2 Sheets—Sheet 1.

N. NILSON.

ROTARY ENGINE.

No. 190,067. Patented April 24, 1877.

Fig. 1.

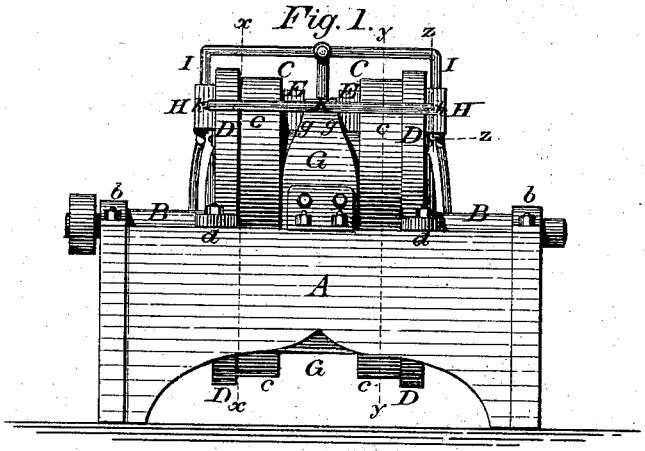


Fig. 2.

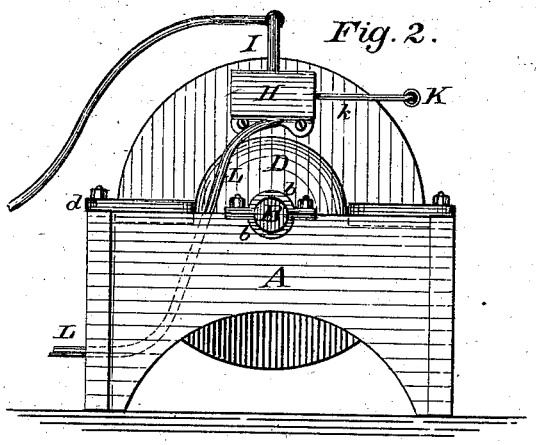
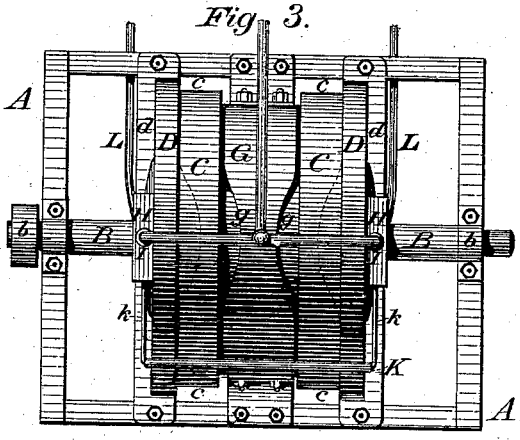


Fig. 3.



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Inventor:

Nils Nilson
by Lewis Bagger & Co.
Att'ys

2 Sheets—Sheet 2.

N. NILSON.

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Fig. 4.

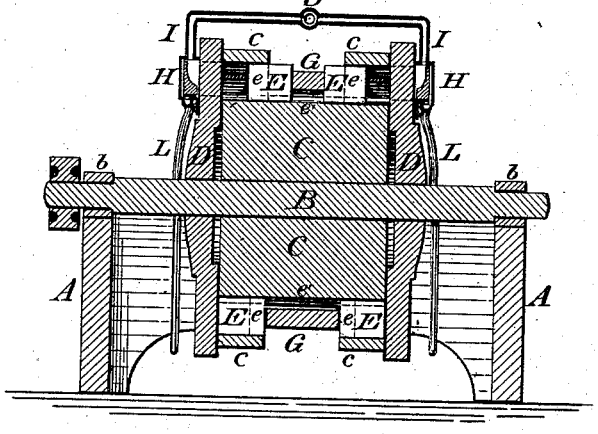


Fig. 5.

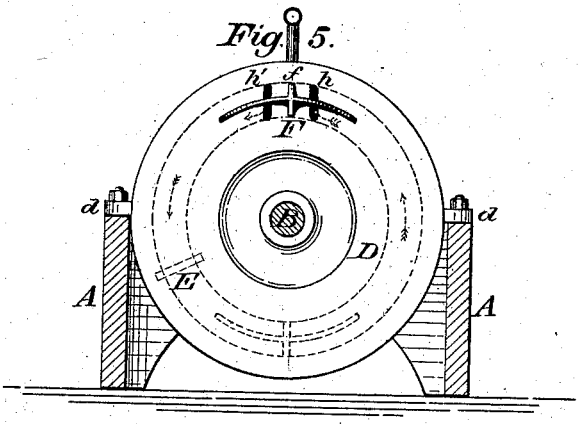


Fig. 6.

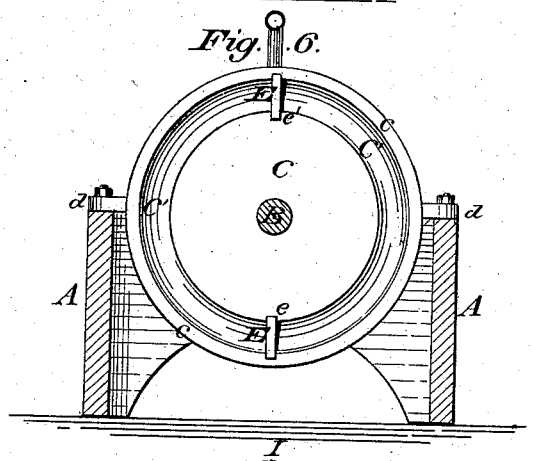
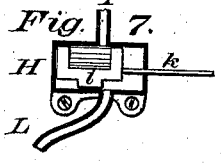


Fig. 7.



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UNITED STATES PATENT OFFICE.

NILS NILSON, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 190,067, dated April 24, 1877; application filed April 11, 1877.

To all whom it may concern:

Be it known that I, NILS NILSON, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain improvements in rotary engines; and it consists in the novel and improved construction and arrangement of parts whereby the same engine may be driven by steam, water, or compressed air, without making any change in its construction or operative parts necessary.

In the drawings hereunto annexed, Figure 1 is a front elevation. Fig. 2 is a side elevation. Fig. 3 is a top plan. Fig. 4 is a longitudinal section through the axle. Fig. 5 is a cross-section through the line *x x*. Fig. 6 is a similar section through the line *y y*, and Fig. 7 is a similar section through the line *z z*.

Similar letters of reference indicate corresponding parts in all the figures.

A is the frame of the machine, having bearings *b* for the shaft or axle B. Rigidly affixed upon the middle of the latter is a cylinder, C, having flanges *c*. D are circular end plates or disks of a diameter somewhat in excess of cylinder C, and rigidly affixed upon the frame A by means of brackets *d*. Disks D are perforated in the center to admit of the passage of the driving-shaft B.

The flanges *c* of cylinder C have each a circumferential groove or recess, denoted by C′, which faces plates D. The recesses C′ are slotted, as indicated at *e*, Fig. 6, at points diametrically opposite to each other, and the cylinder C has a longitudinal mortise, denoted by *e′*, so arranged as to unite slots *e* in the flanges *c c* opposite to each other. Within slots *e* are placed the abutments E, consisting of plates that fit snugly in the recesses or slots *e*, so that they may slide forward and backward in the mortises or guide-grooves *e′* in the cylinder C.

Arranged upon the inside faces of the disks or end plates D are projections F, Fig. 5, consisting of metal plates beveled at both ends, so as to form a shoulder slanting in both directions from the middle. This shoulder is curved so as to fit within recess C′, and has a cross-piece, *f*, of a depth equal to the width of recess C′.

Plates D being secured in their position—*i. e.*, abutting against cylinder C, so as to form a steam and air tight joint—the beveled plates F, with their cross-pieces *f*, will fit into the circumferential recesses C′, the vertical plate *f* dividing said recess into two separate parts. Both plates D are constructed alike, each having the plate F with its cross-piece *f*.

The object of these plates is twofold, viz: first, to form a division in the steam-recess C′, and second, to form guides for the sliding abutments E. As one of these valves, in rotating with the cylinder within which it is placed, approaches plate F, it will, as the cylinder rotates, be gradually pushed toward the center by the bevel of the plate into the groove or guide slot *e′* in the centrally-depressed part of the cylinder C. In order to push the abutments E back to their normal position within recesses C′, after they have passed the guide-plates F, another guide-plate, G, is arranged within the depressed portion of cylinder C. This is of the construction shown in the top plan, Fig. 3, consisting of a semi-cylindrical plate secured upon the frame A, and having segmental recesses, denoted by *g*, in each of its sides facing the flanges or shoulders *c* of the cylinder C.

These segmental recesses are of a depth corresponding to the width of the projecting guide-plates F on disks D, so as to allow room for the sliding abutments E when these are pushed from the shoulders *c* by plates F. After the abutments E have passed the cross-plate *f* they will be gradually pushed back into the steam-recess C′, by the bevel or curve of the segmental recesses *g*, until after the plate F and recesses *g* have been passed, when they will be in the normal position within the steam-chambers C′—*i. e.*, closing up the entire width of the recess.

h h′, Fig. 5, denote perforations in the disks D through which the steam, water, or compressed air is inducted into or ejected from the steam-chambers C′. These perforations

are arranged on each side of the vertical plate *f* in such a manner that the steam or other motive power may be admitted into either one, according to which way it is desired to move the cylinder. This is effected by slides or valves *i*, Fig. 7, sliding horizontally in the steam-chests H, which are affixed upon the outsides of disks D, the steam being inducted by a branched pipe, I. The steam-chests H and slides *i*, Fig. 7, are so arranged that the steam may be made to enter either of the perforations *h* or *h'*. The slides *i* are controlled simultaneously by the connecting-rod K, by which the slide-rods *k* are united, as shown in the top plan, Fig. 3. L are the escape-pipes, by which the steam, water, or compressed air, after doing service in the engine, passes back to the condenser, or out into the open air.

From the foregoing description, the operation of my improved rotary engine will be readily understood. Steam, water, or compressed air being admitted through the pipe I will enter the steam-chests H, and from there will enter the steam-chambers C', either through openings *h* or *h'*, according to the position of the slides *i*. In the position of these slides, (indicated in Fig. 7,) the steam or other motive power will enter perforations *h'* in each disk D simultaneously, and fill up the space in the steam-chambers C', between the projecting plates *f* and the sliding abutments E next to it. The pressure of the steam upon abutment E will cause the cylinder C to rotate. When the opposite abutment E passes the dividing-plate *f*, the steam in the other half of the steam-chamber C' will escape through the perforation *h*, steam chest or valve H, and escape-pipe L, by the pressure caused by the steam that is now filling up the space between the dividing-plate *f* and abutment E. When this latter slide, after having made a rotation, again reaches the dividing-plate *f*, the steam in one-half of the steam-chest C' will escape through the perforation *h*, steam-chest H, and escape-pipe L, fresh steam being constantly admitted through the slide *i* and perforation *h'*. This operation being similar on both sides of the cylinder C, (the slides *i i* being exactly in the same position,) the cylinder C will be kept rotating in the direction of the arrow. When it is desired to shift the direction, the slides *i i* are pushed back by means of the rod K. Steam will now enter the steam-chambers C' through the openings *h*, and escape through openings *h'*, and the operation is simply reversed. The sliding valves E are moved automatically out of and into their normal position in the steam-chambers C' by plates F and G, in the manner already described.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the rotating cylinder C, having steam-chambers C', and sliding abutments E, with the interiorly-arranged guide-plate G, having segmental recesses *g*, substantially as and for the purpose herein shown and specified.

2. The combination of the rotating cylinder C, constructed as herein described, with the disks D, having perforations *h* and *h'* for the induction and escape of the steam or other motive power, steam-chests H, induct-pipe I, and escape-pipe L, all arranged, combined, and operating substantially as and for the purpose herein shown and specified.

3. The rotary steam, water, or air engine herein described, consisting of the rotating cylinder C, having circumferential steam-chambers C', and sliding abutments E, in combination with the stationary guide-plate G, stationary disks D, steam-chests H, adjustable slide-valves *i*, induct-pipe 1, and escape-pipes L, all constructed and combined for operation substantially in the manner and for the purpose herein shown and specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

NILS NILSON.

Witnesses:
H. C. O. MORRISON,
NILS OLSON.