

April 2, 1929.

A. H. ADAMS

1,707,547

LAUNDRY DRIER CONTROL APPARATUS

Filed April 12, 1928

Fig. 1.

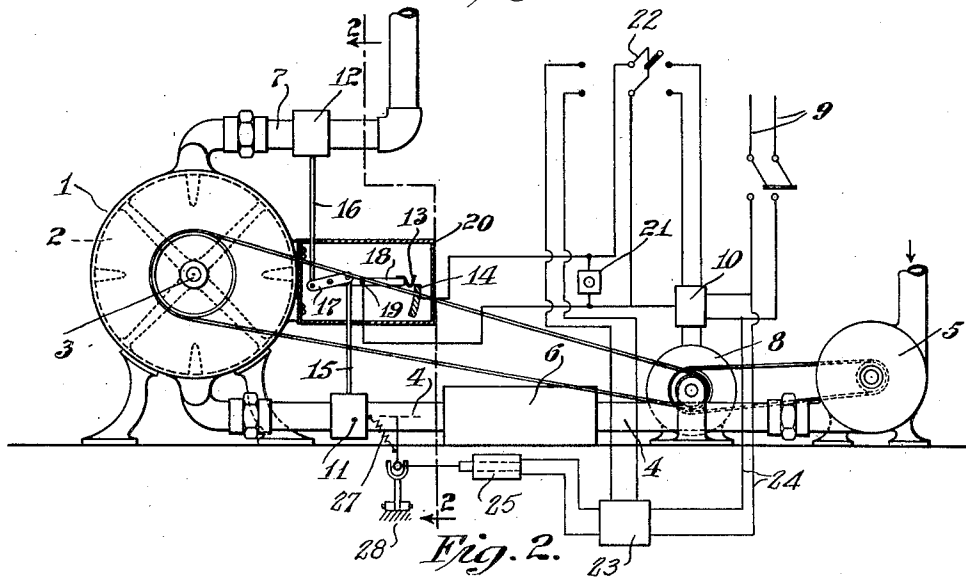
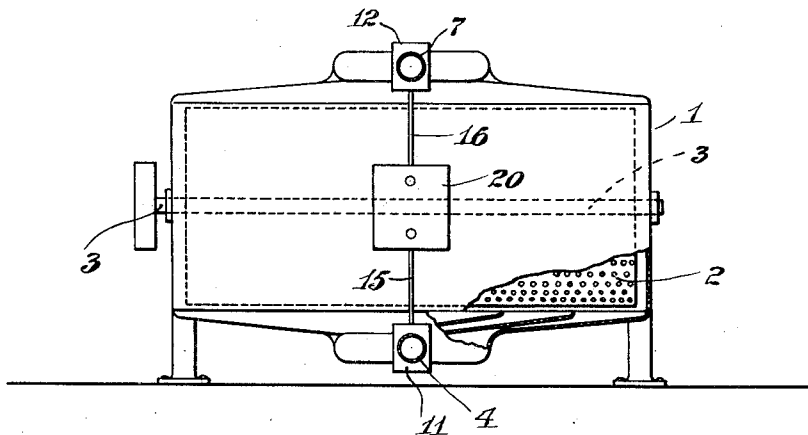


Fig. 2.



ARTHUR H. ADAMS
INVENTOR

BY *Pam...ich*

ATTORNEY

Patented Apr. 2, 1929.

1,707,547

UNITED STATES PATENT OFFICE.

ARTHUR H. ADAMS, OF LA GRANGE, ILLINOIS, ASSIGNOR TO TROY LAUNDRY MACHINERY COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

LAUNDRY-DRIER-CONTROL APPARATUS.

Application filed April 12, 1928. Serial No. 269,582.

This invention relates to laundry drying apparatus.

An object of the invention is the provision of a thermostatic arrangement for stopping the operation of a laundry drier when the clothes therein have been dried to the desired degree. More specifically it is an object of the invention to provide, in a machine of the type wherein hot air is passed through clothes to dry them, means responsive to the difference in temperature between the inlet and outlet air, for stopping the drying operation when the clothes have been dried sufficiently.

According to my invention, I provide, in a hot air clothes drier, a thermostat responsive to the temperature of the air before it is passed around the clothes and a second thermostat responsive to the temperature of the air after it has been passed around the clothes, and means responsive to a predetermined difference in the movements of said thermostats, corresponding to temperature variations, for stopping the drying operation. The difference in the temperature variations of the thermostats may be obtained by coupling the thermostats together. The thermostats may, for example, be opposed to each other by mechanical means such as a series of links, or by hydraulic means. It is desirable to use two temperature responsive devices, one in the input air stream and one in the output air stream, for the reason that the temperature of the input air stream may not remain constant. If the constancy of temperature of the input stream could be depended on, one thermostat alone could be used, the one in the output air stream. This one thermostat would be adjusted to open the drier driving motor circuit, or otherwise stop the drying operation upon the attainment of a certain temperature by the output air.

For a clearer understanding of the invention reference may be had to the following detailed description and accompanying drawings, of a preferred embodiment of my invention.

In the drawings Fig. 1 shows in elevation and partly in section a drying mechanism constructed in accordance with my invention.

Fig. 2 is a sectional view taken along line 2-2 of Fig. 1.

Referring more particularly to the drawings, reference numeral 1 indicates a laundry drying machine which in this case is repre-

sented as a drum containing a revolving clothes tumbling cylinder 2, but may be of any other well known type. The cylinder 2 is supported by a shaft 3 having a pulley or other suitable driving means attached thereto. Interconnected with the drum for supplying air thereto is an inlet air duct 4, which conducts air, forced by blower 5 through a heater 6, to the interior of drum, where it passes through or around the clothes as they are tumbled in the cylinder 2. The cylinder is constructed of open work or perforated material and the air therefore easily circulates through the clothes and absorbs moisture from them. The air laden with moisture is expelled from the drum through an outlet duct 7. The blower 6 is driven by an electric motor 8 which may also drive the tumbler. The current for running the motor is derived from a power line 9, from which it passes to the motor through a remote control circuit breaker 10, which may be of any well known type.

Automatic control of the drying operation is obtained through two thermostats 11 and 12 placed in the inlet and outlet air ducts respectively. These two thermostats are interconnected differentially to operate a pair of contacts 13 and 14, by means of rods 15 and 16 pivotally attached to the thermostats at one end and at the other end to a link 17. The link 17 is in turn pivoted to the end of a lever arm 18 pivotally mounted at 19 on a housing 20 supported on the drum of the machine. By means of this linkage the opening or closing of the contacts 13 and 14 is made responsive to the difference in the movement of the thermostats responsive to temperature changes in the inlet and outlet air stream. If the temperature of both inlet and outlet air increases or decreases equally, the link 17 rocks around its pivotal connection point with the lever arm 18 without any sidewise movement thereof. However, when the temperature of only the inlet varies or the said temperature varies more than the outlet temperature varies, the link 17 is not only rocked but displaced sideways, causing a movement of the lever arm 18. If the movement of the lever arm 18 is great enough the contacts 13 and 14 will be operated. From this it will be seen that the rocking of the lever arm 18, and corresponding operation of the contacts 13 and 14, will be responsive to the difference in the temperatures of the in-

let and outlet air, as registered by the thermostats, and not to equal variation of the temperature of the air in the ducts.

The contacts 13 and 14 are arranged to be open when the temperatures of the inlet and outlet air are the same, or within a predetermined number of degrees of each other. These contacts are connected to the terminals of a double-pole double-throw switch 22 which in one position connects them to the remote control circuit of the breaker 10. The said contacts are adapted when closed, to hold the breaker closed, thus permitting current to pass from the line 9 to the motor. In its other position, this switch will connect the contacts 13 and 14 through to another remote control circuit breaker 23. This breaker is connected to the power supply line 9 by means of line 24 and to a mechanism 25 for controlling the opening and closing of the damper 26. This mechanism may, for example, be a solenoid arrangement. The damper will be open when the solenoid is energized and when the solenoid is deenergized will close by means of a spring 27. When the switch 22 is closed on its motor control terminals the solenoid 25 will be deenergized. In this case a manual device 28 is provided to hold the damper 26 open against the action of spring 27. In order to cut out the automatic thermostatic control a shortening switch 21 is provided. It may be found necessary to close this switch for an interval upon starting the drier after a shut-down, as the temperatures of the inlet and outlet atmosphere would probably be very nearly the same at the start until the hot air had time to absorb moisture from the clothes.

In operation, with damp clothes in the cylinder 2, the motor 8 is connected to the line by closing the line switch, at the same time it may be found necessary to close the switch 21, thus short-circuiting the thermostatic control device. When the motor is running air is forced by the blower 5 through the heater 6 and inlet pipe 4 into the drum 1, where it passes through and around the clothes therein and is expelled through the outlet pipe 7. As the air passes through the clothes it takes up moisture therefrom, and in doing so loses a certain amount of heat. The amount of heat lost and the corresponding variation in temperature, is registered by the outlet thermostat 12 which is placed so as to be affected by the outlet air stream. As the clothes become drier the loss in temperature of the air in passing through the drum becomes smaller, and therefore for a given drying machine and a given dryness of clothes, or given humidity within the drum, a certain difference in the air inlet and outlet temperatures can be predicted. The thermostat 11 in the inlet air stream, the thermostat 12 in the outlet air stream, and the linkages 15, 16, 17 and 18 are therefore so selected as to open the contacts

13, 14, and stop the motor 8, thus terminating the drying operation, upon the obtaining of a certain difference in the inlet and outlet temperatures. The inlet thermostat is beneficial because the inlet air temperature may not always be constant. With this thermostat, however, the inlet temperature need not be accurately determined as it is merely the loss in temperature of the air, or the difference in the readings of the thermostats, that determines the operation of the contacts.

The contacts 13 and 14 are used, in the embodiment of the invention described, to open the circuit breaker of the machine driving motor but might be used to stop the hot air flow only, for example, by operating a damper to control the inlet air stream, or might be used to stop the tumbler motor.

I have shown the thermostats as interconnected in opposition by means of levers but they may be interconnected by any other form of linkage in order to give the desired differential response.

It will be obvious to those skilled in the art that the invention is capable of a wide variety of modifications and adaptations and that the present disclosure is intended merely to illustrate its nature without limiting its scope, which is defined in the claims.

What I claim is:

1. In a laundry drying mechanism, a clothes receptacle, an air inlet and an air outlet for said receptacle, means for supplying hot air to said inlet and means responsive to a predetermined difference in the temperatures of the air in the said inlet and said outlet for preventing said means first mentioned from supplying hot air to said inlet.

2. In a laundry drying mechanism, a clothes receptacle, an air inlet and an air outlet for said receptacle, means for supplying hot air to said inlet and means responsive to a predetermined change in the temperature of the air in the said outlet for preventing air from being supplied to the said inlet.

3. A laundry drying mechanism according to claim 1 wherein the means responsive to a predetermined difference in temperature comprises a thermostat in the air inlet and a thermostat in the air outlet, the two thermostats being interconnected to produce a differential action.

4. In a laundry drying mechanism, a clothes receptacle, a hot-air inlet and an air outlet, a thermostat for said inlet and a thermostat for said outlet, a lever, said thermostats being oppositely connected to the ends of said lever and movable means pivotally interconnected with an intermediate point on said lever for controlling the operation of said drying mechanism.

5. In a laundry drying machine, a drying mechanism including means for conducting hot air to the clothes being dried, means for conducting the used air from the said laun-

dry and means responsive to a predetermined difference in temperature between the input and output air for stopping the operation of the drying mechanism.

5 6. In a laundry drying machine, means for forcing hot air around the laundry to be dried and means responsive to a predetermined loss in temperature of the air in passing
10 around the laundry for terminating the drying operation.

7. In a laundry drying mechanism, a drying
15 tumbler, means for rotating said tumbler, a hot-air intake pipe for said tumbler and an air outlet pipe for said tumbler, a thermostat connected with each of said pipes and inter-
connected to give a differential action, and electrical means responsive to a predetermined differential action for stopping the
20 drying process.

8. The method of drying laundry to a predetermined degree which comprises, placing

the laundry in a closed container, conducting a stream of air into said container past said laundry and terminating the drying operation when the temperatures at an inlet and
25 an outlet air duct of said container reach a predetermined relation.

9. The method of dehydrating which comprises, placing material to be dehydrated in a closed container, connecting said container to a source of dehydrating air and
30 terminating the dehydrating action when the temperature of the air reaching said container from said source prior to its contact with said material reaches a predetermined relation
35 with respect to the temperature of said air after contact with said material.

In testimony whereof, I have signed my name to this specification, this 9th day of April 1928.

ARTHUR H. ADAMS.