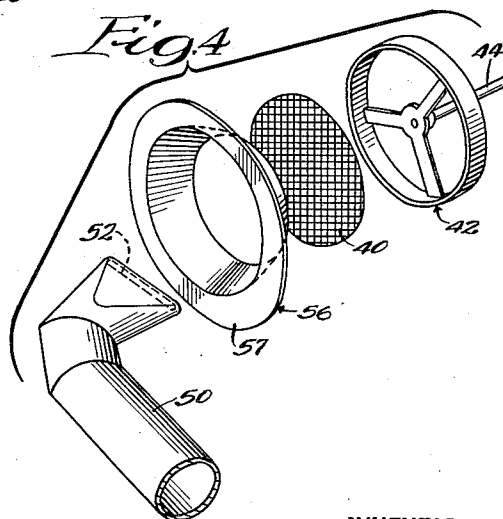
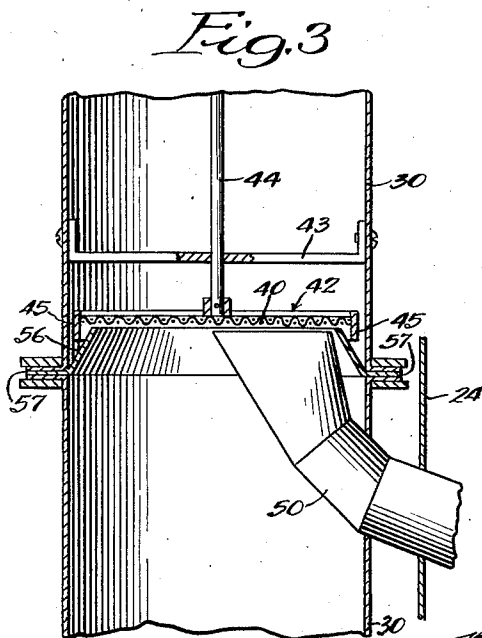
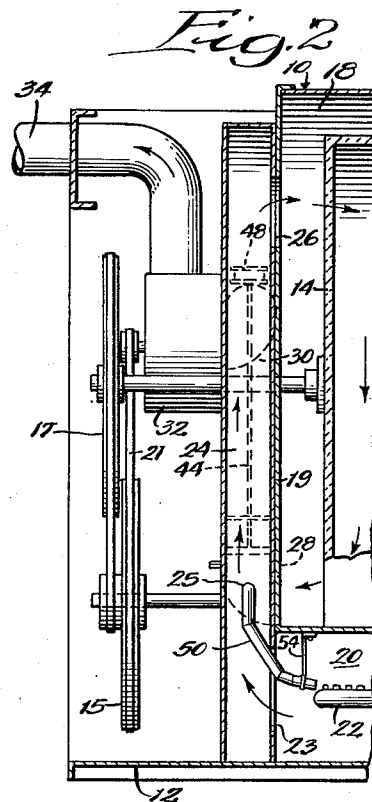
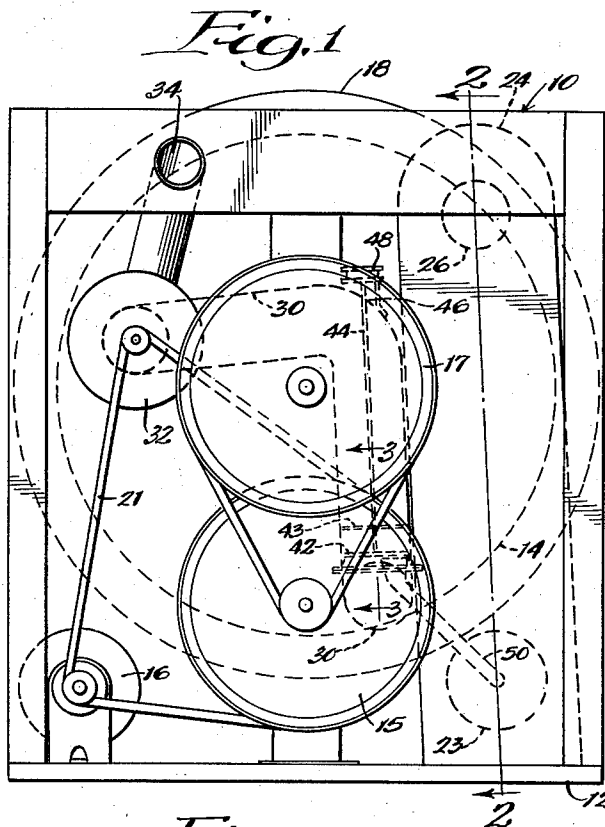


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 APPARATUS FOR ELIMINATING LINT IN
 DISCHARGE DUCT OF CLOTHES DRIERS
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1

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APPARATUS FOR ELIMINATING LINT IN DISCHARGE DUCT OF CLOTHES DRIERS

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7 Claims. (Cl. 263—33)

This invention relates to an apparatus for eliminating lint entrained in the gas stream discharged from clothes driers and for lowering the relative humidity of the gas stream to prevent condensation.

It has been proposed heretofore to heat the exit gas stream in the discharge duct leading from the drier to a temperature sufficiently high to incinerate the lint entrained therein and simultaneously to lower the relative humidity of the gas to eliminate condensation. It has been found, however, that a relatively large amount of heat is required to do an effective job in accordance with this method. To be economically feasible the equipment required for accomplishing these objectives must add only a relatively small sum to the cost of the drier and must not appreciably increase the cost of operation.

It is a general object of this invention to provide an apparatus for incinerating the lint and lowering the relative humidity of the exit gas stream which requires a relatively small amount of heat, utilizes the control elements already a part of the drier, and can be installed with only minor modifications of typical production-model drier structures.

A further object is to provide an apparatus of the nature indicated for gas operated driers which utilizes hot combustion gases diverted from the main gas burner in the drier, thus eliminating the necessity of adding a separate burner, extra pilots and safety controls.

Another object is to provide means for carrying out incineration of the entrained lint continuously and without noticeable smoke production.

These and other objects will become apparent from the following description and are pointed out more clearly in the appended claims.

In the drawings:

Figure 1 is a rear elevational view of a conventional drier which has been modified to incorporate the apparatus of this invention;

Figure 2 is a sectional view taken along the line 2—2 of Figure 1;

Figure 3 is an enlarged sectional view taken along the line 3—3 of Figure 1 showing details of the incinerating apparatus of the invention; and

Figure 4 is an exploded perspective view of the essential elements required for incineration of the lint, which are located within the exit duct.

The invention comprises continuously separating the lint from the flowing gas stream and igniting the separated lint by bringing it into contact with a flame and/or hot gases or heating elements maintained at above the ignition temperature of the lint. By separating the lint from the gas stream it becomes unnecessary to raise the temperature of the entire stream to the lint ignition temperature, which means that the total heat required for complete incineration is only a fraction, say less than 10–15%, of the amount required to bring the whole stream to ignition temperature.

Referring now to the drawings, the drier is indicated generally by the numeral 10 and comprises the usual

2

elements, including frame members 12, an enclosed compartment 18, a perforated drum 14 for tumbling the clothes rotatably mounted within the compartment, a motor 16 for driving the drum and the air blower, the necessary ducts for bringing air into and out of the compartment 18, and a gas burner 22 for heating the air. As best shown in Figure 2, a duct 20 beneath the compartment 18 communicates with the room through a grill (not shown) at the front of the machine and serves to conduct air from the room into the compartment 18 through duct 24 and the opening 26. The gas burner 22 is mounted centrally within the duct 20. The air flows over the burner 22, whereupon the temperature thereof is raised, and then up through the duct 24 and into the compartment 18 where it absorbs the moisture from the clothes and takes on a certain amount of lint which rubs off the clothes during tumbling.

Moisture-laden air carrying entrained lint escapes from the compartment 18 through outlet opening 28 in the rear panel of the compartment. It will be understood that the location of the air inlet and outlet openings is not critical and will vary with the construction of the drier. A generally L-shaped discharge duct 30 connects to the opening 28 and extends upwardly and laterally across the back of the machine. An exhaust blower 32 connects at its intake side to the end of the duct 30, the blower discharging to the atmosphere through any suitable conduit (not shown) connected to the blower outlet 34.

For collecting lint from the air stream a screen 40 is mounted on a circular support 42 adapted to fit within the duct. The screen support 42 is fixed to the end of a rod 44 journaled in a bracket 43 secured to the inside wall of the duct 30. The rod 44 pierces the duct 30, as indicated at 46, and is coupled to a small electric motor 48 of the variety employed for clocks. Motor 48 utilizes the same source of power supply as the motor 16. If desired, motor 16 may be used to drive the screen support 42 through a suitable speed reducer (not shown). The screen 40 may be replaced by any suitable means for trapping the lint while permitting the gas to flow freely through the duct. A perforated plate might serve perfectly well for this purpose. The concentrated heat source required to burn the lint from the rotating screen is provided in the form of a burner or by-pass tube 50 which extends from the screen 40 through the duct 24 to the burner 22 in the duct 20. The tube 50 is supported by the wall of the duct 24 through sealed opening 25 and by a bracket 54, depending from the upper surface of duct 20. The by-pass tube 50 terminates in a slit 52 at one end thereof and is so disposed within the duct 30 that the slit 52 lies parallel to a radius of the screen 40 and is slightly spaced therefrom. The opposite end of the tube 50 extends into the duct 20 through the opening 23 and terminates adjacent the main gas burner 22 for conducting burning gases from the main burner flame through the tube to the screen 40. The duct 30 is maintained under reduced pressure by the downstream blower 32, which causes the burning gases to be drawn through the tube 50.

To insure collection of all the lint on the screen and to prevent lint from accumulating on the edges of the screen support 42 and the interior wall of the duct 30 adjacent thereto, a frusto-conical sleeve or collar 56 is incorporated within the duct 30. The restriction in the diameter of the duct 30 resulting from incorporation of the sleeve 56 directs the gas flow through the screen so that the lint does not pass between the outer edge of the screen support 42 and the duct 30. Preferably, the screen support 42 has a flange 45 which extends between the sleeve 56 and the duct 30.

The blower 32 fixed to the end of the duct 30 may be operated by the motor 16, which serves to rotate the drum

within the drier compartment. This blower is of sufficient capacity to draw a slight vacuum on the compartment 18 and the entire ductwork system so that air is constantly flowing from the room into the drier and is discharged from the drier to the out-of-doors through the outlet 34 of the blower.

In operation, the screen 40 is rotated at a uniform speed of about one revolution per minute; the speed of rotation is not critical. By rotating the screen continuously, the lint which builds up thereon is burned off continuously in small quantities so that no noticeable smoke is generated and discharged from the ductwork. If desired, the burner mouth may be adapted to move past a stationary screen. It is important only that there be relative motion between the lint collector and the flame.

Although in the construction illustrated I have shown an apparatus which utilizes gas as the source of heat, it will be understood that electricity may also be used to burn the lint. For example, the screen may be made of nichrome wire connected to a source of electrical energy so that it will heat up to incandescence and burn the lint immediately as it strikes the screen. In such case, it is not necessary to rotate the screen. It is also possible to utilize a separate gas burner for incinerating the lint, but this approach is not as economical as that disclosed because additional controls and pilots are required.

It will be obvious, of course, that when the temperature in the area of the screen is raised to the ignition temperature of the lint, that the relative humidity of the gases discharged from the drier will be lowered. Therefore, the air and combustion gases which are discharged from the drier to the atmosphere outside the room in which the drier is located are relatively dry (above their dew point) and condensation occurs outside rather than in the ductwork of the drier where it might cause rusting.

Instead of hot gases or electrical heating elements as the heat source, it is possible to heat the lint particles by means of radiant energy which will heat the particles without heating the gas stream.

Other modifications in the apparatus of the invention will occur to those skilled in the art without departing from the scope of the appended claims.

This application is a continuation-in-part of my co-pending application entitled "Improved Clothes Drier," Serial No. 420,998, filed April 5, 1954, now abandoned.

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

1. In a clothes drier having a drum compartment and a rotatable drum mounted therein for tumbling the clothes, an air inlet duct connecting to said compartment, a gas burner mounted within said inlet duct, an exit duct leading from said compartment for discharging lint- and moisture-laden gas therefrom, a screen rotatably mounted within said exit duct, a by-pass tube having one end mounted within said exit duct adjacent said screen and the opposite end mounted within said inlet duct adjacent said gas burner, and an exhaust fan in said exit duct downstream of said screen for advancing the gas through the drier and drawing hot gases from the gas burner through the by-pass tube to maintain said one end of the tube at a temperature above the ignition point of the lint.

2. In a clothes drier having a drum compartment and a rotatable drum mounted therein for tumbling the clothes,

an air inlet duct connecting to said compartment, a gas burner mounted within said inlet duct, an exit duct leading from said compartment for discharging lint- and moisture-laden gas therefrom, a screen rotatably mounted within said exit duct, a by-pass tube having one end mounted within said exit duct adjacent said screen and the opposite end mounted within said inlet duct adjacent said gas burner, means mounted within the duct for preventing the lint from flowing around the screen, and an exhaust fan in said exit duct downstream of said screen for advancing the gas through the drier and drawing hot gases from the gas burner through the by-pass tube to maintain said one end of the tube at a temperature above the ignition point of the lint.

3. In a clothes drier having a drum compartment and a rotatable drum mounted therein for tumbling the clothes, an air inlet duct connecting to said compartment, a gas burner mounted within said inlet duct, an exit duct leading from said compartment for discharging lint- and moisture-laden gas therefrom, a circular screen rotatably mounted within said exit duct, a power source for rotating said screen at a rate of about one revolution per minute, a by-pass tube having one end mounted within said exit duct, said end having an elongated opening disposed parallel to a radius of said screen and slightly spaced therefrom, the opposite end mounted within said inlet duct adjacent said gas burner, and an exhaust fan in said exit duct downstream of said screen for advancing the gas through the drier and drawing hot gases from the gas burner through the by-pass tube to maintain said one end of the tube at a temperature above the ignition point of the lint.

4. The clothes drier of claim 3 in which the exit duct contains means for preventing the lint from flowing around the screen.

5. The clothes drier of claim 2 in which the exit duct contains a frusto-conical sleeve mounted upstream of the screen with its smaller end facing the screen to direct the flow of gas through the duct away from the walls of the duct toward the center of the screen.

6. A clothes drier comprising a compartment for contacting wet clothes with heated air, an exit duct leading from said compartment for discharging lint- and moisture-laden gas therefrom, a disc-like screen rotatably mounted within said duct in a plane normal to the flow of gas therethrough, a concentrated source of heat mounted within said exit duct adjacent said screen to maintain a sector of said screen above the ignition point of the lint in the gas, and means for rotating said screen with respect to said heat source to incinerate the lint as it is trapped by the screen.

7. The clothes drier of claim 6 in which the exit duct contains deflecting means for preventing the lint from flowing past said screen.

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