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SYSTEM AND METHOD FOR SECTIONAL CONSTRUCTION ASSEMBLY FOR USE WITH A WOOD MULLION

Abstract

A construction section for supporting a glass panel and configured to be coupled to a building structure. The construction section may comprise a wood mullion, an upper fitting, and a gravity fitting. The wood mullion may comprise an elongate body, a pair of cutouts in the upper and lower ends, and upper and lower pockets. The elongate body may comprise an exterior face, an upper end, and a lower end. The pair of cutouts in the upper and lower ends may be configured to receive at least a portion of the building structure. The upper and lower pockets may comprise a void area within the elongate body adjacent the exterior face. The upper fitting may be configured to support at least a portion of the glass panel. The gravity fitting may be coupled within the lower pocket and configured to support at least a portion of the glass panel.

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Background/Summary

RELATED APPLICATIONS [0001] This application is a continuation in part of U.S. patent application Ser. No. 18/582,962 filed Feb. 21, 2024, entitled SYSTEM AND METHOD FOR SECTIONAL CONSTRUCTION ASSEMBLY and incorporates the disclose of the application by reference.

BACKGROUND OF THE TECHNOLOGY
[0002] A variety of systems are used in the construction of buildings, both commercial and residential. Many of these systems employ a framework, such as in the case of conventional point-supported and conventional glass wall systems. In these systems, panes of glass are attached to, and supported by horizontal and vertical mullions. The type of construction materials often require alternate methods and systems for attaching fittings that support glass panels to the building structure.
SUMMARY OF THE TECHNOLOGY
[0003] A system and method for the assembly and support of construction sections. The system may generally include a fitting that is suitably adapted for supporting a construction section or glass panel that is attached or otherwise affixed to an alternate type of structural building material. The fitting may be configured to hold and retain a construction section or glass panel once the fitting is engaged with the mullion. The mullion may include a wood or other type of wood composite material used in a variety of construction settings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0004] A more complete understanding of the present technology may be derived by referring to the detailed description when considered in connection with the following illustrative figures. In the following figures, like reference numbers refer to similar elements and steps throughout the figures. For simplicity and clarity of illustration, elements in the figures are not necessarily drawn to scale.
[0005] FIG. **1**A representatively illustrates an isometric, exploded view of a construction assembly with a fitting and gravity fitting attached to a mullion in accordance with an exemplary embodiment of the present technology;
[0006] FIG. **1**B representatively illustrates an isometric, assembled view of a construction assembly with a fitting and gravity fitting attached to a mullion and supporting a glass panel, in accordance with an exemplary embodiment of the present technology;
[0007] FIG. **2** representatively illustrates a front view of a mullion in accordance with an exemplary embodiment of the present technology;
[0008] FIG. **3** representatively illustrates a top, cross-sectional view of the fitting attached to a mullion and supporting a glass panel in accordance with an exemplary embodiment of the present technology;
[0009] FIG. **4** representatively illustrates a detail plan view taken from FIG. **3** showing the attachment of the fitting to the mullion in accordance with an exemplary embodiment of the present technology; and
[0010] FIGS. **5**A-**5**F representatively illustrates schematic plan views of various mullion shapes in

accordance with an exemplary embodiment of the present technology.

DETAILED DESCRIPTION OF THE DRAWINGS

[0011] The present technology may be described in terms of functional block components and various processing steps. Such functional blocks may be realized by any number of components configured to perform the specified functions and achieve the various results. For example, the present technology may employ various types of mullions, fittings, hangers, fasteners, spacers, glass panels, walls, and the like, which may carry out a variety of functions. Further, the present technology may employ any number of components for a point supported construction system for supporting a glass panel.

[0012] Various representative implementations of the present technology may be applied to any system for construction. Certain representative implementations may include systems and methods tailored to a specific type of construction, such as point-supported glass wall systems.

[0013] Modern curtain walls are typically comprised of vertical and horizontal metal framing (mullions) supporting cladding (glass) panels to create a weather tight building enclosure. The framing utilizing metal mullions provides continuous contact with the edge of the cladding (glass) which limits thermal performance of the assembled façade. This standard metal façade assembly has a high carbon footprint which is detrimental to the environment. Replacing the metal framing noted with wood/timber framing and eliminating all horizontal framing materials dramatically reduces the amount of carbon dioxide released into the atmosphere related to the façade assembly that utilizes wood framing. It also provides for point-supporting the cladding panels/glass improving the thermal performance of the assembled façade reducing operating cost and reducing operational carbon dioxide emissions.

[0014] In general point-supported glass wall systems utilize fittings connected with mullions to provide support for various types of construction sections. Fittings may be attached to a mullion and the construction section or glass panel is supported by the fitting. Typically, a mullion may include any number of suitable materials, such as aluminum, steel, graphite, composite and/or the like. In one embodiment, the mullion may be fabricated from wood or timber for the reasons described above.

[0015] A wood mullion may be used as a structural or decorative element in architecture and carpentry. A wood mullion is typically a vertical member made of wood that supports the weight of the glass or other materials and can also serve aesthetic purposes.

[0016] A wood mullion can provide structural support by helping to distribute the load and prevent sagging or warping. Wood mullions can enhance the aesthetics of a building's facade. They come in various designs and profiles, allowing architects and designers to create visually appealing patterns and styles.

[0017] Referring now to FIGS. **1-3**, a construction system **100** generally comprises a wood mullion **105**, an upper fitting **110**, and a gravity fitting **115**. The wood mullion **105** is generally configured for engagement with the upper fitting **110** and the gravity fitting **115** and provides support for a construction section and/or glass panel held in place by the upper fitting **110** and the gravity fitting **115**. The wood mullion **105** may comprise any structural or design features that may be employed to allow for the attachment of the fitting(s) **110**, **115** for providing support and/or retention of construction sections.

[0018] The construction sections may comprise wood, ceramic, glass, glass panels, polymer sheeting, bullet-proof glass, synthetic paneling, and the like.

[0019] The wood mullion **105** may comprise a first end **120** that may be positioned towards the interior of a structure being constructed and a second end **125** configured to be coupled to the upper fitting **110** and the gravity fitting **115**.

[0020] The second end **125** of wood mullion **105** may comprise an exterior face **130** with one or more void areas or pockets **135**. Each pocket **135** may comprise an aperture **140** that is drilled or otherwise created and configured to receive a portion of the upper fitting **110** and the gravity fitting

115. A metal tapped insert **145** may be received within the aperture **140**. The metal tapped insert **145** may comprise internal threading configured to receive any suitable fastener.
[0021] The upper fitting **110** may be suitably configured to support any type of construction section, such as a pane of glass or glass panel **150**. The upper fitting **110** may comprise an inner fitting **155**, an outer fitting **160**, a first fastener **165** configured to couple the upper fitting **110** to the wood mullion **105**, and a second fastener **170** configured to couple the inner fitting **155** to the outer fitting **160**. Once assembled the inner fitting **155** and the outer fitting **160** are configured to support at least a portion of the glass panel **150**.
[0022] The orientation of the upper fitting **110** and the wood mullion **105** allows for a space or gap **162** between the exterior face **130** of the second end **125** of the wood mullion **105** and an interior surface **164** of the glass panel **150**. The gap **162** may comprise a distance approximate a dimension of the inner fitting **155** between the exterior face **130** of the second end **125** of the wood mullion **105** and an interior surface **164** of the glass panel **150**.
[0023] The gap **162** may improve the thermal performance of the construction system **100**. The gap **162** does this by reducing the amount of contact area of the glass panel **150** and wood mullion **105** thereby reducing the thermal transfer across the construction system **100**. The improved thermal performance of the construction system **100** reduces cost and lowers the operational carbon footprint of a building.
[0024] Additionally, the gap **162** allows for inspection of the upper fitting **110** and its connection to the glass panel **150** in all directions. For example, if there is a water leak the connection can be viewed from the interior and the location of the water leak may be easily identified and easily repaired to stop the water leakage. In traditional systems where the glass panel is in continuous contact with the framing system or standard wood mullion it is impossible to determine the exact location of a water leak because the actual glass joint is hidden by the framing. This improves and simplifies the building maintenance over the lifetime of a building.
[0025] Still further, the gap **162** visually separates the glass panel **150** from the metal framing (not shown), expressing the glass panels as an uninterrupted plane. This attribute visually improves the appearance of the assembled wall in the construction system **100** as compared to traditional glass wall systems, where the glass is in continuous contact with the traditional wood mullion framing.
[0026] The inner fitting **155** may comprise a first aperture **175** that is centrally located and configured to receive the first fastener **165** to couple the upper fitting **110** to the wood mullion **105**. The first fastener **165** may be received within the metal tapped insert **145** to couple the upper fitting **110** to the wood mullion **105**.
[0027] The inner fitting **155** may comprise additional apertures **180** located outwardly of the first aperture **175** that are configured to receive the second fastener **170** to couple the inner fitting **155** to the outer fitting **160**. The outer fitting **160** may comprise additional apertures **185** that are configured to align with the additional apertures **180** in the inner fitting **155**.
[0028] The second fastener **170** may comprise a stud **190** and cap nut **195** arrangement where the studs **190** are received in the additional apertures **180** in the inner fitting **155**. When installed, the stud(s) **190** may be received in additional apertures **180** in the inner fitting **155** and project through an aperture(s) **185** in the outer fitting **160**. The cap nut(s) **195** may then be coupled to the stud(s) **190** to assemble the fitting **110**, which can then support the glass panel **150**. The stud(s) **190**, cap nut(s) **195**, and aperture(s) may be threaded as understood by one of ordinary skill in the art. The cap(s) **195** reside within the additional apertures in the outer fitting **160** and receive the stud(s) **190** to connect the inner fitting **155** to the outer fitting **160**. The upper fitting **110** may comprise at least one gasket **167** located between the inner fitting **155** and the glass panel **150** and the outer fitting **160** and the glass panel **150**.
[0029] The inner fitting **155** may comprise a raised portion **195** that is received in the void area or pocket **135** of the wood mullion **105** when assembled. The raised portion **195** may snugly fit within the void area or pocket **135** when the first fastener **165** is placed within the metal tapped insert **145**

to couple the upper fitting **110** to the wood mullion **105**.
[0030] The gravity fitting **115** may be used in conjunction with the fitting **110** described above to support a construction section in any manner. For example, the gravity fitting **115** may be provided for vertical support of a construction section and/or glass panel **150**.
[0031] The gravity fitting **115** may comprise a panel support **200** and a support arm **205**. The panel support **200** engages and vertically supports the glass panel **150** and/or construction section. The support arm **205** comprises a mating surface with a raised portion **210** configured to fit within the void area or pocket **135** of the wood mullion **105** when assembled. The panel support **200** may be coupled to a lower portion of the support arm **205** and is located generally horizontal and perpendicular to the support arm **205**. The support arm **205** may be oriented generally parallel to the exterior surface **130** of the mullion **105**.
[0032] The support arm **205** may comprise at least one aperture **220** and the raised portion **210** configured to couple the gravity fitting **115** to the mullion **105**. At least one fastener **215** may be received within the at least one aperture **220** and the metal tapped insert **145** to couple the gravity fitting **115** to the wood mullion **105**. The raised portion **210** may snugly fit within the void area or pocket **135** when the at least one fastener **215** is placed within the metal tapped insert **145** to couple the gravity fitting **115** to the wood mullion **105**.
[0033] The structure of the wood mullion **105** allows it to support the weight of the construction section or glass panel **150** held by the upper fitting **110** and the gravity fitting **115**. Additionally, the wood mullion **105** may permit translational or rotational motion in response to environmental effects, such as wind, rain and/or thermal expansion or contraction.
[0034] The wood mullion **105** may connect with any suitable structures, systems and devices in any suitable manner to achieve any particular purpose. The wood mullion **105** may be configured for attachment to a surface such as a floor, wall and/or the like. The wood mullion **105** may comprise any suitable shape, such as, the shapes including but not limited to those shown in FIGS. **5**A-**5**F. The wood mullion **105** may be attached to any suitable surface in any suitable manner, and may be configured to support any structure, system, device or architectural element in any suitable manner. For example, the structure of the wood mullion **105** may comprise upper and lower cutouts **225**, **230** that are configured to couple the mullion **105** to a building structure **235**. The cutouts **225**, **230** can be shaped in any manner that will allow the wood mullion **105** to be coupled to a suitable building structure. In one embodiment a plate **235** may be inserted within the cutouts **225**, **230** and fastened thereto by a nut **240** and bolt **245** configuration.
[0035] In a construction system according to various aspects of the present technology, mullions may be attached to the structure of a building to provide a framework for supporting construction sections. Suitably configured fittings may be attached to the mullions to provide point-supported or continuously supported retention of construction sections. Construction systems in accordance with various exemplary embodiments of the present technology may be used to build any type of structure, such as a point-supported glass wall, for example. The construction system may also be used to achieve various aesthetic benefits. For example, the panes of glass used to form a glass wall will generally be displaced away from the mullions, making it more difficult to see the mullions from an exteriorly disposed vantage point. Additionally, construction systems in accordance with the present technology may be used to achieve any structural benefit, whether now known or hereafter described in the art, such as the ability to construct a multi-story point-supported glass wall system using substantially vertically aligned mullions without the need for horizontally-aligned mullions.
[0036] Constructs (i.e., construction designs) that may be realized via implementation of various embodiments of the present technology shall be understood to comprise anything that may be at least partially assembled from at least one or more component parts, such as, for example: a window; a wall; a partition; a frame; a panel; a covering; a dome; a door; a display case; a display wall; a display frame; a cubicle; a presentation display; a booth; an enclosure; a temporary habitat;

a mobile home; a video device array; various architectural construction elements; and/or the like.
[0037] A ‘construction section’ shall be understood to comprise any component part of a construct surface, such as, for example, a pane of glass, a panel of wood, a sheet of drywall, a graphite board, Plexiglas, Lucite, a video device element, etc. Furthermore, a construction section may comprise any two-dimensional (e.g., substantially planar) or three-dimensional (e.g., polyhedral, spherical, hemispherical, elliptical, parabolic, etc.) geometry and/or any combination thereof.
[0038] In the foregoing description, the technology has been described with reference to specific exemplary embodiments. Various modifications and changes may be made, however, without departing from the scope of the present technology as set forth. The description and figures are to be regarded in an illustrative manner, rather than a restrictive one and all such modifications are intended to be included within the scope of the present technology. Accordingly, the scope of the technology should be determined by the generic embodiments described and their legal equivalents rather than by merely the specific examples described above. For example, the steps recited in any method or process embodiment may be executed in any appropriate order and are not limited to the explicit order presented in the specific examples. Additionally, the components and/or elements recited in any system embodiment may be combined in a variety of permutations to produce substantially the same result as the present technology and are accordingly not limited to the specific configuration recited in the specific examples.
[0039] Benefits, other advantages and solutions to problems have been described above with regard to particular embodiments. Any benefit, advantage, solution to problems or any element that may cause any particular benefit, advantage or solution to occur or to become more pronounced, however, is not to be construed as a critical, required or essential feature or component.
[0040] As used herein, the terms “comprises,” “comprising,” or any variation thereof, are intended to reference a non-exclusive inclusion, such that a process, method, article, composition or apparatus that comprises a list of elements does not include only those elements recited but may also include other elements not expressly listed or inherent to such process, method, article, composition or apparatus. Other combinations and/or modifications of the above-described structures, arrangements, applications, proportions, elements, materials or components used in the practice of the present technology, in addition to those not specifically recited, may be varied or otherwise particularly adapted to specific environments, manufacturing specifications, design parameters or other operating requirements without departing from the general principles of the same. Any terms of degree such as “generally,” “substantially,” “about,” and “approximate” as used herein mean a reasonable amount of deviation of the modified term such that the end result is not significantly changed. For example, these terms can be construed as including a deviation of at least ±5% of the modified term if this deviation would not negate the meaning of the word it modifies.
[0041] The present technology has been described above with reference to an exemplary embodiment. However, changes and modifications may be made to the exemplary embodiment without departing from the scope of the present technology. These and other changes or modifications are intended to be included within the scope of the present technology.

Claims

1. A construction section for supporting a glass panel and configured to be coupled to a building structure, comprising: a wood mullion comprising: an elongate body having an exterior face, an upper end, and a lower end; a pair of cutouts in the upper and lower ends configured to receive at least a portion of the building structure; an upper pocket having a void area within the elongate body adjacent the exterior face; and a lower pocket having a void area within the elongate body adjacent the exterior face; an upper fitting configured to support at least a portion of the glass panel; and a gravity fitting coupled within the lower pocket and configured to support at least a

portion of the glass panel.
2. The construction section of claim 1, wherein the upper fitting comprises: inner fitting; an outer fitting; a first fastener configured to couple the inner fitting to the upper pocket; and a second fastener configured to couple the inner fitting to the outer fitting.
3. The construction section of claim 2, wherein the gravity fitting is coupled within the lower pocket, comprising: a panel support; a support arm; and a third fastener configured to couple the gravity fitting to the lower pocket.
4. The construction section of claim 3, wherein the panel support vertically supports the glass panel.
5. The construction section of claim 4, wherein the panel support is coupled to a lower portion of the support arm and is located substantially horizontal and perpendicular to the support arm.
6. The construction section of claim 5, wherein the support arm is oriented generally parallel to the exterior surface of the mullion.
7. The construction section of claim 6, wherein the support arm comprises a mating surface with a raised portion configured to fit within the void area of the lower pocket.
8. The construction section of claim 1, wherein the upper and lower pockets each contain an aperture that receives an insert configured to couple the first and third fasteners.
9. The construction section of claim 8, wherein the insert is a metal tapped insert having internal threads that receive the first and third fasteners.
10. The construction section of claim 3, wherein the first, second, and third fasteners comprise a stud and cap nut.
11. The construction section of claim 1, wherein an interior surface of the glass panel is spaced apart from the exterior face of the wood mullion by a gap.
12. A construction section for supporting a glass panel and configured to be coupled to a building structure, comprising: a wood mullion comprising: an elongate body having an exterior face, an upper end, and a lower end; a pair of cutouts in the upper and lower ends configured to receive at least a portion of the building structure; an upper pocket having a void area within the elongate body adjacent the exterior face; and a lower pocket having a void area within the elongate body adjacent the exterior face; an upper fitting comprising: inner fitting; an outer fitting; a first fastener configured to couple the inner fitting to the upper pocket; and a second fastener configured to couple the inner fitting to the outer fitting; a gravity fitting coupled within the lower pocket, comprising: a panel support; a support arm; and a third fastener configured to couple the gravity fitting to the lower pocket.
13. The construction section of claim 12, wherein the panel support vertically supports the glass panel.
14. The construction section of claim 13, wherein the panel support is coupled to a lower portion of the support arm and is located substantially horizontal and perpendicular to the support arm.
15. The construction section of claim 14, wherein the support arm is oriented generally parallel to the exterior surface of the mullion.
16. The construction section of claim 15, wherein the support arm comprises a mating surface with a raised portion configured to fit within the void area of the lower pocket.
17. The construction section of claim 12, wherein the upper and lower pockets each contain an aperture that receives an insert configured to couple the first and third fasteners.
18. The construction section of claim 17, wherein the insert is a metal tapped insert having internal threads that receive the first and third fasteners.
19. The construction section of claim 12, wherein the first, second, and third fasteners comprise a stud and cap nut.
20. The construction section of claim 12, wherein an interior surface of the glass panel is spaced apart from the exterior face of the wood mullion by the inner fitting.