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(54) **TOP MEMBER ARRANGEMENT FOR A ROOF WINDOW**

(57) Top member arrangement (200) for a roof window comprising an interface module (11) comprising at least one climate regulating device including three lips (15) each having a distal free top and a bottom end, which lips extending along the length of an elongate base part (16) and with the distal free tops extending diverging from the elongate base part (16). An inner side of two of the lips (15a, 15b) are adapted to sealing engagement with a sash profile (30) of the roof window in a closed position.

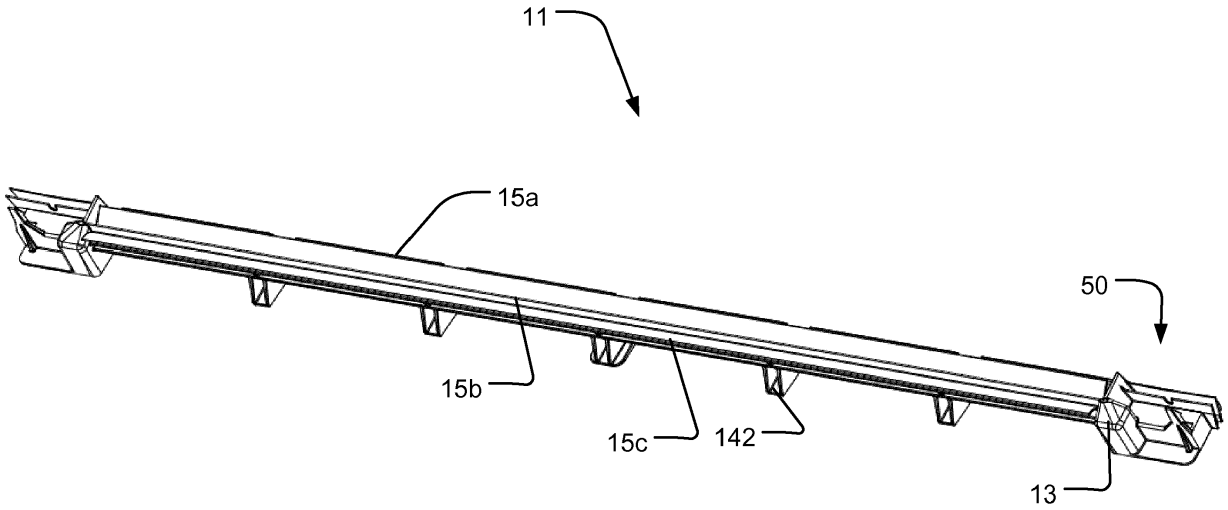

Fig. 3

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Description

[0001] The present invention relates to a top member arrangement, more specifically the invention relates to a top member arrangement for a roof window comprising: an interface module comprising at least one climate regulating device including a first, a second and a third lip each having a distal free top and a bottom end, which lips extending along the length of an elongate base part and with the distal free tops extending diverging from the elongate base part, wherein an inner side of the first and the third lip, respectively, are adapted to sealing engagement with a sash profile of the roof window in a closed position.

[0002] Furthermore, a roof window and a method for assembling a roof window comprising the top member arrangement are disclosed. Windows may be provided in a number of varieties and include a number of different features in order to provide sealing between a window and its surroundings and to fulfil other functions such as ventilation, climate regulation and easy installation.

[0003] An example of a sealing strip or gasket is disclosed in the applicant's own application US2005/0000173, which discloses a gasket disposed between a curb and a skylight. The gasket comprises three lips adapted to seal against the window pane and furthermore two arms adapted to seal against a frame of the skylight.

[0004] An element which is particularly used for roof windows and skylights is a top cover, which may consist of comparatively thin metal sheet profile, for instance of aluminium or plastic profiles for covering the top parts of the frame and sash structures. It is known from prior art to provide the top covering means with sealing strips along the different interfaces, together with a number of other elements, such as, insulation elements, support elements, holding elements and cut out foam blocks to shield from the weather on the external side of the window. The elements are adapted to assist with regulating the climate inside such as enabling ventilation, but at the same time making sure that the inside of the window is shielded from the weather. An example of the applicants own piece of prior art is shown in fig. 1.

[0005] All the parts shown in fig. 1 forms part of the top member arrangement and will have to be produced individually as the material varies for each element and subsequently assembled either at the production facilities or at the construction site.

[0006] Although the known technology provides a perfectly good solution, there is still room for improvement especially in terms of ease and speed of installation and even better climate regulation properties.

[0007] It is thus an object of the present invention to provide a top member arrangement as mentioned in the introduction, the top member arrangement exhibiting further improvements compared to the prior art.

[0008] This and further objects are met by a top member arrangement mentioned in the introduction, where the interface module further comprises an end part provided at one or both end(s) of the elongate base part, which is/are integrally formed with the elongate base part and the first, the second and the third lip, the interface module thus constituting one piece.

[0009] Because the end part is provided as an integrated part of the lips extending along the length of the top member arrangement both the production process and the installation is made considerably easier and faster because only one element has to be made instead of several smaller parts of different materials. Installation of the interface module in the top cover is managed in seconds, as it comprises a number of different features made to fit the exact top cover and other related parts in contact with the interface module.

[0010] In an embodiment of the invention the second lip is positioned between the first and the third lip and an edge of the second lip at its distal free top is preferably adapted to sealing engagement with the sash profile. Thus the second lip may provide further sealing in addition to the first and the third lip.

[0011] Additionally the end part of the module may comprise a resilient element, preferably in the form of a substantially rectangular oblique pyramid, adapted to sealing engagement with a corner of the sash profile. The resilient element may have other shapes as well, but preferably the resilient element is adapted to sealing engagement with a corner of the sash profile.

[0012] In a further embodiment the interface module further comprises a rib element attached to and extending along the length of the elongate base part, the rib element being adapted to provide rigidity to the elongate base part. The rib element may have different cross-sectional shapes as well, such as rectangular, triangular or any other type of polygon.

[0013] According to an embodiment of the invention the second lip may be more rigid than the first and/or the third lip. This rigidity should provide better sealing properties.

[0014] According to another embodiment of the invention the top member arrangement may further comprise a stiffening member being attached to the end part(s) and being positioned in parallel to and at a distance from the elongate base part. The stiffening member makes the interface module easier to install.

[0015] According to another embodiment of the invention the end part(s) comprise(s) a wedged shaped guide element adapted to engage with a recess of the sash profile and guide the interface module to the correct position during mounting. The guide element is preferably adapted to fit with a recess of the sash profile and guide the interface module to the correct position during mounting.

[0016] According to a further embodiment the end part comprises a first blade, and preferably a second blade positioned essentially in parallel to the first blade, wherein the first blade, and preferably the second blade, comprise(s) a first and a second edge, wherein the first edge

is adapted to sealing engagement with a top cover of the roof window and the second edge is adapted to sealing engagement with the sash profile. By incorporating these blades into the interface module, further sealing elements are made dispensable.

[0017] Additionally the first edge of the first blade may be provided with a recess for accommodating a cord, for example for a sensor. The sensor may a rain sensor such that the window for example is automatically closed when it starts to rain, or a temperature sensor.

[0018] The interface module may be made of a thermoplastic elastomer, TPE, or a thermoplastic vulcanizate, TPV. These materials are relatively hard such that the element is made relatively stiff and it may easily be injection-moulded.

[0019] According to a further embodiment, the interface module is moulded in one piece by means of multi shot injection. Thereby all the different elements of the interface module may be created at once.

[0020] Furthermore according to an embodiment of the invention the top member arrangement may comprise an interface module, a top cover and an air filter.

[0021] Additionally according to a further embodiment a roof window may be provided, comprising a sash and a frame, the frame comprising a top frame member, a bottom frame member, two side frame members, and the top member arrangement of the invention, wherein the top member arrangement is adapted to be positioned at an external face of the top frame member.

[0022] According to a second aspect a method for assembling a roof window may be provided, comprising the steps of connecting a frame with a top member, a bottom member and two side members defining a frame plane, with a sash having a top member, a bottom member and two side members defining a sash plane, the sash being connected to the frame by a pivot hinge provided between the side members of the frame and sash, respectively, connecting a top member arrangement of the invention to the frame by at least two mounting brackets and engaging the mounting brackets with at least two attachment members that are integrally formed with an interface module of the top member arrangement.

[0023] In this specification a sash profile may comprise any part of the sash, such as covering elements, cladding, or other elements forming part of the sash or being attached to the sash.

[0024] A climate regulating device may be any part of the top member arrangement that enables the climate, for instance temperature, ait humidity etc. in a room into which the window leads, to be influenced in relation to the surrounding climate. The climate regulating device thus contributes to for example sealing, air flow control, light penetration etc. at the interfaces of the different parts of the window.

[0025] When referring to adapted to sealing engagement it means that the element has a substantially complementary shape that roughly corresponds to the shape of the element that it seals against.

[0026] It is to be understood that, throughout the description and claims of the specification, the word "comprise" and variations of the word, such as "comprising" and "comprises", is not intended to exclude other additives, components, integers or steps.

[0027] In the following the invention will be described in further detail with reference to a non-limiting embodiment according to the invention shown in the drawings, where:

Fig. 1 show an exploded view of the prior art,
Fig. 2 show a schematic perspective view of an embodiment in the mounted position,
Fig. 3 show a schematic perspective view of an embodiment of the interface module,
Fig. 4 show a schematic cross section of the interface module in a plane perpendicular to the length axis of the top member arrangement,
Fig. 5 show a schematic perspective view of an embodiment of the end part as seen from above,
Fig. 6 show a schematic cross section of a top member arrangement in a plane perpendicular to the length axis of the top member arrangement near the end part,
Fig. 7 shows a perspective view of an embodiment as seen in the mounted position.
Fig. 8 shows a perspective view of a roof window comprising the top member arrangement.
Fig. 9 shows as assembly detail of the present invention.

[0028] Here the invention has been illustrated with reference to a roof window, however it may be used on other types of windows such as vertical windows, skylights or other inclining windows not necessarily positioned in the roof.

[0029] Fig. 1 is merely to illustrate a prior art solution that may be replaced by the present invention. The prior art solution consists of a tubular sealing gasket 1 attached to an aluminium support rail 2. The support rail 2 is attached to a top cover (not shown) by means of a bracket 6. At each end two foam blocks (3, 6) are attached to provide sealing between the top cover and the sash profile. Finally a polymer element 5 is provided at each end to provide support for the foam blocks and contribute to other attachment capabilities.

[0030] Fig. 2 schematically depicts an embodiment of the top member arrangement 200 in a mounted position. An interface module 11 is mounted inside a top cover 20. The interface module 11 extends from one end of the top cover 20 to the other and abuts a sash profile 30 forming part of a sash of a window. Further elements of the interface module 11 that can be seen are a rib element 12 in the form of two parallel blades extending between a resilient corner element 13 positioned at an end part (clearly seen in fig. 3) of the interface module 11. Furthermore a stiffening member 14 in the form of a strip 141 extending from one end part to the other and addi-

tionally attached to the rib element 12 at spaced apart points by means of integrally moulded connecting elements 142. The interface module is moulded in one piece in a thermoplastic elastomer. The rib element 12 may be in another shape, such as a solid or hollow elongate rectangular or triangular element, or other imaginable shapes. The strip 141 of the stiffening member 14 may be attached along the full length of the rib element 12 or attached at one or more points to an elongate base part (not shown). The top cover 20 and sash profile 30 are made of metal, preferably aluminium, but may also be made of plastic. Fig. 2 further discloses a mounting bracket 47 at each end of the top cover 20 for attaching the top cover 20 and the other elements of the top member ar-rangement, preferably to a window frame. Additionally an insulation pad 21 is disclosed at the top of the top cover 20.

[0031] Fig. 3 schematically depicts an embodiment of the interface module 11 as seen in perspective from above. The interface module 11 comprises a number of climate regulating devices including a first 15a, second 15b and third 15c lip extending diverging, or in a fan like configuration, from the elongate base part (see fig. 4) directly below the three lips. The first 15a and the third 15c lip appear more flexible as they are wider, i.e. from a distal top end to the base part, than the second lip 15b. The second lip 15b is attached to the end part 50 at each end, whereas the first 15a and third 15c lip are only attached to the elongate base part. This way it is easier for the first and third lip to abut the sash profile. This can in particular be seen in fig. 4 which is an embodiment of a cross section of the interface module. The attachment of the lips 15a-c to the end part 50 may be configured in a different way, such that the first 15a and/or third lip 15c is/are attached to the end part and the second lip 15b only being attached to the elongate base part 16.

[0032] In fig. 4 there is also shown a solid rectangular element 121a attached to the elongate base part 16 and at each end to the end parts 50. Additionally a fourth lip 122 is attached to the end part 50 and to the elongate base part 16. The fourth lip 122 serves as a holding means for an air filter (see fig. 6). Each end part comprises a number of different climate regulating devices. One of these devices is a wedged shaped guide element 51 adapted to engage with a recess of the sash profile and guide the interface module to the correct position during mounting. Looking at fig. 7 it can be seen how the wedged shaped guide element 51 fits perfectly with a recess in the cladding 31 on a window frame. The window frame may not be provided with cladding, but it may merely fit with the external surface of the frame in order to provide easy installation as well as regulating/preventing air flow from the outside in.

[0033] The strip 141 of the stiffening member 14 and the connecting elements 142 are adapted for sealing engagement with the top cover 20. The connecting elements 142 are adapted to sealing engagement with the front 24 of the top cover. With reference to fig. 6, the strip 141 is adapted for sealing engagement with the bottom 26 of the top cover. The strip 141 is adapted to fit in a recess 27 of the bottom 26 of the top cover.

[0034] In fig. 5 it is shown that the end part 50 comprises another climate regulating device, namely a resilient element 52 in the shape of a rectangular, oblique pyramid, the apex of which abuts the wedged shaped guide element 51 and the end of the second lip 15b. The resilient element 52 is adapted to sealing engagement with a corner of the sash profile. The resilient element may have other shapes, but preferably the resilient element is adapted to the shape of the sash profile such that it is substantially weather tight. A view at fig. 6 reveals how the resilient element 52 may fit together with the sash profile 30.

[0035] In fig. 5 the end part 50 comprises further climate regulating devices namely a first blade 53 and a second blade 54 positioned essentially in parallel to the first blade, the first blade 53 and the second blade 54 comprise a first edge 55 and a second edge 56 positioned at a distal end. The first edge 55 is adapted to sealing engagement with a top cover of a roof window and the second edge 56 is adapted to sealing engagement with the sash profile. In an opposite proximal end of the second edge 56, the first 53 and the second 54 blade are attached to the wedged shaped guide element 51. The guide element may have other shapes. In fig. 7 it can be seen how the second blade 54 seals the space above the cladding of the sash and the top cover.

[0036] The first edge 55 of the first blade 53 is provided with a recess 57 for accommodating a cord, for example for a sensor. Thereby a temperature sensor or a rain sensor may be accommodated on the outside of the window, while the control parts are positioned on the inside of the window. The window may be controlled to close when it starts to rain. The recess 57 also constitute a climate regulating device as it enables the blades 53, 54 to seal tightly even though a cable is provided between the interfaces of the blade(s) and the sash.

[0037] The end part 50 further comprises a wedged and/or hook shaped attachment member 58. The attachment member 58 is adapted to engage with a mounting bracket connected to the frame of the window. It may function as a temporary attachment feature, until the top cover arrangement is fixed to the window frame with more permanent means such as screws. The top member arrangement may also be attached by means of a male and a female part. One arranged on the top member arrangement and the other on the window frame and adapted for mutual snap locking engagement. The attachment member and/or snap locking engagement is fast and easy to use and secures a proper placement.

[0038] The end part 50 further comprises a base member 59, to which all the parts on the end part are connected to, but the end part may be configured in a different way.

[0039] Fig. 6 shows a cross section of a top member arrangement in an assembled state. An air filter 60 is

here placed between the top cover 20 and the fourth lip 122. The air filter 60 preferably extends along the length of the interface module 11 from end part to end part. The top member arrangement 200 abuts an external face 49 of the top member of the frame 40.

[0040] Fig. 7 shows an embodiment of an interface between a top cover 20, an interface module 11 and the cladding 31.

[0041] The rib element 121b is here in a slightly different embodiment. Instead of being a solid rectangular element, two lips are provided extending perpendicular from the elongate base part 16.

[0042] With reference to figs. 2 and 7, the top cover 20 comprises a top 22, a left and a right side 23a, 23b, respectively, and a front 24 and a back 25.

[0043] Fig. 8 shows an embodiment of a window 32 comprising a pane 33 defining plane, a frame 40 having a top member 41, a bottom member 42 and two side members 43, 44 defining a frame plane 45, and a sash 30 having a top member 34, a bottom member 35 and two side members 36, 37 defining a sash plane 46. In the embodiment shown, the window is centre-hung in that the sash 30 is connected to the frame 40 by a pivot hinge provided between side members 36, 43; 37, 44 of the frame 40 and sash 30, respectively, to be openable by tilting the sash 30 of the window 32 about the pivot hinge axis 38 defined by the pivot hinge.

[0044] On this figure only the cover 20 of the top member arrangement 200 is shown. The sash 30 is provided with a cladding 39, and the frame 40 is likewise provided with a cladding 31, preferably in aluminium or other weatherproof material.

[0045] Fig. 9 shows an embodiment of the top member arrangement 200 in an assembled state according to the present invention. In particular it can be seen how the hook shaped head of the attachment member 58 engages with the mounting bracket 47 for attachment to the frame (not shown).

[0046] Although the rib element(s) and the stiffening member(s) contribute to obtain a uniform sealing pressure between the lips 15a-c and the sash profile 30, the stiffness may be obtained in different ways for example by using rib elements in a different shapes /sizes or using a different material that provides a more stiff structure of the interface module.

[0047] Although the end parts are preferably similar, they may be different from each other.

[0048] It is to be understood that, throughout the description and claims of the specification, the word "comprise" and variations of the word, such as "comprising" and "comprises", is not intended to exclude other additives, components, integers or steps.

[0049] Embodiments of the invention:

1. Top member arrangement for a roof window comprising:

an interface module comprising at least one climate regulating device including a first, a second and a third lip each having a distal free top and a bottom end, which lips extending along the length of an elongate base part and with the distal free tops extending diverging from the elongate base part,

wherein an inner side of the first and the third lip, respectively, are adapted to sealing engagement with a sash profile of the roof window in a closed position,

the interface module further comprises an end part provided at one or both end(s) of the elongate base part, which is/are integrally formed with the elongate base part and the first, the second and the third lip, the interface module thus constituting one piece.

2. Top member arrangement according to embodiment 1, wherein the second lip is positioned between the first and the third lip and an edge of the second lip at its distal free top is preferably adapted to sealing engagement with the sash profile.

3. Top member arrangement according to embodiment 1 or 2, wherein the end part of the module comprises a resilient element, preferably in the form of a substantially rectangular oblique pyramid, adapted to sealing engagement with a corner of the sash profile.

4. Top member arrangement according to any one of the embodiments 1 to 3, wherein the interface module further comprises a rib element attached to and extending along the length of the elongate base part, the rib element being adapted to provide rigidity to the elongate base part.

5. Top member arrangement according to any one of the embodiments 1 to 4, wherein the second lip is more rigid than the first and/or the third lip.

6. Top member arrangement according to any one of the embodiments 1 to 5, further comprising a stiffening member being attached to the end part(s) and being positioned in parallel to and at a distance from the elongate base part.

7. Top member arrangement according to any one of the embodiments 1 to 6, wherein the end part(s) comprise(s) a wedged shaped guide element adapted to engage with a recess of the sash profile and guide the interface module to the correct position during mounting.

8. Top member arrangement according to any one of the embodiments 1 to 7, wherein the end part comprises a first blade, and preferably a second blade positioned essentially in parallel to the first blade,
the first blade, and preferably the second blade, comprise(s) a first and a second edge, wherein the first edge is adapted to sealing engagement with a top cover of the roof window and the second edge is adapted to sealing engagement with the sash profile.

9. Top member arrangement according to embodi-

ment 8, wherein the first edge of the first blade is provided with a recess for accommodating a cord, for example for a sensor.

10. Top member arrangement according to any one of the embodiments 1 to 9, wherein the interface module is made of a thermoplastic elastomer, TPE, or a thermoplastic vulcanizate, TPV.

11. Top member arrangement according to any one of the embodiments 1 to 10, wherein the interface module is moulded in one piece by means of multi shot injection.

12. Top member arrangement according to any one of embodiments 1-11, comprising a top cover and an air filter.

13. Roof window comprising a sash and a frame, the frame comprising a top frame member, a bottom frame member, two side frame members, and a top member arrangement according to any one of the embodiments 1-12, wherein the top member arrangement are adapted to be positioned at an external face of the top frame member.

14. A method for assembling a roof window comprising the steps of connecting a frame with a top member, a bottom member and two side members defining a frame plane, with a sash having a top member, a bottom member and two side members defining a sash plane, the sash being connected to the frame by a pivot hinge provided between the side members of the frame and sash, respectively,
connecting a top member arrangement according to any one of the embodiments 1-12 to the frame by at least two mounting brackets, and
engaging the mounting brackets with at least two attachment members that are integrally formed with an interface module of the top member arrangement.

Claims

1. Top member arrangement (200) for a roof window comprising:

an interface module (11) comprising an end part (50) provided at one or both end(s) of an elongate base part (16), which is/are integrally formed with the elongate base part (16), the interface module (11) thus constituting one piece, the end part (50) comprises an attachment member (58), adapted to engage with a mounting bracket (47) connected to a frame (40) of the roof window.

2. Top member arrangement (200) according to claim 1, wherein the attachment member (58) is wedged and/or hook shaped or is attached by means of a male and a female part, where one is arranged on the top member arrangement (200) and the other on the frame (40) of the roof window and adapted for mutual snap locking engagement.

4. Top member arrangement (200) according to claim any one of claims 1 to 3, where the interface module (11) further comprises at least one climate regulating device including a first (15a), a second (15b) and a third lip (15c) each having a distal free top and a bottom end, which lips extending along the length of the elongate base part (16) and with the distal free tops extending diverging from the elongate base part (16),
wherein an inner side of the first (15a) and the third (15c) lip, respectively, are adapted to sealing engagement with a sash profile (30) of the roof window in a closed position.

5. Top member arrangement (200) according to anyone of the preceding claims, wherein the second lip (15b) is positioned between the first (15a) and the third lip (15c) and an edge of the second lip (15b) at its distal free top is preferably adapted to sealing engagement with the sash profile (30).

6. Top member arrangement (200) according to anyone of the preceding claims, wherein the end part of the module comprises a resilient element (52), preferably in the form of a substantially rectangular oblique pyramid, adapted to sealing engagement with a corner of the sash profile (30).

7. Top member arrangement (200) according to any one of the preceding claims, wherein the interface module (11) further comprises a rib element (12) attached to and extending along the length of the elongate base part (16), the rib element (12) being adapted to provide rigidity to the elongate base part (16).

8. Top member arrangement (200) according to any one of the preceding claims, wherein the second lip (15b) is more rigid than the first (15a) and/or the third lip (15c).

9. Top member arrangement (200) according to any one of the preceding claims, further comprising a stiffening member (14) being attached to the end part(s) (50) and being positioned in parallel to and at a distance from the elongate base part (16).

10. Top member arrangement (200) according to any one of the preceding claims, wherein the end part(s) (50) comprise(s) a wedged shaped guide element (51) adapted to engage with a recess (57) of the sash profile (30) and guide the interface module (11) to the correct position during mounting.

11. Top member arrangement (200) according to any one of the preceding claims, wherein the end part (50) comprises a first blade (53), and preferably a

second blade (54) positioned essentially in parallel to the first blade (53),
the first blade (53), and preferably the second blade (54), comprise(s) a first (55) and a second edge (56), wherein the first edge (55) is adapted to sealing engagement with a top cover (20) of the roof window (32) and the second edge (56) is adapted to sealing engagement with the sash profile (30).

12. Top member arrangement (200) according to claim 11, wherein the first edge (55) of the first blade (53) is provided with a recess (57) for accommodating a cord, for example for a sensor.

13. Top member arrangement (200) according to any one of the preceding claims, wherein the interface module (11) is made of a thermoplastic elastomer, TPE, or a thermoplastic vulcanizate, TPV.

14. Top member arrangement (200) according to any one of the preceding claims, wherein the interface module (11) is moulded in one piece by means of multi shot injection.

15. Top member arrangement (200) according to any one of claims 1-11 comprising a top cover (20) and an air filter (60).

16. Roof window (32) comprising a sash (30) and a frame (40), the frame (40) comprising a top frame member (41), a bottom frame member (42), two side frame members (43, 44), and a top member arrangement (200) according to any one of claims 1-15, wherein the top member arrangement (200) are adapted to be positioned at an external face of the top frame member (41).

17. A method for assembling a roof window (32) comprising the steps of connecting a frame (40) with a top member (41), a bottom member (42) and two side members (43, 44) defining a frame plane (45), with a sash (30) having a top member (41), a bottom member (42) and two side members (43, 44) defining a sash plane (46), the sash (30) being connected to the frame (40) by a pivot hinge provided between the side members (36, 43; 37, 44) of the frame (40) and sash (30), respectively,
connecting a top member arrangement (200) according to any one of claims 1-15 to the frame by at least two mounting brackets (47), and
engaging the mounting brackets (47) with at least two attachment members that are integrally formed with an interface module (11) of the top member arrangement (200).

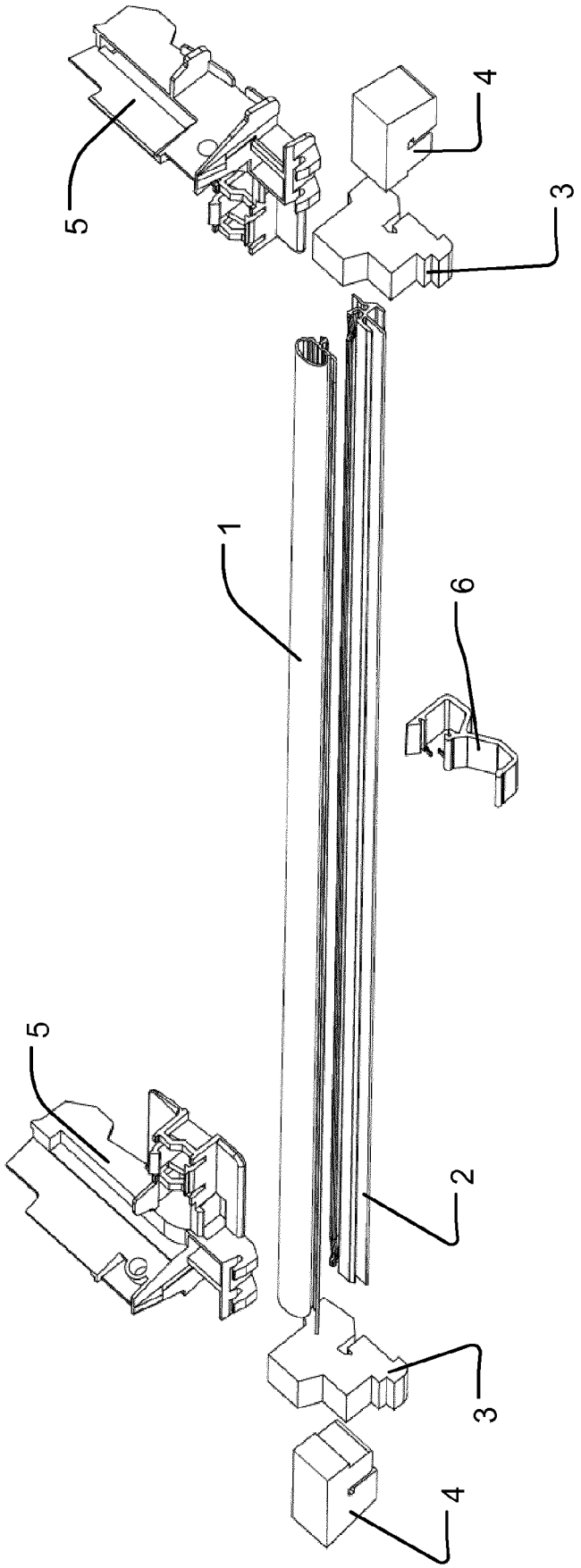


Fig. 1

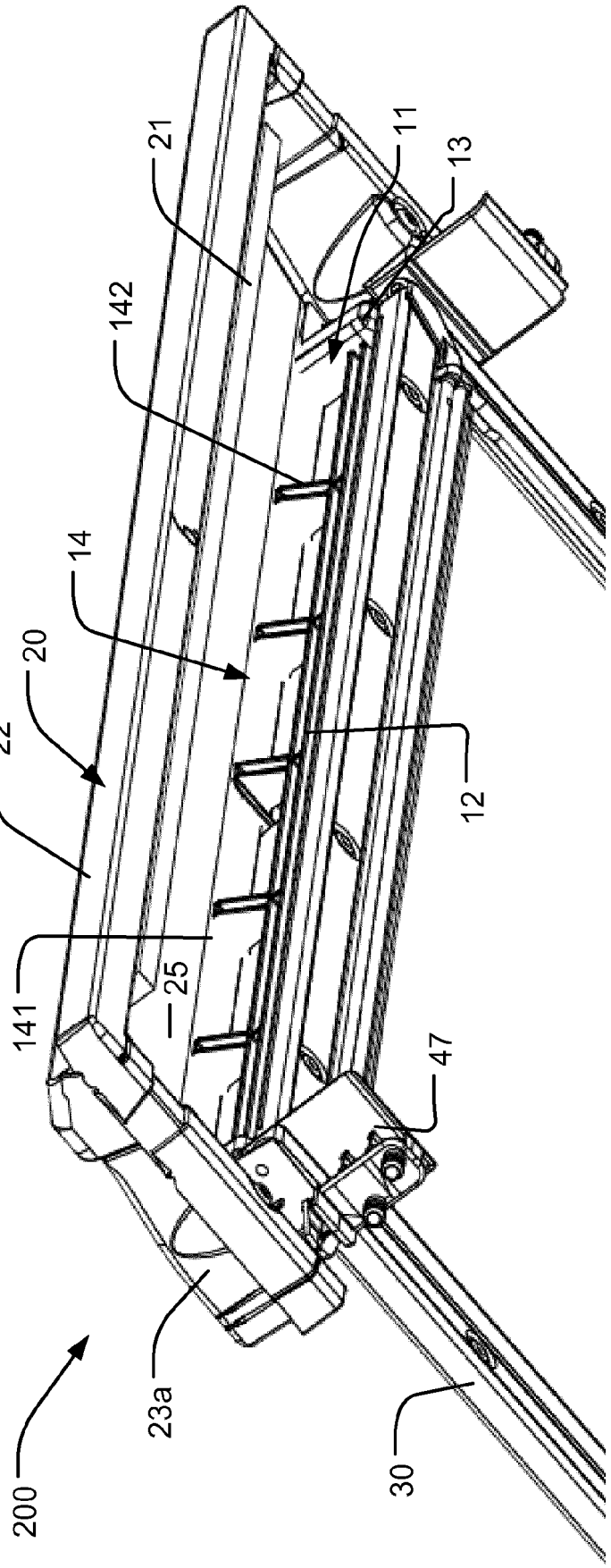


Fig. 2

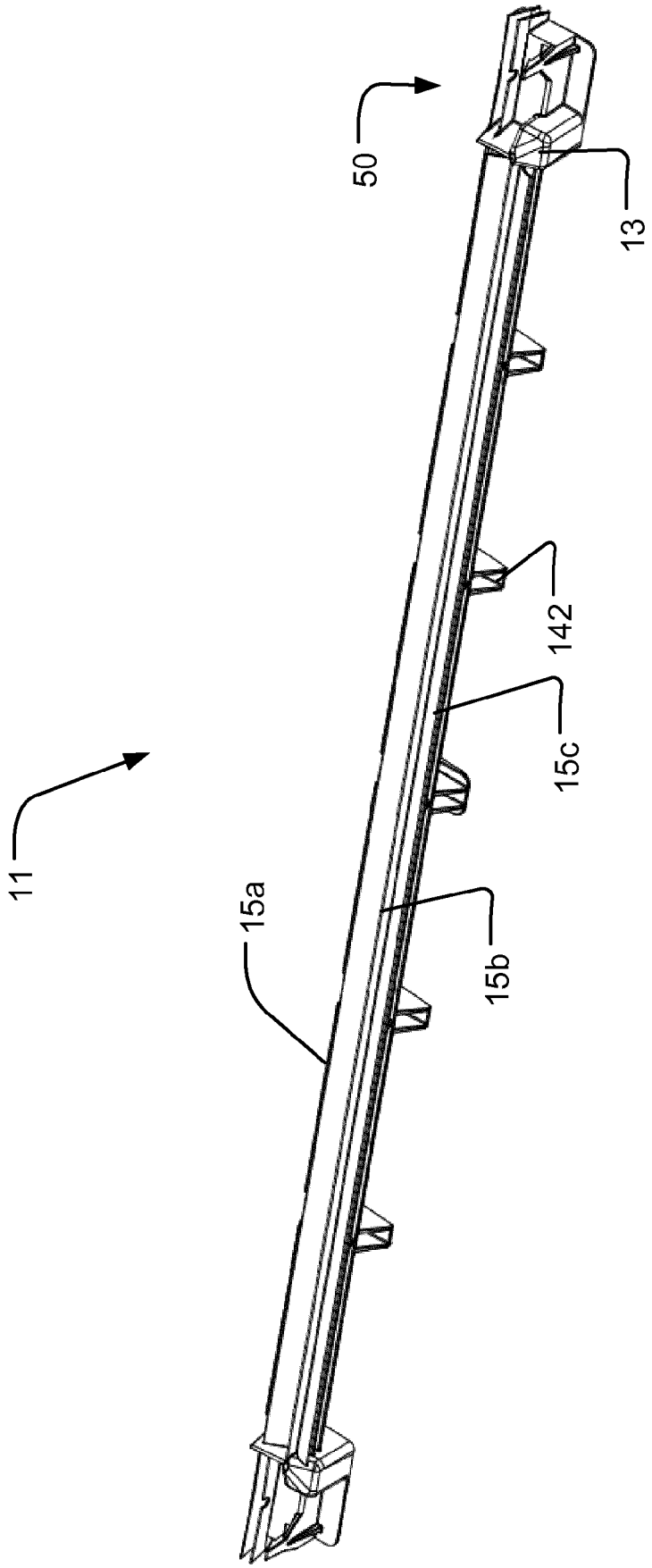


Fig. 3

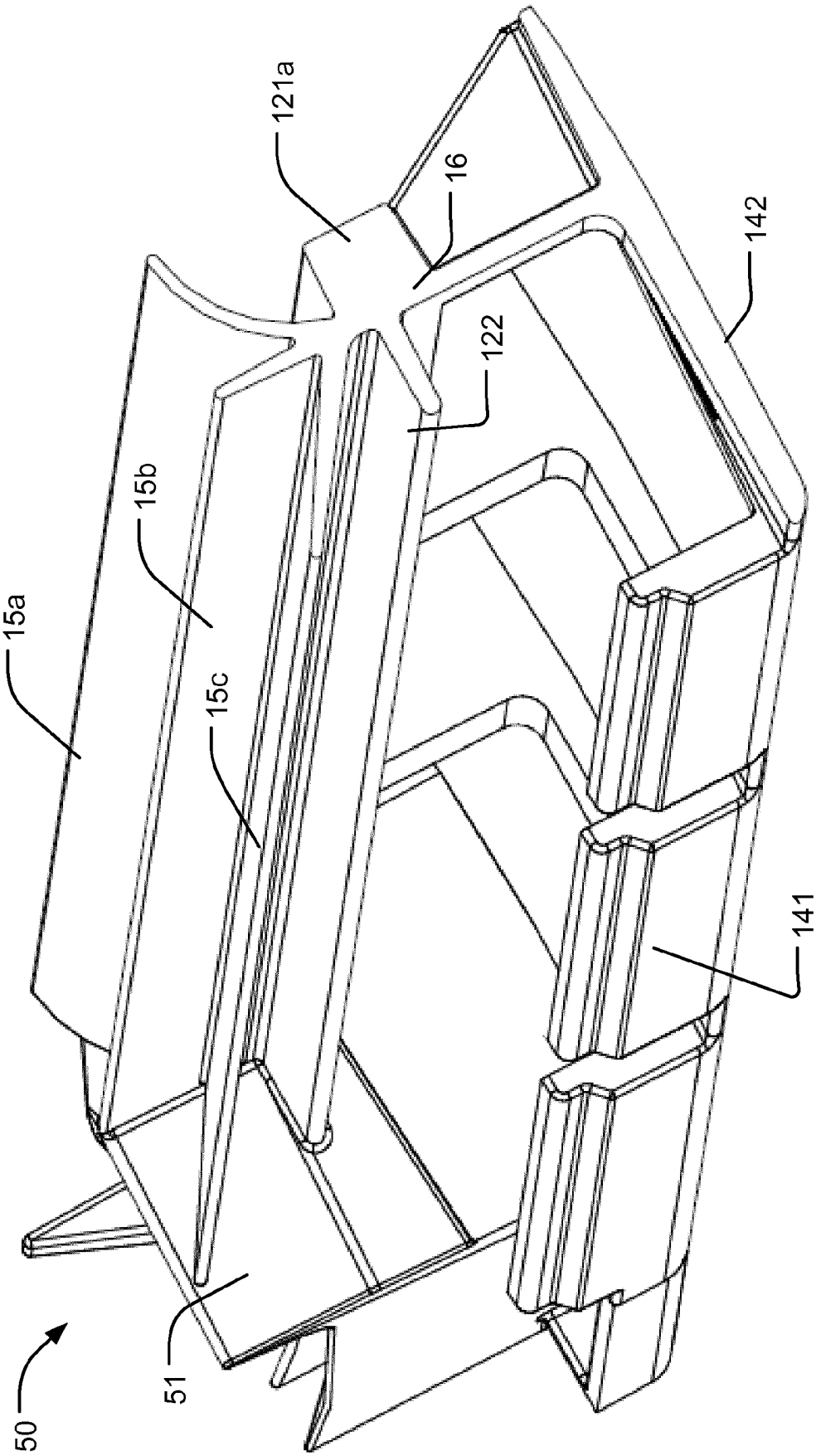


Fig. 4

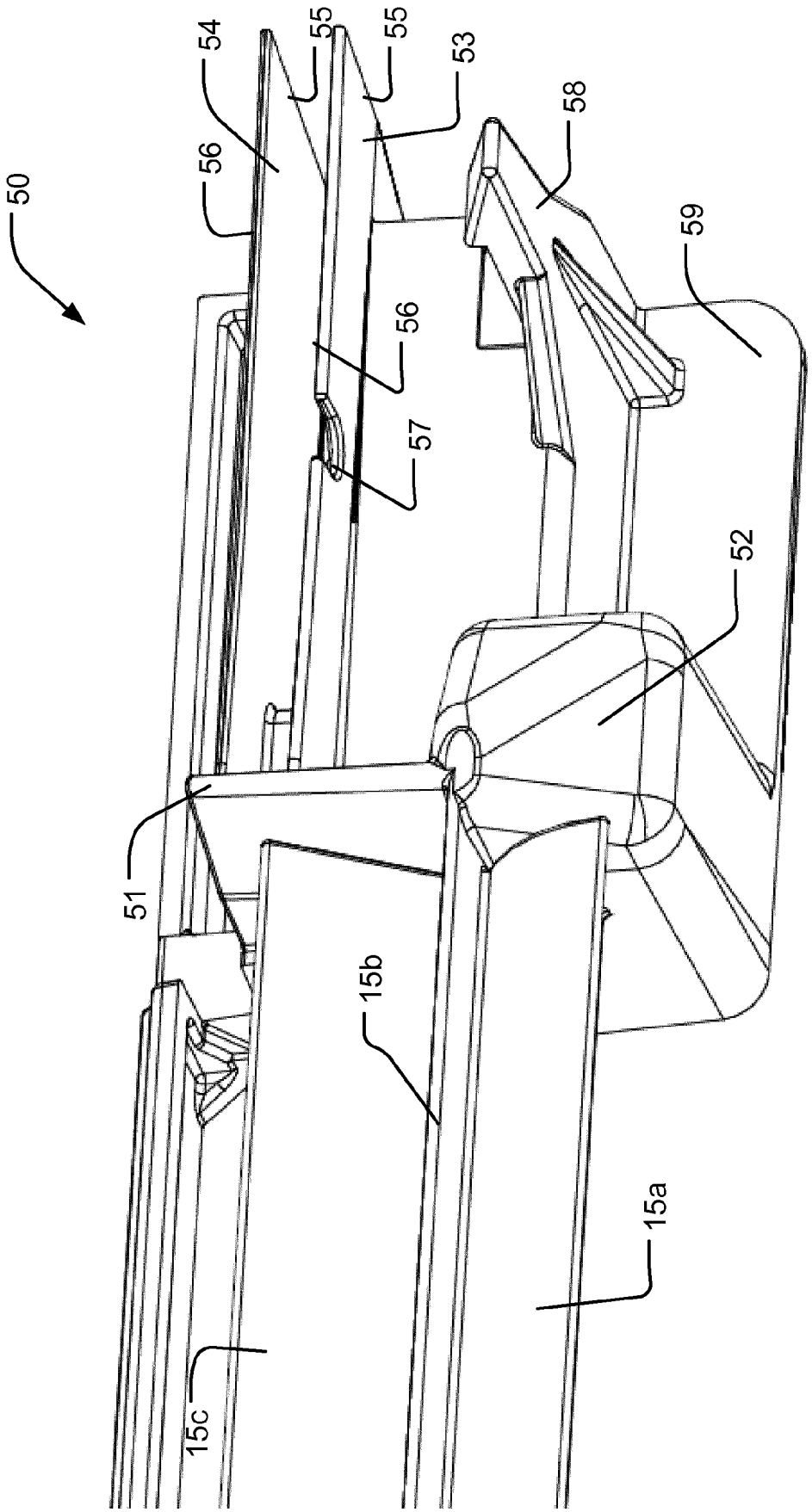


Fig. 5

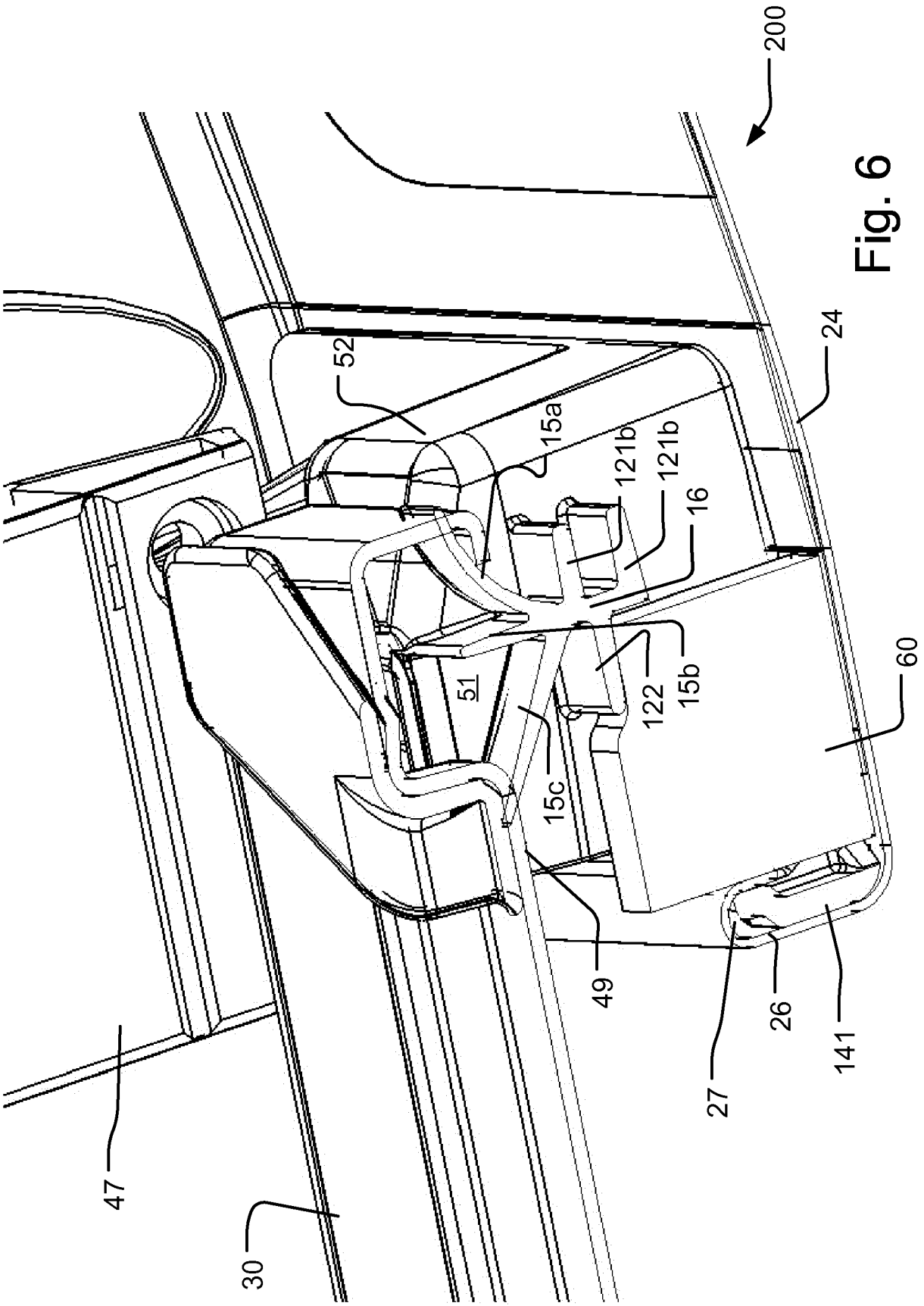


Fig. 6

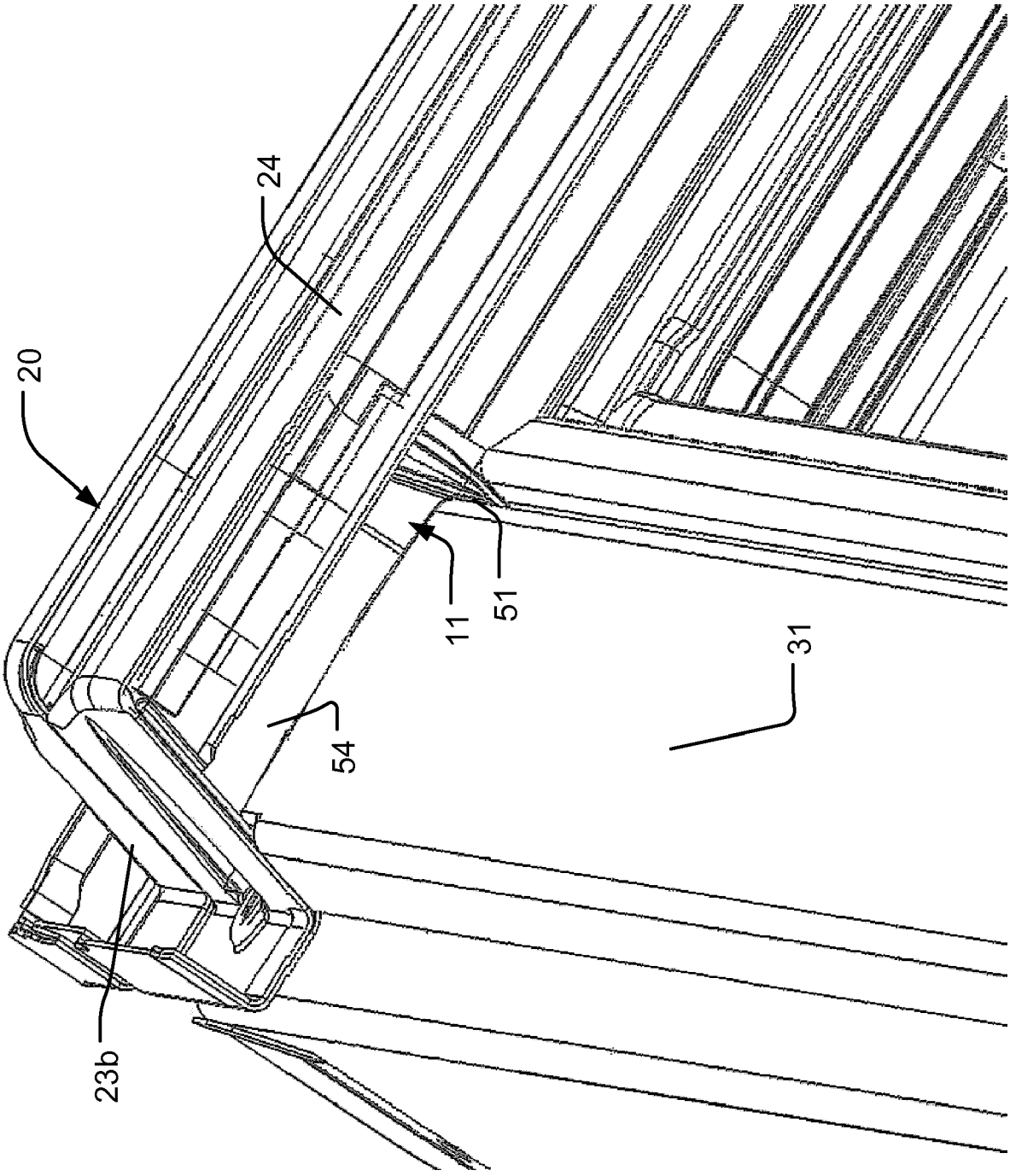
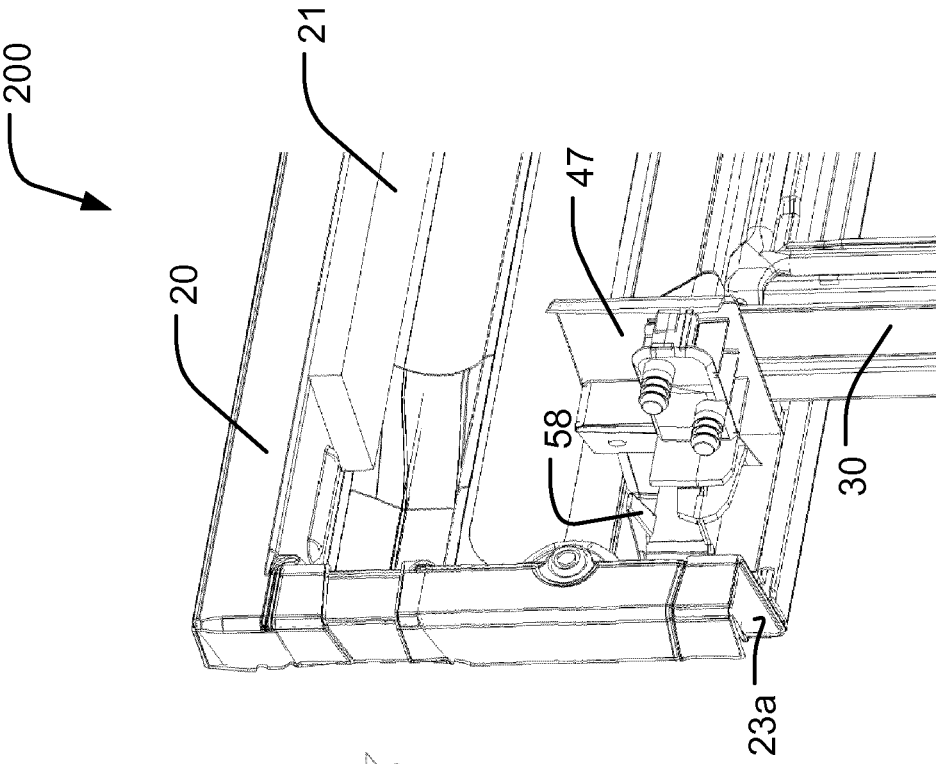


Fig. 7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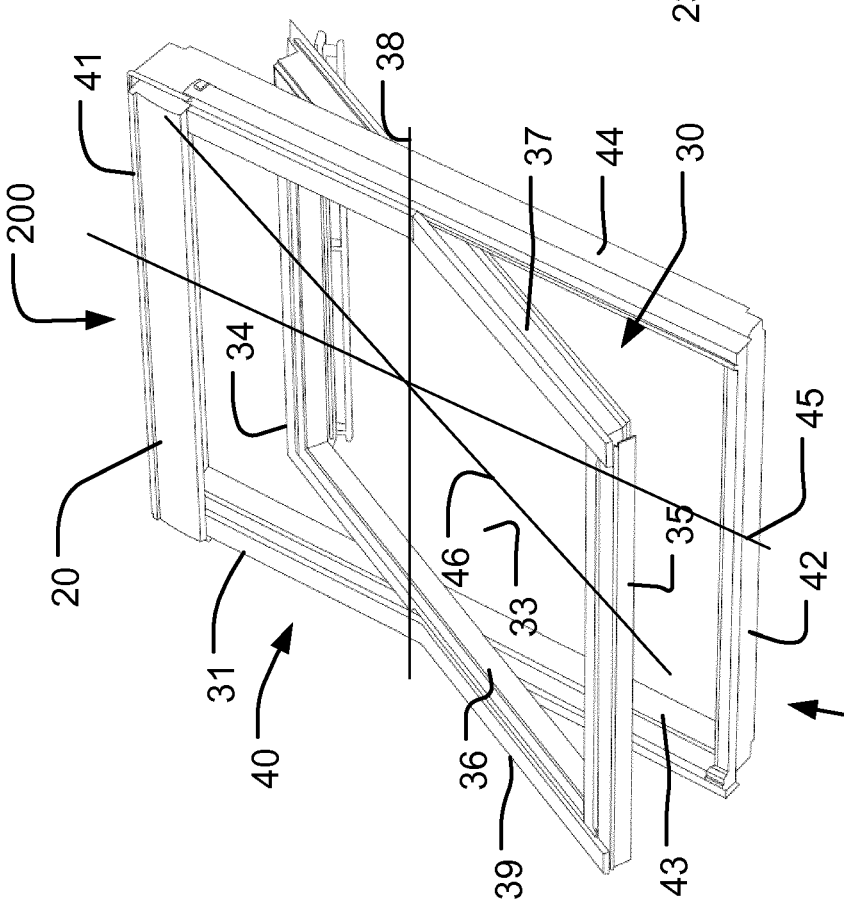
20
47
58
30
23a

Fig. 9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34
45
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46
33
35
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43
32

Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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