

[54] **PANEL STRUCTURE AND THE LIKE WITH CONNECTING MEANS**

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

[21] Appl. No.: **96,139**

[52] U.S. Cl.: **287/20.926**, 287/20.92 D, 287/20.92
C, 248/224, 312/111, 52/582

[51] Int. Cl.: **F16b 5/07**

[58] Field of Search: 287/20.924, 20.925,
287/20.926, 20.927, 20.92 C, 20.92 R;
248/224; 312/111; 52/581, 582, 481, 480

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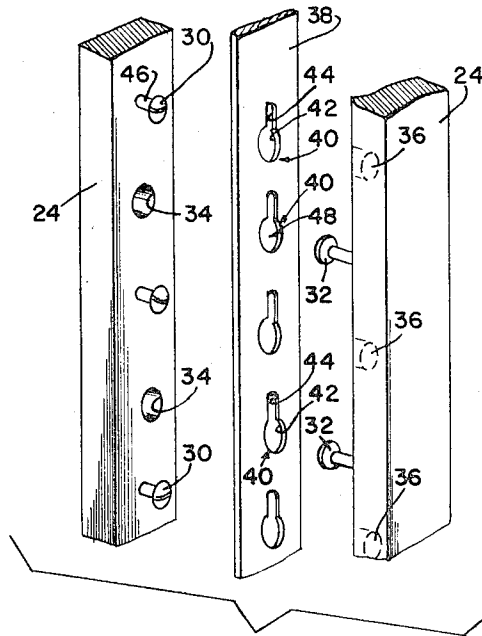
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[57] **ABSTRACT**

A panel structure comprising a plurality of individual panel members having flat connector means disposed therebetween having slot means for receiving locking bolt means therethrough with the connector means having an unlocked position and a locked position so that separate panel members may be quickly joined together in a rigid fashion for assembling a wall partition, room, or the like, and in which the connector members may be disposed in an unlocked position so that the panel members may be quickly disassembled, when desired.

10 Claims, 11 Drawing Figures



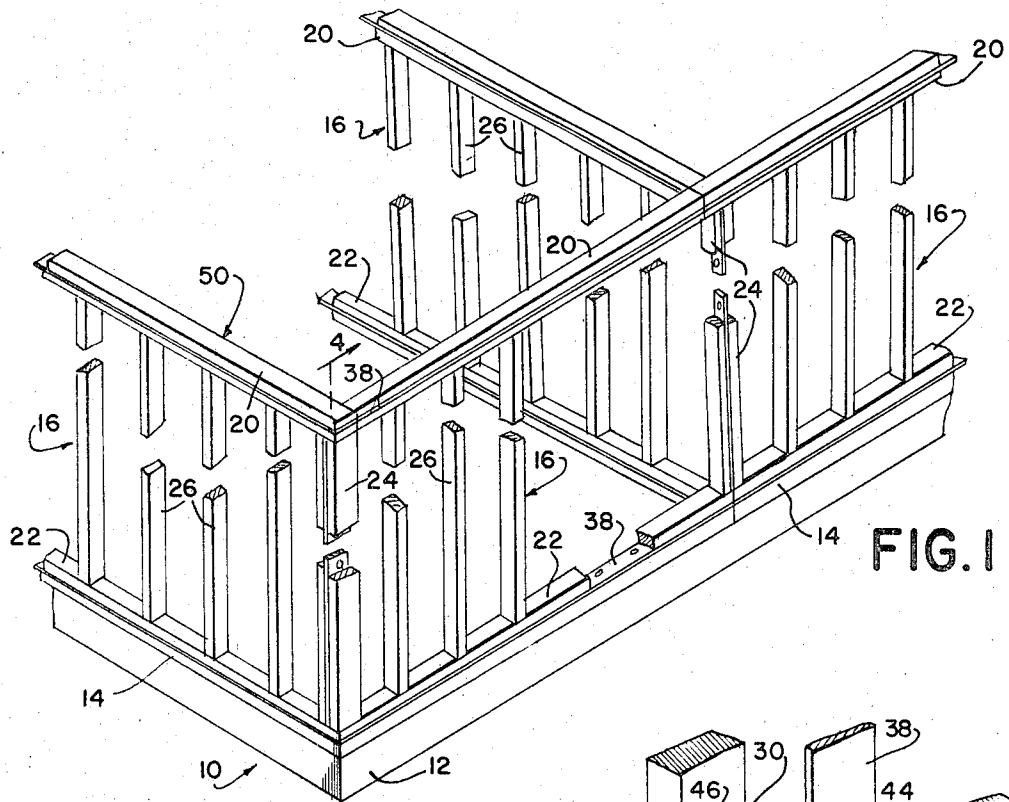


FIG. 1

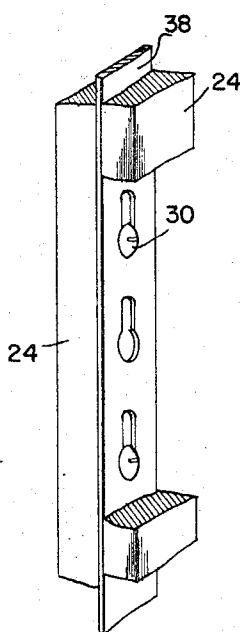


FIG. 3

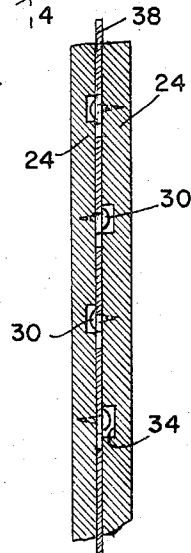


FIG. 4

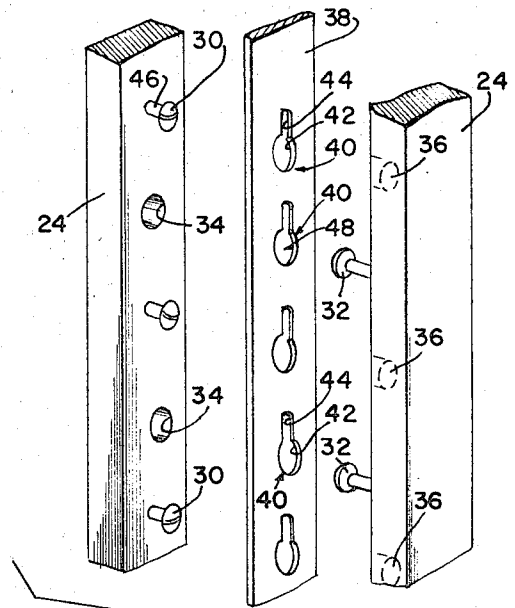


FIG. 2

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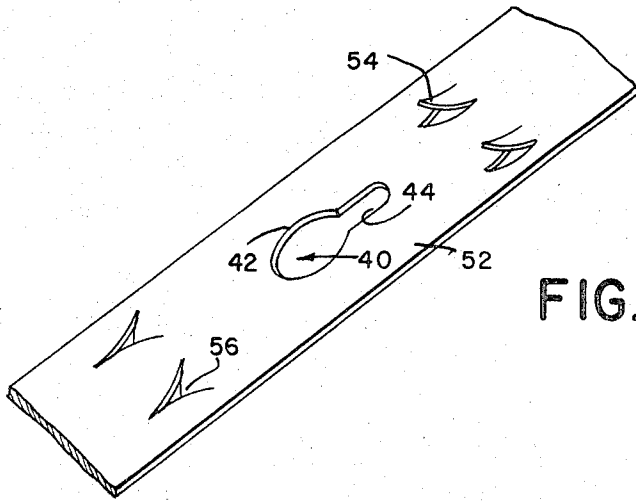


FIG. 5

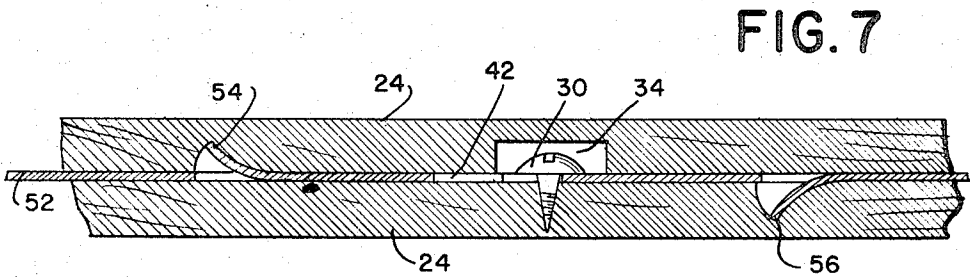


FIG. 7

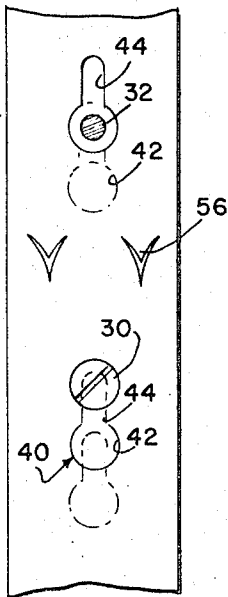


FIG. 6

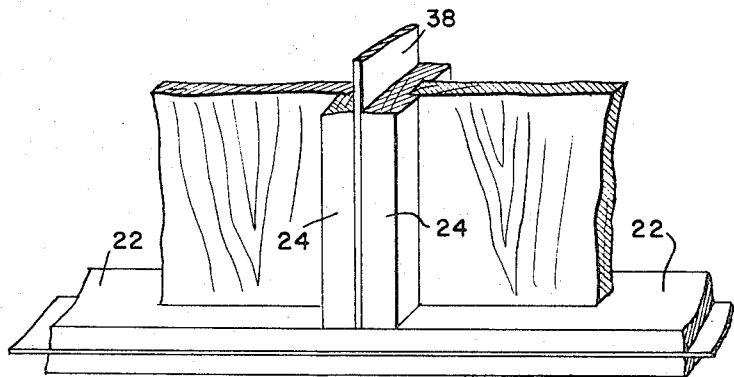


FIG. 4A

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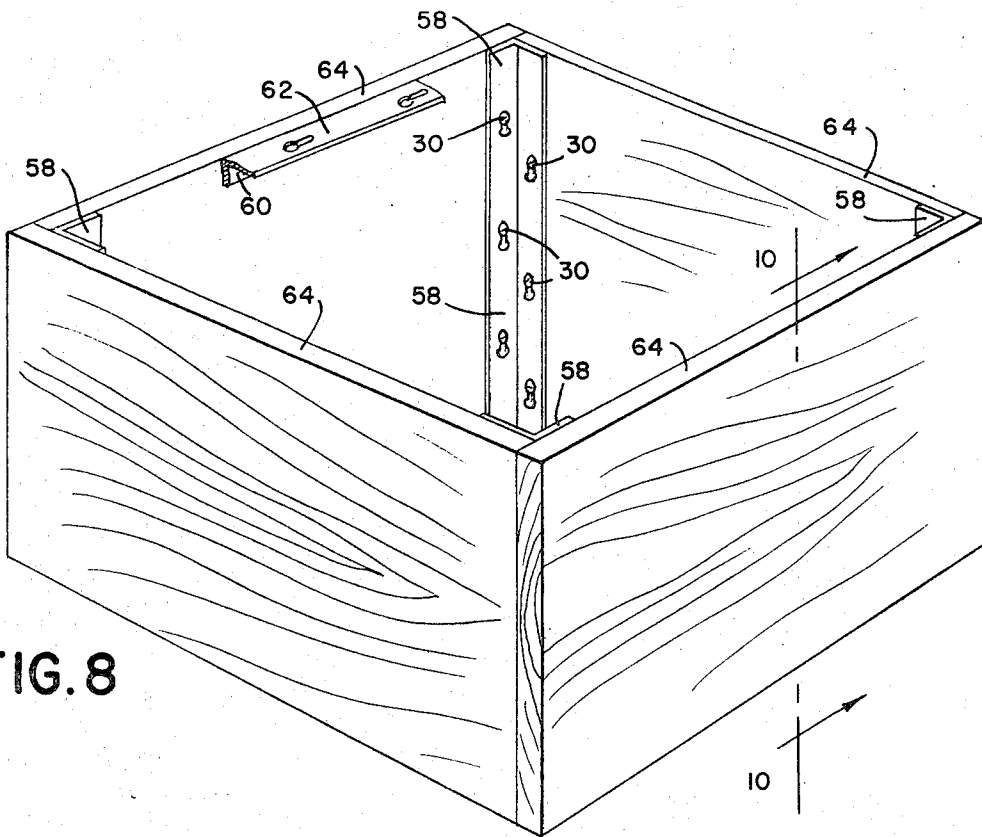


FIG. 8

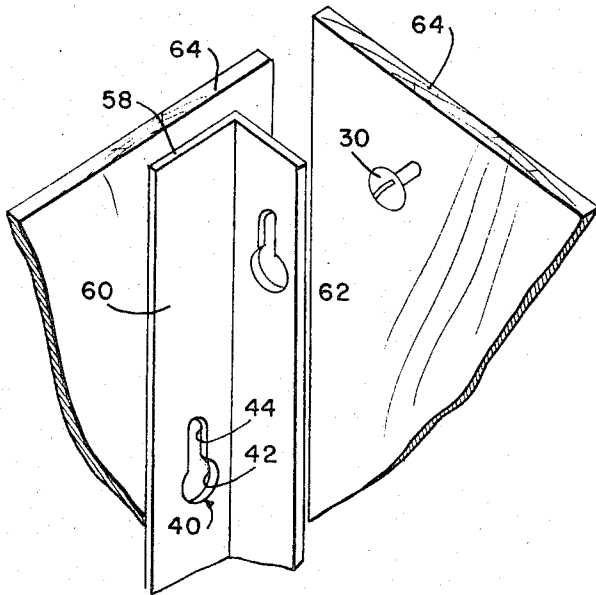
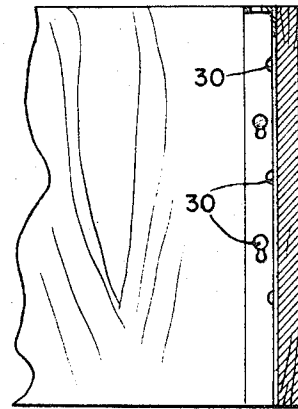


FIG. 9

FIG. 10



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PANEL STRUCTURE AND THE LIKE WITH CONNECTING MEANS

The present invention relates to a panel or wall structure in which a plurality of individual panel members may be joined together so as to form a building, factory, home, garage, shipping crate, container, and other types of space facilities.

It is an object of the present invention to provide a simple and inexpensive method of quickly erecting multiple story buildings and building panels by utilizing complementary bolt locking means disposed in adjacent panels to be joined together and a flat connector or cleat means with slot means, and with the bolt locking means disposed through the slot means to enable the connector means to be positioned in a locked position to form a rigid structure.

It is still another object of the present invention to provide a method of forming a crate or container by utilizing individual sides and end panels and providing the flat connector means and bolt locking means on the sides and ends to make a collapsible container.

It is a further object of the present invention to provide a crate which can be easily assembled and loaded and shipped to a destination where after being unloaded said container can be easily and quickly dismantled, banded in a small stack and returned to the original site for reuse.

It is yet another object of the present invention to provide a method of forming a wall structure and the like from a plurality of individual panel members in which the panel members are connected together by interlocking flat connector members and pin or bolt locking members and in which the connector members can be formed inexpensively of gauge sheet metal.

Another object of the present invention is to provide a floor panel structure which can be provided with matching cleat slots therein to affix wall panels on the topside and bottom side of said floor structure to provide multiple level structures.

It is another object of the present invention to provide flat connector members which extend parallel to the two by four members which form the perimeter of the panels being joined to enable the connector member to be coextensive therewith to give added strength to the joint.

It is another object of the present invention to provide a connector member for joining two panels together which allows a wide tolerance in manufacture and does not require extreme care in lining up two panels to be joined.

It is another object of the present invention to provide connector means having raised teeth or prongs thereon for driving home into the two by four to give the locking together further rigidity.

Various other objects and advantages of the present invention will be readily apparent from the following detailed description when considered in connection with the accompanying drawings in which

FIG. 1 represents a perspective view of a wall structure made in accordance with the present invention and illustrates therein several unfinished rooms.

FIG. 2 is an enlarged exploded perspective view illustrating the connector means and the bolt locking means embodied in the present invention.

FIG. 3 illustrates the connector means of the present invention disposed in a locked position.

FIG. 4 is a perspective enlarged detailed view illustrating the joining together of a horizontal panel and two vertical panels joined together by the connector means of the present invention.

FIG. 5 illustrates a modified connector means in which the flat connector plate member is provided with projecting teeth extending in opposite directions thereon to dig into the two by fours to which the connector member is attached.

FIG. 6 is a front view illustrating the modified connector means of FIG. 5 being moved into a locked position so that the teeth thereon bite into the two by fours.

FIG. 7 is a cross sectional view illustrating the teeth on the connector member of FIG. 5 and 6 disposed in their locked position in two adjacent two by fours.

FIG. 8 is a perspective view of the invention when it is utilized to form a collapsible container.

FIG. 9 is a fragmentary detailed view in perspective, illustrating the method of utilizing the present invention to form one of the corners of the box.

FIG. 10 is a detailed view taken along the line 10-10 of FIG. 8.

Referring to the drawings the reference numeral 10 generally designates an unfinished building structure made in accordance with the present invention and generally designated by the reference numeral 10. The building structure comprises a foundation or base 12 upon which is disposed a plurality of horizontal two by fours generally designated 14. The structure is designed to receive a plurality of vertical sides 16 which have a substantially rectangular configuration. The vertical sides consist of horizontal two by fours 20 defining their upper perimeter and horizontal lower two by fours 22 defining their bottom perimeter with vertical two by fours 24 extending between said upper and lower two by fours 20 and 22 respectively and defining the opposite ends or the vertical perimeters of the vertical sides 16. A plurality of vertical two by fours 26 extend between the upper and lower two by fours 20 and 22 respectively between the end two by fours 24 so as to form a conventional wall or studding for the frame of a partition for wall panel. It is of course realized that some of the members designated 24 may be facing in another direction from the other member 24 forming the other vertical side of the frame, and also that the particular size of the members 24 may vary in order to provide a panel with a flush surface throughout its entire rectangular frame so that a room or compartment can be readily built from the four vertical sides, as illustrated in FIG. 1.

The adjacent panels or frames or vertical sides 16 to be detachably connected to each other are provided with a plurality of vertically spaced headed bolt members 30 and 32 respectively and which members form complementary locking means or pins. Disposed between the headed bolt members 30 are spaced bores or recesses 34 while the adjacent two by four is provided with similar bores 36 spaced therebetween. The bores 34 are adapted to receive the heads of the bolts 32 while the bores 36 are adapted to receive the heads of the bolts 30 therein as hereinafter described.

The connector member is generally designated 38 and comprises a substantially flat plate having space longitudinally therealong a plurality of spaced slots 40. The slots 40 are generally of a keyhole configuration and have an enlarged circular portion 42 and an upper elongated or narrow portion 44 as best seen in FIG. 2.

When it is desired to secure two adjacent members 24 to each other the two panel members are disposed next to each other and the connector members is placed therebetween, as best illustrated in FIG. 2 so that the headed bolts 30 are in alignment with the slots 40 in the connector member 38 and also in alignment with the bores 36 in the adjacent member 24. At this time the headed bolt members 32 on one member 24 are in alignment with the slots 40 in the connector member 38 and are further in alignment with the bores 34 in the adjacent member 24 adapted to receive the headed bolts 32. Thereafter the adjacent members 24 are moved together until they bear against the opposite sides of the connector member 38 and are flush therewith. At this time the respective headed bolt members 30 and 32 are inserted through the large portion 42 of the slots and into their respective recesses. Thereafter, the connector member 34 is driven downwardly by any suitable means and thus the narrow or elongated portion 44 of the slots rests on the shafts 46 and 48 of the respective headed bolts 30 and 32 so that the two adjacent members 24 and the respective adjacent panels or vertical sides are locked to each other.

When assembling a room structure such as illustrated in FIG. 1 the horizontal two by four members 14 and the adjacent lower horizontal member 22 is connected to the horizontal member 14 in the same manner as already described in connection with the locking together of the two vertical side members or frames 16. After the lower horizontal member 22 is locked or secured to the horizontal member 14, the vertical side members are secured to each other. Thereafter, if desired, a top panel or frame generally designated 50 and comprised of a number of two by fours of rectangular configuration adapted to be disposed adjacent the upper horizontal members 22 is secured by the connectors 38 in connection with the securing together of two of the vertical side members or frames 16.

Referring to the embodiment of the invention illustrated in FIG. 5 this connector member 52 is substantially the same as that described in connection with FIGS. 1 and 2 except that it is provided with punched out triangular shaped teeth 54 and 56 therein. The teeth 54 and 56, as best illustrated in FIGS. 5 and 7 bite or dig into the adjacent two by four members 24 when the headed bolt members are disposed in the narrow part 44 of the slots 40 in the connector 52 when the connector is driven home or disposed in its locked position.

It is to be noted that the connector members 38 and 52 are preferably of a width that is coextensive with the adjacent member 24 to which they are secured so as to provide a maximum of strength and rigidity for the securing together of the two members.

When it is desired to disconnect the adjacent panel members or wall structures it is only necessary to lift or raise the connector members into vertical sides so that the bolt heads are again disposed in alignment with the enlarged circular portion 42 of the slots 40 in the connector members and thus the two members, now in an unlocked position can be readily disassembled as desired.

Referring to the embodiment of the invention illustrated in FIGS. 8 to 10, this illustrates the invention when it is made into a collapsible container with a top

and a bottom. In this embodiment of the invention, the connector member 58 is formed of an angle iron configuration and is L-shaped with one connector side being designated 60 and the other connector side being designated 62. The slots 40 are alternately disposed in the sides 60 and 62 as illustrated in the figures and the sides or panel members 64 to form the sides of the box and the top of the box, and are provided with the headed bolts 30. The bolts 30 are inserted through their respective slots 40 after two panels 64 are disposed at right angles to each other and thereafter the angle iron connector members 58 are driven downwardly so as to interlock with the respective bolt members so as to form two sides of the box and the top as illustrated in the figures.

Thus from the foregoing description it is apparent that the present invention can utilize an angle iron connector member for joining together two sides of a container so as to form a collapsible container that can be dismantled after it has been shipped to a point of use and after the goods have been removed therefrom.

Thus from the foregoing description it is apparent that the present invention provides a novel connector means which extends parallel to the two frame members which are to be joined together to give a maximum strength and the connector means of the present invention further allows a wide tolerance in the manufacture thereof and does not require extreme care in lining up adjacent panels.

Another feature of the present invention is the fact that it has raised prongs extending in opposite directions therefrom for driving home and biting into two adjacent frame members to be secured or locked together for further rigidity.

Since various changes can be made in the relative arrangement and the location of the various parts of the invention without departing from the spirit and the scope of the invention, it is certainly not meant to limit this invention except by the scope of the appended claims.

What is claimed is:

1. A reciprocable connector for joining together parallel edges of two separate panels and the like, said connector comprising an elongated flat rigid strip with opposite sides adapted to extend parallel to the parallel edges of the two panels said strip having a plurality of parallel slot means therethrough, each slot means having an enlarged portion and a narrow portion, each slot means being adapted to receive a locking means through said slot means enlarged portions in opposite directions, said locking means comprising bolt means having enlarged head means larger than said slot means narrow portion to prevent them from passing therethrough; said connector having teeth projecting from the sides thereof in opposite directions for engagement with the panel edges thereby to restrain it from undesired independent movement and a means for reciprocating the connector, whereby only said connector has to be moved in one direction or the other to connect or disconnect said two panels.

2. A joint structure of the character described, comprising a pair of parallel studs forming the adjacent edges of two panel members to be joined together, said studs each having longitudinally spaced headed members secured thereto and projecting toward each other,

Each stud having bore means therein positioned to receive the headed members on the other stud, a substantially flat, elongated reciprocable, separate connector member disposed between said studs and extending coextensively therewith to secure said studs to each other, said connector having a plurality of parallel slot means therein, each slot means having an enlarged portion for receiving said headed members therethrough and a small portion to retain said headed members, said headed members being disposed in alternate relationship on said studs, and said bore means being recesses disposed in each stud in alternate relationship and in alignment with the headed members of the other stud which they receive when the enlarged portion of each slot means is in alignment with said headed members and said panel members are moved towards one another, and means to reciprocate the connector.

3. A reciprocable connector for joining together therewith in facial contacting relation the parallel, adjacent edge portions of two panels or the like, said connector comprising an elongated straight member having at least two flat side portions and being made of plate like material, a plurality of elongated, longitudinally spaced, parallel slot means extending through said flat portion of said connector, each said slot means having an enlarged portion and a narrow portion, said slot means being adapted to receive therethrough from different directions and releasably to retain locking means mounted on and extending outwardly from each of said adjacent edge portions, said locking means comprising a plurality of bolt means longitudinally spaced along said edge portions, said bolt means having enlarged head means which are slightly smaller than said slot means enlarged portions and larger than said slot means narrow portions, said spacing of said bolt means being the same as the spacing of said slot means

thereby to permit said slot means simultaneously to register with all of said bolt means, and a plurality of tooth means projecting outwardly from said flat connector portions for engagement with the adjacent edge portions of said panels, and means for reciprocating the connector, whereby when the edge portions of said panels are moved into contact with the flat portion of said connector and said connector has been moved to its engaged position, the narrow portions of said slot means are engaged behind the head means of said bolt means and said tooth means are engaged with said edge portions thereby releasably connecting said panel edges and restraining said connector from independent movement.

4. The connector of claim 3 wherein said teeth are triangular in configuration.

5. The connector of claim 4 wherein said slot means have a keyhole configuration.

6. The connector of claim 5 wherein said teeth are disposed in sets between adjacent slot means.

7. The connector of claim 6 wherein said teeth extend in the same direction longitudinally of said connector.

8. The joint structure of claim 7 wherein said headed members are bolts with an enlarged head thereon and a shaft with said shaft being small enough to pass through said small slot portion and said head being of larger size than said small portion to lock said connector to said bolts.

9. The structure of claim 8 wherein said slot means are spaced longitudinally of the connector member and said slot means have therein small portions adjacent the same ends of the slot means.

10. The structure of claim 9 wherein said slot means are of a keyhole configuration.

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