A. L. SCUDDER & J. L. WAGER.

ROTARY STEAM ENGINE.

No. 190,785. Patented May 15, 1877.

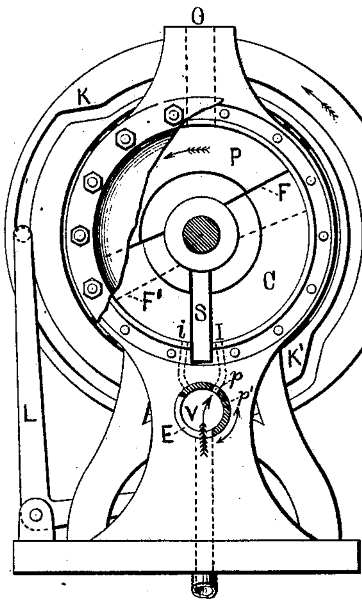

Fig. 1.

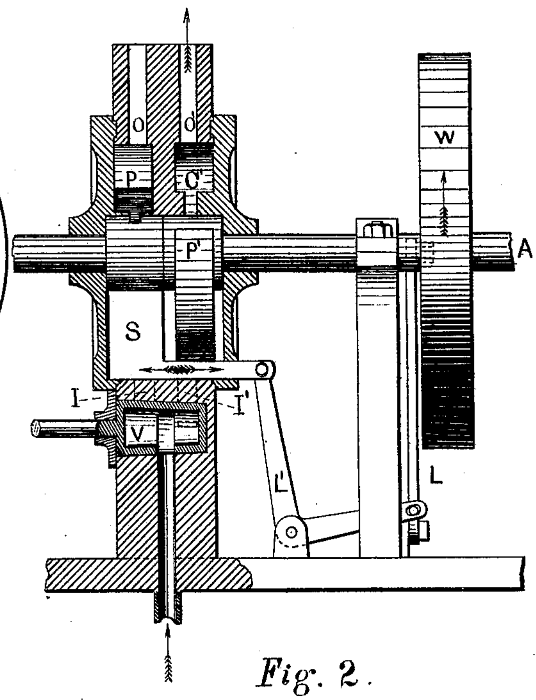

Fig. 2.

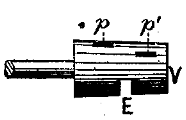

Fig. 4.

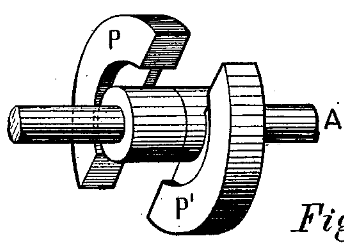

Fig. 3.

Witnesses.

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ABRAM L. SCUDDER AND JOHN L. WAGER, OF DEPOSIT, NEW YORK.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **190,785**, dated May 15, 1877; application filed January 31, 1877.

To all whom it may concern:

Be it known that we, ABRAM L. SCUDDER and JOHN L. WAGER, of the village of Deposit, in the county of Broome and State of New York, have jointly invented a new and Improved Form of Rotary Steam-Engine, of which the following is a full and exact description, reference being had to the accompanying drawings, in which like parts are indicated by the same letters.

Figure 1 is an end view of our rotary engine, with a portion of the cylinder-head broken away, the valve-cover removed, and the hollow conical rock-valve shown in vertical cross-section. Fig. 2 is a side view of our rotary engine, showing certain parts in vertical axial section, namely, the castings forming the cylinders or steam-chambers and the cylinder-heads, also the conical rock-valve and inlet-steam pipe. Fig. 3 is a perspective view of the pistons firmly attached to the shaft, and shows their relative position—symmetrically opposite—when in working order; the hubs of the pistons are in contact. Fig. 4 is a perspective view of the hollow conical rock-valve, showing the elongated circumferential entrance E for the steam, and the two outlet-ports *p* and *p'*.

The main feature of our joint invention consists in having two similar cylinders or steam-chambers (formed by the revolution of any desirable surface about the main axis) located on the same axial line, back to back, and separated by a diaphragm. Through the center of this diaphragm the shaft of the engine passes, as also portions of the hubs of the pistons, which are firmly attached to the shaft. Through this diaphragm also passes a reciprocating slide, S, (well shown in Figs. 1 and 2,) which forms, first in one chamber and then in the other, an abutment for the steam to act against.

The slide is represented as being moved by the cam-groove K and K' on the side of the balance-wheel W through the intervention of the bent levers L and L'; but it may be actuated by any equivalent device. It is always in the cylinder to which the steam is admitted, and its reciprocating movement is made very quickly, and during that fraction of a revolution—generally less than one-sixteenth—when the live steam is entirely cut off from the cylinders and the spent steam is passing away, so that the movement of the slide is made under comparatively little or no pressure whatever.

There are two steam-inlets to each cylinder, one on each side of and close to the base of the slide S. In the cylinder C they are lettered I and *i*, but in the drawing of the cylinder C' they are not shown. One inlet only to each cylinder would be necessary should the rotation be always in one direction.

Each cylinder has but one outlet, and that outlet diametrically opposite the slide S. The outlet of cylinder C is lettered O; that of cylinder C' lettered O'.

The operation of the engine is as follows: If it be desired to have the shaft revolve in the direction shown by the arrows in Fig. 1, the valve V is set as represented in said figure, and steam, being admitted to the valve through the elongated entrance E, enters the front cylinder C on the right side of the reciprocating slide S, the position of which in cylinder C is best shown in Fig. 2. The pressure of the steam against the face F of the piston P rotates it, the shaft, and piston P' in the direction indicated by the arrows until, just before the face F of piston P reaches the steam-outlet O, the valve V is rotated just enough to close the port *p*, and shut off the steam from the front cylinder C.

As soon as the face F of piston P begins to pass the outlet O of cylinder C, the steam in said cylinder begins to exhaust; and when the said face F has completely passed the outlet O (the face F' of the piston P' in rear cylinder C' will have passed the slide-recess in the meantime) the cam K suddenly throws the slide S into the rear cylinder C', and the valve V is immediately further rotated, so that the port *p'* covers the inlet I' and the steam enters the cylinder C', and the piston P' repeats the movement of piston P, making a nearly semi-revolution, when the valve V makes a retrograde movement, closing the inlet I'; and upon the piston P' passing the outlet O', the cam K' suddenly throws the slide S forward into the cylinder C, and the valve V is at once further rotated, so as to admit steam to the front cylinder, as before described.

To reverse the direction of the rotation, the

conical hollow rock-valve V is uncoupled and thrown over far enough to engage the valve-ports *p* and *p'* alternately with the front and rear inlet-passages of the cylinders on the left side of the slide S, as shown in Fig. 1.

We claim as our joint invention—

The combination, in a rotary steam-engine, substantially as described, of double cylinders and pistons with a reciprocating slide, which acts alternately in either cylinder as an abutment for the steam, as and for the purpose set forth.

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Witnesses:
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