Aug. 3, 1948. A. BRAUN ET AL 2,446,457

BEAM

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FIG.1.

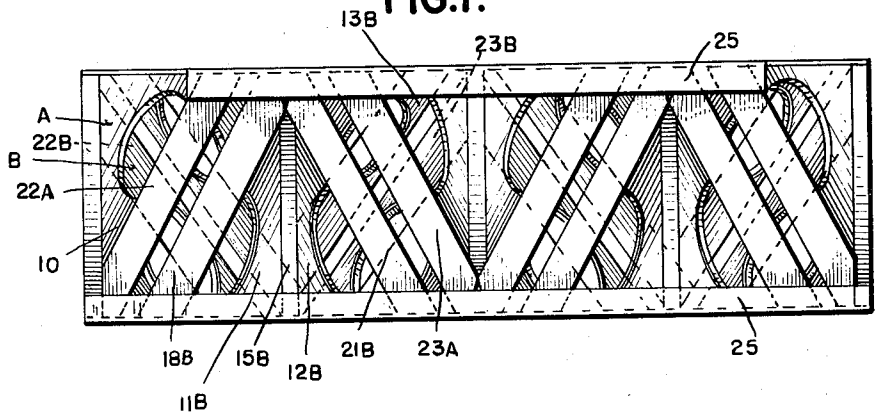


FIG.2.

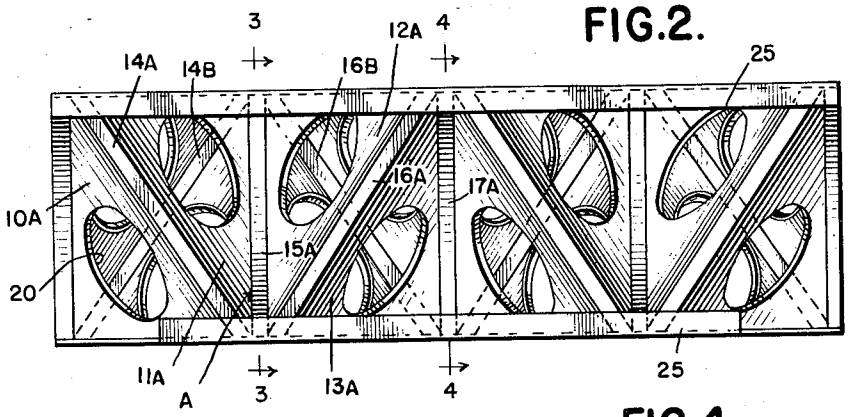


FIG.3.

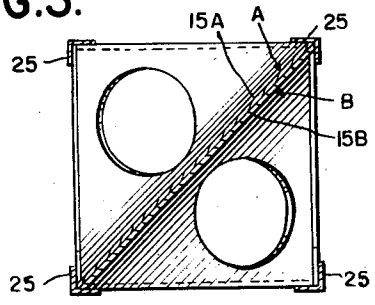
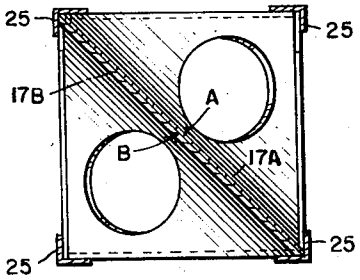


FIG.4.



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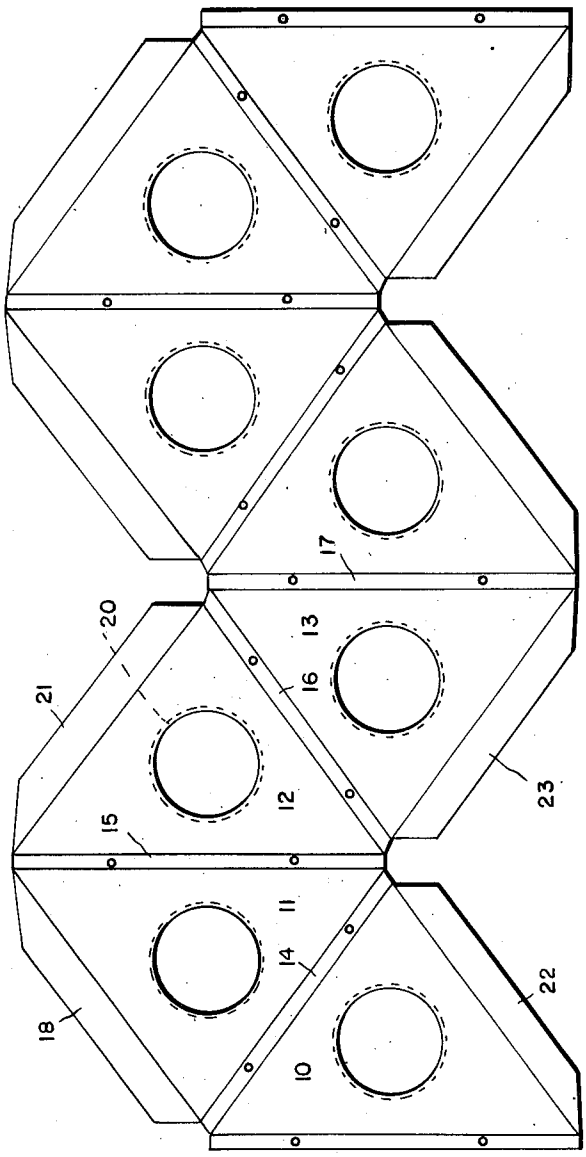
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FIG.5.



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2,446,457

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Alfred Braun and Frederick W. Braun,
Detroit, Mich.

Application June 22, 1944, Serial No. 541,590

8 Claims. (Cl. 189—37)

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The invention relates to beams or other structural members and the principal object is to obtain a structure of high strength.

This object is attained by employing triangular-shaped web portions between the flanges of the beam.

Another object of the invention is to obtain a structure utilizing the triangular web principle which may be constructed from flat sheet metal by cutting the sheet to the desired configuration and then bending to form the sheet into a series of triangular elements which may be assembled into a beam.

In the drawings,

Figure 1 is a side view of the beam;

Figure 2 is a top view;

Figure 3 is a cross section on the line 3—3 of Figure 1;

Figure 4 is a cross section on the line 4—4 of Figure 1;

Figure 5 is a plan view of the sheet from which the web is made.

The beam is made from two metal sheets A and B which are shaped as shown in Figure 5 to form a series of identical isosceles triangles 10, 11, 12 and 13 which may be continued in series for whatever length is desired. Adjacent sides of triangles 10 and 11 are connected together by a quadrilateral 14. Adjacent bases of triangles 11 and 12 are connected by quadrilateral 15. Adjacent sides of triangles 12 and 13 are connected by quadrilateral 16 and adjacent bases of triangle 13 and the triangle of the next series by a quadrilateral 17. The unattached sides of the triangles are provided with trapezoidal flanges 22, 18, 21, and 23 respectively, and the triangles themselves may be perforated if desired for lightness and, as shown, are each provided with a cylindrical hole 19 pressed out to form the circular flange 20.

Each of the sheets A and B after being fashioned as described is then bent at the sides of each triangle so that the quadrilateral portions 14 and 16 remain in a common plane while the triangles 10, 11, 12 and 13 are bent into planes at an angle with one another as illustrated in Figures 3 and 4. Thus a rectangular beam is formed by combining the two bent sheets A and B and by using the subscripts A and B to designate corresponding portions of the two sheets the beam may be described as follows. The portions 14A and 16A are in the top plane of the beam while the portions 14B and 16B are in the bottom plane of the beam. The portions 15A and 15B are adjacent each other and extend diagonally from the upper

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right to the lower left of the beam (as viewed in Figure 3). The portions 17A and 17B are adjacent each other and extend from the upper left to the lower right of the beam. The flanges 18A and 21A extend in the left-hand plane of the beam while the flanges 18B and 21B extend in the right-hand plane of the beam. The flanges 22B and 23B are in the left-hand plane and the flanges 22A and 23A are in the right-hand plane.

It will be seen that the only points at which the two bent sheets A and B contact are along the lines of the diagonal portions 15 and 17 respectively, and at these points the two sections may be secured together by means of bolts, rivets, welding or other suitable means. To complete the structure it is preferable to have four angle bars 25 at each of the four corners of the beam. These may be united to the other portions of the beam with which they contact in any suitable manner as by welding.

In the preceding description only one unit of the beam structure is described, but this may be continued for whatever length is desired by a continuation of the series of the webs and flanges in the same relationship as already described.

The beam as hereinbefore described has a high degree of strength and rigidity in comparison with the amount of material forming the structural elements thereof. The high strength is due primarily to the fact that the web portions are all of triangular shape and are so arranged as to mutually supplement and reinforce one another.

With the sheet metal construction as described, the beam may be simply manufactured and lends itself readily to modifications which permit beams to be constructed of different sizes and shapes. For example, it is not necessary that the cross section of the beam be a square but it may be of other rectangular shape with one dimension greater than the other, and, if desired, the beam may have shapes other than rectangular. It should also be understood that the perforation of the triangular webs may be other than disclosed and that the flanges may be of a greater or less extent as described to give whatever structural strength is required in this portion of the beam.

What we claim as our invention is:

1. A structural member comprising a pair of sheets each bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the

other sheet, but with successive pairs of said edges at right angles to each other, and longitudinally extending members secured to said webs.

2. A structural member comprising a pair of sheets each bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the other sheet, but with successive pairs of said edges at right angles to each other, and longitudinally extending angle members secured at the corners of the structure formed by said sheets.

3. A structural member comprising a pair of sheets each bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the other sheet, but with successive pairs of said edges at right angles to each other, said sheets also having portions adjacent said triangular webs bent into a plane extending longitudinally of the structure formed by said sheets.

4. A structural member comprising a pair of sheets each bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the other sheet, but with successive pairs of said edges at right angles to each other, said sheets also having portions adjacent said triangular webs bent into a plane extending longitudinally of the structure formed by said sheets and longitudinally extending angle members secured to said portions arranged in said plane.

5. A beam of rectangular cross section having a pair of sheets bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the other sheet, but with successive pairs of said edges at right angles to each other, each of said sheets also having portions lying in the planes of the sides of said beam.

6. A beam of rectangular cross section having a pair of sheets bent into a series of triangular webs extending in different diagonal planes, an edge of each successive web of one sheet meeting a corresponding edge of each successive web of the other sheet along a diagonal line, with said edge of one sheet parallel to said edge of the other sheet, but with successive pairs of said edges at right angles to each other, each of said sheets also having portions lying in the planes of the sides of said beam, and longitudinally extending angle members secured at the corners of the structure formed by said sheets.

7. A beam of rectangular cross section having flat portions lying in the planes of the sides of said beam and having triangular webs with one edge portion of each triangle extending diagonally of said beam and the other two edge portions of each triangle extending obliquely of adjacent sides of the beam with the apex of said edge portions at a corner thereof.

8. A beam of rectangular cross section comprising a sheet bent into a series of triangular webs with certain edge portions thereof extending in diagonal lines in transverse planes and having flanges extending from edges of said triangular webs lying in the planes of the sides of said beam.

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