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(71) Applicant: **ARCELIK ANONIM SIRKETI** [TR/TR]; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR).

(72) Inventors: **CERKEZ, Volkan**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **KAYTAZ, Adem**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **YONAR, Cem**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **TEKES, Yunus Ekrem**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR).

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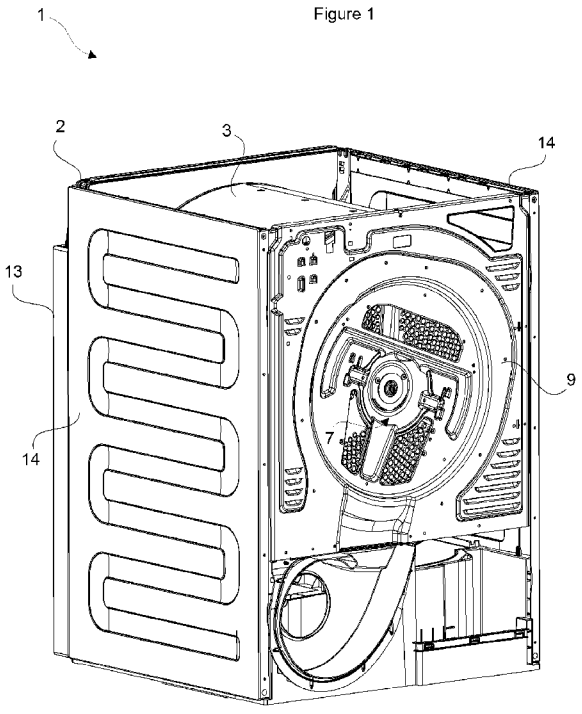
(54) Title: A HORIZONTAL AXIS LAUNDRY DRYER

Figure 1




(57) Abstract: The present invention relates to a laundry dryer (1) comprising a body (2); a drum (3) wherein the laundry to be dried is placed, that is positioned in the body (2) and that can be rotated around a horizontal rotation axis; a shaft (4) that forms the rotation axis of the drum (3); a bearing element (7) that has a bearing (5) wherein the shaft (4) is borne and a skirt (6) that surrounds the bearing (5), and a panel (9) that has an opening (8) in which the bearing (5) is placed and whereon the bearing element (7) is fixed so as to carry the drum (3).

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## Description

# A HORIZONTAL AXIS LAUNDRY DRYER

[0001] The present invention relates to a horizontal axis laundry dryer having a bearing element wherein the drum shaft is borne.

[0002] In front-loading laundry dryers, the laundry to be dried is placed into a drum and the drum is rotated around a horizontal rotation axis by means of a motor. Movement provided by the motor is transferred to the drum via a shaft that rotates inside a stationary bearing. The bearing is fixed onto the wall that carries the drum by means of fixing elements such as screws and bolts. However, especially in laundry dryers with higher load capacities and higher rotation speeds, it is required to increase the number of fixing elements that provide the connection of the bearing element to the wall due to greater forces and higher tensions acting on the bearing element. Therefore, in the state of the art, in order to provide a firm connection between the bearing element and the wall, generally four to six fixing elements are used. However, increase in the number of fixing elements increases the production and labor costs and the duration of the assembly process.

[0003] In the state of the art European Patent Application No. EP2796612, a laundry dryer is disclosed, having a bearing element that is designed so as to be easily fixed onto the rear wall.

[0004] The aim of the present invention is the realization of a laundry dryer wherein the mounting of the bearing element is simplified.

[0005] The laundry dryer realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof comprises a bearing element that has a bearing wherein the shaft on the drum is borne and a peripheral skirt that surrounds the bearing; a panel whereon the bearing element is fixed and that has an opening thereon wherein the bearing is seated, and at least one support that is disposed on the panel and that is in the form of a protrusion against which the skirt bears when the bearing is seated into the opening. Thus, since the load acting on the bearing element is carried by the support, the number of elements needed to provide a secure connection between the bearing

element and the panel can be decreased. Thereby, the mounting of the bearing element can be performed easily and quickly.

[0006] In an embodiment of the present invention, the support is in the form of a protrusion projecting through the opening towards the back of panel so as to be single piece with the panel. Thus, the rigidness of the support is increased and especially in cases when the drum has a high load capacity, the bearing element is enabled to be supported securely and firmly.

[0007] In another embodiment of the present invention, an abutment that extends almost parallel to the skirt is arranged on the support. When the bearing element is placed on the support, the abutment contacts the rear surface of the skirt and supports the bearing element towards the panel. Thus, the abutment is enabled to grasp the edge of the skirt and the grip between the bearing element and the panel is improved.

[0008] In another embodiment of the present invention, at least two supports are provided on the panel, that support the bearing element from the right and left sides when the bearing element is placed onto the panel. Thus, since the need for performing a further alignment process for aligning the bearing element with the opening is eliminated, the mounting process is simplified.

[0009] In another embodiment of the present invention, the skirt has round edges and the support has a curved form that fits the round edge of the skirt and partially extends along the edge of the skirt. Thus, the support supports the bearing element diagonally.

[0010] By means of the present invention, a laundry dryer can be realized wherein the connection between the bearing element and the panel is provided quickly and securely without increasing costs. Thus, the production and labor costs are decreased.

[0011] The laundry dryer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0012] Figure 1 – is the perspective view of the laundry dryer related to an embodiment of the present invention wherein some components thereof are omitted.

[0013] Figure 2 – is the partial view of the laundry dryer related to an embodiment

of the present invention.

[0014] Figure 3 - is the partial cross-sectional view of the laundry dryer related to another embodiment of the present invention, shown just before the bearing element is placed onto the panel.

[0015] Figure 4 – is an enlarged view of the detail A in Fig. 3.

[0016] The elements illustrated in the figures are numbered as follows:

1. Laundry dryer
2. Body
3. Drum
4. Shaft
5. Bearing
6. Skirt
7. Bearing element
8. Opening
9. Panel
10. Support
11. Abutment
12. Fixing element
13. Front wall
14. Side wall

[0017] The laundry dryer (1) comprises a body (2); a drum (3) wherein the laundry to be dried is placed, that is positioned in the body (2) and that can be rotated around a horizontal rotation axis; a shaft (4) that forms the rotation axis of the drum (3); a bearing element (7) that has a bearing (5) wherein the shaft (4) is borne and a skirt (6) that surrounds the bearing (5), and a panel (9) that has an opening (8) in which the bearing (5) is placed and whereon the bearing element (7) is fixed so as to carry the drum (3). The body (2) comprises a front wall (13), a rear wall (not shown in figures) and two side walls (14), and the panel (9) is attached to the side walls (14) so as to be supported by the body (2). The bearing element (7) is fixed onto the panel (9) by attaching the skirt (6) to the panel (9) with fixing elements (12) such as screws, bolts and rivets. The shaft (4) arranged on the drum (3) is inserted into the bearing (5) that is fixed onto the panel (9)

and thus, the drum (3) is grouped with the panel (9).

[0018] The laundry dryer (1) of the present invention comprises at least one support (10) in the form of a projection on the panel (9), that carries the bearing element (7) by supporting the skirt (6) from below when the bearing (5) is placed into the opening (8). The bearing (5) is inserted into the opening (8) from the back of the panel (9) so that the skirt (6) bears against the panel (9) from behind and the bearing element (7) is placed onto the panel (9) by seating the skirt (6) onto the support (10) projecting outwards from the rear surface of the panel (9). After the bearing element (7) is placed onto the panel (9), the skirt (6) is attached to the panel (9) by means of the fixing elements (12) and thus, the bearing element (7) is fixed onto the panel (9). Since the bearing element (7) presses on the support (10), the vertical forces acting on the bearing element (7) are enabled to be advantageously transferred directly to the panel (9). Thus, the bearing element (7) is securely fixed onto the panel (9) without the need for using a large number of fixing elements (12). Furthermore, by decreasing forces and tensions acting on the fixing elements (12), operational errors that may occur over time when the fixing elements (12) get loose and deformed are prevented and the lifetime of the laundry dryer (1) is prolonged.

[0019] In an embodiment of the present invention, the support (10) projects outwards from the wall of the opening (8). The support (10) is produced by shaping the edge of the sheet metal panel (9) that surrounds the opening (8) by means of a suitable shaping method such as bending or drawing, and is in the form of an extension extending through the opening (8) towards the back of the panel (9). Thus, ease of production is provided.

[0020] In another embodiment of the present invention, on the support (10) at least one abutment (11) is provided that bears against the skirt (6) from being so as to support the bearing element (7) towards the panel (9). The abutment (11) is provided by bending the tip of the support (10) upwards so that the support (10) has almost an L-shaped cross-section. In this embodiment, the support (10) is in the form of a pocket on the panel (9) wherein the bearing element (7) is inserted, and grasps the edge of the

skirt (6). Thus, the abutment (11) supports the bearing element (7) towards the panel (9) and the forces acting on the bearing element (7) in the direction of the axis of the shaft (4) are advantageously allowed to be transferred directly to the panel (9). Thereby, the number of fixing elements (12) required to securely fix the bearing element (7) onto the panel (9) is further reduced.

[0021] In another embodiment of the present invention, at least two supports (10) bear against the skirt (6) from the left and right sides so as to support the bearing element (7) from the sides. The bearing element (7) is placed between the supports (10) arranged oppositely on the panel (9) so as to contact the supports (10) on both sides. The supports (10) hold the bearing element (7) from both sides and enable the bearing element (7) to be placed correctly and quickly onto the panel (9). Thus, the bearing element (7) is prevented from displacing.

[0022] In another embodiment of the present invention, the skirt (6) has at least one round edge, and the support (10) has a curved form so as to surround the edge of the skirt (6). The skirt (6) is in the form of a circular plate that surrounds the bearing (5). The support (10) is in the form of a circular arc matching the shape of the round edge of the skirt (6), and surrounds the edge of the skirt (6) when the bearing element (7) is placed onto the panel (9). Thus, the bearing element (7) is prevented from slipping on the support (10).

[0023] In another embodiment of the present invention, on the panel (9) two supports (10) almost in the form of about a quarter arc of circle are provided so as to surround the bottom left and bottom right edges of the skirt (6). The supports (10) almost completely surround the edge of the bottom half of the circular skirt (6) and thus securely support the bearing element (7) from below. Thus, since the bottom half of the skirt (6) is not required to be fixed to the panel (9), the number of fixing elements (12) is further decreased.

[0024] In another embodiment of the present invention, the skirt (6) is fixed onto the panel (9) at the upper part thereof by means of at least one fixing element (12). Thus, the bearing element (7) that is already supported by

means of the support (10) from below can be fixed on to the panel (9) using the minimum number of fixing elements (12).

[0025] In another embodiment of the present invention, the skirt (6) is fixed onto the panel (9) by means of two fixing elements (12) at the top right and top left sides thereof. By means of this embodiment, especially in cases when the drum (3) has a high load bearing capacities and is rotated at high speeds, the bearing element (7) is enabled to be fixed in a secure and stable manner onto the panel (9) using only two fixing elements (12).

[0026] By means of the present invention, by means of the supports (10) that carries the bearing element (7), the load acting on the fixing elements (12) is decreased and thus, the production and labor costs are reduced by advantageously decreasing the number components used. Furthermore, by means of the present invention, the time spent for aligning the bearing element (7) and mounting the same onto the panel (9) is saved.

## Claims

1. A laundry dryer (1) **comprising** a body (2); a drum (3) wherein the laundry to be dried is placed, that is positioned in the body (2) and that can be rotated around a horizontal rotation axis; a shaft (4) that forms the rotation axis of the drum (3); a bearing element (7) that has a bearing (5) wherein the shaft (4) is borne and a skirt (6) that surrounds the bearing (5), and a panel (9) that has an opening (8) in which the bearing (5) is placed and whereon the bearing element (7) is fixed so as to carry the drum (3), **characterized by** at least one support (10) in the form of a protrusion on the panel (9), that carries the bearing element (7) by supporting the skirt (6) from below when the bearing (5) is placed into the opening (8).
2. A laundry dryer (1) as in Claim 1, **characterized by** the support (10) that extends outwards from the wall of the opening (8).
3. A laundry dryer (1) as in Claim 1 or 2, **characterized by** at least one abutment (11) that is arranged on the support (10) and that bears against the skirt (6) from behind so as to support the bearing element (7) towards the panel (9).
4. A laundry dryer (1) as in any one of the above claims, **characterized by** at least two supports (10) that bear against the skirt (6) on the right and left sides so as to support the bearing element (7) from the sides.
5. A laundry dryer (1) as in any one of the above claims, **characterized by** the skirt (6) that has at least one round edge and the support (10) that is curved so as to surround the edge of the skirt (6).
6. A laundry dryer (1) as in Claim 5, **characterized by** two supports (10) that have the form of about a quarter arc of circle so as to surround the bottom right and bottom left edges of the skirt (6).
7. A laundry dryer (1) as in any one of the above claims, **characterized by** the skirt (6) that is fixed onto the panel (9) from the upper part thereof by means of at least one fixing element (12).
8. A laundry dryer (1) as in Claim 7, **characterized by** the skirt (6) that is fixed onto the panel (9) by means of two fixing elements (12) at the top right and top left parts thereof.

Figure 1

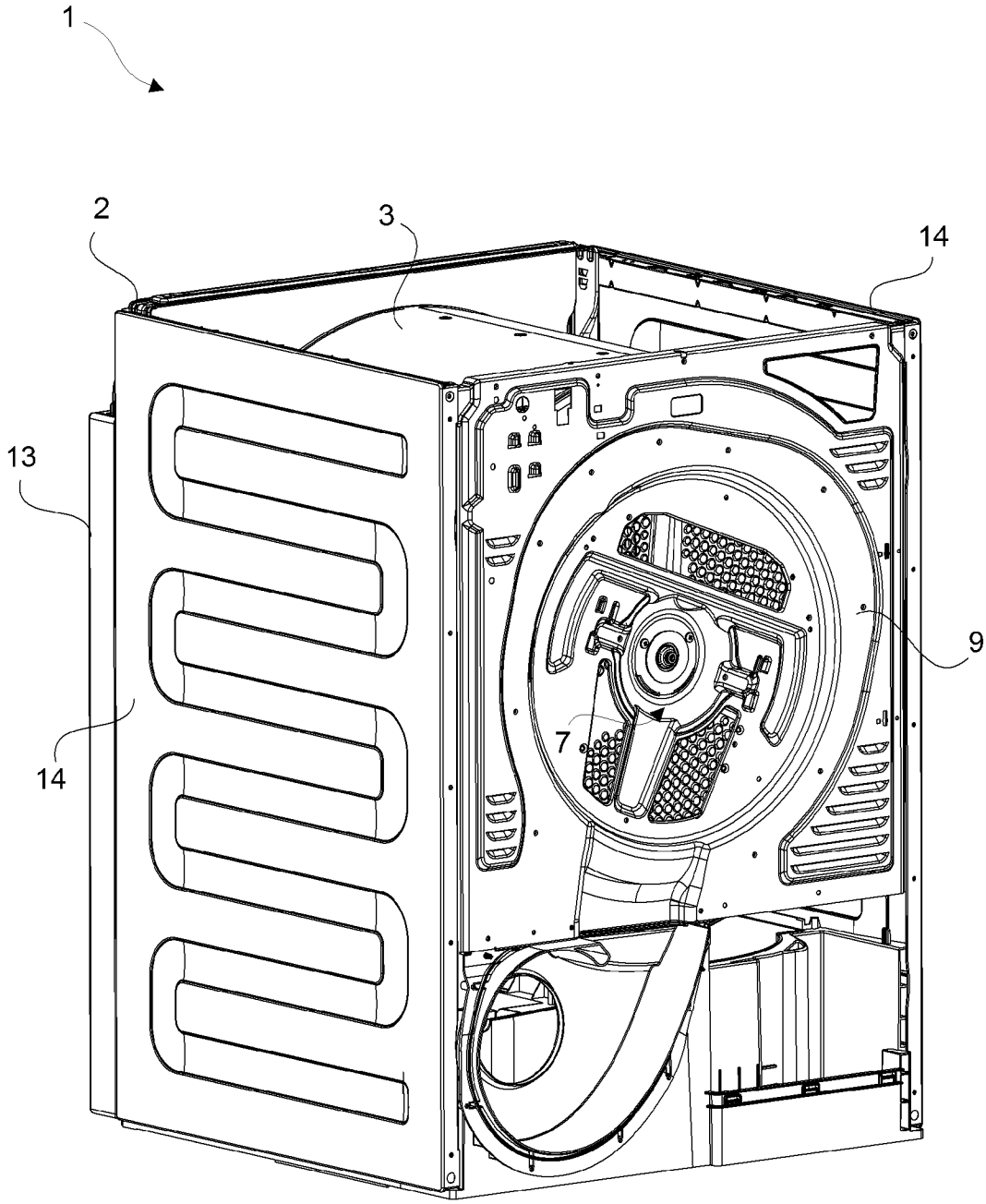


Figure 2

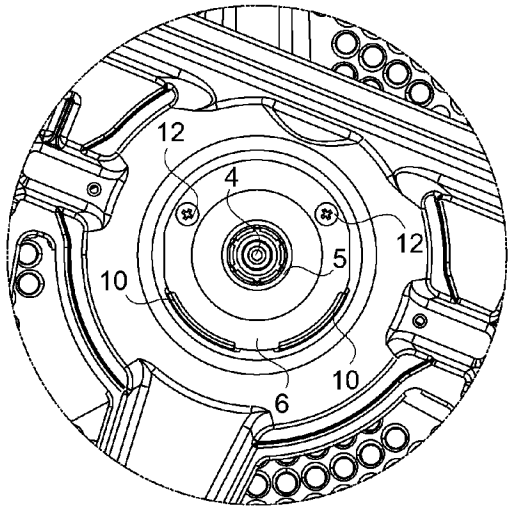



Figure 3

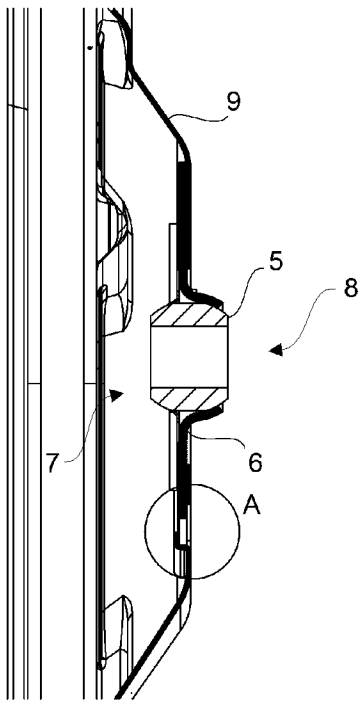
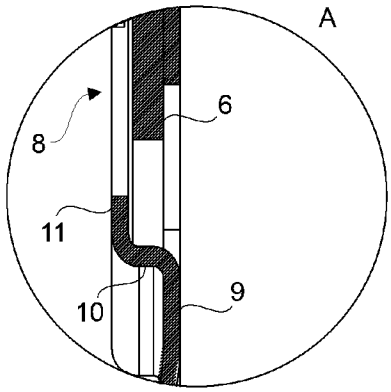



Figure 4



# INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/057158

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F58/06 D06F37/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 5 463 883 A (PELLERIN JAMES W [US] ET AL) 7 November 1995 (1995-11-07) figure 1 | 1-8 |
| X | US 5 927 106 A (PELLERIN JAMES W [US]) 27 July 1999 (1999-07-27) figures 1,3 | 1-3,5,7, 8 |
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| X | US 5 105 636 A (ANASTASE CONSTANTIN [US] ET AL) 21 April 1992 (1992-04-21) figures 1,3 | 1,7,8 |
| X | GB 1 500 032 A (BURCO DEAN LTD) 8 February 1978 (1978-02-08) figure 1 | 1,2 |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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|---|---|
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|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Kising, Axel |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2018/057158

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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