

J. Collicott,
Rotary Steam Engine.

N^o 53,731.

Patented Apr. 3, 1866.

Fig: 1.

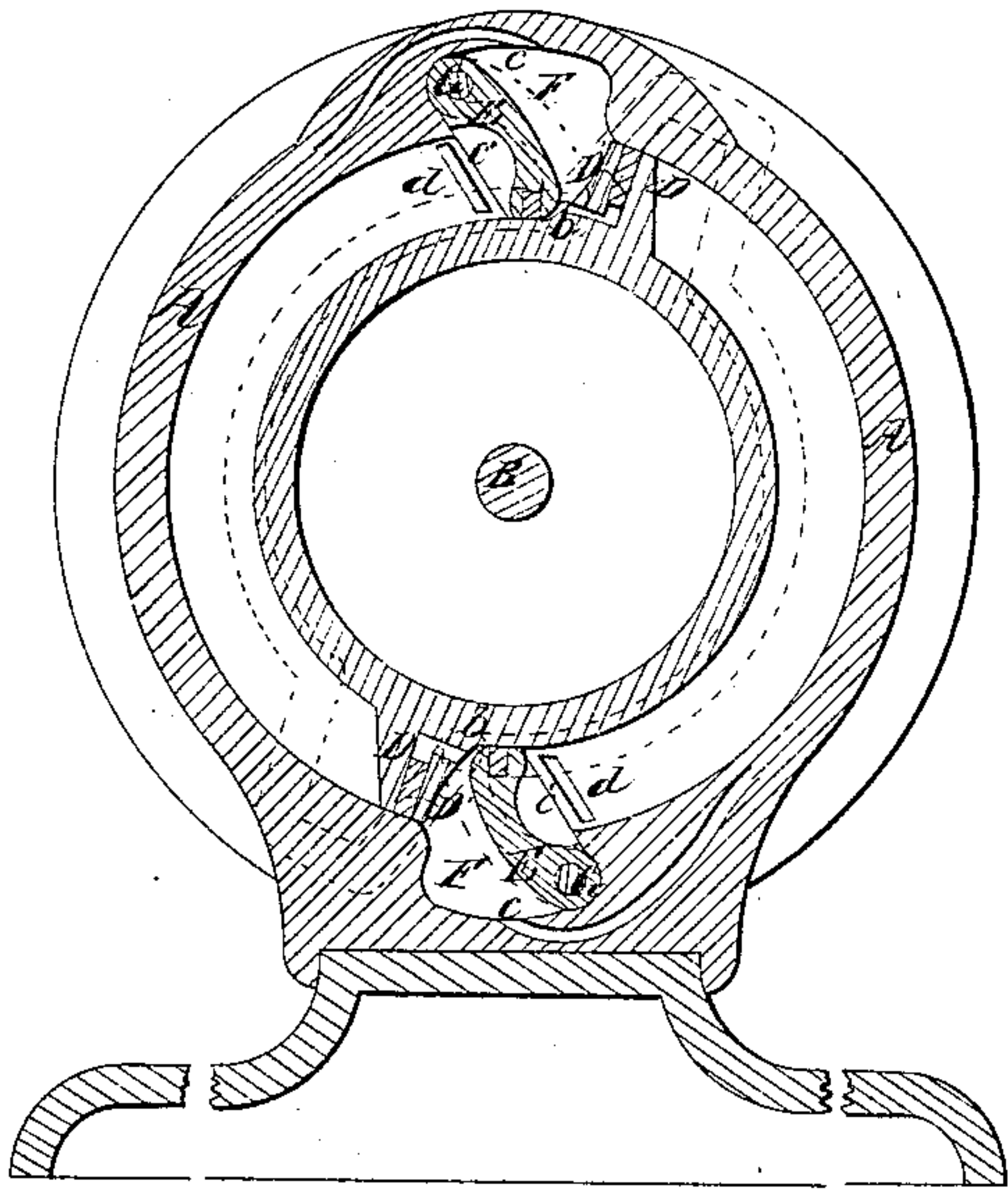


Fig: 2.

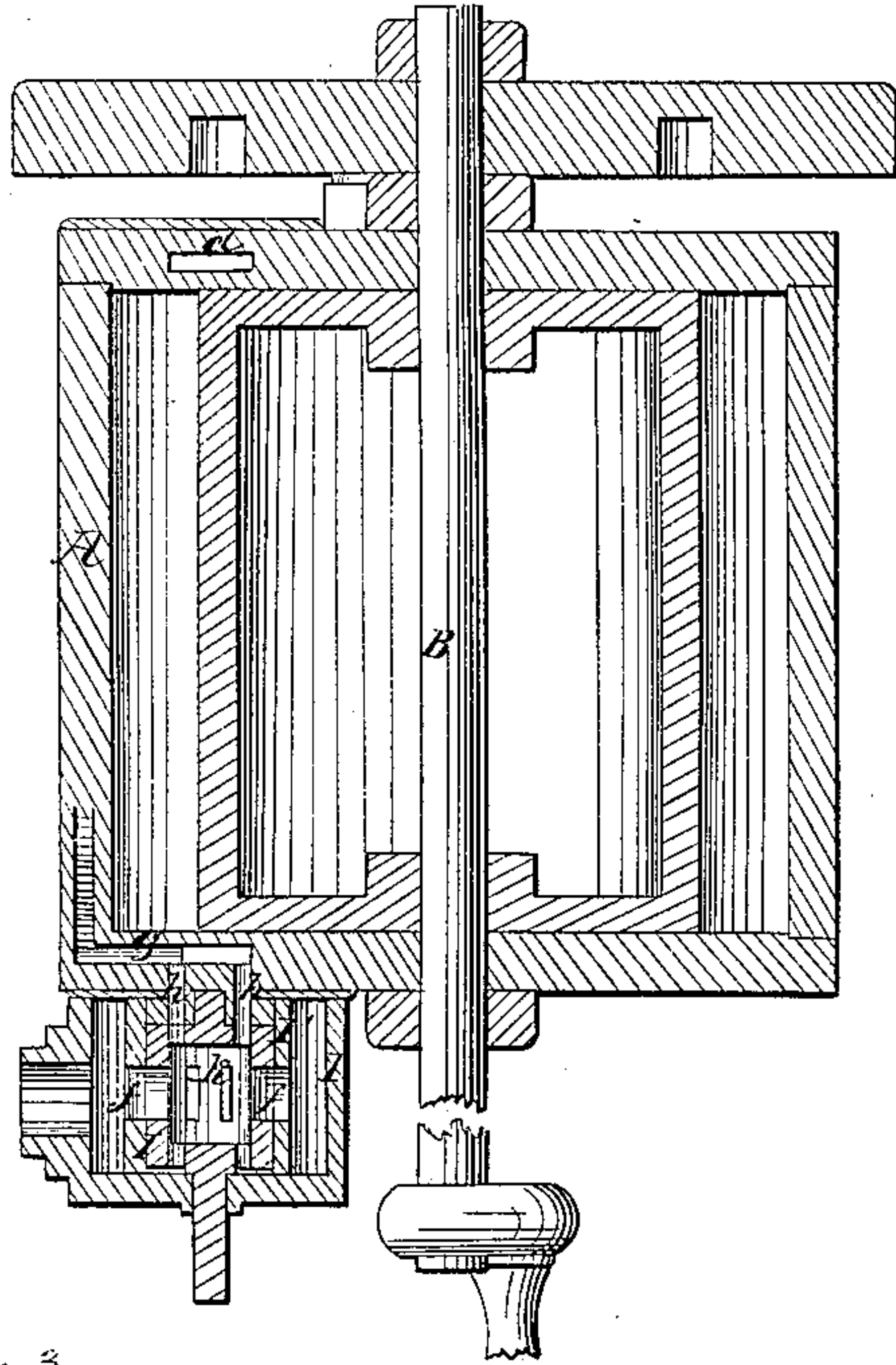


Fig: 3.

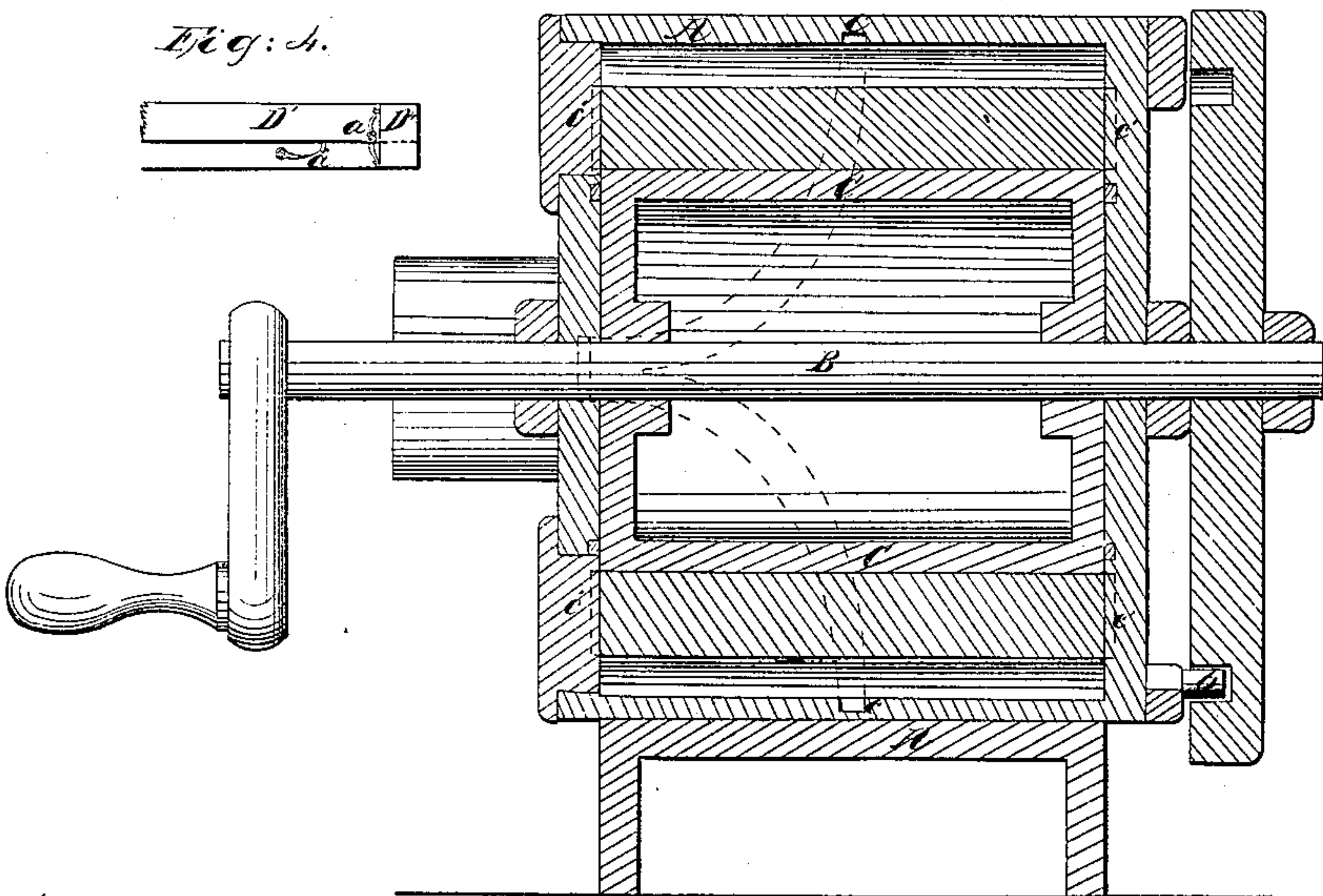


Fig: 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN COLLICOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND OTIS MARSHALL, OF SAME PLACE.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. 53,731, dated April 3, 1866.

To all whom it may concern:

Be it known that I, JOHN COLLICOTT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Rotary Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a transverse section. Fig. 2 is a horizontal section, and Fig. 3 a vertical section in a plane parallel with and through the axis. Fig. 4 shows parts in detail.

In all the figures like parts are indicated by the same letters of reference.

A is the outer casing or cylinder of my engine, and is stationary. Upon the shaft B, having its bearings in the heads of the cylinder A, is another cylinder, C, less in diameter than A, the space between them being the chamber in which the steam operates upon the pistons D D, which are secured to and revolve with the cylinder C on the shaft B.

The pistons D D are packed with strips D' D', of suitable material, which are inserted in the pistons, as shown in Fig. 1, fitting closely, but still capable of movement in such a manner as to press tightly against the inner surface of the cylinder A, such movement being caused by the pressure of steam which passes in under them through holes in the pistons on that side which receives the direct action of the steam.

When the steam is not acting, as at the time when the pistons are passing the valves E E, the packing-strips are retracted or drawn within their cavities by springs *a a*. (Seen in Fig. 4.)

The ends D'' D'' of the packing-strips are separate pieces, and are made to pack against the inner surface of the ends of the cylinder A by the same means as the strips D' D' are against the concave surface, and are governed by springs in the same manner.

In the cylinder A, and attached to its inner surface by joints, upon which they freely swing, are the valves E E, extending the whole length of the inside of the cylinder and hinged so as to swing into recesses F F in the cylinder A in such a manner that the annular steam-space

between the cylinders A and C may be uninterrupted for the passage of the pistons past the valves. These last extend beyond the ends of the cylinder C into recesses in the heads of the cylinder A, and are so arranged that their ends shut against ledges or rabbets, forming straight sides to such recesses, where they are kept by the pressure of the acting steam, preventing the escape of steam around their ends and protecting the packing *i*, with which they are furnished, from undue pressure against the surface of the cylinder C as it revolves.

The motion of the valves is produced as follows: The stems G G of the valves pass through one end of the cylinder A and are attached to cranks, the pins *b* of which extend into a groove in the cam H, fixed on the end of the shaft B, and revolving with it on the outside of the cylinder A. This groove is shown in red in Fig. 1. The cam H is so fixed on the shaft in relation to the pistons D as that just as the piston reaches the valve which extends across and closes the steam-space, and before they are in actual contact, one of the straight sides of the groove catches the pin *b* and causes the valve E to be lifted out of the way of the piston while the piston is passing under it, and as soon as this has happened the other straight side allows the pin *b* to fall again, carrying with it the valve again across the steam-space behind the piston. This is immediately operated on by the steam from the ports *c c*, which open into the recesses F, so that the steam shall be injected between the moving piston and the valve and impinge directly upon the piston, thus adding the impulsive force of the jet to the expansive power. This takes place on opposite sides of the engine at the same time and relieves the bearings of the piston-cylinder from unequal or oblique pressure. The escape-openings *d d* open from the annular steam-space and communicate, by proper channels, with the eduction-opening in the head of the cylinder A that is next to the cam H. The openings *d d* are near the valves E, and on that side of them which is approached by the pistons in their revolution.

That portion of the cylinder A which forms the recess for the upper valve may be open and fitted with a cover so arranged that it shall be the top of the recess and be secured

in place by bolts or keys, permitting it to be lifted off, allowing easy access to the valves and pistons for the purpose of adjustment and repairs without disturbing other parts of the engine.

The steam-chest is composed of two concentric cylinders, I I', having an annular space, *ee*, between them, connecting with the steam-pipe from the boiler. The inner cylinder, I', has a valve, K, also a hollow cylinder ground to fit steam-tight in the cylinder I'. Through this cylinder are openings *ff*, at equal distances, on its circumference. The valve K has corresponding openings, the spaces between the openings in both valve and cylinder being wider than the openings, so that the spaces on the valve may be turned opposite to and close the openings in the cylinder.

The space inside of the valve K communicates, by the openings *hh*, through the seat of the steam-chest and head of the cylinder A, with the channels *gg* to the steam-ports *c*.

The valve K has holes through its front end, through which the steam may pass to exert a pressure upon it from against the head of the steam-chest to balance the pressure from the action of the steam in the engine.

The arrangement of the parts of my invention is equally adapted to air-engines as with steam-engines.

It should be remarked that the escape-open-

ings *dd*, instead of being in one or both of the heads of the cylinder A, as represented in the drawings, may extend the whole length of the annular steam-space and open into the body of the cylinder A, near the valves, there to connect with channels extending around and within the body of the casing A to their outlets.

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

1. The pistons DD, when formed in one piece with or immovably fixed to the rotary cylinder, and provided with packing-strips acted on by the pressure of the steam, substantially as and for the purposes herein set forth.

2. The steam-chest, with its rotating balanced valve, in combination with the steam ports and channels of a rotary steam or air engine, when arranged so that the steam shall be allowed to impinge directly upon the pistons in the center of their lengths, and at right angles, or nearly so, with their surfaces.

3. The hinged valves extending from end to end of the cylinder, when formed at their ends to pack against the shoulder *c'* on the cylinder-heads by the pressure of the steam, as described.

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