

L. H. WOODS.  
Rotary Engines.

No. 144,941.

Patented Nov. 25, 1873.

Fig. 1.

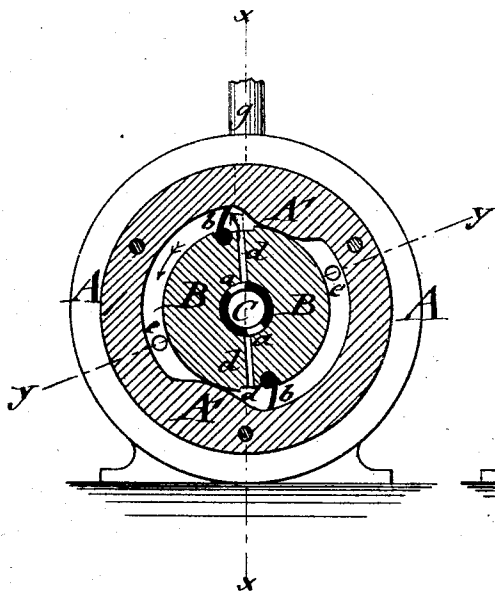


Fig. 2.

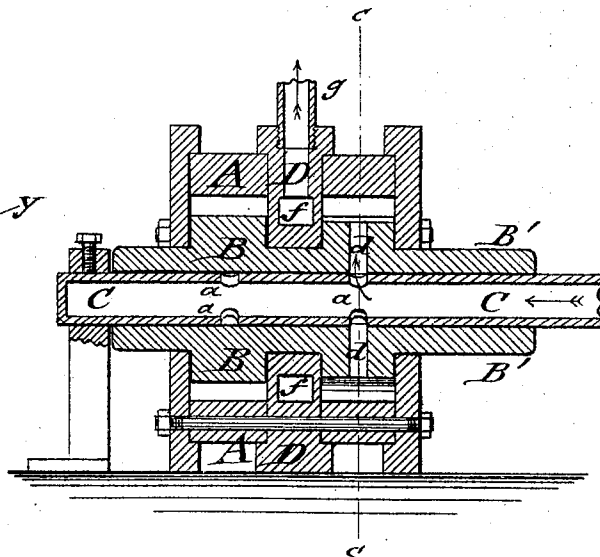
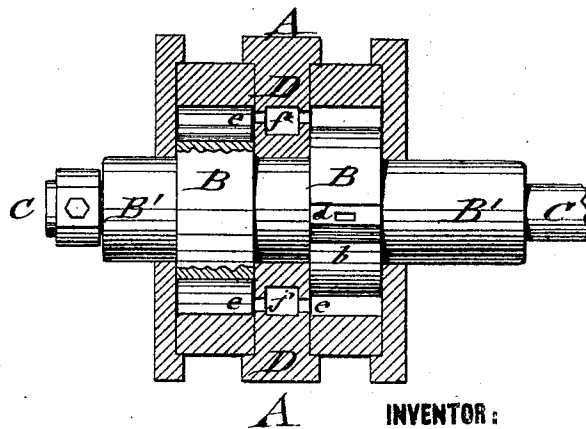


Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

LEONARD H. WOODS, OF SYRACUSE, NEW YORK.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **144,941**, dated November 25, 1873; application filed October 18, 1873.

*To all whom it may concern:*

Be it known that I, LEONARD H. WOODS, of Syracuse, in the county of Onondaga and State of New York, have invented a new and Improved Rotary Engine, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a vertical transverse section of my improved rotary engine on the line *c c*, Fig. 2; Figs. 2 and 3, respectively, vertical longitudinal sections of the same on the lines *x x* and *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of my invention is to produce a rotary engine, which overcomes some of the defects of that class of engines by being built very compactly, having no dead-centers, and reversing with perfect ease. My invention consists of the arrangement, in an outer steam-cylinder with abutments, of a rotating drum on a stationary hollow shaft with steam-ports, by which the steam is alternately applied to vibrating gates placed at right angles in the two sections of the drum, and exhausted by suitable ports.

A in the drawing represents the outer steam-cylinder, which is placed, by means of suitable stuffing-boxes, on the shaft-extensions B' of rotating drum B. Cylinder A is divided, by a central partition, D, in which the exhaust is arranged, into two parts, and provided in each part, at the inner surface, with curved projections or abutments A', which are made to touch drum B by suitable packing, and prevent thus communication of the steam-chambers at both sides of the same. Drum B rotates on a stationary hollow shaft, C, which is closed on one side, conducting, by means of entrance-ports *a a*, the steam from the boiler to cylinder A. The hollow shaft C is supported and retained in position in suitable manner. Its steam-ports *a a* are placed for both sections of drum B on the same side, which is also the case with abutments A' in steam-cylinder A. Drum B is also constructed in two sections at both sides of the central partition D, and provided with hinged vibrating gates *b* at diametrically-opposite sides, with or without springs, which close, when passing along abutments A', over steam-channels *d*, which

convey the steam from ports *a* through the drum to the inside of cylinder A. Gates *b* and channels *d* of one section of drum B are arranged under right angles to those of the other section, so that the rotating drum will receive steam at every quarter of a revolution, and retain it at full force while the other section receives its supply, which equalizes the power and permits the ready starting of the engine at any point. The exhaust-ports *e* are arranged in the central partition D, and lead to a channel, *f*, in the same, carrying the steam out by the joint-pipe *g*, as indicated in Fig. 2. The alternating action of the entering steam on the wings or gates of the drum rotates the same in the outer cylinder. They are closed in passing over the abutments and then thrown open by the steam until the engine gets started, when they are kept open by centrifugal force. When the gates of one section pass the exhaust-ports steam is cut off and applied to the other section, keeping the drum in even and continuous rotation.

For reversing, another steam cylinder and drum, arranged in the same manner, but with wings in opposite direction, are placed on the stationary steam-conveying shaft.

The compact construction of this engine allows its application to a great variety of purposes, where small space only is allotted to the engine and its boiler.

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

1. The rotary engine, consisting of the combination of steam-cylinder A, having abutments A', and exhaust-partition D, rotary drum B, and stationary hollow steam shaft C, arranged substantially as and for the purpose described.

2. The rotating drum B, having sleeves or shaft extensions B', hinged vibrating gates *b*, and steam-ducts *d*, which are arranged in such a manner that those of one section are at right angles to those of the other section, for the purpose set forth.

LEONARD H. WOODS.

Witnesses:

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