J. GOUGEON.

ROTARY ENGINE.

APPLICATION FILED OCT. 10, 1911.

1,025,975.

Patented May 14, 1912.

3 SHEETS—SHEET 1.

Fig. 2.

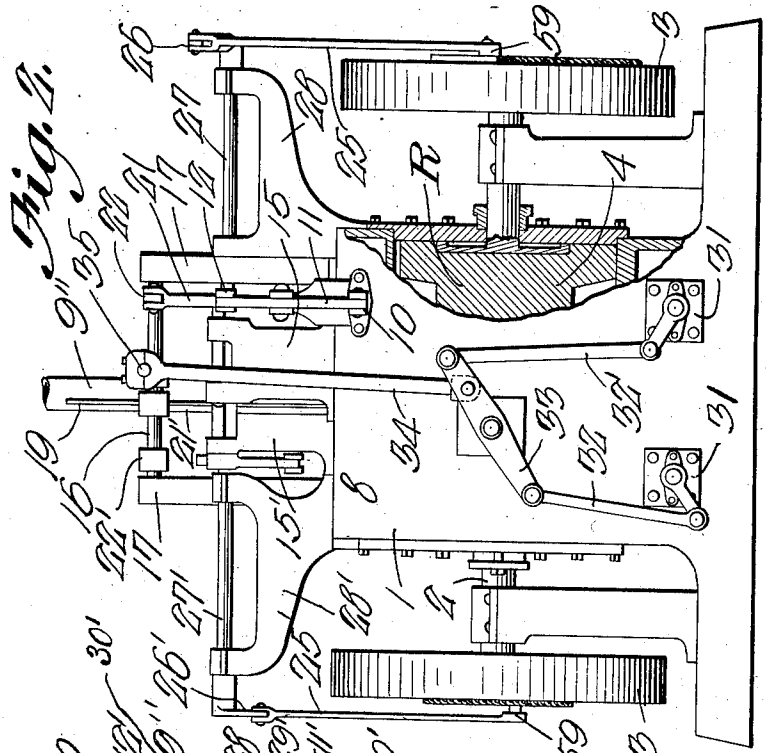
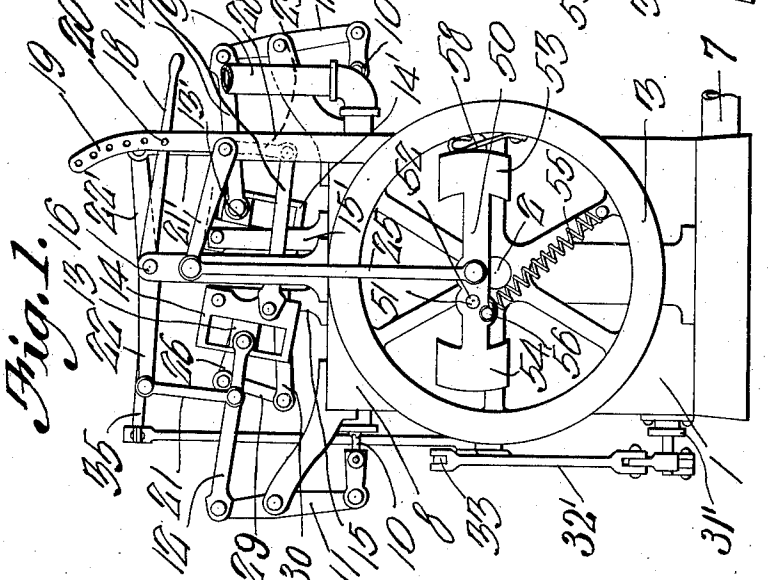


Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 3.

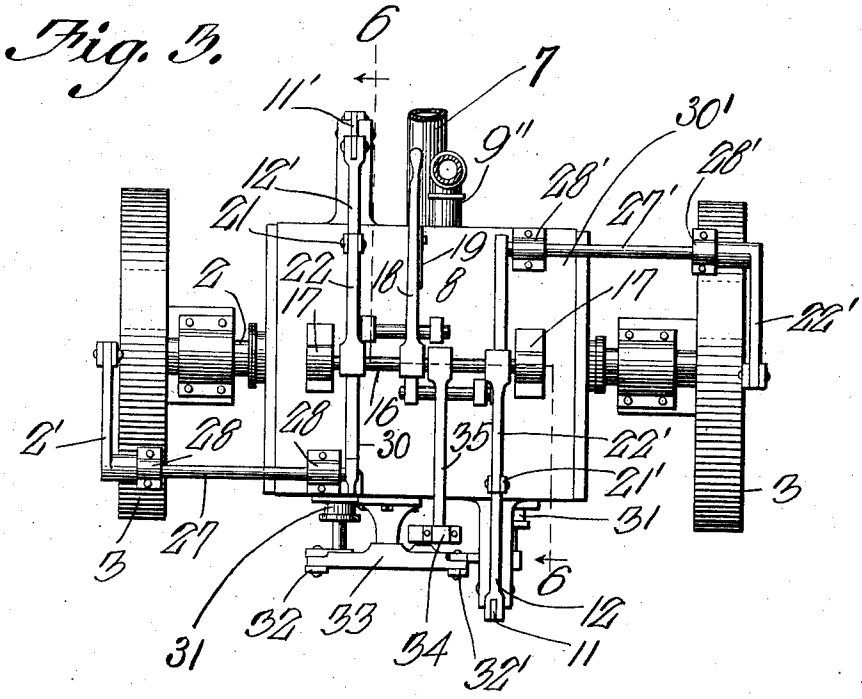
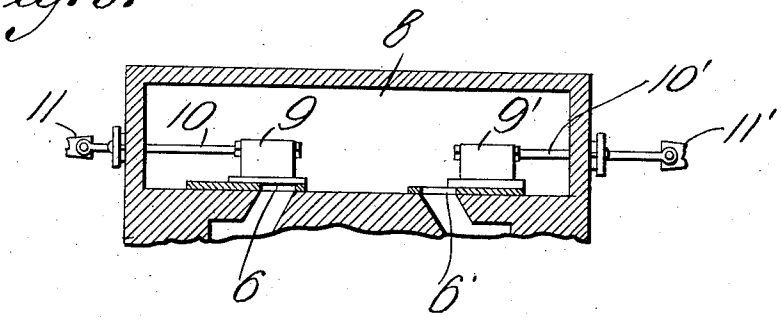


Fig. 6.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 4.

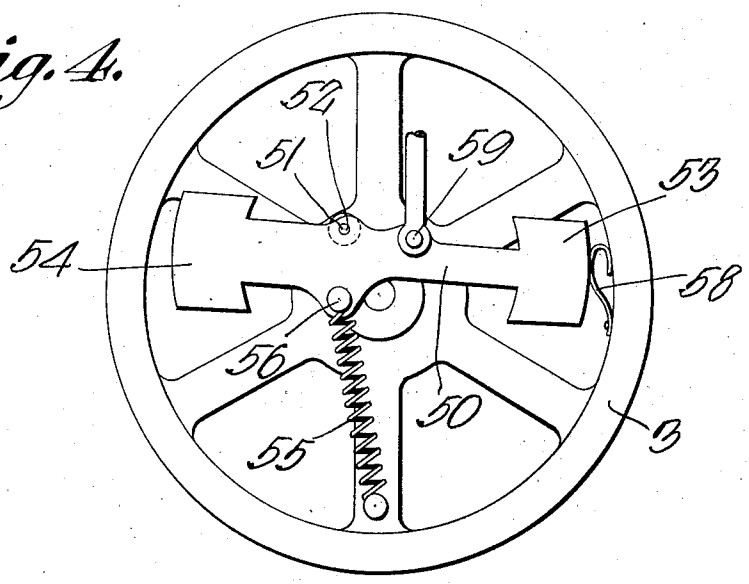
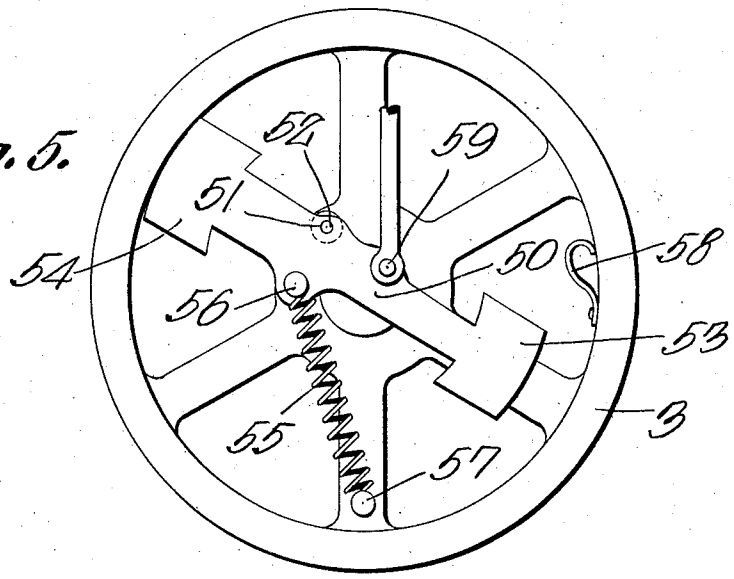


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

1,025,975. Specification of Letters Patent. Patented May 14, 1912.

Application filed October 10, 1911. Serial No. 653,808.

To all whom it may concern:

Be it known that I, JOSEPH GOUGEON, a citizen of the United States, residing at Baltic, in the county of Houghton and State of Michigan, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to rotary engines and is more particularly designed to improve the construction and operation of the engine set forth in Letters Patent No. 1,000,509, dated August 15, 1911.

The object of the invention is to provide a reversible engine of the rotary type which is provided with a series of link controlled valve gears which in turn are operatively connected with the engine shaft, means being provided for manually shifting the valves to change the direction in which the engine shall rotate, the said means including mechanism for closing one or the other of the exhaust ports of the engine in combination with fly wheel carried and controlled governors. That it to say when the cut off valve which controls the steam to drive the engine in one direction is held closed over its port its coöperating exhaust valve is also closed. Thus when the engine is to rotate in one direction, the cut-off and exhaust valves at one side of the piston are closed while the valves at the other side are open and when the engine is to rotate in the opposite direction, the first mentioned valves are opened while the last mentioned valves are closed. The parts of the valve gears are both manually and automatically shiftable with relation to the links whereby the movement of the exhaust valves may be controlled.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings:—Figure 1 is a side elevation of the engine complete. Fig. 2 is a view of the engine at a right angle to the side illustrated in Fig. 1. Fig. 3 is a top plan view of the invention. Fig. 4 is a view of one of the fly wheels with governor in normal position. Fig. 5 is a similar view with the governor in its maximum valve operating position. Fig. 6 is a section on line 6—6 of Fig. 3.

The engine includes a casing 1 in which is journaled a shaft 2, two fly wheels 3 being mounted upon the respective ends of said shaft. A piston or rotor R is located in the casing 1 and is fixed to the intermediate portion of the shaft 2. A steam chest 8 is formed in the upper part of the casing 1 and a steam supply pipe 9″ communicates with the said steam chest. The ports 6 and 6′ lead from the interior of said chest to the chamber in which the piston 4 is located. Valves 9 and 9′ are located in the chest 8 and are arranged to move over the ports 6 and 6′ respectively. Operating rods 10 and 10′ are connected with the valves 9 and 9′ and project through the sides of the casing 1. Levers 11 and 11′ are fulcrumed at sides of the casing 1 and their lower ends are pivotally connected with the outer end of the rods 10 and 10′. Bars 12 and 12′ are pivotally connected at their outer ends to the upper ends of the levers 11 and 11′ and the said bars are provided at their inner ends with pivoted blocks 13 and 13′ respectively. Links 14 and 14′ are pivotally mounted on the standards 15 and 15′ respectively which are mounted upon the top of the casing 1 and the blocks 13 and 13′ are slidably mounted in the said links.

A shaft 16 is journaled in standards 17 which are mounted upon the top of the casing 1 and an operating handle 18 is fixed to said shaft. A segment 19 is located adjacent said lever 18 and the lever is provided with a spring pawl 20 adapted to engage the said segment whereby the said lever is held in an adjusted position. Links 21 and 21′ are pivotally connected at their lower ends with the intermediate portions of the bars 12 and 12′ respectively and at their upper ends the said links 21 and 21′ are pivotally connected with arms 22 and 22′ which in turn are fixed at their inner ends to the shaft 16 and project beyond the opposite sides thereof. Both of the fly wheels 3 are provided with governor mechanisms, whereby the respective valves 9 and 9′ are automatically controlled to regulate the admission of pressure fluid to the rotor R, and each governor consists primarily of a bar 50 pivoted off center at 51 to a pin 52 which is connected to and carried by the fly wheel eccentrically of the hub thereof. The

bar 50 is provided with the weighted ends 53 and 54, the weight 53 normally as viewed in Fig. 4, having its outer face nearer the rim of the fly wheel than the outer face of the weight 54, the coiled spring 55 which is connected to the bar 50 at 56 opposite to the pin 52 and to the fly wheel 57 normally holding the bar 50 and its weighted ends in such position. Disposed in the path of the outer weight 53, to the inner face of the rim of the fly wheel is a flat spring contact 58, which acts as a cushioning and retarding means when the bar 50 is in normal position. The rods 25 and 25′ are connected at their lower ends at 59 to the respective bars 50, eccentrically of the shaft 2. The upper ends of the pitman rods 25 and 25′ are pivotally connected with the inner ends of the arms 26 and 26′ respectively and the said arms 26 and 26′ are fixed to shafts 27 and 27′ respectively which are journaled to standards 28 and 28′ located at the top and to their respective sides to the casing 1. Arms 29 and 29′ are fixed at their upper ends to the shafts 27 and 27′ respectively and extend downwardly approximately at right angles to the arms 26 and 26′. Bars 30 and 30′ are pivotally connected at their outer ends to the lower ends of the arms 29 and 29′ respectively and at their other ends the said bars 30 and 30′ are pivotally connected with the links 14 and 14′ respectively. Valves 31 and 31′ are located to control the exhaust to the main exhaust pipe 7 and are operatively connected with the rods 32 and 32′ respectively. A lever 33 is fulcrumed to the side of the casing 1 and its ends are connected with the upper ends of the rods 32 and 32′. The lower end of a rod 34 is pivotally connected with the lever 33 at one side of the fulcrumed point of the latter and the upper end of the rod 34 is pivotally connected to the end of an arm 35 which in turn is rigidly fixed upon the shaft 16. By this arrangement a valve gear is provided which may be manually adjusted in connection with the pivoted links to cause one or the other of the valves to move to a greater or less extent over the ports that it governs and by reference to the drawings it will be seen that the parts are so positioned and arranged that when one valve is at a state of rest or approximately so over the port that it governs the other valve is movable over that port which it governs. This is for the reason that when the shaft 16 is turned by using the lever 18, the arms 22 and 22′ are swung whereby the links 21 and 21′ are moved longitudinally and the bars 12 and 12′ are moved so that when one of the blocks 13 or 13′ is at the lower end of a link the other block is at the upper end of its receiving link. Also when the shaft 16 is turned the arm 35 is moved about the axis of the said shaft whereby rods 34 are moved longitudinally and the lever 33 is rocked upon its fulcrum. The arrangement of the rods 32 and 32′ with relation to the valves 9 and 9′ is such that when for instance the rod 32 closes the valve 31 in its respective exhaust, the valve 9′ is uncovered from its port or is permitted to move to uncovered position with relation to same while the valve 9 is held in covered position over its port 6. On the other hand when the valve 31 is closed the valve 9 is permitted to move over its port while the valve 9′ is held in closed position over the port 6′. By this arrangement the steam or fluid pressure can pass through one side of the casing 1 while the valve at the other side of said casing is closed and vice versa. Therefore it will be seen that means is provided for reversing or changing the direction in which the engine shaft is rotated and to automatically operate the valves 9 and 9′ from the fly wheel 3 through the governor bar 50.

Any form of impact receiving and pressure fluid expanding blades may be used upon the rotor R, the essential feature of the invention being an arrangement of the inlet and exhaust valve operating mechanism controlled automatically from the fly wheels of the engine.

What is claimed is:—

1. A rotary engine comprising a casing having induction and exhaust ports, a shaft, a fly wheel upon each end, a rotor journaled in the casing between the induction and exhaust ports, valves movably mounted over the induction ports, links pivoted upon the casing, valve gears operatively connecting the valves with the links, manually operable mechanisms connected with the valve gears and adapted when operated to engage one of the valve gears with the active end of one of the links, while the other valve gear is arranged with the passive end of the other link and a governor carried by each fly wheel and operably connected to said links.

2. A rotary engine comprising a casing having induction and exhaust ports, a shaft projecting through and beyond opposite sides thereof, a fly wheel at each end of the shaft, a rotor journaled in the casing between the induction and exhaust ports, valves arranged to move over the induction ports, links pivoted upon the casing, valve gears operatively connecting said valves with said links, a manually operable means located upon the casing and connected with the valve gears and adapted to hold the terminal member of one of the valve gears in contact with the active end portion of one link while the terminal member of the other valve gear is held in contact with the passive end of the other link, valves located in the exhaust passage and operatively connected together, means connecting the oper-

ating mechanism of the exhaust valves with the means for manually adjusting the valve gears with relation to said links, and two governors, one carried by each fly wheel, and operably connected to the links to automatically control all valves.

3. A rotary engine comprising a casing having induction and exhaust ports, a shaft, two fly wheels, a rotor journaled in the casing between the induction and exhaust ports, valves arranged to move over the said induction ports, links pivoted upon the casing valve gears operatively connecting said valves with said links, a shaft journaled upon the casing and operatively connected with the terminal members of the valve gears to slide the same simultaneously along the links whereby one valve gear is connected with the active end of one link, while the other valve gear is connected with the passive end of the other link, valves located in the exhaust passages, a valve gear connecting the said exhaust valves together, means operatively connecting the said exhaust valve gear with the said shaft, the valve gear of the exhaust valves having its parts so arranged when one exhaust opens the other exhaust valve closes and vice versa, and two governors, one carried by each fly wheel and operably connected to the links to automatically control all valves.

4. A rotary engine comprising a casing having induction and exhaust ports, a shaft, a fly wheel upon each end, a rotor journaled in the casing between the induction and exhaust ports, valves movably mounted over the induction ports, links pivoted upon the casing, valve gears operatively connecting the valves with the links, manually operable mechanisms connected with the valve gears and adapted when operated to engage one of the valve gears with the active end of one of the links, while the other valve gear is engaged with the passive end of the other link, a governor carried by each fly wheel and operably connected to said links, said governor comprising a bar having weighted terminals pivoted intermediate of its ends and eccentrically to the fly wheel, and a spring connected to the bar and to the fly wheel at the opposite side to and in line with its connection to the fly wheel, said bar being connected to the link to actuate the valves automatically.

5. A rotary engine comprising a casing having induction and exhaust ports, a shaft projecting through and beyond opposite sides thereof, a fly wheel at each end of the shaft, a rotor journaled in the casing between the induction and exhaust ports, valves arranged to move over the induction ports, links pivoted upon the casing, valve gears operatively connecting said valves with said links, a manually operable means located upon the casing and connected with the valve gears and adapted to hold the terminal member of one of the valve gears in contact with the active end portion of one link while the terminal member of the other valve gear is held in contact with the passive end of the other link, valves located in the exhaust passage and operatively connected together, means connecting the operating mechanism of the exhaust valves with the means for manually adjusting the valve gears with relation to said links, and two governors, one carried by each fly wheel and operably connected to the links to automatically control all valves said governor comprising a bar having weighted terminals pivoted intermediate of its ends and eccentrically to the fly wheel, and a spring connected to the bar and to the fly wheel at the opposite side to and in line with its connection to the fly wheel, said bar being connected to its link to actuate the valves automatically.

6. A rotary engine comprising a casing having induction and exhaust ports, a shaft, two fly wheels, a rotor journaled in the casing between the induction and exhaust ports, valves arranged to move over the said induction ports, links pivoted upon the casing, valve gears operatively connecting said valves with said links, a shaft journaled upon the casing and operatively connected with the terminal members of the valve gears to slide the same simultaneously along the links whereby one valve gear is connected with the active end of one link, while the other valve gear is connected with the passive end of the other link, valves located in the exhaust passages, a valve gear connecting the said exhaust valves together means operatively connecting the said exhaust valve gear with the said shaft, the valve gear of the exhaust valves having its ports so arranged when one exhaust opens the other exhaust valve closes and vice versa, said governor comprising a bar having weighted terminals pivoted intermediate of its ends and eccentrically to the fly wheel, and a spring connected to the bar and to the fly wheel at the opposite side to and in line with its connection to the fly wheel, said bar being connected to its link to actuate the valves automatically.

7. In a rotary engine, the combination of a casing, a rotor shaft journaled therein and extending therethrough, a fly wheel carried upon each end of the shaft, two inlet valves and controls, one to each fly wheel, two exhaust valves, one to its respective inlet valve, exterior mechanism for each set of inlet and exhaust valves, a shaft journaled upon the casing and to each mechanism, and projecting outwardly above its respective fly wheel, a double weighted bar connected eccentrically to its respective fly wheel, said connections being off center of the bar, a

pitman rod connected to each mechanism controlled shaft at its upper end and having its lower end connected to its respective bar at a point equidistantly off center to the connection of the bar to the fly wheel, a spring connected to the bar and the fly wheel to hold the connection of the piston rod at a point eccentrically of the fly wheel, and a spring cushioned stop carried by the fly wheel in the path to engage one of the weighted ends when in normal position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH GOUGEON.

Witnesses:

GEORGE GOUGEON,

WILLIAM GOUGEON.