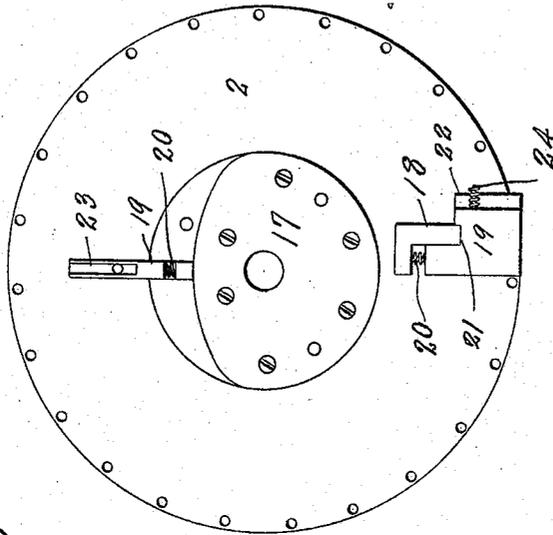


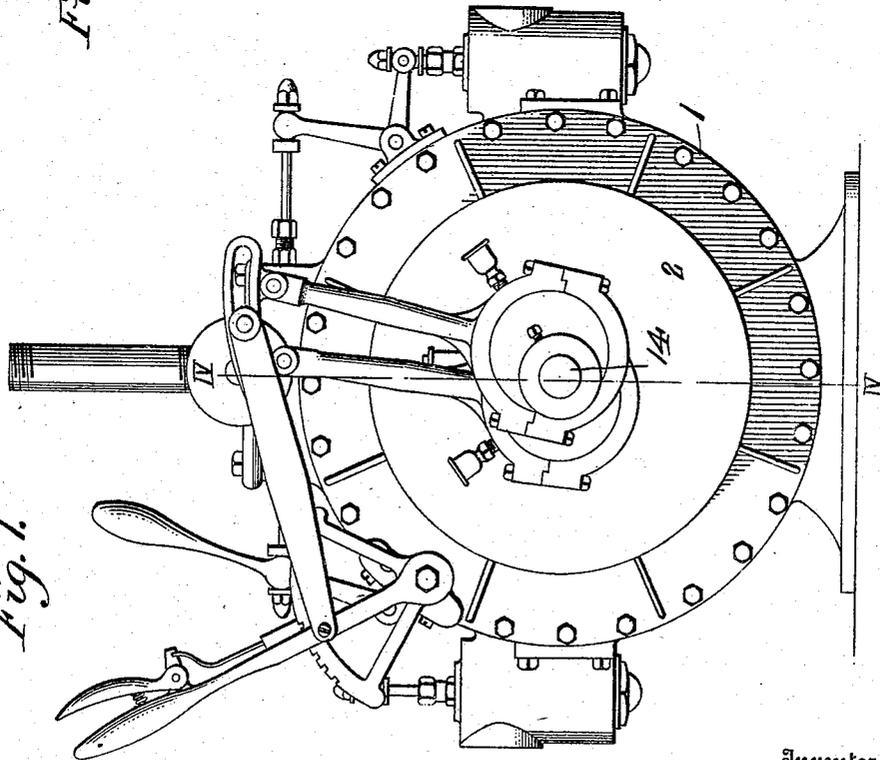
C. G. CONN.  
 ROTARY MACHINE,  
 APPLICATION FILED FEB. 18, 1908.

931,038.

Patented Aug. 17, 1909.  
 3 SHEETS—SHEET 1.



*Fig. 7.*



*Fig. 1.*

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Witnesses

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*A. C. Knight.*

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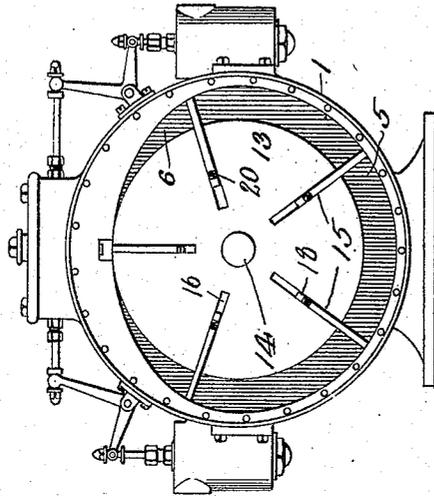
C. G. CONN.  
 ROTARY MACHINE,  
 APPLICATION FILED FEB. 13, 1908.

931,038.

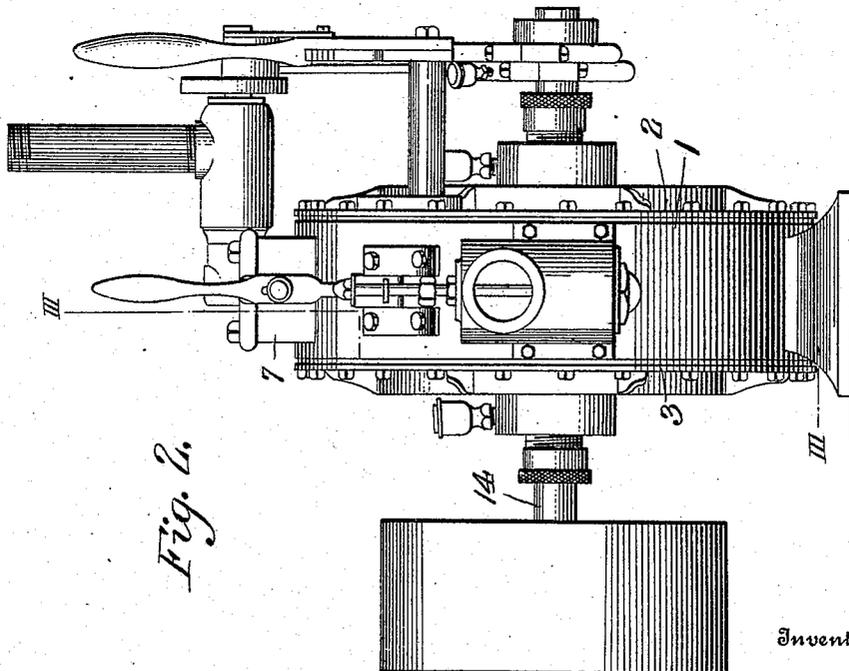
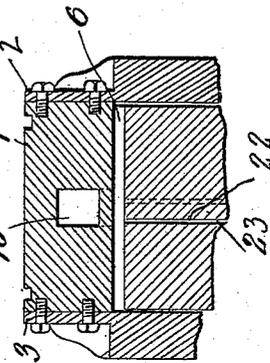
Patented Aug. 17, 1909.

3 SHEETS—SHEET 2.

*Fig. 6.*



*Fig. 5.*



*Fig. 2.*

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931,038.

Patented Aug. 17, 1909.  
 3 SHEETS—SHEET 3.

Fig. 4.

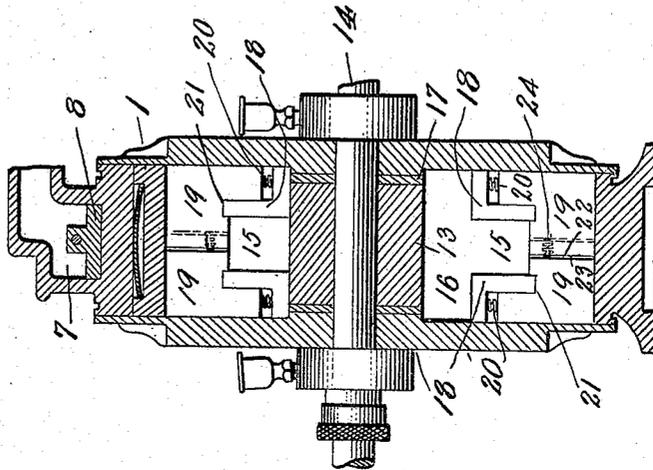
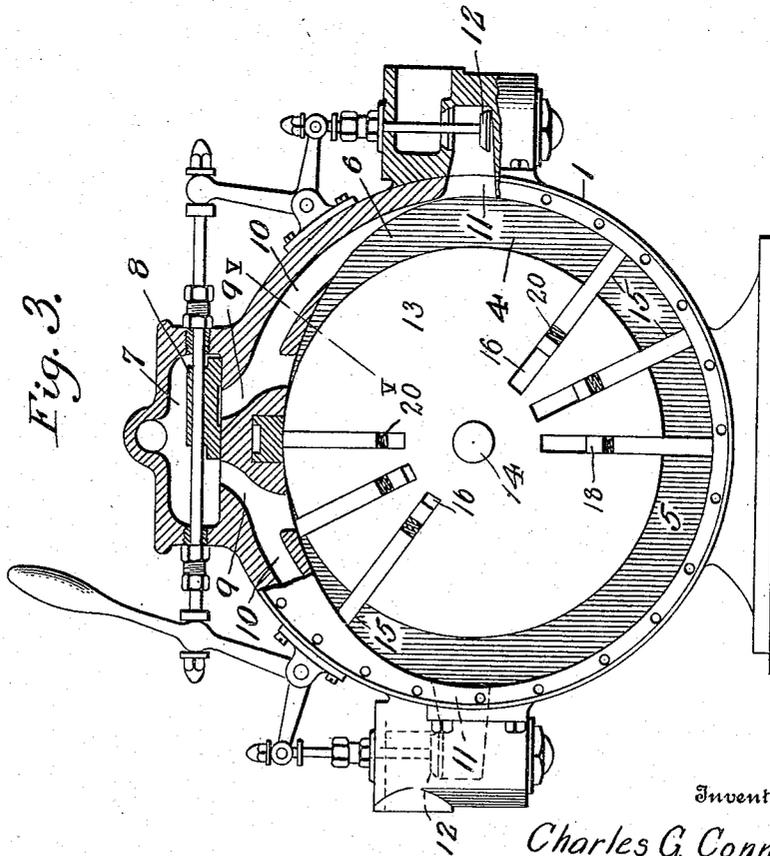


Fig. 3.



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# UNITED STATES PATENT OFFICE.

CHARLES G. CONN, OF ELKHART, INDIANA.

## ROTARY MACHINE.

No. 931,038.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed February 13, 1908. Serial No. 415,711.

*To all whom it may concern:*

Be it known that I, CHARLES G. CONN, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Rotary Machines, of which the following is a specification.

My invention relates to rotary machines and has for its general object to provide improvements in that type of rotary machines forming the subject-matter of U. S. Letters Patent No. 825,374, granted to Cornelius A. Black, July 10, 1906.

In the drawings forming a part of this specification, two embodiments of my invention are shown.

Figures 1, 2, 3, 4, 5 and 7 of the drawings, show the invention as applied to a rotary steam engine; while Fig. 6 shows my invention adapted to the needs of a rotary air compressor.

One of the objects of this invention is to provide means whereby a rotary engine may be adapted for efficient running at high speeds and under a high pressure of steam. In the engine forming the subject-matter of the above referred to Letters Patent, difficulty was experienced under high pressure and speeds, resulting in an inefficient running of the engine due to the leakage of steam around the piston-heads. This difficulty, I have obviated by replacing each piston-head by a group of two or more piston-heads as circumstances required so as to provide packing spaces between the adjacent piston-heads of each group.

Another object of this invention is to provide means whereby that portion of the waste steam which has been carried past the exhaust pipe, may be conveyed back to the exhaust; while at the same time the open groove-like passages disclosed in the patent to Black—referred to above, may be done away with to obviate an injurious grooving of the piston-heads resulting from a constant wear of the heads over said grooves.

Another object of my invention is to obviate the use of springs for sustaining the weight of the piston-heads and of the steam passages, disclosed in the patent to Cornelius A. Black referred to above, whereby steam was admitted into the chambers to force the piston-heads out against the cylindrical walls of the casing to make a steam-tight joint. This object is attained by means of guide-cams to be described hereafter.

Other and further objects will appear from the following specification, as illustrated in the drawings forming a part thereof.

In the drawings, Figure 1 is a side elevation of a rotary engine embodying the features of my invention; Fig. 2 is an end elevation of the same; Fig. 3 is a vertical section on the line III—III, Fig. 2; Fig. 4 is a vertical section on the line IV—IV, Fig. 1; Fig. 5 is an enlarged detail section of the elliptical head on the line V—V, Fig. 3; Fig. 6 is a side view of another embodiment with the cylinder-head removed showing my invention as applied to a rotary air compressor; and Fig. 7 is an inside elevation of a casing cover upon its removal from the engine shown in Fig. 3.

Referring to the drawings in which similar reference characters refer to the same parts throughout the several views, the cylindrical casing 1, provided with cylinder heads 2 and 3, incloses a piston chamber 4 provided with a lower circular portion 5 and an upper elliptical portion 6. Mounted above the elliptical head 6, is a steam chest 7 within which a throttling valve 8 may be operated to admit steam into the cylinder by way of ports 9, 9. Arranged wholly within the walls of the elliptical head 6 are provided relief passages 10, 10, each of which connects at one end with one of the ports 9, and at the other end with the piston chamber in close proximity to the exhaust pipe.

Adjacent to the points where the cylindrical and elliptical portions of the casing merge, are placed exhaust ports 11, 11 (seen best in Fig. 3) controlled by valves 12, 12.

Referring now to Figs. 3 and 4, the rotor comprises a cylindrical piston 13 keyed to a shaft 14 and provided with radially extending piston-heads 15 arranged in groups. In the embodiment illustrated in these figures the piston-heads have been arranged in groups of three but as will appear from the description to follow, these heads may be arranged in groups of two or four or any other number demanded by the requirements of very high speeds and pressures, without departing from the spirit of my invention. To adapt the piston-heads 15 to move in and out of the rotary piston, said heads 15 are slidably mounted in radially slotted recesses 16 in said rotary piston.

Referring more particularly to Figs. 4, 5 and 7, the inside faces of the casing covers

will be seen to have been each provided with a track cam 17. These cams may be either attached or cast solid with the casing covers. To economize the use of steam and to simplify the construction of the piston-heads, said piston-heads are made in two parts 19, 19 which are provided on adjoining edges with the tongue 22 and groove 23 by means of which they are joined. Between the parts 19, 19 and seated within suitable cavities in the edges thereof, is inserted a spring 24 whose function is to exert a pressure tending to force the parts 19, 19 yieldingly outward against the side walls of the piston casing. Connected with each of the parts 19, 19 is a foot or leg 18, one end of which seats within a recess 21 in said part, and the other end of which is adapted to slide upon the cam-track 17 to control the inward and outward movement of each of said piston-head parts. A yielding pressure is created between the piston-heads 19 and the cylindrical wall of the casing by means of small springs 20 inserted between the feet 18 and parts 19. While I have shown the piston-heads constructed in two parts, this is only the preferred form of this part of my invention.

By particular reference now to Fig. 3, the function of the relief passages 10 will be evident. As the rapidly moving piston-heads pass the exhaust port 11, the steam on the live-pressure side thereof is only partially exhausted. When, however, the piston-head reaches the second exhaust port (admission port for the reverse rotation) the exhaust of the steam is completed.

In Fig. 6 of the drawings, a modification of my invention is shown in which the piston-heads have been positioned equidistantly around the drum of the rotary piston. While in this embodiment, my invention has been shown as adapted particularly to the requirements of a rotary air compressor, it is very evident that it may be used equally well as a steam engine by providing the steam supply pipe and throttling valve therefor. As a matter of fact the operation of a compressor being exactly the reverse of that of a steam engine, it will be obvious that the essence of my invention as disclosed in the foregoing specification may be embodied with equal advantage in a pump or a prime mover.

The adjustment of the shaft 14 of the rotor within its casing is accomplished in the manner described in the Letters Patent above referred to.

The link mechanisms for operating the several valves does not form a part of the subject-matter of this invention so that a description of the same has not been embodied in the specification.

Having thus described my invention, what

I claim and desire to secure by Letters Patent is:—

1. In a rotary machine, the combination with an engine casing; of a rotor mounted therein; piston-heads arranged in groups in said piston, each of said piston-heads being adapted to slide independently of the others; means for constantly forcing each of said piston-heads outward against the walls of the casing, the grouping of said piston-heads being such that only one piston-head in each group is subjected to the expansive action of the steam.

2. In a rotary machine, the combination with a cylindrical casing; of a circular piston having opposite groups of piston-head chambers therein, the angular space between the outer chambers of each group being less than the angular space between the groups; a pair of oppositely arranged exhaust ports in the cylindrical wall of said casing; piston heads slidably mounted in the chambers in the piston; and means connected with each piston-head whereby it is subjected to a continuous pressure outward during its revolution in such manner as to cause only one piston-head of each group to be exposed to the expansive action of the steam during the pressure part of the stroke.

3. In a rotary machine, the combination with the cylindrical casing having diametrically-opposed exhaust ports in the cylindrical wall thereof; of a rotor mounted in said casing; radially movable piston-heads mounted in groups in said rotor, the angular space covered by each group being less than the angular space between adjacent groups; means connected with each piston-head whereby it is forced resiliently outward against the cylindrical wall of the casing independently of the others whereby only one piston-head of each group is subjected to the expansive force of the steam during that portion of the pressure stroke between said exhaust ports.

4. In a rotary machine, the combination of an engine casing comprising a circular portion and a non-circular portion, a rotor mounted centrally with respect to said circular portion and provided with radially movable piston-heads arranged in groups and adapted to be held constantly in contact with the walls of the engine casing; a cam-track adapted to engage the inner ends of said piston-heads to adjust them during their revolution and means for cushioning said piston-heads with steam during the pressure part of the stroke.

The foregoing specification signed at Elkhart, Ind., this 31st day of January, 1908.

CHARLES G. CONN.

In presence of two witnesses—

W. J. GROVERT,  
GERTRUDE STREGO.