

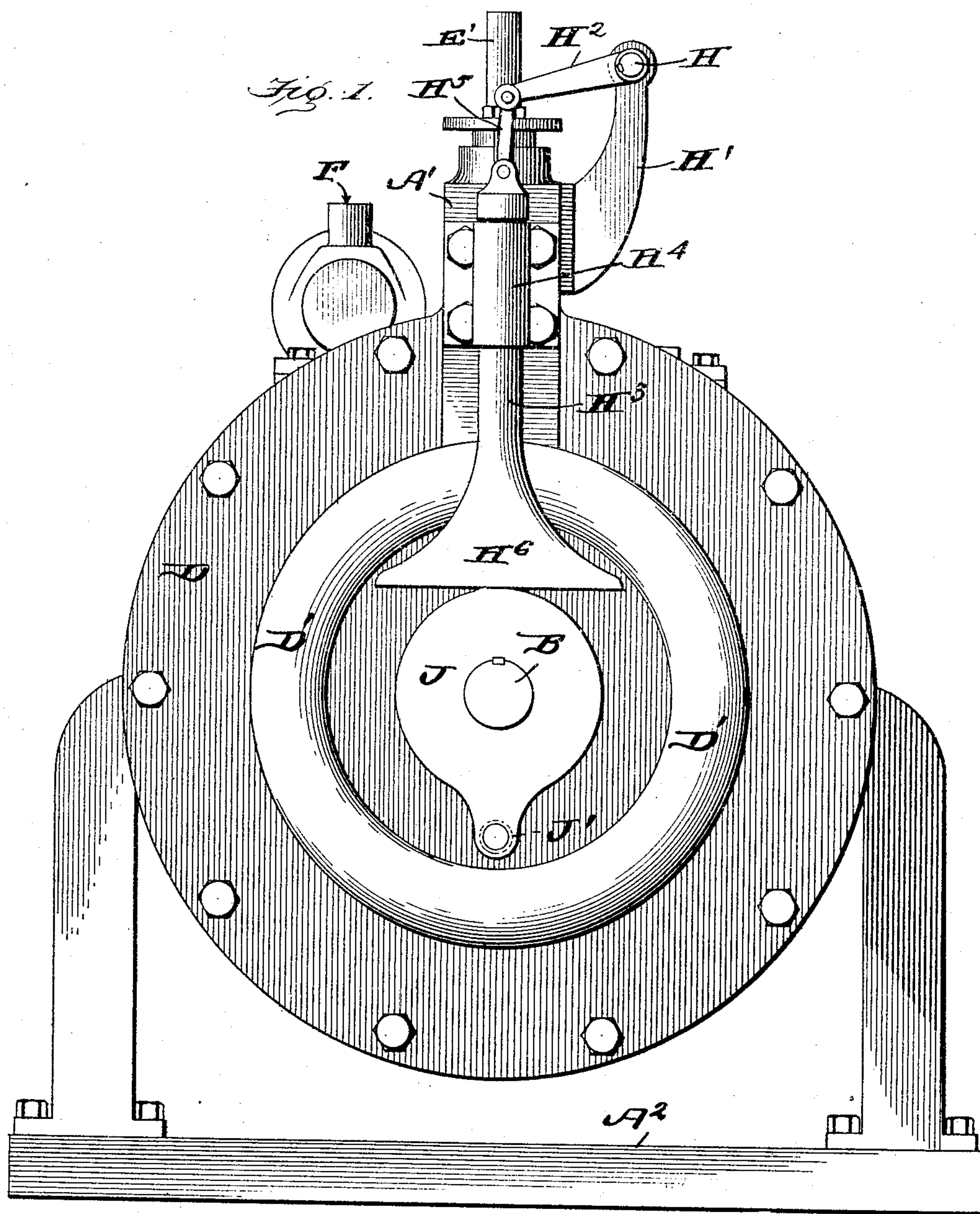
No. 782,802.

PATENTED FEB. 14, 1905.

E. UREN.
ROTARY ENGINE.

APPLICATION FILED MAR. 7, 1904.

3 SHEETS—SHEET 1.



Inventor

Edward Uren.

Witnesses

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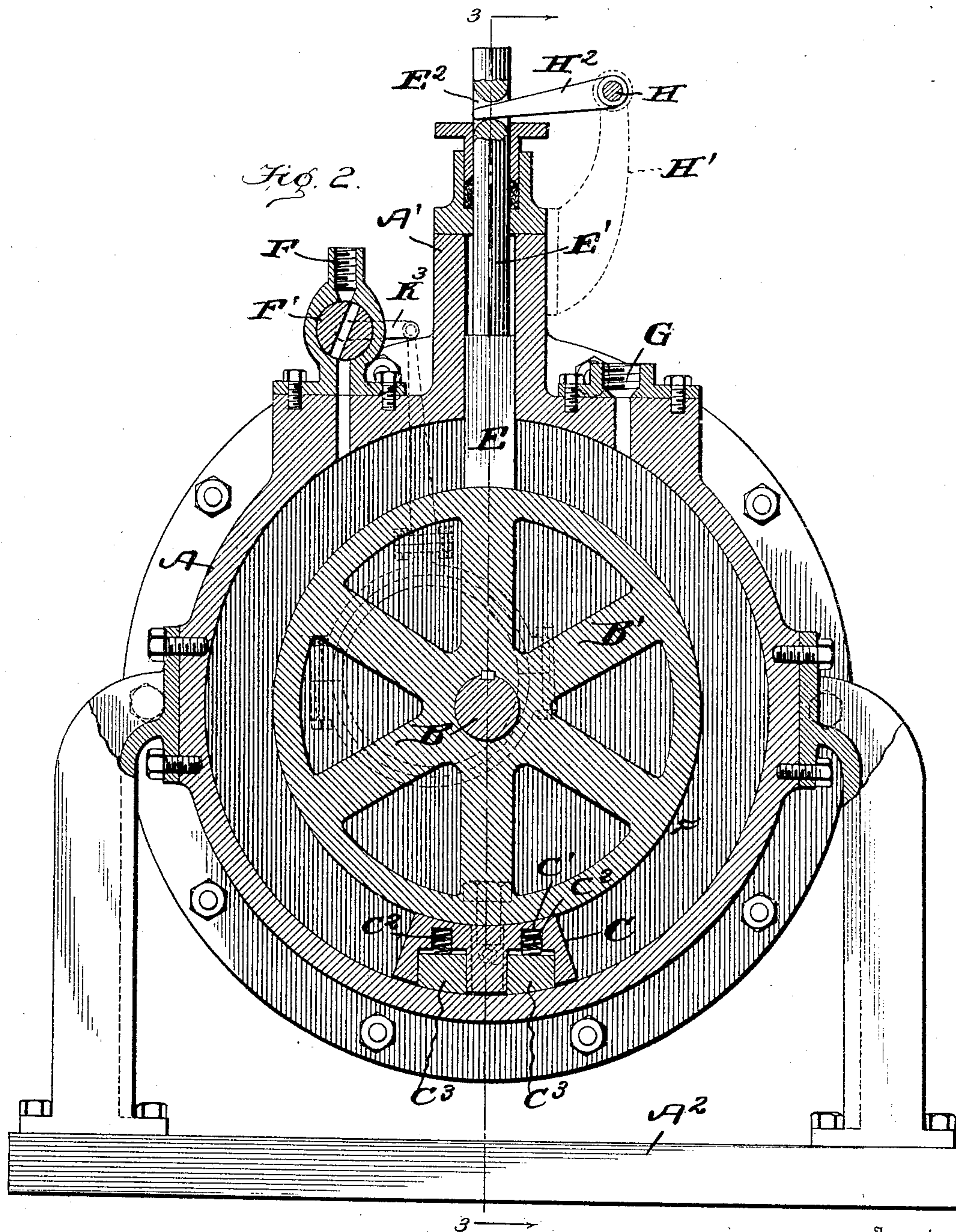
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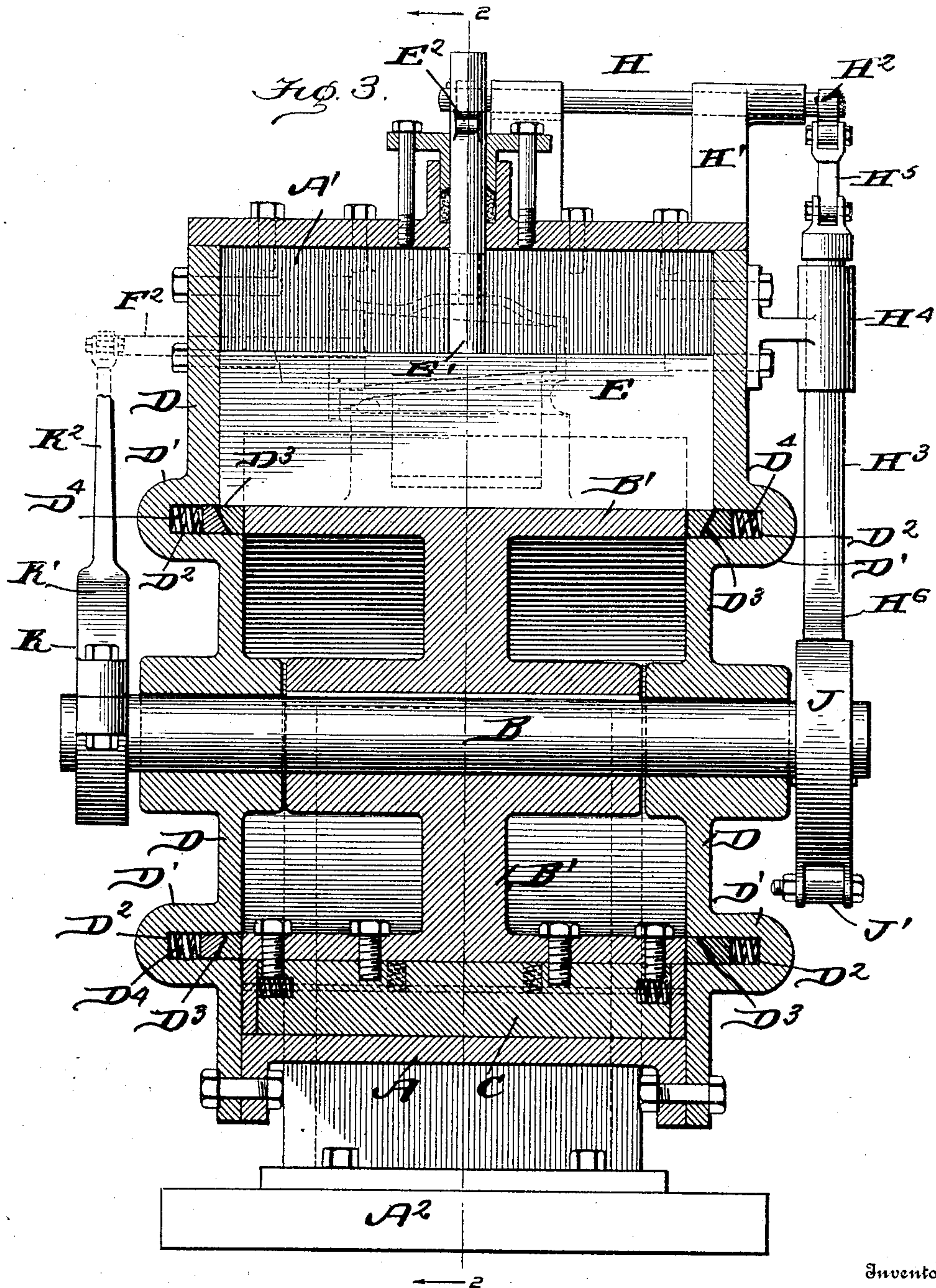
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

EDWARD UREN, OF SACRAMENTO, CALIFORNIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 782,802, dated February 14, 1905.

Application filed March 7, 1904. Serial No. 196,997.

To all whom it may concern:

Be it known that I, EDWARD UREN, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to that class of engines having a revolving piston, a movable abutment, and means for admitting steam into the space between the piston-head and the abutment.

The objection to many of the rotary engines heretofore designed has been that they are too complicated for practical use, and while theoretically an improvement in the art, yet practically they break down under continuous use owing to the multiplicity of parts, especially of valves, spring-actuated abutments, and sliding piston-heads projected outwardly by springs.

The object of this invention is to provide a rotary engine of the fewest possible parts consistent with an operative practical engine, whereby the whole may be strongly and durably constructed at a reasonable cost. In this engine but one valve, one cam, one abutment, and one piston-head is employed, and all these parts are moved positively and do not depend on gravity or the force of springs for their movement.

My invention also consists in the novel features of construction and combination of parts hereinafter described, particularly pointed out in the claims, and shown in the accompanying drawings, in which—

Figure 1 is an end elevation of my engine. Fig. 2 is a vertical section on the line 2 2 of Fig. 3. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 2.

In the drawings, A represents a cylinder of the desired size, and extending longitudinally along the top of the cylinder A is a casing A', having parallel side walls and opening downwardly into the cylinder A. The cylinder A is supported by suitable brackets upon a bed-plate A². Passing longitudinally through the cylinder A is a shaft B, having a driving-wheel B' keyed thereto. The shaft B is rotatably journaled in the cylinder-heads D and

extends through the said heads. Secured to the periphery of the wheel B' and extending practically from one cylinder-head D to the other is a piston-head C. The sides of the piston-head are inclined so as to be disposed at right angles to tangential lines touching the periphery of the wheel B'. Parallel longitudinally-extending recesses are formed in the piston-head, and sockets C' communicate with the recesses. In these sockets are arranged springs C², which bear outwardly on the under sides of packing-strips C³, arranged in the recesses, the outer faces of the packing-strips being curved to fit snugly against the sides of the cylinder A.

The cylinder-heads D are formed with annular exterior shoulders D', which increase the thickness of the ends, and annular grooves D² are formed on the inner faces of the ends coinciding with the exterior shoulders D'. Packing-strips D³ are arranged in these grooves, and springs D⁴, also arranged in the grooves, bear on the packing-strips and force same outwardly in close engagement with the sides of the rim or periphery of the wheel B'. The packing-rings D³ are formed in two sections—an inner and an outer section—the meeting faces of these sections being oppositely angled, so that the thrust of the springs D⁴ is both outward and lateral, thereby making a tight joint.

A sliding head or abutment E is adapted to contact on the periphery of the wheel B', and a stem E' is connected to this sliding head. The head is adapted to move vertically between the parallel walls of the casing A', the stem working through a suitable stuffing-box formed on the casing A', and above the stuffing-box the stem is slotted, as shown at E², the upper and lower walls of the slot being rounded. On one side of and adjacent the sliding head is a steam-inlet F, in which is arranged a one-way valve F', and on the opposite side of the sliding head is arranged an exhaust-port G, normally open and not provided with a valve. The exhaust-port G is interiorly threaded, as shown, in order that an exhaust-pipe (not shown) may be secured thereto.

Extending longitudinally above and paral-

lel with the cylinder A is a rock-shaft H, sup-
 ported by a suitable bracket H' and having
 secured thereto adjacent each end rocker-arms
 H², and the outer end of one of these arms
 5 H² rests in the slot E² of the sliding-head stem
 E'. A lifting-bar H³ is arranged at the end
 of the cylinder A, over which one end of the
 rock-shaft H projects, and the upper portion
 of the bar works vertically through a sleeve
 10 H⁴, and its upper end is pivotally connected
 to a link H⁵, which in turn is pivoted to the
 outer or free end of the remaining rocker-arm
 H². The lower end of the bar H³ is enlarged
 15 to form a shoe H⁶, which rests upon a cam-
 wheel J. The cam projection of the cam-
 wheel J is bifurcated, and a cam-roller J' is
 journaled in this bifurcated portion and is
 adapted to engage and lift the shoe H⁶, lifting
 also the bar H³, link H⁵, and rocking the rock-
 20 shaft H through the medium of the arm H²,
 to which the link H⁵ is attached, and impart-
 ing the same rocking movement to the other
 rocker-arm H², thereby lifting the stem E' and
 the sliding head E.

25 Upon the opposite end of the shaft B to
 that which carries the cam-wheel J is arranged
 an eccentric K, having the usual eccentric-
 strap K', rod K², and the crank-arm K³ pivoted
 at its free end to the rod K² and connected at
 30 its opposite end to the stem F² of the valve F'.

The operation of the engine is as follows:
 Steam enters the cylinder A through the valve
 F' and inlet F, and as it cannot pass the slid-
 ing head E, which is down or in its lowest po-
 35 sition, it forces around the piston C, turning
 the wheel B' and shaft B. When the piston-
 head has traveled one-third of the distance
 around the cylinder, steam is cut off by action
 of the eccentric K and connecting parts and
 40 the steam works by expansion until the pis-
 ton passes the exhaust G. As the piston nears
 the sliding head after passing the exhaust-
 port G the head is drawn upward into the
 casing A' by action of the cam-roller J' on the
 45 shoe H⁶ and the piston-head passes beneath the
 sliding head. As the piston-head passes the
 steam-inlet F the valve is again opened and a
 new cycle is commenced.

50 It will be seen from the above that the con-
 struction and operation of the engine are very
 simple.

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

55 1. The combination with a rotary engine
 having a revoluble piston therein, of a casing
 having parallel vertical walls, a sliding head
 adapted to move vertically between said walls
 and to project downward into the path of the
 60 piston, an upwardly and outwardly extending

stem connected to the sliding head, a rocker-
 shaft, an arm secured to the rocker-shaft and
 adapted to actuate the sliding-head stem, a
 lifting-bar adapted to move vertically and ar-
 ranged at an end of the said engine, an arm
 65 secured on the rocker-shaft and terminating
 adjacent the upper end of the lifting-bar, a
 link pivotally connecting the last-mentioned
 arm and the lifting-bar, and a cam on the en-
 gine-shaft adapted to lift said bar as the pis-
 70 ton approaches the sliding head.

2. The combination with a rotary engine
 having a piston and a shaft driven by the pis-
 ton, of a cam-wheel on said shaft having a bi-
 furcated cam portion, a roller in said bifur-
 75 cated portion, a sleeve arranged above the
 cam-wheel, a lifting-bar movable vertically in
 the said sleeve and having a shoe formed at
 its lower end adapted to normally rest on the
 cam-wheel and to be engaged by the cam-
 80 roller, a rock-shaft, a rocker-arm secured to
 the said shaft adjacent its outer end, a pivot-
 ed link connecting the upper end of the lift-
 ing-bar and the outer free end of the rocker-
 arm, a sliding head adapted to extend nor-
 mally into the path of the piston, a slotted
 stem connected to said head, and a rocker-arm
 secured to the rock-shaft and having its free
 end in engagement with the slot of the stem
 of the sliding head.

3. In a rotary engine, a cylinder, cylinder-
 heads, annular, exterior shoulders formed on
 the said heads, annular grooves formed on the
 inner faces of the cylinder-heads coincident
 with the shoulders, springs in the grooves, a
 90 sectional packing-ring arranged in the said
 grooves the meeting faces of the sections be-
 ing oppositely angled, a shaft through the
 cylinder, and a wheel keyed to the shaft and
 having its sides bearing on the outer section
 of the said packing-rings.

4. A rotary engine comprising a cylinder,
 a rotatable shaft journaled therein, a wheel
 keyed to the said shaft and extending from
 end to end of the cylinder, a piston-head ar-
 ranged on the periphery of the wheel parallel
 to the shaft and extending from end to end of
 the cylinder, said piston-head being formed
 with two parallel, longitudinal recesses and
 having sockets opening into said recesses,
 springs in the sockets, packing-strips arranged
 in the recesses and engaged by the springs,
 the sides of the said piston-head being out-
 wardly divergent, and means for admitting
 and exhausting steam from the said cylinder.

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Witnesses:

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