

J. R. PLANK.
 HYDRAULIC MOTOR.
 APPLICATION FILED APR. 6, 1911.

1,002,541.

Patented Sept. 5, 1911.

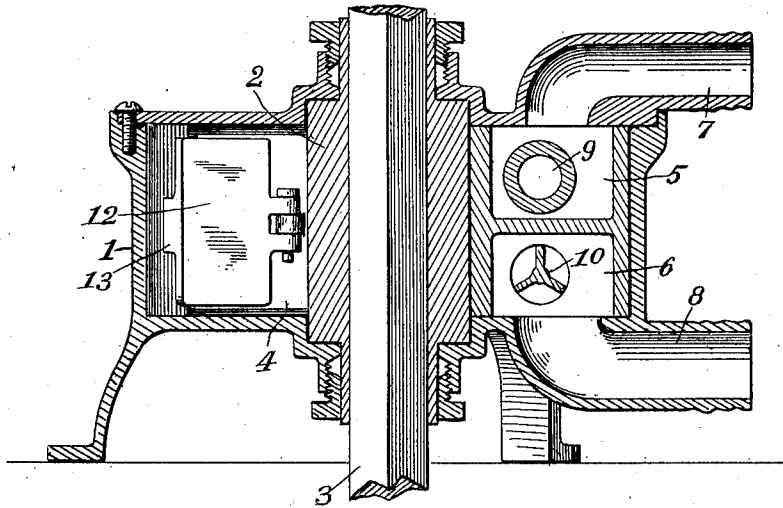


Fig. 1.

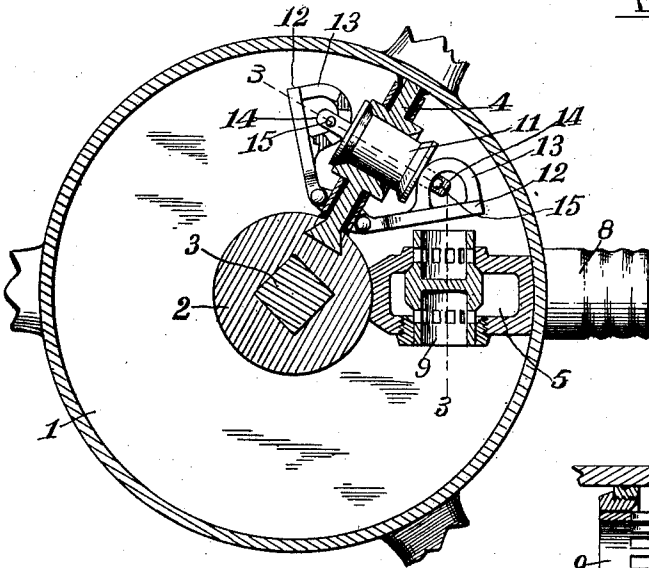


Fig. 2.

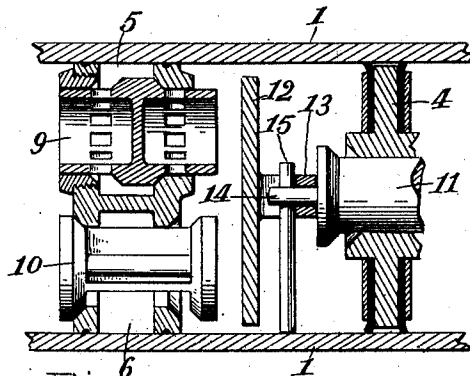


Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

J RAYMOND PLANK, OF GRAND RAPIDS, MICHIGAN.

HYDRAULIC MOTOR.

1,002,541.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed April 6, 1911. Serial No. 619,282.

To all whom it may concern:

Be it known that I, J RAYMOND PLANK, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in hydraulic motors, and particularly to such motors for operating washing machines, and its object is to provide the same with improved valve operating mechanism, together with various new and useful features hereinafter more fully described and particularly pointed out in the claims, reference being had to the accompanying drawings in which:—

Figure 1 is a vertical section of a device embodying my invention; Fig. 2 a sectional plan view; Fig. 3 a detail in vertical section on the line 3—3 of Fig. 2.

Like numbers refer to like parts in all of the figures.

1 represents a cylindrical case in the axis of which is a rotative hub 2 in which is a vertically slidable angular shaft 3 adapted to carry the agitator of a washing machine (not shown).

4 is a radial piston fixed in the hub and traversing the space within the case and adapted to oscillate therein. An abutment extends radially across the space within the case and is provided with chambers 5 and 6. An inlet passage 7 opens into the chamber 5 and an exhaust passage 8 opens into the chamber 6 to convey water to operate the motor. In the chamber 5 is an inlet valve 9 adapted to alternately open and close openings in opposite sides of the said chamber to discharge water alternately in opposite directions into the interior of the case. In the chamber 6 is an exhaust valve 10 adapted to alternately discharge water from the interior of the case into the lower chamber, and thence out through the passage 8. To simultaneously shift these valves I provide an improved mechanism, consisting of a spool shaped abutment 11 extending through the piston and having a limited longitudinal movement therein. This abutment operates plates 12 adapted to simultaneously engage and shift both valves,

these plates being hinged to the piston close to the hub 2 and adapted to swing toward and from the abutment 11. This abutment is connected at opposite ends to these plates by means of a loop 13 on each plate having a slot therein to receive a lug 14 on the respective end of the abutment which lug is prevented from withdrawal from the loop by a pin 15 extending vertically through the end of the lug, and to insure the pin remaining in place therein, it is prolonged downward to slidably engage the bottom of the case.

In operation, when the piston swings around toward the valves the latter will be positioned with the exhaust valve open toward the approaching side of the piston and the inlet valve opened toward the receding side of the piston. As approaching plate 12 engages the valves the pressure behind the abutment will hold the same projected toward the valves with sufficient force to shift the valves whereupon as the valves move to shift, the plate is immediately met by the in-rush of water through the inlet valve, which balances the abutment in the piston and at the same time cushions the piston against water and thus prevents any hammering of the mechanism. These plates also being pivoted close to the hub engage the valves squarely and thus take off any side thrust on the same due to the angular relation of the abutment to the same. By this construction a single abutment or projection is adapted to operate both valves simultaneously.

What I claim is:—

1. A water motor, comprising a reciprocating piston, valves adapted to control and shift the flow of water in the motor, a plunger longitudinally movable in the piston and adapted to shift the valves and also adapted to permit further movement of the piston after the plunger operates on the valves and a hinged plate swinging between the plunger and the valves.

2. A water motor, comprising a reciprocating piston, a plunger longitudinally movable in the piston, inlet and exit chambers, valves in said chambers adapted to shift the flow of water in the motor, said valves being shifted by the plunger before the piston stops, whereby the piston is cushioned on the incoming water and a plate hinged at one side and swinging between the plunger and the valves.

3. A water motor, comprising a cylindrical case, a hub rotative in the axis of the case, a radial abutment having inlet and exhaust chambers, valves in the abutment adapted to reverse the flow of water in the motor, a radial piston in the case, a plunger longitudinally movable in the piston and adapted to shift the valves before the piston stops moving toward the same and a plate at each side of the piston hinged to the piston and swinging between the plunger and the valves.

4. A water motor, comprising a cylindrical case, a hub in the axis of the case, a radial piston on the hub, plates pivoted near the hub, a plunger movable in the piston and connected to the plates, an abutment at one side of the hub, and valves in the abutment engaged and shifted by the plates.

5. A water motor, comprising a cylindrical case, a hub in the axis of the case, a radial piston on the hub, plates pivoted to the piston near the hub, a plunger movable

in the piston and attached to the plates at its ends, an abutment at one side of the hub, and valves in the abutment engaged and shifted by the plates.

6. A water motor, comprising a cylindrical case, a hub rotative in the axis of the case, a radial piston on the hub, plates at opposite sides of the piston and pivoted thereto near the hub, a plunger longitudinally movable in the piston and having projections at its ends, loops on the plates having slots to receive the projections, pins in the projections to retain the same in the loops, a radial abutment in the case, and valves in the abutment engaged and shifted by the plates.

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

J RAYMOND PLANK.

Witnesses:

HAROLD O. VAN ANTWERP,
LUTHER V. MOULTON.