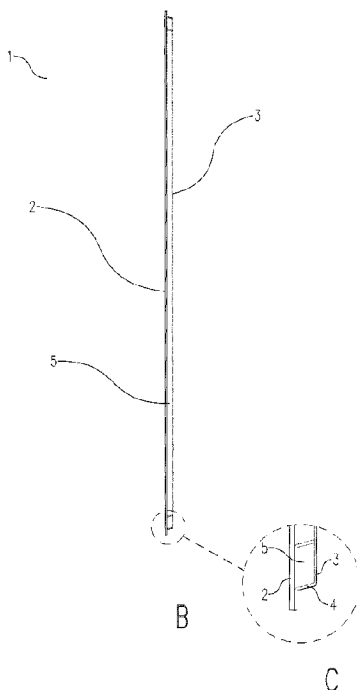




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(57) **Abrégé/Abstract:**

An access door (1) for use in a cooling device for keeping products chilled and displaying them, in particular food and/or beverages, comprising an at least substantially transparent multiple- walled construction. The multi-walled construction comprises an at least substantially plate- shaped first wall (2) and an at least substantially plane-parallel second wall (3). The walls (2,3) each comprise at least substantially an edge part around them by which both walls are mutually connected. Furthermore both walls (2,3) mutually hold a cavity (5) between the edge parts. Due to the multi-walled construction having an enclosed cavity the access door has a very good stiffness, and moreover due to the presence of the cavity insulates well and reduces condensation on the transparent access door.

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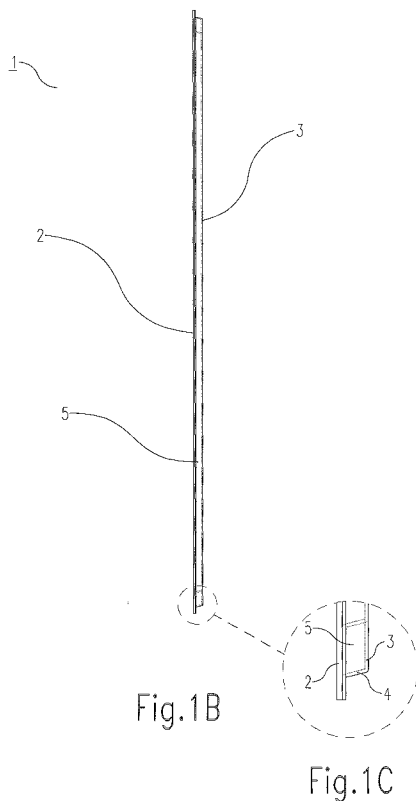
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(54) Title: COOLING DEVICE AND ACCESS DOOR



(57) Abstract: An access door (1) for use in a cooling device for keeping products chilled and displaying them, in particular food and/or beverages, comprising an at least substantially transparent multiple-walled construction. The multi-walled construction comprises an at least substantially plate-shaped first wall (2) and an at least substantially plane-parallel second wall (3). The walls (2,3) each comprise at least substantially an edge part around them by which both walls are mutually connected. Furthermore both walls (2,3) mutually hold a cavity (5) between the edge parts. Due to the multi-walled construction having an enclosed cavity the access door has a very good stiffness, and moreover due to the presence of the cavity insulates well and reduces condensation on the transparent access door.

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Cooling device and access door

The present invention relates to a cooling device for keeping products chilled and displaying them, in particular food and/or beverages, comprising a product space conditioned by cooling means bounded on an entry side by an adjustable access door. The invention also relates to an access door of the type as used in a cooling device according to the present invention.

Cooling devices are mainly used in supermarkets, department stores and other shops such as corner shops, petrol stations, self-service restaurants etc., to keep products inside chilled. For example, in order to keep products with a limited shelf life such as food and beverages fresh for longer, and to be able to offer certain products for immediate consumption chilled. This concerns mostly vertical cooling walls comprising a cupboard within which cooling means are provided in order to chill and keep chilled to a certain temperature a product space surrounded by the cupboard. Within the product space shelves are provided on which the products are exhibited as an offer to the public passing by. In order to offer the public passing by a good view of the exhibited goods, many original cooling devices are created to be open on the visible side. This however allows chilled air from the product space to circulate freely with warmer air from the surroundings, as a result of which effective and adequate cooling with the cooling means requires relatively large amounts of energy. In addition to higher energy costs for the shop concerned, this also forms a substantial burden on the environment.

Consequently, cooling devices have been made according to the type described in the opening paragraph, whereby the product space is bordered by a so-called day cover in the form of an adjustable access door at the entry side. The access door forms a partition which counteracts a free exchange of air between the product space and any surrounding air, and as a result helps to lower the consumption of the cooling device. The access door in known cooling devices is often mostly made of a glass plate. Such a glass plate can be transparent so as to hardly detract from a view of the exhibited goods in the cooling device. However, in view of the usual dimensions of the access door used in a cooling device the glass plate has to be relatively thick for a sufficiently reliable strength, which results in a heavy impractical whole.

A plate of plastic with corresponding dimensions has a significantly lower weight than its glass counterpart. Accordingly, a number of alternative cooling devices are known where the access

door is chiefly made of a plastic plate. However, for a sufficiently stiff access door in which unwanted curvatures and other deformations through exposure to fluctuations in temperature and moisture or possibly its weight are prevented., it is apparent that a thickness of the plastic plate used nevertheless leads to a substantial total weight of the whole.

5

The present invention thus inter alia intends to provide a cooling device with an at least in this regard improved access door without compromising on its optical properties.

10 In order to achieve the intended goal a cooling device of the type described in the opening paragraph is, in accordance with the invention, characterized in that the access door comprises an at least substantially multi-walled construction of an at least substantially plate-shaped first wall and an at least substantially plane-parallel second wall, each of the walls comprising at least substantially a flat edge part all around with which both walls are interconnected and that both walls mutually hold a cavity between the edge parts. The invention is moreover
15 based on the insight that multi-walled constructions consisting of walls attached to each other at the edge parts with an enclosed cavity space, a kind of box structure as it were, not only offers very good stiffness to the access door so no deformation takes place, but due to the presence of the cavity also insulates well and reduces condensation on the transparent access door. Consequently, due to its high stiffness the access door needs less material, so that it can
20 be made with a relatively light weight, whereas good visibility of the goods exhibited in the product space of the cooling device is maintained in almost all cases.

Within the context of the invention a preferred embodiment of the cooling device according to the invention is characterized in that at least one of both walls comprises a central part at the
25 location of the cavity which is offset from the edge part and borders the cavity. Accordingly, the wall concerned can be made of an at least almost completely flat central part, whereby a part of the wall extending from the central part comprises the edge part to be attached to an edge part of the other of the walls while enclosing the cavity. The other of the walls can thus be made completely flat so that production costs can be reduced. Although either one of the
30 walls can be chosen as the completely flat wall, the other wall say comprising the offset central part, the access door is aesthetically at its most attractive with a completely flat wall on the visible side of the access door. Consequently the cooling device according to the present invention in a special embodiment is characterized in that the first wall is at a visible side of

the access door and is at least almost completely flat and that the second wall comprises the central part offset from the edge part.

5 A total thickness of the construction of the access door is preferably adapted to the usual dimensions for use of such doors, so that the access door according to the present invention can be used with already existing or commonly used furniture and locking means. Within this total thickness a thickness of the cavity is preferably a minimum of 8mm for good insulation. A remaining thickness of the door can be variably attributed to the walls. Thus both walls can for example be made with a uniform wall thickness. However, in a further preferred embodiment
10 the cooling device according to the present invention is characterized in that the first wall on the visible side mainly has a wall thickness thicker than a wall thickness of the second wall. The wall on the visible side of the door is after all often the most intensively influenced. Passers-by for example unexpectedly knock against it with body parts or objects such as shopping baskets and trolleys. By giving the wall on the visible side in particular a relatively large wall thickness
15 within the desired total thickness of the door the risk of harm to the wall such as cracks, fractures or other types of serious damage, is decreased. Furthermore, at least on the visible side the access door can be optionally provided with a scratch resistant transparent layer of coating in order to reduce scratches or other surface damage.

20 In a further preferred embodiment the cooling device according to the present invention is characterized in that at least one of both walls is made of plastic, in particular of a plastic chosen from a group of polymethylmethacrylate (PMMA), such as high impact PMMA, extruded PMMA or cast PMMA, polycarbonate (PC) and polyethylene terephthalate glycol (PETG). In addition to favourable weight savings the walls of plastic offer a further
25 improvement by reducing condensation through good heat absorption of the material. The plastics mentioned specifically moreover have good transparent properties, so that a clear and bright view of the products offered in the cooling device is maintained.

A special embodiment of the cooling device according to the present invention is characterized
30 in that both walls are made of the same plastic. This is not only beneficial in practical terms but also enables a good and reliable attachment between the walls with a suitable adhesive. Accordingly in a further preferred embodiment according to the present invention the cooling device is characterized in that the walls are attached to each other with a transparent

adhesive, in particular with a transparent acrylate adhesive, provided between the edge parts. By using a transparent adhesive the access door remains at least almost fully transparent, even at the edge parts, whereas an acrylate adhesive is moreover capable of attaching the walls of acrylate so strongly that additional clamping or closing means or door frames around the circumference of the access door are unnecessary.

In a further preferred embodiment according to the present invention the cooling device is characterized in that at least one of the walls is provided with one or more ventilation openings for ventilation between the cavity and the surrounding air, and in a particular embodiment according to the present invention is characterized in that the ventilation openings at a side of the walls facing the cavity is partly closed off with a ventilating closure member. The ventilation openings enable a ventilation of the cavity space, so that condensation on the access door is further reduced without having to comprise to much on the insulating capability of the door. In particular by using a ventilating closure device an air pressure and air temperature in the cavity space can also be adjusted at will. Condensation can be prevented particularly well when the ventilation openings are provided for in the wall at the product space side of the access door by exchanging air in the cavity with cooler drier air from the product space.

A further preferred embodiment of the cooling device according to the present invention is characterized in that a light source is provided for in the cavity which is capable of illuminating at least a visible side of the access door. The light source can be used to attract the public passing by and to direct their attention more towards the products exhibited in the cooling device, while heat emitted from the light source is screened off from the product space by placing it in the cavity. Although every known type of light source can be used, the cooling device in a further preferred embodiment according to the present invention is characterized in that the light source comprises LED-lighting and in particular consists of one or more LED-strips. LED-lighting and in particular LED-strips are particularly good for placement in the cavity of the access door due to their relatively modest dimension and due to their favourable energy consumption, making a permanent connection to a power network unnecessary.

In a further preferred embodiment according to the present invention the cooling device is characterized in that the access door is provided with prints. This can for example be a

promotional text or an image or an indication of price or other types of information. However in a particular embodiment according to the present invention the cooling device is characterized in that the prints comprise a camouflaging decorative print which is provided at least between the edge parts at a side of the first wall facing the cavity. Consequently a

5 potentially less attractive connection between the edge parts as a result of the adhesive provided between them is removed from view, so that a view of the access door from the visible side thus remains particularly appealing regardless. Moreover the prints cannot be affected from the outside due to use on the side facing the cavity so that they remain attractive for a long period of time. When using a light source in the cavity the camouflaging

10 decorative prints can also be used to remove the light source and fittings used from view behind the prints, so that only the light emitted from the light source remains visible.

In a preferred embodiment an access door of the type as used in the cooling device according to the present invention is provided with suspension means on at least two corner points of

15 the walls. Consequently an at least almost completely prefabricated access door can be produced to be attached quickly and efficiently to the cooling device on-site.

The invention will now be explained in more detail based on an example of an embodiment and an associated drawing. The drawing shows:

- 20 figure 1A a front view of an example of the embodiment of an access door according to the present invention;
- figure 1B a side view of the example of the embodiment of an access door according to the present invention; and
- figure 1C a detailed view of the example of the embodiment of an access door according to the present invention;
- 25

The figures are purely schematic and not drawn to scale. In particular some of the parts and dimensions are represented in a more or less exaggerated manner for the sake of clarity.

30 As shown in figure 1A up to and including figure 1C an access door (1) for use in a cooling device according to the present invention comprises a completely uninterrupted first plate-shaped wall (2) of plastic at a visible side. The first wall (2) is moreover made of cast polymethylmethacrylate (cast PMMA), which is a particularly suitable plastic for use in the

access door of a cooling device due to its good transparency. With its own flat edge part the first wall (2) is attached to an edge part of a plane-parallel second wall (4) which is also fully made of cast polymethylmethacrylate. The second wall (4) comprises a substantially flat central part (3) which is offset from the edge part to leave room for a cavity (5) bounded by the walls. Consequently, the second walls forms as it were a box-shaped body with a flat edge part against which the first wall is easily attachable, for example, by using an adhesive connection. In this example of an embodiment the PMMA walls are attached using a transparent acrylate adhesive so that even a connection between the walls remains at least almost transparent. As shown in figure 1A the access door comprises a gripping part (6) at the length side enabling a user to easily grasp the access door with a hand in order to adjust the access door, for example to move the door from a closed position shutting off the product space to an open position in order to take a product out of the product room. The gripping part (6) is formed by a recess in the length side of both the first as well as the second wall. The access door also comprises a corner profile (7) for a relatively simple joining of the hinge means to install the access door as a hinge door in the cooling device.

An attachment of the first wall (2) against a box-shaped second wall (4) results in a very stiff box-shaped construction which prevents a deformation of the access door with relatively little material. The access door is thus particularly light in weight. Moreover, the presence of a cavity space provides further improved insulation capability of the access door and reduces the appearance of condensation, undoubtedly also due to the use of plastic walls.

Although the invention was described in more detail solely using this one single example of an embodiment it should be clear that the invention is certainly not limited to this. On the contrary, in the context of the invention many variations and embodiments are available to the average person skilled in the art.

Claims

1. Cooling device for keeping products chilled and displaying them, comprising a product space conditioned by cooling means and bound on an entry side by an adjustable access door, wherein the access door comprises an at least substantially transparent multi-walled construction of an at least substantially plate-shaped first wall and an at least substantially plane-parallel second wall, wherein said walls each comprise an edge portion at least substantially around their periphery by which said walls are connected to each other, wherein at least one of both walls comprises a central portion that is offset with respect to the edge portion such that said walls mutually maintain a cavity at the location of said central portion that is bounded by said central portion, characterized in that at least one of the walls is provided with one or more ventilation openings for ventilation between said cavity and surrounding air.
2. Cooling device according to claim 1, characterized in that said one or more ventilation openings are provided to one of the walls at the side that faces said product space.
3. Cooling device according to claim 2, characterized in that said one or more ventilation openings are partly closed off with a ventilating closure member at a side of the walls facing the cavity.
4. Cooling device according to claim 1, characterized in that the first wall is located at a visible side of the access door and is at least almost completely flat and that the second wall comprises said central portion which is offset from the edge part.
5. Cooling device according to claim 4, characterized in that the first wall mainly has a wall thickness which is thicker than a wall thickness of the second wall.
6. Cooling device according to claim 1, characterized in that at least one of both walls is made of plastic.

7. Cooling device according to claim 1, wherein at least one of the walls is made of plastic selected from the group consisting of polymethylmethacrylate (PMMA), polycarbonate (PC) and polyethylene terephthalate glycol (PETG).
8. Cooling device according to claim 6 or 7, characterized in that both walls are made of the same plastic.
9. Cooling device according to claim 1, characterized in that the walls are attached to each other with a transparent adhesive, provided for between the edge parts.
10. Cooling device according to claim 1, wherein the walls are attached to each other with a transparent acrylate adhesive, provided for between the edge parts.
11. Cooling device according to claim 1, characterized in that a light source is provided for in the cavity capable of illuminating at least a visible side of the access door.
12. Cooling device according to claim 11, characterized in that the light source comprises LED lighting.
13. Cooling device according to claim 11, wherein the light source comprises one or more LED strips.
14. Cooling device according to any one of claims 1 to 13, characterized in that the access door is provided with prints.
15. Cooling device according to claim 14, characterized in that the prints comprise a camouflaging decorative print which is disposed at least between the edge parts at a side of the first wall facing the cavity.
16. Cooling device according to any one of claims 1 to 15, wherein the access door comprises suspension means that are provided at corner points of the walls.
17. Cooling device according to any one of claims 1 to 16, wherein the products comprise food and/or beverages.

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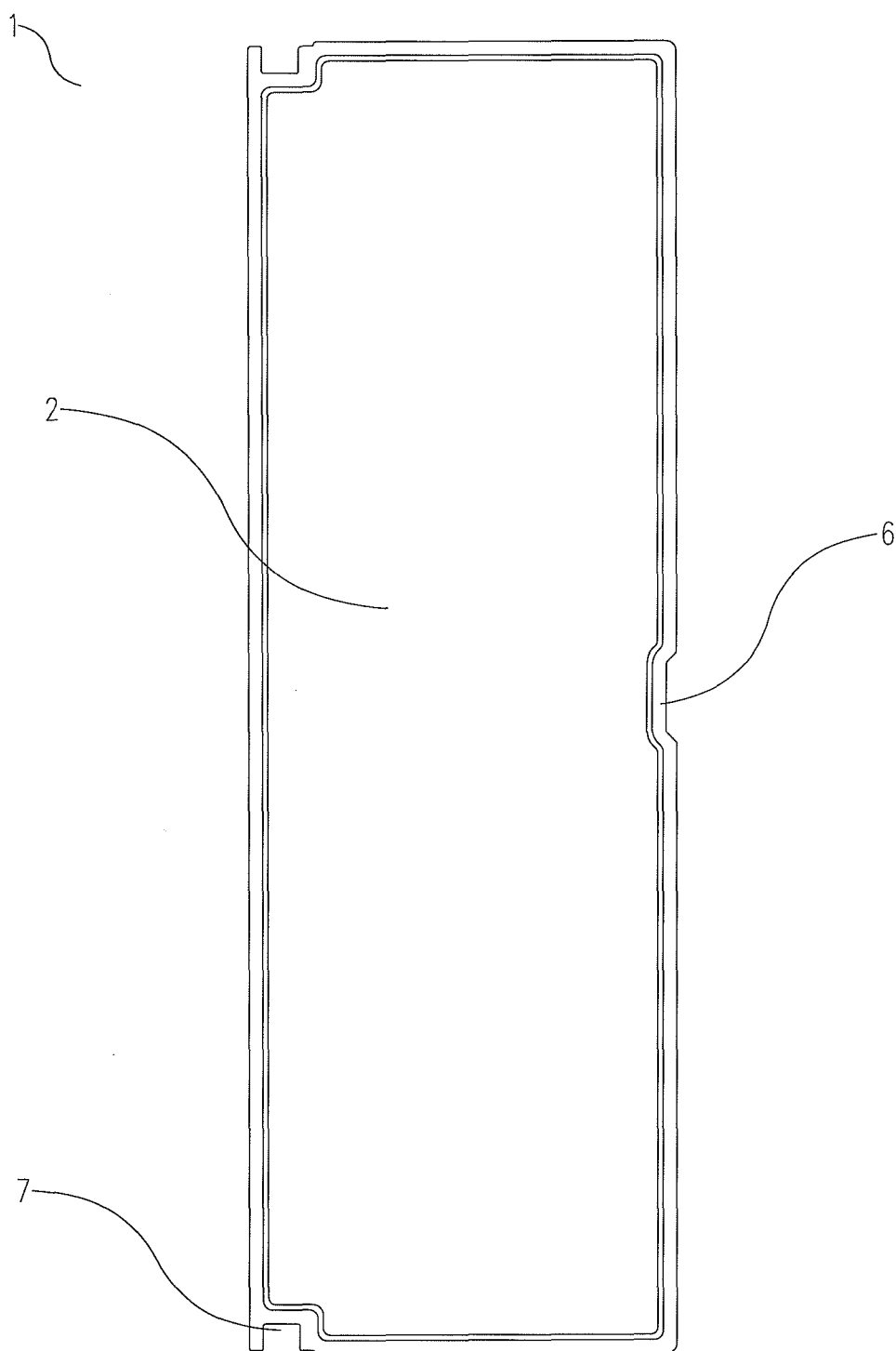


Fig.1A

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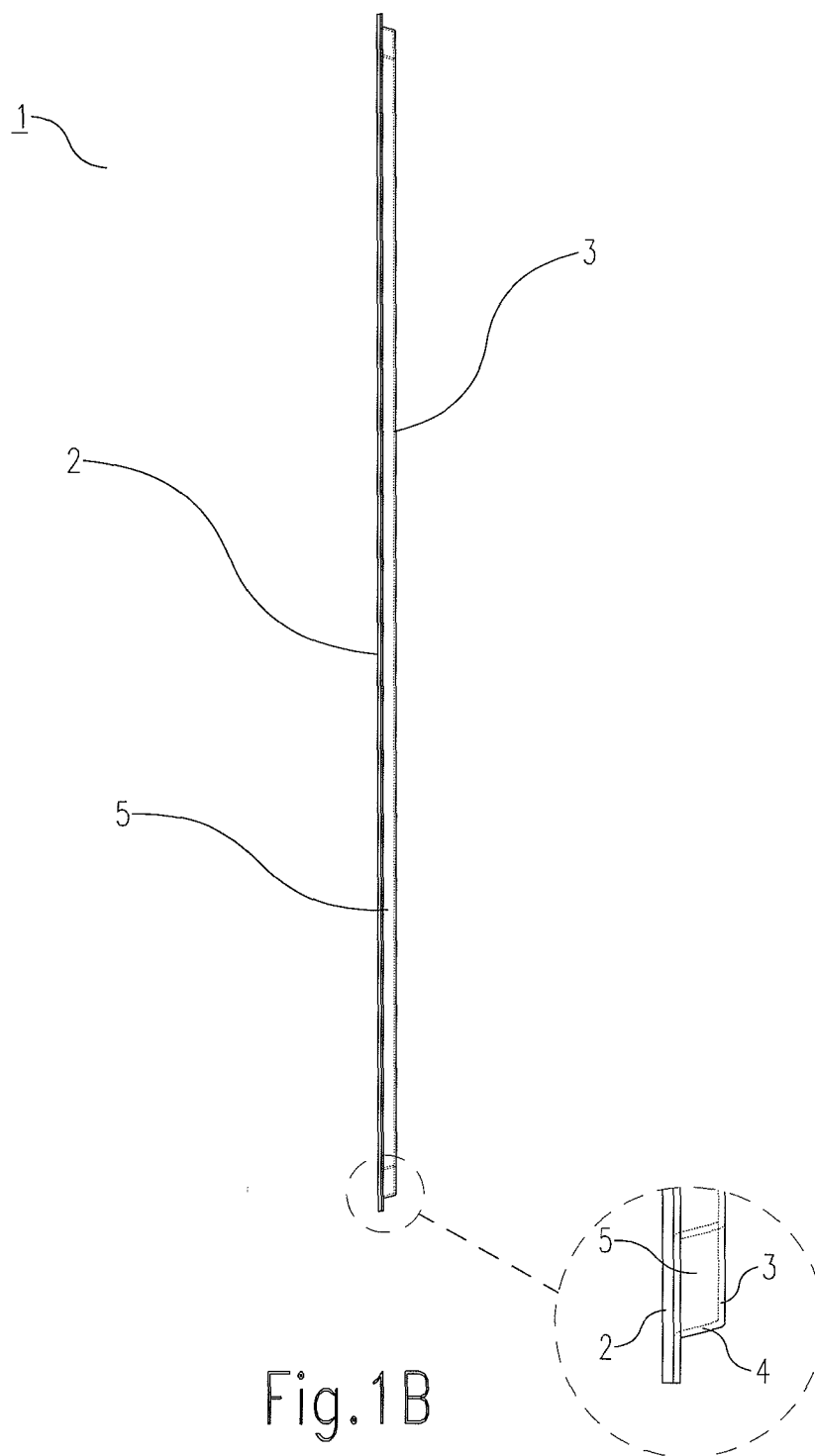


Fig.1B

Fig.1C

