

- [54] LINT SCREEN FOR DRYER
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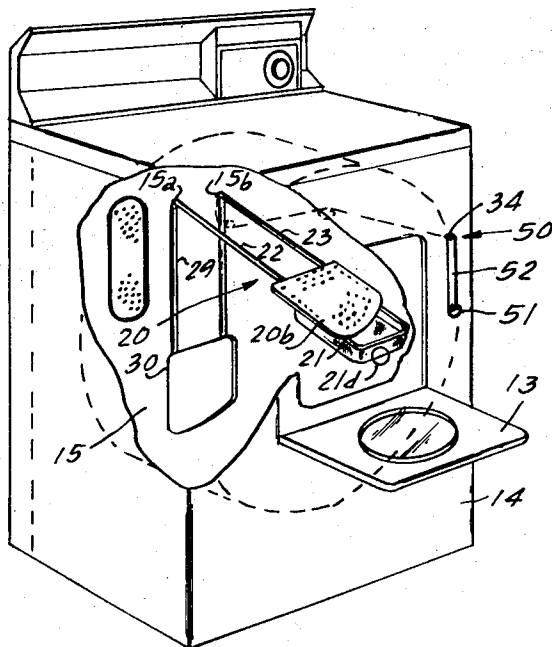
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- [58] Field of Search34/79-82, 233; 55/507, 509, 511, 529

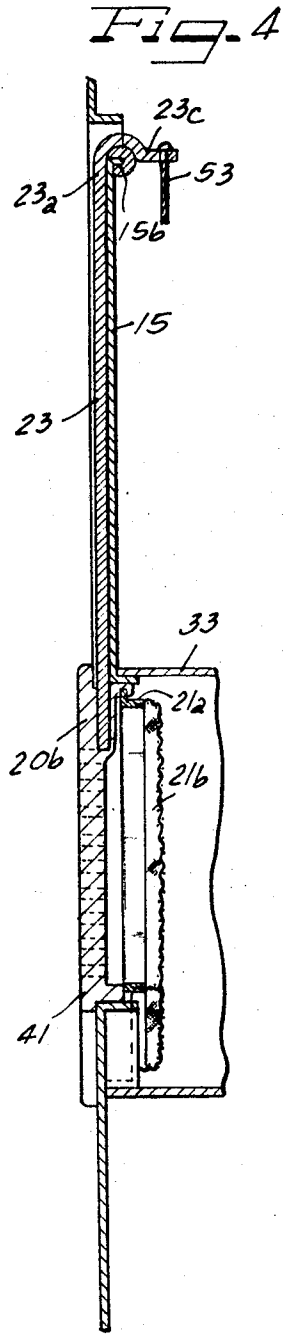
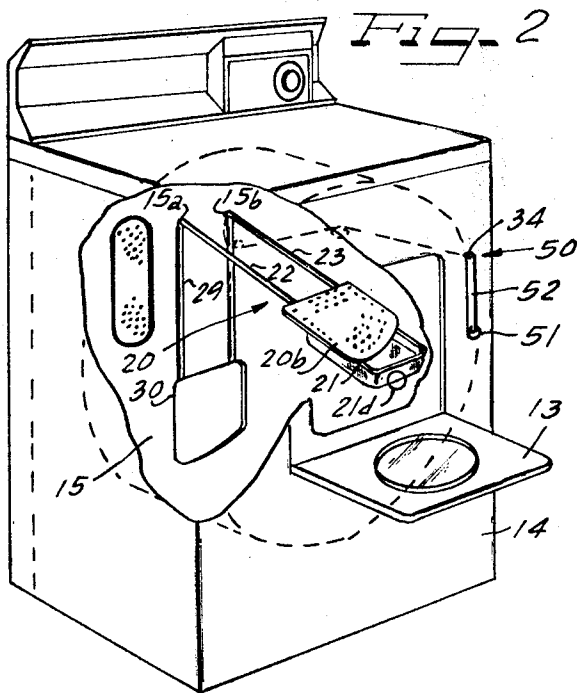
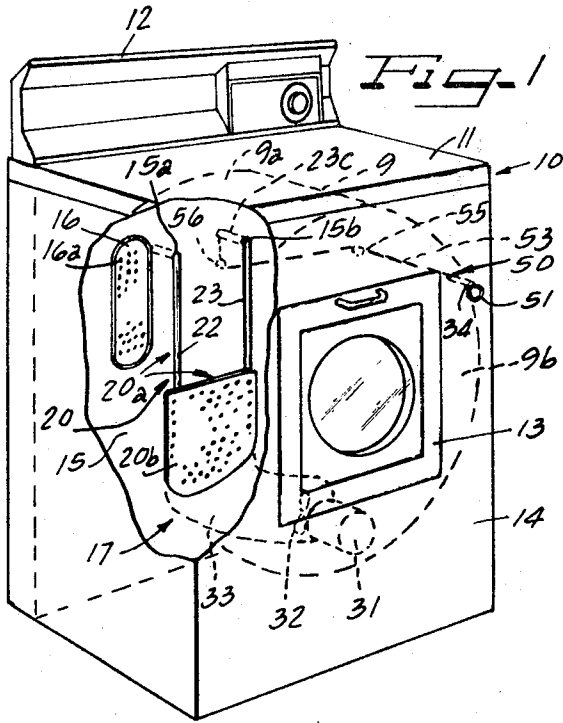
[57] ABSTRACT

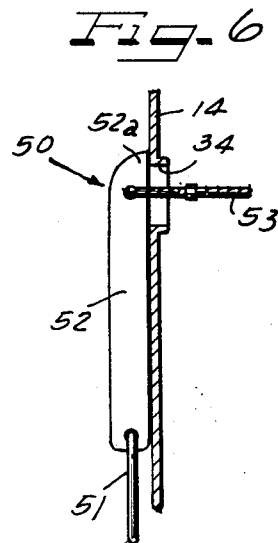
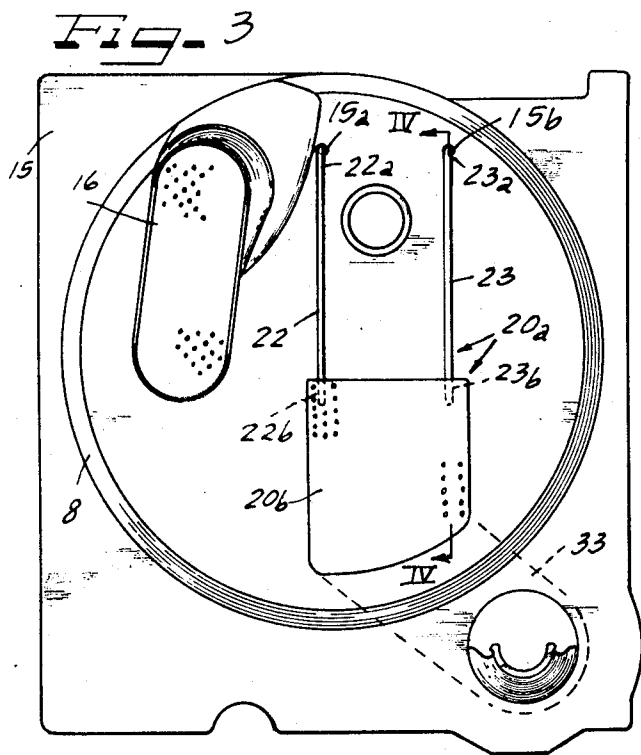
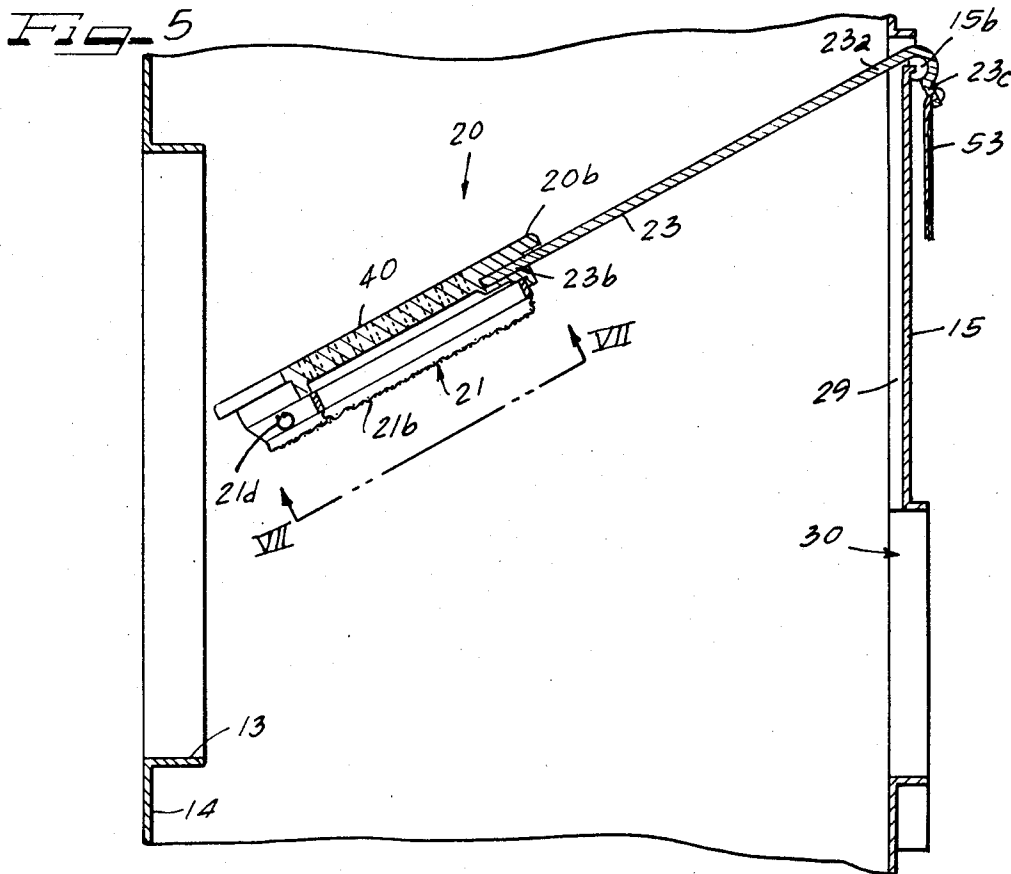
A lint filter for a clothes drying apparatus comprises a filter element on a mounting means pivotally attached to a stationary rear wall of a dryer within the diameter of the revolvable drum rear opening through which air exiting from the drying chamber is directed for removal of lint. An operating means on the dryer cabinet adjacent the front opening pivots the filter means forwardly and upwardly to an accessible position adjacent the front opening so that the filter element may be removed for cleaning.

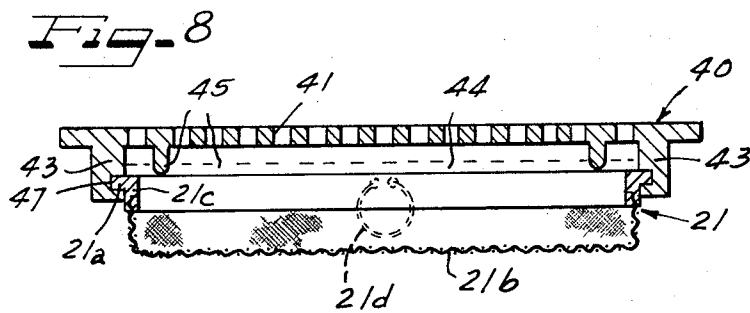
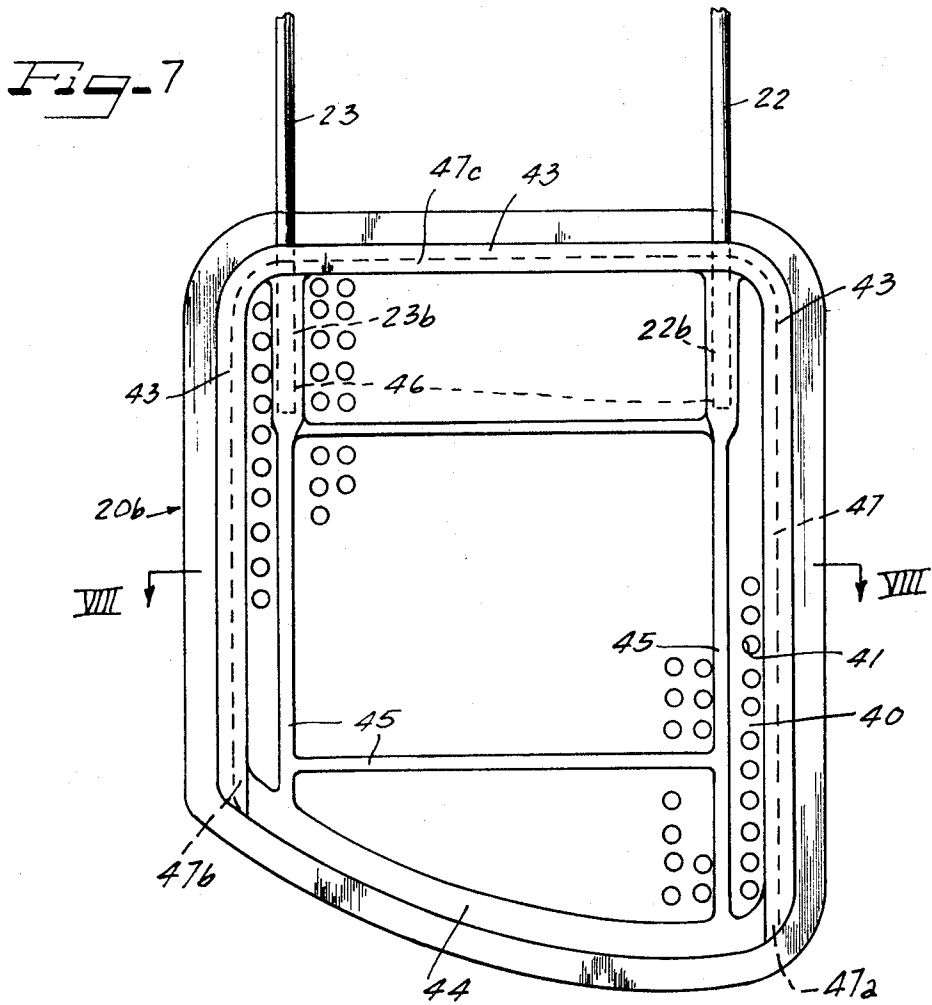
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13 Claims, 8 Drawing Figures









LINT SCREEN FOR DRYER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention generally relates to domestic clothes drying apparatus and more specifically to a lint filter means.

2. The Prior Art

It is common to provide screens for drying machines to filter the air circulated through a treatment zone. Such filter screens have been mounted in various locations in and around the treatment zone of the dry apparatus.

In one instance in a machine having a rotating drum, a lint filter is mounted on the rear end of the drum to filter the air as it leaves the treatment zone. When cleaning is required the screen must be removed by the user reaching through the front opening and pulling the lint screen off its mounting. This operation requires an awkward stooping, stretching and twisting maneuver on the part of the user and therefore is extremely inconvenient. Moreover, if the interior of the apparatus is dark it may be difficult to find. Further, if the drying apparatus has a front door which swings down to form a shelf it may be possible that the inward reaching movement by the user reaching into the dryer from alongside the door may create an unbalance whereby the user would be forced to lean on the door and hence very likely distort it.

SUMMARY OF THE INVENTION

The disadvantages of the prior art are overcome by the construction of the drying apparatus according to the invention disclosed wherein a filter means is pivotally mounted within a drying chamber on a stationary rear bulkhead inside the rear opening of a revolvable drum so that the lint collecting filter element or lint screen may be swung away from the rear bulkhead through the drum to a point adjacent a front or loading opening in the drum thereby to greatly facilitate its removal and cleaning. In its normal operating position the filter means is positioned in the passageway through which air is removed from the drying chamber by air translation means so that particles suspended in the air will be removed. An operating means positioned at a convenient point on the dryer apparatus allows pivotal movement of the filter means to be easily and rapidly effected so that the lint screen may be rapidly cleaned when required.

The filter means comprises a lint screen and a lint screen mounting means with the lint screen being removably retained on the mounting means and the mounting means being pivotally attached to the stationary rear bulkhead wall member. Although it is contemplated that the mounting means may be attached to the bulkhead in any orientation that allows pivotal movement of the filter means, it is preferred that it be attached in an orientation with the pivotal attachment generally vertically above the lint screen. In a first position the lint screen and the mounting means may be substantially flush with the rear wall. In the first position the lint screen covers the passageway or opening in the wall member through which air is removed from the drying chamber. The mounting means may include a lint screen retainer and a pair of generally vertically inclined pivot arms, each arm having a first upper end pivotally attached at a pivot point to the wall member

and a second end supporting the lint screen retainer whereby the force of gravity serves to help retain the filter means in the first position.

At least one of the pivot arms may have a second portion at its upper end and on the opposite side of the pivot point extending through the back wall of the bulkhead so that with the operating means connected to this second portion, the filter means may be conveniently pivoted away from the rear wall.

The clothes dryer may include a front wall having an opening therein in the area of the front opening of the drum to provide access to the drum through the front wall. In this arrangement the operating means may include a cable-pulley combination having a holder member with a pull ring therethrough. The front wall has a second opening therethrough of a size to allow the cable and the holder member to pass therethrough but smaller than the pull ring. Thus, when the filter means is in its first position the pull ring will be adjacent the second opening whereas when the filter means is pivoted to its second position adjacent the front opening the holder member will have been pulled out through the second opening and pivoted to hold the filter means in its second position.

The lint screen retainer means comprises a plate-like member having a plurality of openings therein and a horseshoe-shaped rib member forming a slot for slidably receiving the foraminous lint screen therein. The pivot arms are attached at their lower end to the plate-like member to position the lint screen in the opening in the rear bulkhead and allow pivotal movement of the retainer to the front opening for removal and cleaning of the lint screen. The lint screen is cleaned by pivoting the filtering means to its second position, sliding the lint screen out of its position below the plate-like member, passing the element through the opening, emptying it of the collected lint and sliding it back into position below the plate-like member and returning the filter means to its position in the air passageway by means of the operating means.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the invention will be readily apparent from the following description of certain preferred embodiments thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure and in which:

FIG. 1 is a perspective schematic view of the invention with portions of the cabinet and drum removed to show the filter means pivotally mounted on a rear bulkhead;

FIG. 2 shows the apparatus in the same position as FIG. 1 with the exception that the front door has been opened, the filter means has been swung away from the outlet passageway in the rear wall to a second position adjacent the front opening, and the lint screen has been partially removed.

FIG. 3 is an elevational view of the stationary rear bulkhead with the filter means in operative position;

FIG. 4 is an enlargement of a sectional view of the filter means taken along the lines IV—IV in FIG. 3;

FIG. 5 is a schematic side elevation of the filter means in the second position indicating the cooperation with the operating means;

FIG. 6 is a schematic side elevation view of the holding member and pull ring portion of the operating means showing their cooperation with the second opening in the front wall of the cabinet;

FIG. 7 is a schematic plan view of the lint screen retainer with the lint screen removed viewed along line VII—VII in FIG. 5, and particularly the plate-like means with the horseshoe-shaped rib member for slidably receiving the lint screen; and,

FIG. 8 is a cross section taken along the lines VIII—VIII of FIG. 7 with the lint screen in position in the retainer.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2 there may be seen a clothes drying apparatus generally indicated at 10 having a tumbling drum 9 enclosed by a cabinet 11 and having a control console 12. A motor 31 is suitably connected to the tumbling drum 9 as is known in the art to provide a tumbling action for the clothes. The motor 31 also has air translation means such as a fan or blower 32 connected therewith to provide a flow of air through suitable duct work 33 in the drying cabinet 10. The drum 9 is generally cylindrically shaped and has a rear opening 9a and a front opening 9b. A stationary rear wall bulkhead 15 extends over the rear opening 9a of the drum 9 while a stationary front wall 14 having a door means 13 extends over the front opening 9b to provide a generally cylindrically shaped clothes drying space or chamber 17.

A suitably heated or treated drying medium such as air is drawn by the fan 32 through duct work, not shown, to the drying chamber 17 and enters through inlet openings 16a in inlet panel 16 located in the stationary rear wall 15 within the periphery of the rear drum opening 9a. Advantageously the inlet panel 16 is mounted flush on the rear wall to avoid interference with material being tumbled by the drum 9. After the air has entered the drying space 17 and circulated therein among the tumbling material, it is drawn by suction from the fan 32 through an outlet passageway opening 30. The fan 32 draws the air through duct work 33, and exhausts the air to the atmosphere through suitable duct work, not shown.

During the circulation of the air with the tumbling clothes, loose particles, particularly lint from the clothes, will be carried away by the air. These particles would tend to impair operation of the fan if they were allowed to reach and clog it. Hence, a filter means generally indicated at 20 is provided in the outlet passageway 30 to filter the lint and loose particles from the air before they reach the fan. While the volume of loose particles will depend upon the type of clothes being dried, it is clear that they will be of an amount such as to require periodic cleaning of the filter means. By means of the disclosed invention, this periodic cleaning and maintenance is simply and rapidly effected by a filter means generally indicated at 20, pivotally mounted on the rear bulkhead over the outlet opening 30 so that the filter means may be swung away from its operative first position to a second position at a point adjacent the front opening 9b for cleaning and maintenance.

The filter means 20 includes a filter element or lint screen 21 and a lint screen mounting means 20a. As shown in FIGS. 1 through 5 the lint screen 21 is attached to the mounting means 20a with the lint screen 21 being positioned over the outlet opening 30 and the

mounting means 20a being pivotally attached to the stationary rear wall 15 at pivot points 15a, 15b spaced from the lint screen 21. In its first or operative position as shown in FIG. 1, the filter means 20 hangs by the weight of gravity such that the air flow through the drying space 17 must pass out through the lint screen 21 covering opening 30 in order to be exhausted by the fan 32. As shown in FIG. 2, the door 13 to the drying chamber 17 is opened and the filter means 20 is in a second position with the lint screen 21 swung away from the rear wall 15 about the pivot points 15a, 15b so that it projects, as may be also seen in FIG. 5, to a point adjacent the front cabinet opening 13. The lint screen 21, shown partially removed, may be simply and conveniently removed and cleaned when the filtering means 20 is in the second position.

Movement of the filter means 20 from the first position as shown in FIGS. 1 and 4 to a second position as shown in FIGS. 2 and 5 may be accomplished by an operating means generally indicated at 50 as will be hereinafter explained.

Referring to FIGS. 3, 4 and 5, it may be seen that the mounting means 20a includes a lint screen retainer 20b and a pair of generally vertically inclined pivot arms 22, 23 each having a first upper end 22a, 23a, respectively, pivotally attached at pivot points 15a, 15b, respectively, to the rear wall member 15. A second, lower end 22b, 23b of the pivot arms 22, 23, respectively, supports the lint screen retainer 20b. The pivot arms 22, 23 are of a length such that when they are pivoted about the pivot points 15a, 15b, the lint screen 21 and retainer 20b will be adjacent the front opening 13 as shown in FIG. 5.

The lint screen retainer 20b, as shown enlarged in FIG. 7, removably supports the lint screen 21 and may include a foraminous member 40 of a size slightly larger than the opening 30 and having a plurality of openings 41 therein. The foraminous member 40 may be made of a molded plastic material and may include strengthening ribs such as illustrated at 44 and 45 to provide a rigid support. A generally horseshoe-shaped rib 43 extends generally about two sides and one end of frame 40 and includes a slot 47 on the inside periphery thereof which slot 47 is adapted to receive a complementary shaped rib 21a of the lint screen 21. The pivot arms 22, 23 are received in slots or sockets 46 of the frame 40 at ends 22b and 23b respectively so that a secure and rigid connection between the lint screen retainer 20b and the pivot arms is effected.

The lint screen 21 has a screen portion 21b which is molded into a plastic rim section 21c as may be seen from the cross sectional view of FIG. 8. The lint screen 21 fits into the retainer 20b by alignment of the rib 21a of the lint screen with the slot 47 at ends 47a and 47b after which the lint screen may be pushed into the slot 47 until the rib 21a engages the end 47c of the slot 47. The lint screen 21 is retained in this position by an interference of friction fit between the slot 47 and rib 21a so that it will not slide out of the slot under the force of gravity or movement as the filter means 20 is being swung from its first to its second position alternatively, a detent may be provided on the lint screen 21 or retainer 20b. The friction force, however, is such that the lint screen 21 may be removed from the retainer 20b by a person pulling on a removal ring 21d when the filter means 20 is in the second position. As may be seen in FIG. 5, the lint screen 21 and the removal ring 21d

are easily accessible for removal and cleaning through the front opening 13 when the filter means 20 is in the second position. Since the filtered material will be pressed into the basket-shaped screen 21b, it should be noted from FIG. 5 that the contents of the lint screen will be held under gravity and therefore will minimize the possibility that the collected particles will fall out.

When the filter means 20 is in the first position as shown in FIG. 4, it is substantially flush with the rear wall 15. As there shown, the thickness of the foraminous frame portion 41 overlaps the rear wall to provide a seal therewith and in such case projects beyond the rear wall by its thickness. Since the drum rotates between the stationary walls 14 and 15, it may be seen that the material being tumbled by the drum may contact any projections into the drying area and hence it is advantageous to maintain these walls free of material engaging obstructions.

Referring to FIGS. 3, 4 and 5, it may be seen that the bulkhead 15 has a raised area 8 which receives the rear of the tumbling drum 9. The pivot arms 22 and 23 of the lint screen mounting means 20a are mounted in recesses 29 formed in the bulkhead so that they do not project beyond the wall 15. It may be further seen that the filter retainer 20b and the lint screen 21 fit into the opening 30 when the filtering means is in its first position. Thus, air passing from the drying space 17 through the outlet opening 30 must pass through the screen 21a. The particular size of the screen mesh will depend on the expected particle size and desired effectiveness. A duct 33 is shown through which the filtered air passes to the fan 32.

When required, the filtering means 20 may be swung from its position as illustrated in FIGS. 1 and 4 to the second position as shown in FIGS. 2 and 5 by operating means 50. As illustrated in FIGS. 1, 2, 5 and 6, the operating means 50 includes a pull ring 51 which is connected through a holding member 52 and a cable 53 to an extension 23c on the opposite side of a pivot point 15b from the pivot arm 23 whereby force applied to the pull ring will be transmitted to the extension 23c and pivot the filter means 20 about the pivot point 15b from its first position as shown in FIG. 4 to a second position as shown in FIG. 5. Suitable pulley members 55 and 56 as shown in FIG. 1 may be provided to change direction and facilitate movement of the cable 53. To allow the filtering means 20 to be maintained in the second position as shown in FIG. 5, a holding member 52 is provided between the pull ring 51 and the cable 53 so that when the ring 51 is pulled from its position abutting a second opening 34 in the front wall 14 the holding member 52 will be in a first position coaxial with the cable 53 whereby it may pass through the opening 34. After the cable 53 has been pulled a distance sufficient to raise the filtering means 20 from its first position to its second position as shown in FIGS. 2 and 5 the holding member 52 will have its inner end 52a outside the opening 34. At this point the position of the member 52 is changed from its first position in which it is coaxial with the cable 53 to a second position as shown in FIG. 6 where it is transverse to the axis of the cable 53 in which case it will no longer pass back through the opening 34. By pulling the cable 53 with the pull ring 51 through the opening 34 in the cabinet and placing the holding member 52 across the opening such that the end 52a contacts the cabinet wall 14, the filter means 20 can be held in the second position as shown

in FIGS. 2 and 5 for removal of the lint screen 21 from the retainer 20b. The direction of the holder member 52 is changed to be coaxial with the cable 53 to release the filter means 20 and return it to its operative position. It will be understood that the filter means 20 and the operating means 50 may be required to operate under conditions of high heat and humidity and hence require a durable construction such as has been provided. Moreover, the lint screen 21 and the mounting means 20a are simple and easy to construct.

From the foregoing description of the invention it may be seen that there has been provided a drying apparatus having a filter means which overcomes the disadvantages of the prior art and is simply operated and easily constructed. Thus, with the operating means 50 adjacent the front door 13, the user may conveniently move the filter means 20 from a first position flush with the back wall 15 to a second position with the lint screen 21 adjacent the opening 13 whereby the lint screen may be readily removed for cleaning and replaced. The awkward stooping, stretching and twisting as has been heretofore required is no longer necessary as the swing-out feature of the filter means allows for easy removal of the lint screen for cleaning without having to reach to the rear of the dryer drum. The flush mounting of the filter means 20 assures trouble-free operation, and the mounting of the filter means in the bulkhead allows for greater freedom of the airflow duct design.

Although modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such modifications as might reasonably and properly come within the scope of my contribution to the art.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a clothes drying apparatus having a drying chamber with front and rear walls, air translation means for moving air through said drying chamber, air outlet means in said rear wall of said chamber, and door means in said front wall for providing access to said drying chamber;
 - a lint filter for separating lint from the air moving through said drying chamber comprising,
 - filter means pivotally mounted for movement between a first position in which said filter means obstructs said outlet and a second position in which said filter means is placed adjacent said door means in a location accessible for cleaning said filter means.
2. A clothes drying apparatus according to claim 1 wherein said filter means comprises a lint screen and a pivotable lint screen mounting means.
3. A clothes drying apparatus according to claim 2 wherein said mounting means comprises a lint screen retaining means for removably retaining said lint screen on said mounting means, and at least one pivot arm having a first end pivotally attached at a pivot point on said rear wall and a second end supporting said lint screen retaining means.
4. A clothes drying apparatus according to claim 3 including an operating means connected to said one pivot arm for selectively pivotally moving said filter means between said first and second positions.

5. In a clothes drying apparatus having a drying chamber with front and rear walls, air translation means for moving air through said drying chamber, air outlet means in said rear wall of said chamber, and door means in said front wall for providing access to said drying chamber;

lint filter means for separating lint from the air moving through said drying chamber comprising, a lint screen and a pivotable lint screen mounting means, said mounting means being pivotally movable for swinging movement between a first position and a second position, said mounting means including a lint screen retaining means for removably retaining said lint screen on said mounting means, said mounting means positioning said lint screen to obstruct said outlet when said mounting means is in said first position and said mounting means when in said second position locating said lint screen adjacent said door means in an accessible position for ready removal of said lint screen for cleaning.

6. A clothes drying apparatus according to claim 5 wherein said lint screen and said mounting means are mounted to be disposed substantially flush with said rear wall wherein said first position to avoid obstructing said drying chamber.

7. A clothes drying apparatus according to claim 5, wherein said mounting means includes a pair of generally vertically inclined pivot arms each having a first upper end pivotally attached at a pivot point to said rear wall and a second lower end supporting said lint screen retaining means whereby said filter means is retained in said first position in part by the force of gravity.

8. A clothes drying apparatus according to claim 7 wherein at least one of said pivot arms has a second portion at its upper end on the opposite side of said pivot point extending through said rear wall; and operating means connected to said second portion for selectively pivotally moving said filter means between said first and second positions.

9. A clothes drying apparatus according to claim 8 wherein said front wall has means forming an opening adjacent said door means,

said operating means including a cable-pulley arrangement having a holding member with a pull ring therethrough said holding member passing through said opening

and said pull ring being adjacent said opening when said filter means is in said first position and said holding member being adjacent said opening when said filter unit is in said second position whereby said holding member retains said filter means in said second position.

10. A clothes drying apparatus according to claim 5 wherein said lint screen mounting means comprises a plate-like foraminous member, a horseshoe-shaped rib member on said plate-like member defining a slot for slidably receiving said lint screen and rod members attached at their one end to said plate-like member and pivotally mounted to said rear wall at their other end.

11. In a dryer, means forming a treatment zone comprising tumbling means forming a circumferentially continuous wall means rotatable on a generally horizontal axis and having means defining a front opening through which materials to be dried may be placed in and removed from the treatment zone,

air translation means for circulating a stream of temperature conditioned air through said treatment zone,

wall means including a rear wall opposite said front opening for defining an opening or passage there-through of said air stream and a front wall adjacent said front opening,

and a filter means for separating lint from the air stream,

said filter means comprising a mounting means connected to said rear wall for pivotal movement between a first and a second position,

and a lint separating element carried by said mounting means and positioned when in said first position at said rear wall covering said passage through which air is directed for filtering, and positioned when in said second position in an accessible position at said front opening.

12. In a dryer as defined in claim 11, said lint separating element being removably mounted in said filter means to facilitate cleaning thereof.

13. In a dryer as defined in claim 11, an operating means connected to said mounting means and having an actuator means positioned in an accessible position on said front wall for selectively moving said filter means between said first and second positions.

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