

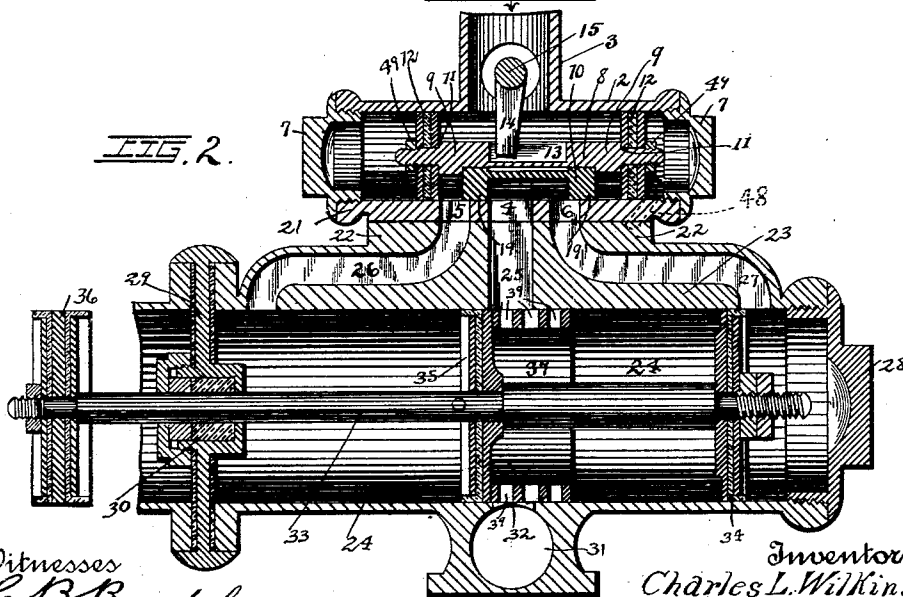
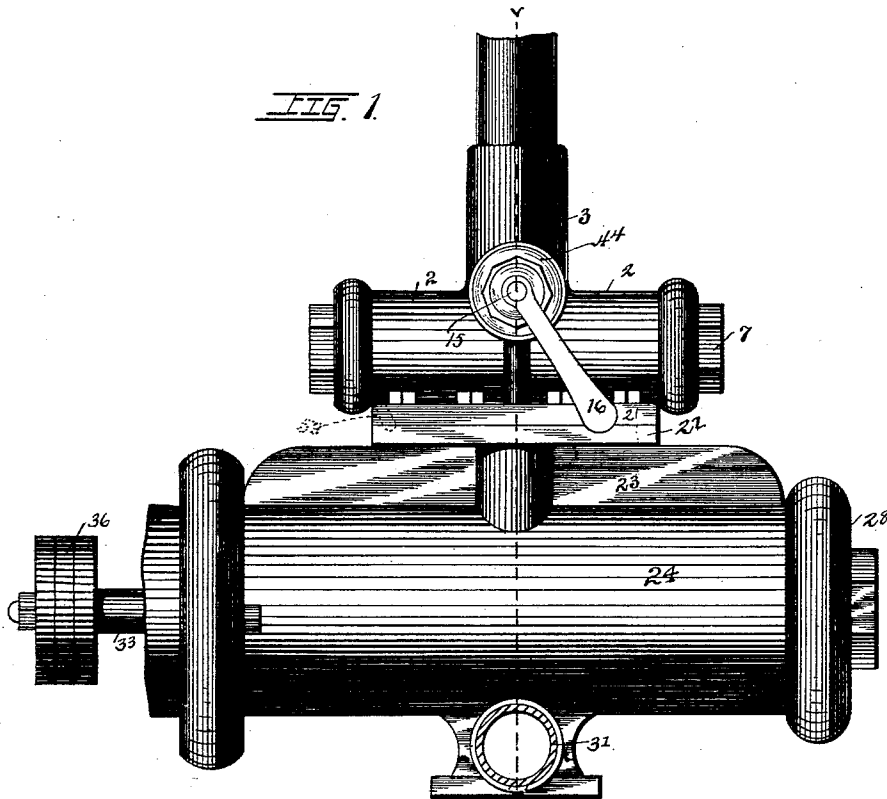
(No Model.)

3 Sheets—Sheet 1.

C. L. WILKINS
WATER MOTOR.

No. 484,271.

Patented Oct. 11, 1892.



Witnesses
H. B. Bradshaw
E. C. Bragg

Inventor
Charles L. Wilkins
By his Attorneys
Staley, Shepard

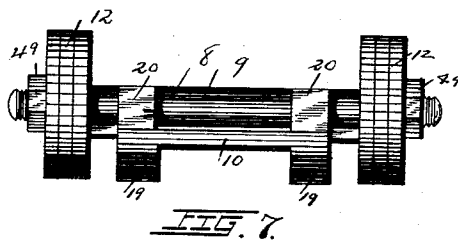
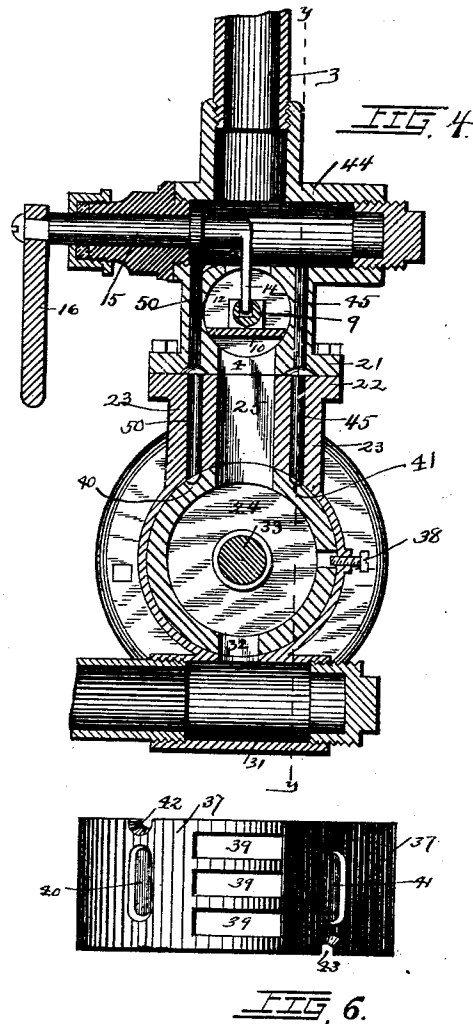
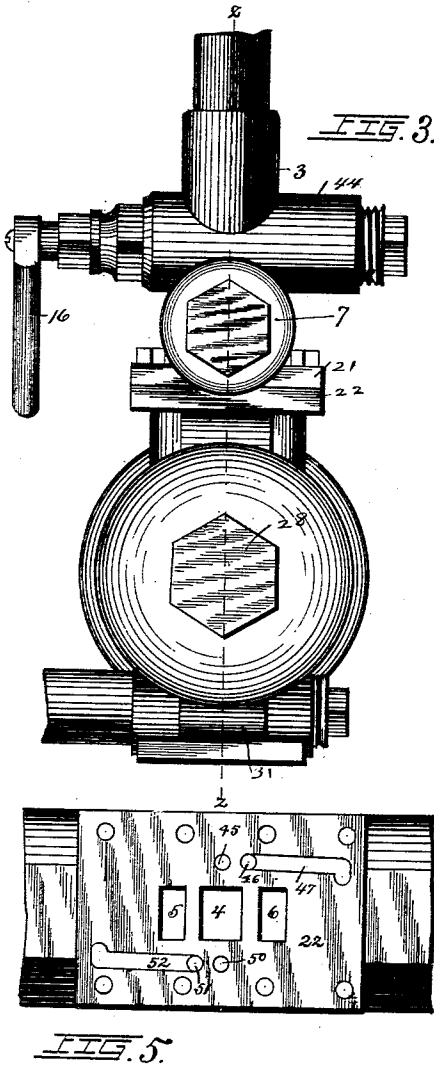
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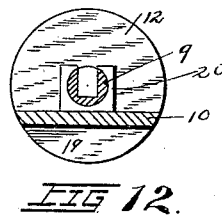
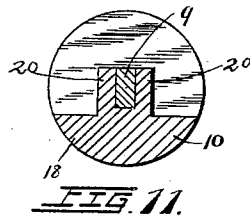
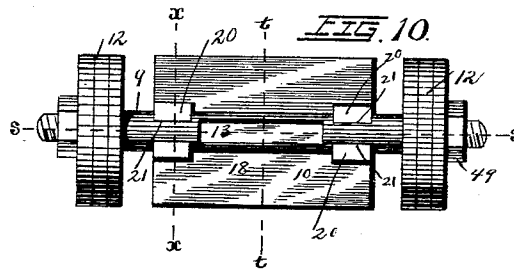
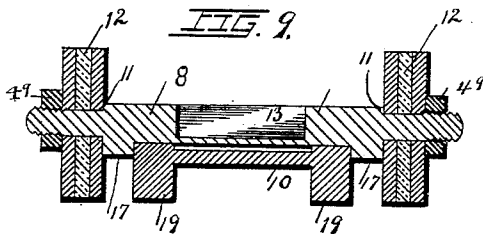
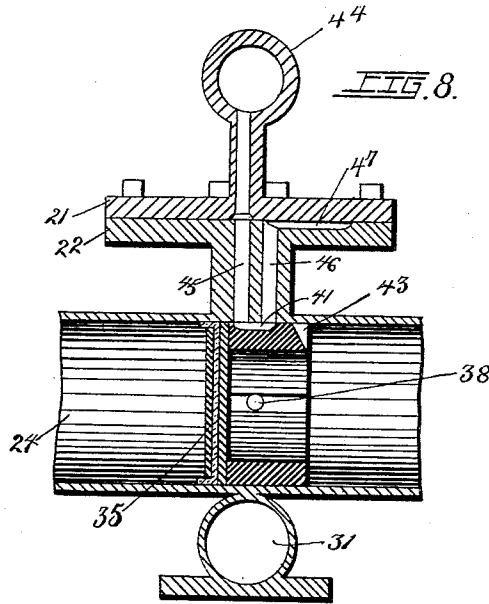
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3 Sheets—Sheet 3.

C. L. WILKINS.
WATER MOTOR.

No. 484,271.

Patented Oct. 11, 1892.



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UNITED STATES PATENT OFFICE.

CHARLES LAWRENCE WILKINS, OF COLUMBUS, OHIO.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 484,271, dated October 11, 1892.

Application filed February 18, 1892. Serial No. 421,964. (No model.)

To all whom it may concern:

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

My invention relates to the improvement of water-motors, and has particular relation to that class of water-motors wherein the motive power is furnished through the city water-pipes.

The objects of my invention are to provide a motor of this class of simple and reliable construction, to provide for the automatic operation of the main valve or piston directly from the operating-valve cylinder without the intervention of the usual operating-valve rod, to provide an improved form of valve for the valve-cylinder, to provide improved and automatic means for alternately supplying the heads of the operating-valve with water-pressure, to so construct my improved motor as to obtain great power thereby, and to produce other improvements which will be more specifically pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved motor. Fig. 2 is a central longitudinal section of the same. Fig. 3 is an end view thereof. Fig. 4 is a sectional view on line *z z* of Fig. 3. Fig. 5 is a plan view of the motor-body, showing the upper or operating cylinder removed. Fig. 6 is a view in elevation of the valve-ring. Fig. 7 is a side elevation of the operating-valve. Fig. 8 is a sectional view on line *y y* of Fig. 4, showing the operating-cylinder and its valve removed. Fig. 9 is a central vertical section of the operating-valve, taken on line *s s* of Fig. 10. Fig. 10 is a plan view of the same; and Figs. 11 and 12 are transverse sections taken, respectively, on lines *x x* and *t t* of Fig. 10.

Similar figures refer to similar parts throughout the several views.

2 represents the operating or valve cylinder, which is provided, as shown, with a central supply-pipe, as indicated at 3.

4 represents a central exhaust-port in the bottom of said cylinder 2, and 5 and 6 repre-

sent, respectively, water-ports which are arranged near and on opposite sides of the port 4. The cylinder 2 is, as shown at 7, provided with caps, which, although detachably connected with the cylinder, normally close said ends.

8 represents the operating-valve body, which, as indicated at 9 and 10, is formed of two sections. The section 9 is, as shown in the drawings, in the form of a shaft or rod of less length than the interior of the cylinder 2, said shaft being provided, as shown in the drawings, with screw-threaded end portions and circumferential shoulders 11 near said screw-threaded portions. Fitting upon the end portions of the section 9, and clamped by nuts 49 against the shoulders 11, are suitable valve-heads 12, which fit snugly within the cylinder 2. Formed in the upper side of the central portion of the valve-section 9 is a longitudinal socket 13, within which extends the lower end portion of an arm 14, which depends from the inner portion of a key-pin 15, the latter entering the inlet-pipe 3 at right-angles therewith, and being provided on the outside of said pipe 3 with a handle-piece 16. The outer side of the portion 8 is provided, adjoining each of the valve-heads 12, with a downwardly-projecting lug 17, between which and against the under side of the body of the section 9 bears the body of the valve-section 10. This section 10, as shown in the drawings, consists of a body 18, the under side of which is provided at each end with a downwardly-projecting portion 19, which conforms to the shape of and bears within the cylinder 2. This section 10 is connected with the section 9 by means of four arms 20, one pair of which projects upward from the body 18, near each end thereof, said arms fitting within correspondingly-shaped notches 21, formed in opposite sides of the portion 9. From this connection it will readily be seen that any sliding movement of one section of the valve-body will be imparted to the other section. The valve-section 10 is of such length that when one of its lugs 19 rests between the ports 4 and 5 the ports 6 and 4 are made to communicate through the space or way which exists between the lugs 19. Said ports 6 and 4 are by said lugs 19 cut off from communication with the cylinder 2.

As shown in the drawings, the bottom portion of the cylinder 2 is extended to form a base-plate 21. This base-plate 21 rests upon a correspondingly-shaped top plate 22 of an upper side extension 23 of the power-cylinder 24, of greater dimensions than the cylinder 2. This cylinder 24 has its central portion communicating with the port 4 of the upper cylinder by an exhaust port or passage 25, while the ports 5 and 6 of the upper cylinder communicate by ports or passages 26 27 with the cylinder 24, near opposite ends thereof. As shown in the drawings, the lower cylinder 24 is provided with a detachable cap or head 28 at its rear end, while the opposite end of said cylinder is closed by a suitable disk, (indicated at 29,) the center of which is provided with a water-tight journal-bearing 30. The lower side of the cylinder 24 is provided with an extension or base 31, which through an opening 32, communicates with the interior of the cylinder 24, diametrically opposite the exhaust-port 25. Within the cylinder 24 extends a piston-rod 33. This piston-rod bears within the journal-bearing 30 and carries upon its inner end portion a suitable piston-head 34. A similar piston-head 35 is carried near the center of the piston-rod. The outer end of the piston-rod 33 may be provided with a suitable suction or plunger-head 36 or may be connected with any mechanism or parts thereof with which it is desired to impart motion.

37 represents my improved valve-ring, which, as shown in the drawings, forms the greater part of a circle, and which, fitting snugly and adapted to slide within the cylinder 24, is prevented from rotation therein by means of a suitable set-screw 38, which is inserted within a screw-hole in the wall of the cylinder 24, and the inner end of which projects between the ends of said ring. The ring 37 is provided on its upper and lower sides with a number of longitudinal mortises 39, and on opposite sides of said mortises said ring is provided with transverse depressions or pockets 40 41.

42 represents a notch which is formed in the edge of the ring opposite one end of the pockets 40, and 43 is a similar notch formed in the opposite ring edge opposite the pocket 41. As shown in the drawings, the ring 37 is so supported within the cylinder 24 as to bring its upper openings 39 into communication with the exhaust-port 25, when the piston-head 35 is pressing against the outer side of the ring and the piston is at its limit of inward motion. In this position the lower openings 39 of the ring 37 are in communication with the opening 32 of the discharge-tube 31.

Communicating with a cross extension 44 of the pipe 3 at a point above and slightly at one side of the upper cylinder is a passage or port 45, which, passing downward through the side wall of the upper cylinder, is continued through the extension 23 of the lower cylinder to the interior of the cylinder 24, or

to the periphery of the ring 37 contained therein, where said passage or port communicates with the pocket 41. At its opposite end the pocket 41 communicates with the lower end of a port 46, which is parallel with the passage 45 and which extends upwardly through the base-plate 22, where it communicates, as shown in Fig. 5 of the drawings, with one end of a groove or channel 47 formed in the upper surface of the plate 22 and which leads to a point near one end of the latter and communicates at said point with the lower end of an upwardly-directed passage 48, which is shown in dotted lines in Fig. 2 of the drawings. This passage 48 leads, as shown in said figure, to one end, which I will term the "rear end" of the upper cylinder 2, communicating therewith in rear of or on the outer side of the valve-head 12. In this manner a connection or passage-way may be formed between the inlet-pipe 3 and one end of the cylinder 2.

The opposite side wall of the cylinder 2 and the opposite side wall of the extension 23 are provided with ports 50, 51, 52, and 53, (the latter being shown in dotted lines in Fig. 1 of the drawings,) said ways and passages corresponding, respectively, with the ways and passages 45, 46, 47, and 48. The groove 52 and passage 53 lead, however, to the opposite end of the valve from that reached by the groove 47 and passage 48. The valve 8, being in the position shown in Fig. 2 of the drawings—*i. e.*, in such position with the cylinder 2 that the ports 4 and 6 communicate through the way or space between the lugs 19 of the valve-section 10, said ports being cut off by said lugs from communication with the remainder of the cylinder interior and the port 5 being unclosed—the operation of my improved water-motor and the method of imparting to the piston 33 a reciprocating motion is as follows: The water which has been admitted to the cylinder 2 through the pipe 3 and which has passed about the shaft portion 9 of the cylinder-body and through the ports 5 to 26, and which has been utilized for pressing the piston-head 35 to its inner limit, is contained in the forward portion of the cylinder. In order to connect the ports 5 and 4, and thus admit of the water contained in the forward portion of the cylinder 24 passing outward through the ports 26 to 5, a sliding motion is imparted in the manner hereinafter described to the valve 8, which will result in the passage of the forward lug 19 of said valve-body to a point in front of the port 5 and in a change of the rear 19 to a point between the ports 4 and 6. This movement of the valve, as will readily be seen, will result in bringing the port 6 into communication with the cylinder 2. The valve movement thus described is produced by the pressure of live water, which, passing inward from the pipe 3, enters the passage 45, passes through the latter to the ring-pocket 41, and passes from said pocket 41 into the passage 46, thence into the groove

47, and up through the port 48 to the upper cylinder end. The pressure of the water thus discharged into said cylinder end forces the valve 8 toward the opposite end of the cylinder, this movement of said valve resulting in the change and location of the parts thereof and in the opening and closing of the ports, as hereinbefore described. This movement of the valve having been accomplished, it is evident that the water which flows into the cylinder 2 through the pipe 3 will pass through the ports 6 to 27 to the rear end of the cylinder 24, where through pressure upon the piston-head 34 the latter, together with its piston 33, will be driven to the forward end of the cylinder. The piston-head by contact with the ring 37 will operate to force said ring sufficiently toward the forward end of the cylinder to cause the port 46 to come into communication with and discharge through the notch-outlet 43 of said ring. This movement of the ring will at the same time result in a communication of the ports 50 and 51 by the communication therewith of the ring-pocket 40. In this manner a communication will be obtained through the passage 50, pocket 40, groove 52, and port 53 between the forward portion of the cross-extension 44 of the pipe 3 and the forward portion of the cylinder 2. The water-pressure thus imparted to the forward end of the valve 8 will result in driving the latter back to the position shown in the drawings. The exhaust-water, which, as hereinbefore described, passes alternately from the ports 5 and 6 into the port 4, is allowed to escape through the openings 39 of the ring 37 into the outlet-tube 31. It is evident that the return inward motion of the piston-rod will result, through the pressure of the head 35 against the ring 37, in driving the latter to a position which will again bring the ports 4 and 46 into communication through the medium of the pocket 41. In the manner above described it will readily be seen that a continuous reciprocating motion may be imparted to the piston-rod automatically and that this motion is attained by a water-power supplied directly from the valve-cylinder without the intervention of any mechanical connection by lever or otherwise between the operating-valve 8 and said piston-rod. In this manner it will be seen that the power usually employed in transmitting motion to the parts which ordinarily connect the operating-valve and piston-rod is saved, and through the water having a direct action upon the piston-heads great power will be attained. In case the operating-valve should become so clogged by any collection of sediment within the cylinder 2 as to interfere with the starting of the motor automatically it is evident that by turning the handle-piece 16 in such manner as to cause an engagement of the pin-arm 14 with the valve-body the latter may be given an impetus which will result in properly loosening and starting the same. It will also be observed that from my construction and method of operation one of the piston-

heads is entirely relieved from water-pressure during the action of the water upon the opposite head, thus entirely removing any resistance from the direction in which the piston is traveling. It will be observed that the construction herein described admits of the water-motor being produced in a simple and reliable form and at a reasonable cost of manufacture.

It is obvious that a motor of this construction might be employed for many purposes where motor power is desirable, but that said motor is particularly adapted for use in pumping water from a cistern or other points to elevated house-tanks, for pumping pipe-organs, or running light machinery.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a water-motor, the combination, with the cylinder 24, a ring-valve therein, openings 39, pockets 40 41, and notches 42 43 in said ring-valve, the latter having a sliding motion, as described, of a valve-cylinder, a reciprocating valve therein, and ports connecting said cylinder 24 with the valve-cylinder, said ports adapted, as described, to be opened and closed by the movement of said ring-valve, substantially as specified.

2. In a water-motor, the combination, with the power-cylinder 24 and driving-piston therein, valve-cylinder 2, the valve 8 and its operating piston therein, and a feed-pipe for said valve-cylinder, and two pairs of live-water passages, one passage of each pair connecting cylinder 24 and feed-pipe 44 and the other connecting cylinder 24 and one end of the cylinder 2, of a valve-ring 37, fitting and sliding in cylinder 24, and separated pockets 40 41 in said ring, the latter adapted to be forced to such position in said power-cylinder as to alternately form a connection through the medium of said pockets between the passages composing each of live-water passages, substantially as described.

3. In a water-motor, the combination, with the power-cylinder 24 and driving-piston, as described, therein, valve-cylinder 2, and feed-pipe therefor, and two pairs of live-water passages, one passage of each pair connecting cylinder 24 and feed-pipe 44 and the other connecting the cylinder 24 and one end of the cylinder 2, of a valve-ring 37, fitting and sliding within the cylinder 24, separated pockets 40 and 41 in said ring, and notched outlets 42 and 43 on opposite sides of said ring and opposite said pockets, said ring adapted to be forced in such position in said power-cylinder as to alternately form a connection through the medium of said pockets between the passages composing each pair of live-water passages, substantially as specified.

CHARLES LAWRENCE WILKINS.

In presence of—

C. C. SHEPHERD,
THOS. S. GATES.