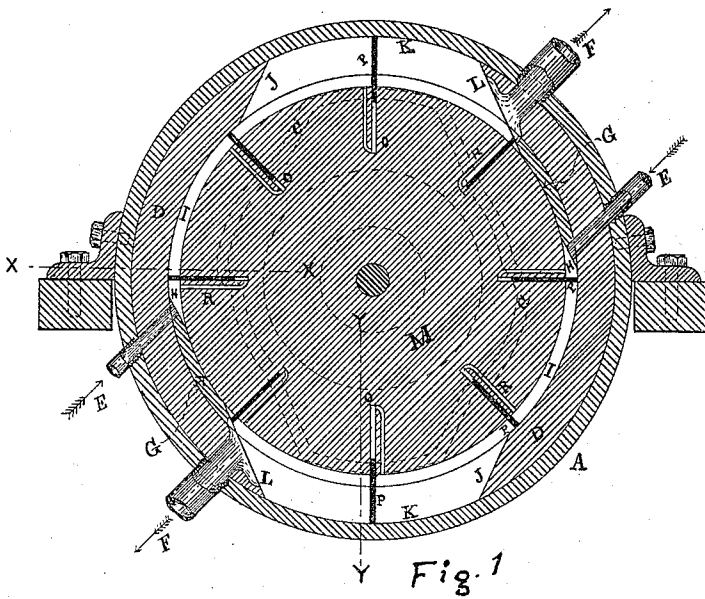
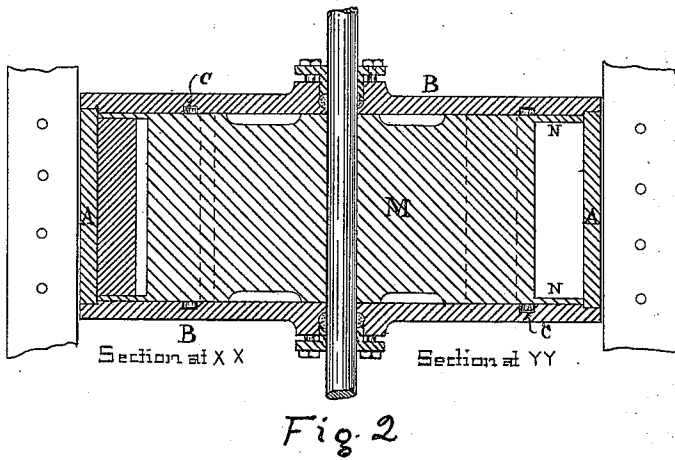


*(No Model.)

J. FORSYTHE
ROTARY STEAM ENGINE.

No. 440,120.

Patented Nov. 4, 1890.



Witnesses

H. J. Biggs
J. Lincoln Ralph

Inventor

Joseph Forsythe

UNITED STATES PATENT OFFICE.

JOSEPH FORSYTHE, OF PITTSBURG, PENNSYLVANIA.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 440,120, dated November 4, 1890.

Application filed July 23, 1886. Serial No. 208,898. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH FORSYTHE, of Pittsburg, Allegheny county, Pennsylvania, have invented certain new and useful Improvements in the Rotary Steam-Engine for which a patent was granted me, No. 335,121, dated February 2, 1886, the improvement being more particularly in the abutment therein described, the following being a clear and exact description thereof, reference being had to the accompanying drawings, which form part of this specification, and in all of the several figures of which the same letters represent the same parts.

Figure 1 represents a vertical section of engine at median line transverse to axis, showing abutments, piston, and wings in place in cylinder. Fig. 2 shows a vertical section parallel to axis at Y Y and a horizontal section parallel to axis at X X.

A represents the cylinder; B, the cylinder-heads, each of which has in its inner side a continuous or endless groove C, formed for the arms or wheels of the wings or sliding heads hereinafter described, and each of said cylinder-heads is pierced at its center for shaft of piston, the orifices being provided with proper stuffing-boxes. This cylinder has affixed to its concave side two segment-shaped abutments D, each traversed by an influent way E and effluent way F, and having two levels and three inclines, the first level G being nearest to the axis and by the first incline H connected with the second level I, which in like manner is by the second incline J connected with a third level K, being the concave surface of the cylinder, which in like manner is connected by the third incline L with the first level G, the influent port opening through the first incline and the effluent port through the third incline.

The piston M is cylindrical, with flanges N at its ends, the flanges and body of the piston cut radially and longitudinally toward the axis at equal distances to form recesses O in the body for wings P or sliding heads, and slides or holders in front of them in the flanges for said wings, each of said recesses having a steamway R, with one port in the convex surface of the body of the piston and the other port in the depth or rear of recess

on median line transversely to axis of the body of the piston. A wing P in each of said recesses, provided with short arms or spindles and wheels destined to roll on the sides of the guide-grooves C nearest to the axis, forms the complement requiring description here.

As to its mode of operation, this engine works as follows: The first and second inclines form successive faces of abutments of different areas, from which two volumes of steam of different pressures act upon the exposed areas of the wings or sliding heads, which are equivalent to the areas of the respective faces of abutments. The steam introduced through the influent port in the first incline between the first and second levels and flanges, finding before it a wing forming a moving wall to the first chamber, presses that wall or wing before it until it is replaced by a succeeding wing, the preceding wing when past the incline emerging from its recess until its outer edge is pressed against the concave surface of the shell of the cylinder; and the steam expanding from the second face of the abutment acts on the increased surface of the wing thus exposed and drives it forward until after being replaced as wall of the second chamber by the succeeding wing, which has in the meantime given place as wall of the first chamber to a third wing; it comes opposite the exhaust-port of the other abutment, which extends a little beyond the end of the third incline, and the steam exhausting out from its recess it is then borne against the incline, which presses it back into its recess, where it passes under the first level of said second abutment and is lifted up the first incline into the first chamber, corresponding to the one from whence it started, from thence to begin a second career in all respects similar to that described, being followed by all the others successively, each in its turn being operated in like manner, as described, and each by its resistance to the pressure upon it contributing to the revolution of the body of the piston, which carries along all the other wings not under immediate pressure, and, together with the steam in the recesses, the slides or holders in the flanges, the inclines and concave surfaces of the different levels or elevations, the centrifugal tendency of the wings, and the guide-grooves

in the cylinder-heads, necessitates and regulates all their motions.

I claim—

5 In a rotary steam-engine wherein the cylinder and piston have a common axis and one or more intervening abutments with influent and effluent ways, one or more stepped abutments, each having two or more concentric
10 surfaces at different distances from the axis, with two or more intervening and alternating faces, the abutment or abutments closing the circular chamber intervening between the cylinder and piston at one or more points to the passage of steam in one direction and
15 presenting said faces in the opposite direc-

tion as fixed faces, from which the steam acts on wings or sliding heads in opposition, moving in a circle or segments of a circle, the wings forming moving walls of two or more chambers of progressively-increasing size for
20 the purpose of making in a single cylinder a first use of steam at pressure and a second or other auxiliary use of steam by expansion, in combination, substantially as described and shown. 25

In witness whereof I hereto sign my name.
JOSEPH FORSYTHE.

Witnesses:

H. J. BIGGER,
J. LINCOLN RALPH.