

June 13, 1944.

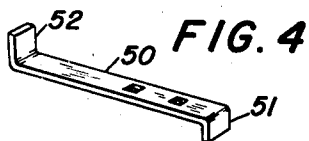
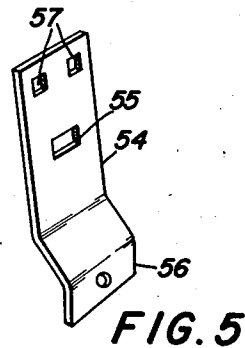
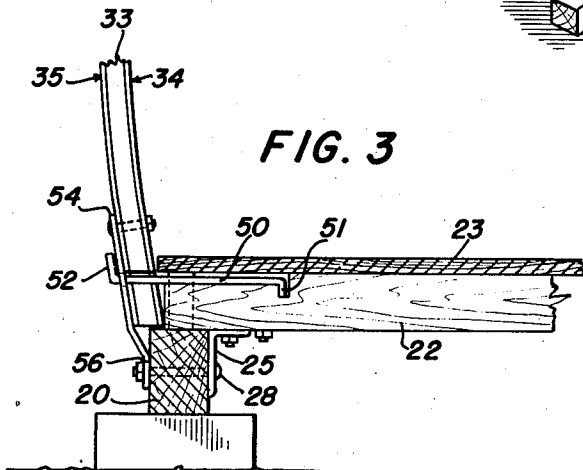
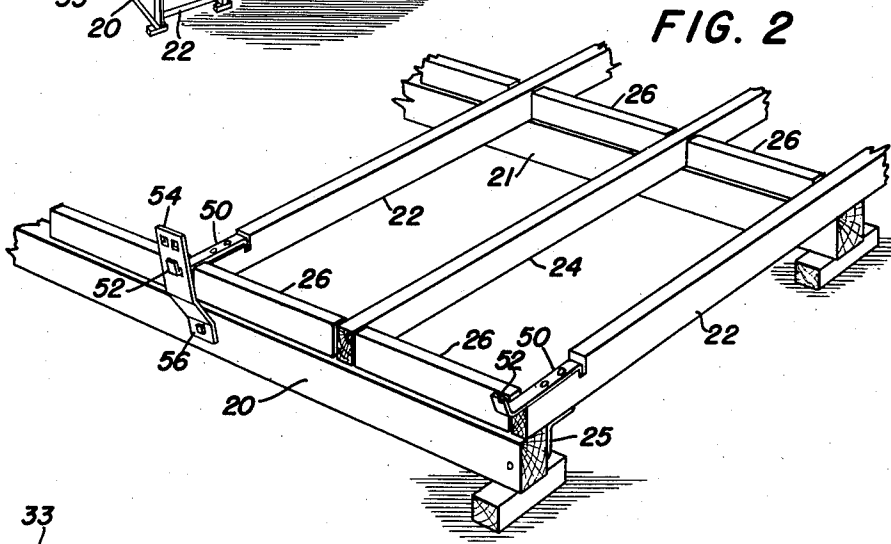
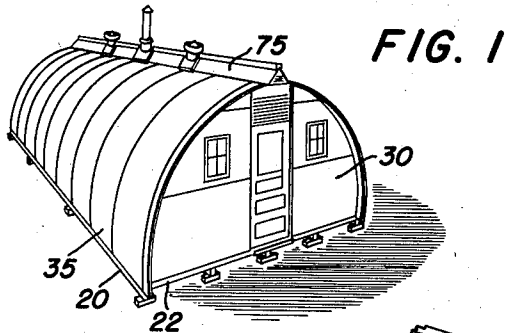
F. HOBBS

2,351,209

BUILDING CONSTRUCTION

Filed Aug. 19, 1942

3 Sheets-Sheet 1



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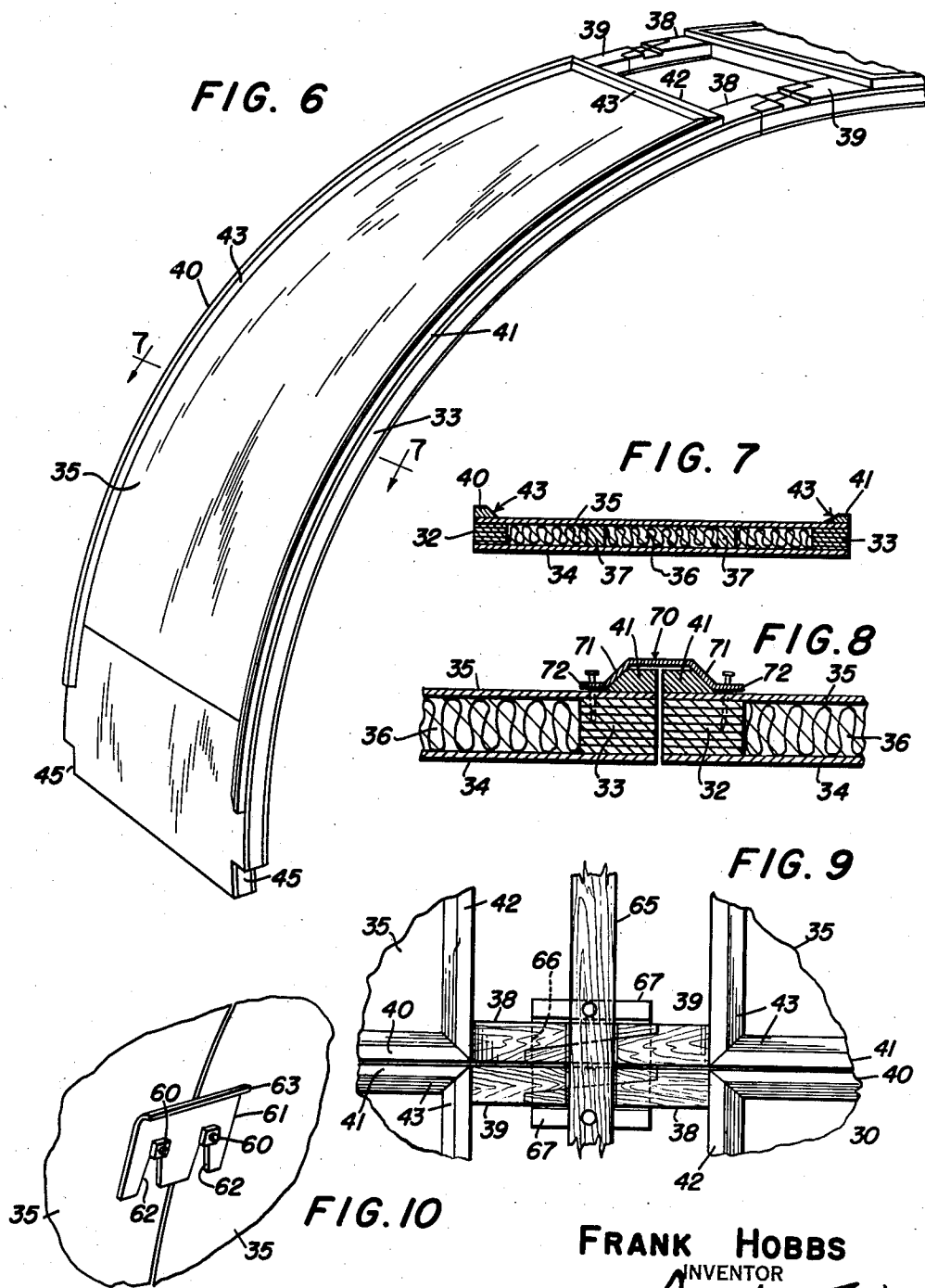
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

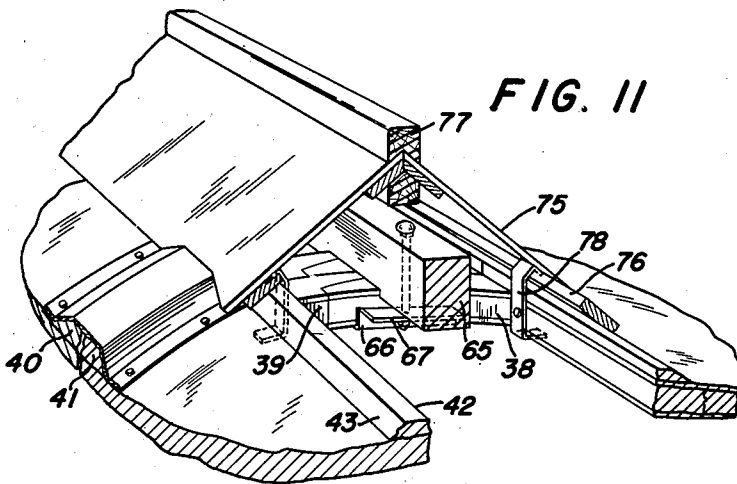


FIG. 11

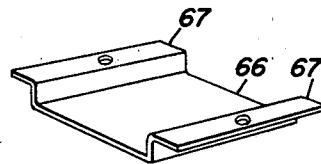


FIG. 12

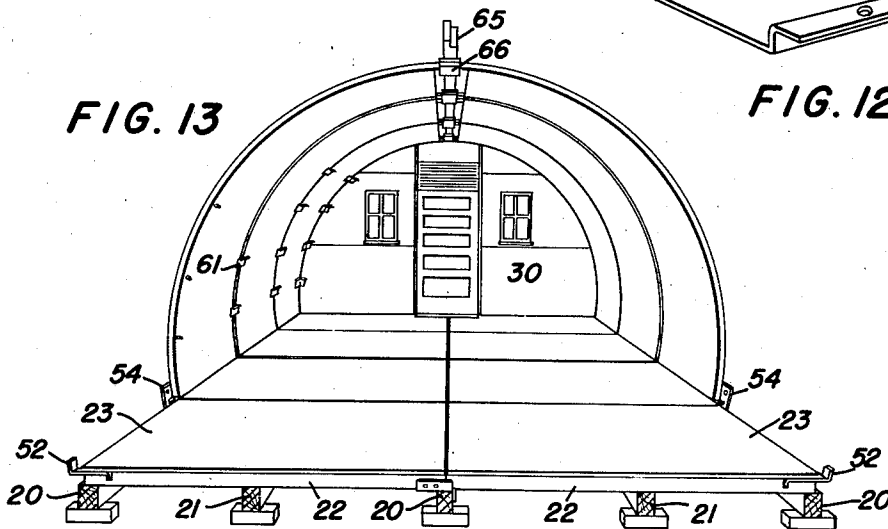


FIG. 13

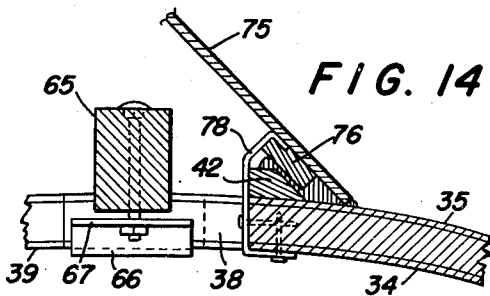


FIG. 14

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2,351,209

BUILDING CONSTRUCTION

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3 Claims. (Cl. 20—2)

The present invention relates to improvements in building construction and in particular to improvements in a type of construction that employs prefabricated and insulated panels that may be quickly attached to a floor section to form, with certain bulkhead sections, the complete building.

The prior art has shown many types and variations of prefabrications of buildings. It has shown the use of insulated panels and means for joining the panels together. Many of these prefabricated structures are useful and desirable for permanent structures, but have been so constructed that when once together they were difficult to take apart or, once disassembled, to reassemble. Generally the design was not suited for use in remote or inaccessible camps where ease of assembly and transport are prime considerations. A construction system to remedy these defects of the prior art must be radical in its broad concept and in the minutiae of its assembly adjuncts. The broad concepts of the design are those features which allow the construction to be light, portable, and basically easily assembled; but it is the design, arrangement, and coaction of the minutiae of the structure that actually allows and permits the attainment of these ends.

Having in mind the defects of the prior art, it is an object of the present invention to provide a light weight and easily assembled portable prefabricated building construction.

A further object of the present invention is the provision of a building construction in which a single type of panel forms the major portion of the walls and the roof of the building.

Another object of the present invention is the provision of a building construction using prefabricated and insulated panels in which each panel forms a section of a side and half of a section of the top of the building.

A further object of the present invention is the provision of novel means for securing together adjacent panels.

Yet another object of the present invention is the provision of novel means for joining together the side and platform sections with the foundation sills.

A still further object of the present invention is the provision of a novel construction for joining the panels together along the ridge of the building, and also in providing a novel ridge construction.

The foregoing defects of the prior art may be remedied, and the foregoing objects attained by a construction in which a rectangular frame is

made up of manually portable sections that, when assembled on suitable sills and covered, will form the platform, or floor, for a substantial sized and sturdy building. I provide hollow arcuate wall sections or panels that are constructed of spaced apart plywood or fabricated sheets. The hollow interior of the panels is usually filled with suitable insulation such as a mineral wool bat, and the edges are spaced apart and closed by solid ribs glued and nailed therebetween. Internal and intermediate ribs are also used on occasion. An end of each panel rests directly on a sill against a longitudinal edge of the platform. The other end of each panel is provided with horns, or fingers, that coact with similar fingers on the opposed panel to form a connecting means between opposed panels along the ridge line of the structure. The assembled structure is roughly semi-cylindrical in shape. A segmental bulkhead, provided with suitable doors and windows, closes each end of the structure. The panels are each joined to the side sills and the platform by a simple T-iron, the head of which extends between and joins together two side panels and secures the two panels to the sill. The stem of the T has one end secured to a floor joist and the other end may be and preferably is detachably secured to the head of the T. The outer side edges of the panels are provided with flanges that are secured together by wedge and lock bands that hold pairs of panels together and seal the joint between panels. Auxiliary securing means may also be provided between the panels in the form of drift plates that may be driven over pins to wedge and draw the panels together. A ridge pole, and saddle plates coacting therewith, is provided for making a firm and strong ridge construction. A ridge cap seals the ridge joint and also forms a duct for ventilating air and for power conduits or other similar elements.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which

Figure 1 is a perspective view of an assembled building embodying my invention;

Figure 2 is a perspective view of a portion of the assembled sills and floor joists used with the construction shown in Figure 1;

Figure 3 is a transverse sectional view of a side sill at the joint between panels;

Figure 4 is a perspective view of the T-stem of the locking T-iron assembly;

Figure 5 is a perspective view of the head plate of the T-iron locking assembly;

Figure 6 is a perspective view of one of the building panels and, coacting therewith, a part of the opposed similar panel;

Figure 7 is a section on the line 7-7 of Figure 6;

Figure 8 is an enlarged transverse sectional view of contiguous portions of two adjacent panels;

Figure 9 is a fragmentary plan view of the ridge assembly and saddle clamp means;

Figure 10 is a fragmentary perspective view of two panels and a drift plate assembly for aiding in drawing together and locking panels together;

Figure 11 is a perspective view of the ridge assembly of the construction;

Figure 12 is a perspective view of a clamping plate or saddle used in the ridge assembly;

Figure 13 is a perspective view of an assembled portion of the interior of the construction; and

Figure 14 is a transverse sectional view of a portion of the ridge assembly showing details thereof.

A preferred form of my invention is shown in Figure 1, wherein there is shown a prefabricated building structure suitable for use at remote and inaccessible sites.

Foundation

This building is formed with a foundation frame comprising longitudinal side sills 20 and intermediate sills 21. Placed transversely of the sills and spanning the spaces therebetween are a plurality of spaced apart floor joists. These floor joists are divided into two groups; the primary joists 22 are located under joints of the floor panels 23, and the secondary joists 24 are located intermediate of the primary joists 22. The floor joists may be secured to the sills by suitable means such as the angle irons 25. Placed longitudinally of and upon the sills between the joists are the filler blocks 26 for supporting the floor panels thereabove. The floor panels 23 are of a size so that they will extend from one sill to another, and from one joist to another. In the present showing the panels extend from an outer edge to the center of the floor and have a joist supporting the mid portion thereof. Customarily, the flooring panels are secured to the joists by nailing, and are here shown to be conventional plywood panels.

In assembling the frame at a predetermined site, foundation blocks are placed at suitable points on the ground to support the various sills in an approximate level plane. The joists 22 and 24 are next dropped into place onto the sills, and in the notches or spaces between the ends of the filler blocks 26. This roughly assembled frame is next trued to the square and leveled. Thereupon anchoring bolts 28 are passed through the angle irons 25 to be subsequently tightened to anchor the joist ends to the sills. When this frame has been trued, the flooring panels are placed in position and nailed to the joists. It is to be noted that the floor panels as shown in Figure 3 terminate short of the outer edge of the sill.

End bulkheads

At both ends, usually beginning at one end, bulkheads 30, 31, having door and window open-

ings, are assembled and temporarily supported in a vertical position. In end profile, as can be seen in Figures 1 and 13, the bulkheads are roughly semi-circular. In the drawings, the bulkheads are shown as being a segment of a circle greater than a half circle. This is for the purpose of increasing head room, particularly near the edges of the platform in the later assembled structure.

Wall and roof panels

Referring to Figures 6, 7, and 8, wherein the details of a wall and roof panel are illustrated, the panel comprises side ribs 32, 33 which space apart the inner panel face sheet 34 and the outer panel face sheet 35, thus defining a hollow wall section that is light in weight but has great structural strength and rigidity, as is apparent. Any suitable insulating material, such as the mineral wool batt 36, may be placed in the interior of the panel. On occasion, intermediate ribs 37 may be placed in the panel.

The ribs 32 and 33 are preferably formed of thin strips of material glued together in a laminated assembly and curved longitudinally to conform to the profile of the bulkhead. At the end of the panel to be disposed at the ridge of the structure, the edge ribs 32, 33 extend beyond the facing sheets and form horns 38, 39, or fingers. On the exterior face of the panel and along both side edges, and across the upper end edge are placed wedge and sealing strips 40, 41, 42. Each of these strips has a cam surface 43 facing interiorly of the panel. At the lower corners of the panels are formed notches 45.

T iron

Used in assembling the panels to the platform are the T irons shown in place in Figures 2, 3, and disassembled in Figures 4 and 5. A T iron comprises a stem 50 which at its inner end has a hook 51 adapted to be placed in a suitable notch near the outer end of each joist 22. The stem is secured to the joist by conventional means. On the outer end of the stem 50 is another hook 52. The head of the T iron comprises a plate 54 having an opening 55 through which the stem 50 is inserted and retained by the outer hook 52. The head plate 54 has a lower offset end 56 which is adapted to engage the bolt 28 and be secured to the sill by the sill bolt 28. Near the upper end of the head plate 54 there is formed bolt openings 57 for securing the plate to two adjacent wall panels.

Panel erection

A wall panel is raised into position so that the notched, or lower, edge rests upon the upper outer edge of a sill 20. In this position, the notches receive the stems 50 of spaced apart T irons. The inner face of the panel abuts the outer edge of the flooring 23, and the outer face lies interiorly of the T iron head plate 54. Bolts are passed through the holes 57 and through the panel, and secured to anchor the wall panels to the sills. The erection of the panels is commenced at one end by erecting the first panel on an end bulkhead. Next, another panel is erected on the bulkhead and in opposition to the first erected panel.

When the two opposed panels are thus raised, the horns 38, 39 are brought into overlapping relation, as shown in Figure 6, and lie alongside a joint that is formed by the subsequent erection of similar panels forming two series on either side of the median of the building. The horns of opposed panels are interlocked in the manner

illustrated in Figures 6 and 9. The horns of adjacent pairs of opposed panels comprise a finger joint at the ridge of the structure. Several wall panels thus erected are temporarily supported by suitable framing.

As can be seen in Figure 10, the inner faces of the panels have outstanding studs 60, or pins, adjacent the edges thereof. A drift plate 61 provided with tapered notches 62 is driven over and between the studs 60 to draw and secure adjacent panels together. The drift plates 61 are provided with a driving edge flange 63 to facilitate driving of the plates. Eave strips or panels are joined to the first assembled panels and the bulkhead to overhang and extend beyond the bulkhead. The side edges of the panels erected adjacent the bulkhead are suitably joined to the bulkhead by drift plates similar to those shown in Figure 10 except that they are medially bent to conform to the angular junction of the wall panels and the bulkhead.

Ridge construction

A ridge pole 65 is rested upon the various spaced apart finger joints formed by the interlocked horns of the erected wall panels. A saddle plate 66 is placed under the finger joint, and bolts passed through holes in flanges 67 on the plate 66 anchor and secure the plate and the ridge pole together. It is to be noted that in this construction the upper edges of opposed wall panels are spaced apart leaving openings whose ends are defined by the finger joints.

For convenience of transportation the ridge pole is usually formed of several similar sections that are joined together at their ends to produce a single sturdy member that extends the full length of the building.

When all the panels of the two opposed series are erected and coupled with the bulkhead on the end of the building opposite the first mentioned bulkhead, the structure is substantially complete. The building then has joined walls and ceiling portions and the ends are closed. However, there are next the steps of making the structure weather-tight and habitable—in other words, the various joints between adjacent panels must be closed and sealed and the openings along the ridge line covered.

Joint seals

To close the joint between adjacent wall panels, I employ U bands 70 which straddle adjacent edge or wedge strips 40, 41 in the manner disclosed in Figure 8. Sloping flanges 71 on the U bands engage the cam faces 43 of the wedge strips, and nails or other fastening pass through the offset edges 72 of the U bands and into the ribs of the wall panels to tightly draw the U bands to the outer face of the panels and to aid in bringing the edges of the panel together in tight sealing relation. A sealing, preferably in a plastic state, may be placed in the joint and under the U bands 70.

The overhead longitudinal openings along the ridge are covered by a ridge cap formed in the shape of an inverted V trough 75, whose edges have secured thereto strips 76 and apex is formed with a stiffening member 77. The walls of the ridge cap are suitably notched at their edges to conform to the uneven contour of the outer faces of the walls produced by the sealing strips and U bands at the wall joints. Anchor clips 78 secure the ridge cap to the structure, so that the strips 76 lie against the sloping face of the

sealing strips 42, and a sealing compound is customarily used at this place.

A building structure provided in the foregoing manner is entirely suitable for many uses. One such prime use is for military housing which usually is needed at points remote from common sources of supply and usually inaccessible except by long distance transportation. This structure lends itself ideally to such construction since the various parts are relatively small and may be handled without the necessity of bulky and heavy transportation and erection equipment. Additionally, the assembly operation is purposely simple and easy so that inexperienced labor may be employed in the erection operation without requiring skilled training or a high degree of mechanical ability.

The structure, when completed, is entirely self-supporting, and is interiorly braced in a manner that affords the maximum amount of unobstructed floor space while at the same time the building is extremely sturdy and capable of withstanding hard usage by the elements and the occupants. The external curved faces of the walls and roof receive and pass off the forces of wind in a manner that avoids racking or twisting. From a military standpoint the structure is ideal because it permits ready concealment from aerial observation since the curved face blends well with the ground surface and can be simply camouflaged.

The space enclosed by the inverted V cap serves as a ventilation duct and also permits the simple installation of electrical conduits and other similar equipment. To introduce to or receive air from the duct formed at the ridge line, the ends of the V cap are closed by louvered plates and, at various points in the length of the building, suitable ventilator tubes rise from the apex of the cap as shown in Figure 1. Communication of air between the duct and the interior of the building is through the openings that occur between the ends of the wall panels. By thus providing ventilation at the ridge line of the building, the structure, when employed as a habitation, may be occupied by many persons and yet no one need be exposed to drafts or other uncomfortable conditions in order that others can have sufficient fresh air. Since excess heat rises to the crown of the enclosed area it is easily drawn off through the ventilator duct in an even manner throughout the length of the building.

It will appear that many of the means and details of my building construction are unusual, but I have found them desirable in order to satisfy my broad and rather radical concept of the necessities of prefabrication in meeting the circumstances that exist during and following production and upon assembly of the structure. The details that have been described with particularity actually prevail in my attainment of the primary concepts.

The many various parts of the construction are standardized into a relatively small number of similar interchangeable parts, any one of which will serve in the place requiring that type part. For example, all the wall panels are the same so that no matter in what order or in which series any particular one is used a fit will result and others can be brought into proper adjacent position without fitting or special skilled work on the part of the erectors.

In the important functions of securing and sealing the panels, ridge cap, and other points throughout the structure, simple uncomplicated

members are employed that permit fast attachment and tight sealing, all without additional master clamps or other special equipment. All that the workman needs in the way of tools is a hammer, a screw-driver, and a wrench, and all the fasteners can be handled.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. A building construction, comprising: sill, side, and platform members contiguous to each other, and a T shaped tie member; the head of the T being secured to and joining two of said side members to the sill member and the stem of the T joining the T to a platform member. 20

2. A building construction, comprising: sill, side, and platform members contiguous to each other, and a T shaped tie member; the head of the T being secured to and joining two of said side members to the sill member, the stem of the T being detachably secured to the head, and the stem joining the T to a platform member. 5

3. A building construction, comprising: a sill, a floor platform resting on said sill, an anchor strap extending horizontally outward from said platform and having a hook on the outer end, a wall rising above said platform and wholly supported on said sill externally of the platform edge, an anchor plate slotted to engage over said hook on the anchor strap and fastened to the sill and the wall to tie the wall to the sill and to the floor platform. 10

FRANK HOBBS.