

Nov. 3, 1970

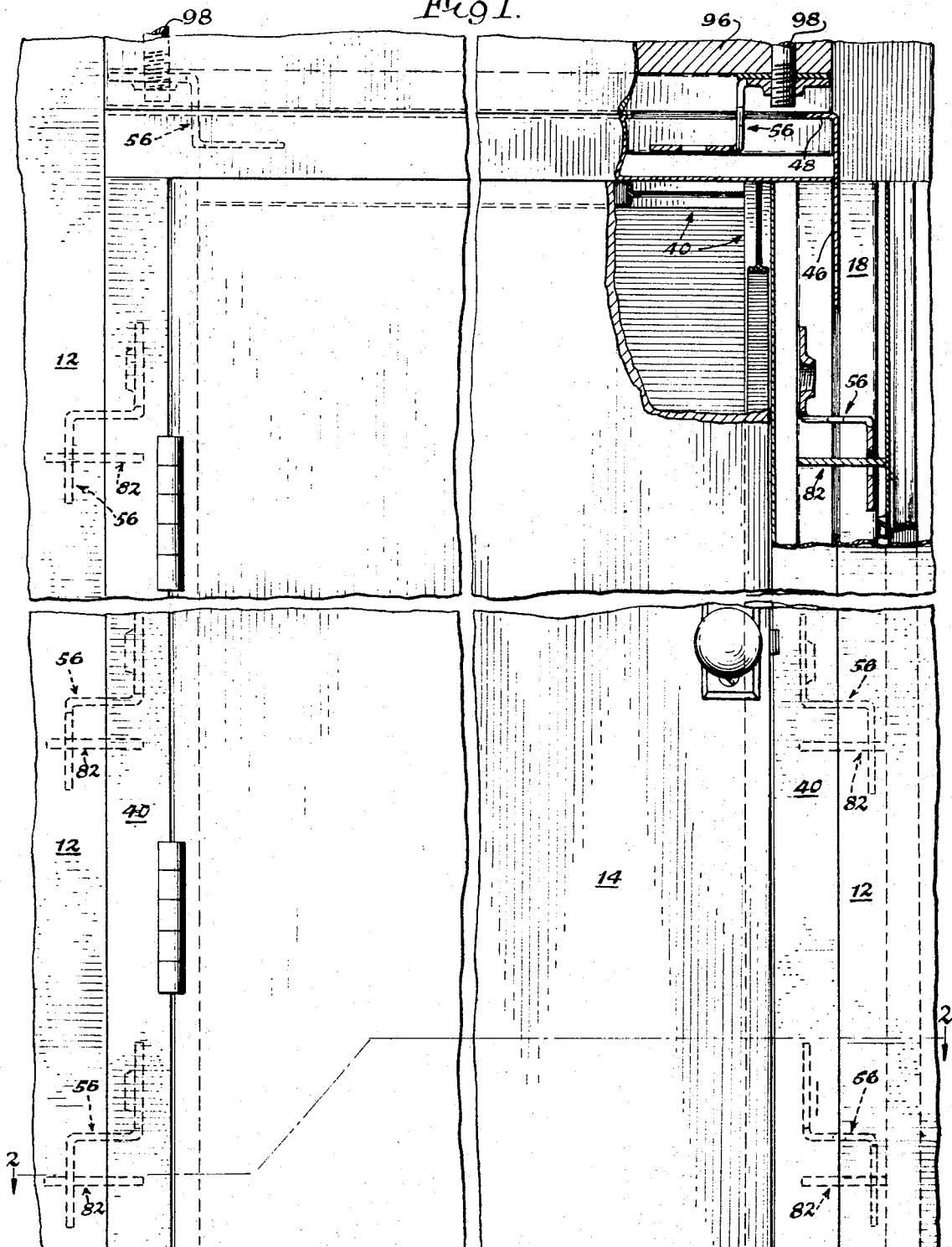
R. P. LICKLITER ET AL
PANEL WALL STRUCTURE WITH PANEL CONNECTORS JOINED
BY SPACER AND ATTACHING CLIPS

3,537,222

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2 Sheets-Sheet 1

Fig 1.



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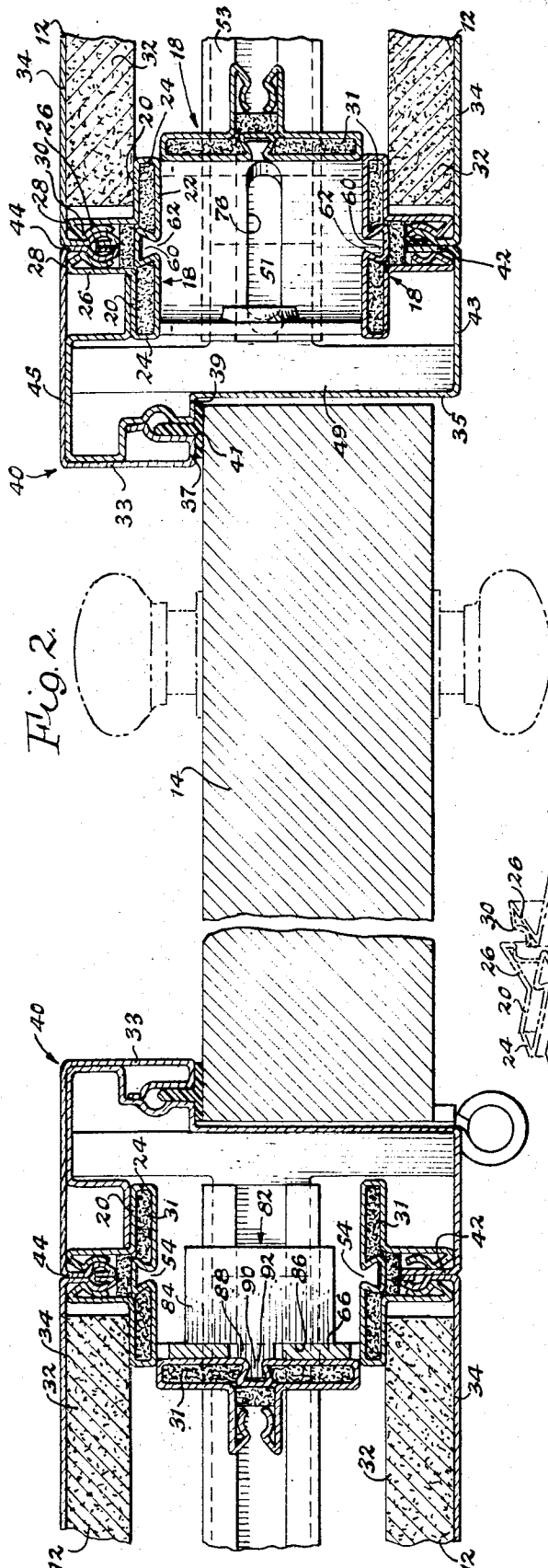


Fig. 2.

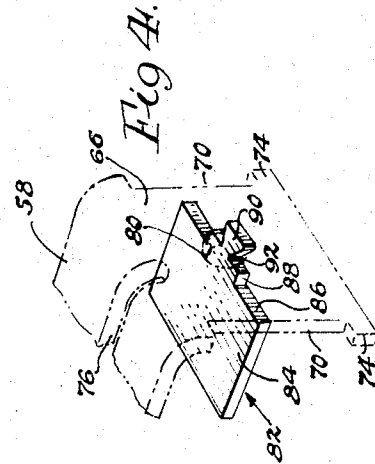


Fig. 4.

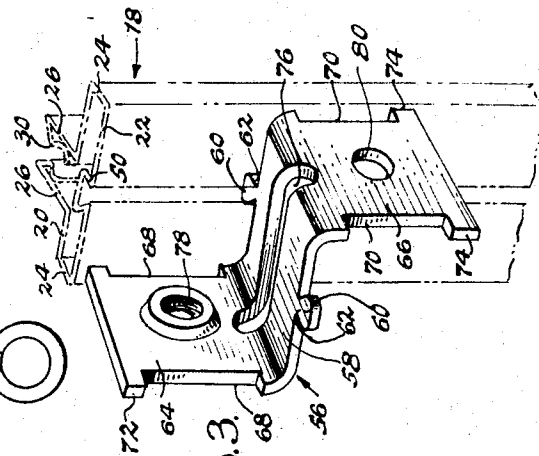


Fig. 3.

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PANEL WALL STRUCTURE WITH PANEL CONNECTORS JOINED BY SPACER AND ATTACHING CLIPS

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Continuation-in-part of application Ser. No. 703,955, Feb. 8, 1968. This application Nov. 20, 1968, Ser. No. 777,438

Int. Cl. E04b 2/76; E06b 1/18

U.S. Cl. 52—481

18 Claims

ABSTRACT OF THE DISCLOSURE

A rigid support structure comprising a pair of opposed panel connectors and a third adjacent panel connector extending in the same direction interlocked together by means of a spacer clip having an attaching clip. Insulation is provided within the panel connectors to fireproof the same. The spacer clip is of generally Z-shaped configuration having a web body spanning the space between the opposed panel connectors and having locking heads for insertion into the opposed panel connectors. Legs extend in opposite directions from the web body and have lateral edges with portions thereof bearing against the opposed panel connectors. An opening is provided in one of the legs for admitting the locking head of the attaching clip therethrough to be inserted in the third panel connector.

CROSS-REFERENCE TO A RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 703,955, filed Feb. 8, 1968 on Wall Structures.

BACKGROUND OF THE INVENTION

This invention relates generally to the construction art, and more particularly to certain new and useful wall panel constructions employing novel spacer means.

It is known to employ various prefabricated, modular wall paneling arrangements for erecting partition or perimeter wall structures in an effort to provide mass produced, low cost constructions which can be readily installed and which also can be easily dismantled when it is desired to remove or shift the position of the walls. Wall panel supports in the form of panel connectors maintained in a spaced relationship by detachable interlocking spacer elements are disclosed in Ser. No. 703,955.

Such constructions are sometimes subjected to heavy compressive loads and periodic impact forces, particularly in the area of door frame enclosures. To adequately reinforce such constructions may pose a problem when the wall structure is to be fire rated because of the additional reinforcing material required which can substantially increase the transmission of heat.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a double wall construction which is simple, inexpensive, rigid and strong in construction, and rugged and durable in use.

It is another object of this invention is to employ insulated panel connectors having heat resisting materials provided therein.

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It is another object of the present invention to provide a double wall panel supporting structure incorporating stabilizing spacer clips detachably interlocking said supporting structure.

Still another object of this invention is to provide the foregoing in a structure possessing the requisite stability and strength while minimizing direct transmission of heat.

In carrying out this invention, opposed elongated panel connectors extending along the side edge portions of wall panels are utilized in conjunction with spacer clips interposed between the connectors, the clips and connectors having a detachable interlock. A third, angularly related panel connector is interlocked with the opposed elongated panel connectors by the spacer clips to form a strong and rigid supporting structure. Thermal insulating material is provided within the panel connectors to fireproof the same. The clip is of a generally Z-shaped configuration having oppositely directed legs which are recessed defining ears in bearing relation with the opposed panel connectors. An attaching clip having a locking head insertable through an opening in one of the spacer clip legs interlocks the third panel connector to the spacer clips.

The foregoing and other objects, advantages and characterizing features of this invention will become clearly apparent from the ensuing detailed description of an illustrative embodiment thereof, taken together with the accompanying drawings wherein like reference numerals denote like parts throughout the various views.

DESCRIPTION OF THE DRAWING FIGURES

FIG. 1 is a fragmentary front elevational view of a paneled wall structure, with portions broken away, in which a preferred illustrative embodiment of the invention is incorporated;

FIG. 2 is a fragmentary, horizontal sectional view taken about on lines 2—2 of FIG. 1;

FIG. 3 is a perspective view of a spacer clip of this invention, an associated panel connector being indicated in phantom; and

FIG. 4 is a perspective view of an attaching clip used with the present invention, an associated panel connector being indicated in phantom.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now in detail to the drawings, there is shown an illustrative embodiment of this invention incorporated in a partition or perimeter wall construction comprising a double wall structure having opposed panel members 12 defining opposite wall surfaces with an access door 14 therein as shown in FIGS. 1 and 2.

Panels 12 are mounted and supported in properly spaced relation by means including panel connectors, generally designated 18, which extend vertically and also can extend horizontally to receive the four side edge portions of each supported panel 12. Each panel connector 18 (FIG. 3) consists of a sheet metal fabrication of a unitary, one-piece construction formed to provide a rectangular body portion having front face portions 20 and a rear face 22 joined and spaced apart by opposite side faces 24. A pair of flange portions 26 extend outwardly from front face portions 20 away from rear face 22 to form a pair of corners adapted to receive the edge portions of adjacent panel members, or to receive the edge portion of one panel member and a portion of a

door frame assembly as shown in FIG. 2. The metal or other sheet material of which connectors 18 are fabricated is folded over at the outer end of flanges 26 to provide cam surfaces 28 leading to opposed shoulder portions 30, the opposite edges of the sheet material terminating within the opening between flanges 26.

A particular feature of the present invention is that the wall structure can be fire rated by including a heat insulating material 31, such as fiber glass, substantially pure braided asbestos, or the like within the rectangular body portion 20-24 and partially between opposed flange portions 26 of panel connectors 18 along their entire lengths to fireproof the same in the event of a fire.

Each panel member 12 includes a body 32 of gypsum, wallboard or any other suitable material, covered with a skin 34 of metal or other thin sheet material which can be painted or decorated to provide any desired effect. Skin 34 extends beyond panel body 32 and is formed to provide an intumed skirt having a shoulder engaging behind connector shoulder portions 30 with a snap-fit, as disclosed in application Ser. No. 703,955. If desired, door 14 can be formed of the same material as panels 12.

Door 14 is mounted and supported in a door frame structure including door frame assemblies, generally designated 40, such assemblies extending vertically along the opposite side edges of door 14 and horizontally above the top edge of door 14 to form a door frame construction. Door frame assemblies 40 are each provided with interlocking means such as an intumed flange 42 which slip-fits between flanges 26 of the adjacent connector 18, and an intumed skirt 44 inserted between flanges 26 of the opposite panel connector 18 with a snap fit. Door frame assemblies 40 are fully disclosed and claimed in application Ser. No. 777,437 filed Nov. 20, 1968, filed simultaneously herewith and each comprises wall surfaces 33 and 35 connected by shoulder portions 37 and 39 which define a door stop and are spaced to receive a cushioning strip 41. Wall portions 43 and 45 complete the outer wall paneling and connect surface 35 with flange 42 and surface 33 with skirt 44, respectively.

Panel connector friction clips 46 having right angularly connected flanges 48 (FIG. 1) are provided at each corner of the door frame construction to join the ends of the vertical and horizontal door frame assemblies 40 together with a friction fit. The lateral edges of friction clips 46 are serrated so as to be snugly received in channels formed in the rear faces 22 of opposed connectors 18. In order to reinforce the door frame structure and add rigidity thereto, a brace clip is provided adjacent the bottom of each door frame assembly, such clip comprising an upper horizontal flange 49 extending between wall portions 43 and 45 and having opposite ends abutting the inner surfaces of wall portions 43 and 45. Flange 49 is connected by a web body to a lower horizontal flange 51 inserted in a channel member 53 supported on a floor surface and disposed midway of the double wall structure. Clips 46 and the brace member also are disclosed and claimed in the above mentioned application Ser. No. 777,437.

A significant feature of the present invention is the provision of a third vertically extending panel connector 18 (FIG. 2) interlocked with opposed panel connectors 18 to form a rigid, reinforced construction capable of withstanding heavy compressive forces and bending moments. As shown in FIGS. 2 and 3, panel connectors 18 are formed to provide an internal channel having inwardly diverging side walls 50 leading to a rear wall 52 and providing a restricted inlet opening 54 through rear face 22. Channel 50-54 extends the full length of connector 18 in alignment with the opening between flange portions 26, the channel proper being entirely confined within the rectangular body portion 20-24 of the connector as shown.

In accordance with this invention, means including

spacer clips 56 are provided for interlocking the three panel connectors together and for maintaining the opposed panel connectors in properly spaced relation. Spacer clips 56 (FIG. 3) each comprise a web body 58 spanning the space between a pair of opposed panel connectors 18 as shown in FIG. 2 and having at opposite sides thereof locking heads 60 joined to body 58 by reduced width neck portions 62. Spacer clips 56 are conveniently fabricated from a sheet of steel, aluminum or other suitable material, and preferably have a material thickness less than the width of inlet opening 54 to the connector channels. Heads 60 fit within channels 50-54 with necks 62 extending through openings 54 to interlockingly engage a pair of opposed panel connectors 18 at opposite sides of spacer clips 56, as described in Ser. No. 703,955.

Each clip 56 is of generally Z-shaped configuration having legs 64 and 66 formed at opposite ends of body 58 and extending in opposite directions normal to the plane of body 58. The lateral edges of legs 64 and 66 are recessed as at 68 and 70 defining ears 72 and 74 having bearing surfaces adapted to contact rear faces 22 of opposed panel connectors 18. Thus, the contact bearing area between opposed connectors 18 and spacer clip 56 is materially reduced to minimize thermal conduction while adding rigidity to the overall double wall construction. To further decrease heat transmission through spacer clip 56, an elongated slot 76 extends lengthwise of body 58 thereby providing a barrier against the transmission of heat. A threaded opening 78 is provided in leg 64 and an opening 80 is provided in leg 66 for reasons hereinafter apparent.

An attaching clip 82 (FIG. 4) formed of the same material and having substantially the same thickness as spacer clip 56 is provided for connecting the third panel connector 18 to spacer clip 56. Attaching clip 82 comprises a main body portion 84 having a front edge 86 adapted to bear against leg 66 and an extension 88 adapted to be received in opening 80 of leg 66. Extension 88 is provided with a locking head 90 joined to extension 88 by a restricted or reduced width neck portion 92. The width of attaching clip 82 is approximately the same width as recessed leg 66 so that the lateral edges of clip 82 do not contact the rear faces of opposed panel connectors 18.

When assembling a wall in accordance with this invention, opposed panel connectors 18 are erected and spacer clips 56 are inserted therebetween at spaced intervals along the lengths thereof as illustrated in FIG. 1. To do this, spacer clips 56 are initially rotated to a position 90° from the positions shown in the various drawing figures. This aligns the thickness of spaced clips 56 with channel openings 54, permitting heads 60 to be inserted through openings 54. Spacer clips 56 are then twisted 90° to the positions shown in the drawings. This confines heads 60 within channels 50-54, the relative sizes being such as to provide a snug-fitting interlocking engagement between spacer clips 56 and opposed panel connectors 18. A third panel connector 18 is erected in a right angularly related position adjacent the opposed panel connectors 18 as shown in FIG. 2 with legs 66 of spacer clips 56 abutting the rear face of third panel connector 18. Attaching clips 82 are rotated to a position 90° from that shown in FIG. 4 and inserted through openings 80 into opening 54 of the third panel connector 18, the spacing between opening 80 and body 58 and the width of body 84 being dimensioned to permit this. Attaching clips 82 are then twisted 90° to the position shown in FIG. 4 to lock the third panel connector against legs 66 and thereby provide a snug-fitting interlocking engagement between spacer clips 56, opposed panel connectors 18 and adjacent panel connector 18. After the three vertically extending panel connectors have been fully assembled, door frame assemblies 40 may be snap-fitted behind shoulders 30 of opposed panel connectors 18 to form a door frame construction. Horizontally extending panel connectors 18 can be secured to ceiling 96 by threading anchor fastening means

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98 such as a bolt or a screw through threaded opening 78 of spacer clip 56. It should be understood that the box-like supporting structure of three panel connectors interlocked by means of a spacer clip 56 and an attaching dip 82 can be employed at any selected juncture between adjacent modular panels where added rigidity and strength is required or desired.

Accordingly, it is seen that this invention fully accomplishes its intended objects. Panel connectors 18 and spacer clips 56 together with attaching clips 82 provide a quickly assembled supporting framework on which wall panels and door frame assemblies can be readily snapped in place. The provision of three panel connectors interlocked together provides a reinforced support structure of substantial strength and stability. The supporting framework can effectively resist heat transfer by providing insulating material within the interior panel connectors 18. The spacer clips provide the requisite spacing and bearing support between the panel connectors and are recessed along their panel connector engaging surfaces to minimize heat conduction within fire rated tolerances.

It will be appreciated that the insulated panel connectors also can be used to secure panels against horizontal as well as vertical wall surfaces.

An illustrative embodiment of this invention having been disclosed, it is to be understood that this has been done by way of illustration only, without thought of limitation.

We claim:

1. In a double wall, panel members providing opposed wall surfaces, and means supporting said panel members including a pair of elongated panel connectors each having a front face provided with panel connecting means engaging one of said panel members and a rear face formed to provide a locking head receiving channel having a restricted inlet opening, said front and rear faces of said panel connectors being joined at opposite sides thereof, said panel connectors being arranged in spaced apart relation with said rear faces thereof facing each other, at least one spacer clip having a web portion extending between said rear faces of said panel connectors, said spacer clip also having locking head portions joined to said web portion at opposite sides thereof, and a pair of legs extending in opposite directions from opposite ends of said web portion, said locking head portions interlocking with said locking head receiving channels, and said legs extending lengthwise of said panel connectors in bearing engagement with said rear faces of said connectors adjacent said opposite sides thereof.

2. A wall structure according to claim 1 wherein said panel connector engaging portions of said legs are recessed intermediate the opposite ends thereof to reduce the transmission of heat between said opposed panel connectors.

3. A wall structure according to claim 2, said spacer clip web portion engaging said opposed panel connectors and having a slot therein to further reduce transmission of heat.

4. A wall structure according to claim 1 together with a third elongated panel connector positioned closely adjacent said opposed connectors in right angular relation thereto, and means detachably interlocking said third panel connector in assembled relation with said opposed connectors.

5. A wall structure according to claim 4 wherein said last-named interlocking means includes an attaching clip mounted on one of said spacer clip legs and having locking engagement with said third panel connector.

6. A wall structure according to claim 1, wherein said spacer clip web portion extends across said rear faces laterally of said connectors.

7. A wall structure according to claim 1, wherein said panel connecting means comprise generally parallel flanges extending from said front faces in a direction generally normal thereto away from said rear faces, and means pro-

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viding shoulders on said flanges for interlocking with shouldered panel attaching means.

8. A wall structure according to claim 7 wherein each of said panel connectors comprises a one-piece unitary construction of sheet material, said front and rear faces being joined and spaced apart by opposite side faces providing a rectangular body portion, said channels being confined within said respective body portions.

9. A wall structure as set forth in claim 1, wherein said locking heads are joined to said web portion by reduced width neck portions, said locking heads being adapted to pass through said restricted inlet openings upon predetermined rotation of said clip relative to said connectors.

10. Means for supporting panel members in a double wall construction comprising a pair of opposed elongated panel connectors each having panel connecting means and a rearface provided with locking head receiving means, at least one spacer clip extending between said rear faces of said panel connectors, said spacer clip comprising a web portion and locking head portions at opposite sides thereof interlocking with said locking head receiving means for maintaining said opposed panel connectors in properly spaced relation, a third elongated connector also having a rear face provided with locking head receiving means, said third connector being positioned closely adjacent said pair of opposed connectors in right angular relation thereto with said rear face of said third connector adjacent said spacer clip, and an attaching clip engaging said spacer clip and having a locking head interlocking with said locking head receiving means of said third connector for connecting the latter to said spacer clip.

11. Panel supporting means as set forth in claim 10, wherein there are at least two of said spacer clips interposed between and interlocked with said opposed panel connectors in spaced apart relation therealong, said third connector being interlocked with both of said spacer clips by at least two of said attaching clips.

12. Panel supporting means as set forth in claim 11, wherein each of said clips has a leg extending lengthwise of said opposed panel connectors, said third connector being interlocked with said legs.

13. Panel supporting means as set forth in claim 12, said locking head receiving means of said connectors comprising channels having restricted inlet openings, said spacer clip locking heads being joined to said web portions by reduced width neck portions, each of said legs having an opening therethrough, each of said attaching clips comprising a main body portion adapted to bear against one of said spacer clip legs when said attaching clip is interlocked with said third connector and an extension adapted to pass through one of said openings, said attaching clip locking heads being joined to said extensions, said spacer clips being adapted for rotation relative to said pair of opposed panel connectors between a first position confining said locking heads thereof within said channels and a second position permitting said locking heads thereof to pass through said inlet openings, said attaching clips being adapted for rotation relative to said spacer clips and said third connector between a first position confining said locking heads thereof within said third connector channel and a second position permitting said locking heads thereof to pass through said third connector channel inlet opening and said spacer clip leg openings.

14. Panel supporting means as set forth in claim 10, wherein said spacer clip has a leg extending lengthwise of said opposed connectors, said third connector being locked against said leg.

15. A spacer clip of generally Z-shaped configuration for holding a pair of panel connectors assembled in spaced apart relation comprising sheet material fabricated to provide a body portion adapted to extend between a pair of panel connectors and having at opposite sides thereof locking heads joined thereto by reduced width neck portions and adapted for interlocking engagement with such

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panel connectors, and legs extending in opposite directions from said body adjacent the opposite ends thereof, said legs having lateral edges which are recessed intermediate the opposite ends thereof to define spaced apart ears having surfaces adapted for bearing engagement with such panel connectors.

16. A spacer clip as set forth in claim 15, wherein each of said legs has an opening therethrough, one of said openings being tapped.

17. A spacer clip as set forth in claim 15, wherein said body is slotted from one end to the other thereof.

18. A panel connector comprising an elongated body member of generally rectangular configuration providing a pair of generally parallel spaced apart front and rear faces connected by a pair of side faces extending therebetween, a pair of generally parallel flanges extending from said front face in a direction generally normal thereto and away from said rear face for receiving the adjacent edge portions of panel members in the corners provided by said flanges and said front face, and means providing shoulders on said flanges for interlocking with shouldered panel attaching means, said rear face forming a channel disposed within the generally rectangular configuration of said body member and having a restricted inlet opening through the plane of said rear face, said channel being adapted to receive a spacer member therein through said rear face, and heat insulating material dis-

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posed within said rectangular configuration of said elongated body member, a portion of said insulating material being disposed against said channel away from said rear face and extending between said flanges.

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ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—211, 404, 493, 714, 731