

[54] **STRUCTURAL JOINT**
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[21] Appl. No.: **39,733**

[52] U.S. Cl.52/280, 52/495, 52/79, 52/309, 52/627
[51] Int. Cl.E04b 1/38, E04b 2/08
[58] Field of Search.....52/242, 275, 582, 584, 483, 52/489, 495, 300, 718, 280; 287/20.92 C, 189.36 C

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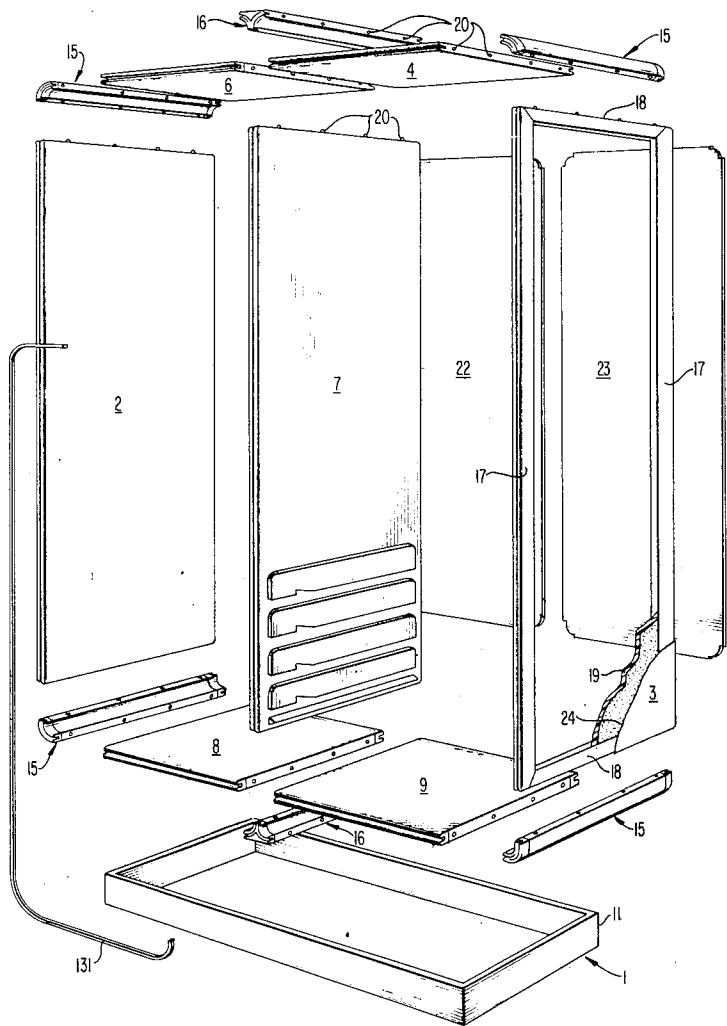
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[57] **ABSTRACT**
A joint removably secures adjacent flat structural elements at an angle to each other with a connecting assembly that has a base member and a sliding catch. The base member has surfaces that are placed against mating surfaces on the flat elements and the sliding catch holds the same together by sliding a wedge underneath a headed stud that extends from each of the flat elements through the base member surfaces. The joint is suitable for a corner of a piece of furniture.

16 Claims, 20 Drawing Figures



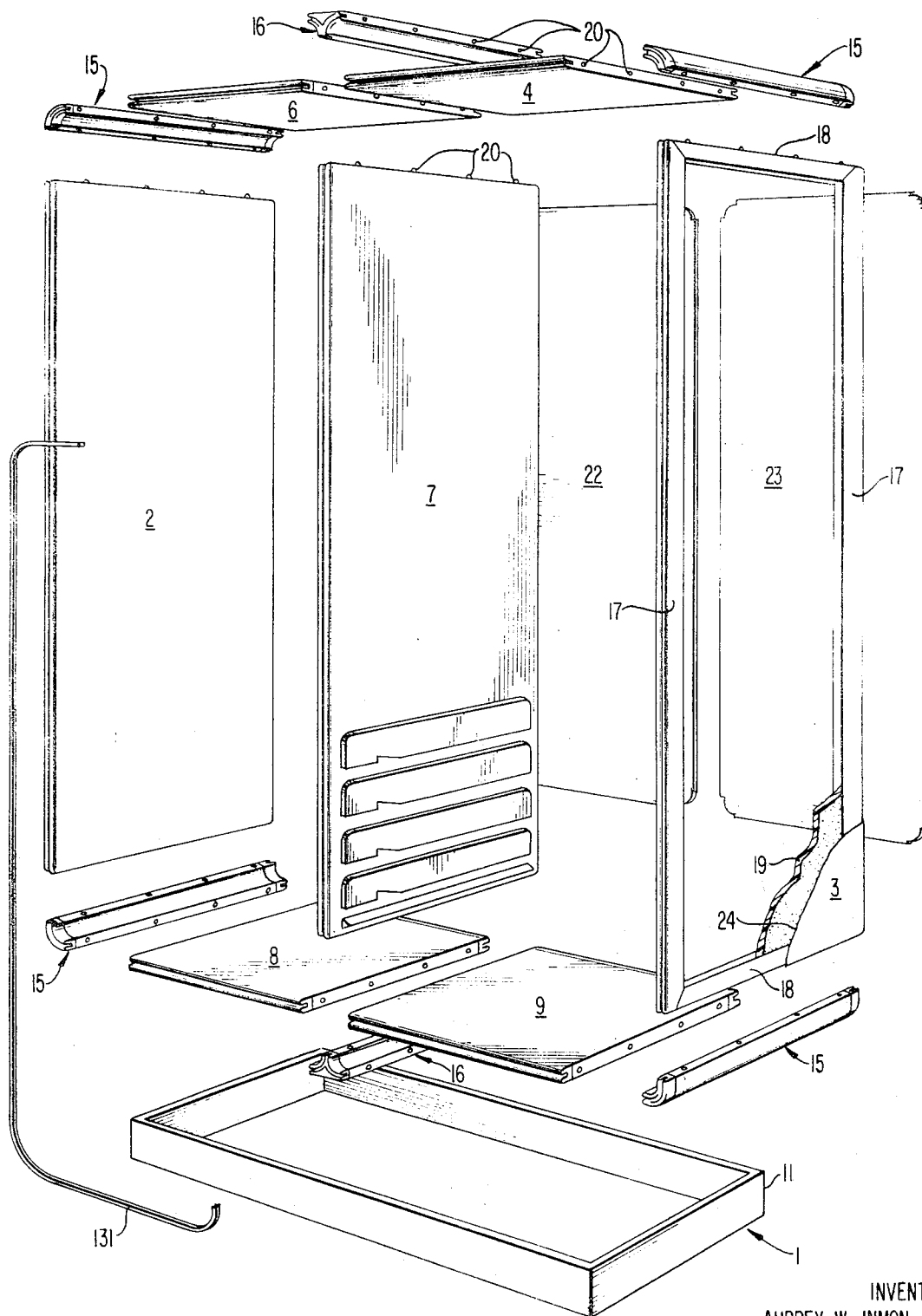


FIG. 1

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ATTORNEY

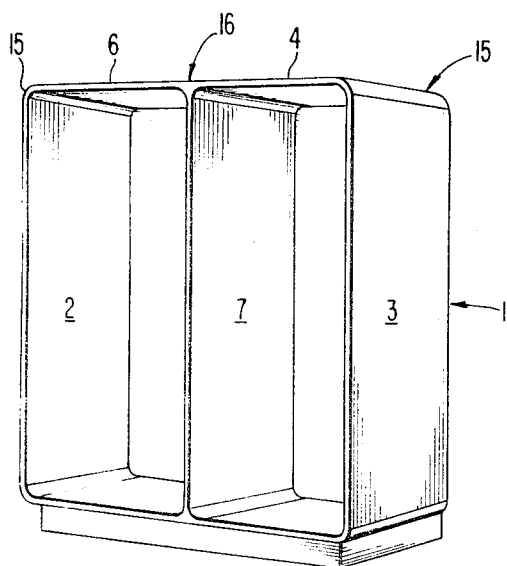


FIG. 2

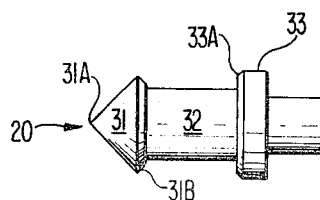


FIG. 10

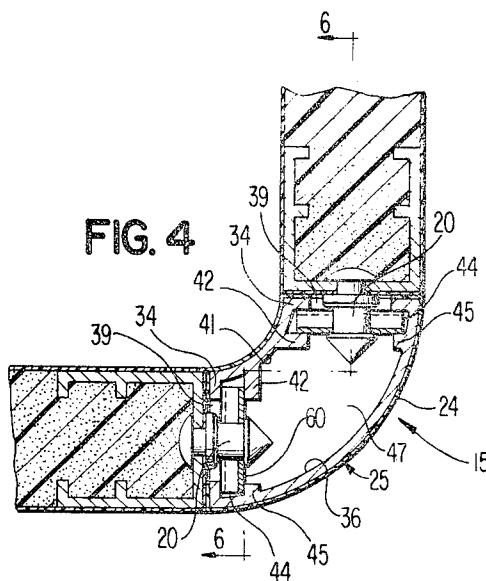


FIG. 4

FIG. 6

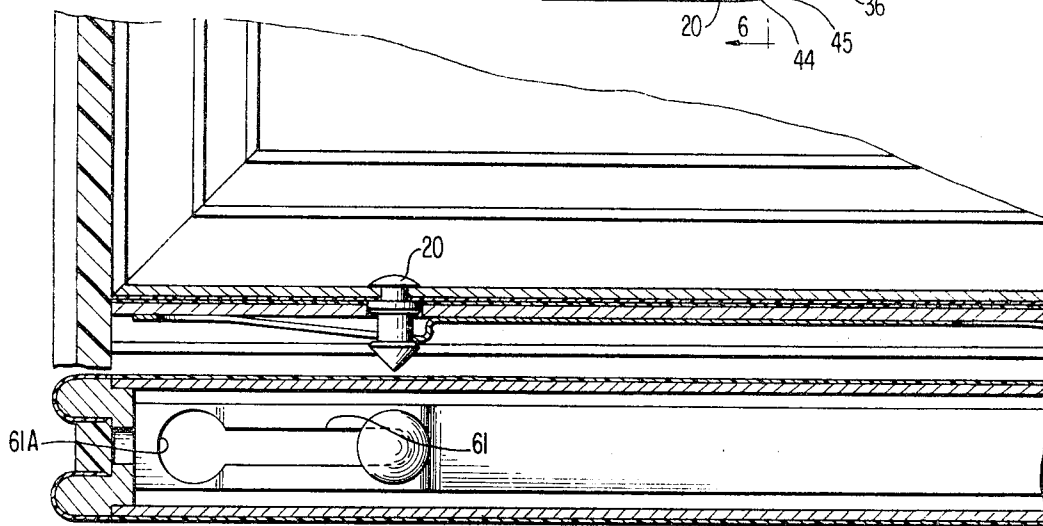


FIG. 6A

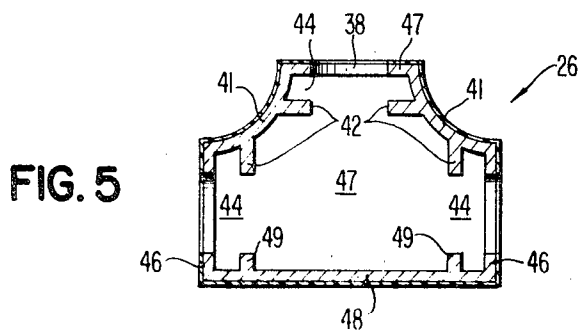
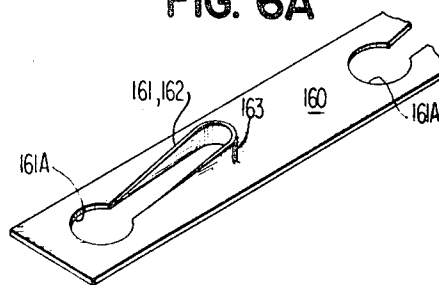


FIG. 5



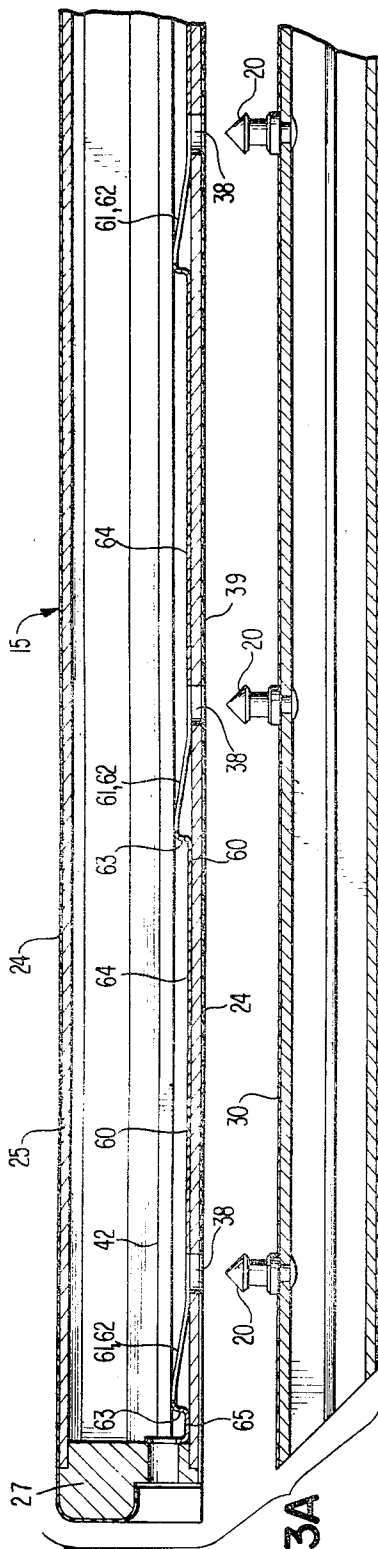
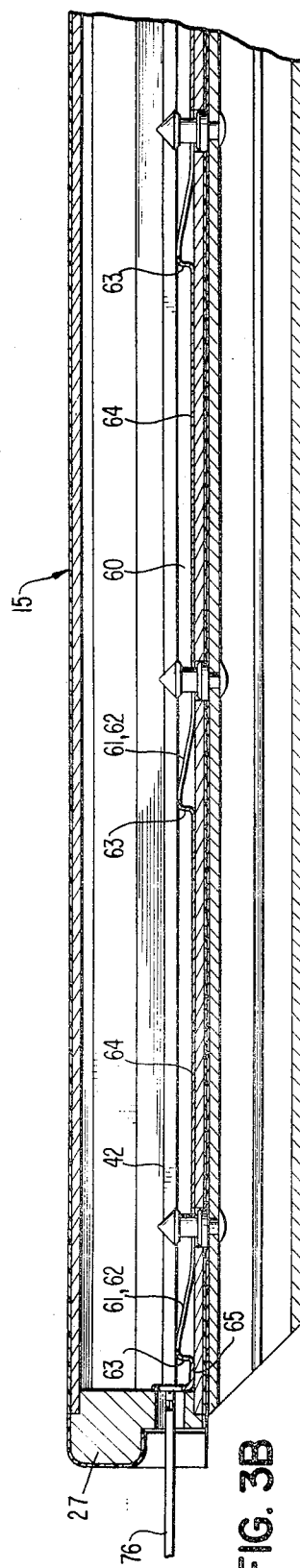
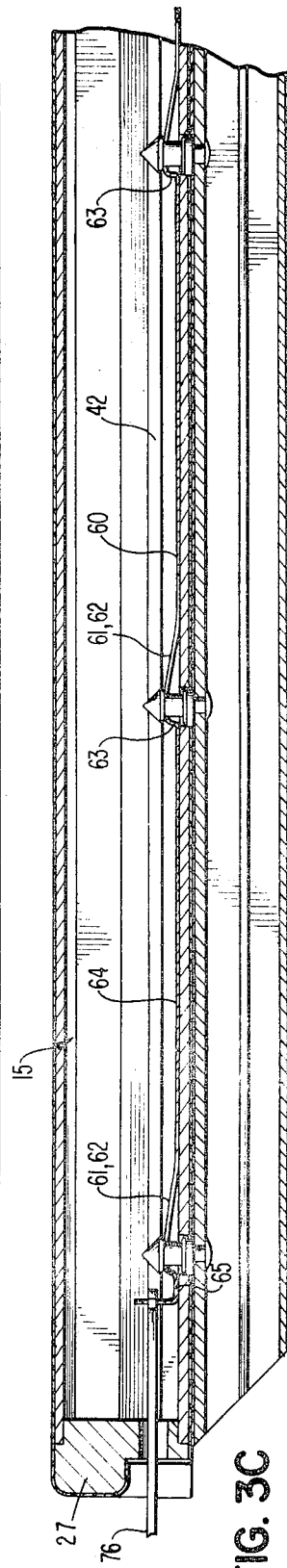


FIG. 3A



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FIG. 7

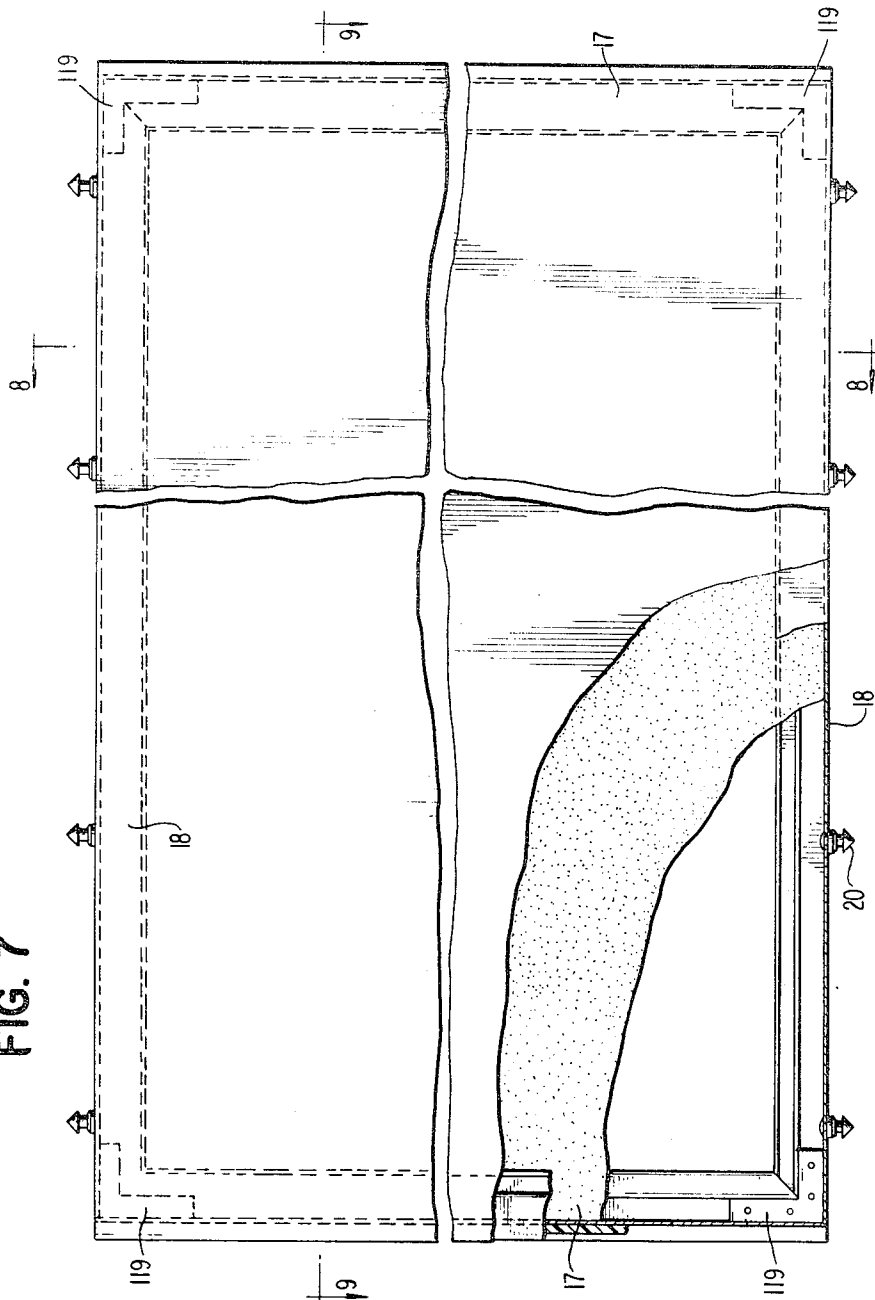


FIG. 8

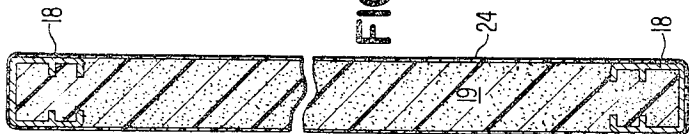


FIG. 9

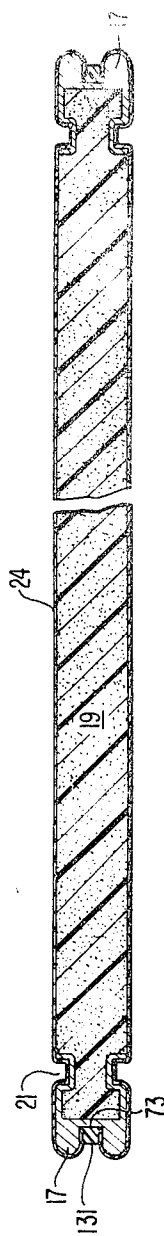


FIG. 14

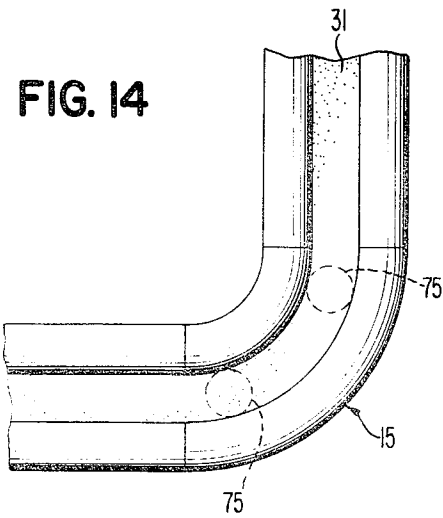


FIG. 15

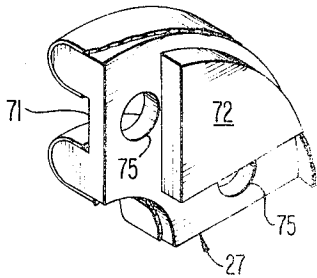


FIG. 16

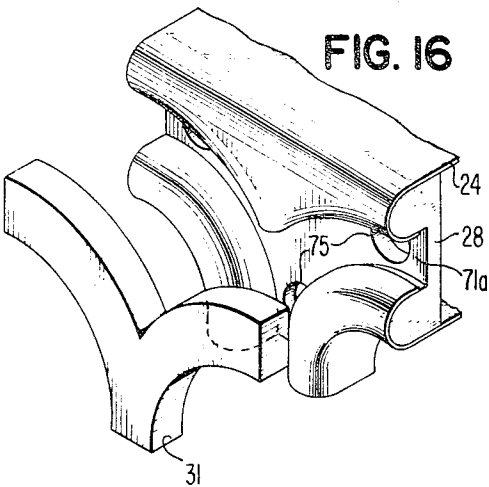


FIG. 17

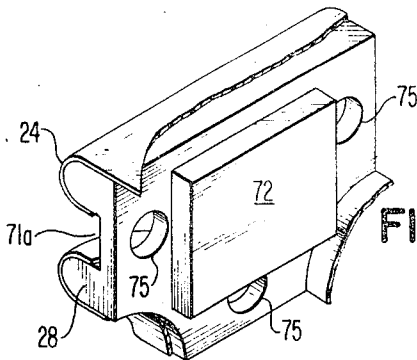


FIG. 12

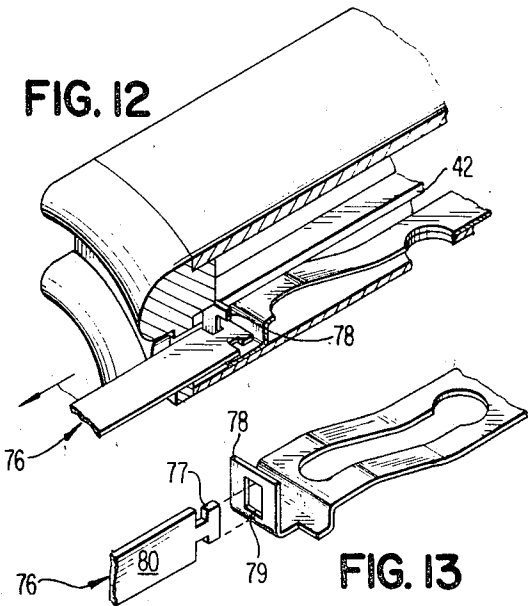


FIG. 11

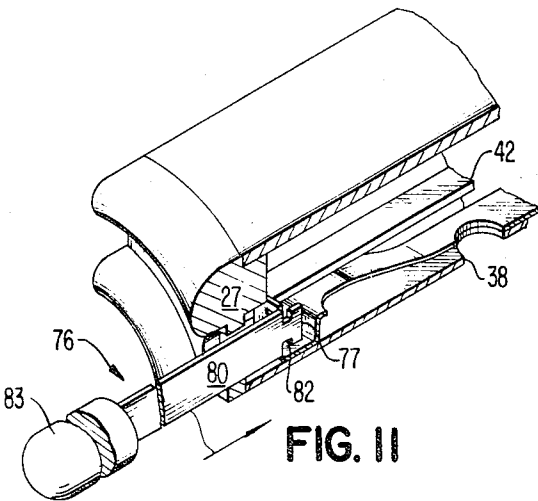


FIG. 13

STRUCTURAL JOINT

SUMMARY OF INVENTION AND BACKGROUND

This invention relates to a structural joint for securing together flat structural elements. One aspect of the invention is a joint suitable for securing flat structural components of furniture to each other at an angle such as securing walls of a cabinet together at a corner or a partition. Without limiting the present invention thereto but by way of example the present invention will be described in connection with an item of furniture, more specifically a modular cabinet construction.

Modular furniture and similar items are often so constructed to be assembled, repaired, modified after assembly, and disassembled. This reduces shipping costs by permitting shipping from the factory of a number of flat panels and small parts which take up less space than an assembled cabinet, for example.

Also, furniture used in schools, dormitories, offices and the like often requires repairs. In such cases as school furniture, etc. conventional furniture often has to be removed to a repair shop where it is held during the time required for repairs. This involves the moving and storage of items that are bulky and builds an inventory of furniture that, during the time for moving and repairs, is not being used. Thus, furniture that can be repaired in situ affords advantages in reducing handling and inventories of items undergoing repair or modification.

Efforts have been made in the past to provide furniture capable of modular construction but which presents a unified appearance regardless of the different varieties of modules which may have been assembled. Modular construction uses standard components or parts to construct various pieces of furniture and often permits ready alterations in an existing piece of modular furniture, additions to it, or repairs to it. For example, an ordinary cabinet can be converted to a chest of drawers or expanded into a series of storage units, and so forth.

The present invention has for an object the production of an improved joint suitable for use in modular furniture whereby adjacent structural elements can be secured to each other. An object of the present invention is to provide a joint that facilitates the assembly and disassembly of structures. Still another and further object is to provide a joint that is particularly suitable for furniture such as cabinets. An object is also to provide a structure that permits in situ repair.

The structure of the present invention, using a corner of a cabinet for example, involves a base member shaped like a hollow quarter round that is used for fastening together two panels or sides of the cabinet which are substantially at right angles to each other. For example, a top or a bottom may be joined to a side, etc. The panels of the cabinet have studs with enlarged heads protruding from their end surfaces. The studs extend into the hollow quarter round where they are each engaged and secured in place by a slide catch having wedge surfaces thereon that slide underneath the stud heads. The wedging action makes each joint tight and the nature of the present construction permits a simultaneous wedging action involving a plurality of studs. This joins a pair of panels to one hollow quarter round to form a corner joint. A similar construction is used for partitions, only instead of a quarter round cross section a tee cross section is used.

The nature of the present invention admits of modular construction and facilitates assembly and disassembly and also affords means to render unitary the appearance of structures employing the present invention.

Other advantages, objects and features may be discerned from reading the following detailed description in conjunction with the annexed drawings wherein:

FIG. 1 is an exploded assembly view of a cabinet using the present invention;

FIG. 2 is an assembled cabinet drawn to a different scale than FIG. 1;

FIG. 3A is a cross sectional view of a corner joint assembly showing the parts before they are put together;

FIG. 3B shows the corner joint first assembled before the sliding catch is moved into position and with a tool being inserted;

FIG. 3C shows the assembly of FIG. 3B after the sliding catch has been pushed into locking position and shows the tool engaged with the catch;

FIG. 4 is a lateral cross section of the base member for a corner joint showing the skin;

FIG. 5 is a lateral cross section of the base member tee for use in making a partition joint;

FIG. 6 is a cutaway side view of a corner joint locked in place and a cutaway plan view of the same joint illustrating the shape of the slots in the slide;

FIG. 6A is a perspective view of part of a modified form of the catch;

FIG. 7 is a side view of an assembled cabinet side panel or partition showing the rivets in place on the end frame members;

FIG. 8 is a section taken along 8—8 of FIG. 7;

FIG. 9 is a section taken along 9—9 of FIG. 7;

FIG. 10 is a side view of one embodiment of a rivet;

FIGS. 11, 12 and 13 illustrate respectively a cutaway view of the slide operating tool inserted through the end cap in the sliding catch to push the catch into locking position, locked to the slide for pulling it to an unlocked position, and the tool - catch relationship;

FIGS. 14 and 15 are respectively a front view and rear perspective view of an end cap for a corner assembly;

FIG. 16 is an exploded view of a partition T end cap and vinyl rubber strip; and

FIG. 17 is a rear perspective view of the partition T end cap of FIG. 16.

Like numbers are used where convenient for designating like parts.

GENERAL

In FIGS. 1 and 2 is shown a cabinet 1 having a construction comprising a plurality of flat structural frame members such as sides 2, 3, tops 4, 6, a partition 7, and bottoms 8, 9 that are assembled together on a base 11 in modular fashion using connecting assemblies 15, 16, respectively at corner joints and partition joints. A modular type construction is illustrated whereby the same types of joints can be used to add additional and similar units to the cabinet while at the same time providing a unitary appearance.

Two kinds of frame members comprising the side or end panels 2, 3 are illustrated in FIG. 1. These can be a single piece construction as shown for the left side panel 2 and middle partition 7 as well as the various top and bottom panels. Preferably, the panel may comprise

a framed construction as shown for side 3 of metal uprights 17, and horizontal bars 18 into which are fitted or to which are secured one or more types of rigid foamed polyurethane or other plastic cores 19 (shown as partly broken away) and is covered by a plastic skin 24 of the sort described below. Aluminum is preferred for the uprights and horizontal bars which are each hollow extruded aluminum with a suitable cross section. FIGS. 4 and 7 respectively show preferred cross sections for the horizontal 18 and upright 17. The metal frame members 17, 18, etc. are secured together by any suitable means, e.g., welding or internal keys 119 (FIG. 7). The studs 20 are driven into (e.g., if the panel is of wood) or welded or riveted (e.g. if the panel is of metal) to the various panel ends, or joining surfaces, on the framework. As a matter of convenience in the present description, the tops 4, 6, bottoms 8, 9, sides 2, 3 and partitions 7, etc., i.e., the structural elements to be joined together, will be referred to as frame members.

The back panels 22, 23 shown in FIGS. 1 and 2 may be secured to the back of the frame members by different means, e.g., held in grooves 21 (FIG. 9) that are formed in the back ends of the sides 2, 3 and partitions 7.

CORNER JOINT ASSEMBLY

As seen in FIGS. 3A, 3B, 3C and 4, the corner joint 15 is an assemblage of cooperating elements having four kinds of parts: a skin 24, a base member 25, end caps 27, and catch means 60.

The skin serves a number of purposes. The appearance of the corner joint is caused to match that of the other cabinet element in color, texture, etc., or to contrast therewith where desired. The corner joint skin also holds the end caps in place on the base member. This permits the use of a diversity of materials since the end caps may advantageously be of molded plastic while the base member may be of metal. By thus holding the end caps in place, the catch is also held in place within limits. Thus, a unitary joint structure is provided.

Although the preceding paragraph refers to the structure of a joint suitable for use at a corner, a similar structure is used for the tee joint 16 employed at partitions, i.e., in FIGS. 16, 17 a skin 24 holds end caps 28 against the ends of the tee base member 26 (FIG. 5) and a plurality (three for a tee) of catch means 60 are enclosed within the base member.

The skin 24 may be selected from any of a large number of known plastic materials. Preferably the skin is made of Rohm & Haas' Kydex which is an alloy of acrylic resin polymer and polyvinyl chloride. This material is extremely tough and, when cured, very hard and rigid. It is capable of bridging short spans. It is thermoplastic and readily formed to shape by the use of heat. It is caused to adhere to the aluminum extrusions and the plastic end caps by a conventional contact adhesive.

All the assemblies 15 for the corner joints between the side, top and bottom panels employ a joint structure according to the present invention that includes an extruded hollow aluminum base member 25 shaped in cross section like a quarter round piece of molding, as in FIG. 4. An extruded hollow aluminum tee base member 26 (referring to the cross sectional shape as in

FIG. 5) is used for the partition. The ends of each base member are closed off by suitable corner rail caps 27 (FIGS. 14 and 15) or tee rail caps 28 (FIGS. 16 - 17) to enhance the appearance.

A flat joining surface 30 on each frame member has in a line a plurality of studs 20 extending a predetermined uniform distance therefrom. The corner base member 15 (or 17 at a partition) receives the rivets and is fastened securely thereto in the manner hereafter described.

When the cabinet of FIG. 1 is assembled it has the general appearance as shown in FIG. 2. The unitary character of the appearance is enhanced by a decorative strip 31 as illustrated in FIGS. 1, 6, 9 and 16 that illustrate how a decorative strip is received in a groove which extends all around the front face of the cabinet. The strip helps to cover up joints between the frame members (such as the various panels) and the corner and partition (tee) base members, to conceal access holes in the end caps, and to protect the skin where the latter is rolled around the ends of the panels and end caps.

Each stud 20 (FIG. 10) has an enlarged head 31 outwardly of a shank 32. The base of the shank immediately adjacent the flat joining surface 30 has a locating collar 33. The collar is of equal or preferably larger diameter than the head. The upper corner 33A of the collar is chamfered and the outer end 31A of the head is pointed (such a head is known as a steeple head) so that each of the holes 38 in the base member legs readily centers itself on the head, moves down the stud and settles around the collar. The stud collar 33 fits fairly snugly in the hole 38. The periphery 31B of the head is chamfered on its underside to facilitate separating a corner joint from a panel.

The collar 33 acts to locate the base member. It also holds the base member in place during hammering and forcing of the catch 60. The collar thickness preferably should not exceed that of the thickness of the base member leg 34, 46, 47.

The corner joint connecting assembly 15 has a base member 25 shaped like a hollow quarter round member having first and second legs 34 substantially at right angles to each other. The outer ends of the legs are connected by an outer wall 36 that is contoured to the desired shape — here as a quarter round — so that the ends of the legs come out flush with the outermost surfaces of the frame members or panels. The quarter round legs 34 are positioned in face-to-face relationship with their respective joining surfaces 30 on the frame members 2 - 9.

Each of the legs has holes 38 in it arranged and spaced so that each stud can extend through a hole with the underside of the stud head being spaced a short distance from the back or inner face 39 of the legs. Each of the holes is of a size large enough to receive the collar 33 on the rivet, but mates closely enough with the rivet that no appreciable relative motion is permitted between the corner joint and the frame member or panel. The base member legs are each thick enough to rise above the rivet collars whereby the collars cannot interfere with movement of the catch 60.

The corner base member 25 has first and second legs which are connected by an inner curved wall 41 that also supports two longitudinal splines 42 that run paral-

lel with the wall and provide sliding catch spaces 44 between them and the legs. A catch is slidably supported within each catch space. The outer wall 36 supports splines 45 adjacent each leg to help define the spaces 44. The splines 42, 45 also strengthen the member.

The partition joint or tee member of FIG. 5 is similarly constructed, having a pair of inner side walls 41, one on each side of the bottommost leg 47 and a pair of legs 46, 46 disposed in parallel planes for the purpose of making butt joints to such frame members as the top and bottom panels 4, 6, 8, 9 shown in FIG. 1. Each of the inner walls of FIG. 5 supports longitudinal splines 42, 42 which aid in defining the sliding catch space 44, and the upper outermost flat wall 48 also supports splines 49 which assist in defining the catch space. Each base member 25, 26 has a central space 47 between the catch spaces 44 and the outer wall 36, 48.

The sliding catch 60 as illustrated in FIGS. 3A, 3B, 3C and 6 has a zigzag or sawtooth cross section and contains a plurality of slots 61 for engaging the studs. One end 61A (FIG. 6) of each slot is larger than the other end; the large end is big enough to pass the stud head 31 and the small end is large enough to receive the stud shank 32 but smaller than the stud head. Preferably the slots are of keyhole shape with the smaller part of each keyhole being located in the inclined surface 62 whereby the slot may be said to have inclined walls. The inclined slot walls 62 terminate their incline at end walls 63 which drop off sharply to a flat base surface 64. The alternating pattern of a flat base surface 64, incline 62, and end wall 63 is repeated for a length sufficient to provide enough slots 61 for engaging whatever number of studs are employed. At the left as viewed in FIGS. 3A, 3B and 3C the end wall 63 drops down to a shortened flat base 65; the tab 78 extends upwardly from base 65. The tab 78 is a means for locking the sliding catch in place by pushing with a tool as described below with reference to FIGS. 11 - 13 as well as FIGS. 3A - 3C.

When the corner joint is assembled the catch 60 is first positioned so that all of the stud heads pass through the large end 61A of their respective slot and then the catch is moved to the left as viewed in FIGS. 3B and 3C. This wedges the inclined wall 62 of the slot between the underside of the stud head and the leg back 39 on the corner joint base member. Preferably the catch is made of steel.

The corner joint has a cap 27 at each end. Each cap (FIGS. 14 - 15) has its outer surface shaped to match the contours of the edges of the cabinet panels, partitions and walls and is flush with the outer edges and surfaces of the adjacent panels. In the illustrated embodiment, a groove 71 is provided whereby a strip 31 of decorative material is inserted to partially conceal the line or joint between the base member and the panel and to enhance the unitary appearance of the cabinet. The back of each cap has lugs 72 thereon that fit into the central spaces 47 in the base and tee members.

The tee caps 28 (FIGS. 16 - 17) have an outer surface shaped to match the cabinet panel contours. Lugs 72 hold the tee caps in place by engaging the ends of the central spaces 47 in the partition base member 16. Grooves 71A, illustrated as tee-or Y-shaped, receive the decorative strip 31.

Many times the cabinets constructed according to this invention may be against a wall whereby access to both end caps is difficult. The following paragraphs FIGS. 3A - 3C and FIGS. 11 - 13 describe features which permit access from one side only for the purpose of assembling or disassembling the corner joint with or to adjacent panels.

Each end cap has a hole 75 located to be in register with the tab 78 on a catch 60 and/or catch space 44 that is associated with that portion of the cap when assembled to the base member. Thus, a cap for a corner will have two such holes and a tee 3 holes.

A special tool 76 (similar to a screwdriver) as illustrated in FIGS. 11 - 13 is designed to pass through the hole, engage the tab on the catch (FIG. 3 too) and permit either pulling or pushing the cap. In the embodiment of FIGS. 11 - 13 pulling to the left will unlock the cap while pushing to the right will lock it. The outer end 77 of the tool is small enough to pass vertically through the hole 79 but the hole is narrow enough horizontally (as seen in FIGS. 11 - 13) to engage the tool if the latter is rotated by 90°.

The upstanding tab 78 on each catch has therein a hole 79 shaped in size to receive the operating end of the tool. For pulling purposes, the tool acts like a hook which engages the tab by means of the hole. For pushing purposes, the tool blade 80 is bigger than the hole in the vertical direction so that the front of the tool 81 can enter the hole and the shoulder made by large blade 80 can then push.

The tool 76 is necked down at 82 (FIG. 11) sufficiently to allow rotating the tool in hole 78 so that tool end 77 engages the catch by engaging the tab. Tool end 77 is wider than the hole 79 but is not quite as high as the hole nor quite as thick as the hole is wide. Tool shank 80 is wider than the tool end and larger than any dimension of the hole 78 to provide a convenient stop means or depth gauge. A handle is fitted on the shank.

The tab 78 is narrow enough to extend vertically upward from the catch through the space between the splines 42, 45 to the central space 47. The tab does not extend so far that it mechanically interferes with other tabs within the base member.

In the preferred embodiment, all of the studs on all of the frame members are equally spaced and extend the same amount from their respective joining surfaces. They are also arranged in a straight line on each joining surface. This permits interchangeability of parts and the use of thin panels or frame members. For the same reason the holes in the legs and slots in the springs are spaced in the same manner as are the studs.

In FIG. 6A is a modified form of the catch or slide 160. It may be used wherever the catch or slide 60 is illustrated elsewhere in the drawings. The differences from the catch 60 are primarily structural in character. For example, a keyhole shaped slot 161, 161A, 162 is provided in the catch 160. However, said slot is formed by upstanding walls 162 so far as the inclined surfaces and narrow edges are concerned. These may conveniently be formed by drawing or stamping a piece of steel so as to form the sloping walls 161, 162 integrally with the body of the catch 160. The rounded end wall 163 connects the opposed inclined side walls 161, 162. The enlarged portion of the slot 161A is, as with the corresponding enlarged portion 61A (e.g., FIG. 6)

large enough to receive and pass the head of a rivet while the walls 161, 162 are spaced far enough apart to let the shank of a rivet pass therebetween.

ASSEMBLY, DISASSEMBLY, AND MODULAR FEATURES

Referring to FIGS. 1 and 3 assembly is accomplished by bringing a leg 34 of a corner member 15 into face-to-face relation with a joining surface 30 on a frame member 2-9 and causing the studs to pass through the respective holes 38 in the legs and into slots 61 in the catch. Sliding catch 60 is then moved to the right as viewed in FIG. 3 so that the inclined surface 62 wedges between the back 39 of the leg and the underside of the stud head 32. This wedging causes a firm and positive engagement of the respective members. A connection is similarly made with an adjacent panel.

As in FIGS. 1, 14, 16, when the entire cabinet has been structurally assembled a decorative strip 31 is placed in the grooves 71, 73. This strip can be a flexible or resilient material such as vinyl rubber polymer. The groove 71 in the cap is aligned with a corresponding groove 73 (FIG. 9) in each of the adjacent panels whereby the decorative strip extends continuously and without interruption from one panel past the cap to the other panel.

If it is desired to disassemble the cabinet, the strip overlying each joint is removed and a tool used to move the sliding catch to an unwedged position. This would mean pulling the catch to the left as viewed in FIG. 3.

The modular character of this construction should now be apparent. For example, additional cabinet elements may be added by substituting the tee or partition joint of FIG. 5 for the corner members and then adding additional top, bottom, side and rear panels in the manner described above. A suitable base 11 or different size can be provided and can be made of any suitable material such as wood, plastic or the like.

The invention claimed is:

1. A joint construction comprising

a first panel with a flat joining surface;

a second panel with a flat joining surface at substantially right angles to said panel joining surface; and at least one stud extending from each said joining surface and having a shank portion smaller than the outermost end of the stud; and

a connecting assembly that includes (1) a base member that has first and second legs at substantially right angles to each other and disposed respectively against said first and second panel joining surfaces and (2) first and second catches respectively slidably mounted on said first and second legs so that each engages the stud on one of said joining surfaces to secure such leg against its respective one of said surfaces in face-to-face relationship;

each leg having a hole through which can pass said stud outermost end and through which extends the stud on the corresponding joining surface;

each catch having at least one slot located on an incline, one end of the slot being larger than the other end, the larger end of the slot being large enough to permit the outermost end of the stud to pass through, the narrower portion of the slot being large enough to receive the shank portion of

the stud but smaller than the stud outermost end, each incline sloping up and away from said leg and joining surface and containing said narrower portion; and

means to locate the base member and hold it in place with no appreciable motion relative to said frame members when sliding the inclines under the stud outer ends with the narrow portions of the slots receiving the shank portions, thus wedging the legs against the respective panel.

2. A joint construction according to claim 1 wherein said means to locate comprises a collar around the base of said stud larger than the stud outermost end, which collar is receivable in the hole in each leg.

3. A joint construction, suitable for joints such as corners and partitions in furniture, comprising

a first frame member with a flat joining surface;

a second frame member with a flat joining surface at substantially right angles to said first member joining surface;

a plurality of similarly spaced studs extending from each said joining surface, each stud having a shank portion smaller than the outermost end of the stud; and

a connecting assembly that includes (1) a base member that has first and second legs at substantially right angles to each other and disposed respectively against said first and second frame member joining surfaces and (2) first and second catches respectively slidably mounted on said first leg and said second leg so that each is engageable with studs extending from one of the joining surfaces, is slidable on one of said legs, and secures said legs against said surfaces in face-to-face relationship;

each leg having holes through which can pass said stud outermost end and through which extend the studs on the corresponding joining surface;

each catch having a plurality of inclines each of which has a keyhole slot therein, the larger end of the slots being large enough to permit the outermost end of a stud to pass through, the narrower portion of the slots being large enough to receive the shank portion of a stud but smaller than a stud outermost end, each incline sloping up and away from said leg and joining surface and containing said narrower portion; and

means to locate said base member and hold it in place with no appreciable motion relative to each of said frame members when sliding the inclines under the stud outer ends with the narrow portions of the slots receiving the necked down portions, thus wedging the legs against the respective frame members.

4. A joint construction according to claim 3 wherein said base member is hollow and the legs extend outwardly to the edge of the joining surface and are connected by an outer wall.

5. A joint construction according to claim 3 wherein at least one end of said base member is covered by a cap having a groove therein, the frame members have edges flush with said cap and have grooves therein that align with said cap groove, and a flexible decorative strip disposed in the cap and frame member grooves.

6. A joint construction according to claim 3 for joining three or more frame members comprising

a third frame member with a flat joining surface substantially parallel to said first frame member joining surface and with studs as aforesaid; and in said connecting assembly a third leg on said base member substantially parallel to said first leg and a third catch, with holes and slots as aforesaid.

7. A joint construction according to claim 3 wherein each means to locate comprises a collar around the base of each stud shank which is larger than the stud outermost end, the hole in each leg being large enough to receive said collar, and each leg being thicker than said collar in the vicinity of each said hole.

8. A connecting assembly for joining together panels or frame members at an angle to each other, each frame member having at least one stud for engaging said assembly, said connecting assembly comprising

a base member with two legs each supported at an angle to the other leg

each leg having at least one hole therein for receiving therethrough a stud having a head larger than its shank and which protrudes from a frame member against which said leg is placed in face-to-face relation;

a catch removably and slidably located on each leg and having a slot therein, one end of said slot being larger than the other end, the large end of said slot being sized to pass the head of said stud and the small end of the slot being large enough to pass the stud shank but too small to pass the stud head;

an inclined surface on said catch in which incline is formed at least part of said slot said surface inclining away from said leg in the same direction as the narrow portion of said slot and containing at least a part of said narrower portion; and

means on each of said legs to locate said base member and hold it in place with no appreciable motion relative to each of such frame members while locking the assembly to such frame members

by sliding the incline on the catch underneath the head on the stud while being so held in place by said means to locate.

9. A connecting assembly according to claim 8 wherein each means to locate includes a hole in each of said legs for receiving snugly a member shaped to fit said hole and mounted on each said frame member.

10. A connecting assembly according to claim 8 wherein said base member is a hollow structure, the legs are of substantially equal length, and an outer wall connects the outer ends of the legs.

11. A connecting assembly according to claim 8 wherein each leg has a plurality of holes and each catch has a corresponding plurality of slots whereby a corresponding plurality of studs on each of said frame members can be thereby engaged.

12. A joint construction according to claim 8 wherein said catch has on one end thereof an upstanding tab, said tab containing means for engaging a tool during assembling to permit pulling and pushing of the catch.

13. A connecting assembly according to claim 8 further comprising an end cap secured to each end of said base member and a skin wrapped around the base member and engaging said end caps to secure the caps upon the base member.

14. A connecting assembly according to claim 8 wherein each of said catches has at one end an upstanding tab with a tool engaging hole in said tab.

15. A connecting assembly according to claim 14 having on at least one end thereof an end cap having a groove in the outer face thereof, tool receiving holes therein within said groove and in register with the respective said holes in said tabs.

16. A connecting assembly according to claim 15 wherein the first said hole each of the holes in said groove is round and the second said hole holes in each of said tabs is rectangular.

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