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CLOTHES DRYERS

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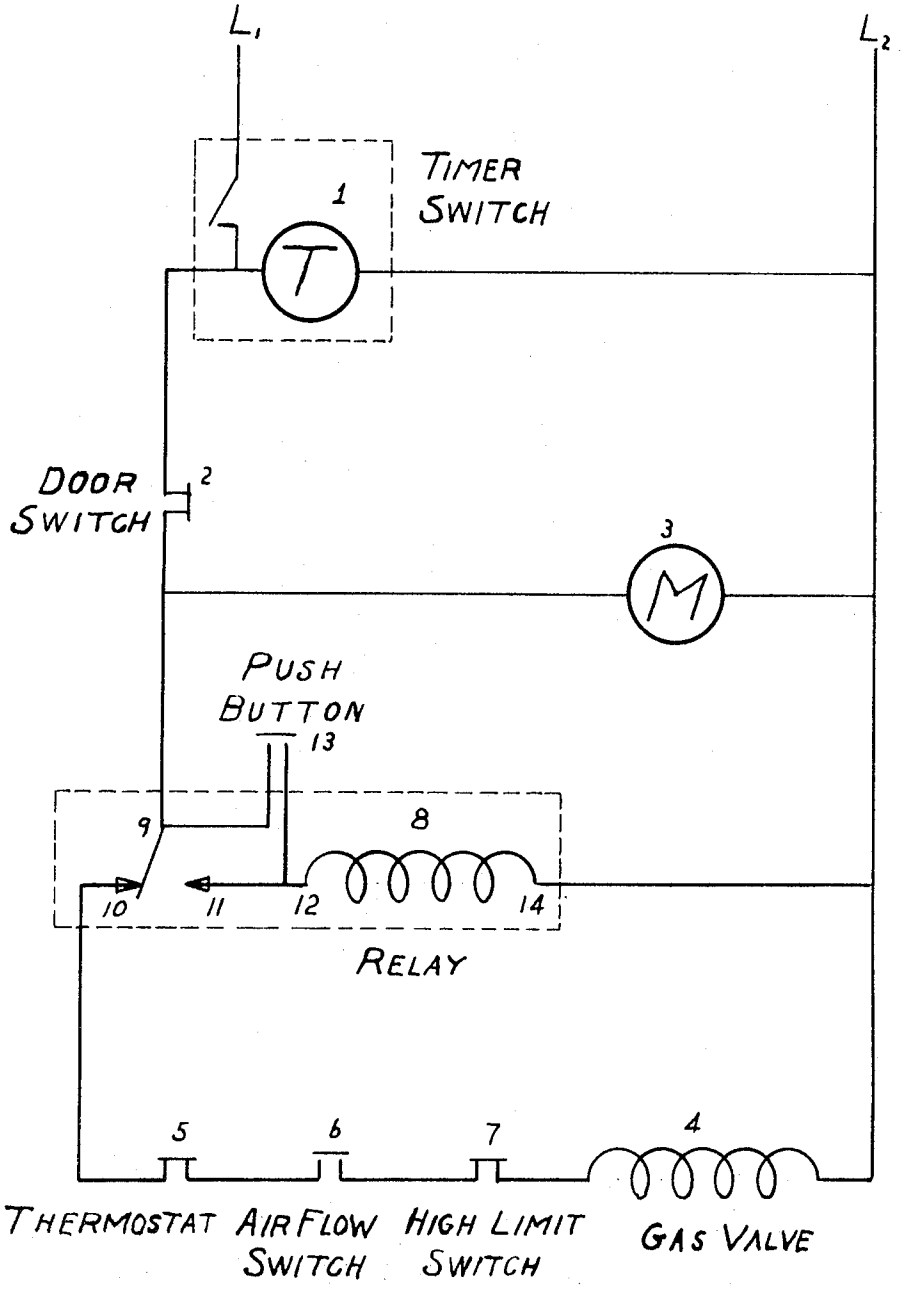

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CLOTHES DRYERS

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ABSTRACT OF THE DISCLOSURE

This invention consists of a relay operable by the user of a clothes dryer to alter the normal operation of the machine by turning off the heat while the machine continues to tumble the clothes and blow air through them to cool the clothes for wrinkle free drying of permanent press fabrics, which relay is coupled to the clothes door of the machine so that when the door is opened the action of the user is cancelled, restoring the dryer heat to the normal thermostatic control so that the next user of the machine is assured of receiving full drying capacity.

This invention is for a control system for the tumbler type of clothes dryer that permits achieving superior results in the drying and finishing of permanent press fabrics.

In the tumbler type of clothes dryer the wet or damp clothes to be dryed are placed in a perforated drum which revolves slowly when the machine is in use and through which heated air is forced by a blower. The heated air carries away the moisture in the clothes and the rotation causes the clothes to tumble and thus exposes all articles in the load to the same treatment.

In the conventional machine the operation is controlled by a timing device which stops the machine at the expiration of a preset time interval. During operation the temperature of the heated air is controlled by a thermostat. If the time interval and temperature are adequate for the moisture content of the load of clothes, the clothes are dry when the time interval expires, and they are warm. If the load of clothes contains articles made of drip dry or permanent press fabrics, these must be removed promptly and placed on hangers or forms to cool. If they are allowed to cool in a heap the wrinkles and folds present in the heap will be set by the cooling, and they will not be fit for wear unless they are ironed.

If, on the other hand, the tumbling is continued in the machine, with continued air flow but without heat, the clothes will be cooled while being tumbled and they will emerge without wrinkles. Two types of machines have recently appeared on the market that provide for this mode of operation of the dryer, one controlled by temperature and the other controlled by time.

In the temperature controlled cool down method the heat is shut off at the expiration of the previously selected (in the case of coin operated self service equipment, of the previously paid for) time interval but the tumbling of the clothes and the passage of air continued until the temperature of the air after it has passed through the clothes has dropped to a preset value.

In the time controlled method, the heat is turned off, but the tumbling of the clothes and the passage of the air continued, at a fixed time before the expiration of the previously selected time interval, if the user selects that mode of operation by the appropriate positioning of a switch or control.

In a dryer equipped with this invention the user, desiring to finish a load of permanent press fabrics already in the machine and having ascertained that the degree of dryness is adequate, merely presses a button to turn off the heat, continuing the tumbling and air circulation for the balance

of the preselected time. When the machine is stopped, as it must be to check the condition of the clothes, or to remove them, the control automatically resets to normal operation. When the machine is restarted the button must be pushed again if further tumbling without heat is desired.

This is a unique solution to the problem of how to provide a cool down period at the end of a drying cycle. It has definite advantages over the temperature method and over the time method because it is always under the control of the operator or user and it resets itself to the normal drying mode automatically. This is especially important in coin operated self service equipment. It avoids claims for refunds since it cannot forget to turn on the heat, and it requires no foresight on the part of the user.

In the temperature controlled cool down method the heat is shut off at the expiration of the previously selected time interval but the tumbling of the clothes and the passage of air continued until the temperature of the air passed through the clothes has dropped to a preset value. This is accomplished by the addition of a relay and a thermostat. It provides a cool down period beyond the end of every preselected time interval, whether needed or not. In coin operated equipment the user estimates the time required to dry a load of clothes and inserts enough coins in the slot to buy the time she has estimated. She is often optimistic or hopeful and usually buys less time than required to dry the clothes. After starting the dryer she waits till it stops. Upon opening the door she finds that the clothes are cool, and too often still damp, and she wonders if the machine is heating properly. The time spent in cooling damp clothes is wasted time, and it is provided free by the store owner, thus requiring more dryers than would otherwise be required in a given store. In the conventional mode of dryer operations the clothes are warm when the dryer stops, and that is what customers expect. If they are still damp, the customer buys more time, but no time is wasted.

In the time controlled method, the heat is turned off but the tumbling of the clothes and the passage of the air continued at a fixed time before the expiration of the previously selected time interval. The time at which the heat is turned off can be selected, within certain limits, by the owner, in the case of coin operated equipment, but the user has no control over the start of the cool down period, nor how long it runs. If the cool down time is too short the clothes will still be warm at the expiration of the purchased time. If more time is purchased, the purchased interval will start with heat, and the cool down time will be the same as in the previous cycle, and it may well be insufficient. It may be impossible to cool down a large load with this arrangement.

In the use of dryers equipped with this invention, the cool down period starts when the user pushes the button, and it may continue for as long as the user wishes. If the clothes are not cooled to the user's satisfaction when the purchased time has expired the user may buy more time and press the button to get tumbling without heat. The cool down time does not start automatically. It starts only when the user presses the button. It requires a deliberate action to initiate it. Whenever the machine stops the control is automatically reset to normal operation. This is an important feature. The next user of the machine is assured of normal drying operation, with heat. There is no need to adjust a control or to set the machine for a particular mode of operation. Whenever the door is opened and reclosed and the machine started, it will start with a normal drying cycle with heat, and so continue until the button is pushed or until the selected time interval runs out or the door is opened.

The mechanism by which the foregoing may be accomplished in a tumbler type of clothes dryer is shown in the

schematic diagram. It consists of a time switch **1** which passes current, for the selected interval of time, through a switch **2** that is opened when the door is opened to a motor **3** that drives the air blower and the clothes drum or cylinder and to the gas valve circuit which opens the gas valve **4** to the burners when the thermostat **5** calls for heat if the air flow switch **6** is closed and if the safety limit switch **7** is not opened by excessive temperature and if the relay **8** is in its normal, or dropped out position.

The relay **8** is a conventional single pole two throw relay and it is connected as follows. The moveable contact **9** is connected to one line of the source of power when the time switch **1** and the door switch **2** are closed. The normally closed contact **10** supplies power to the gas valve **4** through its associated control and safety switches, if the dryer is so equipped, when the relay is de-energized. The normally open contact **11** is connected to one end **12** of the relay coil and to one side of the push button **13**. The other side of the push button is connected to the moveable contact **9**. The other end **14** of the relay coil is connected to the other side of the power line. The time switch **4** and the door switch **2** may be placed so as to interrupt either side of the power. The operation in either case is the same.

With the relay de-energized power is supplied to the gas valve circuit whenever it is desired to operate the dryer, and the operation is the same as in any conventional dryer not having the benefit of this invention. If the button is pushed a circuit will be closed from the line through the coil of the relay to the other side of the line, actuating the relay. The relay will be held in by the closing of the normally open contact **11**, paralleling the push button, and the normally closed contact **10** will be opened, interrupting power to the gas valve circuit, thus shutting off the heat. The heat will remain off for as long as the relay coil has power. When the power to the relay coil is interrupted by opening the door, by the passage of time opening the time switch or by a failure of the power supply to the dryer the relay will be de-energized and automatically restore the connections to the gas valve circuit for normal operation.

The preferred method of obtaining the benefits of this invention is by the use of an electric relay as described above. It could also be accomplished by a single pole single throw switch that could be operated by the user to interrupt the circuit to the gas valve and that would be mechanically reset to on condition by opening the door.

Nor need the benefits of this invention be restricted to gas heated drivers. It is also applicable to electrically heated and to steam heated dryers. For such equipment the gas valve **4** in the preceding description is replaced by the contactor that controls the current to the heaters for electric equipment or by the steam valve for steam heated dryers.

I claim the following:

1. In a machine for drying clothes having a rotating drum into which the clothes to be dryed are deposited, access to said drum being controlled by a door, having means to blow air through the clothes and having means to heat said air before it is blown through said clothes, a manually operable device to turn off the source of heat and means operated by opening and closing said clothes door to resore the source of heat.

2. In a clothes dryer having a drying chamber with a door through which the clothes to be dryed must be passed and having means to force air through said drying chamber and means for heating said air before it goes to said drying chamber, manually operated means to turn off said heat, and means to restore said heat actuated by the opening and closing of said clothes door.

3. In a clothes dryer having a thermostat to control the heating element and a door giving access to the drying compartment, manual means to turn off the heating element regardless of the requirements of the thermostat and means acutated by opening said door to restore the control of the heating element to the thermostat.

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