

RUFUS LEACH.

Improvement in Rotary Engines.

No. 121,947.

Patented Dec. 19, 1871.

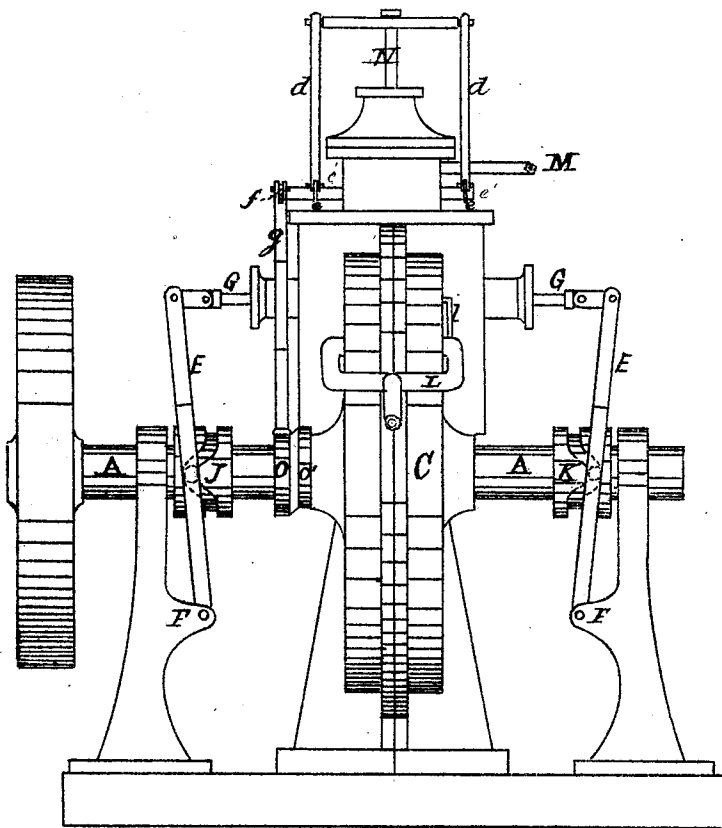
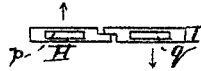


fig 1.

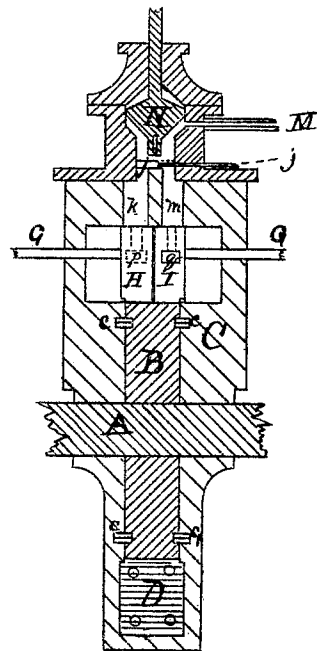


fig 2

Witness

John F. Ricker
Fred Foster

Inventor

Refused Leach
Tex Chas Franklin Leary
Atty

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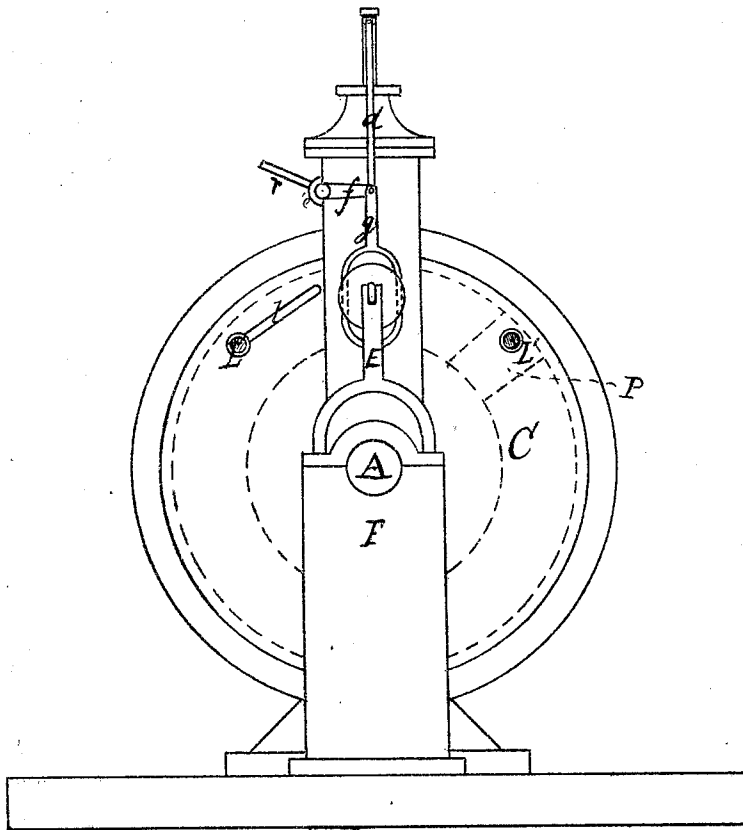


fig. 3.

Witness

John F. Ricker
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UNITED STATES PATENT OFFICE.

RUFUS LEACH, OF BANGOR, MAINE, ASSIGNOR TO HIMSELF AND MICHAEL SCHWARTZ, OF SAME PLACE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 121,947, dated December 19, 1871.

To all whom it may concern:

Be it known that I, RUFUS LEACH, of Bangor, in the county of Penobscot and State of Maine, have invented a new and useful Rotary Engine; 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 drawing forming a part of this specification, in which—

Figure 1 shows a front elevation of my invention; Fig. 2, a section of the cylinder and valves; Fig. 3, a side elevation.

Same letters show like parts.

My invention aims at producing an economical and effective rotary engine, which will do its work without waste of steam and will be simple in construction and operation. The working parts of my engine, such as the piston-head and the cams operating the abutments and regulating the admission of the steam, are all placed upon and move with one central shaft, which insures regularity in their operation.

Reference to the drawing will enable me to explain my devices fully. At A is shown the central or main shaft, having upon it a collar, B, working in the cylinder C of the engine, and making steam-tight joints therewith by means of the packing-rings *c c c c*. The space between the inner circumference of the cylinder C and the outer surface of the collar B serves for the piston-head D to work in. This piston-head is attached to the collar, so that it and the shaft A revolve with it as the piston moves around. At E E are levers pivoted to the standards F F below the shaft at their lower ends, and attached at their upper extremities to rods G G, which pass into the cylinder C and are attached to valves H I. These arms or levers are operated by cams J K upon the main shaft and communicate their motion through said rods G G to the valves. These valves are set into the cylinder in such a way as to close the space through which the piston D travels for a greater part of its stroke, each valve closing half the space and meeting in the center. By the action of the cams J K they are drawn apart and the space left clear for the passage of the piston when it arrives at that part of the stroke and closed again when it has passed. They thus act as abutments for the steam to act against. At L is the exhaust of the engine, which remains always open, the piston forcing the steam through

it as it advances. *l* shows a smaller pipe placed close to the abutments H I and connecting with the exhaust. This carries off the air between the piston and the abutments when the former has passed the exhaust L and before the valves are opened by the cams J K, which air otherwise would compress and retard the action of the engine. Steam is admitted to the cylinder through the feed-pipe M, and the supply is regulated by the valve N, operated by rods *d d*, levers *e f*, rod *g*, and a cam, O, upon the shaft A. This cam may be arranged to cut off the steam at any desired point, allowing expansion to force the piston. After the steam passes the valve N it enters the cylinder C through ports in the abutments H I, forcing itself directly against the piston-head. The abutments are halved together and overlap each other, so that the pressure of the steam against them tends to make the joints tight. (See detail.)

The operation of the engine is as follows: Suppose the piston to be at P, Fig. 3, dotted lines. The abutments H I being closed and steam being admitted through the feed-pipe, it forces the piston forward, driving the air before it through the exhaust-pipe. If the cut-off valve N is arranged to check the steam at half stroke the expansion forces the piston forward and past the exhaust L, the air between the exhaust and the abutments being expelled by the pipe *l*. As the head nears the abutments the cams J K, acting upon the arms E E, open them, allowing the piston to pass through, and immediately closing them behind it. Steam is again admitted by the action of the cam O, and the operation is repeated. The removal of the abutments at the proper time, their return to their places, and the admission and the cutting off of the steam are all regulated by the motion of the piston itself, since they are upon the same shaft. This renders their operation a matter of great certainty and regularity.

A short lever, *r*, is attached to the rods, operating the cut-off valve so that steam may be admitted with ease when it is desired to start the engine.

To render the action of the engine reversible the entrance-ports in the abutments may be arranged to open upon opposite sides (see *p* and *q*, Fig. 2) and steam be fed to the engine through either port by means of separate passages *k* and *m* leading to them, and a valve, *j*, opening one

of these passages and closing the other at the same time. A second cam, *O'*, may also be provided, attached to the cam *O* in such a way—as, for instance, with a beveled surface between them—that it may be shifted under the arm *g*, taking the place of the eccentric *O* and cutting off the steam at the proper time. Two exhaust-pipes are also provided, as at *L* and *L'*, the one nearest the port through which the steam enters being the one to be closed during the working of the engine.

There being two abutments, less space is traveled over by each than if one only was used, and they are enabled to withdraw from the cylinder in less time.

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

1. The combination and arrangement of the cams *J K* and cam *O* with the collar *B*, piston

D, cylinder *C*, and pivoted lever *E*, all constructed and operating substantially as herein set forth.

2. The combination and arrangement of the cams *J K*, arms *E E*, pivoted, as described, to the standards *F F*, rods *G G*, and abutments *H I*, operating as herein set forth.

3. The combination of the valve *N*, rods *d d*, levers *e f* on shaft *e'*, rod *g*, and cam *O* or *O'*, when arranged and operating as herein specified.

4. The combination of the valve *j*, passages *k* and *m*, and ports *p* and *q* in the abutments *H I*, when constructed and arranged as shown, and for the purpose set forth.

5. The combination of the piston *D*, abutments *H I* having ports *p q* therein, exhaust *L*, and escape-pipe *l*, when arranged as set forth.

Witnesses:

RUFUS LEACH.

MICHAEL SCHWARTZ,

WM. FRANKLIN SEAVEY.

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