





# UNITED STATES PATENT OFFICE.

WILLIAM EVANS, OF MANCHESTER, ENGLAND, ASSIGNOR OF TWO-THIRDS TO WILLIAM THOMAS HILL, OF WITHINGTON, LANCASTER COUNTY, ENGLAND, AND RONALD GALE, OF WOKING, SURREY COUNTY, ENGLAND.

## MOTOR.

SPECIFICATION forming part of Letters Patent No. 706,489, dated August 5, 1902.

Application filed January 8, 1902. Serial No. 88,882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM EVANS, engineer, a subject of the King of Great Britain and Ireland, and a resident of 21 Birnam street, Seedley, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Motors, (for which I have made application in Great Britain, No. 12,037, dated June 13, 1901,) of which the following is a specification.

This invention relates to a motor designed more especially for washing-machines. It is illustrated in the accompanying drawings, in which—

Figure 1 is an enlarged longitudinal section of the motor. Fig. 2 is a similar view with the parts in a different position.

In Fig. 1 the piston-rod B is represented at the back end of its stroke and in Fig. 2 at the forward end. Within the cylinder *l* is arranged a suitably-packed double piston, the one, *m*, being of larger area than the other, *n*, to which latter the piston-rod B is secured. Arranged within the piston-rod B is a spindle *o*, which passes through the pistons *m* *n* and is supported at one end in a stuffing-box *o'*. A double valve *p*, having a slotted valve-spindle *q*, through which the spindle *o* passes, is provided with two seatings *r* and *s* in the valve-chest *t* of the motor. The other end of the valve-spindle *q* is provided with a piston *u*, slidable fluid-tight in a cylinder *v*. A port *v'* conducts pressure at the required times to the piston *m*. The valve-box *t* is provided with circular ports *w* *w'*, to govern which the spindle *o* is formed with pistons *x* *y*. A pipe 1, in communication with the supply-nozzle 2, conducts uninterruptedly the water-pressure to the smaller piston *n*, the pressure to the larger piston *m* being intermittent.

The operation of the motor is as follows: At the end of its stroke, as shown in Fig. 1, the piston *m* has come into contact with the piston *y* and slid the spindle and pistons into the position shown. The port *w* is then closed, *w'* being open to the exhaust 3, so that any water at the back of the valve *p* is allowed to exhaust. It will be understood that the nozzle 2 is in communication with the water-sup-

ply of the house, and the pressure entering as shown by the arrows, Fig. 1, jams the valve *p* on its seat *r* and passes through the port *v'* to the piston *m* and also along the pipe 1 to the piston *n*. As has been stated, the piston *n* is under constant water-pressure; but being of less area than the piston *m* the superior pressure on the piston *m* causes the pistons to be traversed outward into the position shown in Fig. 2, the water in the cylinder *l* in front of the piston *n* being forced back along the pipe 1 to mix with the supply. The return stroke of the piston-rod B is effected as follows: On nearing the completion of the outward stroke the piston *m* comes into contact with a tappet or adjustable nut 4 on the end of the spindle *o* and moves it forward until the pistons *x* *y* occupy the positions shown in Fig. 2. The port *w* is then open to pressure and the port *w'* is closed. The water-pressure, as shown by the arrows, is conducted to the back of the piston *u*, which is of superior area to the valve *p*, so that the valve *p* is thrust on its seat *s*, thus cutting off the supply to the port *v'*. The pressure being thus removed from the piston *m*, the pressure on the piston *n* then reverses the stroke of the piston-rod B, the water in the cylinder behind the piston *m* exhausting, as shown by the arrows, through the port *v'* and via the slotted valve-spindle *q* to the exhaust-outlet 3, from whence it is discharged through a waste-water pipe. On the completion of the backward stroke the piston *m* actuates the spindle *o* to bring the pistons *x* *y* in the positions shown in Fig. 1, when on the pressure being removed from the back of the piston *u* the valve *p* is again thrust on its seating *r* and the cycle of operations is repeated. The motor is thus double-acting, with the necessity of only one single and easily-constructed valve-gear.

I declare that what I claim is—

A water-motor having two pistons of unequal area, a port in uninterrupted communication with the water-supply and conducting pressure to the piston of the smaller area, a port leading to the piston of larger area, a double valve having a slotted valve-stem and

a piston of larger area than the valve, a port leading to back of said piston, and a port leading to exhaust, piston-valves working in the slot of the double valve and actuated by  
5 the piston of the motor to govern such ports, and an exhaust-port arranged substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM EVANS.

Witnesses:

JOSHUA ENTWISLE,  
ALFRED YATES.