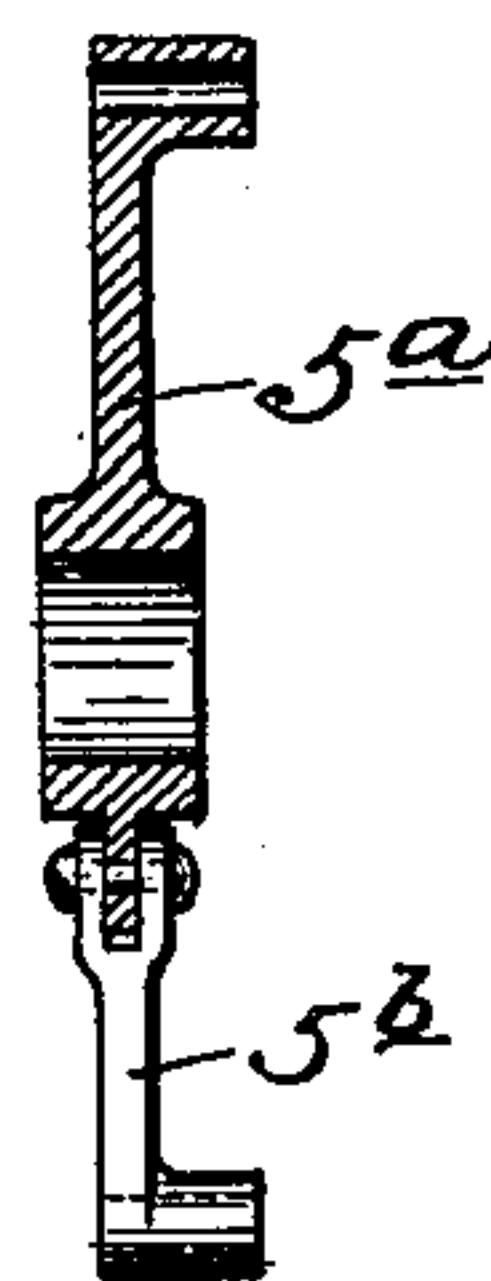


Fig. 11.



Witnesses:

R. A. Williams
James C. Herron.

Inventor:

John C. Beckfield
by John H. Roney
his Attorney.

UNITED STATES PATENT OFFICE.

JOHN C. BECKFIELD, OF PITTSBURG, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 731,155, dated June 16, 1903.

Application filed June 20, 1901. Serial No. 65,262. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BECKFIELD, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Rotary Engines, of which improvement the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 indicates a central section of my improved rotary engine or motor. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a face view of the valve from the left-hand side of Fig. 1. Fig. 5 is a section on line 5 5 of Fig. 4. Fig. 6 is a section on line 6 6 of Fig. 4. Fig. 7 is an elevation of a modification of my improved engine illustrated in Fig. 8 viewed from the left-hand side of said figure. Fig. 8 is a vertical transverse section of the same on line *x x* of Fig. 7. Fig. 9 is a vertical transverse section of an additional modification of my improved rotary engine or motor; Figs. 10 and 11, respectively, detail plan and side elevations of a modified form of propulsion means.

My invention relates to that class of engines known as "rotary" engines; and the object of my invention is to produce a simple and compact engine of this general type of the highest possible efficiency.

Another object of my invention is to provide a valve mechanism for use in such engines which is centrally disposed—*i. e.*, arranged between the propulsion-links or power-transmitting means and capable of being reversed—*i. e.*, of admitting fluid-pressure at one end or one side of the valve and exhausting at the opposite end or side thereof, and vice versa; and it consists in other novel features of construction hereinafter more specifically described and claimed, reference being had to the accompanying drawings, which form a part of this specification, in which like reference characters indicate like parts wherever they occur throughout the several views.

Referring to said drawings, 1 indicates a frame or case comprising, as shown in the drawings, a cylinder *a*, the ends of which are closed by the heads *b* and *c*, respectively.

This feature of my construction is not, however, absolutely essential to the efficiency and operativeness of my improved engine or motor. 2 is a cylinder-disk revolubly mounted in said case or frame and having cylinders 3 3 radially disposed thereon, in which are operatively mounted or secured pistons 4, to the outer ends of which pistons the outer ends of propulsion-links 5 5 are connected by means of the pins *d*, which pass through the outer ends of the pistons and elongated openings *e* in the cylinders and upon the projecting ends of which the outer ends of the links are mounted and fastened by the cotter-pins *f*. The inner ends of the propulsion-links are mounted upon a common center or bearings which are a common center for all the links and which are eccentrically disposed with relation to the cylinder-disk and the centrally-disposed valve 6, which is concentric with the cylinder-disk and upon which the cylinder-disk is revolubly mounted.

In Figs. 1 to 8, inclusive, I have shown the propulsion-links or power members on one side of the valve as being mounted on the hollow eccentrically-disposed horizontally-projecting stem 7 of the valve and similar links or power members on the opposite side of the valve as being mounted upon the solid projection or shaft 8. In Fig. 9, however, I have shown a modification of my improved engine or motor in this respect in which the hollow stem of the valve and the oppositely-projecting solid portion thereof are concentric with the valve and with the cylinder-disk mounted thereon, having, however, eccentrically-disposed rings or collars 9 9, having common centers keyed or shrunk upon said parts or integral therewith and upon which the inner ends of the propulsion-links or other power-transmitting devices are mounted. It will be observed that the propulsion-links or other means of transmitting power from the pistons are arranged on both sides of the centrally-disposed valve and the cylinders, which insures steadiness in the operation of the device. The hollow stem 7 of the valve constitutes not only a fixed support for the valve and power members, but also composes fluid admission and discharge ports to the valve, being provided with a centrally-disposed partition *g*, which subdivides the hollow stem or

tube longitudinally into ports *h* for the admission of fluid to the valve and port *i* for the discharge or exhaust of fluid from said valve. The said ports communicate with, respectively, the ports *h'* and *i'*. The port *h* communicates with the cylinders successively for the admission of fluid thereto, and the port *i* communicates with the cylinder at the opposite side of the valve for the exhaust or discharge of fluid therefrom. In the operation of my improved engine or motor the function of the ports may be reversed—*i. e.*, the ports *h* *h'* may be the exhaust-ports and the ports *i* *i'* the fluid-supply ports or admission-ports. Consequently the engine is a reversing one—*i. e.*, an engine capable of being driven in either direction. The said valve 6 is provided with an enlarged portion *j*, in which the ports *h'* and *i'* are formed, the inner side of this enlarged portion being provided with a straight or inclined shoulder *k*, which contacts with, and the correspondingly straight or inclined portion on the side of the cylinder-disk being held thereto by a retaining-plate 10, recessed in the opposite side of the valve and held in said recess by a spring-pressed bolt *l*, which is mounted in a recess *x* in the body of the valve, the bolt being drawn tight against the plate by the tension of a heavy spring *m*, mounted on the same between the enlarged head thereon and the plug *n*. 11 is a spider which is bolted or otherwise suitably secured upon one side of the cylinder-disk and terminates in a power-shaft 12, which projects through an orifice or bearing in the boss *o*, projecting concentrically from the head *b* of the frame. The opposite head *c* of the shell or frame is also provided with a boss *p*, eccentrically disposed with relation to the cylinder-disk and valve and in which the tubular projection of the valve is rigidly secured.

In Figs. 7 and 8 I show a modified form of my apparatus in which instead of propulsion-links to transmit power from the pistons I substitute the disks 13 and 14 on either side of the valve eccentrically disposed with relation thereto and to the cylinder-disk. The horizontal pins *d'*, which pass through the outer ends of the pistons and project in the elongated openings or slots in the outer ends of the cylinders, are removably secured in the curved slots 15 and 16, formed in the periphery of the disks. The slots 15 and 16, formed in the face of the disk, may be of less elongation than the slots 17, formed in the lower side of the face of said disk, and the said disks are secured at the upper face thereof against lateral movement, the pins *d'* secured thereto at such point being only free to move vertically in the slots formed in the outer end of the cylinders. The disks 13 are cut away to form the openings 18, through which openings the spider 11^a projects.

In Figs. 10 and 11 I show, respectively, plan view and side elevation, partly in section, of a modified form of propulsion means. In these figures 5^a is a link mounted on the eccentric-

ally-disposed bearing and having pivotally connected thereto the links or arms 5^b, all of which and said link 5^a are connected with the pistons.

I claim as my invention and desire to secure by Letters Patent—

1. In a rotary engine, the combination of a centrally-disposed valve, cylinders revolubly mounted on the valve, pistons in the cylinders, propulsion members connected to the pistons and revolubly mounted, and a retaining device for holding the cylinders on the valve and preventing lateral displacement comprising a plate abutting the cylinders, and a spring-pressed member for holding said cylinders yieldingly in position on the valve.

2. In a rotary engine, the combination of a centrally-disposed stationary valve, a disk revolubly mounted thereon carrying cylinders having pistons therein, and disks mounted on bearings concentric to each other on each side of the valve and said first-mentioned disk but eccentrically disposed with relation to said valve, the said disks being provided with segmental slots in the sides and connected to the pistons at said slots.

3. In a rotary engine, the combination of a shell or frame, a disk rotatably mounted therein carrying cylinders having pistons operable therein, a stationary valve arranged at the side of said disk and concentrically disposed with relation thereto, the said valve having inlet and exhaust ports communicating with said cylinders, and a tubular projection upon which said valve is supported in which are formed longitudinal ports communicating with the inlet and exhaust ports, respectively, of the valve, the said valve having also a cylindric body portion or plug on which said disk is mounted and a solid cylindric portion which is concentric with the tubular portion on the opposite side of the valve and members located on opposite sides of the cylinders and journaled on the tubular and solid projections of the valve and connected to the pistons.

4. In a rotary engine, the combination of a shell or frame, a disk rotatably mounted therein carrying cylinders having pistons operable therein, a stationary valve arranged on the side of said disk and concentrically disposed with relation thereto, the said valve having inlet and exhaust ports communicating with said cylinders, and a tubular projection upon which said valve is supported in which are formed longitudinal ports communicating with the inlet and exhaust ports, respectively, of the valve, the said valve having also a cylindric body portion or plug on which said disk is mounted and a cylindric portion which is concentric with the tubular portion on the opposite side of the valve and eccentrically disposed with relation to the cylinder-disk and valve, means to connect the stem of the pistons with the eccentrically-disposed projections of the valve, and means to hold the valve in close contact with the cylinder-disk.

5. In a rotary engine, the combination with

a disk having cylinders provided with inlet and exhaust ports, of a valve on which the disk is adapted to revolve, said valve having an enlarged hub provided with arc-shaped inlet and exhaust ports in its side face against which the cylinders abut and over which the inlet and exhaust ports of the cylinders are adapted to play, and also provided with a hollow shaft having a partition providing inlet and exhaust ports communicating with the arc-shaped ports, pistons in the cylinders, and propulsion devices connected to the pistons and having eccentric bearings.

JOHN C. BECKFIELD.

Witnesses:

CLARENCE A. WILLIAMS,
JOHN H. RONEY.