

No. 750,169.

PATENTED JAN. 19, 1904.

W. I. COOLEY.  
ROTARY ENGINE.

APPLICATION FILED JUNE 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

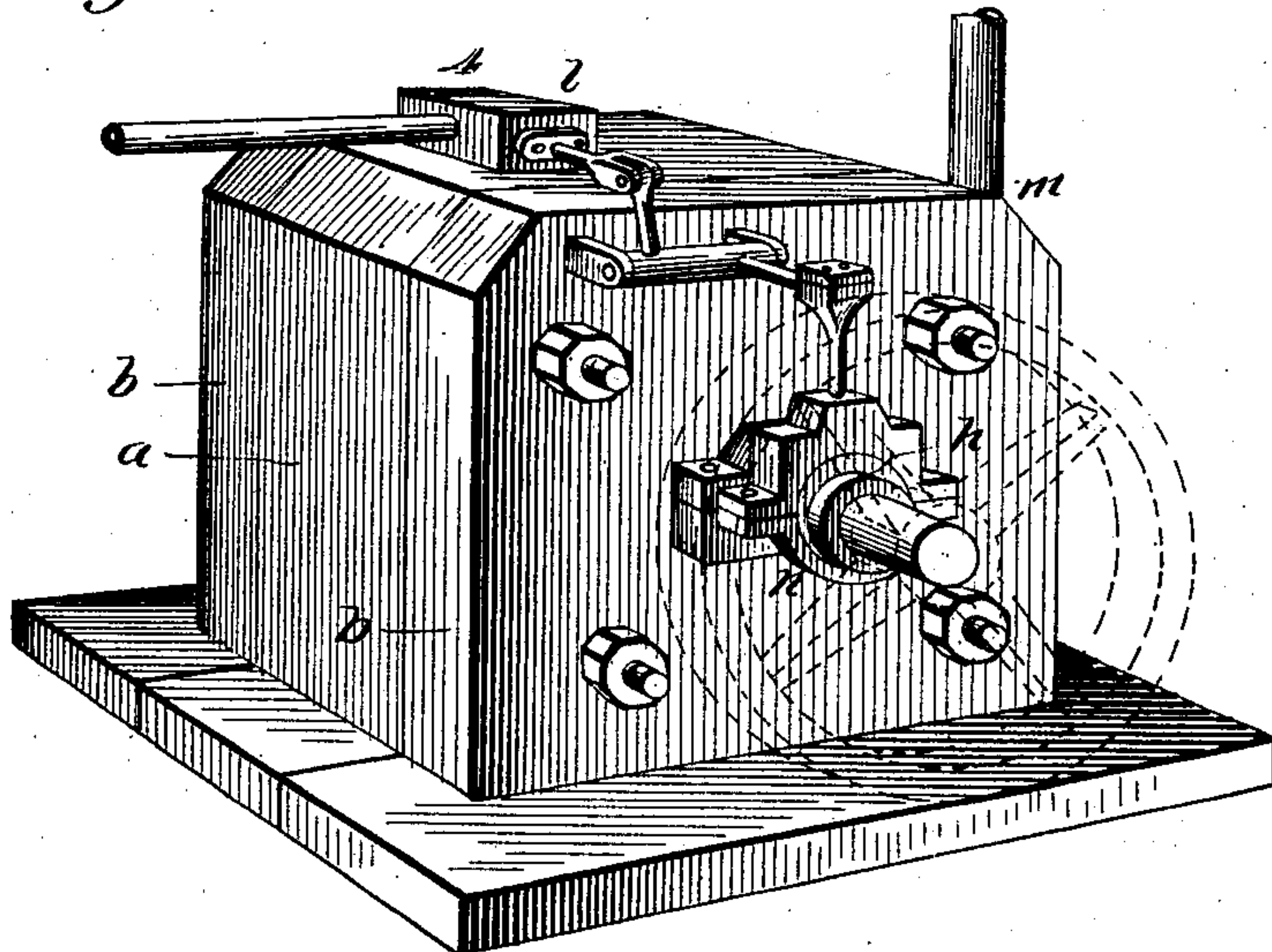
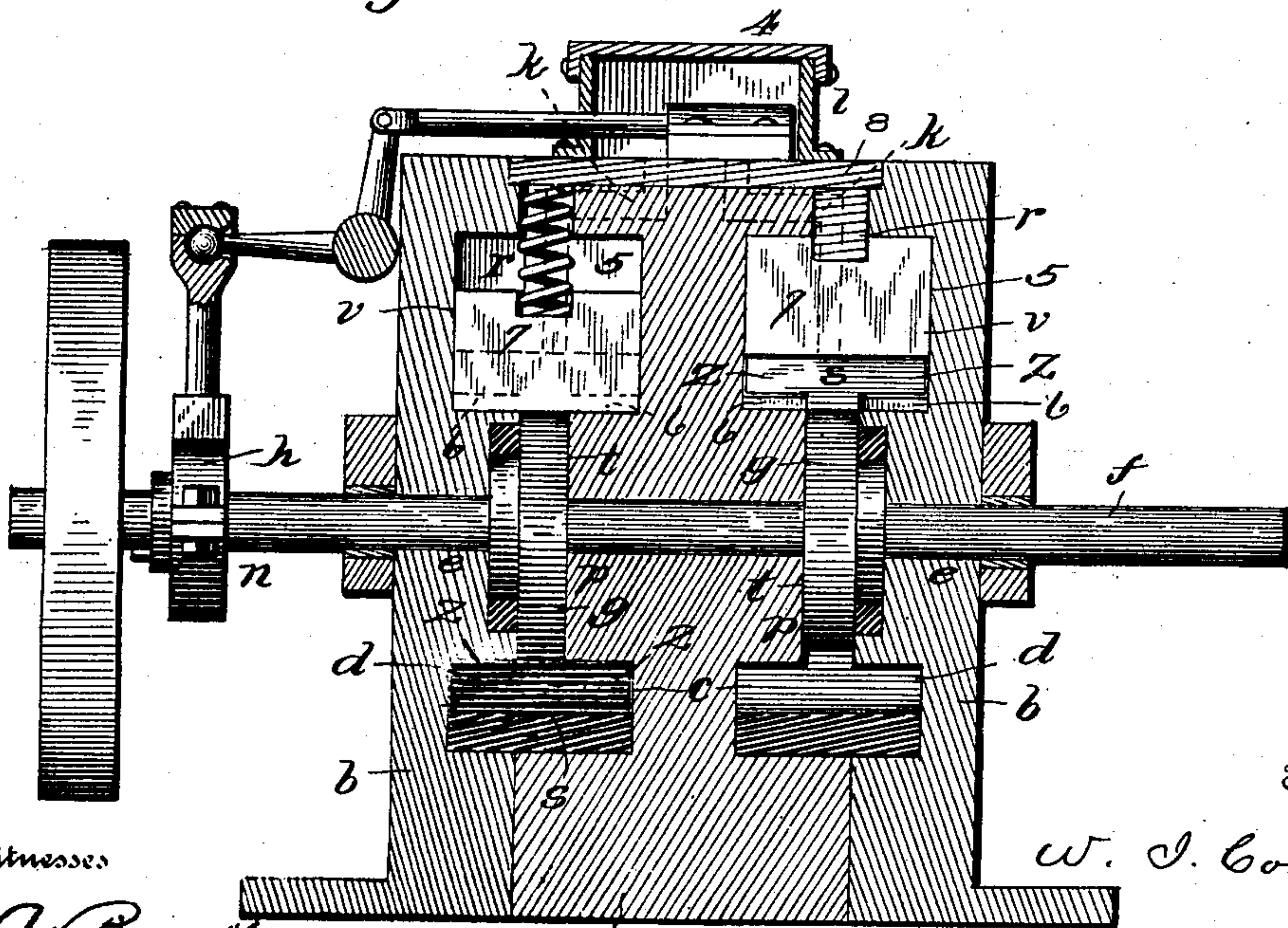


Fig. 2.



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Witnesses

R. A. Boswell.

A. G. Hedney

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2 SHEETS—SHEET 2.

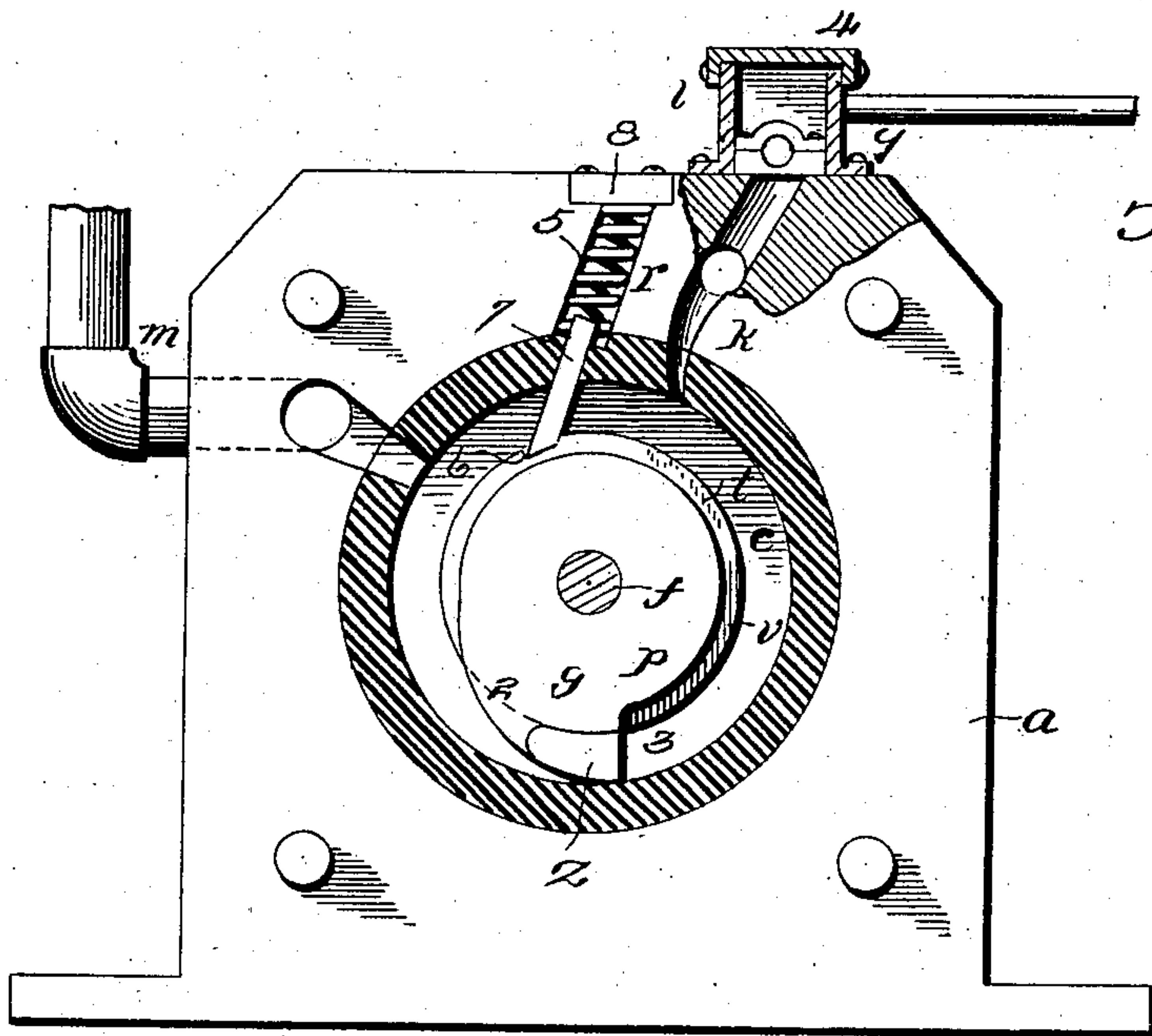


Fig. 3.

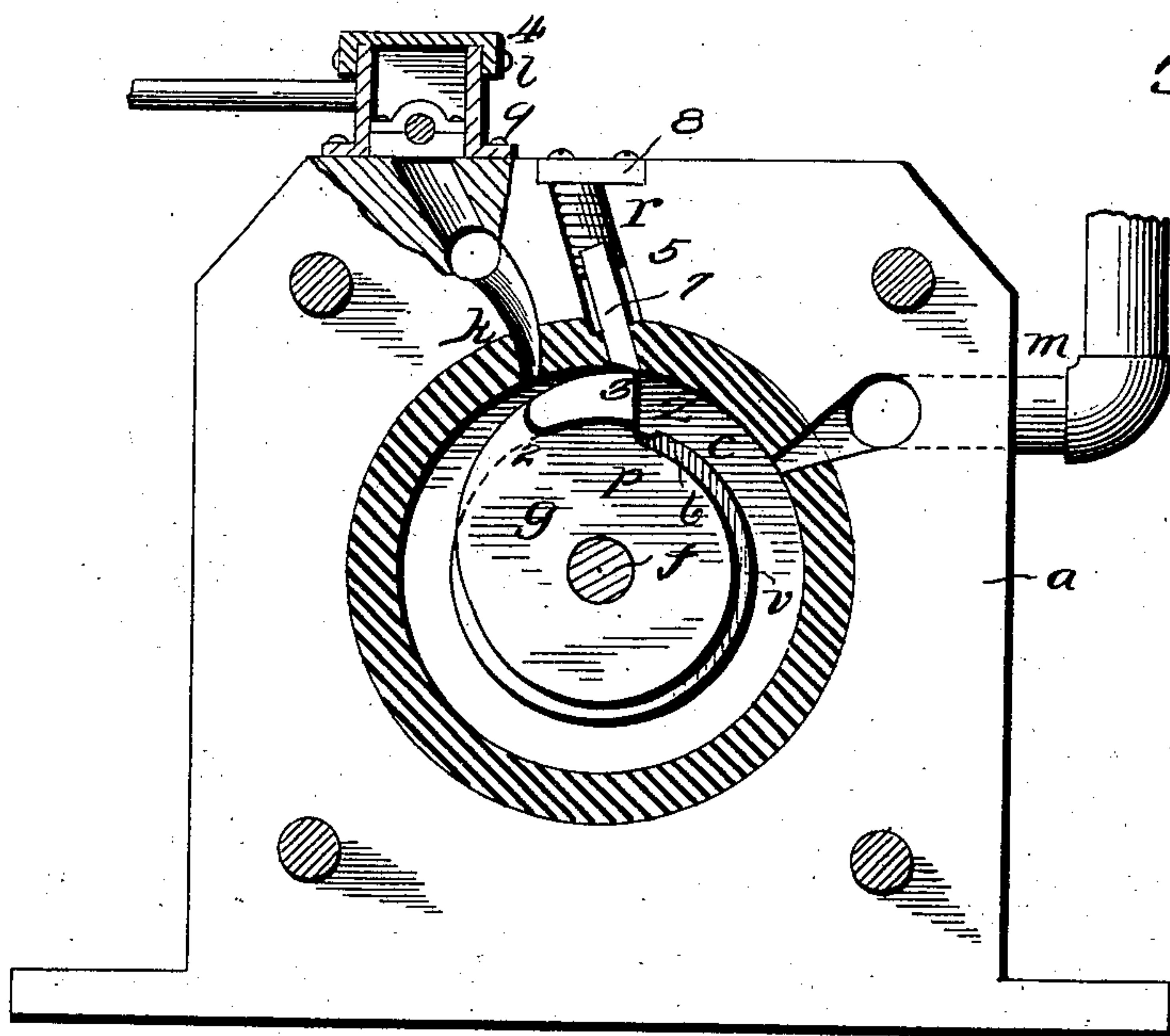


Fig. 4.

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## UNITED STATES PATENT OFFICE.

WILLIAM I. COOLEY, OF SALTVILLE, VIRGINIA.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 750,169, dated January 19, 1904.

Application filed June 19, 1903. Serial No. 162,260. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM I. COOLEY, a citizen of the United States, and a resident of Saltville, in the county of Smyth and State of Virginia, have made a certain new and useful  
 5 Invention in Rotary Engines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make  
 10 and use the invention, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view illustrating  
 15 the invention. Fig. 2 is a transverse vertical sectional view. Fig. 3 is a vertical sectional view showing the cut-off slide of one side in depressed position. Fig. 4 is a vertical sectional view showing the cut-off slide of the  
 20 opposite side in raised position.

The invention has relation to duplex compensating rotary engines; and it consists in the novel construction and combinations of parts, as hereinafter set forth.

25 In the accompanying drawings, illustrating the invention, the casing is shown in three parts—the middle or body portion *a* and the two heads *b b*. The middle portion *a* is provided on each side with a large annular groove  
 30 or channel *c*, which forms the inner portion of the piston-chamber for this side, the outer portion of this chamber being formed by a corresponding annular groove or channel *d* in the cylinder-head, which is bolted to the mid-  
 35 dle portion. The shaft-bearings in the cylinder-heads are indicated at *e*, and *f* is the shaft which carries the pistons *g* and the valve-operating eccentric *h*. The steam-port of the piston-chamber is indicated at *k*. It leads  
 40 from the valve-chamber *l* and is designed to be formed mainly in the middle portion *a* of the casing. The exhaust-port of the piston-chamber is indicated at *m*. The inner wall of the large annular channel *c* of the middle  
 45 portion of the casing is rabbeted at *v* to provide an abutment or bearing-face *t*, which lies in a plane parallel to but more toward the central vertical plane of the middle portion of the casing than the face of this por-  
 50 tion. This abutment is therefore depressed

or set back sufficiently to receive the piston-head *p* in such wise that the outer face of this piston-head is flush with the face of the middle portion of the casing and works against the inner face of the adjacent cylinder-head. 55  
 This piston-head is not of great thickness, but may be of sufficient diameter to give a powerful leverage to the piston-flange *s*, which has two lateral extensions or branches *z*, which project into the deep channels *c* of the mid- 60  
 dle portion of the casing and *d* of the cylinder-head. In front and rear, however, the contour of these lateral extensions is similar to that of the middle portion of this piston-  
 65 flange. The forward face, therefore, of the piston-flange is shelving or of cam character, gradually extending backward and outward from the marginal portion of the piston-head in spiral form, as indicated at 2. The rear  
 70 face of the piston-flange is abrupt, as indicated at 3.

Through the top portions of the casing-sections *a* and *b*, near the valve-chest 4, is formed on each side leading into the respective piston-chamber of that side an oblique or inclined 75  
 slot 5, and in the concentric abutment portions of these parts of the casing or convex superficies of the abutments *t* is formed a reception notch or groove 6. The slot and  
 80 groove or notch is made partly in the middle portion of the casing and partly in the cylinder-head, as shown. Located in the slot in such wise as to have movement across the circular chamber formed by the channels *c* and  
 85 *d* is a plane slide 7, which rests on the piston head and flange during the rotation thereof. The slots of these cut-off slides 7 open at  
 90 the top of the casing and are provided with a cover-piece 8, which may be removed when desirable for inspection or other purpose. Each cut-off slide has its lower edge beveled  
 95 to correspond with the slope of the piston-flange, and said lower edge when the slide moves across the piston-channel enters the notch or groove 6, thereby enhancing the security of the cut-off. Suitable packing-rings  
 100 are designed to be applied in the usual man-



ner around the steamway or piston-chamber, and the piston-head should also be supplied with proper packing to prevent the escape of steam past the piston-flange.

5 The valve-chest extends across the top of the middle portion *a* of the casing and is provided with steam-ports extending downward from its chamber and respectively in communication with the lateral piston-chambers.  
 10 The valve 9 is designed to move in a reciprocatory manner in this chamber, first closing the port of one piston-chamber and opening that of the other and then returning, closing the port of the last and opening that of the  
 15 first piston-chamber. This alternate action of the valve is designed to let steam into the piston-chambers alternately or in a compensating manner, the piston-flange of one piston having its position relatively opposite that of  
 20 the piston-flange of the other piston. When, therefore, one piston-flange is near the end of its stroke and approaching the cut-off slide of its chamber, the other piston-flange is at the opposite point in its chamber and is under the  
 25 comparatively strong power of steam expansion.

The reciprocating motion of the valve is designed to be effected by means of an eccentric *n*, which is located on the shaft outside the  
 30 casing, its strap being connected to an angle-lever device *q*, which is connected to the valve-rod.

The engine may be constructed to be re-

versible by flattening the opposite flange-heads and adding an extra back-stop.

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

1. In a rotary engine, the combination of the cylinder having the annular channels, the inclined slots, and the central abutments provided with notches in their convex surfaces, the opposite laterally-extended cam-piston flanges of the piston-head, the shaft, the inclined cut-off slides in said slots and engaging  
 45 said notches, the springs for said slides, the reciprocating valve, and the eccentric on said shaft connected with said valve, substantially as specified.

2. In a rotary engine, the combination with  
 50 the annularly-channeled middle portion of the casing, and the annularly-channeled cylinder-heads, of the central abutments of the piston-chambers, the opposite laterally-extended piston-flanges of the piston-heads, the shaft, the  
 55 slots of the casing, the inclined cut-off slides, their springs, the reciprocating valve, and its connections, and the eccentric on the shaft, substantially as specified.

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

W. I. COOLEY.

Witnesses:

J. T. BENNETT,  
 JAS. LAPLEY.