J. F. CESARIO.

ROTARY MOTOR.

APPLICATION FILED MAR. 25, 1911.

1,017,850.

Patented Feb. 20, 1912.

2 SHEETS—SHEET 1.

Fig. 2.

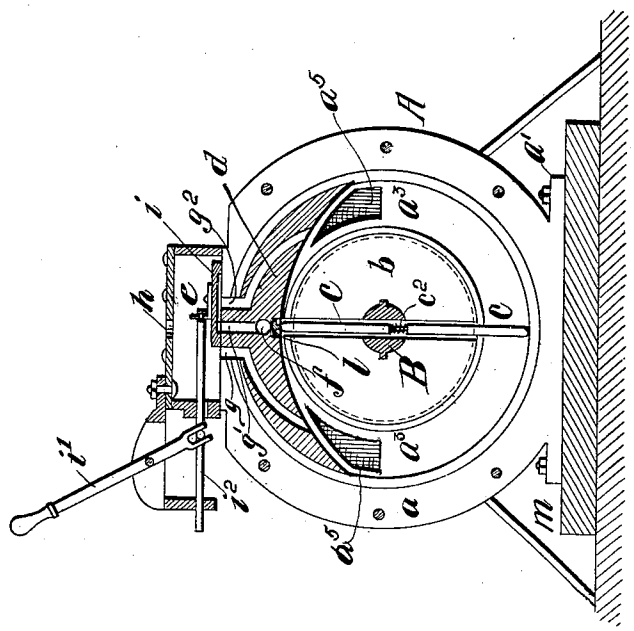
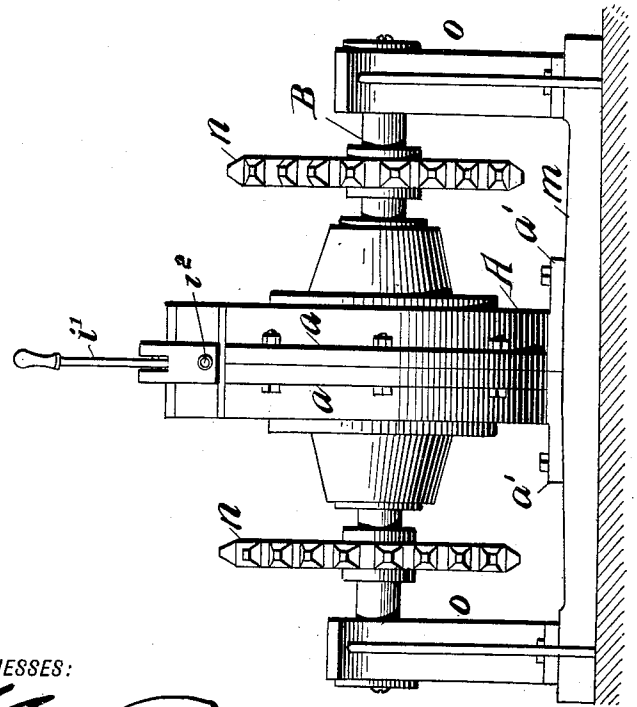


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 4.

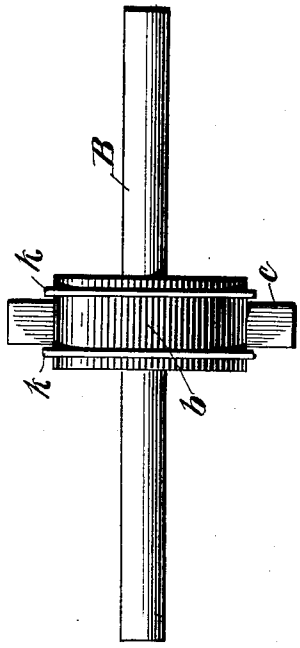


Fig. 6.

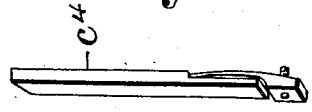


Fig. 3.

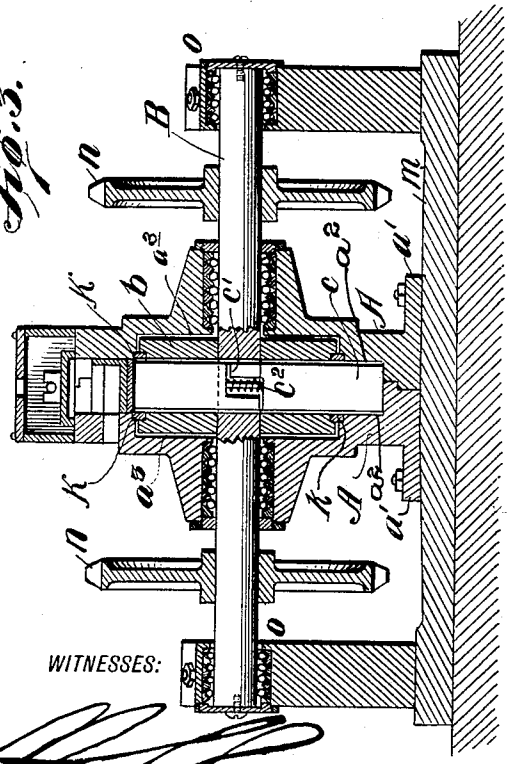
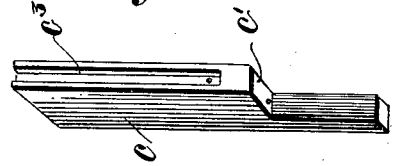


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN FRANKLIN CESARIO, OF BOGALUSA, LOUISIANA.

ROTARY MOTOR.

1,017,850. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed March 25, 1911. Serial No. 616,806.

To all whom it may concern:

Be it known that I, JOHN F. CESARIO, a citizen of the United States, residing at Bogalusa, in the parish of Washington and State of Louisiana, have invented certain new and useful Improvements in Rotary Motors, of which the following is a specification.

My invention relates to motors, and has particular relation to devices of this character in which the motive fluid acts to provide a rotatory movement to a shaft or other driven member in either direction at will.

The principal object of my invention is to provide a device in which the motive fluid (steam, air, water, etc.) is controllably introduced into a cylindrical chamber in which it acts to drive the blades carried by a member to rotate the latter, the parts being arranged to prevent the formation of dead centers, to permit the blades to have their projecting and retracting movements substantially free from pressure, and which can be manufactured at a relatively low cost, requires a minimum number of parts, which is simple and efficient in operation and durable in construction.

To these and other ends, the nature of which will be readily understood as the invention is hereinafter disclosed, my invention consists in the improved construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim.

In the drawings: Figure 1 is a side elevation of a motor constructed in accordance with my invention. Fig. 2 is a central cross-sectional view of the same, some of the parts being shown in elevation. Fig. 3 is a central longitudinal sectional view. Fig. 4 is a detail view of the piston. Figs. 5 and 6 are detail views respectively of one of the blades and its packing.

A designates the cylinder in the form of a casing formed of two complemental parts somewhat dish-shaped in appearance, each having flanges a for connecting the members together and flanges a' by means of which the casing is secured to a suitable base m. Each member or section of the casing is provided with a central opening arranged axially for the passage of a shaft B, and is also recessed annularly with respect to such axial opening, the recessed portion being of substantially two different depths, the portion of greatest depth surrounding the opening and the portion of less depth surrounding the first-named recessed portion. These recessed portions, indicated as a^2 and a^3, respectively, serve to receive a piston or blade carrier b mounted on the shaft (the carrier b being positioned within the opposing recessed portions a^3,) while the opposing recessed portions a^2 serve as a fluid space or blade race-way and within which the motive fluid moves to operate the motor.

Located within the upper portion of the recessed portions a^2 is a member d, the outer face of which substantially fits the interior of the casing at this point, and having its inner face extending on a curved line of considerably greater radius than the radius of the outer face, the member being somewhat crescent-shaped, and having a radial thickness centrally of the member, substantially equal to the radial length of the fluid space, said inner face of the member extending to and intersecting the curved periphery of said fluid space. The member d is preferably formed with three ports g, g' and g^2 having their outer ends opening into a valve-chest e, the port g' leading to a laterally extending exhaust port f which preferably extends to the atmosphere through the casing, while the ports g and g^2 lead inwardly, preferably on curved lines, to opposite sides of the fluid space. The ports g and g^2 act either as inlet or exhaust ports to the fluid space according to which side of said space the fluid is entering.

To control the admission and exhaust of the fluid to and from the fluid space, I provide the chest e with a fluid inlet port h, and within the casing mount a reciprocatory valve i operated by a lever i' mounted without the chest, the lever being connected to the valve by a suitable connection i^2. The under face of the valve e is undercut a distance sufficient to embrace the three ports g, g' and g^2 when the valve is in an intermediate position, the valve in this position, entirely cutting off the supply of fluid to the ports and to the fluid space, and at the same time opening both ports g and g^2 (which communicate directly with the fluid space) to the exhaust port f and releasing all pressure from such space.

The member b is rotated by means of blades or pistons c mounted in a diametrical passage formed in the member b, said blades

being preferably formed as shown in Fig. 5, having their inner ends cut away, as at c' to permit them to overlap, said parts being preferably held separated by a spring or springs c^2, the function of the latter being to retain the outer edges of the blades in contact with the outer periphery of the fluid space. The opposite edges of the blades c are preferably recessed, as at c^3 for the reception of suitable packing c^4, such as illustrated in Fig. 6, this packing taking up for wear, etc., during the operation of the motor. The periphery of the member b is also preferably provided with rings k which act as packing to prevent the escape of the fluid from the fluid space. As will be seen, the blades c act to form chambers within the fluid space, and the entrance of the fluid into a chamber acts to force the blade which forms the advance end of the chamber forwardly. For instance, with the arrangement of parts shown in Fig. 2, the fluid will enter the fluid space on the left through the port g, causing the blades c to move counterclockwise, the lower blade forcing the fluid which may be in advance thereof toward and into the port g^2 (which is acting as the exhaust port) and into port g' from where it passes to the atmosphere through port f. This movement of the blades will bring the upper blade into position to intersect the outlet end of port g and partially cut off the fluid (the curvature of the inner face of member d and the port g being such that the area of said end of the port is greater than the area of the end of the blade) but not sufficient to entirely cut off the supply. To prevent any bad effects from this cutting off of the supply at this time, I preferably provide the bottoms of the recessed portions a^2 with shallow depressions a^5, said depressions a^5 having their peripheral walls spaced from but substantially following the contour of the walls of the members b and d and the periphery of the fluid space, one of said depressions a^5 being located at each end of the member d in each of the casing sections, so that there is provided opposite depressions a^5 adjacent the ports g and g^2, which, depressions, however, do not communicate directly with said ports. As said depressions a^5 extend beyond the ports in opposite directions and are of greater length than the thickness of the blades c, said depressions a^5 will provide communication to opposite sides of the blade, and since each blade passes a considerable distance over the depressions a^5 before it passes into position over the inlet port, it will be manifest that fluid will pass from the space in advance of the blade around the blade through the depressions a^5 into what may be termed a pressure-balancing chamber, before the blade reaches a position where it receives the impact of the entering fluid directly, so that all liability of back pressure from the fluid in advance of the blade is avoided with the result that dead centers cannot be formed.

This particular arrangement of the depressions or by-passes a^5 serve another function in that they permit the blades c to have their radial movement with extreme freedom, a result especially desirable where they ride on the inner face of member d. This result is due to the fact that during the major portion of such radial movement the fluid pressure on opposite sides of the blade is (owing to the free communication through the permanently-open depressions a^5) substantially balanced, both on the inlet and exhaust side of the fluid space, thereby permitting the springs c^2 to exert their pressure to retain the blade in contact with member d, this substantial balancing of the pressures leaving the blades free from a facial pressure which would cause the blade to frictionally engage the walls of the member b. To prevent the passage of the fluid, I preferably employ suitable packing i which serves to prevent the leakage of fluid from exhaust to inlet side of the fluid space. As will be readily understood, a shifting of the valve e so as to uncover port g^2 to the entering fluid will cause a reverse movement of the member b, the exhaust then passing through port g; when the valve is at an intermediate position, both ports g and g^2 are open to the exhaust, thereby entirely eliminating the pressure with the fluid space.

To permit a free movement of the parts I preferably mount the shaft in anti-friction bearings both in the casing sections and in the supports o, as shown in Fig. 3. To enable the shaft to be connected up to this work, I preferably provide a pulley or sprocket wheel n on each side of the casing, as shown.

The motor herein disclosed will, as will be readily understood operate in connection with any desired motive fluid, such as steam, air, water, etc., the particular arrangement of parts being such that it will operate efficiently irrespective of the particular kind of fluid employed, the minimum number of parts aiding in permitting this result.

While I have herein disclosed one form in which my invention may be carried out, it is understood that variations in structure may be required to meet the exigencies of use, and I desire it to be understood that I reserve the right to use any and all modifications thereof as may be required, in so far as such modifications may fall within the spirit and scope of the invention as expressed in the following claim.

Having thus described my invention, what I claim as new is:

In a fluid engine, a casing having an annular recess centrally therein and also an annular raceway concentric thereto of

greater diameter than the same, a rotary shaft passed transversely through the casing at the center of the recess and having a slot opening through opposite sides thereof for alinement with the raceway, a circular blade carrier fixed to the shaft and substantially occupying the entire space of the recess, the said carrier being provided with a guide passage in alinement with the slot in the shaft and opening through the periphery of the carrier at opposite sides thereof, pressure blades slidable in said guide passage and having recessed overlapped inner ends engaged in the slot in the shaft, expansion means located between the overlapped inner ends of said blades for projecting the outer ends thereof in the raceway, the said blades being provided with channeled longitudinal side edges, spring acting packing strips arranged in the said channels and engaging the walls of the guide passage adjacent thereto, a cam enlargement formed at a point in the raceway to provide radial movements to the blades, the said casing being provided with by-passes near the ends of said enlargement and opening into the raceway, and means for admitting driving fluid to one side of the axis of movement of the blades and also for exhausting said fluid at the opposite of the axis of movement of the latter.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JOHN FRANKLIN CESARIO.

Witnesses:
CHRIS. L. OLIVIER,
E. F. WEBB.