No. 793,664. PATENTED JULY 4, 1905.

M. KLEINDIENST.

ROTARY ENGINE.

APPLICATION FILED MAY 17, 1905.

Fig. 2.

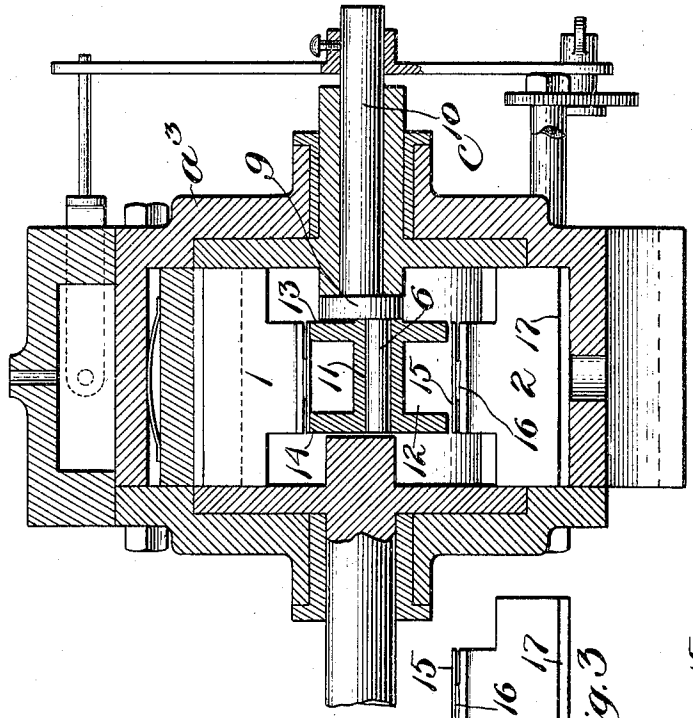


Fig. 3

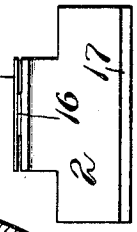


Fig. 4.

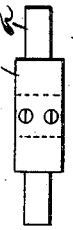
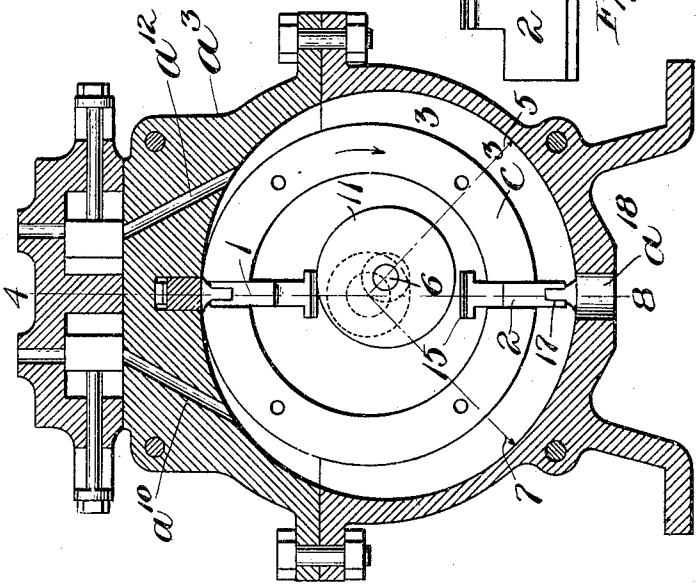


Fig. 1.



Witnesses

Arthur F. Randall

M. A. Jones.

Inventor:

Max Kleindienst,

by Geo. S. Maxwell

Attorney.

PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 793,664. Patented July 4, 1905.

UNITED STATES PATENT OFFICE.

MAX KLEINDIENST, OF JAMAICA PLAIN, MASSACHUSETTS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 793,664, dated July 4, 1905.

Application filed May 17, 1905. Serial No. 260,743.

To all whom it may concern:

Be it known that I, MAX KLEINDIENST, a citizen of the United States, residing at Jamaica Plain, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Rotary Engines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention is an improvement on that class of rotary engines shown and described in United States Letters Patent No. 723,689, dated March 24, 1903. In the aforesaid rotary engine a series of pistons are mounted to move radially in a carrier fast on the end of a rotary drive-shaft, said pistons being controlled by a wrist-pin projecting from a crank within the engine-cylinder on the end of a shaft extending coaxially of said drive-shaft in the opposite direction and normally stationary, but capable of being rocked for reversing the engine. The connection of said pistons to said wrist-pin is shown in said patent as in the form of links, and in practice it has been found that these links produce a considerable pounding action, with attendant noise, and my present invention aims to overcome these objections. I provide on the aforesaid wrist-pin a freely-rotating wheel or bearing on whose periphery the inner ends of the pistons are free to rest, the wrist-pin and rotary bearing-wheel being so related to the cylinder-surface as to maintain the pistons in positive engagement with the cylinder-surface for the desired active driving movement thereof.

In the accompanying drawings, in which I have shown a preferred embodiment of my invention, Figure 1 is a transverse vertical section through the engine-cylinder, showing my invention applied therein. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a view in side elevation of the lower piston. Fig. 4 is a top plan view of said piston.

The general features of the engine may be, and preferably are, as shown in the aforesaid patent, and accordingly I have omitted showing them here, it being sufficient to point out that a cylinder-shell a^3 is provided with ports a^{10} a^{12} a^{18}, substantially as shown in said patent, and within the cylinder is a carrier-ring c^3 for carrying the pistons 1 2, (or such other number thereof as may be desired.) The cylinder itself or piston-chamber 3 is of special shape, the part from the upper center 4 to the point 5 being formed on the arc having the wrist-pin 6 as a center when said wrist-pin is thrown to the right, Fig. 1, and the portion of the cylinder from 4 to the point 7 is formed on the arc of a circle whose center is said wrist-pin 6 when thrown to the opposite or left-hand position, the surface from 5 to 7 following the natural path of the piston, preferably on a radius from the center of the carrier c^3. The points 5 and 7 are respectively forty-five degrees from the middle vertical line indicated by the dotted line 4 8, measuring from the center of said carrier, and correspond to the normal throw of the crank-pin 6 to the right and left, respectively, for reversing purposes. The crank-pin or wrist-pin 6 extends from a crank or disk 9 at the inner end of a shaft c^{10}, corresponding to the shaft c^{10} in the aforesaid patent. Mounted to freely rotate on said wrist-pin 6 is a bearing-wheel 11, preferably cut away at its inner portion 12 to provide opposite flanges 13 14. On the inner side of each piston I preferably mount a thin plate 15, of spring-steel, shown as supported immovably on a block 16 at its center, so that the opposite yielding ends of said plate 15 engage, respectively, the flanges 13 14. Each piston has a rigid flaring packing 17 at its outer end for maintaining a tight joint with the peripheral surface of the cylinder 3, the steam-pressure on the flaring edges acting to press the packing outward.

In practice as the carrier is rotated by the pistons the latter as soon as they approach the middle line 4 8 engage the flanges 13 14 of the bearing-wheel 11 and are thereby held positively outward in engagement with the peripheral wall of the steam chamber or cylinder until they reach or closely approach the exhaust-port a^{18}, whereupon they are carried out of engagement with said bearing-wheel, as there is no longer necessity for their positive control. As said bearing-wheel is free to

rotate, it follows that there is no pounding action, inasmuch as the approach of the piston to engaging position with said wheel is gradual and both parts are moving in the same direction. This is also facilitated by the yielding engagement of the plate 15 with said wheel; yet the piston is held positively in the required position during its driving movement, inasmuch as the adjacent peripheral surface of said wheel is parallel to the active surface 4 5 of the cylinder when the pistons are being driven in the direction of the arrow and is similarly parallel to the opposite surface 4 7 when the reversing-shaft c^{10} has been rocked ninety degrees, so as correspondingly to throw the wrist-pin 6 and wheel 11 to the left.

By reason of the aforesaid construction not only is the engine rendered noiseless as to the pounding before mentioned, but the piston is held positively in driving position and is left unrestrained in the remaining portion of its travel and all pivots, links, and springs are done away with.

I wish it to be understood that many changes in form, arrangement, and relation of parts may be resorted to within the spirit and scope of my invention.

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

1. In a rotary engine, a cylinder, a piston-carrier mounted centrally therein, a piston carried thereby and movable radially thereof, a reversing-shaft, having a wrist-pin located eccentrically of said cylinder, and a bearing-wheel mounted on said wrist-pin for positively projecting said pistons.

2. In a rotary engine, a cylinder, a reversing-shaft mounted therein and provided within said cylinder with an eccentric wrist-pin, a bearing-wheel mounted on said wrist-pin, said pin and wheel being adapted to be shifted adjacent one side or the other of said cylinder by the corresponding reversing motion of the reversing-shaft, said cylinder having its said adjacent peripheral surface formed parallel with the adjacent surface of said bearing-wheel, a piston for engaging said wheel, and carrying mechanism for said piston.

3. In a rotary engine, a cylinder, a piston, a carrier therefor, a reversing-shaft, provided with an eccentric wrist-pin extending within said cylinder, and a rotary wheel on said pin provided with opposite peripheral flanges, for receiving the inner end of said piston.

4. In a rotary engine, a cylinder, a piston, a carrier therefor, a reversing-shaft, provided with an eccentric wrist-pin extending within said cylinder, and a rotary wheel on said pin provided with opposite peripheral flanges, said piston having on its inner end a thin spring-plate whose freely-yielding ends engage respectively said peripheral flanges.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAX KLEINDIENST.

Witnesses:
GEO. H. MAXWELL,
M. A. JONES.