William A. Graham's Rotary Engine.

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PATENTED JUN 27 1871

Fig. 1

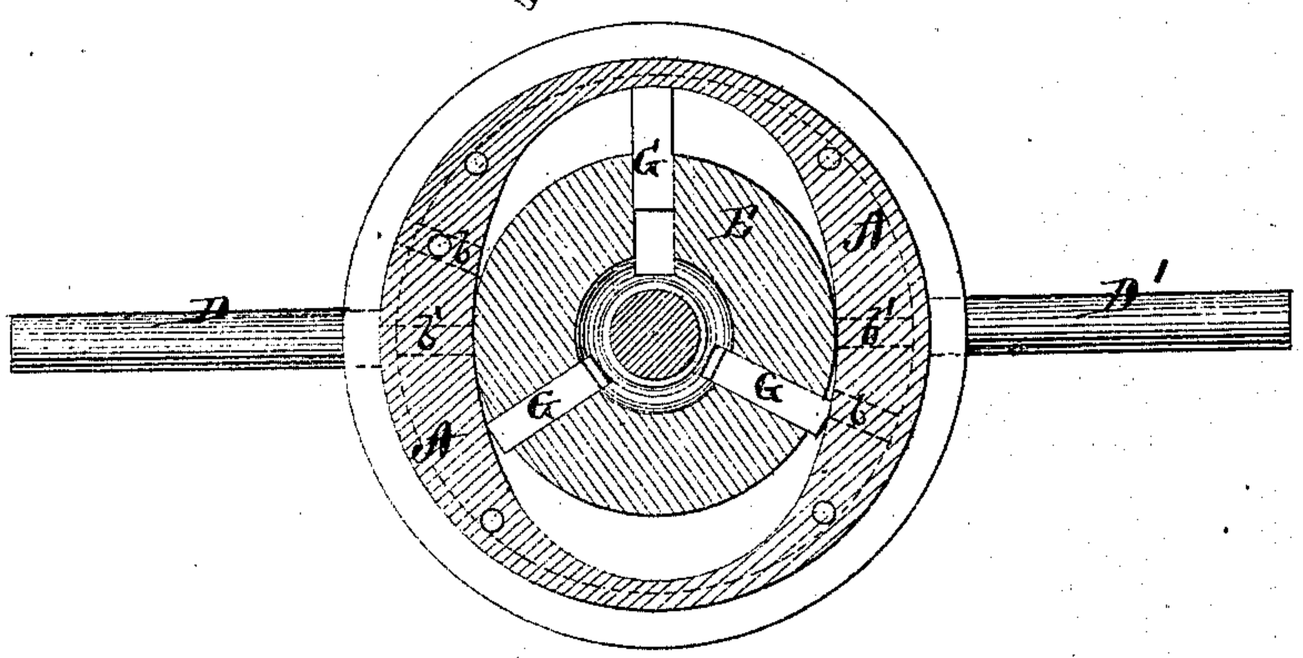
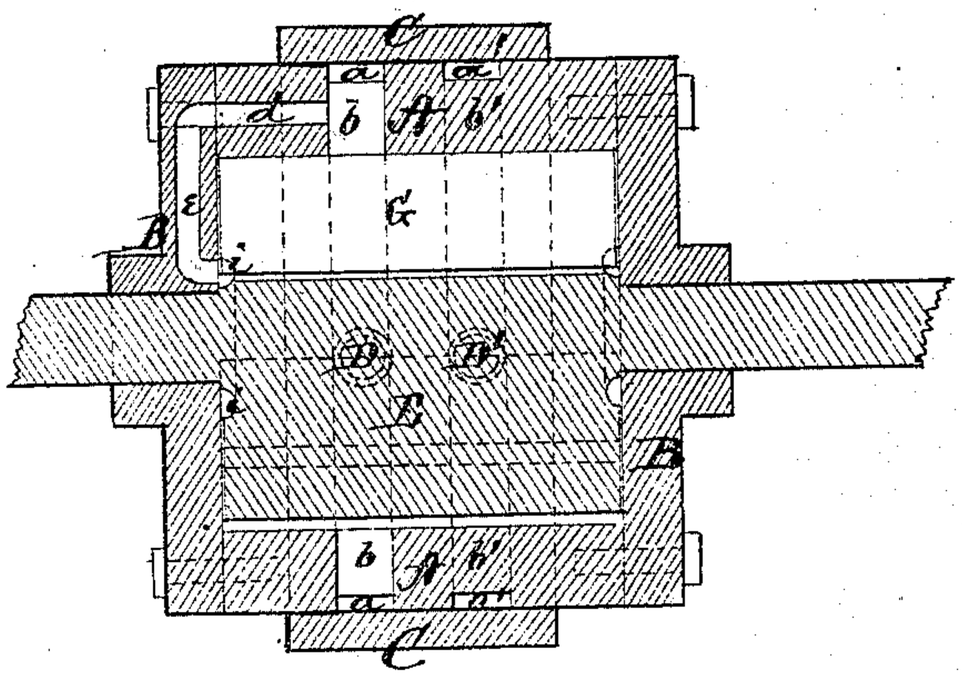


Fig. 2



Witnesses.

C. L. Emerson

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UNITED STATES PATENT OFFICE.

WILLIAM A. GRAHAM, OF CARLISLE, PENNSYLVANIA.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 116,436, dated June 27, 1871.

To all whom it may concern:

Be it known that I, WILLIAM A. GRAHAM, of Carlisle, in the county of Cumberland and in the State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of a rotary engine, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a transverse vertical section, and Fig. 2 is a longitudinal vertical section of my engine.

A represents a cylinder of any suitable dimensions, the ends of which are closed by the heads B B. The cylinder A is, upon the outside, provided with two parallel circumferential grooves, *a* and *a'*, which have ports *b b* and *b' b'* communicating with the interior of the cylinder. The cylinder is further surrounded by a steam-tight jacket, C, through which pass two tubes, D and D', the former leading into the groove *a* and the latter into the groove *a'*. In place of making the cylinder A and jacket C of separate pieces, they may be cast in one piece with the passages *a a'* and ports *b b'* through it. The interior of the cylinder A is oval-shaped, as shown in Fig. 1, and through the center of the heads B B pass the journals of a cylindrical head, E, which is of such diameter that it will fit snugly between the two nearest points of the interior surface of the cylinder. At these points I propose, in a full-sized machine, to make grooves or recesses in the inner surface of the cylinder, and extending the entire length of the same, for the reception of followers to be opereated by screws from the outside, whereby this joint may at all times be kept steam-tight. This will be necessary, as the head, revolving, cannot but wear more or less at these points. The revolving head is provided with three or more longitudinal grooves radiating from the center, at equal distances apart, in which grooves the pistons G G are placed. The steam entering through the pipe D passes into the groove *a*, and through the ports *b b* into the interior of the cylinder, to operate upon the pistons G G so as to rotate the head E, said pistons being forced outward against the interior surface of the cylinder by steam, as will be presently described. The steam, when entering through the pipe D, groove *a*, and ports *b b*, is exhausted through the ports *b' b'*, groove *a'*, and pipe D'. By the arrangement of suitable stop-cocks the steam may be admitted through the pipe D and exhausted through D', thereby reversing the motion of the revolving head. This can be effected almost in an instant. From one or both of the ports *b* a passage, *d*, leads horizontally through the cylinder A, and communicates with a passage, *e*, in the head nearest to said port. This passage *e* leads to or near the center of the head, and communicates with a circular groove, *i*, in the end of the revolving head E. The groove *i* being situated at the inner ends of the grooves or slots for the pistons G G, the steam will, of course, enter said grooves behind the pistons and force them outward, thus taking the place of the springs used in or with similar pistons for rotary engines. When the action of the engine is reversed the passages *d e* are closed, and similar passages opened at the other end of the cylinder to operate the pistons.

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

1. The passages *d e* and groove *i* for admitting the steam behind the pistons G G, substantially as and for the purposes herein set forth.

2. The combination of the cylinder A with passages *a a'*, ports *b b'*, heads B B, passages *d e*, pipes D D', and the cylindrical head E with pistons G G and grooves *i i*, all constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of May, 1871.

W. A. GRAHAM.

Witnesses:

C. L. EVERT,

JAS. E. HUTCHINSON.