(No Model.)

J. McGOWAN.

ROTARY STEAM ENGINE.

No. 262,602. Patented Aug. 15, 1882.

Fig. 1.

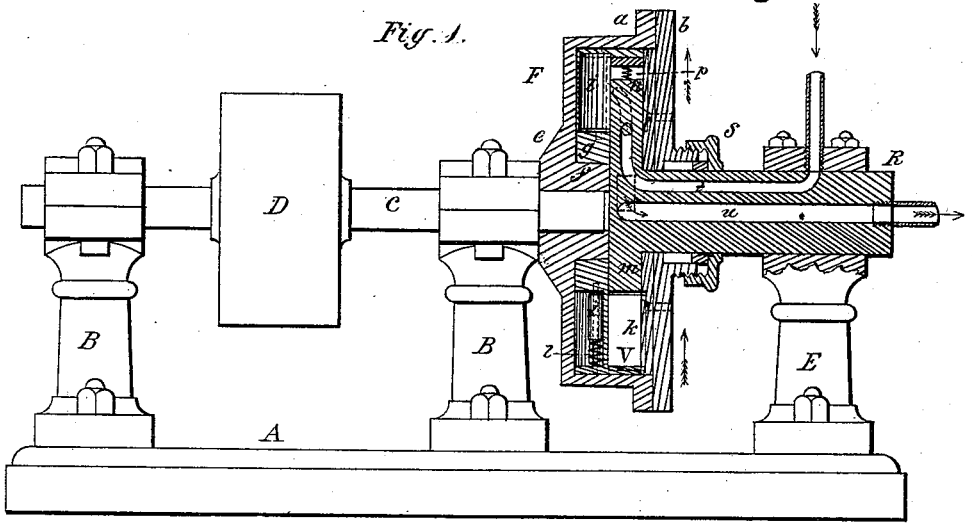


Fig. 4.

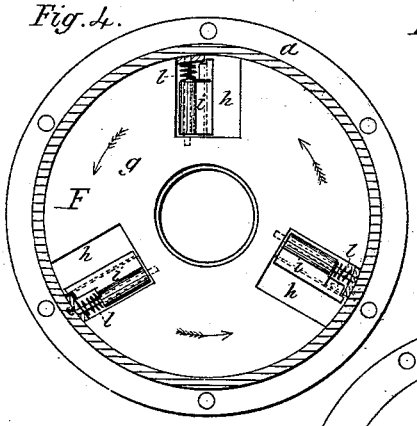


Fig. 3.

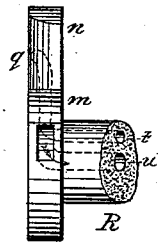


Fig. 2.

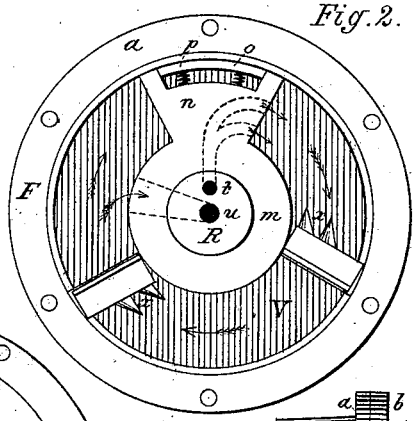


Fig. 5

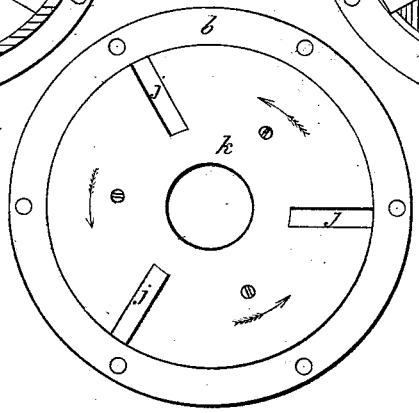


Fig. 6.

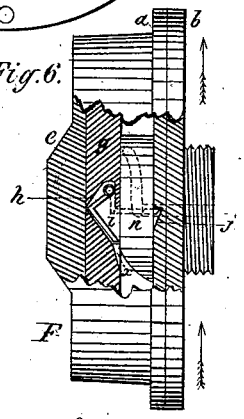
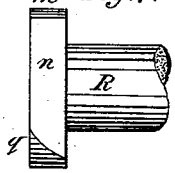


Fig. 7.



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ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 262,602, dated August 15, 1882.

Application filed August 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN McGOWAN, a citizen of the United States, residing at Coal Valley, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rotary Steam-Engines, of which the following is a specification.

My invention relates to improvements in that class of rotary steam-engines wherein a rotating cylinder provided with swinging or laterally-moving valves is caused to revolve around a stationary or fixed interior abutment containing supply and exhaust passages that lead into and through the trunnion supporting the said stationary abutment; and my invention consists in the peculiar construction, arrangement, and mode of operating, closing, and seating the swinging valves, in combination with their respective recesses and a stationary abutment contained within the concentric steam-chamber of the revolving cylinder, whereby the several valves are pushed back into their respective recesses by coming in contact with the stationary abutment, and, after passing the same, are thrown outwardly across the concentric chamber of the cylinder by the direct action of the ingoing steam, and seated in and against the permanent walls of the revolving engine in such a manner as to give the edges of said valves a good substantial steam-tight bearing.

The nature of my invention will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved rotary engine, wherein the revolving cylinder, stationary abutment, and the several steamways are shown in vertical central section; Fig. 2, a front interior view of the cylinder exhibiting the arrangement and relation of the stationary abutment to the cylinder and the several valves; Fig. 3, an edge elevation of the abutment detached from the cylinder, together with a portion of its trunnion; Fig. 4, a vertical transverse section of the cylinder just back of and exposing the several valve-recesses and the valves therein; Fig. 5, an inside view of the removable head of the cylinder, having attached thereto a circular and concentrically-arranged thick plate, in which are cut three radial grooves to receive the forward ends of the several valves; Fig. 6, a side elevation of the cylinder, having a portion broken away to exhibit the position taken by the valves before and during their passage of the stationary abutment; Fig. 7, a top view of the stationary abutment removed from the cylinder.

I construct my rotary engine by erecting upon a base-plate, A, three stout pillars, two, B B, of which support a longitudinally arranged shaft, C, carrying a suitable pulley, D. On that end of this shaft nearest the third pillar, E, is firmly secured the cylinder F of the engine, consisting of a circular metallic box of large diameter in proportion to its depth, and provided with a projecting flange, *a*, around its mouth, closed by a removable head, *b*, attached to the engine-cylinder by bolts passing through its rim into said flange, after the manner usual in other engines.

This engine is provided, in addition to its external conical hub *e*, with a circular projection, *f*, extending interiorly half the depth of the cylinder, and around this projection is arranged a solid block, *g*, filling up the entire space that would otherwise exist from the face of the projection *f* to the back and circular walls of the cylinder. In this block are located at equidistant points three sockets, *h*, and each contains a swinging valve or small angular door, *i*, so pivoted or hinged therein as that when opened outwardly it will extend entirely and at right angles across the remaining space of the cylinder, with its front edge resting in its appropriate radial recess, *j*, in the plate *k*, attached to the inner face of the removable head *b*. Each of these angular doors or valves has around its pintle a small spiral spring, *l*, pressing the doors toward the center of the engine, and when the doors are open each nearly fills its respective pocket or recess.

Leading from the main space of the cylinder into the several pockets, to enable the live steam to enter and get behind the doors as they go by the inlet-passage, are two V-shaped channels, *x*, cut in the aforesaid block.

Bearing against the end of the interior projection, *f*, and surrounding block *g*, and be-

tween them and the face of the plate *k* attached to the movable head *b*, is a stationary disk, *m*, arranged concentrically within the cylinder, and provided with a fan-shaped extension or abutment, *n*, terminating in the arc of a circle corresponding to that of the inside of the cylinder; and the convex surface of the abutment contains a movable plate, *o*, kept close against the interior circle of the cylinder by means of suitable springs, *p*, to make a steam-tight joint. The fan-shaped extension of the disk is beveled on that side, *q*, of its edge coming in contact with and next the swinging doors or valves, whereby they are crowded each into its respective recess and held there until liberated by the complete passage of that portion of the cylinder beyond the fan-shaped extension. This disk forms part of a large and strong trunnion, R, extending outwardly through the removable head of the engine, the joint between them being closed by suitable packing held in place by means of a properly-constructed screw-cap, S, and the trunnion is rigidly supported in an outside bearing upon the top of a stout pillar, E, a little distance from the cylinder. The trunnion has an induction-passage, *t*, and exhaust-passage, *u*, through it in the direction of its length. The exhaust, being the larger, is arranged on the axial line and the induction just above it and parallel therewith. The inlet-passage extends into the fan-shaped extension *n* of the disk *m*, and then by two curved branches (shown by the dotted lines *r* in Fig. 2) enters the circular steam-space V of the engine. The exhaust-passage *u* simply extends to and through the opposite edge of the disk *m*, being somewhat widened or enlarged at its mouth.

Operation: Steam, being admitted to the inlet-passage, will proceed through its curved branches into the circular steamway of the cylinder, acting directly upon the nearest swinging door, driving the cylinder around in that direction until the second swinging door has just passed the fan-shaped abutment, when the steam, issuing therefrom a little to that side, will first enter the V-shaped channels leading behind that door and force it outwardly and at right angle across the concentric steamway of the cylinder, pressing the door closely against its top and side bearings with sufficient force as to practically prevent leakage. As the third door comes in contact with the bevel of the fan-shaped abutment it will be forced back into its pocket or recess, and the steam previously existing or occupying the space between it and the second door allowed to escape by way of the exhaust-passage. As each door, after emerging from behind the fan-shaped abutment, is opened and acted upon in regular succession by the live ingoing steam, it follows that a continuous and regular rotation of the engine must ensue.

Having thus stated the nature and construction of my improved revolving-cylinder engine, I claim—

1. A revolving-cylinder steam-engine provided with a concentrically-arranged internal disk containing the exhaust-passage, and a bevel-edged fan-shaped stationary abutment, through which extends the inlet-passage, in combination with three hinged doors, in the form of a right angle, swinging laterally into side pockets or recesses in the cylinder while passing the said stationary abutment, and by the force of the ingoing steam opened outwardly and directly across the concentric main space of the cylinder, each with its front edge resting in its appropriate radial groove formed in the inner face of the removable head of the engine, whereby a proper and resistant bearing is given the front edge of each swinging door, as shown and set forth.

2. A revolving cylinder-engine operated by steam and provided with an internal stationary abutment, in combination with laterally-swinging doors or valves, the pintles of which are arranged radially, or nearly so, to the axis of the engine.

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