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BEAM AND CLAMP BUILDING CONSTRUCTION

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FIG. 1

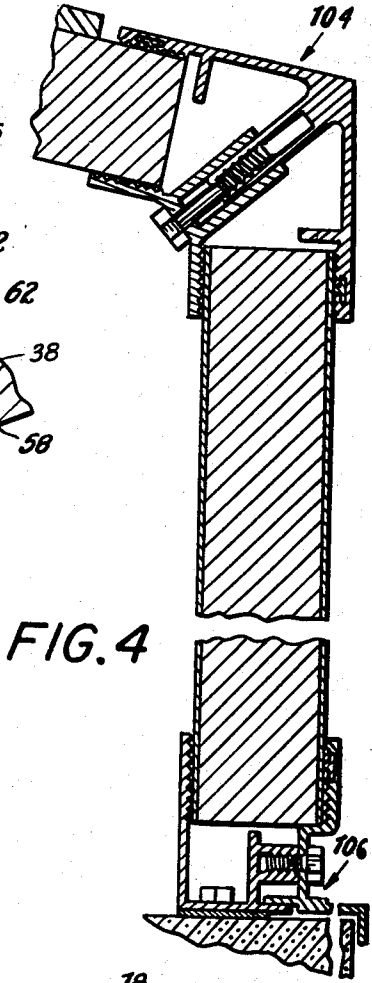
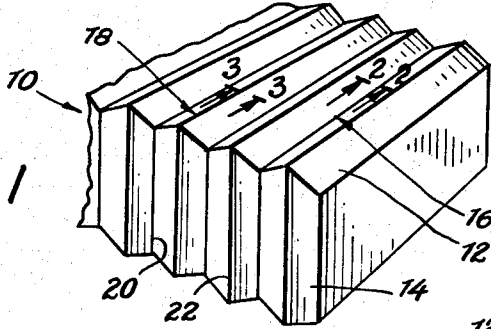


FIG. 4

FIG. 2

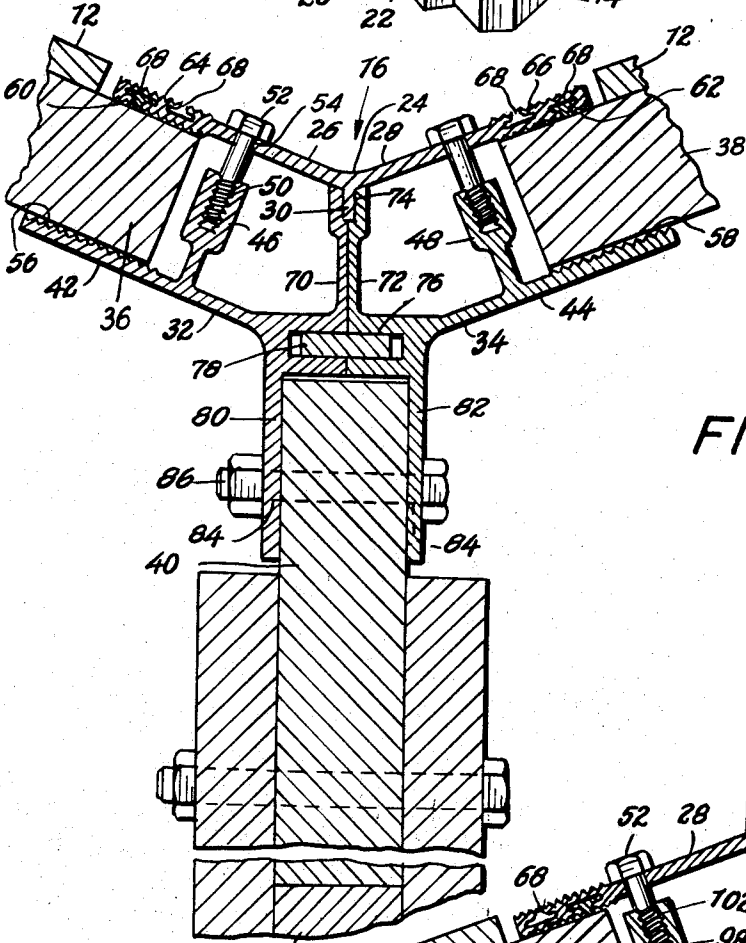
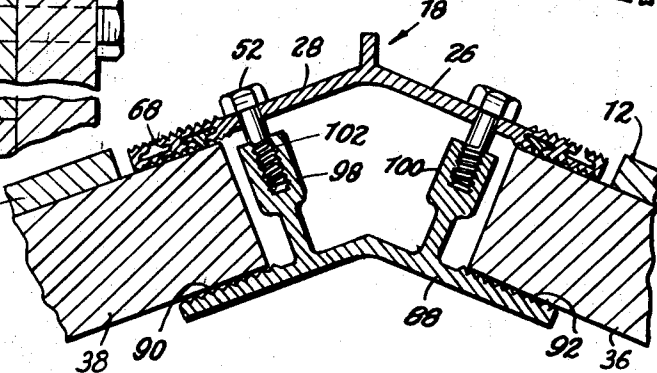


FIG. 3



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1

2

3,394,526
**BEAM AND CLAMP BUILDING
 CONSTRUCTION**
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This invention relates to improvements in building construction and, more particularly, to an improved building construction based on a beam and clamp system.

Today there are many forms of panelized building construction offering a number of advantages particularly in lowering erection time and costs. Most panelized wall construction today employs a clamping system whereby aluminum clamps, for example, serve to hold or clamp the panel in place.

Further panelized wall constructions may also embody the "folded plate" principle or be of the geodesic dome variety. The latter operates on an arch principle whereas the former ordinarily required an independent support.

A principal object of this invention is to improve on these prior art panelized building construction techniques by employing a system utilizing clamps that not only hold panels together but support these parts as well; and with the panels also contributing to the support of the building while, at the same time, providing for the building skin and enclosure.

Another object is to provide a building system of this nature capable of being erected literally by the use of only a single tool notably a screw driver.

A further object is to provide a building system of this type wherein the entire building can be plant fabricated and subsequently, readily assembled and disassembled for future relocation and assembly with erection being possible in any weather because, with the employment of the materials contemplated, the elements will have no effect on the structural components.

Still further objects include:

A building system employing components of minimum weight thereby holding shipping costs at a low figure;
 Extruded clamping beams and posts;

A building system in which both walls and roof act as a single unit enabling extruded aluminum connectors in the valleys and ridges of the wall to support part of the roof load;

The utilization of panelized wall and roof sections that are not too heavy for two average men to lift and install by hand;

And other objects and advantages as well.

Other objects and advantages will become apparent from the following detailed description which is to be taken in conjunction with the accompanying drawings illustrating a single somewhat preferred embodiment of the invention and in which:

FIG. 1 is a fragmentary perspective view of a part of a building construction incorporating a sawtooth configuration in accordance with the teachings of this invention;

FIG. 2 is an enlarged fragmentary sectional view taken along the line 2-2 of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view taken along the line 3-3 of FIG. 1; and

FIG. 4 is a fragmentary sectional view showing a corner detail and base anchoring detail applicable to the building construction of this invention.

In the drawings, a building 10 is shown erected employing the "beam and clamp" system of this invention. This system also contemplates the utilization of roof panels 12 and wall panels 14 for not only completing the

outer skin and surfacing of the building but support purposes as well. With respect to the roof, a valley connector 16 effectively connects and clamps adjacent panels. A ridge connector 18 similarly connects adjacent panels of the roof. The wall panels, on the other hand are connected by means of similar valley clamps 20 and ridge clamps 22. In view of the lightweight nature of the construction contemplated by this invention, it is suggested that the building be suitably anchored to an appropriate foundation. Inasmuch as this securement is well within the purview of one skilled in the art, further discussion in this area is deemed unnecessary.

Turning now to the roof valley connector clamp 16, it should be initially appreciated that a three-piece clamp construction is employed with each part preferably fabricated by means of an extrusion technique as is the case with the other clamps and connectors disclosed herein. Thus, the valley clamp 16 includes a valley cap 24 having angularly extending legs 26 and 28 as well as a centrally located downwardly extending web 30. The angular relationship between the legs 26 and 28 conforms with the design of the accordion roof configuration and contour. The length of the valley cap 24 is dictated by that of the clamp 16 which, in turn, is determined by the design. The clamp 16 also includes a pair of lower identical and mating pieces 32 and 34.

The clamp pieces 32 and 34 cooperate with the valley cap 24 to secure therebetween framing members 36 and 38 which may be selected from standard framing lumber; and the pieces cooperate with one another in securing therebetween a beam 40 which also may be selected from standard lumber framing. In successful applications of this invention, the framing members 36 and 38 were formed from 2 x 4" lumber whereas beam 40 was 2 x 8" lumber. In securing the framing members 36 and 38, the pieces 32 and 34 are, respectively, provided with angularly extending jaws 42 and 44. These jaws are disposed at similar angles to the spaced respective legs 26 and 28; and each includes an upwardly extending elongated socket 46 and 48. Each socket is provided with a longitudinally extending opening 50 suitably serrated or grooved to mate with the threads of a threaded bolt 52 extending through spaced openings 54 in the legs 26 and 28 of the valley cap 24. To facilitate the gripping engagement with the frame members 36 and 38, the interior associated surfaces of the jaws 42 and 44 are provided with serrations 56 and 58, respectively. Similarly, the valley cap 24 is formed such that its divergent legs 26 and 28 are serrated along surfaces 60 and 62 as well as the exterior surfaces 64 and 66 employed when the cap 24 is used in the clamp that forms the ridge of the sawtooth roof and wall design. In this connection, the legs 26 and 28 are also formed with recesses 68 which are conveniently adapted to receive gaskets for purposes of hermetically sealing the juncture between the valley or ridge cap, as the case may be, and the frame members clamped by means of the particular connector.

The connector pieces 32 and 34 are also provided with web portions 70 and 72, respectively, adapted to be disposed in abutting relationship as shown. The upper terminal end of these webs define an accommodating recess 74 capable of receiving the downwardly extending web 30 of the cap 24. In order to assure the desired relationship between the web 70 and 72 and, consequently, the connector pieces 32 and 34, registering slots 76 are adapted to receive a plate 78 functioning as a key for such purposes. The connector pieces 32 and 34 are also provided with downwardly extending flanges 80 and 82. These flanges, together with the base of the web 70 and 72, define an opening adapted to receive the upper edge of beam

40. In order to suitably anchor the connector pieces 32 and 34 to beam 40, a number of spaced openings 84 are provided in the downwardly extending flanges 80 and 82 through which a bolt and nut assembly 86 extends.

Referring now to the ridge beam connector 18 of the roof, it should be appreciated that the cap thereof is of identical construction as the cap 24 of the valley connector 16 but reversed to have its legs 26 and 28 extending downwardly in a diverging angular direction. In view of the identical nature of the cap construction, like numerals will be applied to designate like parts. In completing the ridge beam clamp 18, an integral lower beam clamp piece 88 is provided. This connector piece 88 is provided with interior serrations 90 and 92 along its longitudinally extending side edges to facilitate gripping of frame members 36 and 38. In addition, the connector piece 88 is provided with upwardly extending members 98 and 100 each provided with longitudinally extending recess 102 defined by slotted or grooved side faces adapted to mate with threaded bolts 52 in securing the frame members 36 and 38 in place by means of the connector 18. Gaskets disposed within the slots 68 of the ridge cap serve to hermetically seal the junction between the connector and extending frame members.

Referring now to the construction of the walls of the building construction contemplated by this invention, it will be appreciated that the walls embrace identical construction as the roof and are essentially a roof turned on end. Thus, it will be observed that the connector 20 associated with vertically extending post 40' is identical with the connector 16. The connector 22 is identical with the connector 18. For this reason, like structural parts will be designated with like numerals for these connectors. The frame members will be similarly designated but with accompanying primes.

As will be observed from the drawings, the roof frame members 36 and 38 cooperate in supporting the roof panels 12 of suitable material as, for example, suitably treated plywood capable of withstanding the contemplated weather and elements. The lumber frames 36' and 38' serve to support the vertical side panels 14 again selected from suitable material.

Although conventional techniques may be employed for the construction of the corner joining the roof and side walls as well as the means for anchoring the building base to the selected support, it is recommended that the details of FIG. 4 be utilized at these locations. In view of the foregoing detailed description, the extruded corner clamp 104 and extruded anchor connector 106 and their respective structural details should be evident to those skilled in the art.

Thus, it should be appreciated that all of the parts constituting the building construction contemplated by this invention are capable of being prefabricated. Contemporary building materials can readily be employed and adapted for this construction. The building is, accordingly, capable of being lightweight and adapted to be fabricated in one location and then shipped for erection at another location. The structural system embodied by this invention is adapted to employ extrusions for the clamping members and these may assume the form of structural aluminum extrusions acting as continuous clamps and weather seals. This clamping system operates to hold together large and relatively thick stress skin roofing and wall panels. In this connection, the wall panels may be translucent plastic sheets suitably bonded to a decorative aluminum frame. Of course, these plastic wall sheets may, for decorative purposes, be crystal white translucent material. Opaque plywood panels may form the undulating sawtooth roof and ceiling profile. Naturally, other sheet material can be employed for both the roof and walls. The gaskets or weather strips can be fabricated of a suitable vinyl material.

The particular building encompassed by the construction of this invention is basically rectangular; and it al-

lows a great expanse of open interior space. The sawtooth perimeter contributes to a hexagonal modulation of the building plan.

Both the walls and roof panels act as a single unit through the interconnecting clamping system. There are no vibrations susceptible mechanical linkage in the construction thereby contributing to the overall desirability of the building ultimately erected. With prior selection of building materials for the clamping system and panels, weather or the elements present no problems inasmuch as construction can be carried out even in the rain or with the presence of high moisture conditions. The part can be bolted and threaded to one another in any type of weather. Above all, the pleasing appearance and configuration, together with the versatility and flexibility of aesthetic properties, render the building construction an extremely saleable commodity. With respect to the clamping system, there is basically only three aluminum extrusions required for both the roof construction as well as that of the walls.

Thus, among others, the aforementioned objects and advantages have been most effectively attained. Although a single somewhat preferred embodiment of the invention has been disclosed herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

I claim:

1. A clamping system for building construction comprising a cap having a pair of arms extending in opposed directions, a pair of associated and oppositely extending clamping pieces spaced from said cap and coupled therewith to secure therebetween at least one structural member, said clamping pieces being discretely formed and adapted to be coupled with one another as well as with the cap, said clamping pieces including abutting web portions, and said web portions defining an accommodating recess adapted to receive a portion of said cap to facilitate the orientation of said cap with respect to said pieces.

2. The invention in accordance with claim 1 wherein the junction between the arms of the cap is provided with a laterally extending web with the angle between the web and each of the arms being greater than 90°.

3. The invention in accordance with claim 1 wherein each of the arms is serrated to increase the gripping engagement of the arm with the associated structural member.

4. The invention in accordance with claim 1 wherein each of the arms is provided with a groove for receiving weather stripping to seal the junction between the arm and the structural member.

5. A clamping system for building construction comprising a cap having a pair of arms extending in opposed directions, a pair of associated and oppositely extending clamping pieces spaced from said cap and coupled therewith to secure therebetween at least one structural member, said clamping pieces being discretely formed and adapted to be coupled with one another as well as with the cap, each of said clamping pieces including a laterally extending portion defining a recess defined by grooved surfaces adapted to mate with the threads of bolts, and bolts extending through said cap into said recess for threaded coupling said cap to said clamping pieces.

6. The invention in accordance with claim 5 wherein alignment means associated with both of said clamping pieces serves to maintain the pieces in substantial alignment, said alignment means including slots formed in each one of said clamping pieces and a plate disposed in the slots.

7. The invention in accordance with claim 5 wherein each of said clamping pieces includes a serrated surface for facilitating the securement of the structural member.

8. The invention in accordance with claim 5 wherein each of said clamping pieces includes a laterally extending flange spaced from one another in substantially parallel re-

5

relationship, said flanges adapted to be clamped to a structural member.

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