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(54) Window assembly with a cover panel assembly to cover window opening

(57) An outwardly opening window assembly (130) mounted in a window opening (13,14) in a wall, said window assembly comprising a window frame made up of a number of frame members (131) where one of said frame members is fastened to the window opening on the centre facing surface of the window opening, a window sash made up of a number of sash elements (132), a mounting fitting which connects one of said sash elements with one of said frame members, a window pane (7) arranged in said window sash and a cover panel assembly comprising a number of cover panel elements (133), where one of said cover panel elements is fastened to one of said frame members and is arranged such that the portion of the centre facing surface (13,15) of the window opening which is located between the innermost edge of said frame member and the inside surface of the wall in which the window opening is arranged is completely covered by said cover panel element, **characterized in that** said cover panel assembly is arranged such that the innermost edge (144) of the major visible centre facing surface (141) of the portion of the sash element (132) which is arranged on the inside of the window pane and/or the innermost edge (143) of the major visible centre facing surface (140) of the portion of said frame member (131) which is arranged on the inside of the sash element are/is arranged on or outside a plane (A) which is arranged offset 5mm towards the centre of the window from a plane (B) which comprises the major visible centre facing surface (142) of the cover panel element (133).

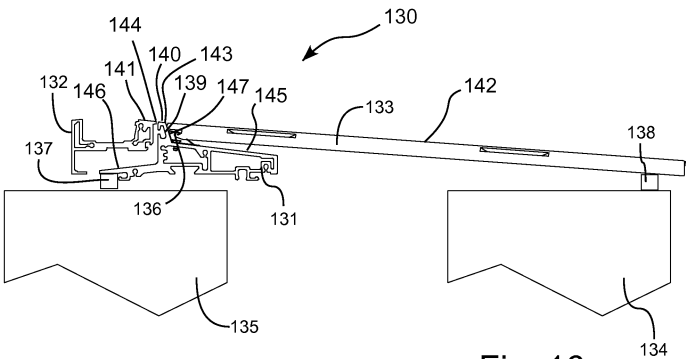

Fig. 16

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Description

[0001] The current invention relates to an outwardly opening window assembly mounted in a window opening in a wall, said window assembly comprising a window frame made up of a number of frame members where one of said frame members is fastened to the window opening on the centre facing surface of the window opening, a window sash made up of a number of sash elements, a mounting fitting which connects one of said sash elements with one of said frame members, a window pane arranged in said window sash and a cover panel assembly comprising a number of cover panel elements, where one of said cover panel elements is fastened to one of said frame members and is arranged such that the portion of the centre facing surface of the window opening which is located between the innermost edge of said frame member and the inside surface of the wall in which the window opening is arranged is completely covered by said cover panel element,

Description of related art

[0002] In many window assemblies mounted in window openings in a wall of a house, there is a large distance between the innermost edge of the frame members and the inner side of the wall of the house due to the relatively thick walls used in modern houses. In most modern houses, the walls are hollow and are filled with insulation. Due to the distance between the inner most surface of the window frame members and the inside surface of the house wall means that the frame does not cover the gap in the wall and therefore access is given to the insulation arranged within the wall. This is not practical or aesthetically pleasing and it is therefore desired to cover this gap with a cover panel.

[0003] These cover panels are also sometimes called extension jambs or extension frames since they extend the width of the jamb or frame to match the thickness of the wall in which the window assembly is mounted. Some people also refer to cover panels as casings or trim. The bottom cover panel is also called a sill in some cases.

[0004] Cover panels are typically installed by the carpenter who installs the window assembly and can be made from different types materials, for example gypsum boards, flat pieces of wood, flat pieces of plastic, etc. In the past couple of years, pre-manufactured cover panel assemblies can be purchased which can be assembled and installed by less experienced workers and still achieve a high quality finish.

[0005] Some examples of currently available cover panels and cover panel assemblies are disclosed in US6829865, W003033834, US6389763, and US6141922.

Summary of the invention

[0006] A first aspect of the current invention is to provide a window assembly according to the introductory paragraph which is better than the window assemblies known in the art.

[0007] This is provided in that said cover panel assembly is arranged such that the innermost edge of the major visible centre facing surface of the portion of the sash element which is arranged on the inside of the window pane and/or the innermost edge of the major visible centre facing surface of the portion of said frame member which is arranged on the inside of the sash element are/is arranged on or outside a plane which is arranged offset 5mm towards the centre of the window from a plane which comprises the major visible centre facing surface of the cover panel element..

[0008] In this way the cover panel element and the remainder of the window assembly are arranged such that the viewers attention is focused towards the window instead of towards the window assembly itself. Furthermore, more light is allowed to enter the room due to the continuous surface running from the window pane to the inside wall of the house.

[0009] It should be noted that in the current claim1, the value 5mm is used. In a preferred embodiment, this value would be 0mm in order to provide a very smooth surface. However, due to tolerances it is difficult to guarantee a 0mm fit, therefore the value of 5mm is used. However, within the scope of this application, values other than 5mm could be used, for example 4mm, 3mm, 2mm, 1mm and 0mm. This is also true for the dependent claims which comprise the value 5mm.

[0010] When discussing the features of the window assembly, some sort of reference is needed in order to describe the relationship between the different components. In the current specification the relative terms are used in a context were the window assembly is mounted in an outer wall of a house. The terms inside and outside refer to respectively the inside of the house and the outside of the house. For example, the term "outwardly facing" would be something which faces in a direction looking from the inside of the house towards the outside of the house.

[0011] In order to specify the placement of a component on a plane which is parallel to the plane of the window assembly, the phrases "towards the centre of the window assembly" and "towards the periphery of the window assembly" are used. The periphery of the window assembly is the outermost edge of the window assembly. So something which is close to the periphery of the window assembly is also located close to the edge of the window opening. In contrast, something which is located close to the centre of the window assembly is located far from the edge of the window opening. The terms inside and outside can also be used to describe the relative location between two objects on a plane which is parallel to the plane of the window. For example, of one element is arranged outside the plane of the cover panel, then this means that the element is arranged further from the centre of the window assembly than the plane of the cover

panel.

[0012] In addition, it should be mentioned that when the term "looking towards" or "facing towards" are used, it is meant that the normal vector to the surface which is referred to has a component which is directed towards the object described. For example a surface which is facing towards the centre of the window assembly will have a normal vector which has a component which is directed towards the centre of the window assembly. Instead of using the phrase "surface which faces the centre of the window assembly", the phrase "centre facing surface" is used in some cases. If the surface is not planar, then the average normal vector of the surface would have a component which is pointing towards the centre of the window assembly.

[0013] In addition, the term "major surface" is used. The term "major surface" should be understood as being the largest surface of the element which fits with the additional describing terms. For example, the major centre facing surface is the largest surface of the element which faces the centre of the window assembly.

[0014] The term "visible surface" is also used and should be understood as being a surface which is visible to the user of the window assembly when the window assembly is finally installed in the window opening and in a closed position. For example, the cover panel is arranged to cover the window opening, therefore the centre facing surface of the window opening is not visible, but is still facing the centre of the window assembly.

[0015] It should also be noted that the term "innermost edge" is used in the claims. The innermost edge should be understood as the edge which is located closer to the inside of the window assembly than any other edge. It should also be noted, that in cases where the edge has been filleted or chamfered, then the edge which should be used for the interpretation of the claims should be the theoretical non-chamfered or non-filleted edge.

[0016] In one embodiment, the innermost edge of the major visible centre facing surface of the portion of the sash element which is arranged on the inside of the window pane could be arranged on or outside a plane which is arranged offset 5mm towards the centre of the window from a plane which comprises the major visible centre facing surface of the portion of the frame member which is arranged on the inside of the sash element. It should be noted that in this embodiment, the main idea would be that the innermost edge of the frame member is arranged on or outside the 5mm offset plane of the cover panel element and the innermost edge of the sash element is arranged on or outside the 5mm offset plane of the frame member. In this way a smooth progression is provided without any large visible disrupting edges.

[0017] In another embodiment, the major visible centre facing surface of the portion of the sash element which is arranged on the inside of the window pane could be arranged co planer with or outside a plane which is offset 5mm towards the centre of the window assembly from a plane which comprises the major centre facing surface of the cover panel element. By arranging the surface of the sash element co-planar or outside the 5mm plane of the cover panel, no significant disrupting surfaces are visible from the inside of the window assembly.

[0018] In a preferred embodiment, the cover panel element could cover at least a portion of a centre facing surface of the frame member which is arranged on the inside of the plane of the window pane. In this way, the cover panel can be supported by the frame member and/or can cover the frame member such that the focus is on the cover panel and not the frame member. The cover panel assembly could furthermore be arranged such that the cover panel element covers between 80 and 100% of a centre facing surface of the frame member which is located to the inside of the innermost edge of the centre facing surface of the portion of the sash element which is arranged on the inside of the window pane. If a large portion of the frame member is covered, then the frame member will have a very small visual effect on the window assembly. Furthermore, the frame member could be made from a lower visual quality material which could reduce costs.

[0019] In one embodiment of the cover panel element, the innermost edge of the visible major centre facing surface of the cover panel element could be arranged on the inside of the plane of the innermost surface of the wall in which the window opening is arranged. This provides a very simple and elegant completion to the cover panel assembly.

[0020] A sealing bead could furthermore be applied between the cover panel and the window opening at a distance of more than 5 mm from the inside surface of the wall and/or from the innermost edge of the cover panel. In this way, the sealing bead can be hidden in the shadow of the cover panel.

[0021] In one embodiment, the cover panel element could be arranged as a single planar plate and in that the innermost end of the cover panel element could be arranged as a simple edge of the plate. This allows for the use of many natural materials, such as wood and stone to be used and allows for a very simple and elegant construction.

[0022] In order to fasten the cover panel assembly to the frame members, the window assembly could comprise mounting clips which are fastened to the window frame and which engage with at least some of the cover panel elements in order to hold the cover panel assembly fastened to the window frame and where the clips and the cover panel elements are arranged such that the cover panel elements are fastened to the clips by displacing the cover panel assembly in a direction normal to the plane of the window assembly and towards the outside of the window assembly. By arranging the clips and the cover panel assembly as described above, it is very simple to mount the cover panel assembly in the window assembly without the need for any special tools.

[0023] One of the mounting clips could comprise a flange which protrudes in a direction perpendicular to the

plane of the window pane and which could be arranged in a slot in the cover panel element. In a further embodiment, the flange could be provided with barbs which allow motion in one direction, but not in the other direction.

[0024] In order to increase the light entering through the window assembl, a plane which comprises the visible major centre facing surface of the cover panel element could be arranged at an angle to the normal vector of the window pane of between 0 and 30 degrees.

[0025] In order to strengthen the cover panel assembly, a surface of the cover panel element which faces the periphery of the window assembly could be supported on a centre facing surface of the frame member and/or the centre facing surface of the window opening.

[0026] In one embodiment of the window assembly a cross section taken through a first side of the window assembly on a plane which is perpendicular to the longitudinal axis of the frame member of said first side of the window assembly could be the same as a cross section taken through a second side (and/or third and/or fourth side) of the window assembly on a plane which is perpendicular to the longitudinal axis of the frame member (5) of said second side (and/or third and/or fourth side) of the window assembly. In this way, a high degree of standardization is provided which reduces the manufacturing costs. It also reduces the number of different components in the window assembly and makes assembly easier.

[0027] It should be emphasized that the term "comprises/comprising/comprised of" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof. For example, in the claims it is stated that one frame member is fastened to the window opening. However, according to the above paragraph, this should be interpreted as at least one frame member is fastened to the window opening. In other words, just because the word "one" is used in a claim, the scope of protection of the claim should not be limited to "one" item, but should include any structure which has at least one item.

Brief description of the drawings

[0028] In the following, the invention will be described in greater detail with reference to embodiments shown by the enclosed figures. It should be emphasized that the embodiments shown are used for example purposes only and should not be used to limit the scope of the invention.

[0029] Figure 1 shows a schematic perspective view of a portion of a first embodiment of a window assembly according to the invention.

[0030] Figure 2 shows a schematic side view of the portion of the window shown in figure 1.

[0031] Figure 3 shows a schematic cross section view of a second embodiment of a window assembly but which is similar to the embodiment shown in figures 1-2.

[0032] Figures 4-6 show three different embodiments of how the cover plate could be attached to the frame member.

[0033] Figure 7 shows a schematic perspective view of a portion of a third embodiment of a window assembly according to the invention.

[0034] Figure 8 shows a schematic side view of the portion of the window assembly shown in figure 7.

[0035] Figure 9 shows a schematic cross section view of a fourth embodiment of a window assembly.

[0036] Figure 10 shows a schematic cross section view of a fifth embodiment of a window assembly.

[0037] Figure 11 shows a schematic cross section view of a sixth embodiment of a window assembly.

[0038] Figure 12 shows a schematic cross section view of a seventh embodiment of a window assembly.

[0039] Figure 13 shows a schematic cross section view of an eighth embodiment of a window assembly.

[0040] Figure 14 shows a schematic cross section view of a ninth embodiment of a window assembly.

[0041] Figure 15 shows a schematic cross section of a tenth embodiment of a window assembly.

[0042] Figure 16 shows a schematic cross section of an eleventh embodiment of a window assembly.

[0043] Figure 17 shows a close up of the window assembly of figure 16.

[0044] Figure 18 shows a similar view as figure 17, but where the window has been assembled incorrectly due to manufacturing tolerances.

[0045] Figure 19 shows a side view of one embodiment of a clip used to attach the cover panel element to the frame member.

[0046] Figure 20 shows a perspective view of the clip shown in figure 19.

Detailed description of the embodiments

[0047] The portion of the window assembly 1 shown in figures 1 and 2 is a portion of one side of the window assembly. The figures are representations of a cross section taken through one of the sides of the window assembly and being arranged on a plane which is perpendicular to the longitudinal axis of the frame member of said side of the window assembly. The figure shows what appears to be the bottom portion of the window assembly, however the person skilled in the art will be able to appreciate that the portion could also be one of the vertical sides or the top portion of the window assembly. In other words, the complete window assembly could be arranged such that the horizontal bottom portion, the vertical side portions and the horizontal top portion all had an arrangement which was the same as the portion shown in figures 1 and 2.

[0048] The portion of the window assembly 1 shown in figures 1 and 2 comprises an outer wall portion 2, an inner wall portion 3, a hollow space 4 between the outer and inner walls filled with insulation (not shown), a frame

member 5, a sash element 6, a double glazed window pane 7, a cover panel element 8, an inner sealing bead 9 arranged at the inside of the window assembly and an outer sealing bead 10 arranged at the outside of the window assembly.

[0049] The frame member 5 is one of four frame members which make up a rectangular window frame as is typical in window assemblies. The frame member is fastened to the inner and/or the outer wall via a bracket (not shown) or other form of mounting arrangement. Details of the mounting are not shown as they will be known to the person skilled in the art. The sash element 6 is one of four sash elements which make up a rectangular window sash surrounding the glass pane. The window sash is in this embodiment pivotably attached along one side of the window sash to one or more of the window frame members. The front sealing bead 10 seals the gap between the window opening and the window frame. Due to the window frame, window sash, window pane and outer sealing bead, the window opening is sealed to prevent the outside environment from contacting the inside environment.

[0050] In order to seal the window opening from the inside to create a finished appearance, the window assembly has a cover panel 8 which is arranged to cover the space between the innermost edge 11 of the sash and the innermost surface 12 of the inner wall 3. In the current embodiment, the cover panel is arranged such that it covers the entire surface 27 of the frame member which is arranged on the inside of the innermost edge (11) of the sash element and which faces the centre of the window assembly. In this way, when looking out at the side of the window assembly from the centre of the window in the closed position of the window assembly, the frame member is not visible at all. The cover panel also covers the gap 4 between the inner and outer walls as well as the surface 13 of the inner wall 3 which faces the centre of the window opening. In the current embodiment, the surface 13 of the inner and the surface 14 of the outer wall are arranged at the same distance from the centre of the window assembly, however in other embodiments, as will be shown later, the two surfaces could be arranged at different heights.

[0051] It can also be seen from the figures that there is space 15 available underneath the cover panel wherein different types of accessories could be integrated. A non limited set of examples of accessories is comprised of motors for window actuators, insect nets, sun screens, curtains, ventilation and lights.

[0052] The cover panel can be manufactured from many different materials and surfaces which will give very different visual impressions. Some non limiting examples are: copper, zinc, glass, matte plastic, transparent/translucent plastic, aluminum coated materials, foil coated materials and wood based materials. It is an advantage of the cover panel arrangement of this embodiment that the entire visual aspect of the window can be changed simply by changing the cover panel elements. This gives a lot of design freedom to the interior decorator who can actually use the window assembly itself as a design parameter. For example, the window cover panel elements could be chosen to match a sofa or to match with the type of floor covering chosen.

[0053] In addition, since the inside portion of the frame member is completely covered, the builders, when installing the window frame or when working on the house in general do not have to pay particular attention to how the frame is treated. The frame can be marked up and cosmetically damaged without being visible to the user once the cover panel assembly is installed. This also allows the window manufacturer to use materials for the frame which are of lower cost and/or lower cosmetic quality. Instead the window manufacturer can focus on strength and workability of the frame material. This is especially important for wooden windows where large pieces of cosmetically fine wood, which would be required in a visible wooden frame, are relatively expensive.

[0054] The integrated cover panels also give a complete clean expression to the window assembly. In a typical window assembly, one can see the window sash, the window frame and the window cover panel. In the current embodiment, the user only sees the window cover panel and the sash. Furthermore, in the current embodiment, the cover panel is arranged such that the surface 16 of the cover panel which faces in towards the centre of the window assembly is arranged slightly closer to the centre of the window assembly than the surface 17 of the sash element which is arranged on the inside surface of the glass pane and which faces in towards the centre of the window assembly. In this way, there will be a slight shadow at the transition between the cover panel and the sash which will blend out the transition. This will give a smooth visual impression where the sash element and the cover panel appear to merge into one element. This gives a very clean impression which will not distract the user's eyes.

[0055] The offset between the centre facing surface of the sash element and the centre facing surface of the cover panel element is due to the fact that in the current embodiment, the centre facing surface 17 of the sash element is arranged flush with a centre facing surface 18 of a protrusion 19 on the frame element arranged adjacent the sash element. This protrusion ensures a smooth transition in situations where no cover panel according to the current invention is used. In order for the cover panel to cover this protrusion of the frame member completely, the cover panel comprises a thin protrusion 20 which is arranged at the outermost edge 28 of the cover panel and which is arranged to cover the protrusion 19 of the frame member. The thinner the protrusion 20 of the cover panel is made, the smaller the offset between the centre facing surface of the sash element and the centre facing surface of the cover panel will be. However, at the same time, the thinner the protrusion 20 of the cover panel is made, the greater the risk that the protru-

sion 20 will break off or warp over time. As will be shown later, in other embodiments (see figures 7, 8, 15 and 16), the protrusion on the cover panel is not present which will expose the protrusion of the frame member. In other embodiments (see figures 9-13), the protrusion 19 on the frame member is removed and the cover element can therefore cover the frame element completely without the need for a protrusion on the cover panel.

[0056] It should be noted that in this embodiment, the window sash is presented as a single integrated element. However as will be known to the person skilled in the art, in many cases the window sash is comprised of a sash profile and a glazing bead which holds the window pane in the sash profile. The person skilled in the art should therefore understand that the current invention will also cover sash elements which are comprised of multiple elements and that the surface of the sash element as mentioned above will also refer to the surface of a glazing bead which is mounted on the sash profile. Examples of such profiles can be seen in figures 12 and 13.

[0057] As can be seen from the figures, there is no trim on the inside edge of the cover panels which distracts the eyes of the viewer. Rather the cover panel is arranged as a single simple planar plate element and the innermost end fo the panel is just the end of the panel itself. In this way the focus of the viewer's eyes is taken away from the outer trim and is instead focussed on the cover panel and further on to the view. In order to seal the gap between the cover panel and the inner wall, a sealing bead 9 is arranged in the gap. The sealing bead is pulled slightly back behind the front edge of the cover panel and behind the inside surface of the inner wall. A small shadow will be created under the front edge of the cover panel which will hide the sealing bead from view. This also gives a lightness to the assembly and decreases the physical outer dimensions of the window assembly.

[0058] In the current embodiment, the cover panel has been arranged at an angle to the normal vector of the plane of the window assembly such that the cover panel slopes slightly in the direction from the window pane to the inside surface of the inner wall.

[0059] It should also be noted that in the current embodiment, the window opening has two centre facing surfaces 13,14. Furthermore it can be seen that the frame member is mounted on these surfaces. However, as will be known to the person skilled in the art, the frame member could actually ne supported in the window opening via a bracket which is fastened to the outwardly facing surface of the inner wall portion. However, according to the understanding of the current specification, even in this case, the frame member is mounted on the centre facing surface of the window opening. It can also be seen that the frame member is arranged between a plane which comprises the outside surface of the wall and a plane which comprises the inside surface (12) of the wall. This is the case for all of the embodiments disclosed in this specification. However, the scope of protection should extend to cover other frame members having parts which could extend beyond these planes. Furthermore in the current embodiment, there is a distance between the innermost edge/surface of the frame member 5 and the inside surface 12 of the inner wall 3.

[0060] The embodiment shown in figure 3 is essentially identical to the embodiment shown in figures 1 and 2, however a trim element 21 has been integrated with the seal 22 located between the inside surface 23 of the window pane and the outwardly facing surface 24 of the inner portion 25 of the sash element 6. The trim element is arranged such that the surface 26 of the trim element which faces in towards the centre of the window assembly is arranged flush or co-planar with the surface 16 of the cover panel which faces in towards the centre of the window assembly. The trim element could be arranged without any fixed connection to the centre facing surface 17 of the actual sash element, or it could be fastened to the centre facing surface 27 via an adhesive or via other means for example velcro or other form of snap mechanisms. The trim element could also be supplied independently of the seal element. The trim element could be made from the same material as the cover panel. In this way, it would be possible to provide a set comprising a cover panel assembly and a set of trim elements. A user could then mount new trim elements to the window sash and a new cover panel assembly to the window frame and thereby change the entire visual impression of the window assembly without changing any of the structural components of the window assembly.

[0061] Figures 4-6 show different embodiments of ways of fastening the cover panel assembly to the frame members. Common between the different embodiments are that some form of clip 30,31,32 is arranged at the outermost end of the cover panel and some form of clip 33,34,35 is arranged at the inner most end of the frame element. In this way, the cover panel is supported at two points on the frame member. In the three embodiments, the clips at the outermost edge of the cover panel are arranged such that the clip is attached to the frame member either via gluing or via a fastener such as a screw or nail and the cover panel is arranged with a slot into which the clip is pressed during mounting. The clip then holds on to the inside surfaces of the slot via a sort of tooth or barb arrangement which bites into the sides of the slot in order to hold the cover panel firmly attached to the frame member. The slot is arranged such that a cross section through the slot along a plane which is perpendicular to the longitudinal axis of the slot shows a rectangular outline having a major axis which is arranged at an angle of between 20° and 0° to the normal vector to the plane of the window. The clip arranged at the innermost end of the frame member is attached either to the surface (29) of the cover panel which faces the periphery of the window assembly and/or to the inwardly and/or centre facing surface 27 of the frame member. Since there is more room at this point, the clip can be arranged in many different ways. Three options are shown in the figures. As can be seen, the presence of a protrusion 20 on the

cover panel hides the details of the clips and ensures a clean transition between the cover element and the sash. It can also be seen for example by comparing figures 5 and 6, that even if there are dimensional tolerances between the frame and the cover panels, the arrangements shown in figures 4-6 will absorb the tolerances without decreasing the clean appearance of the window assembly. This is important since the cover panel is usually one of a four cover panels which have been joined in a cover panel assembly. In order for the joints between the cover panel elements of the cover panel assembly to be formed properly, it is important that the connection between the frame members and the cover panels does not pull the frame members apart and that slight differences in the sizes between the cover panel assembly and the window frame are not obviously visible to the viewer of the assembled window assembly.

[0062] The embodiment 50 shown in figure 7 and 8 is again very similar to the embodiment shown in figures 1 and 2. Therefore the same reference numerals will be used. The only difference between the embodiment 50 of figures 7 and 8 and the embodiment 1 of figures 1 and 2 is that the cover panel 51 does not have a protrusion 20 which covers the protrusion 19 of the frame member. Instead, the major centre facing surface 16 of the cover panel is arranged flush or co-planar with the centre facing surface 18 of the protrusion 19 of the frame member 5. Since the centre facing surface 18 of the protrusion 19 of the frame member 5 is also arranged flush or co-planar with the centre facing surface 17 of the sash element 6, all the centre facing surfaces of the frame member, sash element and cover element are arranged in the same plane. This will also give a very clean visual impression with no disturbing elements in the window assembly. The fact that the small surface of the protrusion 19 of the frame member is visible can be used to create a unique visual expression.

[0063] The embodiment 60 shown in figure 9 also comprises a frame member 5, a sash member 6, a window pane 7 and a cover panel 8. In this embodiment the frame member is arranged without a protrusion 19 (of figure 1) adjacent the sash member 6. In this way the centre facing surface 61 of the frame element is arranged at an offset to the centre facing surface 62 of the sash element. This allows the cover panel 8 to completely cover the frame element without the need for any thin protrusions at the outermost edge of the cover panel. The centre facing surface 16 of the cover panel is therefore arranged completely flush with the centre facing surface 62 of the sash element 6. It can also be seen that the outwardly facing surface 63 of the cover panel is arranged to abut the inwardly facing surface 64 of the sash element. Furthermore, the surface 65 of the cover panel which faces towards the periphery of the window opening is arranged to support on the centre facing surface 61 of the frame member.

[0064] The embodiment 70 shown in figure 10 is very similar to the embodiment shown in figure 9. The difference in this case is that the centre facing surface 13 of the inner wall 3 is arranged closer to the centre of the window assembly than the centre facing surface 14 of the outer wall 2. In this case, the centre facing surface 16 of the cover panel 8 is arranged horizontally and without any slope. It could be imagined that an embodiment such as the one shown in figure 10 is used as the bottom portion of the window assembly and the embodiment shown in figure 9 is used as the top and side portions of the window assembly. The bottom portion could advantageously be arranged horizontal so that it can be used as a window sill where items, for example flower pots, can be placed. It should be noted from figure 10, that the centre facing surface of the sash element is not arranged co-planar with or outside a plane which comprises the major surface of the centre facing surface of the cover panel element. However, the innermost edge 71 of the centre facing surface of the sash element is arranged on said plane.

[0065] The embodiment 80 shown in figure 11 is also very similar to the embodiment shown in figure 9. The difference in this case is that the cover panel element 8 is extended in such a way that the outermost edge 81 of the centre facing surface 16 of the cover panel 8 abuts the inside surface 23 of the window pane. In this case the portions of both the sash element and the frame member which are located in on inside of the inner surface 23 of the window pane are completely covered. This will give a very clean visual impression as the viewer will not see any connection lines between different elements of the window assembly.

[0066] The embodiment 90 shown in figure 12 is almost identical to the one shown in figure 9. The only difference is in the shape of the frame member and the shape of the sash element which is a two part sash element, a sash profile 94 and a glazing bead 95. The glazing bead is snapped onto the sash profile in order to hold the window pane 7 in place. In this case, the centre facing surface of the sash element according to the understanding of this patent specification is actually the centre facing surface 96 of the glazing bead.

[0067] This embodiment also shows in more detail, the arrangement of the cover panel at the inside edge of the cover panel. As can be seen the inside edge 91 of the cover panel is arranged on the inside of a plane 92 which is flush with the inside surface 93 of the inner wall 3. A sealant bead 9 is arranged in the gap between the surface 97 of the cover panel which faces the periphery of the window opening. The sealant bead is arranged at a short distance from the inside edge of the inner wall.

[0068] The embodiment 100 shown in figure 13 is almost identical to the one shown in figure 12. The difference is that at the end of the cover panel 101 a casing/trim 102 is attached to cover the gap 103 between the cover panel and the centre facing surface 13 of the window opening in the wall.

[0069] The embodiment 110 shown in figure 14 shows an embodiment which is similar to the embodiment

shown in figure 9, but where the cover panel 111 abuts the innermost side 112 of the frame element such that the entire centre facing surface 113 of the frame member 5 is visible. The centre facing surface 114 of the cover panel, the centre facing surface 113 of the frame member and the centre facing surface 115 of the sash element 116 are all arranged at an angle to the normal of the window assembly. In addition all the mentioned centre facing surfaces are arranged co-planar.

[0070] Figure 15 shows an embodiment 120 which is very similar to the embodiment shown in figure 14, but where the centre facing surface 124 of the cover panel 121, the centre facing surface 123 of the frame member 122 and the centre facing surface 125 of the sash element 126 are not arranged co-planar. However, the innermost edge 127 of the centre facing surface of the frame member is arranged on a plane which comprises the centre facing surface 124 of the cover panel element and the innermost edge 128 of the centre facing surface of the sash element 126 is arranged on a plane which comprises the centre facing surface 123 of the frame member 122.

[0071] Figures 16 to 18 show an embodiment 130 of a window assembly which is in many ways similar to the embodiment shown in figures 7 and 8. The window assembly comprises a frame member 131, a sash element 132, a cover panel element 133, an inner wall portion 134, and outer wall portion 135 and a mounting clip 136. A sealing bead 137 is arranged between the frame member and the outer wall portion and a second sealing bead 138 is arranged between the cover panel element and the inner wall portion.

[0072] The frame member 131 is of the kind which has an upwardly protruding protrusion 139, the centre facing surface 140 of which is arranged essentially co-planar with the centre facing surface 141 of the sash element. In this embodiment, the centre facing surface 142 of the cover panel element is also arranged essentially co-planar with the centre facing surface 141 of the sash element and the visible portion of the centre facing surface 140 of the frame member. It can be seen from figure 18, that the surfaces are not exactly co-planar, however for the viewer of the window assembly, the surfaces will appear to be co-planar.

[0073] It can also be said that the innermost edge 143 of the visible centre facing surface 140 of the frame member 131 is arranged on the plane which comprises the major surface 142 of the cover panel element. Furthermore, it can be seen that the innermost edge 144 of the visible centre facing surface 141 of the sash element is arranged on a plane which comprises the visible centre facing surface 140 of the frame member.

[0074] However, due to manufacturing tolerances, the different elements of the window assembly could be located in slightly different positions. Due to this, it is imagined that the innermost edge 143 of the frame portion will be located on or outside a plane A which is arranged offset 5mm from a plane B which comprises the centre facing surface 142 of the cover panel element. Furthermore the innermost edge 144 of the centre facing surface 141 of the sash element will be arranged on or outside a plane C which is arranged offset 5mm from a plane D which comprises the visible centre facing surface 140 of the frame member. This is shown schematically in figure 18.

[0075] It can be noted that the frame member has three centre facing surfaces. A main centre facing surface 145 is arranged on the inside of the sash element. This surface is covered by the cover panel element when the window assembly is fully assembled and is therefore not visible when the window assembly is fully assembled. The cover panel element can be at least partly supported on this surface. A centre facing surface 146 is also arranged on the outside of the innermost edge of the sash element. This centre facing surface 146 is covered by the sash element in the closed position of the window and is therefore not visible either. The third centre facing surface 140 is the top surface of the protrusion 139 of the frame member. This surface is visible both when the window is closed and when the window is fully assembled. The surface 147 which is located between the visible centre facing surface 140 of the frame member and the main centre facing surface 145 of the frame member is arranged at an angle of greater than 45 degrees to a normal vector of the plane of the window assembly. As a rough guideline, surfaces which are arranged at an angle of greater than 45 degrees to the normal vector of the window assembly are considered to be inside or outside facing surfaces and not centre or periphery facing surfaces. It should also be noted that according to this specification, the surfaces 140, 147 and 145 should be considered as three separate surfaces and not one common surface. There is a clear distinction between the three surfaces.

[0076] It can also be seen from the figures that the outermost edge 148 of the cover panel element is chamfered. In this way a "V" shaped groove is provided between the outermost edge of the cover panel element and the innermost visible edge of the frame element. This V-shaped groove could in certain embodiments be filled with a sealant bead in order to provide a smooth transition between the frame member and the cover panel element.

[0077] The clip 136 shown in figure 19 is just one out of many possible embodiments of a mounting clip which would work in a window assembly according to the invention. The clip is made from a thin sheet of plate metal material which is bent and stamped into the correct form. The clip comprises a first flange 151, a second flange 152 and a third flange 153. The first flange has two holes 154 through which screws can be placed to screw the flange onto the frame member. The second flange is arranged at an angle to the first flange. The angle between the first flange and the second flange is arranged to match the angle between the main centre facing surface 145 of the frame member and the inwardly facing surface 147 of the protrusion 139 of the frame member. The third

flange 153 is arranged at an angle to the second flange. The angle of the third flange is arranged to be at a slight angle to the normal of the window assembly when the clip is mounted on the frame member. The angle of the third flange is furthermore arranged so that the third flange points slightly towards the plane of the first flange. The arrangement of the clip on the frame member and the arrangement of the different angles is shown in figure 17.

[0078] The first flange 151 is provided with two upwardly bent "barbs" 155. The upwardly bent barbs are arranged to bite into the outer surface of the cover panel element when the cover panel element is assembled with the clip. Due to the arrangement of the barbs, once the cover panel has been mounted, the cover panel element is held in place by the barbs. The third flange is also provided with barbs 156 which engage with a slot 149 in the cover panel element. The barbs will also allow the cover panel element to be mounted in a simple manner and will then hold the cover panel element in place. During mounting, the third flange will be bent slightly upwardly which will ensure that the third flange exerts a small force on the cover panel element towards the first flange. This will more securely hold the cover panel element in contact with the barbs 155 on the first flange. Figure 17 shows the third flange of the clip in the unbent position. In the actual situation when the cover panel is mounted on the clip, the third flange will be bent upwards so that it is centred in the slot. It can also be seen from figure 17, that the entrance to the slot 149 is chamfered, so that it is easier to insert the third flange in the slot during mounting.

[0079] It is to be noted that the figures and the above description have shown the example embodiments in a simple and schematic manner. The fine structural details have not been shown since the person skilled in the art should be familiar with these details and they would just unnecessarily complicate this description and the figures.

[0080] It should also be noted that the specification contains other inventions than the ones specifically mentioned in the claims. The person skilled in the art will understand that these inventions could be filed as divisionals later on. For example, one additional invention is a window assembly where the surfaces of the cover elements which face the centre of the window assembly, the surfaces of the window sash which are arranged on the inside of the window pane and which face the centre of the window assembly and/or the surfaces of the frame member which face in towards the centre of the window assembly and which are arranged on the inside of the innermost edge of the surface of the sash member which is arranged on the inside of the window pane and which faces in towards the centre of the window assembly are arranged co-planar with each other and at an angle other than parallel to the normal to the plane of the window assembly. The surfaces could for example, be arranged at an angle of between 1 and 30 degrees to the normal of the plane of the window assembly.

[0081] It should also be noted that the reference numerals used in the claims typically only refer to one embodiment. But it should be clear to the person skilled in the art that the claims also cover embodiments having reference numerals which are not present in the claims. Should the reference numerals of all the embodiments be added to the claims, then the large number of reference numerals would make the claims harder to understand.

[0082] For the sake of completeness, a number of additional phrases are disclosed here below which could form the basis of additional dependent and or independent claims. The phrases could be combined with other phrases from the description and/or other claims as should be clear to the person skilled in the art.

[0083] A window assembly (1) wherein one of the sash elements (6) comprises a trim piece (21) which is arranged on the surface (17) of the sash element which faces in towards the centre of the window assembly and which is arranged on the inside of the window pane (7), and where the surface (26) of the trim piece which faces in towards the centre of the window assembly is arranged flush with the surface (16) of the cover panel which faces in towards the centre of the window assembly.

[0084] A window assembly (1) wherein said trim piece (21) is integrated with a seal element (22) which is placed between an outwardly facing surface (24) of the sash element (6) and the inside surface (23) of the window pane (7).

[0085] A window assembly (80) wherein the cover panel assembly is arranged such that the cover panel element (8) at least partially covers the sash element (6) when seen from the centre of the window assembly.

[0086] A window assembly (80) wherein said cover panel assembly is arranged such that the outermost edge (81) of the cover panel element (8) abuts the inside surface (23) of the window pane (7).

[0087] A window assembly wherein the plane comprising the major centre facing surface (17) of the portion (25) of the window sash element (6) which is arranged on the inside of the window pane is arranged co planer with or outside the plane which comprises the major centre facing surface (16) of the cover panel element. It should be noted that the plane of the window sash element should be limited to that amount of the plane which is arranged outside the innermost edge of the sash element.

[0088] A window assembly (60) wherein the cover panel assembly is arranged such that an outwardly facing surface (63) of the cover panel element (8) abuts an inwardly facing surface (63) of the sash element (6).

Claims

1. An outwardly opening window assembly (130) mounted in a window opening (13,14) in a wall, said

window assembly comprising a window frame made up of a number of frame members (131) where one of said frame members is fastened to the window opening on the centre facing surface of the window opening, a window sash made up of a number of sash elements (132), a mounting fitting which connects one of said sash elements with one of said frame members, a window pane (7) arranged in said window sash and a cover panel assembly comprising a number of cover panel elements (133), where one of said cover panel elements is fastened to one of said frame members and is arranged such that the portion of the centre facing surface (13,15) of the window opening which is located between the innermost edge of said frame member and the inside surface of the wall in which the window opening is arranged is completely covered by said cover panel element, **characterized in that** said cover panel assembly is arranged such that the innermost edge (144) of the major visible centre facing surface (141) of the portion of the sash element (132) which is arranged on the inside of the window pane and/or the innermost edge (143) of the major visible centre facing surface (140) of the portion of said frame member (131) which is arranged on the inside of the sash element are/is arranged on or outside a plane (A) which is arranged offset 5mm towards the centre of the window from a plane (B) which comprises the major visible centre facing surface (142) of the cover panel element (133).

2. A window assembly (130) according to claim 1, **characterized in that** the innermost edge (144) of the major visible centre facing surface (141) of the portion of the sash element (132) which is arranged on the inside of the window pane is arranged on or outside a plane (C) which is arranged offset 5mm towards the centre of the window from a plane (D) which comprises the major visible centre facing surface (140) of the portion of the frame member (131) which is arranged on the inside of the sash element (132).

3. A window assembly (130) according to claim 1, **characterized in that** the major visible centre facing surface (131) of the portion of the sash element (132) which is arranged on the inside of the window pane is arranged co-planar with or outside a plane (A) which is offset 5mm towards the centre of the window assembly from a plane (B) which comprises the major centre facing surface (142) of the cover panel element (133).

4. A window assembly (130) according to any one of claims 1-3, **characterized in that** the cover panel element (133) covers at least a portion of a centre facing surface (145) of the frame member (131) which is arranged on the inside of the plane of the window pane.

5. A window assembly (1) according to any one of claims 1-4, **characterized in that** the cover panel assembly is arranged such that the cover panel element (8) covers between 80 and 100% of a centre facing surface (27) of the frame member (5) which is located to the inside of the innermost edge (11) of the centre facing surface (17) of the portion (25) of the sash element (8) which is arranged on the inside of the window pane (7).

6. A window assembly (90) according to any one of claims 1-5, **characterized in that** the innermost edge (91) of the visible major centre facing surface of the cover panel element (8) is arranged on the inside of the plane (92) of the innermost surface (93) of the wall (3) in which the window opening is arranged.

7. A window assembly (90) according to claim 6, **characterized in that** a sealing bead (9) is applied between the cover panel (8) and the window opening (13) at a distance of more than 5 mm from the inside surface (92) of the wall and/or from the innermost edge (91) of the cover panel.

8. A window assembly according to claim 6 or 7, **characterized in that** cover panel element is arranged as a single planar plate and **in that** the innermost end of the cover panel element is arranged as a simple edge of the plate.

9. A window assembly (1) according to any one of claims 1-8, **characterized in that** the window assembly comprises mounting clips (30,33) which are fastened to the window frame (5) and which engage with at least some of the cover panel elements (8) in order to hold the cover panel assembly fastened to the window frame and where the clips and the cover panel elements are arranged such that the cover panel elements are fastened to the clips by displacing the cover panel assembly in a direction normal to the plane of the window assembly and towards the outside of the window assembly.

10. A window assembly (130) according to claim 9, **characterized in that** one of the mounting clips (136) comprise a flange (153) which protrudes in a direction perpendicular to the plane of the window pane and which is arranged in a slot (149) in the cover panel element (133).

11. A window assembly (130) according to any one of claims 1-10, **characterized in that** a plane (B) which comprises the visible major centre facing surface (142) of the cover panel element (133) is arranged at an angle to the normal vector of the window pane

(7) of between 0 and 30 degrees.

12. A window assembly (60) according to any one of claims 1-11, **characterized in that** a surface (65) of the cover panel element (8) which faces the periphery of the window assembly is supported on a centre facing surface (61) of the frame member (5).

13. A window assembly (1) according to any one of claims 1-12, **characterized in that** a cross section taken through a first side of the window assembly on a plane which is perpendicular to the longitudinal axis of the frame member (5) of said first side of the window assembly is the same as a cross section taken through a second side of the window assembly on a plane which is perpendicular to the longitudinal axis of the frame member (5) of said second side of the window assembly.

14. A window assembly (1) according to claim 13, **characterized in that** a cross section taken through a third side of the window assembly on a plane which is perpendicular to the longitudinal axis of the frame member (5) of said third side of the window assembly is the same as the cross section taken through the first and second side of the window assembly.

15. A window assembly (1) according to any one of claims 1-14, **characterized in that** said window frame comprises four frame members (5) having identical cross sections and **in that** said window sash comprises four sash elements (6) having identical cross sections, said cross sections being taken on planes which are perpendicular to the longitudinal axes of the frame members or sash elements respectively.

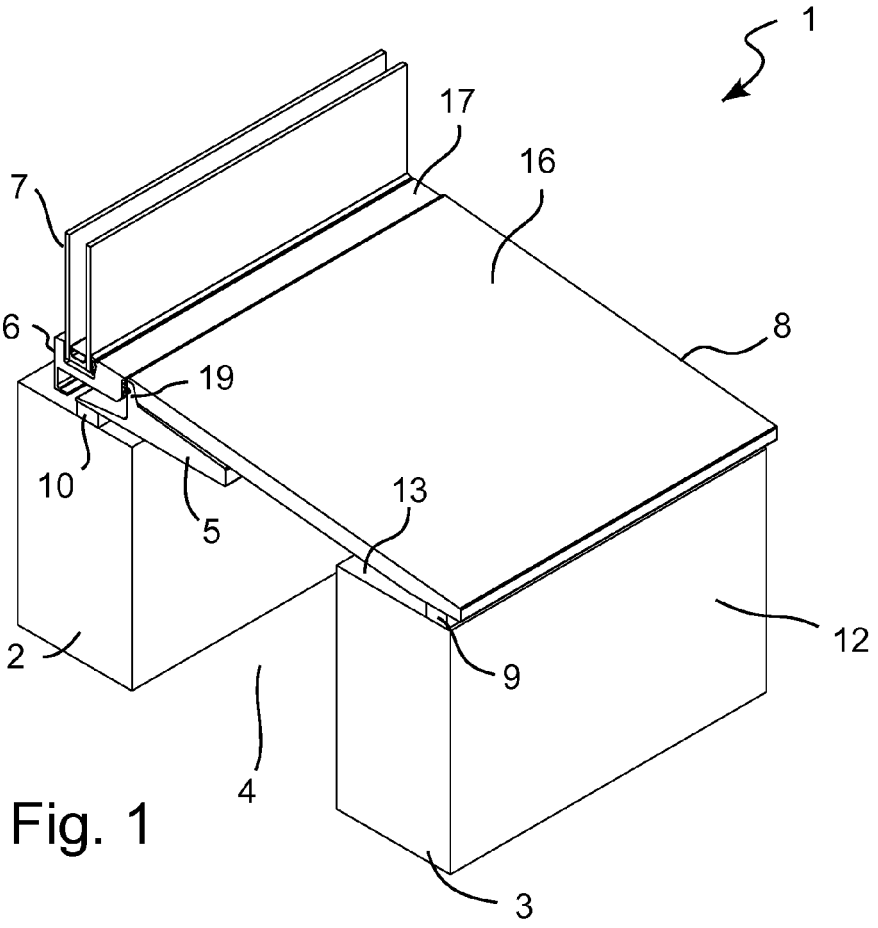
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Fig. 1

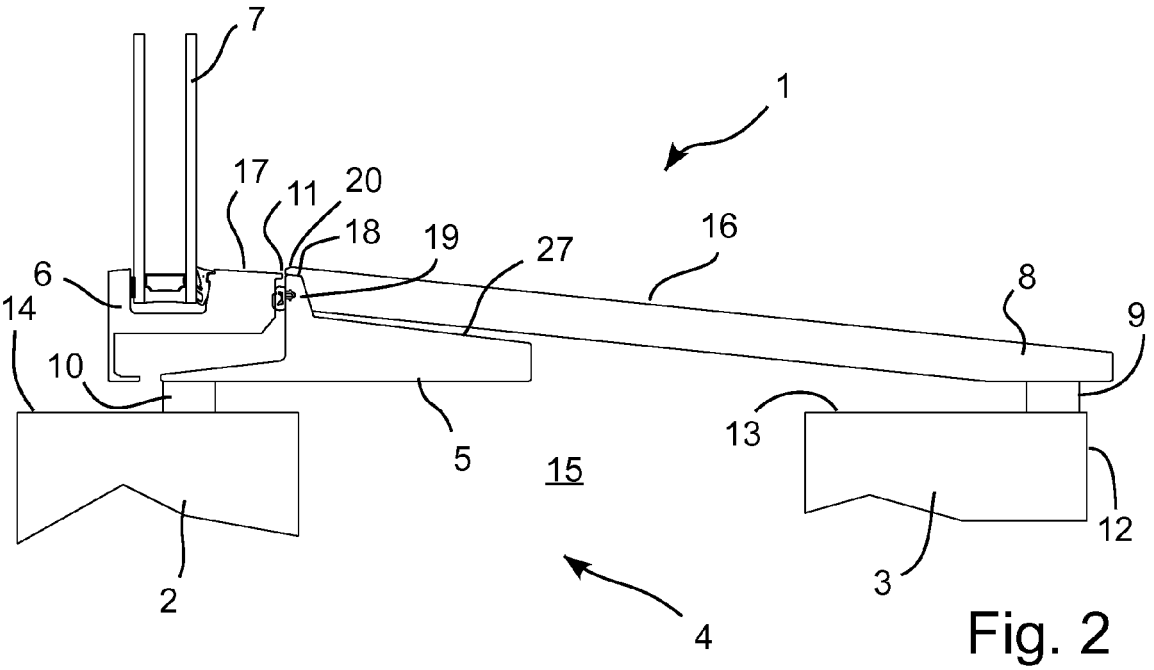
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Fig. 2

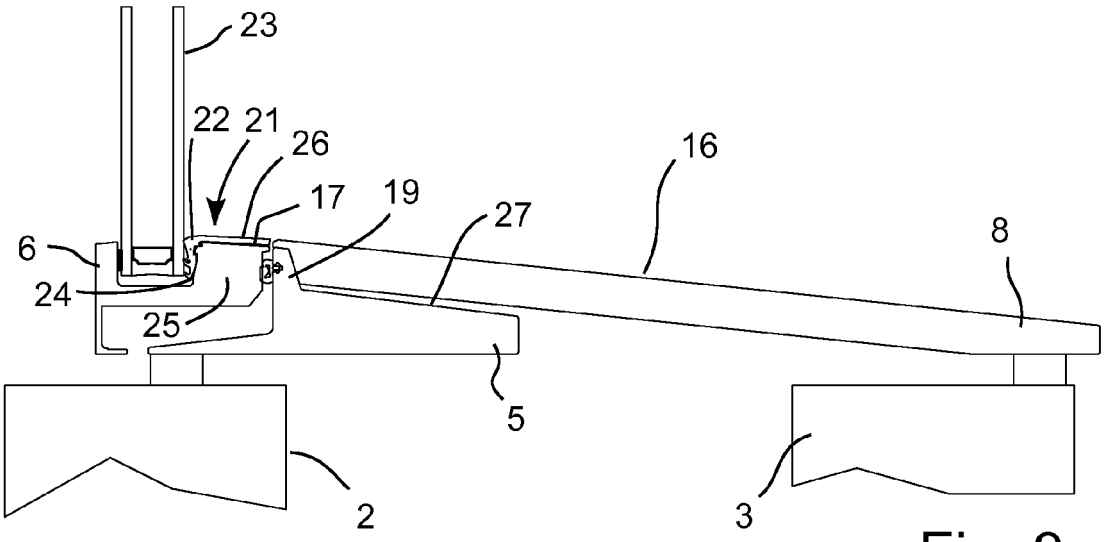

Fig. 3

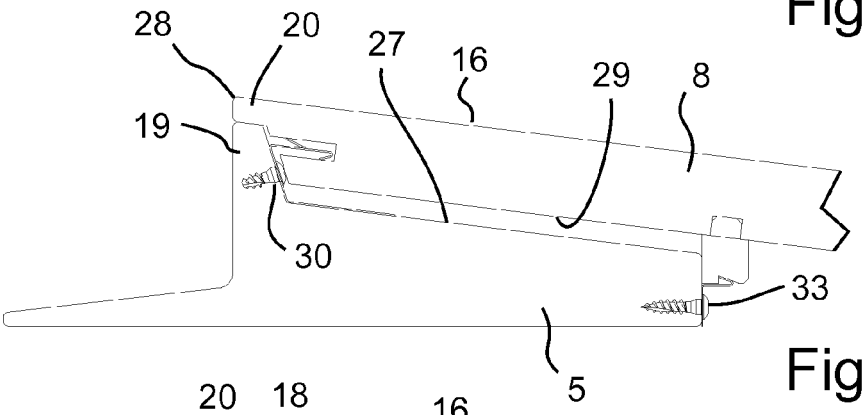

Fig. 4

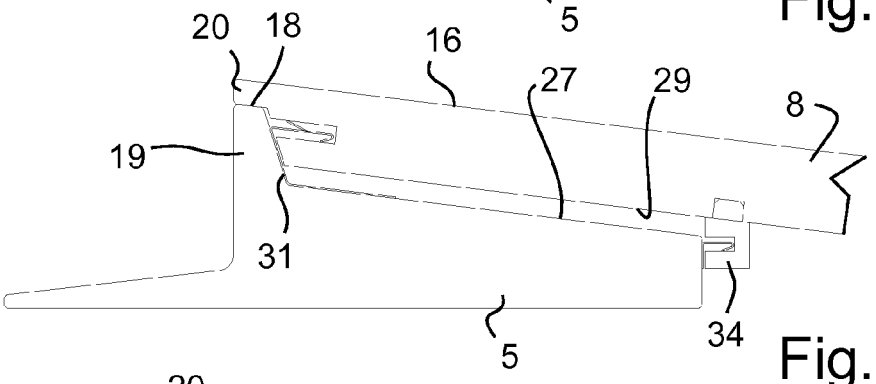

Fig. 5

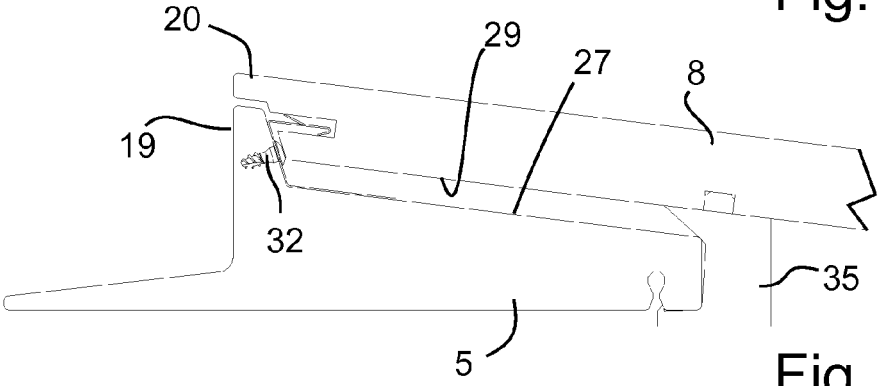

Fig. 6

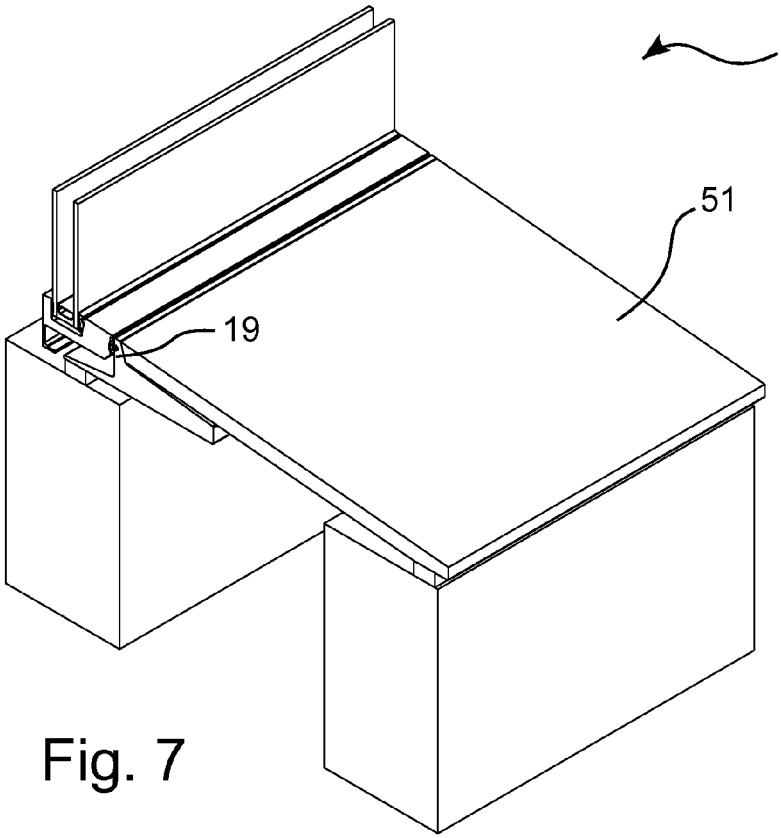

Fig. 7

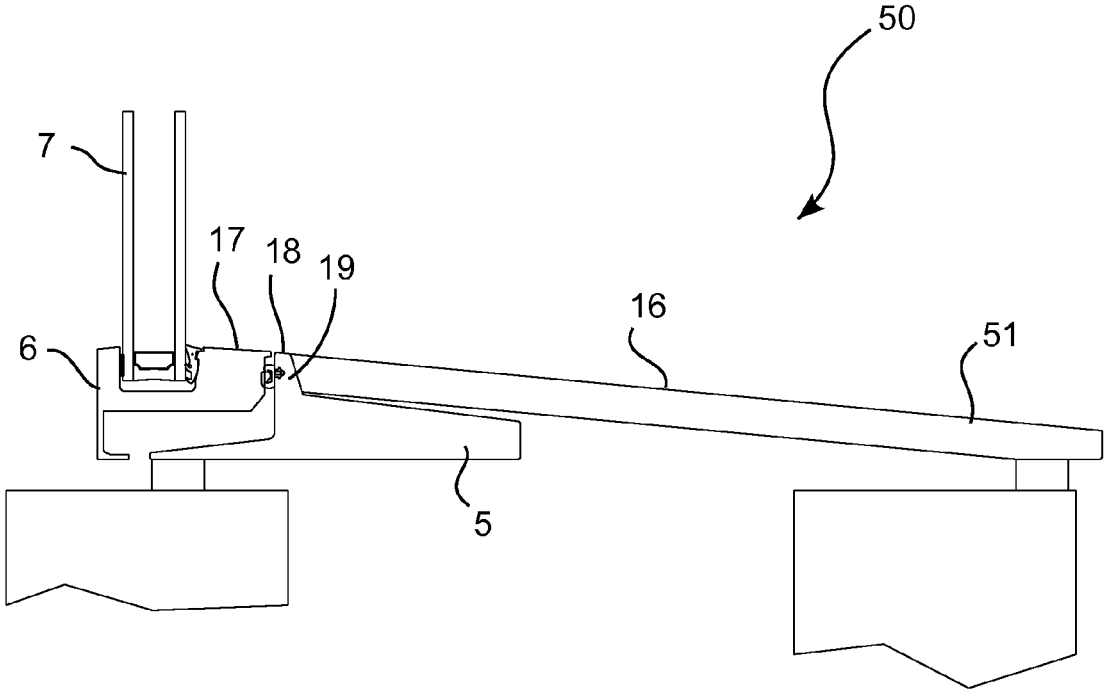

Fig. 8

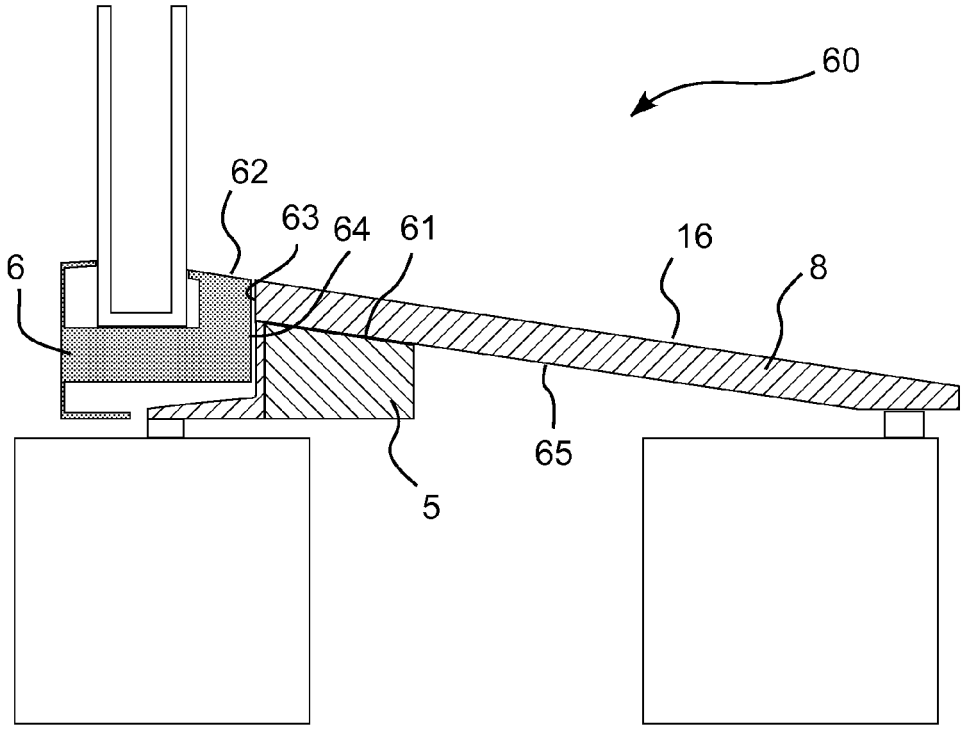

Fig. 9

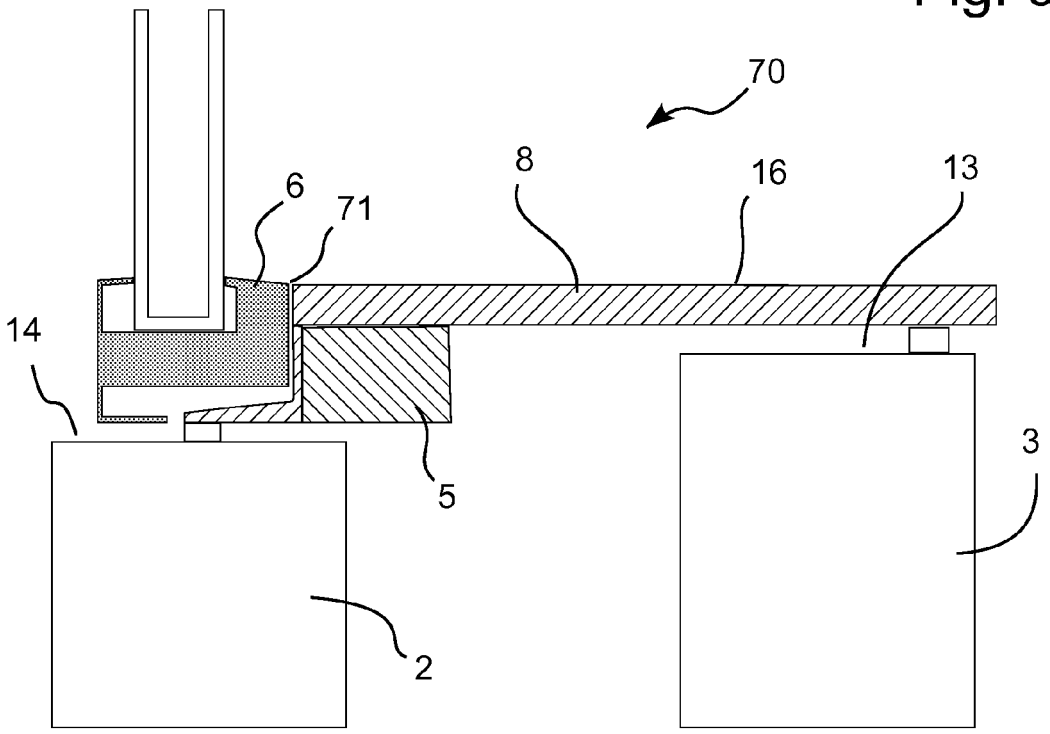

Fig. 10

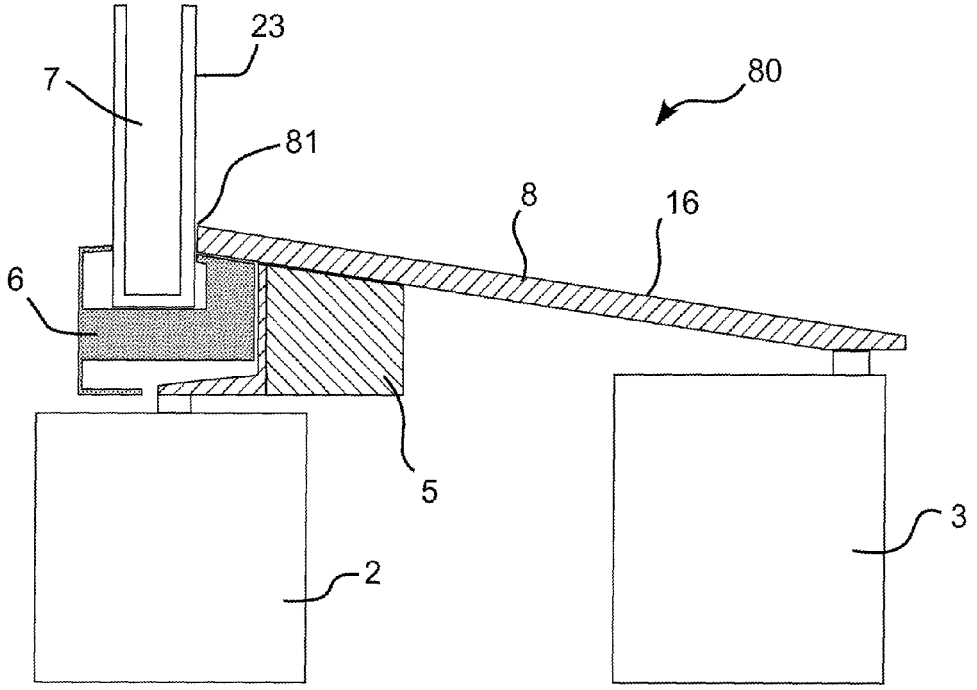

Fig. 11

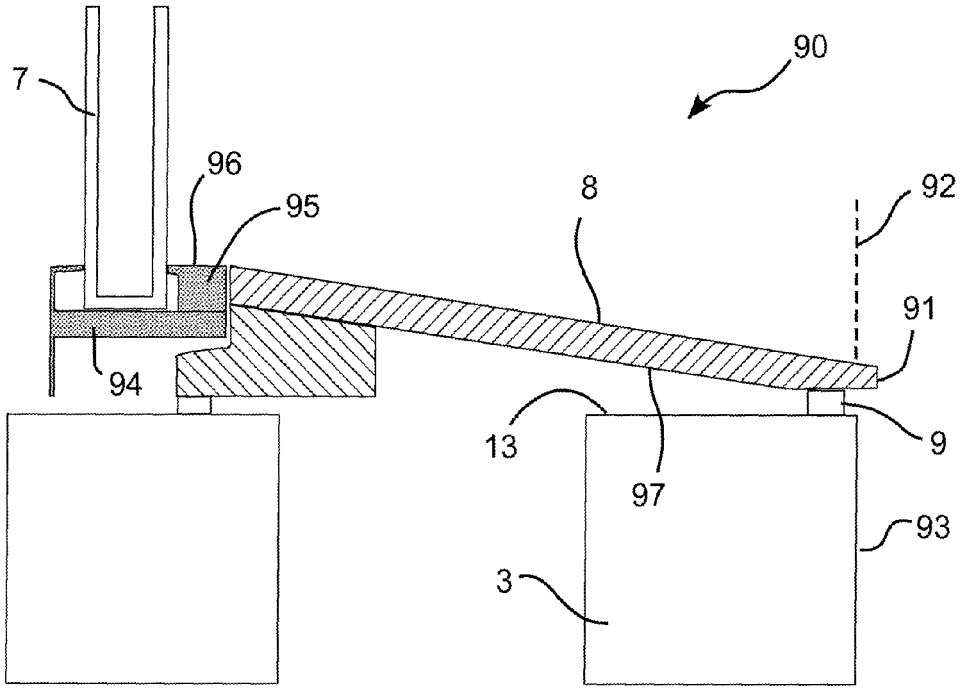

Fig. 12

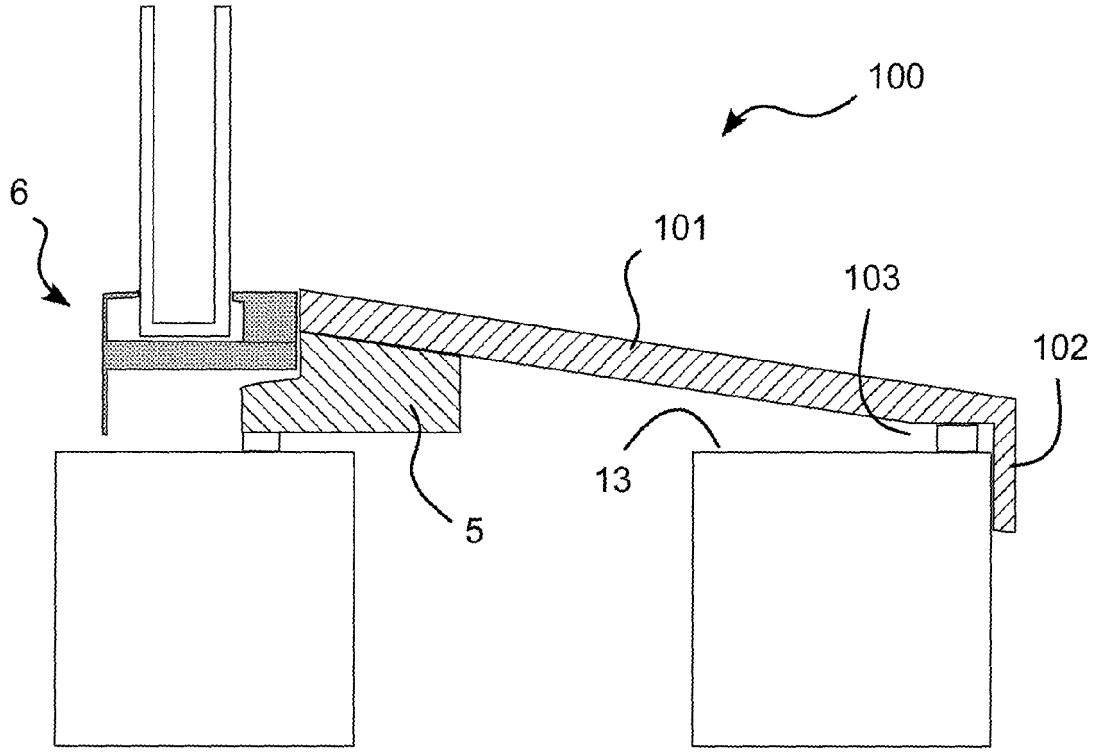

Fig. 13

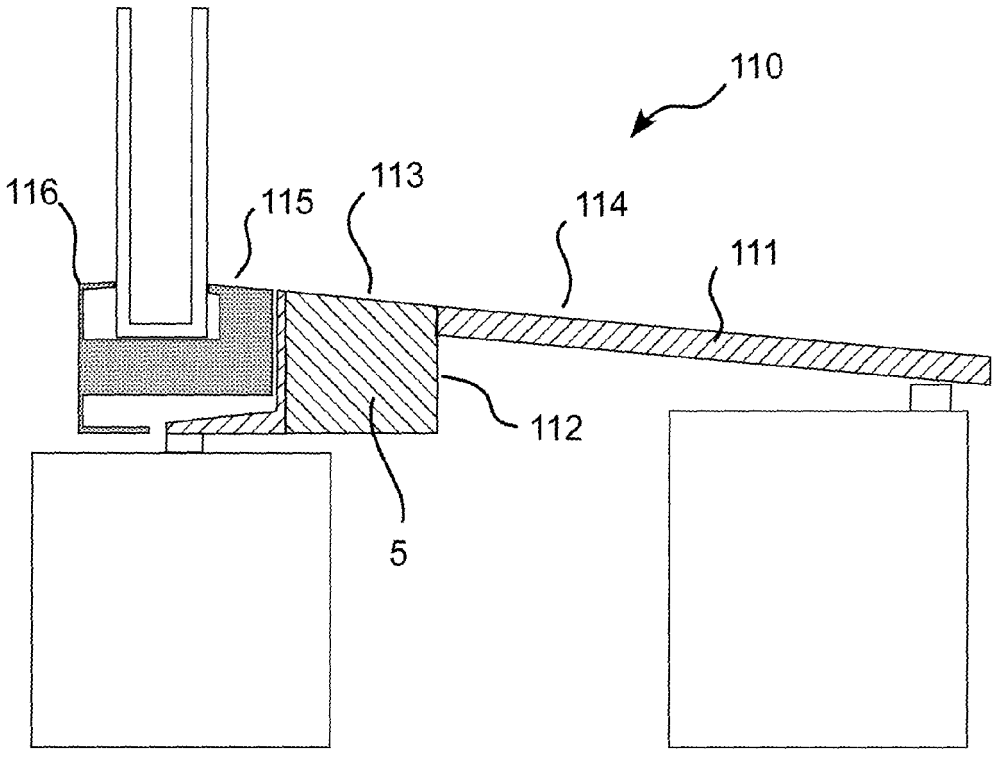

Fig. 14

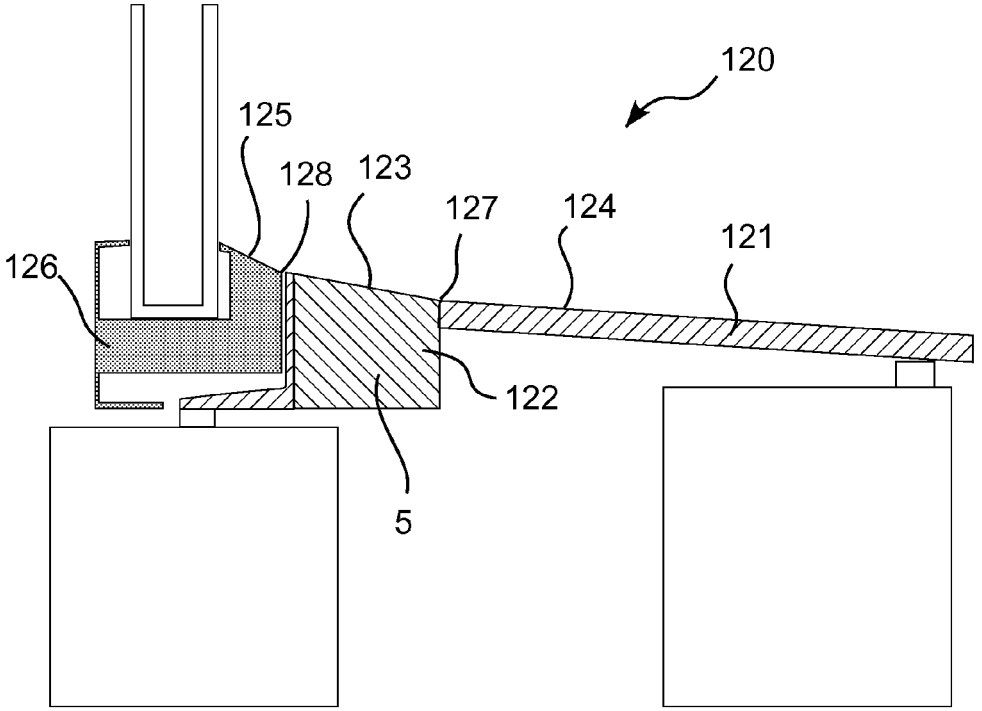
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Fig. 15

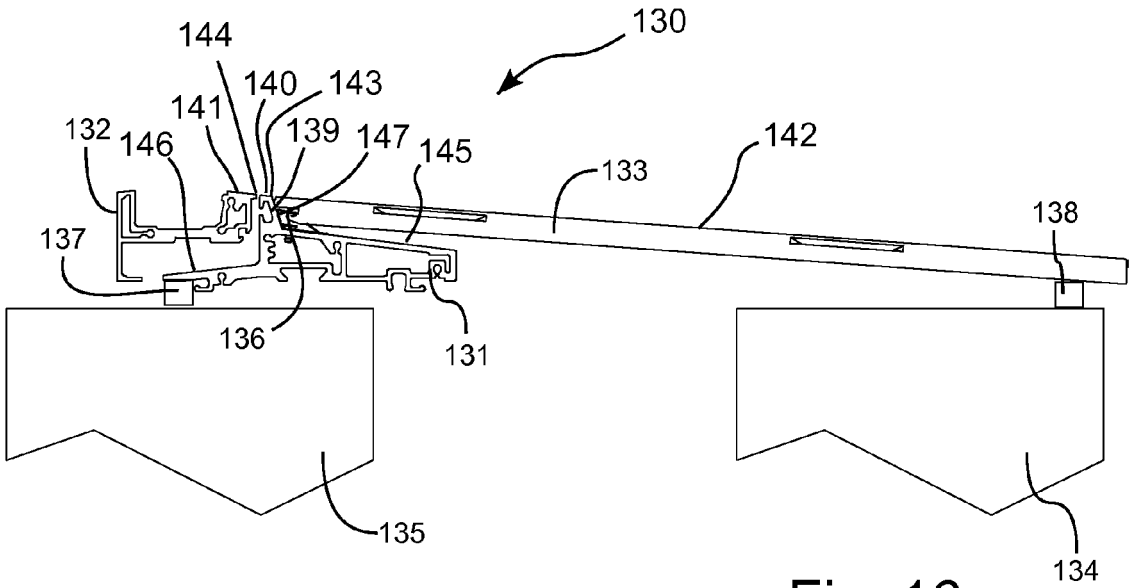
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Fig. 16

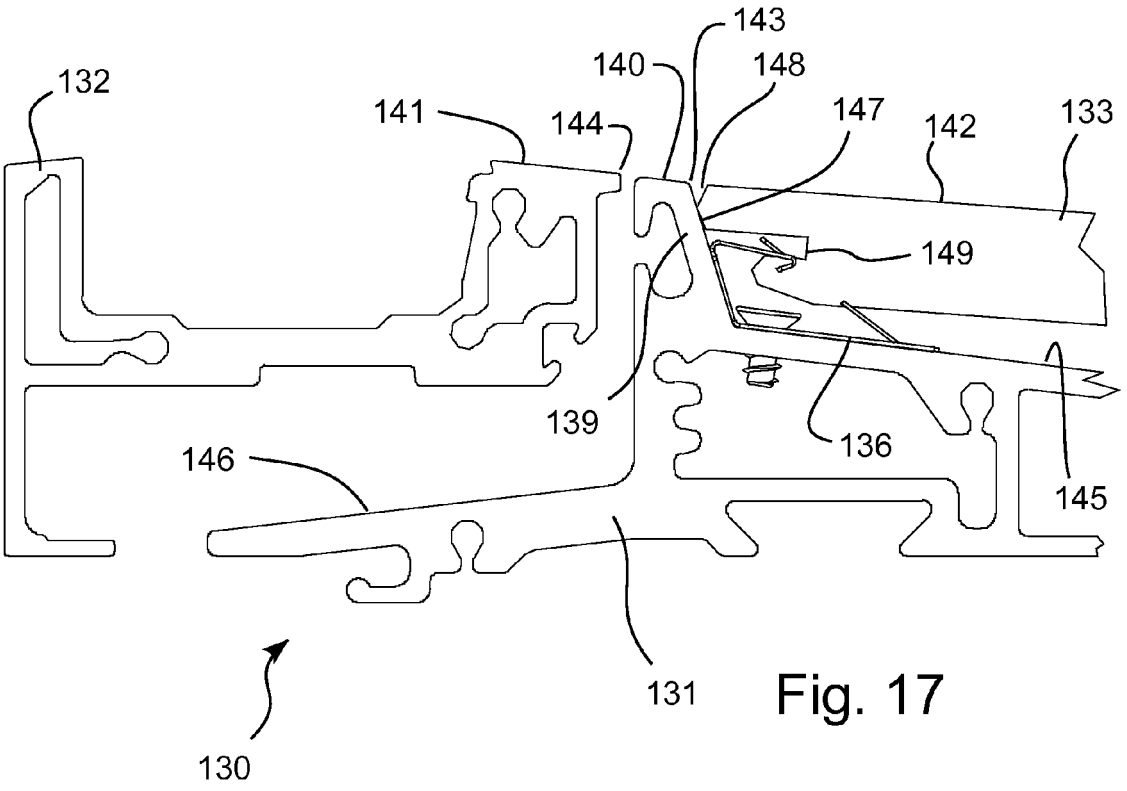
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Fig. 17

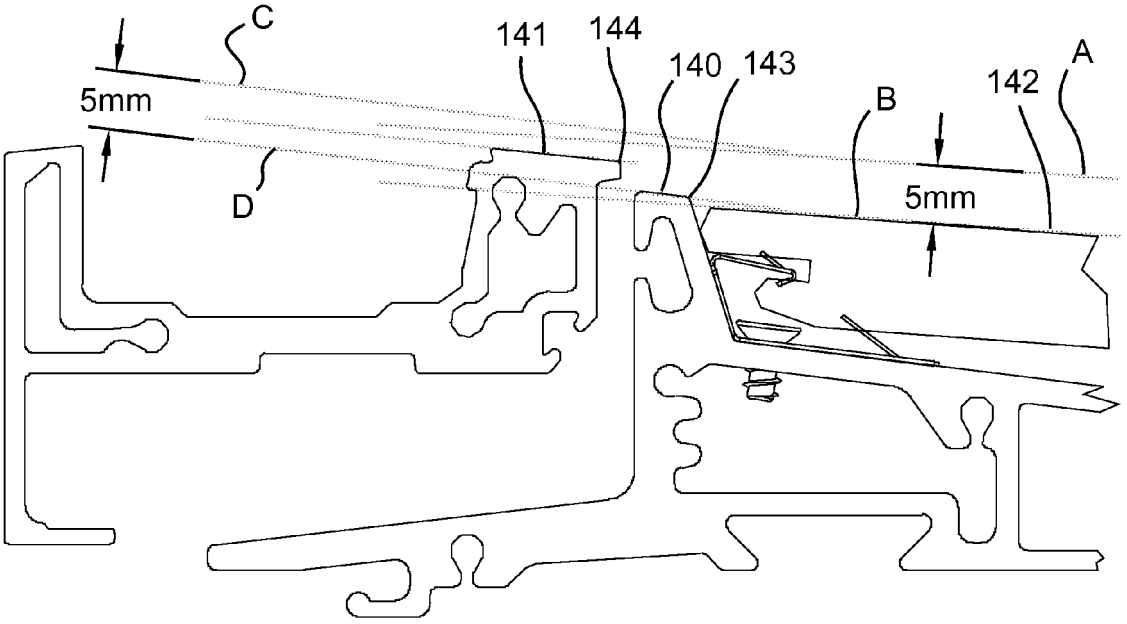
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Fig. 18

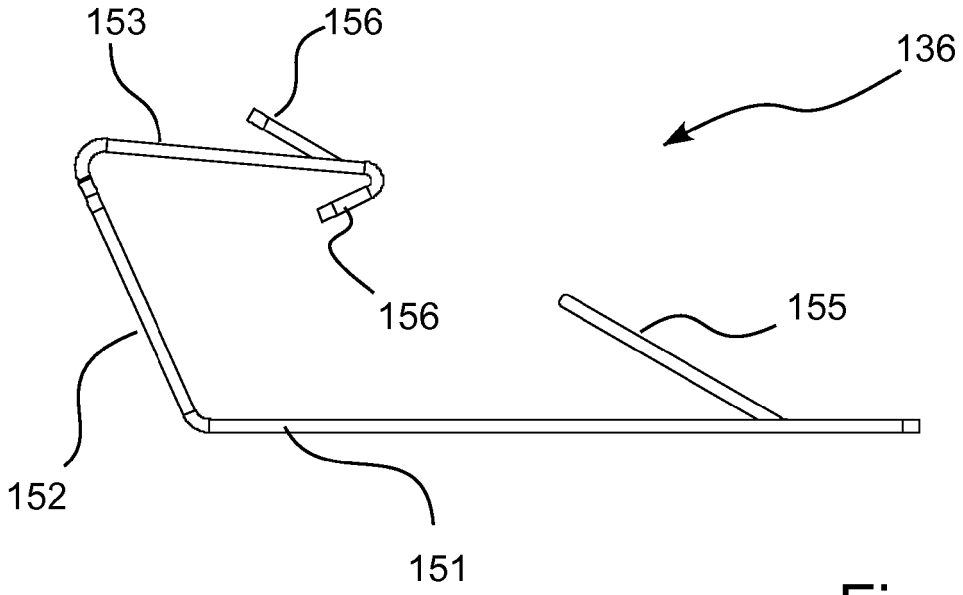

Fig. 19

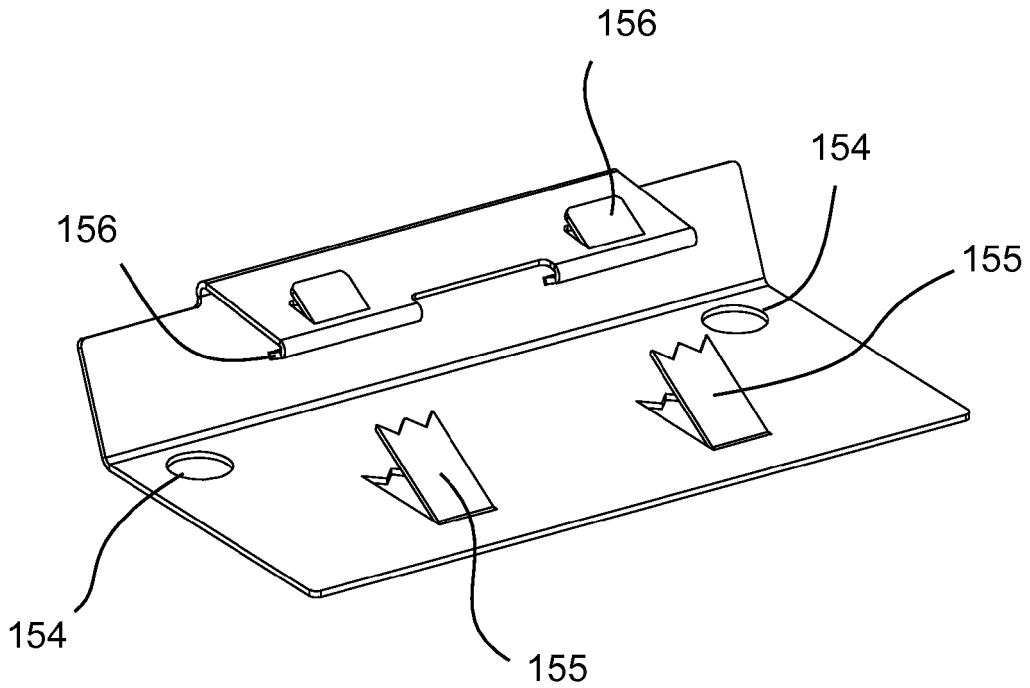

Fig. 20

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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 09 15 6344

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2005/059289 A (TNO [NL]; BOUMA PETER WALTER [NL]; DE KROON JACOBUS CORNELIS ANTO [NL]) 30 June 2005 (2005-06-30) * the whole document * -----	1-9, 11-15	INV. E06B1/00 E06B1/34 E06B1/70 E06B3/00
X Y	WO 00/66867 A (JENSEN KIM BISGAARD [DK]) 9 November 2000 (2000-11-09) * the whole document * -----	1-3,6-8, 11,13-15 9,10	
Y	WO 2007/059159 A (CUATRO LLC [US]; PRINCE JACK R [US]) 24 May 2007 (2007-05-24) * figures 33-35 * * paragraphs [0024] - [0032] * * paragraphs [0117] - [0119] * -----	9,10	
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