Nov. 5, 1968 S. L. McMILLAN 3,408,834

LID LATCH AND INTERLOCK

Filed April 3, 1967 3 Sheets-Sheet 1

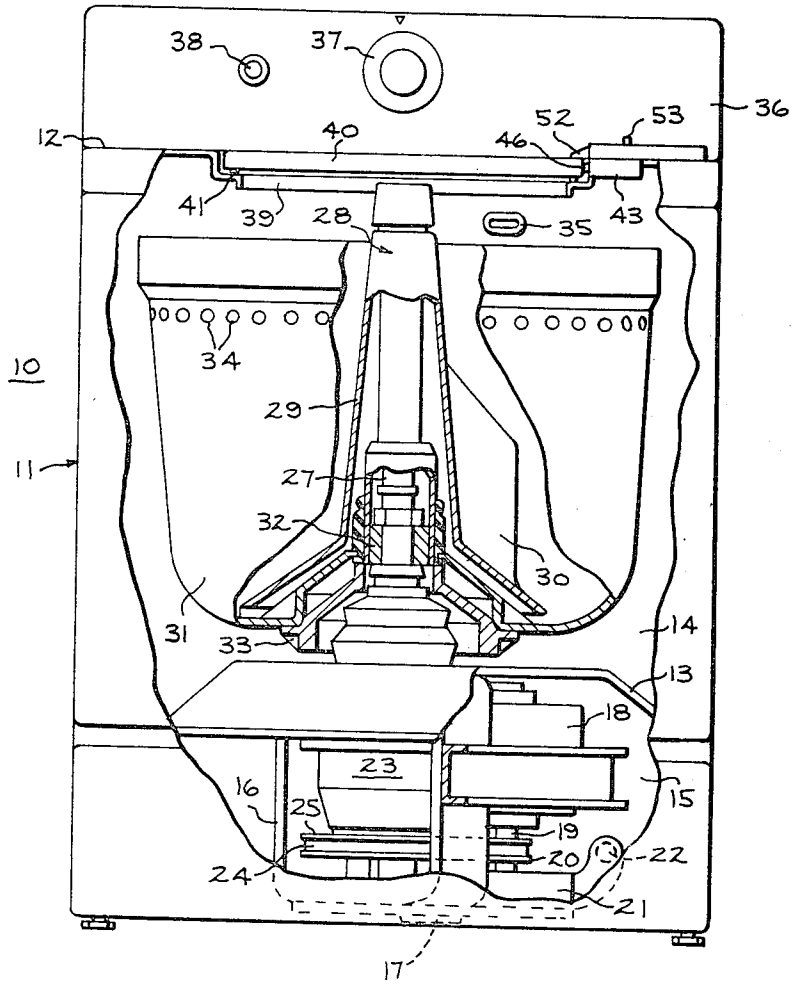


FIG. 1

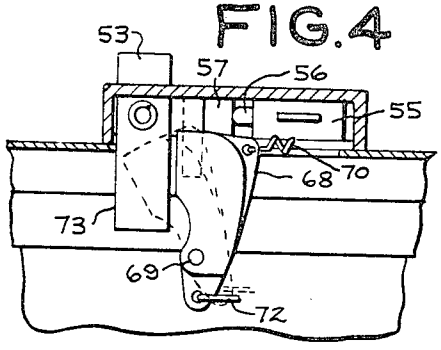
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LID LATCH AND INTERLOCK

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FIG. 4



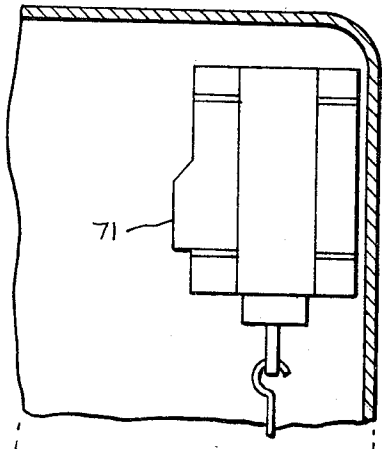
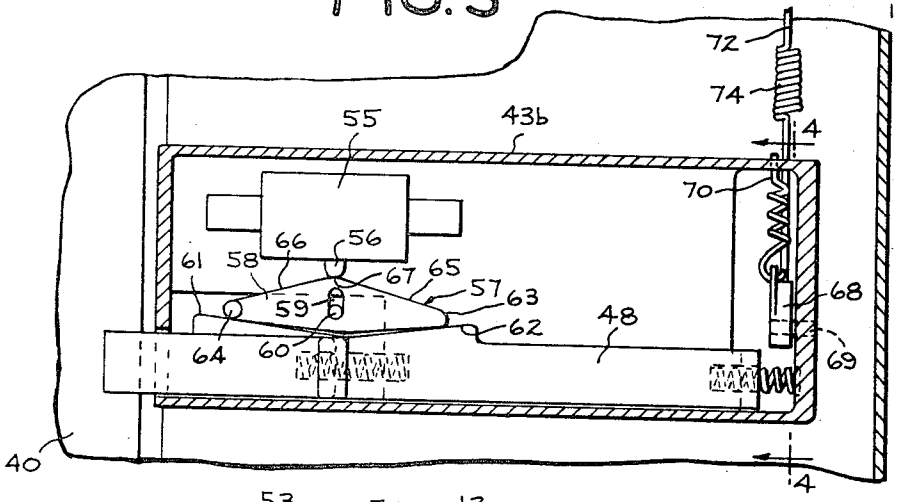


FIG. 3



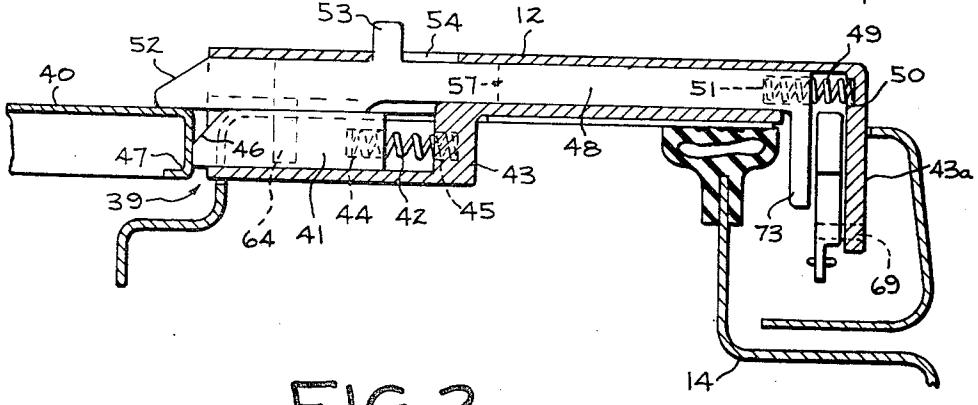


FIG. 2

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LID LATCH AND INTERLOCK

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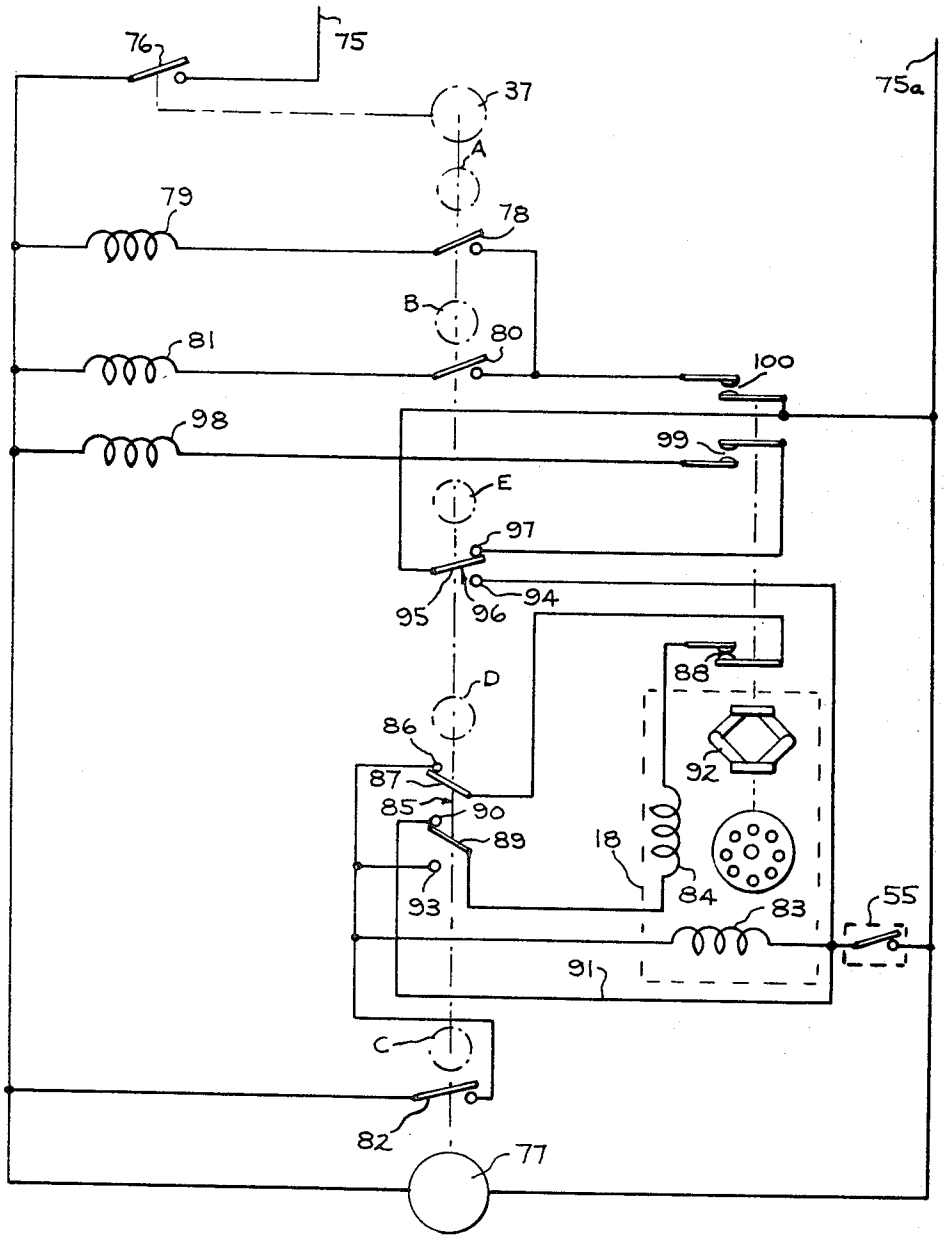


FIG. 5

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3,408,834

LID LATCH AND INTERLOCK

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Filed Apr. 3, 1967, Ser. No. 628,114
7 Claims. (Cl. 68—12)

ABSTRACT OF THE DISCLOSURE

An automatic fabric washer including means for insuring that the washer door is closed during centrifugal extraction. In the washer a door closure indicator member is moved out of the washer access opening by closing the washer door, a lock member is movable to a position restraining the door in its closed position and a latch member is movable to a position preventing the lock member being moved from its door restraining position. A first switch is closed in response to the indicator and lock members being in the positions described and a second switch is closed when the washing machine is centrifugally extracting liquid. Power means are energized when both the switches are closed to move the latch member to its position blocking the lock member.

Summary of the invention

An object of this invention is to provide an improved lid latch and interlock mechanism for an automatic washer.

Another object of this invention is to provide an improved lid latch and interlock mechanism which is effective to positively lock the access door of a washing machine closed.

A further object is to provide such an improved lid latch and interlock mechanism which is so constructed as to discourage attempts to "fool" it.

In accordance with one aspect of the invention there is provided a fabric washing machine including a housing with washing means in the housing to wash fabrics in a suitable fluid and centrifugally extract the fluid from the fabrics. The housing includes a door movable between an open position and a closed position and a door closure indicator member biased to a first position and movable to a second position in response to the door being closed. A door lock member is movable between a first position free of the door and a second position restraining the door in its closed position. A latch member is movable between a first position free of the door lock member and a second position preventing the door lock member being moved from its second position. The machine also includes means responsive to the position of the indicator and lock members for energizing the washing means for centrifugal extraction only when both these members are in their second positions and power means for moving the latch member to its second position when the washing means is causing centrifugal fluid extraction.

Description of the drawings

The features which are believed to be novel are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, may best be understood by reference to the following detailed description taken in conjunction with the accompanying drawings.

In the drawings:

FIGURE 1 is a front elevational view of a fabric washing machine, including one embodiment of the invention;

FIGURE 2 is an enlarged, fragmentary, front elevational view of a portion of the machine of FIGURE 1;

FIGURE 3 is an enlarged, fragmentary plan view of the machine of FIGURE 1;

FIGURE 4 is a view taken along line 4—4 of FIGURE 3; and

FIGURE 5 is a simplified electrical circuit diagram of a circuit suitable for use in the machine of FIGURE 1.

Description of the preferred embodiments

Referring now to FIGURE 1, there is shown a fabric or clothes washing machine **10** incorporating one embodiment of this invention. The machine is provided with an outer appearance cabinet **11** including a top **12** and a bottom bulkhead **13**. The bottom bulkhead **13** is welded or otherwise secured within the appearance cabinet **11** to provide a water collection compartment **14** and a machinery compartment **15**. Disposed within the machinery compartment **15** is a frame **16** mounted for gyratory movement about a pivot **17** positioned at the base of the cabinet. Frame **16** carries a drive motor **18** having a downwardly disposed shaft **19**. The shaft **19** is in driving relation to both a drive pulley **20** and the rotor of a drain pump **21**. The specific details of the pump and its connection to compartment **14** are conventional and will not be described herein. However, it will be understood that liquid from compartment **14** is brought down to pump **21** through a suitable conduit (not shown) and is then discharged by the pump to a drain conduit **22** adapted for discharge to a stationary tub or drain line.

A transmission assembly **23** is also mounted on frame **16**. The transmission is operated by motor **18** and pulley **20** through a belt **24** which connects pulley **20** to a pulley **25** arranged in driving relationship to the transmission. A shaft **27** extends upwardly from transmission **23** and is secured at its upper end (not shown) to an agitator **28**, which may be of the conventional type having a centerpost **29** and washing vanes **30**. As is conventional in washing machines, transmission **23** is of the type which, when motor **18** operates in one direction, will cause oscillation of shaft **27**. This in turn drives agitator **28** so that it oscillates in a horizontal plane and provides a washing action when there is liquid contained within a basket **31**. Rotation of motor **18** in the opposite direction causes transmission **23** to rotate shaft **27** continuously in a single direction, while at the same time like rotation of a sleeve **32** also connected to be operated by the transmission **23** is provided. Sleeve **32** is secured to a fixture **33** on which basket **31** is mounted. Consequently, when shaft **27** and sleeve **32** rotate together continuously, the agitator **28** and basket **31** are rotated as a unit to effect centrifugal extraction of liquid from fabrics or clothes contained in the basket. The centrifugal force causes the liquid to pass out through openings such as those shown at **34**, which are provided for that purpose. The liquid drains into compartment **14** from which it is taken by pump **21** and expelled to the drain or stationary tub. A suitable clothes guard (not shown) may be provided to retain fabrics in basket **31** while, at the same time, the liquid is allowed to escape.

Thus rotation of motor **18** in one direction causes oscillating operation of agitator **28** for washing and rinsing of fabrics in the liquid, while rotation of the motor in the other direction causes high speed rotation of the agitator **28** and basket **31** together for centrifugal extraction of the liquid.

A suitable water inlet **35** permits entry of water into the basket **31**. The passage of water through inlet **35** is controlled by conventional solenoid operated valves of a construction well known to those in the art. The control of these valves is described in connection with the discussion below of FIGURE 5.

Supported at the back and on top of the washing machine is a control panel **36** including control dial **37** and

a multiple position rotary switch **38**, which may be used to set the operating components of the machine to perform a desired cycle of operation.

Fabric washing machines, whether they be the vertical agitator type illustrated in FIGURE 1 or the tumbler type, have an appropriate opening for the insertion or removal of the fabrics to be washed. Machine **10** is provided with such an opening **39** in the top **12**. The machine further includes a door or lid **40** which is pivoted along one edge as illustrated at **41** so as to be manually movable between a closed position covering opening **39**, as illustrated in FIGURE 1, and an open position exposing the opening **39**. Such doors are open before and after the sequence of operation of the machine for the insertion and removal of fabrics and are generally kept closed during the sequence of operation. During centrifugal liquid extraction the basket **32** and agitator **28** are rotated at a rather high speed. Thus, it is desirable to latch the lid **40** closed prior to any centrifugal extraction operation and to interlock the lid **40** and motor **18** so that the extraction operation is automatically terminated if the lid is opened or, preferably, to insure that the lid cannot be opened until centrifugal extraction is terminated.

Referring particularly to FIGURES 2 through 4 there is shown a lid latch and interlock mechanism for accomplishing this purpose. This mechanism includes a first elongated member (a door or lid closure indicator) **41** which is biased into a first position extending into the opening **39** by a spring **42** which is mounted between the member **41** and a wall **43**. The wall **43** forms a protected compartment for the lid latch and interlock mechanism at the top of the water collection compartment **14**. One end of the spring **42** is received in a recess **44** in member **41** and the other end is received in a recess **45** in wall **43**.

The spring **42** biases the member **41** to the left, as seen in FIGURE 2, so that the ramp **46** formed at the outer end thereof is in a position to be engaged by the edge **47** of the door or lid **40**, as the door **40** is closed. This causes the member **41** to be cammed or moved to the right to a second position, as seen in FIGURE 2.

The mechanism also includes a second elongated member (door or lid lock) **48** which is mounted over the lid closure indicator **41** and is biased to extend into the opening **39** by a spring **49**. One end of the spring **49** is received in a recess **50** formed in a down turned edge **43***a* of the wall **43** and its other end is received in a recess **51** formed in the end of member **48**. The end of member **48** extending into opening **39** is provided with a ramp **52** which is engaged by the edge **47** of the door **40** as the door is moved from its open to its closed position. Thus, in a manner similar to member **41**, member **48** is cammed out of the way by door **40** as the door is closed. However, once the door has passed, the member **48** is moved to the left (as seen in FIGURE 2) by the spring **49** so that the lid lock **48** overlies the door **40** and holds the door in its closed position. In order to free the door so that it may be opened, the lid lock **48** is provided with a projecting tab or handle **53** which extends through an opening **54** in the top **12**. The user may grasp the handle **53** and move the lock **48** to the right, freeing the door **40** so that it may be opened.

As another portion of this invention there is provided a first or lid switch **55** which is closed only when door **40** is locked in its closed position. The switch **55** may be of the type which is biased to a switch open position and is closed by moving an actuator such as that shown at **56**. The switch automatically returns to its open condition when the closing force is removed from the actuator. As seen in FIGURE 3, the switch **55** is mounted to the side of members **41** and **48** with the actuator extending toward these members.

A link **57** is provided to interconnect the switch actuator **56** with the members **41** and **48**. The link includes a body portion **58** having an elongated opening **59** which receives a pin **60** extending upwardly from a horizontal portion of the wall **43**. With this arrangement the link **57** is free for both sliding and rotary movement about the pin **60**. The lid closure indicator **41** is provided with a cam portion **61** and the lid lock **48** is provided with a cam portion **62**, which cooperate to form a pair of relatively movable diverging walls. One end **63** of the link **57** is arranged to contact cam **62** and the other end includes a downwardly extending pin or tab **64** arranged to contact cam **61**. With this arrangement of parts the positioning of the link **57** is controlled by the relative positioning of the cams **61** and **62**. With the members **41** and **48** in the position shown in FIGURES 2 and 3, that is with the lid **40** closed and locked, the cam surfaces are in their closest relative positions and force the link **57** in its extreme position toward the switch **55**. This causes the actuator **56** to be depressed closing the switch.

The body **58** of link **57** is formed along one edge with a pair of angled walls **65** and **66** which converge at an apex **67**. With the lid **40** closed and locked the apex **67** is brought into contact with the actuator **56**. This causes the actuator **56** to be depressed to close the switch **55**. If the lid lock **48** is moved out of register with the opening **39**, the cam portion **62** will be moved to the right (as seen in FIGURE 3). This allows the link **57** to pivot about pin **60** so that the switch actuator **56** will move off of the apex **67** onto the wall **66**. This allows the internal bias of the switch to open the switch contacts. In a similar manner when the lid closure indicator is moved into the opening **39** by its associated spring **42** when the lid is opened, the cam **61** is moved to the left (as seen in FIGURE 3). This allows the link **57** to pivot in the other direction about pin **60** and the actuator **56** to ride along wall **65** so that the contacts of the switch **55** are opened. With the arrangement of parts thus far illustrated the switch **55** is closed only when the lid **40** is locked in its closed position. The switch **55** is included in an electrical control circuit, to be described in detail below, so that certain operations of the washing machine may not take place unless the switch **55** is closed.

This mechanism is designed so that the switch **55** will be closed only when the lid is locked closed, that is when member **41** is moved to the right and member **48** is moved to the left (as seen in FIGURE 2). It will be noted that since lid lock **48** extends over lid closure indicator **41**, this arrangement discourages attempts to "fool" it.

As another portion of this invention there is provided, as part of the latch and interlock mechanism, means for holding the lid lock in its position retaining the lid closed. For this purpose there is provided a third member or latch **68** which is pivotally mounted on a pin **69** secured in the down turned portion **43***a* of wall **43**. A spring **70** is attached at one end to the latch and at the other to another portion **43***b* of the wall, and biases the latch to a first position (shown in the solid line in FIGURE 4) free of the lock **48**. A solenoid **71** is provided and is connected to the latch **68** by an operating rod **72**. The solenoid acts in opposition to the spring **70**, that is when the solenoid is energized it pulls on the latch **68** through the operating rod **72** in opposition to the spring **70**. The solenoid **71** overcomes the spring force and moves the latch to its other position (shown in dotted line in FIGURE 4), where the latch is interposed between the down turned portion **43***a* and a foot **73** provided on the end of lid lock **48**. With the latch in this position the lid lock **48** may not be moved out of its interfering relationship with the door **40** and securely holds the door in its closed position. When the solenoid **71** is de-energized the spring **70** again moves the latch to its first position, free of the lid lock **48** so that the lid lock may be moved out of interfering relationship with the lid. The operating rod **72** is formed with a spring portion **74** to compensate for any slight misadjustment between the solenoid **71** and the latch **68**. It also allows the solenoid to pick-up should it be energized when the lock **48** is in a position interfering with the motion of latch **68**. This prevents burn-out of the solenoid.

Referring now to FIGURE 5, there is shown, in schematic form, a simplified electric circuit for the machine of FIGURE 1, utilizing the lid latch and interlock mechanism of this invention. It will be understood that many washing machine features which do not relate to the invention such as, for instance, sequence control means for selecting a number of different sequences of operation of the machine, water temperature selecting means, fluorescent lights, etc., have been omitted in order to simplify and clarify the description of the subject matter of this invention. The circuit is connected across a pair of lines **75** and **75***a* which, in the usual way, are energized from a source of 120 volt, 60/cycle alternating current power. The connection of the different components of the machine across the source of power is controlled by a switch **76** which is actuated by axial movement on the dial member **37**. When dial **37** is moved inwardly, switch **76** is opened and (when the dial is pulled axially outwardly, the switch is closed so as to connect the various components of the machine to the source of power.

A timer motor **77** in connected across the lines **75** and **75***a* under control switch **76** and is connected in controlling relationship to a group of generally circular cams A, B, C, D, and E. These cams are also controlled by dial **37**. In other words, in the conventional way, the cams may be manually preset by rotation of the dial to a position for providing the various desired functions of the machine. When it is desired to set the machine in operation the dial **37** is pushed in, opening switch **76** and then rotated so as to provide the proper setting for the various cams. The dial then is pulled axially outwardly, closing switch **76** to initiate the sequence of operations. The dial **37** is connected to the timer motor so that when the timer motor has operated a sufficient period of time to complete the desired cycle of operation the dial **37** will have been rotated sufficiently to be released and moved inwardly, so as to open switch **76**.

The cam A controls a switch **78** which is in series with the coil **79** of a switch controlling the flow of hot water into the machine (the valve not being otherwise shown). Cam B controls a switch **80** in series with the coil **81** of a valve controlling the entry of cold water to the machine. Each valve normally will operate to permit the entry of water when its coil is energized and to preclude entry of water when its coil is deenergized.

Cam C controls a switch **82** which is in series with drive motor **18** so as to control the energization thereof. More specifically, switch **82** is connected directly in series with the main winding **83** of motor **18** which, as is conventional, is a split-phase, resistance-start, induction type motor. In order to effect the starting of this type of motor, there is required, in addition to the main winding **83**, a start winding **84**. Start winding **84** is connected in parallel with main winding **83** by means of a double-pole, double-throw motor-reversing switch **85** controlled by cam D. With switch **85** in the position shown, the circuit for the start winding **84** extends through the contacts **86** and **87** of switch **85**, then through the contacts of a switch **88**. Switch **88** is responsive to the centrifugal forces created by operation of the motor so that, when the motor is rotating below a predetermined speed, switch **88** is closed and, when the motor is operating above that speed, the switch is closed. The circuit then continues through the start winding **84** and contacts **89** and **90** of switch **85**, and then through a conductor **91**, to the other side of main winding **83**. Thus, when the switch **82** is closed, the motor **18** may be energized with windings **84** and **83** in parallel with each other and the motor is able to start in a predetermined direction. As the motor comes up to speed, switch **88** is opened by the centrifugal, motor-connected device **92**, and the motor then continues to run on the main winding **83** alone. When contacts **87** and **89** are moved by cam D to engage contacts **90** and **93** respectively, the polarity of the start winding is reversed with respect to the main winding. This is because the circuit from switch **82** proceeds through contacts **93** and **89**, the start winding **84**, switch **88** and the contacts **87** and **90** to conductor **91**. In other words the connection of start winding **84** is reversed relative to winding **83** so that the motor starts to operate in the opposite direction. The motor will continue to run in the opposite direction on run winding **83** when the centrifugal mechanism **92** opens switch **88** as the motor comes up to speed.

The circuit for the motor **18** may be completed to line **75***a* through lid switch **55** or through the contacts **94** and **95** of a switch **96** controlled by cam E, the switch **96** having a third contact **97**.

A third circuit is provided from line **75** to line **75***a* and includes the series connection of the coil **98** of solenoid **71**. A switch **99**, which is also controlled by centrifugal mechanism **92** and contacts **97** and **95** of switch **96**. The switch **99** is constructed and arranged to be open whenever the motor **18** is at rest or rotating below a predetermined speed and to be closed by centrifugal mechanism **92** whenever the motor comes up to operational speed. Thus it will be seen that an energizing circuit for the coil **98** of solenoid **71** is energized when switch **76**, controlled by dial **37** is closed, motor **18** is rotating at operational speed, closing switch **99**, and contact **95** has moved into engagement with contact **97** in response to appropriate rotation of cam E. In this regard cam E is designed to close contacts **94** and **95** during periods of washing and rinsing and to close contacts **95** and **97** during periods of centrifugal liquid extraction.

If dial **37** is rotated so as to set the various cams for a cycle of operation and is then pulled out so that switch **76** is closed, cam A will have closed switch **78** to energize coil **79** and permit the entry of hot water into the machine. In series with coil **79** and switch **78** there is a centrifugal switch **100**, also controlled by centrifugal mechanism **92**. The switch **100** is closed when the drive motor **18** is at rest or operating below a predetermined speed and open when the drive motor is rotating at normal operational speed. This insures that, when the motor starts operation, the entry of water will cease. The energization of coil **79** continues for a predetermined period under the control of timer motor **77**. It will be understood that, conventionally, inlet valves of washing machines are formed so as to provide a substantially even flow of inlet water regardless of substantial variations in water pressure; thus, at the end of a predetermined period of timer motor operation, the desired amount of water will have entered basket **31**. At this time the fill operation is terminated by cam A opening switch **78**.

Cam C then closes switch **82** to energize drive motor **18**. Since cam E closes contacts **94** and **95** the motor will be energized regardless of whether lid switch **55** is closed. With the particular direction of rotation provided for motor **18** by cam B, the transmission **23** will provide the aforementioned operation of agitator **28** and a washing operation will take place. As the motor comes up to speed, centrifugal mechanism **92** opens switch **88**, to deenergize start winding **84**; opens switch **100** to insure deenergization of the water inlet valve; and closes switch **99** in the lid latch interlock circuit.

This washing operation continues until cam C opens switch **82**, at which point the drive motor **18** is deenergized and stops. However, the timer motor **77** continues to operate, causing cam D to reverse the positioning of switch **85** and cam E to move contact **95** from contact **94** to contact **97**. Thereafter cam C recloses switch **82** and motor **18** starts rotating in the opposite direction from before, assuming the door is closed and locked so that lid switch **55** is closed. As previously explained, this causes a centrifugal liquid extraction operation to be provided. This action continues for a predetermined per-

iod of timer motor operation, at the end of which cam C again opens switch **82**. Thereafter cams A and B close switches **78** and **80** and, switch **100** is closed because motor **18** is at rest. This setting allows the mixing of hot and cold water and introduction of warm water to the basket **31**. After a predetermined period of warm water fill, cams A and B open switches **78** and **80**, cam D returns switch **85** to its agitate position, cam E returns contact **95** to contact **94** and cam C then recloses the switch **82**. This energizes drive motor **18** in the agitation direction of operation and a period or rinse agitation ensues.

At the end of the rinse agitation period, cam C again opens the switch **82**, cam D moves switch **85** to its other position, cam E moves contact **95** to its other position, then cam C recloses switch **82**. This again causes the drive motor **18** to rotate in the centrifugal liquid extraction direction of operation to remove the rinse water from the basket, again assuming lid switch **55** is closed. At the conclusion of the second extraction operation timer motor **77** will have rotated dial **37** sufficiently that it is released and moved inwardly to cause switch **76** to be opened, this deenergizing the entire circuit.

It will be understood that, while a very basic sequence of operation having a single wash period followed by a centrifugal extraction and a single rinse period followed by a centrifugal extraction has been described, various modifications may be included to provide for sequences of operation including prewashes and multiple rinses and various manual controls may be included for selecting hot, warm or cold water for the various wash and rinse operations.

With this circuit it will be seen that, as drive motor **18** comes up to operational speed, switch **99** is closed and, assuming contacts **95** and **97** are closed in response to proper positioning of cam E as described above, coil **98** for solenoid **71** will be energized to rotate the latch **68** into alignment with the foot **73** of lid lock **48**. When coil **98** is energized, lid lock **48** is restrained in its interfering relationship with door **40**, preventing the door from being opened, and the lid lock is not released until the drive motor **18** has been deenergized and slows down below the predetermined speed, opening switch **99**.

With many present day washers it may be desired to have a pre-wash, with or without a detergent, and then a wash period with detergent. Many of the machines providing for such cycles do not include automatic detergent dispensers, therefore it would be necessary to be able to open the door **40** during agitation operation of the machine in order to insert detergent. Switch **96** and switch **55** are interconnected to enable the door or lid **40** to be opened during periods of agitation and to insure the lid is locked closed during centrifugal extraction. The operation of cam E is integrated with the other cams so as to close contacts **94** and **95** during rotation of motor **18** in the agitation direction and close contacts **95** and **97** during rotation of the motor in the centrifugal liquid extraction direction. Since the circuit through contacts **94** and **95** is in parallel with lid switch **55**, lid **40** may be opened during periods of agitation and the machine will continue to operate. Since contacts **95** and **97** are in circuit with coil **98** and not in circuit with motor **18**, lid **40** must be locked closed (to close switch **55**) before motor **18** will be energized in the centrifugal extraction direction and the lid will be restrained (or latched) in its closed position as long as extraction continues.

The foregoing is a description of illustrative embodiments of the invention, and it is applicant's intention in the appended claims to cover all forms which fall within the scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A fabric washing machine including:

(a) a housing;

(b) washing means in said housing to agitate fabrics in a suitable fluid and centrifugally extract the fluid from the fabrics;

(c) said housing including a door movable between an open position and a closed position;

(d) a door closure indicator biased to a first position and movable to a second position in response to said door being moved to its closed position;

(e) a door lock movable between a first position free of said door and a second position restraining said door in its closed position;

(f) a latch movable between a first position free of said door lock and a second position preventing said door lock being moved from its second position to its first position;

(g) means responsive to the position of said indicator and said lock for energizing said washing means for centrifugal extraction only when both said indicator and said lock are in their second positions and power means for moving said latch to its second position when said washing means is causing centrifugal fluid extraction.

2. A fabric washing machine including:

(a) a housing;

(b) electrically energizable washing means in said housing to agitate fabrics in a suitable fluid and centrifugally extract the fluid from the fabrics;

(c) said housing defining an opening for loading and unloading fabrics and including a door movable to open and close said opening;

(d) a door closure indicator biased to a first position extending into said opening and movable to a second position in response to said door being moved to its closed position;

(e) a door lock movable between a first position free of said door and a second position in interfering relationship with said door when said door is in its closed position;

(f) an electric power circuit for said washing machine;

(g) a first connected switch in said circuit, means actuating said first switch from said indicator and said lock and closing said first switch when said indicator and lock are in their second positions to provide for energization of said washing means at least during centrifugal extraction;

(h) a second switch connected in said circuit, said second switch being closed when said washing means is causing centrifugal fluid extraction;

(i) a latch biased to a first position free of said lock and movable to a second position preventing said lock being moved from its second position to its first position;

(j) and electrically operated power means connected to said third member and effective, when energized, to move said third member to its second position to hold said lock in interfering relation with said door; said power means being connected in sadi circuit in said lock in interfering relation with said door; said power means being connected in said circuit in series with said second switch.

3. The invention as set forth in claim **2** wherein said indicator and lock include complementary cam portions, said first switch includes an actuator biased to a switch open position and movable to a switch closed position, and a link is movably mounted for engagement with said cam portions and said actuator; said cam surfaces engaging said link to thereby move said actuator to its switch closed position when said indicator and lock are in their second positions.

4. The invention as set forth in claim **2** wherein a third switch means is connected in parallel with said first switch during agitation operation of said washing means and is connected in series with said power means and said second switch during centrifugal extraction operation of said washing means.

5. The invention as set forth in claim **2** wherein said

lock is mounted in juxtaposition to and outside said indicator and is biased to its second positon wherein it covers said indicator.

6. A fabric washing machine including:

(a) a housing;

(b) electrically energizable washing means in said housing adapted to agitate fabrics in a suitable fluid and centrifugally extract the fluid from the fabrics;

(c) said housing defining an opening for loading and unloading fabrics and including a door selectively movable to open and close said opening;

(d) an elongated door closure indicator biased to a first position extending into said opening and longitudinally movable to a second position in response to said door being moved to its closed position;

(e) an elongated door lock mounted in juxtaposition to and outside said indicator, said lock being longitudinally movable between a first position free of said door and a second position in which it will interfere with the outer surface of said door when said door is closed and biased to its second position to cover said indicator;

(f) said indicator and lock including complementary cam portions forming a pair of relatively movable, diverging walls;

(g) an electric power circuit for said washing machine;

(h) a first switch connected in said circuit, said first switch including an actuator biased to a switch open position and movable to a switch closed position for providing energization of said washing means;

(i) a link movably mounted for engagement with said diverging walls and with said actuator, said link holding said actuator in its switch closed position in response to said indicator and lock being in their second positions, said link freeing said actuator for movement to its switch open position in response to either of said indicator and lock moving to its other position;

(j) a second switch connected in said circuit, said second switch being closed when said washing means is causing centrifugal fluid extraction;

(k) a latch biased to a first position free of said lock and movable to a second position preventing said lock being moved from its second position to its first position;

(l) and electrically operated power means connected to said latch and effective, when energized, to move said latch to its second position, said power means being connected in said circuit in series with said second switch.

7. The invention as set forth in claim 6 wherein a third switch means is connected in parallel with said first switch during agitation operation of said washing means and is connected in series with said power means and said second switch during centrifugal extraction operation of said washing means.

References Cited

UNITED STATES PATENTS

3,007,479	11/1961	Jacobs et al.	134—58
3,065,619	11/1962	Coss	68—12

WILLIAM I. PRICE, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,408,834 November 5, 1968

Stephen L. McMillan

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, line 39, "connected switch" should read -- switch connected --; line 55, beginning with "hold" cancel all to and including "switch." in line 59, same column 8, and insert -- hold said lock in interfering relation with said door; said power means being connected in said circuit in series with said second switch. --.

Signed and sealed this 10th day of March 1970.

SEAL)
ttest:

dward M. Fletcher, Jr.
ttesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents