MOUNTING FOR ROTATABLE DRUMS
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12 Claims. (Cl. 34—133)

This invention relates to a skid means forming a journal support for a cylindrical drum rotatable on a substantially horizontal axis and more particularly relates to means for rotatably supporting the drum including circumferentially continuous track means formed in the outer cylindrical wall of the drum and non-rotatable skid means contoured complementary to and engaging the track means for forming a cradle to rotatably support the drum.

The embodiment of the invention shown in the accompanying drawings discloses an illustrative clothes dryer having a casing and cylindrical tumbler dryer drum situated within the casing for rotation on a horizontal axis. A plurality of axially spaced circumferentially continuous grooves are formed in the outer periphery of the drum wall to provide a track means. In order to support the drum for rotation, a plurality of non-rotatable skids are mounted within the casing on both sides of a vertical plane intersecting the axis of the drum and below a horizontal plane intersecting the drum axis to engage the track means and to form a cradle for rotatably supporting the drum.

The surfaces of each of the skids which engage the track means form bearing surfaces which are shaped to the contour of the track means. Interposed between the surfaces and the track means is a layer of material such as polyurethane having a low coefficient of friction to reduce the frictional force or drag between the skids and the drum. All of the skids are situated below a horizontal center line of the drum and therefore the drum can be easily and conveniently mounted on the skids by merely lowering it into place. The skids are mounted in the casing for pivot movement in a plane transverse to the axis of the drum to provide for proper alignment of the track means and the skids and to ensure continuous engagement thereof in good bearing relationship. If desired, a resilient member or seal may be interposed between the skids and the skid mounting members to maintain proper positioning of the skids, to allow for vibration of the drum while maintaining good bearing relationship thereof with the skids, to attenuate vibration of the casing due to vibration of the drum and to reduce the sound level of the drum due to vibration.

It is, therefore, an object of the present invention to provide skids for mounting a horizontal cylindrical drum whereby the skids are situated on both sides of a vertical plane intersecting the axis of the drum and below a horizontal plane intersecting the drum axis to form a cradle for rotatably supporting the drum.

Another object of the present invention is to provide a plurality of circumferentially continuous grooves formed in the outer periphery of the wall of the drum to form track means for the skids.

Another object of the present invention is to provide a horizontal cylindrical drum supported for rotation on a plurality of skids with a layer of material such as polyurethane having a low coefficient of friction interposed between the skids and the drum to reduce the friction or drag therebetween.

Yet another object of the present invention is to provide means for mounting the skids for pivotal movement in a plane transverse to the axis of the drum to provide easy assembly of the drum and the skids and to provide for proper circumferential alignment of the skids and the track means.
3 into the rear bulkhead 15 to give rigidity and stiffness to the bulkhead in order to obtain a flat sealing surface for the rear end 23 of drum 20. Suitable drive means are provided for rotating the drum 20 and in the exemplary form disclosed herein comprises an endless belt 29 wrapped around the outer periphery of the cylindrical side wall 21 and driven for rotation by an electric motor 30. In order to circulate temperature conditioned air through the dryer a centrifugal blower 31 is mounted within the casing and is driven by the motor 20 by means of a V-belt 32.

In accordance with the principles of the present invention the drum 20 is supported for horizontal rotation within the casing 11 by means of a plurality of skids as indicated generally at 35. The skids are situated on both sides of a vertical axially extending plane intersecting the axis of the drum and are also situated below a horizontal axially extending plane intersecting the drum axis.

As illustrated in the drawings, a pair of axially spaced skids may be situated on either side of the vertical plane intersecting the drum axis. The skids form a support or cradle for the drum 20 and it will be apparent that the drum can be easily and conveniently mounted on the skids by merely lowering the drum from the upper portion of the cabinet 11 down to the skids.

The skids 35 are mounted for pivotal movement on a pair of cylindrically shaped horizontally extending shaft members 34 and 36, the axes of which are parallel to the axis of the drum 20 and which are mounted within the casing by means of flange brackets 37 connected in fixed assembly to the side walls 12 and 13 or, alternatively, to a floor panel 38 of the casing 11 (FIGURE 7). The pivotal mounting of the skids in the illustrated embodiment allows the automatic adjustment of the skids to the contour of the drum, thereby compensating for normal deviations occurring in the production and assembly of such parts.

As best illustrated in FIGURE 2, the outer periphery of the cylindrical side wall 21 of the drum 20 has formed therein a plurality of axially spaced circumferentially continuous grooves 39 which form track means for receiving the skid 35. The grooves 39 also provide structural reinforcement for the cylindrical drum 20. In the embodiment illustrated a total of two grooves are provided but it will be apparent that additional grooves 39 as well as additional skids may be employed depending upon such factors as the axial length of the drum 20 and the weight of the drum as well as the weight of load to be carried therein.

Referring to FIGURES 3 and 4 one preferred embodiment of a skid member incorporating the principles of the present invention is shown generally at 45 and is particularly characterized as comprising a pair of generally triangularly shaped oppositely facing side walls 40 and 41 which include flat parallel portions 42 and 43 spaced axially along the shaft 36 and upwardly inwardly inclined portions 44 and 46 which are shown as converging at an adjoining edge as at 47. An outer surface 48 of the adjoining edge 47 is arcuately shaped complementarily to an outer surface 49 of the groove 39.

Referring to FIGURE 3, the adjoining edge 47 of the skid 35 comprises a pair of end portions 50 and 51 which are raised radially in the direction of the axis of the drum 20 and which are situated on both sides of a lowered portion 52. The raised portions 50 and 51 constitute bearing surfaces for the drum 20 and are shaped complementarily to the circumferential contour of the groove 39. In order to reduce frictional forces or drag between the skid 35 and the drum 20, a layer of material having a low coefficient of friction, for example, polyurethane is shown at 53 interposed between the bearing surfaces 50 and 51 of the skid 35 and the groove 39 of the drum 20. The material 53 is particularly characterized as being arcuately shaped to continguously abut the outer surface 48 of the adjoining edge 47 of the skid and the outer surface 49 of the groove 39.

In the illustrative embodiment disclosed in the drawings, the material 53 extends circumferentially continuously around the groove 39 and is fixedly secured thereto for corotation therewith by an adhesive or bonding agent. It will be appreciated, however, that short pieces of the material 53 could be bonded to the skid 35 to merely overlie the bearing surfaces 50 and 51 thereof to thereby remain stationary relative to the surfaces 50 and 51.

The side walls 40 and 41 are apertured as at 54 and 56 respectively to receive the shaft 36 and are connected in fixed assembly by means of a tubular sleeve member 57 having an inner surface 58, the diameter of which is greater than the diameter of apertures 54 and 56.

In order to compensate for vibrations of the drum 20 which may result from an unbalance of the material load carried therein, and in order to dampen or attenuate such vibrations with respect to the shaft 36 and the casing 11, a tubularly shaped insert or bushing 59 of suitable resilient material, such as rubber, is housed in the sleeve 57 between the side walls 40 and 41 and is centrally apertured as at 60 to receive the shaft 36 in snug gripping relation. It will be noted that the apertures 54 and 56 are sufficiently oversized to provide for considerable movement of the skid 35 while precluding abutting engagement of the side walls 40 and 41 with the shaft 36.

Another skid arrangement constructed in accordance with the principles of the present invention is illustrated in the embodiment shown in FIGURES 5 and 6 and constitutes a generally triangularly shaped solid body member 61 comprising flat parallel side walls 62 and 63 and angularly inclined converging end walls 64 and 66. An upper edge 67 of the body member 61 comprises a pair of raised end portions 68 and 69 which are shaped similarly to the raised portions 50 and 51 of the skid 35 and also serve as bearing surfaces to be received in the groove 39 of the drum 20. Intermediate the end portions 68 and 69 is a depressed portion 70 corresponding to the surface 52 of the skid 35 and at the corner portion of the triangle formed by the converging end walls 64 and 66 is formed an enlarged axially elongated journal portion 71 apertured as at 72 for receiving the shaft member 36. It will be noted that the upper edge 67 is arcuately shaped to correspond to the contour of the groove 39 and a layer of material having a low coefficient of friction is secured to the bearing surfaces or raised portions 68 and 69 to minimize friction or drag.

Still another embodiment of a skid member constructed in accordance with the principles of the present invention is shown generally at 73 in FIGURE 7 and comprises a generally triangularly shaped wire form member having a pair of major sides 74 and 76 and a minor side 77. The skid 73 may be formed of any suitable material such as metal rod or the like and there is formed at a corner thereof defined by sides 74 and 76 an enlarged journal member 78 apertured as at 79 for receiving the shaft support shaft 36. It will be appreciated that the minor side 77 is shaped to correspond to and be contiguous engageable in good bearing relationship with the groove 39 of the drum 20 and it will be noted that in the illustrated embodiment the entire side 77 forms a single bearing surface for engaging the groove 39.

A flange bracket 37a may also be mounted on the bottom panel 38 of the casing 11 whereas the brackets 37 of FIGURE 1 which mount the more equilateral skids 33 are connected to the side walls of the casing 11. It may also be mounted on the bottom panel 38 and the bracket 37a of FIGURE 7 may be mounted on the side walls of the casing 11.

Although various modifications might be suggested by those versed in the art, I wish to embody with the scope
of the patent warranted hereon all such modifications as 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 dryer having a housing and a cylindrical tumbler dryer drum situated on a horizontal axis within the housing, means defining a plurality of circumferentially continuous grooves formed in the drum around the periphery thereof, a plurality of skids positioned within said housing having bearing surfaces formed therein for engaging the periphery of said grooves for supporting said drum for rotation, said engaging surfaces of said skids shaped complementarily to said grooves to form a cradle for said drum, means in said housing for pivotally supporting said skids for permitting the engaging surfaces of said skids to snugly engage the grooves of said drum in good bearing relationship, and an insert of resilient material situated between said supporting means and said skids for damping vibrations of the housing which may be caused by an imbalance of the drum.

2. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis, the improvement of means for rotatably supporting said drum comprising:
   a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum radially outwardly of said drum and engaging said drum along the lower outer periphery thereof to form a cradle for rotatably supporting said drum, said skids each having a pair of axially spaced side walls extending circumferentially about a portion of the outer periphery of said drum and joined at the radially inner edges thereof, said skids and adjoining portions of the outer periphery of said drum having interengaging bearing surfaces for rotatably journalling said drum, and means in said casing for mounting said skids.

3. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising:
   a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axes of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum, said skids each having a pair of axially spaced side walls converging toward a plane situated perpendicularly to the axis of said drum and adjoining at the radially inner edges thereof, said adjoining inner edges of said side walls being axially arcuately shaped complementarily to said track means and extending circumferentially along a portion of said track means to provide an arc of contact between said track means and said adjoining inner edges, said side walls extending radially outwardly of said drum substantially in the form of a triangle with the adjoining inner edges thereof forming one side of said triangle and a pair of radially outwardly converging edges forming the other two sides of the triangle.

4. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising:
   a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum, means for supporting said mounting shaft in said casing, and a layer of material having a low coefficient of friction interposed between said bearing surfaces and said track means for reducing friction therebetween.

5. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising:
   a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum, said skids each having a pair of axially spaced side walls converging toward a plane situated perpendicularly to the axis of said drum and adjoining at the radially inner edges thereof, said side walls extending radially outwardly of said drum substantially in the form of a triangle with the adjoining inner edges thereof forming one side of said triangle and a pair of radially outwardly converging edges forming the other two sides of said triangle.

6. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising:
   a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum, said skids each having a solid portion extending in a plane perpendicularly to the axis of said drum and forming substantially a triangle in said perpendicular plane, one side of said triangle being axially arcuately shaped complementarily to said track means and extending circumferentially about and engaging a portion of said track means to provide an arc of contact between said track means and said one side, the other two sides of said triangle extending radially outwardly of said drum and converging to form a corner of said triangle, said one side of said triangle having radially inwardly raised portions at the ends thereof and a radially outwardly lowered portion between said raised portions whereby said raised portions provide a pair of circumferentially spaced bearing surfaces for engaging said track means, means forming a centrally apertured journal member.
at said corner of said triangle for receiving a skid mounting shaft,
means in said casing including skid mounting shaft means for pivotally mounting said skids, and
a layer of material having a low coefficient of friction interposed between said bearing surfaces and said track means for reducing friction therebetween.

6. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum,
said skids each having a solid portion extending in a plane perpendicularly to the axis of said drum and forming substantially a triangle in said perpendicularly plane,
one side of said triangle being axially arcuately shaped complementarily to said track means and extending circumferentially about and engaging a portion of said track means to provide an arc of contact between said track means and said one side,
the other two sides of said triangle extending radially outwardly of said drum and converging to form a corner of said triangle,
said one side of said triangle having radially inwardly raised portions at the ends thereof and a radially outwardly lowered portion between said raised portions whereby said raised portions provide a pair of circumferentially spaced bearing surfaces for engaging said track means,
means forming a centrally apertured journal member at said corner of said triangle for receiving a skid mounting shaft,
means in said casing including skid mounting shaft means for pivotally mounting said skids, and
a layer of material having a low coefficient of friction interposed between said bearing surfaces and said track means for reducing friction therebetween.

7. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum radially outwardly of said drum and engaging said drum along the lower outer periphery thereof to form a cradle for rotatably supporting said drum,
said skids each comprising a wire form member shaped substantially in the form of a triangle, one side of said triangle extending circumferentially about a portion of the outer periphery of said drum, said one side of each of said skids and an adjoining portion of the outer periphery of said drum having interengaging bearing surfaces for rotatably journalling said drum, and
means in said casing for supporting said skids.

8. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum,
said skids each comprising a wire form member shaped substantially in the form of a triangle situated in a plane extending substantially perpendicularly to the axis of said drum, one side of said triangle being a minor side and being axially arcuately shaped complementarily to said track means and extending circumferentially along a portion of said track means to provide an arc of contact between said track means and one side,
the other two sides of said triangle being major sides and extending radially outwardly of said drum and converging to form a corner of said triangle,
means forming a centrally apertured journal member at said corner of said triangle for receiving a skid mounting shaft,
means in said casing including skid mounting shaft means for pivotally mounting said skids, and
a layer of material having a low coefficient of friction interposed between said track means and said skids for reducing friction therebetween.

9. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis and having axially spaced arcuately shaped grooves formed in the outer periphery thereof for providing a track means, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum and radially outwardly of said drum for engaging said track means along the lower outer periphery of said drum,
said skids each comprising a wire form member shaped substantially in the form of a triangle situated in a plane extending substantially perpendicularly to the axis of said drum, one side of said triangle being a minor side and being axially arcuately shaped complementarily to said track means and extending circumferentially along a portion of said track means to provide an arc of contact between said track means and one side,
the other two sides of said triangle being major sides and extending radially outwardly of said drum and converging to form a corner of said triangle,
means forming a centrally apertured journal member at said corner of said triangle for receiving a skid mounting shaft,
means in said casing including skid mounting shaft means for pivotally mounting said skids, and
a layer of material having a low coefficient of friction interposed between said track means and said skids for reducing friction therebetween.

10. In a clothes dryer having a housing and a cylindrical tumbler dryer drum situated on a horizontal axis within the housing, the improvement of means defining a plurality of circumferentially continuous track means formed in the drum around the periphery thereof,
a plurality of skids mounted within said housing below the axis of the drum and having bearing surfaces formed thereon shaped complementarily to said track means for engaging said track means to provide a cradle for the drum and for supporting the drum for non-axial rotational movement, and drive means for said drum comprising a motor-driven pulley situated outside of said drum and below the axis of rotation of said drum, and an endless belt wrapped snugly around the upper portion of the periphery of the drum and around said motor-driven pulley for driving the drum and for maintaining the track means of the drum in good cradling engagement with said skids,
11. In a dryer having a casing and cylindrical dryer drum positioned within said casing on a horizontal axis, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum radially outwardly of said drum and engaging said drum along the lower outer periphery thereof to form a cradle for rotatably supporting said drum,
said skids each having a pair of axially spaced side walls extending circumferentially about a portion of the outer periphery of said drum and adjoined at the radially inner edges thereof to form bearing surfaces to engage said portion of the outer periphery of said drum,
means in said casing for mounting said skids, and
a layer of material having a low coefficient of friction interposed between said bearing surfaces and said drum for reducing friction therebetween.

12. In a dryer having a casing and a cylindrical dryer drum positioned within said casing on a horizontal axis, the improvement of means for rotatably supporting said drum comprising,
a plurality of skids situated in said casing on both sides of a vertical plane intersecting the axis of said drum radially outwardly of said drum and engaging the drum along the lower outer periphery thereof to form a cradle for rotatably supporting said drum, said skids each comprising a wire form member shaped substantially in the form of a triangle, one side of said triangle extending circumferentially about a portion of the outer periphery of said drum to form bearing surfaces to engage said portion of the outer periphery of said drum, means in said casing for supporting said skids, and a layer of material having a low coefficient of friction interposed between said bearing surfaces and said drum for reducing friction therebetween.

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