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PREFABRICATED METAL PANEL JOINING MEMBER

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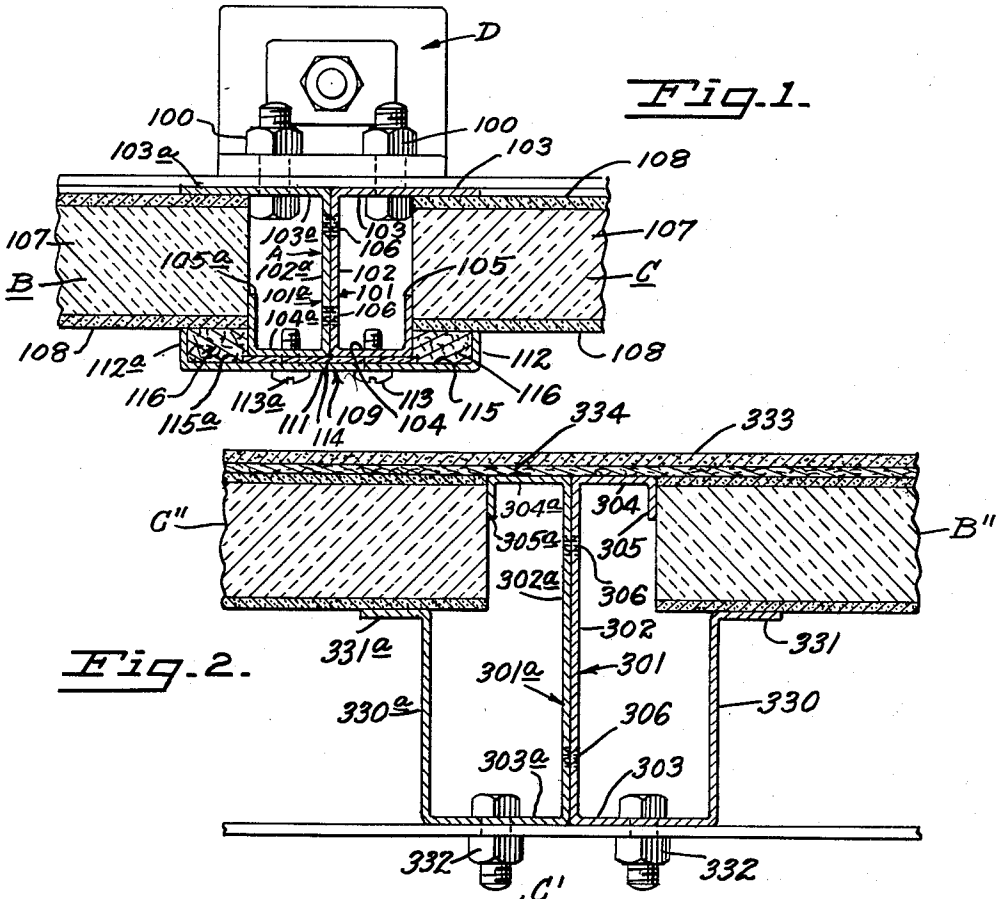

Fig. 1.

Fig. 2.

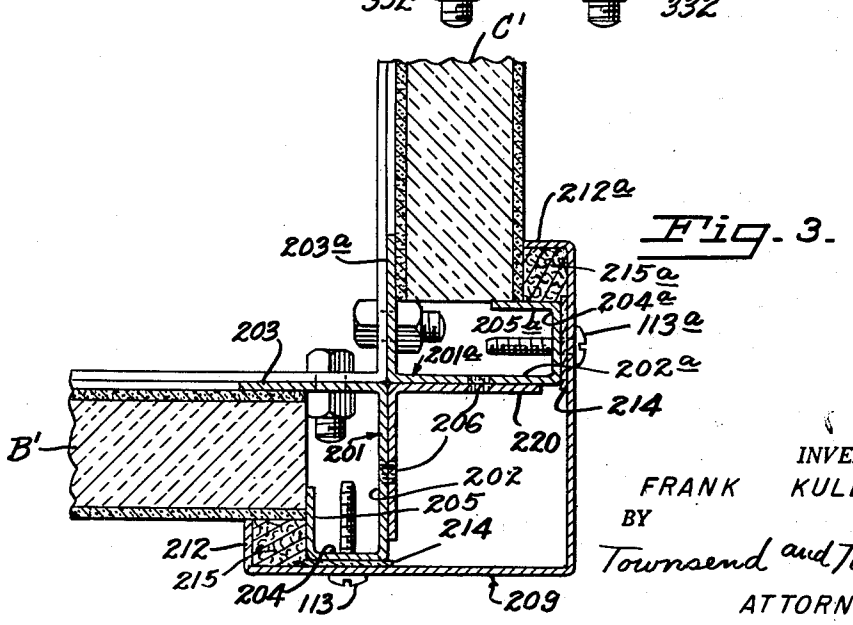

Fig. 3.

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PREFABRICATED METAL PANEL JOINING MEMBER

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3 Claims. (Cl. 189—34)

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This invention relates to an improved panel joining member and more particularly relates to an improved prefabricated metallic panel joining member suitable for joining a pair of adjacent wall or roof panels together at their adjoining edges.

One embodiment of my invention which is illustrated in the drawings and which will be described hereinafter in more detail comprises a prefabricated metallic stud particularly adaptable for joining two vertically disposed wall panels together. The stud is made up of two channel pieces, each of which comprises a web and two opposed parallel sides of unequal length, and the webs of the two channel pieces are rigidly connected to one another. The shorter side of each channel piece is formed with an inwardly extending flange which is adapted to abut against an edge of an adjacent panel to maintain said panel spaced from the web of the channel piece. A cover plate, secured adjustably to the shorter sides of the joined channel pieces, provides a means for clamping adjoining panels securely to the stud.

The second embodiment of my invention which is illustrated in the drawings and which will be more fully described hereinafter, comprises a modification of the first embodiment and is particularly suitable for joining an adjacent pair of roof panels together. The principles of construction and operation of the second embodiment of the present invention are broadly the same as those which make up the first embodiment and, specific distinctions between the two will be related in detail hereinafter.

In the manufacture and assembly of prefabricated buildings and houses it is particularly desirable to employ as many uniform parts as possible. In copending applications Serial Nos. 714,097 and 19,149, each of which is now abandoned, reference is made to the purposes, objects and advantages of building structures which employ studs and wall panels of substantially uniform and standardized size.

Although the present invention can be used to advantage with any number of types of panels, it has been found that a type of laminated panel sold under the trade name "Cemesto-Board" and made up of a central core of cane sugar fibre faced on both sides with a relatively hard and smooth layer of cement and asbestos mixture is particularly satisfactory, especially in localities where extremely varied climatic conditions exist. This latter mentioned type of panel possesses qualities of low moisture absorption and excellent heat insulation so desirable in territories

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where heavy rainfall is not uncommon and extreme variations in temperature are to be expected.

A principal object of the present invention is to provide a panel joining member of novel construction which permits all the exterior wall and roof panels of a building to be erected solely from the exterior side of the building frame, thereby eliminating the necessity for workmen having to bring exterior wall and roof panels within the interior of the building framework in order to erect them.

Another object of the present invention is to provide a prefabricated metal panel joining member which is formed with a plurality of angular bends which, in turn, result in great structural strength and rigidity of the member.

Another object of the present invention is to provide a novel prefabricated stud member which when fully assembled and positioned operatively in association with a pair of joined panels contains hollow pockets into which may be inserted a plastic calking material. The hollow pockets serve as weather protective containers for the calking material and prevent the latter from drying and hardening, and a weather tight seal between the panels and stud at their points of joinder is insured.

Another object of the present invention is to provide a substantially hollow panel joining member through which electrical wiring and the like may be run to various outlets and fixtures within the building.

Another object of the present invention is to provide a stud member comprising two channel pieces which may be assembled to function as a panel joining member in a straight line wall construction or may be assembled to serve as a corner stud construction.

Other objects of the invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

Fig. 1 is a view in cross-section of one embodiment of my invention shown in operative association with a pair of adjoining panels which are shown fragmentarily.

Fig. 2 is a view in cross-section of a second embodiment of my invention shown in operative association with a pair of adjoining panels which are shown fragmentarily.

Fig. 3 is a view in cross-section of the embodiment illustrated in Fig. 1 assembled to form a corner stud construction.

Referring now more particularly to the draw-

ings Fig. 1 illustrates a type of panel joining member which is particularly suitable as a vertical stud member for joining adjacent edges of adjoining wall panels together in a straight line wall construction. Fig. 3 is illustrative of a similar type stud member which is assembled to form a corner stud construction. Fig. 2 illustrates a modification of the type of a construction shown in Figs. 1 and 3 and is particularly adapted as a rafter construction to join adjacent roof panels together. In short, the type of construction illustrated in Figs. 1 and 3 is particularly adapted for supporting panels which are disposed in a substantially vertical plane, whereas, the type of panel joining member illustrated in Fig. 2 is especially suited for supporting adjacent panels such as roof slabs or panels which are normally disposed in a plane more nearly approaching horizontal.

In Fig. 1 there is illustrated in cross-section a prefabricated metal stud, indicated generally at A, in operative association with adjacent edge portions of a pair of panels, indicated generally at B and C. The metal stud member A may be secured adjacent its bottom extremities by bolts 100 to a sill-plate or angle iron, indicated generally at D, which, in turn, is preferably firmly anchored in concrete or the like. The metal stud member may be cut to desired length or height to suit particular building specifications and can be fastened adjacent its upper extremities to the roof or ceiling supporting members (not shown) by bolts, welding or other suitable means (not shown).

The stud member shown in Fig. 1 comprises identically formed channel pieces, which are indicated generally at 101 and 101a. Channel piece 101 comprises, more specifically, a web 102 and two opposed parallel sides 103 and 104 which project outwardly perpendicularly to the plane of the web. Side 103 is of considerably greater length than side 104, and this latter side, in turn, is formed with an inwardly extending flange 105. Flange 105 is disposed in a plane substantially parallel to the plane of web 101.

In view of the fact that channel pieces 101 and 101a are identically formed, the parts of channel piece 101a are numbered the same as the parts comprising channel piece 101 but are suffixed by the numeral "a" to distinguish them in the drawings.

In the construction illustrated in Fig. 1 the channel pieces 101 and 101a are joined back-to-back at their webs preferably by spot welding, as indicated at 106, to form a unitary stud construction.

A prefabricated stud member of the present type is, of course, designed and proportioned with relation to the dimensions of the panels with which it is to be used. In the instant case it may be assumed that each of the panels B and C have a given and predetermined thickness, and it is noted in this respect that the length of the webs 102 and 102a of the channel pieces substantially exceed the thickness of each panel. The reason for this particular arrangement of parts will become clear hereinafter. It has also been mentioned heretofore that a particularly satisfactory type of panel construction for use with the present invention comprises a laminated panel having a central core of sugar cane fibre, such as indicated at 107, faced on both sides with a relatively hard cement and asbestos surfacing compound, indicated at 108.

In the erection of a building embodying the present invention it is contemplated that the frame of the building, including the wall studs, ridge beam and rafters will all be assembled and secured in their proper position before interior and exterior paneling operations are commenced. It may be assumed for purposes of convenient discussion that vertical studs, comprising joined channel pieces of the type heretofore indicated at 101 and 101a, will have been erected and securely anchored in their properly spaced positions as a part of the framework of the building before the panels are erected. Assuming further that the studs are utilized in exterior stud construction, the members would be positioned so that the longer sides 103 and 103a of the joined channel pieces face inwardly and the shorter sides 104 and 104a face outwardly. This arrangement permits all of the exterior panels to be positioned with respect to the studs from the outside of the building frame and eliminates any necessity for workmen having to carry exterior panels within the confines of the building framework to erect them.

In operation, the panels B and C are positioned so that their edges abut against inwardly extending flanges 105 and 105a respectively. (In actual practice the panels may be cut so as to allow about a $\frac{1}{16}$'' clearance between the panel edges and the abutment flanges to facilitate rapid and easy insertion of the panels into their proper positions between spaced stud members.) Flange 105 maintains panel B in spaced relationship with respect to web 102, and similarly flange 105a maintains panel C in a position spaced from web 102a. The completed stud, therefore, is formed with a substantially hollow interior through which electrical wiring may be run if desired.

A cover plate, such as indicated generally at 109, is employed to clamp the panels B and C securely to the stud member A. More specifically, cover plate 109 comprises a channel piece having a web portion 111 and inwardly extending sides 112 and 112a. Cover plate A is preferably cut to the same length as the stud member to which it is attached so that it extends the full length or height of the stud member. Suitable apertures at spaced intervals may be formed in the web of the cover plate lengthwise thereof in registry with corresponding apertures provided in each of the sides 104 and 104a of the channel piece to permit the cover plate to be fastened by screws, as indicated at 113 and 113a to the said channel pieces. Preferably a coating or sheet of suitable heat insulating material, such as an asphaltic compound, indicated at 114, is inserted between the cover plate and the channel pieces to prevent direct heat transfer therebetween. It is believed evident from the foregoing that tightening of screws 113 and 113a will cause the inwardly projecting end of side 112 of the cover plate to bear against the adjacent side of panel B and clamp it securely against side 103 of channel piece 101 to maintain the panel securely fixed to the stud member. Simultaneously with the tightening of screws 113 and 113a the inwardly projecting end of side 112a of the cover plate will bear against and clamp panel C against side 103a of channel piece 101a.

An important feature of the present construction is that after the cover plate has been properly positioned and clamped against adjoining panels, hollow pockets, such as indicated at 115 and 115a, which extend the entire length of the cover plate and stud member, are formed. Preferably each hollow pocket 115 and 115a is packed

with a suitable plastic calking compound, as indicated at 116, which may be introduced or injected into the hollow pockets manually or by a conventional calking gun, or, alternatively, the cover plate may be packed with calking material before attaching it to the stud plate and when the cover plate is tightened against the stud the calking material will be compressed to fill the pockets 113 and 113a and the excess material, if any, will be squeezed out around the sides of the plate during the tightening process. The hollow pockets 115 and 115a comprise a weather protective container for the calking compound and prevents the latter from hardening or drying due to direct exposure to the weather. As a result the calking compound can be maintained for indefinite periods in a plastic state, and, therefore, expansion and contraction of the metal stud member due to temperature variations will not open up seams and cracks between the panels and the studs as might otherwise be the case were no calking compound used or were the calking compound permitted to harden and become brittle and non-plastic in texture.

Referring now more particularly to Fig. 3 there is indicated a corner stud construction comprising two identically formed channel pieces, as indicated generally at 201 and 201a, which, in turn, are identical in all respects to channel pieces 101 and 101a. More specifically, channel piece 201 comprises a web 202, opposed parallel sides (of unequal length) indicated at 203 and 204, and an inwardly extending flange 205. Corresponding parts of channel piece 201a are identified by similar reference numerals but are suffixed by the letter "a" to distinguish them in the drawings. Adjoining panels, indicated generally at B' and C' in Fig. 3, may be considered structurally similar in all respects to the panels indicated at B and C in Fig. 1.

The respective webs of channel pieces 201 and 201a are rigidly connected to one another by an angle piece 220 which is preferably spot welded to each of the webs, as indicated at 206, whereby the respective planes of the webs are disposed substantially perpendicular to one another.

Cover plate 209 comprises an angle piece having two inwardly projecting flange or side members indicated at 212 and 212a respectively. The cover plate, in turn, is secured adjustably to each channel piece by screws, such as indicated at 113 and 113a, and tightening of these screws will cause the end of inwardly projecting flange 212 to bear against and clamp metal panel B' firmly against side 203 of channel piece 201, and tightening of the screws will similarly cause the inwardly projected end of flange 212a to bear against and clamp panel C' firmly against side 203a of channel piece 201a. It is noted that the inwardly extending flanges 205 and 205a maintain the respective panels in spaced relationship to the webs of the channel pieces thereby defining a hollow stud member. Moreover, when the cover plate 209 has been securely screwed in place, hollow pockets 215 and 215a (similar to pockets 115 and 115a already identified), are formed which, in turn, are preferably packed with suitable plastic calking compound. Heat insulating material, such as indicated at 214 is preferably provided between the cover plate and the channel pieces.

The construction illustrated in Fig. 2 comprises a panel joining member, which as has been previously noted, is particularly adaptable for use in rafter construction and comprises a pair of identically formed channel pieces indicated generally at 301 and 301a respectively. Channel piece 301 comprises a web portion 302 and opposed parallel sides 303 and 304. Side 304 is substantially shorter in length than side 303 and is provided with an inwardly extending flange 305. The longer side 303 is provided with an integrally formed and inwardly projecting angle piece having two flat plane surfaces 330 and 331. Surface 330 is disposed in a plane substantially parallel to the web portion 302 of the channel, and surface 331 of the angle piece is disposed in a plane substantially perpendicular to surface 330 and parallel to the plane of side 303.

The several parts which comprise identically formed channel piece 301a bear the same identifying numerals as the corresponding parts of channel piece 301 but are suffixed by the letter "a" to distinguish them in the drawings.

In assembly the two channel pieces 301 and 301a are attached together back-to-back at their webs by spot welding, as indicated at 306, or by other suitable means, to form a unitary rafter member. A rafter comprising a pair of joined channel pieces may be attached conveniently to its supporting members of the building frame (such as a stud or ridge beam, or the like) by bolts, such as indicated at 332, which may be projected through suitable apertures (not shown) formed in the side members 303 and 303a. Obviously, the rafters may be affixed to their respective supporting members by spot welding or by other suitable means.

It is noted that in the rafter construction shown in Fig. 2 no element comparable to either the cover plate 109 or cover plate 209 is indicated. The reason for this is that the weight of the roof panels indicated at B'' and C'' resting on supporting surfaces 331 and 331a, respectively, is considered sufficient to maintain the panels in position with respect to the rafter without employment of additional clamping means. Moreover, it is contemplated that roofing material will be laid directly over the roofing panels, and this, in turn, will greatly assist in maintaining the roof panels in rigidly fixed position. A highly satisfactory roofing surface is shown in Fig. 2 and comprises an under layer of relatively heavy gauge felt, indicated at 334, and an outer layer of mineral surfacing material, such as indicated at 333.

Although I have described my invention in some specific detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

I claim:

1. In a building structure, the combination of a pair of structural panels lying in the same plane but spaced edgewise; a prefabricated metal stud unit joining said panels, said stud unit comprising a pair of generally channel shaped members each having a web and opposed parallel side elements of unequal length perpendicular to said web, the webs of said members being secured rigidly together in back-to-back relation, the shorter side elements of said members each terminating in inturned portions lying at right angles to said shorter side elements and each abutting an edge of one of said panels, the longer side elements of said members each terminating in a flat portion positioned against a face of the panel abutting the corresponding one of said inturned portions; and securing means affixed to

said shorter side elements of said members, overlapping and securing said panels.

2. In a building structure, the combination of a pair of structural panels lying at right angles to each other and having their near edges spaced apart; a prefabricated metal stud unit joining said panels, said stud unit comprising a pair of generally channel shaped members each having a web and opposed parallel side elements of unequal length perpendicular to said web, said members being disposed with their webs at right angles to each other and the side elements of each member extending toward an adjacent one of said panels, and a metal member of right angle cross section secured to said webs maintaining said members rigidly in position, the shorter side elements of each of said members terminating in an inwardly turned portion lying at right angles to said shorter side element and abutting the edge of one of said panels, the longer side element of each of said members terminating in a flat portion positioned against a face of the panel abutting the corresponding one of said inturned portions; and a cover member of generally right angle cross-section secured to said shorter side elements of said members and overlapping said panels maintaining said panels in position against said longer side elements.

3. In a building structure, the combination of a pair of structural panels arranged with their edges spaced apart; a prefabricated unit positioned between and joining said panels, said

unit comprising a pair of generally channel shaped members each having a web and opposed side elements of unequal length extending from the web, said channel shaped members being arranged each with its side elements extending toward an adjacent one of said panels, the shorter side elements of said members terminating in inturned portions each abutting an edge of one of said panels fixing the same against edgewise movement toward said prefabricated unit, the longer side elements of said members each terminating in a flat portion positioned against a face of the panel abutting the corresponding one of said inturned portions; and means affixed to said shorter side elements of said members, overlapping said panels and maintaining the same in engagement with said flat portions.

FRANK KULLMER.

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