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2,623,299

DRIER

Filed June 28, 1946

2 SHEETS—SHEET 1

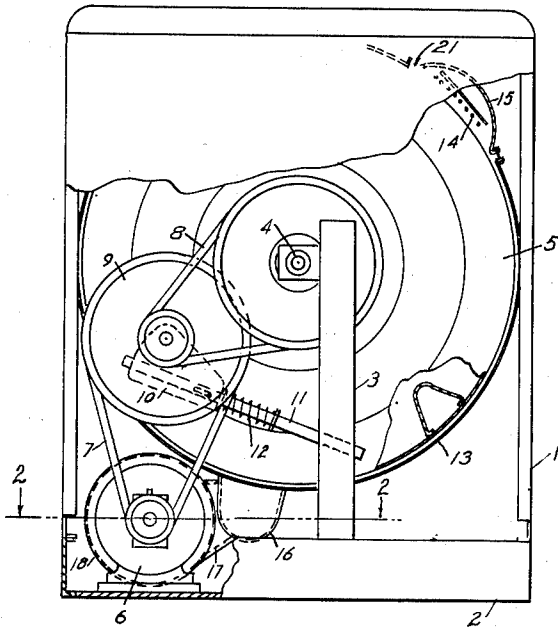


FIG. 1.

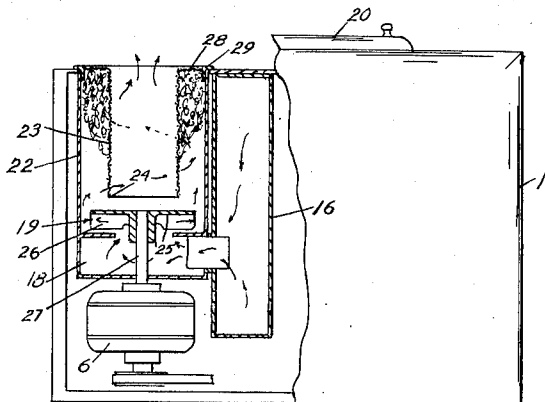


FIG. 2.

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2 SHEETS—SHEET 2

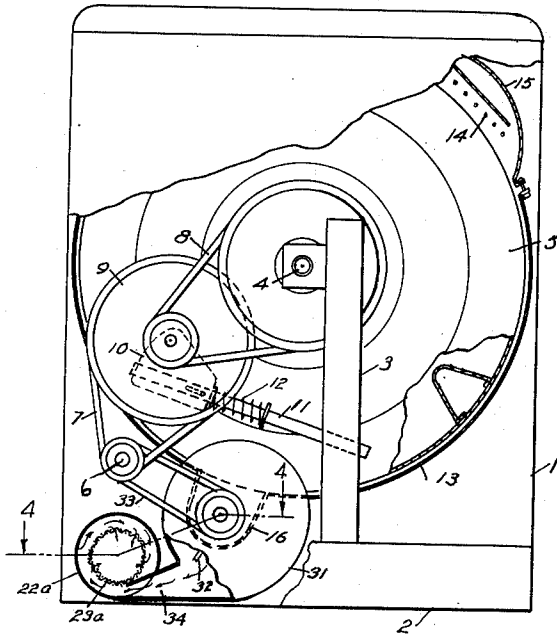


FIG. 3.

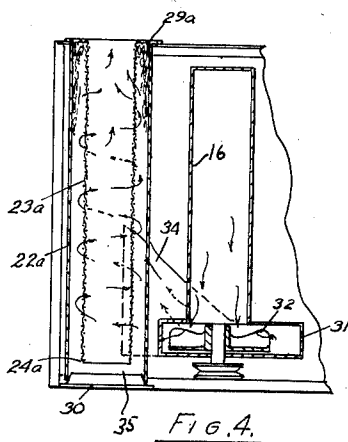


FIG. 4.

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DRIER

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7 Claims. (Cl. 34—82)

1

In tumbler type clothes driers the lint dislodged during washing is released as the clothes are dried and is blown out with the exhaust air. Although the quantity of lint is not large, it is a nuisance. This invention is intended to provide a centrifugal lint trap. In a preferred form the entrained lint is centrifugally compacted or felted about a removable cylindrical filter screen having a discharge for the filtered air at its center. A by-pass passage to the center of the screen prevents stoppage of the air flow when the trap is overloaded with lint. Further objects and advantages appear in the specification and claims.

In the drawings, Fig. 1 is a back view, partly broken away, of a clothes drier; Fig. 2 is a top view in section on line 2—2 of Fig. 1; Fig. 3 is a back view of a modification; and Fig. 4 is a section on line 4—4 of Fig. 3.

Referring to the drawings, 1 indicates a cabinet mounted on a base 2 having at its back a post 3 carrying a journal 4 for a horizontal drum 5. The drum is rotated by an electric motor 6 through a double V-belt drive 7 and 8 including an intermediate or idler pulley 9 journaled in a bracket 10 slidably mounted on an arm 11 and urged outward by a spring 12 which maintains the desired tension on the belts 7 and 8. The drum is surrounded by a casing 13 in the upper right hand corner of which is located a heating element 14 and a reflector 15 for directing the heat against the outer surface of the drum. At the lower left hand corner of the casing is an axially extending trough 16 having a connection 17 to an inlet chamber 18 for a centrifugal fan 19.

In the use of the drier, the clothes are loaded into one end of the drum through a door 20 at the front of the casing and the heating element 14 and motor 6 are energized to apply heat to the clothes and to rotate the drum to tumble the clothes. The air is admitted to the cabinet through inlet openings, not shown, and flows around the outside of the casing 13 into an inlet opening 21 adjacent the upper end of the reflector 15. The air flows diagonally across the drum into the trough 16 and out through the fan 19. The parts so far described are, or may be, of conventional construction.

During the drying, particles of lint adhering to the clothes at the end of the washing are broken loose and picked up by the air circulating through the drier. While the quantity of lint is not large, the accumulation over a period of use may be substantial. There is a possibility that lint accumulating within the drier may be suffi-

2

cient to cause a dust explosion. In the present construction the lint in the air passing through the fan 19 is collected in a lint trap comprising a cylindrical casing 22 surrounding the fan 19 and extending axially from the fan toward the front of the drier cabinet, and a removable reentrant cylinder screen 23 having its inner end 24 adjacent the fan 19. The fan preferably has a hub 25 adjacent the inner end 24 of the screen and carrying on its opposite face blades 26 providing a fan of substantially the same diameter as the hub. The fan hub may be mounted on a shaft 27 extending from the opposite end of the motor 6 which drives the drier. The fan 19 discharges the air and the entrained lint in the form of a vortex spiraling around the screen 23 toward the front of the cabinet. Due to the velocity of the air, only a small quantity filters through the inner part of the screen 23 and substantially none of the air flows into the inner open end 24 of the screen. This is due to the fact that the air discharged from the fan would have to turn a sharp corner in order to enter the inner end 24 of the screen. The greater part of the air filters through the part of the screen 23 toward the front of the cabinet and through the annular screen 28 extending from the front end of the screen 23 to a ring 29 slidably fitting within the front end of the cylindrical casing 22.

Due to the rotary motion of the air, the lint tends to felt around the front end of the cylindrical screen 23 and against the inner surface of the annular screen 28. As the quantity of lint collected increases, the back pressure builds up and finally reaches a point at which a considerable part of the air flows directly into the inside of the screen 23 through its inner open end 24. At this time the operator is warned by the presence of lint on the floor in front of the drier that the lint trap is overloaded with lint.

The collected lint may be removed by sliding the ring 29 out the front end of the casing 22. This removes the filter screens 23 and 28 carried thereby and provides access to the front end of the casing 22 for removal of any lint which may have dropped off the screen. Because the lint flowing through the fan is collected in the lint trap, there is little danger of recirculation of the lint within the drier casing. The by-pass passage provided by the open inner end 24 of the screen 23 permits sufficient flow of air so that the drying operation will not be interfered with even though the lint trap is completely full.

The modification shown in Figs. 3 and 4 differs primarily in the construction of the lint trap

which is designed to fit wholly within the base so that it may be located within the toe space usually provided at the front of the drier cabinet. Corresponding parts are indicated by the same reference numerals.

The lint trap casing 22a is located within the base 2 and extends the entire depth of the base. The back of the casing 22a is closed by a removable closure 30. At the front of the casing is a removable ring 29a carrying at its inner edge 10 a cylindrical filter screen 23a having its inner end 24a adjacent the closure 30 at the back of the drier. Because of the small diameter of the casing 22a, it is not feasible to locate the air circulating fan within the casing as was done in the construction shown in Figs. 1 and 2.

The air is circulated through the drier by a centrifugal fan having a casing 31 connected to the back end of the trough 16 and an impeller 32 driven by a belt 33 from the motor 6 which 20 drives the drier drum 5. In this construction the motor is mounted above the lint trap casing instead of directly in line with the casing as in the Figs. 1 and 2 construction so as to permit a greater length of the lint trap.

The fan has its discharge 34 connected tangentially to the casing 22a and discharging the air between the casing and the filter screen 23a. As shown in Fig. 4, the discharge is fanned out along the length of the casing so that the air is given both an axial and a rotational movement about the filter screen. The rear edge of the discharge 34 is slightly in front of the open end 24a of the screen so that there is substantially no tendency for air to flow into the end 24a until 30 the filter screen has become overloaded with lint. When the filter screen is overloaded, the air flows into the open end 24a through the space 35 which provides a by-pass passage of sufficient area so that the drying operation can be carried 40 on even though the filter screen is completely clogged with lint.

As in the Figs. 1 and 2 construction, the lint tends to felt around the front end of the screen 23a. As the lint collects around the front end 45 of the screen, the surface of the screen available for filtering decreases until finally the back pressure through the filter screen is sufficient so that some air and lint is discharged through the by-pass passage 35. The presence of lint on the floor in front of the drier gives a warning to the operator that the lint trap is overloaded with lint.

The lint trap is unloaded by removing the screen 23a which exposes the front end of the chamber 22a so as to permit ready removal of the lint.

What I claim as new is:

1. In a tumbler type clothes drier having a rotatable clothes receiving drum, a centrifugal 60 fan impeller discharging air from the drier, walls forming a hollow lint trap receiving the fan discharge, said walls extending axially from the fan, and a cylindrical filter screen extending axially into the trap providing an annular space between it and said walls receiving the fan discharge, the screen having an open end adjacent and within the periphery of the impeller whereby air is normally discharged around and along the outside of the screen.

2. In a tumbler type clothes drier having a rotatable clothes receiving drum, walls forming a hollow lint trap having an inlet at one end and an outlet at the other, at least one of said walls having porous sections downstream of the inlet

through which the air filters, an opening into a wall of said trap at the inlet end, means discharging air from said drier through said opening causing a whirling motion of said discharged 5 air into the trap in the region of said porous section whereby the lint in the air tends to ball up within the trap and to felt against the porous section, and an effectively unobstructed by-pass passage from the trap having an opening in front of the porous sections as regards the direction of air flow and presented so that the air entering the trap normally flows past the opening and the air to enter the opening must turn a sharp corner.

3. In a tumbler type clothes drier having a rotatable clothes receiving drum, a lint trap having walls extending axially from the inlet to the discharge end of the trap, means discharging air and entrained lint from the drier into the inlet of the trap in the form of a spiral vortex spiralling along the walls of the trap toward the discharge end, a hollow filter extending into the core of the vortex from the discharge end of the trap back toward the inlet end of the trap and 25 having a discharge through its center leading toward the discharge end of the trap, said filter having sufficient capacity to pass all of the air until the filter becomes clogged with lint, and a by-pass opening into the filter at the inlet end of the trap and spaced from the normal path of the air and entrained lint, said opening leading to the center of the filter through which air flows when the trap is filled with lint.

4. In a tumbler type drier having a rotatable clothes receiving drum, means discharging air from the drier, inner and outer walls forming a hollow annular lint trap having an inlet at one end and an outlet at the other, said means discharging air into the inlet end of said annulus in the form of a vortex which spirals axially therealong toward the outlet, at least one of said walls having porous sections downstream of the inlet through which the air in said vortex filters as it spirals down between the annular walls, and said inner wall being open at the outlet end of the trap and the inlet end thereof forming an effectively unobstructed overflow passageway having its inner end within lint trap and open and presented away from the normal path of the vortex of air and entrained lint.

5. In a clothes drier, a casing, a clothes receiving drum therein rotatable to tumble the clothes, an air exhaust passage having an inlet leading from the casing and an outlet to the outside air, said inlet and outlet being axially spaced apart and the passage extending axially from the inlet toward the outlet, means for causing a flow of air axially along the passage from the inlet to the outlet and for setting up a whirling motion of the air in the passage beyond the inlet as regards the direction of air flow, a filter in contact with and intercepting the whirling air on its way to the outlet, said filter having sufficient capacity to pass all of the air until the filter becomes clogged, and an effectively unobstructed overflow passage for air and entrained lint in excess of the capacity of the filter, said overflow passage being located upstream of the filter.

6. In a tumbler type clothes drier having a rotatable clothes receiving drum, a centrifugal fan impeller discharging air from the drier, walls forming a hollow lint trap receiving the fan discharge, said walls extending axially from the fan, and a filter screen circular in cross-section extending axially into the trap providing an annular space between it and said walls receiving

5

the fan discharge, the screen having an open end adjacent and within the periphery of the impeller whereby air is normally discharged around and along the outside of the screen.

7. In a clothes drier, a housing, a rotatable clothes receiving drum therein, heating means adjacent to said housing in the path of the flow of air thereinto, a closed duct system having its intake end connected to the drum housing and having annular walls defining an outlet discharging to the outside air, means including an air propeller within the duct system for directing the flow of air from the drum housing toward the inner periphery of the annular walls and out the outlet defined thereby, a removable lint trap within the annular walls defining the outlet, said trap having a peripheral wall of annular shape made of screen-like material and having a central opening, and motor means for driving said drum and air propeller.

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6

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20