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WATER MOTOR.

APPLICATION FILED OCT. 2, 1908.

917,092. Patented Apr. 6, 1909.

Fig. 1.

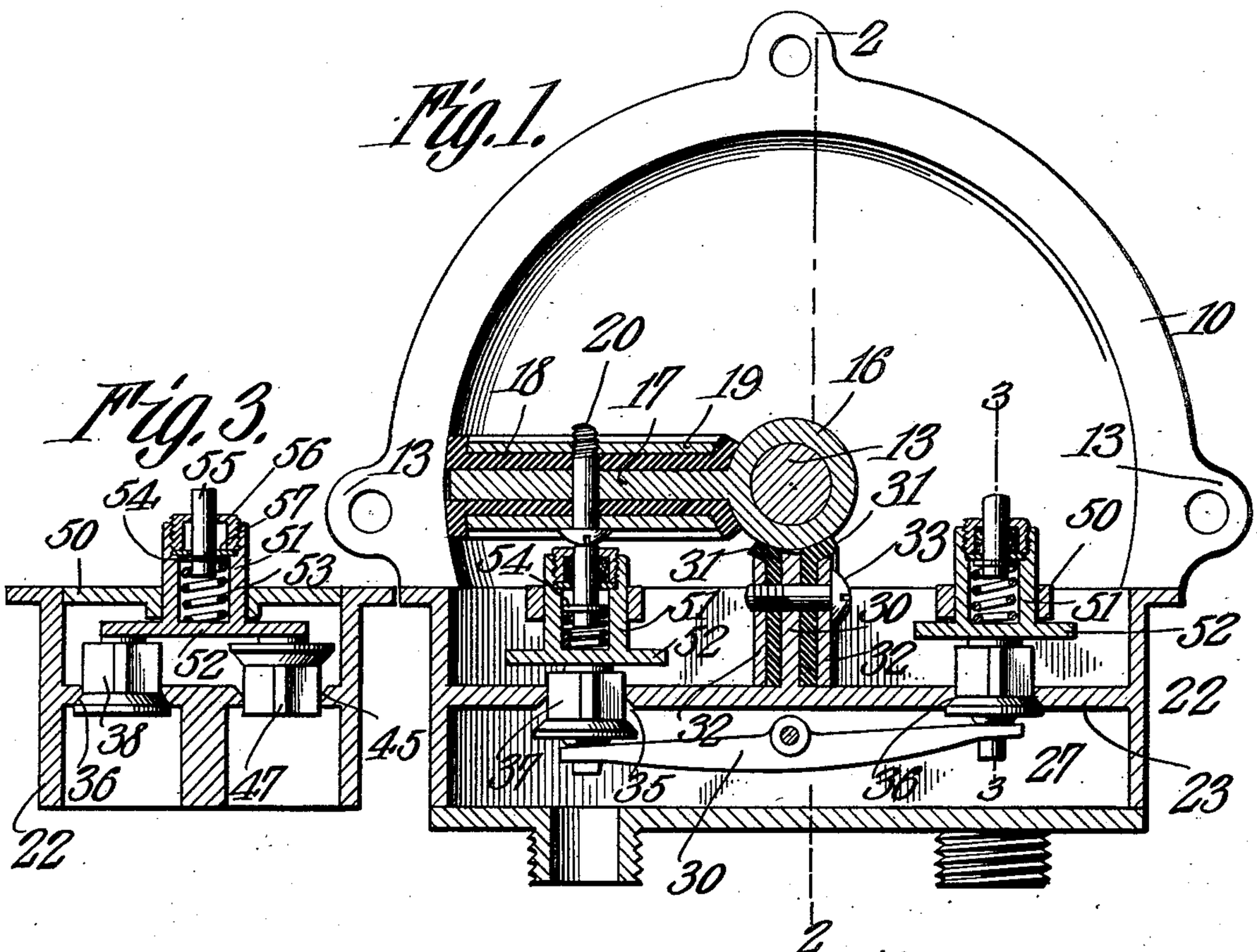


Fig. 3.

Fig. 2.

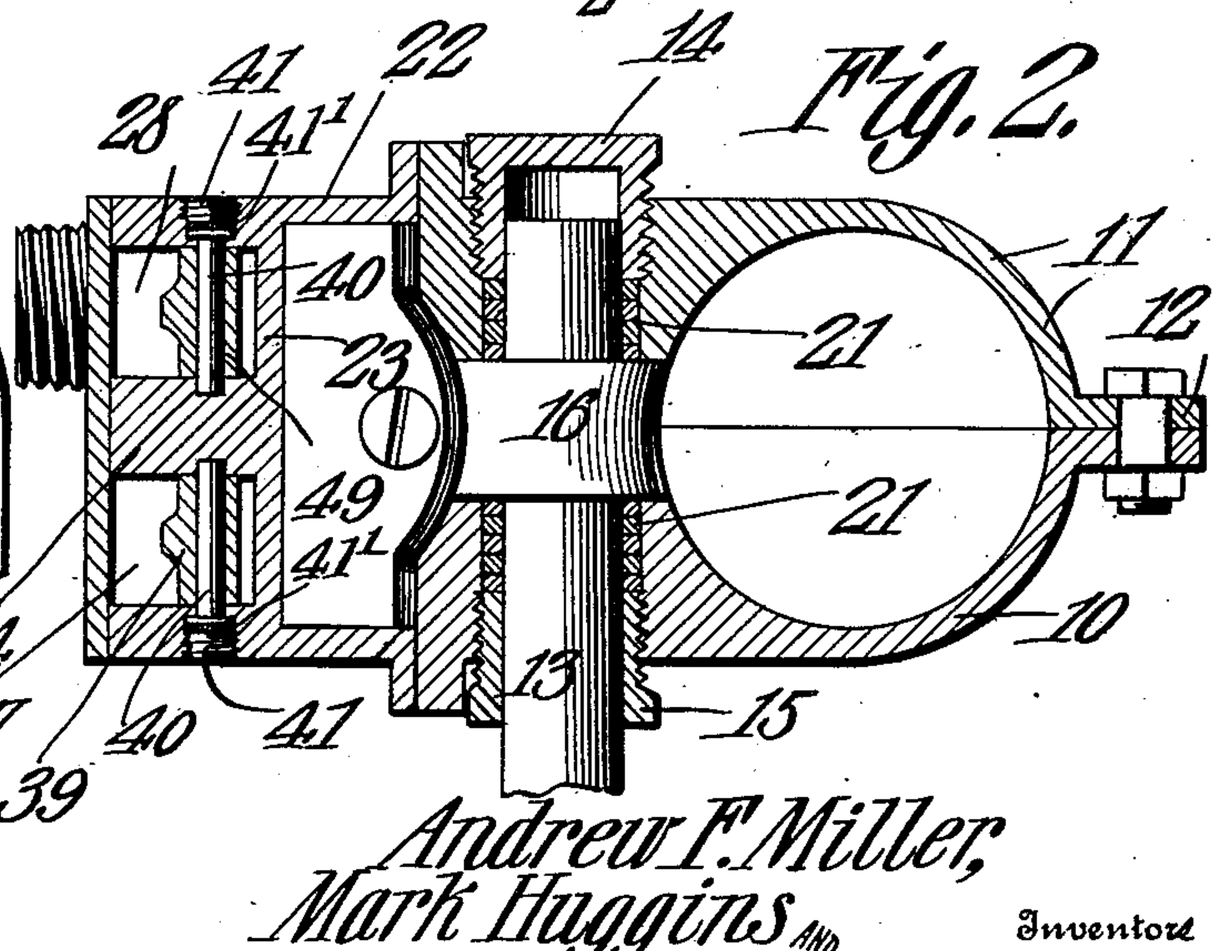
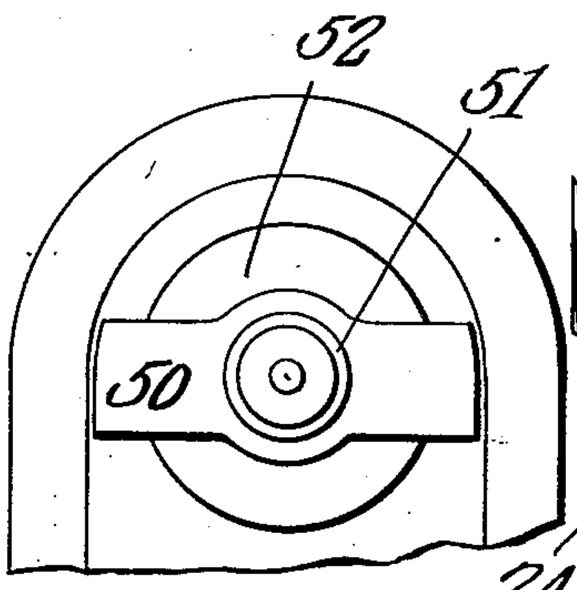


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WATER-MOTOR.

No. 917,092. Specification of Letters Patent. Patented April 6, 1909.

Application filed October 2, 1908. Serial No. 455,837.

To all whom it may concern:

Be it known that we, ANDREW F. MILLER, MARK HUGGINS, and CHARLES E. JENKINS, citizens of the United States, residing at Columbus, in the county of Franklin, State of Ohio, have invented a new and useful Water-Motor, of which the following is a specification.

This invention relates to fluid pressure motors and has for its principal object to provide a motor of simple and economical construction which may be readily attached to the faucet of a water pipe and operated by the pressure from a city main for the purpose of actuating a washing machine, sewing machine, or the like.

A further object of the invention is to provide a motor having an oscillatory piston and provided with inlet and exhaust valves which are operated directly from the piston, thus dispensing with the usual valve gear and its connections.

A still further object of the invention is to provide a yieldable connection between the valves and the piston, so that after the valves have been shifted, the piston may still continue its movement without coming to an abrupt stop.

A still further object of the invention is to provide a yieldable or cushioning connection which in addition to permitting opening and closing movements of the valves will, also, serve as a means for cushioning and gradually bringing the piston to stop.

A still further object of the invention is to provide means for housing the springs and preventing the same from coming into contact with the water.

A still further object of the invention is to so construct the cylinder and valve casing as to readily permit the removal of the upper portion of the casing so that access may be had to the entire mechanism.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a sectional plan view of a water motor constructed in accordance with the invention. Fig. 2 is a transverse sectional view of the same on the line 2—2 of Fig. 1. Fig. 3 is a transverse section on the line 3—3 of Fig. 1. Fig. 4 is a detail elevation showing one of the yieldable connections and its guide.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The cylinder is formed of two mating sections 10 and 11, each in the form of an incomplete circle. These are securely fastened together by riveting, soldering, or the like. The cylinder is provided with projecting bolting ears 12 by which it may be secured to a suitable base. The central portions of the cylinder sections are bored for the reception of a shaft 13 over the upper end of which fits a cap gland 14 in order to prevent the passage of dust and dirt, and at the same time to prevent leakage. The threaded opening in the lower section of the cylinder receives an ordinary gland 15, through which the shaft extends for coupling to the washing machine or other device to be operated. Rigidly secured to the central portion of the shaft is the hub 16 of a piston wing 17, on either or both sides of which are circular cup leathers 18, which are confined in place by outer disks 19 and a bolt 20. The hub of the piston wing is rigidly secured to the shaft, and around said shaft are packing rings 21 which are forced tightly against the end portions of the hubs by means of the glands 14 and 15 for the purpose of preventing the escape of the actuating fluid around the shaft.

Secured to the open side of the cylinder is a valve chest 22 carrying a vertically disposed partition 23 which forms the outer head of the working space of the cylinder, and in this partition are formed a number of inlet and escape ports, these being arranged side by side in pairs. Extending from the outer face of the partition 23 to the outer end of the valve chest is a horizontal partition 24 which divides the outer portion of the chest into an inlet chamber 27 and an exhaust chamber 28, these being provided with suitable connections for the admission and escape of the operating fluid. This valve chest may be removed when necessary to expose all of the working parts of the motor without opening the cylinder.

Projecting inwardly from the vertical partition 23 of the valve chest is a plate 30 on the opposite sides of which are fitted cup leathers 31 held in place by plates 32 and a transverse securing bolt 33. These members form an abutment that divides the working space of the cylinder and which bears so tightly against the hub of the piston wing and the curved wall of the cylinder as to prevent leakage from one side to the other.

That portion of the partition 23 which forms the base of the inlet chamber 27 is provided with two inlet ports 35 and 36 and these are arranged to be opened and closed by a pair of valves 37, 38 of precisely the same construction, one valve being moved to open position while the other is simultaneously moved to closed position. The stems of these valves are connected to a lever 39 that is pivoted on a pin 40, the latter extending through openings formed in the outer wall of the chest and in the horizontal partition 24. The outer end of the pin is headed and fits in an enlarged threaded opening into which is tapped a headless screw 41, a blind gasket 41′ being preferably introduced between the end of the pin and the inner face of the screw for the purpose of preventing leakage.

In that portion of the partition 23 which forms the base of the exhaust chamber 28 are arranged two exhaust ports 44 and 45 which may be opened and closed by a pair of valves 46 and 47 of precisely the same construction, one valve being arranged to move to open position, while the other moves to closed position. The stems of these valves are connected to the opposite ends of the lever 49 that is mounted on a pin 40 of the same construction as the corresponding pin which supports the lever of the inlet valves.

Extending across the inner portion of the valve chamber, or that portion of the chamber which really forms a part of the cylinder, are two cross bars 50. These cross bars are provided with a flanged opening for the reception of a cylindrical casing 51, and the inner end of the casing is provided with an enlarged integral disk 52 that is arranged to bear against the inner face of the valves. In each casing 51 is a helical compression spring 53 against which bears an annular flange 54 carried by a pin 55, which latter extends out through a gland 56, the inner end of the gland bearing against the gasket 57 that is seated against a shoulder formed within the casing and between the gland and the outer face of the gasket, a liquid proof packing 59 is interposed. This spring casing 51 may be filled with any suitable lubricating material for the purpose of preventing undue wear and the spring will be fully protected from the action of the water which is used as an operating means.

In operation, the inlet valve 37 being open, and inlet valve 38 being closed while exhaust valve 46 is closed and exhaust valve 47 is open, the piston wing being assumed to be in the position shown in Fig. 1, water or other actuating fluid will enter the inlet chamber 27 and will pass through the inlet port 35, while the dead water in advance of the piston wing will exhaust through the port 44 to the exhaust chamber 28. The entering volume of water will then force the piston wing to travel around clockwise until the piston wing strikes the pin 55 shown to the right of Fig. 1. The first effect will be to slightly compress the spring 53, thereby forming a cushion which will gradually check the movement of the piston wing. As the spring continues to yield, movement will be transmitted to the spring casing 51 and disk 52, and will thus act on the two valves 38 and 47, moving the valve 38 to open position and the exhaust valve 47 to closed position. This movement will be transmitted through the two levers 39 and 49 to the mating valves at the opposite side, causing the inlet valve 38 to close and thus shut off the inflow of water, and the valve 46 to open, so that the water is now free to escape through the port 44 to the exhaust chamber, whereupon the movement of the piston wing will be reversed. In all cases, the movement of the piston wing will not be abruptly checked, but will gradually cease as the spring is compressed and then assisted by the pressure of the entering water, the spring will start the piston on its return stroke.

The main shaft may be coupled directly to the device to be operated, and as no valve mechanism is employed for transmitting movement from the shaft to the valves, the motor may be made and kept in repair at very small cost.

What is claimed is:—

1. In a fluid pressure motor, a cylinder, a stationary abutment therein, a valve chest divided into inlet and exhaust compartments, a pair of inlet ports, and a pair of exhaust ports leading from the chest to the cylinder on opposite sides of the abutment, inwardly closing inlet valves for the inlet ports, outwardly closing valves for the exhaust ports, a pair of levers one connecting the inlet valves and the other the exhaust valves, cross bars mounted in the valve chest, a spring casing slidably mounted in the cross bars and provided with a disk for transmitting movement simultaneously to adjacent inlet and exhaust valves, a spiral spring disposed within the casing, a pin slidably mounted in the casing and being arranged to engage the spring, and an oscillatory piston wing mounted in the cylinder and being arranged to engage the pin.

2. In mechanism of the class described, a cylinder, an oscillatory piston wing, inlet

and exhaust valves, a spring casing, a disk carried thereby and arranged to engage adjacent inlet and exhaust valves, a spring disposed within said casing, a flanged pin against which the outer end of the spring bears, a gland closing the outer end of the spring casing, a gasket and packing held in place by the gland, the outer end of the pin being disposed in the path of movement of the piston wing.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

ANDREW F. MILLER.
MARK HUGGINS.
CHARLES E. JENKINS.

Witnesses:
CHAS. A. LEWIS,
HARRY H. JENKINS.