No. 883,972. PATENTED APR. 7, 1908.

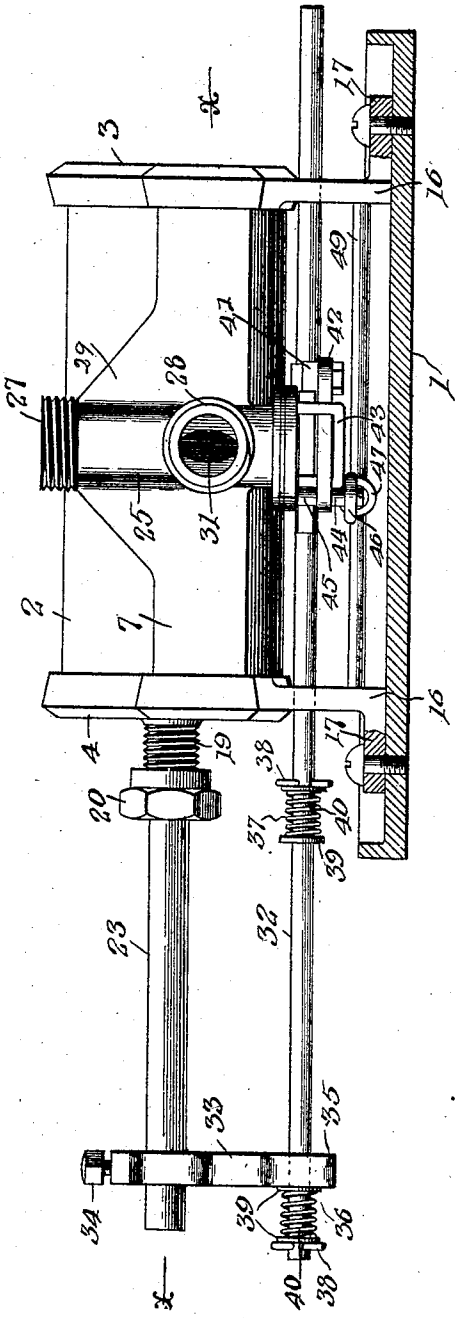
J. H. ROSE.

HYDRAULIC MOTOR.

APPLICATION FILED JULY 9, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

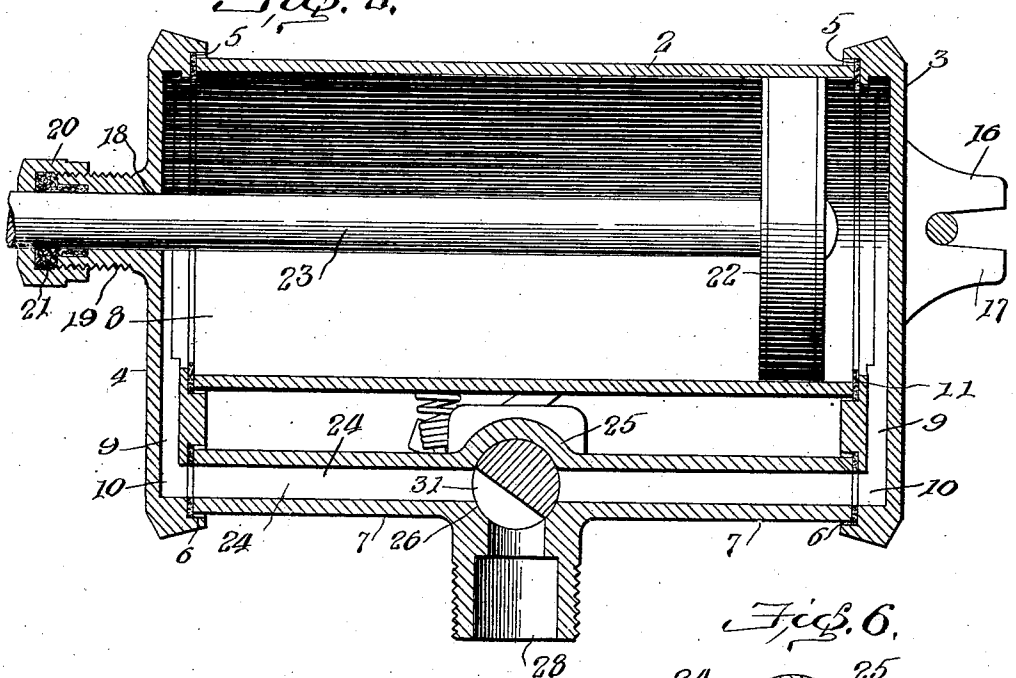


Fig. 6.

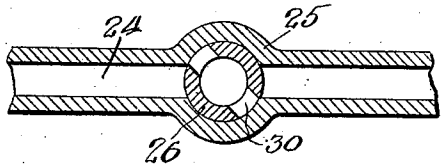


Fig. 3.

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3 SHEETS—SHEET 3.

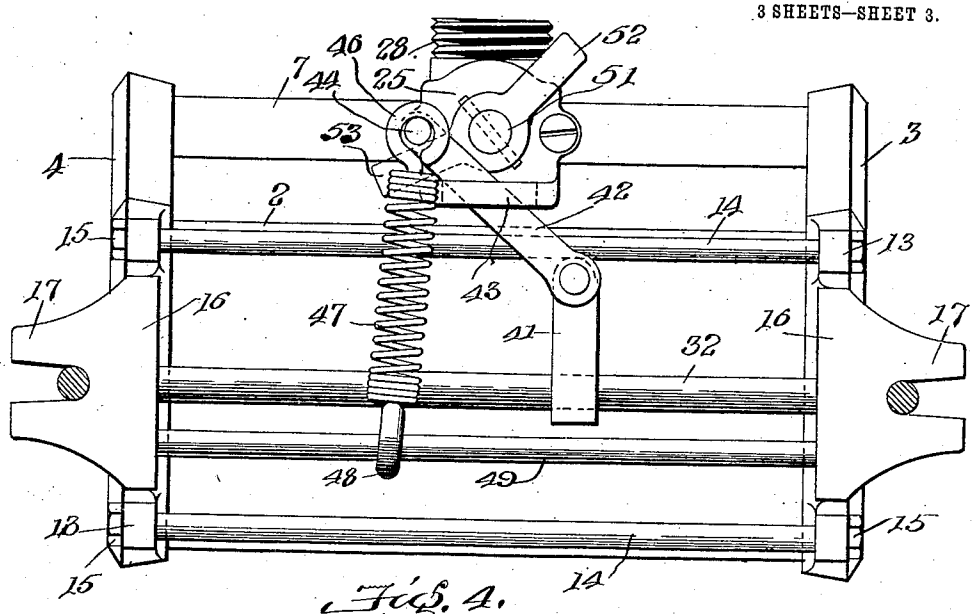
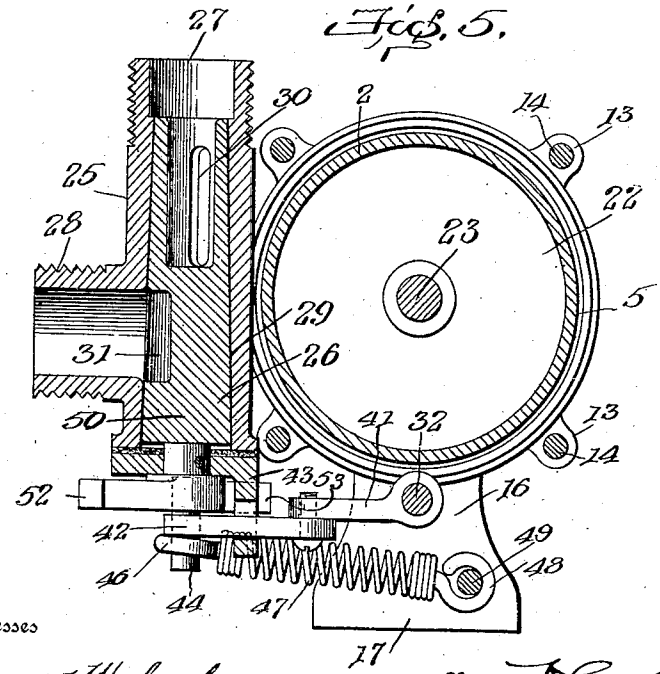


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN H. ROSE, OF DAYTON, OHIO.

HYDRAULIC MOTOR.

No. 883,972. Specification of Letters Patent. Patented April 7, 1908.

Application filed July 9, 1906. Serial No. 325,258.

To all whom it may concern:

Be it known that I, JOHN H. ROSE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hydraulic motors, and has for its object to provide a simple, efficient and inexpensive reciprocating water motor of the single-cylinder double-acting type, the same being designed primarily for use as a small motor for domestic purposes, and being capable of ready application in various situations, owing to the fact that its organization is such that its pressure and exhaust connections may be reversed.

To these and other ends my invention consists in certain novel features which I will now proceed to describe, and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a motor embodying my invention in one form; Fig. 2 is a horizontal section of the motor on the line $x\ x$ of Fig. 1; Fig. 3 is a longitudinal section of the side bar showing the valve chamber; Fig. 4 is a bottom plan view of the motor showing the valve-operating mechanism; Fig. 5 is a transverse section taken through the cylinder and the valve chamber; and Fig. 6 is a horizontal section on the line $y\ y$ of Fig. 3.

In the said drawings, the motor is shown, in Fig. 1, as mounted upon the usual drip base 1, although this base may be dispensed with. The motor proper comprises a cylinder 2, preferably in the form of a plain piece of cylindric tubing, of brass or the like. This cylinder is supported in a frame comprising end pieces and side pieces in the form of castings, preferably of brass, which may be readily constructed and connected without any special fitting of the parts. The end members of the frame are indicated by the reference numerals 3 and 4. Each end member of the frame comprises a body portion having a seat 5 for the corresponding end of the cylinder and a lateral seat 6 to receive the ends of the side member 7 of the frame. The central portion of each end member thus constitutes the cylinder head and is provided with a central chamber 8, in free communication with the corresponding end of the cylinder, said central chamber being connected by a transverse passage 9 with the openings or ports 10 in the seats or recesses 6 which receive the ends of the side member 7. The seat 5 is provided with a gasket or packing washer 11, fitting between it and the corresponding end of the cylinder 2, and the seats 6 are provided with similar gaskets or packing washers 12 fitting between said seats and the ends of the side frame member 7.

Each of the end frame members 3 and 4 is proivded with apertured lugs 13 through which pass longitudinal connecting bolts or threaded rods 14, provided at their outer ends with nuts 15. By means of these nuts and bolts the two end frame members may be drawn towards each other so as to firmly grip between them the cylinder and the side frame member, and thus hold the cylinder and frame rigidly and firmly together, the gaskets or packing washers making water-tight joints between the parts, and doing away with the necessity of any special fitting or machining of the castings or threading of the cylinder ends.

Each of the end frame members is provided with a supporting leg 16 with a slotted foot 17, by means of which the motor may be secured to the base 1 or any other suitable support through the medium of screws or the like. The two end members of the frame are similar in construction except that the end member 3 is closed, while the end member 4 has an aperture 18 for the passage of the piston rod and a guide sleeve or nipple 19 for said piston rod extending outwardly from the opening 18 and threaded externally to receive a cap 20, carrying a packing 21, thus constituting a stuffing box for the piston rod. The piston is indicated at 22 and the piston rod at 23. The side member of the frame is in the form of a bar having a passage 24 extending longitudinally therethrough and having a central valve casing 25, the valve chamber 26 of which lies midway of the passage 24 and is in communication with both portions thereof. Two pipes or conduits are in communication with this chamber by means of nipples 27 and 28, either of which may be used as the pressure pipe or the exhaust pipe. The valve chamber 26 is preferably enlarged by flaring the upper walls of the passage outwardly, as indicated at 29, and in this chamber is placed a double three-way valve. This valve may be of any suitable construction, but I prefer that

shown in the drawings which is in the form of a tapering plug valve having two sets of openings at the opposite ends of the same, the one opening 30 being adapted to connect the valve chamber with the inlet pipe through the nipple 27, and the other opening 31 connecting the outlet pipe with the valve chamber through the nipple 28. As shown in the drawings, the first opening is formed by boring longitudinally into the smaller end of the plug and cutting away the sides of the same to communicate with the valve chamber. The other opening is preferably formed by cutting away a portion of the circumference of the plug. These openings are so arranged on the circumference of the plug that when the nipple 27 is connected to one side of the valve chamber, the nipple 28 will be connected to the opposite side, and there will be no communication between the two opposite sides of the valve chamber.

The operating mechanism for this valve is in the main part similar to that described in my pending application, Ser. No. 271,276, filed July 26, 1905, but there are some variations from this structure which I will now describe. A sliding rod 32 is mounted in the supporting legs beneath the cylinder 2 and extends some distance beyond the end of the same. An arm 33 is secured to the piston rod 23 by a set screw 34, and has an opening 35 in its lower end adapted to slide on the rod 32 between the abutments 36 and 37 formed on the rod 32. These abutments preferably comprise a split key 38, and washers 39 having a coiled spring 40 between them. Mounted on the rod 32 at a point intermediate the supporting legs 16 of the frame is an arm 41. Pivotally connected to the outer end of this arm is a lever 42, fulcrumed in a slotted plate 43 secured to the lower end of the valve casing. At the outer end this arm is provided with two oppositely extending lugs 44 and 45. The outer lug 44 is engaged by a ring 46 secured to one end of a spring 47, the other end, 48, of said spring being slidably connected to a rod 49 mounted in the supporting legs 16 and lying parallel to the valve operating rod. Secured to the stem 51 of the valve 50 are two outwardly extending arms 52 and 53 adapted to be engaged by the lug 45 on the lever 42 as the same turns in the plate 43.

The operation of the valve mechanism is as follows. With the construction described and the parts in the position shown in the drawing, the fluid is admitted through the inlet nipple 27, through the opening 30 into the valve 50, through the passage 24 and port 10 to the chamber 8 and cylinder 2 and forces the piston 22 forward. The fluid on the opposite side of the piston is forced out through the chamber 8 at the opposite end of the cylinder into the passage 24 and out through the opening 31 of the valve 50 to the exhaust nipple 28. As the piston rod advances, it carries with it the arm 33, which, as it approaches the outer extremity of the stroke, engages the abutment 36 on the outer end of the rod 32 and moves that rod outward in the direction of the movement of the piston. As the rod 32 moves outward, it carries with it the arm 41, forcing the lever 42 up against the tension of the spring 47 and turning it on its fulcrum in the plate 43. As the upper end of this lever moves over it carries with it the upper end of the spring 47, the lower end of said spring traveling in the same direction on the rod 49. As the lug 44 passes the central point in its passage, the tension of the spring 47 draws the same quickly to its lower position, and in its downward movement the lug 45 engages the arm 52 on the valve stem 51 and carries the same with it, thereby turning the valve plug and reversing the position of the openings 30 and 31 in said valve plug, thus admitting the pressure fluid to the opposite side of the piston and reversing the operation just described.

While I have shown and described one form in which my invention may be embodied, I do not wish to be understood as limiting the same to the details of construction disclosed in the said drawings and description as same may be varied without departing from the principle of my invention.

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

1. In a water motor of the character described, the combination, with a frame, a cylinder supported by said frame and a piston reciprocating within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passage, an arm connected to said valve and adapted to actuate the same, a part mounted on said frame and provided with a guideway, a lever extending loosely through said guideway, means carried by said lever for engaging said arm, and means connected to the piston for operating said lever, substantially as described.

2. In a water motor of the character described, the combination, with a frame, a cylinder supported thereby, and a piston within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passages, an arm connected to said valve and adapted to actuate the same, a part carried by said frame having an outwardly extending portion, a movable support, a lever pivotally connected thereto and adapted to be engaged by said outwardly extending portion intermediate the ends of said lever, means carried by said lever for engaging said arm, and means connected to the piston for moving said support to operate said lever.

3. In a water motor of the character described, the combination, with a frame, a cylinder supported thereby and a piston within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passages, arms connected to said valve and adapted to actuate the same, a part carried by said frame and having projections extending therefrom, a lever fulcrumed between said projections, means carried by said lever for engaging said arms, and means connected to the piston for operating said lever, substantially as described.

4. In a water motor of the character described, the combination, with a frame, a cylinder supported thereby, and a piston mounted within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passages, arms connected to said valve and adapted to actuate the same, a rod mounted to slide longitudinally of said cylinder, a part carried by said frame and provided with a guideway, a lever pivotally connected to said rod and extending loosely through said guideway, means carried by said lever for engaging said arms to actuate said valve, and means connected to said piston for operating said rod, substantially as described.

5. In a water motor of the character described, the combination, with a frame, a cylinder supported thereby, and a piston mounted within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passages, arms connected to said valve and adapted to actuate the same, a part carried by said frame and having projections extending therefrom, a rod mounted to slide longitudinally of said cylinder, a lever pivotally connected to said rod and fulcrumed between said projections, a pin carried by said lever and adapted to engage said arms, a spring connected to said lever and adapted to retain said pin normally in engagement with one of said arms, and means connected with said piston for operating said rod, substantially as described.

6. In a water motor of the character described, the combination, with the frame, a cylinder supported thereby, and a piston mounted within said cylinder, of inlet and outlet passages extending to the opposite ends of said cylinder, a valve controlling said passages, arms connected to said valve and adapted to actuate the same, a part carried by said frame and having projections extending therefrom, a rod mounted to slide longitudinally of said cylinder, a lever pivotally connected to said rod and fulcrumed between said projections, a projection carried by said lever adapted to engage one of said arms, a spring connected at one end to said lever and connected at its other end to said frame and adapted to slide longitudinally thereof, and means connected with said piston for operating said rod, substantially as described.

7. In a water motor of the class described, the combination, with a frame, a cylinder within said frame, and a piston reciprocating therein, of inlet and outlet passages to the opposite ends of said cylinder, a valve controlling said passages, arms connected to said valve and adapted to turn the same, a slotted plate secured to said frame, a lever extending through said slotted plate, a pin carried by said lever and adapted to engage said arms, and means connected to the piston for operating said lever, substantially as described.

8. In a water motor of the class described, the combination, with a frame, a cylinder mounted therein, and a piston reciprocating in said cylinder, of inlet and outlet passages connecting the opposite ends of said cylinder, a valve controlling said passages, arms secured to said valve and adapted to operate the same, a slotted member carried by said frame, a lever moving in said slot, oppositely extending lugs at one end of said lever, a spring connected at one end to one of said lugs and having a sliding connection at its opposite end with a rod secured on said frame, and means connected to said piston for moving said lever and causing the second pin to engage the arm secured to said valve, substantially as described.

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

JOHN H. ROSE.

Witnesses:
C. A. KUHNS,
ALBERT KERN.