

Nov. 15, 1960

R. F. DOTY

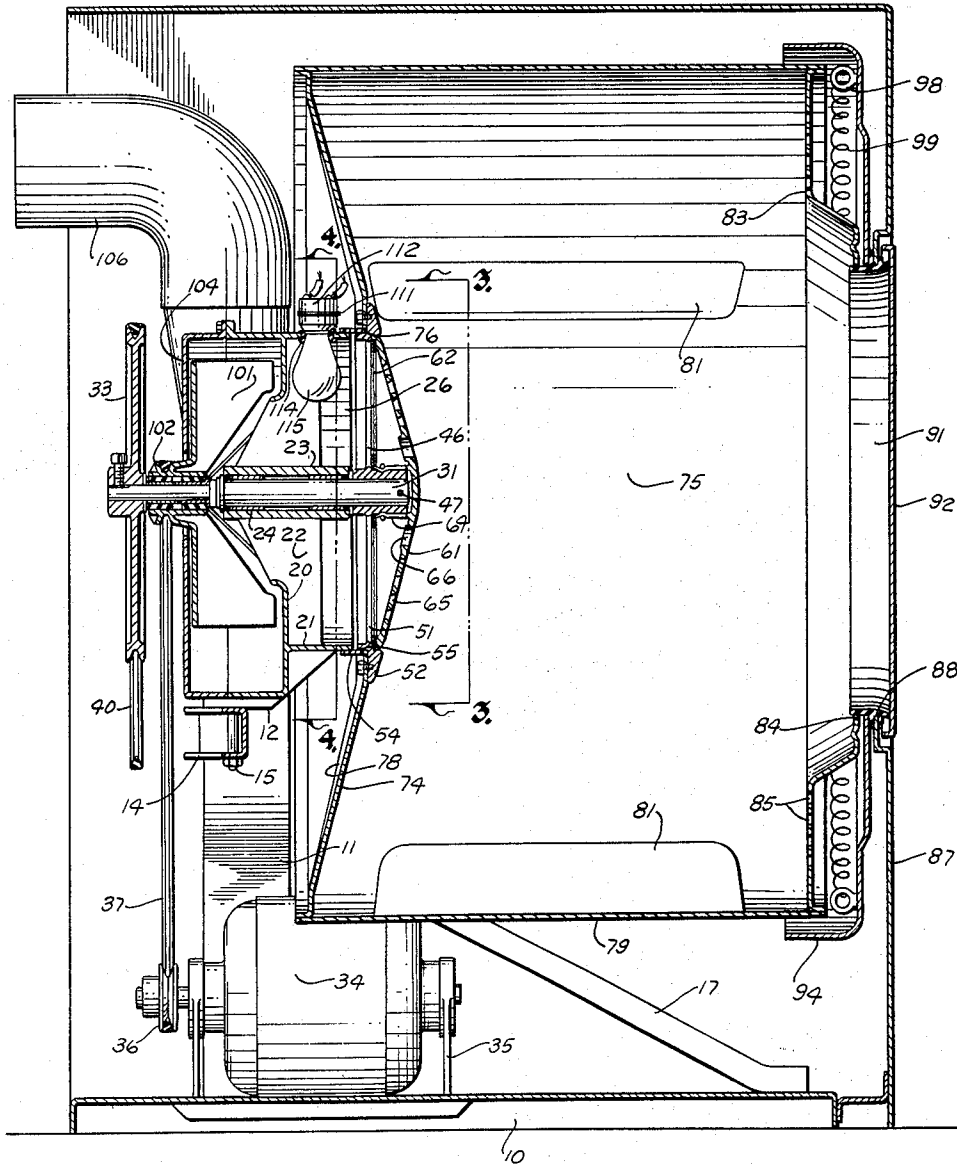
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ILLUMINATED LINT TRAP FOR CLOTHES DRIER

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4 Sheets-Sheet 1

Fig. 1.



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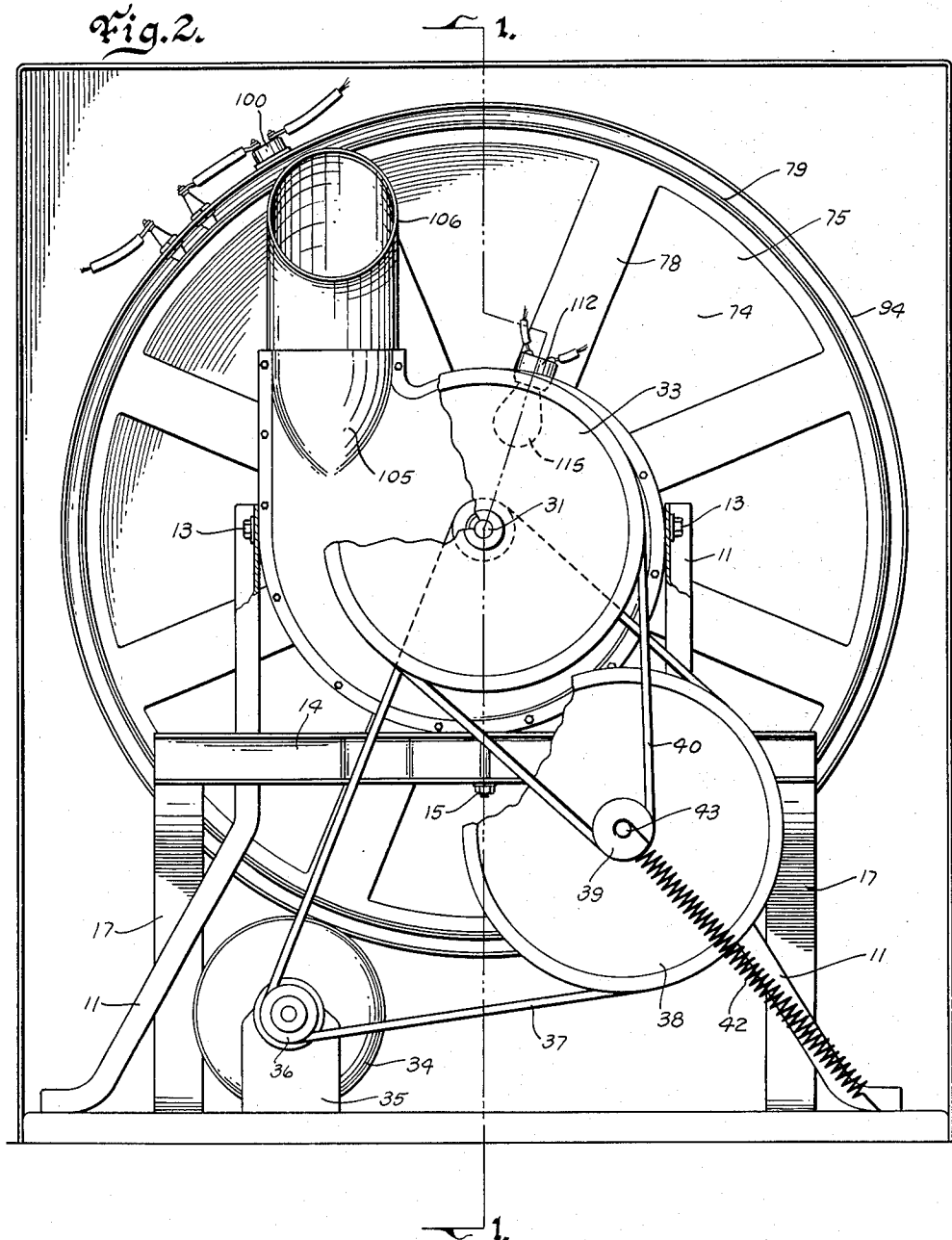
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Fig. 2.



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Fig. 3.

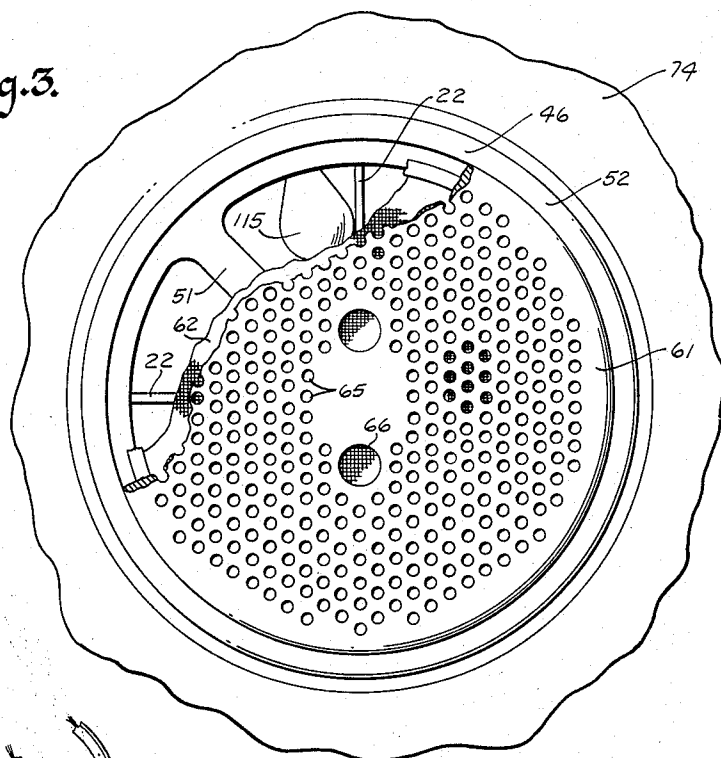
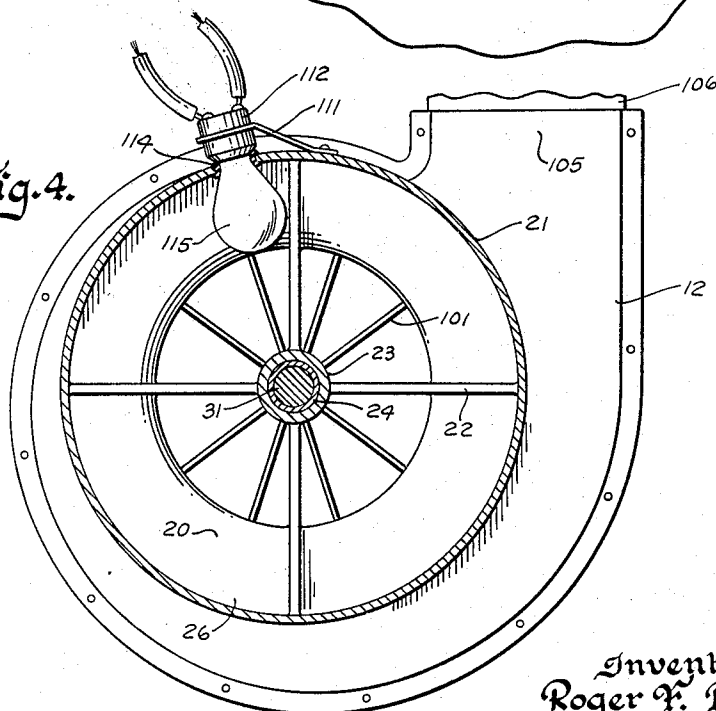


Fig. 4.



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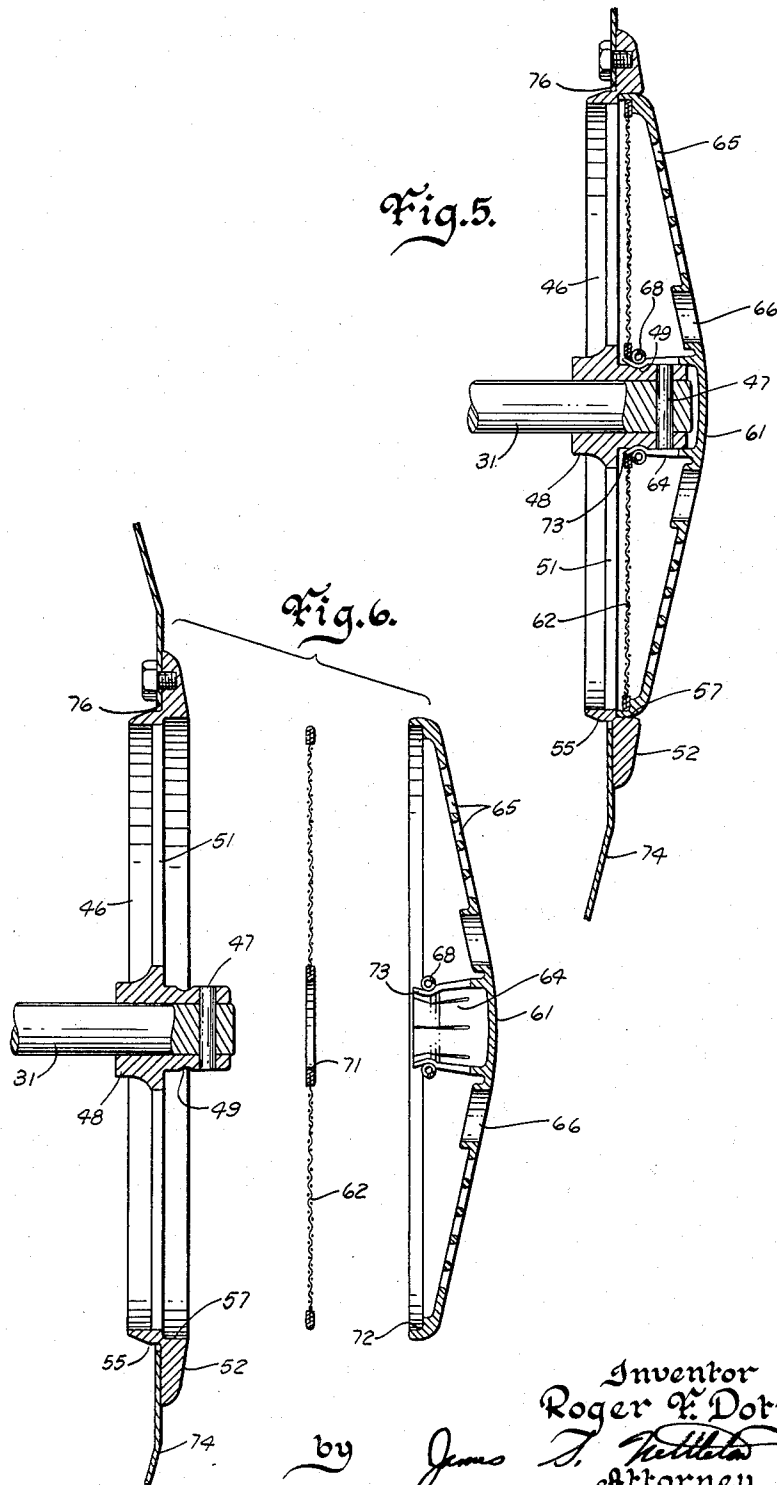
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ILLUMINATED LINT TRAP FOR CLOTHES DRIER

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ILLUMINATED LINT TRAP FOR CLOTHES DRIER

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8 Claims. (Cl. 34—82)

This invention pertains to a clothes drier appliance and is directed to a means for illuminating the interior of a clothes tumbler during loading and unloading operations and for illuminating a lint trap assembly to indicate the presence or absence of lint in the latter assembly.

This invention is particularly applicable to that type clothes drier having a clothes receiving drum provided with an air inlet in its front portion and with a centrally located air exhaust opening in its rear wall to which is affixed a revoluble drum drive shaft journaled in a blower housing supporting that drive shaft and provided with an air inlet conduit aligned with that exhaust opening in the rear drum wall.

Air flow through the drum and its tumbling fabric contents is, in this illustrative embodiment, produced by the suction created by the rotation of an impeller revolubly mounted on the drum drive shaft within the blower housing. A light source positioned within the blower housing between the impeller and a lint trap assembly covering the centrally located air exhaust opening in the rear drum wall for filtering all air passing from the drum illuminates the interior of the drum as well as projecting light through the lint trap assembly to indicate the presence or absence of lint within that assembly.

In the accompanying drawings:

Figure 1 is a side elevational view of a clothes drier embodying my invention;

Figure 2 is a rear elevational view, partially broken away, of the drier shown in Figure 1;

Figure 3 is an enlarged fragmentary view, partially broken away, taken on line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary view taken on line 4—4 of Figure 1;

Figure 5 is an enlarged fragmentary sectional elevational view showing the assembly of the drum spider, lint screen and lint screen retainer incorporated in the drier shown in Figure 1; and

Figure 6 is an exploded view of the elements shown in Figure 5 showing the lint screen retainer and lint screen separated from each other after the lint screen retainer has been removed from the drum spider.

In the accompanying drawings there is shown a clothes drier provided with a base frame 10 which serves as a support for the two upstanding channel base members 11 which are connected at their upper ends to opposite sides of the hollow blower housing casting 12 by means of the tap bolts 13.

Blower housing 12 is prevented from pivoting about bolts 13 by the horizontal channel member 14 which is fastened to the lower periphery of housing 12 by means of the bolt 15 located midway between the opposite ends of channel member 14. Channel member 14 is welded to the vertical brace members 11 to provide a rigid three-point support for the blower housing 12 and has its ends welded in turn to the two channel members 17 which form an acute angle with base frame 10 to which they are rigidly connected near the front edge of that base

member. This construction not only supports blower housing 12 and all structure supported thereby but prevents blower housing 12 from being moved back and forth about the lower ends of the vertical brace members 11.

Casting 12 includes a tubular portion 21, a divider wall 20 having a rearwardly flared inner portion defining an intake into an impeller chamber, and four internal radially directed longitudinal webs 22 which converge toward each other to provide a bearing retainer member 23 containing bearings 24. Member 23 cooperates with tubular member 21 to define a passageway 26 of four segments located between the tubular portion 21 and the bearing retainer member 23. Since the supporting webs 22 are longitudinally continuous for support purposes only, the four-part passageway or conduit 26 can be for illustrative purposes termed a singular passageway concentric to the bearing retainer member 23.

Mounted within the bearings 24 is the revoluble drum drive shaft 31 which projects from both ends of casting 12. Drum drive shaft 31 carries affixed at its rear, or left end as shown in Figure 1, a large pulley 33 which is driven by motor 34 through motor pulley 36, main drive belt 37, integral pulleys 38 and 39 and belt 40 to reduce the speed of motor 34 to the desired tumbling speed of approximately 50 r.p.m. Mounting bracket 35 anchors motor 34 to frame 10.

The spring 42 connected between base frame 10 and shaft 43 carrying pulleys 38 and 39 maintains both of belts 37 and 41 under the desired degree of tension by means of a slider block (not shown) fastened to shaft 43 and retained in a guide block (not shown) carried by one of the braces 11.

The opposite or forward end of the drum drive shaft 31 is rigidly pinned to the drum spider member 46 by means of a cross-pin 47 piercing both of the members 31 and 46 (Figures 5 and 6). Drum spider member 46 is provided with a hub portion 48 which carries an annular recess 49 which is connected to the four radiating spokes 51 connected in turn to the rim 52 of member 46. A heat resistant gland or belt sealing member 54 encircles the front periphery of blower housing 12 and the circular shoulder 55 formed on the rear portion of drum spider 46.

The rim 52 of spider member 46 is formed with a circular recess 57 which receives and cooperates with a two-part lint trap assembly including the lint screen retainer member 61 and lint screen 62. Lint screen retainer member 61 is provided with a longitudinally recessed hub portion 64 which, when expanded, may receive hub 48 of spider member 46 as shown in Figure 5.

The conical face of lint screen retainer member 61 is provided with a plurality of holes 65 permitting air flow therethrough and is further provided with a pair of diametrically opposed finger holes 66 to facilitate removal of members 61 and 62 from hub 48 and from each other as shown in the exploded view of Figure 6.

The slotted portion 64 is encircled by a garter spring 68 which tends to collapse slotted portion 64 into a smaller diameter. When lint screen retainer member 61 has been removed from hub 48 of drum spider member 46, the slotted hub 64 collapses sufficiently to allow its insertion into the centrally located opening 71 of the lint screen member 62 which in turn is received by recess 72 located in the rear face of the rim of the lint screen retainer member 61.

When the lint screen 62 is fitted over the slotted hub 64 of the lint screen retainer member 61, this two-part assembly can, by reason of the camming action of the outturned ends 73 of the slotted hub 64, be pushed over the spider hub 48 where it will remain in place due to the action of the garter spring 68 urging the curved ends 73 into the annular recess 49 of the drum spider member

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46. Once these parts have been assembled in this position, the periphery of the lint screen retainer member 61 forms a lint-tight seal in the shouldered recess 57 thereby effectively filtering all the air passing through drum spider member 46 as is apparent from an inspection of Figures 1, 3 and 5.

From these same figures, it will be seen that rim 52 of drum spider member 46 is rigidly fastened to the rear wall 74 of the clothes drum 75 adjacent the periphery of the air exhaust opening 76 blanked out of the central portion of rear wall 74 so as to receive the drum spider 46. The rear drum wall 74 is provided with a plurality of radial supporting ribs 73 embossed in the rear drum wall 74 to strengthen and reinforce drum 75.

Rear wall 74 is imperforate except for the centrally located air exhaust opening 76. The periphery of rear wall 74 is flanged to form a supporting shoulder for the imperforate cylindrical side wall 79 which carries the clothes elevating vanes 81 for tumbling clothing within drum 75 during rotation of the latter member.

Cylindrical side wall 79 is connected to the front drum wall 83 provided with a centrally located access opening 84 aligned with exhaust opening 76 and several circular bands of holes 85 in its outermost portion to define an air intake into drum 75.

The cabinet 87 which is fastened to base frame 10 and which encloses the entire drying mechanism is provided with an access opening 83 which is aligned with the drum access opening 84 thereby allowing both of the access openings 84 and 88 to receive a door gasket 91 which is fitted into the cabinet access opening 88 and which protrudes through access opening 84 into drum 75. The door panel 92 hinged to cabinet 87 abuts door gasket 91 to form an airtight seal for cabinet 87.

Fastened to cabinet 87 around opening 88 and located between that cabinet and drum wall 83 is the shroud or cowling member 94. Shroud 94, which is substantially circular in shape with its rearwardly flanged periphery extending just beyond the junction of drum walls 79 and 83, is provided with a blanked centrally located opening to permit its encompassing of the door gasket 91 which is maintained in place by the cooperation between this stationary shroud member 94 and cabinet 87.

Located between the shroud member 94 and the front drum wall 83 and maintained in place by the insulated wire clips 98 fastened to shroud 94 is the open coil electric heating element 99 which extends completely around the inside of member 94 to raise the temperature of air drawn into drum 75 through the holes 85 in the front drum wall 83. Air flow into drum 75 through the holes 85 and into the blower housing casting 12 is produced by rotation of the revoluble impeller member 101 located in the scroll-shaped part of blower housing 12. The high limit switch 100 mounted on the periphery of shroud 94 and connected in series with heater 99 opens at a predetermined temperature, for example 170°, to disconnect heater 99 in case the air temperature within shroud 94 should rise to an unreasonably high value. Such a temperature rise could result from a reduction in air flow due to a clogged lint trap or a break in belt 37 driving impeller 101.

Impeller member 101, which is integrally formed with the pulley 102 driven by main drive belt 37, is resiliently mounted on and bonded to small diameter bushings journalled on the rear step-down portion of the drum drive shaft 31. This step-down portion of shaft 31 prevents axial movement of impeller member 101 toward the divider wall 20 of housing 12 while pulley 33 limits axial movement of impeller member 101 in the opposite direction.

Impeller member 101 is enclosed by the divider wall 20, the tubular portion 21 and by the scroll-shaped blower housing cover 104 which cooperates with and fits against casting 12 in a juxtapositional relationship to form an air discharge passageway 105 connected to the exhaust elbow

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106 for venting the hot moist air expelled from the interior of drum 75 into a remote atmosphere.

Mounted on an upper part of the front half of the blower housing casting 12 is a bracket 111 (Figure 4) which is rigidly connected to a ceramic electrical socket 112. Socket 112 is aligned with an opening in casting 12 which is fitted with an insulated gasket 114 encompassing a light bulb 115 received in socket 112.

Bulb 115 may be lit at all times or may be energized through a door switch (not shown) whenever door panel 92 is opened during either the loading or unloading operations to illuminate the interior of drum 75 and apprise the operator of the presence of various articles within drum 75.

Bulb 115 also serves a second function in that its light is projected into drum 75 through the lint screen 62 making it possible for the operator of the drier illustrated in the accompanying drawings to determine easily whether or not lint has become deposited upon lint screen 62 without necessitating the removal of the lint trap assembly to make such an inspection.

To operate the clothes drier shown in the accompanying drawings, clothes drum 75 is loaded with moist fabrics and power is then supplied to motor 34 and heating element 99 through a control circuit forming no part of this invention. The energization of motor 34 causes clothes drum 75 to rotate at approximately 50 r.p.m. while causing impeller member 101 to rotate at approximately 1700 r.p.m. to exhaust air from the blower housing 12 through the air discharge passageway 105 in the exhaust elbow 106.

This pumping of air through the exhaust elbow 106 creates a partial vacuum within drum 75 with the result that air from the ambient atmosphere flows into drum 75 through holes 85 after passing between shroud 94 and drum 75. Air entering drum 75 by way of this path is elevated in temperature when it passes over the heating unit 99 located between drum 75 and shroud 94. In actual construction, a 4500 watt heating unit has been used as the heat source.

Since the air flow through drum 75 in practice has been approximately 150 cubic feet per minute, an effective heat transfer of heat from heater 99 to the interior of drum 75 is achieved while the operating temperature of the air within drum 75 is kept at a rather low level thereby insuring a safe and a delicate drying operation of the fabrics within that drum. For example, in the actual construction of this machine, the temperature of the air flowing from exhaust elbow 106 is normally about 150° when a 4500 watt heating element is used in conjunction with this preferred air flow. This large volume of relatively low temperature air intermixes with the damp fabrics as they are tumbled by vanes 81 during the rotation of drum 75 to rapidly and efficiently evaporate moisture from these fabrics at these low operating temperatures to produce a shorter drying operation.

The hot air passing from drum 75 through the lint screen retainer member 61 and the lint screen 62 by reason of the suction produced by impeller member 101 is filtered of its entrained lint prior to the exhausting of this hot moist air through the centrally located air exhaust opening 76. Since an accumulation of lint on the front or upstream side of the lint screen 62 would materially reduce or cut off air flow through drum 75 and result in overheating or even scorching of fabrics contained within drum 75 in the event of failure or delayed opening of high limit switch 100, it will be seen that the illuminated region to the rear or downstream side of the lint trap assembly will attract the attention of the operator of the drier whenever door panel 92 is opened and readily indicate the presence or absence of lint within this lint trap assembly. In other words, it will not only serve to illuminate both the drier drum 75 and the lint trap assembly but will serve as a constant reminder that the lint trap assem-

bly should be diligently attended to after each drying operation has been completed.

I claim:

1. In a clothes drier, a clothes receiving drum provided with a front wall having an access opening therein, a rear wall in said drum provided with an air exhaust opening aligned with said access opening, a conduit communicating with said exhaust opening for removing air from said drum, a lint trap covering said exhaust opening for filtering lint from air passing into said conduit, and a light source positioned in said conduit for projecting light rays through said lint trap into said drum to illuminate the interior of said drum and indicate the presence or absence of lint within said lint trap.

2. In a clothes drier, a clothes receiving drum provided with an air exhaust opening, means supporting said drum for rotation on a horizontal axis, a lint trap covering said opening and connected to said drum for rotation therewith, a stationary conduit aligned with said opening for discharge of air from said drum, and a light source positioned in said conduit for projecting light rays through said lint trap into said drum to illuminate the interior of said drum and indicate the presence or absence of lint within said lint trap.

3. In a clothes drier, a clothes receiving drum provided with an air exhaust opening, means supporting said drum for rotation on a horizontal axis, a lint trap covering said opening and connected to said drum for rotation with said drum, air translating means for moving air through said lint trap during rotation of said drum, and a light source positioned between said air translating means and said lint trap for projecting light rays through said lint trap to illuminate the interior of said drum and indicate the presence or absence of lint within said lint trap.

4. In a clothes drier, a clothes receiving drum provided with a front wall having an access opening therein, a rear wall in said drum provided with an air exhaust opening aligned with said access opening, means supporting said drum for rotation on a horizontal axis, a stationary conduit communicating with said exhaust opening for removing air from said drum, a lint trap covering said opening for filtering air entering said conduit from said drum, and a light source positioned in said conduit for projecting light rays through said lint trap to indicate the presence or absence of lint within said lint trap.

5. In a clothes drier, a clothes receiving drum provided with a front wall having an access opening therein, a rear wall in said drum provided with an air exhaust opening aligned with said access opening, a stationary conduit communicating with said exhaust opening for removing air from said drum, a lint trap covering said opening and connected to said drum for rotation therewith, said lint trap filtering air passing through said exhaust

opening into said conduit, air translating means positioned within said conduit for moving air from said drum into said conduit, and means positioned between said air translating means and said lint trap for illuminating the interior of said drum and indicating the presence or absence of lint within said lint trap.

6. In a clothes drier, a revoluble clothes receiving drum provided with a front wall having an access opening therein, a rear wall in said drum provided with an air exhaust opening aligned with said access opening, a stationary conduit communicating with said exhaust opening for removing air from said drum, air intake openings in said drum, means for rotating said drum to tumble fabrics placed within said drum, a lint trap covering said exhaust opening and carried by said drum for rotation therewith, said lint trap filtering lint shaken loose from said fabrics and suspended in the air passing from said drum through said exhaust opening and into said conduit, air translating means positioned within said conduit for moving air through said air intake and exhaust openings and into said conduit, and means positioned between said air translating means and said lint trap for illuminating the interior of said drum and indicating the presence or absence of lint within said lint trap.

7. In a clothes drier, a clothes receiving drum having an access opening and an air exhaust opening; an air exhaust conduit communicating with said exhaust opening; a light source supported in said conduit; a lint trap in front of said exhaust conduit and interposed between said light source and said access opening; said light source, said lint trap and said access opening being visually aligned; and means for circulating air through said drum, said lint trap and said exhaust conduit.

8. In a clothes drier having a casing with an access opening; a clothes receiving drum within said casing having an air exhaust opening; an air exhaust conduit communicating with said exhaust opening; means for translating air from said drum through said air exhaust conduit; a lint trap in front of said exhaust conduit and having a front face visible from said access opening and a rear face toward said exhaust conduit; and means for illuminating the rear face of said lint trap to indicate visually from said access opening the presence or absence of lint on the front face of said lint trap.

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