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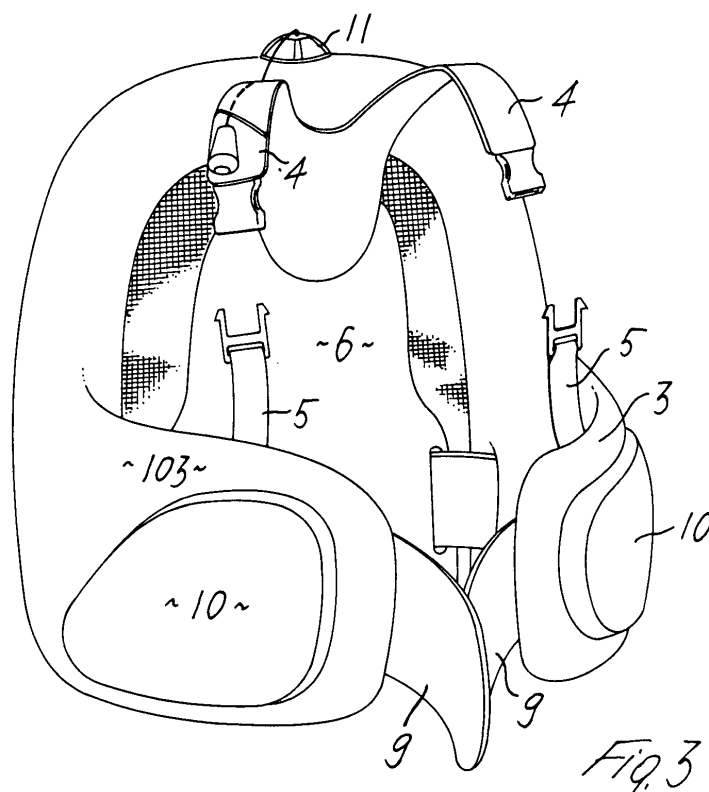
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(54) **Balancing jacket for diving activities equipped with horseshoe-shaped inflatable pocket with ventral extensions and method for its manufacture**

(57) Method for manufacturing a balancing jacket for diving activities characterized by the following steps:
a) manufacturing an inflatable chamber by joining two pieces (1) of suitable fabric substantially having a plan C-shape; manufacturing a back element (2) made of fabric having a substantially U-shape; and applying

around said back element the central portion of said inflatable chamber, thus obtaining a tubular back-supporting horseshoe structure (101) provided with two tubular end extensions extending forward substantially as a right angle with respect to said horseshoe structure, thus forming two ventral supporting chambers (3).



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Description

[0001] The present invention relates to balancing jackets for diving activities, and in particular to balancing jackets equipped with horseshoe-shaped inflatable bladder, i.e. comprising two parallel arms joined one to the other in a U shape by means of an intermediate bladder portion.

[0002] More particularly, the present invention relates to a balancing jacket equipped with horse-shoe-shaped bladder, in which said bladder further comprises two inflatable ventral extensions obtained as one piece together with said bladder.

[0003] From FR-A-2 708 560 jackets are known having a floating area placed both in the ventral and lateral portions and also on the shoulders. Also known are the so-called "back-mounted" jackets having a front area carrying the harness and an inflatable area which is placed on the back portion. Both types of these jackets are disadvantageous because they lack in stability in water. In particular, "back-mounted" jackets tend to push forward the diver's body with his head down, which can be very dangerous if the diver is tired.

[0004] Finally, as for instance disclosed in US-A-4 523 914, there are jackets combining the two types mentioned above. However, the latter types of jackets are quite complex and expensive, since they consist of a plurality of air chambers. Furthermore, for all these known types of jackets it is necessary to provide for a large number of sizes so as to meet all size requirements from the customers, which greatly increases their manufacturing costs.

[0005] The object of the present invention is therefore a balancing jacket for diving activities equipped with a horseshoe-shaped inflatable bladder placed on the back, which envelops the bottle and therefore gives the diver a lower hydrodynamic resistance with respect to the one given by conventional back-mounted jackets extending outside the bottle. Moreover, since said bladder is provided with ventral inflatable extensions obtained as one piece, the user is given an extremely comfortable and safe floating trim (the diver "sits as in an armchair" in the jacket). Finally, thanks to the particular structure of the jacket according to the invention and to the separation between inflatable portion and harness, the number of necessary sizes can be minimized.

[0006] According to a main feature the jacket according to the invention comprises an inflatable chamber consisting of a base element substantially having a plan C-shape, the central portion of said base element being shaped as a U by applying a textile back element whose shape is complementary to the U, thus obtaining a horseshoe structure with two end portions extending forward substantially as a right angle starting from said horseshoe structure, thus forming the ventral floating chambers.

[0007] Advantageously, said back element shaping the whole structure is preferably made of a net fabric,

so as to further reduce the hydrodynamic resistance of the assembly.

[0008] Another object of the present invention is a method for manufacturing a jacket as mentioned above.

[0009] Further objects and advantages according to the present invention will be evident from the following description of a preferred embodiment of said jacket made with reference to the enclosed drawings, in which:

Figure 1 is a plan view of a section of the floating chamber of the jacket according to the invention; Figure 2 is a perspective view of the floating chamber in Figure 1, shaped thanks to the application of the back element.

Figure 3 is a perspective view of the front side of a jacket according to the invention, together with the harness elements, and

Figure 4 is a perspective view of the back side of the jacket in Figure 3.

[0010] With reference to the drawings, Figure 1 shows a plan view of the element 1 constituting the air chamber of the jacket according to the invention. Such element 1 has a plan contour substantially shaped as C and consists of two sheets of air-proof fabric, which are joined one to the other along their edges. Said element 1 can be in itself the inflatable air chamber of the jacket, or it can be provided inside - in quite a common way - with a second air-proof bladder (generally a plastic bladder) constituting the air chamber of the jacket. In the latter case the outer bladder can also be made by sewing together several textile elements also in a non-air-proof way, since the air chamber function is performed by the inner bladder.

[0011] The base element 1 in Figure 1 is given its final shape, shown in Figure 2, by sewing and/or joining its intermediate edge with a U-shaped piece of fabric 2 constituting the frame shaping the jacket, which thus takes on a horseshoe shape 101 in its back portion, with two enveloping extensions or arms 3, 103 extending forward starting from the horseshoe back, almost as arms of an ideal armchair.

[0012] Advantageously, though not necessarily, the piece of fabric 2 consists of a net fabric.

[0013] Onto the piece of fabric 2 the back support 6 is mounted, which can be stiff or soft, or of any other type. Said back support contains the harness shoulder straps 4, provided on their ends with fast coupling elements cooperating with complementary coupling elements applied onto the ends of two belts fastened to the air chamber elements 3, 103. To the back support 6 it is also possible to fasten the rear back (not shown), to which the bottle 8 (Figure 4) is hanged, for instance by means of the belt 7. The belts 9 are fastened to the ends of the two ventral extensions 3, 103, thus closing the front portion of the jacket in the area of the diver's belt. Said belts 9 are advantageously provided with Velcro-type or similar connecting elements, though they can al-

so be provided with fast coupling buckles.

[0014] As shown in Figure 3, two pockets 10, which might be used to house ballast lead, can be applied onto the outer side of the ventral extensions 3, 103. Obviously the jacket further comprises discharge valves (only one of them being shown, referred to with numeral 11), the inflating valve (not shown) which can be arranged on the front side of one of the ventral extensions 3, 103, and all those other accessory elements required for such a jacket.

[0015] As better shown in Figure 4, the jacket according to the invention develops around the air bottle 8 enveloping it almost as in a niche, so as to minimize the hydrodynamic resistance of the assembly. When the diver is floating, he is kept by the jacket in a very comfortable position, as if he were sitting in an armchair. Beyond being comfortable, this position is also quite safe in case the diver should be taken ill, since his whole weight is kept out of water, without risking being pushed with his head under water as could occur with some types of back-mounted jackets.

[0016] Obviously, the present invention is not limited to the embodiment shown and described, but it includes all those construction changes and variations that fall within the ampler framework of the inventive idea, substantially as claimed later.

[0017] So, for instance, although in the description and claims it is stated, referring to the chamber 1 of the jacket, that the latter consists of "two sheets or two pieces of fabric" joined one to the other, it is understood that the general expression "two sheets or two pieces of fabric" also includes the fact that said sheets or pieces forming the chamber 1 can also be obtained from two plane fabric elements obtained by joining several lengths of fabric and then by cutting them so as to form the final sheet or piece with the plan contour according to the invention.

[0018] Obviously, in case said chamber 1 is the air chamber of the jacket, said lengths will be of air-proof fabric and will be joined one to the other in an air-proof way, whereas in case the chamber 1 contains a second air-proof bladder constituting the air chamber of the jacket, said lengths can be joined one to the other also in a non-air-proof way.

[0019] The advantages deriving from the use of the balancing jacket according to the invention will be evident.

[0020] The main portion of the horseshoe-shaped inflatable bladder of the jacket according to the invention is disposed in use in the dorsal portion of the user, with the addition of two lateral inflatable extensions. Frontal inflatable portions are absent.

[0021] Thanks to its peculiar form, the inflatable bladder extends "backwards" from the upper dorsal portion of the back of the jacket, that is it extends toward the air bottle.

[0022] In the jackets according to the prior art, the inflatable portion extends "forwardly" from the back of the

jackets thus causing, when the jacket is completely inflated a pressure against the dorsal zone of the diver. The said drawback is completely obviated by the jacket according to the invention which, as said, is inflated "backwards" with respect of the back of the jacket.

[0023] A further advantage of the jacket according to the invention resides in the true buoyancy thrust afforded. In all prior art jackets, also in those which are horseshoe-shaped with backward buoyancy, whenever the diver is afloat, a portion of their inflatable bladder is above the water surface. It will be evident that the portion of the inflatable bladder which is above the water surface will not contribute to the buoyancy of the diver, so that if a jacket is used with, for instance, a maximum buoyancy of, say, 20 kg, the effective buoyancy will be in the order of 17-18 kg, according to the shape of the jacket. With the jacket according to the invention, thanks to the fact that the upper portion of the bladder is practically turned backwards by about 90° with respect to the back of the jacket, and is therefore disposed at a slightly lower level with respect to the shoulders of the diver, the buoyancy thrust of the jacket will be always completely used.

Claims

1. Method for manufacturing a balancing jacket for diving activities **characterized by** the following steps:
a) manufacturing an inflatable chamber (1) by joining two pieces of suitable fabric substantially having a plan C-shape; manufacturing a back element (2) made of fabric having a substantially U-shape; and fastening around the U-shaped portion of said back element (2) the central portion of said inflatable chamber (1), thus obtaining a tubular back-supporting horseshoe structure (101) provided with two tubular end extensions (3, 103) extending forward substantially as a right angle with respect to said horseshoe structure (101), thus forming two ventral supporting chambers.
2. Method for manufacturing a jacket for diving activities according to claim 1, in which the central portion of said chamber (1) is sewn to the edge of the U-shaped portion of said back element (2).
3. Balancing jacket for diving activities **characterized in that** it comprises an inflatable chamber consisting of a base element (1) substantially having a plan C-shape, the central portion of said base element (1) being shaped as a U by applying a back element (2) made of fabric having a complementary shape with respect to the U shape, thus obtaining a horseshoe structure (101) with two end portions (3, 103) extending forward substantially at a right angle starting from said horseshoe structure (101).

4. Balancing jacket for diving activities according to claim 3, **characterized in that** said tubular chamber (1) is made with air-proof fabric, and constitutes the air chamber of the jacket.

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5. Balancing jacket for diving activities according to claim 2, **characterized in that** said tubular chamber (1) contains a second bladder constituting the air chamber of the jacket.

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6. Balancing jacket according to any of the preceding claims, in which said back element (2) is made of a net fabric.

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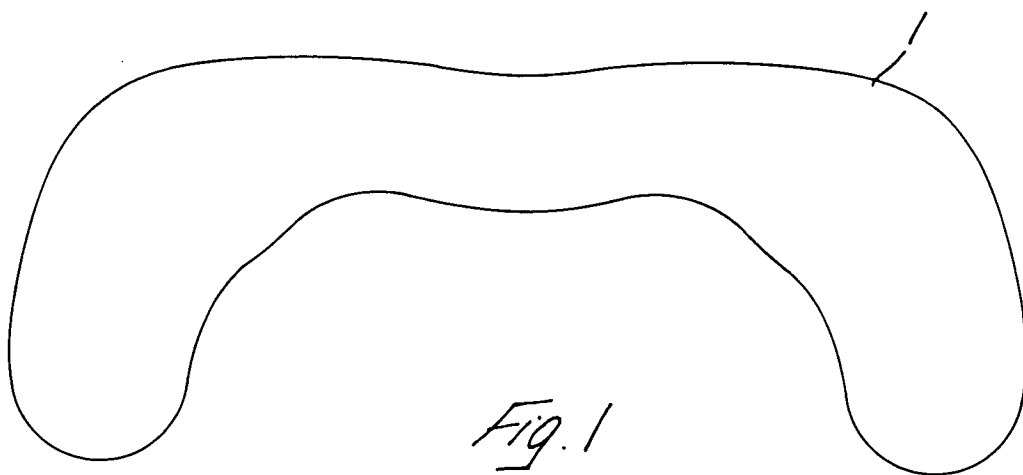
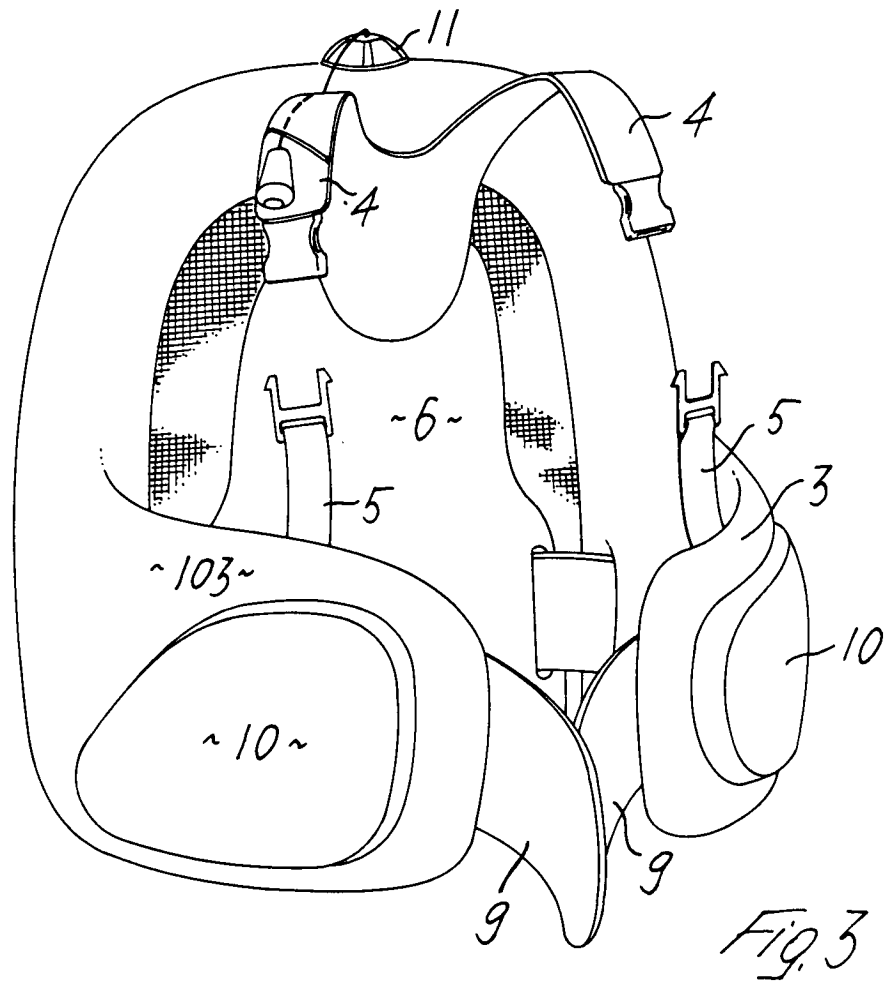
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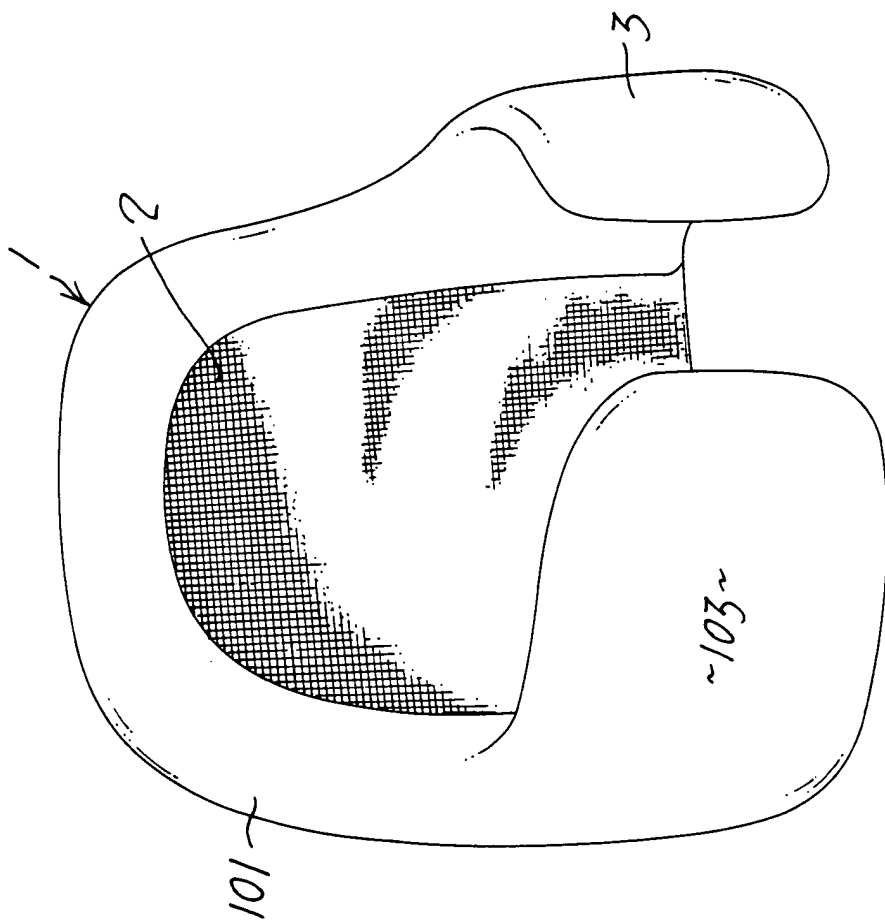


Fig. 2

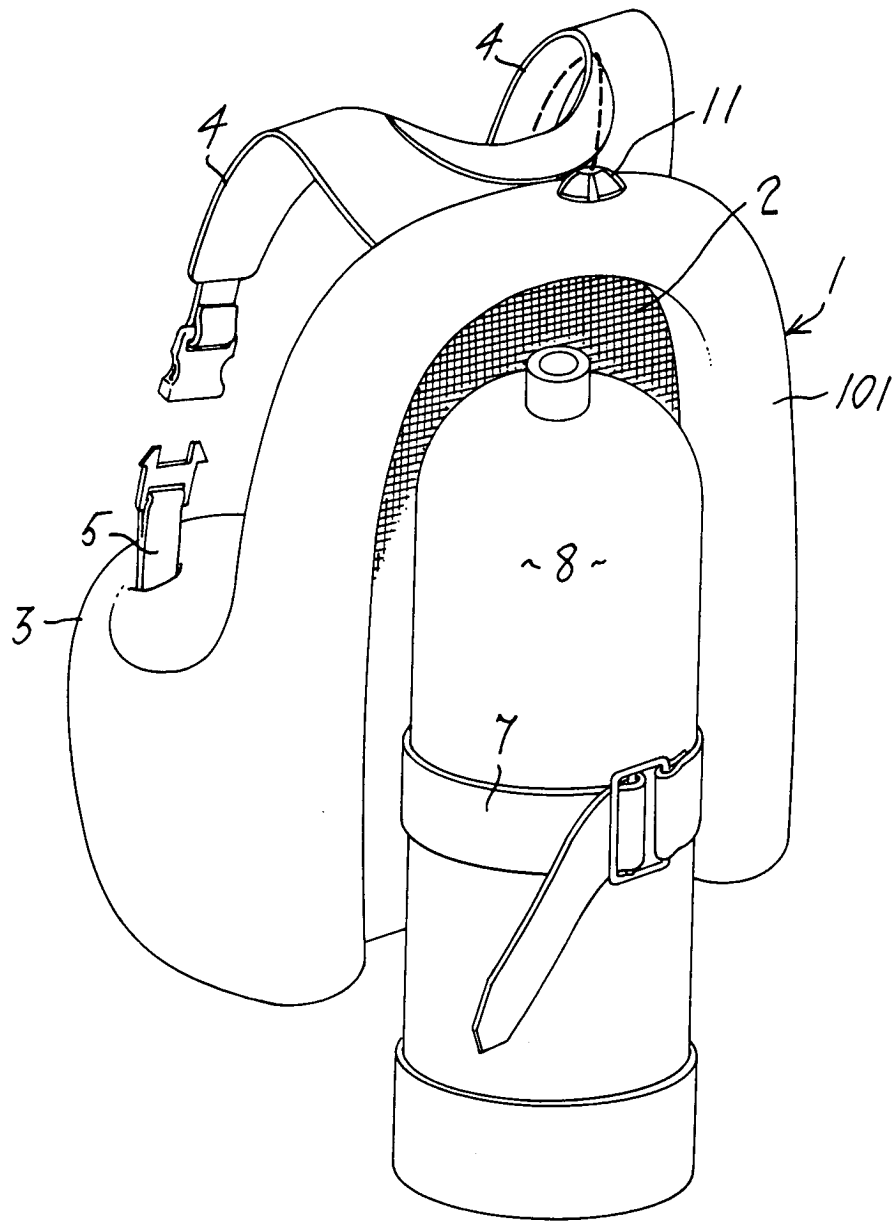


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 4800

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	FR 2 708 560 A (CAVALERO) 10 February 1995 (1995-02-10) * page 3, line 12 - line 32; figures 1-3 *	1-4,6,7	B63C11/08
A	US 5 441 367 A (TOTH DOUGLAS J) 15 August 1995 (1995-08-15) * column 2, line 64 - column 3, line 24; figures 1,2 *	1,3,4,7	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B63C
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 October 2003	DE SENA HERNAND., A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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