

1,012,164.

Fig. 1.

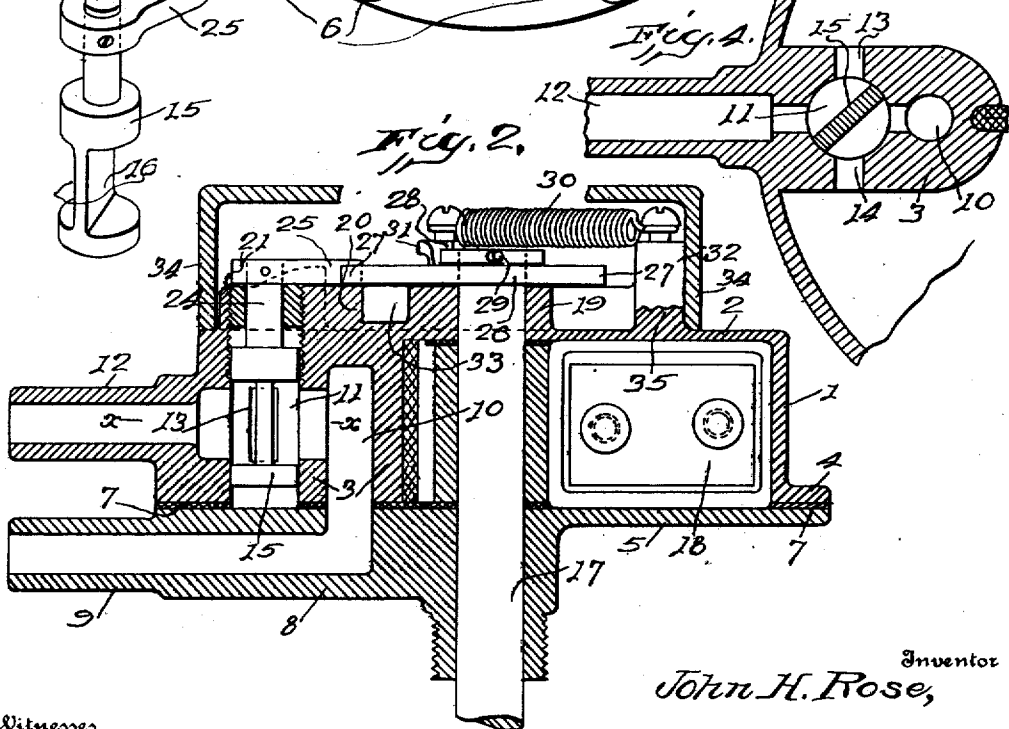
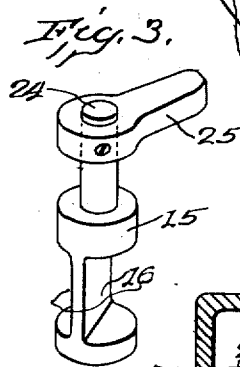
Fig. 1 is a top plan view of a circular mechanical assembly. It features a central shaft (12) with a handle (24) extending to the left. The assembly is enclosed in a circular housing (6) with six screws (2) around its perimeter. Internal components include a central hub (19) with a pin (17) and a spring (29). A lever arm (27) is pivoted on the hub and has a roller (31) at its end. A dashed line (32) indicates a path or boundary. Other labels include 22, 25, 28, 30, 33, 35, and 38.

Fig. 3.

Fig. 3 is a detailed view of a component, likely a roller or pin, showing a cylindrical body (24) and a curved, hook-like end (25).

Fig. 4.

Fig. 4 is a partial view of a component, showing a curved, hook-like end (15) and a cylindrical body (13).



Witnesses

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UNITED STATES PATENT OFFICE.

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OSCILLATING WATER-MOTOR.

1,012,164.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed December 3, 1909. Serial No. 531,144.

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 Oscillating Water-Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to oscillating water motors, and the object of the invention is to provide a motor of this character in which the admission of the water to the opposite sides of the piston will be controlled by a single valve, which valve will be positively actuated by mechanism arranged on the outside of the motor casing and controlled by the movement of the piston.

20 To this end it is a further object of the invention to provide a motor with a three-way valve arranged to simultaneously control both the ingress and egress of the water and having its valve stem extending through one of the cylinder heads and having mechanism mounted on said cylinder head and controlled by the rotation of the motor shaft for actuating said valve stem.

30 In the accompanying drawings, Figure 1 is a top plan view of a motor embodying my invention, with the cap removed; Fig. 2 is a vertical sectional view, taken centrally through the same; Fig. 3 is a detail view of the valve and its actuating finger; and Fig. 4 is a transverse sectional view, taken through the abutment and the valve on the line *x x* of Fig. 2.

40 In these drawings I have illustrated one embodiment of my invention and have shown the same as comprising a casing which is preferably cast in two pieces. As here shown the cylindrical portion 1 of the casing has the upper cylinder head 2 permanently secured thereto and is provided with a radially arranged abutment 3, both the abutment and the cylinder head being preferably cast integral with the cylindrical portion of the casing. The cylindrical portion 1 has at its lower edge an annular flange 4 to which is secured the lower cylinder head 5. This lower cylinder head, as here shown, comprises a flat, circular plate of a diameter substantially equal to the diameter of the annular flange 4 and secured thereto by means of bolts 6, a suitable packing 7 being arranged between the flange and the lower cylinder head to prevent the leakage of

water between these members. The lower cylinder head 5 has mounted thereon and preferably cast integral therewith an inlet pipe 8 having a nipple 9, by means of which it may be connected to the usual supply pipe and communicating with an inlet opening 10 in the abutment 3, which inlet opening, in turn, communicates with a valve chamber 11 in the abutment. A nipple 12 is secured to and preferably cast with the cylindrical portion 1 of the casing and comprises an exhaust conduit which is also in communication with the valve chamber 11. This valve chamber is in communication with the chamber formed within the interior of the motor casing on each side of the abutment, and, to this end, is provided with ports 13 and 14 extending through the opposite sides of the abutment. A turn-plug valve 15 is mounted in the valve chamber 11 and has its side portions cut away to form ports 16, which ports are so arranged that, when the valve member is in one position, the inlet 10 will be connected with the port 13 and the exhaust 12 with the port 14. When the position of the valve member is reversed the inlet 10 will be connected with the port 14 and the exhaust with the port 13, thereby reversing the direction of the flow of the water.

50 A motor shaft 17 is journaled in the upper and lower cylinder heads of the casing and has rigidly secured thereto a piston 18 which fits snugly within the chamber formed within the casing. The upper cylinder head 2 is provided with a boss 19 which forms a part of the bearing for the motor shaft and which is connected by means of a radial rib 20 with a second boss 21 arranged immediately above the abutment 3 and having two stops 22 and 23 extending upwardly therefrom on opposite sides of the radial center thereof. The stem 24 of the valve 15 extends through the upper cylinder head 2 and the boss 21 and has secured thereto a finger 25 arranged between the stops 22 and 23 and connected to the valve stem in such a manner that, when it is in engagement with the stop 22 the port 13 will be connected with the inlet and the port 14 with the exhaust, and, when in engagement with the stop 23, the port 14 will be connected with the inlet and the port 13 with the exhaust.

100 Suitable means are mounted on the upper cylinder head 2 for actuating the finger 25 to shift the valve 15 and thereby reverse

the flow of the water. This means preferably comprises a plate 26 mounted on and movable with the motor shaft 17 and having arms 27 arranged to engage the finger 25. In the present instance this plate is segmental in form, is loosely mounted on the shaft 17 and is supported by the boss 19. The plate is operatively connected to the shaft and is caused to move therewith by means of a lug 28 mounted on the plate 26 at a point substantially midway between the two arms 27 and adapted to be engaged by a part secured to the shaft 17. In the present instance this part consists of a screw 29 mounted on the shaft 17 and extending beyond each side thereof a distance sufficient to enable it to engage the lug 28 when the shaft is rotated. It will be noted that by this arrangement of the plate and the means for operatively connecting the same to the shaft, the shaft and its piston will be permitted to move through a considerable portion of their stroke before any movement is imparted to the plate 26. For the purpose of quickly shifting the valve and avoiding any possibility of its stopping on a dead center, the latter portion of the movement of the plate 26 is imparted thereto by a spring 30 which is arranged to actuate the same when either arm is in engagement with the finger 25 and thus positively actuate the valve.

In the present construction the plate 26 has a radial finger 31 extending therefrom at a point substantially midway between the two arms 27 and one end of the spring 30 is connected to this finger and the other end is connected to a stud 32 mounted on the upper cylinder head 2 on that side of the shaft 17 opposite the valve stem 24 and in alinement with the shaft and the valve stem. This arrangement of the spring is such that, when the finger 31 has been moved into alinement with the stud 32 and the valve stem 24, the spring will be under its greatest tension, and, consequently, as soon as the finger passes out of alinement with said member, the contraction of the spring will tend to move the finger, and, consequently, the plate, about their pivotal centers and toward the stud 32. The arrangement of the arm 27 relatively to the finger 31 is such that the movement of the shaft will have carried the finger 31 past its dead center position, that is, the position in alinement with the shaft 17 and the stud 32, before the arm 27 shall engage the finger 25. Consequently, a quick movement is imparted to the valve and the direction of the flow of the water is reversed instantly and without any possibility of the valve stopping on a dead center, with an equal water pressure on both sides of the piston. The movement of the plate 26 and arms 27 is limited by the stops 33 secured to the under side of the

plate and adapted to engage the radial rib 20. Each stop is so arranged with relation to the corresponding arm 27 that it will engage the rib 20 before the finger 25 of the valve stem will engage the stop 22 or 23, as the case may be, thus avoiding the imparting of a severe jar to the valve, which would result if the arm 27 moved the finger positively against the stop. The finger has, however, been moved through the greater portion of its movement before the stop 33 engages the rib and the momentum imparted to the finger and the valve will, together with the water pressure, serve to complete the movement of the valve.

The mechanism mounted on the upper cylinder head 2 may be inclosed in a housing or cap 34 which is adapted to fit about a vertically arranged flange or boss 35 carried by said cylinder head and encircling the operating parts mounted thereon. If desired a lubricant may be placed in the housing and the parts immersed or partially immersed therein.

With the parts in the position shown in Fig. 1 it will be noted that the water is entering the interior of the casing through the port 14 and that the piston and shaft have moved through a considerable portion of their stroke. The projection 29 on one side of the shaft is just about to engage the lug 28 on the plate 26, which plate has been stationary during the movement of the piston to its present position. The continued movement of the piston will move the plate a distance sufficient to carry the finger 31 past its dead center position, and, when it is past this position, the spring 30 will continue the movement of the plate 26 until the stop 33 engages the rib 20, and this movement will shift the valve 15, thereby admitting the water to the interior of the casing through the port 13 and reversing the direction of movement of the piston 18. It will be noted that this construction and arrangement of the motor and its operating parts enable me to employ a single valve of a very simple construction which may be positively shifted to reverse the direction of the flow of the water and that the mechanism employed for so shifting the valve is controlled by the movement of the piston and is so arranged as to be readily accessible for repair or adjustment; and further, that access may be had to the valve-controlling mechanism without interfering with the operation of the motor. It will also be noted that the motor is cast in two pieces, and, owing to the character of the moving parts thereof, no fine machine work is required, thereby enabling a very strong, durable motor to be manufactured at a very low cost.

While I have shown and described one embodiment of my invention it will be readily apparent that many modifications and

alterations of the same can be made without departing from the spirit of my invention and I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described.

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

In a motor, a casing comprising a cylinder and cylinder heads, a shaft journaled in said cylinder heads, a piston carried by said shaft, an abutment mounted within said casing and cooperating with said piston to divide said casing into two chambers, said abutment having a valve chamber communicating both with a supply pipe and with an exhaust pipe and provided with ports leading to the respective chambers in said casing, a rotary valve mounted in said valve chamber to control said ports and having a stem extending through one of said cylinder

heads, a finger mounted on said stem, a plate loosely mounted on said shaft and having arms arranged to engage the opposite sides of said finger, a lug carried by said plate, a projection arranged on said shaft to engage said lug, a spring connected with said plate between said arms and connected with said casing in substantial alinement with said shaft and said stem, an outwardly extending flange carried by said cylinder head, and a cap cooperating with said flange to form a housing inclosing the moving parts mounted on said cylinder head and adapted to contain a lubricant.

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

JOHN H. ROSE.

Witnesses:

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J. E. SANGER.