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(54) **Food refrigerating device**

(57) Food refrigerating device comprising a first and a second opposed wall (11, 12) which contribute to delimiting a refrigerating compartment (10); the first wall (11) defining a first thermoformed socket (110) and the second wall (12) defining a second thermoformed socket (120).

The device comprises a profile (2) which contributes

to supporting an evaporator (3) or a shelf, the profile (2) comprising:

- a first end (21);
- a second end (22);

the first and second ends (21, 22), at least in an operating configuration, are at least partly inserted in the first and second sockets (110, 120), respectively.

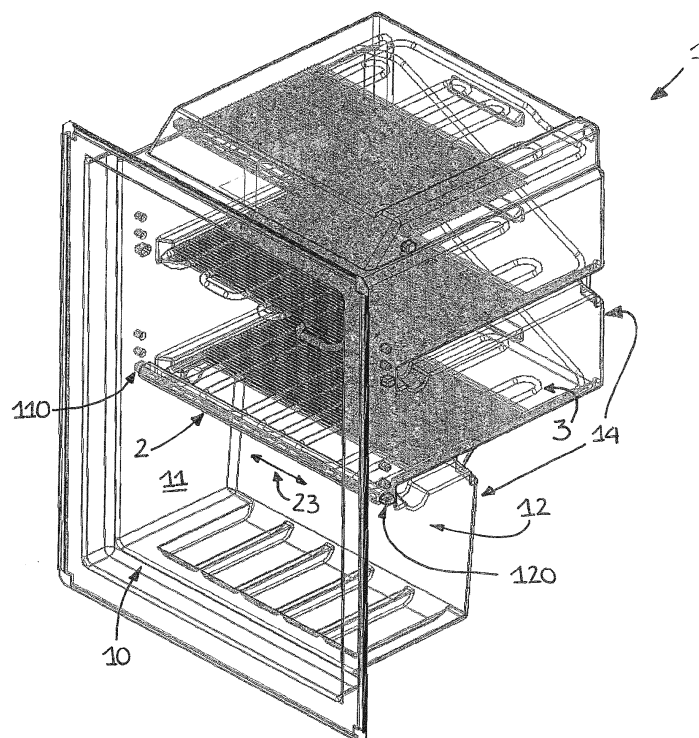


Fig. 1

## Description

**[0001]** The present invention relates to a device for refrigerating food items. Freezers are known comprising a food housing compartment. The compartment comprises a plurality of extractable drawers and an evaporator shelf structure is interposed between each pair of said drawers. With the aim of positioning the evaporator shelf structure, the freezer comprises:

- two lateral support rails of the evaporator shelf system, said rails being thermoformed with the lateral walls of the food conservation compartment;
- posterior thermoformed bulges;
- a C-shaped support.

**[0002]** The central stretch of the C-shape support is at the front of the evaporator shelf system; the two lateral stretches of the C-shaped support are superposed on the lateral walls of the conservation compartment of the food items and are constrained thereto by means of screws.

**[0003]** The above solution is not free of drawbacks connected especially to the multiple components required for realizing the correct positioning of the evaporator shelf system and the labour times required.

**[0004]** In this context, the technical objective underpinning of the present invention is to provide a food refrigeration device which enables a faster and simpler assembly. A further aim of the present invention is to optimize the components of a food refrigerating device.

**[0005]** The specified technical objective and the set aims are substantially attained by a food refrigerating device, comprising the technical characteristics set down in one or more of the appended claims.

**[0006]** Further characteristics and advantages of the present invention will more fully emerge from the non-limiting description of a preferred but not exclusive embodiment of a food refrigerating device, as illustrated in the accompanying drawings, in which:

- figure 1 is a perspective view according to the present invention;
- figure 1a is a larger-scale view of figure 1;
- figures 2 and 3 illustrate a profile that is a part of an electrical household appliance according to the present invention;
- figures 4 and 5 show details of the profile of figures 2 and 3;
- figure 6 illustrates a detail of an electrical household appliance according to the present invention.

**[0007]** With reference to the appended figures, reference numeral 1 denotes a food refrigerating device (typically a freezer).

**[0008]** The device 1 comprises a first and a second wall 11, 12, opposite one another, which contribute to delimiting a refrigerating compartment 10. The device 1

advantageously comprises an access door to said refrigerating compartment 10. The door is advantageously substantially vertical. The device 1 further comprises an inner end wall 14 which faces said door in a closing configuration. The first and the second wall 11, 12 develop between the door in the closing configuration and the inner end wall.

**[0009]** The first wall 11 advantageously defines a first thermoformed socket 110. The second wall 12 defines a second thermoformed socket 120.

**[0010]** The first and the second thermoformed sockets 110, 120 are advantageously one opposite another. The sockets 110, 120 lie on a same imaginary straight line that is horizontal; the straight line advantageously develops substantially perpendicularly to an imaginary vertical plane of symmetry of the refrigerating compartment.

**[0011]** The insertion edge of the first and/or the second socket 110, 120 is advantageously at least partly rounded (this detail advantageously facilitates insertion of the first socket and/or the second protrusion into the second socket). The insertion edge internally of the first and/or the second socket 110, 120 is connected to surrounding portions of the first and/or the second wall 11, 12.

**[0012]** The first socket 110 comprises an access opening 111 to an inside thereof and an inner end surface 112; said first socket 110 further comprises a lateral surface 113 which develops between the access opening 111 and the inner end surface 112; the lateral surface 113 comprises a plurality of faces 114.

**[0013]** The device 1 comprises an evaporator 3. Alternatively or additionally the device 1 comprises a shelf. The shelf is normally used to support food portions or food products. Typically, though not necessarily, the shelf is made of glass. The evaporator 3 comprises a conduit which is advantageously serpentine-shaped; a refrigerating fluid flows internally of the conduit, which fluid removes heat from the refrigerating compartment 10. The evaporator 3 is part of cooling means of the refrigerating compartment 10. The device 1 advantageously comprises a profile 2 which contributes to the support of the evaporator 3 or the shelf. The profile is thus integral with support means 4 of the evaporator 3 or the shelf. In particular, said support means 4 can further comprise a first support 41 and a second support, preferably afforded by thermoforming respectively in the first and the second wall 11, 12. The support means 4 can advantageously comprise at least a rear bulge.

**[0014]** The profile 2 comprises:

- a first end 21 advantageously comprising a first protrusion 210;
- a second end 22 advantageously comprising a second protrusion 220. The first and second ends 21, 22, at least in an operating configuration, are at least partly inserted in the first and second sockets 110, 120, respectively.

**[0015]** In the operating configuration the first and sec-

ond sockets 210, 220 are at least partly inserted (preferably wholly) respectively in the first and the second socket 110, 120.

**[0016]** The first and the second protrusion 210, 220, the first and the second socket 110, 120, advantageously define joint connecting means of the profile 2 with the remaining parts of the device 1. In particular, the connecting means of the profile 2 to the remaining parts of the device 1 are exclusively joint means (especially threaded connecting means are absent). The connecting means are therefore rapid connecting means. The operating configuration is the one assumed during the normal functioning of the device 1. The profile 2 can be removed in order to enable easier maintenance.

**[0017]** In the operating configuration, said first protrusion 210 is in contact with all said faces 114 of the first socket 110 in order to better constrain the profile 2.

**[0018]** The first protrusion 210 is advantageously such as to prevent, in combination with the first socket 110, the rotation of the profile 2. The first protrusion 210 advantageously comprises at least a straight stretch. The first seating 110 is preferably substantially shaped as a parallelepiped. The first protrusion 210 advantageously comprises a first straight stretch intersected by two straight transversal stretches (preferably perpendicular).

**[0019]** The straight stretches advantageously has a substantially constant thickness. The shape has been found to be particularly effective in preventing shrinkage problems of the material during forming and also in preventing rotation of the profile 2 (as indicated in the foregoing).

**[0020]** The second end 22 comprises a flexible tab 221 for extracting the second protrusion 220 from the second socket 120. The second protrusion 220 projects from said tab 221. In particular the second protrusion 220 projects in an external direction of the profile 2.

**[0021]** The second protrusion 220 is preferably such as to prevent the rotation of the profile 2, in combination with the second socket 120.

**[0022]** The profile 2 comprises a principal direction of extension 23; said flexible tab 221 extending transversely to the principal direction of extension 23. In particular, the flexible tab 221 in the rest configuration is substantially perpendicular to said principal direction of extension.

**[0023]** The tab 221 advantageously protrudes in a cantilever fashion towards said inner end wall 14. In particular, the tab 221 comprises a first end 223 in which it is connected to remaining parts of the profile 2 by means of a joining edge and a second end 224 which can displace with respect to the first end 223. With the aim of releasing the profile 2, a user can advantageously move said tab 221 in order to determine exit of the second protrusion 220 from the second socket 120.

**[0024]** The profile 2 defines an internal cavity 24 destined to house a part of the evaporator 3 or the shelf. Typically the serpentine-shaped conduit of the evaporator 3 comprises a plurality of parallel and flanked straight

stretches connected to one another at connectors 30 thereof (U-shaped).

**[0025]** The cavity 24 houses at least a part of said connecting ends 30 (see figure 1a). In particular the profile 2 defines an inlet mouth 20 to said cavity 24; in the operating configuration said inlet mouth 20 is facing towards the inner end wall 14.

**[0026]** Internally of the cavity 24 the profile 2 comprises a plurality of positioning fins 25 (or teeth) placed side by side along the principal direction of extension 23 and designed to abut part of the evaporator 3 or of the shelf. In particular said fins 25 are destined to abut the connectors 30 of the evaporator 3. Typically the fins 25 are reciprocally parallel. Should the profile 2 be used for supporting a shelf instead of an evaporator 3, the fins 25 are used to abut an edge of the shelf, typically an edge of the shelf facing towards the door.

**[0027]** The fins 25 are advantageously arranged on a first and a second row; the first and the second row project from two opposite surfaces of the cavity 24. The fins 25 of the first row face the fins 25 of the second row. The fins of the first row and/or the fins of the second row are equidistant.

**[0028]** The fin 221 advantageously contributes to delimiting the cavity 24.

**[0029]** The second protrusion 220 comprises a guide piece 222 which facilitates insertion thereof into the second thermoformed socket 120. The second protrusion 220 develops along the principal direction of extension of the profile 2 between two ends, one of which is very close to the fin 221 and one of which is distanced from the fin 221. The guide piece 222 is defined by the fact that the end of the second protrusion 220 distanced from the fin 221 comprises an inclined surface towards the second end 224 of the fin 221. Advantageously though not necessarily the inclined surface is planar. The guide piece 22 facilitates the inserting of the second protrusion 220 in the second thermoformed socket 120.

**[0030]** The first protrusion 210 advantageously projects from a flap 27 that contributes to closing off the cavity 24. Said flap 27 is advantageously opposite the fin 221. The flap 27 develops perpendicularly to the principal direction of extension 23 of the profile 2.

**[0031]** The profile 2 advantageously comprises a first portion 28 which in the operating configuration is the upper portion of the profile 2, a second portion 29 which in the operating configuration is the lower portion of the profile and a connecting portion 280 which connects the first and the second portion 28, 29.

**[0032]** The profile 2 comprises an intermediate stretch 26 interposed between the first and the second ends 21, 22, said intermediate stretch 26 being deformable to facilitate extraction and insertion of the first and second protrusions 210, 220 from and into the first and second sockets 110, 120, respectively. The profile 2 is advantageously entirely obtained by moulding. Further, the profile 2 is in a single piece (not an assembly of various components). The profile 2 is advantageously made of

high-impact polystyrene (HIPS).

**[0033]** To apply the profile 2 to remaining parts of the device 1, the following procedure is usually followed:

- inserting the first protrusion 210 into the first socket 110;
- inserting the second protrusion 220 into the second socket 120.

**[0034]** This operation can comprise a bend of the profile 2 with respect to the principal direction of extension. The operation can comprise a bending of the fin 221 towards the inside of the profile, for example following contact of the second protrusion 220 with parts of the second wall 12 that are external of the second socket 120. Once inserted in the second socket 120 the fin 221 returns into the undeformed configuration.

**[0035]** To extract the profile 2 the following procedure is normally followed:

- bending the tab 221 towards the inside of the profile 2; this operation is advantageously done by using a screwdriver or an elongate tool;
- extracting the second protrusion 220 from the second socket 120 (this step can also include the deformation of the profile 2 along the principal direction 23 of extension);
- extracting the first protrusion 210 from the first socket 110.

**[0036]** The invention as it is conceived enables multiple advantages to be attained.

**[0037]** The invention enables a rapid assembly of the profile 2 to remaining parts of the device 1. This operation can further be carried out without the aid of special tools (which would be necessary should the use of screws or other threaded elements be required).

**[0038]** The invention as conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept characterised thereby. Furthermore all the details can be replaced by other technically equivalent element. In practice, all the materials used, as well as the dimensions, can be any according to requirements.

## Claims

1. A food refrigerating device comprising a first and a second opposed wall (11, 12) which contribute to delimiting a refrigerating compartment (10); the first wall (11) defining a first thermoformed socket (110) and the second wall (12) defining a second thermoformed socket (120); **characterized in that** it comprises a profile (2) which contributes to supporting an evaporator (3) or a shelf, the profile (2) comprising:

- a first end (21);
- a second end (22);

the first and second ends (21, 22), at least in an operating configuration, being at least partly inserted in the first and second sockets (110, 120), respectively.

2. The device according to claim 1, **characterized in that** the profile (2) defines an internal cavity (24) designed to house part of the evaporator (3) or of the shelf.

3. The device according to claim 2, **characterized in that** inside the cavity (24) the profile (2) comprises a plurality of positioning fins (25) placed side by side and designed to abut part of the evaporator (3) or of the shelf.

4. The device according to any of the preceding claims, **characterized in that** the first end (21) comprises a first protrusion (210), the second end (22) comprising a second protrusion (220); in the operating configuration, the first and second protrusions (210, 220) being inserted at least partly in the first and second sockets (110, 120), respectively.

5. The device according to claim 4, **characterized in that** the second protrusion (220) comprises a guide piece (222) which facilitates its insertion into the second thermoformed socket (120).

6. The device according to claim 4 or 5, **characterized in that** the first socket (110) comprises an access opening (111) and an inner end surface (112); the first socket (110) also comprising a lateral surface (113) which extends between the access opening (111) and the inner end surface (112) and comprises a plurality of faces (114); in the operating configuration the first protrusion (210) being in contact with all the faces (114) to contribute to constraining the profile (2).

7. The device according to any of the claims from 4 to 6, **characterized in that** the profile (2) comprises an intermediate stretch (26) interposed between the first and second ends (21, 22), the intermediate stretch (26) being deformable to facilitate extraction and insertion of the first and second protrusions (210, 220) from and into the first and second sockets (110, 120), respectively.

8. The device according to any of the claims from 4 to 7, **characterized in that** the second end (22) comprises a flexible tab (221) for extracting the second protrusion (220) from the second socket (120); the second protrusion (220) projecting from the tab (221).

9. The device according to claim 8, **characterized in that** the profile (2) has a principal direction of extension (23), the flexible tab (221) extending transversely to the principal direction of extension (23). 5
10. The device according to claim 8 or 9, **characterized in that** it comprises a door for access to the refrigerating compartment (10) and an inner end wall (14) which is opposite the door in a closed configuration; the tab (221) projecting in cantilever fashion towards the inner end wall (14). 10
11. A method for assembling an electrical household appliance according to any of the claims from 8 to 10, **characterized in that** it comprises the steps of: 15
- inserting the first protrusion (210) into the first socket (110);
  - inserting the second protrusion (220) into the second socket (120); 20
  - the step of inserting the second protrusion (220) into the second socket (120) comprising bending the tab (221) towards the inside of the profile (2). 25
12. A method for removing the profile (2) from an electrical household appliance according to any of the claims from 8 to 10, **characterized in that** it comprises the steps of: 30
- bending the tab (221) towards the inside of the profile (2);
  - extracting the second protrusion (220) from the second socket (120);
  - extracting the first protrusion (210) from the first socket (110) 35

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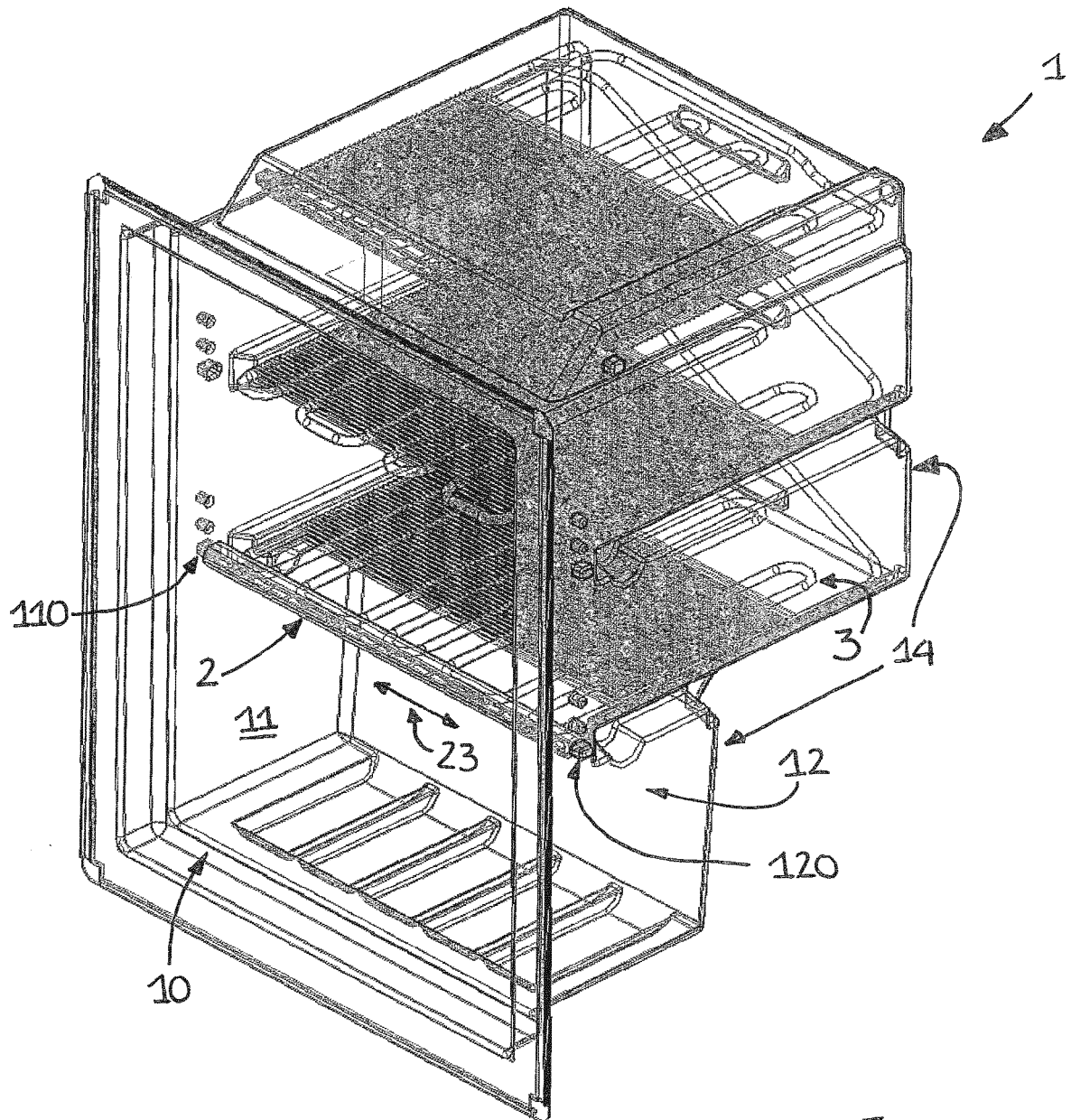


Fig.1

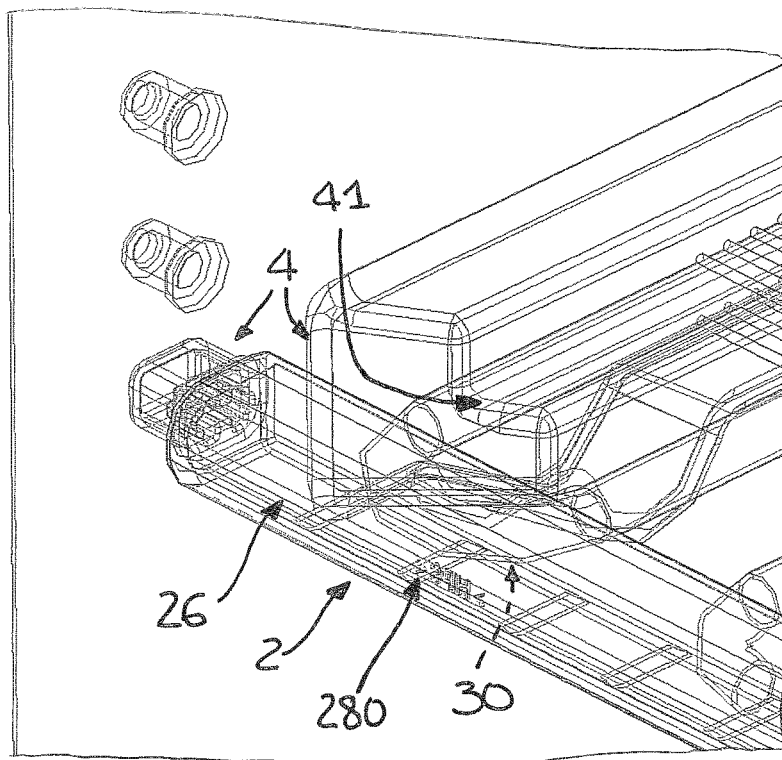


Fig. 1a

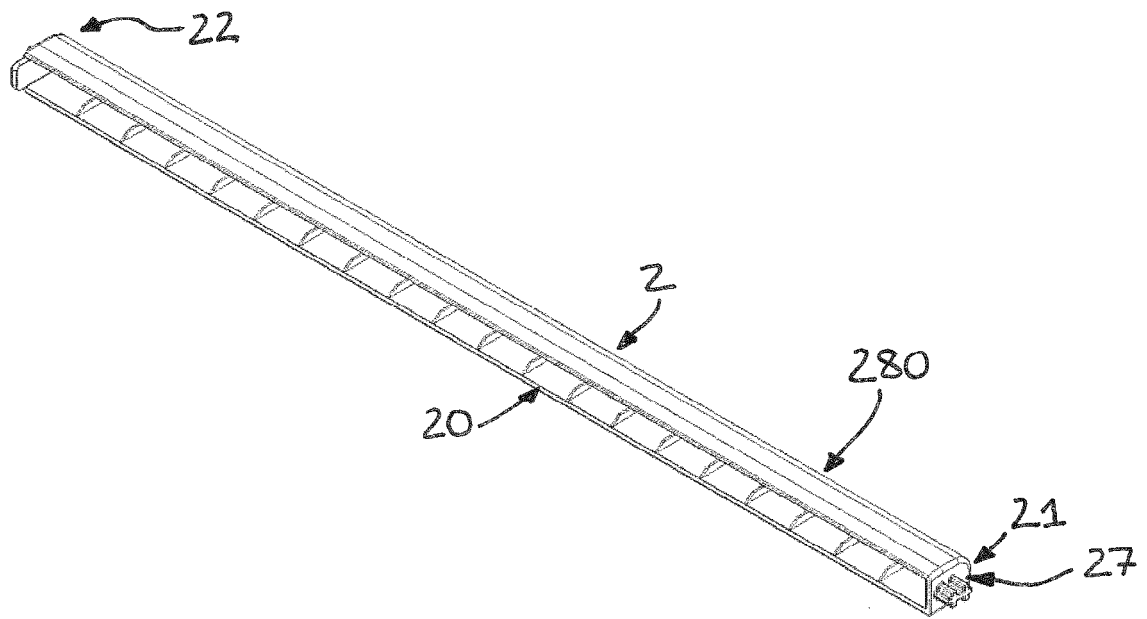


Fig. 2

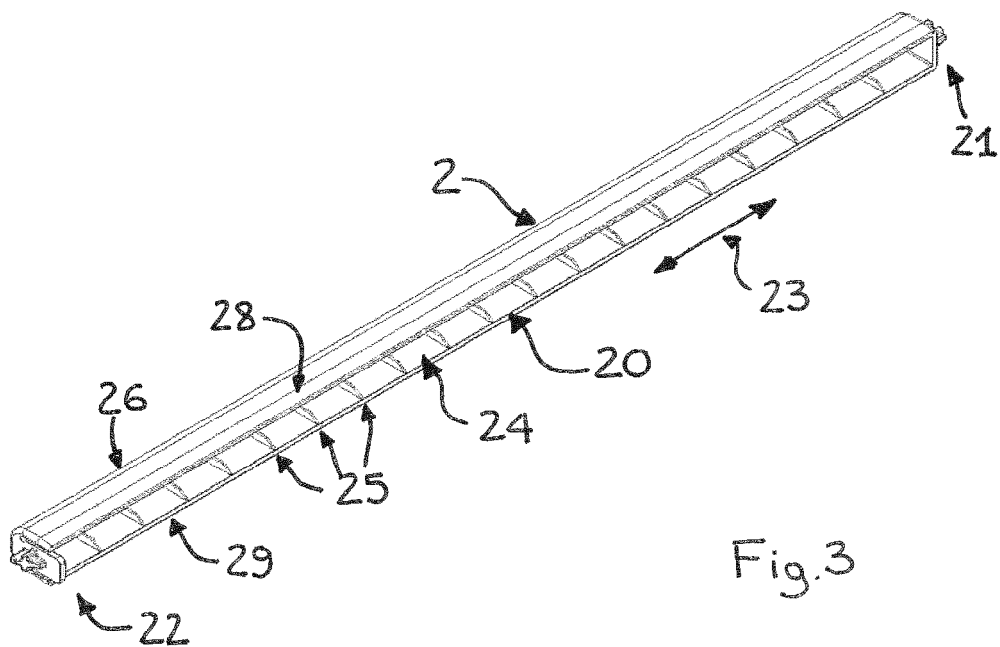
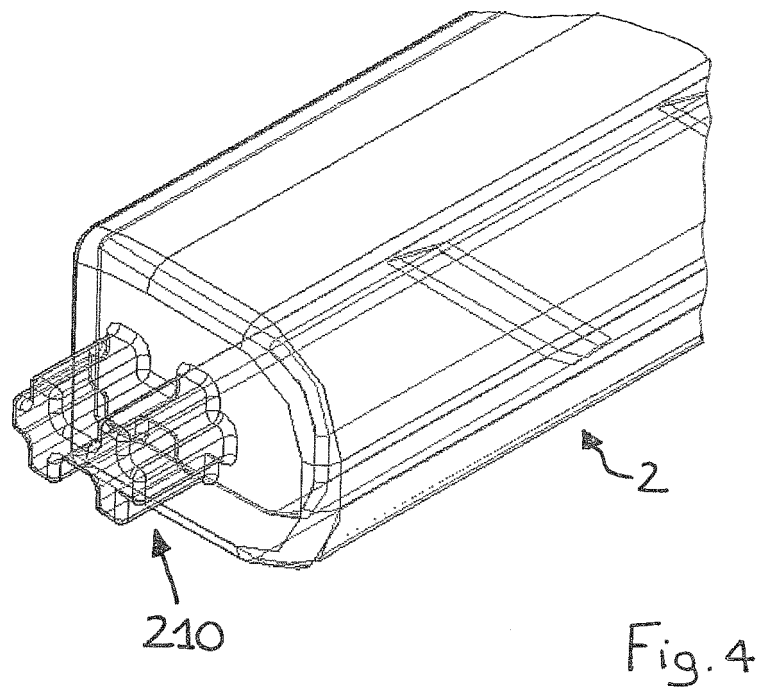
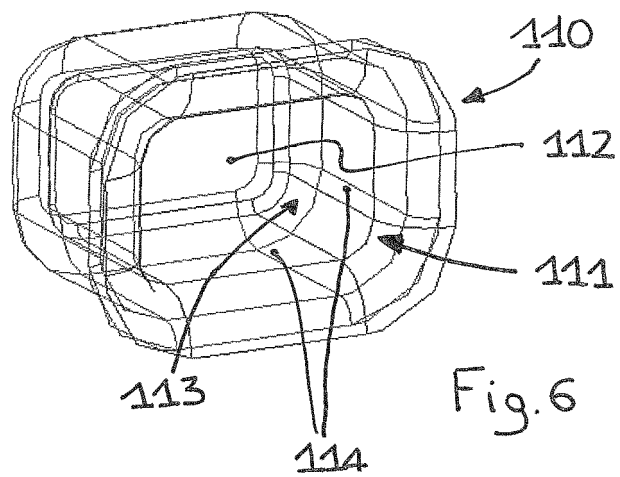
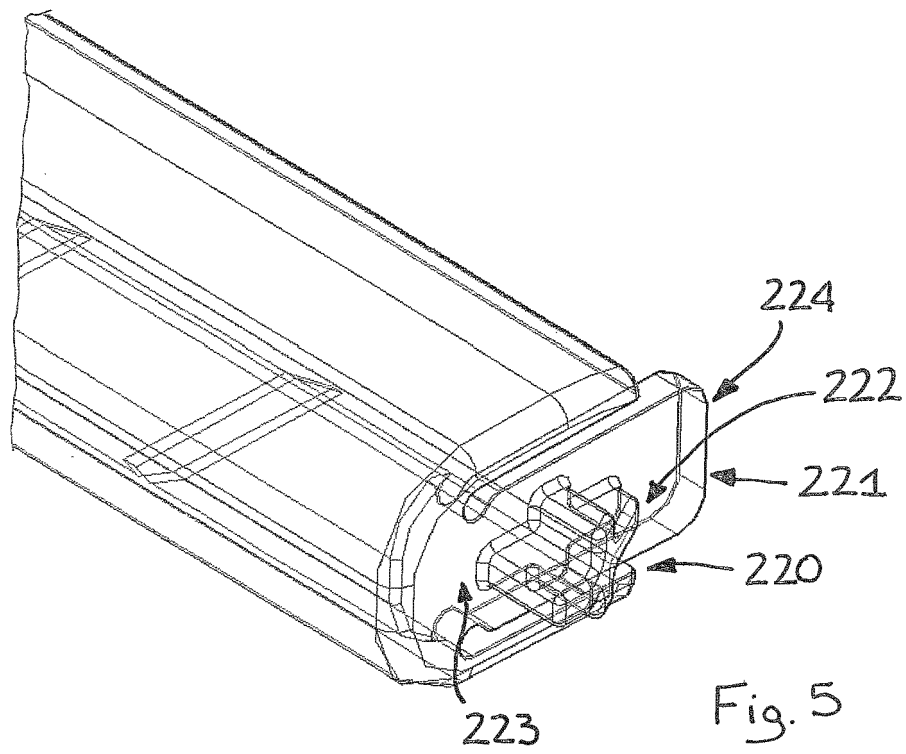


Fig. 3









## EUROPEAN SEARCH REPORT

Application Number  
EP 13 15 2823

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* paragraphs [0024] - [0026]; figures 3-6 *	3,8-12	
Y	----- EP 1 655 564 A1 (INDESIT CO SPA [IT]) 10 May 2006 (2006-05-10) * paragraphs [0030] - [0035]; figures 2,3 *	3,8-12	
X	----- US 3 865 448 A (WINTERHEIMER SYLVESTER A) 11 February 1975 (1975-02-11) * column 3, lines 1-9; figures 1-3 *	1,2,4-7	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search Munich		Date of completion of the search 21 February 2013	Examiner Salaün, Eric
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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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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