(No Model.)

L. J. STRAIT.

ROTARY ENGINE.

No. 388,379. Patented Aug. 21, 1888.

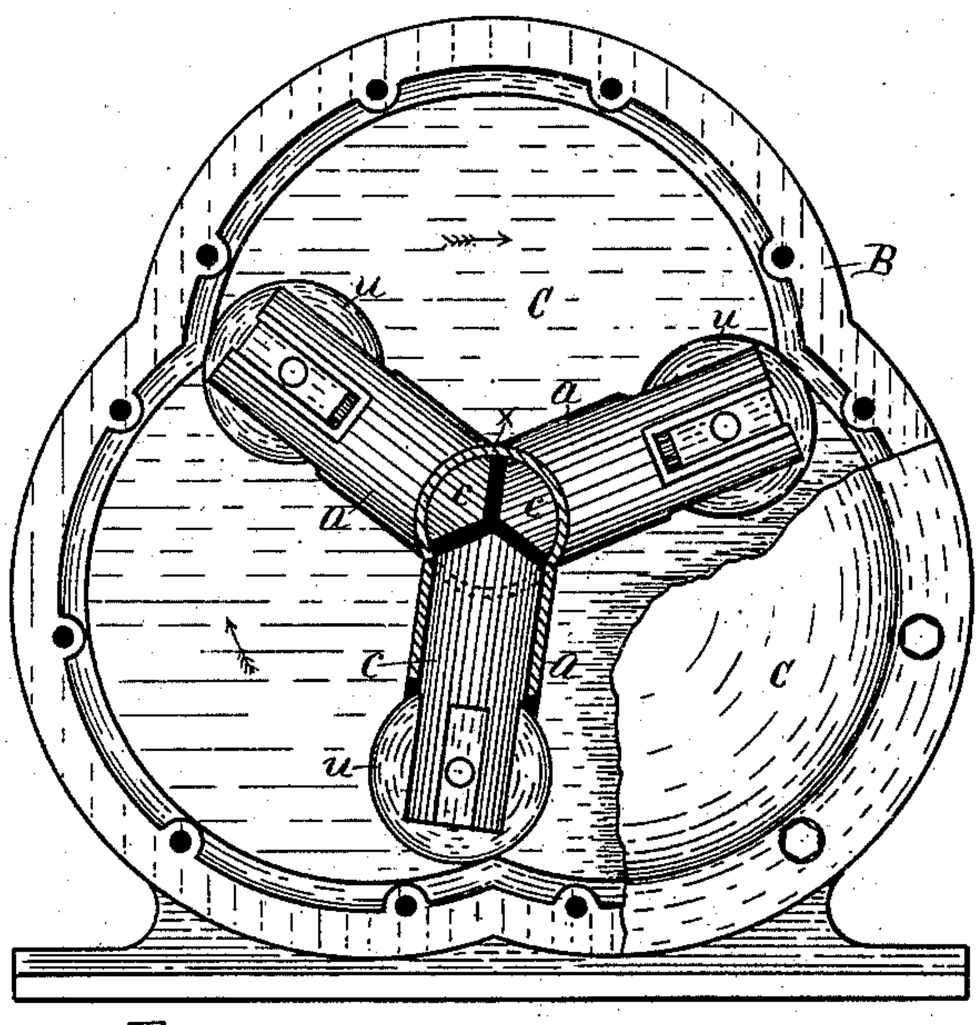

Fig. 1

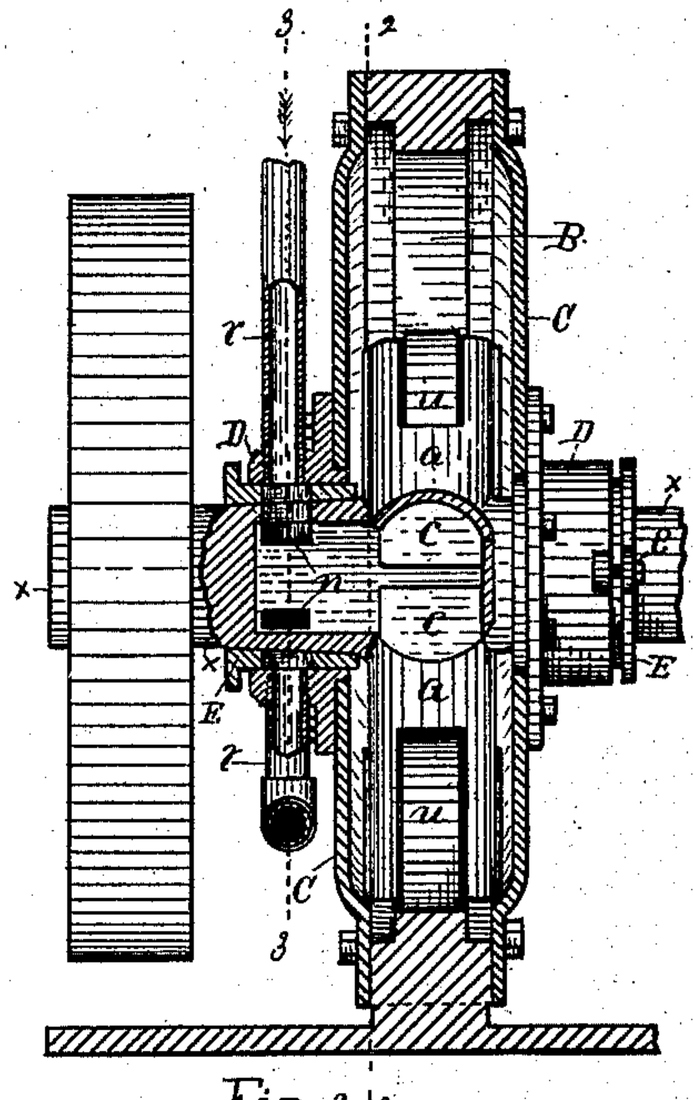

Fig. 3

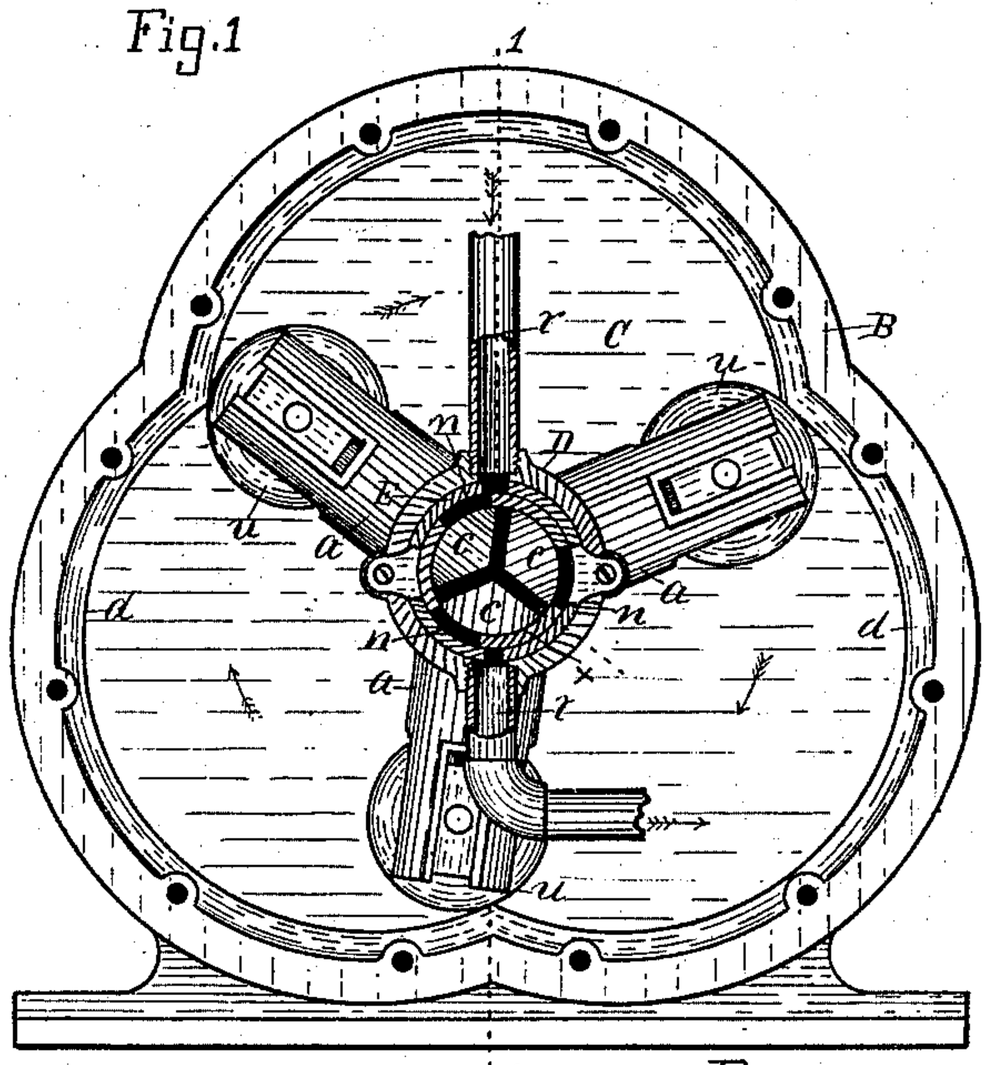

Fig. 2

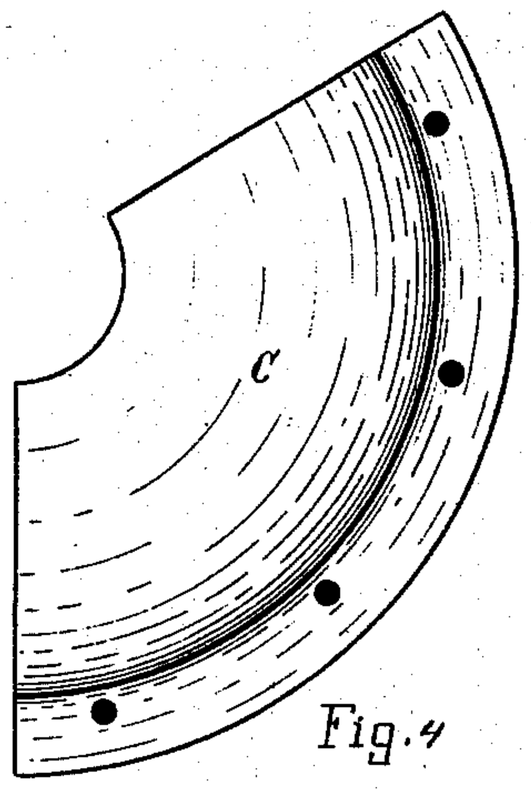

Fig. 4

Witnesses.
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UNITED STATES PATENT OFFICE.

LACELLE J. STRAIT, OF KALAMAZOO, MICHIGAN.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 388,379, dated August 21, 1888.

Application filed February 10, 1888. Serial No. 263,602. (No mode'.)

To all whom it may concern:

Be it known that I, LACELLE J. STRAIT, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to that class of rotary engines the piston of which has wheeled ends traversing an incline to increase the effect of a given amount of steam upon the principle of leverage.

An important feature of my invention is that I employ a series of independent cylinders radiating from an internal steam-chamber of the rotary power-shaft, a piston in each cylinder, and extending into said steam-chamber, which chamber is common to them all, and an individual incline to each piston, said inclines being fractional portions of equal circles, all of which are described and claimed below.

In the drawings forming a part of this specification, Figure 1 is an elevation with parts in section near line 2 2 in Fig. 3 and parts broken away. Fig. 2, same with parts in section on line 3 3, Fig. 3; Fig. 3, a view, as from a point at the right of Fig. 2, with parts in section on line 1 1 in Fig. 2; and Fig. 4 shows a lettered detail, below described.

Referring to the lettered parts of the drawings, B is a frame having two, three, or more inclines which are traversed by the wheels *u* of the outer ends of the pistons *c*—that is to say, which are traversed by the wheeled end of the pistons, all in unison while under pressure of steam, or water, or air, as the case may be, for I do not wish to be limited to the use of steam, and anticipate that air will be largely employed as the power or force to run the engine.

The frame B here shown has a series of three like scallops, *d*, internally around it, each one representing like fractional portions of a true circle, Fig. 2. The three cylinders *a* radiate from the power-shaft *x*, independent of each other and equidistant from each other.

In Fig. 2, suppose steam through the induction-pipe *r* is entering the upper port, *n*, (being one of three which enter an internally-cored chamber in shaft *x*, Fig. 3,) the steam passes into said chamber and from thence enters the spaces between the ends of the pistons *c*. This space is shown in black at center of Figs. 1 and 2. The wheels *u* of each individual piston *c* are now at the apex of their respective inclines. The pressure of steam on the pistons is equal on them all, and they are forced out in unison. This causes the cylinders and power shaft to revolve or rotate. When the wheels *u* have passed the central point in each fractional portion of a circle, the steam-exhaust through pipe *t* for one of the ports *n* will then have registered with the exhaust-port and the induction-port will be closed. Momentum will carry the wheels *u* over the balance of the fractional circles to the apex of the inclines again, where steam is again taken, and so continuing. Centrifugal force holds the pistons out during the exhaust, so that the wheels really traverse the entire portion of the fractional circles, with no material friction except on the first half, or what I have termed the "three inclines."

It is preferable that the inner ends of the pistons shall be of V shape, as in Figs. 1 and 2, to allow them to come farther into the steam-chamber, which chamber is common to them all, and have less space between them than there would be if they were blunt or square at their contiguous ends. There being less space between said ends, less steam is required to fill said space in order to start the pistons.

The lower cylinder, *a*, in Fig. 1 is in section, showing its individual piston *c* therein and the wheel *u*. The rotating parts are balanced in the bearings of the power-shaft, because the pressure is equal from all directions. The cylinders have no fixed heads, as in ordinary engines, against which a part of the steam-pressure is exerted, the pressure in the present instance being against movable pistons in different directions. The arrows in Fig. 1 show the direction in which the parts rotate. As here shown, the scallops *d* are fractional portions of equal circles, and the pistons all move in unison, as before stated.

The cylinders are inclosed within the frame B by the side walls, preferably consisting of sections C, Fig. 4. Fig. 2 shows the walls, one on each side.

Any suitable bearings may be employed for

the power-shaft *x*. In Fig. 3 I have shown a collar, D, internally larger than the diameter of the power-shaft *x*. The flange of the collar D is bolted to the wall C. The periphery of the shaft where the bearing comes is tapered, as shown in section in Fig. 3. Around this part of the shaft, and between it and the interior of the collar D, is a box, E, internally flared, so as to nicely fit the tapered part of the shaft *x*. The flange of the box E is bolted to lugs on the collar D, as at *e*, left side, Fig. 3. By tightening the bolts the box is forced in like a wedge sufficient to take up the wear, so that the ports *n* will not leak steam between the box and shaft. The construction on the other side of Fig. 3 is the same as to bearings, but has no ports, as on left side. It will be seen that the exhaust-port and induction-port pass through the box E, Figs. 2 and 3.

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

1. In a rotary engine, the combination of a power-shaft having an internal chamber, independent hollow cylinders communicating with one end of said chamber and radiating from the shaft, induction and eduction ports leading into the other end of said chamber, an individual wheeled piston in each cylinder, extending into said chamber, which is common to them all, and inclines for the wheels to traverse, substantially as set forth.

2. In a rotary engine, a power-shaft having the internally-cored chamber and the ports leading into it, independent cylinders radiating from said chamber, an individual piston in each cylinder, the contiguous ends of said pistons being in said chamber and V-shaped and having a wheel at the outer end of each, and suitable inclines for the wheels to traverse, substantially as set forth.

3. The combination of a power shaft having the internal steam-chamber, a series of cylinders radiating therefrom and communicating therewith, and being equidistant from each other, a wheeled piston in each cylinder, and inclines representing portions of like circles arranged in relation to the cylinders and pistons, as stated, whereby said pistons all operate in unison, substantially as set forth.

4. The combination of the power-shaft having the internal steam-chamber and the ports leading into it, the bearing portion of the shaft where the ports are being tapered, the fixed collar, and the internally-flared adjustable box, whereby the wear can be taken up to prevent steam leaking from the ports through the bearings, substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in presence of two witnesses.

LACELLE J. STRAIT.

Witnesses:
CULLEN C. PACKARD,
L. BALLOU.