This invention relates to the preparation and use of a shaped panel section. In a more particular aspect the invention relates to the fabrication and recurrent use of shaped panel sections to produce walls, roofs and combinations thereof for buildings, storage shelters, canopies and portions thereof. In another aspect the invention is directed to the use of a folded metal shaped panel in recurrent series to form a symmetrical system which is structurally suitable for use as a roof or wall structure.

Many building units aim at great strength with light weight but necessarily take geometrical forms which are unattractive, require an excessive amount of unusable space and are expensive to fabricate into a structurally suitable system of units. In some systems an excessive amount of internal structural assembly or bracing is required to make the fabricated system structurally stable.

An object of the present invention is to provide a shaped panel section which is light and contains structural rigidity.

Another object of the present invention is to provide a shaped panel gaining strength from an unusual shaping of the material of fabrication.

A further object of this invention is to provide a structural system fabricated from a recurrent series of shaped panel sections in symmetrical form.

Other objects and advantages of this invention will become more apparent from the following description.

The present invention relates among other things to the method of forming a shaped panel section and its use in a recurrent symmetrical series to produce a desired roof structure suitable for canopies and buildings. In accordance with a particular aspect of this invention, the shaped panel section is joined to another and supported as a structurally integral unit in cantilever fashion from a transverse bearing structure anchored to and supported by one or more support columns.

The transverse bearing structure to which the shaped panels are attached and supported in cantilever fashion may be any suitable structural materials including metal, wood or reinforced concrete which will provide the required structural rigidity to the assembled unit. That is the transverse bearing structure may be a metal I beam, wood or reinforced concrete beam fabricated either in a flat or triangular shape or the fabricated bearing structure may comprise a pair of parallel girders rigidly spaced from one another by suitable cross or web forming members arranged in triangular form.

The shaped panel sections employed in the structure of this invention may be fabricated from various materials selected from the group consisting of reinforced concrete, metal, wood, paper and/or plastic materials which are clear or opaque and of the same or a different color or a combination of one or more of the above. In a specific aspect more fully described hereinafter by way of example, the shaped panel sections are fabricated by folding metal panels to provide rectangular panels which are of a V shape at one end thereof and substantially flat at the opposite end of the panel with the metal in between shaped in the form representing a tetrahedron.

As a means for more fully understanding the invention herein described reference is now had to the drawings presented herewith wherein:

FIGURE 1 is a plan view layout of a metal plate before folding in accordance with this invention.

FIGURE 2 is an embodiment of the plan view layout of FIGURE 1.

FIGURE 3 shows a top perspective view of a plurality of shaped panels comprising four shaped panels attached to another and supported in cantilever fashion from a transverse bearing member.

FIGURE 4 is an end view of two opposed shaped panel sections which have been cut along the line AGP, FIGURE 1, to form the gull wing leading end shape.

FIGURE 5 is a top view of a recurrent series of shaped panels arranged in symmetrical fashion.

FIGURE 6 is a diagrammatic view in elevation of a transverse bearing structure to support the assembled panels rigidly and in cantilever fashion similarly to that shown in FIGURE 3.

Referring now to FIGURE 1 by way of example there is illustrated in plan view layout a metal plate 2 provided with corners A, B, C, D, divided along a line E, F, Metal plate 2 is to be folded along dotted lines 4, 6, 8, 10 and 12. The plate is cut along solid line 14 from E to G to obtain a folded metal shaped panel section in accordance with this invention based on the layout of FIGURE 1. The plate is folded along lines 6 and 10 so that the folds as viewed represent the bottom of V channels. The plate is also folded along lines 4, 8 and 12 in an opposite direction to the fold made along lines 6 and 10 so that the folds along 4, 8 and 12 represent the ridges of a geometric form and form three faces thereof known as a tetrahedron having an apex G. When FIGURE 1 is properly shaped along the lines indicated or a metal plate is folded to obtain the shaped panel of this invention, and overlapping of the folded metal flat sections adjacent line 14 is realized and this overlapped portion may be removed if desired or not before rigidly connecting this flat section together to form a rigid and flat triangular section AGD.

FIGURE 2 represents an embodiment of the layout of FIGURE 1 wherein flat sections are provided between the folds made on lines 18 to 20 and 24 to 26 in the bottom of the formed V. Accordingly FIGURE 2 is folded along the dotted lines 16, 18, 20, 22, 24, 26, 28, 30 and 32. The plate is cut along line 34. The folds are made in FIGURE 2 in a direction similar to that described with respect to FIGURE 1 to provide a shaped panel having a V shape end B', C', C' opposite to a flat end A', E', D' and provided with a shape in between representing a tetrahedron having an apex G'. Accordingly FIGURES 1 and 2 shaped as described above forms a light structural panel which is essentially flat along one edge and V shaped along the opposite edge as described and shaped therebetween so that the sides of the shaped panel A, B and D, C are maintained essentially parallel to one another.

FIGURE 3 shows a top perspective view of a plurality of shaped panels fastened adjacent to each other and supported in cantilever fashion. In the perspective view of FIGURE 3 only one shaped panel has been specifically identified with letters and numerals corresponding to those used in FIGURE 1 in order to simplify the discussion. Accordingly the panel of FIGURE 1 shaped as shown in FIGURE 3 is joined to others in symmetrical fashion as shown to form a structure of recurrent geometric shapes supported by a transverse structure containing beams 40 and 42 more clearly shown and described with respect to FIGURE 6. The arrangement of FIGURE 3 clearly shows the rigidity attained by fastening the shaped panels together at their V ends and along their edges AB or CD to provide a recurrent combination of shaped
panels gaining strength from their unusual shape when suitably connected together. The structurally rigid arrangement attained by rigidly connecting together the shaped panels of this invention may be employed in a wide variety of combinations and applications including walls for a building and/or a roof structure for buildings or various canopy arrangements which extend from a building wall or are supported through one or more columns or support pylons. In a specific aspect, the arrangement of FIGURE 3 is employed in a plurality of recurrent sections to provide a canopy roof structure rigidly attached to a transverse beam assembly as shown in plan view, FIGURE 5. As an aid to understanding FIGURE 5 one complete panel section corresponding to the layout of FIGURE 1 is specifically identified and one end panel corresponding to a portion of the panel of FIGURE 1 is identified. FIGURE 4 is provided to show an end view of the roof structure of FIGURE 5 with the opposed sections DFG of the end panels resembling a wing shape. It is contemplated adding rigidity to this wing shape by the addition of a tie-bar connecting the point G with the ridge line DC. Structural tie-bars may also be employed in each full panel section between the apex G of the tetrahedron and ridge points C and B if desired or considered necessary.

As indicated hereinbefore, FIGURE 6 shows a specific transverse beam assembly which may be employed to support the shaped panels of FIGURE 1 in cantilever fashion as shown in FIGURES 4 and 5. That is, transverse beams 40 and 42 are spaced apart and rigidly fastened to one another by a plurality of alternately sloping web forming members which are sloped and spaced with respect to another to correspond to the V end of the shaped panel of FIGURE 1 as shown in FIGURE 5. The beam assembly of FIGURE 6 is supported by a column 44 above ground line 46 from footings 48.

As indicated hereinbefore the structure may be fabricated of many different materials or combinations thereof which are moldable or may be shaped to form the shaped panel of this invention. It is also contemplated covering the upper or top surface of the assembled panels when used as a roof structure to provide essentially a smooth upper surface. In yet another embodiment it is contemplated cutting the panel of FIGURE 1 or modifying the shaped panel so that the angle between edges AB and BF, FC and CD, may be more or less than 90 degrees to permit positioning the outer edge AD of the shaped panel above or below a line passing through CB of the shaped panel.

It is clear from applicant’s disclosure that many minor modifications may be made to the structure of this invention and its method of assembly without departing from the spirit and scope thereof and applicant’s invention is not to be unduly limited by the specific examples shown and described herein.

I claim:

1. A structure comprising in combination triangular panels connected together to provide one edge of the structure in the shape of a V, a first triangular panel section positioned on the opposite end of the structure on a plane generally perpendicular to the plane formed by said V-shaped edge of the structure, a base edge of said first triangular panel section forming the opposite edge of said structure from said V-shaped edge, said first triangular panel positioned with two additional second triangular panels to form three surfaces of a tetrahedron shaped section, said second panels having a common apex joined at the bottom of said V-shaped edge and at least two other similar third triangular panels separately joined along their longest edge coextensively with the two bottom edges of said tetrahedron shaped section in a manner to extend divergently upwardly therefrom so that a pair of similar remaining edges, one each of said third triangular panels form said V-shaped edge.

2. A shaped panel member comprising a substantially triangular first surface portion AGD with one edge AD defining a terminal end of the member, two triangular intermediate surface portions AGF and DGF, each having one edge AG and DG thereof coextensive with one of each of the remaining two edges AG and DG of the first surface portion and depending divergently downwardly therefrom with a second edge GF of each of the intermediate surface portions being coextensive and inclined downwardly from the apex lying opposite the terminal edge of said first surface portion, a pair of triangular side surface portions ABF and DCF each having one edge thereof DF and AF coextensive with one of each of the remaining edges of the intermediate surface portions and extending divergently upwardly with the uppermost edges AB and DC of each of the side surface portions being substantially parallel and the remaining two edges BF and CF of said side surface portions defining a V-shaped edge of said panel member lying in a plane generally perpendicular to the plane of the first surface portion AGD.

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