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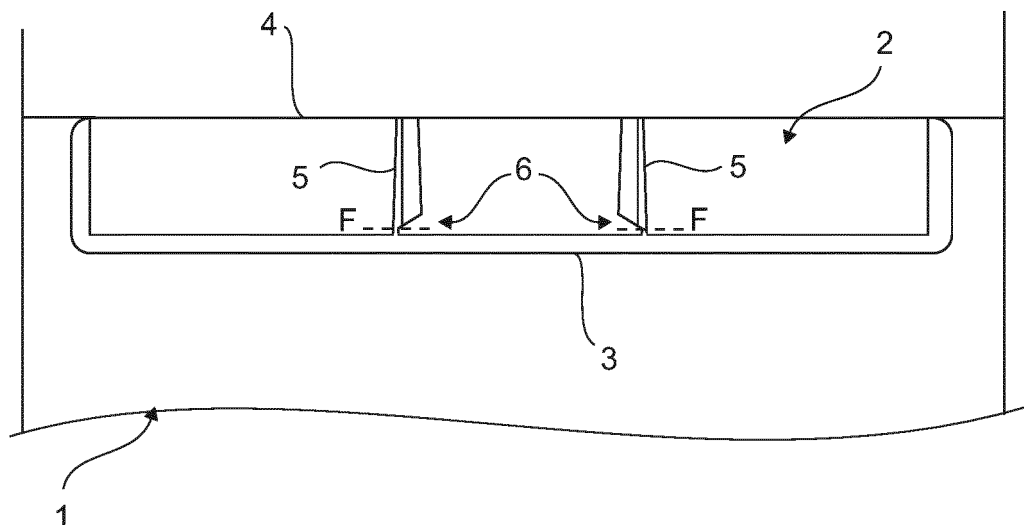
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(54) **A COOLING DEVICE**

(57) This invention helps to prevent any deformation of the walls of the board casing (2) by increasing the strength of the board casing (2) during the filling of the insulation material, thanks to the temporary protrusions (5) extending from the base (3) of the board casing (2)

and after the insulation material is filled, the protrusions (5) are broken and removed from the board casing (2), allowing the desired electronic card to be easily placed inside the board casing (2), regardless of the dimensions of the electronic card to be placed in the board casing (2).

Figure 1



Description

[0001] The present invention relates to a cooling device wherein the board casing is prevented from being deformed.

[0002] In cooling devices, especially in refrigerators and freezers, polyurethane-based insulation material is usually filled between the inner wall and the outer wall of the body in order to provide thermal insulation between the inner volume of the body and the external environment. The cooling device also comprises a door to close and seal the body which is the storage volume. In particular, the cooling device may be formed as a growth chamber, an ice box, a refrigerator, a freezer, a refrigerator-freezer combination and/or a wine cooler.

[0003] During the production of the cooling device, the inner wall and the outer wall of the body are placed in a mold and an insulation material such as polyurethane is injected between the inner wall and the outer wall in liquid form while inside the mold, and then the polyurethane expands after a while due to its properties, filling the insulation volume between the inner wall and the outer wall. Due to the method used to fill the insulation volume with insulation material, the insulation material does not spread homogeneously inside the insulation volume. In particular, if the body is removed from the mold without waiting for the curing and cooling of the insulation material, the insulation material continues to cool down. Due to the nonhomogeneous spreading of the insulation material in the insulation volume, different forces act on the inner wall and outer wall of the body, and structural defects occur in the inner and outer walls due to the irregular shrinkage of the insulation material and local collapses in the cellular structure of the insulation material.

[0004] Moreover, the board casing, which is located in the cooling device as embedded in the insulation volume and which protects the circuit board, is also deformed during the polyurethane injection process due to the reasons mentioned above. In the state of the art, said structural defects which occur in the board casing due to the polyurethane injection process are solved by placing various support members between the board casing walls. This process both increases the cost and requires additional labor.

[0005] In the state of the art Korean Patent Application No. KR20070043073, a cooling device is disclosed, wherein the deformation of the casing during the polyurethane process is prevented by means of a protrusion provided on the board casing. In this embodiment, the protrusion is a protrusion which passes through the circuit board placed into the casing.

[0006] In the state of the art European Patent Application No. EP3327384, a household appliance, especially a cooling device, is disclosed, comprising additional support members manufactured from various materials in various forms so as to increase the strength of the board casing during the injection of the insulation material.

[0007] The aim of the present invention is the realization

of a cooling device comprising a board casing of which the strength is increased against the pressure exerted by the insulation material during the application of the insulation material.

[0008] The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body having an inner wall and an outer wall and an insulation volume remaining therebetween; a board casing which is disposed in the insulation volume; and at least one protrusion which increases the strength of the board casing during the application of the insulation material into the insulation volume and which is broken afterwards to be removed from inside the board casing. This temporary arrangement of the protrusions eliminates the need to make any design changes to the board casing or the boards to be placed into the board casing.

[0009] The board casing is preferably a casing which receives circuit boards, or can be a casing which receives other physical components.

[0010] The protrusion extends from the base of the board casing to the ceiling of the board casing in the vertical axis. The protrusion comprises at least one recess which is arranged thereon, which allows the protrusion to be broken and removed from inside the board casing after the application of the insulation material is completed, which extends parallel to the base along the protrusion, which weakens the protrusion and which causes the notch effect. In the embodiment of the present invention, the recess extends continuously parallel to the base.

[0011] In another embodiment of the present invention, the recess extends along the protrusion, parallel to the base, intermittently, at intervals.

[0012] The recess is arranged on the protrusion, at the bottom of the protrusion, that is, closest to the base of the board casing. Thus, after the protrusion is broken, it is ensured that the remaining part of the protrusion inside the board casing is minimal.

[0013] The cross-section of the recess is triangular or circular. Thus, it is ensured that the protrusion is broken smoothly along a certain cross-section. In addition, it is ensured that the remaining part does not harm the operator.

[0014] It is ensured that the protrusions extending from the base of the board casing are broken by the operator who installs the board by applying force to the opposite direction of the side where the recesses are arranged.

[0015] By means of the present invention, thanks to the protrusions extending from the base of the board casing, during the application of the insulation material, the strength of the board casing is increased and it has been ensured that the walls of the board casing are prevented from being deformed, and moreover, after the application of the insulation material is completed, the protrusions are broken and removed from inside the board casing such that the desired circuit board is easily placed into the board casing, regardless of the dimensions of the

circuit board to be placed in the board casing.

[0016] A cooling device realized in order to attain the aim of the present invention is illustrated in the attached figure, where:

Figure 1 - is the sideways cross-sectional view of a body and the board casing therein.

[0017] The elements illustrated in the figures are numbered as follows:

1. Body
2. Board casing
3. Base
4. Ceiling
5. Protrusion
6. Recess
- F - Break line

[0018] The cooling device comprises a body (1) having an inner wall and an outer wall and an insulation volume remaining therebetween; a board casing (2) which is disposed in the insulation volume; and at least one protrusion (5) which increases the strength of the board casing (2) during the filling of the insulation material into the insulation volume and which is broken afterwards to be removed from inside the board casing (2).

[0019] Thus, the deformation of the walls of the board casing (2) is prevented during the production of the cooling device and the filling of the insulation material, and after the application of the insulation material is completed, the protrusion (5) is broken by the operator and removed from inside the board casing (2) such that the circuit board can be easily mounted into the board casing (2) without any limitations arising due to the protrusion (5).

[0020] The protrusion (5) extends from the base (3) of the board casing (2) to the ceiling (4) of the board casing (2) in the vertical axis. The protrusion (5) comprises at least one recess (6) which is arranged thereon, which allows the protrusion (5) to be broken and removed from inside the board casing (2) after the filling of the insulation material is completed, which extends parallel to the base (3) along the protrusion (5) and which weakens the protrusion (5). By means of the recess (6), a break line (F) is formed, thus enabling the operator to break the protrusion (5) easily and quickly. Moreover, by means of the recess (6), an insignificant part of the protrusion (5) remains under the break line (F) in the board casing (2) while the protrusion (5) is prevented from breaking, fragmenting outside the break line (F) in a manner to hurt the operator.

[0021] In the embodiment of the present invention, the recess (6) extends on the protrusion (5) continuously parallel to the base (3).

[0022] In another embodiment of the present invention, the recess (6) extends on the protrusion (5), parallel to the base (3), intermittently, at intervals.

[0023] In the preferred embodiment of the present invention, the recess (6) is arranged on the protrusion (5),

at the bottom of the protrusion (5), that is, closest to the base (3) of the board casing (2). Thus, it is ensured that after the protrusion (5) is broken, the remaining part of the protrusion (5) in the board casing (2) is minimal and the remaining part of the protrusion (5) is shortest.

[0024] In an embodiment of the present invention, the cross-section of the recess (6) is triangular.

[0025] In another embodiment of the present invention, the cross-section of the recess (6) is curved, preferably semicircular.

[0026] The protrusions (5) extend from the base of the board casing (2) towards the ceiling (4) thereof. During the application of the insulation material, said protrusions (5) support the walls of the board casing (2) and increase the strength of the board casing (2) during the application of the insulation material. After the insulation material is filled, the protrusions (5) are preferably broken from the bottom, that is, closest to the base (3) of the board casing (2), and removed from inside the board casing (2) as the operator applies a force to the opposite direction of the side where the recesses (6) are arranged. In this case, only the part of the protrusion (5) up to the recess (6) remains at the base (3) of the board casing (2), which does not prevent the placement of the circuit board to be placed in the board casing (2). Afterwards, the circuit board is placed in the board casing (2) by the operator and the assembly process is completed.

[0027] By means of the present invention, thanks to the protrusions (5) extending from the base (3) of the board casing (2), during the filling of the insulation material, the strength of the board casing (2) is increased and it has been ensured that the walls of the board casing (2) are prevented from being deformed, and moreover, after the filling of the insulation material is completed, the protrusions (5) are broken and removed from inside the board casing (2) such that the desired circuit board is easily placed into the board casing (2), regardless of the dimensions of the circuit board to be placed in the board casing (2).

Claims

1. A cooling device **comprising** a body (1) having an inner wall and an outer wall and an insulation volume remaining therebetween; and a board casing (2) which is disposed in the insulation volume, **characterized by** at least one protrusion (5) which increases the strength of the board casing (2) during the filling of the insulation material into the insulation volume and which is broken afterwards to be removed from inside the board casing (2).
2. A cooling device as in Claim 1, **characterized by** the protrusion (5) which extends from the base (3) of the board casing (2) to the ceiling (4) of the board casing (2) in the vertical axis.

3. A cooling device as in Claim 2, **characterized by** the protrusion (5) comprising at least one recess (6) which allows the protrusion (5) to be broken and removed from inside the board casing (2) after the filling of the insulation material is completed, which extends parallel to the base (3) along the protrusion (5) and which weakens the protrusion (5). 5
4. A cooling device as in Claim 3, **characterized by** the recess (6) which extends on the protrusion (5) continuously parallel to the base (3). 10
5. A cooling device as in Claim 3, **characterized by** the recess (6) which extends on the protrusion (5), parallel to the base (3), intermittently. 15
6. A cooling device as in any one of the Claims 3 to 5, **characterized by** the recess (6) which is arranged on the protrusion (5), at the bottom of the protrusion (5), closest to the base (3) of the board casing (2). 20
7. A cooling device as in any one of the Claims 3 to 6, **characterized by** the recess (6) the cross-section of which is triangular. 25
8. A cooling device as in any one of the Claims 3 to 6, **characterized by** the recess (6) the cross-section of which is semicircular. 30

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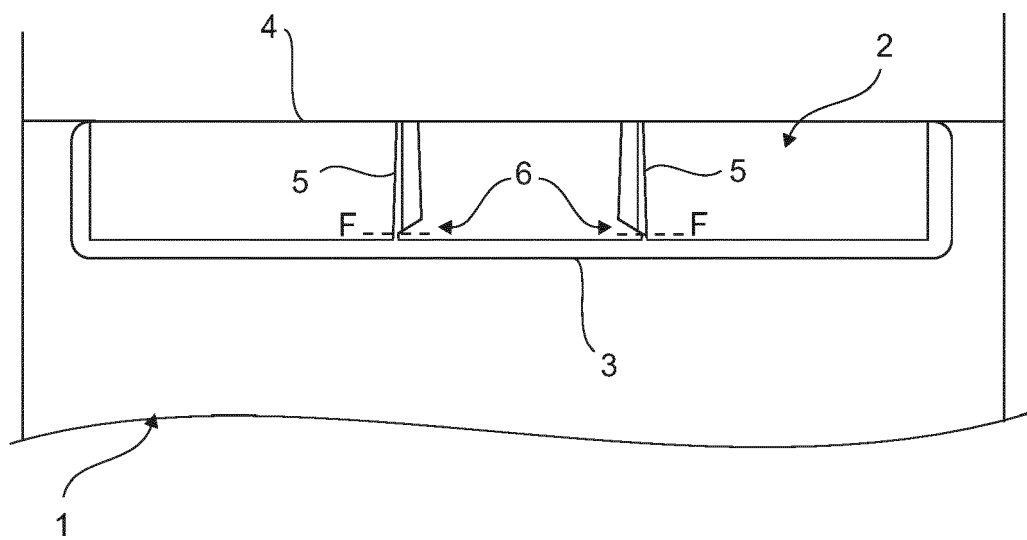
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Figure 1





EUROPEAN SEARCH REPORT

Application Number

EP 22 19 8935

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 2019 027723 A (HITACHI APPLIANCES INC) 21 February 2019 (2019-02-21) * figures 5,7 *	1-8	INV. F25D23/06
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			TECHNICAL FIELDS SEARCHED (IPC)
			F25D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 February 2023	Examiner de Graaf, Jan Douwe
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 19 8935

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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14-02-2023

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