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(54) **BENCH SEAT**

(57) Bench, consisting of a body (1) comprised of three longitudinal panels (5, 6 and 7) which in turn consist of as many extruded profiles, provided on their longi-

tudinal adjacent edges with tongue and groove coupling and attachment means. This body is supported by legs (2) that are attached to the bottom of the panels (5 and 7).

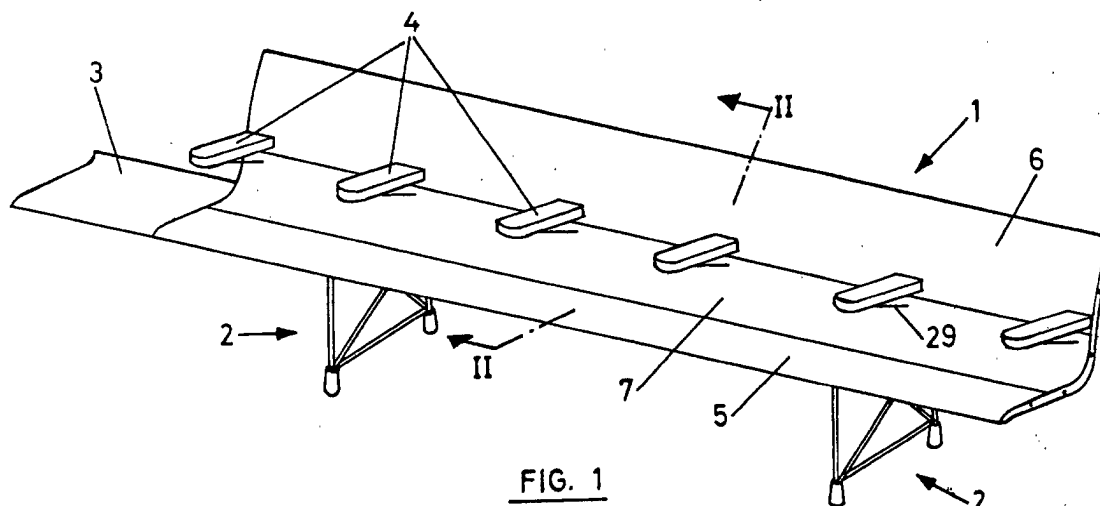


FIG. 1

Description

[0001] The present invention relates to a bench, specifically designed for public spaces, which consists of a body defining the back and the seat that rests on supporting legs.

[0002] Benches of the above described type for public spaces are generally conceived as sturdy assemblies, both as regards the seat body and the supporting legs. When the benches are installed out of doors, traditional materials are stone, wood, iron and concrete. When they are meant for use indoors, in addition to the above materials it is common to use plastic material, particularly for the seat body.

[0003] Whichever materials are used, at least the seat body consists of a single part; the supporting legs can be included in said body or be independent of it.

[0004] The object of the present invention is a bench with a different construction, fundamentally relying on a different structure of the seat body that allows manufacture with known and used materials and methods.

[0005] According to the present invention, the seat body of the bench is comprised of three hollow longitudinal panels, of equal length, made of metal, preferably aluminium and obtained by extrusion. The two end panels are identical, with a substantially flat shape, and are meant to determine the back and the seat, while the intermediate panel is transversally bent at an angle greater than 90°, with a rounded inner and outer vertex, to define a transition area between the seat and the back.

[0006] The three panels that form the bench have adjacent longitudinal edges that are provided with means for coupling and attachment by a tongue and groove configuration. These means consist of a longitudinal protruding tongue and a groove having an equal section, transversally inclined and arched, with a free edge and a curved base. The tongue and the groove have a section that is limited by two greater concave and convex edges with different radii, slightly convergent, and joined by a convex segment or profile. The convex side of the longitudinal tongue has a right-angled longitudinal recess with one of the edges defining said angle being bevelled.

[0007] The transverse edges of the three panels are open and placed coplanar to each other, being closed on either side by a common cover that is attached to the three panels. With this arrangement, the panels that form the seat body are joined to each other by the longitudinal tongue and groove means and by the transverse covers.

[0008] This attachment can be complemented by locking screws inserted through threaded orifices made in the lower walls of the groove that become part of the coupling means.

[0009] Preferably, the intermediate panel will have the grooves of the coupling means on its two longitudinal edges, while the end panel shall have the corresponding longitudinal groove on the edge adjacent to the central

panel.

[0010] The bench of the invention is completed by legs made by a structure comprised of steel rods joined on one side to a baseplate of the bench body, while on the opposite end they form segments defining support feet.

[0011] In the bench of the invention the seat body can be prolonged, at least on one side, in the form of a table comprised of two panels: an anterior panel identical to one of the end profiles of the seat body and a posterior panel with a similar structure that reaches the start of the curvature of the intermediate seat panel. The two panels that form the table are provided on their adjacent edges with coupling means similar to the panels of the seat body. In addition, the two panels of the table are connected to the adjacent panels of the body of the bench by a bottom plate that is bolted to both sets of panels.

[0012] Lastly, the bench of the invention can include armrests consisting of a substantially flat body, from the rear of which emerge stems that can be inserted in the orifices of the panels to which they are secured by screws.

[0013] All of the above described characteristics and others of the invention, as set forth in the claims, will be described in what follows in greater detail with the aid of the accompanying drawings, in which a non-limiting example of an embodiment is shown.

[0014] In the drawings:

Figure 1 is a perspective view of a bench constructed according to the object of the invention.

Figure 2 is a cross section of the bench along the line II-II of figure 1, in an enlarged view.

Figure 3 is a profile view of one of the end panels of the seat body.

Figure 4 is a profile view of the intermediate panel of the seat body.

Figure 5 is a profile view of the two panels that form the table, attached to each other.

Figures 6 and 7 are details of the assembly or coupling between successive panels.

Figure 8 is a front view of one of the covers that close the end segments of the seat body.

Figure 9 is a perspective view of one of the seat legs.

Figures 10, 11 and 12 are, respectively, a side elevation, front elevation and plan view of the leg assembly of figure 9.

Figures 13 and 14 are, respectively, a plan view and a side elevation view of the plate that connects the table and the bench body.

[0015] Figure 1 shows a bench comprised of a body labelled by the number 1, support legs labelled by the number 2, a side table 3 disposed as a prolongation of the seat area of the body 1 and an armrest 4.

[0016] The bench body 1, as can be seen in figure 1,

is comprised of three longitudinal panels, two end panels labelled 5 and 6 that are identical to each other and an intermediate panel 7. The three panels are hollow and are comprised of an equal number of extruded aluminium profiles, of narrow width, provided between their greater walls with reinforcement partitions 40.

[0017] The panels 5 and 6 are substantially flat, with a slight transverse curvature on the end and respectively define a seat area and a back area, and are connected to each other by the intermediate panel 7 that determines a transition area between the seat area 5 and the back area 6 that has a transverse elbow with an angle greater than 90°, with the vertex rounded on the inside and on the outside.

[0018] The three panels are provided along their adjacent edges with a tongue and groove coupling system. This system, as can be best seen in figures 3 and 4, consists of a longitudinal groove 8 established along the longitudinal edges of the panel 7, and a tongue 9 provided along the longitudinal edge of the panels 5 and 6 adjacent to the intermediate panel 7. Said groove 8 and tongue 9 have an equal section, transversally inclined and arched, limited by two greater edges curved in the same sense but with different radii, which are labelled in the tongue 9 by the numbers 10 and 11 and in the groove 8 by the numbers 10' and 11'. The edge 11-11' has the greater radius and the two edges converge slightly to end in a rounded edge in the tongue 9 and in an also rounded base in the groove 8. The tongue 9 is provided in its convex edge 11 with a longitudinal recess 12 with a right-angled profile, with one of the edges ending in a bevelling 13.

[0019] In order to assemble the body of the bench, as shown in figures 6 and 7, the tongue 9 of the panels 5 and 6 is coupled to the opposing groove 8 of the panel 7. For this purpose, as shown in figure 6, the rounded edge of the tongue 9 is placed opposite the opening of the groove 8, with the panels 5 and 7 defining a certain angle. Then the panel 5 is turned with respect to the panel 7, while the tongue 9 is gradually inserted in the groove 8 until a full coupling is achieved, as shown in figure 7. The same process is followed for the panel 6, which will define the back area, and the intermediate panel 7.

[0020] In order to secure the assembly of the panels, the panel 7 is provided on its bottom surface near the groove 8 with a threaded orifice 14 through which can be inserted a locking screw that will rest against the opposite surface of the recess 12 of the tongue 9, preventing said tongue, together with the panel 5, from turning with respect to the panel 7 in the sense that would uncouple them.

[0021] With this arrangement the bench body assembly formed by the three described panels is secured.

[0022] The panels 5, 6 and 7 are equal in length, so that their open end sections are coplanar on either side and are closed by a cover 15, figure 8, with an outline that matches that of the transverse edges of the bench

body and is provided with orifices 16 for passage of screws that are threaded in the inner cells 17 of the panels, thereby securing the assembly of the bench body without risk of separation of its component elements.

[0023] The bench body described is supported by the legs 2, which are comprised of structures of steel rods as shown in figures 9 to 12. In the example shown each leg consists of two rods folded into a C-shape, labelled 19 and 20, with two diverging side branches with different inclination and length. These two C-bars are connected through the central branch by a plate 21, after which the corresponding side branches converge to end in end segments 22 that are set against and joined to each other, with a reinforcement cross bar 23 running between the start of them.

[0024] The plate 21 rests on the bottom surface of the bench body, partly on the panel 5 and partly on the panel 7, and is joined to these by screws passing through the orifices 24 of the plate 21 and are attached to the threaded orifices of the panels 5 and 7 not shown. It is possible to couple flanges 26 to the end segments 22, attached by locking screws 27.

[0025] The bench body can include armrests 4, which determine a supporting body that is the armrest itself, from which extend rear tubular stems 28, internally threaded starting at their free end, and one or more lower tubular rods 29 also internally threaded starting at their free ends that pass through the orifices of the anterior wall of the panels 6 and 7 and are placed opposite the orifices of the rear wall of said panels, through which are inserted locking screws, not shown.

[0026] As shown in figure 1, the bench of the invention can include a table 3 as an extension of the seat area. This table 3, as shown in figure 5, is comprised of two hollow panels labelled 30 and 31 in turn comprised of as many extruded aluminium profiles. The panel 30 is identical to the end panels 5 and 6 of the body of the bench, while panel 31 is identical to the intermediate panel until the start of its curvature, so that the top of the table 3 is disposed exactly as an extension of the top surface of the seat area of the bench. Said panels 30 and 31 are provided on their adjacent longitudinal edges with coupling means identical to those described with reference to figures 3 and 4, consisting of a groove 8' and a tongue 9', with identical characteristics as described above. The end transverse edge of the top of the table 3, formed by the panels 30 and 31, is also closed by a cover similar to that described with reference to figure 8 but which matches the path of the edges of the panels 30 and 31, with the attachment effected by screws as described above.

[0027] The panels 30 and 31 can also be joined on the bottom by a plate 32, figures 13 and 14, that is provided on one of its surfaces with a longitudinal reinforcement rib 33. This plate is provided with orifices 34 and is sized so that it rests on the panels 30 and 31 of the table top and also on the panels 5 and 7 of the bench, being attached to all of these panels by screws passing

through the orifices 34 and threaded in the threaded orifices of said panels.

[0028] With the above-described construction a light-weight and very sturdy bench with a stylised profile is obtained, which is also easily transportable and storable in a disassembled position.

[0029] The outer surface of the panels 5, 6 and 7 can be longitudinally ribbed except on the free longitudinal edges of the panels 5 and 6.

[0030] The inner surface of the bench body could be upholstered, such as with removable pillows.

Claims

1. Bench consisting of a body (1) that defines the back and the seat and is supported by legs (2), **characterised in that** said body is comprised of three hollow longitudinal panels of equal length, two end panels (5, 6) that are identical and substantially flat, that form the seat and the back, and an intermediate panel (7) transversally bent that defines a transition area between the seat and the back; these panels are provided on their adjacent longitudinal edges with tongue and groove coupling and attachment means (8, 9), while their transverse edges are open and are closed on both sides by a common cover (15) that is attached to the three panels; and **in that** the legs (2) are attached to the bottom of the end panel (5) that defines the seat and to the intermediate panel (7) by means of screws that are threaded in nuts embedded in said panels.

2. Bench according to claim 1, **characterised in that** the panels (5, 6, 7) consist of extruded metal profiles, preferably of aluminium, that are provided with intermediate reinforcement partitions (40) between their greater walls.

3. Bench according to claim 1, **characterised in that** the panels (6, 7) corresponding to the back and the transition area are provided on their greater walls with opposing orifices for anchoring and attaching the armrests (4).

4. Bench according to claim 1, **characterised in that** the tongue and groove means for coupling and attaching the longitudinal edges of the panels consist of a longitudinal groove (8) and a longitudinal tongue (9) of identical section, transversally inclined and arched, with a free edge and curved base, with the tongue having a longitudinal recess (12) on the convex side.

5. Bench according to claim 4, **characterised in that** the groove (8) and the tongue (9) that define the coupling and attachment means have a section limited by two greater edges (10, 11 - 10', 11') curved

in the same sense but with different radii, slightly convergent and joined by an end convex segment.

6. Bench according to claim 4, **characterised in that** the recess (12) of the longitudinal tongue has a right-angled profile with one of the edges (13) defining said angle being bevelled, while the opposing wall of the longitudinal groove has a threaded orifice (14) meant to receive a locking screw that rests on one of the surfaces defined by the right-angled profile

7. Bench according to claim 1, **characterised in that** longitudinal edges of the panels including the coupling and attachment means are flat, and approximately perpendicular to the adjacent areas of the greater surfaces of said panels.

8. Bench according to claim 1, **characterised in that** the end panels (5, 6) are substantially flat and have a band adjacent to the free longitudinal edge that is slightly outwardly curved, with a diminishing thickness and ending at a rounded edge.

9. Bench according to claim 1, **characterised in that** the intermediate panel (7) is provided at its two longitudinal edges with the groove (8) that forms part of the coupling and attachment means between panels, while the end panels (5, 6) are provided, after their longitudinal edge adjacent to the intermediate panel, with the tongue (9) that completes said coupling means.

10. Bench according to claim 1, **characterised in that** each leg (2) consists of a structured formed from steel rods that are joined on one side to a baseplate (21) of the bench, while on the other side they end at segments (19, 20) that define supporting feet.

11. Bench according to claim 10, **characterised in that** each structure consists of two C-frames with divergent side branches of different length and inclination, which frames are disposed with their central branches parallel and connected by baseplates (21) that rest on and are attached to the end panels (5) and the intermediate panel (7) and are secured to these by screws, while the side branches (19, 20) of each side converge towards each other until their ends meet, after which they continue as parallel segments (22) that are set abutted and joined to each other to form the supporting feet, with the ends of the side branches of either side and their continuation joined by an intermediate crossbar (23).

12. Bench according to claim 1, **characterised in that** the seat body is prolonged, at least on one side, as a table (3) that is comprised of at least two panels (30, 31) determined by as many extruded aluminium

um profiles, an anterior panel (30) identical to one of the end profiles (5, 6) of said seat body and a rear panel (31) that reaches the end of the curve of the intermediate panel of the seat, with both panels being provided at their adjacent edges with tongue and groove means (8', 9') for coupling and attachment identical to those of the panels of the seat body, with these two panels joined to each other and to the adjacent panels of the seat body by means of a bottom plate (32) that is attached to all of these by screws.

13. Bench according to claim 3, **characterised in that** the armrests consist of a body from which extends rearward two tubular stems (28) threaded internally at their end segment, while from its bottom surface extends a rod (29) inclined backwards that ends as an internally threaded tube, with the tubular segments of the stems and rods meant to be inserted in the orifices of the anterior wall of the panels in order to receive attachment screws inserted through opposing orifices.

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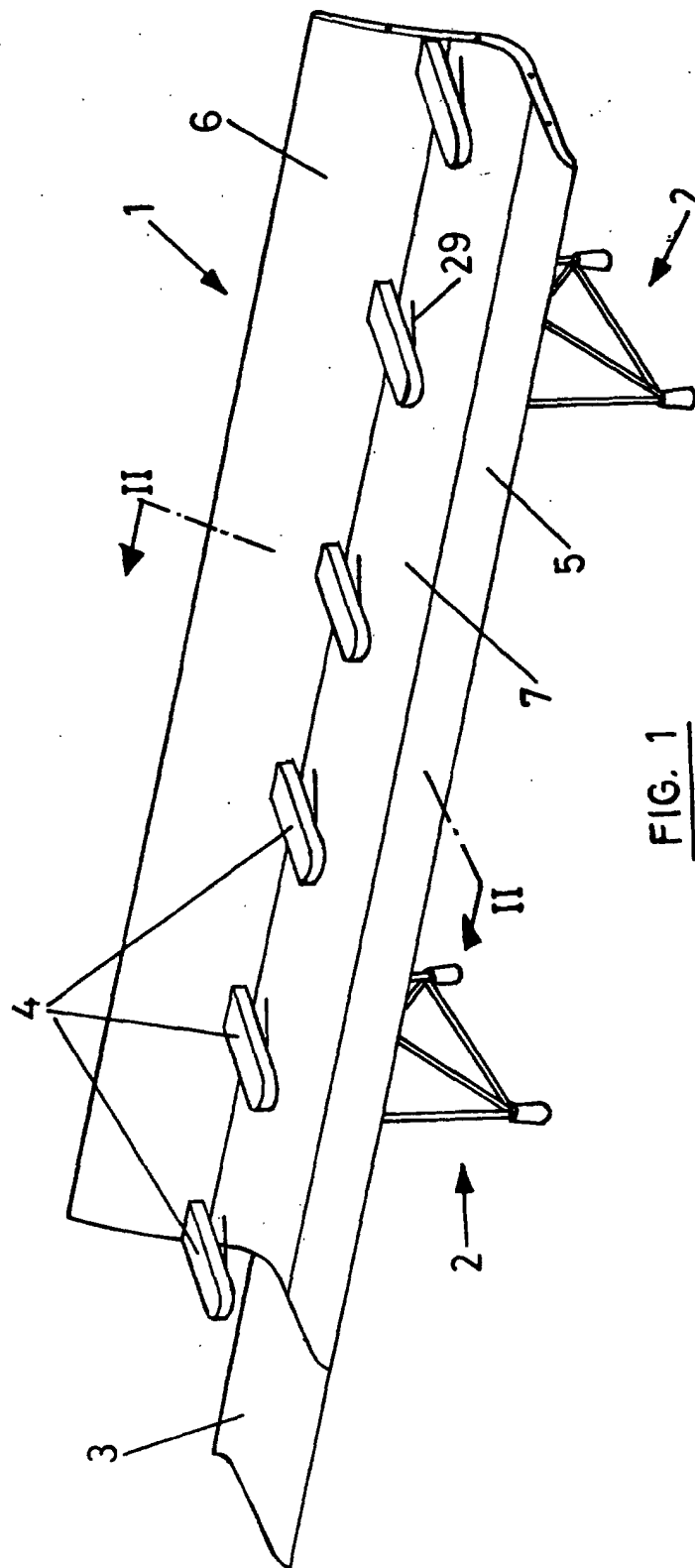


FIG. 1

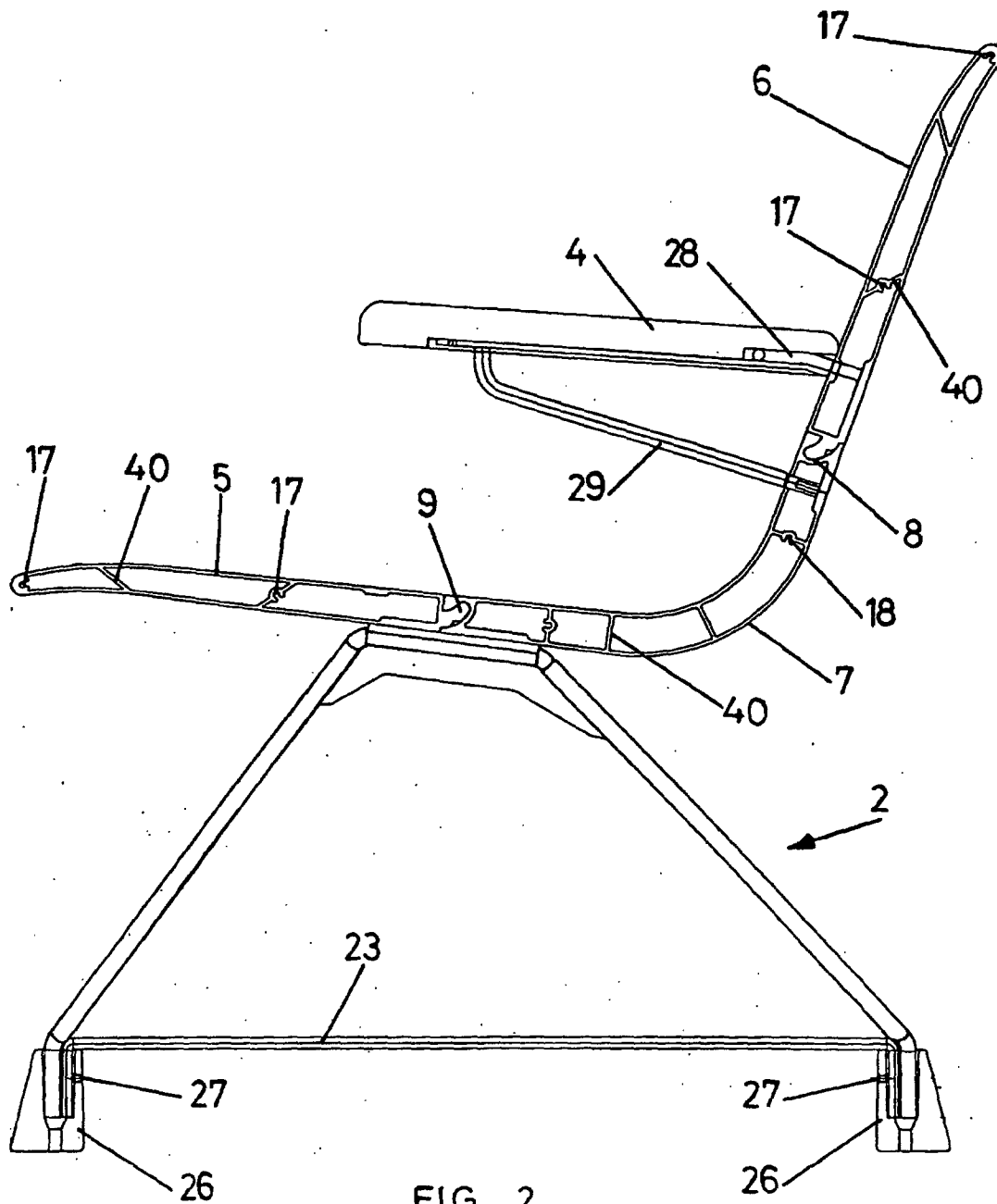
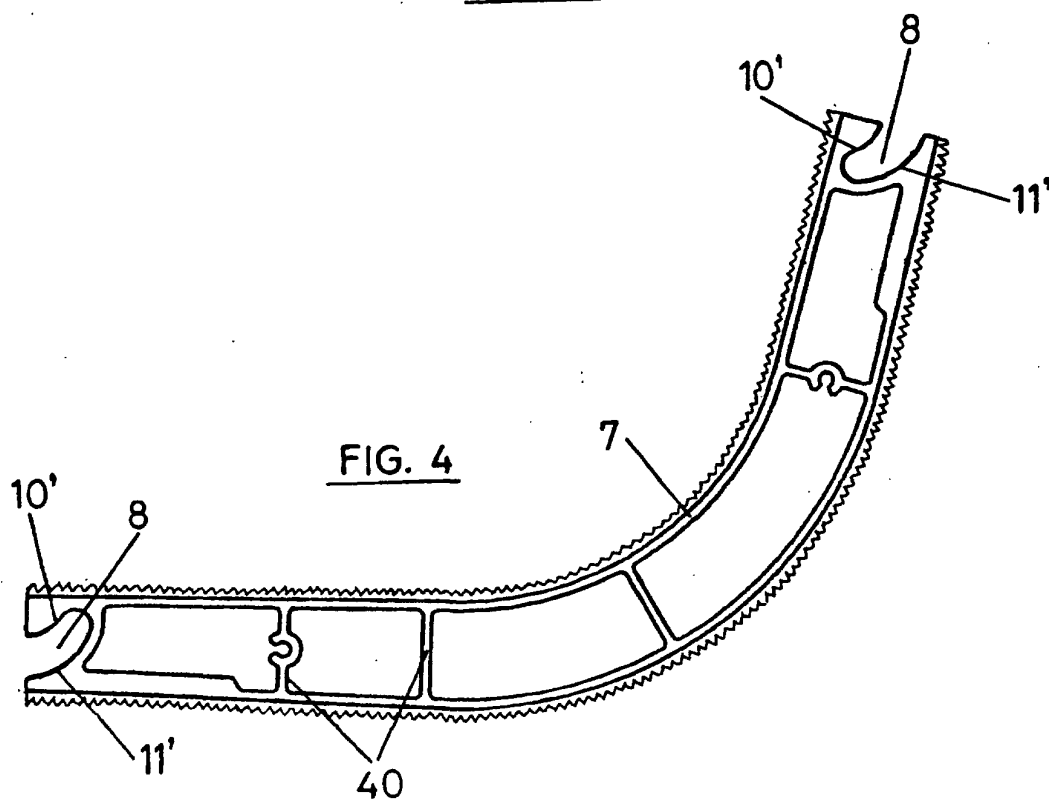
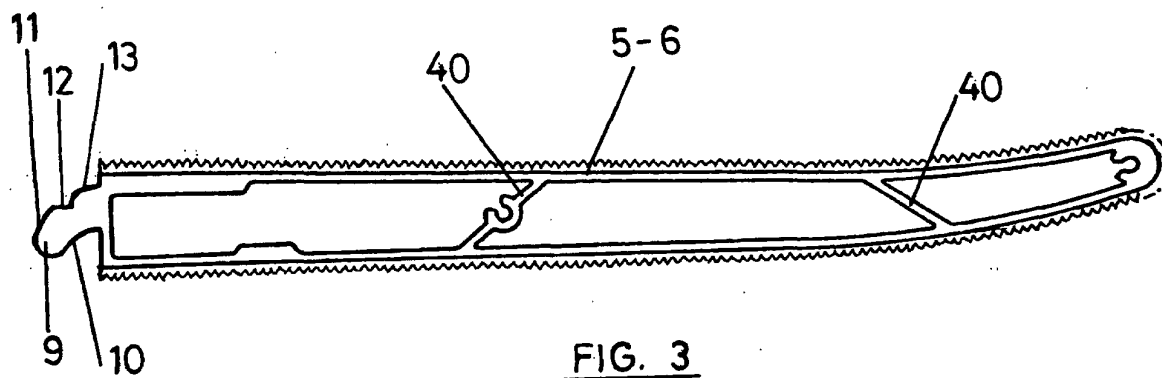
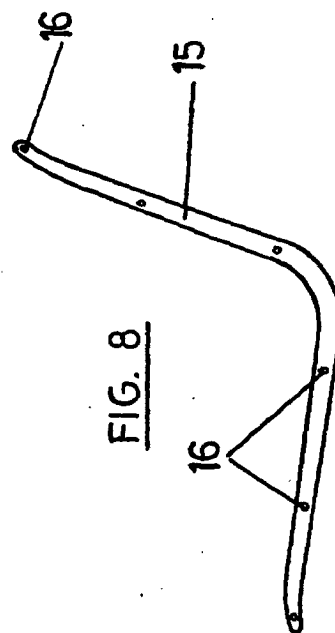
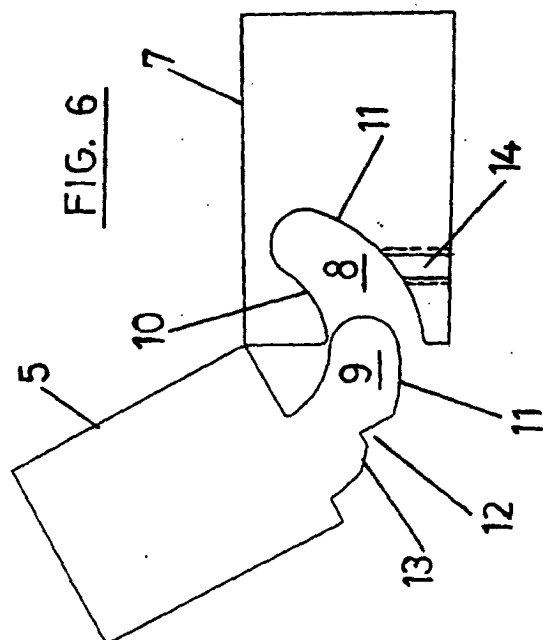
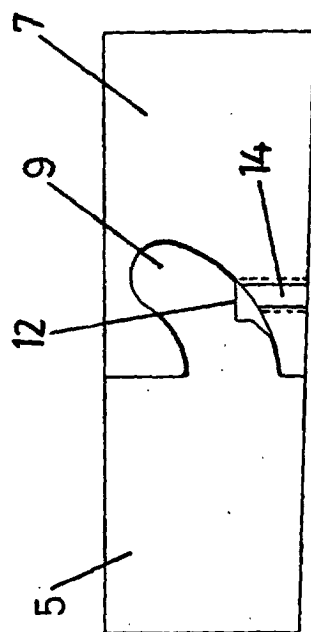
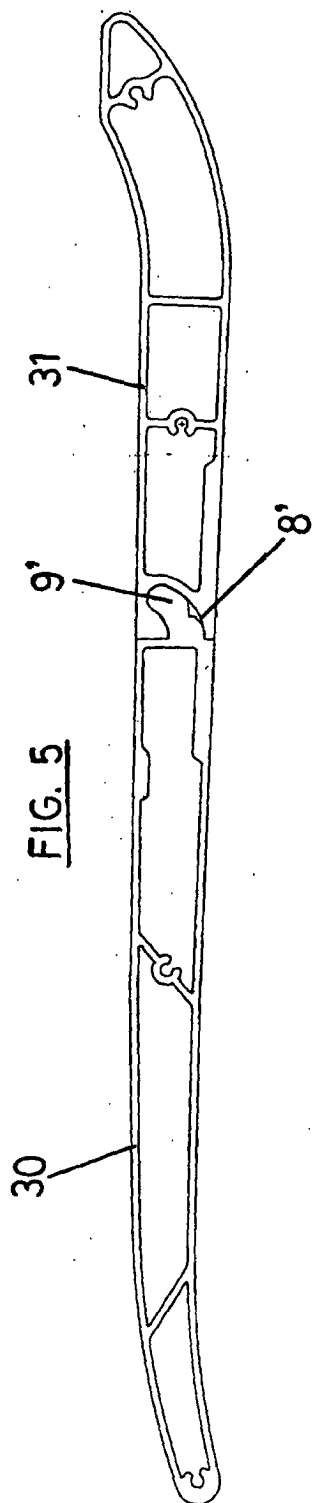
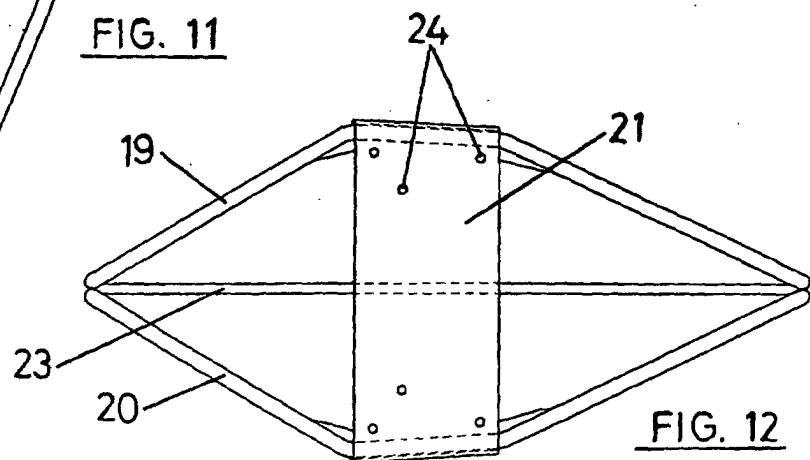
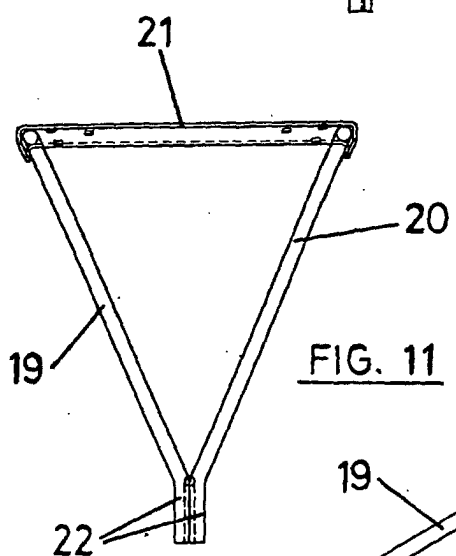
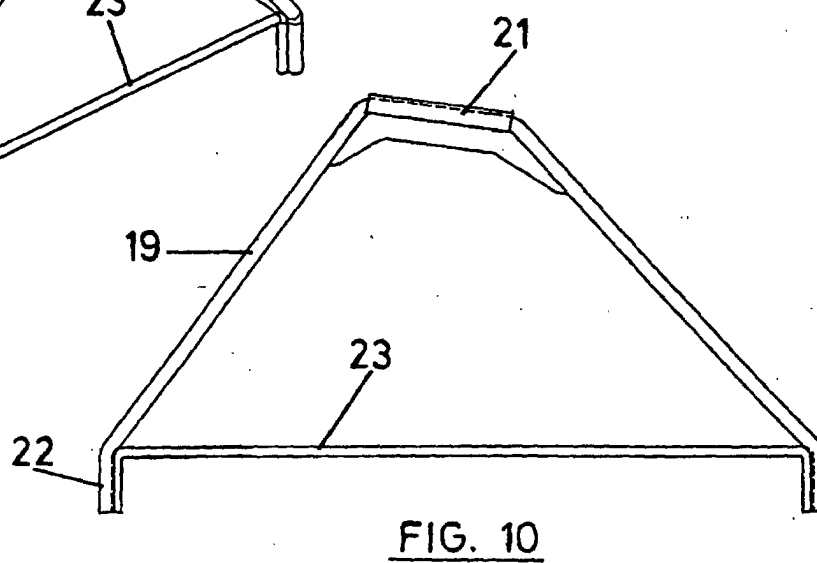
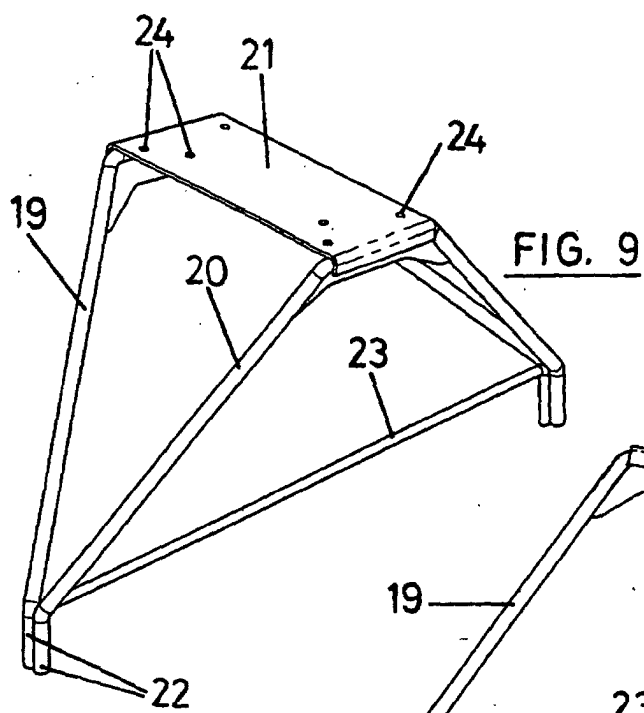
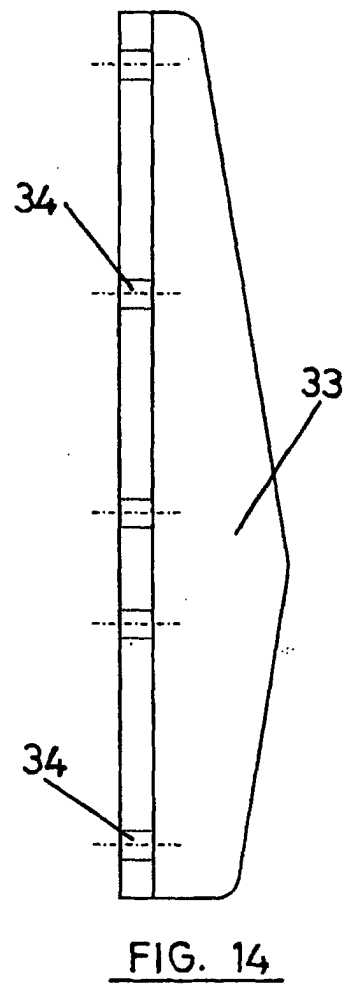
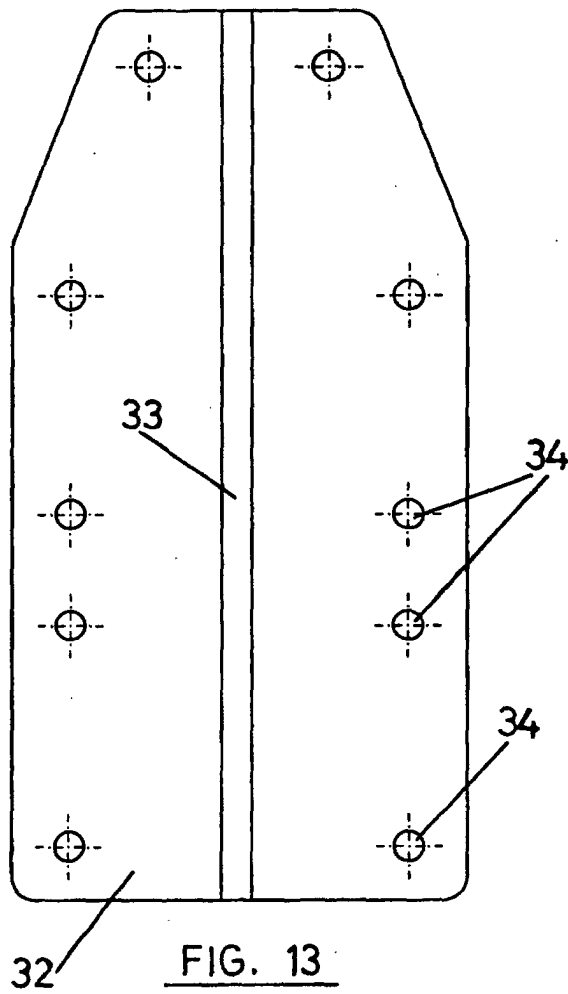


FIG. 2









INTERNATIONAL SEARCH REPORT

International Application No

PCT/ES 02/00493

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A47C13/00 A47C11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47C B60N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 330 594 A (SABLE SA) 30 August 1989 (1989-08-30) figures 2-4	1
A	US 4 580 836 A (VERNEY CLAUDE J) 8 April 1986 (1986-04-08) column 2, line 21 - line 25	1
A	US 5 924 771 A (BAUCH LUTZ ET AL) 20 July 1999 (1999-07-20) figure 1	1
A	US 4 580 841 A (RAFTERY WILLIAM B) 8 April 1986 (1986-04-08) figures 6,7	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

18 December 2002

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02/01/2003

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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