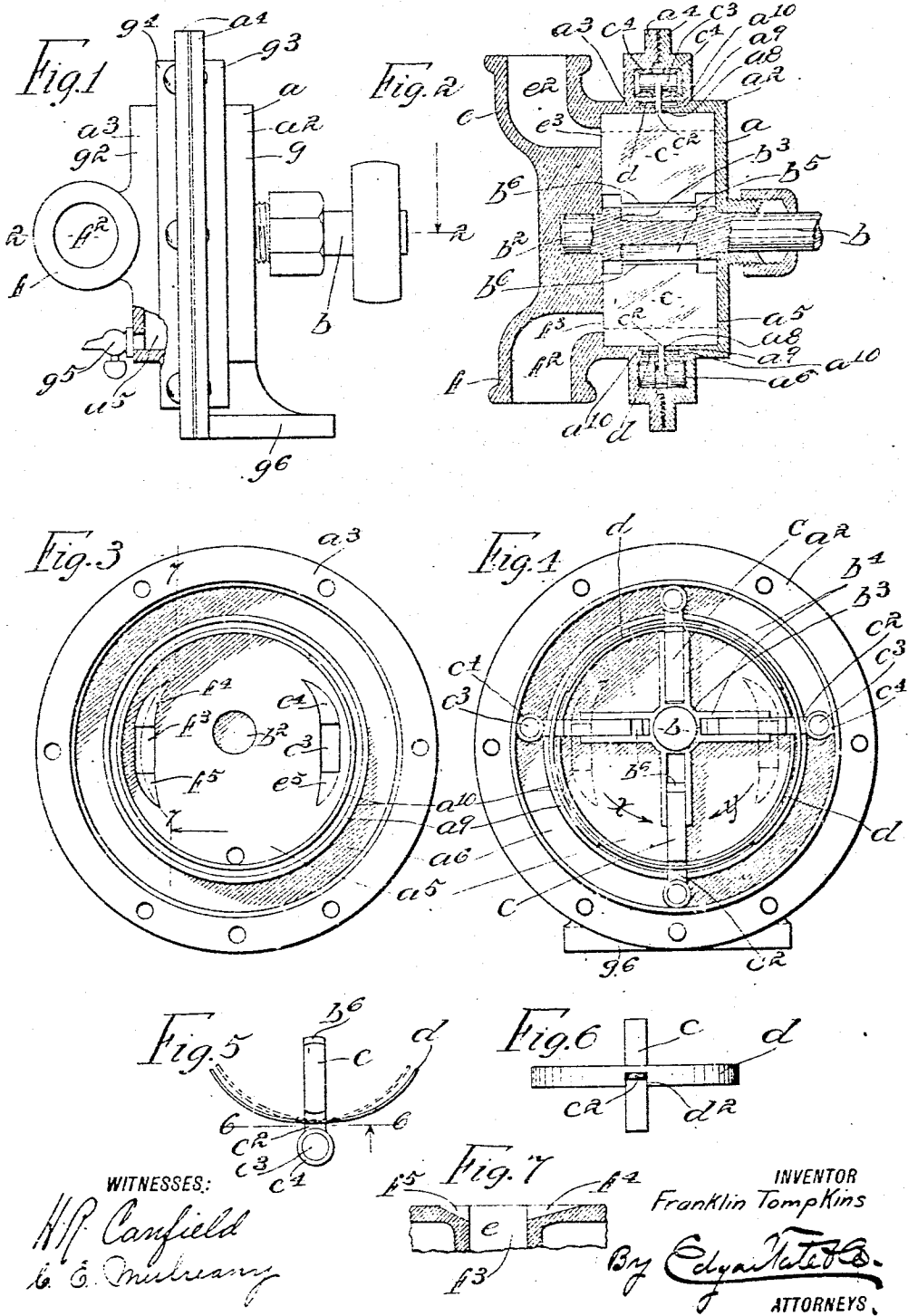


P. TOMPKINS.
ROTARY ENGINE.

APPLICATION FILED JULY 30, 1909.

949,510.

Patented Feb. 15, 1910.



WITNESSES:

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to E. C. Mulholland

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UNITED STATES PATENT OFFICE.

FRANKLIN TOMPKINS, OF NEW DORP, NEW YORK.

ROTARY ENGINE.

949,510.

Specification of Letters Patent. Patented Feb. 15, 1910.

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To all whom it may concern:

Be it known that I, FRANKLIN TOMPKINS, a citizen of the United States, and residing at New Dorp, Staten Island, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, such as will enable those skilled in the art to which is appertains to make and use the same.

This invention relates to rotary engines and the object thereof is to provide an improved engine of this class which is simple in construction and operation and which will operate with a maximum of efficiency, and without leakage or loss of power; and with this and other objects in view the invention consists in a rotary engine constructed as hereinafter described and claimed.

The invention is fully described in the following specification of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views and in which;—

Figure 1 is a side view of my improved rotary engine, part of the construction being broken away. Fig. 2, a horizontal section on the line 2—2 of Fig. 1. Fig. 3, an inside view of the back part of the casing of the engine detached. Fig. 4, an inside view of the front part of the casing of the engine detached and showing the operative interior parts of the engine mounted therein. Fig. 5, a side edge view of one of the piston blades which I employ and showing a spring connected therewith. Fig. 6, a view looking in the direction of the arrow of Fig. 5 and taken in the line 6—6 of said figure, and Fig. 7, a partial section on the line 7—7 of Fig. 3.

In the practice of my invention I provide a circular casing a composed of separate side parts a^1 and a^2 and for the purpose of this description the side parts a^1 and a^2 will be called respectively the front and back part of the casing.

The front and back parts a^1 and a^2 of the casing a are provided with annular flanges a^3 by which they are connected and within the said casing and formed in the separate parts thereof is a central circular chamber a^4 inclosed by a central annular chamber a^5 also formed in the separate parts of the casing and the annular chamber a^5 is placed in communication with the central circular,

chamber a^4 by an annular space a^6 and the said annular chamber a^5 and the central circular chamber a^4 are separated by annular walls a^7 in which are formed annular grooves a^{10} forming an annular space between the central circular chamber a^4 and the outer annular chamber a^5 .

Passing inwardly through the front part of the casing a and eccentrically of the chamber a^4 thereof is a shaft b the inner end of which has a bearing in the back part a^2 of said casing as shown at b^1 and that part of the shaft b within the casing a , in the form of construction shown is enlarged to form a hub b^2 and said hub is provided with radial arms b^3 , four of which are shown and in which are mounted slidably movable piston blades c provided centrally of their outer edges with necks c^1 which pass outwardly through the annular space a^6 and are provided with transverse trunnions c^2 which fit in and are adapted to turn through the annular chamber a^5 and said trunnions are provided at their opposite ends with anti-friction sleeves or rollers c^3 .

Placed in the annular space formed by the annular grooves a^{10} are curved springs d which are connected with necks c^1 of the piston blade c as shown in Figs. 5 and 6, said springs being provided centrally with recesses d^1 and the springs d are of such length that the ends thereof overlap in the annular space formed by the annular grooves a^{10} . The hub b^2 of the shaft b is also provided, in the form of construction shown, with longitudinal recesses b^4 , and the radially movable piston blades are provided at their inner edges with corresponding projections b^5 adapted to enter said recesses.

The back part of the casing a is provided with radially directed tubular coupling members e and f forming inlet and exhaust passages, and for the purpose of this description the passage e^2 will be described as the inlet, and the passage f^2 as the exhaust, and these passages communicate with the central circular chamber a^4 by means of ports e^3 and f^3 which are clearly shown in Figs. 2 and 3 and the positions of which, for the purpose of this description, are indicated in dotted lines in Fig. 4 and in the form of construction shown in the inlets e^2 and the exhaust f^2 and the corresponding ports e^3 and f^3 are placed horizontally or in a horizontal plane and in the back wall of the

central circular chamber a^5 are formed upwardly and downwardly directed grooves or recesses e^4 , e^5 and f^4 and f^5 which communicate with the corresponding ports e^3 and f^3 .

5 The front part a^2 of the casing a is provided with a central circular enlargement g , and the back part a^3 of said casing with a corresponding central circular enlargement g^2 , in which the central circular chamber a^5 is formed and said parts of the casing are also provided with other annular enlargements g^3 and g^4 respectively in which the annular chambers a^6 is formed, and the bottom of the central circular chamber a^5 is provided, preferably at the back side thereof with a drain tap or similar device g^5 for the purpose of draining off water of condensation which may form in said chamber. The front part a^2 of the casing a is also provided with a pedestal or base g^6 whereby the said engine may be supported on any suitable support and secured thereto if desired.

The operation will be readily understood from the foregoing description when taken in connection with the accompanying drawing and the following statement thereof. If steam be admitted through the inlet e^2 and ports e^3 , the shaft b , arms b^4 and piston blades c will be turned in the direction of the arrow x of Fig. 4 and the steam will be exhausted through the port f^3 and passage f^2 as will be readily understood. If it is desired to reverse the engine the steam is admitted thereto through the passage f^2 and the port f^3 and in this case the shaft b , arms b^4 and piston blades c will be turned in the direction of the arrow y of Fig. 4. It will be understood that any suitable means or apparatus may be employed for reversing the engine, but as said means form no part of my invention they are not shown and described herein. The grooves and recesses e^4 and e^5 which communicate with the port e^3 and the corresponding grooves or recesses f^4 and f^5 which communicate with the port f^3 , are intended to facilitate the operation of the motor, and the admission of steam thereto and the exhaust of the steam therefrom. It will be seen that the radial arms b^4 and piston blades c divide the central circular chamber a^5 into separate sectorial compartments the dimensions of which are constantly changing, as the shaft b , arms b^4 and piston blades c turn in said chamber, and the grooves and recesses e^4 and e^5 and f^4 and f^5 which communicate respectively with the ports e^3 and f^3 are intended to accommodate the apparatus to this change in the dimension of the said sectorial compartment, and to prevent the undue compression of the contents thereof, or the expansion and consequent formation of a vacuum therein.

65 Although I have described my improve-

ment as a rotary engine to be operated by steam, in which event power may be transmitted by or from the shaft b for any desired purpose, it will be apparent that the said device may be used as a pump for 70 pumping water or other liquids, in which event power is applied to rotate the shaft b , said power being obtained from any suitable source, and when the said device is used in this manner the water or other liquids will enter through one of the ports e^3 or f^3 , and be discharged through the other according to the direction in which the shaft b is turned, and the operation of the piston blades c will be the same when the device is 80 used in this manner as when it is used as a rotary engine. The grooves or recesses e^4 and e^5 and f^4 and f^5 which communicate respectively with the ports e^3 and f^3 are of particular use and advantage when the device is used as a pump, as above described, by reason of the fact that liquids are not capable of compression and as the dimensions of the sectorial compartments formed in the central circular chamber a^5 by the 90 arms b^4 and blades c are constantly changing, and as the said compartments are filled with liquids, it is necessary to facilitate the exhaust of said liquids from said compartments and this necessity is provided for by the said grooves or recesses e^4 and e^5 and f^4 and f^5 in connection with the corresponding ports e^3 and f^3 .

My invention in addition to being used as a rotary engine and as a pump as hereinbefore described, may also be used as an air compressor, and may also be used as a rotary engine with compressed air as a propelling medium.

By the means of the construction herein 105 described, and by the use of the springs d and the annular space a^{10} in which said springs are placed and which is substantially filled by said springs and the employment of the annular chamber a^6 which is separated from the central circular chamber a^5 in the manner described, I provide against the leakage of steam when the device is used as a rotary engine, or the leakage of water or other liquids when the device is used as a pump, to a 115 great extent, and in this way my improvement when used either as a rotary engine or as a pump may be operated with the greatest possible percentage of efficiency and the least possible reduction in loss of power.

The object of providing the recesses b^5 in the hub b^2 of the shaft b and the corresponding projections b^6 on the piston blades c is to increase the radial dimensions of said blades so as to strengthen and stiffen them 125 when at the limit of their outward movement in the arms b^4 and prevent the twisting or clamping of said blades as they are carried around by the shaft b .

Although I have described the parts a^2 130

and a^3 of the casing a as the front and back parts of said casing it will be apparent that these terms are merely relative and either side of said casing may be called the front or back, if desired.

My invention is not limited to the exact details of the construction herein shown and described, and various changes therein and modifications thereof may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its invention.

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

1. In a rotary engine or pump, a casing provided with a central circular chamber, an annular chamber inclosing the central circular chamber and in communication therewith by an annular passage, a shaft passing eccentrically through said central circular chamber and provided with radial arms, slidably movable piston blades mounted in said arms and provided with necks passing through said annular space and provided at their outer ends with transverse trunnions movable in said annular chamber, and inlet and exhaust ports communicating with said central circular chamber.

2. In a rotary engine or pump, a casing provided with a central circular chamber, an annular chamber inclosing the central circular chamber, and in communication therewith by an annular passage, a shaft passing eccentrically through said central circular chamber and provided with radial arms, slidably movable piston blades mounted in said arms and provided with necks passing through said annular space and provided at their outer ends with transverse trunnions movable in said annular chamber, and inlet and exhaust ports communicating with said central circular chamber, the walls of the said central circular chamber being provided between said chamber and the annular chamber with annular grooves separated by said annular space and curved plate springs mounted in said grooves and connected with the necks of said piston blades.

3. In a rotary engine or pump, a casing provided with a central circular chamber, an annular chamber inclosing the central circular chamber and in communication therewith by an annular passage, a shaft passing eccentrically through said central circular chamber and provided with radial arms, slidably movable piston blades mounted in said arms and provided with necks passing through said annular space and provided at their outer ends with transverse trunnions movable in said annular chamber, and inlet and exhaust ports communicating with said central circular chamber, the walls of the said central circular chamber being provided between said chamber and the annular chamber with annular grooves separated by said annular space and curved plate springs mounted in said grooves and connected with the necks of said piston blades, said journals being also provided with anti-frictional sleeves.

4. In a rotary engine, a circular casing provided with a central circular chamber, an annular chamber inclosing the central circular chamber and in communication therewith by means of an annular space, a shaft passing eccentrically through said central circular chamber, and provided with radial arms, slidably movable piston blades mounted in said arms and provided with necks which pass through said annular space, said necks being provided with transverse trunnions movable in said annular chamber and inlet and exhaust ports or passages communicating with said central circular chamber through one side of the casing, said side of the casing being provided at its inner face with oppositely directed grooves or recesses which communicate with said ports or passages.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 29th day of July 1909.

FRANKLIN TOMPKINS.

Witnesses:

H. R. CANFIELD,
C. E. MULREANY.