

L. L. DODDS.
WATER MOTOR.
APPLICATION FILED MAR. 5, 1909.

948,501.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 1.

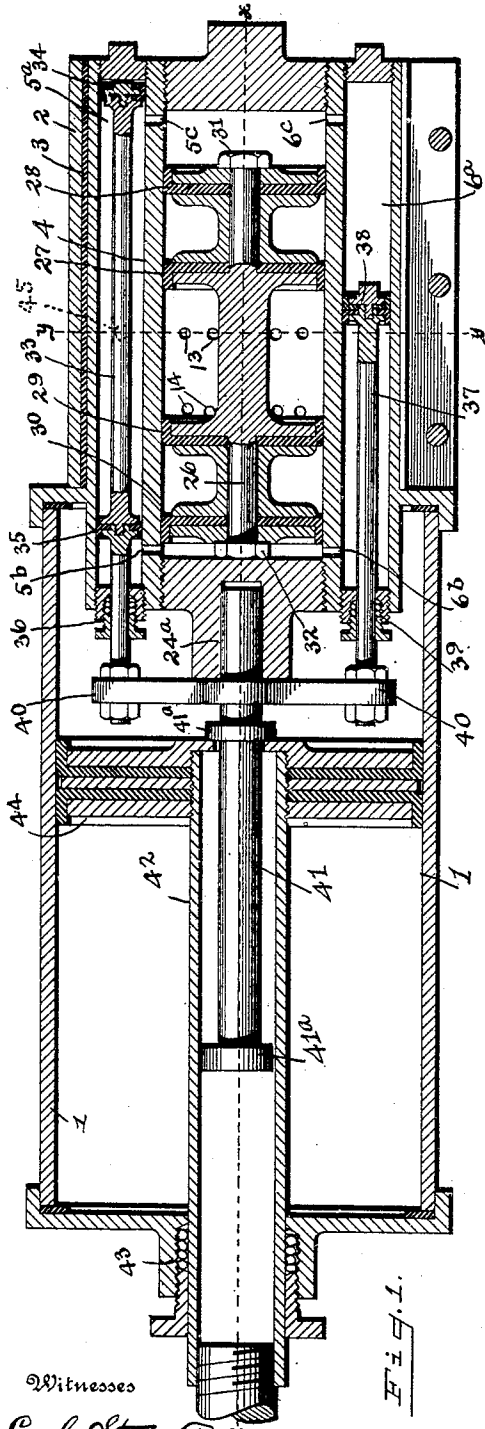


Fig. 1.

Witnesses

Carl Stoughton &
A. L. Phelps

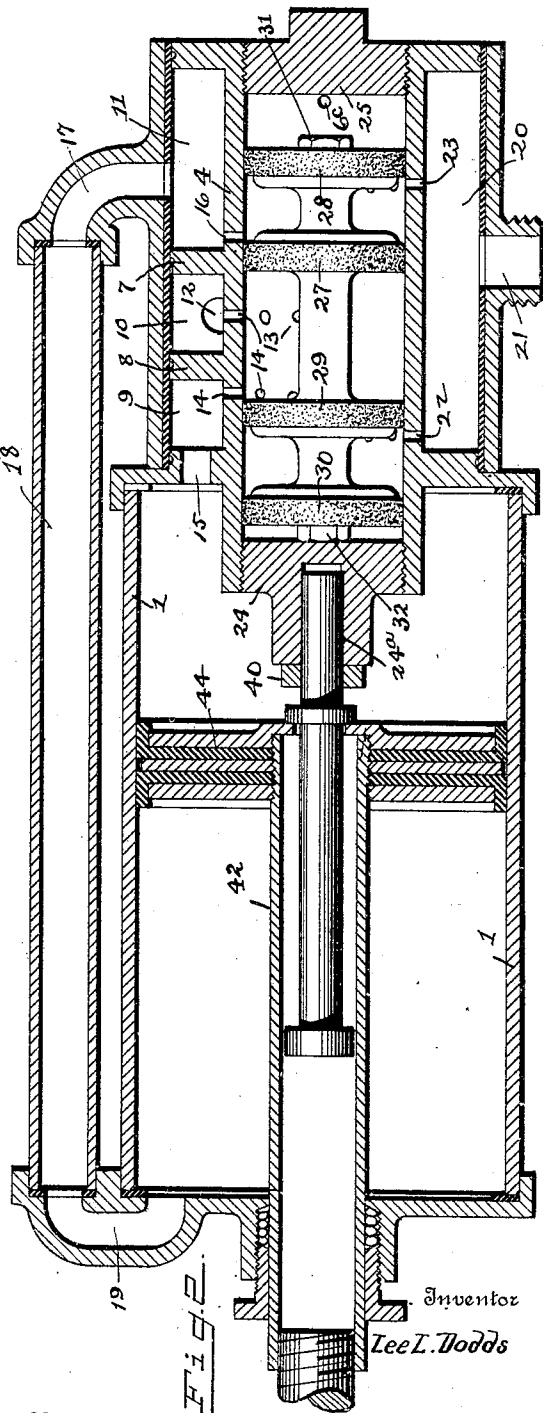


Fig. 2.

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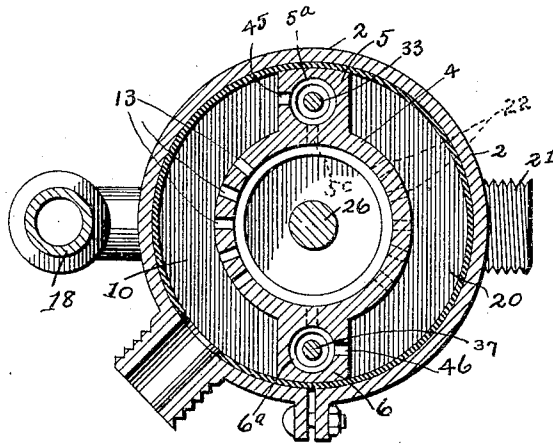


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

LEE L. DODDS, OF COLUMBUS, OHIO, ASSIGNOR TO THE MONARCH SPECIALTY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

WATER-MOTOR.

948,501.

Specification of Letters Patent.

Patented Feb. 8, 1910.

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To all whom it may concern:

Be it known that I, LEE L. DODDS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Water-Motors, of which the following is a specification.

My invention relates to the improvement of water motors of that class in which city water pressure is employed to operate the pump or motor, and the objects of my invention are to provide an improved motor of this class of superior construction and arrangement of parts; to provide an improved valve mechanism and means for imparting a positive reciprocating motion to a piston rod, and to produce other improvements the details of which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which:

Figure 1 is a central vertical longitudinal section of my improved motor, Fig. 2 is a horizontal section on line $x-x$ of Fig. 1, and, Fig. 3 is a transverse section on line $y-y$ of Fig. 1.

Similar numerals refer to similar parts throughout the several views.

In carrying out my invention, I employ a horizontally disposed main cylinder 1, with the inner end of which is connected an exterior valve casing 2, the latter being provided with a suitable internal lining indicated at 3. Formed with the external casing 2 is a smaller internal valve casing 4, the latter having its forward end portion extending, as shown, into the inner end portion of the main cylinder 1. At opposite points, the upper and lower sides of the internal valve cylinder 4 are connected with the external casing 2 by wings 5 and 6, each of the latter extending the full length of the internal cylinder and each being formed with a central longitudinal bore or supplemental valve chamber, the latter being indicated respectively at 5^a and 6^a. These supplemental valve chambers are closed at their ends and the upper supplemental chamber is connected near each end with the ends of the valve chamber formed within the casing 4, through the medium of ports which are indicated respectively at 5^b and 5^c. The lower supplemental valve chamber communicates with the ends of the central valve chamber through similar ports 6^b and 6^c.

Through the medium of ports 7 and 8, each of which is curved to form an arc of a circle, the space between the wings 5 and 6 on one side of the valve casing 4, is divided into three adjoining chambers which are indicated respectively at 9, 10 and 11. The central chamber 10 has a water inlet opening therein, which is shown at 12 and said chamber 10 is also connected with the central portion of the main valve chamber through the medium of ports 13. The chamber 9 which is shown in Fig. 2 of the drawing, at the left of the chamber 10, also communicates with the interior of said main valve casing 4 through ports 14 which are adjacent to the wall or partition 8. This chamber 9 also has a comparatively large outlet or port 15 which leads into the inner end of the main or power cylinder 1. The chamber 11, as prescribed for the chambers 9 and 10, is provided with ports, one of which is shown at 16, and which communicate with the interior of the main valve casing 4. This chamber 11 also has connected therewith, an outwardly extending pipe arm 17 which through the medium of the pipe section 18 and a passage 19 at the outer end of the power cylinder is connected with said power cylinder.

The space within the casing 2 and on the opposite side of the inner valve casing 4 from that in which is formed the chambers 9, 10 and 11 comprises an exhaust space or chamber such as is indicated more clearly in Fig. 2 at 20 and from this chamber leads laterally a suitable outlet pipe arm 21. This exhaust chamber is connected with the interior of the valve casing 4 through the medium of ports 22 formed in the inner end portion of said chamber and ports 23 formed to the right of the center of the length of said chamber.

The inner end of the central valve cylinder 4 is closed by a threaded lug 24 and the outer end thereof by a removable plug 25. Within the cylinder 4, I provide a reciprocating valve body, which comprises a central horizontal rod or member 26 on each side of the center of the length of which is carried a pair of separated cup leathers, the cup leathers to the right being indicated at 27 and 28 and the cup leathers comprising the pair to the left being indicated at 29 and 30. Each end of the central rod or valve member 26 is provided with a nut or enlarged head,

these heads being indicated at 31 and 32 respectively. As indicated in the drawing, the valve body is somewhat shorter than the distance between the valve casing plugs 24 and 25.

In the upper supplemental valve casing 25, I provide a horizontal valve rod 33 which carries at its outer or rear end a piston-like valve 34. The rod 33 also carries toward its inner end a piston-like valve 35, said rod on the outer side of said valve extending through a packing or stuffing box 36 in the end of the chamber 5^a.

In the lower supplemental valve chamber 6^a is a horizontal valve rod 37 which is shorter than the rod 33 and which carries on its inner end a piston-like valve 38. The rod 37 as prescribed for the rod 33 passes through a stuffing box indicated at 39 and has its outer end portion connected with the outer end of the rod 33 by a bar 40. This bar 40 is carried by a horizontal plunger or rod 41 which has an enlarged forward end or head 41^a, said rod 41 having its rear end portion movably inserted in an end socket 24^a of the end plug 24 of the valve casing 4. On the outer side of the bar 40, the pin 41 extends loosely within a tubular piston rod 42 which leads through a packing ring or stuffing box 43 in the outer end of the power cylinder 1. The hollow piston rod 42 carries on its inner end a suitable form of piston 44 which fits within the cylinder 1. The pin 41 also has formed therewith on the outer side of the bar 40, a collar 41^a which is adapted to abut against the inner face of the piston 44. The supplemental valve chamber 5^a communicates with the water supply chamber 10 through the medium of a port 45 formed in the wing 5 and the supplemental valve chamber 6^a communicates through the medium of a port 56 with the exhaust chamber 20, these connections being formed about midway of the lengths of said supplemental valve chambers.

In the accompanying drawings, I have shown the power piston 44 in its innermost position in the cylinder 1 and when said piston is in this position, the central valve body will be, as shown, in the forward end portion of the casing 4, its head 32 in contact with the casing end plug 24. When the piston and main valve are in the position thus indicated, the piston-like valve 34 is, as shown, in the rear end of the supplemental valve chamber 5^a, said valve and the valve 35 being thus beyond or in rear of the ports 5^c and 5^d and the valve 38 beyond or in rear of the exhaust port 46. Water under pressure being turned into the inlet 12, passes through the ports 13 into the space between the cup leathers 27 and 29, thence through the ports 14 and passage 15 to the rear of the piston 44 against which the water will exert such pressure as to move said piston forwardly

into the cylinder 1. When the piston 44 has thus been moved forwardly a sufficient distance to engage the enlarged head 41^a of the pin 41, it is obvious that said pin will be moved outwardly with the piston 70 and that through the movement of the connecting bar 40 thus imparted, the supplemental valve rods 33 will be moved outwardly until the piston-like valves 34 and 35 are in front of the ports 5^c and 5^d and the valve 38 is in front of the port 46. It will be understood that the central valve body will have previously been moved to its forward position in the casing 4 by the pressure of water entering the rear end of the valve casing through the port 5^c, the water thus provided being supplied from the chamber 10 through the port 45 and supplemental valve chamber 5^a. The piston 44 having as described been forced to the forward or outer end of the cylinder 1, it is obvious that water from the valve chamber 5^a will be free to pass through the port 5^b into the forward end of the casing 4, where it will exert pressure on the cup leather 30 to drive the central valve body to the rear end of the valve casing. In this operation, the water in rear of said central valve body, will be forced downward through the port 6^c into the supplemental valve chamber 6^a, from which it will escape through the port 46 into the exhaust chamber 20 and thence out through the outlet 21. When the rearward movement of the main or central valve body is continued until the cup leather 27 has passed the port 16 and the port 14 is brought into communication with the space between the cup leathers 29 and 30, it is obvious that the water under pressure between the cup leathers 27 and 29 will pass through the port 16, thence through the pipe arm 17, pipe section 18 and passage 19 to the outer end of the cylinder 1 where it will exert such pressure on the piston 44 as to drive the latter back to the position shown in the drawing. During this operation, the water in the cylinder 1 which is in rear of the piston, will be forced through the passage 15 and port 14 into the space between the cup leathers 29 and 30 where it will be permitted to exhaust through the port 22. In the forward movement heretofore described of the central valve body, it is obvious that water which may have been contained in front of the piston 44 will be forced through the passage 19, pipe section 18 and pipe arm 17 into the chamber 11 from which it will escape through the port 16 into the space between the cup leathers 27 and 28 and thence out through the port 23.

From the construction and operation described, it will be observed that a comparatively simple although powerful water motor is provided, by means of which a reciprocating motion may be imparted to the pis-

ton rod and that such motor may be employed for pumping or other purposes.

What I claim, is:

5 In a water motor, the combination with a power cylinder, a piston and piston rod therein, an external valve casing connected with one end of said power cylinder, an internal valve casing and supplemental valve chambers on opposite sides of said internal
10 valve casing, of a central valve body comprising four cup leathers as described within said internal valve casing, a supplemental valve rod working in one of said supplemental valve casings and carrying two separated valve bodies, a valve rod working in the remaining supplemental valve casing and having a single valve thereon, a bar connecting corresponding ends of said supplemental valve rods, and a pin connected
15 with said bar and extending loosely through

the piston of the power cylinder, said pin having an enlarged head, said supplemental valve cylinders having ports in their opposite end portions communicating with opposite ends of the central valve casing, said
25 central valve casing having central ports leading from a source of water supply and having ports communicating with the inner end of the power cylinder, one of said supplemental valve casings having a water inlet
30 between the valves therein and the remaining supplemental valve casing having an outlet port.

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

LEE L. DODDS.

Witnesses:

L. CARL STOUGHTON,
A. L. PHELPS.