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

(11) EP 1 726 332 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.11.2006 Bulletin 2006/48

(51) Int Cl.:
A62B 1/02 *(2006.01)*

(21) Application number: **06445029.9**

(22) Date of filing: **21.05.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **22.05.2005 SE 0501144**

(71) Applicant: **KOBUSINSKI, Karl**
S-60591 Norrköping (SE)

(72) Inventor: **KOBUSINSKI, Karl**
S-60591 Norrköping (SE)

(74) Representative: **Berglund, Erik Wilhelm**
Berglunds Patentbyra AB
Aspebraten
590 55 Sturefors (SE)

(54) Evacuation device

(57) Evacuation device for the enabling of evacuation of patients, elderly etcetera at fire and the like, including an inflatable part, inflatable with a gas tube, the device after the inflation constituting a through like part with inflated cushions under and on the sides of the person that is to be evacuated. Around the device runs a strap that form several handles along the edge. The strap extends further forward in the foot direction and ends with loops folded double to allow the pulling of the device on floor or ground. On the bottom side a separate layer with low friction is arranged, which does not constitute a wall in any of the inflatable spaces.

Fig. 6

EP 1 726 332 A1

Description

[0001] The present invention concerns an evacuation device. A number of different helping means are known for the evacuation of humans from buildings at danger, and then in particular fire, for instance different type of ladders and in particular fire escapes. A drawback at these devices is however that it is required that the person in distress that is to be evacuated actively can take part in the evacuation himself. At a fire in a home designed for elderly, hospital etcetera one can however not count on help from the affected to any larger extent. Frequently one can also fear that there are comparatively many that has to be helped and saved and furthermore the available personnel on place may be very small, for instance at night.

[0002] The object of the invention is to improve the above conditions so that the evacuation of sick, elderly and handicapped etcetera can be considerably facilitated.

[0003] In accordance with the invention this object is solved with a device including an inflatable part that at evacuation has or can be given a through-shaped condition for receiving and protecting the person to be evacuated.

[0004] Advantageously the device has a bottom glide surface with low friction, for instance in the shape of a coating.

[0005] In accordance with an advantageous further development of the invention the device includes means for securing a person, that is to be evacuated, in the device, for instance in the shape of bands or straps with mountings and the like.

[0006] In a further development of the inventive concept the inflation takes place by means of gas tube or the like integrated but exchangeable in the device.

[0007] The evacuation device is advantageously stored rolled together or folded minimizing its volume. A number of evacuation devices can be stored in cardboard boxes or fastened together with bands in numbers suitable to provide a rational handling.

[0008] By means of the device in accordance with the invention the evacuation of elderly, sick disabled is essentially facilitated. One quite simply place a person that is to be evacuated in the device. When this is done two persons may by means of handles on the device carry out the person in question. Alternatively the evacuation device may on floor or ground be pulled away by means of straps in the front end of the device. In particular in the latter case the required work is moderated and may in many cases be possible for one person. Due to the good glide features of the device and that it is filled with air the device has the ability not only to glide well on an even and flat substrate but can also pass thresholds and other unevenness with a minimum of effort for the person or persons pulling it. At the passage of a thresholds at a suitable inflation pressure in principal a wave like indentation in the bottom of the device will be formed where principally the force for the shaping of the front edge of the wave is regained at its rear edge so that the force for passing becomes small. At the same time also the influence on the person in the device will be very small and the person in question will hardly notice a threshold is passed. In the same way the device may under controlled conditions be pulled or be allowed to glide downstairs respectively. With a surprisingly small effort when needed a great number of persons in need can thus be evacuated in a short time by means of the invention.

[0009] Since the person that is to be evacuated is enclosed between air cushions he will be well protected during the evacuation, against impacts from below as well as from the sides. In this way one avoids the wounds that otherwise easily result in the stress and haste that is normally the case at evacuations. This means in reality a saving of time at the evacuation.

[0010] A major advantage with the invention is further that the cost of the evacuation device, due to its simplicity, is relatively low why one for the sake of the security already in advance may have a large number of evacuation devices on location. Furthermore the rescue service can easily bring along a large number of devices. Since the persons that are to be evacuated thus principally each can be provided with their own device the evacuation may be executed in stages and successively those who are to be evacuated are primarily pulled away from the dangerous area. In this way a given personnel force can save more persons in a given time. When the persons that are to be evacuated are well "packaged" in their evacuation "cocoons" the handling becomes simple whether it is transport along corridors, in staircases or even through windows and out in lift cages on sky lift trucks of the fire department etcetera.

[0011] Since the evacuation device according to the invention primarily is intended to be dragged or pulled on the floor not only small required forces are obtained but furthermore the evacuated person will be placed low which at fire is of great advantage since the smoke is at its minimum along the floor. Since the evacuation device with a contained person is easy to pull the person that pulls can crawl and still be able to pull. Nor is it critical if the towing person on a floor loose his grip, the evacuated person does not fall to the floor and injure himself, but its only to take a new grip.

[0012] Further advantages and characteristics of the invention are apparent from the following description of a preferred embodiment of the invention with reference to the enclosed drawings. In the enclosed drawings Figure 1 shows a semi-finished evacuation device according to the invention, Figure 2 the ready evacuation device in an inflated state, Fig 3 the inflated device in perspective, as Fig 4 and Fig 5, Fig 6 the device with a person therein and Fig 7 a detail of the device.

[0013] The evacuation device shown in the drawings comprise an essentially flat part shown in fig 1 comprising two sheets of reinforced plastic that have been welded to each other to an inflatable unit that is divided into sec-

tions that in turn in a known manner are provided with further internal welds to ensure the shape in inflated state. More in detail the inflatable part comprise a back section 1, a seat section 2, lateral sections 3 and 4 and head lateral sections 5 and 6, an upper head section 7 and an additional seat section 8. The air spaces in the sections are connected to each other and are at use inflated by a gas container, filled with for instance nitrogen. The inflatable part is so shaped that it when inflated receives a through like shape. This can partly be achieved by means of the shaping of the inflatable sections, partly by placing folds between these at the outer edge.

[0014] Around the part inflatable to through shape a band 9 extends that in even or uneven distances is fastened to the outer (upper) edge of the inflatable part. The band is at this somewhat longer then the surrounding edge so that handles are shaped all the way around the evacuation device. The last fastening point of the band on each sides are the outer corners of the lateral sections farthest away from the head section. From these points the two ends of the band continue forward and are provided with fastening means 11 to enable a fastening of the two bands to each other. The outer ends are furthermore folded double so that loops 10 are formed for pulling, one on each side.

[0015] The front edge of the seat section facing away from the back section is centrally in the middle provided with a further strap 12 that can be fastened together with the two above mentioned ends of the band fastened in the lateral sections. In this way also the lower section of the device may be given a closed bowl shape. To this effect loops and hooks are arranged on the bands.

[0016] For the inflation of the device a gas container 13 with valve is arranged in the front edge of the seat section. The inflatable part is at the seat section extended 8 and folded double around the gas container that is connected to the inflatable part via an easily openable valve. When the container is triggered it quickly inflates the entire device.

[0017] In order to ensure for example that the back section at towing along the floor or in a staircase can protect the person lying in the device one can consider to arrange non-return valves to the back section so that even if any of the other sections of the inflatable part is damaged the protection and damping downwards remain.

[0018] At the use of the device one can consider first to inflate the device and then place for instance a patient therein, the straps are tightened and the patient is pulled away from the dangerous surrounding. As an alternately one can consider to place the patient on a flat and unfilled device, that when the patient is in place is inflated by the accompanying container after a triggering of the opening valve. This may essentially facilitate the transfer of the person to the device, for instance the person in question can be rolled over on to the device with a moderate amount of work. For instance one can consider that in connection with a catastrophe the first use of the evacuation device is carried out by placing a patient or corresponding on the device in its non-inflated state and that when this person has been brought to safety the evacuation device is returned and used for yet an other patient, but this time without being flat from the start and the new patient is loaded into the device in an inflated state, this in case the number of devices is less than the number of persons that have to be evacuated.

[0019] Along the back section as well as possibly along parts of head section and lateral sections advantageously a reinforcing lower slide layer is arranged that advantageously also has a low friction against different floor materials. This material or layer also serve as protection for the inflatable part. One can also consider back and head sections comprising several inflatable layers so that an additionally improved protection ability is obtained. The reinforced bottom layer may also be allowed to extend a larger or a smaller distance out on the lateral sections.

[0020] One can also consider at manufacturing that the above mentioned extension of the seat section extends along the entire bottom side of the evacuation device in order to achieve the wear layer with low friction facing the ground. One can also consider that the extension of the seat section not only constitute a wear section but also constitute a lower inflatable section that for instance can constitute runners for lateral stabilizing and further shockabsorbing by arranging elongate inflatable spaces with large diameter at the longitudinal edges.

[0021] Before use the evacuation device in accordance with the invention is stored rolled together and not inflated. The lateral sections are folded in towards the middle and with the gas container in the center the device is rolled together to a compact and relatively small manageable roll. Since the device is simple and further may be manufactured rationally the cost for each unit will be low so that always a sufficient number can be at hand for the patients in for instance a ward. When the patients have bean placed on the evacuation device these do not have to be pulled all the way out of the hospital but this may of course take place stage wise so that one starts by first removing these from the ward, possible one by one and then thereafter continue with further transports when everyone has been evacuated from for instance the ward were for instance the fire has started.

[0022] When the straps are pulled up in the lower end of the evacuation device the legs of the evacuated are locked and the device is drawn together around the lower end of the body so that a comparatively stable fixation is achieved between the evacuated and the device.

[0023] As an alternative the inflatable part may already at the manufacturing be given a through-shape. This is for instance done by between the inflatable sections arrange flat non-inflatable sections that are folded double and welded. In particular one may do so in the head end of the device, but one can also consider to connect the seat section with the lower edges of the sides.

[0024] As is apparent from the Figure 6 the legs of the

evacuated are held fast between the seat section and the straps over the legs. The support for the lower part of the legs shown in Fig 7 may if so desired be obtained by the folded section being shaped so that it is inflated more than what is shown.

[0025] In order to secure the holding of the evacuated in the evacuation device further fastening straps may be arranged, for instance in the shape of a chest high strap connecting the sides of the device with each other. One can even conceive the straps together forming a harness like structure, improving safety further and making lifting through windows etcetera possible.

[0026] Through the through shape the evacuated is protected around the head and the body. Since the legs are lifted by the seat section the package of evacuated and device becomes shorter and more easy to handle. Since the lower sections of the legs are lifted up by the shape of the through they will not get in contact with the ground, does not prevent pulling in the foot direction and receives a certain protection. Since pulling primarily is intended to take place in the foot direction it is further ensured that feet and lower sections of the legs are held up from the ground in the normal case were an upright person pulls the evacuated behind him.

[0027] Since the pulling takes place in the foot direction the pulling also becomes lighter since the required lifting force will be much smaller than if the evacuated would be pulled in the opposite direction. The pulling require less force since the center of gravity of the evacuated is further away from the pulling person. The pulling person will have his arm angle closer to the ideal angle for pulling and gets a better control of the person to be evacuated since the point of gravity for this one remain low. The effort for a pulling fireman will thus be smaller and he has the strength for more, that is he can evacuate more persons. Since the evacuated is lying down his head will be close to the ground, ensuring that the evacuated has access to the least smoke containing air. By furthermore heart and head being on the same level the load of the heart will also be the least, to which also the lifted feet contribute.

[0028] Sometime evacuation down staircases will surely be necessary and here is as is realized the risk of head injuries less if the feet are in the lower end.

[0029] At last but not least shall be mentioned that the evacuated of course feels more secure if he, or she, look forward in the direction that he, or she, is pulled (if not the amount of smoke prevents all seeing).

[0030] Instead of using directly in each other sewn straps, as has been shown on the drawings, the straps may be fastened to metal fastenings, one on each side in the foot end and one on each side in the head end. This improves the strength of the strap connections when they form angles relative each other and also facilitates the fastening of hooks for lifting by means of machinery for instance a crane. At this either all four mountings can be used alternatively only those in the head end, which also provides a stable lifting.

[0031] In addition to the strapping of the legs, shown in the drawings there are straps for strapping over the stomach and the chest respectively, which straps are fastened in the angle between back section and lateral sections alternatively a distance up on the lateral sections.

[0032] Advantageously the material in the outer folded section is extended with a non-inflatable part that extends along the back section so that an additional layer is obtained against the ground further reducing the risk of injuries and puncture. This further layer is in the longitudinal direction fastened, for instance welded, in the transition between the back sections and the lateral sections.

[0033] A combined relief valve and emptying valve is arranged in the lower end, for instance on the inside of one of the lateral sections and allow oversizing of an inflation tube ensuring sufficient inflation. The inflation tube is further preferably provided with a manually controllable valve for controlling the inflation speed. By arranging many connections between the different inflatable spaces filling can take place faster and the risk of local overpreassures during filling is reduced.

[0034] If so should be required the device can be used without rising the seat section for instance for persons that are to stiff.

Claims

1. Evacuation device, **characterized in that** it includes an inflatable part that at evacuation has or can be given a through shaped state for the receiving of the person that is to be evacuated.

2. Evacuation device according to claim 1, **characterized in that** it includes a lower glide surface with low friction, for instance in the form a coating.

3. Evacuation device according to claim 1 or 2, **characterized in that** it includes means for the fixing of a person that is to be evacuated in the device, for instance in the shape of bands.

4. Evacuation device according to any of the preceding claims, **characterized in that** the seat section (at use) is arranged to be angled up from the back section so that the legs are held up by the seat section with the lower part of the legs on the outside of the seat section.

5. Evacuation device according to claim 4, **characterized in that** on the outside of the seat section an additionally inflated section is arranged to hold up further the lower parts of the legs of an evacuated person.

6. Device according to any of the preceding claims, **characterized in that** in the proximity of the lower end (seat end) bands are arranged on both sides

extending in the foot direction of the evacuated in order to enable pulling the device together with an evacuated person therein.

7. Device according to any of the preceding claims, **characterized in that** around the edge of the through shaped part lifting handles are arranged for example in the shape of a surrounding and more or less dot-wise to the inflatable section fastened band.

8. Evacuation device according of any of the preceding claims, **characterized in that** in a lower section (seat section) of the evacuation device a band is centrally arranged that can be connected with the two lateral bands in order to achieve a locking to the legs of the evacuated.

9. Evacuation device according to any of the preceding claims, **characterized in that** below the evacuation device an extra wear resistent and low friction presenting layer of fabric or the like is arranged that is no part of the inflatable volumes.

10. Evacuation device according to any of the preceding claims, **characterized in that** a gas tube for the inflation is arranged in the front edge of the seat section and that the inflatable part is folded around this so that a support for the lower parts of the legs is achieved.

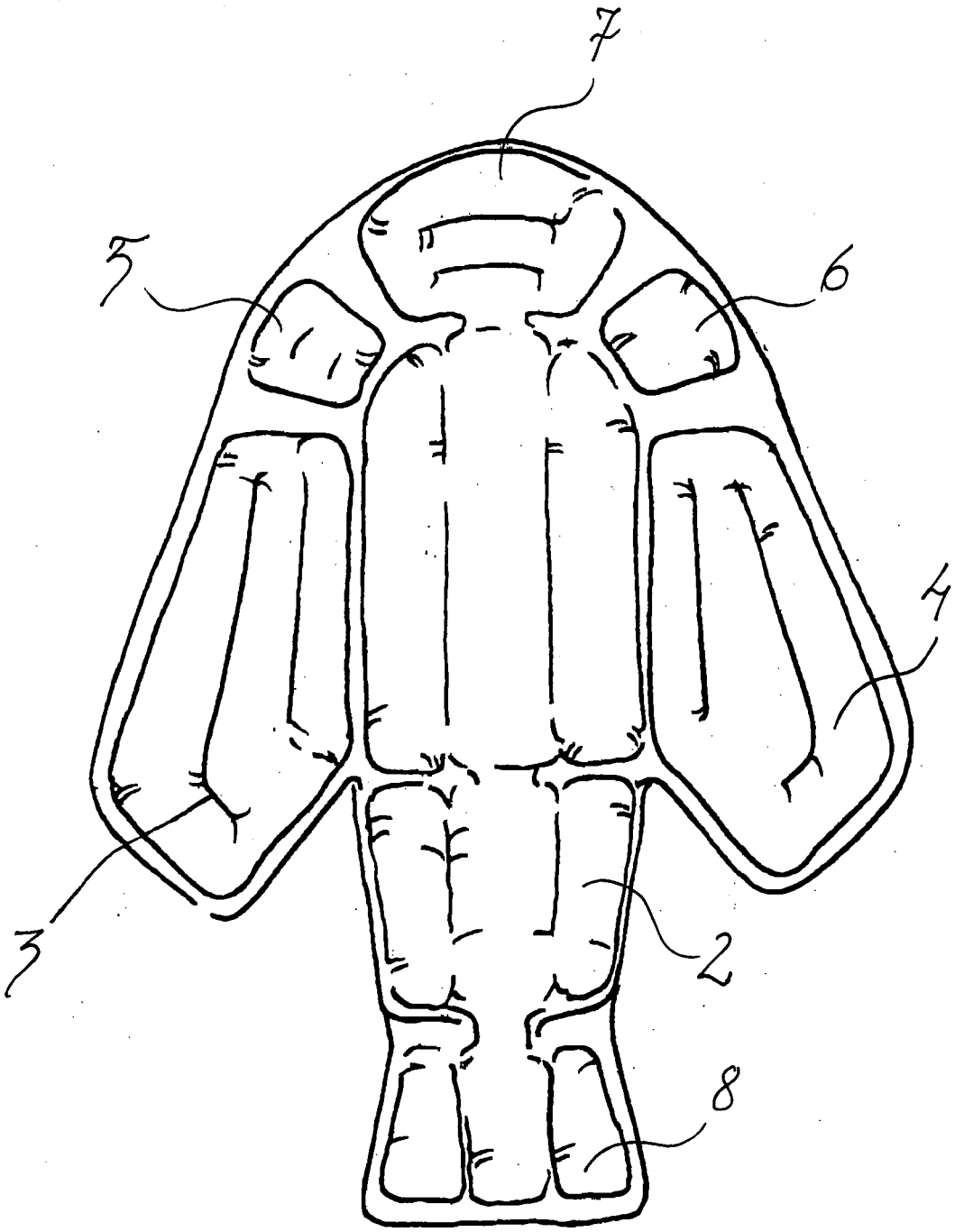


Fig. 1

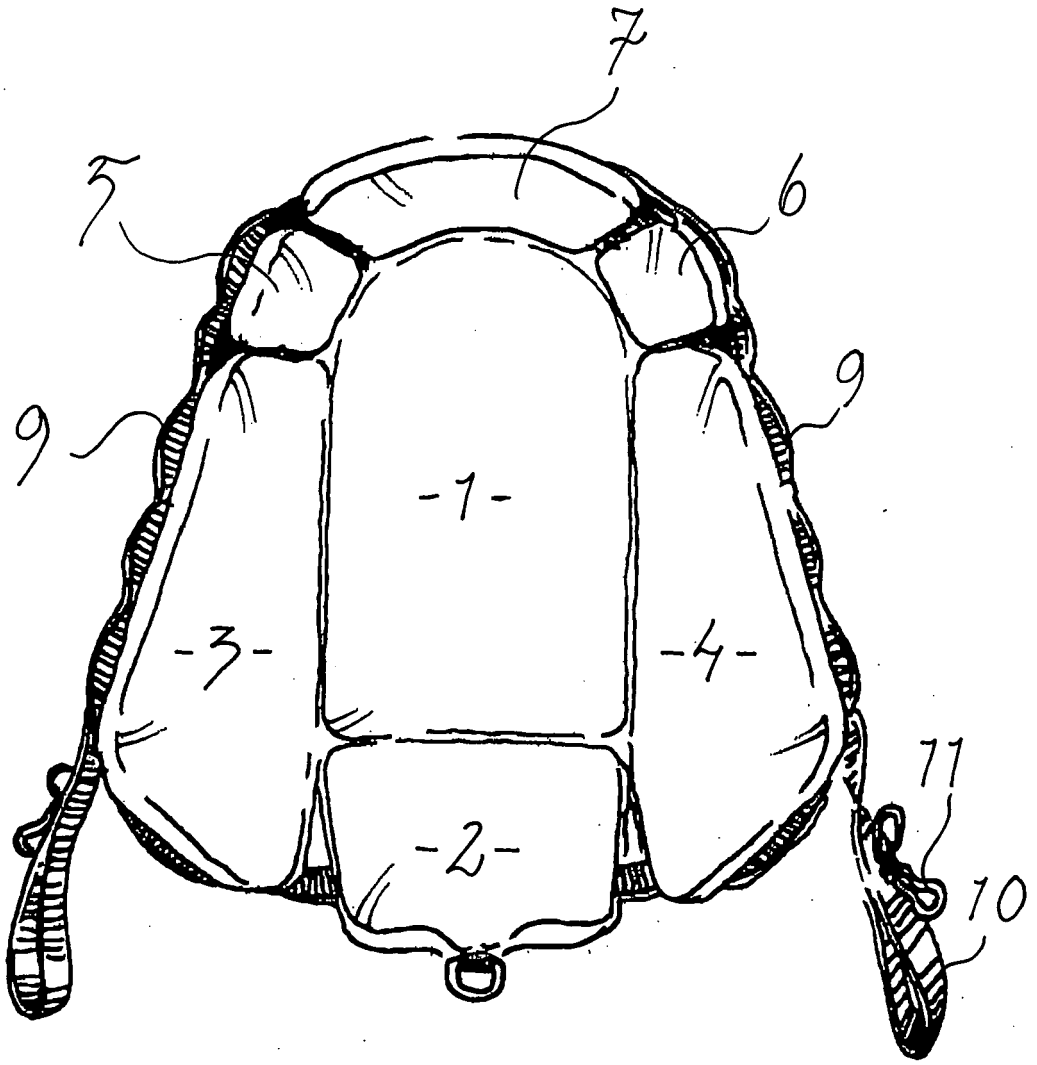


Fig. 2

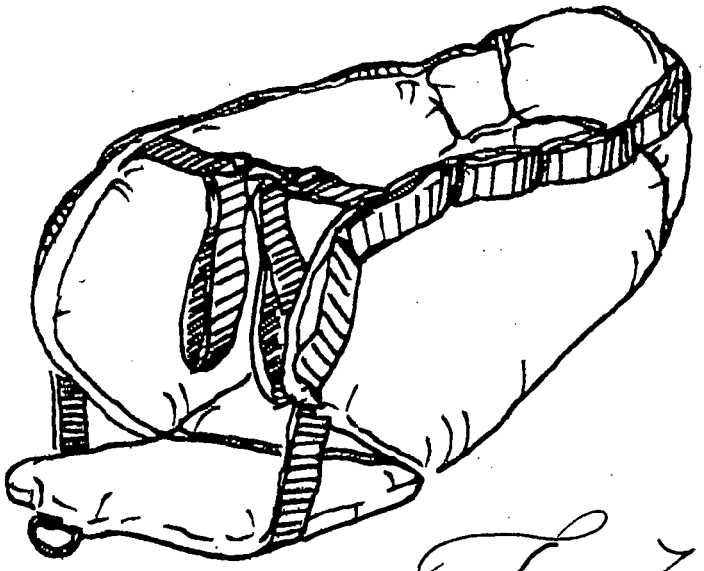


Fig. 3

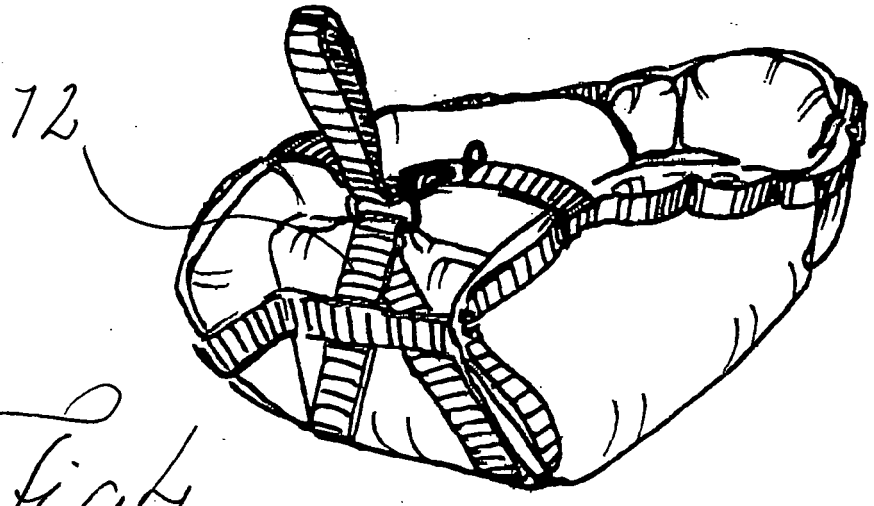


Fig. 4

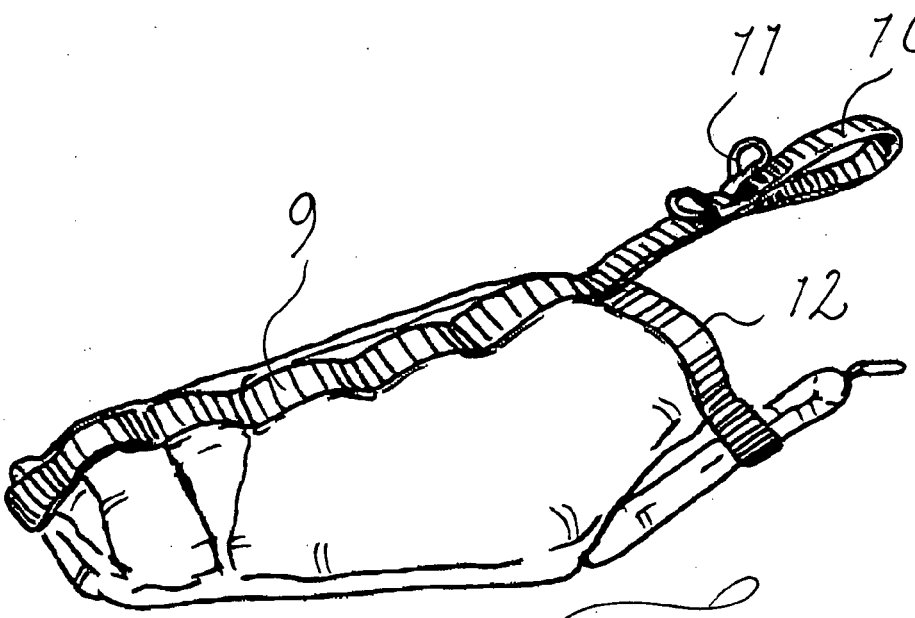


Fig. 5

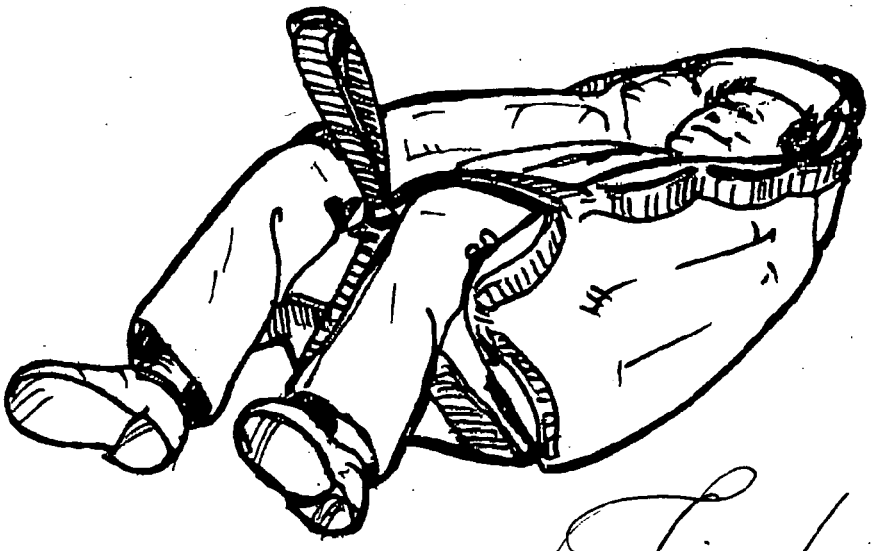


Fig. 6

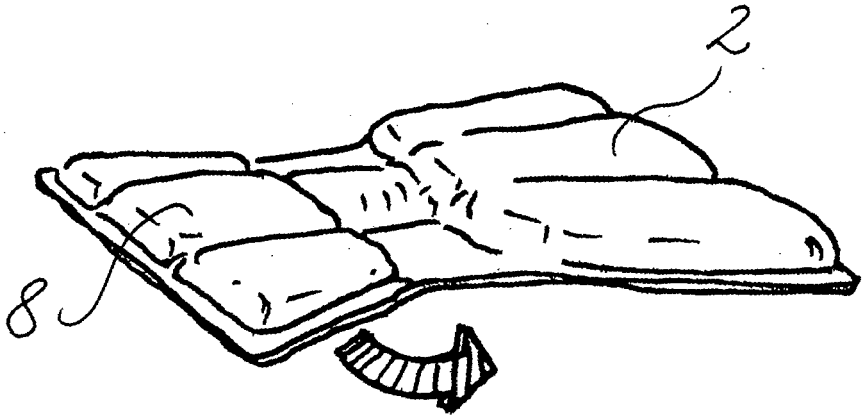
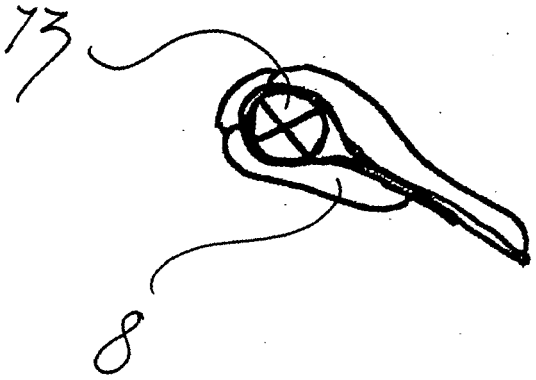


Fig. 7



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 44 5029

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/106155 A1 (ARAI LISA) 12 June 2003 (2003-06-12) * abstract; figure 2 * * page 1, paragraphs 7,9 * * page 2, paragraphs 11,12,17,22 * * page 3, paragraphs 33,41 * * page 4, paragraph 44 * -----	1-10	INV. A62B1/02
X	US 4 736 474 A (MORAN ET AL) 12 April 1988 (1988-04-12) * abstract; figures 2,4 * -----	1-3,6-10	
X	US 6 053 534 A (TIMMERMAN ET AL) 25 April 2000 (2000-04-25) * abstract; figure 1 * -----	1-3,5-10	
X	DD 148 718 A1 (KRANKE,GUENTER,DD) 10 June 1981 (1981-06-10) * abstract; figure 1 * -----	1-3,5-10	
			TECHNICAL FIELDS SEARCHED (IPC) A62B A61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 August 2006	Tempels, M

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 ON EUROPEAN PATENT APPLICATION NO. EP 06 44 5029

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-08-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003106155 A1	12-06-2003	NONE	
US 4736474 A	12-04-1988	DE 3727885 A1	17-11-1988
		FR 2614526 A1	04-11-1988
		GB 2203951 A	02-11-1988
		JP 1681783 C	31-07-1992
		JP 3047858 B	22-07-1991
		JP 63275341 A	14-11-1988
US 6053534 A	25-04-2000	NONE	
DD 148718 A1	10-06-1981	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82