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[54] **BUILDING PANELS AND CHANNELS**

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[52] **U.S. Cl.** **52/236,** 52/309, 52/265, 52/271, 52/593, 52/300, 52/622

[51] **Int. Cl.** **E04b 2/08**

[58] **Field of Search**.....52/309, 425, 372, 370, 593, 52/262, 284, 264, 265, 275, 266, 241, 300, 293, 270

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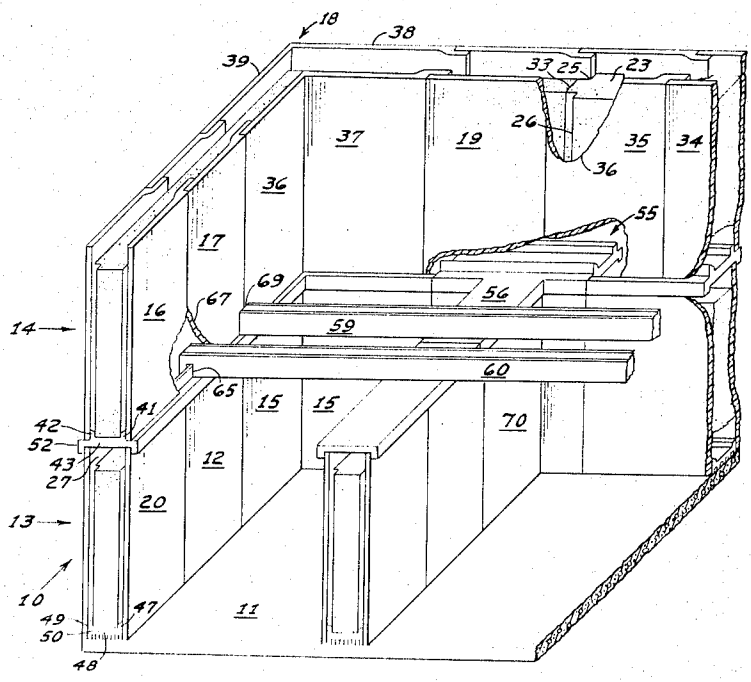
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[57] **ABSTRACT**

Prefabricated panels are erected with channels for constructing a building. Each panel has two fiber glass walls spaced apart by insulating material with offset flanges for interlocking with the adjacent panel. U-shaped channels mounted to the floor concealingly extend into the bottom of the panels. Cap channels cover the top of each panel, forming a raceway, and also serving as a mounting for the second-story panels. Corner panels and channels are provided, as well as T-shaped panels and channels. Rafters having fiber glass walls separated by insulating material fit over the channels to support the second floor.

6 Claims, 13 Drawing Figures



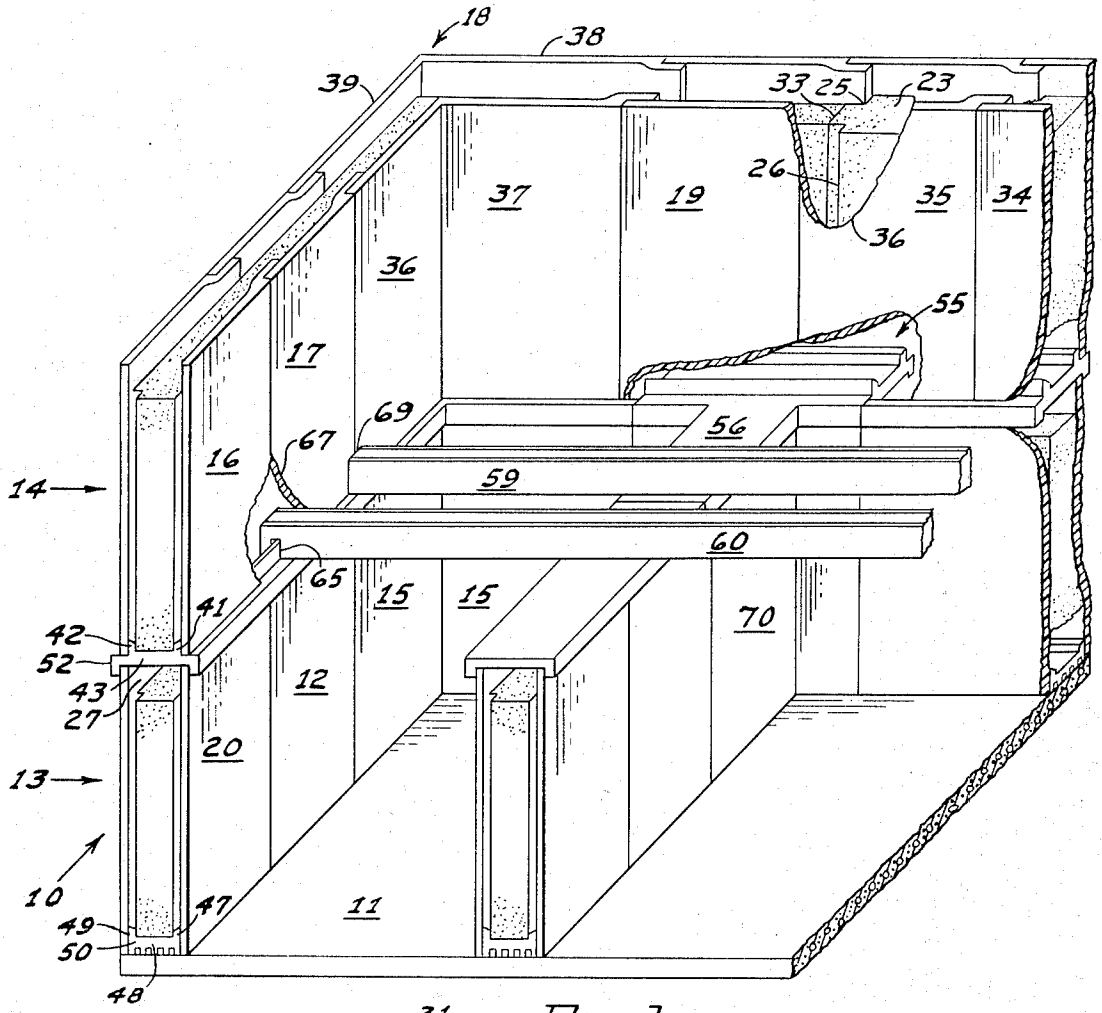


Fig. 1

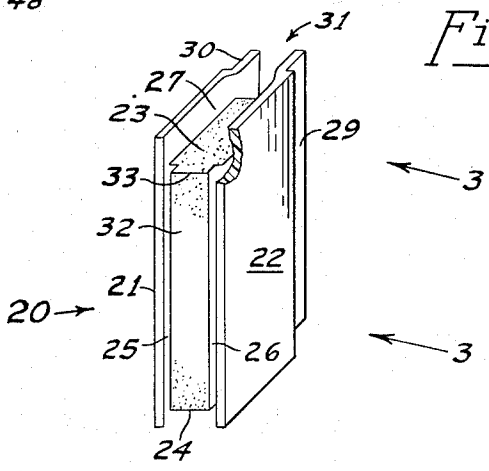


Fig. 2

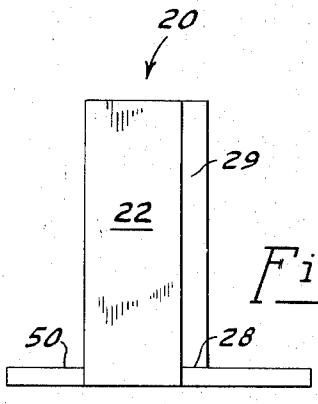


Fig. 3

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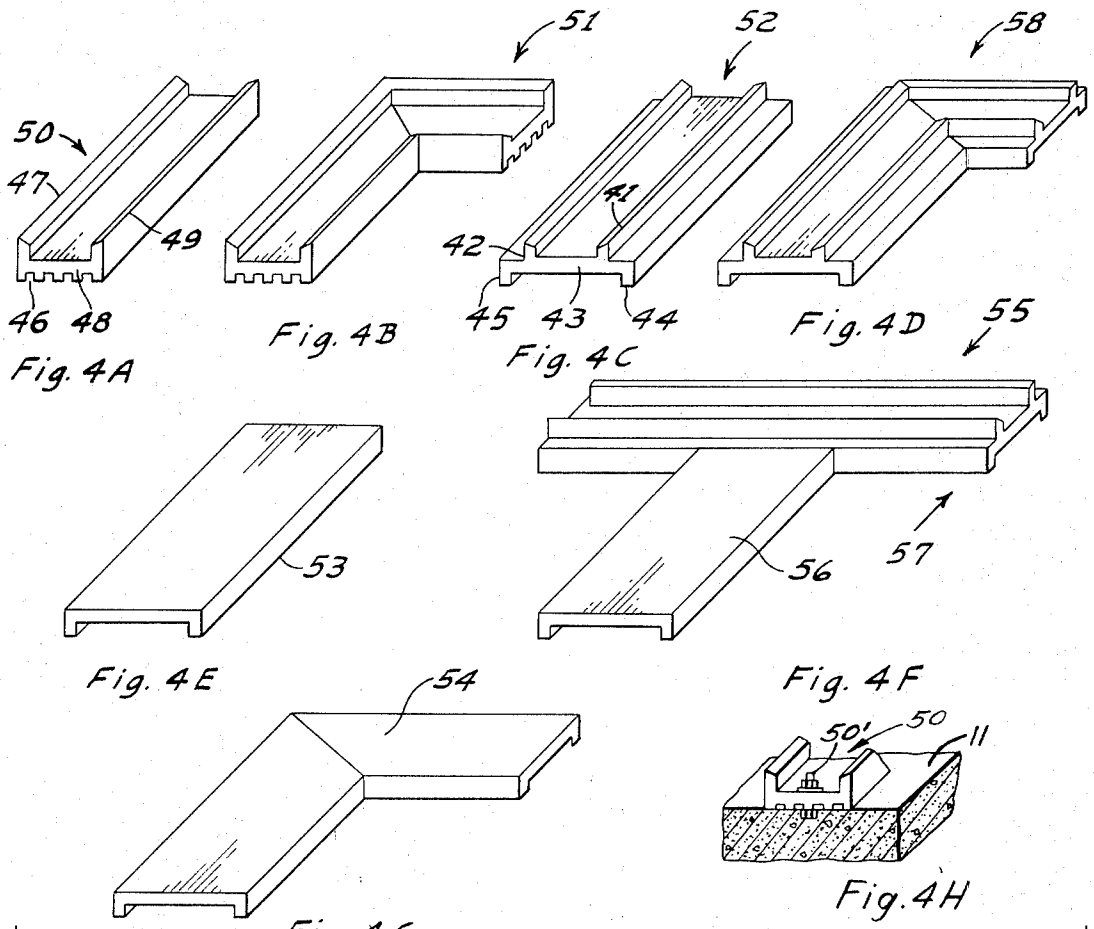


Fig. 4A Fig. 4B Fig. 4C Fig. 4D Fig. 4E Fig. 4F Fig. 4G Fig. 4H

Fig. 4

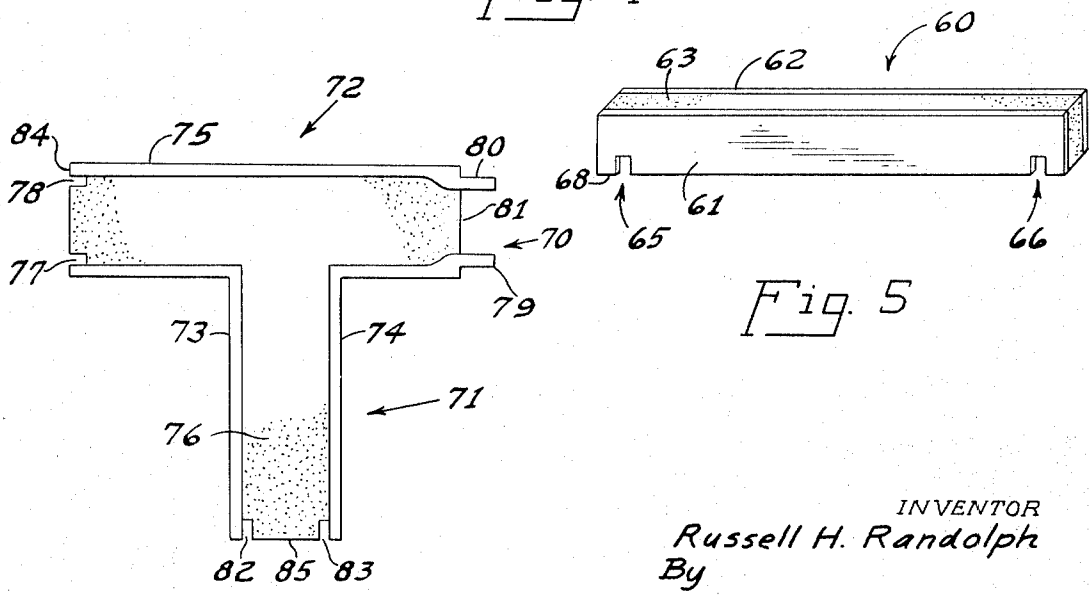


Fig. 6 Fig. 5

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BUILDING PANELS AND CHANNELS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is in the field of prefabricated building construction.

2. Description of the Prior Art

Prefabricated panels have been devised to reduce the cost of constructing a building. Some of these panels are disclosed in the following U.S. Pats. Nos. 3,174,590 issued to Haker; 3,299,270 issued to D'Avella; 3,313,073 issued to Mathews; 3,328,933 issued to Lutze; and 3,357,146 issued to Gartrell.

Many of the prior art panels require special fastening devices to lock adjacent panels together. The use of fastening devices add to the time and cost of erection, and are, therefore, not desirable. Another disadvantage of the prior art panels is that they are not water tight and allow heat transfer. The heat transfer typically occurs by conduction of heat via the various metal fastening devices and flanges. In addition, the prior art panels do not readily mount to floors, nor are the panels readily mounted atop one another.

From the above background, it can be seen that there is a need for a water tight building construction having panels fastened together in such a way so as to minimize heat transfer. The building construction should be rigid, strong and erectable quickly and easily, without requiring special fastening devices.

SUMMARY OF THE INVENTION

This invention is prefabricated panels and channels for use in building construction. Each panel has two fiber glass walls separated by polyurethane foam insulating material. Adjacent panels are locked together by offset flanges provided at the backs of the panel walls. U-shaped channels sealingly mounted to the bottom grade are concealed within the panel sidewalls and extend into slots formed along the bottom of the insulating material. The insulating material is recessed at the top of each panel forming a raceway. A cap channel covers each panel top and will support second-story panels. Corner panels and channels are provided, as well as T-shaped panels and channels. Rafters having fiber glass members separated by polyurethane foam insulating material fit over the cap channels to support the second floor or roof.

It is an object of the present invention to provide a water-tight building construction having panels fastened together in such a way so as to minimize heat transfer through the panels.

It is a further object of the present invention to provide the previously described building construction which is erectable quickly and easily without requiring special fastening devices.

Another object of this invention is to provide a modular structure that is fireproof, vermin proof, moisture proof and dust proof.

Yet another object of this invention is to provide a modular building panel which incorporates a textured exterior surface simulating stone, wood, brick or other surfaces in various weatherproof colors and a textured interior surface of a variety of designs.

Also an object of this invention is to provide a complete system of modular building construction incorporating improved methods of interlocking, insulation and erection.

Related objects and advantages of the present invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view of building construction incorporating the present invention.

FIG. 2 is an enlarged perspective view of one of the panels of FIG. 1.

FIG. 3 is a side view of the panel of FIG. 2 viewed in the direction of arrows 3—3.

FIGS. 4A through 4H illustrate perspective views of the various channels utilized in the present invention.

FIG. 5 is a perspective view of one of the rafters utilized in the present invention.

FIG. 6 is a top view of a T-shaped panel shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawing and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated herein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to FIG. 1, there is illustrated building construction 10 mounted on top of a floor or grade 11. Construction 10 has a first story 13 and a second story 14, each having panels joined together in such a manner so as to form rooms. A perspective view of panel 20 is shown in FIG. 2. Panel 20 has a first side wall 21 spaced from a second side wall 22 by insulating material 23. A variety of materials may be used as insulation; however, best results have been obtained by producing insulating material 23 from polyurethane foam. Walls 21 and 22 are made from fiber glass and have offset flanges 29 and 30 integrally attached to walls 22 and 21 at the back 31 of panel 20. The insulating material of the adjacent panel is formed to receive flanges 29 and 30. That is, slots 25 and 26 are formed in material 23 at the front 32 of panel 20 to receive the offset flanges of the adjacent panel. Material 23 does not extend beyond the integral junction of flanges 29 and 30 to walls 22 and 21 in order that the adjacent tongue 33 formed between slots 25 and 26 may fit between flanges 29 and 30. Panels 19 and 35 in FIG. 1 are cut away at 36 to more clearly illustrate the fitting relationship between the two panels. Material 23 of panel 35 has slots 25 and 26 to receive the offset flanges of panel 19. Tongue 33 of panel 19 extends between the offset flanges and abuts against the insulating material of panel 35. It has been determined that slots 25 and 26 should be under-sized with respect to offset flanges 29 and 30 to insure a tight fit. Insulating material 23 does not extend completely to the top of walls 21 and 22 (FIG. 2) so as to form raceway 27 for receiving and concealing electrical conduits and mechanical plumbing within the panel. Holes may be readily drilled through insulating material 23 to facilitate the routing of the electrical conduits and mechanical plumbing. The bottom 24 of each panel is

mounted on top of a channel having upwardly extending flanges. Channel **50** (FIG. 1) has two upstanding flanges **47** and **49** integrally joined to a base **48**. The insulating material on the bottom of panel **20** is slotted along the entire bottom edge of said walls **21** and **22** to receive flanges **47** and **49**. In addition, the insulating material does not extend down to the bottom edge of walls **21** and **22** in order that base **48** will not interfere with the insulating material, and so that walls **21** and **22** will extend down sufficiently so as to conceal flanges **47** and **49**.

FIG. **3** is a side view of panel **20** viewed in the direction of arrows **3—3** of FIG. **2**. The bottom **28** of offset flange **29** is notched so as to not interfere with the upstanding flange of channel **50**. Flange **29** is offset sufficiently so as to be exactly over and parallel with the upstanding flange of channel **50**. Therefore, it is necessary to remove the bottom portion from offset flange **29**. The bottom portion of offset flange **30** of side wall **21** (FIG. **2**) is notched in a manner identical to that of flange **29**.

It can be appreciated that the construction shown in FIG. **1** can be varied greatly depending on the exact needs of the building. Of course, the panels and channels must also be varied depending on the exact needs. Panels **12**, **19**, **20**, **34** and **35** are identical. Corner panels **15** and **18** are identical, and are very similar to the panels already described. In fact, corner panels **15** and **18** are identical with respect to the previously described panels except that panels **15** and **18** are L-shaped thereby forming a corner. The walls of the corner panel **15** are configured from two separate pieces of fiber glass, each wall being of one piece and L-shaped, thereby forming a corner with each wall having an offset flange at its opposite end. The inside corner wall and the outside corner wall of this panel are separated by foam as in the other panels, but when complete, the corner panel is an integral L-shaped panel which lends basic rigidity to the entire structure.

A variety of channels are required with the present invention and are illustrated in FIG. **4**. Base channel **50** has upstanding flanges **47** and **49** integrally joined to base **48** with grooves **46** formed on its bottom. Mastic is placed within grooves **46** across the bottom of base **48** to seal the base channel to grade **11**. In many cases, grade **11** is concrete and thus anchor bolts **50** may be embedded into the concrete with shanks extending through suitably sized holes in base **48**. Nuts are then threaded onto the shanks, thereby securing the base channel to the grade. The tops of flanges **47** and **49** are bevelled inward so as to facilitate ease of entry into the bottom slots of the panel. Corner base channel **51** is identical to channel **50** except that it is configured at a right angle to receive the bottom of a corner panel, such as panel **18** of FIG. **1**. Dual cap channel **52** (FIG. **4**) is used to mount a second story panel on top of a first story panel. Channel **52** has a base **43** integrally joined to two downward extending flanges **44** and **45** and to two upwardly extending flanges **41** and **42**. Flanges **44** and **45** are spaced apart, fitting on the outside surfaces of the first story side panel walls, while flanges **41** and **42** fit within the inside surface of the second story side panel walls. Referring to FIG. **1**, the upwardly extending flanges **41** and **42** of channel **52** fit within panel **16**, whereas the downwardly extending flanges of channel **52** fit on the outside of the side walls of panel **20**. Channel **58** of FIG. **4** is identical to channel **52** except that it is configured to receive a corner panel. Channel **58** is mounted on top of corner panel **15** of FIG. **1**, and supports corner panel **18**.

In the event the top of the panels is not jointed to a top floor or roof, then cap channels **53** and **54** (FIG. **4**) are used to cover the panel top. Channels **53** and **54** have downwardly extending flanges which are spaced apart for fitting on the outside of the panel side walls. Typically, channels **53** and **54** are placed on top of panels forming room partitions or officettes. Cap channel **54** is configured to cover the top of a corner panel. T-shaped channel **55** has a single cap channel **56** identical to cap channel **53** as is bonded to the side of a dual cap channel **57**, identical to channel **52**. Channel **55** is used to cover the top of T-shaped channel **70** (FIGS. **1** and **6**). A top view of panel **70** is shown in FIG. **6** with channel **55** removed. Two L-shaped side walls **73** and **74** are spaced apart and from wall **75** by insulating material **76**. Panel **70** is identical with respect to the previous panels described except for the "T" configuration. The insulating material is recessed and slotted on the bottom of panel **70** for receiving channel **50** and is also recessed at the top of panel **70** for concealing electrical conduits and mechanical plumbing. Slots **77** and **78** are formed in the insulating material at end **84** and slots **82** and **83** are formed in the insulating material at end **85** for receiving offset flange ends of adjacent panels. The insulating material is recessed at end **81** with offset flanges **79** and **80** integrally attached to walls **75** and **74**. The T-shaped channel **55** is installed on the top of panel **70** with channel **56** fitting over side panel **71** and channel **57** fitting over back panel **72** and supporting panels **19** and **35** of FIG. **1**.

Rafters **59** and **60** fit over channel **56** for supporting a second floor. A perspective view of rafter **60** is illustrated in FIG. **5** having fiber glass walls **61** and **62** spaced apart by insulating material **63**. The ends of rafter **60** have slots **65** and **66** extending through material **63** and walls **61** and **62** for engaging the innermost flanges of dual cap channel **52**. Panels **16** and **17** are cut away at **67** in FIG. **1** showing slot **65** engaging the innermost flange **41** of channel **52**. End portion **68** (FIG. **5**) of rafter **60** freely fits between flanges **41** and **42** resting atop of base **43** (FIG. **1**) of channel **52**. The innermost wall of the panels is cut out in order that rafter **60** may pass therein. Thus, panels **17** and **36** are cut out at **69** receiving rafter **59**. In the event, rafters **60** are required to support a roof, then slots **65** and **66** are made sufficiently wide so as to fit over the cap channels **53** of FIG. **4**. The rafter **60** in the latter case overhangs on the exterior of the building.

As previously described, a variety of insulating materials may be used between the side walls. Polyurethane foam is particularly advantageous since the exothermic reaction occuring during the expansion of the foam produces sufficient heat to chemically bond the insulating material to the side walls, thereby providing a very strong panel with excellent insulation characteristics. The polyurethane foam and the fiber glass walls are fireproof thereby enhancing the desirability of the construction.

It will be obvious that the present invention provides a water tight building construction having panels

fastened together at their tops and bottoms by channels thereby minimizing heat transfer through the panels. It will also be obvious that the building construction provides a very rigid structure erectable quickly and easily, without requiring special fastening devices. Also, it will be obvious that the panels of the described building construction are prefabricated away from the construction site, and may be textured in such a manner so as to simulate various wall designs and surfaces.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention and the scope of the claims are also desired to be protected.

The invention claimed is:

1. A building structure comprising:

first story interlocking rigid panels having first and second non-metallic walls parallel and spaced apart, said panels having rigid insulating material between and connecting said first and second walls, said material being chemically bonded to said first and second walls;

base channels fixedly mounted to a floor and having said panels mounted thereon, said base channels each having a pair of first spaced apart mounting members extending up between said material and said walls with said material extending down between said members of each pair;

cap channels mounted to the top of said panels having retaining flanges extending down adjacent and outboard of said walls;

second story interlocking panels identical to said first story interlocking panels and mounted atop said cap channels; and wherein:

said cap channels each have a second pair of spaced apart mounting members extending up between the material and the side walls of said second story panels with the material of the second story panels extending down between the members of each said pair;

said walls of said first story panels and said second story panels have back ends with offset parallel flanges disposed inward of said walls and connected to said back ends, said walls of said first story panels and second story panels have front ends;

said insulating material has slots positioned adjacent said walls at said front ends, said slots sealingly and concealingly receive said offset parallel flanges;

said walls have top ends and bottom ends with said insulating material recessed at said top ends forming a raceway, said material is recessed and slotted at said bottom end sealingly and concealingly receiving said base channels.

2. The structure of claim 1 wherein:

said offset parallel flanges are aligned with and positioned over said first members of said base channel.

3. The structure of claim 1 additionally comprising:

rafters having a pair of parallel walls spaced apart, said parallel walls are slotted fittingly engaging said second pair of members of said cap channels.

4. The structure of claim 1 wherein:

some of said first story panels and said second story panels are corner shaped; and,

some of said first story panels and said second story panels are T-shaped.

5. The structure of claim 4 additionally comprising:

anchor bolts embedded in said floor having shanks lockingly engaged with said base channels.

6. The structure of claim 4 wherein:

said base channels have grooved bottoms and bevelled top ends.

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