Aug. 2, 1966 J. H. LOOS 3,263,343

LINT DISPOSER FOR CLOTHES DRYER

Filed Nov. 12, 1963 3 Sheets-Sheet 1

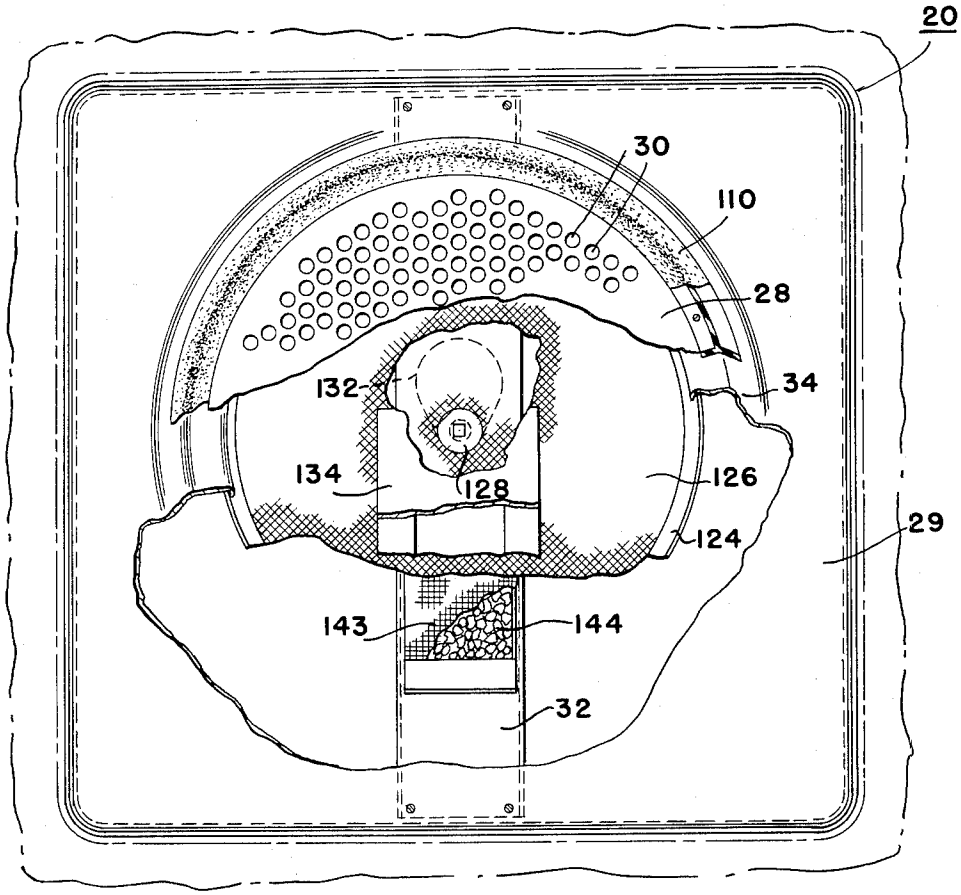


Fig. 2

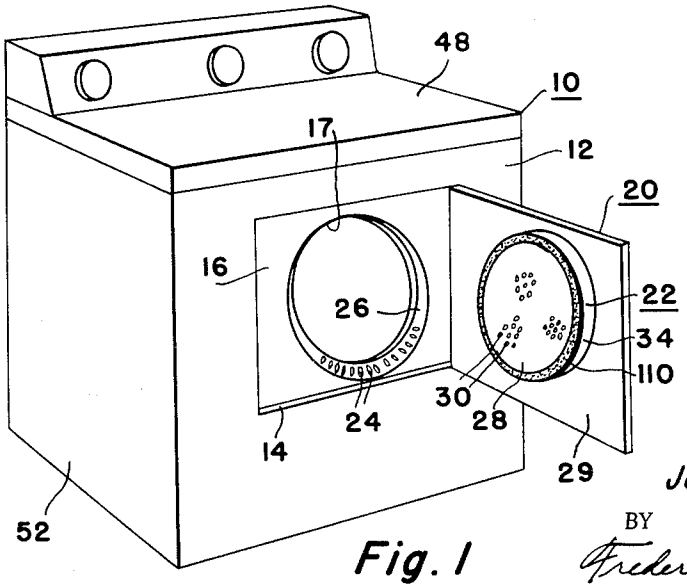


Fig. 1

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LINT DISPOSER FOR CLOTHES DRYER

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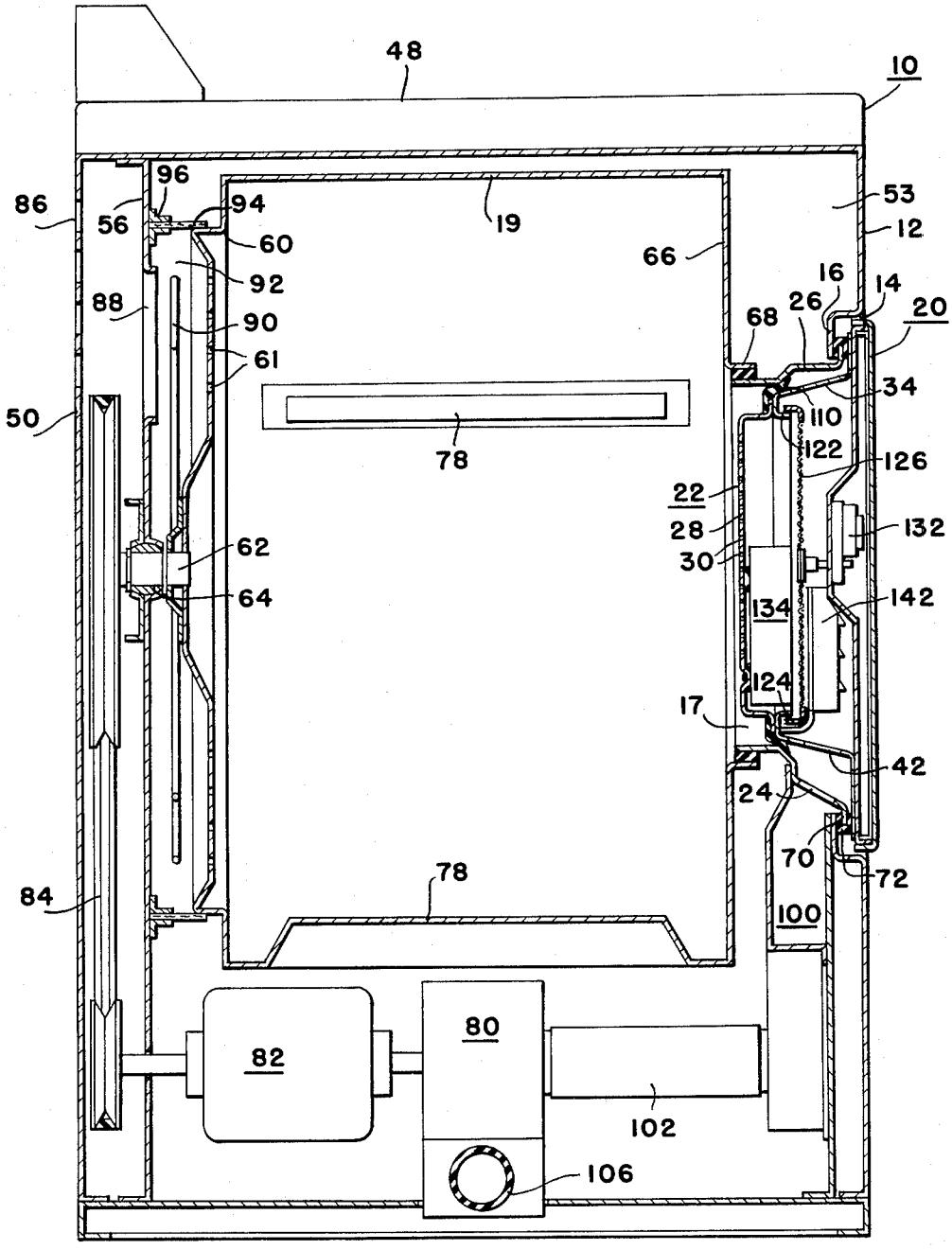


Fig. 3

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LINT DISPOSER FOR CLOTHES DRYER

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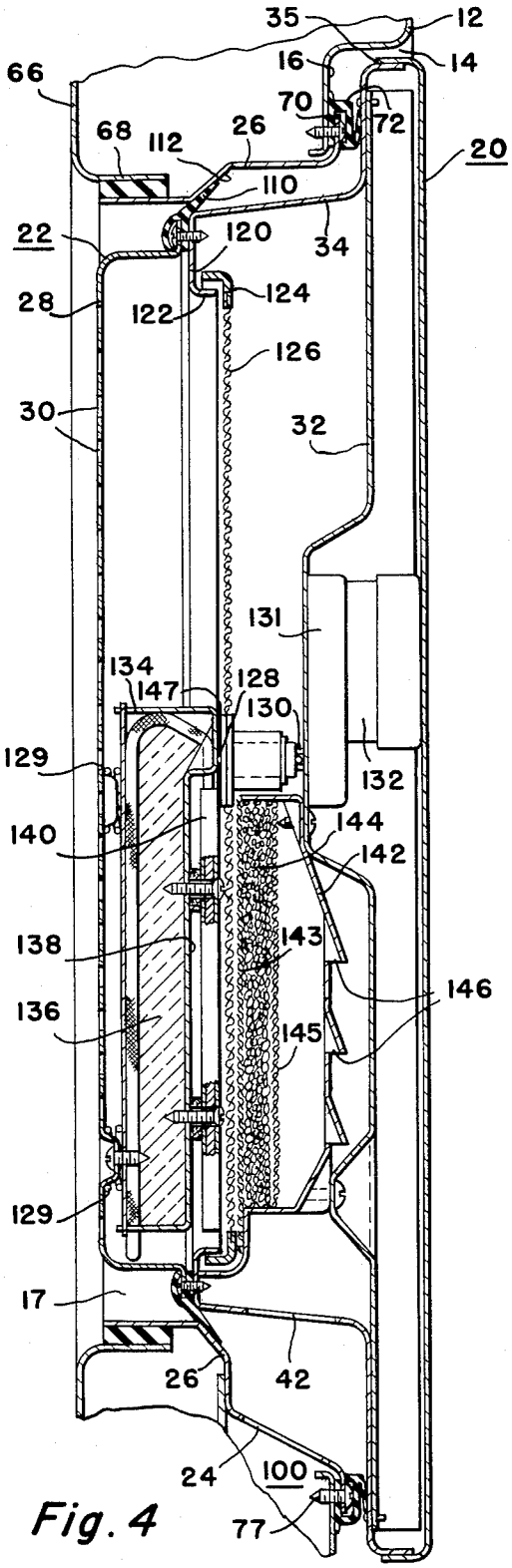


Fig. 4

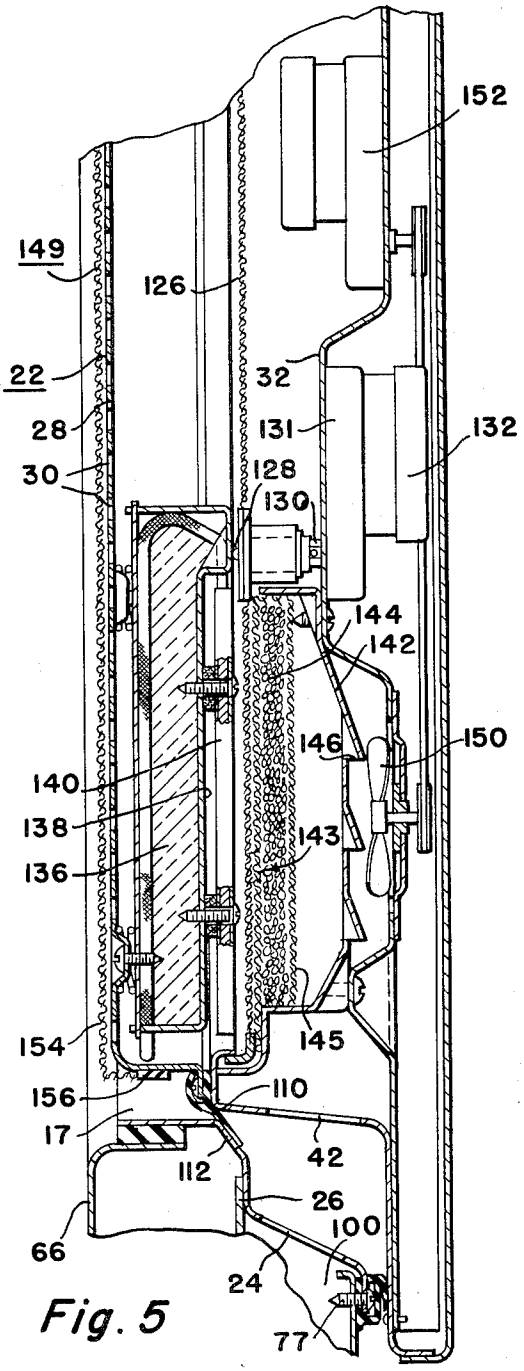


Fig. 5

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LINT DISPOSER FOR CLOTHES DRYER

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10 Claims. (Cl. 34—82)

This invention relates to a domestic appliance and more particularly to an improved continuous lint burner for a clothes dryer.

One of the most frequently heard objections to the domestic clothes dryer involves the elimination of lint which is generated during the tumbling of clothes. Commonly assigned copending applications Ser. No. 710,808, filed January 23, 1958, now Patent No. 3,132,006, suggests burning the lint continuously in order to reduce the lint to an inconsequential ash residue.

Accordingly it is an object of this invention to provide an improved continuous lint burner for a clothes dryer which is more readily accessible.

Another object of this invention is the provision of a continuous lint burner for a clothes dryer which is mounted on the door of the clothes dryer for improved air flow control.

A further object is the provision of a continuous lint burner which is mounted on a dryer door, thereby making the device an interchangeable option available as an accessory for prior art dryers not so equipped.

A more specific object of this invention is the provision of a door mounted continuous lint burning arrangement including means for eliminating the smoke and odor from burning lint and means for preventing the burning of wool lint.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is a perspective view of a clothes dryer having its access door in an open position;

FIGURE 2 is fragmentary rear elevational view, with parts broken away, to show the improved door mounted lint burning arrangement of this invention;

FIGURE 3 is a side sectional view, partly in elevation, of a domestic clothes dryer provided with this invention;

FIGURE 4 is an enlarged, fragmentary side sectional view of a preferred embodiment of the lint burning and smoke eliminating clothes dryer door of this invention; and

FIGURE 5 is a side sectional view similar to FIGURE 4 of another embodiment of this invention.

In accordance with this invention and with reference to FIGURE 1, a clothes dryer **10** is shown with a cabinet having a front wall **12** in which a recessed opening **14** is provided. The recessed opening **14** terminates in an inset wall **16** which circumscribes an access opening or drum outlet port **17** in communication with a tumbling drum **19** therebehind. Adapted to close the opening **14** is a vertically pivoted door **20** having a lint eliminating housing **22** mounted thereon and adapted to extend into said opening **17** when the door **20** is in closed position.

The lint eliminating housing **22** is adapted to project into intercepting air flow relationship with air moving outwardly through opening **17** on its way to an arcuate series of ports **24** along the bottom of a front port plate or collar **26**. The lint eliminating housing **22** is formed with a vertical inlet or inner panel **28** in which a plurality of inlet ports or perforations **30** are formed. The lint screen guard or inner panel **28** is joined to the inner door panel **29** at the inner end of a drawn circumambient

housing wall or duct means portion **34** thereof. Since air must flow through the housing **22** on its way from the drum opening **17** to the port plate openings **24**, the circumambient wall **34** is provided further with an exhaust opening **42** in a bottom portion thereof to permit air to leave the housing **22**. The peripheral jointure **35** where inner and outer door panels meet should be airtight to prevent ingress of air to the housing **22**.

To more clearly understand the structure of a clothes dryer suitable for use with this invention, reference may now be had to FIGURE 3. The clothes dryer **10**, in addition to its front wall **12**, door **20** and lint eliminating housing **22**, includes a top cabinet portion **48**, a rear wall **50**, and sidewalls **52**, **53**. Extending generally parallel to the rear wall **50** is an interior bulkhead **56** for mounting the tumbling drum **19**. The tumbling drum is generally cylindrical in form and includes a rear wall **60** which is perforated at **61** to permit ingress of air through the wall. A shaft **62** is affixed to the wall **60** and is journaled in a spherical bearing **64** carried by the partition or bulkhead **56**. Opposite the rear wall **60** in the drum is an annular front wall **66** which terminates in a generally cylindrical neck or collar portion **68** in axial alignment with the opening **17** formed by the inwardly directed collar of the port plate **26**. It may be seen in FIGURE 4 that the port plate **26** has a radially outwardly directed flange **70** which is carried in a seal **72** and fixed thereby relative to the recess wall **16** of the cabinet opening. Thus, the front collar **68** of the tumbling drum **19** circumscribes the drum support collar **17** of the port plate **26** and is supported thereby in a manner taught more particularly in the patent to Whyte, 2,843,945, issued July 22, 1958. In this way the tumbling drum **19** is supported for rotation and journaled at its rear wall on the partition **56** and at its front end by the port plate **26**. The port plate **26** may be fastened to the front wall **12** of the dryer by any suitable fastening means such as by screws **77**. In order to improve the agitation of clothes within the tumbling drum during rotation thereof, baffles such as **78** may be included.

The air flow through the clothes dryer **10** is motivated by a blower **80** (FIGURE 3) which is driven by a motor or other suitable prime mover **82** which serves also to rotate the tumbling drum **19** through a belt and pulley arrangement **84**. Although this invention is not so limited, the clothes dryer **10** is of the vented type—the rear wall **50** being provided with inlet openings **86** which communicate with the tumbling drum through an opening **88** in the rear bulkhead **56**. Serving as the means for heating incoming air is an electrically energizable heater **90** which is mounted within an annular chamber **92** between the rear bulkhead **56** and perforated rear wall **60** of the tumbling drum. An annular seal **94** defines the peripheral limits of the annular space **92** and may be of any suitable flexible material such as felt mounted in a channel formed by an annular bracket **96** on the rear bulkhead **56**.

Adjacent the front wall **12** of the dryer **10** and connected to the port plate openings **24** is a front duct **100**. This duct **100** extends downwardly and channels the air to the inlet of the blower **80** thereby completing an air flow path past the heater **90** and through the tumbling drum **19** and the lint eliminating housing to the blower **80**. Leading from the blower **80** is an outlet or discharge conduit **106** which is connected to the atmosphere in the case of a vented dryer or to the inlet chamber **92** in the case of a recirculating or condensing dryer.

During operation clothing or other material will be tumbling within the drum **19** and the heater currents of air will intermingle with the clothes, picking up the moisture and lint therefrom prior to egress from the tumbling drum through the drum outlet **17**. At this point, air is drawn into the lint eliminating housing **22** through perforations **30** in the inner panel **28**. An annular seal **110** cir-

cumscribes the outer limits of the inner panel **28** in a manner to engage a beveled annular portion **112** of the port plate **26** when the door **20** is closed. The seal **110** engages the port plate between the port plate openings **24** and the air outlet opening **17** from the drum to direct all air flow through the lint eliminating housing **22**. As this heated air passes through the housing **22**, it will be filtered of foreign matter and will pass then through the exhaust opening **42** in the housing.

Turning now to FIGURES 2 and 4, the preferred embodiment of the door mounted lint burner will be described. Within the lint eliminating housing **22** a radially inwardly turned portion **120** of the cylindrical wall or duct means **34** has an annular shoulder portion **122** for receiving in sealing engagement therewith the outer peripheral edge or annular frame **124** of the disc-like lint collecting screen **126**. The screen **126** is tightly stretched on the frame **124** and positioned to intercept air flow proceeding from the openings **30** in the inner panel to the exhaust outlet **42** from the lint eliminating housing. The steel hub, welded or staked to the screen **126**, is journaled at one end in a depression or thrust bearing in the lint burner housing as at **128** (springs **129** push housing **134** against the said one end) and at the other end is mounted on a drive shaft or pinion **130** which extends through a support channel **32** from a prime mover means having a gear reduction unit **131** and a drive motor **132**. The screen is adapted to be driven by the motor in the speed range between ⅙ r.p.m. and ¼ r.p.m. All lint passing through the lint eliminating housing will be trapped on the side of the screen **126** facing the tumbling drum; and this trapped lint is slowly rotated into juxtaposition with a lint burning heating element **140** for incinerating the lint.

Within the lint eliminating housing **22** is an open-sided box-like lint burning housing **134** supported on the inner panel **28** and having any type of high temperature insulation **136** backing up a slight recess **138** in which the lint burning heating element **140** is positioned—aluminum clad steel forming the recess **138** to reflect the heat toward the screen **126**. Note that the heating element **140** is close enough to the upstream side of the screen **126** so that the lint on any portion of the screen in proximity therewith will be surely and quickly incinerated as the screen portion is rotated past the heater. Electrical conduits for energizing the motor **132** and the heater **140** may be channeled to the door through a protective hinge arrangement taught in the patent to Haslup, 3,042,471, issued July 3, 1962.

A quantity of smoke and odor accompanies the lint burn process. For this reason an open-sided box-like smoke and odor eleminating or catalyst housing **142** is supported on the vertical channel **32** and positioned adjacent the lint burning housing **134** on the opposite or downstream side of the screen **126**. A catalyst **144** is carried in this housing **142** between support screens **143, 145** and acts to eliminate the products of combustion by altering the smoke and odor to make them colorless and odorless. Platinum coated alumina or chromia alumina in bead or pellet form has been used successfully as the catalyst. A honeycombed ceramic called "Cercor" marketed by Corning Glass Co. has been coated with a precious metal (platinum) and also used in place of the bead-like catalyst.

The catalyst housing **142** has in the rear thereof exhaust outlets or louvres **146** through which the altered products of combustion are withdrawn. The normal suction of the clothes dryer blower **80** will cause the smoke generated in the area between the heating element **140** and the catalyst **144** to be drawn through the catalyst for alteration thereof—the colorless, odorless results being withdrawn through the exhaust louvres **146**, the exhaust outlet **42** of the lint eliminating housing and the ports **24** in the front port plate into the front duct **100**. Note that the housings **134** and **142** snugly sandwich the screen therebetween. This leaves only a small or restricted air flow connection **147** with the duct means **34** around the periphery of the housing **134** at the screen **126**. When the blower **80** is operating, a full air flow is drawn through the lint eliminating housing duct means **34** with the lint burning housing **134** serving as an air flow shield for the area where lint is being burned. A lesser or reduced quantity of air is drawn through the burn and smoke elimination area when the door is closed as determined by the combined flow resistances of the duct connection **147**, the screens **126, 143** and **145**, the catalyst **144**, the louvres **146** and the exhaust opening **42**. The variation of any of these can regulate the reduced air flow. As a matter of fact air flow control in the door mounted continuous lint burner is much improved over the device in the aforementioned copending application.

In the embodiment of FIGURES 2 and 4 with door **20** closed the lint collecting screen **126** is rotated continuously throughout a clothes drying cycle and the lint burning heating element is energized concurrently with the dryer operation. Where the door **20** is opened during the drying cycle while the lint is burning, air flow through the lint eliminating housing **22** will stop. Although the heater **140** will be immediately deenergized, a small residue of smoke may remain. The occurrence of such a smoke and odor residue has not been troublesome in the preferred embodiment. However, if every vestige of noxious products of combustion is to be removed the embodiment shown in FIGURE 5 may be used.

The lint eliminating arrangement shown in FIGURE 5 is identical with that shown in FIGURE 4 with the exception of the means used to draw the smoke through the catalyst bed **144** and the addition of a wool lint collector **149**. In this second embodiment a separate impeller **150** is used and adapted to be driven by a second motor **152**. Thus, so long as the motor **152** remains energized, even with the door **20** open, any smoke and odor being generated by the burning of lint will be sucked through the catalyst bed and thereby converted to colorless and odorless products.

The wool lint collector or filter **149** is rather like a hair net designed to slip over the perforated panel **28** of the lint eliminating housing to prevent wool lint (the cause of a rather persistent odor when burned) from reaching the screen **126**. The lint collector is installed as shown in FIGURE 5 only whenever excessive amounts of wool are being dried, such as a wool blanket. More particularly, the collector is formed with a circular section **154** of nylon mesh (42–45 mesh) and a peripheral elastic band **156** to retain the collector on the housing **22**.

It should now be seen that an improved continuous lint burning arrangement has been provided for a clothes dryer—a compact arrangement which is accessibly mounted on the door of the clothes dryer and adapted thereby to be interchangeable with doors on dryers which were not originally supplied with the lint burning feature.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A fabric dryer comprising a casing defining a drying chamber and having an air inlet opening and an air outlet opening therein, door means vertically hingedly mounted with respect to said casing for closing said air outlet opening, lint eliminating means supported on said door means for burning lint carried from the fabric through said air outlet opening and for causing the products of said burning to be colorless and odorless, and blower means operable for circulating air flow sequentially through said drying chamber and the lint eliminating means when said door means is closed, said lint eliminating means including housing means having a perforated inlet panel portion parallel to said door means extending sealingly into air intercepting relationship with said air outlet opening, and having an exhaust port connected in air flow supply relationship to said blower means, a flat, circular screen member positioned extending across said

housing means downstream from said perforated panel portion and parallel therewith and having at least a section thereof in intercepting air flow relationship to the flow of air from said air outlet opening to said exhaust port to form a lint catcring barrier, said screen member being rotatably mounted and positioned so that rotation of said screen member causes said at least a section thereof alternately to be placed in intercepting air flow relationship and then to be removed from said intercepting air flow relationship, motor means on said door means for rotating said screen member, means forming an insulated lint burning chamber within said housing means blocking a portion of said perforated inlet panel in a manner to shield air flow from that section of said screen mmeber which is removed and enclosing heating means positioned adjacent that section of said screen member which is removed for burning lint caught on said section of said screen member, and means forming a smoke and odor eliminating chamber on the opposite side of said section of said screen member from said heating means and sandwiching said screen member section therebetween, said means forming the lint burning chamber being spaced slightly from said means forming the smoke and odor eliminating chamber to permit passage of said screen member and a limited flow of air therebetween, said smoke and odor eliminating chamber enclosing catalyst means in communication with the smoke and odor resulting from said burning lint and including restricted outlet ports in communication with said blower means through said exhaust port in said housing means for conveying said limited flow of air from said portion of said screen member to said catalyst means thereby to draw the smoke and odor from said burning lint to said catalyst means when said blower means is operating and said door means is closed.

2. The fabric dryer of claim 1 including impeller means connected to said restricted outlet ports in said smoke and odor eliminating chamber and operable to draw smoke and odor from said burning lint to said catalyst means when said impeller means is operating irrespective of whether said door means is open or closed.

3. A fabric dryer comprising a casing defining a drying chamber and having an air inlet opening and an air outlet opening therein, door means movably mounted with respect to said casing for closing said air outlet opening, lint eliminating means on said door means for burning lint carried from the fabric through said air outlet opening and for causing the products of said burning to be colorless and odorless, and means for circulating air sequentially through said drying chamber and the lint eliminating means when said door means is closed, said lint eliminating means including housing means having an inlet portion connected to said air outlet opening, a lint filter member positioned extending across said housing means downstream from said inlet portion and having at least a portion thereof in intercepting air flow relationship to the flow of air from said air outlet opening to form a lint catching barrier, said lint filter member being movably mounted and positioned so that movement of said lint filter member causes said at least a portion thereof alternately to be placed in intercepting air flow relationship and then to be removed from said intercepting air flow relationship, means for moving said lint filter member, means forming a lint burning chamber in said housing means in air flow shielding relationship to that portion of said lint filter member which is removed and including means positioned adjacent that portion of said lint filter member which is removed for burning lint caught on said portion of said lint filter member, and means forming a smoke and odor eliminating chamber on the opposite side of said portion of said lint filter member from said burning means and including smoke and odor altering means in communication with the smoke and odor resulting from said burning lint, said smoke and odor eliminating chamber including means in communication with said air flow circulating means for conveying at least a portion of the flow of air from said portion of said lint filter member to said smoke and odor altering means thereby to alter the smoke and odor from said burning lint to colorless and odorless products.

4. The fabric dryer of claim 3 wherein said means for conveying is an air duct having one end in restricted communication with said smoke and odor eliminating chamber and its other end in communication with said air flow circulating means.

5. The fabric dryer of claim 3 wherein said means for conveying is an impeller interposed in limited air flow inducing relationship between said smoke and odor eliminating chamber and said air flow circulating means.

6. A continuous lint burning fabric agitator comprising a drum for agitating said fabric and having an opening, a door for closing said opening, a lint eliminating means on said door, a blower for producing a first air flow through said drum and said lint eliminating means, duct means including said lint eliminating means connecting said drum and said blower, a rotatably mounted lint collecting surface in said lint eliminating means between said blower and said drum, means forming a compartment adjacent at least a portion of said surface to shield said portion from said first air flow and having restricted connections with said duct means, a lint burn heater in said compartment adjacent said surface, a smoke and odor altering means in said compartment adjacent said heater and downstream from said portion of said lint collecting surface, said restricted connections of said compartment with said duct means conveying a second air flow through said compartment; and power means for moving said drum, blower and lint collecting surface.

7. A continuous lint burning fabric agitator comprising a drum for agitating said fabric and having an opening, a door for closing said opening, a lint eliminating means on said door, a blower for producing a first air flow through said drum and said lint eliminating means, duct means including said lint eliminating means, a rotatably mounted lint collecting surface in said lint eliminating means in air flow intercepting relationship to said duct means, means forming a compartment adjacent at least a portion of said surface to shield said portion from said first air flow and having a restricted connection with said duct means, a lint burn heater in said compartment adjacent said surface, and means connected to said compartment downstream from said portion of said lint collecting surface for removing smoke and odor resulting from burning lint, said restricted connection of said compartment with said duct means conveying a second air flow through said compartment to said removing means.

8. A door construction adapted for burning lint when used with a clothes dryer, said door construction comprising an outer imperforate panel and an inner perforate panel adapted for receiving a stream of air from the clothes dryer, duct means spacing said inner and outer panels to form a lint eliminating chamber therebetween and having an exhaust opening, a circular screen rotatably journaled on said outer panel and having a portion thereof extending across said duct means between said inner panel and said exhaust opening and rotatably in a manner to alternately intercept and be removed from air flow between said inner panel and said exhaust opening, an insulated lint burning housing between said inner panel and the portion of said screen which has been removed, said housing including a recess open toward said screen on one side thereof enclosing a heater adjacent the portion of said screen which has been removed, a smoke altering casing adjacent said recess and open toward said screen on the opposite side thereof enclosing a catalyst means for eliminating smoke and odor, means including an impeller for impelling air from said duct means into the space between said heater and said catalyst means and from said space through said catalyst means to said exhaust opening, and power means sup-

ported in fixed relationship to said outer panel for rotating said screen at one speed and said impeller at another speed.

9. A door construction adapted for burning lint used with a clothes dryer, said door construction comprising an outer imperforate panel and an inner perforate panel adapted for receiving a stream of air from the clothes dryer, duct means spacing said inner and outer panels to form a lint eliminating chamber therebetween and having an exhaust opening, a circular screen rotatably journaled on said outer panel and having a portion thereof extending across said duct means between said inner panel and said exhaust opening and rotatable in a manner to alternately intercept and be removed from air flow between said inner panel and said exhaust opening, an insulated lint burning housing between said inner panel and the portion of said screen which has been removed, said housing including a recess open toward said screen on one side thereof enclosing a heater adjacent the portion of said screen which has been removed, a smoke altering casing adjacent said recess and open toward said screen

on the opposite side thereof enclosing a catalyst means for eliminating smoke and odor, means for conveying air from said duct means into the space between said heater and said catalyst means and from said space through said catalyst means to said exhaust opening, and power means supported in fixed relationship to said outer panel for rotating said screen.

10. The door construction of claim **9** including a removable mesh-like hood covering said inner panel for removing wool lint when the door is adapted for use with a clothes dryer drying fabric having wool therein.

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