

[54] **FASTENING MEANS FOR DOUBLE-SKIN FOAM CORE BUILDING CONSTRUCTION PANEL**

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 [51] Int. Cl.E04c 1/10, E04c 2/20
 [58] Field of Search52/593-595, 309, 52/483, 489, 592, 492, 478, 520, 521; 287/189.36
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[56] **References Cited**

UNITED STATES PATENTS

2,328,051 8/1943 Bull52/483

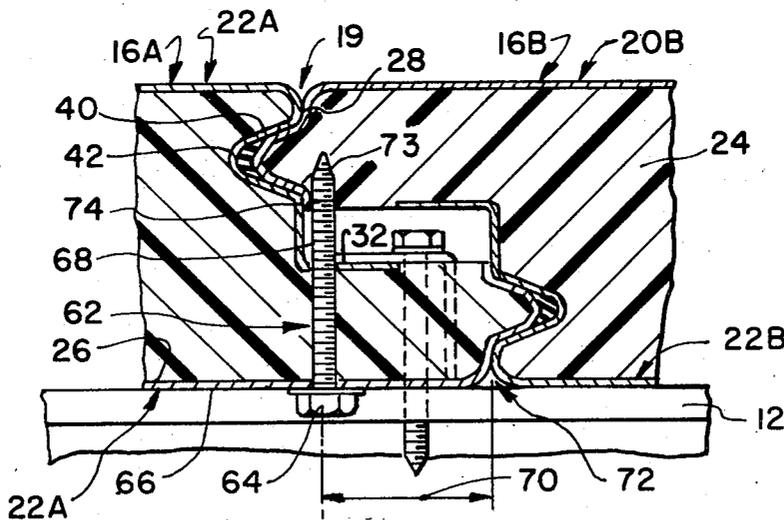
3,456,411 7/1969 Cacossa52/483
 3,535,844 10/1970 Glaros52/595

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[57] **ABSTRACT**

A double-skin building construction panel having a foam core and having its outer skin laterally offset from and spaced-apart from its inner skin — each panel presenting an overlapping edge portion along one side and an overlapped edge portion along its opposite side. The panels are adapted to be assembled in lapped relation without externally visible fasteners. Mating elements in the outer skin provide positive mechanical engagement of adjacent outer facing sheets when the panels are erected to the structural framework of a building. A clip and fastener arrangement is provided for securing the overlapped edge portion of each panel to the subgirts of a structural framework.

7 Claims, 7 Drawing Figures



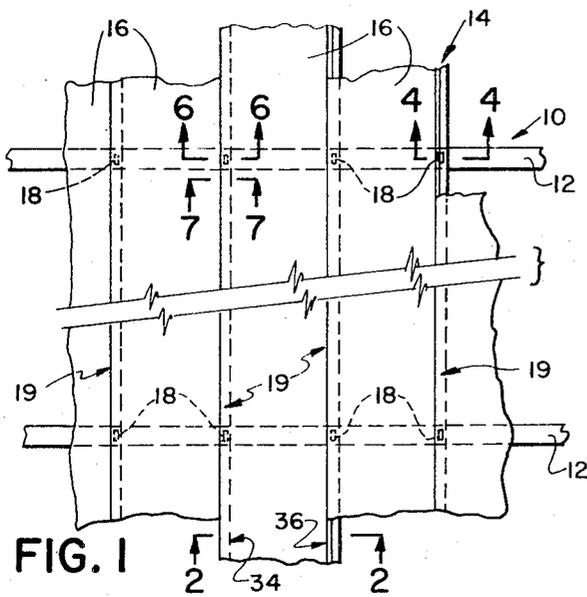


FIG. 1

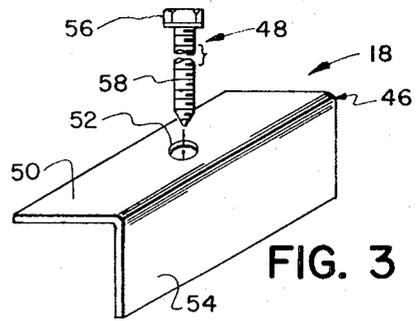


FIG. 3

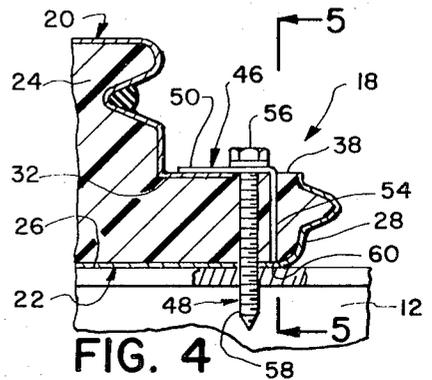


FIG. 4

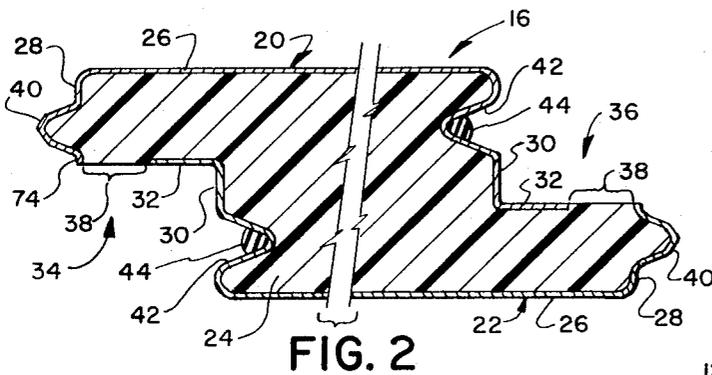


FIG. 2

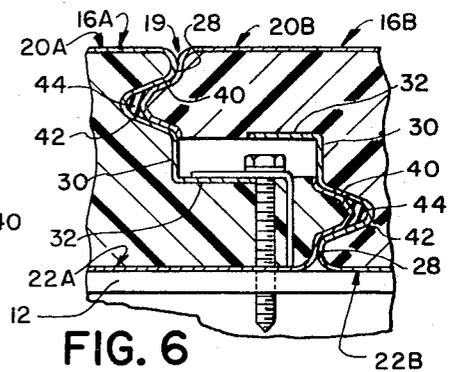


FIG. 6

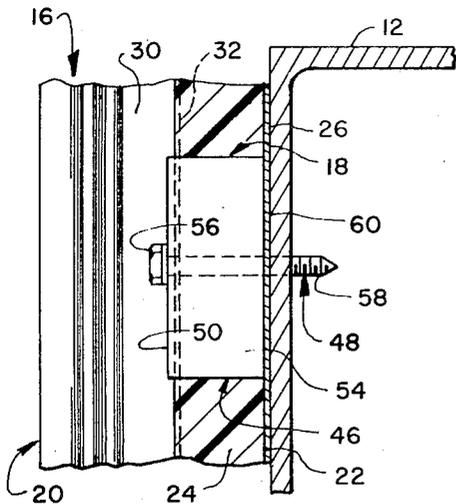


FIG. 5

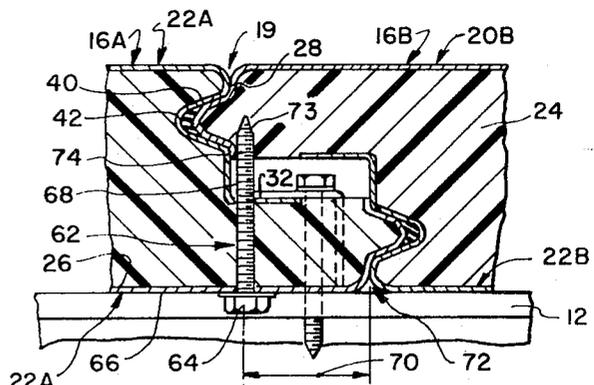


FIG. 7

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FASTENING MEANS FOR DOUBLE-SKIN FOAM CORE BUILDING CONSTRUCTION PANEL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to double-skin foam core building construction panels and means for securing the same to the structural framework of a building.

2. Description of the Prior Art

Double-skin construction panels are well known in the prior art for use in the construction of buildings, see U.S. Pats. No. 2,047,154 (C. J. PIMSNER, July 7, 1936); No. 2,284,229 (G. V. PALMER, May 28, 1942); No. 3,062,337 (J. H. ZITTLE, Nov. 6, 1962); No. 3,367,076 (P. S. O'BRIEN, February 6, 1968). Such double-skin panels have utilized thermal-insulation materials such as glass fiber batts, lightweight foamed plastic blocks and the like to maintain the outer sheet and inner sheet in spaced-apart relation. When building panels with spaced-apart facing sheets are applied to a building framework, some fastening means is provided to secure the panel to the framework. The fastening means may be hidden from external view, see U.S. Pats. No. 3,045,293 (J. A. POTCHEN, July 24, 1962); No. 3,290,845 (M. K. SNYDER, Dec. 13, 1966); No. 3,372,520 (E. E. HENSEL, Mar. 12, 1968). The fastening means may be exposed to view, see U.S. Pats. No. 3,399,503 (H. J. W. PAYNE et al, Sept. 3, 1968); No. 3,466,831 (W. F. LENOIR, Sept. 16, 1969).

SUMMARY OF THE INVENTION

The principal object of this invention is to provide improved means for securing the overlapped edge of a double-skin foam core building panel to a subgirt of a building framework — the inner facing sheet being positively secured to the subgirt while the outer facing sheet being positively connected to the inner facing sheet.

Another object of this invention is to provide connecting means by which the outer facing sheet is positively connected to the inner facing sheet independently of the subgirt.

The present fastening means is adapted for use with building construction panels of the type having an outer facing sheet, an inner facing sheet and a plastic foam core disposed between the facing sheets. The outer facing sheet is laterally offset from the inner facing sheet — the panel presenting an overlapping edge portion and an overlapped edge portion. Complementary mating elements formed in the outer facing sheet, provide positive mechanical engagement between the facing sheets of adjacent panels.

In accordance with the present invention, fastening means is provided in the region of the overlapped edge portion of each panel for securing the panel to a subgirt of a structural framework. The fastening means includes a clip member, preferably in the form of an angle, having a first arm portion overlying a flange presented by the outer facing sheet and a second arm portion extending into the foam core in the region between the flange of the outer facing sheet and an adjacent side wall of the inner facing sheet. A fastener secures the clip member to the subgirt. The arrangement is such that the clip member and fastener cooperate to provide a positive connection between the inner and outer facing sheets; and to positively secure the inner facing sheet to the subgirt.

Further in accordance with the present invention, a second fastener may be provided having a head engaging the exposed surface of the inner facing sheet and a shank extending into the panel into threaded engagement with the flange of the outer facing sheet. The second fastener positively connects the outer facing sheet to the inner facing sheet. The second fastener is applied to the panel at a location spaced from a subgirt and only in the region of the intermediate subgirts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary elevation view of a building wall;
FIG. 2 is a cross-sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is an isometric view of a clip member of the present invention;

FIG. 4 is a fragmentary cross-sectional view taken along the line 4—4 of FIG. 1;

FIG. 5 is a fragmentary cross-sectional view taken along the line 5—5 of FIG. 4;

FIG. 6 is a fragmentary cross-sectional view taken along the line 6—6 of FIG. 1; and

FIG. 7 is a fragmentary cross-sectional view taken along the line 7—7 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates a building structural framework 10 of which only vertically spaced horizontal subgirts 12 are illustrated. The building structural framework 10 supports a wall structure 14. The wall structure 14 is assembled from plural building panels 16 erected in edge overlapped relation and presenting plural joints 19. Each of the panels 16 is secured to the subgirts 12 by fastening means 18 of the present invention. **PANEL 16**

Referring to FIG. 2, the panel 16 comprises an outer facing sheet 20, an inner facing sheet 22 and a plastic foam core 24 disposed between the outer facing sheet 20 and the inner facing sheet 22. Each of the facing sheets 20, 22 includes a central web 26, and first and second side walls 28, 30 provided along the opposite longitudinal sides thereof. A flange 32 extends outwardly from the second side wall and is generally parallel to the central web 26.

The facing sheets 20, 22 are laterally offset from one another. The overall arrangement being such that the flange 32 of each facing sheet 20, 22 confronts the opposing central web 26 of the other facing sheet 22, 20 and is laterally spaced-apart from the first side wall 28 of the other facing sheet 22, 20. As a result of the lateral offset relation of the facing sheets 20, 22, the panel 16 presents an overlapping edge portion 34 and an overlapped edge portion 36. A gap 38 is presented at each of the edge portions 34, 36, between the flange 32 and the adjacent first side wall 28. The foam core 24 is exposed at the gaps 38.

The outer facing sheet 20 is provided with complementary mating elements, in the form of a rib 40 and a complementary groove 42 formed in the first and second side walls 28, 30 respectively. A bead 44 of sealant material is applied to the groove 42. If desired, the inner facing sheet 22 also may be provided with a rib 40 and a complementary groove 42 containing a bead 44 of sealant material.

A typical joint 19 is illustrated in FIG. 6. It will be observed that the adjacent panels 16A, 16B are erected (a) with the first side wall 28 of each facing sheet 20B, 22A confronting the second side wall 30 of the adjacent facing sheet 20A, 22B and (b) with one of the mating elements (rib 40) of the panel 16B engaged with the complementary mating element (groove 42) of the adjacent panel 16A, whereby at least the outer facing sheets 20 are mechanically engaged with one another, and (c) with the flange 32 of the outer facing sheet 20A positioned inboard of and spaced-apart from the flange 32 of the inner facing sheet 22B. It will be appreciated that the ribs 40 penetrate the beads 44 to provide moisture seals between the adjacent outer facing sheets 20A, 20B and between the adjacent inner facing sheets 22A, 22B.

PRESENT EMBODIMENT

The fastening means 18 (FIG. 3) comprises a clip member 46 and a fastener 48. The clip member 46 includes a first arm 50 provided with a central aperture 52 and a second arm 54. The clip member 46 preferably is in the form of an angle wherein the first and second arms 50, 54 are mutually perpendicular.

The fastener 48, preferably of the self-tapping type, includes a head 56 and a shank 58.

It will be observed in FIGS. 4 and 5 that when the clip member 46 is installed, the first arm 50 overlies the flange 32 of the outer facing sheet 20 and the second arm 54 extends into the foam core 24 in the region (gap 38) between the

flange 32 of the outer facing sheet 20 and the first side wall 28 of the inner facing sheet 22. The clip member 46 is installed simply by pressing the second arm 54 through the foam core 24. Thereafter, the fastener 48 is installed, with its head 56 engaging that surface of the first arm 50 remote from the flange 32 and with its shank 58 threadedly engaged with the subgirt 12. The shank 58 of the fastener 48 extends through the foam core 24 in the region between the flange 32 and the second arm 54 of the clip member 46. The fastener 48 urges the clip member 46 toward the subgirt 12 — the lower edge 60 of the second arm 54 engaging the central web 26 of the inner facing sheet 22.

It will be appreciated that the clip member 46 and fastener 48 cooperate to provide a positive connection between the outer facing sheet 20 and the inner facing sheet 22, and to positively secure the inner facing sheet 22 to the subgirt 12.

In FIG. 7, a second fastener 62 has a head 64 engaging the exposed surface 66 of the inner facing sheet 22 and a shank 68 threadedly engaging the flange 32 of the outer facing sheet 20. The second fastener 62 preferably is located on the panel 16A at a distance from the subgirt 12. Consequently, the second fastener 62 provides a positive connection between the outer and inner facing sheets 20, 22 of each panel 16 independently of the subgirt 12.

It will be observed in FIG. 7 that the second fastener 62 preferably is located at a preselected distance 70 from the joint 72 between adjacent facing sheets 22A, 22B. In that location, the remote end 73 of the shank 68 is positioned adjacent to a terminal edge 74 (see also FIG. 2) of the first side wall 28 (outer facing sheet 20B). It will be appreciated that the second fastener 62 serves (a) to positively connect the outer facing sheet 22A to the inner facing sheet 22B; and (b) to preclude disengagement of the rib 40 (panel 16B) from the groove 42 (panel 16A).

FIG. 1 illustrates the panels 16 erected vertically and spanning across horizontally presented subgirts 12. It should be readily apparent that the panels 16 may, instead, be erected horizontally and span across vertically presented structural components.

What is claimed is:

1. In a wall structure assembled from plural building wall panels erected in side-by-side overlapped relation and spanning across plural, spaced-apart subgirts;

each of said panels comprising an outer facing sheet, an inner facing sheet, and a foam core disposed between said outer facing sheet and said inner facing sheet;

each said facing sheet including:

a central web,

first and second side walls extending along the opposite side edges of said central web, and

a flange extending outwardly from the second side wall generally parallel to said central web;

said outer facing sheet being laterally offset from said inner facing sheet whereby said flange of each facing sheet confronts the opposing central web of the other facing sheet and is laterally spaced-apart from the first side wall of the other facing sheet; and

complementary mating elements formed in said outer facing sheet, one disposed lengthwise of the first side wall and one disposed lengthwise of the second side wall; said panels being erected

a. with the first side wall of each facing sheet confronting the second side wall of the adjacent facing sheet, and

b. with one of said mating elements of each panel engaged with the complementary mating element of the adjacent panel, whereby the outer facing sheets are mechanically engaged with one another, and

c. with said flange of each said outer facing sheet positioned inboard of and spaced-apart from said flange of each said inner facing sheet;

the improvement in means for securing said panels to certain of said subgirts, comprising:

a clip member having a first arm overlying said flange of said outer facing sheet and a second arm extending into said foam core in the region between said flange of said outer facing sheet and the first side wall of said inner facing sheet; and

a fastener securing said clip member to said subgirt.

2. The improvement of claim 1 wherein said fastener includes a head engaged with that surface of said first arm remote from said flange and a shank threadedly engaged with said subgirt.

3. The improvement of claim 1 wherein said shank extends through said foam core in the region between said flange and said second arm.

4. The improvement of claim 1 wherein that edge of said second arm remote from said first arm, is engaged with the central web of said inner facing sheet.

5. The improvement of claim 1 wherein said first arm and said second arm are mutually perpendicular.

6. The improvement of claim 1 including a second fastener having a head engaging the exposed surface of said inner facing sheet and a shank threadedly engaged with said flange of said outer facing sheet, said second fastener being spaced from said subgirt.

7. The improvement of claim 6 wherein the shank of said second fastener is positioned adjacent to the first side wall of the outer facing sheet of the adjacent panel thereby to preclude disengagement of the complementary mating elements in the outer facing sheets of the adjacent panels.

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