

No. 629,119.

Patented July 18, 1899.

W. W. ANDREWS.
ROTARY ENGINE.

(Application filed Mar. 16, 1899.)

(No Model.)

3 Sheets—Sheet 1

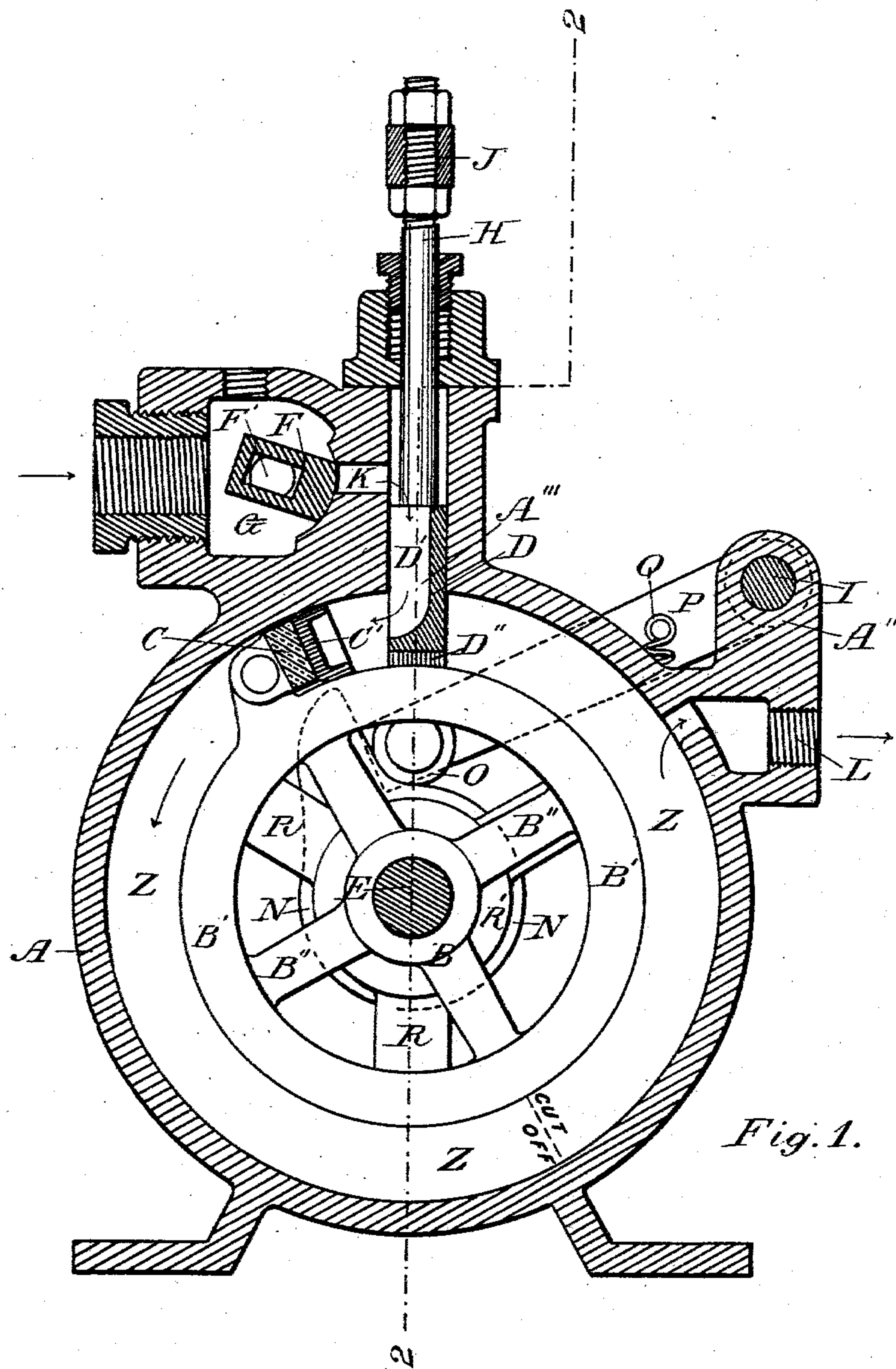


Fig. 1.

WITNESSES.

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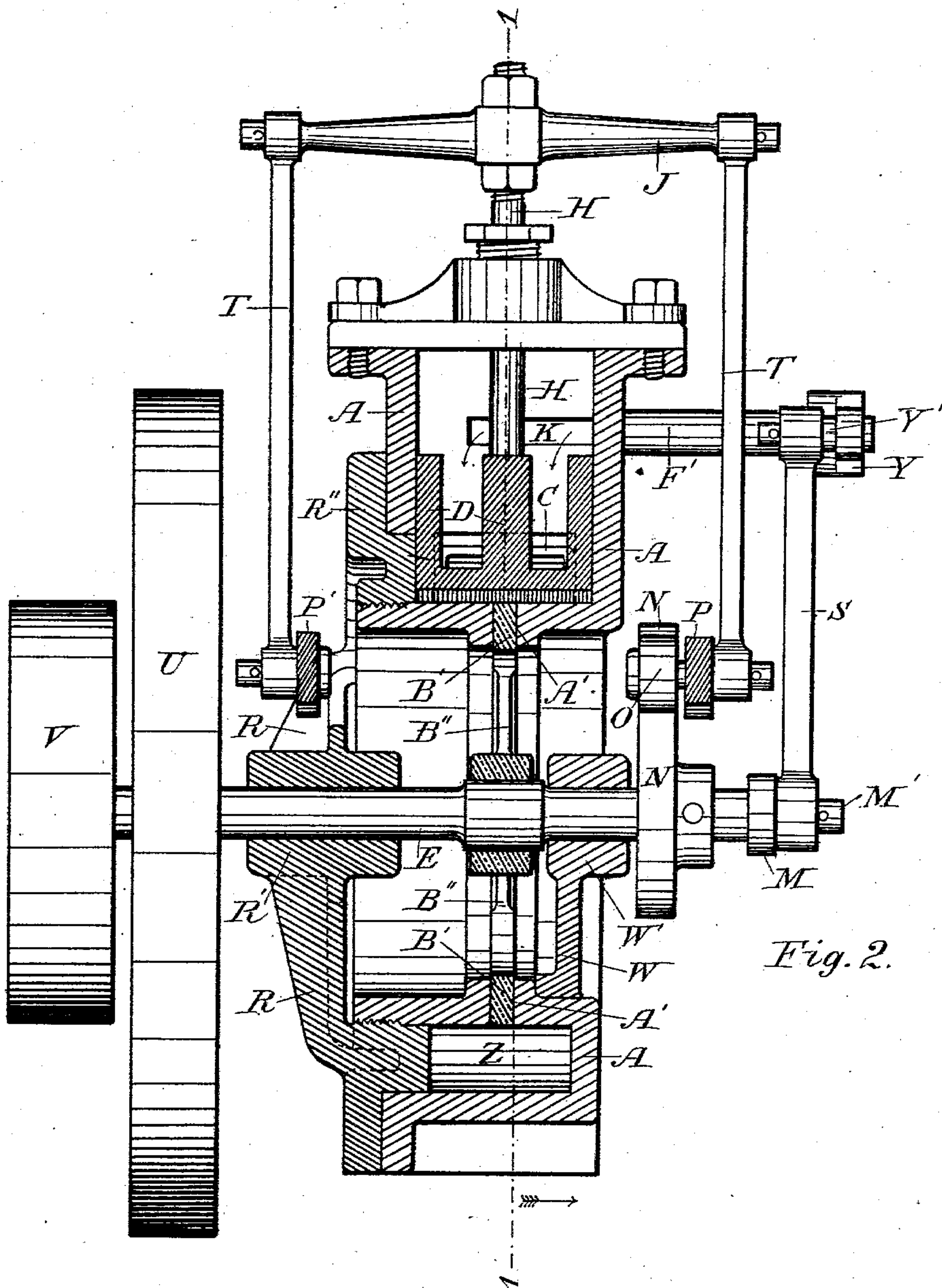


Fig. 2.

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3 Sheets—Sheet 3.

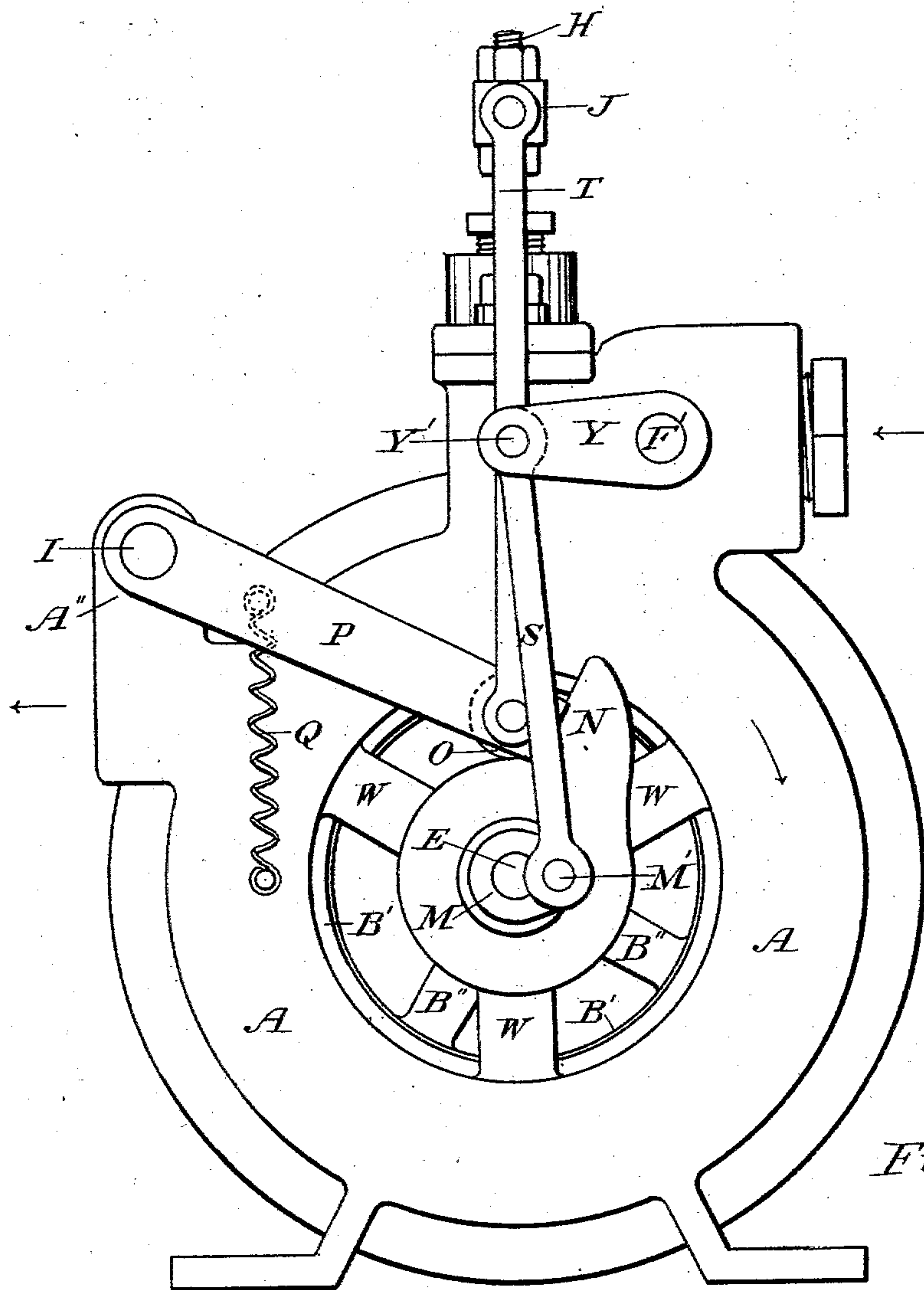


Fig. 3

WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM W. ANDREWS, OF LOS ANGELES, CALIFORNIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 629,119, dated July 18, 1899.

Application filed March 16, 1899. Serial No. 709,350. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ANDREWS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

My invention relates to rotary engines; and its object is to provide an improved engine or motor of this class adapted to be operated by steam, compressed air, water, or any other fluid under pressure, and of greater efficiency and simplicity than those with which I am acquainted.

The invention consists in certain construction and arrangements of parts hereinafter described, and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a central transverse section taken on line 1 1 of Fig. 2 and looking in the direction indicated by the arrow at the bottom of the drawing. Fig. 2 is a section on line 2 2 of Fig. 1, excepting the cam N, roller O, connecting-rods T, the valve-gear M M' S, the pulleys Y Y', and the fly-wheel U, shown in elevation. Fig. 3 is an end view of the end opposite to that where the driving-pulley is mounted, the pulley and the wheel being omitted.

A is the piston-casing, cylindrical in form and surrounding the piston-chamber Z. It has an annular opening A' around the inner perimeter thereof, forming a passage for the reception and working therein of the flat annular rim B' of the piston-wheel B, filling up this opening and tightly fitting therein, so as to render the steam-chamber Z steam-tight and at the same time permit the rim to work therein. It has also steam or air inlet opening A'' and exhaust-opening L. The wheel B has spokes B'' and is keyed to the main shaft E. Mounted on the outer perimeter of the rim B' is the piston C, having packing C'. In the upper part of this chamber is the movable abutment D. This abutment has a vertical movement into and out of the chamber Z at the top thereof. When it is in the position shown in the drawings, it is at its extreme downstroke, in which position it completely closes the piston-chamber at that point and forms an abutment for the steam or air which enters into the piston-

chamber from the steam-chest G through the inlet-port K and the recess D' formed in the abutment, passing around the chamber Z, and out at the exhaust L, moving the piston C around in front of it until the piston has passed the point marked "Cut-off" on Fig. 1, when the valve will cut the steam off, and from this point until the piston passes the exhaust the steam will act expansively. From the exhaust the piston will be carried to the position shown in the drawings by the momentum of the fly-wheel U. After passing this point it will take live steam again. (A description of the mechanism whereby this is accomplished is explained farther on.) This abutment D is mounted on the stem H, which in turn is affixed to the cross-head J. This cross-head is attached to the upper end of the upright connecting-rods T, the lower ends of these rods being journaled on the free ends of the arms P and P'. On the free end of the arm P is rotatively attached the roller O, which roller is kept in contact with the cam N by the spring Q. As the cam N, revolving in the direction indicated by the arrows in Figs. 1 and 3, approaches the abutment D the roller O, being in contact with the cam N, raises the roller O, and with it the free end of the arm P and also of P'. These in turn, by means of the connecting-rods T, raise the cross-head J, and with it the stem H and the abutment D. The raising of this abutment gives a free passage to the piston C under the abutment. As soon as the piston has passed from under the abutment the shape of the cam N allows the roller O, and with it the abutment D, to descend. The rock-shaft I, journaled in projections A'' on the casing A, extends from one end to the other of the device. To one end is keyed the arm P and to the other end the arm P', forming a rigid connection between the arms P and P', whereby P' will move in harmony with P, giving a like vertical reciprocating motion to both the connecting-rods T.

M is a crank keyed on the outer end of the main shaft E, on which is mounted the wrist-pin M'. On this pin is journaled the lower end of the pitman S, the upper end of the pitman being journaled on a wrist-pin Y' of the crank Y, which is keyed to the valve-stem F', and on this stem F' is keyed the valve F,

whereby the rotation of the main shaft will impart to the slide-valve F the necessary oscillating motion to feed the steam or air to and cut it off from the chamber Z, as desired.

5 The valve F being operatively connected with the main shaft E, as shown, will make one complete oscillation with each revolution of the shaft.

The parts being connected in the relative position shown in the drawings, (*i. e.*, more particularly the valve and the piston,) the engine will operate as I have hereinbefore described. The piston will be driven by live steam one-half of its revolution and approximately one-fourth of its revolution by steam expansively and the remainder of the revolution by the momentum, there being but one steam piston-chamber, one piston, one steam-inlet, and one exhaust, thereby greatly simplifying the device while adding materially to its efficiency.

It will be further observed that the recess D' in the abutment D is so shaped as to project the steam into the piston-chamber Z in the direction of and against the piston, giving to the device greater efficiency than when the steam is discharged into the piston-chamber at right angles thereto.

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

A rotary engine comprising the casing A, having steam-chest G having inlet-port K, piston-chamber Z, inlet-opening A''', exhaust

L and annular opening A', the piston-wheel 35 B having annular rim B', the piston C mounted on the rim B', the rock-shaft I journaled in the projections A'' on the casing A, arms P and P' keyed to the rock-shaft I, the connecting-rods T movably mounted on the lower 40 ends of the arms P and the upper ends movably mounted on the cross-head J; the cross-head J removably affixed to the upper end of the abutment-stem H, the stem H connecting the cross-head with the abutment D, the movable abutment D having a vertical movement 45 in the inlet-opening A''' and recessed opening D'; the cam N keyed to the main shaft E, the roller O rotatively mounted at the lower end of the connecting-rod T; the spiral spring Q 50 arranged to exert a downward pressure on arm P; the crank M having wrist-pin M' for engaging the lower end of the pitman S; the pitman S pivoted at its upper end on the crank-pin Y'; the crank Y keyed to the stem 55 F', the valve-stem F' to which is keyed the valve F; the slide-valve F mounted on the stem F' in the steam-chest G and adapted to open and close the inlet-port K, substantially as shown and described. 60

In witness that I claim the foregoing I have hereunto subscribed my name this 8th day of March, 1899, at Los Angeles, California.

WILLIAM W. ANDREWS.

Witnesses:

HENRY T. HAZARD,
M. MCGINNIS.