No. 877,635. PATENTED JAN. 28, 1908.

J. DIETZ.

WATER MOTOR.

APPLICATION FILED APR. 17, 1907.

FIG. 1.

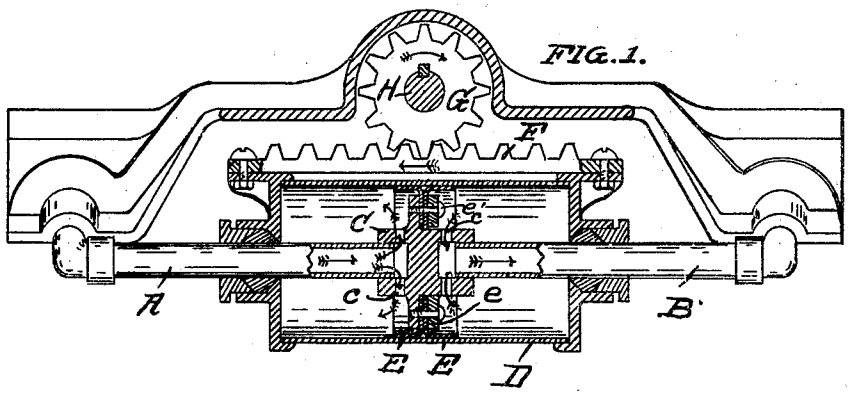


FIG. 2.

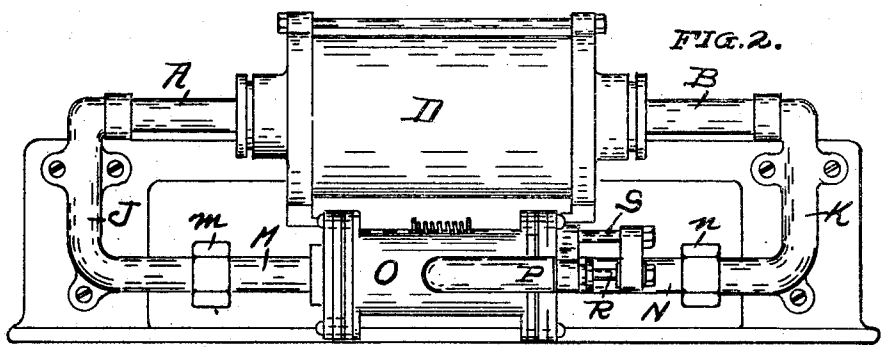


FIG. 3.

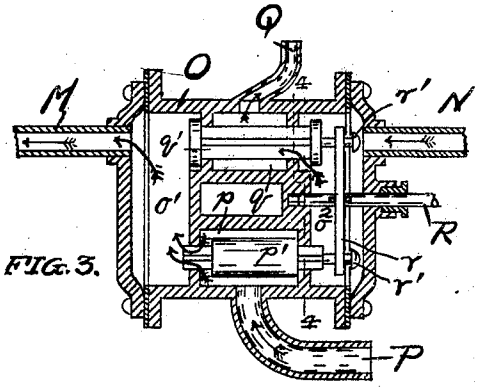


FIG. 4.

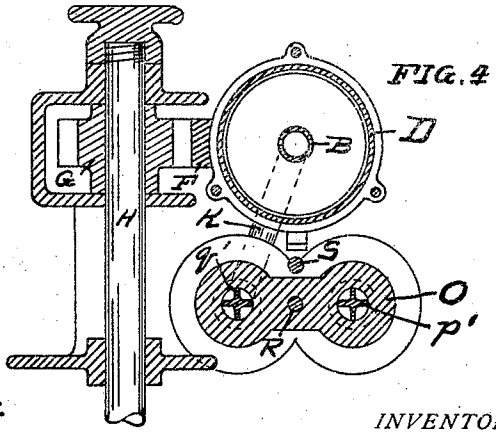
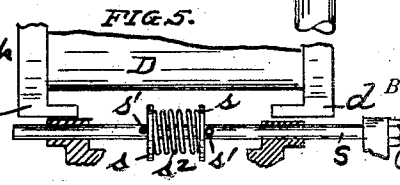


FIG. 5.



WITNESSES:

Brayton J. Richards

Linnie Mantz

INVENTOR.

John Dietz

BY James A. Ramsey

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN DIETZ, OF CINCINNATI, OHIO.

WATER-MOTOR.

No. 877,635. Specification of Letters Patent. Patented Jan. 28, 1908.

Application filed April 17, 1907. Serial No. 368,615.

To all whom it may concern:

Be it known that I, JOHN DIETZ, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Water-Motors, of which the following is a specification.

The object of my invention is to provide a water motor of improved construction and operation, which is especially adapted for driving light machinery, such as washing machines.

My invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings: Figure 1 is a horizontal section of a motor embodying my invention. Fig. 2 is an elevation of the motor. Fig. 3 is a horizontal section through the valve. Fig. 4 is a section on line 4—4 of Fig. 3, and Fig. 5 is a detail view of the valve operating mechanism.

The piston rod of the motor is in the form of two pipes A and B secured to the piston head C as shown. In piston head C, surrounding the open mouths of pipes A and B are openings *c* which serve to maintain pipes A and B in permanent open communication with the interior of cylinder D on opposite sides of piston head C. Flap valves E are secured to piston head C by rings *e* secured by screws *e'*. At its inner side cylinder D carries a rack bar F meshing with a gear G feathered to the shaft H, which may be connected with the operative parts of a washing machine or other light machinery.

Pipes A and B are supported by and connected to pipes J and K which are secured to the frame L of the motor. Pipes M and N are secured to pipes J and K by means of removable couplings *m* and *n* and serve to connect pipes A and B with the chambers *o'* and o^2 in valve chamber O, as shown.

Supply and exhaust pipes P and Q communicate with chambers *p* and *q* in chamber O, and admission and exhaust valves *p'* and *q'* are slidably mounted in chambers *p* and *q*. The positions of valves *p'* and *q'* which in the walls of chambers *p* and *q* are made spider shaped as shown in Fig. 4, so that when the port at one end of a chamber is closed by its valve the port at the other end is open through the space in the spider. At one end the valves *p'* and *q'* are secured to a cross bar *r* by means of screws or pins *r'* which permit of some play or lost motion of bar *r*. The bar *r* is carried by a rod R connected with a rod S slidably mounted on the top of valve chamber O. Near its center rod S carries loose rings or washers *s* held from moving away from each other by pins *s'*, and imprisoning a spring s^2. On the bottom of cylinder D are lugs *d* adapted to contact with washers *s* at either end of the stroke of the cylinder. By this construction it will be seen that with valves *p'* and *q'* in the positions shown in Fig. 3, water from supply pipe P will pass to chamber *c'* in valve chamber O and thence through pipes M and J to pipe A and enter the corresponding side of cylinder D, moving the latter in the direction of the arrow in Fig. 1. At the same time exhaust pipe Q is in communication with chamber o^2 in valve chamber O, and thence through pipes N and K with pipe B, thus serving to exhaust the other side of cylinder D so as to permit of its movement. As the cylinder D nears the end of its stroke, a lug *d* encounters the corresponding washer *s*, compressing the spring s^2 and sliding rod S to shift valves *p'* and *q'* so as to throw pipe P in communication with pipes N and B and pipe Q in communication with pipes M and A. This reverses the movement of cylinder D; the compression in the single spring s^2 serves to securely seat valves *p'* and *q'* and to give the cylinder an initial impulse on its return stroke.

By providing play between cross bar *r* and screws *r'*, the former is free to move back from the port in chamber *p* under the influence of water emerging therefrom on that side so as to permit free passage of the water without unseating the valve *p*, and the valve is always free to properly seat itself under the influence of the inrushing water, regardless of the position of the valve at the time the water is turned on. The play or space between the end of the valve *p'* and cross bar *r* should be equal to the movement of the valve.

It will be observed that the piston head forms a solid partition between the operative and inoperative sides of the cylinder so that there can be no leakage, and the cylinder head carries no valves to create friction and resistance. The water emerging radially from openings *c* under valves E tends to seat and hold said valves in position. Furthermore, by the above arrangement the cylinder and operative shaft are mounted centrally in their housings, so that the strains are borne

equally by the two sides of the housing and the weight is evenly distributed on each side of the operative shaft.

While I have shown and described my device as adapted to be operated by water, it will be understood that any other fluid under pressure may be used.

I claim:

1. In a water motor, the combination of open pipes connected with opposite sides of a piston head, a cylinder mounted to reciprocate on said pipes and piston head, permanent open communication between said pipes and the opposite sides of said cylinder, a supply and exhaust, a valve adapted to alternately connect the cylinder pipes with the supply and exhaust, and automatic means for shifting said valve, substantially as set forth.

2. In a water motor, the combination of open pipes connected with opposite sides of a piston head, a cylinder mounted to reciprocate on said pipes and piston head, permanent open communication between said pipes and the opposite sides of said cylinder, a supply and exhaust, a valve adapted to alternately connect the cylinder pipes with the supply and exhaust, and automatic means carried by the cylinder for shifting said valve, substantially as set forth.

3. In a water motor, the combination of open pipes connected with opposite sides of a piston head, a cylinder mountd to reciprocate on said pipes and piston head, permanent open communication between said pipes and the opposite sides of said cylinder, a valve chamber outside of the cylinder fixed independent of the movement of said cylinder, a supply and exhaust for the valve chamber, a valve in the valve chamber adapted to alternately connect the cylinder pipes with the supply and exhaust, and automatic means for shifting the valve, substantially as set forth.

4. In a water motor, the combination of open pipes connected with opposite sides of a piston head, a cylinder mounted to reciprocate on said pipes and piston head, permanent open communication between said pipes and the opposite sides of said cylinder, a valve chamber outside of the cylinder fixed independent of the movement of said cylinder, a supply and exhaust for the valve chamber, a valve in the valve chamber adapted to alternately connect the cylinder pipes with the supply and exhaust, and automatic means carried by the cylinder for shifting the valve, substantially as set forth.

5. In a water motor, the combination of pipes A and B secured to piston head C, cylinder D mounted to reciprocate on pipes A and B and piston head C, openings *c* permanently communicating with pipes A and B, rack bar F carried by cylinder D and meshing with gear G on shaft H, valve chamber O provided with supply and exhaust pipes P and Q, chambers o' and o^2 in valve chamber O and connected with pipes A and B, valves p' and q' in chamber O and automatic means for operating valves p' and q', substantially as set forth.

6. In a water motor, the combination of pipes A and B secured to piston head C, cylinder D mounted to reciprocate on pipes A and B and piston head C, openings *c* permanently communicating with pipes A and B, rack bar F carried by cylinder D and meshing with gear G on shaft H, valve chamber O provided with supply and exhaust pipes P and Q, chambers o' and o^2 in valve chamber O and connected with pipes A and B, valves p' and q' in chamber O, valve rod R having a connection with valves p' and q' which permit some lost motion, and means on the cylinder for operating valve rod R, substantially as set forth.

7. In a water motor, the combination of pipes A and B secured to piston head C, cylinder D mounted to reciprocate on pipes A and B and piston head C, openings *c* permanently communicating with pipes A and B, flap valves E radially surrounding openings *c*, rack bar F carried by cylinder D and meshing with gear G on shaft H, valve chamber O provided with supply and exhaust pipes P and Q, chambers o' and o^2 in valve chamber O and connected with pipes A and B, valves p' and q' in chamber O, valve rod R connected with valves p' and q' by means of cross bar r and screws r', slidable rod S connected with rod R and carrying washers *s* and springs s^2, and stops *d* on cylinder D adapted to contact with washers *s*, substantially as set forth.

8. In a water motor, the combination of a reciprocating cylinder, an operative connection with said cylinder, valves outside of said cylinder fixed independent of the movement of said cylinder adapted to control the reciprocations thereof, and a single yielding engagement between said cylinder and said valves for operating the valves.

JOHN DIETZ.

Witnesses:
JAMES A. RAMSEY,
LINNIE MANTZ.