E. MYERS.

Rotary Engines.

No. 144,559. Patented Nov. 11, 1873.

Fig. 1.

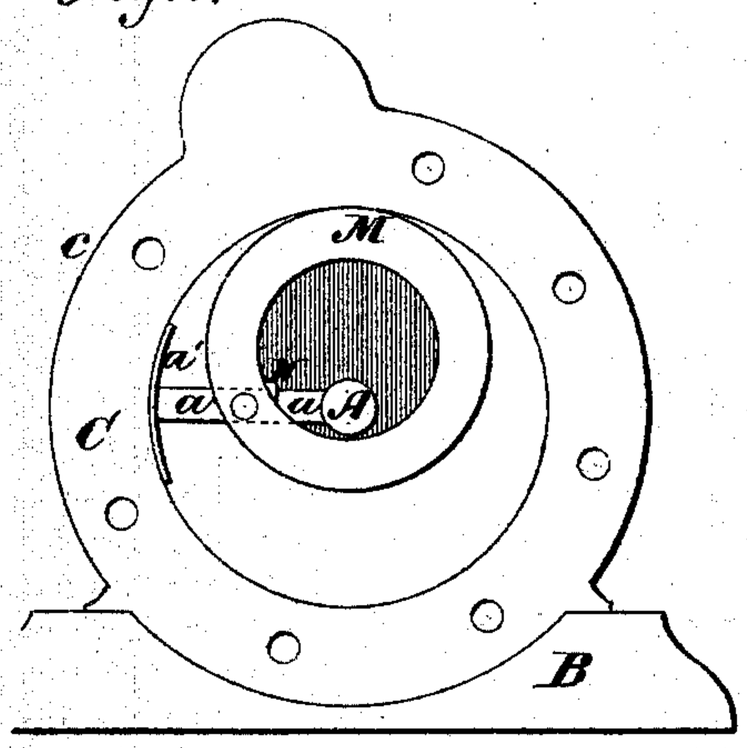


Fig. 3.

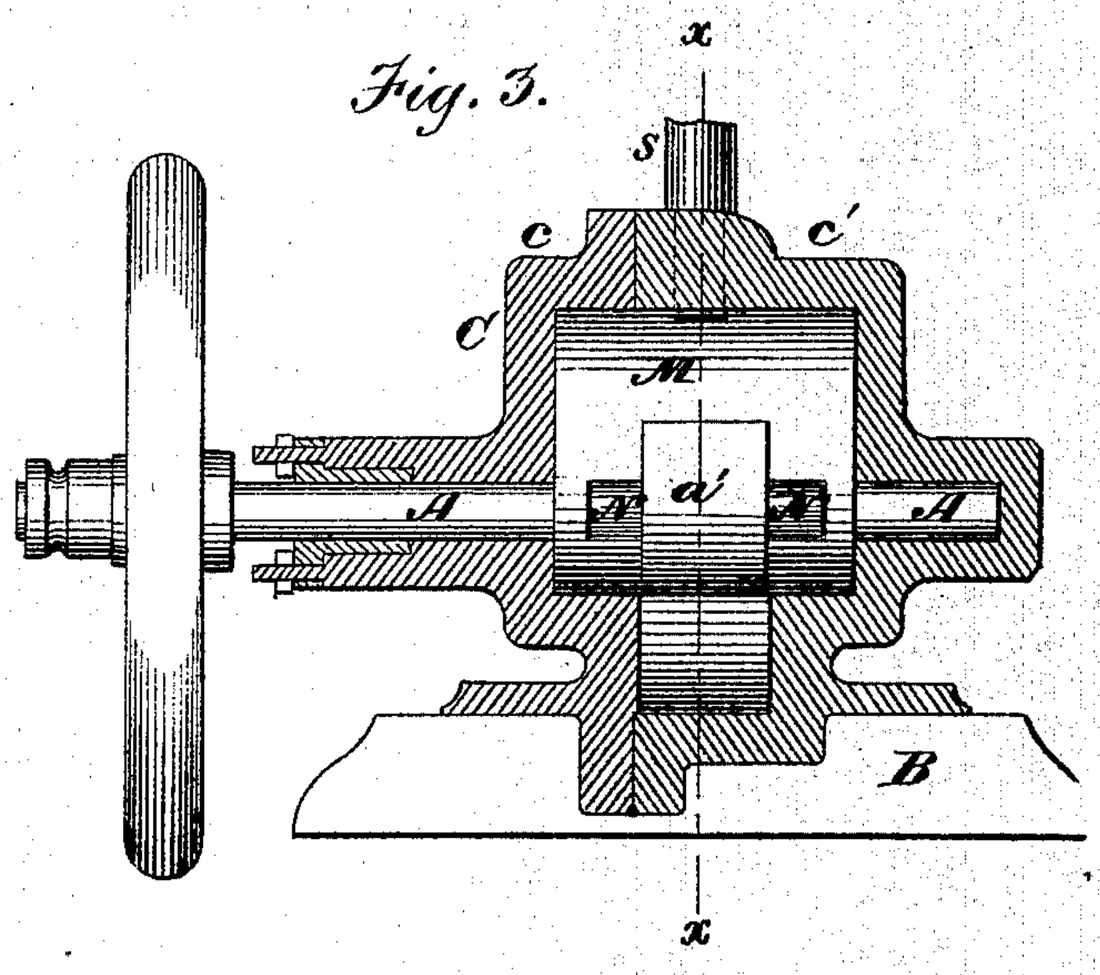


Fig. 2.

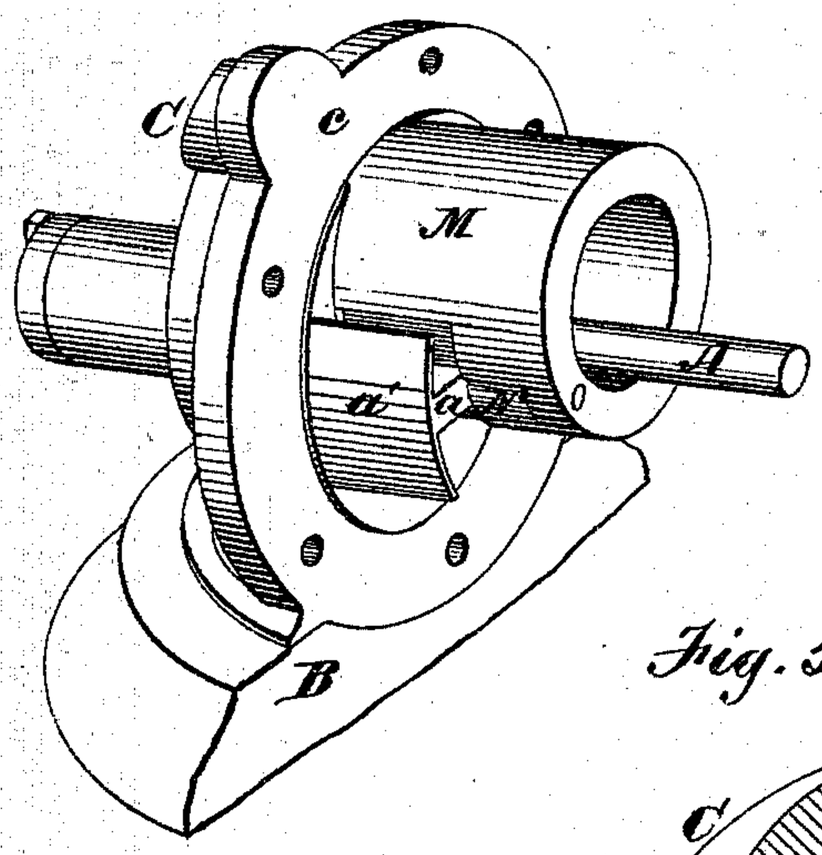


Fig. 4.

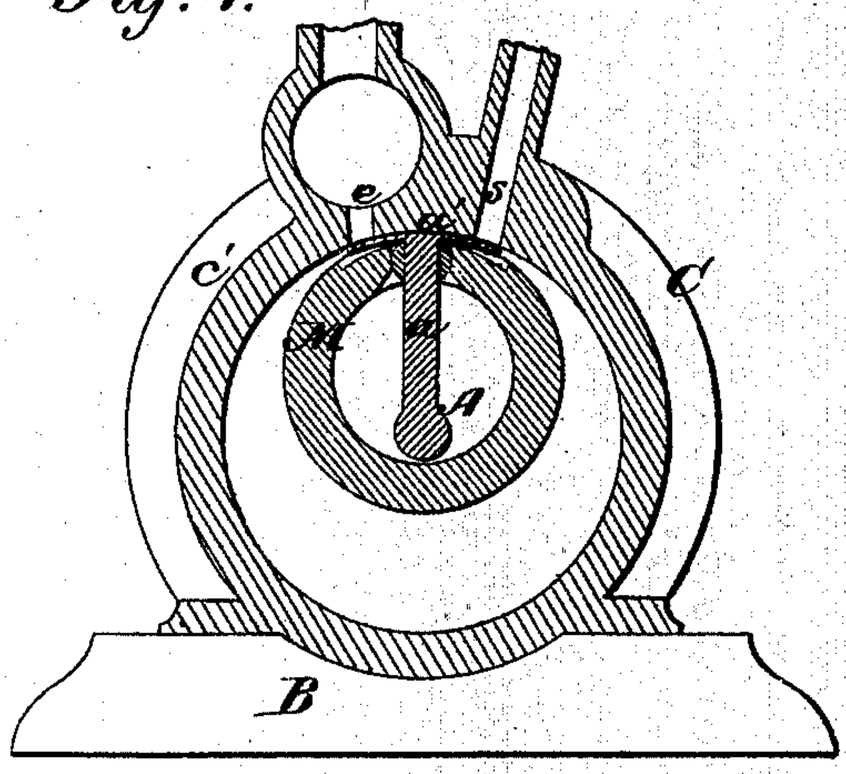
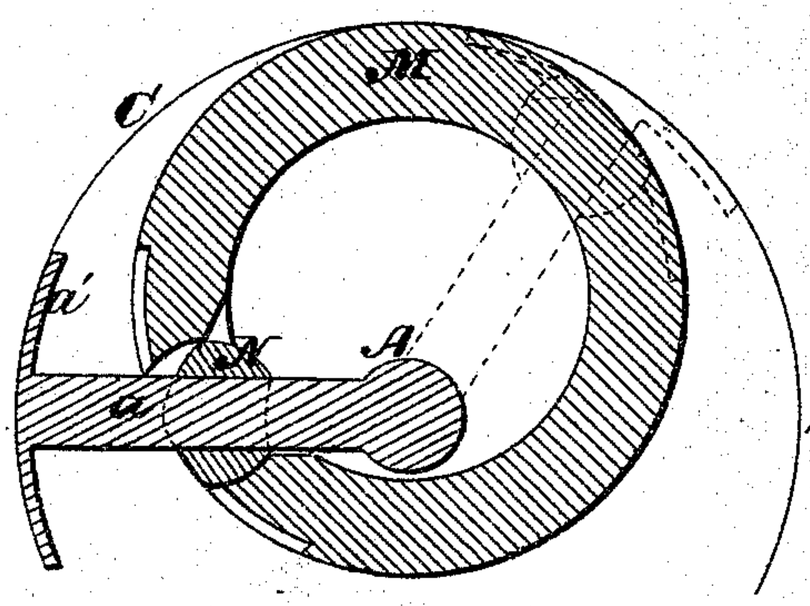


Fig. 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWARD MYERS, OF NEW YORK, N. Y. ASSIGNOR TO AMBROSE W. THOMPSON, OF SAME PLACE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **144,559,** dated November 11, 1873; application filed February 24, 1873.

To all whom it may concern:

Be it known that I, EDWARD MYERS, of the city, county, and State of New York, have invented a new and Improved Rotary Engine; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is an end elevation, one-half of the cylinder having been removed. Fig. 2 is a perspective view of the parts represented in Fig. 1. Fig. 3 is a longitudinal vertical section. Fig. 4 is a transverse vertical section in line *x x* of Fig. 1. Fig. 5 is a vertical section of the piston and abutment.

All the drawings above referred to represent a single engine.

Similar letters of reference in the accompanying drawings denote the same parts.

This invention relates to that class of rotary engines in which an eccentric hollow abutment is employed in connection with a piston extending through the wall of the abutment and rotating therewith; and my improvement consists in attaching the piston rigidly to the shaft of the engine, so as to operate as a lever to move the shaft, the latter being arranged at the center of the cylinder within the eccentric abutment, and the piston having a valve arranged upon its outer end, which is received in a bed or recess in the eccentric hollow abutment when passing near the steam-ports, the valve thus acting to prevent the steam from passing out of the exhaust-port until the valve has passed that port, thus allowing the steam to act for a longer time upon the piston, and until it arrives in a vertical position, when the force of gravity of the piston commences to act to give to it a motion of rotation on its axis, as hereinafter more fully set forth.

In the drawings, C is the cylinder, constructed in two sections, *c c'*, which fit together steam-tight, and are properly secured by bolts, in the usual manner. B is the bed-plate or foundation on which the engine rests. A is the main shaft, arranged in the axial line of the cylinder. *e* is the live-steam port; *s*, the exhaust. Within the cylinder, and eccentric thereto, is arranged a rotary tubular abutment, M, one side of which is in contact with the concave wall of the cylinder, and the ends of which project into the end walls of the cylinder beyond the steam-chamber, so as to have a firm steam-tight bearing therein. The main shaft passes eccentrically through this abutment, as shown in Figs. 1, 2, 3, 4, and has its bearings beyond the ends of the abutment in suitable boxes provided for the purpose. Cast upon the shaft, or rigidly secured thereto, so as to extend through the wall of the abutment, is a flat arm or crank, *a*, the lateral edges of which fit steam-tight between the end walls of the steam-chamber, while its terminal edge fits steam-tight against the concave periphery of said chamber, as shown in the drawings. The steam, entering the chamber on one side of this arm and exhausting on the other side, causes it to operate as a rotary piston, the abutment completely filling the space behind the piston, and preventing the steam from backing around in that direction.

If preferred, two or more arms or pistons may be employed instead of one, for the purpose of avoiding a dead-point, and when thus employed they may be arranged diametrically opposite to, or at right angles with, each other, or in any other relative position that will enable them to accomplish the purpose. On the end of the piston I arrange a curved plate, *a'*, to fit the concave wall of the cylinder, and to cover both ports *s e* when the piston is vertical, and prevent the escape of any steam through the exhaust-port *s* until after the plate or valve *a'* has partially passed said port, and the piston is in a vertical position, thus allowing the steam to operate for a longer time upon the piston, or until it has reached a vertical position, after which the gravity of the piston will assist in giving it a motion of rotation on its axis. The said curved plate or block is packed in any suitable manner, if preferred, as indicated in Fig. 6.

It is evident that the rotation of the shaft within the eccentric abutment will cause a sliding movement of the piston *a* in the slot, which permits it to pass through the abutment; and it is further evident that the inclination of the piston with relation to the slot will vary at different parts of their revolution, the piston being perpendicular to the plane of the slot when at the points shown in Fig. 4, but inclined to said plane when at any other

point in its revolution, as shown in Figs. 1, 2, 5. Provision must be made to accommodate this varying of inclination, and I accordingly bevel off the inner corners of the slot, as shown in Figs. 4, 5, or pass the piston between friction-rollers applied to the walls of the slot. When the friction-rollers are employed they will, if properly constructed and adjusted, serve to pack the piston to prevent leakage around it. When rollers are not used, an oscillating stuffing-box or block, N, may be employed, arranged within the slot in the manner clearly represented in Figs. 1, 2, 3, 4, 5. The face of the abutment in the immediate neighborhood of the slot must be cut away to countersink the plate *a'* while passing the steam-ports, and the outer face of the oscillating block must be cut away at the sides of the piston for the same purpose; but at the lateral edges of the piston care must be taken to prevent the steam from passing around it, and the ends of the block N, which project up through the slot in the abutment, must be so constructed along the line *n n* that the surface of the block along said line will come flush with the convex surface of the abutment, and thereby prevent the possibility of any escape of the steam around the edge of the piston.

One great advantage in this improved engine arises from the fact that all the rotary parts revolve in a fixed position, and under no circumstances vary from that position. The piston is merely a crank-arm attached to the main shaft, and, therefore, does not slide, and cannot get out of order, but partakes of all the firmness, strength, and positiveness of action that distinguish the shaft itself. So, too, the abutments are journaled in the end walls of the cylinder, where they rotate without changing position. The position of these two parts being fixed and positive, the only sliding movement there is about the engine is the movement of the piston in the slot in the abutment. This, however, cannot tend to get either of said parts out of order, because both parts have a positive movement on their own axes, which no friction between them can effect. The friction is easily reduced to a minimum by the appliances herein described, so that the engine works smoothly, easily, and without any material wear.

Another advantage of this engine is, that the power of the steam is applied directly to the shaft itself, which is in line with the center of the cylinders, and not to the shaft in line with and connected to the abutments. The difference in economizing power and preventing wear and tear is very great.

It will be observed that the steam is applied at the greatest advantage at the long arm of a lever connected directly to the working-shaft. The power, therefore, depends simply upon the size and length of the arm or piston, and the economy of steam is as great as in any other form of engine that has ever been devised. A four-foot piston gives an eight-foot stroke, while the steam is applied at the extreme end of the piston, where it has the greatest possible leverage.

Having thus described my invention, what I claim as new is—

A recessed hollow abutment operating eccentrically, and a working-shaft rotating in the central line of the steam-chamber, the latter being provided with ports *s e* arranged, as set forth, in combination with a piston directly attached to the working-shaft, and provided with a valve, *a'*, substantially as described.

The above specification of my invention signed by me.

EDWARD MYERS.

Witnesses:
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