(No Model.) 4 Sheets—Sheet 1.

J. E. MILLS.

ROTARY STEAM ENGINE.

No. 343,831. Patented June 15, 1886.

Fig. 1.

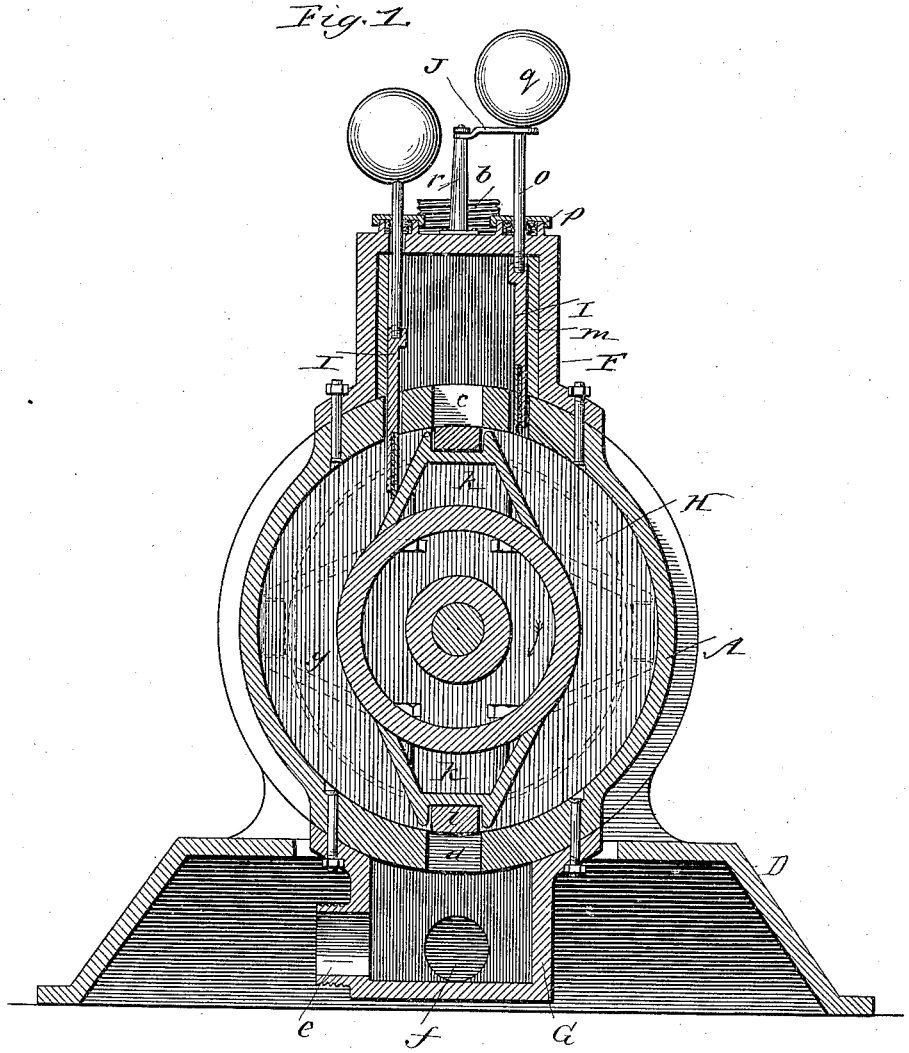

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Fig. 2.

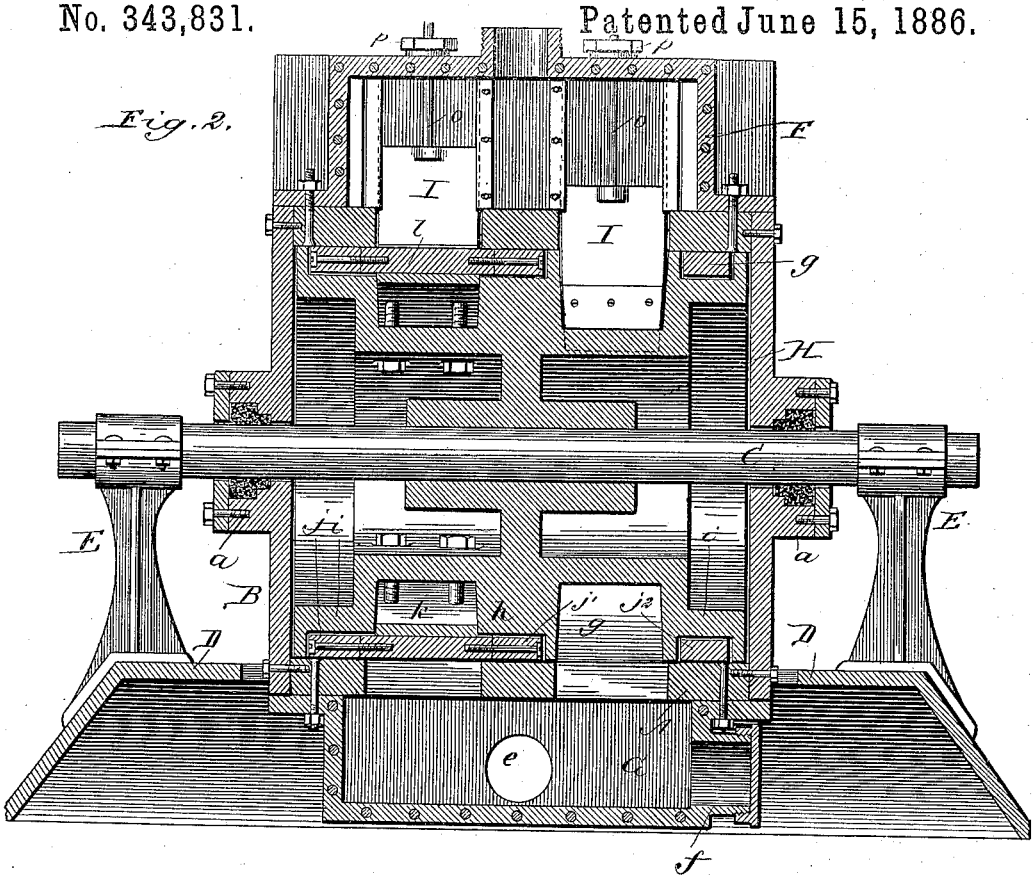
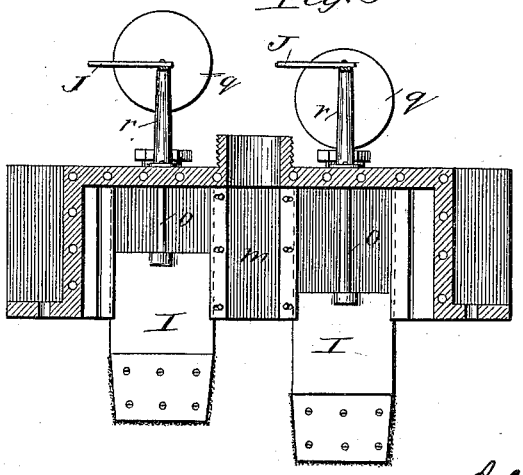


Fig. 3



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ROTARY STEAM ENGINE.

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Fig. 4.

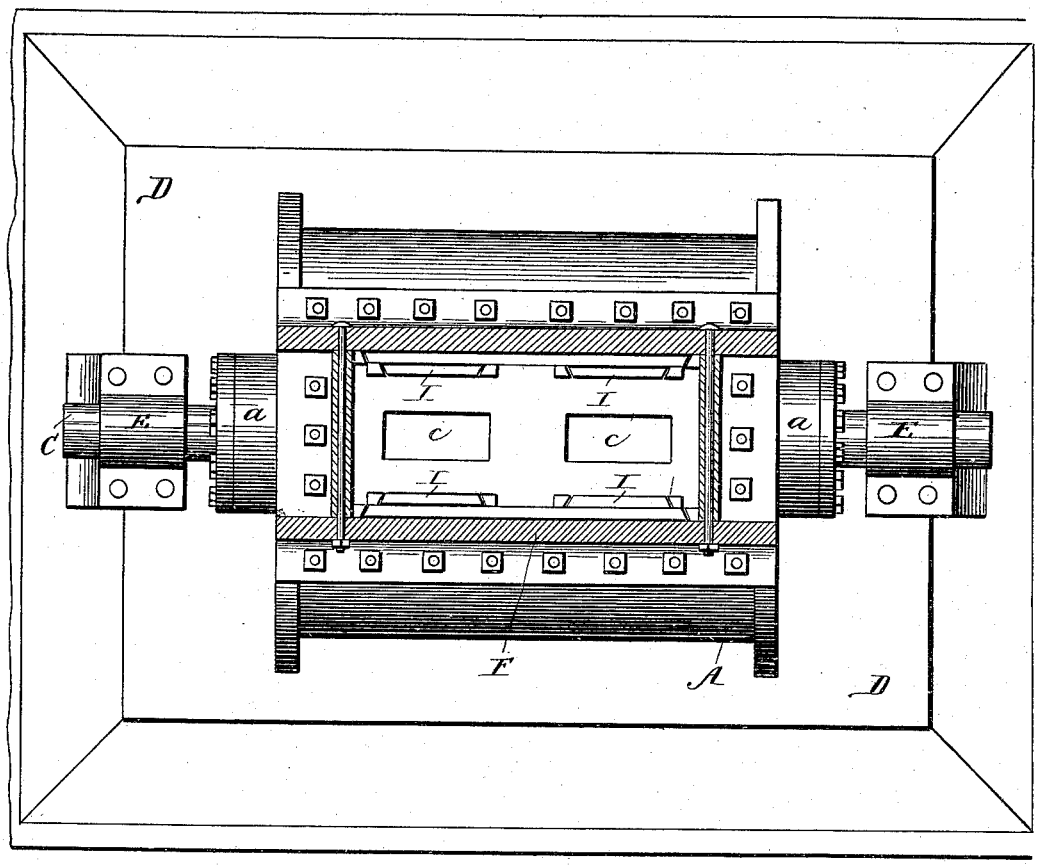
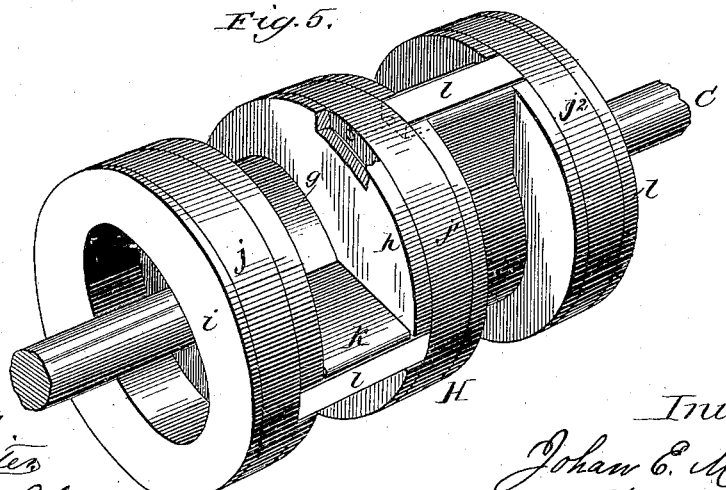


Fig. 5.



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ROTARY STEAM ENGINE.

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Fig. 6.

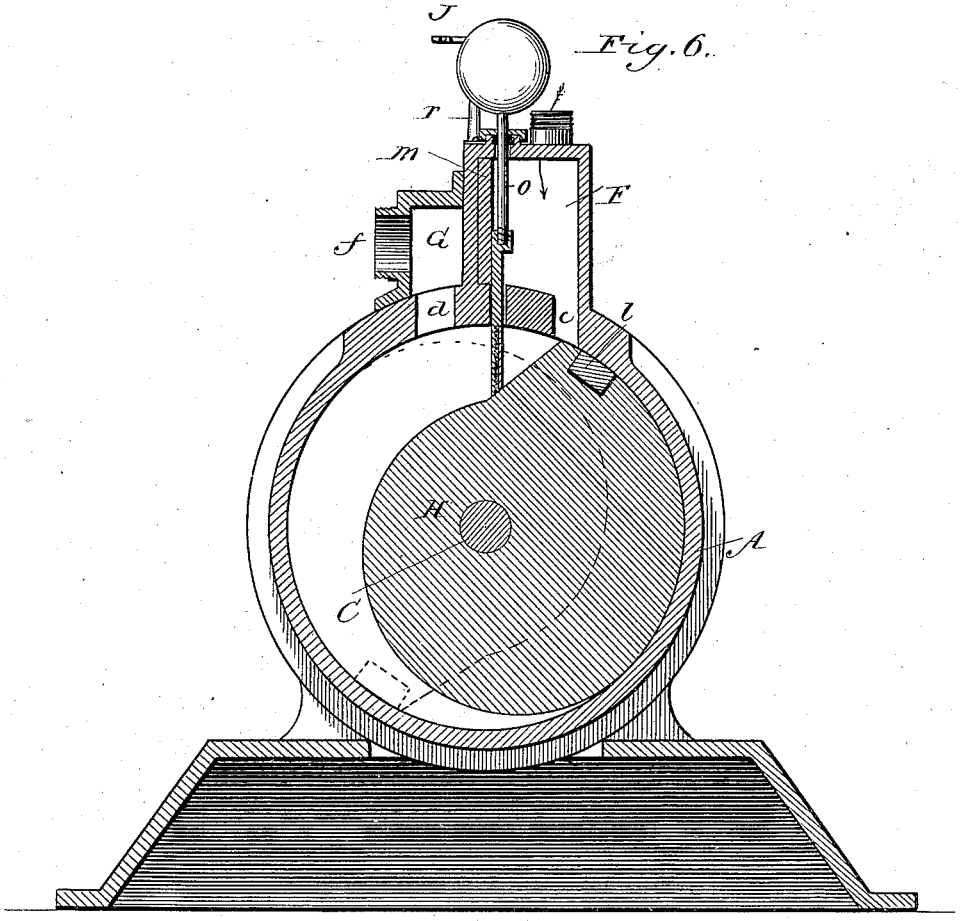
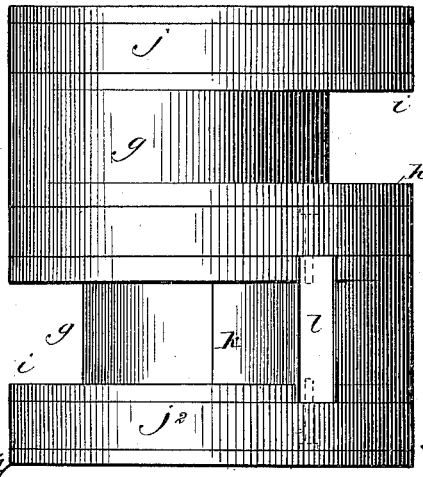


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHAN E. MILLS, OF CHICAGO, ILLINOIS.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 343,831, dated June 15, 1886.

Application filed March 30, 1886. Serial No. 197,200. (No model.)

To all whom it may concern:

Be it known that I, JOHAN E. MILLS, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its object to produce a rotary engine that is simple in its construction and automatic in its operation; and it consists of the novel devices and combinations of devices hereinafter described, and specifically claimed.

In the accompanying drawings, Figure 1 represents a vertical cross-section of the engine; Fig. 2, a longitudinal vertical section through the center of the same; Fig. 3, a similar sectional view of the steam-chest and of the gravitating abutment-gates; Fig. 4, a sectional plan of the engine; Fig. 5, a perspective view of the rotary piston; Fig. 6, a modification of the engine as built non-reversible, and Fig. 7 a perspective view of the piston-wheel of same.

Corresponding letters in the several figures of the drawings designate like parts.

A denotes the cylinder, closed at both ends by covers B, each provided with a stuffing-box, *a*, for shaft C to project through. This cylinder A is mounted upon a bed-plate, D, with standard-bearings E, secured upon each end thereof, in which bearings the shaft C is journaled.

Upon the top of cylinder A is secured the steam-chest F, with steam-inlet nozzle *b*, which steam-chest communicates with the cylinder through the port *c;* and against the bottom of cylinder A is secured the exhaust-chest G, communicating with the cylinder through port *d*, and having two exhaust-nozzles, *e* and *f*, to either one of which the exhaust-pipe may be connected.

Upon shaft C is mounted a cylindrical wheel, H, having two large annular grooves, *g*, turned into its periphery, which grooves are a little wider on top than in their bottom, and the central partition-flange, *h*, as well as the end flanges, *i*, have turned annular grooves in their faces for packing-rings *j j' j²*, that are to be split and jointed in the usual manner adapted for common piston-rings to form hermetic joints with the bore of cylinder A.

In each groove *g* of the wheel H are closely fitted and secured by bolts two V-shaped blocks or frames, *k k*, that are placed diametrically opposite, and the blocks *k* of the two grooves *g* are placed in a rectangular position relative to each other, each of these blocks *k* forming a piston proper for rotating wheel H.

Longitudinally into the face of each block *k* is planed a rectangular groove, which grooves are extended through the shoulder-flanges of packing-rings *j*, to be continuous between such packing-rings *j j' j²*, and into each such groove is fitted a packing-strip, *l*, which extend from the central packing-ring, *j'*, to either end ring, *j* or *j²*, and are rigidly secured between such packing-rings by screws passed through rings *j* and tapped into the butt-ends of packing-strips *l* in a manner to form a continuous elastic packing that will insure a tight joint with the bore of cylinder A.

Against each side of steam-chest F is inserted between dovetailed corner-strips a plate, *m*, again provided with dovetailed guide-strips, between each pair of which is guided a gate, I, that through close-fitting slotted openings in the cylinder A can move vertically into such cylinder. The lower ends of these gates I are formed tapering to enter and make a close joint with the grooves *g* of wheel H, for which purpose their edges are grooved for holding some fibrous packing. Each such gate I has secured to its upper edge a rod, *o*, that is passed through a stuffing-box, *p*, in the cover of steam-chest F, and to the upper extremity of such rod *o* is secured a ball, *q*, which by its gravity will assist such gates in dropping quickly. Placing a gate I to each side of steam-port *c* has for its object to make the engine rotate in either direction by operating either gates on one side or the other in the steam-chest, and therefore the gates to remain idle and out of contact with the piston-wheel are suspended and locked in their elevated position by arms J, pivotally secured upon posts *r*, such arms J being adapted to swing under the balls *q* of either gate I, affording a support for the same.

This engine is automatic in its operation, the gates I forming the abutments for the

steam, exerting its force against the wing-pistons *k*, that again act as cams for raising the gates by the inclined face on one side to pass from under, and then to drop again by following the incline of the opposite side of the wing-piston *k*, and while the pistons *k* in one groove *g* of wheel H are on their dead-center with both the steam and exhaust ports closed by the packing-strips *l*, the pistons *k* in the other groove *g* are under full action of the steam, whereby a uniform rotation of the piston-wheel is obtained in all positions. The steam acts upon the wing-piston until its packing-strip *l* has passed the exhaust-port *d*, by which time the diametrically-opposite wing-piston has the force of the steam. Thus each piston is the motor during one half of a revolution and is carried idle during the other half of a revolution.

In Figs. 6 and 7 is shown a modification of my devices, and represent an engine built to rotate only in one direction with a single piston-face that has the force of the steam on its nearly entire revolution, the two piston-faces of opposite ends of the piston-wheel being diametrically opposite relative to each other.

As will be noticed, in this engine the piston-wheel H is cam-shaped in its grooves *g*, with sufficient concentric face to cut off the steam on about two-thirds of its revolution, the exhaust-chest G, with its port *d* and nozzle *f*, is placed on top adjacent to the steam-chest, and only a single pair of abutment-gates are required.

What I claim is—

1. In a rotary engine, the combination, with cylinder A, of wheel H, having grooves *g*, with double-inclined faces for automatically lifting the gravitating abutment-gates I, substantially as described, to operate as specified.

2. In a rotary engine, the combination, with cylinder A, of wheel H, having grooves *g*, with wing-pistons *k* and packing-rings *j j' j²*, connected by the packing-strips *l* of the wing-pistons, all substantially as shown and described.

3. In a rotary engine, the cylinder A, with steam-chest F, and exhaust-chest G, with ports *c* and *d*, and with gravitating gates I, in combination with the grooved piston-wheel H, having doubly-inclined wing-pistons *k*, substantially as described, to operate as specified.

4. In a rotary engine, the combination, with the grooved piston-wheel H, having doubly-inclined wing-pistons *k*, of the cylinder A, having steam-chest F, with port *c*, and of abutment-gates I, provided with weights *q*, substantially as described, for the purpose specified.

5. In a rotary engine, the combination, with the grooved piston-wheel H, having wing-pistons *k*, of the cylinder A, having steam-chest F, and of a double set of abutment-gates, I, arranged at opposite sides of the steam-port *c*, substantially as and for the purpose set forth.

6. In a rotary engine, the combination, with the grooved piston-wheel H, having wing-pistons *k*, of cylinder A, having steam-chest F, and of a double set of gravitating abutment-gates, I, arranged at opposite sides of steam-port *c*, either one set to be held out of operation by a swinging arm, J, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHAN E. MILLS.

Witnesses:
ANTON SCHOENINGER,
HARRIS W. HUEHL.