(No Model.)

# A. C. GIBSON.

## ROTARY ENGINE.

No. 263,505. Patented Aug. 29, 1882.

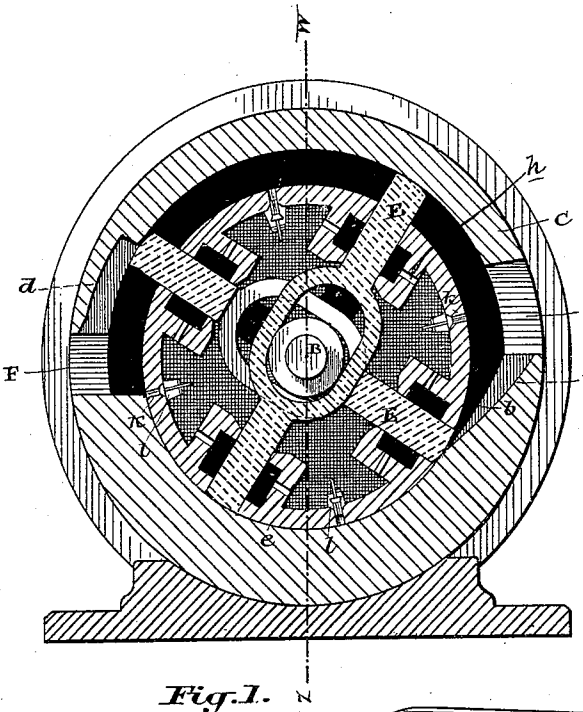



Fig. 1.

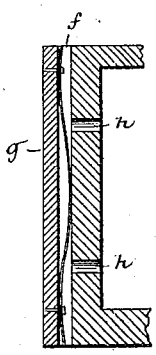



Fig. 5.

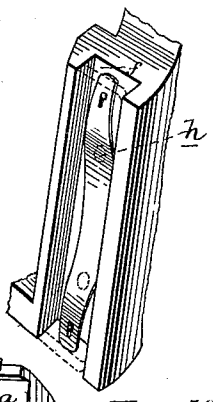



Fig. 5a

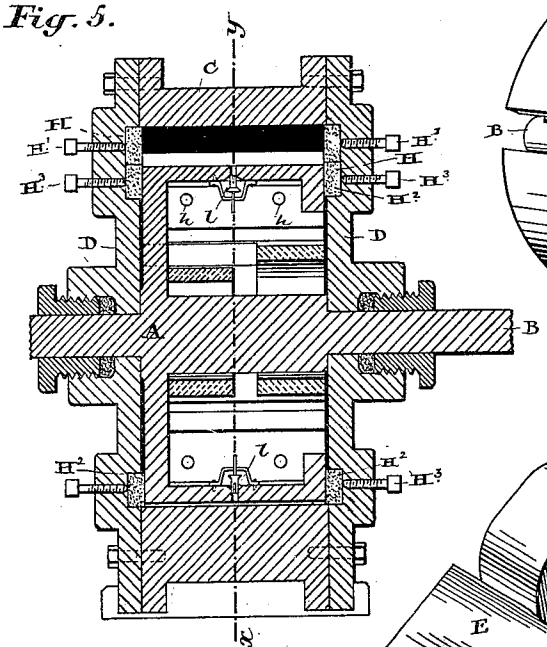



Fig. 2.

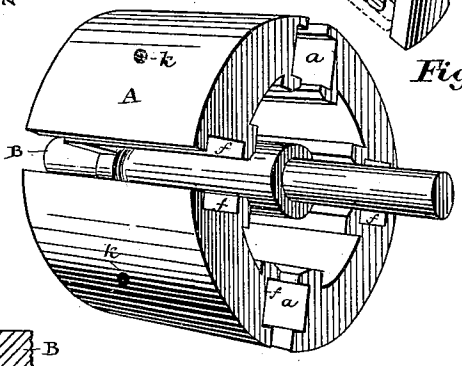



Fig. 3.

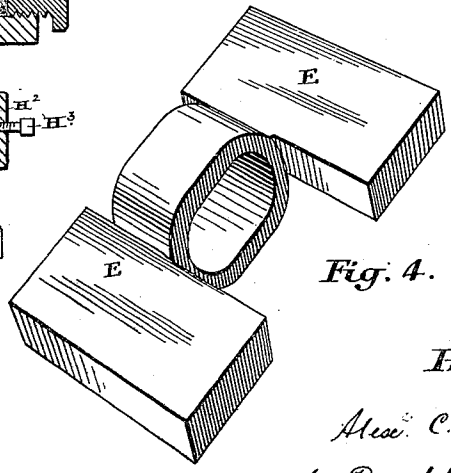



Fig. 4.

Witnesses.

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# UNITED STATES PATENT OFFICE.

ALEXANDER C. GIBSON, OF TORONTO, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO EDMOND ARMANT, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 263,505, dated August 29, 1882.

Application filed April 10, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER CALDER GIBSON, a subject of the Queen of Great Britain, residing at the city of Toronto, in the county of York, in the Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The object of the invention is to provide a cheaply-constructed, simple, and effective rotary engine capable of being propelled by either steam, water, or compressed air, and equally effective when used as a rotary pump; and it consists of a peculiarly-formed hollow cylindrical piston pivoted within a cylinder so bored out that a segment of its interior periphery shall correspond with the circle of the cylindrical piston within it, while the balance of the interior periphery of the cylinder is enlarged to correspond with the circle described by the extended wings passing through the cylindrical piston, as hereinafter described.

Figure 1 is a sectional end view through X Y. Fig. 2 is a cross-section through Z W. Fig. 3 is a perspective view of my cylindrical piston-head. Fig. 4 is a perspective view of one of the wings. Figs. 5 and 5ª are details showing a plan for packing the connection between wings and cylindrical piston-head.

A is my cylindrical piston-head, having slotted passage-ways *a* (see Fig. 3) cut in its body, as shown.

B is a spindle attached to or forming part of the piston-head A.

C is an open-ended cylinder provided with covers D. The cylindrical piston-head A fits within the cylinder C, and the spindle B passes through and is journaled within holes made in the covers D, suspending the cylindrical piston-head A immediately over and in proximity to the segment *e* of the interior periphery of the cylinder C, made to correspond with the circle of the piston-head.

E are the wings, made to fit in the passage-ways *a* and extending clear through the piston-head A. The loops connecting the two ends of the wings E permit their adjustment, notwithstanding the spindle B, which passes through the center of the cylinder. As shown in the drawings, there are two wings, forming four projecting points beyond the periphery of the piston-head, the form of the loops connecting the two ends of the piston-head being such that they pass the spindle B at right angles to each other and may be adjusted independently. As each end of the wings E comes in contact with the segment *e* of the interior periphery of the cylinder corresponding with the circle of the piston-head A it is pushed in flush, or nearly so, with the circle of the piston-head, the opposite end of the wing being thereby caused to protrude on the opposite side of the piston-head, the interior periphery of the cylinder being bored out to correspond to the circle described by the end of the wings when protruding in the manner mentioned. At one end of the segment *e* is formed the inlet-port F, and at, or rather near, the other end of the segment is formed the outlet-port G. As the steam enters the inlet-port F it comes in contact with a protruding end of one of the wings E, thereby causing the piston-head A to revolve, each wing being acted upon in its turn by the incoming steam, which escapes when the wing reaches the outlet-port G, the projecting end of the wing coming in contact with the inclined guide *b*, leading from the enlarged portion of the cylinder's interior to the smaller circle formed by the segment *e*. The wings being thus adjusted so that the end which formerly protruded is forced into the piston-head, while the other end is caused to protrude on the opposite side, the steam coming in contact with it thereby maintaining the rotary movement of the piston-head.

In order to form a steam-tight joint between the covers D and the ends of the piston-head A, I provide an adjustable ring, $H^2$, fitting into a groove cut in the inside surface of the covers D. These rings are provided with adjusting-screws $H^3$, screwed into the covers D, so that the pressure of the rings against the ends of the piston-head may be adjusted so as to form the required joint.

With the view of forming a joint on the edges of the projecting ends of the wings E, I place on each cover D an adjustable ring, H, provided with adjusting-screws H′. These rings do not extend round the entire circle of the cover, merely extending round that portion of

the cover where the wings project beyond the circle of the cylindrical piston.

In order that the full pressure of the steam may be exerted on each projecting end of the wings E as long as possible, I cut a groove or channel, *d*, leading from one side of the inlet-port F, so that the steam will find its way into the space between the end of the wing approaching the outlet-port and the end of the wing passing through the inlet-port. In this manner the full effect of the steam is secured for as long a time as possible, live steam being directed against each projecting end during nearly the whole of its travel between the inlet and outlet ports.

In order that any water or steam which might be carried beyond the outlet-port G shall have an opportunity of escaping, I cut a groove or channel, *n*, corresponding with the groove or channel *d*, but extending from the side of the outlet-port G to the interior surface of the segment *e*, as is clearly shown in Fig. 1.

With the view of forming a steam-tight joint on either side of the wings where they pass through the slotted passage-ways *a* in the piston head A, I form on either side of each wing a recess, *f*, into which I fit a gib or pressure-plate, *g*. (See Fig. 5.)

Through the wall forming each recess *f*, I pierce a hole, *h*, connecting the interior of the piston-head A with the recess behind each gib *g*. These holes are intended to admit the steam-pressure behind each gib, so as to force the surface of each against the side of each wing it is fitted to.

With the view of admitting the steam-pressure into the interior of the piston-head, and at the same time preventing the steam so admitted escaping when passing the port G, I pierce the body of the piston-head A with a number of holes, *k*, each hole being provided with a stop-valve, *l*, which is held in position by the cage or guide-piece. So long as the pressure outside the piston-head A exceeds the pressure within it the valves *l* remain open, permitting the free passage of the steam through the holes *k*. When the pressure within the piston-head A becomes greater than the pressure without—for instance, when passing the outlet-port G—the valves close, thereby preventing the escape of the steam within the piston-head. Consequently, the pressure within the piston-head being always maintained, the gibs *g* are constantly held against the surface of the wings.

The foregoing description refers to my improved rotary engine when propelled by steam, water, or compressed air. When it is to be used as a pump the spindle B will be driven by some suitable motor, in which case the action of the wings will draw the water into the port F and discharge it from the port G, forming a powerful and effective rotary pump.

Of course when the engine is to be used as a rotary pump it will not be necessary to make any provision, such as described, for packing the side of the wings.

What I claim as my invention is—

1. The cylinder C, having segment *e*, inlet F, and outlet G, and channels *d n*, adjacent to the inlet and outlet, in combination with a piston-head, A, provided with adjustable wings E, recesses *f*, gibs *g*, holes L, leading into the recesses *f*, and the ports *k*, substantially as and for the purpose specified.

2. In a rotary engine having a hollow cylindrical piston-head provided with adjustable wings and revolving within the cylinder or case *c* D, as described, the gib *g* and spring, and the apertures *h*, connecting the interior of the piston-head with the recesses *f* and adapted to admit steam-pressure therein to force said gib against the side of the wing E, all combined and operating as set forth.

3. In a rotary engine having a hollow cylindrical piston-head provided with adjustable wings and revolving within a cylinder, as described, the hole *h*, connecting the interior of the piston-head with the recess *f* behind each gib *g*, in combination with the holes *k*, each hole being provided with a stop or check valve, *l*, substantially as and for the purpose specified.

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Witnesses:
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