W. J. MORRISON.

FLUID MOTOR.

APPLICATION FILED MAR. 27, 1909.

955,896.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

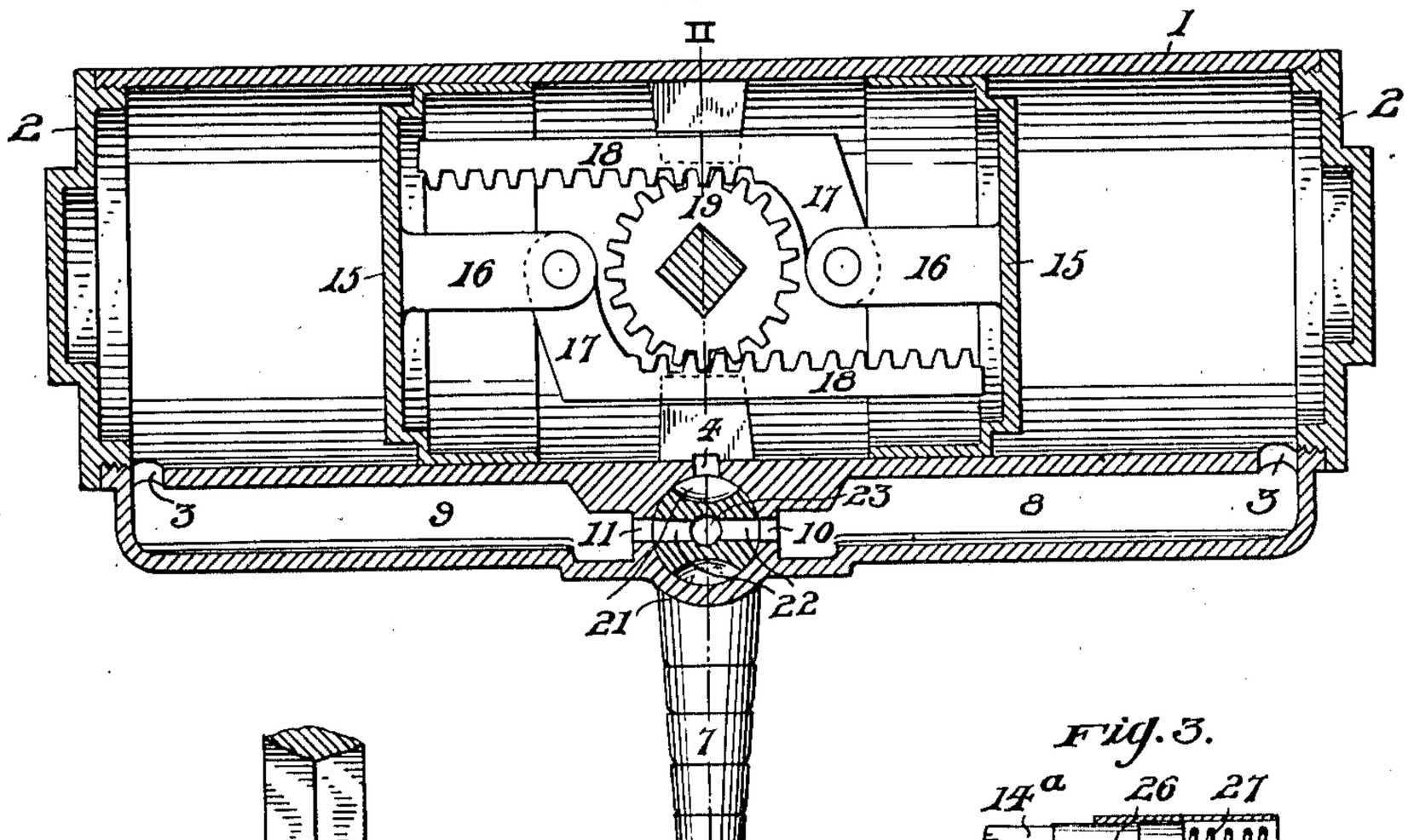


Fig. 2.

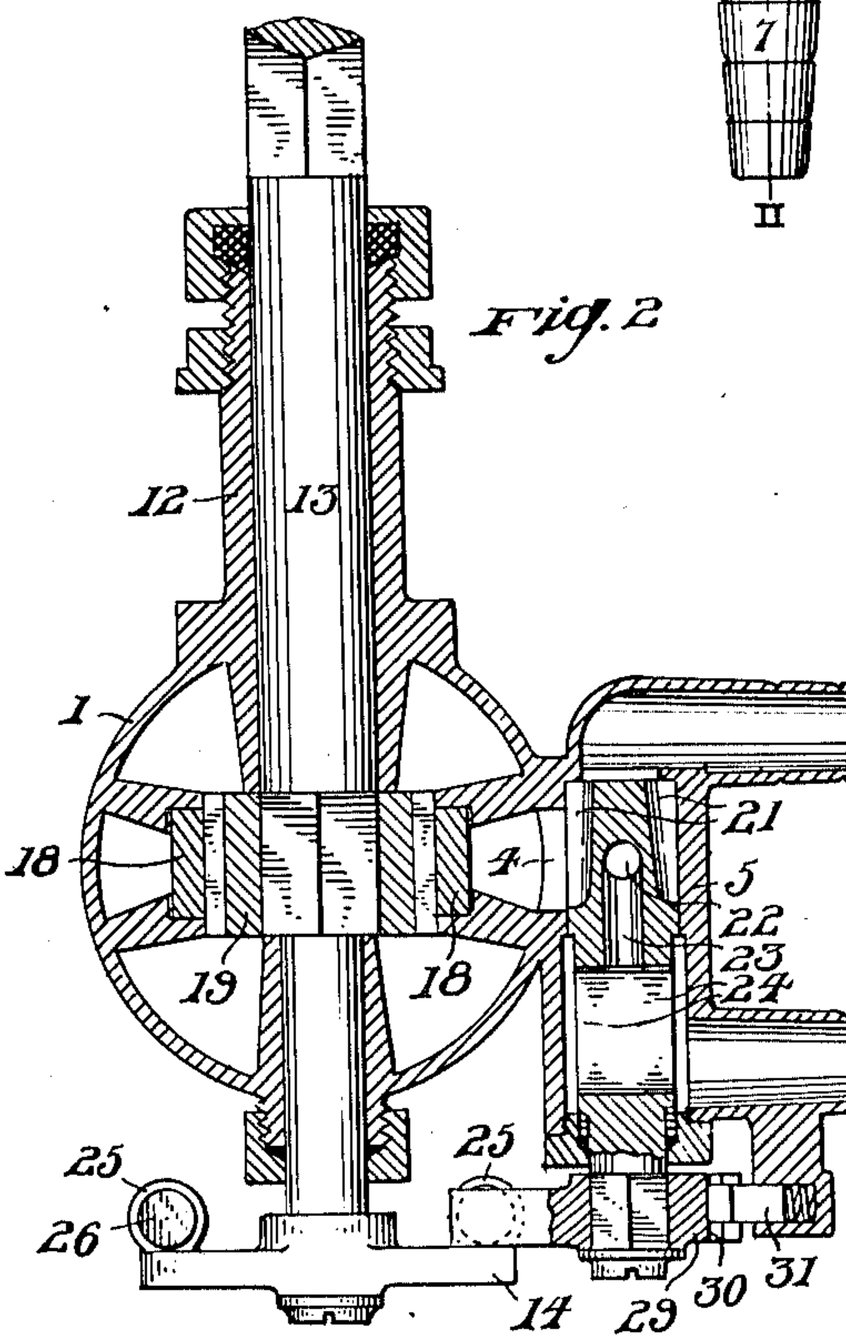


Fig. 3.

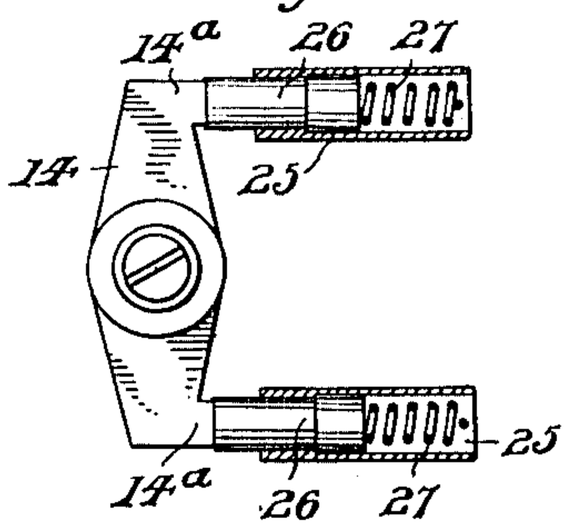
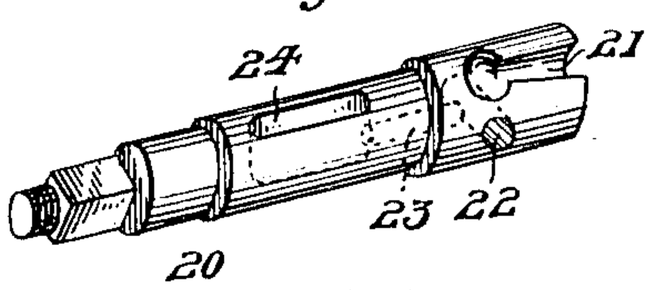


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

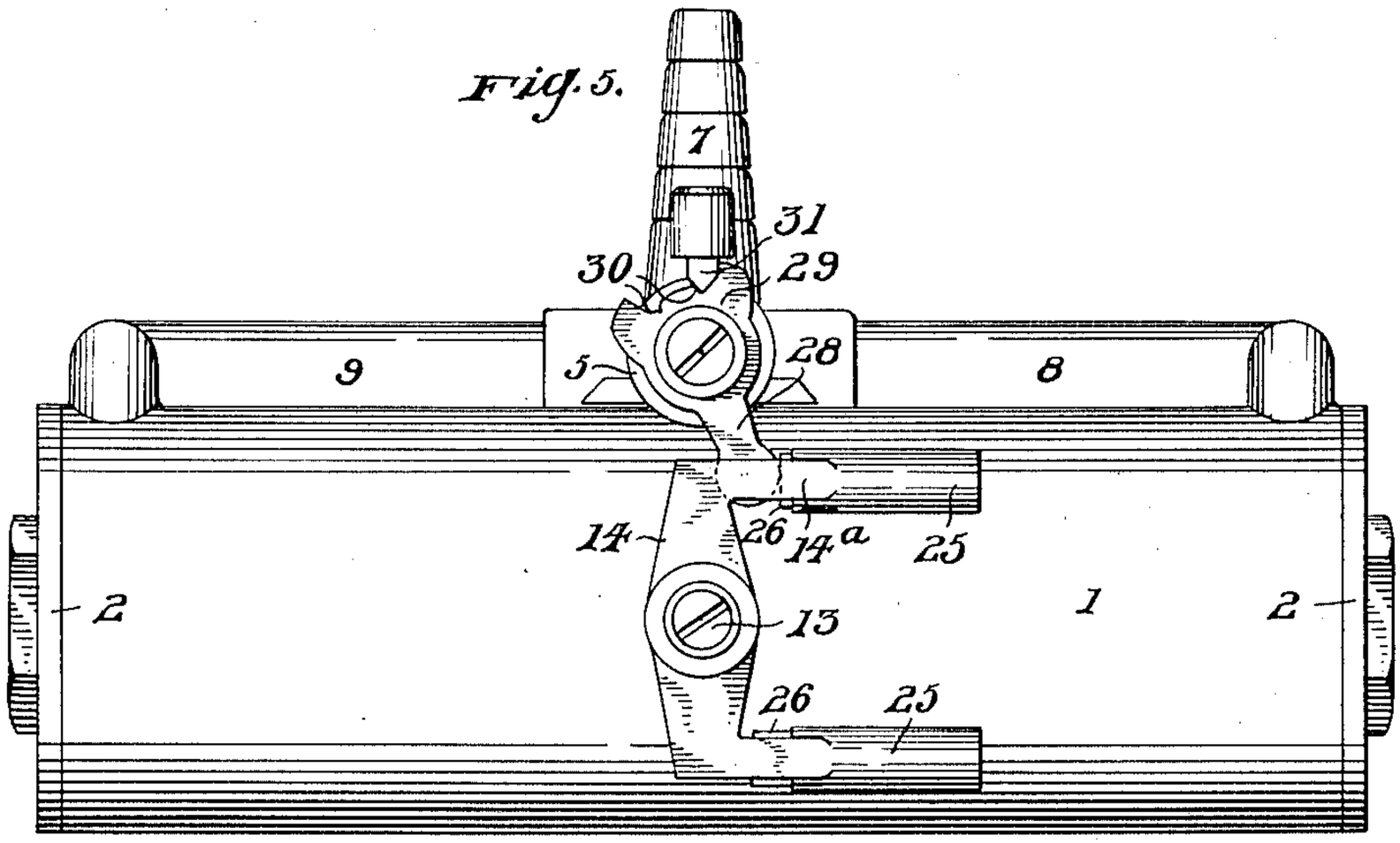
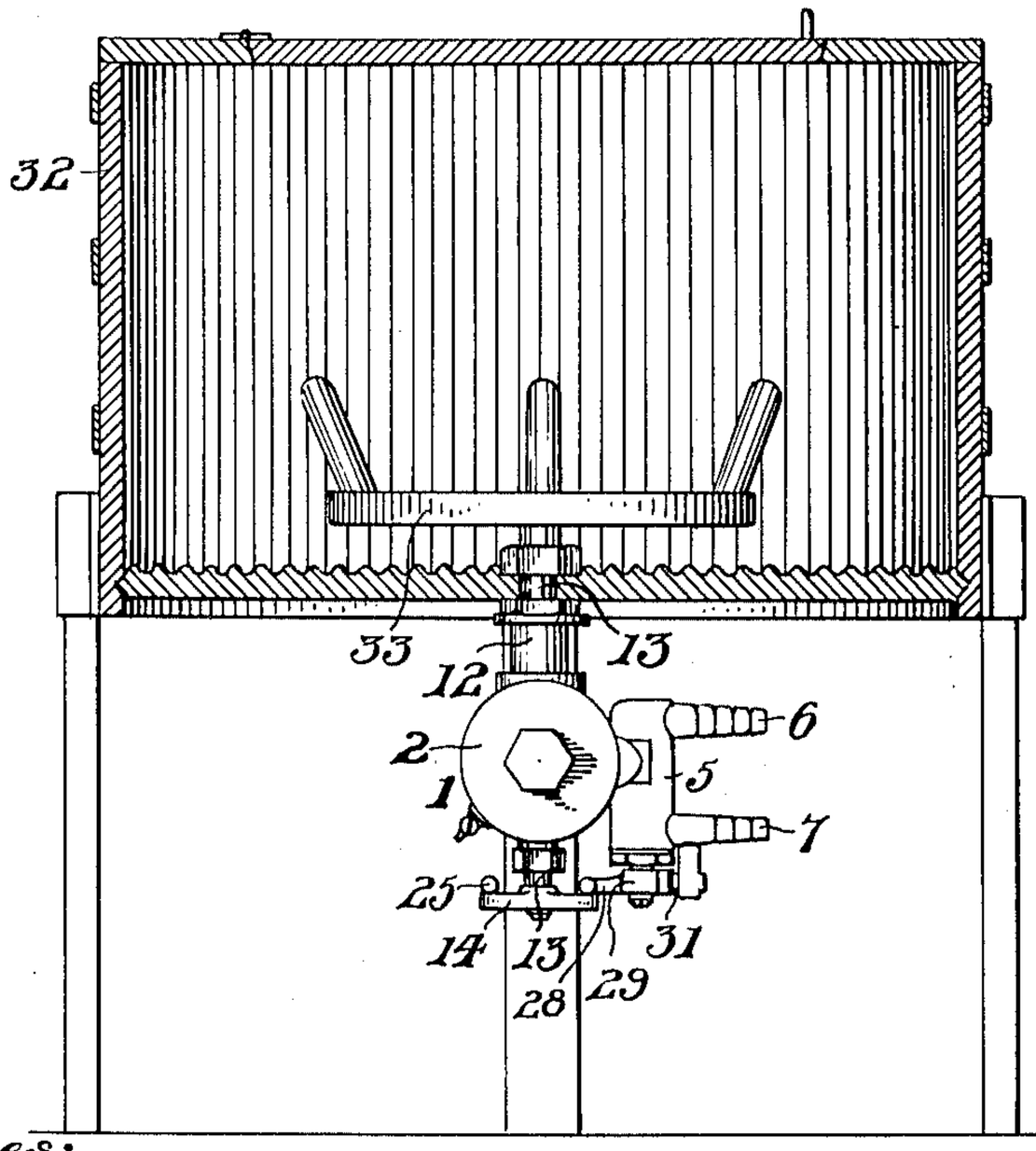


Fig. 6.



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FLUID-MOTOR.

*955,896. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed March 27, 1909. Serial No. 486,095.

To all whom it may concern:

Be it known that I, WILLIAM J. MORRISON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Fluid-Motors, of which the following is a specification.

My invention relates to a new and improved fluid-motor.

In the embodiment of my invention, as illustrated by the drawings, I have shown a motor particularly designed to be operated by water-pressure, but my motor may be operated by other fluids, as air, gas, or steam.

An object of the present invention is to provide a simple and efficient fluid-motor capable of generating considerably more power from a given fluid pressure than fluid-motors as heretofore designed.

A further object of my invention is to provide a motor particularly designed to be operated by a very low fluid pressure.

In the accompanying drawings, which illustrate an application of my invention, Figure 1, is a longitudinal horizontal sectional view of a motor embodying my invention; Fig. 2 a vertical sectional view taken on line II—II of Fig. 1; Fig. 3 a detail view, partly in elevation and partly in section of a portion of the valve actuating mechanism; Fig. 4, a detail perspective view of valve; Fig. 5, a bottom plan of motor; and Fig. 6, a diagrammatic view showing an application of my invention in connection with a washing machine.

Referring to the drawings 1 designates a cylinder provided with cylinder-heads 2, and formed with end fluid-ports 3 and a centrally disposed fluid-port 4. Located at the side of the cylinder is a valve-chest or casing 5 together with fluid-supply inlet and exhaust passages or nozzles 6 and 7. As illustrated and as preferred the cylinder, valve-casing and the inlet and exhaust passages are formed of a single casting. The casting is formed with fluid-passages 8 and 9 respectively leading from the ports 10 and 11 of the valve-casing to the end fluid-ports 3. In addition to the ports or members above mentioned, the integral casting comprises an upwardly projecting hollow-member 12 designed to receive a portion of the motor driving-shaft 13. Shaft 13 extends through the cylinder and has mounted on its lower end a member 14 of the valve-actuating-mechanism.

Arranged within the cylinder I employ two pistons or plungers 15 each having its rod 16 engaging a projecting member 17 of one of the two similar movable rack-plates or bars 18. Interposed between the rack-plates 18 and keyed to shaft 13 is a gear-wheel 19. The teeth of gear 19 are adapted to mesh with the teeth of the two rack-plates 18 and as said plates or bars are moved by their respective pistons a rotary or a partial rotary motion is imparted to the shaft 13. The reciprocating movement of the two pistons is effected by the motive-fluid introduced to and discharged from the cylinder through the end-ports 3 and the central port 4 and for the purpose of controlling the admission and discharge of the fluid I employ a rotary valve 20. The form of valve preferably employed is particularly shown by Figs. 2 and 4 and as illustrated comprises two inlet ports 21 in open communication with the fluid supply inlet passage 6 and adapted to be brought into register with the ports 10 and 11 which latter respectively communicate with the passages 8 and 9 leading to the respective end fluid ports 3, thereby permitting the motive-fluid to enter the end fluid ports and come in contact with the corresponding faces of the two pistons causing said pistons to move in unison and toward each other. Upon a partial rotation of the valve one of the inlet ports 21 will register with the central port 4 and admit fluid to the center of the cylinder and against the opposite faces of the pistons, thus driving the pistons away from each other or toward the ends of the cylinder.

To permit the fluid to alternately pass from the ends and center of the cylinder I provide the valve with a discharge or exhaust port 22. This port 22 is arranged to alternately register with the ports 10 and 11 and port 4. Arranged at right angles with and in open communication with port 22 is a port 23. Port 23 in turn leads to a series of ports 24 which latter permit the passage of the exhaust fluid into the discharge or waste passage 7.

That portion of the valve actuating mechanism carried by and movable with the motor-shaft comprises in addition to the member 14 and its arms 14^a, a sleeve 25 carried by or a part of each arm 14^a, a plunger or movable striking-member 26, and a spring 27. These parts rotate with the motor-shaft and are so arranged that upon each

half revolution of said shaft one of the plungers 26 is carried into contact with an arm 28 of a notched ring-member 29 mounted on a projecting portion of valve 20, as shown by Fig. 5. Located directly above and adapted to enter the notches 30 of ring-member 29 I employ a spring pressed pawl 31. This valve actuating mechanism coöperates to give about a one-eighth turn to the rotary valve for every half revolution of the motor-shaft thereby permitting the motive-fluid to be alternately admitted and exhausted from the ends and center of the cylinder as above described.

In Fig. 6, I have shown diagrammatically my motor in connection with a washing-machine. When used in this connection I prefer to place the motor under the tub 32 and extend the motor-shaft up through the bottom thereof and mount an agitator 33 directly on the shaft.

What I claim is:

1. A fluid-motor having a cylinder, two pistons within the cylinder, a valve-mechanism operative to simultaneously admit a motive-fluid to the corresponding sides of each piston and to effect an exhaust of the fluid from the opposite sides of the pistons, a shaft extending into the cylinder, and means connecting the pistons and shaft for imparting a rotary movement to the shaft.

2. A fluid motor having a single cylinder, two pistons within the cylinder, a motor shaft, means connecting a piston and the shaft, a rotary valve, a valve actuating mechanism comprising a striking-member carried by the shaft and operative to move the valve to admit fluid to the corresponding sides of each piston and to effect an exhaust from the opposite sides of the pistons.

3. A fluid motor comprising a cylinder, two pistons in the cylinder, a motor shaft extending through the cylinder, means within the cylinder connecting the pistons and the motor shaft, and a rotary valve mechanism operative to admit fluid to the corresponding sides of each piston and to effect an exhaust from the opposite sides of the pistons.

4. In a fluid-motor, a cylinder, pistons working in the cylinder a motor shaft extending into the cylinder, a valve, mechanism connecting the pistons, shaft, and the valve operative to move the valve to simultaneously effect an admission of motive-fluid to the ends of the cylinder on corresponding sides of the pistons and a discharge of the motive-fluid from the center of the cylinder and vice versa.

5. In a fluid-motor, a cylinder provided with central and end fluid-ports, pistons in the cylinder, a motor-shaft extending into the cylinder, rack-bars engaging the pistons, a gear carried on the motor-shaft and arranged to mesh with the rack-bars, a valve, valve actuating-mechanism operative to move the valve to simultaneously effect an admission of motive-fluid to the end fluid-ports and on corresponding sides of the pistons and a discharge of the motive-fluid through the central port and vice versa.

6. In a fluid-motor, a cylinder, pistons located entirely within the cylinder, a motor-shaft extending into the cylinder, means within the cylinder connecting the pistons and shaft, a valve, and mechanism connecting the valve and shaft operative to move the valve to admit fluid to the corresponding sides of each piston and to effect an exhaust from the opposite sides of the piston.

7. In a fluid-motor, a cylinder, pistons located entirely within the cylinder, a motor-shaft extending into the cylinder, means within the cylinder connecting the pistons and shaft, a valve, and a valve actuating mechanism comprising a spring pressed striking-member carried by the shaft operative to move the valve to admit fluid to the corresponding sides of each piston and to effect an exhaust from the opposite sides of the pistons.

8. In a fluid-motor, a cylinder, pistons in the cylinder, a fluid supply inlet and an exhaust passage in communication with the same, a motor-shaft, means connecting the shaft and pistons operative to effect a rotary movement of the shaft, a rotary valve having inlet ports in communication with the fluid supply inlet, an exhaust port, a port at right angles with the exhaust port, and a plurality of ports connecting the port at right angles with the exhaust port and the exhaust passage, and valve actuating mechanism.

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

WILLIAM J. MORRISON.

Witnesses:
A. C. Way,
W. G. Doolittle.