E. LEHMANN.

WASHING AND RINSING MACHINE.

APPLICATION FILED JULY 6, 1917.

1,296,823. Patented Mar. 11, 1919.

Fig. 1

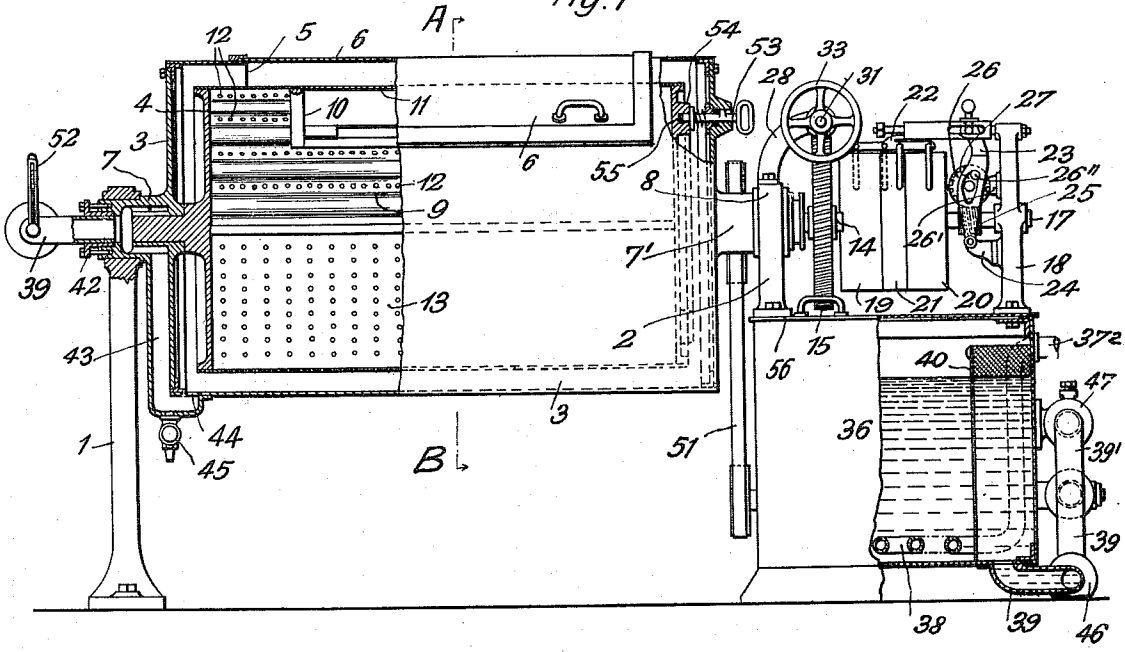


Fig. 2

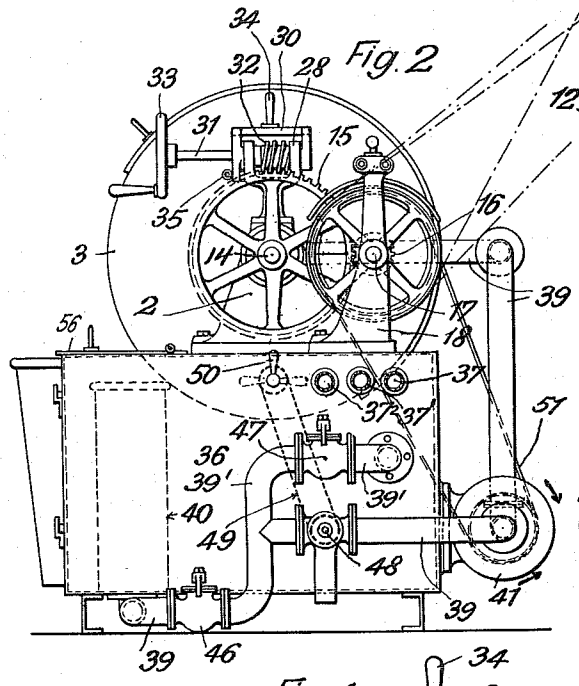


Fig. 3a

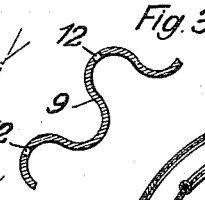


Fig. 3

Fig. 4

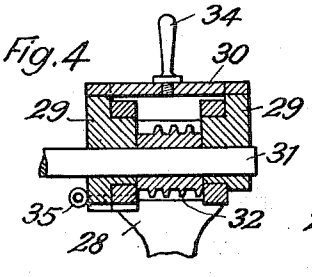
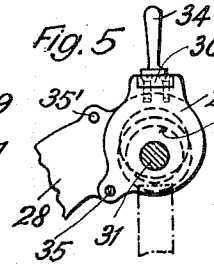


Fig. 5



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WASHING AND RINSING MACHINE.

1,296,823. Specification of Letters Patent. **Patented Mar. 11, 1919.**

Application filed July 6, 1917. Serial No. 178,974.

To all whom it may concern:

Be it known that I, EDUARD LEHMANN, a citizen of the Republic of Switzerland, residing at Zurich, Switzerland, have invented certain new and useful Improvements in Washing and Rinsing Machines; and I 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention relates to certain new and useful improvements in machines for washing and rinsing clothes and the like.

My invention will best be understood, when described in connection with the accompanying drawing, in which—

Figure 1 represents a front view of the machine, partly in section;

Fig. 2 a side elevation thereof, looking from the right of Fig. 1;

Fig. 3 a cross-section on line A—B of Fig. 1;

Fig. 3ª a detail of Fig. 3, on an enlarged scale;

Fig. 4 a section through a detail part, and

Fig. 5 an elevation thereof.

In the standards 1, 2 are rotably supported the nested drums 3, 4. The outer drum or shell 3 is provided in its cylindrical wall with an aperture 5, closable by the slide 6. The shell 3 has hollow shaft extensions or trunnions 7, 7′ adapted to be journaled in the bearing heads 8 of the standards 1 and 2. The inner drum 4 is formed of a corrugated sheet metal cylinder 9 with an aperture 10 closable by means of the two-part hinge cover 11. The cylinder 9 is provided with perforations 12 at the outer apices of the individual corrugations, and a longitudinal plate (baffle plate) 13, also perforated, extends from the cylinder axis to the wall. The inner drum, at the end next to the standard 2, is provided with a shaft 14, extending through the hollow trunnion 7 of the outer drum and supporting a spur gear 15. This latter meshes with a spur wheel 16 on a jack shaft 17, which is journaled respectively in the standard 2 and a bearing upright 18. On the shaft 17 is fixed between the two idle pulleys 19, 20 the fast pulley 21. The double belt fork 22 is pivoted to the oscillatory lever 23 which with its lower end is pivotally secured to the bracket 24 extending from the bearing upright 18. A worm 25 is fast on the shaft 17, and the intermeshing worm wheel 26 rotates on a bracket 26′ and is provided with a crank pin 26″, which extends laterally into a slot 27 provided in the oscillating lever 23, the slot being widest in its middle portion and narrowing toward the extremities, as clearly shown in Fig. 1.

In the bracket support 28, extending from the standard 2, are arranged above the spur wheel 15, coaxially of one another, two plates 29 rigidly connected by the cross-member 30 (Figs. 4 and 5). In these plates the shaft 31 is eccentrically journaled, and a worm 32 is fixed to this shaft, which latter carries at its one end a hand wheel 33. The cross-member 30 can be rotated by means of a handle 34, which movement, obviously, will cause the shaft 31 to be raised or lowered for the purpose of placing the worm 32 into or out of gear with the spur wheel 15. A stop 35, coöperating with respectively disposed depressions 35′ in the bracket 28, secures the parts in the desired operative position or inoperative position.

The reservoir or tank 36, which supports the uprights 2 and 18, is provided at its upper part with conduits 37 37′ and 37² for introducing cold water, hot water, and steam respectively. The conduit 37² for steam communicates with a coil 38 in the reservoir, and into the bottom of the latter opens a conduit 39, protected by the strainer 40. The conduit 39 has a branch 39′ which communicates with the tank 36 outside the strainer, and another branch of the pipe 39 leads to a reversible pump 41 of well known construction such as shown in U. S. Patent No. 1,182,571, dated May 9, 1916, and thence to the hollow shaft member 7, where a stuffing box is provided. With the hollow shaft member 7 communicates the upper end of the conduit 43, whose lower end communicates with the interior of the drum 3, as at 44, near which opening a drain cock 45 is provided. In the conduit 39 is provided near the tank 36 a check valve 46, and in the conduit 39′ a similar non-return valve 47. Between these valves 46, 47 and the reversible pump is interposed a three-way cock 48, which by means of the chain drive 49 is connected to a handle 50 located on the side wall of the tank. The pump is actu-

ated by belt drive 51 from the jack shaft 17 and delivers, according to the sense of rotation of the latter, in one or the other direction. A thermometer 52 is operatively located in the conduit 39 near the hollow shaft member or trunnion 7 (extreme left of Fig. 1).

The operation of the described machine is the following: The clothes to be washed are placed into the inner drum 4, the slide 6 and the hinge-cover 11 being first opened; the latter are then closed and the pump is started in such sense that it sucks out of the tank 36 the washing medium prepared therein. Obviously only the inner drum 4 rotates, while the outer shell 3 remains stationary. The pump forces the fluid, which has passed through the filter 40, through the conduit 39 and the pipe 43 into the outer drum 3, whence the fluid is forcibly squirted through the perforations 12 onto the clothes in drum 4. After this latter drum has revolved a certain number of times, the double belt fork by the action of the oscillating lever gearing will have been shifted sufficiently to throw the one belt from the fixed pulley 21 over onto one of the adjacent idle pulleys 19 or 20 respectively, and the second reversely running belt from the respective loose pulley to the fixed pulley, so that now the direction of rotation of drum 4 and pump 41 is reversed. The pump now acts suckingly and draws the washing fluid back again into the tank through the conduit 39′, since the non-return valve 46 prevents the passage toward the strainer 40, while the non-return valve 47 allows the fluid to pass through. The crank pin 26″ operates idly for some time within its guide slot 27, and finally, after the drum has revolved a number of times, actively engages the lever 23, with the result that the belt fork is operated again for reversing the driving direction.

During the described operations the worm 32 is out of engagement with the spur wheel 15. Upon the washing operation being completed and the fluid having been drawn out of the drums, the worm 32 is brought into mesh with the spur wheel 15 by laying over the handle 34 at the moment where no drive belt is on the fixed pulley. This will arrest the drum 4. A spring-actuated bolt 53 operating through the head plate of the shell 3, is now released and bears against the respective head plate of the drum 4. The hand wheel 33 is now actuated and drum 4 is rotated until its opening 10 registers with the opening 5 in the shell, when the spring bolt 53 snaps into a bore 55 of the annular flange 54 on the drum head, as shown in Fig. 1, with the result that shell and drum are coupled to one another. Further actuation of the hand wheel 33 then rotates the two locked drums until the openings 5 and 10 are in a favorable position for taking out the clothes which will require about a quarter turn of the shell.

During the rotation of the drum 4 the wash comes in contact only with the inner apices of the corrugations, where there are no perforations, which greatly saves the clothes. During the reversal of motion of drum 4, the wash will be fully immersed; it will spread out and the dirt will readily become detached and float in the bath, and is then quickly flooded out with the sucked-out fluid.

The non-return valves 46, 47 serve the purpose to always force the fluid to pass through the strainer 40 in the direction from the interior of the tank 36, so that it always enters the drums in strained and purified condition. The washing medium may further be cleaned by skimming it off through the hinged cover plate 56.

After the boiling operation and after the tank has been emptied, the latter can be disconnected from the pump by operation of the three-way cock 48, when the machine can be operated as a rotary washer. During this operation water can be heated in the tank 36 for rinsing the boiled clothes. This being accomplished, the three-way cock is placed into its third position, which causes the spent boiling-water to run out of the machine. For discharging the spent fluid, a special discharge cock, not shown in the drawing, may be provided.

The thermometer 52 indicates the temperature of the active fluid.

What I claim is:

1. In a washing machine, in combination, a rotatable shell, a perforated drum rotatable within said shell, means for rotating the drum in alternate directions, a tank for washing fluid, a conduit connecting said tank and shell, a reversible pump interposed in said conduit, reversible in unison with said drum, whereby washing fluid will be periodically delivered by said pump to said shell and directed in jets through the drum perforations onto the clothes in said drum and alternately withdrawn into said tank.

2. In a washing machine, in combination, a rotatable shell, a perforated rotatable drum in said shell, means for rotating the drum, a tank for washing fluid, a conduit connecting said tank and shell, a reversible rotary pump interposed in said conduit, and mechanism for simultaneously reversing the direction of rotation of said drum and pump.

3. In a washing machine, two nested rotatable drums, a tank for washing fluid, a conduit connecting the outer drum and tank, a strainer interposed between the conduit and tank, a branch pipe connecting the conduit and tank, a reversible pump connected in said conduit between the drums and tank, mechanism for reversibly actuating the inner drum and pump, and valves in the con-

duit and branch whereby only strained washing fluid is delivered from the tank to the pump.

4. In a washing machine, a washing vessel, a solution container, a filter therein subdividing the container into two parts, a reversible pump, means for operating the latter, a conduit connecting the pump on one side with the washing vessel to supply the washing liquid to and from the latter, a conduit connected with the other side of said pump having two branches, one of which is connected with one sub-division and the other branch with the other sub-division of the solution container, means for reversing the pump to supply wash liquid in an opposite direction in the last named conduit, and control elements to maintain the passage of the washing liquid through the filter always in the same direction.

5. In a washing machine, a washing vessel, a liquid container, a filter in the latter dividing the same into two parts, a pump, means for operating the pump, conduits connecting the pump with the washing vessel and the two sub-divisions of the liquid container, valves in said conduit and reversing means whereby the purified liquid in one part of the liquid container is delivered to the wash vessel and from the latter to the other part of the liquid container.

6. In a washing and rinsing machine, in combination, two nested drums, the inner drum having a cylindrical wall of corrugated sheet metal with perforations in the outwardly directed apices of the corrugations, means for rotating said inner drum first in one direction and then reversing the direction of movement an equal period of time, a tank for washing fluid, a conduit connecting said outer drum and said tank, a reversible pump in said conduit actuated also by said drum-rotating and reversing means and adapted to alternately force washing fluid into said drums and to withdraw it again.

In testimony that I claim the foregoing as my invention, I have signed my name.

EDUARD LEHMANN.