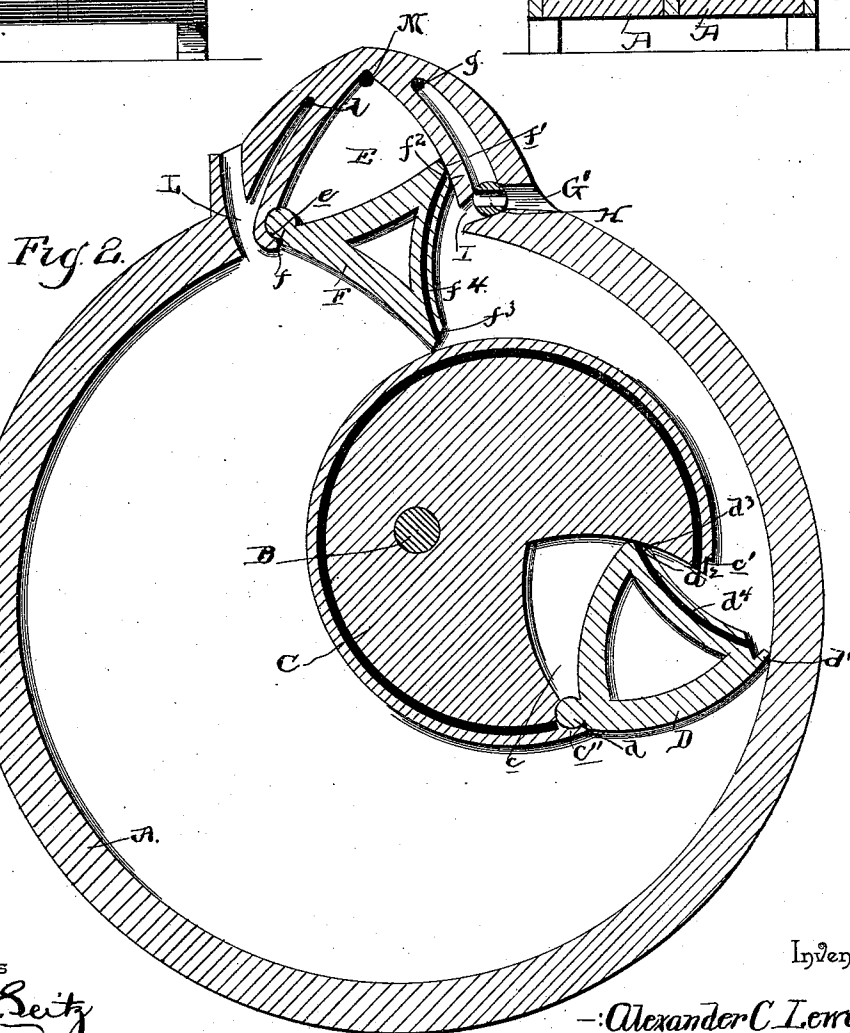
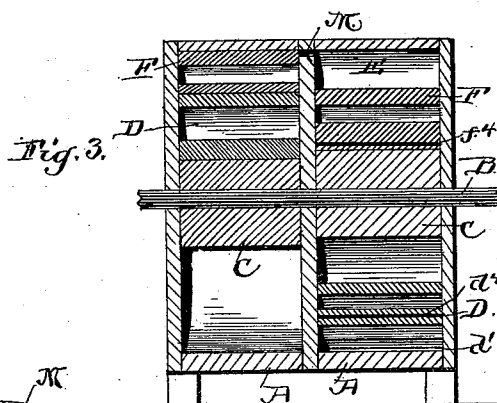
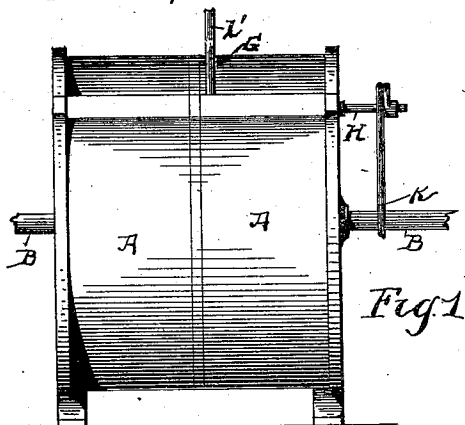


(No Model.)

A. C. LEWIS.
ROTARY ENGINE.

No. 466,540.

Patented Jan. 5, 1892.



Witnesses

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Inventor

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UNITED STATES PATENT OFFICE.

ALEXANDER C. LEWIS, OF McCrory, ARKANSAS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 466,540, dated January 5, 1892.

Application filed June 6, 1891. Serial No. 395,305. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER C. LEWIS, a citizen of the United States, residing at McCrory, in the county of Woodruff and State of Arkansas, have invented a new and useful Rotary Engine, of which the following is a specification.

My invention relates to an improvement in rotary steam-engines, and has for its object to provide an engine the construction of which permits a full utilization of the steam-power and at the same time the valves and other parts are so evenly balanced and receive the force of the steam in equal proportion to each other, so as to materially reduce friction; and it consists of a double-cylinder engine provided with eccentrically-mounted pistons within each cylinder, the same being provided with peculiarly constructed and arranged valves and further details of construction that will be hereinafter more fully explained, illustrated in the accompanying drawings, and specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a rotary steam-engine constructed in accordance with my invention. Fig. 2 is a vertical transverse sectional view through one of the engine-cylinders. Fig. 3 is a vertical longitudinal sectional view through both cylinders, the pistons and valves in each in opposite positions.

Referring to the accompanying drawings by letter, A A designate the two cylinders of which this engine is composed. Within each cylinder and eccentrically mounted upon the drive-shaft B is the piston C, which is provided with a triangular recess *c*, within which the valve D is designed to work and be seated. The valve D is triangular in shape with curvilinear sides to conform in shape and contour to the triangular recess within the piston that forms the valve-seat, and the apex of the triangular-shaped valve is provided with a rounded projection *d*, that is adapted to take into and work within the concaved recess *c'* at one of the extremities of the sides forming the triangular recess within the piston, thus forming a simple but firm pivotal connection between the valve

and the piston. The said valve is also provided with a projecting tongue *d'*, that is designed to fit into the shouldered recess *c'*, located at the extremity opposite to that in which the valve is pivoted, and thus allows the valve to fit closely within its seat and form a continuous circle with the periphery of the piston, and thus allow the same to revolve freely within the casing. The corner of the valve D opposite to that which is provided with a projecting tongue is beveled at *d²*, that bears upon one of the sides of the triangular recess during the back-and-forth motion of the valve within the same, the said bearing-face being provided with suitable packing *d³*, which communicates with the face packing *d⁴*, seated in the valve across its entire face, and the side of this valve upon which the steam bears is concaved in order that there may be a uniform pressure exerted upon the valve across its entire surface, which is easily accomplished, inasmuch as this side of the valve does not register with the side of the triangular recess corresponding to the same, and thus permits the steam to bear upon this face of the triangular valve from its beveled corner to the projecting tongue, which bears against the inner periphery of the cylinder-casing during the entire revolution of the piston whether the valve is partially within the recess or entirely without the same. The upper end of each cylinder is further provided with a triangular valve seat and recess E, corresponding in shape to the recess within the piston, and within which also works a triangular valve F of an analogous shape to that of the piston-valve, but has all of its sides concaved, in order when closed to seat itself snugly within its seat, and also to preserve the circle of the inner periphery of the valve-casing when it is in its closed position and allow the piston to freely pass thereby. This valve is also provided with a rounded projection *f*, that is seated in and pivotally works within the concaved recess *e*, located at the extremity of one of the sides forming the valve-recess, and it is also provided with the beveled portion *f'*, in which is located the packing *f²*, that is adapted to bear against the face of one of the sides forming said re-

cess, corresponding to the construction and operation of the valve in the piston, and also has the oppositely-beveled portion f^3 . The steam-bearing face is concaved similar to that of its corresponding valve, in order that it may have a bearing-face of equal area to that of said piston-valve at every point during the revolution of the piston, and which causes the valve to follow and bear upon the eccentric also during its entire movement, said valve being also provided with the face-packing f^4 , communicating with the packing f^2 , located at one of said extremities of said valve.

The piston within each cylinder is mounted upon the same shaft, but does not register with the movement of the other, but alternates, in order that there may be no dead-center, and the liability to the same is effectually overcome. The steam is admitted to the cylinders through the supply-pipe G, connected with any suitable generator and connecting with the steam-inlet opening G', and the same is alternately fed into and shut off from the respective cylinders by means of the oscillating valves H, which extend through the entire length of both cylinders and control the inlet of the steam through the openings I, over which beveled portions f^3 abut when the valve E is closed, communicating with the interior of the cylinder, and which opens directly upon the concaved bearing-face of the valve located at the top of the cylinders, and the said oscillating valves are operated by means of the eccentric K upon the drive-shaft outside of the cylinder connecting with the crank-arm k on the valve-stem h , extending without the cylinder. When the steam is shut off from one cylinder, the same is allowed to pass freely to the other cylinder through the passage g in each cylinder-head, as also is the exhaust-outlet L, located at the opposite side of the cylinder-head in communication with each cylinder through the passage l , located correspondingly to that of the supply steam-passage referred to, the exhaust-outlet L being connected with the exhaust-pipe l' opposite to the supply-pipe and suitably secured in said outlet-passage to conduct the exhaust-steam from the cylinders. An opening M in the valve-seat and recess at the top of the cylinder communicating with the recess and valve-seat in the opposite cylinder prevents back-suction or back-pressure upon the valve working within the recess, and thus permits free motion of the same within said recess.

From the foregoing description it is thought that the operation of my invention is quite apparent. The steam upon its entrance at the upper end of the cylinder bears first upon the valve located at this point and throws the same down upon the periphery of the piston eccentrically mounted within the cylinder-casing and is then deflected around and throws the piston-valve open and against the inner periphery of the casing, the area of pressure upon both valves being co-extensive, and the same are evenly balanced and permit a

ready throw of the piston, which is also assisted in its revolution by the steam bearing thereupon. As the piston revolves the valves at first are thrown partially open, then to their full extent, and finally, when the piston has completed a revolution, both valves fit snugly within their seats, the upper valve closing the inlet-opening momentarily while the piston passes this point, which it is assisted in doing by the piston in the opposite cylinder, which is revolving under full steam-pressure, as the supply-controlling valve has now shut off the steam from the present cylinder, the exhaust-port being of course left freely open.

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

1. In a rotary steam-engine, the combination, with a double cylinder and pistons eccentrically mounted therein upon the same shaft, of a triangular-shaped recess within each piston, triangular valves pivoted to said pistons and working within said recesses, and triangular valves located at the top of each cylinder within correspondingly-constructed triangular recesses and adapted to impinge upon the periphery of the revolving pistons during the entire revolution, substantially as set forth.

2. In a rotary steam-engine, the combination, with a double cylinder and pistons eccentrically mounted therein upon the same shaft, of a triangular-shaped recess within each piston and having curvilinear sides, triangular valves pivoted to said pistons and having curved sides to correspond with the side of the recess forming its seat and to complete the circle of the eccentric-piston when the valve is closed, and also to provide a concaved steam bearing-face, and triangular valves provided with curved sides and located at the top of each cylinder within correspondingly-constructed triangular recesses, said valves being designed to oscillate in said recesses and under the pressure of steam to have one of the angle ends thereof always in contact with the periphery of said eccentric-pistons substantially as set forth.

3. In a rotary steam-engine, the combination, with a double cylinder and valved pistons eccentrically mounted therein upon the same shaft, of a triangular-shaped recess located at the top of each cylinder and having curvilinear sides and triangular-shaped valves provided with a semi-rounded projection that is adapted to work within the concaved recess located at one of the extremities of the sides forming said triangular recess, the sides of said valves all being concaved to conform to the valve-seat, the inner periphery of the cylinder-casing, and to provide a bearing-face for the steam extending the entire length of the side of the valve, substantially as set forth.

4. In a rotary steam-engine, the combination, with a double cylinder and pistons ec-

centrically mounted therein, of an alternately-
operating oscillating supply-regulating valve,
a triangular-shaped recess within each piston
and having curvilinear sides, a concaved re-
cess and shouldered ledge at opposite termi-
nals of the sides forming said recess, a trian-
gularly-shaped valve having sides correspond-
ing to the valve-seat and the periphery of the
piston and also having a concaved steam
bearing-face, a rounded projection taking
into said concaved recess and a projecting
tongue adapted to seat itself in said should-
ered ledge, and triangular valves having con-
caved sides located at the top of each cylin-

der within correspondingly - triangular re-
cesses and further provided with a similar
pivotal connection at one of the extremities
of the sides forming said recess to that of
said piston-valve and having beveled bear-
ing-faces on the other angles of said valve,
substantially as set forth.

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

ALEXANDER C. LEWIS.

Witnesses:

A. MONTGOMERY,
E. J. CROSSETT.