

Dec. 30, 1941.

O. J. CHAYIE

2,267,786

WASHING MACHINE

Filed July 16, 1938

4 Sheets-Sheet 1

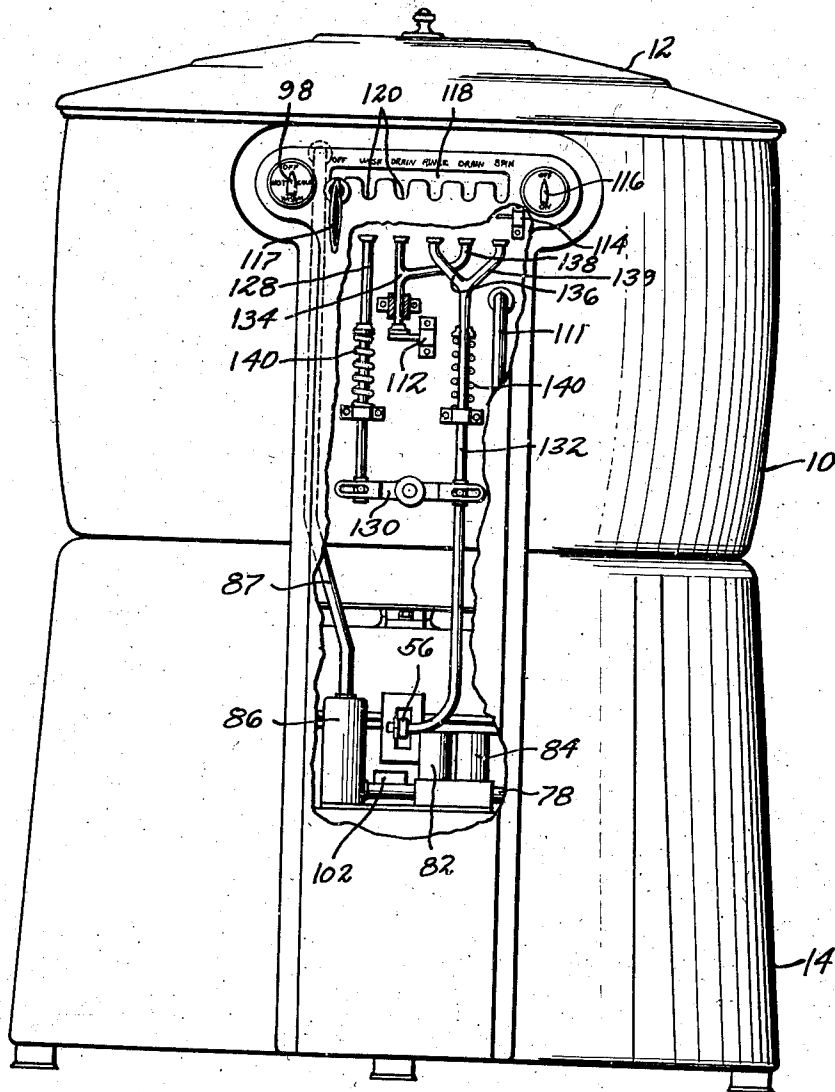


Fig. 1

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4 Sheets-Sheet 2

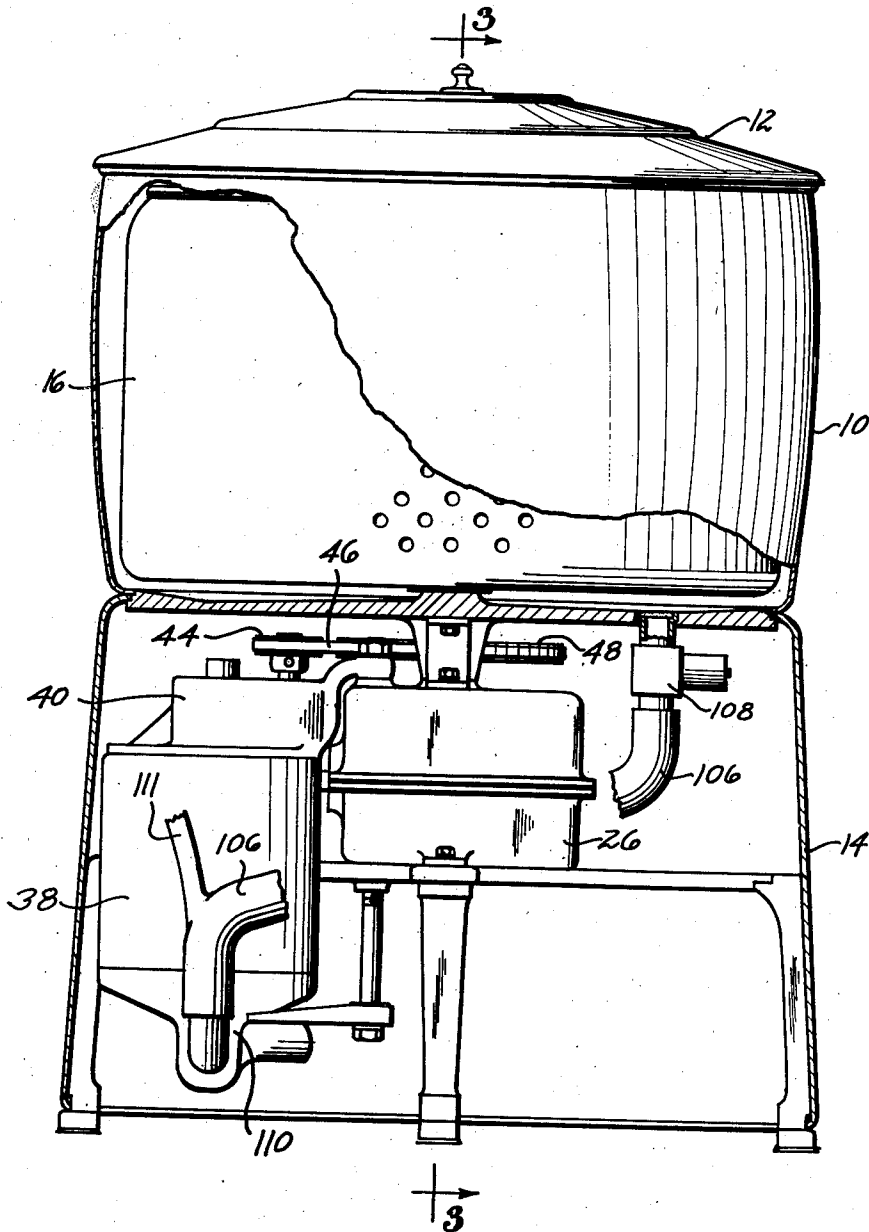


Fig. 2

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4 Sheets-Sheet 3.

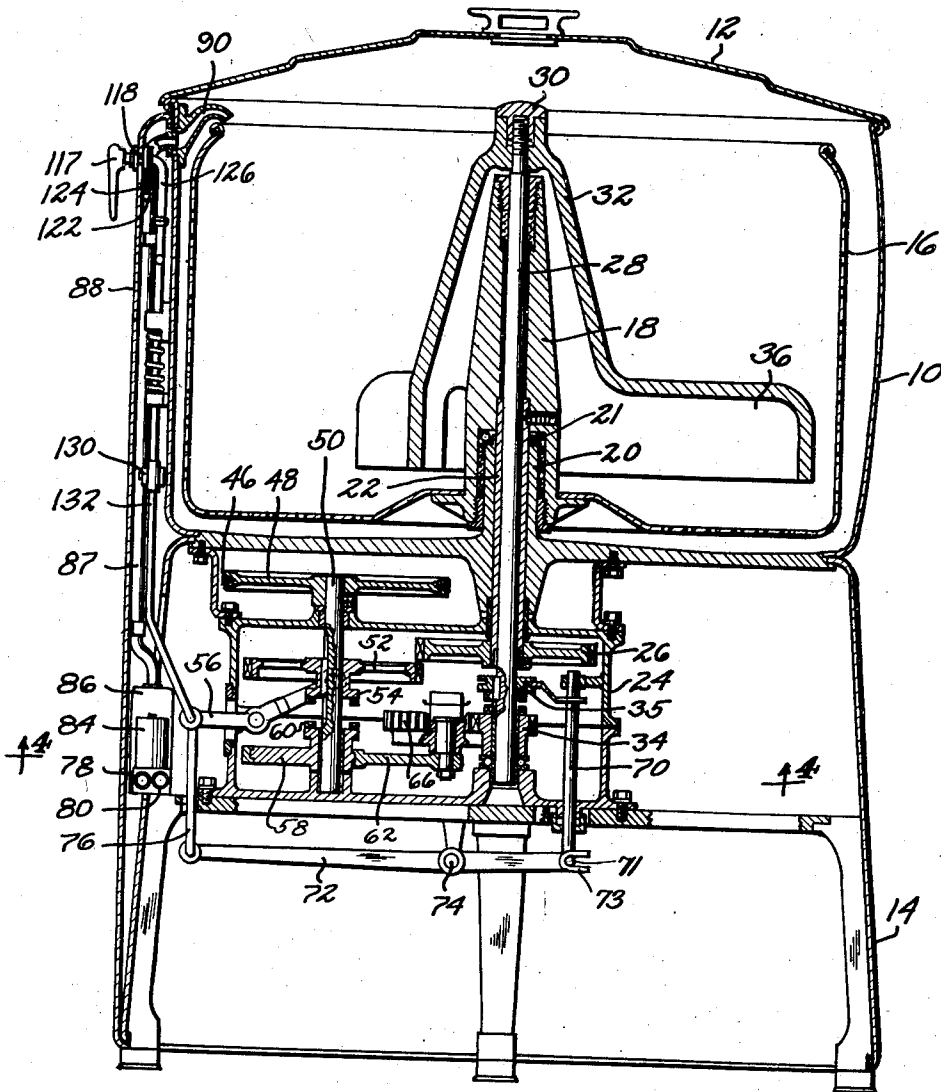


Fig. 3

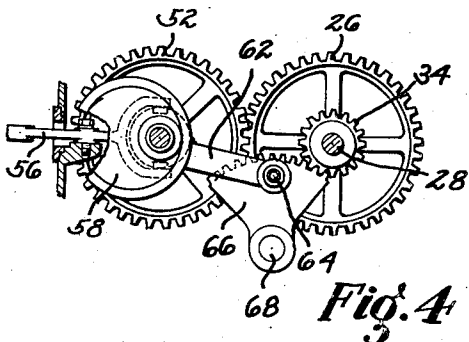


Fig. 4

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4 Sheets-Sheet 4

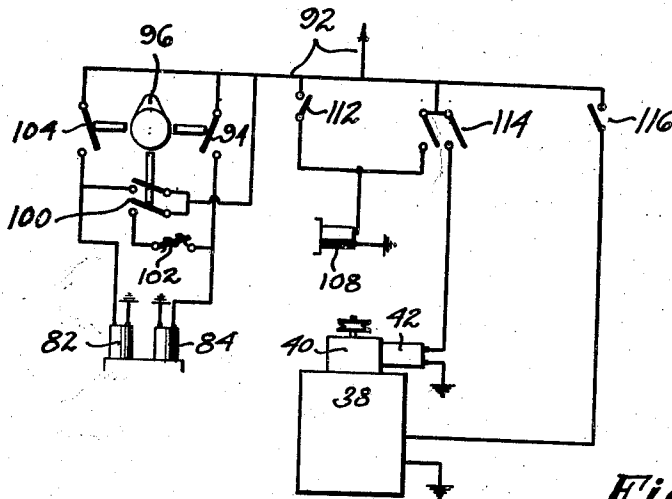


Fig. 6

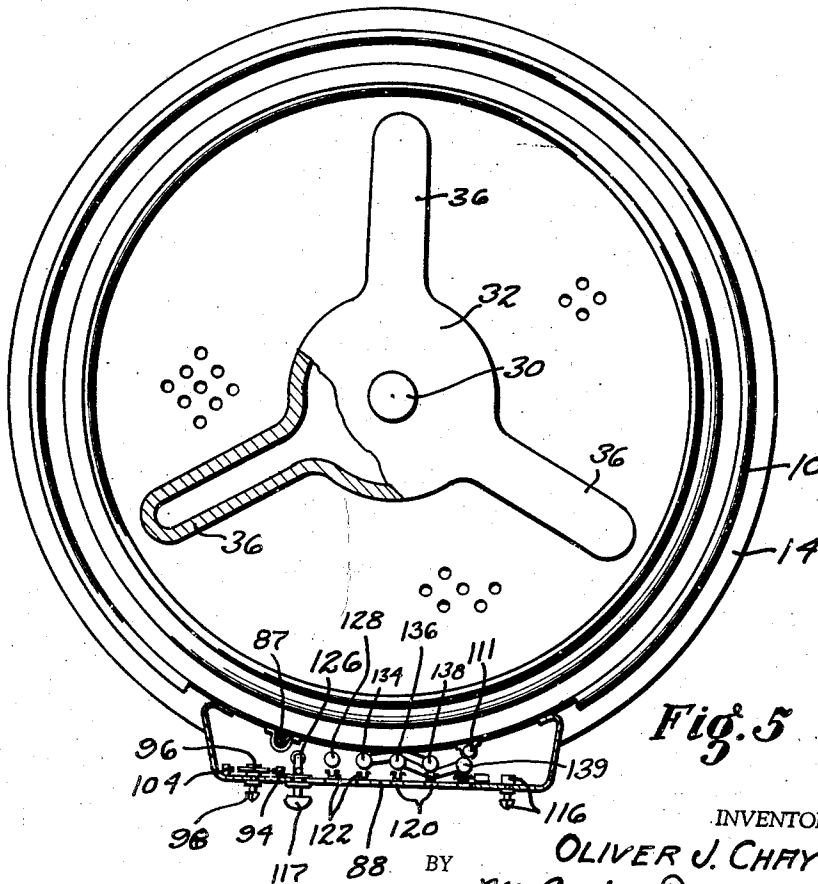


Fig. 5

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UNITED STATES PATENT OFFICE

2,267,786

WASHING MACHINE

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mesne assignments, to American Machine and
Metals, Inc., East Moline, Ill., a corporation of
Delaware

Application July 16, 1938, Serial No. 219,526

3 Claims. (Cl. 68—23)

This invention relates to washing machines and is illustrated as embodied in a washing machine of a type wherein the manual labor involved in lifting the wet clothes around is eliminated.

An object of the invention is to provide a washing machine in which washing, rinsing, and damp-drying or extracting take place in the same container, under selective manual control, without the necessity of handling the materials being washed. Important features relate to the design, operation, and mounting of the control devices used to attain this object.

Another object is to provide a machine in which the operations are controlled manually, yet simply and by a minimum number of control devices conveniently arranged in a compact group.

The illustrated machine has an imperforate tub, with a perforated container or drum rotatably mounted therein, and an agitator or beater independently oscillatably mounted within the basket. According to an important feature, the agitator is disconnected after the washing operation, and the drum is then rotated first slowly to rinse the clothes and then rapidly to dry them.

An important feature of the invention relates to controlling the washing and rinsing and drying operations by a single control member movable to several positions, and selectively controlling the operations of the container and agitator. This member with a motor starting switch and a water inlet control device, controls the entire machine.

The above and other objects of the invention, and desirable particular constructions and arrangements of parts, will be apparent from the following detailed description of an illustrative embodiment shown in the accompanying drawings, in which:

Figure 1 is a front elevational view of my novel washing machine with part of the control panel broken away to show the control mechanism;

Figure 2 is a rear elevational view with parts of the tub and base broken away to show the motor, transmission, and drain mechanism;

Figure 3 is a vertical section on the line 3—3 of Figure 2;

Figure 4 is a sectional detail view of some of the gearing taken on the line 4—4 of Figure 3;

Figure 5 is a top plan view of the machine with the cover removed and with a portion of the control panel broken away; and

Figure 6 is a wiring diagram.

Referring to these drawings, the machine is shown as comprising vertically disposed tub 10 provided with a removable cover 12 and mounted on a base 14. The base may conveniently be made in the form of a generally cylindrical skirt enclosing the driving mechanism.

Within the tub is a circular cylindrical drum or clothes container or receptacle 16 preferably made of sheet metal and which may be perforated on its bottom and sides. The clothes container is open at the top and is provided with a central sleeve or boss 18 which is sleeved over another sleeve boss 20 formed on or secured to the bottom of the tub 10 and which provides a rotatable mounting for the basket. A shoulder on the sleeve 18 rests on a ball thrust bearing 21 mounted on the end of the sleeve 20.

A sleeve 22 secured to the boss 18 passes down through the boss 20 into a gear casing 24 provided within the enclosure of the base 14 and has secured at its end a gear 26 for rotatably driving the basket.

A shaft 28 coaxially mounted within the sleeve 22, extends above the boss 18 and has secured at its upper end, by means of a nut 30, an agitator or beater 32, at its lower end, the shaft extends below the gear 26 in the gear casing 24 and has rotatably mounted on it a gear 34. Splined or keyed to the shaft 28 is a dog clutch collar 35 which is slidable into or out of engagement with mating clutch teeth on the gear 34, whereby the gear 34 may be connected to the shaft 28 to oscillate the agitator 32, or may be disconnected therefrom to permit the agitator to turn freely.

The agitator may comprise a generally conical central portion secured at its apex to the shaft 28 and extending nearly to the bottom of the basket where it is formed with a plurality of integral horizontally extending arms 36, in the present example three in number.

To drive the drum 16 and agitator 32 I prefer to employ a motor gear unit comprising a motor 38 and a two-speed transmission 40 similar to the unit described and illustrated in an application of Rex Earl Bassett, Jr., and John W. Chamberlin, Serial No. 129,429, filed March 6, 1937, Patent No. 2,165,884, granted July 11, 1939, and having a solenoid 42 (see Fig. 6) for shifting the gears.

This unit is provided with a driven pulley 44 which drives, through a V-belt 46, a pulley 48 mounted on a shaft 50 extending through the gear casing 24 in parallel spaced relationship with the sleeve 22 and shaft 28.

Within the casing 24 is an element slidably arranged on the shaft 50 on splines or keys so as to be driven thereby. This element is made up of a gear 52 and a jaw clutch member 54 joined by a reduced diameter portion which forms a clutch collar. The clutch collar is engaged by a clutch fork and lever 56 pivoted on the casing 24 and extending out of the casing through a suitable opening. Rotatably mounted on the shaft 50 is an eccentric 58 having formed with it a jaw clutch member 60 adapted to mate with the clutch member 54. The eccentric is provided with an eccentric strap and connecting rod 62 having its end pivotally connected at 64 (see Fig. 4) to a gear segment 66 oscillatably mounted at 68 on the wall of gear casing 24.

The gear segment 66 is constantly in mesh with the gear 34, previously described, for driving the agitator 32 with an oscillating motion when the clutch members 54 and 60 are engaged by swinging the clutch lever 56 in a clockwise direction.

The gear 52 is adapted to mesh with the gear 26 to drive the container 16 in continuous rotation when the clutch lever is swung in a counterclockwise direction. Figure 3 shows the clutch lever 56 in a neutral position which it normally occupies, with neither the clutch member 54 nor the gear 52 in engagement.

The clutch collar 35 is engaged by a clutch fork and shifter rail 70 vertically slidably in suitable supports in the gear casing 24. The fork and rail 70 extends below the casing and has a pin 71 slidable in a forked end 73 on one end of a lever 72 fulcrumed intermediate its ends at 74 and having its other end operatively connected with the clutch lever 56 by a link 76 so as to be moved in unison therewith.

When the lever 56 is operated to engage the gears 52 and 26 the clutch collar 35 is raised and remains in an inoperative position similar to the illustrated condition which it occupies when the lever 56 is in neutral. Consequently the agitator 32 is free to rotate at such times as the container 16 is being rotated.

When the lever 56 is operated to engage the clutch members 54 and 60 to drive the eccentric 58, the lever 72 is swung in a clockwise direction to lower the clutch collar 35 and connect the gear 34 to the shaft 28 to oscillate the agitator.

Hot and cold water are brought into the machine through separate conduits 78 and 80 and one means of controlling the water is illustrated comprising solenoid valves 82 and 84 which act to open the conduits 78 and 80 respectively when energized. After passing through the solenoid valves 82 and 84, the conduits join and enter a mixing chamber 86 from which a single conduit 87 extends upwardly between the control panel 88 and the wall of the tub 10 and discharges into the tub through a nozzle 90 curved over the upper edge of basket 16 so as to discharge directly into the materials therein.

Electric power is supplied to the machine by suitable supply indicated as a wire 92, the return part of the circuit being indicated diagrammatically by appropriate grounds. A switch 94 is connected between the wire 92 and the cold water solenoid valve 84 and can be closed to admit cold water by rotating a cam 96 one quarter turn clockwise by means of an indicator and control knob 98.

A double pole single throw switch 100 is connected between the wire 92 and both solenoid valves and can be closed to admit both hot and

cold water by rotating the cam 96 one-half turn clockwise. In series with one pole of the switch 100 and the cold water solenoid is a thermostatic switch 102 positioned on the common discharge of the two valves to open and close according to the temperature of the mixed water and thereby open and close the cold water valve 84 to regulate the temperature of the mixture. A third position of the cam 96 closes a switch 104 which energizes only the valve 82 to admit all hot water to the tub 10.

A drain line 106 from the tub is controlled by a solenoid operated valve 108 and in some instances, where it is desired to discharge into a set-tub or sink, I may provide a pump 110 driven by the motor 38 to assist in discharging water through the drain connection 106. I also prefer to provide an overflow pipe 111 from the tub 10 to the drain pipe 106 below the valve 108, to insure that the proper water level in the tub is not exceeded.

A single pole switch 112 is arranged to energize the valve 108 and open the drain, while a double pole double throw switch 114 has one pole in parallel with the switch 112 to operate the drain and its other pole connected to energize the solenoid 42 to shift the transmission 40 into high speed.

A switch 116 is arranged on the control panel for manual operation to start and stop the motor.

On the control panel 88 is positioned a control handle 117 slidably in a horizontal slot 118 having six notches or seats 120 forming six control positions. Adjacent each notch is a spring clip 122 engageable with a ball ended projection 124 on the control handle to hold the handle in its operative position. The handle is provided with a downwardly projecting finger 126 engageable successively in the several control positions with several control members as follows: a plunger 128 operative through a rock lever 130 and a second plunger 132 to rotate the clutch lever 56 in a clockwise direction as seen in Figure 3; a plunger 134 engaging the switch 112 previously described; a forked arm 136 on the plunger 132 to rotate the clutch lever 56 in a counterclockwise direction; a forked arm 138 on the plunger 134; and the second forked arm 139 of the plunger 132 operating simultaneously with the arm of the switch 114. Balanced springs 140 compressed between abutments on the tub 10 and on the plungers 128 and 132 serve to return and normally to maintain those plungers in their neutral or inoperative positions.

To operate my machine, the cover 12 is first removed and the clothes, or other materials to be washed are placed in the tub. The indicator knob 98 is next turned to admit water of the proper temperature (either cold, mixed or hot, depending upon the type of materials). When the water reaches the proper level in the tub as indicated by the overflow pipe, the knob 98 is turned back to its "off" position, soap is added in suitable quantity and the cover is replaced.

The control handle is now moved from its "off" position into its first operative position which I prefer to call the "wash" position. As the handle is pushed down into the notch 120 the finger 126 engages the plunger 128, moving it downwardly. The plunger 132 is raised through the rock lever 130 and the clutch lever 56 is swung to engage the clutch 54, 60 to drive the eccentric 58. At the same time the lever 72 is swung to engage the clutch collar 35 with the gear 34. The

motor switch 116 is now turned on and the motor drives the agitator back and forth in a well known manner, to wash the clothes.

When the clothes are sufficiently washed, the motor may be turned off by means of the switch 116 and the control handle 117 is shifted into the next notch which provides a "drain" operation. The springs 140 return the clutches to neutral, and the finger 126 engages the plunger 134, closing the switch 112 and thereby opening the drain valve 108. The motor may be turned on again so that the pump 110 will act to rapidly discharge the drain water, and then the motor may be turned off again.

When the drainage is complete, the control handle is moved to the next position for a "rinsing" operation. In this position, the finger 126 on the handle engages the plunger 132 and forces it down thereby engaging the gears 52 and 26. The water is turned on at an appropriate temperature and the motor is started. In this condition the container 16 rotates slowly and the water sprays down on the clothes providing a thorough rinsing. When the water reaches the proper level, it may be shut off while the rotation of the container is continued for any desirable length of time to insure complete removal of the soap from the materials being washed, after which the motor is stopped.

The next position is a "drain" position which operates similarly to that previously described, i. e. lifting the handle from the "rinse" notch disengages the gears 52 and 26, and forcing it down in the "drain" notch closes the switch 112 again through the medium of the forked arm 138 of the plunger 134. The motor may be again started so as to bring the pump into operation, and stopped when the tub is empty.

Next the handle 117 is moved to the last position. The plunger 132 is again depressed to engage the gears 52 and 26, and at the same time the switch 114 is closed to shift the transmission 40 into its high speed position and to open the drain line 106. Now, when the motor is started, the container 16 is rotated at high speed to extract the remaining water from the materials being washed and leave them in a damp dry condition. The extracted water passes out through the drain with the aid of the pump 110. The agitator 32, it will be noted, is free to turn with the container. After a sufficient period of extraction the motor switch 116 is turned off and the control handle 117 is returned to its original or "off" position ready for the next operation, whereupon the cover 12 is lifted and the clothes removed for further drying and ironing.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

I claim:

1. In a washing machine comprising a base and a tub mounted thereon and means for operating on work in the tub to perform different operations thereon without removing it from the tub including mechanism housed within the base, the combination of a vertical control panel mounted on the front of the tub and base and having its top portion provided with horizontally-spaced seats arranged in a series, and control means for said mechanism housed between said panel and the tub and base and including control members on the front of the panel for convenient manual manipulation and one of which is movable manually selectively along from one to another of said seats for actuating certain of said control means.

2. A washing-drying machine comprising washing and drying means oscillated for washing and rotated continuously in one direction for drying, a motor, shiftable driving means driven by the motor and connected to said means to oscillate or to rotate it, longitudinally movable control rods connected to the driving means to shift it into oscillating or rotating drive, drain means for the washing and drying means, a longitudinally movable control rod for the drain means, certain of said control rods having forked ends arranged in alinement in series according to the successive steps of a washing-drying cycle, and a single control member movable laterally along the ends of said rods into register selectively therewith and then shiftable parallel to the rods selectively to engage the ends of and operate the rods.

3. In a washing-extracting machine comprising a base and a tub mounted thereon and means for operating on work in the tub to perform different operations thereon without removing it from the tub including mechanism housed within the base, the combination of a control panel mounted on the front of the tub and having a portion provided with horizontally spaced seats arranged in a series, and control means for said mechanism housed between said panel and the tub and base and including a control member on the front of the panel for convenient manual manipulation and which is movable manually selectively along from one to another of said seats for actuating certain of said control means, said control member when positioned in at least two of said seats which are non-adjacent serving to effect the same type of control of the washing-extracting machine, whereby the said machine may be manually sequentially controlled by the movement of said control member from one seat to another progressively from one end to the other of said panel.

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