

No. 632,969.

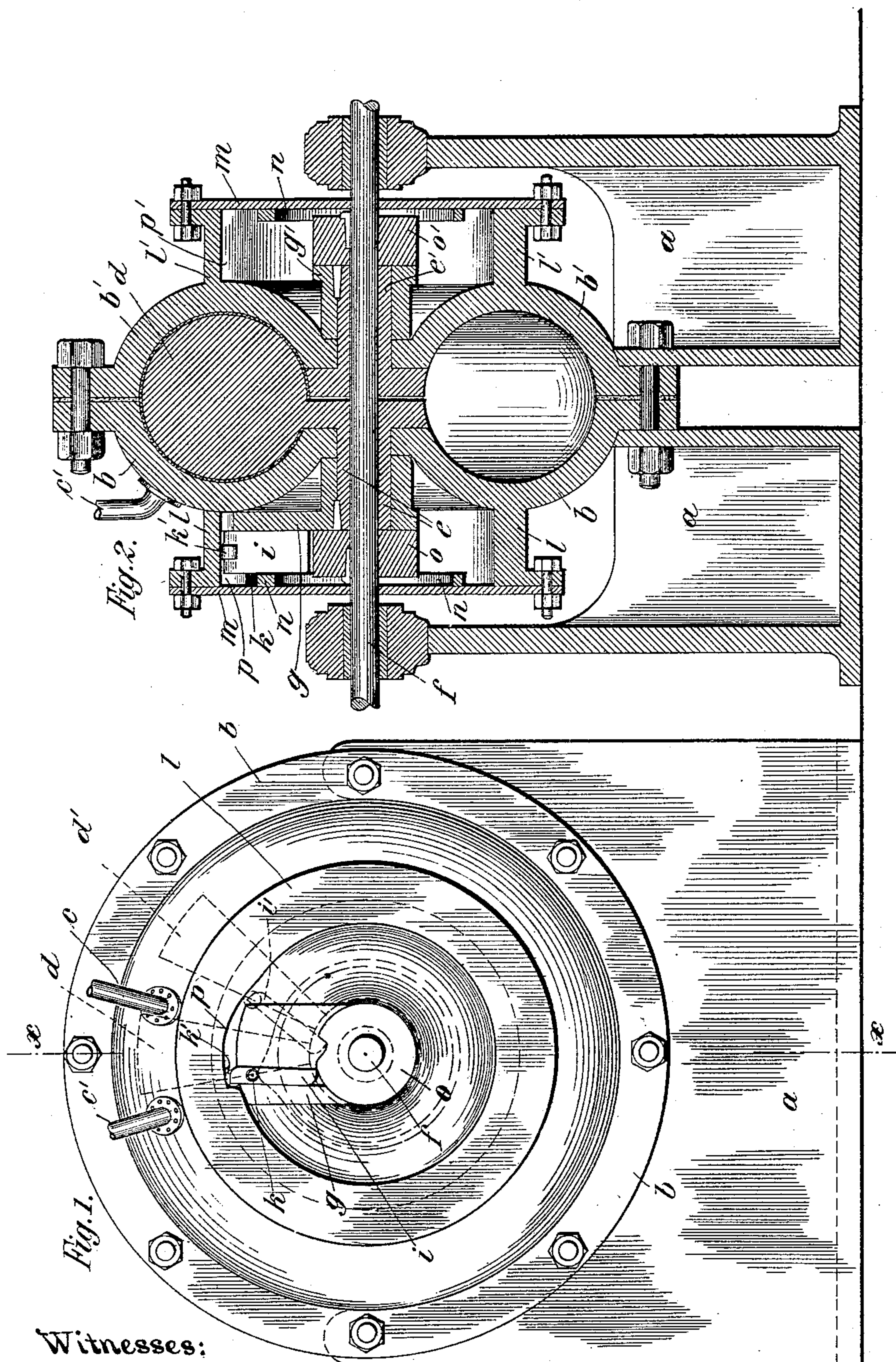
Patented Sept. 12, 1899.

J. L. PIENING.
ROTARY POWER ENGINE.

(Application filed Aug. 3, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

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J. Buehler.

Inventor,
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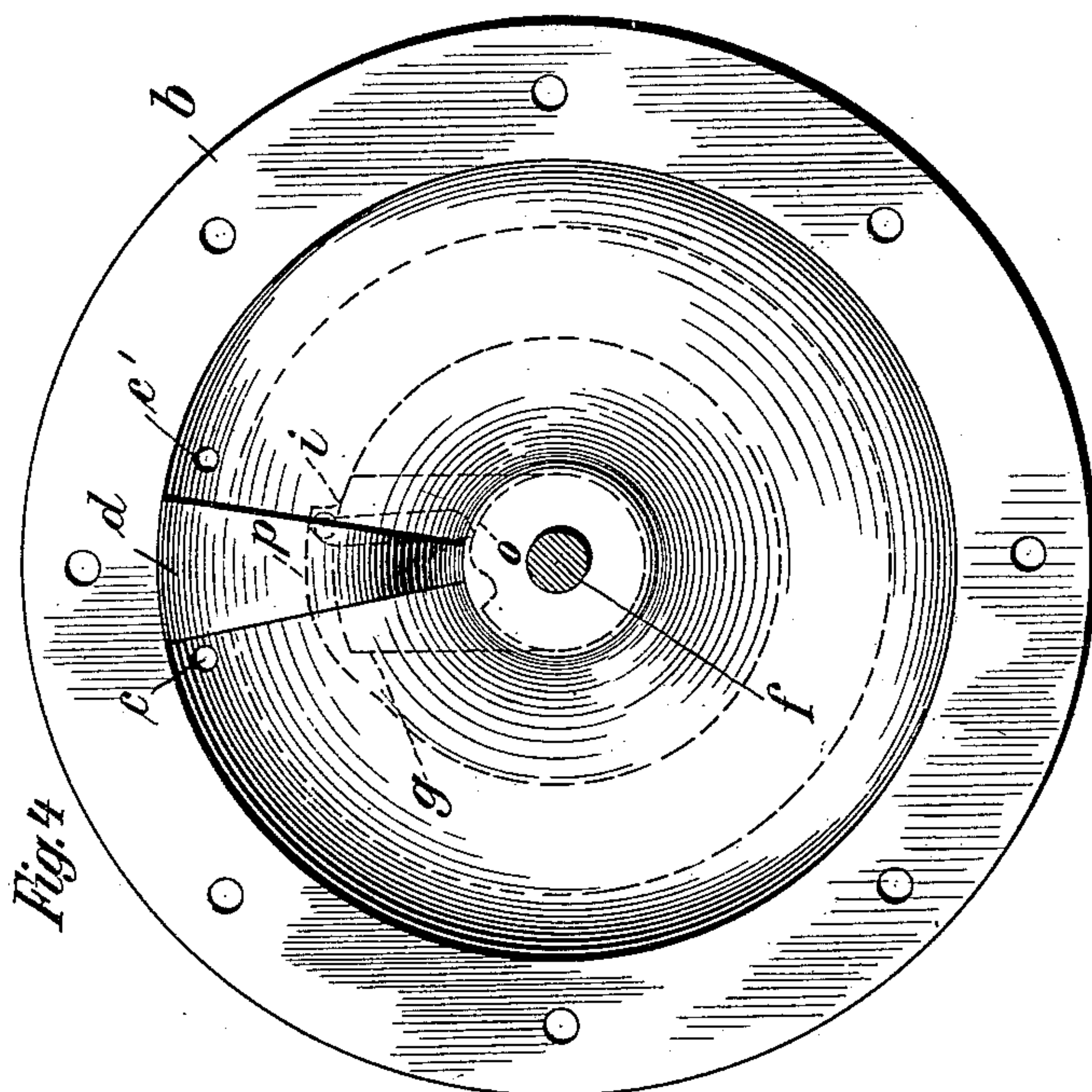


Fig. 4

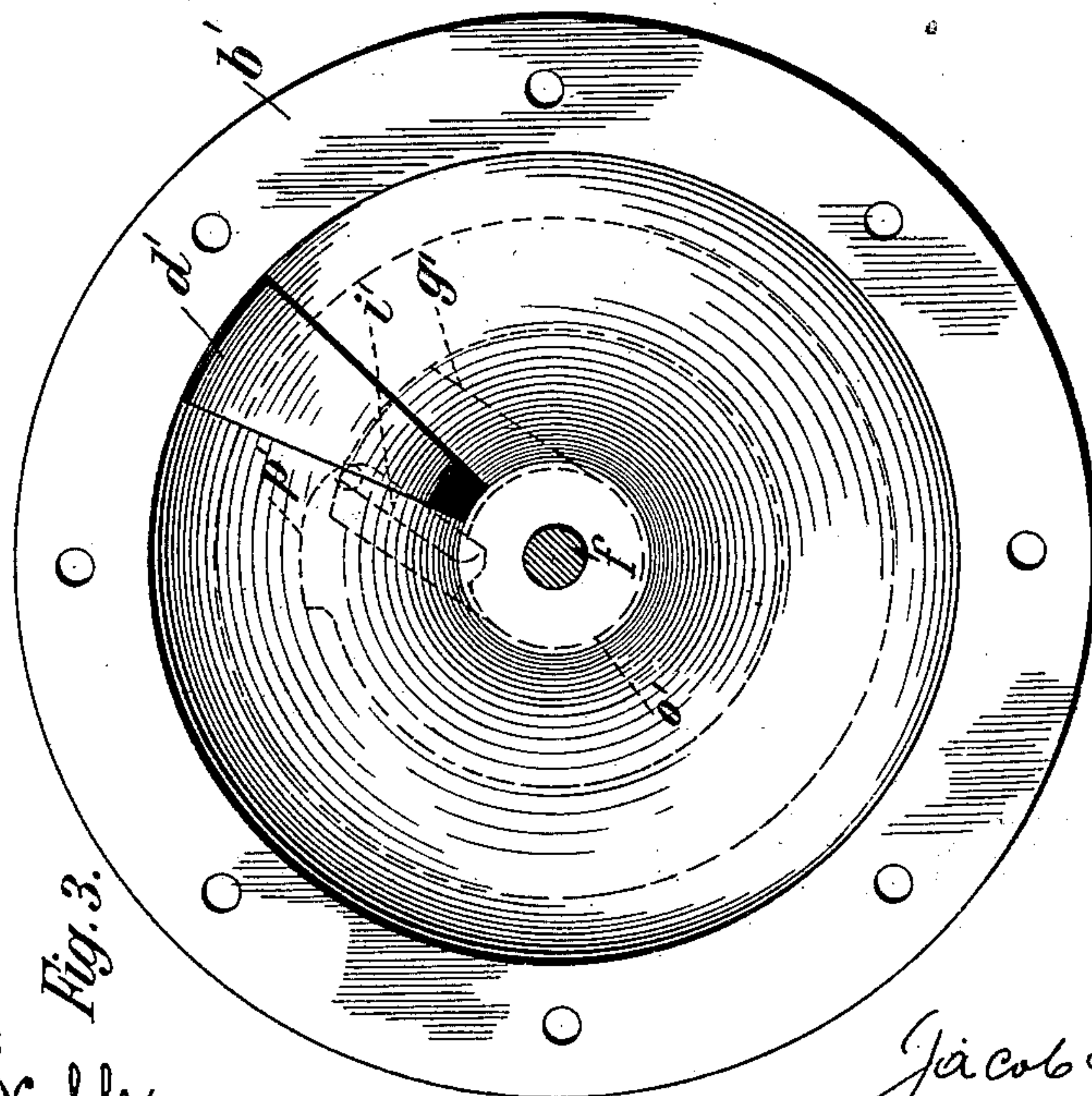


Fig. 3

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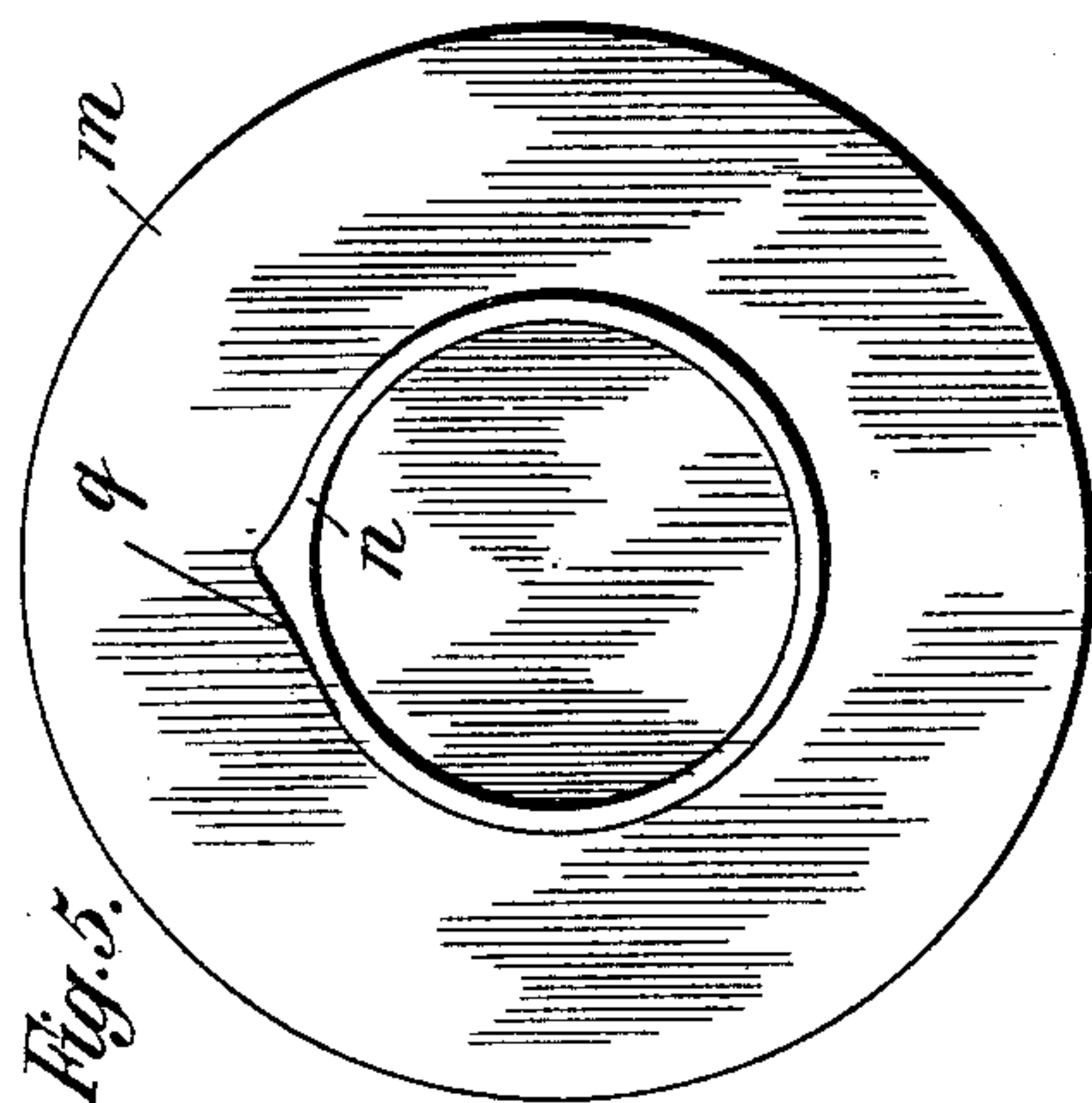
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Witnesses:

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UNITED STATES PATENT OFFICE.

JACOB LUDWIG PIENING, OF ELMSHORN, GERMANY.

ROTARY POWER-ENGINE.

SPECIFICATION forming part of Letters Patent No. 632,969, dated September 12, 1899.

Application filed August 3, 1898. Serial No. 687,615. (No model.)

To all whom it may concern:

Be it known that I, JACOB LUDWIG PIENING, carpenter, a subject of the Emperor of Germany, residing at Elmshorn, Germany, have invented certain new and useful Improvements in Rotary Power-Engines, of which the following is a full, clear, and exact description.

The object of the present invention is a rotary power-engine of that kind in which the piston has not a reciprocating motion, which is consequently not converted by means of rods and cranks into rotary motion, but which itself possesses a rotary motion and is connected to a shaft by means of a suitably-formed arm. The advantages of this kind of power-engine consist principally in that they avoid the centrifugal forces developed during the conversion of the reciprocating into the circular motion. Consequently by very much increased speed of revolution a very considerably smoother running of the machine is obtained and also a considerable reduction of the wear and tear of the separate parts thereof.

The object of the invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a side view of a machine constructed according to the invention, the cover having been taken off. Fig. 2 shows a vertical section on the line xx of Fig. 1. Figs. 3 and 4 illustrate the interior of the two cylinder-halves, and Fig. 5 is a view of one of the covers provided with a guiding-rod.

To the frame of the machine there is attached by screws the cylinder formed of two halves b and b' , having the steam-inlets c and the steam-outlets c' . The pistons d and d' of the machine are placed upon annular hubs e and e' . These latter run loose upon the shaft f . To these hubs e and e' the controlling mechanism is keyed from both sides. This consists on each side of the cylinder of a correspondingly-formed casting g and g' . These castings are provided with radial channels, and each of these channels possesses a bolt i or i' , which is capable of being displaced outward. These bolts i and i' are guided in the periphery l of the cylinder. They are, moreover, provided with two guiding-rollers k k' , the one whereof slides along the periphery l of the cylinder, while the other moves upon

a guide-bar n , secured to the inner face of the cover m . Upon the shaft f are placed the rings o and o' . These are provided at their periphery with notches which correspond to the apertures p and p' in the edge of the cylinder and the exact form whereof is shown clearly in Figs. 1, 3, and 4 of the accompanying drawings. It must, moreover, be noted that in the rotating power-engine according to the present invention two pistons are present, which, strictly speaking, move independently of one another and alternately, whereby through the ending motion of the one piston in consequence of the steam or air cushion between acting as a buffer the motion of the other is commenced, and consequently the guidance of the machine by means of suitable connecting parts is automatically effected by the piston.

The operation of the machine is as follows: In the position shown in Fig. 1 the one piston d is stationary, while the other, d' , stands, as is shown, in front of the steam-inlet. The fresh steam entering at c effects a pressure on both pistons corresponding to their size. The piston d is prevented from backward motion because its bolt i is in contact with the sharp edge of the cavity p . Owing to the shape of the cavity p , it has consequently only motion in the opposite direction available, and both pistons can therefore only turn in one direction. The steam can consequently only act to move the piston d' to the right, the bolt i' whereof at the same time quitting the cavity cut in the ring keyed upon the shaft f , whereby the ring o' is revolved by the piston and with it the shaft f itself. The air in front of the piston d' escapes during its forward motion through the outlet c' . The outlet for the air or steam driving the machine is not placed close behind the piston when at rest, but lies, as shown in the drawings, a certain space behind. Consequently when the outlet is closed by the rotating piston the air, steam, or like between the two pistons is compressed, whereby the piston which is at rest is moved forward. By this means also the blow or stroke imparted to the standing piston from the moving one is cushioned or diminished. After this both pistons move together a short distance farther until the rotating piston reaches the po-

sition of rest. Any contact of the two pistons with one another is completely impossible, because the steam or compressed air between them acts as a buffer and prevents them approaching too near to one another. As, moreover, the steam-inlet is placed close before the piston which is in the position of rest, the advanced piston is driven forward by the entering steam or the like. At the same time the bolt *i* is pressed against the sloping track of the cavity *p*, and thereby also upon the edge of the ring upon the shaft *f*. The piston moving farther will then continue to move until it again closes the steam-inlet, and the operation commences over again. The dead-point of the machine consequently remains at the end of the motion of the piston, and in the zone the piston in motion presses the other one forward. The dead-point position is ended as soon as its pressure forward is completed, and the inlet is again opened. The machine must consequently be provided with a sufficiently heavy fly-wheel to overcome the dead-point position. If, however, two or more cylinders are fixed to drive a single shaft and the respective dead-point positions are displaced one as against the other, the necessity for the use of such a fly-wheel is obviated. The removal of the bolt *i* from the cavity of the ring *o* is not momentary, but successive. The two guide-rods have a sloping track, whereby the bolt *i* is already so far raised out of the cavity of the ring *o* that the ring can then take hold beneath the bolt and press the same upward, whereby the same then finally passes behind the sharp edge of the cavity *p*. After completion of its course the piston *d'* gives a cushioned stroke against the piston *d*, and thereby pushes the latter before the steam-inlet. The piston *d* then stands in the initial position of the piston *d'* and is fixed by means of its bolt *i*, while *d* makes the above-described forward motion.

For the effectiveness of the machine there is required the spring *q*, which is placed in the guide-piece (shown specially in Fig. 5)

and is so shaped that it corresponds to the cavity *p* and *p'* on the periphery of the cylinder. This spring presses the bolt *i* and *i'* in the cavity *p*.

The advantage of the improved rotary power-engine constructed as above described and adapted for the use of compressed air, carbonic acid, or other sources of power, if required, is that in contradistinction to all rotary steam-engines, which themselves have an advantage over the ordinary steam-engines, the present invention possesses greater simplicity of construction and consequently more certainty of action, as may readily be seen from the description and the drawings.

What I claim, and desire to secure by Letters Patent, is—

1. A rotary engine comprising a cylinder having two alternately-moving pistons loosely mounted on a suitable shaft and adapted to open and close the exhaust-port as described, and means for driving the shaft, consisting of collars secured thereto and to the pistons and carrying sliding bolts, substantially as set forth.

2. A rotary engine comprising a cylinder having guide rods or rings secured to the inner face of its heads, two alternately-moving pistons loosely mounted on a suitable shaft and adapted to open and close the exhaust-port as described, means for preventing back strokes of the pistons, and means for driving the shaft consisting of collars secured thereto and to the pistons and carrying sliding bolts, substantially as set forth.

3. A rotary engine comprising a cylinder having guide rods or rings secured to the inner face of its heads, pistons *d*, *d'*, castings *g*, *g'* secured to the piston-hubs, the collars and sliding bolts, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

JACOB LUDWIG PIENING.

Witnesses:

E. H. L. MUMMENHOFF,
W. P. LEONHARD.