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(72) Inventors:  
• **Hurn, Martyn**  
**Kendal, Cumbria LA9 6AA (GB)**  
• **Eveleigh, Tom**  
**Kendal, Cumbria LA9 6AA (GB)**

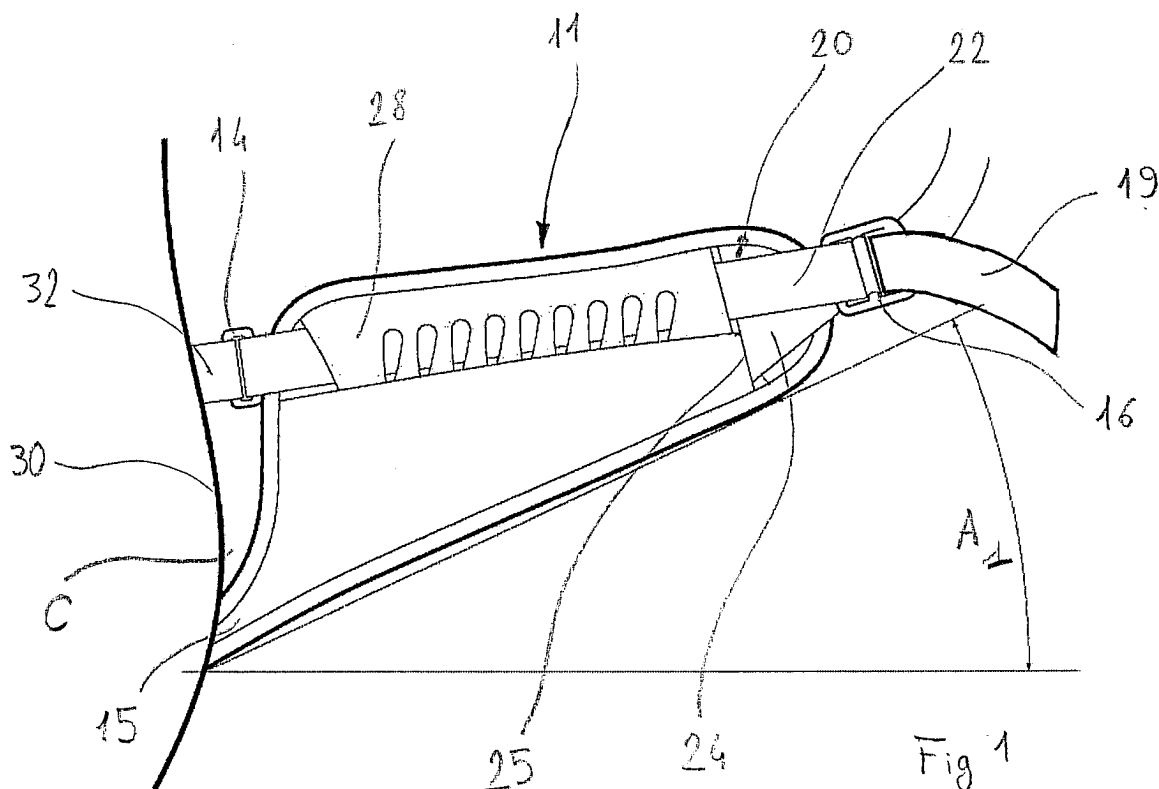
(71) Applicant: **Lowe Alpine Holdings Limited**  
**Kendal**  
**Cumbria LA9 6AA (GB)**

(74) Representative: **Dragotti, Gianfranco et al**  
**Dragotti & Associati srl**  
**Via Turati 32**  
**20121 Milano (IT)**

(54) **Backpack with adaptive fit waist belt**

(57) A backpack with a bag pack and a waist belt, which can adjust its position according to the wearer particular body shape, is described.  
Said waist belt comprises two side hip portions (11, 17) joined to the bag pack, and a strap connection (18) interconnecting said two side hip portions (11, 17); each

hip portion further comprises a webbing (20) being fastened to the related side hip portion (11, 17), a first buckle (14), through which said webbing (20) is connected to said bag pack, and a second buckle (16), through which said webbing (10) is connected to said strap connection (18).



## Description

**[0001]** The present invention relates to a backpack with a waist belt, which can adjust its position according to the wearer particular body shape.

**[0002]** Backpacks usually comprise a pack body and a pair of shoulder straps. In order to make the transport more comfortable and secure, some types of backpacks, such as trampers backpacks or haversack, can also include a waist belt, which makes the pack body stable and closer to the wearer back and let part of the pack body weight to be applied not only on user shoulder but also on the user waist and hips as well.

**[0003]** At present backpacks generally comprise means that let the backpack to be adjustable to the wearers different sizes. Thus, while the pack body maintains a fixed dimension, the shoulder straps and the waist belt can vary their length and position.

**[0004]** In this way, by operating just on some buckles and straps, the same backpack can fit users with different body characteristics such as shoulder width, chest and shoulder size, waist size, torso height and waist shape.

**[0005]** Among the several adjustable backpack features - length and angular setting of shoulder straps, length of waist belt, distance between hip belt and the top junction of shoulder straps with pack body - one of the most important is the angular position of the hip belt.

**[0006]** A conventional waist belt has a strip shaped in order to better adhere to the user waist profile. In fact for a comfortable backpack carrying, waist belt has to be tight around the torso just below the waistline and it has to adjust its lateral inclination according to the user hip shape and specifically to the waist inclination below the waistline.

**[0007]** Thus, the carrying may be comfortable, if the weight force is applied not only to the shoulder or to a small hipbone area, but if it is also uniformly applied along the entire waistline.

**[0008]** In order to achieve this aim, some types of waist belts are known which can vary not only their distance from the top junction of shoulder straps with pack body, but also their angular position therewith.

**[0009]** For example US-A-5,725,139 discloses a waist belt that can change its angular position; in particular this type of belt includes two lateral hip parts; each part presents two horizontal spaced straps, one of which can vary its length by setting the buckle which said strap passes through. In this way the two straps can have different lengths, which cause the lateral hip part to vary its angular position.

**[0010]** Thus, when the user wears the backpack and he needs to adjust the waist belt, he has to set the buckle and the related strap in such a way that each hip part moves angularly to fit the waist shape.

**[0011]** These adjusting operations can be repeated till the waist belt is in a comfort position. It is evident that this setting procedure can be difficult and time consuming, since the adjusting means are also in positions dif-

ficult to access, whereby users often do not set the waist belt angularly and consequently the weight of the backpack is applied only on small areas of the hipbone, leading an uncomfortable use of the backpack itself.

**[0012]** Therefore the main object of the invention is to provide a backpack with a waist belt, which can fit every kind of user waist shape by simply binding the belt around the torso, without complicated adjusting setting elements.

**[0013]** This and further objects are reached by a backpack comprising a pack body, and a waist belt with two side hip portions, each one joined to the pack body at one end, and a strap connection interconnecting said two side hip portions, in order to encompass the user's torso, characterized by further comprising, for each said hip portion, a webbing fastened to the related side hip portion on at least one point, forming a closed loop, a first buckle, through which said webbing is connected to said pack body; a second buckle, through which said webbing is connected to said strap connection.

**[0014]** The features and advantages of the invention shall be more clearly appreciated from the following description of some embodiments illustrated as non limiting examples in the accompanying drawings, in which:

fig. 1 is a side view of a side hip portion of the waist belt, according to the present invention, in a first of the many angular positions;

fig. 2 is a schematic sectional view of the side hip portion of figure 1 perpendicular to the webbing passing through the side hip portion;

fig. 3 is a side view of the side hip portion in a second angular position;

fig. 4 and 5 are two frontal views of the waist belt in the angular position of fig. 1 and 3, respectively;

fig. 6 and 7 are the frontal views of two users with different waist shape wearing the waist belt of the preceding figures;

fig. 8 is a schematic sectional view of the side hip portion according to a second embodiment of the waist belt;

fig. 9 is a side view of a side hip portion of the waist belt according to a third embodiment of the waist belt.

**[0015]** With reference to the above-mentioned figures, a waist belt 10 comprises:

- a right and a left side hip portion 11, 17 of a cushioning material, joined at 15, 29 to a pack body 30, which is shown only partially in fig. 4 and 5
- a strap connection generally designated by the reference numeral 18, consisting of two webs 19, 21 joined by a male-female fastener 31 at their free ends and secured to the hip portions 11, 17 through respective buckles 16, 23;

- two webbings 20, each one sewn to the related hip portions 11, 17 and passing through a first buckle 14 which is designated as unilooop in the following description, and the second buckles 16.

**[0016]** Since the waist belt 10 is of a symmetrical construction, only the right side portion thereof will be now described with particular reference to figures 1 to 3.

**[0017]** The hip portion 11 has essentially a triangular shape, one cathetus C of which is substantially parallel to the backpack maximum extension direction, namely close to vertical.

**[0018]** The joint between the hip portion 11 and the pack body 30 is restricted to a small connecting portion 15 of said triangular shape, specifically at the bottom end of said cathetus C, in such a way that the entire side hip portion 11 can rotate around said connecting portion 15.

**[0019]** The webbing 20 is sewn through its ends on the related hip portion 11 at points 25, 27, so that the webbing 20 and the part of the hip portion comprised between said points 25, 27, does form a closed loop. In particular, said fastening points 25, 27 are positioned near the other two vertexes of the hip portion 11.

**[0020]** Moreover the length of said webbing 20 is greater than the direct distance (D) between the fastening points 25, 27 where the webbing ends are sewn on, as schematically illustrated in fig. 2; in fact the webbing 20 is retained on the side hip portion 11 by the unilooop 14 and the buckle 16 which the webbing 20 slidably passes through.

**[0021]** In this way the webbing 20 can be ideally divided into three parts: the first one 24 extends from one fastening point 25 to the buckle 16 and has a length  $L_1$ , the second part 22 from said unilooop 14 to said buckle 16 and has a length  $L_3$  and the third part 26 from the unilooop 14 to the opposite sewing point 27 and has a length  $L_2$ . Thus the total length of the webbing ( $L_1 + L_2 + L_3$ ) is greater than the direct distance (D) between the fastening points 25, 27.

**[0022]** A ribbon 32, connecting said webbing 20 with the pack body 30, passes through the unilooop 14. Alternatively said unilooop 14 can be directly connected to the pack body 30.

**[0023]** The buckle 16 is passed through by one of the two webs 19, 21 which are part of the strap connection 18. In this way each side hip portion 11, 17 is connected by said webbing 20 to the pack body 30 and to the strap connection 18, in such a way that the waist belt 10 encompasses the user's torso.

**[0024]** According to a feature of the invention a sleeve 28 in which the webbing 20 - specifically the webbing central part 22 - passes through, is attached to the upper portion of the hip portion 11.

**[0025]** The webbing 20 is slidably movable through said unilooop 14 and said buckle 16 in such a manner that the lengths ( $L_1$  and  $L_3$ ) of its first and third part 24, 26 can be varied. As a consequence, by passing through the sleeve 28, the webbing 20 moves the side hip portions

11, 17 angularly around the connecting portion 15.

**[0026]** Thus, as shown in figures 1 and 3, the side hip portion 11 can be set in different angular positions, varying the ideal angle having, as a vertex, the connecting portion 15 of the side hip portion 11 with the pack body 30, and as the sides the base cathetus of the ideal triangle which the side hip portion can be assimilated to and the ideal horizontal line coming from said connecting portion 15.

**[0027]** According to figures 4 to 7, when the user wears the backpack, after closing the male-female fastener 31 and tightening the two webs 19, 21, the above-defined angle changes; in fact by tightening the two webs 19, 21, the waist belt 10 decreases its length and the hip portion 11 moves according to the direction F - the length  $L_2$  of the first webbing part 24 increases, while the length  $L_1$  of the third webbing part 26 decreases. Thanks to this movement both the hip portions 11, 17 position themselves in a higher position, generating an angle  $A_1$ , as shown in figure 1.

**[0028]** Advantageously this in turn increases the lateral slope  $B_1$  of the hip belt - the slope of the ideal line tangent to the lateral profile of the waist belt - and this change let the hip belt to accommodate accentuated hip profiles, as shown in figures 4, 6.

**[0029]** Vice versa, if the two webs 19, 21 are extended, the waist belt 10 increases its length and the webbing 10 moves with respect to the hip portion 11 - the length  $L_2$  of the first webbing part 24 decreases, while the length  $L_1$  of the third webbing part 26 increases.

**[0030]** Thanks to this webbing movement the hip portions 11, 17 position themselves in a lower position and generate an angle of lower width  $A_2$ , as shown in figure 3.

**[0031]** As a result the lateral slope of the hip belt decreases - angle  $B_2$  - so as to fit a less notable hip profile, as illustrated in figures 5, 7.

**[0032]** As a second preferred embodiment the webbing 20 can be a band joined to the related hip portion at a single point 12, in such a way that it forms a one-body closed loop, as illustrated in figure 8, where the same parts of the first embodiment show the same reference numbers.

**[0033]** According to an alternative embodiment shown in figure 9, each side hip portion 11 is provided with an opening 13 at the level of the user's hip bone, so as to improve the wearability of the back pack.

**[0034]** It is understood that possible variations, mechanically and/or conceptually equivalent to those above described, can be conceived within the scope of the invention.

**[0035]** For instance only one reach of the closed loop formed by the webbing 20 can be slidably housed in the hip portion 11, the other reach being freely positioned outside thereof.

## Claims

### 1. Backpack comprising:

- a pack body (30); 5
- a waist belt (10) with two side hip portions (11, 17), each one joined to the pack body (30) at one end (15, 29), and a strap connection (18) interconnecting said two side hip portions (11, 17), in order to encompass the user's torso, 10

**characterized by** further comprising, for each said hip portion (11, 17):

- a webbing (20) fastened to the related side hip portion (11, 17) on at least one point (25, 27), forming a closed loop; 15
- a first buckle (14), through which said webbing (20) is connected to said pack body (30);
- a second buckle (16), through which said webbing (10) is connected to said strap connection (18). 20

### 2. Backpack according to claim 1, **characterized in that** said webbing (20) is fastened to the related side hip portion (11, 17) at a first fastening point (25) and at a second fastening point (27), said webbing (20) having a length greater than the direct distance between said fastening points (25, 27). 25

### 3. Backpack according to any one of claims 1 and 2, **characterized in that** said hip portion (11, 17) comprises a sleeve (28) which the webbing (20) passes through. 30

### 4. Backpack according to any one of claims 1 to 3, **characterized in that** said first buckle (14) is connected to said pack body (30) through a ribbon (32). 35

### 5. Backpack according to any one of claims 1 and 3, **characterized in that** said webbing (20) is divided into three parts by said first buckle (14) and said second buckle (16); the first part (24) being comprised between said first fastening point (25) and said second buckle (16), the second part (22) being comprised between said first buckle (14) and said second buckle (16), the third part (26) being comprised between said first buckle (14) and said second fastening point (27). 40 45

### 6. Backpack according to claim 1 or 4, **characterized in that** said side hip portion (11, 17) comprises an opening (13). 50

### 7. Waist belt comprising: 55

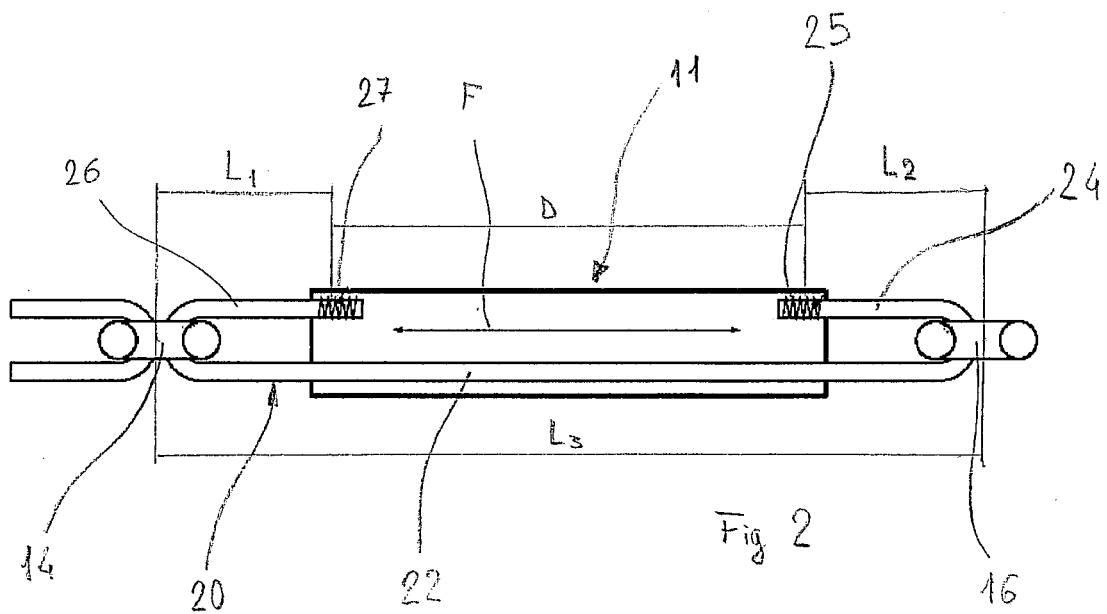
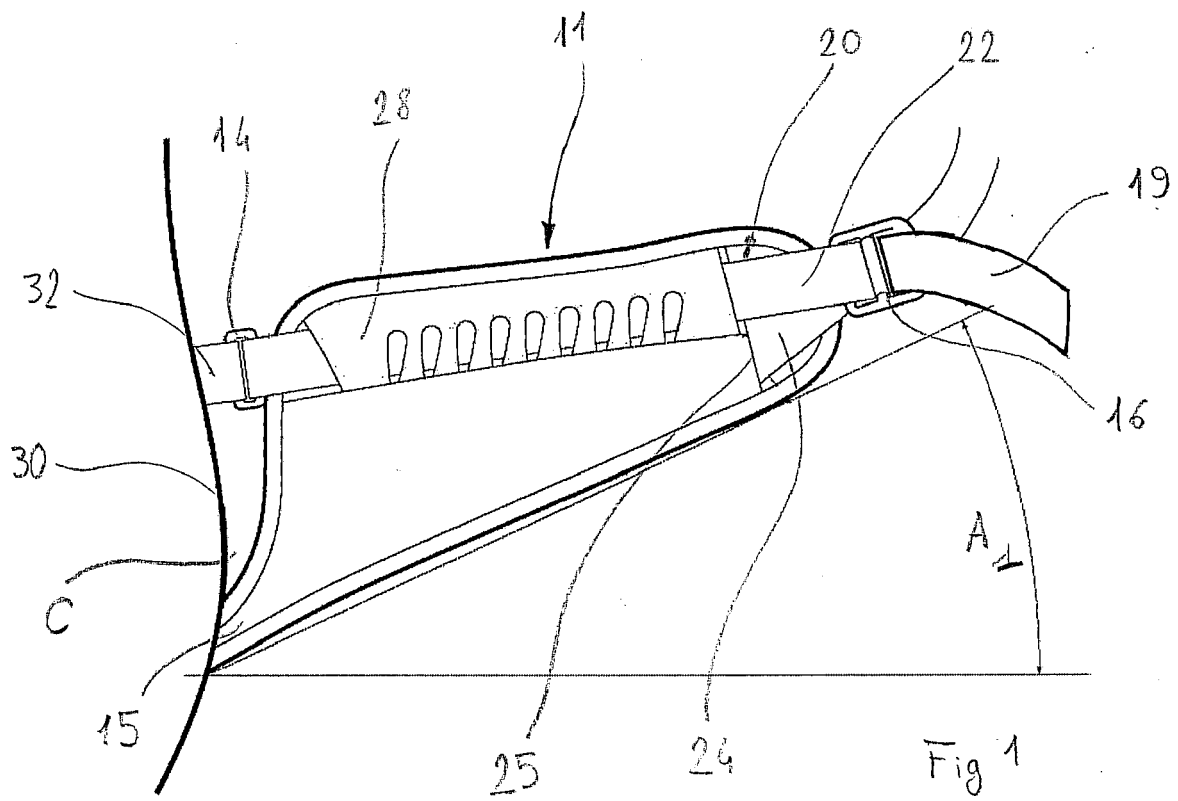
- two side hip portions (11, 17), each one adapted to be joined to the pack body (30) of a back-

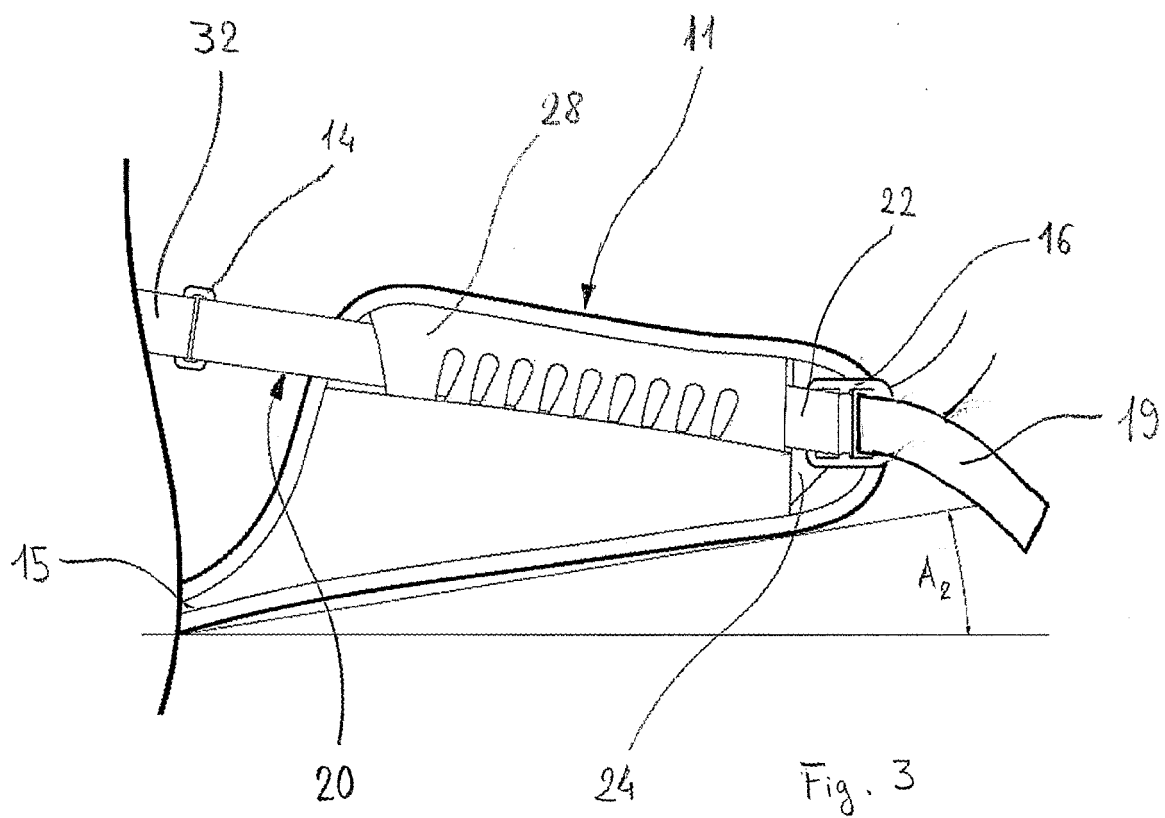
pack at one end (15, 29) thereof;

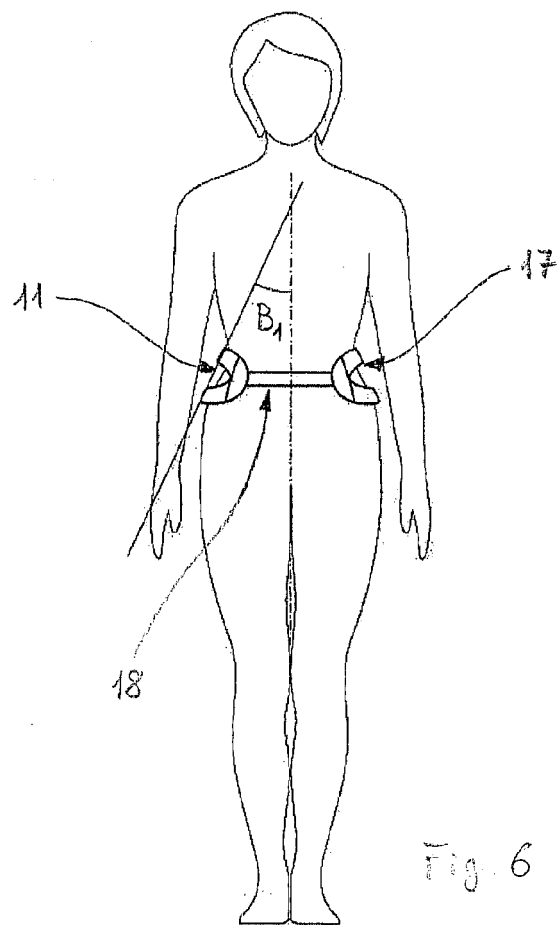
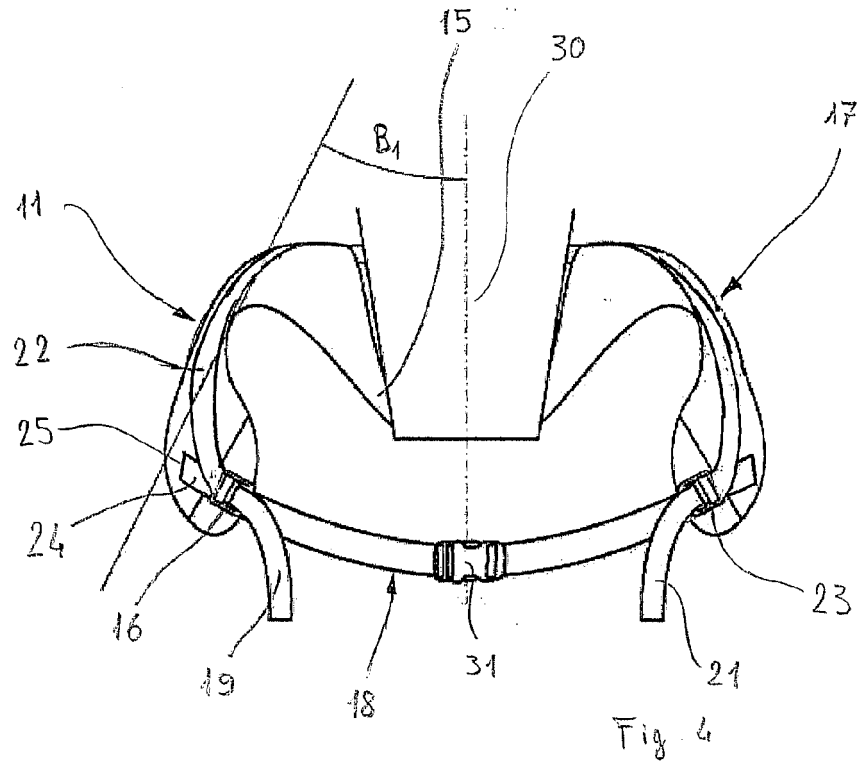
- a strap connection (18) interconnecting said two side hip portions (11, 17), in order to encompass the user's torso;

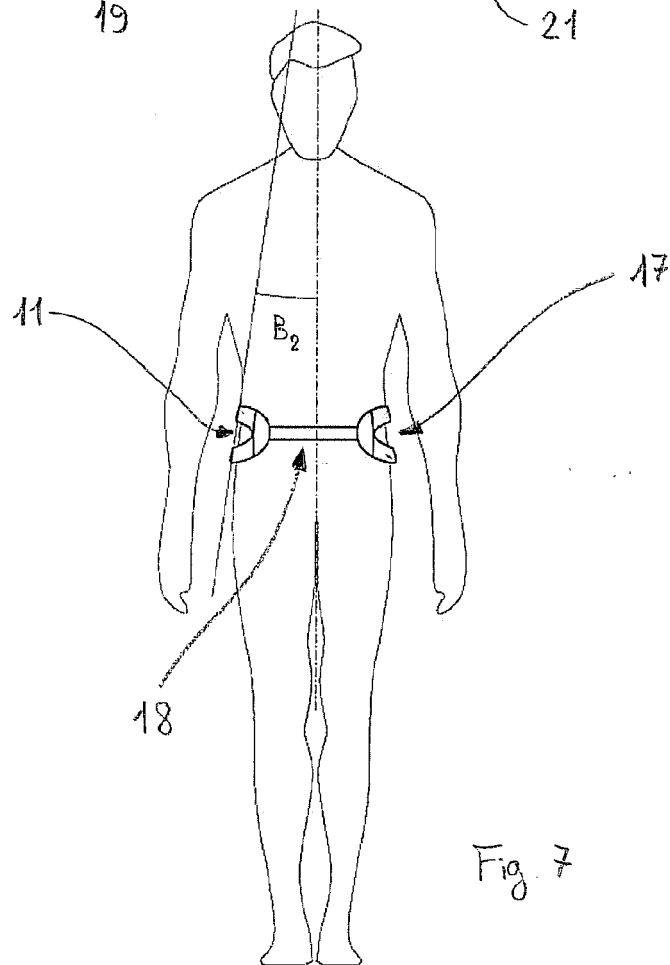
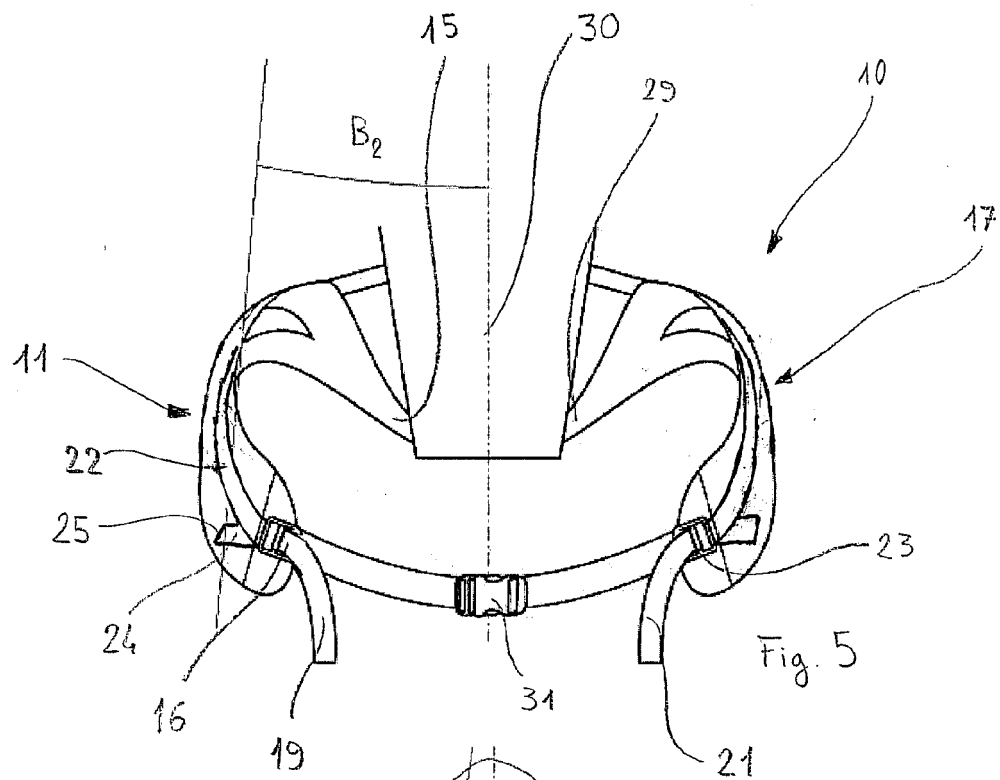
**characterized by** further comprising, for each said hip portion (11, 17):

- a webbing (20) being fastened to the related side hip portion (11, 17) on at least one point (25, 27), and forming a closed loop;
- a first buckle (14), for the connection of said webbing (20) to said pack body (30);
- a second buckle (16), for the connection of said webbing (20) to said strap connection (18).

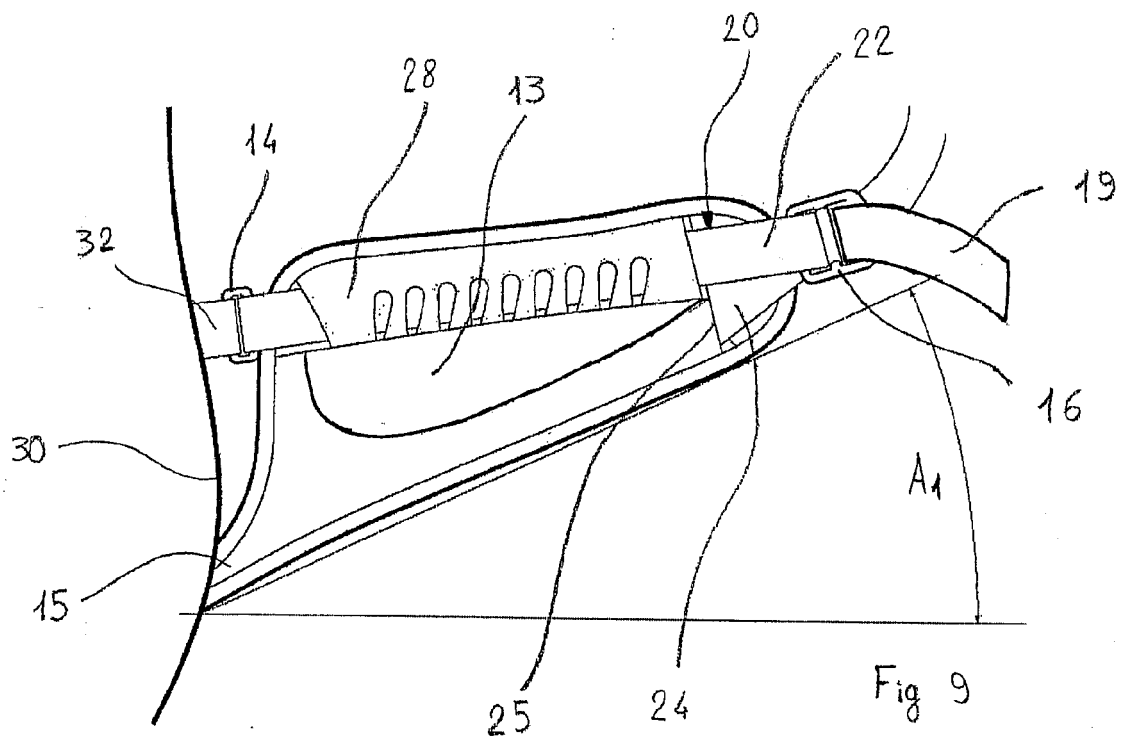
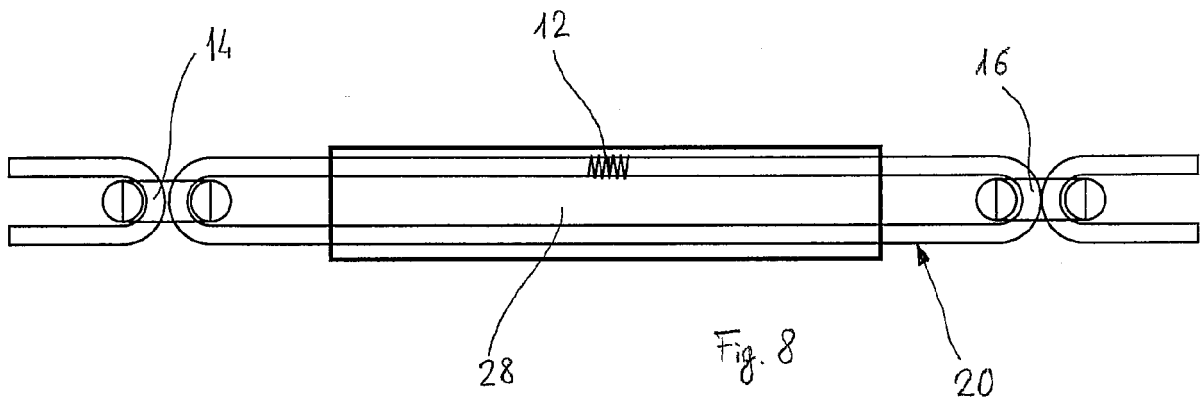














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# EUROPEAN SEARCH REPORT

Application Number  
EP 06 11 8088

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		9 February 2007	Dinescu, Daniela
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			

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EPO FORM 1503 03.82 (F04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 06 11 8088

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09-02-2007

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**REFERENCES CITED IN THE DESCRIPTION**

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