United States Patent

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[54] **PREFABRICATED WALL UNIT CONSTRUCTION**
4 Claims, 7 Drawing Figs.

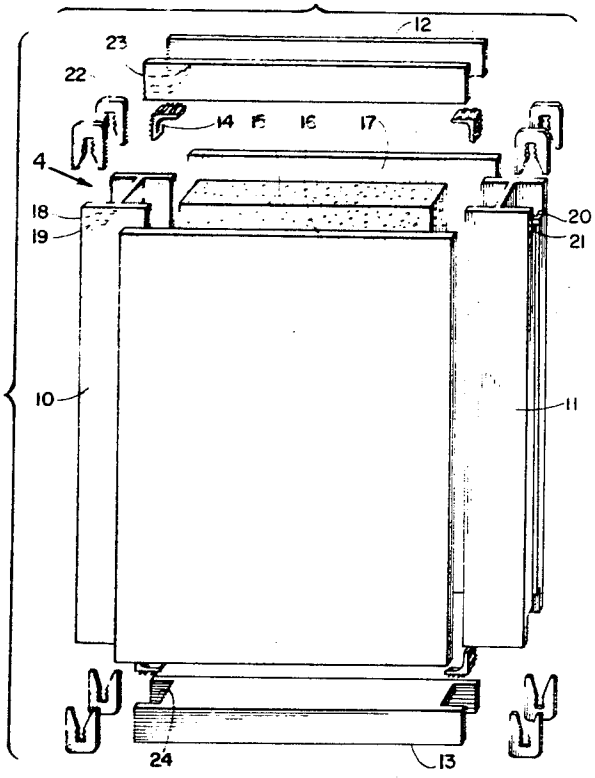
[52] **U.S. Cl.** **52/475,** 52/584, 52/615
[51] **Int. Cl.** **E04b 2/16,** E04c 2/10
[50] **Field of Search** 52/475, 584, 615

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ABSTRACT: Prefabricated wall units are provided for ready connection in longitudinal alignment by clips receivable over shaped side columns when positioned adjacent to each other. Each unit includes top and bottom channels defining a frame with the columns and a suitable insulating filler. Side panels are provided to complete the prefabricated construction.



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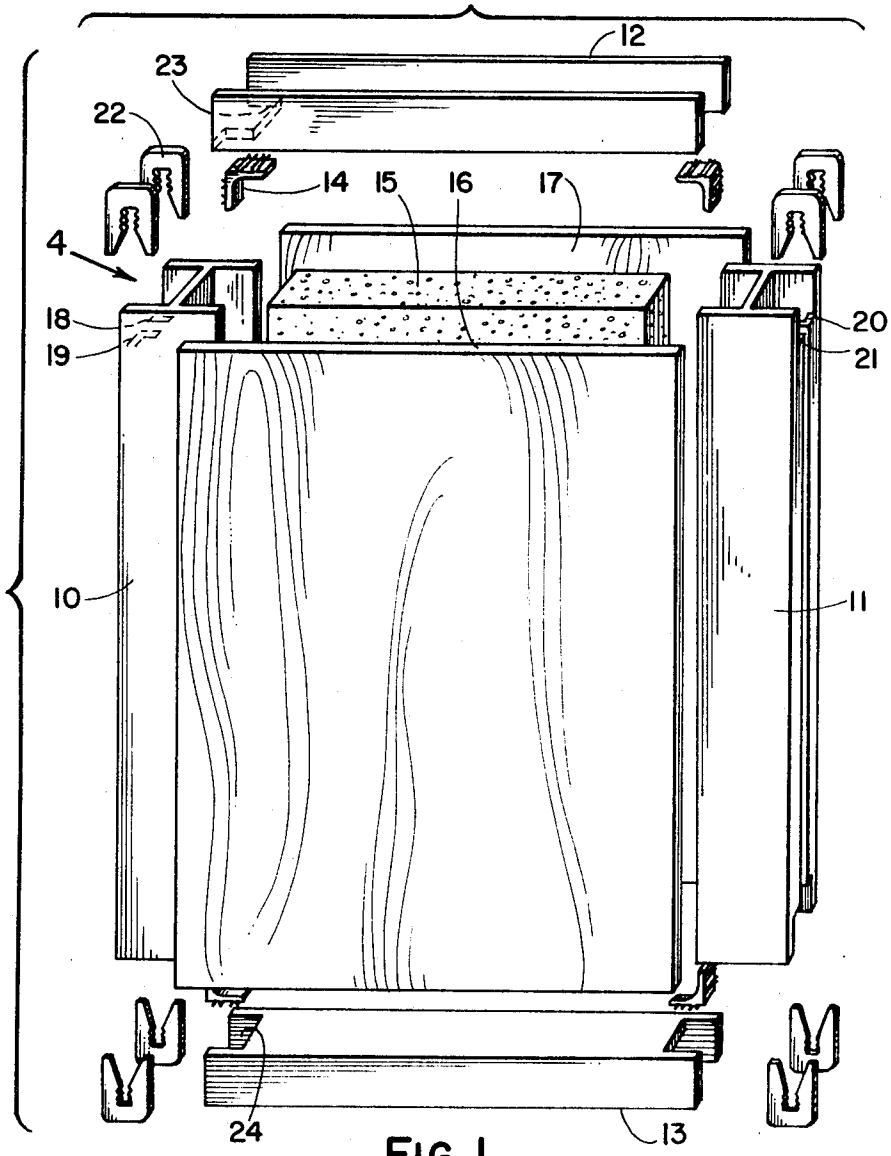


FIG. 1

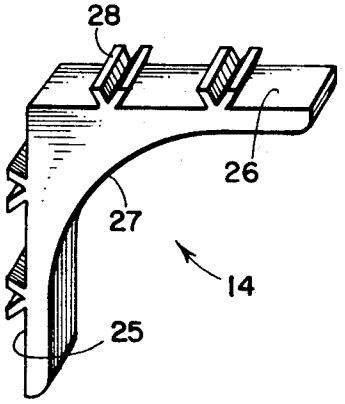


FIG. 2

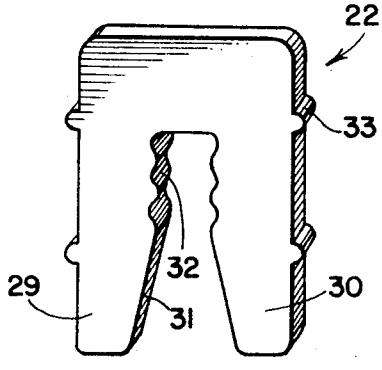


FIG. 3

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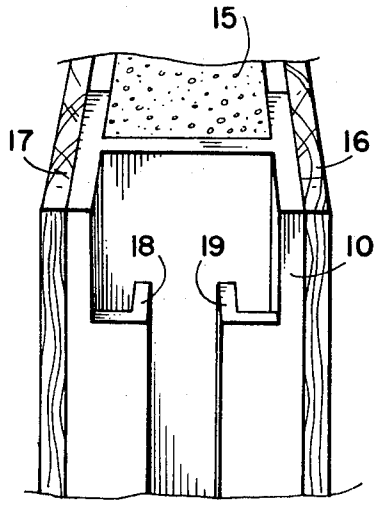


FIG. 4

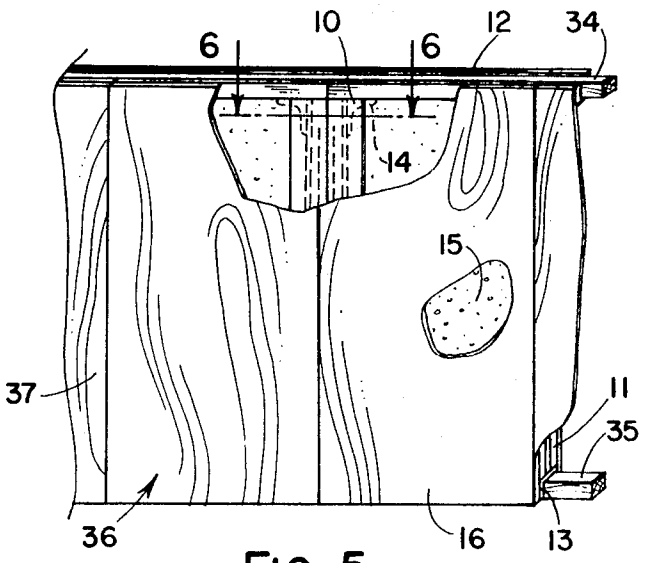


FIG. 5

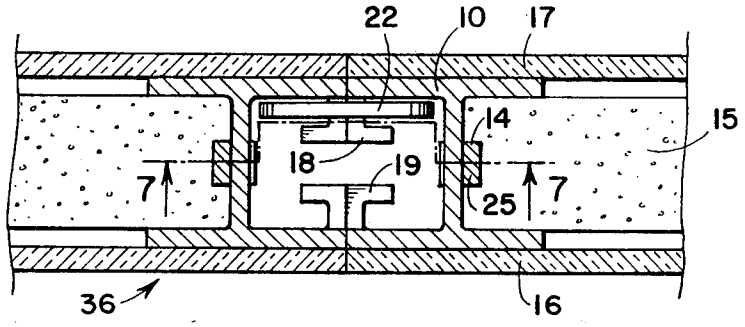


FIG. 6

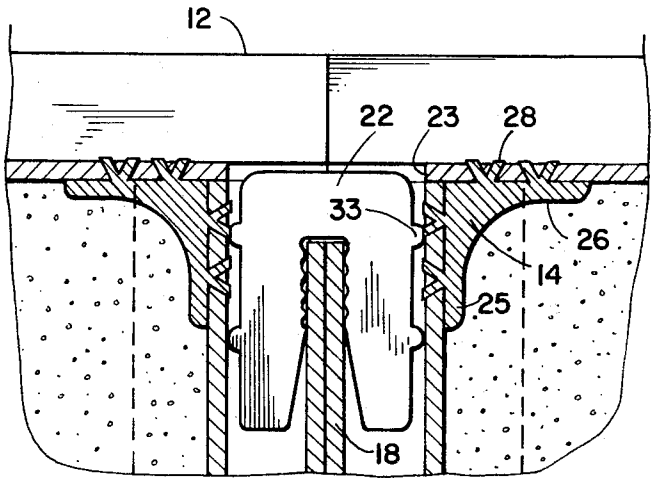


FIG. 7

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PREFABRICATED WALL UNIT CONSTRUCTION

This invention relates generally to building structures and more particularly to a prefabricated wall unit construction.

The primary object of the present invention is to provide prefabricated wall units of identical construction adapted to be intercoupled to form the wall structure of a building.

More particularly, it is an object to provide prefabricated wall units which which may serve as load-bearing units or not, as desired, to the end that the wall units may comprise exterior as well as interior walls of a building.

Another object is to provide prefabricated wall units having means for intercoupling the same in a fast and efficient manner without the need for special tools, to the end that the resulting wall structure of a building may be erected in a minimum of time and expense.

Yet another object is to provide prefabricated wall units having components which are readily manufactured at a minimum of cost, with the result that the wall units are particularly well adapted for mass production.

Still another object is to provide prefabricated wall units which are adapted to be joined to conventional flooring and roofing structures, with the result that design and construction may be accomplished at costs considerably less than heretofore possible.

Another object is to provide prefabricated wall units characterized by high strength and light weight.

Briefly, these and many other objects and advantages of this invention are attained by providing prefabricated wall units of identical design adapted to be erected on conventional flooring structure to support conventional roofing structure. Each wall unit of the invention is constructed of readily manufactured components including a pair of columns forming the ends of the unit and a pair of channel members forming the top and bottom of the unit. The columns and channel members are intercoupled to form a unitary frame structure which may be covered on its sides by siding panels made of plywood, for example. In the preferred embodiment, insulating material may be positioned within the frame structure between the siding panels.

The invention includes novel means by which a plurality of wall units may be coupled together to form the wall structure of a building. The novel coupling means permit the wall units to be erected in longitudinal alignment. When arranged in longitudinal alignment to form an exterior load-bearing wall, the wall units form a continuous bottom channel for receiving a floor sill member, while the top portion of the wall units form an upwardly opening continuous channel for receiving a roof supporting member.

An important feature of the invention relates to the identical construction of each of the wall units, thereby enabling construction of a wall structure by random selection of the wall units, accordingly, marking and indexing of the individual wall units to insure proper placement is largely eliminated.

A better understanding of the invention will now be had by referring to a preferred embodiment as shown in the accompanying drawings, in which:

FIG. 1 is an exploded perspective view, illustrating the components of an individual prefabricated wall unit in accordance with the invention;

FIG. 2 is an enlarged perspective view of one of the bracket means forming a component in the structure of FIG. 1;

FIG. 3 is an enlarged perspective view of a clip means forming one of the components of the structure of FIG. 1;

FIG. 4 is a fragmentary perspective view of one of the component end portions looking in the direction of the arrow 4 of FIG. 1;

FIG. 5 is a fragmentary perspective view of a plurality of prefabricated wall units connected together and partly broken away to expose interior portions thereof;

FIG. 6 is an enlarged fragmentary cross section taken in the direction of the arrow 6–6 of FIG. 5; and,

FIG. 7 is a further fragmentary cross section taken in the direction of the arrow 7–7 of FIG. 6.

Referring first to FIG. 1, the prefabricated wall unit comprises a pair of horizontally spaced vertical columns 10 and 11 of identical construction and a pair of vertically spaced horizontal channels 12 and 13 of identical construction. These members are arranged to be secured together as by means of brackets one of which is indicated at 14 to define a rectangular frame structure.

A core of insulating material 15 is disposed within this frame structure and thereafter siding panels 16 and 17 may be adhesively secured to opposite sides of the frame structure to sandwich the core 15 there between.

The core 15 may constitute a plastic foam such as polyurethane and the siding panel 16 and 17 may constitute plywood. When the various elements described are assembled, the dimensions of the panels 16 and 17 correspond with the outer dimensions of the rectangular frame.

As will be evident from FIG. 1, the column members 10 and 11 are of H-shape in cross section with the inwardly directed legs of the H arranged to straddle adjacent sides of the core 15 and the outwardly directed legs thereof including L-shaped rail portions 18 and 19 for the column 10 and 20 and 21 for the column 11. The columns face in opposite directions as shown and the rail portions terminate short of the ends of the columns. These rail portions will be described in greater detail as the description proceeds.

It will also be evident that the channels 12 and 13 have their open ends facing upwardly and downwardly in opposite vertical directions respectively.

The assembly is completed by a plurality of clip means of general U-shape one such clip being shown at 22. As will also become clearer as the description proceeds, these clip means are arranged to secure together adjacent prefabricated wall units of identical construction to that shown in FIG. 1. To enable ready insertion of the clip means, the channels 12 and 13 include cutout portions such as indicated at 23 and 24 at their ends.

FIG. 2 illustrates in detail one of the bracket means such as that designated at 14 in FIG. 1. All of the bracket means are identical in construction. As shown in FIG. 2, the bracket means defines right-angled surface portions 25 and 26 strengthened in their right-angle relationship by a web or fillet 27. These surfaces include catch projections such as indicated at 28 arranged to be received in adjacent inner corners of the columns and channels to secure the same in a rectangular relationship.

FIG. 3 illustrates one of the clip means such as that designated at 22 in FIG. 1. All of these clip means are identical. As shown in FIG. 3, the clip means is defined by a substantially U-shaped member the legs 29 and 30 thereof defining a receiving slot having a smooth tapered entrance portion 31 and toothed portion 32. In addition, the outer edges of the legs may include rib projections such as indicated at 33 the purpose for which will become clearer as the description proceeds.

FIG. 4 illustrates in greater detail the rail portion of the column construction for the column 10 of FIG. 1. It will be noted that the L-shaped rail portions 18 and 19 are defined by portions of the outer legs of the H-shape of the column turning towards each other and thence inwardly. It will also be evident that these rail portions terminate short of the upper and lower ends of the columns.

In FIG. 5 the prefabricated wall unit of FIG. 1 is shown in assembled position with the upper channel 12 thereof straddling a roof supporting structure or ceiling sill 34 which usually takes the form of an elongated wooden beam. The lower channel 13 in turn is shown straddling a conventional floor sill 35. A further prefabricated wall unit designated by the arrow 36 is shown in alignment with the first mentioned unit and additional wall units a fragmentary portion of one being shown at 37 may be secured to the wall unit 36 to define a series of wall units so that a wall of any desired continuous length may be formed. In this respect, the ceiling sill 34 and floor sill 35 will be common to the wall units and extend continuously through the aligned upper and lower channels respectively of the wall units.

In the fragmentary cross section of FIG. 6, the rail portions 18 and 19 of the column 10 are shown abutting corresponding rail portions in the next adjacent wall unit 36. A clip such as the clip 22 is shown in position straddling the adjacent L-shaped rail portion. A similar clip would be provided about the rail portion 19 and corresponding abutting rail portion of the wall unit 36.

In FIG. 6 the surface portion 25 of the bracket 14 described in FIG. 2 is shown with its catch portions secured within the cross portion of the H-shape of the channel.

In FIG. 7 the remaining right-angled surface 26 of the bracket 14 in turn is shown secured to the underside of the upper channel 12 with the catch portions 28 received therein to lock the channel in right angled relationship to the column. The disposition of the clip 22 will also be clear from FIG. 7 wherein it will be noted that the projecting ribs such as the rib 33 results in a force fit of each of the legs of the clip between the L-shape rail portions and the cross portion of the H structure of the column. The straddling of the L-shaped rails such as the rail portion 18 and adjacent corresponding portion of the next wall unit will also be clear from FIG. 7.

OPERATION

The prefabricated wall units are assembled in a factory, the basic components thereof being as described in FIG. 1. In this respect, the columns and channels are secured together by the brackets such as illustrated in FIG. 2 to define the rectangular frame structure. The siding panels 16 and 17 may then be secured to opposite sides of the resulting frame and thereafter the insulating core 15 disposed within the enclosed rectangular structure. This may be accomplished by a simple plastic foaming operation, the core being foamed in place.

The various clip members such as 22 may be provided separately or may be temporarily secured with one leg between the L-shsped rail portions and the cross portion of the H's merely as a convenience.

Several such prefabricated wall units all of identical construction are provided at the factory and shipped to a building site.

There is no need to index or otherwise identify the various panels since all are identical. Moreover, since the opposite columns 10 and 11 are identical in construction and the top and bottom channels 12 and 13 are identical in construction, the top as illustrated in FIG. 1 could serve as the bottom and the bottom could serve as the top. In other words, there is no particular orientation except that the column members should be vertical and the channel members horizontal.

At a building site, the prefabricated wall units may be utilized to form either an outside wall or an interior wall. In either event, the structure is extremely strong and can serve as a load-bearing structure in the building.

As described heretofore, the various prefabricated wall units may be positioned in side by side longitudinal relationship to define a continuous wall of given length. At this point, the clip members if temporarily secured to the H-shaped channels are removed so that the wall units may be positioned next to each other in flush end relationship as illustrated in FIG. 6. The various clips are then secured over the engaging L-shape portions of the respective wall units as described in FIGS. 6 and 7. It should be noted that there are four clips for each joint between adjacent wall units. Two of these clips are positioned over the upper rail portion ends and two over the bottom rail portion ends.

When an assembly of panels has been connected together as described, the same may be positioned over a continuous floor sill such as 35 shown in FIG. 5 and thereafter a roofing member or ceiling sill 34 positioned in the upper channel 12. Nails may be driven through the sides of the respective channels to these wooden members to secure the completed continuous wall structure in place.

The clips themselves may be positioned by simply hammering the same over the engaging portions of the L-shaped rails forcing them into position. Thus no special tools other than conventional tools are required and the assembly may take place very rapidly.

A further feature of this invention resides in the fact that the prefabricated wall units may be utilized with conventional floor sills normally provided in building constructions so that no alteration of normal building frame portions are necessary.

Because of the bracket structure in cooperation with the columns and channel members, and because of the plastic foam insulation material, an extremely strong and yet light and easily transportable prefabricated wall unit results. As mentioned, the wall units may thus serve as load-bearing units for exterior walls or as load-bearing units in interior portions of a building.

From the foregoing description it is apparent that this invention provides a simplified and efficient construction means whereby the wall structure of a building may be erected at a minimum of time and expense. The identity of each of the prefabricated wall units constructed as described enables the erection of a continuous wall by random selection of the wall units and yet enables this construction to take place with conventional floor and roofing structural members.

It will thus be evident that all of the various objects set forth heretofore are fully realized by the invention as described.

What I claim is:

1. A prefabricated wall unit construction comprising: a pair of horizontally spaced vertical columns of identical construction and a pair of vertically spaced horizontal channels of identical construction; bracket means connecting the end portions of said columns and channels to define a rectangular frame with the columns facing in opposite horizontal directions and the channels having their open ends facing upwardly and downwardly in opposite vertical directions; a rectangular core member of insulating material disposed in said frame; and a pair of rectangular siding panels of dimensions corresponding to the outside dimensions of said rectangular frame secured on opposite sides of said frame, said columns each including parallel rail portions of L-shaped cross section running vertically along a major portion of the exposed end edges of said columns; and clip means for straddling the L-shaped rail portions of one column with the L-shaped rail portions of an adjacent prefabricated wall unit identical in construction to said first mentioned prefabricated wall unit whereby a plurality of such prefabricated wall units may be aligned and secured by said clip means in series with their lower channels received over a common building floor sill and their upper channels received over a common ceiling sill to provide a continuous wall structure of any desired length.

2. The subject matter of claim 1, in which said column members are H-shaped in cross section, the inwardly directed legs thereof straddling the adjacent side of said core and the outwardly directed legs thereof turning towards each other and thence inwardly to define said L-shaped cross section of said rail portions, said rail portions terminating short of the upper and lower ends of said columns, and said channels including cutouts at opposite ends to provide access for inserting said clip means over the ends of said rail portions.

3. The subject matter of claim 2, in which said clip means comprise substantially U-shaped members having an open ended toothed slot defined between the legs of the U for straddling adjacent L-shaped rail portions of aligned wall units, the outer edges of said legs including projecting ribs to provide a force fit of each leg of the clip means between the corresponding L-shaped rail and cross portion of the H-shape.

4. The subject matter of claim 2, in which said bracket means each comprise a member defining right-angle surface portions having projecting catches receivable in the inner right angle corners defined between the adjacent ends of the columns and channels.