

(No Model.)

J. J. CLARK.
ROTARY ENGINE.

No. 423,986.

Patented Mar. 25, 1890.

Fig. 1.

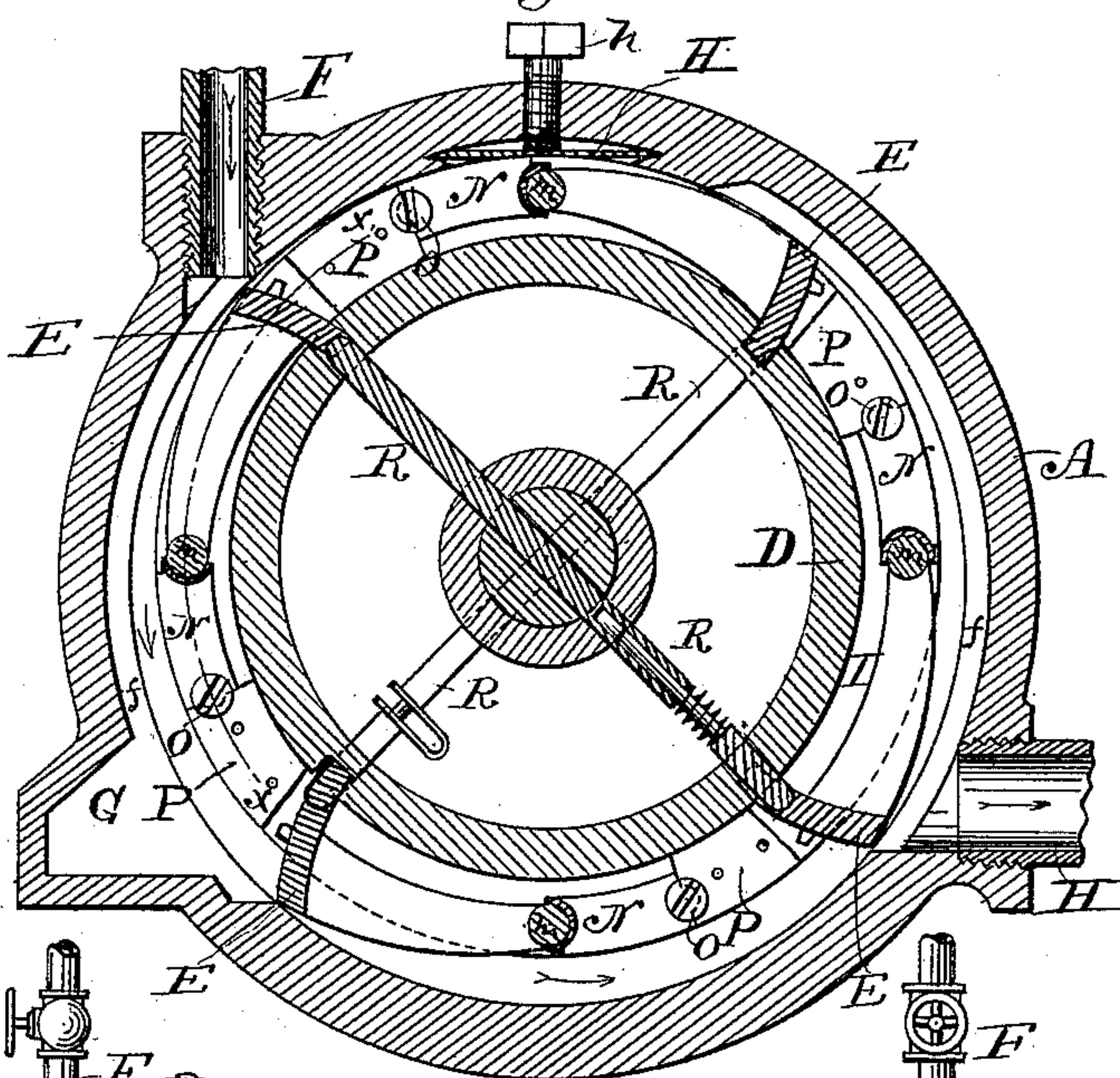


Fig. 3.

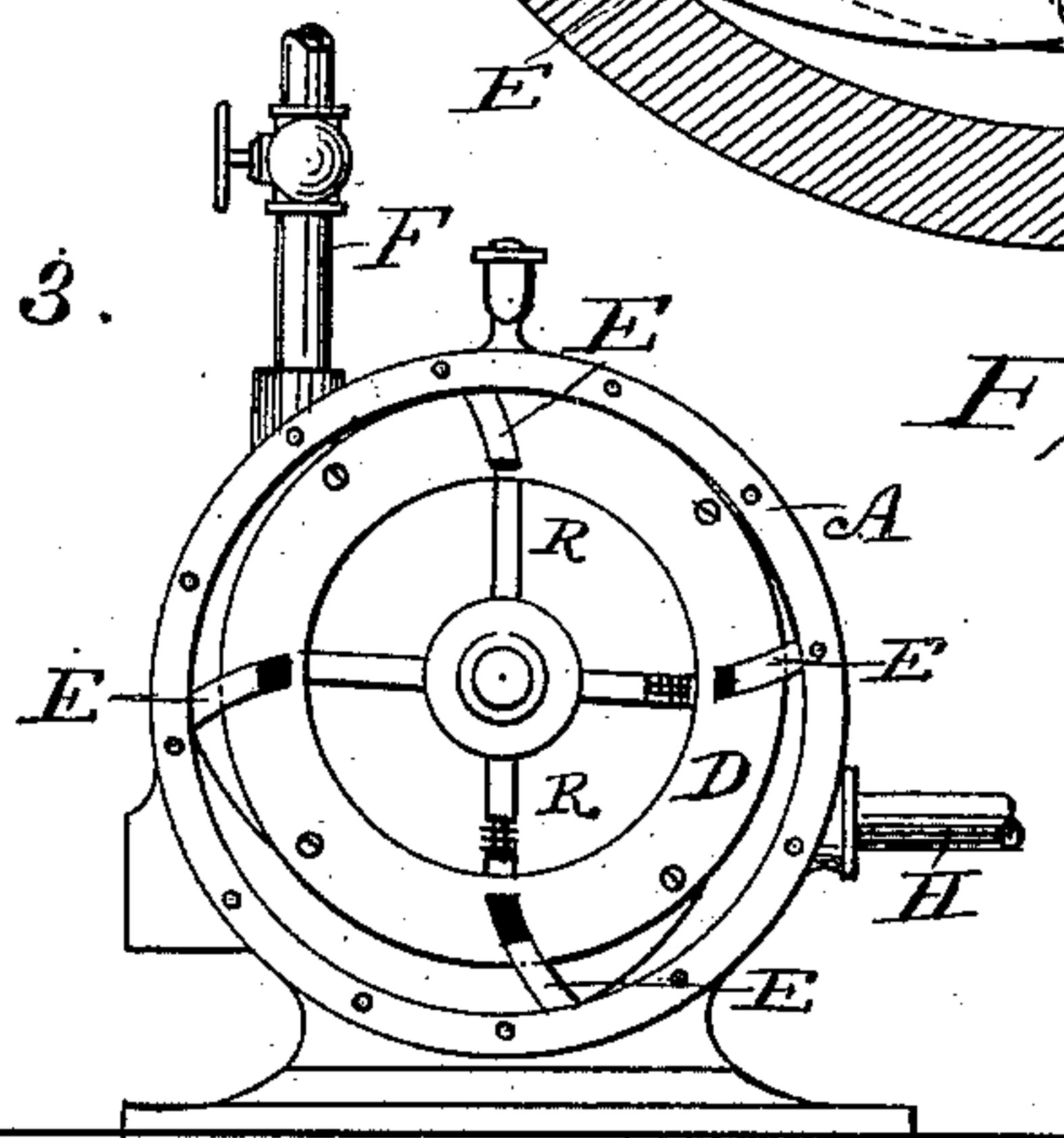


Fig. 5.

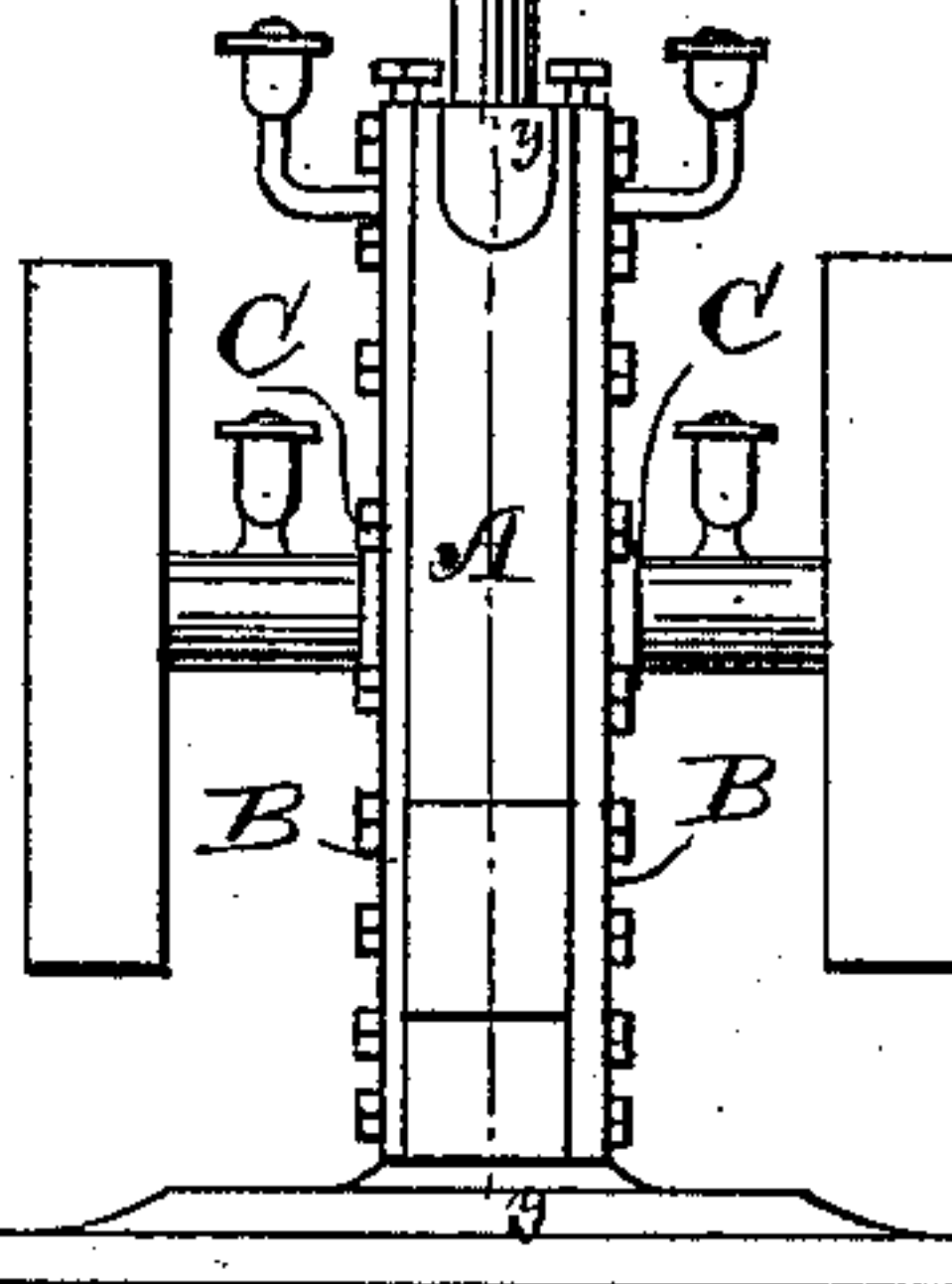


Fig. 2.

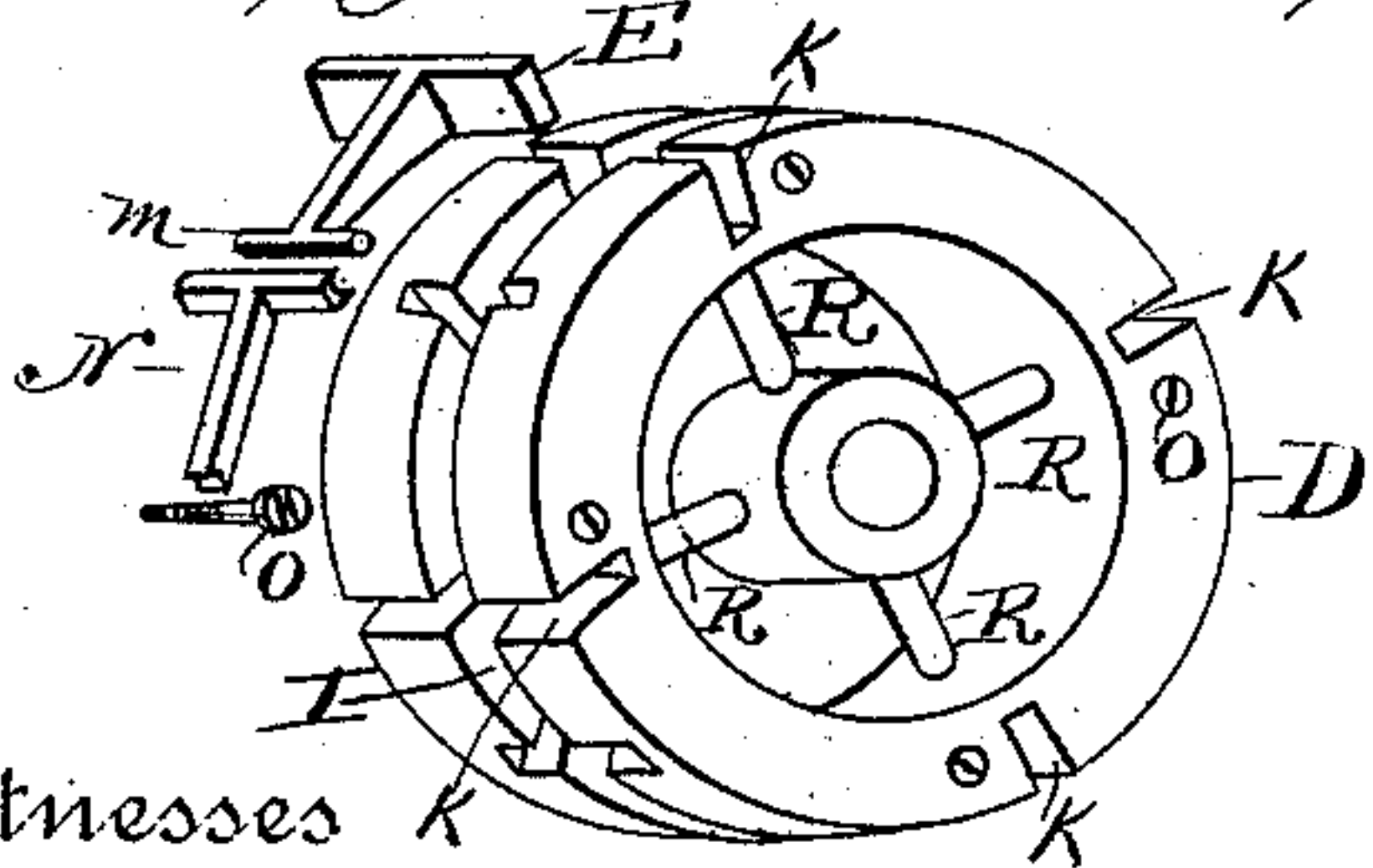
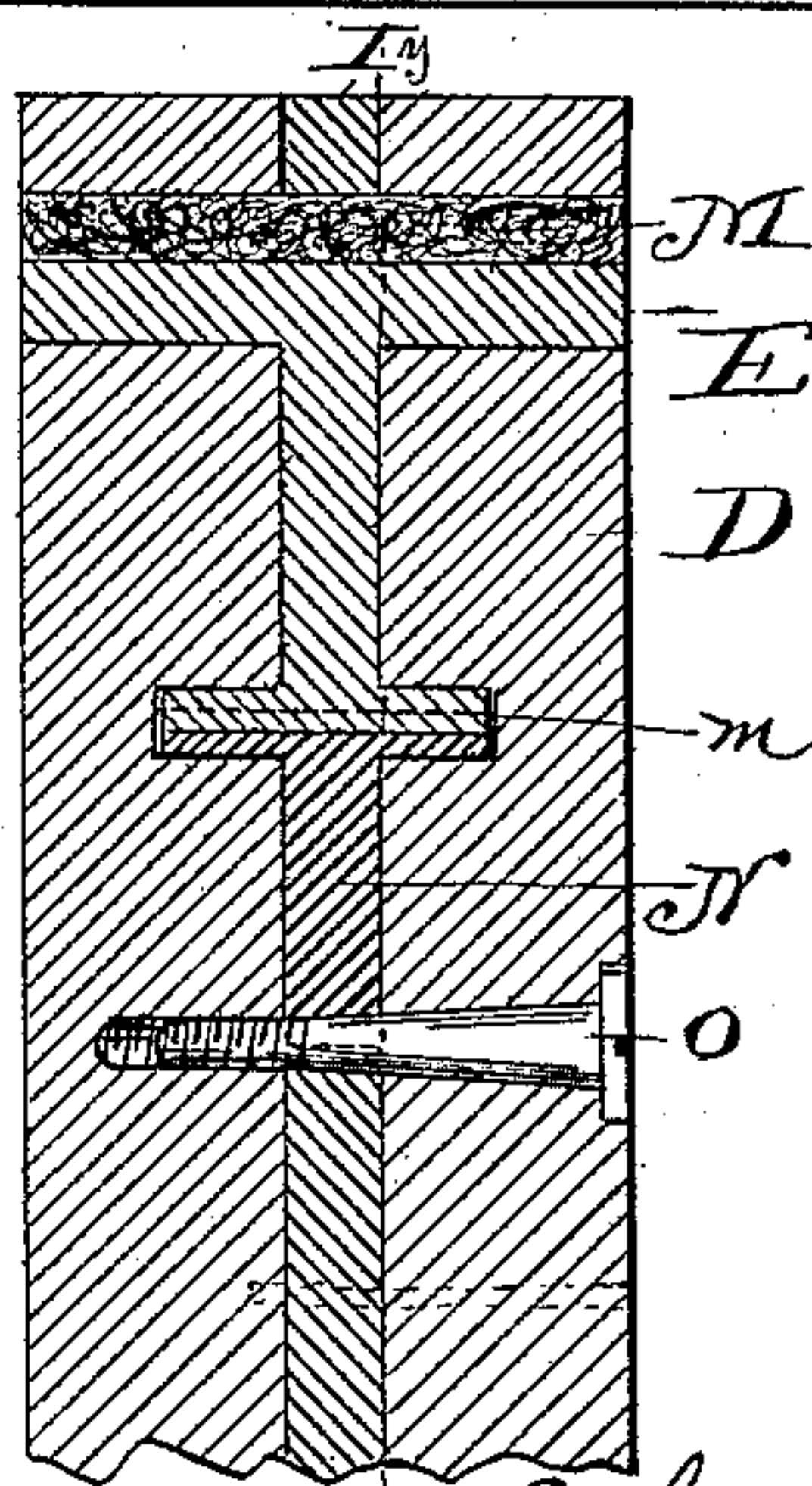


Fig. 4.



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JOHN J. CLARK, OF ELGIN, ILLINOIS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 423,986, dated March 25, 1890.

Application filed July 15, 1889. Serial No. 317,524. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CLARK, of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful
5 Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to
10 the letters of reference marked thereon.

This invention relates to certain improvements in rotary engines of the class known as "eccentric-piston engines," or such as employ
15 movable abutments against which the force of the steam is exerted to rotate the piston, the object of the invention being to produce an exceedingly cheap and highly-efficient engine of neat and compact design, and one in which the wear of the parts can be readily
20 compensated for or the parts renewed at slight cost.

To these ends the invention consists in certain novel details of construction and combinations and arrangements of parts, to be hereinafter described, and pointed out particularly in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a sectional view of an engine embodying my
30 improvements. Fig. 2 is a perspective view of the piston and abutments separated. Fig. 3 is an end view with the head removed. Fig. 4 is a section of the piston on the line $x-x$, Fig. 2. Fig. 5 is an edge view.

35 Similar letters of reference in the several figures indicate the same parts.

The cylinder or casing A is provided on one or both ends with removable heads B, secured in position by suitable bolts, and in each of
40 these heads is formed a bearing for the shaft C, which carries the piston D, said bearings being preferably arranged to one side of the center of the cylinder in order that the perimeter of the piston may run in juxtaposition
45 to the cylinder-walls on one side and leave the proper steam-space on the opposite side.

Mounted on the piston in a manner to be presently described are the movable abutments E, adapted to move out and bridge the
50 steam-space and against which the steam acts to rotate the piston. In order to secure the greatest amount of power with the least fric-

tion or expenditure of fuel and steam, the live steam entering through pipe F passes down around the piston to the steam-chamber G, a
55 groove or channel f being preferably formed in the wall of the cylinder to facilitate the passage of the steam to the chamber. The exhaust is through port H, located at a point about opposite to the inlet-port F; but as this
60 is at a point where the abutments are not entirely withdrawn a groove or channel f' is provided in the cylinder for the escape of steam when the abutments have passed the exhaust-
65 port.

The steam-chamber may be cast integral with the cylinder, if desired, and is of such size as to form an expansion-chamber in which a sufficient quantity of steam accumulates to give practically the full pressure on
70 the abutments throughout the entire stroke from the chamber to the exhaust, which would not be the case were the steam for operating against the rapidly-moving abutment admitted through a small port or ports as
75 ordinarily. Steam entering the port F passes freely down to the chamber, exerting very little force on the abutments, and that only by impact; but it serves to keep the parts thoroughly heated, preventing condensation
80 and consequent decrease in pressure and loss of power.

The passage of steam from the live steam to the exhaust side of the piston at the point opposite the steam-space is prevented by a
85 packing formed by a spring-plate H, the ends of which are dovetailed into the wall of the cylinder, and a screw or screws h , passing through the wall of the cylinder, bear against the center of the plate, thus enabling the
90 center portion to be bent in toward the piston and an exceedingly close joint made, and that, too, without projecting the edges of the plate as they are held in the dovetail recesses in the cylinder.

95 Difficulty has been heretofore experienced in making a piston with sliding abutments which will combine cheapness of manufacture with efficiency and durability, which desiderata will be found embodied in my present construction. A circular piston of the
100 desired size with the hub, &c., and a comparatively thick rim, is first cast or otherwise formed and a groove I turned or planed in

the same throughout the whole circumference, preferably on a center line, as shown, and then cross-grooves K are similarly formed of a depth sufficient and of proper shape to
 5 accommodate the abutments. The piston having been thus formed, the abutments E, which are of substantially T shape, are inserted with the heads in the transverse grooves, and the shanks in the circumferen-
 10 tial groove and secured in position by cross pins or bolts O, inserted from the end of the piston. The portions of the circumferential groove between the abutments are then filled, as by pieces P, held in place by cross-bolts,
 15 and finally to insure the steam-tight fitting of the piston and abutments as well as to secure smooth bearing-points the whole piston is turned and polished down, if desired, in an ordinary lathe, which insures regularity in
 20 the shape.

In the preferred construction of abutment shown in Fig. 4 a transverse base-pin *m* is provided, which seats in a half-bearing in a groove in the piston, and in rear of this base
 25 is placed a T-shaped block N, which holds the same securely in position, being itself held and adjusted to take up any possible wear and keep the abutment seated against the packing by the tapering bolt O, screw-
 30 threaded at the end and provided with a slot, whereby it may be easily set in or out without the necessity of removing the piston. The packing M at the front of the abutments is of any preferred kind, and is inserted, as
 35 shown, in grooves formed in the front wall of the transverse grooves for the abutments. Cross-rods R are provided, passing straight across the piston and engaging opposite abut-
 40 ments for the purpose of moving them out in the ordinary manner, and in order to take up any wear on either or both of the abutments such rods are preferably in two parts, one sliding within the other, with an interposed spring for forcing the sections apart, as shown

clearly in the drawings. The style of spring 45 employed may be varied, of course, two styles being shown—one a flat U-spring and the other a spiral spring.

The whole engine may be mounted on a stand or base and driving-pulleys mounted 50 on the shaft on both sides of the same, as shown in Fig. 5.

The operation of an engine of this character is well understood and need not be herein specifically set forth, and it suffices to say 55 that an engine constructed in accordance with this invention will be found to give the maximum power per pound of steam-pressure, and its extreme simplicity and ease of construction at once recommend it for universal use. 60

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

1. In a rotary steam-engine, the combination, with the cylinder, of the piston having the circumferential groove extending around 65 the same and the transverse grooves, and the abutments pivoted in the circumferential grooves, and having the heads working in the transverse grooves, substantially as described.

2. In a rotary engine, the combination, with 70 the cylinder, of the piston having the circumferential groove extending around the same and the transverse grooves, the abutments having the heads and bottom bars fitting in said grooves, the movable pins below the bot- 75 tom bars, and the wedging-surface for moving the same, whereby the abutments may be adjusted, substantially as described.

3. In a rotary engine, the combination, with the piston having the circumferential and 80 transverse grooves, of the T-shaped abutments fitting in said grooves, and the screw for adjusting the same to take up wear, substantially as described.

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Witnesses:

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