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(71) Applicant: **Metalfrio Solutions S.A.**
**04186-220 Sao Paulo SP (BR)**

(72) Inventor: **Sartoreli Filho, Luiz Carlos**
**07600-000 Mairipora SP (BR)**

(74) Representative: **Patentanwälte**
**Ruff, Wilhelm, Beier, Dauster & Partner**
**Kronenstrasse 30**
**70174 Stuttgart (DE)**

(54) **A closure assembly applicable to a cooling equipment**

(57) The present invention relates to a closure assembly (1) applicable to a cooling equipment comprising a cabinet (16), the closure assembly (1) being provided with first profile (3) and second profile (2), which are arranged in opposition to each other at the side walls (50) of the cabinet (16), the cabinet (16) being closed by at least one cover (12) arranged between the first and second profiles (3, 2), the closure assembly (1) being configured so that the first profile (3) will comprise at least one first recess (4) and the second profile (2) will comprise at least one second recess (7), each recess (4, 7) defining an aperture (14, 17) limited by first face (24, 27) and second face (24', 27'), the first and second faces (24, 27, 27, 27') of the recesses (4, 7) being arranged substantially orthogonal to the sidewalls (50) of the cabinet (16). Each aperture (14, 17) defining a spacing for housing a cover (12) and the innermost portion arranged between the first face (24, 27) and the second face (24', 27') of at least one of the recesses (4, 7) defining a dimension (D1) smaller than the outermost portion of larger dimension (D2) arranged between the first and second faces (24, 24', 27, 27'), the cover (12) being slidingly housed between the recesses (4, 7), the movement of the cover (12) being limited by the smaller dimension (D1) of at least one of the recesses (4, 7).

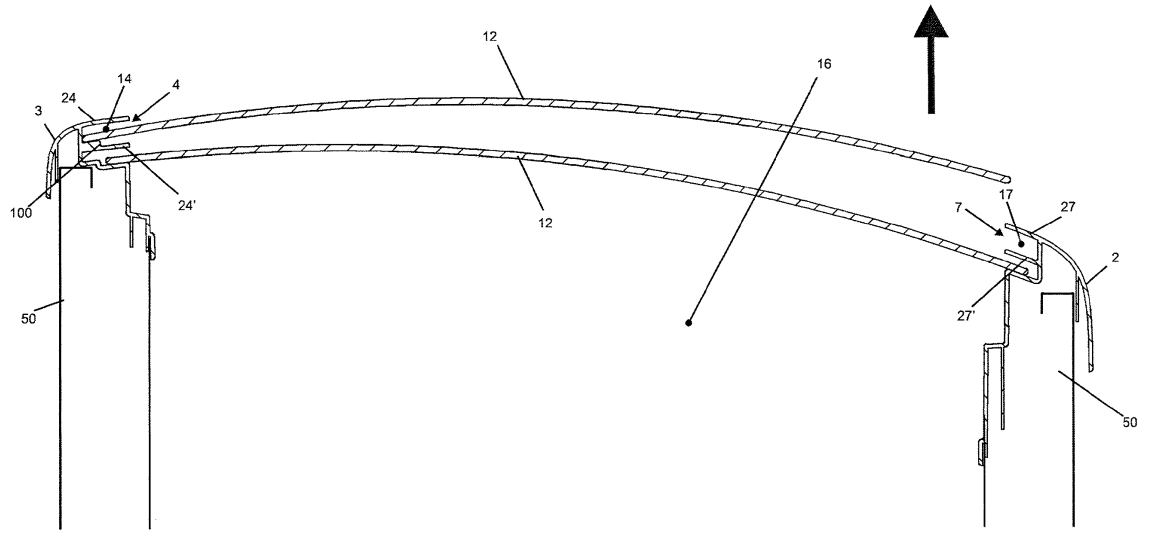


FIG. 4

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## Description

**[0001]** The present invention relates to a closure assembly applicable to a cooling equipment, capable of enabling simple mounting and dismounting of one of more covers.

Description of the Prior Art

**[0002]** The use of cooling equipments is common both in commercial environments as in residential environments. Basically, the cooling equipments have as objective food products storage, preserving them at a temperature to prolong their useful life and to keep their quality.

**[0003]** Residential cooling equipments have basically two compartments, known as refrigerator and freezer. The refrigerator usually has larger dimensions in comparison with a freezer, having an average storage capacity of 300 liters and operating at an average temperature of 3°C, while the freeze operates at average temperatures of -12°C and storage capacity of 70 liters.

**[0004]** On the other hand, commercial cooling equipments are normally arranged in convenience networks, supermarkets, restaurants, drugstores, among others, and, unlike residential equipments, which basically may have both horizontal (chest freezer) and vertical shapes, the choice depending only on the need and desire of the client. Anyway, regardless of the shape of the product, the objective of the cooling equipment is always the same, that is, preserving the product inserted into it, thus prolonging its useful life.

**[0005]** Unlike residential equipments, most of commercial equipments have only one compartment for products storage; however the storage capacity thereof is quite variable. An equipment of average capacity of 170 liters is considered small, while one of 550 liters storage capacity is considered large.

**[0006]** Further, in comparison with residential cooling equipments, commercial equipments have the difference of being capable of operating at wider temperature ranges in only one compartment. For instance, as already mentioned, residential equipments have two compartments, the refrigerator and the freezer, each compartment being capable of reaching a given temperature, the freezer being capable of reaching lower temperatures in comparison with the refrigerator. On the other hand, most of the commercial cooling equipments are composed of only one compartment and, depending on the model the equipment can operate as a refrigerator (operation temperature range from 2°C to 8°C) , as a freezer (operation temperature range from- 15°C to- 22°C) and even as refrigerator and freezer at the same time, thus being capable to operate at temperatures ranging from 2°C to 8°C and from- 15°C to- 22°C. The product operation temperature, as well as its storage capacity, depends only on the need of the client and on the type of product (beverages, foods, ice, ice- cream, among others) which is stored in the cooling equipment.

**[0007]** Among the commercial equipments, one stands out by the use of horizontal freezers, also known as chest freezers, this type of equipment being composed basically of a rectangular cooling cabinet, having on its top surface at least one cover fixed to the cabinet frame.

**[0008]** It is noted that the cover is responsible for performing thermal insulation, thus keeping the internal temperature at a desired level. Moreover, the cover is made preferably of a colorless or transparent material such as glass, thus enabling the food inserted into the cooling cabinet to be viewed without the need to open the cabinet and preventing unnecessary heat exchange between the cooling cabinet and the external environment.

**[0009]** As it is natural in a commercial equipment that contains products to be consumed, it is necessary to provide it with an impeccable appearance and, for this reason, the cover that separates the consumer from the cooled product should be kept clean.

**[0010]** During the life cycle of a horizontal freezer, there is therefore the need to remove the cover sometimes, for instance, for performing maintenance and cleaning of the cooling cabinet, or even for repairing the glass cover, which may undergo some kind of damage, thus requiring replacement. In the event of cover removal, it will always be necessary for the whole process from removal until replacement thereof to take place safely and within a reduced time.

**[0011]** In the case of prior art horizontal freezers, the cover is fixed directly to a profile, usually made of plastic, which in turn is also fixed directly to the cooling cabinet. In other words, the cover is coupled to the plastic profile by means of fixing elements such as, for example, screws, rivets or glue/silicone and, in the same way, the plastic profiles are coupled to the freezer cabinet by using the same fixing elements.

**[0012]** Thus, in the prior art technologies, if a cover removal is required, the plastic profile should be firstly removed and then the cover. This way, whenever there is the need to remove and/or change the cover of a horizontal freezer, the employee in charge should have adequate tools for performing such operation and, as in most cases, the fixation is made by using screws, and the employee should remove one screw at a time and then remove the cover altogether. This makes the cover removal process time consuming and exhaustive and still there is the possibility that the operator gets hurt during the process, or that the freezer undergoes some damage due to incorrect handling of the tools used by the employee.

**[0013]** Optionally, there are some prior art solutions that make use of an additional profile (for example, a metallic one) , the function of which is to fix the glass to its frame, having this profile a baguette- style function. Although this solution presents a more simple construction, the removal and replacement of the additional profile is toilsome. One of the drawbacks of this solution is due to fact that the user removes the glass without employing adequate tools, often using his nails or fingertips to re-

move the additional profile. Many of these situations cause injuries or cuts to the user, thus not providing a solution to the problem of removing and replacing the covers of commercial freezers.

**[0014]** Therefore, it is not known in the prior art, a closure assembly for closing one or more covers, preferably for use on commercial freezers, which does not require the use of fixing elements for coupling the cover to the profile or frame, so that the removal and/or replacement of the cover will take place more rapidly, more efficiently and in safety, without any need for the operator to employ adequate tools to perform the operation, which may result in injuries to the operator and damages to the cooling equipment.

**[0015]** Further, it is not known in the prior art any cooling equipment, more specifically commercial equipment that has a closure assembly for one or more covers and that uses the refrigerator profile/ frame itself to couple the covers, the fixation thereof being performed without using any additional fixing element.

Objectives of the Invention

**[0016]** The present invention has as objective the provision of a closure assembly for one or more covers, which does not need to use fixation elements for coupling the cover to the plastic profile of the refrigerator.

**[0017]** The present invention has also the objective of providing a cooling equipment composed of a closure assembly for closing one or more covers, which uses only the profile itself of the cooling equipment to fix the covers responsible for the thermal insulation.

**[0018]** It is also an objective of the present invention to provide a closure assembly for one or more covers, in which the cover removal procedure from a cooling equipment will be rapid, efficient and safe.

Brief Description of the Invention

**[0019]** The objectives of the invention are achieved by means of a closure assembly with the features of claim 1. The closure assembly is applicable to a cooling equipment comprising a cabinet, the closure assembly being provided with first profile and second profile arranged in opposition in the cabinet sidewalls, the cabinet being covered by at least one cover arranged between first and second profiles, wherein the first profile comprises at least one first recess defining and the second profile comprises at least a second recess, each recess defining a limited aperture through a first face and a second face, the first and the second faces of the recesses being arranged by means substantially orthogonal with respect to the cabinet sidewalls; each aperture defining a spacing for housing the cover, the innermost portion arranged between the first face and the second face of at least one of the recesses defining an aperture that is smaller at the outermost portion arranged between the first and second faces, the cover being slidingly housed between the recesses, wherein the movement of the cover is limited by the smaller aperture of at least one of the recesses.

**[0020]** The objectives of the invention are also achieved by means of a cooling equipment with the features of claim 9, this cooling equipment having a closure assembly as mentioned above.

Brief Description of the Figures

**[0021]** The present invention will now be described in greater details with reference to an example of an embodiment represented in the figures. The figures show:

- Figure 1 is a perspective and cross-sectional view of a possible embodiment applied to a horizontal cooling cabinet comprising the closure assembly of the present invention;
- Figure 2 is a side view highlighting the closure assembly of the present invention, where the covers are placed;
- Figure 3 is a side view of a cooling cabinet having the closure assembly of the present invention during an initial step of cover removal;
- Figure 4 is a side view of a cooling cabinet having the closure assembly of the present invention during an intermediate step of cover removal;
- Figure 5 is a side view of a cooling cabinet containing the closure assembly of the present invention after cover removal.

Detailed Description of the Figures

**[0022]** Figure 1 shows a perspective and cross-sectional view of a possible configuration applied to a cooling cabinet 16 having the closure assembly 1 of the present invention. Preferably, but not compulsorily, the cabinet 16 is of the horizontal type, which is also called chest freezer, being closed by means of two covers 12 responsible for providing thermal insulation of the cabinet 16. Alternatively, the cabinet 16 may be closed by one, three or more covers 12 arranged over each other, and the cabinet 16 may be both horizontal or vertical.

**[0023]** It is noted that a cabinet 16 may be constructed from two or more overlapped sliding foils, each foil being provided with its covers 12. Thus, in order to access the interior of the cabinet 16, suffice it to slide one foil over the other. Alternatively, the cabinet 16 may be provided with only one foil with its respective cover assembly 12, the foil being pivotable to one of its ends, so that upon pulling the foil at the opposite end, the foil opens and enables access to the interior of the cabinet 16.

**[0024]** The dimensions of the covers 12 are directly related to the dimensions of the cabinet 16 and may be totally planes or slightly angulated, depending only on the need of the client and of the developed design on the refrigerator. In this embodiment, the covers 12 are preferably colorless or transparent and made of glass, thus

enabling the user to view the internal compartment of the cabinet 16 altogether. Alternatively, the covers may be made of acrylic, or even from a material that has translucency characteristics on the covers 12.

**[0025]** As shown in figure 1, the cabinet 16 comprises a first profile 3 and a second profile 2, which are arranged in opposition to each other at the ends of the sidewalls 50 of the cabinet 16. Thus, the covers 12 are arranged between the first and the second profiles 3, 2, without the need to use any additional fixing element. The fixation of the covers 12 of the present invention is made due to the relation of the cover 12 with the structural embodiment of the first profile 3 and of the second profile 2.

**[0026]** Figure 2 represents a cross-sectional side view pointing out the closure assembly 1 of the present invention in an embodiment wherein the covers 12 are in place, showing the arrangement of the covers 12 during normal operation of the cooling equipment.

**[0027]** As shown in figure 2, the first profile 3 comprises at least one first recess 4 and the second profile 2 comprises at least one second recess 7. It should be stressed that the number of existing recesses are directly related to the number of covers 12 employed on the cabinet 16. In this way, for each cover 12 there will be two recesses 4, 7, in other words, considering that the cover 12 is supported by two of its sides, two recesses 4, 7 per cover 12 will be necessary.

**[0028]** Each of the recesses 4, 7 define a respectively aperture 14, 17, the apertures 14, 17 being configured as being only bored-through elements on the first profile 3 and on the second profile 2. Each aperture is like a groove, so that an aperture 14 is limited by first face 24 and by second face 24', which are arranged substantially orthogonal to the sidewalls 50 of the cabinet 16. Similarly, the aperture 17 is limited by first face 27 and by second face 27', which are arranged substantially orthogonal to the sidewalls 50 of the cabinet 16, the same thing happening for each existing recess on the cooling cabinet 16. It should be noted that the expression "substantially orthogonal to the sidewalls 50" embraces a variable angle between the first and second faces 24, 24', 27, 27' of the recesses 4, 7 with respect to the sidewalls 50 of the cabinet 16, which enables them to be defined by angles ranging from 90 to 125 degrees.

**[0029]** As described, each aperture 14, 17 defines a spacing for housing at least one end of the cover 12, the two apertures 14, 17 housing a cover. Naturally, if the constructive embodiment has two covers 12, the recesses 4, 7 may share adjacent internal faces 24, 24', 27, 27'.

**[0030]** In a preferred embodiment shown in figure 5, the innermost portion between the first face 24 and the second face 24' defines a smaller dimension or width D1 than the outermost portion, the inlet portion of cover 12, of smaller dimension or width D2, arranged between the first face 24 and the second face 24'.

**[0031]** In this preferred embodiment of the closure assembly 1 described in the present invention, the second face 24' further comprises a protruding tooth 100, arranged inside the first recess 4, the protruding tooth 100 being responsible for preventing the cover 12 from displacing horizontally in the inner portion of the first recess 4, since the latter acts like a displacement limiter for the covers 12. Although in this preferred embodiment of the closure assembly 1 the protruding tooth 100 is arranged on the second face 24' of the first recess 4, the protruding tooth 100 could be arranged on the first face 24, 27 or on the second face 27', and it is important to point out that the protruding tooth 100 should be arranged on the recesses 4, 7 of only one of the profiles 3 or 2 to prevent displacement of the cover 12 after its housing. The protruding tooth 100 further performs an important role during the removal process of the covers 12, which will be described in greater detail along this description. It is noted that the existence of the tooth 100 that configures a smaller dimension or width D1 of the recess 4.

**[0032]** As it is clear, this embodiment prevents the cover 12 from displacing horizontally during the normal operation of the cooling equipment, since the cover 12 remains substantially fitted into the recesses 4, 7, and limited on one side by a bottom wall of a recess 7 and, on the other side by an existing protruding tooth 100 in the analogous recess 4.

**[0033]** Alternatively to the structural embodiment of the protruding tooth 100, the first and the second faces 24, 24', 27, 27' could have concurrent profiles, thus defining one of the recesses 4, 7 in the form of a wedge. By "concurrent traces" one means that the concurrence point between the first and the second faces 24, 24', 27, 27' occurs at the innermost portion of one of the recesses 4, 7, enabling the innermost portion to have a smaller dimension or width D1 than the innermost portion of larger dimension or width D2.

**[0034]** Further, it is important to point out that, just as the number of recesses 4, 7, the number of apertures 14, 17 existing in the closure assembly 1 of the present invention are directly related to the number of covers 12 employed in the isolation of the cooling cabinet 16.

**[0035]** A preferred structural embodiment of the closure assembly 1 having been described, which comprises first profile 3 and second profile 2, the other figures of this specification have the objective of showing how the present invention enables the removal of covers 12.

**[0036]** As already mentioned before, figure 2 shows the arrangement of the covers 12 during normal operation of the cooling equipment, and in this embodiment the cover 12 is arranged over the second faces 24' and 27' of the apertures 14, 17, respectively.

**[0037]** Since in this preferred example two covers 12 are employed to provide thermal insulation of the cooling cabinet 16, if it is necessary to remove the covers 12, one should first remove the upper cover 12 and then the lower cover 12.

**[0038]** As shown in figure 3, in order to remove the upper cover 12 through the closure assembly 1 of the present invention, one should first displace it horizontally toward the protruding tooth 100, and then raise it to a

height corresponding to the height of the protruding tooth 100 and overlap the cover 12 to the protruding tooth 100. It is noted that the protruding tooth 100 has such height that prevents inadvertent displacement of the cover 12 over the protruding tooth 100.

**[0039]** Subsequently, one should push the upper cover 12 horizontally toward the first profile 3, the cover 12 will come into contact with the end portion of the aperture 14, thus reaching the end limit of its horizontal displacement. In this way, upon displacement of the upper cover 12 horizontally until it comes into contact with the end portion of the aperture 14 of the first profile 3, the surface of the cover 12 that was in contact with the second face 27' of the second profile 2 before will also displace horizontally toward the first profile 3, thus causing loss of contact between the cover 12 and the second face 27'.

**[0040]** Thus, the worker in charge of removing the upper cover 12 may then raise by its free side, since the cover 12 is no longer limited to the first face 27 of the second recess 7 of the second profile 2, as shown in figure 4 of the present patent application. Then, the worker should pull the upper cover 12 toward the second profile 2, and the upper cover 12 will be removed altogether, as shown in figure 5.

**[0041]** The process for removing the upper cover 12 through the closure assembly 1 of the present invention having been described, one repeat the same steps for removing the lower cover 12. In this way, the covers 12 are removed easily and securely, without the need to employ tools that might cause injuries to the worker, which results in greater efficiency and safety during the process of removing the covers 12 of a cooling equipment .

**[0042]** In the same way as the covers 12 were removed from the cooling cabinet 16 by using the closure assembly 1 of the present invention, the covers 12 can be inserted again into the cooling cabinet 16, without the need to employ tools, it being sufficient to proceed as described in the present patent application, but in reversed order.

**[0043]** One should point out the fact that the cover closure assembly 1 described in the present patent application should be preferably but not compulsorily employed on horizontal cooling equipments, the so-called chest freezers. However, nothing prevents the cover 12 closure assembly 1 from being used on vertical cooling equipments or any other equipment - whether a cooling one or not - that employs covers, whether made of glass, plastic, fiber or any other material - for isolate a given surface of the equipment. It is sufficient to provide the equipment with first profile 3, second profile 2 and a cover having the constructive characteristics of the present invention.

**[0044]** It should be reminded that the first profile 3 and the second profile 2 may be manufactured together with the cabinet 16 - thus being an integral part of the cabinet - or they may still be associated to any cooling cabinet 16, it being enough to adequate the embodiments of the profiles 3, 2 to its sidewalls 50. In this way, the closure assembly 1 of the present invention can further function as an accessory for other existing cooling equipments. Thus, the first and second profiles 3, 2 may be designed so as to associate any constructive embodiment of a cabinet 16, enabling prior art freezers to take advantages of the present invention in a quick and simple way. Of course, the profiles 3, 2 may be made of any material, such as metal or polymer, and may additionally receive a painting-type or anodizing finishing, if the metal is aluminum.

**[0045]** As described above, it is important to point out that the number of covers 12 employed on the cooling cabinet 16 may vary, the employ of at least one cover 12 being sufficient to perform the thermal insulation of the product.

**[0046]** A preferred example of embodiment having been described, one should understand that the scope of the present invention embraces other possible variations, being limited only by the contents of the accompanying claims, which include the possible equivalents.

## Claims

1. A closure assembly (1) applicable to a cooling equipment comprising a cabinet (16), the closure assembly (1) being provided with first profile (3) and second profile (2), which are arranged in opposition to each other at the ends of sidewalls (50) of the cabinet (16), the cabinet (16) being closed by means of at least one cover (12) arranged between the first and second profiles (3, 2), the closure assembly (1) being **characterized in that**:

   - the first profile (3) comprises at least one first recess (4) and the second profile (2) comprises at least one second recess (7), each recess (4, 7) defining an aperture (14, 17) limited by first face (24, 27) and second face (24', 27'), the first and second faces (24, 24', 27, 27') of the recesses (4, 7) being arranged substantially orthogonal to the sidewalls (50) of the cabinet (16);
   - each aperture (14, 17) defining a spacing for housing a cover (12);
   - the innermost portion arranged between the first face (24, 27) and the second face (24', 27') of at least one of the recesses (4, 7) defining a dimension (D1) smaller than the outermost portion of larger dimension (D2) arranged between the first and second faces (24, 27, 24', 27');
   - each cover (12) being slidingly housed between the recesses (4, 7), the movement of the cover (12) being limited by the smaller dimension (D1) of at least one of the recesses (4, 7).

2. The closure assembly (1) according to claim 1, **characterized in that** the cover (12) is colorless or transparent such as glass or acrylic.

3. The closure assembly (1) according to claim 1 or 2, **characterized in that** the first and second faces (24, 27, 24', 27') of the recesses (4, 7) protrudes toward the sidewalls (50) of the cabinet (16) with an angle ranging from 90 degrees to 125 degrees.

4. The closure assembly (1) according to one of the preceding claims, **characterized in that** at least one of the first and second faces (24, 24', 27, 27') is provided with a protruding tooth (100) inside the recess (4, 7).

5. The closure assembly (1) according to one of the preceding claims, **characterized in that** at least one of the recesses (4, 7) comprises first and second concurrent faces (24, 24', 27, 27'), the recess (4, 7) being in the form of a wedge.

6. The closure assembly (1) according to one of the preceding claims, **characterized in that** the profiles (2, 3) are integral part of the cabinet (16).

7. The closure assembly (1) according to one of the preceding claims, **characterized in that** the profiles (2, 3) are associable at the ends of the sidewalls (50) of the cabinet (16).

8. The closure assembly (1) according to one of the preceding claims, **characterized in that** upon mounting and dismounting of the cover (12) one of the ends of the cover (12) is moved toward the internal end of one of the recesses (4, 7), overlapping the adjacent protruding booth (100).

9. Cooling equipment with a closure assembly (1) as defined in claims 1 to 8.

10. Cooling equipment according to claim 9, **characterized in that** it is an either horizontal or vertical refrigerator.

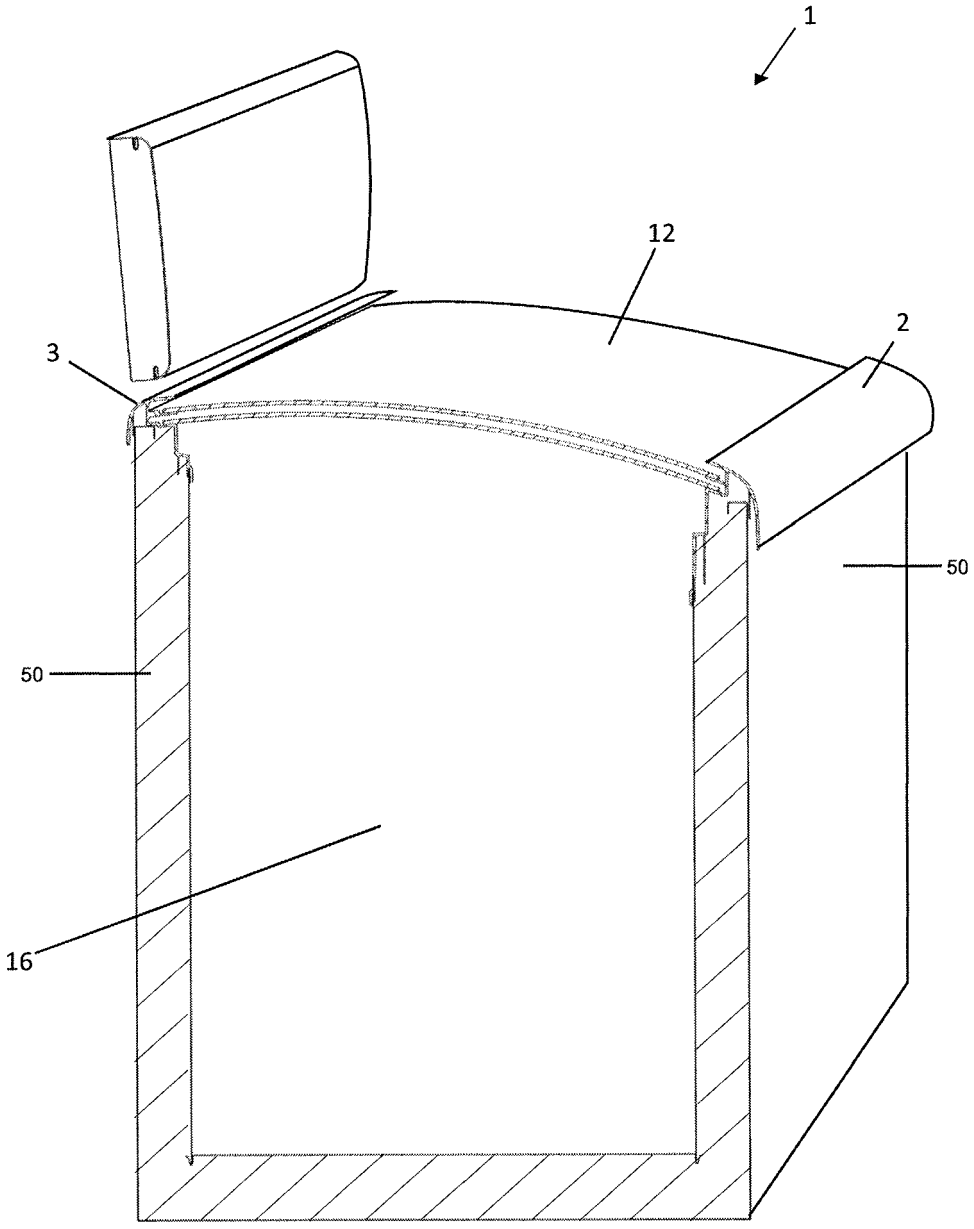


FIG. 1

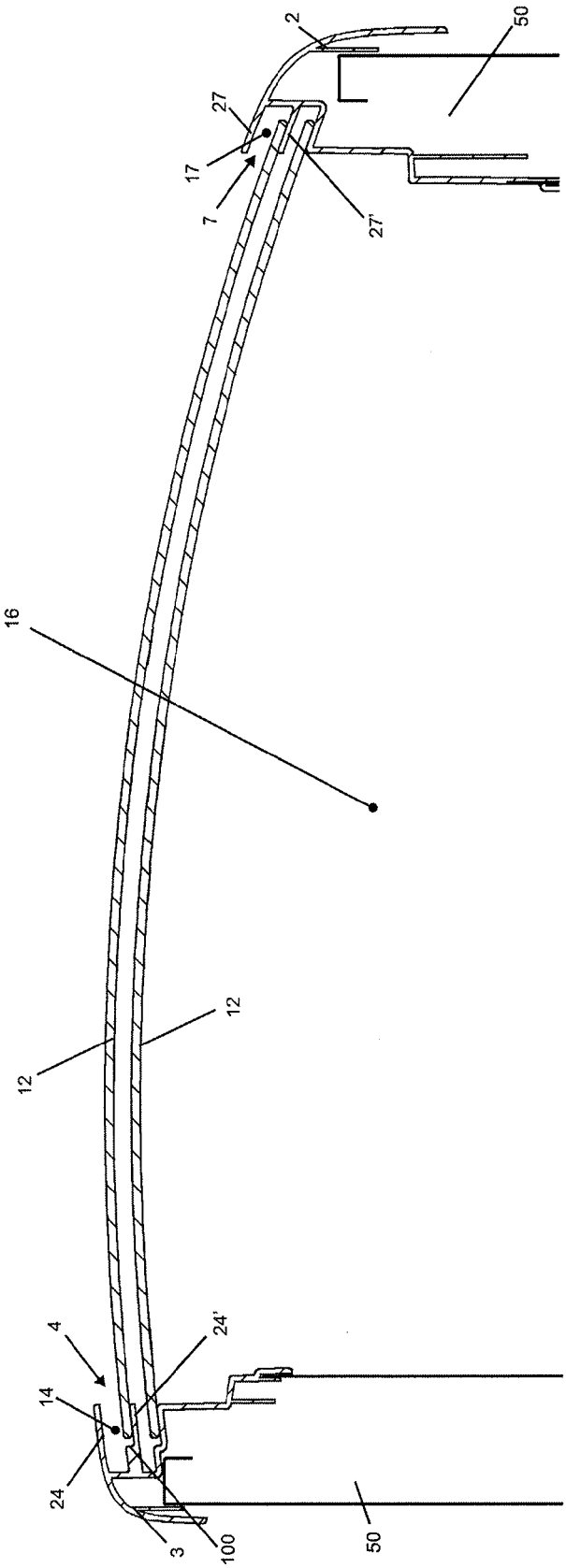


FIG. 2

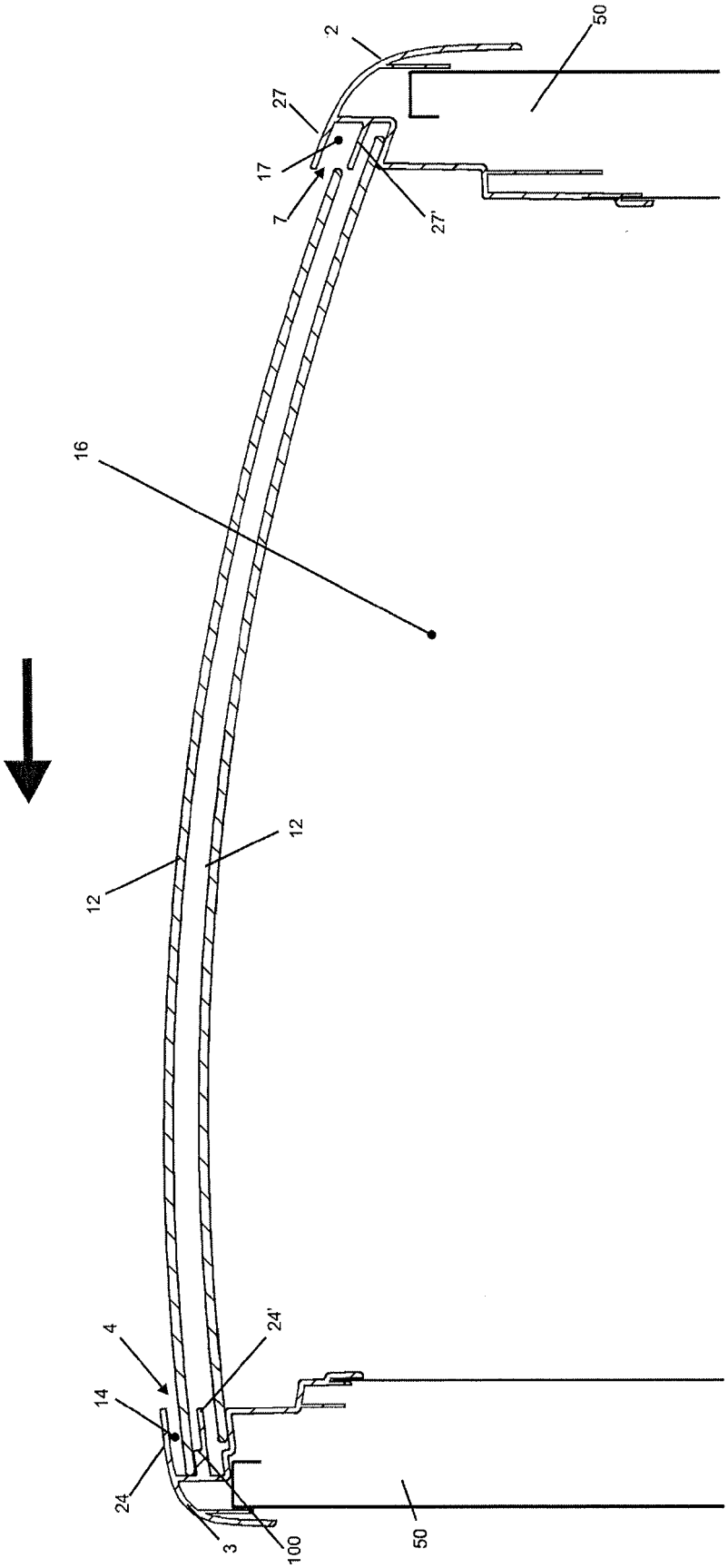


FIG. 3

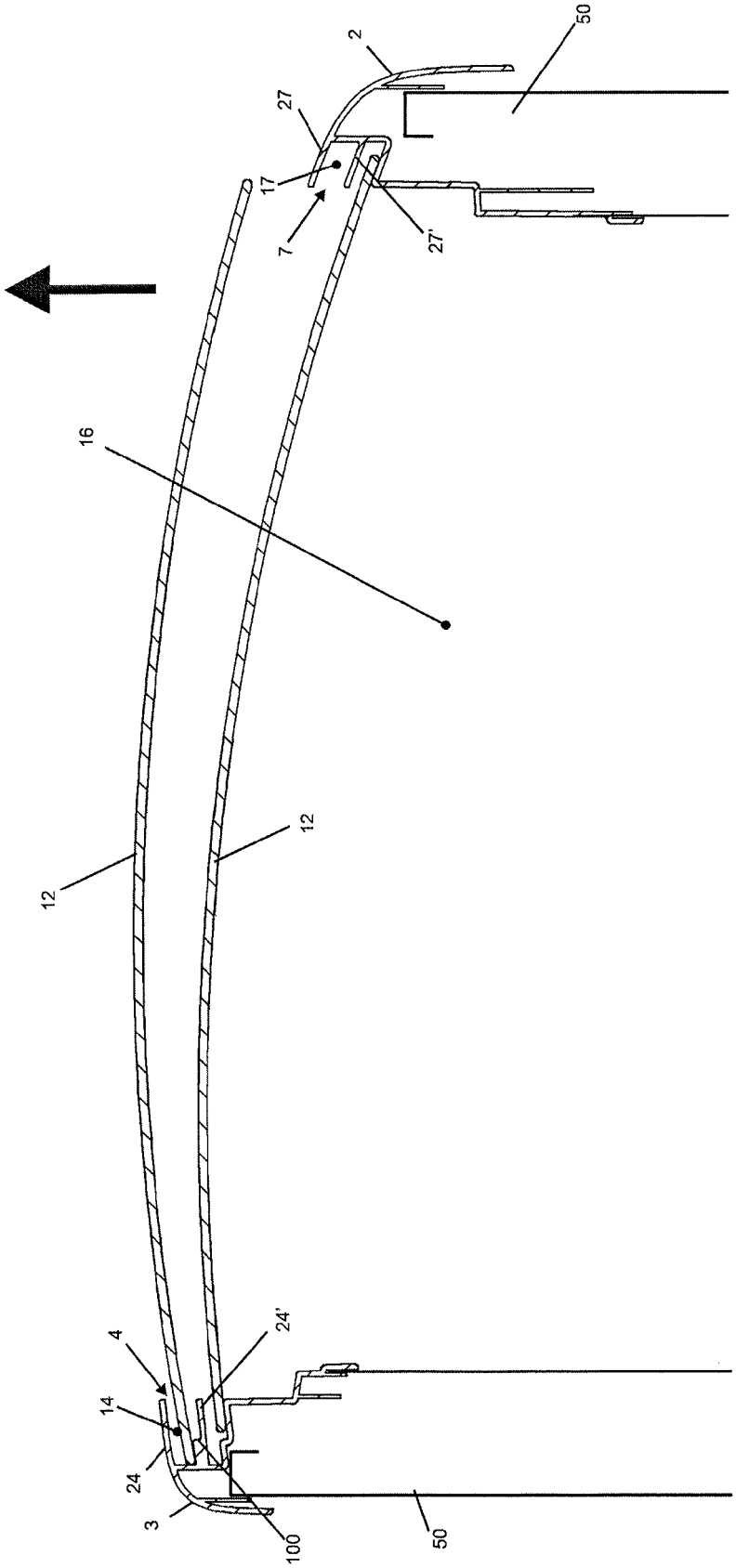


FIG. 4

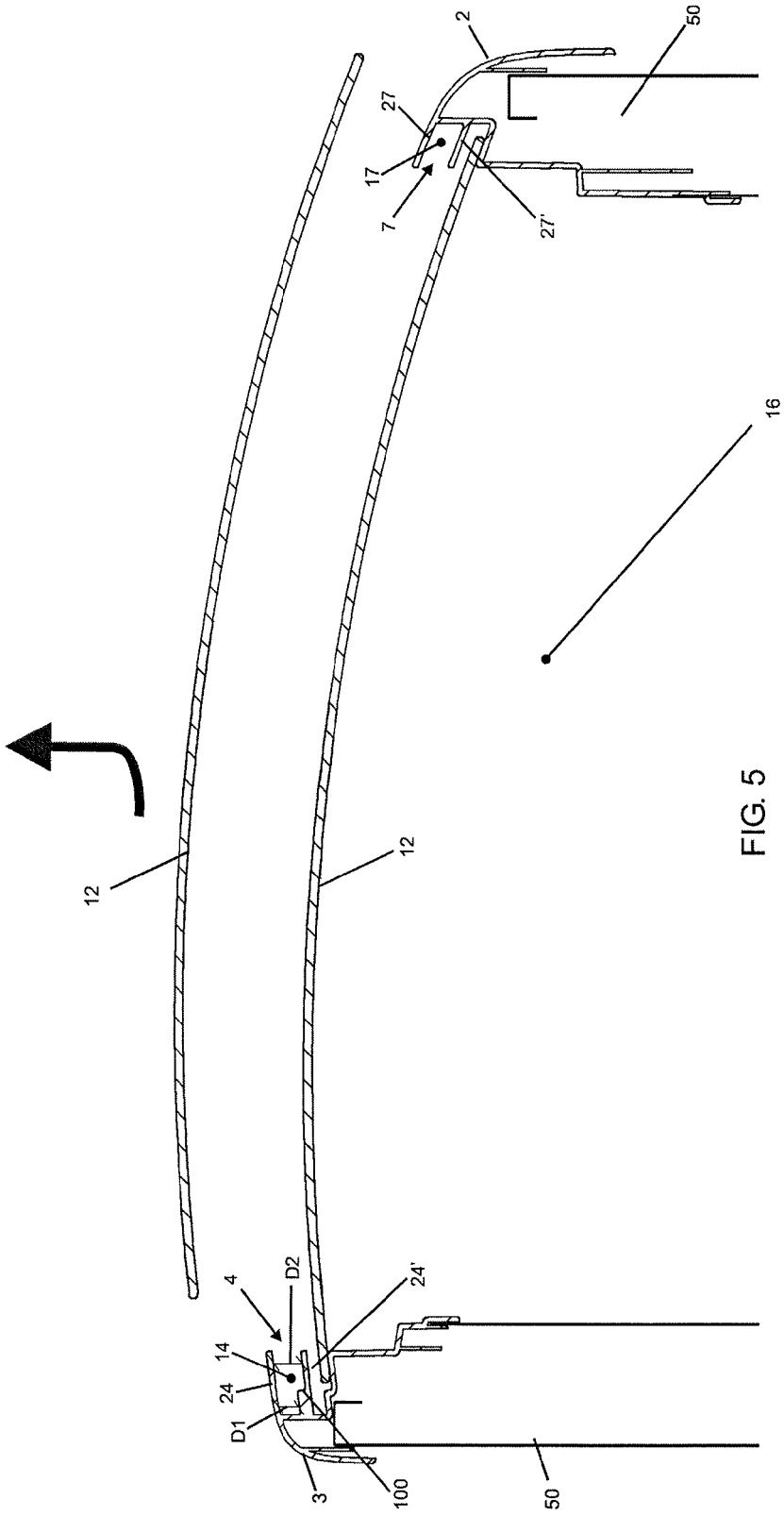


FIG. 5