(No Model.) 2 Sheets—Sheet 1.

W. L. TUCK.

ROTARY ENGINE.

No. 339,827. Patented Apr. 13, 1886.

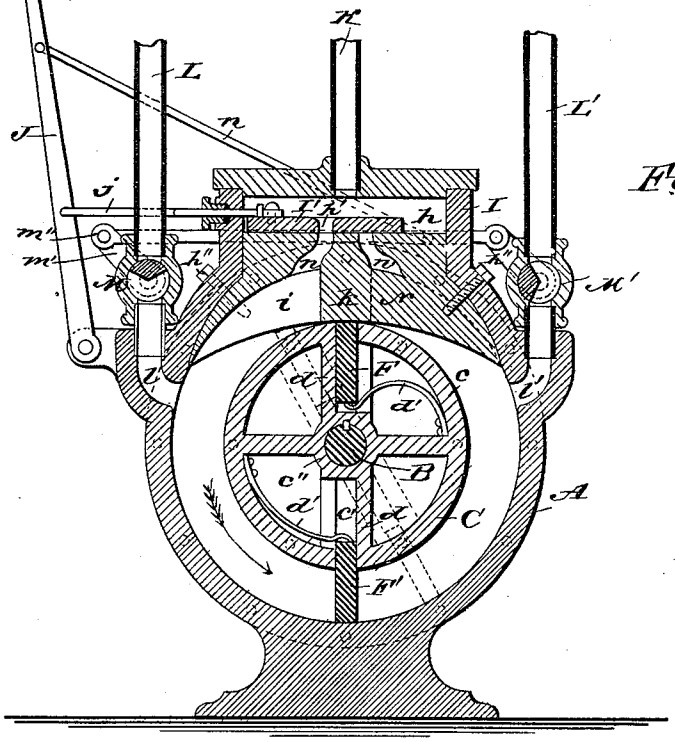


Fig. 1.

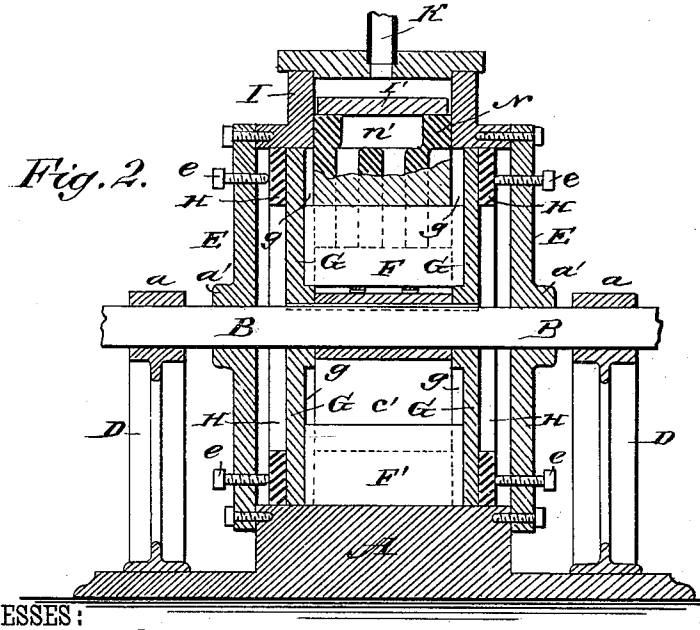


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

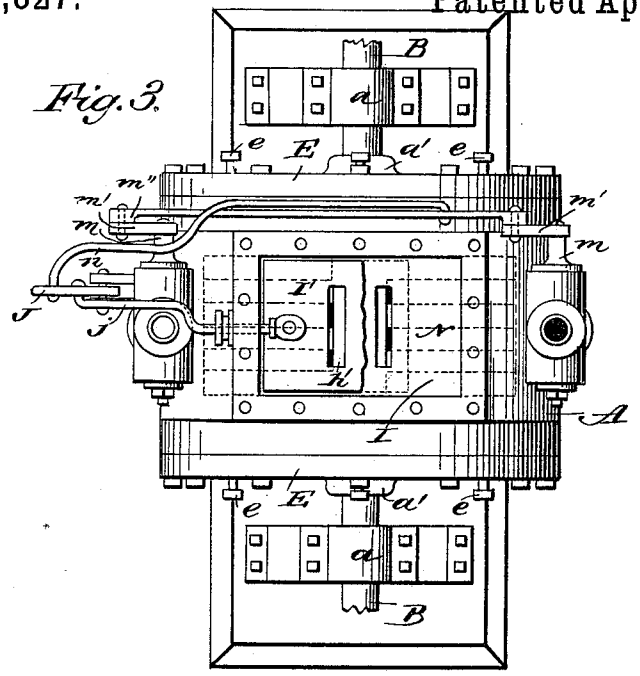


Fig. 4.

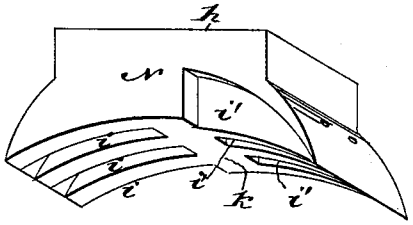


Fig. 5.

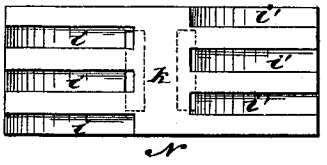
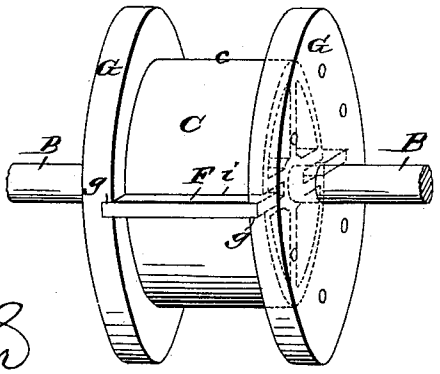


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM L. TUCK, OF BAY VIEW, WISCONSIN.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 339,827, dated April 13, 1886.

Application filed February 9, 1886. Serial No. 191,386. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. TUCK, of Bay View, in the county of Door and State of Wisconsin, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

This invention relates to improvements in reversible rotary engines; and it consists of the combinations of parts, including their construction, substantially as hereinafter set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a view of my improved form of rotary engine, taken in central vertical cross-section. Fig. 2 is a view taken in longitudinal central vertical section. Fig. 3 is a plan view of the engine, the top of the steam-chest being removed and a portion of the valve being also removed to disclose the construction of the parts. Fig. 4 is a perspective view of the non-concentric block arranged within the cylinder and steam-chest, and within which the steam-ports are formed. Fig. 5 is a view of the under side thereof, and Fig. 6 is a perspective view of the piston and its adjacent packing-rings.

Prior to my invention one of the most serious disadvantages met with in the use of rotary engines was that the steam could not act with full force and effect throughout the entire revolution of the piston, and, in fact, could only act with full force during a very small portion of such revolution; but with my improved construction I am able to utilize the full force of the steam throughout the greater part of the revolution of the piston.

In constructing my improved form of rotary engine I provide a circular cylinder, A, and through the axis of this cylinder I pass a shaft, B, upon which the piston C is mounted, said shaft being guided and braced by bearings *a a*, that are carried by brackets D D, and being further steadied and supported by bearings *a' a'*, formed in the cylinder-heads E E.

The piston proper consists of a drum-like structure having a solid or closed periphery, *c*, except for the slots *c' c'*, the peripheral rim being carried by spokes that project from the central hub, *c''*. The slots *c' c'* are formed in the spokes *d*, which are arranged in the same line, but upon opposite sides of the central hub, said slots extending entirely across the spokes. Within these slots *c'* I mount sliding wings F F', which are forced outward and against the interior face of the cylinder by springs *d'*. To each side face of the cylinder I secure a circular plate, G, formed so as to fit closely against the circular sides of the cylinder A; but in order that a perfectly-tight joint may be insured, I place packing-rings H H between each of the circular plates G and its adjacent cylinder-head E, the rings H being held against the plates G by tightening-screws *e e*. In order that the wings F F' may move freely within the slots *c'*, and at the same time prevent the passage of any steam, I form said wings so that they will extend slightly beyond the side faces of the piston, the projecting ends riding in slots *g*, that are formed in the plates G G. The steam-chest I is just above the cylinder A, and is preferably made integral with it. The inner circular walls of the cylinder are cut away directly below the steam-chest, in order that the projecting arms of the block N may be placed therein, the upper portion of said block being rectangular, to fit within the steam-chest, and constituting the valve-seat *h*. As before stated, the extending arms of the block N fit within the cut-away portion of the cylinder-walls, being held to place by top bolts, *h''*. The lower faces of these arms are circular, but are not concentric with the interior circular wall, and the block is so proportioned that when placed in position the peripheral face of the piston will fit tightly against its central solid portion, *k*, so that as the piston is revolved the wings F F' will be gradually compressed as they strike against the block until they are forced to the position in which the wing F is shown in Fig. 1.

Within the block N there are formed a number of upwardly-extending recesses, *i i i' i'*, the recesses *i* being upon one side, and the recesses *i'* being upon the other side, of the central and solid portion, *k*, and, as shown, one of the recesses upon each side of said portion *k* being formed directly upon one of the outer faces of the block. The two inner recesses upon each side of the block communicate with the steam-ports *n n'*, formed in the upper part of the

block and leading into the steam-chamber of the chest I.

A sliding valve, I′, formed with a single port, *h′*, rests upon the valve-seat *h*, and is moved forward and back to bring its port *h′* in register with the ports *n n′* by means of a connecting-rod, *j*, which leads to a lever, J, that is pivotally mounted in bearings formed upon the side of the cylinder.

The steam-chest is, as usual, closed by a cap, and the steam is led into the chest through a pipe, K. Two exhaust-pipes lead from the cylinder A, as shown at *l l′*, and each of these ports communicates with an exhaust-pipe, L L′, in which there are arranged valves M M′, the valve-stems *m m* carrying lever-arms *m′*, that are connected by a rod, *m″*. The rod *m″* is in turn connected by a rod, *n*, with the lever J, and the valves M M′ are so formed and mounted that when one is turned to close the passage to its pipe the other will be turned to open the way to the exhaust-pipe, in connection with which it operates, and, as both the valves I′ and the exhaust-pipe are operated by the same lever, it follows that when the lever J is thrown to shift the valve I′ from one steam-port to the other that the relative position of the valves will be reversed.

Such being the general construction of the engine, it will be seen that when the piston is in the position shown in dotted lines in Fig. 1 that the steam will act upon the wing F′, which is fully extended, and will continue to so act until the wing F has passed beyond the lower non-concentric face of the block, or so that the steam is always acting upon a fully-expanded wing, and consequently with the greatest possible effect.

The exhaust is through the recesses in the block N, after the wings have struck the block.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a rotary engine, the combination, with a circular cylinder in which there is arranged a non-concentric block, N, having recesses *i i* and steam-ports *n n′*, of a revolving piston having wings F F′, a valve, I′, exhaust valves M M′, a manipulating lever common to all valves and connecting devices, substantially as described.

2. In a rotary engine, the combination, with a circular cylinder of the non-concentric block having recesses and steam-ports, of a piston having wings and radially-slotted plates within which the ends of said wings move, a slide-valve, exhaust-valves, and a manipulating lever common to the valves and connecting devices, substantially as and for the purpose set forth.

WILLIAM L. TUCK.

Witnesses:
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JOHN TUCK.