

(No Model.)

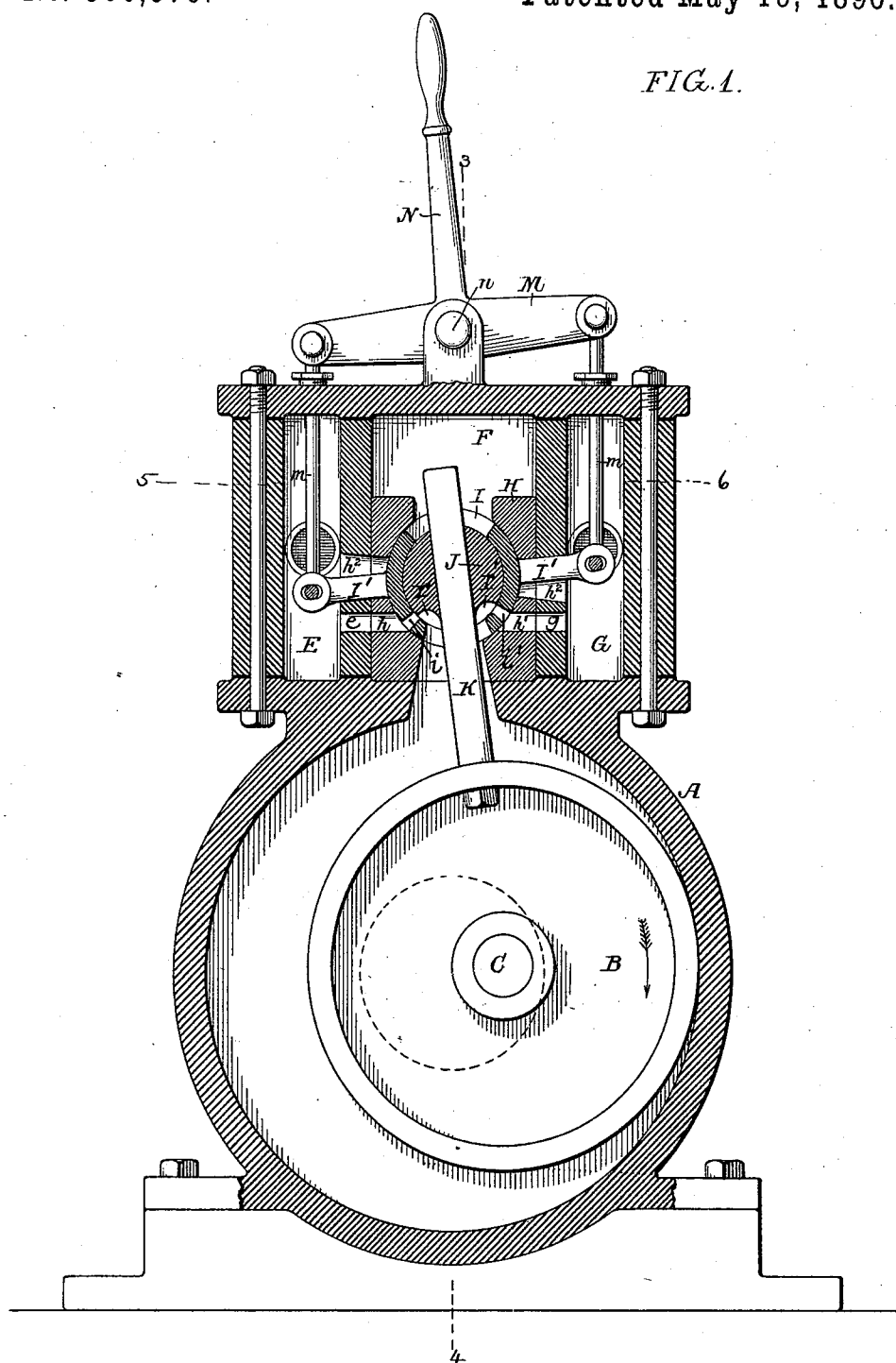
3 Sheets—Sheet 1.

I. N. FORRESTER.
ROTARY ENGINE.

No. 560,579.

Patented May 19, 1896.

FIG. 1.



Witnesses:

A.V. Group
R. Schleicher

Inventor:

Isaac N. Forrester
by his Attorneys
Houpin & Houpin

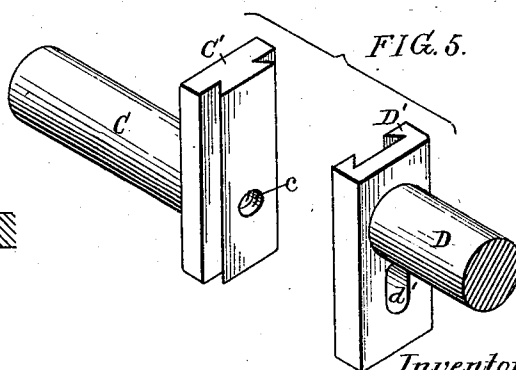
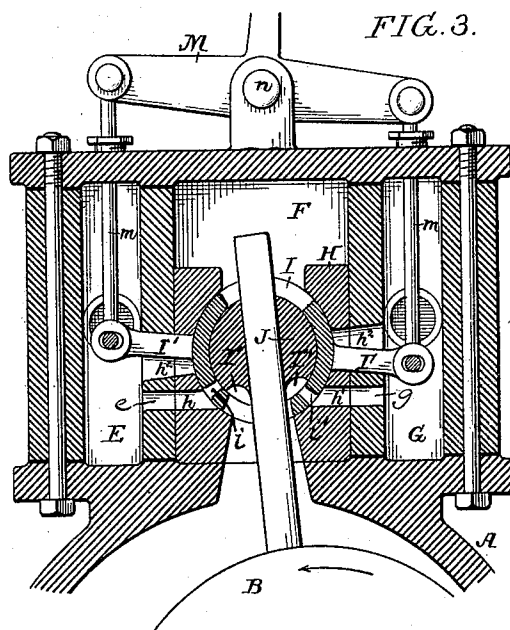
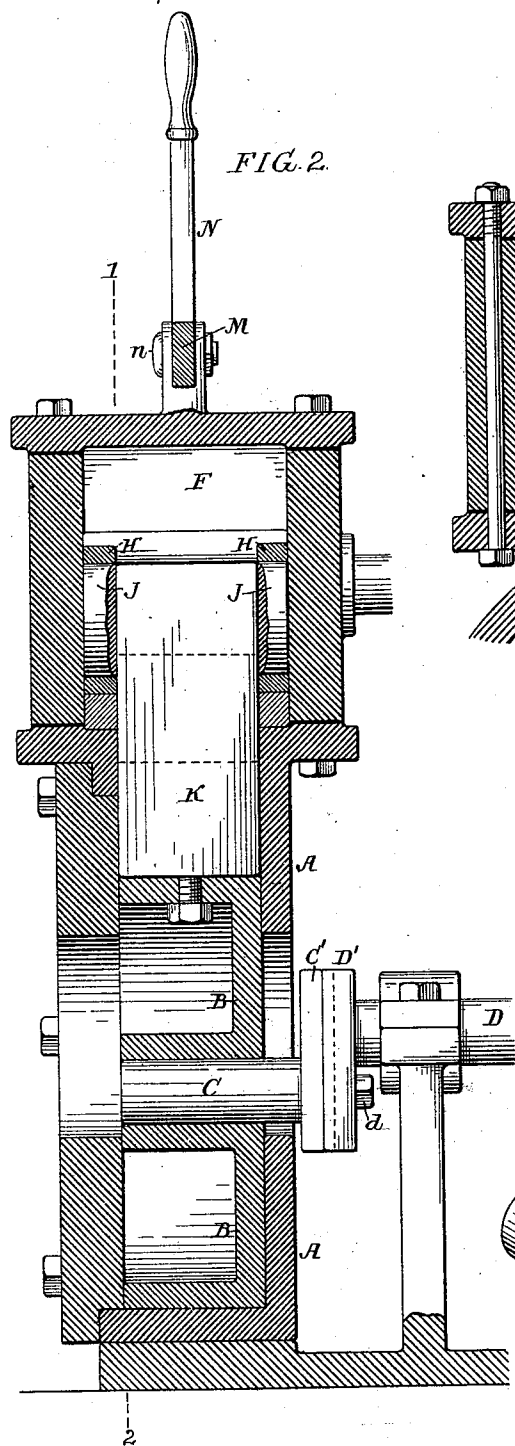
(No Model.)

3 Sheets—Sheet 2.

I. N. FORRESTER.
ROTARY ENGINE.

No. 560,579.

Patented May 19, 1896.



Witnesses:
A. V. Grouper
R. Schleicher

Inventor:
Isaac N. Forrester
by his Attorneys
Howm & Howm

(No Model.)

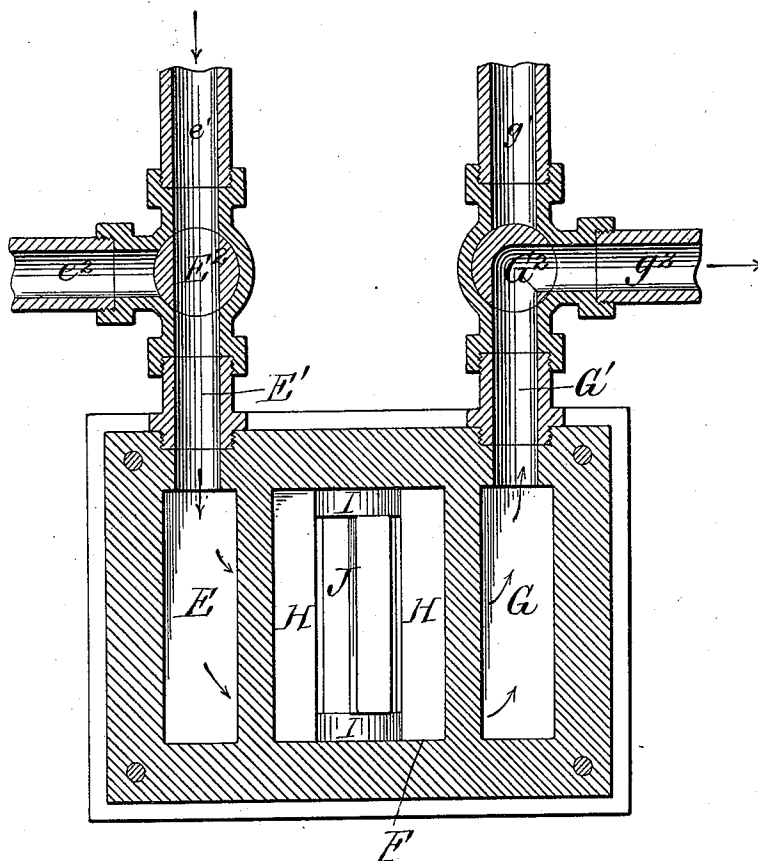
3 Sheets—Sheet 3.

I. N. FORRESTER.
ROTARY ENGINE.

No. 560,579.

Patented May 19, 1896.

FIG. 4.



Witnesses:
Murray C. Boyer
Fred C. Benner

Inventor:
Isaac N. Forrester
by his Attorneys
Housen & Housen

UNITED STATES PATENT OFFICE.

ISAAC N. FORRESTER, OF CAMDEN, NEW JERSEY.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 560,579, dated May 19, 1896.

Application filed December 8, 1892. Serial No. 454,463. (No model.)

To all whom it may concern:

Be it known that I, ISAAC N. FORRESTER, a citizen of the United States, and a resident of Camden, New Jersey, have invented certain
5 Improvements in Rotary Engines, of which the following is a specification.

My invention relates to certain improvements in the construction and operation of rotary engines, and has for its main object
10 the construction and arrangement of an automatic cut-off which will be operated on each rotation of the engine and which is so constructed as to be reversible; and a further object being to improve the general construction
15 of the class of engines to which the invention appertains, as more fully set forth hereinafter.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation on the line 1 2, Fig. 2. Fig. 2 is a transverse sectional
20 elevation on the line 3 4, Fig. 1, the piston, however, being shown in a different position. Fig. 3 is a view similar to Fig. 1, but illustrating the position in which the cut-off is placed when the motion of the engine is re-
25 versed. Fig. 4 is a sectional plan view on the line 5 6, Fig. 1; and Fig. 5 is a perspective view of a detail of the engine.

The engine is one of that general class in which a circular piston is centrally mounted
30 upon a crank-pin carried by the main shaft and so arranged as to rotate within a cylindrical casing, the engine being provided, as usual, with a cylinder A and a circular piston B, centrally mounted upon the crank-pin C, carried by the main crank-shaft D. In order to
35 compensate for the wear between the piston and cylinder, I preferably make the crank-block in two parts C' D', dovetailed into each other and adapted to be secured together by a set-screw d, adapted to a threaded opening
40 c in the portion C' and passing through a slotted opening d' in the portion D', so that as the periphery of the piston or the interior face of the cylinder wears away from use the distance
45 between the center of the shaft and the center of the crank-pin may be altered to accommodate such wear.

Mounted above the cylinder A is the steam-chest, which is divided into three chambers
50 E F G, the chambers E and G communicating

with steam-pipes and being capable of acting, when required, either as entrance or exhaust chambers.

Within the chamber F is placed a block H, snugly fitting in the lower portion of the chamber and having its central portion recessed
55 for the reception of a cut-off sleeve I, within which is a valve-block J, having a transverse recess for the passage of the abutment K, carried by or formed integral with the piston B.
60

The block H is provided with steam-ducts h h', which communicate with steam-passages e g, leading from the chambers E and G, respectively, and is also provided with openings
65 h² h², through which pass diametrically opposite bars I', each having one end secured to the cut-off sleeve I. The upper and lower portions of this cut-off sleeve are cut away for a distance corresponding to the width of the
70 abutment K, so as to permit the free movement of the latter, while its inner portion is recessed in such manner as to snugly fit around the valve-block J.

The opposite sides of the cut-off sleeve I are connected by the levers I' to vertical rods m m,
75 which extend through stuffing-boxes in the covers of the chambers E and G, and at a suitable point outside of the chambers are connected, respectively, to the opposite ends of a lever M, fulcrumed at n and provided, preferably,
80 with a reversing-lever N, by means of which the position of the cut-off sleeve may be altered when the engine is to be reversed.

In the valve-block J are two passages r r', extending for the full length of the block and
85 open at all times to the cylinder A and moved by the oscillation of the block in such manner as to communicate with the ports h h', leading to the chambers E and G, so that the steam may have free entrance and exit to and
90 from the cylinder, the supply of steam being automatically cut off, however, at any desired point dependent upon the adjustment of the cut-off sleeve I. In the cut-off sleeve are
95 ports i i', the position of which may be altered, so that steam can be taken from either the chamber E or the chamber G, as desired. Thus in Fig. 1, the engine rotating in the direction of the arrow, steam is being admitted
100 to one side of the piston from the chamber G

through the ports *g h' i'* and escaping from the chamber on the opposite side of the piston through the ports *h i e* to the chamber E.

If the cut-off sleeve be adjusted to the position shown in Fig. 3, the chamber E becomes the live-steam chamber and the chamber G the exhaust, the piston then revolving in the opposite direction to that shown in Fig. 1, or in the direction shown by the arrow in said Fig. 3. Various means may be employed for shifting the position of the cut-off sleeve, and valves should be placed in the pipes E' G', so as to provide for making the chambers E G either inlet or exhaust chambers, as desired. Such valves may, for instance, be plunger-valves, such as shown at E² G² in Fig. 4, each valve having both a through-passage, serving to connect the pipe E' or G' with a steam-inlet pipe *e'* or *g'*, and an angle-passage serving to connect the pipe E' or G' with an exhaust-pipe *e²* or *g²*. Thus, as shown in Fig. 4, the valve E² connects the pipe E' with the inlet-pipe *e'*, while the valve G² connects the pipe G' with the exhaust-pipe *g²*, change in the position of the valves effecting a reversal of these conditions. Simultaneous operation of the valves may be effected by a lever similar to and carried by the same shaft as the lever M.

I claim as my invention—

1. The combination of the cylinder, the rotated piston therein, an oscillated abutment carried by said piston, a valve-block through which the abutment passes, said valve-block having steam-passages, chambers on either side of the valve-block adapted for use as sup-

ply or exhaust mediums for the steam, means for governing the use of said chambers, and communicating passages extending from said chambers to the periphery of the valve-block, said valve-block adapted to be moved into line with the said steam-passages by the oscillation of the abutment, substantially as specified.

2. The combination of the cylinder, the piston therein, an abutment connected to said piston, a valve-block through which said abutment passes and by which it is operated, a cut-off sleeve surrounding said valve-block, steam-ports, and devices for reversing the position of the cut-off sleeve, substantially as specified.

3. The combination of the cylinder and its piston, the abutment, an oscillated valve-block, supply and exhaust chambers on either side of the valve-block, valves controlling the inlet and outlet of the motive fluid to said chambers, a cut-off sleeve surrounding the valve-block, and levers connected to the cut-off sleeve and the valves controlling the inlet and outlet of the motive fluid, whereby the position of said cut-off sleeve and the direction of movement of the engine may be reversed, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC N. FORRESTER.

Witnesses:

JNO. E. PARKER,
JOSEPH H. KLEIN.