

Aug. 4, 1964

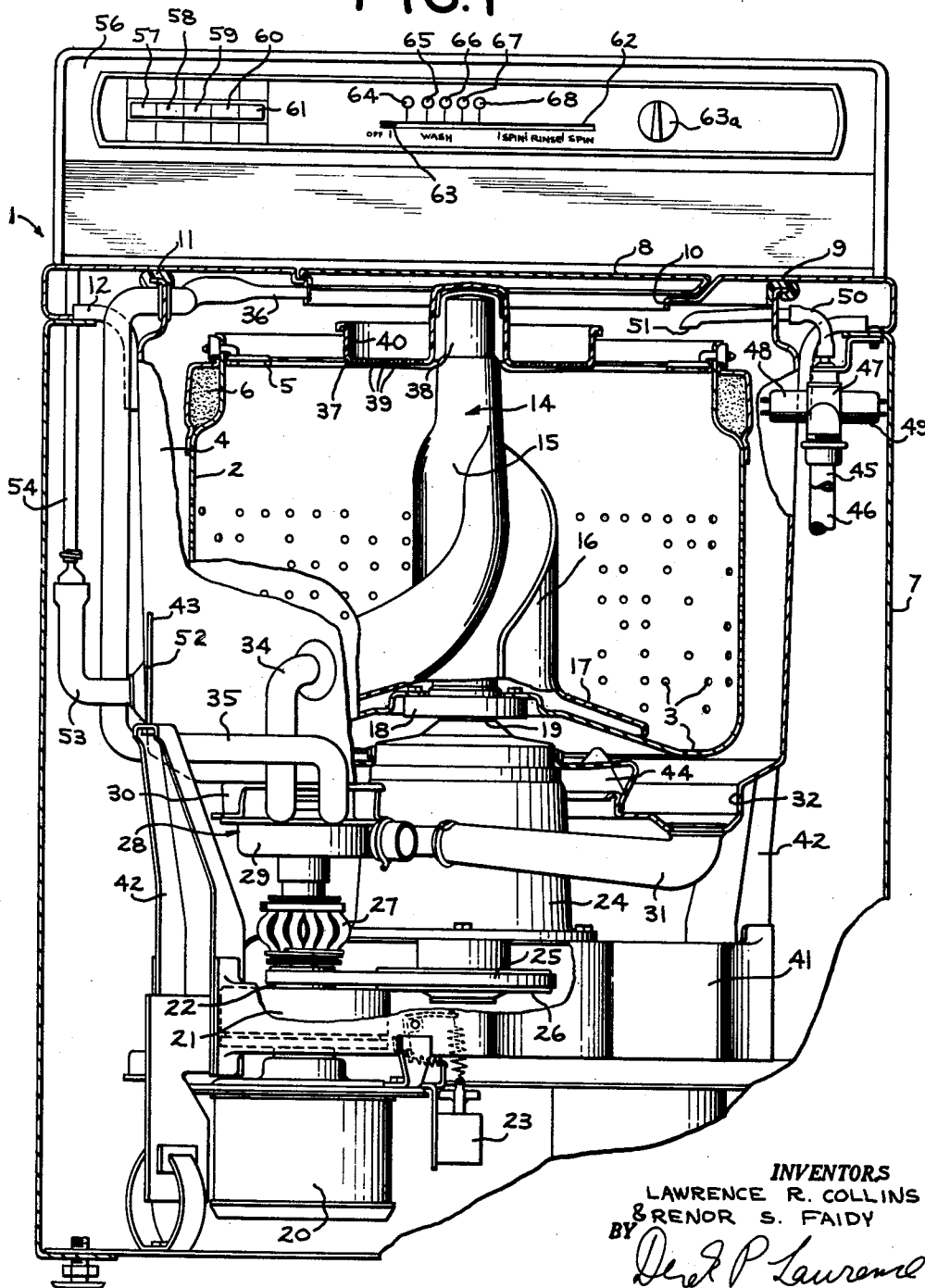
L. R. COLLINS ET AL
AUTOMATIC WASHING MACHINE WITH IMPROVED
CYCLE SELECTION MEANS

3,142,976

Filed May 22, 1963

2 Sheets-Sheet 1

FIG. 1



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2 Sheets-Sheet 2

FIG. 2

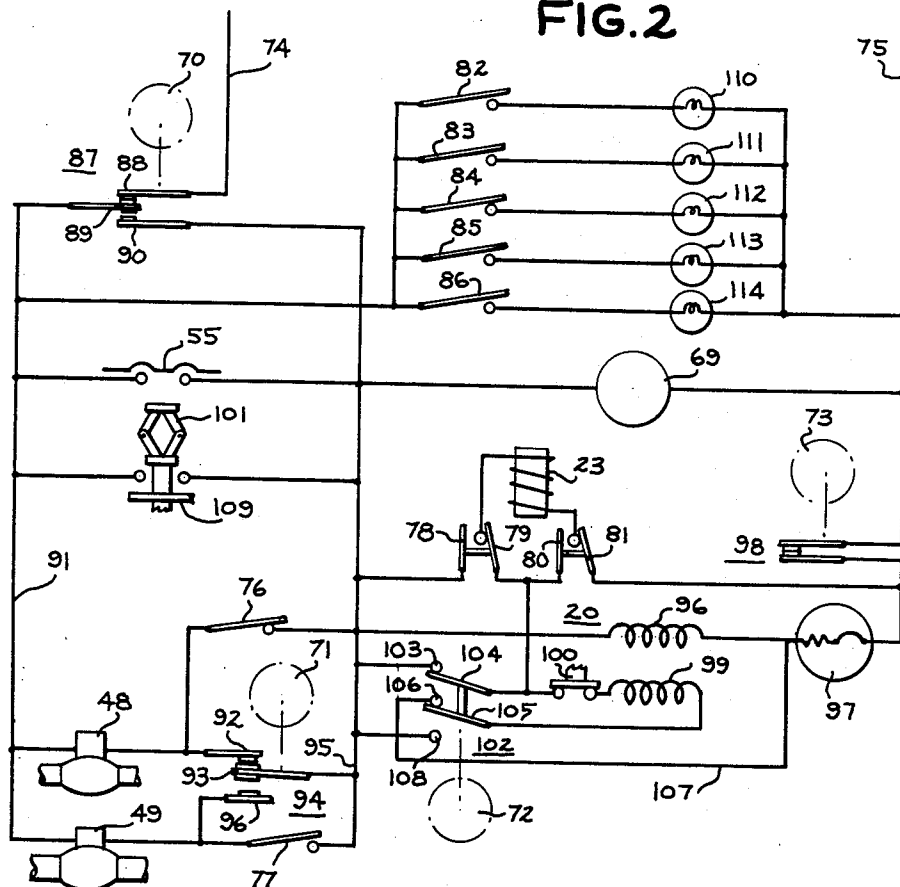
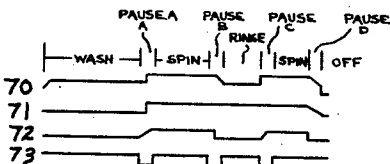


FIG. 4

	WHITE	NON COLORFAST	STURDY	DELICATE	SPECIALS
WASH TEMP.	HOT	WARM	WARM	WARM	WARM
RINSE TEMP.	WARM	WARM	COLD	COLD	COLD
ACT. SPEED	NORMAL	NORMAL	NORMAL	DELICATE	DELICATE
SPIN SPEED	FAST	FAST	SLOW	SLOW	FAST
INDICATOR LT.	110	111	112	113	114

FIG. 3



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AUTOMATIC WASHING MACHINE WITH IMPROVED CYCLE SELECTION MEANS

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4 Claims. (Cl. 68-12)

This invention relates to automatic washing machines, and more particularly to washing machines which provide for a plurality of alternatively selectable sequences.

Automatic washing machines are, in their most desirable form, made so that they will wash a variety of different types of fabrics. In order to achieve this, different types of cycles must be provided in such machines. For instance, while some fabrics may take a relatively rapid motion of an agitator in a washing machine, others require a slower, gentler motion. Also, it is desirable for some fabrics to have liquid centrifuged out of them at higher speeds than other fabrics. By the same token, wash and rinse water temperatures also should be varied depending upon the type of fabric being washed. In some types of machines, these individual features are made selectable on a one-by-one basis, but on the whole it is more convenient for an operator to merely select a type of fabric, and then have the various types of operation most suitable for that fabric automatically selected and provided by the machine. Thus, for instance, the operator might push a single button marked "White Cottons" and thereby select hot wash water, warm rinse water, normal agitation speed and fast spin speed.

Another variable which is important is the length of washing time provided. The optimum length of time varies for different types of fabrics, and thus different wash times should be provided for the different fabric selections on those machines which select all the different functions together, as explained above. However, it has been found that operators of washing machines, particularly in the case of domestic washing machines, often do not like to have a particular length of wash time imposed on them even though the manufacturer of the washing machine may believe it to be the optimum for that particular type of fabric. Rather, operators of domestic washing machines prefer to have the length of time suggested to them in each case, so that they may follow the suggestion if they so desire but may deviate therefrom and provide a longer or shorter wash time if they are not inclined to follow the suggestion.

It is an object of our invention to provide an improved arrangement whereby the selectively variable functions of a washing machine are selected by depression of a single manually operable member rather than individually, and wherein the depression of this manually operable member also automatically provides the appropriate suggestion for length of washing time without, however, imposing that length of time on the operator against her volition.

In one aspect thereof, our invention is for use in a washing machine of the type having a plurality of different selectable washing sequences including a wash step followed by a rinse step and a liquid extraction step. First manual means are operable to a plurality of positions corresponding to the plurality of different washing sequences. A first switch means has a plurality of positions controlling a function of the machine so as to provide the plurality of different washing sequences; each position of the first manual means provides one of the positions of the first switch means.

In order to effect the steps in sequence, electrically controlled means are provided and are controlled by a second switch means. The second switch means is under

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the control of a timer motor means so that a wash step is provided, followed by rinse and extraction steps of predetermined duration, and by termination of the operation of the machine.

First indicating means are provided to show, on a dial, which point in a sequence of steps has been reached. Second manual means are provided for setting the first indicating means so as to select a point at which the sequence of steps begins. Our invention contemplates the provision of second indicating means showing on the dial a plurality of different points in the wash step at which the first indicating means may be set. This second indicating means is controlled by the first manual means so as to indicate one of the plurality of points in the wash step for each selected one of the plurality of washing sequences. As a result, the machine indicates to the operator the suggested optimum washing time but does not impose that washing time upon her regardless of whether she wants it or not.

Preferably, the second indicating means is in the form of a plurality of lights which are alternatively selected and which are spaced on the dial so as to indicate the point of the dial at which the machine is preferably set for the particular selected cycle or sequence.

The subject matter which we regard as our invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. The invention itself, however, both as to its organization and method of operation together with further advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings.

In the drawings, FIGURE 1 is a front elevational view of a clothes washing machine which includes our improvement, the view being partly broken away and partly in section to illustrate details;

FIGURE 2 is a schematic diagram of an electrical control circuit incorporating our invention, which circuit is incorporated in the machine of FIGURE 1;

FIGURE 3 is a schematic view of the development of the cam surfaces used in the control of the timer operated switches in FIGURE 2, thereby indicating the operation of the switches by the cams throughout a cycle; and

FIGURE 4 is a schematic chart indicating the selection of different functions to provide different types of sequences.

Referring now to FIGURE 1, I have shown therein an agitator-type clothes washing machine 1 having a conventional basket or clothes receiving receptacle 2 provided over its side and bottom walls with perforations 3 and disposed within an outer imperforate tub or casing 4 which serves as a liquid receptacle. The basket 2 may be provided with a suitable clothes retaining member 5 for preventing clothes from being floated over the top of the basket, and with a balance ring 6 to help steady the basket when its rotated at high speed.

Tub 4 is rigidly mounted within an appearance cabinet 7 which includes a cover 8 hingedly mounted in the top portion 9 of the cabinet for providing access to an opening 10 to the basket 2. As shown, a gasket 11 may be provided so as to form a seal between the top of tub 4 and portion 9 of the cabinet thereby to prevent escape of moisture and moist air into the cabinet around the tub. The rigid mounting of tub 4 within the cabinet 7 may be effected by any suitable means. As a typical example of one such means I have provided strap members 12, each of which is secured at one end to an intumed flange 13 of the cabinet and at its other end to the outside of tub 4.

At the center of basket 2 there is positioned a vertical axis agitator 14 which includes a center post 15 and a

plurality of curved water circulating vanes 16 joined at their lower ends by an outwardly flared skirt 17. Both the clothes basket 2 and the agitator 14 are rotatably mounted. The basket is mounted on a flange 18 of a rotatable hub 19 and the agitator 14 is mounted on a shaft (not shown) which extends upwardly through the hub 19 and through the center post 15, and is secured to the agitator so as to drive it.

During a sequence of operations of machine 1, water is introduced into tub 4 and basket 2, and the agitator 14 is then oscillated back and forth on its axis, that is, in a horizontal plane within the basket, to wash the clothes therein. Then, after this washing step is completed, basket 2 is rotated at high speed to extract centrifugally the washing liquid from the clothes and discharge it to drain. Following this extraction operation a supply of clean liquid is introduced into the basket for rinsing the clothes and the agitator is again oscillated. Finally, the basket is once more rotated at high speed to extract the rinse water.

Basket 2 and agitator 14 may be driven through any suitable means. By way of example, we have shown them as driven from a reversible motor 20 through a system including a clutch 21 mounted on the motor shaft. Motor 20 is a single speed motor, and in order to provide two different speeds of operation for agitator 15 and basket 2 clutch mechanism 21 is caused to be of the two speed type. Depending upon the selection of the operator, clutch 21 is effective to drive its output pulley 22 either at the speed of motor 20 or at a predetermined lower speed. In other words, the clutch is effective to provide a direct drive between motor 20 and output pulley 22, or alternatively is effective to produce a reduced speed drive of pulley 22. A two speed clutch of this type, particularly suited for use in the illustrated machine, is described in detail and is claimed in Patent 2,869,699 issued to John Bochan on January 20, 1959 and assigned to General Electric Company, assignee of the present invention.

The two speed clutch 21 is controlled by means of a solenoid 23 to be later described. This solenoid operates a latch mechanism (not shown) which is effective in one position to condition clutch 21 for the high speed drive of pulley 22 and which in a second position is effective to condition the clutch for the low speed drive of pulley 22. Specifically in the illustrated machine, when solenoid 23 is de-energized the two speed clutch 21 provides a direct drive between motor 20 and pulley 22 and when the solenoid is energized the clutch 21 provides a reduced speed drive of pulley 22.

The output pulley 22 transmits power to a transmission assembly 24 through a belt 25 and a pulley 26. Thus, depending upon the direction of motor rotation, pulley 26 of transmission 24 is driven in opposite directions. Transmission 24 is so arranged that it supports and drives both the agitator drive shaft and the basket mounting hub 19. When motor 20 is rotated in one direction the transmission causes agitator 14 to oscillate in a substantially horizontal plane within the basket 2 at the speed determined by clutch 21. Conversely, when motor 20 is driven in the opposite direction the transmission rotates wash basket 2 and agitator 14 together at a centrifuging speed determined by clutch 21 for centrifugal liquid extraction. While the specific type of transmission mechanism used does not form part of the invention, reference is made to Patent 2,844,224 issued to James R. Hubbard et al. on July 22, 1958 and owned by the General Electric Company, assignee of the present invention. That patent discloses in detail the structural characteristics of a transmission suitable for use in the illustrated machine.

In addition to operating transmission 24 as described, motor 20 also provides a direct drive through a flexible coupling 27 to a pump structure, generally indicated at 28, which may include two separate pumping units 29 and 30 both operated simultaneously in the same direction by motor 20. Pump 29 has an inlet which is con-

nected by a conduit 31 to an opening 32 formed at the lowermost point of tub 4. Pump 29 also has an outlet which is connected by a conduit 33 to a suitable drain (not shown). Pump 30 has an inlet connected by a conduit 34 to the interior of tub 4 and an outlet connected by a conduit 35 to a nozzle 36. The pumps are formed so that in the spin direction of motor rotation pump 29 will draw in liquid from opening 32 through conduit 31 and discharge it through conduit 33 to drain, and in the other direction of rotation pump 30 will draw in liquid through conduit 34 and discharge it through conduit 35 and nozzle 36, each of the pumps being substantially inoperative in the direction of rotation in which it is not used.

Nozzle 36 is positioned to discharge into a filter pan 37 secured on the top portion 38 of agitator 14 so as to be movable therewith. With this structure then, when the motor is rotating so as to provide agitation, pump 30 draws liquid through conduit 34 from tub 4 and discharges it through conduit 35 so that the liquid passes from nozzle 36 into filter pan 37 and then down through a number of small openings 39 provided in the bottom of the filter pan and back into basket 2. In this manner, the filter pan 37 with its small openings 39 and its upstanding side wall 40 causes lint which is separated from the clothes during a washing operation to be filtered out of the water and thus prevents it from being redeposited on the clothes. This type of structure is more fully described and claimed in Patent 2,481,979 issued to Russell H. Colley on September 13, 1949 and assigned to General Electric Company, owner of the present invention.

Motor 20, clutch 21, transmission 24, basket 2 and agitator 14 form a suspended washing and centrifuging system which is supported by the stationary structure of the machine so as to permit isolation of the vibrations from the stationary structure. It will be understood that such vibrations occur primarily as a result of high speed spinning of basket 2 with a load of clothes therein as mentioned above. While any suitable suspension structure may be used, one suitable structure includes a bracket member 41 with transmission 24 mounted on top thereof and motor 20 mounted to the underside thereof. The bracket member in turn is secured to upwardly extending rigid members 42, and each of the two upwardly extending members 42 is connected to a cable 43 supported from the top of the machine. While only a portion of the suspension system is shown in the drawings, such a vibration isolating system is fully described and claimed in Patent 2,987,190 issued on June 6, 1961 to John Bochan and assigned to General Electric Company, assignee of the present invention.

In order to accommodate the movement which occurs between basket 2 and tub 4 without any danger of leakage between them the stationary tub 4 is joined to the upper part of transmission 24 by a flexible boot member 44. Boot 44 may be of any suitable configuration, many of which are known in the art to permit relative motion of the parts to which it is joined without leakage therebetween.

Hot and cold water may be supplied to the machine through conduits 45 and 46 which are adapted to be connected respectively to sources of hot and cold water (not shown). Conduits 45 and 46 extend into a conventional mixing valve structure 47 having solenoids 48 and 49 so that energization of solenoid 48 permits passage of hot water through the valve to a hose 50. Energization of solenoid 49 permits the passage of cold water through the valve, and energization of both solenoids permits mixing of hot and cold water in the valve and passage of warm water into hose 50. Hose 50 has an outlet 51 positioned to discharge into basket 2 so that when one or both of the solenoids 48 and 49 are energized water passes into basket 2 and tub 4. The level to which water rises in the basket and tub may be controlled by any suitable

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liquid level sensing means. One typical arrangement for doing this is to provide an opening 52 in the side of tub 4 adjacent the bottom thereof, opening 52 being connected through a conduit 53 and a tube 54 to a conventional pressure sensitive device (shown schematically in FIGURE 2 by the numeral 55) which may be positioned within the control panel 56 of machine 1. In the conventional manner, as the water rises in basket 2 and tub 4 it exerts increasing pressure on the column of air trapped in the tube 54, and at a predetermined pressure level the column of air then trips switch 55 to shut off whichever of solenoids 48 and 49 may be energized.

The control panel 56 is provided with five manually operable selector buttons 57, 58, 59, 60 and 61, each of which selects a particular type of operation as will be further described herebelow. In addition to these push-button members 57 through 61, the control panel includes a suitable dial, which in this case is in the form of a linear dial 62. The dial is shown to represent a complete sequence of steps in a washing operation such as that shown in FIGURE 3, that is, wash, spin, rinse, and another spin. The particular point reached in a sequence is shown by an indicator strip 63 whose position along the dial 62 is controlled by a manual member 63a in the conventional manner, rotation of member 63a causing movement of strip 63 along the dial 62.

In addition, five small openings 64, 65, 66, 67 and 68 are provided through which lamps may shine as further disclosed herebelow. All five of the lamp openings 64 through 68 are within the wash step so that when the manual member 63a is used to preset strip 63 at different positions along the dial 62 corresponding to any one of the lamp openings, a different length wash step is provided in the sequence of operation, and is then followed by the other conventional steps.

Referring now to FIGURE 2, there is shown an electrical control system for machine 1. In order to control the sequence of operation of the machine, the circuit includes a timer motor 69 which drives a plurality of cams 70, 71, 72 and 73. These cams, during their rotation by the timer motor, actuate various ones of a group of timer switches (as will be described) so as to cause the machine to pass through an appropriate sequence of operations, first providing a washing step, then providing an extraction step to centrifuge out the wash water from the clothes, then a rinse step in which the clothes are rinsed with clean water, and finally another extraction step for removal of the rinse water from the clothes.

The electrical circuit as a whole is energized from a power supply (not shown) through a pair of conductors 74 and 75. Prior to initiation of a particular sequence, one of the manual control members 57 through 61 is depressed. Members 57, 58, 59, 60 and 61 control the positions of a group of switches 76, 77, 78, 79, 80 and 81; in addition, they control switches 82, 83, 84, 85 and 86. Depression of each one of members 57 through 61 provides a different combination of closure of these switches. While the particular mechanism for causing this to be effected is not shown, such mechanisms are well known in the art. For instance, such a mechanism is fully shown and described in Patent 2,934,926, issued on May 3, 1960 to William R. Buechler, and assigned to General Electric Company, assignee of the present invention.

Cam 70 controls a switch 87 which includes contacts 88, 89 and 90. When cam 70 has assumed a position where all three contacts are separated, machine 1 is disconnected from the power source and is inoperative. The position of the cams is controlled by the manual member 63a in the conventional manner (not shown), with the indicator 63 showing on the dial 62 what position the cams are in.

When contacts 88 and 89 are together, power is provided to the control circuit of the machine from conductor 74 through the two contacts to a conductor 91. From the conductor 91 the circuit extends through valve

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solenoids 48 and 49 in parallel with each other. From solenoid 48 the circuit extends through a stationary contact 92 which is engageable by a contact 93 of switch 94 controlled by cam 71. When contact 93 is in the up position engaging contact 92, a circuit through the valve solenoid 48 is then completed from conductor 91 to a conductor 95. When the contact 93 is in the down position, a circuit is completed from conductor 91 through valve solenoid 49, a contact 96, and contact 93 to conductor 95.

It will be observed that switch 76 is in parallel with contact 92 so that even when contact 92 is not engaged by contact 93 the switch 76 may complete the circuit between conductor 91 and 95 through solenoid 48. In similar fashion, switch 77 is in parallel with contact 96 so that a circuit for solenoid 49 may be completed from conductor 91 to conductor 95 independently of the position of contact 93 of timer switch 94. When switch 76 is closed and switch contact 93 is in the down position, both solenoids will be energized and warm water will be provided. The same result is achieved by closure of switch 77 with contact 93 in the up position. When contact 93 is in the position with switch 77 opened, hot water will be provided, and when switch 76 is opened and contact 93 is in the down position cold water will be provided.

From conductor 95 the energizing circuit then continues through the main winding 96 of motor 20, a conventional motor protector 97, and a switch 98 controlled by cam 73 to the conductor 75. Motor 20 is of the conventional single phase induction type, provided with a start winding 99 which assists the main winding 96 during starting of the motor and is energized in parallel therewith. A normally closed motor-operated centrifugal switch 100 is provided in series with start winding 99. When the motor is at rest or rotating below a predetermined speed, switch 100 is closed, but as the motor comes up to speed switch 100 is opened by the centrifugal mechanism schematically shown at 101. Thus, when the motor is at running speed, contact 100 is open and the motor runs on main winding 96 alone.

When the circuit for the start winding 99 in parallel with main winding 96 is completed, and with switch 102 controlled by cam 72 in the position shown, the circuit is as follows: from conductor 95, the circuit extends through a contact 103, switch arm 104, centrifugal switch 100, start winding 99, switch arm 105, contact 106 and a conductor 107. When the switch 102 is moved to the down position by cam 72, the connection of winding 99 relative to winding 96 is reversed. In other words, the connection from conductor 95 extends as follows: from contact 103, the circuit then passes through switch arm 105, winding 99, centrifugal switch 100, switch arm 104, and contact 106 to conductor 107. In the first position of switch 102, and with the motor starting from a standstill so that switch 100 is closed, the motor will rotate in a direction to provide agitation. When the switch 102 is moved down to its other position, the reversal of winding 99 relative to winding 96 causes the motor to reverse in the usual way and (provided switch 100 is initially closed) the rotation will be in the opposite direction, thereby causing spin.

A circuit is also completed in parallel with motor 20 from conductor 95 through the timer motor 69 to conductor 75.

As the motor comes up to speed and switch 100 opens, the same centrifugal mechanism 101 causes a switch 109 to close thereby providing a short circuit across solenoids 48 and 49 for a purpose to be hereinafter described. By the same token, a short circuit across the solenoids is provided when the pressure responsive switch 55 closes after an adequate amount of water has entered the machine.

When the main winding 96 of motor 20 is in series with valve solenoids 48 and 49, and the switch 87 is in the position shown, a much lower impedance is provided in the circuit by motor 20 than is presented by the valve

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solenoids. As a result, the greater portion of the supply voltage is taken up across the solenoids and relatively little across the motor. This causes whichever of the solenoids is connected in the circuit to be energized sufficiently to open its associated water valve. As a result, water at a selected temperature is admitted to the machine through outlet 51, motors 20 and 69 remaining inactive.

This action continues with the circuitry thus arranged so that the water pours into basket 2 and tub 4. Because of perforations 3, water rises in both basket and tub at substantially the same rate. As the head of water acting on the column of air trapped in tube 54 increases, the pressure of this air increases until it actuates switch 55 provided within control panel 56. When switch 55 closes, it then provides a short circuit across the solenoids directly from conductor 91 to conductor 95. With the solenoids thus excluded from the effective circuit, they become de-energized and a high potential drop is provided across windings 96 and 99 of motor 20. This causes the motor to start rotation, while at the same time timer motor 69 starts so as to initiate the washing step in the sequence of operations. Thus, when there is sufficient potential across the valve solenoids to energize them the motor remains de-energized, and it is necessary to short the solenoids out of the circuit so that they are de-energized before the drive motor 20 is energized.

Continuing with the description of the circuit of FIGURE 2 it will be observed that switch 98 is in series with main motor 20 but it is not in series with timing motor 69. Thus, by the opening of this switch the operation of motor 20 may be stopped but the timer motor will nonetheless continue to operate, because it is deliberately provided with an impedance much greater than that of the valve solenoid. This makes it take up much of the supply voltage and continue in operation, leaving so little voltage across the solenoids that they do not operate their respective valves.

As described above, it is desirable to make the agitator speed selectively variable (either high or low) and to make the speed of centrifuging either high or low, in order to obtain maximum washing effectiveness with different types of loads. For this, solenoid 23 is provided in connection with clutch 21 in order to achieve two output speeds of the clutch to provide for these high and low speed operations. Switches 80 and 81 control the agitation speed and switches 78 and 79 control the spin speed. When switch 80 is closed, solenoid 23 is not energized during agitation, and consequently high speed agitation is provided. If switch 81 is closed, the solenoid is energized and a low speed agitation is provided. In the same manner, closing of switch 79 precludes energization of solenoid 23 during spin and a high spin speed is provided, while closing switch 78 causes energization of solenoid 23 and a low spin speed is provided. The precise manner in which the setting of these switches 78, 79, 80 and 81 controls the energization of solenoid 23 is described in substantial detail and is claimed in Patent 2,950,612 issued on August 30, 1960 to Wallace H. Henshaw, Jr., and assigned to General Electric Company, owner of the present invention.

Completing the description of the circuitry of FIGURE 2 it will be observed that the five switches 82 through 86 are connected across conductors 91 and 75, and are respectively in parallel circuits in series with small lamps 110, 111, 112, 113 and 114.

Referring now to the five pushbuttons 57 through 61, button 57 is pushed when the operator wishes to wash a load of conventional white clothes, for instance those made of cotton and like fabrics. Pushing of this button causes closure of switches 76, 80, 79 and 82. Depression of button 58 causes closure of switches 76, 77, 80, 79 and 83. Depression of button 59 causes closure of switches 77, 80, 78 and 84. Depression of button 60 causes closure of switches 77, 81, 78 and 85. Depression of button 61 causes closure of switches 77, 81, 79 and 86. As pre-

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viously described, this may be effected through any conventional mechanism such as that shown and described in the aforementioned Buechler patent.

In addition to the switches operated by the pushbuttons, the timer motor during its operation causes operation of switches 87, 94, 102 and 98 in a sequence shown diagrammatically in FIGURE 3, where the cam surface configuration is shown. The initiation of a sequence of operations is effected through manual member 63a, by causing the cams to be rotated until they are at some desired point in the wash step, as shown in FIGURE 3. As soon as the wash step has been entered, cam 70 causes switch 87 to have contacts 88 and 89 closed and contact 90 open. This provides for energization of one or both of solenoids 48 and 49, as described above, until a sufficient amount of water has entered the machine for switch 55 to close and cause energization of motors 20 and 69.

The washing operation then proceeds under the control of timer motor 69 until pause A is reached, at which time the four cams move their associated switches as shown so that switch 87 has all three contacts thereof closed, switch 94 has contact 93 thereof moved to its down position, switch 102 is reversed, and switch 98 is opened. The closure of contact 90 causes the solenoids to be bypassed completely, but because switch 98 is open the drive motor 20 comes to a stop with the timer motor continuing to run. At the end of the pause switch 98 is reclosed, and the drive motor starts up in the opposite direction to provide a spin operation. At the end of the spin operation, there is a second pause B provided by the opening of switch 98, at which time switches 87 and 102 are returned to their original positions. For this reason, upon reclosing of switch 98 the valve solenoids again fill the machine until switch 55 causes them to be shorted out and causes the motors 20 and 69 again to start operation. In the same manner as before, at the end of rinse there is a pause C provided by the opening of switch 98, followed by a spin. At the end of that spin step, the cam 70 causes all three contacts of switch 87 to be separated so as to terminate all operation of the machine.

It will be observed that when the operation of the machine is started, whatever particular combination of functions has been selected by depression of one of buttons 57 through 61 is provided (see FIGURE 4) and that in addition, as an important aspect of our invention, one of the lamps 110 through 114 is lit since one of the switches 82 through 86 is closed. It will be understood that for the various different types of fabrics shown in FIGURE 4 different washing times are desirable. By the provision of our arrangement of switches and lights, we provide a suggestion to the operator of the machine of the optimum length of washing time for any particular type of fabric to be washed. However, the operator is not restricted from selecting a different length of washing time if she so desires. In this way the suggestions which are desired by the operator are given to her automatically in response to her selection of a particular sequence of washing operations, while still leaving her the freedom to vary wash time that past experience has shown she also wants. In addition, it will be observed that the particular arrangement of FIGURE 1 is particularly convenient inasmuch as the five selector buttons 57 through 61 shown in FIGURE 3 are arranged linearly, and the five openings 64 (through 68 through which lights 110 through 114 shine) are similarly arranged linearly in a manner which corresponds to the positioning of the buttons. All of this provides considerable ease of visual selection, and eliminates to a great extent any possibility of error if the operator does wish to follow the suggestion for a particular type of cycle.

While in accordance with the patent statutes we have described what at present is considered to be the preferred embodiment of our invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the inven-

tion, and it is therefore aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a washing machine having a plurality of different selectable washing sequences including a wash step, a rinse step, and a liquid extraction step:

- (a) first manual means operable to a plurality of positions corresponding to the plurality of different washing sequences; 10
- (b) first switch means having a plurality of positions and controlling at least one function of said machine to provide said plurality of different washing sequences, said first manual means in each position providing one of said switch means positions; 15
- (c) electrically controlled means for effecting said steps; 20
- (d) timer motor means; 25
- (e) second switch means for controlling operation of said electrically controlled means and said timer motor means to provide a wash step followed by rinse and extraction steps of predetermined duration and then termination of operation of said machine, said timer motor means operating said second switch means to provide said steps and said termination; 30
- (f) a dial;
- (g) first indicating means showing on said dial which point in a sequence of steps has been reached;
- (h) second manual means for setting said first indicating means to select a point at which a sequence of steps begins;

(i) and second indicating means showing on said dial a plurality of different points in said wash step at which said first indicating means may be set, said second indicating means being controlled by said first manual means to indicate one of said plurality of points in said wash step for each selected one of said plurality of washing sequences.

2. The apparatus defined in claim 1 in which said second indicating means comprises a plurality of lights spaced at different points on said dial.

3. The apparatus defined in claim 2 wherein said plurality of lights are connected in parallel circuits with each other, and a plurality of light switches are respectively provided in said circuits, said first manual means in each position thereof causing closure of one of said light switches to permit energization of one of said lights.

4. The apparatus defined in claim 2 wherein said washing machine has a control panel provided thereon, said first manual means comprising a plurality of horizontally aligned pushbuttons, said dial being formed to extend horizontally, and said second indicating means comprising a plurality of lights disposed in horizontally spaced relation along the initial portion of said dial.

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