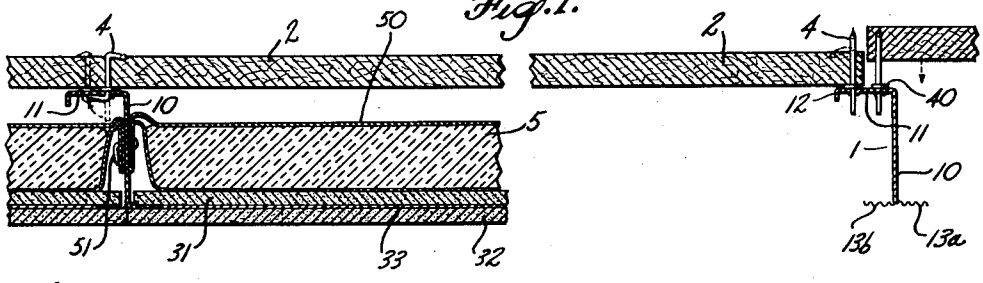
Jan. 17, 1961 O. P. WOLSTEAD 2,968,070

BUILDING PANEL CONSTRUCTION

Filed Dec. 10, 1957

Fig. 1.



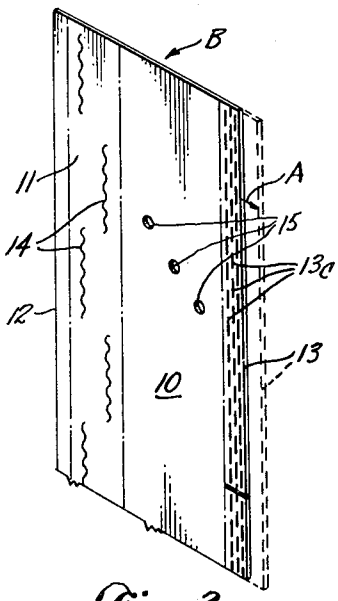


Fig. 3.

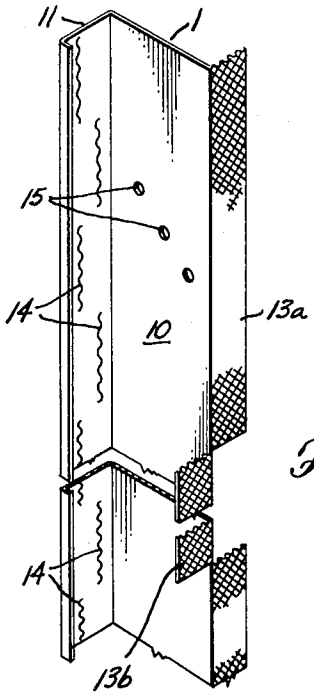


Fig. 4.

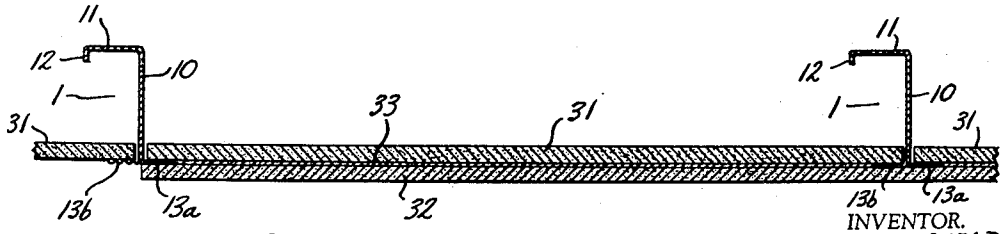


Fig. 2.

INVENTOR.
OLAF P. WOLSTEAD

BY
Reynolds, Beach & Christensen

ATTORNEYS

United States Patent Office 2,968,070 Patented Jan. 17, 1961

2,968,070

BUILDING PANEL CONSTRUCTION

Olaf P. Wolstead, 1306 Howell St., Seattle 1, Wash.

Filed Dec. 10, 1957, Ser. No. 701,863

6 Claims. (Cl. 20—4)

This invention relates to improvements in building panel (ceiling or wall) construction and is herein illustratively described by reference to its preferred form; however it will be recognized that certain changes or modifications of detail may be made without departing from the essential features involved. A novel stud and joist structural member disclosed herein is disclosed and claimed in a copending application Serial No. 10,472 filed February 23, 1960 by the present applicant.

It is known that walls and ceilings which incorporate sheet metal studs or the like and preformed cover sheets (i.e. plaster board, etc.) of standard size, or even if cut to size, may be erected quickly, cheaply and with a minimum of skilled labor. Heretofore, however, nails or like securing means were generally used to secure parts in place, and erection was a slow, manual job. The securing means were generally visible, and were difficult to conceal. The resulting structures were not always as strong and durable as required, or were elaborate and expensive.

According to the present invention, the entire wall (or ceiling), including the base sheeting and the finish sheeting, mounted on the studs, is completed in simple and rapidly performed operations, and without use of nails or the like, at least on one side of the wall, the layers of sheeting being held together and being held to the studs or joists by an interposed adhesive.

In accordance with this invention, foraminous flanges of members are disposed intermediate the panel base sheeting and the surface sheeting, respectively, but in such a manner that the adhesive, applied in flowable condition, penetrates or permeates foramens in the flange elements so that a thorough bond is provided over the entire area, between the edge portions of the base sheeting and the finish sheeting, and between these edge portions and the stud flange elements. Application of the wet plaster or other adhesive over substantially the entire interface between base and surface sheetings avoids any tendency for a bulge or surface discontinuity at the joists or studs and assures a lasting strong bond between the sheeting panels. Since the flange elements are bonded in sandwiched relationship between and to the edge portions of firmly bonded sheeting panels, a rigid structural whole is achieved. Such flange elements serve as a spacer and screed, if need be, to assure uniform adhesive thickness over the sheeting interface area.

Where exterior sheeting is also required, the structural member flange, on the edge opposite the expanded metal flange, is preferably formed with slits to receive clips or spikes which hold the exterior sheeting in place.

Provision is made in such studs for the support at necessary intervals of the edges of insulating batts which can be disposed in the space between the interior and the exterior wall panels, and each such batt can be supported at sufficiently frequent intervals to prevent any undue sagging or displacement.

The invention is shown in the accompanying drawings in typical forms as presently preferred by me.

Figure 1 is a cross-sectional view through the wall construction of this invention as employed in the upright exterior wall of a building structure, and Figure 2 is a similar view but illustrating the invention employed in a ceiling construction.

Figure 3 is an isometric view of a portion of the length of a blanked out sheet from which the novel structural member is ultimately formed by bending operations, and Figure 4 is a similar view, showing the structural member in its finished preferred form.

A structural member (joist or stud) suitable for use with the present invention is shown in Figures 3 and 4. It is preferably formed of sheet metal, and a blank B of proper length (usually eight feet, for studs), when completed as shown in Figure 4, will include a web portion **10**, a mounting flange **11**, with a turned-up stiffening edge **12**, and an opposite flange portion generally designated at **13**. The latter is preferably integral with the blank B and formed by an expanded metal process comprising the formation of slits **13C** which become diamond-shaped openings when flange portion **13** is expanded as indicated by the arrow A in Figure 3 to the extent of the width indicated by the dash lines there. The resulting foramens will extend throughout all portions of the flange portion **13**. The flange portion **13** is slit transversely to the edge of the web at intervals (such as one foot each) along its length. Thereupon flange elements or tabs **13*a*** and **13*b*** are bent at right angles to the web **10** being directed alternately to opposite sides of the web to achieve the effects of a double flange with a minimum of metal. The resulting structural member may be provided at one or both ends with means for mounting it upon a sill or for joining it to a plate in the wall construction, but since such elements or other provisions to the same end need not necessarily require any special elements on the structural member proper, or are known in the art pertaining to the use of metal studs and joists, such details have not been illustrated herein.

Such structural members used as wall studs **1** are shown in Figure 1 incorporated in a typical exterior wall construction according to this invention. The mounting flange **11** in this instance is the support for exterior sheeting panels **2**, of any suitable nature, and the flange elements **13*a*** and **13*b*** are the supports for two plaster board interior sheeting panels, namely base panels **31** and finish panels **32**. The base panels **31** are readily held initially behind and in contact with the flange elements **13*a*** and **13*b*** of successive studs spanned by such panels. The panels **31** may be pre-cut just sufficiently short of edge contact as to leave room for the thin webs **10** of the studs, between adjacent panels **31**. The finish panels **32**, however, are preferably of a width that they will come into edge abutment when they are applied directly to the exposed face of the base panels **31**, and over the flange elements **13*a*** and **13*b*** of the studs. These panels **31** and **32** are held in this relationship by the application between their surfaces of an interfacial adhesive as indicated at **33**, which might be mastic, but which is preferably wet plaster. This thin layer of plaster when applied wet, preferably by spraying it on, penetrates and permeates the foramens of the flange elements **13*a*** and **13*b***, and is of a thickness throughout its area about equal to the thickness of the flange elements. The latter then may serve as a screed or guide to thickness of the adhesive plaster layer. The adhesive plaster at **33**, when it dries, thoroughly secures together the integrated wall construction, including the interposed flange elements **13*a*** and **13*b*** and the base panel **31** and finish panel **32**, with the studs themselves. There are no nail indentations to conceal, or to mar the surface; and bulges or surface irregularities usually encountered in plasterboard walls, except with the most skilled workmanship, are avoided.

The studs are preferably formed with provision for mounting the exterior sheeting panels 2 without the employment of nails or the like, although absence of marring is of minor consequence here, since an exterior veneer sheathing ordinarily covers the sheathing panels 2. Preferably, a special form of clip or spike is employed, indicated at 4, the shank whereof is formed with a stop collar 40 intermediate its ends. One end is intended to penetrate a slit 14 in supporting flange 11 of the stud. Preferably, the slits 14 are of elongated undulated form extending lengthwise of the structural member. The slits are staggered in location at intervals along opposite sides of the median line of the flange 11 so as to accommodate spikes 4 in positions to hold the edges of abutting sheets 2. The spikes are initially driven through these slits from the outer side of the flange 11, deforming the sheet metal sufficiently only at the slit edges to accommodate the spike shanks and without danger of bending or warping the flange as a whole. A tubular impact tool may be used to drive the spikes. When driven, their inner ends are clinched over as shown at the left in Figure 1, wherefore they constitute a secure means of retention for the sheathing panels, and a form of securement which is quickly and readily applied. Their outer end portions have a length exceeding the thickness of the sheathing panels 2, and penetrate predrilled holes in these panels when the latter are pressed into position as they are shown at the right in Figure 1. The projecting tips may then be clinched over to retain the panels. The predrilling of holes in panels 2 to accommodate spikes 4 may or may not be required, depending upon hardness of the panel material used.

Provision is also made for the support of insulating batts 5. These batts, frequently of loosely-felted fibrous material encased in retentive skins 50, are secured along their edges to the web 10. The web may be provided with apertures 15, and clips or nails may be used, as indicated at 51, passing through the edges of the batts and through the apertures 15 to retain and support the batts.

The construction illustrated in Figure 1 is an upright exterior wall construction. The present invention is well adapted, also, to a ceiling construction such as that shown in Figure 2. Here, the structural members 1 serve as joists supported by resting their ends on the top plates of opposite walls (not shown), or in any other suitable manner. Thus supported, the flange elements 13*a* and 13*b* extend horizontally along the lower edge of the joist. The base panel 31, of plasterboard or the like, is inserted between two adjacent joists and is allowed to rest upon the oppositely projecting flanges thereof. No securing means is employed, but as before, wet plaster is sprayed over the exposed (lower) faces of panels 31 including the expanded metal flanges 13*a* and 13*b* and the finish panels are pressed into place to be held by the adhesive action of the plaster and to some extent by suction. Again, through the permeation of the foramens of the flange elements 13*a* and 13*b* by the adhesive and the interlocking of such elements between the interbonded sheets, the resulting structure is rigidly integrated. Such ceiling panels are easily and quickly erected and require no special skills to achieve a workmanlike uniform appearance and structural strength. The integral bonding of the sheets of plasterboard to each other and to the flange elements 13*a* and 13*b* impart greatly increased structural strength to the ceiling.

In each of these panel structures, it will be seen that the structural member, which may serve either as a stud or joist, is specially adapted for rapid, low-cost construction using standard materials. These structural members may be relatively light in weight since they may be of formed sheet metal, and since the substantial advantages of a double flange are achieved by the single stretch of expanded metal cut and bent into oppositely directed tabs which are integrated by plaster with the continuous marginal edges of the sheeting panels in order to impart any required additional stiffness to the structural member such as that which would be imparted by a continuous metal flange thereon.

I claim as my invention:

1. A panel construction comprising a plurality of base sheets arranged substantially edge to edge in a common plane, a plurality of finish sheets edge-abutting in a parallel common plane, an interfacial adhesive mounting the finish sheets upon said base sheets, and supporting studs of sheet metal extending along the opposite edges of the base sheets, and each including flange means along one edge, a web separating adjoining base sheets, and flange elements of foraminous formation directed to opposite sides of the web and positioned interfacially between the base sheets and the finish sheets and obscured by the latter, the foramens of the flange elements being permeated by the adhesive intermediate the base and finish sheets.

2. A wall construction as in claim 1, wherein the foraminous flange elements are integral with the web of the stud, and comprise tabs directed alternately to opposite sides of the web, along the length of the stud.

3. A wall construction as in claim 1, including an insulating batt behind each base panel and intermediate successive studs, the web being perforated at intervals, and tie elements engaged with the edges of the batts and penetrating such perforations, for the support of the batts.

4. A wall construction as in claim 1, wherein the studs are disposed in a vertical plane, and the base and finish sheets constitute the interior wall, a sheathing panel applied to the mounting flanges, and spikes projecting from the mounting flange and penetrating said sheathing panel, for support of the latter.

5. A wall construction as in claim 4, wherein the mounting flange is slit at intervals in its length, to receive a part of the length of the spike, and to leave the remainder thereof projecting to penetrate the sheathing panel.

6. A wall construction as in claim 5, including a collar surrounding each spike between its ends, to gauge its penetration of the slits of the mounting flange.

References Cited in the file of this patent

UNITED STATES PATENTS

1,164,160	Arey	Dec. 14, 1915
1,974,819	Koerner	Sept. 25, 1934
2,101,001	Balduf	Nov. 30, 1937
2,384,849	Pieri et al.	Sept. 18, 1945
2,457,147	Hall	Dec. 28, 1948
2,736,929	Nies et al.	Mar. 6, 1956

FOREIGN PATENTS

435,206	Great Britain	Sept. 17, 1935
738,967	Great Britain	Oct. 19, 1955