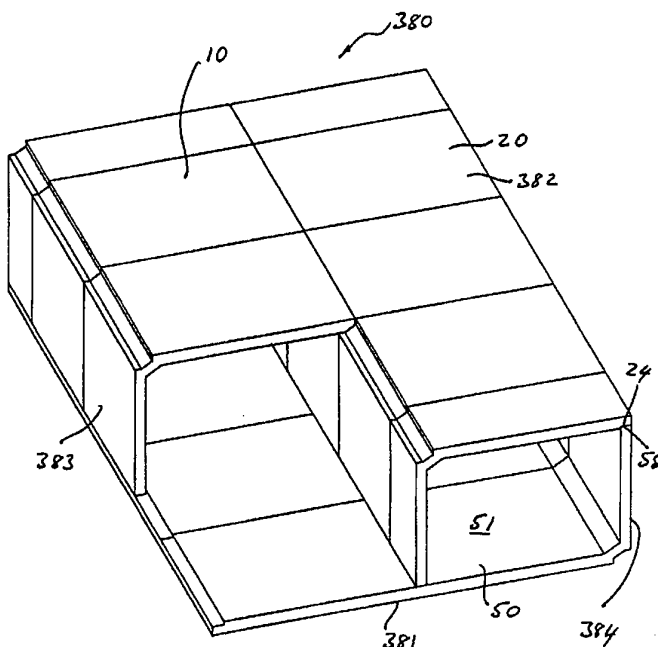




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<p>(21) International Application Number: PCT/AU94/00650</p> <p>(22) International Filing Date: 25 October 1994 (25.10.94)</p> <p>(30) Priority Data: PM 2006 25 October 1993 (25.10.93) AU</p> <p>(71) Applicant (for all designated States except US): QLD PROCAST PTY. LIMITED [AU/AU]; 493 South Street, Toowoomba West, QLD 4350 (AU).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): PROWSE, Steven, Michael [AU/AU]; 493 South Street, Toowoomba West, QLD 4350 (AU).</p> <p>(74) Agent: TANNAHILL, Ian, Robert; Pizzey & Company, 6th floor, 444 Queen Street, Brisbane, QLD 4000 (AU).</p>	<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).</p> <p>Published With international search report.</p>	

(54) Title: A METHOD OF CONSTRUCTING A ROOFED STRUCTURE



(57) Abstract

A method of constructing a roofed structure including arranging a plurality of building elements (10, 20 and 50) both end to end and side by side so as to create a structure of the type illustrated in the figure. The building elements (10, 20 and 50) are each similar in construction. The building element (10) includes a body having divergent wall portions (11 and 12) and opposing primary mounting portions (14 and 15), respectively. The mounting portions (14 and 15) are associated with the free ends of the wall portions (11 and 12). The building element (10) also includes a secondary mounting portion (17) located intermediate the two primary mounting portions and wherein the mounting portion (14) and the mounting portion (17) are complementary.

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A METHOD OF CONSTRUCTING A ROOFED STRUCTURE

This invention relates to a method of constructing a roofed structure.

This invention has particular but not exclusive application to a method of constructing a culvert, and for illustrative purposes reference will be made to such application. However, it is to be understood that this invention could be used in other applications, such as the construction of buildings such as sheds, car ports or the like and wherein the various structural elements described herein may be used to construct retaining walls and wing walls.

The most commonly used and widely accepted method of constructing culverts involves the use of one or more precast concrete, inverted "U" shaped, building elements, herein after referred to as "crown units". Typically the crown units are placed end on end so as to form a tunnel under a road through which water for example may pass. In some instances more than one tunnel is required and as a consequence crown units may also be placed side by side so as to create two or more tunnels. The crown units may be supported by a precast or insitu formed concrete base comprising one or more concrete slabs.

Unfortunately, the legs of abutting crown units limits the width of the tunnels and thereby restricts the volume of water which may flow therethrough. Futhermore, during the construction of culverts comprising two or more crown units arranged side by side it is necessary to grout between the abutting legs of adjacent units.

In use, a flat slab of concrete, hereinafter referred to as a "link slab", may be placed on the opposing upper edges of adjacent crown units so as to span any gap therebetween. Where link slabs are used to span adjacent crown units, it will be appreciated that the top of each link slab will sit above the roof of the crown units. Accordingly, it is sometimes necessary to fill the space between adjacent link slabs with a low strength concrete so as to allow proper compaction of the fill material placed on top of the culvert.

Culverts may also be constructed using a plurality of vertically orientated legs, each formed from a flat concrete slab, and wherein the legs are used to support one or more horizontally disposed slabs of concrete or lids. The legs
5 may be supported by a precast or insitu formed concrete base comprising one or more concrete slabs.

Unfortunately during the erection of culverts of this type it is necessary to support the legs using mechanical props until the fill is compacted evenly at each end of the
10 culvert. Where there is some time delay between the erection of the culvert and the compaction of the fill, the mechanical props can not be used in the construction of other culverts.

It will also be appreciated that displacement of the fill, such as might occur during a flood, may cause a culvert
15 of this type to collapse. It should also be noted that in the case where culvert legs are short, there is little or no room within the tunnel space to place props.

The present invention aims to alleviate one or more of the above disadvantages and to provide a method of
20 constructing a roofed structure which will be reliable and efficient in use.

With the foregoing in view, this invention in one aspect resides broadly in a method of constructing a roofed structure including:-

25 arranging a plurality of building elements end to end so as to form a roofed structure and wherein at least some of said building elements are primary building elements of the type comprising a body having divergent wall portions and opposing primary mounting portions, each said primary
30 mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.

Preferably the opposing primary mounting portions are upper and lower mounting portions.

35 The building elements, including the primary building element, may be manufactured from concrete which may be reinforced by reinforcing elements.

In one embodiment, the primary building element may

include an arcuate wall and wherein the wall may include mounting portions associated with opposing end portions thereof.

In an alternative embodiment, the primary building element may comprise two divergent walls which extend outwardly from an intermediate wall portion. The walls may be planar or arcuate and may each include a mounting portion possibly associated with a free end portion thereof.

The primary building element may further include additional mounting portions which may be engageable with the mounting portions of abutting building elements including an intermediate mounting portion located intermediate the aforementioned upper and lower mounting portions. For example, the primary building element may include an intermediate mounting portion associated with an intermediate wall portion.

In one embodiment, the mounting portion may comprise an end portion of a wall of the primary building element and wherein the profile of the end portion may compliment the profile of a mounting portion of another building element.

In one embodiment, the intermediate wall portion may include a protrubence such as an edge thereof, or a flange extending outwardly therefrom, which may be embraced by, or provide support for, an abutting portion of an adjacent building element. Alternatively, the intermediate wall portion may include a rebated intermediate mounting portion and wherein the profile of the rebate may compliment the profile of an adjacent building element to be received therein.

However, it will be appreciated that the various mounting portions may include mounting means mounted on the primary building element at upper and lower locations and locations intermediate thereof. The mounting means may include mounting flanges and mounting brackets affixed to the primary building element.

The roofed structure may include one or more side walls and a roof each of which may comprise a wall of a primary building element. The structure may be supported by a base

wall or foundation which may include a wall of a primary building element and/or one or more slabs of concrete.

The relationship of the various building elements from which the roofed structure is constructed may be maintained by way of attachment means used to attach abutting building elements together. The attachment means may include dowels, threaded fasteners, or settable liquid such as cement or concrete.

In a further aspect, this invention resides in a building element for use in the construction of a roofed structure, said building element including:-

a body having divergent wall portions, and opposing primary mounting portions, each said primary mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.

In yet another aspect this invention relates to a roofed structure including:-

the arrangement end to end of a plurality of building elements so as to form a roofed structure comprising at least one primary building element of the type including a body having divergent wall portions and opposing primary mounting portions, each said primary mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.

In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a typical embodiment of the invention and wherein:-

FIG. 1 is a perspective view from above of a building element constructed in accordance with the present invention;

FIG. 2 is a perspective view from below of the building element illustrated in figure 1;

FIG. 3 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 4 is a perspective view from below of the building

element illustrated in figure 3;

FIG. 5 is a perspective view from above of another building element constructed in accordance with the present invention;

5 FIG. 6 is a perspective view from below of the building element illustrated in figure 5;

FIG. 7 is a perspective view from above of another building element constructed in accordance with the present invention;

10 FIG. 8 is a perspective view from below of the building element illustrated in figure 7;

FIG. 9 is a perspective view from above of another building element constructed in accordance with the present invention;

15 FIG. 10 is a perspective view from below of the building element illustrated in figure 9;

FIG. 11 is a perspective view from above of another building element constructed in accordance with the present invention;

20 FIG. 12 is a perspective view from below of the building element illustrated in figure 11;

FIG. 13 is a perspective view from above of another building element constructed in accordance with the present invention;

25 FIG. 14 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 15 is a perspective view from above of another building element constructed in accordance with the present invention;

30 FIG. 16 is a perspective view from above of a plurality of building elements used to construct an arch;

FIG. 17 is a perspective view from above of another building element constructed in accordance with the present invention;

35 FIG. 18 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 19 is a perspective view from above of another building element constructed in accordance with the present invention;

5 FIG. 20 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 21 is a perspective view from above of another building element constructed in accordance with the present invention;

10 FIG. 22 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 23 is a perspective view from above of a plurality of building elements used to construct an arch;

15 FIG. 24 is a perspective view from above of another building element constructed in accordance with the present invention;

20 FIG. 25 is a perspective view from above of another building element constructed in accordance with the present invention;

FIG. 26 is a perspective view from above of another building element constructed in accordance with the present invention;

25 FIG. 27 is a perspective view from above of a plurality of building elements used to construct an arch;

FIG. 28 is a perspective view from above of a plurality of building elements used to construct an arch;

FIG. 29 is a perspective view from above of a plurality of building elements used to construct an arch;

30 FIG. 30 is a perspective view of a link slab constructed in accordance with the present invention;

FIG. 31 is a perspective view of another link slab constructed in accordance with the present invention;

35 FIG. 32 is a perspective view of another link slab constructed in accordance with the present invention;

FIG. 33 is a perspective view of another link slab constructed in accordance with the present invention;

FIG. 34 is a perspective view of another link slab

constructed in accordance with the present invention;
FIG. 35 is a perspective view of another link slab
constructed in accordance with the present invention;
FIG. 36 is a perspective view of another link slab
5 constructed in accordance with the present invention;
FIG. 37 is a perspective view of another link slab
constructed in accordance with the present invention;
FIG. 38 is a perspective view of a crown unit
constructed in accordance with the present invention;
10 FIG. 39 is a perspective view of another crown unit
constructed in accordance with the present invention;
FIG. 40 is a perspective view of another crown unit
constructed in accordance with the present invention;
FIG. 41 is a perspective view of another crown unit
15 constructed in accordance with the present invention;
FIG. 42 is a perspective view of another crown unit
constructed in accordance with the present invention;
FIG. 43 is a perspective view of a roofed structure
constructed in accordance with the present invention;
20 FIG. 44 is an end view of the roofed structure
illustrated in figure 43;
FIG. 45 is an end view of an alternative roofed
structure constructed in accordance with the present
invention;
25 FIG. 46 is an end view of an alternative roofed
structure constructed in accordance with the present
invention;
FIG. 47 is an end view of an alternative roofed
structure constructed in accordance with the present
30 invention;
FIG. 48 is an end view of an alternative roofed
structure constructed in accordance with the present
invention;
FIG. 49 is an end view of an alternative roofed
35 structure constructed in accordance with the present
invention;
FIG. 50 is a perspective view of an alternative roofed
structure constructed in accordance with the present

invention;

FIG. 51 is an end view of the roofed structure illustrated in figure 50;

5 FIG. 52 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 53 is an end view of an alternative roofed structure constructed in accordance with the present invention;

10 FIG. 54 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 55 is an end view of an alternative roofed structure constructed in accordance with the present invention;

15 FIG. 56 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 57 is an end view of an alternative roofed structure constructed in accordance with the present invention;

20 FIG. 58 is a perspective view of an alternative roofed structure constructed in accordance with the present invention;

25 FIG. 59 is an end view of the roof structure illustrated in figure 58;

FIG. 60 is an end view of an alternative roofed structure constructed in accordance with the present invention;

30 FIG. 61 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 62 is an end view of an alternative roofed structure constructed in accordance with the present invention;

35 FIG. 63 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 64 is an end view of an alternative roofed structure constructed in accordance with the present invention;

5 FIG. 65 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 66 is an end view of an alternative roofed structure constructed in accordance with the present invention;

10 FIG. 67 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 68 is an end view of an alternative roofed structure constructed in accordance with the present invention;

15 FIG. 69 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 70 is an end view of an alternative roofed structure constructed in accordance with the present invention;

20 FIG. 71 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 72 is an end view of an alternative roofed structure constructed in accordance with the present invention;

25 FIG. 73 is an end view of an alternative roofed structure constructed in accordance with the present invention;

30 FIG. 74 is an end view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 75 is an end view of an alternative roofed structure constructed in accordance with the present invention;

35 FIG. 76 is an end view of an alternative roofed structure constructed in accordance with the present invention;

invention;

FIG. 77 is a plan view of an alternative roofed structure constructed in accordance with the present invention;

5 FIG. 78 is a plan view of an alternative roofed structure constructed in accordance with the present invention;

FIG. 79 is a plan view of an alternative roofed structure constructed in accordance with the present invention;

10 FIG. 80 is a cross-sectional view of a joint for connecting adjacent building elements together;

FIG. 81 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

15 FIG. 82 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 83 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

20 FIG. 84 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 85 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 86 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

25 FIG. 87 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 88 is a plan view of yet another joint for connecting adjacent building elements together;

30 FIG. 89 is a cross-sectional view of the joint illustrated in figure 88;

FIG. 90 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 91 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

35 FIG. 92 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 93 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

FIG. 94 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 95 is an end view of roofed structure constructed in accordance with the present invention;

5 FIG. 96 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 97 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 98 is a cross-sectional view of yet another joint

10 for connecting adjacent building elements together;
FIG. 99 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 100 is a cross-sectional view of yet another joint for connecting adjacent building elements together;

15 FIG. 101 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 102 is a cross-sectional view of yet another joint for connecting adjacent building elements together;
FIG. 103 is a cross-sectional view of yet another joint

20 for connecting adjacent building elements together;
FIG. 104 is a side view of a selection of mounting portions having differing profiles;
FIG. 105 is a side view of a selection of mounting portions having differing profiles;

25 FIG. 106 is a perspective view of an alternative building element constructed in accordance with the present invention;
FIG. 107 is a perspective view of an alternative building element constructed in accordance with the

30 present invention;
FIG. 108 is a perspective view of a building or roofed structure constructed in accordance with the present invention;

35 FIG. 109 is a perspective view of a building or roofed structure constructed in accordance with the present invention;
FIG. 110 is an end view of a plurality of building elements stacked one on top of the other;

FIG. 111 illustrates a method of transporting a plurality of building elements;
FIG. 112 illustrates a cross-sectional view of a wing wall constructed in accordance with the present invention;
5 FIG. 113 illustrates a cross-sectional view of another wing wall constructed in accordance with the present invention, and
FIG. 114 is a perspective view of yet another building element constructed in accordance with the present invention.

10 Figures 1 and 2 illustrate a building element 10 comprising two divergent, orthogonal, walls 11 and 12 which extend outwardly from an intermediate wall portion 13. The walls 11 and 12 are planar, of substantially equal length, and each include a mounting portion 14 and 15 associated with a free end thereof.

The mounting portion 14 includes a bevelled edge 16 and is locatable within a complementary shaped rebate of an adjacent building member.

20 The building member 10 also includes a third mounting portion 17 located intermediate mounting portions 14 and 15. The third mounting portion includes a rebate 18 formed in the intermediate wall portion 13 and wherein the profiles of the rebate 18 and the mounting portion 14 are complementary.

30 Figures 3 and 4 illustrate another building element 20 which is quite similar to the building element 10. The building element 20 comprises two divergent, orthogonal, walls 21 and 22 which extend outwardly from an intermediate wall portion 23. The walls 21 and 22 are planar, of substantially equal length, and each include a mounting portion 24 and 25 associated with a free end thereof.

The mounting portion 24 includes a checked out portion 26.

35 The building member 20 also includes a third mounting portion 27 located intermediate mounting portions 24 and 25. The third mounting portion includes a rebate 28 formed in the intermediate wall portion 23 and wherein the profiles of the

rebate 28 and the mounting portion 14, of the building element 10, are complementary.

Figures 5 and 6 illustrate another building element 30 which is quite similar to the building element 10. The building element 30 comprises two divergent, orthogonal, walls 31 and 32 which extend outwardly from an intermediate wall portion 33. The walls 31 and 32 are planar, of substantially equal length, and each include a mounting portion 34 and 35 associated with a free end thereof.

10 The mounting portion 34 includes two, rectangularly shaped, indentations 36 formed in the free end of the wall 31.

The building member 30 also includes a third mounting portion 37 located intermediate mounting portions 34 and 35. 15 The third mounting portion includes a rebate 38 formed in the intermediate wall portion 33 and wherein the profiles of the rebate 38 and the mounting portion 14, of the building element 10, are complementary.

Figures 7 and 8 illustrate another building element 40 20 which is quite similar to the building element 10. The building element 40 comprises two divergent, orthogonal, walls 41 and 42 which extend outwardly from an intermediate wall portion 43. The walls 41 and 42 are planar and each include a mounting portion 44 and 45 associated with a free 25 end thereof. The wall 41 is approximately twice the length of the wall 42.

The mounting portion 44 includes a bevelled edge 46 and is locatable within a complementary shaped rebate of an adjacent building member.

30 The building member 40 also includes a third mounting portion 47 located intermediate mounting portions 44 and 45. The third mounting portion includes a rebate 48 formed in the intermediate wall portion 43 and wherein the profiles of the rebate 48 and the mounting portions 44 and 14, of building 35 element 10, are complementary.

Figures 9 and 10 illustrate another building element 50 which is quite similar to the building element 20. The building element 50 comprises two divergent, orthogonal,

walls 51 and 52 which extend outwardly from an intermediate wall portion 53. The walls 51 and 52 are planar and each include a mounting portion 54 and 55 associated with a free end thereof. The wall 51 is approximately twice the length 5 of the wall 52.

The mounting portion 54 includes a checked out portion 56.

The building member 50 also includes a third mounting portion 57 located intermediate mounting portions 54 and 55. 10 The third mounting portion includes a rebate 58 formed in the intermediate wall portion 53 and wherein the profiles of the rebate 58, the mounting portion 14 of the building element 10, and the mounting portion 44 of the building element 40 are complementary.

15 Figures 11 and 12 illustrates another building element 60 which is quite similar to the building element 30. The building element 60 comprises two divergent, orthogonal, walls 61 and 62 which extend outwardly from an intermediate wall portion 63. The walls 61 and 62 are planar and each 20 include a mounting portion 64 and 65 associated with a free end thereof. The wall 61 is approximately twice the length of the wall 62.

The mounting portion 64 includes two, rectangularly shaped, indentations 66 formed in the free end of the wall 25 61.

The building member 60 also includes a third mounting portion 67 located intermediate mounting portions 64 and 65. The third mounting portion includes a rebate 68 formed in the intermediate wall portion 63 and wherein the profiles of the 30 rebate 68, the mounting portion 14 of the building element 10, and the mounting portion 44 of the building element 40 are complementary.

Figure 13 illustrates a building element 70 comprising two divergent walls 71 and 72 which extend outwardly from an 35 intermediate wall portion 73.

The wall 71 is arcuate whilst the wall 72 is substantially planar and wherein the distance spanned by the wall 71 is approximately equal to the height of the wall 72.

The walls 71 and 72 each include a respective mounting portion 74 and 75 associated with a free end thereof.

The mounting portion 74 includes a bevelled edge 76 and is locatable within a complementary shaped rebate of an adjacent building member.

The building member 70 also includes a third mounting portion 77 located intermediate mounting portions 74 and 75. The third mounting portion includes a rebate 78 formed in the intermediate wall portion 73 and wherein the profiles of the rebate 78, the mounting portion 74, and the mounting portion 14 of the building element 10 are complementary.

Figures 14 and 15 illustrate a pair of building elements 80 and 80a which are quite similar to the building element 70. The building elements 80 and 80a each comprise two divergent, walls 81 and 82 which extend outwardly from an intermediate wall portion 83.

In each case the wall 81 is arcuate whilst the wall 82 is substantially planar and wherein the distance spanned by the wall 81 is approximately equal to the height of the wall 82.

The building element 80 is provided with upper and lower mounting portions 84 and 85 associated with the free ends of the respective walls 81 and 82.

The mounting portion 84 includes an upper checked out portion or step 86.

The building member 80 also includes a third mounting portion 87 located intermediate mounting portions 84 and 85. The third mounting portion includes a rebate 88 formed in the intermediate wall portion 83 and wherein the profiles of the rebate 88, the mounting portion 74 of the building element 70, and the mounting portion 14 of the building element 10 are complementary.

The building element 80a is also provided with upper and lower mounting portions 84a and 85a associated with the free ends of the respective walls 81 and 82.

The mounting portion 84a includes a lower checked out portion 86a and wherein the checked out portions 86 and 86a are complementary.

The building member 80a also includes a third mounting portion 87a located intermediate mounting portions 84a and 85a. The third mounting portion includes a rebate 88a formed in the intermediate wall portion 83 and wherein the profiles of the rebate 88a, the mounting portion 74 of the building element 70, and the mounting portion 14 of the building element 10 are complementary.

It will be appreciated that an arch may be formed by arranging the building elements 80 and 80a end to end such that the opposing mounting portions 86 and 86a abut. It will also be appreciated that the arch constructed from a pair of building elements 80 and 80a will be self supporting.

Figure 16 illustrates another arch 89, shown in a disassembled state, constructed from a pair of opposing building elements 80 which are linked by an intermediate, arcuate, link slab 90. The link slab 90 includes opposing end mounting portions 91 each having a checked out profile which compliments the profile of the abutting mounting portion 86.

Figure 17 illustrates a building element 100 which is similar to the building element 70. The building element 100 comprises two divergent walls 101 and 102 which extend outwardly from an intermediate wall portion 103.

The wall 101 is arcuate whilst the wall 102 is substantially planar and wherein the distance spanned by the wall 101 is approximately twice the height of the wall 102. The walls 101 and 102 each include a respective mounting portion 104 and 105 associated with a free end thereof.

The mounting portion 104 includes a bevelled edge 106 and is locatable within a complementary shaped rebate of an adjacent building member.

The building member 100 also includes a third mounting portion 107 located intermediate mounting portions 104 and 105. The third mounting portion includes a rebate 108 formed in the intermediate wall portion 103 and wherein the profiles of the rebate 108, the mounting portion 104, and the mounting portion 14 of the building element 10 are complementary.

Figure 18 illustrates a building element 110 which is

similar to the building element 100. The building element 110 comprises two divergent walls 111 and 112 which extend outwardly from an intermediate wall portion 113.

The wall 111 is arcuate whilst the wall 112 is substantially planar and wherein the distance spanned by the wall 111 is approximately twice the height of the wall 112. The walls 111 and 112 each include a respective mounting portion 114 and 115 associated with a free end thereof.

The mounting portion 114 includes a lower checked out portion 116.

The building member 110 also includes a third mounting portion 117 located intermediate mounting portions 114 and 115. The third mounting portion includes a rebate 118 formed in the intermediate wall portion 113 and wherein the profiles of the rebate 118, and for example the profiles of the mounting portion 104 of the building element 100 and the mounting portion 14 of the building element 10 are complementary.

Figure 19 illustrates a building element 120 which is similar to the building element 100. The building element 120 comprises two divergent walls 121 and 122 which extend outwardly from an intermediate wall portion 123.

The wall 121 is arcuate whilst the wall 122 is substantially planar and wherein the distance spanned by the wall 121 is approximately twice the height of the wall 122. The walls 121 and 122 each include a respective mounting portion 124 and 125 associated with a free end thereof.

The mounting portion 124 includes a rectangularly shaped protruding edge portion 126.

The building member 120 also includes a third mounting portion 127 located intermediate mounting portions 124 and 125. The third mounting portion includes a rebate 128 formed in the intermediate wall portion 123 and wherein the profiles of the rebate 128, and for example the profiles of the mounting portion 104 of the building element 100 and the mounting portion 14 of the building element 10 are complementary.

Figure 20 illustrates a building element 130 comprising

two divergent walls 131 and 132 which extend outwardly from an intermediate, planar, wall portion 133. The walls 131 and 132 are planar and each include a mounting portion 134 and 135 associated with a free end thereof.

- 5 The mounting portion 134 includes a bevelled edge 136 and is locatable within a complementary shaped rebate of an adjacent building element.

The building element 130 also includes a third mounting portion 137 located intermediate mounting portions 134 and 10 135. The third mounting portion includes a rebate 138 formed in the intermediate wall portion 133 and wherein the profiles of the rebate 138, and for example the profiles of the mounting portion 134 and the mounting portion 14 of the building element 10 are complementary.

- 15 Figure 21 illustrates a building element 140 comprising two divergent walls 141 and 142 which extend outwardly from an intermediate, planar, wall portion 143. The walls 141 and 142 are planar and each include a mounting portion 144 and 145 associated with a free end thereof.

- 20 The mounting portion 144 includes a lower checked out portion 146.

The building element 140 also includes a third mounting portion 147 located intermediate mounting portions 144 and 145. The third mounting portion includes a rebate 148 formed 25 in the intermediate wall portion 143 and wherein the profiles of the rebate 148, and for example the profiles of the mounting portion 134 and the mounting portion 14 of the building element 10 are complementary.

Figure 22 illustrates a building element 150 comprising 30 two divergent walls 151 and 152 which extend outwardly from an intermediate, planar, wall portion 153. The walls 151 and 152 are planar and each include a mounting portion 154 and 155 associated with a free end thereof.

- The mounting portion 154 includes two, rectangularly 35 shaped, indentations 146 formed in the free end of the wall 151.

The building element 150 also includes a third mounting portion 157 located intermediate mounting portions 154 and

155. The third mounting portion includes a rebate 158 formed in the intermediate wall portion 153 and wherein the profiles of the rebate 158, and for example the profiles of the mounting portion 134 and the mounting portion 14 of the building element 10 are complementary.

Figure 23 illustrates an arch 159 constructed from a pair of opposing building elements 160 and 160a.

The building element 160 comprises two divergent walls 161 and 162 which extend outwardly from an intermediate wall portion 163. The walls 161 and 162 are planar, of substantially equal length, and each include a mounting portion 164 and 165 associated with a free end thereof.

The mounting portion 164 includes an upper checked out portion 166 and is locatable within a complementary shaped checked out portion of an adjacent building member.

The building member 160 also includes a third mounting portion 167 located intermediate mounting portions 164 and 165. The third mounting portion includes a rebate 168 formed in the intermediate wall portion 163 and wherein the profiles of the rebate 168 and for example the mounting portion 14 of the building element 10 are complementary.

The building element 160a is very similar in shape to the building element 160 with the exception that the mounting portion 164a includes a lower checked out portion 166a. The checked out portions 166 and 166a are complementary.

It will be appreciated that an arch 159 may be formed by arranging the building elements 160 and 160a end to end such that the opposing mounting portions 164 and 164a abut. It will also be appreciated that the arch constructed from a pair of building elements 160 and 160a will be self supporting.

Figure 24 illustrates a building element 170 comprising two divergent walls 171 and 172 which extend outwardly from an intermediate wall portion 173. The walls 171 and 172 are planar and each include a mounting portion 174 and 175 associated with a free end thereof.

The mounting portion 174 includes a bevelled edge 176 and is locatable within a complementary shaped rebate of an

adjacent building element.

The building element 170 also includes a third mounting portion 177 located intermediate mounting portions 174 and 175. The third mounting portion includes a rebate 178 formed in the intermediate wall portion 173 and wherein the profiles of the rebate 178, and for example the profiles of the mounting portion 174 and the mounting portion 14 of the building element 10 are complementary.

Figure 25 illustrates a building element 180 comprising two divergent walls 181 and 182 which extend outwardly from an intermediate wall portion 183. The walls 181 and 182 are planar and each include a mounting portion 184 and 185 associated with a free end thereof.

The mounting portion 184 includes a lower checked out portion 186.

The building element 180 also includes a third mounting portion 187 located intermediate mounting portions 184 and 185. The third mounting portion includes a rebate 188 formed in the intermediate wall portion 183 and wherein the profiles of the rebate 188, and for example the profiles of the mounting portion 174 and the mounting portion 14 of the building element 10 are complementary.

Figure 26 illustrates a building element 190 comprising two divergent walls 191 and 192 which extend outwardly from an intermediate wall portion 193. The walls 191 and 192 are planar and each include a mounting portion 194 and 195 associated with a free end thereof.

The building element 190 also includes a third mounting portion 197 located intermediate mounting portions 194 and 195. The third mounting portion includes a rebate 198 formed in the intermediate wall portion 193 and wherein the profiles of the rebate 198, and for example the profiles of the mounting portion 174 and the mounting portion 14 of the building element 10 are complementary.

Figure 27 illustrates an arch 199 constructed from a pair of opposing building elements 200 and 200a.

The building element 200 comprises two divergent, walls 201 and 202 which extend outwardly from an intermediate wall

portion 203. The walls 201 and 202 are planar and each include a mounting portion 204 and 205 associated with a free end thereof.

The mounting portion 204 includes an upper checked out portion 206 and is locatable within a complementary shaped checked out portion of an adjacent building member.

The building member 200 also includes a third mounting portion 207 located intermediate mounting portions 204 and 205. The third mounting portion includes a rebate 208 formed in the intermediate wall portion 203 and wherein the profiles of the rebate 208 and for example the mounting portion 14 of the building element 10 are complementary.

The building element 200a is very similar in shape to the building element 200 with the exception that the mounting portion 204a includes a lower checked out portion 206a. The checked out portions 206 and 206a are complementary.

Figure 28 illustrates an arch 209 constructed from a pair of opposing building elements 210 linked by an intermediate building element or link slab 210a.

The building elements 210 each comprise two divergent, walls 211 and 212 which extend outwardly from an intermediate wall portion 213. The walls 211 and 212 are planar, of substantially equal length, and each include a mounting portion 214 and 215 associated with a free end thereof.

The mounting portion 214 includes an upper checked out portion 216 and is locatable within a complementary shaped checked out portion of an adjacent building member.

The building member 210 also includes a third mounting portion 217 located intermediate mounting portions 214 and 215. The third mounting portion includes a rebate 218 formed in the intermediate wall portion 213 and wherein the profiles of the rebate 218 and for example the mounting portion 14 of the building element 10 are complementary.

The building element 210a comprises two divergent planar walls 219 and wherein the walls 219 each include a respective mounting portion 220. The mounting portions 220 each include a lower checked out portion 221 and wherein the checked out portions 216 and 221 are complementary.

Figure 29 illustrates an arch 222 constructed from a pair of opposing building elements 160 linked by an intermediate building element or link slab 223.

The building element 223 comprises a substantially planar wall 224 having opposing end mounting portions 225. The mounting portions 225 each include a lower checked out portion 226 and wherein the checked out portions 226 and 221 are complementary.

Figure 30 is a perspective view of an alternative link slab 230 comprising a substantially planar wall 231 having opposing mounting portions 232. The mounting portions 232 each include a bevelled edge 233 locatable within a complementary shaped rebate of an adjacent building member such as for example mounting portion 17 of building element 10.

Figure 31 is a perspective view of yet another link slab 235 comprising a substantially planar wall 236 having opposing mounting portions 237. The mounting portions 237 each include a rebate 238 and wherein the profile of the rebate 238 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 32 is a perspective view of an alternative link slab 240 comprising two divergent planar walls 241 and two opposing mounting portions 242. The mounting portions 242 each include a bevelled edge 243 locatable within a complementary shaped rebate of an adjacent building member such as for example mounting portion 17 of building element 10.

Figure 33 is a perspective view of an alternative link slab 245 comprising two divergent planar walls 246 and two opposing mounting portions 247. The mounting portions 247 each include a rebate 248 and wherein the profile of the rebate 248 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 34 is a perspective view of an alternative link slab 250 comprising an arcuate wall 251 having opposing mounting portions 252. The mounting portions 252 each include a bevelled edge 253 locatable within a complementary

shaped rebate of an adjacent building member such as for example mounting portion 17 of building element 10.

Figure 35 is a perspective view of yet another link slab 255 comprising an arcuate wall 256 having opposing mounting 5 portions 257. The mounting portions 257 each include a rebate 258 and wherein the profile of the rebate 258 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 36 is a perspective view of an alternative link 10 slab 260 comprising two divergent planar walls 261 separated by an intermediate planar wall 259. The link slab 260 also includes two opposing mounting portions 262. The mounting portions 262 each include a bevelled edge 263 locatable within a complementary shaped rebate of an adjacent building 15 member such as for example mounting portion 17 of building element 10.

Figure 37 is a perspective view of an alternative link slab 265 comprising two divergent planar walls 266 separated by an intermediate planar wall 267. The link slab 265 also 20 includes two opposing mounting portions 268. The mounting portions 268 each include a rebate 269 and wherein the profile of the rebate 269 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 38 is a perspective view of a crown unit 270 25 comprising a pair of planar walls 271 which are separated by an intermediate planar wall 272. Each wall 271 includes a lower mounting portion 273 associated with a free end thereof.

The crown unit 270 also includes a third mounting 30 portion 274 comprising a rebate 275 formed in a portion of the crown unit constituted by the intersection of the walls 271 and 272. The profile of the rebate 275 and for example the mounting portion 14 of the building element 10 are complementary.

35 The crown unit 270 is also provided with a fourth mounting portion 276 consisting of an edge portion 277 of the wall 272 opposite the rebated portion 275.

Figure 39 is a perspective view of a crown unit 280

which is quite similar to the crown unit 270. The crown unit 280 includes a pair of planar walls 281 which are separated by an intermediate planar wall 282. Each wall 281 includes a lower mounting portion 283 associated with a free end thereof.

The crown unit 280 also includes a second pair of mounting portions 284 each comprising a rebate 285 formed in a portion of the crown unit constituted by the intersection of the walls 281 and 282. The profile of the rebates 285 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 40 is a perspective view of a crown unit 286 which is quite similar to the crown unit 280. The crown unit 286 includes a pair of planar walls 287 which are separated by an intermediate arcuate wall 288. Each wall 287 includes a lower mounting portion 289 associated with a free end thereof.

The crown unit 286 also includes a second pair of mounting portions 290 each comprising a rebate 291 formed in a portion of the crown unit constituted by the intersection of the walls 287 and 288. The profile of the rebates 291 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 41 is a perspective view of a crown unit 296 which is quite similar to the crown unit 280. The crown unit 296 includes a pair of planar walls 297 which are separated by a pair of divergent walls 298. Each wall 297 includes a lower mounting portion 299 associated with a free end thereof.

The crown unit 296 also includes a second pair of mounting portions 300 each comprising a rebate 301 formed in a portion of the crown unit constituted by the intersection of the walls 297 and 298. The profile of the rebates 301 and for example the mounting portion 14 of the building element 10 are complementary.

Figure 42 is a perspective view of a crown unit 306 which is quite similar to the crown unit 280. The crown unit 306 includes a pair of planar walls 307 which are separated

by a planar wall 308 having opposing divergent wall portions 308a. Each wall 307 includes a lower mounting portion 309 associated with a free end thereof.

The crown unit 306 also includes a second pair of 5 mounting portions 310 each comprising a rebate 311 formed in a portion of the crown unit constituted by the intersection of the walls 307 and 308a. The profile of the rebates 311 and for example the mounting portion 14 of the building element 10 are complementary.

10 Figure 114 illustrates yet another building element 700 which is quite similar to the building element 10. The building element 700 comprises two divergent, orthogonal, walls 701 and 702 which extend outwardly from an intermediate wall portion 703. The wall 701 is substantially planar 15 whilst the wall 702 includes an arcuate lower surface 704 and a substantially flat upper surface 705. The walls 701 and 702 each include a mounting portion 706 and 707 associated with a free end thereof.

The mounting portion 707 includes a bevelled edge 708 20 and is locatable within a complementary shaped rebate of an adjacent building member.

The building member 700 also includes a third mounting portion 709 located intermediate mounting portions 706 and 707. The third mounting portion includes a rebate 710 formed 25 in the intermediate wall portion 703 and wherein the profiles of the rebate 710 and the mounting portions 707 are complementary.

Figures 43 and 44 illustrate a roofed structure 320 such as a tunnel or culvert comprising a plurality of building 30 elements 20. The structure 320 includes a base wall 321, a roof 322, and a pair of opposing side walls 323 and 324.

The base wall 321 and the side wall 324 are formed by assembling a plurality of building elements 20 side by side in an abutting relationship.

35 Similarly, the side wall 323 and the roof 322 are formed from an assembly of building elements 20 also arranged side by side in an abutting relationship.

With reference to the drawings, it will be noted that

the remote edge 25 of each wall 22 is located within a complementary shaped checked out portion 26 of an adjacent opposing building member 20. It will also be noted that the positioning of the building elements 20 used to form the roof 5 is staggered with respect to the building elements used to form the base wall.

Figure 45 illustrates a roofed structure 330 which is similar to the roofed structure 320. The structure 330 includes a base wall 331, a roof 332, and a pair of opposing 10 side walls 333 and 334.

The side wall 333 and the roof 332 are formed by assembling a plurality of building elements 20 side by side in an abutting relationship as shown.

The opposing side wall 334 is constructed from a 15 plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous side wall and wherein an upper edge 335 of each slab is retained within a complementary checked out portion 26 of an abutting building element 20.

20 The side walls 333 and 334 are supported on a base wall 331 which also comprises a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

With reference to figure 45, it will be noted that the 25 remote edge 25 of each wall 22 is located within a complementary shaped checked out portion 336 formed in the base wall 331. It will also be noted that the lower edge of the slabs used in the construction of the side wall 334 are retained in complementary shaped checked out portions 337 30 formed in the base wall 331.

With reference to the drawings, it will be noted that the remote edge 25 of each wall 22 is located within a complementary shaped checked out portion 26 of an adjacent opposing building member 20. It will also be noted that the 35 positioning of the building elements 20 used to form the roof is staggered with respect to the building elements used to form the base wall.

Figure 46 illustrates a roofed structure 340 comprising

a plurality of building elements 20 and a plurality of building elements 80b which are similar to building element 80a. The structure 340 includes a base wall 341, a roof 342, and a pair of opposing side walls 343 and 344.

5 The base wall 341 and the side wall 344 are formed by assembling a plurality of building elements 20 side by side in an abutting relationship.

Similarly, the side wall 343 and the roof 322 are formed from an assembly of building elements 80b also arranged side
10 by side in an abutting relationship.

With reference to the drawings, it will be noted that the remote edge 25 of each wall 22 is located within a complementary shaped checked out portion 86b of an adjacent opposing building member 80b.

15 It will also be noted that the remote edge 85b of each building element 80b is located within a complementary shaped recess 26.

Figure 47 illustrates a roofed structure 350 which is similar to the roofed structure 340. The structure 350
20 includes a base wall 351, a roof 352, and a pair of opposing side walls 353 and 354.

The side wall 353 and the roof 352 are formed by assembling a plurality of building elements 80b side by side in an abutting relationship as shown.

25 The opposing side wall 354 is constructed from a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous side wall and wherein an upper edge 355 of each slab is retained within a complementary checked out portion 86b of an
30 abutting building element 80b.

The side walls 353 and 354 are supported on a base wall 351 which may be a concrete slab possibly poured on site or which may also comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so
35 as to form a continuous wall.

With reference to figure 47, it will be noted that the remote edge 85b of each wall 82b is located within a complementary shaped checked out portion 356 formed in the

base wall 351. It will also be noted that the lower edge of the slabs used in the construction of the side wall 354 are retained in complementary shaped checked out portions 357 formed in the base wall 351.

5 Figure 48 illustrates a roofed structure 360 which comprises a plurality of building elements or crown units 280. The structure includes a base wall 361, a roof 362, and a pair of opposing side walls 363 and 364.

The roof 362 and the side walls 363 and 364 are formed
10 by assembling a plurality of building elements 280 end to end in an abutting relationship as shown.

The side walls 363 and 364 are supported on a base wall 361 which may be a concrete slab possibly poured on site or which may comprise a plurality of planar concrete slabs, each
15 positioned end to end in an abutting relationship so as to form a continuous wall.

With reference to figure 48, it will be noted that the remote edges 283 of each building element 280 are each located within a complementary shaped checked out portion 366
20 formed in the base wall 361.

Figure 49 illustrates a roofed structure 370 which comprises a plurality of building elements or crown units 286a which are very similar in appearance to the building elements 286, see figure 40. The structure includes a base
25 wall 371, a roof 372, and a pair of opposing side walls 373 and 374.

The roof 372 and the side walls 373 and 374 are formed by assembling a plurality of building elements 286a end to end in an abutting relationship as shown.

30 The side walls 373 and 374 are supported on a base wall 371 which may be a concrete slab possibly poured on site or which may comprise a plurality of planar concrete slabs, each positioned end to end in an abutting relationship so as to form a continuous wall.

35 With reference to figure 49, it will be noted that the remote edges 289a of each building element 286a are each located within a respective complementary shaped checked out portion 376 formed in the base wall 371.

Figures 50 and 51 illustrate a roofed structure 380 such as a tunnel or culvert comprising a plurality of building elements 20, a plurality of building elements 50 and a plurality of a building elements 10. The structure 380 includes a base wall 381, a roof 382, and a pair of opposing side walls 383 and 384.

The base wall 381 and the side wall 384 are formed by assembling a plurality of inverted building elements 50 end to end in an abutting relationship as shown.

10 The roof is formed in part by a plurality of building elements 20 arranged end to end in an abutting relationship whereby the abutting walls 21 combine to form a substantially continuous wall portion and wherein the building elements 20 are each supported by one or more of the inverted building
15 elements 50 used in the construction of the base wall 381 and the side wall 384. In particular, the mounting portion 24 of each building element 20 is adapted to receive therein the remote edge 55 of an abutting building element 50 whilst the remote edge 25 of each building element 20 rests upon an
20 abutting wall 51, intermediate opposing ends thereof.

The remainder of the roof 382 is formed from a plurality of building elements 10 arranged end to end in an abutting relationship whereby the abutting walls 11 combine to form a substantially continuous wall portion.

25 The building elements 10 are each supported by one or more building elements 20 and 50. In particular, the mounting portion 14 of each building element 10 is located within a complementary mounting portion 27 of an abutting building element 20 whilst the mounting portion 15 of each
30 building element 10 is received within a respective complementary shaped recess or checked out portion 56 of an abutting or supporting building element 50.

With reference to figure 50, it will also be appreciated that the abutting walls 12 of the building elements 10
35 combine to form the side wall 383 whilst the abutting walls 22 form a continuous internal wall of the roofed structure.

It will also be noted that the building elements 20 and the building elements 10 are arranged in a staggered

relationship relative to the supporting building elements 50.

Figure 52 illustrates a roofed structure 390 such as a tunnel or culvert comprising a plurality of building elements 50, a plurality of building elements 80b and a plurality of a 5 building elements 70. The structure 390 includes a base wall 391, a roof 392, and a pair of opposing side walls 393 and 394.

The base wall 391 and the side wall 394 are formed by assembling a plurality of inverted building elements 50 end 10 to end in an abutting relationship as shown.

The roof is formed in part by a plurality of building elements 80b arranged end to end in an abutting relationship whereby the abutting walls 81b combine to form a substantially continuous wall portion and wherein the 15 building elements 80b are each supported by one or more of the inverted building elements 50 used in the construction of the base wall 391 and the side wall 394. In particular, the mounting portion 84b of each building element 80b is adapted to receive therein the remote edge 55 of an abutting building 20 element 50 whilst the remote edge 85b of each building element 80b rests within a complementary channel 59 formed in the wall 51, intermediate opposing ends thereof.

The remainder of the roof 392 is formed from a plurality of building elements 70 arranged end to end in an abutting 25 relationship whereby the abutting walls 101a combine to form a substantially continuous wall portion.

The building elements 70 are each supported by one or more building elements 80b and 50. In particular, the mounting portion 74 of each building element 70 is located 30 within a complementary mounting portion 87b of an abutting building element 80b whilst the mounting portion 75 of each building element 70 is received within a respective complementary shaped recess or checked out portion 56 of an abutting or supporting building element 50.

35 With reference to figure 52, it will also be appreciated that the abutting walls 72 of the building elements 70 combine to form the side wall 393 whilst the abutting walls 82b form a continuous internal wall of the roofed structure.

Figure 53 illustrates a roofed structure 400 comprising a plurality of building elements 30. The structure includes a base wall 401, a roof 402 and opposing side walls 403 and 404.

5 The base wall 401 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

The side walls 403 and 404 are supported on the base
10 wall and are each constructed by arranging a plurality of building elements 30 end to end such that the abutting walls 32 each form a substantially continuous side wall. The lower edges 35 of each building element are each received within complementary shaped recesses 405 formed in the base wall
15 401.

The roof 402 consists of a plurality of walls 31 arranged end to end and side by side in an abutting relationship as shown and wherein the respective mounting portions 34 are each supported by an abutting, upstanding,
20 internal wall 406 comprising a plurality of concrete slabs 407 also arranged end to end. The lower edge of each concrete slab 407 is located within a complementary shaped recess formed in the base wall 401.

Figure 54 illustrates a roof structure 409 which is very
25 similar in construction to the roof structure 400 illustrated in figure 53 but wherein building elements 80c are substituted for the building elements 30.

Figure 55 illustrates a roofed structure 410 comprising a plurality of building elements 10 and a plurality of
30 building elements 280. The structure includes a base wall 411, a roof 412 and opposing side walls 413 and 414.

The base wall 411 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so
35 as to form a continuous wall.

The side walls 413 and 414 are supported on the base wall and wherein the side wall 413 is constructed by arranging a plurality of building elements 280 end to end

such that the abutting walls 281 each form a substantially continuous side wall and an internal wall 415 respectively. The lower edges 283 of each building element 280 are each received within a respective complementary shaped recesses 5 formed in the base wall 411.

The other side wall 414 is constructed by arranging a plurality of building elements 10 end to end such that the abutting walls 12 form a substantially continuous side wall and wherein the lower edges or mounting portions 15 of each 10 building element 10 are located within a complementary shaped recess or checked out portion formed in the base wall 411.

It will also be noted from reference to the drawings that the mounting portion 14 of each building element 10 is located within a complementary shaped mounting portion 284 of 15 an abutting building element 280.

Figure 56 illustrates a roof structure 419 which is very similar in construction to the roof structure 410 illustrated in figure 55 but wherein building elements 286a are substituted for the building elements 280 whilst building 20 elements 70 have been substituted for building elements 10.

Figure 57 illustrates a roof structure 420 which is very similar in construction to the roof structure 320 illustrated in figures 44 and 45 but wherein building elements 50 are substituted for the building elements 20.

25 In addition, the roof structure 420 also includes an internal wall 423 which is substantially parallel to external side walls 421 and which provides additional support for the roof 422. The internal wall may comprise a single concrete slab or a plurality of concrete slabs arranged end to end and 30 in abutting relationship.

Figures 58 and 59 illustrate a roofed structure 430 constructed from a plurality of building elements of differing configurations including building elements 20 and building elements 40.

35 The structure 430 includes a base wall 431, a roof 432, a pair of external side walls 433 and 434, and a plurality of internal supporting walls 435, 436, 437 and 438 respectively.

The base wall 431 in part is formed by laying on the

ground, side by side, two building elements 40 and a building element 20 such that the two walls 41 and the wall 21 stand upright and form part of the external wall 434 and the internal walls 436 and 438 respectively. This arrangement is
5 repeated by placing further building elements 40 and 20 on the ground in front of the existing arrangement as shown in figure 58 in particular and wherein the resulting structure has a combined width of several building elements.

The roof 432, side wall 433, and internal walls 435 and
10 437 are formed by placing building elements 40 and building elements 20 side by side and on top of the base structure as illustrated in figures 58 and 59.

Figure 60 illustrates yet another roofed structure 440 which is somewhat similar in construction to the roofed
15 structure 430 and which comprises a plurality of building elements 10, 20 and 40 as shown.

Figure 61 illustrates yet another roofed structure 441 which is somewhat similar in construction to the roofed structure 430 and which comprises a plurality of building
20 elements 10a, 20, 40, 100 and 106 as shown.

Figure 62 illustrates yet another roofed structure 442 which is somewhat similar in construction to the roofed structure 430 and which comprises a plurality of building elements 50, 70 and 110a as shown.

25 Figure 63 illustrates yet another roofed structure 443 which is somewhat similar in construction to the roofed structure 430 and which comprises a plurality of building elements 10a, 20, 40, and 130a as shown.

Figure 64 illustrates yet another roofed structure 444
30 which is somewhat similar in construction to the roofed structure 430 and which comprises a plurality of building elements 50, 130 and 140.

Figure 65 illustrates yet another roofed structure 445 which is somewhat similar in construction to the roofed
35 structure 430 and which comprises a plurality of building elements 10a, 20, 40, 130b, 130c and 140.

Figure 66 illustrates yet another roofed structure 446 which is somewhat similar in construction to the roofed

structure 430 and which comprises a plurality of building elements 50, 170 and 180.

Figure 67 illustrates yet another roofed structure 447 which is somewhat similar in construction to the roofed structure 430 and which comprises a plurality of building elements 10 and 40 supported upon a base structure 448.

The base structure 448 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

In addition, the roof structure 447 also includes an internal wall 448 which is substantially parallel to external side walls 449 and which provides additional support for the roof 450. The internal wall may comprise a single concrete slab or a plurality of concrete slabs arranged end to end and in abutting relationship.

Figure 68 illustrates yet another roofed structure 451 which is somewhat similar in construction to the roofed structure 447 and which comprises a plurality of building elements 10, 30 and 60 supported upon a base structure 452.

The base structure 452 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

Figure 69 illustrates yet another roofed structure 453 which is somewhat similar in construction to the roofed structure 451 and which comprises a plurality of building elements 70 and 286a supported upon a base structure 454.

The base structure 454 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

Figure 70 illustrates yet another roofed structure 455 which is somewhat similar in construction to the roofed structure 451 and which comprises a plurality of building elements 70 and 80c supported upon a base structure 456 and which includes an internal wall 457 comprising a plurality of upstanding concrete slabs arranged end to end.

The base structure 456 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

5 Figure 71 illustrates yet another roofed structure 458 which is somewhat similar in construction to the roofed structure 457 and which comprises a plurality of building elements 130 and 150 supported upon a base structure 459 and which includes an internal wall 460 comprising a plurality of
10 upstanding concrete slabs arranged end to end.

The base structure 459 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

15 Figure 72 illustrates yet another roofed structure 461 which is somewhat similar in construction to the roofed structure 453 and which comprises a plurality of building elements 130 and 296 supported upon a base structure 462.

The base structure 462 may be a concrete slab possibly
20 poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

Figure 73 illustrates yet another roofed structure 463 which is somewhat similar in construction to the roofed
25 structure 453 and which comprises a plurality of building elements 170 and 306 supported upon a base structure 464.

The base structure 464 may be a concrete slab possibly
poured on site or may comprise a plurality of planar concrete
slabs, each positioned side by side in an abutting
30 relationship so as to form a continuous wall.

Figure 74 illustrates yet another roofed structure 465 which is somewhat similar in construction to the roofed structure 457 and which comprises a plurality of building elements 170 and 190 supported upon a base structure 466 and
35 which includes an internal wall 467 comprising a plurality of upstanding concrete slabs arranged end to end.

The base structure 466 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete

slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

Figure 75 illustrates yet another roofed structure 468 comprising a base wall 469, a roof 470 and opposing external side walls 471 and 472.

The roof 470 is a combination of top walls 31 and 41 of respective building elements 30 and 40, and concrete slabs or link slabs 473 and 474. The link slabs are each supported by a plurality of internal walls 475, each comprising a plurality of concrete slabs arranged end to end in an abutting relationship.

The base structure 469 may be a concrete slab possibly poured on site or may comprise a plurality of planar concrete slabs, each positioned side by side in an abutting relationship so as to form a continuous wall.

Figure 76 illustrates yet another roofed structure 476 which is somewhat similar in construction to the roofed structure 453 and which comprises a plurality of building elements 70 and a plurality of building elements 80 and 80a arranged so as to form a self supporting arch as described with reference to figures 14 and 15. The building elements 70, 80 and 80a are supported on a base wall or large concrete slab 477 poured on site and wherein the lower portions of each building elements are located within respective complementary recesses 478 formed in said base wall.

Figures 77, 78 and 79 illustrate plan views of three alternative roofed structures 479, 480 and 481 respectively each constructed from a plurality of building elements.

Whilst it will be appreciated that many of the roofed structures previously described are self supporting, various methods of connecting abutting building elements may be employed in order to improve the structural integrity of the roofed structures.

In this regard, figure 80 illustrates a dowel connection 500 which, for example, may be used to connect respective mounting portions 14 and 17 of abutting building elements 10.

Each connection 500 comprises a vertically orientated, threaded, ferrule 501, cast into the rebated portion 13 of

building element 10 and an aligned void 502, cast into the end portion 14 of the abutting building element.

To effect the connection, a dowel 503 is threadably inserted in the ferrule 501 whereby a portion of the dowel 5 extends upwardly therefrom. The adjacent building element is then lowered in to place such that inclined walls 16 and 18 abut, and wherein the upper portion of the dowel is retained in the void 502 which is subsequently filled with grout or the like.

10 Figure 81 illustrates in detail an alternative dowel connection 505 which, for example, may be used to connect respective mounting portions 14 and 17 of abutting building elements 10. Each connection 505 comprises a threaded ferrule 506, cast into the end portion 14 of a building 15 element 10 which is adjacent and perpendicular to inclined wall 16, and an aligned void 507, cast into the rebated portion 17 of an adjacent building member.

To effect the connection, a dowel 508 is threadably inserted in the ferrule 506 whereby a portion of the dowel 20 extends upwardly therefrom. The adjacent building element is then lowered in to place such that inclined walls 18 and 16 abut, and wherein the upper portion of the dowel is retained in the void, which is subsequently filled with grout or the like.

25 Figure 82 illustrates in detail yet another dowel connection 510 which, for example, may be used to connect respective mounting portions 24 and 15 of abutting building elements 20 and 10 respectively.

Each connection 510 comprises a threaded ferrule 511, 30 cast into the end portion of 15 of a wall 12 which is aligned with a void 512 cast in the end portion 24 of a wall 21.

To effect the connection, a dowel 513 is threadably inserted in the ferrule 511 whereby a portion of the dowel extends upwardly therefrom and wherein the wall 21 is lowered 35 into place from above such that the upper portion of the dowel extends into the void 512, which is subsequently filled with grout or the like.

Figure 83 illustrates in detail yet another dowel

connection 515 which, for example, may be used to connect respective mounting portions 24 and 15 of abutting building elements 20 and 10 respectively.

Each connection 515 comprises a threaded ferrule 516, cast into the end portion of 15 of a wall 12 which is aligned with a void 517 cast in the end portion 24 of a wall 21.

To effect the connection, a dowel 518 is threadably inserted in the ferrule 516 whereby a portion of the dowel extends downwardly therefrom and wherein the wall 12 is lowered into place from above such that the dependent portion of the dowel extends into the grout filled void 517.

Figure 84 illustrates in detail yet another dowel connection 520 which, for example, may be used to connect the mounting portion 15 of a building element 10 to a mounting portion 49 of a building element 40.

Each connection 520 comprises a threaded ferrule 521, cast into the end portion of 15 of a wall 12 which is aligned with a void 522 cast in the wall 41 of an abutting building element 40.

To effect the connection, a dowel 523 is threadably inserted in the ferrule 521 whereby a portion of the dowel extends upwardly therefrom and wherein the wall 41 is lowered into place from above such that the upper portion of the dowel extends into the void 522, which is subsequently filled with grout or the like.

Figure 85 illustrates in detail yet another dowel connection 525 which, for example, may be used to connect the mounting portion 15 of a building element 10 to a mounting portion 49 of a building element 40.

Each connection 525 comprises a threaded ferrule 526, cast into the end portion of 15 of a wall 12 which is aligned with a void 527 cast in the wall 41 of an abutting building element 40.

To effect the connection, a dowel 528 is threadably inserted in the ferrule 526 whereby a portion of the dowel extends downwardly therefrom and wherein the wall 12 is lowered into place from above such that the dependent portion of the dowel extends into the grout filled void 527.

Figure 86 illustrates in detail yet another dowel connection 530 which, for example, may be used to connect the upper portion 531 of an upstanding wall 532 and the end portions 533 and 534 of two abutting link slabs 535 and 536 respectively.

Each connection 530 comprises a threaded ferrule 537, cast into the end portion of 531 of the wall 532 which is aligned with voids 538 and 539 cast in the end portions 533 and 534 of abutting link slabs 535 and 536 respectively.

10 To effect the connection, a dowel 540 is threadably inserted in the ferrule 537 whereby a portion of the dowel extends upwardly therefrom and wherein the walls 535 and 536 are lowered into place from above such that the upper portion of the dowel extends into the voids 538 and 539, which is
15 subsequently filled with grout or the like.

Figure 87 illustrates a bolted connection 545 which, for example, may be used to connect respective mounting portions 14 and 17 of abutting building elements 10.

The connection 545 comprises a threaded ferrule 546,
20 cast into the end portion 14, and an aligned void 547 having an enlarged mouth 548, formed in the internal fillet.

To effect the connection, a bolt 549 is threadably inserted in the ferrule 546 such that the head 550 of the bolt is retained within the mouth 548.

25 Figures 88 and 89 illustrate in detail yet another dowel connection 555 which, for example, may be used to connect the upper portion 531 of an upstanding wall 532 and the opposing end portions 34 of abutting building elements 30 respectively.

30 Each connection 555 comprises a threaded ferrule 556, cast into the end portion 531 of the wall 532 which is aligned with a void 557 formed by the combination of opposing indentations 36 cast in the end portions 34 of the two abutting building elements 30.

35 To effect the connection, a dowel 558 is threadably inserted in the ferrule 556 whereby a portion of the dowel extends upwardly therefrom and wherein the building elements 30 are lowered into place from above such that the upper

portion of the dowel extends into the void 557 and the end portions of the reinforcing 559 protruding from the ends of walls 31 is wrapped about the upper portion of the dowel as illustrated. The void 557 is subsequently filled with grout 5 or the like.

Figure 90 illustrates yet another means 560 by which abutting building elements may be interconnected whereby, for example, the end portion 14c of a building element 10c may include a channel shaped rebated portion 561 formed therein 10 and wherein the complementary shaped mounting portion 17c of an adjacent building element 10c is provided with a rib 562 which is adapted to be received within said recess 561.

Figure 91 illustrates yet another connection means 563 by which abutting building elements may be interconnected. 15 For example, the end portion 564 of a link slab 565 may rest upon or be supported by a mounting portion or corbould or ledge 566 extending outwardly from the side wall 567 of an adjacent building element. The end portion 564 may be connected to the ledge 266 by a dowel connection or a bolted 20 connection of the type previously described.

Figure 92 illustrates yet another connection means 590 by which abutting building elements may be interconnected. For example, the exposed ends 591 of steel reinforcing extending along the length of a link slab 592 may, in use, be 25 bent back upon themselves, and may protrude into the void 593 defined by the walls of a mounting portion 17 of a building element 10. Similarly, the exposed ends 594 of steel reinforcing extending along the wall 12 of the building element 10 also extend into the void 593 and may also be bent 30 back upon themselves.

To effect the connection 590, the void 593 may be filled with cement or concrete. It will be appreciated that in order to make the connection 590 stronger, a steel rod may be threaded through the overlapping looped ends 591 and 593 35 prior to filling the void 593 with concrete.

Figure 93 illustrates yet another connection means 595 by which abutting building elements may be interconnected. For example, the end portion 596 of a link slab 597 may rest

upon or be supported by a mounting portion 598 or ledge 599 which extends outwardly from a side wall 271 of a building element 270. The ledge 559 comprises an "L" shaped steel member one wall of which is bolted to the side wall 271. The
5 end portion 216 may be connected to the ledge 559 using a plurality of fasteners, not shown.

Figure 94 illustrates yet another connection means 600 by which abutting building elements may be interconnected. For example, the end portion 601 of a link slab 602 may
10 include a steel plate 603 cast into the end thereof. A similarly shaped steel plate 604 may also be cast into a wall 271 of a building element 270 and wherein when assembled, the respective steel plates 603 and 604 abut.

To effect the connection the steel plates 603 and 604
15 are welded together.

It will be appreciated that the steel plates 603 and 604 may be attached to steel reinforcing used to reinforce the respective building elements.

Figure 95 is an end view of a roofed structure 605
20 comprising three arches 606, 607 and 608.

The arch 606 comprises a building element 100 and wherein the mounting portion 106 thereof is located within the mounting portion 87 of an adjacent building element 80.

The second arch 607 comprises an assembly of opposing
25 building elements 80 and 80a and wherein figures 96, 97, 98, 99, 100, 101, 102 and 103 illustrate alternative connection means for connecting abutting end portions 84 and 84c.

For example, with reference to figure 96, a ferrule 609 is cast into the end portion 84 which is aligned with a void
30 610 cast into the opposing end portion 84a. To effect the connection, a dowel 611 may be threadably inserted into the ferrule whereby a portion thereof extends upwardly therefrom. The adjacent building element 80a is then lowered into place such that the end portions abut, and wherein the upper
35 portion of the dowel 611 is retained within the void 610 which is subsequently filled with grout or the like.

With reference to figure 97, the profile of the end portions 84 and 84a have been altered and wherein a keyed

connection is used to connect the abutting building elements.

Figure 98 illustrates yet another connection 612 which may be used to connect abutting end portions 84c and 84d of building elements of the type used to form arches 607 and 5 608. In particular the connection 612 includes a ferrule 613 cast into the end portion 84c and which is aligned with a void 615 cast into the end portion 84d. To effect the connection, a dowel 614 may be threadably inserted into the ferrule 612 whereby a portion thereof extends outwardly 10 therefrom in a general horizontal attitude. The adjacent building element 84d is then laterally placed into position such that the end portions abut, and wherein the free end of the dowel is retained within the void 610 which is subsequently filled with grout or the like introduced via 15 grout tube 616.

Figure 99 illustrates yet another method of connecting abutting end portions 84e and 84f of building elements of the type used to form arches 607 and 608. In particular an upper portion of each end portion 84e and 84f has been removed or 20 has been cast such that reinforcing 617 used to support the walls 81 is exposed and extends beyond the outer edges of the building element.

To effect the connection the channel shaped recess 618 formed by the abutment of the end portions 84e and 84f is 25 filled with concrete which when set bonds together the reinforcing of the two building elements.

Figure 100 illustrates a means of connecting abutting building elements which is quite similar to the connection illustrated in figure 99. However, it will be noted that the 30 thickness of the end portions of the respective building elements has been increased.

Figure 101 illustrates means for connecting adjacent end portions 84g of opposing building elements of the type used to construct arches 607 and 608. In particular the 35 reinforcing 620 used to support the walls of each building element is exposed and extends beyond the outer edges thereof.

To effect the connection the gap between the opposing

end portions 84g is filled with concrete which when set bonds together the overlapping reinforcing 620 of the two building elements.

It will be appreciated that temporary formwork 621 may be used to support the concrete, used to fill the gap, until the concrete has set.

Figure 102 illustrates yet another method of connecting abutting end portions 84h of building elements of the type used to form arches 607 and 608. In particular an upper portion of each end portion 84h has been removed or has been cast such that there is provided an upper checked out portion 622. Each end portion also includes a bolt 623 which is cast into the end portion 84h such that the stem of the bolt extends vertically above the checked out portion 622.

To effect the connection, a plate 624 which connects the two abutting building elements is secured to each building element using the aforementioned bolts 623 and respective nuts 625 as shown. Finally, the recess formed by the abutting checked out portions may be filled with grout or the like so as to cover the plate 624.

Figure 103 illustrates connection means 627 which is quite similar to the connection means illustrated in figure 102.

Figure 106 illustrates yet another building element which includes orthogonal side walls 641 and 642 which each include a common edge 643. The building element 640 also includes a top wall or roof 644 which extends outwardly from adjacent upper edges of walls 641 and 642 and which includes rebated mounting portions 645 and 646 extending along respective external common edges shared with walls 641 and 642. The mounting portions 645 and 646 are adapted to receive therein complementary shaped mounting portions of other building elements such as the mounting portion 14 of a building element 10.

Figure 107 illustrates yet another building element which includes orthogonal side walls 651 and 652 which each include a common edge 653. The building element 640 also includes a top wall or roof 654 which extends outwardly from

adjacent upper edges of walls 651 and 652 and which includes rebated mounting portions 655 and 656 extending along respective external common edges shared with walls 651 and 652. The mounting portions 655 and 656 are adapted to receive therein complementary shaped mounting portions of other building elements such as the mounting portion 14 of a building element 10.

In use, a simple roofed structure or culvert such as the structure illustrated in figure 44 may be constructed using two "L" shaped building elements 20 by placing one of the elements on the ground such that one of it's walls forms the base wall of the structure and wherein the second wall is upstanding and constitutes a side wall of the structure. A second building element 20 may then be lowered into position from above using a crane such that one of it's walls forms the roof of the structure and is supported by the upstanding wall of the first building element and the depending wall which rests on the base. The abutting mounting portions of the two building elements may be secured together using the methods of connecting building elements described previously in relation to figures 82 and 83.

It will be appreciated that the length of the roofed structure may be increased by the placement of further building elements 20 next to the existing building elements in a side by side relationship as illustrated in figure 43.

It will also be appreciated that many of the other structures described herein may be constructed by adding building elements to an assembly of building elements such as for example with reference to figure 50, the placement from above of additional building elements 10 which are supported at respective ends by an inverted building element 50 and an adjacent building element 20.

Figures 108 and 109 illustrate buildings which have been constructed by assembling various building elements of the type generally described herein both end to end and on top of one another. The building elements in many instances include one or more mounting portions which are adapted to engage with complementary mounting portions of adjacent abutting

building elements and wherein the building elements may be interconnected using any one of a variety of connections including those previously described herein.

Figures 110 and 111 illustrate a plurality of building elements of the type generally described herein stacked one on top of the other on a support surface such as a tray 660 of a trailer 661. It will be appreciated that the ability to stack the building elements on top of one another reduces the amount of space required to store or transport the building elements.

Figure 112 illustrates a retaining wall 670 comprising a plurality of "L" shaped building elements 671, generally of the type described herein, including a pair of orthogonal, rectangularly shaped, walls 672 and 673. The particular building element 671 illustrated in figure 112 also includes a channel shaped rebated portion 674 formed along a common edge of the two walls.

In use, the building element 671 is arranged such that the base wall 675 and the upstanding wall 676 of the retaining wall 670 are formed by the walls 672 and 673 of an upstanding building element 671. It will be appreciated that additional building elements may be placed side by side so as to extend the length of both the base wall 675 and the upstanding wall 676.

To prevent lateral movement of the building element 671, the wall 672 may be secured to a pier 677 located in the ground using a dowel connection or a bolted connection for example. Furthermore, the rebated portion may engage an abutting, complementary shaped, end portion 679 of an apron slab 680 positioned on the ground in front of the intended position of the retaining wall 670 and wherein the end portion 679 may be connected to the rebated portion 674 using either a dowel connection or a bolted connection.

Once the retaining wall 670 has been assembled, the region behind the upstanding wall 676 may be filled with earth or the like.

To extend the height of the upstanding wall 676 additional building elements 10 for example, may be placed

one on top of the other such that the end portion 14 of each element is located within a rebated portion 17 of an adjacent building element as illustrated in figure 113. It will also be appreciated that the abutting portions of adjacent
5 building elements may be interconnected if required using either a dowel or a bolted connection.

To complete the retaining wall illustrated in figure 112, the region behind the upstanding wall 676 may be filled with earth or the like such that the horizontally disposed
10 walls of the building elements are surrounded by the fill.

It will of course be realised that while the above has been given by way of illustrative example of this invention, all such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to
15 fall within the broad scope and ambit of this invention as is herein defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of constructing a roofed structure including:-
arranging a plurality of building elements end to end so as to form a roofed structure and wherein at least some of said building elements are primary building elements of the type comprising a body having divergent wall portions and opposing primary mounting portions, each said primary mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.
2. A method of constructing a roofed structure as claimed in Claim 1, including using attachment means to attach abutting portions of adjacent building elements together.
3. A method of constructing a roofed structure as claimed in claim 1 or claim 2, wherein at least one of said primary building elements is arranged such that its divergent wall portions form a base wall, or a portion thereof, and a side wall, or a portion thereof, of the structure and wherein said divergent wall portions provide support for adjacent building elements.
4. A method of constructing a roofed structure as claimed in claim 1 or claim 2, wherein at least one of said primary building elements is arranged such that its divergent wall portions form a side wall, or a portion thereof, and a top wall, or a portion thereof, of the structure and wherein said divergent wall portions provide support for adjacent building elements.
5. A method of constructing a roofed structure as claimed in any one of the preceding claims, wherein at least one of said primary building elements includes a secondary mounting portion positioned intermediate said primary mounting portions and wherein an adjacent building element is supported by the engagement of said secondary mounting

portion and a mounting portion of said adjacent building element.

6. A building element including:-
a body having divergent wall portions, and
opposing primary mounting portions, each said primary mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.
7. A building element as claimed in claim 6, wherein said body includes two divergent walls which extend outwardly from an intermediate portion and wherein the respective free end portions of said walls constitute said primary mounting portions.
8. A building element as claimed in claim 7, wherein said walls are substantially planar.
9. A building element as claimed in claim 7, wherein at least one of said walls is arcuate.
10. A building element as claimed in any one of claims 6 to 9, wherein said building element includes a secondary mounting portion located intermediate said primary mounting portions, said secondary mounting portion being capable of engagement with mounting portions of other building elements.
11. A building element as claimed in claim 10, wherein the shape and configuration of at least one of said primary mounting portions and said secondary mounting portion are complementary.
12. A building element as claimed in any one of claims 6 to 11, wherein said building element is a primary building element of the type referred to in claims 1 to 5 and is adapted for use in the construction of a roofed structure according to the method previously defined in claims 1 to 5.

13. A roofed structure including:-

the arrangement end to end of a plurality of building elements so as to form a roofed structure comprising at least one primary building element of the type including a body having divergent wall portions and opposing primary mounting portions, each said primary mounting portion being associated with a respective said divergent wall portion and capable of engagement with mounting portions of other building elements.

14. A roofed structure as claimed in claim 13, wherein said primary building element includes two divergent walls which extend outwardly from an intermediate portion and wherein the respective free end portions of said walls constitute said primary mounting portions.

15. A roofed structure as claimed in claim 14, wherein said walls are substantially planar.

16. A roofed structure as claimed in Claim 2, wherein at least one of said walls is arcuate.

17. A roofed structure as claimed in any one of claims 13 to 16, wherein said primary building element includes a secondary mounting portion located intermediate said primary mounting portions, said secondary mounting portion being capable of engagement with mounting portions of other building elements.

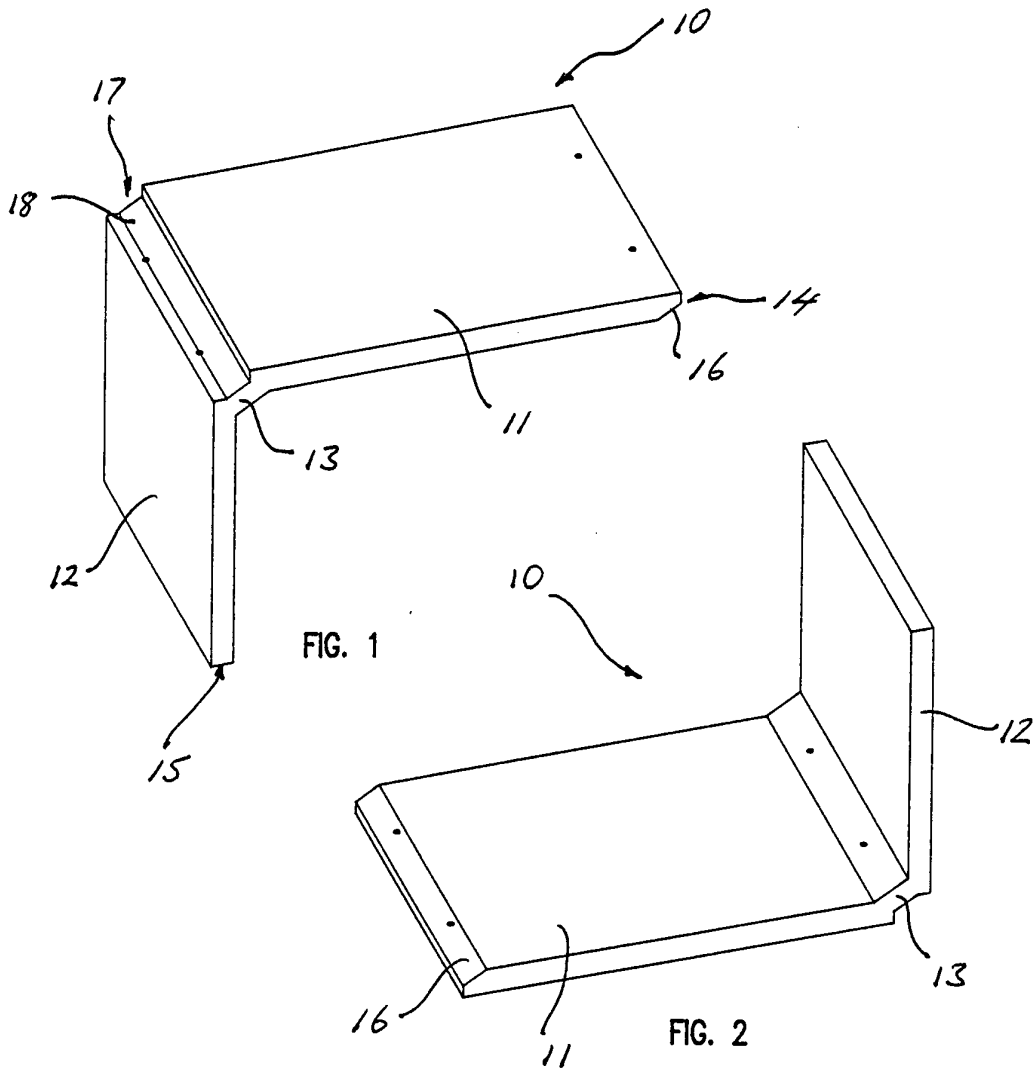
18. A roofed structure as claimed in Claim 17, wherein the shape and configuration of at least one of the primary mounting portions said secondary mounting portion are complementary.

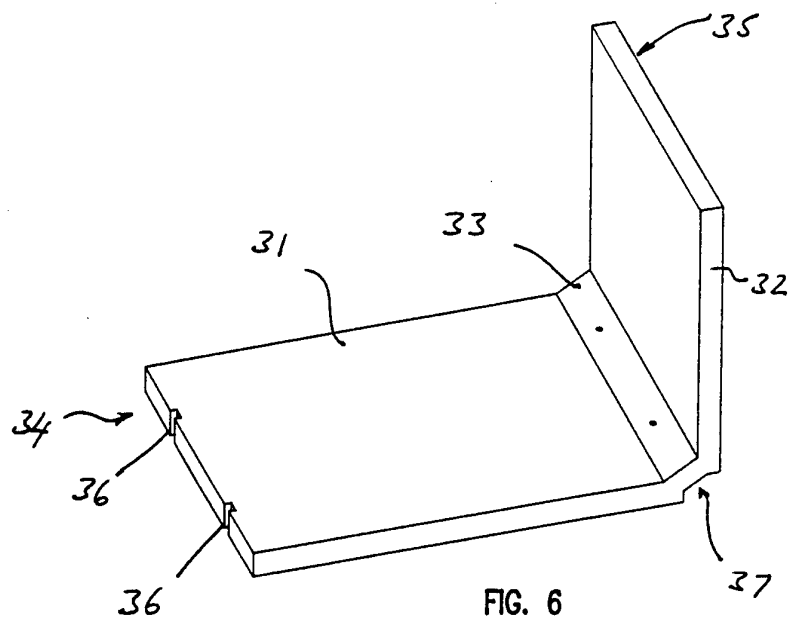
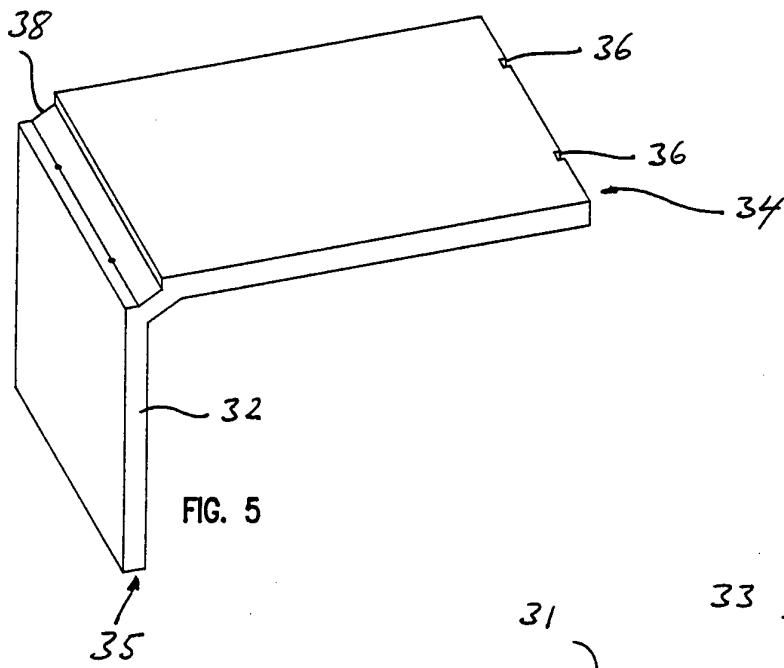
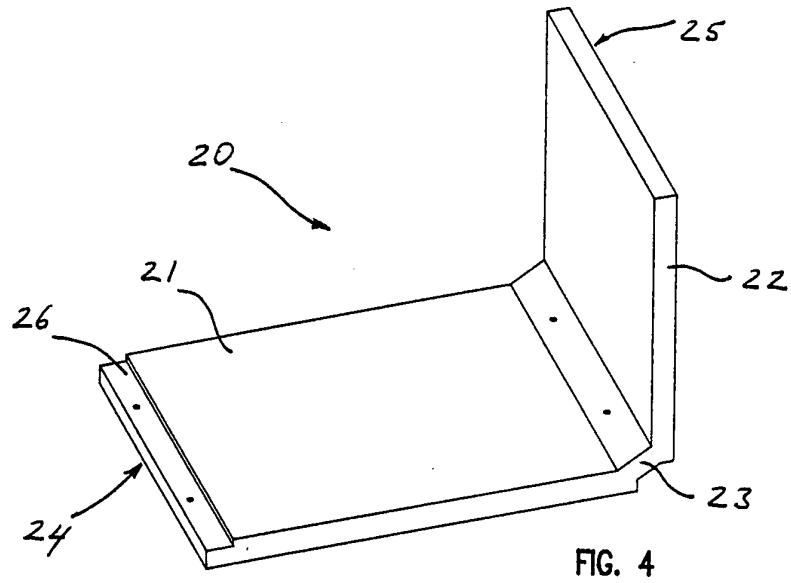
19. A roofed structure as claimed in any one of claims 13 to 17, said roofed structure being constructed in accordance with the method defined in any one of claims 1 to 5.

20. A roofed structure substantially as hereinbefore described with reference to the accompanying drawings.

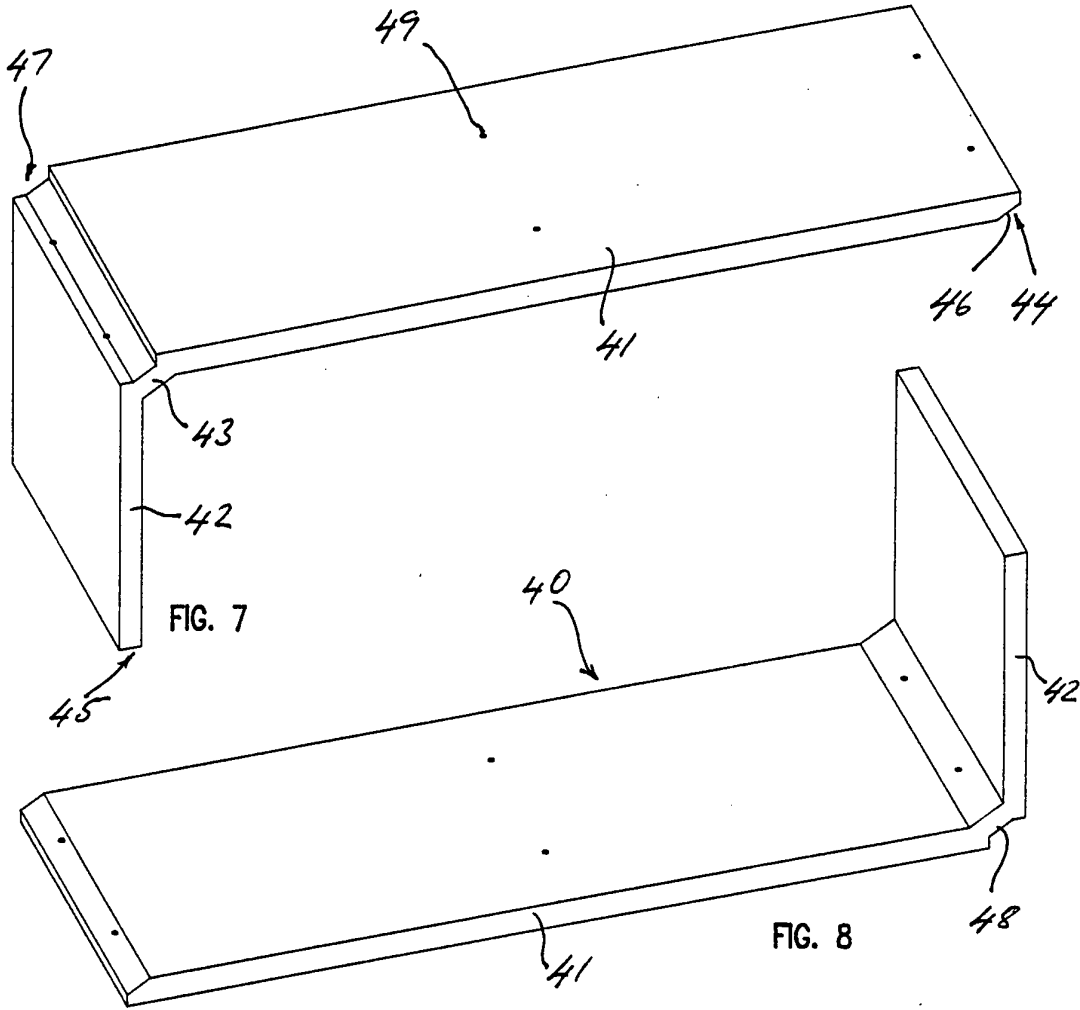
21. A building element substantially as hereinbefore described with reference to the accompanying drawings.

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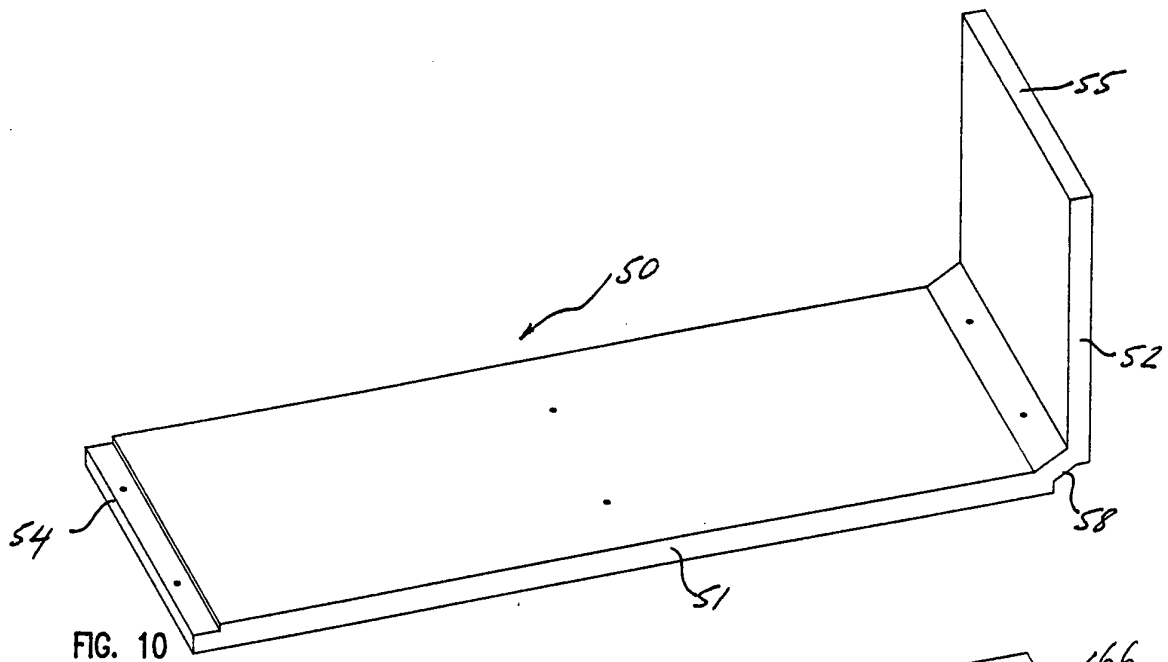


FIG. 10

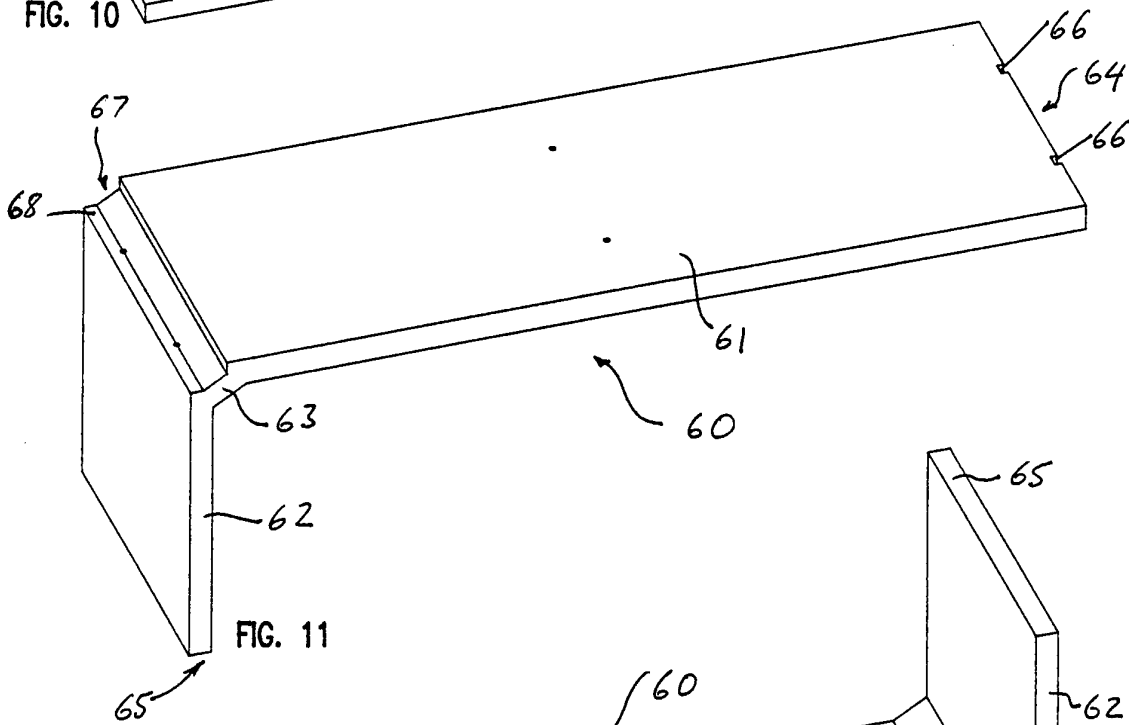


FIG. 11

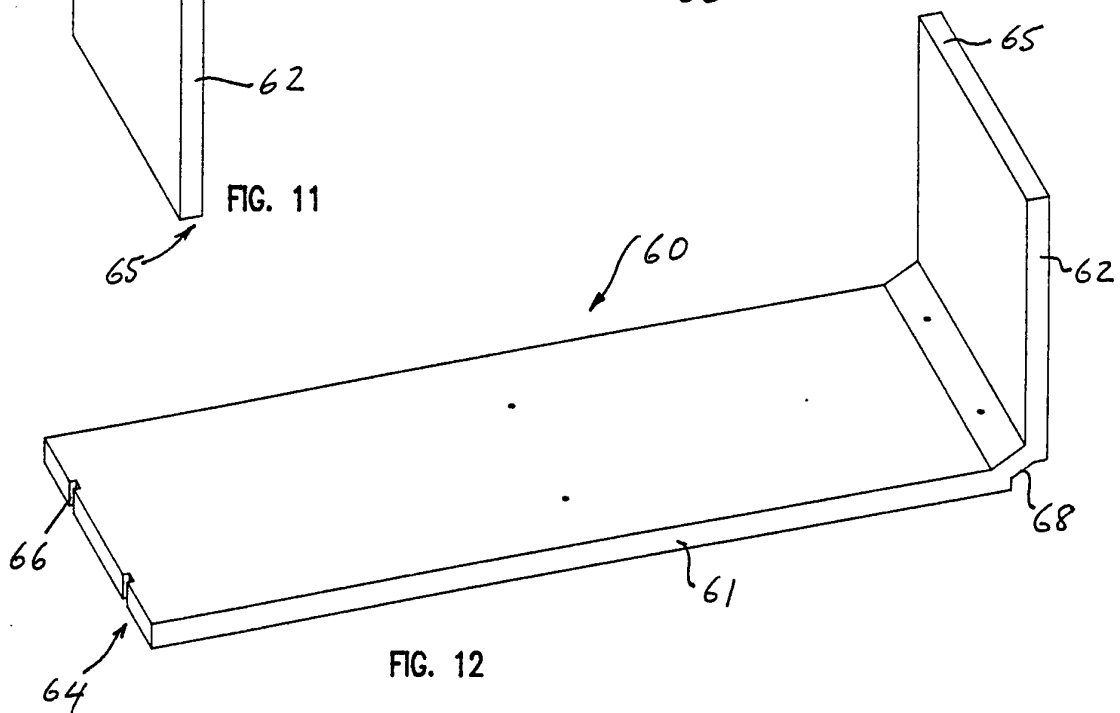


FIG. 12

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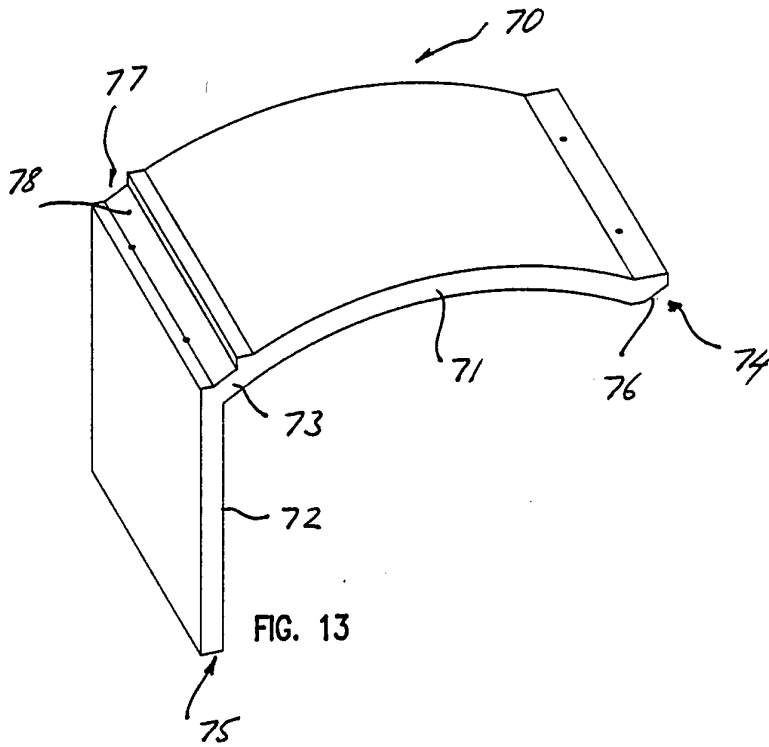


FIG. 13

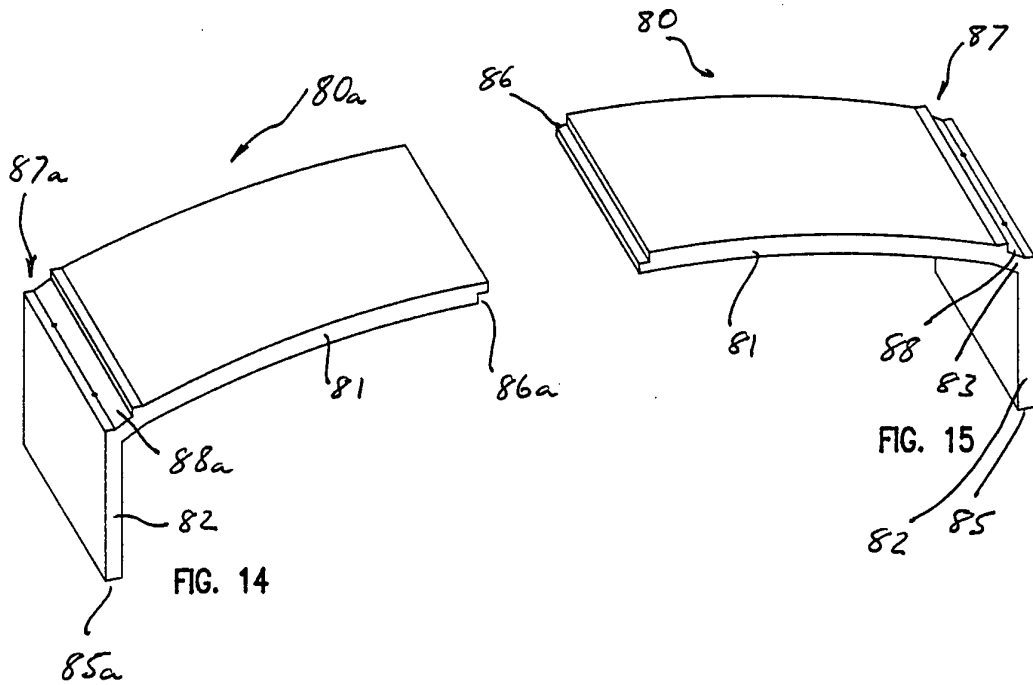


FIG. 14

FIG. 15

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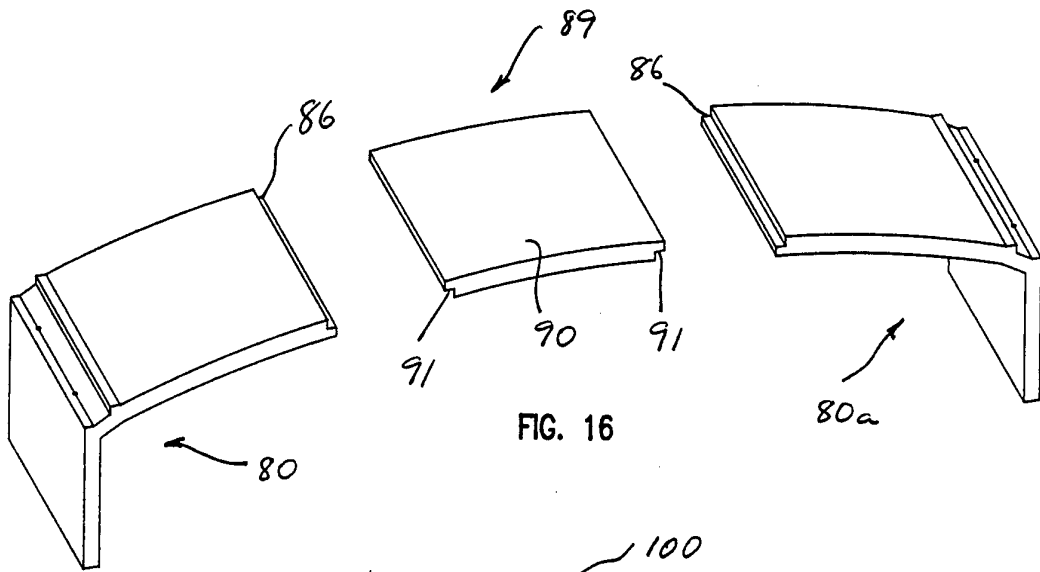


FIG. 16

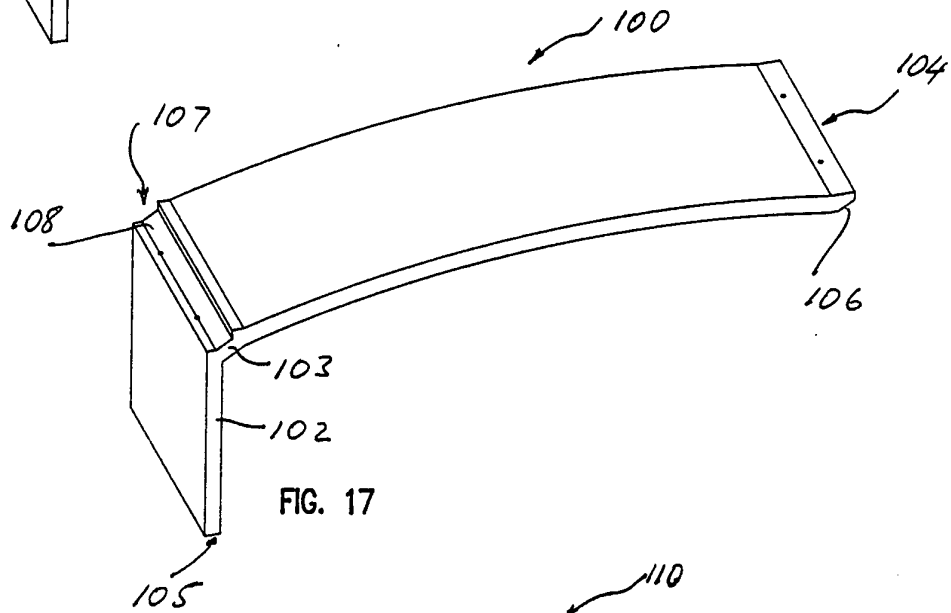


FIG. 17

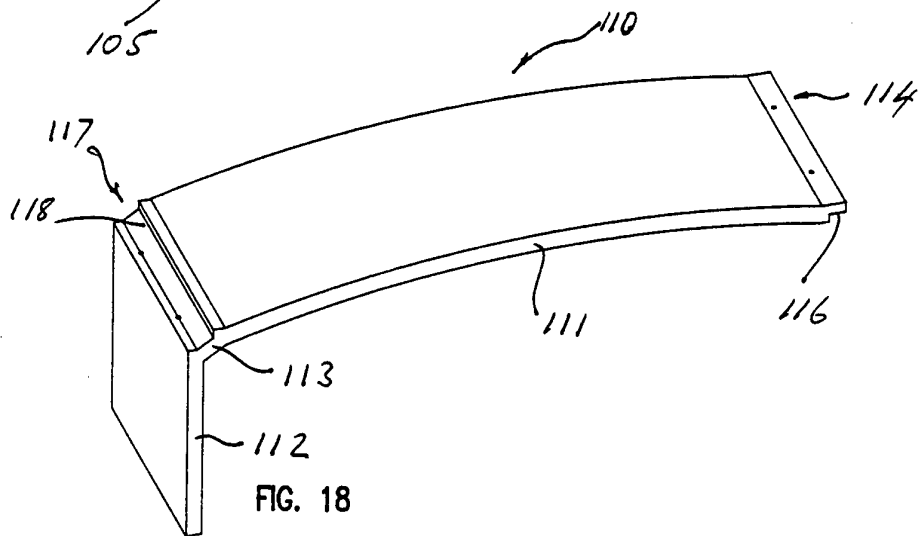


FIG. 18

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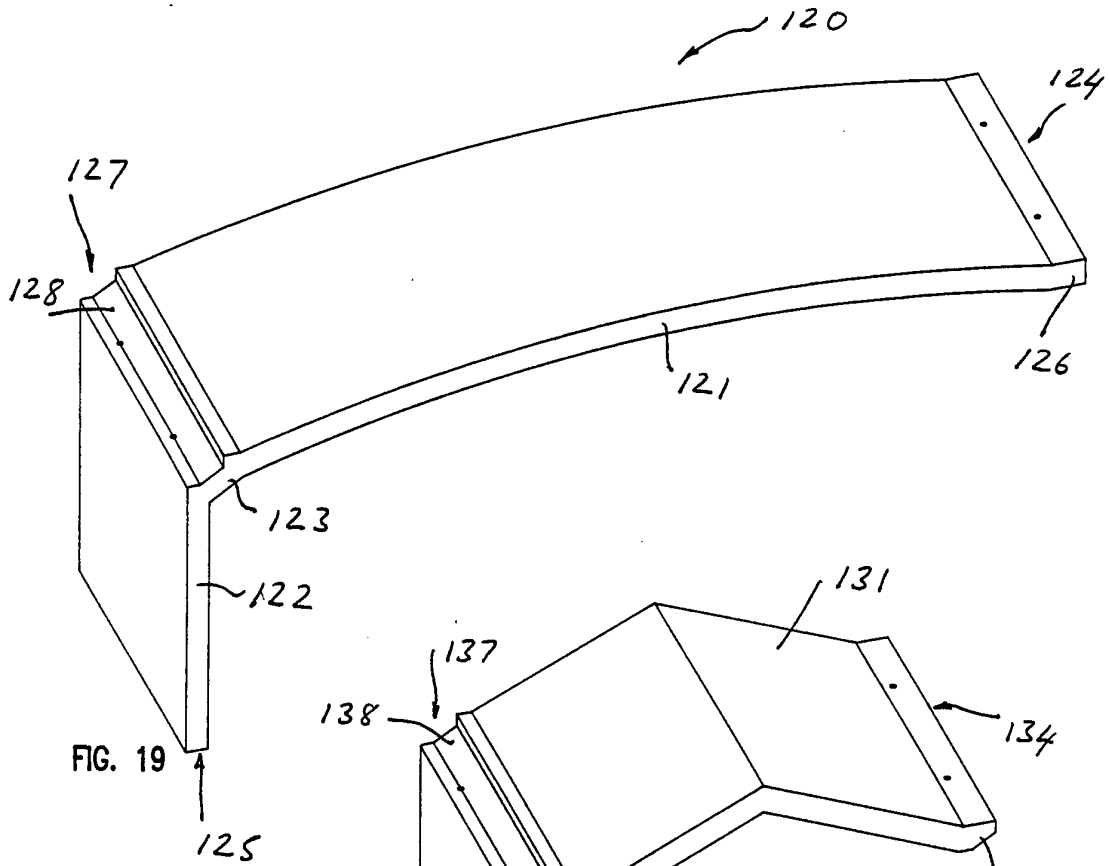


FIG. 19

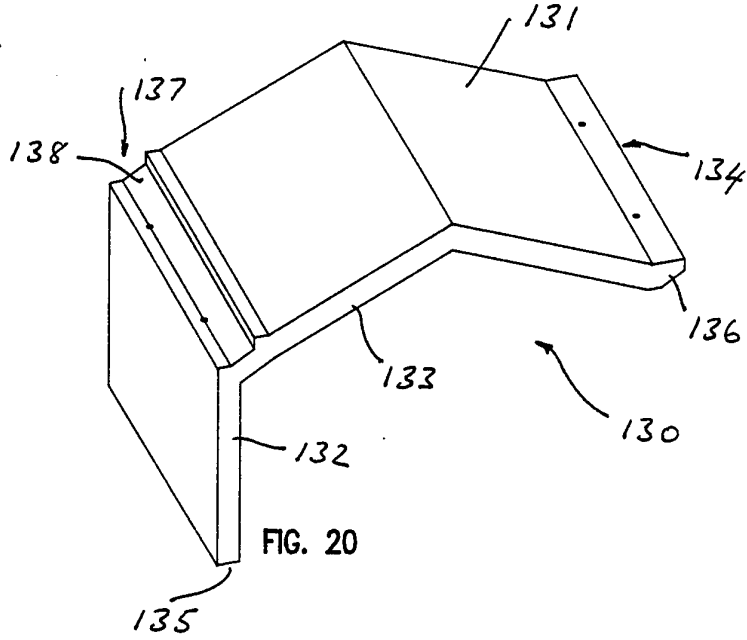


FIG. 20

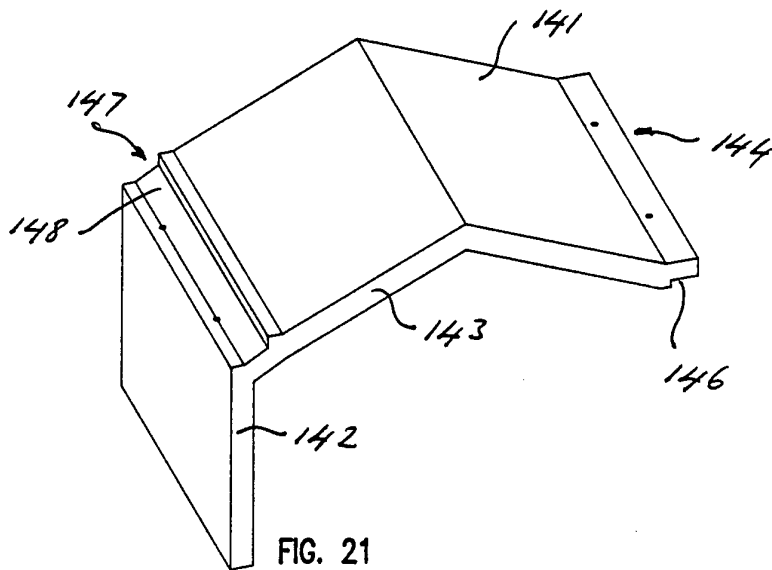
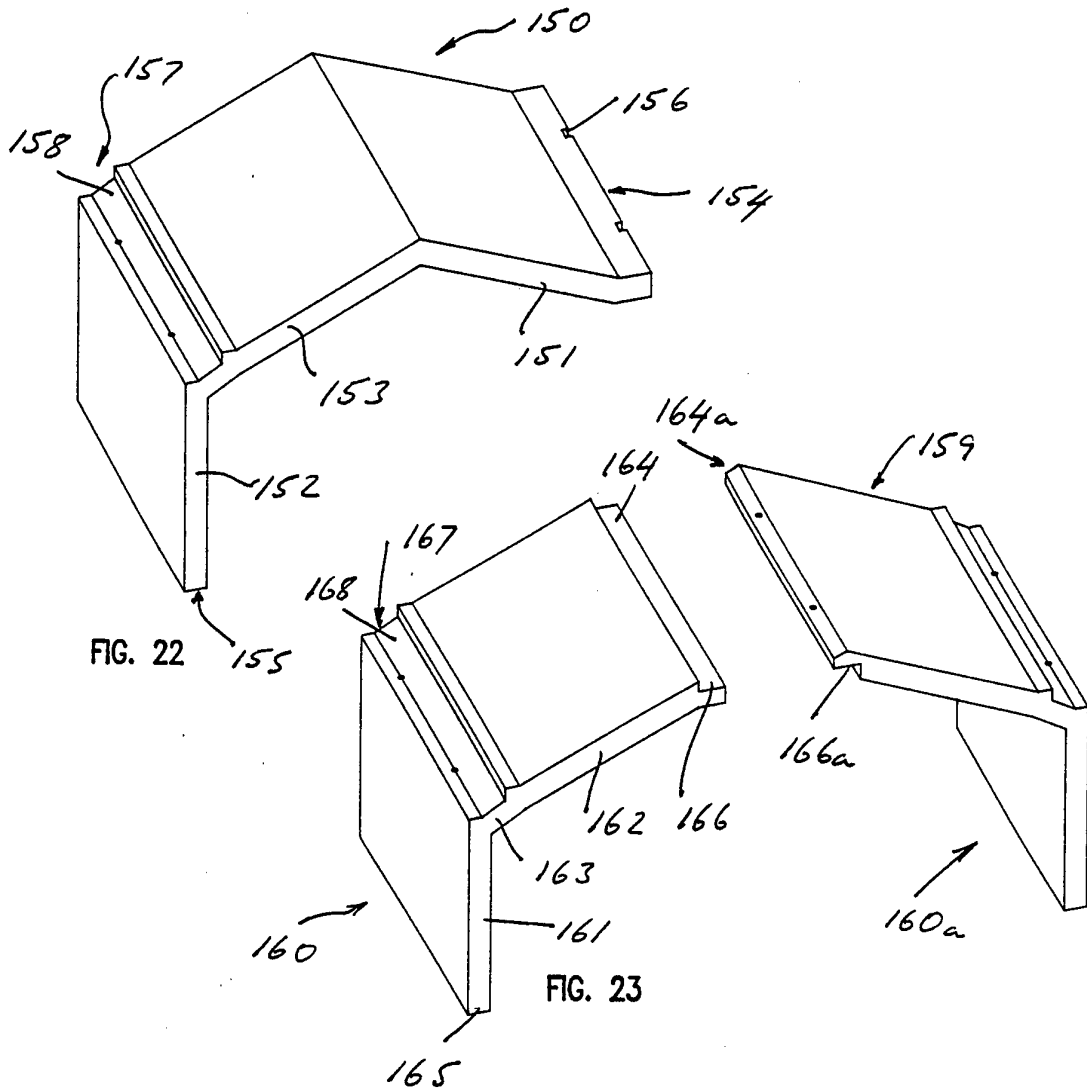


FIG. 21

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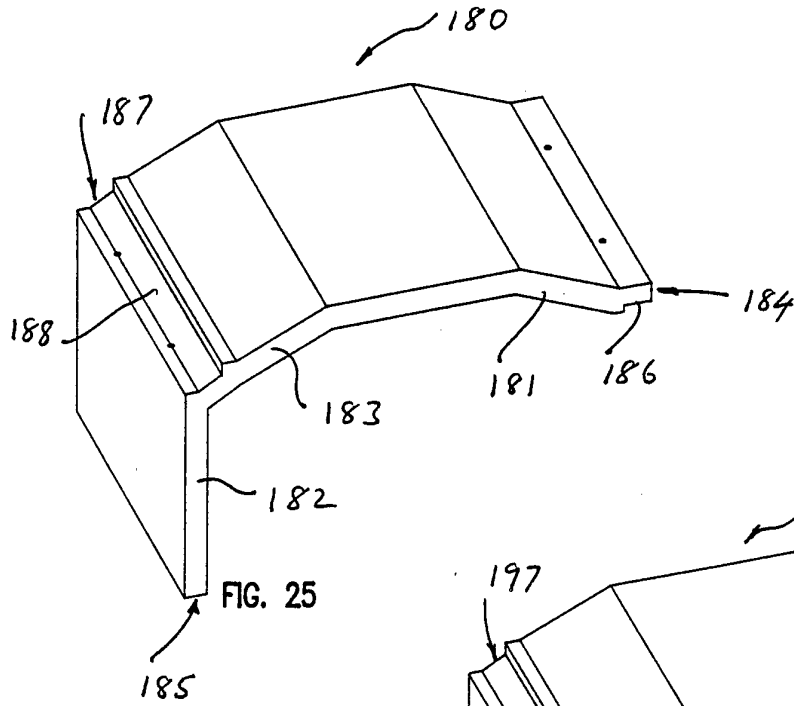


FIG. 25

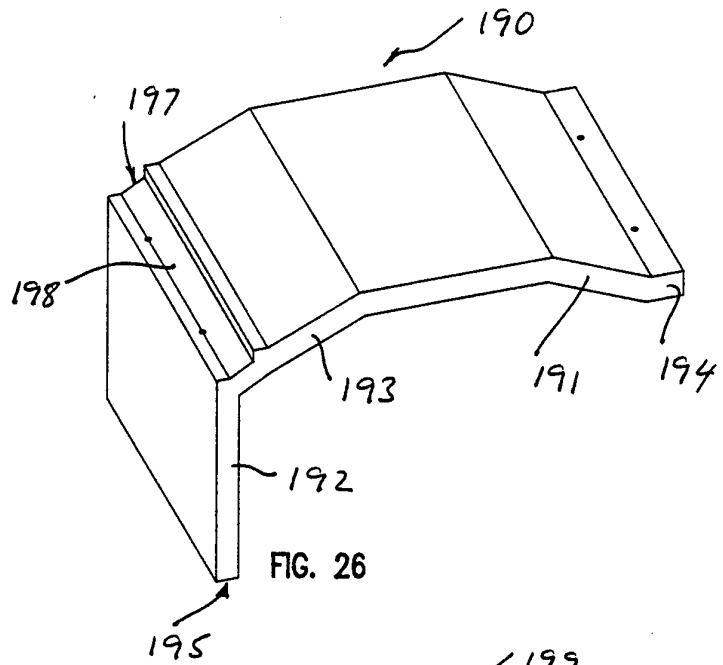


FIG. 26

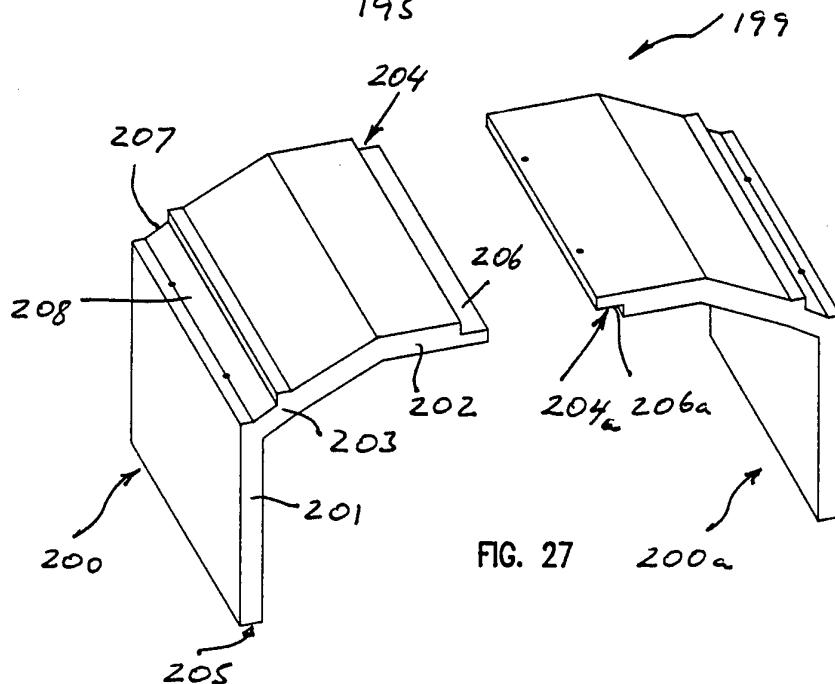


FIG. 27

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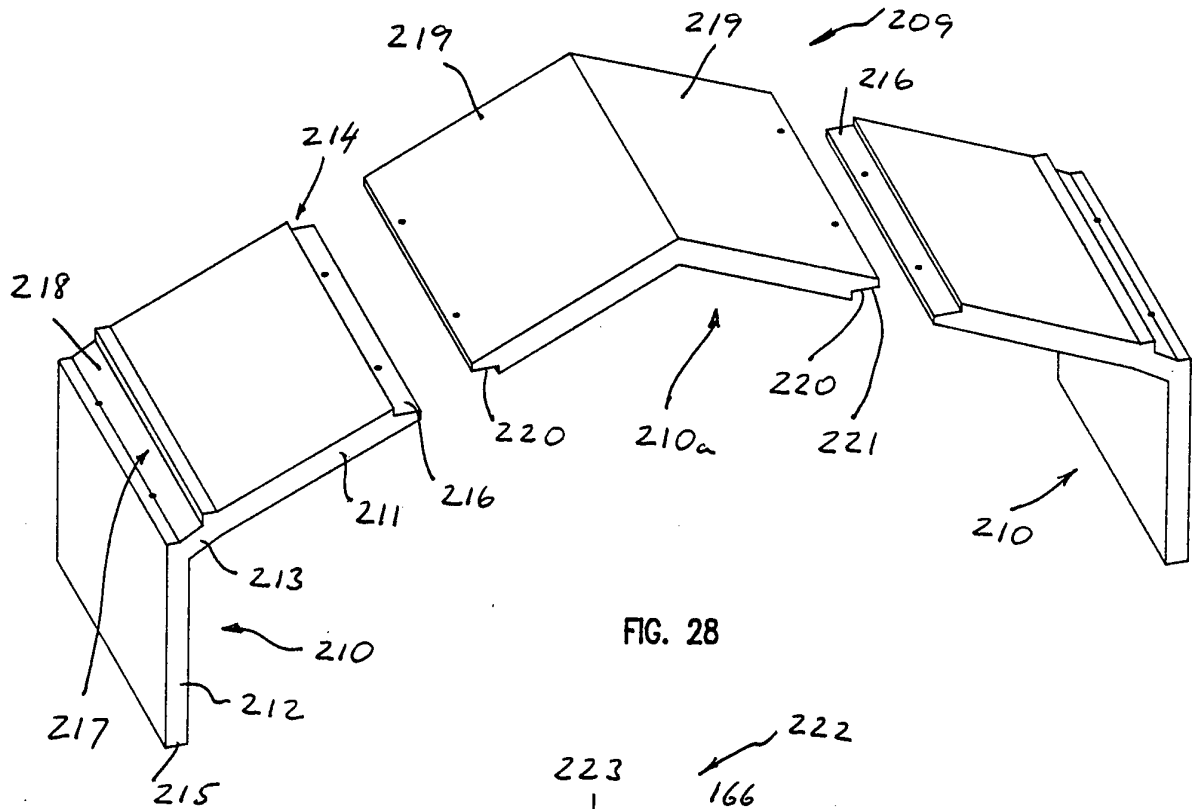


FIG. 28

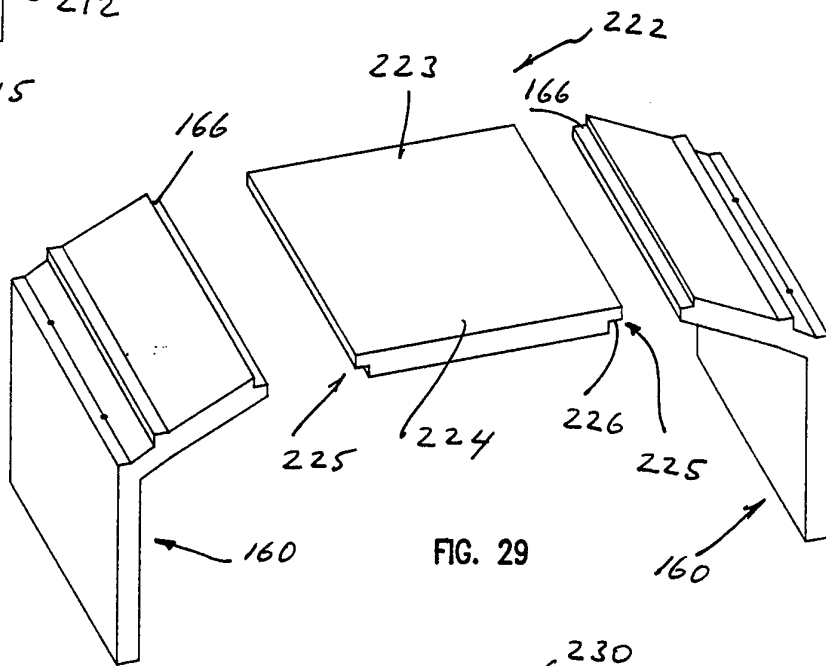


FIG. 29

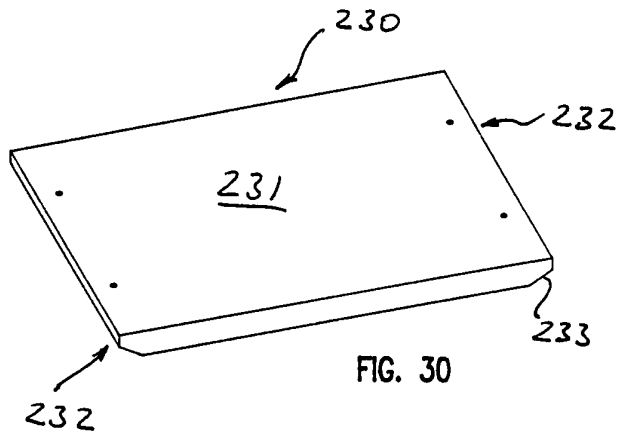


FIG. 30

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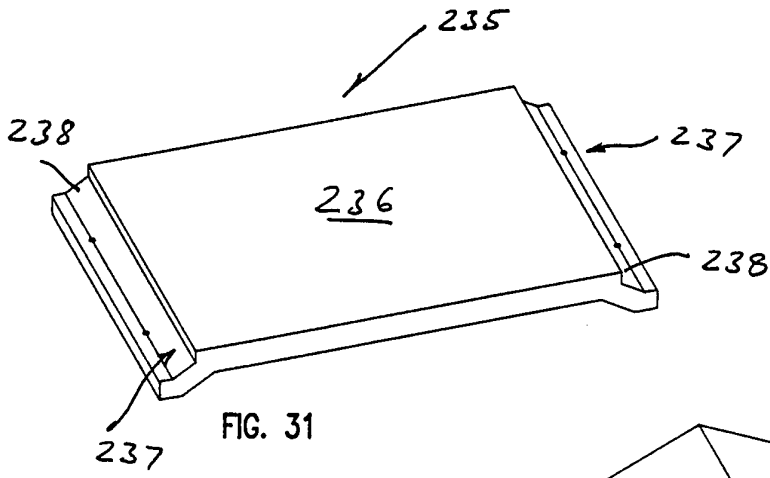


FIG. 31

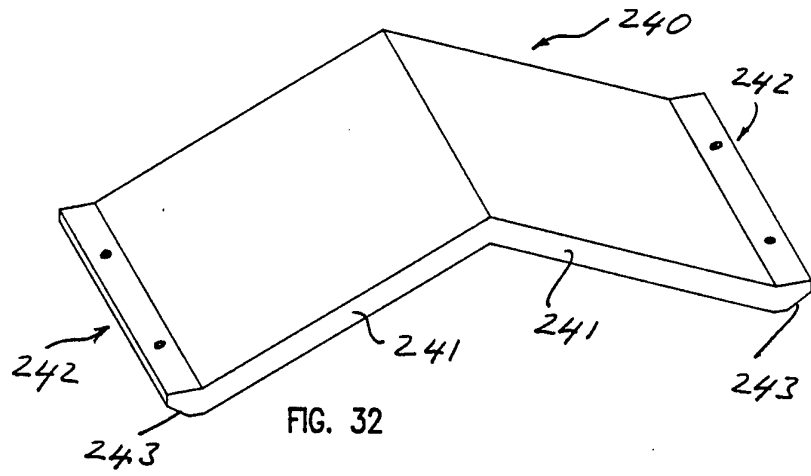


FIG. 32

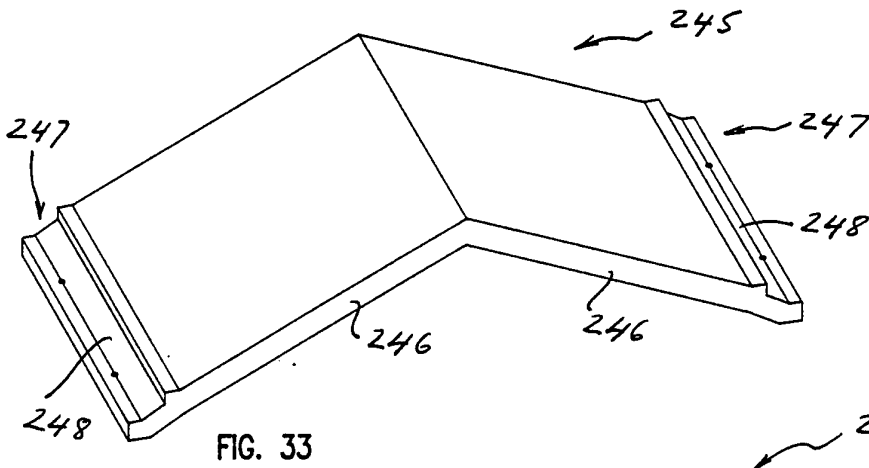


FIG. 33

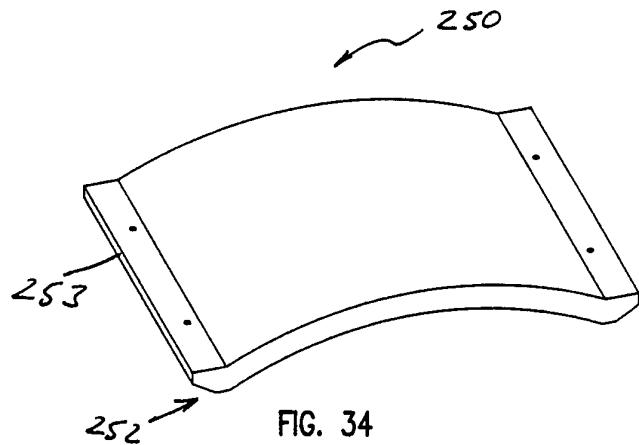


FIG. 34

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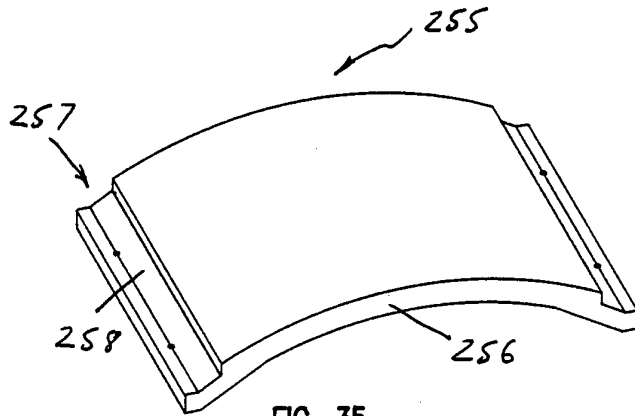


FIG. 35

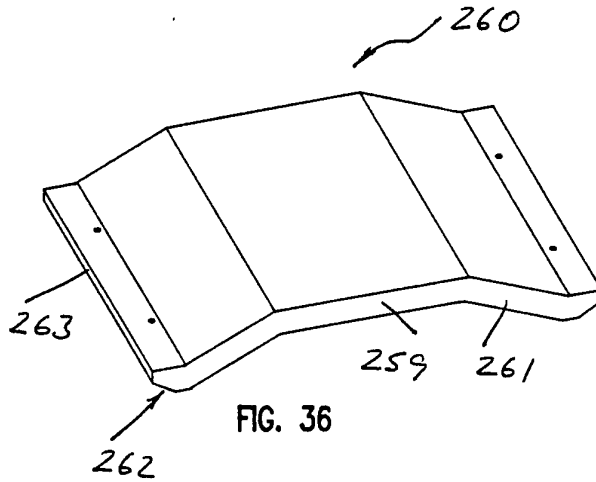


FIG. 36

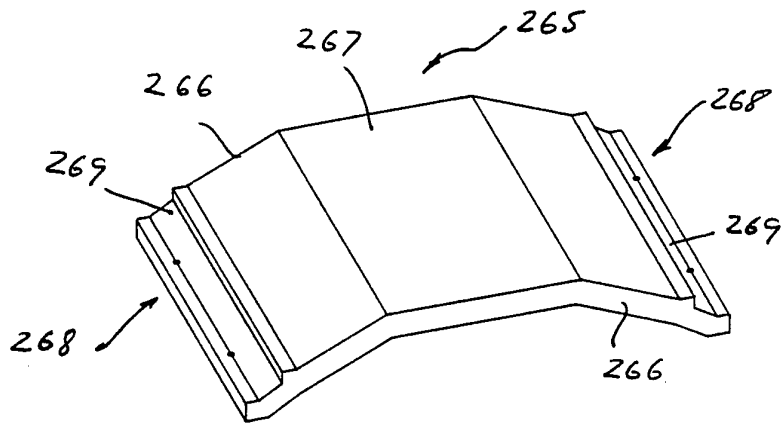
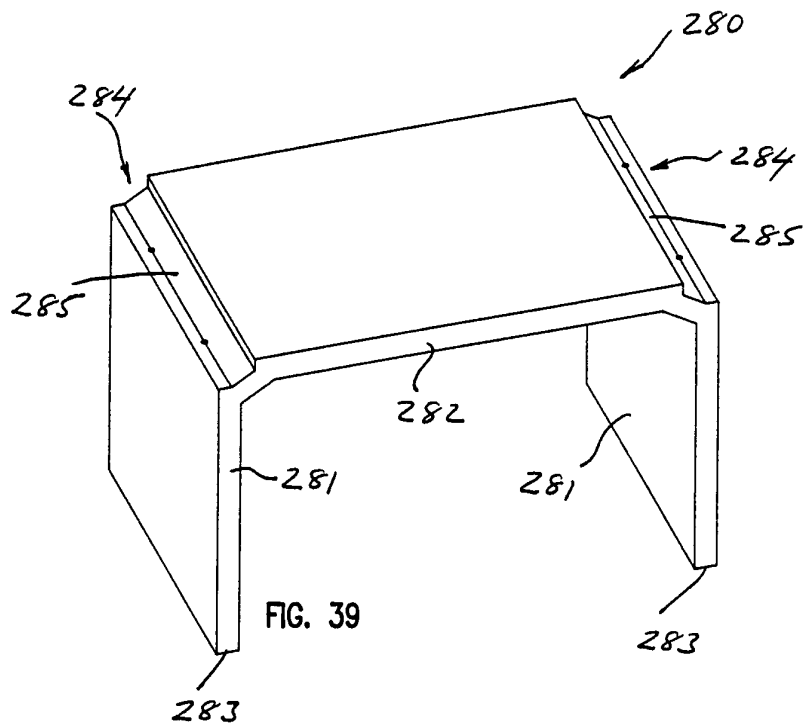
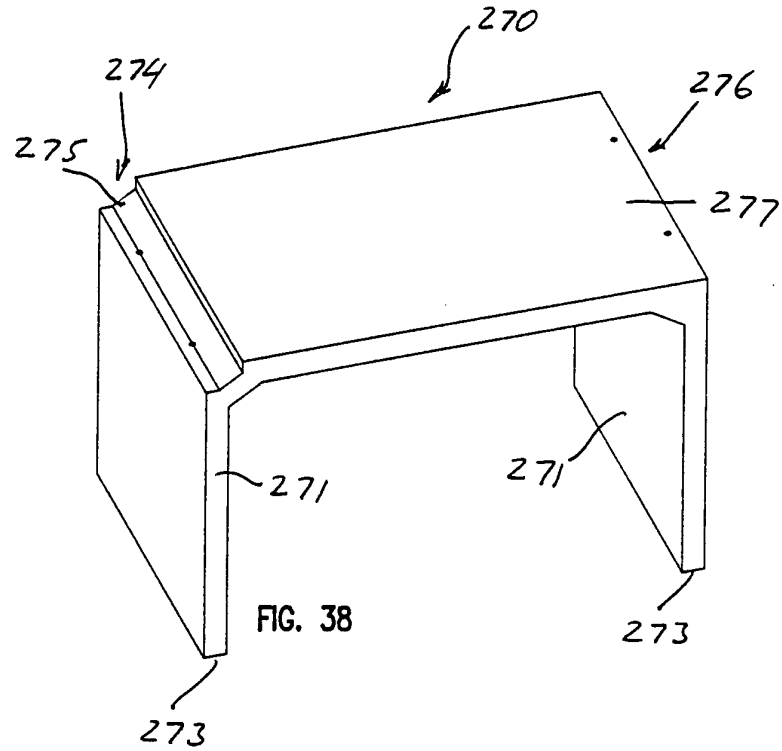
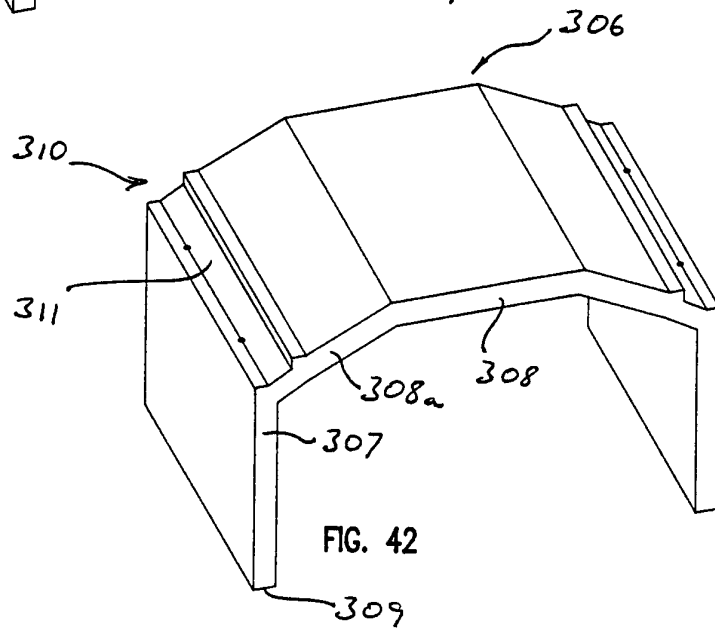
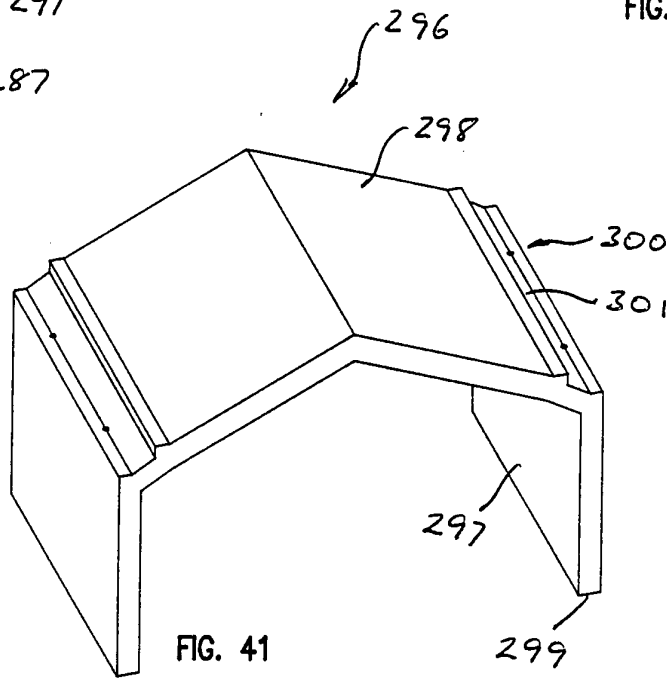
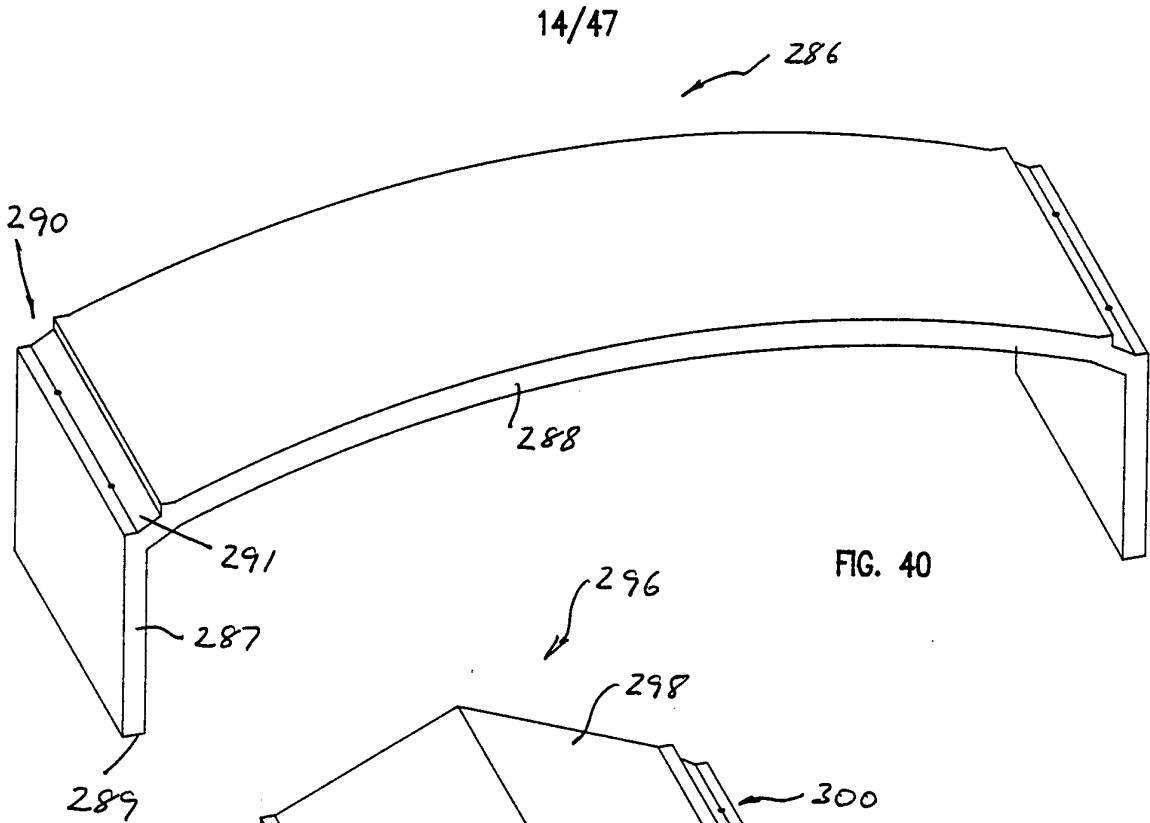


FIG. 37





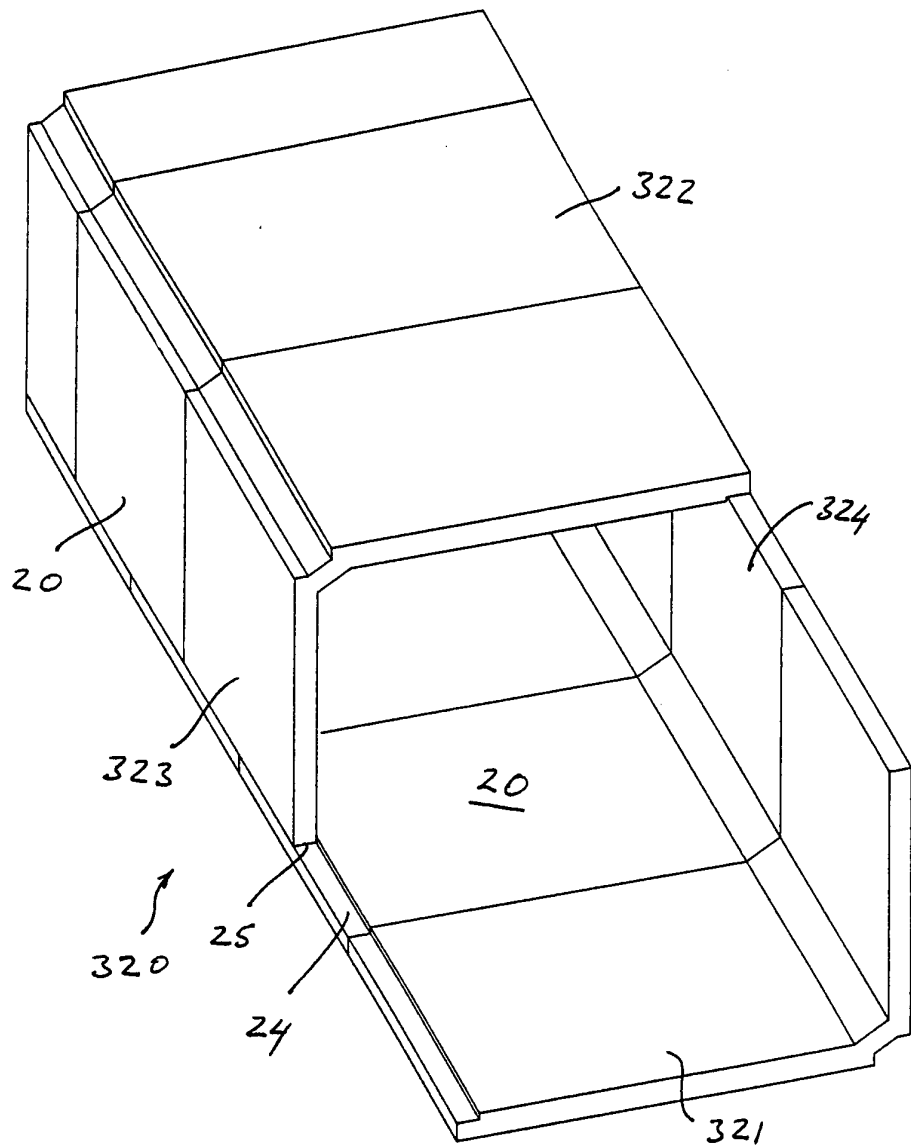


FIG. 43

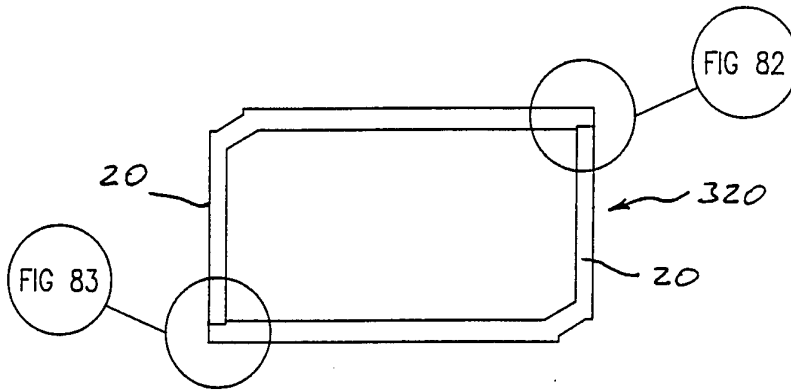


FIG. 44

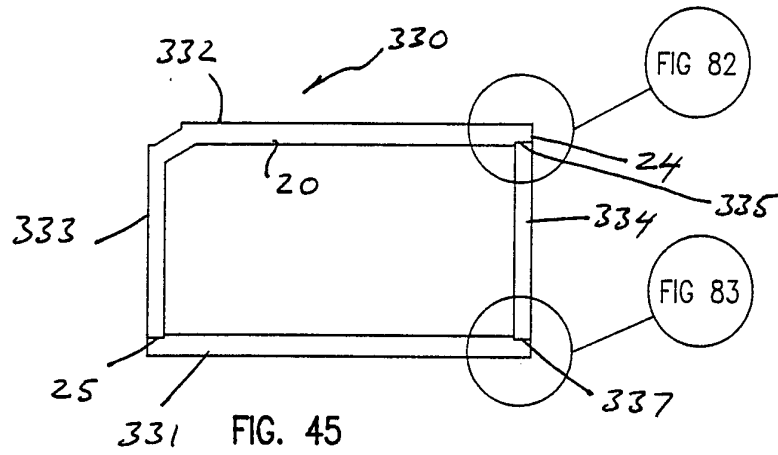


FIG. 45

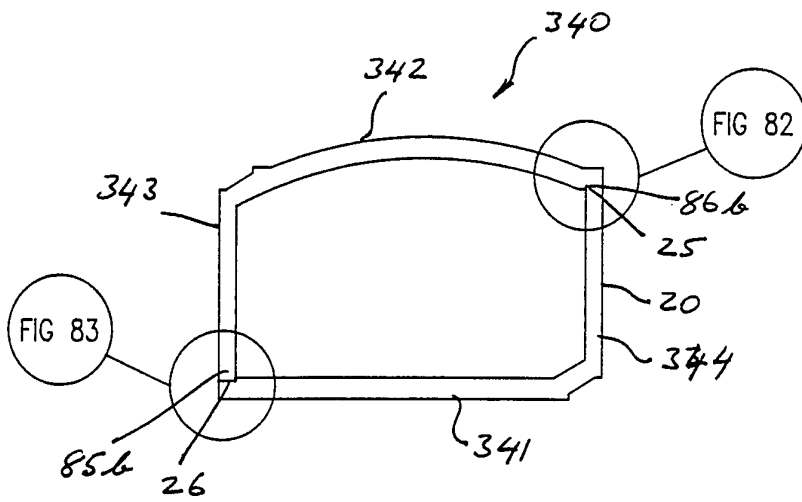
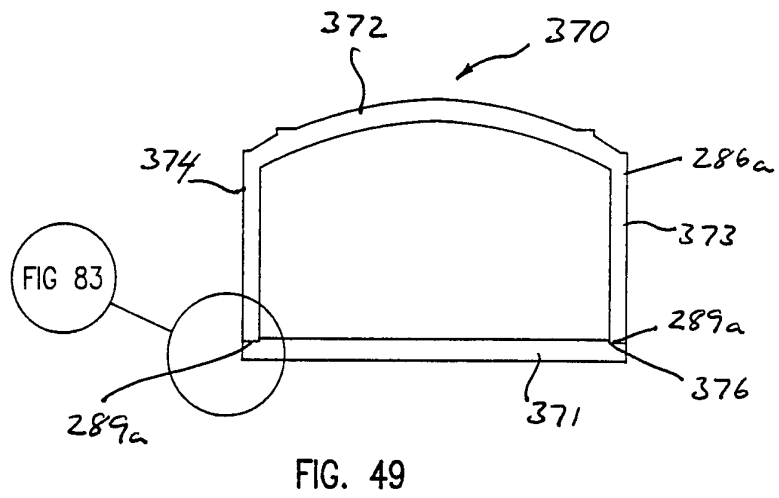
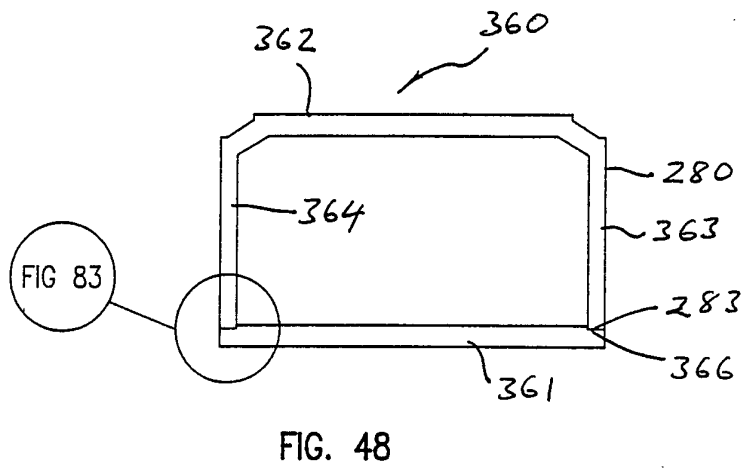
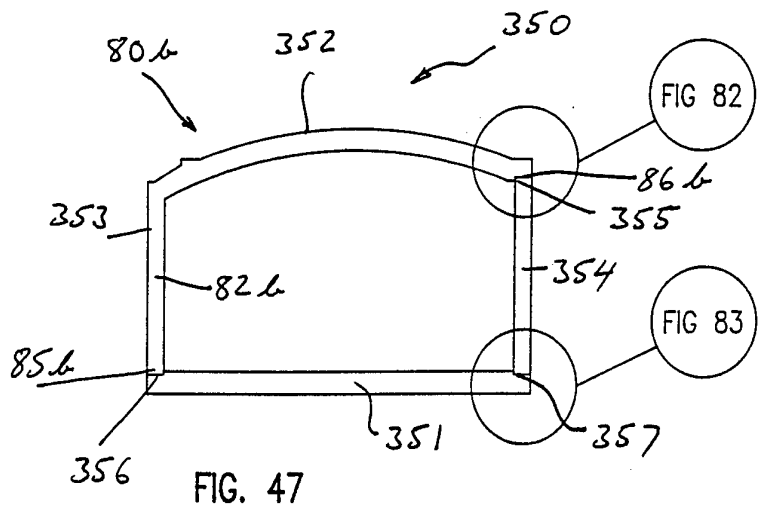


FIG. 46



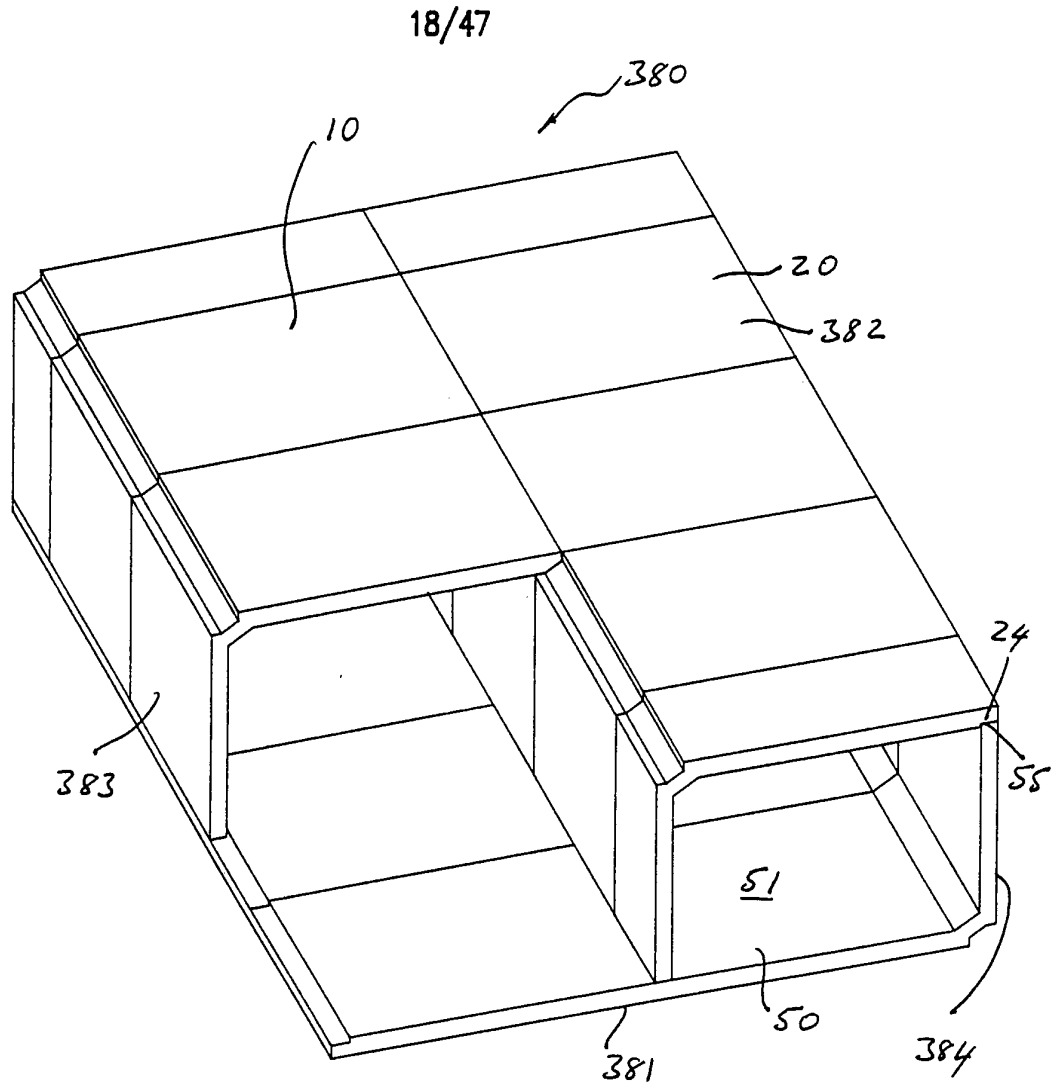


FIG. 50

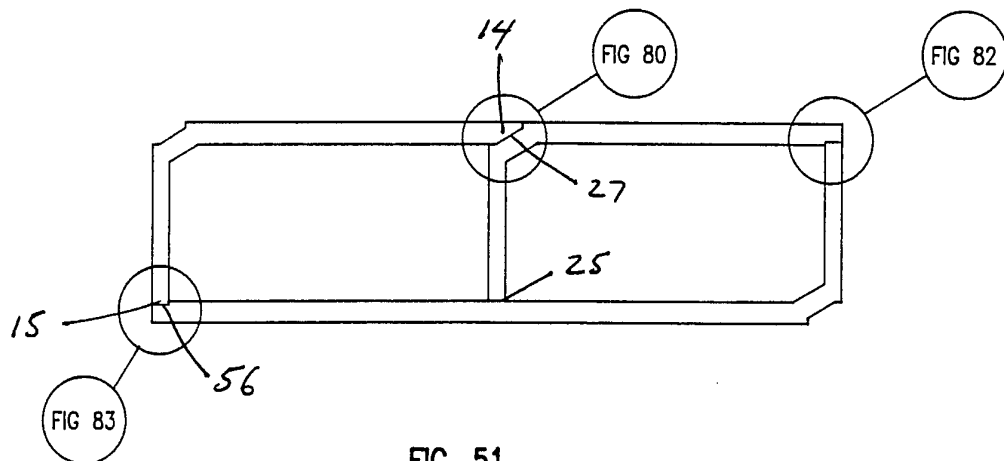
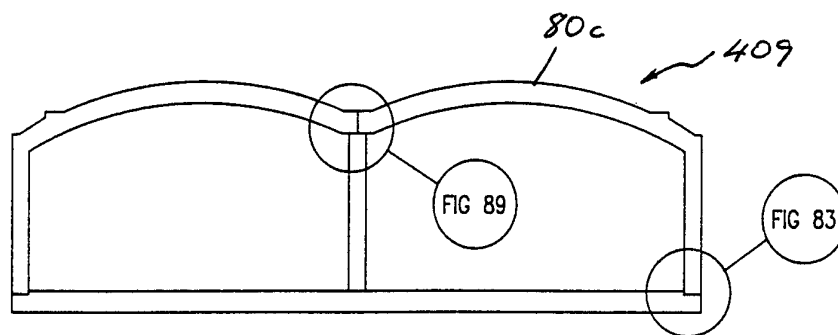
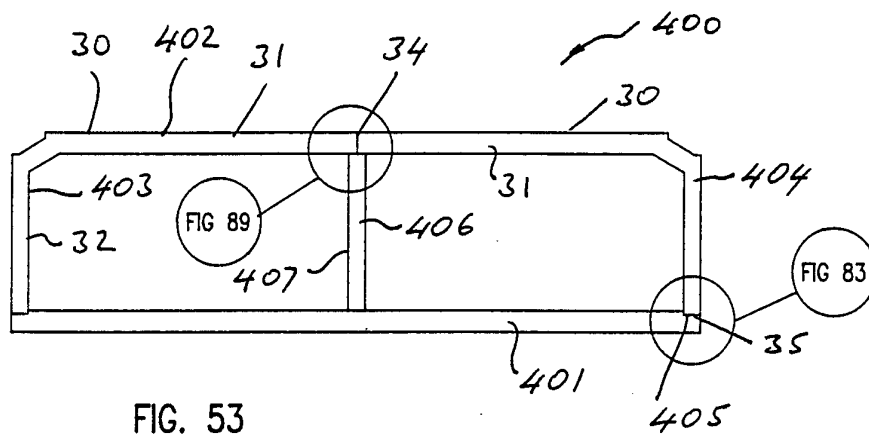
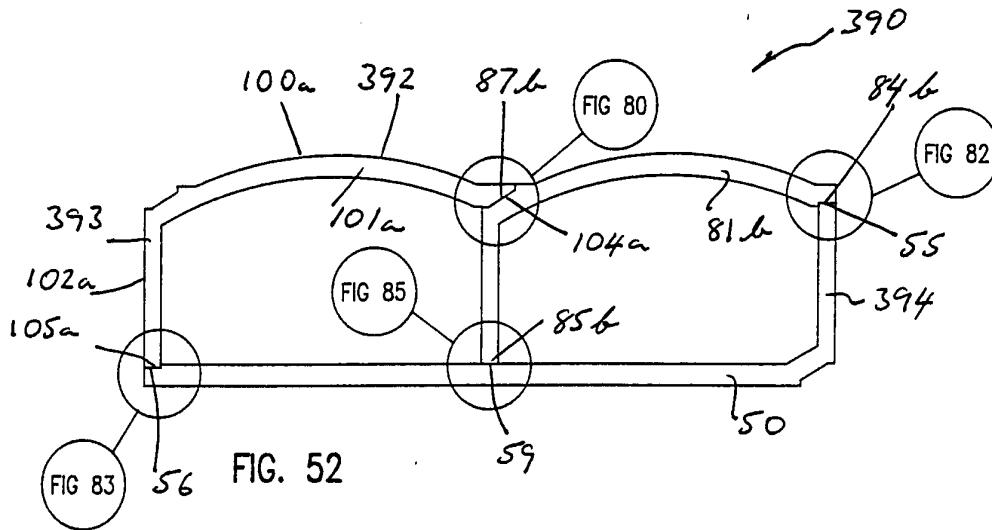


FIG. 51



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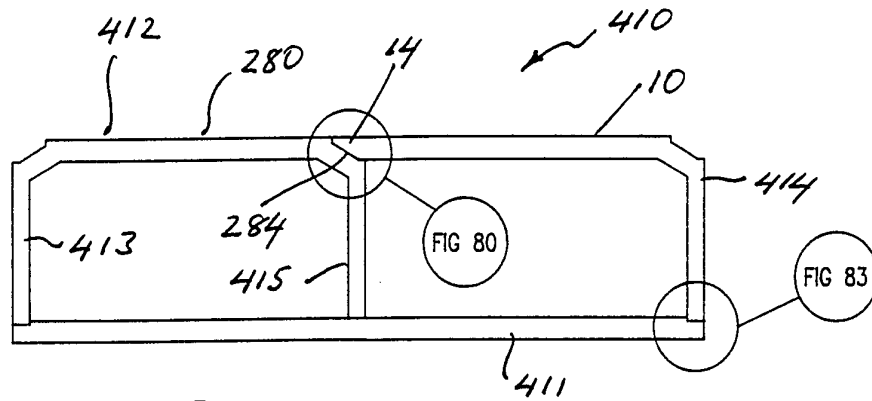


FIG. 55

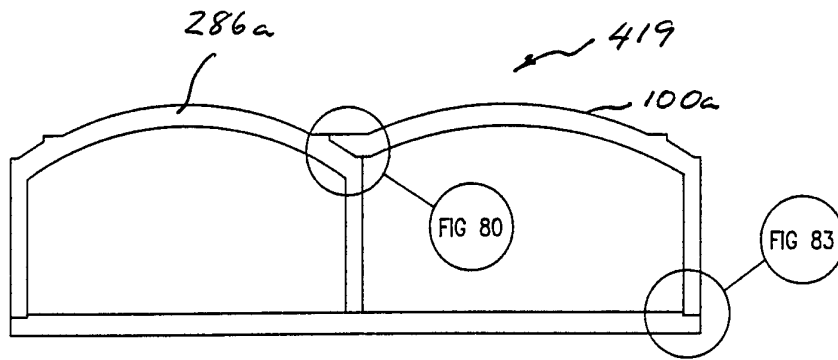


FIG. 56

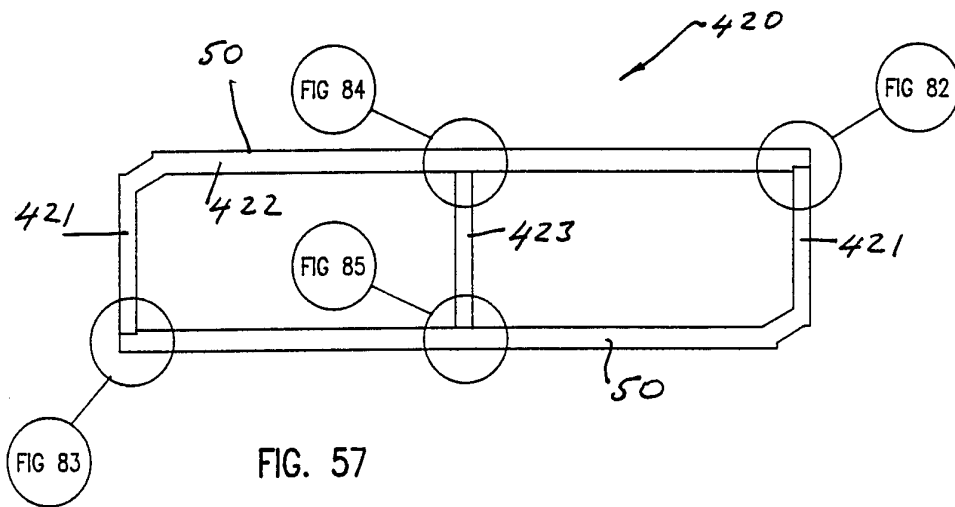


FIG. 57

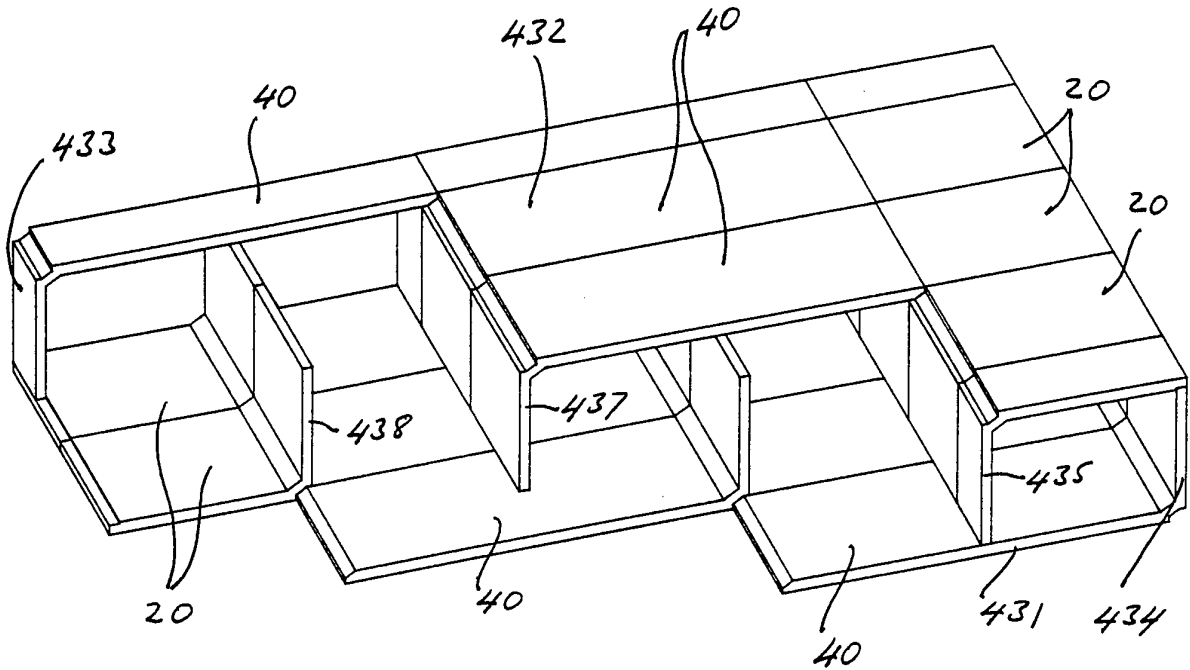


FIG. 58

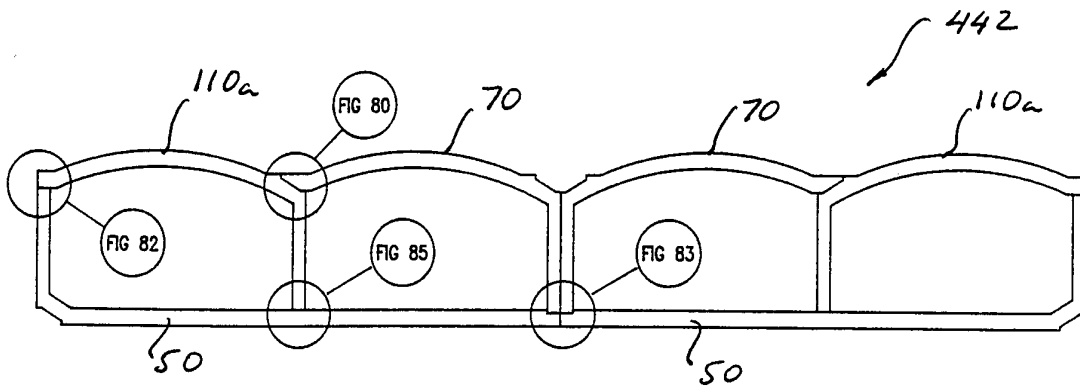


FIG. 62

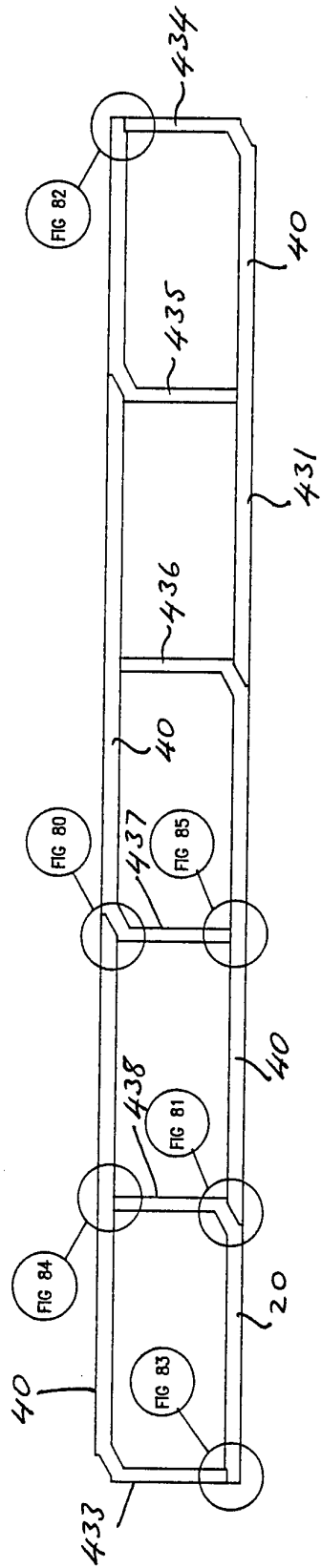


FIG. 59

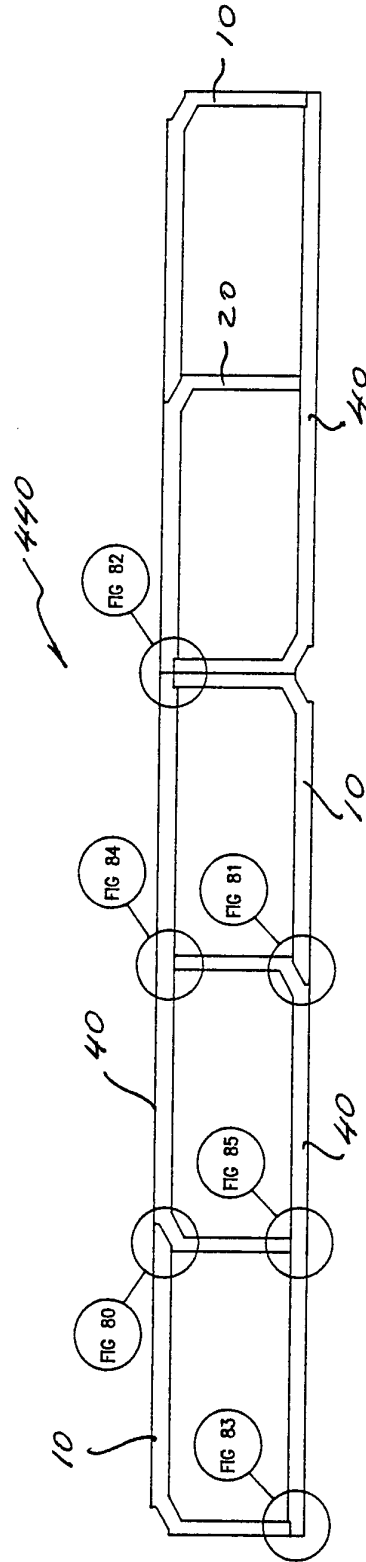


FIG. 60

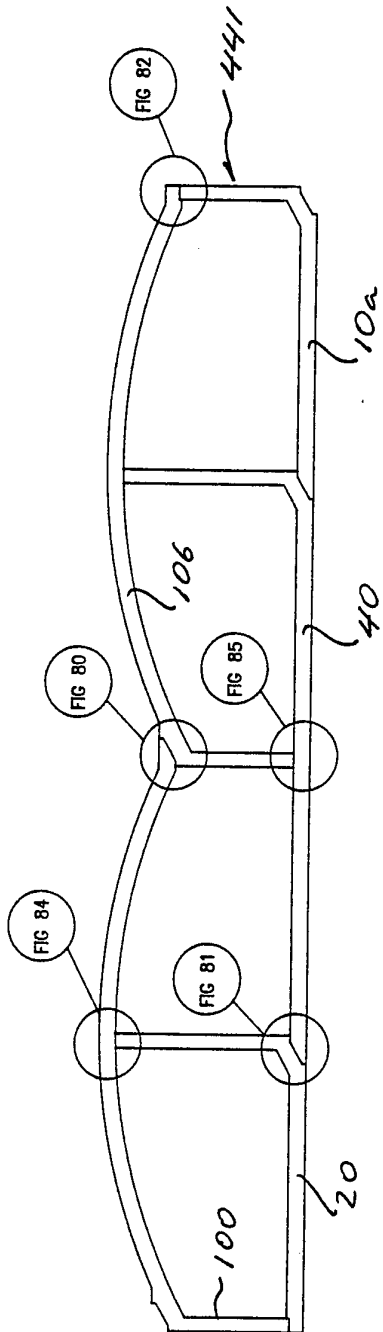


FIG. 61

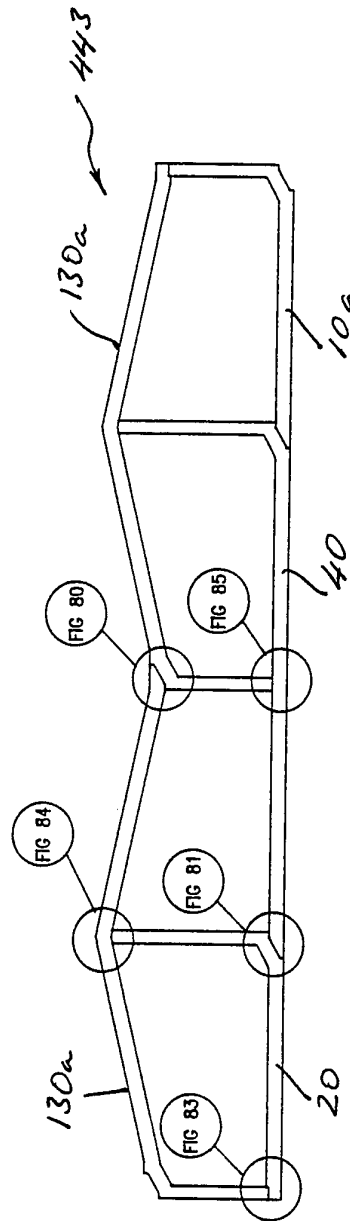


FIG. 63

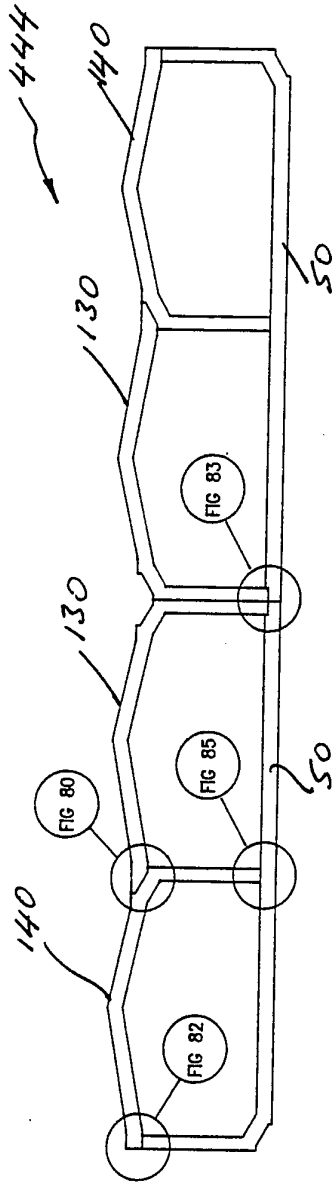


FIG. 64

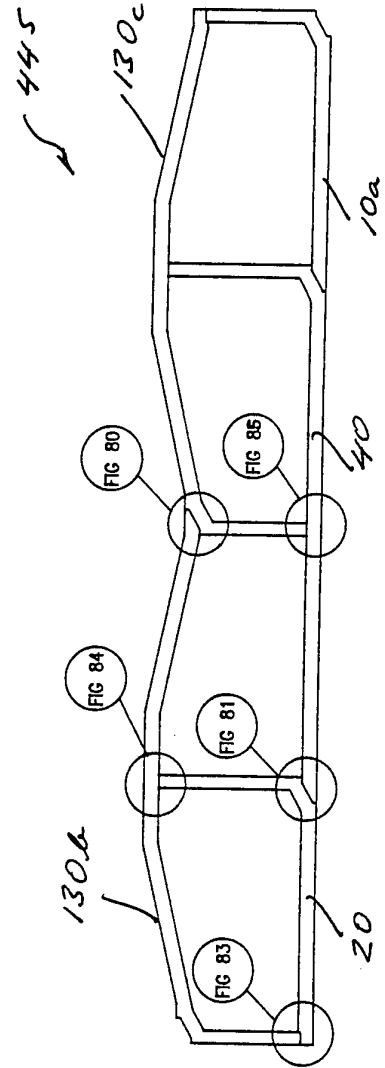


FIG. 65

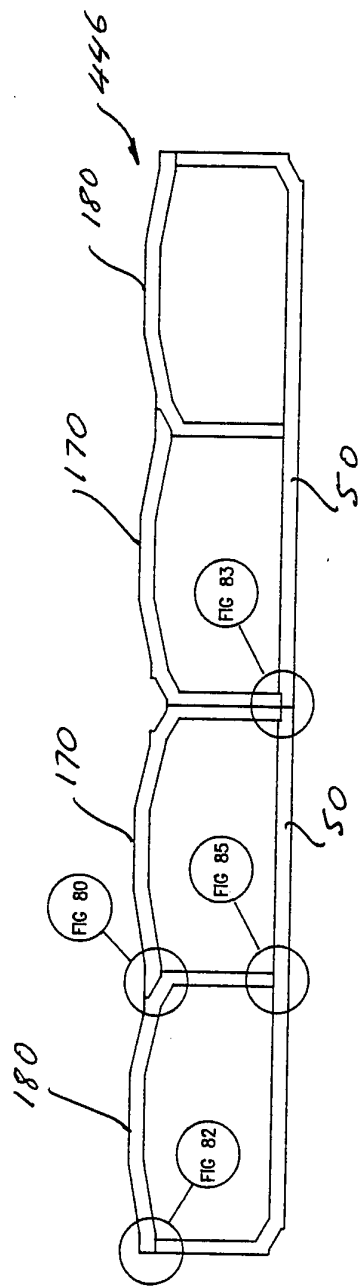


FIG. 66

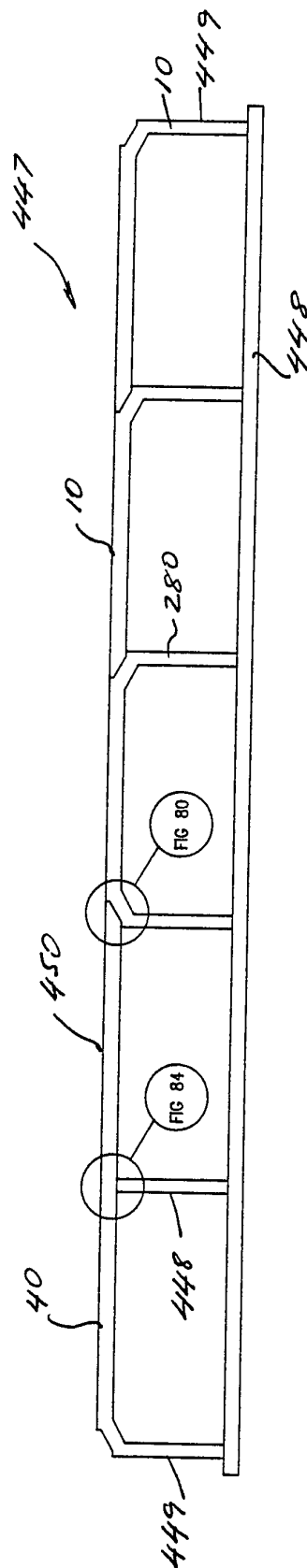


FIG. 67

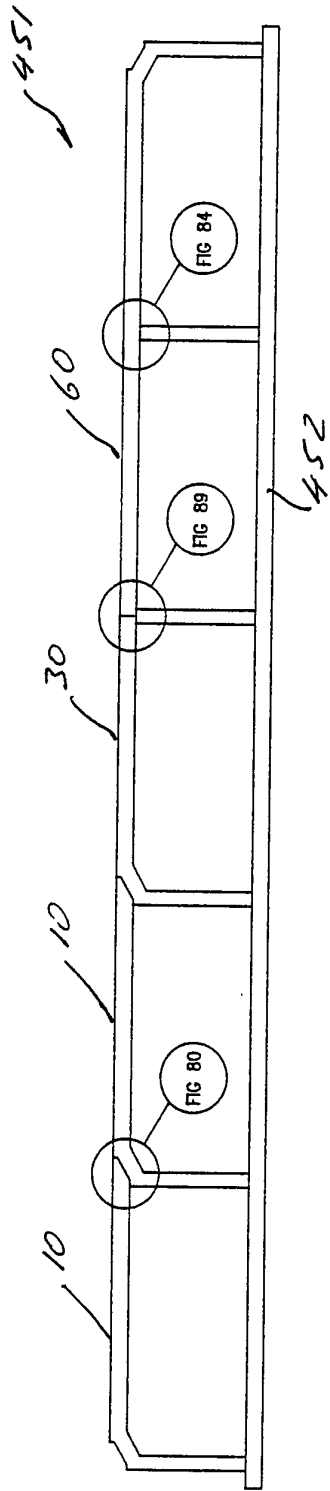


FIG. 68

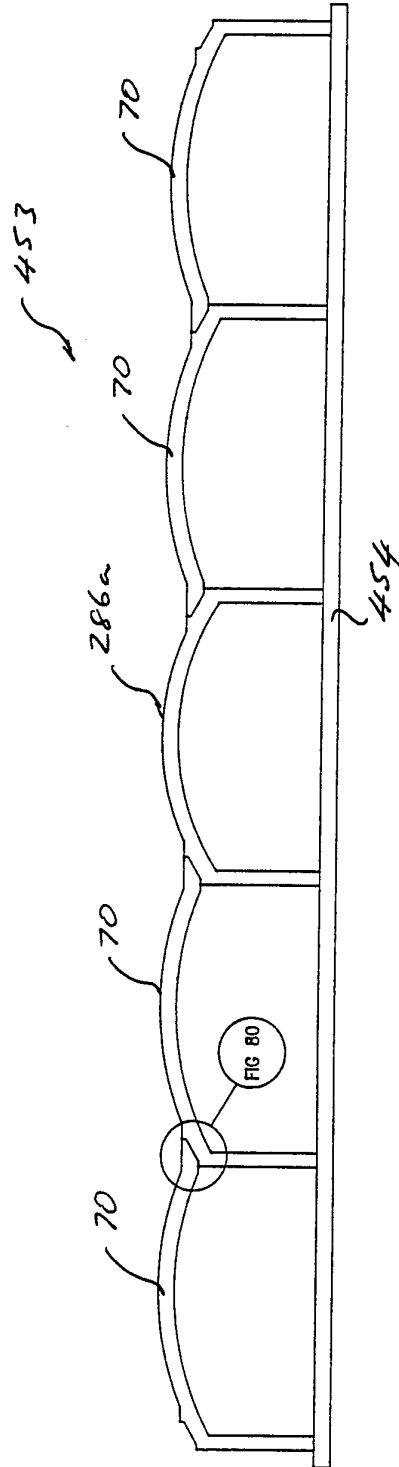


FIG. 69

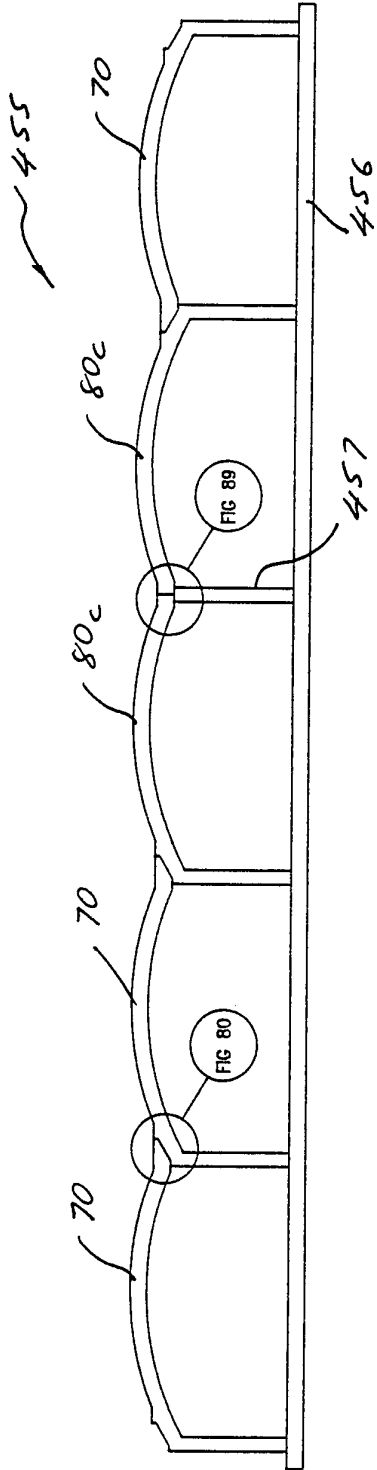


FIG. 70

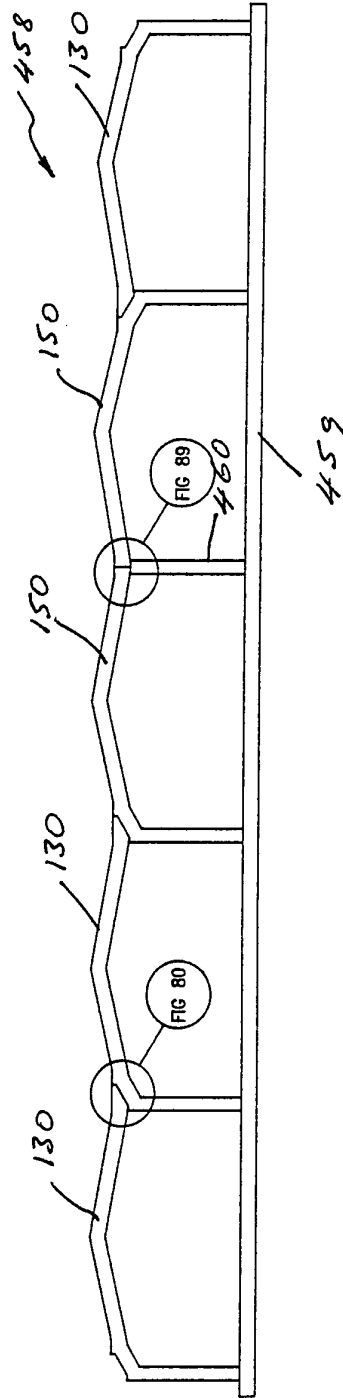


FIG. 71

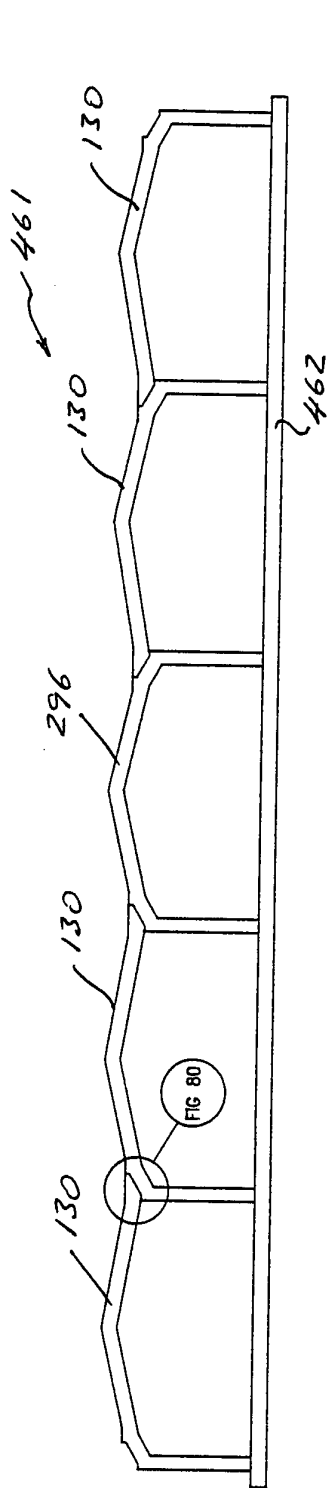


FIG. 72

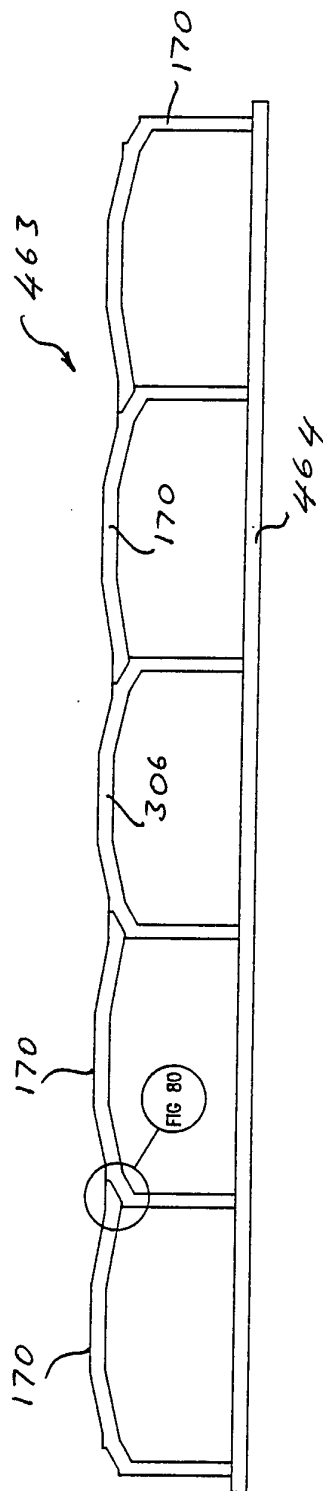


FIG. 73

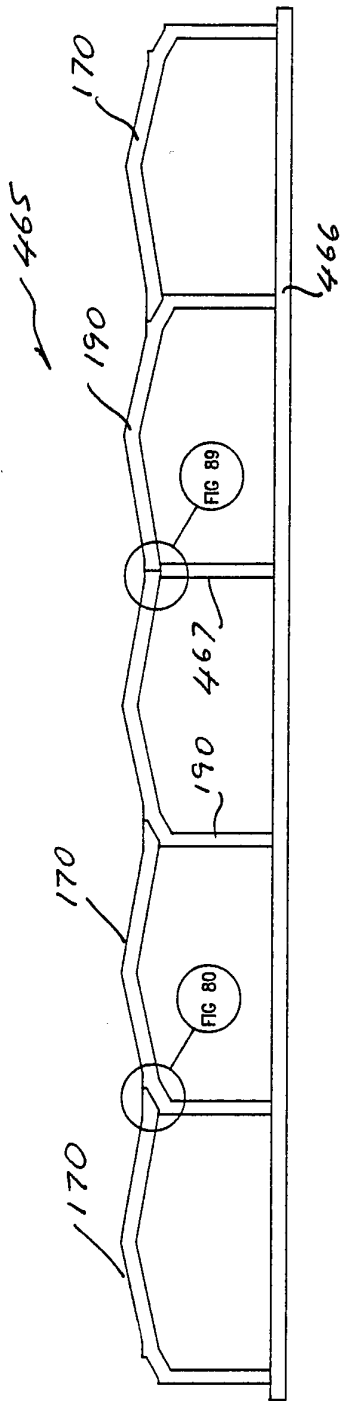


FIG. 74

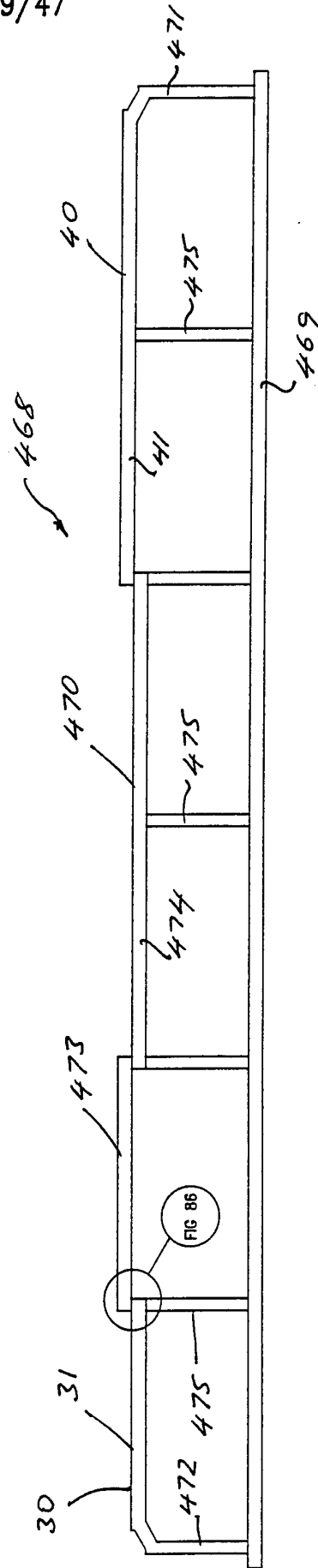


FIG. 75

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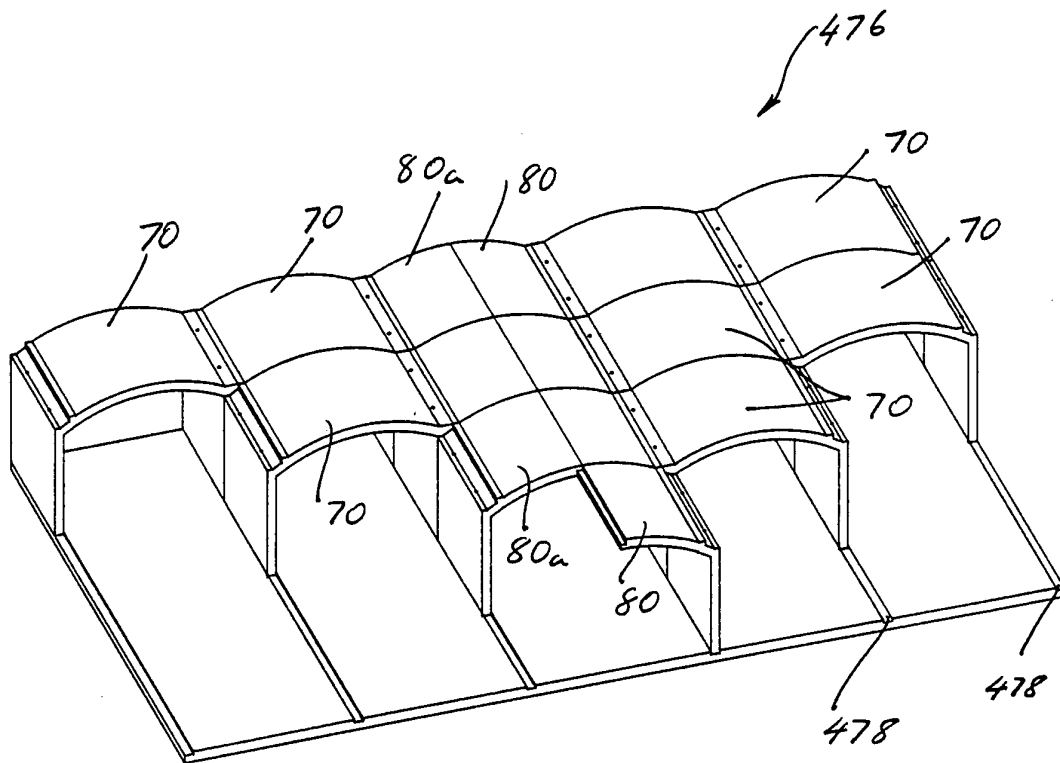


FIG. 76

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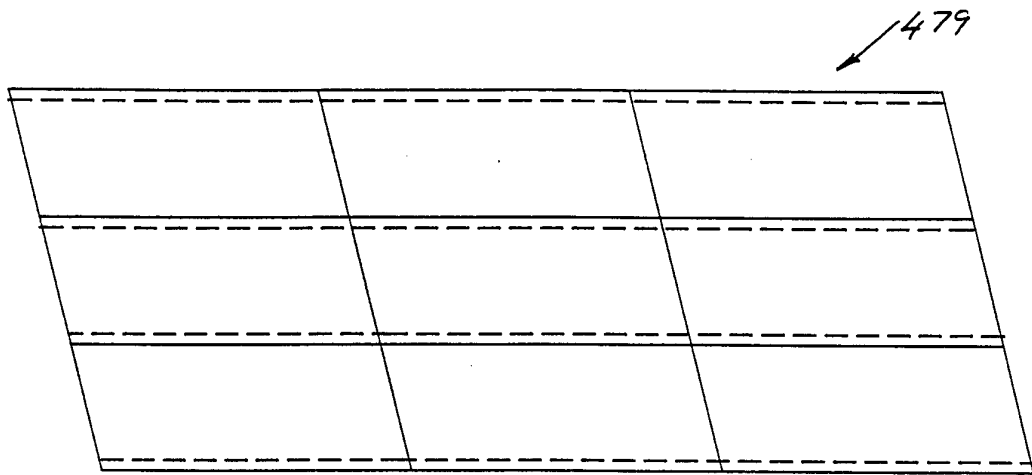


FIG. 77

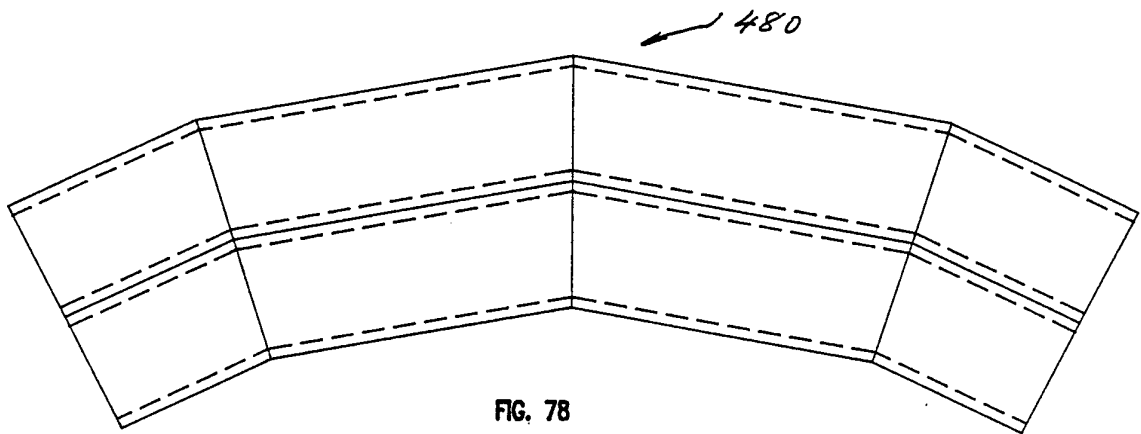


FIG. 78

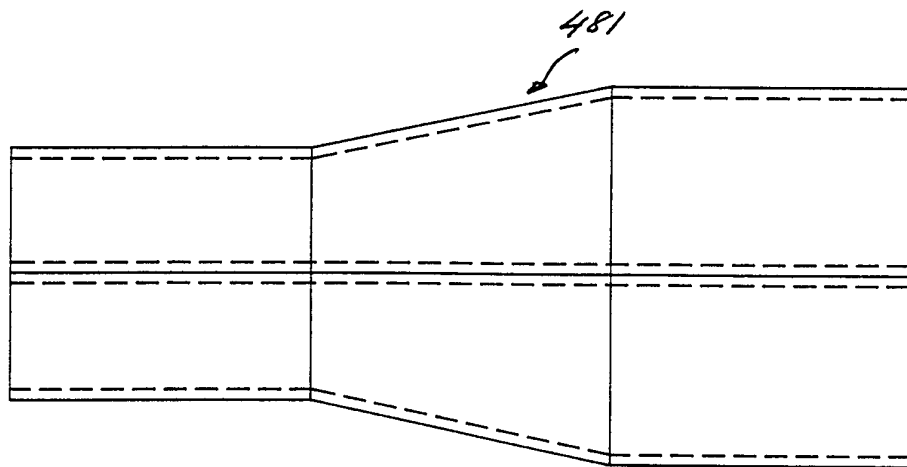


FIG. 79

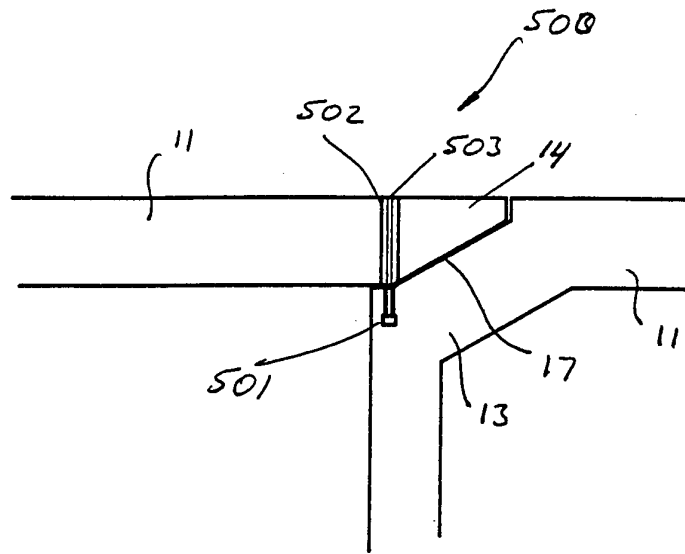


FIG. 80

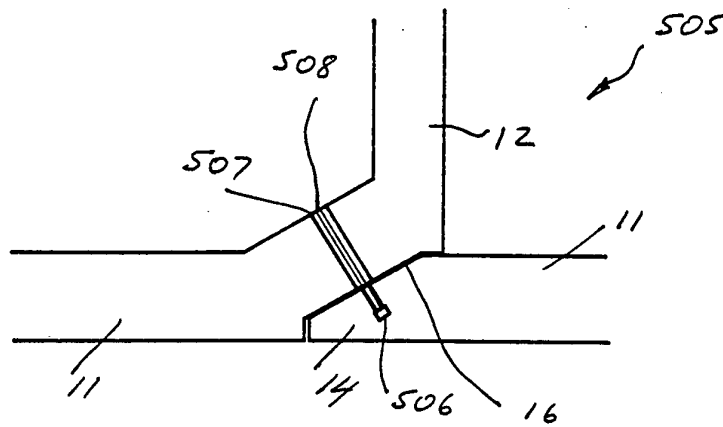


FIG. 81

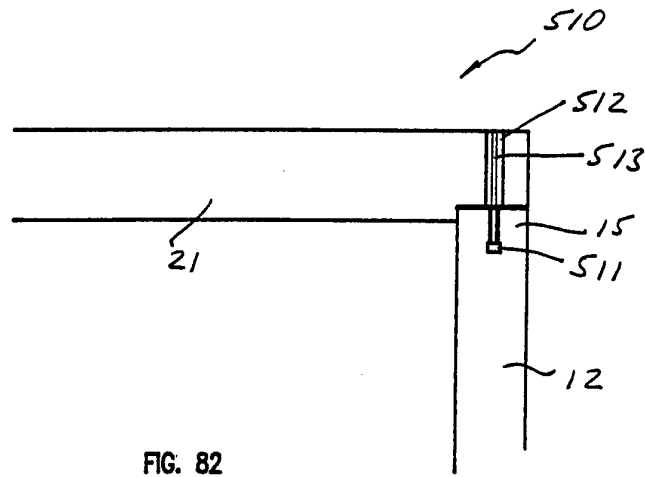


FIG. 82

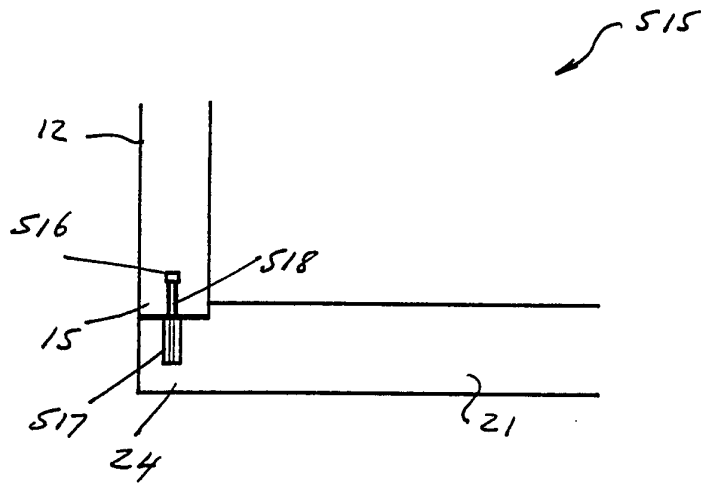
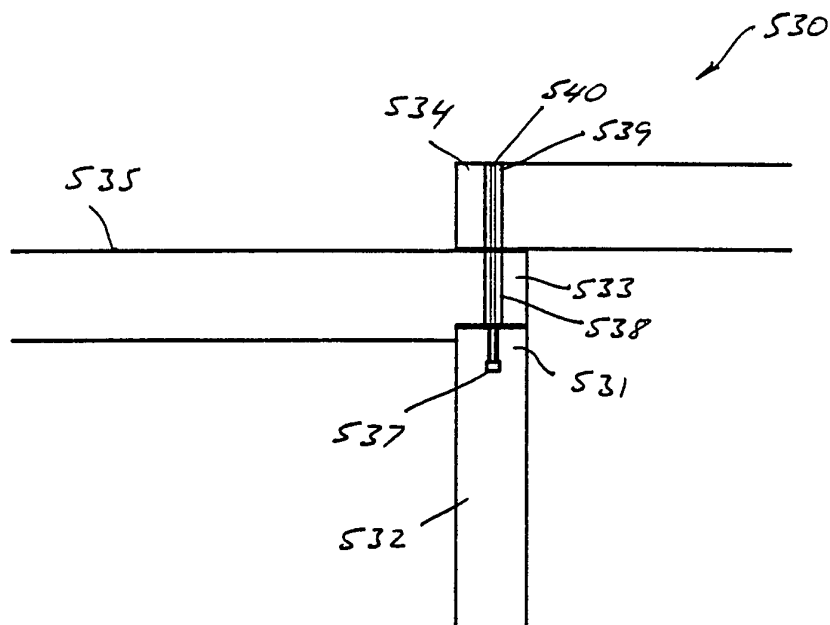
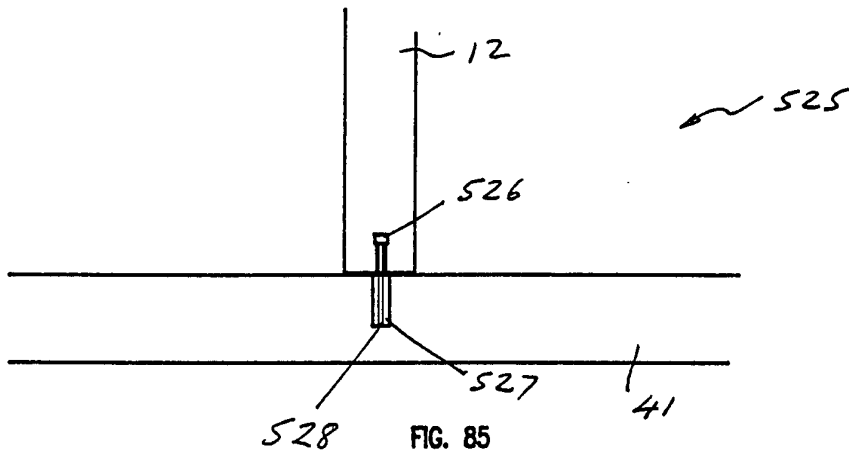
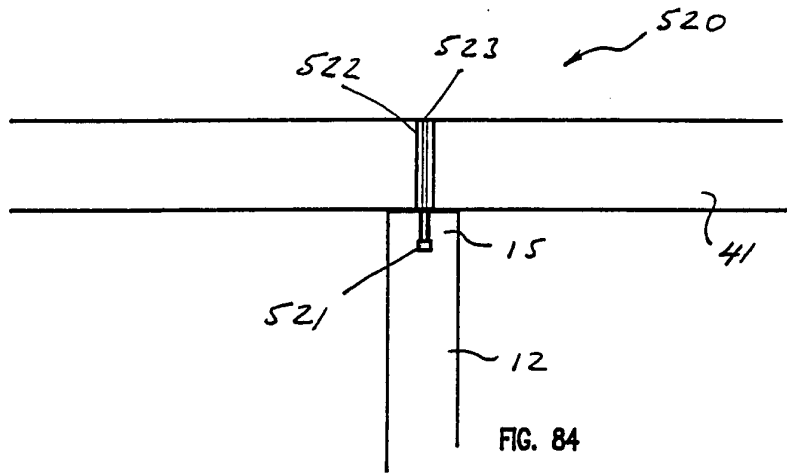
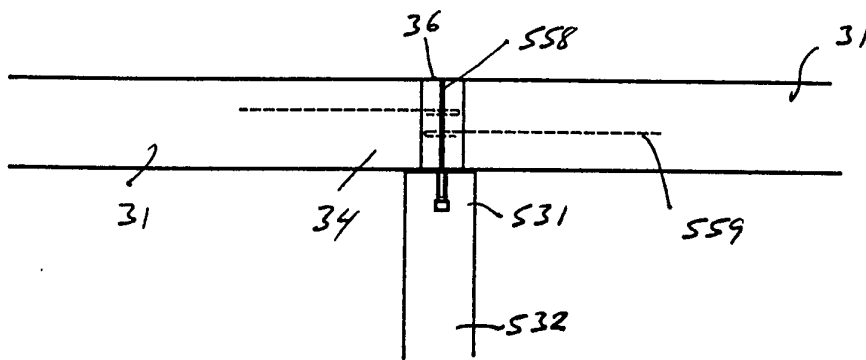
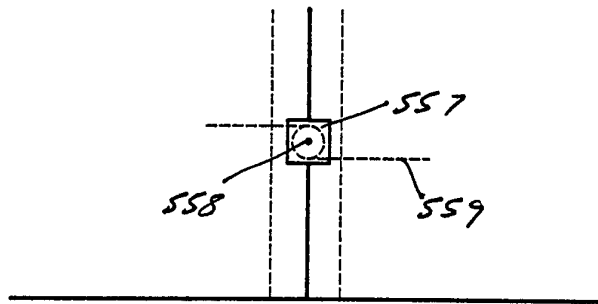
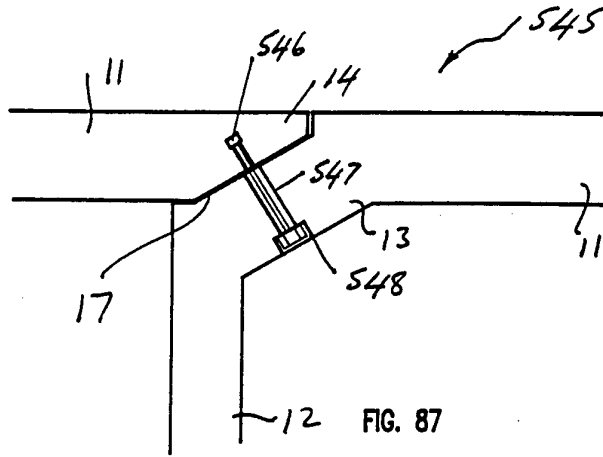


FIG. 83





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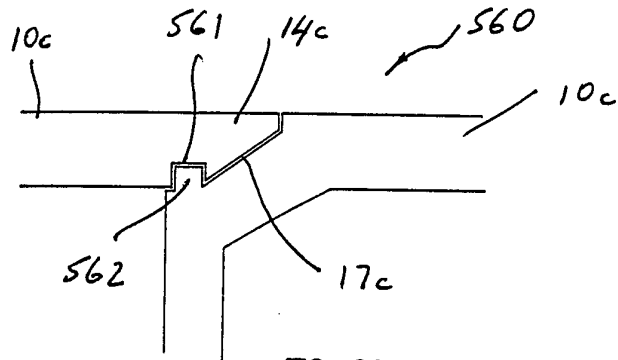


FIG. 90

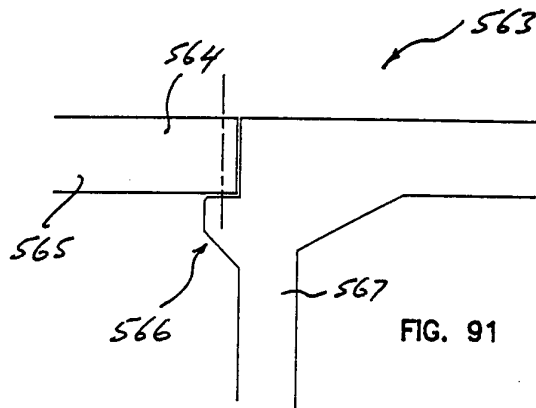


FIG. 91

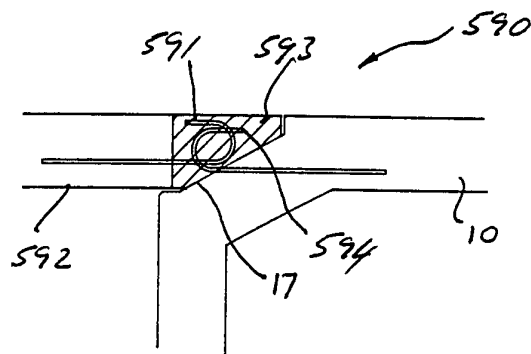


FIG. 92

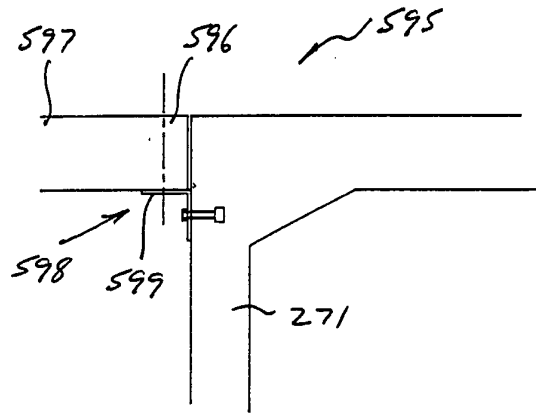


FIG. 93

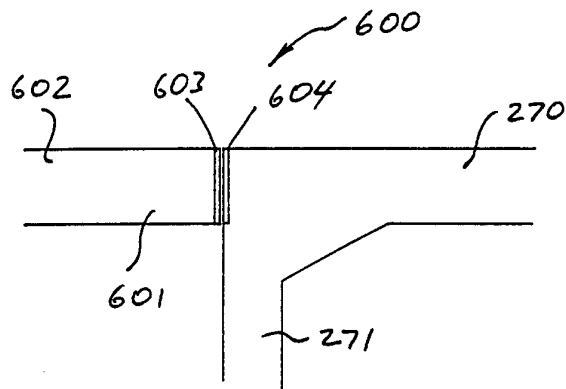
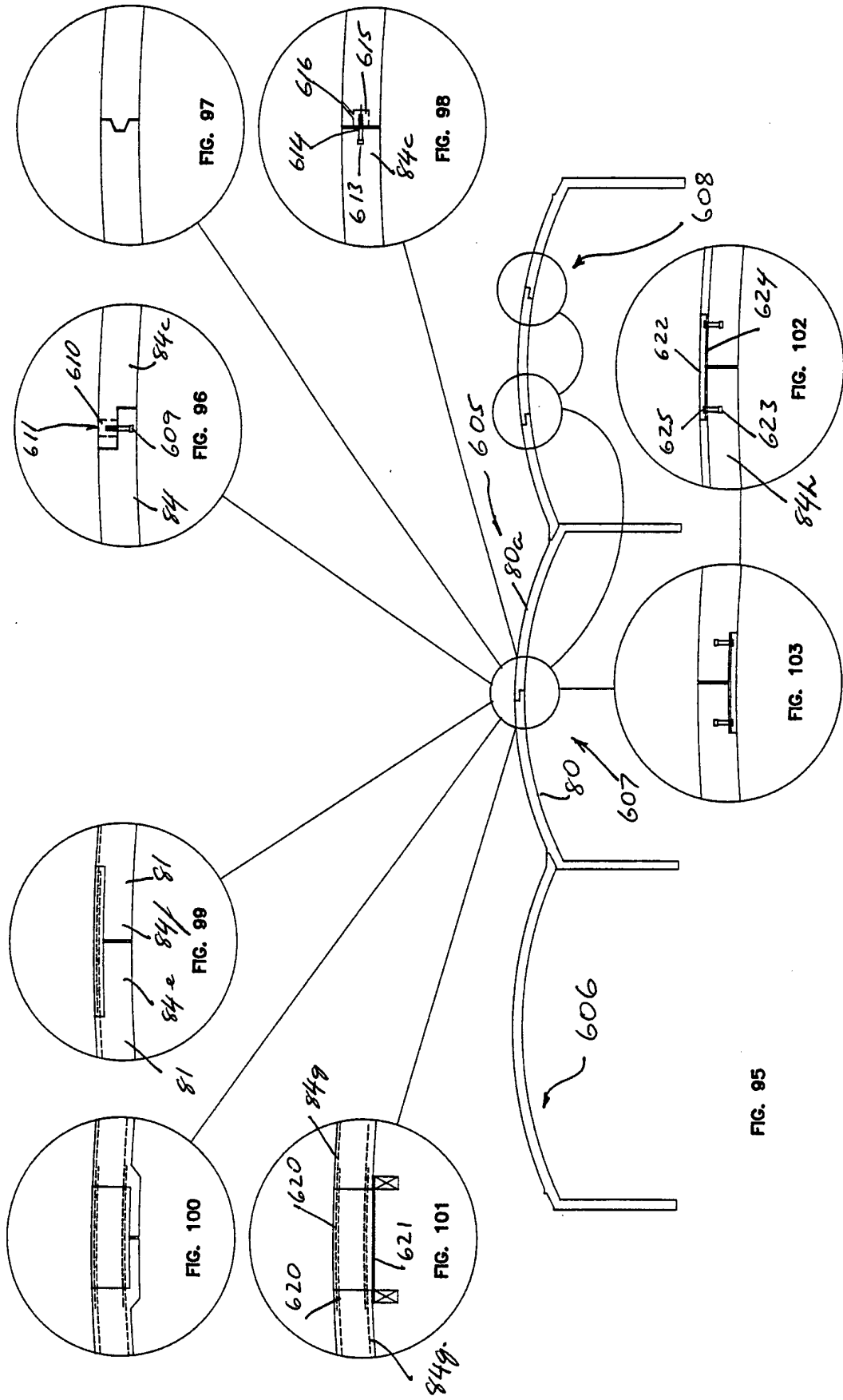


FIG. 94



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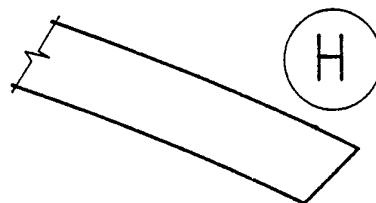
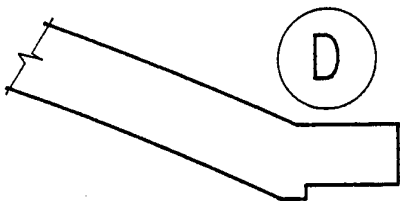
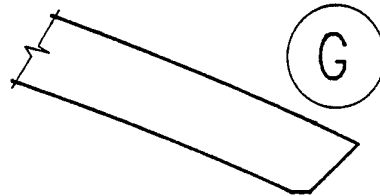
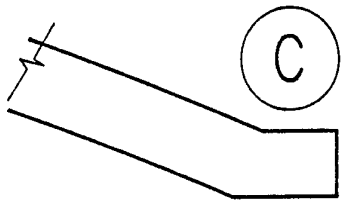
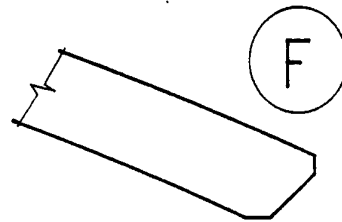
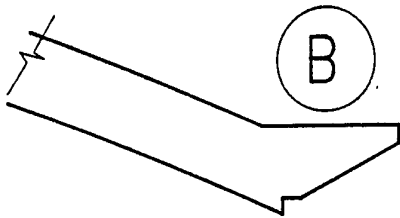
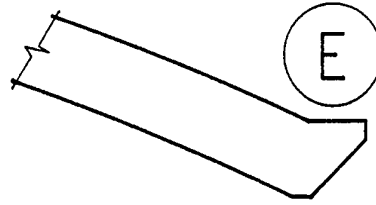
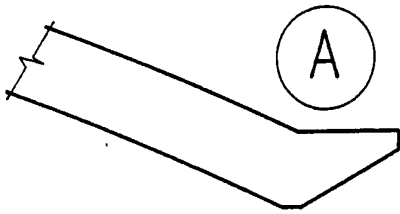


FIG. 104

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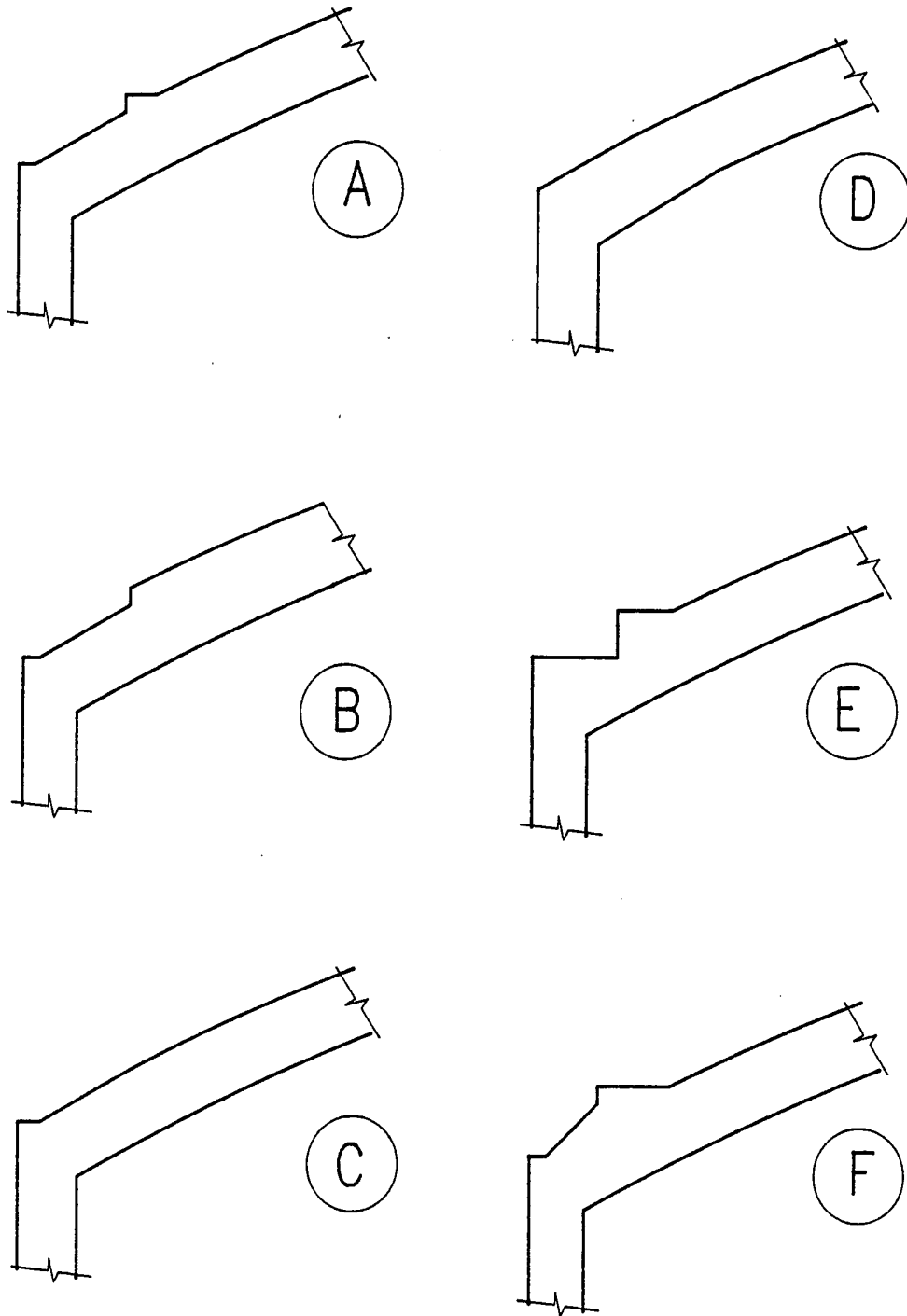


FIG. 105

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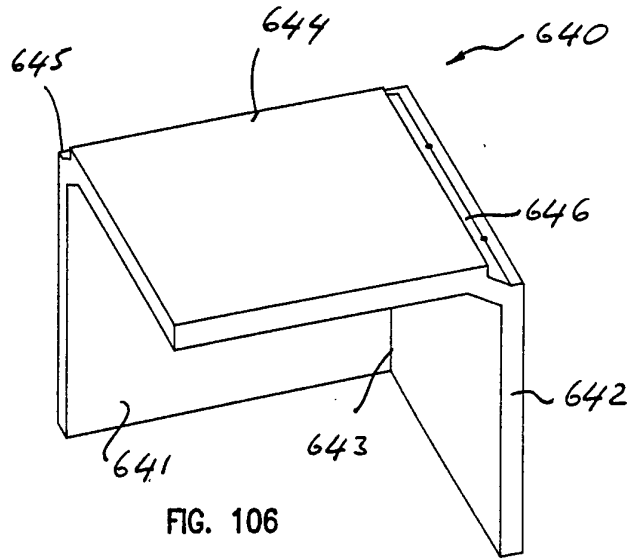


FIG. 106

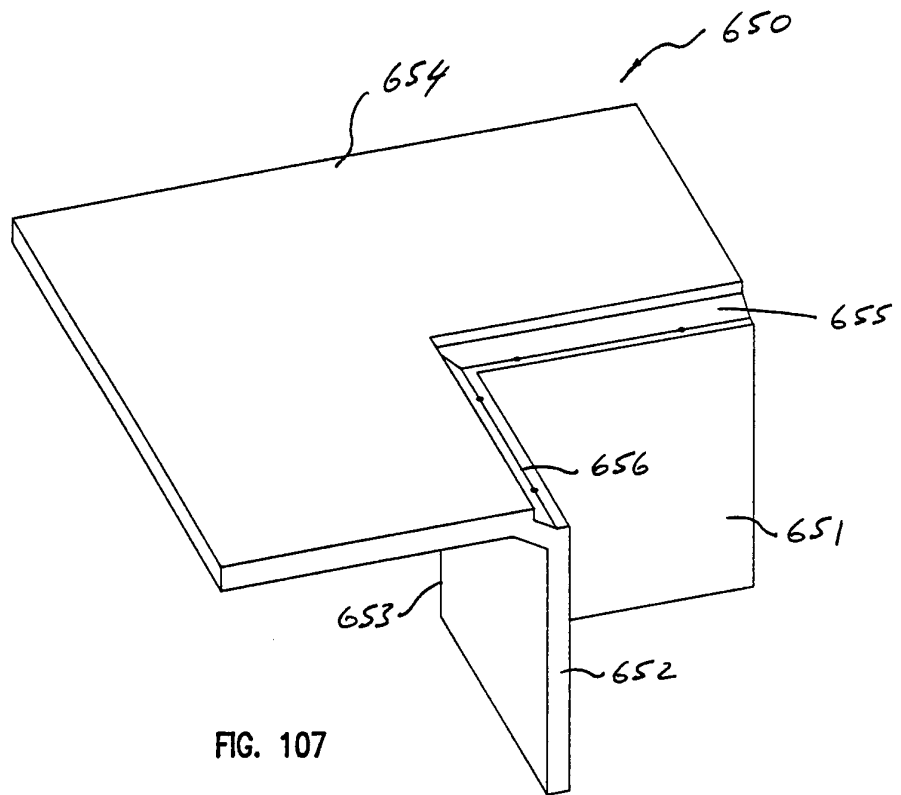


FIG. 107

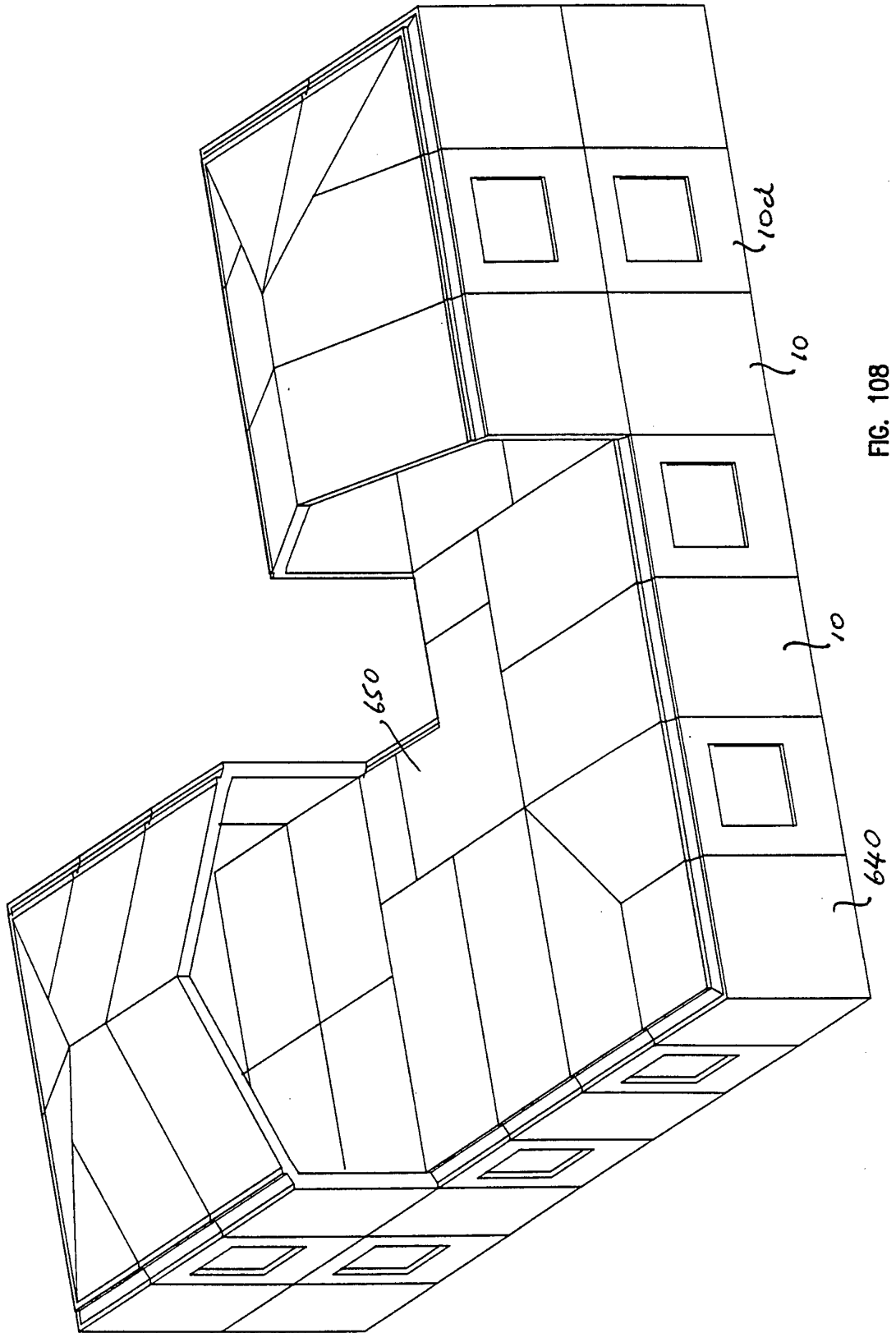


FIG. 108

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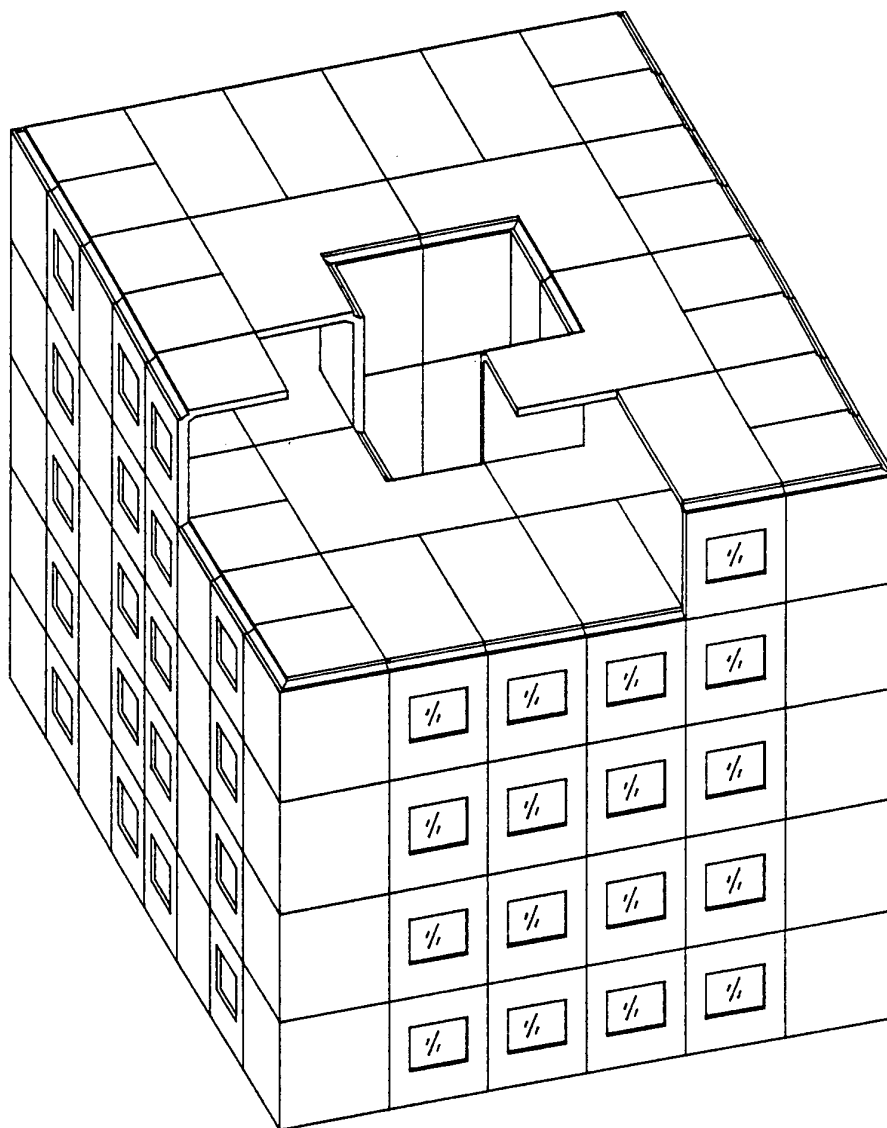


FIG. 109

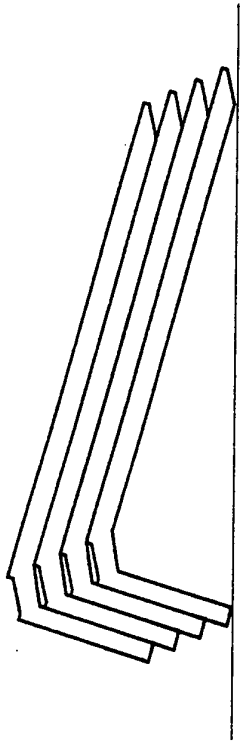


FIG. 110

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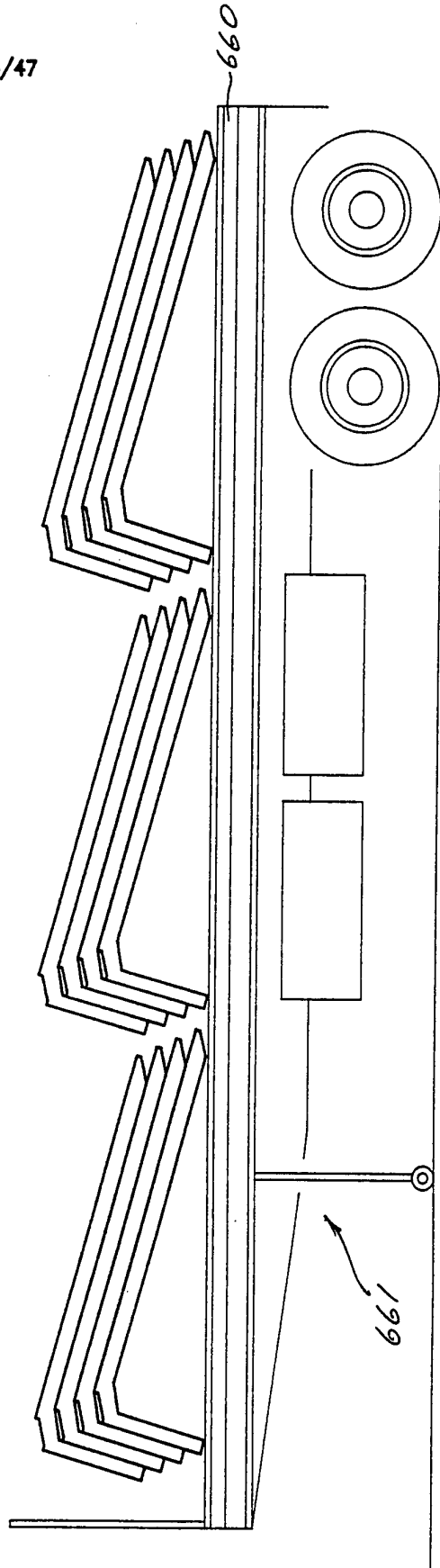


FIG. 111

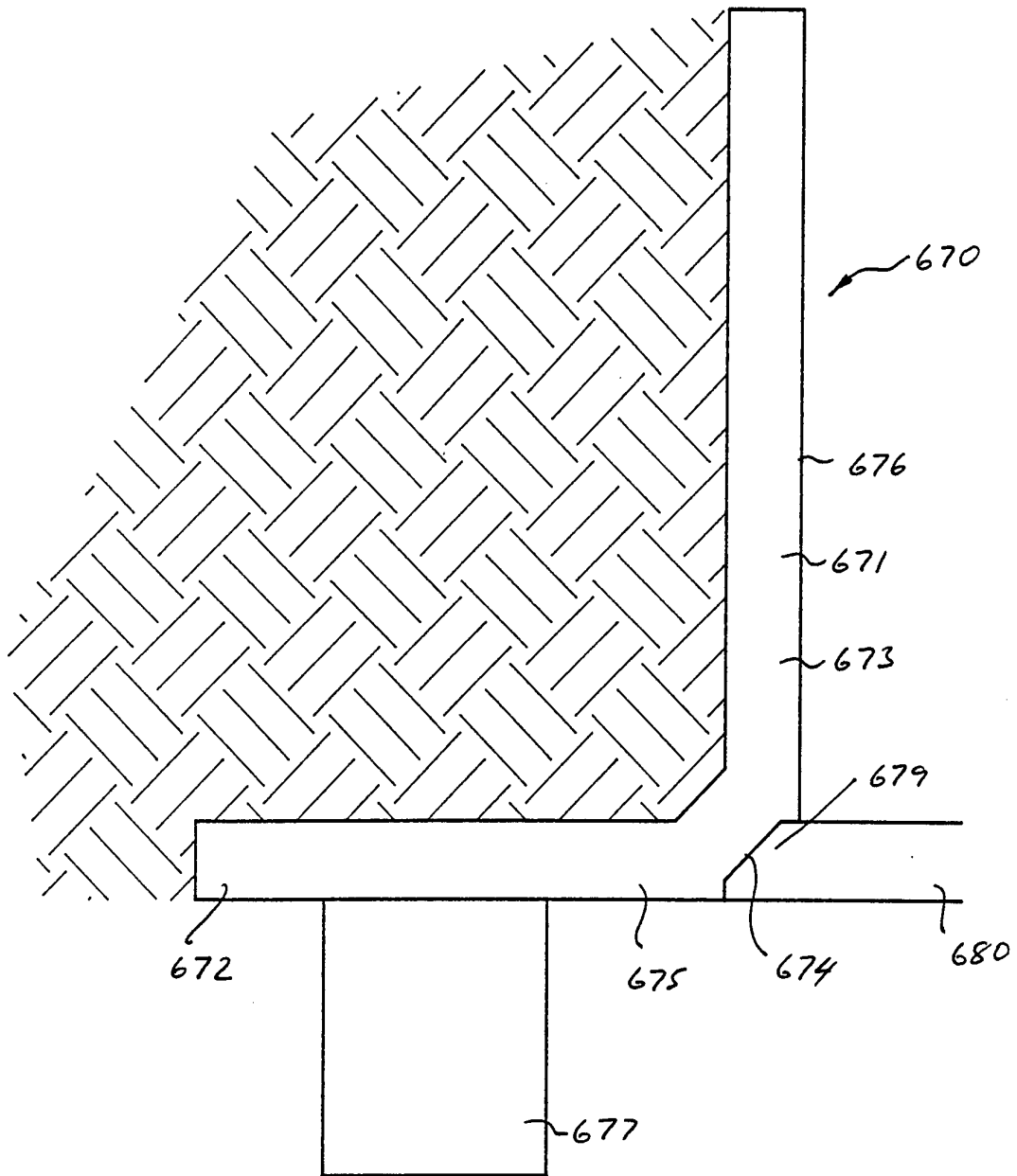


FIG. 112

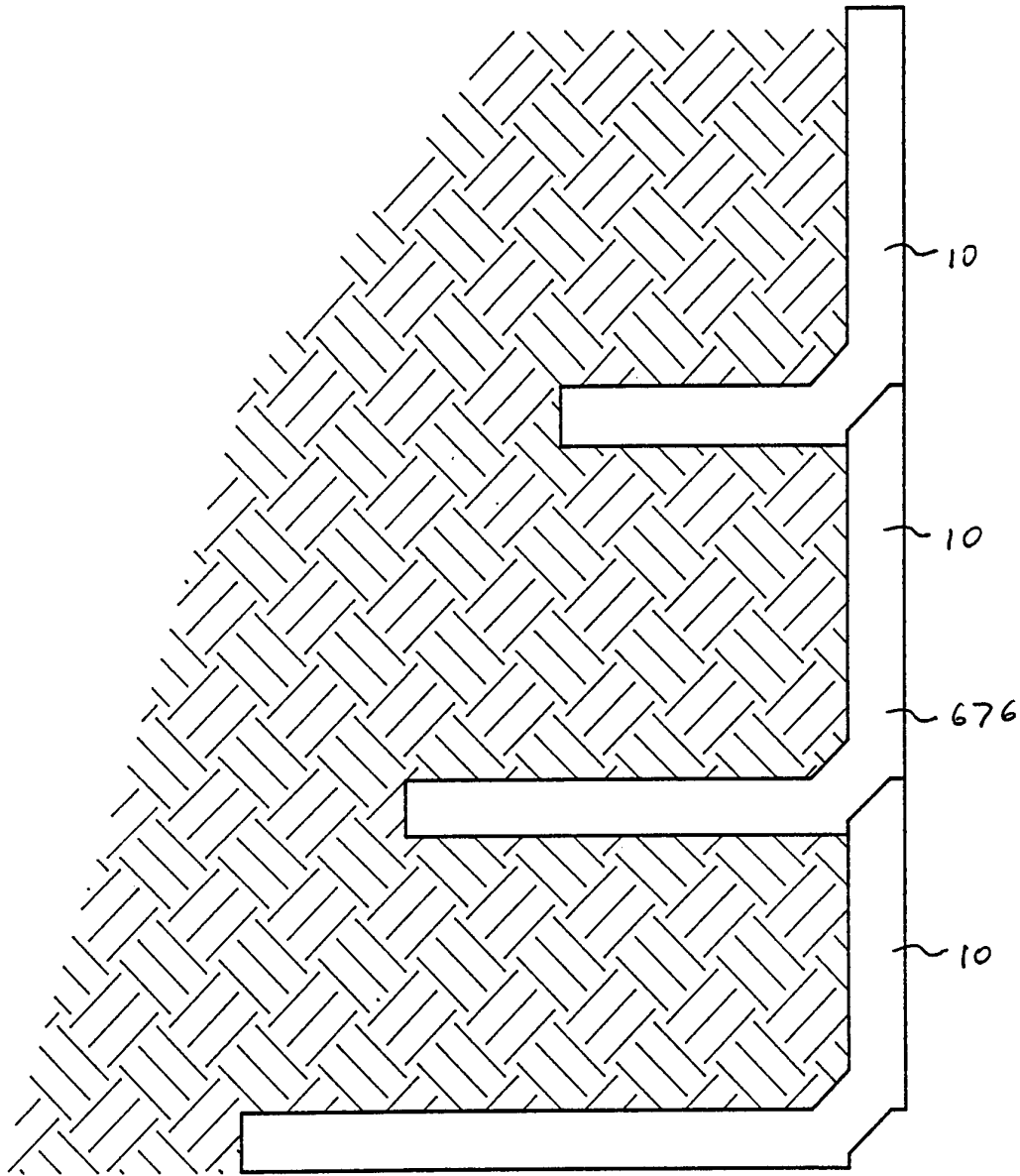
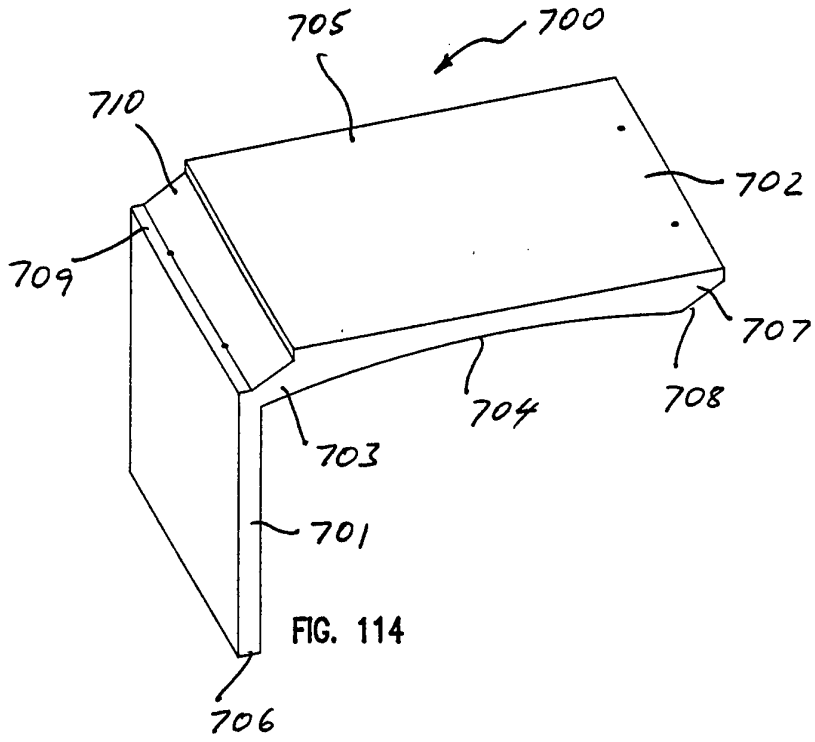


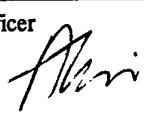
FIG. 113



INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00650

<p>A. CLASSIFICATION OF SUBJECT MATTER Int. Cl.⁶ E01F 5/00, E02D 9/02, E04B 1/343, E04C 1/00, E04B 7/00</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>														
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC: E01F 5/00, E02D 9/02, E04B 1/343, E04C 1/00, E04B 7/00</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC as above</p> <p>Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT</p>														
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to Claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align:center;">X</td> <td>Patent Abstract of Japan, M-148, page 46, JP,A, 57-68427 (MAMORU KOBAYASHI) 26 April 1982 (26.04.82) see abstract</td> <td style="text-align:center;">6-8</td> </tr> <tr> <td style="text-align:center;">X</td> <td>Patent Abstracts of Japan, M-104, page 93, JP,A, 56-122432 (KINJI TERADA) 25 September 1981 (25.09.81) see abstract</td> <td style="text-align:center;">6-8, 10, 11</td> </tr> <tr> <td style="text-align:center;">X,P</td> <td>Patent Abstract of Japan, M-1638, page 2, JP,A, 06-101242 (MAYAYOSHI SATO) 12 April 1994 (12.04.94) see abstract</td> <td style="text-align:center;">6-8, 10 11</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.	X	Patent Abstract of Japan, M-148, page 46, JP,A, 57-68427 (MAMORU KOBAYASHI) 26 April 1982 (26.04.82) see abstract	6-8	X	Patent Abstracts of Japan, M-104, page 93, JP,A, 56-122432 (KINJI TERADA) 25 September 1981 (25.09.81) see abstract	6-8, 10, 11	X,P	Patent Abstract of Japan, M-1638, page 2, JP,A, 06-101242 (MAYAYOSHI SATO) 12 April 1994 (12.04.94) see abstract	6-8, 10 11
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.												
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X	Patent Abstracts of Japan, M-104, page 93, JP,A, 56-122432 (KINJI TERADA) 25 September 1981 (25.09.81) see abstract	6-8, 10, 11												
X,P	Patent Abstract of Japan, M-1638, page 2, JP,A, 06-101242 (MAYAYOSHI SATO) 12 April 1994 (12.04.94) see abstract	6-8, 10 11												
<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</p> <p><input checked="" type="checkbox"/> See patent family annex.</p>														
<p>* Special categories of cited documents :</p> <table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%; vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>										
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>													
<p>Date of the actual completion of the international search 6 January 1995 (06.01.95)</p>		<p>Date of mailing of the international search report 17 Jan 1995 (17.1.95)</p>												
<p>Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929</p>		<p>Authorized officer  D.R. LUM Telephone No. (06) 2832544</p>												

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	Patent Abstract of Japan, E-819, page 129, JP,A, 01-150400 (TAKENAKA KOMUTEN CO. LTD.) 13 June 1989 (13.03.89) see abstract	1-3,4,6-8,10,12-15,19-21
X	Patent Abstract of Japan, M-1470, page 130, JP,A, 05-112986 (SEKISUI PLASTICS CO. LTD.) 7 May 1993 (07.05.93) see abstract	1,2,6-8,12-15,20,21
X	AU,B, 15353/70 (458314) (RICE) 20 May 1970 (20.05.70) see figures 11-13	1,2,4-8,10-15,17,20,21
X	AU,B, 24363/45 (128310) (PORTER) 30 October 1945 (30.10.45) see figures 1 and 2	1,2,6,13,20,21,
X	GB,A, 1055265 (DAVIDSON et al) 18 January 1967 (18.01.67) see figure 1	1-21
X	WO,A, 92/13147 (NIEDERMAIER) 6 August 1992 (6.07.92) see figure 1 b	1,2,4,6-8,12-15,17,19-21
A	US,A, 4854775 (LOCKWOOD) 8 August 1989 (8.08.89) Whole document	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/

AU 94/00650

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Patent Document Cited in Search Report		Patent Family Member					
US	4854775	US	4595314	US	4687371	US	4797030
		US	4993872	CA	1331921	DE	4024176
END OF ANNEX							