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(54) **INSULATED GLAZING FOR MANUFACTURING WALLS OR DOORS FOR REFRIGERATED DISPLAY CABINET AND METHOD FOR MANUFACTURING SUCH INSULATED GLAZING**

(57) An insulated glazing comprising at least one first plate-shaped element (10) and at least one second plate-shaped element (20) substantially transparent facing each other and spaced apart from each other of a predetermined distance (d) to define an inner chamber (2), mechanical coupling means (30) of the first and second plate-shaped element (10, 20) comprising at least one longitudinal profile (31) and at least one substantially transparent adhesive sealant polymeric resin (42) placed inside the chamber (2) in contact with the first and second plate-shaped element (10, 20) and the longitudinal profile (31) to reciprocally join them.

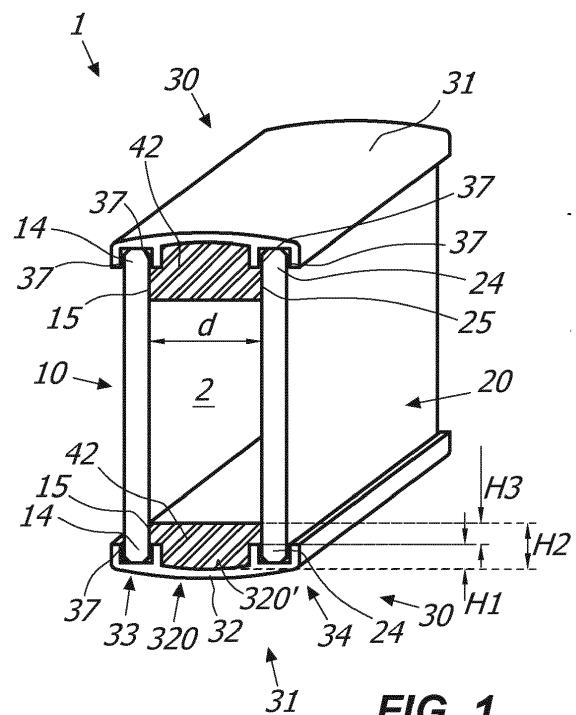


FIG. 1

Description

Field of the invention

[0001] The present invention is generally applicable to the technical field of glazing technology and it particularly relates to an insulated glazing to manufacture walls or doors for refrigerated display cabinets, as well as a door or a wall for a refrigerated display cabinet that includes such an insulated glazing.

[0002] Moreover, object of the patent is a method to manufacture the insulated glazing.

Definitions

[0003] With insulated glazing (or insulating glass or double glazing), it is meant an insulating multilayer given by a set of two or more panes of glass or other transparent material, facing each other, spaced apart and coupled along the perimeter thereof so as to define an inner sealed closed chamber filled with air, with dry air or with a dry gas heavier than air.

[0004] With resin it is meant any polymeric material being liquid or semi-liquid at the time of application as specified hereinafter and that subsequently hardens *in situ*.

[0005] In the present text, with the term "compatible materials" or the like it is meant materials that have chemical and / or physical compatibility, that is, materials that, once coupled, give rise to a joint susceptible to support the transfer of traction or of cutting forces through the contact surface.

[0006] In the present text, with the term "transparent" or the like referred to a material, it is meant the ability of such a material to be crossed by light without the latter being diffused or the ability of such a material to be crossed by light in a diffused way. In other words, the term "transparent" includes both the proper transparency and the translucency.

Background of the invention

[0007] It is known that in stores of perishable goods, in particular food, refrigerated display cabinets are used for the launch to the consumer of the various products. To ensure good visibility and effectiveness of display, such displays generally have both fixed walls and movable closing elements or optically transparent doors.

[0008] Generally, such walls and / or doors are made starting from insulated glazing, whereto handles, hinges or any other accessories suitable for the reciprocal assembly and / or to the refrigerated display are generally added.

[0009] In order to increase the visibility of the products on display, insulated glazing with substantially transparent visible spacer elements are known.

[0010] For example, from the application WO2014 / 009244 an insulated glazing with spacer elements in PM-

MA or transparent polycarbonate is known.

[0011] In practice, such known insulated glazing have shown little appeal on the market, essentially due to the lack of transparency of the materials used. Moreover, such a drawback is due to the fact that the spacer elements in PMMA or polycarbonate are glued to the panes of the insulated glazing. In fact, the presence of glue worsens the aesthetic appeal of such insulated glazing.

[0012] In order to overcome such drawbacks, from the patent EP2878233 an insulated glazing is known wherein the spacer element exclusively consists of substantially transparent hardening resin, generally acrylic or polyurethane. The latter is placed liquid in a mould wherein the edges of the glass panes are subsequently immersed being spaced with the desired distance. Once the resin has hardened, the mould is removed from the insulating glazing. It is evident that in such a case the spacer element also acts as a sealant for the insulated glazing.

[0013] In spite of allowing good visibility, such insulated glazing have several drawbacks.

[0014] A first drawback is the fact that during the construction of the insulated glazing the glass panes must be kept in position at the predetermined distance until the resin thereof has completely hardened.

[0015] Another drawback is the fact that the resin adheres also to the mould, thus impeding the separation of the insulated glazing from the mould thereof after the resin has hardened.

[0016] Therefore, to the object, resins having a limited adhesion ability are used so as to allow the removal of the mould without damaging the latter or the insulated glazing.

[0017] As it is known, the adhesion force is proportional to the area wetted by the resin, therefore in this last case it is necessary to use a high amount of resin to allow a stable coupling between the glass panes with an evident increase in costs, both in terms of costs of the resin and increase of time of hardening thereof.

[0018] Moreover, the spacer-sealant element thus manufactured is bulky, in particular it has a high height, which makes the insulated glazing aesthetically unattractive. In particular, the sealant element, being bulky, introduces optical distortions that compromise the aesthetic appearance and the visual continuity effect required in displays.

[0019] Then, over time, the resin loses the effectiveness thereof, with consequent danger of air infiltration and / or break of the insulated glazing.

[0020] A further drawback is the fact that, after separating the mould from the insulated glazing, an additional cleaning and reprocessing operation of the mould thereof is necessary before a new use.

Summary of the invention

[0021] Object of the present invention is to at least partially overcome the above mentioned drawbacks, by providing an insulated glazing to manufacture walls or doors

for refrigerated display cabinets of high functionality and low cost.

[0022] Another object of the present invention is to provide an insulated glazing to manufacture walls or doors for refrigerated display cabinets that has high aesthetic features.

[0023] Another object of the present invention is to provide an insulated glazing to manufacture walls or doors for refrigerated display cabinets that has a high duration over time.

[0024] Another object of the present invention is to provide an insulated glazing to manufacture walls or doors for refrigerated display cabinets that may be manufactured quickly and easily.

[0025] Another object of the present invention is to provide a method to manufacture an insulated glazing to manufacture walls or doors for refrigerated display cabinets of high functionality and low cost.

[0026] Such objects, as well as others that will appear clearer hereinafter, are fulfilled by an insulated glazing to manufacture walls or doors for refrigerated display cabinets, by a wall or door for refrigerated display cabinets and / or by a method for the construction thereof according to what is herein described, shown and / or claimed.

[0027] In a first aspect, the present invention provides for an insulated glazing for manufacturing walls or doors for refrigerated display cabinets, comprising:

- at least one first plate-shaped element and at least one second plate-shaped element substantially transparent facing each other and spaced apart from each other of a predetermined distance to define an inner chamber, said at least one first plate-shaped element and at least one second plate-shaped element respectively having a first edge area and a second edge area facing each other;
- means to mechanically couple said at least one first plate-shaped element and at least one second plate-shaped element, said mechanical coupling means comprising at least one longitudinal profile placed in correspondence of at least one first section of said first edge area and at least one second section of said second edge area;
- at least one adhesive sealant polymeric resin placed inside said chamber at least in correspondence of said at least one first section and of said at least one second section in contact with said at least one first plate-shaped element, at least one second plate-shaped element and at least one longitudinal profile, so as to cooperate with the latter to reciprocally join said at least one first and one second plate-shaped elements;

wherein said at least one longitudinal profile is made of substantially rigid or semi-rigid substantially transparent polymeric material, said at least one adhesive sealant polymeric resin being substantially transparent.

[0028] Advantageously, said at least one longitudinal profile may include a substantially planar or slightly curved main body with at least one first longitudinal seat and at least one second longitudinal seat extending substantially transversely or perpendicularly from the main body thereof to respectively house said at least one first section and at least one second section.

[0029] Suitably, said at least one first longitudinal seat and at least one second longitudinal seat may have substantially a "U" shape.

[0030] In a preferred but not limiting embodiment, in the insulated glazing having one or more of the above-mentioned features said at least one first longitudinal seat and at least one second longitudinal seat may comprise a respective pair of first side walls and of second side walls susceptible to remain faced or in contact from opposite sides with respect to said at least one first and said at least one second plate-shaped element so as to define side walls inside said chamber and side walls outside thereto, said at least one adhesive sealant polymeric resin being in an amount such as to adhere to said inner side walls and to said at least one first plate-shaped element and at least one second plate-shaped element for a short section overlying thereof.

[0031] Suitably, said inner side walls may have a predetermined first height with respect to said main body, said at least one adhesive sealant polymeric resin having a second height with respect to said main body, said second height being slightly higher than said first height.

[0032] Advantageously, said short section overlying said inner side walls may have a predetermined third height lower than 10 mm, preferably lower than 8 mm and even more preferably lower than 5 mm.

[0033] Preferably, said second height may be equal to the sum of said first height and said third height.

[0034] In a preferred but not limiting embodiment, in the insulated glazing having one or more of the above-mentioned features said main body may have a central portion and at least one first and second end portion opposite therebetween comprising respectively said at least one first and one second longitudinal seat.

[0035] Suitably, said central portion may comprise an inner surface interposed between said inner side walls, said at least one adhesive sealant polymeric resin completely covering said inner side walls and said inner surface.

[0036] Preferably, the height reached by the adhesive sealant polymeric resin in correspondence of said inner surface may substantially coincide with said second height.

[0037] Advantageously, in the insulated glazing having one or more of the above-mentioned features said at least one adhesive sealant polymeric resin may be a hardening resin, preferably a resin that hardens by cross-linking.

[0038] Preferably, in the insulated glazing having one or more of the above-mentioned features said at least one adhesive sealant polymeric resin may be chosen between the acrylic, polyurethane, polyester resins or a

mixture of one or more of the latter.

[0039] In a preferred but not limiting embodiment, in the insulated glazing having one or more of the above-mentioned features said substantially rigid or semi-rigid polymeric material of said at least one longitudinal profile may be chosen so as said first and second side walls are elastically deformed upon the reciprocal coupling of the side walls thereof and of said at least one first section of said first edge area and said at least one second section of said second edge area.

[0040] Suitably, said substantially rigid or semi-rigid polymeric material may have a flexural modulus measured according to ISO 178 of 1000 MPa to 3000 MPa.

[0041] Advantageously, in the insulated glazing having one or more of the above-mentioned features said first and second side walls may comprise first and second fastening elements respectively in contact with said at least one first and one second plate-shaped element to act by friction against the latter, said first and second fastening elements comprising projections of said first and second side walls directed towards the inside of said at least one first and one second longitudinal seat.

[0042] Preferably, said first and second fastening elements may be made of a substantially soft polymeric material so as to permanently deform against said at least one first and one second plate-shaped element upon the thrust of said first and second side walls and to adhere thereto.

[0043] In a preferred but not limiting embodiment, in the insulated glazing having one or more of the above-mentioned features each of said first and second fastening elements may define with said at least one first longitudinal seat and at least one second longitudinal seat a respective first and second interspace between said first and second side walls and said at least one first and one second plate-shaped element, said first and second fastening elements adhering to the latter to prevent the passage of said adhesive sealant polymeric resin in said first and second interspace and to seal said inner chamber.

[0044] Suitably, in the insulated glazing having one or more of the above-mentioned features said substantially soft polymeric material may have a Shore A hardness measured according to ISO 48 of 40 to 80.

[0045] Advantageously, in the insulated glazing having one or more of the above-mentioned features said first and second fastening elements may be longitudinal beads extending substantially along the entire length of said first and second side walls.

[0046] Preferably, in the insulated glazing having one or more of the above-mentioned features said at least one longitudinal profile may be made by extrusion, said fastening elements being coextruded with said at least one longitudinal profile.

[0047] Suitably, in the insulated glazing having one or more of the above-mentioned features said substantially rigid or semi-rigid polymeric material and said substantially soft polymeric material may be compatible with each

other.

[0048] Advantageously, in the insulated glazing having one or more of the above-mentioned features said substantially rigid or semi-rigid polymeric material and said substantially soft polymeric material may be chosen from the group consisting of polycarbonate, polymethylmethacrylate, acrylates, PVC, PA, polyolefins, polyesters.

[0049] In a further aspect, the present invention provides for a door or a wall for a refrigerated display cabinet comprising at least one insulated glazing having one or more of the above-mentioned features.

[0050] In a further aspect, the present invention provides for a method for manufacturing an insulated glazing or a door or a wall for a refrigerated display cabinet having one or more of the above-mentioned features, the method comprising the following steps:

- a) providing of at least one first plate-shaped element and at least one second plate-shaped element substantially transparent, each of them having respectively a first edge area and a second edge area facing each other;
- b) providing of at least one longitudinal profile made of substantially rigid or semi-rigid substantially transparent polymeric material, said at least one longitudinal profile including a substantially planar or slightly curved main body with at least one first longitudinal seat and at least one second longitudinal seat extending substantially transversely or perpendicularly thereto, said at least one first longitudinal seat and at least one second longitudinal seat respectively comprising a respective pair of first side walls and of second side walls;
- c) providing of a predetermined amount of at least one substantially transparent adhesive sealant polymeric resin;
- d) mechanical coupling of said at least one first plate-shaped element and at least one second plate-shaped element by inserting at least one first section of said first edge area and at least one second section of said second edge area respectively in said at least one first and one second longitudinal seat so as an inner chamber is defined between said at least one first and one second plate-shaped element;
- e) inserting said at least one adhesive sealant polymeric resin inside said chamber at least in correspondence of said at least one first section and said at least one second section in contact with said at least one first plate-shaped element, at least one second plate-shaped element and at least one longitudinal profile to reciprocally join thereof;
- f) hardening of said at least one adhesive sealant polymeric resin, so as the latter cooperates with said at least one longitudinal profile to reciprocally join said at least one first and one second plate-shaped element.

[0051] Suitably, said first and second side walls may

be faced or in contact from opposite sides with respect to said at least one first and one second plate-shaped element so as to define reciprocally facing side walls inside said chamber and outer side walls opposite thereto, said inner side walls having a first predetermined height with respect to said main body.

[0052] Advantageously, said at least one adhesive sealant polymeric resin may be in an amount such that it adheres to said inner side walls and to said at least one first plate-shaped element and at least one second plate-shaped element for a short section overlying the side walls thereof, so as the second height reached by said at least one adhesive sealant polymeric resin with respect to said main body is slightly higher than said first height.

[0053] In a preferred but not limiting embodiment, in the manufacturing method having one or more of the above-mentioned features said at least one first plate-shaped element and at least one second plate-shaped element may have respective pairs of first front faces and second front faces having reciprocally facing faces inside said chamber and outer faces opposite thereto, said main body having a central portion and at least one first and second end portion opposite to each other respectively comprising said at least one first and one second longitudinal seat, said central portion comprising an inner surface interposed between said inner side walls defining with said inner faces a working compartment, upon said step e) of inserting said at least one adhesive sealant polymeric resin being in liquid or semi-liquid form, said step e) of inserting including a step e') of pouring of said at least one liquid or semi-liquid adhesive sealant polymeric resin in said working compartment so as it reaches said second height.

[0054] In a further preferred but not limiting embodiment, in the manufacturing method having one or more of the above-mentioned features said step e') of pouring is accomplished by a funnel-shaped device fluidly connected to said working compartment by means of a fluidic connecting line.

[0055] Suitably, upon said step e') of pouring said at least one longitudinal profile may have a first longitudinal section coupled to said at least one first plate-shaped element and at least one second plate-shaped element and a second longitudinal section protruding therefrom to define said fluidic connecting line, after said step f) of hardening said second longitudinal section being removed from said first longitudinal section.

[0056] Advantageous embodiments of the invention are defined according to the appended claims.

Brief description of the drawings

[0057] Further features and advantages of the invention will become more evident by reading the detailed description of some preferred but not exclusive embodiments of an insulated glazing shown as a non-limitative example with the help of the annexed drawings, wherein:

FIGS. 1 and 2 are partially sectioned schematic views of different embodiments of an insulated glazing 1;

FIG. 3 is an enlarged schematic view of some details of an insulated glazing 1, wherein the resin 42 has been removed;

FIG. 3A is an enlarged schematic view of some details of FIG. 3;

FIGS. 3B to 3E are schematic views of various steps of the coupling between the plates 10, 20 and the longitudinal profile 31;

FIGS. 4 and 5 are respectively axonometric and side schematic views of an insulated glazing 1 in a particular operating step with a coupled funnel-shaped device 50;

FIG. 6 is a partially sectioned schematic view of another embodiment of an insulated glazing 1;

FIG. 7 is a schematic view of a pair of doors 101 comprising the insulated glazing 1;

FIG. 8 is a schematic view of a refrigerated display cabinet 100 comprising the doors 101.

Detailed description of some preferred embodiments

[0058] With reference to the aforementioned figures, an insulated glazing 1 is described that may preferably comprise a pair of plate-shaped elements 10, 20 reciprocally facing each other and an inner chamber 2 interposed between the plate-shaped elements 10, 20 thereof.

[0059] The plate-shaped elements may be substantially transparent and / or translucent plates 10, 20. For example the plates 10, 20 may be made of glass or of a plastic material such as polymethylmethacrylate (PMMA), polycarbonate or the like.

[0060] Although hereinafter for the sake of simplicity we refer to plates, it is understood that the insulated glazing 1 may comprise any plate-shaped element without departing from the scope of protection of the appended claims.

[0061] Each plate 10, 20 may define respective planes substantially parallel to each other so as the plates 10, 20 thereof have a predetermined reciprocal distance d, for example of 6 mm to 30 mm.

[0062] It is understood that the plates 10, 20 may be substantially flat or of any shape, for example curved, and they may be substantially parallel to each other or not. For example, the insulated glazing 1 may have two flat and parallel plates 10, 20 (FIG. 1) or two curved and parallel plates 10, 20 (FIG. 2).

[0063] Each plate 10, 20 may comprise an edge area 11' and 21', that in turn may comprise respective perimetral edges 11, 21, reciprocally facing each other, and a respective pair of visible faces 12, 13 and 22, 23 substantially perpendicular respectively to the perimetral edge 11 and to the perimetral edge 21.

[0064] As particularly shown in the annexed figures, mechanical coupling means 30 of the plates 10, 20 may

be provided and a sealant resin **42** to cooperate with the mechanical coupling means **30** and to seal the inner chamber **2**, so as the latter remains substantially insulated.

[0065] Basically, the mechanical coupling means **30** may comprise a substantially semi-rigid or rigid longitudinal profile **31** to couple the plates **10**, **20** in correspondence of the respective perimetral edge **11**, **21**, while the adhesive sealant resin **42** may be interposed between the visible faces **13**, **23** of the edges **11**, **21** of the plates **10**, **20** and the profile **31**, as better explained hereinafter.

[0066] More in detail, the longitudinal profile **31** may comprise a substantially planar or slightly curved main body **32** that may have a central portion **320** and two portions **33**, **34** each of which may comprise a substantially longitudinal seat **33'**, **34'** having a "U" shape extending substantially transversely or perpendicularly from the main body **32** thereof to respectively house the edge area **11'** and **21'** of the plates **10**, **20**. In particular, the longitudinal seats **33'**, **34'** may house a respective section **14**, **24** of such edge areas **11'**, **21'**.

[0067] Suitably, the portions **33**, **34** may be placed at opposite ends with respect to the central portion **320**.

In particular, each of the seats **33'**, **34'** may comprise a respective upper or lower wall **35** substantially parallel to the central portion **320** and a respective pair of side walls **36**, **36'** and **360**, **360'** reciprocally facing each other, that may extend transversely from the main body **32**.

Once the plates **10**, **20** are inserted in the seats **33'**, **34'** of the longitudinal profile **31**, the side walls **36**, **36'** and **360**, **360'** may be faced to or in contact with the plates **10**, **20**, and in particular with the visible faces **12**, **13**, **22**, **23** thereof, while the wall **35** may be faced to or in contact with the edges **11** or **21**.

It is understood that the wall **35** is a lower or upper wall depending on the orientation of the profile **31**. The seats **33'**, **34'** may be substantially concave with the concavity faced towards the plates **10**, **20**.

[0068] Furthermore, therefore, the central portion **320** of the main body **32** may have an inner surface **320'** facing the working chamber **2** that may, therefore, remain interposed between the inner side walls **36'**, **360'** of the seats **33'**, **34'**.

[0069] In any case, the configuration of the seats **33'**, **34'** described above should not be considered exclusive. For example, the side walls **36**, **360'** and **360**, **360'** may have different heights and / or configurations.

[0070] Suitably, as for example shown in FIGs. 3B to 3E, the side walls **36**, **36'** and **360**, **360'**, and preferably the entire profile **31**, may be made of a rigid or semi-rigid polymeric material so as to elastically deform upon the insertion of the section **14**, **24** of the respective edge area **11'**, **21'** to hold the plates **10**, **20**. For example, such polymeric material may have a flexural modulus measured according to ISO 527-2 of 1000 MPa to 3000 MPa, preferably of 1200 MPa to 2500 Mpa.

[0071] Moreover, the side walls **36**, **36'** and **360**, **360'** may further comprise one or more fastening elements

37. For example, the latter may comprise appendices or projections, preferably extending inwards, in contact with the respective edge areas **11'**, **21'** of the plates **10**, **20** so as to act by friction against them. For example, the fastening elements **37** may be a plurality of segments or a plurality of points projecting from the side walls **36**, **36'** and **360**, **360'**.

[0072] Advantageously, the fastening elements **37** may be placed on both walls **36**, **36'** and **360**, **360'**.

[0073] In a preferred but not exclusive embodiment, the fastening elements **37** may comprise or consist of longitudinal beads extending preferably along the entire length of the side walls **36**, **36'** and **360**, **360'**.

[0074] The fastening elements **37** may be integrally coupled with the side walls **36**, **36'** and **360**, **360'** or they may be monolithic therewith, for example they may be coextruded therewith. Preferably, the fastening elements **37** may be coextruded with the longitudinal profile **31**.

[0075] The thrusting action of the side walls **36**, **36'** and **360**, **360'** on the fastening elements **37** against the glass of the plates **10**, **20** allows to fix the plates **10**, **20** with the longitudinal profile **31**, thus preventing the reciprocal uncoupling thereof.

[0076] Moreover, such an action prevents the passage of the polymeric resin **42** in the interspace **340** between the side walls **36**, **36'**; **360**, **360'** and the plates **10**, **20**, so as to further seal the inner chamber **2**.

[0077] Basically, the polymeric resin **42** and the side walls **36**, **36'**; **360**, **360'** with the fastening elements **37** cooperate both for the coupling of the plates **10**, **20** and to seal the inner chamber **2**.

[0078] To accomplish the above mentioned function, the fastening elements **37** may be made of a substantially soft polymeric material so as to permanently deform against the plates **10**, **20** under the thrust of the counteracting side walls **36**, **36'**; **360**, **360'**.

[0079] Suitably, such a substantially soft polymeric material may have a Shore A hardness measured according to ISO 48 of 40 to 80.

[0080] Preferably, both the fastening elements **37** and the longitudinal profile **31** may be made of compatible polymeric materials, preferably equal. Preferably, moreover, such materials or such a material may be substantially transparent.

[0081] Advantageously, such a material may be chosen from the group consisting of polycarbonate, polymethylmethacrylate, acrylates, PVC, PA, polyolefins, and polyesters.

[0082] Moreover, in a preferred but not exclusive embodiment, the distance **d2** between the counteracting side walls **36**, **36'**; **360**, **360'** may be slightly lower than the thickness **s** of the plates **10**, **20**, for example of 1 - 2 mm.

[0083] The adhesive sealant resin **42** may be placed in the inner chamber **2** in correspondence with the sections **14**, **24** in contact with the plates **10**, **20** and the longitudinal profile **31**.

[0084] The adhesive sealant resin **42** may be a sub-

stantially transparent polymeric resin.

[0085] More in detail, the adhesive sealant polymeric resin **42** may completely cover the inner side walls **36'**, **360'** of the seats **33'**, **34'** and the inner surface **320'** of the central portion **320** of the main body **32**.

[0086] Suitably, thanks to the presence of the longitudinal profile **31**, a reduced amount of adhesive sealant resin **42** may be used. In fact, the height **H2** of the adhesive sealant resin **42** with respect to the main body **32** may be particularly reduced.

[0087] Such a feature, as well as the fact that both the adhesive sealant resin **42** and the longitudinal profile **31** are both transparent, allows a cost saving and an improvement in terms of aesthetic pleasantness with respect to the insulated glazing of the background of the invention.

[0088] For example, thanks to such a feature, once two or more insulated glazing **1** have been placed side by side, it is possible to have an effect of substantial visual continuity.

[0089] Preferably but not exclusively, the height **H2** may be substantially constant for the entire adhesive sealant resin **42**. In fact, it is understood that if the longitudinal profile has a slightly curved shape, the height of the adhesive sealant resin **42** may slightly vary between the central portion **320** and the portions **33**, **34**.

[0090] Preferably, the height of the adhesive sealant resin **42** may be considered in correspondence of the inner surface **320'** of the central portion **320** of the main body **32** may be equal to such a height **H2**.

[0091] For example, once cross-linked, the adhesive sealant resin **42** may have a thickness substantially equal to the distance **d** between the plates **10**, **20** and a height **H2** of 5 mm to 20 mm, preferably of about 15 mm.

[0092] Suitably, therefore, the adhesive sealant resin **42** may be in an amount such as to adhere to the inner side walls **36'**, **360'** and to the plates **10**, **20** for a short section **15**, **25** overlying them so as the height **H2** reached by the adhesive sealant polymeric resin **42** with respect to the main body **32** is slightly higher than the height **H1** of the inner side walls **36'**, **360'** with respect to the main body **32** thereof.

[0093] For example, the inner side walls **36'**, **360'** may have a height **H1** of 3 mm to 12 mm, preferably of 3 mm to 8 mm.

[0094] In particular, the section **15**, **25** may have a height **H3** lower than 10 mm, preferably lower than 8 mm and even more preferably lower than 5 mm.

[0095] According to a particular aspect of the invention, the height **H2** may be substantially equal to the sum of the height **H1** and the height **H3**. For example, the inner side walls **36'**, **360'** may have a height **H1** of about 10 mm, while the section **15**, **25** may have a height **H3** of about 5 mm so as the adhesive sealant polymeric resin **42**, once hardened, has a height **H2** of about 15 mm.

[0096] The substantially transparent adhesive sealant polymeric resin **42** may be any resin or mixture of hardening resins known to the person skilled in the field, for

example a thermoplastic resin that hardens by cooling, a resin that hardens by vulcanization, a resin or more resins that harden by cross-linking or a mixture thereof.

[0097] Preferably, the resin may harden by cross-linking. For example, a single or multi-component resin may be used, introduced liquid or semi-liquid at room temperature, that hardens by cross-linking, for example by thermal activation or by UV activation or simply after an incubation time after the components have been mixed.

[0098] Examples of such resins are acrylic, polyurethane, polyester resins or a mixture of one or more thereof.

[0099] Suitably, the resin may have a high adhesion power to the glass, preferably the adhesion of the adhesive sealant resin **42** to the faces **13**, **23** and to the profile **31** may be substantially irreversible.

[0100] To the object, the resin may be a modified resin to increase the adhesion to the glass, as known to the person skilled in the field.

[0101] For example, the resin may be modified by introducing groups of high compatibility with the glass and with the material of the profile **31** so as to increase the adhesion of the adhesive sealant resin **42** with the plates **10**, **20** and with the longitudinal profile **31**.

[0102] A non-exhaustive example of such a resin modification is the silanization.

[0103] Operatively, at first the plates **10**, **20** may be provided and mechanically coupled by means of the mechanical coupling means **30**, as described above.

[0104] Therefore, the plates **10**, **20** may be placed vertically while the longitudinal profile **31** may be placed downwardly so as the former define the side walls of the inner chamber **2** and the latter defines the base wall of the inner chamber **2** thereof.

[0105] Once the plates **10**, **20** have been coupled with the profile **31**, the inner surface **320'** of the main body **32**, the inner side walls **36'**, **360'** and the sections **15**, **25** of the inner faces **13**, **23** of the plates **10**, **20** thereof may define a working compartment **2'** to house the adhesive sealant resin **42**.

[0106] Suitably, the adhesive sealant resin **42** may be inserted in the working compartment **2'** in liquid or semi-liquid form to subsequently harden, as better explained hereinafter.

[0107] In particular, the working compartment **2'** may be laterally limited by the inner side walls **36'**, **360'**, by the inner faces **13**, **23** of the plates **10**, **20** and by plugs **5**, downwardly by the inner surface **320'** of the main body **32**, while it may be opened at the top, that is, towards the inner chamber **2**.

[0108] In this way, the increase in amount of adhesive sealant resin **42** may correspond to the increase of the height **H2** thereof, and vice versa.

[0109] Possibly, during the step of insertion of the adhesive sealant resin **42**, the longitudinal profile **31** may be substantially horizontal or slightly inclined so as the sealant resin **42** thereof has the height **H2** substantially constant along the entire development thereof and so as

the upper surface **41** of the sealant element **42** thereof is substantially flat. In other words, due to gravity, such a surface **41** facing the inner chamber **2** may be substantially flat and orthogonal to the faces **13**, **23** of the plates **10**, **20**.

[0110] Once the adhesive sealant resin **42** has hardened, the plugs **5** may be removed so as not to alter the aesthetic appearance of the insulated glazing **1**.

[0111] According to a particular aspect of the invention, the insertion or pouring of the adhesive sealant resin **42** may be accomplished by means of a funnel-shaped device **50** that, therefore, may be fluidly connected to the working compartment **2'** by means of a fluidic connecting line **3**.

[0112] The longitudinal profile **31** may have a longitudinal section **38** coupled with the plates **10**, **20** and a section **39** protruding therefrom to define the fluidic connecting line **3**. In other words, the longitudinal profile **31** may have a substantially greater length than the section **14**, **24**.

[0113] In particular, the longitudinal section **38** of the longitudinal profile **31** may comprise an end **38'** opposite to the section **39**. Suitably, the plug **5** may be placed at the end **38'** of the longitudinal profile **31**, while the funnel-shaped device **50** may be placed in correspondence of the section **39**.

[0114] Therefore, the adhesive sealant resin **42** may be inserted by means of the funnel-shaped device **50** that, therefore, may have an inlet **51** and an outlet **52** for the liquid resin.

[0115] On the other hand, the device **50** may comprise a lower portion **53** that is counter-shaped with respect to the longitudinal profile **31** so as to couple thereto and to prevent the leakage of liquid resin and an opposite lower portion that may define the outlet **52** for the liquid resin.

[0116] Suitably, therefore, the device **50** may be coupled with the portion **39** so as the outlet **52** thereof is fluidly connected to the working compartment **2'** so as the liquid resin flows therein **2'** flowing along the longitudinal profile **31**, and in particular along the inner surface **320'** thereof.

[0117] In this way, the liquid resin may wet the inner faces **13**, **23** only near the edge areas **11'**, **21'** so as to avoid the risk of dirtying the plates **10**, **20**.

[0118] Possibly, the device **50** may be removably coupled with the longitudinal profile **31** so as to remove the former once the insertion of the adhesive sealant resin **42** into the compartment **2'** has ended and / or once the hardening step thereof has ended.

[0119] According to a particular aspect of the invention, the section **39** may be removed from the section **38**, for example by cutting the longitudinal profile **31** in correspondence of the end of the section **14**, **24** of the plates **10**, **20**.

[0120] In this way, the device **50** may be removed upon the removal of the section **39** from the section **38** of the longitudinal profile **31**. Thanks to such a feature, the manufacturing times of the insulated glazing **1** may be par-

ticularly reduced.

[0121] The hardening may be realized by cross-linking *in situ* and / or in a different processing environment.

[0122] Thanks to the above mentioned features, it is possible to use a reduced amount of hardening resin **42** with a considerable saving in the manufacturing times of the insulated glazing **1**. In fact, the time required to harden the hardening sealant resin **42** increases with the increasing amount thereof.

[0123] Moreover, thanks to the presence of the longitudinal profile **31**, it is possible to move and / or rotate the insulated glazing without having to wait for the hardening sealant resin **42** to be completely hardened, thus reducing the manufacturing times of the insulated glazing **1**.

[0124] In the present text the coupling for the section **14**, **24** of the edges **11**, **21** of the plates **10**, **20** has been described, that is, for one side of the insulated glazing **1**. It is understood that what has been described may be realised for one or more sides of the insulated glazing thereof, possibly on all sides thereof.

[0125] Operatively, after the total or partial hardening of the adhesive sealant resin **42** realized on the section **14**, **24** of the edges **11**, **21** of the plates **10**, **20**, the insulated glazing **1** may be rotated in the plane defined by the plates **10**, **20** and similarly to what has been described above, other sections of the edges **11**, **21** of the plates **10**, **20** may be coupled.

[0126] It is understood that such an embodiment is not limitative, in fact it is possible to manufacture an insulated glazing **1** having any shape not necessarily rectangular, or comprising several glass panes, glass panes and plates in plastic material, plates in polymeric material. Moreover, the plates **10**, **20** may not be flat, for example they may be curved and / or rounded.

[0127] Furthermore, it is understood that the insulated glazing **1** may have the plates **10**, **20** coupled with the profile **31** and the adhesive sealant resin **42** along the entire perimetral edge **11**, **21** or along one or more sections **14**, **24** thereof.

[0128] For example, as shown in FIG. 6, the insulated glazing **1** may have some sections **14**, **24** of the perimetral edges **11**, **21**, for example a pair of opposite sides, coupled by means of the profile **31** and the adhesive sealant resin **42**, while the remaining sections of the perimetral edges **11**, **21**, that is, the other two opposite sides, may be coupled with a metallic spacer element **S** possibly filled with salts, in a *per se* known manner.

[0129] In any case, the insulated glazing **1** may be particularly useful to manufacture walls or doors **101** for a refrigerated display cabinet or a display **100**.

[0130] To manufacture the wall or door **101**, it may be sufficient to couple one or more accessories, for example handles or hinges, with the insulated glazing **1**.

[0131] In particular, a refrigerated display cabinet **100** may comprise one or more doors or shutters **101** adjacent therebetween realized starting from the insulated glazing **1**, so as each door or shutter **101** has the side edges in

contact with the side edges of the adjacent doors or shutters.

[0132] Thanks to the particular configuration of the insulated glazing 1, the visible surface of the refrigerated display cabinet may be substantially transparent, preferably totally transparent, without interruption of visual continuity between a door or shutter 101 and the next adjacent one.

[0133] From what has been described above, it is evident that the invention fulfils the intended objects.

[0134] The invention is susceptible of numerous modifications and variations, all falling within the appended claims. All the details may be replaced by other technically equivalent elements, and the materials may be different according to requirements, without departing from the scope of protection of the invention defined by the appended claims.

Claims

1. An insulated glazing to manufacture walls or doors for refrigerated display cabinets, comprising:

- at least one first plate-shaped element (10) and at least one second plate-shaped element (20) substantially transparent facing each other and spaced apart from each other of a predetermined distance (d) to define an inner chamber (2), said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) respectively having a first edge area (11') and a second edge area (21') facing each other;

- means (30) to mechanically couple said at least one first plate-shaped element (10) and at least one second plate-shaped element (20), said mechanical coupling means (30) comprising at least one longitudinal profile (31) placed in correspondence of at least one first section (14) of said first edge area (11') and at least one second section (24) of said second edge area (21');

- at least one adhesive sealant polymeric resin (42) placed inside said chamber (2) at least in correspondence of said at least one first section (14) and of said at least one second section (24) in contact with said at least one first plate-shaped element (10), at least one second plate-shaped element (20) and at least one longitudinal profile (31), so as to cooperate with the latter to reciprocally join said at least one first and one second plate-shaped elements (10, 20);

wherein said at least one longitudinal profile (31) being made of substantially rigid or semi-rigid substantially transparent polymeric material, said at least one adhesive sealant polymeric resin (42) being substantially transparent.

2. Insulated glazing according to claim 1, wherein said at least one longitudinal profile (31) includes a substantially planar or slightly curved main body (32) with at least one first longitudinal seat (33') and at least one second longitudinal seat (34') extending substantially transversely or perpendicularly from the main body (32) thereof to respectively house said at least one first section (14) and at least one second section (24).

3. Insulated glazing according to claim 2, wherein said at least one first longitudinal seat (33') and at least one second longitudinal seat (34') have substantially a "U" shape.

4. Insulated glazing according to claim 2 or 3, wherein said at least one first longitudinal seat (33') and at least one second longitudinal seat (34') comprise a respective pair of first side walls (36, 36') and of second side walls (360, 360') susceptible to remain faced or in contact from opposite sides with respect to said at least one first and said at least one second plate-shaped element (10, 20) so as to define side walls (36', 360') inside said chamber (2) and side walls (36, 360) outside thereto, said at least one adhesive sealant polymeric resin (42) being in an amount such as to adhere to said inner side walls (36', 360') and to said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) for a short section (15, 25) overlying thereof.

5. Insulated glazing according to the preceding claim, wherein said inner side walls (36', 360') have a predetermined first height (H1) with respect to said main body (32), said at least one adhesive sealant polymeric resin (42) having a second height (H2) with respect to said main body (32), said second height (H2) being slightly higher than said first height (H1).

6. Insulated glazing according to the preceding claim, wherein said short section (15, 25) overlying said inner side walls (36', 360') has a predetermined third height (H3) lower than 10 mm, preferably lower than 8 mm and even more preferably lower than 5 mm.

7. Insulated glazing according to the preceding claim, wherein said second height (H2) is equal to the sum of said first height (H1) and said third height (H3).

8. Insulated glazing according to one or more of claims 4 to 7, wherein said main body (32) has a central portion (320) and at least one first and second end portion (33, 34) opposite therebetween comprising respectively said at least one first and one second longitudinal seat (33', 34').

9. Method to manufacture an insulated glazing accord-

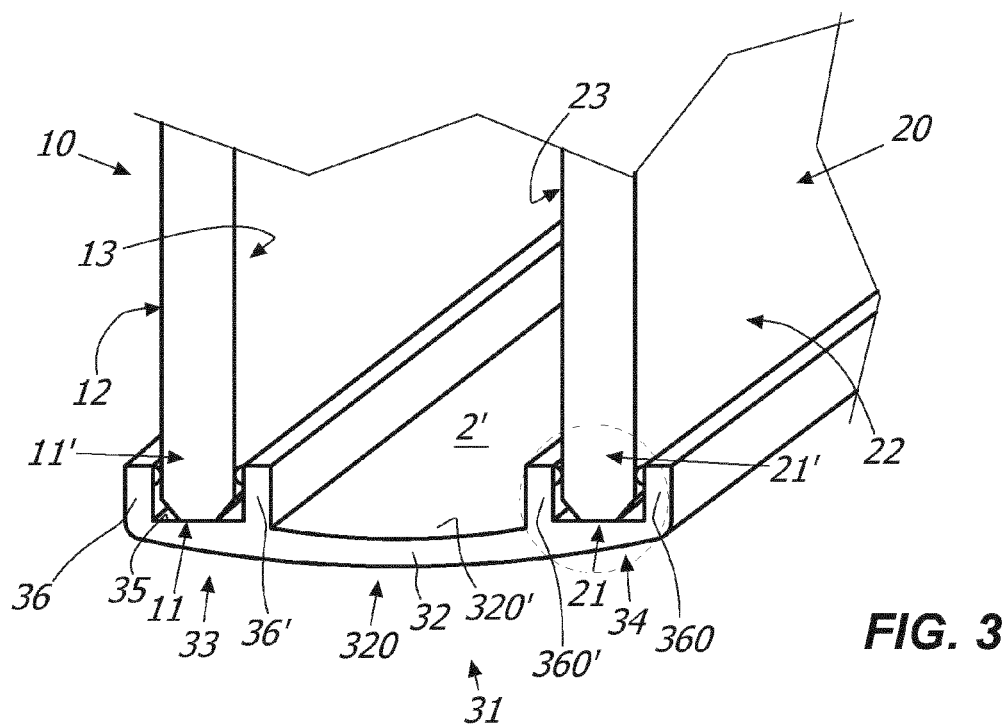
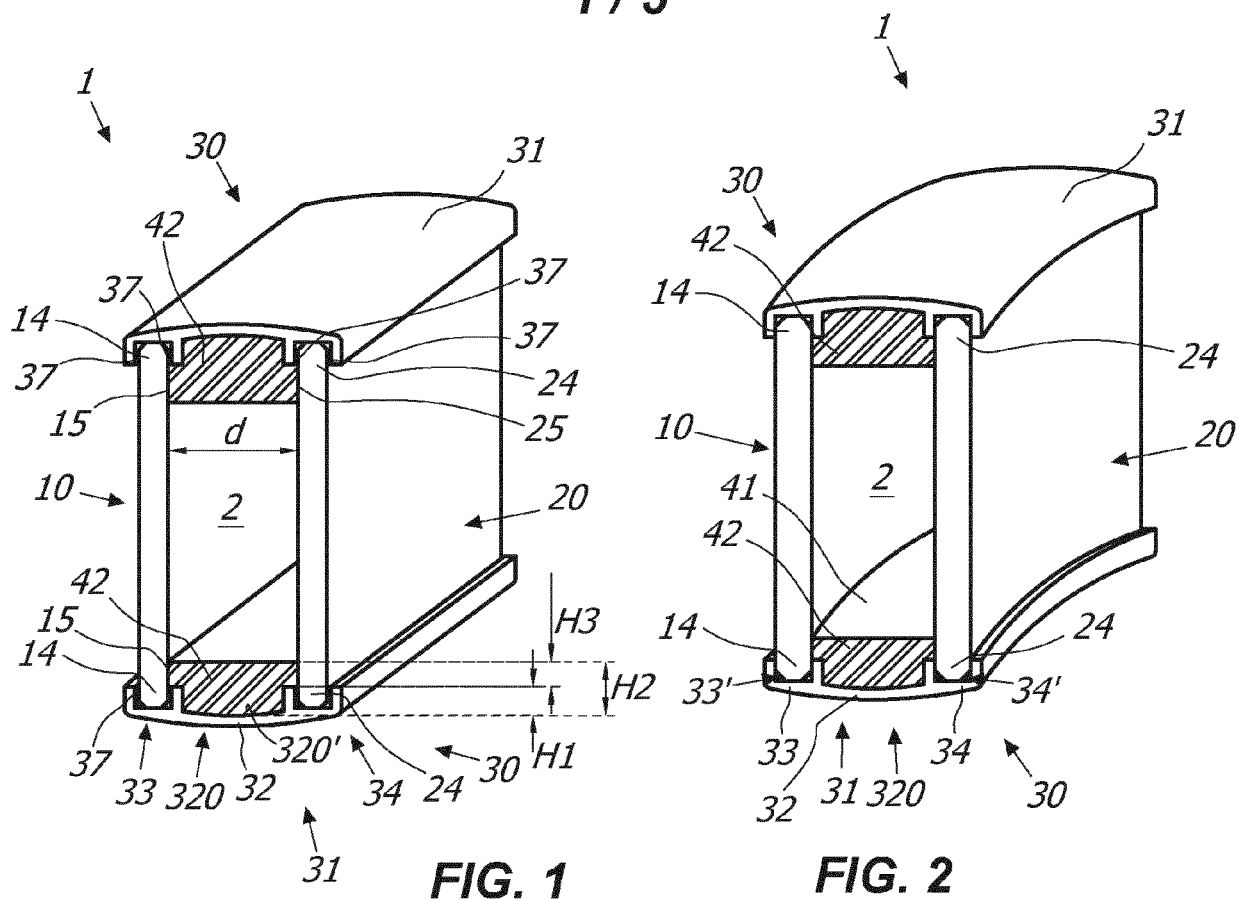
ing to any one of the claims 1 to 8, the method comprising the following steps:

- a) providing of at least one first plate-shaped element (10) and at least one second plate-shaped element (20) substantially transparent, each of them having respectively a first edge area (11') and a second edge area (21') facing each other;
 - b) providing of at least one longitudinal profile (31) made of substantially rigid or semi-rigid substantially transparent polymeric material, said at least one longitudinal profile (31) including a substantially planar or slightly curved main body (32) with at least one first longitudinal seat (33') and at least one second longitudinal seat (34') extending substantially transversely or perpendicularly thereto, said at least one first longitudinal seat (33') and at least one second longitudinal seat (34') respectively comprising a respective pair of first side walls (36, 36') and of second side walls (360, 360');
c) providing of a predetermined amount of at least one substantially transparent adhesive sealant polymeric resin (42);
d) mechanical coupling of said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) by inserting at least one first section (14) of said first edge area (11') and at least one second section (24) of said second edge area (21') respectively in said at least one first and one second longitudinal seat (33', 34') so as an inner chamber (2) is defined between said at least one first and one second plate-shaped element (10, 20);
e) inserting said at least one adhesive sealant polymeric resin (42) inside said chamber (2) at least in correspondence of said at least one first section (14) and said at least one second section (24) in contact with said at least one first plate-shaped element (10), at least one second plate-shaped element (20) and at least one longitudinal profile (31) to reciprocally join thereof;
f) hardening of said at least one adhesive sealant polymeric resin (42), so as the latter cooperates with said at least one longitudinal profile (31) to reciprocally join said at least one first and one second plate-shaped element (10, 20).
10. Method according to the preceding claim, wherein said first and second side walls (36, 36'; 360, 360') are faced or in contact from opposite sides with respect to said at least one first and one second plate-shaped element (10, 20) so as to define reciprocally facing side walls (36', 360') inside said chamber (2) and outer side walls (36, 360) opposite thereto, said inner side walls (36', 360') having a first predetermined height (H1) with respect to said main body

(32).

11. Method according to the preceding claim, wherein said at least one adhesive sealant polymeric resin (42) is in an amount such that it adheres to said inner side walls (36', 360') and to said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) for a short section (15, 25) overlying the side walls thereof, so as the second height (H2) reached by said at least one adhesive sealant polymeric resin (42) with respect to said main body (32) is slightly higher than said first height (H1).
12. Method according to claim 9, 10 or 11, wherein said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) have respective pairs of first front faces (12, 13) and second front faces (22, 23) having reciprocally facing faces (13, 23) inside said chamber (2) and outer faces (12, 22) opposite thereto, said main body (32) having a central portion (320) and at least one first and second end portion (33, 34) opposite to each other respectively comprising said at least one first and one second longitudinal seat (33', 34'), said central portion (320) comprising an inner surface (320') interposed between said inner side walls (36', 360') defining with said inner faces (13, 23) a working compartment (2'), upon said step e) of inserting said at least one adhesive sealant polymeric resin (42) being in liquid or semi-liquid form, said step e) of inserting including a step e') of pouring of said at least one liquid or semi-liquid adhesive sealant polymeric resin (42) in said working compartment so as it reaches said second height (H2).
13. Method according to the preceding claim, wherein said step e') of pouring is accomplished by a funnel-shaped device (50) fluidly connected to said working compartment (2') by means of a fluidic connecting line (3).
14. Method according to the preceding claim, wherein upon said step e') of pouring said at least one longitudinal profile (31) has a first longitudinal section (38) coupled to said at least one first plate-shaped element (10) and at least one second plate-shaped element (20) and a second longitudinal section (39) protruding therefrom to define said fluidic connecting line (3), after said step f) of hardening said second longitudinal section (39) being removed from said first longitudinal section (38).

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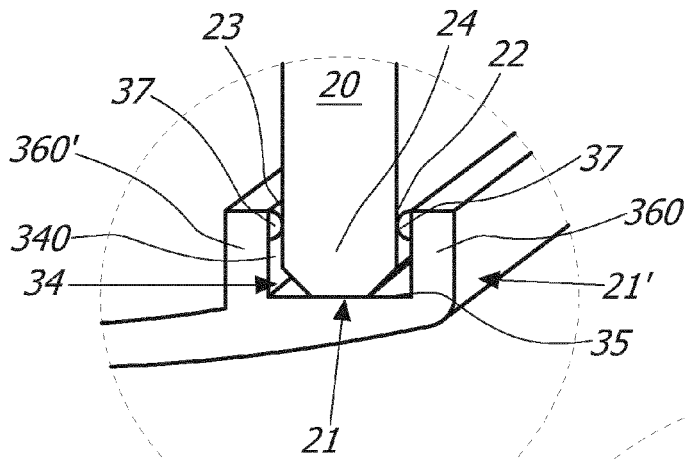


FIG. 3A

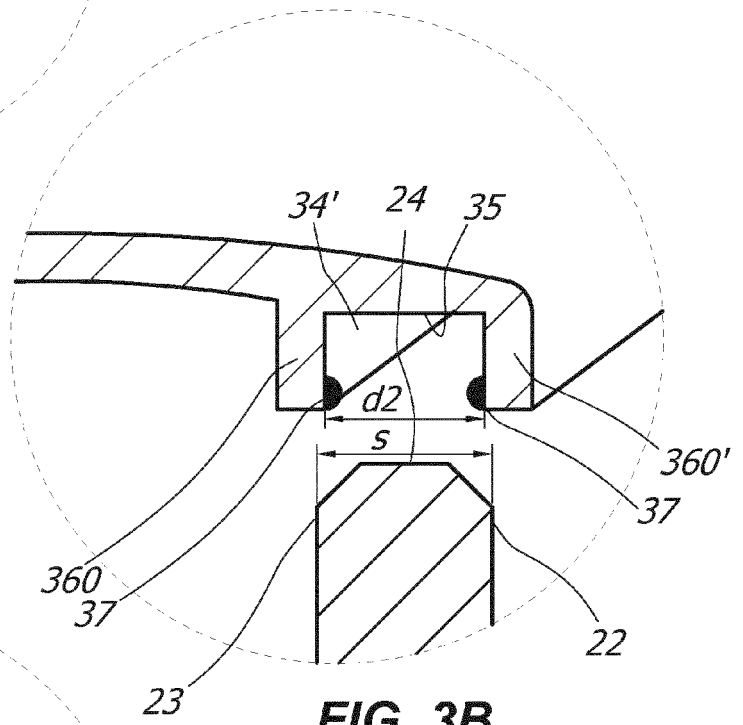


FIG. 3B

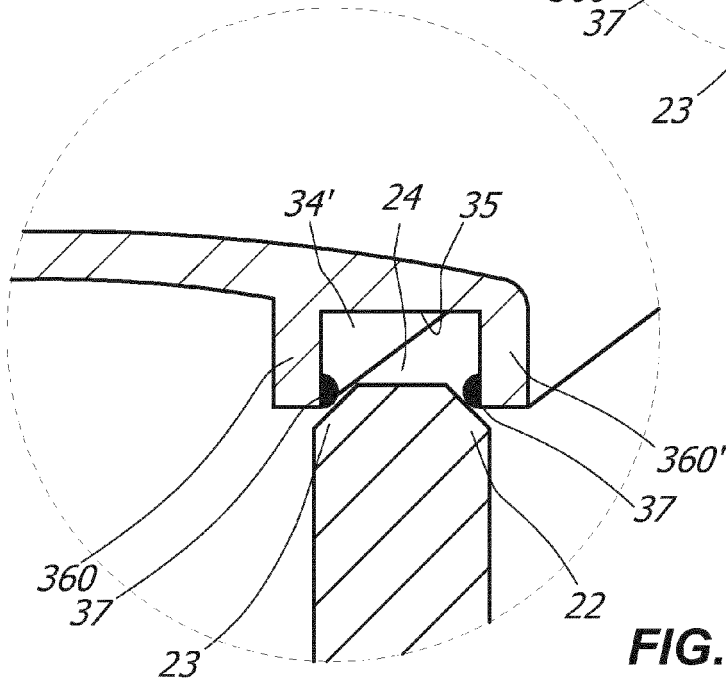


FIG. 3C

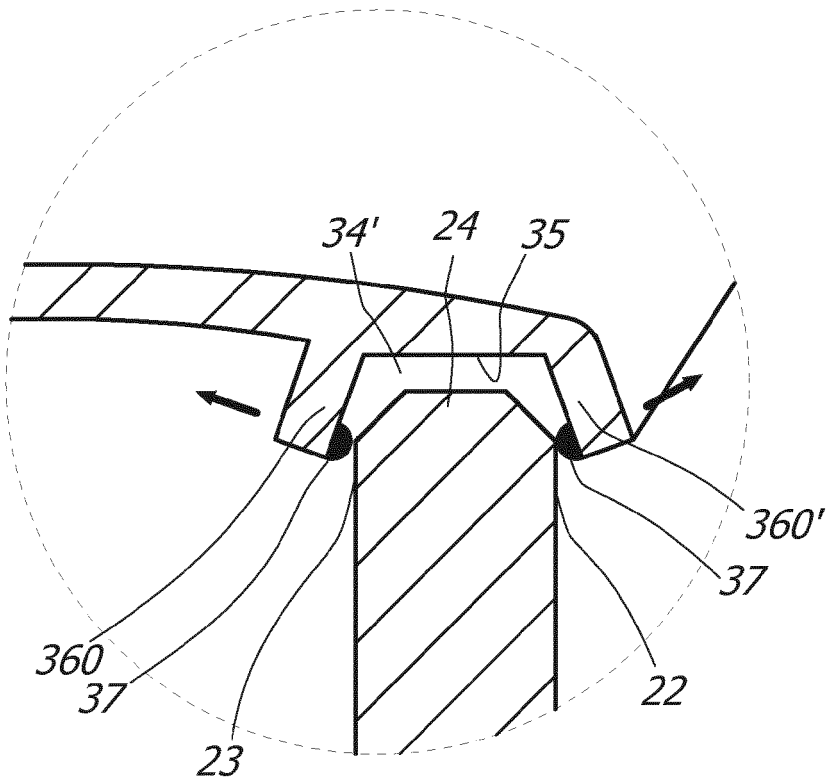


FIG. 3D

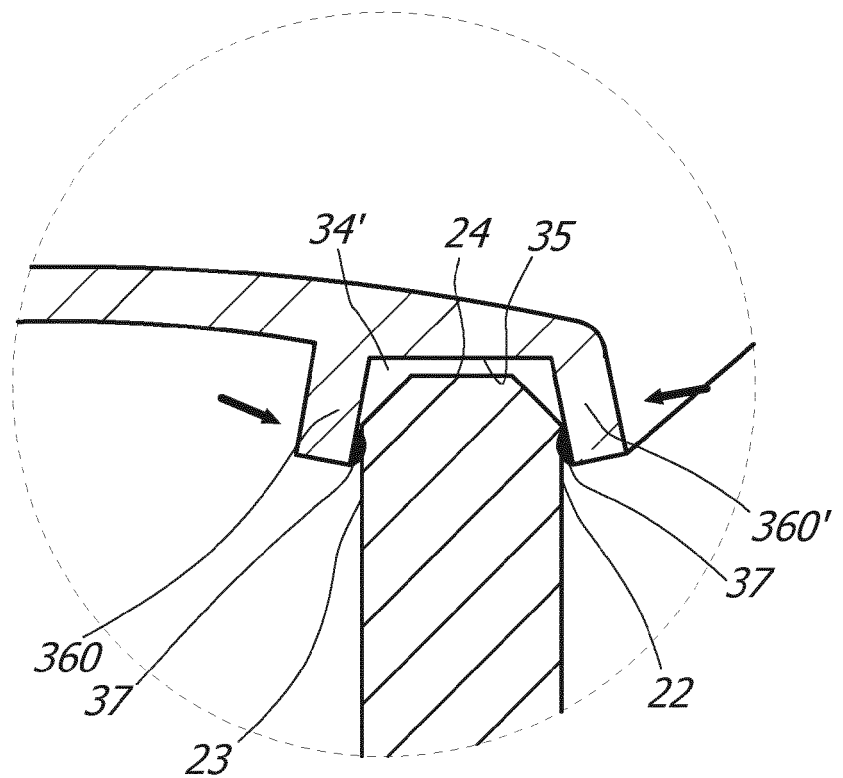


FIG. 3E

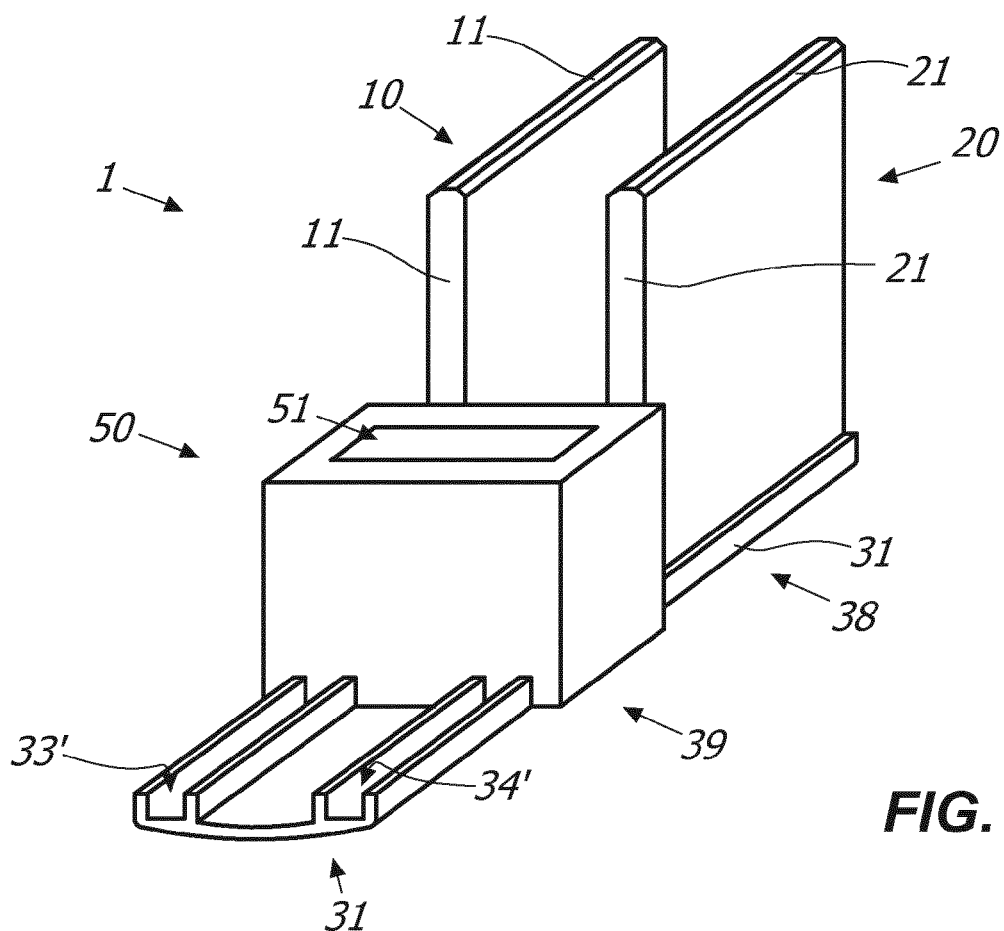


FIG. 4

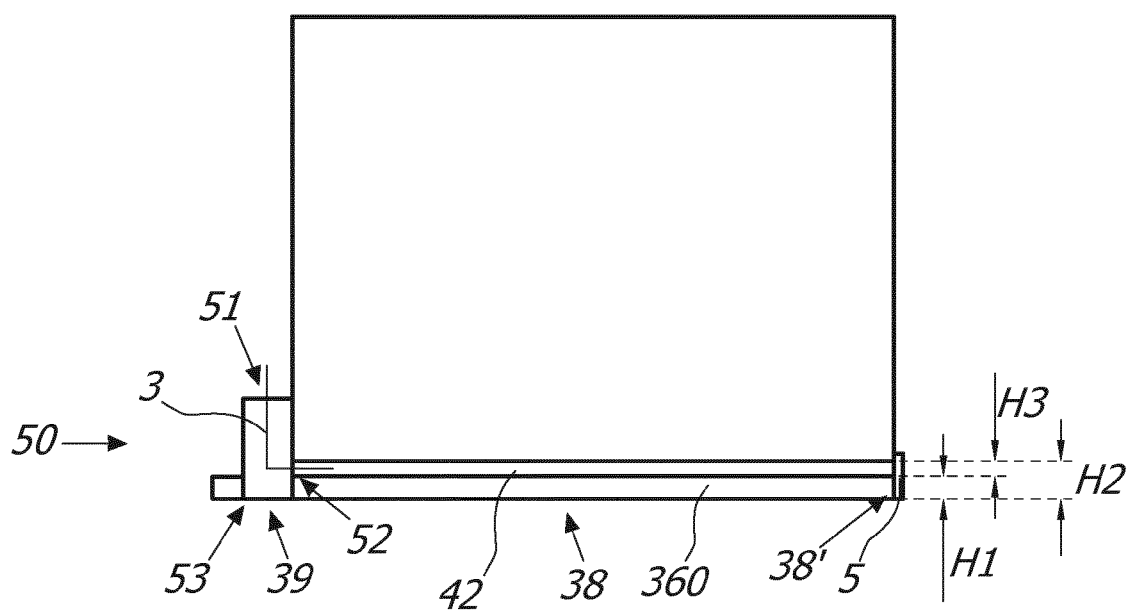
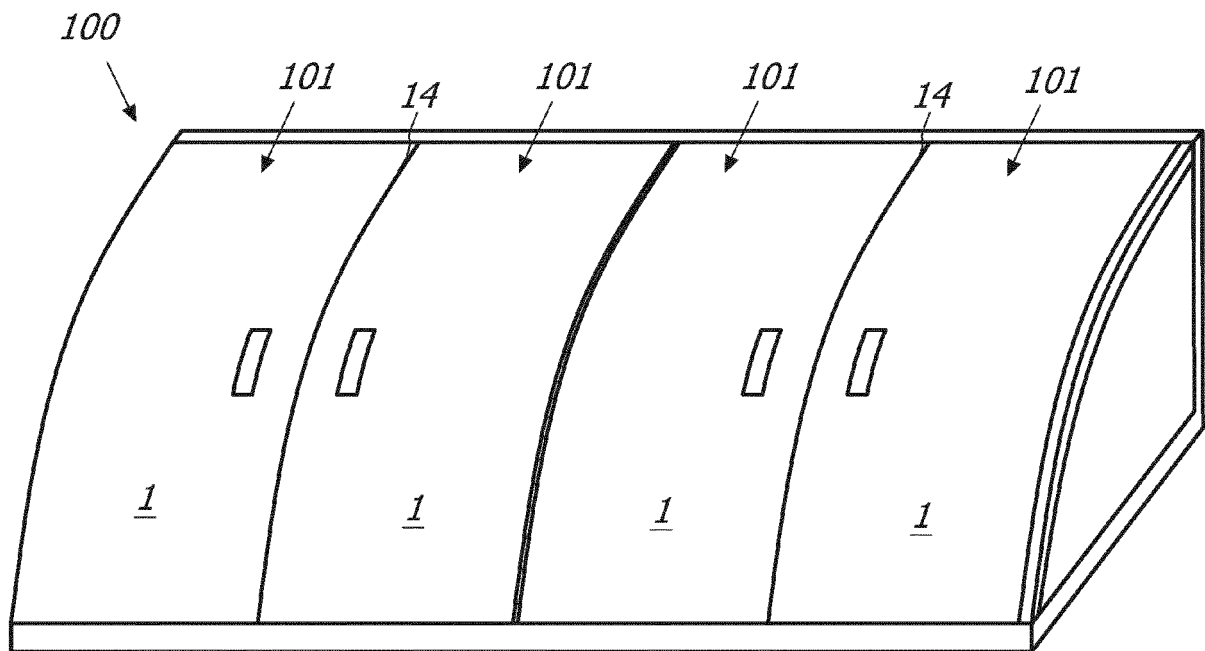
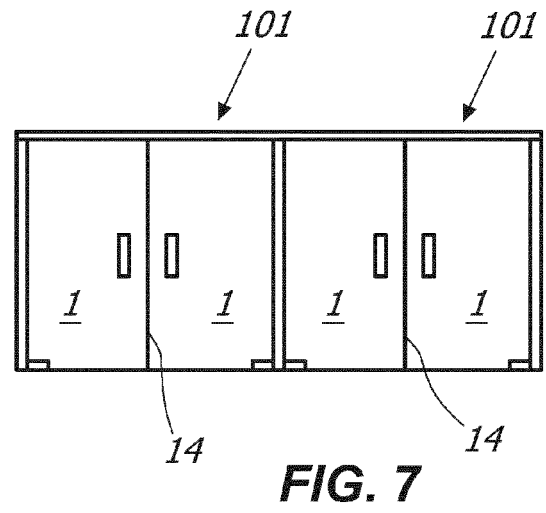
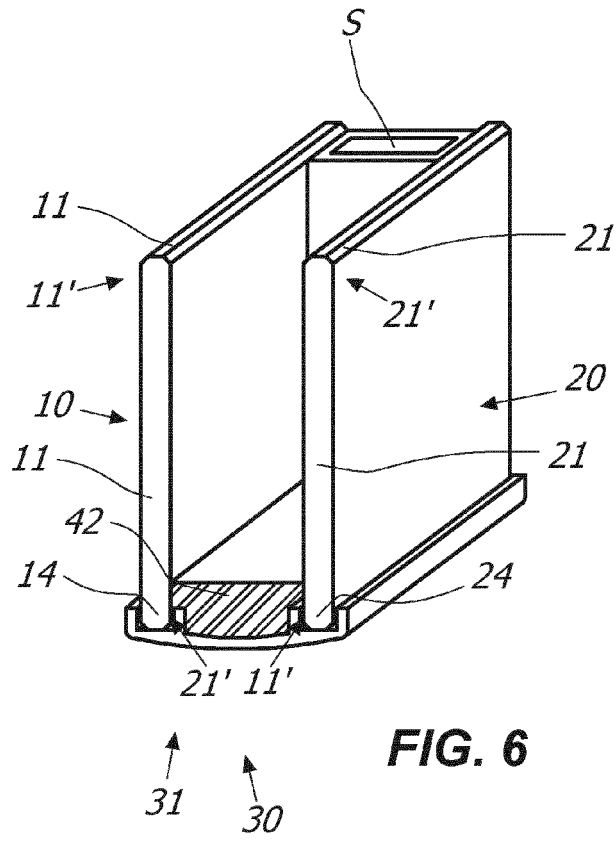


FIG. 5





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