

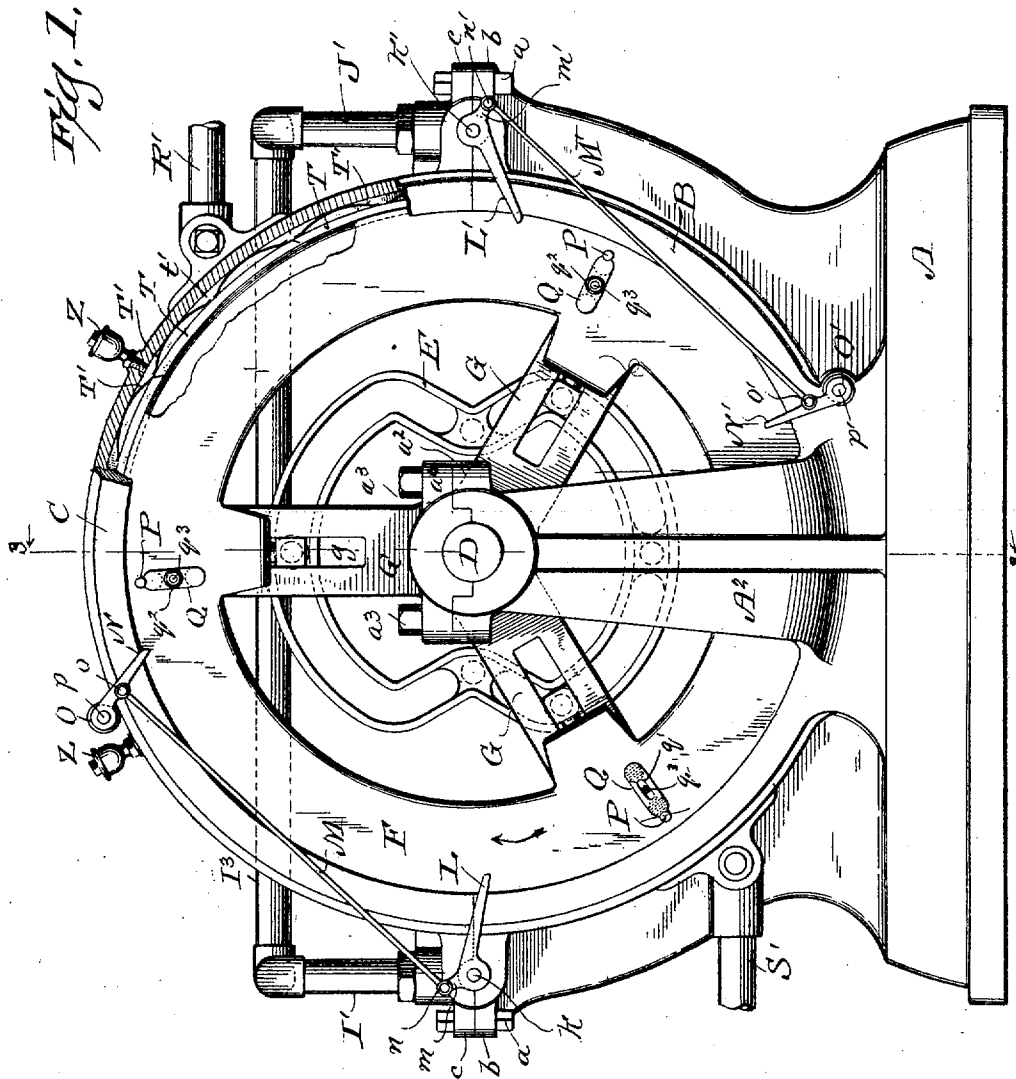
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4 Sheets—Sheet 1.

R. J. FLEISCHER.
ROTARY ENGINE.

No. 582,389.

Patented May 11, 1897.



Witnesses:
Geo. W. Young,
B. C. Roloff.

Inventory:
Richard J. Fleisher
By H. G. Underwood
Attorneys

(No Model.)

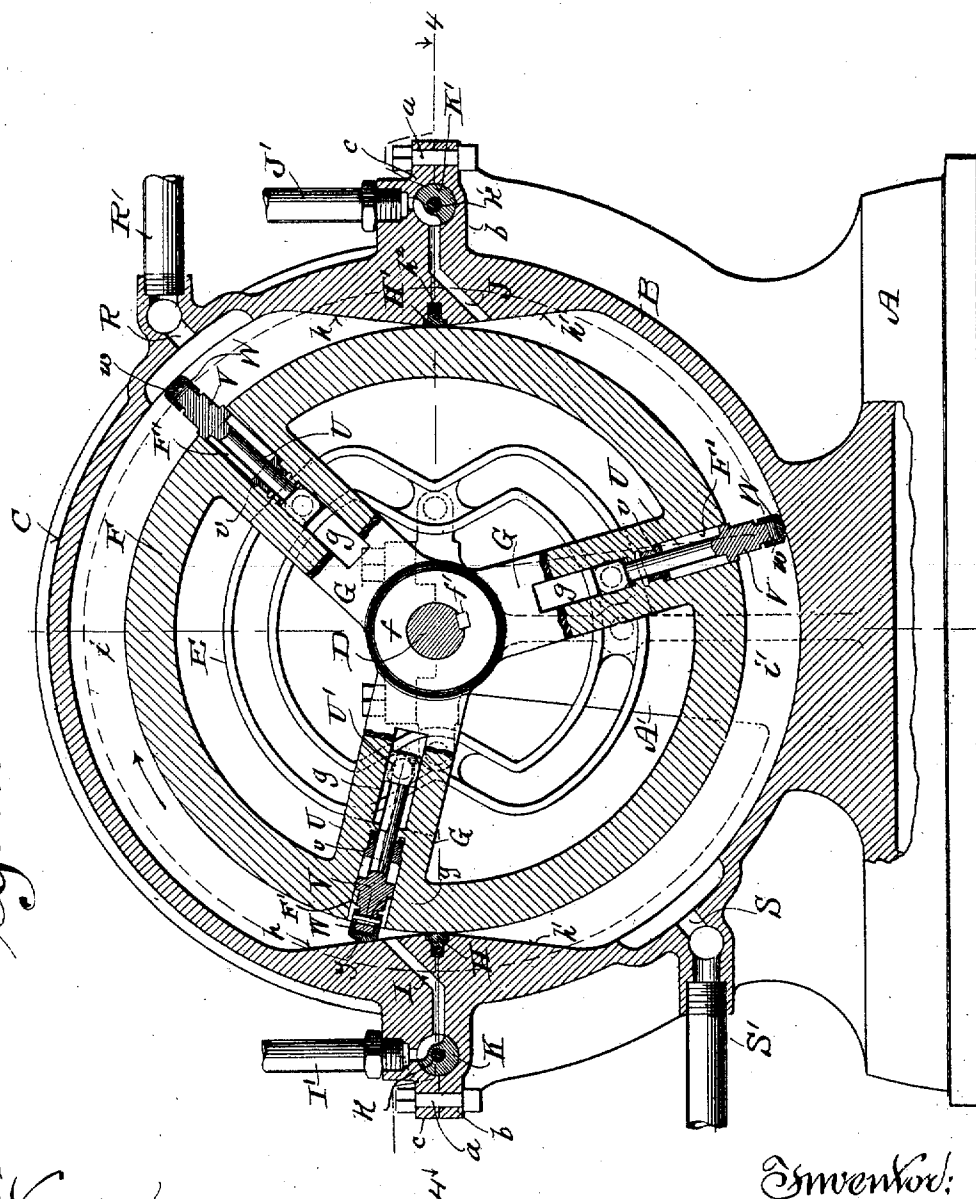
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Fig. 2.



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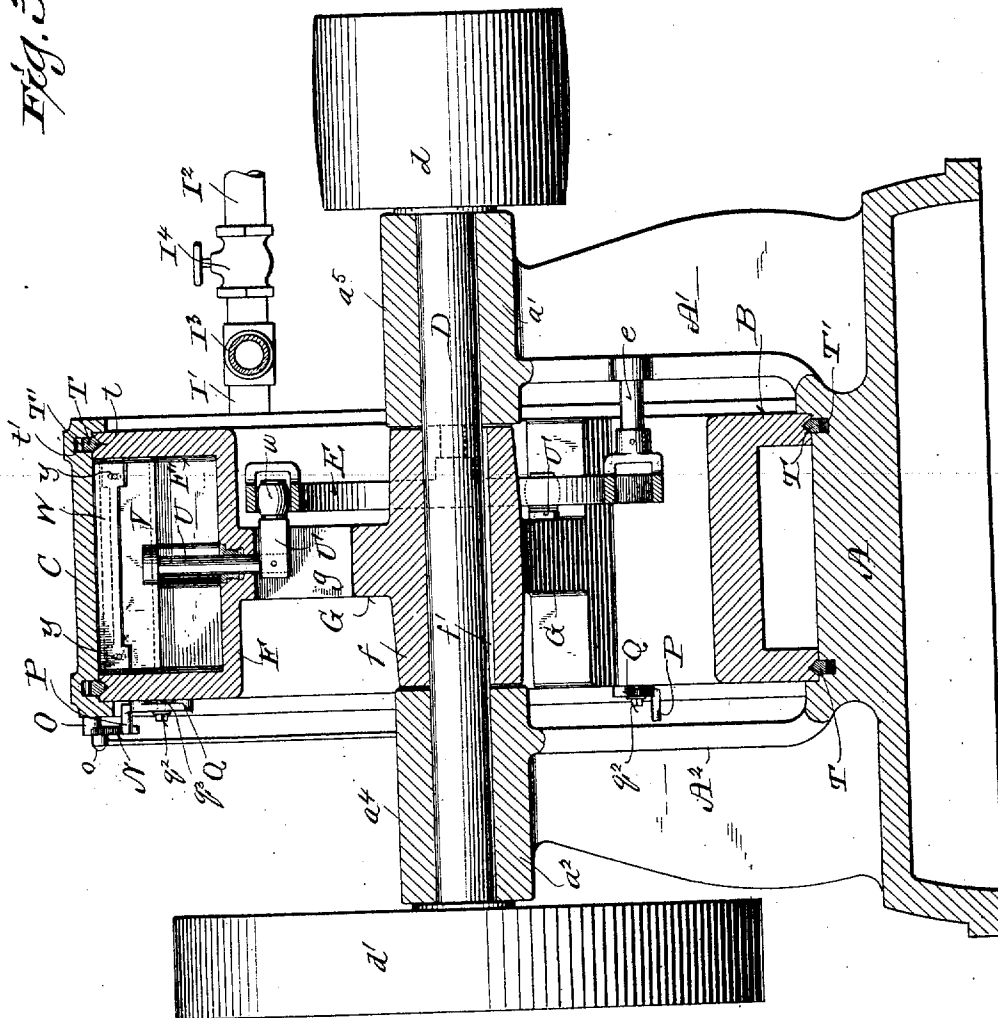
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Fig. 3.



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UNITED STATES PATENT OFFICE.

RICHARD J. FLEISCHER, OF MILWAUKEE, WISCONSIN.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 582,389, dated May 11, 1897.

Application filed December 21, 1896. Serial No. 616,425. (No model.)

To all whom it may concern:

Be it known that I, RICHARD J. FLEISCHER, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to rotary steam-engines; and it consists in certain peculiarities of construction and combination of parts, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a side elevation of an engine embodying my present invention, partially broken away to better illustrate certain details of construction. Fig. 2 is a central vertical section of said engine. Fig. 3 is a central vertical section of the same, taken at a right angle to the sectional line of the preceding figure, on the line 3 3 of Fig. 1. Fig. 4 is a central horizontal section on the line 4 4 of Fig. 2.

Referring to the drawings, A represents the base of my engine, and B the lower portion of the shell or casing rising therefrom, and C is the cap-piece or upper portion of said shell or casing, which latter is preferably horizontally divided, the lower part of the shell and its cap-piece each having lateral projections *b c*, with transverse bolts *a a* passing there-through, by which the two parts of said shell or casing are united.

A' A² are two standards rising from the base on each side of the shell or casing and terminating in bearings *a' a²* for the shaft D of the engine, said bearings having caps *a⁴ a⁵*, secured by bolts *a³ a³*. The shaft D has a pulley *d* on one end and a fly-wheel *d'* on the other end.

E is a camway supported by rods *e e e*, which project therefrom and are secured to the standard A' and to lugs *e' e'* on its cap *a⁵*.

F is a grooved wheel revolving within the shell or casing B C, the said wheel having a hub *f*, secured to the shaft D by a key *f'*, and three spokes G G G, having slots *g g g* therein, said wheel constituting the rotary piston of the engine.

The shell or casing B C projects inward at opposite points, as shown in Fig. 2, and at the line of junction of the parts B C the shell

reaches its inmost projection, having there contact with the wheel F, the said shell above and below these contact-points receding at an obtuse angle, as shown at *h h'*, so as to leave upper and lower steam-chambers *i i'* between the wheel and shell above and below said contact-points, the said contact-points being metallic packings H H', held against the grooved wheel F by springs *h² h²*.

I and J are the steam-inlet ports, both extending down through the lateral projections *c c* of the shell-cap C and thence inward along the line of junction of the parts B C and thence through the inward-projecting enlargements of the shell to the described steam-chambers, the port I passing upward above the contact-point packing H into the upper steam-chamber *i* and the port J passing downward below the contact-point packing H' into the lower steam-chamber *i'*.

I' J' are steam-pipes leading to said ports from a common main I² and connected together, as shown at I³, Fig. 1, there being a valve I⁴, as shown, in the said common main.

K K' are valves that control, respectively, the ports I J. To the outer projecting end of the valve-rod *k* of valve K there is secured the hub of a lever L, extending past the inner annular edge of the shell or casing, and from the same hub there projects a short arm *m*, having a crank-pin *n*, to which is pivotally attached one end of a pitman M, whose other end is pivotally attached to another crank-pin *o*, projecting from a lever N, the hub O of said lever N being pivoted on a pin *p*, projecting from a lug on the shell-cap C. Similarly the outer projecting end of the valve-rod *k'* of valve K' has secured thereto the hub of a lever L', extending past the inner annular edge of the shell on the opposite side of the engine, from which hub there projects a short arm *m'*, having a crank-pin *n'*, to which is pivotally attached one end of a pitman M', whose other end is pivotally attached to another crank-pin *o'*, projecting from a lever N', the hub O' of the last-named lever being pivoted on a pin *p'*, projecting from a lug beneath the shell B.

Q Q Q represent a series of adjustable slotted plates secured to the wheel F and each having an outwardly-projecting pin P for tripping one of the described levers L L' N N'

at predetermined times, as hereinafter explained. The said plates have roughened surfaces q on their under sides and slots q' and are held to the wheel F by nuts q^2 on
 5 screw-bolts q^3 , which bolts project from said wheel through the slots in the plates, so that when the nuts are loosened the plates, by reason of their slots q' , can be set at any angle desired and then quickly secured in the
 10 position to which they have been adjusted by tightening the nuts and thus forcing the roughened under surfaces of the plates against the wheel.

R S represent the exhausts, with pipes R' S' leading therefrom. The annular side flanges of the grooved wheel F are each provided with a continuous peripheral groove l and the shell or casing B C with corresponding annular
 15 grooves l' l'' in line therewith for the reception of the packing T T, which is preferably metallic packing made in sections, as best shown in Fig. 1, extending all around the
 20 said wheel and held against the same by the continuous series of springs T' T'.

U U U represent the plunger-rods, whose inner ends extend into the slotted spokes G G G of the wheel F and there are secured to arms U', terminating in anti-friction-rollers u , which move within the fixed camway E, the
 30 said arms moving back and forth in the slots g in said spokes G. The wheel F is grooved out, as shown at F', in line with each of its spokes G for the reception of the plunger-head V, the said grooves F' being centrally
 35 enlarged, and from the base of the said grooves a bore is cut through for the passage of the plunger-rods U, said bore being enlarged to receive the stuffing-boxes V, through which the said plunger-rods pass.

W W W are spring-controlled packings on the plunger-heads V V V, w representing the springs, the said heads and packings being
 40 united by bolts y y and the heads V being formed with slots y' y' , through which said bolts pass, to afford play for the said spring-controlled packings.

Z Z represent oil-cups for lubrication.

The operation of my engine is as follows, it being understood that the shell or casing
 50 B C constitutes the cylinder and the grooved wheel F the rotary piston of the device. It will be further understood that in the position of parts shown in Fig. 1 the valve K is closed and the valve K' is open and still taking steam
 55 through the inlet J. As the wheel-piston F continues to revolve in the direction of the arrow the adjacent pin P, coming in the path of the lever L, will trip and open the valve K, and as the adjacent plunger-head V, with its
 60 spring-controlled packing W, (herewith for convenience referred to as the "plunger,") reaches the position shown in Fig. 2 the steam from port I presses against said plunger and carries it forward, filling the steam-space i
 65 back of said plunger, as the packing H prevents any escape of this steam into the lower steam-space i' . When lever L is tripped, as

just described, this action brings lever N into the path of the same pin P, and as said lever N is reached the pin trips it and closes the
 70 valve K, but the steam already in said steam-space i will expand and push the plunger forward to the exhaust R and allow this steam to escape therethrough. Meanwhile the valve K' has been closed by the action of the adjacent pin P on the lever N', and the steam
 75 which was back of the lower plunger shown in Fig. 2 has expanded and forced said lower plunger toward the exhaust S, which it reaches just as soon as the plunger shown at the exhaust R in Fig. 2 gets below the steam-port
 80 J and begins to receive steam therefrom, the valve K' being opened as the adjacent pin P strikes the lever L' just in advance of said last-named plunger assuming the position
 85 last described, and when the first plunger reaches the exhaust R the steam-inlet I has been again opened and the last plunger assumes the position of the first plunger just above the inlet I. (Shown in Fig. 2.) There-
 90 fore there is a continuous pressure, first by the direct impact of the steam from the ports and then by the expansion of this steam, after the inlet is closed, against these plungers, together with continuous escape of the steam
 95 ahead of said plungers through the exhaust, whereby there can never be any back pressure of the steam.

My engine is exceedingly light, on account of its having an open annular shell in place
 100 of solid sides, and owing to the described packing there is no loss of steam between said annular shell and the rotary piston or grooved wheel revolving therein.

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

In a rotary engine, the combination with a horizontally-divided annular shell or casing having inlet-ports at its point of separation
 110 and exhaust-ports in its upper and lower portions respectively, of an annular rotary piston revolving within said shell and having a hub supported on the shaft of the engine and slotted spokes rigidly connecting the hub and
 115 annulus of said piston, a stationary grooved cam supported at one side of the said rotary piston, a series of independent plunger-rods whose inner ends extend into the slots in the said spokes and terminate in laterally-pro-
 120 jecting arms, carrying rollers moving within the grooves of the cam, and whose outer ends carry movable spring-impelled plunger-heads, adapted to project into, or to be withdrawn from, the steam-space between the
 125 shell and rotary piston, said shell contracting inwardly at obtuse angles at the point of separation of the two halves thereof, and having inwardly-spring-impelled movable contact-pieces, at the points of inmost projection, one
 130 above, and one below, the opposite inlet-ports, valves in said ports, having projecting valve-rods, levers secured to said valve-rods and projecting inwardly beyond the annular shell,

and having also short arms projecting in another direction, crank-pins on said short arms, other levers pivoted to said annular shell, crank-pins on said last-named levers, pitman-rods connecting the crank-pins on said levers with those on the nearest valve-levers, and a series of adjustable tripping-pins on the rotary piston for engagement with said valve-levers, substantially as set forth.

In testimony that I claim the foregoing I do have hereunto set my hand, at Milwaukee, in the county of Milwaukee and state of Wisconsin, in the presence of two witnesses.

RICHARD J. ELEISCHER.

Witnesses:

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