G. H. BAILEY.

Rotary-Engines.

No. 149,023. Patented March 31, 1874.

Fig. 1.

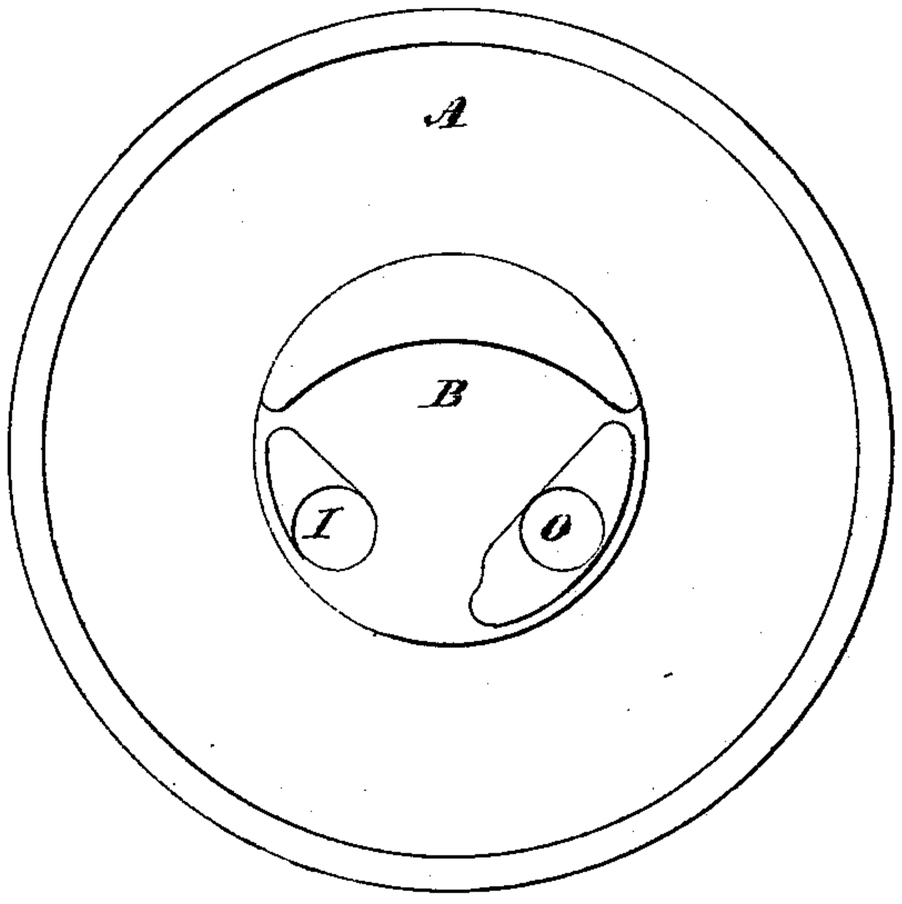


Fig. 2

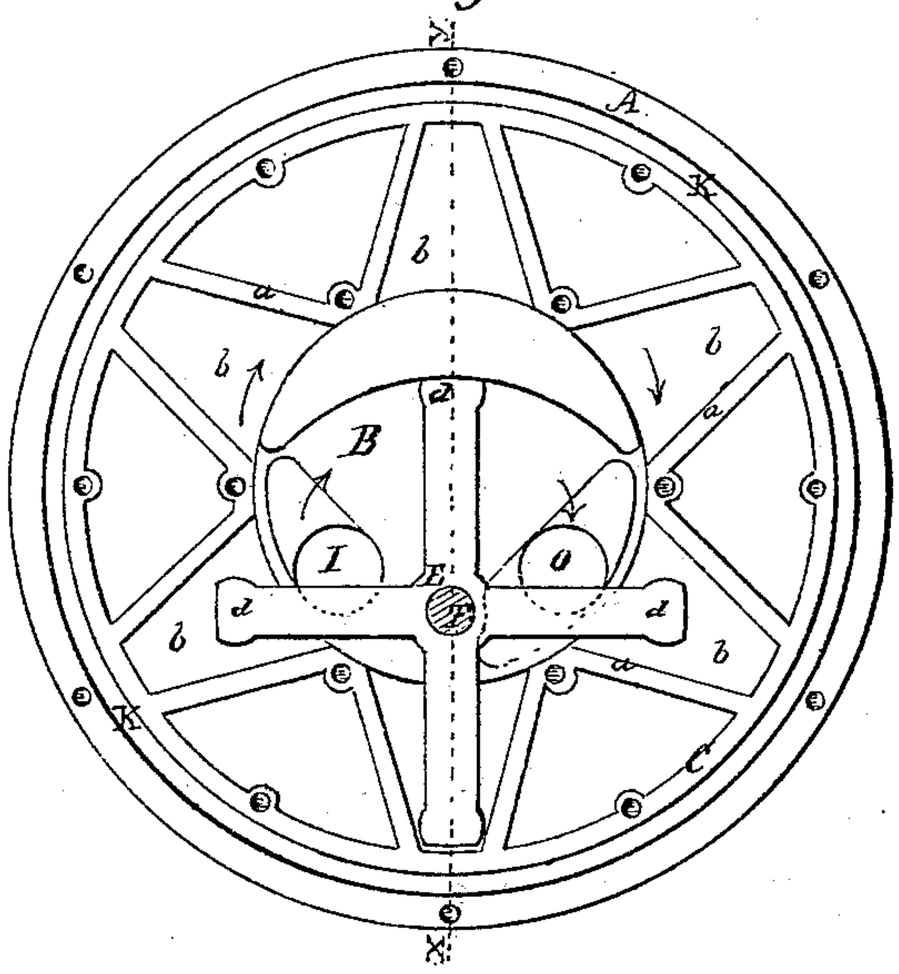
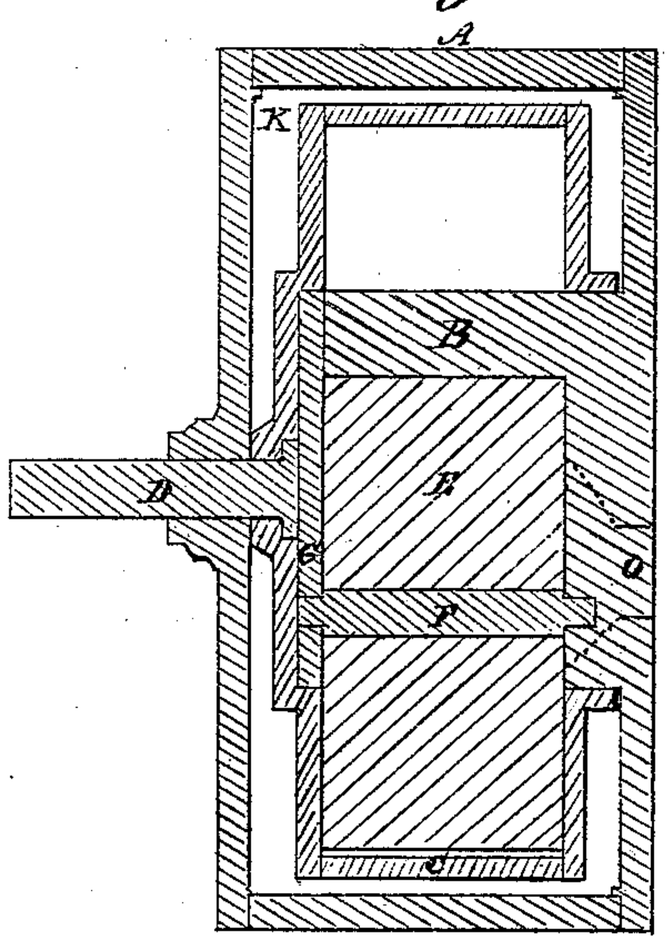


Fig. 3.



Witnesses.

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Geo. M. Bailey

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UNITED STATES PATENT OFFICE.

GEORGE H. BAILEY, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **149,023**, dated March 31, 1874; application filed June 26, 1873.

To all whom it may concern:

Be it known that I, GEO. H. BAILEY, of Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Rotary Engines, of which the following is a specification:

My invention relates to the class of machines for applying power known as rotary engines or motors, and has for its object the removal of certain difficulties inherent in all rotary engines as heretofore constructed—viz., the great amount of rubbing surface and consequent friction and wear of the parts, the difficulty of packing, and extreme care and nicety of workmanship required in fitting.

I will proceed to describe my invention, having reference to the accompanying drawings and the letters and figures marked thereon.

Figure 1 of the drawings is a view of the exterior case and hub, showing the induction and eduction passages. Fig. 2 is a view of the engine with one head removed. Fig. 3 is a section taken on the axis of rotation.

A is a cylindrical box or case, having a hub, B, cast upon or secured to one head thereof. This hub forms the bearing for the revolving drum C, and is concentric with the exterior case. The revolving drum C turns freely on the hub B, and without contact with the interior of the case A, having the annular space K surrounding it. The revolving drum is closed at both ends by heads secured to it with steam or water tight joints. The shaft D, by which power is applied or transmitted, is attached to one head of the revolving drum, and passes through the head of the exterior case. The interior of the drum is divided by partitions, so as to form a series of pistons, *a a*, &c., and chambers *b b*, &c., shaped and arranged substantially as shown in Fig. 2, and working in steam or water tight contact with the surface of the hub. E is a revolving abutment or cut-off, working steam or water tight between the heads of the revolving drum, and is set eccentric with the drum and hub, turning on the axle or pin F. The hub B, for a distance equal to the length of the cut-off, has the form of a lune-shaped segment, the exterior curve of which is that before described as furnishing the bearing for the revolving drum, and the interior curve of which is that described by the extremities of the arms of the cut-off. Against the surface so formed the cut-off works steam or water tight. The position and form of the cut-off are such as to allow the pistons of the revolving drum on one side of the center of rotation to receive the full driving pressure, while by the constant interposition of the cut-off on the opposite side the pistons are relieved of pressure. The arms *d d*, &c., of the cut-off are so arranged with reference to the pistons and chambers of the revolving drum, and are of such form and dimensions, as to exactly fall into and occupy the chambers in the revolving drum, and the pistons of the revolving drum exactly fall into and occupy the spaces between the arms of the cut-off, the cut-off E being revolved by contact of its arms at their extremities with the pistons *a a*, &c., and, being perfectly balanced, or, in other words, having precisely the same pressure on opposite sides of the center of rotation, turns freely and with little resistance. The axle or pin F may have a support, when necessary, in the head G, secured to the end of the hub, and recessed into the head of the revolving drum. In light machines this bearing-head may be dispensed with. I is the induction, and O the eduction, passage. These enter through the head of the exterior case below the segment-hub, and at a distance apart slightly more than the distance between the arms of the cut-off, so that the arms of the cut-off will, in every position, cut off communication between them.

The operation of the engine is as follows: Pressure being applied through the opening I is received by the surface of the piston which happens to be in contact with the exterior surface of the hub B. On the opposite side of the center of rotation, the arm *d* of the cut-off is extended into one of the chambers of the revolving drum, and, being in contact with the adjacent piston, forms a stop or cut-off, beyond which the steam or water cannot pass. The pressure in this direction is, therefore, sustained by the cut-off; but, as the opposite arm is subject to a like pressure in the opposite direction, the effect is neutralized, and the drum is revolved in the direction indicated by the arms in Fig. 2, carrying with it the cut-off. Each piston is in succession brought under

pressure, and a constant rotary motion established, the engine exhausting through the opening O. It is evident that the same arrangement may be applied for pumping water or other fluids, precisely the same construction answering for the pump as for the engine.

I have represented the revolving drum as working within a box or case. I prefer this arrangement, as its use avoids the necessity of packing between the hub and the revolving drum to insure a perfectly steam or water tight joint. I simply make a good mechanical fit with such packing as will not produce friction or be liable to wear, and if a slight leakage occurs, it fills the annular space around the drum, serving as a steam-jacket where steam is used, and in any case subjecting the exterior of the drum to the same pressure as the inside, thus enabling me to make it much lighter than would otherwise be practicable. The exterior case is made steam or water tight by suitable stuffing-box and packing around the shaft D.

It will be seen from the foregoing description that several points are gained by my improved construction. The amount of rubbing surface is greatly reduced; there are no difficult mechanical fits or adjustment of parts to each other; there is the least possible wear and friction, and the whole arrangement is simple, and not liable to derangement. The revolving drum, constructed as I have described, is, in effect, a fly-wheel with the power within itself.

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

1. The exterior case A, with its hub and induction and eduction passages, in combination with the revolving drum C and cut-off E, arranged so as to form a steam-jacket and equalizer of pressure around the drum, substantially as set forth.

2. The combination of the hub B, revolving drum C, and cut-off E, in a manner to produce an engine which rotates entire, substantially as described.

GEO. H. BAILEY.

Witnesses:

G. HOWARD BAILEY,

H. M. BAILEY.