

J. RIX & J. S. SHAW.
ROTARY ENGINE.

No. 28,905.

Patented June 26, 1860.

Fig. 2.

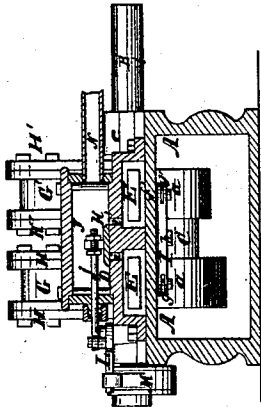


Fig. 4.

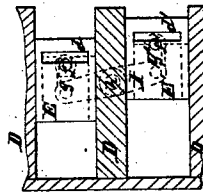


Fig. 1.

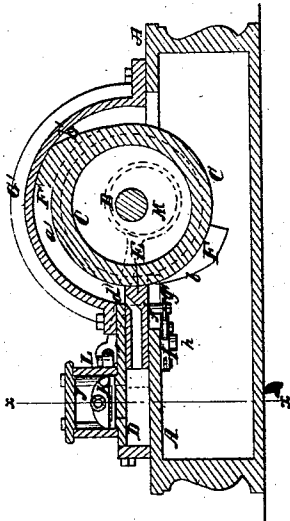
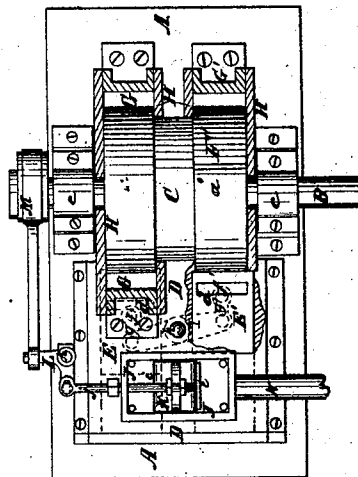


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN RIX AND JNO. S. SHAW, OF SPRINGFIELD, MISSOURI.

ROTARY ENGINE.

Specification of Letters Patent No. 28,905, dated June 26, 1860.

To all whom it may concern:

Be it known that we, JOHN RIX and JOHN S. SHAW, both of Springfield, in the county of Greene and State of Missouri, have invented a new and useful Improvement in Rotary Engines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of an engine with our improvements in a plane perpendicular to the shaft. Fig. 2 is a vertical section at right angles to Fig. 1, in a plane indicated by the line *x, x*, of Fig. 1. Fig. 3 is a plan of the same with the upper part of the cylinder casings and the cover of the valve chest removed. Fig. 4 exhibits a horizontal section of the abutment box with a top view of the sliding abutments.

Similar letters of reference indicate corresponding parts in the several figures.

A, is a hollow bed plate on the top of which are the bearings *e, e*, for the horizontal main shaft B, to which is secured the rotary cylinder C, which is concentric with the shaft and made with two concentric projecting bands *a, a'*, having a square transverse section. On each of these bands there is one of two rotary pistons F, F', made solid with the bands *a, a'*, or bolted securely thereto, the said pistons being of the same width as the bands *a, a'*, and arranged in opposite positions relatively to the axis of the shaft B, and being each beveled in curved form on one side as shown at *b, b'*, to give it a cam like character.

D, is the abutment box bolted to the top of the bed plate A, and divided into two horizontal compartments the sides of which are parallel with the planes of revolution of the cylinder C, and to each of which is fitted steam tight one of the two sliding abutments E, E', one of which is opposite to each of the bands *a, a'*. These abutments work radially to the main shaft B. They are made hollow, open at the end farthest from the cylinder and each with a port *d*, or *d'*, in its upper side but closed at the ends next the cylinder which are made to fit the peripheries of the bands *a, a'*.

G, G, H, and G', H', H', are two cylinder casings consisting of two semi-cylindrical arches G, G', of a radius as much greater than the bands *a, a'*, as the depth of the pistons F, F', and four side plates H, H, and

H', H', of semi-annular form bolted to the said arches and fitting to the shaft B, and cylinder C, and to the sides of the bands *a, a'*, and pistons, said casings communicating each with one of the two compartments of the abutment box on one side of the cylinder, and with the interior of the hollow bed plate on the opposite side.

The two sliding abutments E, E', are furnished on their undersides with studs *f, f'*, which pass through slots in the top of the bed plate and are connected by links *g, g'*, with opposite ends of a lever I, which is arranged to work horizontally within the bed plate on a fixed fulcrum pin *h*, the said links being connected with the said lever at equal distances from its fulcrum and the said lever and its connections being so arranged that when the end of one abutment enters within its respective casing G, H, H, or G', H', H', and is in contact with the periphery of its respective band *a, a'* the end of the other is flush with the inner face of its respective arc G or G', and entirely withdrawn from its respective casing. The ports *d, d'*, of the abutments are so arranged that each opens into its respective cylinder casing when the abutment is in contact with the cylinder but is closed by being withdrawn within the abutment box when the abutment is withdrawn from its respective cylinder casing.

On the top of the abutment box at a distance from the cylinder casing there is a steam chest J, the bottom of which constitutes a seat for a slide valve K, which is arranged to work transversely to the movements of the abutments or parallel with the axis of the cylinder and in this seat there are two ports *i, i'*, one communicating with each compartment of the abutment box. The said slide valve has its face perfectly flat and is long enough to cover both ports with some lap, and the said valve is connected by a rod *j*, passing through a stuffing box in one end of the steam chest with one arm of an elbow lever L, which works on a fixed fulcrum *k*, and whose other arm is connected with an eccentric M, on the main shaft, said eccentric being so set as to cause the valve to commence opening one or other of the ports *i, i'*, just before its respective piston has completely passed its respective abutment, and so to cause the admission of steam to its respective compartment of the abutment

box to act upon its respective abutment which having its port d , or d' , closed is instantly driven by the pressure of the steam upon the interior of its inner end into contact with its respective band a , or a' as soon as the piston has passed it, the lever I, by the same movement drawing out the other abutment into its compartment of the abutment box.

10 N, is the steam pipe connected with the steam chest J. The exhaust pipe is intended to connect with the hollow bed plate the interior of which constitutes an eduction chamber.

15 The operation of the engine is as follows. The steam entering the steam chest J, by the pipe N, is admitted by the valve K, to the ports i , i' , alternately and so allowed to force each of the abutments E, E', in turn into one of the casings G, H, H, or 20 G', H', H', and then to admit steam through the said abutments to act upon their respective pistons to drive them and the cylinder C, in the direction of the arrow shown upon the cylinder in Fig. 1, each piston being acted upon during the half revolution which it makes within its respective cylinder casing and while the other piston makes that half of its revolution that is made within the hollow bed plate.

30 In Figs. 1 and 3 of the drawing the port i , is represented open and its respective abutment E, has been forced into contact with the band a' , of the cylinder, and the steam is passing through the said abutment and issuing from its port d' , into the casing G', H', H', and acting on the piston F', but just before the said piston passes out of the casing G', H', H', the piston F, will enter 40 the casing G, H, H, and as soon as it shall have entered thereinto, the valve K, will

open the port i , and so admit steam into the abutment E, and such steam after forcing in the said abutment and so drawing out E', will issue through the port d , into the casing G, H, H, and act upon the piston F. In this way one or other piston is always subject to the action of the steam and the revolution of the cylinder C, and shaft are kept up the steam exhausting from each casing into the bed plate as soon as its respective piston passes out of the casing. In this operation the cam like formation of the pistons shown at b , b , prevents them catching the abutments as they pass and makes them prevent the abutments being forced into the cylinder till the proper time.

The steam may be worked expansively to such extent as may be desired by giving the valve K, a proper lap and length of stroke to cut off steam from the ports i , i' , at the desired point in the revolution of the pistons.

By extending the casings G, H, H, and G', H', H', all around the cylinder and providing two sets of abutments and two slide valves the engine may be made reversible.

What we claim as our invention and desire to secure by Letters Patent is.

The combination of the two hollow sliding abutments E, E', and the slide valve K, the said abutments being provided with ports d , d' , as described and applied within separate compartments of a box D, to which steam is admitted by the said valve alternately, and the whole operating substantially as herein set forth.

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