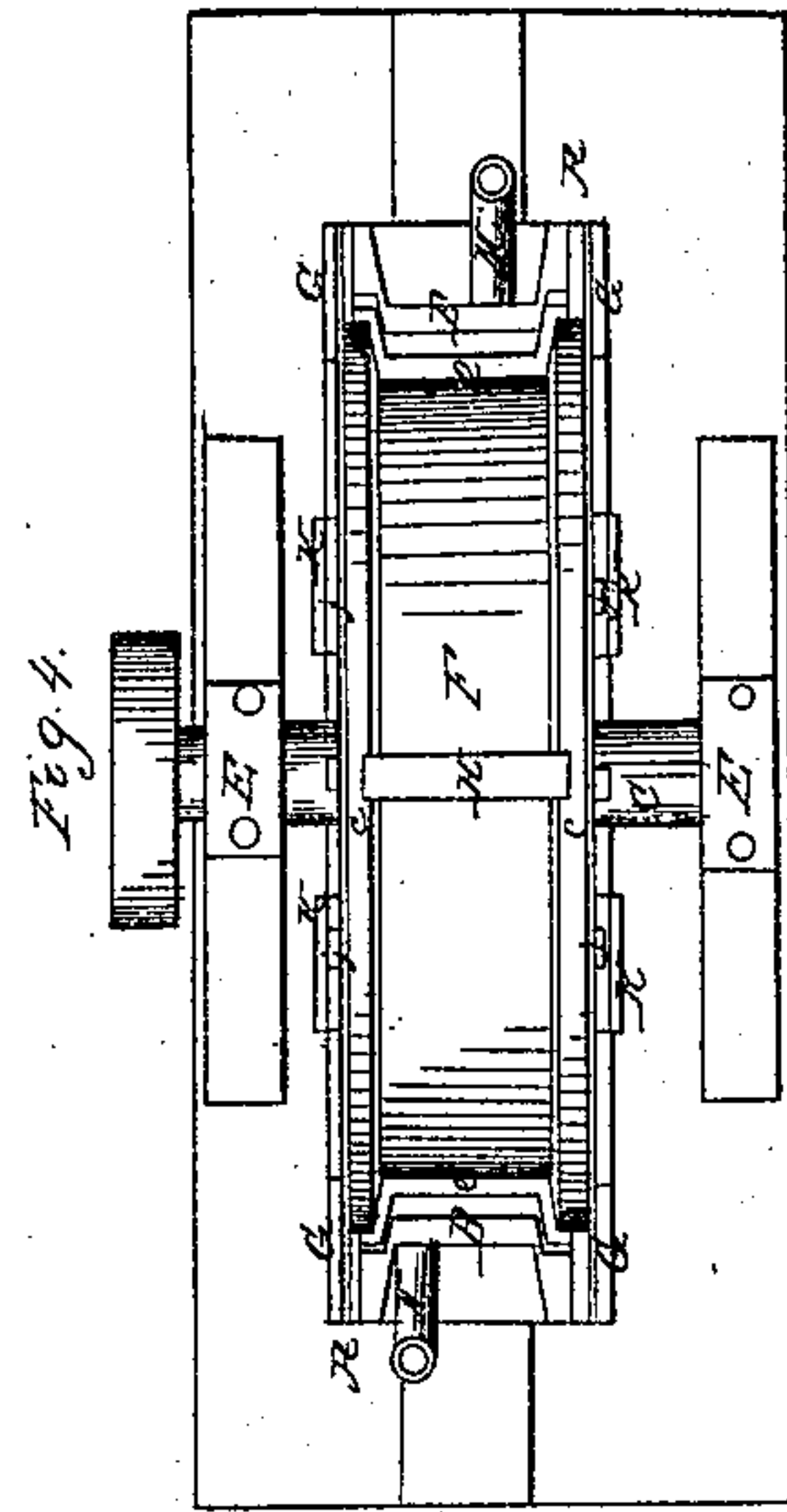
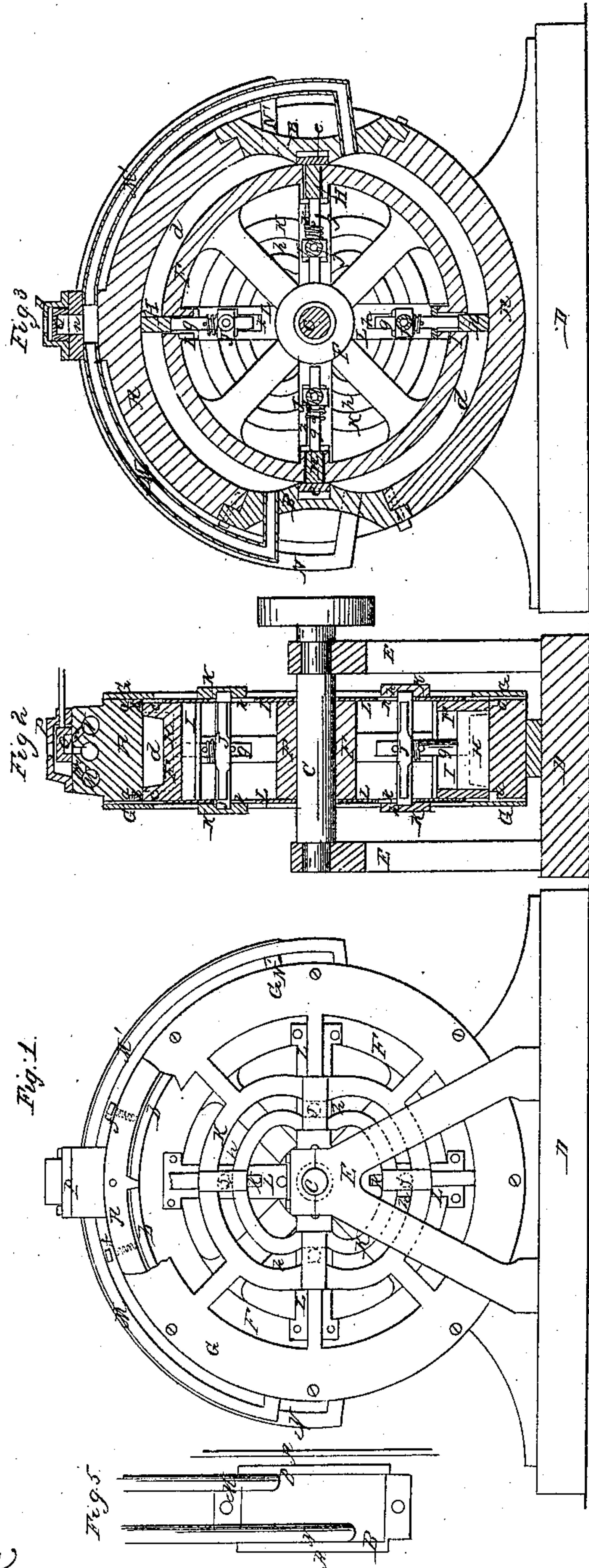


W. H. DEVALIN.
ROTARY ENGINE.

No. 34,414.

Patented Feb. 18, 1862.



Witnesses:
J. B. Smith
J. W. Ford

Inventor:
W. H. Devalin
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attorneys

UNITED STATES PATENT OFFICE.

WILLIAM H. DEVALIN, OF SACRAMENTO, CALIFORNIA.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 34,414, dated February 18, 1862.

To all whom it may concern:

Be it known that I, WILLIAM H. DEVALIN, of Sacramento, in the county of Sacramento and State of California, 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 of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a rotary engine with my improvements. Fig. 2 is a vertical axial section of the same. Fig. 3 is a vertical section of the same perpendicular to the axis. Fig. 4 is a top view of the same with the upper half of the cylinder removed. Fig. 5 is an outside view of one of the cylinder-abutments. Fig. 6 is an inside view of the abutment with the packing-piece removed.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in a certain combination of pistons, piston-boxes, connecting-rods, cross-heads, rollers, cams, and springs, constructed and operating as hereinafter explained.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the stationary cylinder consisting of a simple ring with a cylindrical bore and flat sides or ends, with a rabbet *a* in each inner corner for the reception of packing *b*, and with two openings at opposite points of nearly its whole width and of about one-eighth its circumference for the reception of the abutments B B, which are bolted into their places. This cylinder is bolted to the bed-plate D.

C is the main shaft arranged concentric with the cylinder A in bearings in standards E E, erected on the bed-plate D.

F is the piston-wheel having its rim formed with two flanges *c c*, which are turned to fit the interior of the cylinder A. The recess *d* in the rim between the said flanges constitutes the steam-channel, three sides of the said channel being thus formed in the piston-wheel and only the outer side being formed by the cylinder and only the outer ends of the pistons rubbing against the cylinder.

The abutments B B fit snugly into the recess between the flanges *c c* of the piston-wheel F, and each is fitted with a packing-piece *e* to prevent steam passing them. The

packing *b* is inserted in the form of segments, as shown in Fig. 2, and the several segments are kept in place in the rabbet *a* by covering-plates G G, bolted to the sides of the cylinder, and are adjusted to fit steam-tight the flanges of the piston-wheel by set-screws *f f*. Springs may be interposed between the set-screws and the packing to enable the latter to keep itself tight.

H H H H are the rotating and radially-sliding pistons, four in number, fitted to boxes I I I I provided for their reception in the wheel F. These pistons have each a rod *g*, which passes through a steam-tight stuffing-box in the bottom or inner end of the boxes I I I, and each piston-rod has firmly secured to it a cross-head J, which is furnished at or near its ends with anti-friction rollers *j j* to run in grooves *h h* in stationary cams K K, which are secured to or made in the same pieces with the covering-plates G G, before mentioned, the said cross-heads also working in grooves *k*, radial to the shaft C in guide-arms L L, bolted to the outside of the wheel F. The rotary motion of the piston-wheel causes the pistons revolving with it to derive, through the action of the cams K K upon their cross-head rollers, the inward and outward or radial movement necessary to enable them to pass the abutments and return them into their operative positions. The piston-rods *g* are fitted loosely to their cross-heads, and springs *i* are applied to them in such manner as to tend to give the pistons an outward pressure. These springs allow the pistons to accommodate themselves to any want of truth in the inner periphery of the cylinder.

Steam is admitted to and exhausted from the cylinder through the abutments by pipes M M' and N N', connecting with the steam-chest P, containing the three-part valve Q, the two pipes M M' connecting with the outer port *m* of the steam-chest, and one of said pipes communicating with the cylinder on the upper side of one abutment and the other on the lower side of the other abutment, and the two pipes N N' connecting with the other outer port, and the said pipes communicating with the cylinder on opposite sides of the two abutments to those on which the pipes M M' connect, as shown in Fig. 1. Either the two pipes M M' or the two pipes N N' may be used for the induction of the steam and the other two for the eduction, according to the intend-

ed direction of the revolution, the position of the valve Q determining the direction. In the drawings (see Figs. 2 and 3) the valve is in a position to open M M' to the steam and N N' to the exhaust, and the engine rotates in the direction of the arrow shown on the piston-wheel in Fig. 3.

The form of the grooves *h h* in the cams K K nearly corresponds with that produced by the combination of the inner periphery of the cylinder A with the faces of the abutments. The cylinder-faces consist of two arcs, each equal to about three-eighths ($\frac{3}{8}$) of a circle; but each of the four pistons requires to be acted upon by the steam above or below the abutments during but one-fourth of a revolution.

I have throughout this specification de-

scribed my invention as relating to a steam-engine; but it is applicable to air or gas engines and also to rotary pumps. In applying it to a pump the pistons should pass entirely through stuffing-boxes in the inner ends of the boxes I and be exposed to the atmosphere.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the pistons H, boxes I, rods *g*, cross-heads J, rollers *j*, cams K *h*, and springs *i*, all constructed, arranged, and operating in the manner and for the purposes hereinbefore shown and explained.

WM. H. DEVALIN.

Witnesses:

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