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BUILDING STRUCTURE WITH PANEL CONNECTING MEANS

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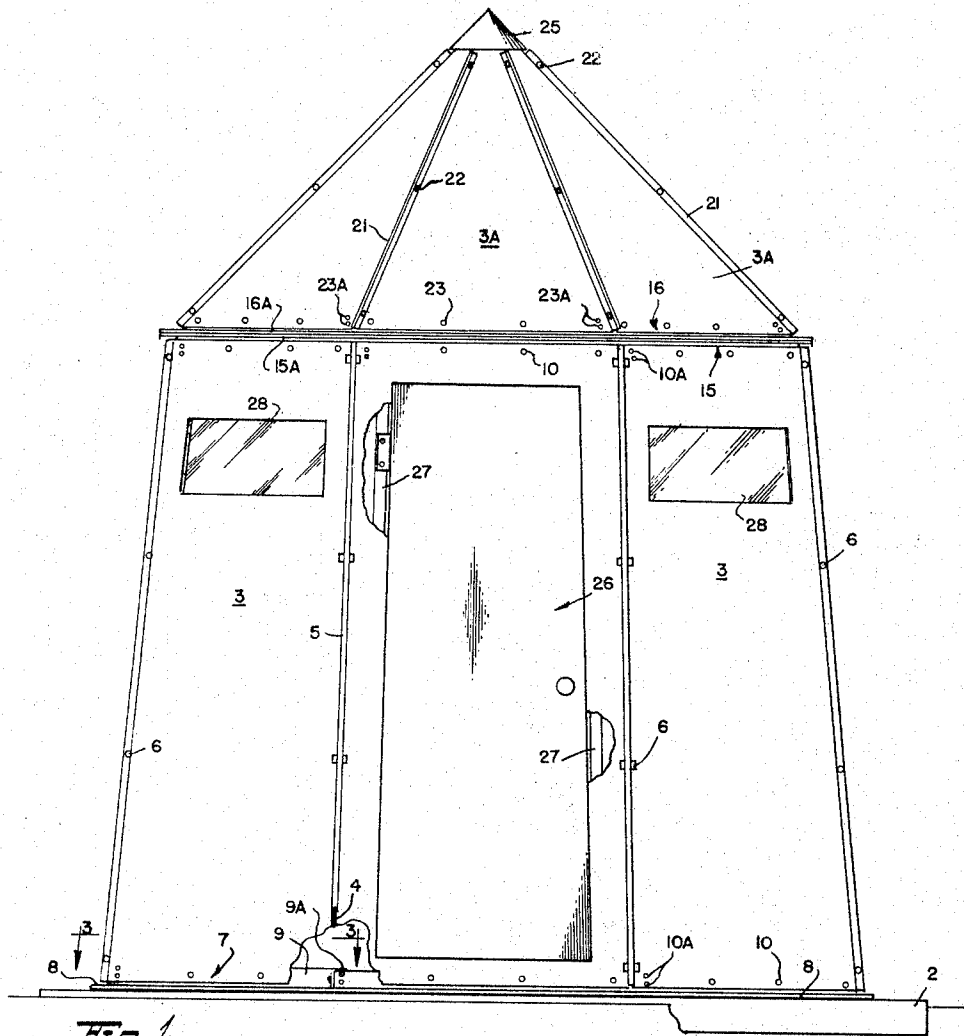


Fig. 1

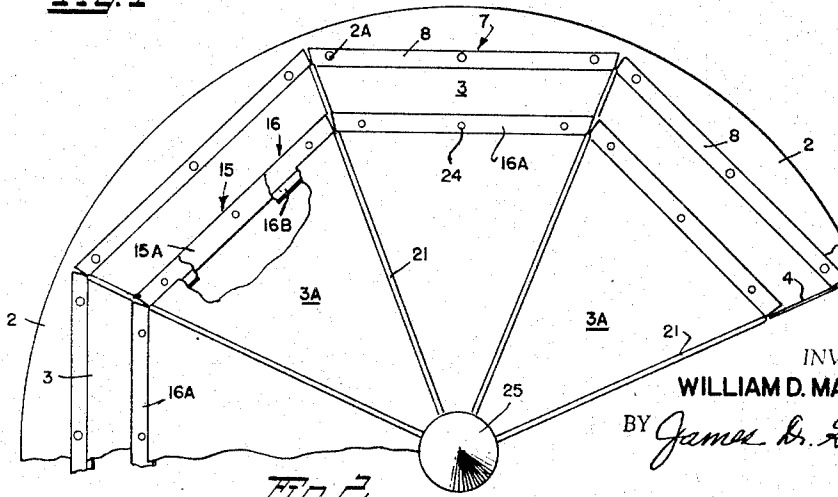


Fig. 2

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BUILDING STRUCTURE WITH PANEL CONNECTING MEANS

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This invention relates to improvements in building construction of the monocoque type including specially designed panels interlocked in a new and novel manner to provide a rigidly integrated, utility-type structure.

A primary object of this invention is the provision of a building of the character described which is of light weight, durable, inexpensive construction made from inexpensive materials which ordinarily are unsuitable as structural components of conventional buildings but when assembled in accordance with the present invention result in a substantially built shelter requiring no internal or external supporting frames or braces.

Another equally important object of the invention is to provide a type of building construction having a minimum number of interchangeable structural members made of material which lends itself to low cost mass production and packaging for marketing in a "flat pack" or knockdown compact form. The few component parts are especially designed for expeditious assembly by a purchaser with the use of only a screwdriver and a wrench. The low cost and ease of fabrication renders the building practical for a wide variety of uses such, for instance, as the storage of tools, garden furniture and equipment as well as various recreational uses.

The novel manner of interlocking the building components provides adequate strength and rigidity enabling the use of lightweight, flexible sheet stock and a resultant multi-sided structure which lends itself to convenient enlargement by the insertion of matching wall and roof panels.

An object of equal importance is the provision of panel connecting angle members of substantially identical configuration which may be advantageously produced with a minimum number of forming dies.

The foregoing and other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof and in which:

FIGURE 1 is an elevational view of a building structure made in accordance with my invention.

FIGURE 2 is a fragmentary top plan view of FIGURE 1.

FIGURE 3 is a sectional plan view taken approximately along line 3—3 of FIGURE 1.

FIGURE 4 is a fragmentary perspective view of typical side and roof panels and their respective interconnecting angle plates.

FIGURE 5 is a sectional view on an enlarged scale taken along the line 5—5 of FIGURE 4.

FIGURE 6 is an enlarged fragmentary elevational view taken approximately along the line 6—6 of FIGURE 4, and

FIGURE 7 is a perspective view of a base plate in supporting securement to a fragment of its respective side panel.

With continuing reference to the drawings and particularly FIGURE 1 thereof, reference numeral 1 indicates generally a building structure made in accordance with my invention and supported upon a base 2. The structure comprises a plurality of interlocked side and roof panels indicated at 3 and 3A, respectively, manufactured from light gauge sheet metal. Although the structure as shown is mounted preferably upon a cement slab 2 and

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secured thereto by lag bolts as at 2A (FIGS. 2 and 3), it will be readily understood that bases of other suitable material such as wood, cement blocks and the like would be equally effective, and in some instances, due to the inherent rigidity of the structure, the base securing means 2A could be dispensed with.

The side or wall panels 3, as best illustrated in FIGURE 1, are of trapezoidal shape, inclined upwardly and inwardly at approximately five degrees from the vertical and interlocked with the roof panels 3A into a symmetrical building structure.

Formed along the length of one side of each of the side panels 3 is an outwardly projecting angular flange 4 and along the opposite side thereof is a U-shaped flange 5 which projects outwardly for interlocking securement to the side edges of the juxtaposed panels 3. Matching holes 4A and 5A are spaced apart along the flanges 4 and 5 respectively for the reception of fasteners 6 inserted in the course of fabricating the structure. While not shown, the plates 3 and 3A may be crimped along their longitudinal axes if desired, for stiffening purposes without departing from the spirit and scope of this invention.

Securing each of the side panels 3 to the base 2 are elongated base angle plates indicated generally at 7 (FIGURE 7). Each of said plates comprises a base-engaging horizontal portion 8 and an upwardly inclined panel-engaging portion 9. This latter portion terminates at one of its ends in an inwardly bent apertured tab 9A. It will be noted that the bottom edge 9B of tab 9A is biased to provide clearance with the base 2. The angle plates 7 are of slightly heavier gauge sheet metal than that of the side and roof panels but yet capable of proper shaping and fitting by manual operations. The plates 7 are secured along the interior of the bottom edge of their respective panels 3 by fasteners 10 extending through matching holes 11 and 12 pre-punched in the plates 7 and panels 3. The fasteners 10A at the left end of the plate shown in FIGURE 7 also lock the tab 9A of the adjoining plate (not shown) in position against the back side of the panel-engaging and supporting portion 9.

Secured in a similar manner (FIG. 5) to the top edge of each wall panel 3 by additional fasteners 10 is a lower angle plate indicated generally at 15, adapted for securement to a matching superimposed upper angle plate indicated generally at 16. Such securement of the angle plates 15 and 16 to each other and the latter to roof panels 3A provides a strong, durable support for the entire roof structure. The plates 15 and 16 are similar to the bottom plates 7 in that they each have horizontal portions 15A and 16A and downwardly and upwardly inclined portions 15B and 16B both terminating at one of their ends in tab-like extensions 15C and 16C. The angular relation of the horizontal and inclined portions of the upper angle plate 15 is approximately 135 degrees resulting in a roof pitch of 45 degrees, but of course this can be varied if desired with the resulting changes being necessary in the dimensions of the roof panels 3A.

In fabrication of the wall structure each side panel 3, affixed with its base angle plate 7 and a lower angle plate 15, is slidably engaged with adjacent side panels by means of flanges 4 and 5 engaged respectively with flanges 5 and 4 of said adjacent panels. Fasteners 10A are then inserted through their respective panels 3, plates 7, 15 and tabs 9A, 15C to secure adjacent panels in solid wall formation.

The roof structure is composed of panels 3A also of lightweight sheet metal interlocked in the same manner as the hereinabove described wall structure. Briefly, each of the panels 3A comprise a flat metal sheet having an outwardly projecting right angular flange 20 and an angular U-shaped flange 21 projecting outwardly and extend-

ing the length of the panel's sides. Fasteners 22 extend through matching holes 20A and 21A in flanges 20 and 21 for securing the panels in juxtaposition. The multi-paneled roof structure, including upper angle plates 16 secured to the lower end of the panels 3A by fasteners 23 and 23A, is fabricated into a unitary assembly in a manner similar to the wall structure with the fasteners 23A extending through tabs 16C. Bolts 24 secure in matching engagement lower and upper angle plates 15 and 16. The roof panels 3A terminate at their upper ends in horizontal disposition to provide a ventilator opening which may be provided with a conical cap 25 as shown, or some other type closure affixed so as to provide an air space for ventilating purposes between said cap and the roof panels.

In areas where periodic surveillance of the building is not possible, use of permanent type fasteners such as rivets may be preferred. The use of any of a wide variety of types of fasteners is feasible, the particular selection of which is suited to the use to which the building is put without departing from the spirit and scope of this invention.

While inclined side panels are shown, it is to be understood the panels 3 could be of rectangular form and the plate portions 9 and 15 vertically disposed to provide a building having vertical side walls.

A unique feature of the structure disclosed is its capability to receive additional side and roof panels for enlargement. As noted above, the novel structure permits the use of sheet metal stock of a weight or gauge not ordinarily acceptable as load bearing members. The flexibility of the material used, such for example, as sheet stock aluminum, for the manufacture of the building's components results in the tabs 9A, 15C and 16C being positionable relative to their respective angle plates as well as the flanges 4, 5, 20 and 21 being positionable relative to their respective panels. In a building constructed as above set out, roof and side panels may be added or removed from the structure by simply re-positioning the attached components. As shown in FIGURE 3, in regard to the base angle plates 7 but applicable also to the lower and upper angle plates 15 and 16, the biased ends of adjacent horizontal portions of said plates define an acute angle which will vary with the number of panels used in the building structure. The broken line portion of FIGURE 3 illustrates, by way of example, the addition of a ninth pair of side and roof panels to an eight sided structure, as partially shown in full lines.

The building structure above described is provided with a door indicated generally at 26 housed within a panel 3 reinforced along the perimeter of the door opening by stiffeners 27 one of which carries door hinging means secured in any conventional and acceptable manner. Similarly, certain selected panels 3 may be provided with windows as at 28 also secured therein in any acceptable manner.

While I have shown particular forms of embodiment of my invention, I am aware that many minor changes therein will readily suggest themselves to others skilled in the art without departing from the spirit and scope of the invention. Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A multi-sided building of the type described having a plurality of pairs of juxtaposed, interlocked side and roof panels and comprising in combination, substantially vertical elongated side panels of flexible sheet metal having longitudinally extending flanges provided on the opposite side edges thereof, for engagement with flanges of adjacent side panels, inclined elongated roof panels of flexible sheet metal also having longitudinally extending flanges provided

on the opposite side edges thereof for engagement with flanges of adjacent roof panels,

base angle plates angular in section, having a horizontal portion and a substantially vertical or side panel supporting portion and laterally extending tab means integral with said last mentioned portion,

lower angle plates affixed to the upper end of said side panels,

upper angle plates affixed to the bottom end of said roof panels,

each of said lower angle plates having a generally horizontal portion and a downwardly inclined portion for engagement with one of said side panels,

each of said upper angle plates having a generally horizontal portion and an upwardly inclined portion for supporting engagement with one of said roof panels, and

said downwardly inclined portion and said upwardly inclined portion provided with integral, laterally extending tab means adapted to be secured in locking engagement with an inclined portion of an adjacent plate.

2. A building as claimed in claim 1 wherein all of said angle plates are of flexible metal including the integral tab means whereby the angular relationship of pairs of side and roof panels to other pairs of adjacent side and roof panels may be varied to permit the addition of additional pairs of side and roof panels.

3. A building structure comprising,

a plurality of juxtaposed, inclined trapezoidal side and roof panels,

said side and roof panels flanged along their non-parallel sides for the reception of fastening means, first plate means secured to the top and bottom parallel sides of said side panels,

second plate means carried by the lower end of said roof panels and in fastened engagement with the first plate means secured to the top of said side panels, said first and second plate means comprising horizontal and inclined portions and adapted to receive fastening means, and

said inclined portions having angularly disposed tab extensions for the reception of fastening means for interlocking said plate means.

4. A building structure comprising,

a plurality of juxtaposed, vertical side panels, a plurality of juxtaposed, inclined roof panels, said side and roof panels flanged along their adjacent edges for the reception of fastening means,

first plate means secured to the top and bottom ends of said side panels,

second plate means secured to the lower end of said roof panels,

said first plate means having a vertical and a horizontal portion adapted to receive fastening means,

said second plate means having an upwardly inclined and a horizontal portion and adapted to receive fastening means, and

said vertical and inclined portions having angularly disposed tab extensions for the reception of fastening means for interlocking said plate means.

References Cited

UNITED STATES PATENTS

1,311,116	7/1919	Fitch	52—582
1,924,480	8/1934	Bayley	52—82
1,977,391	10/1934	Kramer	52—82

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