2 Sheets--Sheet 1.

E. D. LYON.

Rotary Engine.

No. 159,520. Patented Feb. 9, 1875.

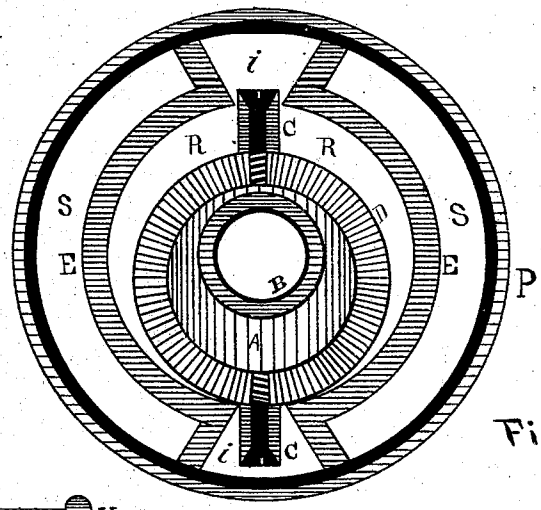

Fig 1

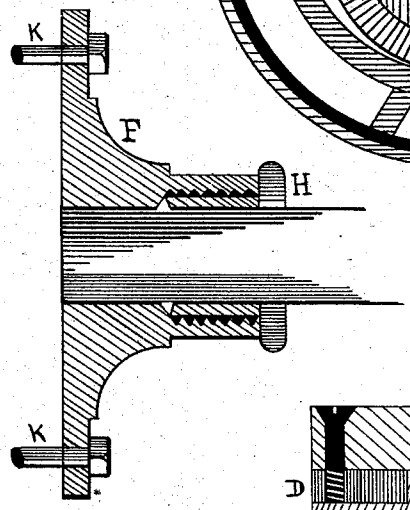

Fig 3

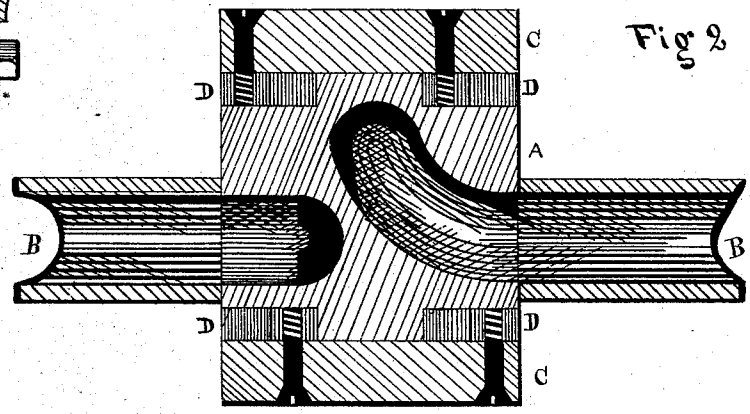

Fig 2

Witnesses:

H. L. Moore

Geo. P. Eldredge

Inventor:

E. D. Lyon

2 Sheets--Sheet 2.

E. D. LYON.

Rotary Engine.

No. 159,520. Patented Feb. 9, 1875.

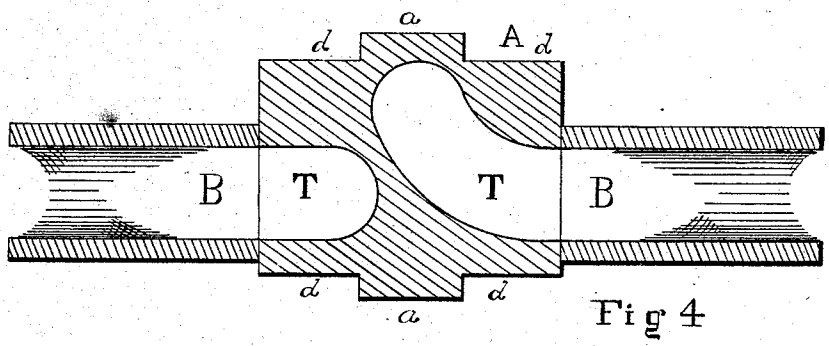

Fig 4

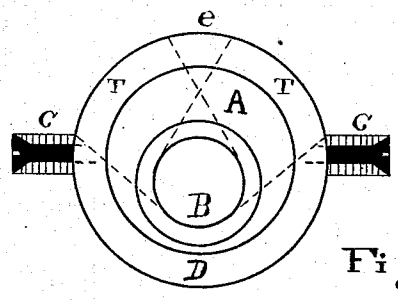

Fig 5

Witnesses;

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Geo. P. Eldredge.

Inventor;

E. D. Lyon

THE GRAPHIC CO. PHOTO LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

EMRA D. LYON, OF OTTAWA, ILLINOIS.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **159,520**, dated February 9, 1875; application filed November 16, 1874.

To all whom it may concern:

Be it known that I, EMRA D. LYON, of the city of Ottawa, State of Illinois, have invented a Rotary Engine for forcing water, applying steam-power, and for use as a water-gage, of which the following is a specification:

My invention consists of a cylinder, A, Figure 4, a portion of each end being cut away, so that such portions are of less diameter, as shown at *d d*, Fig. 4, than the central portion at *a a*. Upon said end portions are fitted bands or rings D D, Fig. 2, of sufficient thickness to bring the end portions to the same diameter as the central portion, as shown at D D, Fig. 2. These bands fit accurately to and revolve upon the ends *d d*. Extending the length of the cylinder, and attached to the bands D D at right angles, are the flanges or pistons C C, Fig. 2. Each of these is attached to a different band on each side of the central portion, *a a*, of the cylinder. By means of this arrangement each flange or piston revolves with the rings to which it is attached around the cylinder, independently of the other flange. This attachment is shown in Fig. 2, at D D. Each end of the cylinder A is pierced at a point a little outside the center with the holes T T, Fig. 4. These holes are made to communicate with the supply and discharge pipes B B, and open in the central part, *a a*, of the cylinder, the openings being somewhat less than half the circumference of that part of the cylinder from each other, measuring from their centers, as shown at T T, Fig. 5. These openings are funnel-shaped, and occupy at the surface of the cylinder nearly one-half of the circumference of said surface. The dotted lines in Fig. 5 show the course of said openings from the axis to the surface of the cylinder.

The aforesaid cylinder, (which, as it is stationary when the pump or engine is in operation, may be called the fixed cylinder,) with its bands and flanges attached as aforesaid, is inclosed in the rotating case P E, Fig. 1, which shows an end section of it. This is a hollow cylinder of sufficient length and diameter to inclose the fixed cylinder, the ends being closed with heads F, Fig. 3, like a steam-cylinder. Opening from and on opposite sides of the inner surface of this case are the slots *i i*, Fig. 1, which receive the flanges C C, and are of the same length. The heads of the rotating case are pierced in the center to admit the supply and discharge pipes B B. These pipes form the axis on which the case revolves, and are clamped and firmly held in boxes outside the heads of the rotating case.

It will be seen that the cylinder A is, in fact, a prolongation of the supply and discharge pipes, enlarged so as to furnish a sufficient bearing for the bands or rings D D, and set eccentrically to the inside of the rotating case P E, in order to form an abutment. It therefore would be proper to call said cylinder the supply and discharge cylinder. In this invention the abutment is really formed by the supply and discharge pipes. The part of this supply and discharge cylinder which is cut away, as aforesaid, is filled up by the bands D D. These therefore help to form the abutment, and their rotation causes them to wear uniformly, and the central portion of said cylinder, at the point where it comes in contact with the inner surface of the rotating case, thus forming the central portion of the abutment, cannot wear away below the rings. The flanges or pistons C C, attached to the rings D D, rotate upon the supply and discharge cylinder, which device is wholly novel, as also is the use of the rings D D to form the end portions of the abutment, by causing them to come in contact with the inner surface of the outer case. I also claim that the use of the supply and discharge pipes to form the abutment, which is accomplished by the supply and discharge cylinder, as aforesaid, and the contrivances incident thereto, as described, are new and original with me.

In operation, the cylinder A is inserted into the rotating case P E, the flanges C C extending into the slots *i i*. The pipes B B are firmly connected with the holes T T, Fig. 4, and pass out through the heads of the case, as at H, Fig. 3. By looking at Fig. 1 it will be seen that as these pipes, which form the axis of the rotating case, are parallel, but not coincident with the axis of the fixed cylinder A, the latter is eccentric to the case, and when the two are adjusted, as specified above, a portion of the surface of the fixed cylinder comes in con-

tact with a portion of the inner surface of the case. This point of contact is shown in Fig. 1, at the lower flange, C, and in Fig. 5, at *e*.

When the case and fixed cylinder are so adjusted, the vacant space R is left between the two, which is divided into two parts by the flanges, and the supply-pipe opens into one of these parts, and the discharge-pipe into the other, the point of contact *e*, Fig. 5, being between the openings of these pipes. When the rotating case begins to turn, one of the flanges C is at the point of contact *e*, and is carried away from it by the slot *i*. This leaves a vacuum behind it, which is filled with water from the supply-pipe. When the flange carried by the case has made half a revolution around the fixed cylinder from the point of contact, the side R, into which the supply-pipe opens, is filled with water, and as the revolution continues, the other flange passes the point of contact and begins to force forward the water. As this last-mentioned flange enters the part of R connected with the supply-pipe, the other flange passes by and leaves open the opening into the discharge, and the water before mentioned is forced out by the flange behind it. This operation is repeated with every revolution of the rotating case, and a stream of water is thus thrown out.

When this engine is used as a pump, the power is applied to the rotating case.

When used as a rotary steam-engine or as a water-gage, the steam or water is forced into the space R through the supply-pipe, and the force exerted presses against the flange which divides that space, and causes it to revolve, carrying the rotary case with it until it opens the discharge and allows the steam or water to escape, as when used as a pump.

I claim as my invention—

1. The cylinder A, having the ports of the inlet and discharge pipes opening in the central part of its periphery, and annular recesses at its ends for the reception of the bands D D, in combination with the supply and discharge pipes B B, the bands D D, the pistons C C, and the rotating case P E, substantially as described, and for the purpose specified.

2. The external cylindrical case P E, having the slots *i i*, and rotating upon the supply and discharge pipes B B, in combination with the pistons C C, the rings or bands D D, and the fixed cylinder A, substantially as described, and for the purpose specified.

E. D. LYON.

Witnesses:
H. H. MOORE,
GEO. P. ELDREDGE.