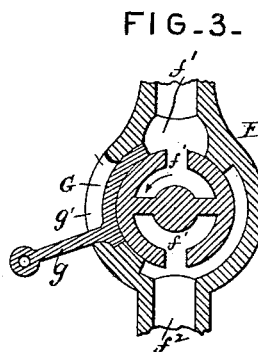
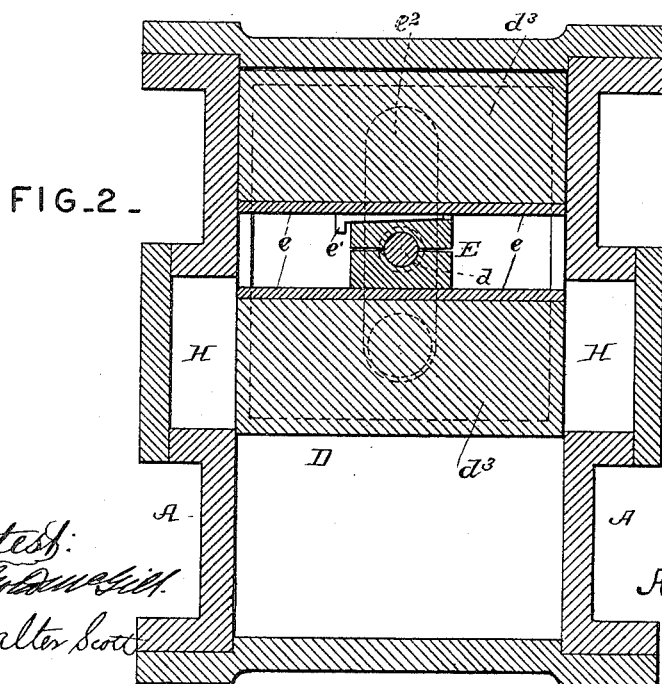
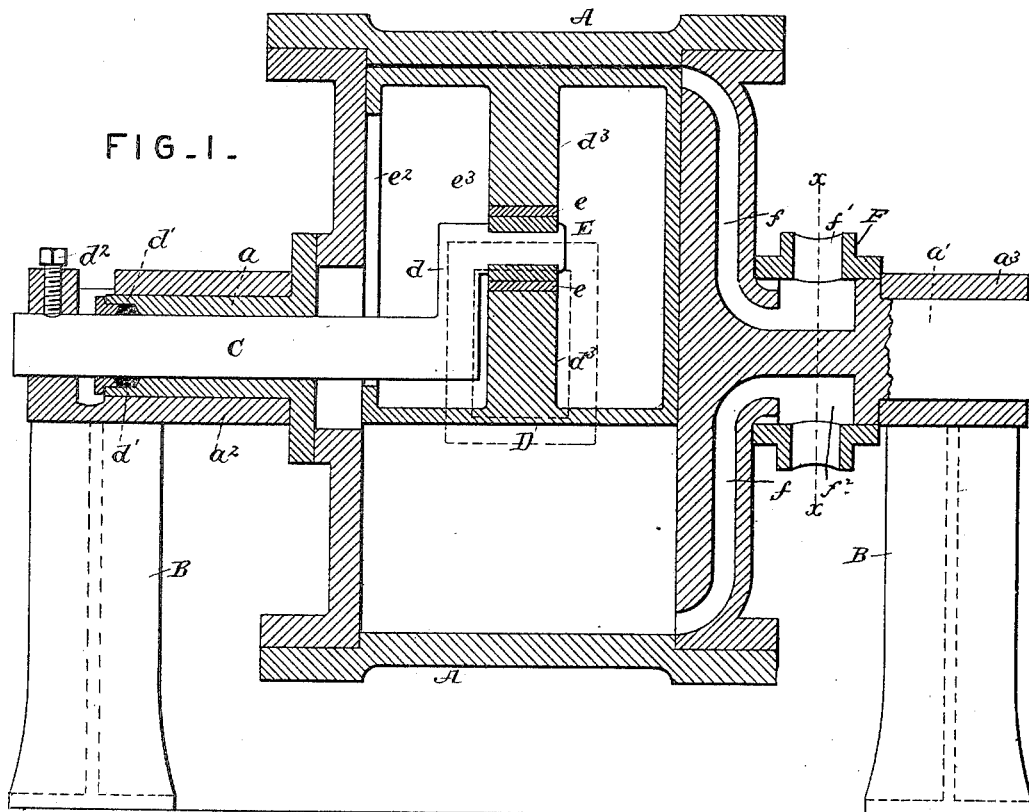


(No Model.)

A. N. PARNALL.
ROTARY ENGINE.

No. 419,062.

Patented Jan. 7, 1890.



Attest:
Alfred N. Parnall
Charles Scott

Inventor:
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By *Raine & Sons,*
attys.

UNITED STATES PATENT OFFICE.

ALFRED N. PARNALL, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO
JAMES W. JACKSON, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 419,062, dated January 7, 1890.

Application filed August 15, 1889. Serial No. 320,813. (No model.)

To all whom it may concern:

Be it known that I, ALFRED N. PARNALL, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention pertains to certain new and useful improvements in rotary engines; and it consists in a stationary shaft and crank upon which is secured, so as to revolve there-around, a reciprocating piston moving within a cylinder revolving on two journals or trunnions, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of my improved rotary engine. Fig. 2 is a transverse sectional view thereof. Fig. 3 is a sectional detail on the line *x x*, Fig. 1.

Referring to the drawings, A designates the revolving cylinder, provided at its ends with trunnions *a a'*, which are secured in journal-boxes *a² a³*, supported by stanchions B.

C is a stationary shaft having a crank end *d*, said shaft being passed through trunnion *a* and a stuffing-box *d'*. A set-screw *d²*, working in journal-box *a²*, bears upon this shaft and holds the same rigidly in position.

D is a piston provided with opposite central plates *d³ d³*, having steel or other metallic facings *e*. This piston is secured upon the crank end *d* of shaft C, said crank being inclosed in a two-part box or cross-head E, secured between the opposite edges of plates *d³* by means of a wedge-key *e'*. A large opening *e²* is formed in one face of piston D, and through it shaft C is designed to project. Within the chamber *e³*, formed by the plates *d³* and one side of the cylinder, oil or other lubricant is placed. Trunnion *a'* is cast with or otherwise secured to cylinder A and operates within journal-box *a³*. This trunnion at

its inner end is provided with two opposite steam-ports *f f*, which also extend through the cylinder A to opposite points thereof.

F is a valve encircling trunnion *a'*, adjacent to the box *a³*. This valve is provided with a steam-chamber *f'* and an outer or exhaust chamber *f²*, and also with an automatic or variable cut-off G, having a handle *g* projecting through a slot *g'* of valve F. By means of cut-off G the space between the opposite upper ends of steam-chamber *f'* can be increased or diminished, and by means thereof the feed of steam through ports *f* will be cut off at an earlier or later point of the stroke.

In Fig. 2 I have shown cylinder A as provided with side chambers H, designed for clearance of cross-head E and to permit of access to adjust wedge-key *e'*.

A pressure of steam or other elastic fluid admitted through one of the ports *f* will pass into the upper end of cylinder A, and the resulting pressure upon the face of piston D operating obliquely against stationary crank *d* causes said cylinder to rotate. The exhaust steam from the lower end of cylinder A passes from the lower port through the exhaust-chamber into the outer atmosphere.

I claim as my invention—

1. In a rotary engine, the combination of the stationary shaft having an inner crank end, the piston having a transverse opening and secured on said crank end, and the cylinder inclosing said piston and having the same axial bearing as said shaft, substantially as set forth.

2. In a rotary engine, the combination of the stationary shaft having an inner crank end, the piston having a transverse opening, the two-part box or cross-head securing said crank end in said opening, and the cylinder inclosing said piston and having the same axial bearing on said shaft, substantially as set forth.

3. In a rotary engine, the combination of the stanchions, the stationary shaft supported by one of said stanchions and having an inner crank end, the piston secured on said crank end, and the cylinder inclosing said piston and having trunnions supported by said stanchions, substantially as set forth.

4. In a rotary engine, the combination of

the stanchions, the stationary shaft supported by one of said stanchions, the piston secured on the inner end of said crank and having a central transverse opening, and the cylinder inclosing said piston and provided with end trunnions and steam-ports, substantially as set forth.

5. In a rotary engine, the combination of the stationary shaft, the reciprocating piston secured on the inner end thereof, the cylin-

der having end trunnions, one of which is provided with steam-ports, the valve inclosing said latter trunnion, and the variable cut-off, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED N. PARNALL.

Witnesses:

FREMONT STANSBURY,

EDWIN M. BROWN.