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(54) **WALL FACE EXTERIOR STRUCTURE OF OUTER WALL FACE INSULATION BUILDING AND ITS WALL FACE EXTERIOR FURRING, LATERAL FURRING STRIP FRAME FOR INSTALLING WALL FACE EXTERIOR MATERIAL AND WALL FACE EXTERIOR FROMING METHOD BY LATERAL FURRING STRIP FRAME, AND EXTERIOR FURRING MATERIAL AND OUTER WALL EMPLOYING**

(57) In a wall exterior structure, an exterior base is formed of a number of vertical furring strips and a number of lateral furring strips, which are arranged in lattice to each other, each furring strip being a C-shaped channel material. A latch tongue, formed to an upright piece of each vertical furring strip, is latched to an upper through hole in each lateral furring strip. The upright piece is disposed at the position where a vertical furring strip intersects a lateral furring strip. The exterior base is provided by fixing the vertical furring strips on the surface of an outer heat insulating layer. An exterior material is hung to the exterior base so that an outer wall is made through a simple work. A ventilation space of about 5 mm, depending on the thickness of the vertical furring strip, is defined outside the outer heat insulating layer. The ventilation space is generally about 2 cm in thick. Hence, the reduced ventilation space can improve the heat insulation property of a building.

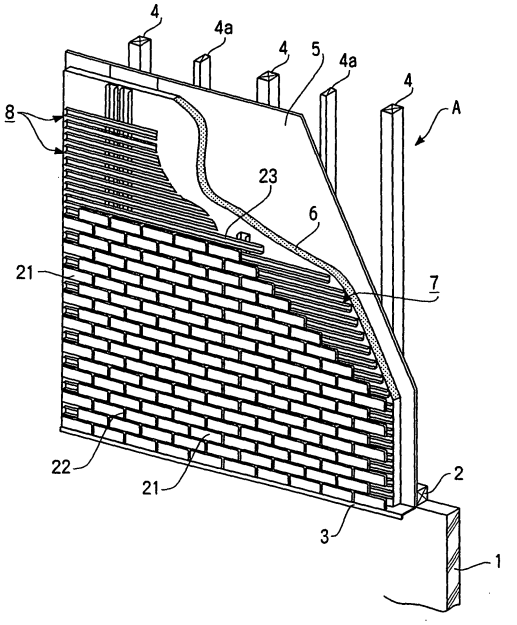

FIG.1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a wall exterior structure for an outer wall heat-insulated building and to a wall exterior base. Furthermore, the present invention relates to a lateral furring frame for wall exterior material installation and to a method for covering walls using the lateral furring frame. Moreover, the present invention relates to an exterior base material and to an outer wall using the exterior base material.

[0002] In more detail, the present invention is made to mount a surface exterior portion to an outer wall via an outer heat insulated layer in a building such as a single-family house. For that purpose, the present invention relates to improving (1) a wall exterior structure and a base for the wall exterior, (2) a lateral furring frame for wall exterior material installation (metallic lateral furring frame) and a method for covering a wall surface using the lateral furring frame, and (3) an exterior base material and outer wall using the base material.

BACKGROUD OF THE RELATED ART

[0003] Conventionally, to construct an exterior structure, a surface exterior portion is mounted to an outer wall surface, acting as the structural frame of a building, via a suitable outer heat insulation layer. Moreover, a desired ventilation space is defined between the outer heat insulation layer and the surface exterior portion. The existence of the ventilation space provides high heat insulation and/or high air tightness to the surface exterior portion itself. Such a wall heat-insulated building is well known.

[0004] As to general buildings including surface exterior portions each in which an outer heat insulation layer is disposed to the above-mentioned outer wall surface via a ventilation space, the wall exterior structure is disclosed in Japanese Patent laid-open publication No. Tokkai 2000-204688.

[0005] In the conventional wall exterior structure, plural wooden furring strips are used. First, furring strips are arranged in parallel on the surface of a structural panel spread over the outer wall surface of a building, via desired spacers, and plural longitudinal portions are securely fixed by means of metal fittings. By doing so, required rows of furring strips are prepared as exterior bases.

[0006] Next, with the furring strip rows left on the surface, respective spacers are embedded in the outer heat insulation layer foamed in the construction site. An exterior structure is constructed through loading outer materials, for example, exterior tiles or plate sidings, over the surfaces of the remaining furring strip rows.

[0007] In this case, a ventilation space, having a gap equal to or near to the depth of the furring strip rows, is defined between each exterior material and outer heat insulation layer suspended over the surface of a structural panel. By doing so, an exterior structure having a ventilation space is completed in the outer wall heat-insulated building.

[0008] In the case of the conventional structure, the furring strip is about 3 cm in width and about 2 cm in thick. As a result, the gap of the ventilation space is about 2 cm, corresponding to the thickness of the furring strip row.

[0009] However, the conventional structure requires attachment of spacers onto exterior surfaces of an outer wall acting as a structural frame and formation of foamed outer heat insulation layers at the construction site. Therefore, undesired problem is that the heat insulation external work on the construction spot is complicated and much hours of work are consumed.

[0010] In such a case, respective furring strips, which support the whole weight of a heat insulation structure such as an exterior material, are fixed via spacers to the surface exterior portion on a structural panel, by means of fittings such as screwed nails. Hence, the whole load acts on the fittings via each furring strip. As a result, it is unavoidable that a failure such as deflection of mounting shafts of the fittings may be induced. For that reason, in sufficient consideration of the load due to exterior materials, an exterior structure having predetermined ventilation space (ventilation gap) must be constructed within an allowable effective length of the mounting shafts of fittings.

[0011] In the illustration in the above-mentioned prior art document, the total dimension (gap dimension) between each furring strip and the surface of an outer wall acting as a structural frame is usually set to an actual length of about 5 cm. For that reason, the effective thickness of the structural panel is about 5 cm. If the effective thickness of the structural panel is about 0.5 cm and the thickness of each furring strip is about 2 cm, the thickness of an outer heat insulation layer formed through the foaming process at the construction site ranges 2.5 cm to 3 cm.

[0012] If the total dimension between the exterior surface and the furring strip is set to a relative large value or the thickness of the furring strip is set to a small value, the outer heat insulation layer can be thickened at least by the set value. By doing so, it is clear that the heat insulation performance of the building itself is more improved, thus providing an exterior structure more effectively.

[0013] However, the total dimension between the surface of the exterior portion and each furring step is generally limited to about 7 cm. More increasing the total dimension leads to excessively lengthening the effective shaft length of the fixing tool. The increased dimension leads to easily deflecting the shaft and decreasing the overall strength, as described preciously. Hence, the total dimension cannot be set to a critical value or more. Moreover, since the furring strip is made of wood, a reasonable material strength must be usually reserved. Hence, the thickness of each furring strip cannot be reduced.

[0014] In such a case, when a foamed heat insulated panel is used as one structural aspect of the outer heat

insulation layer, the thickness of the outer heat insulation layer is limited to at most about 3 cm to 5 cm because the total dimension is limited due to the effective length of the shaft of a fixing tool. As a result, it is impossible to improve the heat insulation performance of a building by disposing outer heat insulation layers having a more thickness than the critical thickness.

[0015] A furring strip in a standard unit set to a predetermined length (hereinafter, referred to as "standard lateral furring strip") is often used as a furring strip for a wall exterior base constructing the wall exterior, particularly, as a horizontally arranged furring strip. The standard lateral furring strip is mounted to an outer wall acting as the structural frame alone or is mounted via other furring strip (referred to as "a vertical furring strip" to distinguish clearly from "the standard lateral furring strip"). The resultant structure is called an outer exterior material mounting base.

[0016] The standard lateral furring strip has protruded lines or engagement rails, running in parallel to both edges thereof. The outer exterior material, for example, the recesses on the back side of an exterior tile are hooked to the engagement rails (refer to Japanese Patent Laid-open Publication No. Tokkai 2003-172012).

[0017] In such a case, on the ground of manufacture, the standard lateral furring strip, which has the length longer than the distance between the center of a main column and the center of an intermediate column in the axial or frame assembling structure of a building, may be set as a standard section. Alternatively, a predetermined length, which is an integral multiple number of the center to center distance, in compliance with Shaku (an old unit in Japanese measuring system) or a metric unit, may be set as a standard length. The standard lateral furring strips are arranged horizontally and continuously in line on the outer wall surface while the ends are butting horizontally and longitudinally to each other.

[0018] However, since the ends such as outer corners or windows are provided at many places in an actual building, the horizontal widths are not fixed. Even if the standard furring strips, having a length larger than the center to center distance or having a length equal to the center to center distance, are used, the total length in arrangement does not match with the structural width. At the construction site, one side of the lateral furring strip may protrude as an extra portion from the end or may be short to the end.

[0019] Therefore, at the construction site, the extra portion is cut and removed while the same material is spliced to the shortage. This makes it very complicated to perform working at the construction site and raises undesired problems.

DISCLOSURE OF THE INVENTION

[0020] The present invention is made to improve the above-mentioned previous problems. A first object of the present invention is to provide a wall exterior structure for outer wall heat insulated buildings, wherein the external finish can be performed certainly and easily for the whole surface of outer heat insulated outer wall at a construction site. Moreover, the present invention can stably latch the outer exterior material at all times, can effectively reserve the proper strength of an outer exterior base, can increase reasonably the thickness of an outer heat insulated layer to be produced, and can improve the heat insulation performance.

[0021] A second object of the present invention is to provide a wall exterior base for the outer wall heat insulated building, wherein respective outer exterior materials can be latched stably at all times in a relatively simplified structure.

[0022] A third object of the present invention is to provide a combination of furring strips of various types for wall exterior installation in an outer wall heat insulated building, wherein the cutting and removing works and splicing and compensation are not required at a construction site so that good workability can be always established highly and easily. In such a combination, when lateral furring strips having a fixed length, i.e. standard lateral furring strips, to be mounted to an outer wall surface are combined, a redundant portion in length and a short portion in length, which may occur because of the existence of outer corners or windows on the outer wall surface, can be compensated effectively through a simple operation.

[0023] In order to achieve the above mentioned objects, a wall exterior structure (defined in Claim 1) comprises vertical furring strips arranged vertically and substantially in parallel on a surface of an outer wall on which an outer heat insulating layer is formed; lateral furring strips suspended in lattice and horizontally intersecting with the vertical furring strips; a furring strip frame, acting as an exterior base, including each vertical furring strip acting as an inner side and each lateral furring strip acting as an outer side; and an exterior material sustained to an engaged portion in a surface of each lateral furring strip. The vertical furring strip including vertical latch portions is arranged at predetermined intervals at intersections between the vertical furring strip and the lateral furring strips. The lateral furring strip including lateral latch portions paired with said vertical latch portions. The furring strip frame engages each lateral latch portion corresponding to said lateral furring strip sustained to the vertical furring strip, to each vertical latch portion in the vertical furring strip. A ventilation space corresponding to a width of the vertical furring strip is defined between the outer heat insulating layer and the lateral furring strip.

[0024] In the wall exterior structure, the outer heat insulating layer is pressed against the surface of said outer wall by the vertical furring strips arranged on the outer wall surface (defined in Claim 2).

[0025] In the wall exterior structure, the vertical furring strip has low vertical rims erected at both ends thereof and the lateral furring strip has low lateral rims erected at both ends thereof. The lateral latch portion in a base

surface between the lateral rims is paired with and snapped into the vertical latch portion formed in a base surface between the vertical rims. A gap of the ventilation space is set by the size of rims protruded at the lateral latch portion. (defined in Claim 3)

[0026] In the wall exterior structure, the lateral furring strips are orthogonally arranged in lattice with the vertical rims of the vertical furring strips from the outside. The each lateral latch portion of the lateral furring strip is snapped into each vertical latch portion of the vertical furring strip by slidably guiding the lateral furring strip over the plane of the vertical rims. (defined in Claim 4)

[0027] In the wall exterior structure, the gap of the ventilation space defined between the exterior base and the outer heat insulating layer is set to 1 cm or less. (defined in Claim 5)

[0028] According to the wall exterior structure for an outer wall heat insulated building (defined in Claims 1 to 5), the wall exterior structure can be easily constructed on the outer wall surface of a building. This feature allows the first to third objects to be achieved certainly and effectively.

[0029] Moreover, according to another aspect of the present invention (defined in Claim 6), a wall exterior base in an outer wall heat-insulated building, comprises vertical furring strips arranged vertically and substantially in parallel to an outer wall surface of a building and each having low rims elected at both ends of each vertical furring strip; and lateral furring strips horizontally intersecting vertical rims of each vertical furring strip and suspended in lattice and having rims erected at both ends thereof. An exterior material is suspended over the lateral erect rims of the lateral furring strip. The vertical furring strip is disposed on said outer wall surface having a vertical latch portion corresponding to a position where the vertical furring strip intersects the lateral furring strip. The lateral furring strip has a lateral latch portion corresponding to a position where the lateral furring strip intersects the vertical furring strip. The lateral furring strips are orthogonally arranged in lattice over the plane of rims of the vertical furring strip from the outside. The latch portion of the lateral furring strip is snapped into the latch portion of the vertical furring strip by slidably guiding the rims of the vertical furring strip.

[0030] According to the wall exterior base for an outer wall heat insulated building (defined in Claim 6), the wall exterior base can be easily constructed on the outer wall surface of a building. This feature allows the first to third objects to be achieved certainly and effectively.

[0031] According to another aspect of the present invention (defined in Claim 7), a lateral furring frame for wall exterior material installation in an outer wall heat-insulated building, comprises second vertical furring strips arranged vertically and substantially parallel to an outer wall surface; second standard lateral furring strips intersecting horizontally and sustained in lattice to the second vertical furring strips; and a combination of the second auxiliary extension furring strip and the second standard lateral furring strip, acting as a mounting base for exterior material suspension. The second auxiliary extension furring strip is combined together with the second standard lateral furring strip and slidably inserted to the second standard lateral furring strip. In correspondence with a width in horizontal direction of the outer wall surface, an end of the second auxiliary extension furring strip is variably extended from an end in an elongated direction of the second standard lateral furring strip.

[0032] In the lateral furring frame, various second standard lateral furring strips having different standard dimensions are prepared and the second auxiliary extension furring strips are combined compatibly to the various second short lateral furring strips. (defined in Claim 8)

[0033] In the lateral furring frame, each of the second standard lateral furring strip and the second auxiliary extension furring strip is formed of a shaped metal plate of steel plate, galvanized sheet iron, or aluminum, shaped through deformation processing such as roll forming, press forming, and extrusion. (defined in Claim 9)

[0034] In the lateral furring frame, the length in lateral direction of the second auxiliary extension furring strip is adjusted arbitrarily and slidably with the second auxiliary extension furring strip combined with the second standard lateral furring strip. (defined in Claim 10)

[0035] In the lateral furring frame, the second auxiliary furring strip is slidably inserted squarely into the second standard lateral furring strip and can be sled arbitrarily in the inserted state. (defined in Claim 11)

[0036] The lateral furring frame further (defined in Claim 12) comprises slide regulation means, disposed on both ends of the second standard lateral furring strip, to travel between the second standard lateral furring strip and the second auxiliary extension furring strip or between the second vertical furring strip and the second auxiliary extension furring strip and through the second standard lateral furring strip over a desired length range. The second auxiliary extension furring strip is inserted and sled into the second short lateral furring strip, within a regulation range of the slide regulation means.

[0037] In the lateral furring frame, each of the second standard lateral furring strip and the second auxiliary extension furring strip has a substantially U-shaped cross section to be slidable, with the second standard lateral furring strip and the second auxiliary extension furring strip mutually inserted. The each of the second furring strip has a furring base formed in a bottom portion in the U-shaped strip and respective engagement portions for exterior material suspension, vertically arranged at both ends on the front side. (defined in Claim 13)

[0038] According to the lateral furring strip for wall exterior material installation used for an outer wall heat insulated building (defined in Claims 7 to 13), the length in lateral direction of a lateral furring frame, that is, of a combination of a second standard lateral furring strip and a second auxiliary extension furring strip, used for the outer wall exterior structure in a building, can be easily

adjusted. In other words, the lateral length dealing with the outer corner or window in a building can be easily adjusted. This feature allows the first to third objects to be achieved certainly and effectively.

[0039] According to another aspect of the present invention (defined in Claim 14), a method for covering wall surfaces with a lateral furring frame to dispose a wall exterior material of an outer wall heat insulated building, comprises steps of using a lateral furring frame for outer exterior installation in any one of Claims 7 to 13 (a lateral furring frame for outer exterior material installation in which a second standard lateral furring strip and a second auxiliary extension furring strip are combined together); and disposing the lateral furring strip for outer exterior material installation over the entire width of the outer wall surface through a single or plural second auxiliary extension furring strip, whereby the outer exterior material is suspended to the lateral furring frame.

[0040] The wall covering method using a lateral furring frame for wall exterior installation for an outer wall heat insulated building (defined in Claim 14) allows the first to third objects to be achieved certainly and effectively.

[0041] According to another aspect of the present invention (defined in Claim 15), a metallic wall exterior material base in an outer wall heat insulated building, comprises third metallic vertical furring strips arranged vertically and substantially in parallel to an outer wall surface; third metallic standard lateral furring strips suspended in lattice to intersect horizontally the third metallic vertical furring strips; and third metallic auxiliary extension furring strips slidably inserted to the third metallic standard lateral furring strips. The third metallic standard lateral furring strips and the third metallic auxiliary extension furring strips act as an exterior material mounting base for suspension. To suspend the third metallic standard lateral furring strips to the third metallic vertical furring strips, each third metallic vertical furring strips has brackets formed at predetermined intervals. Each of the third metallic standard lateral furring strips has through holes to engage a bracket at a corresponding intersection to the third metallic vertical furring strip. A though hole in the third metallic standard lateral furring strip is engaged to a bracket of the third metallic vertical furring strip and the upper inner edge of the through hole is hung and suspended. To insert slidably the third metallic auxiliary extension furring strip to the third metallic standard lateral furring strip, the third metallic standard lateral furring strip has a lateral cross section opened in the front side. The third metallic auxiliary extension furring strip, which has the cross section substantially in common with the third metallic standard lateral furring strip, is loosely mounted squarely to the third metallic standard lateral furring strip.

[0042] In the metallic wall exterior material base, to regulate a sliding range of the third metallic auxiliary extension furring strip to the third metallic standard lateral furring strip, a pair of stoppers butts both ends in horizontal cross direction of a bracket of the third metallic vertical furring strip. The bracket protrudes toward the front side via a through hole for hanging in the third metallic standard lateral furring strip and via a through hole for sliding in the third metallic auxiliary extension furring strip. The pair of stoppers is formed at both inner ends of the through hole, for sliding, in horizontal direction at predetermined intervals. (defined in Claim 16)

[0043] The metallic wall exterior material base further comprises a downward-pointing guide fin formed at the corresponding upper inner edge and between a pair of stoppers. The pair of stoppers is provided to a through hole for sliding in said third metallic auxiliary extension furring strip. The guide fin contacts slidably to an upper inner surface of a bracket in the third metallic vertical furring strip. (defined in Claim 17)

[0044] In the metallic wall exterior material base, the through hole for sliding, formed in the third metallic auxiliary extension furring strip, is rectangular in horizontal and longitudinal direction. The guide fin is formed downwardly at the middle portion of the upper inner edge in the through hole. A pair of stoppers is formed at the lower portion on both the horizontal sides of the through hole, such that each of the stoppers overlaps the lower portion of a bracket of the third metallic vertical furring strip. (defined in Claim 18)

[0045] According to the metallic wall exterior base for an outer wall heat insulated building (defined in Claims 15 to 18), the lateral length of a wall exterior base used for an outer wall exterior structure of a building can be adjusted easily. That is, the lateral length of a combination of a third metallic vertical furring strip, a third standard lateral furring strip, and a third auxiliary extension furring strip can be adjusted easily. In other words, the lateral length dealing with the outer corner or window in a building can be easily adjusted. This feature allows the first to third objects to be achieved certainly and effectively.

[0046] According to another aspect of the present invention (defined in Claim 19), a metallic wall exterior material base in an outer wall heat insulated building, comprises a rail unit frame produced by assembling in a lattice form, fourth metallic vertical rail (fourth metallic vertical furring strip) arranged vertically and substantially in parallel to an outer wall surface; fourth metallic standard lateral rail (fourth metallic lateral furring strip for bridging) horizontally suspended in lattice with third metallic vertical rails; and fourth metallic vertical rail for bridging (fourth metallic short furring strip for bridging) slidably inserted into the fourth metallic standard lateral rail in its longitudinal direction. Exterior materials are sustained to the fourth metallic standard lateral rails and the fourth metallic short lateral rail for bridging.

[0047] In the exterior material base further comprises fourth metallic extension adjusting lateral rails (fourth metallic extension adjusting lateral furring strips) for adjusting the unit width by extending horizontally and longitudinally the fourth metallic standard lateral rail acting as a part of the rail unit frame. Exterior materials are suspended with the fourth metallic extension adjusting lateral rail, together with the fourth standard lateral rail and the

fourth metallic lateral rail for bridging. (defined in Claim 20)

[0048] In the exterior material base, the brackets are formed to the fourth metallic vertical rail acting as part of the rail unit frame vertically and at predetermined intervals. The fourth metallic standard lateral rail acting as part of the rail unit frame includes engagement holes each in which a bracket is inserted at an intersection to the fourth metallic vertical rail. The bracket in the fourth metallic vertical rail is inserted into an engagement through hole in the fourth metallic standard lateral rail and engages the upper inner edge of the engagement through hole. (defined in Claim 21)

[0049] In the exterior material base, a bracket in the fourth metallic vertical rail is used in common to the fourth metallic standard lateral rail for bridging to support the upper edge of an engagement through hole in the fourth metallic standard lateral rail. The bracket being supported on the front side of the engagement through hole, whereby the fourth metallic short lateral rail for bridging is coupled to the fourth metallic standard lateral rail. (defined in Claim 22)

[0050] In the exterior material base, a bracket in the fourth metallic vertical rail is used in common to the fourth metallic extension adjusting lateral rail to support the upper edge of an engagement through hole in the fourth metallic standard lateral rail. The bracket being supported on the front side of the engagement through hole, whereby the fourth metallic extension adjusting lateral rail can extend the fourth metallic standard lateral rail. (defined in Claim 23)

[0051] In the exterior material base, a nearly L-shaped bracket in vertical cross section is formed by cutting and electing a bottom portion of the fourth metallic vertical rail. Latch pieces pointing inward and downward are formed in the bracket. The latch pieces can be snapped into the latch hole formed in the fourth metallic standard lateral rail. The upper edge of the engagement through hole formed in the fourth metallic short lateral rail for bridging is slidably sandwiched between the bottom portion of the fourth metallic vertical rail and the latch piece. (defined in Claim 24)

[0052] In the exterior material base, the upper edge of the engagement through hole formed in the fourth metallic short lateral rail for bridging is slidably sandwiched between the bottom portion of the fourth metallic vertical rail and the latch piece. (defined in Claim 25)

[0053] According to the metallic wall exterior base for an outer wall heat insulated building (defined in Claims 19 to 25), the exterior base used covering the outer wall exterior structure of a building can be constructed easily. This feature allows the first to third objects to be achieved certainly and effectively.

[0054] According to another aspect of the present invention (defined in Claim 26), an outer wall using a wall exterior material base in an outer wall heat insulated building, the wall exterior material comprises fourth metallic vertical rails (fourth metallic vertical furring strips) arranged horizontally and substantially in parallel to an outer wall surface; and fourth metallic standard lateral rails (fourth metallic standard lateral furring strips) suspended horizontally and in lattice to third metallic vertical rails. A rail unit frame in lattice is formed of the fourth metallic vertical rails and the fourth metallic standard lateral rails and acts as a wall exterior material base. An exterior material is suspended to the fourth standard lateral rails and the fourth metallic bridging short lateral rail, which construct the rail unit frame.

[0055] The outer wall further comprises fourth metallic extension adjusting vertical rail (fourth metallic extension adjusting vertical rail) that can extend the fourth metallic standard lateral rail to adjust the unit width of the rail unit frame.

[0056] According to the outer wall using wall exterior base for an outer wall heat insulated building (defined in Claims 26 to 27), an outer exterior base used for covering the outer wall of a building can be constructed easily. This feature allows the first to third objects to be achieved certainly and effectively.

BRIEF DESCRIPTION OF THE DRAWINGS

[0057]

[Fig. 1] Fig. 1 is a partially cutaway view, in perspective, schematically explaining a wall exterior, structure including an outer heat insulation layer, disposed on an outer wall surface of a building, according to a first embodiment of the present invention.

[Fig. 2] Fig. 2 is a front view illustrating the whole of an exterior base mounting the outer wall heat insulating structure shown in Fig. 1.

[Fig. 3] Fig. 3 is an enlarged perspective view, partially disassembled, explaining a mutual relationship between a vertical furring strip and a lateral furring strip arranged over the exterior base.

[Fig. 4] Fig. 4 is an enlarged cross-sectional view illustrating a state where a lateral furring strip is latched at the middle portion in vertical of a vertical furring strip.

[Fig. 5] Fig. 5 is an enlarged cross-sectional view illustrating a state where a lateral furring strip is latched at an end in width of a vertical furring strip.

[Fig. 6] Fig. 6 is a front view illustrating a formation aspect of a vertical furring strip.

[Fig. 7] Fig. 7 is a side view illustrating a formation aspect of the vertical furring strip.

[Fig. 8] Fig. 8 is an enlarged front view illustrating a formation aspect of a latch portion in the vertical furring strip.

[Fig. 9] Fig. 9 is a front view illustrating a formation aspect of the lateral furring strip.

[Fig. 10] Fig. 10 is an enlarged cross-sectional view illustrating a formation aspect of the lateral furring strip.

[Fig. 11] Fig. 11 is an enlarged front view illustrating

a formation aspect of the lateral furring strip.

[Fig. 12] Fig. 12 is a vertical cross-sectional view illustrating an engagement between an exterior base and an outer exterior material.

[Fig. 13] Fig. 13 is a front view illustrating a second standard lateral furring strip to mount an exterior material to an outer wall of a building, according to a second embodiment of the present invention.

[Fig. 14] Fig. 14 is a plan view partially illustrating the second standard vertical furring strip.

[Fig. 15] Fig. 15 is an enlarged vertical cross-sectional view illustrating the second standard lateral furring strip.

[Fig. 16] Fig. 16 is a front view illustrating a second auxiliary extension furring strip combined with the second standard lateral furring strip.

[Fig. 17] Fig. 17 is an enlarged vertical cross-sectional view illustrating a second auxiliary extension furring strip combined with the second standard lateral furring strip.

[Fig. 18] Fig. 18 is a front view partially illustrating a second standard lateral furring strip used to mount an exterior material.

[Fig. 19] Fig. 19 is a plan view partially illustrating a second standard lateral furring strip used to mount an exterior material.

[Fig. 20] Fig. 20 is a front view partially illustrating a second standard lateral furring strip slid to the second auxiliary extension furring strip.

[Fig. 21] Fig. 21 is a plan view partially illustrating a second standard lateral furring strip slid to the second auxiliary extension furring strip.

[Fig. 22] Fig. 22 is a vertical cross-sectional view explaining a mutual relationship between the second standard lateral furring strip and the second auxiliary extension furring strip.

[Fig. 23] Fig. 23 is a cross-sectional view explaining an aspect of the second standard lateral furring strip in an outer corner on the outer wall.

[Fig. 24] Fig. 24 is a cross-sectional view explaining an aspect of the second standard lateral furring strip in an window in the outer wall.

[Fig. 25] Fig. 25 is an enlarged vertical cross-sectional view illustrating an exterior tile, or an exterior material, suspended to the second standard lateral furring strip.

[Fig. 26] Fig. 26 is a front view illustrating a lateral furring strip of the first embodiment as a reference of the second standard lateral furring strip.

[Fig. 27] Fig. 27 is an enlarged front view partially illustrating the second standard lateral furring strip.

[Fig. 28] Fig. 28 is an enlarged vertical cross-sectional view illustrating the second standard lateral furring strip.

[Fig. 29] Fig. 29 is a front view explaining the second auxiliary extension furring strip used to as a lateral furring strip.

[Fig. 30] Fig. 30 is an enlarged vertical cross-sectional view illustrating the second auxiliary extension furring strip.

[Fig. 31] Fig. 31 is a front view illustrating the second vertical furring strip.

[Fig. 32] Fig. 32 is an enlarged vertical cross-sectional view partially illustrating the second vertical furring strip.

[Fig. 33] Fig. 33 is a front view illustrating a second auxiliary extension furring strip combined with a second lateral furring strip.

[Fig. 34] Fig. 34 is a vertical cross-sectional view illustrating the second auxiliary extension furring strip combined with the second lateral furring strip.

[Fig. 35] Fig. 35 is a front view explaining the lateral furring step in Fig. 29 used to the window in the outer wall.

[Fig. 36] Fig. 36 is a front view illustrating a third standard lateral furring strip combined with a third auxiliary extension furring strip to suspend an exterior material to an outside wall of a building embedding a third embodiment of the present invention.

[Fig. 37] Fig. 37 is a front view illustrating the third vertical furring strip.

[Fig. 38] Fig. 38 is a side view illustrating the third vertical furring strip.

[Fig. 39] Fig. 39 is a front view illustrating the third standard lateral furring strip.

[Fig. 40] Fig. 40 is an enlarged front view partially illustrating the third standard lateral furring strip.

[Fig. 41] Fig. 41 is an enlarged vertical cross-sectional view illustrating the third standard lateral furring strip.

[Fig. 42] Fig. 42 is an enlarged front view illustrating the third auxiliary extension furring strip.

[Fig. 43] Fig. 43 is an enlarged vertical cross-sectional view illustrating the third auxiliary extension furring strip.

[Fig. 44] Fig. 44 is a vertical cross-sectional view illustrating the third standard lateral furring strip hung and latched to the third vertical furring strip.

[Fig. 45] Fig. 45 is an enlarged perspective view explaining the third standard lateral furring strip and the third auxiliary extension furring strip combined and mounted with the third vertical furring strip.

[Fig. 46] Fig. 46 is a front view illustrating the third standard lateral furring strip and the third auxiliary extension furring strip combined and mounted with the third vertical furring strip.

[Fig. 47] Fig. 47 is a vertical cross-sectional view explaining the third standard lateral furring strip and the third auxiliary extension furring strip combined and mounted with the third vertical furring strip.

[Fig. 48] Fig. 48 is a front view illustrating a relationship between the third vertical furring strip and the standard lateral furring strip and the third auxiliary extension furring strip at the windows in the outer wall.

[Fig. 49] Fig. 49 is a lateral cross-sectional view il-

lustrating the relationship between the third vertical furring strip, the third cut furring strip and the third auxiliary extended furring strip at a window in the outer wall.

[Fig. 50] Fig. 50 is an enlarged cross-sectional view illustrating an exterior tile, or an exterior material, suspended to the third standard furring strip.

[Fig. 51] Fig. 51 is a front view illustrating a rail unit frame mounted to an outer wall of a building, according to a fourth embodiment of the present invention, the rail unit frame being formed of a combination of a fourth vertical rail, a fourth standard lateral rail and a fourth short lateral rail for bridging are combined together, with an exterior material partially sustained.

[Fig. 52] Fig. 52 is a front view illustrating a rail unit frame wherein a fourth vertical rail, a fourth standard lateral rail and a fourth short lateral rail for bridging are combined together.

[Fig. 53] Fig. 53 is a front view illustrating a relationship between the rail unit frame and the short lateral rail for bridging.

[Fig. 54] Fig. 54 is an enlarged front view illustrating a relationship between a lateral rail for unit formation and a short lateral rail for bridging, engaged to the vertical rail.

[Fig. 55] Fig. 55 is an enlarged front view illustrating a short lateral rail for bridging, mounted to the lateral rail for unit formation in a vertical rail.

[Fig. 56] Fig. 56 is an enlarged perspective view, partially disassembled, explaining the standard lateral rail for unit formation mounted to a vertical rail.

[Fig. 57] Fig. 57 is an enlarged perspective view, partially disassembled, explaining a relationship between a standard lateral rail for unit formation and a short lateral rail for bridging.

[Fig. 58] Fig. 58 is an enlarged cross-sectional view illustrating an exterior material suspended to the rail unit frame.

[Fig. 59] Fig. 59 is an enlarged front view illustrating a bracket portion in the vertical rail unit.

[Fig. 60] Fig. 60 is an enlarged front view illustrating an engagement through hole and a latch hole in a standard lateral rail for unit formation.

[Fig. 61] Fig. 61 is a front view illustrating a short lateral rail for bridging.

[Fig. 62] Fig. 62 is an enlarged front view illustrating a lateral rail for extension adjustment in the rail unit frame disposed adjacent to a window.

[Fig. 63] Fig. 63 is an enlarged perspective view explaining a relationship between a standard lateral rail for unit formation and a lateral rail for extension adjustment.

[Fig. 64] Fig. 64 is a front view illustrating the lateral rail for extension adjustment.

BEST MODE FOR CARRYING OUT THE INVENTION

[0058] The present invention relates to a wall exterior structure for an outer wall heat insulated building and a wall exterior base; lateral furring strips for wall exterior installation and a method for covering a wall using the lateral furring strips; and a metallic exterior base and an outer wall using the metallic exterior base. First, second, third and fourth embodiments of the above-mentioned aspects will be explained blow in detail and specifically by referring to the attached drawings.

[0059] The first, second third and fourth embodiments are explained as follows:

[0060] In the first embodiment, a wall exterior structure including a wall exterior base is generally explained as a most basic outer wall exterior aspect of the present invention. Chiefly, the whole structure including a vertical furring strip and a lateral furring strip is shown in Figs. 1 to 12.

[0061] The second and third embodiments relates to a wall exterior structure including a wall exterior base and a metallic wall exterior base, according to the present invention. In explanation, a standard lateral furring strip (a second standard lateral furring strip in the second embodiment and a third metallic standard lateral furring step in the third embodiment) is used together with an auxiliary extension furring strip (a combination of a second standard lateral furring strip and a second auxiliary extension furring step in a furring frame acting as an exterior base and a combination of a third metallic standard lateral furring strip and a third metallic auxiliary extension furring step in a furring frame) to adjust the lateral width of a lateral furring strip. By doing so, in a building construction, a variation in lateral width of an outer corner or window in a structural frame can be eliminated. Such structures are shown in Figs. 1 to 35 (corresponding to the second embodiment) and Figs. 36 to 50 (corresponding to the third embodiment), respectively.

[0062] In the fourth embodiment, the aspects of the embodiments 1 to 3 are aggregated wholly. A new wall exterior structure (using a fourth vertical furring strip, a fourth standard length lateral furring strip, and a fourth auxiliary extension furring strip) will be explained by referring to Figs. 51 to 64.

[0063] The configurations, functions and effects of the first to fourth embodiments shown in Figs. 1 to 64 are mutually overlapped partially. However, to increase unambiguously the understanding of respective configurations, the common drawings are not omitted.

[0064] In the first embodiment, reference numerals in single- to double-digit number are attached in the corresponding drawings. In the second embodiment, reference numerals in the 100 level are attached except the reference numerals attached to the elements corresponding to elements in the first embodiment. In the third embodiment, reference numerals in the 200 level are attached, except the reference numerals attached to the elements corresponding to elements in the first embod-

iment. In the fourth embodiment, reference numerals in 300 level are attached except the reference numerals attached to the elements corresponding to elements in the first embodiment. By doing so, explanation will be omitted as much as possible and simplified. Thus, respective points are clarified possibly.

[Embodiment 1]

[0065] First, according to the first embodiment, a wall exterior structure and a wall exterior base, shown in Figs. 1 to 12, will be explained below.

[0066] Figs. 1 to 12 show various elements in an outer wall heat insulated building according to the first embodiment. Fig. 1 shows a single family house to which an outer wall portion A is heat insulated according to the wooden axial assembling construction method. The single family house includes a structural base 1 having its lower side embedded in the ground, a basic frame 2 fixed on the structural base 1 and from which a weather board 3 is extended out under a heat insulation structure, and plural main columns 4 and plural studs 4a planted on the basic frame 2.

[0067] The outer wall portion A is formed of a structural panel 5 (being a structural frame in a broader sense) overlying a required surface between the main column 4 and the stud 4a and an outer heat insulation layer 6 disposed over the structural panel 5. An exterior base 7 according to the present invention is disposed to the outer surface of the structural panel 5.

[0068] In that case, a corrosion protection layer, e.g. a corrosion resistant resin film (not shown), is coated on the back surface of each vertical furring strip (or, each metallic vertical furring strip) 8 of the exterior substrate 7 disposed on the outer heat insulation layer 6 to avoid corrosion due to the direct contact of the outer heat insulation layer and the vertical furring strip.

[0069] As shown in Figs. 2 to 12, the exterior base 7 includes a frame, which is formed of plural vertical furring strips 8 and plural lateral furring strips 14. The vertical furring strips 8 are arranged vertically and substantially in parallel over the surface of the outer wall of the panel 5 at predetermined intervals. Each vertical furring strip 8 is formed by shaping a metal plate, for example, a high corrosive resistant metal plate such as steel plate, galvanized steel plate, or galvanic steel plate, or aluminum plate. The lateral furring strips 14 are arranged horizontally in lattice from the outside and between the surfaces of the vertical furring strips 8 at predetermined intervals. Particularly, the lateral furring strips 14 are arranged and held in lattice with the vertical furring strips 8 such that the space in the vertical direction is relatively small. Each lateral furring strip 14 is formed through shaping a metal plate of the same property.

[0070] Each vertical furring strip 8 may be subjected to, for example, deformation processing such as roll shaping, press shaping, and extrusion shaping. Relatively low erect rims 9, 9 are formed along both longitudinal ends (or the right and left ends vertically in installation state) of each vertical furring strip 8. Vertical latch portions 8a are formed on the corresponding bottom surfaces of intersections (to be described later) between rims 9 and 9 at predetermined intervals.

[0071] Similarly, each lateral furring strip 14 is subjected to the deformation processing. Erect rims 15a and 15b, being relatively high, are respectively formed at both edges in the longitudinal direction (or the upper and lower edges in the lateral direction in suspended state) of each lateral furring strip 14. The lateral latch portions 14a respectively paired with the vertical latch portions 8a are formed in the bottom corresponding to an intersection (to be described later) between the rims 15a and 15a at predetermined intervals.

[0072] An aspect between each vertical latch portion 8a and each lateral latch portion 14a will be described below. Specifically, a lateral latch portion 14a in the lateral furring strip 14 is snapped and suspended into the corresponding vertical latch portion 8a in the vertical furring strip 8 disposed on the outer wall surface of the panel 5. After the mounting, a grilled frame acting as an exterior base 7 can be obtained where each vertical furring strip 8 is disposed internally (on the panel 5) while each lateral furring strip 14 is disposed externally (at the outer side).

[0073] In other words, as depicted in Figs. 2 to 12, particularly, in Fig. 8, each vertical furring strip 8 is a relatively long furring strip, which has a width of 4 to 5 cm. Each of the erect rims 9 and 9 has a height of 1 cm or less, e.g. a few millimeters. In order to receive certainly and effectively a lateral furring strip 14 at a corresponding position along the erect rims 9 and 9, lateral receiving seats 10 and 10 are formed at predetermined intervals. Each receiving seat 10 has a step 10a further protruded upward from the edge by several mm.

[0074] The longitudinal length (in the vertical direction in a mounted state) of each vertical furring strip 8 is for example, 45 to 50 cm, being a submultiple of the length referenced by a building to be constructed. Nail holes 11 are opened in the middle in width of the bottom of the vertical furring strip 8 at predetermined intervals, e.g. at an interval of 15 cm. Latch portions 8a are formed in the middle in width corresponding to the portions (except the holes 11) intersected with the lateral furring strips 14 at predetermined intervals, e.g. at an interval of 7 to 8 cm.

[0075] In this case, as understood from Figs. 3 to 5, the vertical latch portion 8a is formed by partially cutting and pulling up relatively widely a nearly middle portion in width of a bottom of a vertical furring strip 8. In the latch portion 8a, an erect piece 12 having a tongue piece 12a is formed at the upper edge thereof. A latch tongue 13 is formed by partially opening downward the upper portion of the erect piece 12.

[0076] In order to provide good latching condition effectively after mounting, each vertical furring strip 8 is fixed to the panel 5 through the hole 11 by means of a fastener through the spring fastener 19, which is inflated slightly outward to provide a required resilient property.

Here, each vertical furring strip 8 is securely screwed to the panel 5 through the hole 11 by means of a screw nail 20.

[0077] As described clearly later, the resilient force provided by the spring fastener 19 works on the outer heat insulation layer 6 via each vertical furring strip 8 to be mounted. This means that the outer heat insulation layer 6 is sandwiched with high pressure. A hard synthetic resin material, with a relatively rich resilience, e.g. nylon resin, is used as a resilient series material for the spring fastener 19, can easily block the thermal conduction from a metal vertical furring strip 8. By doing so, a suitable thermal bridge measure is taken to the outer heat insulation layer 6.

[0078] As understood in Figs. 2 to 12, particularly, Fig. 11, each lateral furring strip 14 is a relatively long furring strip (in the longitudinal direction in a sustained condition) having a width (in horizontal direction in a sustained condition) of 4 to 5 cm. Each of the upper erect rim 15a and the lower erect rim 15b is set to a height of 1 cm or more. For example, with the erect rim of a height of 2 cm or more, the hook/latch portion 16a, 16b is formed, by folding back upward the edge of the erect rim 15a, 15b.

[0079] In that case, the exterior material 21 is hung and sustained in the erect rims 15a, 15b and the hook/latch portion 16a, 16b, as described later. Thus, it is desirable that the exterior material 21 hold relatively and somewhat loosely to the rims 15a, 15b and the latch portions 16a, 16b to deal with possible vibrations and other stresses.

[0080] The longitudinal length (in the horizontal direction in a sustained condition) of each lateral furring strip 14 is, for example, 1.8 to 2 m, being a sub-multiple of the length referenced by a building to be constructed. Lateral latch portions 14, respectively paired with vertical latch portions 8a, are arranged in width on the bottom thereof at predetermined intervals, e.g. at an interval of 50 cm. Similarly, the lateral latch portion 14a has a lower through hole 17 formed by partially cutting away the lower side (in a sustained condition) of the bottom, and a upper through hole 18 formed by partially cutting away the upper portion (in a sustained condition).

[0081] The width (in a suspended state) of the lower through hole 17 is set to be equal to or more than the width of the erect piece 12 in the vertical furring strip 8. The lower through hole 17 receives the whole of the erect piece 12. Similarly, the upper through hole 18 has the size that can receive the latch tongue 13 of the vertical furring strip 8.

[0082] In mounting, the back surface of the lateral furring strip 14 is once contacted, at a slightly upper position, with the erect rims 9, 9 of the vertical furring strip 8. Thus, the lateral furring strip 14 having the lateral latch portion 14a is temporarily placed over vertical furring strip 8 having the vertical latch portion 8a. In the temporal placement, the bent edge of the lower erect rim 15 of the lateral furring strip 14 is pressed down until it butts against the steps 10a, 10b of the lateral receiving seats 10, 10. The receiving erect piece 12 acting as the vertical latch portion 8a of the vertical furring strip 8 is received into the lower through hole 17 acting as the lateral latch portion 14a of the lateral furring strip 14. Similarly, the latch tongue 13 is resiliently press latched into the upper through hole 18. The latch portion 8a is snapped into the latch portion 14a. The rigid, stable coupling can be obtained at the point where the vertical furring strip 8 intersects with the lateral furring strip 14. Thus, a required exterior base 7 can be constructed.

[0083] The exterior base 7, where vertical furring strips 8 and lateral furring strips 14 are arranged in lattice, can previously prepared in parts in a factory and then be carried in a construction site. Alternatively, the exterior base can be completely assembled at a construction site. In either case, the vertical furring strips 8 are arranged equally and horizontally along the lateral furring strips 14. Each lateral furring strip 14 is latched via the latch portions 8a and 14a. However, the lateral furring strip can deal with types of exterior materials 21 sustained in the lateral furring strip 14. The exterior materials 21, for example, exterior tiles, can be used corresponding to the number of intervals of latch portions 8a in a vertical furring strip 8. Moreover, when the exterior material 21 is, for example, an exterior panel, exterior tiles can be used corresponding to the number of intervals of the latch portions 8a in the vertical furring strip 8, which is smaller in number than intervals according to positions corresponding to the height of the exterior panel.

[0084] Moreover, the exterior base 7 is fixed to the outer heat insulation layer 6 while the vertical furring strips 8 are disposed internally (or on the side of the panel 5 and the outer heat insulation layer 6) and the lateral furring strips 14 are disposed externally (on the outside). The vertical furring strips 8 can press the outer heat insulation layer 6 against the panel 5.

[0085] In the exterior base 7, as seen in Fig. 12, exterior materials, herein, exterior tiles 21, are hung and sustained to the upper and lower latch portions 16a and 16b, each being bent upward, in the lateral furring strip 14. In this case, joints in vertical direction of the joints 22 formed between exterior tiles 21 are previously filled with backup materials and thus being cement plastered. However, as to joints in horizontal direction, the bottom itself of the lateral furring strip 14 can be used as a backup material.

[0086] A heat insulation panel of closed-cell foamed phenol series resin and having high heat insulation performance, for example, is generally used for the heat insulation layer 6. However, because an acid catalyst is used for the phenol series resin, the outer heat insulation layer 6 exhibits acid. Acid tends to corrode easily the metallic vertical furring strips 8, thus resulting in a failure of the durability of the exterior base 7.

[0087] However, in the first embodiment, a corrosive protection layer of a corrosive resistant resin film is coated on the back surface of the vertical furring strip 8. By doing so, an harmful effect due to the use of the metallic vertical furring strip 8 can be avoided certainly and pre-

viously so that a high heat insulation performance can be easily obtained.

[0088] The exterior base 7 is disposed on the outside of the outer heat insulation layer 6. Thus, a desired ventilation space 23, which has a relatively narrow gap, can be defined between the outer heat insulation layer 6 and an exterior material, e.g. an exterior title 21, as shown in Figs. 11 and 12.

[0089] In the first embodiment, the ventilation space 23 can be set to be a gap of about 1 cm or less, particularly, about 5 mm. When the first embodiment is assembled using common metal fittings, the gap can be reduced to about 1/4, compared with a gap of about 2 cm in the conventional structure. As a result, the difference between the gap and a total length of about 7 cm of the exterior components of a building, that is, redundant portion of about 1.5 cm, can be used for the outer heat insulation layer 6. Thus, the outer heat insulation layer 6 can be thickened to about 6.5 cm from 3 to 5 cm in the conventional structure so that the heat insulation performance can be improved dramatically.

[Second Embodiment]

[0090] Next, a wall exterior structure embedding the second embodiment of the present invention and a lateral furring strip for wall exterior including the wall exterior base will be explained by referring to Figs. 13 to Fig. 35.

[0091] The second embodiment belongs to the same line as the first embodiment and has so much in common with the first embodiment. Hence, the explanation becomes complicated. In the second embodiments shown in Figs. 13 to 35, like numerals are attached to the same elements as those in the first embodiment. Thus, the explanation is simplified. The number of 100 is added to the corresponding numerals of main elements.

[0092] In the third embodiment, like numerals are attached to the same elements as elements in the first and third embodiments and the explanation is simplified. The number of 200 is added to the corresponding numerals of main elements.

[0093] In the second embodiment shows Figs. 13 to 35, a metallic lateral furring strip frame 100a is formed of plural second vertical furring strips 124 (hereinafter merely referred to as "vertical furring strips 124"), plural second standard lateral furring strips 124 (hereinafter merely referred to as "standard lateral furring strips 101"), and a second auxiliary extension furring strip 102 (hereinafter merely referred to as "auxiliary extension furring strip 102"). Each second vertical furring strip 124 corresponds to the vertical furring strip 8 acting as the exterior base 100. Each second vertical standard lateral furring strip 101 is suspended to each vertical furring strip 124 and is attached to the exterior material 21. Each second auxiliary extension furring strip 102 can be selectively inserted slidably into the standard lateral furring strip 101 to adjust the longitudinal length (corresponding to the horizontal width in a mounted state) of the standard lateral furring strip 102.

[0094] Both the vertical furring strips 124 and the standard lateral furring strips 101 are assembled in a lattice form. The vertical furring strips 124 are arranged vertically and in parallel at relatively broad intervals. The standard lateral furring strips 101 are arranged horizontally and in parallel at relatively narrow intervals. The auxiliary extension furring strip 102 is slidably inserted longitudinally into the standard lateral furring strip 101 to obtain the lateral furring strip frame 100a.

[0095] Since each standard lateral furring strip 101 has its fixed length, the suspension range of the exterior material 21 (the suspension effective width in a mounted state) is specified. This cannot deal with the width of an outer corner or window, varied at construction sites.

[0096] In the lateral furring strip frame 100a of the second embodiment, the auxiliary extension furring strip 102 is slidably protruded out from the end of the standard lateral furring strip 101. This operation allows the total length of both furring strips or the suspension effective width of the lateral furring strip frame 100a to be adjusted variably.

[Third Embodiment]

[0097] Next, a wall exterior structure according to the third embodiment of the present invention and a wall exterior base thereof will be explained by referring to Figs. 36 to 50.

[0098] In the third embodiment shows in Figs. 36 to 50, a metallic rail unit frame 200a is formed of fourth vertical rails (vertical furring strips) 201 (hereinafter merely referred to as "vertical rails 201"), plural third standard lateral rails for unit formation (unit formation standard lateral furring strips) 202 (hereinafter merely referred to as "standard lateral furring strips 202 for unit formation"), plural third bridge short lateral rails (short lateral furring strips for bridging) (hereinafter merely referred to as "short lateral rails 203 for bridging), and plural third extension adjustment lateral rails (lateral furring strips for extension adjustment) 204 (merely referred to as "lateral rails 204 for extension adjustment"). Each fourth vertical rail 201 corresponds to the vertical furring strip 8. Each third standard lateral furring strip 202 is suspended to the vertical rail 201 and is attached to the exterior material 21. Each third short lateral rail 203 is selectively mounted to the standard lateral rail 202. Each fourth lateral rail 204 is selectively suspended to the short lateral rail 203 and is slidable longitudinally (horizontally in a mounted state).

[0099] The vertical rails 201 and the standard lateral rails 202 are combined in a lattice state to construct a lattice rail unit frame 200a. The vertical rails 201 are arranged vertically and in parallel at relatively broad intervals. The standard lateral rails 202 are arranged horizontally and in parallel at relatively narrow intervals. That is, the standard lateral rails 202 are suspended and attached to the vertical rails 201 to assemble the rail unit

frame 200a.

[0100] In the third embodiment, the lateral rail 204, engaged to the standard lateral rail 202 and the short lateral rail 203 for bridging, is slidably extended out from the end of the short lateral rail 203. The total length of both the rails 203 and 204, or the suspension effective width of the rail unit frame 200a itself, can be adjusted variably.

[0101] That is, the short lateral rail 203, attached to the standard lateral rail 202, can reserve the longitudinal length or horizontal length of the standard lateral rail 202 to some extent.

[0102] In other words, the end (here, the right end) of the standard lateral rail 202 can be protruded out to a required length.

Therefore, in the lateral rail 212, the total length in the horizontal direction of the standard lateral rail 210 and the short lateral rail 211 or the entire length in the horizontal direction of the rail unit frame 201 can be arbitrarily adjusted. This can easily compensate the length lacking due to outer corners and windows.

[Forth Embodiment]

[0103] A wall exterior structure according to the fourth embodiment of the present invention and a wall exterior base thereof will be explained by referring to Figs. 51 to 64.

[0104] In the fourth embodiment shown in Figs. 51 to 64, a rail unit frame 301 in lattice constructing an exterior base includes plural fourth metallic lateral rails (lateral furring strips) 302 (hereinafter merely referred to as "lateral rails 302"), plural fourth metallic standard lateral rails (standard lateral furring strips) 310 (hereinafter merely referred to as "standard lateral rails 310"), plural fourth metallic short lateral rails for bridging (short lateral furring strips for bridging) 311 (hereinafter merely referred to as "short lateral rails 311 for bridging"), and plural fourth metallic lateral rails for extension adjustment (lateral furring steps for extension adjustment) 312 (hereinafter merely referred to as "lateral rails 311 for extension adjustment").

[0105] The vertical rails 302 and the standard lateral rails 310 are arranged in lattice. The vertical rails 302 are arranged vertically and in parallel at relatively broad intervals. The standard lateral rails are arranged horizontally and in parallel at relatively narrow intervals. In this case, the lattice-like rail unit frame 301 is constructed as shown in Figs. 51 to 53 and Figs. 54 and 55.

[0106] As shown in Figs. 56 to 61 and Fig. 64, the short lateral rail 311 bridges the standard lateral rails 312. Similarly, as shown in Figs. 62 and 63, the lateral rail 312 extends to adjust the finish width of each standard lateral rail 310 (the detailed structure will be described later).

[0107] The standard lateral rail 310, the short lateral rail 311, and the lateral rail 312, (to be described later in detail), are used to suspend the exterior material 323.

[0108] Each of the rails 302, 310, 311, and 312 is made of a metal, e.g. a metal steel plate having good corrosion resistance, such as galvanized steel plate, galvanic steel plate, which is subjected to deformation processing such as roll forming, shaping, and press shaping.

[0109] Each of the rails 302, 310, and 311 may be a standard rail set to a required length. As shown in Figs. 54 to 56, the vertical rail 302, for example, has a base plate 303 having through holes 304, erect rims 305 and 305, and rail seats 306 and 306. The through holes 304 are arranged at a predetermined interval of 15 cm and allow passage of screws or screwed nails 322, which securely fix rails to the structural frame or columns in the fourth embodiment. Each of the erect rims 305 and 305 is formed through bending outward in low level both ends in width of the base plate 303 to define a ventilation space (to be described later). The rail seats 306 and 306 are formed in the same plane longitudinally along the rims 305, 305 to receive the standard lateral rail 310.

[0110] Here, each of the rails 310, 311 and 32 has substantially same configuration as that in the third embodiment. In the fourth embodiment shown in Figs. 51 to 64, reference numerals in the third embodiment are represented by the order of 300 (for example, the standard lateral rail 210 is represented as the standard lateral rail 310). The function and effect of the elements are substantially identical and hence the duplicated explanation will be omitted.

Claims

1. A wall exterior structure comprising:

vertical furring strips arranged vertically and substantially in parallel on a surface of an outer wall on which an outer heat insulating layer is formed;

lateral furring strips suspended in lattice and horizontally intersecting with said vertical furring strips;

a furring strip frame, acting as an exterior base, including each vertical furring strip acting as an inner side and each lateral furring strip acting as an outer side; and

an exterior material sustained to an engaged portion in a surface of each lateral furring strip;

said vertical furring strip including vertical latch portions arranged at predetermined intervals at intersections between said vertical furring strip and said lateral furring strips;

said lateral furring strip including lateral latch portions paired with said vertical latch portions;

said furring strip frame engaging each lateral latch portion corresponding to said lateral furring strip sustained to the vertical furring strip, to each vertical latch portion in said vertical furring strip;

wherein a ventilation space corresponding to a width of said vertical furring strip is defined be-

tween said outer heat insulating layer and said lateral furring strip.

2. The wall exterior structure defined in Claim 1, wherein said outer heat insulating layer is pressed against the surface of said outer wall by said vertical furring strips arranged on said outer wall surface.

3. The wall exterior structure defined in Claim 1 or 2, wherein said vertical furring strip has low vertical rims erected at both ends thereof and said lateral furring strip has low lateral rims erected at both ends thereof; and wherein said lateral latch portion in a base surface between said lateral rims is paired with and snapped into said vertical latch portion formed in a base surface between said vertical rims; and wherein a gap of said ventilation space is set by the size of rims protruded at said lateral latch portion.

4. The wall exterior structure defined in Claim 3, wherein said lateral furring strips are orthogonally arranged in lattice with said vertical rims of said vertical furring strips from the outside; and wherein each lateral latch portion of said lateral furring strip is snapped into each vertical latch portion of said vertical furring strip by slidably guiding said lateral furring strip over the plane of said vertical rims.

5. The wall exterior structure defined in any one of Claims 1 to 4, wherein the gap of said ventilation space defined between said exterior base and said outer heat insulating layer is set to 1 cm or less.

6. A wall exterior base in an outer wall heat-insulated building, comprising:

vertical furring strips arranged vertically and substantially in parallel to an outer wall surface of a building and each having low rims elected at both ends of each vertical furring strip;
lateral furring strips horizontally intersecting vertical rims of each vertical furring strip and suspended in lattice and having rims erected at both ends thereof;
wherein an exterior material is suspended over the lateral erect rims of said lateral furring strip;
said vertical furring strip disposed on said outer wall surface having a vertical latch portion corresponding to a position where said vertical furring strip intersects said lateral furring strip;
said lateral furring strip having a lateral latch portion corresponding to a position where said lateral furring strip intersects said vertical furring strip;
said lateral furring strips orthogonally arranged in lattice over the plane of rims of said vertical furring strip from the outside;
wherein said latch portion of said lateral furring strip is snapped into said latch portion of said vertical furring strip by slidably guiding said rims of said vertical furring strip.

7. A lateral furring frame for wall exterior material installation in an outer wall heat-insulated building, comprising;

second vertical furring strips arranged vertically and substantially parallel to an outer wall surface;
second standard lateral furring strips intersecting horizontally and sustained in lattice to said second vertical furring strips; and
a combination of said second auxiliary extension furring strip and said second standard lateral furring strip, acting as a mounting base for exterior material suspension;
said second auxiliary extension furring strip combined together with said second standard lateral furring strip and slidably inserted to said second standard lateral furring strip;
wherein in correspondence with a width in horizontal direction of said outer wall surface, an end of said second auxiliary extension furring strip is variably extended from an end in an elongated direction of said second standard lateral furring strip.

8. The lateral furring frame defined in Claim 7, wherein various second standard lateral furring strips having different standard dimensions are prepared; and wherein said second auxiliary extension furring strips are combined compatibly to said various second short lateral furring strips.

9. The lateral furring frame defined in Claim 7 or 8, wherein each of said second standard lateral furring strip and said second auxiliary extension furring strip is formed of a shaped metal plate of steel plate, galvanized sheet iron, or aluminum, shaped through deformation processing such as roll forming, press forming, and extrusion.

10. The lateral furring frame defined in any one of Claims 7 to 9,
wherein the length in lateral direction of said second auxiliary extension furring strip is adjusted arbitrarily and slidably with said second auxiliary extension furring strip combined with said second standard lateral furring strip.

11. The lateral furring frame defined in Claim 10, wherein said second auxiliary furring strip is slidably inserted squarely into said second standard lateral furring strip and can be sled arbitrarily in the inserted state.

12. The lateral furring frame defined in Claim 11, further

comprising slide regulation means, disposed on both ends of said second standard lateral furring strip, to travel between said second standard lateral furring strip and said second auxiliary extension furring strip or between said second vertical furring strip and said second auxiliary extension furring strip and through said second standard lateral furring strip over a desired length range; and wherein said second auxiliary extension furring strip is inserted and sled into said second short lateral furring strip, within a regulation range of said slide regulation means.

13. The lateral furring frame defined in any one of Claims 7 to 12, wherein each of said second standard lateral furring strip and said second auxiliary extension furring strip has a substantially U-shaped cross section to be slidable, with said second standard lateral furring strip and said second auxiliary extension furring strip mutually inserted; and wherein each of said second furring strip has a furring base formed in a bottom portion in the U-shaped strip and respective engagement portions for exterior material suspension, vertically arranged at both ends on the front side.

14. A method for covering wall surfaces with a lateral furring frame to dispose a wall exterior material of an outer wall heat insulated building, comprising steps of:

using a lateral furring frame for outer exterior installation in any one of Claims 7 to 13 (a lateral furring frame for outer exterior material installation in which a second standard lateral furring strip and a second auxiliary extension furring strip are combined together); and
disposing said lateral furring strip for outer exterior material installation over the entire width of the said outer wall surface through a single or plural second auxiliary extension furring strip, whereby said outer exterior material is suspended to said lateral furring frame.

15. A metallic wall exterior material base in an outer wall heat insulated building, comprising:

third metallic vertical furring strips arranged vertically and substantially in parallel to an outer wall surface;
third metallic standard lateral furring strips suspended in lattice to intersect horizontally said third metallic vertical furring strips; and
third metallic auxiliary extension furring strips slidably inserted to said third metallic standard lateral furring strips;
said third metallic standard lateral furring strips and said third metallic auxiliary extension furring strips acting as an exterior material mounting base for suspension;
wherein, to suspend said third metallic standard lateral furring strips to said third metallic vertical furring strips, each third metallic vertical furring strips has brackets formed at predetermined intervals;
each of said third metallic standard lateral furring strips having through holes to engage a bracket at a corresponding intersection to said third metallic vertical furring strip;
wherein a though hole in said third metallic standard lateral furring strip is engaged to a bracket of said third metallic vertical furring strip and the upper inner edge of said through hole is hung and suspended;
wherein, to insert slidably said third metallic auxiliary extension furring strip to said third metallic standard lateral furring strip, said third metallic standard lateral furring strip has a lateral cross section opened in the front side;
said third metallic auxiliary extension furring strip, which has the cross section substantially in common with said third metallic standard lateral furring strip, is loosely mounted squarely to said third metallic standard lateral furring strip.

16. The metallic wall exterior material base defined in Claim 15, wherein, to regulate a sliding range of said third metallic auxiliary extension furring strip to said third metallic standard lateral furring strip, a pair of stoppers butts both ends in horizontal cross direction of a bracket of said third metallic vertical furring strip, said bracket protruding toward the front side via a through hole for hanging in said third metallic standard lateral furring strip and via a through hole for sliding in said third metallic auxiliary extension furring strip, said pair of stoppers being formed at both inner ends of said through hole, for sliding, in horizontal direction at predetermined intervals.

17. The metallic wall exterior material base defined in Claim 15 or 16, further comprising a downward-pointing guide fin formed at the corresponding upper inner edge and between a pair of stoppers, said pair of stoppers being provided to a through hole for sliding in said third metallic auxiliary extension furring strip, and wherein said guide fin contacts slidably to an upper inner surface of a bracket in said third metallic vertical furring strip.

18. The metallic wall exterior material base defined in any one of Claims 15 to 17, wherein said through hole for sliding, formed in said third metallic auxiliary extension furring strip, is rectangular in horizontal and longitudinal direction; and wherein said guide fin is formed downwardly at the middle portion of the upper inner edge in said through hole; and wherein a pair of stoppers is formed at the lower portion on both the horizontal sides of said through hole, such

that each of said stoppers overlaps the lower portion of a bracket of said third metallic vertical furring strip.

19. A metallic wall exterior material base in an outer wall heat insulated building, comprising,

a rail unit frame produced by assembling in a lattice form,
fourth metallic vertical rail (fourth metallic vertical furring strip) arranged vertically and substantially in parallel to an outer wall surface;
fourth metallic standard lateral rail (fourth metallic lateral furring strip for bridging) horizontally suspended in lattice with third metallic vertical rails; and
fourth metallic vertical rail for bridging (fourth metallic short furring strip for bridging) slidably inserted into said fourth metallic standard lateral rail in its longitudinal direction;
wherein exterior materials are sustained to said fourth metallic standard lateral rails and said fourth metallic short lateral rail for bridging.

20. The exterior material base defined in Claim 19, further comprising fourth metallic extension adjusting lateral rails (fourth metallic extension adjusting lateral furring strips) for adjusting the unit width by extending horizontally and longitudinally said fourth metallic standard lateral rail acting as a part of said rail unit frame; and wherein exterior materials are suspended with said fourth metallic extension adjusting lateral rail, together with said fourth standard lateral rail and said fourth metallic lateral rail for bridging.

21. The exterior material base defined in Claim 19 or 20, wherein said brackets are formed to said fourth metallic vertical rail acting as part of said rail unit frame vertically and at predetermined intervals; and wherein said fourth metallic standard lateral rail acting as part of said rail unit frame includes engagement holes each in which a bracket is inserted at an intersection to said fourth metallic vertical rail; and wherein the bracket in said fourth metallic vertical rail is inserted into an engagement through hole in said fourth metallic standard lateral rail and engages the upper inner edge of said engagement through hole.

22. The exterior material base defined in Claim 21, wherein a bracket in said fourth metallic vertical rail is used in common to said fourth metallic standard lateral rail for bridging to support the upper edge of an engagement through hole in said fourth metallic standard lateral rail; said bracket being supported on the front side of said engagement through hole, whereby said fourth metallic short lateral rail for bridging is coupled to said fourth metallic standard lateral rail.

23. The exterior material base defined in Claim 21 or 22, wherein a bracket in said fourth metallic vertical rail is used in common to said fourth metallic extension adjusting lateral rail to support the upper edge of an engagement through hole in said fourth metallic standard lateral rail; said bracket being supported on the front side of said engagement through hole, whereby said fourth metallic extension adjusting lateral rail can extend said fourth metallic standard lateral rail.

24. The exterior material base defined in Claim 22 or 23, wherein a nearly L-shaped bracket in vertical cross section is formed by cutting and electing a bottom portion of said fourth metallic vertical rail; and wherein latch pieces pointing inward and downward are formed in said bracket; and wherein said latch pieces can be snapped into said latch hole formed in said fourth metallic standard lateral rail; and wherein the upper edge of said engagement through hole formed in said fourth metallic short lateral rail for bridging is slidably sandwiched between the bottom portion of said fourth metallic vertical rail and said latch piece.

25. The exterior material base defined in Claim 23 or 24, wherein said upper edge of said engagement through hole formed in said fourth metallic short lateral rail for bridging is slidably sandwiched between the bottom portion of said fourth metallic vertical rail and said latch piece.

26. An outer wall using a wall exterior material base in an outer wall heat insulated building, said wall exterior material comprising:

fourth metallic vertical rails (fourth metallic vertical furring strips) arranged horizontally and substantially in parallel to an outer wall surface; and
fourth metallic standard lateral rails (fourth metallic standard lateral furring strips) suspended horizontally and in lattice to third metallic vertical rails;
wherein a rail unit frame in lattice is formed of said fourth metallic vertical rails and said fourth metallic standard lateral rails and acts as a wall exterior material base;
wherein an exterior material is suspended to said fourth standard lateral rails and said fourth metallic bridging short lateral rail, which construct said rail unit frame.

27. The outer wall defined in Claim 26, further comprising fourth metallic extension adjusting vertical rail (fourth metallic extension adjusting vertical rail) that can extend said fourth metallic standard lateral rail to adjust the unit width of said rail unit frame.

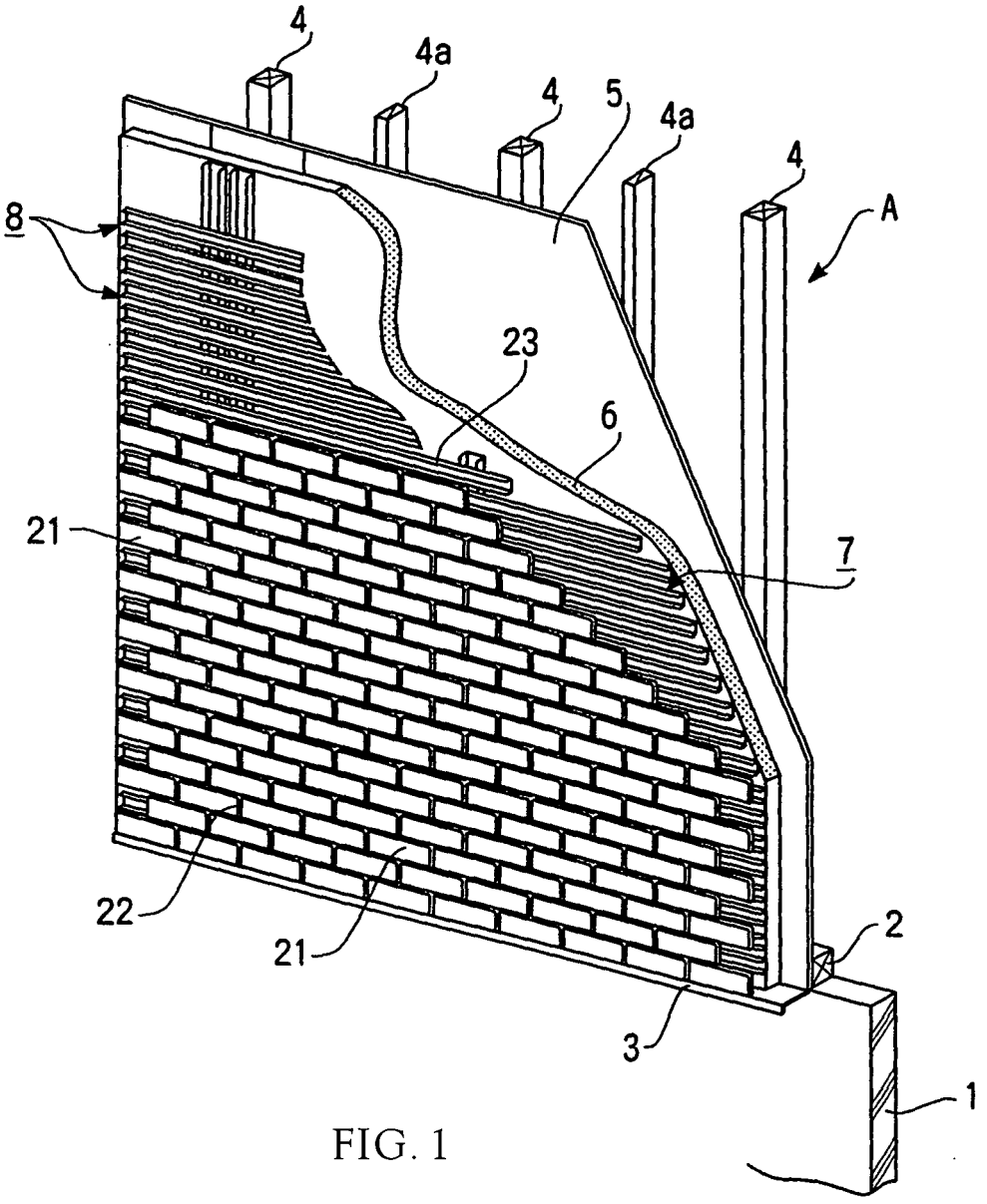

FIG. 1

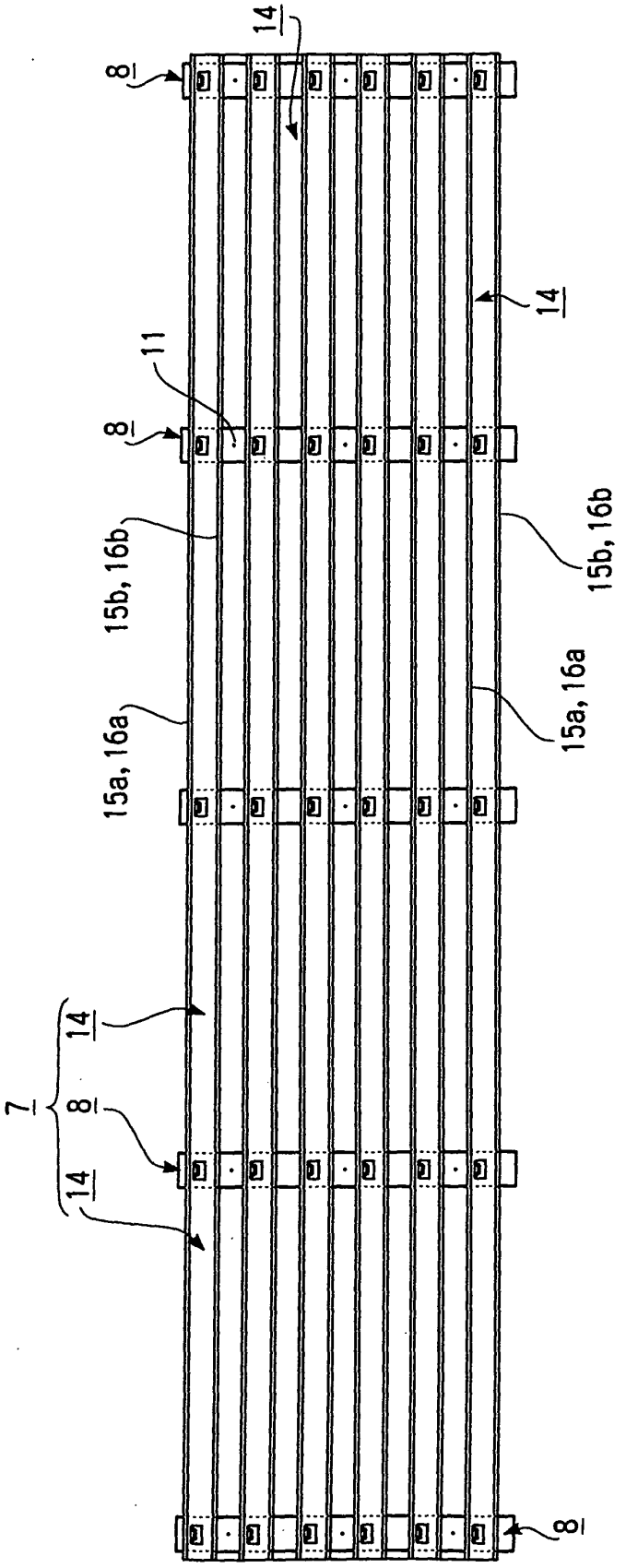

FIG. 2

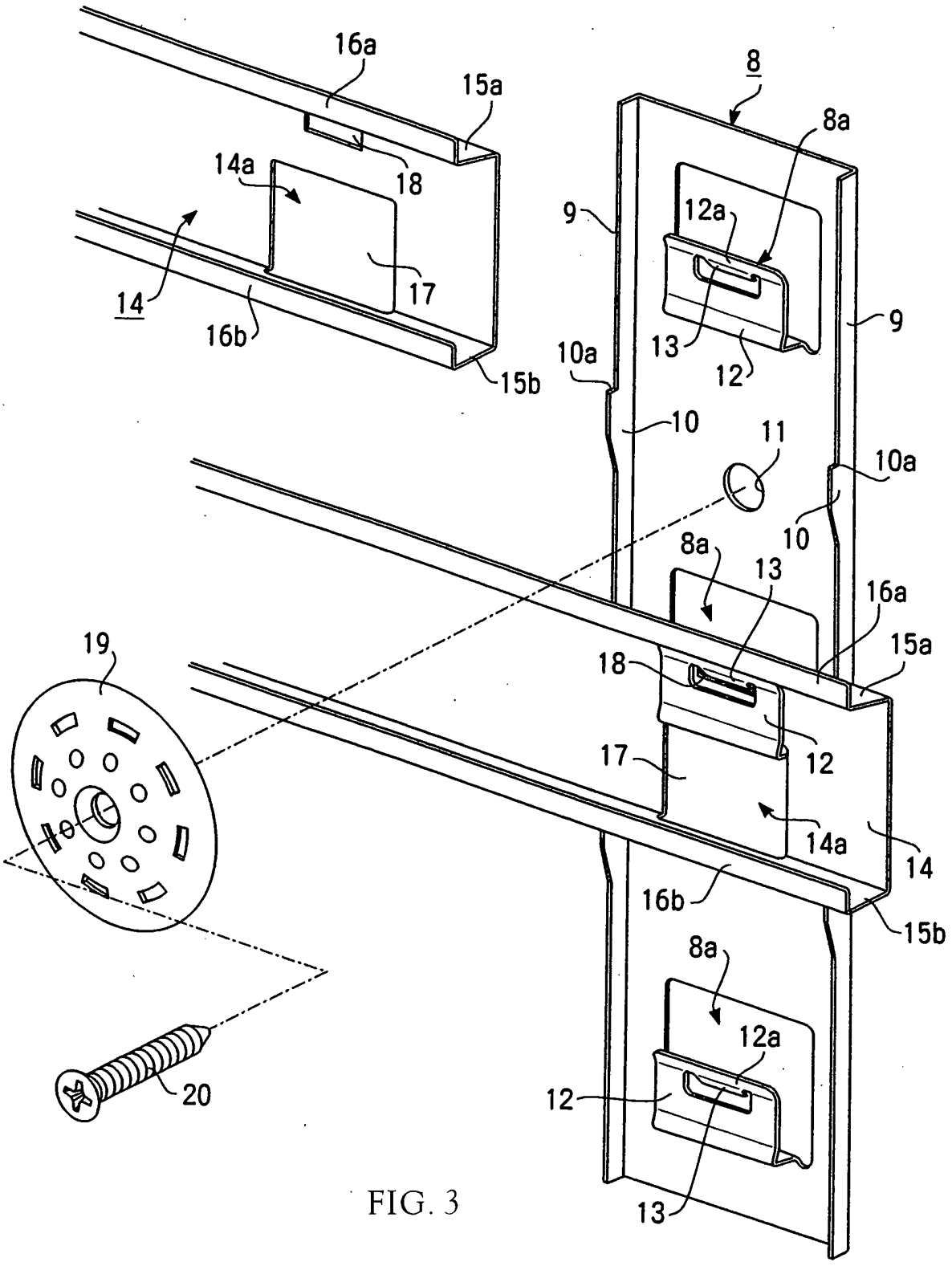
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FIG. 3

FIG. 4

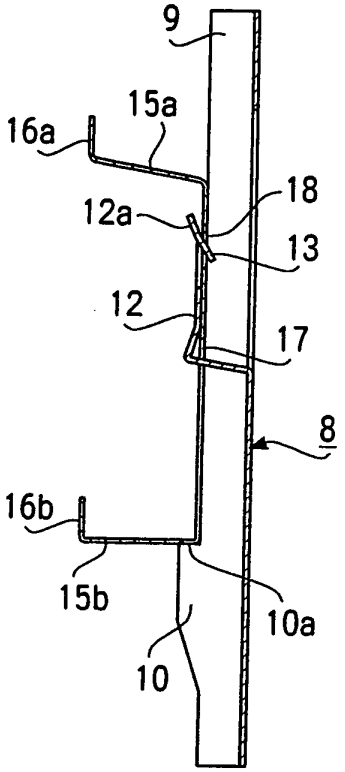
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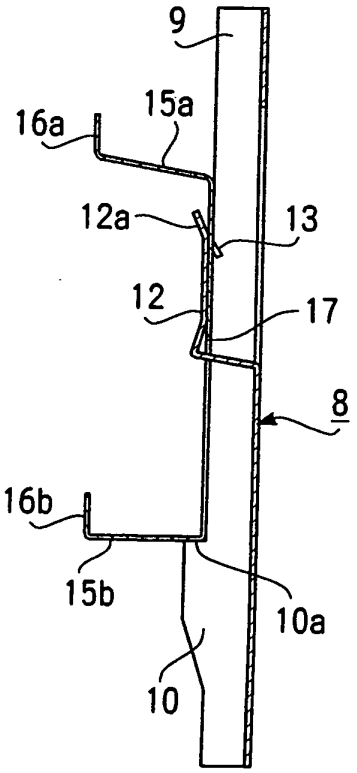
FIG. 5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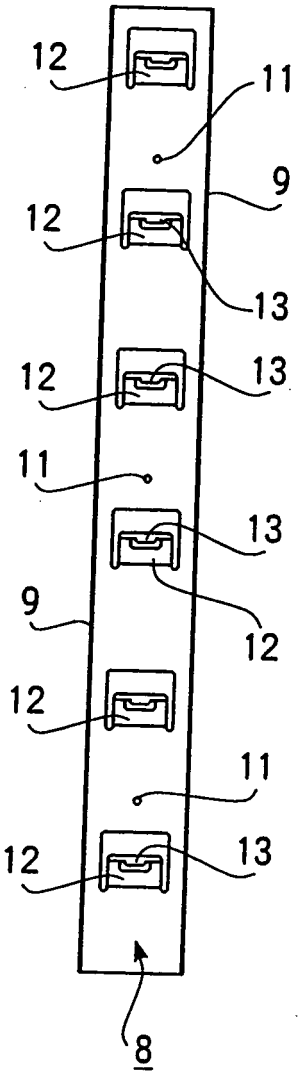


FIG. 6

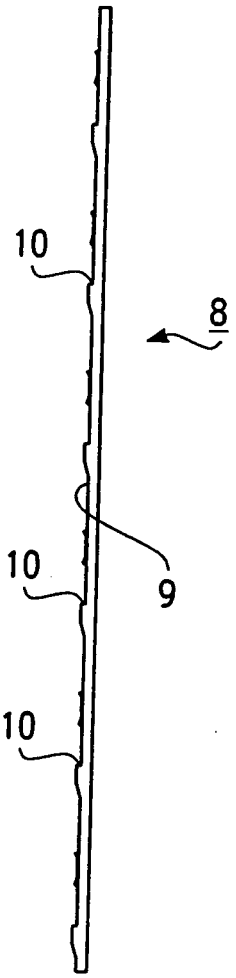


FIG. 7

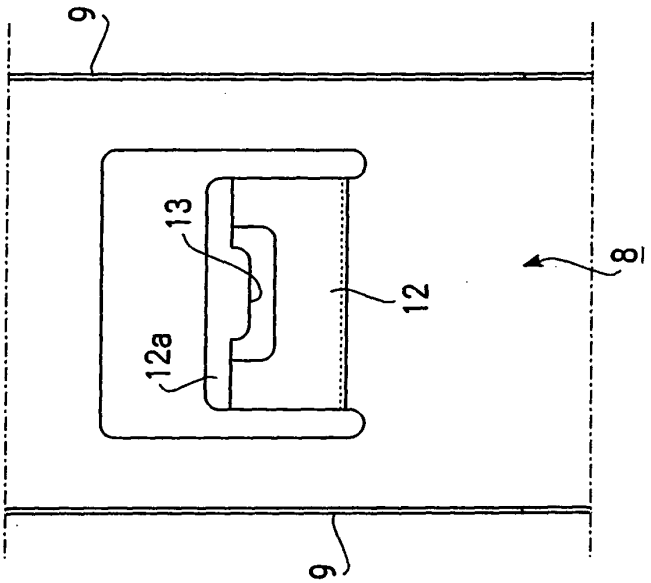


FIG. 8

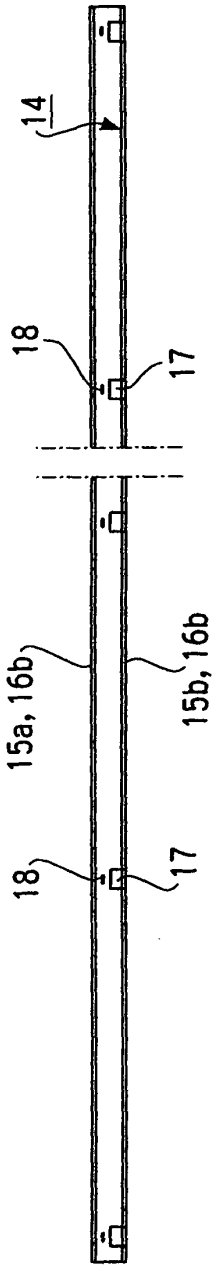


FIG. 9

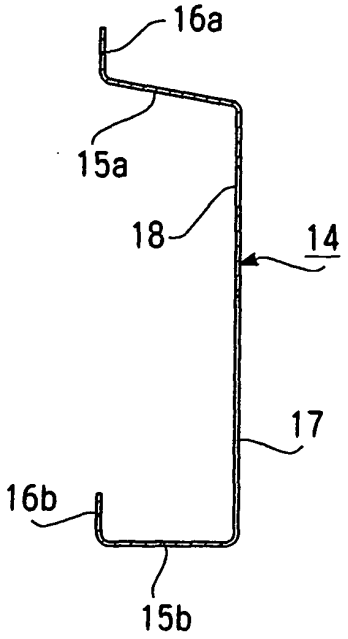


FIG. 10

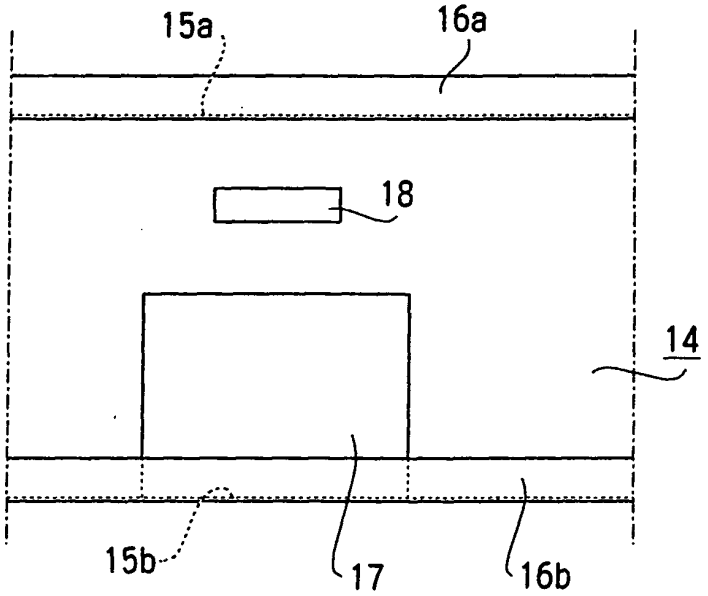
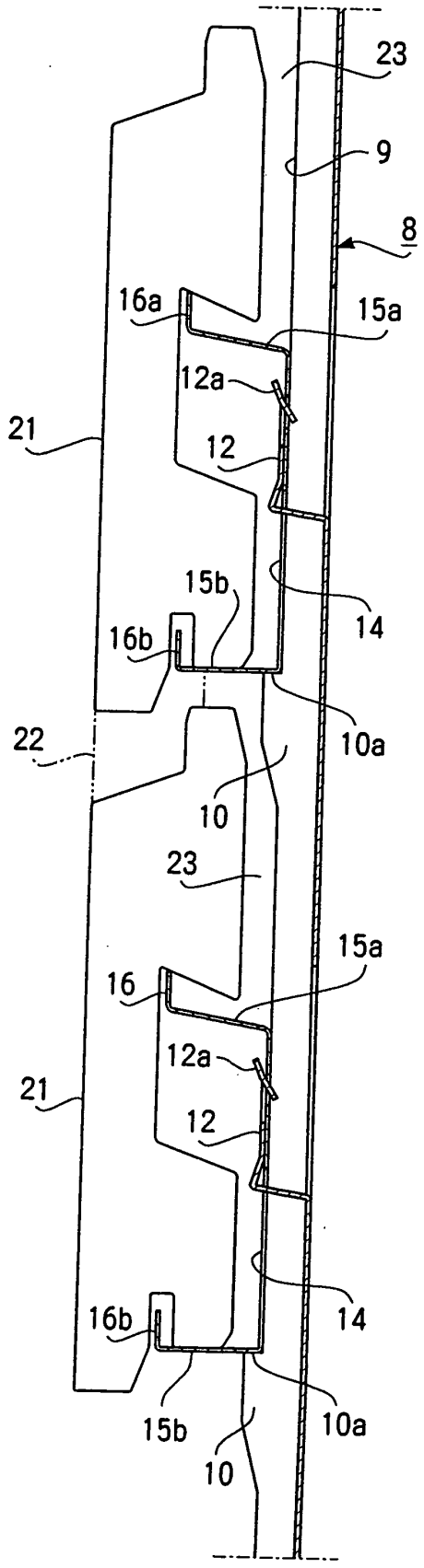


FIG. 11

FIG. 12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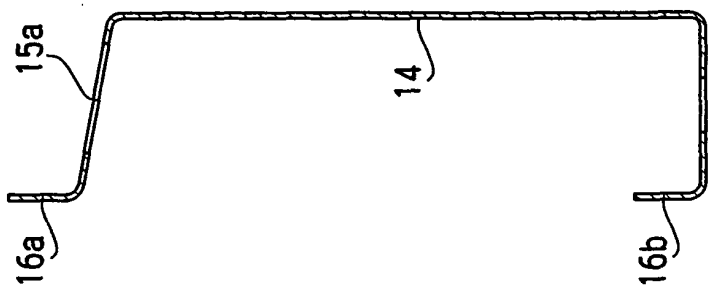


FIG. 15

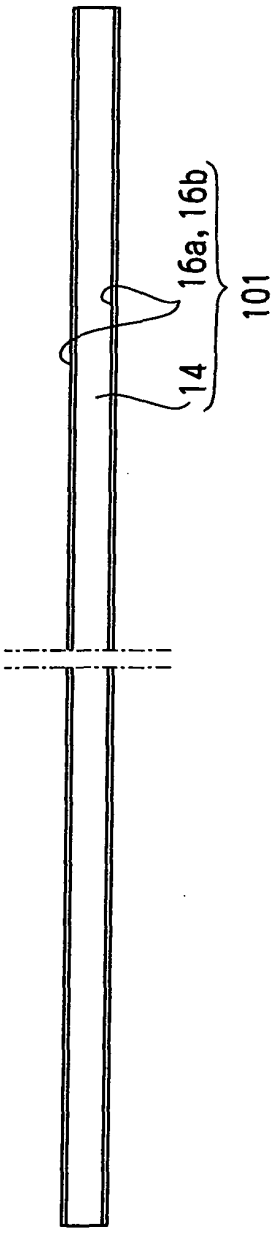


FIG. 13

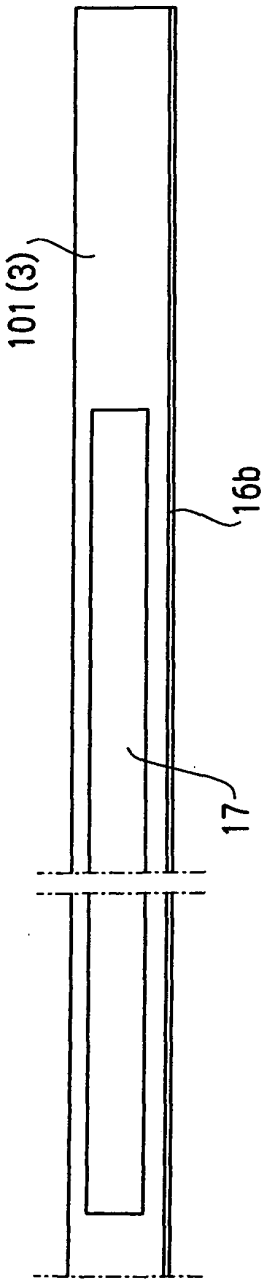


FIG. 14

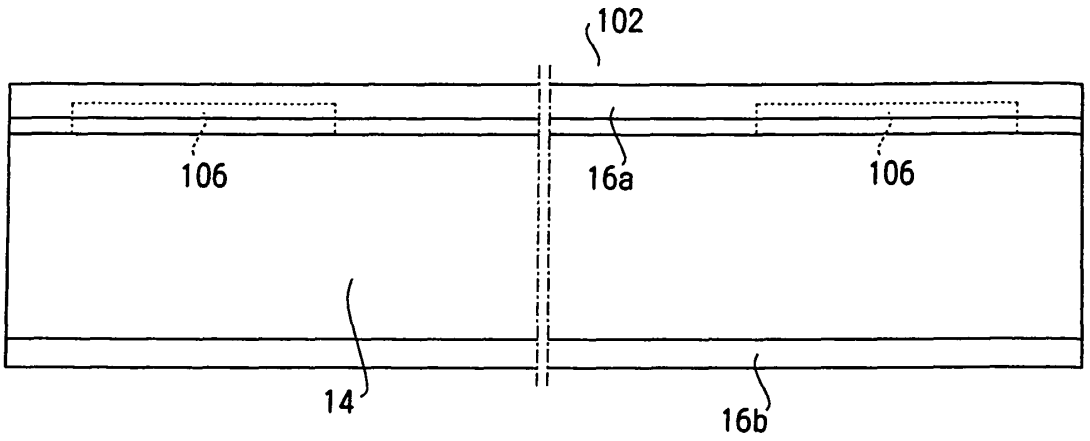


FIG. 16

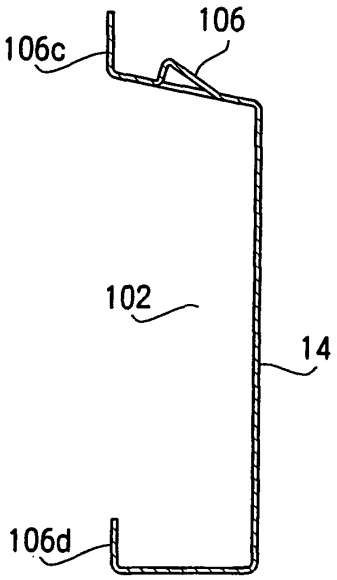


FIG. 17

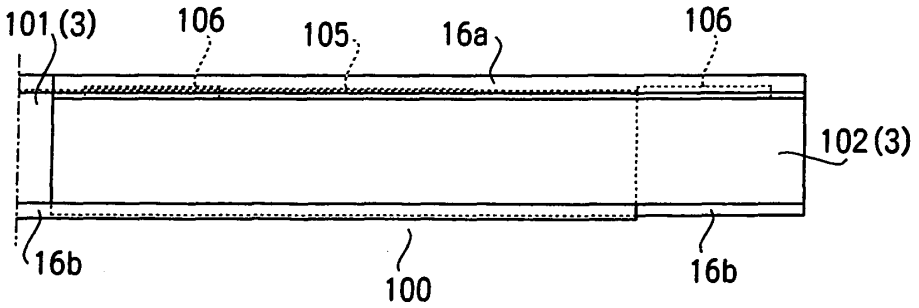


FIG. 18

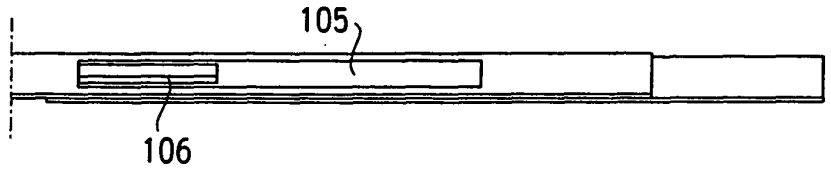


FIG. 19

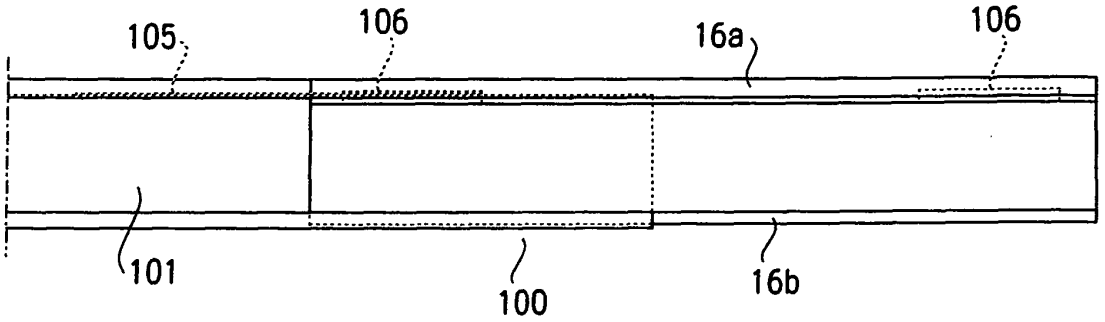


FIG. 20

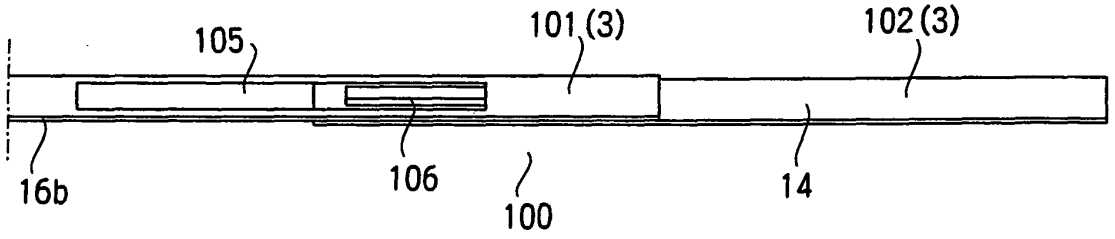
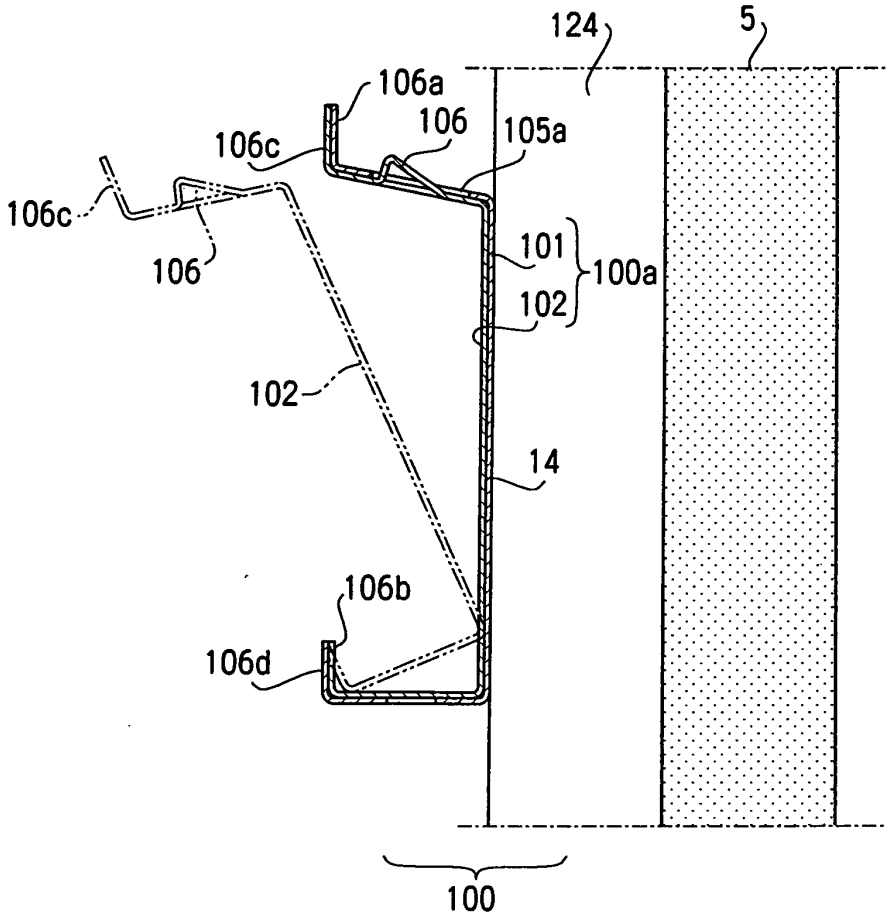


FIG. 21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106b
106d
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FIG. 22

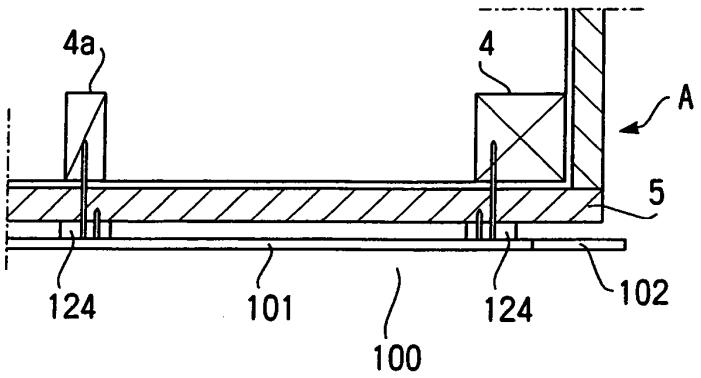
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FIG. 23

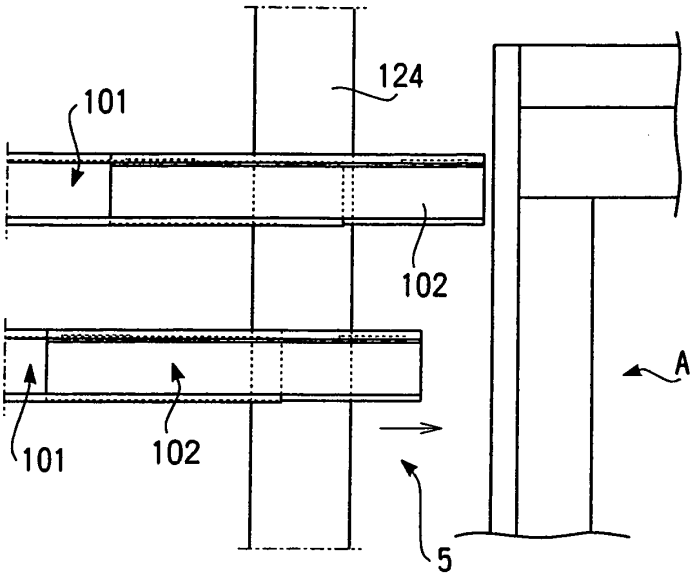


FIG. 24

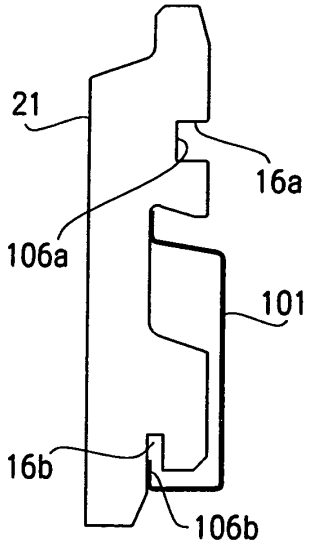


FIG. 25

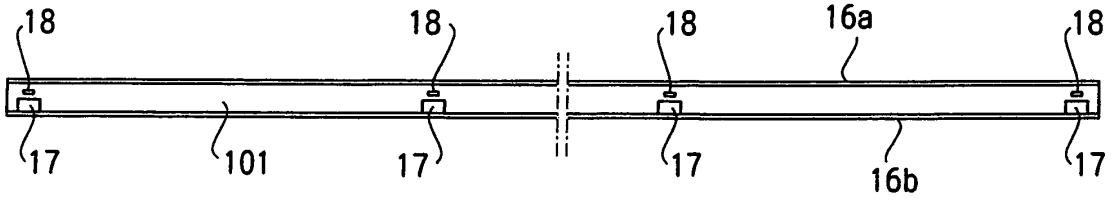


FIG. 26

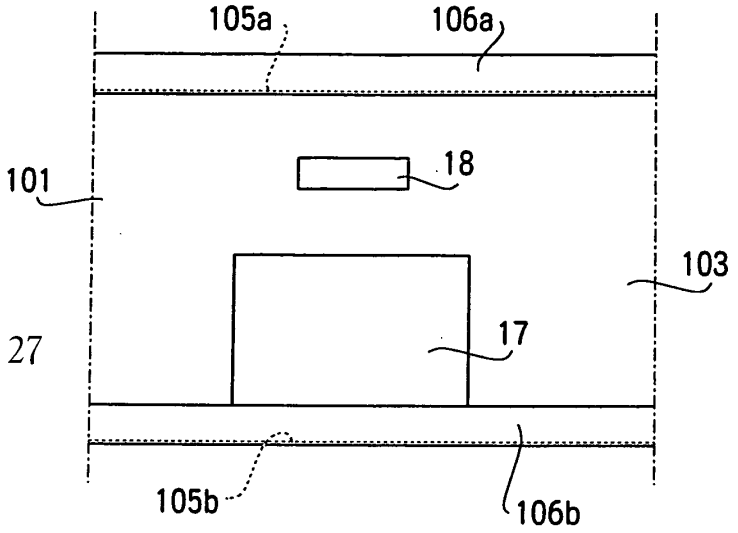


FIG. 27

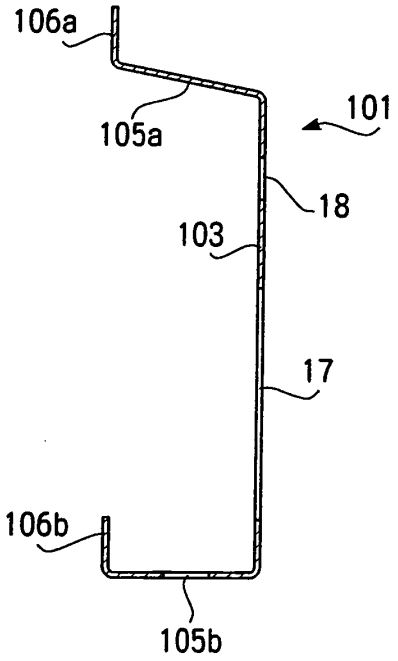


FIG. 28

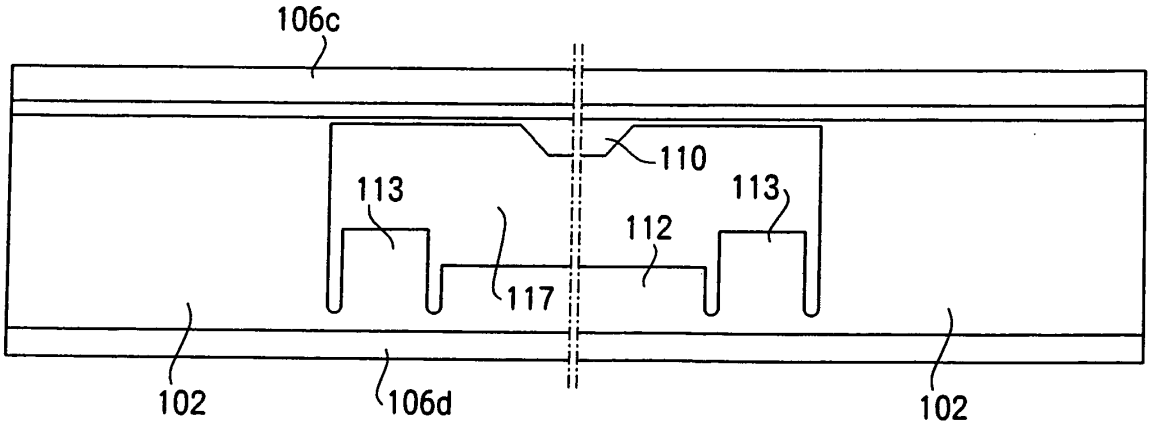


FIG. 29

FIG. 30

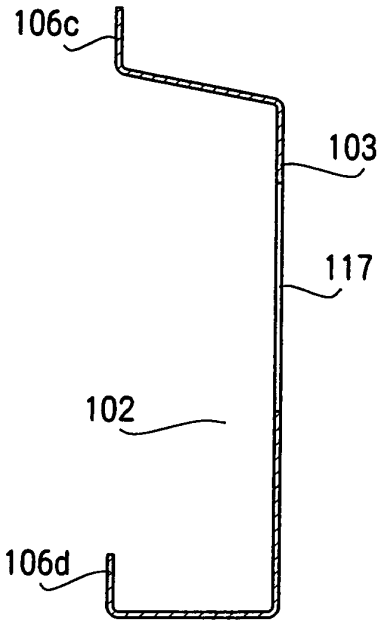
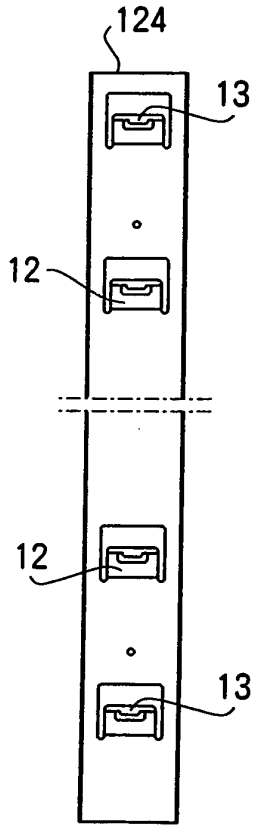


FIG. 31



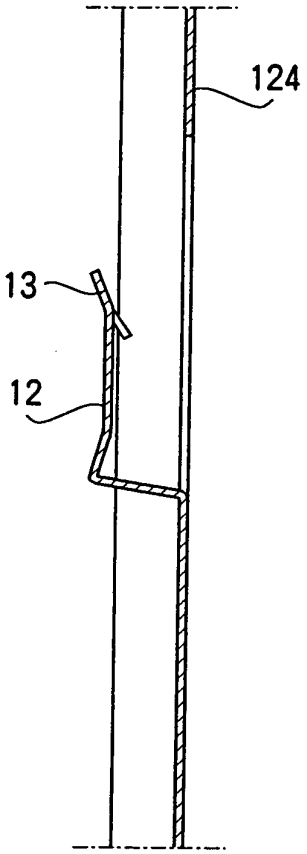


FIG. 32

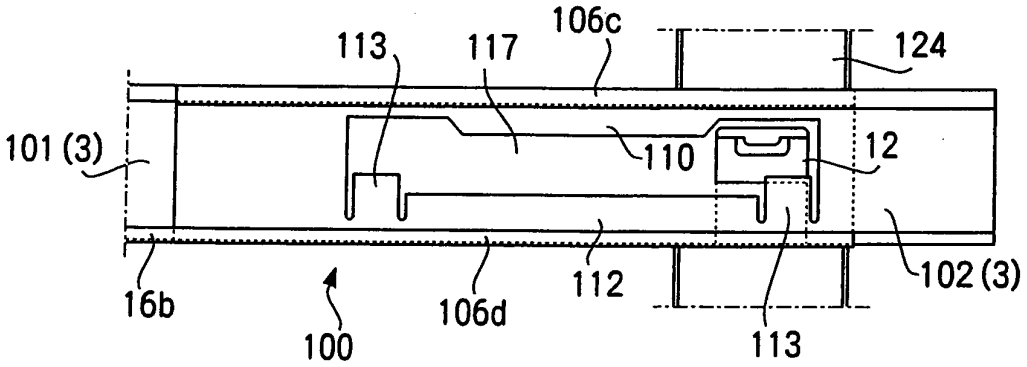


FIG. 33

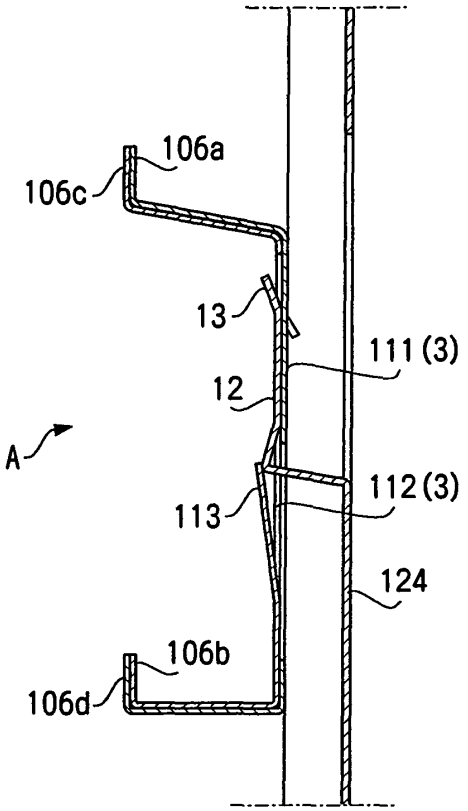

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FIG. 34

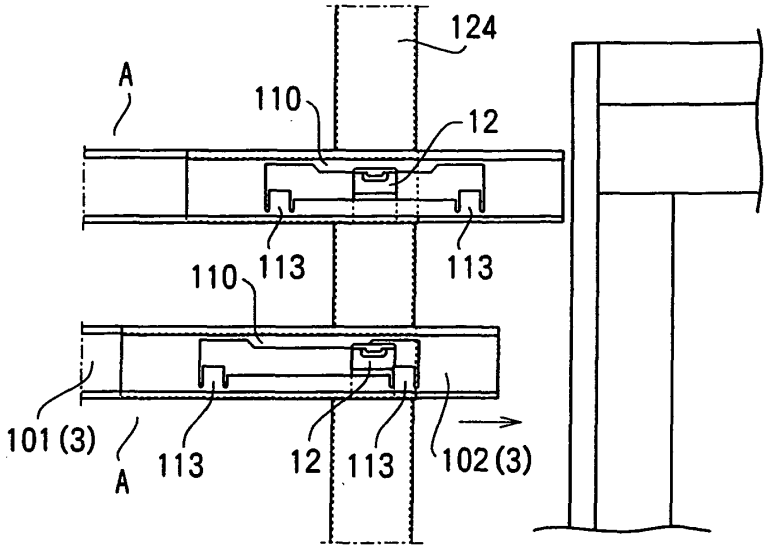
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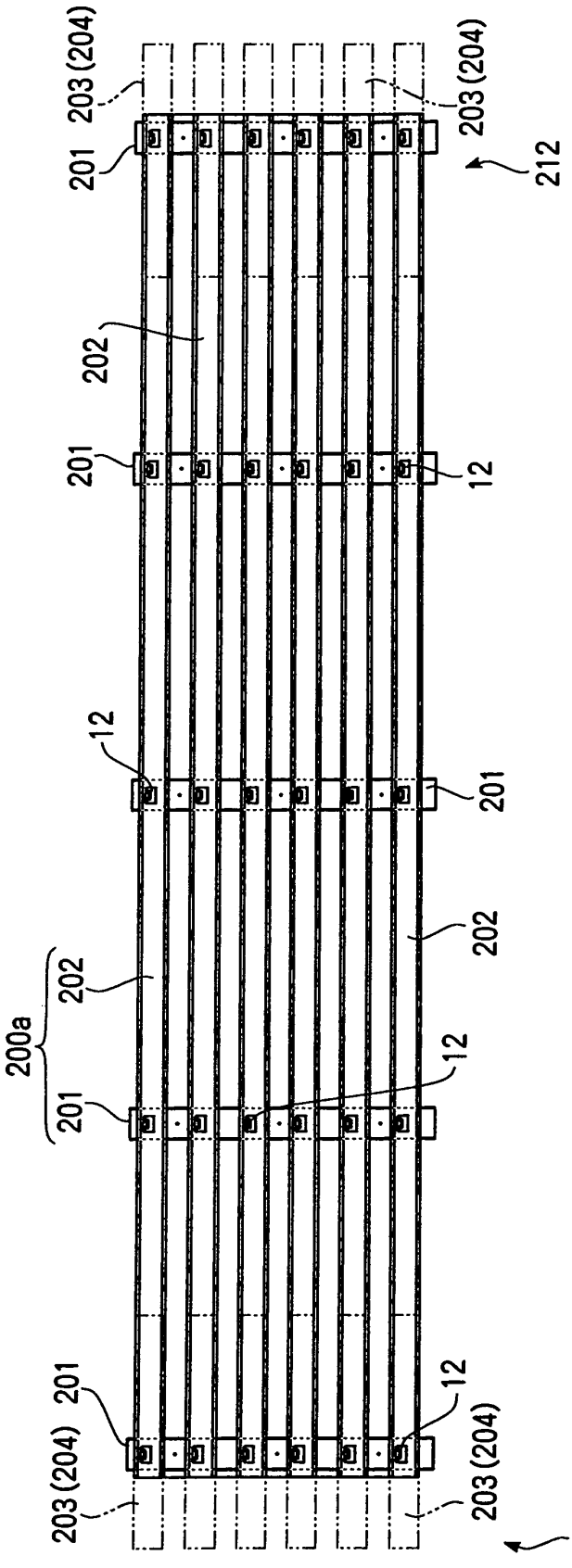
FIG. 35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203 (204)
203 (204)
212

FIG. 36

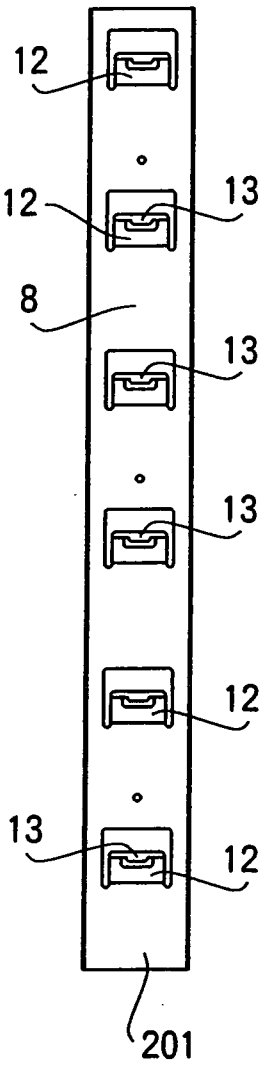


FIG. 37

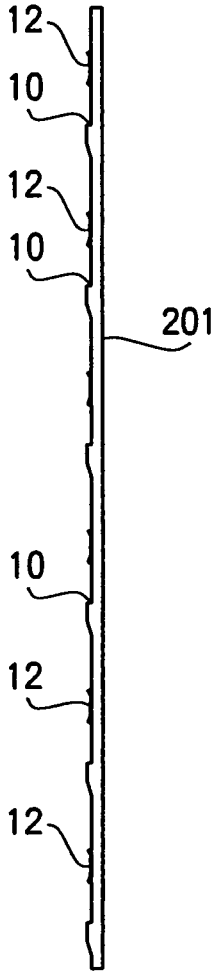


FIG. 38

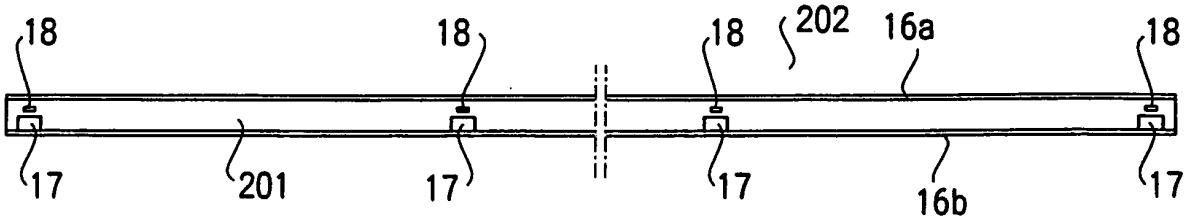


FIG. 39

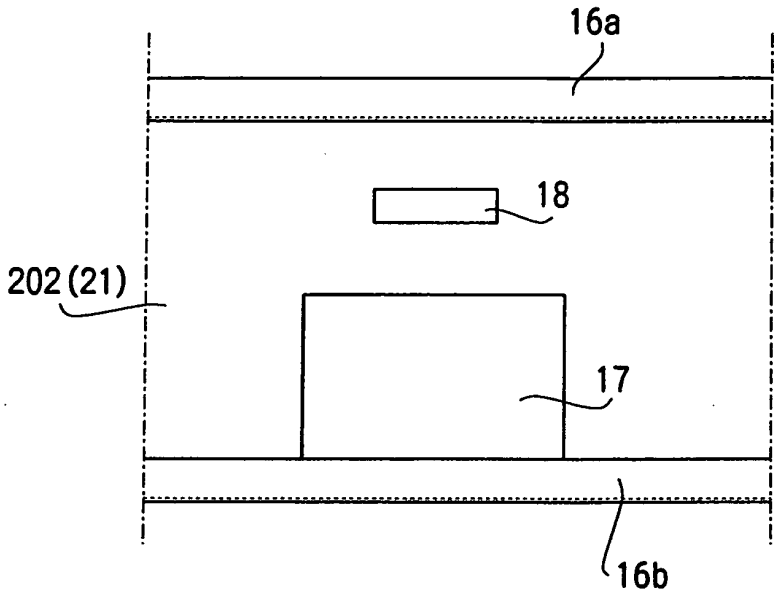


FIG. 40

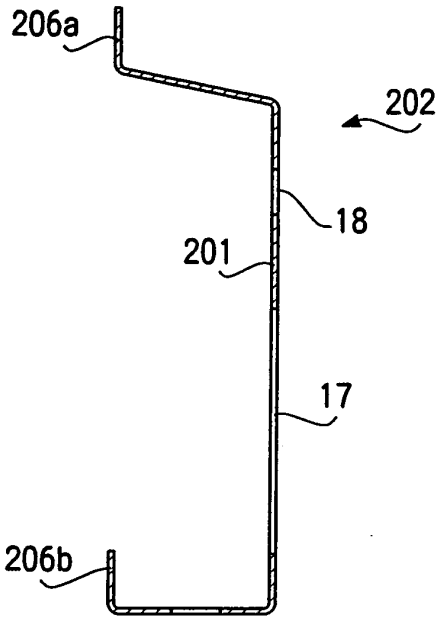


FIG. 41

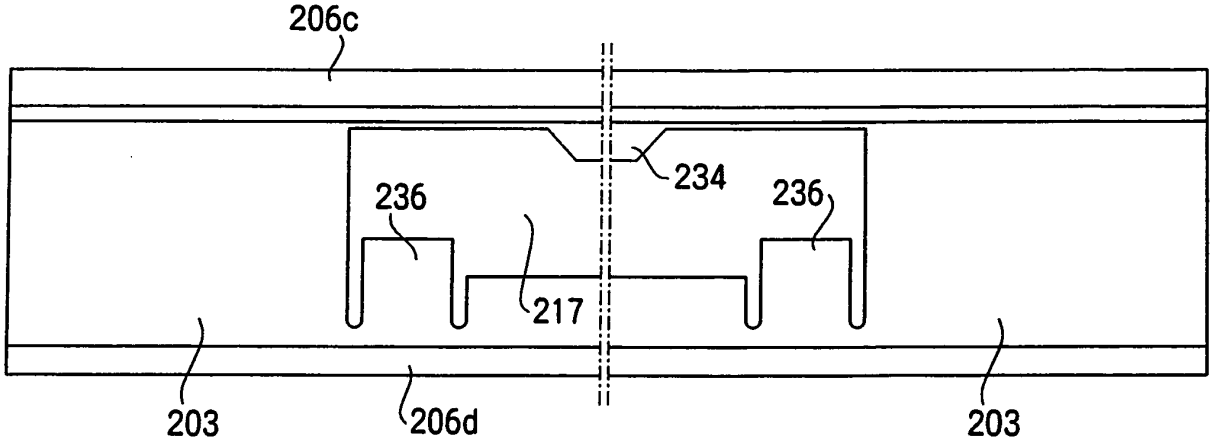


FIG. 42

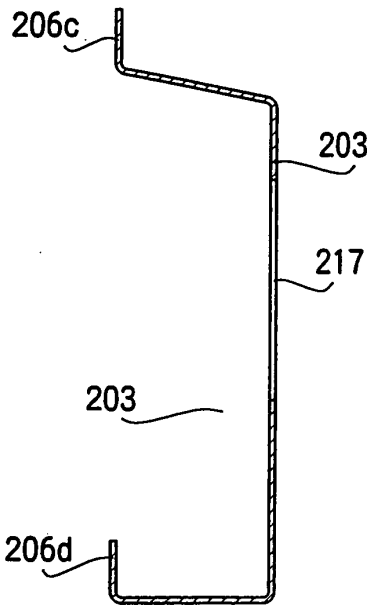


FIG. 43

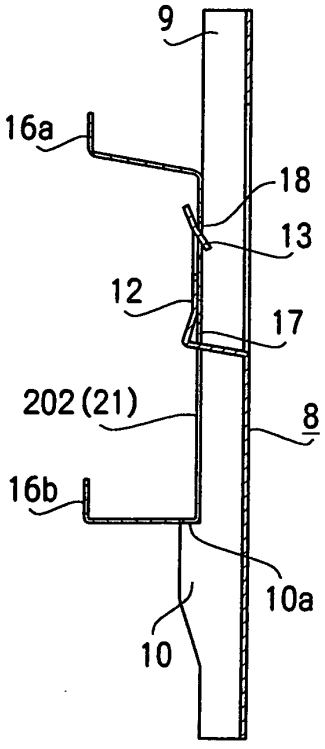


FIG. 44

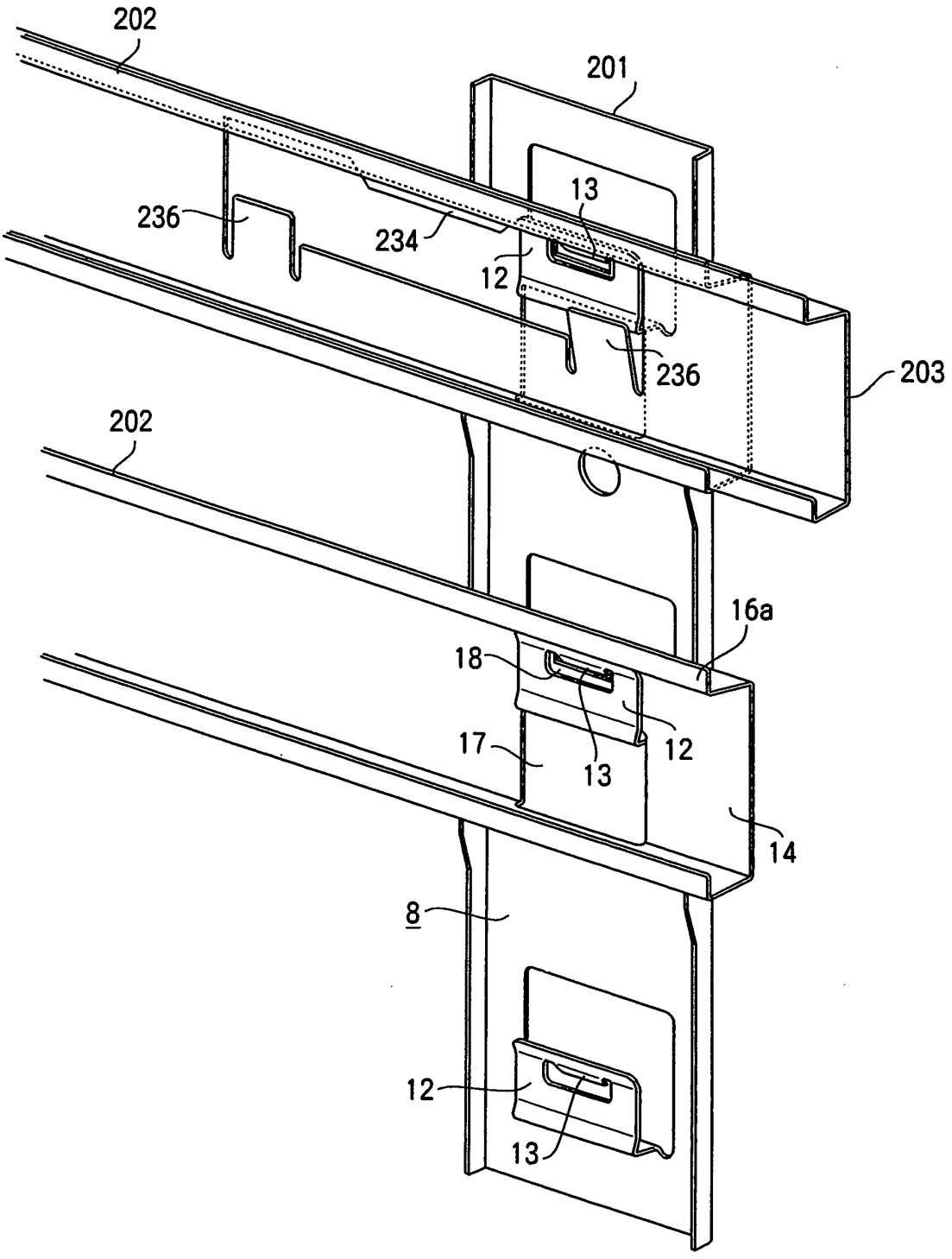
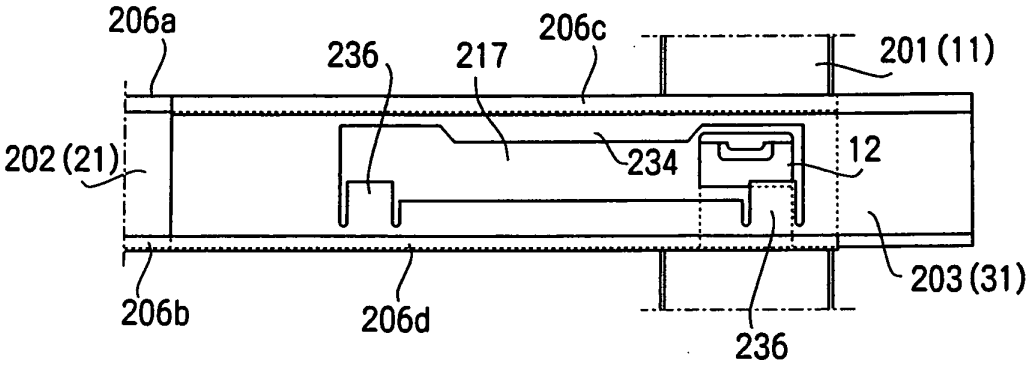


FIG. 45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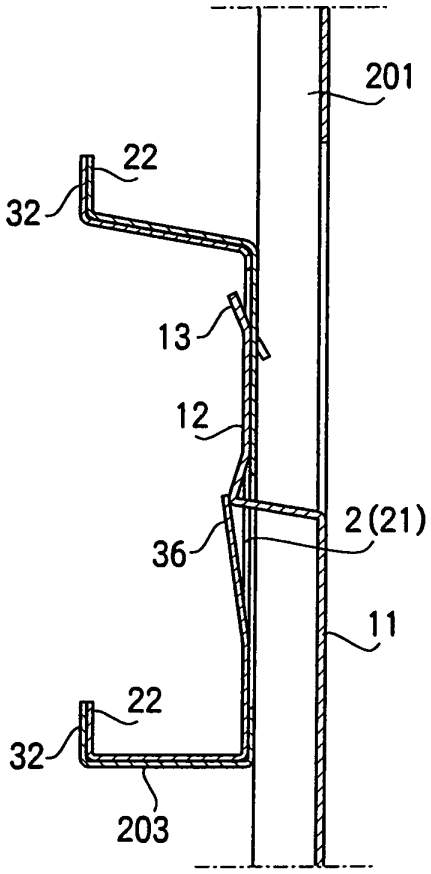
206d
236

FIG. 46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22
32
203

FIG. 47

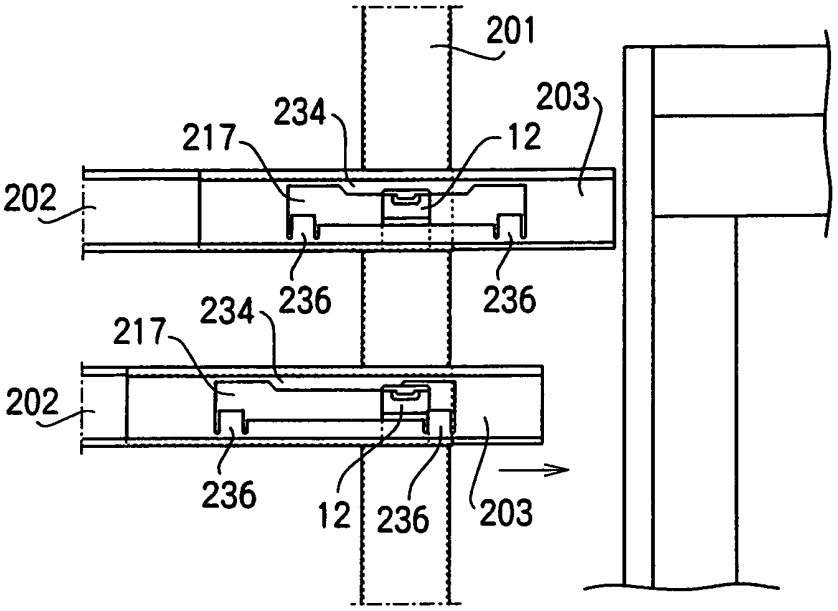
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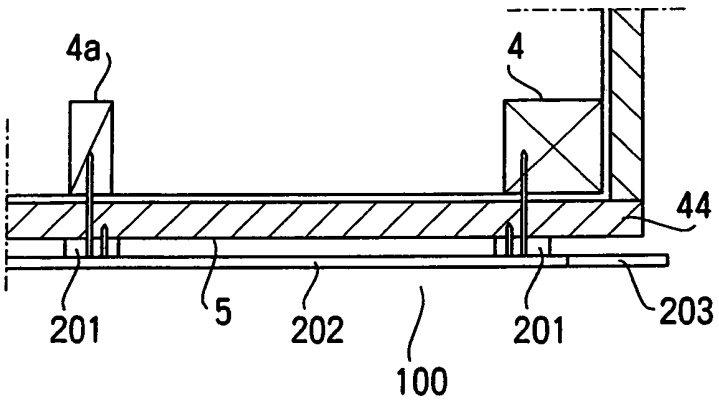
FIG. 48


4a
4
44
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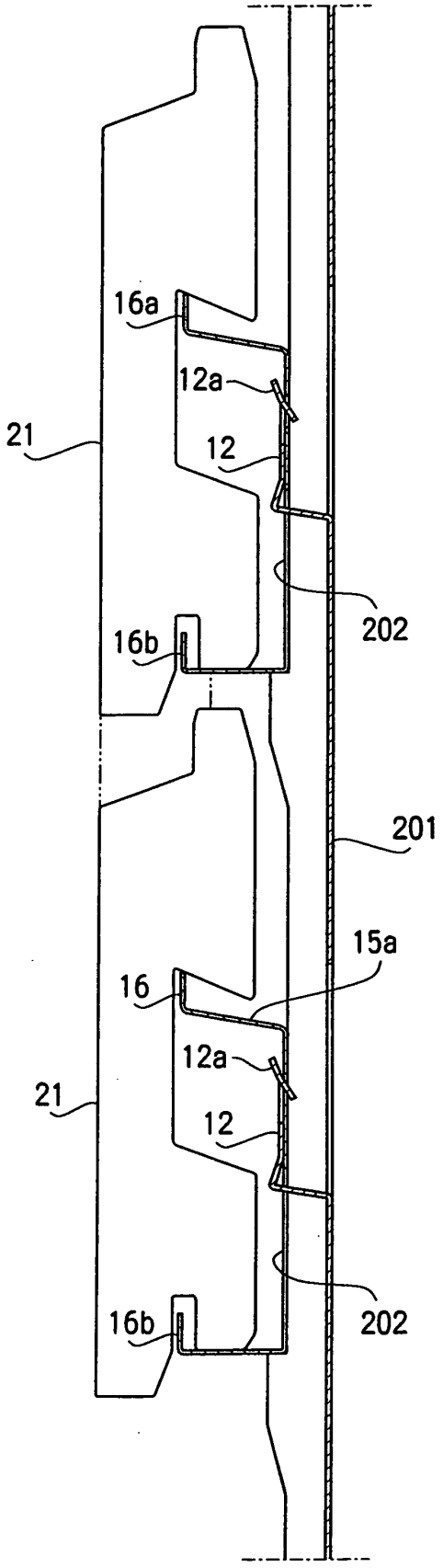
100

FIG. 49

FIG. 50



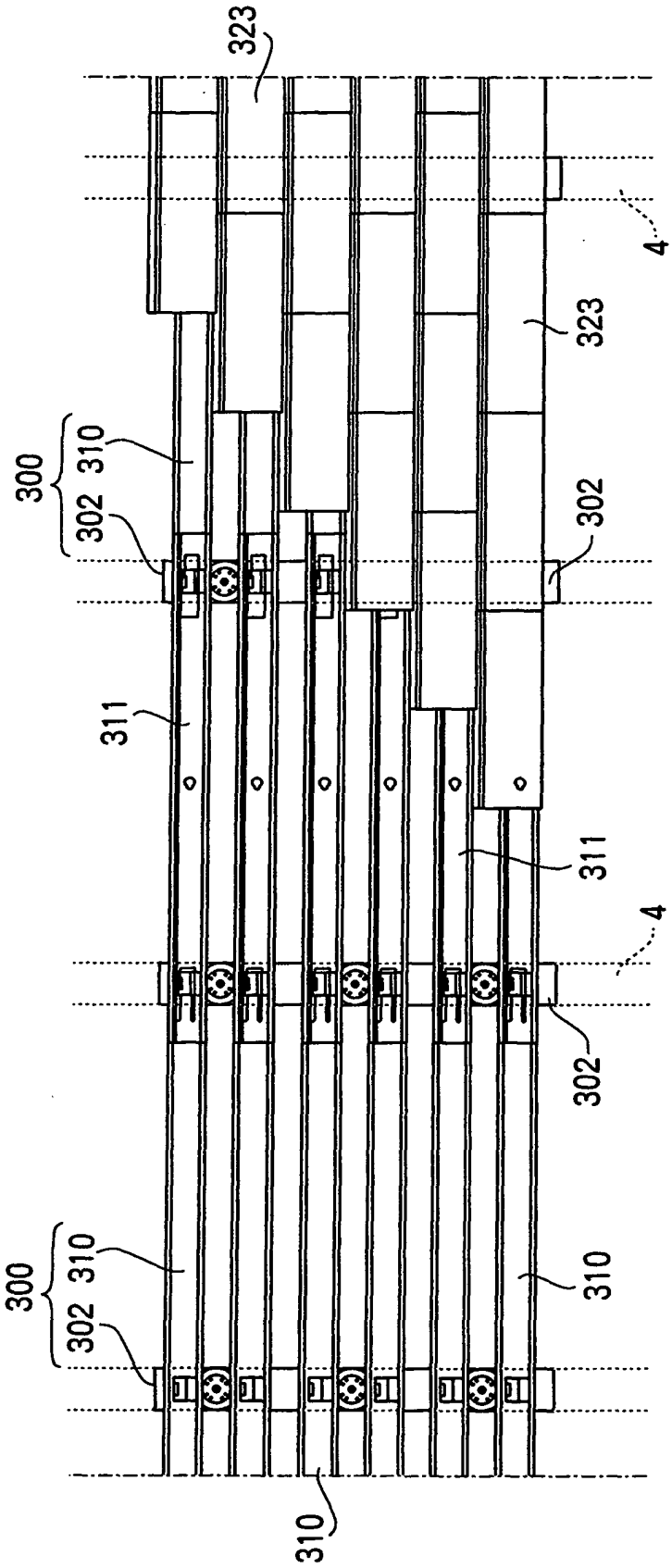


FIG. 51

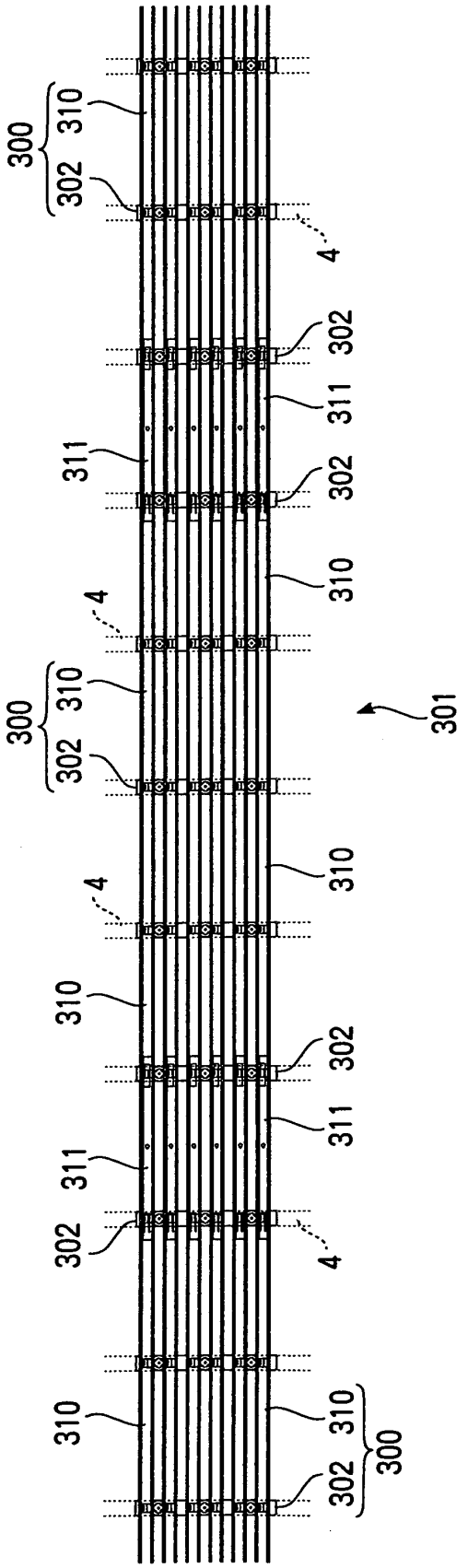


FIG. 52

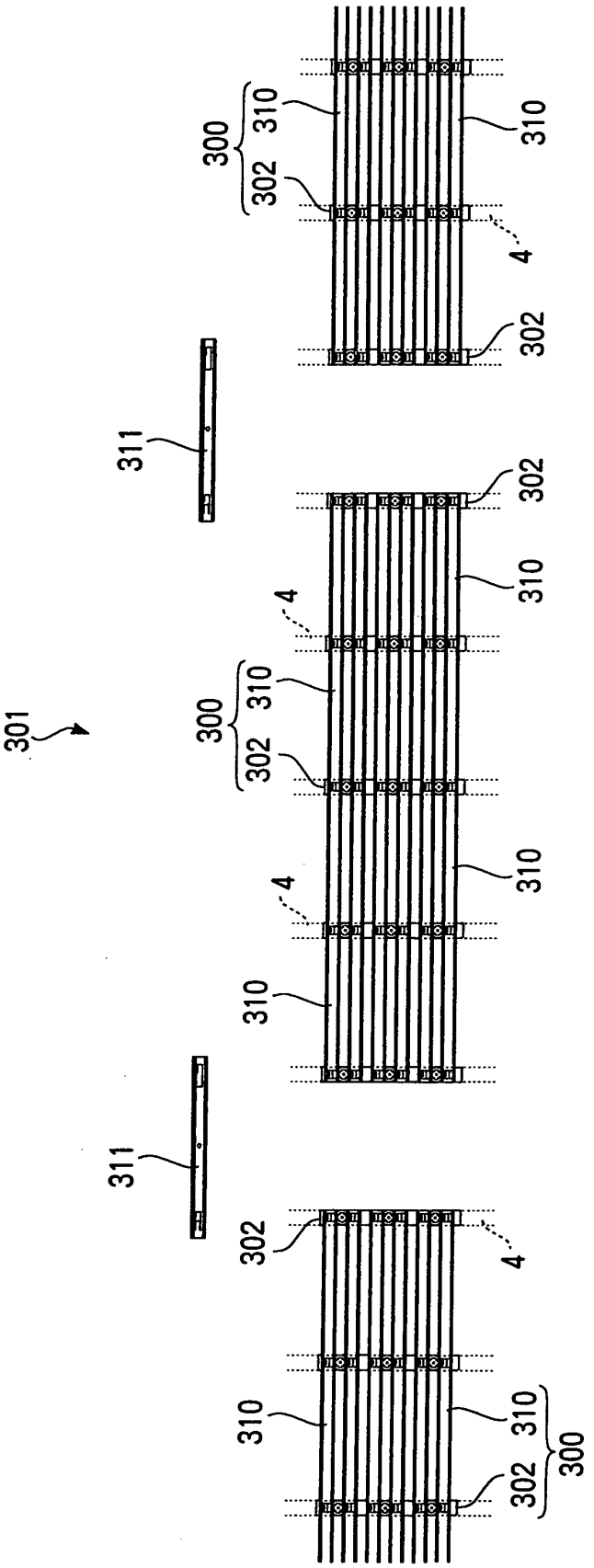


FIG. 53

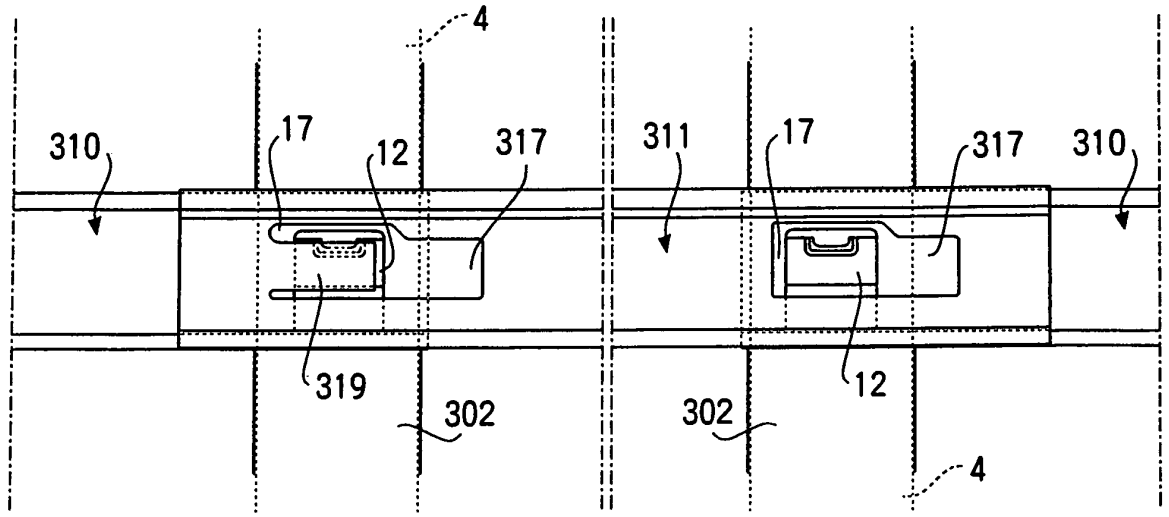

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FIG. 54

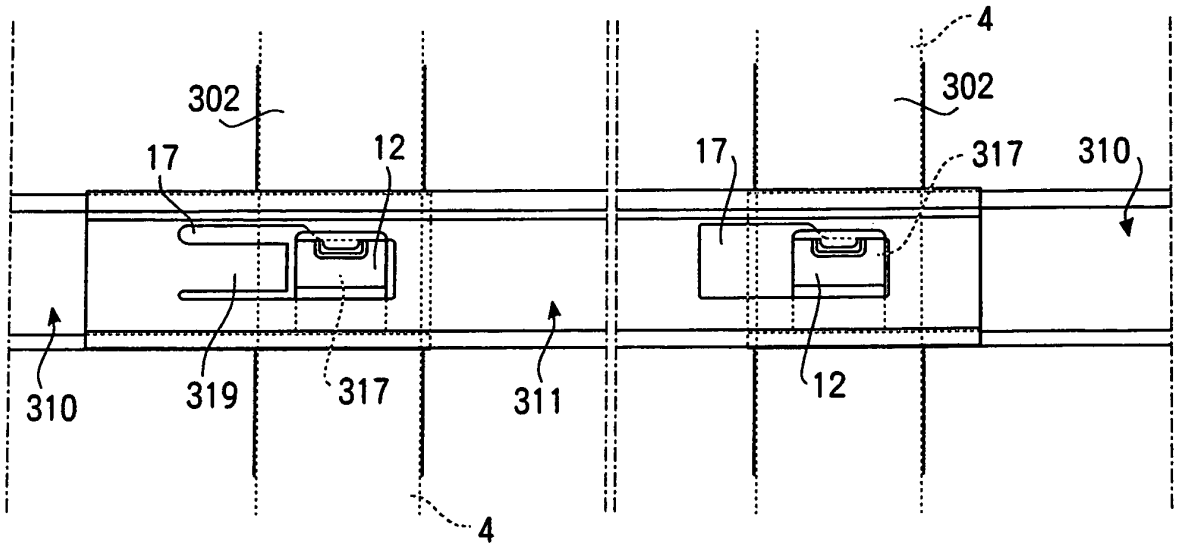
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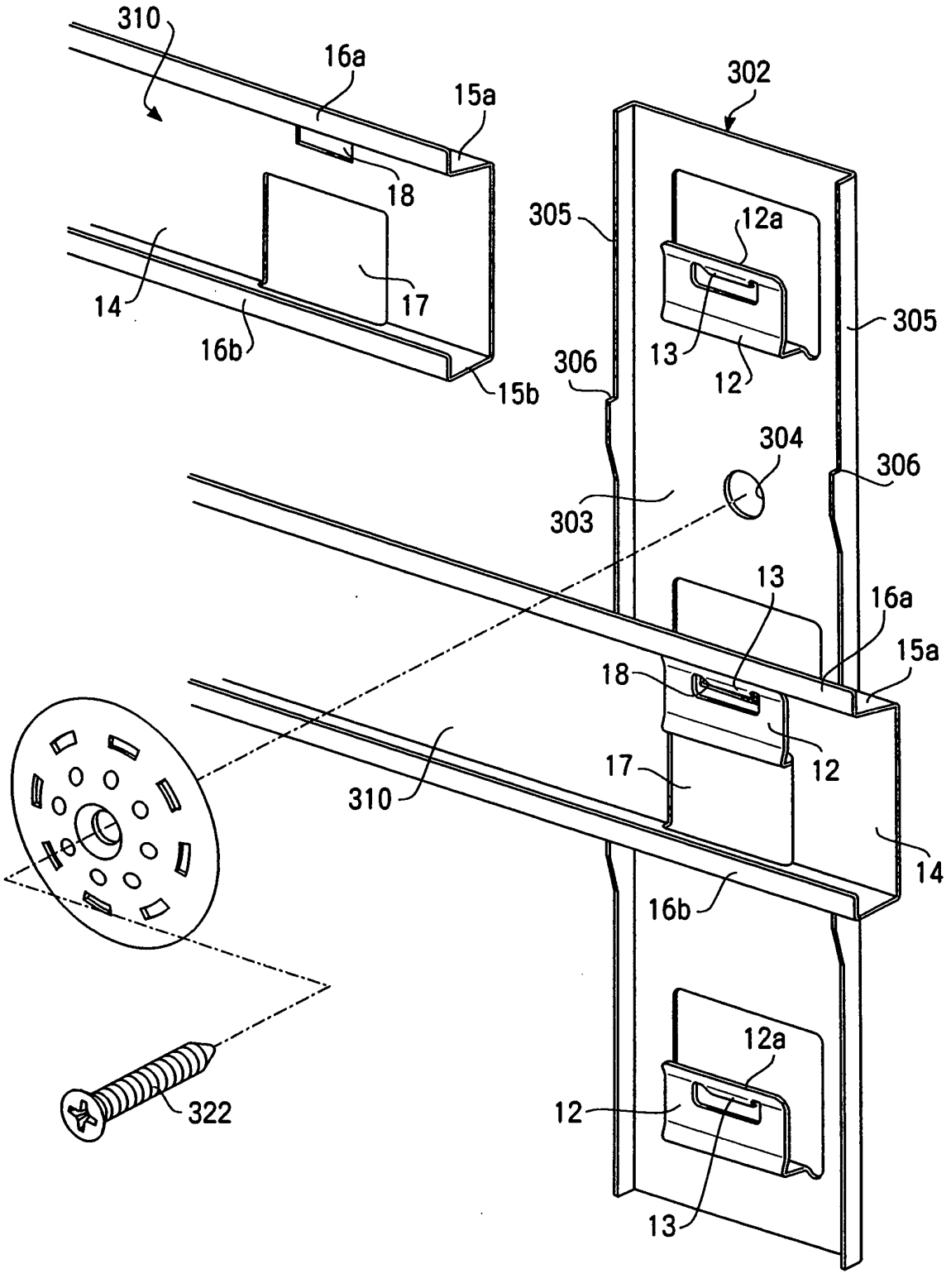
FIG. 55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15a
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322
12a
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FIG. 56

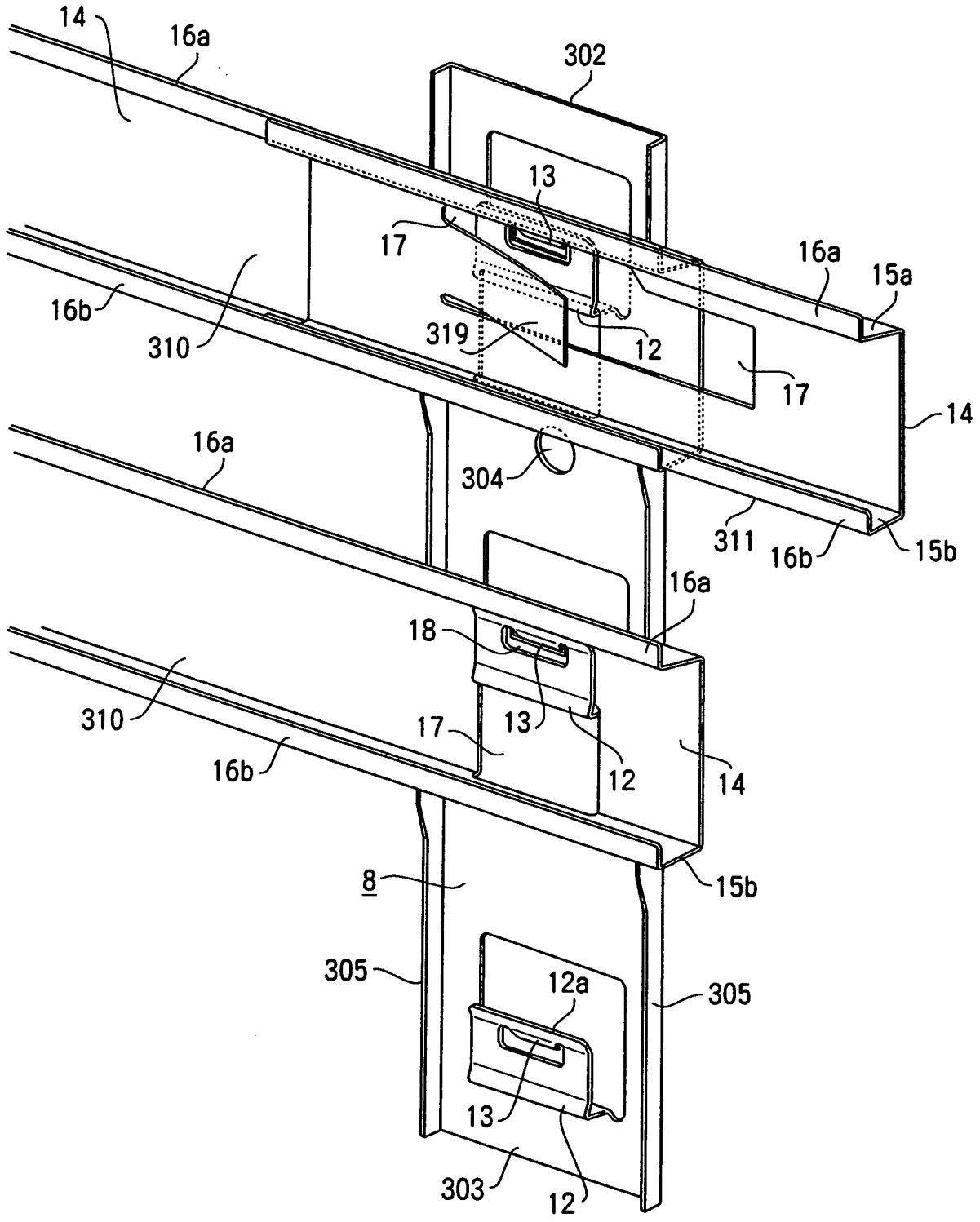
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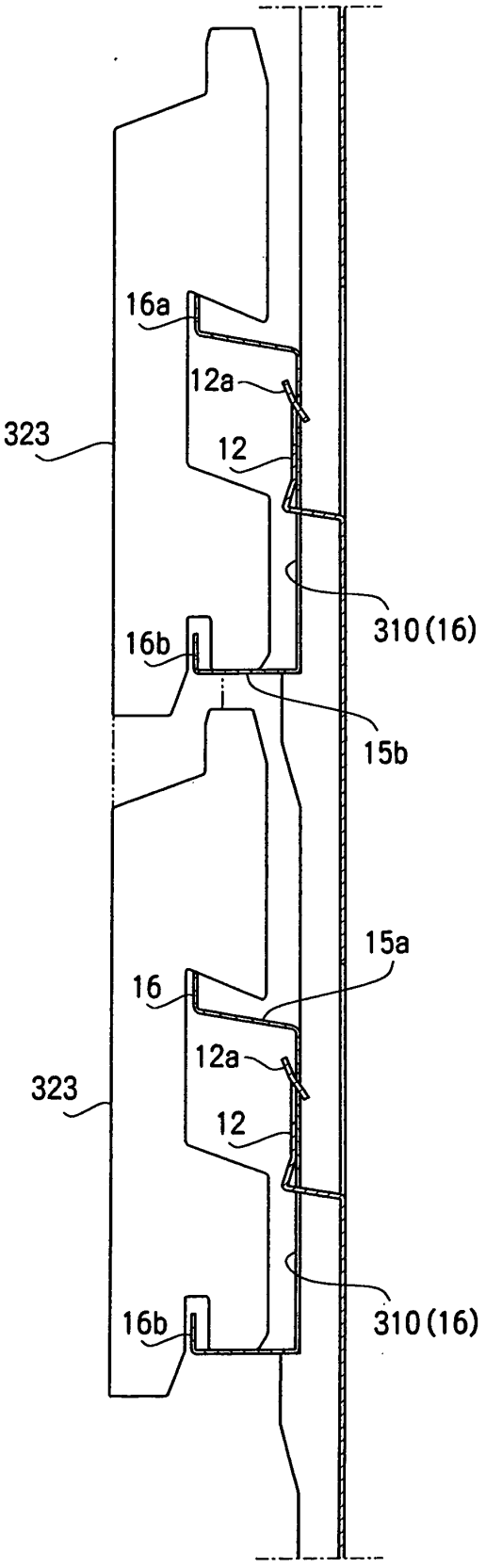
FIG. 57

FIG. 58



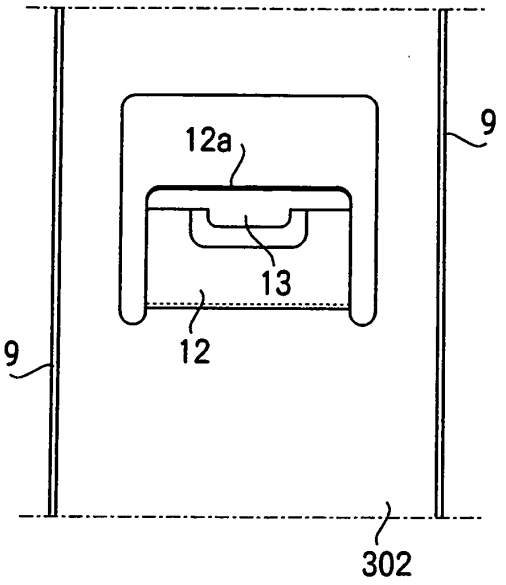


FIG. 59

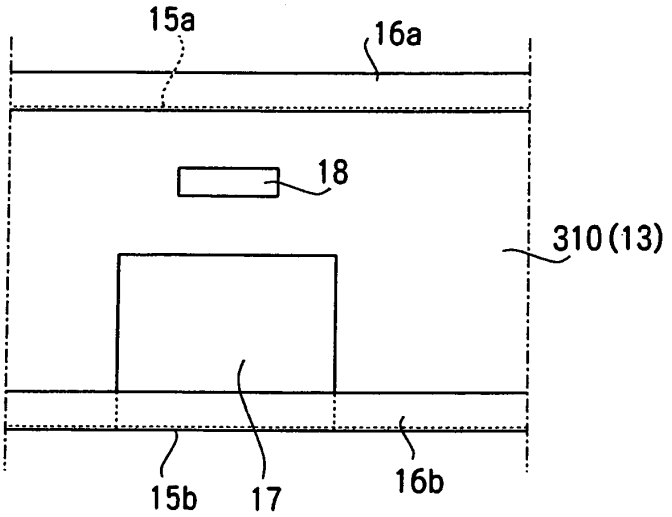


FIG. 60

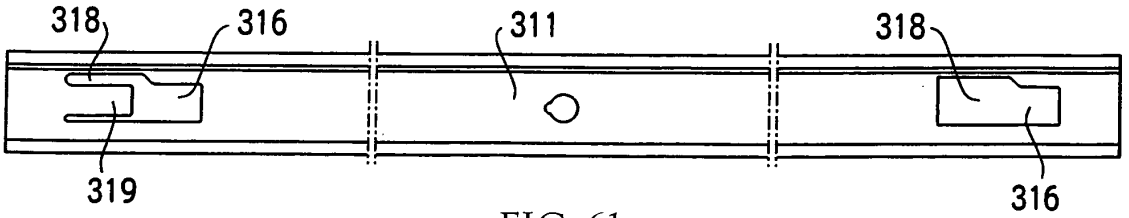


FIG. 61

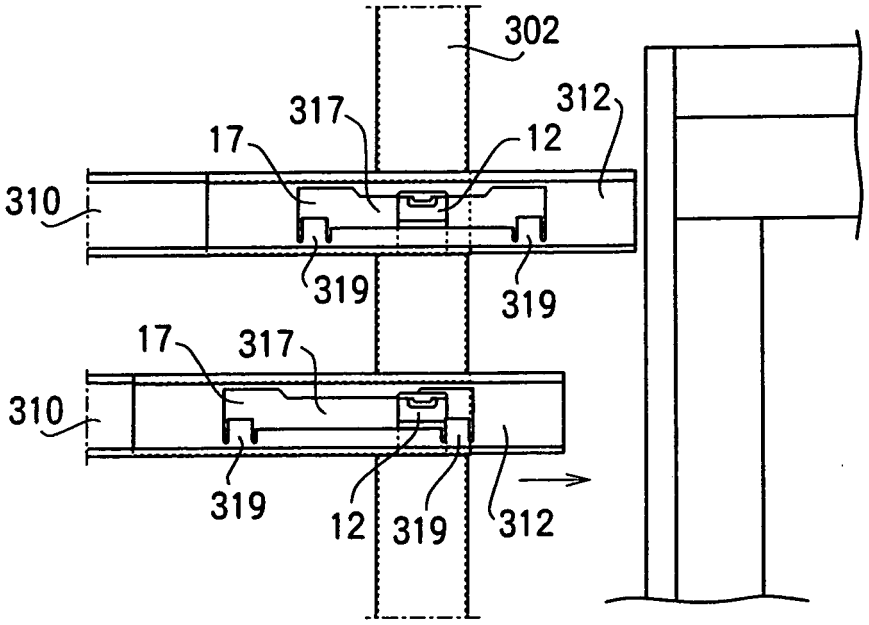


FIG. 62

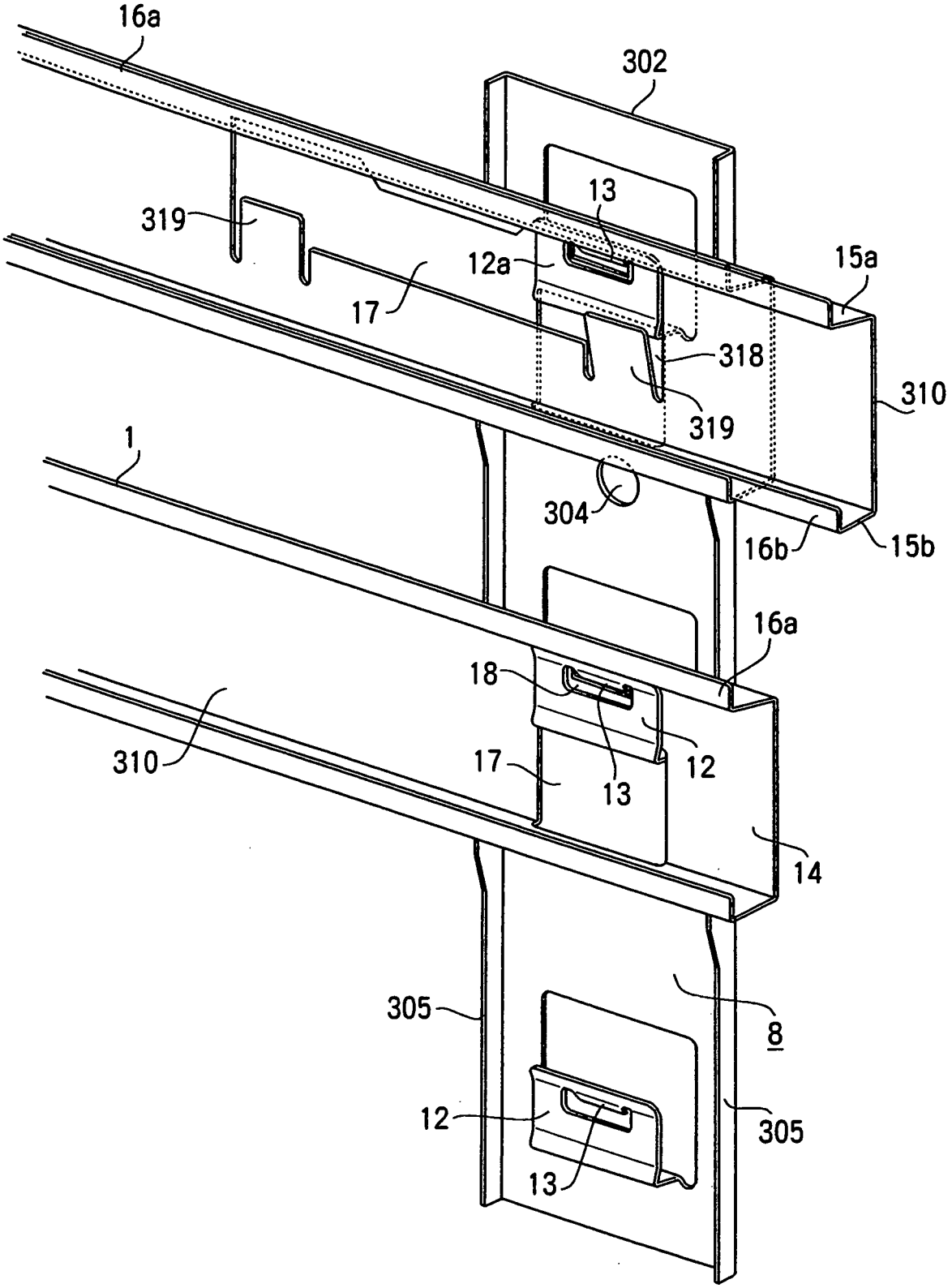

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FIG. 63

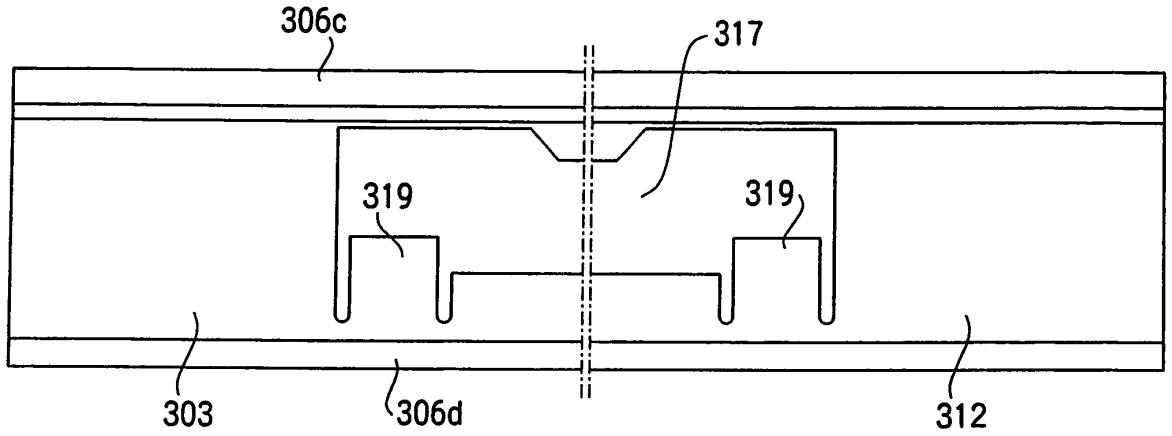

FIG. 64

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/008263

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] E04F13/08, E04B2/56

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)
Int.Cl[7] E04F13/08, E04B2/56

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2005
Kokai Jitsuyo Shinan Koho	1971-2005	Toroku Jitsuyo Shinan Koho	1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2000-204688 A (Kuniaki HASUMI), 25 July, 2000 (25.07.00), Full text; all drawings (Family: none)	1,2,5 3,4,6-27
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 110207/1987(Laid-open No. 14835/1989) (Inax Corp.), 25 January, 1989 (25.01.89), Full text; all drawings (Family: none)	1,2,5 3,4,6-27

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 July, 2005 (05.07.05)	19 July, 2005 (19.07.05)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/008263

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-364101 A (Nippon Steel Corp.), 18 December, 2002 (18.12.02), Par. No. [0009] (Family: none)	2
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 8718/1991(Laid-open No. 105348/1992) (Kabushiki Kaisha Daietsu), 10 September, 1992 (10.09.92), Full text; all drawings (Family: none)	1-27
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 37611/1991(Laid-open No. 132125/1992) (Matsushita Electric Works, Ltd.), 07 December, 1992 (07.12.92), Full text; all drawings (Family: none)	1-27

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Patent documents cited in the description

- JP 2000204688 A **[0004]**
- JP 2003172012 A **[0016]**