United States Patent

Lynch

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[54] INSULATED PANEL

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[52] **U.S. Cl.**.....**52/204**, 49/502, 52/403, 52/584, 52/615

[51] **Int. Cl.**.....**E04b 1/76**

[58] **Field of Search**.....52/578, 615, 404, 416, 204, 52/403, 584; 49/502

[56] **References Cited**

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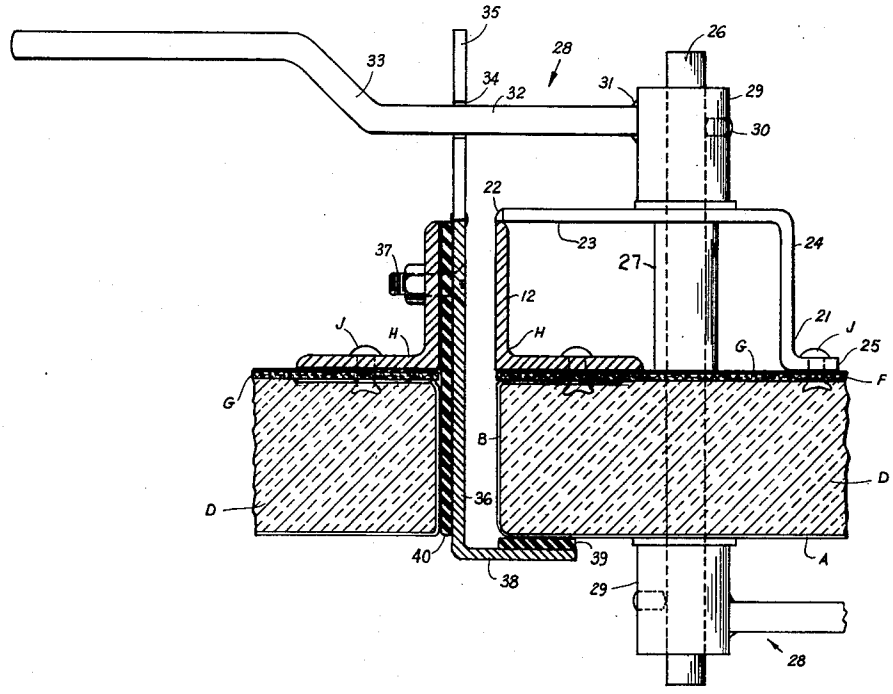
[57] **ABSTRACT**

An insulated panel for use in fabricating building structures wherein fastening strips are utilized in combination with rivets to create a panel that is rigid and has no metal to metal contact between a metallic inner wall and a metallic outer wall.

2 Claims, 4 Drawing Figures



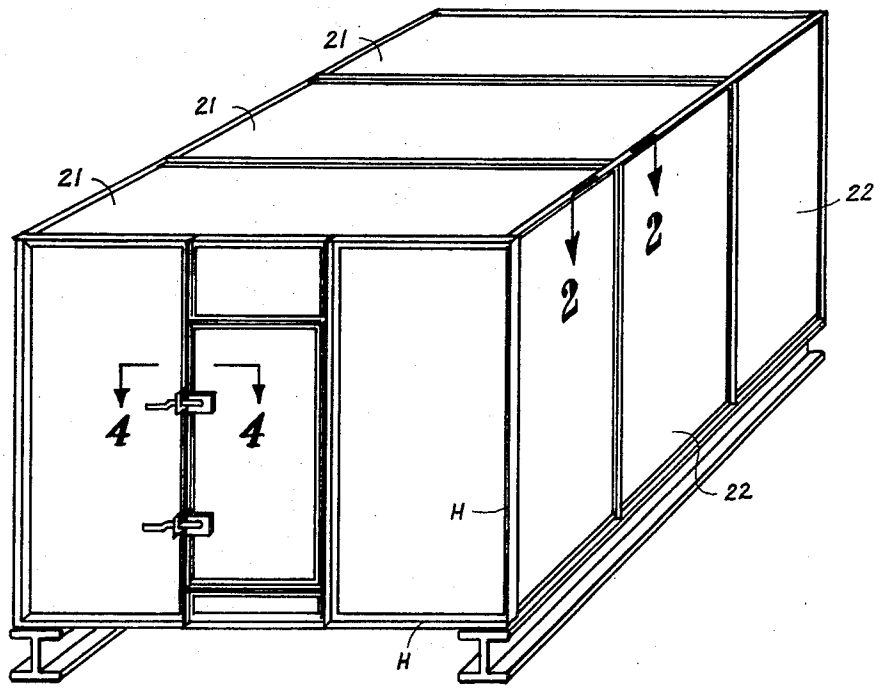


Fig. 1.

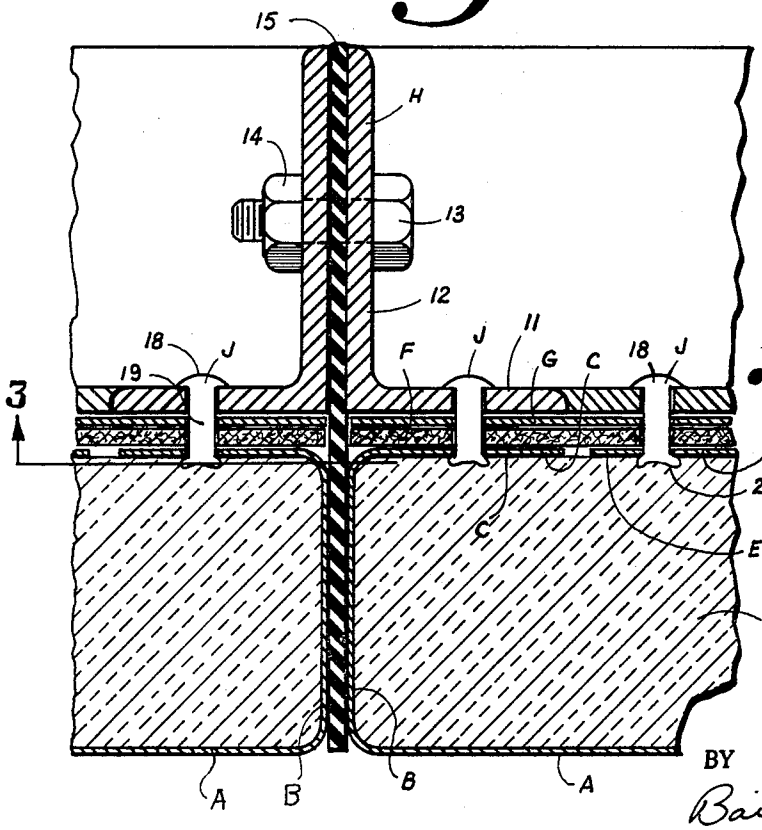


Fig. 2.

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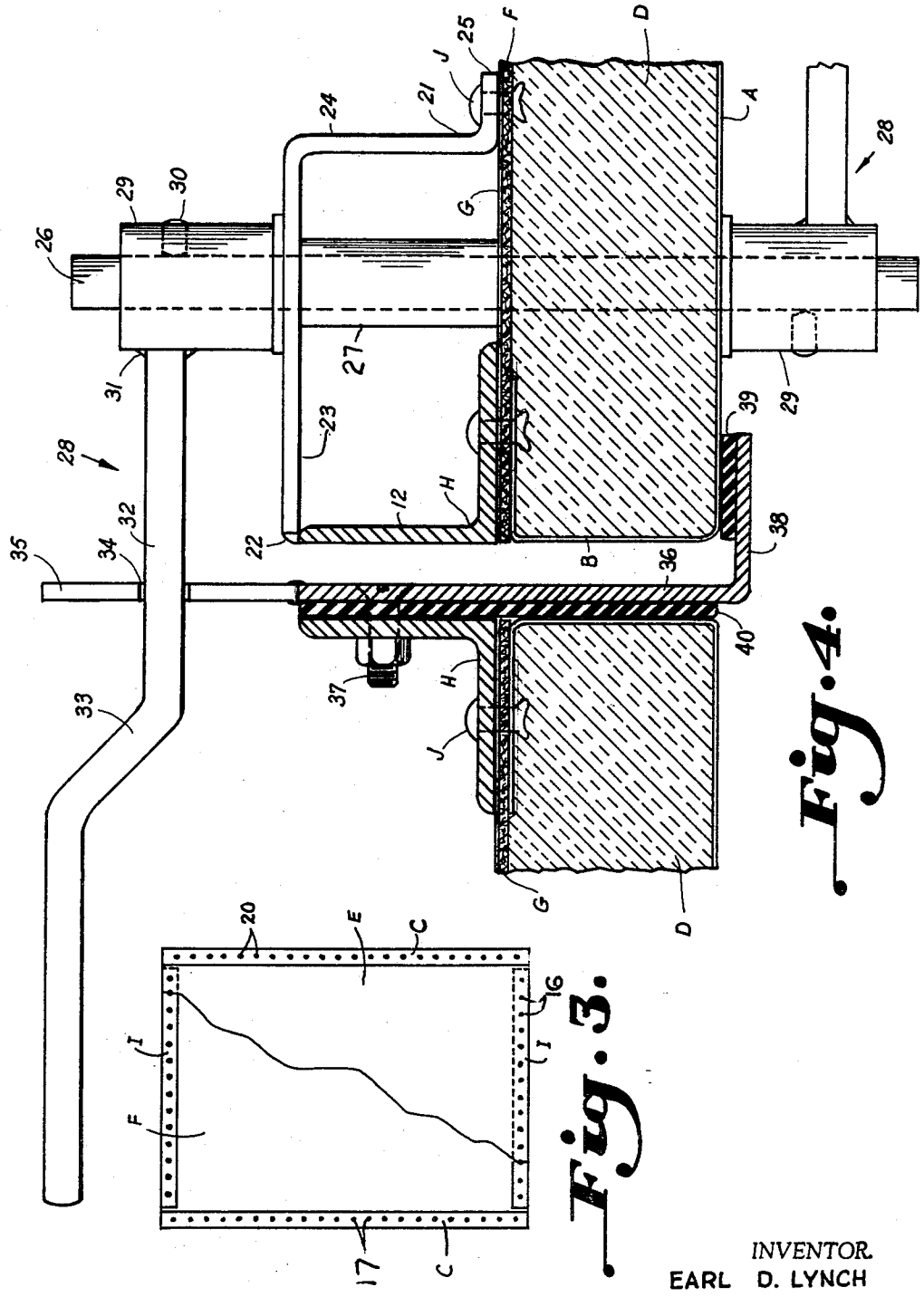

Fig. 3.

Fig. 4.

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INSULATED PANEL

This invention relates to an insulated panel and more particularly to the particular construction of an insulated panel.

Insulated panels for use in fabricating building structures have been utilized heretofore, but some of them are not suited for use where there is a large temperature differential between the inside of the building structure and the outside. The reason for this is that condensation will collect wherever there is a metal to metal contact between the inside of the structure and the outside. Attempts have been made to eliminate a metal to metal contact between an inner wall of the panel and the outer wall, but such are usually difficult to assemble and will sometimes separate as a result of the manner in which such are fastened together.

Accordingly, it is an important object of the present invention to provide an insulated panel for use in fabricating building structures wherein the various components forming the panel are rigidly connected together, minimizing the possibility of such separating.

Another important object of the present invention is to provide an insulated panel for use in fabricating building structures wherein, as a result of the manner in which the various components of the panel are connected together there is no metal to metal contact between a metallic inner wall and a metallic outer wall.

Another important object of the present invention is to provide an insulating panel which can be preassembled and adapted readily to accommodate a handle so that the panel can be utilized as a door forming part of a building structure.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

FIG. 1 is a perspective view illustrating a plurality of insulated panels constructed in accordance with the present invention being used to form a building structure,

FIG. 2 is a transverse sectional view taken along line 2—2 of FIG. 1, showing the manner in which adjacent panels are joined and the manner in which various components of the panels are connected,

FIG. 3 is a sectional view, with parts removed, taken along line 3—3 of FIG. 2, showing the entire width of a panel rather than on a portion, such as illustrated in FIG. 2, and

FIG. 4 is an enlarged sectional view, taken along line 4—4 of FIG. 1, illustrating a panel constructed in accordance with the present invention mounted with a handle so that such can be utilized as a door.

Referring in more detail to the drawings, there is illustrated an insulated panel being used in fabricating a building structure. The panel has a rigid rectangular inner wall A constructed of a continuous piece of sheet metal. The continuous piece of sheet metal is turned outwardly adjacent the sides thereof for defining side walls B. The side walls B terminate in opposed laterally extending projections C which are spaced a predetermined distance from the inner wall for defining a cavity. Insulation D is carried in the cavity between the projection and the inner wall. A lightweight metallic sheet E is interposed between the projections and the insulation B for cooperating with the side and inner walls B and A, respectively, for enclosing the insulation D. A non-metallic board F is carried on the opposite side of the projections C from the insulation D spanning from one side wall B to the other and being of the same rectangular shape as the inner wall A. A rigid metallic rectangular outer wall G is carried flush against and corresponds in shape with the non-metallic board F. Angle-irons H extend around the edge of the outer wall G and have one Flange flush therewith, and the other flange perpendicular thereto. The improvement comprises rigid fastening strips I carried between the non-metallic insulated board F and the lightweight metallic sheet E. The fastening strips I are positioned adjacent the top and bottom of the non-metallic board F between the opposed projections C. The one flange of the

irons H, the metallic outer wall G, the non-metallic insulating board F, and the rigid fastening strip I have aligned holes extending therethrough. Also, extending through the one flange of said angle-irons H, said metallic outer wall G, said non-metallic insulating board F, and the projections C are other aligned holes. Rivets J having an elongated body, an enlarged head adjacent one end of the elongated body, and an expanded head adjacent the other end of the elongated body are provided for fastening the components together. A portion of the rivets J have the enlarged head abutting against one flange of the angle-iron H with the elongated body extending through the aligned holes and the expanded head abutting against the fastening strip I on a side opposite the angle-irons H. The remainder of the rivets have the enlarged head abutting against the one flange of the angle-iron with the elongated body extending through the other aligned holes and the expanded head abutting against one of the projections C on a side opposite the angle-iron H for drawing the angle irons H, the metallic outer wall G, the non-metallic insulating board E and the inner wall A together whereby, a rigid insulated panel is produced having no metal to metal contact between the inner and outer wall. The insulated panel can be used as a door by providing such with a bracket upon which a rod is journaled. The rod is provided with means for preventing condensation from entering the inside of the paneled door.

The inner wall A may be constructed of any suitable metallic material, such as 18 gauge galvanized metal. The inner wall A extends from the bottom of the panel to the top and is rectangular in shape. The inner wall A turns inwardly adjacent its side to form the side walls B. The side walls B also extend from adjacent the bottom of the panel to the top and terminate in opposed laterally extending projections C. The projections C extend inwardly a sufficient distance so that a rivet J can pass therethrough. The projections C are spaced a predetermined distance from the inner wall A to define a cavity into which the insulation D can be placed. The width of the cavity is determined by the desired amount of insulation required. The insulation may be of any suitable material, such as resin bonded glass fiber, and has a lightweight metallic sheet E spanning its side which abuts against the projection C. This is to provide a seal with the side walls B and the inner wall A so that no moisture can collect within the cavity which would deteriorate the insulation D. A rectangular press-board F is carried between the projections C and the metallic outer wall G for preventing a metal to metal contact. The may be constructed of any suitable non-metallic material of high insulation characteristics. The press-board spans the entire side of the panel. In order to add rigidity to the panel the metallic outer wall G is carried flush against the press-board F.

Angle-irons H extend around the marginal edge of the metallic outer wall G for providing means wherein adjacent panels can be secured together. One flange 11 of the angle-irons H is carried flush against the outer wall G, while the other flange 12 is perpendicular thereto, and aligned with the side walls B of the panel. Such enables adjacent panels to be bolted together as by a bolt 13 which extends through a hole in the vertical flange 12 of adjacent panels. A nut 14 is carried on the other end of the bolt for drawing the panels together tightly. Interposed between adjacent panels is a non-metalic gasket 15 constructed of any suitable material, such as neoprene, for providing a seal between adjacent panels. As can be seen in FIG. 1, the angle-irons H extend all the way around the marginal edge of a panel so that adjacent panels can be bolted together. A silicon rubber adhesive sealant is placed between the flange 11 of angle-iron H and the outer wall G for preventing moisture from entering into the interior of the panel.

Metallic fastening strips I are carried adjacent the top and bottom of each panel between the side projections C flush against the non-metallic board F. Flange 11 of the angle-irons, metallic outer wall G, the non-metallic insulating board F, and the rigid fastening strips I have aligned holes 16 extending therethrough. Other aligned holes 17 extend through flange

11, metallic outer wall G, non-metallic insulating board F, and the projections C. A portion of the rivets J have an enlarged head 18 abutting against the flange 11 of the angle-iron H with an elongated body 19 extending through the aligned holes 16 with an expanded head abutting against the fastening strip I on a side opposite the angle-iron H. The remainder of the rivets J extend through the aligned holes 17 with the enlarged head abutting against the flange 11 and the expanded head abutting against the projection C on a side opposite the angle-irons H for drawing the angle-irons, the metallic outer wall G, the non-metallic insulating board F and the inner wall A together whereby a rigid insulated panel is produced having no metal to metal contact between the inner and outer walls.

As illustrated in FIG. 1, the panels can be bolted together in the form of the structure such as illustrated in FIG. 1. The side panels abut along the edges with adjacent side panels and are bolted thereto as by bolts 13. The top panels 21 overlap the upper edge of the side panels 22 and are bolted thereto by means of bolts extending through the flange 12 of the angle-irons H. Prior to placing the top panel 21 on top of the upper edge of the side panels a cap is placed over the upper portion of the insulation D between the lightweight metallic sheet E and the inner wall 10 for providing a seal. A rubber gasket is then placed across the upper edge of the side panels where it abuts against the top panel similar to the gasket 15 positioned between adjacent panels.

FIG. 4 illustrates one of the panels, such as described above, being used as a door. The panel is constructed identical to that described in detail in connection with FIG. 2, and has a dog leg shaped bracket 21 attached by means of a rivet to the outer wall G of the panel. The bracket has one end attached by means of a weld 22 to the outer extremity of the flange 12 of the angle-iron H. The bracket 21 includes a portion 23 which is parallel to the outer wall G and a portion 24 which is perpendicular to the wall G that terminates in a flange 25 through which the rivet J passes to attach the bracket to the outer wall G. A metallic rod 26 extends through a hole carried in the bracket 21 and an aligned hole extending through the panel which includes the outer wall G, board F, metallic sheet E, insulation D, and inner wall A. In the space between the parallel portion 23 of the bracket 21 and the outer wall G a rubber sleeve 27 is carried on the rod 26 for preventing condensation that may collect on the rod from entering into the panel and being absorbed by the insulation D. The sleeve 27 also acts as an air seal.

Handles, generally designated by the reference character 28, are carried on opposite ends of the rod 26 and consist of a sleeve 29 that has a hole therein for allowing such to slip on the end of the rod 26. A setscrew 30 is provided in the sleeve for tightening the sleeve onto the rod 26. Extending laterally from the sleeve and attached thereto by any suitable means, such as by the weld 31, is an outwardly extending lever arm 32. The lever arm 32 extends perpendicular from the sleeve 29 and has a dog leg 33 adjacent the medial portion thereof which terminates in another flat portion. The lever arm engages the slot 34 carried in an outwardly extending flange 35 for securing the door panel in a locked position. An L-shaped bracket 36 is attached to the adjacent panels by a bolt 37 having a recessed head. The L-shaped bracket 36 has a turned in portion 38 with a neoprene seal 39 adherred thereto by adhesive for acting as an abutment when the door is closed. Such provides a positively closed door structure avoiding metal to metal contact between the inside of the structure and the outside except through the metal rod 26. A neoprene gasket 40 is interposed between the bracket 36 and the adjacent panel. On the other side of the door a hinge is interposed between the flange 12 of the angle-iron and the L-shaped bracket 36 for allowing the door to open and close thereon. The hinge is attached by a bolt that extends through the flange 12 and the same hole that the bolt 37 extends through on the other side of the door.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. An insulated panel for use in fabricating building structures, said panel having a rigid rectangular inner wall constructed of a continuous piece of sheet metal, said continuous piece of sheet metal being turned outwardly adjacent the sides thereof for defining side walls, said side walls terminating in opposed laterally extending projections parallel to said inner wall, said laterally extending projections being spaced a predetermined distance from said inner wall for defining a cavity, insulation carried in said cavity between said projections and said inner wall, a lightweight metallic sheet interposed between said projections and said insulation for cooperating with said side and inner walls to enclose said insulation, a non-metallic insulating board carried on the opposite side of said projections from said insulation spanning from one side wall to the other and being of the same rectangular shape as said inner wall, a metallic rectangular outer wall carried flush against and corresponding in shape with said non-metallic board, angle irons extending around the edge of said outer wall having one flange flush therewith and another flange perpendicular thereto, the improvement comprising: rigid fastening strips carried between said non-metallic insulating board and said lightweight metallic sheet adjacent the top and bottom of, said non-metallic board between said opposed laterally extending projections, said one flange of said angle irons, said metallic outer wall, said non-metallic insulating board, and said rigid fastening strips having aligned holes extending therethrough, said one flange of said angle-irons, said metallic outer wall, said non-metallic insulating board and said projections have other aligned holes extending therethrough, rivets having an elongated body and enlarged head adjacent one end of said elongated body and an expanded head adjacent the other end of said elongated body, a portion of said rivets have said enlarged head abutting against said one flange of said angle-iron and said expanded head abutting against said fastening strip on a side opposite said angle-iron and the remainder of said rivets having said enlarged head abutting against said one flange of said angle-iron, with said elongated body extending through said other aligned holes and said expanded head abutting against one of said projections on a side opposite said angle-iron for drawing said angle-irons, said metallic outer wall, said non-metallic insulating board and said inner wall together, whereby a rigid insulated panel is produced having no metal to metal contact between the inner and outer walls.

2. The insulated panel as set forth in claim 1, wherein a bracket is carried between said outer wall and said flange of said angle-iron perpendicular to said outer wall, a rod extending through said panel having an outer end journaled in said bracket, a handle carried on said outer end of said rod, a non-metallic member encompassing said rod between said bracket and said outer wall for preventing condensation from entering said panel along the surface of said rod.

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