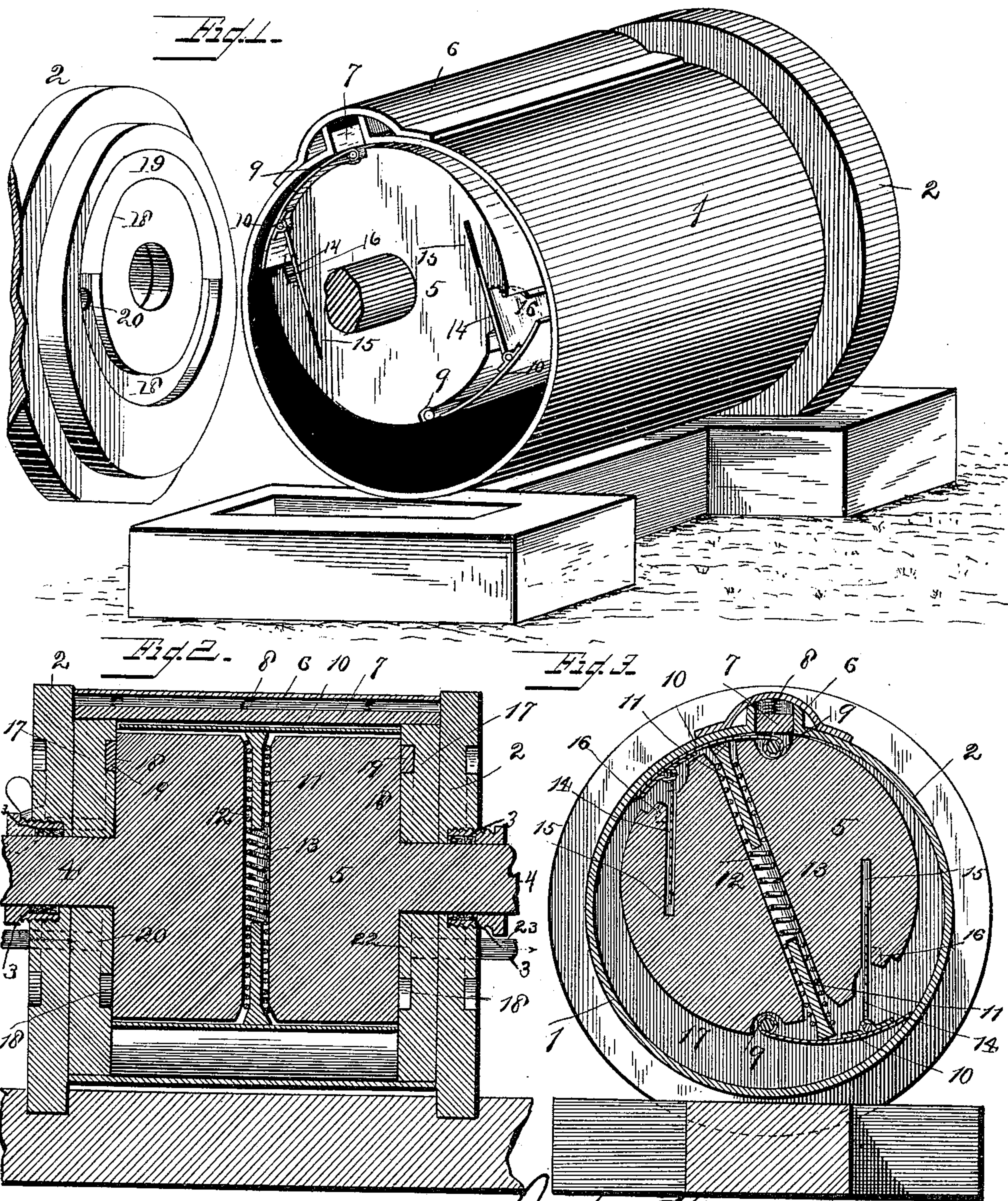


(No Model.)

J. HILLS & F. FITCH.
ROTARY ENGINE.

No. 364,925.

Patented June 14, 1887.



WITNESSES

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UNITED STATES PATENT OFFICE.

JUSTIN HILLS, OF ISCHUA, AND FRANKLIN FITCH, OF FRANKLINVILLE,
NEW YORK.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 364,925, dated June 14, 1887.

Application filed February 14, 1887. Serial No. 227,483. (No model.)

To all whom it may concern:

Be it known that we, JUSTIN HILLS, of Ischua, in the county of Cattaraugus and State of New York, and FRANKLIN FITCH, of Franklinville, in the county of Cattaraugus and State of New York, have invented certain new and useful Improvements in Rotary Engines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of our improved rotary engine, showing one of the heads removed, so as to illustrate the relative location of the circular groove in the inner side of the packing-plate of the head and the sliding ring-segment in the groove and the piston. Fig. 2 is a transverse sectional view of the engine; and Fig. 3 is an axial sectional view of the engine, showing the piston in side view.

Similar numerals of reference indicate corresponding parts in all the figures.

Our invention has relation to that class of rotary steam-engines in which the steam enters the cylinder through the heads, and is carried back of hinged wings upon the pistons by means of grooves at the ends of the engine; and it consists in the improved construction and combination of parts of such an engine in which the said circular grooves are formed in the inner sides of circular packing-plates secured inside of the heads of the cylinder and bearing against the heads or ends of the cylindrical piston, contemplating certain improvements upon the engine for which Letters Patent No. 347,242 were granted to Justin Hills on the 10th day of August, 1886, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates the cylinder of the engine, which cylinder is provided with two heads, 2, suitably secured to the ends of the cylinder and formed with eccentric bearings and stuffing-boxes 3, registering with each other.

The shaft 4 of the cylindrical piston 5 is journaled in these bearings, and the cylindrical surface of the piston bears against the up-

per side of the cylinder, at which point the cylinder is formed with a longitudinal recess, 6, in its inner side, having a packing block or strip, 7, placed within it and bearing firmly and tightly against the surface of the piston, and having springs 8, or set-screws, for forcing it against the piston.

The cylindrical surface of the piston is formed with two diametrically-opposite longitudinal and shallow recesses, 9, and two curved wings, 10, are hinged with one edge in the recesses, and bear with their free edges and outer convex sides against the inner side of the cylinder-headed rods 11, sliding in radiating bores 12 in the piston, and having springs 13, forcing them against the inner sides of the wings, forcing the wings outward.

The inner concave sides of the wings have guide-plates 14, hinged to them near the free edges, and these guide-plates slide in longitudinal grooves or recesses 15 in the sides of the piston, the said guide-plates being either straight, as shown in the drawings, or curved, sliding in correspondingly-shaped grooves or recesses.

The ends of the recesses or grooves for the guide-plates are cut off, to form beveled ports or channels 16, opening in the heads or ends of the piston and to the rear of the guide-plates.

The heads of the cylinder have packing-plates 17, secured against their inner sides, bearing with their inner faces against the ends of the cylinder, and these packing-plates are formed with annular grooves 18, concentric with the piston-shaft and registering with the inner ends of the beveled doors in the cylinder, and a segmental ring, 19, fits in each of the channels or grooves and slides in the same, filling somewhat less than one-half of each groove.

The live-steam ports 20 are formed in these annular grooves or channels at the same side of the piston-shaft, and the live-steam pipes 21 enter these ports, passing into the cylinder through the heads.

The exhaust-port 22 is in the side of the cylinder opposite to the side at which the live-steam ports are, and the exhaust-pipe 23 is secured to the said port.

It will now be seen that when the live steam enters through the ports into the annular grooves or channels the said channels will carry the steam so that it will pass through one of the beveled ports at each end of the piston, and through these beveled ports the steam will be carried back of one of the wings of the piston, forcing the same forward by its expansion, and by the steam being fed to the beveled port, while the outer end of the said port registers with the open portion of the channel. When, now, the outer end of the port arrives at the end of the segmental ring or bar, the latter will cut off the supply of steam into the port, and when the free edge of the wing passes the exhaust-port the steam will be exhausted through the said port, live steam being in the meantime fed to the opposite wing through the ports at that side. In this manner the piston will be revolved, and the period of the revolution at which the steam shall be admitted to the beveled ports, and at which it shall be again shut off from them, can be determined and fixed by adjusting the segmental rings or bars in the annular channels, the said rings or bars serving as cut-offs for the steam, suitable screws, bolts, or similar means being carried out through apertures in the heads from the rings or bars for adjusting and moving them.

The guide-plates will prevent the steam from being caught under the wings, where it would be liable to obstruct the free closing of the wings into their recesses, and the packing block or strip bearing against the piston at the upper side of the cylinder will prevent any of the live steam from entering the exhaust side of the cylinder by passing over the piston, and thus stopping or obstructing the revolutions of the piston.

Having thus described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a rotary steam-engine, the combination of a cylindrical piston having curved wings hinged with their inner edges to the surface of the same, and having beveled ports in the ends to the rear of the hinged edges of the wings, with a cylinder having circular packing-plates at its heads, and having the piston journaled eccentrically in it, and having an annular

groove or channel in each packing-plate concentric with the piston and registering with the outer ends of the beveled ports, and segmental cut-off rings or bars sliding adjustably in the grooves or channels, as and for the purpose shown and set forth.

2. In a rotary steam-engine, the combination of a cylinder having eccentric registering-bearings in its heads, and having the live-steam ports in the heads to one side of the bearings, and having the exhaust-port in the opposite side of the cylinder, a cylindrical piston journaled with its shaft in the bearings, and having curved wings hinged with their inner edges in shallow recesses in the surface of the piston, and provided with springs for forcing them outward, and having inclined or beveled ports passing from the ends of the piston to the back of the wings, and packing-plates secured between the heads of the cylinder and the ends of the piston, and having annular grooves or channels in their inner sides registering with the beveled ports, and provided with adjustable segmental cut-off rings or bars sliding adjustably in the channels, as and for the purpose shown and set forth.

3. In a rotary steam-engine having the live-steam ports at one side and the exhaust at the other side, and having eccentric bearings in the heads of the cylinder, the combination of a cylindrical piston having its shaft eccentrically journaled in bearings in the heads of the cylinder, and having shallow recesses at opposite sides of the piston, curved wings hinged with their inner edges in the recesses, headed rods sliding in radiating bores in the piston, and having springs for forcing them against the inner sides of the wings, and guide-plates hinged to the inner sides of the wings, near the outer edges of the same, and sliding in correspondingly-shaped grooves or recesses in the piston, as and for the purpose shown and set forth.

In testimony that we claim the foregoing as our own we have hereunto affixed our signatures in presence of two witnesses.

JUSTIN HILLS.
FRANKLIN FITCH.

Witnesses:

GEORGE E. SPRING,
CHARLES P. HALLIGAN.