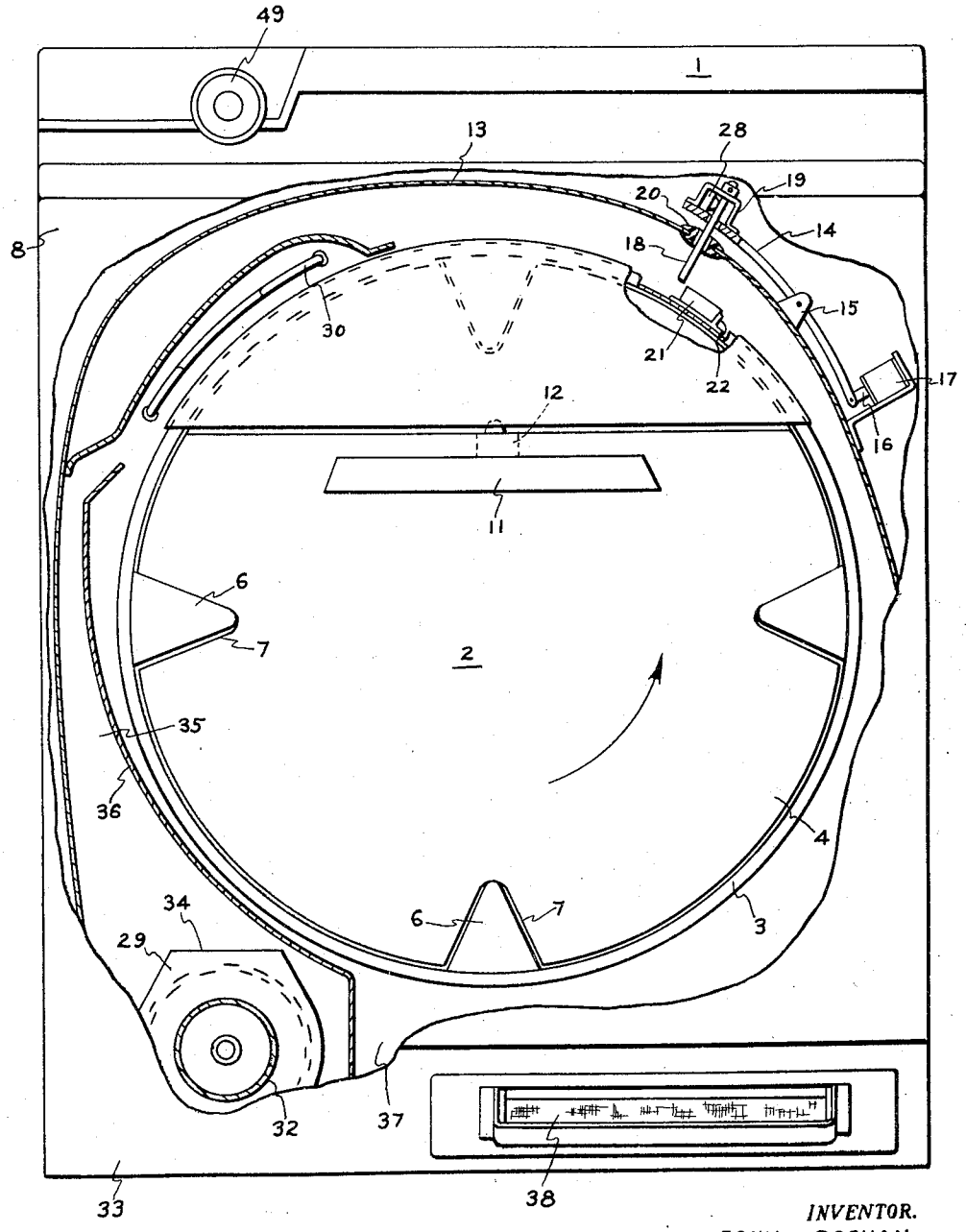
Sept. 22, 1959 J. BOCHAN 2,904,895

LAUNDRY MACHINE WITH BASKET STOP MEANS

Filed July 25, 1956 3 Sheets-Sheet 1

FIG. 1



INVENTOR.
JOHN BOCHAN

BY W. F. Manbeck, Jr.

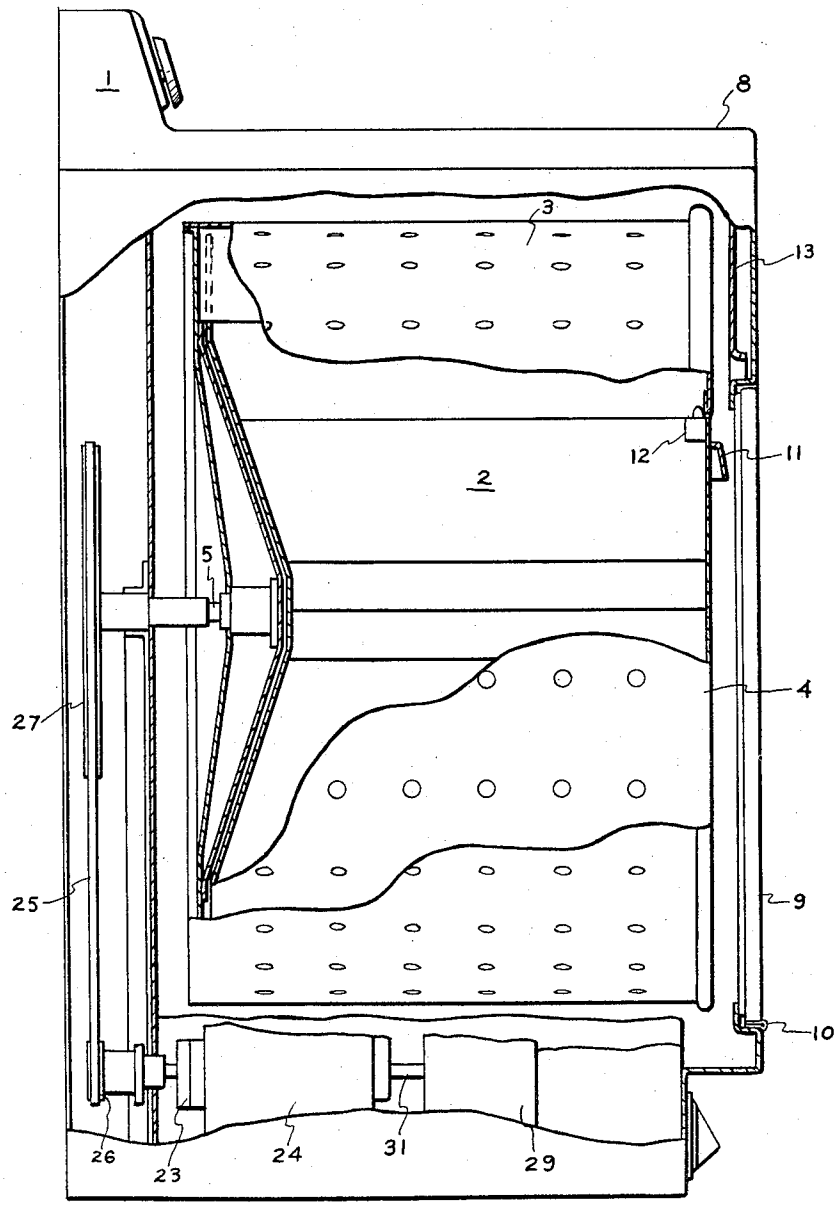
HIS ATTORNEY

Sept. 22, 1959 J. BOCHAN 2,904,895

LAUNDRY MACHINE WITH BASKET STOP MEANS

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FIG. 2



INVENTOR.
JOHN BOCHAN

BY H. F. Manbeck, Jr.

HIS ATTORNEY

Sept. 22, 1959 J. BOCHAN 2,904,895

LAUNDRY MACHINE WITH BASKET STOP MEANS

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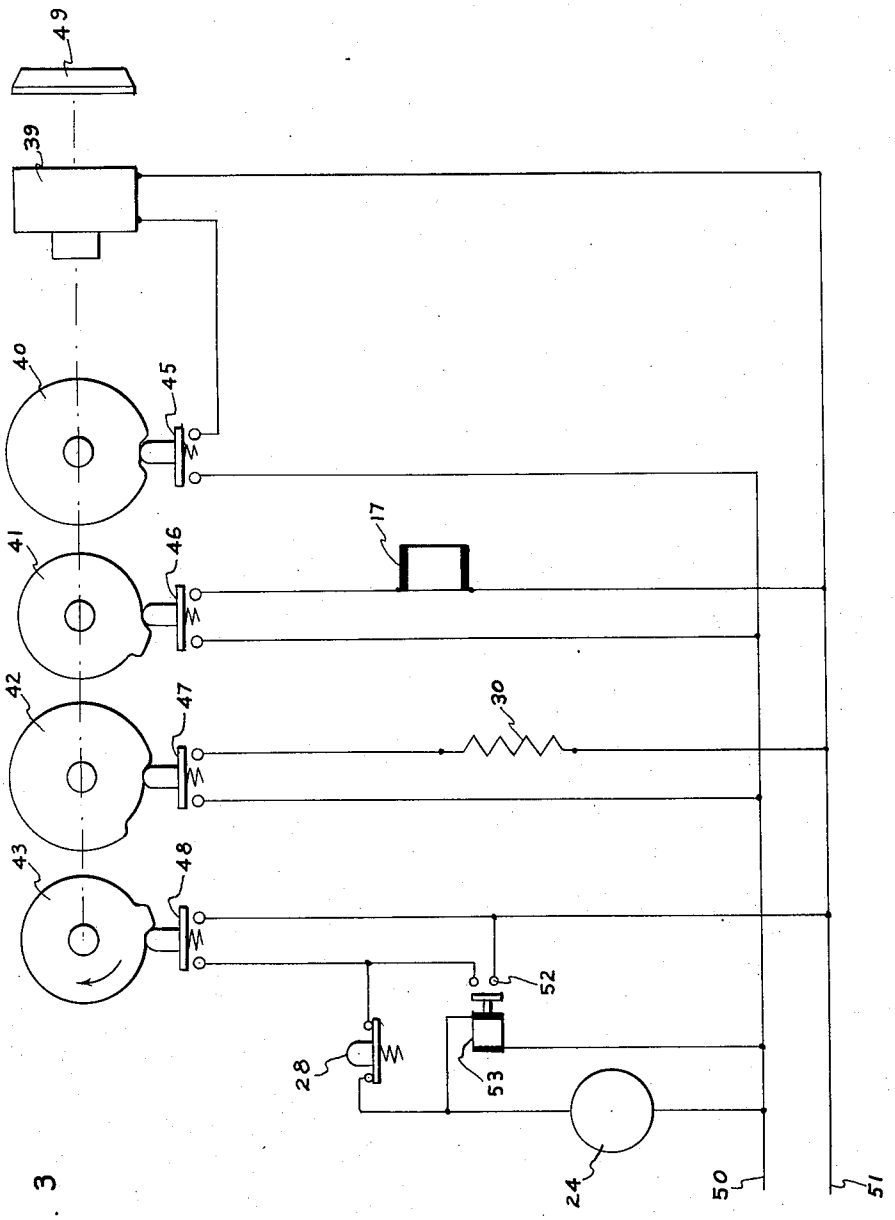


FIG. 3

INVENTOR.
JOHN BOCHAN

BY H. F. Manbeck, Jr.

HIS ATTORNEY

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2,904,895

LAUNDRY MACHINE WITH BASKET STOP MEANS

John Bochan, Louisville, Ky., assignor to General Electric Company, a corporation of New York

Application July 25, 1956, Serial No. 600,139

4 Claims. (Cl. 34—45)

My invention relates to laundry machines and more particularly to laundry machines including a rotating clothes basket for treating the clothes during the machine operation.

In the copending application of Clarence F. Graser S.N. 600,138 filed concurrently herewith on July 25, 1956 and assigned to the same assignee as the present invention there is described and claimed a laundry machine which is so constructed and arranged that it may be very easily loaded and unloaded. This laundry machine includes a clothes basket which is provided with a pull out drawer section. The drawer section is open at its top and it may be pulled partially out of the cabinet of the machine for loading and unloading. When the drawer is in this extended position the contents thereof may be readily reached by the operator without any awkward stooping or bending being necessary. In order, however, for the drawer to be extended from the machine it must first be aligned with the access door in the outer cabinet, and in only one rotational position of the basket is the drawer so aligned.

The present invention has as its primary object the provision of an improved device which will automatically stop the clothes basket of a laundry machine in a predetermined position, and which in particular may be used in applications of the above mentioned Graser machine to stop the clothes basket with the pull out drawer in alignment with the cabinet door.

Another object of my invention is to provide an improved basket stopping arrangement which is completely positive in operation in that the basket drive motor is turned off by the basket stop means itself only after the basket is stopped at the desired rotational position.

In carrying out my invention, I provide a laundry machine having a rotatable clothes basket and a motor for driving the basket. In this machine I provide a new and improved basket stopping arrangement which is effective to stop the basket at a predetermined rotational position at the end of the machine operation. The basket stopping means are mounted by means of a suitable stationary member and they include a movable stop element or latch. This stop element or latch is actuated by means of a suitable solenoid, and when the solenoid is energized the stop element or latch is moved into interference relation with a bumper mounted on the basket. Normally during the operation of the machine the latch is so held that the bumper passes freely under it as the basket rotates; but when the solenoid is energized so that the latch is brought into interference relation with the bumper, the basket is thereupon stopped in the desired rotational position by the bumper coming into engagement with the latch. In my improved arrangement the stopping of the basket also results in the drive motor being automatically de-energized. As the latch is struck by the bumper, it moves slightly and a motor control switch is so arranged that it is operated by this movement of the latch. The switch when operated de-energizes the drive motor and thereby terminates the machine operation.

This arrangement whereby the motor is turned off by the stop means itself only after the basket is first stopped insures that the basket will always be stopped at the proper position.

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

Fig. 1 is a front elevation view of a clothes drying machine including my new and improved basket stopping means in one preferred form thereof, the view being partially broken away and partially in section in order to illustrate details;

Fig. 2 is a side elevational view of the machine of Fig. 1, also partially broken away and partially in section to illustrate details; and

Fig. 3 is a schematic circuit diagram illustrating a preferred electrical control for use with the basket stopping means.

Referring now to Figs. 1 and 2 I have shown therein a clothes drying machine **1** which is illustrative of the various laundry machines to which my invention may be applied. The machine **1** includes a clothes basket **2** which is mounted for rotation about a generally horizontal axis. The basket **2** includes an outer, cylindrical section **3** and an inner, open topped, drawer section **4**. The outer section **3** is attached to the basket drive shaft **5** and is rotated thereby during the operation of the machine. The drawer section **4** as shown fits within the outer section **3** and rotates with it during the operation of the machine, being driven by the interengaging ribs **6** and **7** provided respectively on the two sections. The drawer section is, however, axially movable within the outer fixed section **3** and may be extended partially out of the dryer cabinet **8** when the basket is at rest. It will be understood incidentally that this pull out drawer arrangement is not my invention but rather is claimed in the aforesaid Graser application S.N. 600,138 filed July 25, 1956.

To allow the movement of the drawer **4** partially out of the machine to a loading and unloading position the cabinet **8** is provided with a door **9** which is mounted at its lower end by means of suitable hinges **10**. The door **9** and the basket **2** are so arranged that when the drawer **4** is in its lowermost rotational position, i.e. its position illustrated in Figs. 1 and 2, the drawer and the door are thereupon aligned. If the door is then swung downwardly on its hinges to a horizontal position, the drawer **4** may be pulled or extended partially out of the appearance cabinet for loading and unloading.

To provide for moving the drawer from its operating position to its loading and unloading position the front wall of the drawer is provided with a handle **11**. Once the door **9** has been swung downwardly, this handle **11** may be grasped by the operator and the drawer **4** slid forwardly within the axially fixed section **3** of the basket. Normally the door is prevented from sliding forward by means of a detent or latch arrangement **12**. This detent **12** comprises a spring biased plunger which is mounted on the front wall of the drawer section and which engages the front wall of the fixed section of the basket to hold the drawer section in place during the operation of the machine. However, when the basket is pulled outwardly by the operator by means of the handle **11**, the retaining force of the detent **12** is easily overcome and the basket slid outwardly.

In order for the drawer **4** to be aligned with the cabinet door **9** it must, as mentioned above, be at its lowermost rotational position. By my invention there are provided

in the machine 1 new and improved means which operate automatically so as to stop the basket in this position when the drying operation is completed. Referring now to Fig. 1 I will describe in detail a preferred embodiment of this basket stopping means.

In the machine 1 the basket stopping means are mounted on the stationary shroud or U-shaped wall 13 which encloses the rotating basket 2. The stop means include an operating arm 14 and this operating arm is pivotally mounted on the shroud 13 by means of a suitable bracket 15. The operating arm 14 is attached to the plunger 16 of a solenoid 17 at its one end and at its other end it has mounted thereon an inwardly extending rod or latch 18. Specifically, the rod or latch 18 is pivoted on a generally U-shaped bracket 19 which is in turn attached to the operating rod. The latch 18 as shown extends through a rubber grommet 20 mounted in the shroud 13 to a position in proximity to the outer wall of the basket 2. It will be noted that there is sufficient clearance between the latch 18 and the edges of the hole in the grommet so that the latch may be moved freely in and out through the grommet by means of the operating arm 14.

In order to stop the rotation of the basket latch 18 is brought into interference relation with a bumper 21 which is mounted on the outer wall of the basket 2. The bumper 21 is preferably formed of some resilient material such as rubber and is mounted on the outer wall of the basket by means of a suitable bracket 22. When the solenoid 17 is de-energized, the operating arm 14 and the latch 18 are held in their illustrated position so that there is clearance between the end of the latch and the bumper 21. Thus the basket may rotate freely, the rotation being in the direction of the arrow shown in Fig. 1. However, when the solenoid 17 is energized, the arm 14 is pivoted and the latch 18 moved inwardly so that the latch is brought into interference relation with the bumper 21. In other words the latch 18 is moved to a position wherein it is struck by the bumper 21 as the basket rotates. This positive engagement between the bumper and the latch stops the rotation of the basket immediately with the drawer 4 in its lowermost position in alignment with the cabinet door 9.

So that the basket drive motor will not be injured by the sudden stopping of the drum, a friction type clutch 23 (Fig. 2) is included in the basket drive. Specifically, the basket is driven from its drive motor 24 through the clutch 23 and a belt 25. The belt 25 extends between a pulley 26 mounted on the output shaft of the clutch 23 and a basket drive pulley 27 mounted on the outer end of the basket drive shaft 5. As soon as the bumper 21 engages the latch 18, the clutch 23 begins to slip so as to allow the motor 24 to continue to rotate even though the basket thereafter remains stationary. Thus the motor does not draw a dangerous current and is not otherwise damaged by the stopping of the basket. With regard to the basket itself the rubber grommet 20 and the bumper 21 take up the initial shock of the impact between the latch 18 and the bumper. In other words these resilient members cushion the shock.

Since the motor is still in operation at the time when solenoid 17 is energized to actuate the latch 18, it is thereby insured that the bumper 21 will be positively rotated against latch 18 to stop the basket in the correct position. Once the basket has been stopped in the proper position, it is then advantageous that the motor be de-energized as quickly as possible. In my preferred embodiment the motor is de-energized by means of the stop arrangement itself. Specifically, a motor control switch 28 is mounted on the operating arm 14 by the same bracket 19 as mounts the latch. The operating button or rod of the switch 28 is arranged so that it is contacted by the latch 18 if the latch is pivoted toward it. When the bumper 21 hits the latch 18 to stop the basket, the impact pivots the latch slightly on its mounting toward the switch. As a result of this pivoting, the switch 28 is actuated and thereby the drive motor 24 is de-energized. Thus by this arrangement the motor is de-energized and the driving force for the basket terminated at the same time that the basket itself is stopped in the proper position. A suitable control circuit for controlling the solenoid 17, the motor 24 and the other electrical components of the dryer is described hereinafter.

Although the particular air flow and heat system used within the machine 1 forms no part of the present invention, it will be noted that the machine 1 is provided with a system that includes a centrifugal blower 29 and an electrical heater assembly 30. The blower 29 is driven from the main drive motor 24 of the machine by means of a direct coupling 31 and during the operation of the machine it draws in air from the surrounding room through a conduit 32 which leads from a screened air inlet opening (not shown) in the toeboard 33 of the cabinet. The air drawn in by the blower 29 is discharged through an opening 34 in the top thereof into a passageway 35 which lies between the shroud 13 and a generally arcuate baffle 36. The baffle 36 as shown in Fig. 1 extends arcuately around the lower left hand portion of the drum 2.

The passageway 35 extends upwardly to the general vicinity of the electrical heating assembly 30 and the air discharged from the blower 29 flows upwardly through the passageway and is discharged therefrom across the heater assembly. The air still under pressure from the blower then flows downwardly through the perforate side walls of the inner and outer basket sections 3 and 4 into the basket. The shroud 13 confines the flow path of the air so that it is positively passed into the basket in this manner. The air then moves downwardly through the basket and the articles of clothing being tumbled therein and next passes into a collecting chamber 37 lying beneath the basket on the opposite side of the baffle 36 from the passageway 35. From the chamber 37 the air is discharged out of the machine into the surrounding room through an appropriate lint trap structure 38 mounted in the toeboard 33. Thus the heat and air flow system provides a steady supply of heated dry air to the basket during the drying operation whereby the clothes are effectively dried as they are tumbled.

Referring now to Fig. 3 I have shown therein a preferred control system for controlling the various electrical components of the machine 1. This control arrangement includes a timer mechanism comprising a timer motor 39 and a plurality of cams 40, 41, 42 and 43 which are driven by the timer motor. The cams 40, 41, 42 and 43 control respectively a plurality of switches 45, 46, 47 and 48, and the position of the timer motor and the cams may be preset by the operator by means of a suitable dial 49.

The power for energizing the various electrical components of the dryer is supplied from a pair of supply conductors 50 and 51. The timer motor 39, the heater assembly 30 and the stop mechanism solenoid 17 are energized from these conductors through the switches of the timer mechanism. Specifically, the timer motor 39 is energized across the supply conductors 50 and 51 through the timer switch 45, the stop mechanism solenoid 17 is energized across the supply conductors through the timer switch 46, and the heater assembly 30 is energized across the supply conductors through the timer switch 47. The drive motor 24 unlike the other electrical components is not ordinarily energized through a timer operated switch. Rather it is normally energized from the conductors 50—51 during the operation of the machine by means of the contacts 52 of a relay 53. Tracing through the motor circuit it will be seen that the drive motor and the operating coil of the relay 53 are connected in parallel. These elements are both connected to the supply conductor 50 at their one ends and to the switch 28 of the stop mechanism at their other ends. From the switch 28 the motor circuit may be completed to the other supply conductor 51 either through

the contacts 52 of the relay 53 or through the timer switch 48. At the beginning of the dryer operation the timer switch 48 is closed by the cam 43 to energize initially both the motor and the relay. This energization of the relay causes the contacts 52 to close and thereafter the motor circuit is locked in so long as the relay remains closed.

In Fig. 3 the timer motor and the various cams and switches are shown in the "off" position of the machine. To initiate operation of the machine the timer motor and cams are turned by means of the dial 49 in the clockwise direction indicated by the arrows so as to close switches 45, 47 and 48. The closing of switches 45 and 47 energize the timer motor 39 and the heater assembly 30 respectively. The closing of the switch 48 energizes both the relay 53 and the drive motor 24, and once the relay closes, the motor circuit is then locked in through the relay contacts 52. The machine thus begins operation with the drive motor, the heater and the timer motor all energized. The energization of the timer results in the cams being driven continuously in the direction of the arrows toward the "off" position, and the energization of the drive motor and the heater assembly results in the basket being rotated with warm dry air being blown over the clothes to extract moisture from them. The length of this operation will be determined by the position to which the timer motor and the cams are originally set.

The drying operation continues with both the drum being rotated and heat being applied until the forward end of the recess in cam 42 comes over the cam follower of switch 47. At that point the switch 47 is opened de-energizing the heater assembly 30. Since, however, the drive motor is not effected by this opening of the heater circuit, it continues to rotate both the drum and the blower. Thus the operation of the machine continues with the clothes being tumbled in a stream of cool air so as to cool down both the clothes and the dryer itself.

After this cool down period has continued for a short time, the rise on cam 41 actuates the follower of switch 46 so as to close that switch. This energizes the solenoid 17 of the stop mechanism and brings the latch 18 into interference relation with the bumper 21 of the basket. When the bumper strikes the latch, this, of course, stops the rotation of the basket. As the latch is struck by the bumper, it opens the switch 28, as explained above, and this breaks the motor circuit de-energizing both the motor 24 and the relay 53. Thus the operation of the motor and the basket are terminated with the basket being in the correct position with the drawer 4 aligned with the cabinet door 9. The drawer may then be pulled out of the machine and the dry clothes unloaded.

Shortly after the brake solenoid is operated the recess in the cam 40 moves over the follower of the switch 45. This opens the switch 45 and de-energizes the timer motor. Thus all of the electrical components of the machine are de-energized until such time as the operator again adjusts the knob 49 so as to re-initiate the operation of the dryer.

From the above it will be seen that I have provided a new and improved mechanism for stopping the basket of a laundry machine in a predetermined rotational position. Since the mechanism by the interference of the latch 18 with the bumper 21 provides a positive stop for halting the basket, the basket is always stopped at the same predetermined point. The engagement of the bumper with the latch is, of course, always insured since the stop arrangement itself shuts off the drive motor only after the basket has been stopped.

While in accordance with the patent statutes I have described what is considered to be the preferred embodiment of my invention it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and it is therefore aimed in the appended claims to cover all such equivalent variations as fall in the true spirit and scope of the invention.

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

1. In a laundry machine having a rotatable clothes basket and a motor for driving said basket, means for stopping said basket at a predetermined rotational position comprising a stationary member, a latch movably mounted on said stationary member, a bumper mounted on said basket, electrically operated means for moving said latch into interference relation with said bumper thereby to stop said basket, resilient means associated with said latch to take up the shock of impact between said latch and said bumper, a clutch connected between said motor and said basket for allowing said motor to continue rotating upon the stopping of said basket, and a switch operated in response to the striking of said latch by said bumper for de-energizing said motor.

2. In a laundry machine having a rotatable clothes basket and a motor for driving said basket, means for stopping said basket at a predetermined rotational position comprising a stationary member, an arm pivoted on said stationary member, a latch mounted on said pivoted arm, a bumper mounted on said basket, electrically operated means for pivoting said arm to move said latch into interference relation with said bumper thereby to stop said basket, resilient means associated with said latch to take up the shock of the impact between said latch and said bumper, a clutch connected between said motor and said basket for allowing said motor to continue rotating upon the stopping of said basket, and a switch operated by the movement of said latch when struck by said bumper for de-energizing said motor.

3. In a laundry machine having a rotatable clothes basket and a motor for driving said basket, means for stopping said basket at a predetermined rotational position comprising a stationary member, an arm pivoted on said stationary member, a latch mounted on one end of said pivoted arm, a bumper mounted on said basket, a solenoid for pivoting said arm to move said latch into interference relation with said bumper thereby to stop said basket, resilient means associated with said latch to take up the shock of the impact between said latch and said bumper, a clutch connected between said motor and said basket for allowing said motor to continue rotating upon the stopping of said basket, and a switch actuated by the movement of said latch when struck by said bumper for de-energizing said motor.

4. In a clothes dryer having a rotatable clothes basket, a drive motor for driving said basket, an electrical heater assembly for heating the clothes being tumbled, stop means for stopping said basket at a predetermined rotational position thereof at the end of the drying operation, and a solenoid for operating said stop means, control means comprising a timer motor, a first switch means operated by said timer motor for energizing said heater assembly during the drying operation, a second switch means operated by said timer motor for energizing said solenoid at the end of the drying operation, thereby to actuate said latch means to stop said basket, and a switch actuated by the movement of said latch means as it stops said basket for de-energizing said drive motor, thereby to terminate the operation of said machine.

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