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(54) INSULATING FRAME AND METHOD FOR MAKING AN INSULATING FRAME

(57) An insulating frame for a roof window mounted in an inclined roof structure of a building, comprising top, bottom and side frame members is disclosed. Each frame member includes an insulating member and a support member, and a plurality of frame connector brackets, where a first leg of at least one frame connector bracket, which extends in a direction substantially parallel to the outer side of an insulating frame member, or a guide member attached thereto comprises a bending section, which is bendable by essentially 90 degrees by hand during installation, as well as a method for making the insulating frame. A method for making an insulating frame is also disclosed.

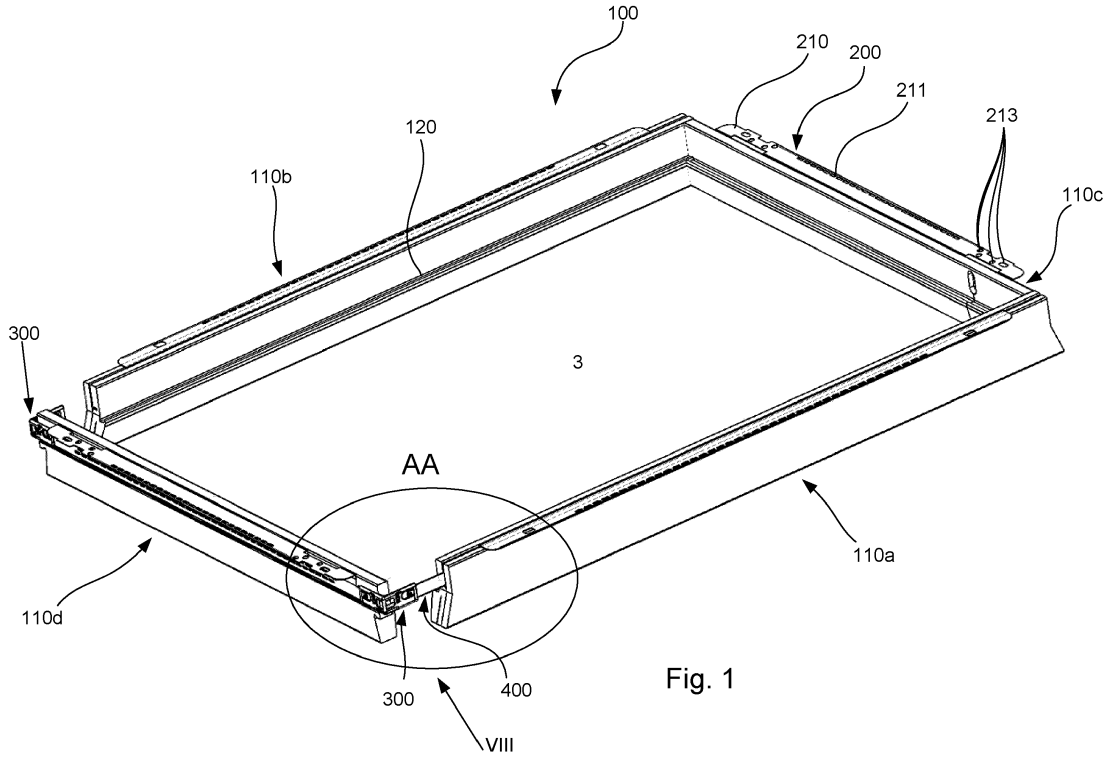

Fig. 1

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Description

[0001] The present invention relates to an insulating frame for a roof window mounted in an inclined roof structure of a building, comprising top, bottom and side members, each including an insulating member and a support member, said insulating frame further comprising a plurality of connector brackets, and said insulating frame defining an inner opening adapted to surround a frame of the roof window and said insulating frame having an interior side intended to face an interior of the building and an exterior side intended to face an exterior and each insulating frame member having an inner side facing the inner opening and an outer side facing away from the inner opening, where frame connector brackets connect the side members to the top and bottom members of the insulating frame.

[0002] Such insulating frames are known from EP1061199A1 and have found wide use and improved the insulating properties of inclined roofs with roof windows considerably, as well as the ease with which a window may be installed in an inclined roof structure. However, the demands for improved insulation and installation are ever on the rise with ever more stringent emission and energy regulations.

[0003] As is known to the person skilled in the art, installing a roof window in an inclined roof structure is a challenging task, particularly in windy or rainy or snowy conditions. This may result in the insulating frame not being assembled and mounted correctly, which may consequently result in difficulties during the subsequent mounting of the window and other associated components such as a lining panel or an underroof collar. This may have a negative impact on the installation process and the insulating properties and thus the optimum performance of the insulating frame and associated window components is not realised.

[0004] It is therefore an object of the invention to provide an insulating frame that is easier to assemble and install.

[0005] In a first aspect of the invention this object is met by an insulating frame as described above, where: a first leg of at least one frame connector bracket, which extends in a direction substantially parallel to the outer side of an insulating frame member in the assembled state of the insulating frame, or a guide member attached thereto comprises a bending section, which is bendable by essentially 90 degrees by hand during assembly of the insulating frame.

[0006] An advantage of the provision of a bending section is that the insulating frame may be packaged with insulating frame members arranged in parallel whilst being interconnected by a frame connector bracket and/or guide member. This allows the insulating frame to be packaged more compactly during storage and transport, whilst being partly assembled. For example, top, bottom and side insulating frame members may be provided interconnected by a frame connector bracket and/or guide member, in the packaging. Delivery in a partly assembled state has the further advantage that on-site assembly time of the insulating frame may be reduced.

[0007] Throughout this text the terms "top", "bottom" and "side" are used to indicate the intended position in relation to the pitch of an inclined roof structure of different parts in the mounted position even though these parts may be located differently during for example storage and transportation or prior to assembly of the insulating frame. Likewise, the term "interior" and "exterior" are used to indicate that something is intended to face the interior or exterior of the building in which the roof window is mounted, respectively, and the terms "inner" and "outer" that something is intended for facing towards or away from the inner opening of the insulating frame, respectively, in the mounted state.

[0008] Before installation of the insulating frame, the interconnected insulating frame members may be arranged substantially perpendicularly, by bending the bending section. Once the insulating frame members have been arranged in their intended relative positions for forming an insulating frame, the bending section(s) may be immobilised.

[0009] Having a guide member with a bending section means that the frame connector bracket can be without a bending section, and thus allows prior art frame connector brackets to be used.

[0010] The guide member is intended to guide a frame connector bracket and an insulating frame member in relation to each other during assembly of the insulating frame, so as to help them achieve a correct engagement. Once the frame connector bracket and insulating frame member have been brought into their intended relative positions, the guide member has served its purpose, and may be removed, unless it also has other functions.

[0011] The frame connector bracket having a guide member attached has the advantage that assembly of the insulating frame is facilitated as the guide member may be tailored to the specific requirements of providing a secure and straightforward assembly of the insulating frame, both in terms of material and structural properties. A further effect may be that it allows a further optimisation of the assembly of the insulating frame e.g. by the guide member being made from a bendable material which is easy to manipulate into attachment with a support member and/or insulating member and/or frame connector bracket. An improved assembly of the insulating frame may provide an improved insulating performance as the likelihood of gaps and/or thermal bridges in the insulating frame is reduced. An improved assembly may facilitate the installation process of the insulating frame.

[0012] Similarly, the first leg of the frame connector bracket comprising a bending section has the advantage that the assembly of the insulating frame may be facilitated as the first leg is easily manipulated into the required position for connecting with the insulating member and/or support member of the insulating frame. This may also facilitate the installation process of the insulating frame.

An improved installation of the insulating frame may have the effect of an improved thermal performance as the potential for thermal leaks, gaps and/or thermal bridges in the installed state is reduced.

[0013] In an embodiment, at least some insulating frame members comprise a cavity into which a guide member may be inserted during assembly of the insulating frame. Said cavity may for example be provided in a support member.

[0014] The term "bendable" is to be understood as the bending section being movable such that the relative angle between two sections of the frame connector bracket or guide member can be changed without substantial unintended damage to the frame connector bracket/guide member and/or bending section.

[0015] The term "bendable by hand" is to be understood as the bending section being easily manipulated by hand so as to cause it to bend as described above.

[0016] Similarly, a "bendable and/or resilient material" is to be understood as a material being movable such that the angle between two sections of it may be changed without substantial damage to the material.

[0017] The bending section may be bendable by essentially 180 degrees. This may have the effect of allowing two insulating frame members, which are interconnected by a frame connector bracket and/or a guide member and which are intended to be arranged in parallel continuation of each other in the assembled state of the insulating frame, to be placed in parallel side-by-side whilst still being interconnected. This may have the effect of allowing an insulating frame to be packaged in a more compact manner whilst being at least partly assembled.

[0018] In its initial state, the bending section may for example have portions extending at an angle of essentially zero degrees to each other, i.e. essentially in parallel, or at an angle of essentially 90 degrees to each other, or at an angle of essentially 180 degrees to each other, i.e. essentially in parallel continuation of each other, or at an angle of essentially 270 degrees to each other. This may have the effect of improving packaging and/or assembly depending on the initial state. For example, it may allow an insulating frame, where the insulating frame members are interconnected by frame connector brackets to be provided, where in the initial state of the bending sections, the insulating frame members are arranged in parallel thus allowing a more compact packaging. When assembling the insulating frame, the bending section is bent from an initial state with portions extending at angles of essentially 180 degrees, i.e. essentially in parallel, over essentially 90 degrees into an assembled state where the portions of the bending section extend at an angle of essentially 90 degrees relative to each other. The bending section in an initial state with portions extending at an angle of essentially 0 degrees i.e. essentially in parallel, may also be bent by essentially 90 degrees into an assembled state where the portions of the bending section extend at essentially 90 degrees relative to each other. The bending section in an initial state with portions extending at an angle of essentially 90 degrees, may be bent by essentially 90 degrees into an assembled state where the portions of the bending section extend at an angle of essentially 0 degrees relative to each other i.e. essentially in parallel. Additionally or alternatively, the bending section may be bendable by 270 degrees.

[0019] In a preferred embodiment a frame connector bracket connects the top, bottom and side members of the insulating frame at each corner of the insulating frame.

[0020] The frame connector bracket and/or guide member may, however, also be used as an extension piece for interconnecting additional insulating frame members to create a larger insulating frame.

[0021] The guide member may comprise a guiding element in the form of a protrusion, groove or the like, where the guide element is adapted for interaction with a corresponding element on an insulating frame member and/or frame connector bracket. This may improve the ease of assembly of the insulating frame as well as the stability of the assembled insulating frame.

[0022] The guide member may be in the form of a strip, ribbon, band, flap, hinge or the like. It may comprise the same and/or different materials than the frame connector bracket. It may for example be made of a material chosen from the following group of materials: metals, polymers, wood, composites or combinations thereof. Additionally or alternatively, it may comprise a hinge. Additionally or alternatively, it may comprise a weakened section. Additionally or alternatively, the guide member and/or weakened section may comprise perforations, longitudinal slits, recesses or the like. This has the effect of improving the bending properties of the guide member.

[0023] The guide member may protrude from the first and/or second leg of the frame connector bracket. The guide member may extend through the frame connector bracket. Additionally or alternatively, a second guide member may be attached to a second leg of the frame connector bracket.

[0024] The guide member may be attached to the frame connector bracket by snap-locking, rivets, screws, nails, spikes, glue, welding, vulcanizing and/or the like. Additionally or alternatively, the guide member may be attached to an inside, an inner surface, an outside and/or an outer surface of the frame connector bracket.

[0025] Additionally or alternatively, the guide member may be attached to the insulating member and/or support member, for example by snap-locking, rivets, screws, nails, spikes, glue, welding, vulcanizing and/or the like. Additionally or alternatively, the guide member may be attached to an interior, an inner surface, an exterior and/or an outer surface of the insulating member and/or support member. Additionally or alternatively, the guide member may be attached internally to the insulating member and/or support member. Additionally or alternatively, the guide member may be an integral part of the insulating and/or support member.

[0026] The term "snap-locking" is to be understood as

a process of mechanical attachment whereby a first element mechanically secures itself to a second element once it is brought into the correct position, potentially by engagement of a mechanical element such as a barb or the like.

[0027] Snap locking may be facilitated by a barbed section that may include lugs, pins or other protrusions formed in the frame connector bracket or guide member e.g. by punching or stamping. The barbed section may include lugs or pins looking like semi-pierced fingernail detent formed into the guide member e.g. by punching or stamping.

[0028] Similarly, the frame connector bracket may be attached to the insulating member and/or support member by snap-locking, rivets, screws, nails, spikes, glue, welding, vulcanizing and/or the like. Additionally or alternatively, the frame connector bracket may be attached to an interior, an inner surface, an exterior and/or an outer surface of the insulating member and/or support member. Additionally or alternatively, the frame connector bracket may be attached internally to the insulating member and/or support member

[0029] A secure attachment of the insulating frame members with the frame connector brackets and/or guide members is desired as this improves the handling of the insulating frame both in the unassembled and an assembled state.

[0030] The term "secure attachment" is to be understood as a permanent or detachable attachment where the attached parts do not become unintentionally detached.

[0031] Said frame connector bracket is preferably made as an angular bracket having two legs that have an angular cross-sectional shape, preferably an L-shape, where each leg comprises a connecting section. This allows the frame connector bracket to be connected to supporting rails, which serve as support members, and have an angular cross-sectional shape perpendicular to their length direction. Such supporting rails are presently considered advantageous as they have good bending resistance. The supporting rails may be made from any suitable material selected from the group consisting of: steel, stainless steel, aluminium, other metals, polymers, ceramics, glass fibre, composites and combinations thereof.

[0032] Additionally or alternatively the frame connector brackets may comprise a flange portion adapted for securing the insulating frame to a roof structure.

[0033] The bending section may be bendable by essentially 30 degrees, 45 degrees, 60 degrees, 70 degrees, 80 degrees, 90 degrees, 100 degrees, 110 degrees, 120 degrees, 130 degrees, 140 degrees, 150 degrees, 160 degrees, 170 degrees, 180 degrees, or 270 degrees. It is currently preferred that the bending section is bendable by 90 degrees as this allows the frame connector bracket to open to an optimal angle between the two insulating frame members, which it interconnects, for installation in a roof structure, whilst allowing the insulating frame members to be packed tightly in a packaging with the frame connector bracket attached. Bending sections of the frame connector brackets and the guide members may be bendable by different amounts.

[0034] In an embodiment of the invention a bending section of the frame connector bracket is bendable substantially by 90 degrees and a bending section of the guide member is bendable substantially by 180 degrees. This allows insulating frame members with both frame connector brackets and guide members attached, to be packaged substantially in parallel with the frame connector brackets. This provides improved flexibility when packaging and transporting the insulating frame. As a result, the insulating frame may be packaged in a more compact manner.

[0035] The first leg of the frame connector bracket may be less than 1/5, 1/6, 1/8, 1/10, 1/12, 1/14, or 1/16 of the length of a frame member of the insulating frame.

[0036] The guide member of the frame connector bracket may be less than 4/5, 3/5, 2/5, 1/5, 1/6, 1/8, 1/10, 1/12, 1/14, or 1/16 of the length of a frame member of the insulating frame.

[0037] The insulating frame can be delivered as a complete kit for assembly including a plurality of insulating members, a plurality of support members and a plurality of frame connector brackets and possibly guide members. Delivery as a kit allows the insulating frame to be packaged in a more compact manner.

[0038] In an embodiment of the invention, the frame connector bracket and/or guide members may be provided connected to one or more insulating frame members.

[0039] In an embodiment of the invention, the frame connector brackets are made from a material chosen from the following group: wood, steel, stainless steel, aluminium, other metals, polymers, ceramics, glass fibre, composites and combinations thereof. It is currently preferred to make the frame connector brackets from a polymer as it provides a good combination of strength, thermal properties, weight and manufacturability.

[0040] In an embodiment of the invention, each frame connector bracket comprises a hinge.

[0041] This has the advantage that the frame connector bracket bends easily at a well-defined position.

[0042] It may have the further effect of reducing the demands on the material of the frame connector bracket as the hinge may be provided in the form of readily available standardised hinge, such as a piano hinge.

[0043] In an embodiment of the invention, the frame connector brackets of comprise a weakened section, which serves as a hinge allowing bending. A further effect may be a reduction in the amount of material required. The material of the weakened section must be resilient.

[0044] In a development of the latter embodiment the weakened section of the frame connector brackets is in the form of longitudinal slits, perforations, recesses or the like. This has the effect of improving the bending properties of the frame connector bracket.

[0045] This may have the effect that any resilient material may be used and then subsequently have the longitudinal slits, perforations and/or recesses or the like applied to the material to provide the bendable properties.

[0046] In another or additional development, the weakened section comprises a removable section of material such as a tear out strip.

[0047] This has the advantage of improving the adaptability of the frame connector brackets as the removable section of material may be removed in cases where a more bendable bracket is necessary and may be left intact when a more rigid frame connector bracket is required.

[0048] The removable section may comprise a latch and/or tab. This may have the effect of improving the ease with which the removable may be removed.

[0049] In another or additional development, the weakened section comprises a different material than the rest of the frame connector bracket.

[0050] This has the advantage that the thermal properties of the frame connector bracket may be optimised by e.g. the frame connector bracket being of a highly insulating material and only the weakened section being of a bendable material which may not be as effective at insulating. Furthermore, it may have the effect of allowing the frame connector bracket to be optimised for a particular use case.

[0051] In an embodiment of the invention, the frame connector brackets and/or guide members are integral parts of the one or more support members and/or insulating members.

[0052] The term "integral" is to be understood as the frame connector brackets and/or guide members being integral with one or more support members and/or insulating members.

[0053] This has the effect that it reduces the number of components required to assemble the insulating frame as well as potential gaps, slits or holes in the frame members that may be associated therewith. This may reduce the potential for thermal bridges. It may also have the further effect of improving the ease of assembly of the insulating frame.

[0054] In an embodiment of the invention, the guide member is in the form of a strip of material inserted in tracks or hollows in the frame connector bracket and support member.

[0055] This has the effect that the frame connector brackets may be provided pre-attached to a frame member of the insulating frame whilst retaining the bendable property. It may have the further effect that the position of the frame connector bracket may be adjusted through the strip of material in the tracks or hollow. Further still, this may have the effect of improving the adaptability of the insulating frame to a given roof structure as well as the ease of installation.

[0056] In an embodiment of the invention, the frame connector bracket or guide member comprises interconnecting means for connecting to the support member.

[0057] The interconnecting means may be in the form of snap-locking, barbed sections, press fitting, rivets, screws, nails, spikes, or the like.

[0058] This has the effect that the frame connector brackets or guide members may be easily connected and disconnected from the insulating frame, which may improve the ease of assembly and the adaptability of the insulating frame.

[0059] In an embodiment of the invention, the guide member comprises a barbed section for securing the attachment between the guide member and/or the support member.

[0060] The attachment between the guide member and/or the support member may produce an audible or tactile response. This has the advantage of providing an assembler of the insulating frame with an assurance that the insulating frame has been assembled correctly. This in turn may have the advantage that the thermal properties and the ease of installation of the insulating are improved.

[0061] The guide member comprising a barbed section may also have the effect of enabling a more secure attachment.

[0062] In an embodiment of the invention the frame connector brackets and/or support members and/or guide member comprise a colour coding and/or a visual indicator for orientation during assembly of the insulating frame. As an example, parts of the guide member, which are intended to be hidden in the correctly assembled state can be given a bright colour, such as red. In this way it will be immediately clear that if any red colour is seen, the insulating frame has not been assembled correctly.

[0063] This has the effect of improving the assembly process and ensuring a correct assembly. This may improve the thermal properties as well as the installation process of the insulating frame.

[0064] In a second aspect of the present invention, the above-mentioned and/or other objects are met by a method for making an insulating frame comprising the steps of:

- providing top, bottom and side members of the insulating frame, each including an insulating member and a support member, said insulating frame defining an inner opening adapted to surround the frame of the roof window and said insulating frame having an interior side intended to face the interior of the building and an exterior side intended to face the exterior and each frame member having an inner side facing the inner opening and an outer side facing away from the inner opening

  - providing a plurality of frame connector brackets, where a first leg of the frame connector brackets or a guide member attached thereto comprises a bending section,
  - arranging the insulating frame members in their intended relative positions for forming an insu-

lating frame, by bending at least one bending section, and

- connecting the top, bottom and side members of the insulating frame to each other using the frame connector brackets.

[0065] In one embodiment at least one bending section is bent by essentially 90 degrees, which is advantageous when making a rectangular insulating frame.

[0066] This has the advantage of providing a more adaptable insulating frame. It may also have the effect of providing an insulating frame with improved thermal properties. It may have the further effect of providing an insulating frame that is easier to install in a roof structure.

[0067] In the following, embodiments of the invention will be explained in more detail with reference to the schematic drawing, in which:

Fig. 1 is a perspective view of a partially assembled insulating frame according to the invention,
Fig. 2 is an enlarged view of the detail AA in Fig. 1 where an outer layer of the insulating member has been removed,
Fig. 3 is an outer perspective view of a frame connector bracket with a guide member attached according to the invention,
Fig. 4 is an inner perspective view of the frame connector bracket in Fig. 3,
Fig. 5 is a side-on perspective view of a guide member according to the invention,
Fig. 6 is a different perspective view of the guide member in Fig. 5,
Fig. 7 is a perspective view of two frame members connected by a frame connector bracket and guide member,
Fig. 8 is a perspective view of an embodiment of the frame connector bracket comprising a hinge.

[0068] An insulating frame 100 according to the invention will now be described in reference to Fig. 1.

[0069] An insulating frame 100 like this is typically installed in a suitable opening in an inclined roof structure (not shown). As is well known to the skilled person, the insulating frame provides an insulating barrier at the interface between a roof window (not shown) and the roof structure, as well as facilitating easier mounting of the roof window by providing a predefined space adapted for the window. The insulating frame 100 has an exterior side adapted to face away from the interior of the building (facing upwards in Fig. 1), and an interior side adapted for facing towards the interior of the building (facing downwards in Fig. 1). An insulating frame 100 like this, that can be efficiently assembled and adapted to a given window in-situ is highly advantageous to the installer, but it may also be delivered in an assembled state.

[0070] The insulating frame 100 comprises top 110c, bottom 110d and side insulating members 110a and 110b, which refer to their location when mounted, support members 200 and connector brackets as will be discussed in more detail below. The insulating frame members 110 define an inner opening 3 and an outer side. The inner opening comprises a ledge 120 projecting towards the inner opening 3, which is intended to project underneath a frame (not shown) of the roof window, which the insulating frame 100 is intended to receive, and the outer side is intended to face the opening in the roof structure. The insulating members, which make up the majority of the volume of the insulating frame 100, are here made from a material of a dimensionally stable nature having good thermal insulating properties combined with a softer material, which is compressible so as to allow it to yield and adapt to the shape of the opening in the roof structure, further details and of this are described in the applicants granted patent EP2677092B1. In this embodiment the insulating members are made from two types polymer foam. It is, however, also possible to make the insulating members from a single material, or for the insulating members to be made from different materials or combinations of materials.

[0071] In this embodiment supporting rails 200, serving as support members, have flanges 210 extending over their entire length and projecting from the frame away from the opening 3. This means that it is not necessary to have the supporting rails and battens of a roof structure in exact positions in relation to each other to achieve a proper support for the insulating frame 100. It is noted, that the insulating frame need not be attached to the battens or other parts of the roof structure but may simply rest on top of these as the subsequent fastening of the roof window will also secure the insulating frame. However, to keep the frame in place before and during the installation of the window frame therein, it may be advantageous to attach at least some of supporting rails to the roof structure. For this purpose and for easing the later fastening of the window mounting brackets, a series of holes 211, which allow a clamp, nail or screw to pass, are provided along the length of the flanges. The features here described in relation to the top frame member 110c also apply to the two side 110a and 110b and the bottom 110d frame members, which are substantially the same.

[0072] The continuous flanges also increase the stiffness of the supporting rails and thus of the insulating frame as such.

[0073] The flanges of the supporting rails 200 here stop at a distance from the frame corners as may also be seen in Figs 1 and 2. This has several purposes. Firstly, the amount of material, which may potentially function as a thermal bridge at the corners is minimized. Secondly, the connection of the frame members for the formation of the insulating frame is not hindered by the flanges. Thirdly, when mounting the roof window by means of mounting brackets attached at the corners of the window frame, the supporting rails 200 are not in the way. For the latter purpose it may, however, be sufficient to merely provide openings and/or recesses 213 in the supporting rails 200, which allows flanges of the window mounting brackets

or fastenings means such as nails, screws or spikes to pass as shown in the in Fig. 1 and 2.

[0074] As is best seen in Fig. 2 the supporting rails 200 in this embodiment are provided with a second flange 220 projecting perpendicularly to the plane of the insulating frame and into the insulating member 112. This flange is intended to provide strength and stiffness to the frame member and to strengthen the connection between the insulating member and the supporting rail, but is also used for interconnection with the frame connector brackets 300 as will be explained later.

[0075] It is currently preferred that the second flange 220 is inserted in a slit in the insulating member, as shown in Fig. 1, and that the supporting rail is attached to the insulating member by means of an adhesive, but if the insulating member is made by moulding, the supporting rail 200 may be embedded in the insulating material during the moulding process.

[0076] In Fig. 2 two supporting rails 200 are shown from the outer side, i.e. in the direction of the arrow VIII in Fig. 1 where an outermost part of the insulating material of the side insulating member, shown to the right in the figure, has been removed for clarity.

[0077] In the embodiments shown the supporting rails 200 are used as points of attachment for the frame connector brackets 300 used for interconnecting the insulating frame members. As may also be seen in Fig. 3 & 4, the frame connector bracket 300 is an angular bracket having an angular cross-sectional L-shape having two legs 310, 320 each projecting in the direction of one of the supporting rails, i.e. here in the direction of the side and bottom of the frame, respectively. Each of these legs are also of an angular cross sectional L-shape, having one part 330 arranged in parallel with the outer side of the corresponding insulating member 112, i.e. perpendicular to the plane of the frame, and another part 340 projecting in parallel to the plane of the frame towards the inner opening 3.

[0078] The frame connector brackets 300 in Figs 1-4 comprise a guide member 400, which extends in a direction parallel to an outer side of the side insulating frame member and is received by interconnecting means in a first leg 310 of the bracket as is best seen in Fig. 3 and 4. As can be seen in Figs. 4-6, at one end, the guide member 400 has interconnecting means in the form of a protrusion 425 adapted for engaging with the leg part 340, such that the profile of the guide member matches that of the leg 310 of the frame connector bracket, and a barbed section 420 which engages with a complimenting barbed section 350 located in a hollow of the bracket leg 310 to provide a secure attachment in the form of a snap-lock. The other end of the guide member 400 has similar interconnecting means in the form of a protrusion 415 and barbed section 410 which engages with a corresponding barbed section 230 in a hollow of a supporting rail 200 in the form of a snap-lock, as is best seen in Fig. 2.

[0079] It should be noted that the interconnecting means need not be in the form of a barbed section or a snap-lock type, but may any other form of mechanical attachment such as clips, press fitting, friction fit, spikes, hooks or the like.

[0080] The guide member 400 in this embodiment is made from a strip of nylon, but may be made from any suitable resilient and/or bendable material such as metals, polymers, wood, natural and synthetic rubbers or combinations thereof.

[0081] If opting for an embodiment without the guide member, where the bending section is instead provided in the frame connector bracket and where the installer has to interconnect a frame connector bracket to a supporting rail without the help of the guide member, it may be advantageous to provide the end of the supporting rail or an area close to it with a colour coding showing its position. The leg of the frame connector bracket intended to be connected to it may then be provided with the same colour to indicate that they fit together.

[0082] As can be seen in Fig. 7, the guide member 400 interconnects the supporting rail 200 of one insulating frame member, here a bottom insulating frame member 110d, and frame connector bracket 300 attached to a supporting rail of another insulating frame member, here a side insulating frame member 110a. The insulating frame members 110a, 110d are here arranged in parallel, so that the insulating frame may be packaged compactly during storage and transport, whilst being partly assembled. To bring the insulating frame members into an assembled state, the guide member 400 is bent by hand until the second leg 320 of the frame connector bracket 300 extends parallel with the supporting rail 200. By then sliding the guide member 400 into a cavity of the supporting rail 200, the frame connector bracket 300 can be brought into engagement with the supporting rail 200.

[0083] As shown in Fig. 8 the frame connector bracket 300 may also comprise a hinge 360 such as piano hinge allowing it to bend as required during for example assembly of the insulating frame 100 or manipulation of the insulating frame 100 during installation.

[0084] The frame connector bracket 300 need not comprise a guide member 400 as shown in the embodiments here.

[0085] Although not shown, the frame connector bracket 300 and/or guide member 400 may also comprise a weakened section allowing the bending section of guide member to be tailored to the specific requirements of a particular insulating frame. Additionally or alternatively, the weakened section may be in the form of, or comprise, a removable section of material allowing the bending properties of the weakened section to be further tailored to specific requirements if necessary. For example, the removable section may be made from a material with a lower level of adhesion such that it is easily removed without causing damage to any of the components. Additionally or alternatively, the weakened section may be made from a material that is more elastic and/or bendable than the rest of the guide member potentially providing a more flexible and predictable bending of the

bending section. The weakened section may also comprise or be in the form of longitudinal slits and/or perforations and/or recesses, which may provide further optimisation of the bending properties as well as the thermal performance.

[0086] Although not shown, the frame connector brackets may also be an integral part of the insulating member 112 and/or support member 200. The frame connector brackets 300 and/or supporting rails 200 and/or insulating members 112, and/or guide members 400 may comprise visual indicators providing guidance during assembly of the insulating frame 100, such as colour coding, markers, labels or the like. This may improve the ease of assembly of the insulating frame.

[0087] In the above, the inventive concept has been described with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the inventive concept, as defined by the appended claims.

List of references

[0088]

100	Insulating frame
110	Frame member
112	Insulating frame member
114	Support member
120	Ledge
200	Supporting rail
210	Flange
211	Holes
213	Openings and/or recesses
220	Flange
230	Barbed section
300	Frame connector bracket
310	First leg of frame connector bracket
320	Second leg of frame connector bracket
330	One part of leg 320
340	Another part of leg 320
350	Barbed section
360	Hinge
400	Guide member
410	Barbed section
415	Protrusion
420	Interconnecting means
425	Protrusion

Claims

1. An insulating frame for a roof window mounted in an inclined roof structure of a building, comprising top, bottom and side members, each including an insulating member and a support member, said insulating frame further comprising a plurality of connector brackets, and said insulating frame defining an inner opening adapted to surround a frame of the roof window and said insulating frame having an interior side intended to face an interior of the building and an exterior side intended to face an exterior and each insulating frame member having an inner side facing the inner opening and an outer side facing away from the inner opening, where frame connector brackets connect the side members to the top and bottom members of the insulating frame **characterized in that**

a first leg of at least one frame connector bracket, which extends in a direction substantially parallel to the outer side of an insulating frame member in the assembled state of the insulating frame, or a guide member attached thereto comprises a bending section, which is bendable by essentially 90 degrees by hand during assembly of the insulating frame.

2. The insulating frame according to claim 1, wherein each frame connector bracket comprises a hinge.

3. The insulating frame according to any one of the preceding claims wherein the frame connector brackets comprise a weakened section.

4. The insulating frame according to claim 3, where the weakened section of the frame connector brackets is in the form of slits, perforations, recesses or the like.

5. The insulating frame according to claim 3 or 4, where the weakened section comprises a removable section of material such as a tear out strip.

6. The insulating frame according to claim 3 to 5, where the weakened section comprises a different material than the frame connector bracket.

7. The insulating frame according to any one of the preceding claims wherein the frame connector brackets are integral parts of the one or more support members and/or insulating members.

8. The insulating frame according to any one of the preceding claims wherein the guide member is in the form of strip of material inserted in tracks or hollows in the frame connector bracket and/or support member and/or insulating member.

9. The insulating frame according to any one of the preceding claims wherein the frame connector bracket or guide member comprises interconnecting means for connecting to the support member.

10. The insulating frame according to any one of the preceding claims, wherein the guide member comprises a barbed section for securing the attachment between the guide member and the frame connector

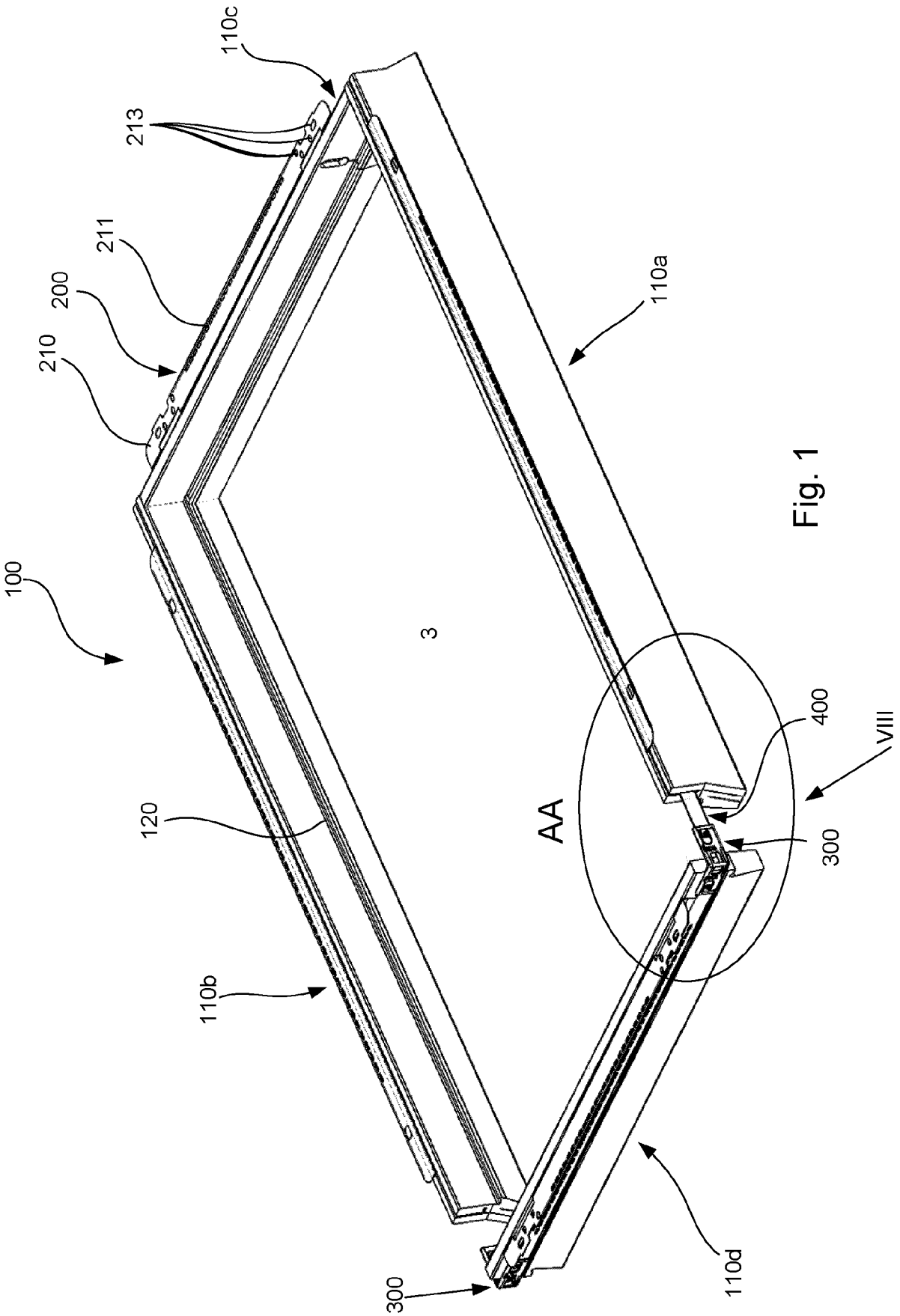
bracket and/or the support member.

11. The insulating frame according to any one of the preceding claims wherein the connector brackets and/or support members comprise a colour coding and/or a visual indicator for orientation during assembly of the insulating frame.

12. A method for making an insulating frame comprising the steps of:

- providing top, bottom and side members of the insulating frame, each including an insulating member and a support member, said insulating frame defining an inner opening adapted to surround the frame of the roof window and said insulating frame having an interior side intended to face the interior of the building and an exterior side intended to face the exterior and each insulating frame member having an inner side facing the inner opening and an outer side facing away from the inner opening,
- providing a plurality of frame connector brackets, where a first leg of the frame connector brackets or a guide member attached thereto comprises a bending section,
- arranging the insulating frame members in their intended relative positions for forming an insulating frame, by bending at least one bending section, and
- connecting the top, bottom and side members of the insulating frame to each other using the frame connector brackets.

13. A method according to claim 12, where at least one bending section is bent by essentially 90 degrees.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VIII
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110b
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Fig. 1

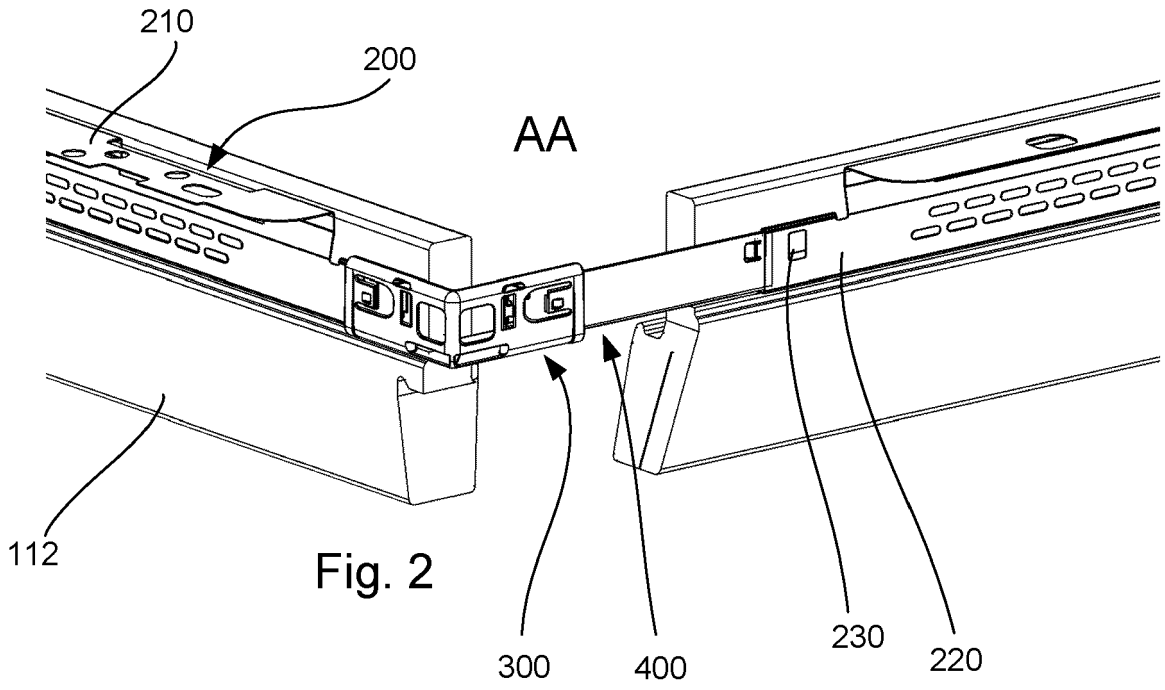

Fig. 2

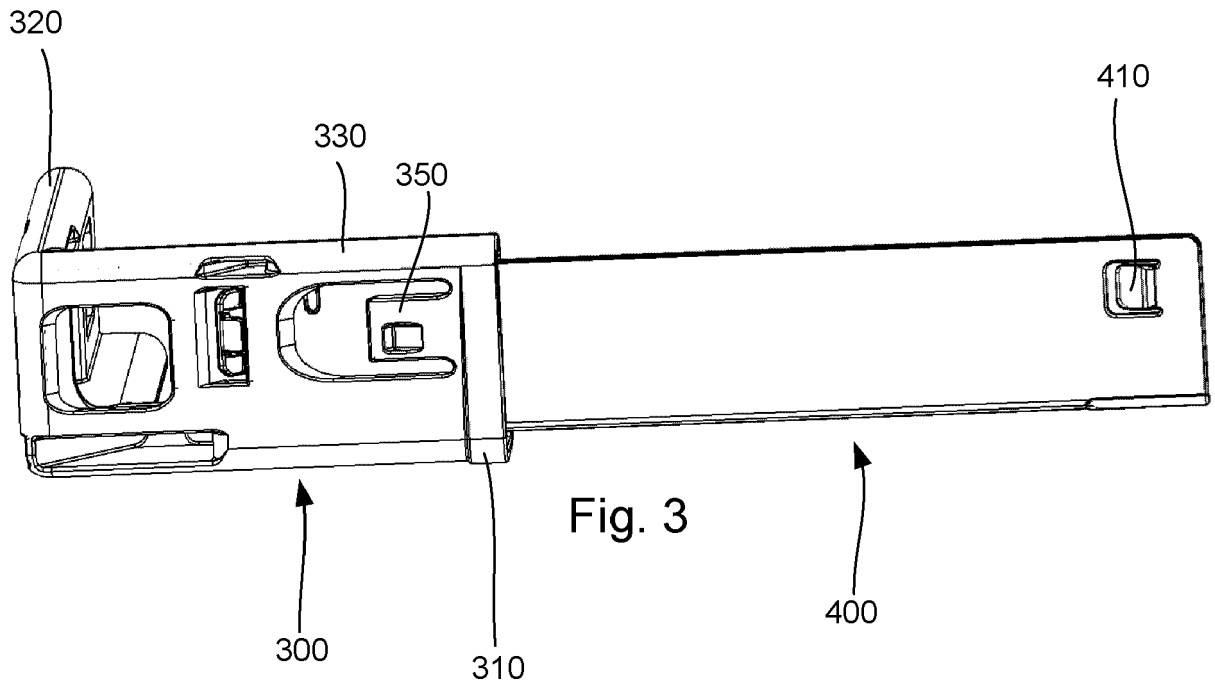

Fig. 3

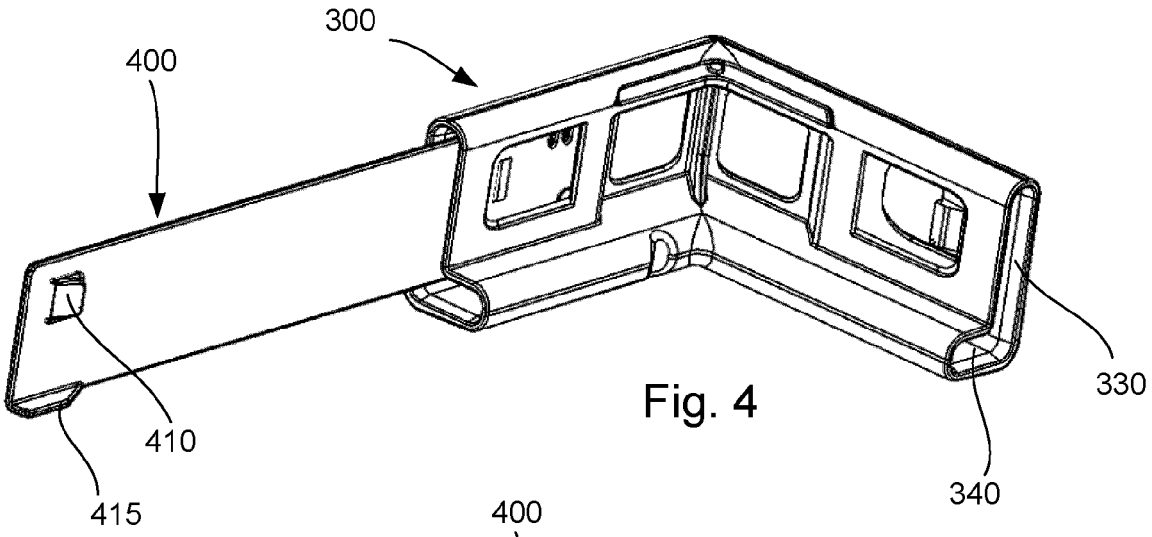

Fig. 4

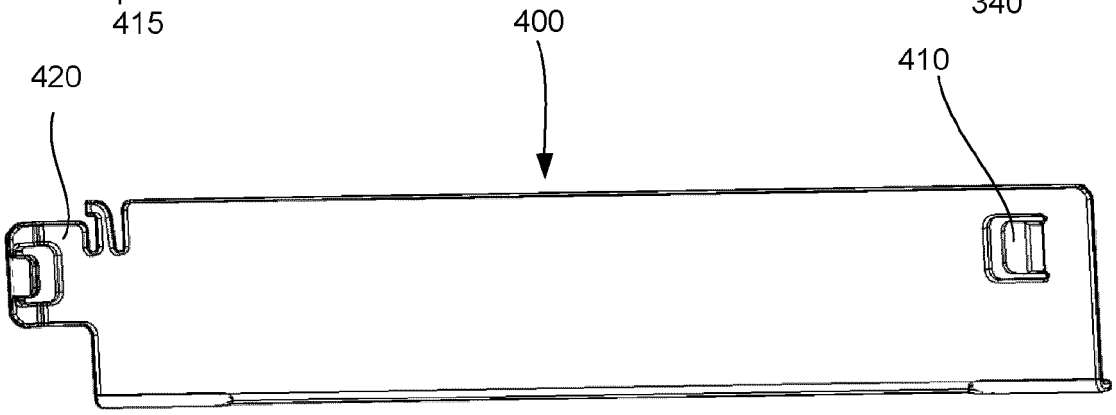

Fig. 5

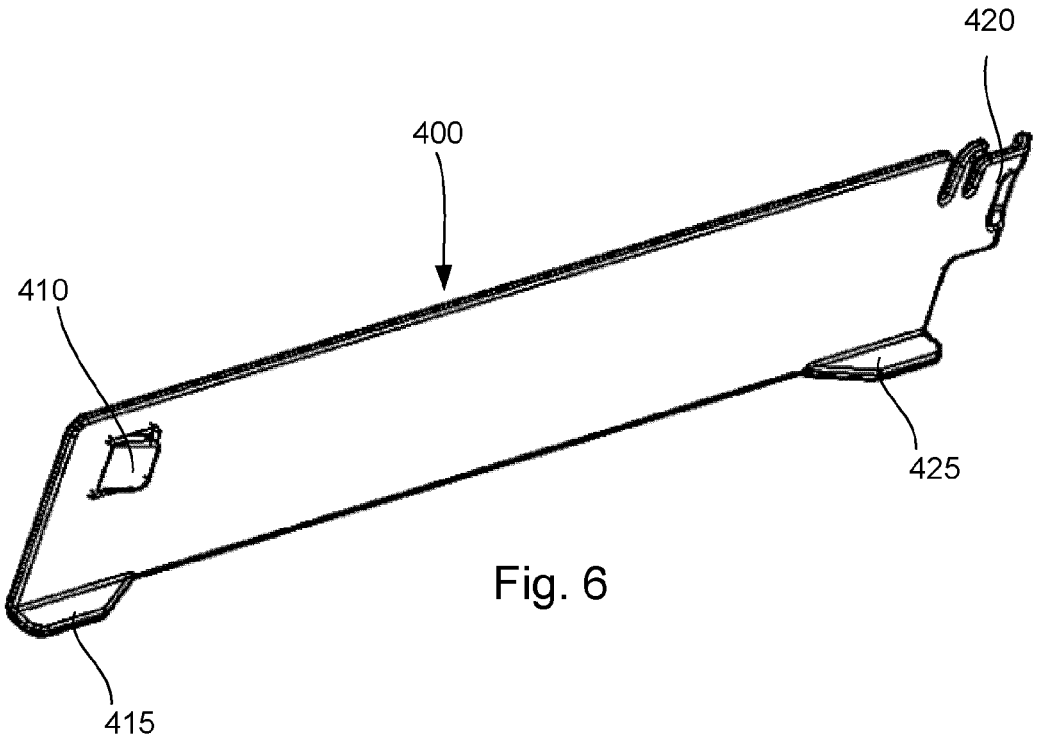

Fig. 6

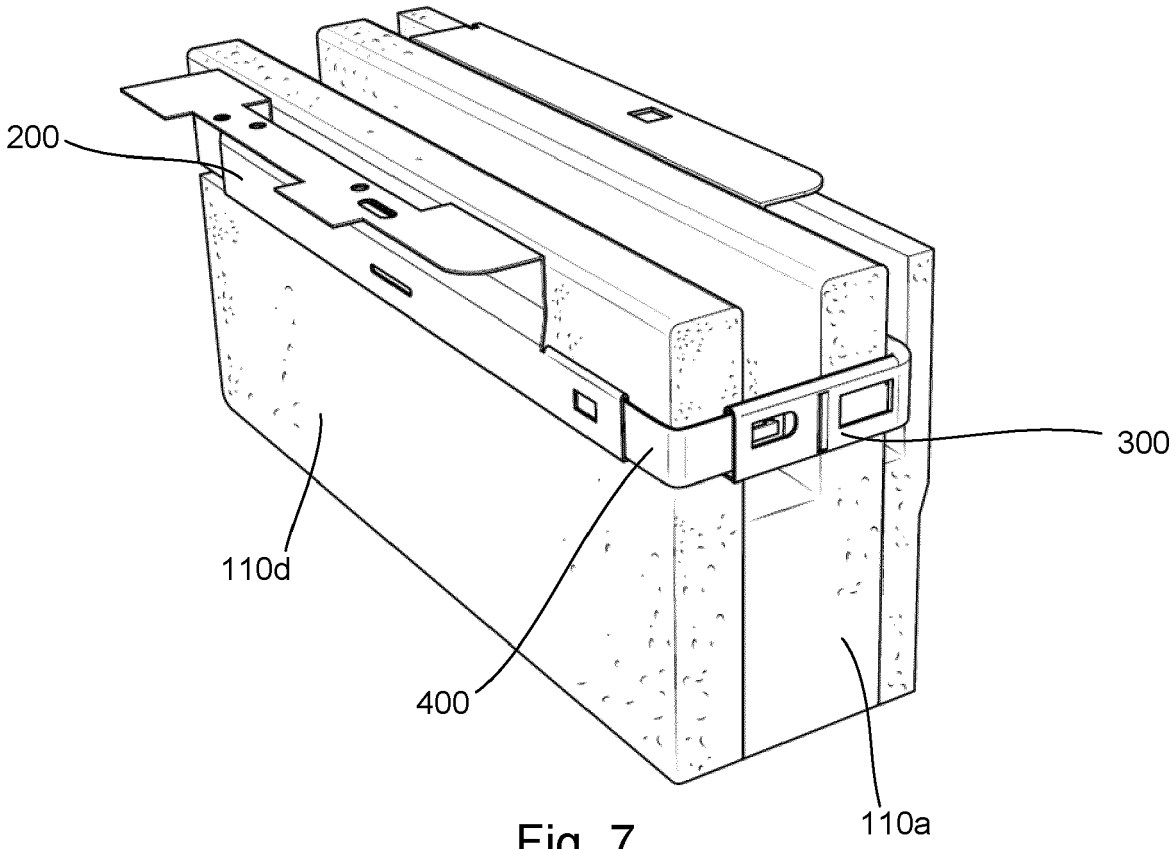

Fig. 7

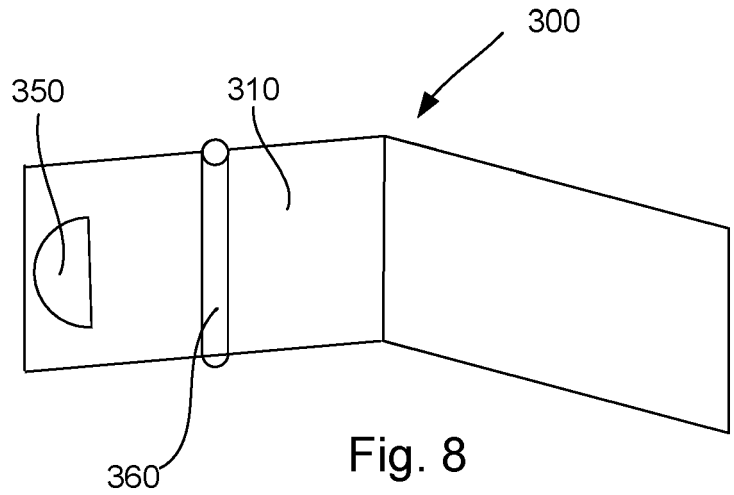

Fig. 8

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Application Number
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E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 April 2020	Tran, Kim Lien

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