F. C. MANUEL.

ROTARY ENGINE.

APPLICATION FILED MAY 18, 1914.

1,131,148. Patented Mar. 9. 1915.

Fig. 1

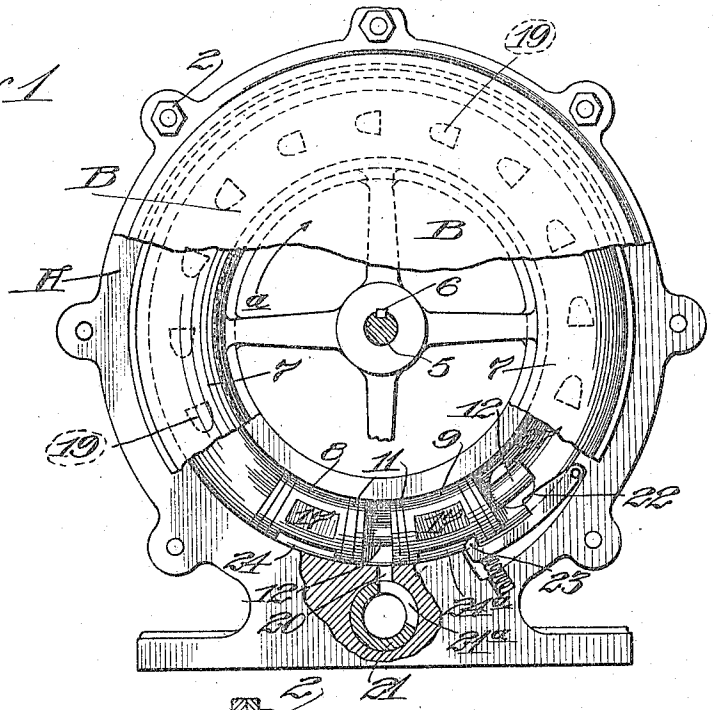
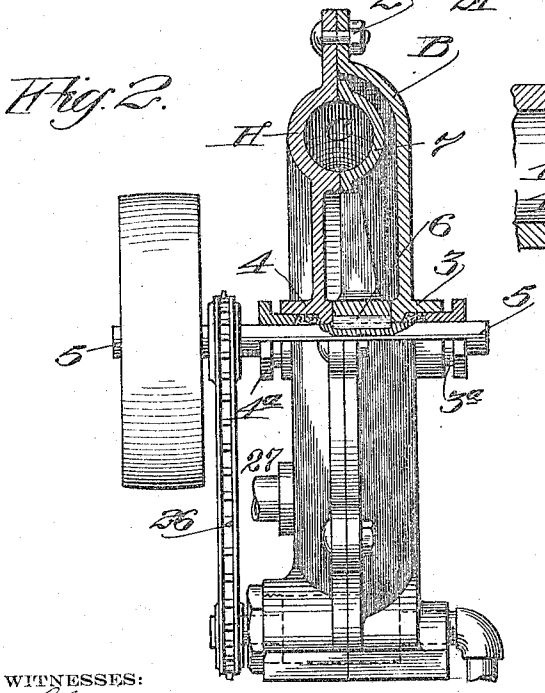


Fig. 2.



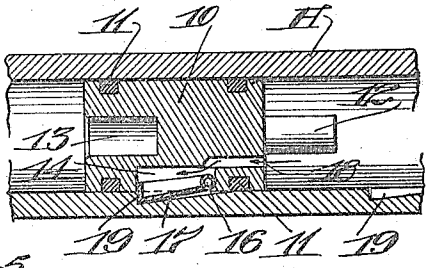


Fig. 3.

WITNESSES:

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FRANK C. MANUEL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO CHESTER A. KENNEY, OF SAN FRANCISCO, CALIFORNIA.

ROTARY ENGINE.

1,131,148. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed May 13, 1914. Serial No. 838,875.

To all whom it may concern:

Be it known that I, FRANK C. MANUEL, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to a rotary engine.

The object of the present invention is to provide a simple, substantial, cheaply manufactured steam engine of the rotary type, and particularly to provide a more efficient form of piston and rotor.

Another object of the invention is to provide a novel form of drive or connection between the piston and rotor.

Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation partly broken away. Fig. 2 is an end view partly in section. Fig. 3 is a horizontal section on line X—X, Fig. 1.

Referring to the drawings, A indicates a main casing, and B a cover section which in this instance is secured to same by bolts 2. Secured to the cover B and main casing A, or formed integrally with same, is a pair of bearings extensions 3 and 4, and journaled in said bearings is a main drive-shaft 5. Interposed between the cover section and the main casing, and secured to the main drive-shafts, as at 6, is a rotor 7.

C indicates an annular, cylinder chamber, one-half of which is formed in the main casing, while the other half is formed in the rotor. Suitably mounted in the cylinder chamber and adapted to transmit power to the rotor, is a pair of piston members 8 and 9.

The construction of the rotor and pistons, together with the manner of forming a drive between same forms the subject matter of the present application. This will be accomplished as follows: Referring to Figs. 1 and 3, each piston is shown as consisting of a solid body portion 10 which is provided with rings 11 in the usual manner. Secured on the rear end of each piston, or formed integrally with same, is an extension 12, and formed in the forward end of each piston is a chamber 13. The side of each piston is provided with a pocket 14 in which is pivotally mounted, as at 16, a latch member 17. This latch member is adapted to be projected outwardly with relation to the piston by admitting steam under pressure to the inner side of the latch through a port 18 which communicates with the rear face of the piston. The inner cylinder face of the rotor is provided with a plurality of notch-like depressions 19 into which latches 17 are adapted to be projected.

Referring to Fig. 1, 20 indicates a steam inlet port which is controlled by a suitable form of valve 21. Steam being admitted through port 20 between pistons 8 and 9 will first enter through port 18 and force latch 17 outwardly into engagement with one of pockets 19 formed in the rotor. A driving connection is thus formed between piston 8 and rotor 7, and the steam admitted between the pistons 8 and 9 will thus force piston 8 with connected rotor around in the direction of arrow *a*. Piston 8 will continue traveling around until it engages with the rear extension 12 of piston 9. At the same time a cam-actuated latch 22 will be depressed by the forward end of piston 8, and the outer end 23 will be depressed out of engagement with a notch 24 formed on the lower side of piston 9, freeing piston 9 and permitting this to move ahead into the position formerly occupied by piston 8. Piston 8 riding over cam 22 will release this and permit the latch end 23 of same to spring out into engagement with recesses 24ª formed in same. Piston 8 is now locked against movement. Latch 17 in piston 9, the moment steam is admitted through port 20, will move into engagement with one of the notches in the rotor, and will thus pass through the same cycle of operation as described in connection with piston 8.

Extensions 12, together with recesses 13, are provided for the purpose of cushioning the impact between the pistons. The rotary valve, indicated at 21, may be of suitable construction, and is in this instance shown as driven from the main shaft at the rate of one to one through sprockets and chain 26. Valve 21 is provided with a port 21ª; this permits live steam to enter the cylinder during a portion of the piston travel. The remainder of the piston travel is completed by the expansive force of the steam, and the steam is finally permitted to exhaust

when one or another of the pistons moves into engagement with latch 23; exhaust port 27 being provided for this purpose. Latch 23, together with cam 22, may be of any suitable width. It is normally spring-actuated, so as to project out into the path of the pistons, but is automatically released when the moving piston moves into engagement with the stationary piston; the impact of the traveling piston being cushioned by extension 12 passing into recess 13. The exhaust does not take place until the stationary piston has been released and the movable piston has become interlocked with latch 23. Valve 21 is then in position where the live steam port 21ª will communicate with the inlet port 20. A continuous drive is thus transmitted to the rotor by each piston in consecutive order, one acting as a driver while the other remains stationary and forms a head against which pressure is exerted to permit the moving piston to transmit power to the rotor. Latches 17 may be thrown into engagement with any one of the notch-like recesses 19 formed in the rotor. Slippage between the rotor and any particular piston can thus take place without affecting the operation of the engine.

The contacting surfaces of the rotor and main casing are preferably ground to form a tight connection at this point; the rotor being held in contact with the main casing, first by the pressure of the outer cover against the hub of the rotor, and secondly, by pressure of the leakage steam which accumulates between the cover and the rotor; any further escape of steam being prevented by providing stuffing boxes 3ª and 4ª.

The engine here shown is simple and substantial in construction and efficient in operation, as leakage steam is entirely eliminated. The long piston stroke furthermore adds to the efficiency of the engine, as complete expansion is permitted.

The materials and finish of the several parts of the apparatus are such as the experience and judgment of the manufacturer may dictate.

I wish it understood that various changes in form, proportion and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

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

1. In a rotary engine, a casing, a rotor connected to the casing and forming an annular chamber in conjunction with the casing, said casing having a pocket, a spring pressed pivoted latch in the pocket having a cam which with the latch proper projects into the chamber, a pair of pistons in the chamber, each piston having a pocket and a steam port which leads from the pocket through the adjacent piston end, a pivoted latch in each piston pocket, each piston having a chamber in one end thereof, and a plunger connected to the opposite end of each piston and receivable in the chamber of the other piston, said pistons having recesses in their peripheries arranged to one side of the latches thereof to receive the latch of the casing, and said rotor having a circular series of depressions in its inner circumference to receive said latches of the pistons.

2. In a rotary engine, a casing, a rotor connected to the casing and forming an annular chamber in conjunction with the casing, said casing having a pocket, a spring pressed pivoted latch in the pocket having a cam which with the latch proper projects into the chamber, a pair of pistons in the chamber, each piston having a pocket and a steam port which leads from the pocket through the adjacent piston end, a latch in each piston pocket, and means whereby steam may enter each pocket and act against the rear face of the latch to move the latter outwardly, said rotor having depressions to receive the piston latches, and said pistons having recesses in their peripheries arranged to one side of the latches thereof to receive the latch of the casing.

3. In a rotary engine, a casing, a rotor connected to the casing and forming an annular chamber in conjunction with the casing, said casing having a pocket, a spring pressed pivoted latch in the pocket having a cam which with the latch proper projects into the chamber, a pair of pistons in the chamber, each piston having a pocket and a steam port which leads from the pocket through the adjacent piston end, a pivoted latch in each piston pocket arranged so that the steam which enters the pocket will act upon the rear face of the last named latch to move the same outwardly, said rotor having depressions to receive the piston latches and said pistons having recesses in their peripheries arranged to one side of the latches thereof to receive the latch of the casing.

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

FRANK C. MANUEL.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.