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Newell(10) **Pub. No.: US 2017/0138060 A1**(43) **Pub. Date: May 18, 2017**(54) **SYSTEM FOR MOUNTING PANELS ON A BUILDING**(71) Applicant: **Brian Geoffrey Newell**, Chorley
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Lancashire (GB)(21) Appl. No.: **15/357,645**(22) Filed: **Nov. 21, 2016****Related U.S. Application Data**

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(60) Provisional application No. 61/567,647, filed on Dec. 7, 2011.

Publication Classification(51) **Int. Cl.**

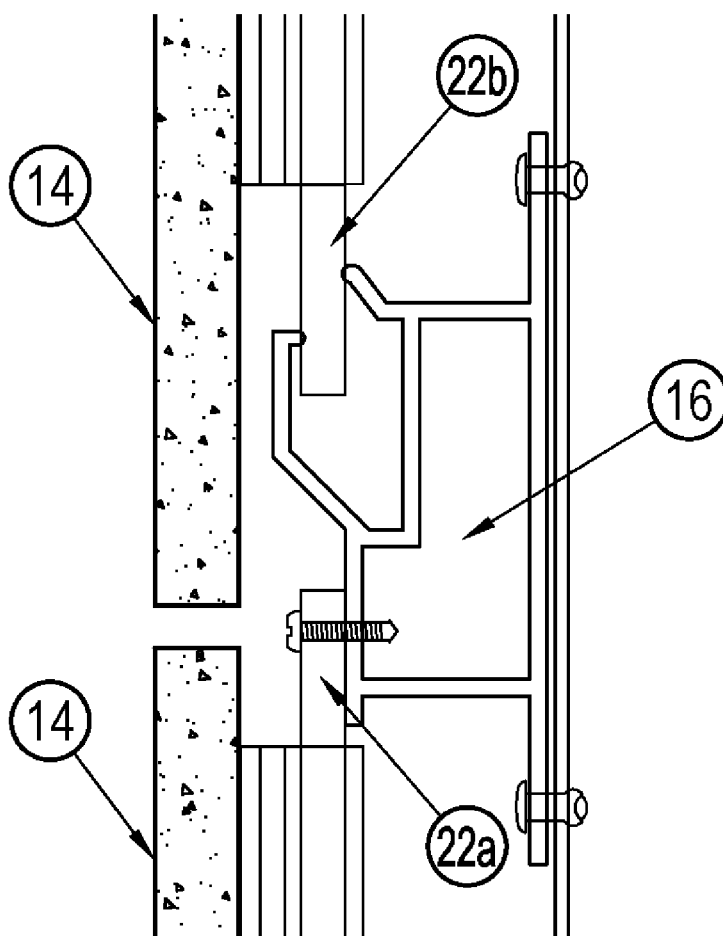
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2001/405 (2013.01)

(57)

ABSTRACT

A mounting rail for attachment to a building has a base with a top edge and a bottom edge. A pivot member projects from the base and provides a pivot point structure. A gripping flange extends from the base toward the pivot point structure and provides a gripping surface between the bottom edge and the pivot point structure. A slot is thus formed in the mounting rail. The mounting rail also has an anchor portion between the gripping surface and the bottom edge. A mounting system for mounting panels on a building includes mounting rails and a plurality of panel brackets for engaging panels to be mounted on the building by engaging the mounting rail slot at one end and the anchor portion at the other end. A method for mounting panels on a building by the use of the system is disclosed.



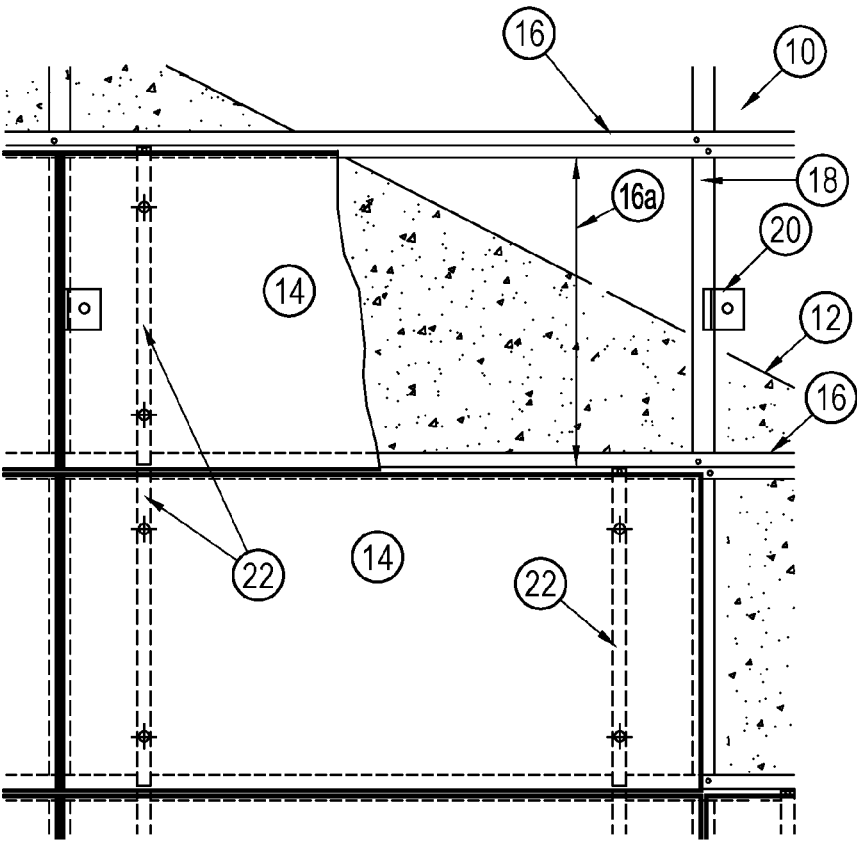


FIG. 1

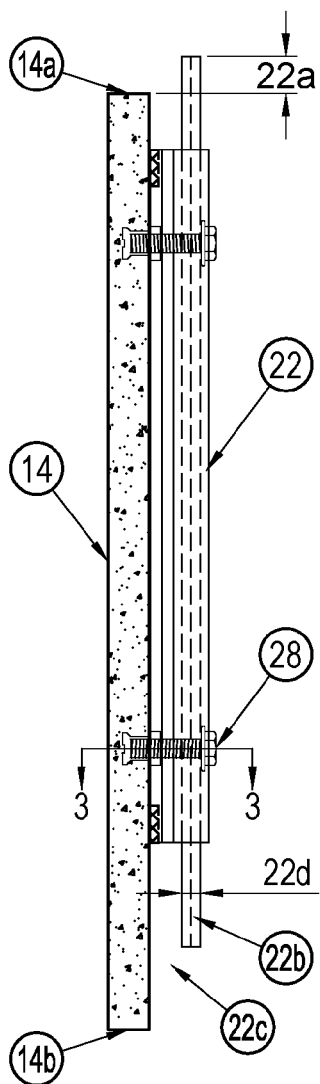


FIG. 2

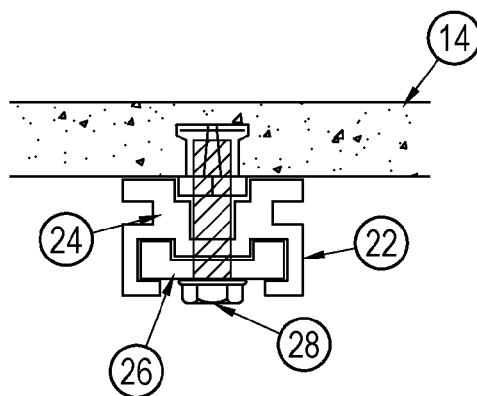


FIG. 3

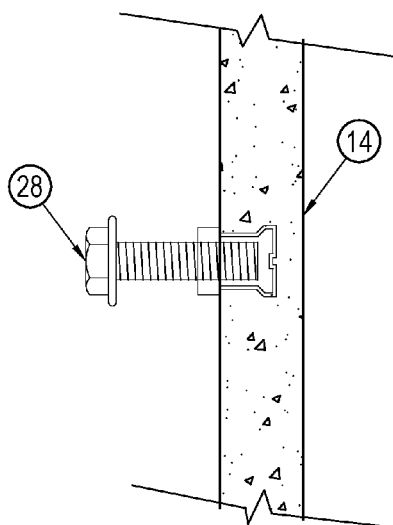


FIG. 4

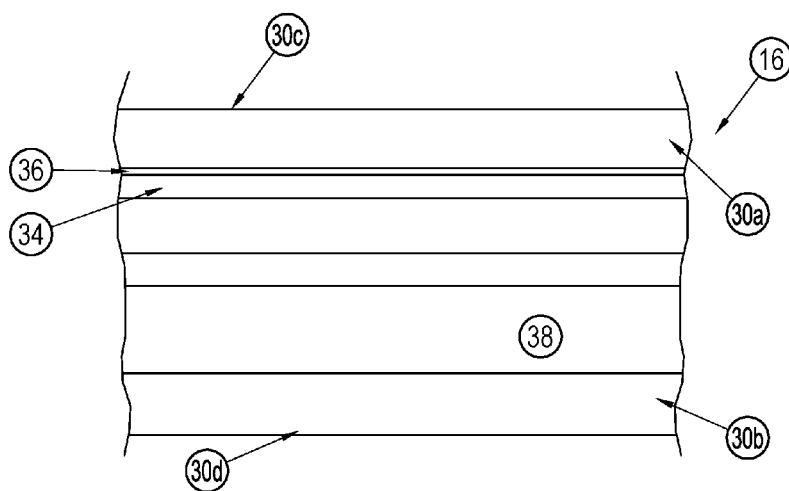


FIG. 5

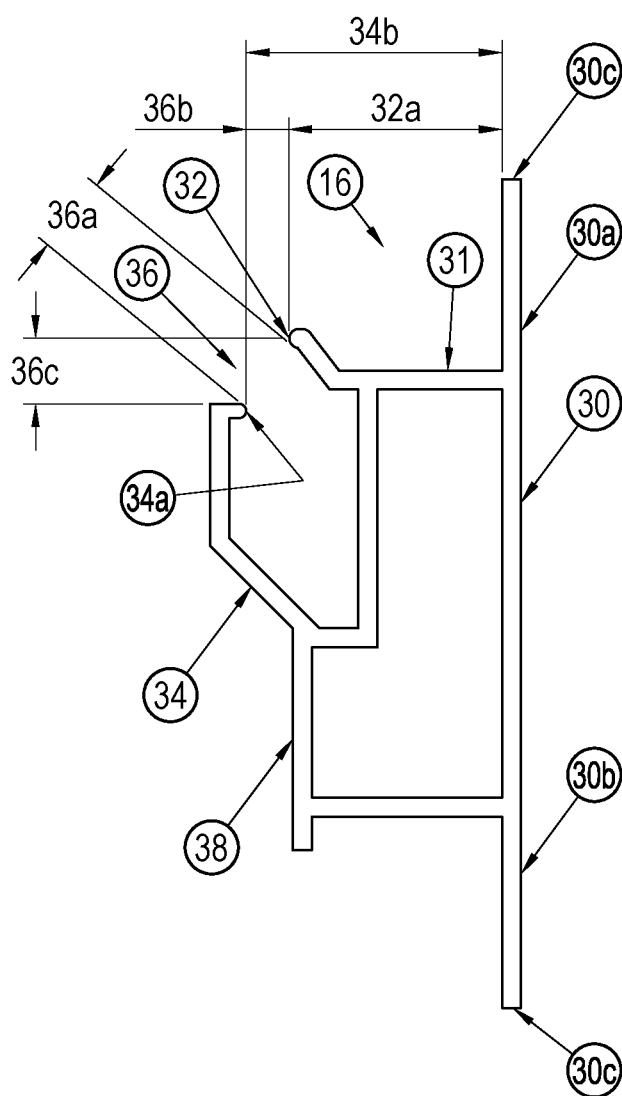


FIG. 6

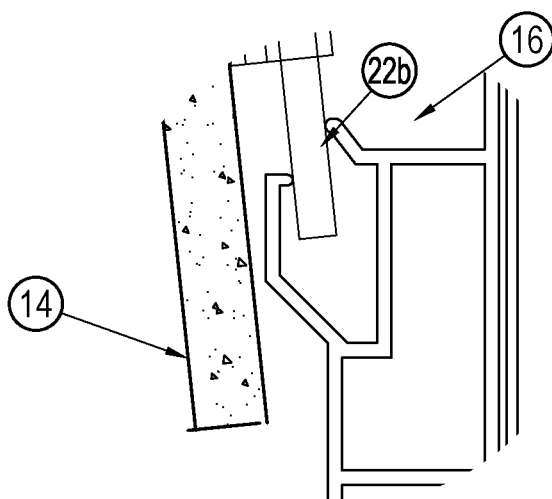


FIG. 7

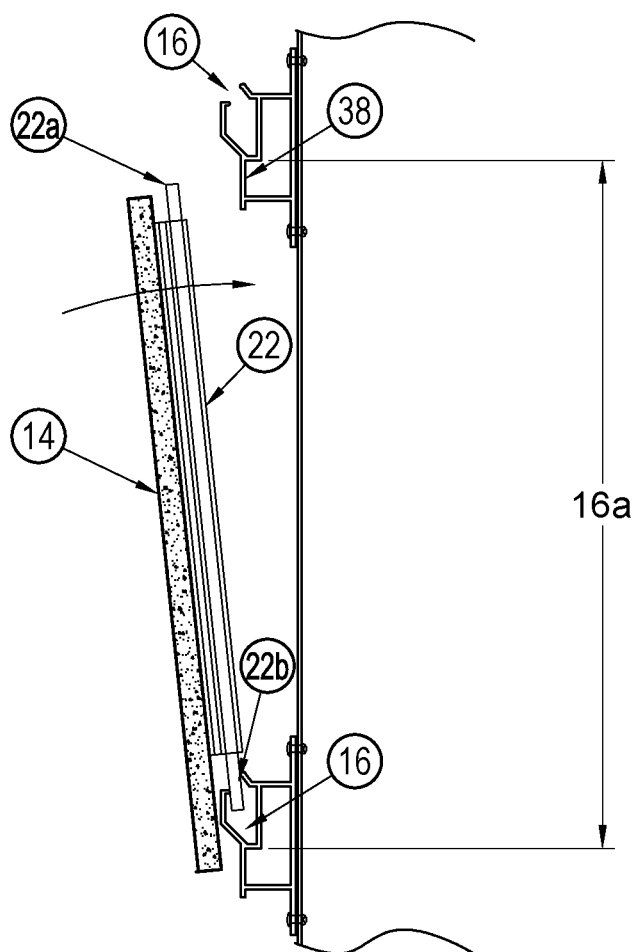


FIG. 8

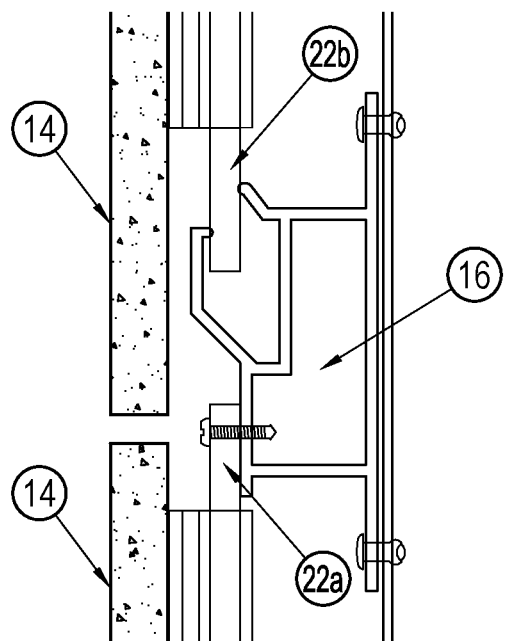


FIG. 9

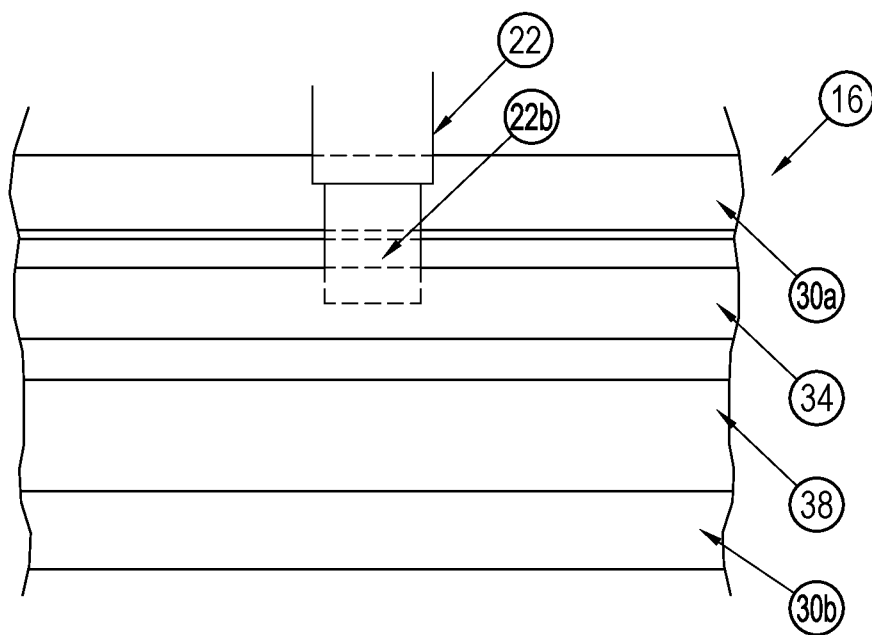


FIG. 10

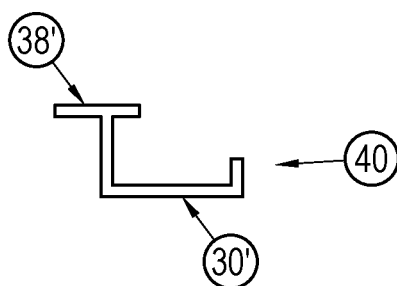


FIG. 11

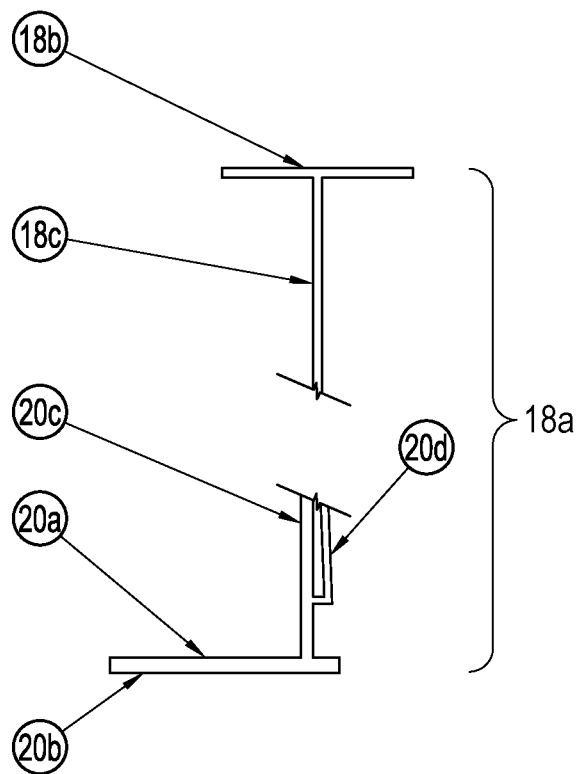


FIG. 12

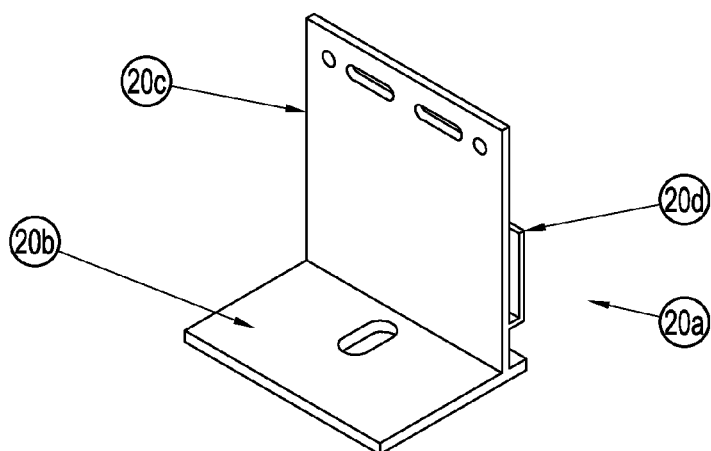


FIG. 12A

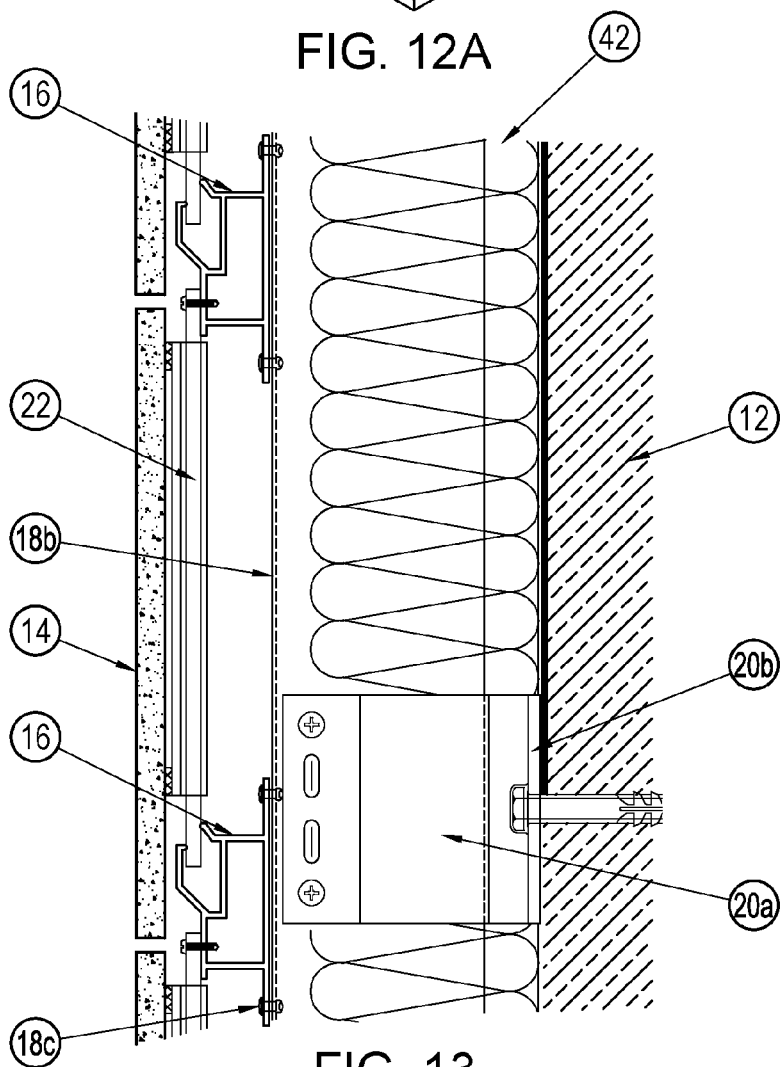


FIG. 13

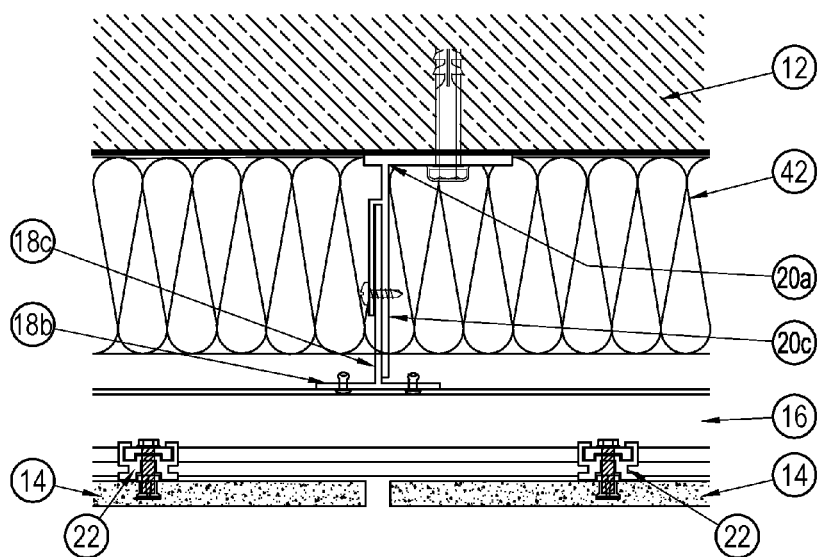


FIG. 14

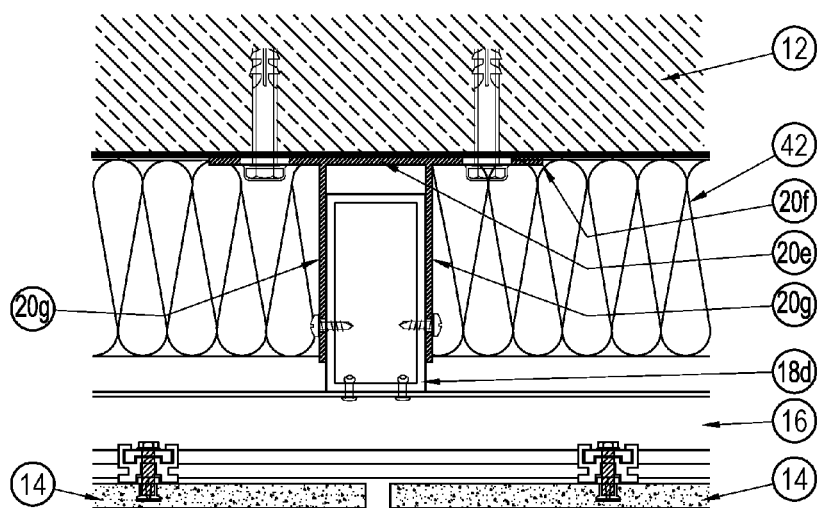


FIG. 15

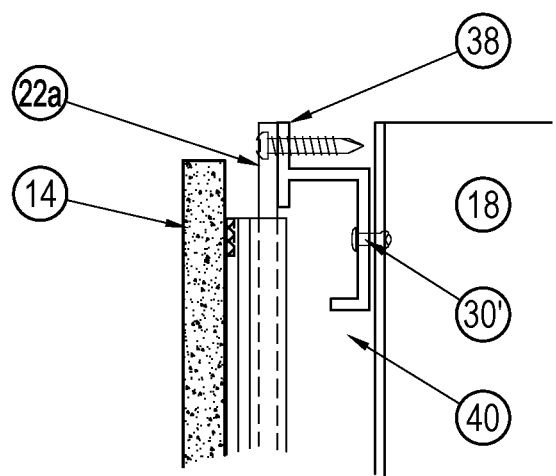


FIG. 16

SYSTEM FOR MOUNTING PANELS ON A BUILDING

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part of U.S. application Ser. No. 13/491,658, filed Jun. 8, 2012, now abandoned, which claims the benefit of U.S. Provisional Application No. 61/567,647, filed Dec. 7, 2011, both of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present disclosure relates generally to a method and apparatus for mounting panels to a building.

SUMMARY OF THE INVENTION

[0003] The present invention resides in one aspect in a mounting rail for attachment to a building, the mounting rail comprising a base for engaging the building, the base having a top edge and a bottom edge, a pivot member projecting from the base and providing a pivot point structure at a fulcrum distance from the base, and a gripping flange on the base extending from a position between the bottom edge and the pivot point structure toward the pivot point structure. The gripping flange provides a gripping surface at a gripping surface height from the base that is greater than the fulcrum distance and at a position between the bottom edge and the pivot point structure. The mounting rail also comprises an anchor portion between the gripping surface and the bottom edge.

[0004] In another aspect, there is described herein a mounting system for mounting panels on a building. The mounting system comprises a plurality of mounting rails and a plurality of panel brackets for engaging panels to be mounted on the building. Each panel bracket has two ends and comprises a bracket tail extending from a first end and a bracket head at the second end. The bracket tail has a thickness which is less than the opening width of the slot but greater than the depth dimension of the slot. The bracket tail is insertable into the slot of one mounting rail, and when the panel bracket is aligned with the base, the bracket tail bears against the pivot point structure and the gripping flange and the bracket head can be secured to an anchor portion of a different mounting rail.

[0005] In yet another aspect, a method for mounting panels on a building is disclosed. The method comprises securing a plurality of horizontally disposed mounting rails as described herein to the building, each mounting rail separated from the next closest mounting rail by a separation distance, providing a plurality of panels each having a plurality of panel brackets as described herein, and inserting the bracket tails into the slot in a mounting rail on the building, and securing the bracket heads to another mounting rail on the building.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a schematic elevation view of a bracket system according to one embodiment, and a building on which the system is mounted; and

[0007] FIG. 2 is a schematic side elevation view of a panel with one embodiment of a vertical panel bracket mounted thereon.

[0008] FIG. 3 is a cross-sectional view of the panel and vertical panel bracket of FIG. 2 taken at 3-3.

[0009] FIG. 4 is a schematic cross sectional view of the undercut anchor seen in FIG. 3 in a panel, in greater detail.

[0010] FIG. 5 is front elevation view of a mounting rail according to one embodiment.

[0011] FIG. 6 is a cross-sectional view of the mounting rail of FIG. 5.

[0012] FIG. 7 is a schematic cross-sectional side elevation view of the lower portion of a panel in an initial stage of being installed.

[0013] FIG. 8 is a schematic cross-sectional side elevation view of the panel of FIG. 7 to show movement needed to secure the panel to a horizontal bracket.

[0014] FIG. 9 is a schematic cross-sectional side elevation view of the top of the panel of FIG. 8 and the lower part of another panel both engaging a mounting rails 16.

[0015] FIG. 10 is a schematic elevation view of a bracket tail (of a vertical bracket for a panel) mounted in a receiving slot in a mounting rails 16.

[0016] FIG. 11 is a cross-sectional view of an uppermost mounting rail according to one aspect of the invention.

[0017] FIG. 12 is a schematic exploded cross sectional view of a building vertical and an anchor bracket according to one embodiment.

[0018] FIG. 12A is a perspective view of the anchor bracket of FIG. 12.

[0019] FIG. 13 is a schematic, partly cross-sections elevation view of a building with panels mounted thereon one above another by a system as described herein including the building vertical and anchor bracket of FIG. 12.

[0020] FIG. 14 is a schematic, partly cross-sections downward view the building of FIG. 13 showing panels mounted thereon side by side by a system as described herein including the building vertical and anchor bracket of FIG. 12.

[0021] FIG. 15 is a schematic, partly cross-sections downward view a building with panels mounted thereon side by side by a system as described herein including and alternative building vertical and anchor bracket.

[0022] FIG. 16 is a schematic cross-sectional elevation view of an uppermost panel mounted on a simplified mounting rail.

DETAILED DESCRIPTION

[0023] A system for mounting panels externally or internally on a building includes a bracket system which forms a grid mounted on the building and between the building and the panels, and on which the panels are mounted. The bracket system includes brackets that are lengthy and mounted vertically or horizontally according to the orientation of their length on the building when the panels are mounted thereon. The bracket system includes panel brackets attached vertically on the panels ("vertical panel brackets") and building brackets mounted on the building, and the vertical panel brackets and building brackets are configured so that the vertical panel brackets can be connected to the building brackets to form the grid and mount the panels on the building. The brackets may be made from extruded aluminum or any other acceptable engineering material.

[0024] The use of the bracket system 10 is described herein with reference to ceramic granite panels, but the invention is not limited in this regard and in other embodiments the bracket system may be used with other types of panels.

[0025] One embodiment of a bracket system 10 is depicted in FIG. 1, which shows panels on the bracket system 10 and the building 12, but the panels 14 are not drawn opaquely (and some are omitted) in order that the bracket system 10 may be viewed. The building brackets include a plurality of mounting rails 16 mounted on the building. The mounting rails 16 are arranged parallel to each other at a vertical spacing 16a. In the illustrated embodiment, the mounting rails 16 are secured to building verticals 18 which themselves are secured to the building by anchor brackets 20, but the invention is not limited in this regard and one of ordinary skill in the art will appreciate that in other embodiments the mounting rails 16 may be mounted on the building in various ways.

[0026] FIG. 2 and FIG. 3 provide some detail of a panel 14 with a vertical panel bracket 22 secured thereto. The vertical panel bracket 22 is secured to the panel 14 by an undercut anchor 28 (FIG. 4). One end of the panel bracket 22 extends upward beyond the top edge 14a to provide the bracket head 22a. At the other end the panel bracket 22 has a bracket tail 22b. In the illustrated embodiment, the panel bracket comprises a bracket base 24 (FIG. 3) and a mounting insert 26 thereon, and the mounting insert 26 extends upward past the end of the bracket base to provide the bracket head 22a and extends downward past the bracket base to provide the bracket tail, but the invention is not limited in this regard and in other embodiments, the panel bracket 22 might be formed as a single integral piece, or the bracket base 24 might extend beyond the top edge 14a with or without the mounting insert 26 to provide the bracket head 22a. The panel 14 also has a bottom edge 14b and an interior surface 12c, and the vertical panel bracket 22 has a bracket tail 22b which is set at a distance from the interior surface 14c to define a tail clearance space 22c and extends downward and does not exceed the bottom edge 14b. Bracket tail 22b has a tail thickness 22d. Again, in the illustrated embodiment, the mounting insert 26 extends beyond the end of the bracket base 24 to provide the bracket tail 22b, but this is not a limitation on the invention, as the bracket tail may be provided otherwise, e.g., as an integral part of the panel bracket 22.

[0027] One embodiment of a mounting rail 16 is shown in FIG. 5 and FIG. 6, where it is seen to comprise a mounting base 30 which provides an upper mounting flange 30a and a lower mounting flange 30b. The upper mounting flange 30a and a lower mounting flange 30b have a top edge 30c and a bottom edge 30d respectively, are preferably provided with a series of mounting holes through which screws, bolts or other suitable connectors can be used to mount the mounting rails 16 to a building. The mounting base 30 supports a pivot member 31 which extends from the mounting base 30 and provides a pivot point structure 32 at a fulcrum distance 32a from the mounting base 30. The mounting base 30 also supports a gripping flange 34 which extends upward toward the pivot point structure 32 and provides a gripping surface 34a at a gripping surface height 34b above the mounting base 30. The gripping surface height 34b is greater than fulcrum distance 32a. There is a receiving slot 36 between the pivot point structure 32 and the gripping surface 34a. The receiving slot 36 has an opening width 36a and a slot depth 36b as measured orthogonally from the mounting base 30 and which is the difference between the gripping surface height 34b and the fulcrum distance 32a. In one embodiment, the slot depth 36b is

slightly less than the tail thickness 22d even when the opening width 36a is greater than the tail thickness. The gripping surface 34a is at a position between the bottom edge 30d and the pivot point structure 32, and is closer to the bottom edge 30 than is the pivot point structure 32. The slot 36 therefore has a slot height dimension 36c. The mounting rails 16 also has an anchor portion 38 between the bottom edge 30d and the gripping surface 34a.

[0028] For purposes of this description, when the vertical spacing 16a is measured from the top of the anchor portion 38 on one mounting rail 16 to the top of the anchor portion on the next mounting rail, the vertical length of a panel bracket 22 (from the bottom of the mounting insert 26 to the top of the head) is slightly less than the vertical spacing 16a so that the panel bracket 22 can engage a mounting rail at each end of the panel bracket as follows.

[0029] A first step for mounting a panel according to one embodiment is depicted in FIG. 7, where it is seen that panel is angled so that the gripping flange 34 is received in the tail clearance space 22c and the bracket tail 22b is received in the receiving slot 36. Next, as indicated in FIG. 8, the top of the panel will be moved closer to the mounting rails 16. As evident from FIG. 8, the vertical spacing 16a between the mounting rails 16 is coordinated with the length of vertical bracket 22 so that bracket head 22a can engage anchor portion 38 of a mounting rail 16 near the top of panel 14 while the bracket tail 22b is received in the receiving slot 36 of the mounting rails 16 nearer the bottom of the panel. As the bracket head 22a comes to rest against the anchor portion 38, the bracket tail 22b becomes cinched between the gripping surface 34a and the pivot point structure 32. Flexure of the gripping flange 34 or the pivot point structure 32, or both, allows the receiving slot 36 to open slightly so that the slot depth 36b will accommodate the tail thickness 22d, with the gripping flange 34 bearing against the bracket tail 22b. The mounting rails 16 thus holds the bottom of the panel in a manner that will permit the bracket tail 22b to move (subject to overcoming friction from the gripping surface 34a and the pivot point structure 32). The bracket head on the panel 14 is secured to the anchor portion 38 of the mounting rails 16 as shown in FIG. 9, e.g., by a screw or bolt. This provides a fixed connection between the upper portion of panel 14 and the building which the lower portion is held in a moveable manner as just described. As indicated in FIG. 9, the bracket tail 22b of another panel 14' situated above panel 14 is received in the receiving slot 36 of the mounting rails 16.

[0030] The bracket head of the uppermost panel, which will not have another panel mounted above it, can be mounted to a mounting rail which has only an anchor portion; there would be no need for a gripping flange or pivot point structure. Accordingly, the uppermost mounting rail in the bracket system 10 can have a different configuration from other mounting rails, as seen, in one embodiment, in uppermost mounting rail 40 shown in FIG. 11, which provides a mount base 30' for engaging a building vertical 18 and an anchor portion 38' to which a panel bracket head 22a can be secured, as shown in FIG. 16.

[0031] To assemble the bracket system 10 for use, the mounting rails 16 are mounted on the building by securing them to building verticals 18. In one embodiment, the building verticals have a T-cross section as shown for building vertical 18a in FIG. 12. The 'cross-bar' section 18b of the T provides a surface against which the mounting base

26 of a mounting rail 16 can rest and be secured to the building vertical 18a. The 'post' portion 18c of the building vertical 18a is received into the slot of a clip designed into an anchor bracket 20a. Anchor bracket 20a has an anchor base 20b which is secured to a building, and an anchor flange 20c which extends away from the building and into which is formed a clip 20d to define a slot into which the post portion 18c is received. When the post portion 18c is positioned in the clip 20d, the two can be secured together, e.g., by a screw or bolt. A screw or bolt through the anchor base 20b secures the anchor bracket 20a to the building. A resulting configuration is depicted in FIG. 13 wherein a layer of insulation 42, which may comprise PVC foam pads or any other suitable material, is applied to the building 12 between the building verticals 18.

[0032] In another embodiment, the building vertical is configured as a rectangular vertical 18d which is secured to the building by being secured to an anchor bracket 20e which has an anchor base 20f from which a pair of parallel anchor flanges 20g extend to define a space between them sufficient to receive the rectangular vertical 18d between them. By securing the rectangular vertical 18d to the anchor flanges 20g, the rectangular vertical 18d is secured to the building and provides a secure structure on which to mount the mounting rails 16 etc.

[0033] An apparatus, system and method for mounting panels on a building as described herein offers several advantageous features. For example, the components are delivered to site and assembled piecemeal. Also, the aluminum framework can be assembled in sections of site and delivered to site in prefabricated panels for erection on site, and thereafter the cladding panels are attached in the normal manner. The system can be used to mount very large ceramic panels, for example, up to about 3.5 meters (m)×1.6 m (about 11.5 feet (ft)×5.25 ft) in size. Prior art systems have the drawback that, if mounting large ceramic panels, the dead-load of the panel is normally carried either on two anchor points at the top of the panel, or via grooves in the horizontal edges of the panel. These methods of panel attachment limit the size of the ceramic in areas with high wind load. Systems as disclosed herein allow the dead-load of the panel to be carried by two or more straps fitted to the back face of panels, the straps evenly distribute the dead-load of the panel by means of multiple undercut anchor fixing points. Some prior art systems rely on the use of interlocking aluminum extrusions as the basis of the support structure upon which the panels are mounted. The tolerances of the manufacturing process for aluminum extrusion are such that, systems that rely on the interlocking of profiles, may be subject to the mounted ceramic panels having the capacity to move under wind-load, which can result in the ceramic panels 'rattling' and producing unwanted noise. In contrast, the profile of the mounting rail bracket is such that, as the ceramic façade panel is positioned into its correct alignment upon the horizontal rails, the floating tail of the straps attached to the rear of the ceramic panel become tightly fitting in a cantilever action upon the horizontal rail. The straps are slightly in tension when finally positioned and this tension provides a secure fixing point for the panel, preventing wind rattle under wind-load. Further, the profile of the mounting rail bracket is designed such that, the floating tail of the straps mounted onto the back of ceramic façade panels can accommodate horizontal and vertical movement without inducing stress in the ceramic panel,

which is a brittle material and must not be subject to stresses caused by wind-load, thermal movement or seismic movement.

[0034] Still another benefit of the floating tail within mounting rail bracket is the ability for the installed panels to accommodate substantial lateral displacement resulting from seismic activity. Prior art systems, as previously patented, do not have the ability to accommodate horizontal and vertical displacement in seismic activity, without damage to or detachment of the ceramic façade panels. The mounting rail brackets are provided with multiple slotted and circular punched apertures along their top and bottom edges. These fixing points accommodate both thermal movement and provide resistance to damage caused by seismic activity. The system has open horizontal and vertical joints and this is a feature of the system which allows pressure equalisation and ventilation of the cavity behind the façade.

[0035] The non-limiting inventive embodiments are described herein with reference to the accompanying drawings, wherein like reference numerals represent like elements throughout. Details of the preferred embodiment and others are provided, but the invention is not limited to the disclosed features, and variations apparent to those of ordinary skill in the art after reading and understanding of this disclosure should be recognized as being within the spirit and scope of the invention as claimed.

[0036] Reference throughout this document to "one embodiment", "certain embodiments", and "an embodiment" or similar terms means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearances of such phrases or in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments without limitation.

[0037] The drawings featured in the figures are provided for the purposes of illustrating some embodiments of the present invention, and are not to be considered as limitation thereto.

[0038] The terms "first," "second," and the like, herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another. The terms "a" and "an" herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item.

[0039] Although the invention has been described with reference to particular embodiments thereof, it will be understood by one of ordinary skill in the art, upon a reading and understanding of the foregoing disclosure, that numerous variations and alterations to the disclosed embodiments will fall within the scope of this invention and of the appended claims.

What is claimed is:

1. A mounting rail for attachment to a building, comprising:

- a base for engaging the building, the base having a top edge and a bottom edge;
- a pivot member projecting from the base and providing a pivot point structure at a fulcrum distance from the base;
- a gripping flange on the base extending from a position between the bottom edge and the pivot point structure

toward the pivot point structure and providing a gripping surface at a gripping surface height from the base that is greater than the fulcrum distance and at a position between the bottom edge and the pivot point structure; and

an anchor portion between the gripping surface and the bottom edge.

2. A mounting system for mounting panels on a building, comprising:

a plurality of mounting rails for engaging the building, each mounting rail having a top edge and a bottom edge, a pivot member projecting from the base and providing a pivot point structure at a fulcrum distance from the base, and a gripping flange on the base extending from a position between the bottom edge and the pivot point structure toward the pivot point structure, and providing a gripping surface at a gripping surface height from the base that is greater than the fulcrum distance and at a position between the bottom edge and the pivot point structure, whereby the gripping flange and the pivot point structure define slot between them, the slot having an opening width, a depth dimension from the base and a top-bottom dimension, and each mounting rail further having an anchor portion between the bottom edge and the gripping flange; and

a plurality of panel brackets for engaging panels to be mounted on the building, each panel bracket having two ends and comprising a bracket tail extending from a first end and a bracket head at the second end, the bracket tail having a thickness which is less than the opening width of the slot but greater than the depth dimension of the slot;

whereby the bracket tail is insertable into the slot of one mounting rail, and when the panel bracket is aligned with the base, the bracket tail bears against the pivot

point structure and the gripping flange and the bracket head can be secured to an anchor portion of a different mounting rail.

3. A method for mounting panels on a building, comprising:

securing a plurality of horizontally disposed mounting rails to the building each separated from the next closest mounting rail by a separation distance, each mounting rail having a top edge and a bottom edge and further having a pivot member projecting from the base and providing a pivot point structure at a fulcrum distance from the base, and a gripping flange on the base extending from a position between the bottom edge and the pivot point structure toward the pivot point structure and providing a gripping surface at a gripping surface height from the base that is greater than the fulcrum distance and at a position between the bottom edge and the pivot point structure, whereby the gripping flange and the pivot point structure define slot between them, the slot having an opening width, a depth dimension from the base and a top-bottom dimension, and each mounting rail further having an anchor portion between the bottom edge and the gripping flange; and

providing a plurality of panels each having a plurality of panel brackets thereon, each panel bracket having two ends and comprising a bracket tail extending from a first end of the panel base and a bracket head at the second end, the bracket tail having a thickness which is less than the opening width of the slot but greater than the depth dimension of the slot; and

inserting the bracket tails into the slot in a mounting rail on the building, and securing the bracket heads to another mounting rail on the building.

* * * * *