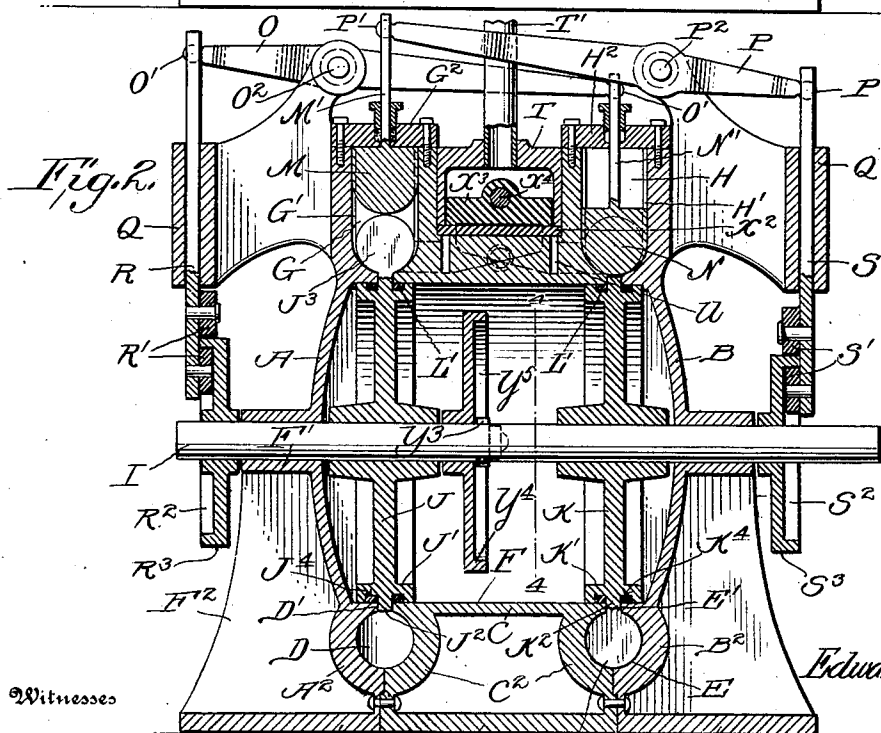
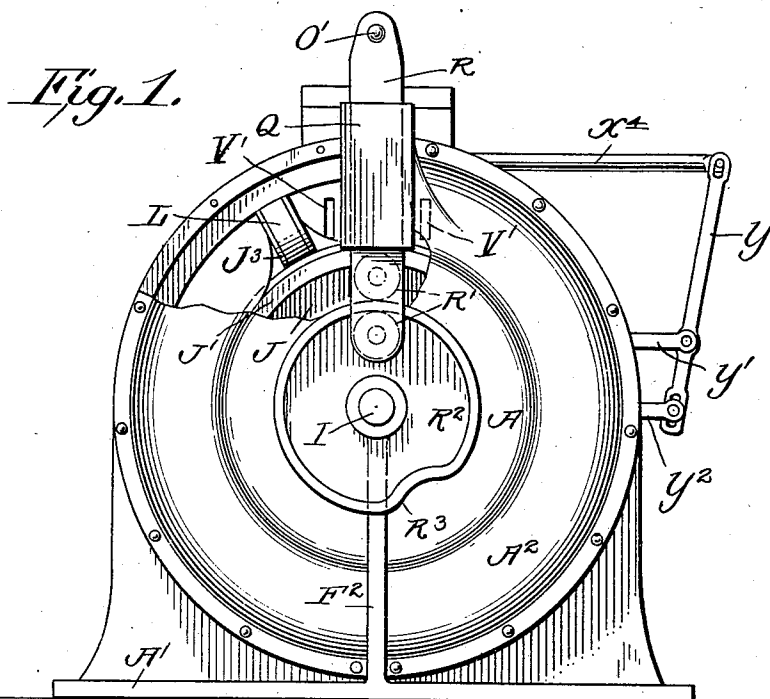


1,017,971.

E. HELDT.
ROTARY ENGINE.
APPLICATION FILED OCT. 29, 1909.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 1.



Witnesses

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C' by K^3

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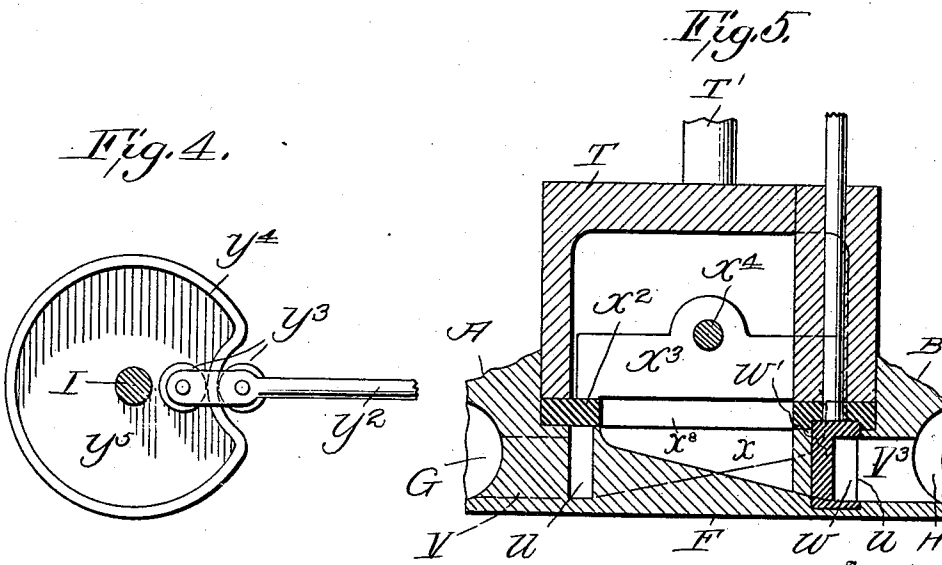
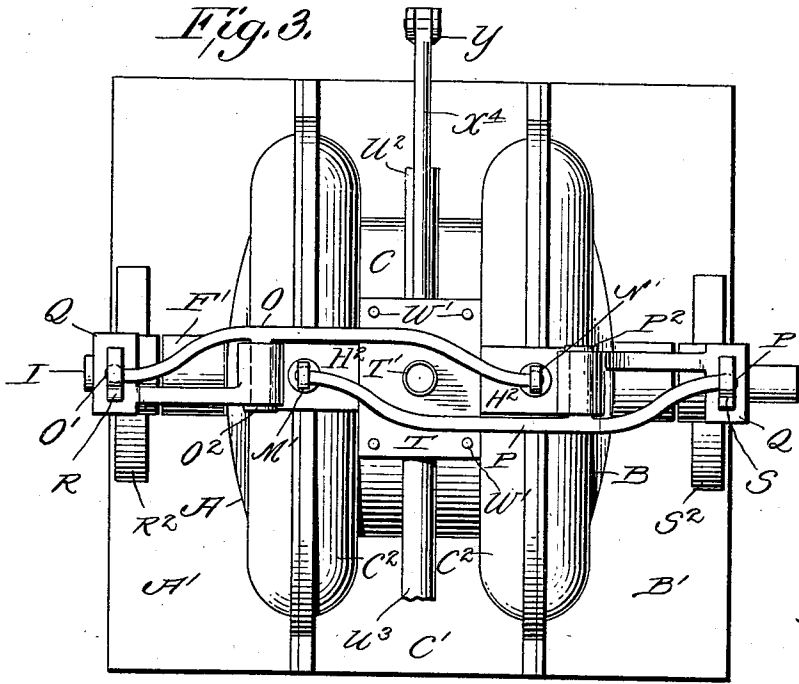
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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 6.

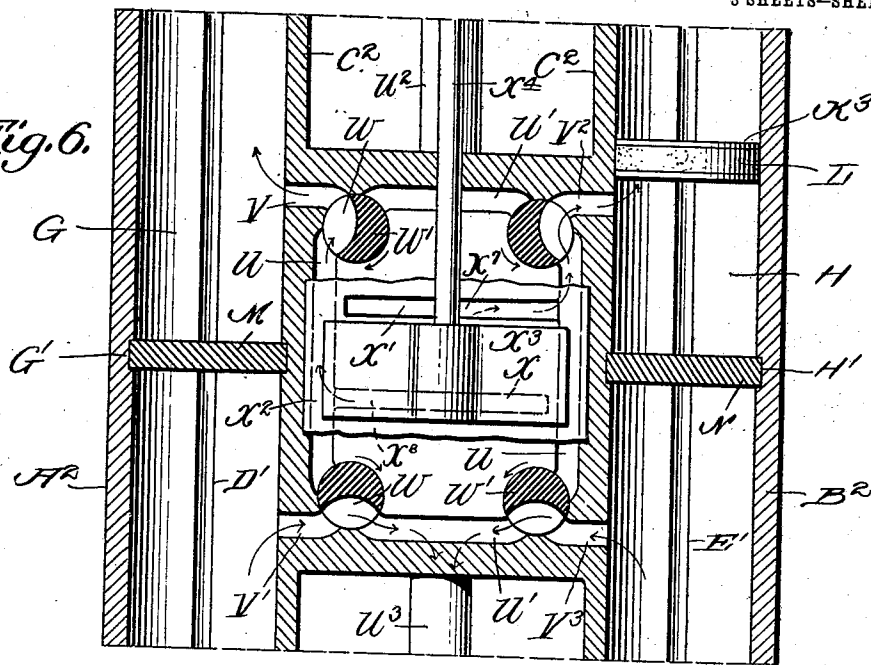
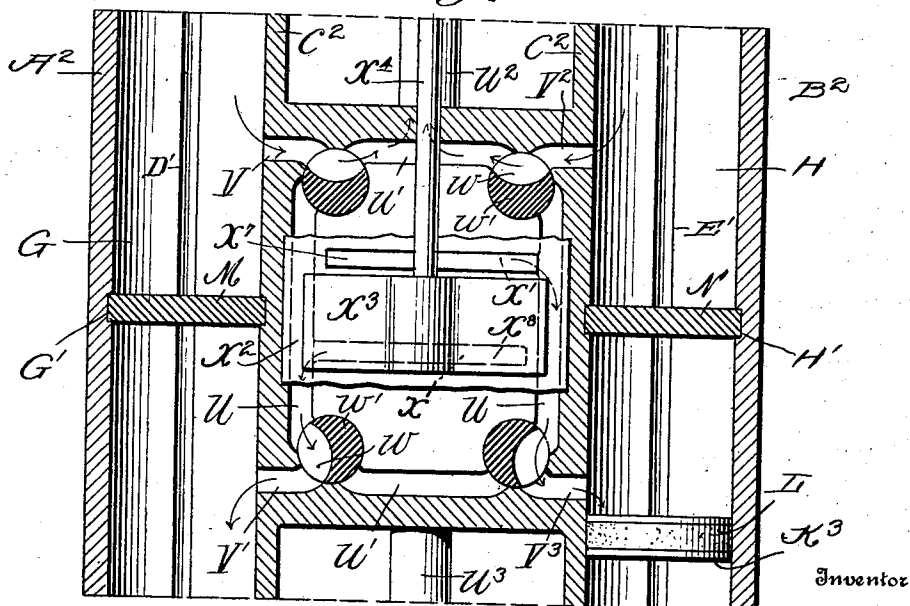


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

EDWARDT HELDT, OF MERRILL, WISCONSIN.

ROTARY ENGINE.

1,017,971.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed October 29, 1909. Serial No. 525,406.

To all whom it may concern:

Be it known that I, EDWARDT HELDT, a citizen of the United States, residing at Merrill, in the county of Lincoln and State of Wisconsin, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

This invention relates to rotary engines, and more particularly to multiple cylinder engines, in which two cylinders are arranged side by side through which extends a common shaft carrying the pistons, the object being to provide an engine in which steam may be delivered into the piston chambers in such a manner that after the steam supply has been cut off, the piston will run the remainder of the revolution upon the expansion of the steam.

Another object of my invention is to provide a rotary engine which may be started at any point in its revolution without any danger of the same getting on a dead center, thereby overcoming the difficulties of engines now in use.

Another object of my invention is to provide an engine in which the piston of one cylinder is arranged opposite to the piston of the other cylinder, whereby steam will be exerting a pressure upon one of the pistons at all times.

A still further object of the invention is to provide an engine which is provided with inlet and outlet ports, each being controlled by a valve so that by operating the same the engine can be readily reversed.

Another object of my invention is to provide a steam chest which is connected to the respective cylinders by passages, said steam chest having outlets in its bottoms, which are alternately opened and closed so as to deliver steam into the respective cylinders in such a manner that when steam is being delivered into one of the cylinders the port leading to the other cylinder is closed, and at the same time the exhausts are opened, so as to allow the spent steam to pass out of the cylinder, as new steam is admitted.

With these and other objects in view, the invention consists in the novel features of construction, combination and arrangement of parts, hereinafter fully described and pointed out in the claims.

In the drawings forming a part of this specification: Figure 1 is a side elevation of my improved engine, the cylinder being partly broken away, so as to show the piston

and the ports leading into the cylinder. Fig. 2 is a longitudinal vertical section through the same. Fig. 3 is a top plan view of the engine. Fig. 4 is a detail section taken on line 4—4 of Fig. 2, showing the cam for operating the slide valve in the steam chest. Fig. 5 is a detailed enlarged vertical section through the steam chest and a portion of the cylinder. Fig. 6 is an enlarged horizontal section through a portion of the cylinders, and the steam chest showing the position of the valve turned into such a position so as to drive the piston in the direction shown by the arrows, and Fig. 7 is a similar view showing the valve turned into such a position that the engine will be driven in a reverse direction.

In carrying out my invention I employ a sectional casting comprising two outer sections A and B and a central section C having base portions A', B' and C', and cylindrical grooved flanged portions A², B², C², connected together by rivets forming annular blade chambers D and E and a central cylindrical piston chamber F, the walls of which are annularly slotted, as shown at D', E' communicating with the blade chambers D and E and with gate housings G and H formed on top of the cylindrical portions A' B'. The flange portions A², B², C² are provided with web portions, so as to strengthen the cylinders and hold them against vibration.

The sides of the piston chamber F are provided with outwardly projecting bearing sleeves F' supported by webs F² extending upwardly from the base, in which is journaled a power-shaft I extending longitudinally through the piston chamber on one end of which is adapted to be secured a pulley or any other suitable driving member, (not shown), for conveying power to any suitable piece of machinery. Fixed on the shaft I, within the chamber F are a pair of wheeled pistons J and K provided with rims J', K' having central annular ribs J², K² adapted to fit snugly within the annular slots D', E', so as to form a tight joint, and yet be capable of moving freely therein. Extending outwardly from the rib of each of the pistons is a circular blade J³, K³, of the same diameter as the blade chamber D and E, and each of the blades are provided with a packing ring L, so as to form a steam-tight joint around the same. The rims of the piston are also provided with annular

grooves J^4 , K^4 , on each side of the annular ribs J^2 , K^2 , in which are arranged packing rings L' for forming a steam joint between the piston chamber and the blade chamber. The pistons are fixed on the wheeled pistons so that the blade of one piston will be diametrically opposite the blade of the other piston, whereby steam will be exerting its full force upon one or the other of the pistons at all times, as will be fully hereinafter described.

The side walls of the gate housings G and H are provided with vertical grooves G' , H' which register with similar grooves formed in the blade chambers D and E , and in which are slidably mounted gate-valves M and N having vertical stems M' , N' , which extend out through stuffing boxes formed in the tops G^2 , H^2 of the housings G and H , and are provided with sockets in their upper ends, in which are loosely mounted the rounded ends O' , P' , of levers O and P which are pivotally mounted as shown at O^2 , P^2 , upon extensions formed on the outer castings and these extensions are provided with guide-ways Q , in which are slidably mounted operating rods R and S provided with sockets in their upper ends, in which are loosely mounted the outer rounded ends of the respective levers O and P , and these levers are provided with spaced rollers R' , S' adjacent their lower ends, between which work the cam flanges R^2 , S^2 of cams R^3 , S^3 , which are fixed on the respective ends of the shaft I , so that when said shaft is rotated, first one and then the other of said gate-valves will be raised and lowered, so as to allow the piston-blades to pass under the same.

The piston-chamber F is provided with a thickened portion, between the gate housings forming a bottom for a steam chest T which is provided with an inlet pipe T' through which steam is adapted to pass into the chest for driving the pistons, as will hereinafter be described. The bottom of the steam chest is provided with side passages U and end passages U' , which communicate with the respective cylinders by ports V , V' , V^2 and V^3 , and the end passages U' have exhaust pipes U^2 , U^3 communicating therewith and the side passages U communicate with valve chambers W , and the end passages U' also communicate with the valve chambers W , and mounted within the valve chambers W are rotary valves W' which can be turned as clearly shown so as to connect the respective passages with the respective ports leading into the blade chambers, so that the engine can be run in either direction desired by changing the positions of these valves, as clearly shown in Figs. 6 and 7. The central portion of the bottom of the steam chest is provided with spaced passages X , X' , one passage communicating

with one of the side passages U , and the other with the other side passage U , and the bottoms of these passages are inclined as clearly shown and arranged over the bottom of the steam chest is a plate X^2 provided with slots X^7 , X^8 communicating with the respective passages X and X' , through which steam is adapted to pass.

Slidably mounted within the steam chest T upon the plate X^2 is a valve X^3 provided with a stem X^4 which extends outwardly through one end of the steam chest, and has the upper end of a lever Y loosely connected thereto which is pivotally mounted upon a bracket Y' , and the lower end of the lever Y is connected to an operating rod Y^2 which is provided with spaced rollers Y^3 , between which works the cam flange Y^4 of a cam Y^5 which is fixed on the shaft I in the piston chamber F and the chamber is provided with a slot through which the operating rod Y^2 passes into the same, and it will be seen that as the shaft is rotated the rod will be drawn in and out by the cam, so as to cause the valve X^3 to reciprocate within the steam chest T , so as to alternately open and close the passages X and X' , whereby steam will be admitted first into one of the blade chambers, and then the other, and it will also be seen that the gate valve will be operated simultaneously, so as to close the blade chambers after the blade has passed under the gate housing, and it will be seen that as steam is admitted, the blades will be forced around in the respective blade chambers by the live steam and the spent steam will be forced out of the exhaust ports into the end passage, and out through the exhaust pipe.

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

1. A rotary engine comprising spaced annular blade chambers, and a central cylindrical piston chamber communicating therewith, wheel pistons mounted in the piston chamber provided with annular ribs working in the slots communicating said chambers, circular blades carried by said pistons working in the blade chamber, a steam chest having ports communicating with the blade chamber, a slide valve for opening and closing said ports, and auxiliary valves for closing said ports.

2. A rotary engine comprising a sectional casting formed with a central piston chamber having spaced annular blade chambers communicating therewith, pistons working in the piston chamber carrying blades working in the blade chambers, housings formed on the top of said blade chambers, gate valves working in said housings operated by said pistons, a steam chest arranged between said housings, ports communicating said steam chest with the blade chambers, a slide valve for alternately opening and closing

said ports leading to the respective chambers, and valves for closing said ports.

3. A rotary engine comprising a central piston chamber having spaced blade chambers communicating therewith, a shaft extending through said piston chambers, blade housings formed on the top of said blade chambers, gate valves working in said housings, pistons mounted on said shaft in said piston chamber, blades carried by said pistons working in said blade chambers, a steam chest arranged between said housings, having spaced ports communicating with the respective blade chambers, rotary valves for closing said ports, passages communicating with said ports, a slide valve for controlling the flow of fluid through said passages, and means operated by said shaft for operating said gate valve and slide valve.

4. In a rotary engine, the combination with spaced blade chambers communicating with a central piston chamber, of pistons mounted in said piston chamber carrying blades working in the blade chambers, gate valves for closing said piston chambers, a steam chest provided with side passages and end passages, ports communicating with said passages with the respective blade chambers, rotary valves for closing or communicating the end of side passages with said ports, exhaust pipes communicating with the end passages, central passages spaced apart and communicating with the respective side passages and a valve for alternately opening and closing said central passages.

5. A rotary engine comprising a sectional casting having a central cylindrical piston chamber and spaced annular blade chambers communicating therewith, a shaft extending longitudinally through said piston chamber, pistons mounted on said shaft carrying circular blades working in the blade chambers, housings formed on said blade chambers, gate valves working in said housings, a steam chest arranged between said housings, ports communicating said blade chambers with said steam chest, a valve slidably mounted in said steam chest, and cam wheels mounted on said shaft in connection with operating rods for operating the pivoted levers connected respectively to said gate-valves and slide-valve.

6. A rotary engine comprising a piston chamber having annular blade chambers communicating therewith, side passages and end passages formed in an enlarged portion,

of said piston-chamber, ports communicating said side passages with said blade-chambers, rotary valves for directing the flow of fluid from said passages to said ports, exhaust pipes connected to the end passages, spaced central passages communicating with the respective side passages, a plate arranged upon said enlarged portions provided with slots communicating with the central passages, a steam chest arranged upon said plate having an inlet pipe and a valve slidably mounted within said steam chest upon said plate for controlling the flow of fluid to the respective blade chambers through the passages and ports.

7. In a rotary engine, the combination with a pair of annular blade chambers communicating with a piston chamber, of pistons carrying blades working in said blade chambers, a steam chest having passages, ports leading from said passages to the respective blade chambers, valves for closing said ports, and a sliding valve for admitting steam to the passages.

8. A rotary engine comprising a central piston chamber having blade chambers communicating therewith, gate housings formed on the top of said blade chambers, gate valves working in said housings, pistons mounted in said chambers provided with blades, and a steam chest arranged between said housings having spaced ports communicating with the respective blade chambers and valves for opening and closing said ports.

9. A rotary engine comprising a central piston chamber having spaced annular blade chambers communicating therewith, pistons mounted in said chambers provided with blades working in said blade chambers, gate valves co-acting with said blade chambers, a steam chest provided with ports communicating with said blade chambers, and valves for closing said ports.

10. In a rotary engine, the combination with a pair of blade chambers, blades working in said chambers, a steam chest having passages, ports leading from said passages to the blade chambers, valves for closing said ports, a spaced slotted plate arranged above said passages, and a sliding valve for closing said slots.

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Witnesses:

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