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(72) Inventors:  
• **HEINZLE, Marcos**  
**89218-585 Joinville (BR)**  
• **TRES, Andrei**  
**89221-480 Joinville (BR)**

(74) Representative: **Soldatini, Andrea et al**  
**Società Italiana Brevetti S.p.A.**  
**Corso dei Tintori, 25**  
**50122 Firenze (IT)**

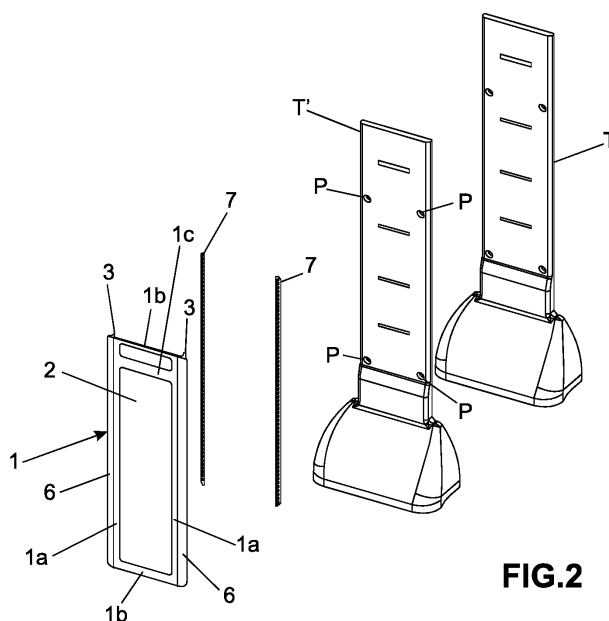
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(71) Applicant: **Whirlpool S.A.**  
**04578-000 São Paulo - SP (BR)**

(54) **FINISHING FRAME FOR AIR DIFFUSERS OF REFRIGERATION APPLIANCES**

(57) The present invention refers to the technological field of electrical appliances, preferably refrigerators and refers to a finishing frame for air diffusers, particularly applied to refrigeration appliances, being comprised of a structure developed to cover and hide the elements responsible for fastening the air diffuser inside the refrigerated compartment. Furthermore, it is intended to enable the accommodation of a lighting system, which considerably simplifies eventual maintenances and replacements of burnout or damaged lamp. More specifically,

the present invention relates to a finishing frame for air diffusers of refrigeration appliances, being formed by a structural body comprised of horizontal (1b) and vertical peripheral segments (1a), obtaining an open portion (2) where the cold air outlet openings (A) of the air diffuser (T) are positioned, at least two opposite peripheral segments being provided with inner wall (3) whose end is provided with fixing element (4) of interaction and engagement together with the diffuser structure (T).



**FIG.2**

## Description

### Field of the Invention

**[0001]** The present invention relates to a finishing frame for air diffusers, particularly applied to refrigeration appliances, such as refrigerators, freezers and the like. More specifically, the finishing frame to air diffusers according to the present invention comprises a structure especially designed to cover and hide the elements responsible for fastening the air diffuser inside the refrigerated compartment.

**[0002]** Additionally, the finishing frame for diffusers of refrigeration appliances, object of the present invention comprises a configuration designed to permit accommodation of a lighting system, which considerably simplifies any maintenance and replacement of burned or damaged lamp, in addition to promote pleasant aesthetic effects users.

### Background of the Invention

**[0003]** As is within the general knowledge of the technicians in the art, virtually all refrigerators appliances are provided with compartments, inside of which there are provided mechanisms to promote the cold air supply, distribution and circulation. In some models of appliances, such mechanisms are comprised of towers or structures that are coupled inside the refrigerated compartment of the appliance, for example, by screws or other equivalent means.

**[0004]** In much of these appliance models, these towers or structures are positioned in the center of the rear wall of the compartment, since it allows to obtain a more homogeneous distribution of the cold air inside said compartment and thus to promote the uniform cooling of the several inner parts of the refrigeration appliance.

**[0005]** One of the drawbacks observed in these cooling appliance models is related to the fact that the fastening elements remain exposed and, therefore, every time the user opens the door of your appliance, it is faced with a non-pleasant finishing, in which the screw heads are often apparent.

**[0006]** Optionally, it is known in the prior art that in some models it is possible to apply small covers involving the screw heads in order to hide them. However, it should be appreciated by those skilled in the art that this solution is not completely efficient, since, over time, it is observed that such covers loosen up and, in most cases, they are lost, so that the user can no longer hide these screws.

**[0007]** Another common situation observed in the refrigeration appliance is related to the provision of a lighting system inside the compartment, in particular when these systems are embedded in the structure of the air diffusers. More particularly, it is noted that some refrigeration appliance models comprise an air diffusion structure whose lighting elements are installed directly on the body thereof. That is, the air diffuser ultimately exerts the

function of cold air distributor and, at the same time, of structural element of the lighting system of the internal compartment of the refrigeration appliance.

**[0008]** In these situations, the users face serious drawbacks when it occurs a fault in the lighting system, for example, when a lamp is burnout. This is because, when one of the lighting system lamps is damaged, the user has to contact Professional experts of a technical assistance to execute the disassemble of the diffuser structure and thereby promote proper maintenance of the lighting system.

**[0009]** Obviously, as it should be noted, this procedure proves to be quite complex and difficult to perform, what discourages the users in performing the maintenance of the appliances thereof and, consequently, the internal lighting of the refrigerated cabinet does not work appropriately, compromising the lighting in certain compartments and / or regions of the refrigeration appliance.

**[0010]** As a mere example of a practical case, such as illustrated in Figure 1, the applicant itself developed and presently sells a refrigeration appliance model which air diffusion structure is formed by a tower (T) provided with a series of openings (A) to exit the cold air, wherein said tower is formed by a cover (T') which is fixed by means of screws (P) in the diffuser structure itself. According to current projects, there is interest in arranging lighting means in this structure, for example, to the disclosure of the brand of the product itself when the user opens the door of the refrigeration appliance, or also a lighting system inside the refrigerated cabinet.

**[0011]** In this case, as previously mentioned, if the system and lighting means were installed directly in the structural body of the cold air diffuser, in the case of any kind of failure or damage to the lamps, it would be needed to contact the technical assistance of the manufacturer, so that they disassemble all the structure of the diffuser tower to promote the replacement of the damaged lamps and / or maintenance of the lighting system. This would certainly result in considerable time and cost to the user, which would certainly quit the maintenance of the appliance.

**[0012]** Furthermore, as can be observed in said Figure 1 attached to the present specification, the heads of the fixing screws of said air diffuser tower are fully visible to the users, thus compromising the aesthetic aspects of the refrigerated cabinet when the user opens the door of the appliance.

**[0013]** In this context, according to the state of the art, it is observed that despite revealing drawbacks related to the aesthetic aspects of refrigerator appliances, they also affect technically the constructiveness and maintenance of such appliances. More particularly, it is noted that the problems and limitations presented by the air diffuser structures available in the prior art appliance compromise the constructiveness and ease of maintenance of the appliances, mainly due to the complex processes of replacement and repair of the systems incorporated to the diffuser, such as lighting systems.

### Objectives of the invention

**[0014]** Therefore, in view of all above, the present invention aims to provide a finishing frame to be applied to the air diffuser structures disposed within the refrigeration appliances, particularly of the type refrigerators and freezers, said frame being understood for technical and functional aspects that can enhance and solve the drawbacks and limitations of the prior art, as highlighted above.

**[0015]** More preferably, it is an objective of the present invention to provide a finishing frame for air diffusers comprising constructive characteristics specially designed to enable secure clamping with the air diffuser, but mostly to hide the fastening means normally used for mounting the diffuser structure.

**[0016]** It is also an object of the present invention to provide a finishing frame to be applied to the air diffuser structure of the refrigeration appliances, the characteristics thereof allow the application of lighting system, the constructiveness thereof is capable of considerably facilitating any maintenance and lamps exchange processes, eliminating the need of full disassembly of the diffuser structure.

**[0017]** Yet another object of the present invention is to provide a finishing frame for air diffusers of refrigeration appliances that allows the arrangement of distinctive signs and also obtain a decorative lighting of the inside of the refrigerated cabinet due to the simple constructiveness and easy handling and implementation.

### Summary of the Invention

**[0018]** Thus, in order to achieve the objectives and technical effects reported above, the present invention relates to a finishing frame for air diffusers, preferably of refrigerator appliances, which comprises a structural body consisting of vertical and horizontal peripheral segments, so as to form an open portion through which there are positioned the exits of cold air of the diffuser tower. More particularly, in accordance with an embodiment of the present invention, at least two opposite peripheral segments, either vertical or horizontal, are provided with at least one inner wall provided with fastening element, which is preferably arranged at the end of this inner wall to interact with the structure of the diffuser tower.

**[0019]** According to a possible embodiment of the present invention, the fastening elements, arranged at the end of the internal walls of the peripheral segments of the present frame, comprise at least one claw responsible for promoting secure fixation of the frame with the diffuser tower, to this end, these claws comprise a configuration able to engage, at least partially, the hear region of the diffuser structure. Optionally, these fastening elements may be of another type or nature, e.g., adhesive tapes, glue, or even means of Velcro type.

**[0020]** Furthermore, as a preferred embodiment of the present invention, said vertical and / or horizontal, pe-

ripheral segments, of the finishing frame for diffusers, are provided with spare edges which extend beyond the inner wall of said frame. Optionally and advantageously, these spares edges accommodate at least one light source of a lighting system.

**[0021]** According to another possible embodiment of the present invention, the finishing frame to air diffusers comprises a lighting system with light sources, which are preferably of the LED type.

**[0022]** Finally, according to a preferred embodiment, the peripheral segments are endowed with figurative and decorative elements. Still advantageously to achieve these effects, said open portion, formed by the peripheral segments, is divided by the arrangement of intermediate segments, the dimensions thereof allow the arrangement of terms, slogans, images and other configurative and decorative elements, which are rapidly noticeable when opening the door of the refrigeration appliance.

### Brief Description of the Drawings

**[0023]** The features, advantages and technical effects of the present invention, as mentioned above, will be best understood by one skilled in the art from the following detailed, which is made by way of example, and not limitative, of preferred embodiments of the invention, and with reference to the appended schematic figures, which:

Figure 1 shows a perspective view of an air diffuser for refrigeration appliances, according to models known in the art;

Figure 2 shows an exploded perspective view of the assembly formed by the air diffuser for refrigeration appliance with the finishing frame according to an embodiment of the present invention;

Figure 3 shows a front perspective view of the assembly formed by the air diffuser for refrigeration appliance with the finishing frame according to an embodiment of the present invention;

Figure 4 shows a rear perspective view of the assembly formed by the air diffuser for refrigeration appliance with the finishing frame according to an embodiment of the present invention;

Figure 5A illustrates a front view of an air diffuser for refrigeration appliance;

Figure 5B illustrates a front view of the finishing frame to the air diffuser according to the present invention; Figure 5C shows a front view of the air diffuser for refrigeration appliance with the finishing frame, according to the present invention;

Figure 6 shows a cross section according to line X-X indicated in Figure 3, of the assembly formed by the air diffuser to refrigeration appliance with the finishing frame according to the present invention;

Figures 6A and 6B show enlarged views of detail of the finishing frame fitting in the air diffuser, according to the present invention;

Figure 7 shows a sectional view of a possible em-

bodiment of the frame applied to a model of air diffuser.

#### Detailed Description of the Invention

**[0024]** According to the above schematic figures, some examples of possible embodiments of the finishing frame for air diffuser structures, object of the present invention, will be described in more detail below, but merely in a illustrative and not limitative way. This is because the present invention may comprise different details and technical, constructive, structural and dimensional aspects without thereby affecting the present scope of protection.

**[0025]** Thus, as illustrated by the attached schematic figures, the finishing frame 1 according to the present invention, is especially developed and designed to be embedded in the structure of an air diffuser (T), such as for example the illustrated tower in Figure 1, this structure being arranged within the refrigerated cabinet of a refrigeration apparatus, of the refrigerator or freezer type.

**[0026]** In this context and as illustrated by the accompanying drawings, the finishing frame 1 is formed by a structural body formed by vertical 1 a and horizontal 1 b peripheral segments, so as to obtain at least one open portion 2 for positioning the exit openings of cold air (A) of the diffuser tower, at least two opposite peripheral segments, whether vertical 1a or horizontal 1b, are provided with inner wall 3 which is provided with fastening elements 4 for interaction and fastening with the diffuser structure (T).

**[0027]** According to possible embodiments of the present invention, these fastening elements 4 may be of any kind and nature, provided that they allow the engagement and support of the frame with the diffuser structure (T). Only by way of example, these fastening elements 4 may be an adhesive tape, glue, Velcro type elements, etc.

**[0028]** More particularly, and as should be appreciated by the skilled in the art, the arrangement of these inner walls 3 with the respective fastening elements thereof 4 on opposite peripheral segments, aims to ensure the fastening of the finishing frame 1, object of the present invention together with the air diffuser structure of the refrigeration appliance. Thus, to ensure such secure attachment, it is necessary to promote interaction between the frame 1 and the diffuser (T) at least in the two vertical segments 1 a or in the two horizontal segments 1 b.

**[0029]** Obviously, it should be evident that there is no impediment in arranging inner walls 3 with the fastening elements thereof 4 in more than two peripheral segments, for example, arrange inner walls 3 with fastening elements 4 on both vertical segments 1 a and in at least one of the horizontal segments 1b or, even, arrange inner walls 3 with fastening elements 4 on both horizontal segments 1 b and at least one of the first horizontal segments 1 a, what will depend on the designs and models of diffusers used in the refrigeration appliances.

**[0030]** Preferably, said fastening element 4 is arranged at the end of said inner walls 3, and comprises at least one claw 5 able to partially surround the rear region of the diffuser structure (T), more particularly able to be fixed in the rear region of cover (T') which is fixed by screws in the diffuser tower (T).

**[0031]** Particularly as shown in Figure 7, the structure of the diffuser (T) can comprise different shapes and configurations, for example, structure (T) may comprise a format that extrapolates the dimensions of frame 1, which, in this case, is embedded in said cover (T') which is firmly attached to the diffuser tower (T).

**[0032]** According to a preferred, but not restricted, embodiment of the present invention, vertical 1 a and horizontal 1 b peripheral segments may be provided with a spare edge 6 that is provided so as to exceed the positioning of inner walls 3. The primary purpose of this spare edge 6 is to enable the accommodation and installation of light sources 7, which are positioned in an imbedded and hidden way from the eyes of the users when opening the door of the refrigeration appliance.

**[0033]** Said light sources 7 are preferably LED type, which are configured in a kind of strip that can be easily installed on the rear surface of said spare edge 6. In this condition, and as can be seen by the figures attached, these light sources 7 can perform the function and replace the conventional indoor lighting system of the cabinets of the refrigerators devices.

**[0034]** Further to promoting a more pleasing aesthetic effect, as it is not apparent to the users, such constructiveness considerably simplifies eventual maintenance and exchange of burnout lamps procedures, since the user simply has to release the frame 1 and promote the proper maintenance and substitutions of the eventually damaged lamps, thus eliminating the need to disassemble, or even shut down, the refrigeration system of the refrigerator appliance to perform these types of procedures.

**[0035]** Optionally, in one possible configuration of the finishing frame according to the present invention, said peripheral segments 1a, 1b may comprise figurative and decorative elements with the indication of the trademark of the appliance, such elements being preferably provided with light sources driven when opening the door of the appliance. Moreover, it is possible to design refrigerator appliances, the internal lighting thereof is conditioned and controlled in accordance with the preferred colors of the user, therefore, only minor adjustments being sufficient in the electrical and electronic circuits so that the light sources, for example LEDs, modulate the colors of lights issued.

**[0036]** In order to obtain surface able to receive these configurative and decorative elements, said frame 1, particularly the open portion 2 can be divided through the arrangement of intermediate segments 1c, the dimensions thereof allow for the arrangement of terms, slogans, images and other configurative elements that can help the visual effect of the user when the door of the refrig-

erator appliance is opened.

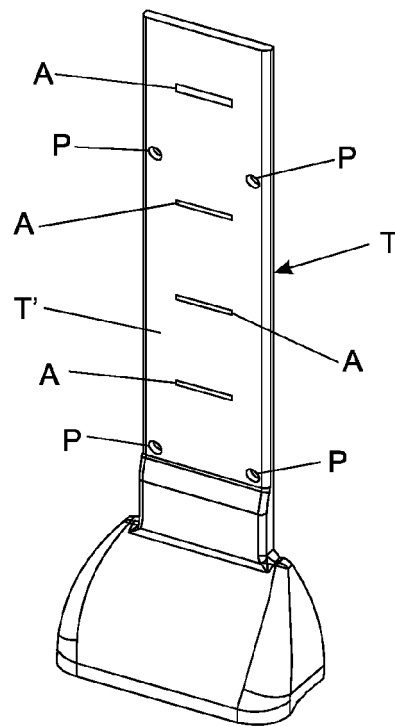
**[0037]** Finally, it is important to note that the present disclosure has the sole purpose of describing exemplarily some preferred and possible achievements of the finishing frame to air diffuser structures of refrigerator appliances, according to the present invention. Therefore, it is important to be evident to the skilled in the art that numerous modifications, variations and combinations of the elements with the same function substantially the same way are possible to achieve the same results, which fall within the scope of protection defined by the appended claims.

## Claims

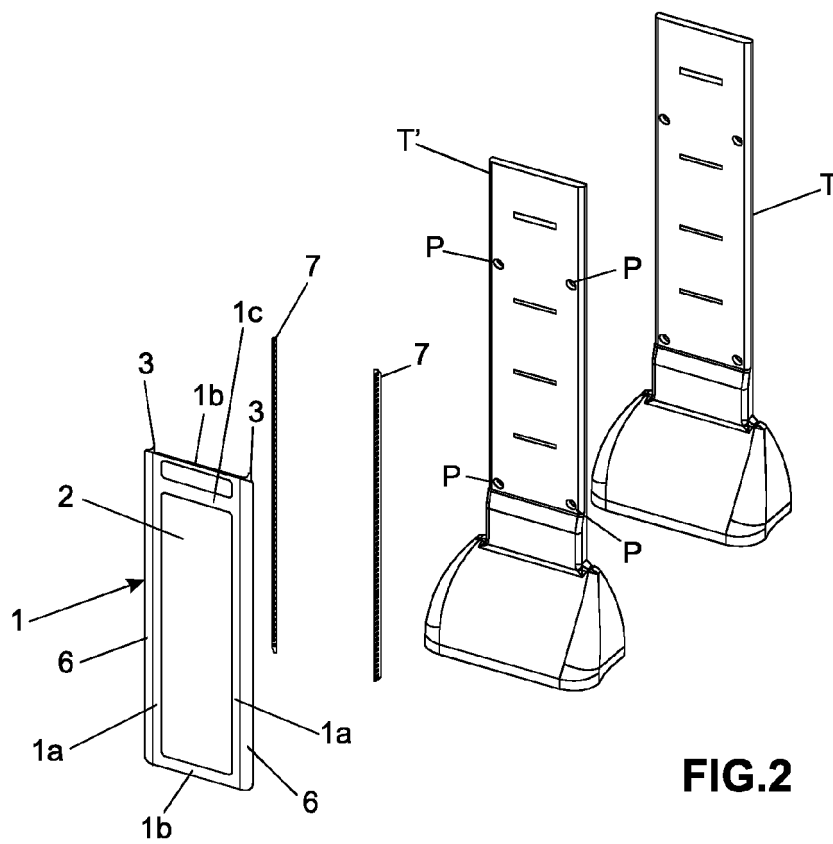
1. Finishing frame for air diffusers of refrigeration appliances, **characterized by** the fact that it comprises a structural body formed by vertical (1a) and horizontal (1b) peripheral segments, forming an open portion (2) for positioning the cold air exit openings (A) of the air diffuser (T), wherein at least two opposite peripheral segments, whether vertical (1 a) or horizontal (1 b), are provided with inner wall (3) having fastening element (4) for interaction and engagement together with the diffuser structure (T).
2. Finishing frame for air diffusers of refrigeration appliances, according to claim 1, **characterized by** the fact that said fastening element (4) is arranged at the end of said wall (3).
3. Finishing frame for air diffusers, according to claim 2, **characterized by** the fact that said fastening element (4), arranged at the end of said inner walls (3), comprises at least one claw (5) that partially surrounds the rear region of the diffuser structure (T).
4. Finishing frame for air diffusers, according to claim 1, **characterized by** the fact that said fastening element (4) may be an adhesive tape, glue, Velcro type elements.
5. Finishing frame for air diffusers, according to claim 1, **characterized by** the fact that said vertical (1 a) or horizontal (1 b) peripheral segments are provided with spare edges (6) extending beyond said internal walls (3).
6. Finishing frame for air diffusers, according to claim 1, **characterized by** the fact that it comprises a lighting system with light sources (7).
7. Finishing frame for air diffusers, according to claim 5, **characterized by** the fact that said light sources (7) are of LED type.
8. Finishing frame for air diffusers, according to claim

5, **characterized by** the fact that said spare edge (6) accommodates at least one light source (7).

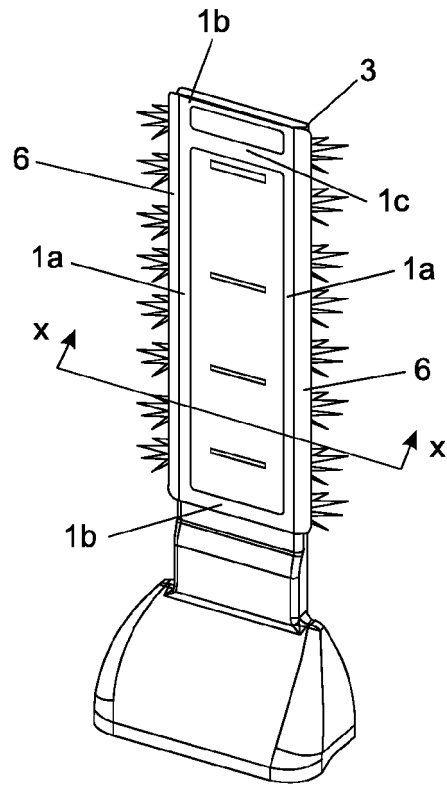
9. Finishing frame for air diffusers, according to claim 1, **characterized by** the fact that said peripheral segments (1 a, 1 b) comprise figurative and decorative elements.
10. Finishing frame for air diffusers, according to claim 1, **characterized by** the fact that said open portion (2) is divided by the arrangement of intermediate segments (1c), the dimensions thereof allow the arrangement of terms, slogans, images and other configurative and decorative elements.



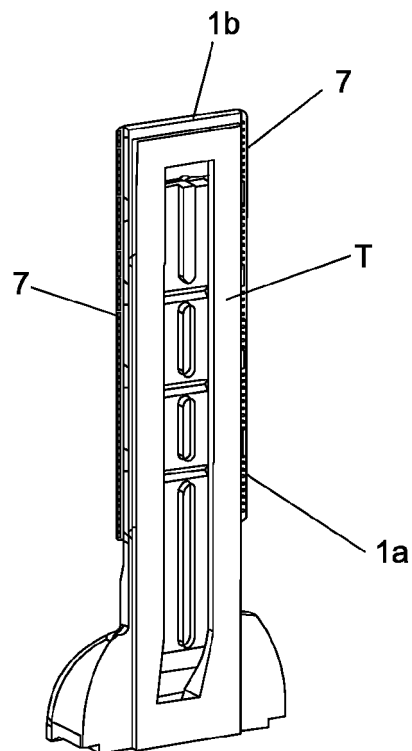
**FIG.1**



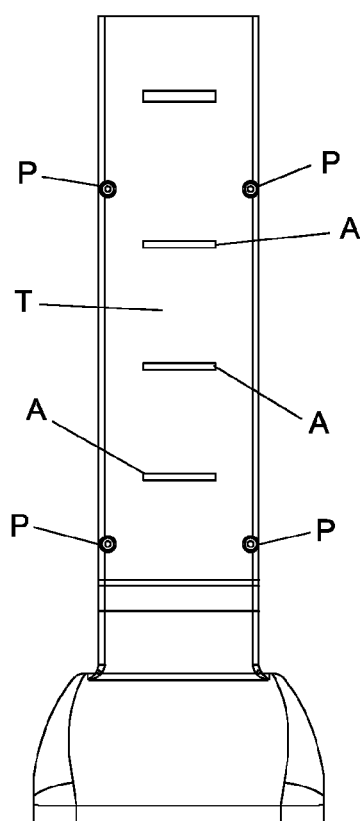
**FIG.2**



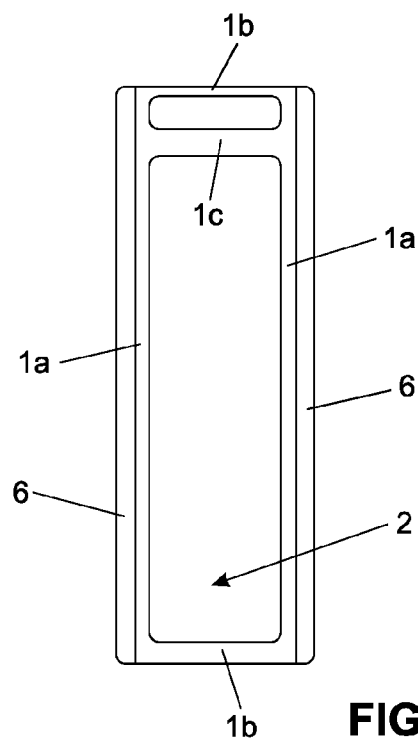
**FIG.3**



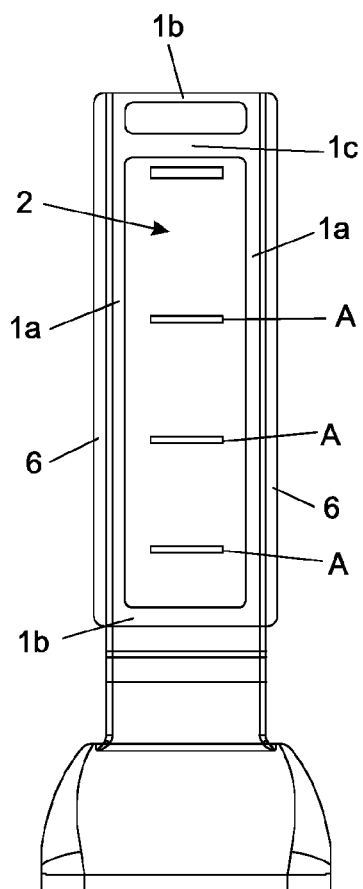
**FIG.4**



**FIG. 5A**

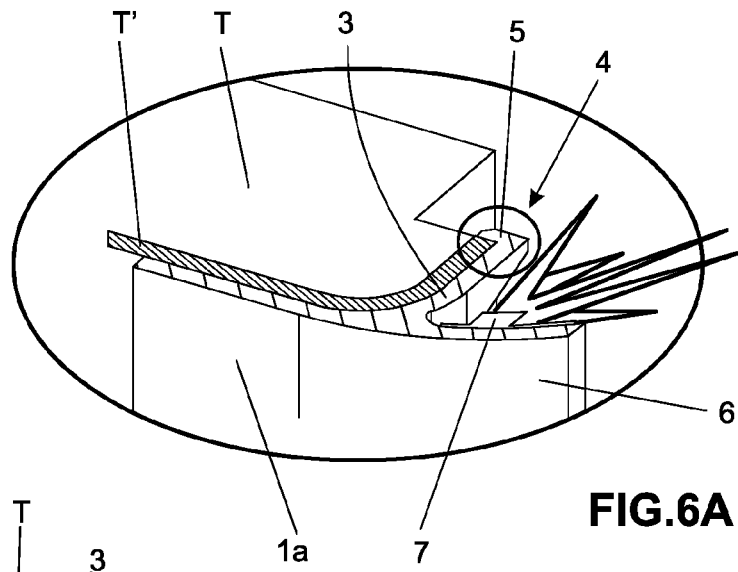


**FIG. 5B**

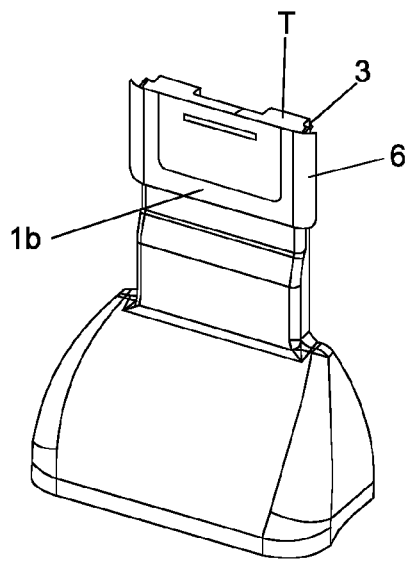


**FIG. 5C**

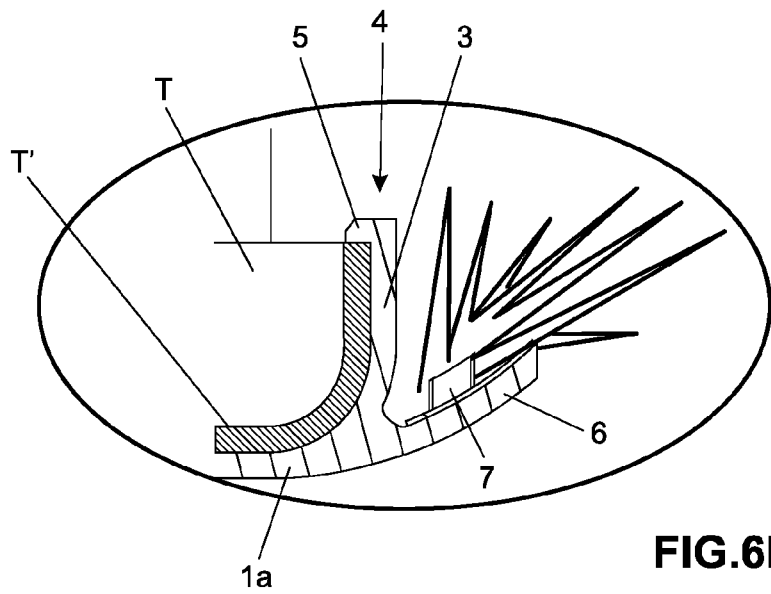




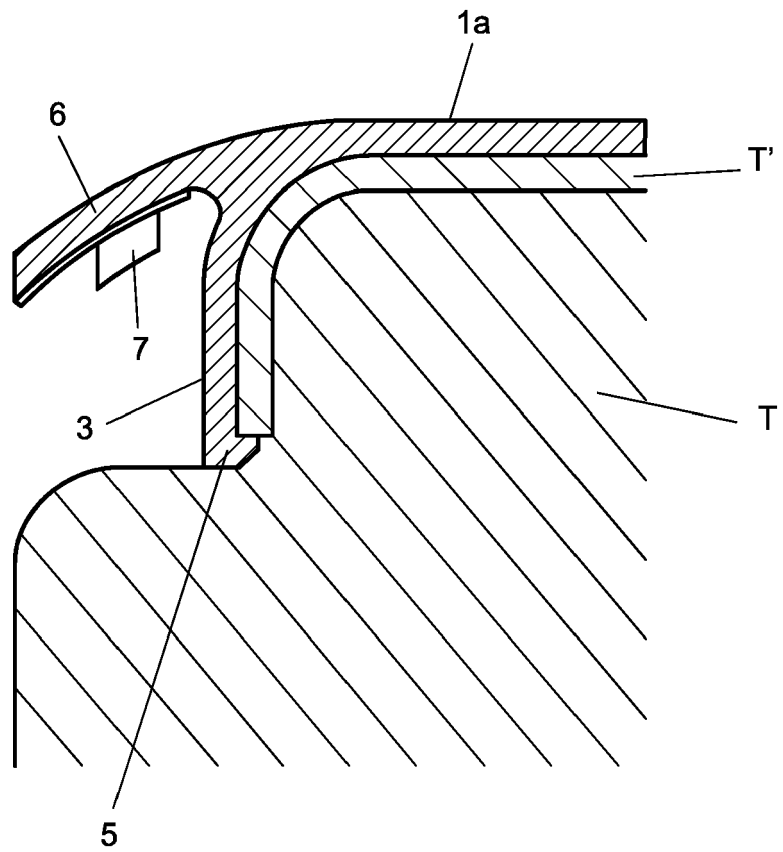
**FIG. 6A**



**FIG. 6**



**FIG. 6B**



**FIG.7**



## EUROPEAN SEARCH REPORT

Application Number  
EP 15 16 9588

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	DATABASE WPI Week 200679 26 January 2006 (2006-01-26) Thomson Scientific, London, GB; AN 2006-776375 XP002745064, -& KR 2006 0007615 A (IHL CO LTD) 26 January 2006 (2006-01-26)	1-5	INV. F25D17/06 F25D27/00
Y	* abstract; figures 1-4 *	6-10	
Y	WO 2012/007807 A2 (ANTONIOMERLONI S P A IN A S [IT]; FRANCOLINI GIANLUCA [IT]) 19 January 2012 (2012-01-19) * abstract; figures 3-5 * * page 6, line 25 - line 26 * * page 8, line 16 - line 22 *	6-8	
Y	CN 102 980 348 A (HEFEI MIDEA ROYALSTAR REFRIGER) 20 March 2013 (2013-03-20) * abstract; figures 1, 2 *	9,10	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 28 September 2015	Examiner Yousufi, Stefanie
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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 EPO FORM 1503 03.82 (P04C01)

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

EP 15 16 9588

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The members are as contained in the European Patent Office EDP file on  
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28-09-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20060007615 A	26-01-2006	NONE	
WO 2012007807 A2	19-01-2012	IT AN20100047 U1 WO 2012007807 A2	13-01-2012 19-01-2012
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