



# UNITED STATES PATENT OFFICE

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DRIER

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1 Claim. (Cl. 34—45)

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In tumbler type clothes driers at the end of the drying cycle, the clothes are hot and uncomfortable to remove. This invention is intended to prevent this by continuing the rotation of the drum after the heater is shut off. In a preferred form the rotation of the drum is started after the heater has warmed the drum to a point at which drying can efficiently start.

In the drawing, Fig. 1 is a perspective view of a drier; Fig. 2 is a sectional elevation; and Figs. 3 and 4 are control diagrams.

Referring to the drawing, there is shown a drier having a cabinet 1 with a door 2 at the front for loading and unloading clothes into a horizontal perforated drum 3 driven in a suitable manner, not shown, by a motor 4. The drum is enclosed by a casing 5 having at its upper left hand corner a cylindrical reflector 6 for directing heat from a heating element 7 onto the outer periphery of the drum. The motor also drives a blower 8, diagrammatically indicated as having its inlet connected to an axial trough 9 at the lower right hand corner of the casing and having its outlet discharging to a passage 10 along one side of the cabinet. The front end of the passage 10 is closed by a filter screen 11. There is also a filter screen 12 extending back from the outlet of the passage 10 and forming one side of the passage. A suitable by-pass passage is provided at the rear of the screen 12 so that when the screens are clogged with lint the air discharge through a passage 13 beside the passage 10. The construction so far described is that shown in more detail in my application Ser. No. 547,380, filed July 31, 1944.

After loading the clothes into the drum the drying operation is started by pushing a push button 14 closing contacts 15 and 16 in series with the heating element 7 through a normally closed safety thermostat 17. The push button is held in the closed position by an over center device diagrammatically indicated at 18. The closing of the contacts 15 and 16 connects the heating element across conductors 19 and 20 forming the live sides of a three wire power system. The driving motor 4 is at all times connected between ground and one of the conductors 19 or 20 through a normally open thermostat 21. The thermostats 17 and 21 are arranged at the top of the cabinet just outside the casing 5 in a position to respond to the temperature of the casing. Under normal conditions the thermostat 17 does not operate. It opens the circuit to the heating element when the circulation of air through the drum is interrupted

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or interfered with. One condition under which the thermostat 17 may operate is when the door is opened and the circulation of air past the heating element is interrupted. The thermostat 21 closes the circuit to the motor when the casing and drum have warmed up. Before this time no appreciable drying could be obtained if the motor were started.

Upon starting the motor, air is drawn into the cabinet through louvers (not shown) into the space between the cabinet and the casing 5 where it is to some extent preheated by contact with the outside of the casing. From here the air flows through a slit 22 into the top of the drum and diagonally across the drum into the trough 9 leading to the blower 8. When the clothes are wet there will be an appreciable drop in temperature of the air while flowing through the drum. As the drying progresses the temperature drop decreases and finally the temperature of the air in the discharge passage 10 reaches a point corresponding to the desired degree of dryness of the clothes. At this point a thermostat bulb 23 located in the passage 10 causes the expansion of a bellows 24 against the end 25 of the push button moving it to the open position. The clothes in the drum are now substantially dried but are too hot to handle comfortably. It is therefore desirable that the rotation of the drum and the circulation of air through the drum be continued until the clothes are cooled. This involves cooling the metal parts of the drier including the drum, the casing 5 and to some extent the cabinet. This is automatically accomplished by the thermostat 21 which opens when the temperature of the casing 5 drops to a value corresponding to the desired cooling of the clothes in the drum. With this arrangement a time lag is introduced between the starting and stopping of the heater and the starting and stopping of the blower and drum. The blower and drum do not operate until the drier has warmed up to a point at which drying can be efficiently accomplished and the operation of the drum and blower continue after the heater has been cut off until the clothes have cooled to a point at which they can be comfortably handled.

The control diagram in Fig. 4 is similar to the previously described control. The sole difference is the connection of the normally open thermostat 21 across the contacts 15 which are connected in series with the driving motor 4 for the drum and blower. Upon pushing the button 14 to close the contacts 15 and 16 through the heating element 7, a circuit is also closed through the

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driving motor 4. The rotation of the drum and operation of the blower therefore start simultaneously with the energization of the heating element. When the clothes reach the desired degree of dryness, the contacts 15 and 16 are opened by expansion of the bellows 24 associated with the thermostatic bulb 23 in the discharge passage 10. At this time the temperature of the clothes as reflected through the temperature of the casing 5 is higher than that required to keep the contacts of the thermostat 21 closed. The motor therefore continues to operate, rotating the drum and circulating air through the clothes until the clothes have cooled. At this point the thermostat 21 snaps to its normally open condition and shuts down the motor.

By locating the thermostat 21 at the top of the cabinet, the operation is not adversely affected by opening the door. Upon opening the door, cold air flows primarily through the door and hot air collects in the upper part of the casing where it would continue to keep the thermostat 21 closed. While opening the door may result in cooling the lower part of the casing, it will not cause the stoppage of the driving motor for the drum and blower, nor due to the safety thermostat 17 will it permit excessively high temperatures of the drum. The location of the thermostat controls is such that the operator cannot interfere with the automatic drying cycle.

What I claim as new is:

In a tumbler type clothes drier having a horizontal drum, a heater for the drum, a casing surrounding the drum, a blower exhausting air from the casing, and a driving motor, a control for the driving motor and heater comprising a power circuit for the heater including contacts opened by

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an exhaust air thermostat upon the rise in temperature which accompanies drying, a power circuit for the motor including contacts opened by said exhaust air thermostat upon the rise in temperature which accompanies drying, manually operable means for closing the power circuits for the motor and heater, and a circuit bridging the contacts in the power circuit for the motor controlled by the exhaust air thermostat, said bridging circuit including normally open contacts controlled by a thermostat responsive to the casing temperatures, said casing temperature thermostat acting to close said contacts in the bridging circuit at casing temperatures prevailing during normal drying but opening the same at lower temperatures at which the clothes are cooled sufficiently to be comfortably handled, whereby the power circuit to the motor is maintained after the opening of the contacts in the power circuits to the motor and heater by the exhaust air thermostat.

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