

(No Model.)

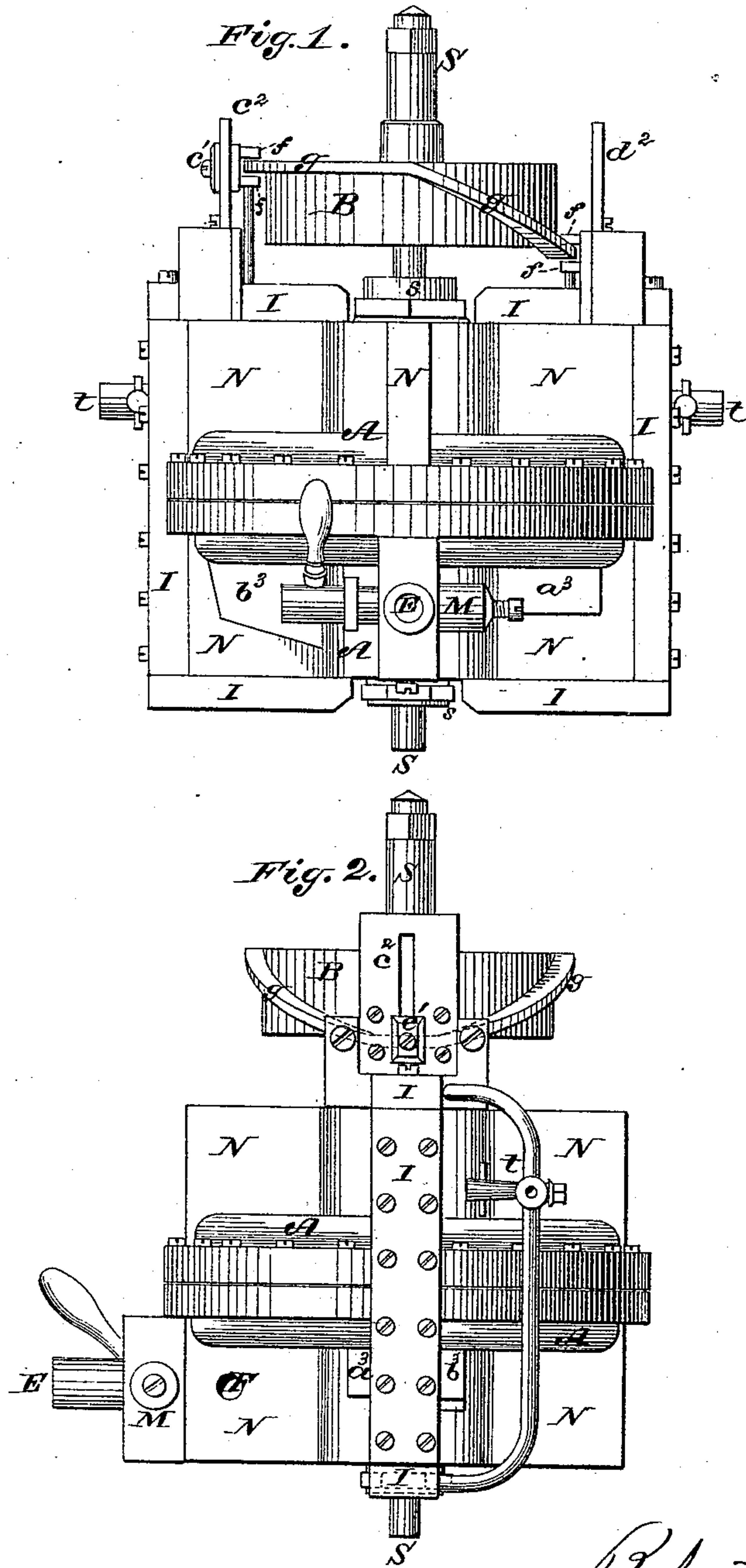
3 Sheets—Sheet 1.

R. H. ISBELL.

ROTARY ENGINE.

No. 251,051.

Patented Dec. 20, 1881.



WITNESSES:

*Henry R. Parker*  
*Thos Alexander Jr*

*Robert H. Isbell*  
INVENTOR

BY *Geo. F. Betts*  
ATTORNEY

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3 Sheets—Sheet 2.

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Fig. 3.

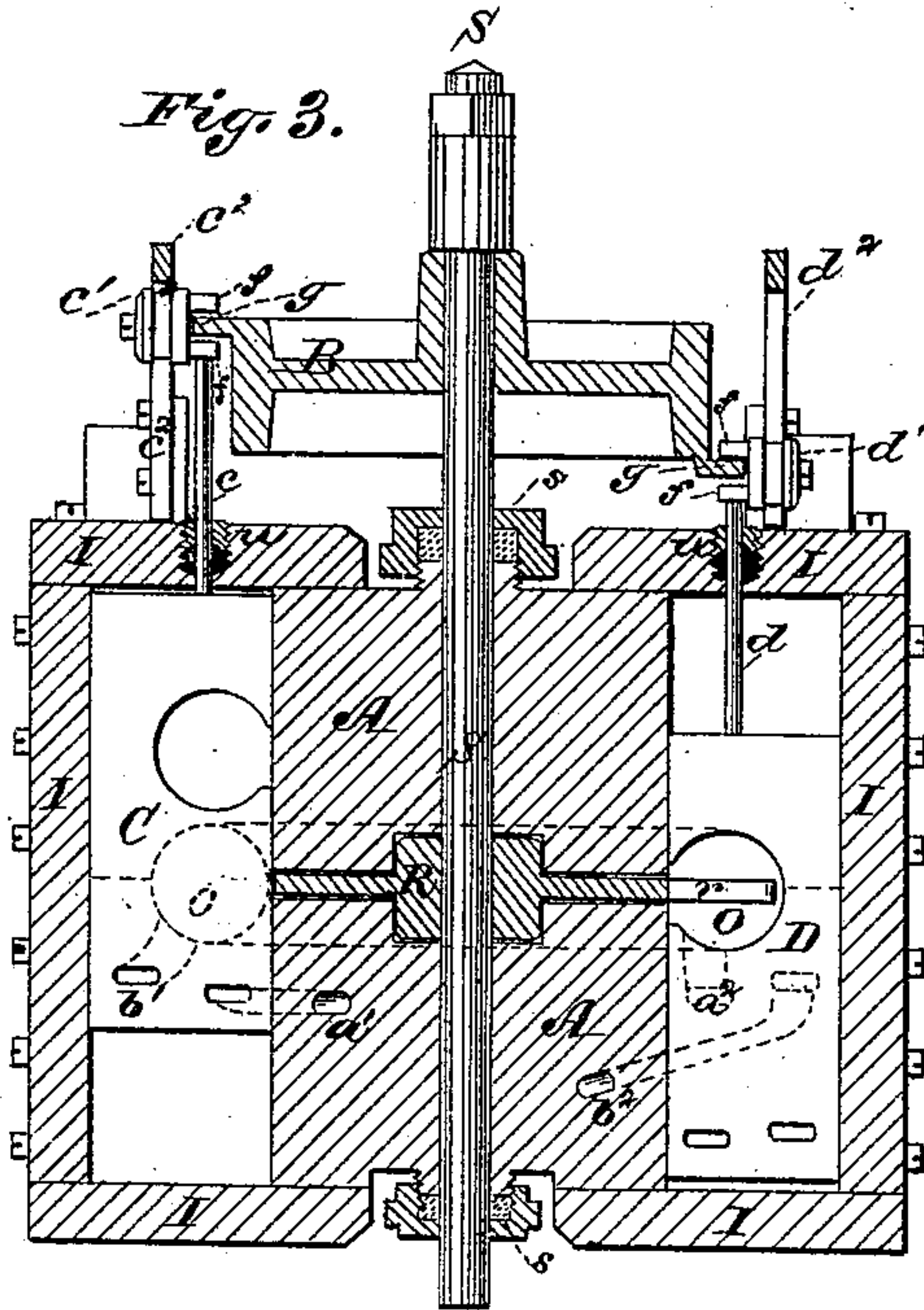
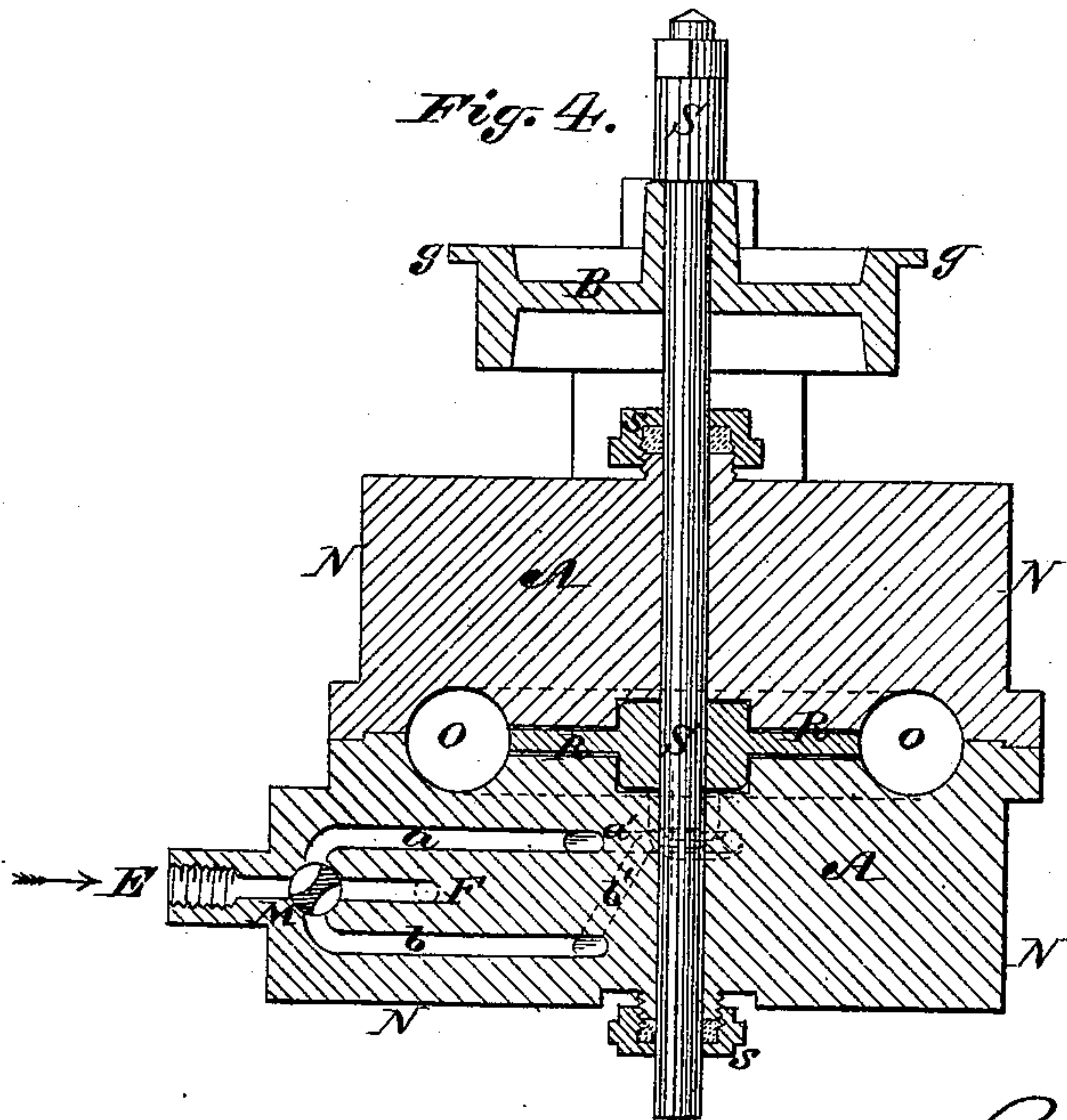


Fig. 4.



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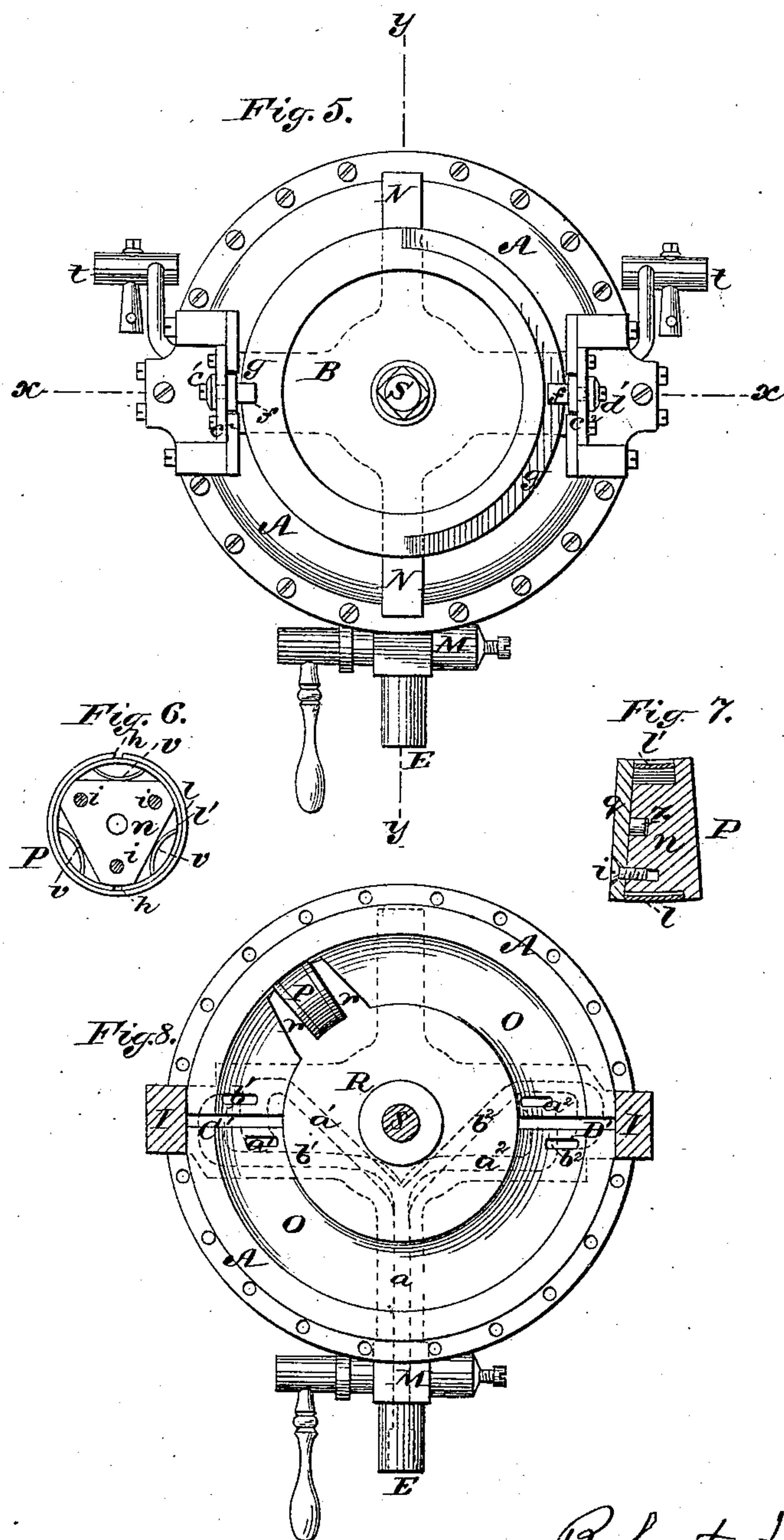
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# UNITED STATES PATENT OFFICE.

ROBERT H. ISBELL, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
GEORGE F. BETTS, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 251,051, dated December 20, 1881.

Application filed May 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT H. ISBELL, of the city of New York, in the county of New York and State of New York, have invented a new and useful improvement in rotary motors, which may be worked by steam, water, or other similar power, and may also be used as a water-meter, of which the following is a specification.

My invention is constructed with a disk firmly secured at its center on a shaft and having on its periphery a piston-head. The said piston-head so works in a stationary annular cylinder as to impart rotary motion to the said disk and thence to the shaft. Two sliding heads or abutments, moving in a direction parallel to the axis of the said shaft and operated by a cam-wheel on said shaft, alternately pass backward and forward through said cylinder at opposite sides thereof, and each in its turn forms the head of a cylinder, between which head and the piston-head the steam or other source of power used for operating the motor is confined. The exhaust and feed ports of the cylinder, which are operated by the movements of these abutments, are so arranged that the said abutments are moved under pressures which are balanced or nearly so.

In order that my said invention may be more easily and clearly understood and more readily performed, I will give a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, similar letters indicating similar parts, making a part of this specification, in which—

Figure 1 is a front view of said motor, looking from above. Fig. 2 is a side view of said motor. Fig. 3 is a sectional view of said motor through the line  $x x$  in Fig. 5. Fig. 4 is a sectional view of said motor through the line  $y y$  in Fig. 5. Fig. 5 is a direct front view of said motor. Fig. 6 is a sectional view of piston-head. Fig. 7 is a cross-sectional view of piston-head, and Fig. 8 is a view showing the course taken by the tubes which connect with the valves of the cylinder.

A represents a box mounted on the frame N, and contains an annular cylinder, O, and disk R, the disk being firmly fastened at its center

on the main shaft S. The said shaft S extends through said motor from front to rear, and on the front portion thereof there is firmly fixed a cam-wheel, B. The disk R extends from the shaft S to the inner side of the cylinder O, and the sides thereof fit tightly against the sides of the opening of the inner portion of the annular cylinder, into which it enters, or against the box A, so as to prevent the escape of steam from the cylinder. On the outer edge of said disk a fixed piston-head, or preferably two jaws,  $r r$ , are fastened, and between the said jaws is placed a piston-head, P, which is constructed with springs and rings in the same manner as the ordinary spring piston-head for straight cylinders.

C and D represent two sliding heads or abutments, which are respectively operated backward and forward through and across the cylinder O in a direction parallel to the axis of the shaft S by the connecting-rods  $c$  and  $d$ , to which they are attached. The said connecting-rods are respectively fastened to the guides  $f$  and  $g$  on the wheel B, slide backward and forward in the slides  $c' c^2$  and  $d' d^2$  as the said wheel revolves. Each of said abutments C and D is provided with a circular opening of the same size as the inner circumference of the cylinder O, and also with two ports,  $a' b'$  and  $a^2 b^2$ , which respectively connect with corresponding ports in the cylinder O, and as each of said abutments is drawn forward it closes the cylinder O and opens the feed valve on one side and the exhaust-valve on the other side of said abutment, and when pressed backward opens the cylinder and closes the said valves, and the movements of said abutments are alternate.

A forward motion of said motor is secured by admitting the steam or other power used through the tubes  $a$ ,  $a'$ , and  $a^2$ , and exhausting the same through the tubes  $b$ ,  $b'$ , and  $b^2$  into the exhaust F, while to reverse the same the power is introduced through the tubes  $b$ ,  $b'$ , and  $b^2$  and exhausted through the tubes  $a$ ,  $a'$ , and  $a^2$  into the said exhaust.

In using the above-described machine for the purpose of measuring water, (in which case it is not necessary to provide for reversing the same,) better results will be obtained by in-

creasing the size of the valves, extending the valves on the abutments C and D almost across the same, and by attaching the feed-pipes to the rear side of the box N and the exhaust-pipes to the front side thereof. The quantity of water passing through the cylinder can be ascertained by attaching an indicator to the shaft S to record its revolutions.

It is also recommended that the valves be increased in size in a water-motor.

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

1. The sliding heads or abutments C D, having openings to correspond with the annular cylinder, and provided with ports  $a' a^2 b' b^2$ , and arranged to move backward and forward through a stationary annular cylinder, O, in a direction parallel to the axis of the shaft S, substantially as above described.

2. The combination of the box A, shaft S, disk R, piston-head, and annular cylinder O with the sliding heads or abutments C D, pro-

vided with openings to correspond with the annular cylinder, and having ports  $a' a^2 b' b^2$ , substantially as above described.

3. The combination of the box A, shaft S, disk R, piston-head, annular cylinder O, and cam-wheel B with the sliding heads or abutments C D, provided with openings to correspond with the annular cylinder, and having ports  $a' a^2 b' b^2$ , substantially as above described.

4. The combination of the box A, shaft S, disk R, piston-head, annular cylinder O, cam-wheel B, tubes  $a a' a^2$  and  $b b' b^2$ , and exhaust-tube F with the sliding heads or abutments C D, provided with openings to correspond with the annular cylinder, and having ports  $a' a^2 b' b^2$ , substantially as above described.

ROBERT H. ISBELL.

Witnesses:

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JAMES A. PATRICK.