

W. J. DUNFEE.
 REVERSIBLE ROTARY STEAM ENGINE.
 APPLICATION FILED MAY 17, 1916.

1,305,345.

Patented June 3, 1919.
 2 SHEETS—SHEET 1.

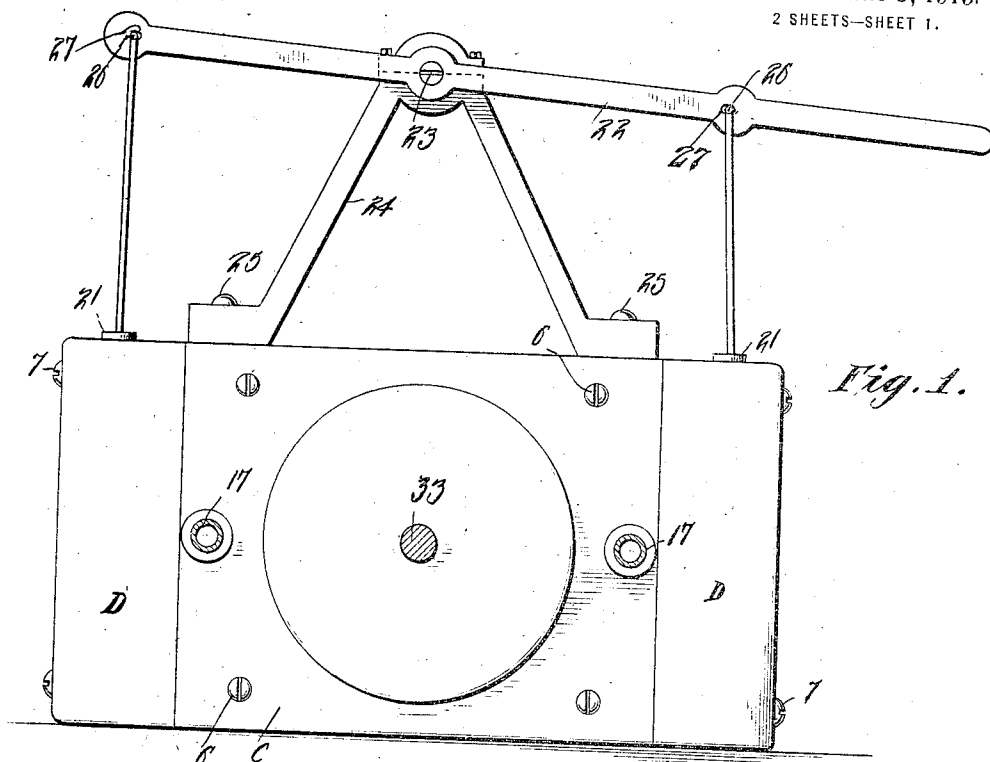


Fig. 1.

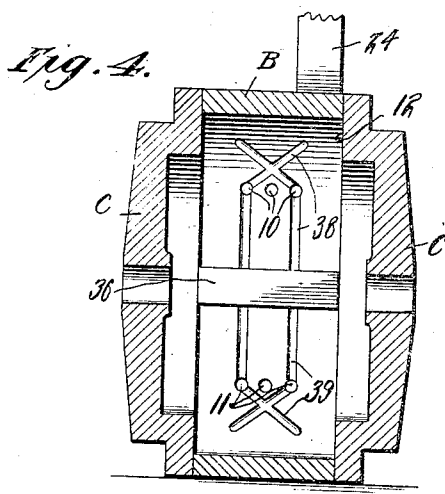
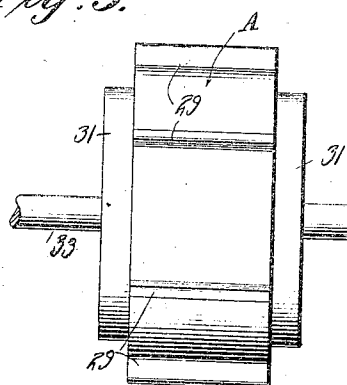


Fig. 5.



WITNESSES

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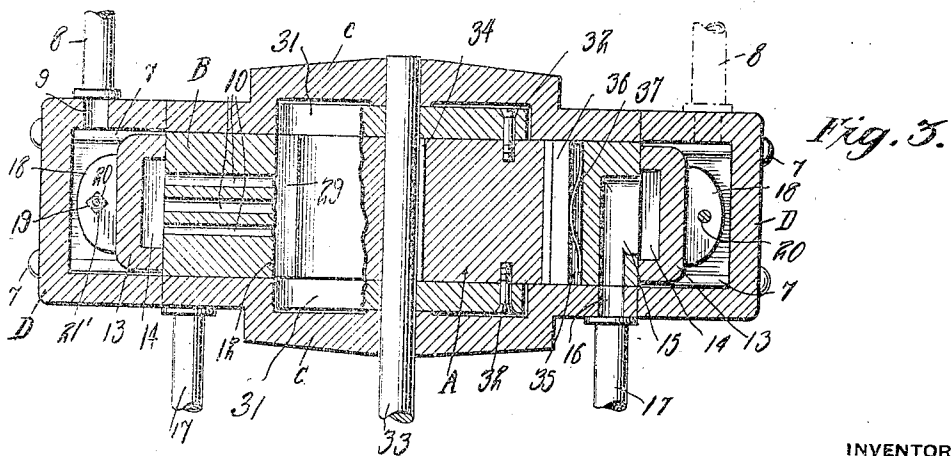
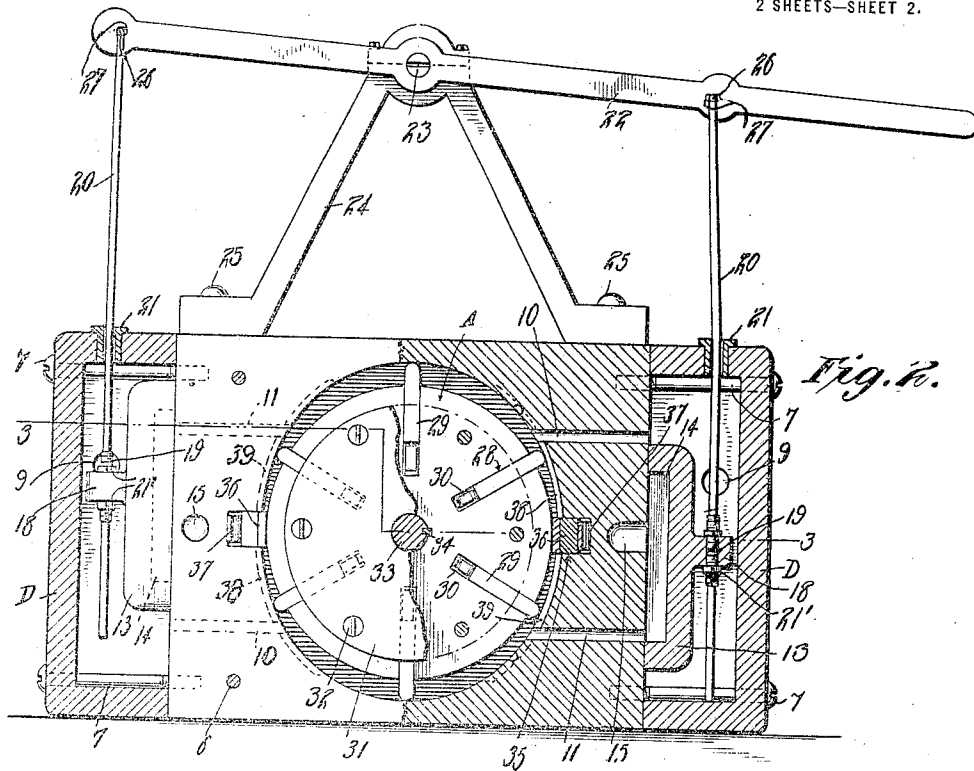
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WILLIAM J. DUNFEE, OF NORTH LEWISBURG, OHIO.

REVERSIBLE ROTARY STEAM-ENGINE.

1,305,345.

Specification of Letters Patent.

Patented June 3, 1919.

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To all whom it may concern:

Be it known that I, WILLIAM J. DUNFEE, a citizen of the United States, residing at North Lewisburg, in the county of Cham-

5 paign and State of Ohio, have invented certain new and useful Improvements in Reversible Rotary Steam-Engines, of which the following is a specification.

My invention relates to a rotary steam
10 engine.

While the invention generally aims to improve and simplify the construction of an engine of this type, yet one definite object is to provide a satisfactory construction of rotary
15 steam engine which may serve as the propelling medium of an automobile or other self-propelled vehicle.

I particularly aim to provide a construction in which the power fluid may be supplied to act on the pistons of the rotor of the
20 engine from opposite sides of the engine casing; a construction wherein the power fluid may bypass the piston of the rotor and act on advanced pistons; a construction having
25 means to adjust the valves of the steam chest adapted to remain in position to which they may be adjusted, and to specifically accomplish the latter end by having shifting rods for the valve which are yieldable through
30 the action of an actuating member to frictionally bind at the stuffing boxes through which they slide.

With the above, and additional objects such as will hereinafter appear, in view, the
35 invention has been embodied in one preferred form as illustrated in accompanying drawings and described hereinafter.

In said drawings:—

Figure 1 is a side elevation of the improved
40 engine;

Fig. 2 is a view of the improved engine mostly in vertical section;

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2;

45 Fig. 4 is a transverse vertical sectional view through the engine casing and side plates thereof, and

Fig. 5 is an edge elevation of the improved rotor employed.

50 Referring specifically to the drawings

wherein like reference characters designate like or similar parts throughout the views thereof, A represents the rotor which may be mounted in any suitable form of housing according to the desires of the manufacturer. 55 However, said housing may comprise a casing B for the rotor, side plates C fastened to the sides of the casing B as by means of set screws 6, and steam chests D fastened against the casing and side plates in any
60 suitable manner as by means of set screws 7 passing through the steam chests and engaging the casing B.

Steam or any other approved motive fluid may be admitted to the steam chests D from
65 pipes 8 through ports 9 and then through passageways 10 and 11 into the rotor chamber 12. It will be noted that the passageways 10 are provided on opposite sides of the
70 rotor and that this is likewise true of the passageways 11, and further that on one side of the rotor passageways 10 are uppermost while on the other side of the rotor passageways 11 are uppermost. Slidably mounted
75 within the steam chests D are valves 13 having recesses or passageways 14 adapted to register selectively with the passageways 10 and with the passageways 11 but always with
80 passageways 15 provided in the casing B and which register with ports 16 in one plate C and from which lead exhaust pipes 17 to any desired location.

Any preferred means may be employed for shifting the valves 13 so as to reverse the
85 direction of turning of the rotor as a result. To this end, each valve 13 is provided with a lug 18 integral therewith and into which portions 19 of shifting rods 20 are screw
90 threaded. Nuts 21' are also mounted on the portions 19 so as to be engageable with opposite sides of the lug 18 and serve as lock nuts. Shifting rods 20 slide vertically
95 through the top wall of the steam chests and through stuffing boxes 21 mounted therein. In addition the rods 20 extend below the
25 valves 13 and serve as stops to abut the lower walls of the steam chests and limit the downward movement of the valves 13. Any improved means may be employed to shift
100 the valves. However they are preferably

moved simultaneously as through the medium of a lever 22 pivoted at 23 in a bearing frame 24 fastened as by means of set screws 25 to the top of the casing B. At their tops, rods 20 have angle lugs 26 extending laterally into slightly enlarged openings 27 provided in the lever 22. Rods 20 are preferably flexible so that they will bend and bind to a slight extent in the stuffing boxes 21 and thereby hold the valves 13 in adjusted positions against danger of accidental displacement.

The rotor is provided with any desired number of radial recesses 28 in which blades or pistons 29 are mounted for radial sliding movement and urged outwardly by means of arcuate leaf springs 30 disposed in the recesses. The recesses are closed at their sides and the pistons are mounted against lateral displacement by means of plates 31 preferably of less diameter than the rotor and secured to the rotor removably as by means of set screws 32. The main shaft of the engine is designated 33 and extends through the rotor A, being keyed at 34 so as to turn in unison with the rotor and preferably having a bearing in the side plates C as well shown in Fig. 3.

The wall of chamber 12 is substantially elliptical and is wiped by the pistons 29 during rotation. At the oblate portions of the chamber walls, recesses 35 are provided to mount suitable packing bars or devices 36 urged outwardly against the periphery of the rotor by means of arcuate leaf springs 37 contained within the recesses 35. These packing devices 36 it will be noted are disposed at diametrically opposite points, and in combination with the rotor form in effect independent chambers to receive the power fluid.

Provided in the wall of chamber 12 are suitable grooves or bypass passageways 38 and 39 communicating respectively with the passageways 10 and 11 and adapted to bypass the power medium past the pistons in engagement with the chamber walls at the said grooves 38 and 39. These grooves are of greater length than the distance between any two successive blades 29. The grooves 38 and 39 are cut into the wall of the chamber 12 starting at recesses 35 and hence when the devices 36 are in place they serve as end walls for the grooves and cut off communication between them.

In operation, say the parts are in the relative positions of Figs. 1 and 2. Steam or another power medium enters the steam chests through the supply pipe 8 and the ports 9 and leaves the chests through the passageways 10 and enters the chamber 12 so as to impinge on the piston blades 29. The fluid thus acts on the piston from opposite sides. It will be realized, that as the fluid enters

the chamber 12, its pistons are disposed over the grooves 38, that a quantity of the fluid will bypass the pistons in question and engage the pistons next in advance thereof. In this way, greater power is secured since the fluid will act on a plurality of pistons simultaneously. The impingement of the fluid against the pistons causes the same to turn and, accordingly, turn the rotor and its shaft 33. The pistons in turning also drive the exhaust steam in the passageways 11 so as to exhaust therefrom through the passageways 14 of the valves 13 and passageways 15, ports 16 and thence through the pipes 17. Since the pistons 29 are slidable against the tension of the springs 30, they may yield inwardly in order to pass the packing devices 36.

In the said positions of Figs. 1 and 2, the valves 13 are maintained in place due to the slight bending of the yieldable shifting rods 20 at the stuffing boxes 21. Downward displacement of the valves is prevented by the engagement or abutment of the lowermost rod 20 with the bottom wall of its steam chest.

To reverse the motion of the engine, it is merely necessary to elevate the lever 22 at its handle shown so as to elevate the right hand valve 13 of Fig. 2 and lower the left hand valve of Fig. 2 until the left hand rod 20 contacts with the bottom of its steam chest. As a result, passageways 10 will communicate with the passageways 14 which will still remain in communication with the passageways 15. The steam will enter from the steam chests through the passageways 11 into the chamber 12 and as a result impinge against the pistons 29 and drive them in the direction opposite to that previously mentioned. With the parts as adjusted, the passageways or grooves 38 and 39 will serve as the bypasses. The valve shifting rods 20 will remain in the positions to which they are last adjusted, due to the frictional engagement thereof at the stuffing boxes 21.

While the slots 27 are slightly enlarged, yet the lever 22 in its movement slightly bends the rods 20 laterally at the stuffing boxes 21.

I claim:

In a rotary engine, the combination with a casing containing the rotor and having steam chests at opposite sides thereof, the casing having inlet and exhaust ports and passage ways from said chests to the rotor housing, and vertically movable valves in said chests; of a rock lever pivotally supported between its ends on said casing, stuffing boxes in the top of the latter and opening into said valve chests, and rods pivoted at their upper ends to said lever and extending through said stuffing boxes and connected with said valves, their lower ends being

of such length as to strike the bottom of the casing and limit the descent of the valves in their chests, and their points of attachment to the rock lever being such that the rods are flexed slightly where they pass through said stuffing boxes by the movement of said lever to either extreme position.

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

WILLIAM J. DUNFEE.

Witnesses:

PAUL C. SPAIN,
DAVIS R. EMMONS.