May 5, 1959 E. H. SMITH 2,884,710

CLOTHES DRYER

Filed Aug. 30, 1956 2 Sheets-Sheet 1

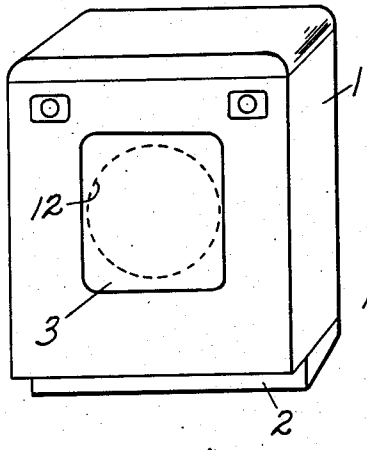


FIG. 1

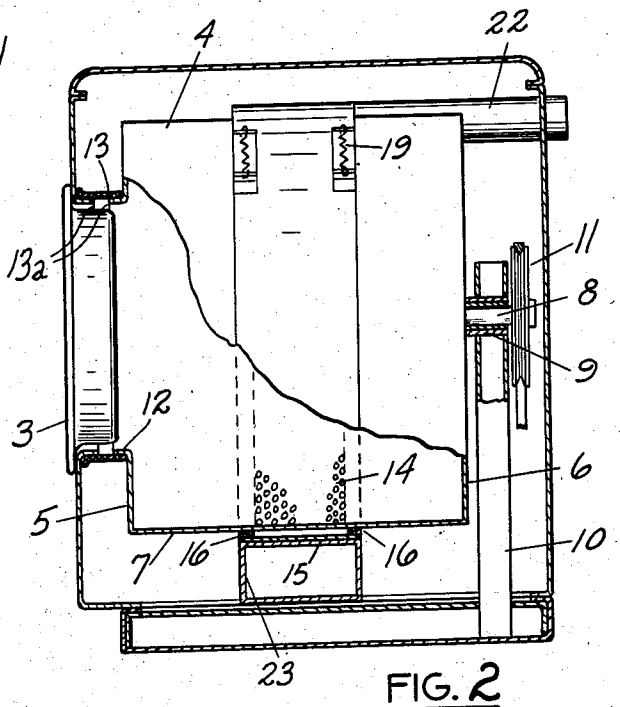


FIG. 2

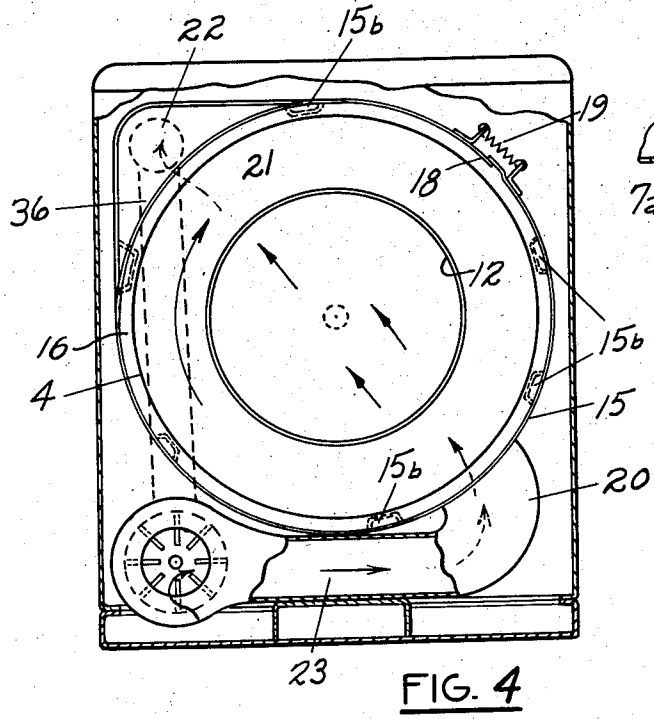


FIG. 4

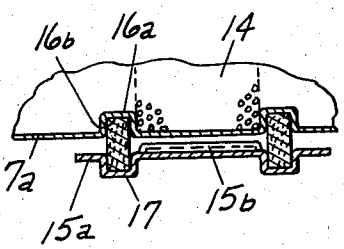


FIG. 3

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CLOTHES DRYER

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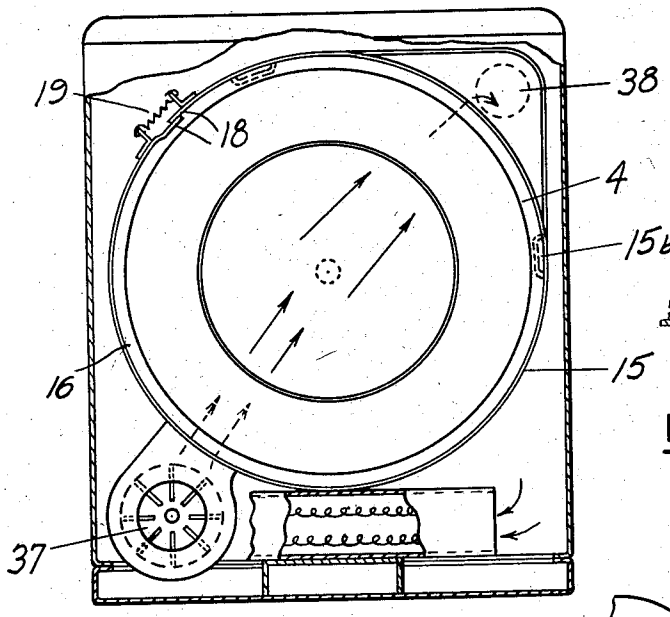


FIG. 5

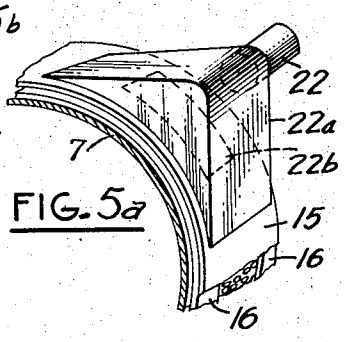


FIG. 5a

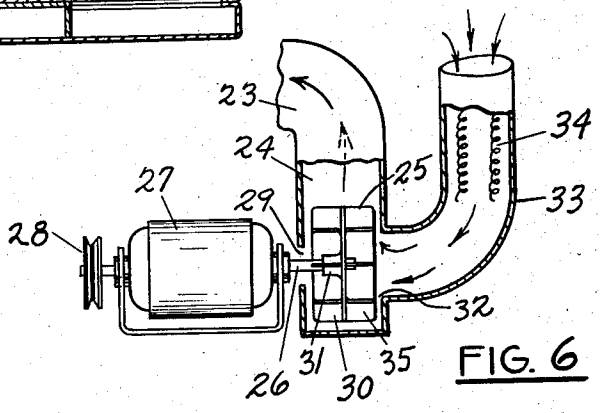


FIG. 6

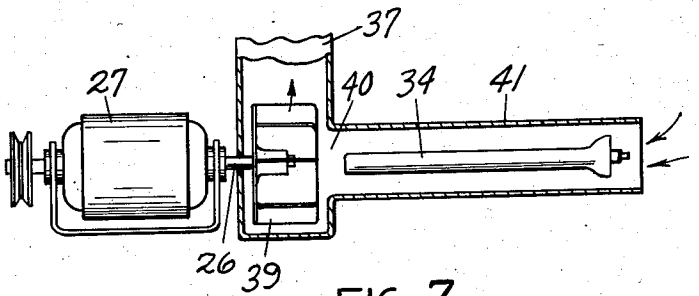


FIG. 7

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CLOTHES DRYER

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3 Claims. (Cl. 34—133)

This invention is a clothes dryer in which the drum has a cylindrical peripheral wall which is imperforate except for a narrow annular section surrounded by a housing which is sealed against the drum on each side of the perforated section. In a preferred form, air inlet and outlet connections are made to diagonally opposite portions of the housing, the inlet being, for example, at the bottom and the outlet at the top. The air circulation is obtained from a fan connected to a stove or heating chamber and to the ambient air. The inherent mixing obtained in the fan discharge reduces the temperature of the air entering the dryer to a safe value so that no scorching is obtained even when the air is blown into the bottom of the annular housing so it discharges directly against the clothes. The relatively high velocities obtained in the housing prevent lint accumulations.

In the drawings, Fig. 1 is a perspective of a dryer; Fig. 2 a sectional side elevation of the dryer; Fig. 3 is a fragmentary view showing a modification; Fig. 4 is a front elevation of the dryer chassis; Fig. 5 is a front elevation of a modification; Fig. 5a is a fragmentary perspective showing the air outlet connection for the Fig. 2 dryer; Fig. 6 is a diagrammatic view of the air circuit showing an electric heater, and Fig. 7 is a similar view with a gas heater.

In the drawing, **1** indicates a cabinet suitably mounted on a base **2** and having a door **3** at the front through which clothes are loaded and unloaded. Within the cabinet is a clothes receiving drum **4** having front and back end walls **5** and **6** and a cylindrical peripheral wall **7** connecting the end walls. The drum carries at its back wall **6** a shaft **8** journaled in a bearing **9** on a post **10** carried by the base **2** and rotated by a pulley **11** through a suitable drive, not shown. The front wall **5** of the drum has an opening **12** through which clothes are loaded and unloaded and around the opening **12** is a felt seal **13** which engages the front wall **5** between spaced collars **13***a*. When the door **3** is closed, the drum is imperforate except for a narrow annular section **14** in the cylindrical wall **7** midway between the end walls **5** and **6**. Outside the perforate section **14** is an imperforate cylindrical band **15** having at opposite edges felt seals **16** cemented to the band and bearing on the cylindrical wall **7** of the drum at opposite sides of the perforate section **14**. The band **15** has adjacent ends **18** which are urged together by springs **19**. By this construction, the felt seals **16** are maintained in sealing engagement with wall **7** of the drum. From one aspect, the springs **19** provide take up for wear.

As shown in Fig. 3, the peripheral wall **7***a* of the drum may have annular channels **16***a* receiving the inner edges of felt seals **16***b* and the band **15***a* may have opposed channels **17** in which are cemented the outer edges of the felt seals **16***b*. The channels **16***a* and **17** in addition to locating the felt seals stiffen both the band **15** and the wall **7***a* and hold those parts to a true cylindrical shape. The band **15***a* can be spaced very closely to the

perforate section **14**, for example, by indented sections **15***b*.

The inlet for heated air for drying the clothes is through a duct **20** connected to the band **15** in a lower right hand quadrant viewed from the front of the dryer. Rotation of the drum in a clockwise direction causes the clothes to be lifted up to about point **21** and to fall diagonally across the drum toward duct **20**. Since the duct **20** is of relatively small diameter, the clothes are continually falling or tumbling into a jet-like stream of heated air issuing from the duct **20**. This secures good cantact between the heated air and the clothes essential for efficient drying. The outlet duct **22** for the moisture laden air is located in a fitting **22***a* mounted on the band between the felt seals **16** and an upper left hand quadrant as viewed from the front of the dryer over the opening **22***b* in the band **15** substantially at the region **21** at which the clothes begin to tumble away from the inner surface of the drum and to fall towards the inlet duct **20**. This means that the outlet opening **22***b* is not blocked by clothes. The air from the outlet duct **22** may be discharged in any direction, for example, to a duct leading to an outside point or it may discharge through a lint catching filter or trap.

The heated air is fed to the inlet duct **20** from the discharge **23** of a double inlet fan or blower **24**. The fan has an impeller **25** mounted on the shaft **26** of a motor **27** which also drives the drum through a pulley **28**. One of the fan inlets **29** is connected to the ambient air and is sucked in through the inlet by blades **30** on the side of the impeller hub **31** adjacent the inlet **29**. The other fan inlet **32** is connected to a duct **33** containing a heating element **34** which may, for example, be an electric heating element or a gas stove or burner. The air sucked in through the duct **33** is heated by the heating element and is forced to the fan discharge by blades **35** on the side of the impeller hub **31** adjacent the fan inlet **32**. The air entering the fan inlet **32** is so hot that it would scorch the clothes if discharged directly against the clothes. The mixture of ambient air from the inlet **29** or from another source of lower temperature air is accordingly necessary if scorching is to be prevented. The impeller **25** functions as an effective mixer due to the inherent turbulence produced by the action of the blades **30** and **35**. Accordingly, the air entering the fan discharge **35** is of uniform temperature with a lack of stratification which could result in localized streams of air of temperature sufficiently high to scorch the clothes.

It has been found that there is not tendency for lint to collect in the dryer or in the ducts connected to the dryer. Even when the discharge duct **22** is intentionally blocked with a filter so that lint will collect, as soon as the blocking is removed the lint is immediately blown out the discharge duct. No lint accumulates between the drum and the inner surface of the band **15**. This may be due to the fact that there are no dead air spots which would give the lint a chance to settle.

By connecting a by-pass duct **36** either to the discharge duct **22** or to the band **15** at a point spaced from the inlet duct **20**, it is possible to recirculate air from the dryer back to the vicinity of the inlet **29**. This improves the drying efficiency. Because of the suction at the inlet **29**, there is no chance for lint to collect around the inside of the dryer cabinet **1**. This is true even although the bypass duct **36** is not sealed directly to the fan inlet **29** as is the case of the duct **33**.

In the modification of Figs. 5 and 7, the fan **37** discharges directly to the lower left hand quadrant of the band **15** and the outlet duct **38** is connected to the band **15** in the upper right hand quadrant in the same manner as the connection of the duct **22** in Fig. 5a so as to

obtain the desired diagonal circulation of heated air through the tumbling clothes. The same double shaft extension motor **27** is used in the same location as in Fig. 6 with the impeller **39** connected to the shaft **26**. The fan has only a single inlet **40** connected to a duct **41** in which is located the gas or electric heater **34**. Ambient air drawn into the duct **41** picks up the products of combustion if the heater is a gas burner and the mixing takes place in the fan casing **37** so the air discharged into the housing **15** is at a temperature low enough to prevent scorching of the clothes. The same drying action is present. The drum rotates counterclockwise as viewed in Fig. 5, and the clothes tumble diagonally from the upper right to lower left quadrants while the heated air flows diagonally from the lower left to upper right quadrants. This insures good contact between the heated air and the clothes essential for efficient drying.

What is claimed as new is:

1. A clothes dryer comprising a drum supported for rotation on a horizontal axis, said drum having an axially extending cylindrical peripheral wall imperforate except for an annular perforated section occupying part of its axial length, an annular imperforate band outside the drum straddling and spaced radially from said perforate section and sealed to the imperforate portion of said peripheral wall on each side of the perforate section, means holding said band in a stationary position with respect to the rotatable drum, and inlet and outlet ducts connected to said band at circumferentially spaced points.

2. A clothes dryer comprising a drum supported for rotation on a horizontal axis, said drum having end walls and a cylindrical peripheral wall extending between the end walls, said cylindrical wall being imperforate except for an annular perforated section intermediate the end walls and occupying part of the axial length of the drum and having annular channels in the imperforate portion at each side of the perforate section, an annular band outside the drum straddling and spaced radially from said perforate section and carrying felt seals riding in said channels, means holding said band in a stationary position with respect to the rotatable drum, and inlet and outlet ducts connected to said band at circumferentially spaced points.

3. A clothes dryer comprising a drum supported for rotation on a horizontal axis, said drum having end walls and a cylindrical peripheral wall connecting the end walls, said cylindrical wall being imperforate except for an annular perforated section between the end walls and occupying part of the axial length of the drum, an annular band outside the drum straddling and spaced from said perforate section and sealed to the imperforate portion of said peripheral wall on each side of the perforate section, means holding said band in a stationary position with respect to the rotatable drum, an inlet duct connected to a lower quadrant of said band, an outlet duct connected to an upper quadrant of said band, a blower for forcing air into said inlet duct, and a heater for heating air flowing to the blower.

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