No. 897,433. PATENTED SEPT. 1, 1908.

J. WAGNER & A. STRNAD.

WATER MOTOR FOR WASHING MACHINES.

APPLICATION FILED DEC. 23, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

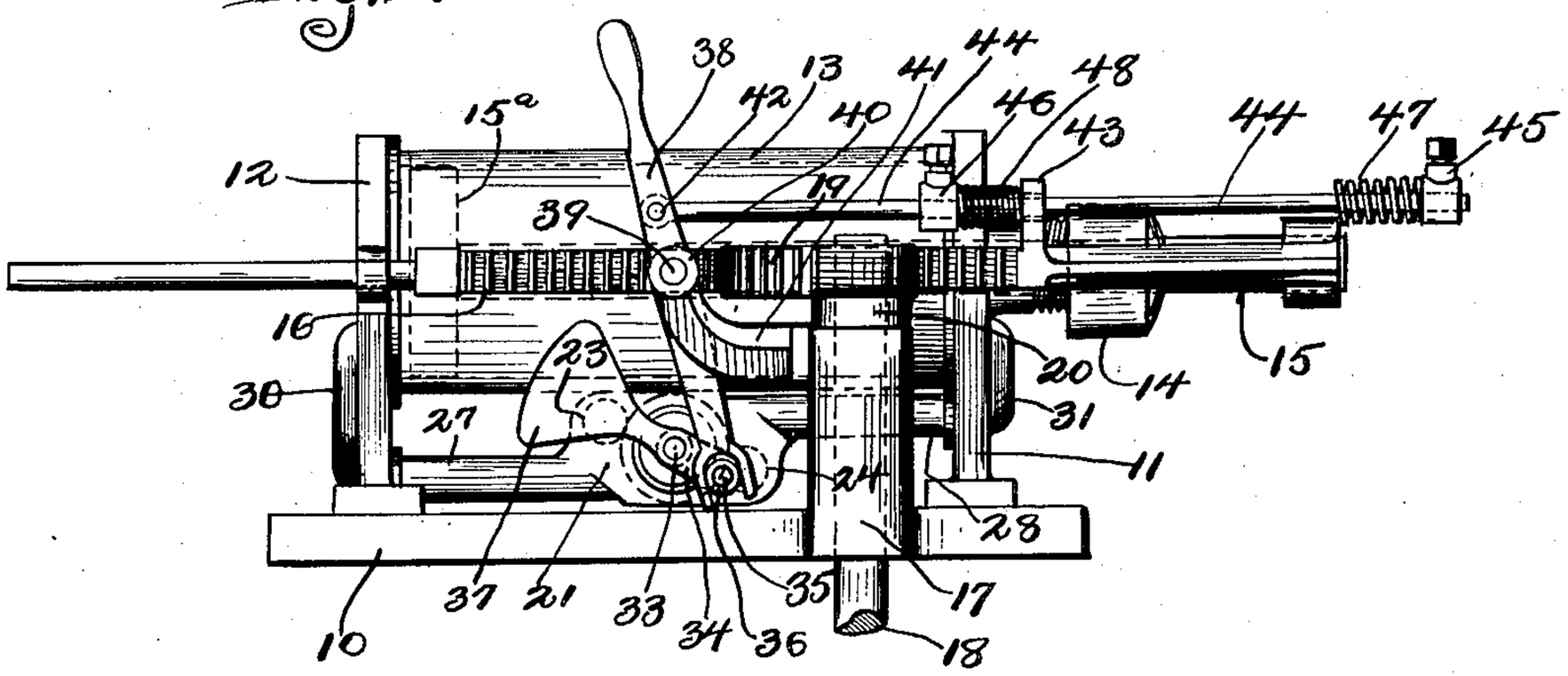
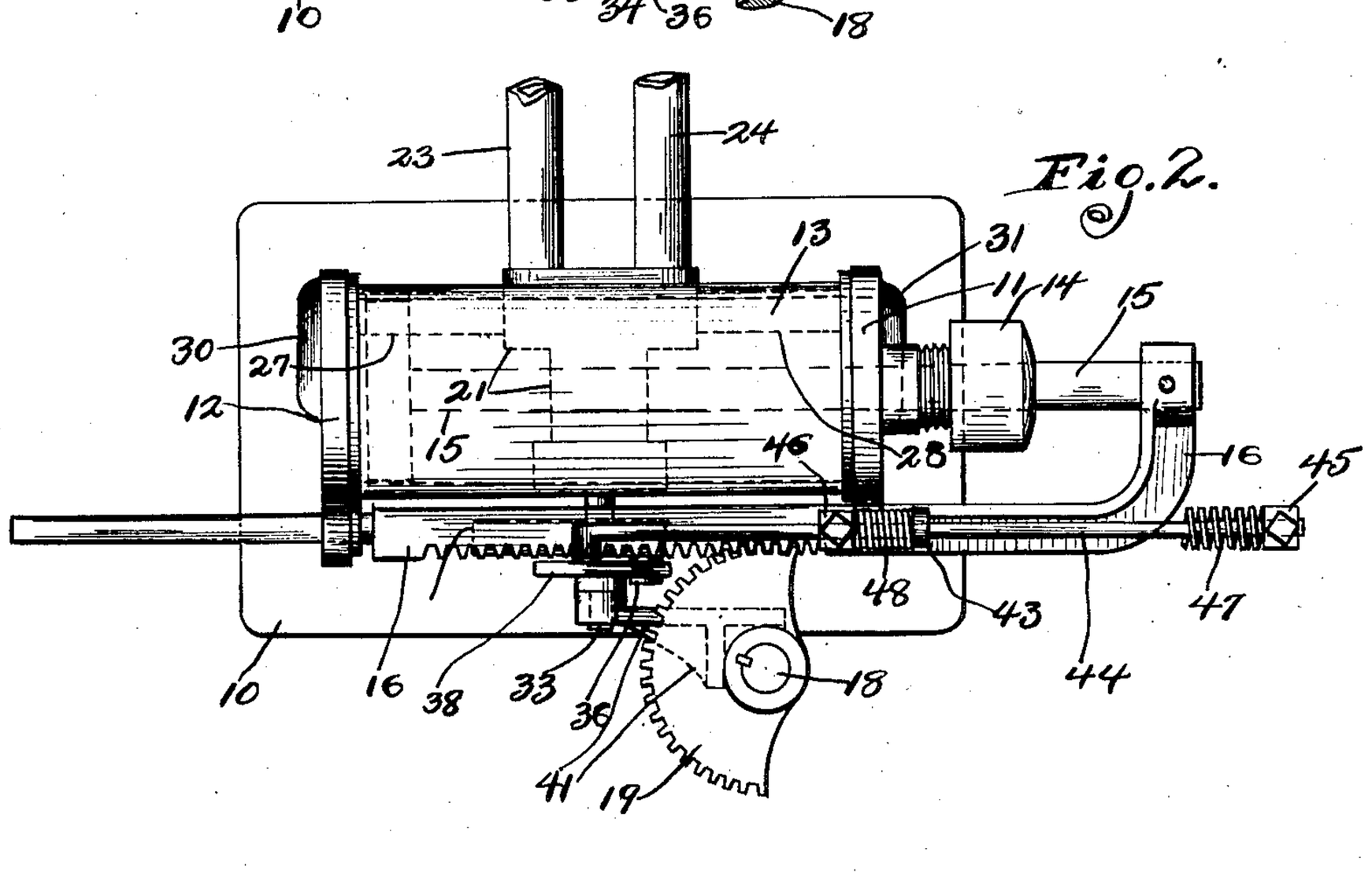


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

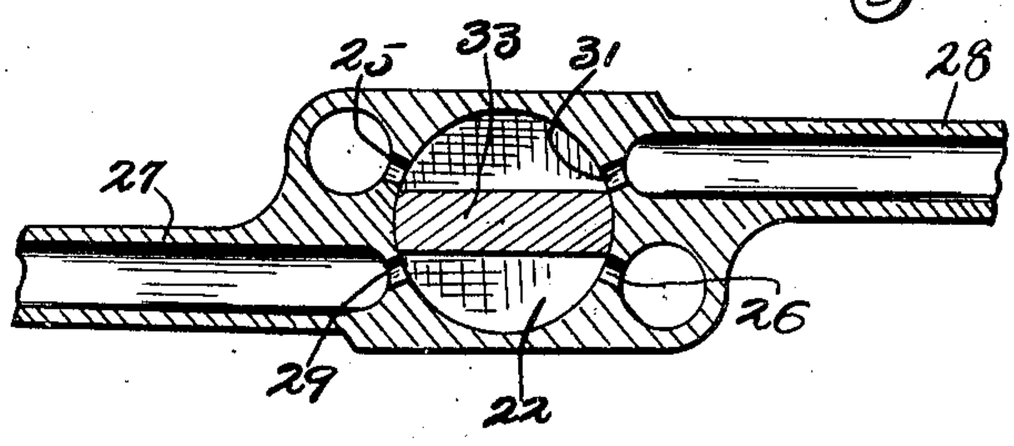
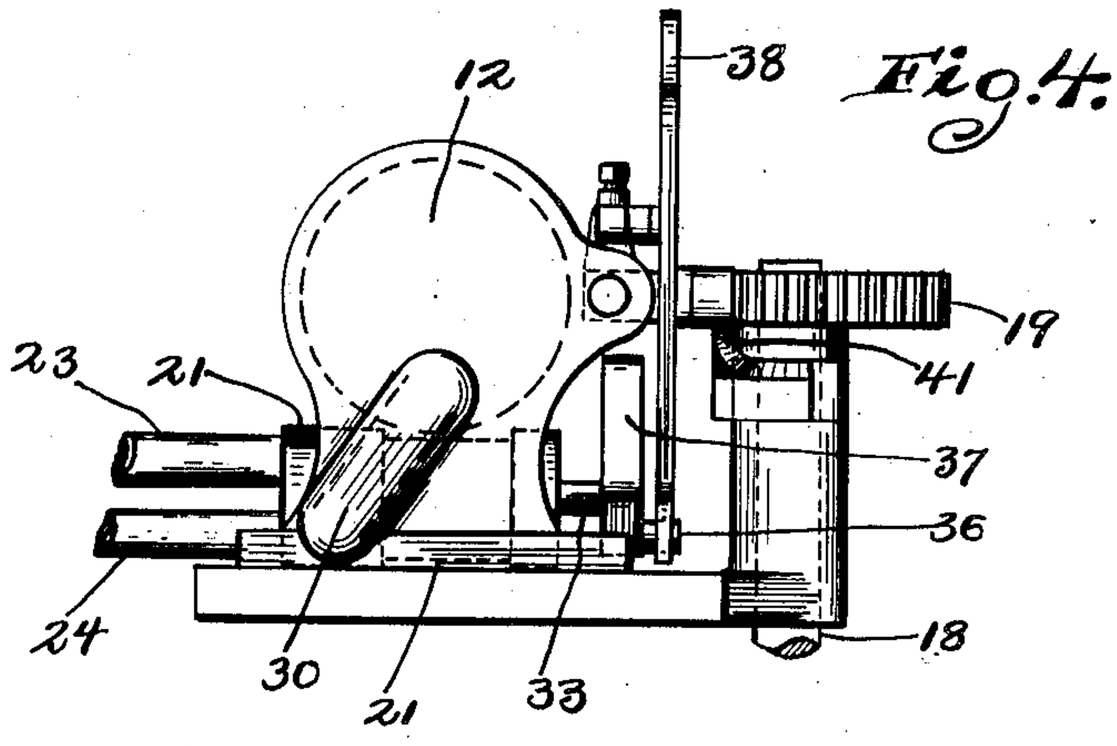


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WATER-MOTOR FOR WASHING-MACHINES.

No. 897,433. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed December 23, 1907. Serial No. 407,781.

To all whom it may concern:

Be it known that we, JAMES WAGNER, a subject of the Emperor of Austria-Hungary, residing at Cleveland, in the county of Cuyahoga and State of Ohio, and ANDREW STRNAD, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Water-Motors for Washing-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to motors and especially hydraulic motors of the reciprocating type adapted particularly for operating washing machines and the like.

More specifically the invention relates to the arrangement and construction of the valve and valve operating mechanism of the motor, and has for one of its objects the provision of a valve which is very simple in construction and effective in its operation, and which will be quickly thrown from one position to the other at the proper time.

A further object is the provision of a motor which will be practically noiseless as far as the operation of the valve is concerned and in which jarring and vibration incident to the operation thereof is reduced to a minimum.

Our invention may be further briefly summarized as consisting in certain novel details of construction and combination and arrangement of parts, which will be described in the specification and set forth in the appended claims.

In the drawings Figure 1 is a side elevation of a motor equipped with our invention, showing also a portion of a washing machine shaft which is operated thereby. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a section taken through the valve and valve chamber.

Referring now to the figures of the drawing, 10 represents a base, which supports the motor and which is intended to be mounted above or on the top of the machine to be operated, such as a washing machine. Mounted on the base are two cylinder heads 11 and 12 which support between the same the cylinder 13. Passing through a suitable opening in the cylinder head 11 and through a stuffing box 14, is a piston rod 15, which carries at its inner end a piston 15^a shown in dotted lines in Figs. 1 and 2. Secured to the outer end of the piston rod 15 in such a manner that it may be reciprocated by the piston is a rack bar 16 which extends along the side of the cylinder parallel to the piston rod and is supported in a lug or extension of the cylinder head 12. The base 10 is provided at one side of the cylinder with a suitable boss or bracket 17, in which is journaled the vertical shaft 18 of the machine to be operated. At the upper end of the shaft is a gear segment 19 which engages the teeth of the rack-bar and intermediate the segment and the top of the boss is a collar 20 which holds the shaft in position. Thus it will be seen that when the piston is operated the shaft 18 will be oscillated by the rack bar and segment.

Between the base 10 and cylinder 13 is a valve casing 21 having a cylindrical bore or valve chamber 22. Connected to one side of the valve casing are fluid supply and exhaust pipes 23 and 24, which communicate with the chamber through inlet and outlet ports 25 and 26, and extending in opposite direction from the valve casing are tubular projections 27 and 28, the former communicating with the valve chamber through a port 29 intermediate the ports 25 and 26 and with one end of the cylinder through a passageway 30, which, as here shown, is cored in the cylinder head 11, and the latter communicating with the valve chamber through a port 31 located diametrically opposite the port 29 and with the opposite end of the cylinder through a passageway 31 in the cylinder head 12.

Located in the valve chamber and mounted on a valve stem 32 which extends through the side of the valve chamber opposite the supply and exhaust pipes is a rotary or oscillatory valve 33 the opposite edges of which are curved and engage closely the inner cylindrical surface of the valve chamber. Secured to the outer end of the valve stem is a crank 34 provided with a wrist pin 35 on which is mounted a sleeve or roller 36 and opposite the crank is an enlargement 37 forming a counter weight the purpose of which will be explained. The roller 36 on the pin 35 is engaged by a bifurcated end of a valve operating lever 38 pivotally supported intermediate its ends by means of a transverse pin or lug 39 in a hub or boss 40

of an arm 41 integral with the bracket or boss 17 extending upward from the base. The end of the lever is provided with a hand hold or grip so that the motor can be operated by hand in case there should be no power to drive the same. Pivotally connected at 42 to the lever 38, and passing loosely through an opening, in an upwardly extending lug 43 on the rack bar, is a valve operating rod 44, which is shifted by the rack bar in a manner to be explained and in turn operates the lever 38 and valve 33 to reverse the movement of the piston. Adjustably mounted on the rod 44 are two collars 45 and 46, one near the outer end of the rod and on one side of the lug 43, and the other on the opposite side of the lug 43. Surrounding the rod between the collars and the lug 43 are coiled springs 47 and 48 which serve to throw the valve at the proper time, and also to cushion the blow of the rack bar upon the valve rod as will be explained.

The operation and purpose of the parts will now be explained more fully.

When the valve is in the position shown in Fig. 4 the motive fluid passes from the inlet or supply pipe 23 through ports 25 and 31 to the pipe or tubular projection 28 and to the right hand end of the cylinder as shown in Fig. 1. At the same time the opposite end of the cylinder is connected to the exhaust pipe 28 through ports 29 and 26. The piston is then driven toward the opposite end of the cylinder, shifting the rack bar 16, gear segment 19, and the operating shaft to which it is attached. As the piston approaches the end of the stroke the lug 43 engages the spring 48 and compresses the same. When the piston has nearly reached the end of the stroke the spring has been compressed sufficiently to cause the valve rod and valve to be moved and the counterweight to be raised toward the central vertical position. This movement of the valve however is comparatively slow as the spring is still undergoing compression and the valve is retarded by the counterweight and also this movement of the valve is not sufficient to cause the closing of the ports. When the piston has reached the end of the stroke the counterweight has been lifted to the central vertical position or approximately to that position, and the spring, which has by this time undergone the maximum compression, expands, throwing quickly the counterweight beyond its central position, and the valve is then shifted by the combined action of the spring and counterweight with the quick movement so as to connect the supply pipe 23 to the opposite end of the cylinder, whereupon the piston immediately begins its return stroke. It will be seen that the only movement imparted to the valve directly by the piston and rack bar, is that movement which takes place while the spring is being compressed and the counterweight is being raised to the central position and the main movement of the valve which controls the motive fluid is caused by the energy stored in the spring and also in the counterweight. Thus it will be seen that it will be impossible for the valve to stick and the motor to become stalled at the end of the stroke, since the valve is shifted quickly by the spring and weight. It will also be seen that the impact of the rack bar on the valve operating mechanism is cushioned, hence jarring and vibration is reduced to a minimum.

We do not desire to be confined to the exact details shown but aim in our claims to cover all modifications which do not involve the departure from the spirit and scope of our invention.

What we claim is,—

1. In combination, a cylinder, a piston in said cylinder, a rack bar operated by said piston, a rotary counterweighted valve controlling the motive fluid to said cylinder, a valve operating mechanism comprising a lever connected to the valve stem, a valve rod connected to said lever, and springs on said valve rod, and means whereby the movement of the piston and rack bar causes the springs to be compressed and shifts the counterweight to a position such that the springs may expand and shift the valve further with a quick movement.

2. In combination, in a motor, a cylinder, a piston in said cylinder, a rack bar connected to said piston and adapted to be operated thereby, a rotary counterweighted valve controlling the motive fluid to said cylinder, a valve operating mechanism comprising a lever connected to said valve, and a valve rod connected to said lever, springs on said valve rod and means whereby the movement of the piston and rack bar compresses a spring and shifts the valve and counterweight to a position such that the spring may expand and cause a further shifting of the valve and counterweight with a quick movement.

3. In combination, in a motor, a cylinder, a piston in said cylinder, a rack bar connected to said piston and adapted to be shifted thereby, a valve casing having supply and exhaust connections for motive fluid, a rotary valve in said casing, a crank and counterweight connected to the stem of said valve, a valve lever engaging the crank, a valve rod connected to the lever, springs on said valve rod, and means whereby the movement of the piston and rack bar compresses the springs and raises the counterweight to position such that the springs may shift the valve and counterweight with a quick movement.

4. In combination, in a motor, a cylinder, a piston in said cylinder, a rack bar connect-

ed to said piston and adapted to be reciprocated thereby, said rack bar having a lug or projection, a valve casing having supply and exhaust connections for a fluid, a rotary valve in said casing, a crank and counterweight connected to the stem of said valve, a lever connected to said crank, a valve rod having two springs and abutments therefor, said parts being so arranged that the lug or projection on the rack bar engages the springs when the piston approaches the ends of its movement, and raises the counterweight to positions such that the springs may expand and shift the same beyond its central position whereby the valve will be shifted quickly by the springs and counterweight.

Signed by us at Cleveland, Ohio, this 29th day of November, 1907.

JAMES WAGNER.
ANDREW STRNAD

Witnesses:
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