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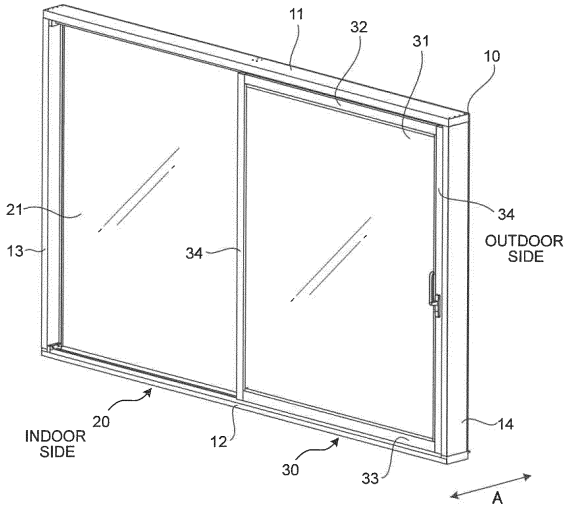
(54) FITTING AND METHOD OF MANUFACTURING FRAME MEMBER

(57) A lower frame (12) includes an inner lower frame part (40) on which a track (17) is arranged, an outer lower frame part (50) supporting a surface facing an outdoor side of a panel (21), and an intermediate lower frame part (60) positioned between the inner lower frame part (40) and the outer lower frame part (50). A covering member (140) is arranged at a portion closer to an outdoor side of a fitting than a movable sash (30) in the lower frame (12), the covering member (140) including an upper surface part (142) extending toward an indoor side from an upper end of the outer lower frame part (50) to cover a gap between the outer lower frame part (50) and the movable sash (30), and a leg part (141) extending downward from an edge positioned on an indoor side of the upper surface part (142) to be supported by the intermediate lower frame part (60). The intermediate lower frame part (60) and the inner lower frame part (40) are separated from each other and an inner connecting member (90) having an insulating property is interposed therebetween, and the intermediate lower frame part (60) and the outer lower frame part (50) are separated from each other and an outer connecting member (100) having an insulating property is interposed therebetween.

FIG.1



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a fitting and a method of manufacturing a frame member.

2. Description of the Related Art

[0002] There has been provided a fitting including, as a frame member constituting a frame body, an inner frame constituent part on an indoor side and an outer frame constituent part on an outdoor side that are arranged in parallel being separated from each other, and a connecting member having an insulating property is interposed between the two frame constituent parts. With such a fitting, the inner frame constituent part is insulated from the outer frame constituent part by the connecting member, so that even when a temperature on the outdoor side is lower than a temperature on the indoor side, for example, water condensation can be prevented from occurring on the inner frame constituent part (for example, refer to Japanese Patent Application Laid-open No. 2002-161671).

[0003] In recent years, to improve a design, provided is a frame member the portion of which positioned on the indoor side is covered with a decorative material. However, in a fitting such as a single sliding window and a double sliding window in which a plate member on the outdoor side and a plate member on the indoor side are arranged in the frame body, the decorative material may be influenced by the temperature on the outdoor side.

[0004] For example, in a lower frame in which the plate member on the outdoor side and the plate member on the indoor side are arranged, a portion up to a track that supports the plate member on the indoor side in a slidable manner is arranged on the indoor side, and a portion closer to the outdoor side than the track is exposed to the outside of a room. Thus, in this lower frame, the portion up to the track on the indoor side becomes the inner frame constituent part, and the connecting member is arranged on the outdoor side thereof. Thus, the decorative material arranged between the track on the indoor side and the plate member on the outdoor side includes a portion that is arranged to be opposed to the outer frame constituent part, so that the portion is easily influenced by the temperature of the outer frame constituent part exposed to the outside of the room. As a result, when the temperature on the outdoor side is lower than the temperature on the indoor side, for example, the temperature of the portion of the decorative material that is arranged to be opposed to the outer frame constituent part is also lowered, so that water condensation may occur on a surface exposed to the inside of the room. In a case in which water condensation occurs on the decorative material, dew condensation water may drip onto the connecting member arranged on a lower side, and early deterioration may be caused in the connecting member, and the insulating property may be influenced.

SUMMARY OF THE INVENTION

[0005] The present invention is made in view of such a situation and provides a fitting and a method of manufacturing a frame member that can improve the insulating property.

[0006] To achieve the object described above, a fitting according to the present invention includes: a frame body including a lower frame provided with a track; a fixed plate member arranged on an outdoor side of the frame body, the fixed plate member including a panel having a lower edge part supported by the lower frame; and a movable plate member arranged on an indoor side of the frame body, the movable plate member being slidable in a longitudinal direction of the lower frame along the track. The lower frame includes an inner lower frame part on which the track is arranged, an outer lower frame part supporting a surface facing an outdoor side of the panel, and an intermediate lower frame part positioned between the inner lower frame part and the outer lower frame part, a covering member is arranged at a portion of the lower frame closer to an outdoor side of the fitting than the movable plate member, the covering member including an upper surface part covering a portion between the outer lower frame part and the movable plate member and a leg part that extends downward from the upper surface part and is supported by the intermediate lower frame part, and the intermediate lower frame part and the inner lower frame part are separated from each other and an inner connecting member having an insulating property is interposed between the intermediate lower frame part and the inner lower frame part, and the intermediate lower frame part and the outer lower frame part are separated from each other and an outer connecting member having an insulating property is interposed between the intermediate lower frame part and the outer lower frame part.

[0007] According to the present invention, the lower frame includes an inner lower frame part, an outer lower frame part, and an intermediate lower frame part that are separated from each other, and the respective connecting members having an insulating property is interposed between the intermediate lower frame part and the inner lower frame part, and between the intermediate lower frame part and the outer lower frame part. Thus, in a case of covering a portion from the track to a fixed plate member on the outdoor side with the decorative material, the intermediate lower frame part arranged on the indoor side can be caused to be opposed to the decorative material, and water condensation can be prevented from occurring on the decorative material.

[0008] In the fitting according to the present invention, a decorative material is arranged on an upper surface positioned on an indoor side of the lower frame.

[0009] According to the present invention, the upper surface of the lower frame positioned on the indoor side is covered with the decorative material, so that quality of external appearance can be improved.

[0010] In the fitting according to the present invention, a support member having an insulating property is interposed between the decorative material and the inner connecting member, the support member is arranged to connect between an upper end of the intermediate lower frame part and an upper end of the inner lower frame part, and the inner connecting member is in intimate contact with a lower surface of the support member.

[0011] According to the present invention, the support member is interposed between the decorative material and the inner connecting member to connect the upper end of the intermediate lower frame part and the upper end of the inner lower frame part, and the inner connecting member is arranged to be in intimate contact with the lower surface of the support member, so that when water such as rainwater adhering to a surface of a movable plate member facing the outdoor side drips onto the lower frame, the water can be prevented from adhering to the inner connecting member, and early deterioration of the connecting member can be prevented.

[0012] In the fitting according to the present invention, the inner lower frame part includes a first engagement receiving part, the intermediate lower frame partincludes a second engagement receiving part, and the support member includes a first engaging part to be engaged with the inner lower frame part via the first engagement receiving part and a second engaging part to be engaged with the intermediate lower frame part via the second engagement receiving part.

[0013] According to the present invention, by engaging each engaging part with each engagement receiving part, the support member can be securely connected to the inner lower frame part and the intermediate lower frame part.

[0014] In the fitting according to the present invention, the support member includes a base part arranged across the inner lower frame part and the intermediate lower frame part, and a plurality of rib parts extending upward from positions separated from each other on an upper surface of the base part, and the decorative material is supported by the support member via upper ends of the rib parts.

[0015] According to the present invention, a portion of the support member to be brought into contact with the decorative material is limited to the upper end of the rib part, so that the entire lower surface of the decorative material can be prevented from getting wet when water enters a space between the support member and the decorative material, and deterioration of the decorative material caused by adhesion of water can be prevented.

[0016] In the fitting according to the present invention, an outdoor side of the upper surface of the base part is lower than an indoor side of the upper surface of the base part, and each rib part includes a notch for drainage.

[0017] According to the present invention, the water that has entered the space between the support member and the decorative material can be efficiently drained via the notch for drainage arranged in the rib part, and deterioration of the decorative material due to adhesion of water can be prevented more securely. The upper surface of the base part may be simply inclined, or an inclined surface may be configured in a stepped form.

[0018] In the fitting according to the present invention, an opening for drainage is arranged at the leg part of the covering member, a drain valve is arranged in the opening for drainage, and a drainage channel for draining water that has passed through the drain valve to an outside is arranged between the leg part and the outer lower frame part.

[0019] According to the present invention, water that has entered a portion closer to the indoor side than the leg part of the covering member is drained to the outside via the opening for drainage and the drainage channel, so that a failure caused by retention of water can be prevented. Additionally, the drain valve is arranged in the opening for drainage, so that water does not enter a space closer to the indoor side than the leg part through the opening for drainage.

[0020] In the fitting according to the present invention, setting blocks supporting a lower surface of the panel are arranged at a plurality of positions in a space provided between the leg part of the covering member and the outer lower frame part, an insertion member having an insulating property equal to or larger than the insulating property of the outer connecting member is arranged at a portion across the intermediate lower frame part and the outer lower frame part between the setting blocks, and the drainage channel includes a drain hole provided by making a notch penetrating the setting block along a depth direction.

[0021] According to the present invention, the insertion member is arranged in the space between the leg part of the covering member and the outer lower frame part, so that retention in the space can be prevented, and an advantageous effect can be obtained in view of the insulation property. As the insertion member, applied is an insulating material having the insulating property equal to or larger than the insulating property of the outer connecting member, so that the insertion member does not become a heat bridge between the outer lower frame part and the intermediate lower frame part. A plurality of setting blocks including the drainage channel are arranged to divide the insertion member, so that the water that has passed through the drain valve is prevented from being retained in the space.

[0022] A fitting according to the present invention includes a frame body including a lower frame provided with a track; an outer plate member arranged on an outdoor side of the frame body; and an inner plate member arranged on an indoor side of the frame body, the inner plate member being slidable in a longitudinal direction of the lower frame along the track. The lower frame includes

an inner lower frame part on which the track is arranged, an outer lower frame part supporting the outer plate member, and an intermediate lower frame part positioned between the inner lower frame part and the outer lower frame part, and the intermediate lower frame part and the inner lower frame part are separated from each other and an inner connecting member having an insulating property is interposed between the intermediate lower frame part and the inner lower frame part, and the intermediate lower frame part and the outer lower frame part are separated from each other and an outer connecting member having an insulating property is interposed between the intermediate lower frame part and the outer lower frame part.

[0023] According to the present invention, the lower frame includes the inner lower frame part, the outer lower frame part, and the intermediate lower frame part separated from each other, and the respective connecting members having an insulating property is interposed between the intermediate lower frame part and the inner lower frame part, and between the intermediate lower frame part and the outer lower frame part. Thus, in a case of covering a portion from the track to the outer plate member with the decorative material, the intermediate lower frame part arranged on the indoor side can be caused to be opposed to the decorative material, and water condensation can be prevented from occurring on the decorative material.

[0024] A method of manufacturing a frame member according to the present invention is a method of manufacturing a frame member, the frame member including two frame constituent parts arranged in parallel in a state of being separated from each other, and a connecting member having an insulating property, the connecting member being interposed between the frame constituent parts. The method includes: forming a frame material in which the two frame constituent parts are connected with each other via a connecting wall part in a state of being arranged in parallel with each other, and an injection groove is arranged between the frame constituent parts, the connecting wall part defining a bottom wall of the injection groove; injecting liquid resin having an insulating property and a foaming property into the injection groove as a raw material of the connecting member; blocking an opening of the injection groove at the time before foaming of the resin is completed by engaging a support member having an insulating property with each of the two frame constituent parts; and dividing the connecting wall part after the connecting member is formed with the resin.

[0025] According to the present invention, the opening of the injection groove is blocked with the support member at the time before foaming of the resin having a foaming property is completed, so that the connecting member can be brought into intimate contact with the support member without complicated processing, and water can be easily prevented from entering a space therebetween.

[0026] The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027]

FIG. 1 is a perspective view of a fitting according to an embodiment of the present invention viewed from an indoor side;

FIG. 2 is a vertical cross-sectional view of the fitting illustrated in FIG. 1 cut on a movable plate member side;

FIG. 3 is a vertical cross-sectional view of the fitting illustrated in FIG. 1 cut on a fixed plate member side;

FIG. 4 is a horizontal cross-sectional view of the fitting illustrated in FIG. 1;

FIG. 5 is a principal part perspective view of a lower frame of the fitting illustrated in FIG. 1 viewed from the outdoor side;

FIG. 6 is a principal part perspective view of the lower frame of the fitting illustrated in FIG. 1 viewed from the indoor side;

FIG. 7 is a diagram illustrating disassembled elements constituting the lower frame of the fitting illustrated in FIG. 1;

FIG. 8 is a vertical cross-sectional view of a frame material applied in configuring the lower frame of the fitting illustrated in FIG. 1; and

FIGS. 9A to 9C illustrate a procedure for manufacturing a frame member of the fitting illustrated in FIG. 1, FIG. 9A is a principal part vertical cross-sectional view of a state in which liquid polyurethane foam is injected into the injection groove of the frame material, FIG. 9B is a principal part vertical cross-sectional view of a state in which an opening of the injection groove is blocked with a support member at the time before foaming of the polyurethane foam injected into the injection groove is completed, and FIG. 9C is a principal part vertical cross-sectional view of a state in which a connecting wall part is cut out after the polyurethane foam is cured.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028] The following describes preferred embodiments of a fitting and a method of manufacturing a frame member according to the present invention in detail with reference to the attached drawings.

[0029] FIGS. 1 to 6 illustrate a fitting according to an embodiment of the present invention. The fitting exemplified herein is what is called a single sliding window configured by arranging a fixed sash (fixed plate member) 20 and a movable sash (movable plate member) 30 in a frame body 10. The frame body 10 is configured such

that an upper frame 11, a lower frame 12, and left and right vertical frames 13 and 14 are assembled into a rectangular frame, and a mullion frame 15 is arranged along a vertical direction between the upper frame 11 and the lower frame 12. In the present embodiment, specifically, a frame made of wood such as lumber and a wood-based material is applied as the upper frame 11, the left and right vertical frames 13 and 14, and the mullion frame 15 among frame members constituting the frame body 10. The lower frame 12 is made of a composite material of aluminum alloy and resin, and an upper surface of a portion arranged on the indoor side is covered with a decorative material.

[0030] The fixed sash 20 is configured by arranging a panel 21 for a fixed sash at a part surrounded by the upper frame 11, the lower frame 12, the vertical frame 13, and the mullion frame 15 in the frame body 10. In the present embodiment, the fixed sash (outer plate member) 20 is arranged at a part as an outdoor side in a depth direction on the left side of the frame body 10 when viewed from an indoor side. As the panel 21 for a fixed sash, double glazing configured by laminating three pieces of plate glass having translucency is applied. However, as the panel 21 for a fixed sash, glass having translucency is not necessarily applied, and a translucent panel made of a resin material or a panel not having translucency may be applied.

[0031] The depth direction is a direction along a depth of the fitting as illustrated as an arrow A in the drawing. In the present embodiment, a phrase "width direction" is also used. The width direction is a vertical direction orthogonal to the depth direction for a frame extending along a horizontal direction such as the upper frame 11 and the lower frame 12. For a frame extending along the vertical direction such as the vertical frames 13 and 14 and the mullion frame 15, a lateral direction orthogonal to the depth direction is referred to as the width direction.

[0032] A movable sash (inner plate member) 30 is configured by mounting a head rail 32, a bottom rail 33, and left and right stiles 34 onto four peripheries of a panel 31 for a movable sash having a rectangular shape, and is arranged at a part as the indoor side in the depth direction of the frame body 10. The stile and rail members 32, 33, and 34 constituting the movable sash 30 are made of wood similarly to the upper frame 11 of the frame body 10 and the like. As the panel 31 for a movable sash, applied is double glazing configured by laminating three pieces of plate glass having translucency similarly to the fixed sash 20. As is clear from the drawing, an upper track 16 is arranged along a longitudinal direction of the upper frame 11 at a part of the upper frame 11 opposed to the head rail 32 of the movable sash 30, and a lower track 17 is arranged along a longitudinal direction of the lower frame 12 at a part of the lower frame 12 corresponding to the bottom rail 33 of the movable sash 30. The movable sash 30 can slide along the longitudinal direction of the upper frame 11 and the lower frame 12 by being guided by the upper track 16 and the lower track 17. In this fitting, when viewed from the indoor side, a frame opening 18 on the right side surrounded by the upper frame 11, the lower frame 12, the other vertical frame 14, and the mullion frame 15 in the frame body 10 can be opened and closed by sliding the movable sash 30. The reference numeral 19 in the drawing denotes a sash roller that rolls by being guided by the lower track 17. Although not clearly illustrated in the drawing, the sash roller 19 is attached to the bottom rail 33 of the movable sash 30. As the panel 31 for a movable sash, glass having translucency is not necessarily applied, and a translucent panel made of a resin material or a panel not having translucency may be applied.

[0033] The following mainly describes a specific configuration of the lower frame 12, and also describes a characteristic portion of the present invention in detail. For convenience of explanation, the following describes each configuration in a state of being attached to a building.

[0034] As illustrated in FIGS. 2, 3, and 7, the lower frame 12 includes an inner lower frame part 40, an outer lower frame part 50, and an intermediate lower frame part 60 that are arranged in parallel in the depth direction. The inner lower frame part 40, the outer lower frame part 50, and the intermediate lower frame part 60 are extruded shape materials formed with aluminum alloy, and are configured to have substantially the same cross-sectional shape along a total length in the longitudinal direction. The inner lower frame part 40 is a portion arranged on the indoor side, and the outer lower frame part 50 is a portion arranged on the outdoor side. The intermediate lower frame part 60 is a portion that is arranged between the inner lower frame part 40 and the outer lower frame part 50, separated from the inner lower frame part 40, and separated from the outer lower frame part 50.

[0035] The inner lower frame part 40 has a configuration in which the lower track 17 described above is integrated with an upper end of a frame base plate part 41 extending in the vertical direction. A lower pawl fin part 42 and a lower outer engagement fin part 43 are arranged at a lower end of the frame base plate part 41, and an upper pawl fin part 44 and an upper outer engagement fin part 45 are arranged at an intermediate part of the frame base plate part 41. The lower pawl fin part 42 and the upper pawl fin part 44 extend substantially horizontally toward the indoor side from the frame base plate part 41, and engaging pawls 42a and 44a are arranged at respective extended edges. The engaging pawls 42a and 44a are bent from the lower pawl fin part 42 and the upper pawl fin part 44 toward a direction of approaching each other. The lower outer engagement fin part 43 and the upper outer engagement fin part 45 extend substantially horizontally toward the outdoor side from the frame base plate part 41. A lower outer engagement projection 43a projecting upward is arranged at an extended edge of the lower outer engagement fin part 43. The upper outer engagement fin part 45 extends such that an extended edge thereof is once curved downward and be-

comes substantially horizontal toward the outdoor side, and includes an inner engagement receiving part 45a arranged at the extended edge thereof. The inner engagement receiving part 45a is a portion projecting downward from the extended edge of the upper outer engagement fin part 45.

[0036] A support base part 70 is attached to a part of the inner lower frame part 40 closer to the indoor side than the frame base plate part 41. The support base part 70 has a hollow angular cylindrical shape formed with resin having an insulating property, for example, polyvinyl chloride (PVC). The support base part 70 is mounted between the lower pawl fin part 42 and the upper pawl fin part 44 of the inner lower frame part 40, and is held in the inner lower frame part 40 by the engaging pawls 42a and 44a not to fall off. A hooking groove 71 is arranged on the upper surface of the support base part 70. The hooking groove 71 is a concave groove formed along the longitudinal direction of the support base part 70. Base part projections 72 are arranged in a direction of approaching each other at a part as an opening edge of the hooking groove 71.

[0037] The outer lower frame part 50 includes a base cylindrical part 51 forming a hollow shape and a panel holding fin part 52 extending upward from an upper surface portion positioned on the outdoor side of the base cylindrical part 51 that are integrally arranged. The base cylindrical part 51 has a substantially angular cylindrical shape having a dimension along a vertical direction shorter than a dimension along the depth direction, and includes inner engagement fin parts 53 and 54 at upper and lower edges of an inner end face facing the indoor side. The inner engagement fin parts 53 and 54 extend horizontally to be substantially parallel with each other toward the indoor side. Inner engagement projections 53a and 54a are arranged at portions opposed to each other on the extended edges of the inner engagement fin parts 53 and 54. A tight material mounting groove 55, a cover supporting fin part 56, and a draining fin part 57 are arranged at an upper end of the panel holding fin part 52. The tight material mounting groove 55 opens toward the indoor side, and extends substantially along the horizontal direction. An outer tight material 59 is mounted at a part of the tight material mounting groove 55 corresponding to the panel 21 for a fixed sash, the outer tight material 59 for sealing between the panel holding fin part 52 and a surface of the panel 21 for a fixed sash facing the outdoor side. The cover supporting fin part 56 projects substantially horizontally toward the indoor side from a part lower than the tight material mounting groove 55 of the surface of the panel holding fin part 52 facing the indoor side. The draining fin part 57 is a portion that inclines and extends to be gradually lower from the upper edge of the panel holding fin part 52 toward the outdoor side, and is bent substantially vertically downward.

[0038] The intermediate lower frame part 60 includes a main body part 61 having a hollow shape, two upper and lower outer engagement fin parts 62 and 63 projecting from an outer end face of the main body part 61 facing the outdoor side, and a lower inner engagement fin part 64 and an upper inner engagement fin part 65 projecting from a part facing the indoor side of the main body part 61 that are integrally arranged. A dimension along the vertical direction of the main body part 61 is configured to be substantially equal to a dimension along the vertical direction of the base cylindrical part 51. The outer engagement fin parts 62 and 63 extend to be substantially parallel with each other toward the outdoor side. Outer engagement projections 62a and 63a are arranged at portions opposed to each other on extended edges of the outer engagement fin parts 62 and 63. As is clear from the drawing, a mutual interval between the outer engagement fin parts 62 and 63 is substantially equal to a mutual interval between the inner engagement fin parts 53 and 54 arranged in the outer lower frame part 50. The lower inner engagement fin part 64 extends substantially horizontally toward the indoor side from a lower edge part of a portion facing the indoor side of the main body part 61. A lower inner engagement projection 64a projecting upward is arranged at an extended edge of the lower inner engagement fin part 64. The upper inner engagement fin part 65 extends upward from an upper edge part of a portion facing the indoor side of the main body part 61. An upper inner engagement fin part 66 and two upper and lower locking fin parts 67 are arranged in the upper inner engagement fin part 65. The upper inner engagement fin part 66 extends toward the indoor side from an upper edge part of the upper inner engagement fin part 65. An upper inner engagement projection 66a projecting downward is arranged at an extended edge of the upper inner engagement fin part 66. A distance from the upper inner engagement fin part 66 to the lower inner engagement fin part 64 is configured to be shorter than a distance from the upper outer engagement fin part 45 to the lower outer engagement fin part 43 in the outer lower frame part 50. The locking fin parts 67 extend to be substantially parallel with each other from the surface facing the outdoor side of the upper inner engagement fin part 65 toward the outside of the room, and a groove-shaped outer engagement receiving part 68 is provided therebetween.

[0039] A support member 80 and an inner connecting member 90 are interposed between the inner lower frame part 40 and the intermediate lower frame part 60 configured as described above, and an outer connecting member 100 is interposed between the outer lower frame part 50 and the intermediate lower frame part 60. Each of the support member 80, the inner connecting member 90, and the outer connecting member 100 is formed with resin having an insulating property, connects the inner lower frame part 40 with the intermediate lower frame part 60, and connects the outer lower frame part 50 with the intermediate lower frame part 60 while securing an insulating property therebetween.

[0040] The support member 80 includes a base part 81 arranged across the inner lower frame part 40 and

the intermediate lower frame part 60, and a plurality of rib parts 82 arranged on an upper surface 81a of the base part 81 that are integrally formed. In the present embodiment, the support member 80 is made of polyvinyl chloride (PVC).

[0041] The base part 81 includes an outer engaging part 83 at a portion positioned on the outdoor side, and includes an inner engaging part 84 at a portion positioned on the indoor side. The outer engaging part 83 extends downward from a lower surface 81b of the base part 81, and is bent toward the indoor side. The inner engaging part 84 is a portion projecting upward from the upper surface 81a of the base part 81. The base part 81 is arranged to cover a gap between the intermediate lower frame part 60 and the inner lower frame part 40 by engaging a bent portion of the outer engaging part 83 with the outer engagement receiving part 68 of the intermediate lower frame part 60, and engaging the inner engaging part 84 with the inner engagement receiving part 45a of the inner lower frame part 40. As is clear from the drawing, the lower surface 81b of the base part 81 makes a stepped form to be gradually lower toward the outdoor side, and each lower surface inclines to be gradually lower toward the outdoor side.

[0042] The rib parts 82 has a plate shape extending upward to be parallel with each other from the upper surface 81a of the base part 81. In the present embodiment, three rib parts 82 are arranged at substantially the same intervals from an edge positioned on the outdoor side of the base part 81 toward the indoor side. Upper ends of the three rib parts 82 are set to have substantially the same height. As illustrated in FIGS. 5 and 6, notches for drainage 82a and rib projections 82b are arranged on the respective rib parts 82. The notches for drainage 82a are openings for sequentially draining water that has dripped or stored on the upper surface 81a of the base part 81 to the outdoor side, and are formed at portions opposed to each other between an upper end of each rib part 82 and the upper surface 81a of the base part 81. Although not clearly illustrated in the drawing, the notches for drainage 82a are arranged at a plurality of positions along the longitudinal direction on each rib part 82. The rib projection 82b is a projecting portion arranged at an upper surface part of the rib part 82. The rib projection 82b is arranged to project to the indoor side on the rib part 82 arranged on the outdoor side and the intermediate rib part 82, and the rib projection 82b is arranged to project to the outdoor side on the rib part 82 on the indoor side.

[0043] An end part on the indoor side of the inner connecting member 90 is arranged between the upper outer engagement fin part 45 and the lower outer engagement fin part 43 of the inner lower frame part 40, and an end part on the outdoor side thereof is arranged between the upper inner engagement fin part 66 and the lower inner engagement fin part 64 of the intermediate lower frame part 60. Between the upper outer engagement fin part 45 and the lower outer engagement fin part 43, the end part of the inner connecting member 90 is held by a stepped part of the upper outer engagement fin part 45 and the lower outer engagement projection 43a, and between the upper inner engagement fin part 66 and the lower inner engagement fin part 64, the end part of the inner connecting member 90 is held by the upper inner engagement projection 66a and the lower inner engagement projection 64a. That is, the inner lower frame part 40 is not in direct contact with the intermediate lower frame part 60, but the inner lower frame part 40 and the intermediate lower frame part 60 are connected with each other via the inner connecting member 90. As is clear from the drawing, an upper surface 90a of the inner connecting member 90 is in intimate contact with the lower surface 81b of the base part 81, and has a shape corresponding to that of the lower surface 81b of the base part 81. That is, the lower surface 81b of the base part 81 makes a stepped form to be gradually lower toward the outdoor side, and each lower surface inclines to be gradually lower toward the outdoor side. A lower surface 90b of the inner connecting member 90 is flat on an upper side than the lower surface of the inner lower frame part 40 and the lower surface of the intermediate lower frame part 60.

[0044] An end part on the indoor side of the outer connecting member 100 is arranged between the outer engagement fin parts 62 and 63 of the intermediate lower frame part 60, and an end part on the outdoor side thereof is arranged between the inner engagement fin parts 53 and 54 of the outer lower frame part 50. The outer connecting member 100 is configured to have a substantially uniform plate thickness. Between the outer engagement fin parts 62 and 63, the end part of the outer connecting member 100 is held by the outer engagement projections 62a and 63a, and between the inner engagement fin parts 53 and 54, the end part of the outer connecting member 100 is held by the inner engagement projections 53a and 54a. That is, the intermediate lower frame part 60 is not in direct contact with the outer lower frame part 50, but the intermediate lower frame part 60 and the outer lower frame part 50 are connected with each other via the outer connecting member 100. As is clear from the drawing, an upper surface 100a of the outer connecting member 100 is substantially identical to an upper surface 51a of the base cylindrical part 51 and an upper surface 61a of the main body part 61. A lower surface 100b of the outer connecting member 100 is flat on an upper side than a lower surface 51b of the base cylindrical part 51 and the lower surface 61b of the main body part 61.

[0045] As the inner connecting member 90 and the outer connecting member 100, applied is resin having an insulating property equal to or smaller than the insulating property of the support member 80 and a foaming property, for example, polyurethane foam. In the present embodiment, liquid polyurethane foam is injected between the inner lower frame part 40 and the intermediate lower frame part 60, and between the intermediate lower frame part 60 and the outer lower frame part 50, and is foamed

and cured to form the inner connecting member 90 and the outer connecting member 100.

[0046] FIG. 8 illustrates a frame material 1 applied in configuring the inner lower frame part 40, the intermediate lower frame part 60, and the outer lower frame part 50 that are connected with each other via the support member 80, the inner connecting member 90, and the outer connecting member 100. The frame material 1 corresponds to an extruded shape material immediately after being formed with aluminum alloy. In the illustrated example, applied is the frame material 1 in which the lower outer engagement fin part 43 of the inner lower frame part 40 is connected with the lower inner engagement fin part 64 of the intermediate lower frame part 60 via an inner connecting wall part 2. Similarly, in the frame material 1, the outer engagement fin part 63 positioned on a lower side of the intermediate lower frame part 60 is connected with the inner engagement fin part 54 positioned on a lower side of the outer lower frame part 50 via an outer connecting wall part 3. As is clear from the drawing, at a stage of the frame material 1, an inner injection groove 4 opening upward setting the inner connecting wall part 2 as a bottom wall is arranged between the inner lower frame part 40 and the intermediate lower frame part 60, and an outer injection groove 5 opening upward setting the outer connecting wall part 3 as a bottom wall is arranged between the intermediate lower frame part 60 and the outer lower frame part 50.

[0047] For the frame material 1 described above, liquid polyurethane foam is injected into the inner injection groove 4 and the outer injection groove 5 as a raw material of the inner connecting member 90 and the outer connecting member 100. Thereafter, the polyurethane foam is foamed to be filled in the inner injection groove 4 and the outer injection groove 5, and the inner connecting member 90 and the outer connecting member 100 having a desired shape can be obtained at the time when the polyurethane foam is cured. After the polyurethane foam is cured, by cutting out the inner connecting wall part 2 and the outer connecting wall part 3, the intermediate lower frame part 60 can be divided from the inner lower frame part 40, and the intermediate lower frame part 60 is divided from the outer lower frame part 50. That is, obtained are the intermediate lower frame part 60 and the inner lower frame part 40 that are arranged in parallel in a separated state and include the inner connecting member 90 interposed therebetween, and the intermediate lower frame part 60 and the outer lower frame part 50 that are arranged in parallel in a separated state and include the outer connecting member 100 interposed therebetween.

[0048] In the present embodiment, specifically, the inner connecting member 90 is formed in the inner injection groove 4 in accordance with a procedure illustrated in FIGS. 9A to 9C. That is, as illustrated in FIG. 9A, a desired amount of liquid polyurethane foam 6 is injected into the inner injection groove 4, and as illustrated in FIG. 9B, the support member 80 is arranged between the inner lower frame part 40 and the intermediate lower frame part 60 at the time before foaming of the injected polyurethane foam 6 is completed. In this state, the opening of the inner injection groove 4 is blocked by the support member 80. Accordingly, the polyurethane foam 6 injected into the inner injection groove 4 is foamed to be filled in a space surrounded by the inner injection groove 4 and the support member 80 without a gap. Thus, according to the method described above, the inner connecting member 90 having a shape along the base part 81 of the support member 80 can be easily and accurately formed. Thereafter, the inner connecting wall part 2 may be cut out as illustrated in FIG. 9C.

[0049] As described above, for the inner lower frame part 40, the intermediate lower frame part 60, and the outer lower frame part 50 connected with each other via the inner connecting member 90 and the outer connecting member 100, an upper surface of a portion arranged on the indoor side is covered with a decorative material 110. More specifically, at a portion on the right side with respect to the mullion frame 15 when viewed from the indoor side (hereinafter, simply referred to as a right side portion), as illustrated in FIG. 2, the decorative material 110 is arranged on an upper surface of a portion closer to the indoor side than a surface facing the outdoor side of the movable sash 30. At a portion on the left side with respect to the mullion frame 15 (hereinafter, simply referred to as a left side portion), as illustrated in FIG. 3, the decorative material 110 is arranged on an upper surface of a portion closer to the indoor side than the panel 21 for a fixed sash.

[0050] The decorative material 110 is arranged avoiding the lower track 17 of the inner lower frame part 40. That is, at a portion closer to the indoor side than the lower track 17, arranged is a continuous inner decorative material 110A having the same cross-sectional shape across the total length of the lower frame 12. A portion close to the outdoor side than the lower track 17 has different dimensions in the depth direction, so that decorative materials 110B and 110C having different shapes are arranged for the right side portion and the left side portion. In the present embodiment, a material made of wood such as lumber and a wood-based material is applied as the decorative material. However, the decorative material is not limited thereto. As the decorative material, a composite material of lumber and plastic (for example, wood plastics combination (WPC), recycled wood, resin containing wood flour), medium density fiberboard (MDF), a melamine decorative plate, and the like may be applied. Specifically, in the present embodiment, the decorative material may contain a material susceptible to water because of the reason described later.

[0051] As illustrated in FIGS. 3 and 2, the inner decorative material 110A includes a hooking tool 111 on a flat lower surface 110a. The inner decorative material 110A is supported by the support base part 70 in a detachable manner by causing the lower surface 110a to abut on an upper surface 70a of the support base part 70, and en-

gaging the hooking tool 111 with a base part projection 72 of the hooking groove 71. A portion of the inner decorative material 110A positioned on the outdoor side projects to the outdoor side to be closer the lower track 17 exceeding the support base part 70, and the lower surface 110a thereof is supported by the upper pawl fin part 44 arranged in the inner lower frame part 40.

[0052] The decorative material arranged at a portion closer to the outdoor side than the lower track 17 in the right side portion (hereinafter, simply referred to as a right outer decorative material 110B) includes the hooking tool 111 on the flat lower surface 110a similarly to the inner decorative material 110A as illustrated in FIGS. 2 and 7. The right outer decorative material 110B is supported by the support member 80 in a detachable manner by causing the lower surface 110a to abut on an upper end face of the rib part 82 arranged in the support member 80, and engaging the hooking tool 111 with the respective rib projections 82b between the rib part 82 on the indoor side and the intermediate rib part 82. A dimension of the right outer decorative material 110B along the depth direction is configured to be substantially equal to a distance from the lower track 17 of the inner lower frame part 40 to the rib part 82 positioned on the most outdoor side of the support member 80. Due to this, an end face 110b facing the outdoor side of the right outer decorative material 110B and an end face 80a facing the outdoor side of the support member 80 are positioned on substantially the same plane. The portion positioned on the indoor side of the right outer decorative material 110B reaches a position being in substantially contact with the lower track 17, and the lower surface 110a thereof is supported by the upper outer engagement fin part 45 arranged in the inner lower frame part 40. A design of projections and depressions is configured on an upper part of the right outer decorative material 110B.

[0053] In the left side portion, the decorative material arranged at a portion closer to the outdoor side than the lower track 17 (hereinafter, simply referred to as a left outer decorative material 110C) includes the hooking tool 111 on a flat lower surface similarly to the right outer decorative material 110B as illustrated in FIGS. 3 and 7. The left outer decorative material 110C is supported by the support member 80 in a detachable manner by causing the lower surface 110a to abut on an upper end face of the rib part 82 arranged in the support member 80, and engaging the hooking tool 111 with each rib projection 82b between the rib part 82 on the indoor side and the intermediate rib part 82. A dimension along the depth direction of the left outer decorative material 110C is configured to be substantially equal to a distance from the lower track 17 of the inner lower frame part 40 to an intermediate part of the outer connecting member 100. A portion positioned on the indoor side of the left outer decorative material 110C reaches a position being in substantially contact with the lower track 17, and the lower surface 110a thereof is supported by the upper outer engagement fin part 45 arranged in the inner lower frame part 40. A portion positioned on the outdoor side of the left outer decorative material 110C is at a position securing a dimension for mounting the panel 21 for a fixed sash between itself and the panel holding fin part 52 of the outer lower frame part 50, and the lower surface 110a thereof is supported by the outer lower frame part 50 and the intermediate lower frame part 60 via a setting block 120 described later. As is clear from the drawing, an inner tight material 112 mounted on the left outer decorative material 110C is interposed between the left outer decorative material 110C and a surface facing the indoor side of the panel 21 for a fixed sash. A design of projections and depressions is provided also on an upper part of the left outer decorative material 110C.

[0054] For the intermediate lower frame part 60 and the outer lower frame part 50 connected with each other via the outer connecting member 100, as illustrated in FIGS. 2 and 3, and FIGS. 5 to 7, the setting block 120 and an insertion member 130 are arranged at a portion between the panel holding fin part 52 and the support member 80, and a covering member 140 is arranged only in the right side portion.

[0055] The setting block 120 is a member having a rectangular parallelepiped shape for supporting a lower surface of the panel 21 for a fixed sash, and is formed with resin having an insulating property equal to or larger than the insulating property of the outer connecting member 100. Although not clearly illustrated in the drawing, in this fitting, setting blocks 120 having the same shape are arranged at a plurality of positions along the longitudinal direction. Each setting block 120 is opposed to a hole for drainage (drainage channel) 52a arranged in the panel holding fin part 52, and a portion thereof positioned on the outdoor side abuts on the panel holding fin part 52. A portion positioned on the indoor side of the setting block 120 is placed only on the outer engagement fin part 62 of the intermediate lower frame part 60. A drain hole (drainage channel) 121 is formed on the lower surface of each setting block 120 along the depth direction. The drain hole 121 is provided by providing a notch penetrating the setting block 120 from an end face facing the indoor side to an end face facing the outdoor side. Although not clearly illustrated in the drawing, a recessed part 122 for avoiding contact with the outer connecting member 100 is formed at a portion corresponding to the outer connecting member 100 on the lower surface of the setting block 120.

[0056] The insertion member 130 has a rectangular parallelepiped shape having a dimension along the vertical direction slightly smaller than that of the setting block 120, and a dimension along the depth direction larger than that of the setting block 120. The insertion member 130 is made of resin having an insulating property equal to or larger than the insulating property of the outer connecting member 100. The insertion member 130 is arranged for reducing a capacity of a space 131 surrounded by the outer lower frame part 50, the outer connecting member 100, the intermediate lower frame part 60, the

support member 80, the left outer decorative material 110C, the panel 21 for a fixed sash, and the covering member 140 described later, and is arranged at a portion between the setting blocks 120.

[0057] The covering member 140 is obtained by integrally forming a leg part 141 and an upper surface part 142. In the present embodiment, applied is the covering member 140 constituted of an extruded shape material formed with aluminum alloy.

[0058] The leg part 141 includes a plate-shaped leg base plate 141a extending along the vertical direction, and a leg supporting plate 141b extending toward the indoor side from a portion on a slightly upper side than a lower end of the leg base plate 141a. A dimension of the leg base plate 141a along the vertical direction is set to be higher than the panel holding fin part 52. A lower end edge of the leg base plate 141a is bent toward the outdoor side. An opening for drainage 141c is arranged at a portion of the leg base plate 141a on an upper side than the leg supporting plate 141b. Openings for drainage 141c penetrate the leg base plate 141a in the depth direction, and are arranged at a plurality of positions along the longitudinal direction, although not illustrated in the drawing. A drain valve 143 is mounted on each opening for drainage 141c. The drain valve 143 allows water to pass through only from the indoor side toward the outdoor side.

[0059] The upper surface part 142 has a hollow thick-plate shape extending from the upper end of the leg base plate 141a toward the outdoor side. The upper surface part 142 is configured to have a dimension such that, when an extended end edge of the leg supporting plate 141b arranged on the leg part 141 is brought into contact with the upper inner engagement fin part 65 of the intermediate lower frame part 60, a portion positioned on the outdoor side can be brought into contact with the panel holding fin part 52 of the outer lower frame part 50. Specifically, in the present embodiment, dimensions are set so that inclination of an upper surface 142a of the upper surface part 142 is the same as that of an upper surface 57a of the draining fin part 57, and the upper surface 142a of the upper surface part 142 is continuous to the upper surface 57a of the draining fin part 57. A support rib 142b and an engagement projection 142c are arranged at a portion positioned on the outdoor side of the upper surface part 142. The support rib 142b is a portion to be brought into contact with the cover supporting fin part 56 of the panel holding fin part 52, and extends vertically downward from a lower edge of a portion positioned on the outdoor side of the upper surface part 142. The engagement projection 142c is engaged with the tight material mounting groove 55 of the panel holding fin part 52 to limit vertical movement of the upper surface part 142, and projects toward the outdoor side from an end face facing the outdoor side of the upper surface part 142. As is clear from the drawing, a lower surface 142d of the upper surface part 142 is not in contact with any of an upper surface 120a of the setting block 120 and an upper surface 130a of the insertion member 130.

[0060] The covering member 140 having the configuration described above is arranged between the intermediate lower frame part 60 and the outer lower frame part 50 by being brought into contact with the upper surface 61a of the main body part 61 via the leg part 141, and engaging a portion positioned on the outdoor side of the upper surface part 142 with the panel holding fin part 52. In this state, the setting block 120, the insertion member 130, and the outer connecting member 100 are covered from the panel holding fin part 52 to a portion closer to the bottom rail 33 of the movable sash 30. As illustrated in FIG. 5, in the present embodiment, the same number of notches for drainage 82a of the support member 80, drain valves 143 of the leg part 141, and the setting blocks 120 are arranged at the same pitch to be portions corresponding to each other in the depth direction.

[0061] In the fitting configured as described above, the inner lower frame part 40 arranged on the indoor side and the outer lower frame part 50 arranged on the outdoor side are arranged in parallel in a separated state, and the connecting members 90 and 100 having an insulating property are interposed therebetween. Thus, influence of outside air on the inner lower frame part 40 can be reduced. Additionally, the intermediate lower frame part 60 is arranged between the inner lower frame part 40 and the outer lower frame part 50, and the inner connecting member 90 and the outer connecting member 100 having an insulating property are interposed between the intermediate lower frame part 60 and the inner lower frame part 40, and between the intermediate lower frame part 60 and the outer lower frame part 50, respectively. Thus, to improve quality of external appearance, even in a case of covering a portion from the track 17 to the fixed sash 20 on the outdoor side with the left outer decorative material 110C, the intermediate lower frame part 60 arranged on the indoor side can be caused to be opposed to the left outer decorative material 110C. Thus, even when an outdoor temperature is lower than an indoor temperature, for example, the left outer decorative material 110C is hardly influenced by the outside air, and water condensation can be prevented from occurring on the left outer decorative material 110C. Specifically, in the present embodiment, the insertion member 130 is arranged in the space 131 surrounded by the outer lower frame part 50, the outer connecting member 100, the intermediate lower frame part 60, the support member 80, the left outer decorative material 110C, the panel 21 for a fixed sash, and the covering member 140 described later, so that convection in the space 131 can be suppressed, and the insulation effect described above becomes obvious.

[0062] The support member 80 is arranged to be in intimate contact with the upper surface of the inner connecting member 90 between the inner connecting member 90 and the decorative materials 110B and 110C. Thus, even in a case in which water such as rainwater adhering to the surface facing the outdoor side of the

movable sash 30 drips onto the lower frame 12, the water can be prevented from adhering to the inner connecting member 90, and early deterioration of the inner connecting member 90 can be prevented. Additionally, a portion of the support member 80 to be in contact with the decorative materials 110B and 110C is limited to a distal end part of the rib part 82, so that the entire lower surface 110a of the decorative materials 110B and 110C can be prevented from getting wet when water enters a space between the support member 80 and the decorative materials 110B and 110C, and deterioration of the decorative materials 110B and 110C caused by adhesion of water can be prevented. The water entered the upper surface of the support member 80 is guided to the outdoor side without being retained due to inclination of the base part 81 and an operation of the notch for drainage 82a arranged in the rib part 82, and is discharged to the outside at an early stage through the drain valve 143 and the drain hole 121 of the setting block 120.

[0063] In the above embodiment, a single sliding window is exemplified. However, the present invention can also be applied to a double sliding window having a configuration in which an outer plate member on the outdoor side is movable.

[0064] According to the present invention, the lower frame includes the inner lower frame part, the outer lower frame part, and the intermediate lower frame part that are separated from each other, and the respective connecting members having an insulating property is interposed between the intermediate lower frame part and the inner lower frame part, and between the intermediate lower frame part and the outer lower frame part. Thus, in a case of covering a portion from the track to the fixed plate member on the outdoor side with the decorative material, the intermediate lower frame part arranged on the indoor side can be caused to be opposed to the decorative material, and water condensation can be prevented from occurring on the decorative material.

[0065] According to the present invention, the opening of the injection groove is blocked with the support member at the time before foaming of the resin having a foaming property is completed, so that the connecting member can be brought into intimate contact with the support member without complicated processing, and water can be easily prevented from entering a space therebetween. Thus, in a case in which water such as rainwater drips onto the lower frame, the water can be prevented from adhering to the connecting member, and early deterioration of the connecting member can be prevented.

[0066] Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

Claims

1. A fitting comprising:

a frame body (10) including a lower frame (12) provided with a track (17);
a fixed plate member (20) arranged on an outdoor side of the frame body (10), the fixed plate member (20) including a panel (21) having a lower edge part supported by the lower frame (12); and
a movable plate member (30) arranged on an indoor side of the frame body (10), the movable plate member (30) being slidable in a longitudinal direction of the lower frame (12) along the track (17), wherein
the lower frame (12) includes an inner lower frame part (40) on which the track (17) is arranged, an outer lower frame part (50) supporting a surface facing an outdoor side of the panel (21), and an intermediate lower frame part (60) positioned between the inner lower frame part (40) and the outer lower frame part (50),
a covering member (140) is arranged at a portion of the lower frame (12) closer to an outdoor side of the fitting than the movable plate member (30), the covering member (140) including an upper surface part (142) covering a portion between the outer lower frame part (50) and the movable plate member (30) and a leg part (141) that extends downward from the upper surface part (142) and is supported by the intermediate lower frame part (60), and
the intermediate lower frame part (60) and the inner lower frame part (40) are separated from each other and an inner connecting member (90) having an insulating property is interposed between the intermediate lower frame part (60) and the inner lower frame part (40), and the intermediate lower frame part (60) and the outer lower frame part (50) are separated from each other and an outer connecting member (100) having an insulating property is interposed between the intermediate lower frame part (60) and the outer lower frame part (50).

2. The fitting according to claim 1, wherein a decorative material (110) is arranged on an upper surface positioned on an indoor side of the lower frame (12).

3. The fitting according to claim 2, wherein
a support member (80) having an insulating property is interposed between the decorative material (110) and the inner connecting member (90), the support member (80) is arranged to connect between an upper end of the intermediate lower frame part (60) and an upper end of the inner lower frame part (40), and the inner connecting member (90) is in intimate con-

tact with a lower surface of the support member (80).

4. The fitting according to claim 3, wherein
the inner lower frame part (40) includes a first engagement receiving part (45a),
the intermediate lower frame part (50) includes a second engagement receiving part (68), and
the support member (80) includes a first engaging part (84) to be engaged with the inner lower frame part (40) via the first engagement receiving part (45a) and a second engaging part (83) to be engaged with the intermediate lower frame part (60) via the second engagement receiving part (68).

5. The fitting according to claim 3, wherein
the support member (80) includes a base part (81) arranged across the inner lower frame part (40) and the intermediate lower frame part (60), and a plurality of rib parts (82) extending upward from positions separated from each other on an upper surface (81a) of the base part (81), and
the decorative material (110) is supported by the support member (80) via upper ends of the rib parts (82).

6. The fitting according to claim 5, wherein
an outdoor side of the upper surface (81a) of the base part (81) is lower than an indoor side of the upper surface (81a) of the base part (81), and
each rib part (82) includes a notch for drainage (82a).

7. The fitting according to claim 6, wherein an opening for drainage (141c) is arranged at the leg part (141) of the covering member (140), a drain valve (143) is arranged in the opening for drainage (143), and a drainage channel (52a,121) for draining water that has passed through the drain valve (143) to an outside is arranged between the leg part (141) and the outer lower frame part (50).

8. The fitting according to claim 7, wherein setting blocks (120) supporting a lower surface of the panel (21) are arranged at a plurality of positions in a space provided between the leg part (141) of the covering member (140) and the outer lower frame part (50), an insertion member (130) having an insulating property equal to or larger than the insulating property of the outer connecting member (100) is arranged at a portion across the intermediate lower frame part (60) and the outer lower frame part (50) between the setting blocks (120), and the drainage channel (52a,121) includes a drain hole (121) provided by making a notch penetrating the setting block (120) along a depth direction.

9. A fitting comprising:

a frame body (10) including a lower frame (12) provided with a track (17);
an outer plate member (20) arranged on an outdoor side of the frame body (10); and
an inner plate member (30) arranged on an indoor side of the frame body (10), the inner plate member (30) being slidable in a longitudinal direction of the lower frame (12) along the track (17), wherein
the lower frame (12) includes an inner lower frame part (40) on which the track (17) is arranged, an outer lower frame part (50) supporting the outer plate member (20), and an intermediate lower frame part (60) positioned between the inner lower frame part (40) and the outer lower frame part (50), and
the intermediate lower frame part (60) and the inner lower frame part (40) are separated from each other and an inner connecting member (90) having an insulating property is interposed between the intermediate lower frame part (60) and the inner lower frame part (40), and the intermediate lower frame part (60) and the outer lower frame part (50) are separated from each other and an outer connecting member (100) having an insulating property is interposed between the intermediate lower frame part (60) and the outer lower frame part (50).

10. A method of manufacturing a frame member, the frame member comprising two frame constituent parts (40,50,60) arranged in parallel in a state of being separated from each other, and a connecting member (90,100) having an insulating property, the connecting member (90,100) being interposed between the frame constituent parts (40,50,60), the method comprising:

forming a frame material in which the two frame constituent parts (40,50,60) are connected with each other via a connecting wall part (2,3) in a state of being arranged in parallel with each other, and an injection groove (4,5) is arranged between the frame constituent parts (40,50,60), the connecting wall part (2,3) defining a bottom wall of the injection groove (4,5);
injecting liquid resin having an insulating property and a foaming property into the injection groove (4,5) as a raw material of the connecting member (90,100);
blocking an opening of the injection groove (4,5) at the time before foaming of the resin is completed by engaging a support member (80) having an insulating property with each of the two frame constituent parts (40,50,60); and
dividing the connecting wall part (2,3) after the connecting member (90,100) is formed with the resin.

FIG.1

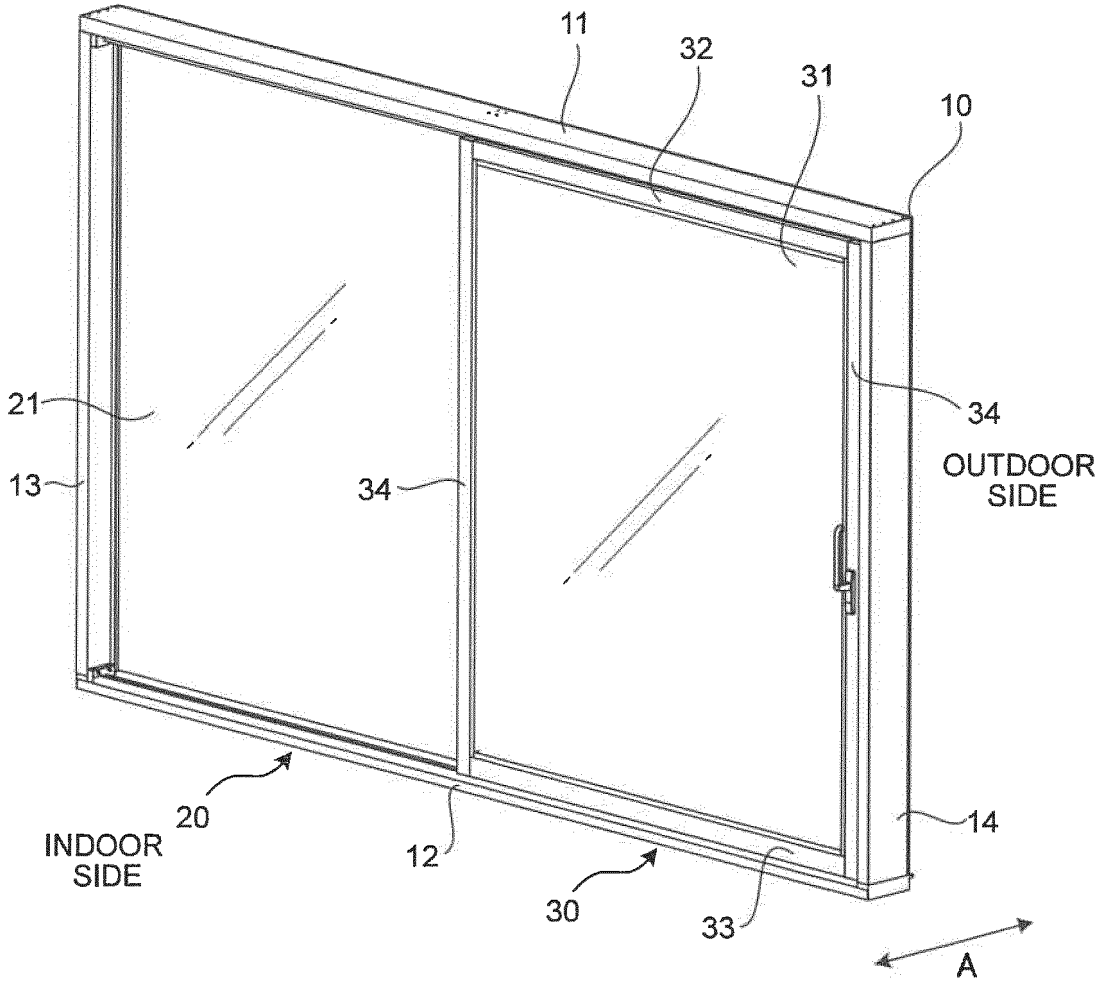
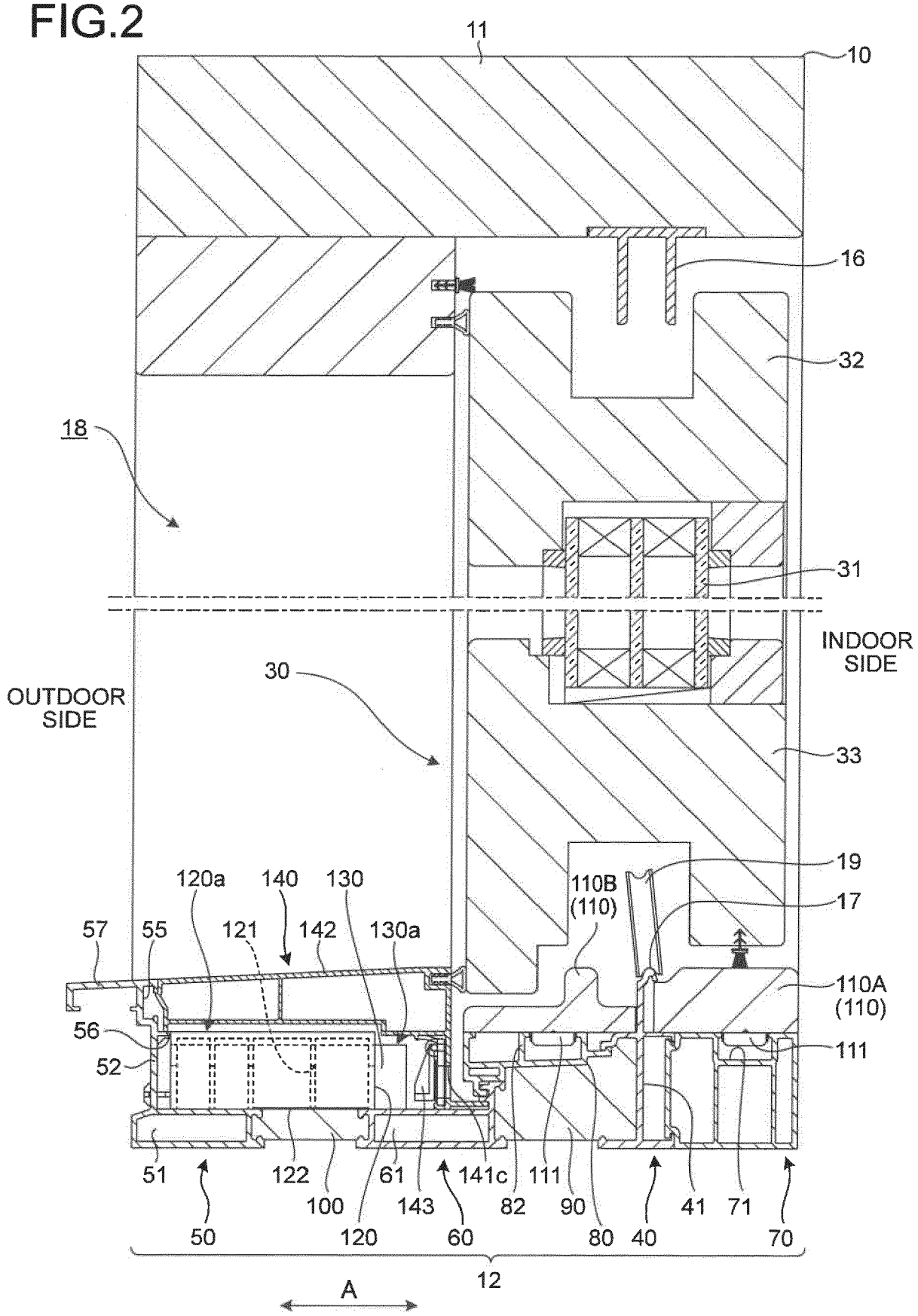


FIG.2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32
18
31
INDOOR SIDE
OUTDOOR SIDE
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33
19
17
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110A (110)
111
120a
140
130
57
55
121
142
130a
56
52
51
122
100
61
143
141c
82
111
90
41
71
50
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60
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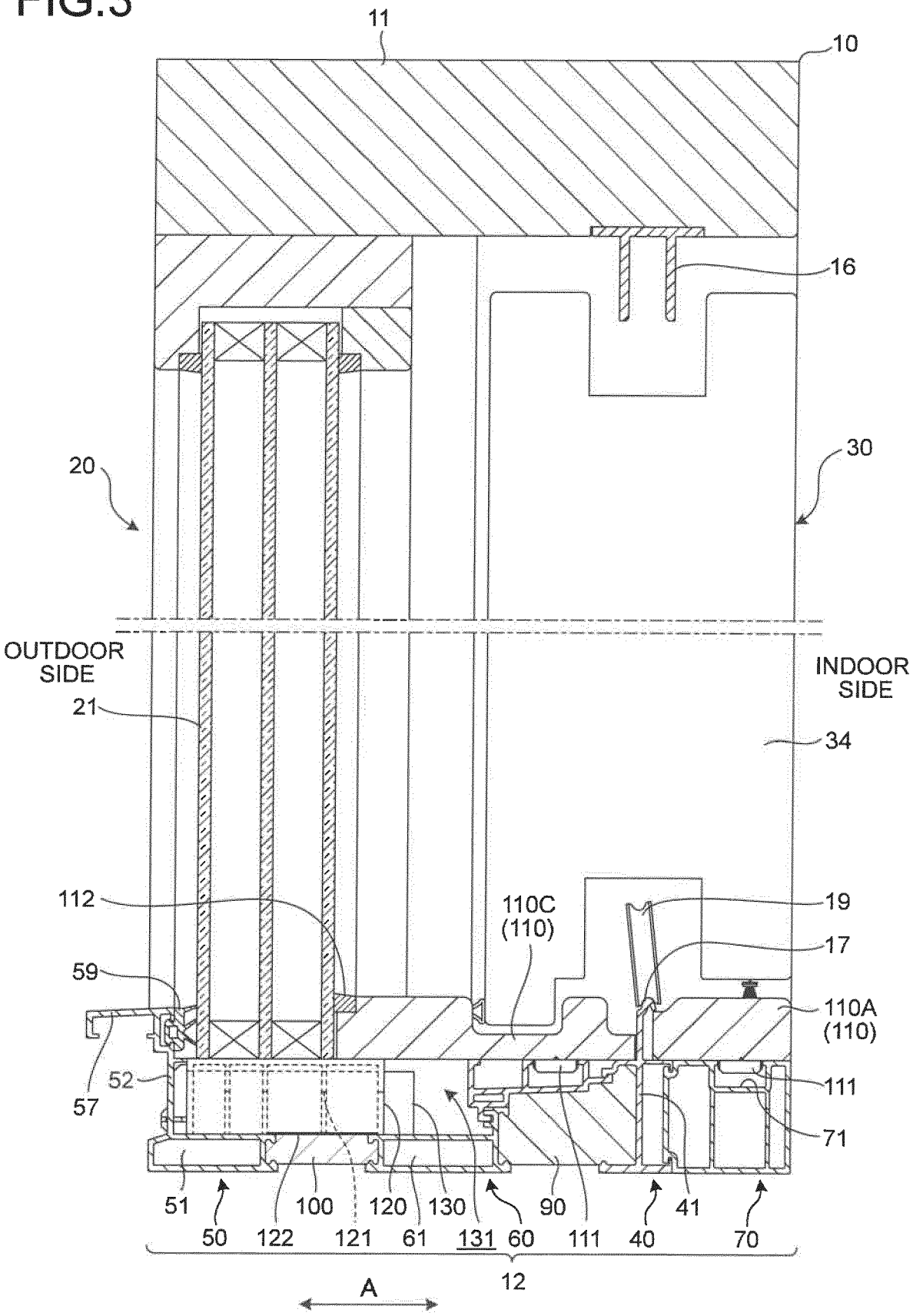
40
70
12
A

FIG.3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110A (110)
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111
57
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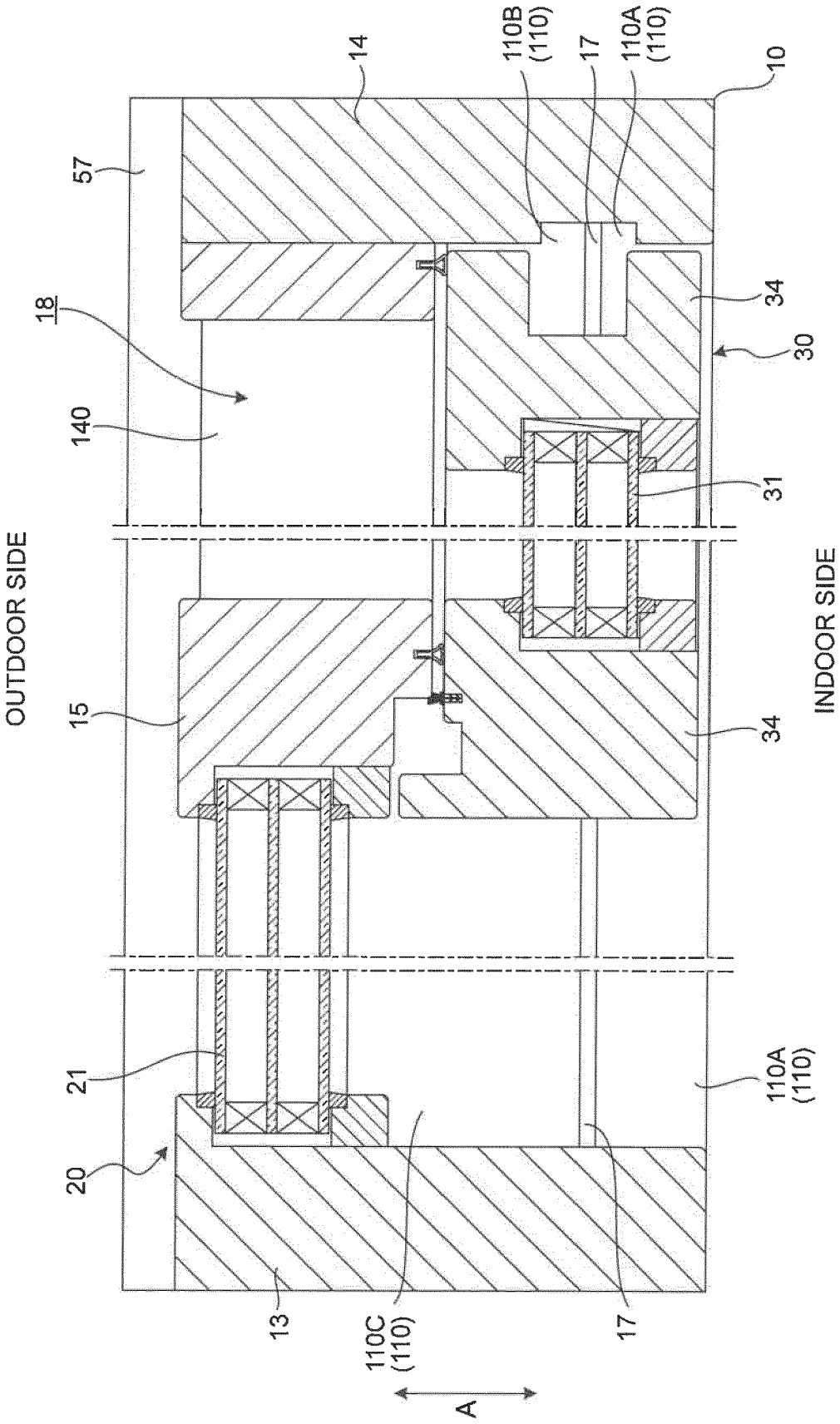
12
A

FIG.4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INDOOR SIDE
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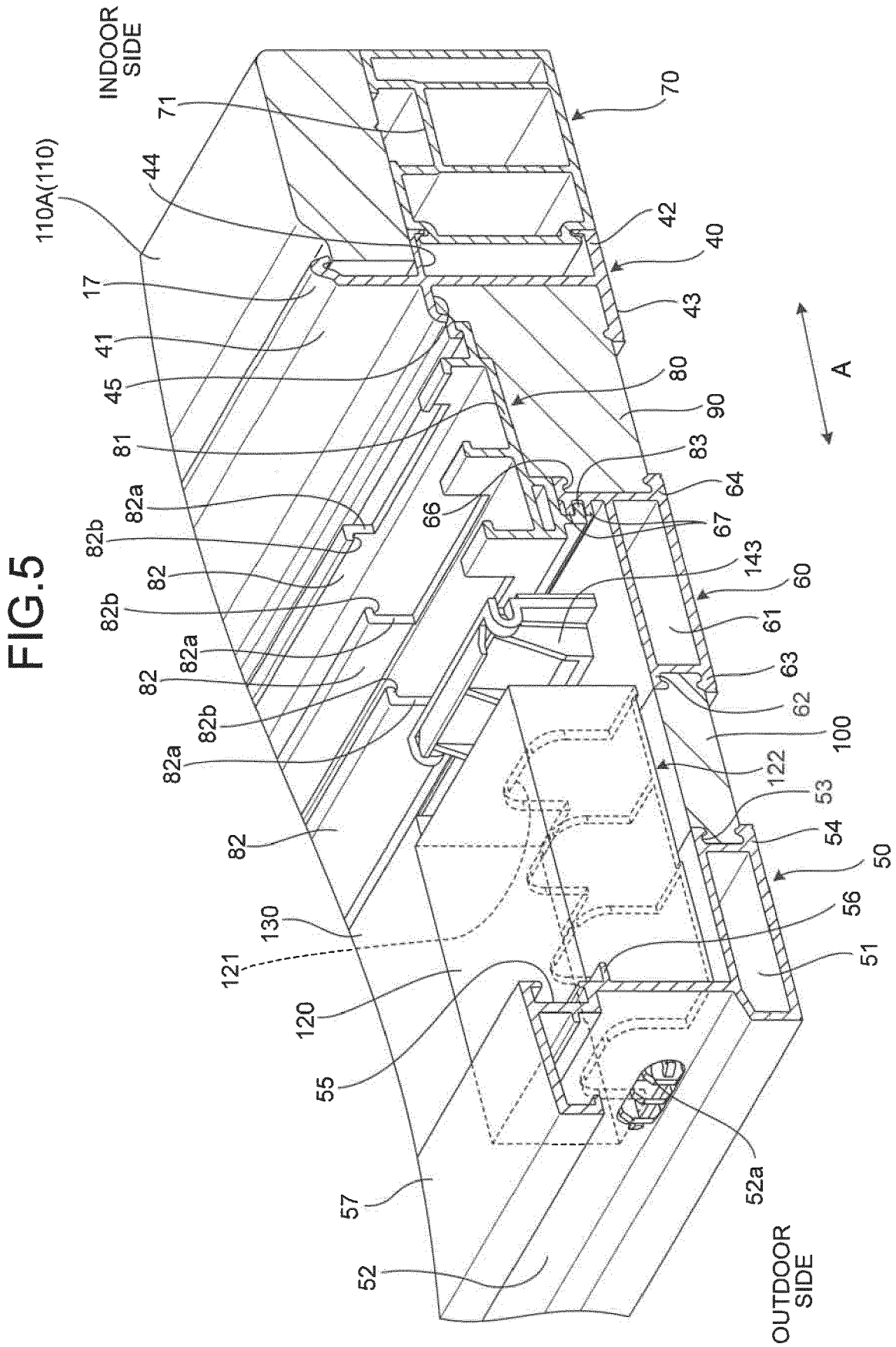
13
110C (110)
17
A

FIG.5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51
130
121
120
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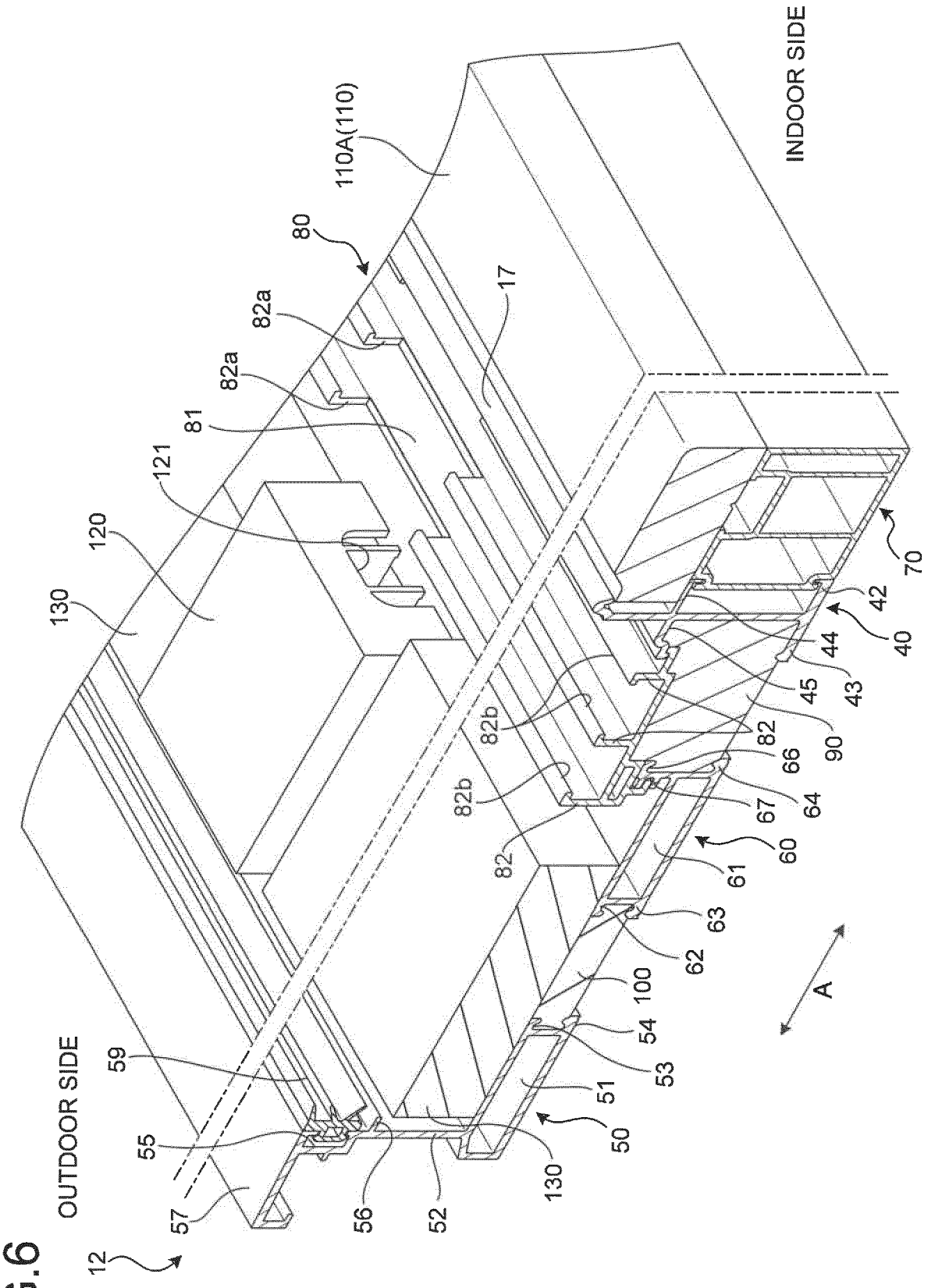
57
52
52a

FIG.6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INDOOR SIDE
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66
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82
82b
82
82b
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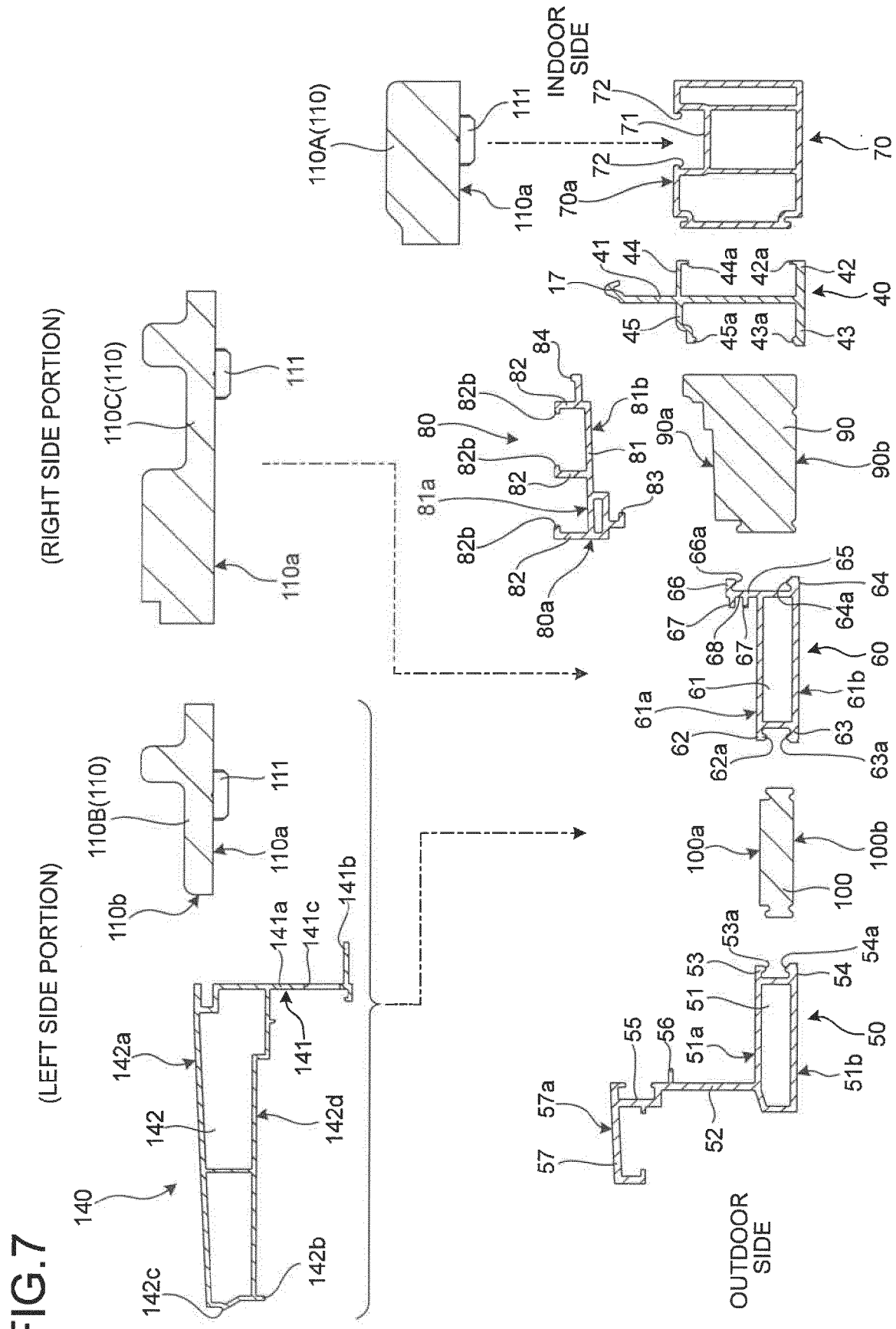
81
82a
82a
80
110A(110)
17

FIG.7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(RIGHT SIDE PORTION)
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141a
141c
141b
141
142a
142
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142b
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62a
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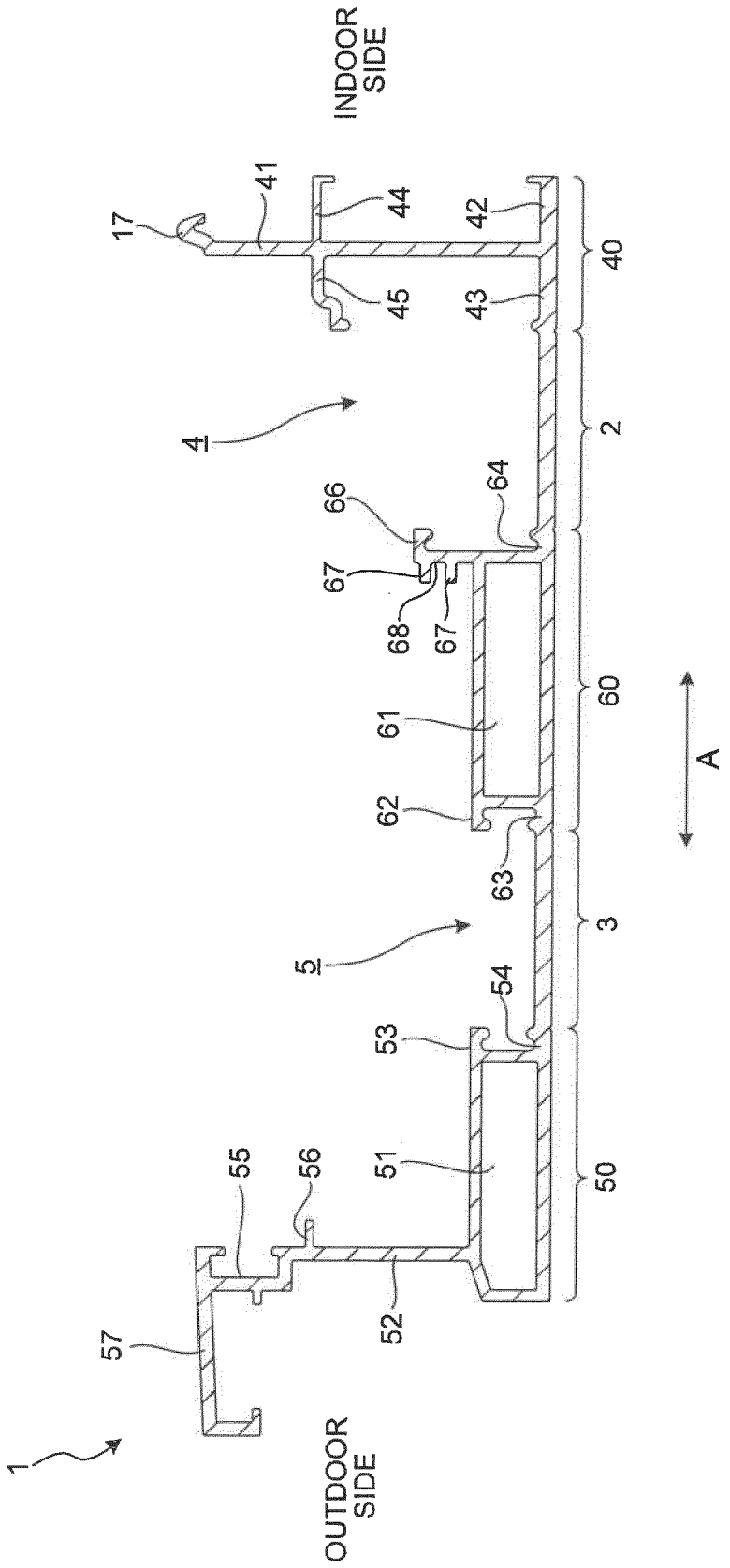
63a
64
64a
65
66
66a
67
68
50
51
51a
51b
52
53
53a
54
54a
55
56
57
57a
100
100a
100b

FIG.8


INDOOR SIDE
OUTDOOR SIDE
17
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44
42
45
43
40
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2
66
64
67
68
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62
63
A
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3
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53
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52
1

FIG.9C

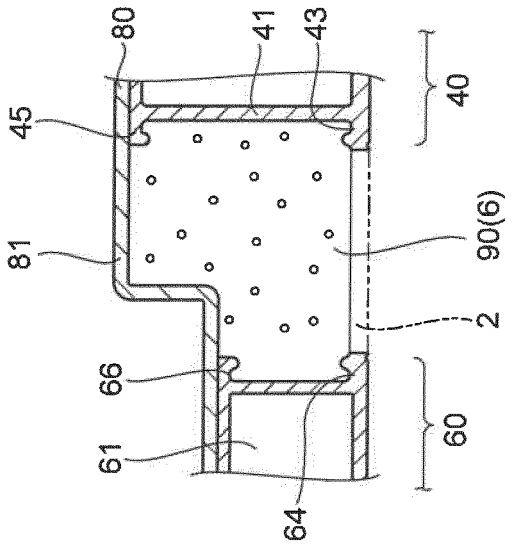


FIG.9B

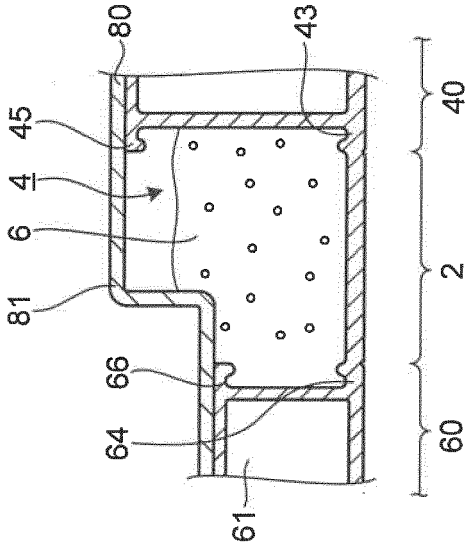
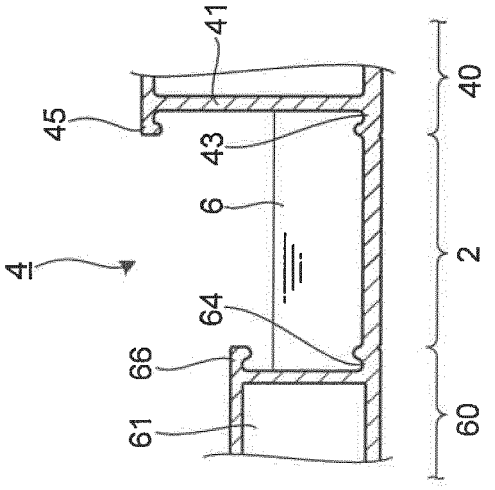


FIG.9A



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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
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