

[54] **BULKHEAD SEAL FOR CLOTHES DRYER**

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[58] Field of Search 34/79, 82, 133, 242, 132, 34/139; 432/115

[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

A stationary bulkhead in a fabric drying apparatus includes an annular axially extending recess openly facing an annular axially facing fabric tumbler end wall fixed to and rotatable with a peripheral sidewall. A bulkhead seal comprising deformable resilient material is disposed in the recess for running engagement with the end wall to effect an air seal between the stationary bulkhead and the rotatable end wall. The dryer construction includes similar bulkheads and seals at both ends of the fabric tumbler.

5 Claims, 2 Drawing Figures

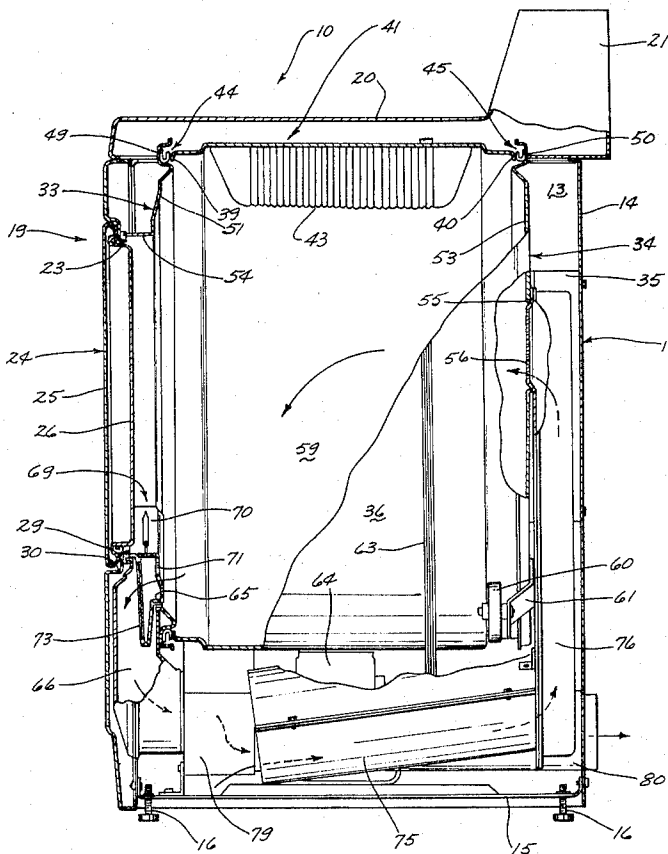


Fig. 1

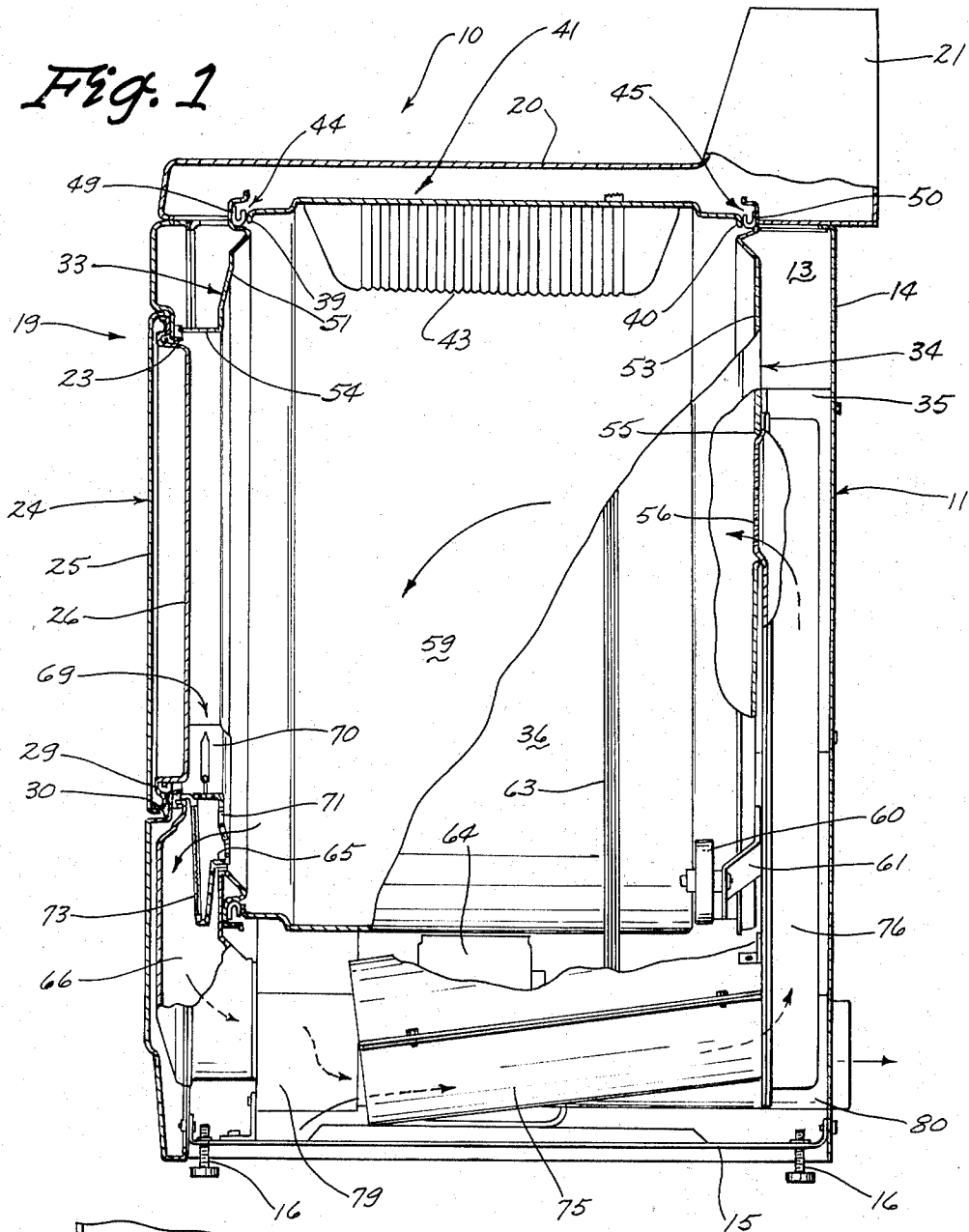
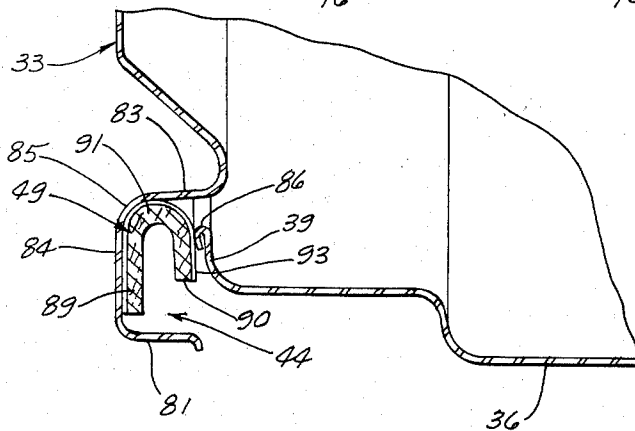


Fig. 2



BULKHEAD SEAL FOR CLOTHES DRYER**BACKGROUND OF THE INVENTION****1. Field of the Invention**

This invention is related to a clothes dryer construction and more specifically to a non-rotary seal fixed to a stationary bulkhead and disposed in a recess thereof for engagement with the end wall of a rotatable fabric tumbler.

2. Description of the Prior Art

Prior art shows a continuing search for a satisfactory air seal between rotary and stationary portions of a clothes dryer. A number of particular prior art disclosures show felt seals fixed to one of the walls of the rotatable fabric tumbler to provide a movable seal engageable with a stationary portion of the dryer. Other prior art disclosures show seals fixed to a stationary wall and engageable with a peripheral sidewall or with tapered portions of the front or rear tumbler walls. A number of the seals comprise a felt strip having a particular configuration to secure maximum surface engagement. Still other disclosures incorporate a spring member operating on a felt strip to insure proper sealing. These varied and diverse showings of the prior art indicate the need for an improved seal arrangement retaining certain advantages of previous seals while eliminating undesirable features.

SUMMARY OF THE INVENTION

It is an object of the instant invention to provide an improved non-rotary seal operable between a rotatable fabric tumbler and an adjacently disposed stationary bulkhead.

It is a further object of the instant invention to provide an improved seal arrangement effectively disposed within an annular recess of a stationary bulkhead and engageable with an end wall of the fabric tumbler.

It is a still further object of the instant invention to provide a stationary seal arrangement disposed in an annular axially extending recess of a stationary bulkhead and engageable with an end wall of a rotatable fabric tumbler wherein the end wall is effectively disposed within the recess.

The instant invention achieves these objects in a clothes dryer having at least one stationary bulkhead in which is formed an axially extending annular recess openly facing the annular end wall of a rotatable fabric tumbler and receiving and supporting a stationary seal engageable with the rotatable tumbler end wall to effect an air seal between the stationary bulkhead and the rotatable fabric tumbler.

Operation of the device and further objects and advantages thereof will become evident as the description proceeds and from an examination of the accompanying page of drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate a preferred embodiment of the invention with similar numerals referring to similar parts throughout the several views wherein:

FIG. 1 is an overall view of the clothes dryer embodying the instant invention and partially cut away and sectioned to show features thereof; and

FIG. 2 is an enlarged fragmentary sectional view of the seal arrangement between the front stationary bulkhead and the rotatable fabric tumbler.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1 there is shown the overall construction for a clothes dryer 10 including a cabinet assembly comprising a three-sided sidewall wrapper 11 having generally vertical opposite side panels 13 and a rear panel 14. The sidewall wrapper 11 is supported on a base 15 which in turn is supported on a horizontal surface through a plurality of adjustable feet 16. The cabinet assembly further comprises a front panel 19 and top cover 20 supported on the sidewall wrapper 11. The top cover 20 includes an upwardly extending housing 21 for accommodating selected controls for the dryer 10.

The front panel 19 defines a generally central access opening 23 and includes a door 24 hinged on the front panel 19 and operable between open and closed positions relative to the access opening 23. The door 24 includes an outer panel 25 substantially flush with the front panel 19 and an inner panel 26 having a portion that extends rearwardly into the access opening 23. A seal 29 supported by the inner panel 26 extends endlessly around the rearwardly extending portion of the inner panel 26 for engagement with a recessed portion 30 of the front panel 19 to effectively provide an air seal at the access opening 23.

Disposed within the cabinet assembly is a pair of spaced apart generally vertical bulkheads 33 and 34. The rear bulkhead 34 is fixed to the sidewall wrapper 11 by a pair of brackets such as the bracket 35 that includes a front flange connected to the bulkhead 34 and a rear flange connected with the rear panel 14. The front bulkhead is similarly connected to the front flanges of the wrapper 11 with a pair of brackets.

A generally cylindrical peripheral sidewall 36 is disposed between the stationary bulkheads 33 and 34. At the front and at the rear of the peripheral sidewall 36 are inwardly turned flanges comprising relatively short end walls 39 and 40 juxtaposed the front and rear bulkheads 33 and 34 and cooperable with the sidewall 36 to effectively define a fabric tumbler 41. A plurality of baffle members 43 are fixed to the peripheral sidewall 36 for assisting in the movement of fabrics within the fabric tumbler 41 during rotation thereof.

The front and rear bulkheads 33 and 34 include radially outwardly disposed recess portions 44 and 45 extending axially toward the front and toward the rear of the dryer 10, respectively. Seals 49 and 50, as will be described hereinafter, are fixed to the bulkheads 33 and 34 in the recesses 44 and 45 and are engageable with the tumbler end walls 39 and 40 to provide an air seal at the ends of the tumbler 41. The bulkheads 33 and 34 also include generally annular portions 51 and 53 extending inwardly from the recesses 44 and 45 and effectively providing extensions of the end walls 39 and 40 of the fabric tumbler 41.

The front bulkhead 33 defines an access 54 into the tumbling chamber that is substantially axially aligned with the access opening 23 in the front panel 19. The rear bulkhead 34 defines an opening 55 to receive a perforate panel 56 through which airflow is directed into the tumbling chamber 59 from a duct system as will be shown.

The tumbler 41 is supported on a generally horizontal axis by a system including a pair of rollers 60 supported on brackets 61 fixed to the rear bulkhead 34 and by a pair of slide bearings (not shown) supported by similar brackets fixed to the front bulkhead 33. The

tumbler 41 could be supported entirely on rollers or entirely on slides as conditions permit.

The fabric tumbler 41 is rotated by a belt 63 encompassing the periphery of the tumbler sidewall 36 and driven by a motor 64 mounted on the base 15.

The airflow system for the clothes dryer 10 includes a heater housing 75 supported adjacent the base 15 and into which air is drawn from the atmosphere for heating prior to movement into the fabric tumbling chamber 59. The heater housing 75 may accommodate either a gas or electric heating unit. The heater housing 75 is connected to a generally upwardly extending rear air duct 76 which conducts heated air from the heater housing 75 through the rear perforate panel 56 and into the tumbling chamber 59.

The air then flows from the chamber 59 through a filter assembly 69 into the front air duct 66. The front bulkhead 33 is partially cut away at 65 to form an opening adjacent the access 54, openly facing the tumbling chamber 59 and connected to the front air duct 66 disposed between the front panel 19 and the tumbler 41, for receiving the filter assembly 69. The filter assembly 69 includes a housing 70 extending generally radially and downwardly from the access opening 54 into the air duct 66 and comprising a perforate portion 71 openly facing the tumbling chamber 59. The filter assembly 69 further includes a filter screen 73 supported on the housing 70 within the air duct 66 adjacent to the perforate portion 71 for removing lint particles from the air flowing out of the tumbling chamber 59 into the front air duct 66.

The air is drawn from the front air duct 66 into a blower assembly 79 from which it is forced through a rearwardly extending lower air duct 80 to atmosphere. The blower 79 includes an impeller (not shown) that is driven by the motor 64 mounted adjacent to the blower 79 on the base 15. The general airflow pattern within the drying apparatus 10 is shown by the broken and solid line arrows in FIG. 1.

Referring again to the bulkhead seals, such as seal 49 for example, as shown in FIG. 1 and more specifically shown in FIG. 2, it is noted that the annular axially extending recess 44 in the bulkhead 33 is generally aligned with the peripheral sidewall 36 and is radially sufficient to effectively receive the inwardly turned end wall 39. The recess 44, as indicated by FIG. 2, includes a generally axially extending outer sidewall 81 and a slightly tapered generally axially extending inner sidewall 83 connected to a base wall 84 by a generous radius 85. The inner sidewall 83 extends axially beyond the tumbler end wall 39 so that the recess 44 effectively receives the tumbler end wall 39. The inwardly extending tumbler end wall 39 includes a folded-over flange or bead 86 to provide a smooth sealing surface.

Still referring to FIG. 2, the seal member 49 disposed between the stationary bulkhead 33 and the rotatable tumbler 41 is shown as a U-shaped or channel-shaped felt member having a pair of generally outwardly extending legs 89 and 90 connected by an intermediate arcuate portion 91. The leg 89 is fixed as with adhesive to the recess base wall 84 of the stationary bulkhead 33 so that the intermediate portion 91 conforms generally to the corner radius 85 and the other leg 90 is movable within the recess 44 for engagement with the front wall 39 of the tumbler 41.

The seal 49 is formed of a flat felt strip joined at the ends into an endless loop. As one edge of the loop, cor-

responding to leg 89, is fixed to the base wall 84, the corner radius 85 tends to cause the felt strip to flare and to fold back on itself at the intermediate arcuate portion 91 to provide the free leg 90 for engagement by the tumbler end wall 39. Upon assembly of the dryer in FIG. 1, the intermediate arcuate portion 91 is effectively under stress with the seal configuration of FIG. 2 because of the reverse loop or folding upon itself and thus produces a biasing force on the free leg 90 to maintain engagement with the tumbler end wall 39. The felt may be coated on one side with an antifriction layer 93 such as polytetrafluoroethylene to provide a smooth, more durable, and lower friction running surface for engagement with the tumbler end wall 39.

It is noted from FIG. 1 that similar seal constructions are provided at the front and rear bulkheads 33, 34 and since the support of the tumbler on rollers and slides permits a limited degree of movement along the horizontal axis, the seal members 49 and 50 must be effective throughout the range of axial movement of the tumbler 41. The biasing force on the free leg 90 of the seal acts in a direction tending to center the tumbler 41 between the bulkheads 33 and 34 and to achieve a generally uniform loading of the seal around each of the front and rear end walls 39 and 40.

It is also noted that airflow through the tumbler resulting from a blower on the outlet side of the fabric tumbler tends to create a pressure within the chamber 59 of somewhat less than atmospheric pressure so that the atmospheric pressure outside the tumbler 41 tends to help maintain the seals 49 and 50 in good contact with the end walls 39 and 40.

An alternate embodiment of the instant invention could include a foam strip operatively fixed to the base wall 84 of the recess portion. The seal could also include felt layers and/or antifriction layers supported by the foam and engageable with the tumbler end wall.

The seal construction of the instant invention provides an improved bulkhead seal having a stationary seal member disposed in a recess thereof and biased into a generally uniform engagement with a tumbler end wall. The provision for a seal in a recess of the bulkhead effectively protects the seal from contact by tumbling fabrics. The self-biasing of the deformable loops of felt seal members engageable with the front and rear end walls of the tumbler achieves advantages not heretofore realized. The construction is inexpensive and easily assembled.

In the drawings and specifications, there is set forth a preferred embodiment of the invention and although specific terms are employed these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in form and proportion of parts as well as the substitution of equivalents are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of this invention as defined in the following claims.

I claim:

1. In a clothes dryer, the combination comprising: a generally vertical stationary bulkhead; means defining a fabric tumbling chamber comprising a rotatable peripheral sidewall and at least one generally vertical annular end wall fixed to and rotatable with said sidewall, said bulkhead including an annular recess aligned with and concentric to said annular end wall for effectively receiving said end wall in an axially overlapping relationship thereto, said bulkhead including an axially re-

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cessed wall at the base of said recess openly facing and generally parallel to said annular end wall; and annular seal means in said recess comprising resilient material in the cross sectional form of a deformable U-shaped loop having a pair of generally parallel radially outwardly extending legs connected by an intermediate arcuate portion, one of said legs being fixed to said recessed wall and the other leg being biased by the intermediate arcuate portion into frictional engagement with said annular end wall for sliding contact therewith to effect a running air seal between said stationary bulkhead and said end wall and effectively disposed within said annular recess.

2. In a clothes dryer as defined in claim 1 wherein said seal means includes a layer of friction reducing material on the side of the resilient material engageable with said annular end wall.

3. In a clothes dryer, the combination comprising: a pair of spaced-apart generally vertical stationary bulkheads; means defining a fabric tumbling chamber disposed between said bulkheads and comprising a rotatable peripheral sidewall extending substantially between the spaced bulkheads and further comprising a pair of generally vertical annular end walls fixed to the end of said sidewall and rotatable therewith, each of said bulkheads including an annular recess aligned with and concentric to an adjacent annular end wall for effectively receiving said adjacent end wall in an axially overlapping relationship thereto, each of said bulkheads including an axially recessed wall at the base of

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said recess openly facing and generally parallel to an adjacent annular end wall; and annular seal means in each of said recesses comprising resilient material in the cross sectional form of a deformable U-shaped loop having a pair of generally parallel radially outwardly extending legs connected by an intermediate arcuate portion, one of the legs of each of said seals being fixed to one of said recessed walls and the other leg being biased by the intermediate arcuate portion into frictional engagement with the adjacent annular end wall for sliding contact therewith to effect a running air seal between each of said stationary bulkheads and said end walls and disposed within said annular recesses effectively isolated from fabrics within said tumbling chamber.

4. In a clothes dryer as defined in claim 3 wherein each of said seal means is formed from a generally flat strip of resilient material and wherein the strip of material includes a layer of anti-friction material on one side thereof for effectively reducing the frictional drag on said rotatable tumbling chamber.

5. In a clothes dryer as defined in claim 3 and further including means engageable with said peripheral sidewall for supporting said tumbling chamber on a predetermined horizontal axis while permitting limited axial movement thereof and wherein both of said seal means are effectively self biased into a generally uniform engagement with an adjacent end wall during rotation of said tumbling chamber.

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