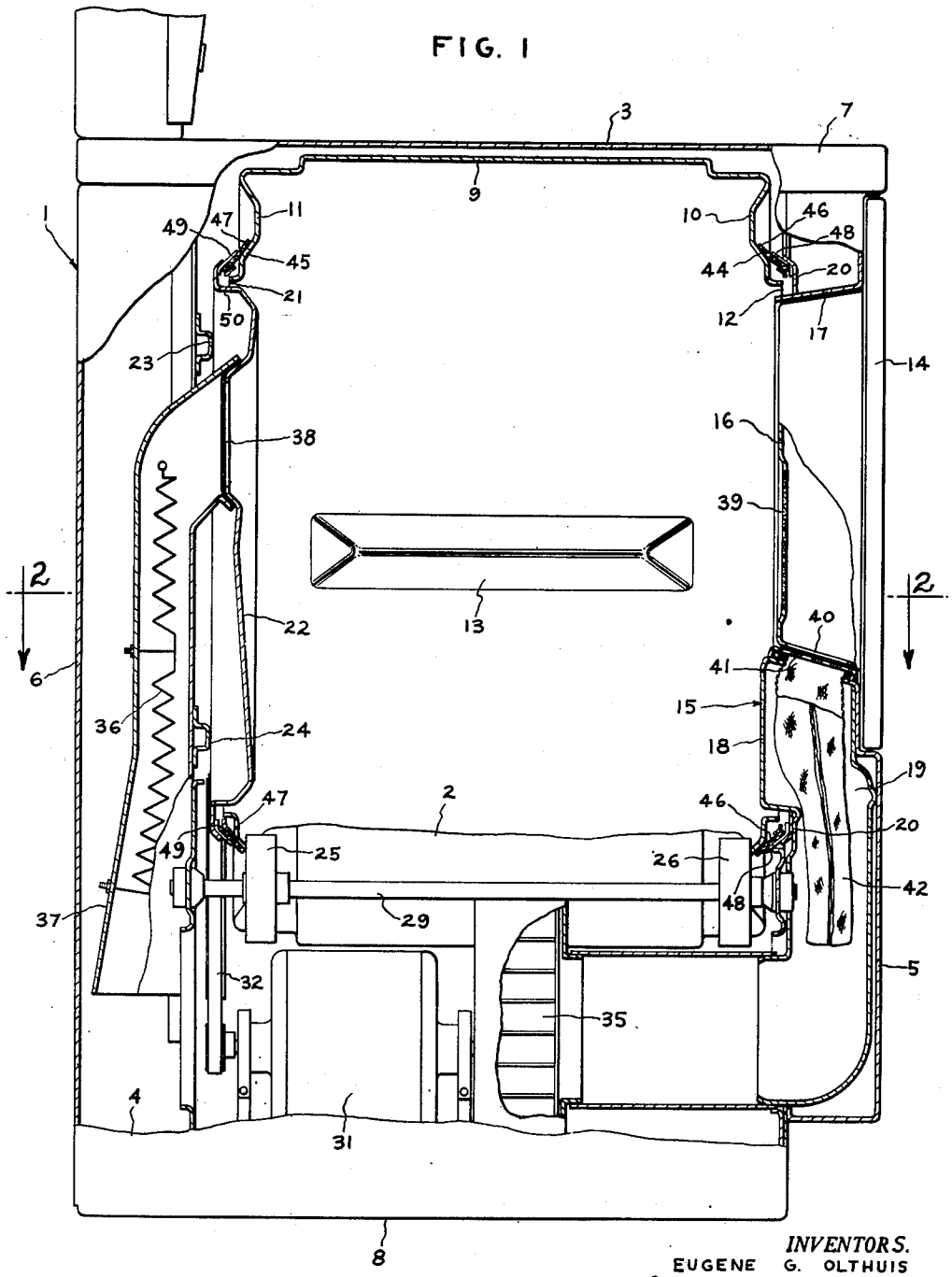
May 20, 1958 E. G. OLTHUIS ET AL 2,835,048

BASKET SUPPORTING AND SEALING ARRANGEMENT FOR CLOTHES DRYERS

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FIG. 1



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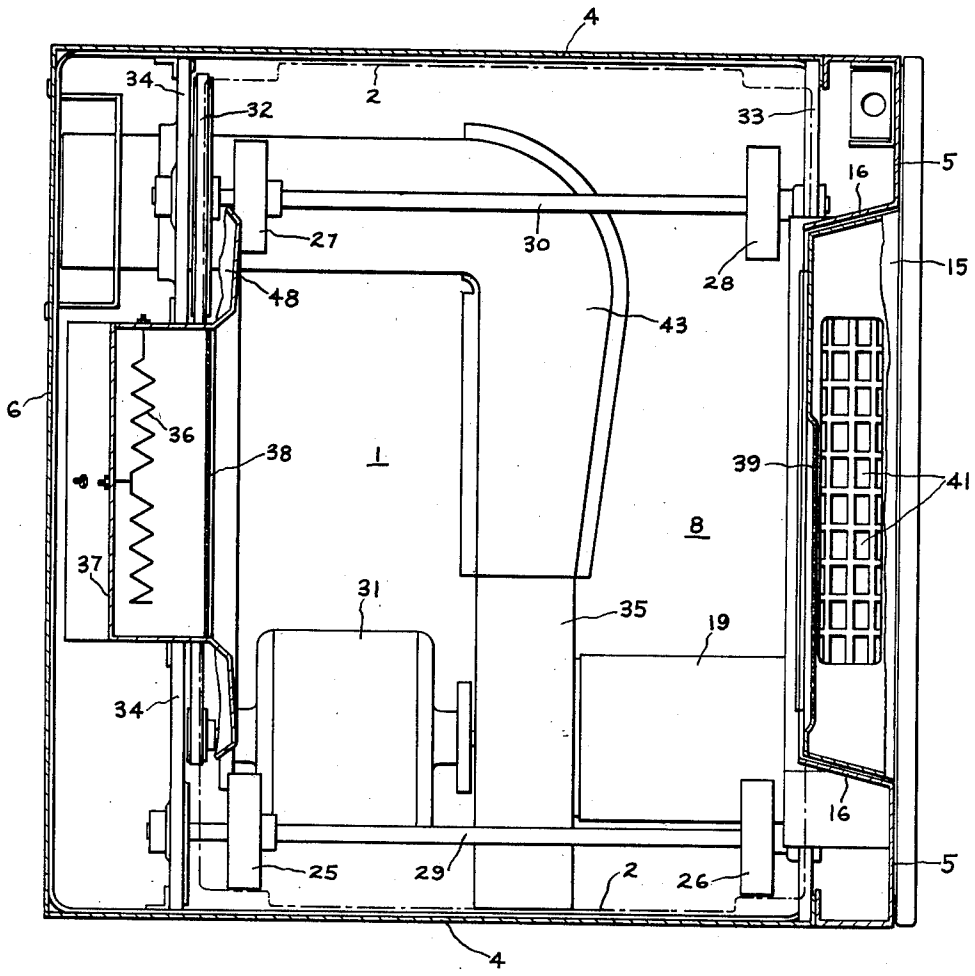
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2 Sheets-Sheet 2

FIG. 2



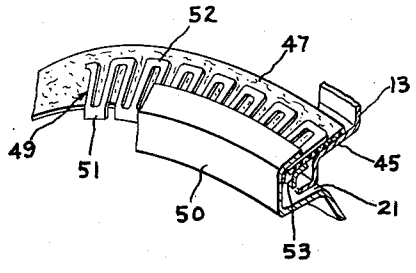


FIG. 3

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BASKET SUPPORTING AND SEALING ARRANGEMENT FOR CLOTHES DRYERS

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3 Claims. (Cl. 34—132)

Our invention relates to clothes drying machines and, more particularly, to the basket supporting and sealing arrangements included in such machines.

It is an object of our invention to provide an improved means for positioning and supporting a clothes dryer basket with respect to a basket driving means.

Another object is to provide an improved air sealing means for maintaining the flow of air through an open-ended rotatable clothes dryer basket in a confined path.

A further object is to provide an improved arrangement for maintaining equilibrium of a rotating clothes dryer basket.

Still a further object is to provide an improved combined air sealing and basket positioning means for a rotatable clothes dryer basket.

In carrying out our invention we provide a clothes dryer having an open ended, and otherwise imperforate, clothes basket, rotatable about a non-vertical axis and supported within a cabinet or casing. An air heating assembly is mounted within the cabinet and means are provided for circulating air over the heater and through the basket, thereby to dry the clothes being tumbled in the basket. The air flows from the heater into and through the basket in a confined path and then passes out of the basket also in a confined path, sealing means being provided at the ends of the basket to prevent air leakage. The sealing means prevents air which has not passed over the heater from entering the basket, and also ensures that only air which has passed through the basket is passed into the outlet path or duct from the basket.

The open-ended basket is driven by means of frictional engagement of its periphery with driving wheels mounted beneath the basket and driven by a suitably controlled drive motor, which may also drive a blower for effecting the flow of heated air through the clothes dryer. Dynamic equilibrium of the basket is maintained by contact of the sealing means with the two ends of the basket. These sealing means are specially formed and mounted so as to provide an inwardly and centrally directed thrust upon the basket and with the two sealing means acting in opposition axially of the basket in order to prevent axial shifting of the basket with respect to the driving wheels. In addition, the sealing means are mounted at an angle with respect to the vertical and serve to support and position the basket at a predetermined axis of rotation with respect to the driving wheels, to the end that the basket periphery does not lift from the wheels during starting or during the abrupt shifting of the clothes being tumbled within the basket.

The subject matter which we regard as our invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. Our invention itself, however, both as to its organization and method of operation, may be best understood by reference to the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view of a clothes dryer

embodying our invention, the view being partially broken away and partially sectionalized to illustrate details of the dryer;

Fig. 2 is a horizontal sectional view of the dryer along line 2—2 in Fig. 1 with the basket removed, and with certain surfaces broken away and partially sectionalized to illustrate further detail; and

Fig. 3 is a perspective view of a segment of our improved sealing and basket positioning means.

Referring to the drawings we have shown therein a domestic clothes dryer 1 embodying the invention in one form thereof. The clothes dryer 1 includes a rotatable open-ended clothes tumbling basket 2, preferably of symmetrical form which is mounted within a suitable outer casing or cabinet 3. The casing has side walls 4, a front wall 5, a rear wall 6, a top panel 7, and a base 8 and completely encloses the basket 2 on all sides. The basket is mounted for rotation about a horizontal axis in a manner which will be explained hereinafter, and it comprises a cylindrical drum-like member having an outer cylindrical side wall 9 and front and rear end walls 10 and 11. The outer cylindrical wall 9 of the basket is substantially imperforate over its entire length, and on its interior surface may have a plurality of suitable clothes tumbling ribs attached thereto, one such rib being shown at 13 in Fig. 1.

The front wall 10 of the basket is provided with a central opening 12 surrounded by a circumferential flange, and a portion of this opening 12 is in alignment with an access opening in the front wall 5 of the outer casing or cabinet for the loading and unloading of clothes. A door 14 is hinged to the cabinet for closing the cabinet opening during operation of the dryer, and the front opening 12 of the basket itself is closed by a bulkhead generally indicated at 15 formed by the combination of the inner surface 16 of the door and a number of adjacent stationary members mounted on the cabinet. Specifically, in addition to the door, the stationary door seat 17, the inner surface 18 of the exhaust duct 19 leading from the basket, and an annular flange 20 mounted on the seat and the duct wall all cooperate to form a bulkhead closing the front opening 12. The flange 20 it will be noted forms a continuous, annular surface around the opening 12 at periphery of the bulkhead 15. At its rear end, the basket likewise has a central opening surrounded by a circumferential flange. This rear opening 21 comprises an air inlet opening and it is closed by means of a stationary, generally circular bulkhead 22 which is mounted on the cabinet by means of a pair of cross supports 23 and 24. As is explained in detail below, sealing means are provided at both the front and rear drum openings, for preventing air leakage therethrough.

The clothes basket 2 is rotatably supported within the outer casing by means of a plurality of uniform diameter roller wheels 25, 26, 27 and 28 (see Fig. 2). The roller wheels 25 and 26 are supported on an idler shaft 29 whereas the roller wheels 27 and 28 are mounted on a power shaft 30 which is driven from the main drive motor 31 of the dryer by means of a belt and pulley drive 32. The motor 31 is controlled by means of the electrical control system (not shown) for the dryer, and it will be understood that any suitable control system may be used since the system forms no part of the present invention. As shown, both the drive shaft 30 and idler shaft 29 are supported at the front and rear of the casing by means of suitable bearings mounted in front and rear support plates 33 and 34. As will be apparent, the basket 2 is so supported on the roller wheels as to turn or roll thereon whenever shaft 30 is turned by motor 31. The ratio of the driving and driven pulleys in the drive 32 is suitably chosen so that the basket is rotated at an

appropriate speed to provide a tumbling action for articles of clothing placed therein.

During operation of the dryer a stream of heated air is passed through the basket 2 in order to evaporate moisture from the clothes being tumbled therein. This stream of air enters the outer casing 3 through various small openings appearing therein as a result of its sheet metal construction. Additionally, special air inlet openings (not shown) such as louvers or a grill may be provided if desired in the side, front or rear walls of the casing. The air entering the casing is circulated through the clothes basket by a suitable fan or blower means, such as the centrifugal blower 35 which is driven directly from motor 31.

The blower 35 first pulls the air entering the casing over a heater assembly 36 which is positioned within an air duct 37 mounted behind the stationary bulkhead 22. The duct 37, which is supported from the bulkhead 22 and the cross member 24, is open at its lower end, and the air passes upwardly through it over the heater assembly 36. After flowing over the heater assembly and being heated thereby, the air is then drawn into the rear end of the clothes basket through a perforate grill 38 in the bulkhead 22. This grill 38, as shown, closes the upper end of the duct 37, and prevents the clothes during their tumbling from entering the duct. From the rear end of the basket the air next passes axially through the length of the basket and in so doing dries the tumbling clothes.

At the front of the basket, the air is drawn into the air discharge duct 19 through the door 14. Specifically, the air passes through a screened opening 39 in the inner wall 16 of the door into the interior of the door itself, and thence passes out through an opening 40 in the bottom of the door into the open top of the duct 19. The top of the duct 19, it will be noted, is closed by a removable grill 41 to prevent clothes from falling into the duct during the loading and unloading of the dryer. The discharge air drawn into the duct 19 passes immediately through a suitable lint trap 42 mounted in the upper part of the duct and this fine mesh trap or bag removes any lint picked up by the air in the clothes basket. From the lint trap 42 the air then passes downwardly and rearwardly into the blower 35 and from there is discharged outwardly from the apparatus through a suitable discharge conduit 43. As indicated in Fig. 2, this conduit 43 may discharge the air through a suitable opening (not shown) in rear wall 6 adjacent the base 8 of the cabinet.

Referring now to Fig. 2, it will be noted that the drum shaped basket, when at rest, occupies a position indicated by the dotted line 2 with respect to the casing walls 4, and is cradled for movement as it rests upon the several roller wheels 25, 26, 27 and 28. The positioning of the rollers to cradle the basket is also shown by the relationship between the basket and the rollers 25 and 26 illustrated in Fig. 1. The basket being mounted in this manner, as it begins to move due to the frictional engagement of its periphery with the drive roller wheels 25 and 26, which, for example, may be formed of rubber, a condition of dynamic instability may occur which tends to cause the basket to lift from the wheels or to shift axially with respect thereto. This condition may occur especially when the preferred form of single diameter wheels are used and when the load of clothing within the basket abruptly shifts. As an important feature of our invention, however, we provide new and improved means whereby such lifting or shifting of the basket is prevented. Specifically and as will now be explained, we provide a new and improved combination basket positioning and sealing means which not only holds the basket in the correct position on the rollers but also prevents air leakage into the basket at both ends thereof.

Our combined basket sealing and positioning means may be best seen by reference to Figs. 1 and 3. Referring to Fig. 1, it will be seen that the front and rear walls 10 and 11 of the basket are provided adjacent their respective openings 12 and 21 with circumferentially extending or annular surfaces 44 and 45, respectively, which surfaces are inclined with respect to the axis of rotation of the basket and preferably are of equal width and diameter. Engaging these inclined surfaces are a pair of circumferential or annular sealing strips of flexible material 46 and 47, such as felt, or the like, which permit the inclined surfaces of the basket to slide with respect thereto during rotation of that basket and without undue wear or heating of the strips. Each of the strips, although it engages the basket by its own internal resilience, may be further held against its associated basket surface by means of a resilient spring, biased to exert pressure upon the basket in a direction generally toward the center of that basket. These springs indicated at 48 and 49 are disposed circumferentially of the basket and, like the strips 46 and 47, are suitably mounted on stationary members of the cabinet. Specifically, both the spring 48 and its associated strip 46 are mounted on the flange 20 at the periphery of the front bulkhead. The rear spring 49 and strip 47 are similarly mounted on a flange or web 50 formed at the periphery of the rear bulkhead 22.

Referring now to Fig. 3, a segmental portion of the air sealing and basket positioning means associated with the basket rear wall 11 is shown and is typical of the construction of the means associated with both the front and rear walls of the basket. A serpentine flat metal spring 49 for example, of spring steel or stainless steel about .004 inch in thickness, and having inward and outward convolutions 51 and 52 is mounted with its inward convolutions rigidly held against the flange or web 50 of bulkhead 22, and with its outward convolutions free to flex, but biased in the direction of the dryer basket. The spacing between the legs of adjacent convolutions, moreover provides a resiliency in a circumferential direction. For improved mounting of the spring, the inner convolutions 51 may be bent into engagement with the angular seat provided by the web 50. Suitable fastening means, such as an inner clamping ring 53 screwed to the flange 50 holds the felt strip 47, the spring portions 51 and the web 50 in substantially fixed relation to each other. As indicated, the resilient action of the outer convolutions 52 acting as a backing, forces the felt strip 47 against the inclined surface 45 of the rear wall 11 of the basket. As the basket then rotates with respect to the fixed strip 47, it is urged to the right (as viewed in Fig. 1) and at the same time is circumferentially urged to maintain its normal axis of rotation as established by rolling contact with wheels 25, 26, 27 and 28. Thus, the strip 47 by the action of the spring 49 as well as by its own internal resilience serves to oppose axial movement of the basket to the left and to maintain the rotational equilibrium of the basket on the wheels.

As mentioned above, the companion air sealing and basket-positioning means 46 associated with the basket front wall 12 is mounted on the continuous web or flange 20. The serpentine spring 48 acts against this felt strip 46 so that it is held in engagement with the inclined surface 44 on the basket. The resilient action of the outer convolutions of the spring thus acts upon the basket together with the internal resilience of the strip 46 to urge the basket to the left (as viewed in Fig. 1) in opposition to the force exerted on the basket by felt strip 47, and at the same time, circumferentially urges the basket to maintain its normal axis of rotation as established by contact with the roller wheels. By reason of the thus described action of the coacting strips 46 and 47 the basket is held in equilibrium during rotation and does not rise from the roller wheels or shift axially during rotation.

Considering now the air sealing function of strips 46 and 47, it will be remembered that both the front and rear openings 12 and 21 of the basket are more or less

covered or closed by stationary circular bulkheads. The rear opening is, of course, closed by the bulkhead **22** and the front opening is closed by the combination bulkhead **15** formed by the door **16**, the door seat **17**, the wall **18** of the outlet conduit, and the annular flange **20** mounted on the wall **18**. To prevent air leakage into the basket, it is thus necessary only that the air paths between these bulkheads and the basket front and rear walls be closed and this is the function accomplished by the strips **46** and **47**. Specifically, the strip **47** provides an air seal between the rear wall **11** of the basket and the bulkhead **22** so as to prevent air leakage into the basket through the rear opening **21**, and strip **46** provides an air seal between the front wall **10** of the basket and the aforesaid combination bulkhead to prevent air leakage into the basket through the front opening **12**.

Referring to Fig. 1, it will be seen that the rear strip **47** by its contact with the basket surface **45** provides a seal at the outer edge of the bulkhead **22** preventing air from passing between the bulkhead web **50** and the basket wall **11** to the opening **21**. Similarly, the front strip **46** by its contact with the basket surface **44** prevents air from passing between the flange **20** and the front wall **10** to the opening **12**. Thus the only way in which air can enter the basket is through the heater duct **37**, it being impossible for cool air to leak into the basket at either its front or rear. Only warm air is thereby introduced onto the clothes for maximum drying efficiency. This drying air after passing through the basket from rear to front is, of course, exhausted from the basket through the door openings **39** and **40** and the exhaust duct **19**.

In accordance with the patent statutes, we have described what at present is considered to be the preferred embodiment of our invention, but it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the true spirit and scope of the invention and we therefore aim to cover, in the appended claims, all such equivalent variations and modifications.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a clothes dryer having an outer casing, a first bulkhead supported within said casing, a second bulkhead supported within said casing and spaced from said first bulkhead, a substantially cylindrical clothes basket having both ends open rotatable about a non-vertical axis and mounted between said bulkheads, a heater, means for circulating a stream of air over said heater and through said basket, said air passing through said first bulkhead and one of the open ends of said basket to enter said basket and through the other open end and said second bulkhead to leave said basket, roller means supporting said basket and frictionally engaging the cylindrical wall thereof for rotating said basket, and annular resilient stationary basket-positioning means supported upon each of said bulkheads, said basket positioning means continuously and slidably engaging the ends of said basket, said basket positioning means preventing air leakage between said basket and said bulkheads and holding said basket in position on said roller means.

2. In a clothes dryer, a clothes basket rotatable about a non-vertical axis and having a cylindrical side wall and apertured end walls, each of said end walls having a flat surface extending circumferentially thereof and inclined with respect to the axis of rotation of said basket, stationary bulkheads for closing the apertures in said end walls, means for introducing a stream of drying air into said basket through one of said bulkheads and the associated basket aperture, and for exhausting it from said basket through the other aperture and bulkhead, a drive means for said basket including roller means supporting said basket and frictionally engaging the cylindrical wall thereof for rotating said basket, and stationary resilient basket-positioning means arranged adjacent said end walls of said basket and slidably engaging said inclined flat surfaces thereon for holding said basket in dynamic equilibrium on said roller means, said basket-positioning means being mounted on said bulkheads and forming an air seal between said bulkheads and said end walls thereby to prevent air leakage into said basket.

3. In a clothes dryer, an imperforate clothes basket rotatable about a non-vertical axis and having a cylindrical side wall and apertured end walls, stationary bulkheads for closing the apertures in said end walls, means for introducing a stream of drying air into said basket through one of said bulkheads and the aperture in the adjacent basket end wall, and for exhausting said stream of air from said basket through the aperture in the other end wall and the other bulkhead, a drive for said basket including roller means supporting said basket and frictionally engaging said cylindrical wall for rotating said basket, and stationary basket positioning means arranged adjacent said end walls of said basket and slidably engaging said end walls for holding said basket in position on said roller means, said basket positioning means at each of said basket end walls comprising a strip of felt-like material and a spring biasing said strip against the end wall, and said basket positioning means being mounted on said bulkheads and forming an air seal between said bulkheads and said end walls thereby to prevent air leakage into said basket.

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