(No Model.)

T. HAWKINS.

ROTARY ENGINE.

No. 262,665. Patented Aug. 15, 1882.

Fig. 2.

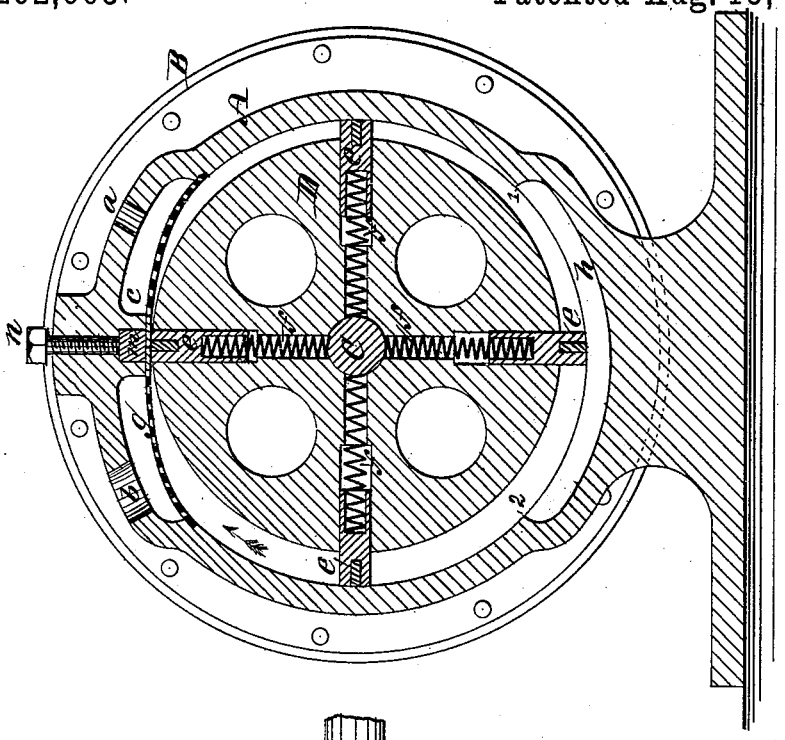
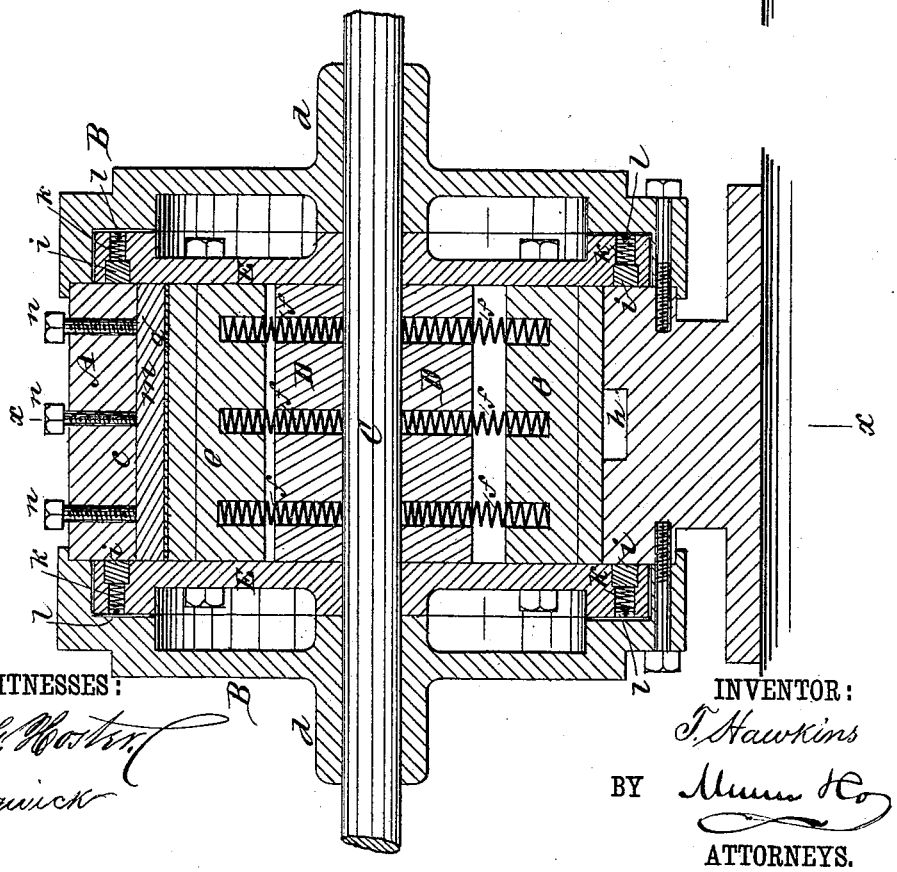


Fig. 1.



WITNESSES:

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THOMAS HAWKINS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-EIGHTH TO WILLIAM EDWARD CRIST, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 262,665, dated August 15, 1882.

Application filed December 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HAWKINS, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Rotary Engines, of which the following is a full, clear, and exact description.

My invention consists in a compound rotary engine in which radially-moving pistons are combined with a case having a steamway constructed to use the steam under high pressure in a small steamway and by expansion in an enlarged chamber, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a transverse section of my improved engine in the plane of the axis, and Fig. 2 is a transverse section at right angles to Fig. 1.

A is the case, of hollow cylindrical form, provided with steam-port *a* and exhaust-port *b*, between which an abutment, *c*, is formed on the inner surface of the case.

B B are the heads of the case, formed with boxes *d d* for the shaft C, which boxes are eccentric to the circular opening of the case.

D is the revolving cylinder, fixed on shaft C and formed with radial grooves, in which are sliding pistons *e*, that are projected against the inner surface of the case by springs *f*, placed behind them. The pistons are four in number, placed equidistant, and the cylinder is of smaller diameter than the interior of the case, so that a steamway is formed around the cylinder. From plate *g* to a point marked 1 in its lower side the steamway is of uniform width, and then increasing in width for a short distance to the point 2, and continues of that width to plate *g* again. The case is recessed at the ports *a b* to allow free inlet and escape of steam, and the recesses are covered by a perforated plate, *g*, attached to the inner surface of the case, and over which the pistons *e* move in passing from the exhaust to the steam-port. The inner surface of case A is also formed with a groove, *h*, between the points 1 and 2, diametrically opposite the abutment *c*, to allow steam to pass in front of the pistons.

For packing the cylinder D, I provide the circular disks E, attached to the ends of the cylinders, and of a diameter to take against the sides of case A. The heads B are recessed to receive the disks E without friction, and the disks are provided with packing-rings *i*, set in grooves so as to take upon the case A. Behind the packing-rings *i* are springs *k*, serving to project them, and set-screws *l* are provided to retain the springs and for setting them up.

The abutment *c* is fitted with a block, *m*, in a groove behind the plate *g*, and a set-screw, *n*, is tapped through the case A and takes on block *m*, so that the block can be projected to press the plate against the cylinder steam-tight.

In operation the steam entering by port *a* acts upon the first piston *e* under high pressure in the smaller steamway until the piston reaches the groove *h*, when the steam passes beneath the piston into the larger steamway, and acts by expansion on the piston next in advance. At the same moment the steam is exhausting through groove *h* another piston is in advance of the steam-port and receives the steam under high pressure, as before. In this manner the cylinder is revolved by the simultaneous action of the steam under high pressure in a small steamway, and by expansion in a larger steamway, and steam is thus used with the greatest economy. While passing over plate *g* the pistons receive steam on both sides through the perforations, and are thus balanced. It is to be observed that the radial movement of the pistons takes place while the pistons are thus balanced both at the plate *g* and groove *h*, and that they remain fixed while passing through either steamway.

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

A steam-engine having radial spring-pressed pistons operating in a steamway between the cylinder and case, of uniform width from plate *g* to a point marked 1, increasing in width to a point marked 2, and then continuing at an increased width to the plate *g*, substantially as and for the purpose specified.

THOMAS HAWKINS.

Witnesses:
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