C. H. PIERCE.

ENGINE.

APPLICATION FILED MAR. 26, 1912.

1,030,679.

Patented June 25, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

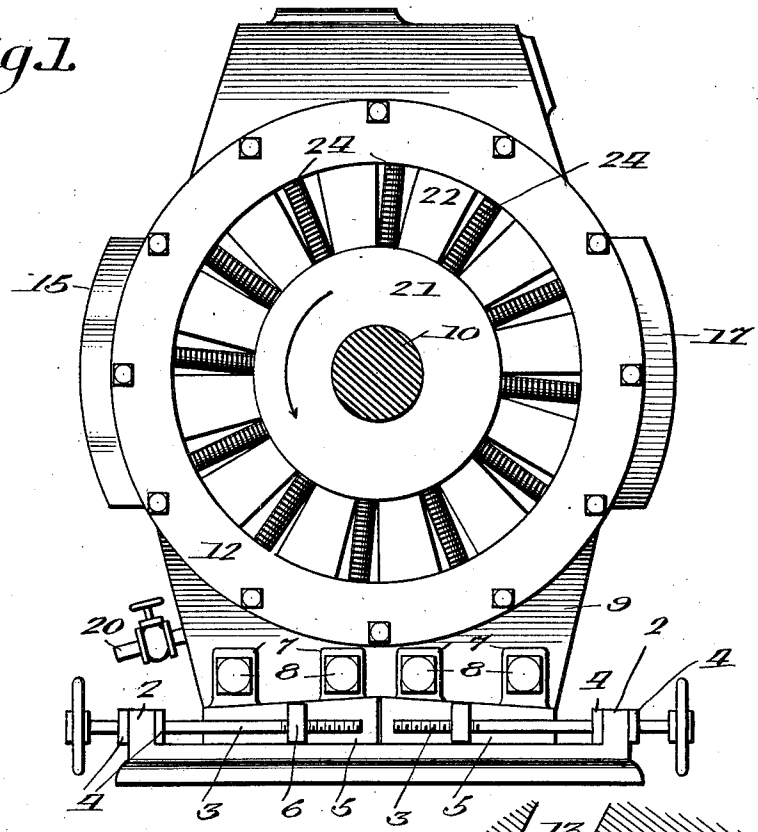
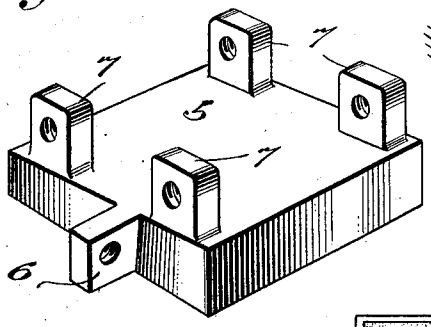


Fig. 4.



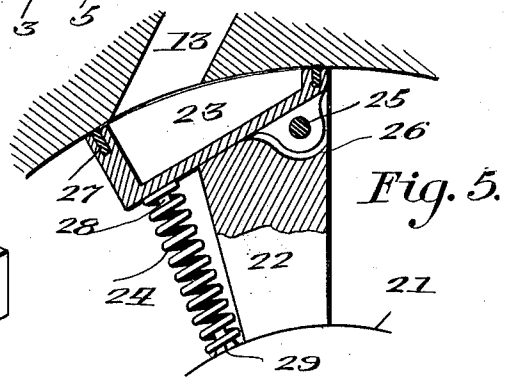
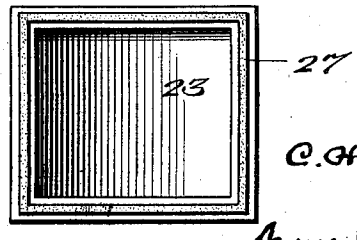


Fig. 5.

Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 2.

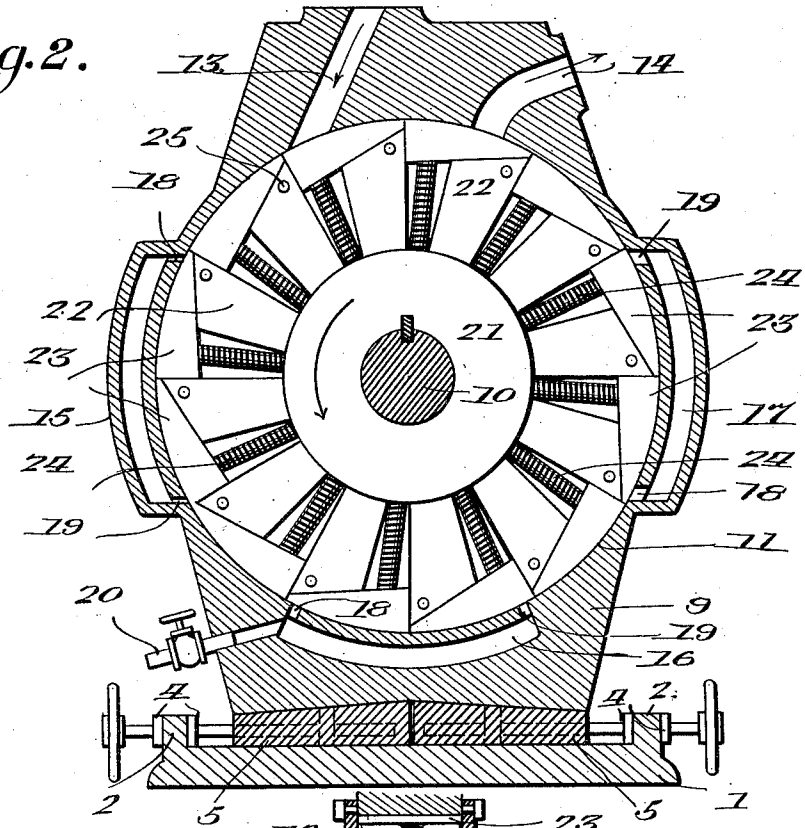
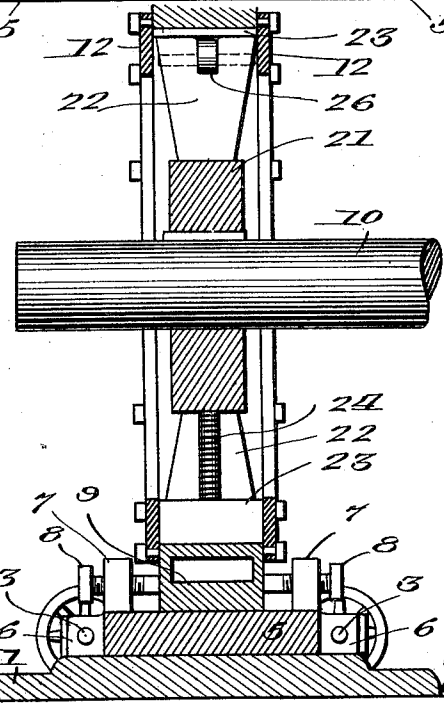


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES HENRY PIERCE, OF NEW MARSHFIELD, OHIO, ASSIGNOR OF ONE-HALF TO WILLIAM STURGILL, OF NEW MARSHFIELD, OHIO.

ENGINE.

1,030,679. Specification of Letters Patent. Patented June 25, 1912.

Application filed March 26, 1912. Serial No. 686,403.

To all whom it may concern:

Be it known that I, CHARLES HENRY PIERCE, citizen of the United States, residing at New Marshfield, in the county of Athens and State of Ohio, have invented new and useful Improvements in Engines, of which the following is a specification.

My present invention pertains to rotary engines; and it contemplates the provision of a simple, inexpensive and reliable rotary engine adapted to be directly connected to the shaft of a machine to be driven and adequately supported with a view to avoiding the imposition of any weight whatever on the said shaft.

The invention in all of its details will be fully understood from the following description and claims when the same are read in connection with the drawings, accompanying and forming part of this specification, in which:

Figure 1 is a view showing in side elevation the engine constituting the best practical embodiment of my invention that I have as yet devised. Fig. 2 is a view showing the engine in longitudinal vertical section and also showing certain parts in elevation. Fig. 3 is a view showing the shaft of a machine to be driven in elevation and the engine in diametrical section. Fig. 4 is a perspective of one of the adjustable supporting blocks of the engine. Fig. 5 is a detail longitudinal-vertical section illustrative of the manner in which the blades of the rotary piston are connected with said piston and maintained in working position. Fig. 6 is a plan of the outer side of one of said blades.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

In the carrying out of my invention, I employ a bed 1 having at its opposite ends lugs 2 in which are smooth bores receiving longitudinal adjusting screws 3 which are held against endwise movement through the said lugs by nuts 4 disposed at opposite sides of the lugs, or any other suitable means.

Disposed and movable endwise on the bed 1 are wedge-shaped supporting blocks 5 having lateral lugs 6 and upstanding lugs 7, all of which lugs are provided with threaded apertures as clearly shown in Fig. 4. The said wedge-blocks are arranged with their higher ends opposed, and the threaded apertures in the lateral lugs 6 receive the longitudinal adjusting screws 3. The apertures in the upstanding lugs 7 of the blocks 5 receive screws 8 which are best shown in Figs. 1 and 3, and are designed to serve a purpose hereinafter described.

Resting on and shaped at its bottom in conformity to the upper sides of the blocks 5 is the casing 9 of my novel engine, and bearing against opposite sides of the said casing 9, Fig. 3, are the before mentioned screws 8. Thus it will be manifest that by manipulating the screws 3, the casing 9 can be accurately adjusted as to height and adjustably fixed so that the application of the engine to the shaft 10 of a machine to be driven will impose no weight on said shaft, and by adjusting the screws 8, the casing 9 can be adjusted and adjustably fixed so as to rest exactly at a right angle to the shaft 10, as is desirable.

The casing 9 is provided with a circular piston-receiving chamber 11 having side annular flanges 12, as best shown in Figs. 1 and 3, and communicating with the said chamber 11 is a steam supply port 13 and a steam exhaust port 14. It will also be understood by reference to Fig. 2, that expansion chambers 15, 16 and 17 are grouped about the chamber 11, each of the said expansion chambers having an induction port 18 arranged nearest the steam inlet port 13 and an eduction port 19 arranged nearest the exhaust port 14. Connected with the lowermost expansion chamber 16 is a valved drain pipe 20 through which water of condensation may be drawn from the lowermost expansion chamber 16 when occasion demands. It is to be understood in this connection that the drain pipe 20 may be omitted when some fluid under pressure other than steam is employed as the agent to actuate my novel engine.

Feathered or otherwise suitably fixed on the shaft 10, which is preferably the shaft of a machine to be driven, is the piston 21 of the engine. The said piston comprises a hub, spokes 22 fixed to and extending radially from the hub, a plurality of peripheral, pan-shaped blades 23, and springs 24, one complementary to each blade 23. The blades are designed to move in a circular path against the circular wall of the chamber 11 and between the flanges 12. The said blades

and their appurtenances are identical in construction, and therefore a detailed description of the blade shown in Figs. 5 and 6 will suffice to impart a definite understanding of all. The single blade referred to is pan-shaped and rectangular in plan, and is gradually diminished in depth from its forward end to its rear end, with reference to the direction in which the rotary piston is driven. See arrow in Figs. 1 and 2. The blade is pivoted at 25 in a recess 26 in its complementary spoke 22, and is provided with packing 27 which entirely surrounds its interior, as shown. At its inner side and adjacent its forward end the blade is provided with a stud 28, and on the hub of the piston is provided a similar stud 29. These studs extend into and hold against lateral displacement the spring 24 which serves the important purpose of taking up wear of the packing 27, and in that way assuring a steam-tight fit of the blade 23 at all times against the circular wall of the chamber 11. As will be readily understood from Fig. 2, the blades 23 are closely arranged—*i. e.*, the forward end of each blade abuts against the rear end of the next preceding blade, with reference to the indicated direction in which the piston is rotated.

In the practical operation of my novel engine, steam or some other suitable fluid under pressure is supplied through the port 13. Such driving agent enters and acts against each blade 23 as the same is registered with the port 13. Then as each blade registers with the port 18, the driving agent enters the first chamber 15 and expands therein and leaves said chamber through the port 19, at which point it acts against the blades and gives the piston a fresh impulse in the direction indicated. This operation is repeated by the ports 18 and 19 of the intermediate expansion chamber 16, and is also repeated by the ports 18 and 19 of the low pressure expansion chamber 17, until finally when the blades are in registration with the port 14 the steam exhausts from the engine.

During the rotation of the piston 21, the pan-shaped blades 23 receive the steam or other agent employed to actuate the engine, and confine the same against the circular wall of the chamber 11 except when the blades are opposite the ports 18 and the exhaust port 14, and hence it will be understood that the expansive agent is adapted to exert its power to the best advantage in rotating the piston 21 and the shaft 10 on which said piston is fixed.

I have entered into a detailed description of the construction and relative arrangement of the parts comprised in the best practical embodiment of my invention of which I am cognizant, in order to impart a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts as in the future practice of my invention such changes or modifications may be made as fairly fall within the scope of the invention as claimed. For instance a lining may be placed on the inside of the outside casing, which will be secured to the outside casing through stub keys or bolts. This, however, I have deemed it unnecessary to illustrate.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. In an engine, the combination of a casing having a circular piston-receiving chamber and also having expansion chambers grouped about the piston-receiving chamber and each connected through ports with the said piston-receiving chamber; said casing also having supply and exhaust ports in communication with the piston-receiving chamber, a rotary piston body disposed in the piston-receiving chamber of the casing and having a hub and radial spokes in the outer ends of which are recesses, pan-shaped blades interposed between the spokes and the circular wall of the piston-receiving chamber and having portions pivoted in the recesses of the spokes and also having packing entirely surrounding their interiors and bearing against the circular wall of the piston-receiving chamber; said blades being increased in depth from their rear ends to their forward ends, with reference to the direction in which the piston is rotated, and springs interposed between the forward portions of the blades and the hub and held against lateral displacement and tending to force the forward portions of the blades radially outward.

2. In an engine, the combination of a casing having a circular piston-receiving chamber and also having supply and exhaust ports in communication with the piston-receiving chamber, a rotary piston body disposed in the piston-receiving chamber of the casing and having a hub and radial spokes in the outer ends of which are recesses, pan-shaped blades interposed between the spokes and the circular wall of the chamber and having portions pivoted in the recesses of the spokes and also having packing entirely surrounding their interiors and bearing against the circular wall of the chamber; said blades being increased in depth from their rear ends to their forward ends, with reference to the direction in which the piston is rotated, and springs interposed between the forward portions of the blades and the hub and held against lateral displacement and tending to force the forward portions of the blades radially outward.

3. In an engine, the combination with a casing having a circular piston-receiving chamber and also having expansion chambers grouped about the piston-receiving chamber and each connected through ports with the said piston-receiving chamber; said casing also having supply and exhaust ports in communication with the piston-receiving chamber, of a rotary piston body disposed in the piston-receiving chamber of the casing, pan-shaped blades pivoted to said body and having packing surrounding their interiors and opposed to the circular wall of the piston-receiving chamber, and expansion springs interposed between the piston body and the forward portions of said blades.

4. In an engine, the combination of a bed, wedge-shaped blocks movable longitudinally on the bed and having their higher ends opposed and also having lateral lugs and upstanding lugs in all of which are threaded apertures, an engine casing disposed on said blocks and having its under side shaped conformably thereto, longitudinal screws bearing and held against endwise movement in portions of the bed and extending through and engaging the threaded apertures in the lateral lugs of the blocks, and screws bearing in the threaded apertures in the upstanding lugs of the blocks and also bearing at their inner ends against opposite sides of the casing.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES HENRY PIERCE.

Witnesses:

EDNA P. BURNS,

LAFE HAWK.