

[54] ELECTROMECHANICAL INTERLOCK

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- [52] U.S. Cl. ....68/12 R, 68/23
- [51] Int. Cl. ....D06f 37/18, D06f 37/42
- [58] Field of Search .....68/12, 23, 23.3

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[57] ABSTRACT

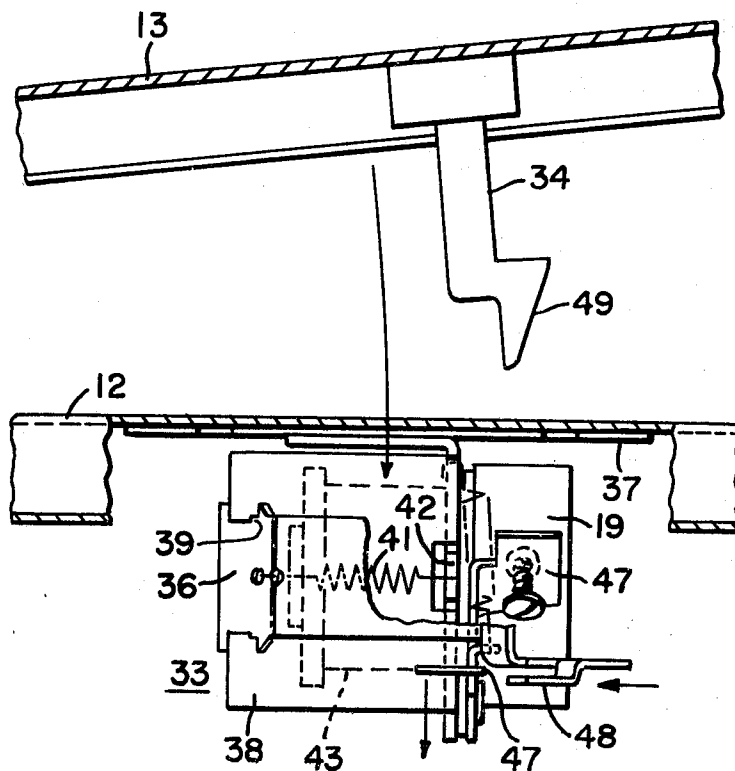
Interlock for the access door of a clothes washing machine which prevents opening of the door during certain portions of the operating cycle, for example, the spin portion thereof. A catch member carried by the door cooperates with a solenoid-actuated latch bar to lock the door during the spin portion of the cycle. The catch also serves to actuate, in the lid-closed position, a microswitch which enables the washer motor to function. A tab member provided as part of the latch bar prevents inadvertent actuation of the microswitch while the door is open and a cam provided on the catch member enables closure of the door, during normal use even though the latch bar has been actuated.

[56] References Cited

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4 Claims, 5 Drawing Figures



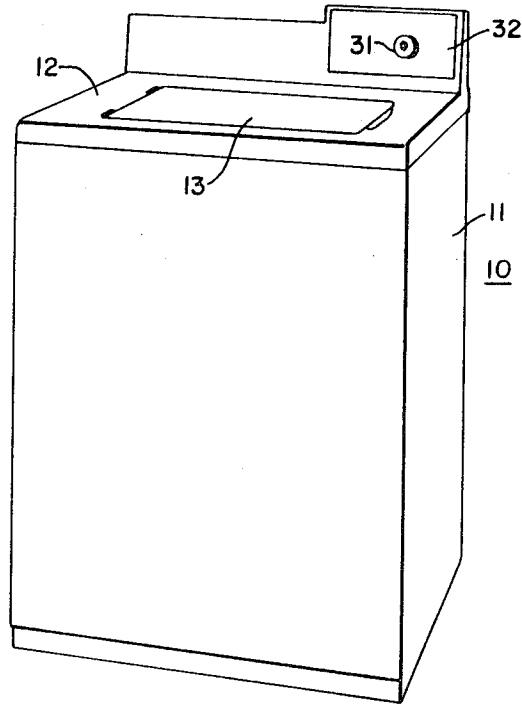


FIG. 1

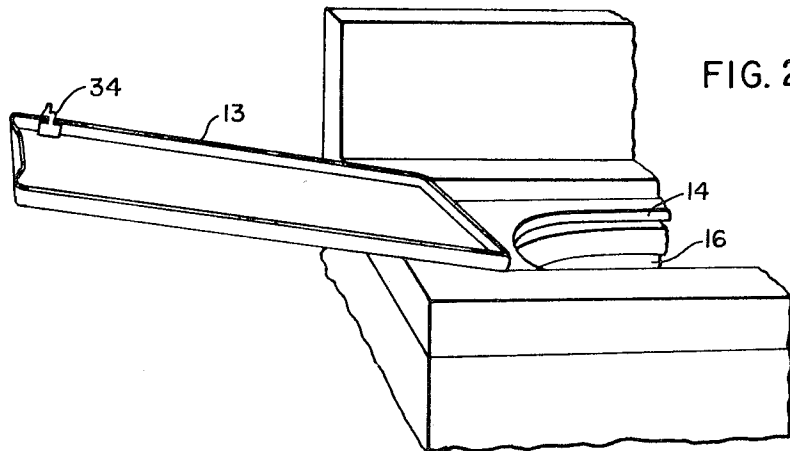


FIG. 2

WITNESSES

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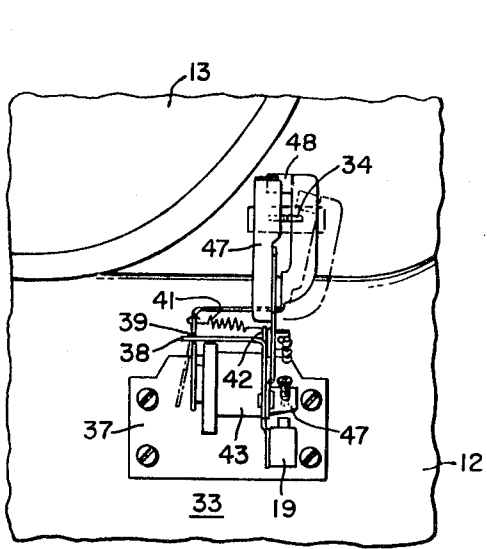


FIG. 3

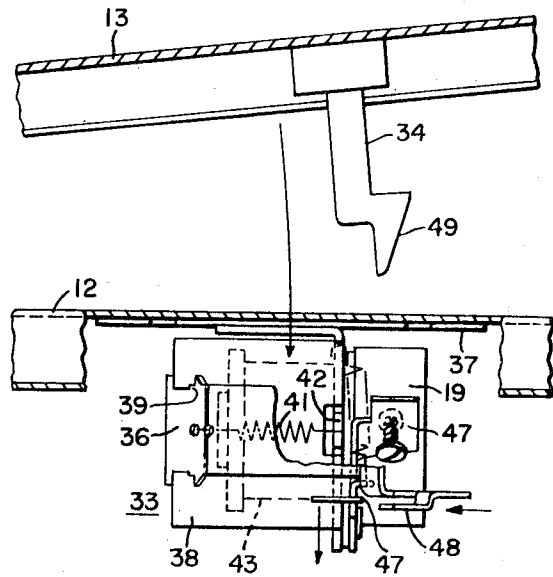


FIG. 4

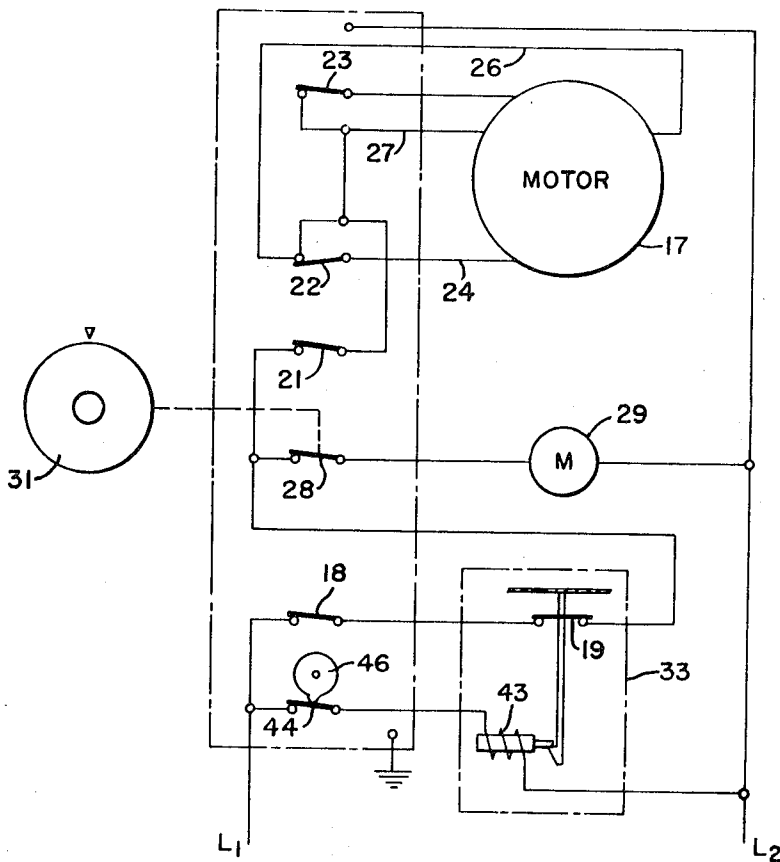


FIG. 5

## ELECTROMECHANICAL INTERLOCK

## BACKGROUND OF THE INVENTION

This invention relates, in general, to agitator-type washing machines and, more particularly, to a safety device in the form of an interlock for the access door thereof.

It is well known that during certain portions of the cycle of operation of the type of machine herein contemplated, exposure to the interior of the machine is extremely dangerous. For example, when the inner basket is rotating at very high speeds, during a spin operation.

Heretofore, attempts at rendering such machines safe during the above-mentioned portion of the cycle led to the development of lid-locking mechanisms which would prevent opening of same during a spin cycle. Such arrangements, it has been found, are not totally satisfactory since the machine can operate through a spin cycle with the lid in the opened position.

Even where measures have been taken to prevent spinning with the lid or door opened, total satisfaction is not obtained since such measures can easily be overridden.

Accordingly, it is the general object of this invention to provide a new and improved agitator-type washing machine.

It is a more particular object of this invention to provide a new and improved interlock for the access door of an agitator-type washing machine.

Another object of this invention is to provide a new and improved interlock for the access door of an agitator-type washing machine wherein a spin cycle is prevented when the door is opened, unless the interlock is intentionally overridden.

## SUMMARY

Briefly, the above-cited objects are accomplished by providing a solenoid-actuated lever cooperating with a catch member secured to the underside of the lid. The solenoid is timer actuated to effect locking of the lid during the spin cycle. Secured adjacent the solenoid-actuated lever is a motor interrupt switch lever which is actuatable by the catch member so that the main motor is inoperative when the lid is open. To prevent inadvertent actuation of the interrupt switch, when the lid is open, the solenoid-actuated lever is provided with a tab which underlies the interrupt switch lever to thereby prevent movement thereof and thereby prevent energization of the main motor. To allow closure of the lid once a spin cycle has started, the catch member is provided with a cam surface which temporarily moves the tab out of the way thereby allowing the interrupt switch lever to be depressed.

Further objects and advantages of the invention will become apparent when considered in view of the following detailed description and drawings forming a part hereof.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an agitator-type washing machine incorporating an interlock forming a part of this invention;

FIG. 2 is an enlarged fragmentary view of the machine illustrated in FIG. 1, but with its access door in the opened position;

FIG. 3 is a bottom plan view, in the installed condition of the interlock forming a part of the present invention;

FIG. 4 is an enlarged front elevational view of the interlock shown in FIG. 3 with the parts thereof in the relative positions occupied thereby, when the washing machine lid is in partially open position; and

FIG. 5 is a partially diagrammatical and partially schematic diagram illustrating the electrical and mechanical aspects of the interlock shown in FIGS. 3 and 4.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, especially FIG. 1, reference character designates generally an agitator-type clothes wash-

ing machine comprising cabinet structure 11 and a top wall 12. Hingedly attached to the top wall 12 is a door structure 13 which serves as a closure for an opening 14 (see FIG. 2) which opening provides access to the interior of the machine 10. Through the opening 14, clothes may be placed into a tub or basket 16 (FIG. 2) which in a conventional manner is sequentially agitated and spun by means of a motor 17, shown schematically in FIG. 5.

The motor 17 is energized through electrical line conductors  $L_1$  and  $L_2$ , power being supplied via a conventional source of house power (not shown). As shown in FIG. 5, the motor 17 is adapted to be energized through closure of a line or start switch 18, a lid-actuated switch 19 (to be more fully described hereinafter), a cam-actuated switch 21 and second and third cam-actuated switches 22 and 23. The switch 22 is connected to the input side of the "start" winding (not shown) of the motor 17 by a conductor 24 and to the input side of the motor "run" winding (not shown) by a conductor 26, the cam-actuated switch 23 and a conductor 27. A fourth cam-actuated switch 28 establishes a circuit from  $L_1$  to a timer motor 29 which drives a plurality of cams (not shown) serving to open and close their associated switches 21, 22, 23 and 28 in a predetermined order. The switch 28 is adapted to be closed by a normally actuatable control knob 31 located in the area of a back splasher panel 32 (see FIGS. 1 and 5).

In accordance with the expressed and implied objects of the present invention, a lid lock mechanism generally indicated by reference character 33 is provided. The mechanism 33, as best shown in FIGS. 3 and 4, comprises a catch member 34 suitably secured to the underside of the door structure 13 and a latch bar 36 mounted for horizontal movement for engaging the catch member 34 when the door structure 13 is in a closed position. To support the latch bar 36 in an operative position, there are provided a pair of mounting brackets 37 and 38 the former of which is secured to the underside of the top wall 12 and the latter of which is spot welded or otherwise suitably attached to the former at substantially a 90° angle thereto. The bracket 38 has a substantially L-shaped configuration (FIG. 3) and the foot portion thereof supports the latch bar 36 as indicated at 39, the foot portion and the portion of the substantially Z-shaped latch bar engaged thereby forming a suitable hinge arrangement. The catch-engaging portion of latch bar 36 is biased to the right, as viewed in FIG. 3, and represented by the dotted-line position thereof, by a coil spring 41 secured to the latch bar and to a tab member 42 struck out of the L-shaped bracket 38.

The latch bar 36 is moved, to the solid-line position shown in FIGS. 3 and 4, by solenoid 43 (FIGS. 3 and 5) physically mounted on the bracket 38. The solenoid 43 is adapted to be energized at a predetermined interval of time to be explained later, through a switch 44 actuated by a timer-driven cam 46.

The lid-actuated switch 19 is herein disclosed as a conventional microswitch (FIG. 3) and is actuated by the catch member 34 through a switch lever 47 adapted to be moved in a vertical direction, as viewed in FIG. 4. The lever is biased in an upward direction by a coil spring (not shown) such that any time the door structure 13 is open, the switch 19 is open and the circuit to the motor 17 is interrupted.

The latch bar 36 has an offset tab member 48 (FIG. 4) which underlies the switch lever 47 when the solenoid 43 is energized. This arrangement serves to prevent actuation of the switch 19 to thereby provide a safety feature which minimizes the possibility of injury, particularly to curious children. In order to effect closure of the door structure 13 without manipulation of the control knob 31, the catch member 34 is provided with a cam surface 49 which serves to temporarily displace the latch bar 36 upon closing of the door structure 13, thereby permitting actuation of the switch 19 by the lever

OPERATION

Once the clothes and detergents have been placed into the tube 16, the door structure 13 is closed and the timer control knob 31 is set to a desired cycle of operation, normally comprising fill, agitate, and spin operations. In so setting the knob 31, the switch 28 is closed by a cam (not shown) to initiate operation of the timer motor 29, and to initiate a fill operation in a conventional manner. After the tub is filled, the circuit to the main motor 17 is established through line switch 18, lid switch 19 and switches 21, 22 and 23, the latter three switches being closed by timer-actuated cams, not shown. After the agitation portion of the cycle, but not necessarily immediately thereafter, a spin operation is initiated in a conventional manner, and substantially simultaneously therewith the switch 44 is closed by cam 46 to establish a circuit to the solenoid 43. At this point the latch bar 36 is shifted to the left as indicated in solid lines in FIG. 3 to engage the catch member 34 thereby preventing opening of the door structure 13 during the spin operation.

It should be apparent that when the door structure 13 is open and the solenoid 43 energized, the tab member 48 prevents depression of the switch lever 47 and the switch 19, cannot, therefore, be actuated.

It will now be apparent that there has been disclosed a safety device for an agitator-type washing machine which device is in the form of a lid latch which prevents opening of the lid during a spin operation and which is adapted to prevent a spin cycle of operation of the machine when the lid is open.

Since numerous changes may be made in the above-described device and different embodiments of the invention may be made without departing from the spirit thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings should be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a clothes washing machine comprising cabinet structure including a door structure in combination, a tub in said cabinet structure for supporting clothes to be washed, means including a motor for sequentially imparting agitating and spinning motion to said tub, means for actuating said motor when the door to the machine is closed, comprising a lever actuated switch, blocking means for preventing actuation of said means for actuating said motor, said actuation preventing means comprising a bar member having an offset tab thereof which is movable in a direction substantially perpendicular to said lever and said tab is adapted to underlie said lever to thereby prevent movement thereof, and being effective when the door is in an opened position, means for preventing opening of said door structure during spinning of said tub, and means effective upon closure of said door structure for overriding said actuation preventing means.
2. Structure as specified in claim 1 wherein, said overriding means comprises a cam surface on a catch member carried by the underside of said door structure, said cam surface serving to temporarily displace said latch bar to permit actuation of said switch.
3. Structure as specified in claim 2 wherein, said latch bar is solenoid actuated, and including, means including a timer-actuated cam for establishing an electrical circuit to said solenoid substantially simultaneously with the initiation of spinning of said tub.
4. Structure as specified in claim 3, including control means for selectively effecting energization of said solenoid.

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