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(54) **Title:** PLANK INSTALLATION SYSTEM AND METHOD

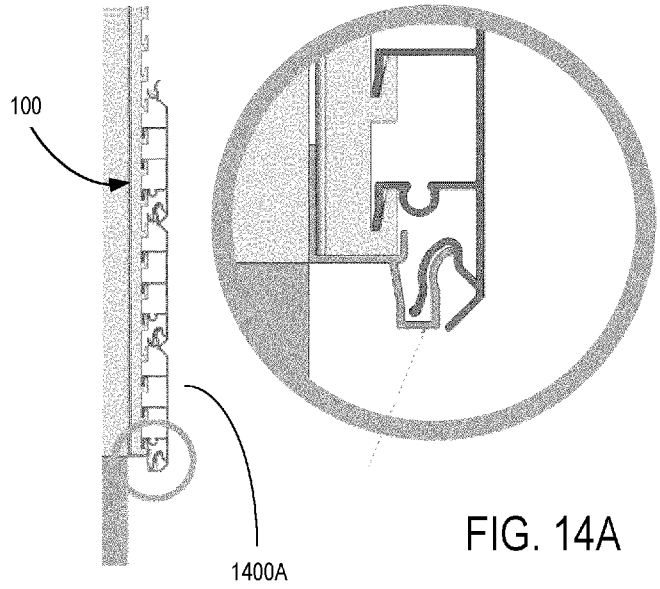

FIG. 14A

(57) **Abstract:** There is disclosed an improved plank installation system and method. In an embodiment, the system comprises a mounting structure having extending mounting hooks; and a plank having extending flanges with latches or clasping members corresponding to the positions of the plurality of extending mounting hooks on the mounting structure, The latches or clasping members of the extending flanges are adapted to interconnect with one or more of the plurality of extending mounting hooks on the mounting structure; whereby the plank is securely mountable to the mounting structure by an interconnection between the latches or clasping members, and the plurality of extending mounting hooks.

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PLANK INSTALLATION SYSTEM AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Serial No. 62/965,133 filed on January 23, 2020.

FIELD

[0002] The present disclosure relates to an improved plank installation system and method for cladding the exterior of buildings and architectural structures, such as walls, roofing, fencing, and patios.

BACKGROUND

[0003] Planks are commonly used to clad the exterior of buildings. Typically, installation requires fixing the plank on an exterior wall using fasteners such as nails or screws to hold the plank against the exterior wall. In some cases, the planks have interlocking features such that installation of a first row of planks allows installation of adjacent rows applies or siding using the interlocking features. However, conventional methods of plank installation can be time-consuming, and require careful measurement to install properly. Installation may also require additional personnel in order to do properly.

[0004] What is needed is an improved plank installation system and method for cladding the exterior of buildings which overcomes at least some of the drawbacks and limitations of conventional installation methods.

SUMMARY

[0005] The present disclosure relates to an improved plank installation system and method which utilizes mounting structures or hanger posts for all types of planks, such as siding, panels or other types of cladding or covering, and which provides a plurality of regularly positioned or continuously repeating protrusions or extending mounting hooks to receive corresponding features provided on the insulation or inner side of the plank, panel or cladding. Hereinafter, all references to mounting structures is understood to include mounting structures or hanger posts as

disclosed herein for any types of planks, such as siding, panels or other types of cladding or covering.

[0006] In an embodiment, the mounting structures comprise a generally U-shaped channel with each extending side of the U-shaped channel providing the regularly positioned, continuously repeating protrusions or extending mounting hooks.

[0007] The regularly positioned continuously repeating protrusions or extending mounting hooks are oriented such that, when installing panels or planks on a vertical wall, or an angled surface such as a roof, gravity causes the planks to naturally stay in position on the extending mounting hooks.

[0008] In another embodiment, the mounting structures include interlocking features which allow adjacent rows of the planks to interlock once installed on the mounting structures.

[0009] In an embodiment, the interlocking features provided on the planks comprise a receiving slot provided on the bottom of each plank, and a corresponding extending flange which is provided along the top of each plank. When installed, the receiving slot of a first row of planks receives an extending flange of planks install below it. Once a plurality of rows are installed, each row of plank helps keep all of the adjacent rows of plank to remain securely in position on the mounting structures.

[0010] In another embodiment, each plank has a plurality of protruding flanges, each having a latch or hook oriented oppositely to the regularly positioned continuously repeating protrusions or extending mounting hooks on the mounting structures. When installed, each of the plurality of protruding flanges engages a corresponding extending mounting hooks on the mounting structures.

[0011] In another embodiment, the receiving slot provided on the bottom of each plank, and corresponding extending flange which is provided along the top of each plank interlock in such a manner so as to prevent moisture from entering between adjacent installed rows of planks.

[0012] In another embodiment, when cladding an exterior vertical wall with planks, the mounting structures are oriented vertically with the extending mounting hooks pointing upwards.

[0013] In another embodiment, when cladding angled roofing with planks, the mounting structures are oriented perpendicularly to the planks with the extending mounting hooks pointing upwards.

[0014] In another embodiment, when cladding a wall or fencing with lengths of planks oriented vertically, the mounting structures are oriented horizontally, such that the extending mounting hooks all point to one side of the structure. Thus, it is not necessary for the mounting structures to be installed vertically for installation to be performed.

[0015] In another embodiment, when cladding a flat surface such as the surface of a patio deck with lengths of planks, the mounting structures are oriented in any desired direction which is perpendicular to the planks, such that the extending mounting hooks all point to one side of the patio deck. Thus, it is not necessary for the mounting structures to be installed in any particular direction on a flat horizontal surface, as long as the direction remains consistent for all extending mounting hooks.

[0016] In another embodiment, the mounting structures are installed at regularly spaced intervals, and parallel to each other. The interval spacing may be selected so as to provide adequate support for the plank upon installation.

[0017] Advantageously, the present plank installation system and method does not require any fasteners, and the interlocking features between adjacent rows of installed planks prevents moisture from entering and damaging the clotted surface of buildings and architectural structures.

[0018] Furthermore, installation is greatly simplified, as once the mounting structures are properly oriented and installed, installation of the planks or cladding requires only one person.

[0019] Additional features and advantages of the present plank insulation system and method is described in more detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1A shows a photograph of a mounting structure in accordance with an embodiment.

[0021] FIG. 1B shows an illustrative profile diagram of the mounting structure of FIG. 1A.

[0022] FIG. 2A shows a photograph of a plank installed on a vertically oriented wall in accordance with an embodiment.

[0023] FIG. 2B shows an illustrative profile diagram of the plank of FIG. 2A.

[0024] FIG. 3A shows a photograph of a plank installed on a vertically oriented wall in accordance with another embodiment.

[0025] FIG. 3B shows an illustrative profile diagram of the plank of FIG. 2A.

[0026] FIG. 4A shows a photograph of a plank installed on a vertically oriented wall in accordance with another embodiment.

[0027] FIG. 4B shows an illustrative profile diagram of the plank of FIG. 4A.

[0028] FIG. 5A shows a photograph of a plank installed on a vertically oriented wall in accordance with yet another embodiment.

[0029] FIG. 5B shows an illustrative profile diagram of the plank of FIG. 4A.

[0030] FIG. 6A shows a photograph of a plank installed on a vertically oriented wall in accordance with still another embodiment.

[0031] FIG. 6B shows an illustrative profile diagram of the plank of FIG. 6A.

[0032] FIG. 7 shows an illustrative diagram of various different plank installation applications, including outer walls, roofing, parapet walls, and fencing.

[0033] FIG. 8 shows a more detailed diagram of roofing installation applications, in which planks are installed horizontally on an angled roof.

[0034] FIG. 9 shows an illustrative example of a parapet wall installation, in which planks are installed horizontally, using a plurality of evenly spaced, mounting structures.

[0035] FIG. 10 shows an illustrative example of a fending installation, in which planks are installed vertically, using a plurality of evenly spaced, mounting structures which are now installed horizontally.

[0036] FIG. 11 shows an illustrative example of an installation of planks on a high rise structure, such as a multi-level building.

[0037] FIG. 12 shows an illustrative example of installation on a high rise structure, in which the planks comprise solar panels which may be installed using extending flanges corresponding to the extending flanges provided on the back of the planks.

[0038] FIGS. 13A to 13C show illustrative alternative designs for the mounting structure for receiving corresponding interlocking clasping members for hanging a plank or panel.

[0039] FIGS. 14A and 14B show illustrative designs for a horizontal mounting base for receiving a mounting structure thereon.

[0040] FIGS. 15A to 15G show an illustrative example of an installation process for multiple planks in a vertical wall cladding installation.

[0041] FIGS. 16A and 16B show an example of a slideable mounting structure in an alternative embodiment.

[0042] FIGS. 17A to 17H show an illustrative example of an installation process for fiber cement LAP siding in accordance with an embodiment.

[0043] FIGS. 18A to 18J show illustrative examples various installation adapters for installing larger sizes of cement panels in accordance with various embodiments.

[0044] FIG. 19A to 19G show an illustrative example of an installation process for solar panels in accordance with an embodiment.

[0045] FIG. 20 shows examples of other mounting structures in accordance with various embodiments.

[0046] FIG. 21 shows examples of mounting structures having an integrated thermal break in accordance with various embodiments.

[0047] FIG. 22A to 22F show examples of mounting structures having an integrated thermal break in accordance with various embodiments.

[0048] FIGS. 23A and 23B show an example of mounting asphalt roofing in accordance with an embodiment.

[0049] FIGS. 24A and 24B show an example of mounting corrugated metal roofing in accordance with an embodiment.

[0050] FIGS. 25A and 25B show an example of mounting corrugated metal siding mounted horizontally in accordance with an embodiment.

[0051] FIGS. 26A and 26B show an example of mounting corrugated metal siding mounted vertically in accordance with an embodiment.

[0052] FIGS. 27A and 27B show an example of mounting a composite decking plank having a clasping base attached thereto in accordance with an embodiment.

[0053] FIGS. 28A and 28B show an example of mounting a composite decking plank having a clasping based embedded therein in accordance with an embodiment.

[0054] FIGS. 29A and 29B show an example of mounting an extruded composite decking plank having a clasping base integrally formed therein in accordance with an embodiment.

[0055] FIGS. 30A and 30B show an example of mounting an engineered wood panel siding in accordance with an embodiment.

[0056] FIGS. 31A and 31B show an example of mounting composite LAP siding in accordance with an embodiment.

[0057] FIGS. 32A and 32B show an example of mounting another type of engineered wood panel siding in accordance with an embodiment.

[0058] FIGS. 33A and 33B show an example of mounting fiber cement LAP siding in accordance with an embodiment.

[0059] FIGS. 34A and 34B show an example of mounting another type of fiber cement LAP siding in accordance with an embodiment.

[0060] FIGS. 35A and 35B show an example of LAP wood siding in accordance with an embodiment.

[0061] FIGS. 36A and 36B show an example of vinyl siding in accordance with an embodiment.

[0062] FIGS. 37A and 37B show an example of foam filled vinyl siding in accordance with an embodiment.

[0063] FIGS. 38A and 38B show an example of insulated vinyl siding in accordance with an embodiment.

DETAILED DESCRIPTION

[0064] As noted above, the present disclosure relates to a plank installation system and method which utilizes mounting structures which provide a plurality of regularly positioned continuously repeating protrusions or extending mounting hooks to receive corresponding features provided on the insulation side of the plank.

[0065] In an embodiment, the mounting structures comprise a generally U-shaped channel with each extending side of the U-shaped channel providing the regularly positioned continuously repeating protrusions or extending mounting hooks.

[0066] The regularly positioned continuously repeating protrusions or extending mounting hooks are oriented such that, when installing panels or planks on a vertical wall, or an angled surface such as a roof, gravity causes the planks to naturally stay in position on the extending mounting hooks.

[0067] In another embodiment, the mounting structures include interlocking features which allow adjacent rows of the planks to interlock once installed on the mounting structures.

[0068] In an embodiment, the interlocking features provided on the planks comprise a receiving slot provided on the bottom of each plank, and a corresponding extending flange which is provided along the top of each plank. When installed, the receiving slot or channel of a first row of planks receives an extending flange of planks install below it. Once a plurality of rows are installed, each row of plank helps keep all of the adjacent rows of plank to remain securely in position on the mounting structures.

[0069] In another embodiment, each plank has a plurality of protruding flanges, each having a latch or hook oriented oppositely to the regularly positioned continuously repeating protrusions or extending mounting hooks on the mounting structures. When installed, each of the plurality of protruding flanges engages a corresponding extending mounting hooks on the mounting structures.

[0070] In another embodiment, the receiving slot provided on the bottom of each plank, and corresponding extending flange which is provided along the top of each plank interlock in such a manner so as to prevent moisture from entering between adjacent installed rows of planks.

[0071] In another embodiment, when cladding an exterior vertical wall with planks, the mounting structures are oriented vertically with the extending mounting hooks pointing upwards.

[0072] In another embodiment, when cladding angled roofing with planks, the mounting structures are oriented perpendicularly to the planks with the extending mounting hooks pointing upwards.

[0073] In another embodiment, when cladding a wall or fencing with lengths of planks oriented vertically, the mounting structures are oriented horizontally, such that the extending mounting hooks all point to one side of the structure. Thus, it is not necessary for the mounting structures to be installed vertically for installation to be performed.

[0074] In another embodiment, when cladding a flat surface such as the surface of a patio deck with lengths of planks, the mounting structures are oriented in any desired direction which is perpendicular to the planks, such that the extending mounting hooks all point to one side of the patio deck. Thus, it is not necessary for the mounting structures to be installed in any particular direction on a flat horizontal surface, as long as the direction remains consistent for all extending mounting hooks.

[0075] In another embodiment, the mounting structures are installed at regularly spaced intervals, and parallel to each other. The interval spacing may be selected so as to provide adequate support for the plank upon installation.

[0076] Advantageously, the present plank installation system and method does not require any fasteners, and the interlocking features between adjacent rows

of installed planks prevents moisture from entering and damaging the clotted surface of buildings and architectural structures.

[0077] Furthermore, insulation is greatly simplified, as once the mounting structures are properly oriented and installed, installation of the planks or cladding requires only one person.

[0078] Various illustrative embodiments will now be described in more detail with reference to the drawings.

[0079] Now referring to FIG. 1A, shown is a mounting structure 100 in accordance with an embodiment. As illustrated, a plurality of mounting structures 100 are spaced apart and installed vertically on an outer surface of a building wall. In an embodiment, each mounting structure 100 comprises a generally U-shaped channel with each extending side of the U-shaped channel providing the regularly positioned continuously repeating protrusions or extending mounting hooks. The regularly positioned continuously repeating hooks are oriented such that, when installing panels or planks on a vertical wall, or an angled surface such as a roof, gravity causes the planks to naturally stay in position on the extending mounting hooks. However, as will be explained below, in other installation applications, it is not necessary to install the mounting structure 100 vertically. Instead, they may be oriented horizontally if it is desired to mount planks in a vertical orientation, for a fending application for example. It is also possible to install the mounting structure 100 in any direction on a flat surface, such as a patio deck, as long as all of the mounting structures 100 are oriented the same way.

[0080] FIG. 1B shows an illustrative profile diagram of the mounting structure 100 of FIG. 1A. As shown, this profile illustrates a plurality of evenly spaced protrusions or extending mounting hooks 110, which are all oriented in one direction. In this illustrative example, the extending mounting hooks 110 are all angled upwards in FIG. 1B.

[0081] As shown, the extending mounting hooks may have an angled inner profile, which provides an interconnection with corresponding latches or angle brackets on a plank, and allows the plank to be seated securely onto the mounting structure 100. However, as discussed further below, the particular shape of the extending hook is illustrative, and not necessarily limiting. If some of the extending

mounting hooks 110 have broken off, given the redundant mounting features of the planks, they may still be securely mounted to the mounting structure 100.

[0082] Now referring to FIG. 2A, shown is a photograph of a first plank design 200A installed on a vertically oriented wall in accordance with an embodiment. As shown, this first plank 200A is installed in rows such that each row interlocks with an adjacent row above and/or below.

[0083] As shown in FIG. 2B, this first plank has a profile with specific features adapted for installing this plank onto the mounting structure 100 of FIG. 1A and FIG. 1B. These specific features include a plurality of flanges with latches 210A – 210C spaced apart vertically to align with each corresponding extending hook 110 provided in the mounting structure 100, Another feature includes a lower end slot 220 for receiving a top edge of another adjacent plank 200A, or alternatively a horizontal base or trim for finishing the bottom of a wall. Another feature is an upper end slot 230 for receiving a lower edge or wall of an adjacent plank 200A above. As these adjacent planks 200A overlap, they form a continuous moisture barrier which prevents rain and snow from penetrating the formed wall as illustrated in FIG. 2A.

[0084] Thus, the first mounting structure 100 and corresponding planks 200A include interlocking features which allow adjacent rows of the first plank 200A to interlock with an adjacent row, as rows of the first plank 220A are installed on the mounting structures 100 one after another.

[0085] In an embodiment, the interlocking features provided on the first plank 200A comprises a receiving slot provided on the bottom of the first plank, and a corresponding extending flange which is provided along the top of the first plank. When installed, as illustrated in FIG. 2A, the receiving slot of a first row of the first plank receives an extending flange of the row of plank install below it. Once a plurality of rows of the first plank is installed, each row of plank helps keep an adjacent row of plank to remain securely in position on the mounting structures 100 by interlocking with each other, as illustrated in FIG. 2B.

[0086] Still referring to FIG. 2B, the first plank further includes a plurality of protruding flanges, each having a latch or hook oriented oppositely to the regularly positioned continuously repeating protrusions or extending mounting hooks 110 on the mounting structures 100. When installed, each of the plurality of protruding

flanges engages a corresponding extending mounting hooks 110 on the mounting structures 100.

[0087] Now referring to FIG. 3A, shown is a pho second plank 200B installed on a vertically oriented wall in accordance with another embodiment. FIG. 3B shows an illustrative profile diagram of the plank of FIG. 3A. While the profile of the second plank 200B is different in that its outer surface is more angled in comparison to the first plank 200A, the interlocking features provided along the top and bottom edges of the second plank 200B are substantially the same as for the first plank 200A shown in FIG. 2B. Therefore, it will be understood that both the first plank of FIG. 2B and the second plank of FIG. 3B can both use the same mounting structure 100 interchangeably.

[0088] Furthermore, both the first plank 200A and the second plank 200B have the same extending flanges 210A, 210B, 210C with latches or clasping members positioned to engage corresponding extending mounting hooks provided on the mounting structure 100.

[0089] Advantageously, the mounting structure 100 can be common to a number of different plank profiles such that the installation steps for any particular plank profile is identical to any other plank profile.

[0090] Indeed, as the location of the interlocking features provided on the first plank or the second plank are also identical, if desired, the first plank can interlock with the second plank below it, or vice versa. As they share common extending flanges which mount both planks to a mounting structure 100 in the same manner, the installation steps are also exactly the same.

[0091] Now referring to FIG. 4A, shown is a photograph of a third plank 200C installed on a vertically oriented wall in accordance with another embodiment. FIG. 4B shows an illustrative profile diagram of the third plank 220C of FIG. 4A.

[0092] As described above for the second plank 200B, while the third plank 200C has a different front profile than the first plank 200A or second plank 200B, the third plank 200C has interlocking features provided along the top and bottom edges which are common to both the first plank 200A and the second plank 200B. Thus, in addition to interlocking with another row of the third plank 200C, the third plank 200C can also interconnect with either the first plank 200A or the second plank 200B,

whether above or below. Thus, if desired, different plank profiles can be used to clad different sections or rows of a wall, fence, roof, or other installation application.

[0093] Now referring to FIG. 5A, shown is a photograph of a fourth plank 200D installed on a vertically oriented wall in accordance with yet another embodiment. FIG. 5B shows an illustrative profile diagram of the fourth plank 200D of FIG. 4A. As described above for the first, second and third planks 200A, 200B and 200C, while the fourth plank 200D has a different profile from the first, second and third planks 200A, 200B, 200C, it also shares common features with the first, second and third planks 200A, 200B, 200C including the interlocking features provided along the top and bottom edges, and the extending flanges having latches or angle brackets to engage corresponding hooks provided on a mounting structure 100. Thus, all four planks 200A, 200B, 200C and 200D can be used with the same mounting structure 100, and are interchangeable with each other. In certain applications, the different planks can be installed interchangeably, or alternatingly in different patterns or configurations.

[0094] Now referring to FIG. 6A, shown is a fifth plank 200E installed on a vertically oriented wall in accordance with still another embodiment. FIG. 6B shows an illustrative profile diagram of the fifth plank 200E of FIG. 6A. As explained above, while the fifth plank 200E has a different profile from the first, second, third and fourth planks 200A, 200B, 200C and 200D, it also shares common features with the first, second, third and fourth planks 200A, 200B, 200C and 200D, including the interlocking features provided along the top and bottom edges, and the extending flanges having latches or angle brackets to engage corresponding hooks provided on a mounting structure 100. Thus, all five planks 200A, 200B, 200C, 200D and 200E can be used with the same mounting structure 100, and are interchangeable with each other. In certain applications, the different planks can be installed interchangeably, or alternatingly in different patterns or configurations.

[0095] FIG. 7 shows an illustrative diagram of various different plank installation applications, including outer walls, roofing, parapet walls, and fencing. As explained above, it is not necessary to install the mounting structure 100 in a particular orientation, so it may be installed vertically for mounting the planks horizontally, for example. The mounting structure 100 may also be installed horizontally, such that the planks can be installed vertically, such as in a fencing

installation. Other orientations are possible for roofing, parapet wall, fencing, or high rise installation applications, for example.

[0096] Now referring to FIG. 8, shown is a more detailed diagram of roofing installation applications, in which planks are installed horizontally on an angled roof. As shown, the mounting structures 100 are installed at regularly spaced intervals, and perpendicularly to the plank being installed horizontally on the roof. As explained earlier, the panels are installed on the mounting structures 100 without the need for fasteners, as the installed rows interlock with each other and help the planks remain installed in position. As also shown, the planks can be staggered, such that their ends do not all line up, but instead form a random pattern or repeating pattern for visual appeal.

[0097] Now referring to FIG. 9, shown is an illustrative example of a parapet wall installation, in which planks are installed horizontally, using a plurality of evenly spaced, mounting structures 100 that are installed vertically. Similar to the roofing application, the mounting structures 100 are spaced apart evenly, and are installed to allow the planks to be horizontally level across all of the rows. In this example, the plank is installed starting from the bottom row, and each subsequent row installed above the previous one.

[0098] FIG. 10 shows an illustrative example of a fencing installation, in which planks are installed vertically, using a plurality of evenly spaced, mounting structures 100 which are now installed horizontally. Thus, as explained above, it is not necessary to install the mounting structures 100 in a vertical orientation as for a wall installation or roof installation, as long as all of the extending mounting hooks 110 on the mounting structures 100 are oriented in the same direction. In this example, the planks are installed in a left to right direction.

[0099] FIG. 11 shows an illustrative example of an installation of planks on a high rise structure, such as a multi-level building. In this example, the mounting structures 100 may be preinstalled as the high rise structure is built, and installation of the planks can take place all at one or in stages, such as one floor at a time. Conceptually, the installation is the same as for a single level or two level structure, and the planks do not require any additional installation steps apart from safety precautions for working at significant heights.

[00100] Now referring to FIG. 12, shown is an illustrative example of installation on a high rise structure, in which the planks comprise solar panels which may be installed using extending flanges corresponding to the extending flanges provided on the back of the planks. These solar panels may be similar extending flanges with latches or angle brackets which allow the solar panels to be installed on preinstalled mounting structures 100. By installing the mounting structures 100 as the high rise structure is built, the solar panel installations can be performed as a final finishing step, rather than as the high rise structure is built.

[00101] Now referring to FIGS. 13A to 13C, shown are illustrative alternative designs for the mounting structure 100 for receiving corresponding interlocking latches or clasping members for hanging a plank or panel 1300A, 1300B, 1300C. As shown, FIG. 13A the curved shape of the protrusions or extending mounting hooks 110 are matched to a correspondingly curved interlocking clasping member provided on the insulation or inner side of a plank 1300A. In FIG. 13B, the shape of the protrusions or extending mounting hooks 110 includes a notch which locks a corresponding interlocking clasping member of plank 1300B in position. FIG. 13C shows a further modified protrusion or extending hook having a notch which interlocks with a corresponding clasping member of plank 1300C in position.

[00102] FIGS. 14A and 14B show illustrative designs for a horizontal mounting base for receiving a mounting structure 100 thereon. As shown, different types and styles of planks 1400A and 1400B may installed using the same mounting structure 100.

[00103] FIGS. 15A to 15G show illustrative examples of an installation process for multiple planks 1500 in a vertical wall cladding installation. In this example, the mounting structures 100 are installed directly onto a wall using screw fasteners. Along the bottom, a horizontal base may be installed to align the bottom edges of the mounting structures 100, and to help support the mounting structures 100 as they are being installed one after another. In particular, FIGS. 15E to 15G illustrate how the planks 1500 interlock upon installation.

[00104] Now referring to FIGS. 16A and 16B, in an alternative embodiment, rather than being directly fastened to a wall, the mounting structure 100 is instead slideably received in the adjustment base 1600, such that it may be slideably adjusted prior to being fixed in position. This allows the protrusions or extending

mounting hooks 110 on each of the mounting structures 100 to be leveled with each other, so as to provide a level base to receive the planks. In this illustrative embodiment, a mounting structure 100 is slideably received in the adjustment base 1600. With the adjustment base 1600 attached first to a wall, roof, or other surface being cladded, the mounting structure 100 is then slideably inserted within the adjustment base 1600.

[00105] Alternatively, the mounting structure 100 can be first slideably inserted into the adjustment base 1600, and the adjustment base 1600 can be mounted on a wall, roof, or other surface being cladded through apertures or holes provided along the length of the mounting structure 100. In an embodiment, apertures or holes are provided along the length of the mounting structure 100, and the extending mounting hooks 110 oriented in one direction. If some of the extending mounting hooks 110 break off, as there are multiple redundant attachment points for each plank, one or two hooks that have been broken off will not affect the ability to mount a plank onto the mounting structure 100.

[00106] As will be apparent from the example described above, the mounting structure 100 and adjustment base 1600 may be formed separately, and different sizes and shapes of mounting structures 100 may be formed to be slideably received in the adjustment bases 1600 for different types of planks.

[00107] Now referring to FIGS. 17A to 17H, shown an illustrative example of an installation process for fiber cement LAP siding 1700 in accordance with an embodiment. As shown, the cement LAP siding 1700 is first provided with a clasping member on its inner side, which may be fastened to it by screws or other types of fasteners. Once installed, the cement LAP siding 1700 is placed against the mounting structure 100 and lowered until the clasping members engage on or more extruding hooks 110 of the mounting structure 100,

[00108] FIGS. 17E to 17G show the progressive installation of a number of cement panels, one installed on top of another, such that the cement panels form an overlapping, moisture proof barrier against rain and snow. FIG. 17H shows a perspective view of the installation process.

[00109] Now referring to FIGS. 18A to 18J, shown are illustrative examples various installation adapters 1800A, 1800B, 1800C, 1800D, 1800E for installing larger sizes of cement panels or the like in accordance with various embodiments.

With cement panels and other heavier types of panels, a plurality of flanges with clasping members may be installed at various intervals so as to engage the extruding members of the mounting structure 100, for example as shown in detail in FIGS. 18B and 18C. FIGS. 18D to 18G show perspective views of how a plurality of such flanges with clasping members may be mounted to the inner side of a cement panel or other type of heavier panel for installation on the mounting members. FIGS. 18H to 18J show additional side views of the cement panels or similar heavier panels being mounted using a plurality of flanges with clasping members.

[00110] Now referring to FIGS. 19A to 19D, shown is an illustrative example of an installation process for solar panels 1900 in accordance with an embodiment. As shown in FIG. 19A, in an embodiment, an angle bracket 1910 may be mounted to a frame of the solar panel 1900, such as a lower frame, so as to allow the solar panel 1900 to be mounted to the mounting structure 100 using a plurality of angle brackets 1910 fastened onto its back. As shown in the perspective views in FIGS. 19E and 19F, in an embodiment, the angle bracket 1910 may extend along the entire width of the solar panel and fastened thereto by a plurality of fasteners in order to keep the solar panel 1900 securely mounted to the mounting structure 100. FIG. 19G shows how a solar panel 1900 may be mounted across a plurality of mounting structures 100 to provide support and distribute the load.

[00111] Now referring to FIG. 20, shown are examples of various types of mounting structures 100A, 100B, 100C, 100D, 100E and 100F in accordance with various embodiments. In addition to having a plurality of extending mounting hooks 110 as described herein, it will be appreciated that various other types of mounting structures such as square or rectangular shaped rods 100E, 100F having evenly spaced apertures of different shapes and sizes along their length may also be used. However, it may be more difficult to line up flanges with clasping members with such apertures, which may make installation somewhat more difficult in comparison to the extending mounting hooks 110.

[00112] Now referring to FIG. 21, shown are illustrative examples of mounting structures 2100A, 2100B, 2100C and 2100D having an integrated thermal break 2110 in accordance with various embodiments. In this example, the thermal break 2110 may be formed from an insulating material which prevents thermal transfer between a front portion having the extending mounting hooks 110, and a rear portion which is adapted to be mounted to a wall or other structural surface. FIG. 22A to 22F

show additional examples of mounting structures 100 having an integrated thermal break 2110 in accordance with various embodiments. In use, these thermal breaks 2110 prevent heat or cold from being transferred from the outer portion to the inner portion of the mounting structure 100, and therefore can provide additional insulation for a building wall or other structure being covered.

[00113] FIGS. 23A and 23B show an example of mounting asphalt roofing in accordance with an embodiment.

[00114] FIGS. 24A and 24B show an example of mounting corrugated metal roofing in accordance with an embodiment.

[00115] FIGS. 25A and 25B show an example of mounting corrugated metal siding mounted horizontally in accordance with an embodiment.

[00116] FIGS. 26A and 26B show an example of mounting corrugated metal siding mounted vertically in accordance with an embodiment.

[00117] FIGS. 27A and 27B show an example of mounting a composite decking plank having a clasping base attached thereto in accordance with an embodiment.

[00118] FIGS. 28A and 28B show an example of mounting a composite decking plank having a clasping based embedded therein in accordance with an embodiment.

[00119] FIGS. 29A and 29B show an example of mounting an extruded composite decking plank having a clasping base integrally formed therein in accordance with an embodiment.

[00120] FIGS. 30A and 30B show an example of mounting an engineered wood panel siding in accordance with an embodiment.

[00121] FIGS. 31A and 31B show an example of mounting composite LAP siding in accordance with an embodiment.

[00122] FIGS. 32A and 32B show an example of mounting another type of engineered wood panel siding in accordance with an embodiment.

[00123] FIGS. 33A and 33B show an example of mounting fiber cement LAP siding in accordance with an embodiment.

[00124] FIGS. 34A and 34B show an example of mounting another type of fiber cement LAP siding in accordance with an embodiment.

[00125] FIGS. 35A and 35B show an example of LAP wood siding in accordance with an embodiment.

[00126] FIGS. 36A and 36B show an example of vinyl siding in accordance with an embodiment.

[00127] FIGS. 37A and 37B show an example of foam filled vinyl siding in accordance with an embodiment.

[00128] FIGS. 38A and 38B show an example of insulated vinyl siding in accordance with an embodiment.

[00129] Advantageously, the present mounting system and method provides a fast, efficient, and cost effective way to install planks on various cladding applications, including outer walls, roofing, fencing, decking, and other cladding applications. By providing various mounting and interlocking features which are common to various different types of plank designs and profiles, all of which can use the same mounting structure due to the common mounting features, the system and method provides great flexibility in installations for various cladding applications for buildings and architectural structures.

[00130] Thus, in an aspect, there is provided a plank installation system, comprising: a mounting structure having a plurality of extending mounting hooks; and a plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks on the mounting structure, the latches adapted to interconnect with one or more of the plurality of extending mounting hooks; whereby the plank is securely mountable to the mounting structure by the interconnection between the latches and the plurality of extending mounting hooks.

[00131] In an embodiment, the mounting structure is an elongate, generally U-shaped structure having a plurality of extending mounting hooks which along each extending wall of the U-shaped structure, the plurality of extending mounting hooks being aligned.

[00132] In another embodiment, the plurality of extending mounting hooks are evenly spaced, and positioned such that latches provided on a plank to be mounted may interconnect at multiple redundant attachment points to the mounting structure.

[00133] In another embodiment, the plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks all share a common mounting structure.

[00134] In another embodiment, the plank has a receiving slot provided on the bottom of each plank, and a corresponding extending flange provided along the top of each plank, whereby, a plank interconnects with an adjacent plank above or below the plank by these receiving slots and extending flanges.

[00135] In another embodiment, the receiving slot provided on the bottom of each plank includes a channel or slot for receiving the corresponding extending flange provided along the top of an adjacent plank.

[00136] In another embodiment, the extending flange provided on the bottom of each plank is adapted to be received in a corresponding receiving slot provide on the bottom of an adjacent plank.

[00137] In another embodiment, the system further comprises an adjustment base for slideably receiving the mounting structure, whereby the mounting structure may be slideably adjusted even after the adjustment base is securely mounted to a surface being cladded.

[00138] In another embodiment, the adjustment base includes channels for receiving corresponding edges of the mounting structure.

[00139] In another embodiment, the mounting structure includes apertures along its length to allow the adjustment base to be mounted with the mounting structure slideably received in the adjustment base.

[00140] In another embodiment, the mounting structure includes a thermal break between an inner portion and an outer portion, such that the mounting structure minimizes thermal energy transfer therebetween.

[00141] In another aspect, there is provided a plank installation method, comprising: providing a mounting structure having a plurality of extending mounting hooks; providing a plank having extending flanges with latches corresponding to the

positions of the plurality of extending mounting hooks on the mounting structure, the latches adapted to interconnect with one or more of the plurality of extending mounting hooks; and mounting the plank securely to the mounting structure by the interconnection between the latches and the plurality of extending mounting hooks.

[00142] In an embodiment, the mounting structure is an elongate, generally U-shaped structure having a plurality of extending mounting hooks which along each extending wall of the U-shaped structure, the plurality of extending mounting hooks being aligned.

[00143] In another embodiment, the plurality of extending mounting hooks are evenly spaced, and positioned, and wherein the method further comprises interconnecting the latches provided on a plank to be mounted at multiple redundant attachment points to the mounting structure.

[00144] In another embodiment, the plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks all share a common mounting structure.

[00145] In another embodiment, the plank has a receiving slot provided on the bottom of each plank, and a corresponding extending flange provided along the top of each plank, whereby, a plank interconnects with an adjacent plank above or below the plank by these receiving slots and extending flanges.

[00146] In another embodiment, the receiving slot provided on the bottom of each plank includes a channel or slot for receiving the corresponding extending flange provided along the top of an adjacent plank.

[00147] In another embodiment, the extending flange provided on the bottom of each plank is adapted to be received in a corresponding receiving slot provide on the bottom of an adjacent plank.

[00148] In another embodiment, the method further comprises slideably adjusting the mounting structure even after the adjustment base is securely mounted to a surface being cladded.

[00149] In another embodiment, the adjustment base includes channels or slots for receiving corresponding edges of the mounting structure.

[00150] In another embodiment, the mounting structure includes apertures along its length to allow the adjustment base to be mounted with the mounting structure slideably received in the adjustment base.

[00151] In another embodiment, the mounting structure includes a thermal break between an inner portion and an outer portion, such that the mounting structure minimizes thermal energy transfer therebetween.

[00152] While the above description provides examples of one or more systems and methods, it will be appreciated that other systems and methods may be within the scope of the present description as interpreted by one of skill in the art.

Claims

What is claimed is:

1. A plank installation system, comprising:

a mounting structure having a plurality of extending mounting hooks; and

a plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks on the mounting structure, the latches adapted to interconnect with one or more of the plurality of extending mounting hooks;

whereby the plank is securely mountable to the mounting structure by the interconnection between the latches and the plurality of extending mounting hooks.

2. The plank installation system of claim 1, wherein the mounting structure is an elongate, generally U-shaped structure having a plurality of extending mounting hooks which along each extending wall of the U-shaped structure, the plurality of extending mounting hooks being aligned.

3. The plank installation system of claim 2, wherein the plurality of extending mounting hooks are evenly spaced, and positioned such that latches provided on a plank to be mounted may interconnect at multiple redundant attachment points to the mounting structure.

4. The plank installation system of claim 1, wherein the plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks all share a common mounting structure.

5. The plank installation system of claim 4, wherein the plank has a receiving slot provided on the bottom of each plank, and a corresponding extending flange provided along the top of each plank, whereby, a plank interconnects with an adjacent plank above or below the plank by these receiving slots and extending flanges.

6. The plank installation system of claim 5, wherein the receiving slot provided on the bottom of each plank includes a channel for receiving the corresponding extending flange provided along the top of an adjacent plank.

7. The plank installation system of claim 5, wherein the extending flange provided on the bottom of each plank is adapted to be received in a corresponding receiving slot provide on the bottom of an adjacent plank.

8. The plank installation system of claim 1, further comprising an adjustment base for slideably receiving the mounting structure, whereby the mounting structure may be slideably adjusted even after the adjustment base is securely mounted to a surface being cladded.

9. The plank installation system of claim 8, wherein the adjustment base includes channels for receiving corresponding edges of the mounting structure.

10. The plank installation system of claim 9, wherein the mounting structure includes apertures along its length to allow the adjustment base to be mounted with the mounting structure slideably received in the adjustment base.

11. The plank installation system of claim 1, wherein the mounting structure includes a thermal break between an inner portion and an outer portion, such that the mounting structure minimizes thermal energy transfer therebetween.

12. A plank installation method, comprising:

providing a mounting structure having a plurality of extending mounting hooks;

providing a plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks on the mounting structure, the latches adapted to interconnect with one or more of the plurality of extending mounting hooks; and

mounting the plank securely to the mounting structure by the interconnection between the latches and the plurality of extending mounting hooks.

13. The plank installation method of claim 12, wherein the mounting structure is an elongate, generally U-shaped structure having a plurality of extending mounting hooks which along each extending wall of the U-shaped structure, the plurality of extending mounting hooks being aligned.

14. The plank installation method of claim 13, wherein the plurality of extending mounting hooks are evenly spaced, and positioned, and wherein the method further comprises interconnecting the latches provided on a plank to be mounted at multiple

redundant attachment points to the mounting structure.

15. The plank installation method of claim 12, wherein the plank having extending flanges with latches corresponding to the positions of the plurality of extending mounting hooks all share a common mounting structure.

16. The plank installation method of claim 15, wherein the plank has a receiving slot provided on the bottom of each plank, and a corresponding extending flange provided along the top of each plank, whereby, a plank interconnects with an adjacent plank above or below the plank by these receiving slots and extending flanges.

17. The plank installation method of claim 16, wherein the receiving slot provided on the bottom of each plank includes a channel for receiving the corresponding extending flange provided along the top of an adjacent plank.

18. The plank installation method of claim 16, wherein the extending flange provided on the bottom of each plank is adapted to be received in a corresponding receiving slot provide on the bottom of an adjacent plank.

19. The plank installation method of claim 16, further comprising slideably adjusting the mounting structure even after the adjustment base is securely mounted to a surface being cladded.

20. The plank installation method of claim 19, wherein the adjustment base includes channels for receiving corresponding edges of the mounting structure.

21. The plank installation method of claim 20, wherein the mounting structure includes apertures along its length to allow the adjustment base to be mounted with the mounting structure slideably received in the adjustment base.

22. The plank installation method of claim 12, wherein the mounting structure includes a thermal break between an inner portion and an outer portion, such that the mounting structure minimizes thermal energy transfer therebetween.

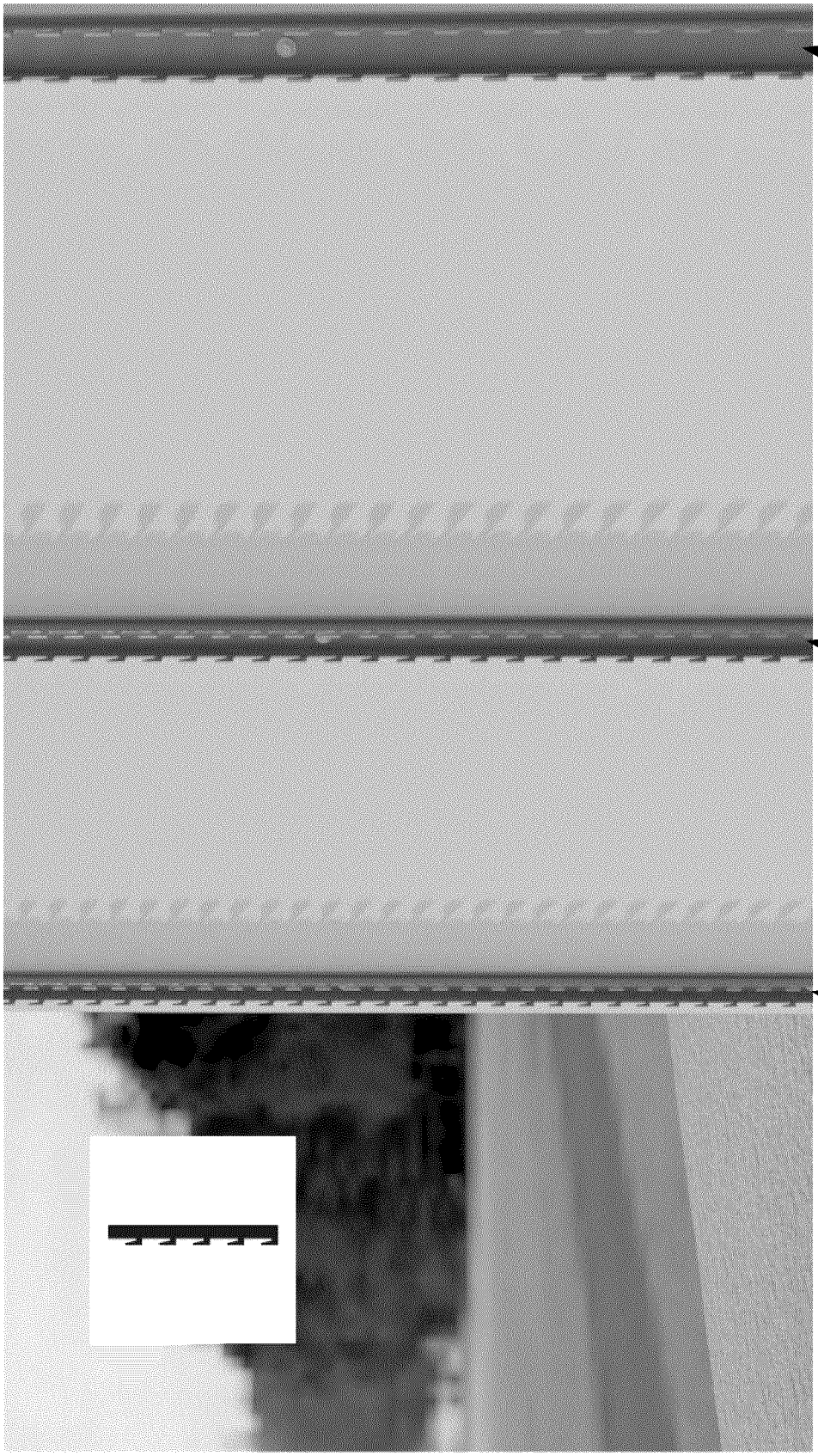

FIG. 1A

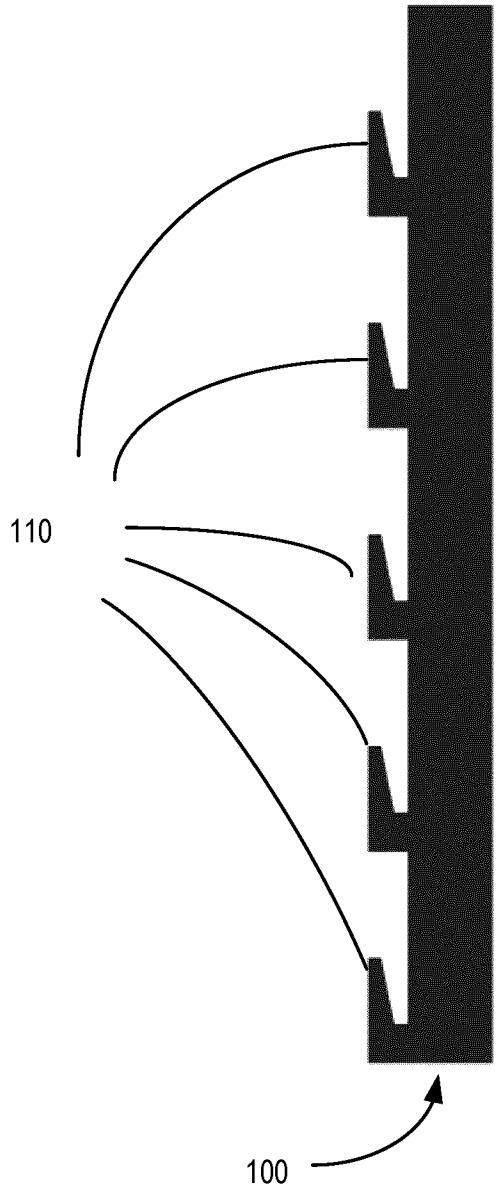

FIG. 1B

FIG. 2A

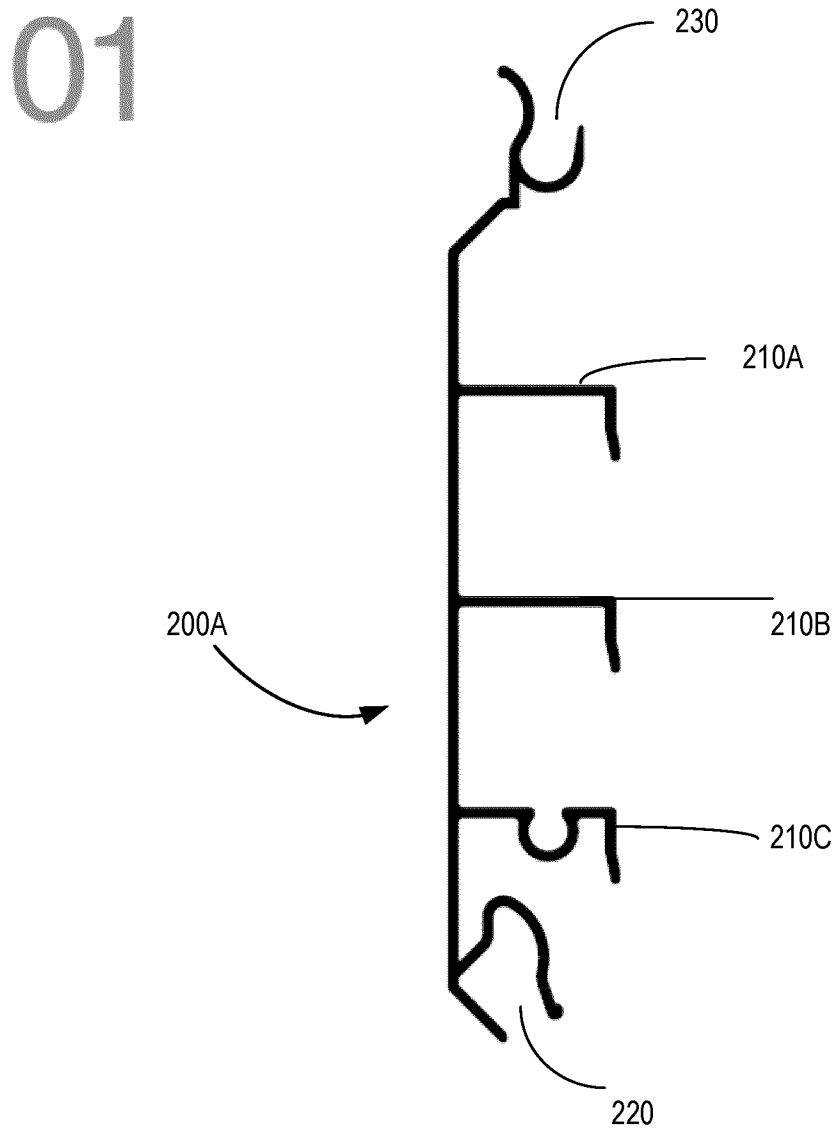

FIG. 2B

FIG. 3A

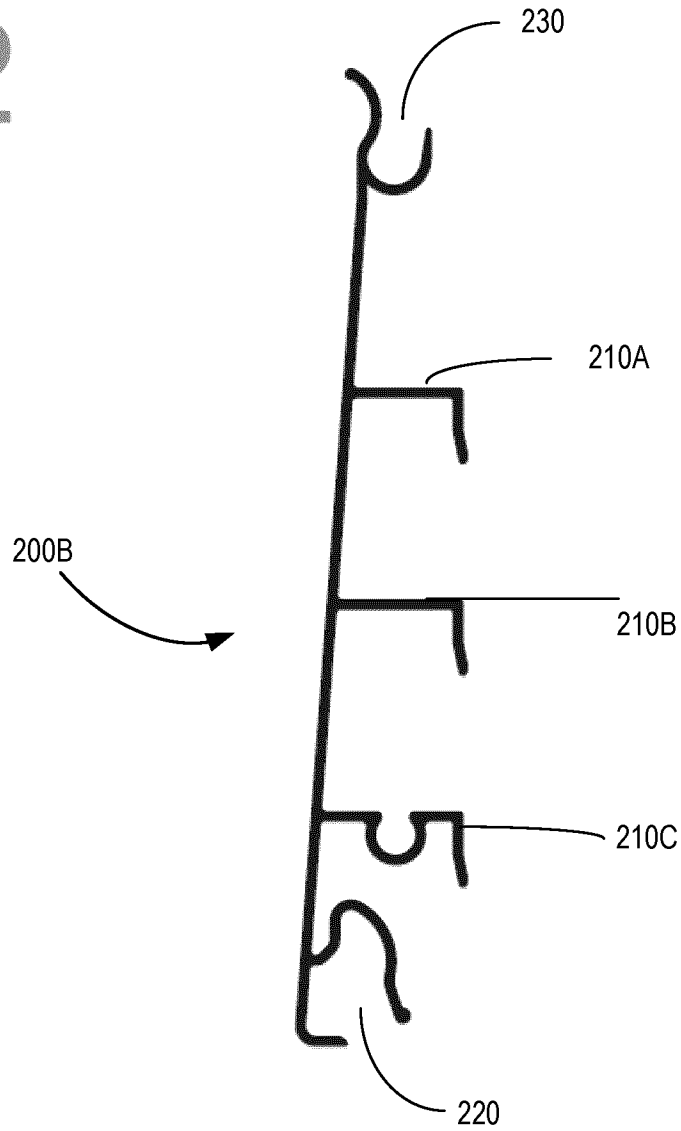

FIG. 3B

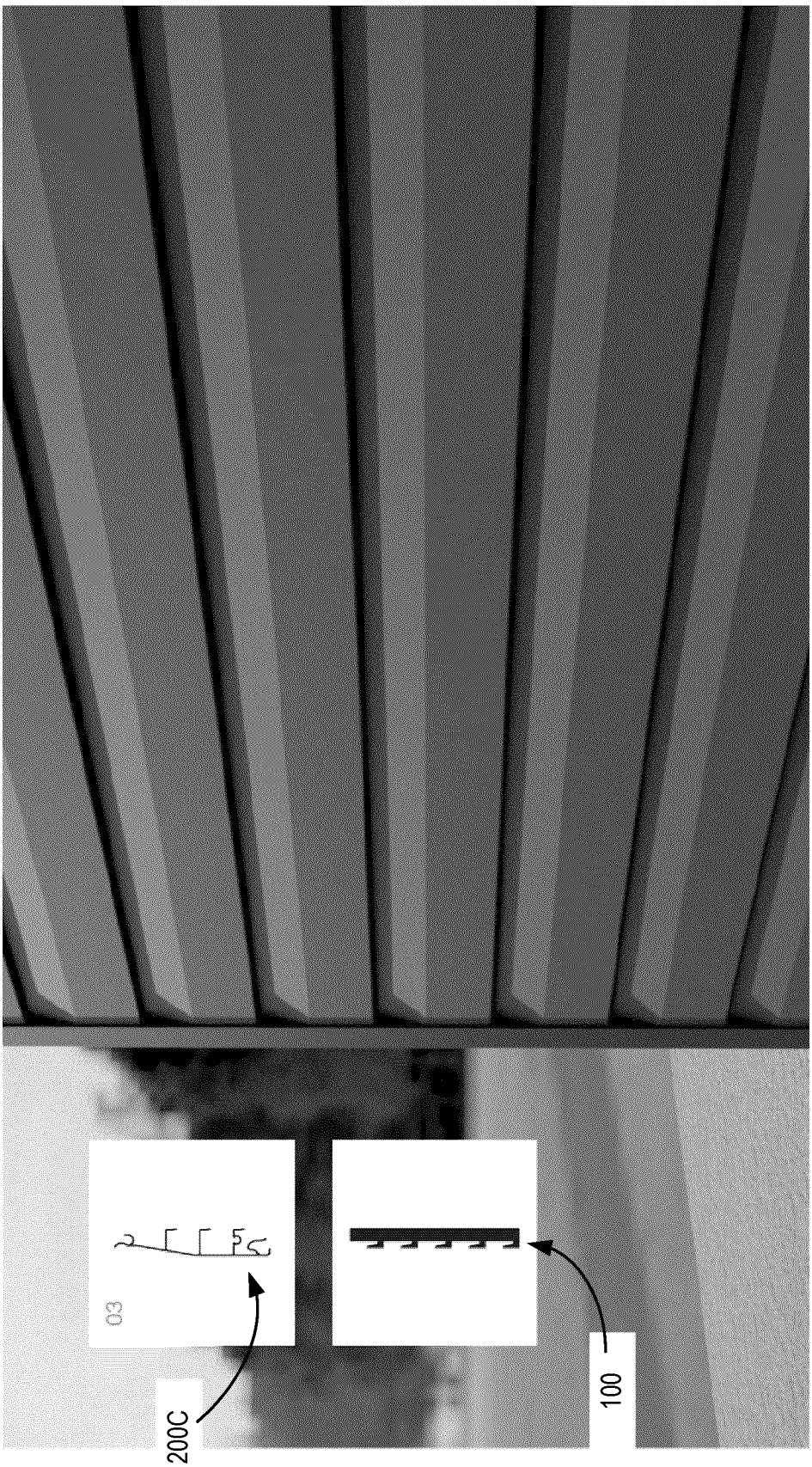

FIG. 4A

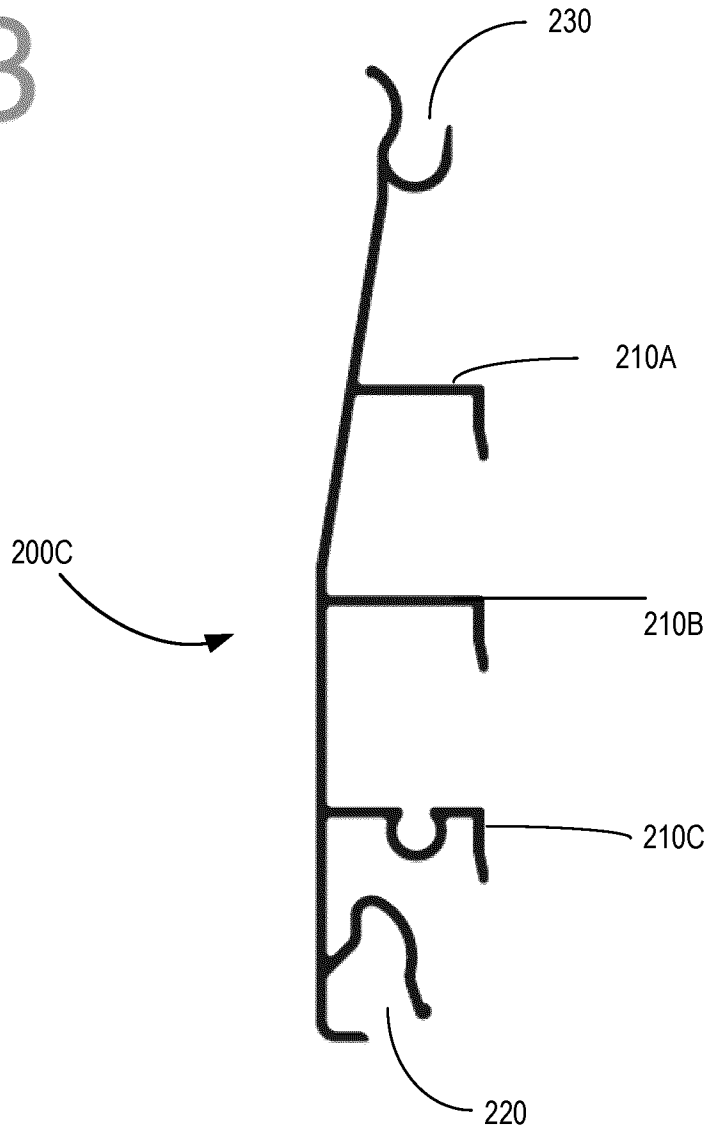

FIG. 4B

FIG. 5A

04

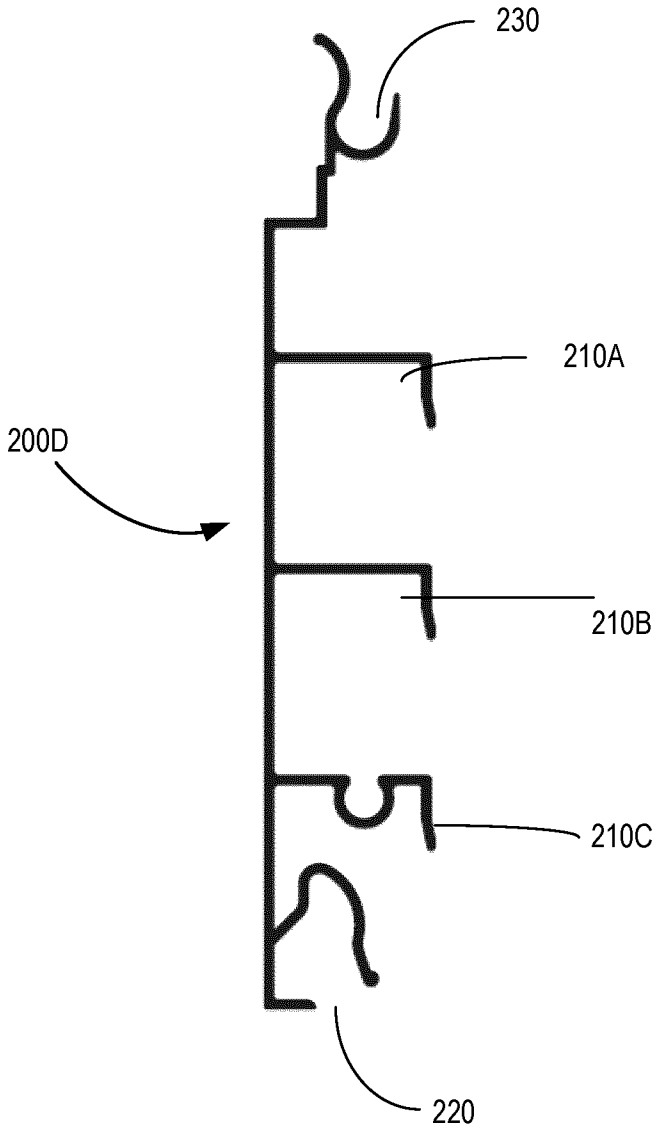

FIG. 5B

FIG. 6A

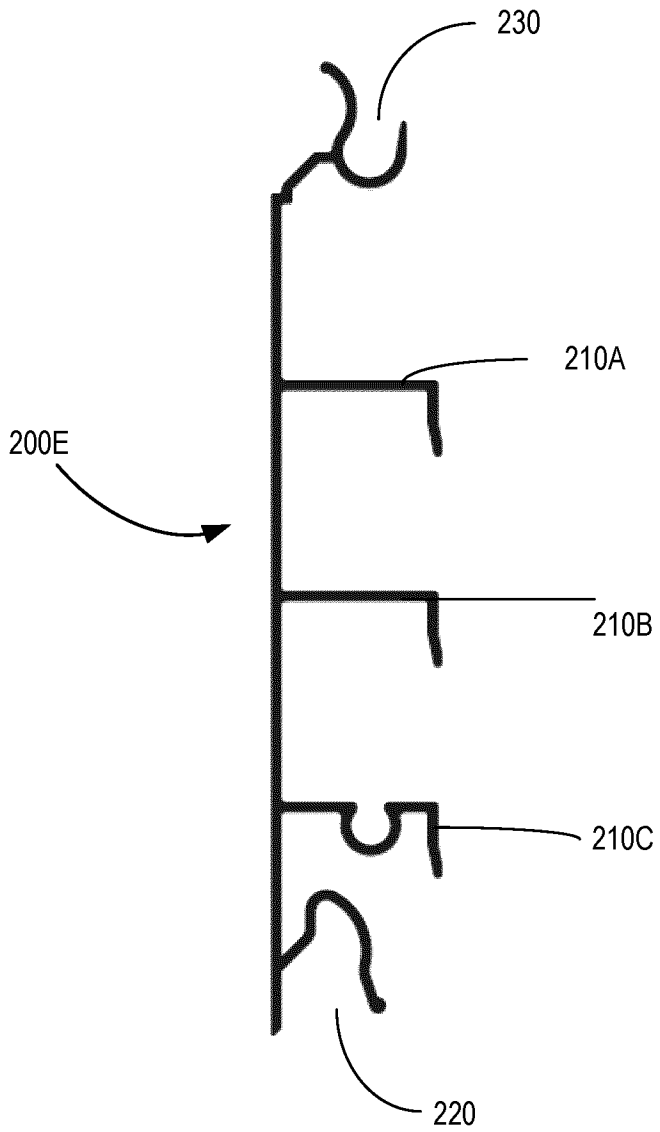

FIG. 6B

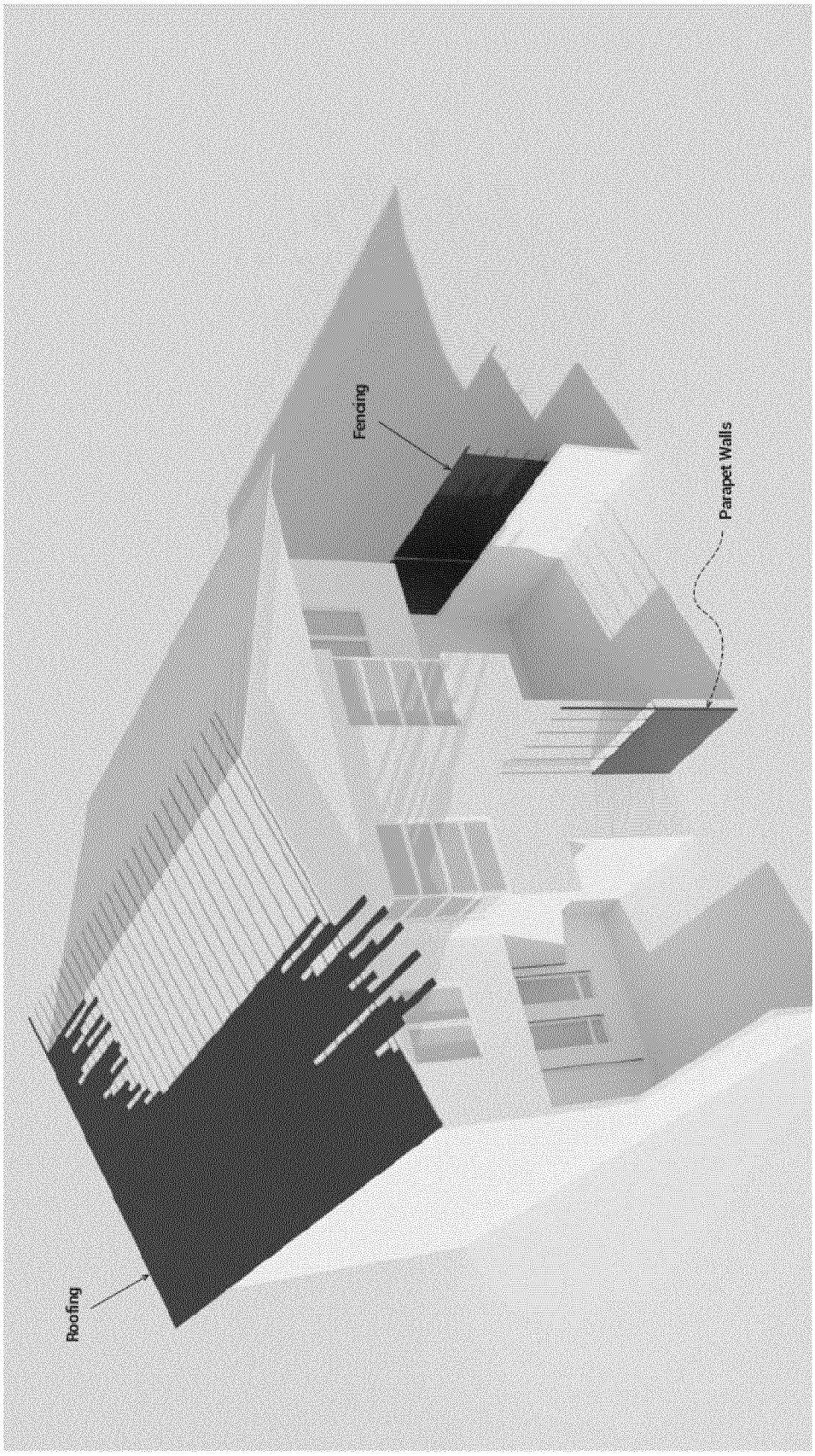

FIG. 7

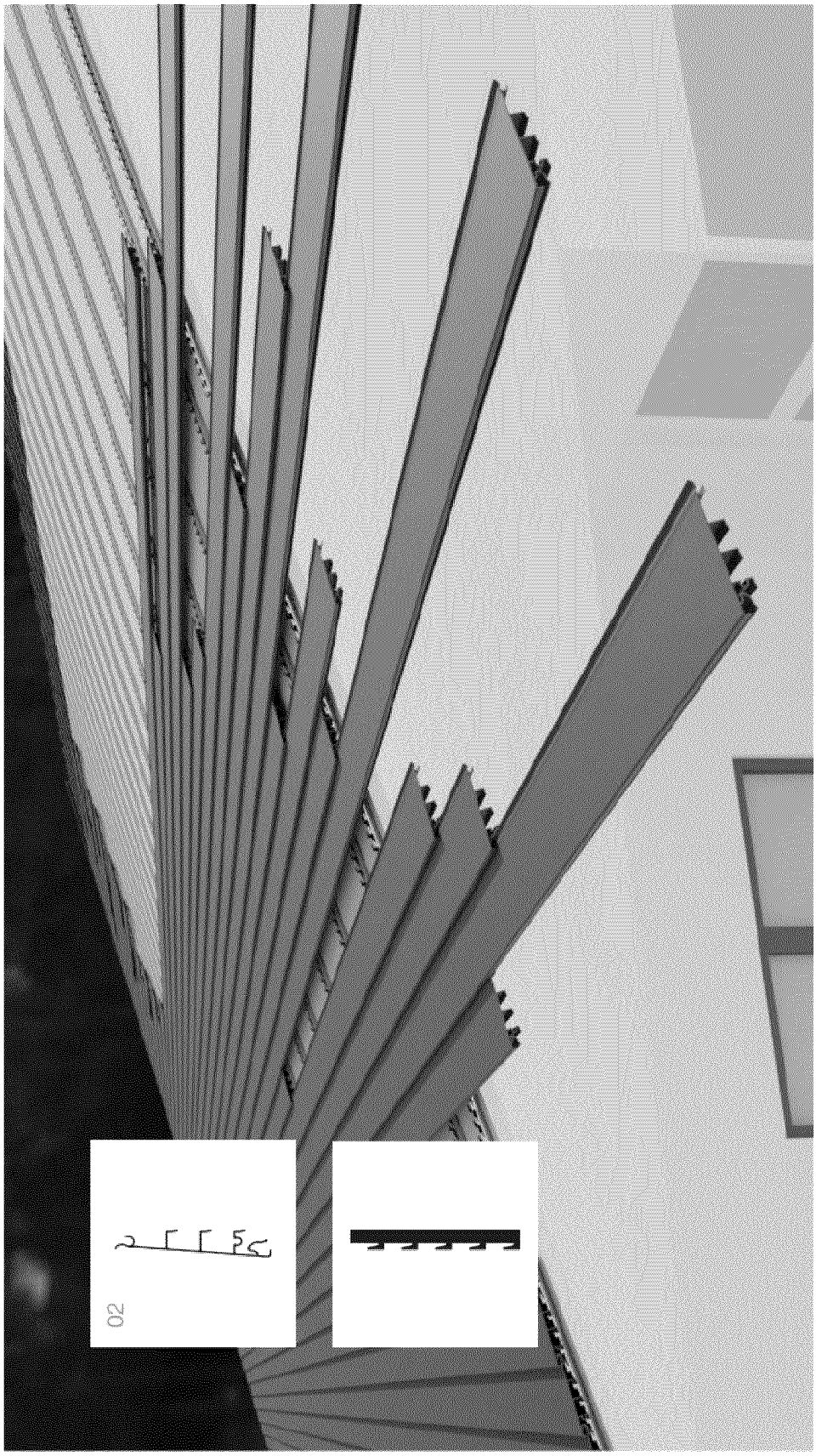

FIG. 8

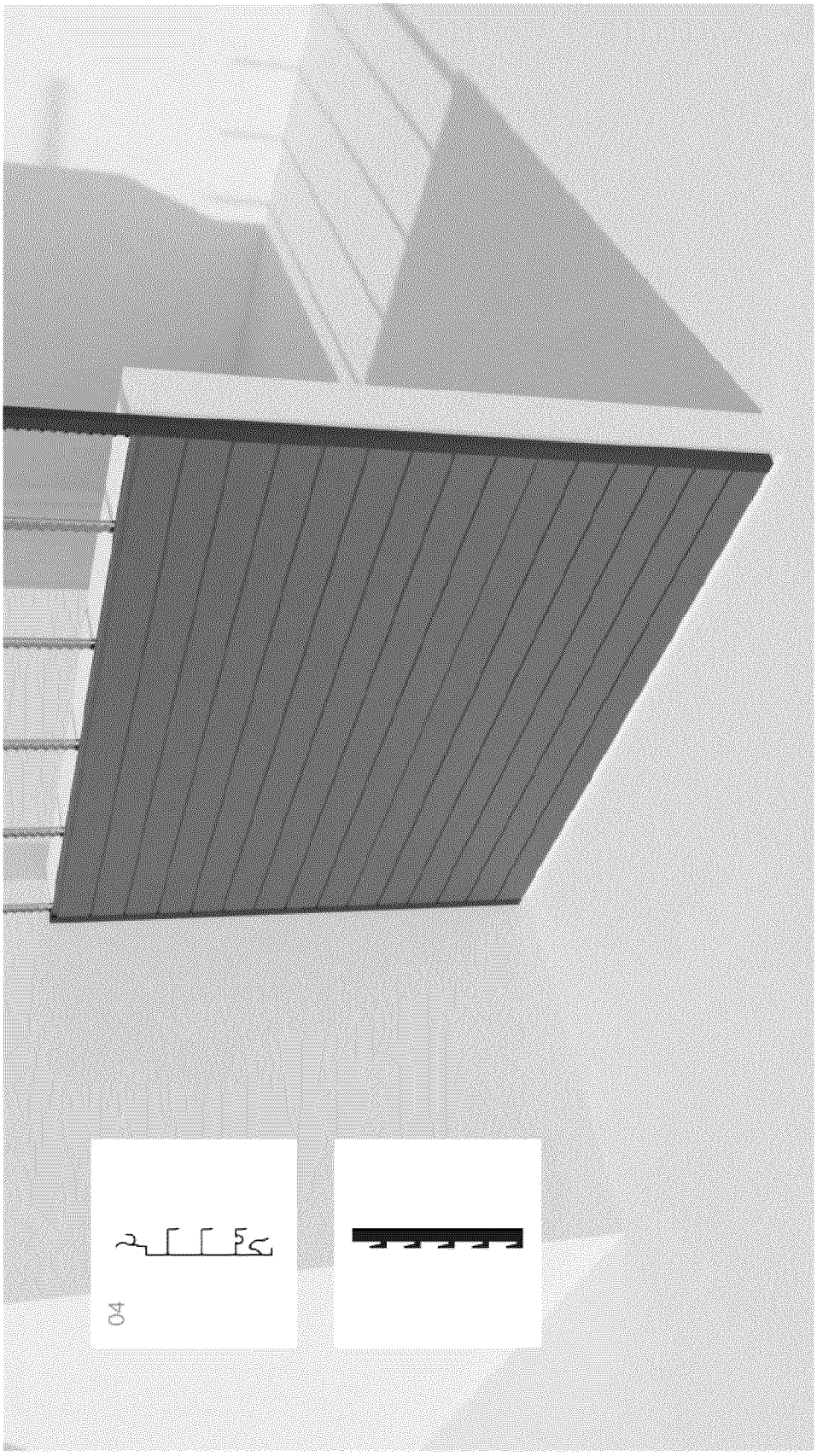

FIG. 9

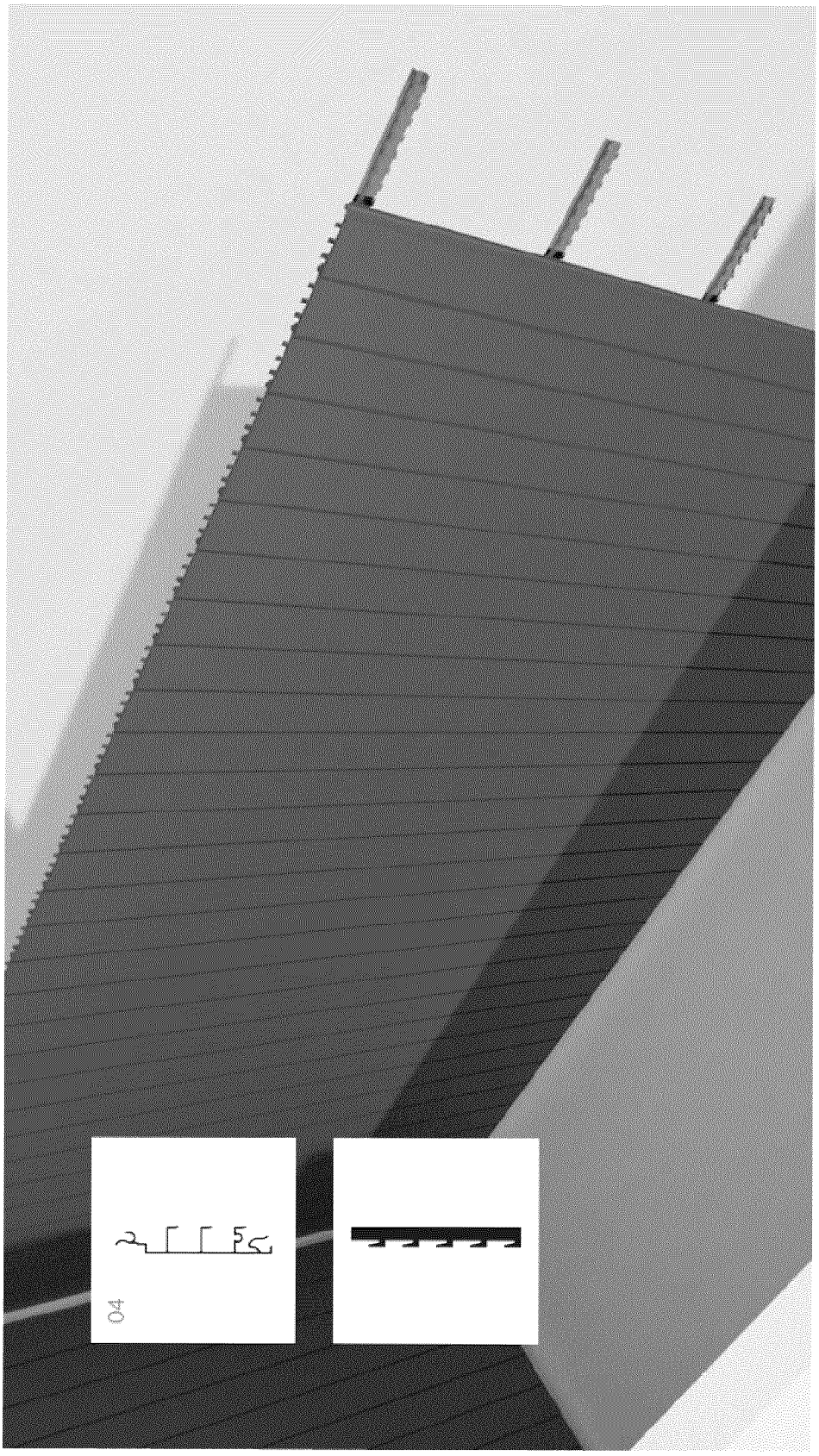

FIG. 10

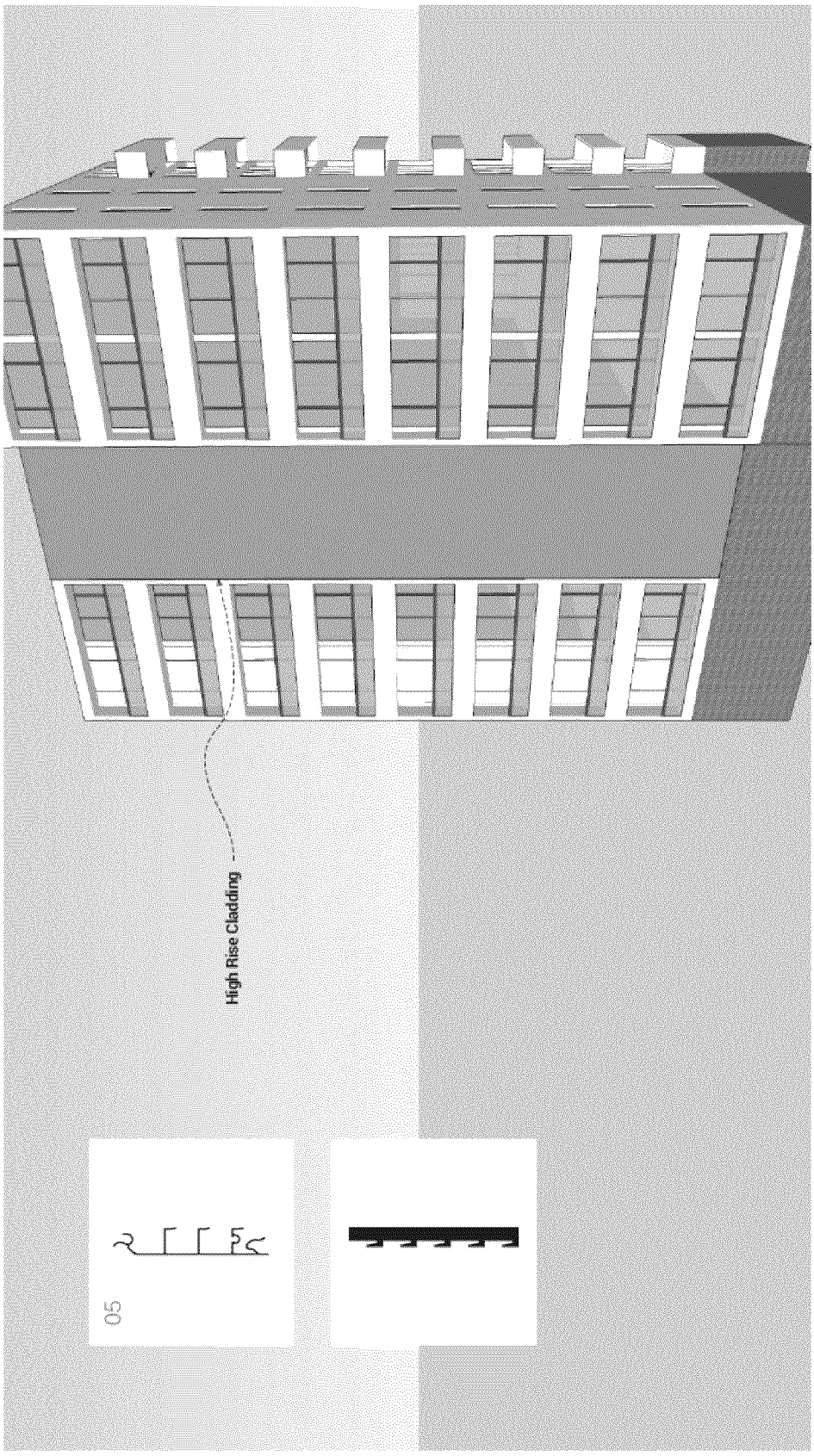

FIG. 11

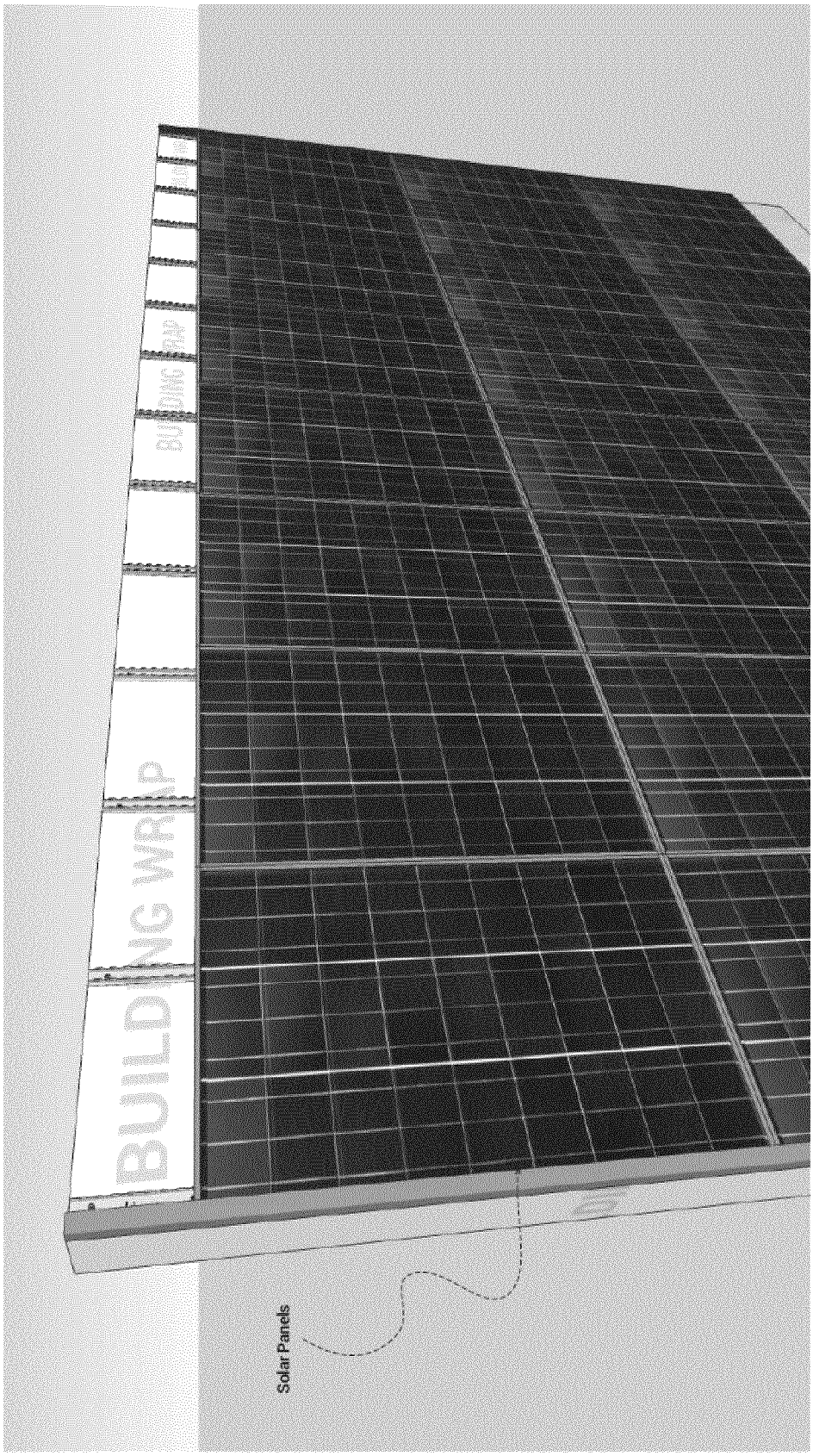

FIG. 12

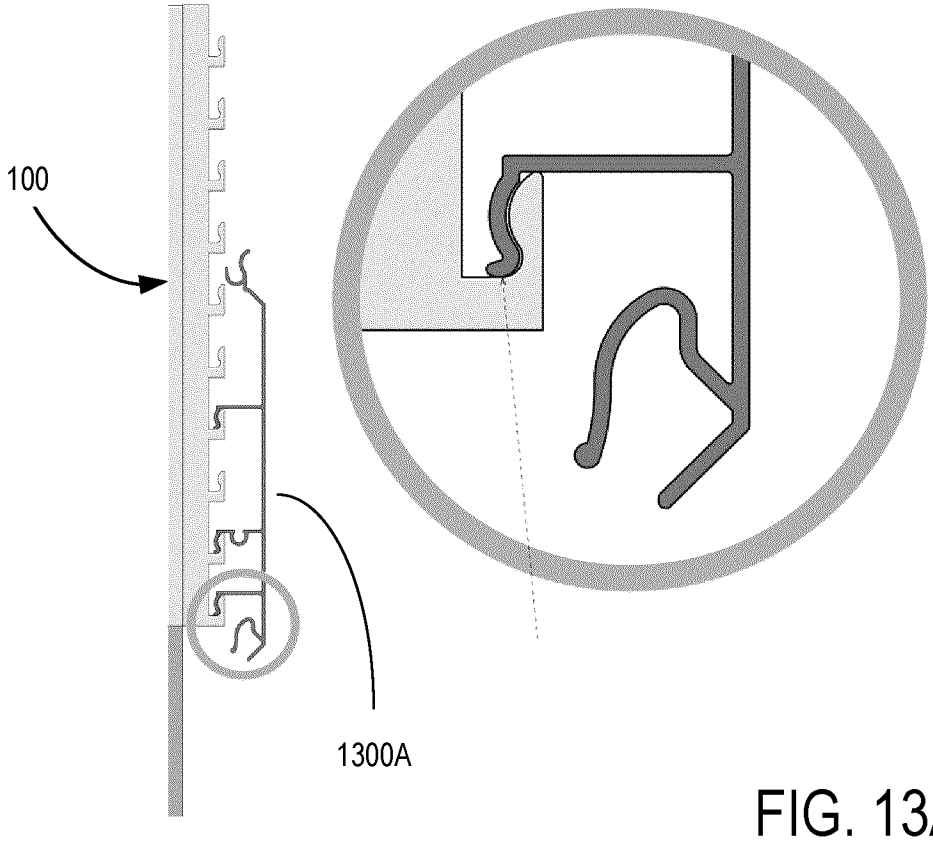

FIG. 13A

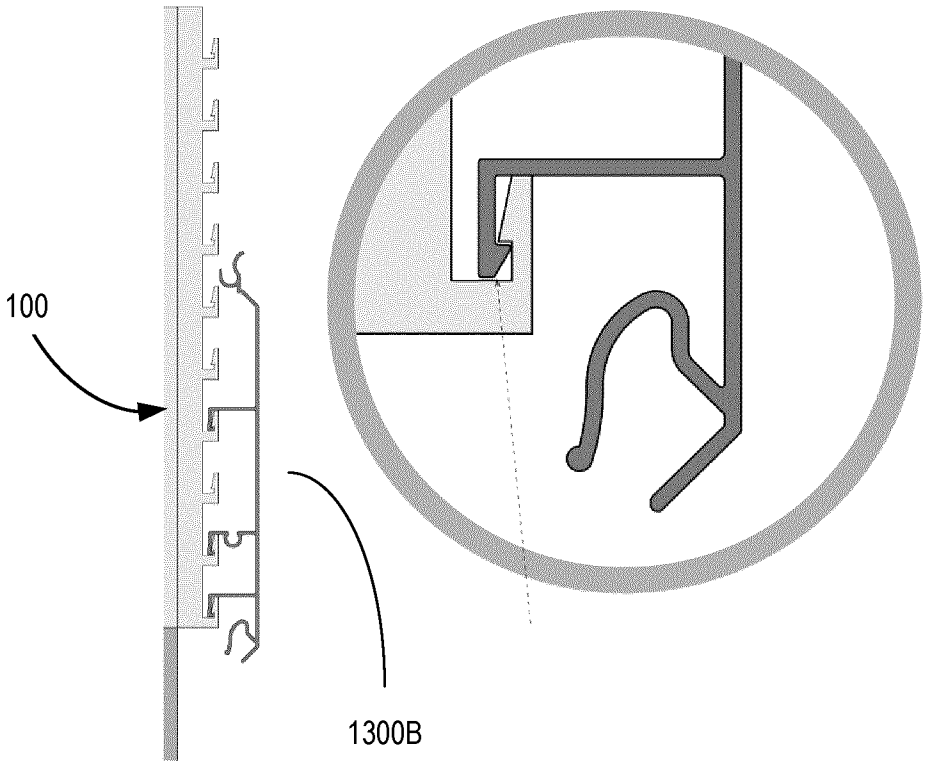

FIG. 13B

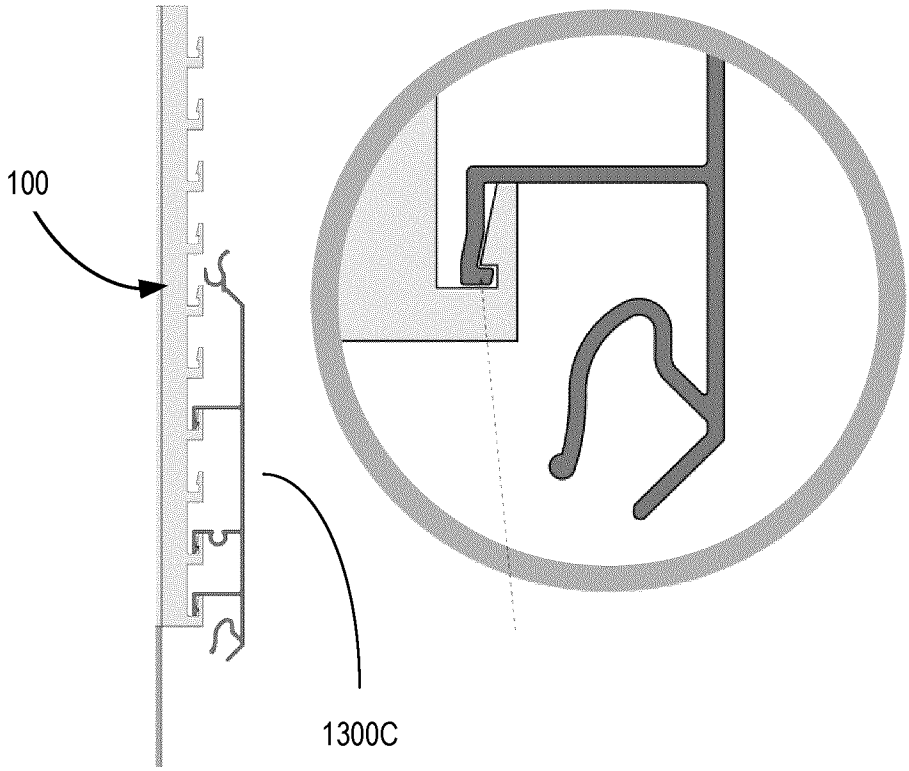

FIG. 13C

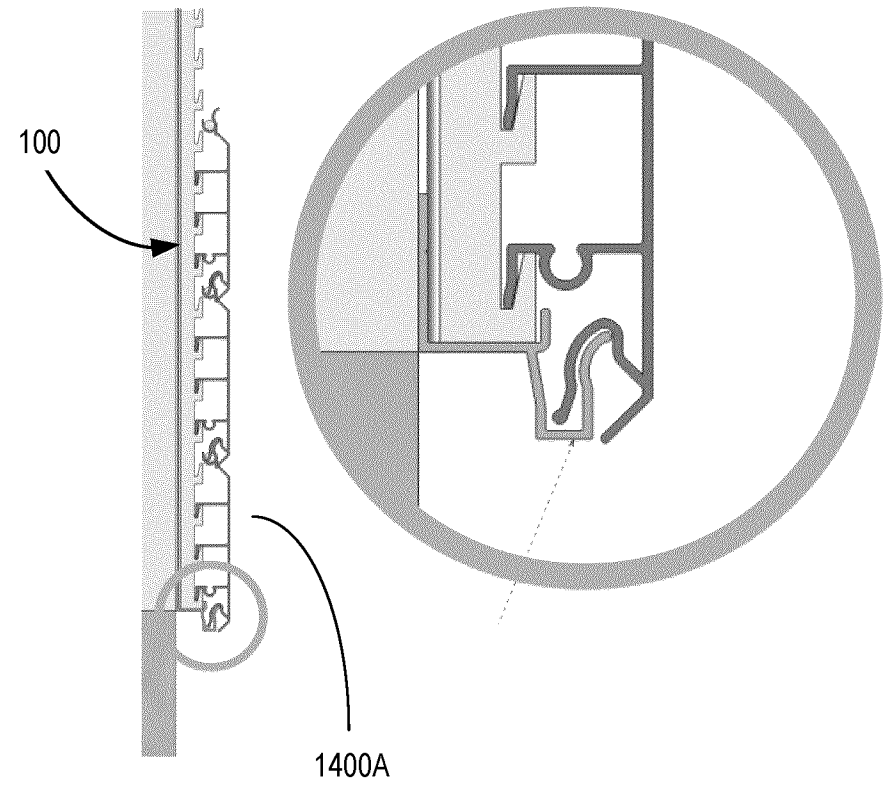

FIG. 14A

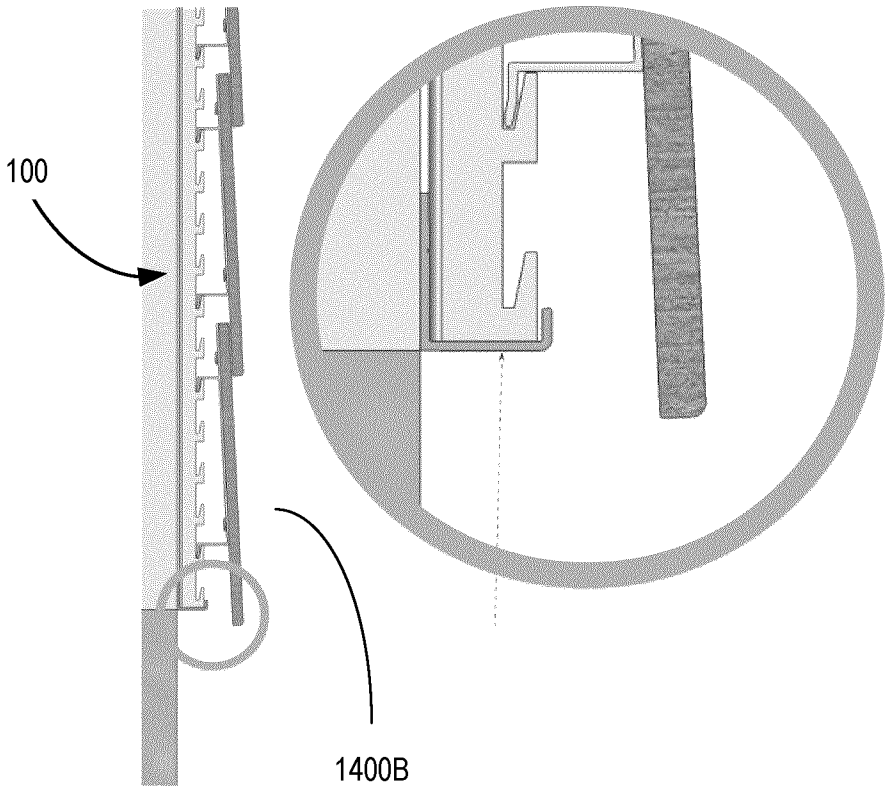

FIG. 14B

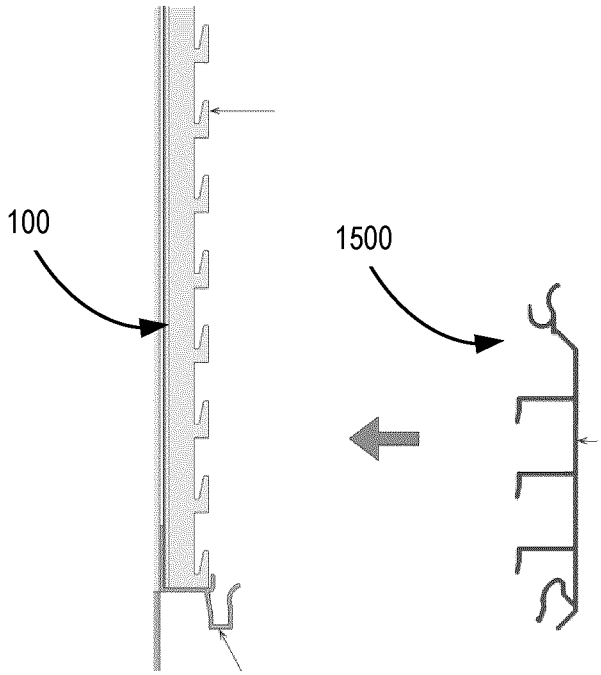

FIG. 15A

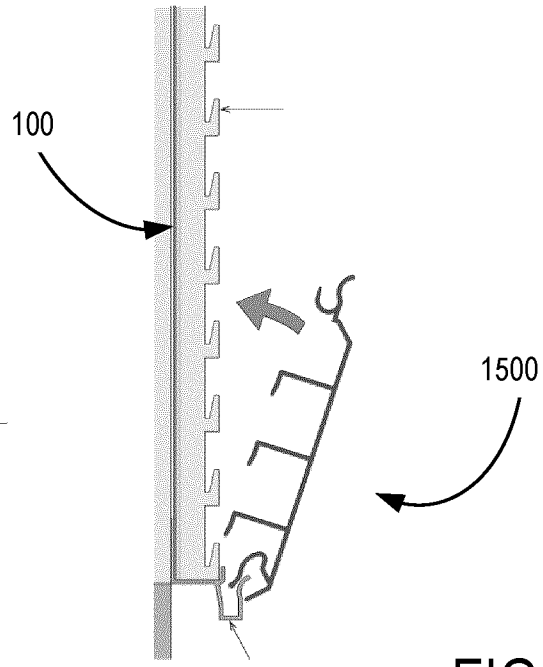

FIG. 15B

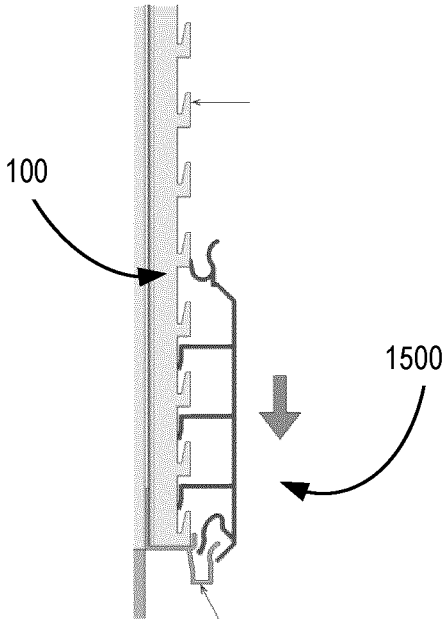

FIG. 15C

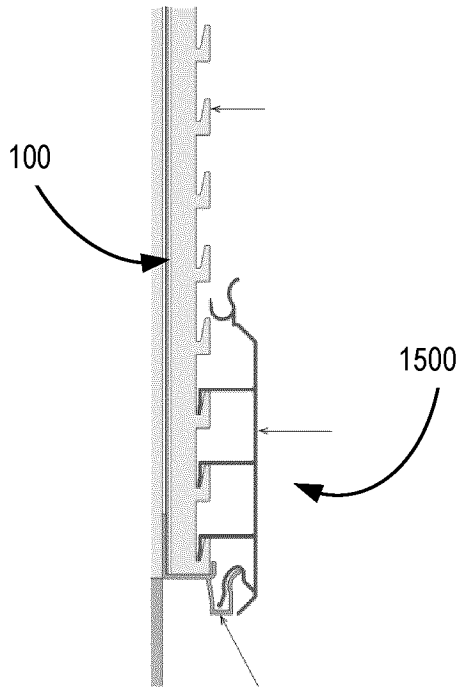

FIG. 15D

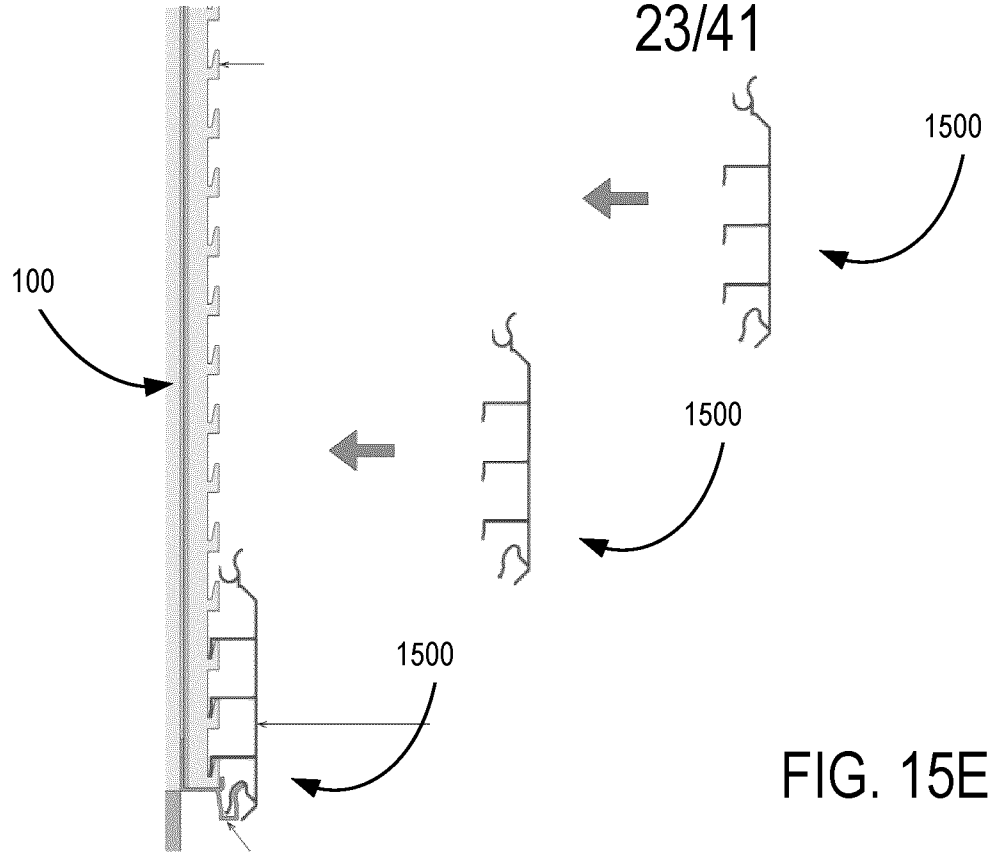

FIG. 15E

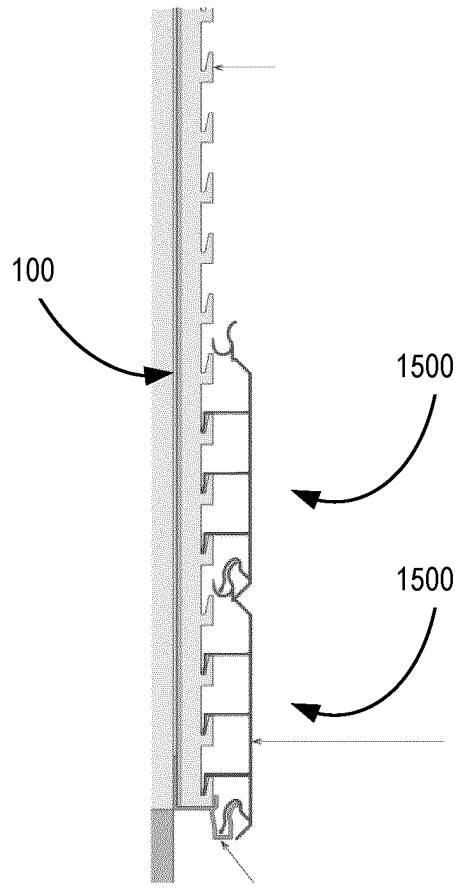

FIG. 15F

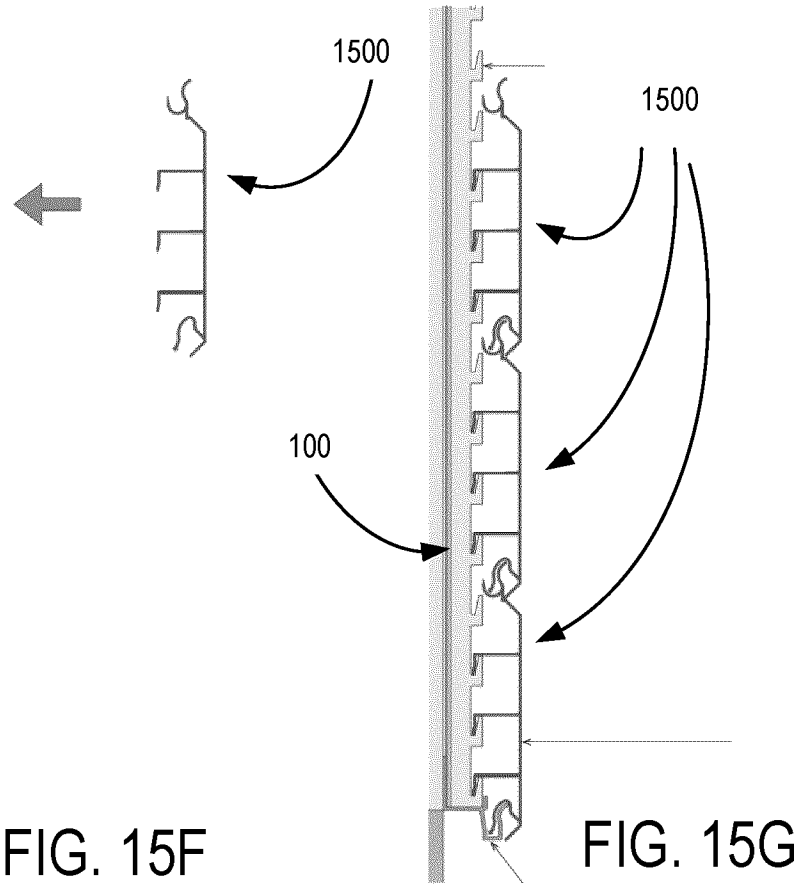

FIG. 15G

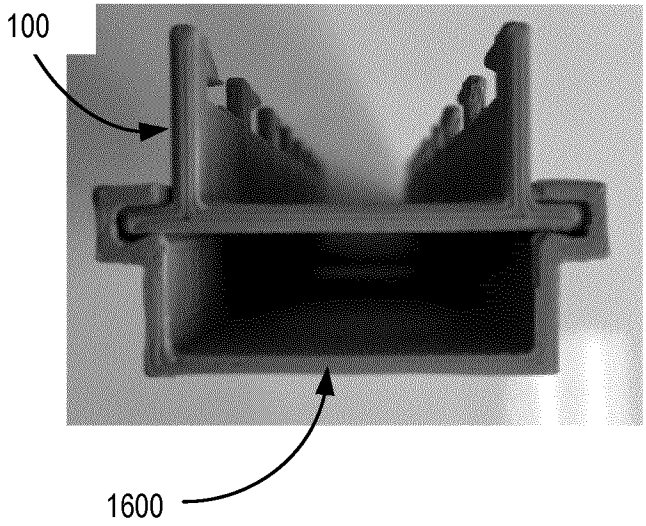

FIG. 16A

FIG. 16B

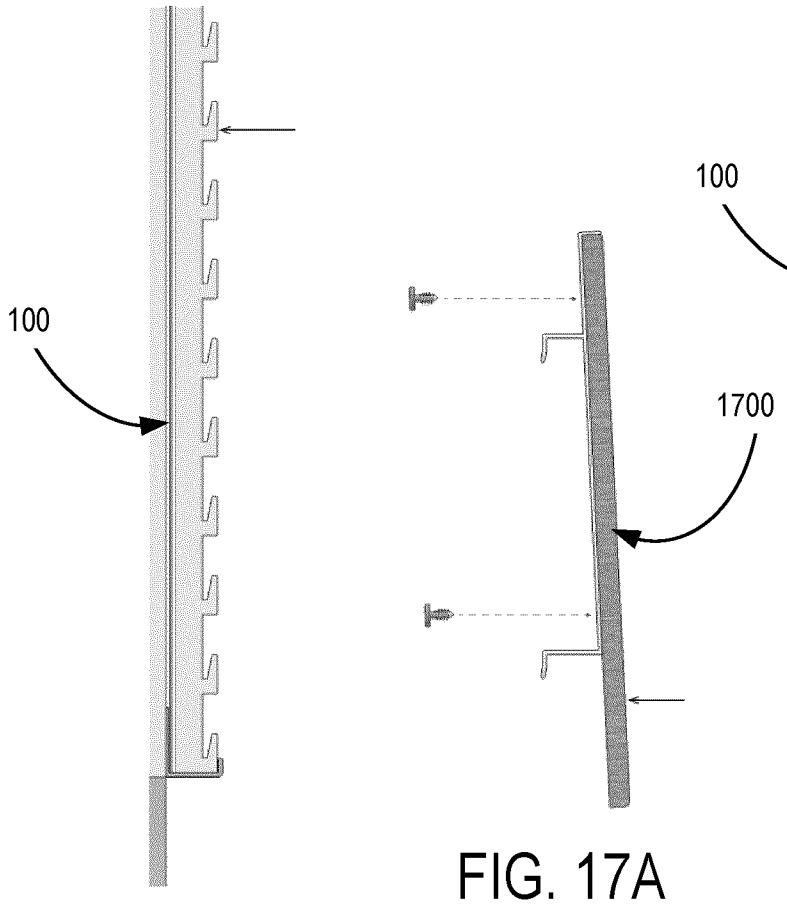

FIG. 17A

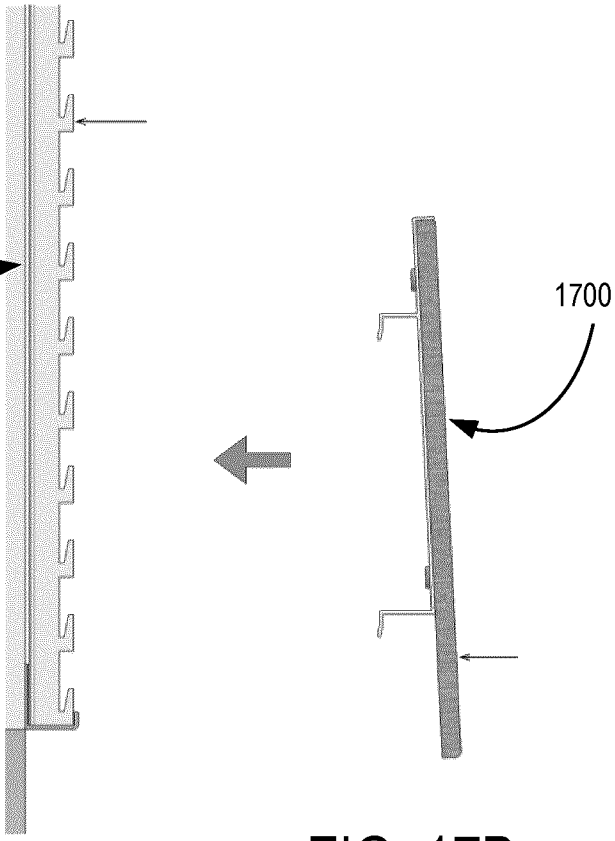

FIG. 17B

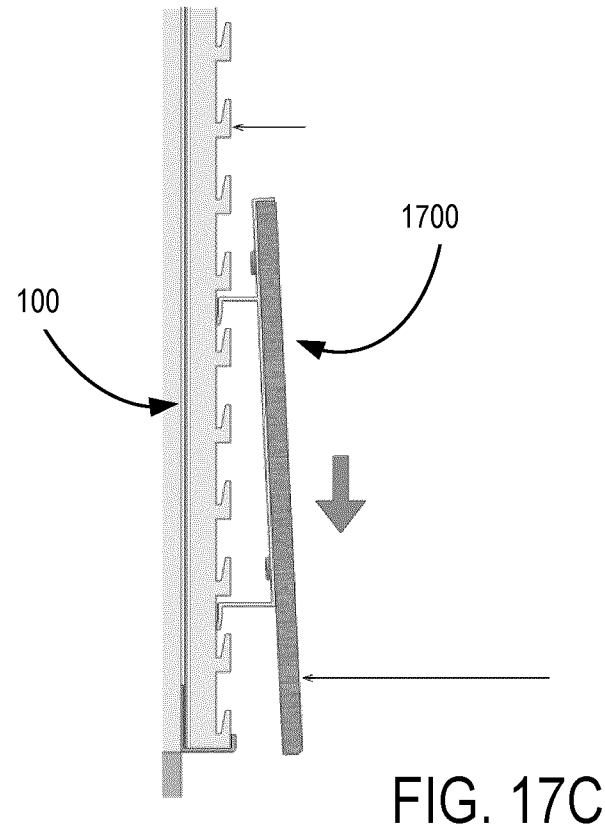

FIG. 17C

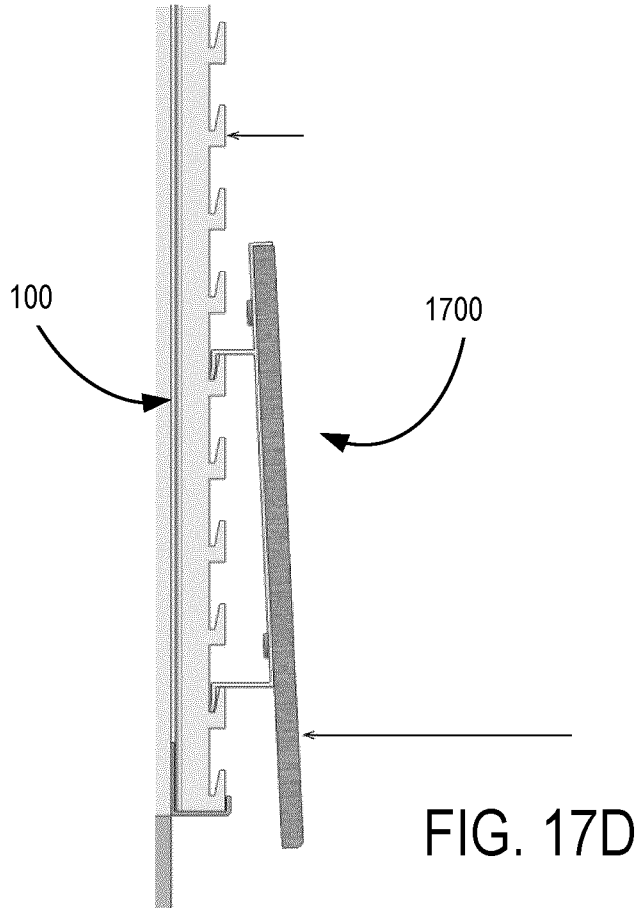

FIG. 17D

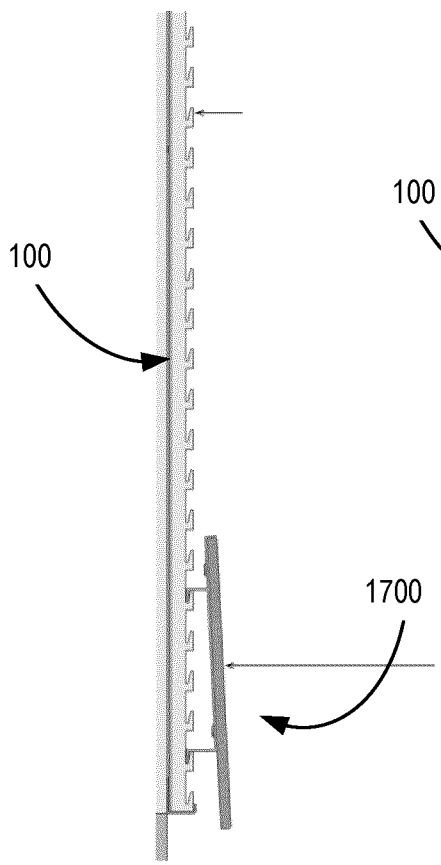

FIG. 17E

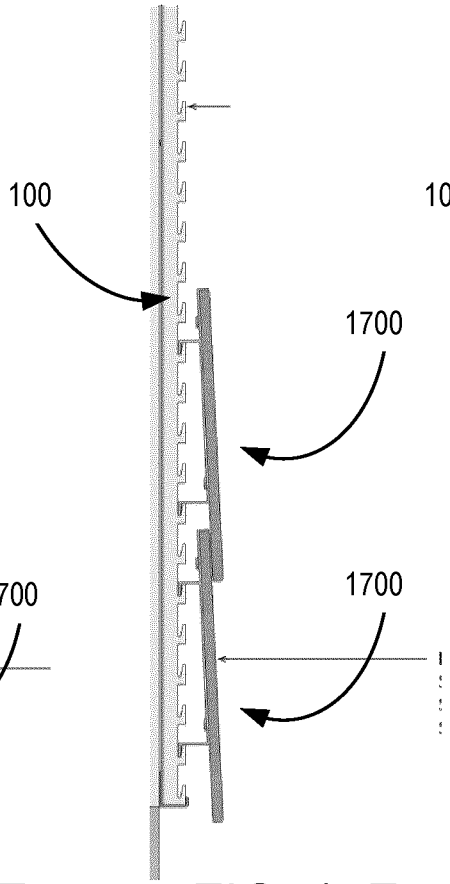

FIG. 17F

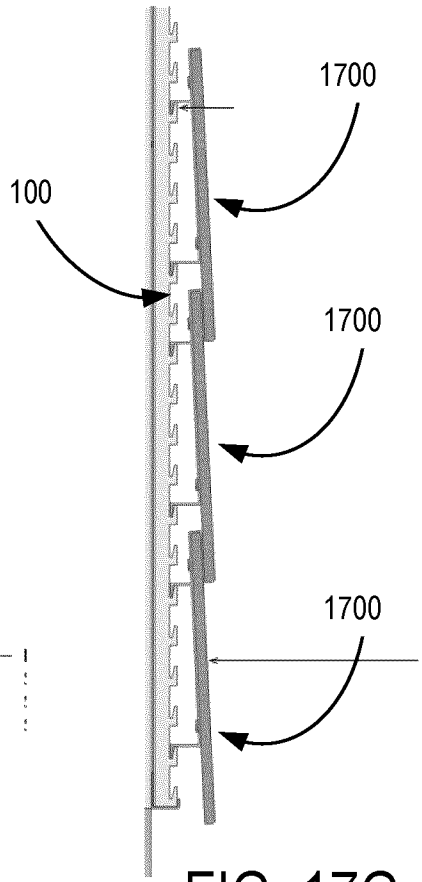

FIG. 17G

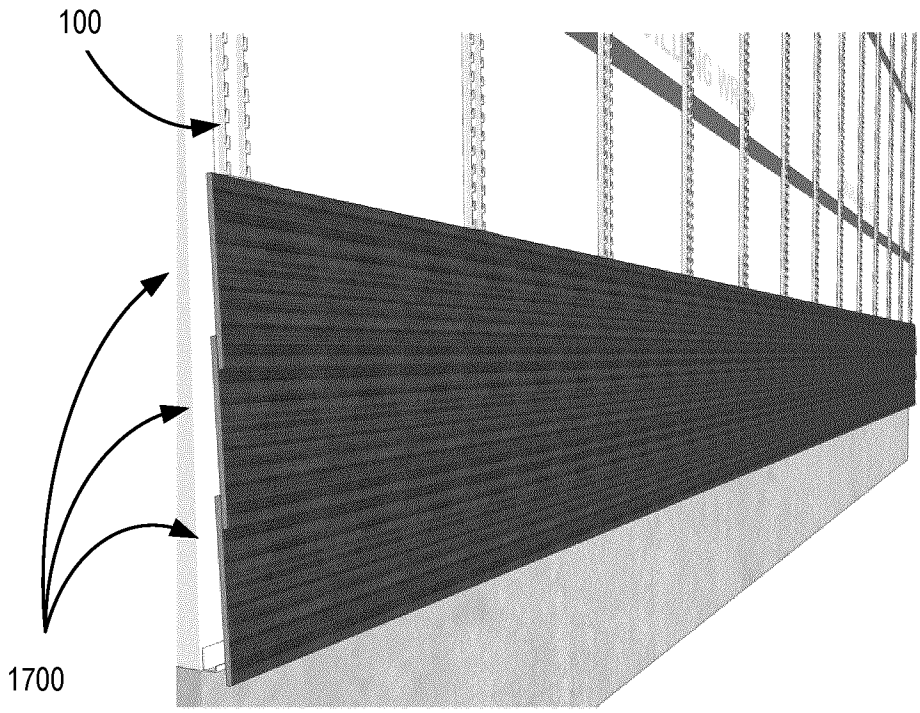

FIG. 17H

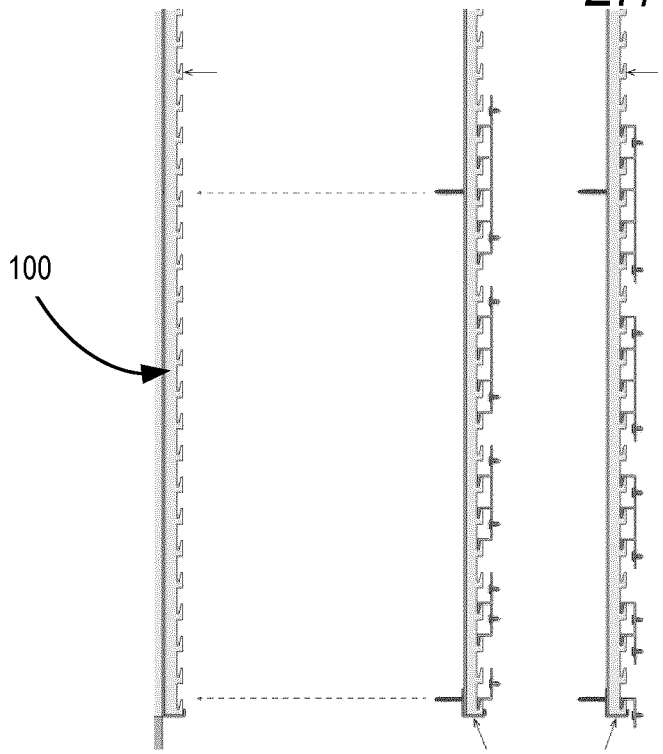

FIG. 18A

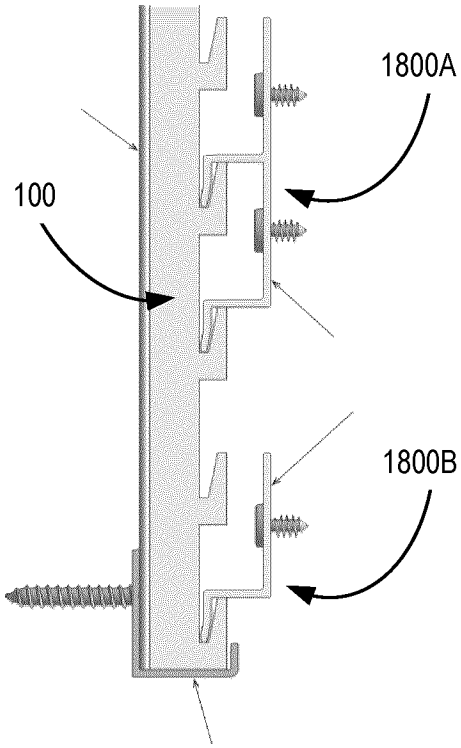

FIG. 18B

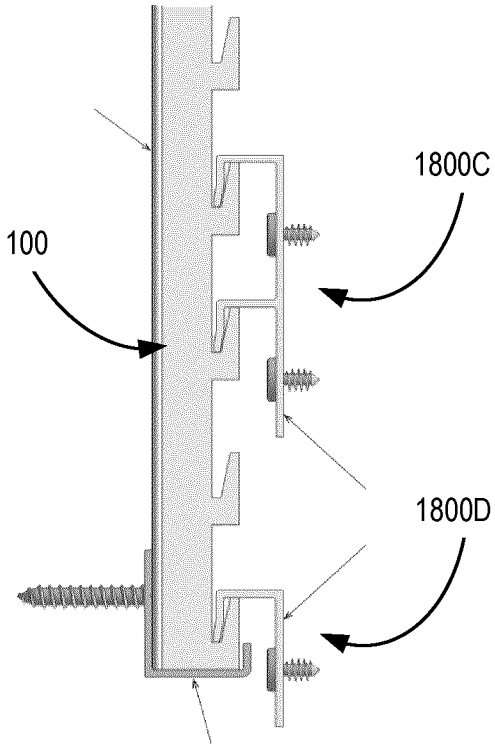

FIG. 18C

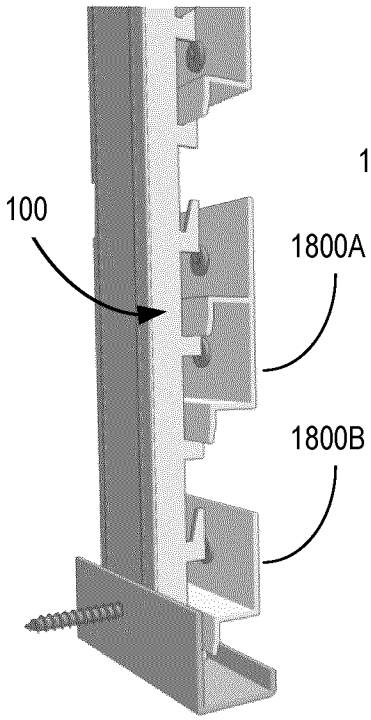

FIG. 18D

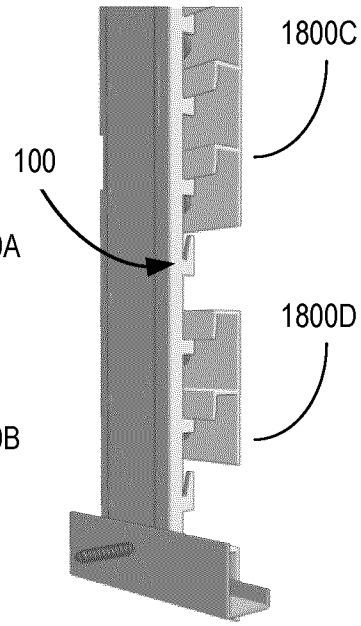

FIG. 18E

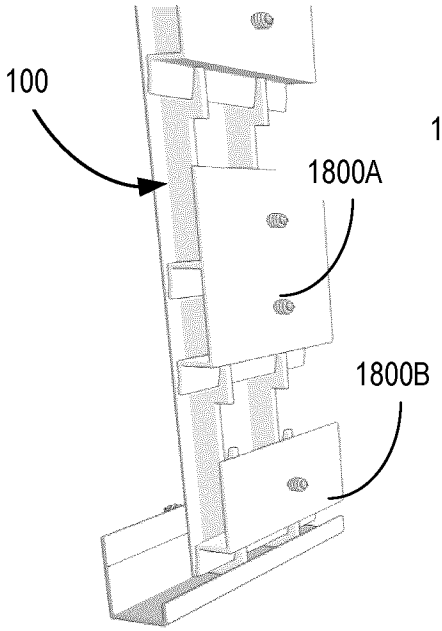

FIG. 18F

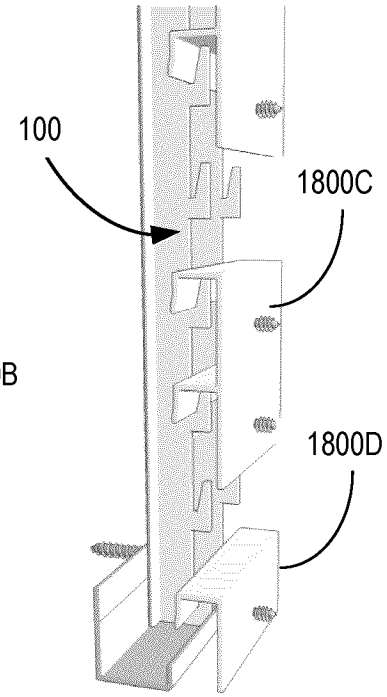

FIG., 18G

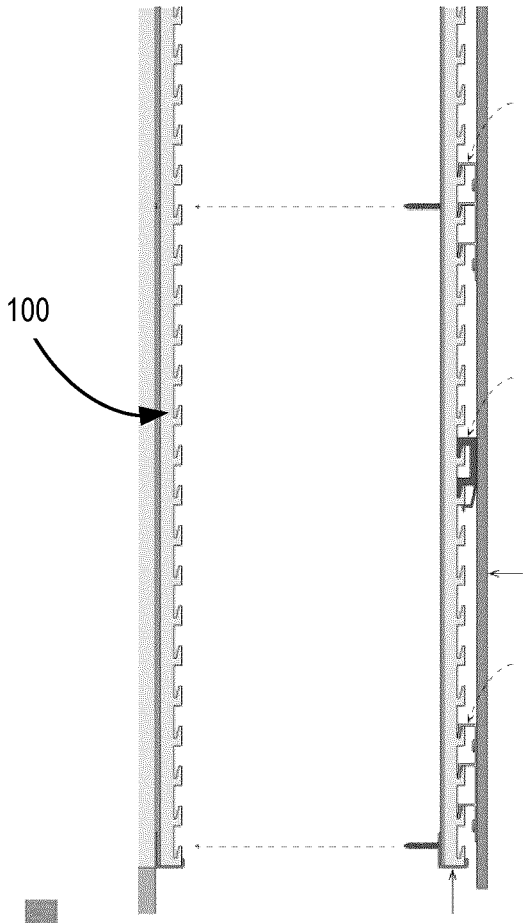

FIG. 18H

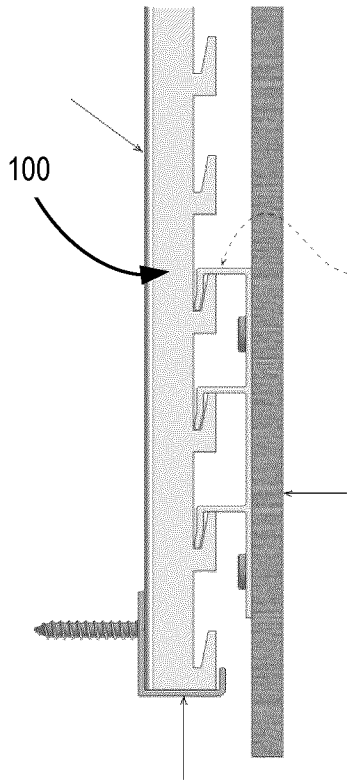

FIG. 18I

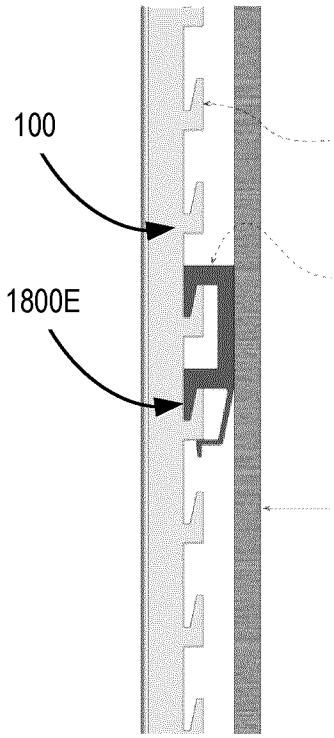

FIG. 18J

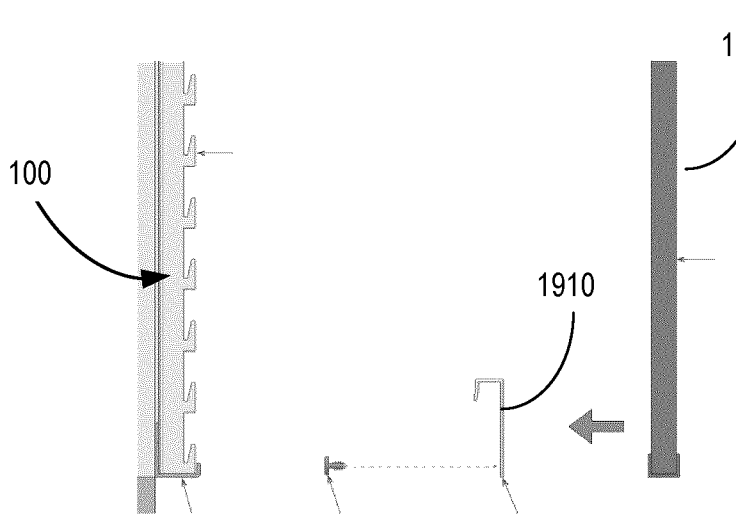

FIG. 19A

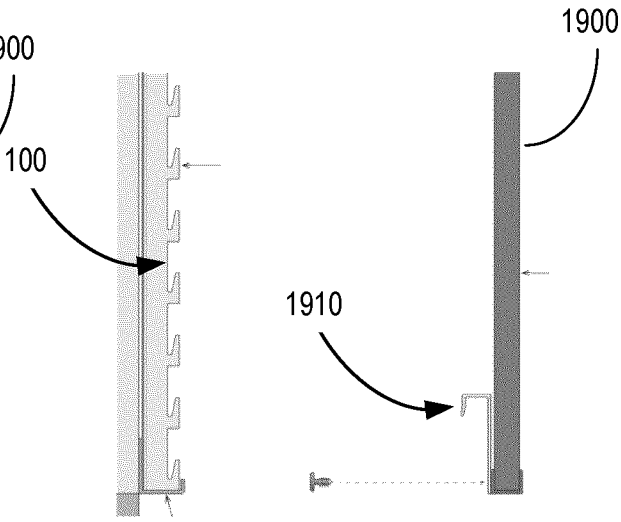

FIG. 19B

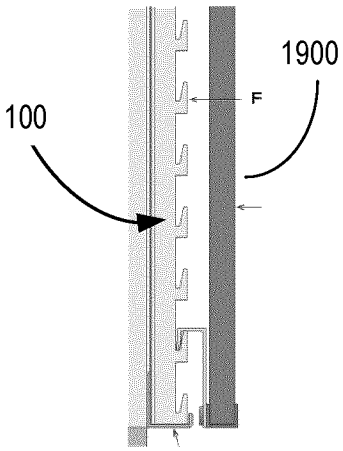

FIG. 19C

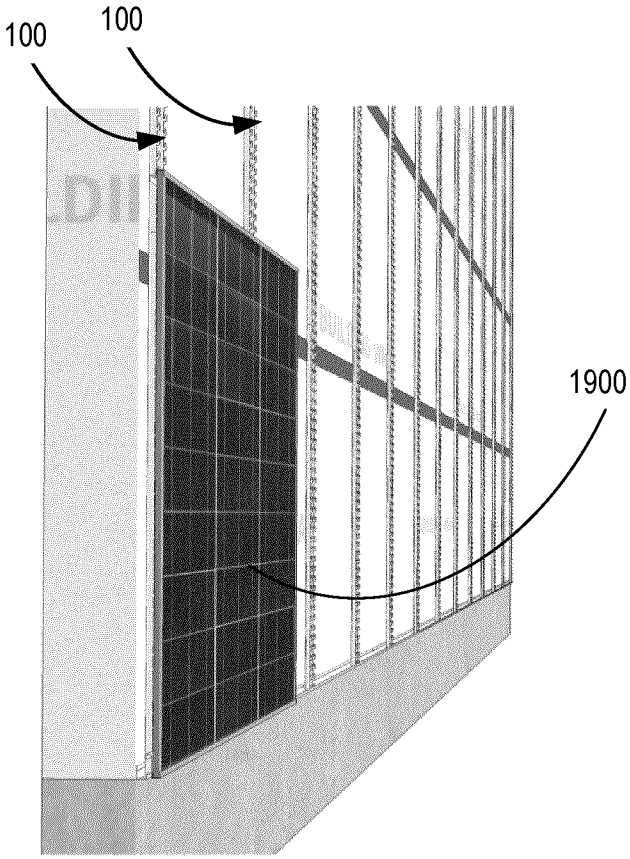

FIG. 19D

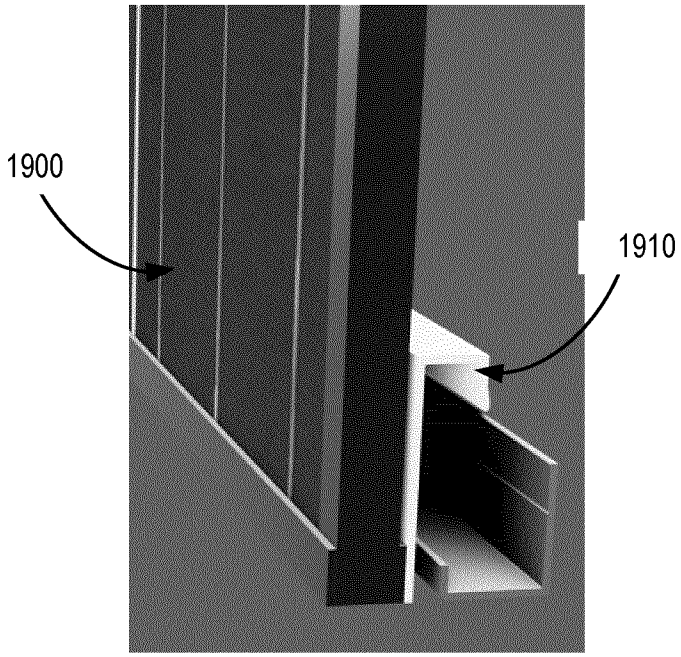

FIG. 19E

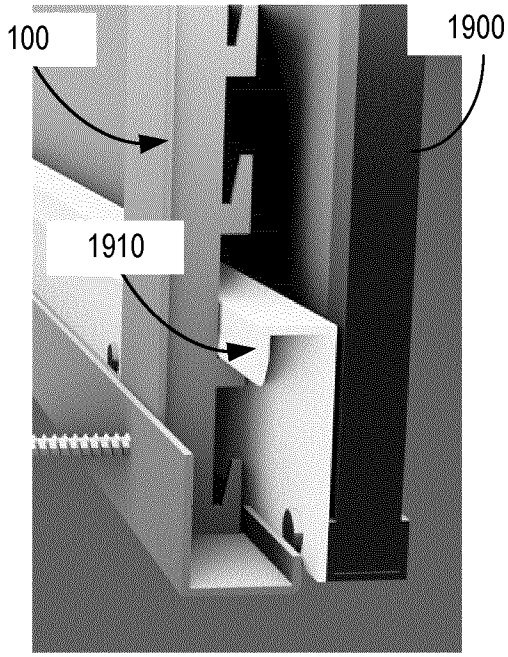

FIG. 19F

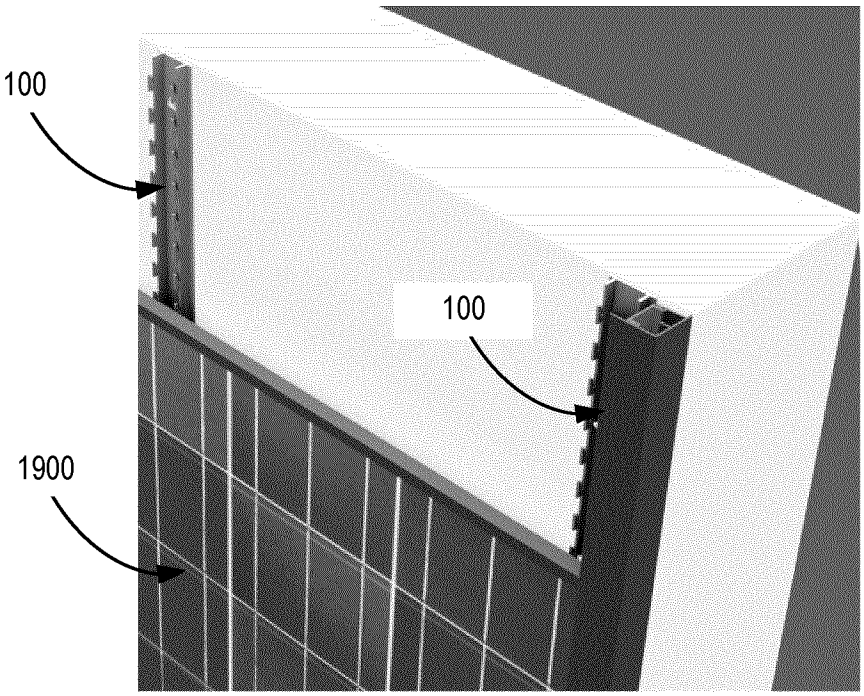

FIG. 19G

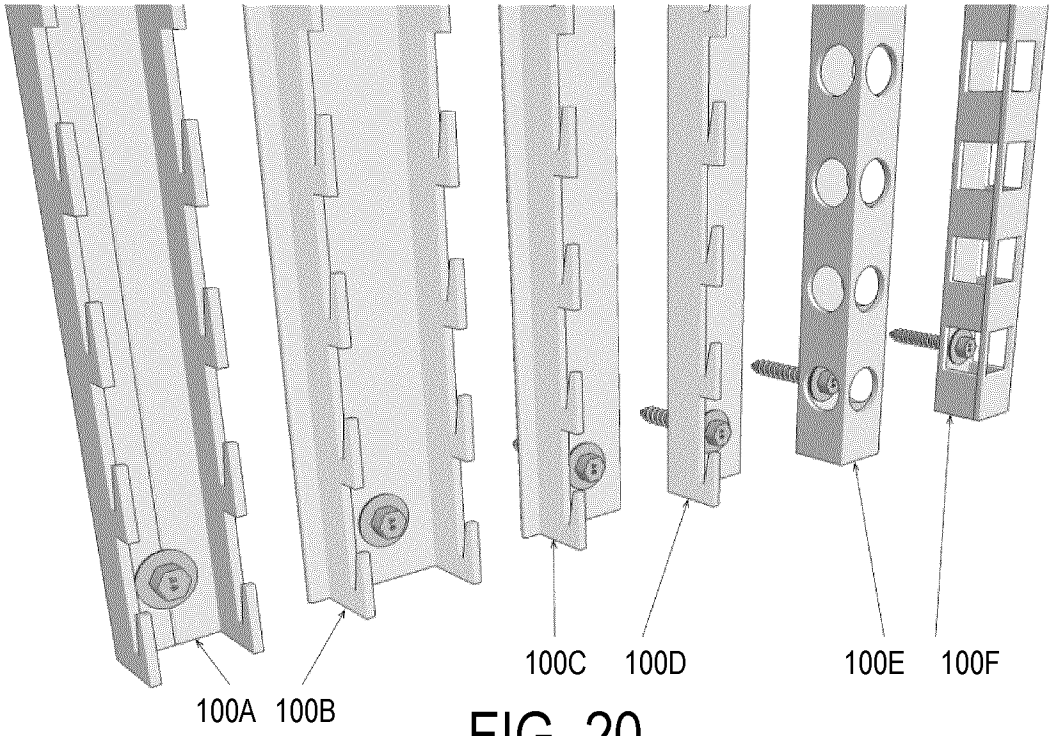
100A
100B
100C
100D
100E
100F

FIG. 20

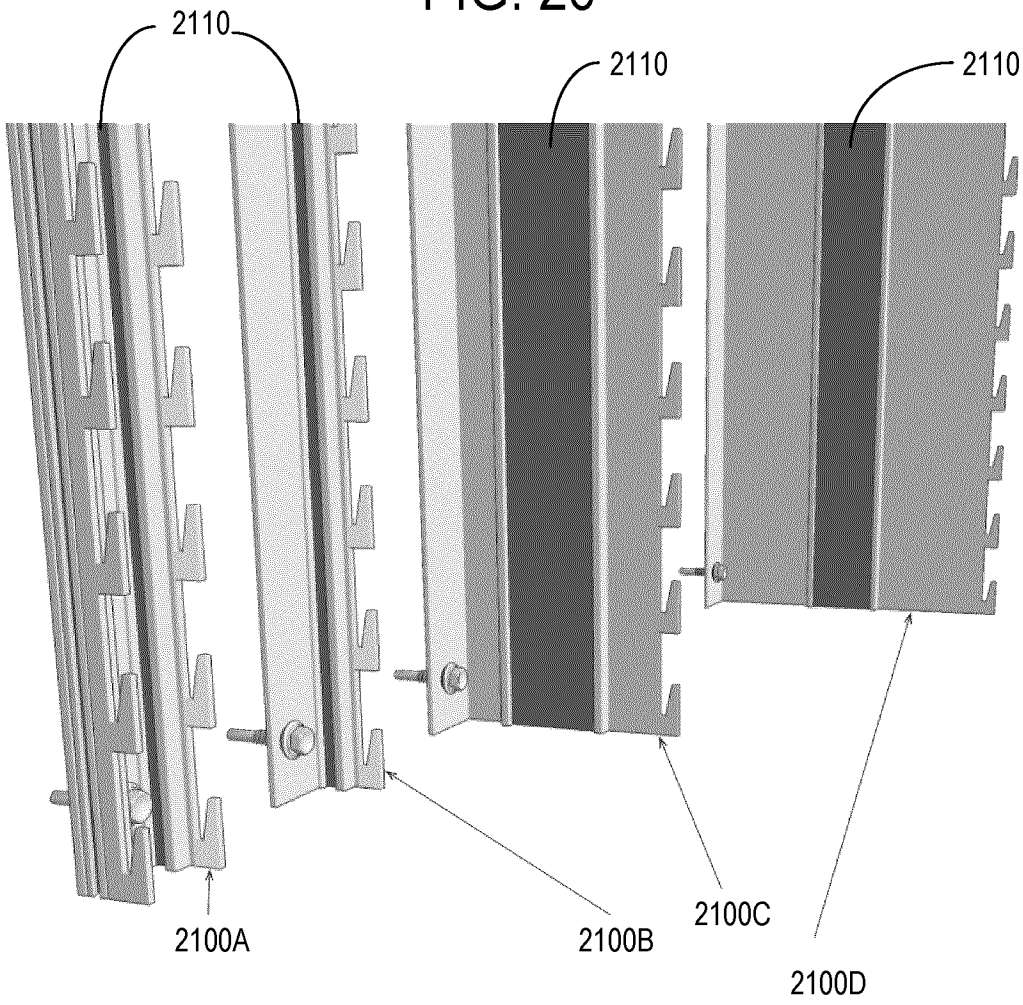
2110
2110
2110
2100A
2100B
2100C
2100D

FIG. 21

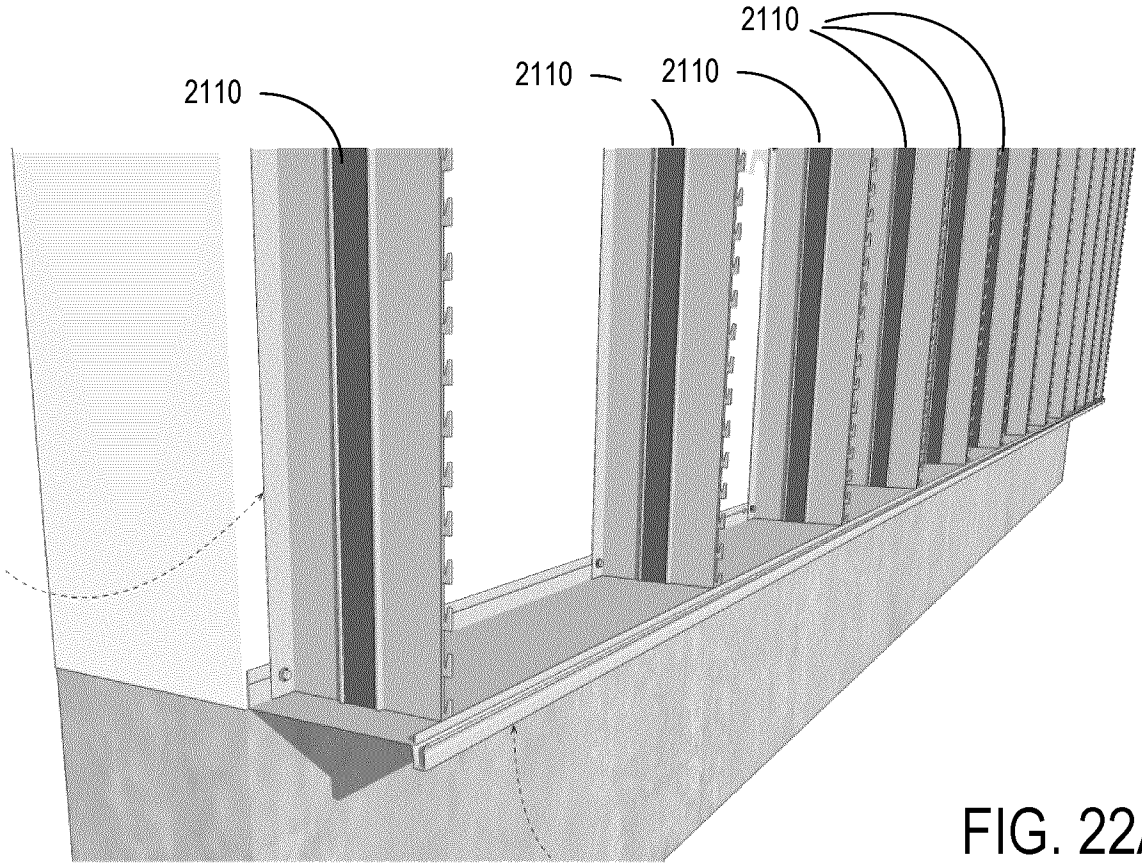

FIG. 22A

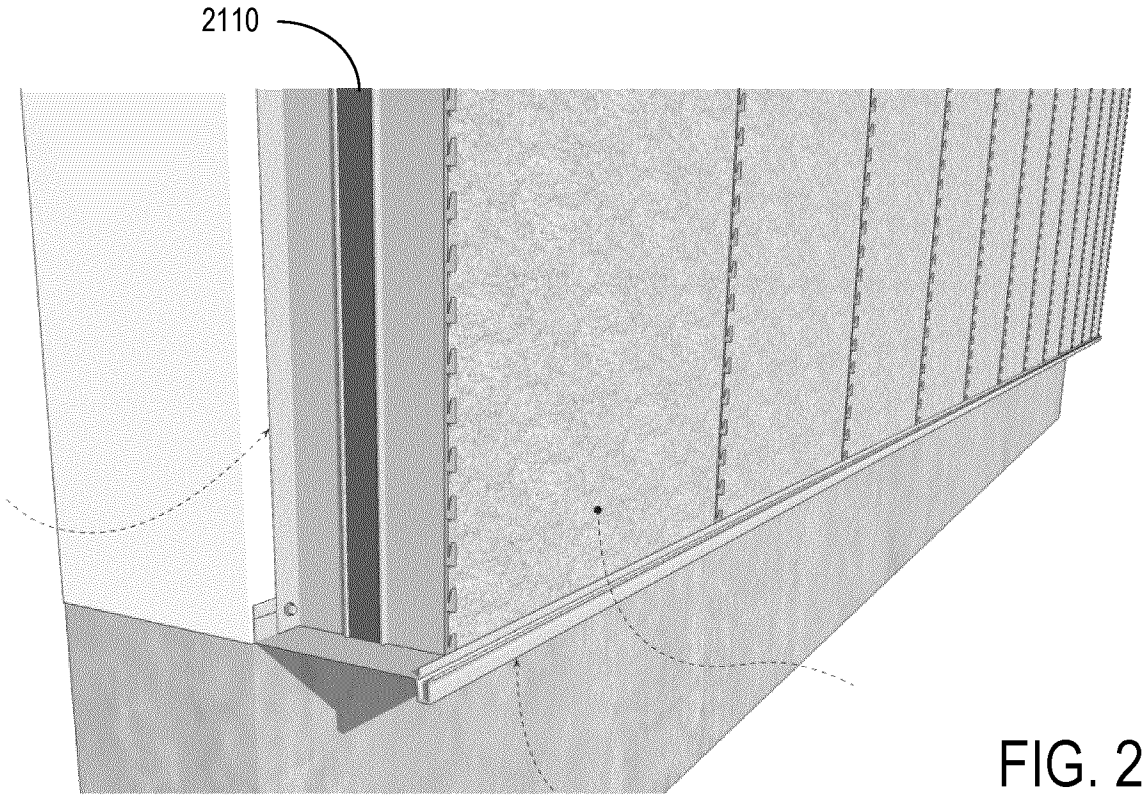

FIG. 22B

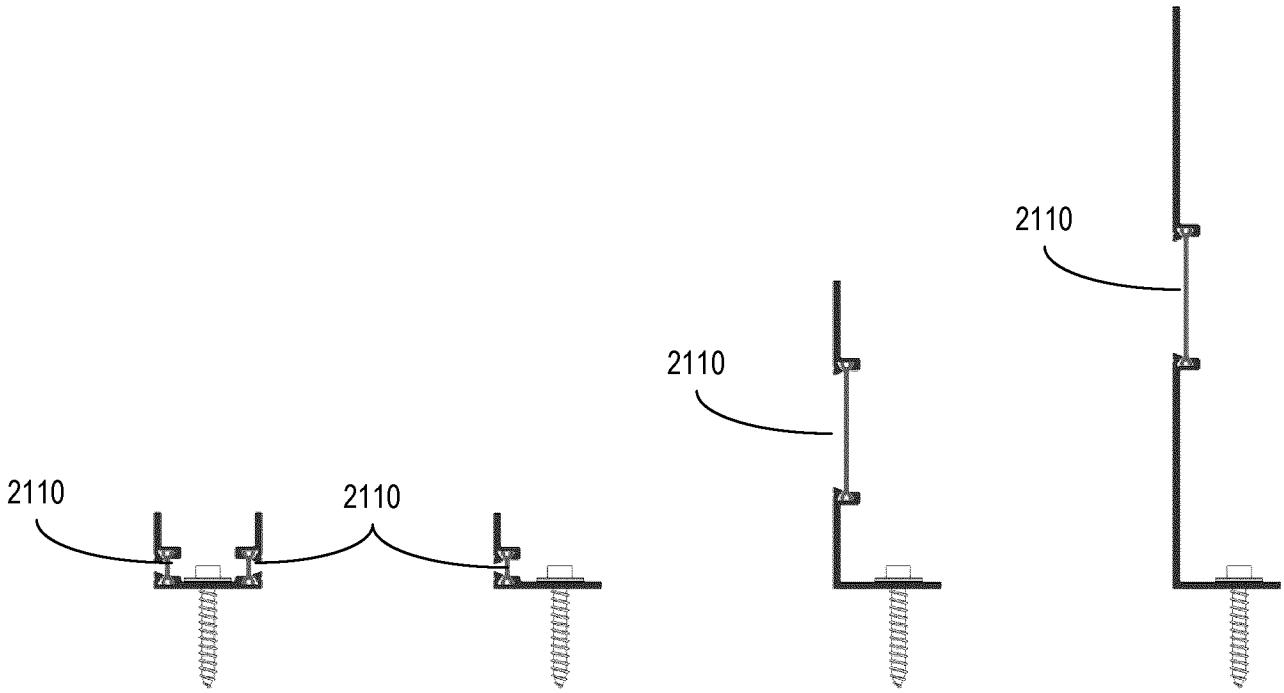

FIG. 22C

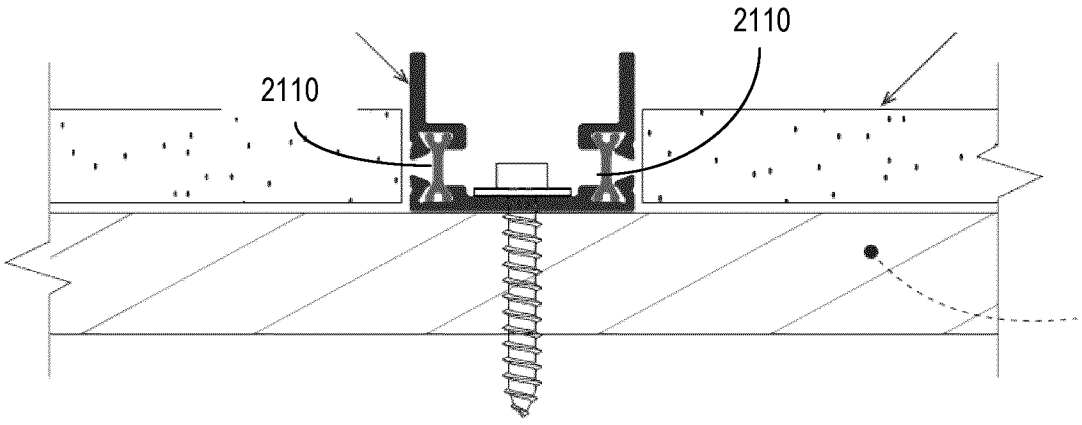

FIG. 22D

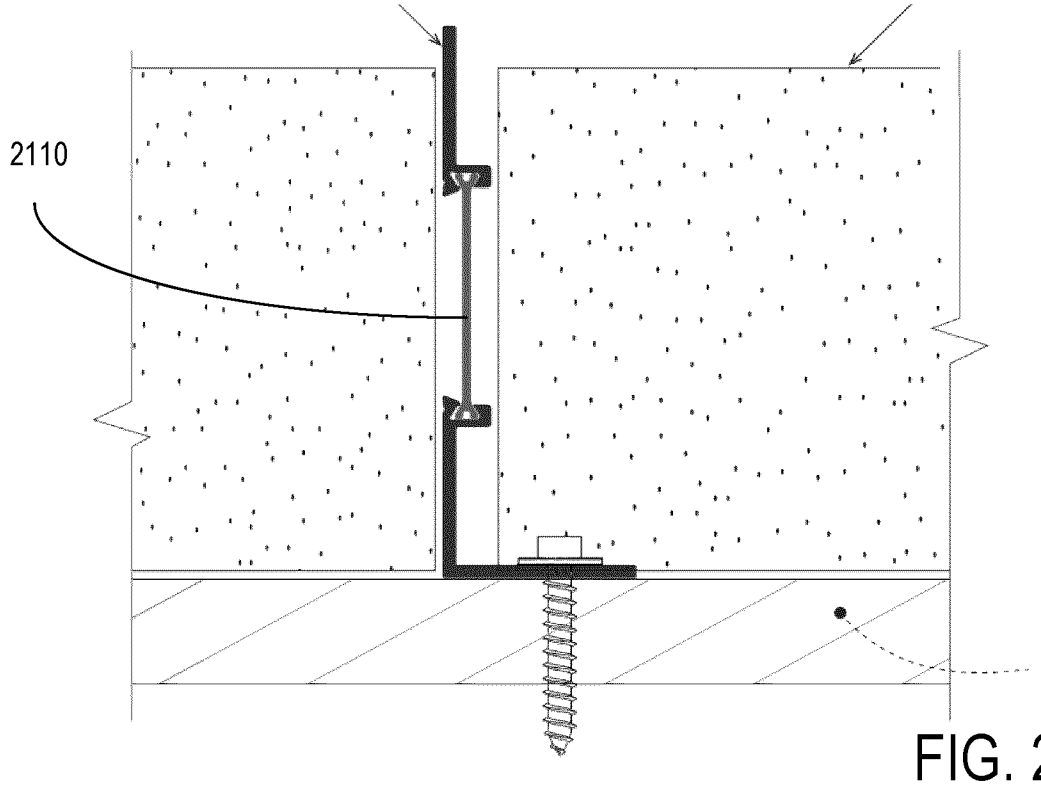

FIG. 22E

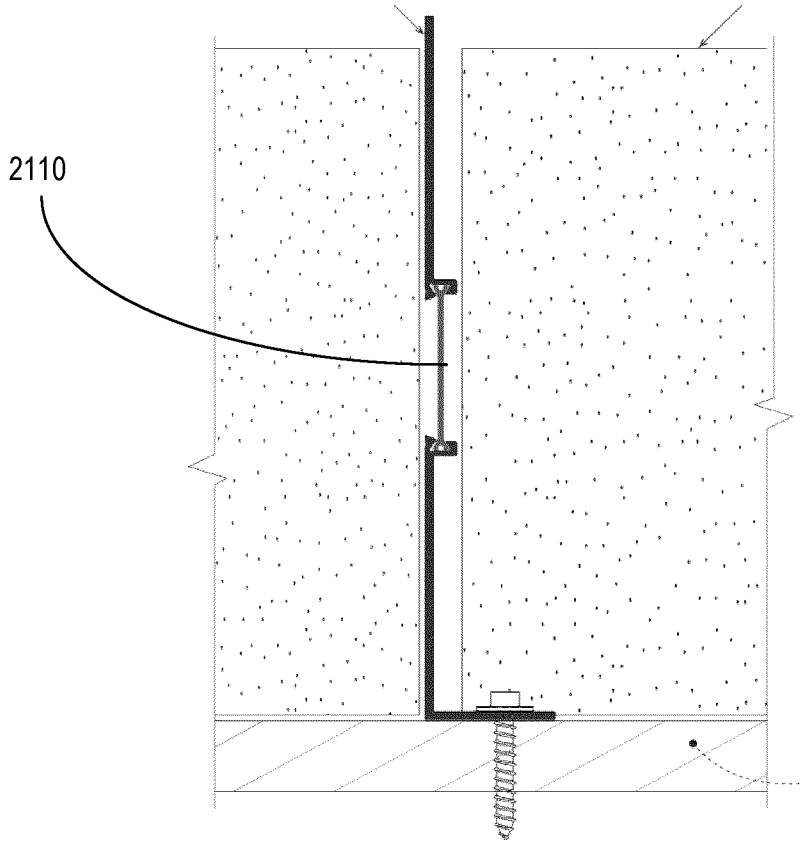

FIG. 22F

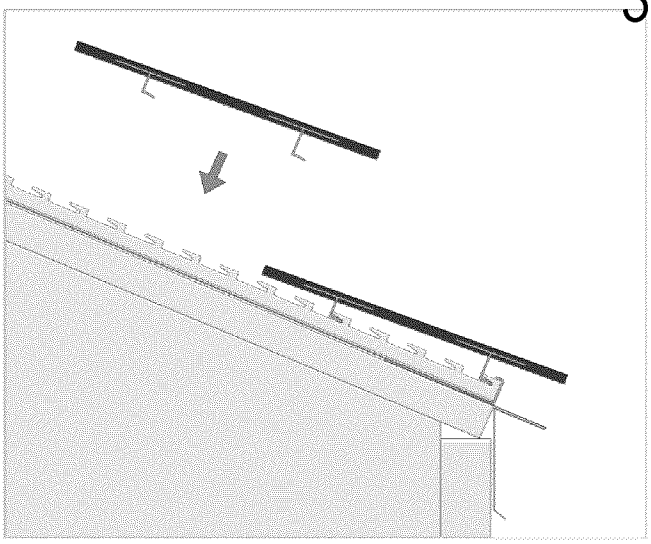

FIG. 23A

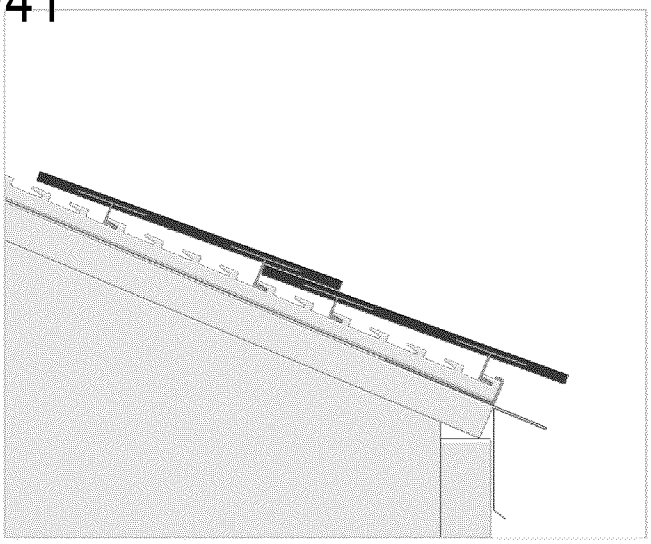

FIG. 23B

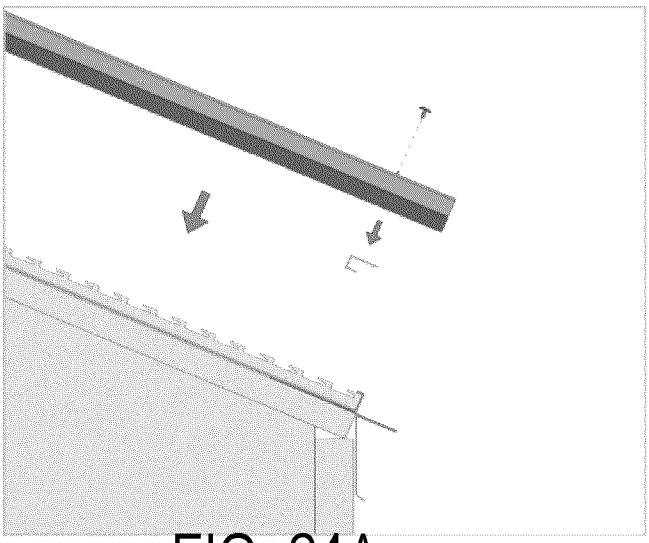

FIG. 24A

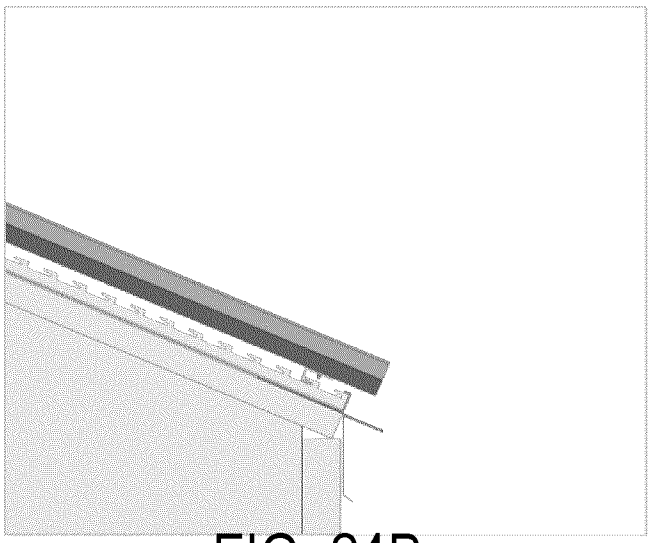

FIG. 24B

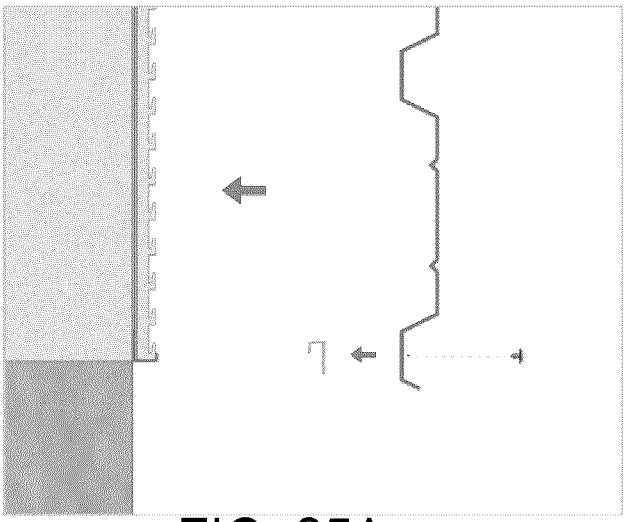

FIG. 25A

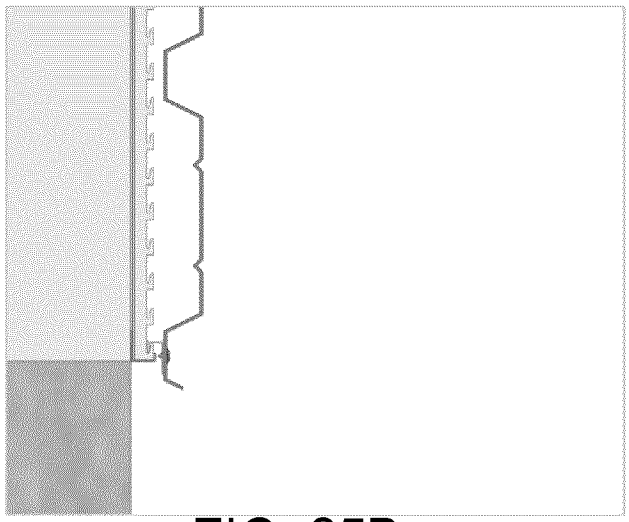

FIG. 25B

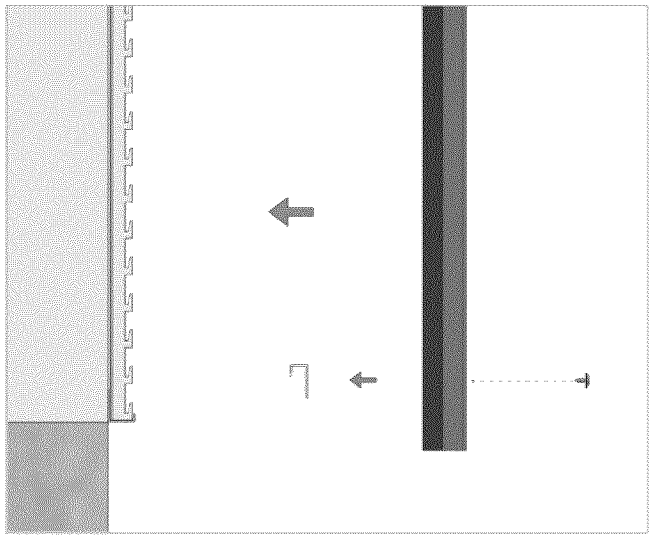

FIG. 26A

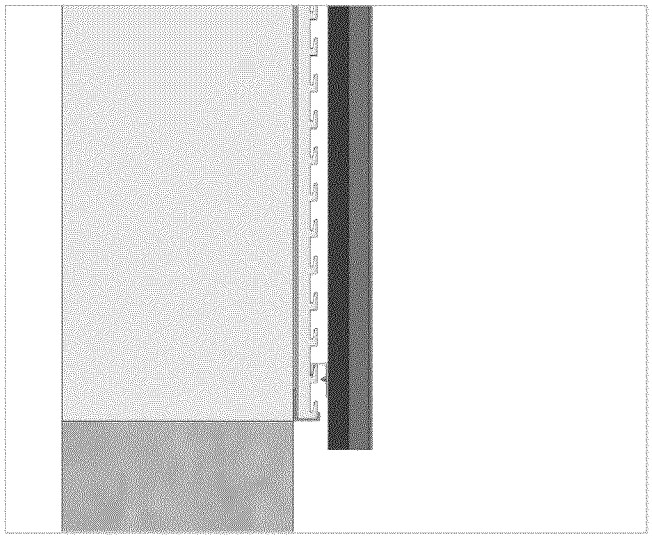

FIG. 26B

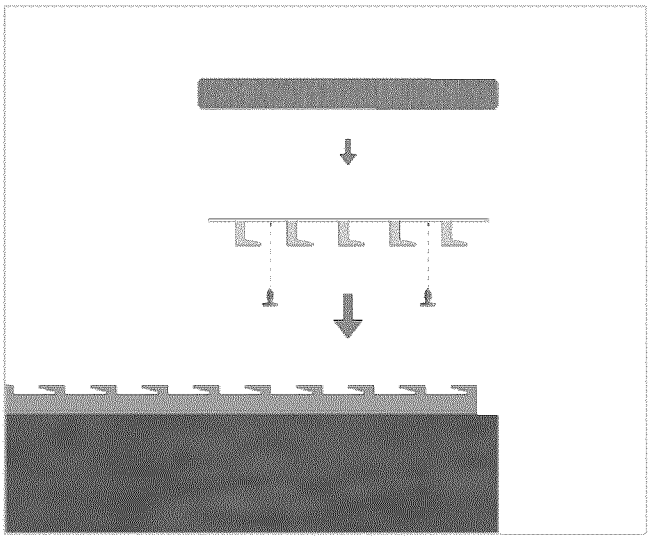

FIG. 27A

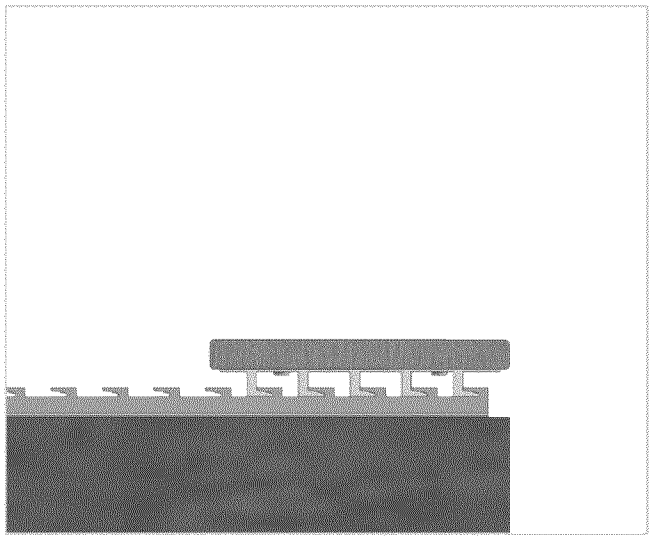

FIG. 27B

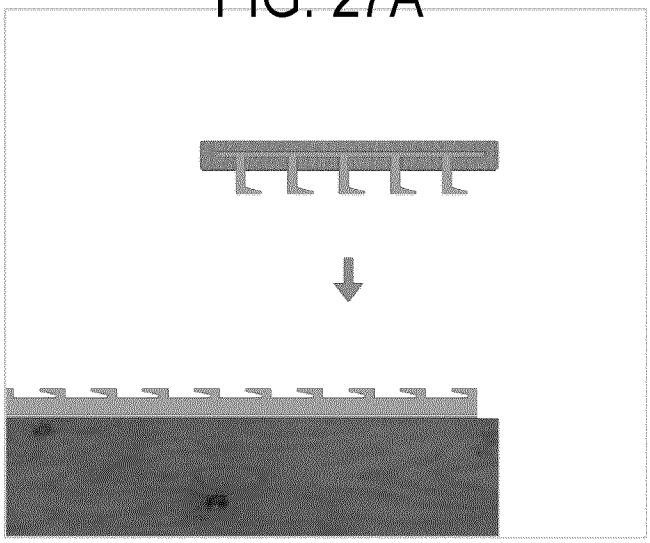

FIG. 28A

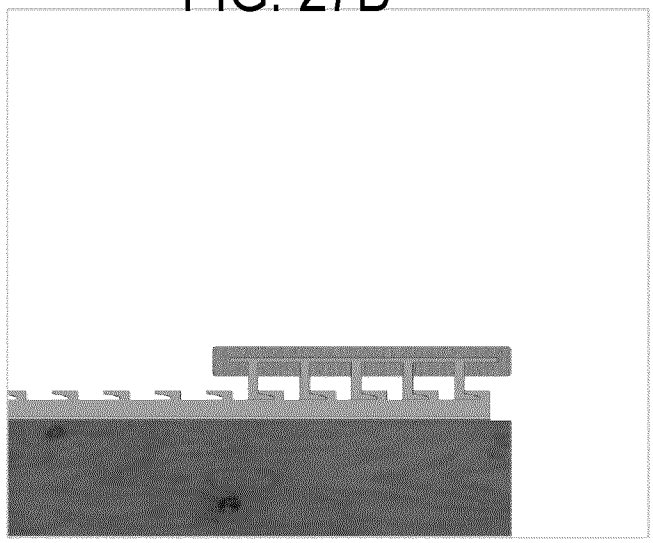

FIG. 28B

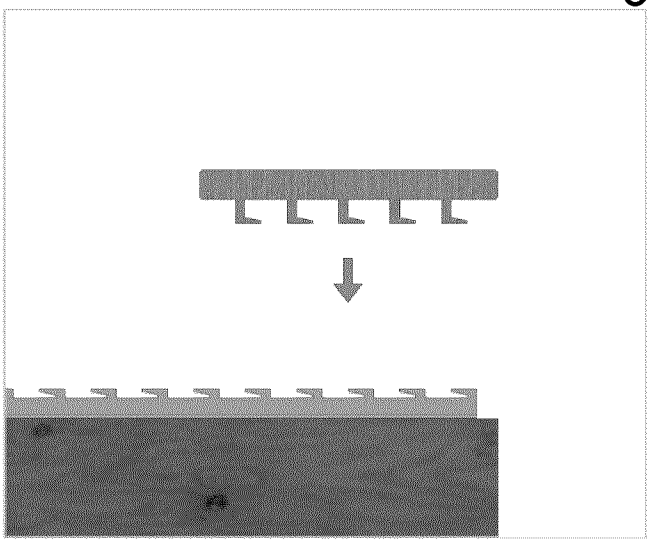

FIG. 29A

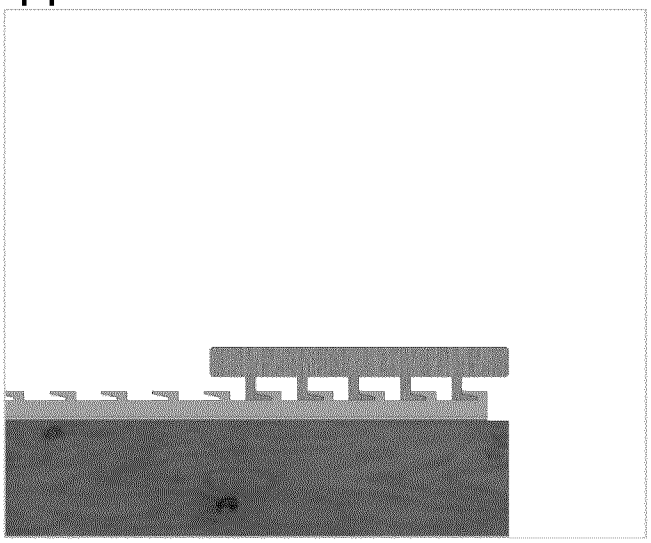

FIG. 29B

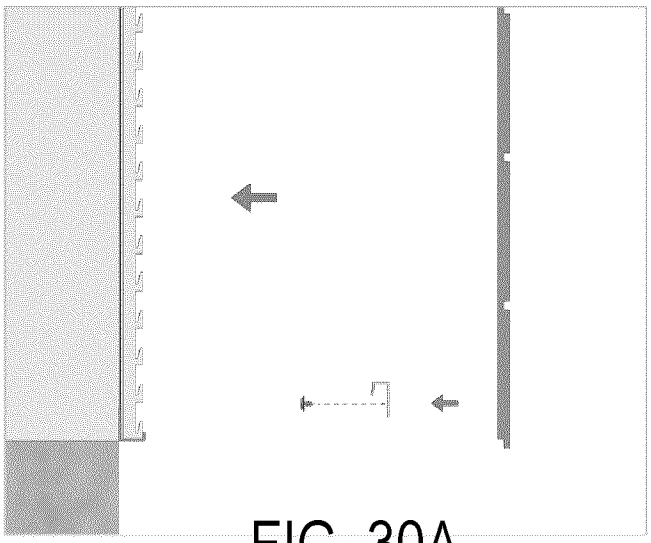

FIG. 30A

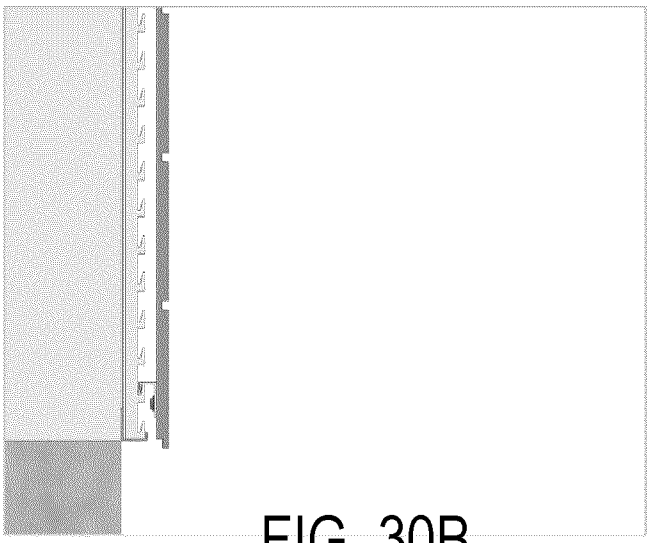

FIG. 30B

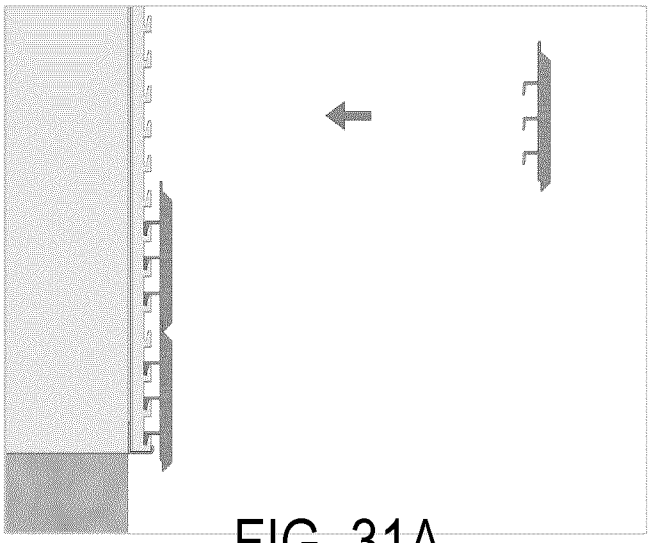

FIG. 31A

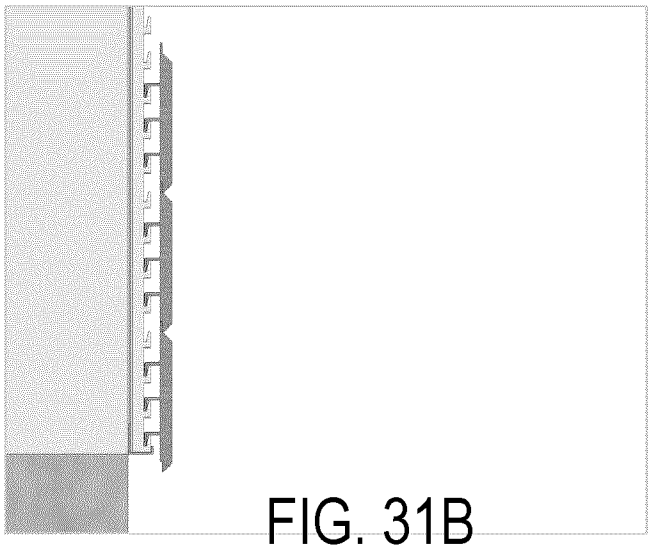

FIG. 31B

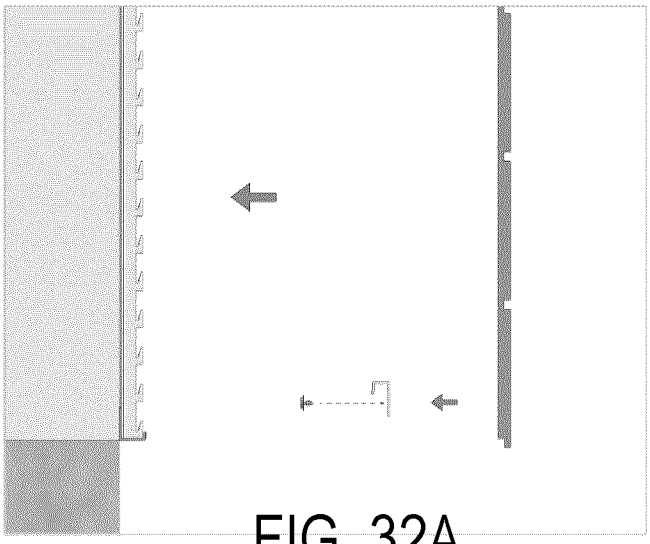

FIG. 32A

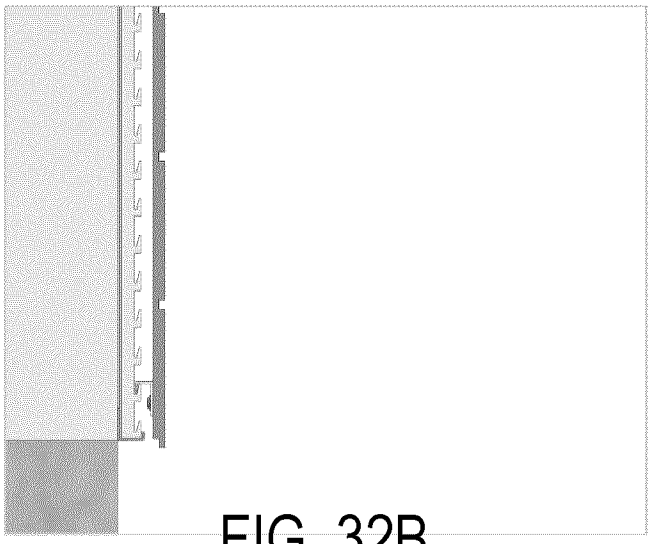

FIG. 32B

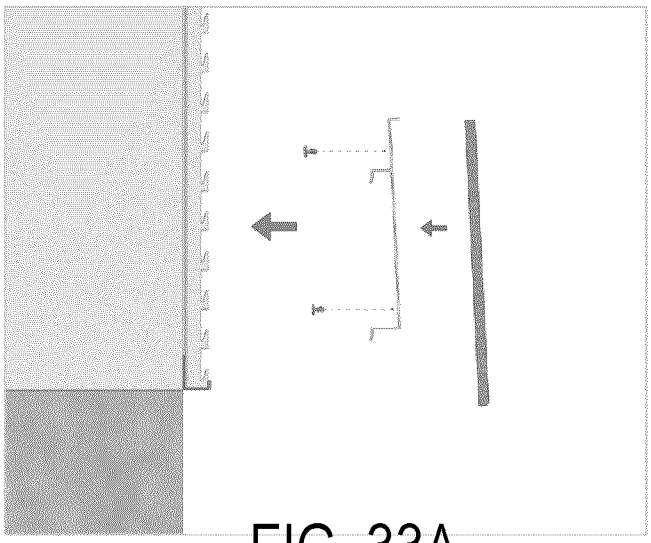

FIG. 33A

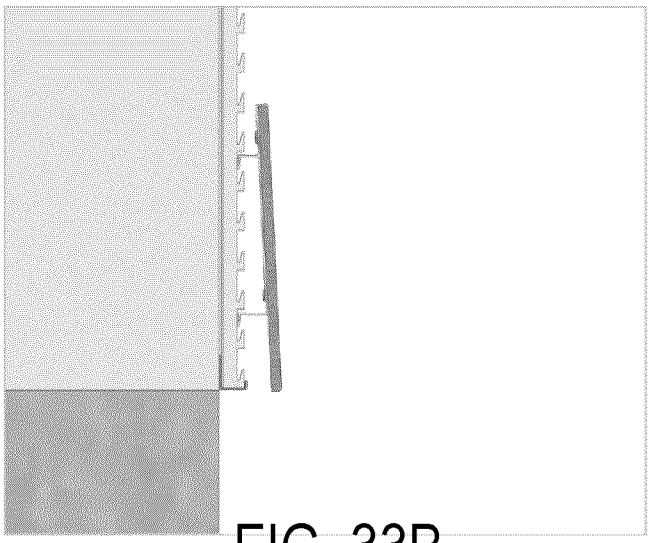

FIG. 33B

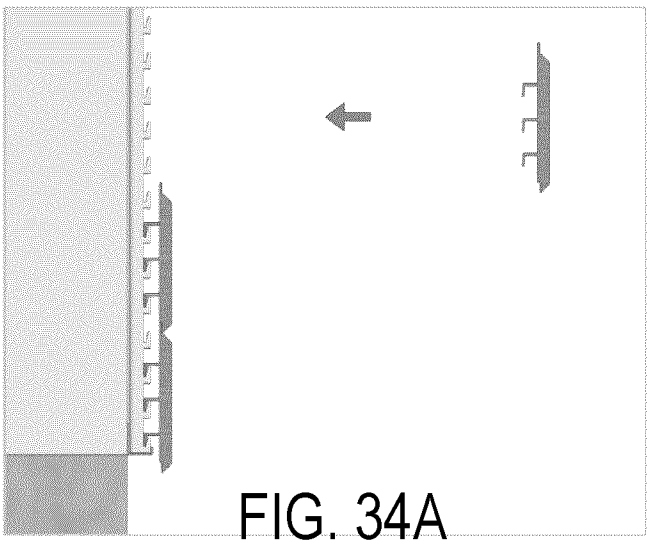

FIG. 34A

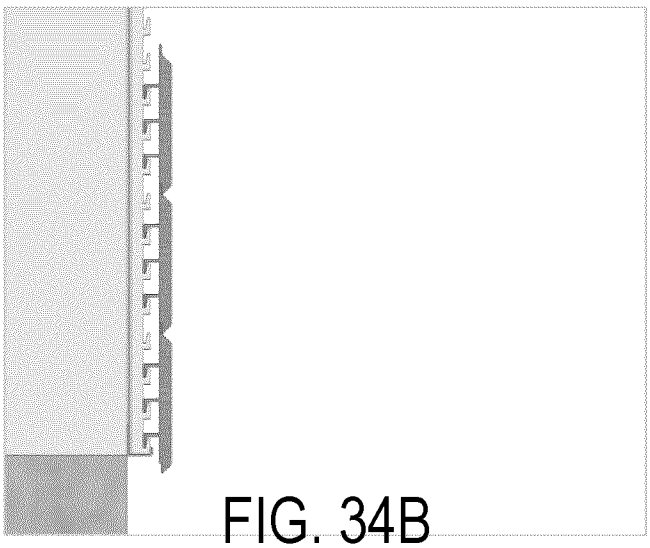

FIG. 34B

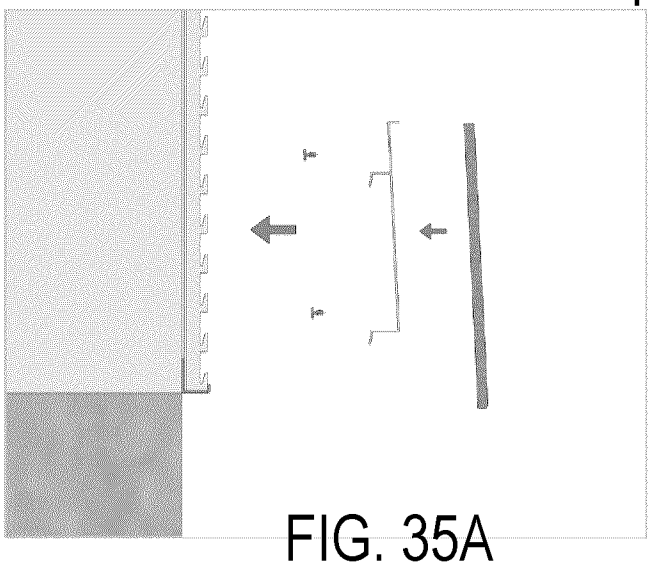

FIG. 35A

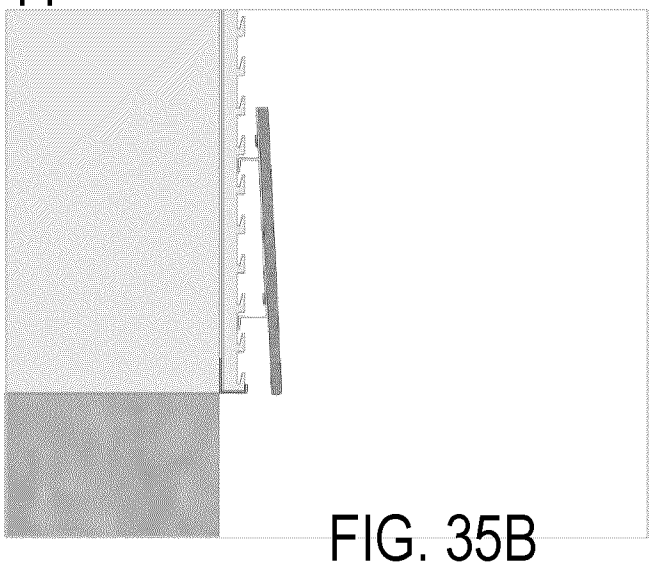

FIG. 35B

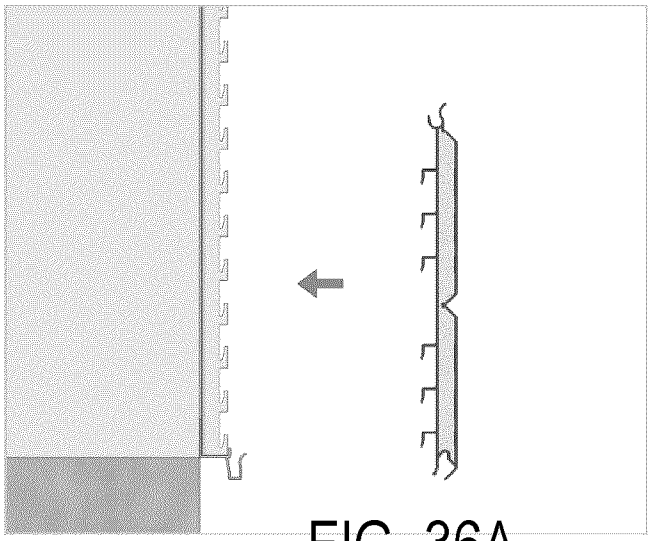

FIG. 36A

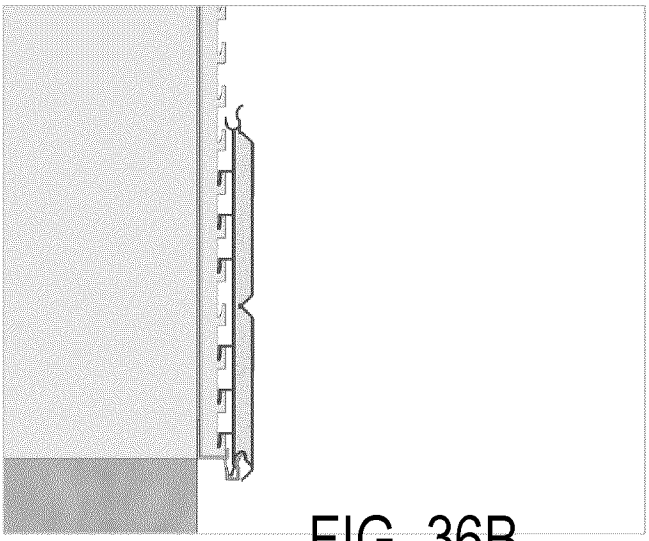

FIG. 36B

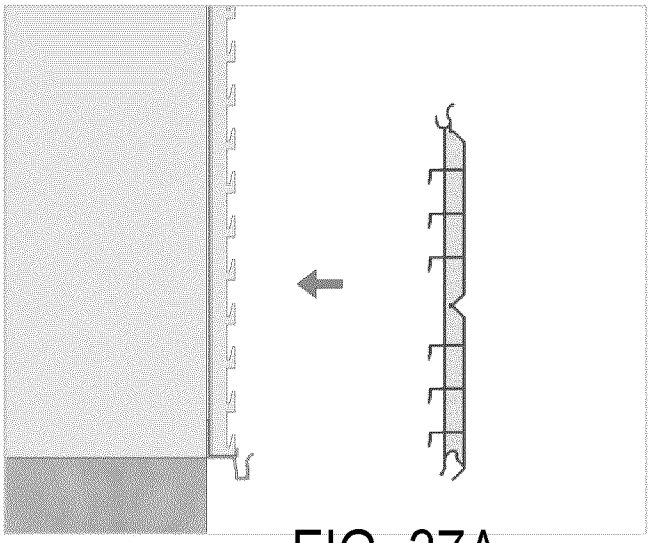

FIG. 37A

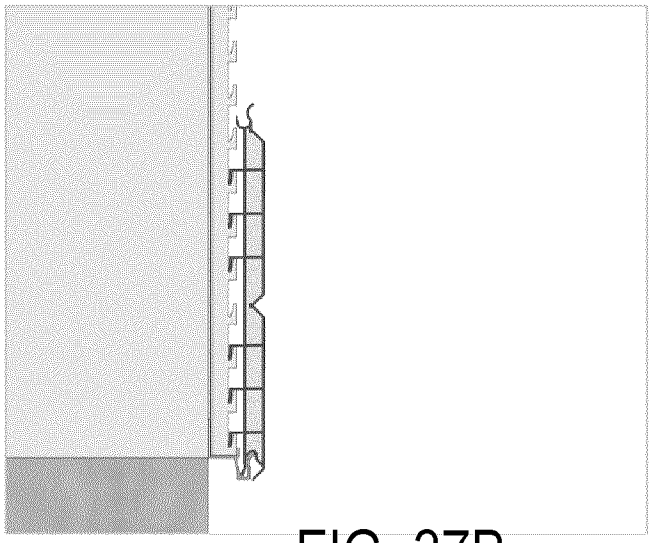

FIG. 37B

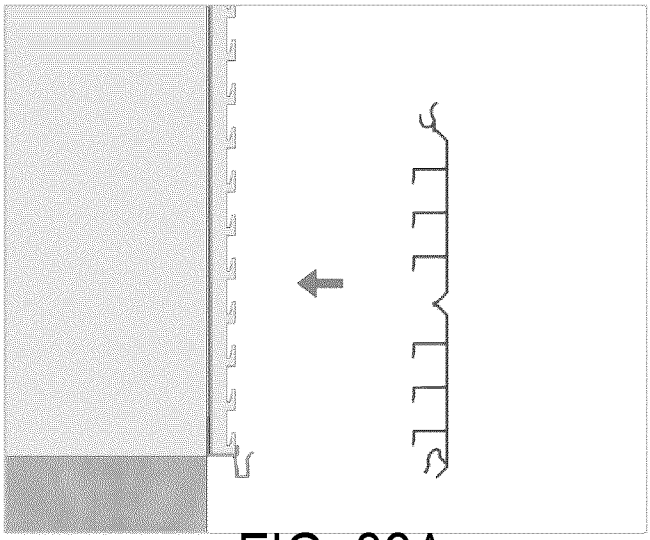

FIG. 38A

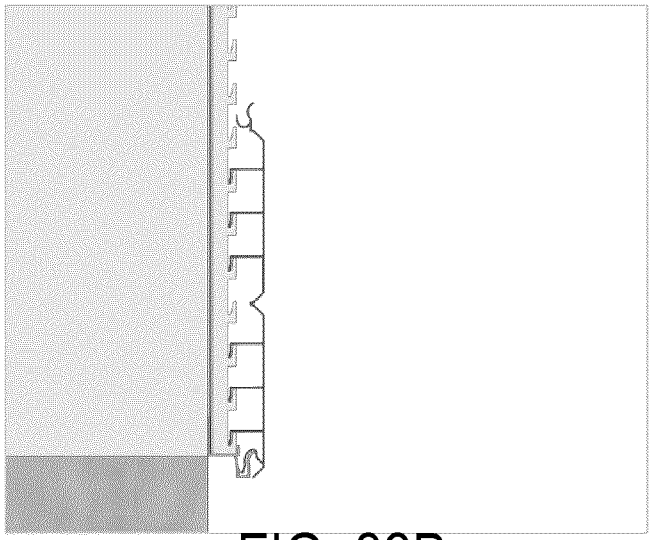

FIG. 38B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2021/050078

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **E04F 13/24** (2006.01) , ***E04C 2/40*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: E04F 13/24 (2006/01), E04C 2/40 (2006.01), E04, E03

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Databases: Questel Orbit

Keywords: panel, plank, mount, anchor, attach, fastener, hook, hanger, channel, gap, sliding, U channel, recess

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CA 3037878 A1 (HARNISH, S. et al.) 29 March 2018 (29-03-2018) ~Entire document~	1-4, 11-15, 22
X	WO 03089734 A1 (KIM, Y.) 03 November 2003 (03-11-2003) ~Entire document~	1-22
X	CN 207499307 U (TANG, S. et al.) 15 June 2018 (15-06-2018) ~Figure 1-2~	1, 12
X	US 20120272603 A1 (CARBINES, R.) 01 November 2012 (01-11-2012) ~Entire document~	1, 12

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D"	document cited by the applicant in the international application	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E"	earlier application or patent but published on or after the international filing date	"&"	document member of the same patent family
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 04 March 2021 (04-03-2021)	Date of mailing of the international search report 05 April 2021 (05-04-2021)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Loretta Ko (873) 354-9771

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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X	WO 2008030114 A1 (CARBINES, R.) 13 March 2008 (13-03-2008) ~Entire document~	1, 12
X	US 6044609 A (KIM, S.) 04 April 2000 (04-04-2000) ~Entire document~	1, 12
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2021/050078

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