Dec. 15, 1925. 1,565,947

R. R. MASTERSON

WASHING MACHINE MOTOR

Filed April 15, 1922

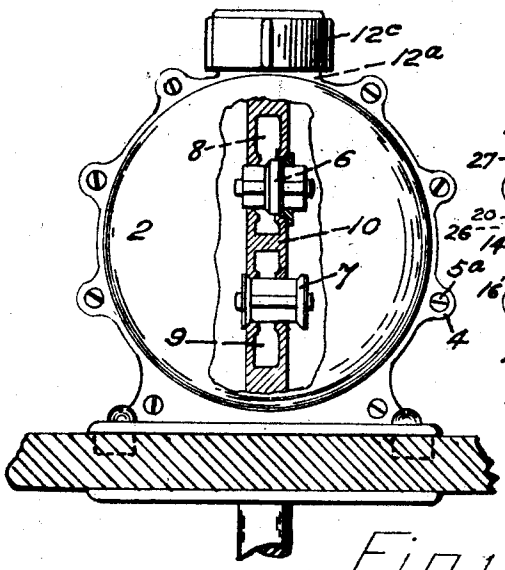


Fig. 1.

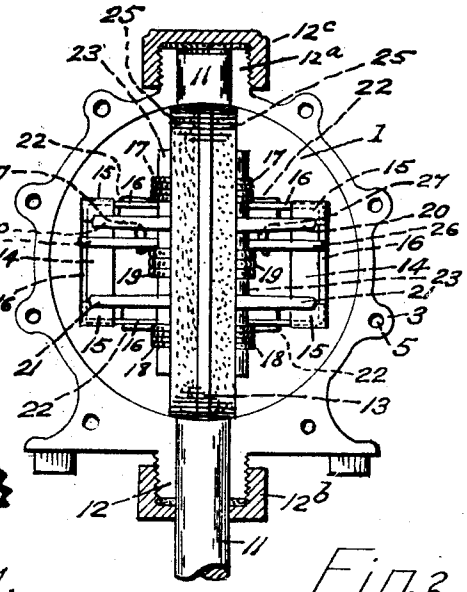


Fig. 2.

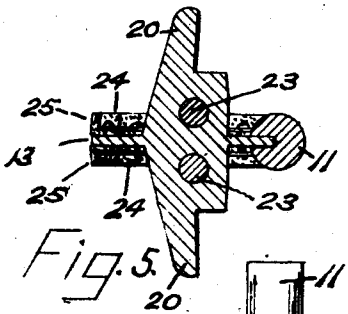


Fig. 5.

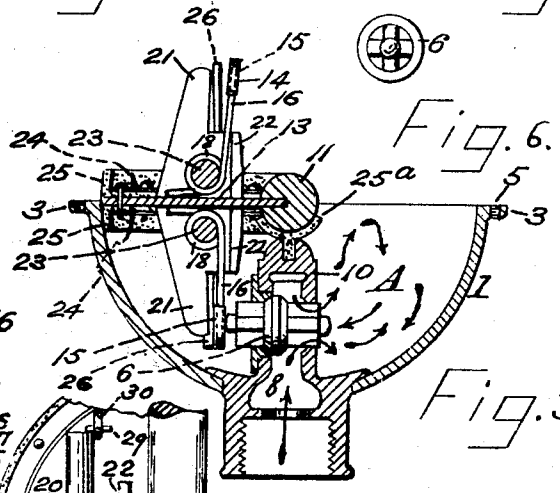


Fig. 3.

Fig. 6.

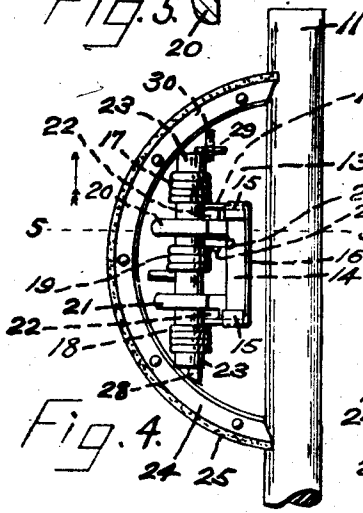


Fig. 4.

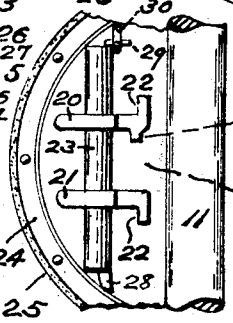


Fig. 7.

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UNITED STATES PATENT OFFICE.

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WASHING-MACHINE MOTOR.

Application filed April 15, 1922. Serial No. 553,223.

To all whom it may concern:

Be it known that I, ROBERT RAIMON MASTERSON, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Washing-Machine Motors, of which the following is a specification.

This invention relates to water-power motors used in connection with hydrant-pressure-operated washing-machines of the agitator or oscillator-arm type, and its main object is to supply a battery of variable light and heavy coil-spring presser-means for action, in unison, on the respective inlet and outlet water-pressure valves of the motor, whereby the heavier auxiliary-springs of greater power are only intended to act in conjunction with the lighter springs when the pressure is high and more especially when the working-load is heavy and at the beginning of a piston-stroke, and the lighter and more flexible springs that are of lesser power or tension are intended to act in conjunction with the closing exhaust-pressure against the back-pressure of the water at that time, and especially at the close of a piston-stroke. Another important object is to so regulate the valve movement as to prevent the unseating or opening of the inlet-valve subsequent to that of the outlet-valve in the oscillatory reverse-action of the vibratory motor-piston. Still another object is to mount said stronger or more powerful springs for the quick reverse-shifting of the inlet-valve in approximate alinement with the axial-center of the inlet-valve for more direct action.

In order to carry out my invention to the best advantage, I employ two corresponding sets of three coil-springs, one set on each side of the customary vertical, segmental, oscillatory piston that is laterally-mounted on a rock-shaft journaled in bearings in a spherical motor-shell, and each set of springs comprising a pair of light wire coils and an intermediate heavy auxiliary wire-coil, said pair of light wire coils being intended for the approaching close of the working-pressure in the shell and connected at their outer ends by means of flat metal re-enforcing plates so that the valves may act in unison, and said heavy-wire auxiliary coils having specially-provided lagging-extensions that only come into action when the light coils have exerted their allotted force but not sufficient to fully or finally unseat the pair of valves for the next reverse-stroke of said piston.

The back-pressure of the water and working-load at the close of a piston-stroke, under the pressure of the lighter coils, (as in Fig. 3), keeps the two valves (inlet and outlet) normally seated, with the inlet-valve seated against further inlet-pressure and with the outlet-valve just closed against further wasting or discharge. The valves in Fig. 3 are now ready for the reverse piston-stroke, under the heavy auxiliary-coil pressure that causes the valves to unseat and axially shift from their former dual position, the auxiliary lagging-extension imparting a quick, darting reverse-movement of the inlet-valve in particular, so as to get the initial power-pressure under way again for the next advance-stroke of the piston, and so on, in rotation, in each reverse-movement of the piston.

In effecting the desired result, I find a coiled-wire spring to be the best to withstand the hard usage occasioned by the reverse-movements of the piston in the clothes-washing operation, as it will not speedily disintegrate or break on account of its many contractions and expansions in use. Besides, I arrange or set the heavier middle coils near the center of the piston, with their lagging-extensions in approximate alinement with the inlet-valve where the heavier feed-water pressure flows into the motor-shell, each lagging-extension acting as a substantial pivot on which the flexible light coils ride, and thereby imparting still greater strength, where needed, for the desired slight interval ahead of or simultaneous with the unseating of the companion outlet-valve, and not at any time, an instant later than said outlet-valve. This structure is of particular advantage in allowing the light flexible coils to adjust themselves to compensate for any wear on the tip-ends of the said pair of valves.

Further, I have backed up said spring-coils with firm metal stops or supports that will always prevent the coils being con-

tracted or compressed beyond a predetermined limit, thereby assuring greater, extended use of said coils.

Still further, I mount said coils in the two sets named, each on a single vertical, axial rod or pin that is parallel to the adjacent face of the piston-blade, such axial rod or pin being held from longitudinal-movement by means of a lug on the piston-blade, at one end, and a removable cotter-pin that engages, at its other end, an eye on said piston-blade. This arrangement is extremely simple, as well as economical, easily assembled and separated by the mere handling of said cotter-pin fastening. The said axial-rod that supports a set of three coils can be easily removed when desired by removing the cotter-pin and replacing one or more of the coils thereon as may be found necessary.

In the accompanying sheet of drawings:—

Figure 1 is a front elevation of the motor, with the middle front of the shell partly broken away and showing the valve-block in section, but with the piston devices omitted; Fig. 2, an elevation of the inner face of the hemispherical valve-section of the motor-shell, and showing the two sets of coil-springs and their connecting presser-plates mounted on the piston in due relation with the rock-shaft and the valve-block; Fig. 3, a sectional plan of the component shell-member that contains the pair of valves and the valve-head, taken partly on a line with the inlet-valve, and showing both sets of coil-spring presser-devices for the valves, with one of the presser-plates in contact with the adjacent tip of the inlet-valve that is shown in a broken-away part of the valve-head, and the said inlet-valve in position ready for its next quick and positive opening or longitudinal shifting under the augmented resilient or rebounding power of the adjacent lagging-coil extension, and also ready for the inflow of feed-water pressure on the other side of the valve-head for the next reverse or advance-movement of the piston; Fig. 4, a side elevation of the piston and its supporting rock-shaft, the latter being shown broken off at its lower portion; Fig. 5, a cross-section of the piston and rock-shaft, taken on the line 5, 5, of Fig. 4, through the integral, oppositely-extended mounting-arms or brackets for the coil-springs; Fig. 6, an end view of the preferred form of inlet-valve used by me in this motor-structure; and Fig. 7, a fragmentary elevation of the piston and rock-shaft with the springs omitted.

The motor consists of a pair of hemispherical sections or halves 1 and 2 forming a hollow ball or shell, each section having flat extensions or flanges that are provided with respective ears 3 and 4 which register with each other when the said sections 1 and 2 are brought together, edge to edge. The ears 3 and 4 are each provided with openings 5 for the reception of the screws 5^a that form their most convenient fastening means.

On one side of the shell-section or component half 1 are the water-power-pressure inlet-valve 6 and the waste outlet or exit valve 7, having suitable passageways to the valve-chambers 8 and 9, respectively, that are constructed in the valve-head or partition-member 10.

The vertical rock-shaft or spindle 11, that journals or oscillates in bearings 12 and 12^a of the united-shell-members 1 and 2, carries a single vertical, radially-extended semi-circular or segmental piston gate or disk 13 and a plurality of coacting elements, the latter embracing the essential features of the invention herein and consisting of a lateral, oppositely-extending pair of vertical presser-plates 14, adapted to carry the light-coils 17 and 18 at their opposite ends and provided with bent-over or closed-flap ends 15, and otherwise supported by means of the opposite loop-ends 16 of the duplicate pairs of said light coil-springs 17 and 18 which are thus held in properly spaced relation by means of the said presser-plates 14.

An orificed cap 12^b is used to couple the lower extended bearings 12 together and a closed cap 12^c is used to couple the upper extended bearings 12^a of the shell-members 1 and 2, as best shown in Fig. 2.

The middle or intermediate heavy coil-springs 19 on opposite sides of the piston 13 are arranged between associated pairs of horizontal, duly spaced bracket-arms 20 and 21 that extend integrally from said piston 13 toward the outer ends of the re-inforcing presser-plates 14 for tension and rest-contacting purposes hereinafter referred to. The integral arms 20 and 21 are each provided with rest-shoulders 22 that are adapted to form back-stops for the said loop-ends 16 of the light coil-springs 17 and 18, and said rest-shoulders detain the said presser-plates 14 for the required normal position of the latter and under the desired tension of the lighter coils 17 and 18.

The entire multiple coil-spring mechanism 17, 18 and 19, together with the duly attached pair of presser-plates 14, 14, are mounted on the said single piston 13 that, in turn, is preferably held or mounted in a vertical seat or groove made in the rock-shaft 11 and secured ordinarily with a drive-fit, or otherwise soldered, as desired, or the said single piston may be made integral with the rock-shaft, if desired, but the latter structure could not be turned down, in making it that way, to advantage. The said sets of coil-springs are each

mounted and held in place on short rods or pins 23 that pass through registering holes made in said bracket-arms 20 and 21.

Upon the peripheral edge of the said single segmental piston 13 are the oppositely-parallel, aligning or coinciding metal strips 24, 24, that have intermediate packing-leathers 25 to extend to and frictionally-engage the inner surface of the coupled hemispherical shell-members 1 and 2, at opposite sides of the valve head or partition 10, and thereby assuring air-and-water tight contact. A concave gasket or leather 25ª is provided between the rock-shaft 11 and the valve-head 10, for the desired water-tight bearing-surface for the rock-shaft within the shell.

The centrally-located, corresponding, heavier, auxiliary coil-springs 19 exert the most or greater pressure upon the inlet-valve 6 and are, of course, of heavier-wire construction.

The companion light coil-springs 17 and 18 located on the opposite faces of the single piston 13 have connecting or reinforcing presser-plates 14, 14, on their tail-ends 16 to combine or cause a simultaneous action of both valves.

The lagging or outwardly extended terminal 26 of each central, heavy auxiliary coil-spring 19 is controlled by the tension of said heavy coil-spring 19, and is especially provided for governing or regulating the desired buffer-pressure on the inlet-valve 6 when a stroke of the piston is finally closing or finishing a power-stroke, and just ready for the return or next forward stroke, (as particularly shown in Fig. 3) so that the resiliency of said lagging-terminal 26 may cause a quick reaction of the piston and a similar immediate or simultaneous opening of the inlet-valve for the feed water-power, and especially when there is a heavy load or large quantity of material in the washing-chamber for laundering. The said outwardly-extending or lagging lever 26 of each of the heavy, middle, auxiliary coils 19 normally rests in contact with a lug 27 (Figs. 2, 4 and 7) on the laterally-extended bracket-arm 20 on each side of the piston 13, and out of contact with the adjacent presser-plate 14 until the opening of the inlet-valve under the feed-pressure is to be effected, at which time said presser-plate 14 advances into action with the ends of both valves for the next advance pressure-flow of the water on the piston 13.

The several sets of coil-springs on the piston-gate 13 are adapted to last indefinitely without fracturing or breaking, as there is no angular bending-action possible on any part of the wires composing said springs, in the compressing-action of the presser-plates 14 on the pair of valves 6 and 7, to duly unseat them, at either side the partition or valve-head 10, when it is desired to advance or to reversely-move the single piston 13, to and fro, within the shell of the motor, to drive the spindle 11 and it, in turn, the washing-agitator.

The bent-over ends 15 of the presser-plates 14 provide a substantial and convenient means of mounting and reenforcing them on the outer looped or connected ends 16 of the outer pairs of the lighter spring-coils 17 and 18 on each of the two faces of the single piston 13.

The short rods or pins 23, on which the three coil-springs of each set are encircled or mounted on each side of the said single piston 13, are held from longitudinal movement by means of a lug 28 on the said single piston 13, at one end, and a cotter-pin 29 in engagement with an eye 30 at the other end, as best seen in Figs. 4 and 7.

In Fig. 3, wherein the piston is at the close of its agitator-stroke in one direction and ready for an advance, return-stroke, I have very clearly shown how the feed-water, passing through the inlet-valve, squirms or forcibly commingles (see the jumbled arrows in chamber A) into a back-pressure on the two valves, normally seating both valves (the same as during the previous full forward-stroke of the said single piston), and with the lighter coil-springs and their connecting presser-plate in contact with the adjacent tip ends of both valves, but with their loop-arms 16 away from contact with the shoulders 22 that extend laterally in opposite directions (see Fig. 7).

Further forward pressure, however, of the final inflowing feed-water against the upper face (Fig. 3) of the said single piston, brings into action the heavy, auxiliary, middle coil 19 and its extension lagging-lever 26, to suddenly and effectually propel or shoot the valves away from their seats, so as to reverse the inflow and outflow of the water in the shell, on the now respective fore and rear sides of the piston, said piston itself being simultaneously reacting and impelled or shot forward in a reverse path for active power-service on the agitator rock-shaft 11.

I claim:—

In a water-motor of the class described, a two-part hollow spherical shell or casing, a single oscillatory valve-actuating radial piston-member, a vertical rock-shaft adapted to carry the said single valve-actuating piston-member in a circular path in said shell, a sliding inlet-valve, a sliding outlet-valve, a valve partition or head provided in one of the hemispherical shell-members and adapted to house both of the said sliding valves, a set of three differential spiral springs each arranged in series with light springs at either side an intermediate heavy spring mounted on the opposite faces of the

said single radial piston-member, vertical presser and spring-connecting plates mounted on and uniting the opposite end pairs of light springs of each of the said sets of differential springs auxiliary high-pressure levers or lagging-extensions provided on the said intermediate heavy springs of the said sets of springs, lateral shoulders on the spring supports for the normal resting of the said high-pressure levers and the latter being adapted to meet and compensate for the high pressure on the sliding inlet-valve in the twin reacting or quick throw-over movement of both valves in unison in the same direction in the said valve partition or head, substantially as shown and described.

ROBERT RAIMON MASTERSON.