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(54) **A DRYER COMPRISING A DRYNESS SENSOR**

TROCKNER MIT TROCKENSENSOR

SÈCHE-LINGE COMPRENANT UN CAPTEUR DE SICCITÉ

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(56) References cited:

EP-A2- 0 365 272 DE-A1-102006 014 871
US-A- 5 940 986

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EP 2 387 643 B1

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Description

[0001] The present invention relates to a dryer comprising a dryness sensor (see US-A-5 940 986).

[0002] As is known, in dryers, various embodiments for sensing the dryness of laundry are available. One of these embodiments is based on the principle that at least two electrodes are disposed to a point where the laundry will contact during the drying process and that a current bridge is formed between the electrodes when the damp laundry contacts both electrodes simultaneously. Dryness sensing can be performed by examining the difference between the resistance values of the electrodes.

[0003] In the state of the art, in order to increase the measurement efficiency and to provide ease of assembly, various embodiments have been developed relating to where these conductive elements used in dryness sensing will be disposed inside the dryer and how they will be assembled.

[0004] In the state of the art United States of America Patent No US3593571, a dryer wherein the electrodes are fastened by means of clip means is explained.

[0005] Another state of the art embodiment is explained in the European Patent Application No EP1473402. In this embodiment, the electrodes are mounted on a sensor body and the sensor body is secured to the front bulkhead of the dryer by mechanical connection methods such as screw and detent.

[0006] In another state of the art embodiment, the United States of America Patent No US4899464, a dryer that comprises electrodes which are snap-fittingly seated in the housings seated on the front bulkhead is explained.

[0007] Another state of the art document is the United States of America Patent No US5940986. In this document, a dryer wherein the electrodes are embedded on the plastic exhaust vent cover by heat staking is explained.

[0008] However, in these state of the art embodiments, albeit small, a space cannot be prevented from remaining between the electrodes and the surface whereto the electrodes are fixed, and the filling of fluffs departed from of laundry to these spaces in the course of time adversely affects the measurement precision. On the other hand, as being an additional assembly step during the production of the dryer, the assembly of the electrodes increases the labor time and cost.

[0009] The aim of the present invention is the realization of a dryer wherein the dryness sensing electrodes are assembled easily and efficiently.

[0010] The dryer realized in order to attain the aim of the present invention is explicated in the attached claims.

[0011] The dryer of the present invention comprises a fixing surface produced such that the electrodes used for dryness sensing are inserted into the mould and at least partially embedded in the fixing surface. The fixing surface is produced from a dielectric material and fixed to the bulkhead. Thus, a space wherein the fluffs departed of laundry can be jammed is prevented from remaining

between the fixing surface and the point whereto the electrodes are fixed, and thus, the measurement efficiency is increased.

[0012] In different embodiments of the present invention, the fixing surface is produced in a way integrated to the bulkhead or is fixed to the bulkhead by an assembly element.

[0013] In the preferred embodiment of the present invention, the electrode comprises a body and two extensions which are located at both sides of the body and which remain inside the fixing surface. The body is cambered such that it will provide a protrusion to be formed on the fixing surface. Thus, the laundry is provided to easily contact the electrodes.

[0014] The model embodiments that relate to the dryer realized in order to attain the aim of the present invention are illustrated in the attached figures, where:

Figure 1 - is the sideways schematic view of a dryer.

Figure 2 - is the perspective view of the bulkhead.

Figure 3 - is the detailed front view of the bulkhead, the fixing surface and the electrodes.

Figure 4 - is the view of detail A in Figure 3.

[0015] The elements illustrated in the figures are numbered as follows:

1. Dryer
2. Drum
3. Bulkhead
4. Opening
5. Electrode
6. Fixing surface
7. Body
8. Extension

[0016] The dryer (1) of the present invention comprises a drum (2) which is rotated around the horizontal axis, a bulkhead (3) which has an opening (4) that enables the laundry to be loaded into the drum (2) and to be unloaded therefrom, and at least two electrodes (5) which are fixed to the bulkhead (3) and which provide dryness sensing to be performed (Figure 1 and Figure 2).

[0017] The dryer (1), furthermore, comprises a fixing surface (6)

- which is fixed to the bulkhead (3),
- which is formed by a plastic material being injected onto the electrodes (5),
- wherein the electrodes (5) are partially embedded (Figure 3).

[0018] After the electrodes (5) are positioned into the mould wherein the fixing surface (6) will be produced, the fixing surface (6) is formed by the plastic injection method. Thus, by providing the assembly of the electrodes (5) without a space and in a leak proof manner, both the dryness measurement is provided to be per-

formed more correctly and the need of additional connecting element is eliminated and hence, the assembly cost is minimized.

[0019] In an embodiment of the present invention, after the electrodes (5) are embedded in the fixing surface (6) during its production, the fixing surface (6) is fixed onto the bulkhead (3) by means of an assembly element.

[0020] In an embodiment of the present invention, the fixing surface (6) is produced as one piece with the bulkhead (3).

[0021] In the preferred embodiment of the present invention, the electrode (5) is arcuately shaped and comprises a body (7) which forms a protrusion outwards from the fixing surface (6), and at least two extensions (8) which are located at both sides of the body (7) and which are embedded in the fixing surface (6) (Figure 4). The arcuate structure of the body (7) facilitates the contact of the laundry to the electrodes (5) during the dryness measurement and thus, effective dryness measurement is provided.

[0022] It is to be understood that the present invention is not limited to the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments.

Claims

1. A dryer (1) comprising - a drum (2) which is rotated around the horizontal axis, - a bulkhead (3) which has an opening (4) that enables the laundry to be loaded into the drum (2) and to be unloaded therefrom, and - at least two electrodes (5) which are fixed to the bulkhead (3) and which provide dryness sensing to be performed, **characterized by** a fixing surface (6) which is fixed to the bulkhead (3) and in which fixing surface (6) the electrodes (5) are partially embedded by means of a plastic injection method, with the fixing surface (6) being formed by a plastic material being injected onto the electrodes (5) by means of the plastic injection method with the electrodes (5) being positioned into a mould.
2. A dryer (1) as in Claim 1, **characterized by** the fixing surface (6) which is fixed onto the bulkhead (3) by means of an assembly element.
3. A dryer (1) as in Claim 1, **characterized by** the fixing surface (6) which is produced as one piece with the bulkhead (3).
4. A dryer (1) as in any one of the above Claims, **characterized by** an arcuately-shaped electrode (5) that comprises a body (7) which forms a protrusion outwards from the fixing surface (6), and at least two extensions (8) which are located at both sides of the body (7) and which are embedded in the fixing surface (6).

Patentansprüche

1. Trockner (1) umfassend - eine Trommel (2), die um ihre horizontale Achse gedreht wird, - eine Trennwand (3), die eine Öffnung (4) aufweist, durch die die Wäsche in die Trommel (2) geladen und daraus entladen werden kann, und - wenigstens zwei Elektroden (5), die an der Trennwand (3) befestigt sind und eine Trocknungsgradmessung ermöglichen, **gekennzeichnet durch** eine Befestigungsfläche (6), die an der Trennwand (3) befestigt ist, wobei die Elektroden (5) teilweise mithilfe eines plastischen Verfahrens in die Befestigungsfläche (6) eingebettet sind, wobei die Befestigungsfläche (6) gebildet ist, indem ein Kunststoffmaterial mittels eines Kunststoffspritzverfahrens auf die Elektroden (5) gespritzt wird, wobei die Elektroden (5) in einer Form angeordnet sind.
2. Trockner (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Befestigungsfläche (6) mithilfe eines Montageelements an der Trennwand (3) befestigt ist.
3. Trockner (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Befestigungsfläche (6) einstückig mit der Trennwand (3) hergestellt ist.
4. Trockner (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine bogenförmige Elektrode (5), die einen Körper (7), der einen Vorsprung von der Befestigungsfläche (6) nach außen bildet, und wenigstens zwei Verlängerungen (8) umfasst, die an beiden Seiten des Körpers (7) angeordnet und in die Befestigungsfläche (6) eingebettet sind.

Revendications

1. Un sèche-linge (1) comprenant - un tambour (2) qui est tourné autour de l'axe horizontal, - une cloison (3) qui présente une ouverture (4) qui permet au linge d'être chargé dans le tambour (2) et déchargé de là, et - au moins deux électrodes (5) qui sont fixées à la cloison (3) et qui permettent la détection de sécheresse, **caractérisé par** une surface de fixation (6) qui est fixée à la cloison (3), les électrodes (5) étant encastrées partiellement dans la surface de fixation (6) par un procédé d'injection de matière plastique, la surface de fixation (6) étant formée par un matériau plastique injectée sur les électrodes (5) par le procédé d'injection de matière plastique avec les électrodes (5) étant positionnées dans un moule.
2. Un sèche-linge (1) selon la Revendication 1, **caractérisé par** la fixation de surface (6) qui est fixée sur la cloison (3) au moyen d'un élément d'assemblage.

3. Un sèche-linge (1) selon la Revendication 1, **caractérisé par** la surface de fixation (6) qui est produite en une seule pièce avec la cloison (3).

4. Un sèche-linge (1) selon l'une quelconque des revendications précédentes, **caractérisé par** une électrode en forme d'arc (5) qui comprend un corps (7) qui forme une protubérance vers l'extérieur à partir de la surface de fixation (6), et au moins deux extensions (8) qui sont situées aux deux côtés du corps (7) et qui sont encastrées dans la surface de fixation (6).

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Figure 1

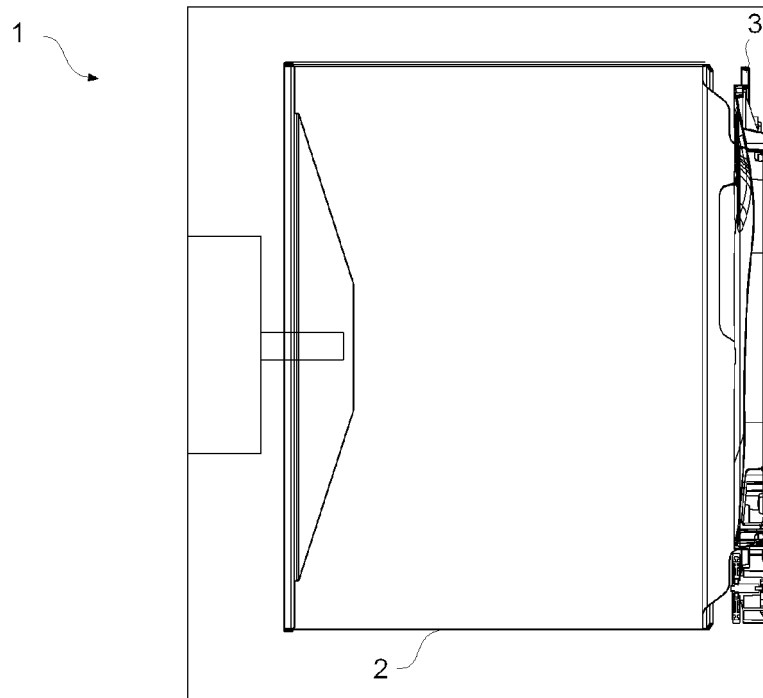


Figure 2

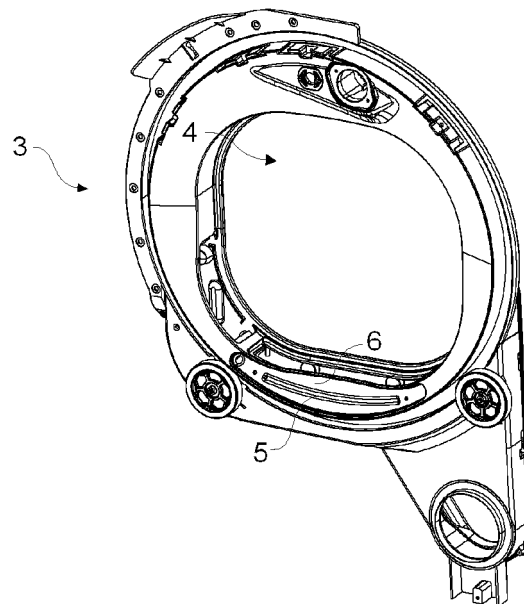


Figure 3

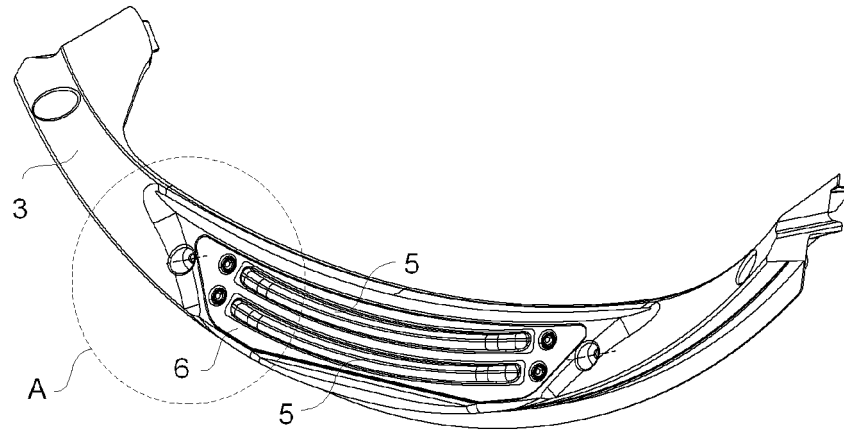
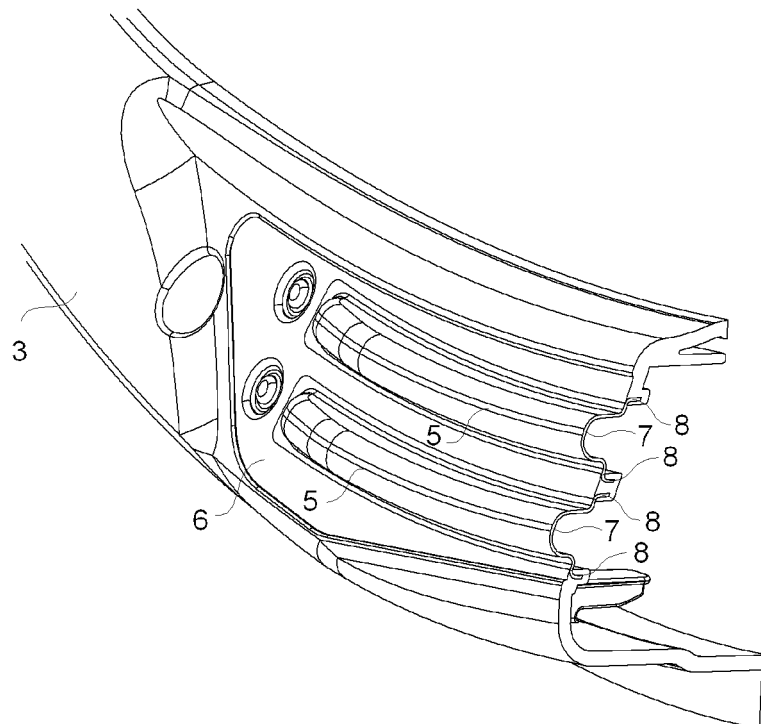


Figure 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5940986 A [0001] [0007]
- US 3593571 A [0004]
- EP 1473402 A [0005]
- US 4899464 A [0006]