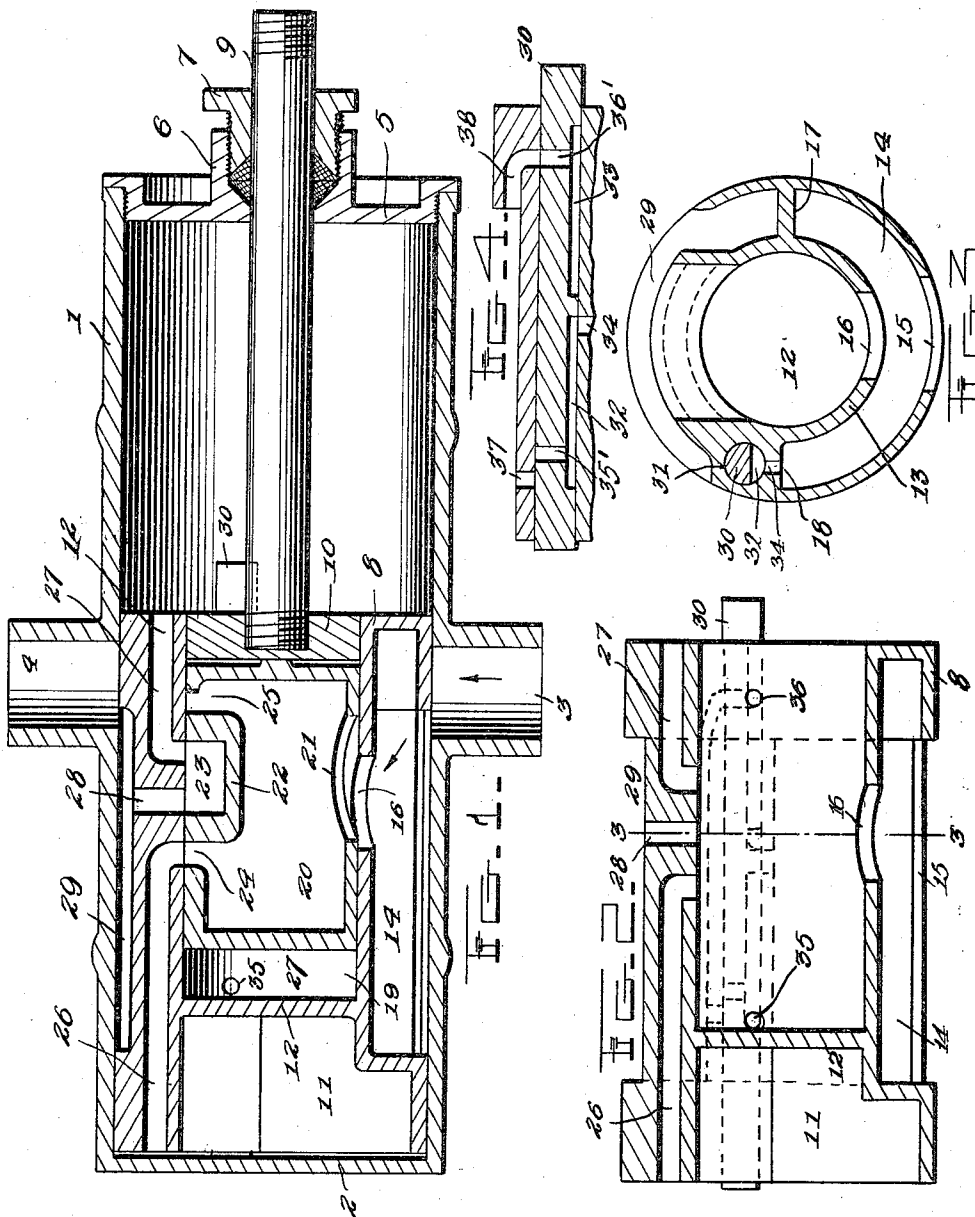


H. J. CRINER.
WATER MOTOR.
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1,130,671.

Patented Mar. 2, 1915.



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Witnesses

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HARRY J. CRINER, OF BURLINGTON, IOWA, ASSIGNOR TO ALFRED OLIPHANT.

WATER-MOTOR.

1,130,671.

Specification of Letters Patent.

Patented Mar. 2, 1915.

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To all whom it may concern:

Be it known that I, HARRY J. CRINER, a citizen of the United States, residing at Burlington, in the county of Des Moines and State of Iowa, have invented certain new and useful Improvements in Water-Motors, of which the following is a specification.

The present invention relates to improvements in water motors, and is designed to provide a fluid motor of the reciprocating type that is facile and efficient in operation, is compact and durable, and being composed of comparatively few parts is not liable to become deranged. The elements of the combined device are simple in construction and may be assembled quickly and with facility, and if necessary the motor may be dismantled with equal facility.

The invention consists in certain novel combinations and arrangements of parts as hereinafter set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles.

Figure 1 is a vertical longitudinal sectional view of the working parts of the motor. Fig. 2 is a similar view of the piston of the motor. Fig. 3 is a transverse vertical sectional view on line 3—3 of Fig. 2. Fig. 4 is a sectional view of the pin valve.

The motor casing or cylinder 1 is closed at its left end by an integral head 2, and is formed with a water inlet 3 and exhaust or outlet 4 for waste water. These openings are provided with suitable inlet hose and outlet or waste hose for the transmission of water to and from the cylinder. The open end of the cylinder is closed by a cap plate 5 having an integral packing cup 6 in which the gland 7 is threaded.

Within the cylinder the piston 8 is adapted to reciprocate, and by means of its stem 9 will communicate power to be applied as desired. The stem 9 is passed through the packed gland 7 and is threaded into the closed end 10 of the piston, the other end of the piston being open to form a chamber 11 between the partition or head 12 of the piston and the head 2 of the cylinder. As best seen in Fig. 3 the piston which is cylindrical in cross section is provided with a smaller concentric partition 13 which forms a semi-

annular space or chamber 14 between these outer and inner walls of the piston, and the piston wall and partition are fashioned with ports 15 and 16 respectively in alinement as shown, the chamber 14 being bounded by longitudinal partitions 17 and 18.

The concentric partition 13 provides a cylindrical valve casing or chamber 19 in which a hollow cylindrical valve 20 reciprocates. This valve has a limited movement between the heads 10 and 12 of the hollow piston and is carried bodily by the piston in its reciprocation. At one side a port 21 is provided and this port is of sufficient dimensions to remain at all times and in all positions in communication with the chamber 14, of the piston 8 through the port 16. Within the hollow valve 20 a partition 22 is formed which furnishes a space 23, and at each side of the partition a port as 24 and 25 is provided, these ports and the space 23 being positioned and adapted to register with an L-shaped port 26, a shorter port 27, or a radial port 28, the two former opening into the cylinder and the latter opening into a space 29 at the upper side of the piston and between it and the wall of the cylinder 1.

In Figs. 3 and 4 a pin valve 30 is illustrated. This valve is a cylindrical bar or pin and is movable in a cylindrical opening 31 that extends the entire length of the piston. The pin valve is somewhat longer than the piston and projects beyond the piston ends, while its underside is cut away at 32 and 33 to form spaces that may alternately register with the short port 34 opening from the chamber 14 to the opening 31. Each of these spaces communicate with the interior of the chamber 19 beyond the ends of the valve 20, one opening thereinto through the port 35 and the other through port 36, these ports being so positioned that water may flow therethrough alternately and impinge against the end of the floating valve 20 and move it as will be understood. The spaces 32 and 33 have exhaust ports 37 and 38 respectively which communicate with the exhaust chamber 29 to exhaust water from the rear of the piston valve 20, the port 38 being shown as registering with port 36' in Fig. 4. In the other position of the valve the port 37 registers with the port 35', as will be understood upon reference to Fig. 4.

In operation, water under pressure is admitted through the inlet 3, and following the direction of the arrows in Fig. 1, flows into

chamber 14 through registering ports 16, 21 into the hollow valve 20. Port 25 is closed but the water is permitted to flow through ports 24 and 26 to the rear of the piston and into its chamber 11 and forcing the piston to the right in Fig. 1. The valve 20 is carried bodily to the right in the hollow piston, it being understood that there is a water pressure at the rear of the valve through port 35. When the piston reaches the end of its stroke to the right, or rather just before it reaches the end of the stroke, the pin or rod valve 30 strikes the head 5 of the cylinder and the rod valve is moved to the left from the position shown in Figs. 1, 2 and 4. Port 35 of chamber 19 is now open to the exhaust space 29 to drain water from the left end of the valve 20, and port 33 of the rod valve is open to port 34 to receive water from chamber 14 and convey it through port 36 to the right end of the valve 20, the exhaust port 38 now being covered. Water pressure through the port 36 forces the valve to the left closing port 26 and opening port 27 through port 25 to the interior of the valve 20, and also opening exhaust from the left end of the cylinder through ports 26, 23, 28, and chamber 29. The water now flows through the ports 25, 27 to the right end of the cylinder and its pressure moves the piston to the left, when the pin valve is again reciprocated to open and close reverse ports to reciprocate the valve 20 to reverse the flow of water and thus the piston is reciprocated.

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

1. The combination in a water motor, of a cylinder, a hollow piston having concentric partition forming semi-annular chamber and a cylindrical valve chamber, and a hollow cylindrical valve reciprocal in said chamber and having limited motion between the heads of the piston, said valve being carried bodily by the piston in its reciprocations, said valve and piston having ports adapted to register with each other, and an auxiliary valve adapted to admit water pressure at alternate sides of the hollow valve to control the same.

2. The combination in a water motor, of a

cylinder, a hollow piston having concentric partition forming semi-annular chamber and a cylindrical valve chamber, and a hollow cylindrical valve reciprocal in said chamber and having limited motion between the heads of the piston, said valve being carried bodily by the piston in its reciprocations, said valve and piston having ports adapted to register with each other, said valve being a 'floating' valve, and an auxiliary valve adapted to admit water pressure at alternate sides of the floating valve to control the same.

3. The combination in a water motor, of a cylinder, a hollow piston having concentric partitions forming semi-annular chamber and a cylindrical valve chamber, and a hollow cylindrical valve reciprocal in said chamber and having limited motion between the heads of the piston, said valve being carried bodily by the piston in its reciprocations, said valve and piston having ports adapted to register with each other, said valve being a 'floating' valve, said valve and piston having cooperating ports to permit flow of the liquid to the rear of the piston, and an auxiliary valve adapted to admit water pressure at alternate sides of the floating valve to control the same.

4. The combination in a water motor, of a cylinder, a hollow piston having a concentric partition forming a semi-annular chamber and a cylindrical valve chamber, and a hollow cylindrical floating valve reciprocal in said chamber and having limited motion between the heads of the piston, said valve being carried bodily by the piston in its reciprocations, said valve and piston having cooperating ports to permit flow of water to the ends of the piston, the concentric chamber of the piston having a port adapted to register with an inlet port in the cylindrical valve, and an auxiliary valve adapted to admit water pressure at alternate sides of the cylindrical valve.

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

HARRY J. CRINER.

Witnesses:

HERMAN BAUMLE,
O. G. WEBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."