W. ATWOOD.

ROTARY ENGINE.

No. 68,337. Patented Sept. 3, 1867.

Fig.3.

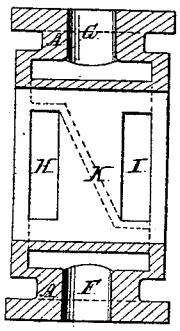


Fig.4.

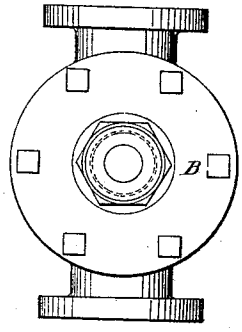


Fig.5.

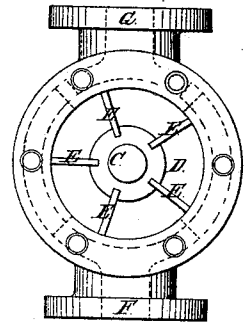


Fig.1.

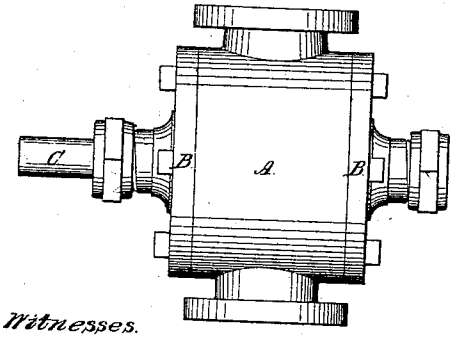
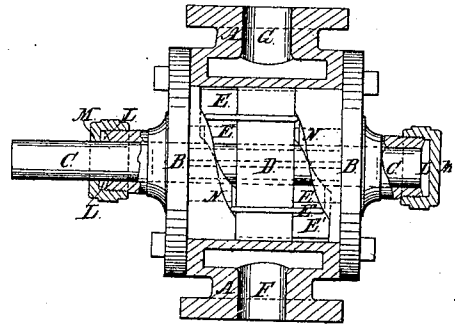


Fig.2.



Witnesses.

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Letters Patent No. 68,337, *dated September* 3, 1867.

IMPROVEMENT IN ROTARY ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM ATWOOD, of Cape Elizabeth, in the county of Cumberland, and State of Maine, have invented a new and improved Rotary Engine, Pump, Blower, &c.; and I hereby declare the following to be a full, clear, and exact description of the same, which will enable others to make and use my invention, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view of the cylinder.

Figure 2, same as in fig. 1, with parts broken out to show the shape of the chamber and the position of the ports.

Figure 3, a vertical longitudinal section of the cylinder, showing the chamber and ports.

Figure 4, an end view of the cylinder.

Figure 5, the same, with the cylinder-head removed, showing a plan of the rotating piston and the wings.

The object of my invention is the production of a rotary engine, pump, or blower, and consists, first, in the construction of a chamber having two or more inclinations and horizontal or level parts on the inner side of each cylinder-head, the highest portions on one head corresponding and being opposite to the lowest parts on the other head, or, where there are projections on one head, there are, opposite to these, depressions on the other; second, my invention consists of a rotary piston having slots and alternating or vibrating wings, the wings vibrating or alternating in the slots, and being equal in number to the slots.

The number of projections and depressions on the cylinder-heads, or the number of vibrating wings and of slots is not essential, but may be regulated by the wishes of the constructor.

In the accompanying drawings, N N show the formation of the interior or inner faces of the cylinder-heads, and the form of the chamber which they make. D shows the rotary piston, and E the alternating wings set in the slots in the piston D. The position of the piston, wings, and slots is clearly seen in the plan, fig. 5. The rotary piston D occupies and fills the centre of the chamber, and rotates therein. Steam, in case my invention is employed as a steam engine, is both taken and exhausted on both sides of the rotary piston; that is, it is taken and exhausted, for example, in fig. 2, upon the upper side of the piston, and the same upon the lower side thereof. So also the alternating or vibrating wings take and exhaust the steam, first upon one, then upon the opposite side of the piston. This is effected by the inclined portions on the interior or inner faces of the cylinder-heads. Let F represent the induction-port. Then F communicates with the chamber in two channels, one above the piston D, on one side of the cylinder, and another below the piston on the other side of the cylinder. (See for illustration fig. 2.) The exhaust G communicates with the chamber above the piston, on the opposite side of the cylinder from which the induction F communicates with it, on the same side of the piston; and the same is true of the induction and exhaustion-ports on the lower or opposite side of the piston. Each of the ports within the cylinder is in extent one-quarter of the inner circumference of the cylinder, so that the two ports on the opposite sides of the said inner circumference of the cylinder extend around or occupy one-half of the said inner circumference. The number of the alternating wings must exceed the divisions of the said inner circumference which the said ports would make, as for example as is shown in the drawing. Each port is one-quarter of the inner circumference of the cylinder, in which case there must be at least five of the vibrating wings, with the view that two are continually presented to the expansive force of the steam, one above and one below the rotating piston, in order to secure its continuous motion. As shown in fig. 3, the ports or apertures H I are rectangular in form; but it will be understood that, by the formation of the chamber by means of the projections and inclinations on the interior faces of the cylinder-heads, these apertures H I are closed in the direction of the diagonal, from one corner to another, so that the form of them open to the admission and exit of the steam is that of a right-angled triangle, or nearly so.

The operation of my invention is as follows: Take, for example, the wing E′ in fig. 2. As in the rotation of the piston it rises up the inclined portion N, it takes steam on the upper side of the piston D; and having passed up the said inclination, and along the horizontal portion of the projection on the cylinder-head, it exhausts its steam on the same side of the piston, but on the opposite side of the cylinder, through the port G. At the same time the steam entering below or on the opposite side of the piston D impels the wing E″ in the same direction; and this steam is exhausted on the opposite side of the cylinder, below the piston, from that

which was admitted above. Thus each wing moved up and down in its slot in the piston by means of the projections on the cylinder-heads alternately receives and exhausts the steam on one and the other side of the piston; and thus a constant force is exerted upon the piston to cause and continue its rotation.

Suitable packing may be employed for those projecting parts of the cylinder-heads upon which the wings slide; and the same is the case if it be found necessary to insure the more perfect contact of the edges of the wings with the interior of the cylinder. This may be accomplished by spring or other packing, as may be desired. The rotary piston may also be packed in the cylinder in any of the ordinary methods.

I have specified the inclined and horizontal parts as being attached to the cylinder-heads; but it is evident that the cylinder may be constructed in two parts, or divided transversely at the centre, having the heads, and the two portions of the cylinder-walls, and the portions therein, forming the chamber in single parts or pieces, united to each other by means of a shoulder or lip, as common.

I have thus far particularly described my invention as a rotary steam engine; but it is evident that the principles applicable to it as such, and the description heretofore made, intended to illustrate the same, show also its applicability for a rotary pump or a blower, in which uses it will throw, in the one case, an unbroken stream of water; in the other, of air.

In describing the parts which give form to the chamber I have used the term inclined plane; but I also desire to specify that such inclination may be in the form of a curve, which would, perhaps, ease the action of the rotary piston. The motion of the wings has also been described in planes parallel to the axis of the piston; but by a slight variation of the construction such motion may be at right angles to such axis, or at any inclination thereto; or the piston may be stationary, have ports therein, and the cylinder rotate, in which case the peculiar formation of the chamber may be imparted by constructing the inclined and horizontal parts upon the piston, and this also either upon its faces or edge.

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

1. The construction of the chamber having inclined and horizontal portions on the interior faces of the cylinder-heads, as and for the purposes described.

2. The rotary piston D, with its slots and alternating wings E, as and for the purposes described.

3. In combination with the cylinder-chamber, the rotary piston, and alternating wings, the arrangement of the four ports of the cylinder, substantially as and for the purposes described.

WM. ATWOOD.

Witnesses:

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