

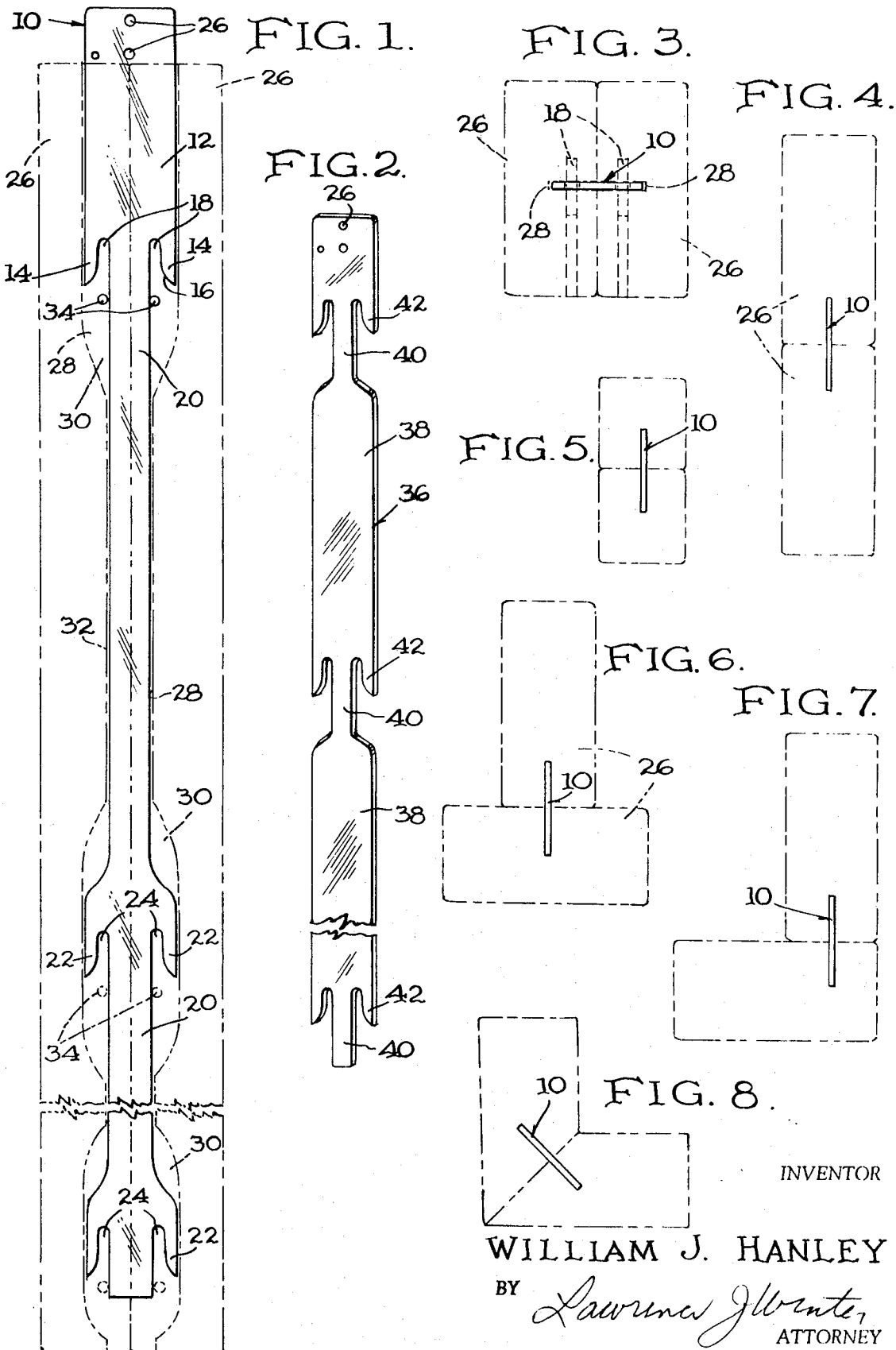
Dec. 14, 1971

W. J. HANLEY
BUILDING AND WALL STRUCTURE AND THE LIKE
AND CONNECTING MEANS THEREFOR

3,626,652

Filed Jan. 5, 1970

4 Sheets-Sheet 1



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FIG. 9.

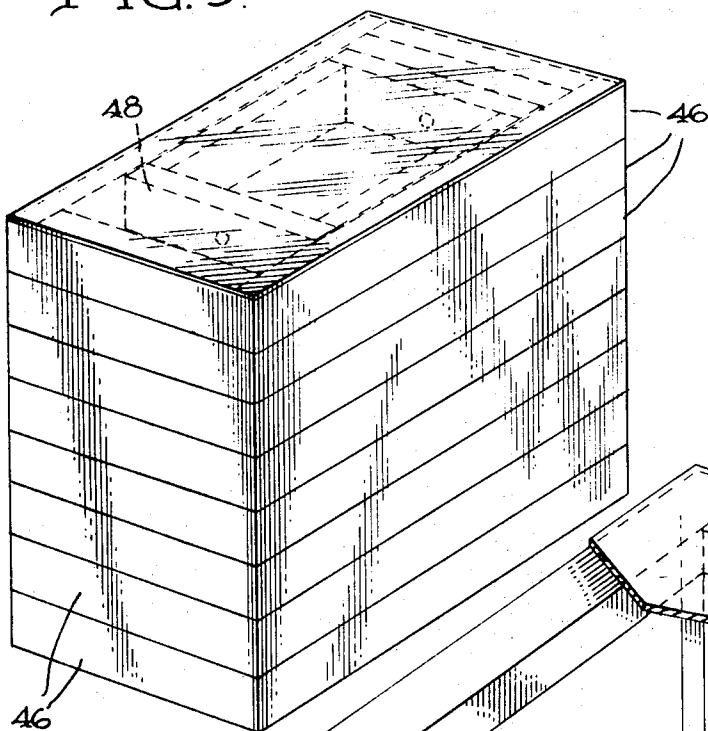


FIG. 11.

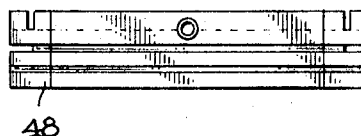
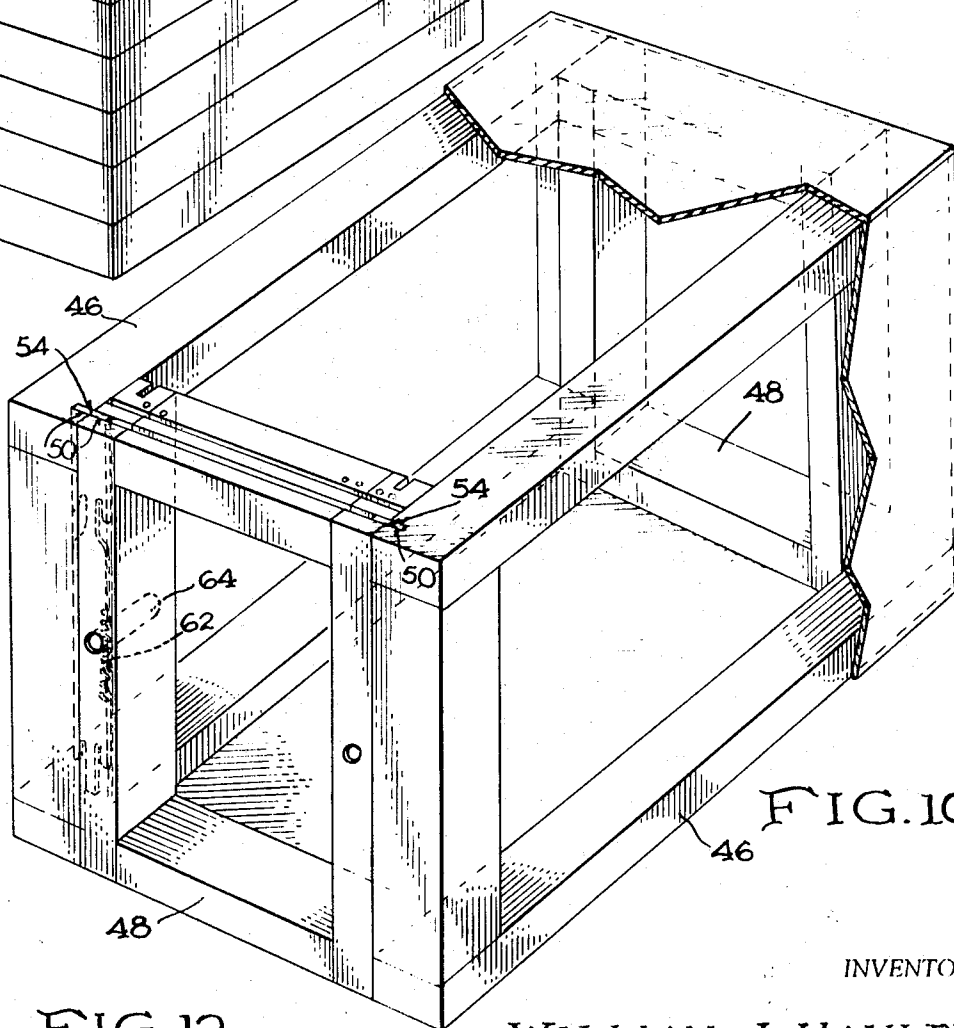


FIG. 10.

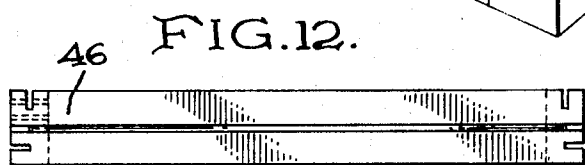


FIG. 12.

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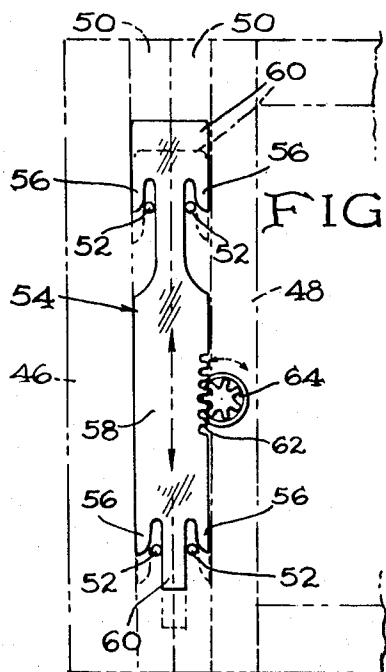


FIG. 13.

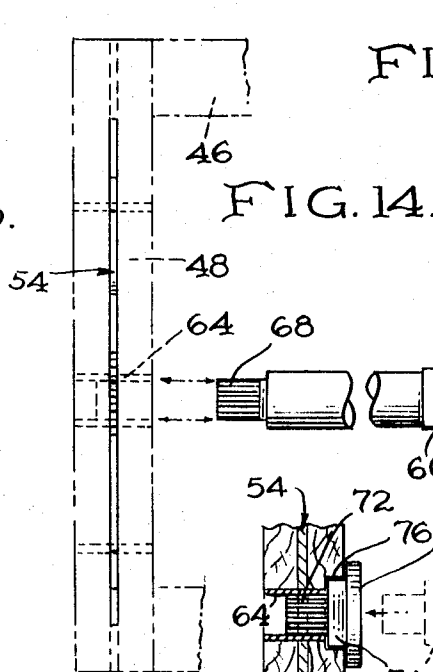


FIG. 14.

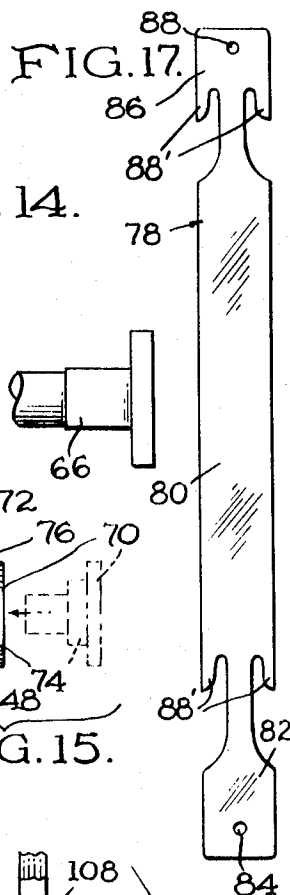


FIG. 17.

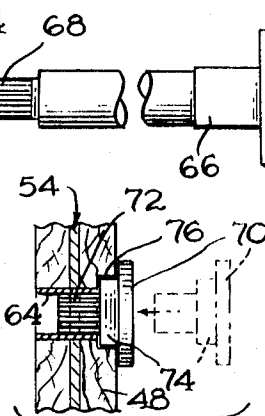


FIG. 15.

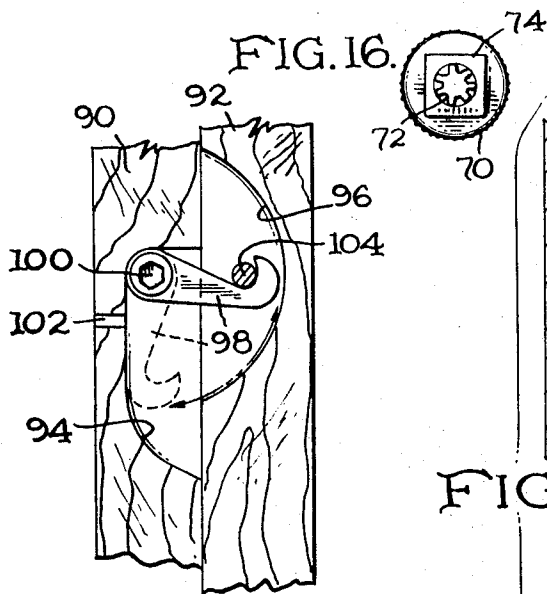


FIG. 16.



FIG. 18.

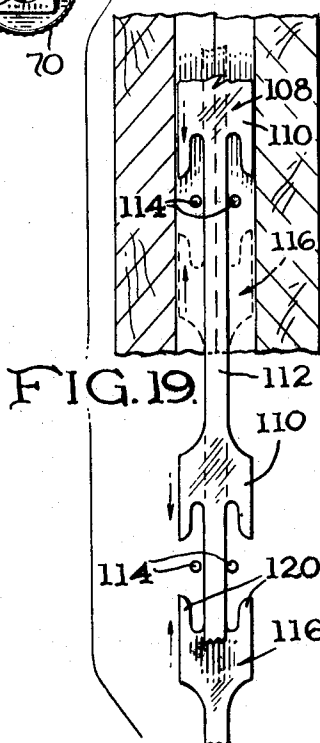


FIG. 19.

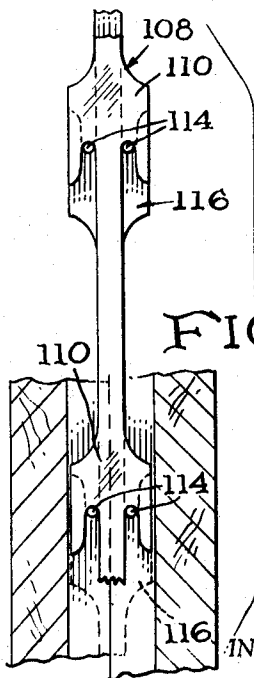


FIG. 20.

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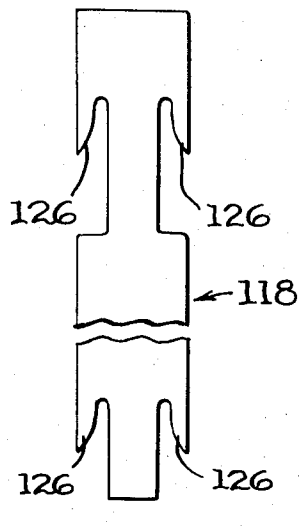


FIG. 21.

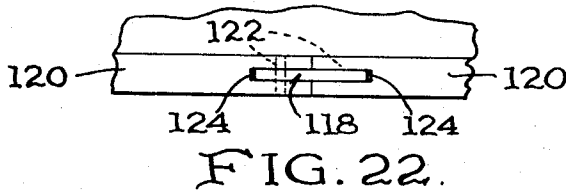


FIG. 22.

FIG. 26.

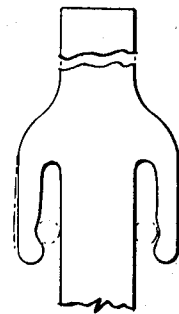
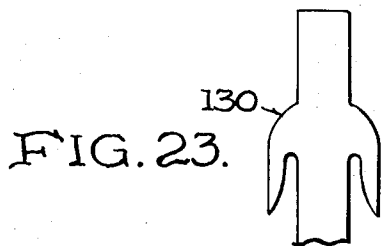


FIG. 23.

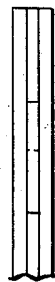


FIG. 24.

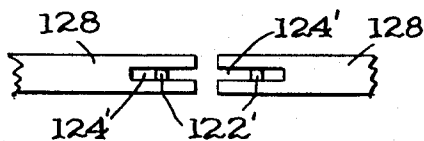


FIG. 25.

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BUILDING AND WALL STRUCTURE AND THE LIKE AND CONNECTING MEANS THEREFOR

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12 Claims

ABSTRACT OF THE DISCLOSURE

A panel structure comprising a plurality of individual panel members having slot means therein with cleat means adapted to be disposed in the slot means with the cleat means having an unlocked position and a locked position so that the panel members may be quickly joined together in a rigid fashion for assembling a wall, container, or the like, and in which the cleat members may be disposed in an unlocked position so that the panel members may be quickly disassembled.

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 or educational tops for children 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 slot means disposed in adjacent panels to be joined together and an interlocking cleat means that are quickly disposed in the slot means, and with pin means disposed in the slot means to enable the cleat means to be positioned in a locking 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 locking cleats adapted to be engaged in complementary slots in said sides and ends and means for moving the locking means cleats to a locked position.

It is a further object of the present invention to provide a method of forming 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 shipping agent 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 cleat members and pin members and in which the cleat members and the pin members can be formed inexpensively of materials such as sheet metal material.

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 story buildings.

It is still another object of the present invention to provide a method of constructing a wall from individual panel members in which panel members are provided with complementary slot means and swingable cleat means are provided to swing from one of the slot means into another of the slot means to engage a pin means therein in order to lock two adjacent panels in a rigid construction.

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 cleat locking means embodying the present invention, shown in an unlocked position when it

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is placed in slot means in the stud means of two panel members to be joined together.

FIG. 2 is a perspective view of a modified cleat locking means for locking together two panel members.

FIG. 3 is a top plan view of FIG. 1.

FIG. 4 is a top plan view of one method of joining two studs of adjacent panel members together.

FIG. 5 illustrates a still further method of joining two adjacent stud members together by another method.

FIG. 6 illustrates a method of joining a right angle partition wall to the outside shell of a house by the present invention.

FIG. 7 illustrates a method of joining two stud members together to form at right angles to each other a corner connection.

FIG. 8 illustrates a method of joining two stud members forming a corner connection wherein each has a complementary diagonal face abutting each other.

FIG. 9 is a perspective view illustrating a stack of frames containing an inner stack of smaller frames for assembling for crate or container frames.

FIG. 10 is a perspective view with portions broken away illustrating a crate frame formed from two rows of the stacked frames illustrated in FIG. 9.

FIG. 11 is an end view of the top frame shown in FIG. 9.

FIG. 12 is a side view of the top frame shown in FIG. 9.

FIG. 13 illustrates the cleat locking means and the locking cleat used in locking the frames together in the container formed in FIG. 10.

FIG. 14 is a side view of the locking cleat and locking means illustrated in FIG. 13.

FIG. 15 illustrates a lock plug inserted into the wrench opening shown in FIGS. 13 and 14 to prevent unlocking rotation of the cleat means.

FIG. 16 is a front view of the locking plug means illustrated in FIG. 15.

FIG. 17 illustrates a modified form of the locking means shown in FIG. 15.

FIG. 18 illustrates another form of locking cleat means with a swingable cleat.

FIG. 19 illustrates a locking cleat means for panel members comprising two parallel disposed cleat means shown in an unlocked position, with the cleats facing in opposite directions.

FIG. 20 illustrates the locking cleat means of FIG. 19 when they have been positioned in a locked position.

FIG. 21 illustrates a locking cleat for metal panels.

FIG. 22 is a top view illustrating two metal panels joined together by the locking cleat means of FIG. 21.

FIG. 23 illustrates a modified form of the locking cleat means for joining together two metal building face panels.

FIG. 24 is a side view of the locking means shown in FIG. 23 illustrating the metal panels with the locking means disposed in the slot in the panels, and

FIG. 25 illustrates the position of the metal panels before they are brought together and closed by the locking means inserted in FIG. 24.

FIG. 26 illustrates a modified form of the locking cleat shown in FIG. 23.

Referring to the drawings, the reference numeral 10 generally designates a locking member comprising an elongated flat preferably sheet metal member having an enlarged rectangular-shaped upper portion 12 with depending oppositely disposed ears or cleats 14 on its lower end. The cleats 14 are substantially straight along their outer surface and have a tapered inner surface 16 forming an elongated rounded end slot 18 with a centrally disposed narrow elongated portion 20 extending below the upper rectangular portion 12. The narrow portion 20 has spaced

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at properly engineered intervals therealong outwardly extending and oppositely disposed cleats 22 forming elongated slots 24 between the cleat and the narrow portion 20, which slots 24 are similar to the slots 18. The locking member or the cleat member 10 is provided with vertically spaced holes 26' for removing the locking cleat member from a pair of studs or two-by-fours 26, as described hereinafter.

The studs or two-by-fours 26 to be joined together are provided with elongated kerfs or slots 28 routed therein as best seen in FIGS. 1 and 3.

The slots 28 are enlarged at spaced intervals indicated at 30, to receive the portions of the outwardly extending cleats 22 therein, as best seen in FIG. 1, while the other portion of the slots as indicated at 32 is narrowed to receive the elongated portion 20 of the locking cleat member 10. The slots 30 are also provided with horizontally extending pins 34 therein which extend transversely of the slots 30 and are adapted to be disposed in the respective slots 18 and 24 of the adjacent cleats when the locking cleat member is disposed in a locked position.

The studs 26 will form the outer frames of two panel members to be joined together. When it is desired to join the two adjacent panel members together in a rigid manner, one of the studs 26 of a panel member, such as the left hand stud 26 in FIG. 1, has the locking member 10 inserted therein. The locking member 10 may be inserted in the slot of this stud by hammering it or tapping it lightly until it is properly positioned in the stud 26, as shown in FIG. 1, with the cleat being disposed above the pins 34 so that the locking member at this time is disposed in an unlocked position. The relative roughness or the rough surface of the routed slot 28 will maintain the locking cleat member 10 in the position in which it is lightly tapped into the slot by a hammer or other suitable means and at this time it will not fall down over the pins 34 in the slot. Thereafter the other stud 26, or the right hand stud, illustrated in FIG. 1, of the other panel member to be joined to the stud 26 or the first panel member is moved into position, and, if necessary, the stud 26 is gently tapped until the right hand portion of the locking cleat member 10 is disposed within the slot, as illustrated in FIG. 1.

Thereafter, a hammer or other suitable means is utilized to pound the locking cleat member 10 downwardly into the respective slots until the respective cleats 14 and 22 move downwardly over the respective pins 34 which are then disposed in the respective slots 18 and 24 of their adjacent cleats.

Thus, with the present invention the locking cleat members will serve to rigidly fasten two adjacent panel members together and will further provide a rigid reinforcement of the panels and make them stronger than before they were rigidly joined together.

Although the locking cleat member has been described as being made of sheet metal material, it is obvious that it could be made of plastic material or any other desired material and the holding pins are preferably set at one-foot intervals although it is also to be realized that the spacing of the pins may be at any desired intervals.

The holes 25 are provided if it desired to disassemble or disconnect the joined panels. The studs 26 are provided with a small slot adjacent the holes 25 so that a tool of any suitable nature may be inserted in the holes 25 so that the locking cleat member 10 can be pulled upwardly to cause the cleats to be removed and unseated from the pins.

Referring to the modified locking cleat member 36, shown in FIG. 2, this is substantially similar to that described in connection with the locking cleat member 10 except that the locking cleat member is provided with elongated wide portions 38 which extend substantially the full length of the locking cleat member with relatively narrow and short sections 40 between said wide portions 38 with the lower portion of the wide portions 38 form-

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ing the oppositely disposed cleats 42. With the modified cleat member, the studs forming the frame of a panel would have larger slots routed out of them.

Referring to FIGS. 4 to 8, inclusive, these figures illustrate different methods of joining two studs of two panel members together, including joining two panel members at right angles to each other so as to form a T-configuration and joining two panel members to each other through their studs at a right angle joint and a method of joining two studs of two panel members to each other at right angles adjacent a diagonal complementary surface in each of the two studs.

Referring to FIG. 9, there is illustrated therein a stack of eight frames for assembling the crate or container frame illustrated in FIG. 10. The stack of frames contains frames that are five inches by eight inches which form the sides of the crate frame and within the outer eight-stack frames five inches by eight inches long are eight other frames that are four inches by five inches and form ends for assembling four crate frames which would have a dimension of four inches across by five inches high by eight inches deep, as illustrated in FIG. 10. The frames may be stud members such as two-by-fours, or studs or any size, depending on the size of the container to be assembled, although, for the purposes of illustration, and as set forth hereinabove, the invention is being illustrated in terms of the aforesaid dimensions. The frames or studs are secured together by any suitable means so as to form a perimeter for a panel member, which perimeter or box frame, as indicated at 46 for the sides for the container and other frames indicated as 48 form ends for the crate frame. The frames 46 and 48 are provided with complementary kerfs or slots 50, as best seen in FIGS. 10 and 13, extending longitudinally thereof and being provided with transfer pins 52 therein disposed at predetermined spaced intervals to receive a locking cleat member 54 therein having oppositely disposed cleats 56 thereon adapted to drop over the transfer pins 52 and the cleat locking member when the locking cleat member is in a locked position. The member 54 is provided with an elongated wide portion 58 between the spaced cleats 56 and also has narrow portions 60' adjacent the cleats 56 with another wide portion 60 adjacent its upper end. One side of the wide portion 58 is provided with a plurality of teeth 62 therein forming a rack. The end frame 48 is provided with an aperture 64 therein and extending through the inner side of the frame to receive a wrench 66 have a plurality of teeth 68 on the end adapted to engage the tooth rack 62, as best seen in FIGS. 13 and 14. The wrench is rotated so as to move the locking cleat member 54 in a downward direction to cause the cleats 56 to drop over the pins 52 when it is desired to rigidly lock the sides together. When the wrench 64 is moved in the opposite direction, it will lift or raise the locking cleat member 54 to the unlocked position shown in FIG. 13 so that the side members 46 and the end members 48 may be disassembled.

By having the aperture 64 open only on the inner side of the frames, the container will be made tamper proof since a wrench cannot be inserted through the apertures. All cleats in the container are rammed home by means of the wrench 66, and the laborer assembles the frames from the inside, locks the cleats then leaves by the door. In order to keep the container from being tampered with and knocked apart by a hammer or other means, a lock plug, indicated at 70, is inserted in the aperture 64, and this plug prevents rotation of the teeth 72 and raising of the locking cleat member 54 to the unlocked position in FIG. 13.

The lock plug 70 is provided with a square shoulder 74 therein which seats in a complementary square shoulder 76 in the frame, as best seen in FIGS. 15 and 16. Thus the engagement of the teeth 72 with the teeth of the rack 62 will prevent any one from striking the front end frame 48, for example, so as to attempt to push it or force it in

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an upward direction to cause the pins 52 in the end frame 48 to lift the locking cleat member in an upward direction in an attempt to disassemble the two rigidly joined parts.

Referring to the modification of the cleat locking member 78 shown in FIG. 17, this may be used in place of that shown in FIGS. 13 and 14, and comprises a wide central portion 80 without a rack. This locking cleat member is also provided with a wide portion 82 adjacent the bottom thereof with a hole 84 therein and a wide portion 86 adjacent its upper end with a hole 88 therein. The cleats 88' are similar to those described in connection with the cleats 56 of the member 54, and in this embodiment of the invention, the holes 84 and 88 are utilized to drive nails therethrough in order to lock the cleat in position after it has been properly hammered or forced downwardly in the complementary slots of the studs to which it is to be locked so that it will not inadvertently become unlocked. Also, if desired, the end frames 48 or the frames 46 may be provided with set screws inserted therein and an Allen wrench may be inserted in the set screws so as to thread them tightly against the face of the locking cleat member in order to prevent the member from moving to an unlocked position after it has been dropped over the respective pins 52 in the slots of the frame.

Referring to the modification of the invention illustrated in FIG. 18, two studs 92 disposed on two separate panels, not shown to be joined together, are provided with routed slots 94 and 96 with the slot 94 having a swingable L-shaped cleat 98 pivotally connected to a bolt member 100. The stud 90 is provided with a slot 102 therein in communication with the slot 94. The complementary arcuate slot 96 is provided with a transverse pin 104 therein. When it is desired to connect the two stud members 90 and 92 together in a rigid manner, a pin or bar is extended into the slot 102 and driven against the cleat 98 until it moves it from the dotted position shown in FIG. 18 to the locked position shown therein in which the lower end 106 cradles the pin 104. The studs 90 and 92 may have the cleats 98 and the pins 104 spaced at predetermined intervals therealong. This type of cleat 98 can be used where it is necessary that the cleat not protrude beyond the panel, for example when the last panel of a house made from the panels is erected.

In the embodiment of the invention shown in FIGS. 19 and 20, there is shown therein a method of rigidly connecting two panel members together by using oppositely directed cleats which are installed in parallel extending slots in a stud. One locking cleat member 108 has a plurality of wide portions 110 spaced at intervals between narrow portions 112 with the wide portions 110 having cleats thereon which are adapted to drop over the transverse pins 114 disposed in the oppositely disposed slots of the studs to be joined together.

The slots have the cleat locking members disposed therein, as already described in connection with the earlier embodiments except there are parallel disposed slots and the second parallel slot has another locking cleat member 116 disposed in the slot. The locking cleat member 116 is identical to the locking cleat member 108 except that its cleats 120 extend in a reverse direction, or in an upward direction. When the two locking cleat members have been disposed in the slots, as illustrated in FIG. 19, the cleat members are in an unlocked position.

When it is desired to lock the cleat members over their respective pins 114, the locking cleat member 108 is driven in a downward direction, as indicated by the arrows in FIG. 19, while the locking cleat member 116 is driven in an upward direction as indicated by the arrows in FIG. 19 until the respective cleats are disposed on their respective transverse pins 114 and the two panels are rigidly joined together.

Referring to FIGS. 21 and 22, there is shown therein a cleat locking member 118 for joining or securing together two adjacent metal building face panels indicated as 120.

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The panels 120 are provided with transverse pins or rivets 122 therein disposed in complementary slots 124. The locking cleat member 118 is forced laterally into the slots 124, at which time the cleats 126 thereon are in an unlocked position and are not disposed over the pins 122. Thereafter, a metal insert member is disposed on top of the cleat locking member 118 and the member is driven downwardly until the cleats 126 are forced over the pins 122.

Referring to the embodiment of the invention illustrated in FIGS. 23 to 25, this also is a method of clamping together metal building face panels indicated at 128 with the use of a modified locking cleat member 130. Referring to FIG. 25, it will be noted that panel members 128 are not closed or abutting one another when the panel members 128 have not been rigidly secured together by the locking cleat member 130, but when the locking cleat member 130 has been properly disposed in the respective slots and driven home over the pins therein, the two panel members 128 are pulled together in abutting relationship.

From the foregoing description, it is apparent that the present invention provides a novel and efficient method of locking together panel members or any type of adjacent structure members, and further can be utilized to make closed containers if desired.

From the foregoing description, it is further apparent that the present invention provides a novel locking cleat means that can be made of sheet metal material or plastic material and which can further be utilized so as to be readily positioned within adjacent complementary slot means in two members which are to be joined together and the cleat member can be forced over transverse pin members disposed in the slot means to rigidly secure two panel members or structural members together and to increase their rigidity and strength by use of the cleat means of the present invention.

It is further apparent from the foregoing description that the present invention provides a novel cleat locking means and a cleat locking means that has rack means to which wrench means can be applied in order to move the cleat means with the rack means into a locked position and which further can be disposed within a closed container so as to prevent tampering therewith.

It is further apparent that the present invention provides a cleat locking means that is swingable from an unlocked position into a locked position over a pin member in another panel to be connected thereto.

From the foregoing description, it is also apparent that the present invention provides novel cleat locking means which are oppositely directed to overlap and lock them together.

Although the structure of this invention has been illustrated and described herein to a somewhat detailed extent, it will be understood, of course, that the invention is not to be regarded as being limited correspondingly in scope, but includes all changes and modifications coming within the terms of the claims hereof.

What is claimed is:

1. A joint of the character described, comprising a pair of stud structures forming the adjacent edges of two panel members to be joined together, said studs having elongated slots therein facing each other, transverse pin means in said slots disposed in alignment with each other, an elongated substantially flat connector member extending into said slots, said connector having oppositely disposed cleats extending outwardly therefrom and forming recesses therein for receiving said pin means therein to secure said panel members together, a second elongated connector member is disposed in said slots and has its cleats extending in a direction opposite to the cleats of said first mentioned flat connector member.

2. The joint of claim 1 wherein said connectors are made of sheet metal material.

3. The joint of claim 1 wherein said connectors are

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provided with hole means therein for removing said connectors from a locked position over said pin means.

4. The joint of claim 1 wherein said connectors have a plurality of alternate wide and narrow sections, and said cleats depend from said wide sections and extend parallel to said narrow sections.

5. The joint of claim 1 wherein said connectors have racks thereon and wrench means are provided to engage said racks to lock and unlock said cleats on said pin means.

6. A connector for joining together wall panels and the like having adjacent edge portions with slot means therein and pin means in said slot means, said connector including a relatively flat member adapted to be inserted into said slot means adjacent said pin means with cleat means on said member for hooking over said pin means rigidly join said adjacent wall panels together, and another relatively flat member of substantially the same shape as said first mentioned flat member with said flat members having their cleat means extending in opposite directions.

7. The connector of claim 6 wherein said members are elongated and said cleat means are spaced longitudinally of said members at predetermined intervals.

8. The connector of claim 6 wherein said cleat means are outwardly extending oppositely disposed sections forming elongated slots disposed at spaced intervals along said members.

9. The connector of claim 6 wherein said members comprise alternate wide sections and narrow sections with said cleat means being formed by depending cleats extending from said wide sections and spaced parallel to said narrow sections.

10. The connector of claim 6 wherein said members have rack means disposed on one side thereof and wrench means are operatively associated with said rack means to move said cleat means into a locking position over said pin means.

11. A connector for joining together two wall panels and the like having adjacent edge portions with longitudinally extending narrow elongated slots therein, said

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slots being disposed in horizontal alignment with each other, at least one transverse fixed pin member in each slot in horizontal alignment with each other, said pin members being disposed in the lower portion of said slots, a substantially flat connection member with downwardly and parallel extending fixed cleats therein disposed at spaced longitudinal intervals, said cleats being disposed on said flat member on opposite sides thereof and in alignment with each other, said cleats forming horizontally aligned elongated slots with the main portion of said flat member, said edge portion panel slots being of substantially greater length than said cleats whereby said member can be inserted in said edge portion slots and driven in one direction to drive the cleats over said pins to detachably lock the panels together.

12. The connector of claim 11 wherein said member comprises alternate wide sections and narrow sections with dependent cleats extending from said wide sections with rack means disposed on one side of said wide sections and wrench means operatively associated with said rack means to move said cleats into a locking position over said pin means.

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FRANK L. ABBOTT, Primary Examiner

U.S. Cl. X.R.

52—586, 127; 287—20.92 K