

A. ALLAN.
ROTARY ENGINE.

No. 179,836.

Patented July 18, 1876.

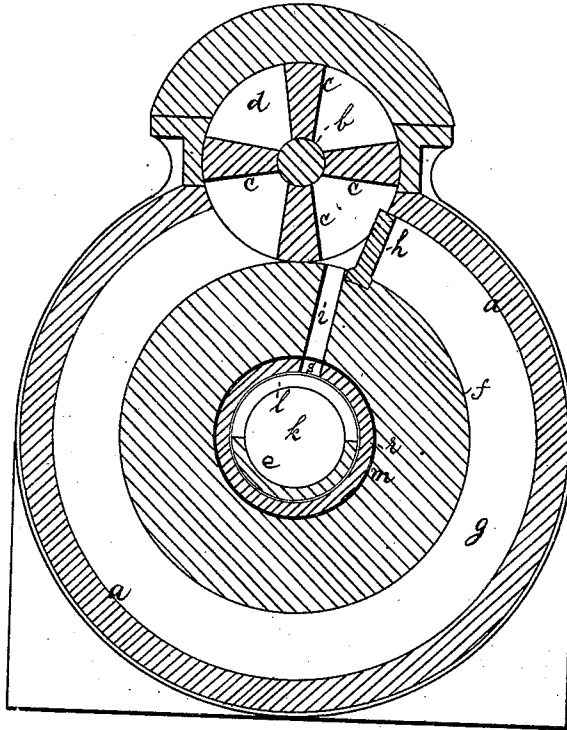


Fig. 1.

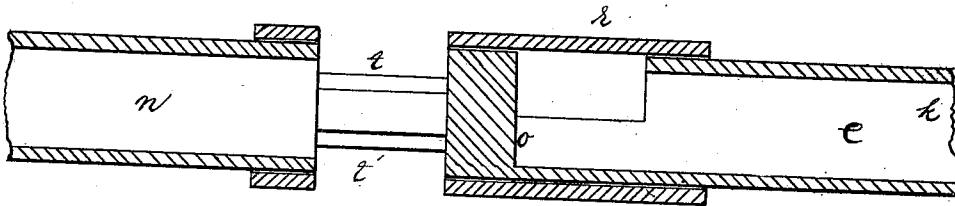


Fig. 2.

Witnesses.

A. E. Briggs
Frank H. Jordan.

Inventor.
Archibald Allan
per William Henry Clifford
att'y.

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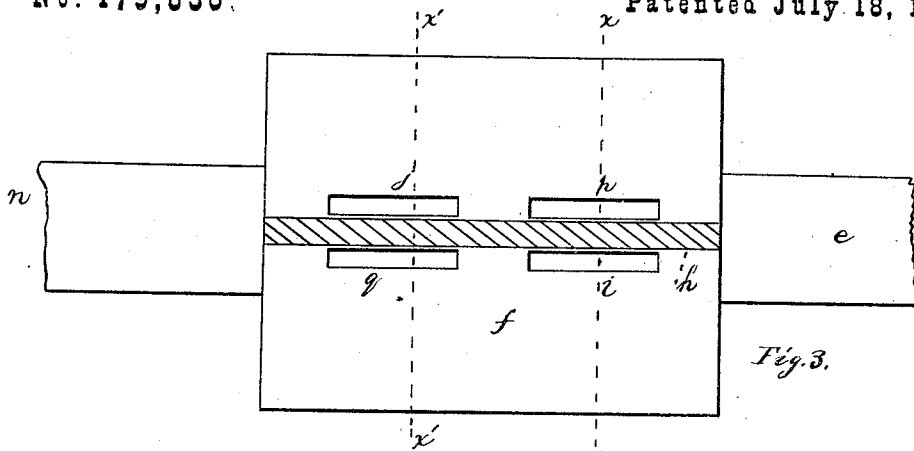


Fig. 3.

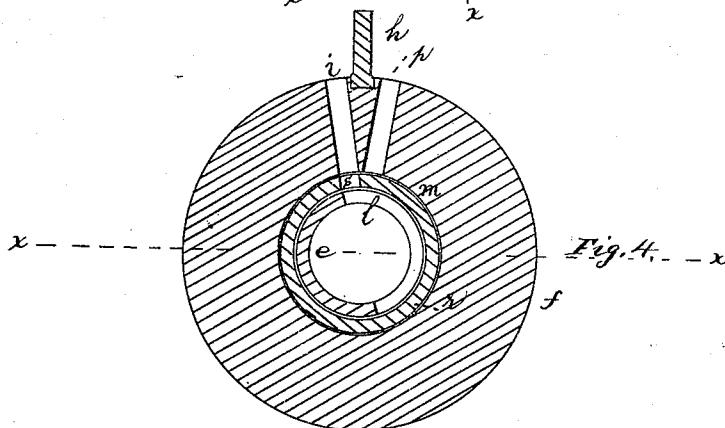


Fig. 4. — x

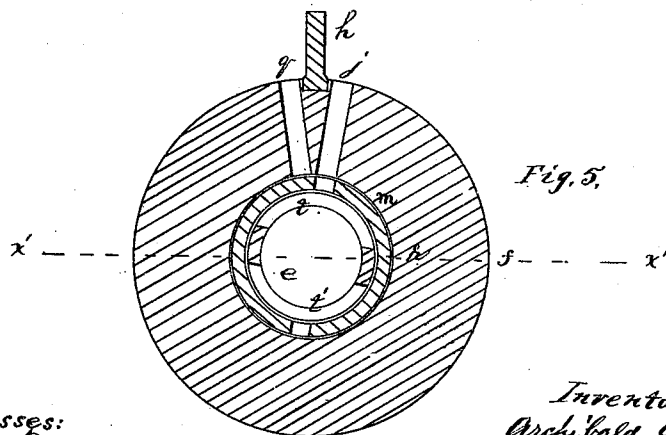


Fig. 5.

Witnesses:
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Frank H. Jordan.

Inventor:
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UNITED STATES PATENT OFFICE.

ARCHIBALD ALLAN, OF BARTLETT, NEW HAMPSHIRE, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE G. LUCY, OF SAME PLACE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **179,836**, dated July 18, 1876; application filed May 8, 1876.

To all whom it may concern:

Be it known that I, ARCHIBALD ALLAN, of Bartlett, in the county of Carroll and State of New Hampshire, 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, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a vertical section of the machine. Fig. 2 is a longitudinal vertical section of the shaft and sleeve. Fig. 3 is a plan of the cylinder with ports and piston. Fig. 4 is a section taken through the line *xx*. Fig. 5 is the same through the line *x'x'*.

Same letters show like parts.

The subject of this invention is a rotary engine, the structure and operation of which may be understood from the following description:

a is the outer cylinder. *b* is a shaft placed at the top of said cylinder, and provided with flanges *c* and end pieces *d*. This shaft, with its flanges and end pieces, fills a space cut out of the cylinder *a* at the top. *e* is a stationary hollow shaft, upon which rotates the cylinder *f* within the outer cylinder *a*, and which inner cylinder is sufficiently less in diameter than the interior of the outer cylinder *a* to leave the annular space *g* between the outer periphery of one and the inner periphery of the other. The cylinder *f* is provided with the piston *h*. Upon the cylinder *f* is the induction-port *i*, and the eduction or exhaust port *j*.

Suppose the two cylinders to be in the relative position shown in Fig. 1, steam enters the hollow stationary shaft at *k*, and reaches the steam-port *l* in said shaft. From thence it enters the port *i* in the cylinder *f*, and is thus admitted into a space between the piston *h*, the cylinder *a*, the shaft *b*, and two of its flanges *c*, where the steam is confined. Thus the steam, pressing against the piston *h*, and continuing to enter through the port *i*, causes a revolution of said cylinder *f*, and its tubular shaft *m*. The cylinder *f* continues to re-

volve until it has made a complete revolution, and until the piston *h* touches one of the flanges *c* on the shaft *b*. At this instant, by proper mechanism connected with the shaft *b*, outside of the cylinder *a*, and operated by the revolutions of the shaft *m*, the shaft *b* is revolved sufficiently to allow the piston *h* to pass the flange, against which it touched on the shaft *b*. This movement of the shaft *b* brings the two parts, viz: the shaft *b* with its flanges, and the cylinder *f* with its piston, into the same relative position before referred to, as shown in Fig. 1. Now, the piston *h* is again ready to take steam, and the dead steam in front of it is, as it revolves, forced out through the eduction-valve *j* of the cylinder *f*. From thence it passes through the exhaust-port *n* of the stationary hollow shaft *e* into the air. The ports *i* and *j* are always open. When the engine is once in operation the exhaust-port is constantly emitting steam.

Thus it will be seen that steam is admitted at one end of the hollow shaft *e* and thrown off at the other. Fig. 2 shows the shaft in detail.

When the steam enters this shaft at *k* it passes along the same until it strikes the abutment *o*, from whence it is turned into the cylinder *f*, and from thence passes through port *i*, as before described. After having performed its duty, and having entered the exhaust-port *j*, it enters the shaft *e* again on the other side of the abutment *o* at the exhaust *n*, and from thence passes away.

It will thus be seen that each successive revolution of the piston *h* drives before it the dead steam, and when the revolution is completed, said steam has been forced out of the exhaust *j* by the pressure of said piston.

Motion in either direction can be given to the cylinder *f* by setting in operation the two ports *p* and *q* on the cylinder *f*, and closing the two, *i* and *j*, heretofore spoken of. In such case *p* becomes the induction and *q* the exhaust. This is effected in the following manner: A sleeve, *r*, surrounds the hollow shaft *e*, and has the steam-port *s* and the two exhaust-ports *t t'*. This sleeve is operated by any convenient mechanism on the outside of the engine.

Suppose the ports *i* and *j* to be open, as before described, then the sleeve *r* is so revolved as to bring its steam-port *s* to communicate with the port *p* on the cylinder *f*. When thus turned, *i* and *j* are closed by the sleeve *r*, and the port *q* becomes the exhaust and *p* the induction. The steam thus being admitted on the side of the piston *h*, opposite to *i*, and exhausted opposite to *j*, the revolution of the machine is necessarily in an opposite direction from what it would be when the other ports were in use. Of course the mechanism to move the shaft *b* is adjusted to conform to this reverse revolution.

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

In combination with the cylinder *a*, the shaft *b*, with its flanges *c*, the stationary hollow shaft *e*, with its ports and abutment, the cylinder *f*, with its piston *h*, its ports and shaft *m*, the sleeve *r*, with its ports *s*, *t*, and *t'*, as herein described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ARCHIBALD ALLAN.

Witnesses:

WM. HENRY CLIFFORD,
FRANK H. JORDAN.