April 25, 1950 O. M. STOLZ 2,505,343

SHEET METAL BUILDING

Filed May 21, 1945 4 Sheets-Sheet 1

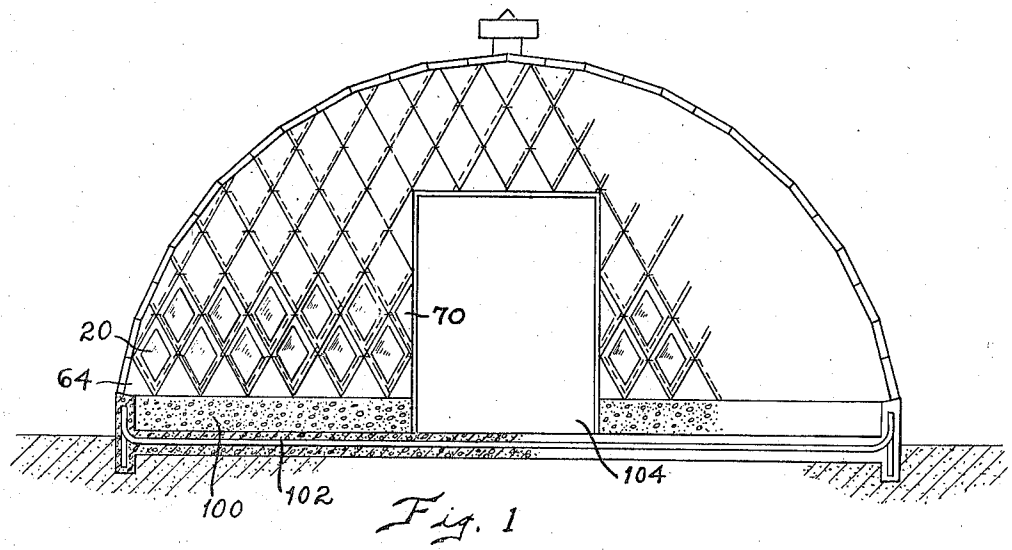


Fig. 1

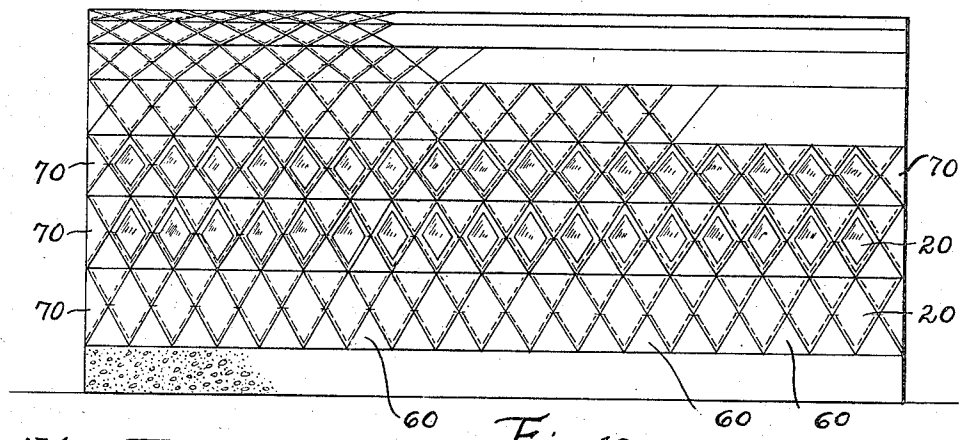


Fig. 10

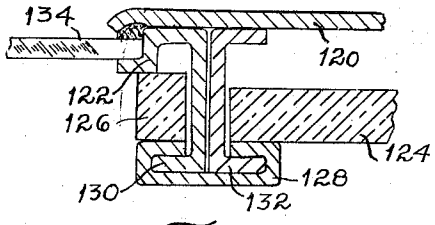


Fig. 9

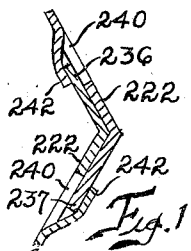


Fig. 11

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SHEET METAL BUILDING

Filed May 21, 1945 4 Sheets-Sheet 2

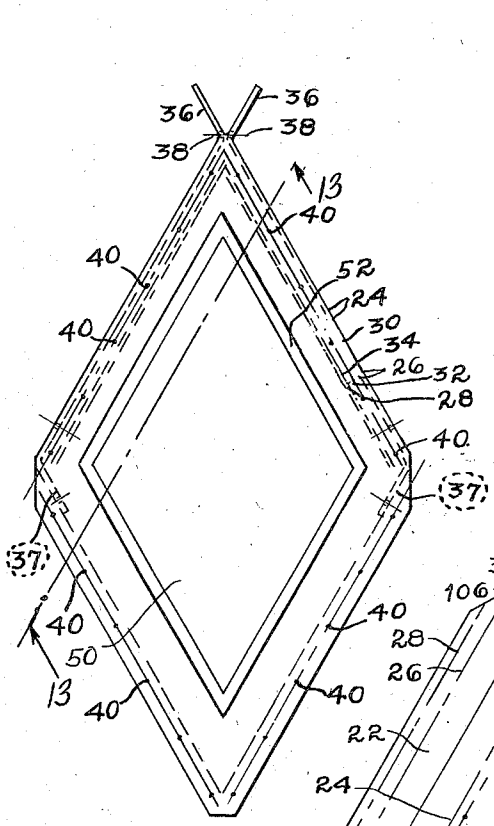


Fig. 4

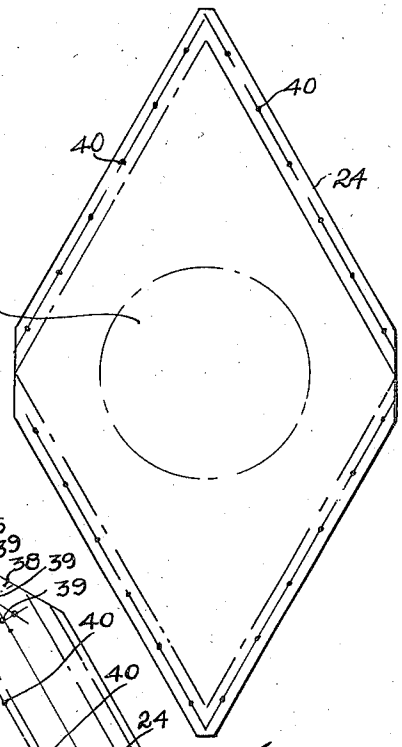


Fig. 3

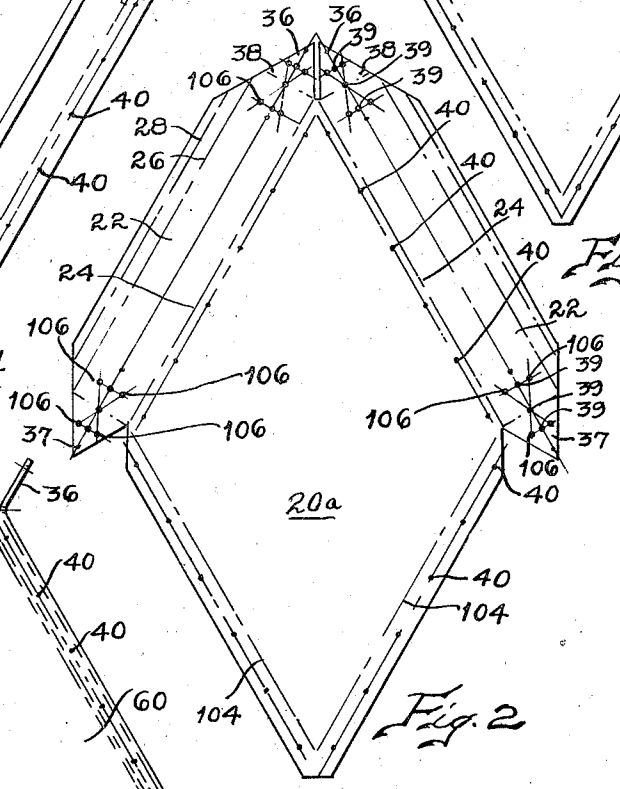


Fig. 2

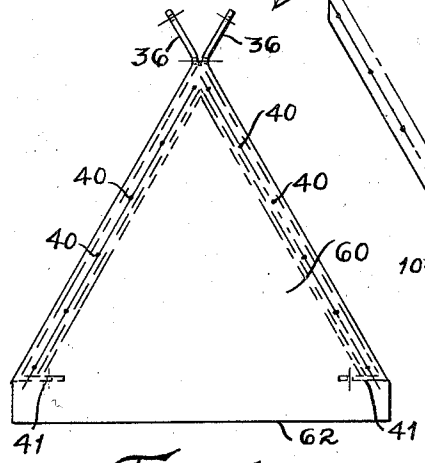


Fig. 5

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SHEET METAL BUILDING

Filed May 21, 1945 4 Sheets-Sheet 3

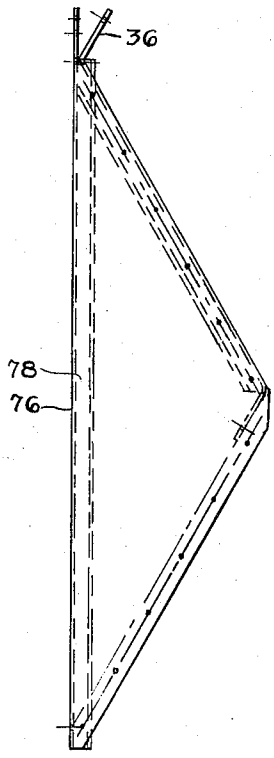


Fig. 8

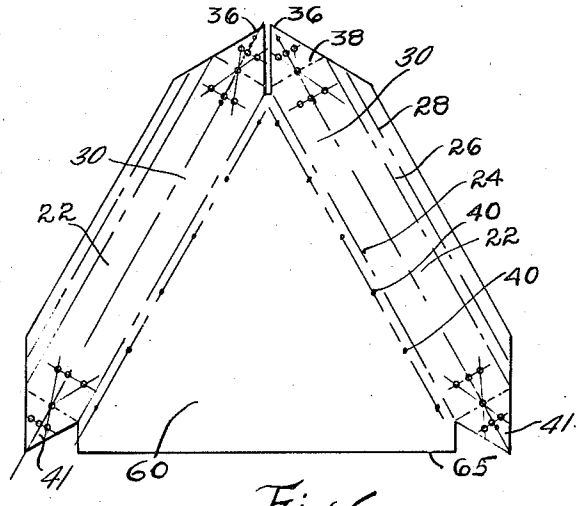


Fig. 6

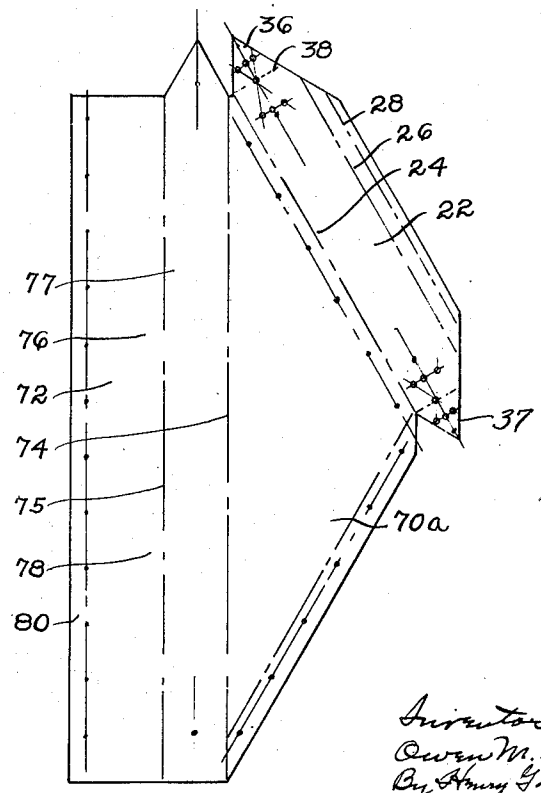


Fig. 7

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April 25, 1950 O. M. STOLZ 2,505,343

SHEET METAL BUILDING

Filed May 21, 1945 4 Sheets-Sheet 4

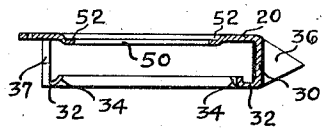


Fig 13

Fig 12

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UNITED STATES PATENT OFFICE

2,505,343

SHEET METAL BUILDING

Owen M. Stolz, Dayton, Ohio, assignor of one-third to John D. Yeck and one-third to Alan D. Roush, both of Dayton, Ohio

Application May 21, 1945, Serial No. 594,989

10 Claims. (Cl. 189—1)

1

This invention relates to the construction of metallic buildings and more particularly to the construction of metallic buildings utilizing interengaging metallic sections.

In conventional sheet metal buildings utilizing sheet metal side walls and a sheet metal roof, it is customary to use a supporting frame. Usually, the frame structure is assembled before applying the sheathing and roofing material.

An object of this invention is to construct a building from formed sheet metal sections, so formed that the sheet metal functions as a frame for the building.

Another object of this invention is to provide a frameless sheet metal building.

Another object of this invention is to produce a building from standard parts, easily produced and assembled from low cost materials with a small amount of labor that may be unskilled.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

Referring to the drawings.

Figure 1 shows an end elevational view of a building constructed from sheet metal sections without the use of framing material.

Figure 2 shows a blank that has been severed and perforated in readiness for forming into shape.

Figure 3 discloses a modification provided with a ventilating opening.

Figure 4 discloses a front elevational view of a section after it has been formed from the blank shown in Figure 2.

Figure 5 discloses a half section.

Figure 6 discloses a blank used in forming the half section shown in Figure 5.

Figure 7 discloses another type of half section.

Figure 8 discloses the half section shown in Figure 7 formed into shape, so as to form a sectional panel.

Figure 9 is a fragmentary cross sectional view of a modification drawn to a much larger scale than the other figures.

Figure 10 is a side elevational view of the building shown in Figure 1.

Figure 11 discloses a fragmentary cross sectional view of a modification.

Figure 12 is an enlarged fragmentary view disclosing several panels assembled.

Figure 13 is a cross sectional view taken substantially on the line 13—13 of Figure 4.

Before describing the structure of the building, several types of panels or sections that may be

2

used in erecting the building will be described. The panels or sections are so formed as to provide reenforcing flanges or portions that give at least a portion of the section rigidity. When the sections are assembled, the flanges form a substitute for the conventional frame structures, as will be more fully described later.

Referring to the drawings, the reference numeral 20a indicates a blank that is used in forming a panel 20. The blank 20a has a main body substantially diamond shaped and a pair of extensions 22 that are adapted to be bent at right angles to the plane of the main body along the lines 24. The extensions 22 may be further formed at right angles along the line 26, to form a flange parallel to the main body, and again formed at right angles along the line 28 to form a reentrant flange. In Figure 4 the extensions 22 have been formed first to form the flange 30, arranged at right angles to the plane of the main body of the section. A second flange 32 and a reentrant flange 34 reenforce the flange 30, so as to give the upper half of the section rigidity. The ears or tabs 36 and 37 of the extensions 22 are folded or bent along the lines 38 into the formation shown at the ends of the flanges, as best seen in Figure 4. After the tabs 36 and 37 have been deflected in opposite directions from the integral flange 30, these tabs are parallel to the other flange 30 on the same section. The tabs 36 on one section diverge into a substantially V-shaped formation, as clearly shown in Figure 4. The blank 20a has been provided with a plurality of apertures 40, extending throughout the periphery of the section shown in Figure 4.

If it is found desirable to provide the building with windows, the center portion 50 of the section may be removed and the margins of the opening provided with a rabbet 52 adapted to form a glazing seat, so that the diamond-shaped opening 50 may be glazed. The section shown in Figure 4 constitutes a typical section used throughout the building, either with glazing 51 or without glazing. In Figure 3 a section similar to that shown in Figure 4 has been provided with a round aperture 56, which may constitute a ventilating opening.

In Figure 5 a half section 60 has been shown, wherein the lower portion of the blank similar to that shown in Figure 2 has been severed along the line 62. The section shown in Figure 5 may be referred to as a half section, forming an isosceles triangle. The half section shown in Figure 5 is made from a blank 64 shown in Figure 6, having extensions 22 folded along the lines 24, 26,

28 and 38, so as to reenforce the sides and provide attaching ears or tabs 36. In this modification tabs 41 extend from the flange 30 parallel to the base line 65.

In Figures 7 and 8 a blank and another half section has been shown, wherein the section has been divided along a vertical line. As may best be seen by referring to Figure 7, a blank 70a is used in forming a panel 70. The blank 70a is provided with one extension 22 adapted to be folded along the lines 24, 26, 28 and 38, so as to reenforce one side and so as to provide one tab or ear 36 and one tab 37. Along the horizontal line there is an extension 72, adapted to be bent at 74 and at 75. This is formed into vertical reenforcing portions including the flange portion 77, the flange portion 78 and a reenforcing flange portion 80, extending normal to the face of the section or panel. The section described thus far will be used along a corner of the building, along the side of a door and elsewhere, as will appear more fully from the description that follows. The sections described thus far are illustrative of the mode of forming the sections and represent only a few shapes of sections that may be used in the building.

In Figures 1 and 10 a building utilizing these sections has been shown. A suitable concrete foundation 100, provided with a floor having reenforcing members 102, may be used to support the building. Sections 60 and 20 cooperate to form the two lower tiers of sections. The portion of the section shown in Figure 2 extending beyond the line 104 overlaps the diagonal sides of the section 60. The sections are secured together by suitable screws 43, bolts or rivets passed through the apertures 40. By securing these sections together, the flanges along two sides of the sections form reenforcing portions for two adjacent sections. An ear or tab 37 of an upper section engages the inner side of a flange 30 of a lower section, while ear 36 of a lower section engages the outer side of a flange 30 of an upper section, so that an ear 36 together with an adjacent flange part 30 nests with a corresponding flange part 30 and ear 37 of another panel. Suitable screws extend through the holes 39 to rigidly hold the flanges with respect to each other. These holes are aligned so that the flanges of one section interlock and are rigidly attached to the flanges of the other section through the ears or tabs 36 and 37.

After the first row and a half of sections have been assembled in the end wall shown in Figure 1, a succeeding row or tier of sections is mounted in position and secured together as described above. It will be noted that next to the door 104 vertical half sections 70 have been used. Odd-shaped sections are inserted along the roof line. The entire end wall is assembled by tiers of sections without the use of a supporting frame.

In both Figures 1 and 10, it can clearly be seen that a curved roof has been used. This curved roof may be made from the sections described above. The only difference is the use of the diagonally disposed holes 106 properly selected for securing the tabs 36 and 37 to the flanges of adjacent sections. By this arrangement, the curved contour of the roof is obtained with only a slight flexing of the main body of the sections.

The structure described thus far consists of a single thickness of sheet wall and roof. It may be found desirable to use insulated panels. In Figure 9 a modification has been shown, drawn to a much larger scale, wherein panels 120 overlie the

flanged portion of a glass-receiving panel 122 and a channel member 132 used in reenforcing the assembly. Insulating members 124 and 126 are seated adjacent a retaining clip 128 interlocking the flange 130 and the flange of member 132. The insulating member 124 is parallel to the exposed surface of the panel 120. The insulating member 126 extends around the margin of the glazing 134. Thus, an insulated building may be erected by the use of the panels disclosed in Figure 9.

In Figure 11, tabs 236 and 237, corresponding to the tabs 36 and 37 shown in Figure 2, are seated in pockets 240 in the flanges 222, the flanges 222 corresponding to the flanges 22 in the preferred embodiment. The pockets 240 are formed by slotting the flanges and striking out from the slot a lip 242, into which the tabs 236 and 237 project. This simplifies assembly and reduces the number of parts and operations used in assembling the panels. If necessary, a rivet or bolt can be used in securing the flanges together. Such a rivet or bolt has not been shown. This interlocking arrangement of the panels facilitates ease in assembly, reduces labor and parts and at the same time produces a sturdy structure.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consists in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. A section for use in building, said section including a diamond-shaped main body portion having one apex directed upwardly, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, and tabs extending outwardly from the ends of the flanges, the tabs extending outwardly from the flanges at the apex diverging so as to form an outwardly directed substantially V-shaped formation, the tabs at the opposite end of the flanges extending inwardly so that the tabs integral with one flange extend parallel to the other flange.

2. A section for use in building, said section including a diamond-shaped main body portion having one apex directed upwardly, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, the outer margins of the flanges merging into flanged portions extending parallel to the main body portion, and tabs extending from the ends of the flanges, the tabs integral with the ends of the flanges terminating at the apex diverging so as to form a substantially outwardly directed V-shaped formation.

3. A section for use in building, said section including a diamond-shaped main body portion having one apex directed upwardly, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, the margins of the flanges merging into flanged portions extending parallel to the main body portion of the section and terminating in reentrant flange portions, and tabs extending from the ends of the flanges parallel to the adjacent flanges, the tabs integral with

the end of the flanges at the point of the diamond of the main body portion forming an outwardly directed substantially V-shaped formation.

4. A section for use in building, said section including a diamond-shaped main body portion, an apex of said diamond-shaped portion being directed upwardly, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, a pair of outwardly diverging tabs integral with the upper ends of the flanges, the tab integral with one flange being parallel to the other flange, said flanges reenforcing one-half of the section, and other tabs extending from the lower ends of the flanges, said other tabs each being integral with one flange and extending parallel to the other flange, the tabs at the apex of the diamond-shaped main body portion diverging outwardly so as to form a substantially V-shaped formation, the tabs located at the other end of the flanges extending inwardly.

5. In a building, a plurality of overlapping sections, each section including a diamond-shaped main body portion, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, tabs extending from the ends of the flanges, the tabs integral with one flange extending parallel to the other flange, and extensions along the other two sides of the diamond-shaped main body portion overlapping adjacent sections.

6. In a building, a plurality of overlapping sections, each section including a diamond-shaped main body portion, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, the outer margins of the flanges merging into flanged portions extending parallel to the main body portions, tabs extending from the ends of the flanges, the tabs integral with one flange extending parallel to the other flange, and extensions along the other two sides of the diamond-shaped main body portion overlapping adjacent sections.

7. In a building, a plurality of overlapping sections, each section including a diamond-shaped main body portion, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, the margins of the flanges merging into flanged portions extending parallel to the main body portion of the section and terminating in reentrant flange portions, tabs extending from the ends of the flanges, the tabs integral with one flange extending parallel to the other flange, and extensions along the other two sides of the diamond-shaped main body portion overlapping adjacent sections.

8. In a building, a plurality of overlapping sections, each section including a diamond-shaped main body portion, reenforcing flanges extending in a direction normal to the main body portion along two adjacent sides thereof and terminating at the apex of the diamond-shaped main body portion, a pair of diverging tabs integral with the upper ends of the flanges, the tab integral with one flange extending in a direction parallel to the other flange, said flanges reenforcing one-half of the section, other tabs extending from the lower ends of the flanges, said other tabs each being integral with one flange and extending parallel to the other flange so as to be directed inwardly, and extensions along the other two sides of the diamond-shaped main body portion overlapping adjacent sections.

9. In a building structure, a plurality of diamond-shaped sections, each section including a diamond-shaped main body portion, flanges extending in a direction normal to the main body portion along two adjacent sides thereof, the ends of each flange terminating in a pair of tabs extending in opposite directions from the flange and parallel to the other flange, said tabs overlapping flanges of adjacent sections, and means for securing the tabs to adjacent flanges, said flanges and tabs cooperating to form a reenforcing frame for the building.

10. In a building structure, a plurality of diamond-shaped sections, each section including a diamond-shaped main body portion, flanges extending in a direction normal to the main body portion along two adjacent sides thereof, the ends of each flange terminating in a pair of tabs extending in opposite directions from the flange and parallel to the other flange, said tabs overlapping flanges of adjacent sections, and means for securing the tabs to adjacent flanges, said flanges and tabs cooperating to form a reenforcing frame for the building, the main body portion of the diamond-shaped section having extensions along the other two sides overlapping adjacent sections to provide means for shedding water.

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