(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 400 227 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 158(3) EPC

(43) Date of publication:
24.03.2004 Bulletin 2004/13

(21) Application number: **02720023.7**

(22) Date of filing: **10.04.2002**

(51) Int Cl.[7]: **A61G 1/00**

(86) International application number:
PCT/ES2002/000173

(87) International publication number:
WO 2002/080836 (17.10.2002 Gazette 2002/42)

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.04.2001 ES 200100843**

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(54) RESCUE STRETCHER

(57) Rescue stretcher, designed for all types of rescue operations in high and middle mountains and ravines. The stretcher is characterized in that it is formed by a base or structure (1), which can be folded and separated into two different parts. It is fitted with protective elements for the head and feet areas and handles for manual transportation; an insulation blanket (2) that can be separated into independent parts; a fixing harness (3), horns (4) to carry the assembly on the shoulders and a protective and immobilizing element for the head (5).

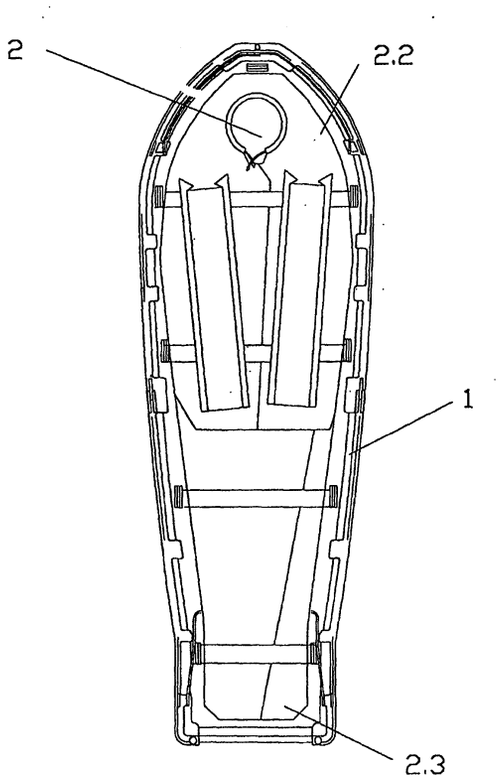

Fig. 9

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Description

[0001] The present descriptive memory refers, as its title indicates, to a rescue stretcher, designed for all types of rescue operations in high and middle mountains and ravines.

[0002] Although currently there are stretchers specifically designed for these types of rescues, they have significant limitations.

[0003] Mountain sports, such as canyoning and other water sports and sports practiced on snow, have revealed new problems with the stretchers that have been used up to now. One of the types of stretcher most used currently is based on a structure of welded tubular elements. This type of structure gets easily caught on anything that sticks out from the terrain, and it is difficult to drag. Sliding it on snow is also made difficult by snow accumulating on the stretcher's structure.

[0004] Another important factor to be considered is that the stretchers currently used do not float, therefore they can easily be lost in water rescues in ravines, rivers, reservoirs and the sea, and they put in danger the life of the injured person.

[0005] It is difficult to access sites where these kinds of rescues are performed. Usually it is necessary to use a means of transport, such as a helicopter, or go there on foot. Consequently, the stretcher needs to be small in size to fit into the helicopter, and light in weight to be carried on land.

[0006] The small size of most stretchers currently used is not suitable for tall injured people whose lower limbs or head hang partially out of the stretcher causing discomfort to the injured person and making him or her less secure.

[0007] Stretchers that are robust enough for mountain rescue are also heavy and therefore difficult to carry on land. When stretchers can be folded, the folding parts present maintenance and robustness problems.

[0008] A further security problem are the conditions for the injured person being rescued, stretchers used up to now do not provide enough security, making it necessary to use helmets or other additional protection. This factor is very important considering the possible severity of high mountain sport injuries, which are usually caused by falls, and require the injured person to be completely immobilized, especially areas such as the spine and the head, of vital importance for the eventual recovery of the injured person and his or her injuries.

[0009] Currently used stretchers are not usually fitted with thermal insulation features for the injured person, and if they do, they are usually a single piece, which means that the insulation has to be completely removed from the injured person in order to provide medical treatment.

[0010] Most currently used stretchers do not provide support for the injured person's torso, which is essential for medical recovery measures such as a heart massage.

[0011] To solve these problems, the stretcher that is the subject of the present invention has been developed.

[0012] The stretcher is formed by a base or structure similar to that of a canoe, fitted with various components in order to increase its usefulness, blankets that protect the injured person from the elements and other accessorizes that enhance security.

[0013] The structure is made of composite material that ensures the strength, weight and buoyancy requirements.

[0014] This structure is made up of two parts joined at a linkage axis with assembling elements, and can be dismantled manually in order to separate it into these two different parts. Once the structure is unfolded, a clamping system secures both parts together

[0015] The external surface of the structure is flat except for some longitudinal grooves that make it easier to drag it over any terrain and to slide it on snow. This design also prevents the stretcher from getting caught on anything that sticks out from the terrain. The inside of the base, where the injured person lies, is completely flat and rigid. The structure's sidewalls have six openings that can be used as handles for manual transportation and handling.

[0016] The stretcher is provided with two protective elements, one for the head and the other one for the feet, these protect the injured person from direct knocks and possible overturns. These protective elements can be collapsed onto the structure if they are not needed.

[0017] Where the feet are supposed to lie, there is a trap that can be opened in order to accommodate an injured person more than 6.39 ft tall.

[0018] The structure is fitted with insertions to attach cinches and other protective elements.

[0019] It is also possible to fit an additional protective element for the head that immobilizes it in case of lateral swings, lurches, etc.

[0020] In addition, an injured person fits inside the stretcher with all the necessary protective splints to immobilize him or her.

[0021] To make transportation of an injured person easier, tubular structures, called horns, have been designed to carry the stretcher on the shoulders or by hand. The tubular structures can be inserted into holes provided for this purpose in the stretchers structure.

[0022] Fixed on to the structure there is an integral harness to secure and immobilize the injured person, and side cinches to hold the injured person and the blanket.

[0023] There are also six anchoring points inserted in the stretcher's structure, on the sidewalls, that allow for different modes of transportation.

[0024] The blanket has three parts, a base to isolate the injured person from the base of the stretcher, a top part that includes a hood to protect the injured person from the waist up, and a bottom one that can be stretched to accommodate a tall person. They are

closed using Velcro. It is possible to lodge floats into this blanket.

[0025] The system put forward, which did not exist before, has multiple advantages over those currently used for the same purposes.

[0026] All the stretcher's manufacturing materials are highly abrasion-resistant and also light, having a total weight lower than that of previously used stretchers.

[0027] When it is empty, one person can easily transport the stretcher, as it can be folded and fitted into a specially designed rucksack.

[0028] Also, when it is empty, the stretcher floats, so it is not lost in water rescues.

[0029] As for transportation with an injured person, the stretcher can be easily carried in two ways, always securing the integrity of the injured person. The first one is transportation by two mountain rescue workers, one in front and the other one at the rear using the horns attached to the stretcher for this purpose, in such a way that the weight falls on the mountain rescue workers' shoulders. The second one is transportation by one or more mountain rescue workers on each side of the stretcher using the lateral handles provided for this purpose. The carriers can wear winter gloves and still be able to introduce their hands into the handles easily.

[0030] It is easy to slide the stretcher in a longitudinal direction forwards and backwards: with either the head or the feet end in front. The longitudinal grooves on the structure make moving it longitudinally easier than transversally.

[0031] The shape of the base of the structure helps to slide the stretcher on snow or ice and minimizes the possibility of snow or ice accumulating on the stretcher, which would then become heavier and more difficult to transport.

[0032] It can also be transported using Tyrolean traverses; it can be hauled up and down from a helicopter or attached to a wall, by means of the anchoring points provided on the sidewalls. These manoeuvres can be performed with the stretcher in a horizontal or a vertical position. The set of handles around the stretcher make it possible to provide manual assistance for these manoeuvres.

[0033] The stretcher floats on water, and thanks to the floats and ballast, it ensures the injured person can breath when the stretcher and the injured person on it are in the water. The stretcher does not have any element liable to retain water and, if any water were to enter, it can be quickly drained once the stretcher has been taken out of this medium.

[0034] It is possible to drag the stretcher over any terrain, during which it protects and supports the injured person. It does not have any elements that stick out and might get caught on vegetation or rock protuberances.

[0035] The stretcher protects the injured person from any direct knock, either from the sides, the inside or as a consequence of an overturn. If the stretcher is upside down on a flat surface, it keeps the body of the injured person off the ground.

[0036] The injured person is attached to the stretcher in such a way that no part of his or her body can protrude from the protection area offered by it, even if the stretcher is banged against something or overturned, and it ensures that the injured person does not move in relation to it at any manoeuvre, whatever position the stretcher is in.

[0037] The stretcher is made up of three levels of fixing elements, one on top of the other. The first one is the integral harness that holds the pelvic area and the chest. If necessary, the head can also be immobilized. The second one is the closed blanket, and finally there are three straps: one at shoulder level, the second one at hip level and the third one under the knees that are fastened after closing the blanket.

[0038] The blanket is made of a material suitable for the thermal insulation of the injured person, it is resistant to tearing and abrasion, and it also makes it possible to constrain the injured person's arms preventing them from coming out from under the blanket.

[0039] The blanket is made up of two separate sections, a bottom one that covers the legs up to the hips, and a top one up to the neck. Both can be taken off or loosened independently to treat localized injuries without removing the blanket from the rest of the body. The blanket can be closed quickly with Velcro or something similar, and it can accommodate an injured person of any height wearing any necessary splints or any other devices. It also has a hood for protection of the head.

[0040] The stretcher is also designed to make any life support measures easy to perform, as the base that supports the torso of the injured person is flat and rigid to allow a full cardiac massage. In addition, the doctor also has clear access to the injured person's head from the front of the stretcher in order to apply tubes or provide artificial respiration assistance.

[0041] The stretcher makes it possible to correctly immobilize any injury, as it has the necessary devices to immobilize the head in such a way that it is in line with the body, and the injured person can wear any necessary splints to immobilize the limbs, the trunk and the neck inside the protected area.

[0042] The stretcher allows the examination of the injured person and the performance of medical operations without the need to remove the protection of his or her whole body, only the area that needs to be examined or treated.

[0043] As for its capacity, it can accommodate one injured person comfortably, and the range of sizes and heights it is suitable for, without detriment to any of its features, is wider than that of the stretchers currently used.

[0044] It does not have any edges or pointing elements that might hinder its transportation or endanger the physical integrity of the injured person or the mountain rescue workers.

[0045] The stretcher can withstand normal use with-

out any deformations or detriment to any of its features, and it is highly secure.

[0046] The anchorage points allow for all transportation manoeuvres, and they are as far away from each other as possible to help stability. Each anchorage point and each handle withstands weights much heavier than normal.

[0047] The rest of the necessary fixing elements, like screws, fasteners, etc. are fixed to the stretcher to avoid loosing them.

[0048] To better understand the subject of the present invention, a possible assembly is represented in the annexed plans.

[0049] In these plans:

Figure 1 shows a plan view of the base or structure of the stretcher unfolded and ready to be used.

Figure 2 shows a side view of the structure, both folded for transportation and unfolded for use.

Figure 3 shows a close view of the protective element for the head, both folded and ready to be used.

Figure 4 is a representation of the possible positions of the protective element for the feet, with the trap closed and with the trap opened.

Figure 5 shows the two possible positions of the stretcher's built-in trap.

Figure 6 is a plan view, with the stretcher's structure behind the blanket.

Figure 7 shows the horns for transportation of the stretcher on the shoulders, and the points where they are fixed on to the structure.

Figure 8 is a representation of the protective and immobilizing element for the head.

Figure 9 shows the stretcher with the blanket folded, and we can see the pockets for the floats.

[0050] The rescue stretcher put forward is formed by a base or structure (1), the blankets (2) that protect the injured person from the elements, as well as the fixing harness (3), the horns (4) used for transportation of the stretcher on the shoulders, and the protective and immobilizing element (5) for the head.

[0051] The structure (1) is divided into two parts of the same length, (1.1) and (1.2), joined by fixing elements (1.3.1) that become the linkage axis (1.3). These elements (1.3.1) can be dismounted manually to separate the structure into the two parts that form it: (1.1) and (1.2). When folded, the two parts can be held together by an anchoring point (1.8).

[0052] The unfolded structure (1), similar to a canoe, has a base that inside is flat and outside has grooves that make it easier to slide longitudinally.

[0053] The unfolded structure (1) is joined by grips (1.32) that, when turned, secure the parts (1.1) and (1.2) together, making the whole set rigid.

[0054] The structure (1) has six holes on the sidewalls that can be used as handles (1.9) for manual transportation. They are reinforced to protect them from possible and unavoidable knocks. They have a rough finish to prevent the mountain rescue workers' hands from slipping out. These handles (1.9) reach the bottom of the structure (1) so that the hole is big enough to quickly and easily drain out any water or snow that might have entered it.

[0055] At the feet end of the structure (1) there is a trap (1.10), made of the same material, which can be opened to allow a tall injured person to take his or her feet out of the structure (1).

[0056] The trap (1.10) is thrown back into alignment with the rest of the structure (1) to prevent any knocks on the bottom part of the stretcher from hitting it directly. It can be opened and closed thanks to a fastener that locks the door into position by means of two side flange tiles.

[0057] There are also six anchorage points (1.8) inserted in the sidewalls of the structure (1) that allow all possible transportation manoeuvres. They are separated from each other as much as possible to help stability. Each one of these anchorage points (1.8) is able to withstand heavier weights than normal.

[0058] The structure (1) has some insertions (1.11) for fix cinches and protective elements. The four central insertions are used to fix the harness (3.1), and the rest are used to fix the cinches for the blankets (2).

[0059] The top protective elements (1.4) are made up of two arches, one that goes from one side of the stretcher to the other (1.1) around the head at chin level (1.4.1), and another one (1.4.2) that starts at the centre of the first one (1.4.1) and ends at the top end of the structure protecting the head longitudinally.

[0060] The bottom protective element (1.7), which can be put away inside the structure (1) of the stretcher when it is not in use, is formed by a single arch that can have two positions. The first one up at 90° over the horizontal axis, protecting the feet from any possible knocks from the top, and the other one is turned 180°, protecting the feet when they stick out of the rear end of the structure (1.2), through the opened trap (1.10).

[0061] The linkage element (1.3.1) is designed in such a way that the structure (1) can be separated into two parts. The element (1.3.1) is fixed onto one of those two parts to avoid loosing it.

[0062] The horns for transportation (4) are made up of two separate elements for the rear (4.2) and a single one for the front (4.1).

[0063] The horns (4) are cushioned to make transportation on the shoulders as comfortable as possible. They are locked into holes in the structure (1) by fasteners. To prevent foreign bodies (such as stones or dirt) from getting into the holes, they are closed with covers that must be removed before the horns can be inserted.

[0064] The structure (1.2) has a trap (1.10) made of the same material, that once opened allows a tall injured person to take his or her feet out of the stretcher. The trap is thrown back into alignment with the rest of the structure (1) to ensure as much as possible that knocks

on the feet area do not hit the trap (1.10) directly. It is fixed into both positions, opened and closed, thanks to a fastener that locks the door by means of two side flange tiles.

[0065] The blanket 2) is made up of a set of elements that protect the injured person from the elements as well as from falling out of the stretcher.

[0066] These elements include a base (2.1), made of insulating material, on which the injured person lies isolated from the structure (1), and two parts, (2.2) and (2.3), made of wear and abrasion resistant, watertight and breathable material, one at the top (2,2) and one at the bottom (2.3). These two parts of the blanket (2) can be separated completely.

[0067] The top blanket part (2.2) has a hood and two pockets on the sides, all the way down to the waist, which can accommodate two floats.

[0068] The bottom blanket part (2.3) has a lapel (2.4) at the bottom that can be stretched to accommodate a tall injured person. Otherwise, the lapel (2.4) remains folded inside the blanket.

[0069] The different blanket (2) elements are joined by means of lapels with Velcro or other means that allow easy attaching and detaching.

[0070] The areas of the blanket close to the linkage axis (1.3) are fixed onto the structure (1) in the same way.

[0071] The blanket (2) is provided with side cinches that surround the injured person once he or she is covered with the blanket (2). These cinches are made of the same material as the flat cinches used for mountaineering in high mountains, and they have press studs. Each cinch is joined to the structure (2) and goes under some fasteners provided on the structure (1).

[0072] In certain areas, the blanket (2) has net fabric to allow any possible water to be drained.

[0073] The integral harness (3) has two fixing elements; the top one (3.1) holds the injured person by the shoulders, and the bottom one (3.2) goes between the legs at groin level. The harness (3) is joined to the structure (1) by inserts.

[0074] The protective and immobilizing element for the head (5), made of a light but resistant and comfortable material for the injured person, is fixed on to the structure (1) with Velcro.

[0075] All the fasteners and fixing elements are attached to the structure (1) to avoid loosing them.

Claims

1. Rescue stretcher designed for all types of rescue operations in high and middle mountains and ravines. It is **characterized in that** it is formed by a structure (1), an insulating blanket (2), a fixing harness (3), horns (4) to carry the assembly on the shoulders, and a protective and immobilizing element for the head (5).

2. Rescue stretcher, as described in the previous claim, **characterized in that** the structure (1) can be folded and separated into two different parts, (1.1) and (1.2), that when unfolded form a rigid assembly that protects the injured person from knocks.

3. Rescue stretcher, as described in the previous claims, **characterized in that** the structure(1) has anchoring elements (1.8) that allow transportation of the stretcher using any of the current methods for this type of rescue. The stretcher can be anchored with one or with all these elements.

4. Rescue stretcher, as described in the previous claims, **characterized in that** inside the structure (1) there is a top protective element (1.4) for the head area, and a bottom protective element (1.5) for the feet area that can be placed in different positions either for transportation or for protection.

5. Rescue stretcher, as described in the previous claims, **characterized in that** the bottom surface of the stretcher (1) that is in contact with the ground is flat except for some longitudinal grooves that make it easier to slide it longitudinally rather than transversally; and **characterized in that** the inside surface of the structure (1), on which the injured person lies, is flat and rigid to make it easier to give medial attention, such as a cardiac massage.

6. Rescue stretcher, as described in the previous claims, **characterized in that** the structure (1) has a trap (1.10) that allows transportation of a tall injured person, and has fixing elements for the harness (3) and for all the accessorizes that might be lost during use.

7. Rescue stretcher, as described in the previous claims, **characterized in that** the structure (1) has handles (1.9) on the sidewalls to carry the stretcher by hand, as well as holes (1.7) to insert the transportation horns (4).

8. Rescue stretcher, as described in the previous claims, **characterized in that** the blanket (2) is made up of two separate sections, has pockets for floats and net fabric in certain areas to drain any water that might have entered the blanket (2).

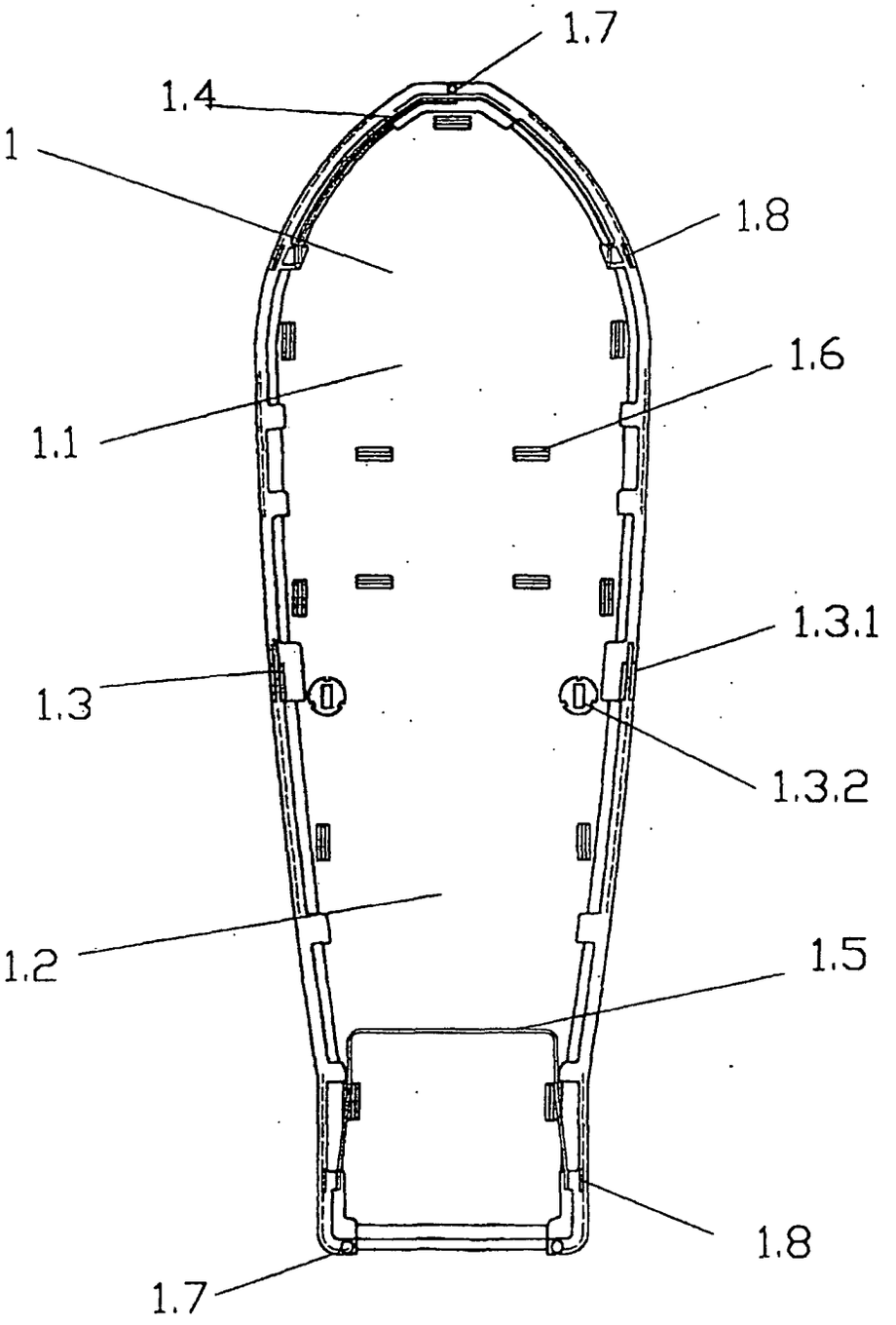

Fig. 1

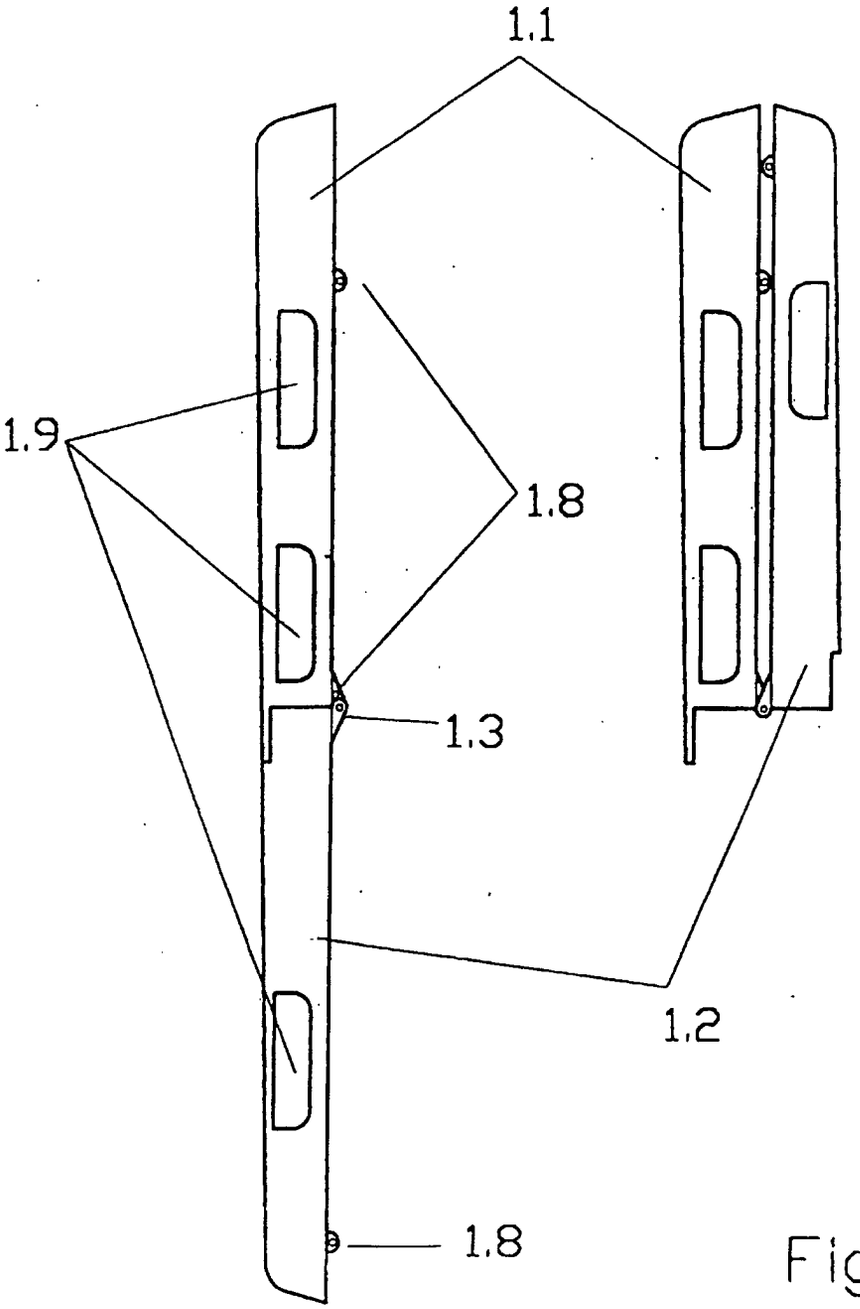

Fig. 2

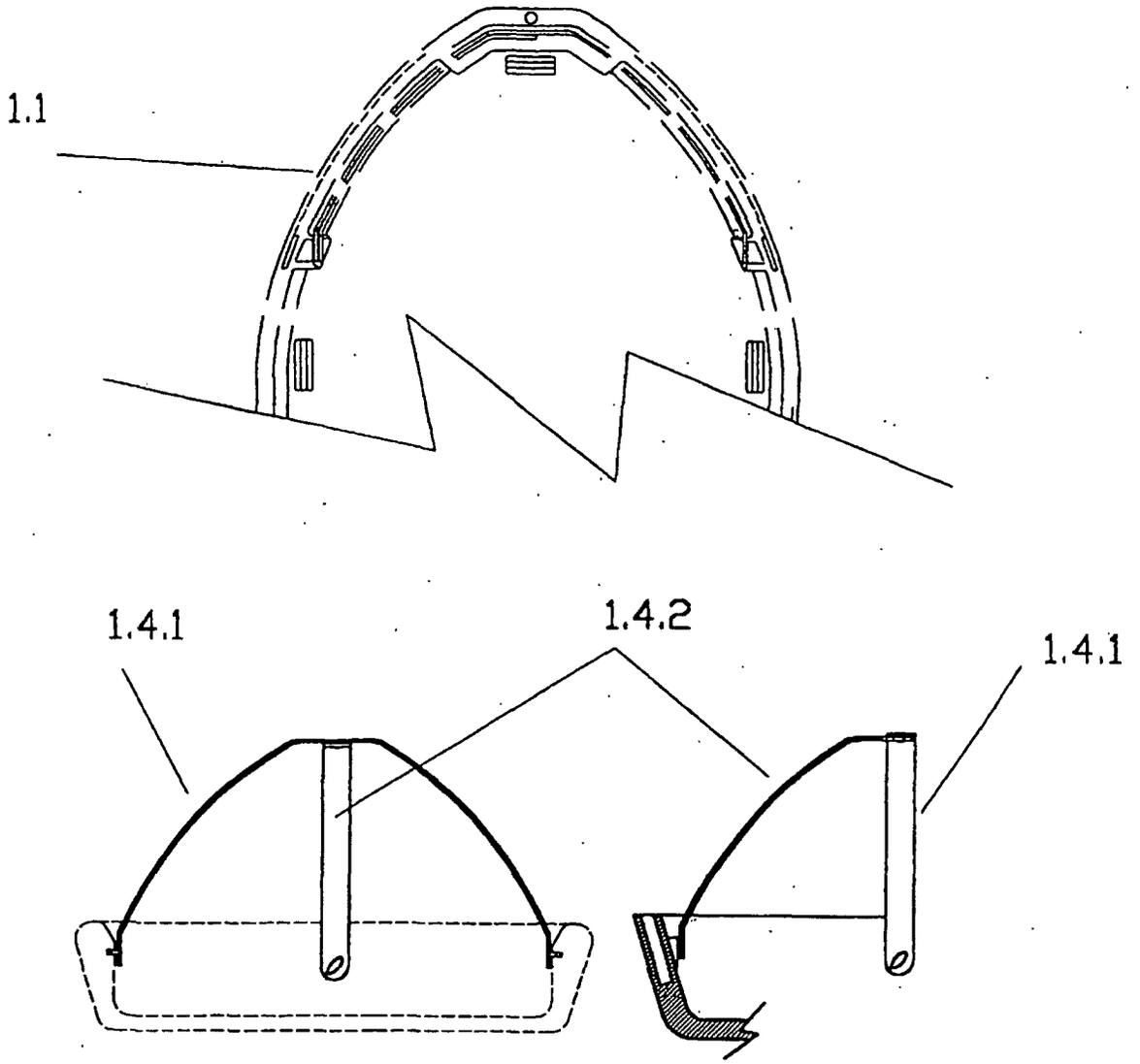

Fig. 3

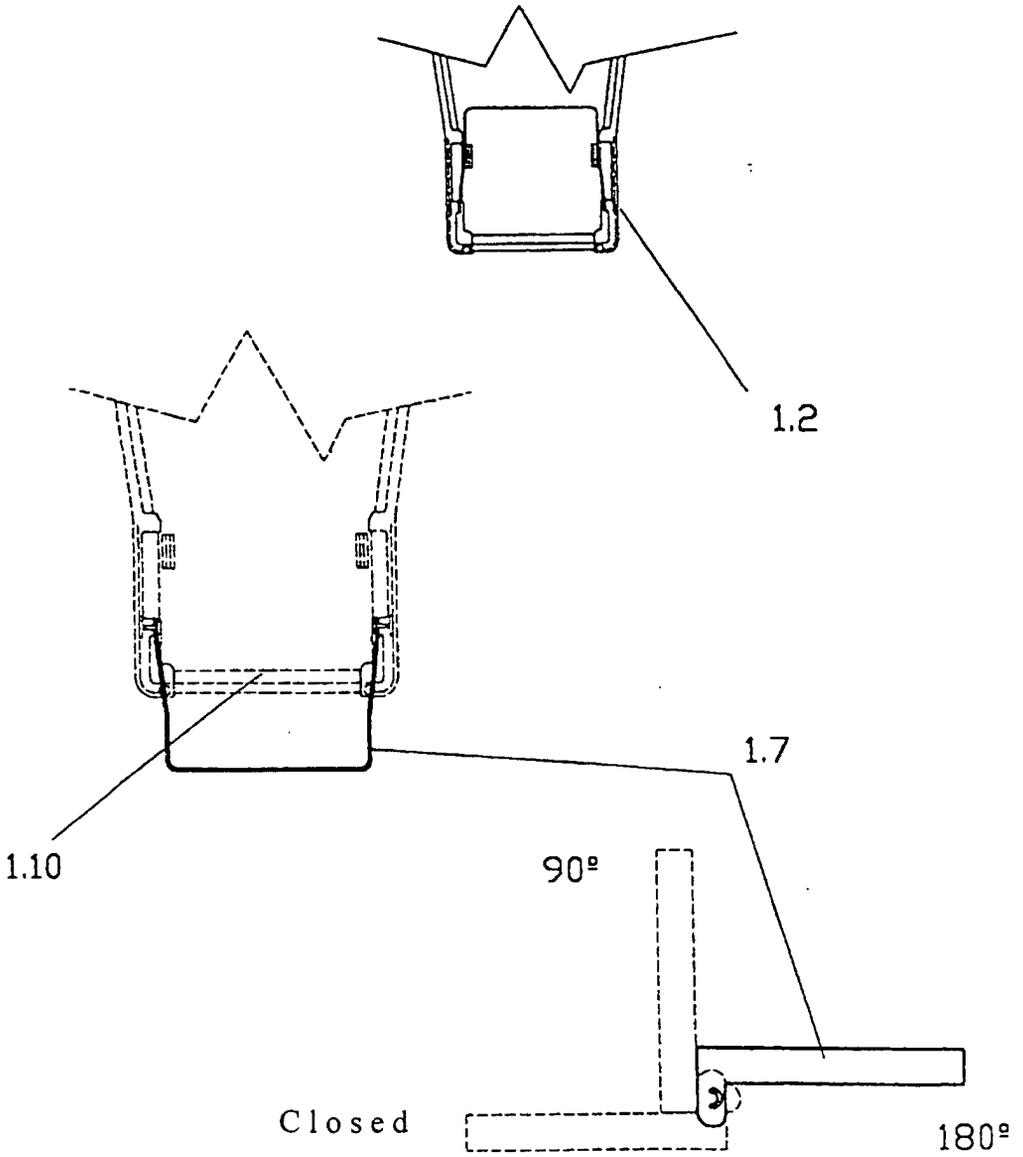

Fig.4

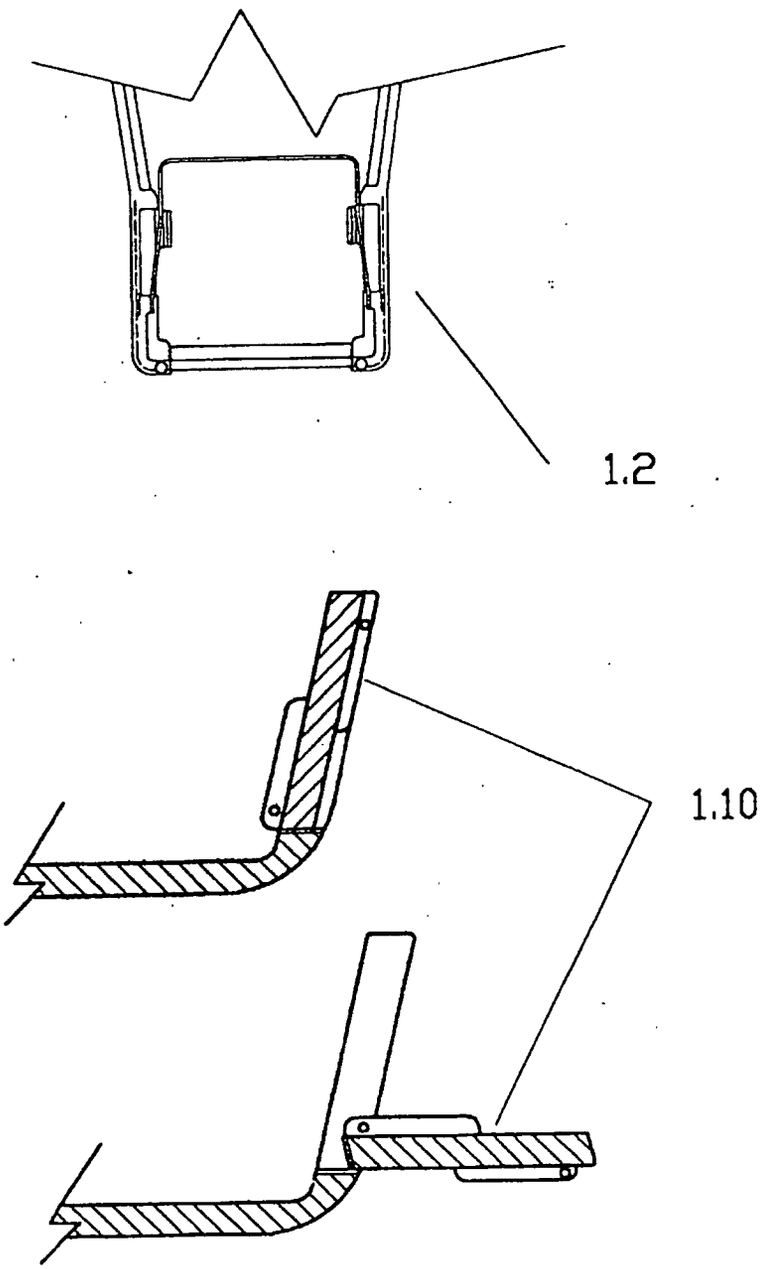

Fig. 5

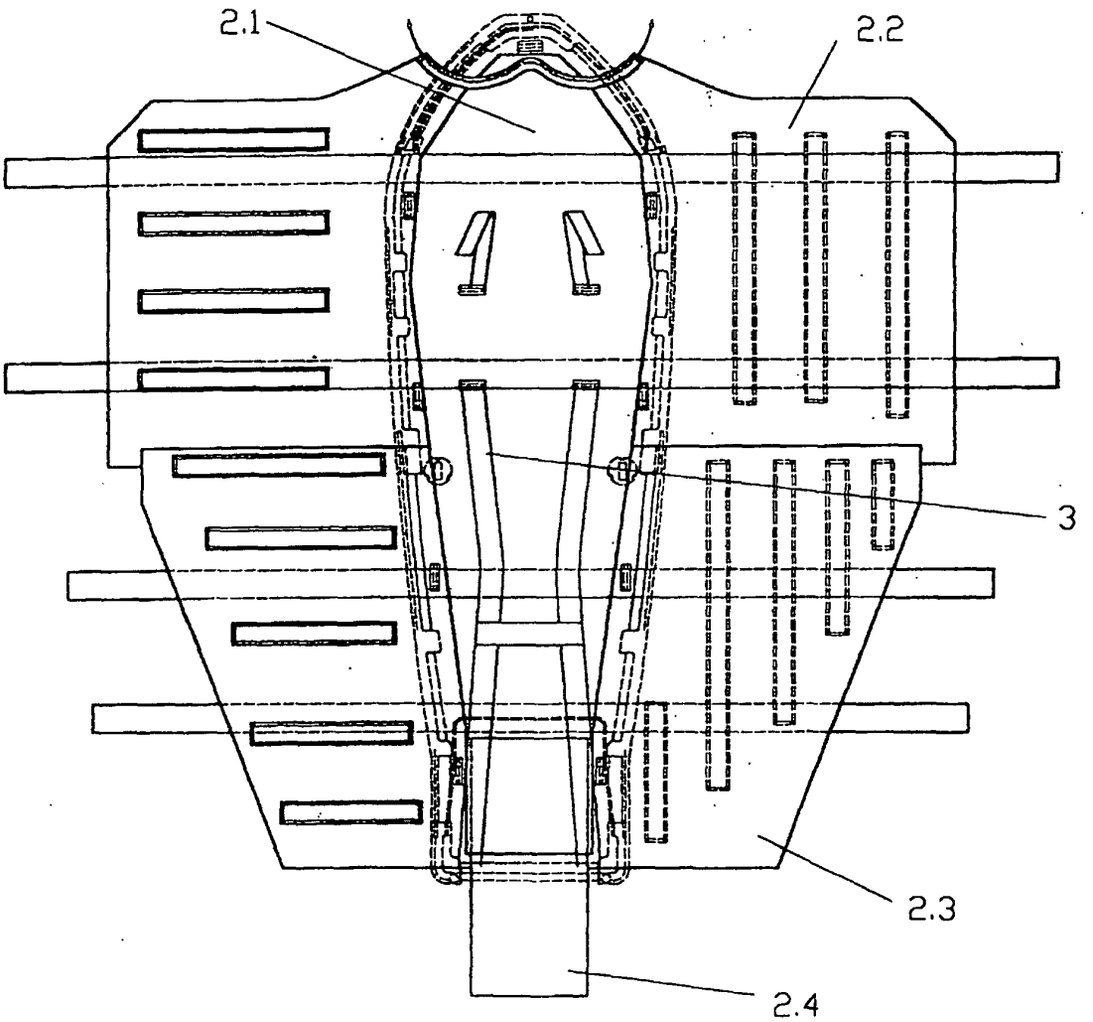

Fig. 6

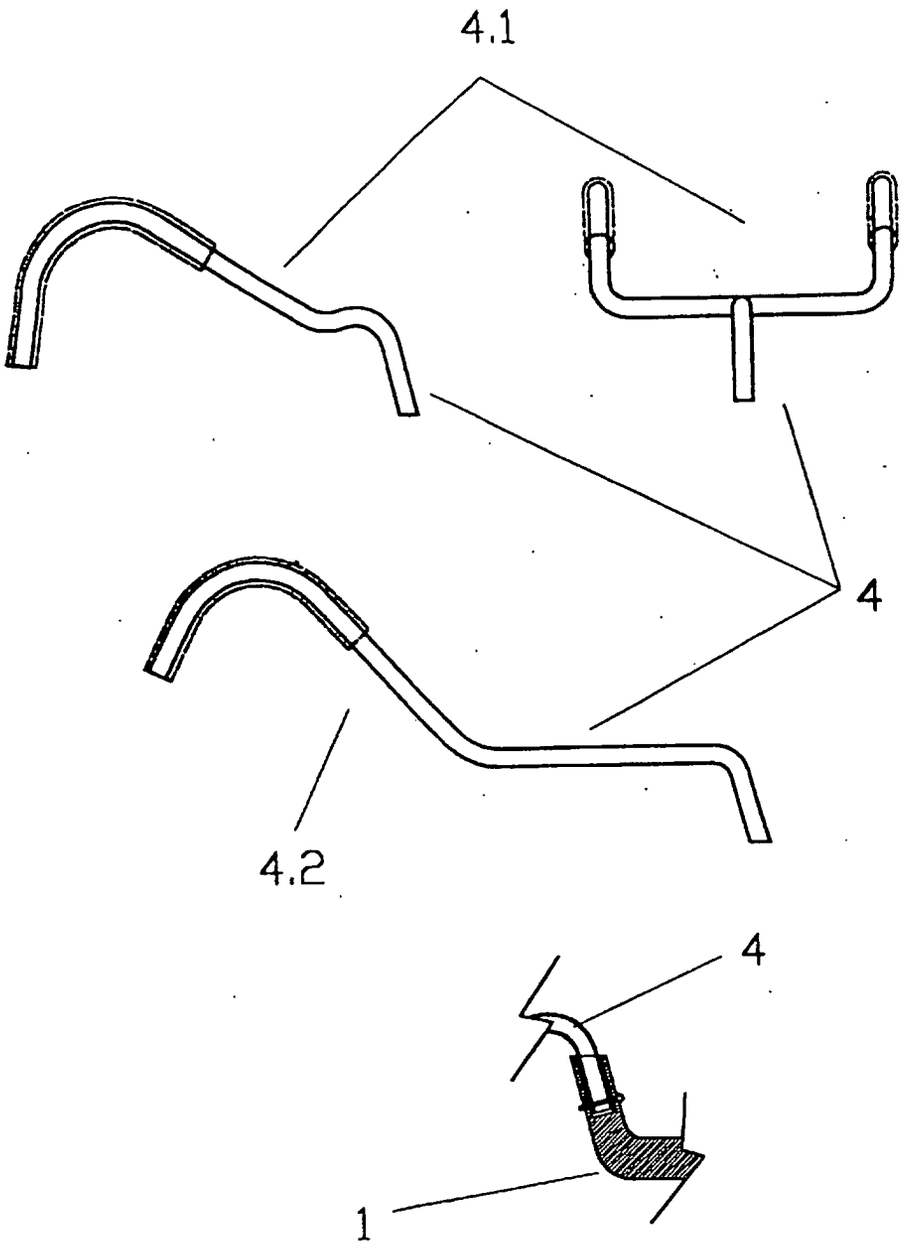

Fig. 7

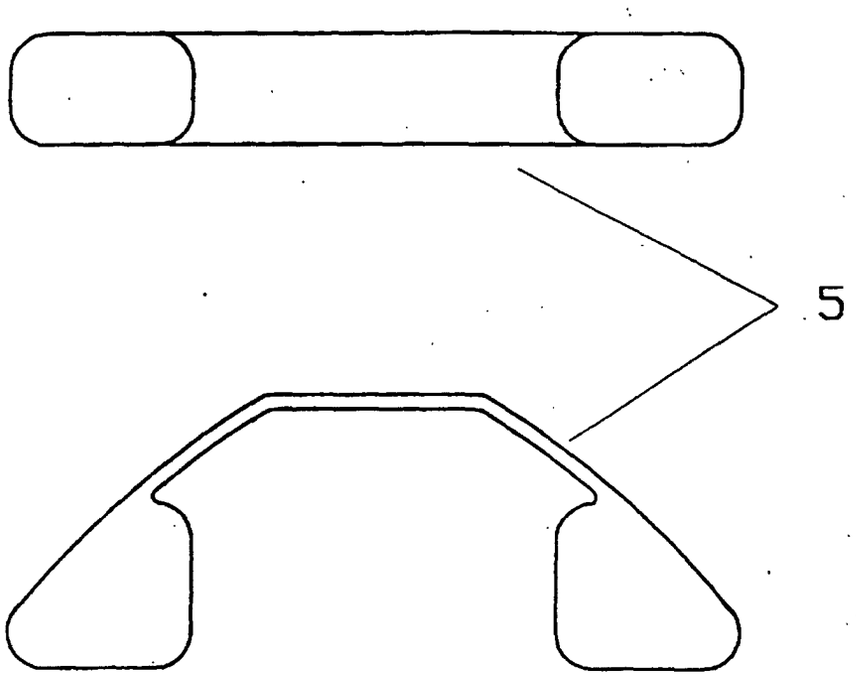

Fig. 8

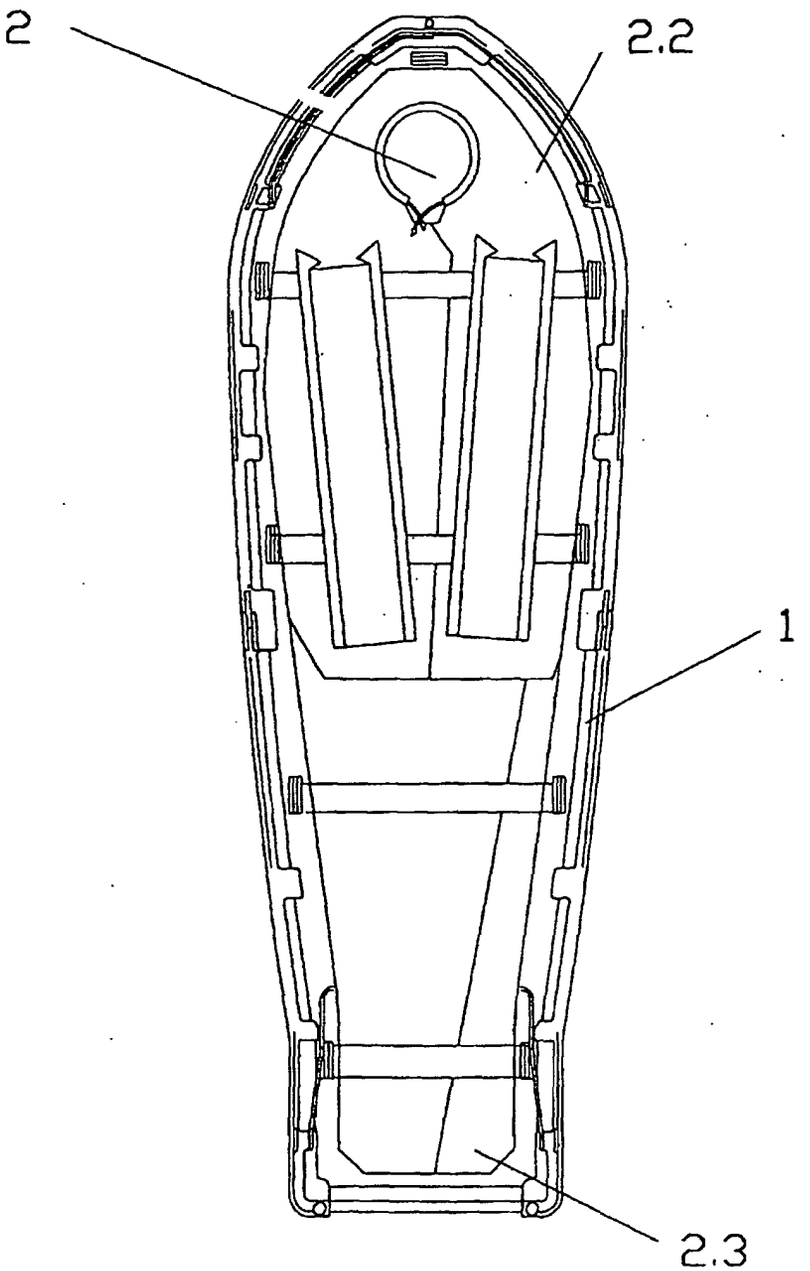

Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES02 /00173

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61G 1/00

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 A61G

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

DOCUMENTOS ESPAÑOLES DE PATENTES Y MODELOS DE UTILIDAD

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

EPODOC, WPI, PAJ, ECLA, UCLA, OEPMPAT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5154186 A (LAURIN et al.) 13.10.1992, **see column 4, line 64 - column 5, line 65, column 7, line 63-column 10, line 59, figures 1-3, 10-14** ---	1-7
Y A	US 4970739 A (BRADFORD) 20.11.1990, **see column 2, line 53-column 3, line 24, figures** ---	1 8
Y A	ES 2107767 T (DAOUK) 01.12.1997, **see the whole document** ---	2-7 1
A	GB 2175216 A (TAYLOR et al.) 26.11.1986, **see the whole document** ---	1-2, 4-5, 7
A	FR 1469755 A (PETZL) 17.02.1967, **see the whole document** ---	1-2, 4, 7

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
01 August 2002 (01.08.02)	**12 August 2002 (12.08.02)**
Name and mailing address of the ISA/ **S.P.T.O.**	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES02 /00173

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 2410181 A (PETERS) 29.10.1946, **see column 3, line 21 - column 4, line 15, column 5, lines 20-47; figures**	1, 3, 8
A	US 5934282 A (YOUNG III et al.) 10.08.1999, **see column 3, lines 6-16; column 3, lines 41-60; figures 1A-1B**	2-3, 5, 7

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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