

June 10, 1952

A. R. CONSTANTINE

2,600,210

CLOTHES DRIER

Filed Feb. 20, 1946

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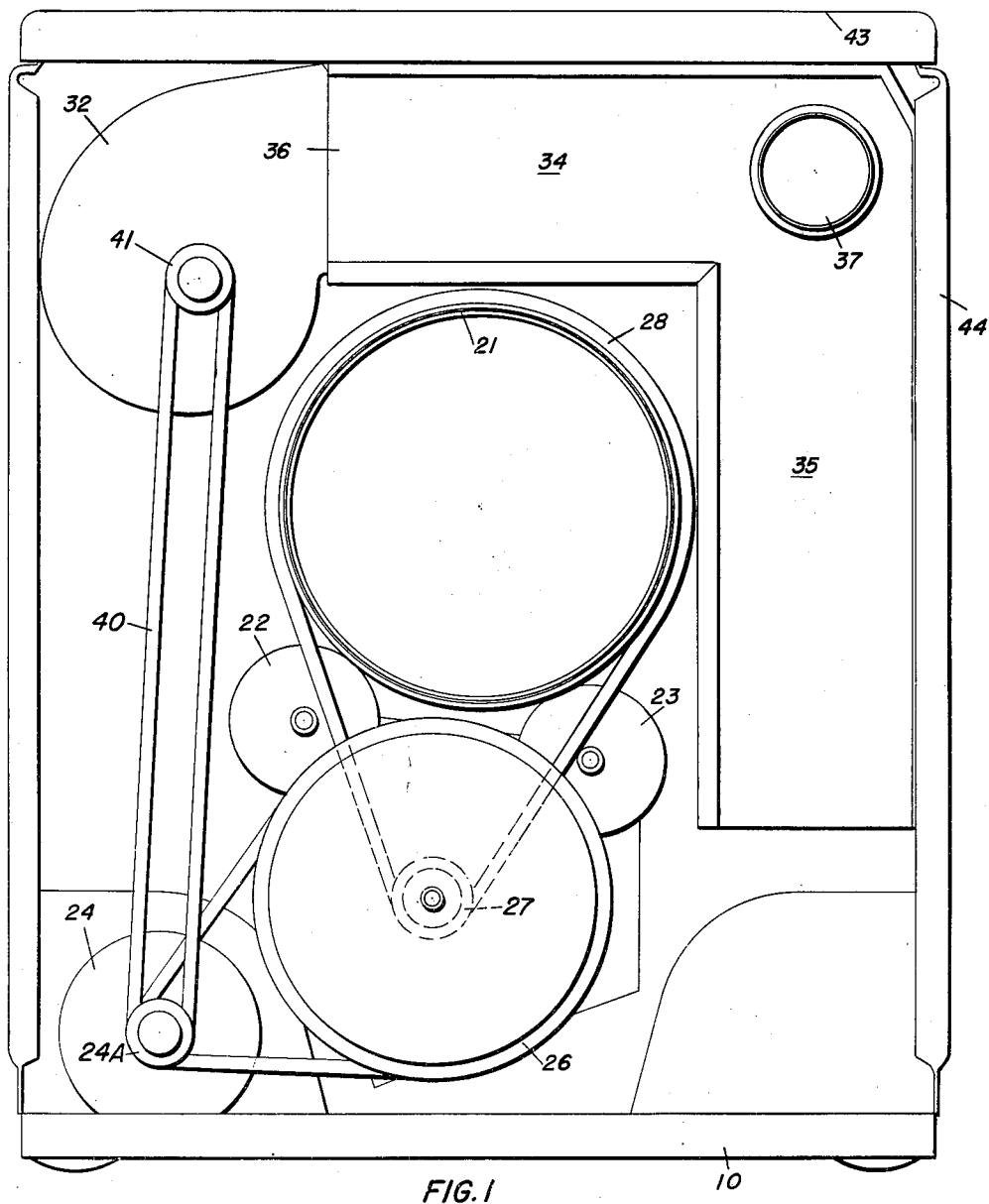


FIG. 1

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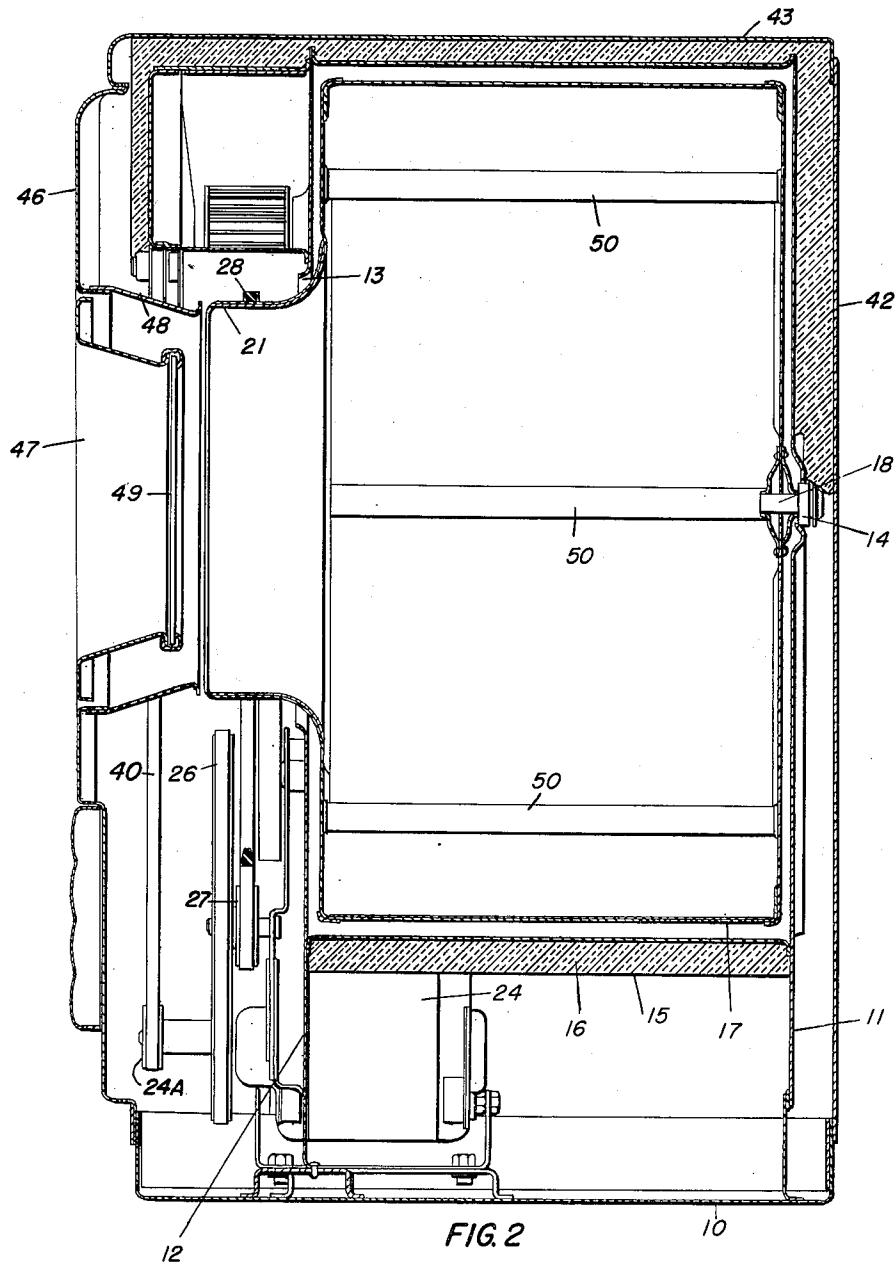
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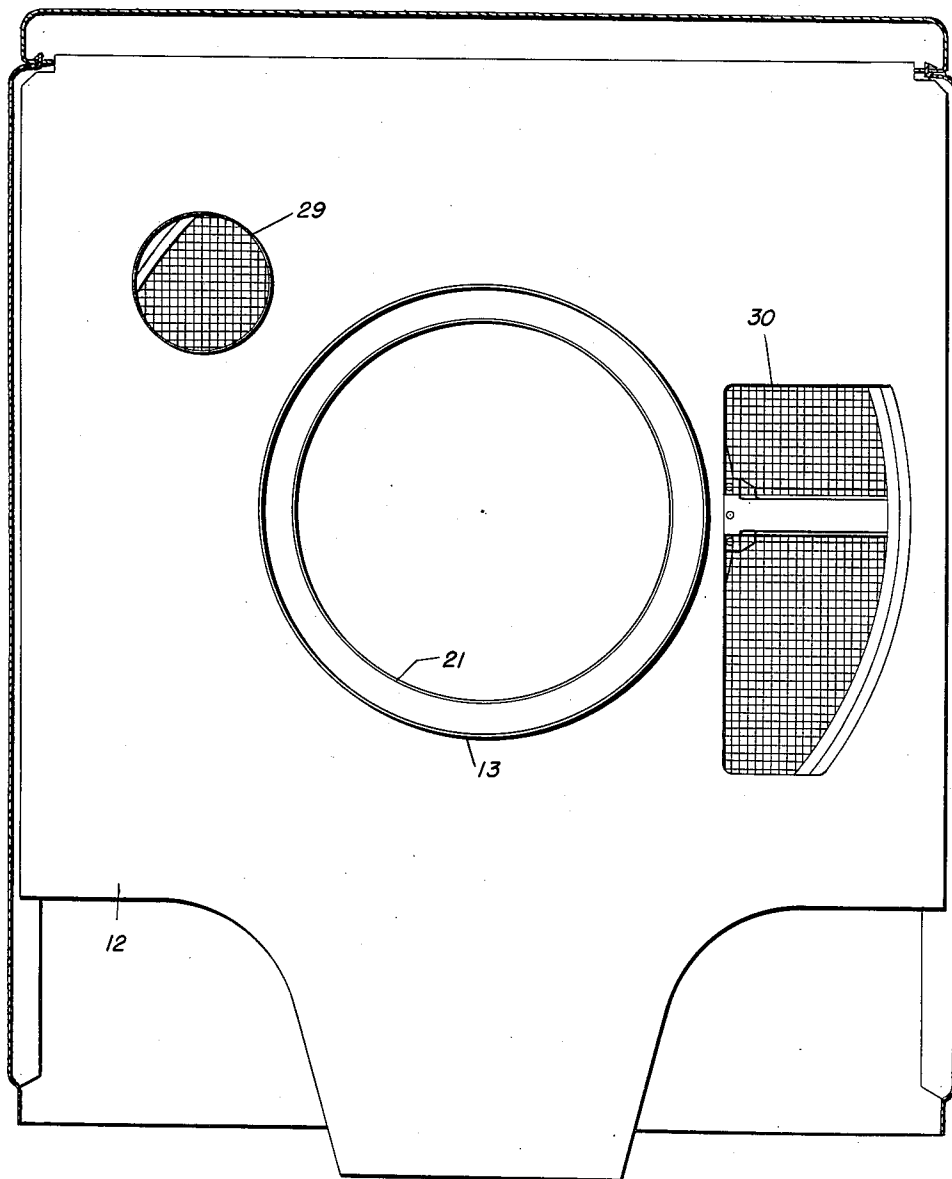


FIG. 3

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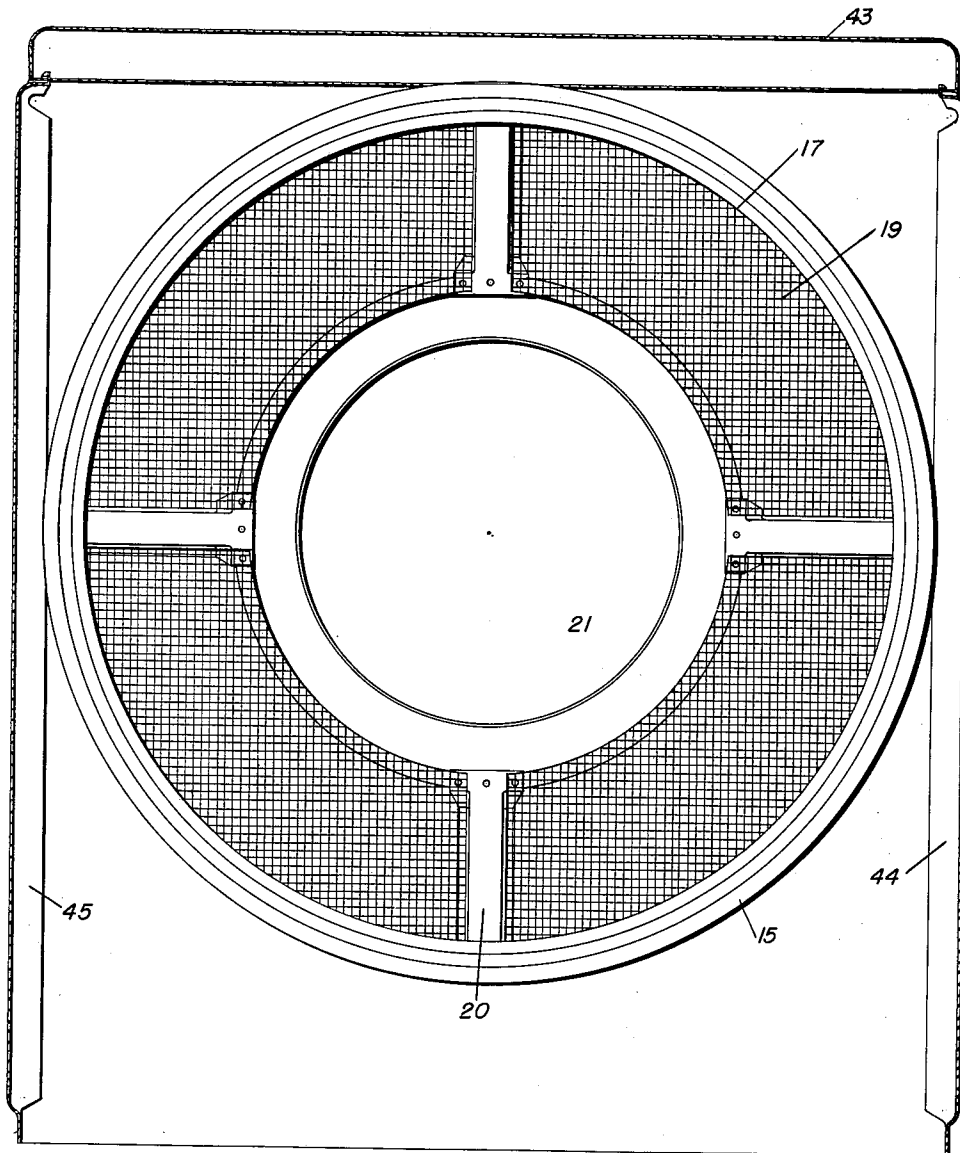


FIG. 4

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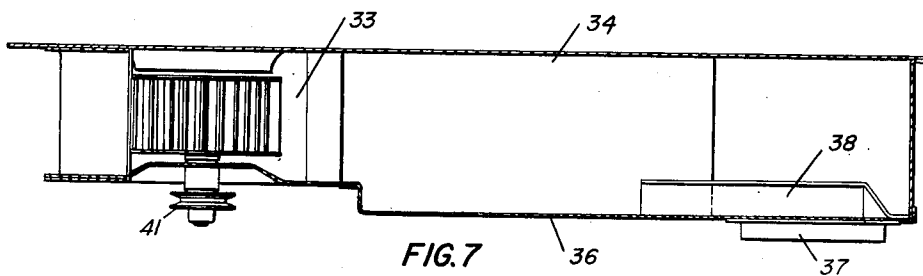
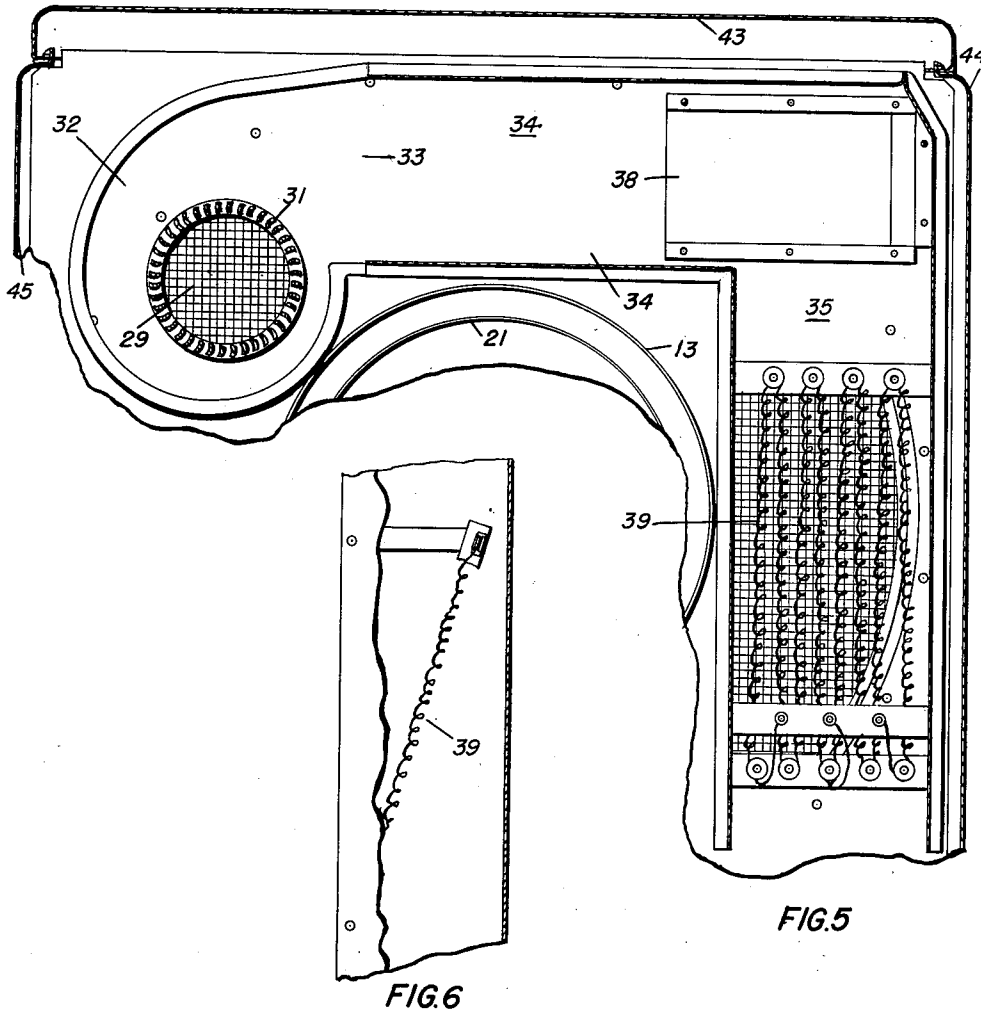
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CLOTHES DRIER

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5 Sheets-Sheet 5



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## UNITED STATES PATENT OFFICE

2,600,210

## CLOTHES DRIER

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10 Claims. (Cl. 34-131)

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This invention relates to clothes dryers of the rotating cylinder type having means to circulate air into and out of said cylinder through a duct in which heat is provided.

It is a primary object of the present invention to provide an apparatus for drying clothes in which a revolving drum is supported and driven from the front thereof and having means to insert clothes into the cylinder also from the front and also to provide air circulating means and heating means all of which are accessible from the front of the machine.

It is a further object to provide a clothes drying apparatus having a drum, means for circulating air into and out of a rotating cylinder through a separate duct in such manner that lint is not collected on the cylinder and does not accumulate in the passageway provided for air into and out of said cylinder.

The above and other objects of the invention will be apparent on consideration of the following more detailed description and by reference to the accompanying drawings forming a part hereof and wherein:

Figure 1 is a front view of the assembled dryer showing the drive mechanism and the opening for receiving the clothes, the front panel of the machine being removed.

Figure 2 is a side view partly in section showing the several parts of the dryer including the several units so arranged as to provide access from the front thereof.

Figure 3 is a view at the front supporting and dividing panel and shows the inlet and outlet openings in the panel which is positioned in front of the cylindrical clothes receiving drum.

Figure 4 is a view parallel to Figure 3 but with the dividing panel shown in Figure 3 removed showing the front of the cylindrical clothes receiving drum.

Figure 5 is a front view of the machine showing the air circulating duct and heating element in position relative to the inlet and outlet.

Figure 6 is a side view of the heating element showing its position in the duct.

Figure 7 is a top view of the air circulating duct showing the circulating fan and outlet arrangement.

Referring to the drawings, a base 10 supports a sheet metal rear supporting panel 11 and a front supporting and dividing panel 12 spaced as shown in Figure 2. The front panel 12 has a circular opening 13 provided therein and the rear panel 11 supports a bearing 14. A cylindrical shaped casing 15 is formed in the shape of a flanged tube

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having its flanges secured to the inside faces of rear panel 11 and the front panel 12, respectively. Suitable heat insulating material 16 is provided around the cylindrical member 15. A rotatable clothes carrying or receiving cylinder 17 has a diameter slightly less than the cylindrical shaped casing 15 and is of a length slightly less than the distance between the front panel 12 and the rear panel 11 and is supported for rotation in the cylindrical shaped outer casing 15. A short shaft 18 is secured to the back wall of the rotatable cylinder and this shaft is supported in the bearing 14. The clothes cylinder 17, as shown in Figure 4 has an annular perforate front wall 19 made up of relatively large mesh screen as shown in Figure 4, the screen being supported on a plurality of radially extending spokes 20. These spokes 20 have their outer ends secured to the circumference of the cylinder 17 and have their inner ends secured to a tubular member 21 which is of such length and shape, as shown in Figure 2, as to extend through the opening 13 in the panel 12. The panel 12, as shown in Figure 1, has roller members 22 and 23 secured thereto in such position that the tubular member 21 and the cylinder 17 are supported for rotation thereby, this front support being in addition to the rear support bearing 14 on the rear panel 11. The tubular member 21 is flared at its inner end and, as shown in Figures 2 and 4, is connected to the spokes 20 and to the annular screened front wall 19. A motor 24 having a pulley 24a provides for rotation of the rotatable cylinder 17 through a belt which drives a large pulley 26 with which rotates a smaller pulley 27 through a belt 28. The tubular member 21 serves as a pulley for driving the cylinder 17 as well as a central access opening for loading wet clothes into the dryer and to remove the dry clothes therefrom.

The space in the opening 13 between the edge of said opening 13 and the tubular member 21 provides an annular passage concentric with tubular member 21 of ample capacity to permit the inlet of air to the interior of the casing 15 and cylinder 17.

The front panel 12 as shown in Figure 3 has an outlet opening 29 and an inlet opening 30. These two openings both coincide as to axial distance from the axis of rotation with the annular front wall 19 of cylinder 17 so that outlet opening 29 and the inlet opening 30 are in effect inlet and outlet openings into and out of the rotatable cylinder 17 through the annular front wall 19 thereof. The outlet opening 29 has a circulating blower impeller 31 mounted for rotation adja-

cent thereto so that rotation of such blower will draw air out from the outlet 29 into the blower housing 32 which is mounted upon the front panel 12. The outlet 33 of the blower housing exhausts into a conduit 34 which is also supported upon the front panel 12. This conduit 34 extends horizontally across the top of the panel 12 and turns downwardly into a vertical conduit section 35 terminating and covering the inlet opening 30, so that air drawn from the outlet 29 by the air circulating impeller is forced into the inlet 30 from the vertical conduit section 35.

The conduit 34 as shown in Figure 7 is of greater width than the blower outlet 33, the conduit being provided with an offset front wall 36 and such front wall is provided with an outlet opening 37 positioned near the righthand end of the conduit 34 and above the vertical conduit section 35 of the downwardly extending conduit. This outlet has a scoop 38 provided adjacent the inner edge thereof of such width as to be only a small amount greater in height than the offset in the front wall 36. Such construction assures that the scoop 38 will divert or pick up air from a portion of the conduit 34, which will represent a relatively slow moving portion of the air stream in conduit 34 and will therefore remove only a small portion of the air passing through said conduit and through the outlet 37.

An electrical heating element 39 is supported in the vertical conduit section 35 substantially over or adjacent to the inlet opening 30 in the panel 12. This heating element 39 made up of electrical resistance wire is preferably inclined in the conduit as shown in Figure 6.

For the purpose of providing power for rotating the circulating blower impeller 31 a belt 40 is provided from the motor 24 to a pulley 41 on the blower housing 32.

A cabinet may enclose the unit as shown and is preferably made up of a back panel 42, a top panel 43, side panels 44 and 45 and a front panel 46. The front panel 46 has a door 47 mounted thereon and such front panel also is provided with a tubular inwardly extending member 48 which tubular member extends inwardly toward the tubular member 21, a space between the ends of the member 48 and 21 being only an amount sufficient for clearance when the cylinder 17 and the member 21 rotate. The outlet 37 discharges to the atmosphere exteriorly of the cabinet through an exhaust outlet (not shown) in the front panel 46.

The door 47 may be provided with a glass 49 and when opened, clothes to be dried are inserted into the cylinder 17 through the openings provided by the tubular members 48 and 21. The cylinder 17 is preferably provided with a plurality of baffles 50 and on rotation the clothes to be dried are tumbled in the cylinder by the rotation thereof.

During rotation of the cylinder the previously described air circulating system on the front panel 12 causes air to be circulated out from the cylinder 17 through the outlet 29 through the conduits 34 and 35 over the heating element 39 and into the cylinder 17 again through the inlet 30. This circulation is forced by the blower impeller unit 31 and 32 and a major portion of the air drawn out from the cylinder and into this conduit is again forced back into the cylinder 17, a small portion only being allowed to be ejected from the outlet 37.

The arrangement of the unit so that the drive motor and all major rotating mechanism and

heating element are positioned in the front portion of the dryer is considered an advantage from the standpoint of accessibility for servicing the machine as the front panel 46 or portions thereof may be removed for the purpose of servicing any of the major units of the dryer.

It is an important feature also that the open screen covered front wall 19 of the drum or cylinder 17 will not collect lint since it is continuously rotating alternately past the air outlet 29 and the air inlet 30 and therefore subjected alternately to air passage in opposite directions so that any lint which may be built up on one side of the screen as it passes the air outlet 29 will immediately be blown off as it passes the air inlet 30. This arrangement of a perforated or screen like wall on a rotating member alternately subjected to air currents in opposite directions for the purpose of creating a circulation of air within the drum is a means of providing such circulation through a screen without accumulation of lint. If an outlet were provided in a front of a drum and an inlet at the rear of the drum, both of which opened into the drum and provided with a screen, lint would collect on both of such openings and such a construction would not be as satisfactory from a lint accumulation standpoint as the above described construction. It is important also to consider the means disclosed herein whereby a minimum of lint is exhausted from the machine with the air which is allowed to flow through the outlet passage 37. This is accomplished by locating the limited outlet 37 in a portion of the air stream where a minimum velocity of circulation exists and away from the normal path of the air thrown from the impeller.

Although the invention has been illustrated by reference to a specific structure found practical in actual operation, it is intended that various changes and modifications may be made within the scope of the following claims.

I claim:

1. In a device of the character described, a rotatable cylinder having a cylindrical portion and front and back walls, said front wall having an opening affording access to said cylinder and one of said walls being perforate, a rear panel adjacent said back wall, a front panel adjacent said front wall, means rotatably supporting said cylinder for rotation between said panels, means interconnecting said front and rear panels and enclosing said cylinder, one of said panels having spaced openings confronting the perforate wall of said cylinder, an air duct disposed exteriorly of said one panel and communicating with the openings in said one panel, whereby said openings serve as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, and means for heating the circulating air.

2. A device as defined in claim 1, including means for diverting and ejecting a portion of the circulating air from said air duct.

3. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall, a front panel adjacent said perforate front wall, means rotatably supporting said cylinder for rotation between said panels, means interconnecting said front and rear panels and enclosing said cylinder, said front panel and said front wall having aligned openings providing access to the interior of said cylinder, said front panel having additional openings

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formed therein, one on each side of its access opening, in confronting relation to the perforate front wall of said cylinder, an air circulating duct on the outer side of said front panel and communicating with said additional openings, whereby said additional openings serve as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, and means for heating the circulating air.

4. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall carrying a bearing rotatably supporting the back end of said cylinder, a front panel adjacent said front wall, means interconnecting said front and rear panels and enclosing said cylinder, a tubular section carried by said front wall of said cylinder and providing a central opening for said cylinder, said front panel having an opening and said tubular section extending through said opening in said front panel, means rotatably supporting said tubular section adjacent said front panel, an air circulating duct mounted upon the outer side of said front panel, said front panel having spaced openings confronting said perforate front wall and communicating with said air duct and serving as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, means for heating the circulating air, and means for effecting rotation of said cylinder, whereby to cause movement of any given confronting portion of said perforate front wall successively past said inlet and outlet openings to thereby prevent the accumulation of lint on said perforate front wall by the alternate reversing of the direction of air flow into and out of said cylinder at said given portion.

5. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall carrying a bearing rotatably supporting the back end of said cylinder, a front panel adjacent said front wall, means interconnecting said front and rear panels and enclosing said cylinder, a tubular section carried by said front wall of said cylinder and providing a central opening for said cylinder, said front panel having an opening and said tubular section extending through said opening in said front panel, means rotatably supporting said cylinder adjacent said front panel, an air circulating duct mounted upon the outer side of said front panel, said front panel having spaced openings confronting said perforate front wall and communicating with said air duct and serving as inlet and outlet openings, respectively, for said air duct, a blower for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, means for heating the circulating air, driving means for effecting rotation of said cylinder including a driving motor and a belt driven from said motor and passing over the upper outer surface of said tubular section and utilizing the outer surface of said tubular section as a pulley, and means for driving said blower from said motor.

6. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall, a front panel adjacent

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said perforate front wall, means rotatably supporting said cylinder for rotation between said panels, said front panel and said front wall having aligned openings providing access to the interior of said cylinder, said front panel having additional openings formed therein, one on each side of its access opening, in confronting relation to the perforate front wall of said cylinder, an air circulating duct on the outer side of said front panel and communicating with said additional openings, whereby said additional openings serve as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, and means for heating the circulating air.

7. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall carrying a bearing rotatably supporting the back end of said cylinder, a front panel adjacent said front wall, a tubular section carried by said front wall of said cylinder and providing a central opening for said cylinder, said front panel having an opening and said tubular section extending through said opening in said front panel, means rotatably supporting said tubular section adjacent said front panel, an air circulating duct mounted upon the outer side of said front panel, said front panel having spaced openings confronting said perforate front wall and communicating with said air duct and serving as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct and through said cylinder via said inlet and outlet openings, means for heating the circulating air, and means for effecting rotation of said cylinder, whereby to cause movement of any given confronting portion of said perforate front wall successively past said inlet and outlet openings to thereby prevent the accumulation of lint on said perforate front wall by the alternate reversing of the direction of air flow into and out of said cylinder at said given portion.

8. In a device of the character described, a rotatable cylinder having a cylindrical portion and front and back walls, said front wall having an opening affording access to said cylinder and one of said walls being perforate, a rear panel adjacent said back wall, a front panel adjacent said front wall, means rotatably supporting said cylinder for rotation between said panels, one of said panels having two openings spaced from the axis of rotation of said cylinder and confronting the perforate wall of said cylinder, an air circulating means positioned on said one panel adjacent one of said openings thereby to draw air through said opening and outwardly from said cylinder, air heating means adjacent said other spaced opening in said panel whereby air is caused to be drawn into said cylinder over said heating means.

9. In a device of the character described, a rotatable cylinder having a cylindrical portion and front and back walls, said front wall having an opening affording access to said cylinder and one of said walls being perforate, a rear panel adjacent said back wall, a front panel adjacent said front wall, means rotatably supporting said cylinder for rotation between said panels, means interconnecting said front and rear panels and enclosing said cylinder, one of said panels having two openings spaced from the axis of rotation of said cylinder and confronting the perforate wall of said cylinder, an air duct circulating means

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disposed exteriorly of said one panel and communicating with the openings in said one panel whereby said openings serve as inlet and outlet openings for said air duct, means for effecting forced circulation of air through said duct and through said cylinder via said inlet and outlet openings, and means for heating the circulating air.

10. In a device of the character described, a rotatable cylinder having a cylindrical wall, a perforate front wall and a back wall, a rear panel adjacent said back wall, a front panel adjacent said perforate front wall, means rotatably supporting said cylinder for rotation between said panels, said front panel and said front wall having aligned openings providing access to the interior of said cylinder, said front panel having two openings spaced from the axis of rotation of said cylinder and confronting the perforate wall of said cylinder, an air circulating duct on the outer side of said front panel and communicating with said two openings, whereby said two openings serve as inlet and outlet openings, respectively, for said air duct, means for effecting forced circulation of air through said air duct

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and through said cylinder via said inlet and outlet openings, and for heating the circulating air.  
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