

No. 612,669.

Patented Oct. 18, 1898.

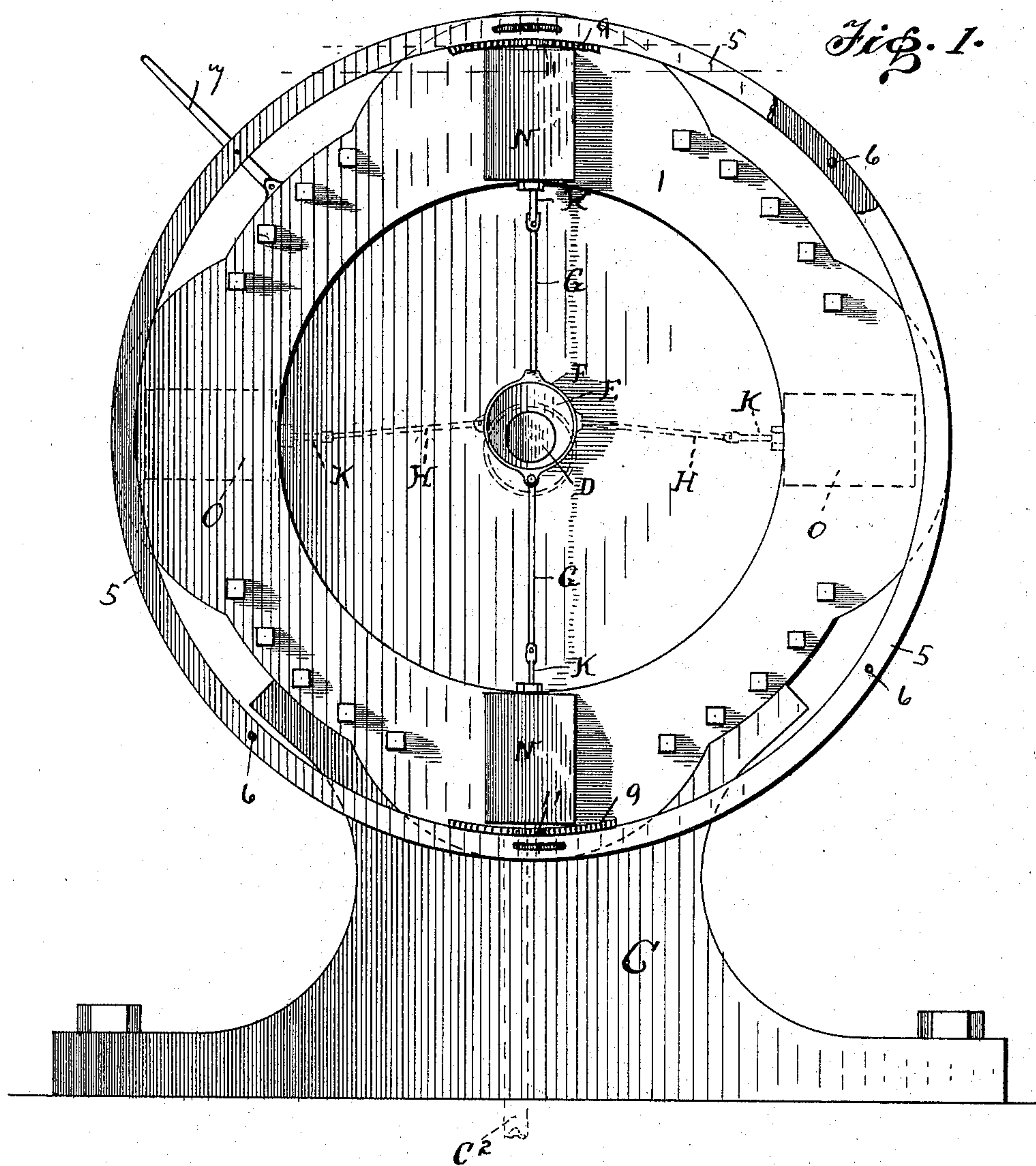
J. M. MAXWELL.

ROTARY ENGINE.

(Application filed June 1, 1897.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses
 Frank. H. Stright.
 A. M. Nixon

By *Henry C. Everett* Attorney

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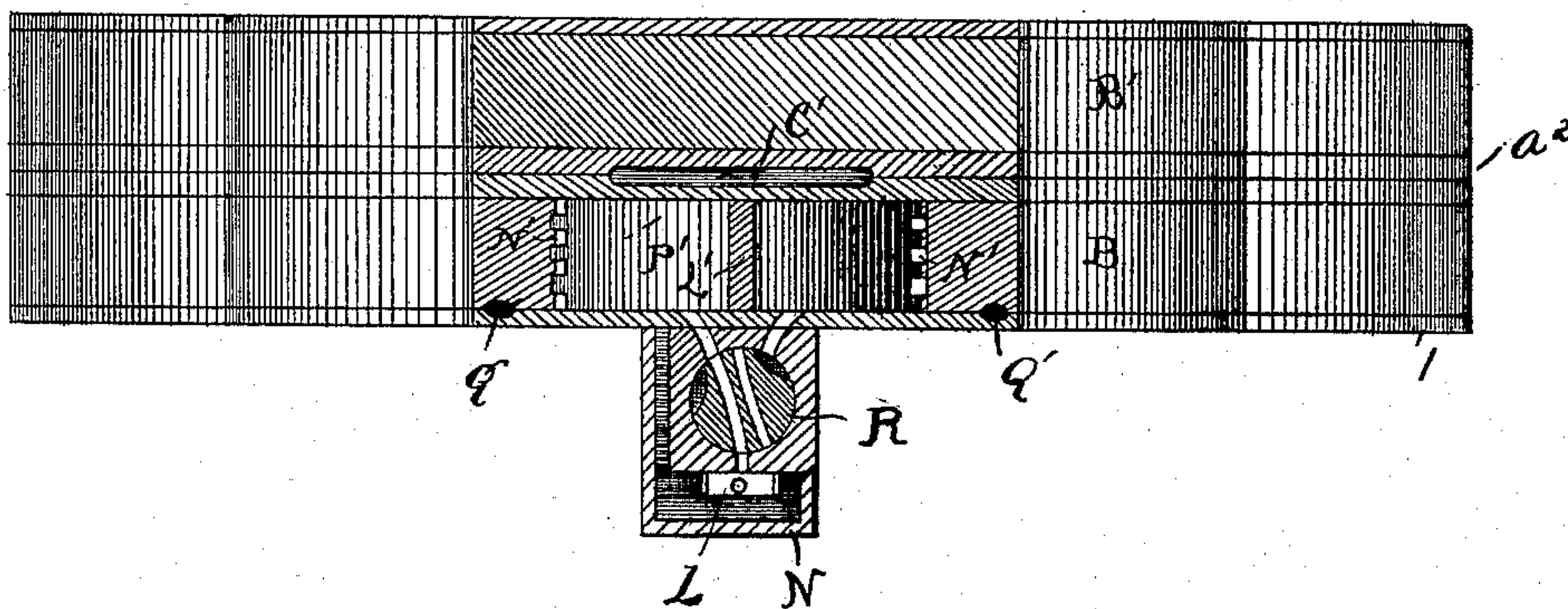
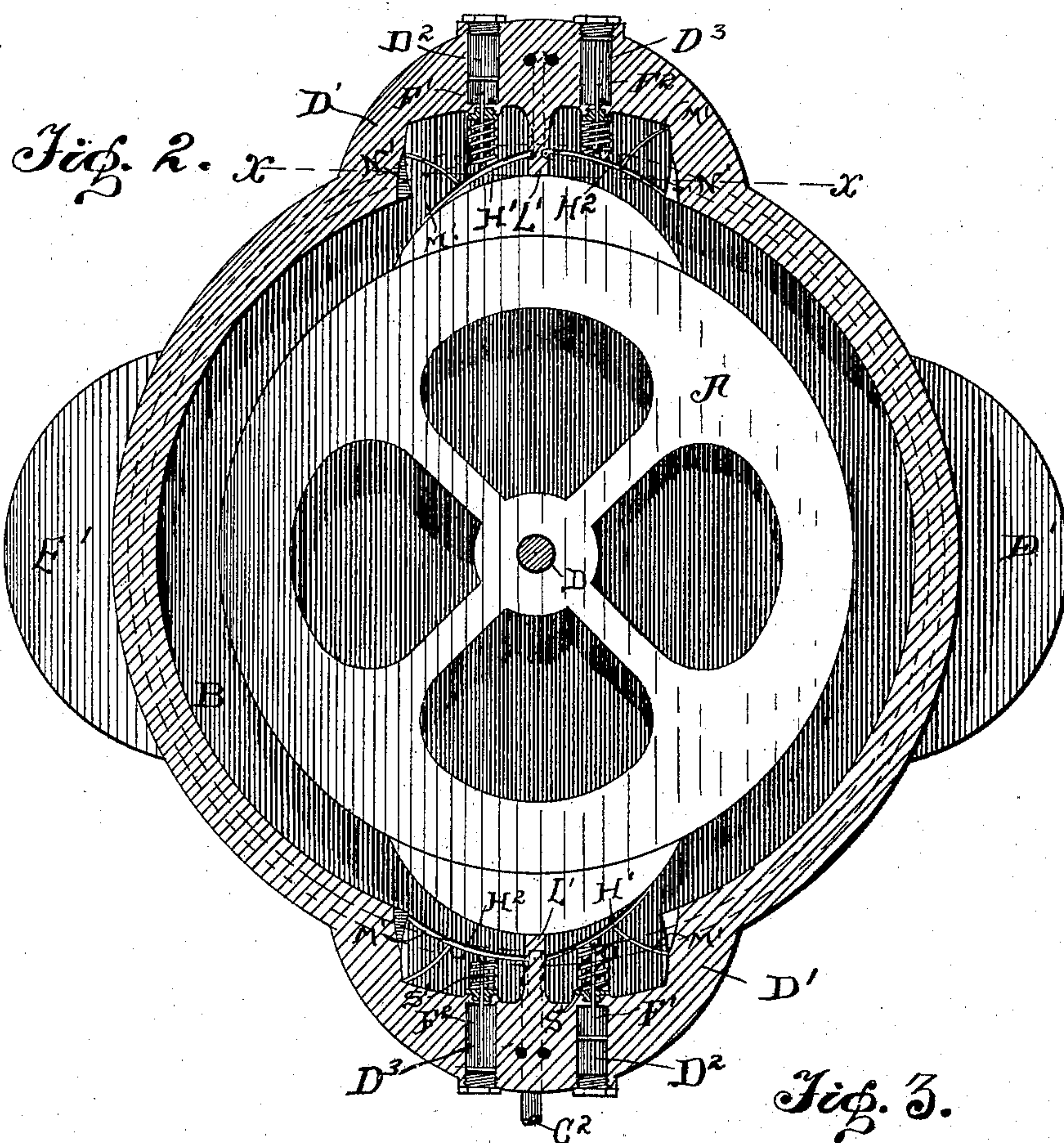
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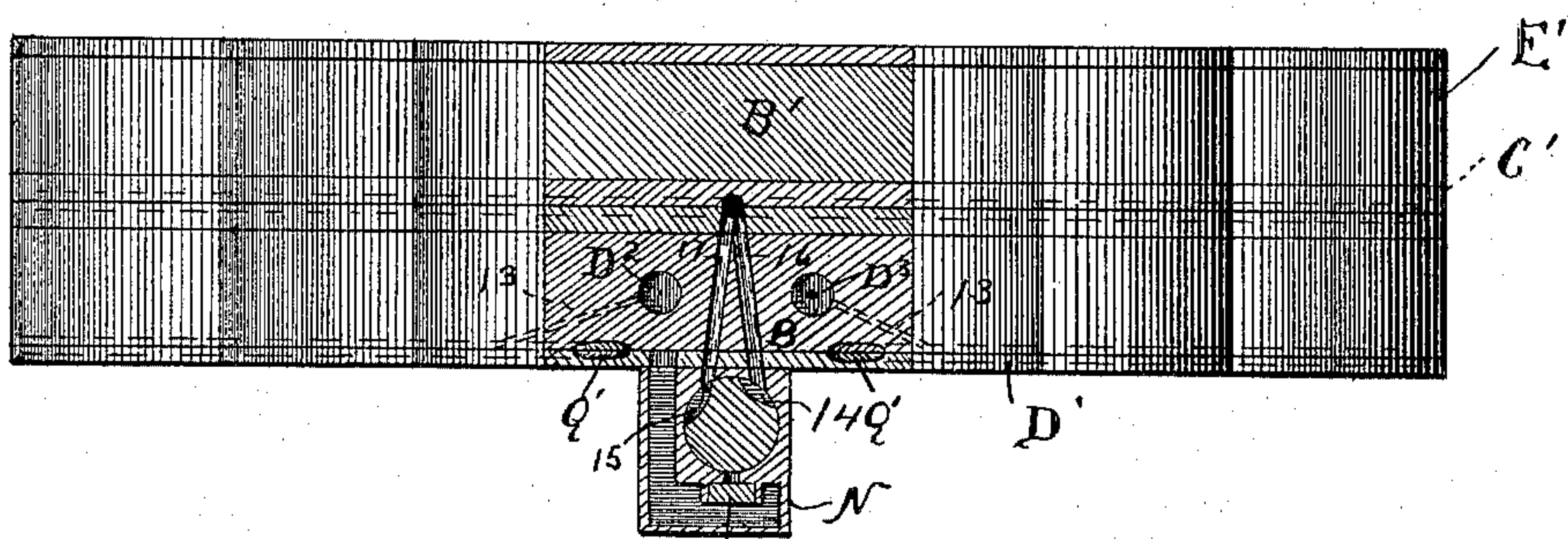
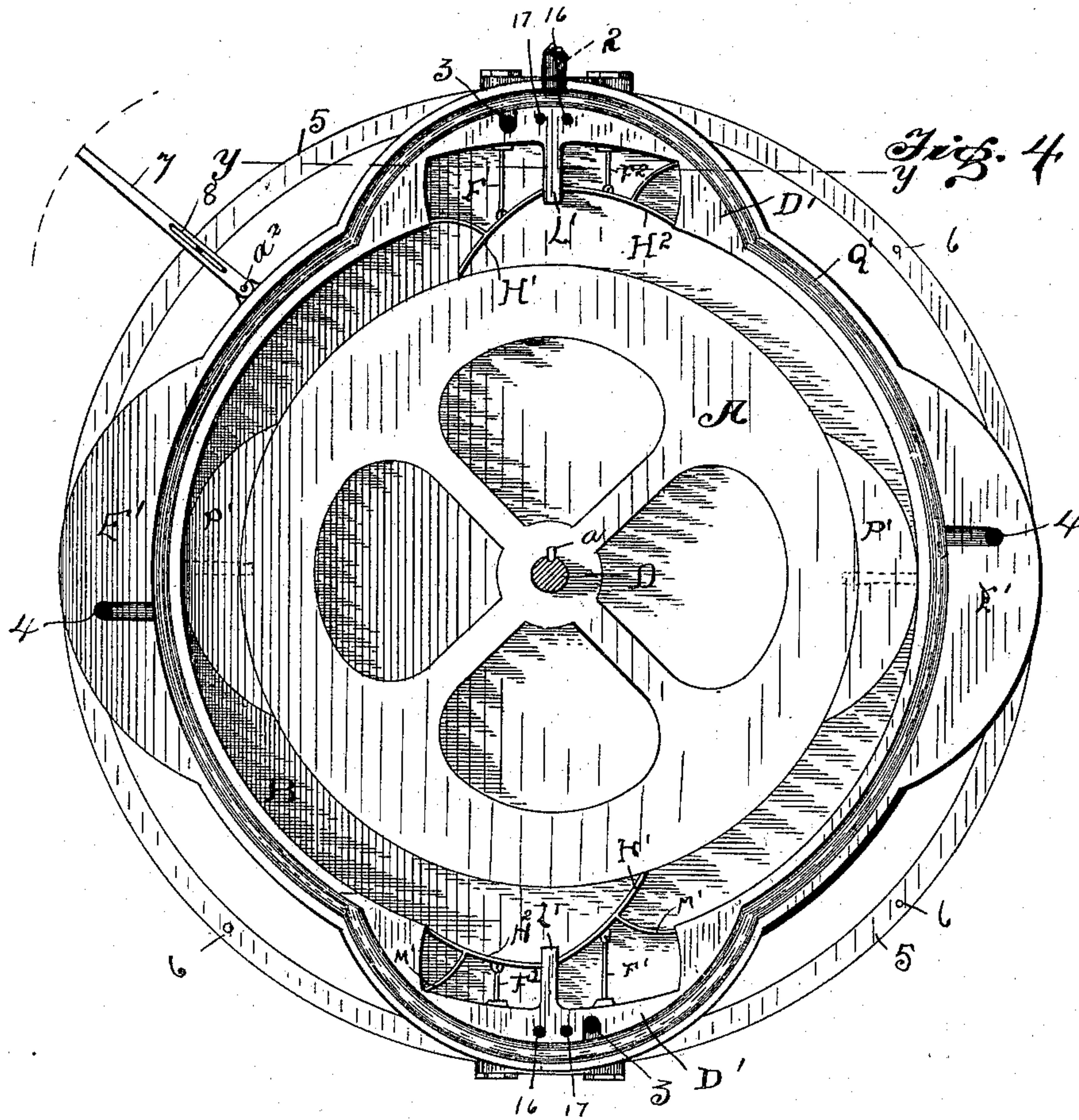


Fig. 5.

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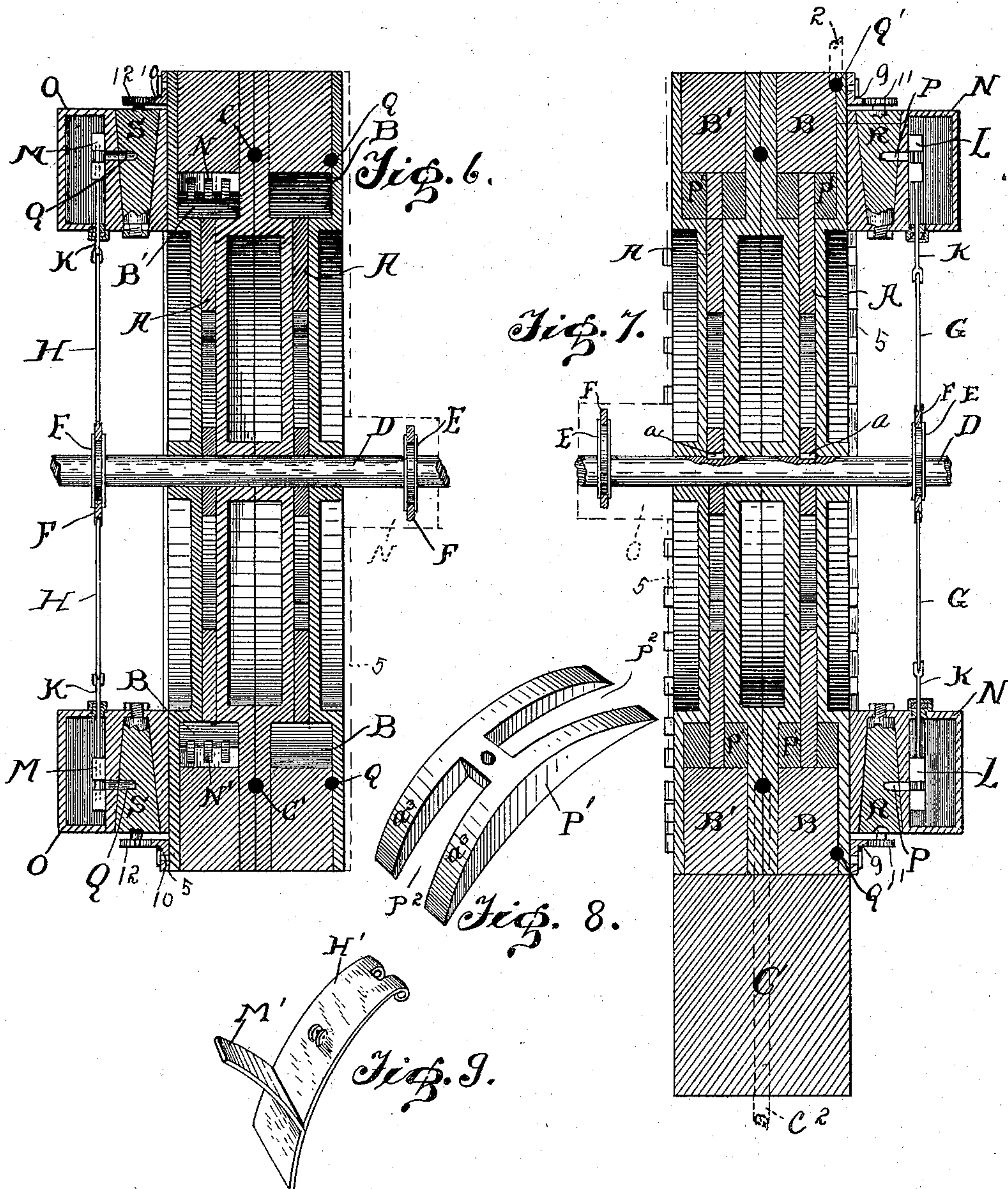
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

JAMES M. MAXWELL, OF PITTSBURG, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 612,669, dated October 18, 1898.

Application filed June 1, 1897. Serial No. 638,988. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. MAXWELL, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in rotary engines, particularly those in which the direction of rotation may be changed at will, the object of the invention being to produce an engine of simplicity in construction and economy in running, not easy to get out of order, and the parts of which can be readily removed and replaced when worn or broken.

20 The invention consists briefly in a rotary piston or power-disk mounted upon a power-shaft having eccentrics connected thereto, which operate slide-valves arranged in steam-chests at the sides of the motor to automatically open and close the ports for the admission and the exhaust of the steam, and in the novel arrangement for the reversing of the direction of rotation, all of which will be more particularly pointed out and explained hereinafter in the specification.

30 In the accompanying drawings, Figure 1 is a side elevation of my improved rotary engine. Fig. 2 is a vertical sectional view. Fig. 3 is a longitudinal sectional view taken on the line X X of Fig. 2. Fig. 4 is a side elevation with one of the plates removed. Fig. 5 is a longitudinal sectional view taken on the line Y Y of Fig. 4. Fig. 6 is a longitudinal sectional view. Fig. 7 is a transverse vertical sectional view. Fig. 8 is a perspective view of one of the abutments secured to the rotary piston. Fig. 9 is a similar view of one of the swinging gates. Fig. 10 is a vertical sectional view of a portion of the rotary piston, the section being taken through the abutment
45 secured thereto.

Referring now to the drawings by reference letters and numerals, A indicates the rotary piston or power-disk operating in the cylinders B B', which may be of any desired size, according to the amount of power required, being in this construction formed with a suitable base C for attaching to a support. The said

rotary piston or power-disk receives the central power-shaft D and is secured thereto by a key *a*, and arranged on said power-shaft at each side of the engine are eccentrics E, connected by a strap F to arms G, which are pivotally connected to piston-rods K, which carry the slide-valves L. On the opposite side of the engine the connection is made so that one set of valves will be open and the other closed, and the arms connecting the eccentrics to the pistons are designated by reference-letters H and slide-valves M. These slide-valves L and M operate in steam-chests N and O and automatically open and close the inlet-ports P and Q, which extend through plug-valves R and S into the cylinder B. A port *b* extends through the plugs *s* into the cylinder B' to feed the steam from the chests O A², separating the cylinders B and B', which are provided with a circumferential groove C', forming the exhaust, the outlet C² of which is arranged at any suitable point. The rim around the cylinders B B' is provided with projections D' and E', in which are arranged cylinders D² and D³ and E² and E³, having pistons *f'* and F² and G' G², operating therein and connected to swinging gates H' H² K' K², hinged to the partition L', which separates the cylinders B and B' into two compartments. The swinging gates are provided with a wing M', which serves to form a purchase for the steam when turned on to allow the gate to drop. The cylinder-rim is cut away to permit the operation of these swinging gates, the steam escaping from the cut-away portions into the cylinders B and B' through channels N'. Arranged on the piston-rods connected to the swinging gates are coil-springs S', which act as a cushion for the said gates. Secured onto the rotary piston at two sides thereof are abutments P', having slots P² extending into the same to engage on projections on the rotary pistons, said abutments being held by bolts to the rotary piston or by other suitable means. By this construction the point of friction is reduced to the width of the intact portions of the abutments.

The inlet 2 is arranged at any suitable point and communicates with a circumferential groove Q', extending between the outer plates and the rim of the cylinder B.

Operation: Steam is admitted through the

inlet 2 to the groove Q', where it courses through same and passes through ports 3 3 and 4 4 to the chests N N and O O. Assuming now that the steam has been admitted to the chests N N, it passes through port P in the plug into the cut-away portion containing the swinging gates, forcing the gate H' down into engagement with $a^3 a^3$ and 1, (see Fig. 10,) and forms a seal and also a purchase for the steam, which now passes through channels N' into the cylinder B, operating the rotary piston and communicating motion to the driving-shaft to operate the eccentrics and alternately admit the steam from the chests N and O to the cylinders B and B', as heretofore described.

In order to reverse the engine, I have provided annular rings 5 5, connected together by pins 6 6, connected to one of which pins is an operating-lever 7, having a slot 8 to receive the pin, one end of lever being pivotally connected to a^2 . These rims are provided with racks 9 10, which engage spur-gears 11 12, secured on the ends of the plugs R and S, thus serving to reduce the position of the plugs, and consequently through the reversed admission of the steam reversing the movement of the rotary piston.

The reversed admission of the steam is accomplished by means of a channel 13, leading from the inlet-groove Q' to the bottom of the cylinders D² D³ and E² E³. Said cylinders E² E³ are located in projections E' and are not shown in detail, the plugs R and S being provided with grooves 14 and 15, which thus communicate alternately with ports 16 17, communicating with the outlet-port C'. To release the steam entirely, these grooves 14 15 are brought into communication with the ports 16 17 at the same time, which allows the steam to escape from both sides of the partition L'.

In Fig. 4 I have shown the springs on the pistons dispensed with, as these are not absolutely necessary to the perfect working of the gates.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a rotary engine, the combination of a cylinder, a rotary piston operating in said cylinder, a power-shaft, steam-chests arranged on one side of the cylinder, eccentrics secured to said shaft, connections between the eccentrics and steam-chests whereby the steam is admitted at intervals, abutments secured to the rotary piston, swinging gates secured to the inside of the cylinder and operating in cut-away portions said swinging gates and abutments serving as a purchase for the steam, substantially as shown and described.

2. In a rotary engine, the combination of a cylinder, a rotary piston mounted upon a power-shaft and operating in said cylinder, steam-chests arranged on the side of the cylinder and communicating therewith, eccentrics mounted on the power-shaft, connections between the eccentrics and steam-chests whereby the steam is admitted at intervals to the cylinder, abutments secured to the rotary piston, wings secured to the inside of said cylinder, said wings being operated by the admission of steam to the cylinder and means for reversing the mechanism, substantially as shown and described.

3. In a rotary engine the combination of a cylinder, a power-shaft, a rotary piston mounted on said power-shaft and operating in the cylinder, abutments secured to said rotary piston, swinging gates secured in a cut-away portion formed on the inner face of the cylinder, said swinging gates being operated by the admission of steam to the cylinder, steam-chests arranged on the side of the cylinder, connections between the power-shafts and steam-chests whereby the steam is admitted to the cylinder at stated intervals, and means for reversing the mechanism, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES M. MAXWELL.

Witnesses:

A. M. WIESON,
THOS. M. BOYD, Jr.