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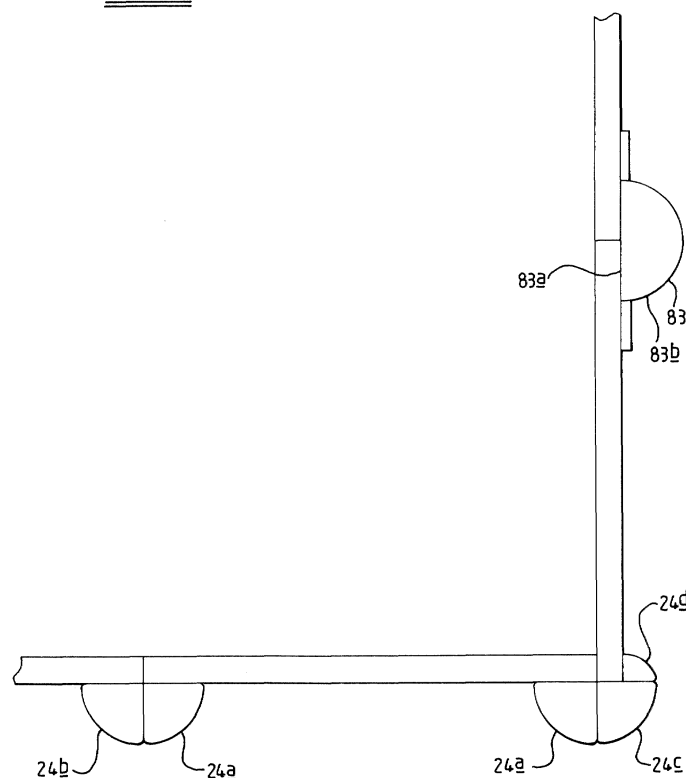
Portable building unit

(57)

A portable building unit comprising an upright having, in cross-section, a first side defining one side of a rectangle having a length (L) and a second side defining an adjacent second side of a rectangle having a breadth (B), the first and second sides being connected

together, at one end, at right angles and there being at least one further side which extends between the opposite ends of the first and second sides and which may lie at least partly within said rectangle so long as the cross-section is not rectangular.

FIG 9



Description

[0001] This invention relates to a portable building unit, hereinafter referred to as being of the kind specified, comprising an upright disposed externally of a wall structure.

[0002] When such a building unit is assembled in side-by-side relationship with a similar building unit two uprights of the adjacent units may be disposed side-by-side.

[0003] Hitherto such uprights have been of square or rectangular cross-sectional shape.

[0004] An object of the invention is to provide a building unit having an upright column which may provide an improved aesthetic appearance whilst retaining the structural strength required thereof.

[0005] According to one aspect of the invention we provide a portable building unit of the type described wherein the upright has, in cross-section, a first side defining one side of a rectangle having a length L and a second side defining an adjacent second side of a rectangle having a breadth B, the first and second sides being connected together, at one end, at right angles and there being at least one further side, as herein defined, which extends between the opposite ends of the first and second sides.

[0006] Said "at least one further side, as herein defined," means any number or shape of further sides but which excludes a further pair of sides of length L and B connected together, at one end, at right angles and connected to the first and second sides at right angles to define said rectangle.

[0007] Said at least one further side may at least partly lie within said rectangle.

[0008] Said further side may, in cross-section, be of generally curvilinear configuration over at least a portion of its extent. The curvilinear configuration may be a sector of a circle.

[0009] The further side may be substantially wholly of said curvilinear configuration except for curved end portions whereby it is connected to the first and second sides.

[0010] The length and breadth of the rectangle may be equal.

[0011] Alternatively, the further side may comprise a curvilinear portion having, at each end, rectilinear portions.

[0012] The rectilinear portions may be connected to the first and second sides respectively by curved end portions.

[0013] If desired the length and the breadth of the rectangle may be equal and the rectilinear portions may have a length equal to half the length/breadth of the rectangle.

[0014] Further alternatively, the further side may comprise end rectangular portions which extend at right angles to the first and second sides and an intermediate rectilinear portion which is inclined to said end portions.

[0015] The length and the breadth of the rectangle may be equal. The end portions may be approximately one third of the length/breadth of the rectangle and the intermediate portion may extend at approximately 135° relative to the adjacent end portion.

[0016] The end rectilinear portions may be connected to the first and second sides represented by curved end portions.

[0017] The section may have similar structural properties to that of a rectangular section of length L and breadth B and made of similar material i.e. of the same or substantially the same material or material of the same or similar relevant physical properties.

[0018] The portable building unit may be rectangular in plan view comprising a wall structure having a shorter side wall and a longer side wall and a roof structure.

[0019] The wall structure may comprise a composite wall panel structure having an inner skin, an outer skin and an infilling therebetween, the outer skin comprising at least one sheet which provides an external surface of the wall structure.

[0020] Said longer side wall may comprise a plurality of discrete rectangular wall panel structures disposed with vertical sides thereof in side-by-side relationship and wherein each discrete wall panel structure comprises an outer skin which comprises a plurality of rectangular sheets each rectangular sheet having two longer opposed edges and two shorter opposed edges.

[0021] The sheets may be juxtaposed in edge-to-edge relationship with longer opposed sides disposed horizontally and shorter opposed sides disposed vertically and the horizontally disposed edges of adjacent sheets being joined together to provide joints between said sheets.

[0022] Alternatively the sheets may be juxtaposed in edge-to-edge relationship with shorter opposed sides disposed horizontally and longer opposed sides disposed vertically and the vertically disposed edges of adjacent sheets being joined together to provide joints between said sheets.

[0023] Said infilling may comprise insulating infilling to which the inner skin and the sheets of the outer skin are bonded.

[0024] The outer skin may be made of metal.

[0025] The inner skin may be made of plasterboard, or metal, or plastic coated metal or gypsum based fibre filled board such as (Firmacel Ply).

[0026] The insulating infilling may comprise a foam plastics material or a mineral fibre such as rock wool.

[0027] Each panel structure may comprise an internal framework having an upright edge member extending along each vertical side of the panel structure and adjacent upright edge members of adjacent wall panel structures being disposed side-by-side.

[0028] The panel structure may include an internal framework comprising a plurality of lateral members extending between the inner and outer skins and positioned at or adjacent the joints between the sheets of the outer skin when said joints are horizontal.

[0029] Alternatively the panel structure may include an internal framework comprising a plurality of vertical members extending between the inner and outer skins and positioned at or adjacent the joints between the sheets of the outer skin when said joints are vertical.

[0030] The building unit may comprise a structural metal frame, comprising said uprights, to which are secured the roof structure and said at least one wall panel structure.

[0031] The building unit may be provided with a floor structure which is secured to the metal frame.

[0032] The structural metal frame may comprise a pair of lateral upstanding sub-frames, each of said sub-frames including an upper member and a lower member, the upper and lower members of each sub-frame being interconnected by said uprights.

[0033] The lower members of the sub-frames may be rigidly interconnected in spaced apart parallel relationship by frame cross-members which extend between the lower members.

[0034] A floor panel may extend between and be supported by the lower members of the sub-frames.

[0035] The upper members of the sub-frames may be interconnected solely by one or more roof panels.

[0036] Each of said roof panels may extend between and be secured below the upper members of such sub-frames so that the upper members are wholly external of the habitable volume of the unit.

[0037] Said upright frame members of the panel structure may be fastened to said uprights.

[0038] The uprights adjacent which the upstanding edges of the panel structures at the ends of the side wall are disposed may comprise a further upright disposed adjacent uprights of the structural frame at the ends of the end wall.

[0039] The uprights may comprise an upright of said structural frame and said structural frame may be disposed external to the habitable volume of the unit.

[0040] According to a second aspect of the invention we provide an assembly of building units according to the first aspect of the invention wherein the units are connected together in side-by-side or end-to-end or side-to-end relationship.

[0041] A building unit may be stacked on top of another building unit.

[0042] The upper unit of said assembly may be provided with a roof panel.

[0043] The roof panel may comprise an external skin of sheet metal, an internal skin and an infilling therebetween, the external skin comprising a plurality of profiled metal sheets, the sheets being disposed in side-by-side relationship with edge corrugations of the profile in overlapping and sealing relationship and preferably each sheet extends as a one-piece sheet over the full length of the roof structure from one end of the roof beam to the opposite end thereof.

[0044] If desired, the roof panels may be made of other material to that described hereinbefore for example the external sheet and/or the internal sheet may be made of plastics, cloth or other material or pitched tiled roof may be provided.

[0045] The lower, and an intermediate unit where provided, of said assembly may be provided with a ceiling panel.

[0046] The or each ceiling panel may comprise a sandwich construction having an upper skin of plywood and a lower skin of steel with an insulating material therebetween and with a peripheral timber or metal frame disposed between the inner and outer skins.

[0047] The invention will now be described by way of example with reference to the accompanying drawings, wherein:

FIGURE 1 is an end elevation of a building assembly embodying the invention,

FIGURE 2 is a side elevation of the building assembly of Figure 1,

FIGURE 3 is a section, to an enlarged scale, on the line 3-3 of Figure 2,

FIGURE 4 is a section, to an enlarged scale, on the line 4-4 of Figure 1

FIGURE 5 is a section, to an enlarged scale, on the line 5-5 of Figure 14,

FIGURE 6 is a section, to an enlarged scale, on the line 6-6 of Figure 14,

FIGURE 7 is a section, to an enlarged scale, on the line 7-7 of Figure 14,

FIGURE 8 is a section, to an enlarged scale, on the line 8-8 of Figure 14,

FIGURE 9 is a section, to an enlarged scale, on the line 9-9 of Figure 14,

FIGURE 10 is a cross-section, to an enlarged scale, through an upright 24a, 24b,

FIGURE 11 shows an alternative cross-section, to an enlarged scale, through an upright 24a, 24b,

FIGURE 12 shows a further alternative cross-section, to an enlarged scale, through an upright 24a, 24b,

FIGURES 13, 13a to 13d show further alternative cross-sections, to an enlarged scale, through an upright 24a, 24b, and

FIGURE 14 is a diagrammatic representation of part of the building assembly of Figures 1 and 2.

[0048] Referring to the drawings, there is shown in Figures 1 and 2 a building assembly 10 comprising four building units 11 - 14. Each building unit is rectangular in plan view having a short end wall 15 and a long side wall 16.

[0049] The units 11 and 12 are disposed in side-by-side relationship with two of their longer sides adjacent. The building units 13, 14 are likewise disposed in side-by-side relationship but with the unit 13 stacked on top of the unit 11 and the unit 14 stacked on top of the unit 12.

[0050] If desired more than two units may be provided in each storey and in each storey the units can be disposed in side-by-side relationship and/or end-to-end and/or end-to-side relationship to provide any desired combination.

[0051] Alternatively, or in addition, the building assembly may comprise more than two storeys by stacking three or more units, one on top of the other.

[0052] Each building module 11 - 14 in accordance with the invention comprises a structural steel frame 20 as best shown in Figures 3 and 4, preferably constructed from steel beams. Each frame 20 comprises two upstanding sub-frames 21a, 21b, which lie in a vertical plane, each comprising respective horizontal roof beams 22a, 22b and lower horizontal floor beams 23a, 23b, interconnected at their ends by uprights 24a, 24b. The two vertical sub-frames 21a, 21b are connected together by a plurality of floor joists 25, of which two, end, joists extend between the floor beams 23a, 23b at positions adjacent to, but spaced apart from, the uprights 24a, 24b.

[0053] The roof and floor beams 22a, 22b, 23a, 23b are each of channel shape in cross-section and each includes a vertically disposed web 26, the roof and floor beams 22a, 22b, 23a, 23b having laterally inwardly or, if desired, outwardly, directed horizontal lower flanges 27 and upper flanges 28. The flanges 27, 28 all have inwardly directed lips at their free ends. If desired roof and floor beams may be of other configuration to that described hereinbefore.

[0054] The uprights 24a, 24b are of a section hereinafter to be described.

[0055] To enable the beams 22a, 22b, 23a, 23b and uprights 24a, 24b to be connected rigidly together, the ends of beams 22a, 22b, 23a, 23b are disposed adjacent the uprights 24a, 24b and secured thereto by means of an angle bracket 29 fastened, such as by being bolted or welded, to the web 26 and bolted to the side wall 31 of the uprights 24a, 24b, which may be reinforced by an apertured plate 32 to which nuts 33 are welded.

[0056] In the case of an upright disposed at a corner of a building unit the angle brackets 29 are welded or bolted to the web 26 whilst the case of uprights disposed adjacent each other a bolted connection 34 is made to bolt adjacent building units together.

[0057] In order to trim the appearance of the corners of a building an additional, non-structural, element 24c is disposed at the corner of the building to complement the upright 24a, or 24b disposed at the relevant corner of the building. If desired a make-up piece 24d may also be provided if desired. The parts 24c and 24d are shown in Figure 9.

[0058] The non-structural element 24b is fixed to the roof and floor beam by an angle bracket at the top and bottom. This is permitted as the wall panel only partially covers the roof and floor beams.

[0059] The make-up piece 24d is fixed to the non-structural element 24c by angle brackets disposed, again, above and below the wall panel.

[0060] Each upright 24a, 24b has in the present example, a hollow cross-section which is constant throughout its length. The cross-section is best shown in Figure 10 and comprises a first side which provides the side wall 31 of the uprights and defines one side of a rectangle having an overall length L, a second side 35, defining a second side of the rectangle having an overall breadth B. The first and second sides are connected together by a further side 36 which, in the present example, is of curvilinear configuration comprising a sector of a circle over the substantially the whole of its length except for curved end portions 37 of similar internal and external radii as the portion 38 connecting the first and second sides 31, 35. In the present example the length L of the side 31 is equal to the breadth B of the side 35 and the dimensions L and B are 115mm long and the side 36 has a radius which is the same as said length i. e. 115mm. If desired the dimensions L and B may lie in the range 50-200 mm, and preferably 65-150 mm and more preferably 90-120 mm. Such an upright is referred to herein as a "Quadrant".

[0061] With an upright of these dimensions and with material 5 mm thick similar i.e. the same or substantially the same, structural performance is achieved as is achieved with a standard overall 100 x 100mm square hollow section upright made of material 5 mm thick. Such a section is referred to hereinafter by the term "S.H.S.".

[0062] That such properties are obtained can be seen from the following comparison.

PROPERTIES	S.H.S.	QUADRANT
Area	$A = 18.70\text{cm}^2$	$= 19.32\text{cm}^2$
Moment of inertia	$I_{xx} = 279\text{cm}^4$	$= 322\text{cm}^4$
Radius of Gyration	$r_y = 3.86\text{cm}$	$= 4.08\text{cm}$
Section Modulus	$Z_x = 55.9\text{cm}^3$	$= 49.44\text{cm}^3$

[0063] By "structural properties" we mean at least the area A of the section and the section modulus Z_x but "structural properties" may also include Moment of Inertia I_{xx} and Radius of Gyration r_y .

[0064] One of skill in the art, knowing the "structural properties" and the shape of the section can calculate, in known manner, other parameters of the columns such as Bending moment, Axial load, Shear strength, making reference as necessary to standard documents such as British Standard 5950 for other information required to enable such calculations to be performed.

[0065] Figure 11 shows an alternative configuration where the same reference numerals refer to corresponding parts as described hereinbefore in connection with Figure 10. However in this case the further side 36 has, at each end, rectilinear portions 39. The rectilinear portions are connected to the first and second sides 31, 35 respectively by curved end portions 37 of the same radii as described hereinbefore. Again the length and breadth of the rectangle is equal and in the present example are 105 mm long. The end rectilinear portions 39 have a length of half this dimension. The radius of the curvilinear portion is 52.5mm.

[0066] Referring now to Figure 12, again the same reference numerals refer to the same parts as described hereinbefore in connection with Figures 10 and 11. In this case the sides 31 and 35 are of the same length and have a dimension of 108 mm. The end rectilinear portions 39 which extend at right angles to the first and second sides have an equal length and are approximately one third of the length/breadth of the rectangle i.e. 40 mm. The intermediate portion 40 is rectilinear and is connected to the end rectilinear portions by curved parts 41 of inner and outer radii of curvature of about twice the thickness of the material. The part 40 extends at approximately 135° to the adjacent rectilinear end portion 39.

[0067] Referring now Figure 13, again the same reference numerals refer to the same parts as described hereinbefore in connection with Figures 10 to 12. In this case the first and second sides 31 and 35 are again of the same length and have a dimension in a preferred range of 65-100 mm. The first and second sides are connected together by a further side 36, which, in the present example, is of curvilinear configuration comprising a sector of a circle over substantially the whole width except for curved end portions 37 of similar internal and external radii as the portion 38 connecting the first and second sides 31, 35. In the present example the length L of the side 31 is equal to the breadth B of the side 35 and the dimensions L & B are 100 mm long and the side 36 has a radius which is the same as said lengths L and B .

[0068] If desired, the further side 36 may have a greater radius than that shown in Figure 13 for example 72 mm so that whole of the side 36 lies externally of the rectangle.

[0069] If desired the side 36 may comprise two separate parts as shown at 36a, 36b which may lie wholly externally of the rectangle or wholly or partly internally of the rectangle as shown in Figure 13b, 13c and 13d respectively.

[0070] The provision of an upright in accordance with the present invention improves the visual appearance of the building unit in particular the building assembly. The "softening" of a structural component by providing a curvilinear or angled configuration provides a smoother building line and thus appears easier on the eye and adds a more contemporary feel to the building. Such a configuration may also reduce the feeling of modularity of the assembly. However such improvement of the aesthetics should be achieved without a reduction or at least without significant reduction in the structural properties of the upright compared with a upright currently used for example an upright having a 100mm square cross-section made of 5mm thick material when compared with a quadrant shaped upright as shown in Figure 10 and as described above.

[0071] The floor joists 25 are of channel shape in cross-section and each comprises a vertical web 55 with horizontally directed flanges 56a, 56b, the upper flange 56a of the intermediate joists having a downwardly directed lip 56c at its free edge and both flanges of the end joists having intumed lips 56c.

[0072] If desired, the floor joist may be of other configuration to that described hereinbefore.

[0073] It will thus be seen that each sub-frame 21a, 21b affords a rectangular aperture defined by the beams and uprights 22a, 23a, 24a and 22b, 23b, 24b respectively which may be closed by end and side wall panels as hereinafter described.

[0074] Lifting eyes may be removably secured to the tops of the uprights 24a, 24b by bolts which engage nuts provided at the top of the uprights.

[0075] The units illustrated in Figures 3 and 4 include a floor structure 61 comprising an upper sheet of wood particle board which rests at its lateral margins on the upper flanges 28 of the lower beams 23a, 23b and is supported on the floor joists 25. If desired, the upper sheet may be of other material than wood particle board such as cement particle board or ply.

[0076] A foil faced film or blanket 62 draped between joists and a coated steel (Aluzink) undraws the floor joists 25 and is secured to the bottom flange of each joist by suitable fasteners.

[0077] To enable the whole structure to be supported on a lorry affording a bed narrower than the overall width of the building module, longitudinal wooden bars 47 are secured in position beneath the joists 25 inwardly of the ends of the module.

[0078] Each unit has a "roof" structure, which extends between and is secured to the roof beams 22a, 22b therebelow

by attachment to the lower flanges 27 thereof. The roof structure of each top storey unit 13, 14 has a roof panel and each bottom unit 11, 12 (and intermediate unit, if present) a ceiling panel. The roof structure may be otherwise attached and disposed if desired.

[0079] The roof panel and ceiling panels are constructed as desired, for example, as described in UK 2.263.296B.

[0080] Secured to the frames 20 are end wall panel structures 70 and side wall panel structures 80 although side and/or end wall panel structures may be omitted from adjacent sub-frames 21a, 21b to provide an obstruction free interior for each storey as described. The adjacent sub-frames 21a, 21b of adjacent units 11, 12, and 13, 14 respectively are directly bolted together by bolts 34 as previously described. In addition the mating flanges 22a, 23a and 22b, 23b of stacked units 11, 13 and 12, 14 respectively are also bolted together, as described in UK 2,262,296B, a desired plurality of bolts being provided longitudinally of the beams.

[0081] If desired further units may be bolted together in either end-to-end or side-by-side, or side-to-end relationship with appropriate end wall panel structures and/or side wall panel structures being omitted as desired to enable units to be linked together to provide a building construction of desired configuration.

[0082] The end wall panel structures 70 are secured to the inwardly facing surface 31 of uprights 24a, 24b so that the panel structures 70 are received entirely within the metal frame 20. Cut-outs are provided at the bottom for the panels to accommodate the floor beams 23a.

[0083] The end wall panel structures 70 comprise an outer skin 71 of plastics coated steel and an inner skin 72 of plasterboard or other suitable material secured to a framework 73 of timber members with foamed plastics insulation material or infilling 74 therebetween.

[0084] The outer skin comprises a plurality, in the present example, three, rectangular metal sheets 75, each of which has opposed edges 76 disposed to extend laterally in a horizontal direction, a horizontal edge of adjacent sheets being joined together along the length of said edges. The uppermost sheet is of the smallest height, the middle sheet the greatest height and the lowermost sheet intermediate height. This configuration is adopted so that the joint between the lowermost and middle sheet is at or below the bottom of any window or other opening with which the building unit may be provided. Similarly, the joint between the uppermost sheet and the middle sheet is at or above the level of the top of any such opening. This avoids the need to cross the or each of the above mentioned joints with a window or other opening. Of course, if desired, an opening may cross one or more of the joints, for example, in the case of a door, although, it is preferred to cross as few joints as possible. Further details of the panel structure are contained in UK 2, 262,296B.

[0085] The side wall panel structures 80 are of similar construction to the end wall panel structures 70 and the vertical edges 81 of their rectangular sheets 75 are disposed behind an inwardly facing surface 82 of intermediate upright elements 83. The intermediate upright elements 83 may be provided for aesthetic reasons, for example, to reflect the appearance of the shorter end wall of the building assembly and/or they may contribute to the overall structural strength of the frame and so comprise an upright of the structural frame, depending upon the size of the building and the way in which the intermediate upright elements 83 are attached to the building unit. In the present example, they are attached to the roof beams 22a, 22b and to the floor beams 23a, 23b by brackets which are bolted respectively to a roof beam and a floor beam.

[0086] The intermediate upright elements 83 may have the appearance of a pair of upright members 24a, 24b and thus comprise a flat portion 83a and a semicircular portion 83b. They may be fastened in position by means of ? Alternatively, if desired, the intermediate upright elements 83 may be of rectangular configuration.

[0087] Further details thereof and of any other part of the structure not described in detail herein may be obtained from UK 2,262,296B.

[0088] If desired the end and side wall panel structures may comprise rectangular metal sheets which are disposed so that their longest edges are vertical and joined together. In this case a suitable reshaped framework will be provided with vertical members lying adjacent the vertical joints.

[0089] Although not shown, the end and side wall panels, where provided, may be equipped with all necessary doors and windows, and the windows may be single or double glazed as required.

[0090] All required internal fittings, including partition walls, carpeting or other floor covering, and appropriate mains services such as gas, electricity, water supply and sanitation may be provided so that the complete unit may be delivered to a prepared site, ready for use, subject only to securing adjacent units together where necessary and applying internal trim strips as necessary at the joints between adjacent units, and if required external trims.

[0091] When two or more units are connected together in end-to-end configuration, the higher ends may be adjacent with suitable guttering being provided at the lower ends.

[0092] If desired, a plurality of roof panels may be provided secured to and, if desired, below the roof beams instead of a single roof panel.

[0093] If desired, the structural frame may be of other configurations than that described hereinbefore. For example, it may comprise a rectangular floor subframe comprising a pair of spaced parallel floor beams connected together by transversely extending floor joists, a rectangular roof sub-frame comprising a pair of spaced parallel roof beams inter-

connected by a plurality of transversely extending roof joists, at least some of the transverse joists being connected to the roof beams intermediate the ends of the roof beams, and a plurality of upstanding, preferably generally vertical, columns extending between and interconnecting the floor and roof sub-frames. At least one floor panel may be supported on the floor joists. At least one roof panel may be supported on the roof joists. If desired the floor structure may

comprise a site poured concrete floor or other site produced floor.

[0094] Although an assembly of our building units has been described above, a single building unit may be provided, or an assembly of any suitable combination of building units may be provided. Where a single building unit is provided a single storey assembly of building units, the or each unit may be provided with skirt members 123 and fascia panels 124 as described hereinbefore.

[0095] In the present specification "comprise" means "includes or consists of" and "comprising" means "including or consisting of".

[0096] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A unit of the kind specified wherein the upright has, in cross-section, a first side defining one side of a rectangle having a length L and a second side defining an adjacent second side of a rectangle having a breadth B, the first and second sides being connected together, at one end, at right angles and there being at least one further side, as herein defined, which extends between the opposite ends of the first and second sides.
2. A unit of the type described wherein said at least one further side lies at least partly within said rectangle.
3. A unit according to Claim 1 or Claim 2 wherein said further side, in cross-section, is of generally curvilinear configuration over at least a portion of its extent.
4. A unit according to Claim 3 wherein the curvilinear configuration is a sector of a circle.
5. A unit according to Claim 3 or 4 wherein the further side is substantially wholly of said curvilinear configuration except for curved end portions whereby it is connected to the first and second sides.
6. A unit according to any one of Claims 3 to 5 wherein the length and breadth of the rectangle are equal.
7. A unit according to Claim 1 or Claim 2 wherein the further side comprises a curvilinear portion having, at each end, rectilinear portions.
8. A unit according to Claim 7 wherein the rectilinear portions are connected to the first and second sides respectively by curved end portions.
9. A unit according to Claim 8 wherein the length and the breadth of the rectangle are equal and the rectilinear portions have a length approximately one third to one half the length/breadth of the rectangle.
10. A unit according to Claim 1 or Claim 2 wherein the further side comprises end rectangular portions which extend at right angles to the first and second sides and an intermediate rectilinear portion which is inclined to said end portions.
11. A unit according to Claim 10 wherein the length and breadth of the rectangle are equal.
12. A unit according to Claim 11 wherein the end portions are approximately from one third to one half of the length/breadth of the rectangle.
13. A unit according to Claim 11 or 12 wherein the intermediate portion extends at approximately 135° relative to the adjacent end portion.
14. A unit according to any one of Claims 10 to 13 wherein the end rectilinear portions are connected to the first and

second sides represented by curved end portions.

15. A unit according to any one of the preceding claims wherein the section has similar structural properties to that of a rectangular section of length L and breadth B and is made of a similar material of the same or substantially the same material.

16. A unit according to any one of the preceding claims wherein the portable building unit is rectangular in plan view comprising a wall structure having a shorter side wall and a longer side wall and a roof structure.

17. A unit according to Claim 16 wherein the wall structure comprises a composite wall panel structure having an inner skin, an outer skin and an infilling therebetween, the outer skin comprising at least one sheet which provides an external surface of the wall structure.

18. A unit according to Claim 17 wherein each panel structure comprises an internal framework having an upright edge member extending along each vertical side of the panel structure and adjacent upright edge members of adjacent wall panel structures being disposed side-by-side.

19. A unit according to any one of the preceding claims wherein the building unit comprises a structural metal frame, comprising said uprights, to which are secured the roof structure and at least one wall panel structure.

20. A unit according to Claim 19 wherein the building unit is provided with a floor structure which is secured to the metal frame.

21. A unit according to Claim 19 or 20 wherein the structural metal frame comprises a pair of lateral upstanding sub-frames, each of said sub-frames including an upper member and a lower member, the upper and lower members of each sub-frame being interconnected by said uprights.

22. A unit according to Claim 21 wherein the lower members of the sub-frames are rigidly interconnected in spaced apart parallel relationship by frame cross-members which extend between the lower members.

23. A unit according to Claim 21 or 22 wherein a floor panel extends between and is supported by the lower members of the sub-frames.

24. A unit according to any one of Claims 21 to 23 wherein the upper members of the sub-frames are interconnected solely by one or more roof panels, each of which extends between and is secured below the upper members of such sub-frames so that the upper members are wholly external of the habitable volume of the unit.

25. A unit according to Claim 18 or any one of Claims 19 to 24 where dependant on Claim 18 wherein said upright edge members of the panel structure are fastened to said uprights.

26. A unit according to Claim 18 or any one of Claims 18 to 25 where dependant on Claim 18 wherein the uprights adjacent which upstanding edges of the wall panel structures at the ends of the side wall are disposed comprise a further upright disposed adjacent uprights of the structural frame at the ends of the end wall.

27. A unit according to any one of the preceding claims wherein the uprights comprise an upright of said structural frame and said structural frame is disposed external to the habitable volume of the unit.

28. An assembly of building units according to any one of the preceding claims wherein the units are connected together in side-by-side or end-to-end or side-to-end relationship or wherein a building unit is stacked on top of another building unit.

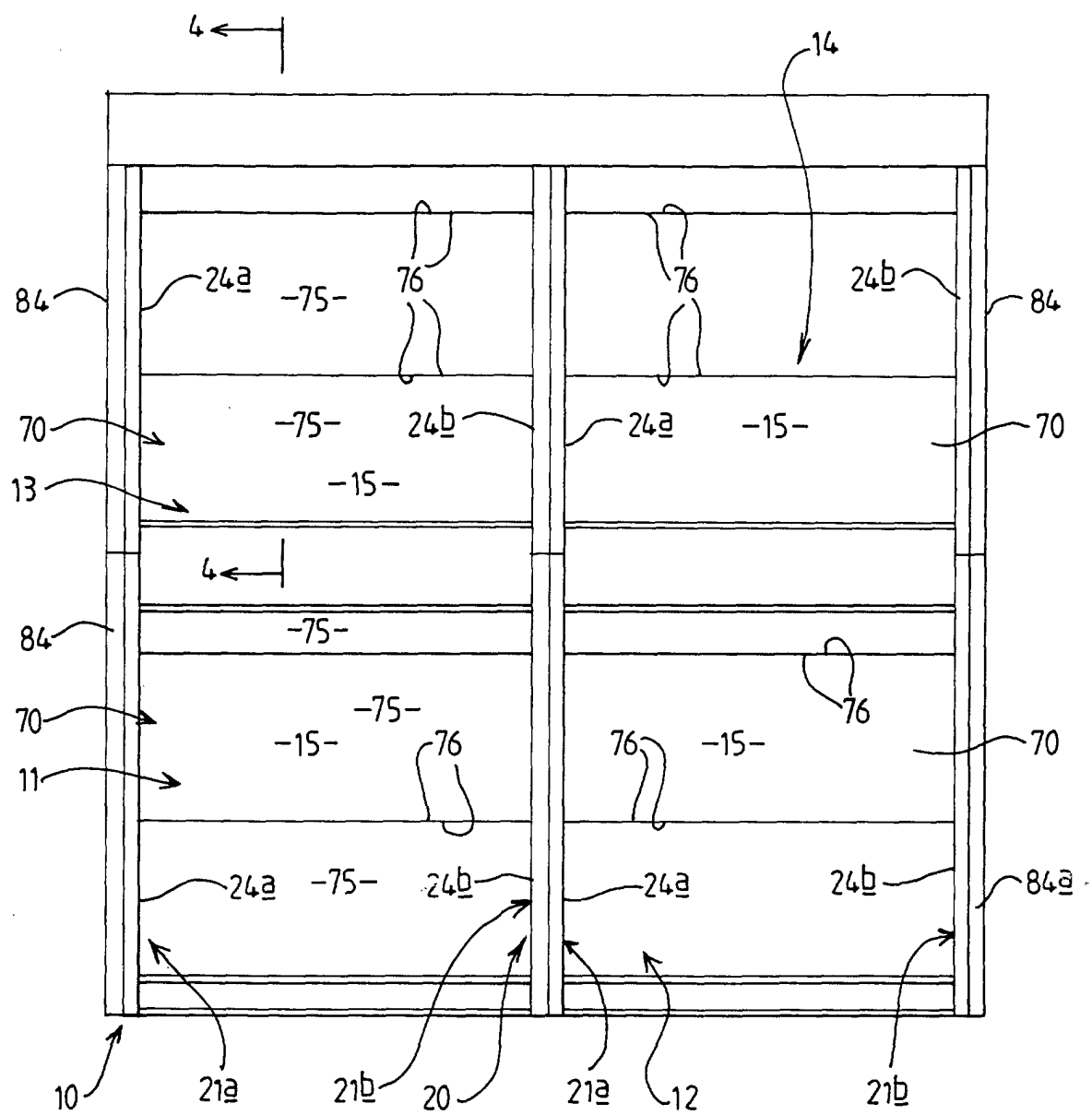
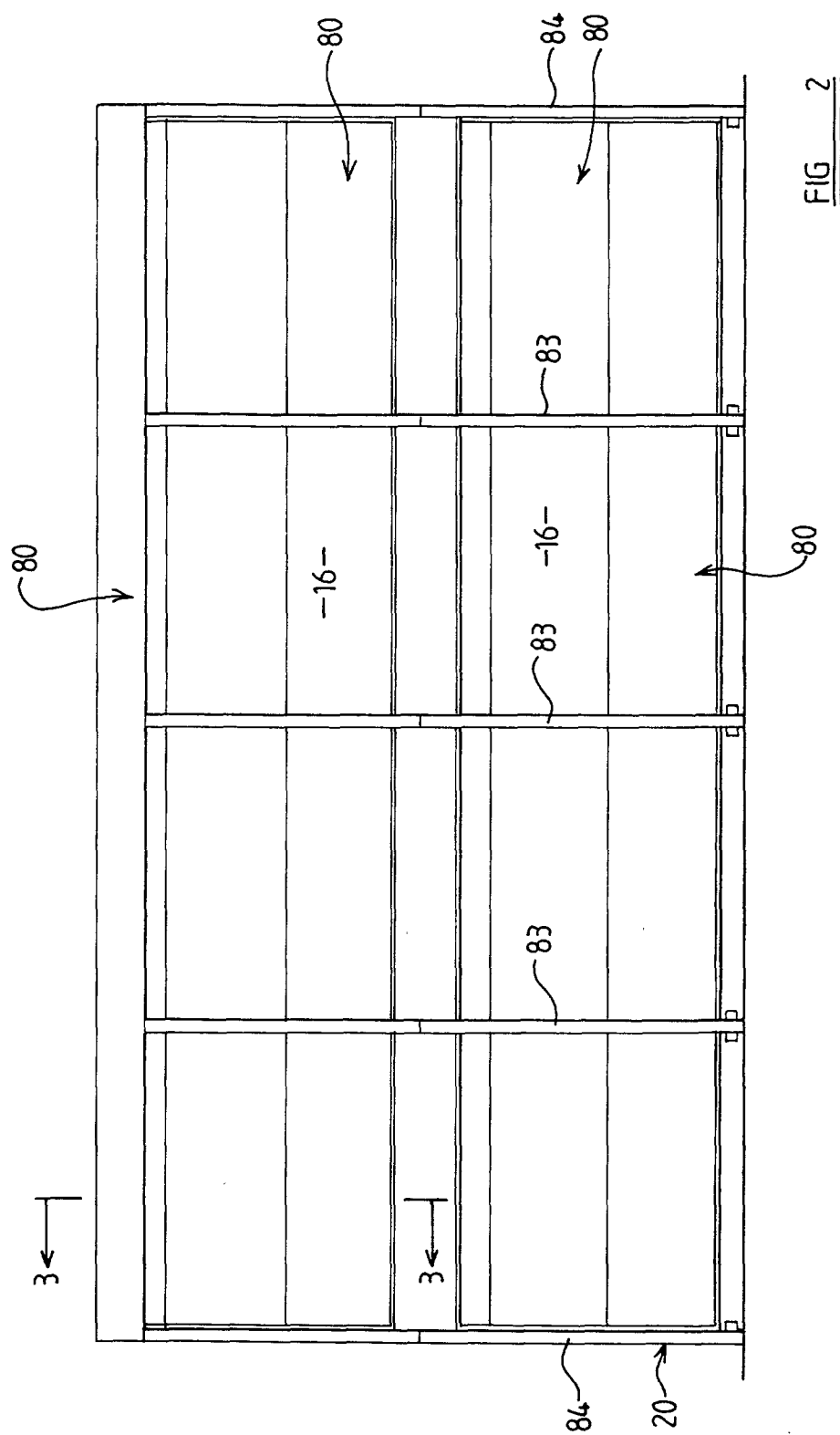
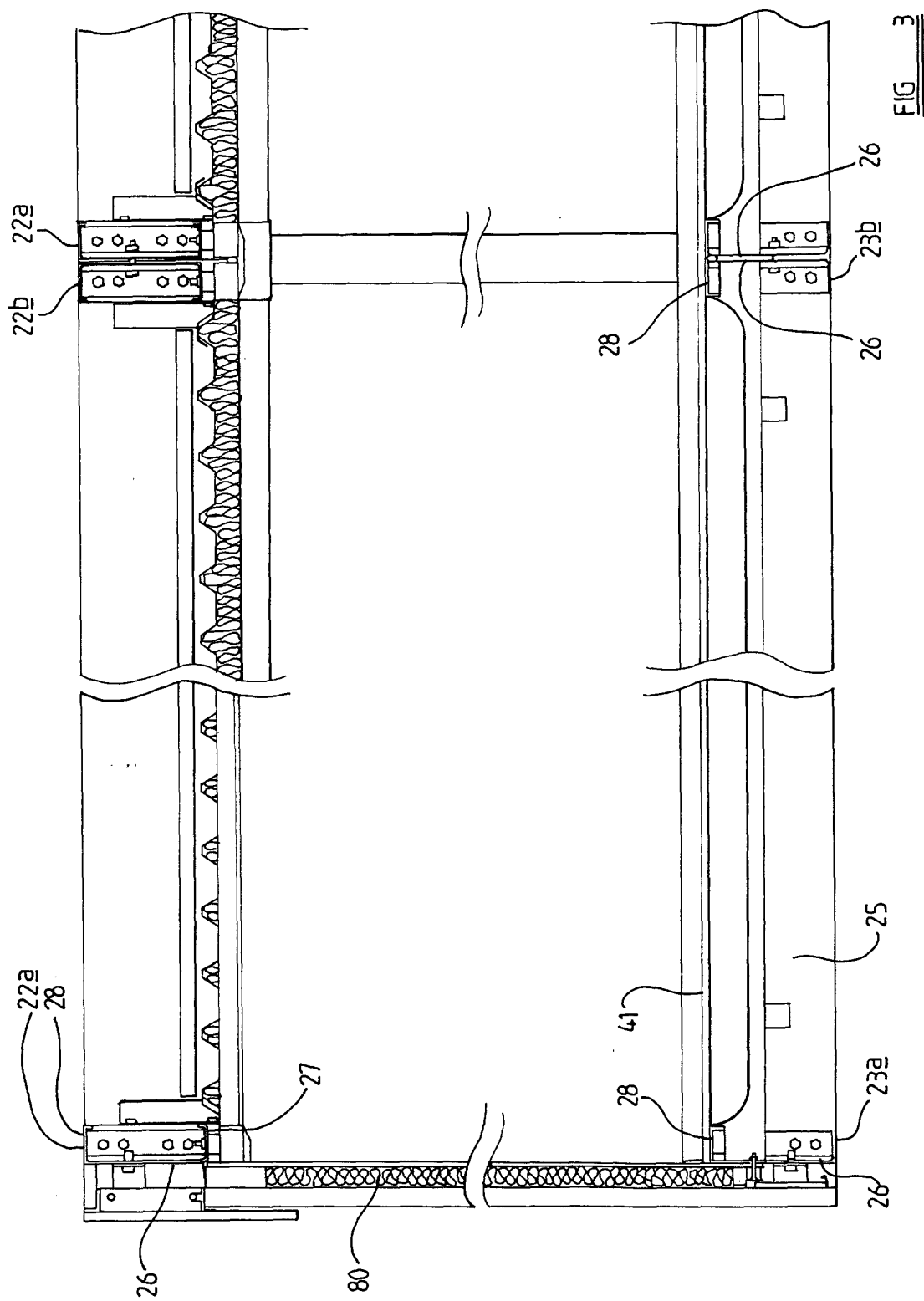
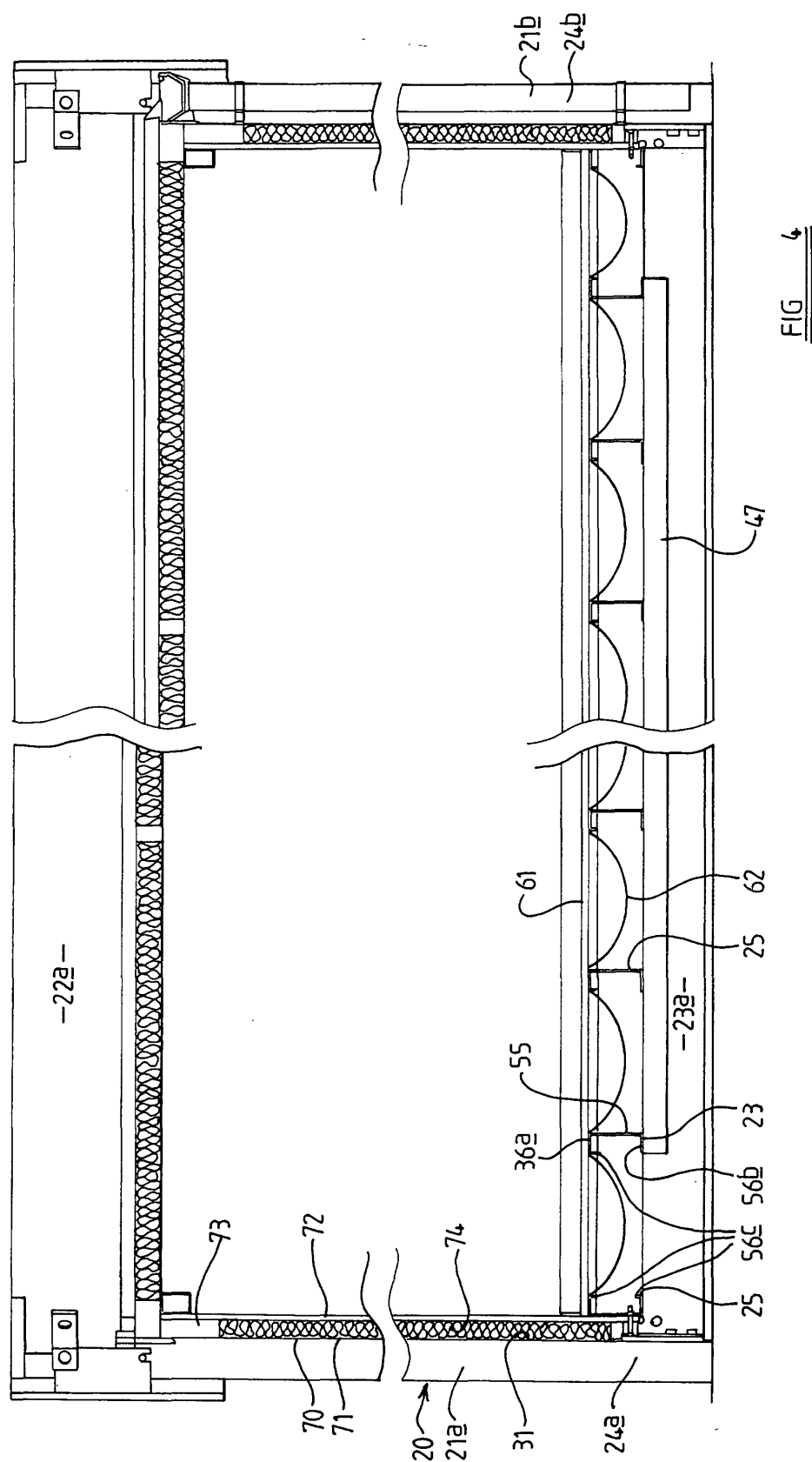


FIG 1







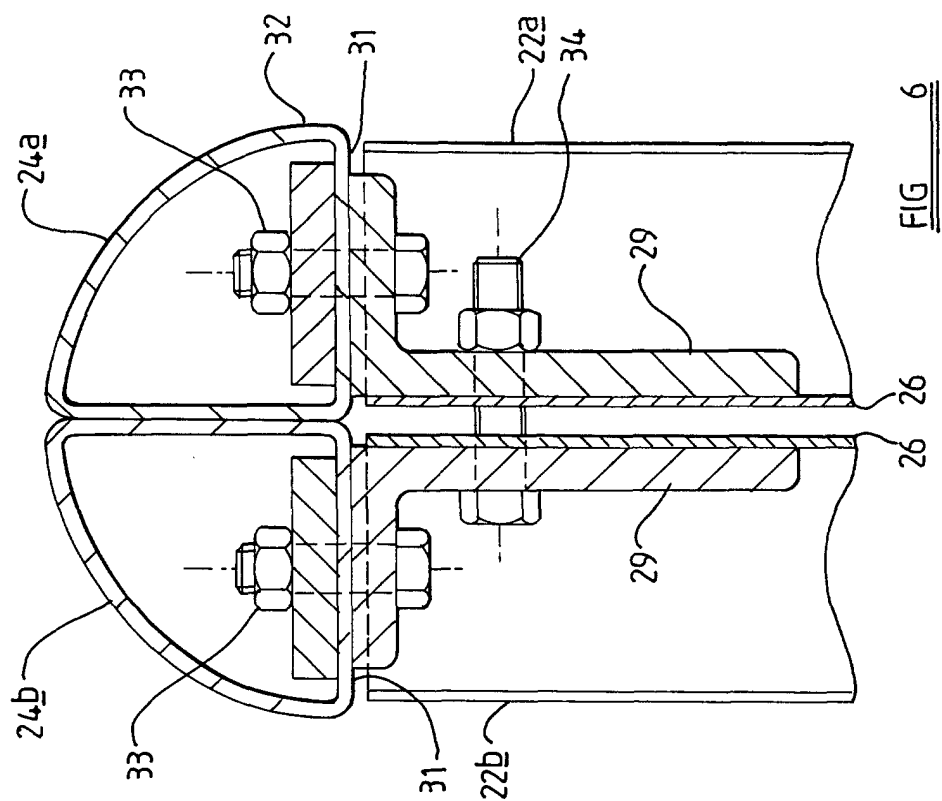


FIG 6

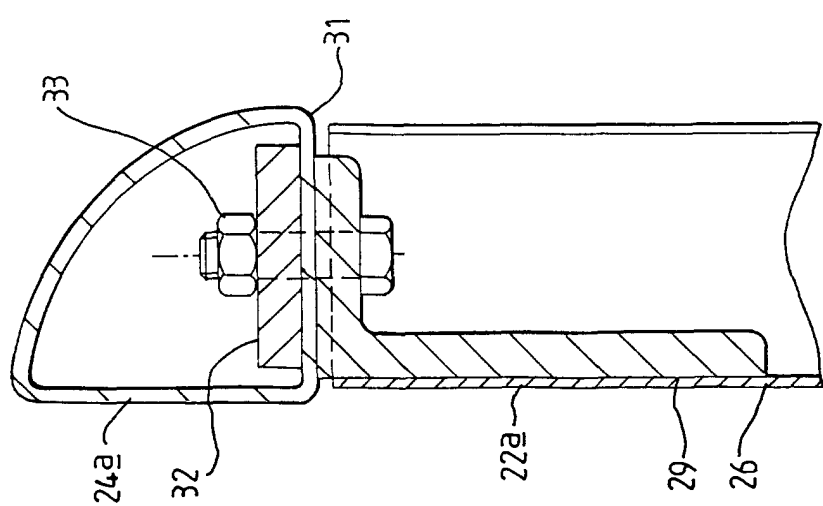


FIG 5

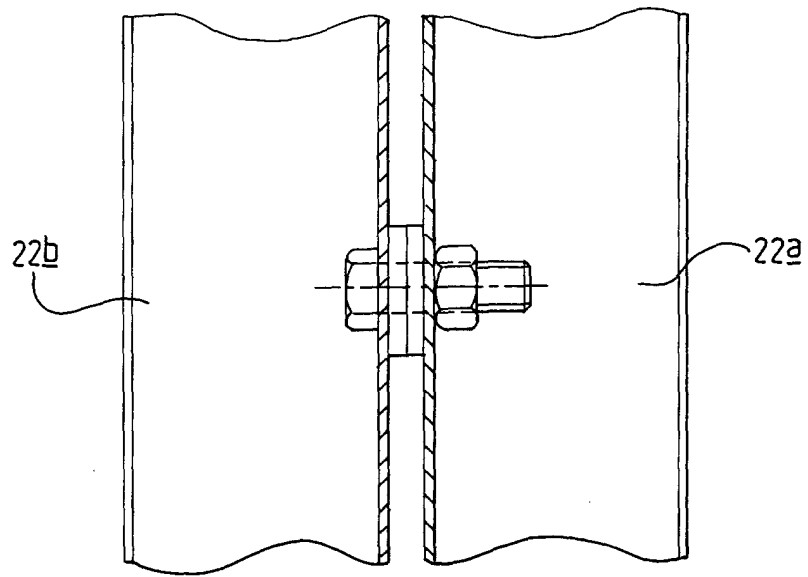


FIG 7

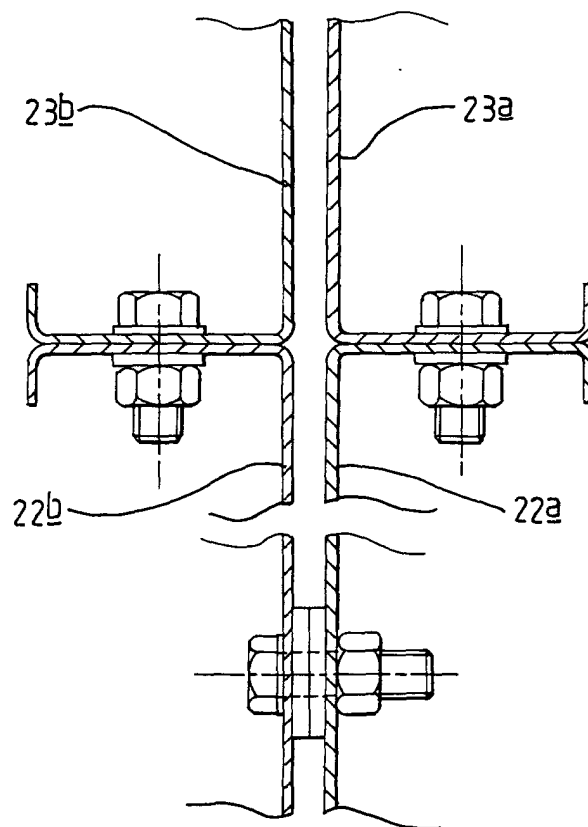


FIG 8

FIG 9

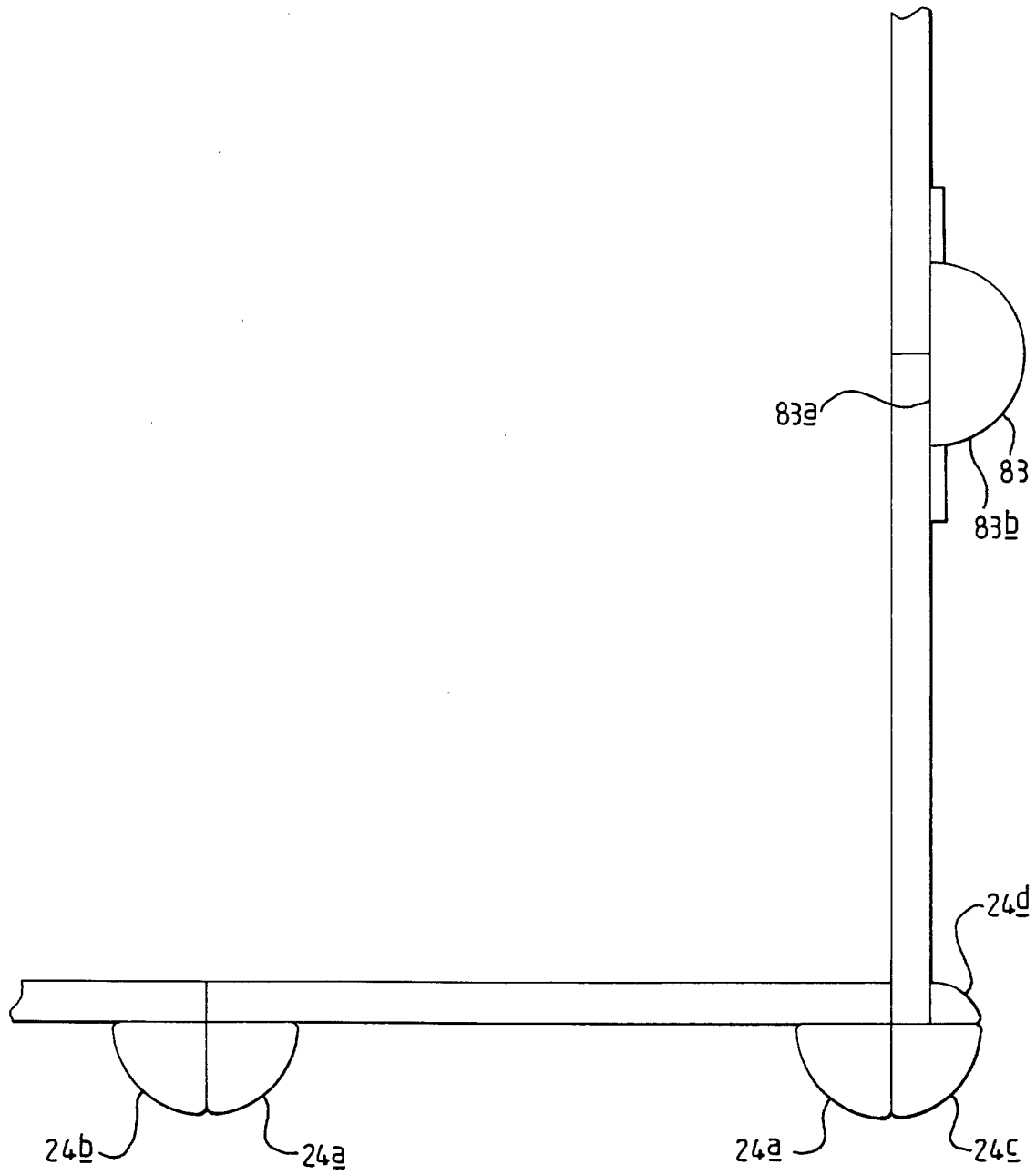


FIG 10

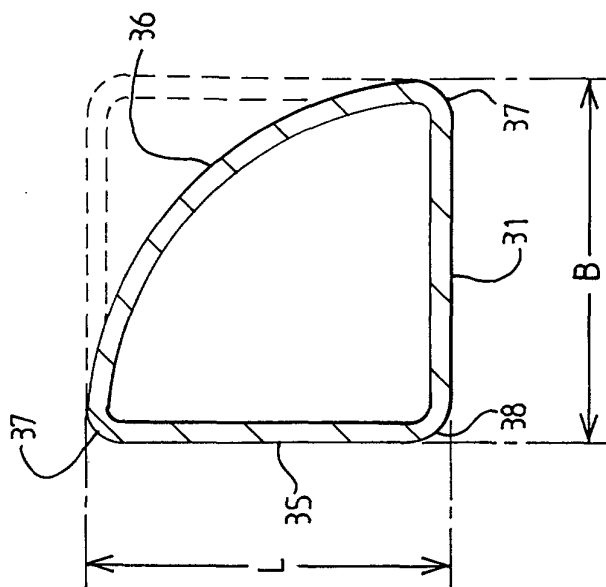


FIG 11

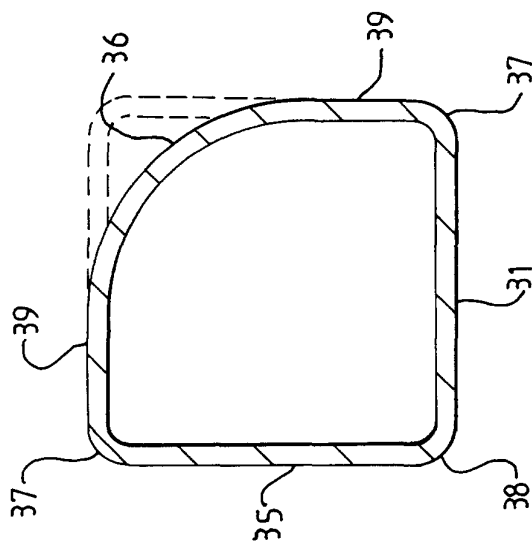
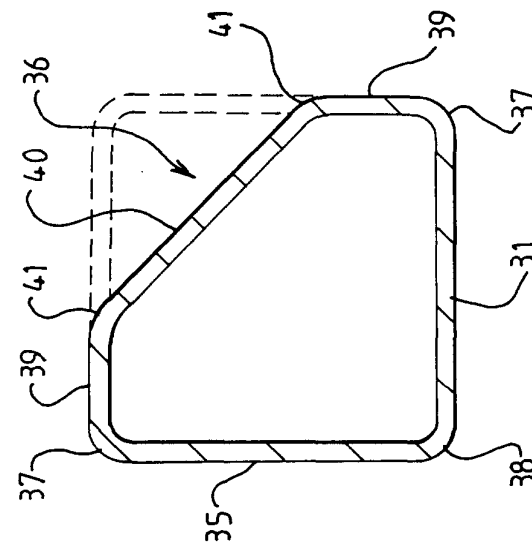
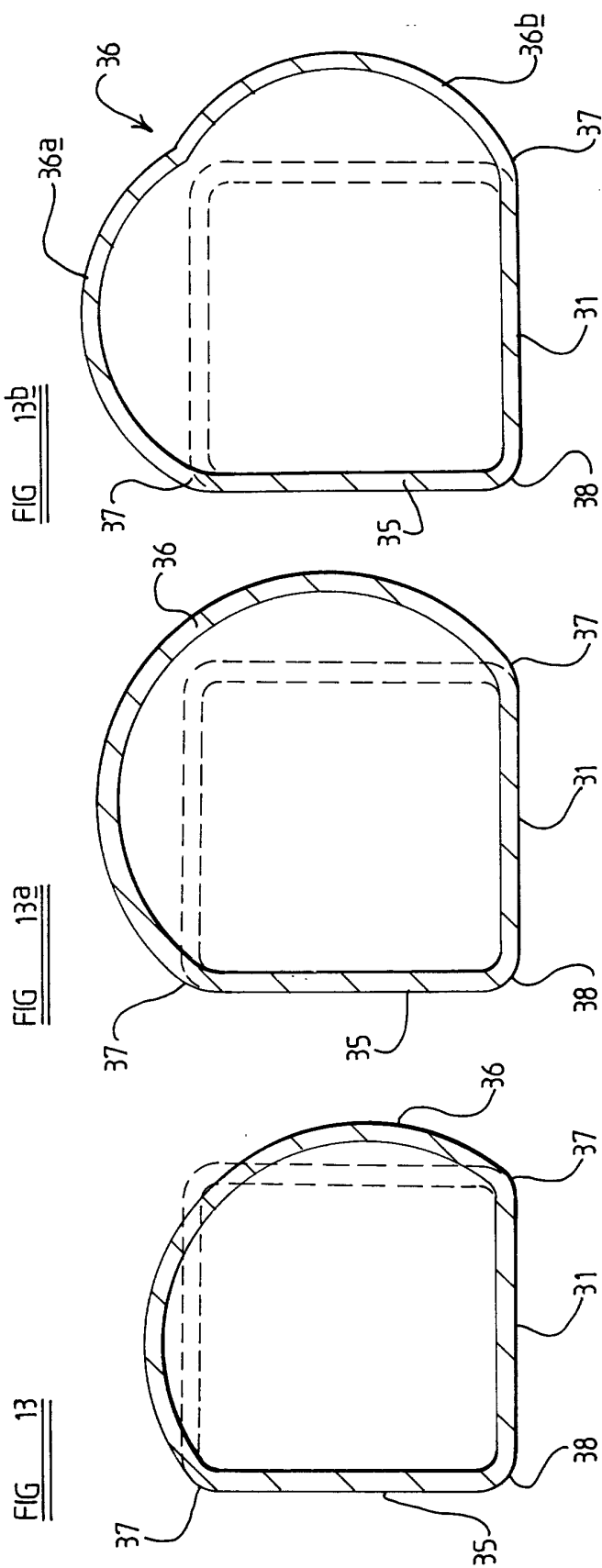
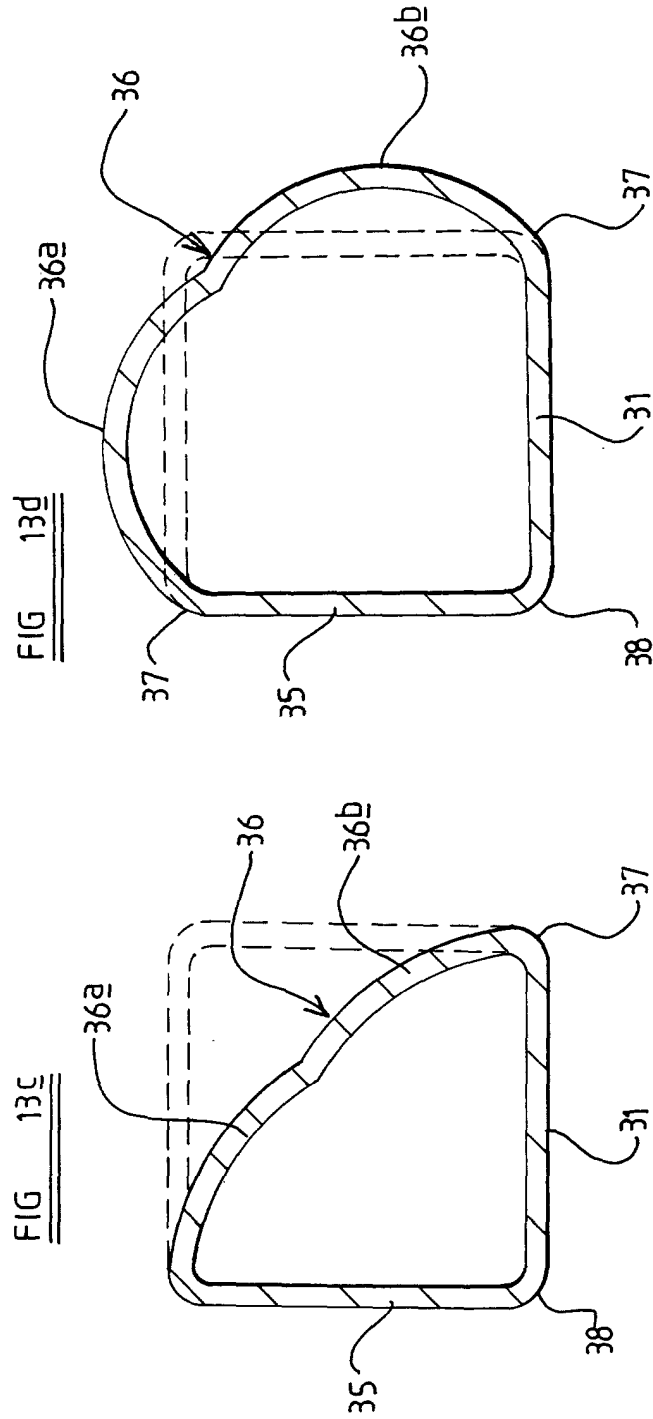


FIG 12







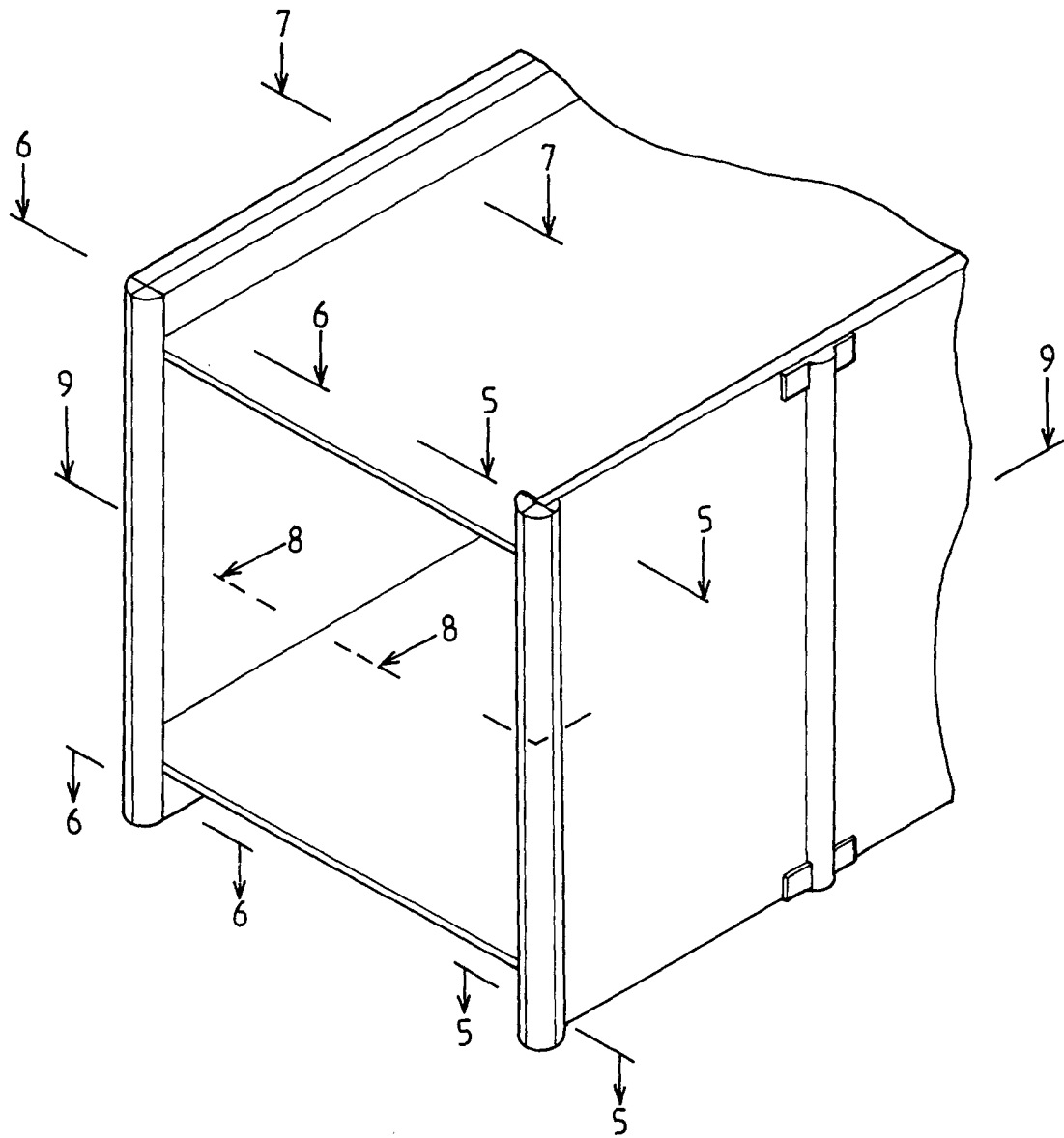


FIG 14



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 10 5798

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 July 2001	Examiner Fordham, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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13-07-2001

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