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(54) **A METHOD FOR ARRANGING AN UNDERROOF COLLAR IN A STATE READY FOR INSTALLATION, A PACKED UNDERROOF COLLAR, AND A METHOD FOR INSTALLING AN UNDERROOF COLLAR**

(57) The invention relates to a method for packaging an underroof collar for use in water-proofing a joint between a roof structure and a window frame. Said method comprises the steps of: Folding along a first folding line extending substantially in parallel to the top and bottom collar members; folding along a second folding line extending substantially in parallel to the top and bottom

collar members; folding along a third and a fourth folding line extending substantially in parallel to the side collar members; and fixating the underroof collar in a folded state. It further relates to a packed underroof collar, to a roof window with a packed underroof collar attached to a window frame, and to a method for installing an underroof collar including unfolding steps.

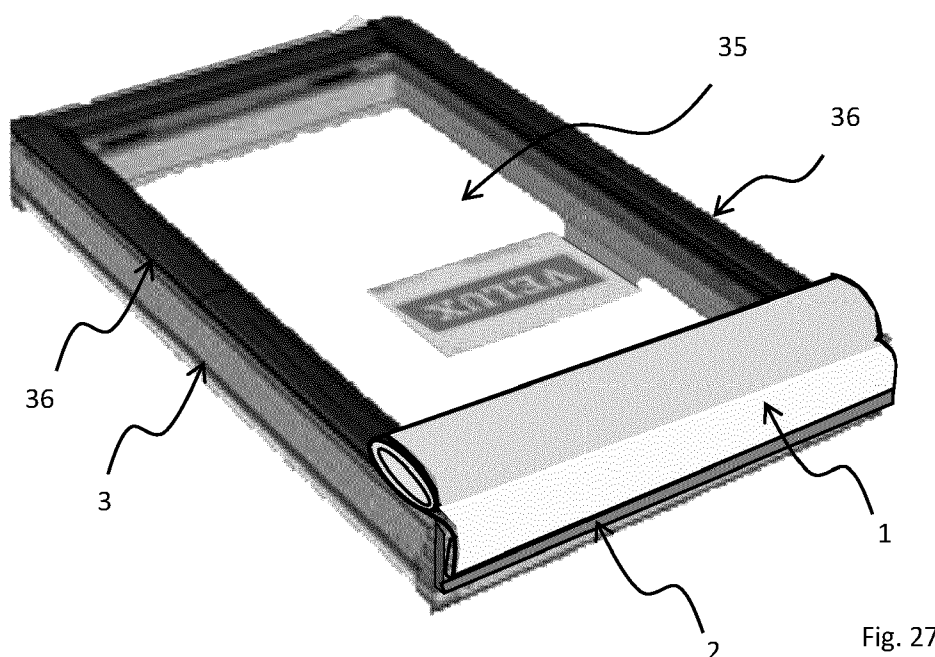


Fig. 27

Description

Technical Field

[0001] The present invention relates to a method for arranging an underroof collar for use in water-proofing the joint between a roof structure and a window frame in a state ready for installation, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening. The invention further relates to a packed underroof collar and to a method for installing an underroof collar.

Background Art

[0002] Underroof collars of the kind mentioned above are known for example from EP0994992B1, EP2952646A1, and EP2284329A2, and since they are made from soft textile-like materials they can be packaged in many ways. Focus have, however, always been on making the packed underroof collar as compact as possible in order to reduce the space needed for storage and transportation.

[0003] In later years focus has shifted towards making the installation of roof window related products, such as underroof collars, easier in order to avoid errors. One example is found in the applicants' own prior patent application WO2018/210937, where the underroof collar was provided with an engagement zone adapted for engagement with a window frame or the like.

[0004] It, however, remains a problem that underroof collars are relatively large and made from soft materials making them difficult to handle, and that even with the engagement zone underroof collar are sometimes not installed correctly or not installed at all.

Summary of Invention

[0005] With this background, it is an object of the invention to provide a method for arranging an underroof collar in a state ready for installation and a packed un-

derroof collar, which allows a reduction of the risk of error both in the packaging process and in the installation of the underroof collar.

[0006] This and further objects are achieved with a method of the kind mentioned in the introduction which is furthermore characterised in the following steps:

A) Folding the underroof collar along a first folding line extending substantially in parallel to a first pair of collar members, so that the one collar member of the pair is arranged on top of the other collar member of the pair, thereby folding the collar members of a second pair of collar members,

B) Folding the underroof collar along a second folding line extending substantially in parallel to the collar members of the first pair, so that at least part of the centre section of each collar member of the second pair is arranged on top of or underneath a collar member of the first pair, and/or a section of the collar member of the second pair located in continuation of a collar member of the first pair when seen in the length direction of said collar member of the first pair,

C) Folding the underroof collar along a third folding line and a fourth folding line extending substantially in parallel to the collar members of the second pair so that the collar members of the second pair are arranged on top of or underneath the collar members of the first pair, and

D) Fixating the underroof collar in a folded state.

[0007] With these folding steps, the underroof collar is packed in a manner, which is both comparatively easy to manage at the production site and facilitates installation of the underroof collar on a roof window mounted in a roof structure.

[0008] In one embodiment, particularly where the underroof collar is intended to be arranged along a side member of a frame of a roof window, step B) may be performed before step A).

[0009] Step D) is preferably performed at the end of the folding sequence, so that the underroof collar is retained in the packed state. It is, however, also possible to fixate the underroof collar between folding steps, for example after steps A) and B). This may for example help prevent that the underroof collar is unfolded in an inexpedient way.

[0010] A fixation between folding steps may for example be achieved by ultrasonic welding or by applying adhesive tape, adhesive, and/or glue.

[0011] A fixation of the packed underroof collar may for example be done by adding one or more strings, straps, clips, staples, hook-and-loop type fasteners, adhesive tape, adhesive, and/or glue. At present it is considered advantageous that a tape or label provided with printed instructions for use of the underroof collar is used for retaining the packed state.

[0012] In a second aspect of the invention the above and further objects are achieved with a packed underroof

collar for use in water-proofing the joint between a roof structure and a window frame, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening, wherein the underroof collar is folded along a first folding line extending substantially in parallel to a first pair of collar members, so that one collar member of the pair is located on top of the other collar member of the pair, thereby folding the collar members of a second pair of collar members, that the underroof collar is folded along a second folding line extending substantially in parallel to the collar members of the first pair, so that at least part of the centre section of each collar member of the second pair is located on top of or underneath a collar member of the first pair and/or a section of the collar member of the second pair located in continuation of a collar member of the first pair when seen in the length direction of said collar member of the first pair, that the underroof collar is folded along a third folding line and a fourth folding line extending substantially in parallel to the collar members of the second pair so that the collar members of the second pair are located on top of or underneath the collar members of the first pair, and that the underroof collar is fixated in a folded state by at least one fixation.

[0013] The embodiments and advantages, which will be described with reference to one aspect of the invention also applies to the other aspects of the invention and vice versa unless otherwise stated.

[0014] The folding along the first folding line, so that the collar members of the first pair are arranged on top of each other, means that the size of the underroof collar becomes more manageable, making the subsequent packaging steps more manageable. When unfolding the underroof collar during installation, this folding step is reversed as the last one, and if doing so after having arranged the collar members of the first pair along a frame member of the window frame the result will be that the underroof collar comes easily into its intended position in relation to the window frame and the roof structure when performing the last unfolding step.

[0015] The first folding line may be positioned so that

the inner rim parts of the collar members of the first pair become aligned after the folding, but other relative positions are also possible. In one embodiment, outer edges of the collar members of the first pair opposite the inner rim parts become aligned after the folding. In any event the first folding line will be positioned about the middle of the centre section of the collar members of the second pair, so that the size of the underroof collar folded along the first folding line is about half the size of the unfolded underroof collar.

[0016] The folding along the second folding line results in that at least part of the centre section of each collar member of the second pair is arranged on top of or underneath other parts of the underroof collar. This not only reduces the size of the folded underroof collar but also means that the centre sections of the collar members of the second pair no longer project as two legs from the collar members of the first pair, thus making the folded underroof collar considerably more manageable. If the collar members of the second pair are so long that they still project from the collar members of the first pair after the folding along the second folding line, they may be folded ones more along an additional folding line extending in parallel to the second folding line.

[0017] During unfolding this sequence of folding means that the centre section of the collar members of the second pair can be brought into position, one on each side of the window frame while still folded along the first folding line or along the top and bottom of the window frame, i.e. before unfolding the underroof collar completely. This reduces the risk of wind catching the underroof collar and making it difficult to position the collar members of the second pair.

[0018] The folding along the third folding line and the fourth folding line results in the collar members of the second pair becoming arranged on top of or underneath the collar members of the first pair. This will contribute to reducing the risk of the collar members of the second pair unfolding unintentionally. In underroof collars for use on a roof covered with tiles or other roofing materials resting on laths, the side collar members are usually made with a surplus of material, for example by using a pleated fabric, and due to the surplus of material the risk of them becoming unfolded or otherwise disordered is high. When folding the underroof collar with the top and bottom collar members as the first pair and the side collar members as the second pair, side collar members with a surplus of material will be folded onto or underneath the top and bottom collar members which means that the risk of them becoming disordered is reduced.

[0019] After being folded along third and fourth folding lines the underroof collar may have a width, when seen in the length direction of the collar members of the first pair, corresponding substantially to the width of the window frame around which it is to be installed. During installation this can be used for positioning the underroof collar correctly in relation to the width of the window frame before unfolding the collar members of the second pair

along the third and fourth folding lines, thus reducing the need for repositioning the unfolded and substantially less manageable underroof collar. This effect is particularly pronounced in an embodiment where the third and fourth folding lines are substantially coinciding with the inner rims of the collar members of the second pair.

[0020] By the folding along the fifth folding line extending substantially in parallel to the collar members of the first pair the underroof collar becomes even more manageable and the dimensions thus obtained makes it fit well into the packaging used for other components used in the installation of a roof window. In one embodiment the underroof collar is further folded along a sixth folding line extending substantially in parallel to the collar members of the first pair to make it even smaller.

[0021] It is presently considered advantageous that, when folding along the fifth folding line, the underroof collar is folded so that at least the centre sections of the collar members of the second pair are arranged between sections of at least one of the collar members of the first pair. This entails that the outer surface of the packed underroof collar consists substantially entirely of an uninterrupted section of the collar member of the first pair. This is particularly advantageous when the top and bottom collar members, which are typically made from a smooth un-pleated fabric, constitute the first pair. Thereby the risk of the underroof collar becoming torn or unfolded due to rims, edges or folds being caught on other objects during handling of the underroof collar is considerably reduced.

[0022] In some underroof collars the top collar member is considerably wider in a direction perpendicular to its length direction than the bottom collar member. To compensate for this difference and make the other folding steps easier, the underroof collar may be folded with the top and bottom collar members as the first pair and folded along a seventh folding line extending substantially in parallel to the top and bottom collar members before the folding along the first folding line. This results in one section of the top collar member becoming arranged on top of or underneath another section of the top collar member.

[0023] To further facilitate the installation of the underroof collar it may be attached to at least one mounting element, such as an insulating member. The mounting element may be arranged against or attached to the window frame or the roof structure before commencing the unfolding of the underroof collar, thus contributing to achieving a correct and stable positioning of the underroof collar in relation to the window frame.

[0024] The mounting element may comprise a fastener adapted for attachment to a window frame and/or the roof structure, such as a strip of an adhesive which may be covered by a cover member in a state of delivery. Similar fasteners may be provided on the inner rim parts of the collar members not directly connected to the mounting element, and in embodiments without a mounting element all inner rim parts may be provided with one

or more such fasteners.

[0025] If the mounting element is an insulating member, it may replace or supplement a member of an insulating frame or insulating assembly used for insulating the joint between the window frame and roof structure.

[0026] The mounting element may also contribute to keeping the underroof collar in the folded or packed state, thereby replacing or supplementing the abovementioned fixation(s).

[0027] In one embodiment the packed underroof collar is attached to a window frame of a roof window before being delivered to an installer. This will facilitate installation as the risk of the underroof collar being turned inside-out or being arranged at the wrong frame member of the window frame before being unfolded is eliminated. Another potential advantage of providing a roof window with the packed underroof already attached to it is that the risk of an installer picking the wrong underroof collar for a particular window, for example one adapted for use with a window of another size, is eliminated. A still further advantage is that the packed underroof collar may be used for protecting the roof window during transportation and handling. As an example, a packed underroof collar arranged along a side frame member of a roof window may replace or supplement the shock absorbing material usually arranged around the window frame before arranging the roof window in a cardboard box. As another example, an underroof collar attached at a top frame member of a roof window may be arranged on the side of the pane of the roof window intended to face the exterior in the mounted state, thus potentially protecting the pane. As a further example, other elements, such as a top covering member, may be covered by or wrapped in the underroof collar.

[0028] A third aspect of the invention relates to a method for installing an underroof collar so that it covers a joint between an inclined roof structure and a window frame, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening. This method comprises the following steps:

- J) Arranging a packed underroof collar at a first frame member of the window frame,
- K) Attaching the inner rim part of a collar member or a mounting element to which the inner rim part of said collar member is attached to the first frame member,
- L) Removing a fixation retaining the underroof collar in a packed state,
- M) Unfolding the underroof collar along a third folding line and a fourth folding line extending substantially in parallel to the collar members of a second pair so that the collar members of the second pair are arranged on top of the exterior surface of the roof structure,
- N) Unfolding the underroof collar along a second folding line extending substantially in parallel to the collar members of the first pair, and
- O) Unfolding the underroof collar along a first folding line extending substantially in parallel to the collar members of the first pair, so that the underroof collar is unfolded entirely.

[0029] This sequence of steps ensures that all collar members are installed correctly and not unfolded until other sections have been brought into place. In this way the installer only needs to relate to one or two collar members at a time and as collar members not yet to be used remain folded, the risk of them being caught by wind is considerably reduced. In case fixations are provided in addition to the one(s) retaining the packed underroof collar in the fully folded state, these additional fixations are broken or removed during the installation of the underroof collar. As an example, spot welds created by ultrasonic welding during the folding of the underroof collar may be broken by hand during the unfolding process.

[0030] Before starting the unfolding of the underroof collar, one or more insulating members may be arranged along one or more window frame members. These insulating members may be delivered together with the packed underroof collar, possibly be attached to it in a manner indicating an intended installation sequence or position.

[0031] The method for installation may also include attaching the other collar members directly or indirectly to the window frame. In this way the underroof collar is fixated in the installed position and subsequent displacement prevented. The attachment of other collar members may also contribute to a wind-proofing of the finished roof structure if for example the attachment is achieved with an uninterrupted strip of adhesive extending along the entire inner rim of the underroof collar.

[0032] To further reduce the risk of the underroof collar becoming caught by wind and/or displaced, one or more collar members may be attached to the roof structure, for example by means of staples being passed through the collar members in the vicinity of the outer edges and into laths or battens of the roof structure.

[0033] In one embodiment, where the top collar mem-

ber and the bottom collar member constitute the first pair of collar members and the side collar members constitute the second pair of collar members, the underroof collar is attached at the top frame member of the window frame. During the unfolding process, the side collar members are arranged on top of the exterior surface of the roof structure above and to each side of the window frame, before being brought down along the side frame members while still remaining folded onto themselves, and finally the bottom collar member is passed over the window frame and down to a position below the bottom frame member when seen in the direction of inclination of the roof structure, thereby unfolding the side collar members entirely.

[0034] In one embodiment, where the top collar member and the bottom collar member constitute the first pair of collar members and the side collar members constitute the second pair of collar members, the underroof collar is attached at a side frame member. During the unfolding process, one side collar member is moved to the opposite side of the window frame, and the top collar member is then arranged at the top frame member of the window frame, and the bottom collar member is arranged at the bottom frame member of the window frame. The order of unfolding the top and bottom collar members may be opposite depending on how the underroof collar is folded. In some cases, the top and bottom collar members do not overlap, and the sequence of unfolding may then be left to the discretion of the installer.

[0035] A further aspects of the invention relate to a roof window where a packed underroof collar is attached to a window frame of the roof window, preferable to a top frame member or a side frame member of the window frame, and to such a roof window mounted in a roof structure where the packed underroof collar is resting on an exterior surface of the roof structure or on an exterior side of a pane of a window, at least after the removal of the at least one fixation. Common to these aspects of the invention is that the packed underroof collar is arranged in a position, which facilitates unfolding and installation of the underroof collar.

Brief Description of Drawings

[0036] In the following description embodiments of the invention will be described with reference to the schematic drawings, in which

Fig. 1 shows an unfolded underroof collar in a perspective view to the left and in a front view to the right; Figs 2-7 show the underroof collar in Fig. 1 in different stages of folding in perspective views to the left and in front views to the right;

Fig. 8 shows an unfolded underroof collar in a perspective view to the left and in a front view to the right; Figs 9-14 show the underroof collar in Fig. 8 in different stages of folding in perspective views to the left and in front views to the right;

Fig. 15 is a photo of a packed underroof collar;
 Fig. 16 is a partially cut-away photo of an underroof collar arranged on top of a mounting element;
 Fig. 17 is a partially cut-away photo of an underroof collar and a mounting element;
 Fig. 18 is a photo of a packed underroof collar;
 Fig. 19 illustrates the arrangement of a packed underroof collar at a top frame member of a window frame installed in an inclined roof structure;
 Fig. 20 illustrates an initial stage of unfolding of the packed underroof collar in Fig. 19;
 Fig. 21 illustrates a final stage of unfolding of the packed underroof collar in Figs 19 and 20;
 Fig. 22 is a partially cut-away photo of packed underroof collar in Fig. 15 attached to a top frame member of a roof window frame;
 Fig. 23 is a partially cut-away photo of an inner side of the mounting element of the packed underroof collar in Figs 15 and 22;
 Fig. 24 shows a second embodiment of a mounting element; and
 Fig. 25 shows the mounting element in Fig. 24 after installation;
 Fig. 26 shows a packed underroof collar attached to a window frame of a roof window;
 Fig. 27 shows another embodiment of a packed underroof collar attached to a window frame of a roof window;
 Fig. 28 shows another embodiment of a packed underroof collar attached to a window frame of a roof window; and
 Fig. 29 shows another embodiment of a packed underroof collar attached to a window frame of a roof window
 Fig. 30 shows an unfolded underroof collar in a top view;
 Figs 31-35 show the underroof collar in Fig. 30 in different stages of folding.

Description of Embodiments

[0037] Referring initially to Fig. 1, an underroof collar 1 for use in water-proofing the joint between a roof structure and a window frame is shown both in a perspective view to the left and in a front view to the right. It comprises a bottom collar member 11, a top collar member 12, and two side collar members 13, 14 for extending along a bottom frame member, a top frame member, and two side frame members of a window frame, respectively, in an installed state. The top and bottom collar members constitute a first pair of collar members and the side collar member constitute a second pair of collar members. Please note that for practical reasons the underroof collar has been illustrated with the bottom collar member facing upwards in Fig. 1, i.e. opposite the intended orientation in the installed state.

[0038] Each collar member includes an inner rim part 111, 121, 131, 141 and an outer edge 112, 122, 132,

142, and the inner rim parts together delimit a collar opening 15. The parts of the collar members extending away from the inner rims towards the outer edges are configured for serving as outer skirt parts coming into engagement with the roof structure in the installed state.

[0039] Each collar member has a length direction extending in parallel with the inner rim part, in Fig. 1 represented only by the length directions LB and LS of the bottom collar member and the left-hand side collar member, respectively.

[0040] All collar members are made from the same smooth fabric, such as a polypropylene non-woven with a wind-proofing layer, but whereas the bottom collar member 11 and the top collar member 12 are simple sheets of material, the side collar members 13, 14 are pleated. The pleating provides a surplus of material, which allows the side collar members to get down between laths of the roof structure and reach an underroof sandwiched between the lath and rafters of the roof structure in a manner well-known to the skilled person.

[0041] In this embodiment, the joints between the side collar members 13, 14 and the bottom and top collar members 11, 12 extend at a 45 degrees angle from the corners of the collar opening 15 towards the outer edges 132, 142, but it is to be understood that other angles are also possible. Particularly it is envisaged that the pleated side collar members may extend over the entire height of the underroof collar, so that outer end edges (not shown) extend in continuation of the outer edges 112, 122 of the bottom and top collar members, or that the side collar members end at level with the inner rim parts 111, 121 of the bottom and top collar members. The joints may be made by welding, gluing, sewing or any other chemical or mechanical means which results in a wind-proof joint.

[0042] Turning now to Fig. 2, the underroof collar 1 has been folded along a first folding line I shown in Fig. 1 so that the bottom collar member 11 has been arranged on top of the top collar member 12 and so that the two side collar members 13, 14 are folded on top of themselves. This results in that the centre sections 133, 143 of the side collar members 13, 14 project as two legs from the top and bottom collar members in the folded state. In this embodiment, the outer edges 112, 122 of the bottom and top collar members have been aligned, and a section of the top collar member 12 close to the collar opening 15 is still visible due to the difference in size between the top collar member and the bottom collar member. To facilitate the further folding steps, the top and bottom collar member may be attached to each other in a releasable manner, for example by means of small welds (not shown) made by ultrasonic welding or by means of an adhesive, and such fixation may also be employed following the subsequent folding steps.

[0043] In the next folding step, the underroof collar is folded along a second folding line II shown in Fig. 2, thereby bringing the underroof collar into the state shown in Fig. 3. This means that the centre sections of the side

collar members 133, 143 are arranged on top of the bottom collar member as well as on top of the sections of the side collar members located in continuation of the bottom collar member when seen in the length direction LB. The second folding line here coincides with the inner rim part 121 of the top collar member 12, and the centre sections 133, 143 of the side collar members no longer project from the rest of the folded underroof collar. This results in a compact folded underroof collar and is therefore presently considered advantageous but need not be the case.

[0044] To achieve a further compacted state of the folded underroof collar it is now folded along a third folding line III and a fourth folding line IV shown in Fig. 3 to the state shown in Fig. 4. This means that the side collar members are arranged upside-down on top of the bottom collar member 11 and the section of the top collar member 12, which is still uncovered due to its larger size. In this way, the centre sections 133, 143 of the side collar members are sandwiched between the other parts of the underroof collar, thus protecting them from unintentional unfolding and also protecting the pleating.

[0045] A still further reduction of the size of the folded underroof collar and protection of edges, which might otherwise get caught on other things during handling of the packed underroof collar is achieved by folding along a fifth folding line V in Fig. 4 to the state shown in Fig. 5, where only the top collar member 12 is exposed.

[0046] In this embodiment the underroof collar is folded one more time along a sixth folding line VI shown in Fig. 5 to the state shown in Fig. 6 and is then attached to a mounting element 2 as shown in Fig. 7. The last folding ensures that the packed underroof collar is compact and corresponding substantially in size to the mounting element, which in turn has substantially the same size as an outer exposed surface of a roof window frame against which it is to be installed.

[0047] Above the folding steps have been described with reference to embodiments, where sections of the underroof collar are always arranged on top of other sections. This is considered advantageous as it will then be possible to see if it has been folded correctly, but it is not excluded to make one or more of the folds so that the section in question is arranged underneath another section or even between sections of an already folded underroof collar.

[0048] Turning now to Figs 8-14 a slightly different way of folding the underroof 1 is shown. It is to be understood that the underroof collar shown here is identical to the one in Fig 1-7 and as many of the folding steps are the same, only the differences will be described.

[0049] The packaging of the underroof collar here starts with a folding of the top collar member 12 along a folding line VII extending in parallel with the length direction LT of the top collar member, thereby bringing the underroof collar into the state shown in Fig. 9. When now folding along the folding line I as described above, so that the bottom collar member 11 is arranged on top of

the top collar member, the still uncovered section of the top collar member is considerably smaller than in the first embodiment as may be seen by comparing Fig. 10 to Fig. 2. Furthermore, when then folding along the folding line II shown in Fig. 10, the resulting folded underroof collar is also considerably smaller as is seen by comparing Fig. 11 to Fig. 3, and the folding along a sixth folding as described above with reference to Figs 5 and 6 is therefore not needed.

[0050] A still further embodiment of a packed underroof collar 1 attached to a mounting element 2 in the form a top insulating member adapted for insulating a top frame member of a roof window frame is shown in Fig. 15. Throughout this description, the same reference numbers will be used for elements having substantially the same function, even though they may not be identical.

[0051] As may be seen in Fig. 15, a section 124 of the top collar member has been left uncovered by the rest of the underroof collar, corresponding to the fifth folding line V being located somewhat below the middle in Fig. 12. The third and fourth folding lines III and IV have also been located slightly more towards the middle of the underroof collar than shown in Fig. 11, but the underroof collar has otherwise been packed as illustrated in Fig. 8-14.

[0052] To keep the packed underroof collar in its folded state it has been provided with fixations 16 in the form of strips of adhesive tape at both ends, said strips of tape being folded around the ends so that it sticks to both the upper side and the lower side of the packed underroof collar.

[0053] Information regarding the intended use of the underroof collar has been provided both on the two strips 16 of adhesive tape and on a sticker 17 attached to the packed underroof collar, but it would also be possible to print information directly on the underroof collar.

[0054] The uncovered section 124 of the top collar member has been attached to the mounting element by means of a strip of adhesive 18, which continues along the entire inner rim of the underroof formed by the inner rim parts of the respective collar member. Fig. 16 shows the top collar member 12 arranged on top of the mounting element 2 before being attached to it and above that the white back side 125 of a similar collar member, where the strip of adhesive 18 is clearly seen. The strip of adhesive 18 may be covered with a cover strip, which is removed before attaching the underroof collar to the mounting element 2.

[0055] In this embodiment, the insulating member constituting the mounting element 2 is made with a recess 21 at the centre extending perpendicular to the length direction LT of the top collar member. The recess 21 may serve to facilitate a correct relative positioning of the underroof collar 1 in the length direction by aligning it with an indentation 126 provided in the inner rim part of the top collar member, said indentation 126 being seen more clearly in Fig. 17.

[0056] As is also seen clearly in Fig. 17 the mounting

element 2 is provided with a further recess 22 extending in parallel with the length direction. By arranging the inner rim part 121 in parallel with this further recess it is ensured that the underroof collar will be in correct height perpendicular to the plane of the roof when installed on the window frame.

[0057] The recess 21 may have the further advantage that it allows the packed underroof collar to be folded ones more to the even more compact state shown in Fig. 18.

[0058] Figs 19-21 show how the packed underroof collar 1 is installed at the top frame member 31 of a roof window frame 3 and unfolded onto the roof structure 4 surrounding the roof window frame.

[0059] The mounting element 2 is provided with a fastener 23, here in the form of an adhesive covered by a cover strip 24, which is removed as indicated by the arrow in Fig. 19 before bringing the mounting element 2 into contact with the top frame member 31.

[0060] The removal of fixations 16 and the unfolding along the fifth and sixth folding lines shown and described with reference to Figs 4-6 is shown in Fig. 20.

[0061] The unfolding of the first and second folding lines described with reference to Figs 1-3 is shown in Fig. 21.

[0062] Fig. 22 is a photo showing the packed underroof collar 1 in Fig. 15 arranged against a top frame member of a roof window frame 3. Installation against the top frame member is considered advantageous as gravity will help with the installation of the underroof collar, but it is not excluded to start from another position.

[0063] Fig. 23 is a photo of the inner side of the mounting element 2 facing the top frame of the window frame 3 in Fig. 22. In addition to the fastener 23, which consists of five parallel strips of adhesive and is here covered by a transparent cover layer, it comprises a recess 25. The recess 25 is configured for making room for wiring connected to electronic equipment on the window, such as an electric operator, a rain sensor or the like so that the insulating material of the mounting element is not compressed to a degree where it influences the insulating properties to any considerable degree. The recess may also be used for positioning the packed underroof collar correctly by fitting over a projection on the window frame only when installed correctly. For the same purpose, lines or patterns may be provided, for example by printing or melting the material.

[0064] Even though the fastener 23 has been described as an adhesive in all of the embodiments above it is also possible to use a mechanical attachment such as clamps or nails.

[0065] The mounting elements 2 described above and shown in the drawing are insulating members made from foamed polyethylene (PE) with closed cells. This material is also widely used for insulating assemblies used with traditional roof windows. Using the same material has the advantage that the installer will recognize the mounting element as being intended for forming part of the in-

ulating assembly surrounding the roof window and that any potential for material deterioration caused by incompatibility between different materials is avoided. In addition, this material lives up to fire safety regulations.

[0066] Making the mounting element 2 from a flexible material allows it to adapt to and accommodate smaller variations in the shape of the window frame or items attached thereto, such as mounting bracket attachment sections, but recesses may be provided as described above with reference to the recess 25. It may also be advantageous to use a material, which allows for an easy removal of a section of the mounting element, either at the production site or at the installation site, thereby creating a recess. For this purpose, weakenings may be provided in the material. It is also possible to make a section of the mounting element from a different material, which is for example relatively easier to compress than the rest of the mounting element, such that this easily compressible material may yield and make room for a mounting bracket, wire or the like.

[0067] In one embodiment the insulating member serving as the mounting element has a thickness of 8-10 mm in a direction perpendicular to the inner side. This will allow it to fit between a window top frame member and standard flashing assembly.

[0068] It is presently considered advantageous to make the insulating mounting element by extrusion as this allow easy shaping of the mounting element and for a strip of adhesive to be added at the same time. The crosswise recess can be made by cutting and milling, for example in connection with the cutting of the extruded member to the desired length of the mounting element.

[0069] Other geometries are possible and may be necessary if the mounting element is adapted for being arranged along a window bottom frame member or a window side frame member instead of along a window top frame member as described above.

[0070] An example of a mounting element with the potential for use both along a top frame member and a bottom frame member of a roof window is shown in Fig. 24. This mounting element 2 consists of a top insulating member 26 for use along the top frame member 31 of the roof window and a bottom insulating member 27 for use along the bottom frame member 32 as shown in Fig. 25. Each insulating member 26, 27 is provided with a fastener 23 for attachment to the respective frame member. As may be seen, each insulating member 26, 27 is shaped so that it fills out the space available between the respective frame member 31, 32 and a respective flashing member 33, 34 arranged to cover the joint between the frame member and the roof structure 4.

[0071] In the state of delivery shown in Fig. 24 the top insulating member 26 and the bottom insulating member 27 are interconnected along a separation line 28. The separation line may be either a weakening in the material if the two insulating members are made in one piece, or an interconnection of the two insulating members keeping them temporarily together, such as a weak adhesive

or glue, a weld, or a mechanical fixation.

[0072] The underroof collar (not shown in Figs 24-25) is attached either to the top insulating member 26 or to the bottom insulating member 27 as described with reference to the other embodiments above and before unfolding it the two insulating members are separated along the separation line. The insulating member no longer connected to the underroof collar is installed in its intended position along the roof window frame before installing the underroof collar as described above. In a still further embodiment (not shown), where the mounting element is attached to the top collar member, a separate insulating element and/or stiffening element may also be attached to the bottom collar member or vice versa. Incorporating an insulating element may contribute to an alternative provision of an insulating frame surrounding the window frame in the installed state, and the provision of a stiffening element may contribute to making the underroof collar easier to handle, particularly during installation. It is to be understood that one element may have both insulating and stiffening properties, but that two separate elements may also be provided.

[0073] The mounting element may alternatively be made from a plate material. This may particularly be advantageous if the window frame member along which the mounting element is to be arranged is without any substantial shape variations, such that a tight fit with the plate material may be achieved over substantially the entire length of the window frame member.

[0074] The plate material may for example be made from a material chosen from the group comprising: polymers, such as polyethylene (PE), polypropylene (PP), polyurethane (PU), polycarbonate (PC) which may possibly be foamed, paper, such as waterproof corrugated cardboard, wood, such as plywood or wood fibre boards, mineral wool, and composites.

[0075] The plate material may for example be made from a material chosen from the group comprising: Laminates, honeycomb-structures, channel plates, bubble plates, perforated plates, extruded materials, foamed or expanded materials, and moulded materials.

[0076] The connection between the underroof collar and the mounting element may for example be achieved by means of a double-sided adhesive tape, but it is also envisaged to use adhesives or glue, such as a hold-melt, or welding. Welding has the advantages that no further material is added but will of course require that at least one of the materials used for the underroof collar and mounting element can be melted.

[0077] Turning now to Figs 26-29 four different embodiments roof windows with packed underroof collars 1 attached to a window frame 3 of a roof window are shown. Fixations have been left out in these figures, but it is to be understood that they will be there in a state of delivery.

[0078] The embodiment in Fig. 26 corresponds substantially to the one shown in Fig. 22. The packed underroof collar 1 is attached to a top frame member 31 of the window frame 3 via a mounting element 2 and the un-

derroof collar is extending along the outer side of the top frame member facing away from the pane 35. In this position the packed underroof collar may help protect the window frame during handling and transportation. While this embodiment is shown with a mounting element 2 it is to be understood that the underroof collar could also be attached directly to the window frame 3.

[0079] In Fig. 27 the underroof collar 1 is attached to the window frame 3 in substantially the same way as in Fig. 26, but the underroof collar has been turned upwards and arranged on top of the window frame. This may require that a section of the top collar member is left uncovered by the rest of the underroof collar as described above with reference to the section 124 in Fig. 15. In this position the packed underroof collar may help protect the pane 35 and the side covering members 36 during handling and transportation of the roof window. Again, the presence of the mounting element 2 is not essential.

[0080] The embodiment in Fig. 28 corresponds to that in Fig. 27 with respect to the attachment to the window frame 3, but the underroof collar has been packed. While the folding along the folding line V described with reference to Figs 4-5 concealed the side collar members, this underroof collar has been folded along the folding line V in the opposite directions so that the side collar members 13, 14 are on the exterior side of the packed underroof collar. When unfolding this underroof collar the side collar members first become arranged on the pane 35 of the roof window and are then folded away from the pane down along the side frame members 37 instead of being unfolded onto the roof surface above the roof window as described above.

[0081] In Fig. 29 the underroof collar 1 has been arranged along one of the side frame members 37 instead of at the top frame member 31. For this purpose, the underroof collar may have been packed as described with reference to Figs 1-7, only with the folding lines extending perpendicular to what is shown, so that the two side collar members 13, 14 are arranged on top of each other when folding along the folding line I.

[0082] Another way of folding an underroof collar, which is particularly useful when it is to be arranged along a side frame member of the window frame is shown in Figs 26-31. Here folding line I and folding line II extend in parallel with the top and bottom collar members 11, 12 and are located close to the inner rims 111, 121 thereof. In this way the length of the underroof collar is reduced so that it corresponds substantially to the length of the window frame along which it is to be arranged, but the bottom collar member 11 is not arranged on top of the top collar member 12 as in Fig. 2. To facilitate the further folding steps, the top and bottom collar member may be attached to the side collar members, for example by ultrasonic welding, and such fixation may also be employed following the subsequent folding steps.

[0083] In the next folding steps, the underroof collar is folded along a third folding line III thereby bringing it into the configuration in Fig. 32 and along folding lines IVa,

IVb thereby bringing it into the configuration in Fig. 33, said folding lines all extending in parallel with the side collar members 13, 14. This means that the underroof collar is brought down to a width corresponding to the width of the side collar members size, the top and bottom collar members 11, 12 being folded onto the side collar members 13, 14.

[0084] A still further reduction of the size of the folded underroof collar is achieved by folding along folding lines IVc and IVd, which also extend in parallel with the side collar members 13, 14, thus first bringing the underroof collar into the state shown in Fig. 34 and then into the state shown in Fig. 35.

[0085] In the embodiment shown the folding along lines III, IVa, and IVb result in the underroof collar being arranged in a zig-zag configuration and the folding along lines IVc and IVd corresponds to a rolling of the underroof collar. This is considered advantageous not only in view of the unfolding in connections with the installation of the underroof collar, but also ensures that the strips of adhesive tape 16 located at the inner rim of one side collar member 13 remain exposed. After the folding along folding line IVd these strips of adhesive tape are used as fixations retaining the underroof collar in the packed state.

[0086] In this embodiment, three strips of tape 16 are shown, but it is to be understood that the number may vary, depending for example on the size of the underroof collar 1, and that other fixations may be used instead, including fixations which are only attached to the underroof collar after the folding has been completed. Furthermore, it is to be understood that the fixations described with reference to one embodiment of the invention may also be used with other embodiments of the invention.

[0087] It is presently considered advantageous that the underroof collar is made from a three-layer fabric comprising a polypropylene (PP) textile, for example a felt or a non-woven, and a wind-proof sheet material. In one embodiment it is a flexible laminated polypropylene sheet according to EN 13859-1. Polypropylene may also be combined with high density polyethylene (HDPE). This applies to all embodiments of the invention.

List of reference numerals

[0088]

1	Underroof collar
11	Bottom collar member
111	Inner rim part of bottom collar member
112	Outer edge of bottom collar member
12	Top collar member
121	Inner rim part of top collar member
122	Outer edge of top collar member
124	Uncovered section
125	Backside
126	Indentation
13	Side collar member

131	Inner rim part of side collar member
132	Outer edge of side collar member
133	Centre section
14	Side collar member
5 141	Inner rim part of side collar member
142	Outer edge of side collar member
143	Centre section
15	Collar opening
16	Fixation
10 17	Sticker
18	Strip of adhesive
2	Mounting element
21	Recess
22	Recess
15 23	Fastener
24	Cover strip
25	Recess
26	Top insulating member
27	Bottom insulating member
20 28	Separation line
3	Roof window frame
31	Top frame member
32	Bottom frame member
33	Top flashing member
25 34	Bottom flashing member
35	Pane of roof window
36	Side covering member
37	Side frame member
4	Roof structure
30 I	First folding line
II	Second folding line
III	Third folding line
IV	Fourth folding line
V	Fifth folding line
35 VI	Sixth folding line
VII	Seventh folding line
LB	Length direction of bottom collar member
LS	Length direction of side collar member
LT	Length direction of top collar member
40	

Claims

1. A method for arranging an underroof collar for use in water-proofing a joint between a roof structure and a window frame in a state ready for installation, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being

arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening,
characterised in that said method comprises the following steps:

- A) Folding the underroof collar along a first folding line extending substantially in parallel to a first pair of collar members, so that the one collar member of the pair is arranged on top of the other collar member of the pair, thereby folding the collar members of a second pair of collar members,
 - B) Folding the underroof collar along a second folding line extending substantially in parallel to the collar members of the first pair, so that at least part of the centre section of each collar member of the second pair is arranged on top of or underneath a collar member of the first pair, and/or a section of the collar member of the second pair located in continuation of a collar member of the first pair when seen in the length direction of said collar member of the first pair,
 - C) Folding the underroof collar along a third folding line and a fourth folding line extending substantially in parallel to the collar members of the second pair so that the collar members of the second pair are arranged on top of or underneath the collar members of the first pair, and
 - D) Fixating the underroof collar in a folded state.
2. A method according to claim 1, where the third and fourth folding lines are substantially coinciding with the inner rims of the collar members of the second pair.
 3. A method according to claim 1 or 2, further comprising the step of:
E) Folding the underroof collar along a fifth folding line extending substantially in parallel to the collar members of the first pair.
 4. A method according to claim 3 where, during step E), the underroof collar is folded so that the centre sections of the collar members of the second pair are arranged between sections of one or both collar members of the first pair.
 5. A method according to one or more of claims 1-4, further comprising the following step, which is performed after step E):
F) Folding the underroof collar along a sixth folding

line extending substantially in parallel to the collar members of the first pair.

6. A method according to one or more of claims 1-5, further comprising the following step, which is performed before step A):
G) Folding the underroof collar along a seventh folding line extending substantially in parallel to the collar members of the first pair, thereby arranging one section of one collar member of the first pair on top of or underneath another section thereof.
7. A method according to one or more of claims 1-6, further comprising one or both of the following steps:
H) Attaching the underroof collar to at least one mounting element, such as an insulating member, and/or
I) Attaching the underroof collar to a window frame of a roof window.
8. A method according to one or more of claims 1-7, where the top collar member and the bottom collar member constitute the first pair of collar members and the side collar members constitute the second pair of collar members.
9. A packed underroof collar for use in water-proofing the joint between a roof structure and a window frame, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening,
characterised in that the underroof collar is folded along a first folding line extending substantially in parallel to a first pair of collar members, so that one collar member of the pair is located on top of the other collar member of the pair, thereby folding the collar members of a second pair of collar members, that the underroof collar is folded along a second folding line extending substantially in parallel to the

collar members of the first pair, so that at least part of the centre section of each collar member of the second pair is located on top of or underneath a collar member of the first pair and/or a section of the collar member of the second pair located in continuation of a collar member of the first pair when seen in the length direction of said collar member of the first pair, that the underroof collar is folded along a third folding line and a fourth folding line extending substantially in parallel to the collar members of the second pair so that the collar members of the second pair are located on top of or underneath the collar members of the first pair, and that the underroof collar is fixated in a folded state by at least one fixation.

10. A packed underroof collar according to claim 9, where the underroof collar is folded along a sixth folding line extending substantially in parallel to the collar members of the first pair, and/or where the underroof collar is folded along a seventh folding line extending substantially in parallel to the collar members of the first pair.

11. A packed underroof collar according to claim 9 or 10, where the collar members of the second pair are arranged between sections of one or both the collar members of the first pair so that the outer surface of the packed underroof collar consist substantially entirely of an uninterrupted section of a collar member of the first pair.

12. A packed underroof collar according to one or more of claims 9-11, where the underroof collar is attached to at least one mounting element, such as an insulating member, said mounting element possibly comprising a fastener adapted for attachment to a window frame.

13. A packed underroof collar according to one or more of claims 9-12, where the top collar member and the bottom collar member constitute the first pair of collar members and the side collar members constitute the second pair of collar members.

14. A roof window where a packed underroof collar according to one or more of claims 9-13 is attached to a window frame of the roof window, preferable to a top frame member or a side frame member of the window frame.

15. A roof window mounted in a roof structure where a packed underroof collar according to one or more of claims 9-13 is attached to a window frame of the roof window and resting on an exterior surface of the roof structure or on an exterior side of a pane of a window, at least after the removal of the at least one fixation.

16. A method for installing an underroof collar so that it

covers a joint between an inclined roof structure and a window frame, said underroof collar comprising a top collar member, a bottom collar member, and two side collar members for extending along a top frame member, a bottom frame member, and two side frame members of a window frame, respectively, in an installed state, said top collar member and said bottom collar member constituting one pair of collar members extending substantially in parallel to each other in the installed state, and said side collar members constituting another pair of collar members extending substantially in parallel to each other in the installed state, each collar member including an inner rim part for being arranged at the window frame and an outer skirt part intended for coming into engagement with the roof structure, and said inner rim parts together delimiting a collar opening, at least in the installed state, where each collar member has a length direction extending in parallel with the inner rim part, and where each collar member comprises a centre section extending between two other collar members along the collar opening,

characterised in that said method comprises the following steps:

J) Arranging a packed underroof collar at a first frame member of the window frame,

K) Attaching the inner rim part of a collar member or a mounting element to which the inner rim part of said collar member is attached to the first frame member,

L) Removing a fixation retaining the underroof collar in a packed state,

M) Unfolding the underroof collar along a third folding line and a fourth folding line extending substantially in parallel to the collar members of a second pair so that the collar members of the second pair are arranged on top of the exterior surface of the roof structure,

N) Unfolding the underroof collar along a second folding line extending substantially in parallel to the collar members of the first pair, and

O) Unfolding the underroof collar along a first folding line extending substantially in parallel to the collar members of the first pair, so that the underroof collar is unfolded entirely.

17. A method according to claim 16, further comprising one or more of the following steps:

P) Arranging one or more insulating members along one or more window frame members before step J),

Q) Unfolding the underroof collar along a fifth folding line and possibly a sixth folding line extending substantially in parallel to the collar members of the first pair,

R) Attaching one or more of the collar members,

which were not attached in step K), directly or indirectly to the window frame after or during step O), and

S) Attaching one or more collar members to the roof structure.

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18. A method according to claim 16 or 17, where steps J) and K) are performed before delivery of the roof window to an installation site, preferably at the site of manufacture of the roof window. 10
19. A method according to one or more of claims 16-18, where the top collar member and the bottom collar member constitute the first pair of collar members and the side collar members constitute the second pair of collar members. 15
20. A method according to claim 19, where in step K), the inner rim part of the top collar member, or a mounting element to which the inner rim part of said collar member is attached, is attached at the top frame member of the window frame, in step M) the side collar members are arranged on top of the exterior surface of the roof structure above and to each side of the window frame, 20 25 in step N) the side collar members are brought down along the side frame members while still remaining folded onto themselves, and in step O) the bottom collar member is passed over the window frame and down to a position below the bottom frame member when seen in the direction of inclination of the roof structure. 30 35
21. A method according to claim 19 or 20, where in step Q), the top and bottom collar members are arranged on an exterior surface of the roof structure above the window frame when seen in the direction of inclination of the roof structure, the bottom collar member being arranged on top of the top collar member. 40
22. A method according to one or more of claims 19-21, where in step K), the inner rim part of a side collar member, or a mounting element to which the inner rim part of said collar member is attached, is attached to a side frame member, 45 in step M), on side collar members is moved to the opposite side frame member of the window frame, in step N), the top collar member is arranged at the top frame member of the window frame, and 50 in step O), the bottom collar member is arranged at the bottom frame member of the window frame.

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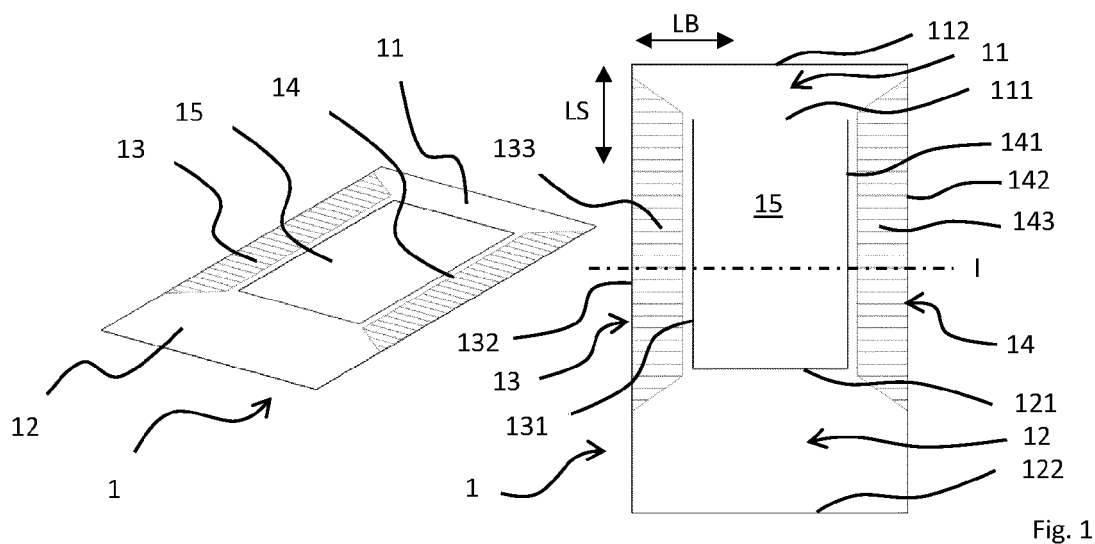


Fig. 1

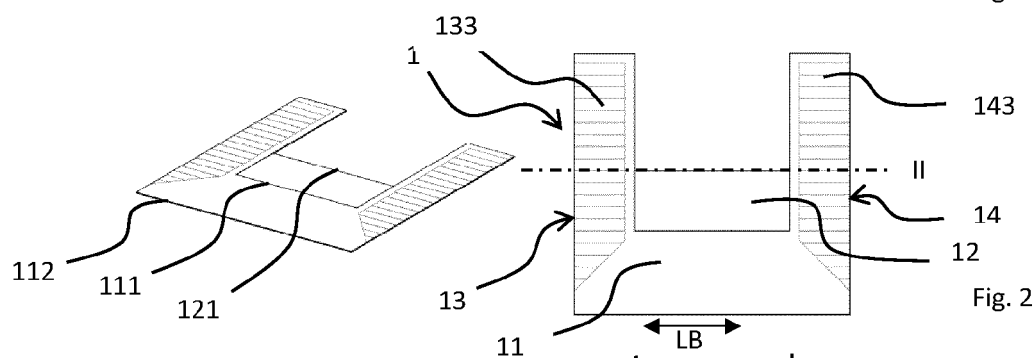


Fig. 2

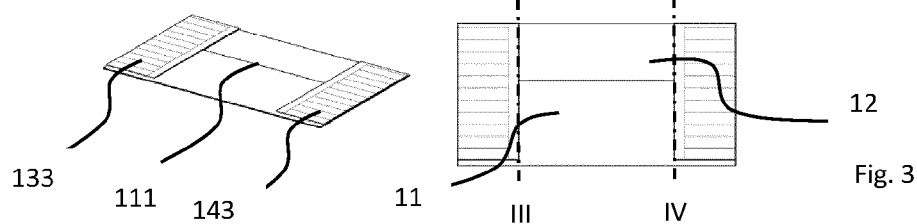


Fig. 3

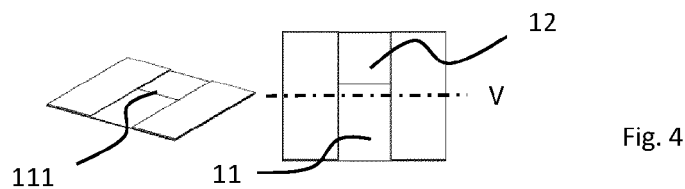


Fig. 4

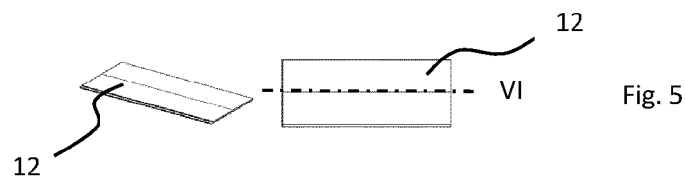


Fig. 5

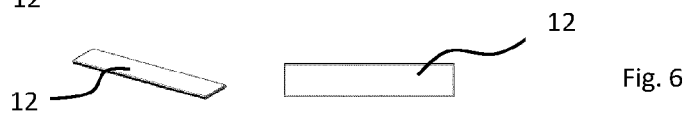


Fig. 6

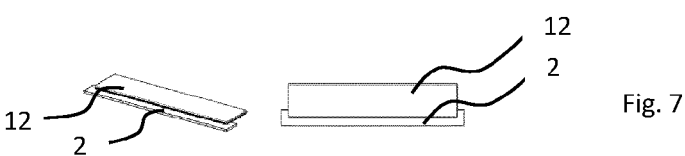
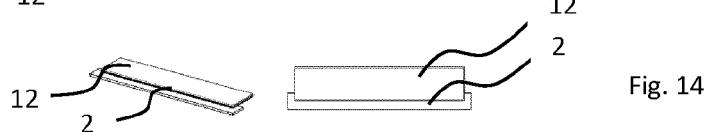
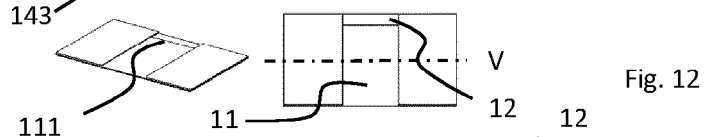
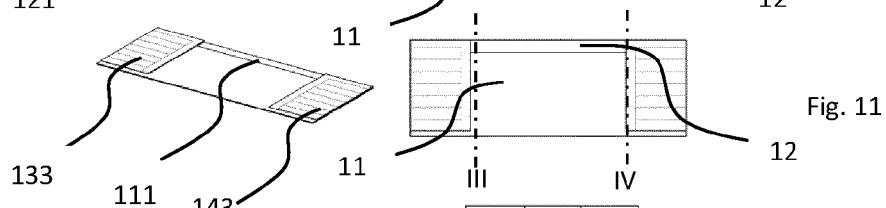
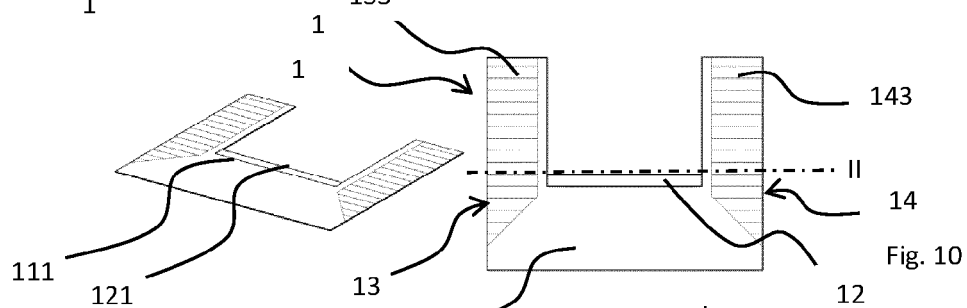
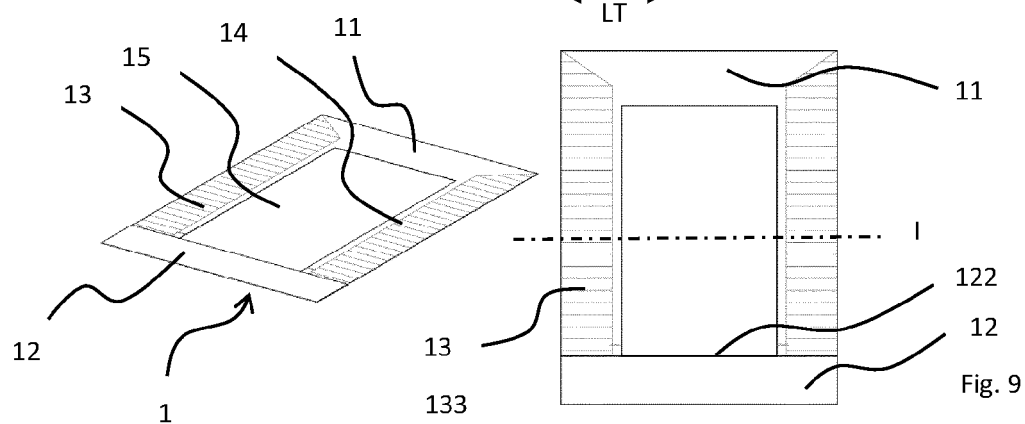
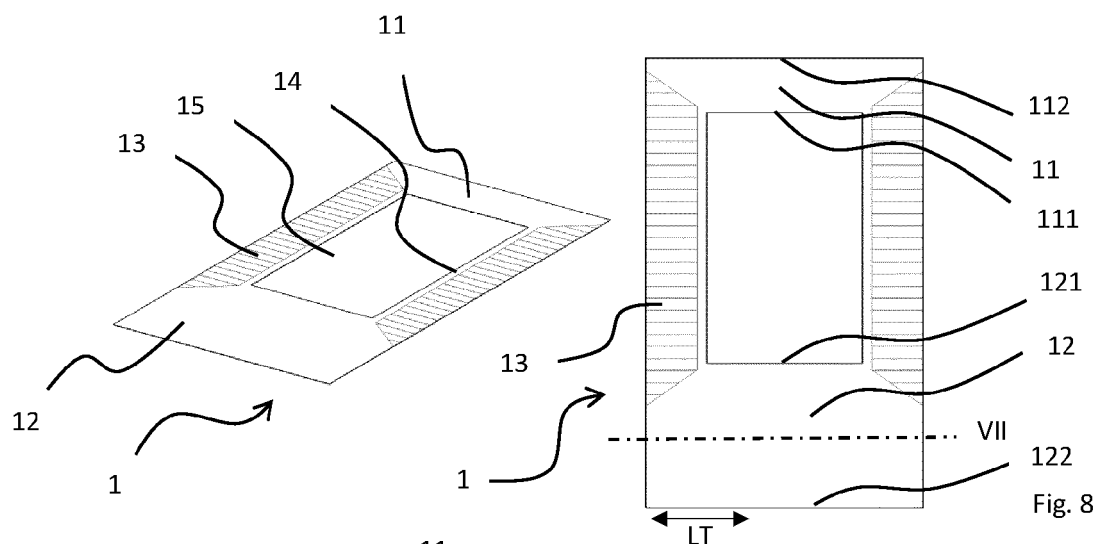


Fig. 7



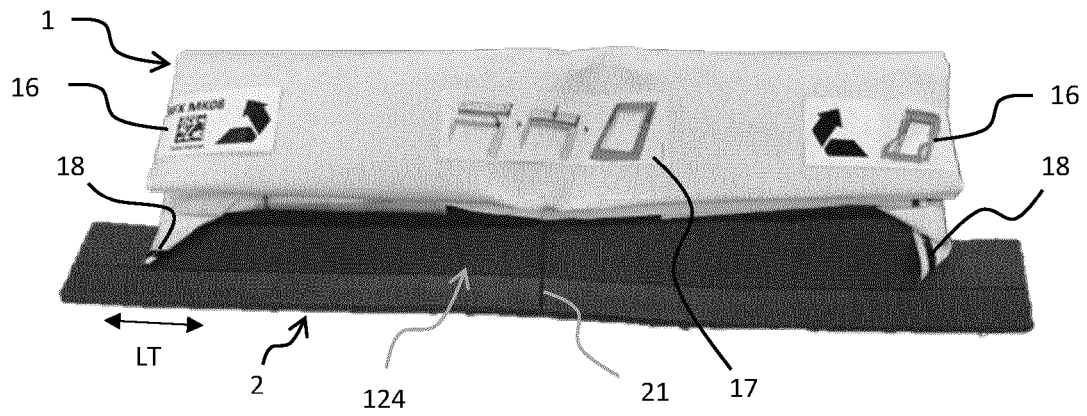


Fig. 15

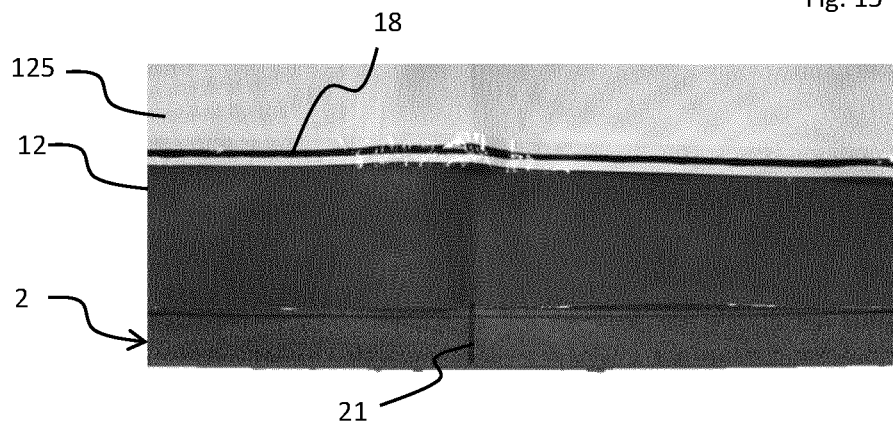


Fig. 16

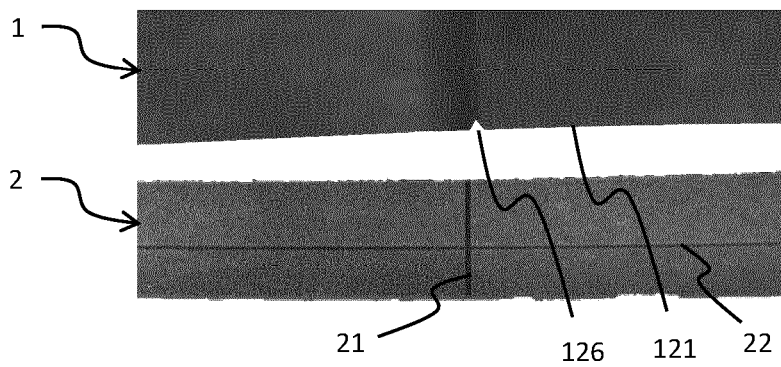


Fig. 17

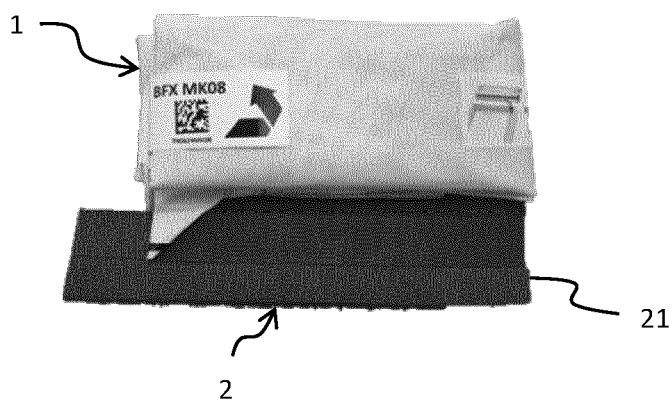


Fig. 18

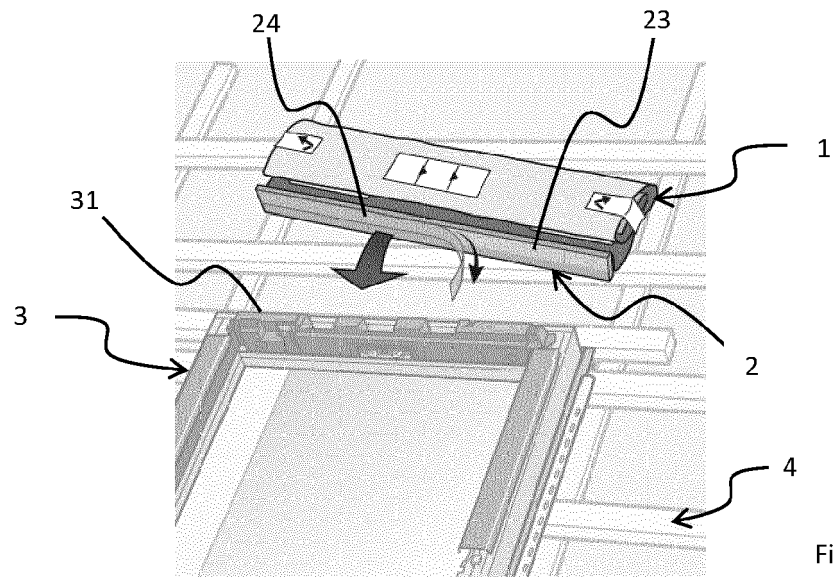


Fig. 19

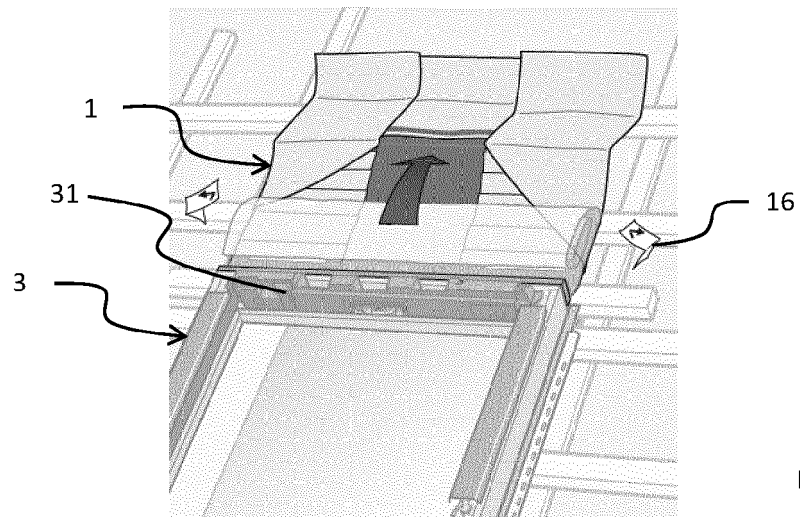


Fig. 20

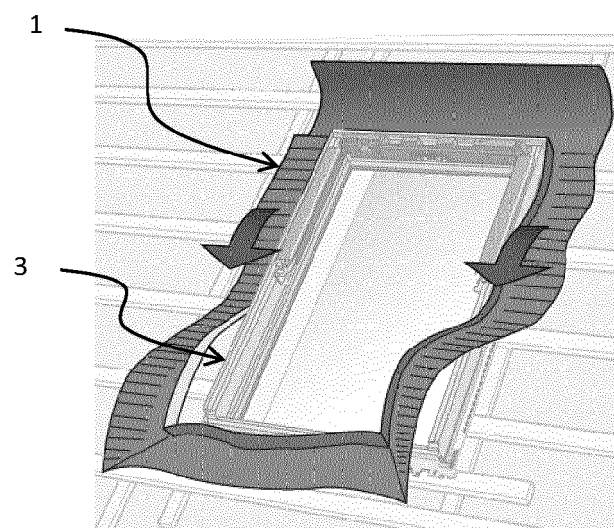


Fig. 21

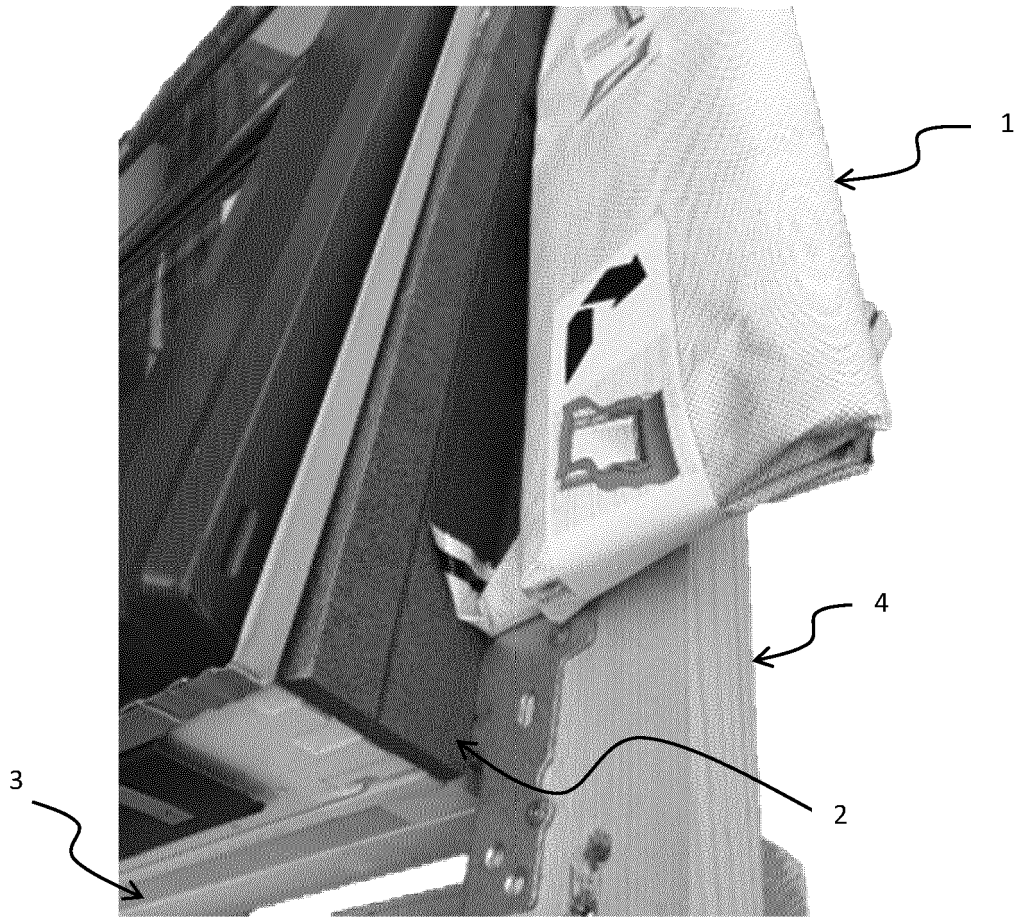


Fig. 22

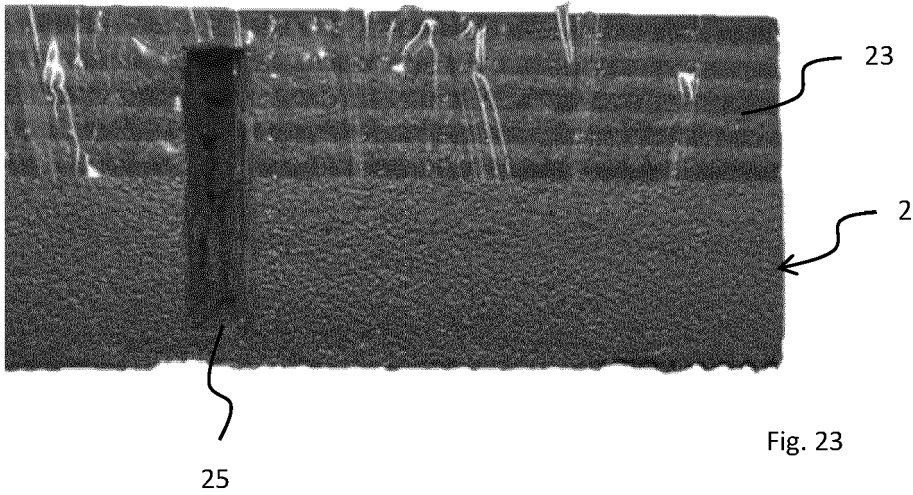


Fig. 23

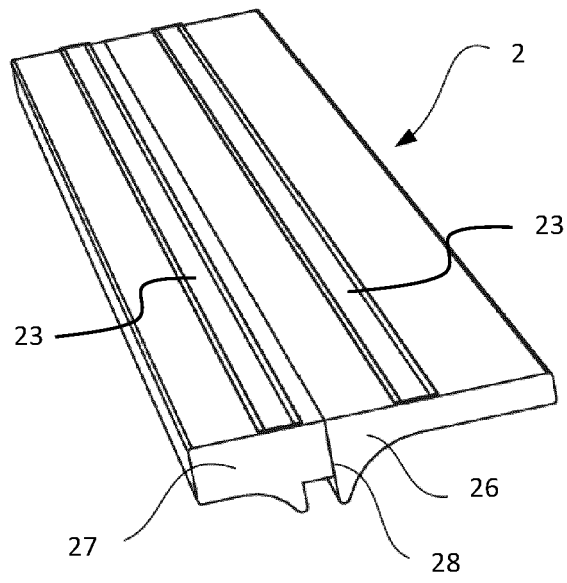


Fig. 24

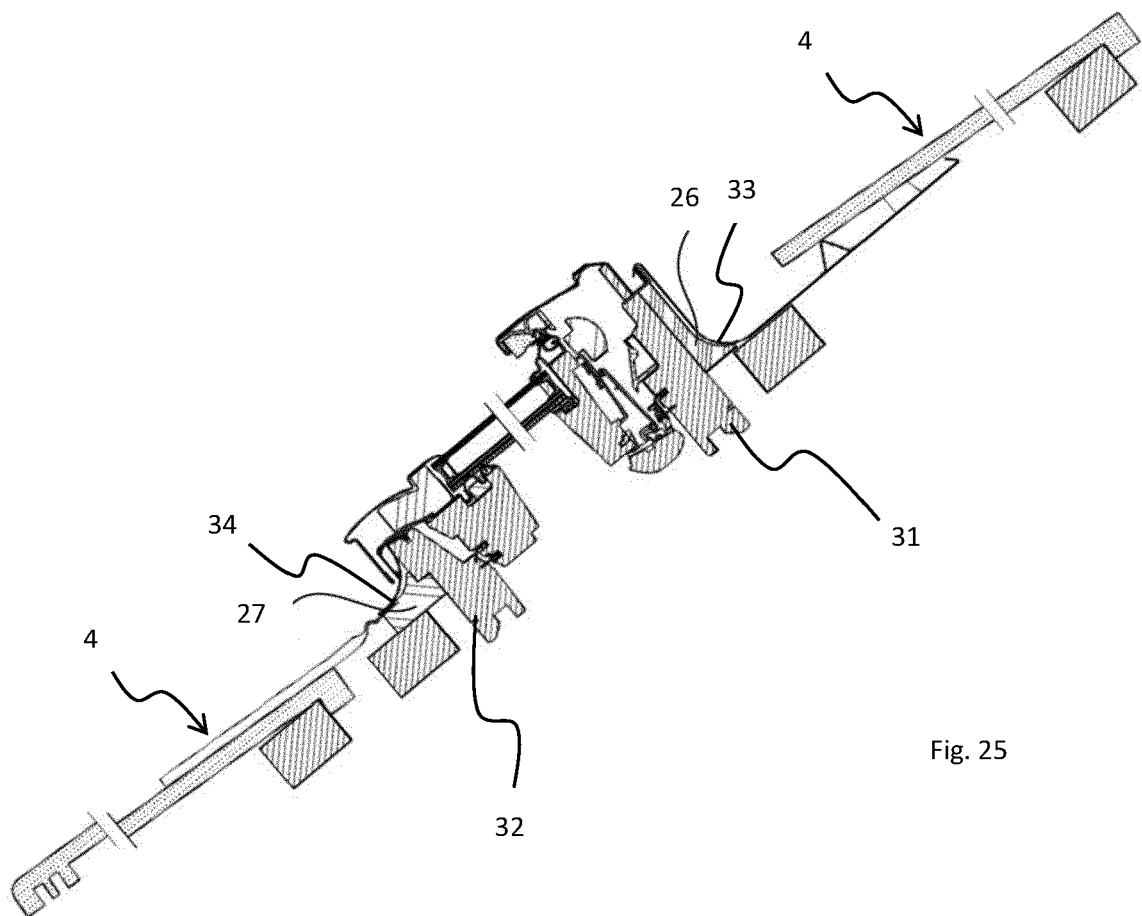
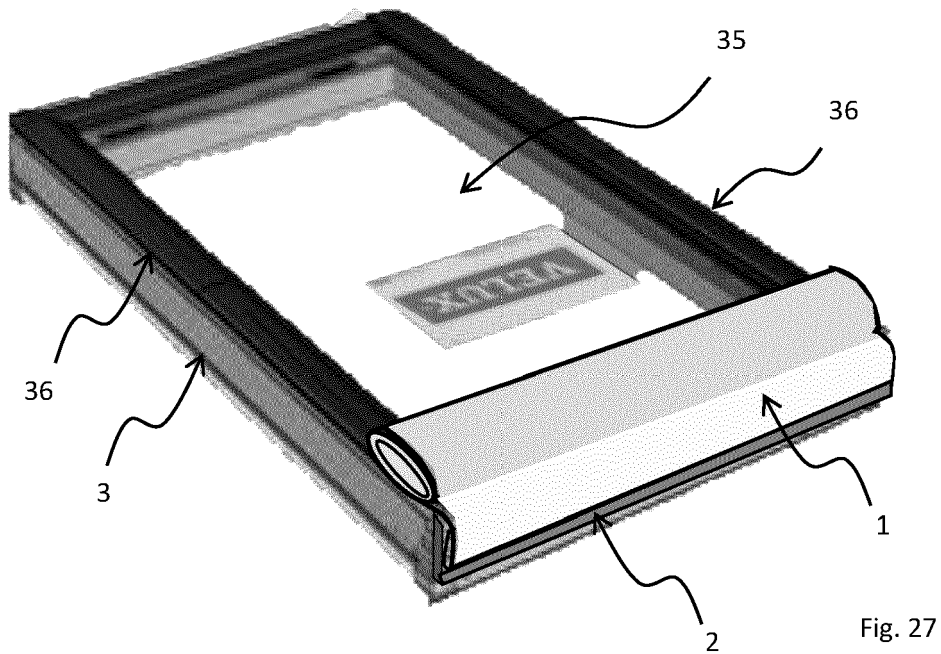
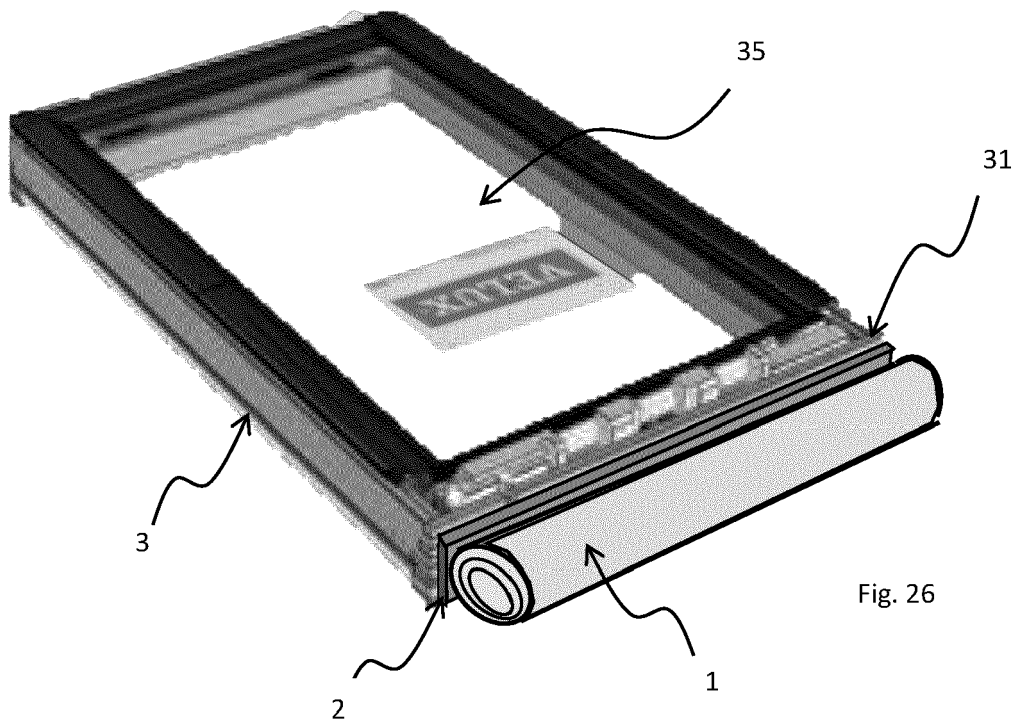


Fig. 25



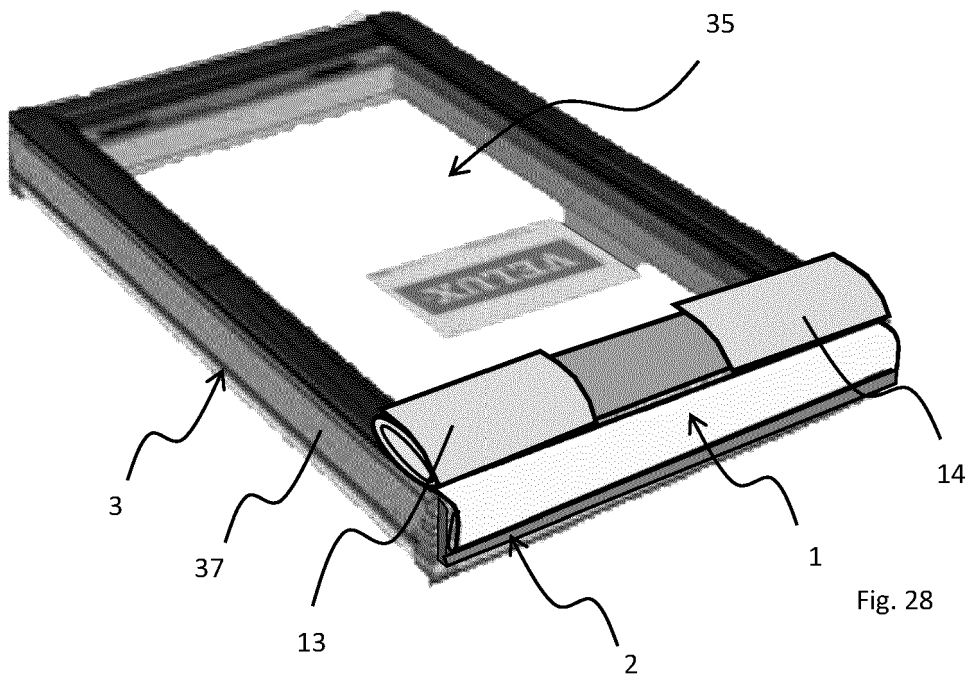


Fig. 28

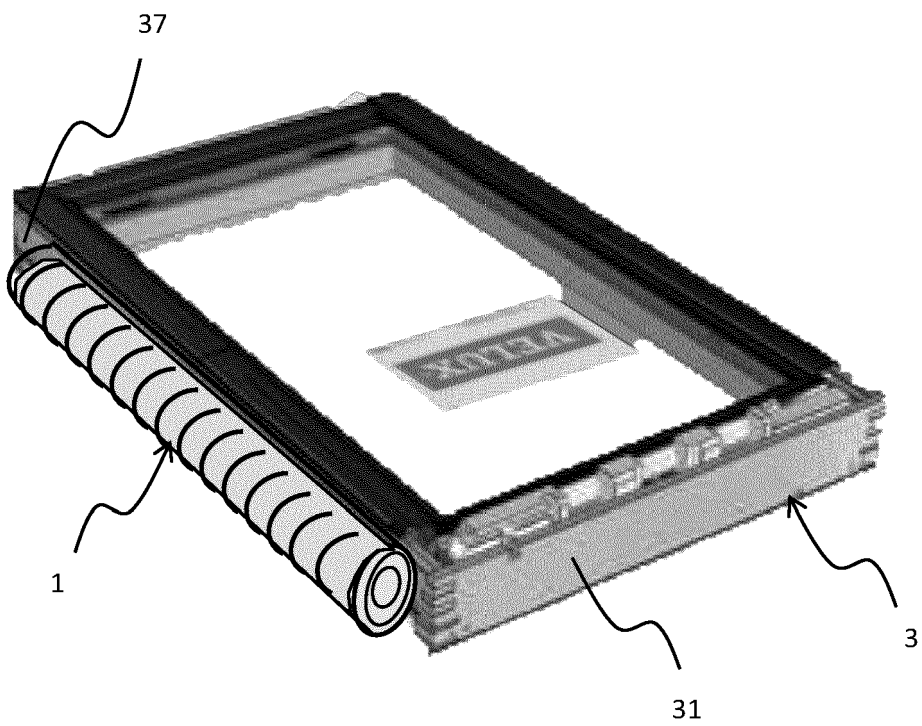
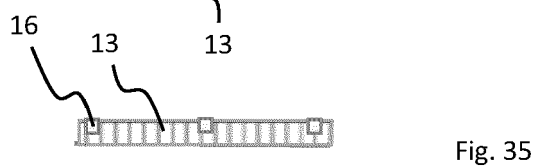
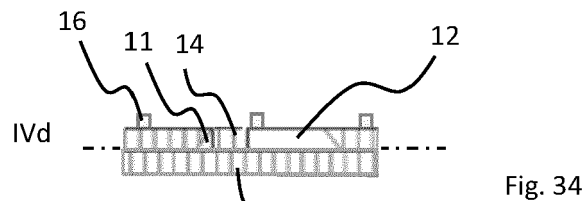
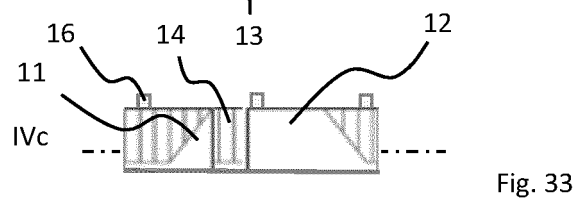
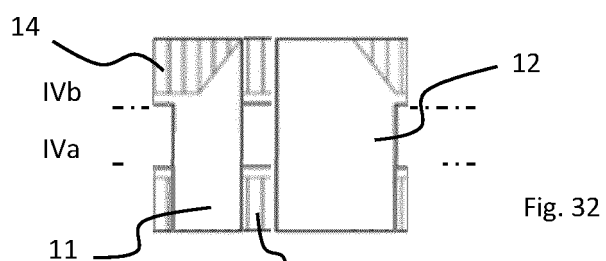
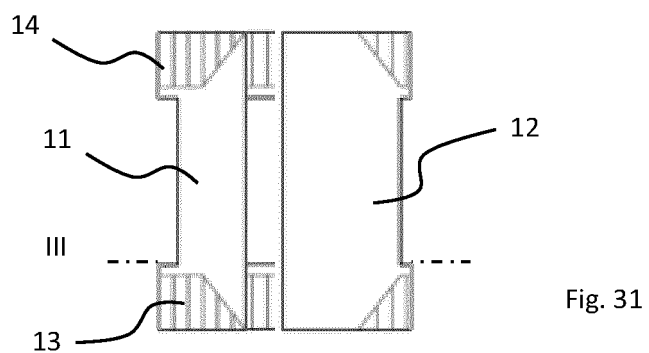
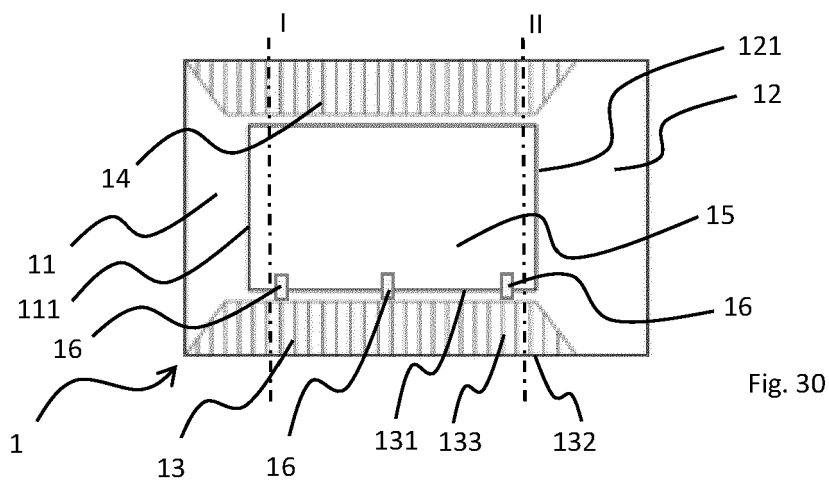


Fig. 29





EUROPEAN SEARCH REPORT

Application Number
EP 21 16 4312

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			TECHNICAL FIELDS SEARCHED (IPC)
			E04D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 July 2021	Examiner Tran, Kim Lien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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