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(54) **A ROOF WINDOW WITH A COVERING MEANS FOR A FRAME**

(57) The invention relates to a roof window 1 comprising a frame 2 with a top member 5, a bottom member 6 and two side members 7, 8, the roof window 1 further comprising a covering including a top casing on the top frame member 5 and a frame striking bead covering 217 on each side frame member 7, 8. The window 1 further comprises a locking mechanism for locking the top casing to the frame 2, said locking mechanism being provided as at least one bracket 535 attached by means of an attachment means 536 to each of the side frame members 7, 8 in a position near the top frame member 5. In a preferred embodiment the bracket(s) 535 comprise(s) a first section 538 and a second section 539, said second section 539 being adapted for abutment with the side frame member 7, 8, said first and second sections preferably being made as one integral element.

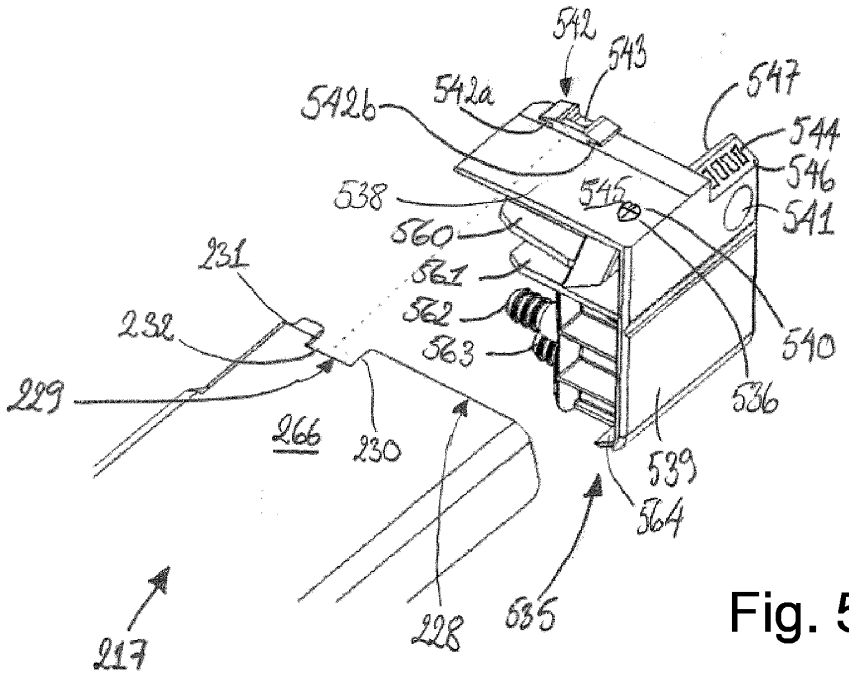

Fig. 5

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Description

[0001] The present invention relates to a roof window comprising a frame with a top member, a bottom member and two side members, the roof window further comprising a covering including a top casing on the top frame member and a frame striking bead covering on each side frame member.

[0002] In known roof windows of this kind, mounting of the parts of the covering may be troublesome, as these may for the most part be fastened to the frame once the frame has been installed into the aperture in the roof. Thus, a plurality of elements must be handled along with the tools to fasten the covering.

[0003] It is therefore an object of the present invention to provide a roof window, by which the installation conditions are facilitated.

[0004] This and other objects are achieved by a window comprising a locking mechanism for locking the top casing to the frame, said locking mechanism being provided as at least one bracket attached by means of an attachment means to each of the side frame members in a position near the top frame member.

[0005] This provides for a comparatively easy and reliable attachment of the top casing to the frame.

[0006] In one embodiment the bottom frame covering is provided with a fitting set adapted to be connected to the frame side member and to the side frame covering.

[0007] By connecting the bottom frame covering to a fitting set, ease of installation is achieved.

[0008] The fitting set preferably comprises an angle bracket and an intermediate member for interconnecting the side frame covering and the bottom frame covering to the frame, said angle bracket preferably being adapted to extend, in a mounted condition, with its longitudinal extension along the longitudinal extension of the side frame member. This provides for a stable and reliable attachment of the covering members and may further allow easy attachment and possibly also detachment of the coverings by adapting the angle bracket and covering members for a mutual snap-locking engagement. Such a snap-locking or a simple locking engagement without snap-function may be achieved by providing the covering members and angle bracket with projecting parts and grooves mating with each other.

[0009] Preferred embodiments and further advantages will be apparent from the following detailed description and the appended dependent claims.

[0010] The invention will be described in more detail below by means of a non-limiting example of an embodiment and with reference to the schematic drawing, in which

Fig. 1 shows a perspective view of a window according to the invention in the assembled state seen from below or inside,
Fig. 2 shows a perspective view of a window according to the invention in the assembled state seen from above or outside,
Fig. 3 shows an exploded view of a bottom sash member of a window according to the invention featuring a bottom sash covering, a pane holding device, an insulating element and a bottom sash gasket according to the invention,
Figs. 4a and 4b show perspectives view of pivot hinges to which female parts of a snap lock fastening means according to the invention are attached,
Figs 5 and 6 show perspective views of a locking mechanism for mounting a top casing according to the invention seen form two different angles,
Fig. 7 shows a perspective view of a glass rim profile according to the invention,
Fig. 8 shows a cross sectional view of a glass rim profile, a frame striking bead covering and a side frame covering in the assembled state according to the invention,
Fig. 9 shows an exploded view of a frame striking bead covering, a sash striking bead covering, and a side frame covering according to the invention,
Fig. 10 shows a perspective view of a lower end of a sash striking bead covering according to the invention,
Fig. 11 shows a perspective view of the transition between a frame striking bead covering and a sash striking bead covering featuring a prolongation of the sash striking bead covering according to the invention,
Fig. 12 shows a perspective view of a lower end of the frame striking bead covering with a labyrinth seal provided with a chamfer according to the invention,
Figs 13, 14 and 15 show three different steps of a process for mounting a frame striking bead covering on a window according to the invention by means of a snap lock fastening means according to the invention,
Fig. 16 shows a perspective view of a bottom frame covering in an embodiment of the invention,
Fig. 17 shows a perspective view of a bottom frame covering in an embodiment of the invention, from another angle,
Fig. 18 shows a perspective view of an angle bracket according to the invention,
Fig. 19 shows a perspective view of a side frame covering and an angle bracket according to the invention, and
Figs 20 and 21 correspond to Figs 1 and 2 showing a roof window according to the invention in from two different angles.

[0011] Fig. 1 and Fig. 2 show a preferred embodiment of a window 1 according to the invention comprising a pane 4 defining plane 16, a frame 2 having a top member 5, a bottom member 6 and two side members 7, 8 defining a frame plane, and a sash 3 having a top member 9, a bottom member 10 and two side members 11, 12 defining a sash plane. In the embodiment shown, the window is

centre-hung in that the sash 3 is connected to the frame 2 by a pivot hinge (200 in Figs 4a and 4b) provided between side members 7, 11; 8, 12 of the frame 2 and sash 3, respectively, to be openable by tilting the sash 3 of the window 1 about the pivot hinge axis 21 defined by the pivot hinge 200. The pivot hinge 200 comprises two parts, namely a sash part (not shown) and a frame part 20.

[0012] The hinges used are preferably of the type described in the applicant's earlier patent applications WO9928581 and GB1028251, where a curved member and a tap on one hinge part travels in a curved guide track in the other during opening and closing of the window. The radius of curvature entails that when using such hinges, the hinge axis lies at a small distance above the actual hinge parts and as the sash frame is turned first the curved member and then the tap comes out of the track. In combination this provides a pattern of movement which allows easy operation of a centre-hung window and allows the sash frame to be turned substantially entirely around.

[0013] As used in this description, a closed position of the window 1 means a position in which the frame plane and the sash plane coincide, that is form an angle of 0 degrees with each other. Similarly an open position of the window 1 as used herein generally means a position in which the sash 3 is tilted about the pivot hinge axis 21 such that the frame plane and the sash plane no longer coincide.

[0014] As seen in Fig. 1 a longitudinal axis 13 of the window 1 is defined as extending perpendicular to and between the frame top member 5 and the frame bottom member 6, a transversal axis 14 of the window is defined as extending perpendicular to and between the respective frame side members 7 and 8 and thereby perpendicular to the longitudinal axis 13 and a depth axis 15 of the window 1 is defined as extending perpendicular to both the longitudinal axis 13 and the transversal axis 14. The pivot hinge axis 21 and the transversal axis 14 are parallel, and are shown as coinciding in the figures.

[0015] The window 1 furthermore comprises a lock 17 of a type known per se for locking the frame 2 and sash 3 to each other as well as a generally circumferentially extending sealing 18 provided on the sash 3 for sealing the gap between the sash 3 and the frame 2 in the closed position of the window 1. The sealing 18 comprises at least one, preferably at least two sealing strips.

[0016] Notwithstanding the centre-hung window 1 shown in Fig. 1 the window according to the invention may in other embodiments be top-hung, with or without an intermediate frame structure, have the hinge axis somewhere between the top and the centre, be side-hung or for that matter even be bottom-hung.

[0017] The sash 3 and frame 2 of the window according to the invention may for example be made of wooden members or members made of cast or extruded polyurethane (PUR).

[0018] With reference to Fig. 3, the window 1 comprises, at the bottom sash member 10 of the sash 3, at least one, preferably at least two, pane holding devices 300 for holding the pane 4 such as to keep it from falling out of the sash 3 of the window. The pane holding device 300 is attached to a surface 307 of a bottom sash covering 319, and is shaped in such a way that it has a face 302 adapted for abutment with the pane 4. Hence the pane holding device 300 may for instance be substantially box shaped or substantially wedge-shaped. The pane holding device 300 is preferably made of a hard plastic.

[0019] As mentioned above, the window 1 further comprises a sash covering above glass 319, which comprises a first section 320 adapted for abutment with the pane 4, a second section 321 extending substantially in extension of and in parallel with the first section 320 and adapted for covering the underlying pane holding device(s) 300, insulating element 303, bottom sash gasket 310 and bottom sash member 10 and a third section 322 extending from and substantially perpendicular to the second section 321 and adapted for shielding a surface of the bottom sash member 10 facing away from the pane 4 in the longitudinal direction 13 of the window 1.

[0020] Attached to the bottom sash member 10 is provided an insulating element 303 for providing insulation of the transition between the bottom sash member 10 and the bottom sash covering 319. The insulating element 303 comprises at least one, preferably at least two, recesses 304 shaped such as to be adapted to accommodate a pane holding device 300. The recess 304 is preferably shaped such as to provide a close fit around the pane holding device 300, thereby providing optimum insulation conditions in the vicinity of the pane holding device 300.

[0021] The insulating element 303 is preferably made of styrene, polystyrene, expanded polystyrene (EPS) or extruded polystyrene (XPS). The insulating element 303 is preferably made as one element, but may in principle also be several elements. The insulating element 303 is attached to the bottom sash member 10 by means of attachment means (not shown), such as e.g. screws or glue, in such a way as to be placed between the bottom sash member 10 and the bottom sash covering 319. Preferably the insulating element 303 and the pane holding device(s) 300 are attached using the same attachment means, preferably a screw, extending through both elements and into the bottom sash member 10 prior to attaching the pane 4 and the bottom sash covering 319 to the window 1.

[0022] The insulating element 303 is preferably provided with a first surface 305 having a contour substantially corresponding to the contours of the surface 306 of the bottom sash covering 319 facing the bottom sash member 10 in the mounted position.

[0023] The insulating element 303 furthermore extends from the bottom sash member 10 in a direction away from the pane 4 of the window 1 in the longitudinal direction 13 of the window 1. The insulating element 303 is provided with a second surface 307, which may have profilings 308, preferably such as slots or recesses,

adapted for engagement with corresponding profilings 309, such as ribs or protrusions, of a bottom sash gasket 310, which will be described in the following.

[0024] The provision of an insulating element 303 as described above is particularly preferred in the case of a window 1 having a wooden frame 2 and sash 3. In case of a window having a frame 2 and sash 3 made of polyurethane or the like the insulating element and the bottom sash member 10 may be one integral element.

[0025] Still referring to Fig. 3, the window 1 furthermore comprises a bottom sash gasket 310 attached to the bottom sash member 10, and preferably made of a rubber material. The bottom sash gasket 310 is intended for sealing the gap between the bottom sash member 10 and the bottom frame member 6 in the closed position of the window 1.

[0026] As may also be seen in Figs 4a and 4b the bottom sash gasket 310 comprises a first part 316, a second part 317, a first surface 311 comprising a first surface part 311 a corresponding to the first part 316 and a second surface part 311 b corresponding to the second part 317, and a second surface 312 opposite the first surface 311. The first part 316 is adapted for attachment with the bottom sash member 10 and the second part 317 is extending from the bottom sash member 10 in a direction substantially away from the pane 4 in the longitudinal direction 13 of the window 1 when attached to the bottom sash member 10.

[0027] The bottom sash gasket 310 may comprise a profiling 309, such as ribs or protrusions, for engagement with a corresponding profiling 308, such as slots or recesses, in a surface 307 of the insulating element 303 described above. Preferably, the second surface 312 comprises the profiling 309.

[0028] The first surface part 311 a of the first surface 311 is adapted for being attached to the bottom sash member 10. The second surface part 311 b of the first surface 311 is adapted for close abutment against a bottom frame covering 237, which is mounted on the bottom frame element 6, in the closed position of the window 1 such as to seal the gap between the bottom sash member 10 and the bottom frame member 6 in the closed position of the window 1. To this end the second part 317 of the bottom sash gasket 310 is configured as described in the following.

[0029] The first part 316 of the bottom sash gasket 310 is substantially plane and rectangular in cross section, whereas the second part 317 comprises a first cross sectional section 313, a second cross sectional section 314 and a third cross sectional section 315. The first cross sectional section 313 extends substantially in parallel with and in extension of the first part 316. The second cross sectional section 314 is angled, preferably 10 to 45 degrees, with respect to the first cross sectional section 313, and the third cross sectional section 315 is angled, preferably 45 to 85 degrees, with respect to the second cross sectional section 314 such that the second part 317 comprises a substantially hook shaped cross section.

[0030] The second part 317, or at least at least the third cross sectional section 315 of the second part 317, may, in addition to the above, be adapted for sealing abutment with the third section 322 of the bottom sash covering 319. In this connection, the hook shaped cross sectional configuration of the second part 317 has the further advantage of providing a larger abutment surface and thus better sealing properties.

[0031] The bottom sash gasket 310 may further comprise at least one flange 318 provided extending substantially in a right angle from the first surface 311, preferably at the transition between the first part 316 and the second part 317. The flange 318 is adapted for abutting the surface of the bottom sash member 10 facing away from the pane 4 in the longitudinal direction 13 of the window 1, such as to ensure that no moisture may penetrate between the bottom sash gasket 310 and the bottom sash member 10.

[0032] The bottom sash covering 319, pane holding device(s) 300, insulating element 303 and bottom sash gasket 310 may all be attached to the bottom sash member 10, preferably in the order mentioned, by means of the same attachment means, preferably at least one screw, extending through all of the elements 319, 300, 303 and 310 and into the bottom sash member 10.

[0033] The above described embodiment of the insulating element 303 and the bottom sash gasket 310 is particularly intended for windows 1 having a sash 3 and a frame 2 made of wood.

[0034] In case of windows 1 having a sash 3 and a frame 2 made of extruded, moulded or cast polyurethane (PUR) or similar materials, the bottom sash member 10 and the insulating element 303 may be made as one integral element, whereas the bottom sash gasket 310 may be provided as one or more sealing strips or similar suitable elements arranged in a groove or recess in the integral bottom sash member 10 and insulating element 303.

[0035] Referring now to Figs. 5 and 6, the window 1 further comprises a locking mechanism 535 for locking the top casing 500 to the frame 2 of the window 1. The locking mechanism is provided as at least one bracket 535 attached by means of an attachment means 536, such as preferably a screw, to each of the side frame members 7, 8 of the frame 2 of the window 1 in a position near the top frame member 5. More specifically, and particularly in connection with a PUR-window, the at least two brackets 535 are attached to the side frame members 7, 8 in the vicinity of an end of a frame abutment list (not shown in Figs 5 and 6) similar to the abutment list 430 described above, which end faces the top frame member 5. The brackets 535 are preferably made of plastic, particularly extruded plastics, but may also be made of e.g. a metal.

[0036] The bracket 535 comprises in the preferred embodiment a first section 538 and a second section 539, preferably being made as one integral element.

[0037] The first section 538 comprises at least one hole 540 for receiving the attachment means 536. The hole 540 is preferably a through hole. The first section 538 is preferably substantially plate shaped. The first section 538 furthermore comprises a structure 542 provided on a surface 545 which in the mounted position of the bracket 535 faces away from the side frame member 7 or 8. The structure 542 protrudes slightly from the first section 538 and is provided with a substantially T-shaped cross section, thus comprising two lateral incisions 542a and 542b. Thereby the structure 542, and particularly the incisions 542a, 542b, are adapted for guiding engagement with a notch 229 in the frame striking bead covering 217 as indicated by the dotted line in Fig. 5, thus facilitating mounting of the frame striking bead covering 217 and ensuring correct positioning thereof with respect to the bracket 535. In the mounted position, the surface 545 and the frame striking bead covering 217 are in abutment. The structure 542 furthermore comprises a recess 543.

[0038] The second section 539 is adapted at least for abutment and preferably for engagement with the side frame member 7 or 8, particularly, to the side frame member 7 and 8 immediately above the frame abutment list. In the embodiment shown the second section is adapted for engagement with a side frame member 7 or 8 in that it comprises two engagement means 562 and 563 adapted for engagement with corresponding holes in the side frame member 7 or 8. Other numbers than two such engagement means - e.g. one or three - may also be provided.

[0039] The second section 539 comprises a structure comprising two abutment means 560, 561. The abutment means 560, 561 have several functions. Particularly the abutment means 560, 561 are adapted for, in the mounted position of the window, ensuring the correct distance between the side frame member 7 or 8 and the corresponding frame striking bead covering 217. Furthermore, the abutment means 560, 561 may be adapted for either abutment with an edge of a side frame covering 270, thereby ensuring correct mutual placement of the bracket 535 and the side frame covering 270, or for engagement with corresponding grooves in the side frame member 7 or 8 for correct placement of the bracket 535 on the side frame member 7 or 8. In the latter case it is possible to replace the engagement means 562 and 563 with holes for e.g. a screw or even to omit the engagement means 562 and 563 altogether.

[0040] The second section 539 furthermore comprises at least one hole 541 for receiving an attachment means (not shown) for attaching the top casing 500 to the bracket 535 and thereby - directly or indirectly according to the position of the hole 541 and the length of the attachment means - to the side frame member 7 and 8. The hole 541 is preferably a through hole. The second section 539 is preferably substantially box or cube shaped. The second section 539 preferably comprises a surface 547 adapted for guiding abutment with a corresponding structure 548, respectively 549, and particularly with a longitudinal wall 550 thereof, of the mounting bracket 510 or 511 of the top casing 500 such as to ensure correct positioning of the top casing 500 during mounting. In a preferred embodiment the surface 547 is inclined in such a way that the cross sectional area of the second section 539 increases in a direction away from a surface 546 to be described further below.

[0041] The second section 539 furthermore comprises a grating-like structure 544 provided on a surface 546, which in the mounted position of the bracket 535 faces away from the side frame member 7 or 8.

[0042] The locking mechanism has the advantage of allowing the top casing 500 to be mounted and/or dismounted from the inside of a building in which the window 1 is mounted when the window 1 is in an opened position, while not allowing the top casing 500 to be dismounted from the outside, thereby rendering intrusion by e.g. burglars through the window more difficult.

[0043] When applying the locking mechanism 535, the user proceeds as follows: Firstly, a locking mechanism 535 is mounted on each side frame member 7 and 8, e.g. by bringing the engagement means 562 and 563 into engagement with corresponding holes in the side frame members 7 and 8. Then the frame striking bead covering 217 is mounted such that the notch 229 is brought into engagement with the incisions 542a and 542b. Next, the top casing is put in place by bringing the respective guiding structures 547 and 548 into abutment. Finally an attachment means 536, such as a screw, is inserted into and through the hole 541 and further into the hole 551 in the structure 548 thereby securing the top casing 500 to the locking mechanism 535 and thereby to the frame 2 of the window 1.

[0044] On each side sash member 11, 12 a glass rim profile 102 is provided. In the following, the glass rim profile 102 adapted to be provided on the one side sash member 11 will be described. It is understood that a similar, however mirror-inverted, glass rim profile is adapted to be provided on the other side sash member 12.

[0045] As is best seen in Fig. 7, the glass rim profile 102 has a longitudinal extension 113. The glass rim profile 102 is adapted to be mounted on a side sash member 11 so as to, in a mounted condition, extend with its longitudinal extension 113 along the longitudinal extension of the side sash member 11 and along a side rim 114 of the pane 4. The glass rim profile 102 extends essentially along the entire length of the side rim 114 so as to retain the pane 4 in the sash 3 and to keep out precipitation.

[0046] Now, with reference to Fig. 8, the glass rim profile 102 is shown viewed along its longitudinal extension 113 and in cross section. The glass rim profile 102 comprises an essentially L-shaped portion with a first wall 104 and a second wall 105, the two walls 104, 105 being substantially perpendicular to each other. A flange 103 extends from the end of the first wall 104 opposite the second wall 105 essentially parallel to and in the same direction as the second wall 105.

[0047] An essentially arc-shaped portion extends from

the second wall 105, the arc-shaped portion comprising a first arc wall 106, an apex 107 and a second arc wall 108. The first arc wall 106 and second arc wall 108 are substantially parallel to the first wall 104 of the "L"-shape. The apex 107 peaks at approximately the same level as the first wall 104 of the "L"-shape.

[0048] From the second arc wall 108 a slightly arc-shaped, almost flat portion 109 extends away from the arc-shaped portion essentially parallel to the second wall 105.

[0049] From underneath the slightly arc-shaped, almost flat portion 109, a small flange 110 extends essentially perpendicular to the portion 109.

[0050] The slightly arched, almost flat portion 109 ends in a folded back portion 111, which is folded back so as to extend below the slightly arc-shaped portion 109. The bottommost part of the folded back portion 111 is at essentially the same level as the underside of the second wall 105.

[0051] The underside of the second wall 105 is adapted to abut, in a mounted condition, an upward-facing face 101 of the side sash member 11. As is best seen in Fig. 7, through holes 112 are distributed in the wall 105 along the longitudinal extension 113 of the glass rim profile 102 (only one hole 112 is visible in Fig. 7). The holes 112 are adapted to receive screws 115 or similar fastening means for fastening the glass rim profile 102 to an upwardly-facing face 101 the of the side sash member 11.

[0052] A sealing material, such as a strip of butyl rubber or the like, may be provided between the upwardly-facing face 101 of the side sash member 11 and the underside of wall 105 of the glass rim profile 102 along all or part of the longitudinal extension 113 of the glass rim profile 102 for providing a better fastening and/or sealing effect against intrusion of moisture.

[0053] Alternatively, a moulded or extruded element (now shown) may be positioned at the location in question, which has the multifunction of providing enhanced sealing, noise-dampening and fastening means.

[0054] Together, the first wall 104, the second wall 105 and the first arc wall 106 form a channel. Although part of the channel is, in a mounted condition, covered by a sash striking bead covering 201 and a frame striking bead covering 217, respectively, (as will be discussed in detail later), the channel is adapted to be able to drain off any of precipitation falling onto it. Thus, when mounted, the glass rim profile 102 serves as part of a weather shielding of the side sash member 11.

[0055] Turning now to the arc-shaped portion formed by first arc wall 106, the apex 107, and the second arc wall 108, it is adapted to allow for an insulating material to be inserted there. Insertion of an insulating material there contributes to better heat insulating properties of the sash 3 in general. Any material or combination of materials suitable for insulation may be chosen, such as for instance foam.

[0056] The slightly arc-shaped, almost flat portion 109 is, in cooperation with the flange 110 and the folded-back portion 111, adapted to retain, in a mounted position, the pane 4 against the side sash member 11.

[0057] As is best seen from Fig. 8, the slightly arc-shaped, almost flat portion 109 and the flange 110 are configured to receive a strip of sealing material 117 between them intended to abut the pane 4.

[0058] The folded-back portion 111 is also adapted to abut the pane 4 and form a close and essentially watertight transition. Also, the folded back portion 111 provides for a gentle abutment face of the glass rim profile 102 for the pane 4 so that scratches and cracks along the side rim 114 are avoided or at least mitigated.

[0059] The fact that the underside of the second wall 105 and the underside of the folded back portion 111 are at substantially the same level, enables, in a mounted condition, the upper face 4a of the window pane 4 to be at substantially the same level as the upward-facing face 101 of the side sash member 11. This has the effect that cold outside air and any precipitation is kept at a substantially uniform level relatively far away and efficiently spaced from the warmer air inside. This is beneficial for reducing thermal transport through the sash structure.

[0060] The glass rim profile 102 is made of a metal, metal alloy or combinations thereof in order to provide sufficient strength for assisting in retaining the pane 4 in the sash 3. The glass rim profile 102 is fabricated in any suitable manner, for instance by extrusion, bending or moulding.

[0061] In another embodiment of the glass rim profile, it comprises two separate elements, namely a glass retaining element 118 and a sealing element 119. The glass retaining element 118 is adapted to serve the purpose of retaining the pane 4 in the sash 3, while the sealing element 119 is adapted to provide insulation and weather shielding. Thus, the twofold task of the glass rim profile, which in the first embodiment was carried out by one integrated glass rim profile, is in this embodiment divided between the two elements 118, 119.

[0062] Turning firstly to the glass retaining element 118, it has a clip-like cross sectional shape.

[0063] The longitudinal extension 120 of the glass retaining element 118 is much shorter than that of the first embodiment.

[0064] For retaining the pane 4 in the sash 3, more glass retaining elements 118 are provided in order to provide sufficient strength. It is expedient if approximately the same number of glass retaining elements 118 is provided as was the case for the number of through holes 112 for screws 115 in the first embodiment. In a mounted condition, the glass retaining elements 118 are distributed along the longitudinal direction of the side sash member 11, preferably evenly distributed.

[0065] The glass retaining element 118 is adapted to be fastened to the side sash member 11. Hereby a clip-like fastening of the glass retaining element 118 to the side sash member 11 is obtained. This has the effect that through holes and screws or similar fastening means are avoided. This is beneficial as to avoid intrusion of water

into the sash structure via the holes and corrosion of the screws. Also it provides for a nicer, more homogeneous appearance when seen from the outside in a mounted condition. Also, in the process of mounting the pane in the sash, the clip-like mounting by means of the glass retaining elements 118 provides for easy and quick mounting of the pane without the necessity of any screwing operations or missing screws.

[0066] The glass retaining element 118 is preferably made of a metal, an alloy or combinations thereof in order to provide sufficient strength for retaining the pane in the sash.

[0067] Turning now to the sealing element 119, it has a cross sectional shape adapted to mate that of the striking bead covering 201, 217, which will be discussed in more detail below, in order to provide for a weather shielding effect and an essentially water repellent transition between the two elements..

[0068] The sealing element 119 extends along the entire side rim 114 of the pane 4 in order to provide satisfactory insulation and water tightness.

[0069] The sealing element 119 is preferably made from a non-metallic material, so that thermal transport is mitigated. Any material or combination of materials having excellent properties as to heat insulation and avoiding thermal transport are suitable, for instance a polymer or combinations of polymers.

[0070] As mentioned above, a sash striking bead covering and a frame striking bead covering assist in weather proofing the window structure. On each side sash member 11, 12 a sash striking bead covering is provided, and on each side frame member 7, 8 a frame striking bead covering is provided.

[0071] In the following, the sash striking bead covering 201 and the frame striking bead covering 217 adapted to be provided on one side sash member 11 and one side frame member 7, respectively, will be described. It is understood that a similar, however mirror-inverted, sash striking bead covering and frame striking bead covering are adapted to be arranged on the other sash and side frame members 12, 8, respectively.

[0072] As is best seen in Fig. 9, the sash striking bead covering 201 has a longitudinal extension 259, and the frame striking bead covering 217 has a longitudinal extension 260. The sash striking bead covering 201 is adapted to be mounted on the side sash member 11 so as to, in a mounted condition, extend with its longitudinal extension 259 along the longitudinal extension of the side sash member 11. Similarly, the frame striking bead covering 217 is adapted to be mounted on the side frame member 7 so as to, in a mounted condition, extend with its longitudinal extension 260 along the longitudinal extension of the side frame member 7.

[0073] The cross sectional profiles of the sash striking bead covering 201 and the frame striking bead covering 217, when viewed along their longitudinal direction, are essentially similar. Hence, although the following description refers to the cross sectional shape of the frame striking bead covering 217, it applies for the cross sectional shape of the sash striking bead covering 201 as well.

[0074] With reference to Fig. 8, the frame striking bead covering 217 comprises a substantially flat mid portion 218. At an end thereof, a flange 219 extends so as to, in a mounted condition of the frame striking bead covering 219, sealingly engage with a water tight gasket 261 provided on the side frame covering 270.

[0075] At the other end of the mid portion 218, the frame striking bead covering 217 extends into an arrangement forming a labyrinth seal with the glass rim profile 102. The labyrinth seal is formed as an extension of a first wall 220 of the frame striking bead covering 217 in the form of a primary wall 262 and a second wall 264. In this manner a groove-like structure is formed by the first wall 220, the primary wall 262 and the second wall 264.

[0076] In the embodiment shown, the second wall 264 extends into a substantially flat portion 221 being essentially parallel to and being at substantially the same level as the mid portion 218. The flat portion 221 ends in a generally downwardly directed flange 222.

[0077] The groove-like structure forming the labyrinth seal is adapted to fit into the channel formed by the L-shape 104, 105 and the first arc wall 106 of the glass rim profile 102 and form an essentially water repelling transition between the striking bead coverings 201, 217 and the glass rim profile 102 in a closed position of the window 1. More specifically, the flat portion 221 and the flange 222 are adapted to substantially overlap the apex 107 and the two arc walls 106, 108 of the glass rim profile 102. This has the effect that any precipitation falling on the striking bead covering 201, 217 is effectively led away either via the labyrinth seal of the striking bead covering 201, 217 or via the flange 222 onto the part of the glass rim profile 102 overlapping the pane 4 and further onto the pane 4 and away. Thus, precipitation will largely be prevented from finding its way into the channel of the glass rim profile 102 formed by the walls 104, 105 and the first arc wall 106. This is advantageous as any precipitation is thus essentially prevented from coming into contact with the through holes 112 and the screws inserted therein for fastening the glass rim profile 102 to the side sash member 11. Hence, intrusion of moisture via the screw holes into the side sash member 11 and also degradation of the screws are prevented or at least mitigated.

[0078] Turning now towards the end 266 which is intended to be the upper end in a mounted condition of the frame striking bead covering 217, a top edge 228 is provided with a substantially rectangular notch 229 as is best seen in Fig. 14. The side edges 230 and 231 of the notch 229 are configured to mate with incisions 542a, 542b provided in side faces of the structure 542 provided on the top casing locking mechanism 535. The bottom edge 232 of the notch 229 is configured to abut an intermediate face 565 of the structure 542. Hence, the notch 229 of

the frame striking bead covering 217 is configured to slidingly engage the structure 542 and its incision 542a, 542b of the top casing locking mechanism 535 in order to be properly positioned during mounting.

[0079] Turning to the sash striking bead covering 201, the end 269 that is intended to be the lower end in a mounted condition has, as is best seen in Fig. 9, a slope 280 towards a folded back portion 207 that serves as mounting means in relation to the bottom sash covering above glass 319. The mounting means 207, which are best seen in Fig. 10, and its cooperation with mating mounting means on the bottom sash covering above glass 319 takes place in a manner known per se and will therefore not be discussed in further detail here.

[0080] Turning now to Fig. 11, the end 268 that is intended to be the upper end in a mounted condition of the sash striking bead covering 201 is provided with a prolongation 281 of a part of the sash striking bead covering. The prolongation 281 of the sash striking bead covering 201 causes a better draining of precipitation away from the sash structure.

[0081] With reference to Figs 4 and 13 - 15, the window 1 furthermore comprises a sash striking bead covering 201 as well as a frame striking bead covering 217. The sash striking bead covering 201 as well as the frame striking bead covering 217 is provided with a male part 208 of a snap lock fastening means for fastening the sash or frame striking bead covering 201 or 217 to the sash 3 or the frame 2.

[0082] In the following, the male part 208 of the snap lock fastening means will be described with reference to the frame striking bead covering 217, but it is understood that the male part of the snap lock fastening means on the sash striking bead covering 201 is similar.

[0083] With reference to Fig. 13, the male part 208 comprises a first leg 210 and a second leg 211, both of which extend from underneath and substantially perpendicular to the mid portion 218 of the frame striking bead covering 217. The first leg 210 is shorter than the second leg 211 and preferably approximately 1/4-3/4 of the length of the second leg 211.

[0084] The first leg 210 is of a thickness that allows it to contain fastening means, preferably a pop rivet 212, for fastening the male part 208 to the frame striking bead covering 217.

[0085] The second leg 211 is flexible along a direction 283 perpendicular to its own longitudinal extension and towards and away from the first leg 210. A protrusion 216 is provided on a face of the second leg 211 that faces away from the first leg 210.

[0086] The male part 208 is adapted to engage in a snap-locking way with a female part 209 of the snap lock fastening means. A female part 209 is provided on the sash 3 and the frame 2, respectively, for the male part 208 on the sash and frame striking bead coverings, respectively.

[0087] As is best seen from Figs 4a and 4b, the female part 209 that is adapted to receive the male part that is provided on the frame striking bead covering 217 is configured to be fastened to the frame part 20 of the pivot hinge. Likewise, the female part 209' that is adapted to receive the male part that is provided on the sash striking bead covering 201 is configured to be fastened to the sash part (not shown) of the pivot hinge 200. It is understood that the female parts 209 and 209' do not necessarily have to be fastened to the respective parts of the pivot hinge. It is envisaged that the female parts are fastened to the side sash member 11 and side frame member 7, respectively, directly. The female part 209 indicated in Figs 14 and 15 is that adapted to engage with the frame striking bead covering 217 and is fastened on the side frame member 7.

[0088] The female part 209 of the snap lock fastening means has the general shape of an angle bracket. One leg 213 thereof is adapted for fastening to a hinge part 19, 20 or side member 7, 11. Another leg 214 thereof is provided with an opening 215 (as is seen in Fig. 14) configured to receive a male part 208 of the kind described above. The hinge parts of the pivot hinge 200 may have elements that assist in forming the female parts 209 of the snap lock fastening means. The female parts 209 of the snap lock fastening means may be integrally formed in the hinge parts.

[0089] The shape of the opening 215 is substantially such that the male part 208 is retained in the female part 209 once inserted. To this end, the flexibility and the protrusion 216 of the second leg 211 assist so that a snap locking effect is obtained.

[0090] To release the male part 208 from its snap lock engagement with the female part 209, the second leg 211 of the male part 208 is pressed towards the first leg 210 of the male part 208 until the protrusion 216 on the second leg 211 can pass through the opening 215 together with the rest of the male part 208. Now, the male part 208 can be retracted from the female part 209.

[0091] Fastening the striking bead covering with the above described snap-lock fastening means is advantageous over the prior art fastening by the aid of screws, since the fastening means are fastened to the striking bead coverings and does not get lost as easily as screws. Also, there are no through holes in the striking bead coverings for insertion of mounting screws. Hence, the risk of water intrusion into the frame and sash structure is reduced. Also, a nicer and more homogeneous appearance is obtained. Furthermore, this embodiment provides for a safer mounting in relation to break-ins, as there are no screws that are accessible from the outside. Furthermore, the snap lock engagement can only be released from the inside of a building in which the window 1 is mounted, as the protrusion 216 on the second leg 211 of the male part 208 is to be pressed from inside in order to release from engagement.

[0092] Both the male part 208 and female part 209 of the snap lock fastening means is made of POM. Using a polymer is beneficial, as it has poor heat conductive properties. Hence, the risk of forming a thermal bridge is

reduced. Furthermore, POM has sufficiently high tensile strength to provide a secure and robust fastening of the striking bead coverings.

[0093] It is envisaged, however, that the male and female part of the snap lock fastening means can be made of any suitable material with a sufficiently high tensile strength. For instance, the male part of the snap lock fastening means may be in the form of a leaf spring made from a suitably flexible and strong metal or alloy or combination thereof. The female part may be made of any material adapted to suitably mate the leaf spring material as regards avoiding formation of a heat bridge and robustness.

[0094] In another embodiment, the female part of the snap lock fastening means is provided on the sash and/or frame striking bead covering, while the male part of the snap lock fastening means is provided on the sash and/or frame.

[0095] A bottom frame covering 237 is provided. As is best seen in Figs 9 and 16, the bottom frame covering 237 is adapted to extend, in a mounted condition, with its longitudinal extension 249 along the longitudinal extension of the bottom frame member 6. The bottom frame covering 237 is configured to extend essentially along the entire length of the bottom frame member 6 so as to cover it from intrusion of precipitation.

[0096] The bottom frame covering 237 is essentially symmetrical around a plane perpendicular to its longitudinal extension 249. In the following, focus will be on the end 238 of bottom frame covering 237 that is adapted to cooperate with the one side frame member 7 and the elements cooperating with that end 238. It is understood, however, that the same considerations apply to the opposite end of the bottom frame covering 237 and those elements cooperating therewith.

[0097] The end region 238 of the bottom frame covering 237 is adapted to serve, via an intermediate member 245 that will be described in further detail below, as mount for an angle bracket 239. The angle bracket 239 forms part of a fitting set adapted to be connected to the frame side member and to the side frame covering.

[0098] The angle bracket 239 has a longitudinal extension 240 and is adapted to extend, in a mounted condition, with its longitudinal extension 240 along the longitudinal extension of the side frame member 7. To this end, the side frame member 7 is provided with a recess (not shown in detail).

[0099] As is best seen from Fig. 18, the angle bracket 239 comprises a first wall 241 and a second wall 242, the two walls being essentially perpendicular to each other.

[0100] An inner face of the first wall 241 of the angle bracket 239 is adapted to abut (directly and indirectly, as will be elaborated later) on an outer side face 7a of the side frame member 7. Also, the inner face of the first wall 241 abuts on an end edge 244 of the bottom frame covering 237 as well (not clearly discernible on any of the figures).

[0101] An inner face of the second wall 242 of the angle bracket 239 is adapted to abut (directly and indirectly) on an upper face 7b of the side frame member 7, possibly in the above-mentioned recess. Also, the inner face of the second wall 242 is adapted to abut (indirectly) an upward-facing face 274 of the bottom frame covering 237.

[0102] An outer face of the first wall 241 of the angle bracket 239 is adapted to abut an inner face of a first wall 272 of the side frame covering 270. An outer face of the second wall 242 of the angle bracket 239 is adapted to abut an inner face of a second wall 273 of the side frame covering 270.

[0103] As is best seen in Fig. 18, at an end 243 of the angle bracket 239 the walls 241, 242 extend into grooves 246 and 247, respectively. The grooves 246, 247 are adapted to fit into mating folded-back portions 276, 277 of the first 272 and second 273 wall, respectively, of the side frame covering 270 (cf. Fig. 19).

[0104] The dimensions of the folded-back portions 276, 277 and the grooves 246, 247 are configured so as to effect a snap-locking engagement of the side frame covering 270 to the angle bracket 239. This eases the mounting process of the side frame covering 270 in that the mounting takes place without further mounting means such as screws.

[0105] The angle bracket 239 is nevertheless provided with a through hole 278 intended for passage of a screw for any subsequent mounting of optional equipment, such as shutters or other forms of sun screening. As may be seen, the hole 278 is here made in a compressed area of the bracket, which gives room for example for a screw head. This compressed area may, however, also serve other purposes such as for example for receiving a projecting part (not shown) on the side frame covering 270 and thus contribute to a snap-locking engagement between the side frame covering and the angle bracket.

[0106] The risk of dropping the side frame covering 270 from the roof during mounting is reduced, since it is retained once snap-lock engaged with the angle bracket 239.

[0107] Also, the longitudinal extension 240 of the angle bracket 239 ensures a good guidance of the side frame covering 270 a stretch up along the side frame covering 270 in relation to the bottom frame covering 237 and in relation to the side frame member 7. In a mounted condition the result is increased stability and robustness of the corner between the bottom frame covering 237 and the side frame covering 270.

[0108] An intermediate element 245 (most clearly discernible on fig. 18) is provided and is adapted to be positioned at the end region 238 of the bottom frame covering 237. It is intended for being positioned between the angle bracket 239 and the side frame member 7 and the bottom frame covering 237, respectively.

[0109] Intermediate members in this field are known. Therefore, only the points on which this intermediate member 245 differs from the known types of intermediate

members will be discussed here. The differences relate to the fact that the prior art intermediate member is adapted to link the bottom frame covering with the side frame covering directly, while the present intermediate member 245 is adapted to link the bottom frame covering 237 with the side frame covering 270 via the angle bracket 239.

[0110] Hence, a slit 248 is provided in the wall 250 of the intermediate member 245 that is configured to be parallel to the upper face 251 of the bottom frame covering 237 in a mounted condition. The slit 248 is adapted to receive an essentially T-shaped protrusion 252 extending from the second wall 242 of the angle bracket 239 in a direction parallel to the first wall 241 of the angle bracket 239 (see Fig. 19). The T-shape of the protrusion 252 is intended to function as a barb and retain the angle bracket 239 in the intermediate member 245 once inserted.

[0111] An L-shaped flange 253 protrudes from the wall 250 of the intermediate member 245 with its first wall 254 being essentially perpendicular to the wall 250 and its second wall 255 being essentially parallel to the wall 250. The flange is adapted to sealingly abut its counterpart of the sash striking bead covering 201 in a mounted condition of both, when the sash 3 is closed against the frame 2.

[0112] The primary purpose of the intermediate member is to provide a water tight connection.

[0113] Turning to the aspect of guiding the side frame covering 270, a guide member 256 is provided. The guide member 256 is essentially hook shaped and is adapted to be fastened to the frame part 20 of the pivot hinge with its base part 257 and to grip around a flange 271 of the side frame covering 270 with its hook part 258. This further assists in providing a screwless, yet robust, mounting of the side frame covering 270.

[0114] In addition to the methods of attachment of the covering members 237, 270 described above, the frame members 5, 6, 7, 8 may also be provided with attachment members (not shown) projecting from the outer side surfaces facing away from the side openings. Holes in the covering members may then be used for hooking the coverings members onto the attachment members and thus contribute to an easy and correct attachment to the frame 2. The attachment members may for example be embodied as slightly bend metal plates, with one leg attached to the frame member and the other projecting slightly from the frame and pointing towards the exterior side of the window.

[0115] It should be noted that the above description of preferred embodiments serves only as an example, and that a person skilled in the art will know that numerous variations are possible without deviating from the scope of the claims.

[0116] Embodiments of the invention include:

1. A roof window 1 comprising a frame 2 with a top member 5, a bottom member 6 and two side members 7, 8, the roof window 1 further comprising a covering 237, 270 including a bottom frame covering 237 adapted to be mounted on the frame bottom member 6 and a side frame covering 270 adapted to be mounted on the frame side member 7, wherein the bottom frame covering 237 is provided with a fitting set 239, 245 adapted to be connected to the frame side member 7 and to the side frame covering 270.

2. A window according to embodiment 1, wherein the fitting set comprises an angle bracket 239 and an intermediate member 245.

3. A window according to embodiment 2, wherein the angle bracket 239 has a longitudinal extension 240 and is adapted to extend, in a mounted condition, with its longitudinal extension 240 along the longitudinal extension of the side frame member 7, preferably in a recess provided in the side frame member 7.

4. A window according to any one of embodiments 1-3, wherein the angle bracket 239 comprises a first wall 241 and a second wall 242, the two walls being essentially perpendicular to each other.

5. A window according to embodiment 4, **characterized** in an inner face of the first wall 241 abuts on an end edge 244 of the bottom frame covering 237.

6. A window according to any one of the above embodiments 4 or 5, wherein an outer face of the first wall 241 of the angle bracket 239 is adapted to abut an inner face of a first wall 272 of the side frame covering 270, and an outer face of the second wall 242 of the angle bracket 239 is adapted to abut an inner face of a second wall 273 of the side frame covering 270.

7. A window according to any one of embodiments 4 to 6, wherein the walls 241, 242 extend into grooves 246, 247 adapted to fit into mating folded-back portions 276, 277 of the first and second walls of the side frame covering 270.

8. A window according to embodiment 7, wherein the dimensions of the folded-back portions 276, 277 and the grooves 246, 247 are configured so as to effect a snap-locking engagement of the side frame covering 270 to the angle bracket 239.

9. A window according to any one of embodiments 2 to 8, wherein the angle bracket 239 is provided with a through hole 278 intended for passage of a screw for any subsequent mounting of optional equipment, such as shutters or other forms of sun screening.

10. A window according to any one of embodiments 2 to 9, wherein a slit 248 is provided in the wall 250 of the intermediate member 245 that is configured to be parallel to the upper face 251 of the bottom frame covering 237 in a mounted condition, said slit 248 being adapted to receive an essentially T-shaped protrusion 252 extending from the second wall 242 of the angle bracket 239 in a direction parallel to the first wall 241 of the angle bracket 239.

Claims

1. A roof window (1) comprising a frame (2) with a top member (5), a bottom member (6) and two side members (7, 8), the roof window (1) further comprising a covering including a top casing on the top frame member (5) and a frame striking bead covering (217) on each side frame member (7, 8), **characterized in that** the window (1) comprises a locking mechanism for locking the top casing to the frame (2), said locking mechanism being provided as at least one bracket (535) attached by means of an attachment means (536) to each of the side frame members (7, 8) in a position near the top frame member (5).

2. A window according to claim 1, **characterized in that** each of at least two brackets (535) are attached to the side frame members (7, 8), each in the vicinity of an end of a frame abutment list, which end faces the top frame member (5).

3. A window according to claim 1 or 2, **characterized in that** the bracket(s) (535) comprises a first section (538) and a second section (539), said second section (539) being adapted for abutment with the side frame member (7, 8), said first and second sections preferably being made as one integral element.

4. A window according to claim 3, **characterized in that** the first section (538) comprises at least one hole (540) for receiving the attachment means (536), where the hole (540) is preferably a through hole.

5. A window according to claim 3 or 4, **characterized in that** the first section (538) is substantially plate shaped and/or the second section (539) is substantially box or cube shaped.

6. A window according to one or more of claims 3-5, **character-ized** in that the first section (538) comprises a structure (542) provided on a surface (545), which faces away from the side frame member (7, 8), said structure (542) protruding slightly from the first section (538) and having a substantially T-shaped cross section, thus comprising two lateral incisions (542a and 542b) adapted for guiding engagement with a notch (229) in the frame striking bead covering (217).

7. A window according to one or more of claims 3-6, **character-ized** in that the structure (542) on the surface (545) of the first section (538) furthermore comprises a recess (543).

8. A window according to one or more of claims 3-7, **character-ized** in that the second section (539) comprises a number of engagement means (562, 563) adapted for engagement with corresponding holes in the side frame member (7, 8).

9. A window according to one or more of claims 3-8, **character-ized** in that the second section (539) comprises a structure comprising two abutment means (560, 561), said abutment means (560, 561) being adapted for, in the mounted position of the window, ensuring the correct distance between the side frame member (7, 8) and the corresponding frame striking bead covering (217).

10. A window according to one or more of claims 3-9, **charac-terized** in that the second section (539) comprises a structure comprising two abutment means (560, 561), said the abutment means (560, 561) being adapted for either abutment with an edge of a side frame covering (270), thereby ensuring correct mutual placement of the bracket (535) and the side frame covering (270), or adapted for engagement with corresponding grooves in the side frame member (7, 8) for correct placement of the bracket (535) on the side frame member (7, 8).

11. A window according to one or more of claims 3-10, **charac-terized** in that the second section (539) comprises at least one hole (541) for receiving an attachment means for attaching the top casing to the bracket (535) and thereby - directly or indirectly according to the position of the hole (541) and the length of the attachment means - to the side frame member (7 and 8), wherein the hole (541) is preferably a through hole.

12. A window according to one or more of claims 3-11, **charac-terized** in that the second section (539) comprises a surface (547) adapted for guiding abutment with a corresponding structure of a mounting bracket of the top casing, the surface (547) preferably being inclined in such a way that the cross sectional area of the second section (539) increases in a direction away from a surface (546), which in the mounted position of the bracket (535) faces away from the side frame member (7, 8).

13. A window according to one or more of claims 3-12, **charac-terized** in that the second section (539) comprises a grating-like structure (544) provided on a surface (546), which in the mounted position of the bracket (535) faces away from the side frame member (7, 8).

14. A method for applying a locking mechanism provided as at least one bracket (535) to a roof window (1) comprising a frame (2) with a top member (5), a bottom member (6) and two side members (7, 8), the roof window (1) further comprising a covering including a top casing on the top frame member (5) and a frame striking bead covering (217) on each side

frame member (7, 8), said method including the following steps: Mounting a locking mechanism provided as at least one bracket (535) on each side frame member (7, 8) in a position near the top frame member (5); mounting the frame striking bead covering (217) such that a notch (229) therein is brought into engagement with incisions (542a, 542b) in the bracket (535); putting the top casing in place by bringing respective guiding structures (547) on the bracket and on the top casing into abutment; inserting an attachment means (536), such as a screw, into and through a hole (541) in the bracket (535) and further into a hole (551) in the guiding structure on top casing thereby securing the top casing to the locking mechanism and thereby to the frame (2) of the window (1).

15. A method according to claims 14, **characterized in that** the mounting of the locking mechanism takes place by bringing engagement means (562, 563) into engagement with corresponding holes in the side frame members (7, 8).

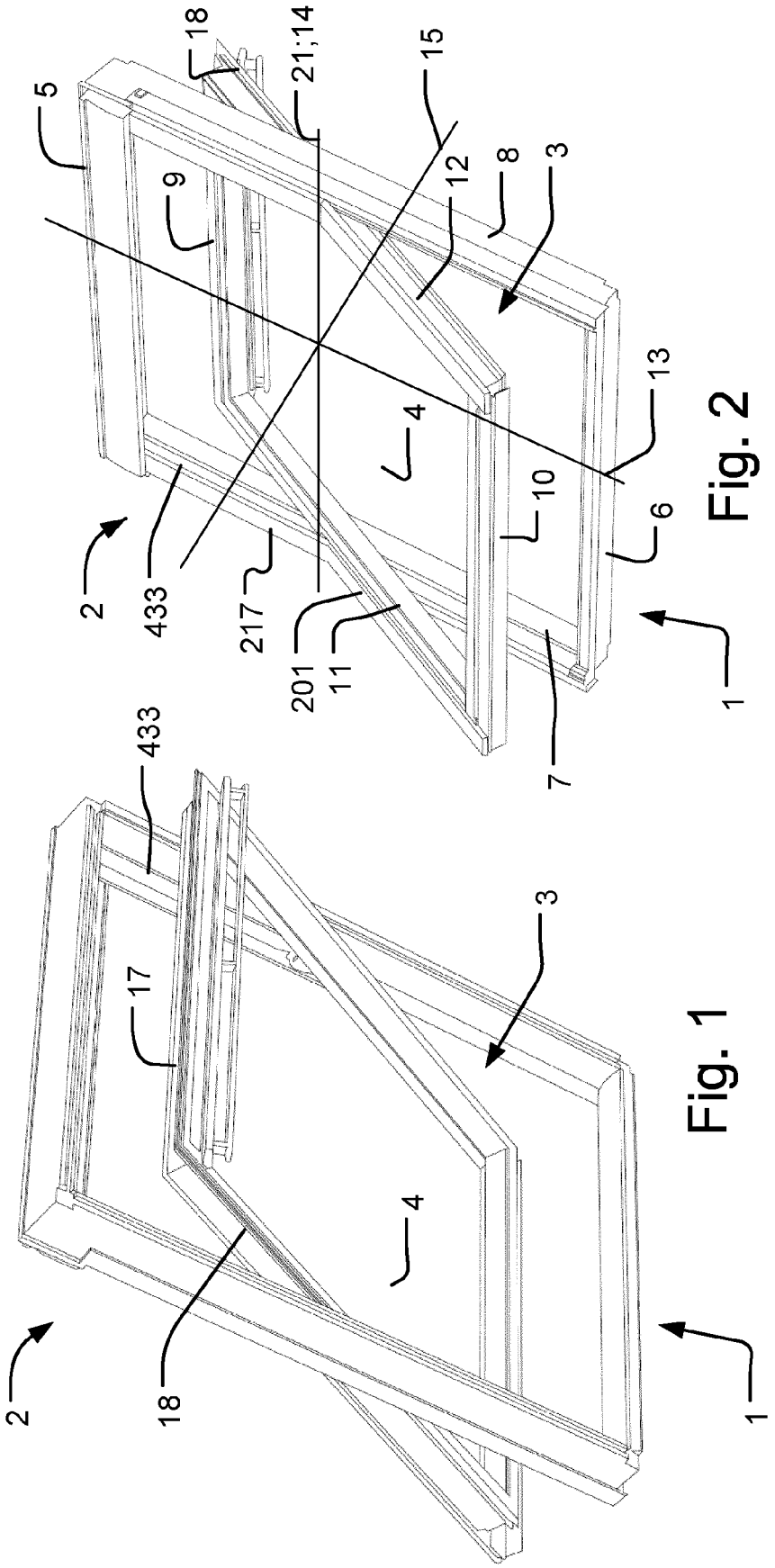

Fig. 1

Fig. 2

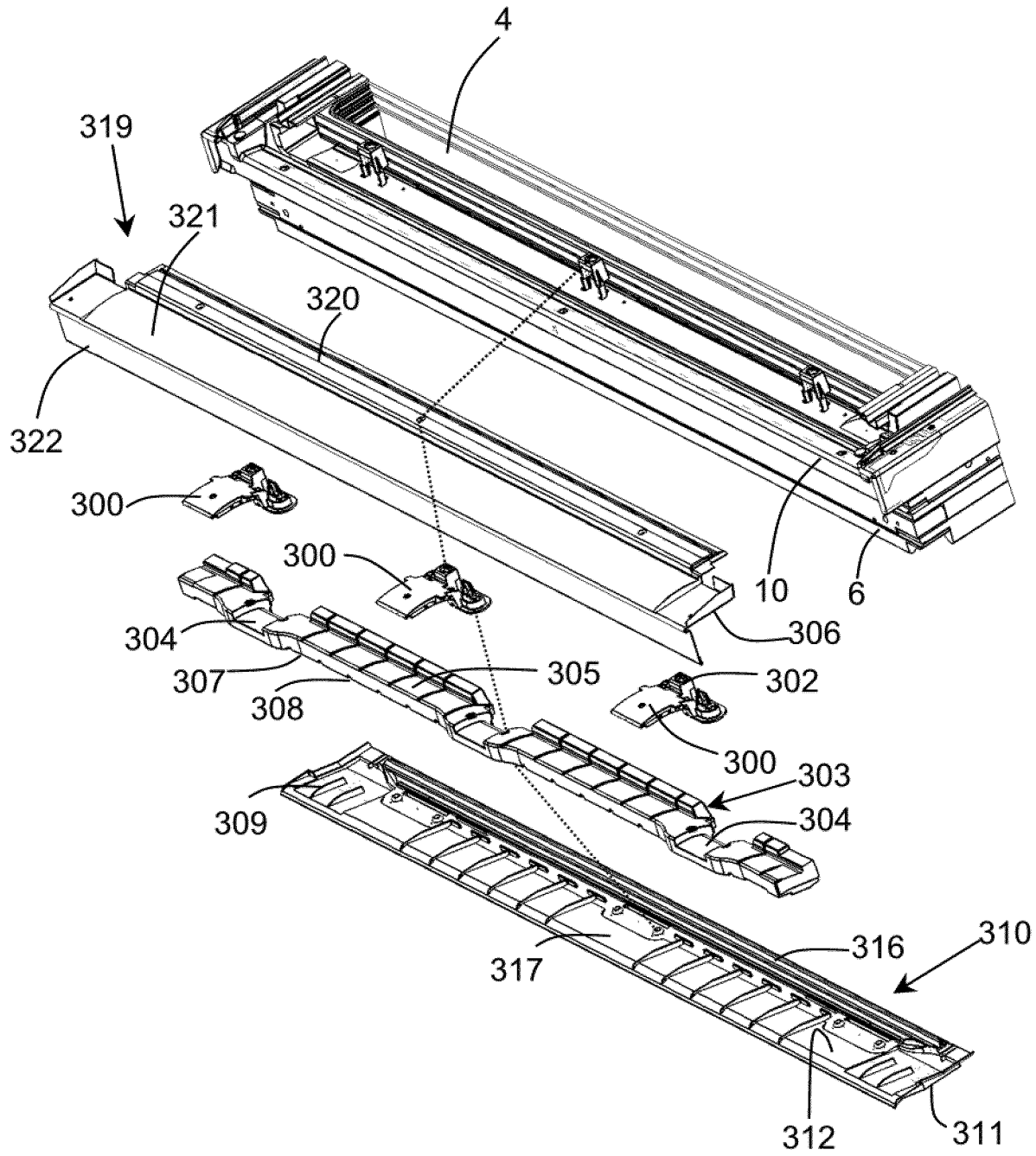
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Fig. 3

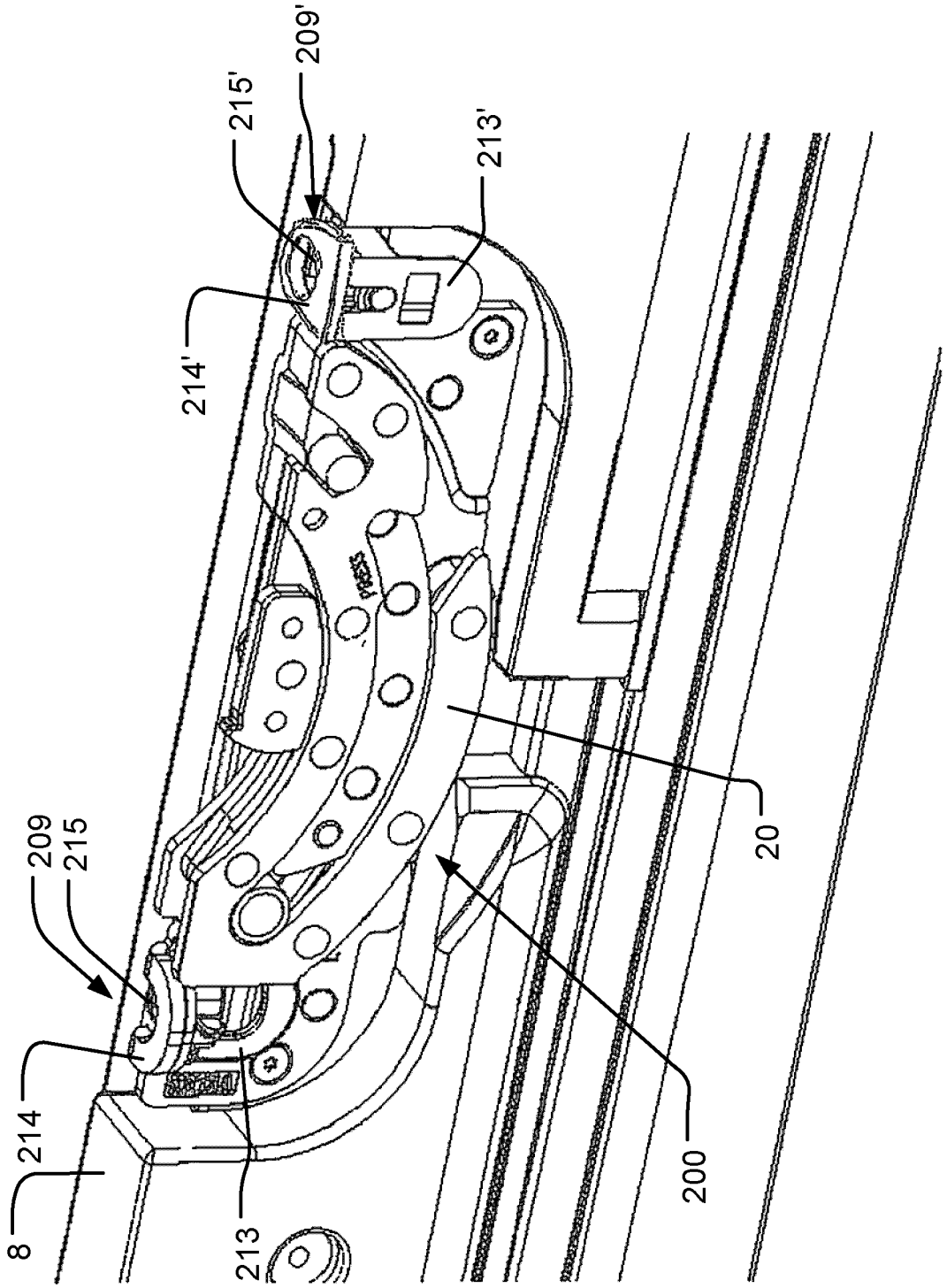


Fig. 4a

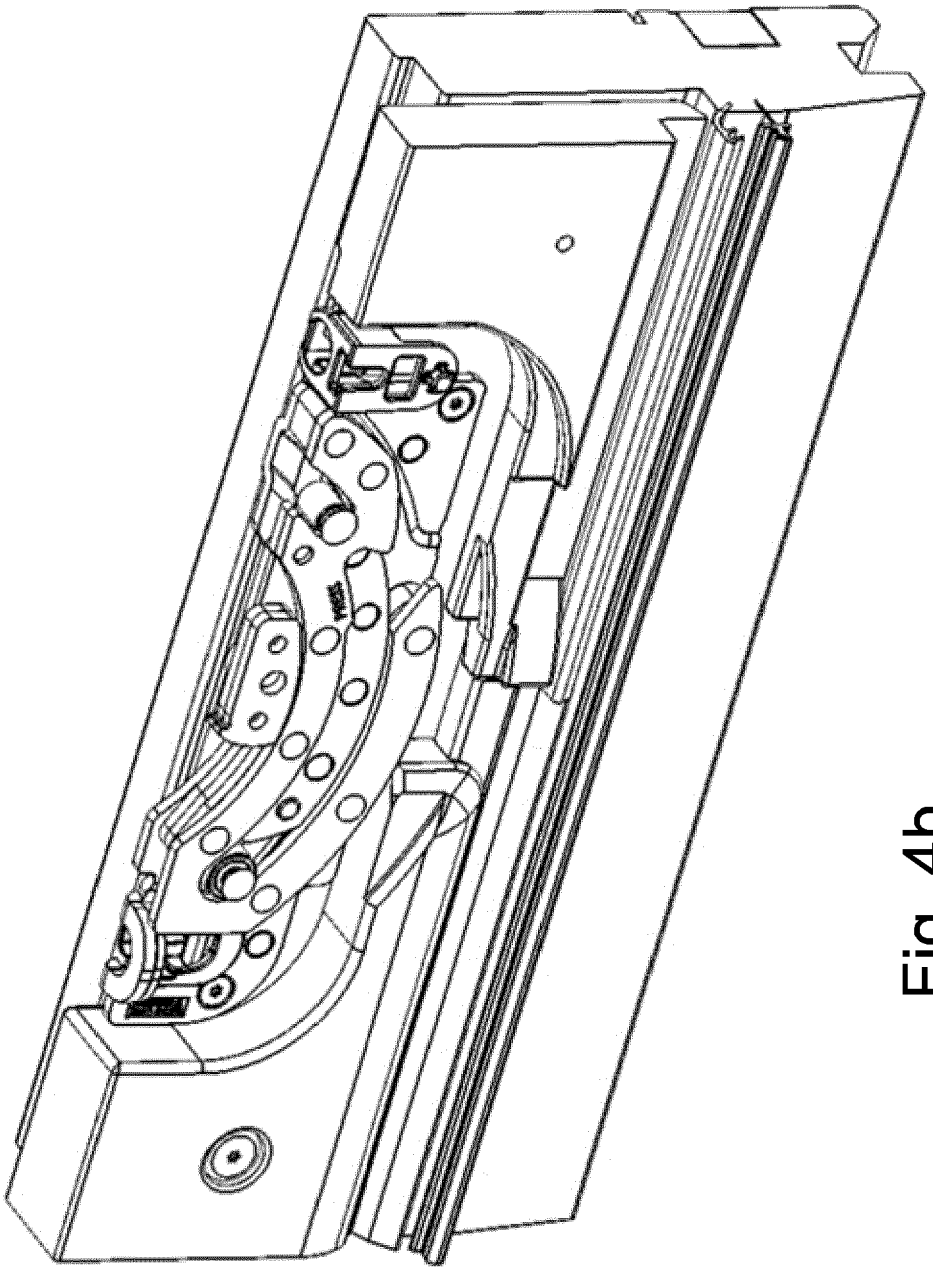
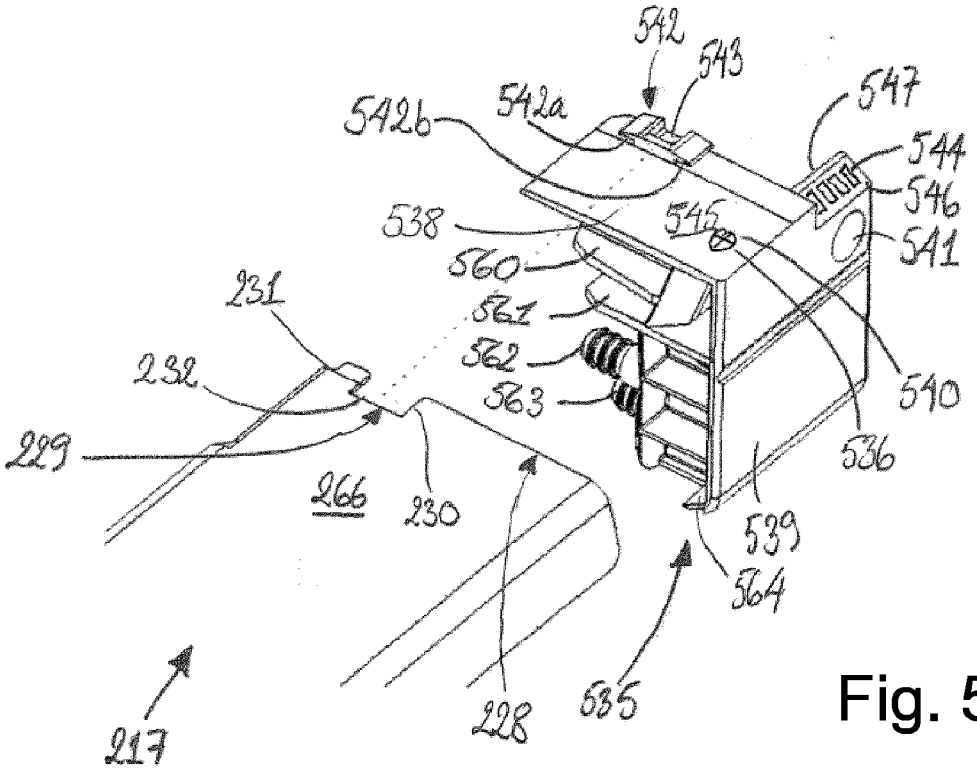


Fig. 4b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542a
542b
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Fig. 5

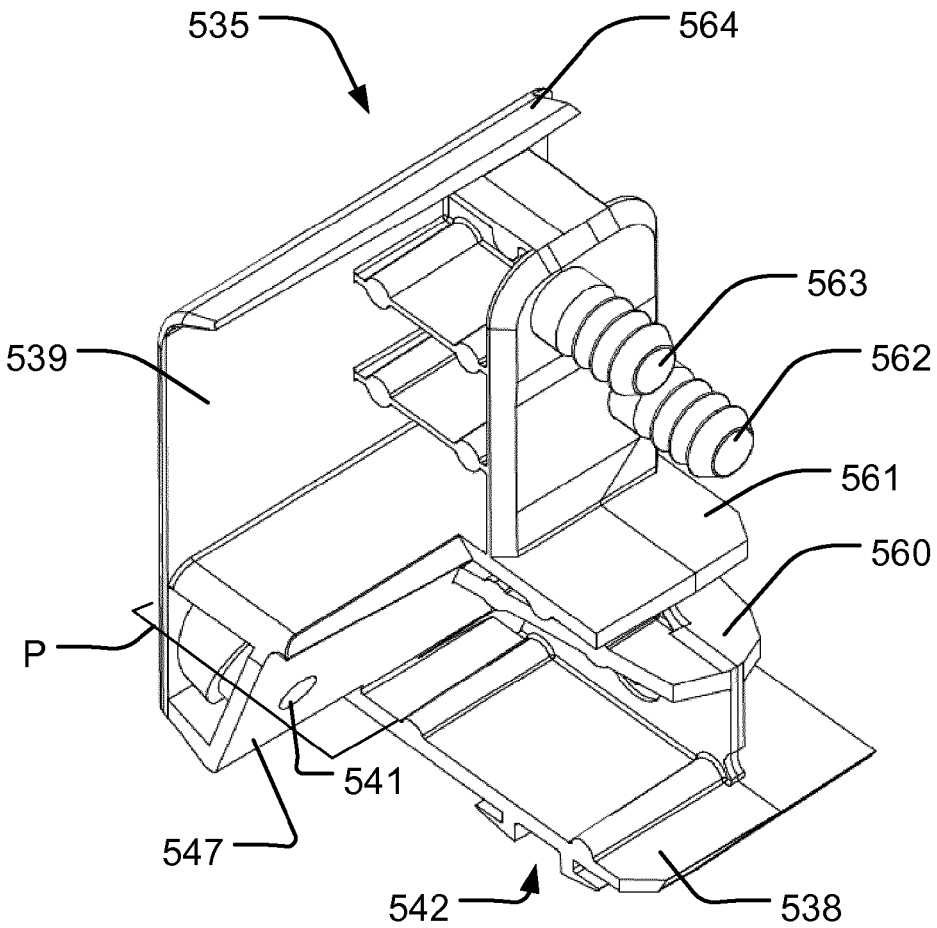
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Fig. 6

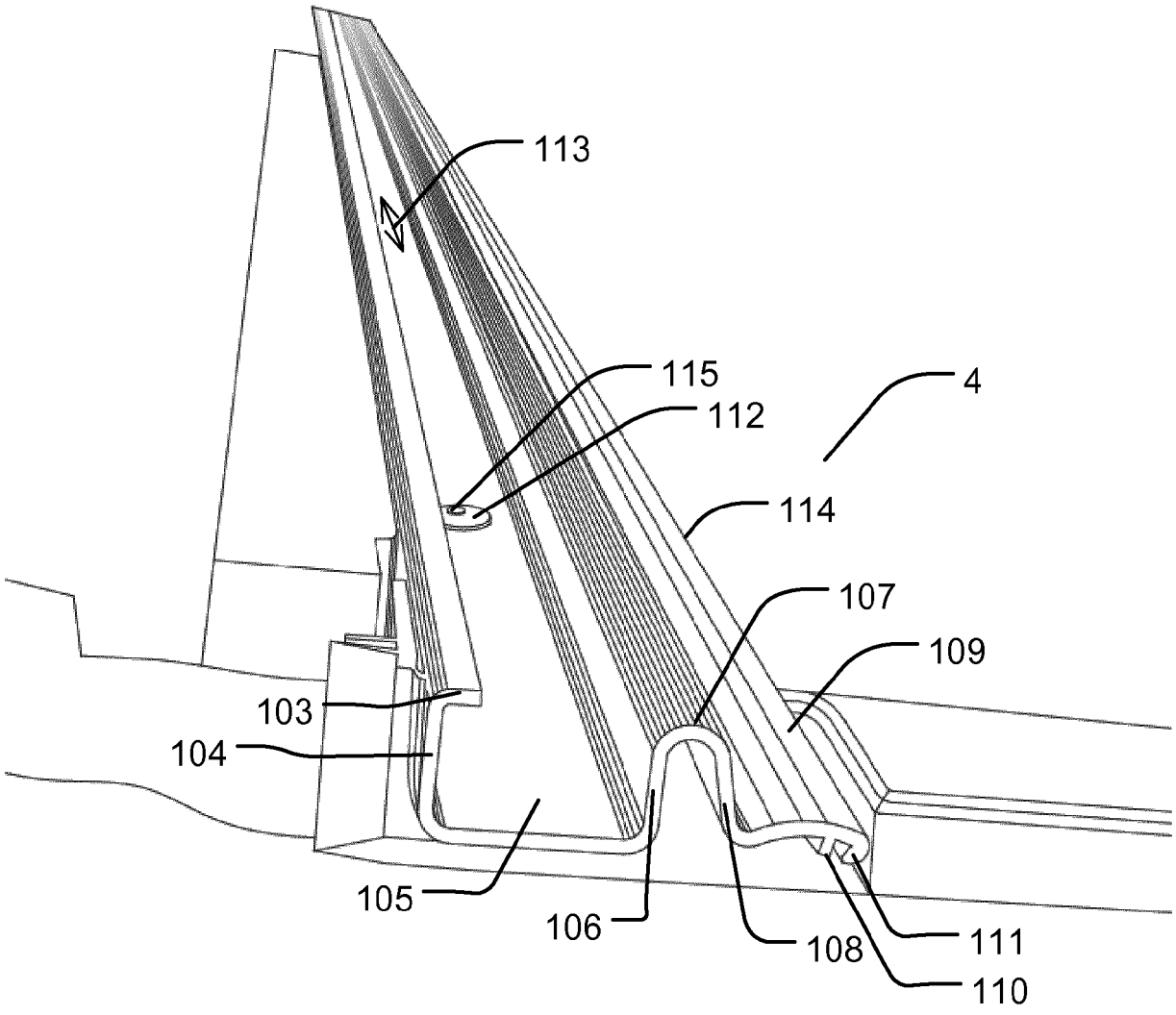

Fig. 7

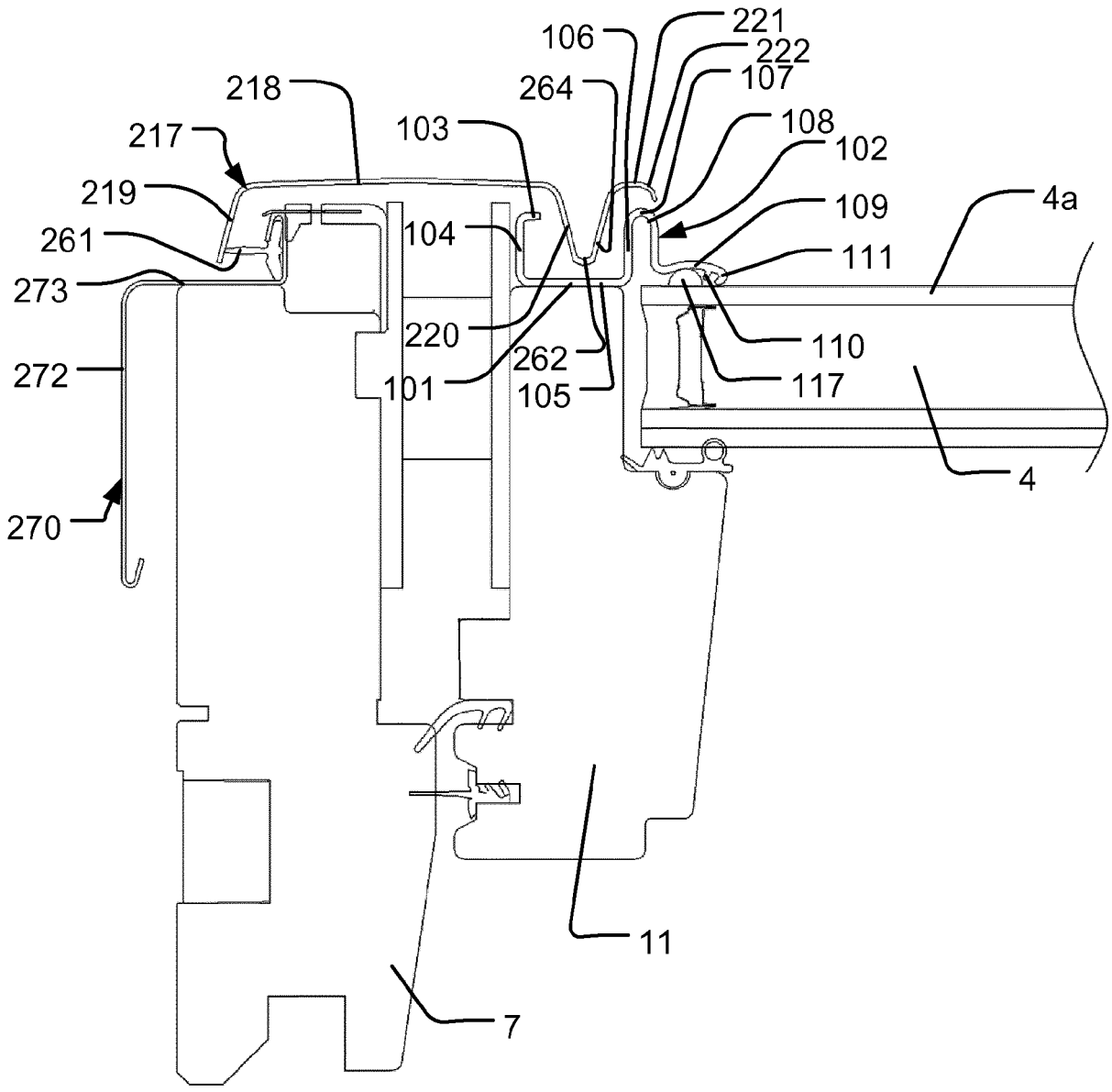
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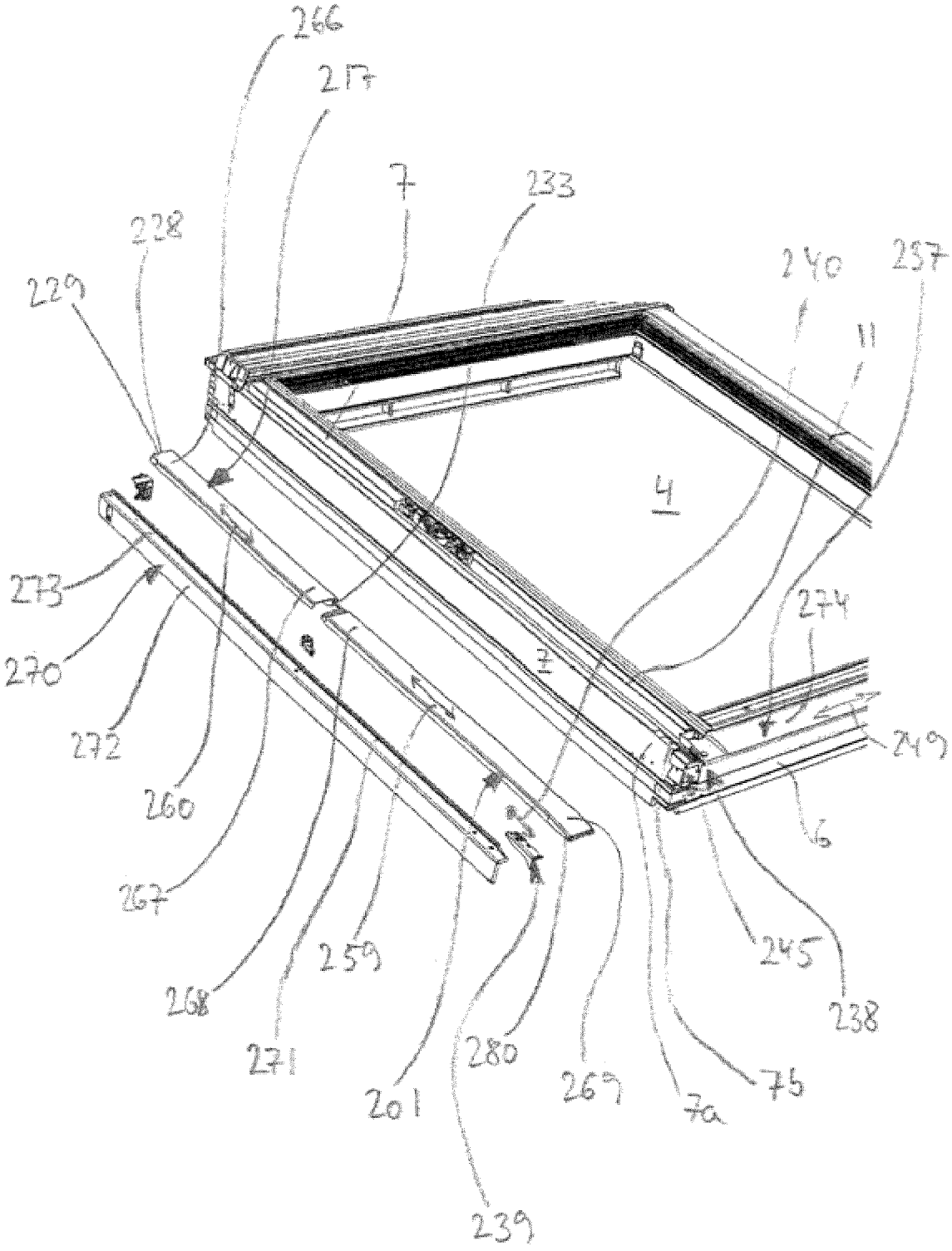
Fig. 8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7a
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Fig. 9

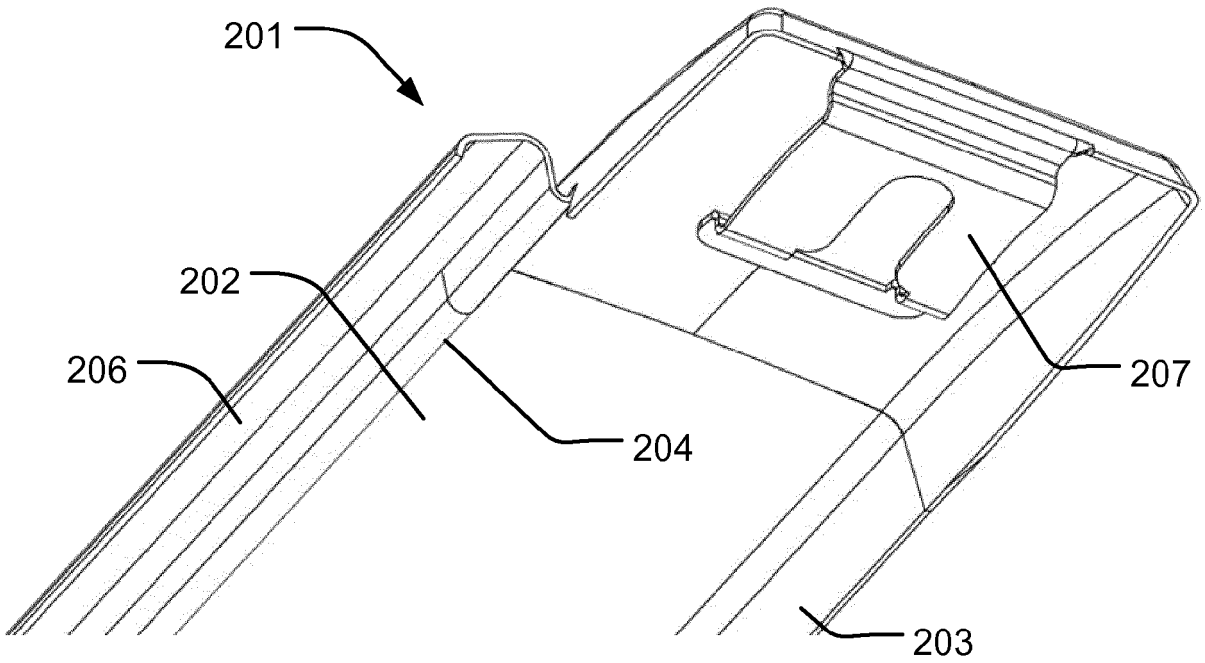


Fig. 10

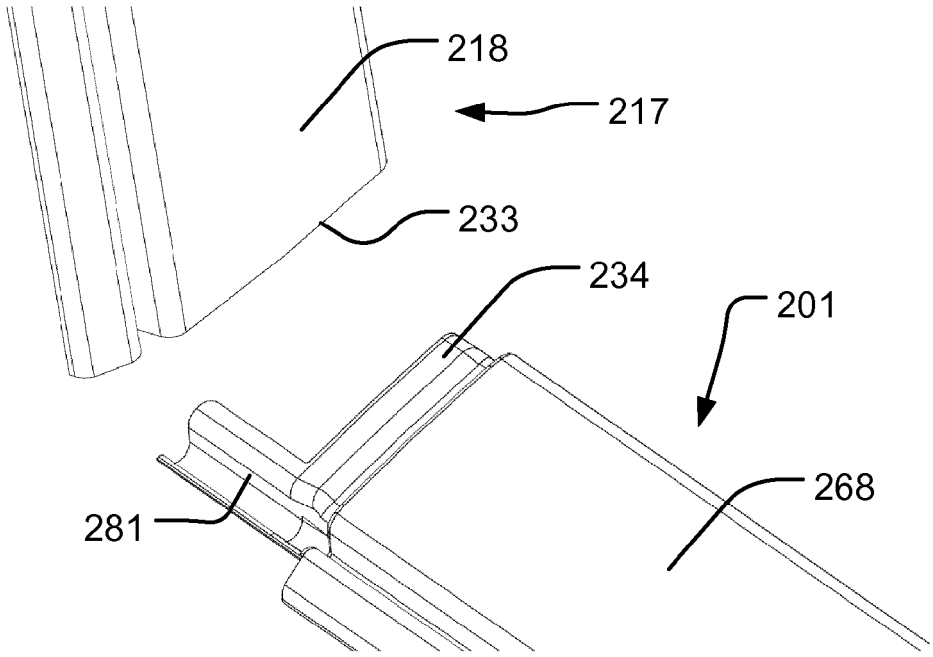


Fig. 11

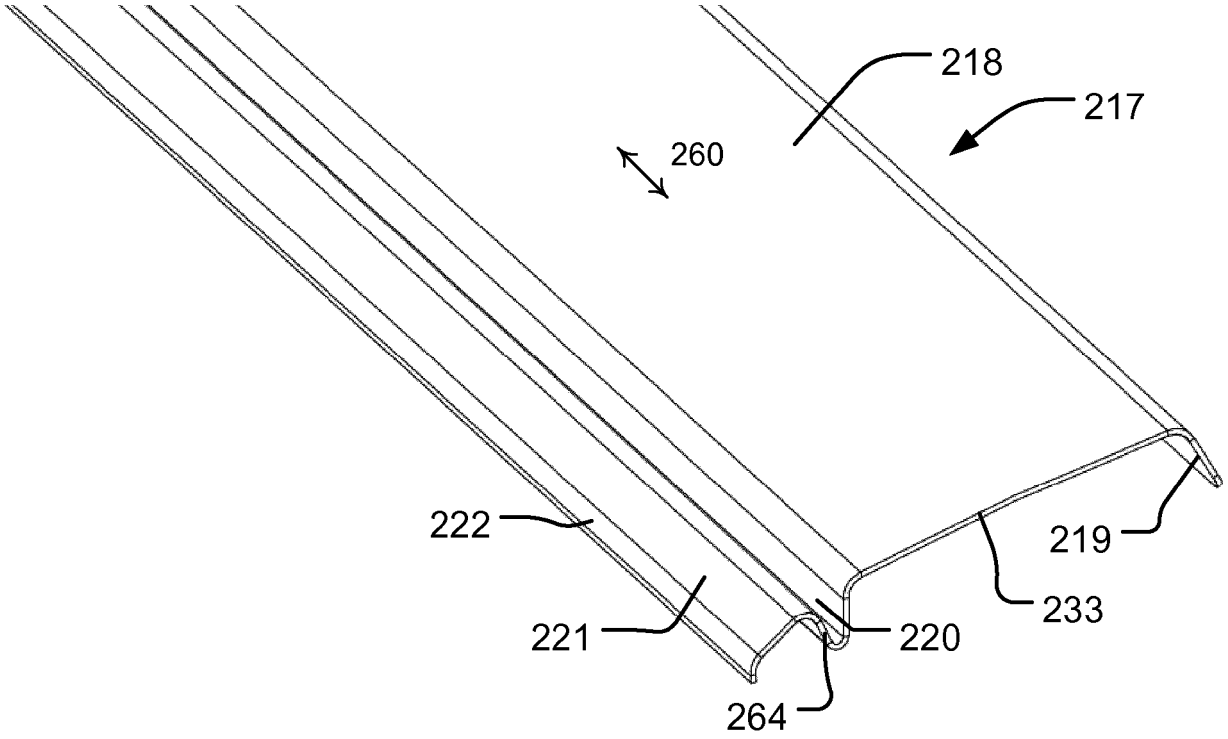


Fig. 12

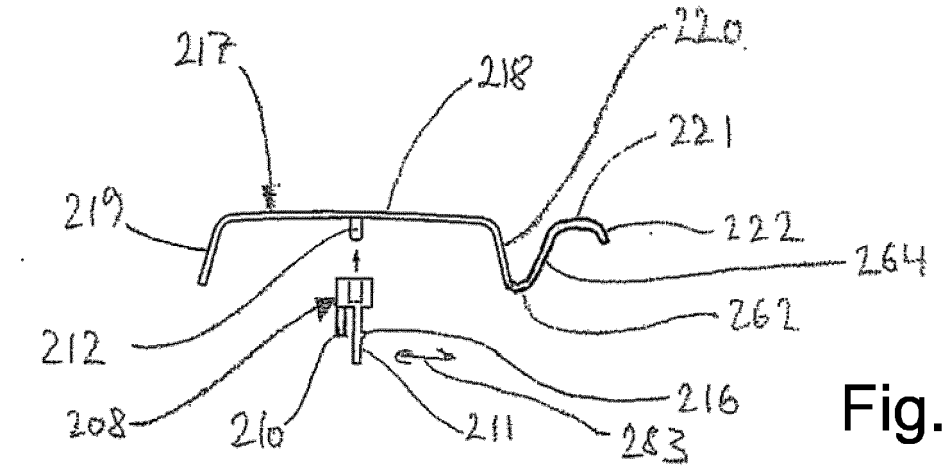


Fig. 13

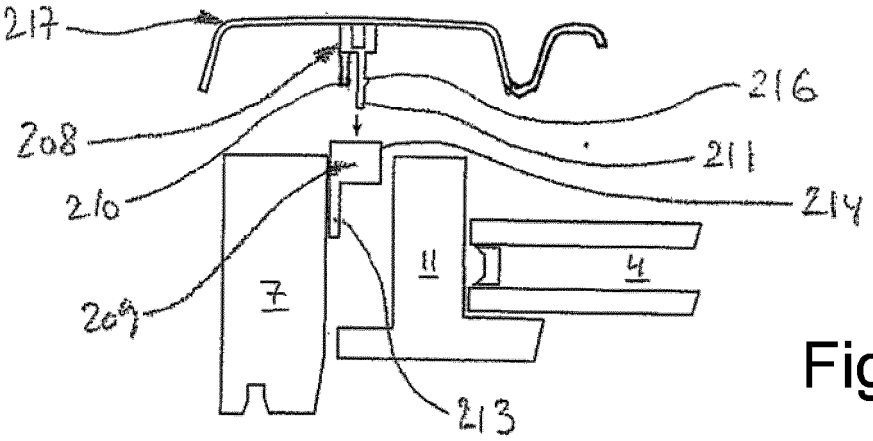


Fig. 14

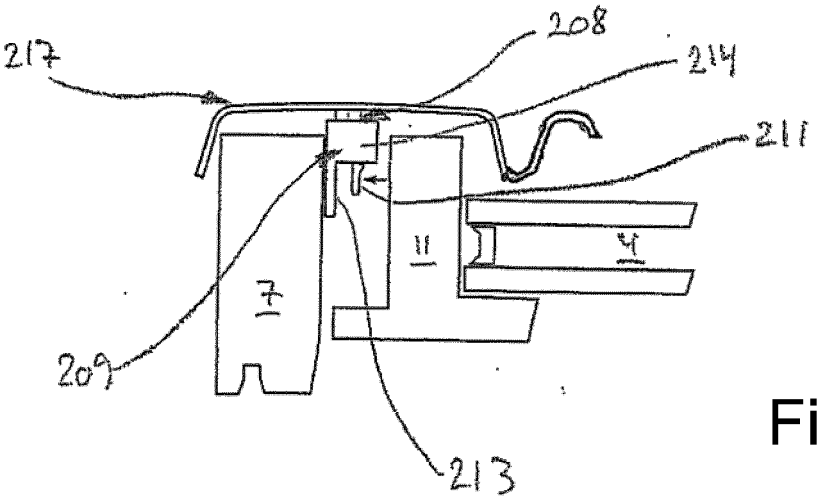
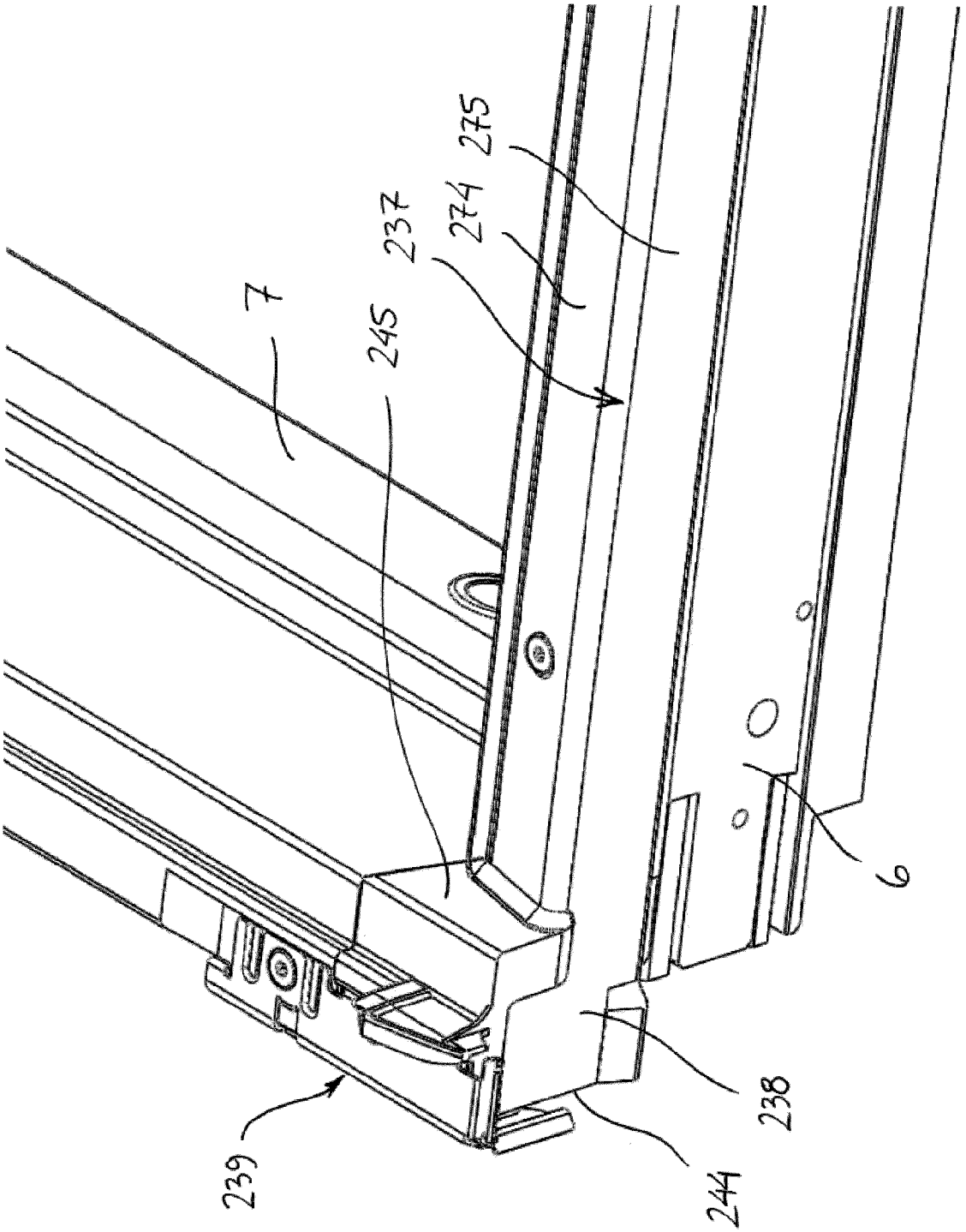


Fig. 15

Fig. 16



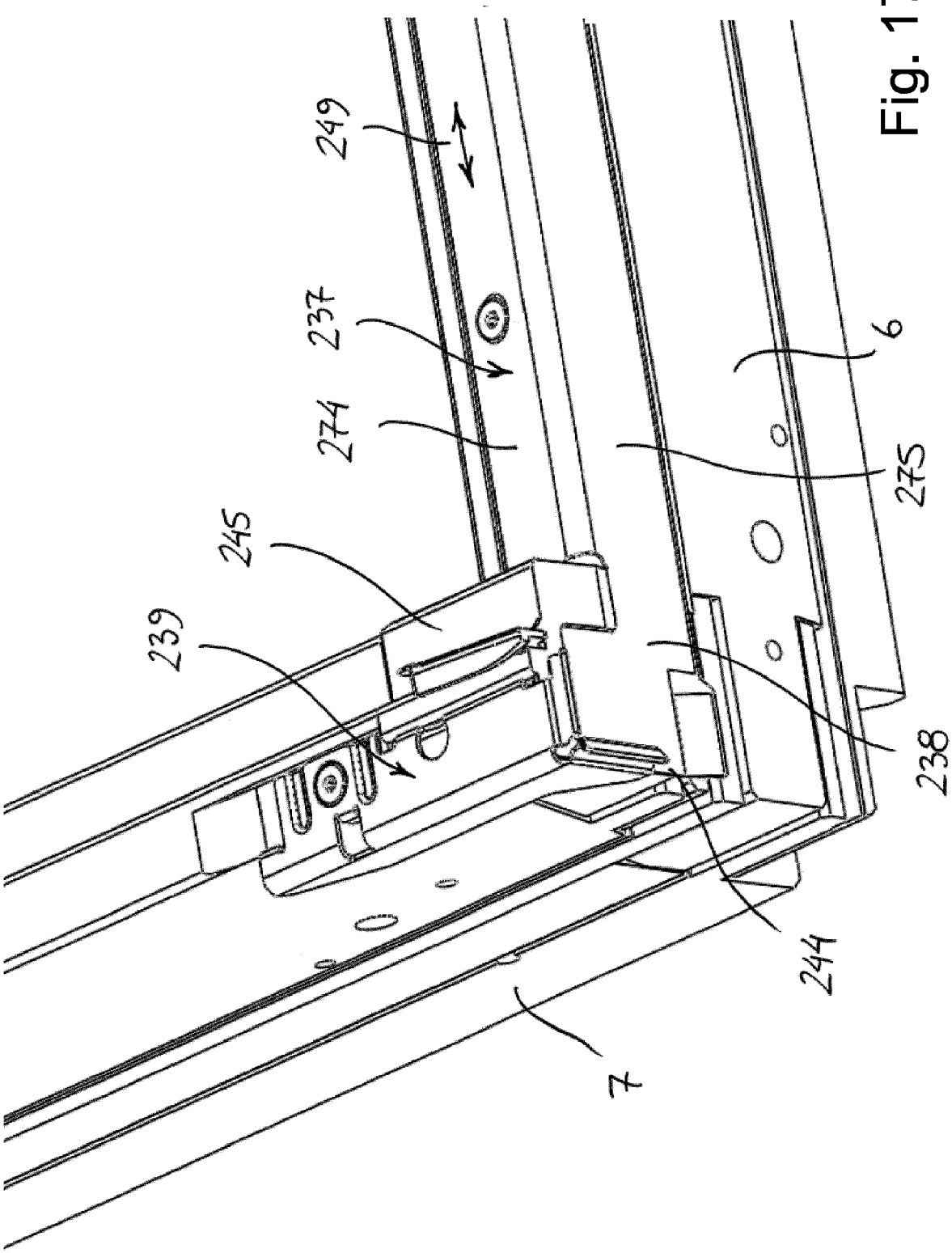


Fig. 17

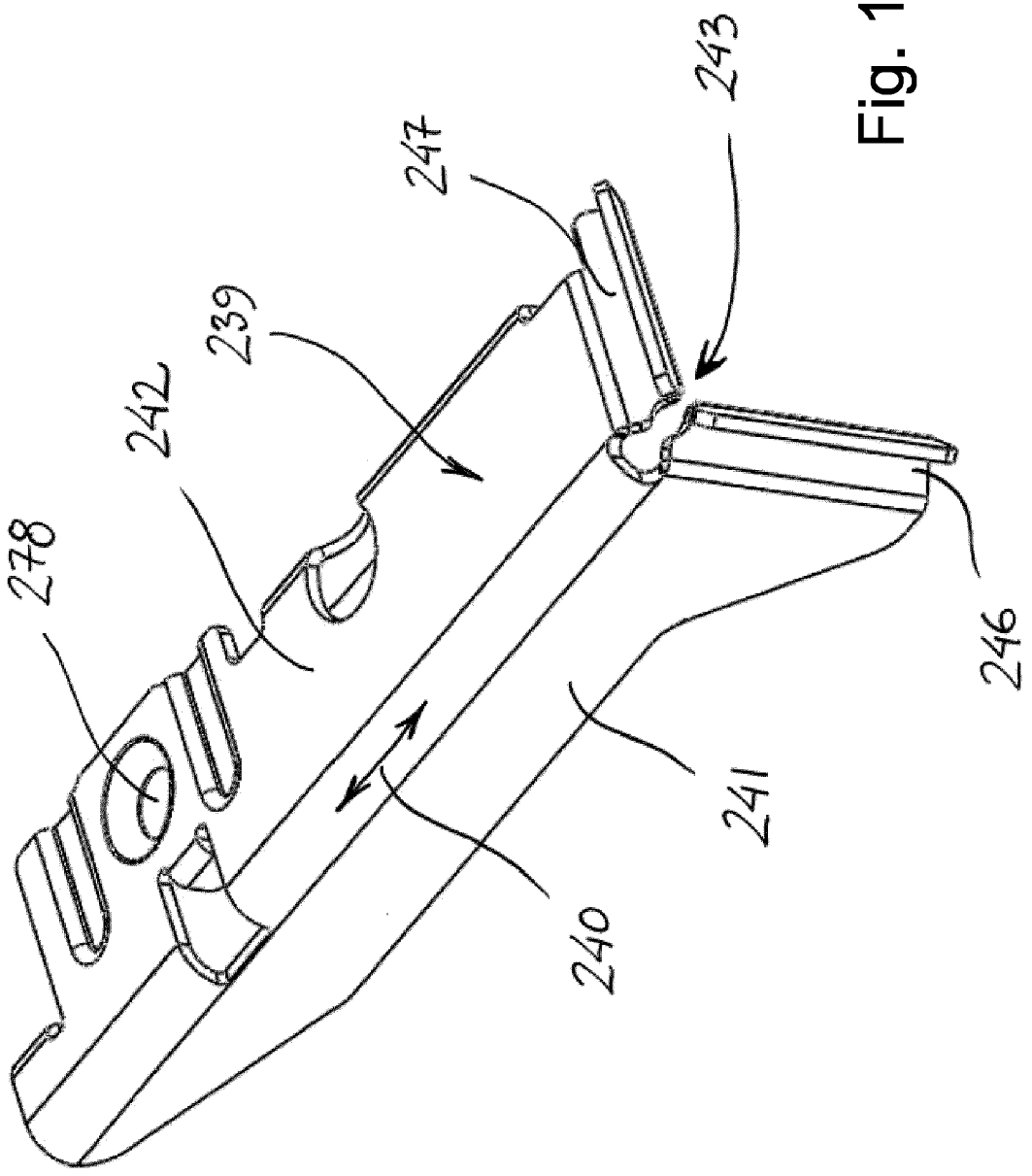


Fig. 18

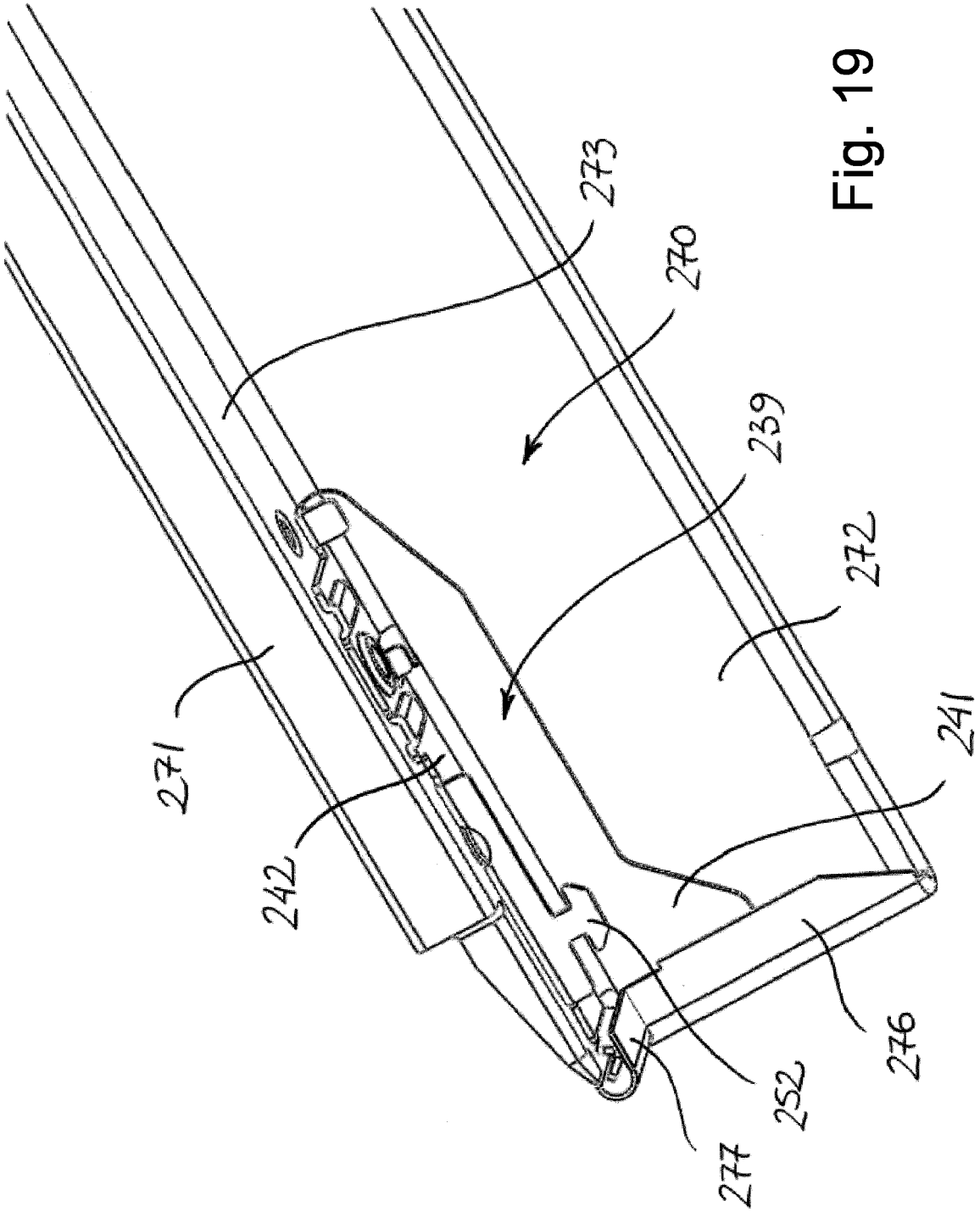


Fig. 19

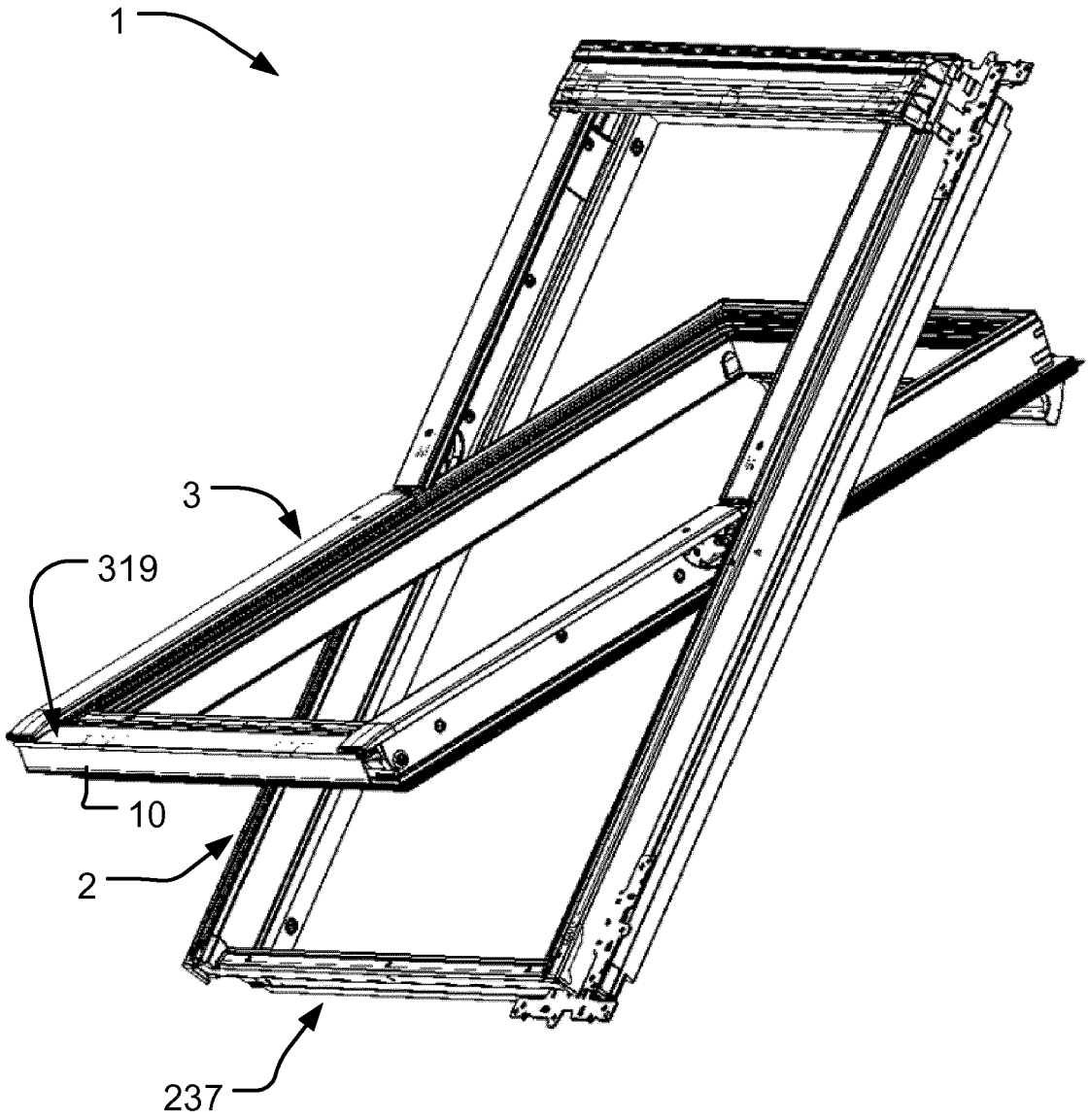


Fig. 20

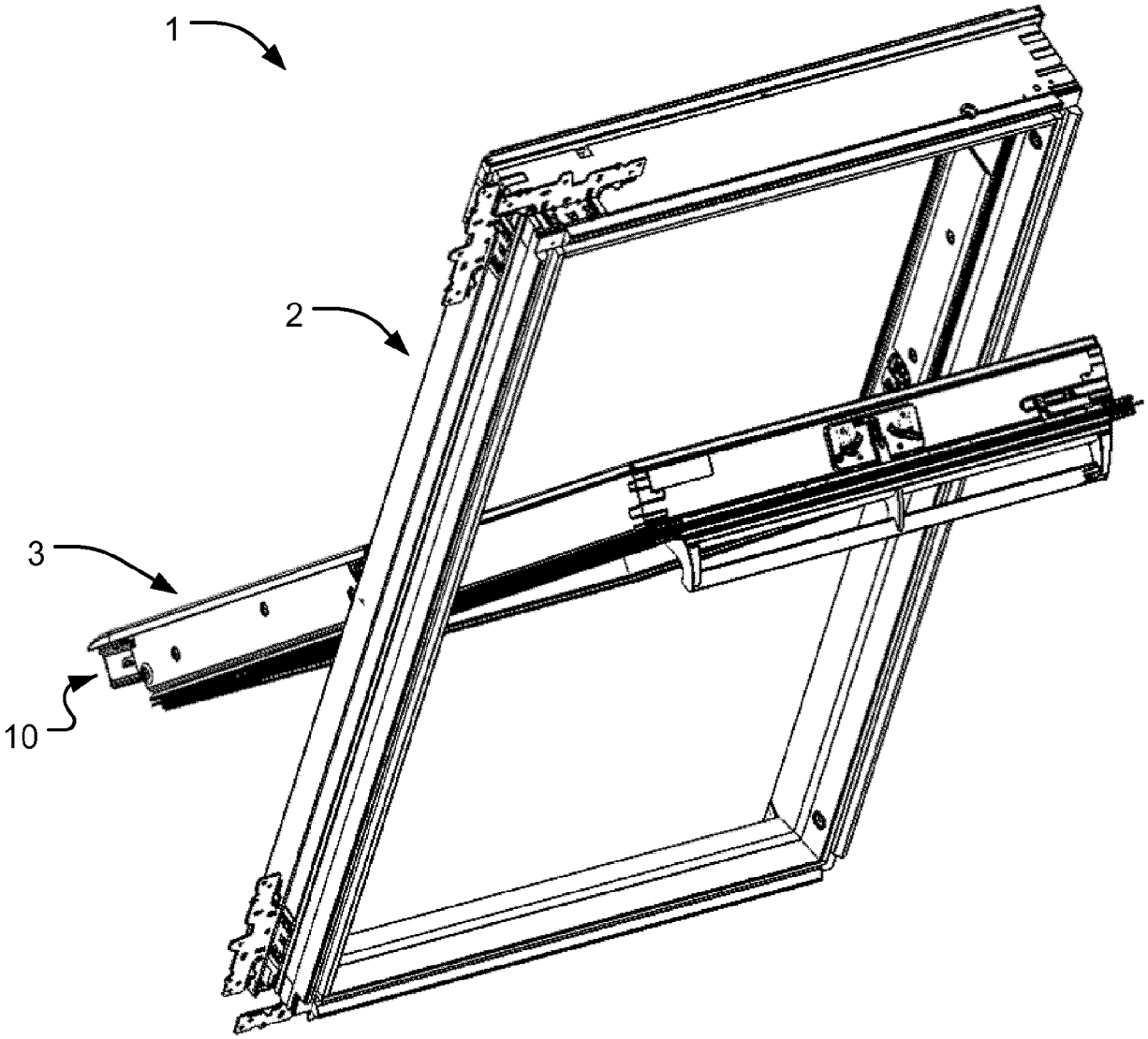


Fig. 21

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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 0871

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	FR 2 700 793 A1 (LAHERA PRODUCTIONS SARL [FR]) 29 July 1994 (1994-07-29)	1-5,8-13	INV.
			E04D13/03
A	* figures 1, 2 *	6,7,14,	E04D13/035
	* page 11, line 23 *	15	E06B7/10

X	DE 10 2009 033938 A1 (ROTO FRANK AG [DE]) 20 January 2011 (2011-01-20)	1-5,8-15	
A	* figures 1, 3, 4, 5 *	6,7	

TECHNICAL FIELDS SEARCHED (IPC)

E04D
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 September 2016	Tryfonas, N

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02-09-2016

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