

United States Patent

Tanner

[15] 3,650,071

[45] Mar. 21, 1972

[54] PANEL FRAME ASSEMBLY

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[22] Filed: **Sept. 8, 1970**

[21] Appl. No.: **70,383**

[52] U.S. Cl.49/411, 49/404, 49/409

[51] Int. Cl.E05d 13/00

[58] Field of Search.....49/404, 409, 410, 411, 425;
160/199, 206; 16/151, 87

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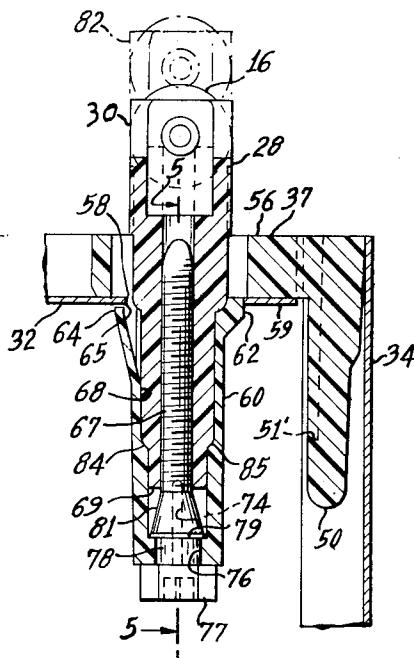
Primary Examiner—Dennis L. Taylor

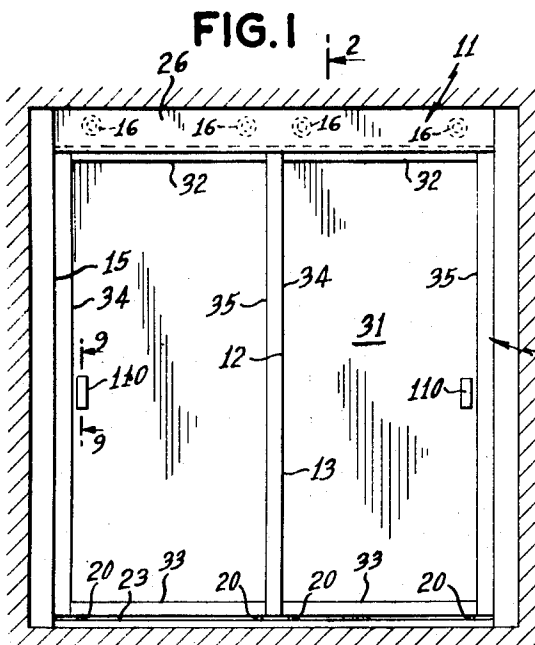
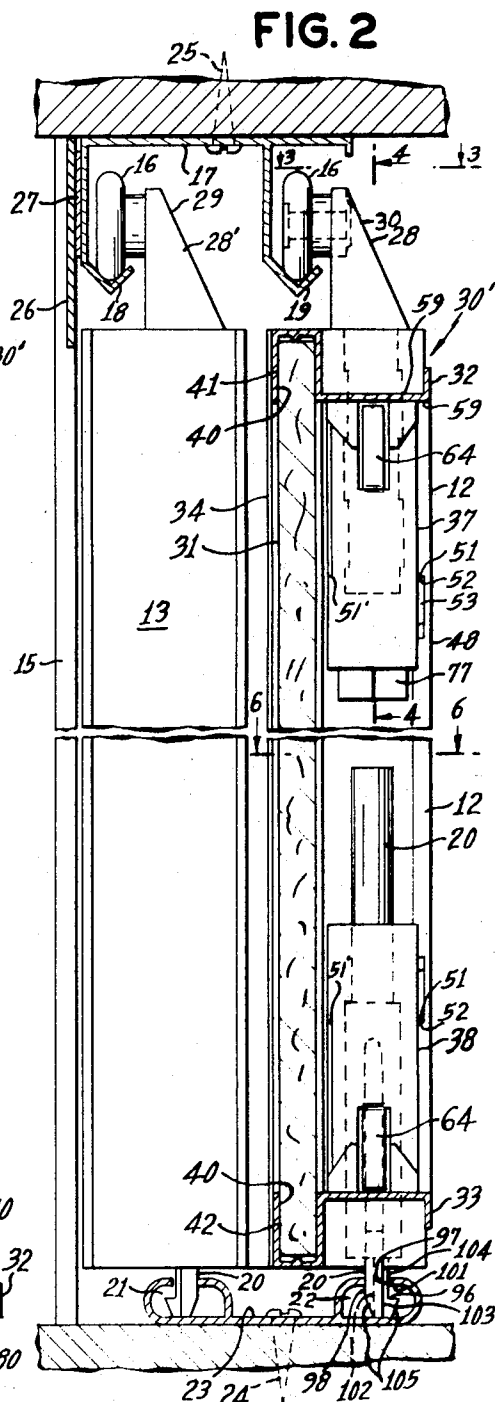
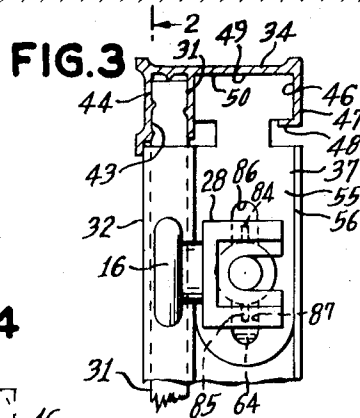
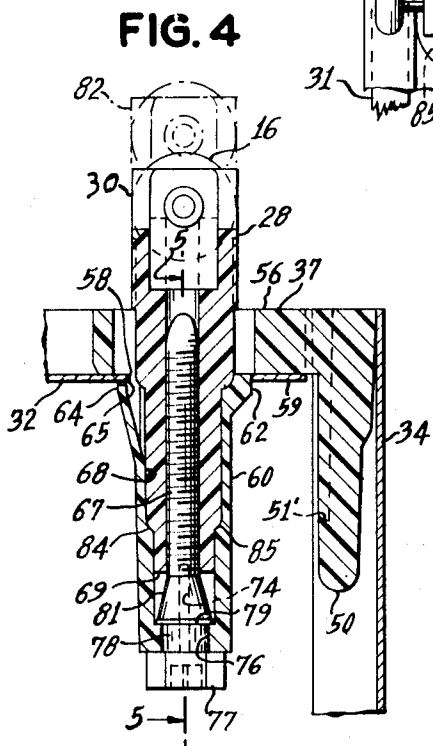
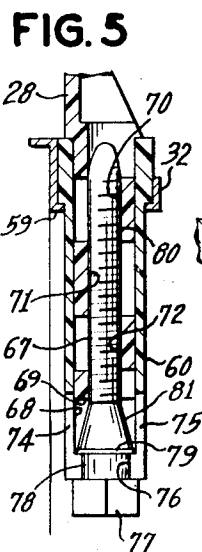
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[57] ABSTRACT

A stile and rail forming a corner, are connected by a unitary corner connector having a first upright portion disposed in a channel of the stile, a laterally extending portion, and a second upright portion spaced from and extending in the same direction as the first upright portion and disposed in an opening in the rail spaced laterally from the stile. The first upright portion includes a shoulder and the channel includes a shoulder, with the shoulders being in engagement to lock the corner connector to the stile. The second upright portion includes a shoulder engaging a shoulder defining the rail opening to lock the corner to the rail. When the connector is an upper connector a member is adjustably connected to the second upright portion which suspends the connector to an upper track. When the connector is a lower connector, an elongated guide element is slidably connected to the second upright portion which guides the connector on a lower track. Other details to the corner connector guide element, and adjustable member are embodied herein.

30 Claims, 10 Drawing Figures





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FIG. 6

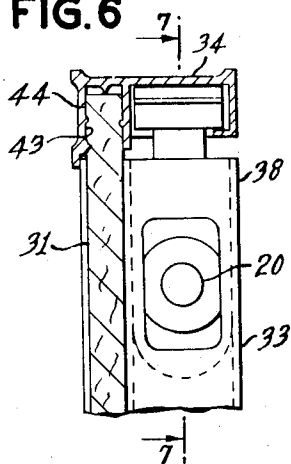


FIG. 7

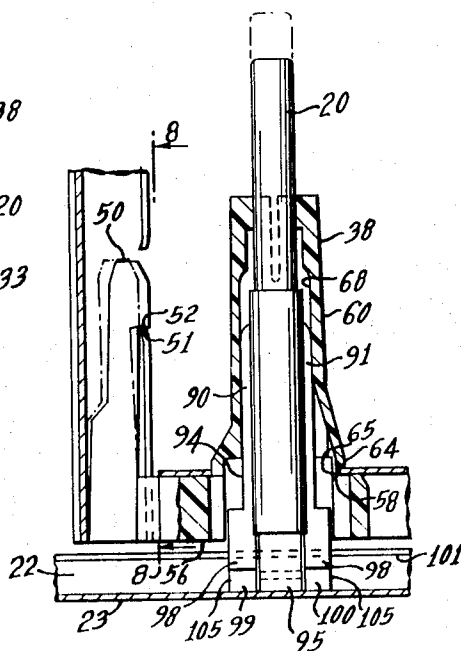


FIG. 8

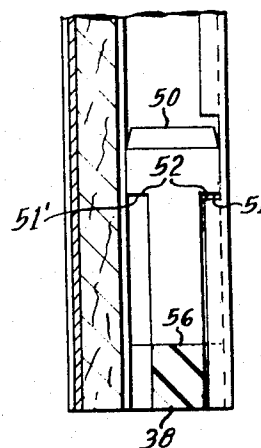


FIG. 9

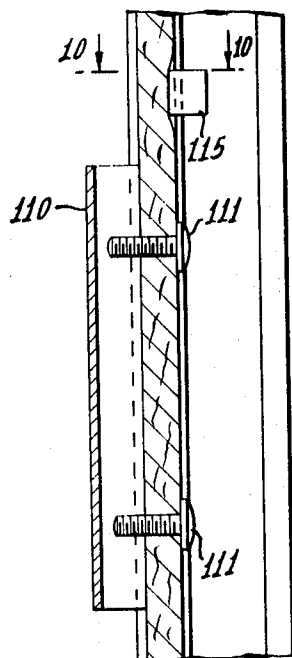
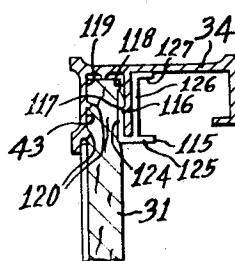


FIG. 10



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PANEL FRAME ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to panel frame assemblies and more particularly to the unitary corner connectors for framing stiles and rails adapted to support rectangular panels or the like.

2. Description of the Prior Art

Movable panel assemblies to which this invention relates are very old in the art, and numerous patents have issued covering various constructions, exemplary of which are U.S. Pat. Nos. 162,930; 1,277,055; 1,343,416; 1,448,845; 1,658,593; 1,934,299; 2,079,028; 2,638,189; 2,664,598; 2,680,875; 2,710,422; 2,741,794; 2,784,445; 2,843,872; 2,888,708; 3,033,285; 3,037,555; 3,052,930; 3,058,173; 3,074,077; 3,102,581; 3,167,112; 3,261,129 and 3,310,914, and Canadian Pat. Nos. 540,444, and 575,102. Many of the above patents have various deficiencies which are substantially alleviated in accord with the invention hereinafter described.

SUMMARY OF THE INVENTION

The panel frame assembly in one aspect of the invention includes a stile and a rail disposed to form a corner with the stile having an inwardly facing channel adjacent the corner. A unitary corner connector having an upright portion is disposed in the stile channel which has a laterally extending portion and another upright portion spaced from and extending in the same direction as the first upright portion. The rail includes an opening spaced from the stile with the other connector upright portion being disposed in the rail opening to connect the stile and rail together. Means are provided between the other upright portion and rail for affixing the other upright portion to the rail. Means are also provided between the first upright portion and stile for affixing the first upright portion to the stile.

In other aspects, the invention includes a member connected to the connector for suspending the connector to an upper track when the connector is an upper corner and a guide element slidably connected to the connector for guiding the connector with respect to a lower track when the connector is a lower corner. Means are associated with the other upright portion for adjusting the vertical extent of the suspending member which includes an elongated headed screw with a spaced shoulder suitably journaled therebetween in a passageway in the other upright portion, such portion being resiliently expandable to permit insertion of the shoulder.

Further aspects include a pair of spaced guiding tongues on the guide member with another tongue therebetween, such other tongue including a laterally extending foot to prevent inadvertent removal from the lower track. The other tongue is laterally offset from the pair of tongues so that both surfaces of each tongue do not engage opposite slot edges of the lower track.

A general object of this invention is to provide an improved panel frame assembly.

A particular object is the provision of an improved corner connector which is locked within a stile and rail of a panel frame assembly without separate parts to affix same together.

Another particular object is to provide an improved upper corner connector for adjustably suspending a panel frame to an upper track.

A further particular object is to provide an improved lower corner connector with an improved guide which prevents inadvertent removal of the guide from and provides smooth sliding of the guide along a lower track.

A specific object is to provide a panel frame assembly which is constructed with a minimum of components and with a minimum number of differently constructed components.

A related specific object is the provision of an improved corner connector which is used in each of the four corners of a panel frame assembly.

Other specific objects include the provision of an improved panel frame assembly which is simple and inexpensive in construction, which is easy and smooth in sliding operation, and durable and readily repaired when required.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features which are believed to be characteristic of this invention as set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a front elevational view of a sliding door assembly utilizing the panel frame assembly in accord with the invention;

FIG. 2 is a cross sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a partial top plan view taken along line 3—3 of FIG. 2;

FIG. 4 is a partial cross sectional view taken along line 4—4 of FIG. 2;

FIG. 5 is a partial cross sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is a partial cross sectional view taken along line 6—6 of FIG. 2;

FIG. 7 is a partial cross sectional view taken along line 7—7 of FIG. 6;

FIG. 8 is a partial cross sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a partial cross sectional view taken along line 9—9 of FIG. 1; and

FIG. 10 is a partial cross sectional view taken along line 10—10 of FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, FIG. 1 depicts a sliding door assembly generally at 11 including a pair of sliding and bypassing doors 12 and 13 with door 13 being outwardly disposed relative to door 12, assembly 11 being installed in a rectangular doorway 15. Each of doors 12 and 13 are slidably suspended by a pair of spaced wheels 16 which roll within upper track 17, wheels 16 of door 13 being disposed in the outer guideway 18 and wheels 16 of door 12 being disposed in inner guideway 19, as clearly depicted in FIG. 2. Each of doors 12 and 13 are slidably guided by a pair of spaced lower guide members 20 which extend into respective guideways 21 and 22 of lower track 23, track 23 being installed in doorway 15 by spaced fasteners 24 along its length and being parallel to the upper track 17 which is similarly affixed in doorway 15 by spaced fasteners 25. A common type fascia plate 26 is connected by double-sided tape 27 or the like directly or adjacent to track 17 to outwardly cover or conceal the upper track 17 and the upwardly extending suspension members 28 and 28' which are suitably and rotatably connected at their upper end portions 29 and 30 to respective wheels 16, suspension members 28 and 28' hereinafter being more fully described.

Each of the doors 12 and 13 are substantially identical and further description of door 12 will suffice to particularly describe the invention. Door 12 includes a panel frame assembly, generally indicated by reference numeral 30', and a panel 31 of any suitable material, such as plywood, paneling, plastic or the like. The frame assembly 30 includes a pair of generally horizontal and identical rails 32 and 33 and a pair of generally vertical and identical stiles 34 and 35, stile 34 being beneath stile 35 of door 13, and four unitary corner connectors, including corner connectors 37 and 38, disposed in each corner and connecting one stile and one rail together, as hereinafter more fully disclosed. Each of the rails 32 and 33 includes a channel 40 opening and facing inwardly with respect to the panel 31 and receiving respective horizontal

edge portions 41 and 42 of panel 31 thereinto as depicted in FIG. 2. Each of the stiles 34 and 35 includes a channel 43 opening and facing inwardly with respect to the panel 31 and receiving respective vertical edge portion, including edge portion 44, of panel 31 thereinto as shown in FIG. 3.

Stiles 34 and 35 each includes another channel 46 opening and facing inwardly with respect to panel 31 and in the same general direction as channel 43, channel 46 having a rear side wall 47 extending horizontally and a lip 48 extending toward the other channel 43 and generally parallel with the channel bottom wall 49. A generally upright portion 50 of corner connector 37 is disposed in and conforms generally to the space defined by and internally of channel 46. Means are associated between upright portion and channel 46 to affix the connector 37 thereto and is seen to herein specifically include a corner connector shoulder 51 engaging channel lip shoulder 52 which is formed by a cutout 53 in lip 48 as shown in FIG. 2, but substantially as more clearly shown in FIG. 7, hereinafter more fully described in connection with lower connector 38. With the shoulder 51 and 52 in engagement the upper surface 55 of laterally extending portion 56 of corner connector 37 is generally flush with the upper extent of rail 32 as shown in FIG. 2. Rail 32 includes an opening 58, as clearly seen in FIG. 4, spaced from the end portion 59 and through which another upright portion 60 extends, portion 60 being spaced from portion 50 and extends generally in the same direction as portion 50. Opening 58 is generally rectangular and the upper portion 62 of upright corner portion 60 is generally rectangular and substantially fits within opening 58. Means are associated between upright portion 60 and rail 32 to affix the connector 37 thereto and is seen to herein specifically include a corner connector shoulder 64 engaging beneath a shoulder 65 defining opening 58 in rail 32 whereby corner and rail are self-locked without other separate components.

Means are attached to corner connector 37 for adjusting the vertical extension and retraction of the suspension member 28 and is specifically shown as comprising an elongated screw 67 rotatably connected to upright portion 60, portion 60 including an elongated passageway 68 into which the lower portion 69 of elongated suspension member 28 extends. Lower portion 69 comprises a plurality of spaced, semicircular threaded portions 70, 71, and 72, as seen in FIG. 5, into which screw 67 is threaded. Housing upright portion 60 includes a pair of slits 74 and 75 therethrough which communicate with passageway 68 and vertical opening 76 also communicates with passageway 68. The screw 67 includes an enlarged head 77, a shank portion 78 journaled in opening 76, and an enlarged shoulder portion 79, shoulder portion 79 (with shank) and head portion 77 being larger in cross section than opening 76. The screw 67 is assembled in the housing upright portion 60 by passing the threaded portion 80 through opening 76 until the tapered conical portion 81 engages within opening 76; further forcing of the screw head 77 upwardly causes the resiliently expandable upright housing portion 60, particularly as provided by slits 74 and 75, to temporarily deform outwardly sufficiently to pass shoulder 79, whereupon shank portion 78 becomes seated within opening 76 and housing portion 60 returns to its non-deformed condition. Upon rotation in one direction of screw head 77, the suspension member 28 will be adjusted upwardly to broken line position 82 and will be retracted downwardly upon rotation of screw 67 in the opposite direction. To inhibit rotation of member 28, means are provided in the form of a pair of ribs 84 and 85 extending outwardly from the cylindrical lower portion 69, as seen from examination of FIGS. 3, 4 and 5, ribs 84 and 85 being stepped as shown in FIG. 4. Ribs 84 and 85 are disposed in respective guideways 86 and 87 to prevent any excessive rotation, there being some small play between the parts in a common manner.

While corner connector 37 is shown at the upper left hand corner of door 12, the identical corner connector may be employed at the upper right hand corner in which event shoulder 51' would engage a similar shoulder 52 of the corresponding lip of stile 35. In that event a similar suspension member 28

would also be used except such suspension member will be turned 180° so that the wheels 16 will be in alignment when disposed in guideway 19.

The lower corner connector 38 is identical to upper corner connector 37, corner connector 38 being shown in FIGS. 2, 6, 7 and 8. Guide member 20 is disposed within passageway 68 of corner connector 38 and is freely movable upwardly and downwardly therein. Elongated ribs 90 and 91 are positioned within guideways 86 and 87, as seen in FIG. 3, to prevent rotation of guide member 20 within housing upper portion 60, previously described as lower portion 60 of connector 37.

At the lower end portion 94 of guide member 20 is an integral tongue 95 terminating in a laterally extending foot 96 which prevents inadvertent removal of the guide member 20 from track 22, track 22 including a slot 97 along its length with the lateral distance thereof being less than the distance between the extremity of foot 96 and the rearward surfaces 98 of depending tongues 99 and 100, as clearly shown in FIG. 2 and 7, tongues 99 and 100 being spaced on either side of tongue 95 to provide proper and smooth operation of the guide member within track 22. Track 22 includes a shoulder 101 defining track slot 97 adapted to be engaged by foot 96 to prevent inadvertent dislodgement of tongues 95, 99 and 100 from within track 22. Middle tongue rearward surface 102 is spaced forwardly of surfaces 99 and 100 of respective tongues 98 and the forward surfaces 103 of tongues 99 and 100 are spaced rearwardly from forward surface 104 of middle tongue 95 such that the forward surface 104 and rearward surfaces 98 function to guide the member 20 in track 22 while foot 96 prevents disassembly of the member 20 from slidable connection with the track 22. Each of the tongues 95, 99 and 100 are provided with a cam surface 105 so that when the tongues are pressed into and through slot 97, the middle tongue 95 flexes laterally toward the pair of tongues 99 and 100, and the pair of tongues 99 and 100 may slightly flex toward middle tongue 95 to reduce the distance between the extent of foot 96 and rearward surfaces 98 so that the tongues may pass and be positioned within slot 97 with foot 96 extending laterally of shoulder 101 within track 22.

Attached to each of door panels 31 is a handle 110 secured by fasteners 111 as shown in FIG. 9. A panel wedging clip 115 includes an indentation 116 which fits on a rib 117 formed in channel side wall 118 to prevent sliding removal downwardly, as shown in FIG. 10, after panel 31 has been forced into stile channel 43. On the opposite channel side wall 119 is formed a pair of ribs 120 which become slightly imbedded within panel 31, when the panel is wood paneling or the like, which further prevents removal of panel 31 after stile 34 is attached thereto. Clip 115 includes a leg 124 positioned between panel 31 and side wall 118 and a laterally extending leg 125 which essentially serves as a handle to force leg 124 into position, if so desired, or the clip 115 may be positioned on side wall 118 before insertion of panel 31. The additional legs 126 and 127 appropriately space the clip 115 and secure the clip to wall 118 without independent components, glue or the like.

While the invention has been described with respect to a certain specific embodiment, it will be appreciated that many modifications and changes may be made by those skilled in the art without departing from the spirit of the invention. It is intended, therefore, by the appended claims to cover all such modifications and changes as fall within the true spirit and scope of the invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. In a panel frame assembly comprising a stile and a rail perpendicularly disposed to form a corner, each said stile and rail having a channel facing inwardly relative to said corner and being adapted to receive respective edges of a corner of a rectangular panel therein, said stile having another channel disposed along its said channel; a unitary corner connector having an upright portion disposed in said other channel, said connector having a laterally extending portion and another upright portion spaced from said upright portion and extend-

ing in the same direction with respect to said upright portion, said rail having an opening therethrough laterally spaced with respect to said channel of said rail and spaced from said stile, said other upright portion of said connector being disposed in said opening whereby said stile and rail are connected together by said unitary corner connector.

2. In the panel frame assembly as defined in claim 1 further comprising means between said other channel and said upright portion for affixing said connector to said other channel.

3. In the panel frame assembly as defined in claim 1 further comprising means between said other upright portion and said rail for affixing said other upright portion to said rail.

4. In the panel frame assembly as defined in claim 1 wherein said upright portion of said unitary corner connector includes a shoulder and wherein said other channel includes a shoulder, said shoulders being in engagement when said upright portion is fully inserted into said other channel whereby said corner and stile are self-locked together.

5. In the panel frame assembly as defined in claim 1 wherein said other upright portion of said unitary corner connector includes a shoulder spaced below said laterally extending portion, said shoulder engaging a shoulder defining said opening in said rail whereby said corner and rail are self-locked together.

6. In the panel frame assembly as defined in claim 1 further comprising another stile and another rail disposed to form three additional corners, said other stile and other rail being identical respectively to said stile and rail, three additional corner connectors identical with said corner connector disposed in respective said additional corners thereby completing said panel frame assembly.

7. In the panel frame assembly as defined in claim 1 wherein said corner is an upper corner, a member connected to said other upright portion and extending above said lateral portion for suspending said stile and rail and corner connector to an upper track to be disposed spacedly above and along said rail.

8. In the panel frame assembly as defined in claim 7 further comprising means connected to said other upright portion for adjusting the vertical extent of said member.

9. In the panel frame assembly as defined in claim 8 wherein said means includes an upright elongated screw rotatably connected to said other upright portion, said member being threadedly connected to said screw within said other upright portion, said member including means cooperatively associated with said other upright portion for maintaining said member in non-rotative relationship whereby rotation of said screw movably adjusts the extension and retraction of said member solely in a vertical and rectilinear direction.

10. In the panel frame assembly as defined in claim 1 wherein said corner is an upper corner, said corner connector other portion including a vertical passageway therethrough, said other portion having a lower end with an opening in alignment with and communicating with said passageway, said opening being smaller in cross section than the cross section of said passageway, an elongated screw having a shank positioned through said opening and extending into said passageway, said screw having a head exposed outwardly of said other upright portion, said shank having an enlarged shoulder spaced from said head and disposed in said passageway, each of said head and enlarged shoulder with shank being larger in cross section than said opening whereby said screw is rotatably connected to said other upright portion, an upright hanger element threadedly engaged with said screw within said passageway, said element including means cooperatively associated with said other upright portion for maintaining said element in non-rotative relationship whereby rotation of said head movably adjusts the extension and retraction of said element solely in a vertical and rectilinear direction, said hanger element extending above said lateral portion for suspending said stile and rail and corner connector to an upper track to be disposed spacedly above and along said rail.

11. In the panel frame assembly as defined in claim 10, wherein said other upright portion is resiliently expandable, said opening being temporarily expandable for insertion of said shoulder therethrough to properly position said shoulder within said passageway.

12. In the panel frame assembly as defined in claim 11 wherein said other upright portion includes a slit therethrough communicating with said opening and passageway.

13. In the panel frame assembly as defined in claim 12 wherein said other upright portion includes a pair of spaced upright slits each communicating with said opening and passageway.

14. In the panel frame assembly as defined in claim 1 wherein said corner is a lower corner, said other upright portion including a vertical passageway, an elongated guide element positioned in said passageway and freely movable upwardly and downwardly therein, said guide element including means adapted to engage a lower track disposed spacedly below and along said rail for preventing inadvertent removal of said guide element from the lower track.

15. In the panel frame assembly as defined in claim 1 wherein said corner is a lower corner, said other upright portion including a vertical passageway, an elongated guide element positioned in said passageway and freely movable upwardly and downwardly therein, said guide element including means cooperatively associated with said other upright portion for maintaining said guide element in a non-rotative relationship, said guide element including means for slidably guiding said element in a lower track to be disposed spacedly below and along said rail.

16. In the panel frame assembly as defined in claim 15, wherein said guide element includes a first upright tongue terminating in a laterally extending foot which is adapted to engage beneath a laterally extending shoulder of the lower track.

17. In the panel frame assembly as defined in claim 16 wherein said means for slidably guiding said element includes a pair of spaced upright tongues positioned respectively on opposite sides of said first tongue.

18. In the panel frame assembly as defined in claim 17 wherein said first tongue includes a vertical surface from which said foot extends, said pair of tongues having vertical surfaces remote from said first tongue surface, said first tongue surface and said surfaces of said pair of tongues respectively being adapted and arranged to engage opposite slot edges of the lower track.

19. In the panel frame assembly as defined in claim 18 wherein said first tongue is laterally offset from said pair of tongues whereby said pair of tongues engage one slot edge of the lower track and said first tongue engages only the other slot edge of the lower track.

20. In a panel frame assembly comprising a stile and a rail perpendicularly disposed to form an upper corner, said stile having an inwardly facing channel adjacent said upper corner, a unitary corner connector having an upright portion disposed in said channel, said connector having a laterally extending portion and another upright portion spaced from said upright portion and extending in the same direction with respect to said upright portion, said rail having an opening therethrough spaced from said stile, said other upright portion of said connector being disposed in said opening whereby said stile and rail are connected together by said unitary corner connector, and a member connected to said other upright portion and extending above said lateral portion for suspending said stile and rail and corner connector to an upper track adapted to be disposed spacedly above and along said rail.

21. In the panel frame assembly as defined in claim 20 further comprising means connected to said other upright portion for adjusting the vertical extent of said member.

22. In the panel frame assembly as defined in claim 21 wherein said means includes an upright elongated screw rotatably connected to said other upright portion, said member being threadedly connected to said screw within said other upright portion.

23. In the panel frame assembly as defined in claim 22 wherein said member includes means cooperatively associated with said other upright portion for maintaining said member in nonrotative relationship whereby rotation of said screw movably adjusts the extension and retraction of said member generally only in a vertical and rectilinear direction.

24. In a panel frame assembly comprising a stile and a rail perpendicularly disposed to form a lower corner, said stile having an inwardly facing channel adjacent said lower corner, a unitary corner connector having an upright portion disposed in said channel, said connector having a laterally extending portion and another upright portion spaced from said upright portion and extending in the same direction with respect to said upright portion, said rail having an opening therethrough spaced from said stile, said other upright portion of said connector being disposed in said opening whereby said stile and rail are connected together by said unitary corner connector, said other upright portion including a vertical passageway, an elongated guide element positioned in said passageway and freely movable upwardly and downwardly therein.

25. In the panel frame assembly as defined in claim 24 wherein said guide element includes means adapted to engage a lower track disposed spacedly below and along said rail for preventing inadvertent removal of said guide element from the lower track.

26. In the panel frame assembly as defined in claim 24 wherein said guide element includes means cooperatively as-

sociated with said other upright portion for maintaining said guide element in a non-rotative relationship, said guide element including means adapted to engage a lower track disposed spacedly below and along said rail for slidably guiding said guide element along the lower track.

27. In the panel frame assembly as defined in claim 26 wherein said guide element includes a first upright tongue terminating in a laterally extending foot which is adapted to engage beneath a laterally extending shoulder of the lower track.

28. In the panel frame assembly as defined in claim 27 wherein said means for slidably guiding said element includes a pair of spaced upright tongues positioned respectively on opposite sides of said first tongue.

29. In the panel frame assembly as defined in claim 28 wherein said first tongue includes a vertical surface from which said foot extends, said pair of tongues having vertical surfaces remote from said first tongue surface, said first tongue surface and said surfaces of said pair of tongues respectively being adapted and arranged to engage opposite slot edges of the lower track.

30. In the panel frame assembly as defined in claim 29 wherein said first tongue is laterally offset from said pair of tongues whereby said pair of tongues engage one slot edge of the lower track and said first tongue engages only the other slot edge of the lower track.

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