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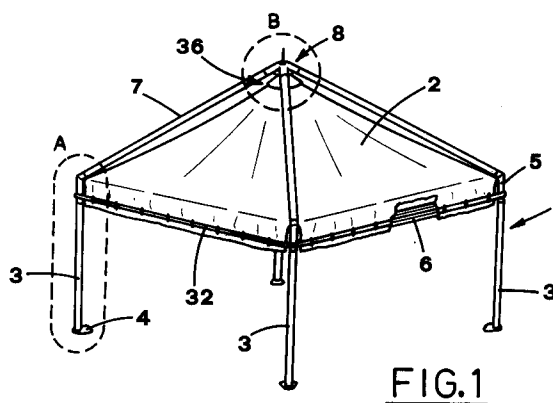
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**INVENTION s.n.c. Via Arienti 26**  
**I-40124 Bologna(IT)**(54) **Structure for supporting light outdoor coverings.**

(57) In a structure to support light coverings for outdoors there are piers 3 are joined, at the bottom, to support feet 4 and disposed on the vertices of a base polygon while a plurality of lateral crosspieces 6 connect the piers 3 at the top. The crosspieces consist of profiled elements which define a longitudinal race 25, into which ringbolts 29 are slideably assembled and locked to fasten a covering cloth 2. Beams 7 are assembled so as to converge in pyramidal form and to insert into a ridge central joint 8 placed at the top. Lastly there are corner joints 5 inserted at the top of the piers 3 to joint a beam 7 and a pair of adjacent lateral crosspieces 6 and means 36 associated with said central joint 8, to fasten and stretch the covering cloth 2.

**FIG.1****EP 0 467 867 A1**

This invention relates to the technical field concerning the manufacture of light outdoor coverings.

It is known that to make outdoor coverings, such as the pavilions commonly called gazebos, light metal structures are generally used.

The structure supporting such coverings generally consists of a metal frame, made up of a number of piers, whose vertices are connected by crosspieces disposed according to the sides of a base polygon; usually crosspieces are disposed to form a square.

Respective beams extend from the top of the piers so as to converge to a point, located at a certain height, where the covering cloth is centrally fastened.

The covering cloth comes down over the crosspieces of the support structure and it is marginally linked to a series of lock rings or ringbolts fastened to the crosspieces.

The erection of the support structure is complicated and often difficult, because of the need to connect the various structure elements consisting of tubular pieces.

It is also quite difficult to assemble the covering cloth, which must be adequately stretched; in fact, slight inaccuracies of assembly may often result in a difficult coupling with the ringbolts fastened to the crosspieces.

Such a problem is particularly felt when the structure is used to build exhibition stands and other temporary coverings, since the costs of labour for assembling and disassembling the structure become considerable.

Furthermore, the support structure mentioned hereinbefore is not very versatile. In particular, the assembly of perimetrical walls is impossible, except by using elements additional to said structure which make its erection even more complicated.

Another drawback is the impossibility to rationally dispose electric current cables and the like, which are in most cases required when covering is used. Therefore such cables are left uncovered, with bad aesthetic effect and danger for whom the covering uses.

One of the objects of the present invention is to provide a support structure which makes it possible to build light outdoor coverings in a simple and quick way, while making the erection of such a structure remarkably easier.

A further object of the present invention is to provide a support structure for light outdoor coverings, that is simple in construction, functional and reliable, as well as versatile to be used.

The objects mentioned hereinbefore are achieved through a support structure substantially made as described in the appended claims.

The erection of the structure described hereinafter is very simple and quick.

Once the assembly has been completed, a basic continuity among the coupled elements is achieved.

Useless encumbrances are avoided, to the advantage of mechanical strength and of the aesthetic look of the structure.

Furthermore, the structure herein described allows to simplify the assembly of a covering cloth, by means of ringbolts that can be fastened exactly in the desired position, according to the type of covering cloth used.

The structure made in accordance with the invention has modular features which make it possible to comply with the different requirements of construction of covered spaces.

In particular, it is possible to join two or more of these structures together.

The modularity and versatility of such a structure allow to comply with the most different requirements, both in gardens and in similar places, and to build exhibition stands in the shortest possible time.

Also the erection and stretching of the covering cloth result to be quick and easy, particularly thanks to the insertion of ringbolts into the races provided along crosspieces of the structure.

Furthermore, the profiled elements making up the structure crosspieces allow to house electric wires and the like in a rational way, as well as to assemble folding walls for perimetrical covering.

To assemble folding walls it is necessary just to insert support slides into relative groove of the crosspieces.

The invention will be described further, by way of example, with particular reference to the accompanying drawings, in which:

- Fig. 1 is a perspective view of the support structure for light outdoor coverings conforming to the present invention;
- Fig. 2 is an enlarged view of detail A of Fig. 1;
- Fig. 3 is an enlarged view of detail B of Fig. 1;
- Fig. 4 is a vertical cross-section of means for fastening the covering cloth;
- Fig. 5 shows a corner zone of the structure in a phase during which the covering cloth is fastened;
- Fig. 6 is a partial view of a folding wall of the structure made in accordance with the invention;
- Fig. 7 is a detailed view of a part of said folding wall;
- Figs. 8 and 9 are respectively a vertical cross-section and a plan view of a joint connecting two structures disposed side by side.

Referring to the above-mentioned figures, the numeral 1 designates the structure supporting a

covering cloth 2, for making a gazebo.

The structure 1 comprises a plurality of piers 3 that can be joined, at the bottom, to respective support feet 4.

The piers 3 are designed to be disposed vertically, being placed at the vertices of an ideal base polygon; in particular, the piers 3 are disposed at the vertices of a square.

The piers 3 are connected at the top by crosspieces 6 disposed along the sides of the base polygon. The crosspieces join the piers by means of angular joint means 5.

Respective beams 7 extend from the top of the piers 3, so as to result inclined and converging in pyramidal form to a ridge central joint means 8, to which they are connected at the top.

The piers 3 and the beams 7 consist of tubular elements with circular section, preferably made of aluminium.

The support feet 4 of the structure 1 comprise a tube 9 supported by a base 10, which has a circular sector shape and is provided with two holes 11 for fastening to the ground.

Each pier 3 is joined, at its lower end, to the tube 9 of the support foot 4 and is locked by a screw 12 crossing respective corresponding holes 13, 14, of the same pier and tube.

The corner joint means 5 comprise a tubular body 15, disposed vertically and comprising a lower tube 16 and an upper tube 17, for joining to a pier 3 and to a beam 7 respectively.

The lower tube 16 is coaxial to the body 15, while the upper tube 17 is inclined, preferably according to a 30-degree angle with respect to a horizontal plane.

The corner joint means 5 is locked to the pier 3 by a screw 18 which crosses a hole 19 of the same pier and a corresponding hole (not illustrated in the drawings) of the tube 16.

Two brackets 20, disposed orthogonal to each other, extend from the body 15 of the corner joint means 5 so as to be coupled with respective lateral crosspieces 6.

The brackets 20 consist of portions of channel-section profiled elements, disposed with their hollow side turned outwards.

The inclined upper tube 17 of the corner joint means 5 is disposed on a vertical plane which is median to the angle formed between the brackets 20.

The lateral crosspieces 6 consist of profiled elements, preferably of aluminium, with a recess for the insertion of the brackets 20 of the corner joint means 5.

Further the crosspieces 6 have a plurality of longitudinal grooves.

More precisely, each profiled element has a longitudinal recess 21 with a "C" section, delimited

by two vertical walls 20a, 20b, and two opposite horizontal walls 20c, 20d.

The brackets 20, are inserted into the recess 21 at both the ends of each profiled element.

The brackets are subsequently fastened therein by means of a pin 22 that crosses holes 23 and 24 respectively made on the upper wall 20c of the profiled element and on the corresponding wall of the bracket.

The lateral wall 20b of the profiled element delimits a race 25 at one side, while opposite folded edges 20e delimit the same race at its bottom and at its top.

The lateral wall 20a of the profiled element, opposite to the lateral wall 20b, delimits two grooves 26 and 27, one overlapping the other, at a side of them, while folded lower edges 20f and 20g delimit these two grooves at the bottom.

The top of the lower groove 27 is delimited by the folded edge 20f while the top of the upper groove 26 is delimited by the upper wall 20c.

A further groove 28 is delimited by folded edges 20h, along the lower face of the profiled element.

Rings or ringbolts 29 are slidably inserted into the race 25, turned to the outside, of the crosspieces 6, in order to fasten the covering cloth 2.

Each ringbolt 29 consists of a ring protruding from a small plate inserted into the race 25 and then locked therein by means of a screw 30.

The rings of the ringbolts 29 are designed to cross corresponding eyelets 31 provided along the edge of the covering cloth 2; then a band 32 is made to cross the ring of the ringbolts to fasten the cloth.

The central joint means 8 consists of four tubular elements 33, made integral with a cone-shaped cap 34 so as to result disposed converging in pyramidal form.

Respective tubes 35 extend from the tubular elements 33 and insert into the upper ends of the beams 7.

Fastening means 36 are associated with the central joint means 8 to fasten and stretch the covering cloth 2.

The fastening means 36 comprise two conical caps 37 and 38.

These caps have a complementary shape, and a hole made at their vertex for the insertion of a threaded bar 39.

The covering cloth 2, that has a hole in its centre, is interposed between the caps 37, 38.

Then the caps 37 and 38 are locked by means of the stop nuts 40, 41 which are screwed onto the bar 39.

The bar 39 can be inserted into a central hole 42 of the central joint means 8, and locked therein

by a stop nut 43, screwed onto the same bar 39, with interposition of a washer 44.

The erection of the structure is carried out as described hereinafter.

First of all, the lateral crosspieces 6 are joined to the brackets 20 of corner joint means 5, locking them by the respective pins 22, so as to form a base square; the ringbolts 29 have been previously inserted into the outer races 25 of crosspieces 6.

Subsequently, the beams 7 are assembled on the upper tubes 17 of the corner joint means 5 and the central joint means 8 are set so as to join the beams 7 at the top (see Figs. 2 and 3). After that the beams 7 have been inserted on the tubes 35, the central joint means 8 does not require any further locking.

The threaded bar 39 is then inserted into the central hole of the covering cloth 2 and the conical caps 37 and 38 are placed at their seats by inserting the opposite ends of the threaded bar 39 in their respective central holes (see Fig. 4). The cloth 2 is then fastened between the caps 37, 38 by means of the nuts 40, 41.

The bar 39 is then inserted into the central hole 42 of the central joint means 8 and locked therein by means of the nut 43. (see Fig. 3). By tightening the nut 43, it is possible to stretch the covering cloth 2.

After having placed the cloth 2 into the base square, the ringbolts 29 must be opportunely spaced out and fastened along the race 25 of the crosspieces 6 (see Fig. 5). The ringbolts 29 are spaced out according to the distance among the eyelets 31 of the cloth 2.

When the ringbolts 29 have been inserted into the eyelets 31, the cloth 2 is fastened by passing the band 32 through the same ringbolts; the band 32 is then fastened at its ends by a knot or a special clip.

After having assembled the covering cloth 2, it is possible to complete the stretching of the same cloth 2, up to the desired tension, by acting on the nut 43 of the fastening means 36.

When the upper part of the structure has been formed completely, one side of the base square is lifted up, in order to allow the insertion of the upper end of the piers 3, previously provided with a relative support feet 4, into the corresponding lower tubes 16 of the corner joint means 5 (see Fig. 2).

In a similar way, the piers 3 on the opposite side of the structure are assembled. The piers 3 are then locked by screws 18.

Support feet 4 are then fastened to the ground, in the most opportune way according to the type of flooring or ground.

Thus the structure 1 is erected in a short time, by easily joining the various elements which compose it, and by fastening the elements with a

limited number of screw. This requires a limited use of labour and may be done even by unskilled personnel.

In particular, the piers 3 and the beams 7 are assembled by means of the cylindrical joint to the tubes of the corner joint means 5 and of the central joint means 8.

The brackets 20 of the corner joint means 5 provide a safe joint with the recess 21 of the lateral crosspieces 6.

The insertion of ringbolts 29 into the race 25, provided along the crosspieces 6, allows to simplify the assembly of the covering cloth 2. In fact, ringbolts 29 can be fastened exactly in the desired position, according to the type of covering cloth used.

The structure described hereinbefore can be perimetrically provided with folding walls 45, as illustrated in Figs. 6 and 7.

These folding walls usefully consist of a cloth 46 which has fastened, at regular distances, a plurality of vertical ribs 47.

The cloth 46 has folded flaps 46a, along the upper and lower edges, so as to form a sort of pockets into which the ribs 47 are inserted.

At the bottom, the folding wall 45 is provided with rollers 48 which are borne rotatably, according to a vertical axis, by respective brackets 49. Brackets 49 are fastened, through two screws 50, at the lower end of ribs 47.

Rollers 48 can slide inside a race 51 provided along the side to be closed by the folding wall.

At the top, the folding wall 45 have eyelets 52, made corresponding to the ribs 47 and designed to receive hooks 53 protruding from the bottom of slides 54, made of a nylon-type material. The slides 54, with a "T" shape, are slideably inserted into the lower guide groove 28 of the crosspieces 6.

The folding wall 45 is delimited at the ends by rods 55, on which the cloth 46 is wound; the ends of the folding walls are provided with straps 56, designed to be tied to the corresponding piers 3 of the structure.

It is possible to join two or more of said structures together, as illustrated in Figs. 8 and 9.

For this purpose, connecting joints 57 are used, which consist of a sort of bracket that can be linked, at the ends, to the crosspieces 6, disposed side by side, of the structures to be joined.

At each end, the bracket is crossed by two bolts 58 which are screwed into corresponding holes of a small plate 59 inserted into the lower groove 28 of the crosspieces 6.

A gutter 60 can be placed between the connected crosspieces 6.

The gutter 60 consists of a profiled element, having a channel shape, which extends longitudinally.

nally for the whole length of the same crosspieces 6.

Furthermore the gutter 60 has edges 60a folded inwards which can be coupled with the lower edges 20g of the grooves 27 of the crosspieces 6.

On the other hand, the groove 26 of the crosspieces 6 can be used to house electric wires and the like. Thus such wires do not clutter the structure in a disorderly way.

## Claims

1. Structure for supporting light coverings for outdoors **characterized in that** it comprises:
  - a plurality of piers (3) joined, at the bottom, to respective support feet (4) and disposed according to the vertices of a base polygon;
  - a plurality of lateral crosspieces (6) designed to connect said piers (3) at the top, and consisting of profiled elements which have at least one longitudinal race (25), into which are slideably inserted and locked ringbolts (29) to fasten a covering cloth (2);
  - a plurality of beams (7) assembled on the top of said piers (3) and converging in pyramidal form;
  - a ridge central joint means (8) into which said beams (7) are inserted at the top;
  - a plurality of corner joint means (5), inserted at the top of said piers (3) and forming joint means (17,20) for a respective pier (7) and for a pair of adjacent lateral crosspieces (6);
  - fastening means (36) associated with said central joint means (8) to fasten and stretch said covering cloth (2) .
2. Structure according to Claim 1, **characterized in that** said corner joint means (5) include:
  - a tubular body (15), comprising a lower tube (16) coaxial to said body (15) and an upper tube (17) inclined, to be coupled respectively with a pier (3) and a beam (7);
  - two brackets (20), coupled with respective lateral crosspieces (6), extending from said body (15).
3. Structure according to Claim 2, **characterized in that** said brackets (20) include portions of profiled elements having a channel section, disposed with their hollow side turned outwards.
4. Structure according to Claim 1, **characterized in that** said lateral crosspieces (6) consist of profiled elements provided with a longitudinal recess (21), with a "C" section, for the insertion of brackets (20) formed by said corner joint means (5), and with a plurality of longitu-

dinal grooves, having their side delimited by the walls of said recess (21) and being delimited by folded edges at their top and bottom.

5. Structure according to Claim 1, **characterized in that** said lateral crosspieces (6) have, along the lower face of the profiled element, a groove (28) into which a plurality of slides (54) are slideably inserted, said slides bearing a folding wall (45).
6. Structure according to Claim 5, **characterized in that** said folding wall (45) includes:
  - a cloth (46) having a plurality of vertical ribs (47) spaced at regular distances;
  - rollers (48) rotatably borne at the bottom of said cloth (46) by means of respective brackets (49) fastened to the lower end of said ribs (47), said rollers (48) sliding inside a race (51) disposed along the side of the structure to be closed.
7. Structure according to Claim 1, **characterized in that** said lateral crosspieces (6) have two grooves (26, 27) located on the side opposite to the longitudinal race (25) for the assembly of ringbolts (29), said grooves (26,27) being provided for housing electric wires and the like.
8. Structure according to Claim 1, **characterized in that** said central joint means (8) comprises a plurality of tubular elements (33), disposed converging in pyramidal shape and integral with a conical cap (34), with respective tubes (35) extending from said tubular elements (33) and joined to the upper ends of said beams (7).
9. Structure according to Claim 1, **characterized in that** said fastening means (36) comprise two conical caps (37,38) having a complementary shape, and a hole made at their vertex for insertion of a threaded bar (39); said covering cloth (2), with a hole in its centre, being interposed between said caps (37,38) while said caps (37,38) are locked by means of stop nuts (40,41) screwed onto said bar (39); said bar (39) being designed to be inserted into a central hole (42) of said central joint means (8) and to be locked by a further stop nut (43), screwed on the same bar (39).
10. Structure according to Claim 1, **characterized in that** it comprises joints (57) for connection with a similar adjacent structure, said joints (57) consisting of a sort of bracket linked, at its ends, to said crosspieces (6) disposed side by side of said structures, by means of screws

(58) screwed into corresponding small plates  
(59) inserted into a respective lower groove  
(28) of said crosspieces (6).

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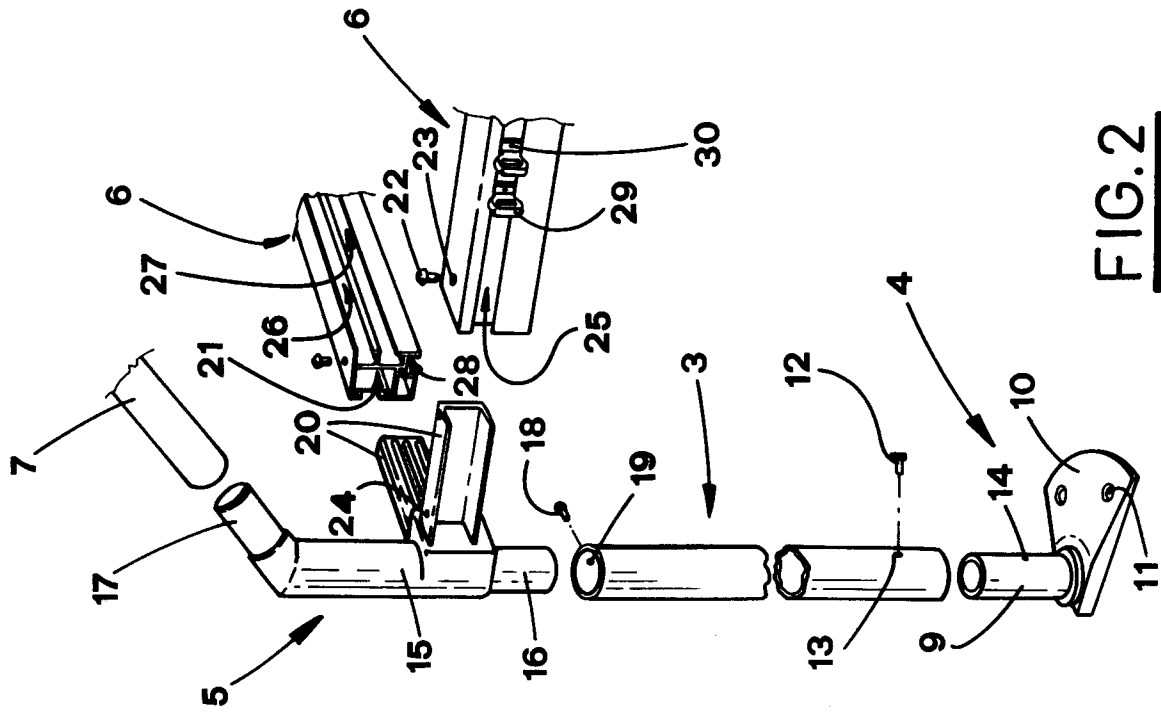
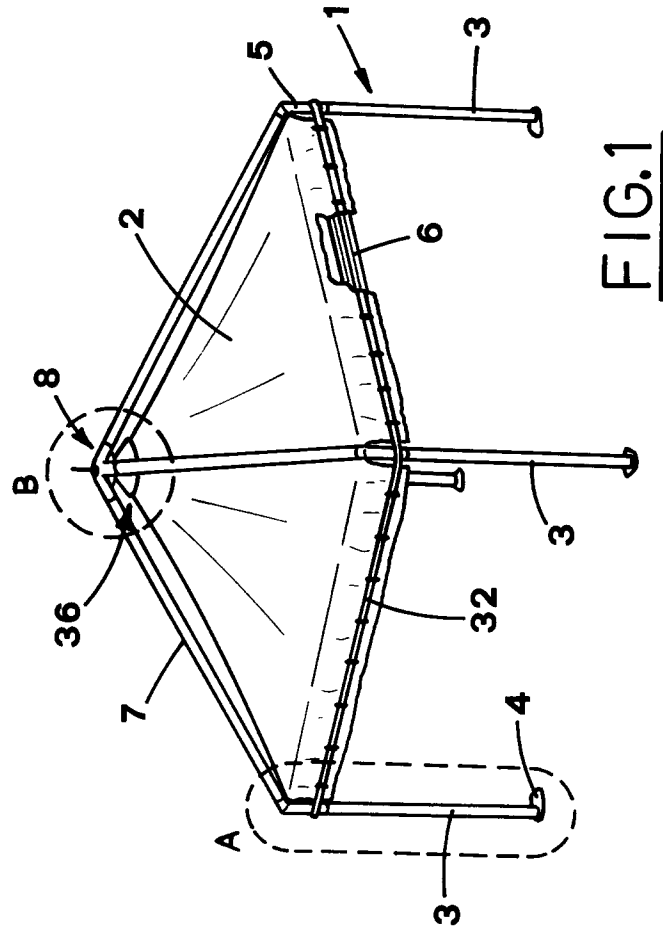
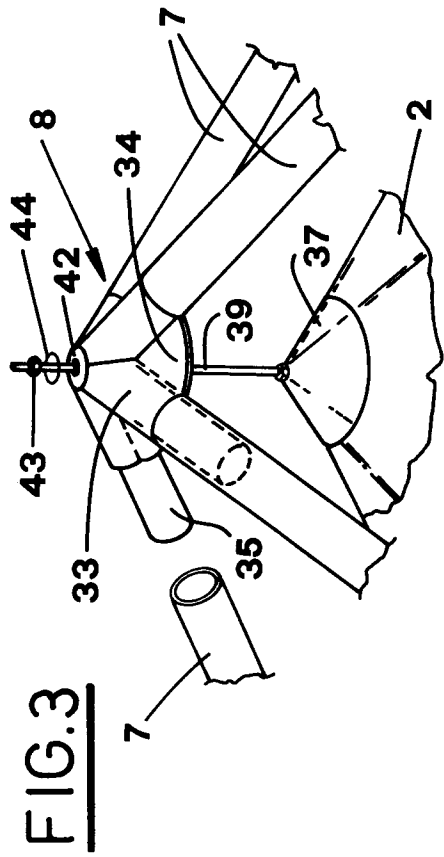


FIG.4

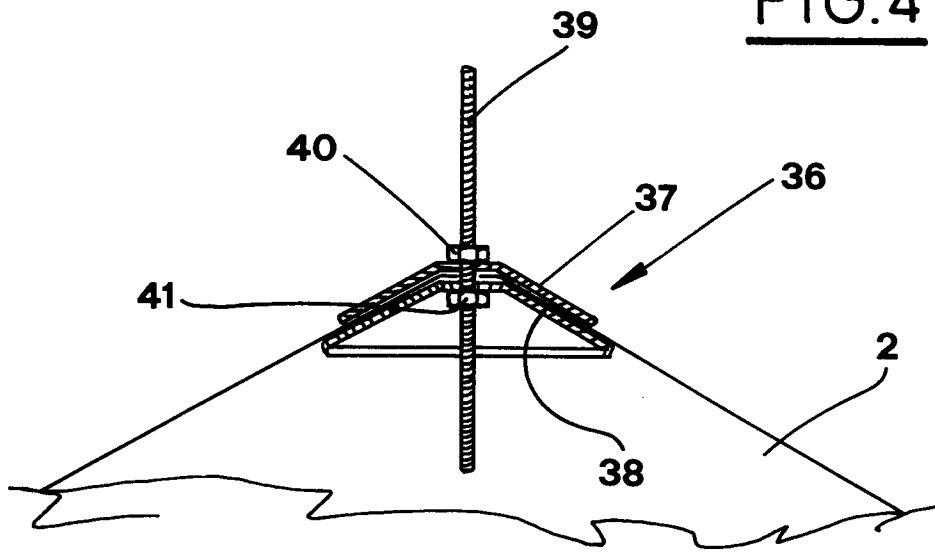
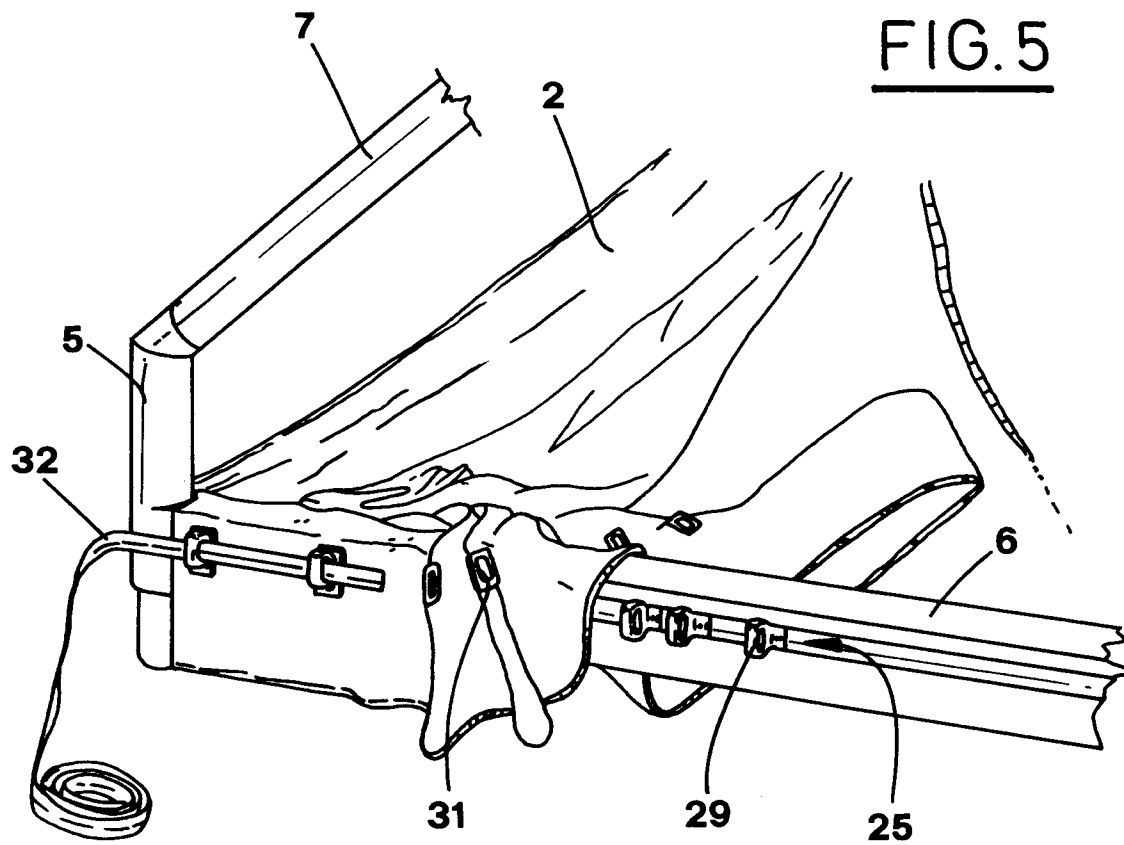
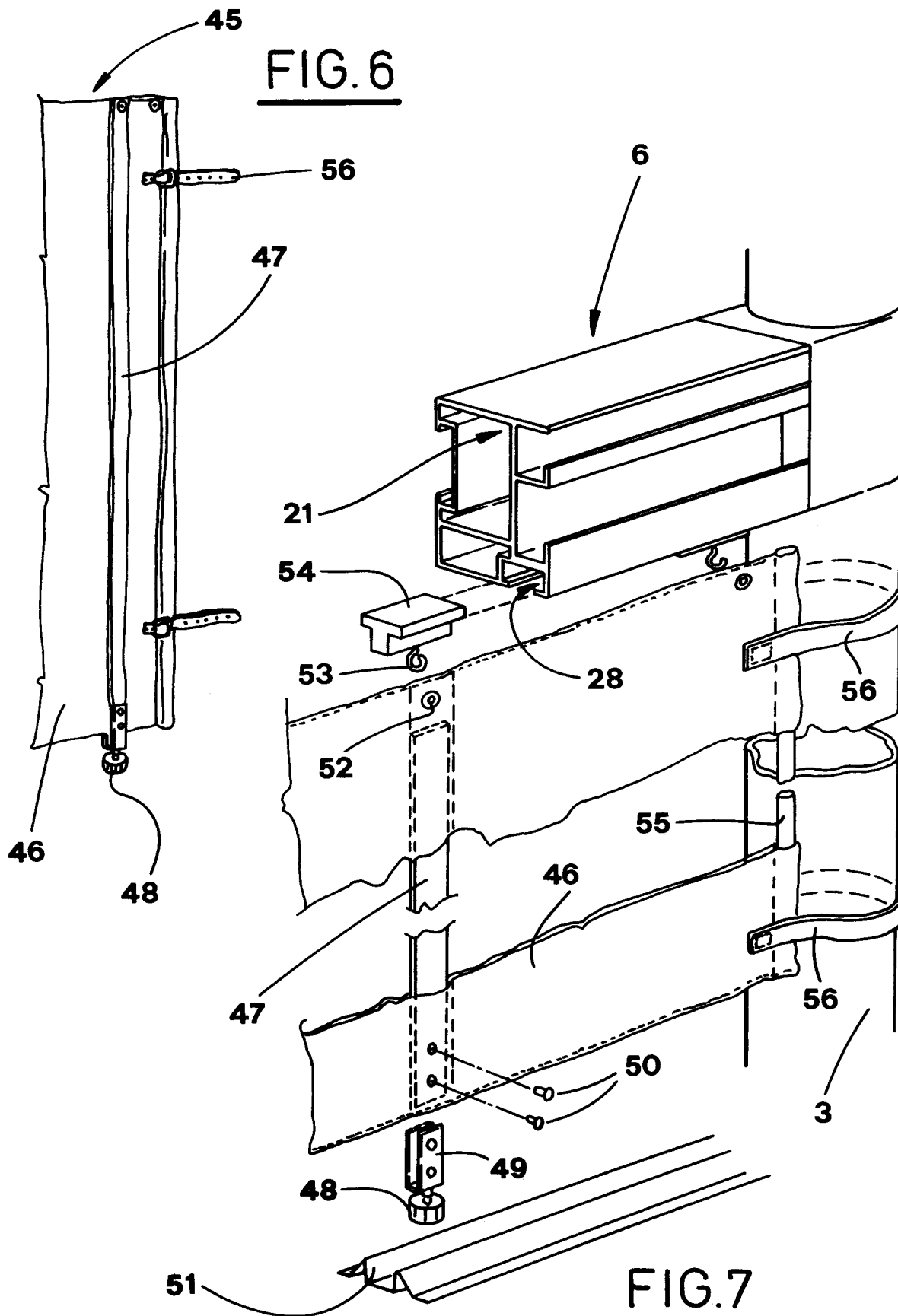
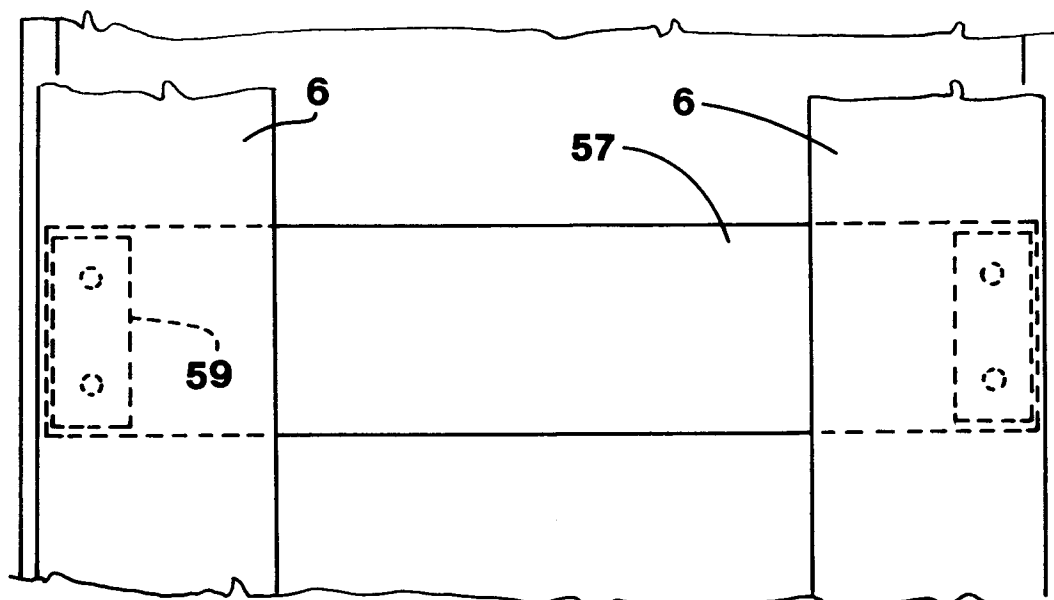
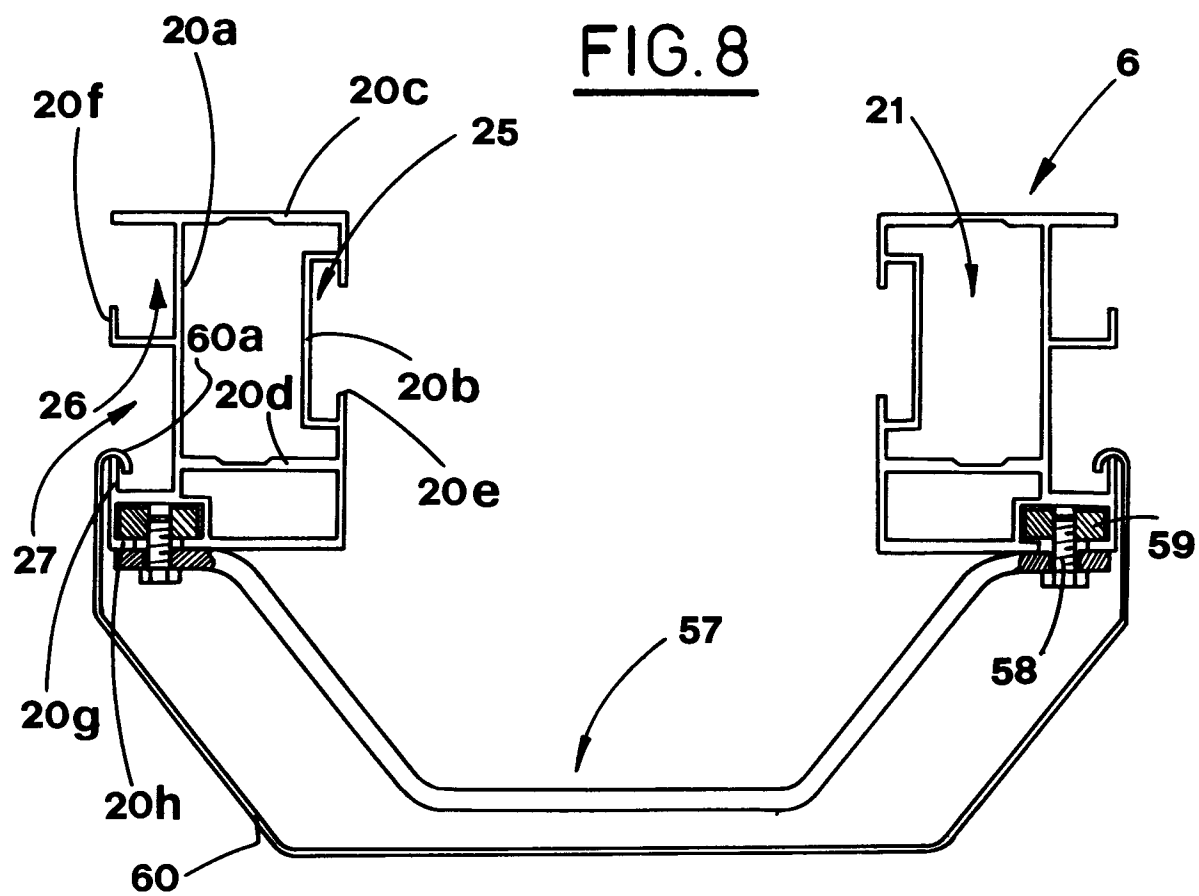


FIG.5









**FIG. 9**



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## EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0317

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-2 137 625 (NORVELL) * the whole document ** - - -	1	E 04 H 15/42 E 04 H 15/58 E 04 H 15/32 E 04 H 15/18
A	NL-A-8 006 627 (HUNTER DOUGLAS INDUSTRIES B.V.) * page 5, line 3 - line 14; figures 2,3 ** - - -	5	
A	FR-A-474 275 (PUJOL) * page 2, line 1 - line 6; figure 3 ** - - -	6	
A	DE-A-3 332 902 (KARL HOCKER STAHLBAU GMBH & CO KG) * page 8, line 15 - page 10, line 22; figures 1,2 ** - - -	6,7	
A	DE-A-2 500 285 (BRUCHER) * the whole document ** - - -	8,9	
A	GB-A-2 162 220 (BOYCE) * page 1, line 96 - page 2, line 30; figure 1 ** - - -	9	
A	DE-A-2 713 157 (KARL HOCKER STAHLBAU KG) * page 5, line 13 - page 6, line 10; figure 1 ** - - - - -	10	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 04 H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 30 October 91	Examiner FORDHAM A.K.
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