Nov. 12, 1946. B. E. BALDUF 2,410,922

FRAME MEMBER

Filed Nov. 12, 1941 2 Sheets-Sheet 1

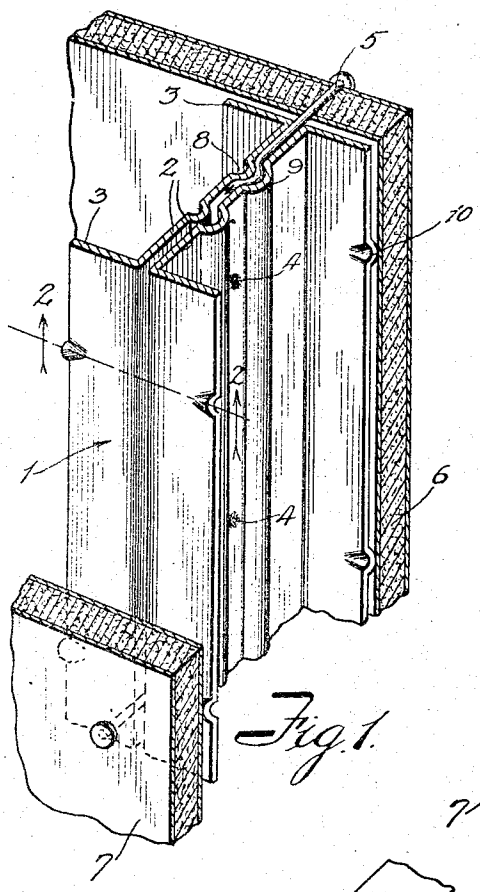


Fig. 1.

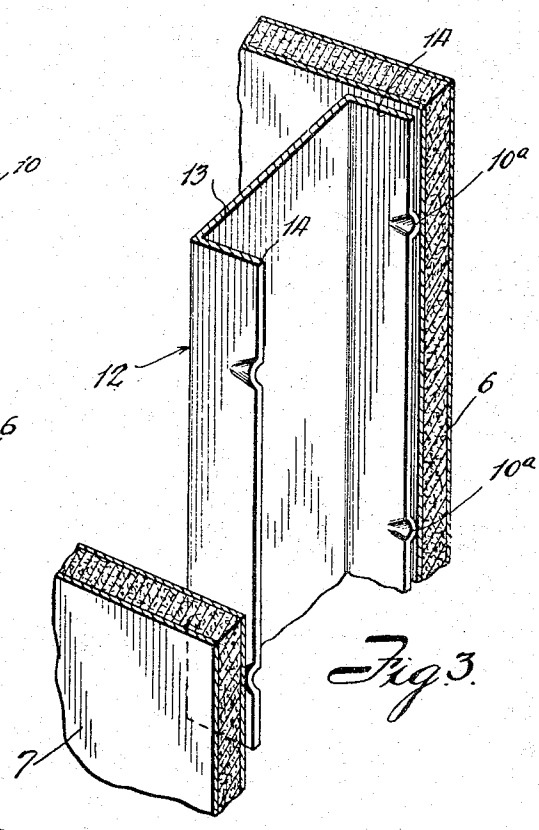


Fig. 3.

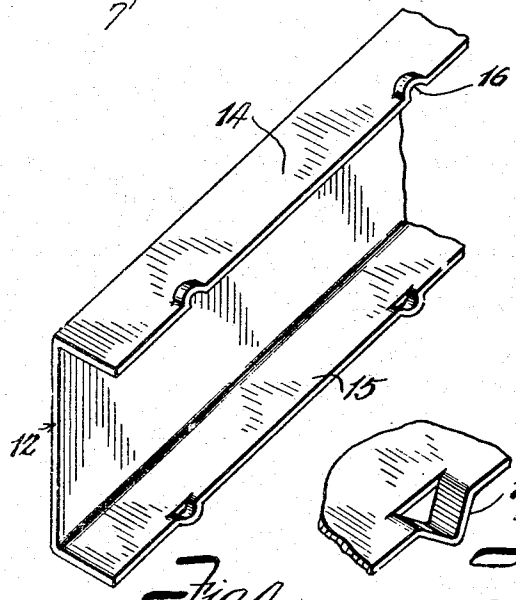


Fig. 4.

Fig. 5.

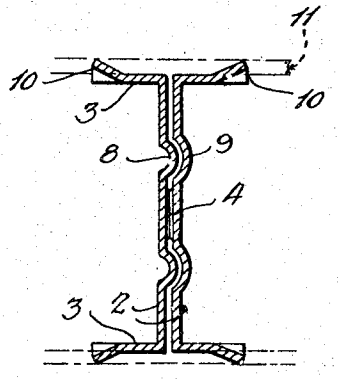


Fig. 2.

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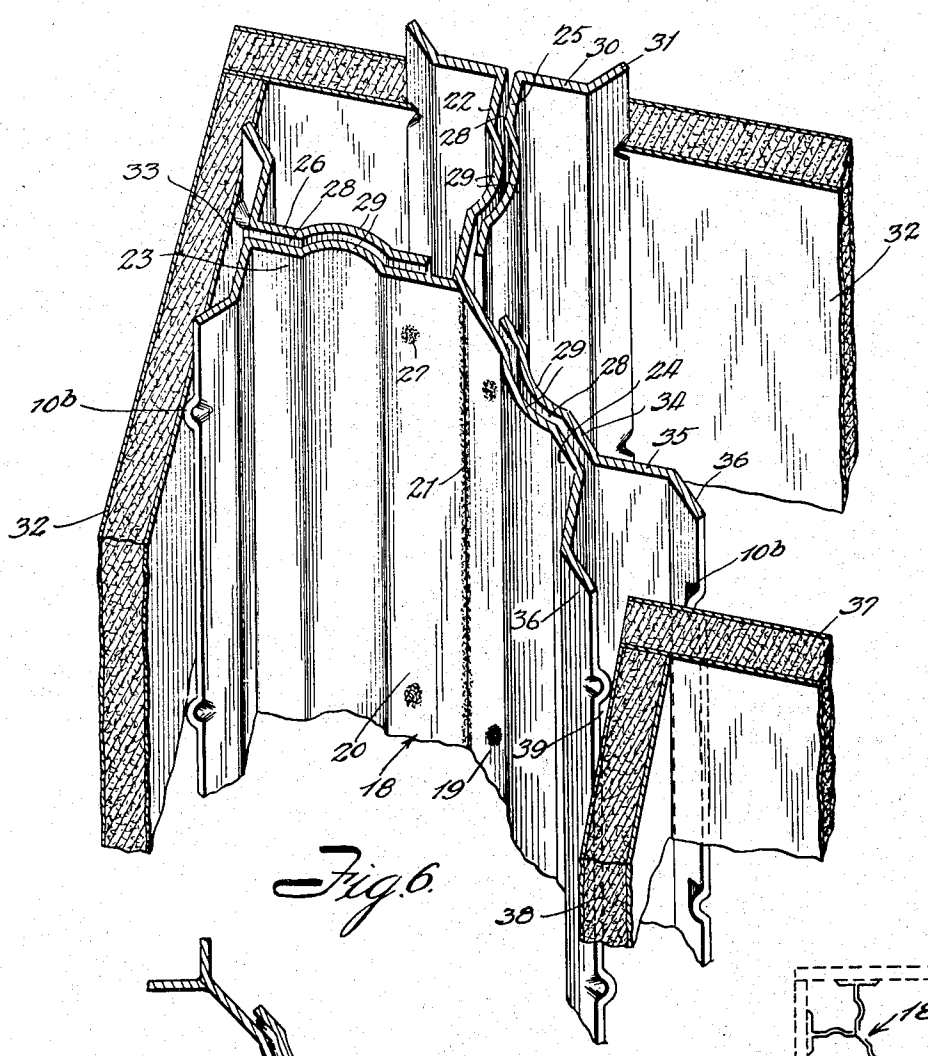


Fig. 6.

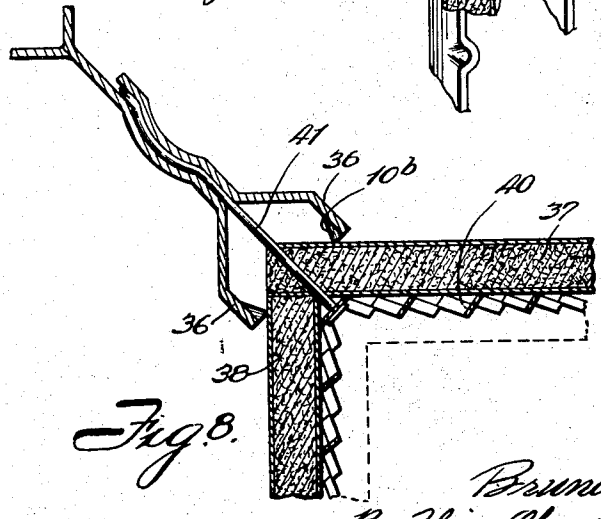


Fig. 8.

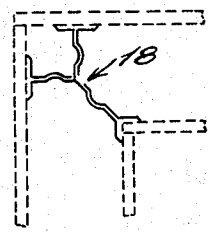


Fig. 7.

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Patented Nov. 12, 1946

2,410,922

UNITED STATES PATENT OFFICE

2,410,922

FRAME MEMBER

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Application November 12, 1941, Serial No. 418,747

6 Claims. (Cl. 72—46)

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This invention relates to a hollow-walled building construction and frame members therefor and more particularly to constructions involving the use of sheet metal frame members such, for instance, as studs, joists, and the like. For the purposes of this specification, the invention will be described in connection with studs and the like. However, it will be understood that it is equally well adapted for use in connection with any sheet metal frame members to which plasterboard and plaster or similar wall finishes are applied.

Ordinarily plasterboard lath or gypsum sheathing of various types in the form of panels are applied directly to the studs and secured snugly against the flanges of the various well known types of sheet metal studs. When constructed in this manner, condensation very rapidly takes place on the studs and this condensation is conducted through the wallboards and discolors the outer surface of the wall and any finish which may be applied thereto.

It is an object of the present invention to provide a hollow-walled building construction and sheet metal stud therefor wherein the discoloring of the porous wallboards is substantially eliminated.

A further object is the provision of sheet metal frame members which will produce the desired results in supporting a wall and preventing disfiguration due to condensation and at the same time in which the amount of material required to form the frame members is substantially reduced below the amount commonly required in the production of these elements.

A further object is the provision of nailable studs or the like in which the plasterboard or gypsum sheathing may be nailed directly to the studs but will be spaced therefrom by suitable projections on the stud flanges and so distributed as to permit convection currents to flow in all directions between the boards and the studs.

In the construction illustrated and described herein, each board is preferably supported against a plurality of small projections extending outwardly from the flanges of the stud and formed integrally therewith. These projections are so formed as to present only a minimum contacting surface to the boards. The boards, of course, may be secured to the studs by any of the means commonly used, such, for instance, as clips or wires, or may be nailed directly to the studs when these studs are designed to provide nailable characteristics.

It is still another object to provide a new and

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novel corner stud, preferably of the nailable type and having suitable flanges and projections thereon, so that all of the inner and outer wallboards converging at the corner may be secured to the stud and suitably spaced therefrom by means of the projections.

A further object is the provision of a corner stud of the character described which will have the required strength in all directions and will provide nailable characteristics whereby all of the boards converging at the corner may be nailed thereto if desired.

Further objects will be apparent from the specification and the appended claims.

In the drawings:

Fig. 1 is a perspective cross sectional view of a nailable I-beam stud and associated wallboards and illustrates one embodiment of the invention.

Fig. 2 is a transverse sectional view through the stud shown in Fig. 1 and is taken on a line substantially corresponding to line 2—2 thereof.

Fig. 3 is a sectional perspective view similar to Fig. 1, but illustrates an embodiment in which a channel stud is used instead of an I-beam stud.

Fig. 4 is a fragmentary perspective view of a portion of the channel stud shown in Fig. 3.

Fig. 5 is a fragmentary perspective view of a slightly modified form of projection which may be used on the stud flanges to provide a short line contact with a wallboard.

Fig. 6 is a sectional view of a nailable sheet metal corner stud and wallboards associated therewith and illustrates another embodiment of the invention.

Fig. 7 is a diagrammatic end view of one of the corner studs as illustrated in Fig. 6.

Fig. 8 is a fragmentary sectional view through the inwardly extending web and flanges of the corner stud shown in Fig. 6 and illustrates the method of securing wallboards and expanded metal corner reinforcing members thereto.

Referring to the drawings in detail, the embodiment illustrated in Figs. 1 and 2 comprises a sheet metal stud 1 formed of two sheet metal channels each having a web 2 and outstanding flanges 3. These channels are secured together preferably by being slightly deformed and spot-welded at spaced points 4 so that the webs are closely adjacent, but slightly spaced, to enable nails 5 to be driven into the studs between the webs as illustrated in order to secure suitable wallboards 6 and 7 thereto. The flanges are formed to provide longitudinal co-operating beads 8 and 9 so that the nails will be deformed in passing between these beads and therefore will

snugly be retained in place. This general construction is well known in the art and it is believed that further description is unnecessary.

In the usual studs of this type, the aligned flanges present only a flat surface to the wallboards, and the boards are secured snugly against this flat surface by means of the nails driven into the studs. In the present invention the outstanding flanges 3 are provided at spaced intervals throughout the length of the stud with outwardly extending projections 10. The projections are spaced along the edge of the flanges a distance considerably less than the width of a single standard plasterboard so that each board applied to the face of the stud will contact with a plurality of the projections and the boards will thereby be spaced a material distance from the flanges and enable convection currents to flow therebetween.

The projections 10 are formed integral with the flange and this is preferably accomplished merely by forming the metal at the edge of the flange outwardly sufficiently to provide a substantially point contact with the adjacent board. This construction provides several advantages in that discoloration of the wallboards and finish thereon is prevented for the reason that moisture condensing on the flanges is not conducted through the boards. Also a much better insulation is provided for the reason that, although the sheet metal is a good conductor of heat, the comparatively wide air spaces provided between the studs and the adjacent boards materially assist in preventing heat conduction through the wall. Another important advantage is that a materially less amount of metal is required in the manufacture of the studs. For instance, the projections shown do not require any additional metal for their formation and, if these projections provide a $\frac{3}{16}$'' air space on each side of the stud, then a saving of a strip of metal of the length of the stud and $\frac{3}{4}$'' wide is obtained. All of these advantageous features are secured without increasing the cost of the stud; in fact, the cost is reduced for the reason that the projections in a stud may be formed at a considerably less expense than the cost of the material saved in the construction.

In Fig. 2 the width of the air space between the stud and the wall board is illustrated by the dotted lines 11 and the width of the strip of metal saved in the manufacture of a stud of the type shown will, of course, be four times the distance between these dotted lines.

Fig. 3 illustrates another embodiment in which a single channel 12 is used and comprises a web 13 and outstanding flanges 14. The flanges 14 have projections 10a formed thereon in the same manner as the projections 10 previously described. This type of stud is, of course, not nailable, and the boards 6 and 7 may be applied thereto by any suitable means such, for instance, as clips or wires, either method being well known in the art. In this construction the boards are spaced from the flanges and suitable air spaces provided therebetween in the same manner as previously described.

Figs. 4 and 5 illustrate slightly different forms of projections which may be applied to any of the stud constructions disclosed herein. In Figs. 4 and 5 the flanges are sheared and formed outwardly to provide projections in which the peaks of the projections extend transversely of the flanges as shown to thereby provide substantially a line contact with the adjacent board. The projections 16 are slightly rounded to provide a somewhat wider bearing surface, which may be preferable when soft wallboards are used, while the projection 17 shown in Fig. 5 provides more nearly a line contact, which may be preferable for some types of boards.

Figs. 6, 7, and 8 illustrate a wall structure including a corner stud 18. This stud may aptly be called a Y-beam and is preferably formed of a wide web member 19 having a laterally extending web 20 welded thereto as at 21. This provides a Y-beam in which the arms of the Y are the outwardly extending web portions 22 and 23 at an angle to each other corresponding to the angle of the corner, the apex of the angle being intersected by an inwardly extending web portion 24 which forms the leg of the Y-beam. Nail holding web portions 25 and 26 are welded to the webs 22 and 23 at spaced points as shown at 27. The welded webs may be deformed adjacent the welding points in order to space the webs slightly and thereby provide nailing slots 28 which slots are substantially identical with the nailing slots previously described. Nails driven into these slots are distorted and interlocked with the stud by means of suitable beads or the like 29.

All of the web members 22, 23, 25, and 26 are provided with laterally extending flanges 30 terminating in angularly outturned flanges 31. The outer wallboards 32 of gypsum sheathing or the like may be applied directly to these outturned angular flanges 31 and nailed to the studding in the same manner as previousy described, in which case the boards will rest against the edges of the angular flanges 31 throughout the extent of the boards and an air space 33 will be provided between the body of the stud and the boards and between the adjacent angular flanges 31. While such a structure is desirable in some constructions, it is preferable to deform the edges of the angular flanges 31 to provide projections 10b against which projections the gypsum sheathing rests, so that the sheathing is out of contact with all portions of the stud except at the points of the projections. This enables a free flow of convection currents in all directions between the stud and adjacent boards. Also, if desired, the angular flanges 31 may be omitted and projections similar to the previously described projections 10 may be formed outwardly from the flanges 30.

A nail holding web portion 34 of substantially the same formations as the web portions 25 and 26 is welded to the inwardly extending web portion 24 in the same manner as previously described. The two inwardly extending web portions 24 and 34 are also provided with the nail holding beads 29 and are arranged to provide a similar nailing slot 28. The inwardly extending webs are provided with angular flanges 35 terminating in spaced inturned flanges 36, which latter flanges are preferably parallel with the web flanges 24 and 34. These flanges 36 are spaced sufficiently to receive therebetween the adjacent ends of the inner gypsum boards 37 and 38 forming the corner of a plaster base or the like. The inturned flanges 36 are also preferably deformed to provide projections 10b such as previously described, which projections are so positioned as to be engaged by the gypsum boards and to space these boards from the flanges as shown at 38. By this construction, convection currents may freely pass between the gypsum boards and the flanges 36 and discoloration of

the inner finish is thereby prevented more effectively.

In a construction such as shown in Fig. 6, it is preferable that the gypsum boards **37** and **38** should be in floating relation to the stud; that is, that they should not be nailed thereto. A floating corner is desirable as it assists materially in preventing plaster cracks.

Fig. 8 illustrates the method of securing expanded metal in the wall corner and at the same time securing the ends of the boards in place. In this construction an expanded metal angle **40** which may be of the type commonly known to the trade as "Cornerite" is nailed into the stud by means of nails **41** in the manner illustrated. By this means, the Cornerite and the gypsum boards **37** and **38** may be snugly secured to the stud. In this construction the stud is preferably provided with the integral projections **10***b*. However, these projections may be omitted if desired, in which case the boards **37** and **38** will rest directly against the edge of the flanges **36**.

It is intended, of course, that the invention should not be limited to the specific embodiment or embodiments disclosed herein, since modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A nailable corner stud comprising a Y-beam, the leg and arms of the Y each having deformed co-operating portions for gripping nails therebetween when gypsum boards or the like are nailed thereto, the leg and arms of the Y each terminating in oppositely extended flanges to engage said boards.

2. A nailable corner stud comprising a sheet metal Y-beam, the leg and arms of the Y each having deformed co-operating portions for gripping nails therebetween when gypsum boards or the like are nailed thereto, the leg and arms of the Y each terminating in oppositely extended flanges, at least some of said flanges having small board engaging projections formed outwardly so that said boards are spaced from said flanges sufficiently to enable convection currents to pass therebetween in all directions.

3. A nailable corner stud comprising a Y-beam, the leg and arms of the Y each having deformed co-operating portions for gripping nails therebetween when gypsum boards or the like are nailed thereto, the leg and arms of the Y each terminating in oppositely extended flanges, said flanges having their free edges turned outwardly for substantially line contact with said boards so that an air space is provided between said flanges and said boards.

4. A nailable corner stud comprising a unitary sheet metal Y-beam, the leg and arms of the Y each having deformed co-operating portions for gripping nails therebetween when gypsum boards or the like are nailed thereto, the leg and arms of the Y each terminating in oppositely extended flanges, said flanges having their free edges turned outwardly, and small spaced projections formed outwardly on said edges for substantially point contact with said boards so that convection currents may pass in all directions between said boards and said stud.

5. In a building, a hollow-walled corner structure having two opposed spaced porous walls that are adapted to receive a finish, said corner structure comprising a unitary sheet metal Y-beam stud, the arms of said Y each having laterally and oppositely extending flanges that terminate adjacent to their edges in spaced outwardly extending projections of small area, porous wallboards secured to the stud against said projections formed on said arms whereby said wallboards define the outside angle of said hollow-walled corner structure with the apex of the angle being substantially in alignment with the leg of said Y, the outer edge of said leg having laterally and oppositely extending flanges that terminate adjacent to their edges in spaced outwardly extending projections of small area, and porous wallboards secured to said stud against said projections formed on said leg whereby said last mentioned wallboards define the inside angle of said hollow-walled corner structure with the apex of said inside angle being substantially in alignment with the leg of said Y.

6. A hollow-walled structure having opposed spaced porous walls, the exposed surfaces of which are adapted to receive a finish, said hollow-walled structure comprising a sheet metal supporting stud having spaced laterally extending longitudinal metal flanges upon which spaced projections of small area extend outwardly therefrom throughout the length of said stud, and porous boards secured against said projections only so that the said porous boards are spaced a material distance from the main body portion of said metal flanges throughout their length whereby moisture that condenses on said sheet metal supporting stud is substantially precluded from being absorbed by said porous boards.

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