

(No Model.)

J. B. RHODES.  
ROTARY ENGINE.

No. 414,255.

Patented Nov. 5, 1889.

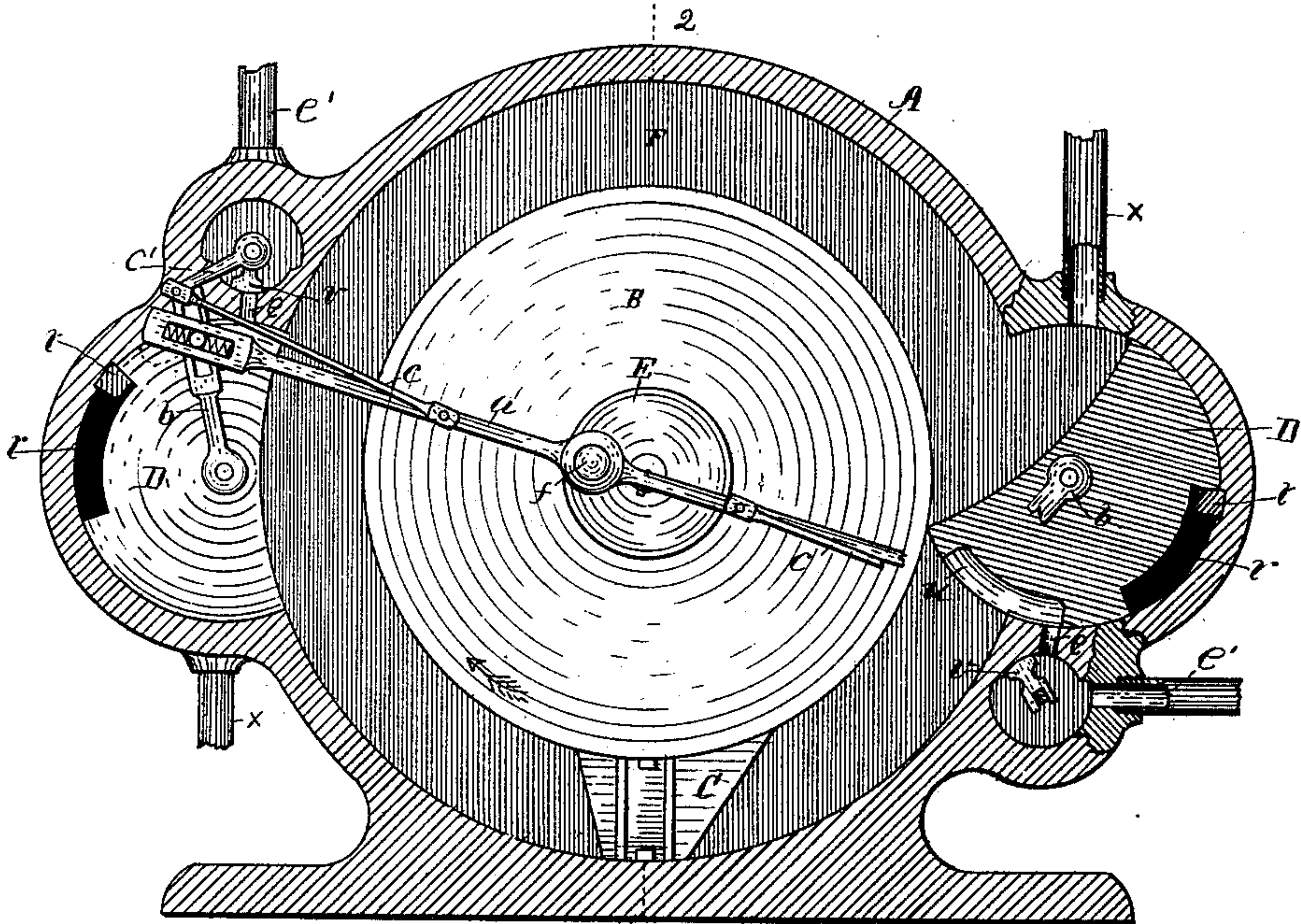


Fig. 1

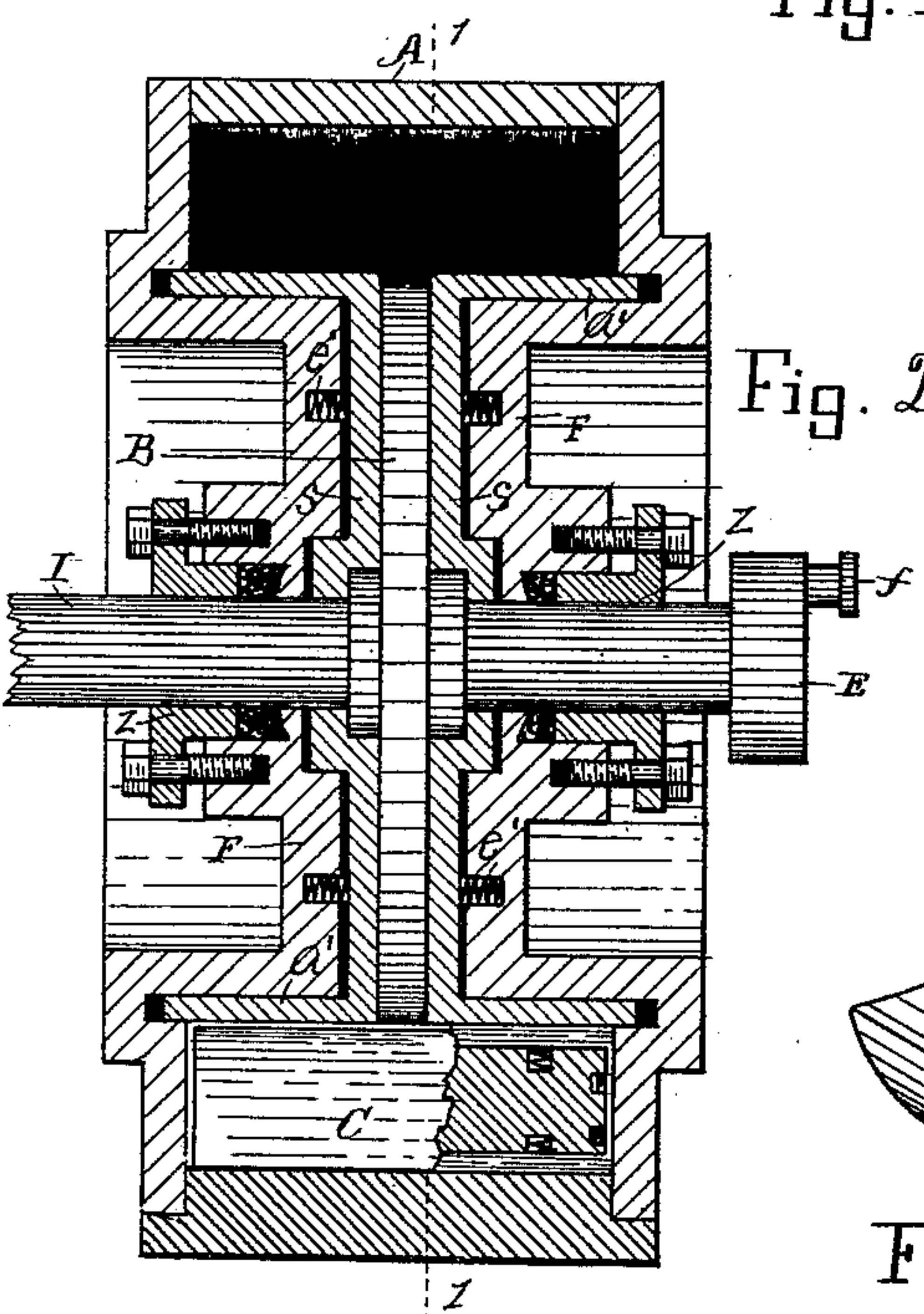


Fig. 2.

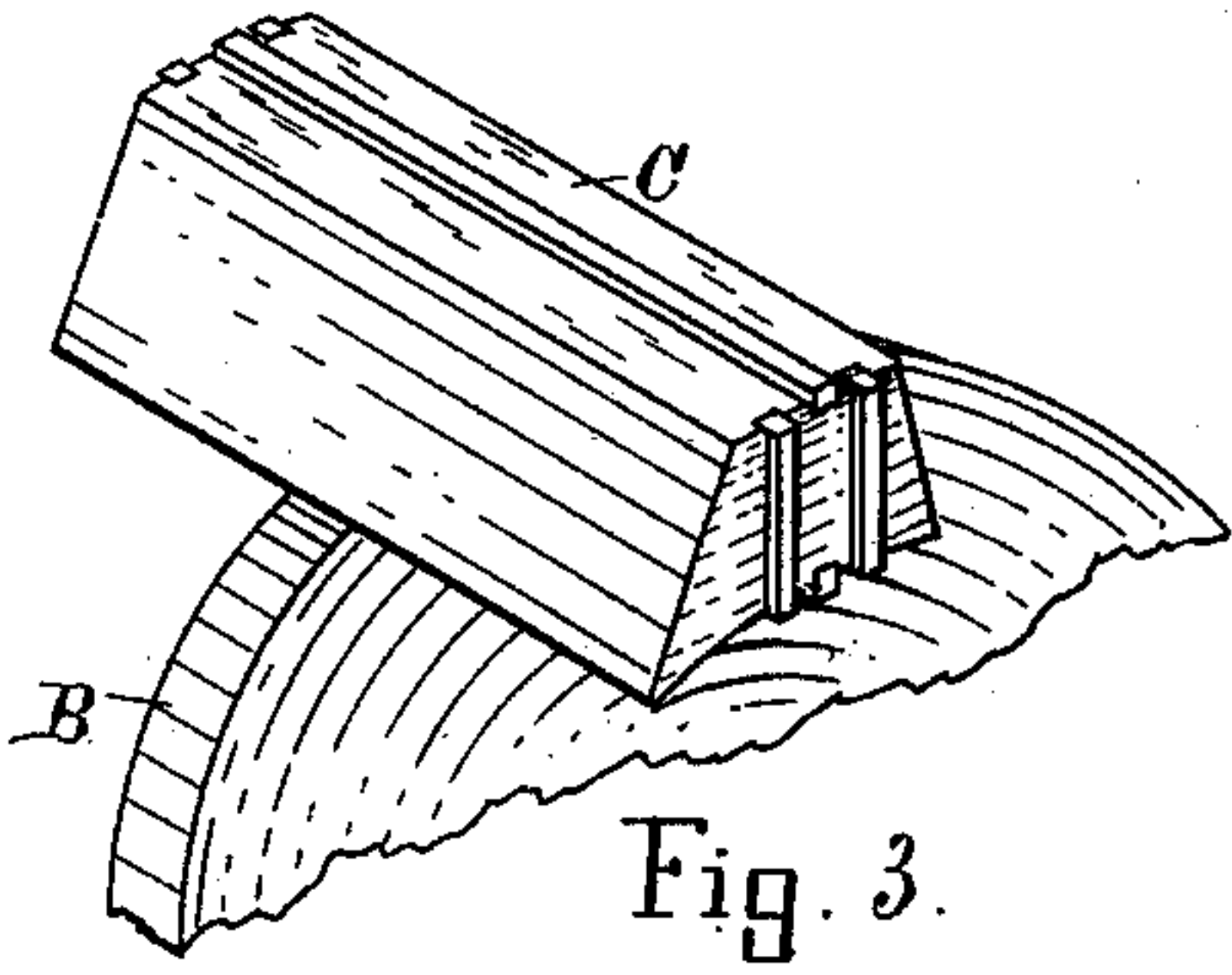


Fig. 3.

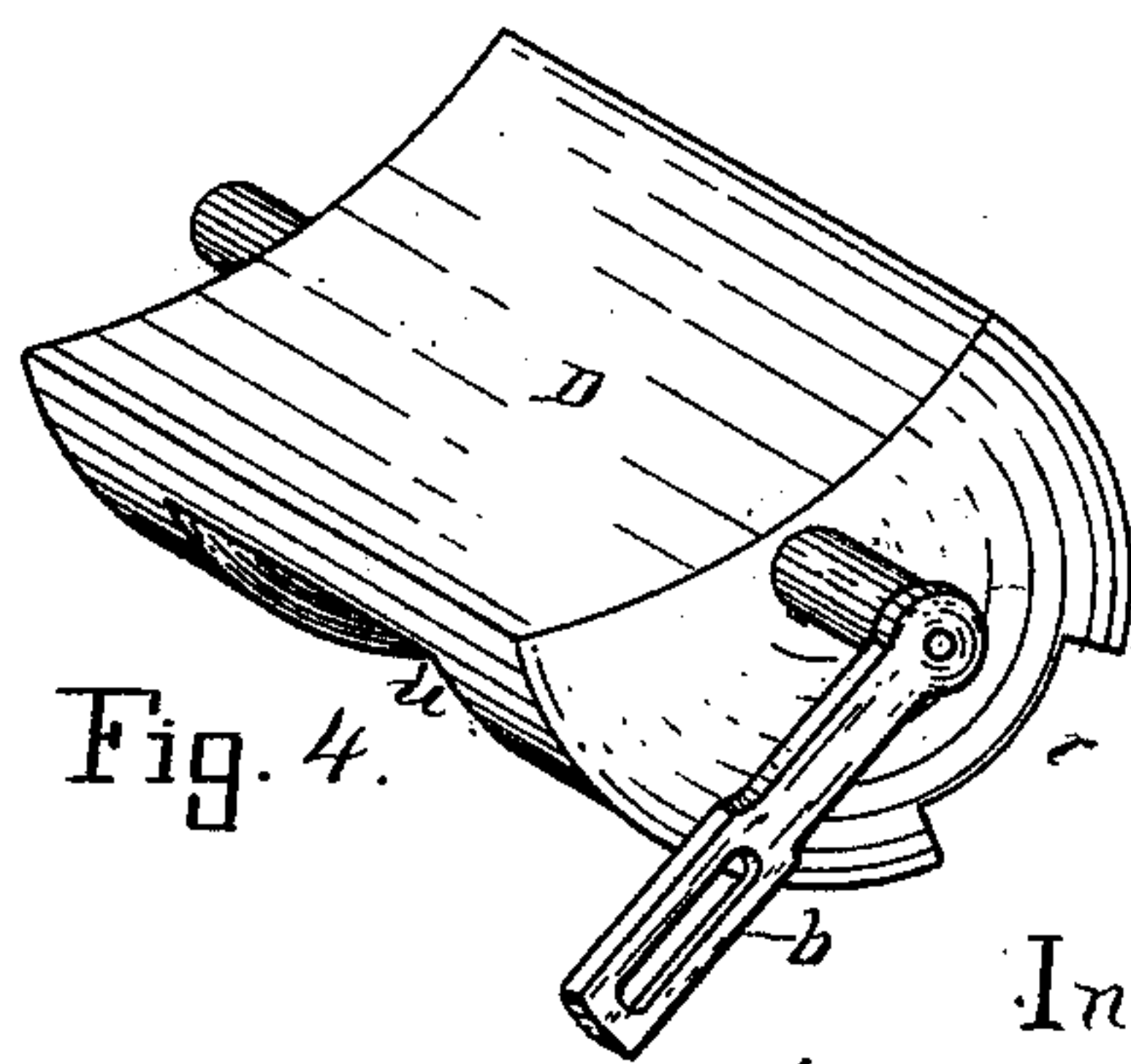


Fig. 4.

Witnesses:  
John C. Perkins  
Charles S. Wood.

Inventor:  
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# UNITED STATES PATENT OFFICE.

JAY BYRON RHODES, OF KALAMAZOO, MICHIGAN, ASSIGNOR OF ONE-HALF  
TO EDWARD BISTER DAY, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 414,255, dated November 5, 1889.

Application filed January 5, 1889. Serial No. 295,517. (No model.)

*To all whom it may concern:*

Be it known that I, JAY BYRON RHODES, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to engines in which a piston-head is employed which rotates in a circular cylinder, and in which oscillating steam-abutments are employed.

The invention consists in improved features of construction and in the novel combination of parts below described, and pointed out in the claims.

The prominent points of utility designed to be attained are economy and simplicity in construction, saving of steam, decrease in friction, and increase of power.

In the drawings forming a part of this specification, Figure 1 is a sectional elevation on line 1 1 in Fig. 2; Fig. 2, a section on line 2 2 in Fig. 1; and Figs. 3 and 4 are enlarged perspective views of lettered details below described.

Referring to the lettered parts of the drawings, A is the cylinder, having a circular space beneath its peripheral wall, in which space the piston-head C rotates. This piston-head is attached to a disk B and fills the space in which it rotates. The disk B is mounted upon the shaft I. Shaft I has bearings in the stuffing-boxes *z z*, said boxes being attached to the side walls F F of the cylinder, Fig. 2. There is a space between the side walls F F, which communicates with the space in which the piston-head rotates. The diameter of the disk B corresponds with the diameter of the space it occupies. To prevent the steam entering the space between the side walls F F, I employ a packing-plate in said space on each side of the disk B, as at S S in Fig. 2, said plates being flanged outward at their outer edge, as at *a' a'*, so as to form an inner wall to the circular space in which the piston-head C rotates. These plates S S may as well be termed "supplemental side walls to the cylinder." They are held closely, but still loosely, against the sides of the disk B by springs *e' e'*, so that the steam cannot pass between them and the

sides of said disk. The object of the springs *e' e'* is to make the supplemental walls S S self-adjustable, so that the wear of said walls and the disk B will not eventually cause an undue space to exist between said parts S and B. In cases where the springs *e'* are not employed it will be necessary to occasionally adjust the walls S nearer to the disk B.

On opposite sides of the cylinder A, Fig. 1, are chambers, the interior of the walls of which represent a part of a circle, and these chambers communicate with the space in the cylinder. These side chambers contain the steam-abutments D, which fill said chambers and are adapted to be oscillated therein by means of the crank-levers *b* and the connecting-rod *a*, each end of which rod is pivotally attached to the slotted end of the levers *b*, as shown at the left of Fig. 1. The same parts broken away at the right side of Fig. 1 are a duplicate of said parts shown at the left side of said figure. The steam-abutments are somewhat in the form of a crescent in end view. They are concaved on one side, conforming to the course of the outer boundary of the space in which the piston-head rotates, as clearly shown at left of Fig. 1. The steam-abutments D have a recess *u* in the convex portion, which recess *u* registers with the induction-ports *e*, and when steam is entering the space in the cylinder the recess *u* also registers with said space, as at right in Fig. 1. In this position the steam-abutment prevents the steam from going upward; hence it presses against the right side of the piston-head C, causing it to rotate in the direction of the arrow. When in this position, the steam-abutment has uncovered the exhaust-port *x* and the steam in front of the piston-head exhausts out of said port.

At *v* is a valve, which at the right side of Fig. 1 has uncovered the induction-port *e*, which leads from the valve-chamber into the recess *u* of the cut-off. The pipes *e'* convey steam into the valve-chamber. The steam-abutments also have a recess *r*, each shouldered side of which alternately contacts with the stops *t* to limit the oscillation of the steam-abutment D. The valves *v* are operated by a rod *c*, which is pivotally attached at one end to the connecting-rod *a* and at the other end



to the end of the crank-lever  $c'$ , which crank-lever is attached to the valve. These described valves, rods, steam-abutments, stops, &c., are of course alike on both sides of the cylinder.

It should have been stated that the connecting-rod  $a$  is centrally pivoted to the wrist-pin  $f$  of the crank-disk  $E$ , which latter is attached to the end of the shaft  $I$ , Fig. 2.

Referring to the left side of Fig. 1, all the ports are closed and the concave surface of the steam-abutment  $D$  registers with the interior plane of the outer wall of the cylinder  $A$ , so that the piston-head will pass by on its way around in its space. The steam abutment and valves will remain in the respective positions here shown until they are reversed by the rods  $a$   $c$ , which action will take place when the piston-head has traversed half the distance of its space from the point it occupies in Fig. 1.

Having thus described my invention, what I claim as new is—

1. In a rotary engine of the class described, the combination of the cylinder and piston, said cylinder having the side chambers communicating therewith, an induction and an eduction port leading into each of said chambers, and the steam-abutments having the recess in their convex surface registering with the induction-ports and arranged to oscillate in said chambers and to open and close the eduction-ports, substantially as set forth.

2. The combination of the cylinder having the side chambers communicating therewith, an induction and an eduction port leading

into each of said chambers, the steam-abutments arranged to oscillate in said chambers and to open and close the eduction-ports, the center shaft, the disk thereon, the piston, and the supplemental disk-like walls between the disk and the outer side walls of the cylinder and having the angled peripheral flanges and covering the hub of the disk closely around the axle, substantially as set forth.

3. In a rotary engine, the cylinder, the disk bearing the piston, the supplemental walls each side of the disk and having the laterally-turned peripheral flanges, the springs between the outer side walls and the supplemental walls, and the steam abutments and valves, all combined substantially as set forth.

4. In a rotary engine, the cylinder, the piston, said cylinder having the side chambers with exhaust-ports leading into them, the valve-chambers having the induction-ports leading from them into the chambers, valves therein, the steam-abutments in the chambers, a connecting-rod attached to the wrist-pin of the crank-shaft and to the cranks at the ends of the steam-abutments, and rods attached to the cranks of the valves and to the connecting-rod, all combined substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in presence of two witnesses.

JAY BYRON RHODES.

Witnesses:

J. H. BECK,

W. R. FARLEY.