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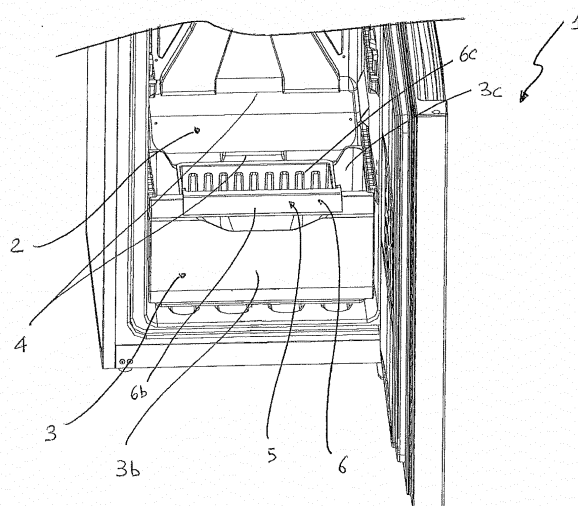
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(54) **REFRIGERATION APPARATUS**

(57) A food refrigeration device includes a freezing compartment (2), a drawer (3) movable between a first position for maximum insertion in the compartment (2) and a second position for at least partial extraction from the compartment (2), at least one cooling inlet (4) associated with the compartment (2) and oriented towards

the drawer (3) to generate a flow of cold air, and at least one blast chiller section (5) smaller than the drawer (3) and at least partially fitted inside the drawer (3), where the cooling outlet (4) is at least partially facing the blast chiller section (5) to lower the temperature faster.

FIG. 1



Description

[0001] The present invention relates to a device for re-frigerating food items.

[0002] A known refrigeration apparatus for food products comprising:

- a freezer (or freezing) compartment;
- a drawer placed inside the freezer (or freezing) compartment.

[0003] The drawer generally is extractable and is used to store frozen foods. These drawers are most often associated with no-frost technology in order to avoid freezing and ice crystal formation.

[0004] The object of the present invention is to provide a food refrigeration device that allows improved flexibility of use.

[0005] This object and others besides, which will more fully emerge during the course of the description which follows, are achieved, in accordance with the present invention, by a food refrigeration device having structural and functional characteristics in accordance with the accompanying independent claims, further embodiments of the invention being identified in the accompanying and corresponding dependent claims.

[0006] The invention is illustrated in more detail below, with the aid of the drawings, which represent a purely exemplary and non-limiting embodiment thereof, wherein:

- Figure 1 is a partial perspective view of the refrigeration device according to the present invention;
- Figures 2 and 3 show front and rear perspective views of a detail of the refrigeration device illustrated in Figure 1;
- Figure 4 shows a side view of the detail illustrated in Figures 2 and 3;
- Figure 5 shows a plan view of the detail illustrated in Figures 2 and 3;
- Figures 6 and 7 show a frontal and rear perspective view of an alternative embodiment of a component illustrated in Figures from 2 to 5. In the appended figures, reference numeral 1 denotes a food refrigerating device (typically a refrigerator-freezer). The refrigeration device 1 includes a freezing compartment 2.

[0007] Preferably, hereinafter we will refer specifically to a freezer compartment 2, as it is more tied to the application according to the present invention, but may be extended to a generic refrigeration compartment.

[0008] In the preferred embodiment, freezer compartment 2 is of the *no-frost* type, which is able to prevent the formation of unwanted ice.

[0009] The refrigerating device 1 also includes a drawer 3 movable between a first position for maximum insertion in the compartment 2 and a second position for at

least partial extraction from the compartment 2.

[0010] Therefore, drawer 3 is extractable from compartment 2.

[0011] Preferably, the drawer 3 is placed at the bottom of compartment 2, in particular, close to a base of the device 1.

[0012] Therefore, the drawer 3 is conveniently the containment element installed at a lower height inside compartment 2.

[0013] In order to allow rapid cooling, the device 1 comprises at least one inlet (or mouthpiece) associated to compartment 2 and oriented towards drawer 3 to generate a stream of cold air.

[0014] Preferably, the compartment 2 includes a number of cooling inlets 4 located in different areas of the device, in order to provide uniform cooling of foods.

[0015] In particular, at least one inlet 4 is located above drawer 3 and oriented towards the inside of the drawer.

[0016] More specifically, drawer 3 has a box-shaped structure defined by a bottom wall 3a, a front wall 3b, a rear wall 3c and two side flanks 3d.

[0017] The distance between the front wall 3b and rear wall 3c defines a depth of the drawer 3.

[0018] The distance between the side flanks 3 defines a width "W2" of the drawer 3.

[0019] The distance between the free end of the sides 3b and the bottom wall defines a height "H2" of drawer 3.

[0020] In this respect, the cooling inlet 4 is placed higher up than a free end of the rear wall 3c of the drawer 3.

[0021] More specifically, the cooling inlet 4 is placed higher up than a central position of the rear wall 3c.

[0022] Note that such a rear wall 3c presents a development, away from the bottom wall 3a, that is lower than that of the front wall 3b (at least in one central part, or median).

[0023] In other words, the free end of the rear wall 3c of the drawer 3 is placed at a distance from the bottom wall 3a that is lower than the corresponding free end of the front wall 3b.

[0024] According to an aspect of the present invention, refrigeration device 1 comprises at least one blast chiller section 5 associated with drawer 3. This blast chiller 5 has a smaller volume than the inner volume of the drawer 3.

[0025] Conveniently, this makes refrigeration (or chilling) quicker and more efficient.

[0026] In this regard, note that blast chiller section 5 is contained at least partially within the drawer 3.

[0027] Therefore, the cooling inlet 4 is installed higher up than said blast chiller section 5.

[0028] Conveniently, the cooling inlet 4 is at least partially facing said blast chiller section 5 to lower the temperature even faster.

[0029] Preferably, the cooling inlet 4 is fully facing the blast chiller section 5 to maximise chilling efficiency.

[0030] Thus, cooling inlet 4 is located above the drawer 3 and 5 and blast chiller 5 and is tilted downwards to direct a stream of cold air inside the blast chiller section

5 (and drawer 3).

[0031] Preferably, note that blast chiller section 5 is defined by a tray 6 that has a bottom wall 6a and at least two side walls (6b, 6c) rising from bottom wall 6a and facing each other.

[0032] More preferably, the side walls are four - a front wall 6b, a rear wall 6c and two side flanks 6d.

[0033] Therefore, even blast chiller section 5 is box-shaped and accessible from the top.

[0034] Preferably, blast chiller section 5 is removably associated (i.e. connected) with drawer 3 so as to move between a position of disengagement and a position of engagement, wherein the blast chiller section 5 is at least partially inside the drawer 3.

[0035] Therefore, the blast chiller 5 (and in particular, tray 6) is equipped with connecting means 7 that can be engaged to the drawer 3. Such connecting means 7 is associated with the side walls 6b, 6c.

[0036] In particular, the connecting means is associated with the front wall 6b and rear wall 6c.

[0037] Preferably, these front and rear walls 6b and 6c each have on their own free end a beak or hook 8a, 8b that can be engaged with the corresponding front wall 3b and rear wall 3c of drawer 3.

[0038] In this way, the blast chiller 5 (or tray 6) can be engaged conveniently to the drawer 3 while resting.

[0039] Therefore, similarly to the drawer 3, even the rear wall 6c of the tray 6, away from the bottom wall 6a, is smaller than the corresponding front wall 6b, so as to adapt exactly to the conformation of the drawer 3.

[0040] In certain embodiments, in order to increase heat exchange and ventilation, the blast chiller 5 (or tray 6) has at least one lumen near the rear wall 6c.

[0041] Alternatively and/or jointly (see Figures 6 and 7), there is a through lumen 9a on front wall 6b near the free end, in order to facilitate heat exchange. In the preferred embodiment, the through lumen 9a in the front wall 6b has a width ranging between 115 and 135 mm, preferably 120 mm, and a height ranging between 27 and 33 mm, preferably 30 mm.

[0042] Moreover, in these or other embodiments, even the side flanks 6d of the tray 6 have at least one oblong through opening 10 extending between a first end 10a proximal the rear wall 6c and a second end 10b distal from the rear wall 6c.

[0043] Preferably, this oblong opening is located close to the bottom wall 6a and runs parallel to it.

[0044] In the embodiment illustrated, the oblong opening has a length ranging between 55 and 65 mm, preferably 60 mm, and a height ranging between 8 and 12 mm, preferably 10 mm.

[0045] In the preferred embodiment, the blast chiller section 5 is associated with the drawer 3, at least in the position of engagement, so that their respective bottom walls 3a, 6a are spaced apart, with the bottom wall of the blast chiller section 5 positioned higher up.

[0046] Therefore, in the position of engagement of the blast chiller 5, a containment and additional refrigeration

zone is defined, or delimited, between the bottom wall of the tray 6 and bottom wall 3a of the drawer.

[0047] In the light of this, the blast chiller section 5, or tray 6, has a lower height than the drawer 3.

5 **[0048]** Remember that by height we mean preferably the minimum distance between the free end of the side flanks 3d, 6d and their bottom wall 3a, 6a.

[0049] In the preferred embodiment, the tray 6 has a height "H1" ranging between 62 and 67 mm, preferably between 64.5 and 66 mm, and more preferably of about 65.2 mm.

[0050] In turn, the drawer 3 has a height "H2" ranging between 180 and 190 mm, preferably between 182 and 186 mm, and more preferably of about 184 mm.

10 **[0051]** Therefore, the containment and additional refrigeration zone has a height "H3", equal to the difference of the two above-mentioned heights, i.e. between 113 and 124 mm, preferably between 116 and 121.5 mm, and more preferably of about 118.8 mm.

20 **[0052]** Preferably, the bottom wall 6a of tray 6 features a plurality of through openings 11 to allow an exchange of air with the zone of the drawer 3 below the blast chiller 5, i.e. the above-mentioned containment and additional refrigeration zone.

25 **[0053]** In the embodiment illustrated, the bottom wall 6a of tray 6 has a reticular shape. In other words, the bottom wall 6a of tray 6 features a band of first parallel beams and a band of second parallel beams that are orthogonal to each other, in order to define the above-mentioned plurality of through openings 11.

30 **[0054]** In the preferred embodiment, the blast chiller section 5 (or tray 6) has a width "W1" lower than width "W2" of the drawer 3, in order to allow the air to recirculate also on its sides.

35 **[0055]** Preferably, the tray has a width "W1" ranging between 288 and 295 mm, preferably between 290 and 293 mm, and more preferably of about 291.7 mm.

[0056] The drawer 3, instead, has a width "W2" ranging between 416 and 423 mm, preferably between 419 and 420 mm, and more preferably of about 419.4 mm.

40 **[0057]** In particular, the blast chiller section 5 (or tray 6) is positioned centrally with respect to the drawer 3, in order to be at the same distance from both the side flanks 3d of the drawer itself.

45 **[0058]** In other words, the distance between the side flank 3d of drawer 3 and the corresponding side flank 6d of tray 6 is equal on both sides.

[0059] Therefore, the tray 6 and the drawer 3 share the same centre line.

50 **[0060]** In order to make it easier the positioning and ensure stability of the blast chiller section 5, the drawer 3 features at least one housing seat 12 at said front wall 3b and/or rear wall 3c, which can be coupled with the blast chiller section 5 (or with the tray 6).

55 **[0061]** This housing seat 12 is sized to prevent movement of the blast chiller section 5 when approaching and/or moving away from side flanks 3d.

[0062] In the embodiment illustrated, the housing seat

12 is defined by an oblong groove 12a that develops along the rear wall 3c from an area proximal to a side flank 3d approaching the other flank.

[0063] Note that, in order to facilitate positioning and handling of the blast chiller section 5, the side flanks 6d of tray 6 feature gripping means 13 on their free ends. Preferably, the gripping means is defined by handles 13a or shelves projecting sideways to the tray 6.

[0064] The invention attains the preset aims and provides important advantages. In fact, the presence of a blast chiller that is associated with the drawer helps lower and stabilise the temperature faster and more efficiently. The removability of the tray, moreover, allows to selectively use the compartment and to facilitate placement of food. Conveniently, moreover, the presence of openings on the bottom and, where necessary, on the sides of the tray will increase air recirculation and therefore heat exchange, thereby providing increased chilling. Note in this regard that tests have shown that it is possible to chill the temperature of a product placed in the compartment from +70° to -18°C in little more than 5 hours. The invention thus conceived is susceptible to numerous modifications and variants, all of which falling within the scope of the inventive concept characterizing the invention. Moreover, all details may be replaced with other technically equivalent elements. In practice, all the materials used, as well as the dimensions, can be any according to requirements

Claims

1. A refrigeration device for refrigerating food products, comprising:

- a freezer compartment (2);
- a drawer (3) that is movable between a first position for maximum insertion in the compartment (2) and a second position for at least partial extraction from the compartment (2);
- at least one cooling inlet (4) associated with said compartment (2) and oriented in the direction of said drawer (3) so as to generate a flow of cold air;

characterised in that it comprises at least one blast chiller section (5) that is smaller in volume than the drawer (3) and housed at least partially in said drawer (3), said cooling inlet (4) at least partially facing said blast chiller section (5) so as to accelerate the reduction in temperature.

2. The refrigeration device according to claim 1, **characterised in that** said blast chiller section (5) is removably associated with said drawer (3) so as to move between a position of disengagement and a position of engagement, wherein the blast chiller section (5) is at least partially in the drawer (3).

3. The refrigeration device according to claim 1 or 2, **characterised in that** said cooling inlet (4) is located at a higher position than said blast chiller section (5).

4. The refrigeration device according to any one of the preceding claims, **characterised in that** said entire cooling inlet (4) faces said blast chiller section (5) so as to accelerate the reduction in temperature.

5. The refrigeration device according to any one of the preceding claims, **characterised in that** said blast chiller section (5) is defined by a tray (6) that has a bottom wall (6a) and at least two side walls (6b, 6c) rising from said bottom wall (6a) and facing each other, said tray (6) being equipped with connecting means (7) for connection with said drawer (3) and associated with said side walls (6b, 6c).

6. The refrigeration device according to claim 5, **characterised in that** said side walls (6b, 6c) comprise at least a front wall (6b) and a rear wall (6c), each of which is provided with a peg (7a) at a free end thereof, said peg (7a) being engageable with corresponding front (3b) and rear (3c) walls of the drawer (3).

7. The refrigeration device according to claim 6, **characterised in that** the extension of the rear wall (6c) of the tray (6), away from the bottom wall (6a), is smaller than said front wall (6b) so as to adapt to the conformation of the drawer (3).

8. The refrigeration device according to claim 6 or 7, **characterised in that** it comprises at least one through opening (9a) afforded in said rear wall (6c) and/or in said front wall (6b) in an area in the proximity of said free end, so as to facilitate heat exchange.

9. The refrigeration device according to any one of the preceding claims, **characterised in that** said blast chiller section (5) is defined by a tray (6), wherein said tray (6) and the drawer (3) both have a respective bottom wall (3a, 6a), said blast chiller section (5) being associated with said drawer (3) so that the respective bottom walls (3a, 6a) prove to be spaced apart from each other, with the bottom wall of the blast chiller section (5) being at a higher height.

10. The refrigeration device according to claim 9, **characterised in that** said bottom wall (6a) is provided with a plurality of through openings (11) so as to enable air exchange with an area of the drawer underlying the blast chiller section (5).

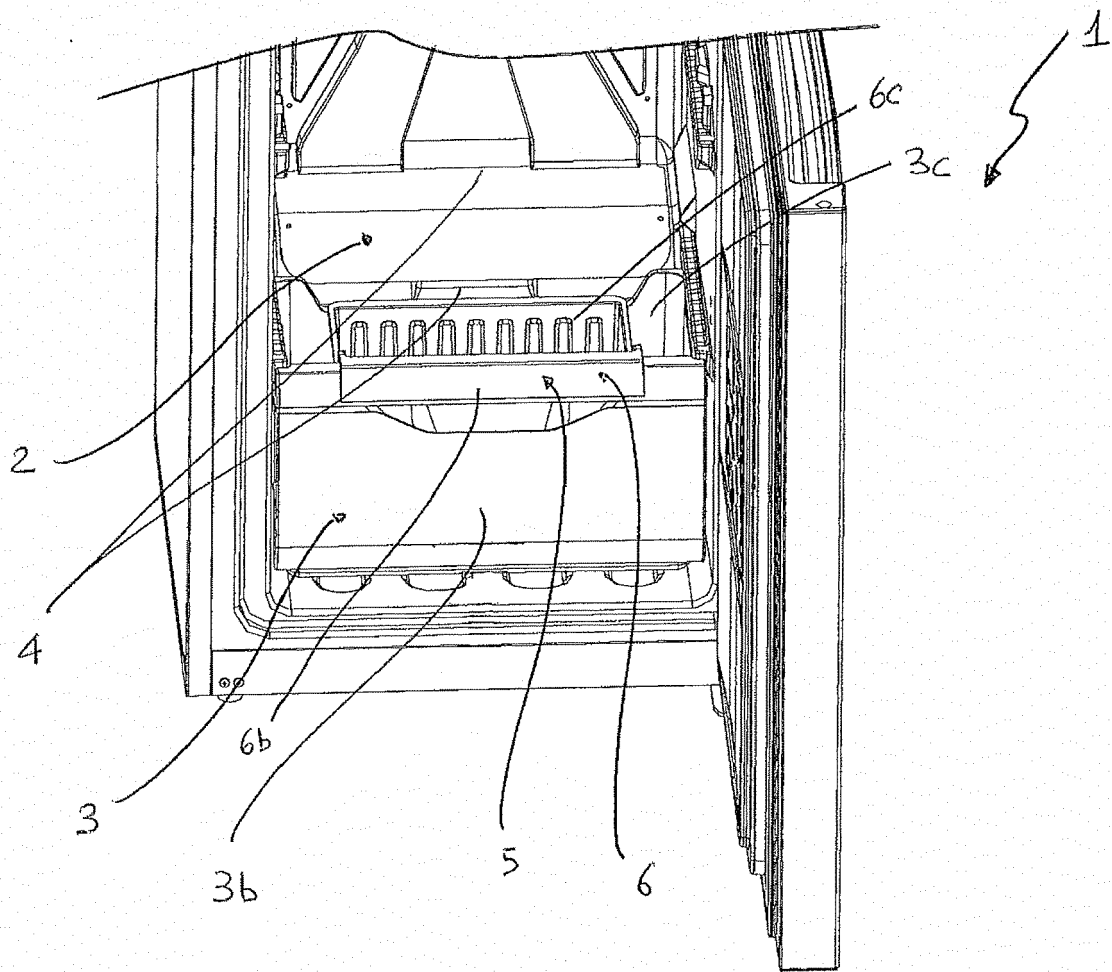
11. The refrigeration device according to any one of the preceding claims, **characterised in that** said drawer (3) has a box-like shape defined by a bottom wall (3a), a front wall (3b), a rear wall (3c) and two lateral flanks (3d) and the blast chiller section (5) is defined

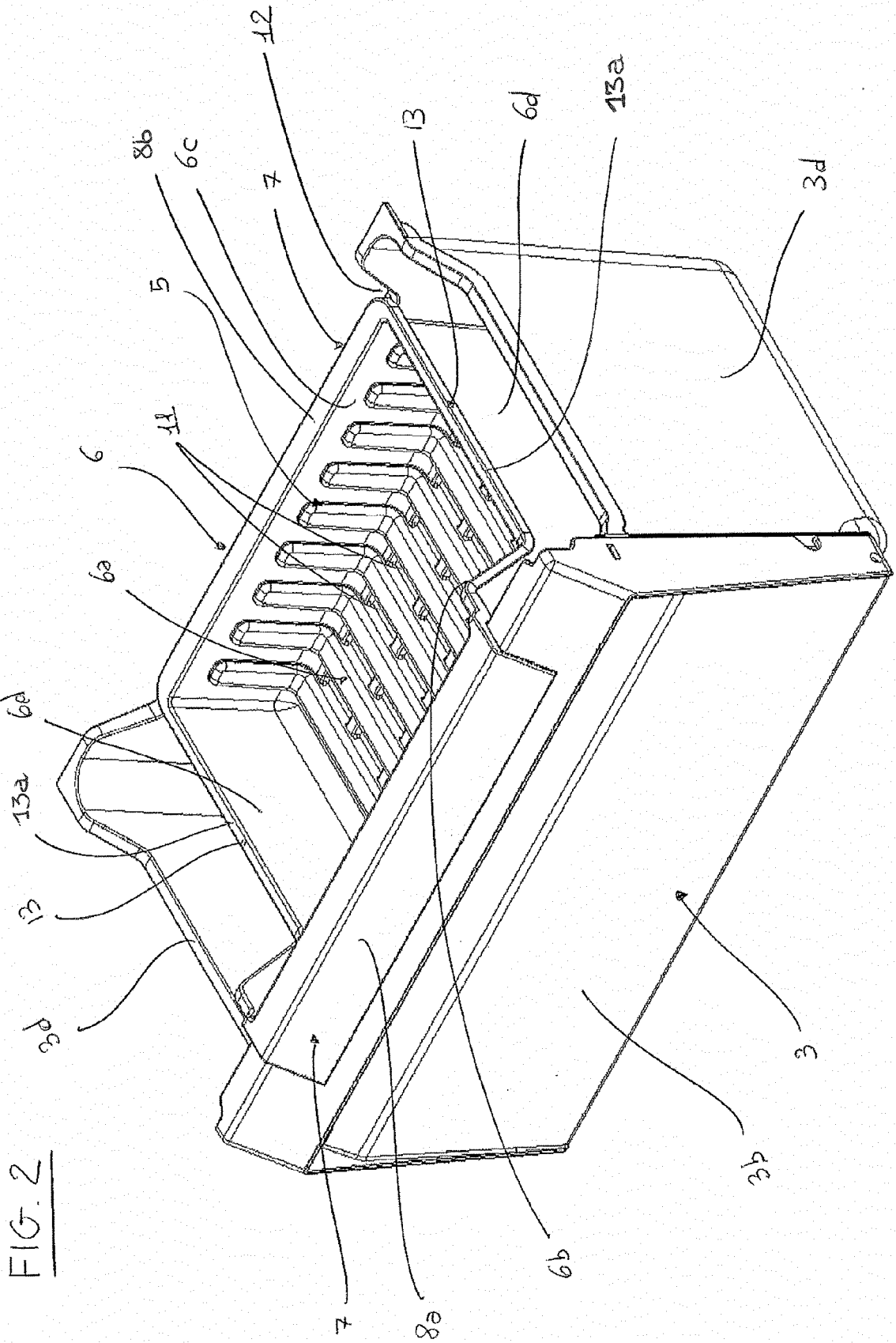
by a tray (6) that has a bottom wall (6a) and at least four side walls coupled in pairs so as to define a front wall (6b), a rear wall (6c) and two lateral flanks (6d), wherein the distance between the front wall (3b, 6b) and the rear wall (3c, 6c) defines a depth of the drawer (3) or of the blast chiller section (5) and the distance between the lateral flanks (3d, 6d) defines a width (W2) of the drawer (3) or the blast chiller section (5); said blast chiller section (5) being narrower in width (W1) than said drawer (3) for the purpose of enabling recirculation of the air laterally thereto.

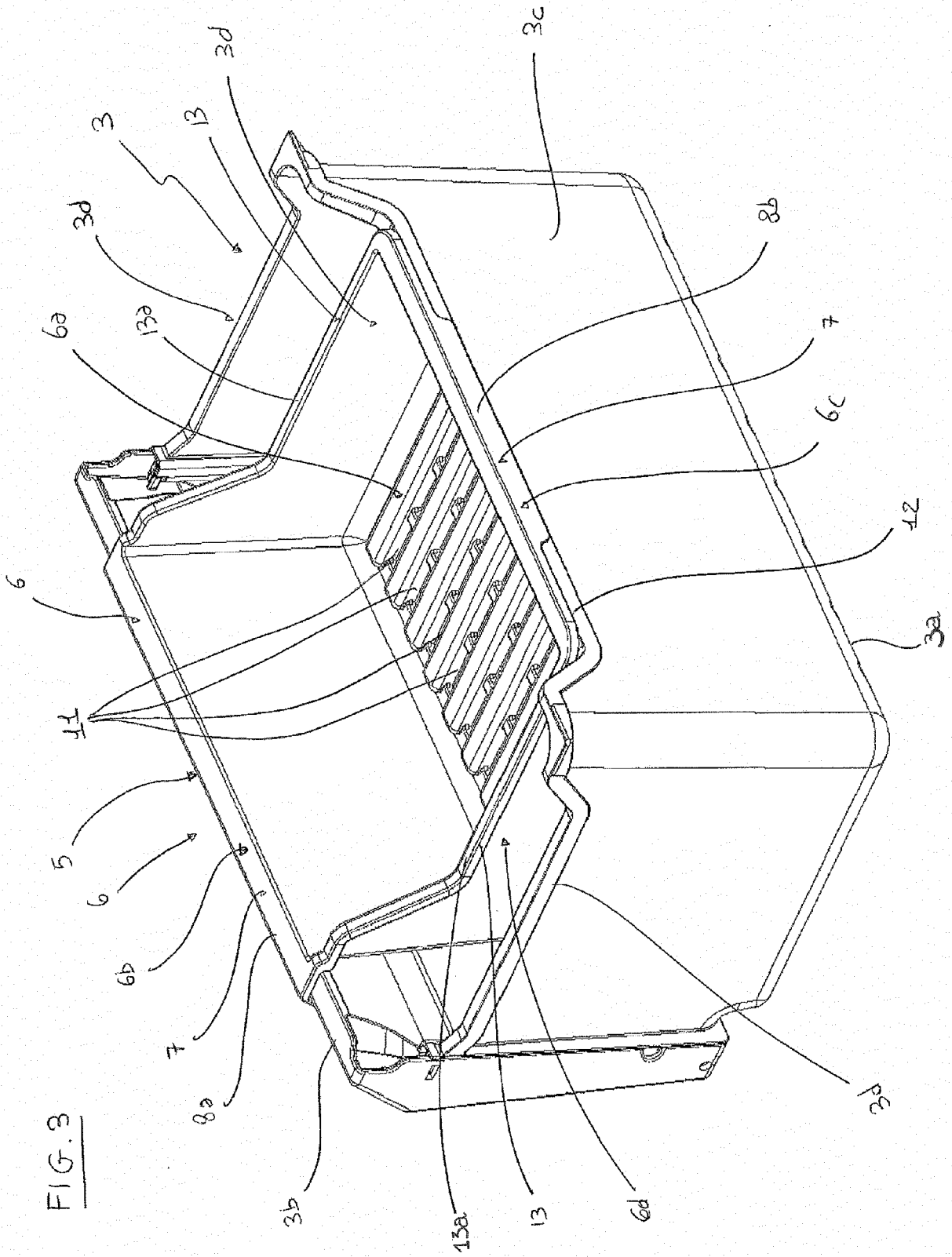
preceding claims, **characterised in that** said freezer compartment (2) is of the no-frost type.

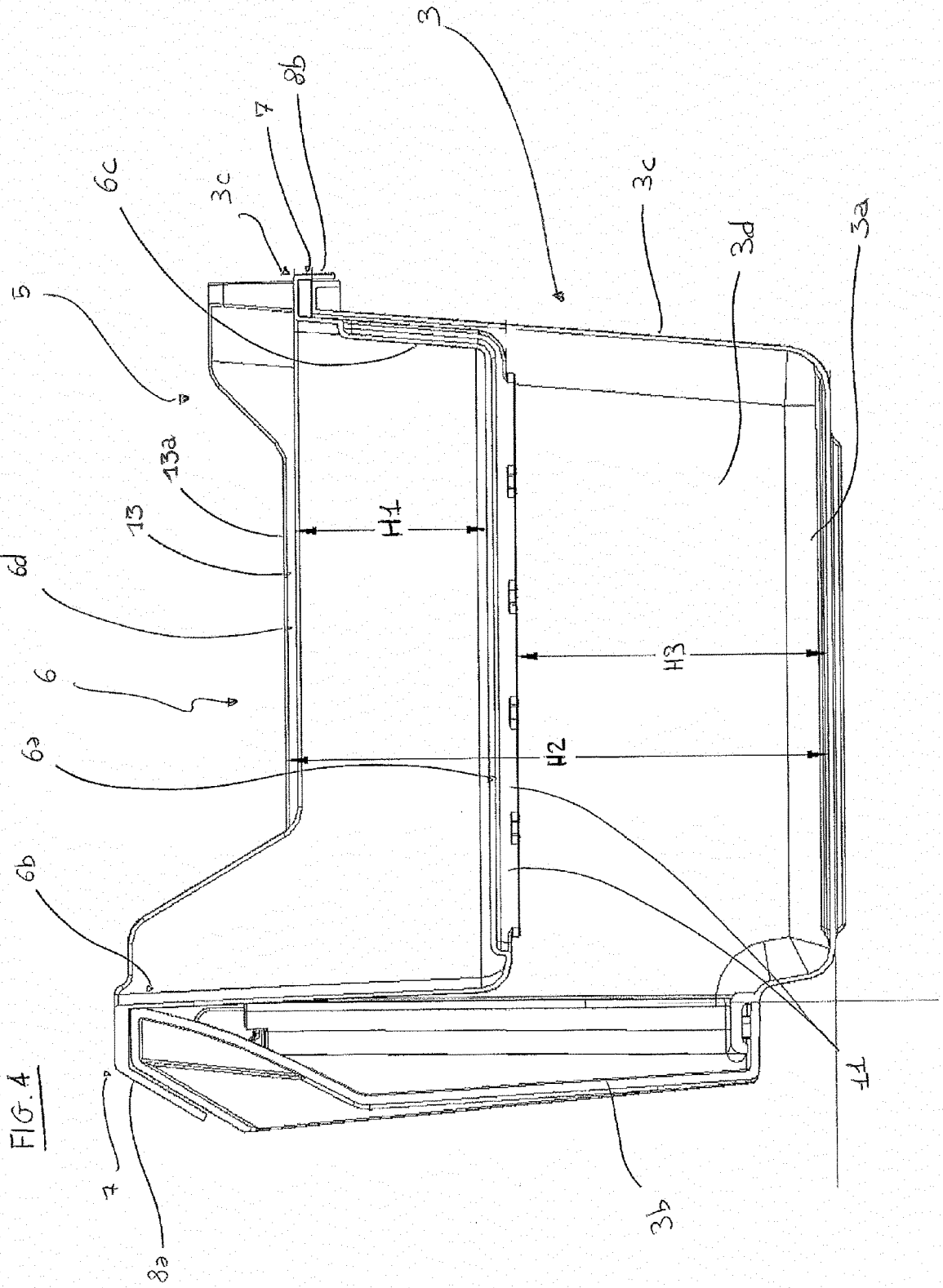
12. The refrigeration device according to claim 11, **characterised in that** said blast chiller section (5) is positioned centrally with respect to said drawer (3) so that it is equidistant from both lateral flanks (3d) of the drawer (3).
13. The refrigeration device according to claim 11 or 12, **characterised in that** at said front (3b) and/or rear (3c) wall, said drawer (3) has at least one housing seat (12) that can be coupled with the blast chiller section (5) and that is sized so as to prevent movement of the blast chiller section (5) towards and/or away from the lateral flanks (3d) of the drawer (3).
14. The refrigeration device according to any one of claims 11 to 13, **characterised in that** the lateral flanks (6d) of the tray (6) have gripping means (13) at the free ends thereof, said gripping means (13) being suitable for facilitating manoeuvrability for the user.
15. The refrigeration device according to any one of claims 11 to 14, **characterised in that** each one said lateral flanks (6d) of the tray has at least one oblong through opening (10) extending between a first end (10a) near the rear wall (6c) and a second end (10b) distant from the rear wall (6c).
16. The refrigeration device according to any one of claims 11 to 15, **characterised in that** the width (W2) of the tray (6) ranges between 288 and 295 mm, preferably between 290 and 293 mm.
17. The refrigeration device according to any one of the preceding claims, **characterised in that** said blast chiller section (5) is defined by a tray (6) having a bottom wall (6a) and at least four side walls coupled in pairs so as to define a front wall (6b), a rear wall (6c) and two lateral flanks (6d), wherein the extension of the lateral flanks (6d) away from the bottom wall (6a) defines a height of the tray (6); said tray being of a height (H1) ranging between 62 and 67 mm, preferably between 64.5 and 66 mm, more preferably of approximately 65.2 mm.
18. The refrigeration device according to any one of the

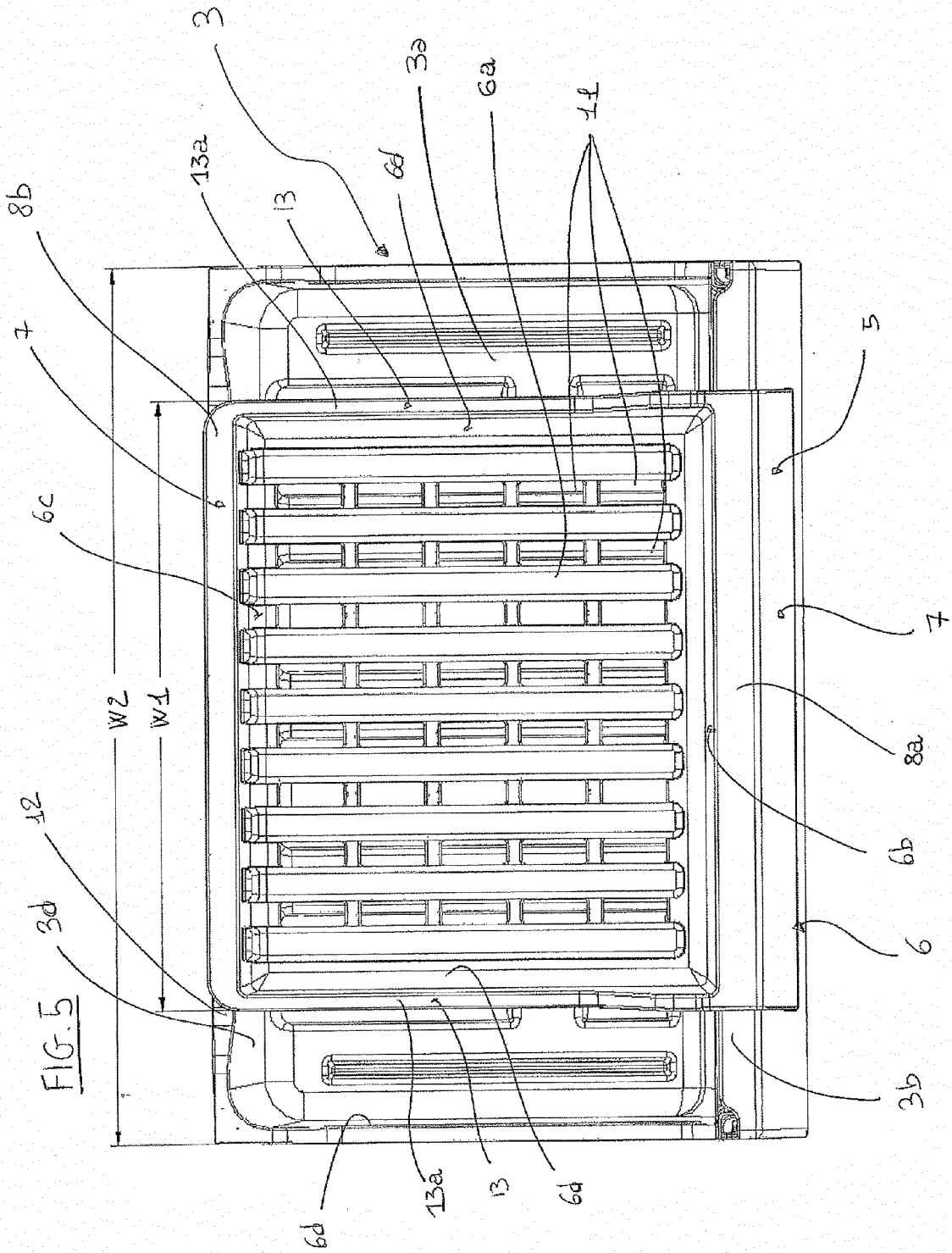
FIG. 1

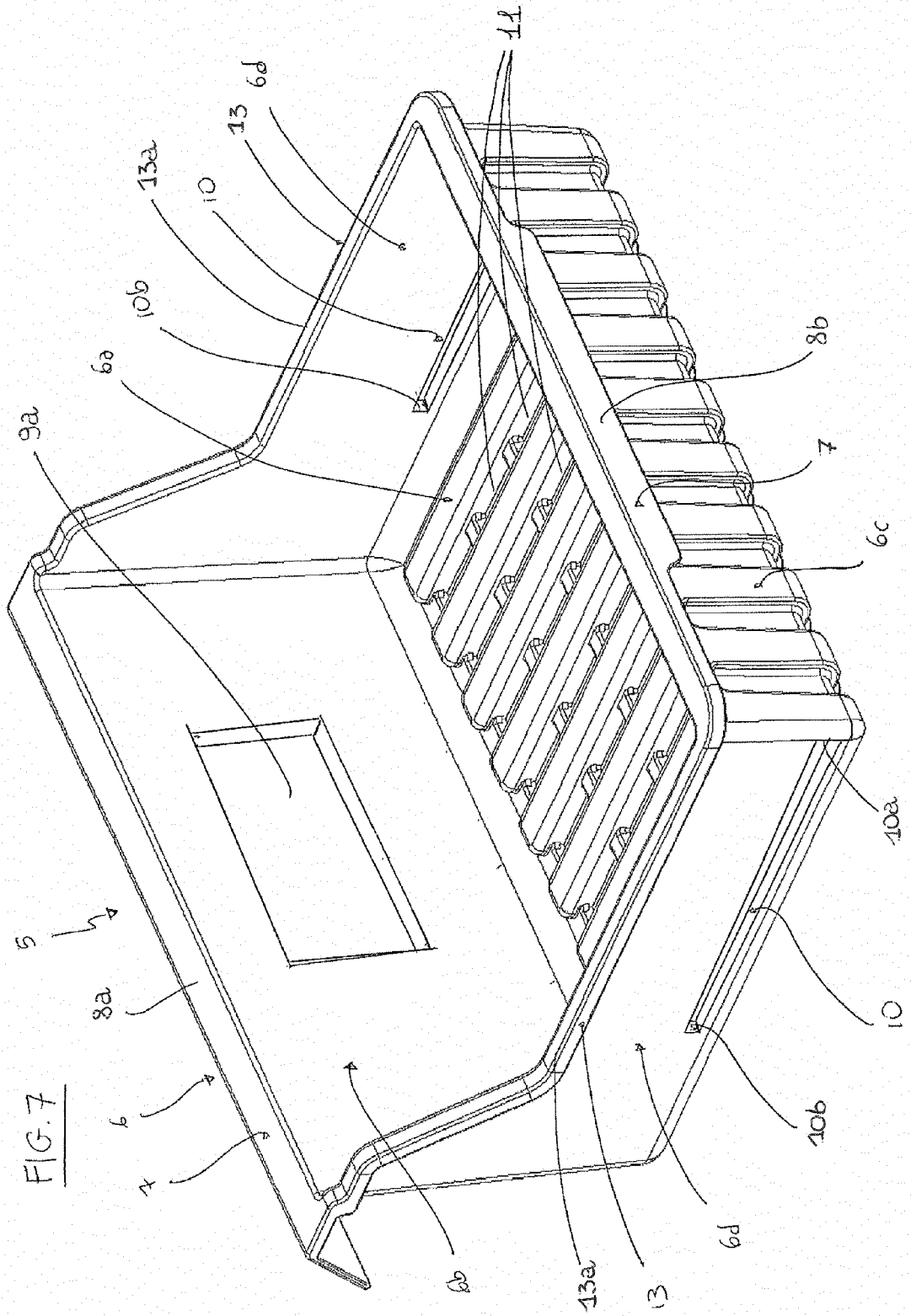














EUROPEAN SEARCH REPORT

Application Number
EP 15 20 0704

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 258 995 A1 (PANASONIC CORP [JP]) 8 December 2010 (2010-12-08)	1-5, 18	INV. F25D25/02
Y	* paragraphs [0041] - [0052], [0129] - [0133]; figures *	6-17	
Y	----- WO 2009/101803 A1 (PANASONIC CORP [JP]; HIRAI TSUYOKI; SUGIMOTO SHUHEI; NAKAMURA MITSUO;) 20 August 2009 (2009-08-20) * abstract; figures *	6-17	
A	----- EP 2 431 692 A1 (LG ELECTRONICS INC [KR]) 21 March 2012 (2012-03-21) * the whole document *	1-18	
			TECHNICAL FIELDS SEARCHED (IPC)
			F25D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		12 April 2016	Vigilante, Marco
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			

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ANNEX TO THE EUROPEAN SEARCH REPORT
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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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12-04-2016

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