Jan. 30, 1962 E. D. MOREY 3,018,560

CLOTHES DRYING MACHINE

Filed Aug. 19, 1959 4 Sheets-Sheet 1

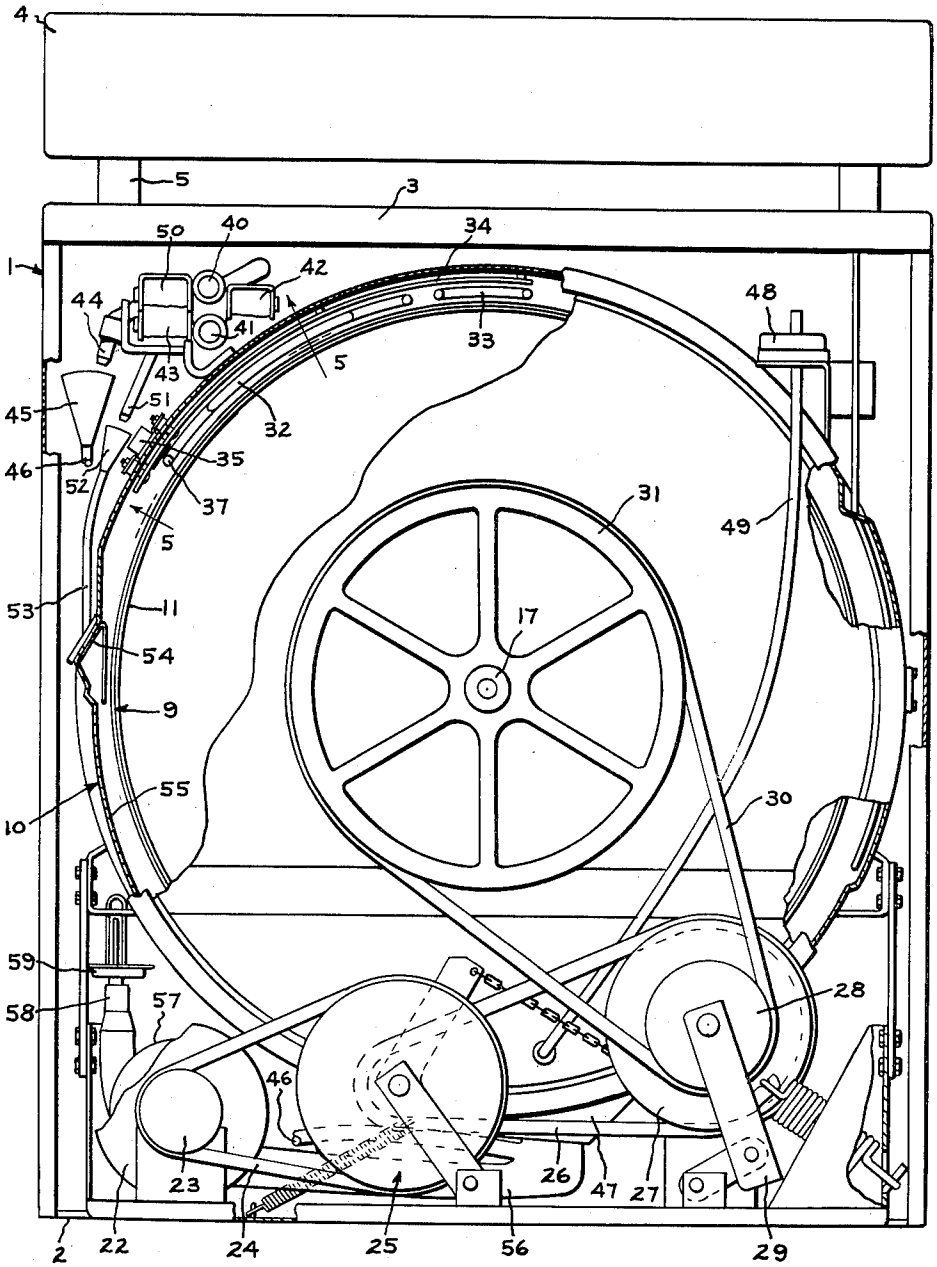


FIG. 1

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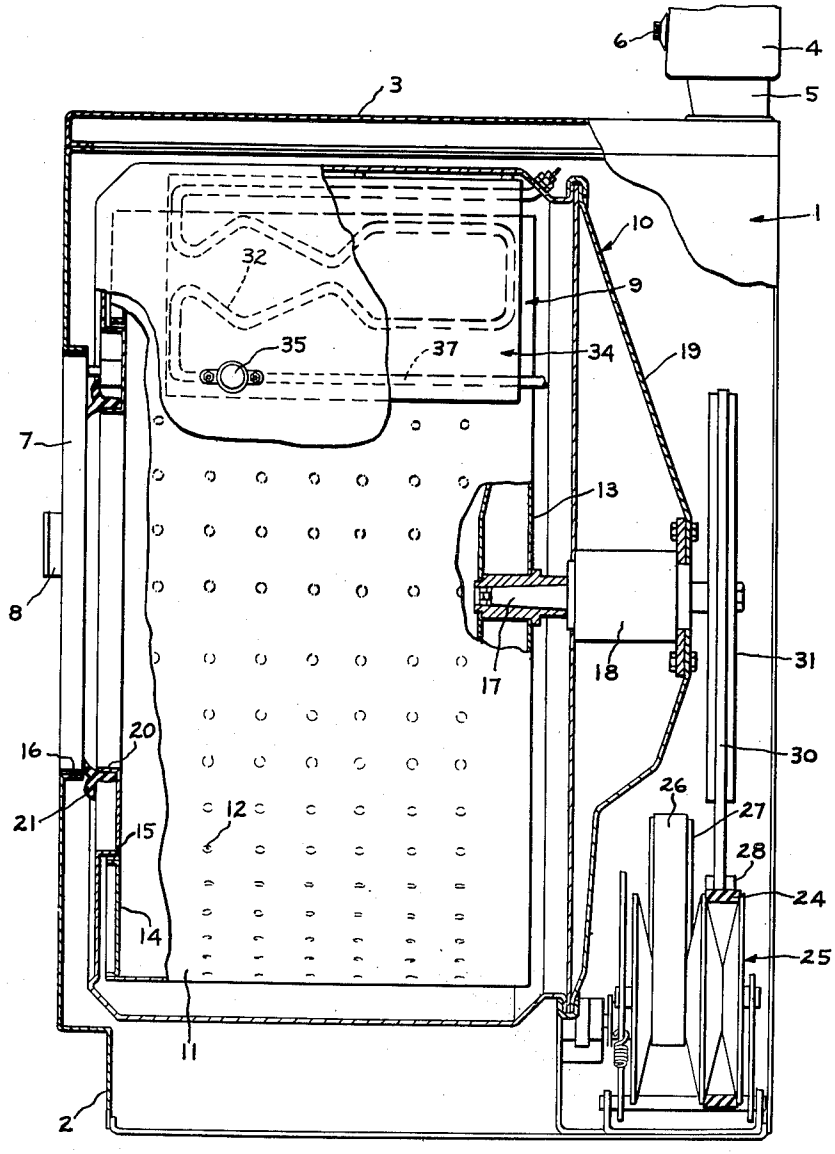


FIG.2

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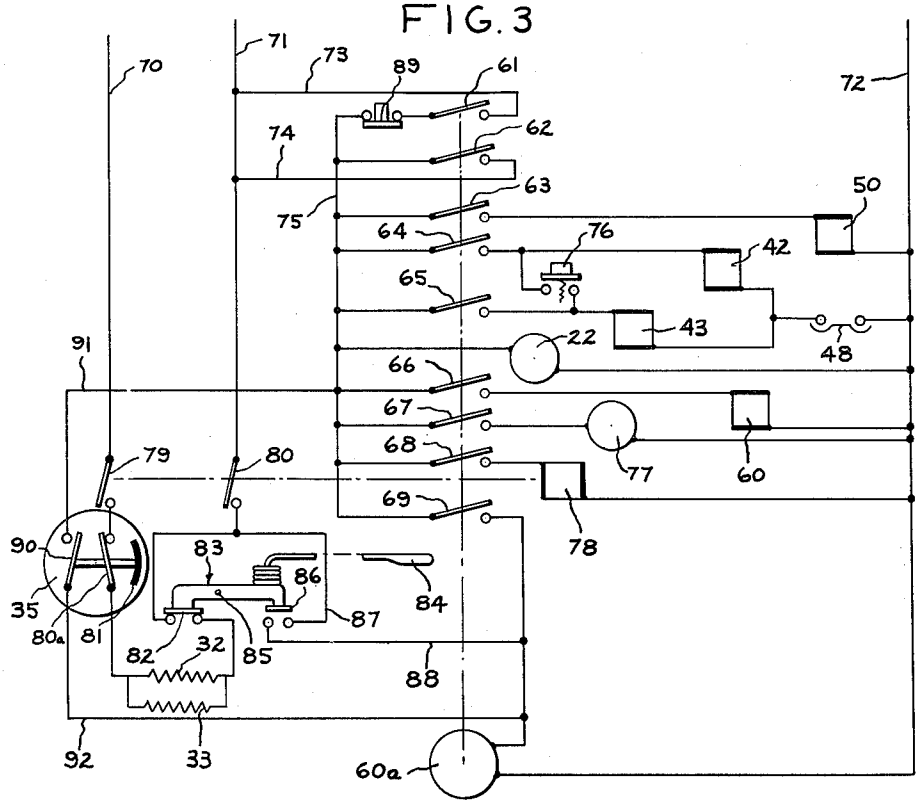
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CLOTHES DRYING MACHINE

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FIG. 3



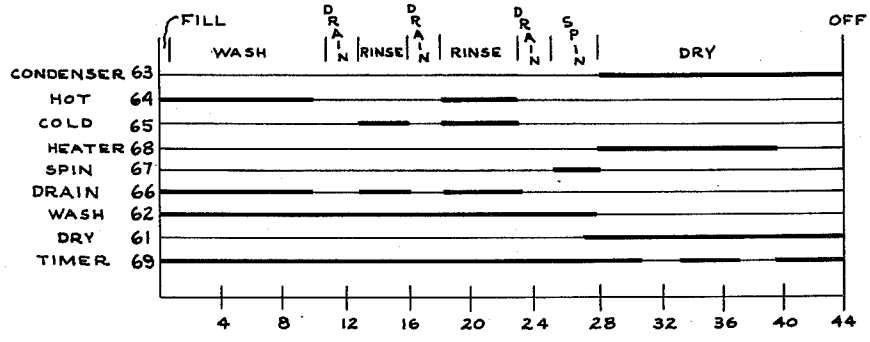


FIG. 4

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CLOTHES DRYING MACHINE

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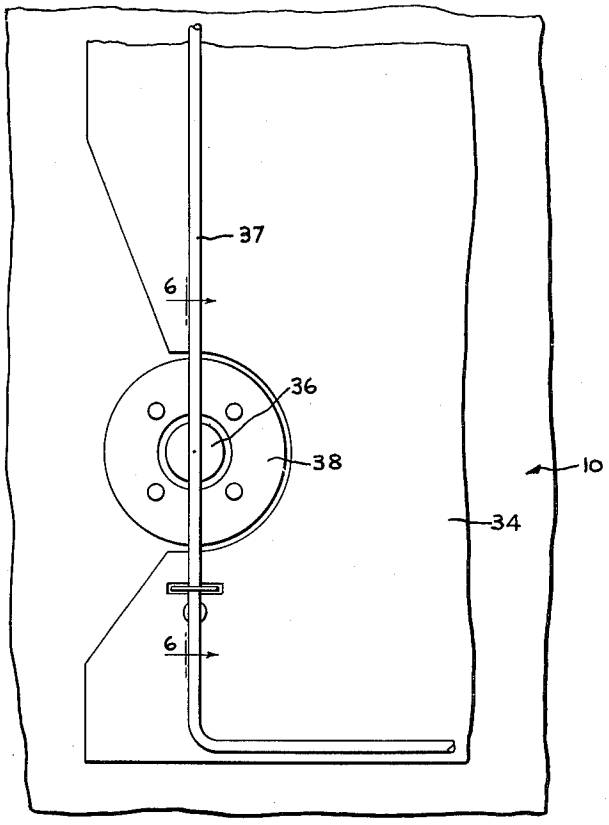


FIG.5

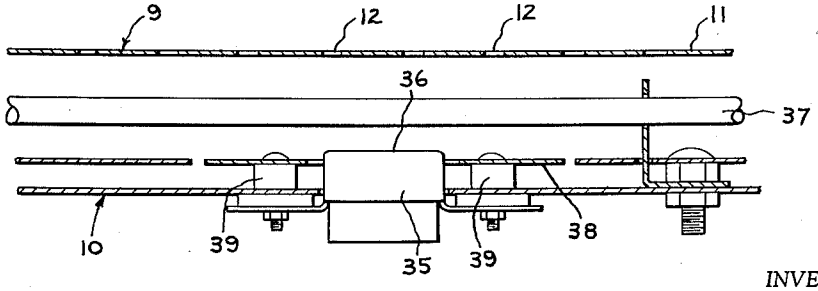


FIG.6

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United States Patent Office 3,018,560
Patented Jan. 30, 1962

3,018,560
CLOTHES DRYING MACHINE

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Filed Aug. 19, 1959, Ser. No. 834,854
6 Claims. (Cl. 34—45)

This invention relates to clothes drying machines, and more particularly to such machines of the type having a rotating clothes-tumbling drum which include means for preventing operation of the heater normally incorporated therein upon cessation of drum rotation.

Clothes drying machines of the type presently commercially available invariably include a source of heat in order to heat the clothes to cause migration of vapor out of the clothes, with the vapor then being carried off by circulating air and disposed of either by exhaustion of the air from the machine or by condensation of the vapor out of the air. Such machines also include a rotatable drum for tumbling the clothes during the heating process, so that the clothes will continually expose different surfaces to the heat. It is readily apparent that if, because of some malfunction, circulation of the air and rotation of the basket should cease but the heating equipment should continue to operate, the clothes will have the same surfaces continually exposed to the heat and burning of the clothes may ensue. For this reason, it is important to have suitable apparatus in the machine which, when either circulation of the air or operation of the clothes tumbling means should stop, will shut off the heating means. A further important point is that if overheating in the basket should occur for any other reason, such as inoperativeness of the normally provided thermostat, with consequent continual operation of the heaters, it is important that the heaters be shut off; even if the clothes are being tumbled and air is being circulated, excessive temperatures in the basket may be harmful to them, particularly in the case of the newer synthetic fabrics.

In order to effect the protective function of shutting off the heaters when either air circulation or rotation of the basket ceases, suitable means are generally provided in presently available machine. For instance, in Patent 2,750,782, issued to Daniel L. Du Hammell, Jr., on June 19, 1956, and assigned to the General Electric Company, owner of the present invention, there is described and claimed a construction for providing protection of the clothes should a belt driven drum fail to rotate and thus tumble the clothes. In addition, the step of providing a temperature-sensitive device which will open the heating circuit upon an excessive temperature in the drum is also a common provision. It will readily be seen that separate protective means for the two different types of failure increase the cost of a clothes drying machine appreciably.

It is accordingly an object of this invention to provide a clothes drying machine wherein a single temperature sensitive means will provide protection both against failure of the drum to rotate and against excessive temperatures in the drum even if it should be rotating.

A further object of this invention is to achieve this desirable result by the provision of the temperature sensitive element positioned and arranged so that it senses a rising temperature in the drum upon failure of the drum to rotate.

A further more specific object of the invention is to provide single temperature sensitive means in a machine wherein the circulation of air in the drum is entirely a result of the rotation of the drum and wherein, as a result, failure of the drum to rotate also causes the air to stop circulating.

A corollary to this more specific object is to provide

the desired protection by positioning the temperature sensitive means in such a way that during rotation of the drum it is cooled by the circulating air but when the drum is not rotating it is, because of its adjacency to the heating means, caused to sense a temperature which will make it operate to shut off the heating means.

In carrying out my invention, I provide a clothes drying machine which has a rotatable drum with a conventional perforated substantially cylindrical wall. The drum includes means for tumbling clothes therein, usually inwardly projecting ribs or vanes, which in addition to tumbling the clothes cause circulation of the air in and about the drum during rotation of the drum. I also provide means for rotating the drum in a predetermined direction which may, as in the Du Hammell patent, be a conventional belt-type drive. Adjacent the outer surface of the drum wall I provide heating means which, both by the circulation of the air and by radiation through the perforations of the drum, heat the clothes in the drum to cause vapor migration therefrom. Adjacent both to the outer surface of the wall and to the leading edge of the heating means relative to the direction of drum rotation, I provide temperature sensitive means. The temperature sensitive means in turn operate control means (which may, if desired, be incorporated right in the temperature sensitive means) at a predetermined high temperature of the temperature sensitive means, causing the control means to shut off the heating means. With this arrangement, when the heating means is operating, the circulation of the air caused by rotation of the drum prevents the temperature sensitive means under ordinary circumstances from reaching the predetermined temperature. However, should the basket stop, there is no longer any air circulating and since the temperature sensitive means is adjacent the heating means the predetermined temperature is rapidly reached and the heating means is shut off. By the same token, even if the drum should be rotating, if for some other reason the temperature in the drum should rise appreciably, the predetermined temperature will again be reached to cause the heating means to shut off.

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

In the drawings,

FIGURE 1 is a rear elevational view of a drying machine, specifically, in this case, a combination washer-dryer (which is also considered to be in the category of clothes drying machines), with the rear panel removed to illustrate details;

FIGURE 2 is a side elevational view of the machine, partly in section and with certain surfaces broken away to show details;

FIGURE 3 is a schematic electrical wiring diagram showing a particular circuit in which my improved protective arrangement may be incorporated into the control system of a drying machine;

FIGURE 4 is a sequence control cam chart illustrating a control sequence for the machine having the control circuit of FIGURE 3;

FIGURE 5 is a view along line 5—5 in FIGURE 1; and

FIGURE 6 is a view along line 6—6 in FIGURE 5.

Referring now to FIGURES 1 and 2 of the drawings, there is shown a combination clothes washing and drying machine wherein the operating elements of the machine are included within an outer cabinet structure having a

central wrap-around section 1. Section 1 is supported on a base and toeboard assembly 2 and carries a separate top 3 on which is supported a backsplasher panel 4 which may, as shown, be mounted on posts 5. Control panel 4 is provided with appropriate control devices, generally shown at 6, which may control various types of washing and drying sequences and various other functions such as water temperature, omission of dryer function, etc. Access to the interior of the machine is provided by a door 7 formed in section 1, the door being mounted on concealed hinges and being opened by suitable means such as latch control 8.

As best shown in FIGURE 2, the machine is of the non-vertical axis type, in this particular case the axis being horizontal. In other words, the machine has a clothes basket or drum 9 mounted for rotation on a generally horizontal axis within an outer enclosing tub structure 10. Drum 9 comprises a cylindrical outer wall 11 provided with a plurality of suitably spaced perforations 12 to allow air and water communication between the interior and the exterior of drum 9. The rear of the drum is closed by means of a suitable wall or plate 13. The drum also includes a front wall 14 which is formed so as to define an access or loading opening 15 in registry with an opening 16 in wrap-around section 1 provided for door 7. The basket is rotatably supported by a shaft 17 which is mounted in an elongated bearing 18 supported from rear wall 19 of tub 10. The tub is also provided with an opening 20 aligned with openings 16 and 15 so that clothes may be placed into and removed from the drum when the door 7 is opened. The door seals against a suitable gasket 21 during operation of the machine.

During the operation of the machine the drum 9 is driven from an electric motor 22. The drive from the motor to the basket includes a pulley 23 which is secured to the motor shaft so as to rotate therewith and over which passess a belt 24 driving an adjustable sheave assembly 25. From the adjustable sheave assembly 25, a belt 26 drives a pulley 27 which is secured to rotate with a pulley 28 mounted on a linkage 29 secured to the base 2 of the machine. A belt 30 connects pulley 28 to a pulley 31 secured on the end of shaft 17 so that rotation of pulley 31 causes rotation of the shaft and consequently of the drum 9. The drive arrangement provides, for a single speed of the motor 22, variable speeds of rotation for the drum as controlled by the adjustable sheave assembly 25. The manner in which the adjustable sheave assembly controls the speed is conventional, and is fully described and illustrated in, for instance, application Serial No. 781,778, filed on December 19, 1958, by John W. Toma and assigned to the General Electric Company, assignee of the present invention. A relatively low speed such as, for instance, 47 r.p.m. may be provided for tumbling the clothes in the basket and for achieving an appropriate circulation of air during the heat drying operation, while a relatively high speed on the order of 200 or 300 r.p.m. may be provided for centrifugally extracting water from the clothes, which is commonly done after washing and rinsing operations and prior to a heat drying operation. In accordance with the illustrated embodiment of my invention, the rotation of the motor 22 is such as to provide a clockwise rotation of drum 9 as viewed in FIGURE 1.

To heat the clothes during the drying portion of the cycle, there is provided in the machine a heater assembly including two electric heaters 32 and 33 which form together a unitary heater assembly. The heaters are adjacent the outer surface of the wall 11 of the drum so that during low speed rotation of the drum the wall is heated, the air adjacent the heaters is heated, and heat is provided directly to the clothes by radiation through the perforations 12. Behind the heaters a suitable reflector plate 34 is provided so as to assist in the heating of the clothes by reflecting heat from behind the heaters back into and against the drum. The reflector plate 34 is, for the sake of economy in manufacture, frequently made of aluminum. It will be observed that the heaters 32 and 33 and their reflector extend through but a portion of the circumfrence of the wall 11 of the drum.

Secured to tub 10 is a temperature sensitive device 35 having an inner end 36 (FIGURE 6) positioned so as to sense temperature within the tub 10. In accordance with my invention, the heat sensitive device 35 is so positioned that surface 36 thereof is adjacent the leading portion or end of heater 32 insofar as the direction of rotation of drum 9 is concerned. More specifically, the preferred location for surface 36 is substantially in alignment with the portion 37 of heater 32 which constitutes the leading edge of the heater. In this position surface 36 is air-cooled during drum rotation, but is exposed to the full heat of the heaters should drum rotation cease. This arrangement is best shown in FIGURE 5. Where the standard aluminum construction is used for reflector 34, I prefer to provide about surface 36 a special separate reflector 38 which is not subject to tarnishing with time as is true to some extent of aluminum. One such commonly available suitable material for the additional reflector 38 is, for instance, stainless steel. As shown in FIGURE 6, the assembly of reflector 38 and temperature sensitive device 35 may readily be secured to tub 10 by standard securing means such as members 39.

Inasmuch as the invention being described is embodied in a combination washer-dryer, the additional components of the machine will be briefly described for the purpose of a complete disclosure of an operative device. The water supply means includes connections 40 and 41 through which hot and cold water is supplied to the machine for the washing operation. A valve controlled by a solenoid 42 admits hot water to the machine and a valve controlled by an opposed solenoid 43 admits cold water to the machine. The hot and cold water valves under the control of solenoids 42 and 43 discharge through a common outlet conduit 44, through a suitable air gap, and into a funnel 45 which leads through a conduit 46 to a sump 47 formed at the bottom of tub 10. The air gap provided by the funnel 45 makes it impossible for the water to be syphoned from the machine and thus contaminate the incoming water supply line. A pressure actuated sensing device, or water level control, 48 controls both solenoids 42 and 43 to maintain the proper water level in the machine during the washing operation. Sensing device 48 is connected to the interior of tub 10 by a conduit 49.

The illustrated machine is of the type which provides cold water during the drying cycle for condensing from the circulating air the moisture extracted from the clothes, the air circulating near the heaters, then over the clothes, and then adjacent moisture condensing means. The condenser water is admitted to the machine through an additional solenoid actuated valve 50 which is energized during the drying operation so that the valve passes water at a slow rate sufficient to condense from the air the moisture vaporized from the clothes. As shown, the condenser water discharges into a conduit 51 and then passes through an appropriate air gap to a funnel 52 and a conduit 53 which connects with an opening 54 in the side of tub 10. From opening 54 the condenser water passes into the tub 10 and then flows in a thin sheet down the lower left wall 55 so as to cool a substantial portion of the area of the side wall and provide a large cool surface for condensing the moisture extracted from the clothes.

The wash and rinse water used during the washing portion of the operation, and the condenser water and the moisture extracted from the clothes during the drying operation, are discharged from the machine through the sump 47 mounted at the bottom of the tub. A suitable discharge hose 56 leads from the sump to a motor driven drain pump 57, preferably driven from the motor 22, and which discharges through an outlet 58 to a valve

59 controlled by a suitable solenoid (schematically shown at 60 in FIGURE 3). Since pump 57 is continually operated, the draining of water from sump 47 is controlled by the drain valve, draining occurring continually during motor operation except when solenoid 60 is energized.

With the apparatus described, any suitable sequence derived from the basic sequence of washing, rinsing and spinning may be utilized to effect the washing operation of the cycle and may be followed, where so desired by the operator, by suitable heating of the clothes as they are tumbled in drum 9. Referring now to FIGURE 3, in order to provide automatically the proper sequence of operations, there is provided a sequence control means in the form of timer motor 60*a* which controls a plurality of timer switches 61, 62, 63, 64, 65, 66, 67, 68, and 69. Switches 61–69 are actuated in a desired sequence by appropriate switch operating means driven by the timer, as indicated schematically by FIGURE 4. Sequence controls are well known, and several types are commercially available; the representation of FIGURES 3 and 4 is therefore purely schematic, it being understood that each of the switches 61–69 is operated by conventional means such as cams. In the particular representation of FIGURES 3 and 4 it is to be understood that each of the switches 61–69 schematically shown in FIGURE 3 is closed during the periods indicated by the heavy black lines in FIGURE 4. In other words, the chart of FIGURE 4 may be regarded for the purposes of this application to be a development of the peripheries of the respective switch operating cams, the heavy lines showing the cam rises.

The power connections for the machine include a pair of line conductors 70 and 71 having a potential of 230 volts between them, and a neutral conductor 72 which has a potential difference of 115 volts with each of the conductors 70 and 71. Switches 61 and 62 are respectively connected by conductors 73 and 74 between conductor 71 on the one hand and a conductor 75 on the other hand. Switch 63 controls the condenser valve solenoid 50, being in series with it between the conductor 75 and neutral 72 and thus across 115 volts. Switch 64 is in series with hot water valve solenoid 42 between conductors 75 and 72, and switch 65 is in series with cold water valve solenoid 43 between conductors 75 and 72. Both the hot and cold water solenoids are also in series with the water level control switch 48, and a manually operable switch 76 is provided to permit both solenoids 42 and 43 to be energized when switch 64 is closed so as to provide, if desired, warm water rather than hot water for washing purposes.

Main drive motor 22 operates continuously during an operating cycle of the machine 1, i.e., as long as either switch 61 or switch 62 is closed, and is connected as shown between conductors 75 and 72. Switch 66 is in series with the drain valve controlling solenoid 60 between conductors 75 and 72. A suitable electrically operated device, such as a gear motor for instance, schematically shown at 77 is provided for controlling the position of the sheave assembly 25 so as to provide either a drum tumbling speed or a spin speed. Motor 77 is controlled by switch 67 which is, as the others, connected in series with the device it controls between the conductors 75 and 72.

A relay device 78 is provided which controls a pair of switches 79 and 80 respectively positioned in lines 70 and 71. In the same manner as the other components, relay 78 is controlled by being in series with a timer operated switch 68 between conductors 75 and 72. When the relay is energized it causes switches 79 and 80 to close. When these two switches are closed, a 230 volt energizing circuit for the heaters 32 and 33 is completed starting with conductor 70, and passing through switch 79, switch 80*a* controlled by a bimetallic element 81 which forms the temperature sensitive part of device 35, the heaters themselves, the contact 82 of a main thermostatic device 83, switch 80, and conductor 71.

The main thermostatic device 83 has a temperature sensitive element 84 (not shown except in FIGURE 3) which is positioned, in the conventional manner, adjacent the basket 9 so as to be sensitive to the temperature of the clothes in the basket. Below a predetermined temperature the thermostatic device is in the position shown so that bridging contact 82 enables the heating circuit to be closed. When the predetermined high temperature is reached, the thermostatic device pivots about a point 85 opening bridging contact 82 and closing another bridging contact 86. The closing of contact 86 completes a 115 volt circuit for the timer motor during drying operations, the circuit extending from conductor 71 through switch 80, bridging contact 86, conductors 87 and 88, and the timer motor 60*a* back to conductor 72. In addition to being thus energized when the thermostatic device 83 is in its tripped position, the timer motor 60*a* may be energized through the timer operated switch 69 which is in series with it across the conductors 75 and 72. Thus, when switch 69 is closed, as during washing, rinsing and spinning operations, the timer motor operation is independent of the heater and tolls out a washing operation. On the other hand, when switch 69 is opened the timer motor does not operate under ordinary circumstances unless thermostat 83 is in the tripped position. This provides a heating cycle of the type where the operations of the heaters 32 and 33 and of the timer motor 60*a* are alternative in nature with first the heaters raising the temperature to a predetermined level and then shutting off while the timer motor runs until the thermostat cools enough to restart the heaters and stop the timer motor. This kind of drying operation may be provided for a predetermined length of time of operation of the timer motor, with the timer motor then causing switch 68 to open, as shown in FIGURE 4, to de-energize relay 78 and open switches 79 and 80 to complete a drying operation.

It will readily be seen by reference to FIGURES 3 and 4 together that the timer motor, by operating switches 61–69 in the sequence shown, causes appropriate operations to be performed for either a washing cycle or a complete washing and drying cycle. Thus, typically, at the beginning of an operation switches 64, 66, 62 and 69 are closed. This causes the drum to operate, with the drive motor 22 receiving power from the connection of line 75 through switch 62 in line 71. Also, solenoid 42 opens its valve to permit hot water to enter the drum until pressure sensitive switch 48 opens; in the event that a warm wash has been selected by depression of button 76, cold water also enters so as to form, together with the hot water, warm water to be provided for the washing operation. The water is retained in the machine, the energization of solenoid 60 through switch 66 closing the drain outlet. At the end of the wash cycle, the solenoid 60 controlling the drain valve is de-energized by the opening of switch 66 and this opens the valve permitting the pump to pass the water out of the machine to the drain. After an appropriate period of this, as timed by motor 60*a*, the cold water solenoid 43 is energized by the closing of switch 65 to cause cold water to be provided for a rinsing operation, and solenoid 60 is energized to close the drain valve. After another drain, provided by the de-energization of solenoid 60, both the hot and cold water solenoids are energized for a warm water rinse, and then this water is also drained out. At the end of this third drain operation the gear motor 77 is energized to move the adjustable sheave assembly 25 to cause the basket speed to be increased to spin speed, the drain valve remaining de-energized to permit the pump to remove the water spun out of the clothes.

At the end of the spin operation switch 62 opens and switch 61 closes. If button 89 has been opened this terminates the cycle. However, if the operator wants to

have a complete wash and dry cycle, she permits button 89 to remain closed and in that case, although switch 62 opens, the conductor 75 remains connected to conductor 71 through switch 61. Also at this time, if the operation continues, switch 68 is closed to energize relay 78 to start operation of the heaters 32 and 33, and switch 63 is energized to start operation of the condenser water, the drain valve solenoid remaining de-energized and the timer remaining energized. A drying operation with energization of the heaters is thus started, with the basket continuing to be rotated by drive motor 22. Shortly after this, the timer motor opens switch 69 to de-energize itself with the drying operation continuing untimed.

When the clothes reach a predetermined high temperature, this is sensed by bulb 84 which causes the thermostatic device 83 to open contact 82 and close contact 86. This stops the heating operation and starts the timing motor which then recloses switch 69 to lock itself in operation for a predeterimned period such as, for instance, four minutes, until the thermostatic device can reset. At the end of the reset period the timer motor opens switch 69 so that once again the heating operation is untimed, the heating having started by the resetting of the thermostatic device 83 to the position shown in FIGURE 3. This continues until the thermostat again trips, at which point the timer motor again starts in operation, closing switch 69 and opening switch 68 to make sure that no further heating operations occur. After an appropriate cool-down period of approximately 4 minutes the timer motor then opens all the remaining closed switches 61, 63, and 69 to open all circuits to the machine with the cycle then being completed and the clothes being clean and dry.

While thermostatic device 35 may be provided in the circuit in various appropriate locations, I have chosen to show it with its switch 80*a* positioned, as shown, in series between switch 79 and the heaters 32 and 33. It will further be seen that the temperature sensitive device 35 includes a switch member 90, ganged to switch 80*a* so as to also be controlled by element 81, which is normally open. This switch member closes only if the bimetallic device 81 should be actuated, which occurs only when the device 35 senses an unusually high temperature either because overheating is occurring in the basket 9 or else because basket rotation has ceased and air is no longer being circulated during the operation of the heaters to cool device 35. When the bimetallic device 81 opens it operates switch 80*a*, opening the circuit to the heater so that despite the fact that switches 79 and 80 are closed the heaters then become de-energized and cease to heat, insuring that the clothes in the basket are not burned despite an operative failure of the machine. At the same time, the switch 90 is closed by the movement of the bimetallic element 81. This completes a circuit which, starting at conductor 71, proceeds through switch 61, conductors 75 and 91, switch 90, conductor 92, timer motor 60*a* and conductor 72. With the timer motor thus energized the machine continues to toll the cycle so as to move to its "off" position despite the fact that the heaters 32 and 33 have been disabled. Thus, despite inoperativeness of the machine of the type which would otherwise cause burning of the clothes, the timer motor 60*a* proceeds to its proper off position without, however, the undesired operation of heaters 32 and 33 ccurring.

It will readily be seen that by the provision of the device 35 in the circuit as shown, and in the physical position relative to the heater and to the basket as shown, it is sensitive to the circulation of the air as caused by the rotation of the basket and will shut off the heating equipment if the basket is not rotating. Also, the device 35 performs the additional function of insuring that should overheating occur within the basket for any other reason the heaters will be shut off to prevent burning of the clothes. In this manner the device 35 doubles as a temperature sensitive switch and as a belt switch.

It will further be observed that by use of a relatively small non-tarnishing reflector plate, the standard type of structure, where an aluminum reflector plate is provided behind the major part of the heaters, may be retained. Because of the non-tarnishing effect, even if the aluminum reflector should dull a little with age, there will be a heat sink created about the temperature sensitive device 35 so that the operation of device 35 still accurately reflects overheating either because of transmission failure or for other reasons.

While in accordance with the patent statutes I have described what at present is considered to be the preferred embodiment of the invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and I therefore aim to cover in the appended claims all such changes and modifications as fall within 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. A clothes drying machine comprising a drum rotatable on a non-vertical axis having a perforated substantially cylindrical wall, said drum including means for tumbling clothes therein and for circulating air during rotation, means for rotating said drum in a predetermined direction, heating means adjacent the outer surface of said wall for heating clothes in said drum, temperature sensitive means positioned adjacent the outer surface of said wall and in substantial radial alignment with the leading edge of said heating means relative to the direction of drum rotation, and means controlled by said temperature sensitive means and arranged to operate at a predetermined high temperature of said sensitive means, said controlled means in turn controlling said heating means and shutting off said heating means when said predetermined temperature is sensed by said temperature sensitive means, said heating means when operating heating said temperature sensitive means to said predetermined temperature unless said temperature sensitive means is cooled by the circulating air.

2. A clothes drying machine comprising a drum rotatable on a non-vertical axis having a perforated substantially cylindrical wall, said drum including means for tumbling clothes therein and for circulating air during rotation, means for rotating said drum in a predetermined direction, electrical heating means adjacent the outer surface of said wall for heating said clothes in said drum, a circuit for energizing said heating means, temperature sensitive means positioned adjacent the outer surface of said wall and in substantial radial alignment with the leading edge of said heating means relative to the direction of drum rotation, normally closed switch means controlled by temperature sensitive means and arranged to open at a predetermined high temperature of said temperature sensitive means, said normally closed switch means completing said circuit to enable energization of said heating means when closed and causing de-energization of said heating means when open, said heating means when operating heating said temperature sensitive means to said predetermined temperature unless said temperature sensitive means is cooled by the circulating air.

3. The apparatus defined in claim 2 wherein said heating means is positioned between the outer surface of said wall and said temperature sensitive means.

4. The apparatus defined in claim 3 wherein aluminum reflector means are secured behind said heating means and non-tarnishing reflector means are provided laterally around said temperature sensitive means thereby to provide a constant heat transmission from said heating means to said temperature sensitive means regardless of the age of said machine.

5. A clothes drying machine comprising a drum rotatable on a non-vertical axis having a perforated substantially cylindrical wall, said drum including said means for tumbling clothes therein and for circulating air during

rotation, means for rotating said drum in a predetermined direction, electrical heating means adjacent the outer surface of said wall for heating clothes said drum, a circuit for energizing said heating means, temperature sensitive means adjacent the outer surface of said wall and in substantial radial alignment with the leading edge of said heating means relative to the direction of drum rotation, sequence control means for causing rotation of said drum and operation of said heating means in a predetermined sequence, a circuit for energizing said sequence control means, and switch means controlled by said temperature sensitive means and arranged to operate when a predetermined high temperature is sensed by said temperature sensitive means, said switch means including a normally closed switch in said heating means circuit and a normally open switch in said sequence control means circuit, said normally closed switch causing de-energization of said heating means when opened at said predetermined temperature, said normally open switch causing continued operation of said sequence control means until the end of a cycle is reached when closed

at said predetermined temperature, said heating means when operating heating said temperature sensitive means to said predetermined temperature unless said temperature sensitive means is cooled by the circulating air.

6. The apparatus defined in claim 5 wherein a primary thermostat is arranged to sense the temperature of clothes in said drum, said primary thermostat providing a drying operation by causing alternative operation of said heating means and said sequence control means for a predetermined period of operation of said sequence control means, said normally open switch when closed causing continued operation of said sequence control means to the end of the cycle independently of the position of said primary thermostat.

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