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(54) **TERMINATION FOR BUILDING STRUCTURES**

(57) A termination assembly comprises a termination member and a drainage assembly. The termination member includes a base interconnecting a connecting flange and a supporting flange, and the base is configured and arranged to receive a portion of a wall between the connecting flange and the supporting flange. The drainage assembly includes a drainage member operatively connected to the base, and the drainage member creates a void to facilitate drainage and ventilation.

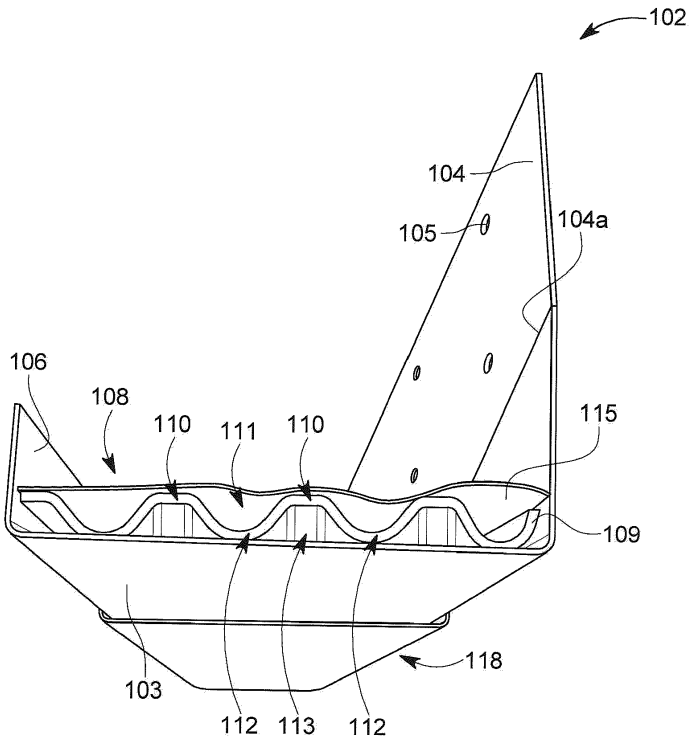

FIG. 4

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 63/164,279, filed March 22, 2021, which is incorporated by reference in its entirety herein.

BACKGROUND

[0002] For buildings with varying types of thin veneers such as stucco, and sidings applied over varying thicknesses of outboard rigid insulation stucco-type exteriors, moisture drainage is important. Rainscreen drainage systems are commonly used with building structures such as exterior walls and windows to provide an air gap over a water resistive barrier to create a capillary break, which allows gravity to drain moisture and provides ventilation to dry out the materials. These rainscreen drainage systems must include functioning terminations. If not adequately drained and ventilated, the building materials can absorb moisture and eventually rot. Even with rainscreen drainage systems, rot can be a problem.

[0003] For the reasons stated above and for other reasons stated below, which will become apparent to those skilled in the art upon reading and understanding the present specification, there is a need in the art for a termination for building structures.

SUMMARY

[0004] The above-mentioned problems associated with prior devices are addressed by embodiments of the disclosure and will be understood by reading and understanding the present specification. The following summary is made by way of example and not by way of limitation. It is merely provided to aid in understanding some of the aspects of the invention.

[0005] In one embodiment, a termination assembly comprises a termination member and a drainage assembly. The termination member includes a base interconnecting a connecting flange and a supporting flange, and the base is configured and arranged to receive a portion of a wall between the connecting flange and the supporting flange. The drainage assembly includes a drainage member operatively connected to the base, and the drainage member creates a void to facilitate drainage and ventilation.

[0006] In one embodiment, a termination assembly comprises a termination member and a drainage assembly. The termination member includes a base interconnecting a connecting flange and a supporting flange, and the base is configured and arranged to receive a portion of a wall between the connecting flange and the supporting flange. The drainage assembly includes a drainage member operatively connected to the base and a filter member operatively connected to the drainage member. The drainage member includes outwardly and inwardly extending portions thereby creating a void to facilitate drainage and ventilation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The accompanying drawings are included to provide a further understanding of embodiments and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments and together with the description serve to explain principles of embodiments. Other embodiments and many of the intended advantages of embodiments will be readily appreciated as they become better understood by reference to the following detailed description. In accordance with common practice, the various described features are not drawn to scale but are drawn to emphasize specific features relevant to the present disclosure. Reference characters denote like elements throughout the Figures and the text.

FIG. 1 is a schematic side view of an embodiment termination constructed in accordance with the principles of the present invention;

FIG. 2 is a schematic side view of another embodiment termination constructed in accordance with the principles of the present invention;

FIG. 2A is a perspective view of the termination shown in FIG. 2;

FIG. 3 is a perspective view of the termination shown in FIG. 1 inserted into the termination shown in FIG. 2 to form a termination assembly;

FIG. 4 is a side perspective view of the termination assembly shown in FIG. 3;

FIG. 5 is a schematic cross section view taken along the lines 5-5 in FIG. 6 of another embodiment termination constructed in accordance with the principles of the present invention;

FIG. 6 is a top view of the termination shown in FIG. 5;

FIG. 7 is a top perspective view of the termination shown in FIG. 5 with a drainage assembly;

FIG. 8 is a top perspective view of the termination shown in FIG. 5 with a drainage assembly;

FIG. 9 is a rear perspective view of the termination shown in FIG. 5;

FIG. 10 is a schematic cross section view taken along the lines 10-10 in FIG. 11 of another embodiment termination constructed in accordance with the prin-

ciples of the present invention;

FIG. 11 is a top view of the termination shown in FIG. 10;

FIG. 12 is a top perspective view of the termination shown in FIG. 10;

FIG. 13 is a schematic view of a building exterior assembly;

FIG. 14 is a schematic side view of a head of a window of the building exterior assembly shown in FIG. 13;

FIG. 15 is a schematic top view of a side of a window of the building exterior assembly shown in FIG. 13;

FIG. 16 is a schematic side view of a window sill of the building exterior assembly shown in FIG. 13;

FIG. 17 is a schematic side view of a bottom of a wall of the building exterior assembly shown in FIG. 13; and

FIG. 18 is a schematic side view of a top of a wall and soffit of the building exterior assembly shown in FIG. 13.

DETAILED DESCRIPTION

[0008] In the following detailed description, reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration embodiments in which the disclosure may be practiced. In this regard, directional terminology, such as "top," "bottom," "front," "back," "leading," "trailing," etc., is used with reference to the orientation of the Figure(s) being described. Because components of embodiments can be positioned in a number of different orientations, the directional terminology is used for purposes of illustration and is in no way limiting. It is to be understood that other embodiments may be utilized and structural or logical changes may be made without departing from the scope of the present invention. The following detailed description, therefore, is not to be taken in a limiting sense, and the scope of the present invention is defined by the appended claims.

[0009] It is to be understood that other embodiments may be utilized and mechanical changes may be made without departing from the spirit and scope of the present disclosure. The following detailed description is, therefore, not to be taken in a limiting sense.

[0010] Embodiments of the disclosure generally provide a termination member configured and arranged to receive at least a portion of a terminal portion of a building veneer, which is part of a wall, for example a top of a wall, a bottom of a wall, and portions forming a window opening, to assist in moisture drainage and ventilation. Generally, the termination member includes a base onto which at least a portion of the terminal portion is seated and a connecting flange and a supporting flange extending from opposing sides of the base. At least a portion of the terminal portion is positioned between the connecting flange and the supporting flange. The connecting flange is configured and arranged to be connected to the building structure. The base is configured and arranged to drain moisture via gravity and provide ventilation.

[0011] A termination member can be used alone or in combination with another termination member. The termination member can include a drainage assembly. The termination member can include drainage apertures.

[0012] In one embodiment, illustrated in FIG. 1, a termination member 102 is an elongate member having a generally L-shaped profile. A base 103 interconnects a connecting flange 104 and a supporting flange 106. Preferably, the connecting flange 104 has a longitudinal bend 104a that allows a top portion including apertures 105 configured and arranged to receive fasteners to be connected to the building structure and allows a bottom portion to extend at an angle away from the building structure. The depth of the base 103, between the connecting flange 104 and the supporting flange 106, accommodates the portion of the terminal portion.

[0013] In an example, the base 103 has a depth of 3 inches, the connecting flange 104 has a height of 3 ½ inches, and the supporting flange 106 has a height of ¾ inches. The bottom portion of the connecting flange 104 is 1 ½ inches and the top portion of the connecting flange 104 is 2 inches. The bend 104a creates a gap of 1/8 inch from the building structure to the base 103.

[0014] As illustrated in FIGS. 3 and 4, an example termination member 102 also includes a drainage assembly 108. The drainage assembly 108 includes a drainage member 109 configured and arranged to create longitudinally extending voids or channels for drainage and ventilation, as shown in FIG. 4. Preferably, the drainage member 109 is made of corrugated spunbond with alternating outwardly and inwardly extending portions 110 and 112 creating outer and inner voids 111 and 113, respectively. Optionally, a filter member 115 is operatively connected to the drainage assembly 108 with adhesive, stitching, fasteners, or other suitable connecting means. Preferably, the filter member 115 is made of a lighter weight spunbond than the drainage member 109 and is not corrugated. The filter member 115 provides a filtering mechanism. Although corrugated spunbond and spunbond are described, it is recognized that any suitable material (e.g., screen material, etc.) and configuration could be used. For example, the drainage member could be corrugated, crimped, or folded to create the voids or channels.

[0015] Preferably, the termination member 102 is inserted into a termination member 118, which is a receiving termination member, as shown in FIGS. 3 and 4. The termination member 118 is illustrated in FIGS. 2 and 2A.

The termination member 118 is an elongate member having a generally L-shaped profile. A base 119 interconnects a connecting flange 120 and a supporting flange 122. Preferably, the connecting flange 120 has a longitudinal bend 120a that allows a top portion including apertures 121, aligning with apertures 105, configured and arranged to receive fasteners to be connected to the building structure and allows a bottom portion to extend at an angle away from the building structure. The depth of the base 119, between the connecting flange 120 and the supporting flange 122, accommodates the portion of the terminal portion.

[0016] In an example, the base 119 has a depth of 3 1/8 inches, the connecting flange 120 has a height of 3 ½ inches, and the supporting flange 122 has a height of ¾ inches. The bottom portion of the connecting flange 120 is 1 ½ inches and the top portion of the connecting flange 120 is 2 inches. The bend 120a creates a gap of 1/8 inch from the building structure to the base 119.

[0017] The termination member 102 fits within the termination member 118, and this assembly is used along the head of a window opening (on top of a window). The termination member 102 is sloped relative to the termination member 118 and provides longitudinally extending voids for drainage and ventilation, and the termination member 118 provides a surface generally aligned with the top of the window for aesthetics. A portion of the veneer can be applied to an exterior surface of the termination member 118 so that it blends with the rest of the exterior. The termination member 102 can be sloped from one end to the other end or it can include a bend proximate the middle to slope downward toward both ends. The gap between the building structure and the bottom portions of the bases 103 and 119 provide additional ventilation. Preferably, the termination members 102 and 118 are made from stainless steel to resist corrosion and be fire resistant. Preferably, the termination members 102 and 118 are made in 8 feet lengths and one or more assemblies can be used along a terminal portion of a building.

[0018] In one embodiment, termination member 118 can be used alone, for example along sides of a window opening, as shown in FIG. 15.

[0019] In one embodiment, illustrated in FIGS. 5-9, a termination member 126 is an elongate member having a generally L-shaped profile. A base 127 interconnects a connecting flange 128 and a supporting flange 131. Proximate the connecting flange 128, the base 127 includes drainage apertures 129, which can be slots extending from the base 127 to or into the connecting flange 128, and the base 127 is angled with a slope 143 toward the drainage apertures 129 to facilitate drainage. Preferably, the connecting flange 128 has a longitudinal bend 128a that allows a top portion including apertures 130 configured and arranged to receive fasteners to be connected to the building structure and allows a bottom portion to extend at an angle away from the building structure. The depth of the base 127, between the connecting flange 128 and the supporting flange 131, accommodates the portion of the terminal portion.

[0020] In an example, the base 127 has a depth of 3 1/8 inches, the connecting flange 128 has a height of 3 ½ inches, and the supporting flange 131 has a height of ¾ inches. The bottom portion of the connecting flange 128 is 1 ½ inches and the top portion of the connecting flange 128 is 2 inches. The bend 128a creates a gap of 1/8 inch from the building structure to the base 127. The angle of the base 127 provides a gap or slope 143 of 1/8 inch from a side of the base 127 proximate the supporting flange 131 to a side of the base 127 proximate the connecting flange 128.

[0021] As illustrated in FIGS. 7 and 8, the termination member 126 includes a drainage assembly 134. The drainage assembly 134 includes a drainage member 135 configured and arranged to create laterally extending voids or channels for drainage toward the drainage apertures 129 and ventilation, as illustrated in FIGS. 8 and 9. Preferably, the drainage member 135 is made of corrugated spunbond with alternating upwardly and downwardly extending portions 136 and 138 creating top and bottom voids 137 and 139. Optionally, a filter member 141 is operatively connected to the drainage assembly 134 with adhesive, stitching, fasteners, or other suitable connecting means. Preferably, the filter member 141 is made of a lighter weight spunbond than the drainage member 134 and is not corrugated. The filter member 141 provides a filtering mechanism. Although corrugated spunbond and spunbond are described, it is recognized that any suitable material (e.g., screen material, etc.) and configuration could be used. For example, the drainage member could be corrugated, crimped, or folded to create the voids or channels.

[0022] Termination member 126 can be used alone, for example along a window sill (bottom of a window opening), as shown in FIG. 16.

[0023] In one embodiment, illustrated in FIGS. 10-12, a termination member 146 is an elongate member having a generally L-shaped profile. A base 147 interconnects a connecting flange 148 and a supporting flange 150. Proximate the supporting flange 150, the base 147 includes drainage apertures 151, which can be slots extending from the base 147 to or into the supporting flange 150, and the base 147 is angled with a slope 153 toward the drainage apertures 151 to facilitate drainage. Preferably, the connecting flange 148 has a longitudinal bend 148a that allows a top portion including apertures 149 configured and arranged to receive fasteners to be connected to the building structure and allows a bottom portion to extend at an angle away from the building structure. The depth of the base 147, between the connecting flange 148 and the supporting flange 150, accommodates the portion of the terminal portion.

[0024] In an example, the base 147 has a depth of 3 1/8 inches, the connecting flange 148 has a height of 3 ½ inches, and the supporting flange 150 has a height of % inches. The bottom portion of the connecting flange

148 is 1 ½ inches and the top portion of the connecting flange 148 is 2 inches. The bend 148a creates a gap of 1/8 inch from the building structure to the base 147. The angle of the base 147 provides a gap or slope 153 of 1/8 inch from a side of the base 147 proximate the supporting flange 150 to a side of the base 147 proximate the connecting flange 148.

[0025] Termination member 146 can be used alone, for example along a bottom of a veneer, as shown in FIG. 17.

[0026] The components of the building and how they are installed are well known in the art and, therefore, will be described generally using reference numerals for similar components although they may be used differently in different views. Although the components and how they are installed with the termination assembly are described, it is recognized that other suitable installation techniques and configurations can be used.

[0027] FIG. 13 illustrates various terminal locations of a building exterior assembly 200. The building exterior assembly 200 includes a wall 201 connected to a wall frame 220 (shown in FIGS. 14 and 16-18) and a window opening 205 in which a window frame 211 is positioned. The wall 201 includes a top 202 and a bottom 203. The window opening 205 includes a top 206, sides 207 and 208, and a bottom 209. The window frame 211 includes a top 212, sides 213 and 214, and a bottom 215. A window jamb 216 and a window pane 217 are operatively connected to the window frame 212.

[0028] Generally, as shown in FIGS. 14-18, the wall 201 includes sheathing 221 operatively connected the wall frame 220. The sheathing 221 is covered with weather resistive barrier (WRB) 222. Then, a filter screen with drainage plane 227, insulation 228, and a filter screen with drainage plane 227' are positioned over the WRB 222. A three coat stucco 230 including a scratch coat 231, a brown coat 232, and a finish coat 233 are applied onto the filter screen with drainage plane 227'. In some embodiments, there is flashing between the WRB 222 and the filter screen with drainage plane 227. These components are installed using methods well known in the art.

[0029] FIG. 14 illustrates an embodiment termination member including termination members 102 and 118 positioned along the head of the window. In this embodiment, a window mounting flange 226 extending from the window frame 212, window flashing 224, and flashing 225 are operatively connected between the WRB 222 and the filter screen with drainage plane 227. The connecting flanges 104 and 120 of the termination members 102 and 118, with termination member 102 inserted into termination member 118, are positioned between the window mounting flange 226 / window flashing 224 and the flashing 225. The bases 103 and 119 are positioned proximate the window frame 212. A chock 229 including a compressible backer rod 229a and caulking 229b can be positioned between the window frame 212 and the base 119 of the termination member 118, and a chock 229' can be positioned between the supporting flanges 106 and 122. A filter screen with drainage plane 227" is positioned on the termination member 102. In this embodiment, the filter screen with drainage plane 227" is similar to the drainage assembly 108 shown in FIG. 4 and includes a horizontally extending drainage member, similar to drainage member 109, and a filter member operatively connected to the drainage member, similar to filter member 115. The filter screen with drainage plane 227, insulation 228, filter screen with drainage plane 227', and a portion of the three coat stucco 230 are positioned on the filter screen with drainage plane 227". The filter screen with drainage plane 227 and the filter screen with drainage plane 227' each include a vertically extending drainage member with a filter member operatively connected thereto. The finish coat 233 can be applied on the bottom of the termination member 118. The termination members 102 and 118 are preferably mounted at an angle relative to the window frame sides 213 and 214 so that the longitudinal channels created by the drainage member 109 facilitate draining to one side.

[0030] FIG. 15 illustrates an embodiment termination member 118 positioned along the side of a window. In this embodiment, a window mounting flange 226 extending from the window frame side 213 and flashing 225 are operatively connected between the WRB 222 and the filter screen with drainage plane 227. The connecting flange 120 of the termination member 118 is positioned between the window mounting flange 226 / flashing 225 and the flashing 225' / filter screen with drainage plane 227, and the base 119 is positioned proximate the window frame 213. A chock 229 including a compressible backer rod 229a and caulking 229b can be positioned between the window frame 213 and the termination member 118. A filter screen with drainage plane 227" is positioned on the base 119 of the termination member 118. In this embodiment, the filter screen with drainage plane 227" is similar to the drainage assembly 108 shown in FIG. 4 and includes a horizontally extending drainage member, similar to drainage member 109, and a filter member operatively connected to the drainage member, similar to filter member 115. The filter screen with drainage plane 227, insulation 228, filter screen with drainage plane 227', and a portion of the three coat stucco 230 are positioned on the filter screen with drainage plane 227". The filter screen with drainage plane 227 and the filter screen with drainage plane 227' each include a vertically extending drainage member with a filter member operatively connected thereto. The finish coat 233 can be applied on the bottom of the termination member 118. The termination member 118 facilitates drainage vertically along the side of the window.

[0031] FIG. 16 illustrates an embodiment termination member 126 positioned along a window sill. The bottom 209 of the window opening 205 includes frame 220, beveled siding 236, WRB 222, and window drainage plane 223 below the window jamb 216. Window drainage plane 223 extends a distance downward from the window opening 205. A sillpan waterproofing 235 is between the WRB

222 and the window drainage plane 223 proximate the window mounting flange 226. The connecting flange 128 is positioned between the window mounting flange 226 / window drainage plane 223 and the filter screen with drainage plane 227, and the base 127 is positioned proximate the window frame 215. A chock 229 including a compressible backer rod 229a and caulking 229b can be positioned between the window frame 215 and the base 127 of the termination member 126. A filter screen with drainage plane 227" is positioned on the termination member 126. In this embodiment, the filter screen with drainage plane 227" is similar to the drainage assembly 134 shown in FIG. 8 and includes a laterally extending drainage member, similar to drainage member 135, and a filter member operatively connected to the drainage member, similar to filter member 141. The filter screen with drainage plane 227, insulation 228, filter screen with drainage plane 227', and a portion of the three coat stucco 230 are positioned on the filter screen with drainage plane 227". The filter screen with drainage planes 227, 227', and 227" each include a drainage member with a filter member operatively connected thereto. The finish coat 233 can be applied on the bottom of the termination member 126. The termination member 126 is preferably mounted so that the lateral channels created by the drainage member 135 direct moisture toward the drainage apertures 129, which are protected by the window frame 215 and facilitate ventilation.

[0032] FIG. 17 illustrates an embodiment termination member 146 positioned along the bottom 203 of the wall 201. A sill seal 237 is positioned between the stem wall or foundation and the frame 220. The connecting flange 148 is connected to the bottom of the frame 220 and positioned between the sheathing 221 and the filter screen with drainage plane 227. The base 147 is positioned proximate the top of the stem wall or foundation. A filter screen with drainage plane 227" is positioned on the base 147 of the termination member 146. In this embodiment, the filter screen with drainage plane 227" is similar to the drainage assembly 134 shown in FIG. 8 and includes a laterally extending drainage member, similar to drainage member 135, and a filter member operatively connected to the drainage member, similar to filter member 141. The filter screen with drainage plane 227, insulation 228, filter screen with drainage plane 227', and a portion of the three coat stucco 230 are positioned on the filter screen with drainage plane 227". The filter screen with drainage planes 227, 227', and 227" each include a drainage member with a filter member operatively connected thereto. The finish coat 233 can be applied on the bottom of the termination member 146. The slope 153 of the base 147 directs moisture toward the drainage apertures 151.

[0033] FIG. 18 illustrates an embodiment termination member 126 positioned along the top 202 of the wall 201 proximate a soffit 241 connected to soffit framing 240. The wall 201 is positioned between the frame 220 and a freeze board 242 operatively connected to the soffit 241. The connecting flange 128 is positioned between the WRB 222 and the filter screen with drainage plane 227, and the base 127 is positioned proximate the soffit 241. A filter screen with drainage plane 227" is positioned on the base 127. The filter screen with drainage plane 227, insulation 228, filter screen with drainage plane 227', and a portion of the three coat stucco 230 are positioned on the filter screen with drainage plane 227". The finish coat 233 can be applied on the supporting flange 131. The drainage apertures 129, which are protected by the soffit 241 facilitate ventilation.

[0034] It is recognized that other suitable types of veneer structures, such as those including insulation or wood, could be used with the present invention.

[0035] Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a variety of alternate and/or equivalent implementations may be substituted for the specific embodiments shown and described without departing from the scope of the present invention. This application is intended to cover any adaptations or variations of the specific embodiments discussed herein. Therefore, it is intended that this invention be limited only by the claims and the equivalents thereof.

Claims

1. A termination assembly, comprising:

   a termination member including a base interconnecting a connecting flange and a supporting flange, the base configured and arranged to receive a portion of a wall between the connecting flange and the supporting flange;
   a drainage assembly including a drainage member operatively connected to the base, the drainage member creating a void to facilitate drainage and ventilation.

2. The termination assembly of claim 1, wherein the termination member is made of metal.

3. The termination assembly of claim 2, wherein the metal is stainless steel.

4. The termination assembly of claim 1, wherein the termination member includes drainage apertures.

5. The termination assembly of claim 4, wherein the base is sloped to direct moisture toward the drainage apertures.

6. The termination assembly of claim 4, wherein the drainage apertures are positioned on the base proximate the connecting flange.

7. The termination assembly of claim 6, wherein the

void created by the drainage member includes lateral channels configured and arranged to direct moisture toward the drainage apertures.

8. The termination assembly of claim 4, wherein the drainage apertures are positioned on the base proximate the supporting flange.

9. The termination assembly of claim 8, wherein the void created by the drainage member includes lateral channels configured and arranged to direct moisture toward the drainage apertures.

10. The termination assembly of claim 1, wherein the drainage member is made of corrugated spunbond.

11. The termination assembly of claim 1, the drainage assembly further comprising a filter member, the drainage member interconnecting the base and the filter member.

12. The termination assembly of claim 11, wherein the drainage member is made of corrugated spunbond and the filter member is made of spunbond.

13. The termination assembly of claim 1, wherein the void created by the drainage member includes longitudinal channels configured and arranged to direct moisture toward a distal end of the termination member.

14. The termination assembly of claim 1, wherein the drainage member includes outwardly and inwardly extending portions creating the void.

15. The termination assembly of claim 1, further comprising a receiving termination member configured and arranged to receive the termination member, wherein the termination member is positioned to slope relative to the receiving termination member, and wherein an exterior surface of the receiving termination member is configured and arranged to receive a portion of a veneer.

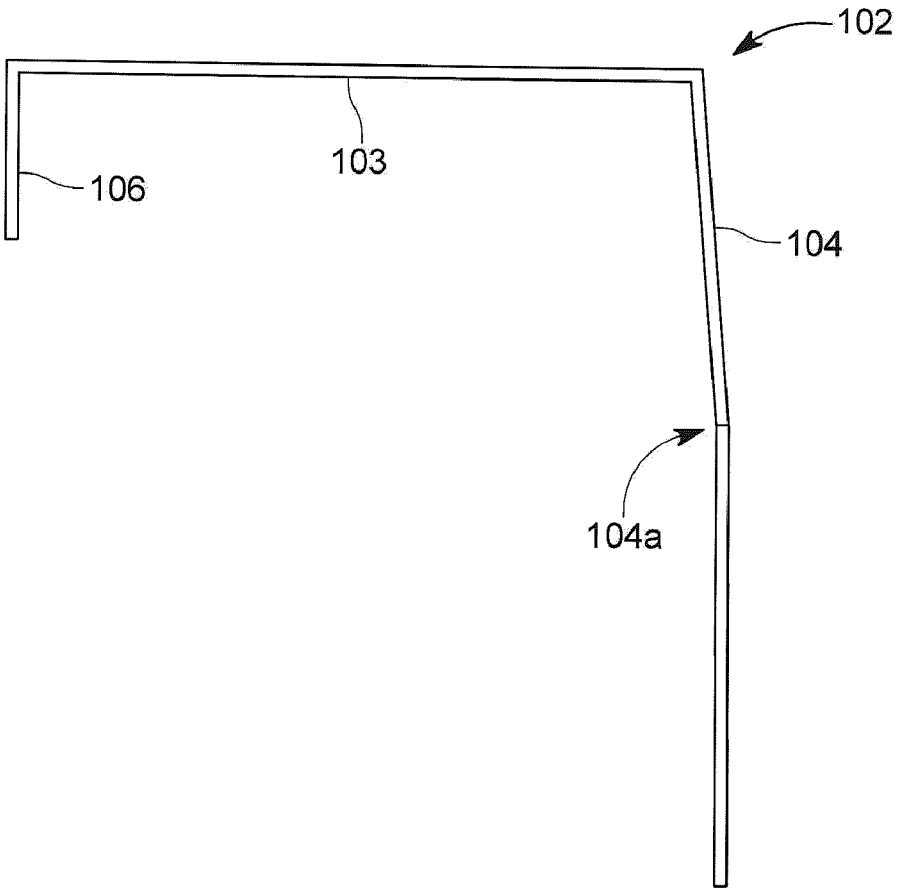


FIG. 1

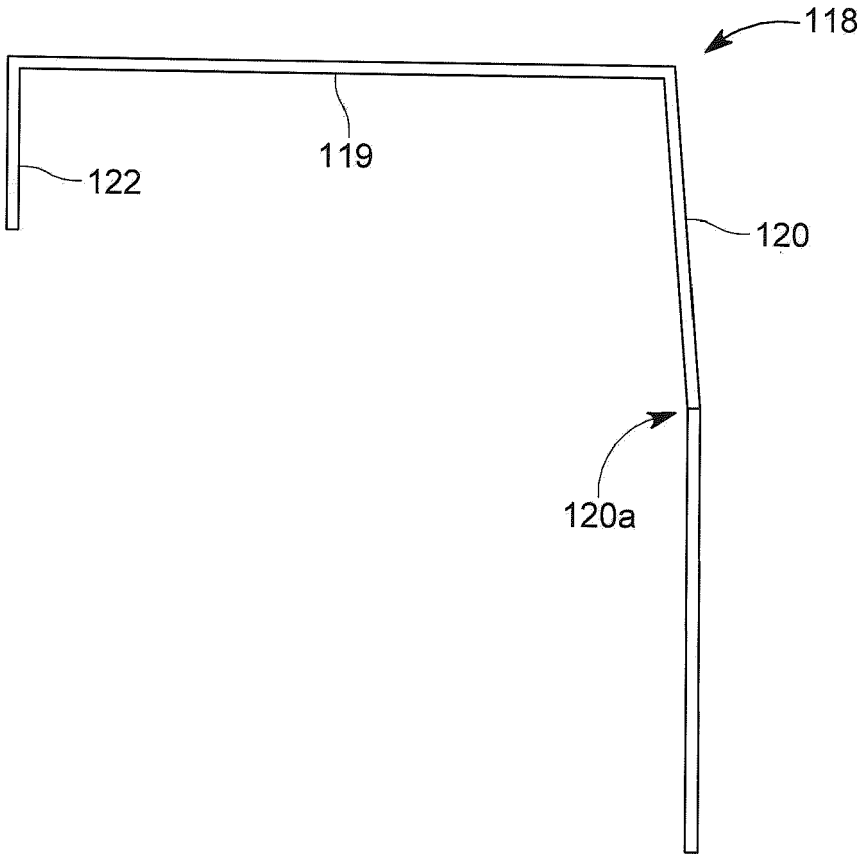


FIG. 2

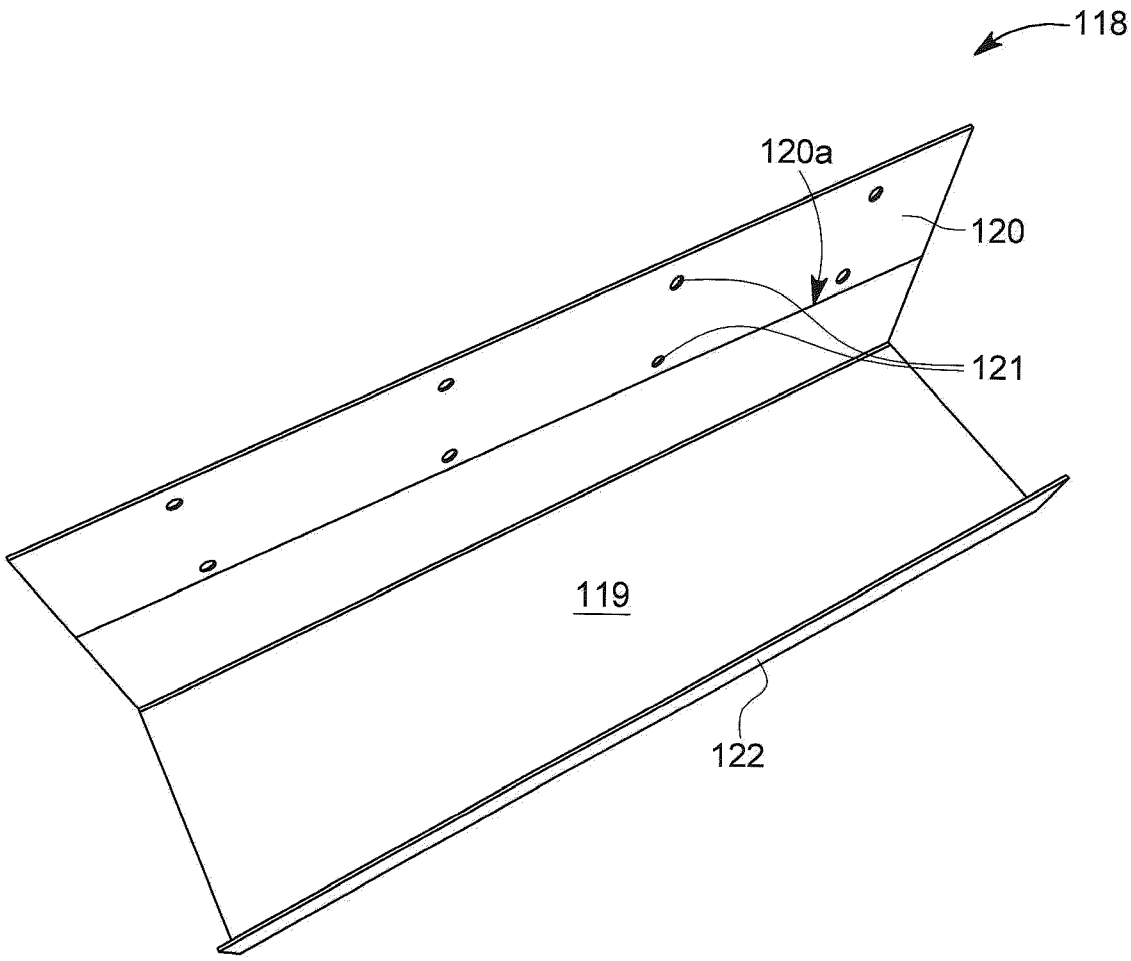


FIG. 2A

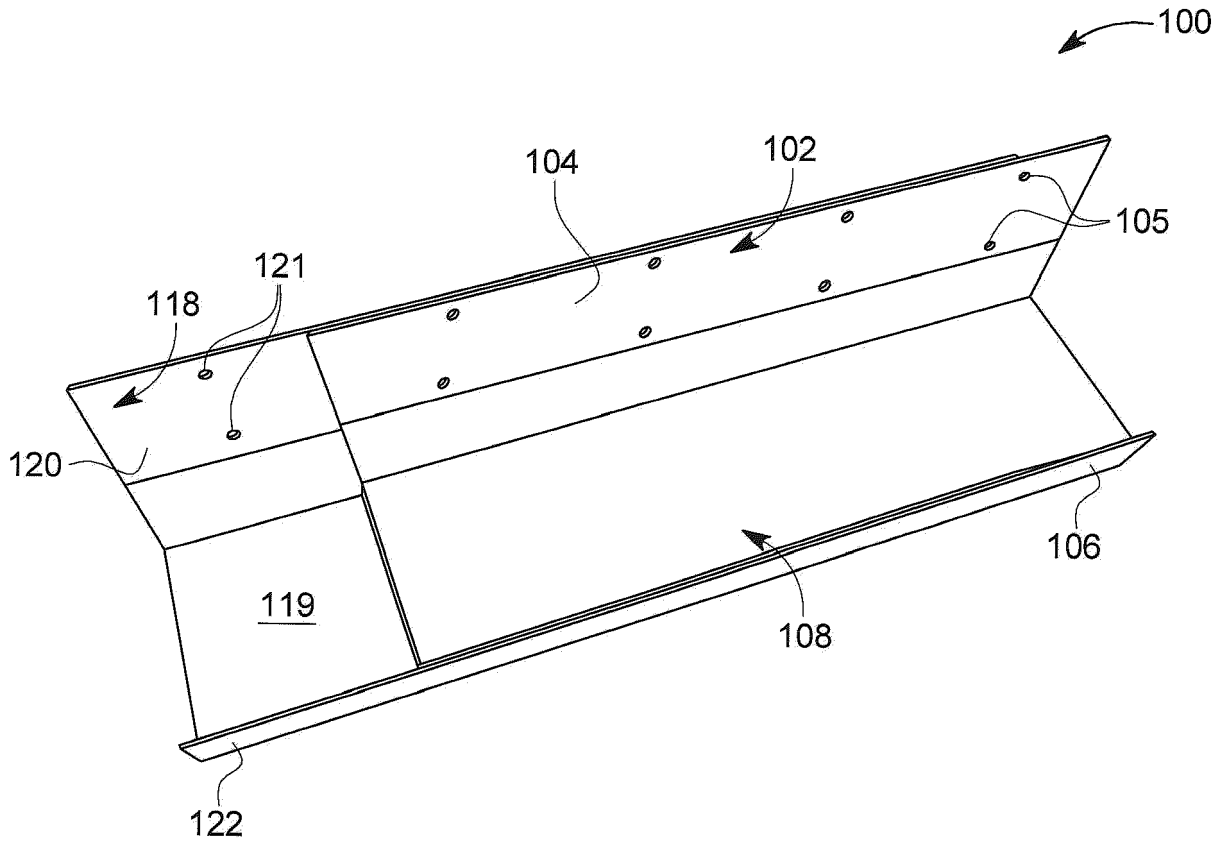


FIG. 3

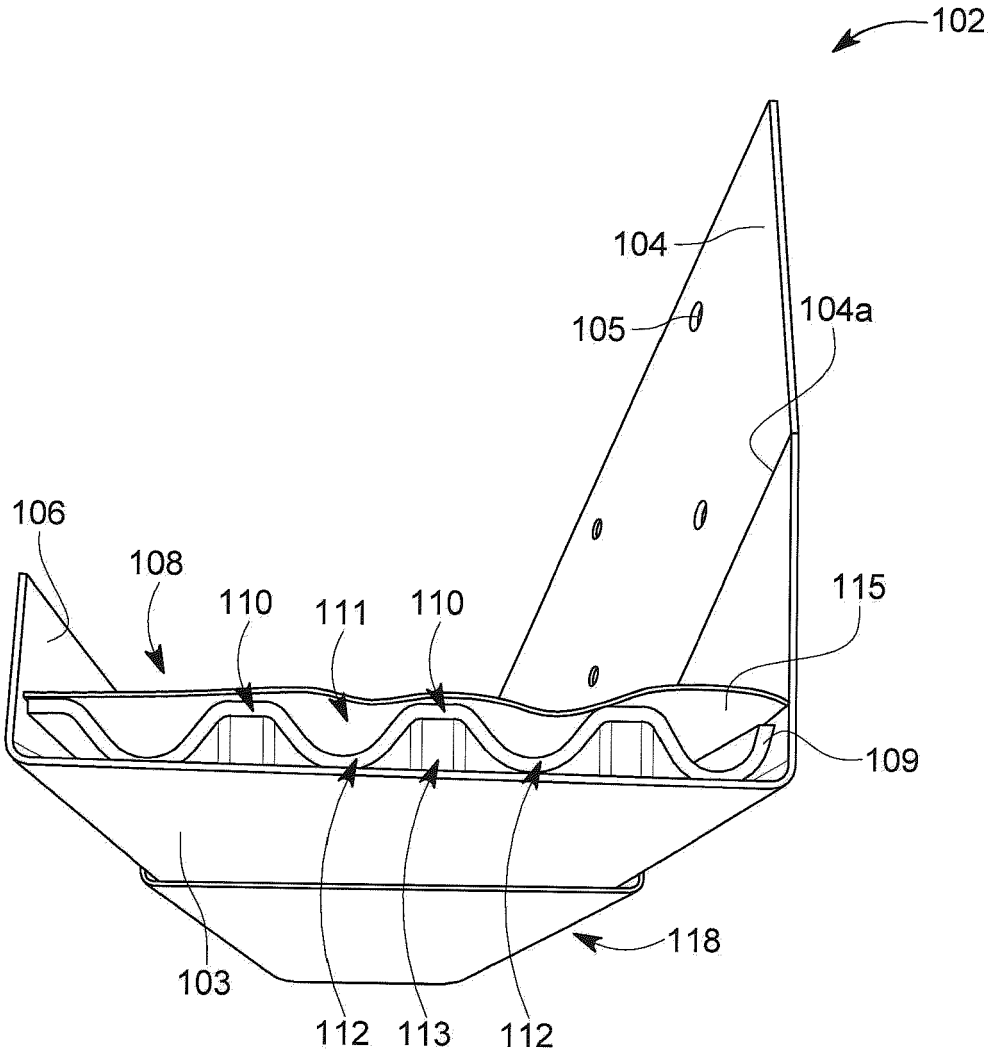


FIG. 4

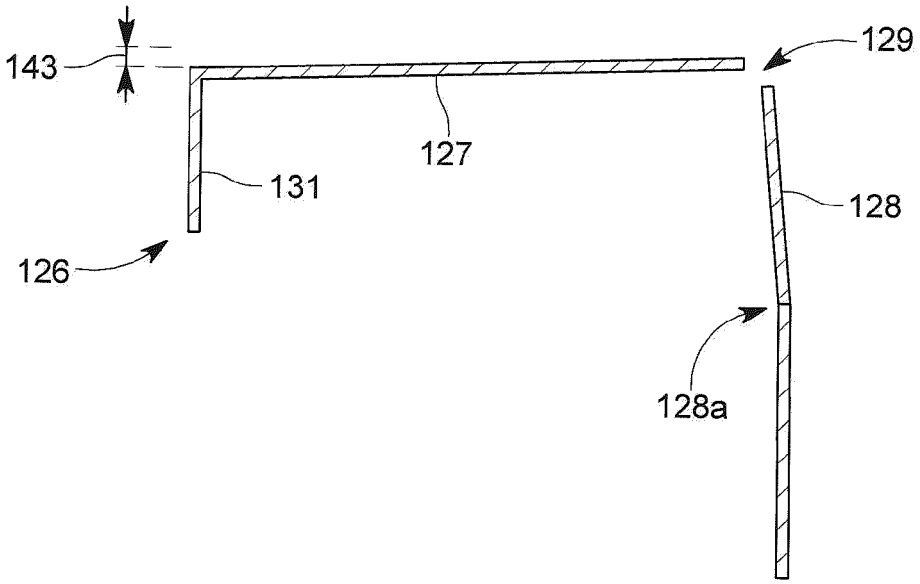


FIG. 5

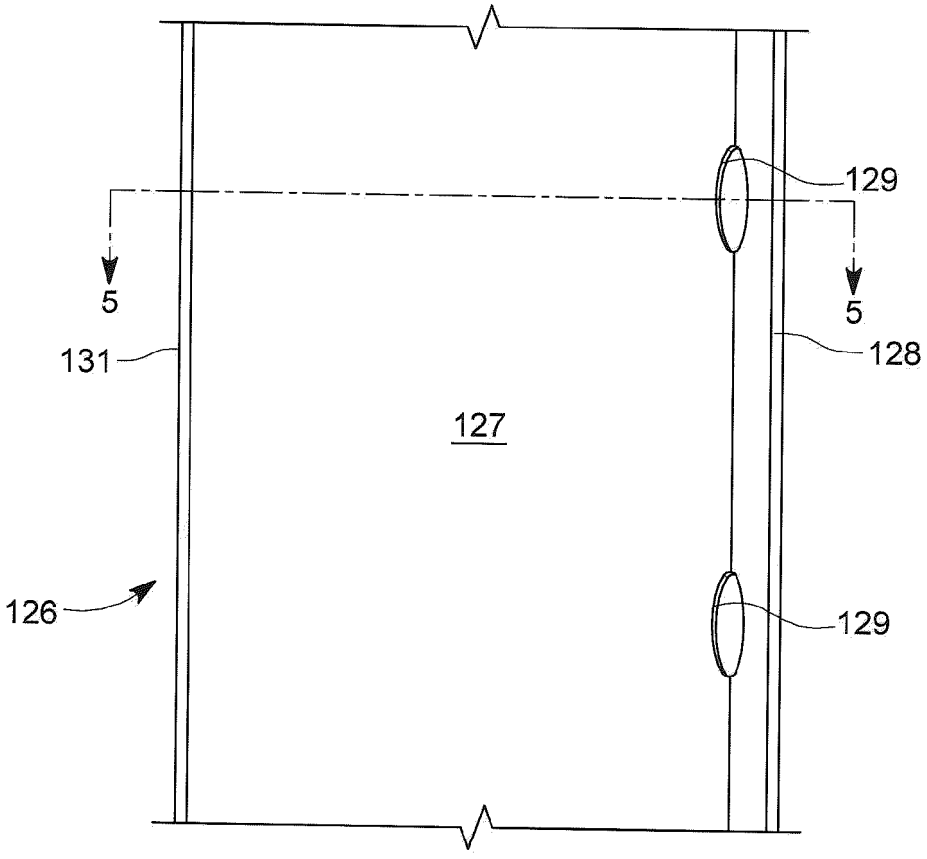


FIG. 6

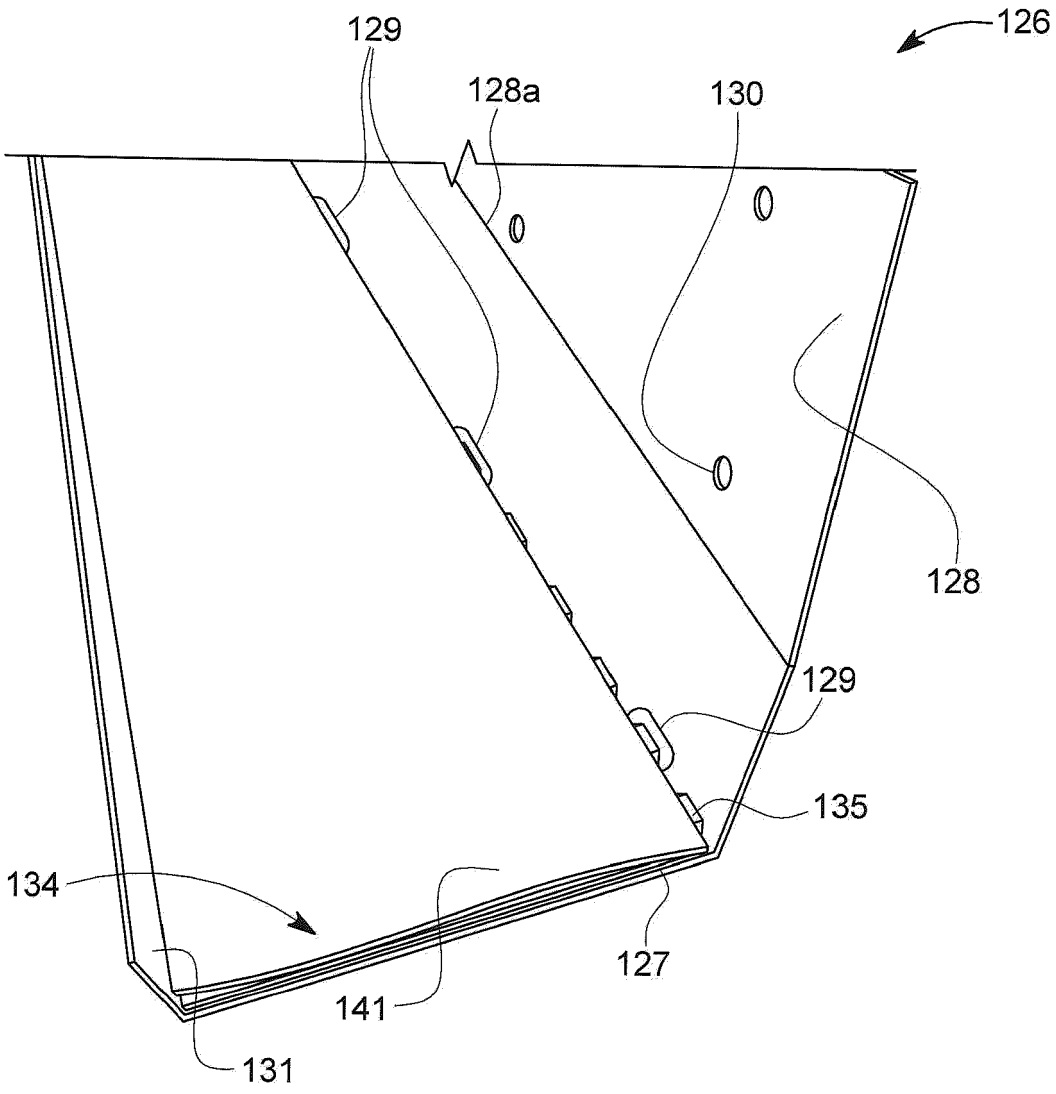


FIG. 7

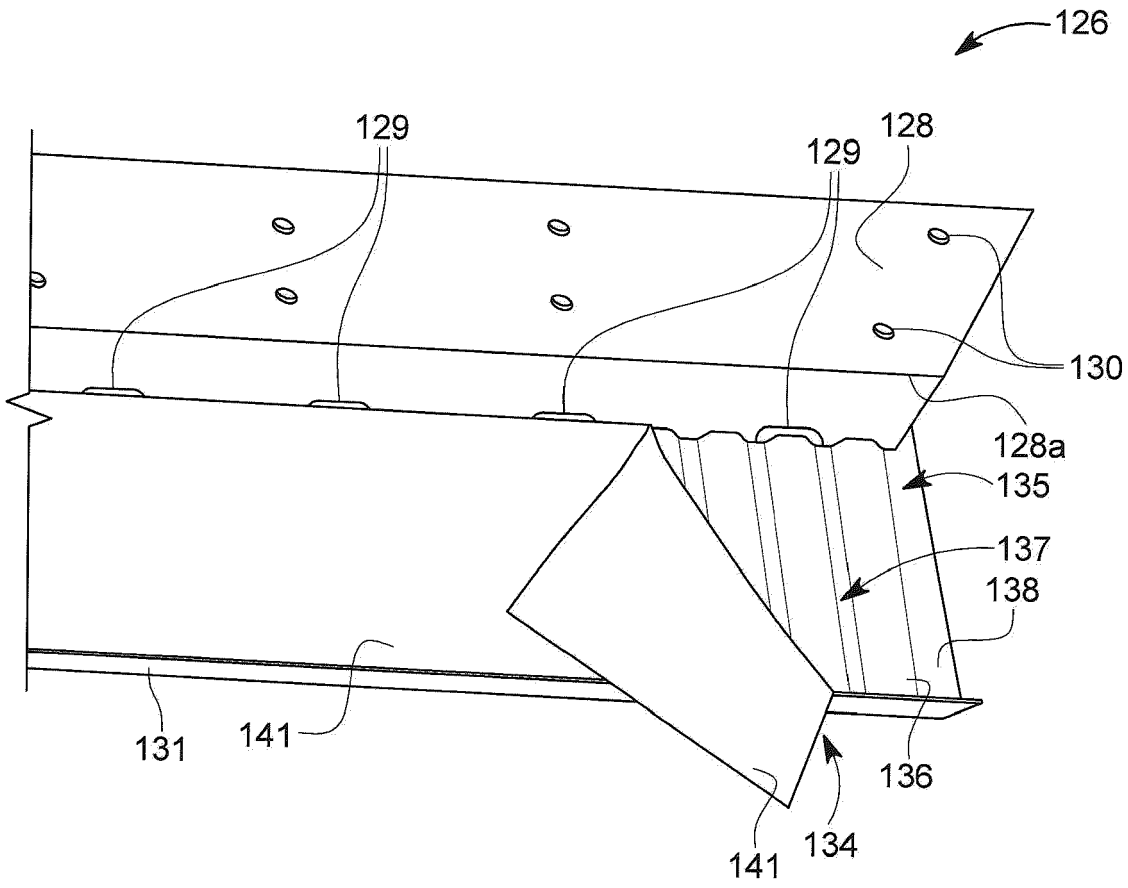


FIG. 8

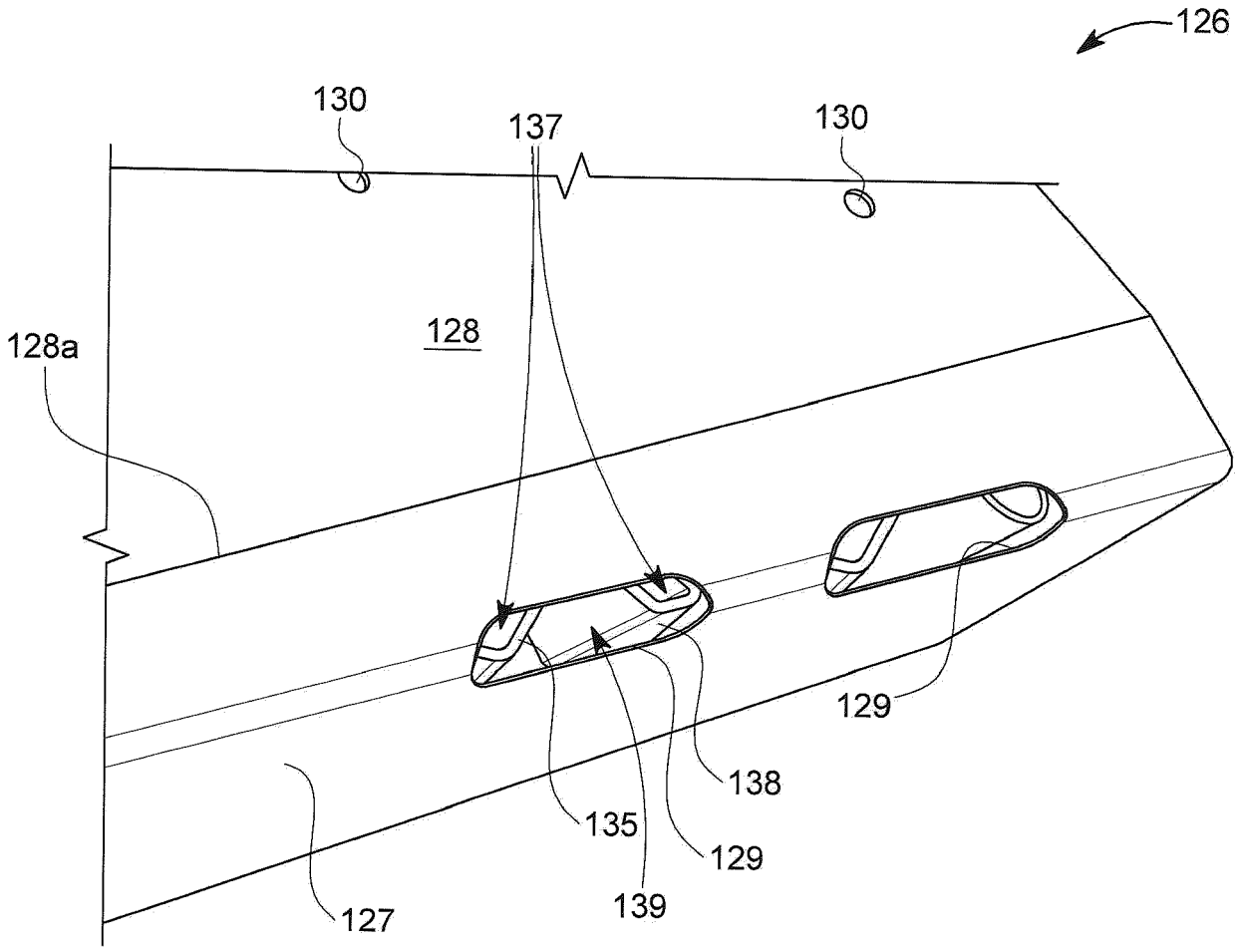


FIG. 9

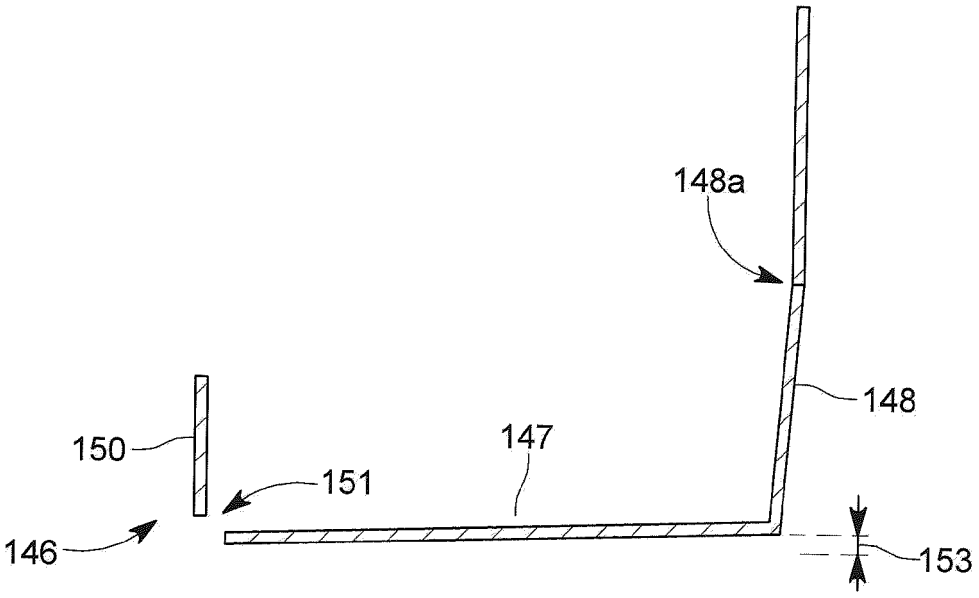


FIG. 10

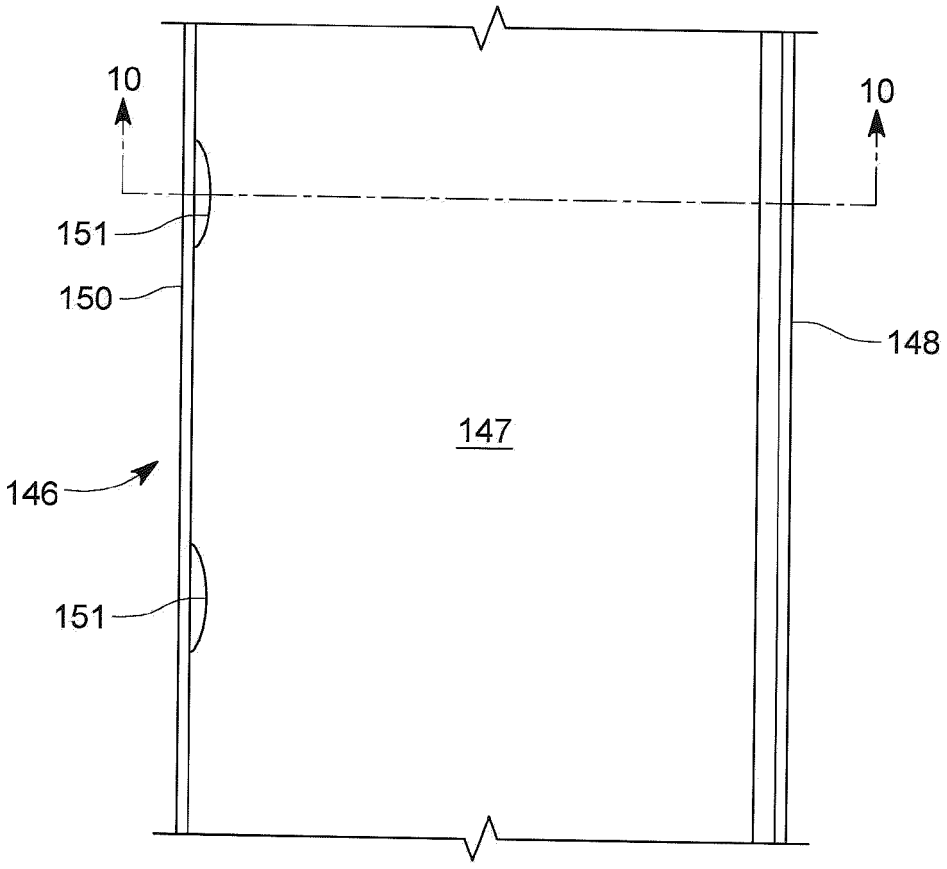


FIG. 11

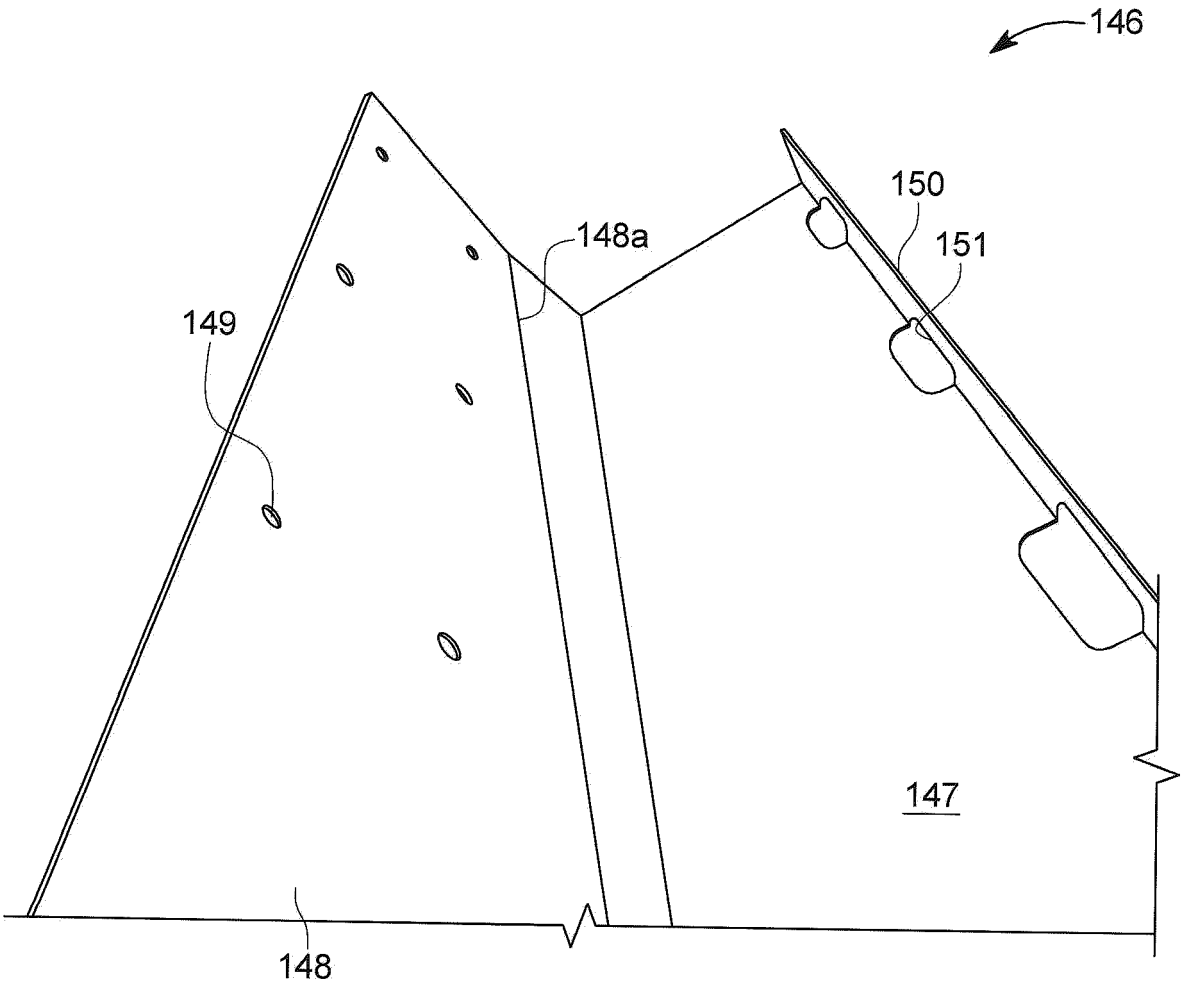


FIG. 12

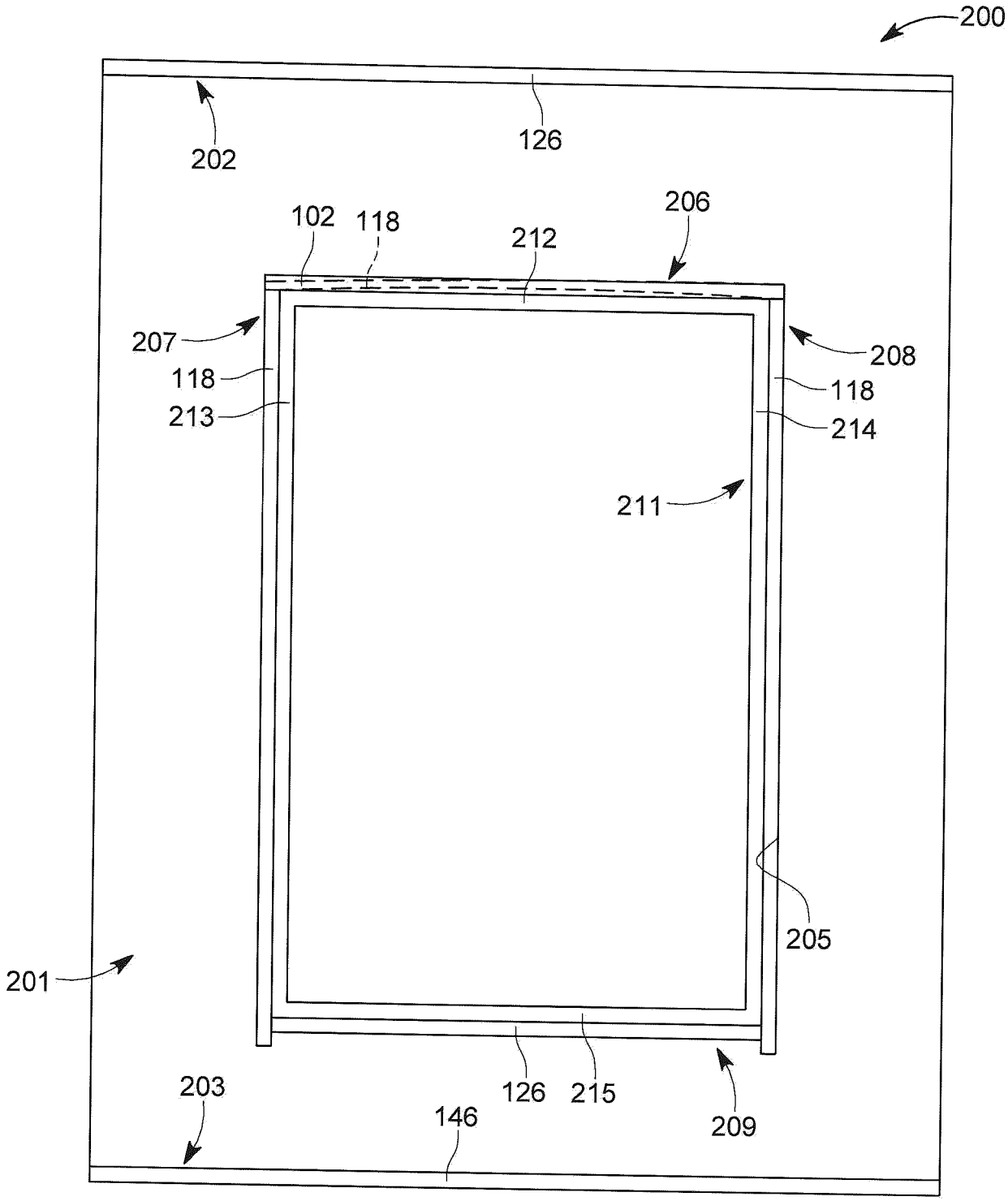

200
202
126
102
118
212
206
207
208
118
213
118
214
211
205
201
203
126
215
209
146

FIG. 13

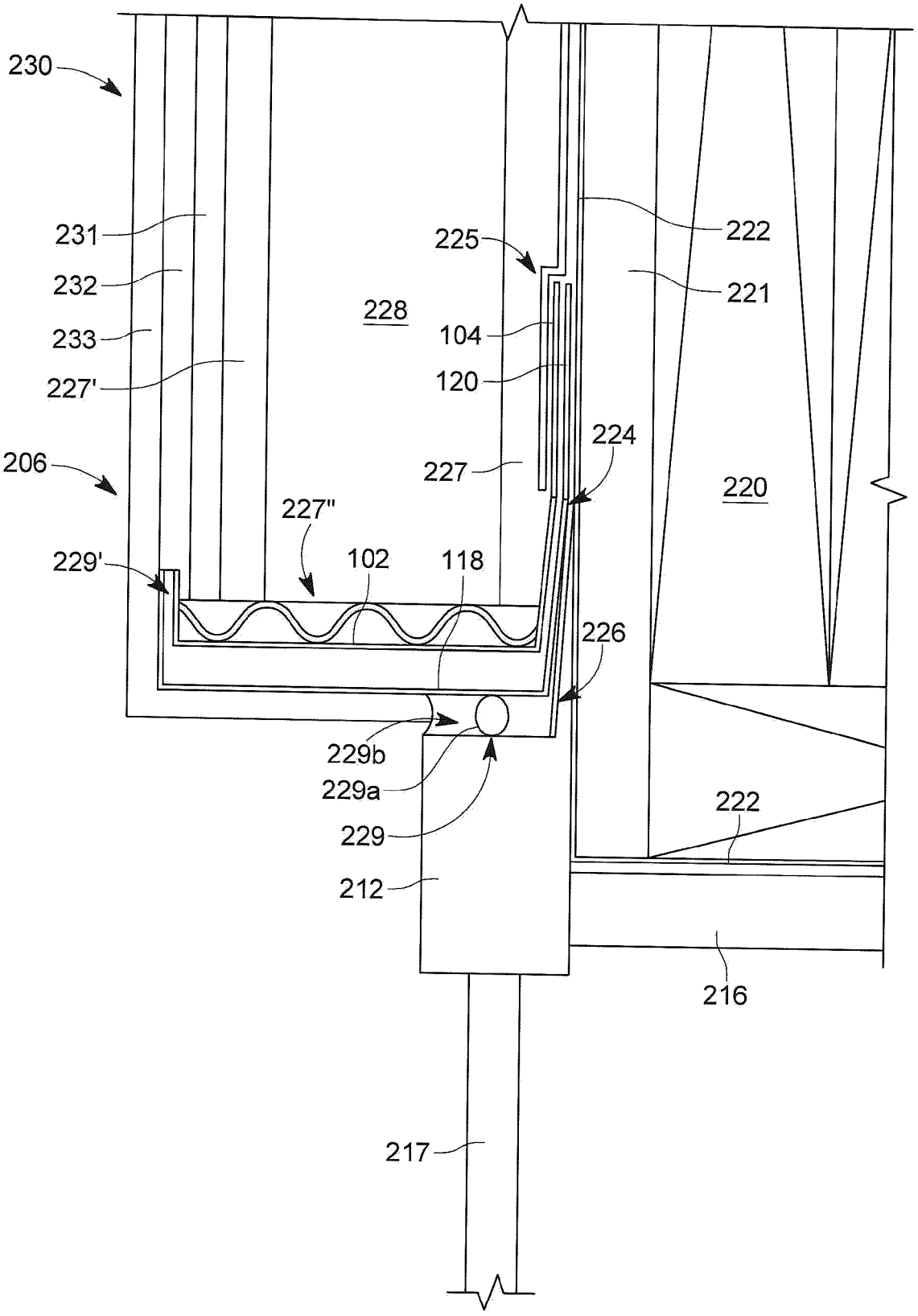

230
231
232
233
227'
206
229'
227"
102
118
228
225
104
120
227
224
222
221
220
226
229b
229a
229
212
222
216
217

FIG. 14

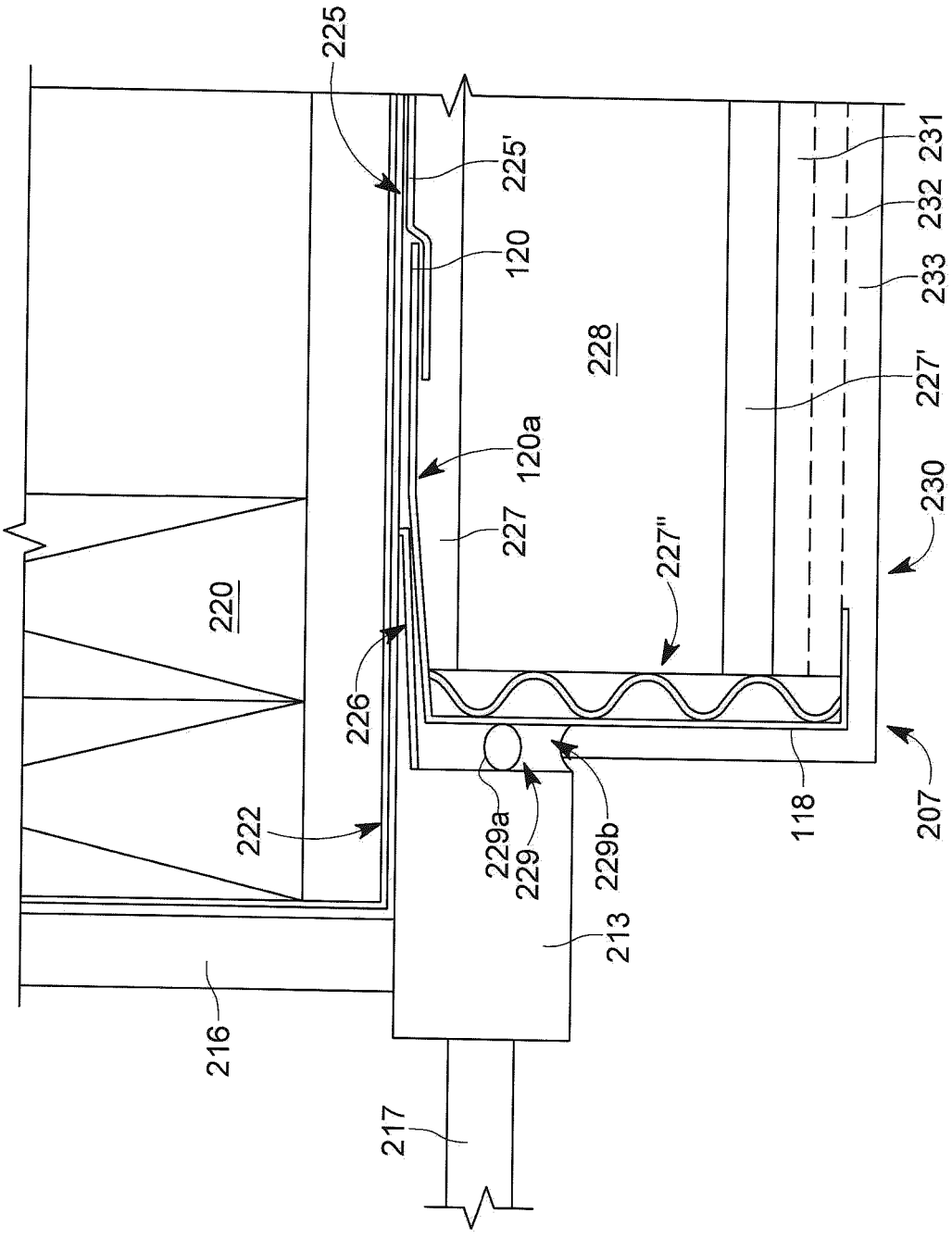

225
225'
120
228
231
232
233
227'
120a
230
227
227''
220
226
222
229a
229
229b
118
207
213
216
217

FIG. 15

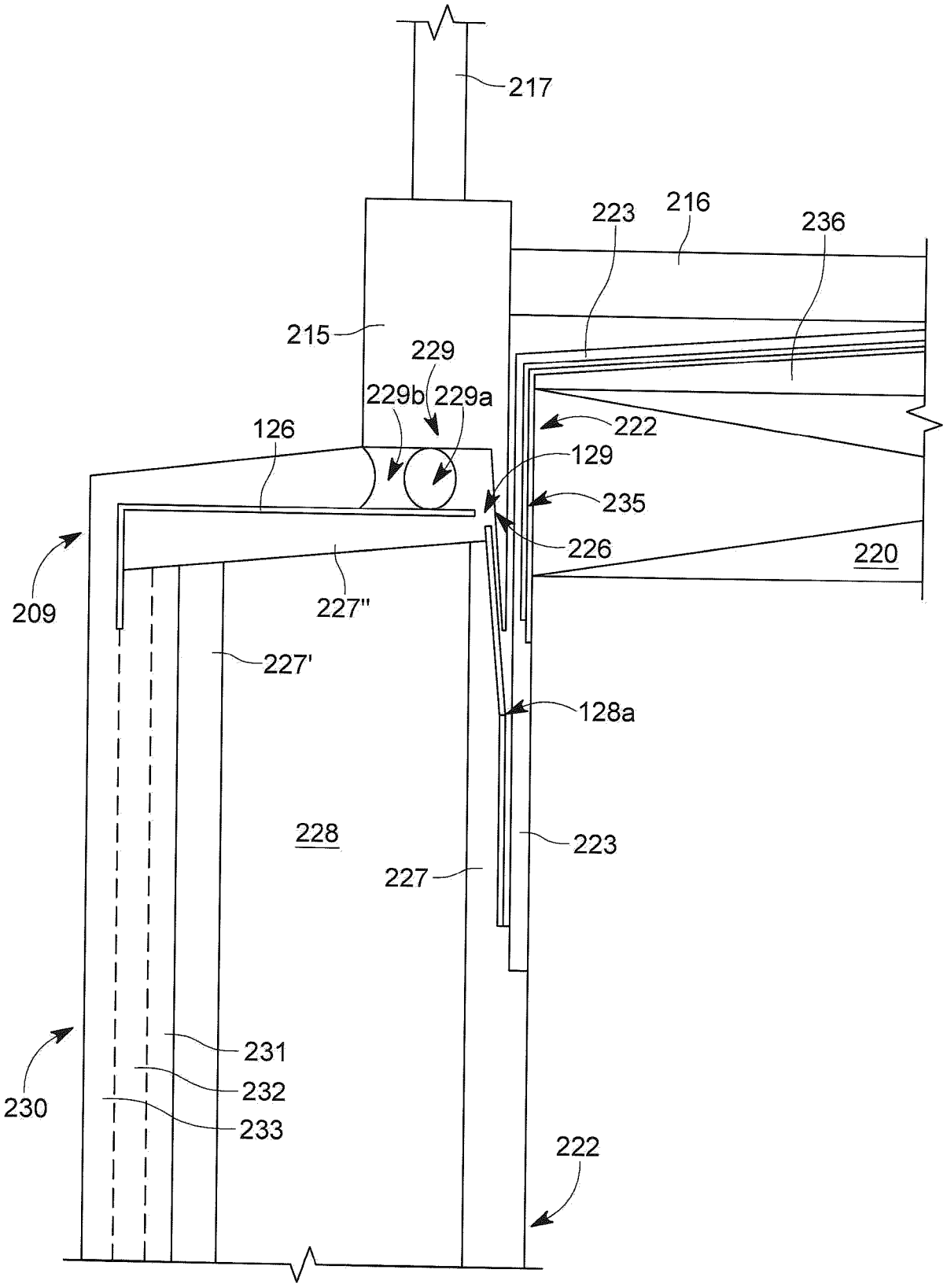
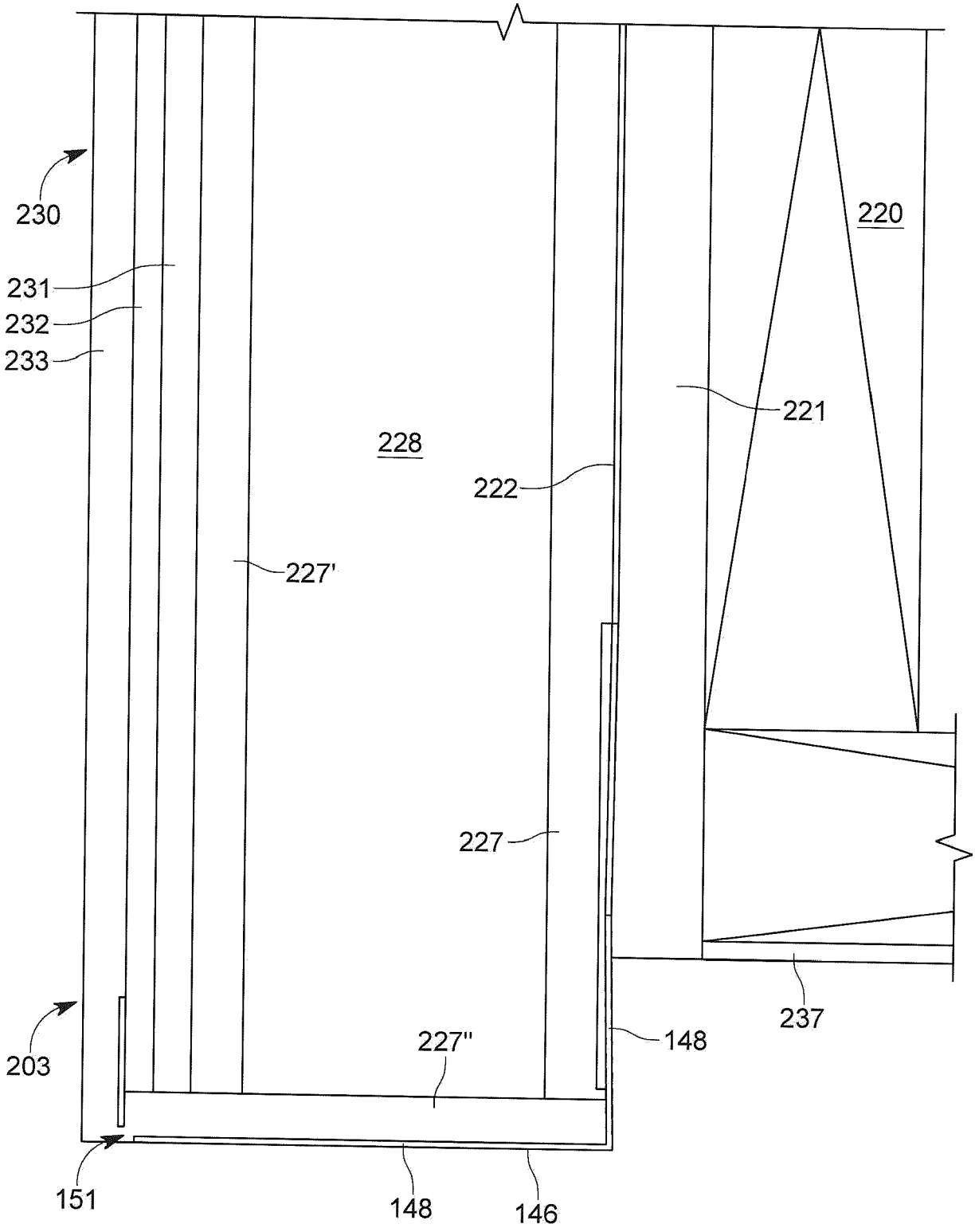

217
223
216
236
215
229
229b
229a
222
126
129
235
226
220
209
227"
227'
128a
228
223
227
231
232
230
233
222

FIG. 16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231
232
233
220
221
228
222
227'
227
237
203
227"
148
151
148
146

FIG. 17

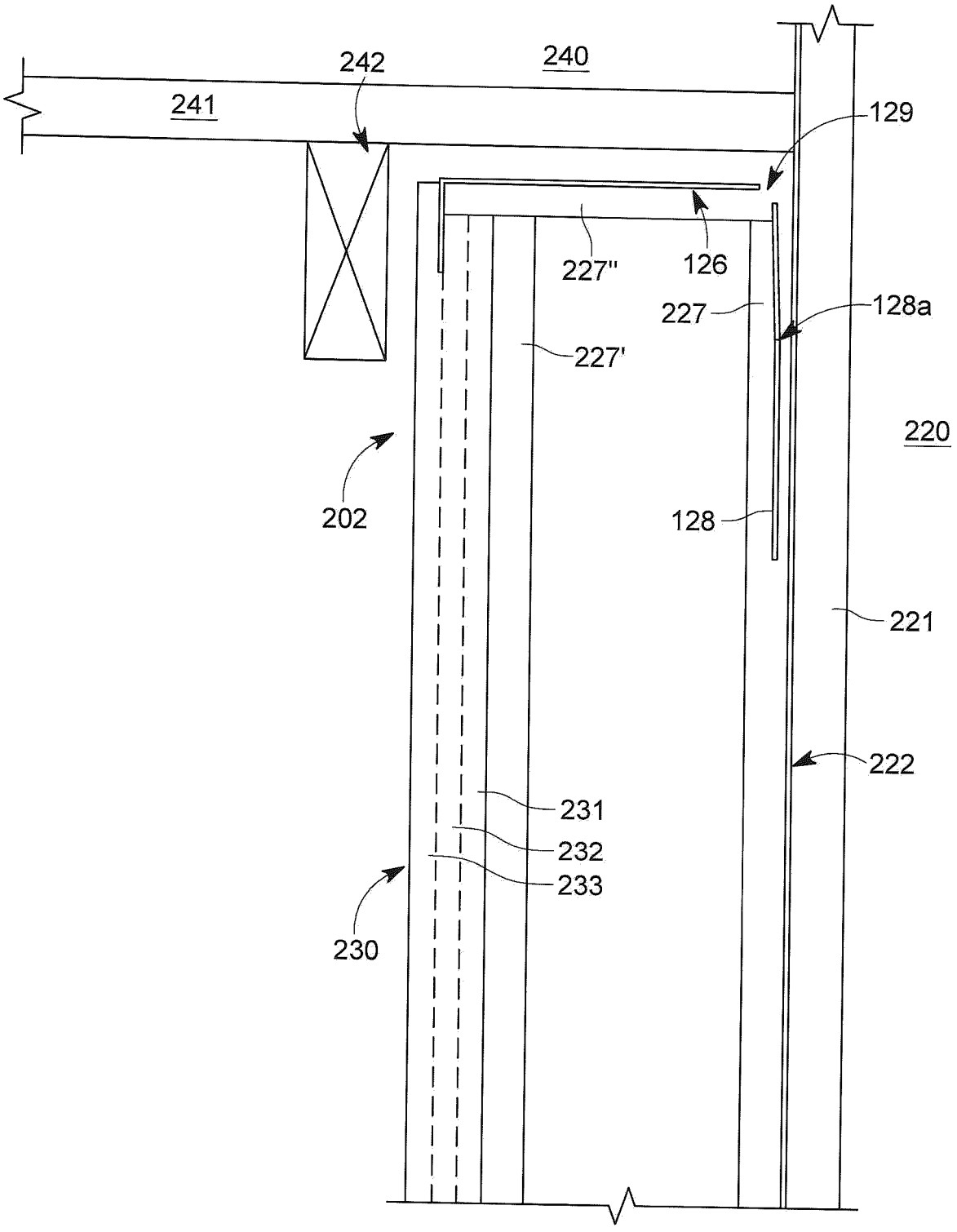
242
240
241
129
227"
126
227
128a
227'
220
202
128
221
222
231
232
233
230

FIG. 18

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 63164279 **[0001]**