Nov. 16, 1926. 1,607,180

F. C. STORV

REVERSIBLE ROTARY MOTOR

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Fig. 1.

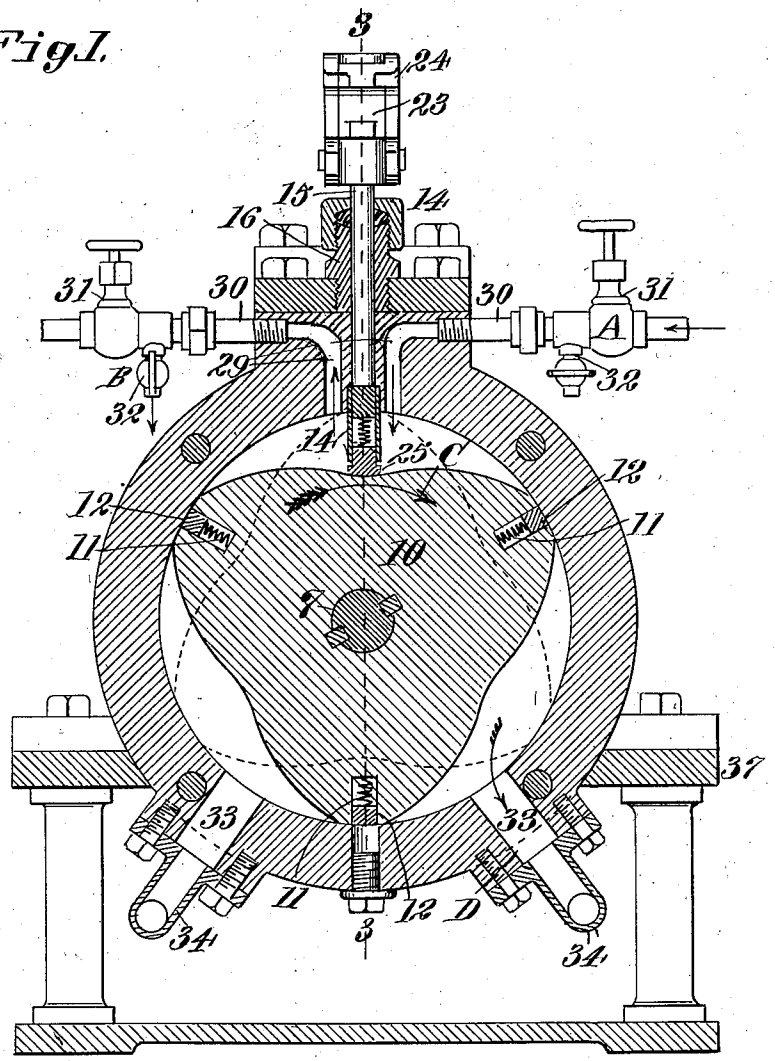
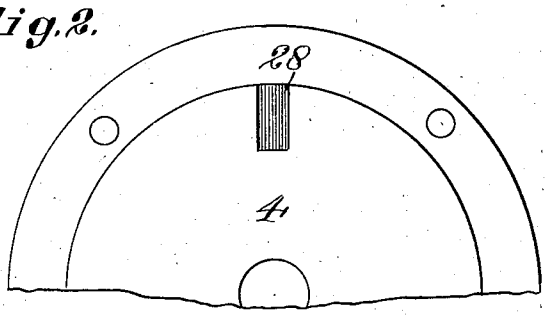


Fig. 2.



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Fig. 3.

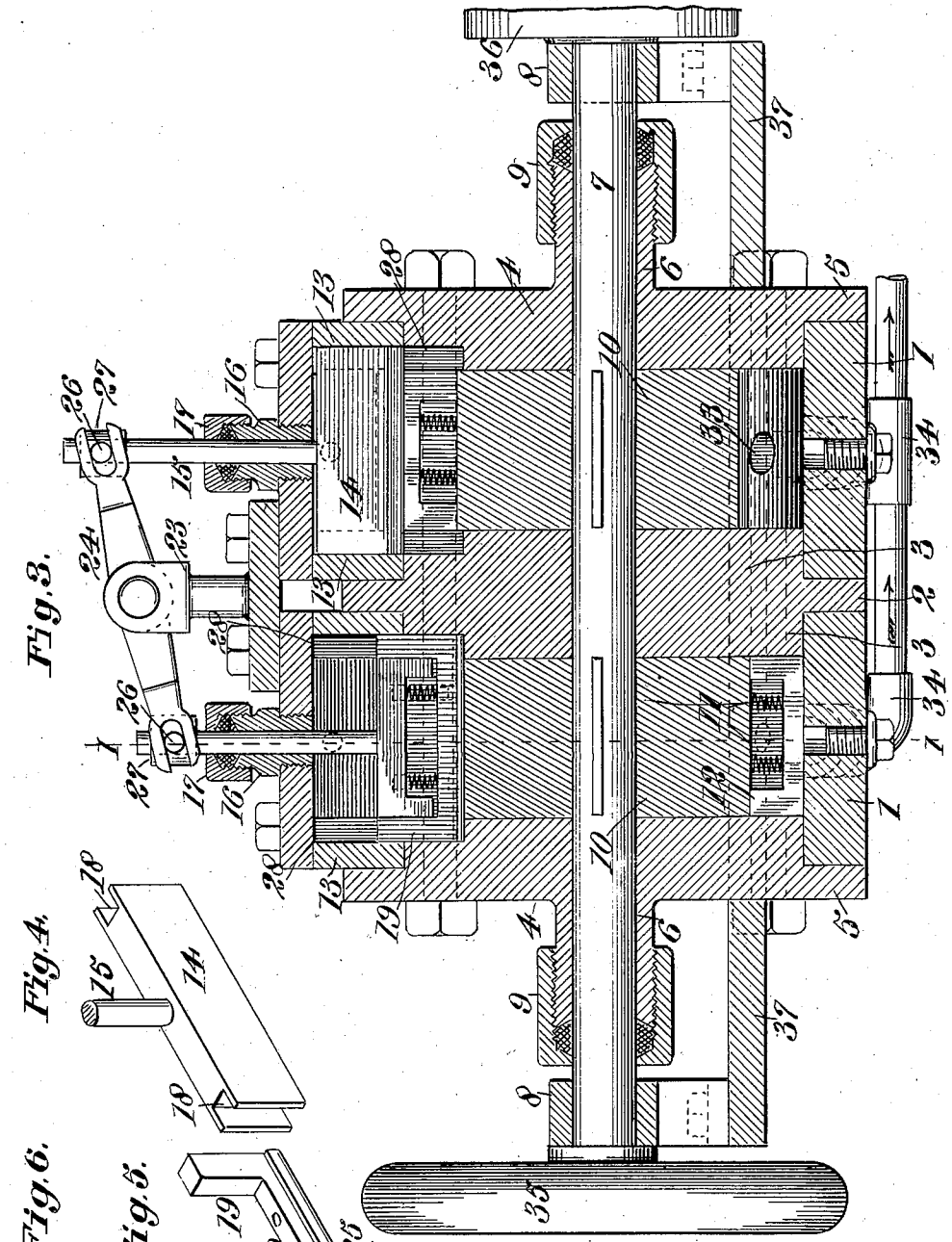


Fig. 4.

Fig. 6.

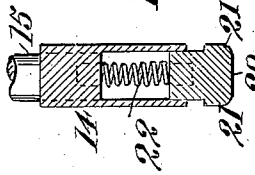
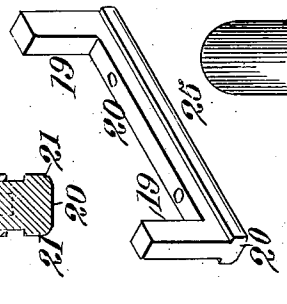


Fig. 5.



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UNITED STATES PATENT OFFICE.

FELIX C. STORV, OF SAN FRANCISCO, CALIFORNIA.

REVERSIBLE ROTARY MOTOR.

Application filed March 25, 1926. Serial No. 97,177.

The present invention relates to a reversible rotary motor, and has for its objects to provide one of the twin cylinder type wherein the maximum power is developed by the application of a minimum amount of expansible fluid under pressure.

A further object is to provide a motor which is capable of developing the same power regardless of the direction of its rotary movement, and to further provide a motor wherein relative contact is maintained between the abutment and rotor surface and the rotor surface and cylinder walls.

Further objects will be apparent from the disclosure in the following specification wherein is illustrated one embodiment of my invention, it being understood that various changes and modifications thereof may be made in accordance with the scope of the appended claim.

To more fully comprehend the invention reference is directed to the accompanying drawings, wherein

Fig. 1 is a view in vertical section through one of the cylinders of my improved motor taken on line 1—1 of Fig. 3.

Fig. 2 is a view in end elevation of one of the cylinder end plates illustrating particularly the abutment groove therein.

Fig. 3 is a longitudinal sectional view taken on line 3—3 of the embodiment of motor illustrated in Fig. 1.

Fig. 4 is a view in perspective of one of the abutment bodies.

Fig. 5 is a view in perspective of one of the abutment shoes, and

Fig. 6 is a view in vertical section of one of the assembled abutment bodies and shoes illustrating the location of the spring interposed between the same.

In the drawings, wherein corresponding parts are indicated by like characters of reference, throughout the several views, 1 represents the cylinder shells preferably annular in end elevation. These shells are arranged in substantially end to end relation, being separated by a cylinder center plate 2 formed on its opposite faces with recesses 3 in which are received the opposite edges of the adjacent shells 1. The opposite ends of the shells 1 are closed by cylinder end plates 4 flanged at 5 to be received within the opposite ends of the shells. The end and center plates are provided with aligned openings 6 in which are received a rotor shaft 7, the same being supported at its ends in bearings 8, stuffing boxes 9 surrounding the shaft at its point of extension through end plates 4.

Keyed to the shaft and positioned one within each shell between the center and end walls 2 and 4 is a rotor 10, substantially triangular in end elevation with the peaks of the triangles contacting with the inner surface of the shells 1, and the peaks of the triangles of adjacent rotors being opposite from each other approximately thirty degrees. In each peak of the respective rotors forced outwardly by the respective springs 11 are packing bars 12 contacting with the inner face of the respective shells to prevent leakage at this point.

Each shell at its upper end is provided with a boss and upwardly and centrally through the same the bosses are vertically slotted as at 13 to receive the body 14 of an abutment reciprocably mounted therein. Each abutment body is provided with a stem 15 operating through a guide 16 and stuffing box 17. The abutment bodies at their ends and under surface are channeled at 18 and within the same are received end members 19 and base 20 of a substantially rectangular abutment shoe 25, the under surface of which is rounded at 21, and is adapted to ride on the peripheral surface of the rotor 10. Springs 22 between the abutment body and shoe afford yielding movement between the same and maintain the shoe surface in contact with the rotor periphery at all times. Pivotally mounted to a bracket 23 preferably on top of the motor structure is a lever 24, the bifurcated forked ends of which project on opposite sides of the stems 15 and receive the pins 26 on collars 27 secured to the stems. It will be observed that the uniting of the abutment stems by the lever 24 and the relative positioning of the rotors as in full and dotted lines, Fig. 1, causes the abutments to closely follow the contour lines of their peripheries and the spring held shoes on the respective abutment bodies will compensate for the difference between the respective strokes of the abutment and will at all times maintain the abutment edges in contact with the rotor peripheries. The end and center plates 2 and 4 are provided with guide channels 28 for receiving the end members 19 of the abutment shoe as in Fig. 3 and affording guides for insuring the movement of the same in a predetermined path. On each side of the respective abutments in said cylinders are

formed the ports 29 each communicating with the interior of the cylinders for the admission of an expansible fluid under pressure, and with the outer end of each port connects a tubular member 30, the supply of expansible fluid under pressure thereinto being controlled by a valve 31. The tubular member 30 between the valve 31 and the point of entrance of the port 28 into the cylinder is provided with a controllable vent valve 32.

The base of each cylinder is preferably provided with a vent opening 33, said openings being provided one on each side of the abutment and at a point removed approximately 67½ degrees from the port 29 on the corresponding side of the abutment. The vents 33 preferably lead to the atmosphere through tubular hoods 34.

A fly wheel 35 is illustrated as being mounted at one end of shaft 7, and at its opposite end the shaft preferably carries a power wheel 36. A frame 37 affords a support for the motor.

The parts being assembled, as in the drawing, and the valve 31 marked A being open and the vent valve 32 marked "B" being open with the other valve 31 and vent valve 32 remaining closed, the expansible fluid under pressure will pass into the cylinder through the port 29 associated with valve A and extend between the abutment and one peak of the rotor 10, causing its rotation in the direction of the arrow C, Fig. 1. The action of the expansible fluid under pressure acts on the rotor until the successive peaks pass the vent 33 marked D when the fluid discharges to the atmosphere. The air compressed by the successive peaks of the triangles of the rotors approaching the opposite side of the abutment from that at which the valve A is located is vented through vent valve 32 marked B. It will be observed that, by offsetting the peaks of the rotors as indicated in full and dotted lines, Fig. 1, an overlapping of power strokes is obtained and that the abutments are automatically reciprocated due to their connection by the lever 24.

To reverse the operation of the engine, it is only necessary to close the valves A and B and to open the respective valves associated therewith which have heretofore remained closed, and when this operation takes place, the shaft 7 will operate in a direction reverse to that indicated by the arrow C, Fig. 1 of the drawings.

I claim:—

A reversible rotary motor including a pair of cylinders, a rotor in each, a shaft extending through the cylinders and common to the rotors, each of said rotors being substantially triangular in plan and arranged and keyed to the shaft with the peaks offset approximately thirty degrees, an abutment reciprocably mounted in each cylinder to ride on the periphery of the rotor, a pivotally mounted lever connecting the abutments, each cylinder provided at opposite sides of and in close proximity to said abutments with a valve controlled port for the admission of an expansible fluid under pressure, said cylinders being each further provided with a pair of vents located one on either side of the abutments, each at approximately sixty-seven and a half degrees from one of said ports, and a controllable vent valve within each admission port between its point of entering the cylinder and its control valve.

In testimony whereof I have signed my name to this specification.

FELIX C. STORV