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(54) **STRUCTURAL WALL PANEL ASSEMBLIES**

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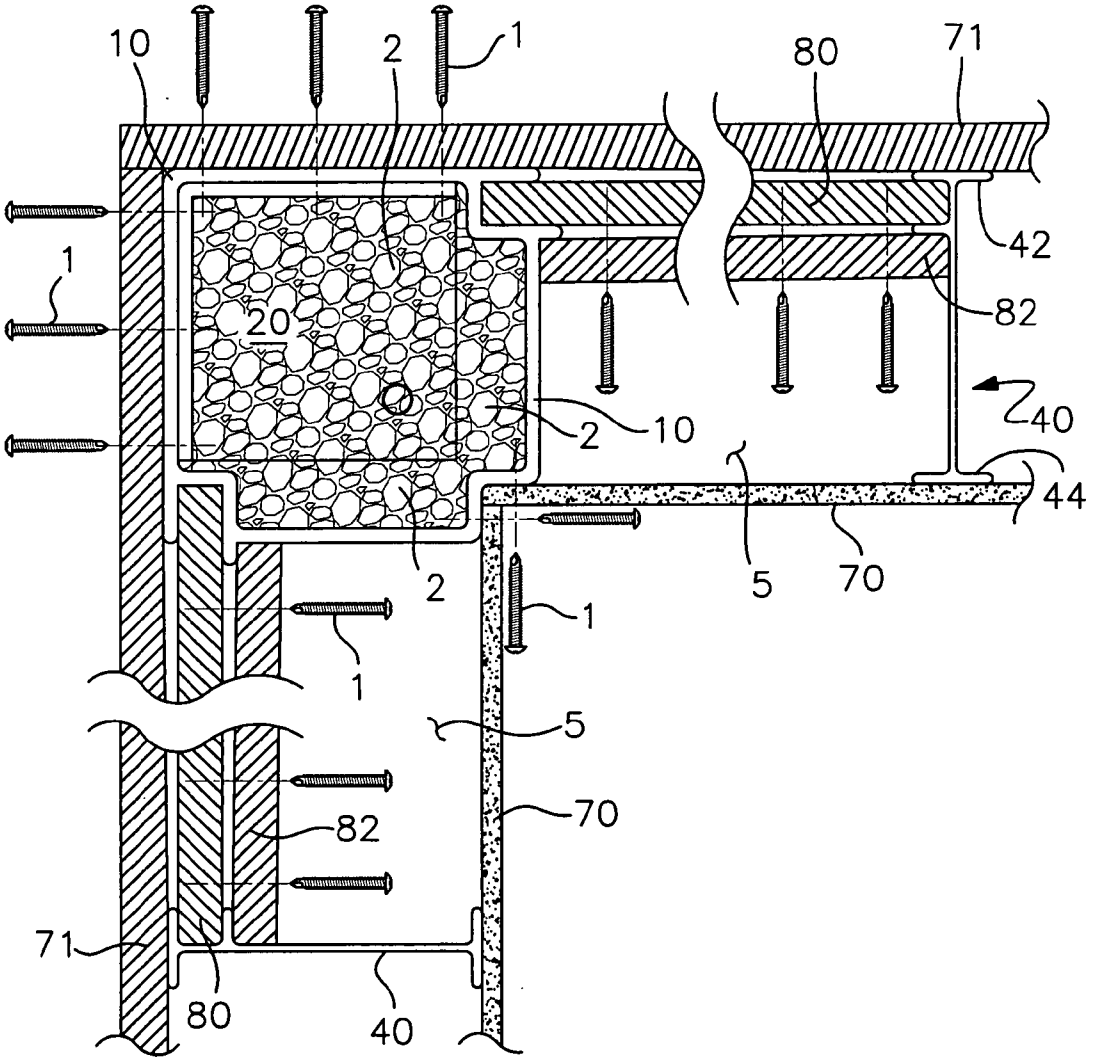
(57) **ABSTRACT**

Novel wall panel assemblies and shear wall assemblies are disclosed herein. Preferred embodiments include novel corner posts, studs, and sill plates for formed of composite materials and suitable for fabricating wall panels and shear wall assemblies for use in the construction of residential and commercial buildings.



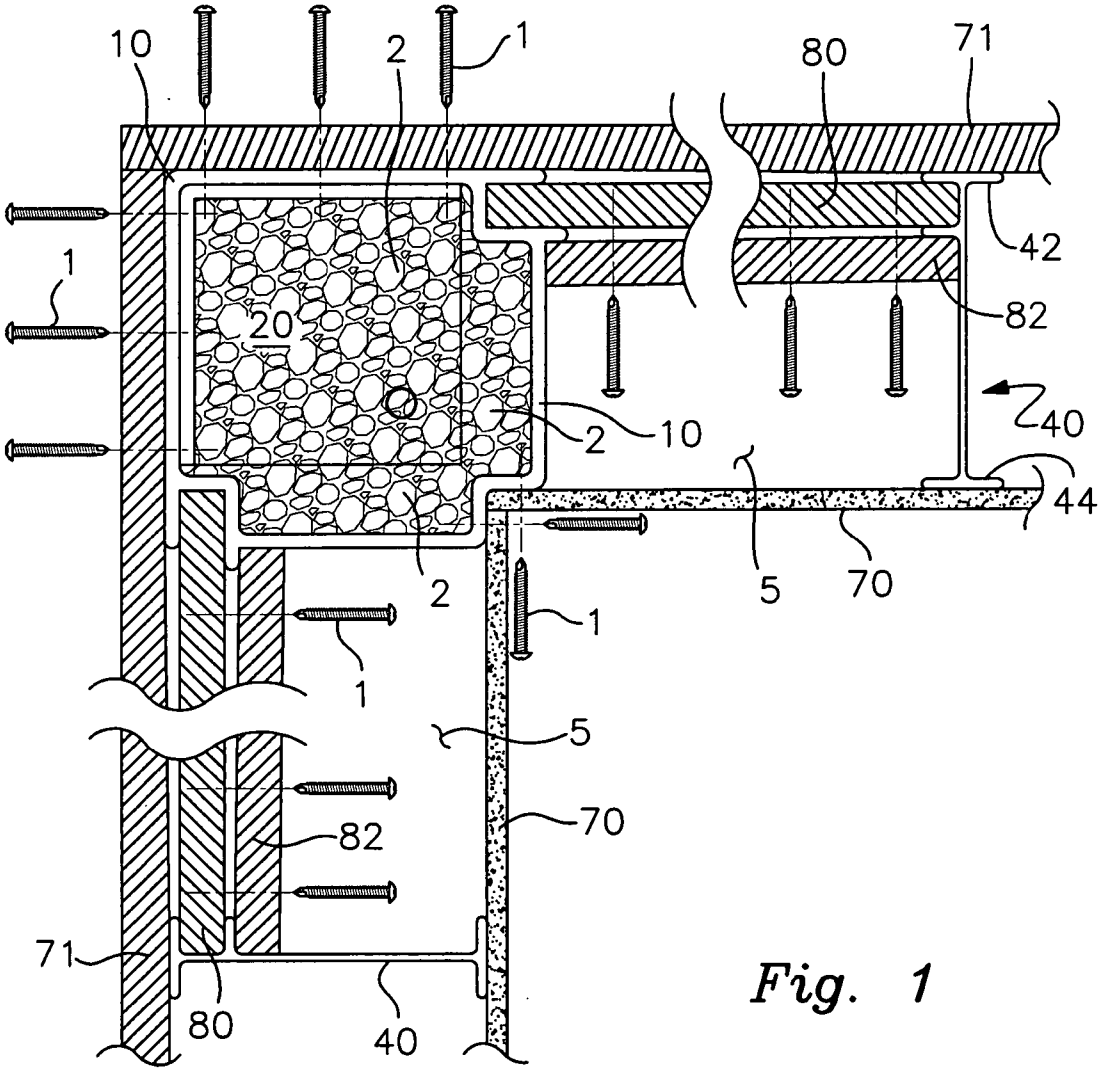


Fig. 1

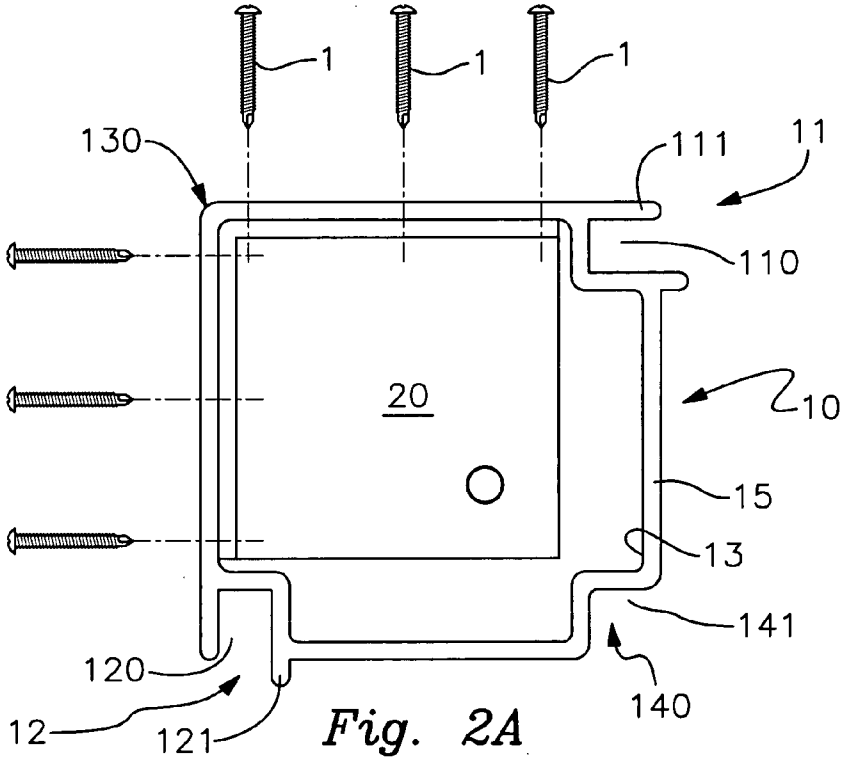


Fig. 2A

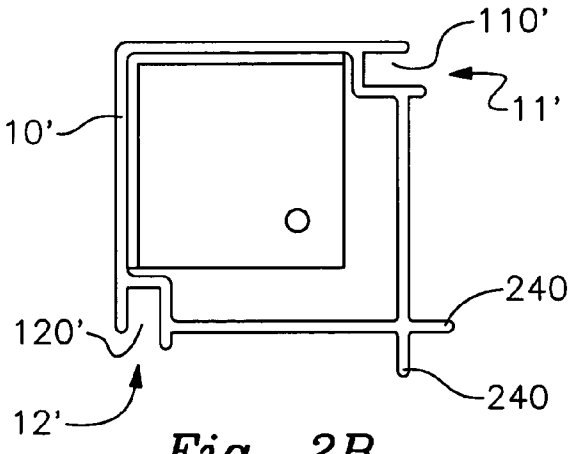


Fig. 2B

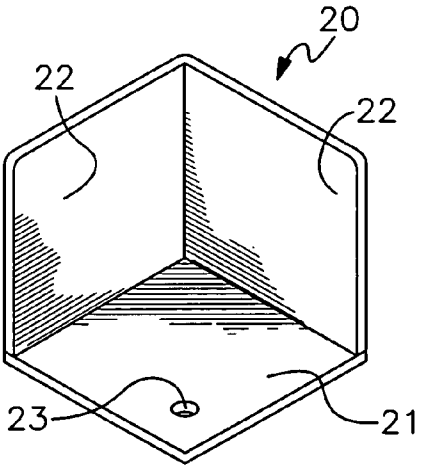


Fig. 3

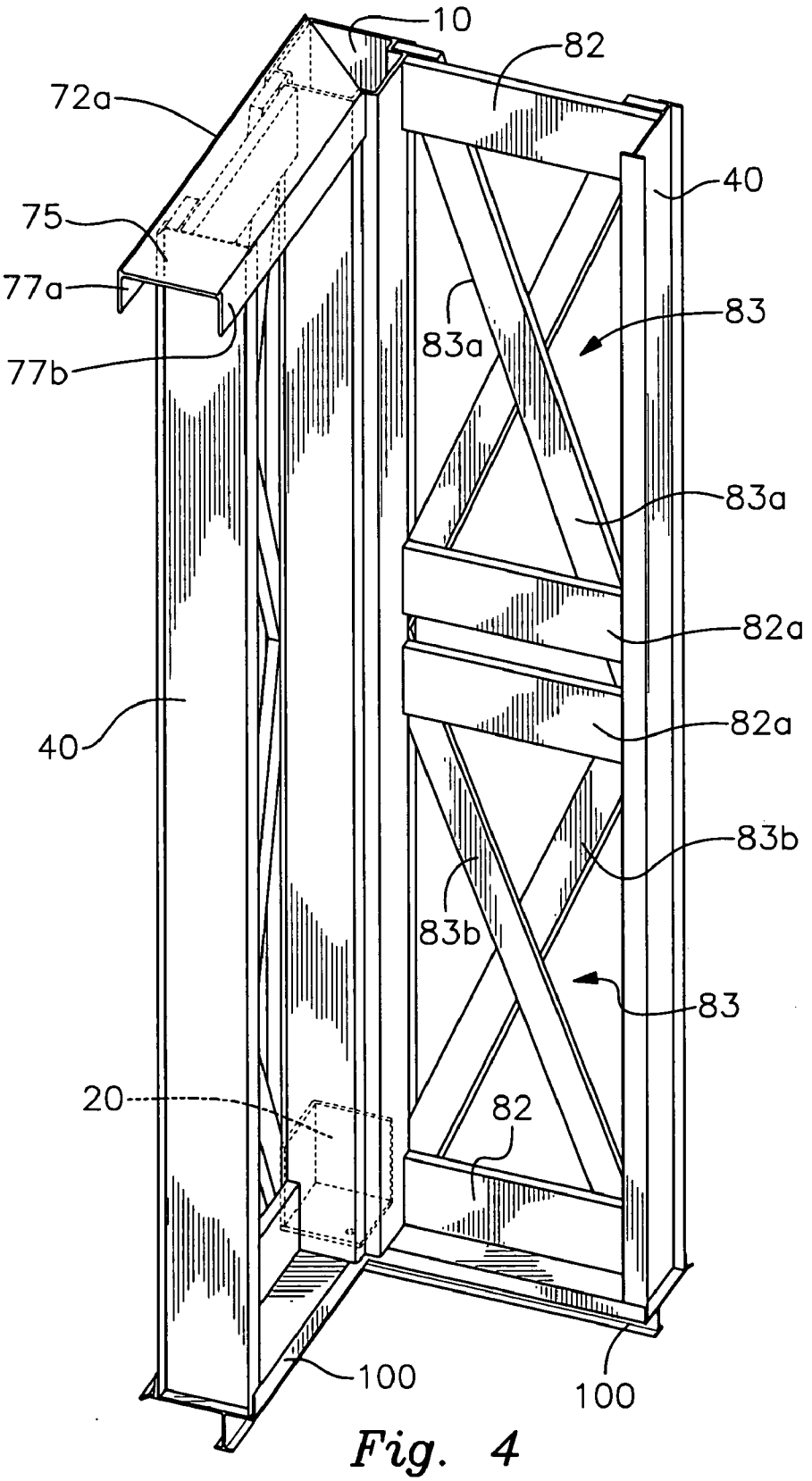

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Fig. 4

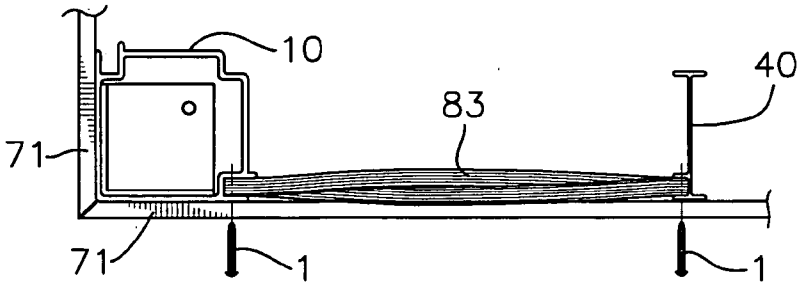


Fig. 5

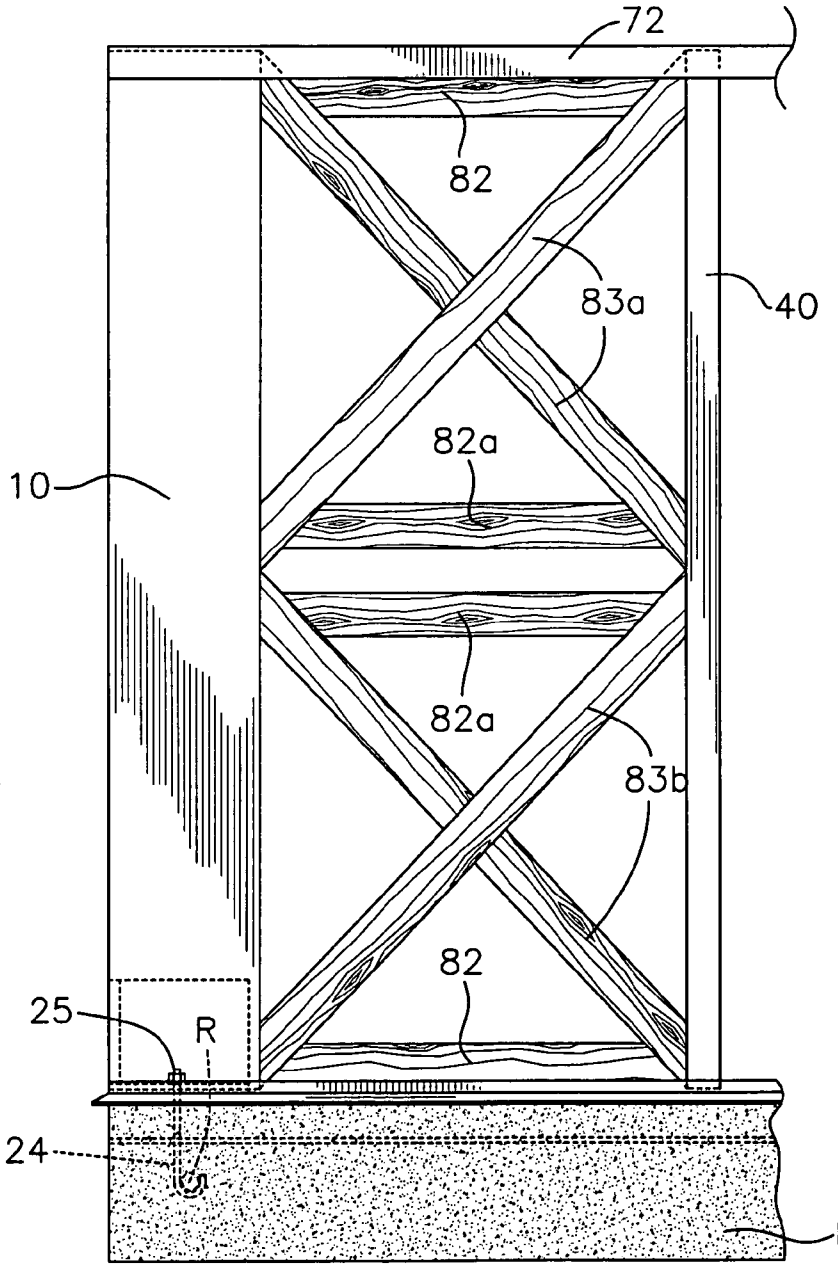


Fig. 6

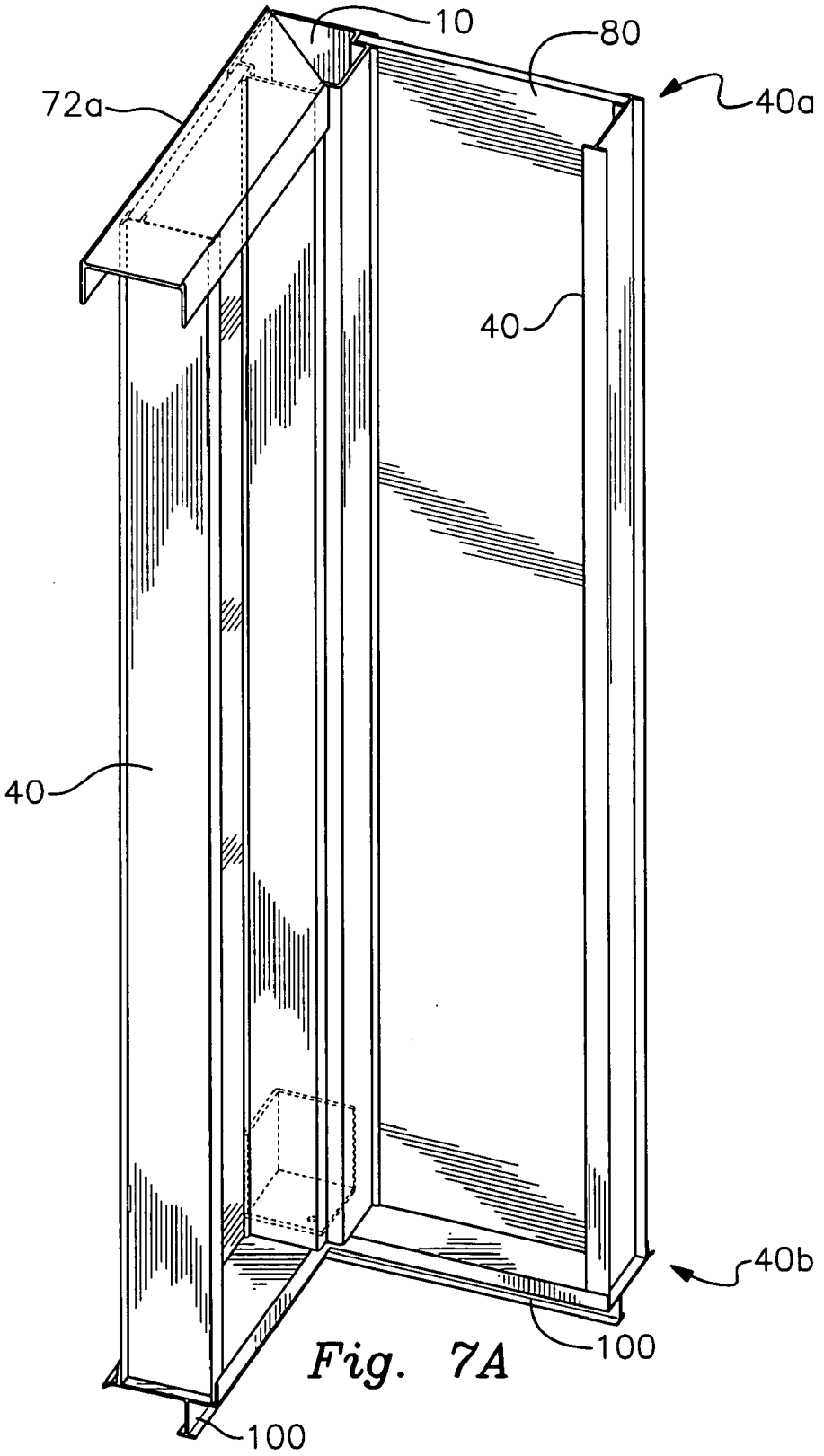


Fig. 7A

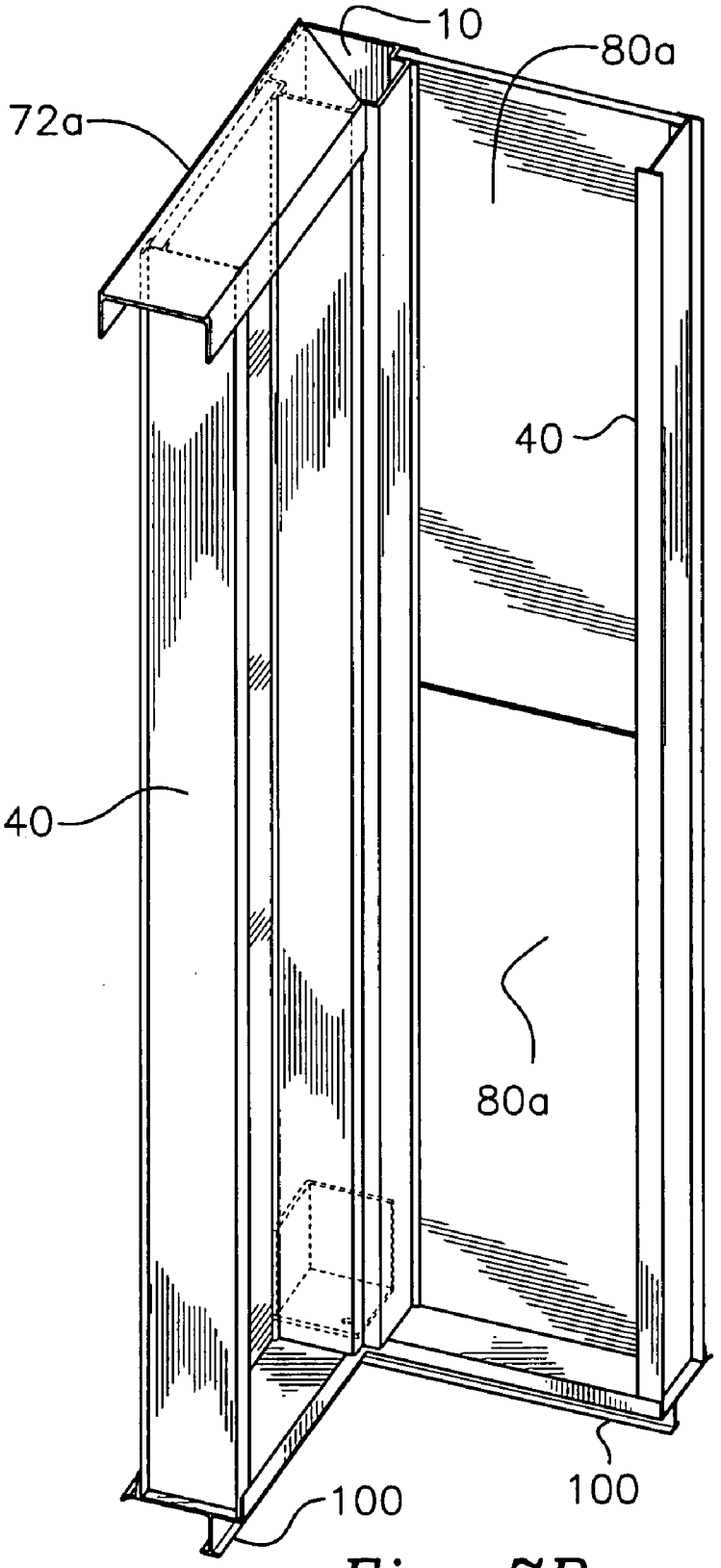


Fig. 7B

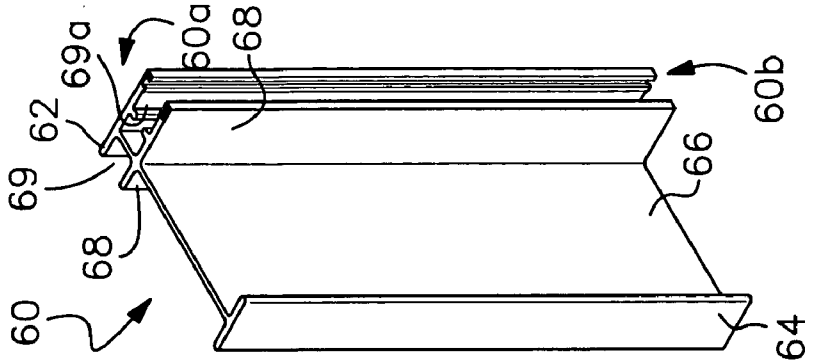


Fig.11

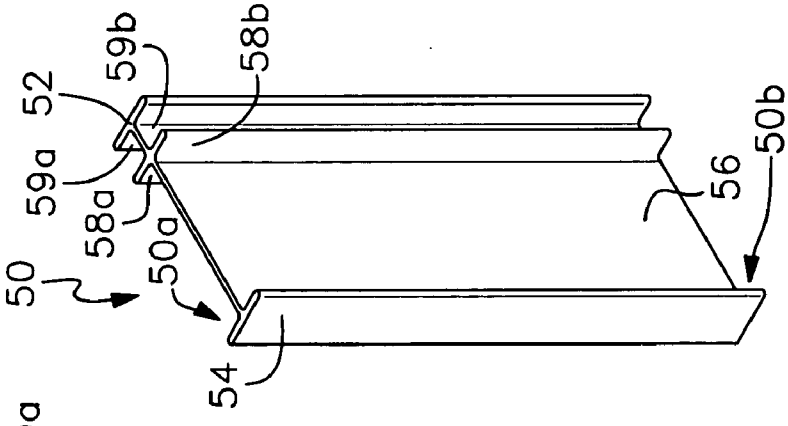


Fig.10

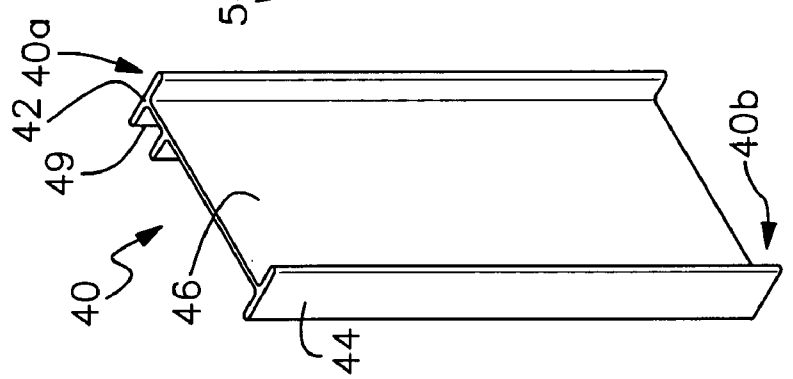
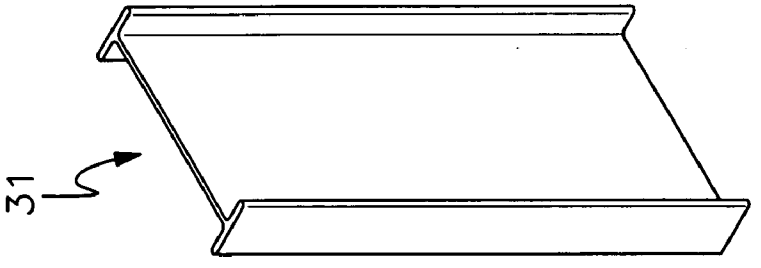


Fig.9



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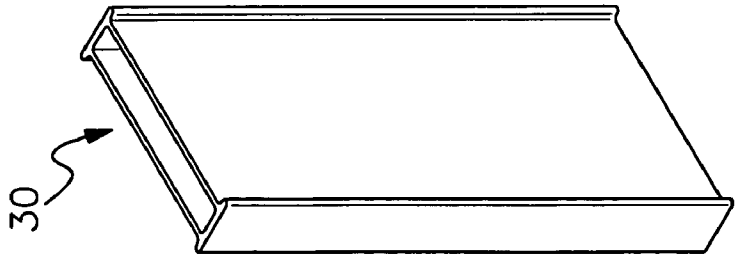
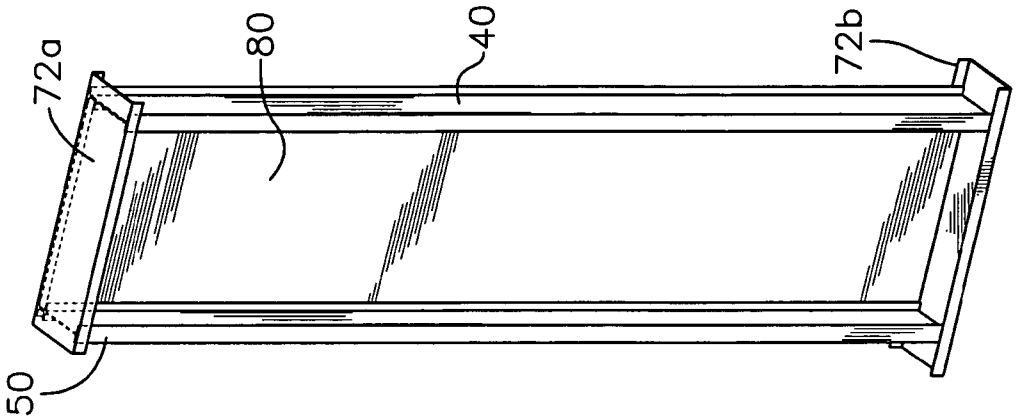


Fig.8A



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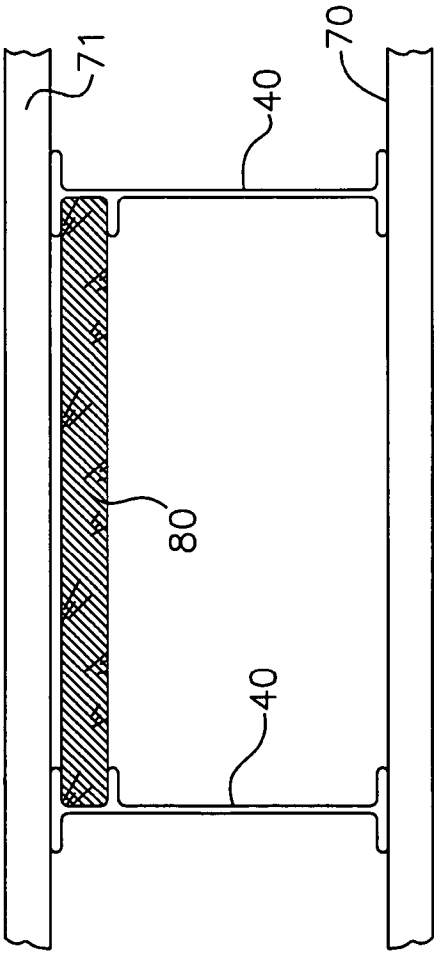

Fig. 12A

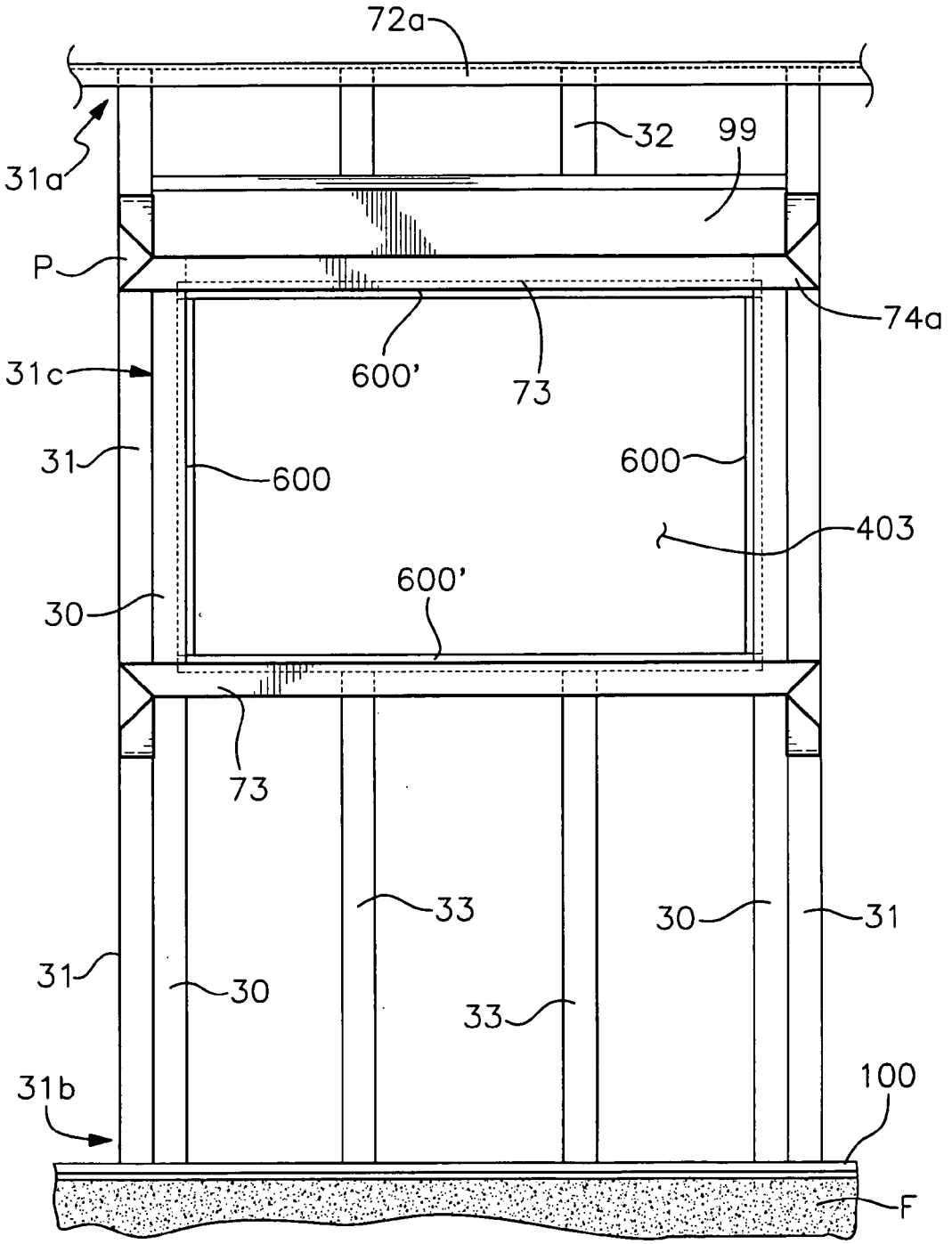
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Fig. 13

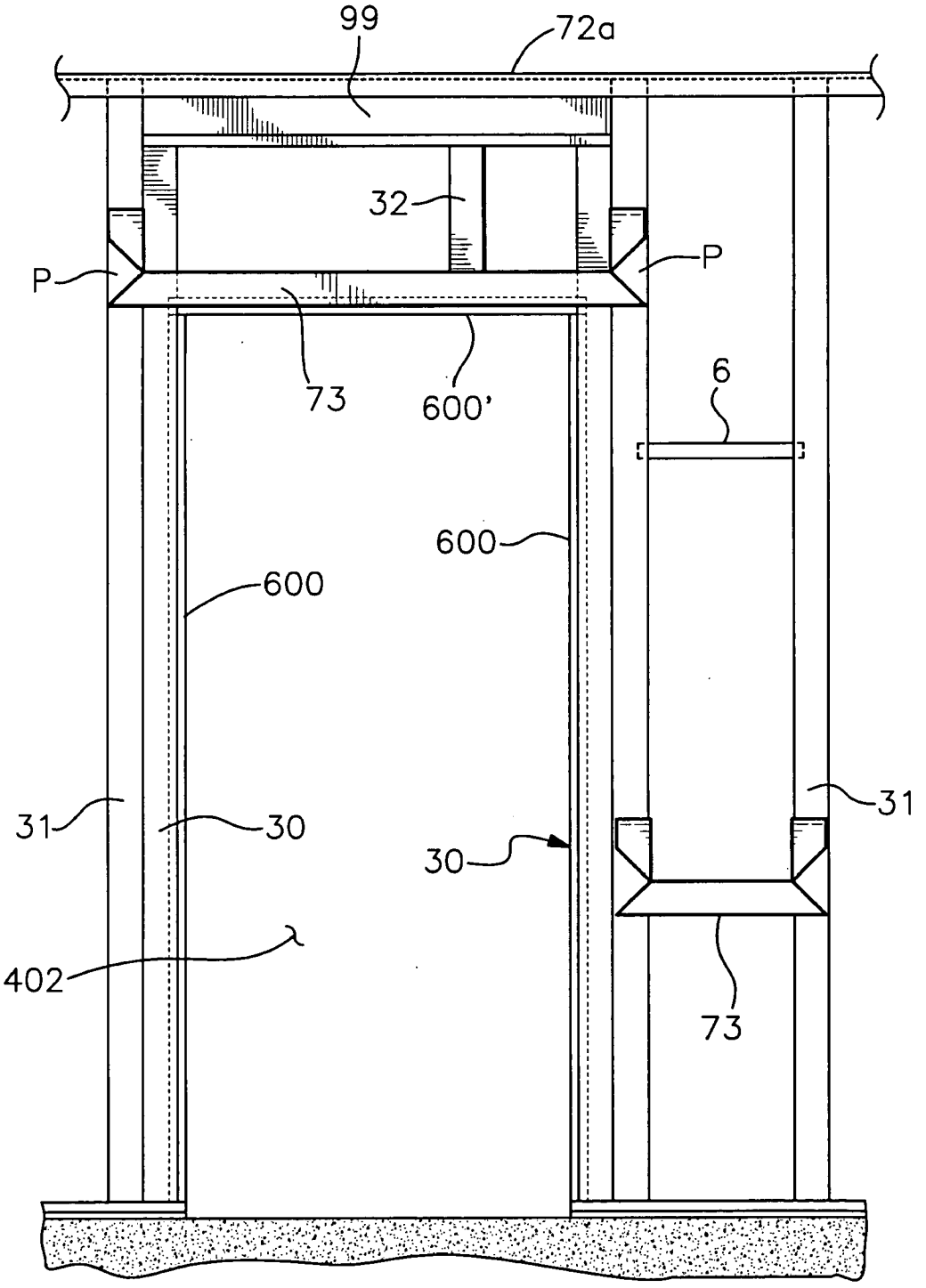
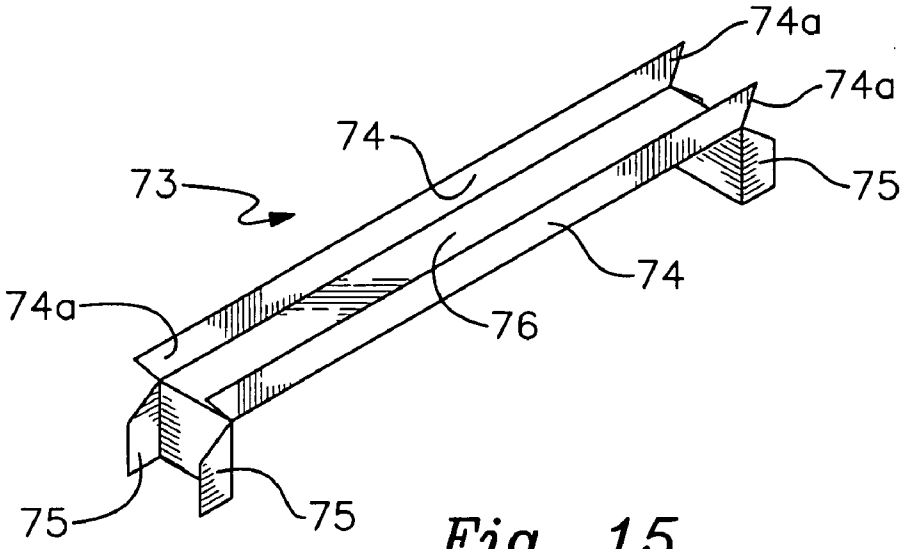


Fig. 14



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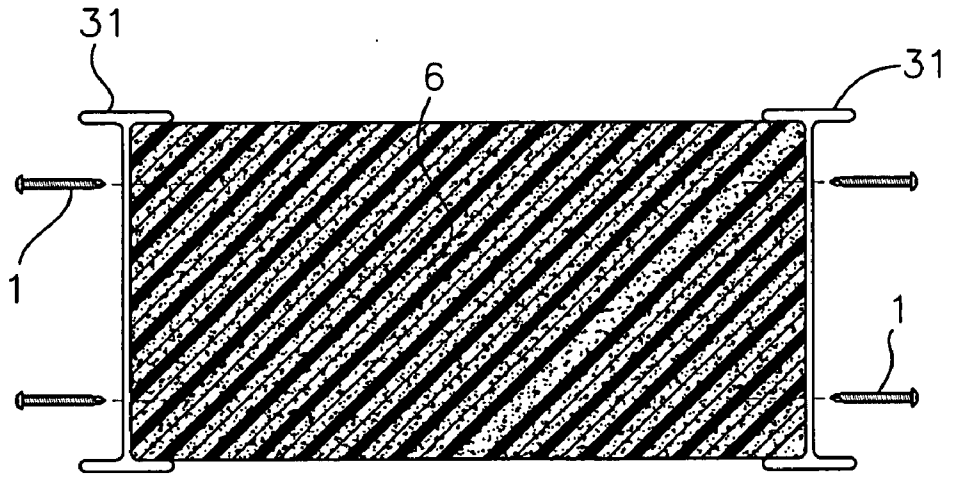

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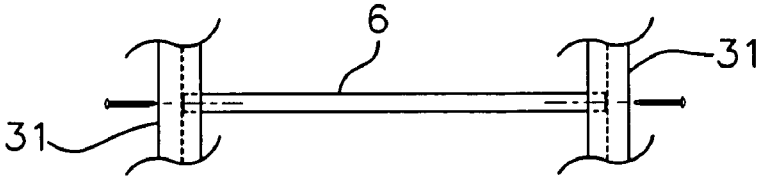

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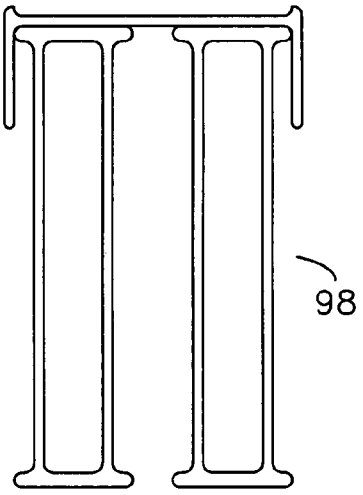
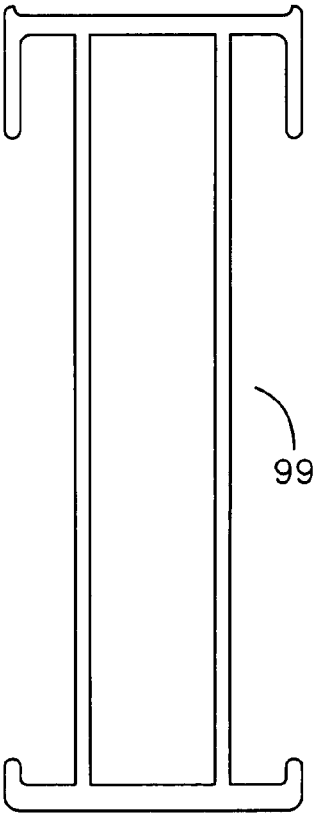


Fig. 16A



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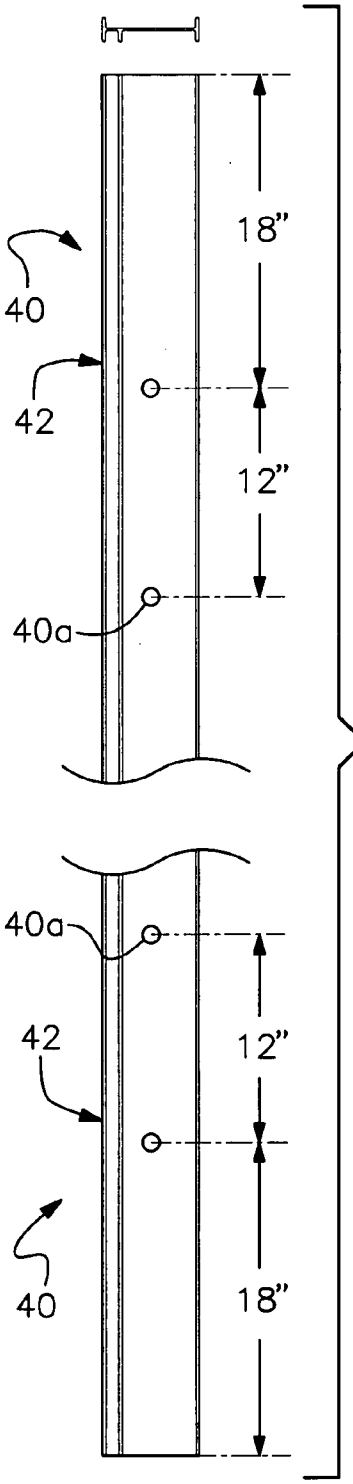

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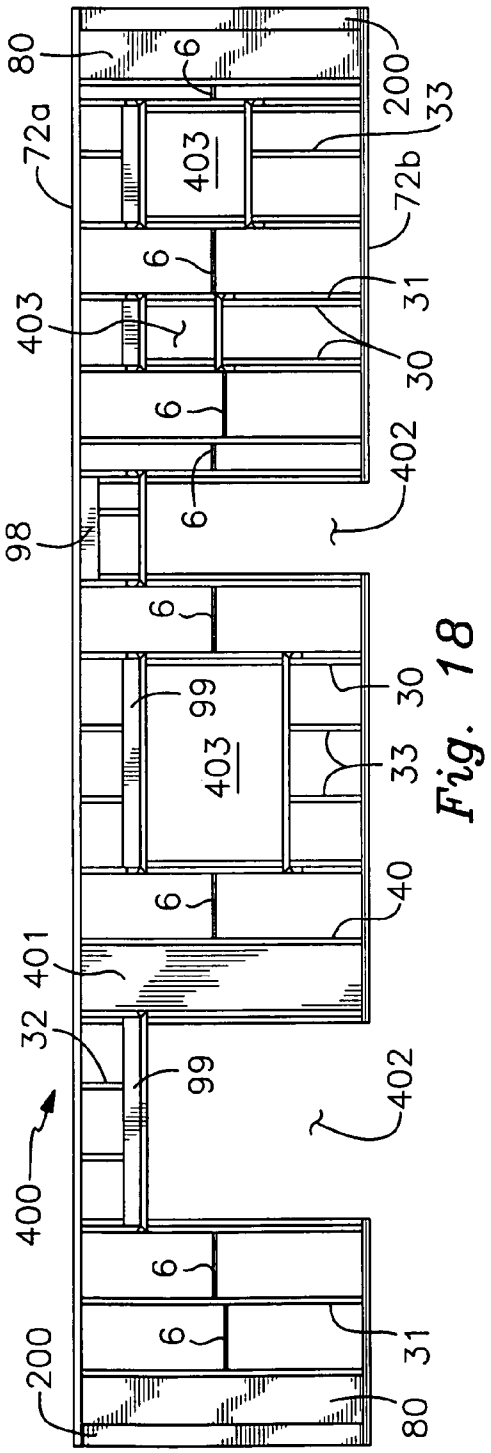
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Fig. 18

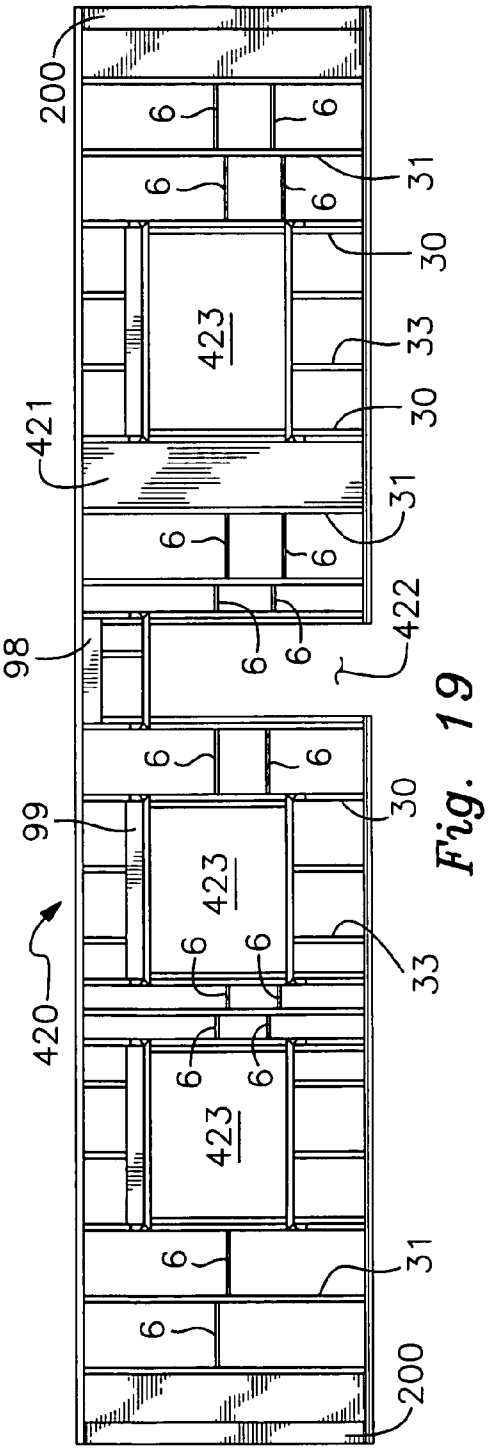
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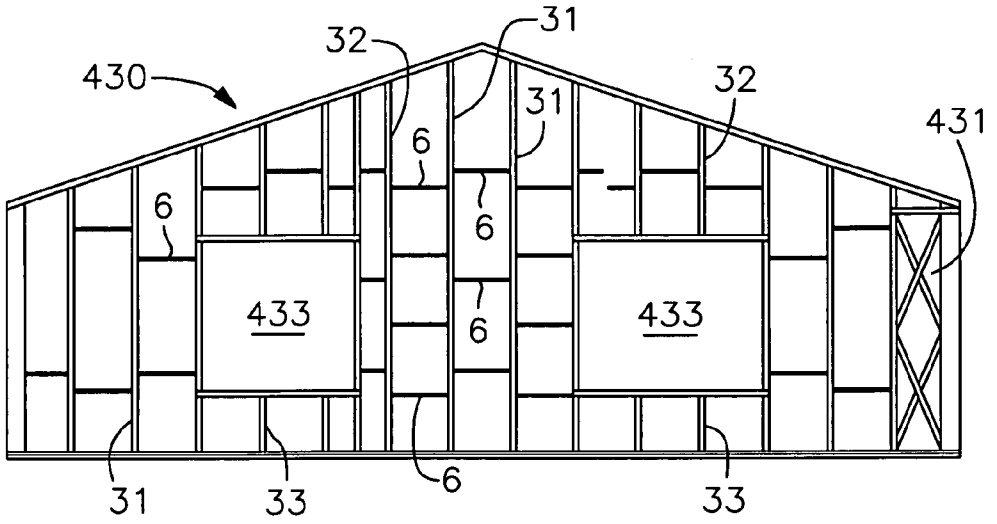
Fig. 19



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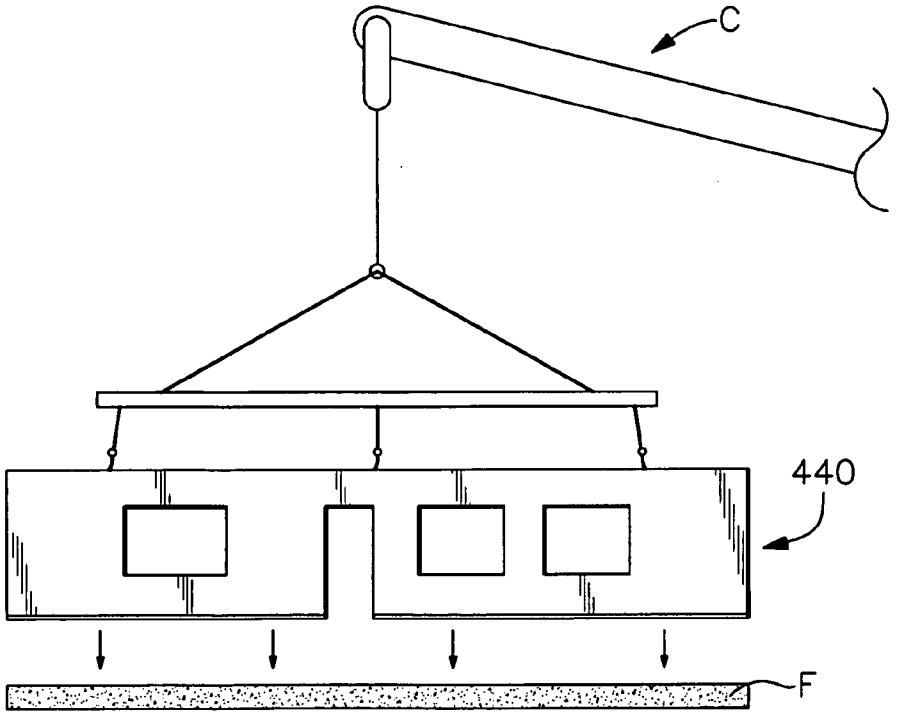

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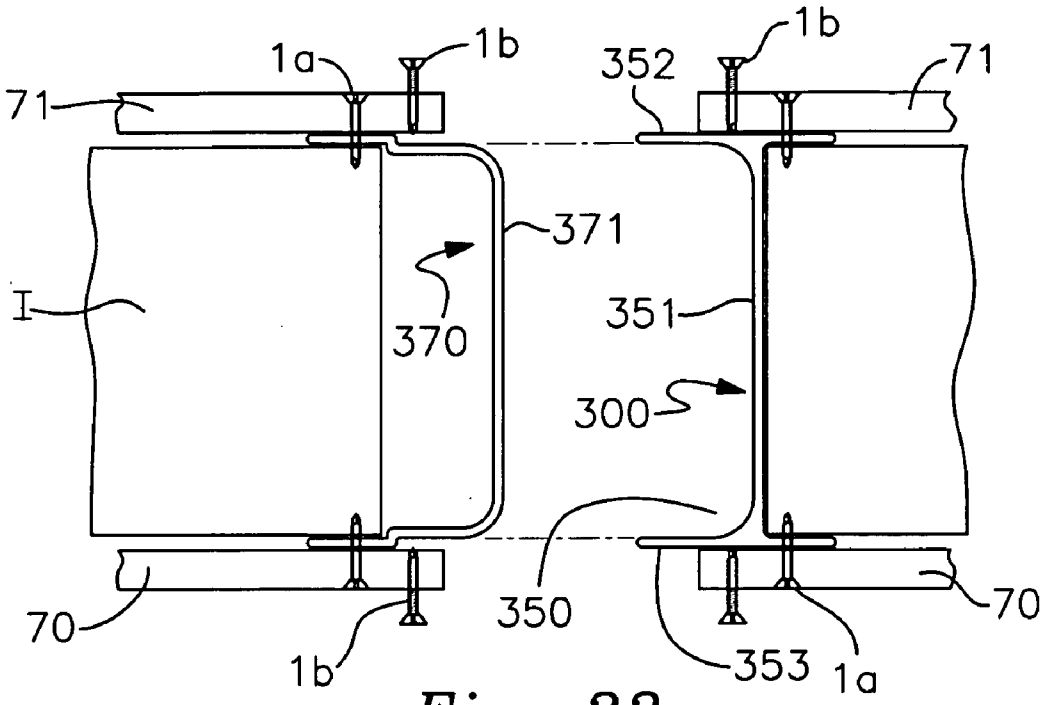
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70
1b
353
1a

Fig. 22

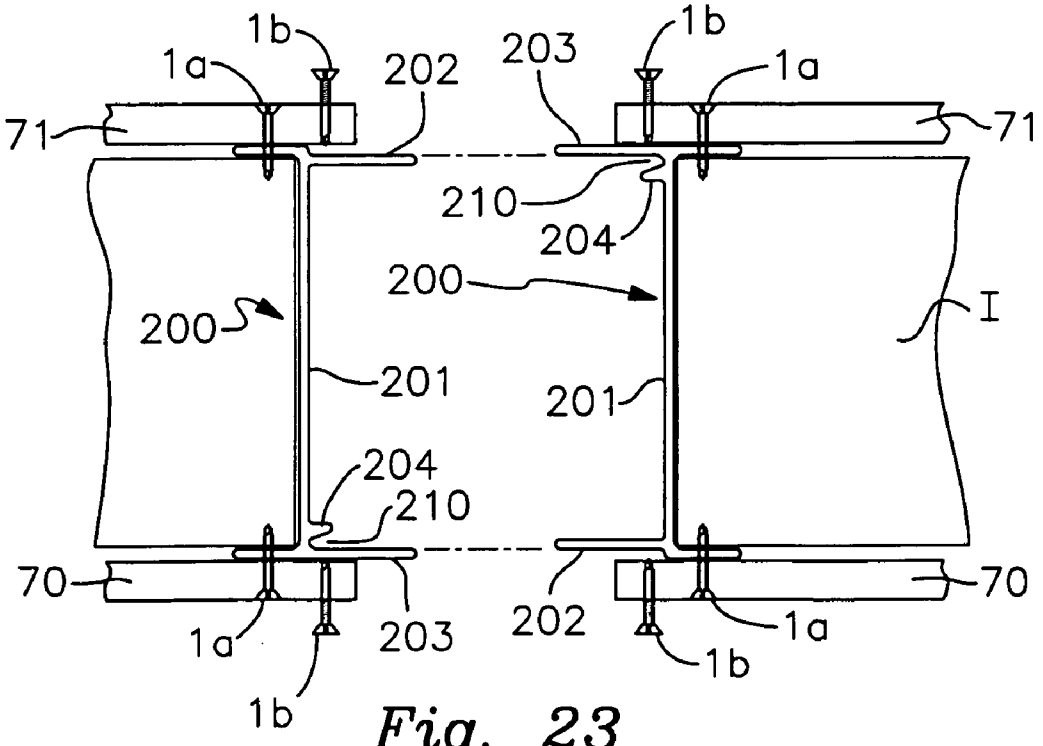
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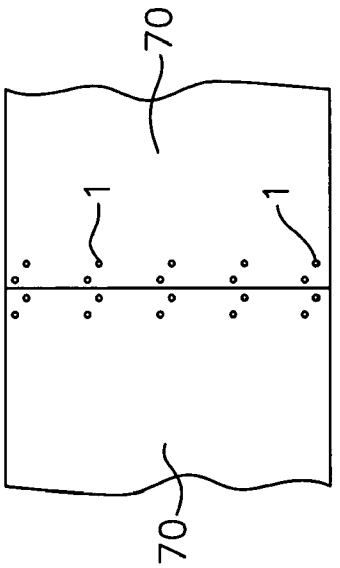
Fig. 23



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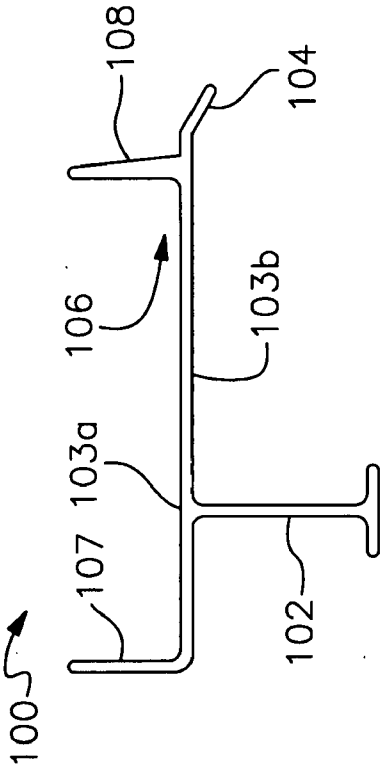

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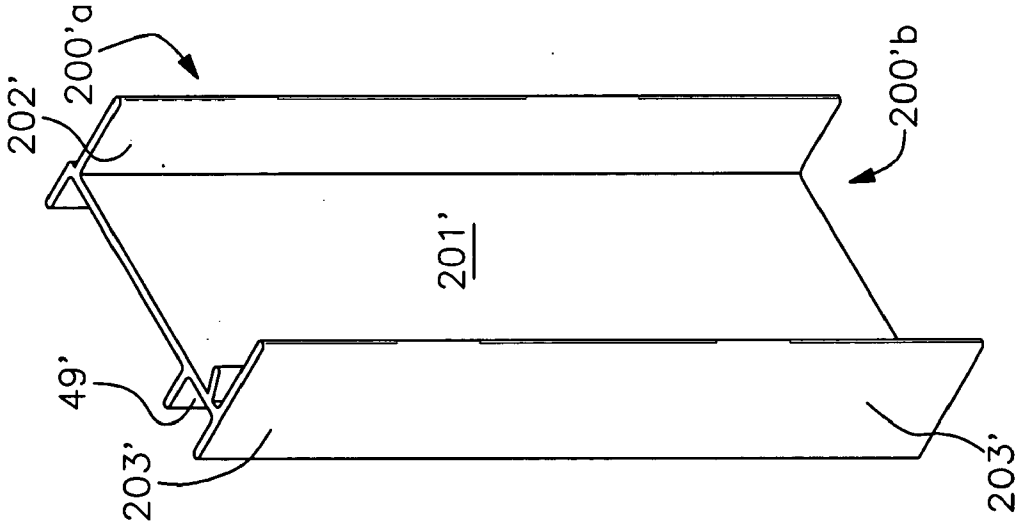


Fig. 38

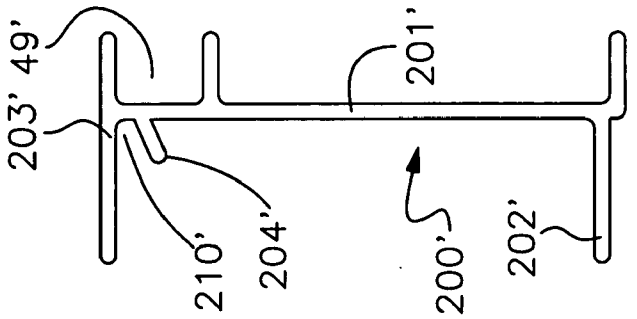
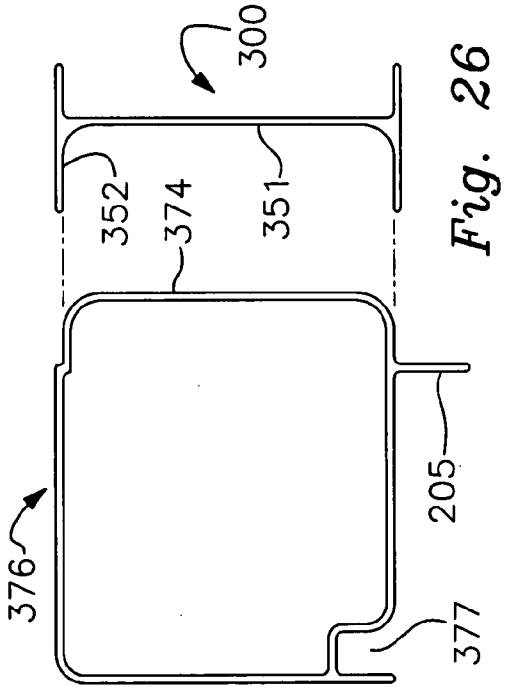


Fig. 37



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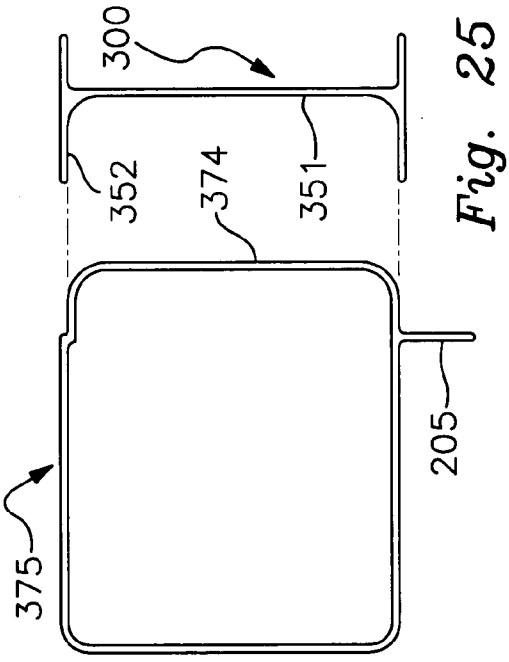


Fig. 25

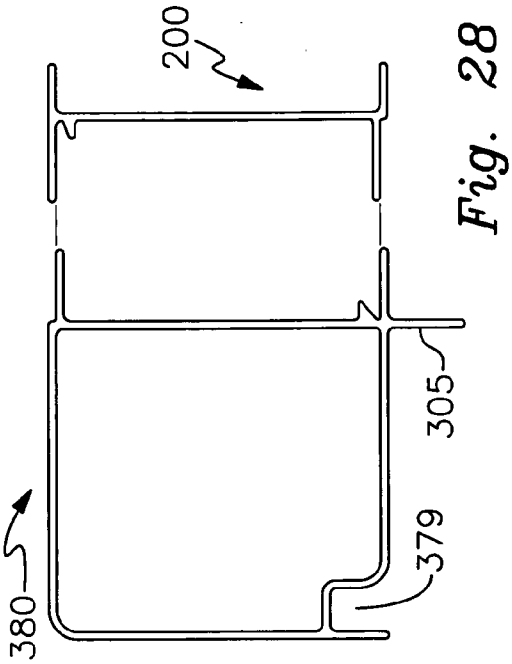


Fig. 28

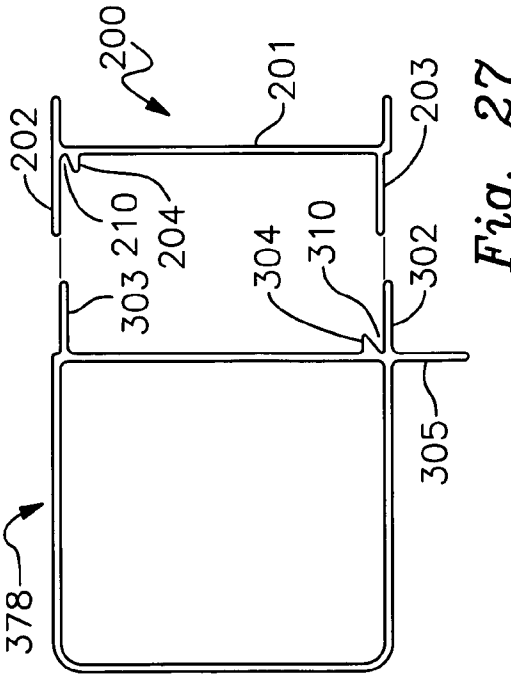


Fig. 27

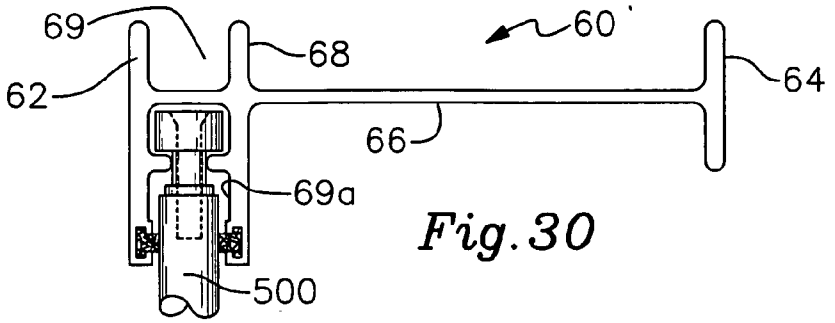


Fig.30

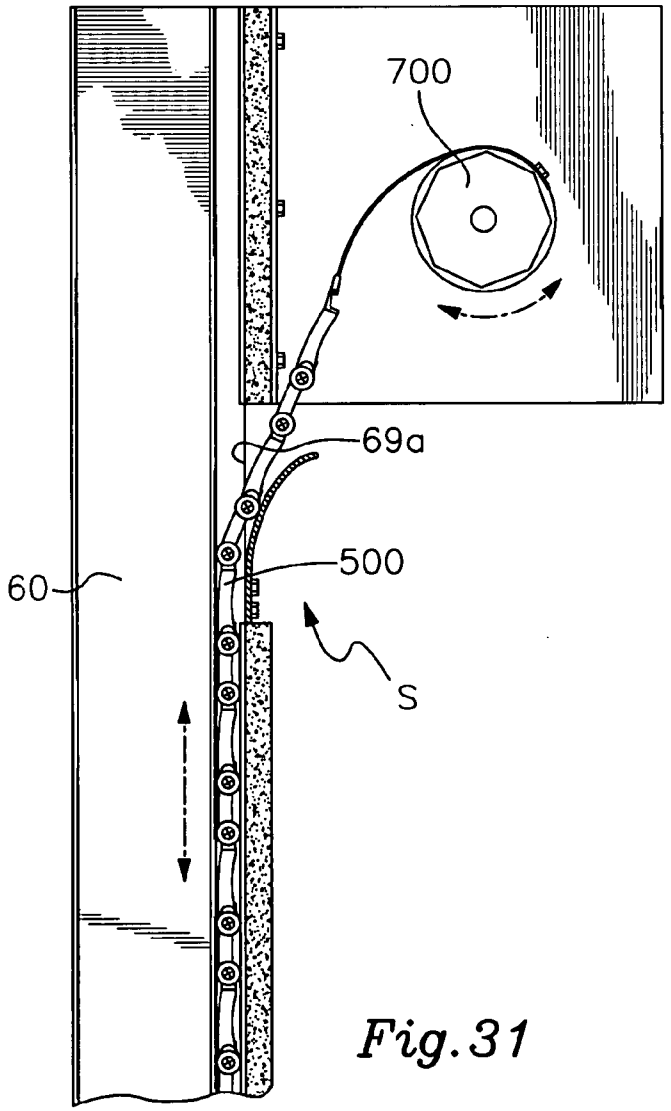


Fig.31

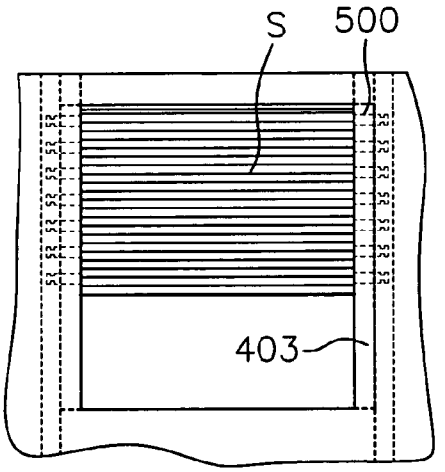


Fig. 32

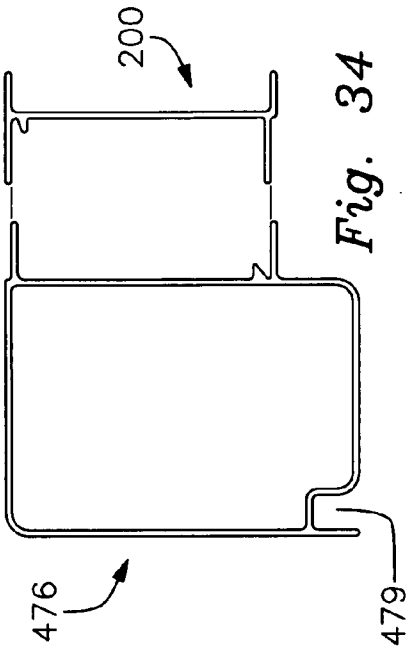


Fig. 34

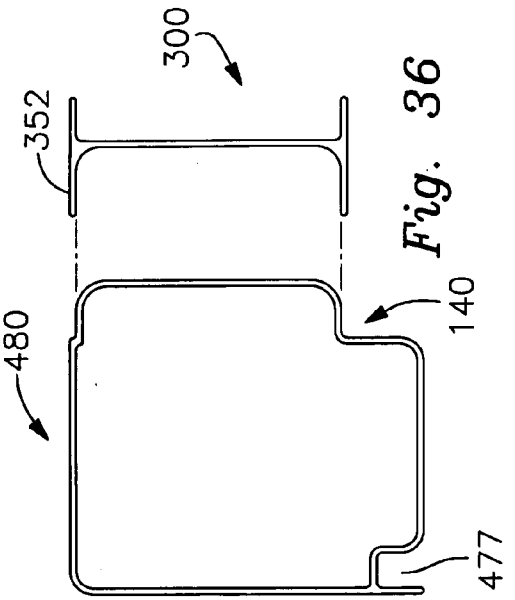


Fig. 36

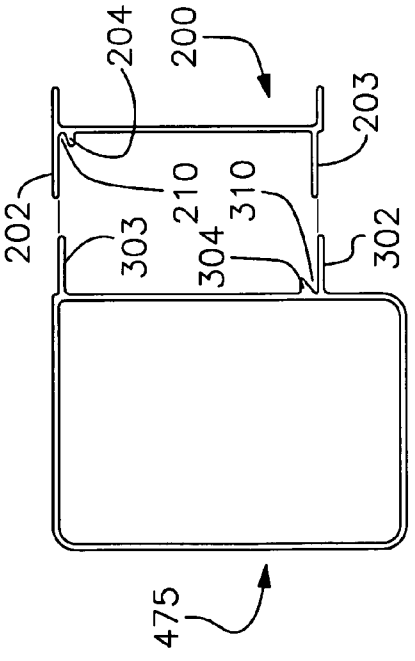


Fig. 33

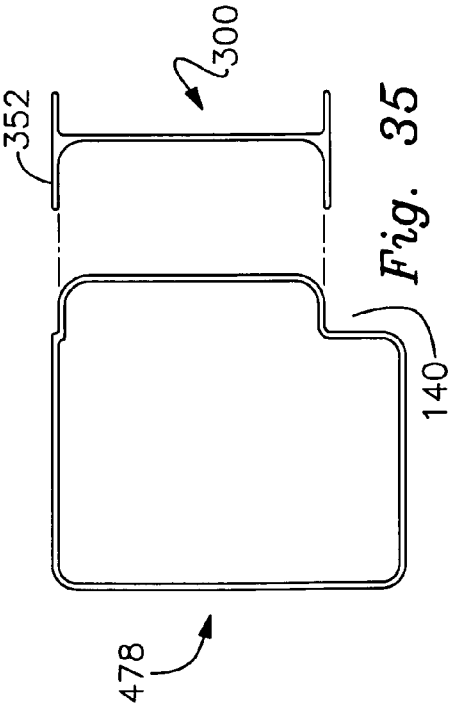


Fig. 35

STRUCTURAL WALL PANEL ASSEMBLIES

SUMMARY OF THE INVENTION

[0001] The present invention is directed to a novel system of wall construction comprising the use of novel structural components and wall panels for use in the construction of residential and commercial buildings.

[0002] Certain aspects of the present invention comprise a structural corner post suitable for engaging a shear wall assembly thereto in the construction of a building. In one embodiment, the corner post has a top end, a bottom end, and a substantially rectangular, longitudinal outer body comprising four corners, the corners including a pair of diagonally opposing corners, each of the opposing corners comprising a longitudinal channel extending from the top end to the bottom end of the corner. The channels are configured to engage an outer edge of a shear wall assembly (e.g. one or more shear wall sheets or cross buck bracing assembly, for example), and are preferably oriented such that when the shear wall sheet(s) or cross buck bracing assembly is engaged within each of the channels, the shear wall sheets or cross buck bracing assemblies are positioned at substantially right angles to one another.

[0003] Certain aspects of the corner post may include an interior corner having an indentation sufficiently large for receiving and having fastened thereto an outer edge of an interior wall sheet. Other embodiments of the corner post include a pair of flanges extending from the interior corner of the post at substantially right angles to one another, the flanges being configured for receiving and having fastened thereon an outer edge of an interior wall sheet.

[0004] The present invention is also directed to a shear wall corner assembly for use in panelized construction of buildings. The shear wall corner assembly comprises a structural corner post having a top end, a bottom end, and a substantially rectangular, longitudinal outer body comprising four corners, the corners including a pair of diagonally opposing corners, each of the opposing corners comprising a longitudinal channel extending from the top end to the bottom end of the corner, the channels configured to engage an outer edge of one or more shear wall sheets, the four corners further including an interior corner positioned between the diagonally opposing corners. The shear wall corner assembly may further include a pair of vertical connecting studs, each of the connecting studs having a bottom end and a top end and positioned adjacent to one of the diagonally opposed corners of the corner post. A pair of shear wall assembly sections are also included, each having one outer side edge engaged within one of the channels of the corner post and an opposing outer side edge secured to one of the connecting studs such that the shear wall assembly sections are oriented at a substantially right angle to one another. A first interior wall sheet is also provided, the interior wall sheet having an outer side edge secured to the interior corner of the corner post, such that the interior wall sheet is positioned parallel to one of the shear wall assembly sections. A second interior wall sheet is also provided, the interior wall sheet having an outer side edge secured to the interior corner of the corner post, perpendicular to the first interior wall sheet.

[0005] The shear wall assembly sections of the corner assembly may comprise of at least one substantially flat sheet of material. Alternatively, the shear wall assembly is a cross buck bracing assembly comprising at least one pair of boards oriented in an overlapping criss-cross pattern between the corner post and one of the connecting studs, each of the boards having opposing ends comprising the outer edge of the shear wall assembly engaged within channels of the connecting stud and the corner post. The shear wall assembly may further include (i) a first board having one outer side edge secured to the corner post near the top end of the corner post and a second outer side edge secured to a top end of one of the adjacent connecting studs, such that the first board is oriented adjacent to and parallel with the sheer wall assembly section and (ii) a second board having an outer side edge secured to the corner post near the bottom end of the corner post and a second outer side edge secured to the bottom end of one of the adjacent studs, such that the second board is oriented adjacent to and parallel with the sheer wall assembly section.

[0006] The present invention is also directed to a shear wall assembly suitable for use in panelized building construction. One embodiment of the shear wall assembly comprises a pair of connecting studs, each of the studs having a top end, a bottom end, an exterior flange, and an interior flange, each of the flanges extending perpendicularly from the elongated web portion of the stud and positioned parallel to one another from the top end to the bottom end of the stud. Each of the studs may further include at least one intermediate flange extending perpendicularly from one side of the web portion and positioned subjacent and parallel to a portion of the exterior flange to form, in combination with the exterior flange, a longitudinal channel extending from the top end to the bottom end of the stud. The shear wall assembly further includes one or more solid shear wall sheets, each having two opposing side edges, each of the side edges engaged within one of the channels of one of the connecting studs. Other aspects of the shear wall assembly include at least one of the connecting studs having two of the intermediate flanges, each of the two intermediate flanges oriented opposite one another on opposing surfaces of the web portion such that, in combination with the exterior flange, the intermediate flanges and exterior flange form a pair of adjacent longitudinal channels, each of the channels configured to engage therein the outer edge of the shear wall sheet.

[0007] A second embodiment of the shear wall assembly may comprise a pair of connecting studs, each of the studs having a top end, a bottom end, an exterior flange and an interior flange, each of the flanges extending perpendicularly from an elongated web portion of the stud and positioned parallel to one another from the top end to the bottom end of the stud. In this embodiment, each of the studs includes at least one intermediate flange extending perpendicularly from one side of the web portion and positioned subjacent and parallel to a portion of the exterior flange to form, in combination with the exterior flange, a longitudinal channel extending from the top end to the bottom end of the stud. This embodiment includes a cross-buck bracing assembly comprising at least one pair of buck boards oriented in an overlapping, criss-cross pattern between the connecting studs, each of the buck boards having opposing ends secured within one of the channels of the connecting studs. A first board is secured to an outer surface of one of the intermediate flanges near the top end of the panel and spanning the width of the panel, such that the first board is oriented

adjacent to and parallel with the cross-buck bracing assembly. A second board is secured to an outer surface of one of the intermediate flanges near the bottom end of the panel and spanning the width of the panel, such that the second board is oriented adjacent to and parallel with the cross-buck bracing assembly. Other aspects of this second embodiment of the shear wall assembly may include at least one of the connecting studs having two of the intermediate flanges, each of the two intermediate flanges oriented opposite one another on opposing surfaces of the web portion such that, in combination with the exterior flange, the intermediate flanges and exterior flange form a pair of adjacent longitudinal channels, each of the channels configured to engage therein the outer edge of the cross buck bracing boards.

[0008] The present invention is also directed to wall panels for use in panelized building construction. In certain aspects, the inventive wall panel includes a pair of panel connecting studs, each of the studs located on one end of the wall panel and each having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post. The wall panel further includes a series of second studs located between the pair of panel connecting studs and an elongated top plate secured to the top ends of the panel connecting studs and the second studs, the top plate having pair of a side walls integral with the top surface of the top plate to form a C-channel within which the studs are engaged. The wall panel also includes at least one exterior wall sheet secured to one of the top plate side walls and at least one interior wall sheet secured to a second of the top plate side walls, thereby creating a hollow interior therebetween within the wall panel. The hollow interior of the wall panel may also contain one or more thermal insulation materials. The wall panel includes one or more window or door opening sections secured between adjacent second studs and one or more shear wall assembly sections secured between adjacent second studs of the wall panel. The wall panel may also include an elongated bottom plate secured to the bottom ends of the panel connecting studs and the second studs, the bottom plate having pair of a side walls integral with the bottom surface of the bottom plate to form a C-channel within which the studs are engaged, and wherein the exterior and interior wall sheets are further secured to one of the side walls of the bottom plate. Preferably, the connecting studs and second studs are formed of a composite material.

[0009] The window or door opening sections of the inventive wall panel may further include a pair of vertical studs formed of a composite material and spaced apart to form the left and right sides of each of the openings, each of the window or door opening studs having a top end, a bottom end, and a side section adjacent the window or door opening. The window and door opening further include a pair of elongated boards formed of material selected from the group of wood and thermoplastic composites, each of the pair of boards secured to the side section of each of the pair of vertical studs of the window or door opening to provide a means of attaching a door jamb, door, window jamb, or window within the opening. These elongated boards may also be secured to the top of the door opening and to the top and bottom of the window opening, preferably by securing the board to the top and bottom jambs of the window opening, or just the top jamb of a door opening. The top end of the window or door opening includes a header assembly secured to the top ends of the pair of vertical studs of the door or window opening, thereby spanning the width of the opening. One or more vertical studs are secured at one end to the header assembly and at another end to the elongated connecting member of the wall panel.

[0010] The window opening of the wall panel may further include a pair of vertical security shutter studs configured to secure thereto a rolling security shutter assembly, the security shutter studs spaced apart to form the left and right sides of each of the openings, each of the security shutter studs having a top end, a bottom end, and a side section adjacent the opening, wherein the side sections of the security shutter studs face one another. The side section of each of the pair of security shutter studs has a longitudinal channel extending from the top end to the bottom end of the security shutter stud, the channel configured to receive a roller mechanism of the rolling security shutter assembly for movement of a the shutter assembly therein. The security shutter assembly of the security shutter comprises a shutter and a roller mechanism comprising a series of rollers on each outer edge of the shutter, the rollers engaged within one of the channels of the security shutter studs for movement of the shutter assembly therein. Preferably, the security shutter studs are formed of a composite material.

[0011] The present invention is also directed to structural studs of various configurations for use in fabricating the shear wall panels and non-shear wall panels. In one aspect, the stud, which is preferably formed of a composite material, is configured to engage a rolling security shutter assembly therein. Specifically, the stud comprises an exterior flange extending perpendicularly from an elongated web portion of the stud. The stud further includes a first intermediate flange extending perpendicularly from one side of the web portion and positioned subjacent with and parallel to a portion of the exterior flange to form, in combination with the exterior flange, a first channel extending the length of the stud, the first channel configured to receive a roller mechanism of a rolling security shutter assembly for movement of a the shutter assembly therein. The stud may further include a second intermediate flange extending perpendicularly from a second side of the web portion and oriented opposite the first intermediate flange such that, in combination with the exterior flange, the second intermediate flanges and a portion of the exterior flange form a second channel adjacent the first channel, the second channel extending the length of the stud and configured to engage therein an outer side edge of at least one wall sheet.

[0012] The present invention is also directed to a wall panel system comprising (a) a plurality of wall panels, each of the wall panels comprising (i) a pair of panel connecting studs formed of a composite material, each of the studs located on one end of the wall panel and having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post, the panel connecting studs further having an exterior flange and an interior flange extending perpendicularly from a central elongated web portion; (ii) a series of second studs located between the pair of panel connecting stud, wherein some of the adjacent studs are spaced apart to form a gap therebetween; (iii) one or more braces secured between one or more pairs of adjacent second studs to span the gap between the adjacent second studs; (iv) an elongated top plate secured to the top ends of the panel connecting studs and the second studs, the top plate having pair of a side walls

integral with the top surface of the top plate to form a C-channel within which the studs are engaged and (v) at least one exterior wall sheet secured to one of the top plate side walls and at least one interior wall sheet secured to a second of the top plate side walls, thereby creating a hollow interior therebetween within the wall panel. The hollow interior formed between the exterior and interior wall sheets may contain a insulation material, such as those used to file the corner posts as mentioned above. The wall panels are secured to one another at opposing ends via the interlocking and mechanically (or adhesively) fastened components of adjacent wall panels, wherein the interlocking component of the connecting stud of one panel comprises a substantially C-shaped channel formed in part by the exterior and interior flanges and the web portion of the connecting stud, the channel configured for engagement therein of a complementarily configured web portion of the connecting stud of an adjacent panel for interlocking engagement of the wall panels to one another. The wall panels are further secured to one another via a plurality of mechanical fasteners penetrating the flanges of adjacent connecting studs of adjacent wall panels, wherein the flanges of adjacent panels overlap one another. The wall panel may further include a corner post, the corner post having an outer body and an interlocking component extending from the outer body for engagement with a complementarily configured interlocking component of one of the wall panels. The corner post may further have an exterior corner and a diagonally opposing interior corner, the interior corner having a pair of flanges extending therefrom at substantially right angles to one another, with each of the pair of flanges configured for receiving and having fastened thereon an outer edge of the interior wall sheet. Alternatively, the corner post may include an indentation sufficiently large for receiving and having fastened thereto the outer edges of an interior wall sheet.

[0013] A second embodiment of the inventive wall panel system also comprises a plurality of wall panels, with each of the wall panels including (i) a pair of panel connecting studs formed of a composite material, each of the studs located on one end of the wall panel and having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post, the panel connecting studs further having an exterior flange and an interior flange extending perpendicularly from a central elongated web portion; (ii) a series of second studs located between the pair of panel connecting studs; (iii) an elongated top plate secured to the top ends of the panel connecting studs, the second studs, the top plate having pair of a side walls integral with the top surface of the top plate to form a C-channel within which the studs are engaged; and (iv) at least one exterior wall sheet secured to one of the top plate side walls and at least one interior wall sheet secured to a second of the top plate side walls, thereby creating a hollow interior therebetween within the wall panel which may be filled with an insulation material. The wall panels are secured to one another at opposing ends via the interlocking components of adjacent wall panels, wherein the interlocking component of the connecting stud of one panel comprises exterior and interior flanges of the connecting stud, in combination with a flange subjacent to the exterior flange and extending from a side of the web portion, the exterior flange and subjacent flange forming a groove for engagement of an interior flange of a complementary configured interlocking component of an adjacent wall panel. The wall panels are further secured to one another via a plurality of mechanical fasteners penetrating the flanges of adjacent connecting studs of adjacent wall panels to another, wherein the flanges of adjacent panels overlap one another. The wall panel system of this embodiment may further include a corner post, the corner post having an outer body and an interlocking component extending from the outer body for engagement with a complementarily configured interlocking component of one of the wall panels. Moreover, the corner post includes an exterior corner and a diagonally opposing interior corner, wherein the interior corner may have a pair of flanges extending therefrom at substantially right angles to one another, each of the pair of flanges configured for receiving and having fastened thereon an outer edge of the interior wall sheet. Alternatively, the corner post may include an indentation sufficiently large for receiving and having fastened thereto the outer edges of an interior wall sheet.

[0014] The present invention is also directed to a novel sill plate for securing structural studs of a framing assembly to a floor pad. In a preferred embodiment, the sill plate comprises interior and exterior side walls defining a longitudinal recess for engaging therein a structural stud or a stud mount, the side walls extending upward from a floor portion of the sill plate, the floor portion having an inner surface onto which the structural stud or stud mount rests and an opposite outer surface for abutment against the floor pad. The sill plate further includes (a) a shield projecting from an outer surface of the exterior side wall, the shield having a portion angled downward; and (b) an inverted T-shaped anchor mount integral with and extending downward from the outer surface of the floor portion of the sill plate for engagement within the floor pad. The inventive sill plate is preferably formed of a composite material, the composite material more preferably being a thermoplastic composite material.

BRIEF DESCRIPTION OF THE FIGURES

[0015] FIG. **1** is a partial top view of a corner post shear wall assembly of the present invention

[0016] FIG. **2**A is a top view of a corner post of the present invention, further including the stud mount for securing the corner post to an underlying floor pad.

[0017] FIG. **2**B is a top view of a second embodiment of the inventive corner post (and stud mount).

[0018] FIG. **3** is a perspective view of the corner post stud mount shown in FIG. **2**.

[0019] FIG. **4** is a perspective view of a second embodiment of the corner post shear wall assembly of the present invention, wherein the shear wall component is a cross-buck bracing assembly.

[0020] FIG. **5** is a partial top view of the corner post shear wall assembly of FIG. **4**.

[0021] FIG. **6** is a side view of the corner post shear wall assembly shown in FIG. **5**.

[0022] FIGS. **7**A and **7**B are perspective views of the corner post shear wall assembly shown in FIG. **1**, but without the stiffener boards.

[0023] FIGS. **8**A-**8**B are perspective views of exemplary vertical studs that may be used in the fabrication of the inventive panels.

[0024] FIG. **9** is a perspective view of one embodiment of a connecting vertical stud for use in the fabrication of shear walls for the inventive panels.

[0025] FIG. **10** is a perspective view of a second embodiment of a connecting vertical stud for use in the fabrication of shear walls in the inventive panels.

[0026] FIG. **11** is a perspective view of a third embodiment of a connecting vertical stud designed to engage a security shutter assembly therein for integration into the inventive panels.

[0027] FIG. **12**A is a top, cross section view of an in-line shear wall panel of the present invention.

[0028] FIG. **12**B is a perspective view of the in-line shear wall panel shown in FIG. **12**B.

[0029] FIG. **13** is a front view of a panel having a window opening.

[0030] FIG. **14** is a front view of a panel having a door opening.

[0031] FIG. **15** is a perspective view of a connecting plate for use in a panel having a window or door opening and for use as a brace for spanning the gap between adjacent studs of the wall panel system.

[0032] FIGS. **16**A and **16**B are exemplary headers for use in window or door openings, or similar openings, within the inventive wall panels.

[0033] FIG. **17** is a broken side view of the stud shown in FIGS. **8-11** showing utility holes for communication of electrical wiring or plumbing.

[0034] FIGS. **18-21** are exemplary elongated wall panels comprising the window and door openings panels shown in FIGS. **13-14** as well as corner shear wall panel assemblies shown in FIGS. **1** and **4** and in-line shear wall assemblies shown if FIG. **12**.

[0035] FIG. **22** is a top partial view of the connecting ends of two wall panels in position for connection to one another via one embodiment of an interlocking connecting member male/female joining system showing mechanical fasteners.

[0036] FIG. **23** is a top partial view of the connecting ends of two wall panels in position for connection to one another via a second embodiment of an interlocking connecting member, single profile inverted joining system showing mechanical fasteners.

[0037] FIG. **24** is a front partial view of the connected panels illustrated in FIG. **22** or **23**.

[0038] FIG. **25** is a top exploded view of an interlocking panel connecting system for connecting a panel to a third corner post design, wherein the corner post incorporates an interlocking component like that illustrated in FIG. **22** with mechanical fasteners not shown.

[0039] FIG. **26** is a top exploded view of an interlocking panel connecting system for connecting a panel to a fourth corner post design similar to that shown in FIG. **25**, but wherein the corner post includes a corner portion configured to engage a separate shear wall component with mechanical fasteners not shown.

[0040] FIG. **27** is a top exploded view of an interlocking panel connecting system for connecting a panel to a fifth corner post design, wherein the corner post incorporates an interlocking component like that shown in FIG. **23** with mechanical fasteners not shown.

[0041] FIG. **28** is a top exploded view of an interlocking panel connecting system for connecting a panel to a sixth corner design post similar to that shown in FIG. **25**, but wherein the corner post includes a corner portion configured to engage a separate shear wall component with mechanical fasteners not shown.

[0042] FIG. **29** is a side view of an inventive sill plate of the present invention.

[0043] FIG. **30** is a top partial view of the panel shown in FIG. **31** and of the stud shown in FIG. **11**, wherein the shutter roller gear assembly is secured within the stud.

[0044] FIG. **31** is a side view of a panel incorporating the connecting stud of shown in FIGS. **11** and **30**, illustrating attachment of the security shutter roller gear assembly therein.

[0045] FIG. **32** is a partial front view of a window opening of the inventive panel incorporating a security shutter.

[0046] FIG. **33** is a top exploded view of an interlocking panel connecting system for connecting a panel to seventh corner post design, wherein the corner post incorporates an interlocking component like that illustrated in FIG. **22** with mechanical fasteners not shown.

[0047] FIG. **34** is a top exploded view of an interlocking panel connecting system for connecting a panel to eighth corner post design, but wherein the corner post includes a corner portion configured to engage a separate shear wall component with mechanical fasteners not shown.

[0048] FIG. **35** is a top exploded view of an interlocking panel connecting system for connecting a panel to a ninth corner post design, wherein the corner post incorporates an interlocking component like that shown in FIG. **23** with mechanical fasteners not shown.

[0049] FIG. **36** is a top exploded view of an interlocking panel connecting system for connecting a panel to a tenth corner post design, but wherein the corner post includes a corner portion configured to engage a separate shear wall component.

[0050] FIG. **37** is a top view of a fourth embodiment of a connecting stud of the present invention designed one side to engage a shear wall assembly and on the other side, designed for interlocking engagement with a complementarily configured connecting stud of an adjacent wall panel or corner post.

[0051] FIG. **38** is a perspective view of the connecting stud illustrated in FIG. **38**.

[0052] FIG. **39** is a front view of a stud brace.

[0053] FIG. **40** is a top view of the stud brace shown in FIG. **39**.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0054] Referring now to FIGS. **1-7**A and **7**B, the present invention, in certain aspects, comprises a novel corner post

designed for engagement of sheer wall assembly in the construction of a variety of buildings. The inventive corner post **10** has a substantially rectangular, longitudinal outer body **15**. Preferably, the corner post has a hollow interior **13** and is formed of a composite material, as discussed in more detail below. The hollow interior of the corner post may be filled with a fill material **2** for purposes of insulation, sound attenuation, increased load strength, and fire proofing, for example; however. Any number of different materials known by those of ordinary skill in the art may be incorporated into the corner post, depending upon the desired function. Exemplary materials include, but are not limited to various aggregate materials, such as sand, small rocks; various insulation materials such as closed cell and open cell foam, rock wool, or fiberglass; mixtures of resin binders such as polyurethane, phenolic, polyester, sodium silicate, and the like, bonded with sand or other aggregate material; various cement mortar mixtures, cement concrete, and bonded flowable fills such as cement or resin bonded waste materials such as fly ash, slag, or other waste material residues.

[0055] FIG. **2**A is a top view of a preferred design of the corner post, which includes a pair of diagonally opposing corners **11**, **12** configured to engage the outer edge of a shear wall assembly, such as one or more shear wall sheets **80** or cross buck bracing **83**, as described below. In particular, each of the corners **11**, **12** comprises of a pair of flanges **111**, **112**, which in combination define a channel **110**, **120** that is configured and sized similarly to the outer edge of one or more sheer wall sheets or a cross buck bracing assembly. The corner post **10** also includes an exterior most corner **130** and a diagonally opposing inner corner **140**. In one embodiment, this inner corner may have an indentation **141** sufficiently large for receiving an outer edge of an interior wall sheet **70**, as best shown in FIG. **1**. Alternatively, as shown in FIG. **2**B, the corner post $\mathbf{10}^1$ may include a pair of flanges **240** extending from the interior most corner at right angles to one another as shown, the flanges **240** oriented to receive, for engagement thereto, the outer edges of an interior wall sheet (not shown). The corner post $\mathbf{10}^1$ also includes diagonally opposing corners $\mathbf{11}^1$, $\mathbf{12}^1$ which may be further configured to include channels $\mathbf{110}^1$, $\mathbf{120}^1$ for receiving the shear wall assembly, as described above. The figures illustrate the corner posts **10**, $\mathbf{10}^1$ having two channels (**110**, **120** and $\mathbf{110}^1$, $\mathbf{120}^1$); however, where only one shear wall in only one direction is desired, the corner post may include only one of the two channels. Moreover, FIGS. **33** and **35** (discussed further below) illustrate similar corner posts having no channels for engaging a shear wall assembly.

[0056] The corner post **10**, $\mathbf{10}^1$ is secured to an underlying floor pad by means of a corner stud mount **20**, as shown in FIGS. **1**-**7**A and **7**B. The stud mount **20** is also shown in phantom in FIGS. **4**, and **6**-**7**A and **7**B. The stud mount **20** preferably comprises a base plate **21** which rests on the top surface of the floor pad or foundation F (see also FIG. **6**). The stud mount further includes two wall portions **22** extending vertically from the base plate and are joined to one another at a right angle, as best shown in FIG. **3**. The wall portions **22** of the corner stud mount are designed for attachment to the inner surface of the corner post **10**, $\mathbf{10}^1$ as more clearly shown in FIG. **1**. The corner post may be secured to the corner stud mount by means of screws, bolts, rivets, and the like. The base plate of the stud mount further includes a hole **23** through which a J-hook **24**, for example, or similar foundation anchoring device, may be engaged to secure the stud mount to the underlying concrete floor pad F. As discussed in the inventor's co-pending U.S. patent application, Ser. No. 11/116,769 (filed Apr. 28, 2005), which is incorporated by reference herein in its entirety, the J-hook **24** is fastened to a segment of re-bar R that is set within the mold used to form the floor pad F prior to the concrete pour. The top portion of the J-hook, which is preferably threaded, extends above the floor pad so it may be inserted through the hole of the base plate and secured thereto by means of a nut. Alternatively, a suitable anchor bolt or continuous load path strap (not shown) may be used to join the corner stud as well as wall panel studs to the underlying floor pad. In areas of seismic earthquake activity shear walls do not flex and expensive assemblies of springs for flexibility, bolts, and threaded rods are used to sufficiently tie and reinforce shear walls to improve the stiffness of the wall while the springs allow for flexibility under cyclic earthquake movement. The flexibility of the inventive corner post formed of a composite material enables the studs to withstand all seismic and earthquake cyclical forces without the need for expensive spring assemblies to absorb and react to the racking movement of the wall panels due to the natural flexibility of the material. The corner post mount may be fabricated from rolled steel, molded fiber, reinforced composite materials, or cast from steel, iron, or aluminum.

[0057] The inventive corner posts **10**, $\mathbf{10}^1$ may be used to form a shear wall corner assembly for use in panelized construction of buildings, as shown in FIGS. **4**-**7**A, and **7**B. The shear wall assembly comprises the corner post **10**, $\mathbf{10}^1$ as discussed above, as well as a pair of elongated connecting studs, as also illustrated in FIGS. **9**-**11** and **37**, wherein each connecting stud is positioned opposite one of the corner post corners **11**, **12**, comprising the shear wall receiving channel **110**, **120**. The present invention is also directed to corner posts that are designed to connect an assembled wall panel via an interlocking mechanism, as shown in FIGS. **25**-**28** and **33**-**36**, and as discussed in greater detail below.

[0058] FIG. **9** is a perspective view of one design of a connecting stud **40** comprising an exterior flange **42** and an interior flange **44**, each flange extending perpendicularly from an elongated web portion **46** of the stud. The stud also includes an intermediate flange **48** extending perpendicularly from one side of the web portion **46** and positioned subjacent with and parallel to a portion of the exterior flange **42** as shown to form, in combination with the exterior flange, a longitudinal channel **49** extending the height of the stud (i.e. from the top end **40***a* to the bottom end **40***b* of the stud). As illustrated in FIGS. **9** and **12**, the channel **49** of the connecting member is sufficiently large to engage the outer edge of a shear wall sheet **80** or cross buck bracing **83** (see FIG. **4**) of the shear wall assembly. As shown in FIG. **1**, the opposite edge of the shear wall sheet **80** is engaged within the corner post channel **110**, **120**. The corner post shear wall assembly may also include a first board, typically a stiffener board **82**, connected at each end, or at various positions along the height of the shear panel assembly, to the corner post **10** and connecting stud **40** behind the shear wall sheet as shown in FIG. **1**. One stiffener board **82** may be positioned near the top end of the corner post and connecting stud and a second stiffener board **82** may be positioned near the bottom of the corner post and connecting stud, as shown in FIG. **4**. One or more additional boards **82***a* (shown in FIG. **4**) may be secured to the corner post and connecting stud, as

well. The stiffener boards **82**, **82***a* provide additional resistance to the shear side-to-side racking forces; however, the incorporation of the stiffener boards into the shear wall panel assembly is optional. The stiffener boards **82**, **82***a* may be mechanically fastened to their adjacent shear wall sheet **80** (or cross buck bracing **83**) by means of a screw **1** or other conventional fastener used by those of ordinary skill in the art, including, but not limited to, screws, bolts, nails, rivets, and the like. Alternatively, or supplementally, the stiffener boards may be adhesively bonded to the corner post and connecting studs (as well as the shear wall sheets or cross buck bracing at the various points of contact covering the contact area. The stiffener boards made be fabricated of a variety of materials, including, but not limited to, wood lumber, plywood strips, oriented strand board strips, cementitious boards strips, metal clad board strips, and the like.

[**0059**] An elongated top plate **72***a* (preferably a C-channel top plate), is secured to the top end of the corner post and connecting member via fasteners (not shown). The top-plate **72***a* includes a pair of side walls **77***a*, **77***b*, with one end of the interior side wall **74** engaged partially within the indentation of the corner post, as shown more clearly in FIG. **4**. Exterior wall sheets **71** are secured to the exterior side wall **77***a* of the top plate and corner post and connecting member, while an interior wall sheet **70** may be secured to the interior side wall **77***b* and corner post and connecting member (not shown in FIGS. **7**A-**7**B for ease of illustration). Trusses or truss mounts (not shown) may be secured to the top surface **75** of the top plate. In addition, a bottom plate **72***b* (i.e. the top plate **72***a* simply inverted) may secured to the bottom ends of the vertical studs (as shown in FIG. **12**B, for example, for a shear wall section) which in turn are further secured to the underlying floor pad by conventional means, such as mechanical and adhesive cement anchors widely used in the industry. As shown in FIGS. **4** and **7**A-**7**B, the bottom ends of the corner post assembly are more preferably secured to a sill plate **100**, as opposed to a bottom plate **72***b*, as discussed in greater detail below. Sill plates, such as those described in co-pending U.S. application Ser. No. 11/116,769, may also be employed, either incorporated with the wall panel prior to installation upon the foundation, or pre-set within the foundation prior to installing the wall panel to the sill plate. In addition, stud mounts (not shown) may be fastened to the interior channel of the sill plate **100** and further fastened to the floor pad by mechanical fasteners, as disclosed in the inventor's co-pending application Ser. No. 11/116,769.

[**0060**] Positioning of the shear wall sheets **80** or cross buck bracing **83** more toward the exterior of the building frame is advantageous in that it allows more room for the attachment of electric boxes (not shown), for example, within the wall panel (i.e. between the stiffener board **82**, **82***a* and interior wall sheet **70** or between the shear wall sheet or cross buck bracing and the interior wall sheet **70**). In addition, the hollow space **5** created between the stiffener board **82**, **82***a* and interior wall sheet **70** (or between the shear wall sheet(s) **80** (or cross buck bracing **83**) and interior wall sheet **70** when no stiffener boards are employed) may be left hollow or filled with a variety of insulating materials such as fiberglass, rock wool, foam insulation, and the like.

[**0061**] FIG. **10** illustrates another connecting stud design **50** similar to the stud **40** illustrated in FIG. **9**, for example, and discussed above. This second stud **50** embodiment, however, differs in that it includes a two intermediate flange **58***a*, **58***b* oriented opposite one another on opposing surfaces of the web portion such that, in combination with the exterior flange **52**, the intermediate flanges **58***a*, **58***b* form a pair of adjacent longitudinal channels **59***a*, **59***b* therebetween, each of the channels extending from the top end **50***a* to the bottom end **50***b* of the stud and configured to engage therein the outer edges of a shear wall assembly such as shear all sheets or cross buck bracing, as discussed above. This second stud **50** design is preferred when creating two in-line shear walls (discussed further below) at some location between the two corners of the building, compared to connecting stud **40**, which might be used, for example, as a center panel dividing two-car garage doors in a four-car garage, or to reinforce a large glass slider door opening in a seismic zone prone to earthquakes (as discussed below).

[**0062**] The in-line shear wall assembly may comprise the use of a third connecting stud design **60** (FIG. **11**) or a fourth connecting stud design **200**[1] (FIGS. **37**-**38**), which will be discussed in greater detail below. It will be recognized by those of ordinary skill in art that the connecting studs illustrated herein are exemplary designs, and that other connecting studs of different configurations may be employed, as well, in the fabrication of the inventive corner post shear wall assembly.

[**0063**] All of the connecting studs illustrated in FIGS. **8**-**11** and **37** may include a series of utility holes **40***a*, as shown in FIG. **17**, for communication of electrical wiring or plumbing (not shown). For ease of illustration, FIG. **17** shows the vertical connecting stud **40** of FIG. **9**.

[**0064**] As discussed above, FIGS. **1** and **7**A illustrate the inventive shear wall corner assembly wherein the shear wall section comprises one solid flat rectangular wall sheet of material **80**. Alternatively, two or more rectangular wall sheets **80***a* may be employed and aligned as illustrated in FIG. **7**B. Suitable materials for fabricating the shear wall sheet of the assembly are those typically employed in the fabrication of sheer wall sheets and include, but are not limited to, concrete board, plywood, Oriented Strand Board (OSB), Hardi Board, plywood, cementitious boards, backer boards, Masonite boards, fiberglass boards, metal clad boards and boards fabricated from adhered layers of metal, insulation, wood, or similar sheeted materials. Preferably, the sheets are from 2-24 feet in height, from 0.5-4 feet wide, and have a thickness as required for the particular material used to provide the appropriate performance for the building design loads.

[**0065**] FIGS. **4**-**6** illustrate another design of the shear wall component of the shear wall assembly whereby instead of a solid sheet of material, the shear wall component is a cross buck bracing, which comprises one or more pairs of criss-crossing rigid buck boards **83**, preferably 2 inch×6 inch buck boards. In this embodiment, each buck board within a pair **83***a*, **83***b* is oriented in an overlapping, criss-cross pattern between the connecting studs and the corner post. Each of the buck boards **83***a*, **83***b* has opposing ends secured within one of the channels of a connecting stud and one of the channels of the corner post. Like the first shear wall assembly design, a stiffener board **82** may be secured near the top of the assembly and another board **82** secured near the bottom of the assembly. FIG. **5** is a top view of the corner post shear wall assembly shown in FIG. **4**, and illustrates

more clearly how the shear wall buck boards **83***a* of a pair are bowed slightly in order to cross over each other within the panel assembly. Cross buck bracing is used to impart rigidity in the shear walls, while allowing slight flexibility under severe seismic loading. FIG. **5** also shows the attachment of exterior wall sheets **71** to the corner shear wall assembly. As for the first shear wall corner assembly discussed above and illustrated in FIG. **1**, other connecting studs may be employed, such as those illustrated in FIGS. **9-11** and **37**.

[**0066**] The shear wall panel assemblies discussed above with respect to the shear wall corner assembly may also be placed in other locations of building structure, and are referred herein as in-line shear wall panel assemblies. FIG. **12**A is a top view of an in-line shear wall panel assembly that is similar to that shown in FIG. **1** with respect to the corner post assembly; however, in this embodiment, the shear wall sheet **80** is engaged at each end to one of the connecting stud designs **40** shown in FIGS. **9-11** (FIG. **12**A specifically shows the use of the stud **40** illustrated in FIG. **9**). FIG. **12**B is a perspective view of the in-line shear wall panel assembly shown in FIG. **12**A, and further illustrates the addition of the C-channel top plate **72***a* secured to the top end of the panel and a C-channel bottom plate **72***b* secured to the bottom end of the panel. (Alternatively, as for the corner post shear wall assembly, two or more shear wall sheets **80***a* may be employed, as shown in FIG. **4**). Stiffener boards (not shown in FIGS. **12**A-**12**B) may also be secured just behind the shear wall sheet **80**, as shown in FIG. **1**, for example. Alternatively, instead of a solid flat sheet **80** of material, the shear wall section may instead comprise two ore more shear wall sheets or cross-buck bracing (not shown), as discussed above for the corner post shear wall assembly. As for the corner shear wall assembly, the space created between shear wall component and the interior wall sheet **70** may be left hollow or filled with a variety of insulating materials such as fiberglass, rock wool, foam insulation, and the like.

[**0067**] The present invention, in certain aspects, is also directed to panelized construction utilizing window and doorway panel segments formed of structural components and materials that are capable of attaching window and door jambs with nail fasteners, as shown in part in FIGS. **13** and **14**. While generally almost all of the fasteners used in the shear wall and non-shear wall panels are screws applied in a factory or in a panel layout assembled on-site, traditional nail fasteners may be desired in securing window jambs and door jambs within the wall on-site, instead of being part of the assembly during production in the factory. In such cases, a nailable filler, preferably in the form of an elongated board, is secured within the window or door opening with mechanical or adhesive fasteners, as discussed further below. The board is preferably formed of a thermoplastic material, but wood lumber or other nailable material may also be used.

[**0068**] Specifically, the inventive wall panel may comprise one or more openings configured for securing a window or a door via a window jamb or a doorjamb. To form the window or door opening, the wall panel includes a pair of vertical studs **31** spaced apart to form the left and right sides of each of the openings, referenced generally at **403** in FIG. **13** and at **402** in FIG. **14**, each of the studs having a top end **31***a,* a bottom end **31***b,* and a side section **31***c* adjacent the opening These vertical studs **31** are preferably formed of a composite material, and may be of any configuration; however, the single-I stud design **31** illustrated in FIG. **8**B is a preferred design due to its lower cost compared to the double-I studs **30**. The single-I stud **31** (the shorter versions referenced generally as "**32**" and "**33**") is also a preferred design when supporting the elongated plate **73** and sill plate **100** in regular supporting intervals, as shown in FIGS. **4**, **6**, **7**A, **7**B, **12**B, **13-14**, and **18-19**, and may be secured to an adjacent vertical double-I stud **30**, as shown in FIGS. **13-14**. Short studs **33** are used to support connecting member **73** to the sill plate in regularly supporting intervals (FIGS. **13** and **18-20**), while short studs **32**, also of a single-I design, are used to support headers **99** (or **98**) to the connecting member (FIG. **14**) or the header **99** to the top connecting plate (FIG. **13**). Preferably, a second pair of double-I vertical studs **30**, are secured to the sides of the headers **99** (or **98**) as also shown in FIGS. **16**A-**16**B.

[**0069**] The panel further includes a pair of elongated boards formed of a thermoplastic material or wood **600**, each of the pair of boards secured to one of the second vertical studs **30** with screws or adhesives to provide a means of attaching a door or window jamb within the opening using nails. The board $\mathbf{600}^1$ may also be secured horizontally near the top of the door opening (FIG. **14**) by attaching the board $\mathbf{600}^1$ to the top jamb formed by connecting member **73** and positioned on top of the corresponding boards **600** aligned along the sides of the door opening as shown. Similarly, the board $\mathbf{600}^1$ may be horizontally secured to the top and bottom jambs of the window opening formed by connecting member **73** (FIG. **13**) by securing the board $\mathbf{600}^1$ to the top and bottom jambs **73** and positioning it over, or in between, the corresponding boards **600** aligned along the sides of the window opening as shown. The second vertical studs may be of any desired configuration, such as the double-I stud **30**, illustrated in FIG. **8**A. Alternatively, the second vertical studs **30** may be omitted, and the thermoplastic or wood board **600** may be attached directly to the outer vertical stud **31** (not shown) when top loads do not require the use of a header, or when the loads are such that a single stud, on each side of the window or door opening, can carry the load. Preferred dimensions of the thermoplastic or wood board **600** are 2×4 standard lumber (i.e. actual 1.5 inches×3.5 inches) and 2×6 standard lumber (i.e. actual 1.5 inches×5.5 inches).

[**0070**] As mentioned above, and as shown in FIGS. **13-15**, an elongated C-channel plate **73** is secured to the top ends and bottom ends of the vertical studs **30**, thereby spanning the width of the opening, each elongated plate **73** having a top surface **76** integral with a pair of side walls **74**, the combination of which defines an inner channel, the top end of each of the vertical studs engaged within the inner channel. A preferred elongated connecting member **73** for use in the window and doorway panel segments is illustrated in FIG. **15** as well as in FIGS. **13** and **14**. Here, the member includes opposing ends, each secured to one of the vertical studs and having flange members **74***a* extending from each end of the side wall and a pair of flange members **75** oriented below the flange members and extending about 90-degrees relative to the horizontal plane of the inner channel. The flange members **74***a,* **75** are configured to attach to the exterior sides of the vertical studs. The orientation of the flanges along the side of the stud provides a location P for a screw fastening. This same elongated plate **73** design may be used as side bracing to support adjacent studs **31** within the wall panel, as discussed further below.

[0071] Generally, a header **98**, **99**, as shown in FIGS. **13-14** and more clearly shown in FIGS. **16**A-**16**B, is secured above the window **403** or door opening **402**. Other header designs, such as shown in the inventor's co-pending U.S. patent application, Ser. No. 11/116,769 may be employed. As shown in FIG. **13**, a series of smaller vertical studs **32** may be secured to the top surface of the elongated connecting member **73** between the connecting member **73** and the header **99**. The studs **32** may be configured similarly to those shown in FIGS. **8**A-**8**B, for example. The header **98** shown in FIG. **16**A is most often used just under the top plate **72***a* and may be fabricated when adding a door or window during remodeling by using standard wall parts. The header **99** illustrated in FIG. **16**B is most often used when initially building the structure or in factory panel production.

[0072] FIGS. **18-21** and **32** illustrate a completed wall panel **400**, **420**, **430**, the panel having one or more door openings **402**, **422**, one or more window openings **403**, **423**, **433**, as well as one or more shear wall assemblies described and illustrated in more detail below. It will be appreciated by those of ordinary skill in the art that the panels illustrated in FIGS. **18-22** are exemplary designs, and that panels having a different quantity, size and/or configured window and door openings, located at any number of different places within the wall panel, may be employed. The wall panel may also include one or more in-line shear wall panel assemblies **401**, **421**, **431** at any desired location within the wall panel, or may exclude the in-line shear wall panel assemblies all together. Moreover, certain aspects of the present invention comprise wall panels of the same or different design shown in FIGS. **18-22**, ranging in length, preferably from 0.5 feet to 4 feet in width, wherein the adjacent panels (e.g. panel **400** and panel **420**) may be secured to one another by an interlocking mechanism, namely connecting studs **200**, **300** (FIGS. **18-19**). In addition, a panel may comprise, in sequence, an entire series of shear wall panel components secured to one another connecting studs $\mathbf{200}^{1}$ shown in FIGS. **37-38**, as discussed in more detail below.

[0073] Specifically, as shown in FIGS. **22** and **23**, this interlocking mechanism is provided by complementarily configured connecting studs **200**, **300**, **370** secured to the outer ends of the wall panel. The connecting studs are preferably secured to each end of the two adjacent wall panels by means of mechanical fasteners **1***a* (e.g. screws, nails, and the like) at preferably 9-inch intervals along the vertical height of the wall panel, as better shown in FIG. **24**. Additional fasteners **1***b* are used to further secure the overlapping portions of adjacent connecting studs to one another, thereby forming a substantially stronger interconnection, as discussed further below. The connecting studs **200**, **300**, **370** each have an interlocking component for engagement with a complementary interlocking component of the connecting stud **200**, **300**, **370** of a second wall panel or a corner post. FIGS. **22-23** illustrate two preferred designs of the interlocking component, which will be discussed in more detail below.

[0074] Each wall panel further includes a second series of intermediate studs **31**, preferably having the single-I configuration as shown in FIG. **8**B, located between the pair of panel connecting studs **200**, **300**, **370** of the panel. The number and specific locations of these studs will be dependent in part upon the size of the panel and the loads required to be supported, but primarily at standard intervals of 16 inches, 24 inches, 36 inches, or 48 inches. Exemplary studs include, but are not limited to, those studs illustrated in FIGS. **8**A-**8**B as well as the shear wall studs shown in FIGS. **9-11** and the studs illustrated in the inventor's co-pending application Ser. No. 11/116,769. The studs **31** are spaced apart are various intervals, as shown in FIGS. **18-20**, for example, to form a gap therebetween. As shown in FIGS. **18-20**, a series of braces **6** are secured to the sides of adjacent studs **31**, thereby spanning the gap between the adjacent studs. These braces are important to use when studs **31** of the single-I configuration are employed in the wall panel system, for they serve to transfer racking forces throughout the wall panel and prevent side loads from causing the studs **31** to buckle. The brace of may be of a number of configurations; however, a preferred design is that illustrated in FIGS. **39-40**. Here, the brace **6** is a thin section of composite material having inherent flexibility that stiffens the wall panel, but allows flex under cyclic earthquake movements, for example. This strip of material **6** fits inside the flanges of adjacent studs **31**, typically the single-I design, as best shown in FIGS. **39-40**. In addition, preferred dimensions for the brace are 1 inch (thickness)×3⅛ or 5⅛ inches (width), with the length being what is necessary to reach each of the adjacent studs. Employment of a series of braces **6**, as shown in FIGS. **18-20**, also function as a commonly used fire stop to prevent the chimney effect from drawing air up the open space between studs. The system of braces may also be fabricated from wood and other materials known by those of ordinary skill in the art to be suitable for fire stops between studs. The connecting plate **73**, as shown in FIGS. **14-15**, may also be used as a brace between adjacent studs. Moreover, while brace **6** is referenced in FIGS. **18-20**, it will be appreciated by the skilled artisan that the connecting plate **73** of FIG. **15** may also be employed, as well any other brace designs, as the supporting brace between adjacent studs.

[0075] The wall panel further includes at least one exterior wall sheet **71** and one interior wall sheet **70** secured to the side walls of the top plate **72***a* and in some embodiments the bottom plate **72***b* (or sill plate) of the panel as well as to the outside surfaces of the various vertical studs via mechanical fasteners (e.g. screws and the like). The space created between the interior wall sheet **70** and exterior wall sheet **71** may be left hollow or it may be filled with a variety of insulating materials such as fiberglass, rock wool, foam insulation, and the like, where desired. For ease of illustration, the exterior and interior wall sheets are omitted from FIGS. **18-20**, but are shown in FIGS. **22-24**. In the preferred embodiment, the connecting studs and intermediate studs are formed of a composite material, as defined further herein. Moreover, it will be recognized by the skilled artisan that the front section of a panelized building, for example, may comprise a long single wall panel (see FIGS. **18-19**, for example), the panel having connecting studs **200**, **300** at each end for interlocking connection to a corresponding corner post (FIGS. **25-28**) or wall panel with corner posts having one of the configurations illustrated in FIGS. **25-27** or FIGS. **33-36** (discussed below). Alternatively, the front portion of the building may comprise of two or more smaller panel sections (not shown) connected to one another by corresponding, adjacent connecting studs **200**, **300**,$\mathbf{200}^{1}$ the outer most panel sections having a connecting stud as described configured for interlocking engagement with a corresponding corner post shown in FIGS. **25-28** and **33-36**.

[0076] As discussed above, the interlocking components of the pair of connecting studs may be of any number of configurations. FIGS. **22** and **23** illustrate two preferred designs. FIG. **22** illustrates a male/female interlocking design system wherein the connecting stud **300** of one panel comprise a substantially C-shaped channel **350** formed in part by the exterior **352** and interior **353** flanges of the web portion **351** of the connecting stud. The channel is configured for engagement therein of a complementarily configured web portion **371** of the connecting stud of an adjacent panel. Once engaged, mechanical fasteners **1***b* are used to further secure the overlapping **352** flange of the connecting stud to the male component **370** of the adjacent panel, as shown. Alternatively, adhesives and mechanical fasteners may be used in combination. Exemplary adhesives include, but are not limited to, polyurethane base adhesives and other flexible high strength adhesives commonly used in the construction industry, such as LIQUID NAILS (vended by Macco Adhesive, Strongsville, Ohio), GORILLA GLUE (vended by Gorilla Glue Company, Cincinnati, Ohio), various commercially available panel adhesives, and the like. And while adhesives may be used alone (i.e. in lieu of mechanical fasteners), this is not preferred.

[0077] FIGS. **25-26** and FIGS. **35-36** illustrate the incorporation of this male/female interlocking design concept in conjunction with either corner post **375**, **376** (FIGS. **25-26**) or corner post **478**, **480** (FIGS. **35-36**). Here, the male interlocking component is essentially a C-shaped protrusion **374** extending from the surface of the corner post **375**, **376** immediately adjacent to the connecting stud of the wall panel. [For ease of illustration, the additional components of the panel are omitted, leaving only the connecting stud in alignment with this second embodiment of the inventive corner post.] Mechanical fasteners **1***b* or adhesives (not shown in FIGS. **25-26** and **35-36**) are used to similarly secure exterior flange **352** to the complementary interlocking component of the corner post **375**, **376**. The corner post **376** illustrated in FIG. **26** and the corner post **480** illustrated in FIG. **36** are modified versions of the corner post **375** (FIG. **25**) and corner post **478** (FIG. **35**), wherein one of the exterior corners **377**,**477** is configured to engage a shear wall component, such as shear wall sheet or cross buck bracing (not shown) as illustrated and described above for the corner post **10**, **10**^{1} shown in FIGS. **1-2**. The corner post **376**, **375** may also feature a flange **205** to which an interior wall sheet may be secured, as described above for corner post **10**^{1} shown in FIG. **2**B, or an indentation **140** (FIG. **36**) for within which the interior wall sheet may be secured.

[0078] FIG. **23** illustrates a second design of the interlocking component of the panel connecting member. Here, both connecting studs **200** have the same configuration, with one of the studs simply inverted prior to being fastened to the end of the panel. The interlocking component of each connecting stud includes at one end a first flange **202** extending perpendicularly from the web portion **201** of the stud. At the opposite end of the connecting stud is a second flange **203** extending perpendicular to the web portion of the stud, opposite the first flange. A groove **210** is provided between the first flange **202** and a shorter, intermediate flange **204** extending from the web portion and positioned subjacent the first flange **202**. The groove **210** is configured for engagement therein of the second flange portion **203** of the connecting stud of the adjacent panel, as shown. Once engaged, mechanical fasteners **1***b* are used to further secure the overlapping first flange **202** of the connecting stud to the second flange **203** of the connecting stud of the adjacent panel, as shown. As discussed above, adhesives may also be used on mating surfaces prior to assembly and mechanical fastening.

[0079] FIGS. **27-28** and **33-34** illustrate the incorporation of this inverted interlocking design concept in conjunction with a corner post **378**, **380** (FIGS. **27-28**) or corner post **475**, **476** (FIGS. **33-34**) wherein the second flange **303** of the interlocking component extends from the surface of the corner post immediately adjacent to the connecting stud of the wall panel. Opposite flange **303** of the corner post **378** are the first flange **302** and intermediate flange **304**, which in combination form the groove **310** so described above and function to accommodate the second flange **203** of the interlocking component of the adjacent connecting stud of the wall panel. As for FIGS. **25-26** and **35-36**, the additional components of the panel are omitted for ease of illustration, leaving only the connecting stud in alignment with this embodiment of the inventive corner post. Corner post **380** corner post **476** are modified versions of the corner post **378** (FIG. **27**) and corner post **475** (FIG. **33**), wherein one of the exterior corners **379**,**479** is configured to engage a shear wall component, such as shear wall sheet or cross buck bracing (not shown) as illustrated and described above for the corner post **10**, **10**^{1} shown in FIGS. **1-2**. The corner post **378**, **380** (FIGS. **27-28**) may also feature a flange **305** to which an interior wall sheet may be secured, as described above for the corner post **10**^{1} shown in FIG. **2**B. Mechanical fasteners **1***b* (not shown in FIGS. **27-28** and **33-34**) are used to similarly secure flange **202** and flange **203** to the complementary interlocking component **302**, **303**, respectively, of the corner post. As discussed above, adhesives may also be used in joining the connecting members.

[0080] FIGS. **37-38** illustrate a fourth embodiment of a connecting stud **200**^{1} having exterior **203**^{1} and interior **202**^{1} flanges extending perpendicularly from opposing ends of an elongated central web portion **201**^{1} and positioned parallel to one another, as shown. The stud **200**^{1} also includes on one side of the stud, and extending from the web portion **201**^{1}, a longitudinal channel **49**^{1} sufficiently large for engaging the outer edge of a shear wall assembly, as described above for other embodiments of the inventive stud shown in FIGS. **9-11**. As for the other inventive stud designs described and illustrated herein, the channel **49**^{1} extends from the top end **200***a*^{1} and the bottom end **200***b*^{1} of the stud. On the other side of the web portion, the stud **200**^{1} incorporates the inverted interlocking component of stud **200**, shown in FIG. **23**, for example. As described for similarly designed studs, the interlocking component of stud **200**^{1} comprises the exterior **203**^{1} and interior **202**^{1} flanges of the stud, in combination with an intermediate flange **204**^{1} subjacent the exterior flange. The intermediate flange **204**^{1}, in combination with the exterior flange **203**^{1}, form a groove **210**^{1} for engagement therein of the interior flange **202**, **202**^{1} of a complementary configured interlocking component of an adjacent wall panel, including a shear wall panel.

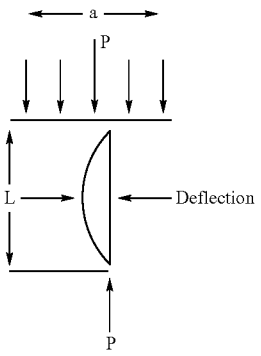
[0081] One advantage of the inventive of interlocking connecting members of the present invention is that when engaged with one another, the adjacent connecting studs **305**, **370** of FIG. **22** or adjacent connecting studs **200** of FIG. **23** both form a double-flange stud that provides superior strength (i.e. when flange **202** is fastened to flange **203** (FIG.

23) and when flange **352** and **353** are fastened to web portion **371** (FIG. **22**)), as may be required for structural and lateral support.

[**0082**] Moreover, another advantage of the interlocking component of the present invention is that interlocked panels using the interlocking studs **200** are significantly stronger than the panels that are non-interlocking. Strength tests were performed on the interlock stud component **200** and the single I stud **31**, with the data shown herein in Tables 1-4. In particular, the interlock stud components **200**, when assembled to one another (i.e. two studs **200** secured to one another via mechanical fastening) was found to be 13.2% stronger than the single-I stud **31** when comparing the critical buckling loads (4,278 lb vs. 3,868 lb) under an area normal load of 44.46 lb/ft^2 (Tables 1 and 2) and critical bucking loads of 8,755 lb vs. 7,735 lb under area normal load of 88.15386 lb/ft^2 (Tables 3 and 4). Moreover the assembled stud interlocking components **200** exhibited 56.2% les deflection compared to the single I stud **31**.

TABLE 1

Compression of Assembled Stud Interlocking Component (200)	
Area Normal Load = 44.45668 lb/ft^2	Longitudinal Modulus = 3 million PSI
Stud spacing (a) = 24 in.	Second Moment of Area = 2,129 in^4
Stud Length (L) = 10 ft.	Cross-sectional area = 1.093 in^2
Horizontal span = 30 ft.	Centroid to Outer Fiber Distance = 1.871 in
Stud vertical load (P) = 1,333.7 lb	Deflection (D) = 0.333 in. Allowable Deflection (L/360) = 0.333 in.
Critical Buckling Load = 4,378 lb	
Maximum Stress - 1,611 PSI	



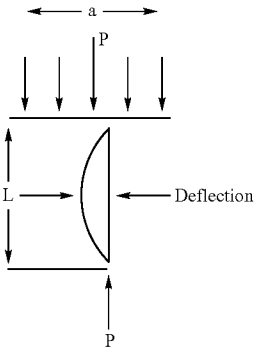
[**0083**]

TABLE 2

Compression of Single -I Stud (30)	
Area Normal Load = 44.46 lb/ft^2	Longitudinal Modulus = 3 million PSI
Stud spacing (a) = 24 in.	Second Moment of Area = 1,881 in^4
Stud Length (L) = 10 ft.	Cross-sectional area = 0.974 in^2
Horizontal span = 30 ft.	Centroid to Outer Fiber Distance. = 1.75 in
Stud vertical load (P) = 1,322.308 lb	Deflection (D) = 0.333 in. Allowable Deflection (L/360) = 0.333 in.

TABLE 2-continued

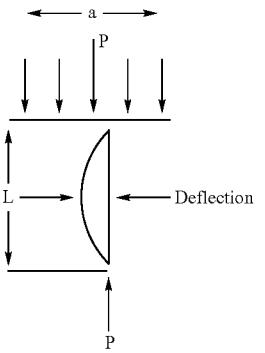
Compression of Single -I Stud (30)
Critical Buckling Load = 3,868 lb
Maximum Stress - 1,757 PSI



[**0084**]

TABLE 3

Compression of Assembled Stud Interlocking Component (200)	
Area Normal Load = 88.91335 lb/ft^2	Longitudinal Modulus = 6 million PSI
Stud spacing (a) = 24 in.	Second Moment of Area = 2,129 in^4
Stud Length (L) = 10 ft.	Cross-sectional area = 1.093 in^2
Horizontal span = 30 ft.	Centroid to Outer Fiber Distance. = 1.871 in
Stud vertical load (P) = 2,667.401 lb	Deflection (D) = 0.333 in. Allowable Deflection (L/360) = 0.333 in.
Critical Buckling Load = 8,755 lb	
Maximum Stress - 3,221 PSI	



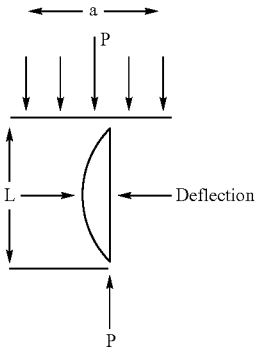
[**0085**]

TABLE 4

Compression of Single -I Stud (30)	
Area Normal Load = 88.15386 lb/ft^2	Longitudinal Modulus = 6 million PSI
Stud spacing (a) = 24 in.	Second Moment of Area = 1,881 in^4

TABLE 4-continued

Compression of Single -I Stud (30)	
Stud Length (L) = 10 ft.	Cross-sectional area = 0.974 in^2
Horizontal span = 30 ft.	Centroid to Outer Fiber Distance = 1.75 in
Stud vertical load (P) = 2,644.616 lb	Deflection (D) = 0.333 in.
	Allowable Deflection (L/360) = 0.333 in.
Critical Buckling Load = 7,735 lb	
Maximum Stress - 3,535 PSI	



[0086] The interlocking mechanism design of the inverted connecting stud member **200** and corner post **378**, **380** differs in part from the male/female interlocking stud member **300** design in that once adjacent panels incorporating the inverted connecting stud **200** are secured to one another, a gap is created between the two interlocked panels (or between the panel and corner post **378**, **380**, **475**, **476**). No such gap is created in a panel-to-panel or panel-to-corner post connection employing the male/female interlocking stud **300**. The creation of this gap between adjacent panels (or corner post and panel) resulting from the employment of the inverted stud **200** and corner post **378**, **380**, **475**, **4776** design is advantageous in that it provides another location within the panels comprising the constructed building for housing various electrical wiring, cables, fiber optic wiring, and the like.

[0087] As discussed above, the interlocking components (either designs) of adjacent connecting stud members should be further secured to one another by mechanical fasteners **1***b* (with or without adhesives) for ultimate strength. As shown in the figures, this mechanical fastening of the interlocking components and all component fastening is always in shear (i.e. 90 degrees to the force) to provide a much stronger connection therebetween. In contrast, it is typical in wood fabrication to drive nails through sill boards and top boards into the ends of the studs. Other wood studs may be toe nailed into the bottom or top studs. These fasteners fail easily in uplift pull out forces as encountered in hurricanes and tornadoes. In the present invention, each screw driven into the construction components in shear has a minimum pullout force of 1,700 pounds each in shear, compared to a **10***d* nail with a pullout force of 58 pounds in pullout (in recent tests by the inventor).

[0088] As shown in FIGS. **22-23**, the space between the interior and wall sheets **70**, **71** of the connected panels may be filed with an insulation material I, for example, fiberglass, radiant barrier, rock wool, foam insulation, or remain empty.

[0089] Each of the inventive panels may be lifted separately by a crane C (FIG. **21**) and arranged upon a foundation or floor pad F. The panels may be secured to an underlying floor pad via any conventional means, including the use of the inventive stud mounts and/or sill plates described and illustrated in the inventor's co-pending U.S. patent application Ser. No. 11/116,769. As discussed above and shown in FIGS. **12**B and **18**, the panels include a C-channel top plate **72***a* secured to the top ends of the vertical studs comprising the panel. A C-channel bottom plate **72***b* (i.e. top plate **72***a* simply inverted) may also be secured to the bottom ends of the studs, as shown in FIG. **12**B, during assembly of the wall panel. In lieu of the bottom connecting plate **72***b*, a sill plate or stud mount as illustrated in co-pending U.S. patent application Ser. No. 11/116,769 may be secured thereto during panel assembly. In both designs, the panel may then be mechanically fastened to the floor pad via industry standard concrete anchors installed on site after the wall panels are in position.

[0090] Alternatively, the bottom ends of the vertical studs may remain free from attachment to a sill plate, stud mount, or bottom connecting plate **72***b* during assembly, and instead, may be engaged within a stud mount or sill plate that is pre-set within the floor pad or foundation F. A preferred means for securing the wall panels to the underlying floor pad, however, is the sill plate **100** illustrated in FIGS. **4** and **29**, wherein the sill plate is pre-set within the foundation prior to installation of the assembled wall panel, as discussed further below. The sill plate **100** comprises interior **107** and exterior **108** side walls defining a longitudinal recess **106** for engaging therein a structural stud or a stud mount, either alone or as part of a panel. The side walls extend upward from a floor portion **103***a* of the sill plate, the floor portion having an inner surface onto which the structural stud or stud mount rests, and an opposite outer surface **103***b* for abutment against the floor pad. The sill plate also includes a shield **104** projecting from the outer surface of the exterior side wall, the shield having a portion angled downward as best shown in FIG. **29**. Extending downward from, and integral with, the outer surface of the floor portion of the sill plate is an inverted T-shaped anchor **102**. Prior to pouring the concrete to form the floor pad, the sill plate is positioned within the floor pad mold, with the anchor **102** extending into the concrete floor pad. When the concrete is poured, the anchor is totally submerged within the concrete, fastening the sill plate to the concrete pad and sealing the space beneath the sill plate for the entire length of the sill plate, leaving the remaining components of the sill plate exposed above the floor pad upon curing (see FIGS. **6**, **7**A, and **7**B). The inventive sill plates provides an excellent barrier to air and insects, thereby obviating the need for foam or asphalt tape to cover gaps that might be caused by subsidence. The sill plate may be formed of any conventional material such as plastic or metal; however, a preferred material is a composite material as defined herein, and more preferably, a composite material comprising a thermoplastic resin that allows the sill plate to be penetrable by a nail, for example, alternatively a thermosetting resin may be used.

[0091] The present invention is also directed to the use of a novel connecting vertical stud **60** for use in the fabrication of the wall panels, wherein the stud is configured to house the roller mechanism of a security shutter assembly, such as roll-type hurricane shutters, for example, the roller mechanism namely comprising the roller guide bearing and roller

hinge located on each side of the shutter. The stud **60** is illustrated in FIGS. **11**, and **30-31**. Like the stud designs illustrated in FIGS. **9** and **10**, the security shutter stud **60** of the present invention comprises an exterior flange **62** and an interior flange **64**, each flange extending perpendicularly from an elongated web portion **66** of the stud. The stud may also includes an intermediate flange **68** extending perpendicularly from the web portion **66** and positioned subjacent with and parallel to the exterior flange **62** to form, in combination with the exterior flange, a longitudinal channel **69** extending the height (i.e. top end **60***a* to the bottom end **60***b*)of the stud. As illustrated in FIGS. **11** and **30**, for example, this channel **69** is sufficiently large to engage the outer edge of a shear wall sheet **80** or cross buck bracing **83** (not shown). The security shutter connecting stud **60** further includes an elongated longitudinal channel **69***a* (extending from the top end to the bottom end of the stud) for engaging the roller mechanism of the shutter, this roller mechanism located on the outer edges of the shutter S (see FIGS. **31-32**). The channels **69***a* of each of the pair of the security shutter connecting studs **60** are positioned adjacent one another, and thus face one another, within the window opening to function as a track within which the roller mechanism of the security shutter are engaged. The shutter assembly **500** may move freely up and down within the adjacent tracks of studs via a motor and winch assembly **700** secured outside of the panel within the assembled building.

[0092] The various interlocking joints, corner posts, and connecting studs of the present invention may be fabricated of any material (metal and non-metal) commonly known and used in the metal, composite, or construction industries; however, the illustrated designs of the structural components and their assembly are particularly well-suited for fabrication using extruded metals and composite materials, molded composite materials, or pultruded composite materials. The combination of the structural design and use of these lightweight materials provides for a more cost-effective product that is lighter in weight, more precise dimensionally, capable of automated production, faster to erect, and has an improved life cycle performance than currently applied construction support framing technologies, such as pre-cast lintels or cast in place tie beams, used with concrete block buildings, wood fabricated or manufactured lumber headers used in wood buildings, or steel box beams or steel I beams used in steel buildings. The use of composites in the inventive panelized assembly in particular is also more ecologically friendly, requires less material, has superior sustainability, and lower life cycle costs when compared with all other structural support framing assemblies.

[0093] As used herein, "composite" material shall mean any material that is formed from fiber materials impregnated with a resin, mats, and filler, also commonly referred to as "fiber-reinforced plastics" (FRP). The fibers and resins used to form the composite material may be combined in an extrusion process, and therefore referred to herein as an "extruded fiber reinforced composite," or they may be combined in a molding process, and therefore referred to herein as a "molded fiber reinforced composite," or finally, they may be combined in an pultrusion process, and therefore referred herein as a "pultruded composite." Exemplary fiber materials for use in the pultruded composites include, but are not limited to, hemp, kenaf, jute, flax, sisal, acralate, polyethylene, polyester, or spectra organic fibers or fiberglass, aramids (e.g. KEVLAR), basalt, carbon, graphite, boron, and quartz inorganic fibers. Generally, the fiber material may be formed from any long, longitudinally oriented, fiber strands woven into ropes or rovings, or processed into woven cloth mats in a variety of orientations, from 15 degrees to 90 degrees, but more preferably in 45-degree and 90-degree warp and weft fiber orientations or other configurations of filaments, such as directionally laid mats, continuously laid mats, and stitched mats. Other exemplary fiber materials include, but are not limited to, silicon carbide, ceramics, stainless steel, and nickel.

[0094] The resins may be selected from any number of thermoset or thermoplastic materials. Exemplary thermoplastic materials include, but are not limited to, polyesters, polypropylenes (PP), vinylesters, polycarbonates, nylon, polyvinyl chloride (PVC), and PVC derivatives, polyethylene (PE), high density polyethylene (HDPE), polyphenylene sulfide (PPS), polycarbonate (PBT), acetal, acrylonitrile-butadine-styrene (ABS), polysulfone, polyethersulfone, polyetheramide, polyetheretherkeytone (PEEK), and Teflon. Exemplary thermoset materials include, but are not limited to, phenolics, polyesters, epoxies, and polystyrenes, silicon, vinyl esters, polyesters alkyds, cyanate esters, bismaleimides (BMI), polyimides, melamines, dially phthalate (DAP), urea, furans, silicates and polyurethanes.

[0095] Typical composite formulations used in industries such as fiberglass ladders have a bending modulus in the range of 2.5 to 3.0 million PSI (pounds per square inch) are made from formulae such as that recited in Table 5 below.

TABLE 5

Composite Formula- Total Glass 50% by weight and 18.36% Filler[1]

	Weight (%)	Component
A.	49	fiberglass roving
	1	fiberglass continuous strand mat
B.	18	polyester resin
	6	vinyl ester fire retardant resin
	4	PVA (polyvinyl acetate) anti shrink agent
	1	release agent
	1.5	styrene
	0.5	White Pigment
	0.015	UV stabilizer
	18.36	calcium carbonate
	0.5	high initiation temp catalyst
	0.125	low initiation temp catalyst
	100.000	

[1]350° F. = Die temperature
36 inches per minute = pull speed

[0096] In the present invention, more advanced composites generally used in highly specialized applications, such as those used in the military and aerospace industries. These advanced composites have a bending modulus typically in the range of 6.0 to 8.0 million PSI. Preferred composites for the present invention, which the inventor refers to as "advanced construction composites," are similar to those used in these highest applications, but have a bending modulus in the range of 4.0 to 7.0 million PSI and are made from formulae such as that recited in Table 6 below.

TABLE 6

Pultrusion Formula - Total glass (80% by weight, 60% by volume) and No Filler[2]	
750	pounds 507AA Glass Roving - Johns Manville
40	pounds T1777 W C glass - Freundenberg Veil
10	pounds Unifire continuous strand mat - Saint-Gobain Vetrotex
800	pounds
	Total Resin (20% by weight)
	Resin Ratio (2.76 parts resin, 1.00 parts hardener, 2.50% mold release)
143.5	pounds of resin - Dow Accelacure PT 2000R (phenolic resin)
52.0	pounds of hardener - Accelacure PT 1000H
4.5	pounds release agent - Accelacure MR 500
200	pounds

[2]475° F. = Die temperature
36 inches per minute = pull speed

[0097] The pultrusion, molding, and extrusion processes that may be employed, as well as the amounts and combinations of resins and fiber materials used, depending upon the particular manufacturing process employed (i.e. extrusion versus pultrusion versus molding), are those that are commonly known by those of ordinary skill in the art. Preferred resin formulations are described in the inventor's co-pending U.S. patent application Ser. No. 11/116,769, which as discussed above, is incorporated herein by reference in its entirety.

1. A structural corner post suitable for engaging a shear wall assembly thereto in the construction of a building, said corner post having a top end, a bottom end, and a substantially rectangular, longitudinal outer body comprising four corners, said corners including a pair of diagonally opposing corners, at least one of said of said opposing corners comprising a longitudinal channel extending from said top end to said bottom end of said corner and configured to engage an outer edge of a shear wall assembly.

2. The corner post of claim 1, wherein said post has a hollow interior formed by said outer body.

3. The corner post of claim 1, wherein said post is formed of a composite material.

4. The corner post of claim 2, further including a fill material housed within said hollow interior of said post.

5. The corner post of claim 4, wherein said fill material comprises one or more materials suitable for sound attenuation or thermal insulation.

6. The corner post of claim 1, wherein said shear wall assembly comprises either one or more shear wall sheets or cross buck bracing,

7. The corner post of claim 1, wherein said four corners further include an exterior most corner and a diagonally opposing interior corner, said interior corner having an indentation sufficiently large for receiving and having fastened thereto an outer edge of an interior wall sheet.

8. The corner post of claim 7, wherein said post has a hollow interior formed by said outer body.

9. The corner post of claim 8, wherein said post is formed of a composite material

10. The corner post of claim 1, wherein said four corners further include an exterior most corner and a diagonally opposing interior corner, said interior corner having a pair of flanges extending therefrom at substantially right angles to one another, each of said pair of flanges configured for receiving and having fastened thereon an outer edge of an interior wall sheet.

11. The corner post of claim 10, wherein said post is formed of a composite material

12. A shear wall assembly suitable for use in panelized building construction, said assembly comprising:

a pair of connecting studs, each of said studs having a top end, a bottom end, an exterior flange, and an interior flange, each of said flanges extending perpendicularly from of an elongated web portion of said stud and positioned parallel to one another from the top end to the bottom end of said stud, and wherein each of said studs further includes at least one intermediate flange extending perpendicularly from one side of said web portion and positioned subjacent and parallel to a portion of said exterior flange to form, in combination with said exterior flange, a longitudinal channel extending from the top end to the bottom end of the stud; and

one or more shear wall sheets, each having two opposing side edges, each of said side edges engaged in within one of said channels of one of said connecting studs.

13. The shear wall assembly of claim 12, wherein at least one of said connecting studs includes two of said intermediate flanges, each of said two intermediate flanges oriented opposite of one another on opposing surfaces of said web portion such that, in combination with said exterior flange, said intermediate flanges and exterior flange form a pair of adjacent longitudinal channels, each of said channels configured to engage therein the outer edge of a second shear wall sheet.

14. A shear wall assembly suitable for use in panelized building construction, said assembly comprising:

a pair of connecting studs, each of said studs having a top end, a bottom end, an exterior flange and an interior flange, each of said flanges extending perpendicularly from an elongated web portion of said stud and positioned parallel to one another from the top end to the bottom end of said stud, and wherein each of said studs further includes at least one intermediate flange extending perpendicularly from one side of said web portion and positioned subjacent and parallel to a portion of said exterior flange to form, in combination with said exterior flange, a longitudinal channel extending from the top end to the bottom end of the stud; and

a cross-buck bracing assembly comprising at least one pair of buck boards oriented in an overlapping, criss-cross pattern between said connecting studs, each of said buck boards having opposing ends secured within one of said channels of said connecting studs.

15. The shear wall assembly of claim 14, further including:

a first board secured to an outer surface of one of said intermediate flanges near the top end of said panel and spanning the width of said panel, such that said first board is oriented adjacent to and parallel with said cross-buck bracing assembly; and

a second board secured an outer surface of one of said intermediate flanges near the bottom end of said panel and spanning the width of said panel, such that said

second board is oriented adjacent to and parallel with said cross-buck bracing assembly.

16. The shear wall assembly of claim 15, wherein at least one of said connecting studs includes two of said intermediate flanges, each of said two intermediate flanges oriented opposite of one another on opposing surfaces of said web portion such that, in combination with said exterior flange, said intermediate flanges and exterior flange form a pair of adjacent longitudinal channels, each of said channels configured to engage therein the outer edges of a second set of cross buck bracing boards.

17. A wall panel for use in panelized building construction, said panel comprising:

a) a pair of panel connecting studs, each of said studs located on one end of said wall panel and each having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post;

b) a series of second studs located between said pair of panel connecting studs, said second studs spaced apart to form a gap between adjacent second studs;

c) one or more braces secured between one or more pairs of adjacent second studs to span the gap between said adjacent second studs;

d) an elongated top plate secured to the top ends of said panel connecting studs and said second studs, said top plate having pair of a side walls integral with a top surface of said top plate to form a C-channel within which said studs are engaged;

e) at least one exterior wall sheet secured to one of said top plate side walls and at least one interior wall sheet secured to a second of said top plate side walls and said studs, thereby creating a hollow interior therebetween within said wall panel;

f) one or more window or door opening sections secured between adjacent second studs; and

g) one or more shear wall assembly sections secured between adjacent second studs of said wall panel.

18. The wall panel of claim 17, wherein said pair of panel connecting studs and second studs are formed of a composite material.

19. The wall panel of claim 17, further including a elongated bottom plate secured to the bottom ends of said panel connecting studs and said second studs, said bottom plate having pair of a side walls integral with a bottom surface of said bottom plate to form a C-channel within which said studs are engaged, and wherein said at least one exterior wall sheet and said at least one interior wall sheet are further secured to one of said side walls of said bottom plate and said studs.

20. The wall panel of claim 19, wherein said hollow interior created within said wall panel contains one or more thermal insulation materials.

21. The wall panel of claim 19, wherein said pair of panel connecting studs and second studs are formed of a composite material.

22. The wall panel of claim 21, wherein said window or door opening section further comprises:

a) a pair of vertical studs formed of a composite material and spaced apart to form the left and right sides of each of said openings, each of said window or door opening studs having a top end, a bottom end, and a side section adjacent said opening;

b) a pair of elongated boards formed of material selected from the group of wood and thermoplastic composites, each of said pair of boards secured to said side section of each of said pair of vertical studs of said window or door opening to provide a means of attaching a door jamb, door, window jamb, or window within said opening;

c) a second elongated board formed of a material selected from the group of wood and thermoplastic composites, said second board secured near a top jamb of said window or door opening;

d) said top end of said window or door opening having a header assembly secured to the top ends of said pair of vertical studs of said door or window opening, thereby spanning the width of said opening; and

e) one or more second vertical studs secured at one end to said header assembly and at another end to said elongated connecting member of said wall panel.

23. The wall panel of claim 17, wherein said panel comprises a window opening section, said window opening section further comprising:

a) a pair of vertical security shutter studs configured to secure thereto a rolling security shutter assembly, said security shutter studs spaced apart to form the left and right sides of each of said openings, each of said security shutter studs having a top end, a bottom end, and a side section adjacent said opening, wherein said side sections of said security shutter studs face one another;

b) said side section of each of said pair of security shutter studs having a longitudinal channel extending from the top end to the bottom end of said security shutter stud, said channel configured to receive a roller mechanism of said rolling security shutter assembly for movement of a said shutter assembly therein; and

c) a third elongated board formed of a material selected from the group of wood and thermoplastic composites, said second board secured near a bottom jamb of said window opening

24. The wall panel of claim 23, wherein said security shutter studs are formed of a composite material.

25. The wall panel of claim 23, further including said rolling security shutter assembly, said security shutter assembly having a shutter and a roller mechanism comprising a series of rollers on each outer edge of said shutter, said rollers engaged within one of said channels of said security shutter studs for movement of said shutter assembly therein.

26. The wall panel of claim 25, wherein said security shutter studs are formed of a composite material.

27. A wall panel suitable for use in panelized building construction, said panel comprising:

a) a pair of panel connecting studs, each of said studs located on one end of said wall panel and having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post;

b) a series of second studs located between said pair of panel connecting studs, said second studs spaced apart to form a gap between adjacent second studs;

c) an elongated top plate secured to the top ends of said panel connecting studs and said second studs, said top plate having pair of a side walls integral with a top surface of said top plate to form a C-channel within which said studs are engaged;

d) at least one exterior wall sheet secured to one of said top plate side walls and at least one interior wall sheet secured to a second of said top plate side walls, thereby creating a hollow interior therebetween within said wall panel;

e) one or more window opening sections secured between adjacent second studs; and

f) at least one or more of said window openings further including (i) a pair of vertical security shutter studs configured to secure thereto a rolling security shutter assembly, said security shutter studs spaced apart to form the left and right sides of each of said window opening, each of said security shutter studs having top end, a bottom end, and a side section adjacent said opening, wherein said side sections of said security shutter studs face one another, and (ii) said side section of each of said pair of security shutter studs having a longitudinal channel extending from the top end to the bottom end of said security shutter stud, said channel configured to receive a roller mechanism of a rolling security shutter assembly for movement of a said shutter assembly therein.

28. The wall panel of claim 27, wherein said panel connecting studs, said second studs, and said security shutter studs are formed of a composite material.

29. The wall panel of claim 28, further including said rolling security shutter assembly, said security shutter assembly having a shutter and a roller mechanism comprising a series of rollers on each outer edge of said shutter, said rollers engaged within one of said channels of said security shutter studs for movement of said shutter assembly therein.

30. The wall panel of claim 27, further including one or more braces secured between one or more pairs of adjacent second studs to span the gap between said adjacent second studs.

31. A sill plate for securing structural studs of a framing assembly to a floor pad, said sill plate comprising:

a) interior and exterior side walls defining a longitudinal recess for engaging therein a structural stud or a stud mount, said side walls extending upward from a floor portion of said sill plate, said floor portion having an inner surface onto which the structural stud or stud mount rests, and an opposite outer surface for abutment against said floor pad;

b) a shield projecting from an outer surface of said exterior side wall, said shield having a portion angled downward;

c) an inverted T-shaped anchor mount integral with and extending downward from said outer surface of said floor portion of said sill plate for engagement within said floor pad.

32. The sill plate of claim 31, wherein said sill plate is formed of a thermoplastic composite material.

33. A shear wall corner assembly for use in panelized construction of buildings, said shear wall corner assembly comprising:

a structural corner post having a top end, a bottom end, and a substantially rectangular, longitudinal outer body comprising four corners, said corners including a pair of diagonally opposing corners, each of said opposing corners comprising a longitudinal channel extending from said top end to said bottom end of said corner, said four corners further including an interior corner positioned between said diagonally opposing corners;

a pair of vertical connecting studs, each of said connecting studs having a bottom end and a top end and positioned adjacent to one of said diagonally opposed corners of said corner post;

a pair of shear wall assembly sections, each having one outer side edge engaged within one of said channels of said corner post and an opposing outer side edge secured to one of said connecting studs such that said shear wall assembly sections are oriented at a substantially right angle to one another;

a first interior wall sheet having an outer side edge secured to said interior corner of said corner post, such that said interior wall sheet is positioned parallel to one of said shear wall assembly sections; and

a second interior wall sheet having an outer side edge secured to said interior corner of said corner post, perpendicular to said first interior wall sheet.

34. The shear wall corner assembly of claim 33, wherein said interior corner of said corner post includes an indentation sufficiently large for receiving and having fastened thereto said outer edges of said second interior wall sheets.

35. The shear wall corner assembly of claim 33, wherein said interior corner has a pair of flanges extending therefrom at substantially right angles to one another, each of said pair of flanges configured for receiving and having fastened thereon said outer edges of said interior wall sheet.

36. The shear wall corner assembly of claim 33, wherein each of said connecting studs comprises an exterior flange and an interior flange, each of said flanges extending perpendicularly from an elongated web portion of said stud and positioned parallel to one another from the top end to the bottom end of said stud, and wherein each of said studs further includes at least one intermediate flange extending perpendicularly from said web portion and positioned subjacent with and parallel to said exterior flange to form, in combination with said exterior flange, a longitudinal channel extending the top end to the bottom end of said stud.

37. The shear wall corner assembly of claim 33, wherein said corner post and connecting studs are formed of a composite material, and wherein said corner post has a hollow interior formed by said outer body.

38. The shear wall corner assembly of claim 33, further including a fill material housed within said hollow interior of said corner post.

39. The shear wall corner assembly of claim 38, wherein said fill material comprises one or more materials suitable for sound attenuation or thermal insulation.

40. The shear wall corner assembly of claim 33, wherein said shear wall assembly comprises at least one solid, substantially flat sheet of material.

41. The shear wall corner assembly of claim 33, wherein said shear wall assembly is a cross buck bracing assembly comprising at least one pair of boards oriented in an overlapping criss-cross pattern between said corner post and one of said connecting studs, each of said boards having opposing ends comprising the outer edge of said shear wall assembly engaged within channels of said connecting stud and said corner post.

42. The shear wall corner assembly of claim 41, further including (a) a first board having one outer side edge secured to said corner post near the top end of said corner post and a second outer side edge secured to a top end of one of said adjacent connecting studs, such that said first board is oriented adjacent to and parallel with said sheer wall assembly section; and (b) a second board having an outer side edge secured to said said corner post near the bottom end of said corner post and a second outer side edge secured to said bottom end of one of said adjacent studs, such that said second board is oriented adjacent to and parallel with said sheer wall assembly section.

43. An elongated structural stud for use in building construction, said stud having an exterior flange extending perpendicularly from an elongated web portion of said stud, said stud further having a first intermediate flange extending perpendicularly from one side of said web portion and positioned subjacent with and parallel to a portion of said exterior flange to form, in combination with said exterior flange, a first channel extending the length of said stud, said first channel configured to receive a roller mechanism of a rolling security shutter assembly for movement of a said shutter assembly therein.

44. The stud of claim 43, wherein said stud is formed of a composite material.

45. The stud of claim 43, wherein said stud further comprises a second intermediate flange extending perpendicularly from a second side of said web portion and oriented opposite said first intermediate flange such that, in combination with said exterior flange, said second intermediate flanges and a portion of said exterior flange form a second channel adjacent said first channel, said second channel extending the length of said stud and configured to engage therein an outer side edge of at least one wall sheet.

46. The stud of claim 45, wherein said stud is formed of a composite material.

47. A wall panel system for use in panelized construction, said system comprising

a) a plurality of wall panels, each of said wall panels comprising:

i) a pair of panel connecting studs formed of a composite material, each of said studs located on one end of said wall panel and having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post, said panel connecting studs further having an exterior flange and an interior flange extending perpendicularly from a central elongated web portion;

ii) a series of second studs located between said pair of panel connecting stud, said second studs spaced apart to form a gap between adjacent second studs;

iii) an elongated top plate secured to the top ends of said panel connecting studs and said second studs, said top plate having pair of a side walls integral with a top surface of said top plate to form a C-channel within which said studs are engaged; and

iv) at least one exterior wall sheet secured to one of said top plate side walls and at least one interior wall sheet secured to a second of said top plate side walls, thereby creating a hollow interior therebetween within said wall panel; and

b) said wall panels secured to one another at opposing ends via the interlocking components of adjacent wall panels, said interlocking components of adjacent wall panels further secured to one another by a plurality of mechanical fasteners, and wherein said interlocking component of the connecting stud of one panel comprises a substantially C-shaped channel formed in part by said exterior and interior flanges and said web portion of said connecting stud, said channel configured for engagement therein of a complementarily configured web portion of the connecting stud of an adjacent panel for interlocking engagement of said wall panels to one another.

48. The wall panel system of claim 47, wherein each of said plurality of mechanical fasteners penetrates said flanges of adjacent connecting studs of adjacent wall panels, wherein said flanges of adjacent panels overlap one another.

49. The wall panel system of claim 47, wherein said wall panels are further secured to one another via an adhesive applied between overlapping flanges of adjacent panels.

50. The wall panel of claim 47, further including one or more braces secured between one or more pairs of adjacent second studs to span the gap between said adjacent second studs.

51. The wall panel system of claim 47, further including a corner post, said corner post having an outer body and an interlocking component extending from said outer body for engagement with a complementarily configured interlocking component of one of said wall panels.

52. The wall panel system of claim 51, wherein said corner post had an exterior corner and a diagonally opposing interior corner, said interior corner having a pair of flanges extending therefrom at substantially right angles to one another, each of said pair of flanges configured for receiving and having fastened thereon an outer edge of said interior wall sheet.

53. A shear wall assembly suitable for use in panelized building construction, said assembly comprising:

a pair of connecting studs, each of said studs having a top end, a bottom end, a first flange, and a second flange, each of said flanges extending perpendicularly from opposing ends of an elongated web portion of said stud and positioned parallel to one another from the top end to the bottom end of said stud, and wherein each of said studs further includes at least one intermediate flange extending from one side of said web portion and positioned subjacent and parallel to a portion of said exterior flange to form, in combination with said exterior flange, a longitudinal channel extending from the top end to the bottom end of the stud;

each of said connecting studs having an interlocking component extending from said web portion of said stud and comprising said exterior and interior flanges, said interlocking component configured to engage a

complementary interlocking component of a connecting stud of an adjacent wall panel; and

a shear wall assembly section having opposing outer edges, each of said edges engaged within one of said channels of said connecting studs.

54. The shear wall assembly of claim 53, wherein said exterior and interior flanges of said connecting stud, in combination with a flange subjacent to said exterior flange and extending from a side of said web portion, comprise said interlocking component of said stud, said exterior flange and subjacent flange forming a groove for engagement of an interior flange of a complementary configured interlocking component of an adjacent wall panel.

55. A wall panel system for use in panelized construction, said system comprising

a) a plurality of wall panels, each of said wall panels comprising:

i) a pair of panel connecting studs formed of a composite material, each of said studs located on one end of said wall panel and having an interlocking component for engagement with a complementary interlocking component of a second wall panel or a corner post, said panel connecting studs further having an exterior flange and an interior flange extending perpendicularly from a central elongated web portion;

ii) a series of second studs located between said pair of panel connecting studs, said second studs spaced apart to form a gap between adjacent second studs;

iii) an elongated top plate secured to the top ends of said panel connecting studs and said second studs, said top plate having pair of a side walls integral with a top surface of said top plate to form a C-channel within which said studs are engaged;

iv) at least one exterior wall sheet secured to one of said top plate side walls and at least one interior wall sheet secured to a second of said top plate side walls, thereby creating a hollow interior therebetween within said wall panel; and

b) said wall panels secured to one another at opposing ends via the interlocking components of adjacent wall panels, said interlocking components of adjacent wall panels further secured to one another by a plurality of mechanical fasteners, and wherein said interlocking component of the connecting stud of one panel comprises said exterior and interior flanges of said connecting stud, in combination with a flange extending from a side of said web portion subjacent to said exterior flange, said exterior flange and subjacent flange, in combination, forming a groove for engagement of an interior flange of a complementary configured interlocking component of an adjacent wall panel;

56. The wall panel system of claim 55, wherein each of said plurality of mechanical fasteners penetrates said flanges of adjacent connecting studs of adjacent wall panels, wherein said flanges of adjacent panels overlap one another.

57. The wall panel system of claim 55, wherein said wall panels are further secured to one another via an adhesive applied between overlapping flanges of adjacent panels.

58. The wall panel of claim 55, further including one or more braces secured between one or more pairs of adjacent second studs to span the gap between said adjacent second studs.

59. The wall panel system of claim 55, further including a corner post, said corner post having an outer body and an interlocking component extending from said outer body for engagement with a complementarily configured interlocking component of one of said wall panels.

60. The wall panel system of claim 59, wherein said corner post has an exterior corner and a diagonally opposing interior corner, said interior corner having a pair of flanges extending therefrom at substantially right angles to one another, each of said pair of flanges configured for receiving and having fastened thereon an outer edge of said interior wall sheet.

61. The wall panel system of claim 59, wherein said corner post had an exterior corner and a diagonally opposing interior corner, wherein said interior corner of said corner post includes an indentation sufficiently large for receiving and having fastened thereto said outer edge of an interior wall sheet.

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