(No Model.)

A. L. JEFFERIS & W. C. THURMAN.

ROTARY ENGINE.

No. 380,489. Patented Apr. 3, 1888.

Fig. 1.

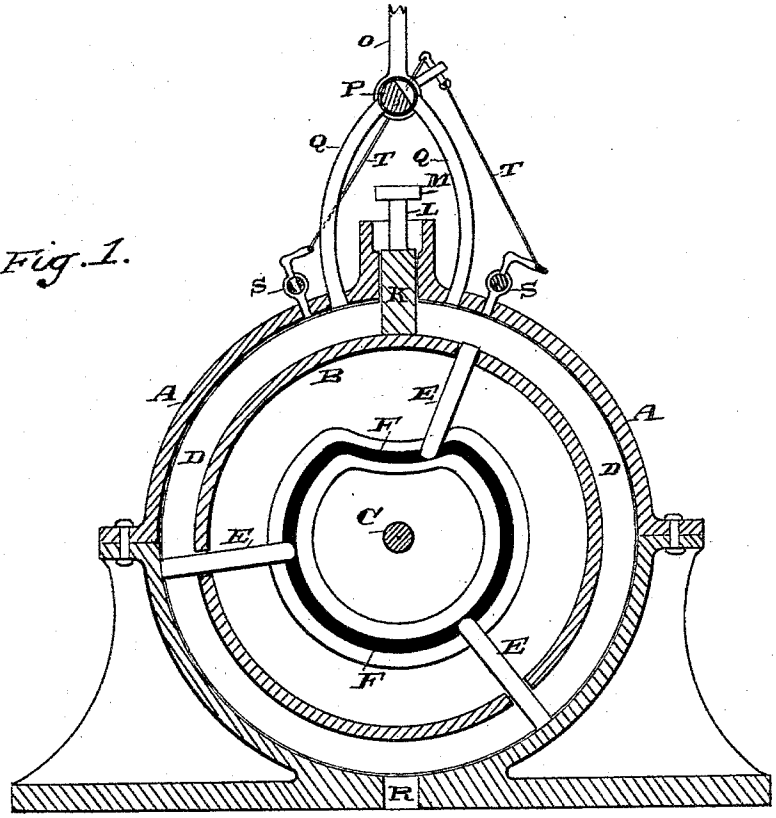


Fig. 3.

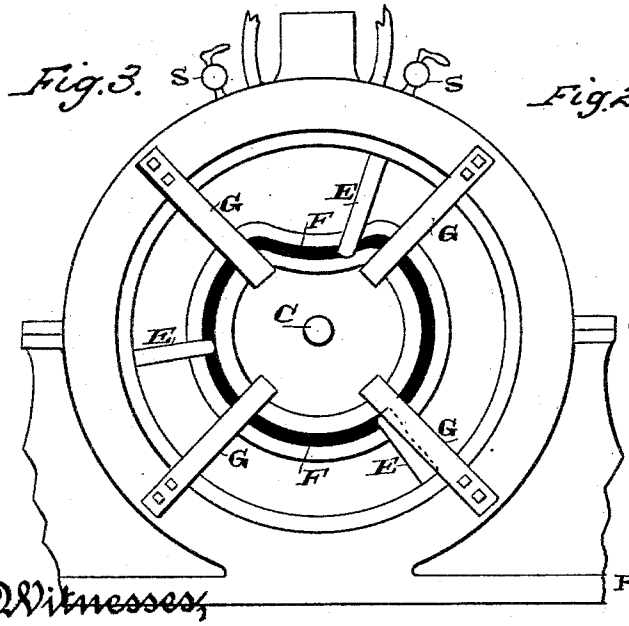
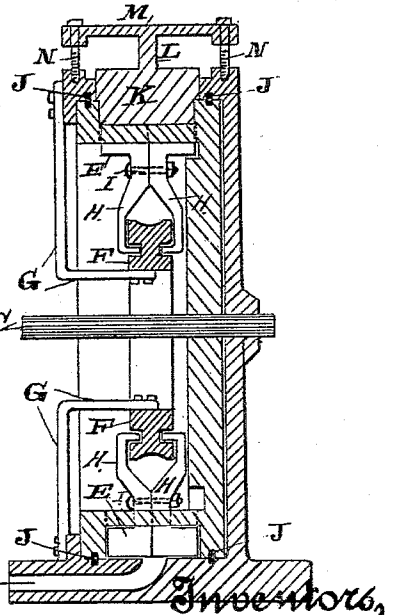


Fig. 2.



Witnesses,
Geo. H. Strong.
J. L. Morse.

Inventors,
A. L. Jefferis.
By W. C. Thurman.
Dewey & Co. attys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ALBIN L. JEFFERIS AND WILLIAM C. THURMAN, OF LINCOLN, CALIFORNIA, ASSIGNORS OF ONE-FOURTH TO J. C. INGRAM, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 380,489, dated April 3, 1888.

Application filed June 15, 1887. Serial No. 241,427. (No model.)

To all whom it may concern:

Be it known that we, ALBIN L. JEFFERIS and WILLIAM C. THURMAN, of Lincoln, county of Placer, State of California, have invented an Improvement in Rotary Engines; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to certain improvements in rotary engines; and it consists of an outer stationary case, an inner rotary shell or cylinder having pistons moving radially through its periphery, and a cam by which they are actuated, a stationary abutment adjustable through the outer case and fitting against the face of the inner cylinder, together with steam and exhaust passages, and certain details of construction, all of which will be more fully explained by referring to the accompanying drawings, in which—

Figure 1 is a side view of our engine, with a section through the steam and piston chamber and valve. Fig. 2 is a transverse vertical section taken through the line of the shaft of the rotating cylinder.

A is an outer case, which resembles a cylindrical box, one side of which is closed and the other left open. Within this case is fitted the rotary disk or wheel B, which is mounted upon a shaft, C, having suitable journal-boxes, so that the disk or cylinder B revolves concentrically within the case A, and in so doing leaves a space, D, between its periphery and the inside of the case A, which serves as the steam-chamber, within which the pistons E are fitted, so as to receive the pressure of steam at the proper time. The pistons E slide in and out through the rim of the wheel or disk B, and are operated by means of a cam-groove, F, in a stationary central rim or support, so that they are withdrawn for the purpose of passing the stationary abutment, and are immediately moved out to fill the chamber and receive the pressure of steam as soon as the abutment has been passed. In our construction, one side of the outer case being left open, the cam F is supported in place by means of arms G, having their outer ends securely bolted to the outer case and their inner ends bent inwardly and bolted to the inner part of the cam-ring, so that the latter is rigidly held in place. The grooves are made in this ring on the sides, as shown more plainly in Fig. 2, and the pistons E are connected with these grooves by means of arms H, the outer ends of which are securely fastened to the piston-plates, and they extend inwardly, the shanks being separated and carried around, so that their inner ends enter the cam-grooves in the sides of F, as plainly shown in Fig. 2. The arms or shanks H are secured together in pairs by a bolt, I, passing through them, and having a nut by which they are drawn tightly together.

If it is necessary to remove any portion of the apparatus, as one side of the case is open, it is only necessary to unscrew the bolts I, when the outer one of the arms H can be taken off, and the cam F may then be removed by simply taking off the supporting-arms G.

The inner rotary wheel, B, is formed, as shown in Fig. 2, with flanges at its edges having a diameter sufficiently greater than that portion through which the pistons slide, to form a chamber in the interior of the piston-case, as before described.

In order to make a tight joint between the flanges of the traveling ring B and the stationary outer case, we employ packing-rings, as shown at J, which project from the edges of the flanges of B into corresponding grooves made in the inner face of the case A.

K is an abutment which slides down through a channel formed in the outer case, fitting exactly between the flanges and against the periphery of the rotating ring B and having the edges projecting slightly over the flanges of B, as shown in Fig. 2, and close to the rings J, so as to make a tight joint at that point. This abutment has an arm, L, connecting it with a cross-bar, M, which latter is secured to the case by bolts N, and by moving these bolts wear may be taken up between the abutment K and the face of the moving cylinder B, thus keeping a tight joint at all times. The cam F is of such shape as to withdraw the pistons E, so that their outer edges are just flush with the periphery of the ring B and they will pass beneath the abutment K, after which they are immediately forced out so as to fill the chamber formed between the periphery of B, its side flanges, and the outer stationary case, A.

O is the steam-inlet pipe having a valve, P, fixed in it, and two branches, Q, opening out

from this valve-chamber, so that when the valve stands in one direction it may admit steam to one of these branches, and when turned to stand in the other direction it will admit steam to the other branch. One of the branches Q opens upon one side of the abutment K and the other branch opens upon the opposite side of the abutment.

R is the exhaust-passage, which is situated at the opposite side of the case from the abutment K, so that after the pistons have passed this passage the steam which has driven them to this point is allowed to escape.

In order to relieve the pistons of any back-pressure which might be caused by air or steam remaining within the cylinder behind the abutment, we have shown cocks or valves S opening one upon each side of the abutment K. When steam is being admitted from the right side of the abutment, as shown in Fig. 1, the cock S upon that side will be closed and the cock or valve upon the opposite side will be open. The valve P being then turned, so as to admit steam to the right-hand steam-pipe Q, will close the left-hand pipe Q, and by means of a connecting bar or rod, T, the valve S upon the left side will be open and the valve upon the right side will be closed. This prevents the escape of steam which is admitted to drive the pistons, and at the same time as the pistons approach the abutment K from the left side it allows any air or vapor which may be contained between them and the abutment to escape, and the back-pressure is thus relieved.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a rotary engine, the outer case having one side left open, the concentrically-revolving rim or wheel having pistons sliding through its periphery into the chamber formed by the face and flanges of the wheel and the interior of the outer case, the stationary cam-ring having grooves or channels upon opposite sides, in combination with the yokes or arms H, bolted together in pairs, with one end secured to the piston and the others bent so as to enter cam grooves or channels, substantially as herein described.

2. In a rotary engine, the outer stationary case, the concentric rotary rim or wheel having flanges projecting upon each side of the periphery, with grooves in their edges, and packing-rings fitting said grooves and corresponding grooves in the inside of the exterior case, in combination with the pistons sliding through slots in the periphery of the rotary ring, and connected by shanks H with a stationary cam, by which they are forced out and withdrawn to pass a fixed abutment, K, extending through the outer case and against the periphery of the rotary wheel, substantially as described.

3. In a rotary engine, the fixed outer case, the rotary rim with its radially-sliding pistons and the grooved cam by which they are actuated, in combination with an abutment extending through the outer case, so as to close the piston-chamber, the supporting-bar, and the adjusting-bolts, substantially as herein described.

4. In a rotary engine, the stationary outer case composed of the periphery and one closed side, a stationary grooved or channeled cam-ring supported from the opposite or open side of the case by the radial arms G, in combination with the concentrically-mounted rotary rim or wheel B, having flanges upon each side of its face, which form with the outer case the piston-chamber, within which the radially-sliding pistons receive the pressure of steam, the adjustable abutment K, and the steam-inlet passages opening upon each side of the abutment, and the exhaust-passage in the opposite part of the circumference of the case from the abutment, substantially as herein described.

5. The rotary flanged rim W, its radially-sliding pistons and packing-rings mounted concentrically within the fixed stationary case, having the fixed abutment, the steam-passages opening upon either side of the abutment, and the relief valves or cocks, in combination with the valve, whereby steam may be admitted to either of the passages, and connections whereby the relief-valves are correspondingly closed and opened, substantially as herein described.

In witness whereof we have hereunto set our hands.

ALBIN L. JEFFERIS.
WILLIAM C. THURMAN.

Witnesses:
B. F. MYRES,
R. F. BURNS.