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(54) PERSONAL PROTECTION DEVICE AND GARMENT INCLUDING SUCH A DEVICE

PERSÖNLICHE SCHUTZVORRICHTUNG UND KLEIDUNGSSTÜCK MIT EINER SOLCHEN
VORRICHTUNG

DISPOSITIF DE PROTECTION PERSONNELLE ET VÊTEMENT COMPRENANT UN TEL
DISPOSITIF

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(56) References cited:
WO-A1-2005/110133 GB-A- 2 434 964
US-A- 4 737 994 US-A- 5 500 952
US-A1- 2002 078 484 US-A1- 2004 183 283

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Description

[0001] The present disclosure refers to a protection device for a personal protection, including an inflatable element adapted to protect from impacts and/or falls a passenger, a motor vehicle driver or an alike user, during a sporting and/or working activity.

[0002] In the last years, as a result of a constant research in safety during all sporting activities, but more generally all those dangerous activities practiced under extreme conditions or at high speeds, above all in the motorcycling field, the offer of protection devices allowing effective and concomitantly practical protection of the upper portion of the body of a user, by use of an inflatable element, has increased. At the instant of an impact, a slipping or a fall in general, the inflatable bag is put in fluid communication with a source of fluid, such a compressed gas canister or a fluid generator.

[0003] At the instant of an impact, the inflatable element creates an air cushion about the upper portion of the body of the user, allowing to protect the body of the user from impacts. Inflatable elements are known from US 4 737 994 and GB 2 434 964.

[0004] At the basis of the present disclosure, there is the recognition by the Inventor of the present disclosure that the use of a personal protection device like that made available to date by the known art, though advantageous under many standpoints, has not always proved sufficient to guarantee an adequate protection for a user. On the basis of said recognition, a personal protection device is made available, whose main features are respectively specified in the first claim, in a garment according to claim 12.

[0005] Secondary features of the subject of the present disclosure are defined in the corresponding dependent claims thereof.

[0006] The subject of the present disclosure provides several relevant advantages.

[0007] In particular, with the personal protection device according to the present disclosure, it is possible to provide an inflatable element at a region of the pelvis of the user (in practice, embracing the pelvis), in which a first side protection portion of said inflatable element is arranged so as to protect at least one hip region, and a second side protection portion is arranged so as to protect at least the other region of the hip of the user.

[0008] Moreover, the protection device according to the present disclosure provides connecting in fluid communication the first side protection portion to the second side protection portion via a connecting portion which protects a bottom zone of the back of a user.

[0009] Thanks to the protection device according to the present disclosure it is possible to safeguard one of the parts of the body of a user, i.e. the region of the pelvis, and more particularly of the hips, which proved to be among the ones more concerned and exposed to an impact in case of fall during a dynamic activity, for example a fall from a motorcycle, or a fall from a horse or a fall

during skiing.

[0010] In an embodiment, the connecting portion is provided with an appendage to protect a coccyx and/or sacrum region of a user.

[0011] In an embodiment, the first side protection portion and the second side protection portion are substantially "C"-shaped, i.e., with a curved profile or with a curved region defining a cavity or a concavity. When the personal protection device is worn on, a protruding hip bone, that is, the iliac crest bone, is located at the, i.e., is in the, cavity or concavity formed by the arcuate profile. Such a "C"-like form and shape of the side protection portions of the inflatable element is therefore shaped to the anatomy of the hip region, and further allows the inflatable element to remain stationary in position during inflation and offer a high protection of the hip.

[0012] In an embodiment, the protection device comprises a second inflatable element, located at a zone of the shoulders and of the neck. The second inflatable element is connected in fluid communication with the abovementioned inflatable element via one or more cannulas. The presence of the second inflatable element allows to obtain a protection as complete as possible for the more exposed parts of the body of a user, i.e., the zone of the shoulders and of the neck and the zone of the pelvis. Moreover, the second inflatable element may be provided with a source of gas under pressure. In this embodiment, with a single source of gas under pressure associated with the second inflatable element, it is possible to inflate, via the one or more cannulas, also the inflatable element of the pelvis.

[0013] In an embodiment, the protection device is included in a garment, such as for example a motorcyclist suit or a jacket, and is easily wearable by a user. Preferably, to reduce the encumbrance as much as possible, the garment comprises a pocket intended to house the protection device.

[0014] Other advantages, features and operation steps of the subject of the present disclosure will be made evident in the following detailed description of some preferred embodiments thereof, given by way of example and not for limitative purposes. However, it is evident how each embodiment could have one or more of the advantages listed above; anyhow, it is not required for each embodiment to concurrently have all of the advantages listed.

[0015] Reference will be made to the figures of the annexed drawings, wherein:

- Figure 1 shows a view, from above, of a protection device according to the present disclosure, resting on a plane;
- Figure 2 shows a perspective view from a rear side of the protection device of Figure 1 in a worn-on condition;
- Figure 3 shows a side perspective view of the protection device of Figure 1 in a worn-on condition;
- Figure 4 shows a top perspective view of a protection

device according to the present disclosure, resting on a plane, in accordance with an alternative embodiment;

- Figure 5 shows a perspective view from a rear side of the protection device of Figure 4 in a worn-on condition;
- Figure 6 shows a side perspective view of the protection device of Figure 4 in a worn-on condition;
- Figure 7 shows a perspective view from a rear side of a garment including a protection device according to the present disclosure in a deflated condition;
- Figure 8 shows a perspective view from a rear side of a garment including a protection device according to the present disclosure in an inflated condition.

Referring to Figures 1 to 8, a personal protection device according to the present disclosure, in accordance to one embodiment, is denoted by the reference number 10.

[0016] The personal protection device 10 comprises an inflatable element 12 which is adapted to assume substantially a first rest condition or deflated condition, and a second active condition or inflated condition. The modes of inflating the inflatable element 12 will be described in the description below.

[0017] The inflatable element, which may be manufactured according to the technology described in WO2010/067288 and WO2010/067393, is intended to create a protection for the hips and for the pelvis of a user.

[0018] In particular, the inflatable element 12 includes a first side protection portion 13 intended to protect at least one hip region, in the example of the figures, the right-side hip, and a second side protection portion 14 intended to protect at least the other region of the hip, i.e. the left-side hip region, and a connecting portion 16 defining a zone of connection between the first side protection portion 13 and the second side protection portion 14, and defining a fluid communication between said first side protection portion 13 and the second side protection portion 14.

[0019] In practice, the personal protection device 10 includes a first side protection portion 13 and a second side protection portion 14 fluidically connected to each other and intended to create an air cushion which embraces the hips, and therefore at least partially the pelvis.

[0020] In the example illustrated, the portions 13, 14 and 16 define a single bag.

[0021] In an embodiment like the one shown in the figures, the first side protection portion 13 and the second side protection portion 14 are substantially "C"-shaped, i.e., with a curved profile or with a curved region defining a cavity or a concavity. The first side protection portion 13 and the second side protection portion 14 are connected to each other at the curved region such that the cavities or concavities of each first side protection portion 13 and second side protection portion 14 are pointing on the side opposite to the connecting portion 16.

[0022] Moreover, in the embodiment example, the connecting portion 16 is shaped as an elongated band and

acts both as a fluid connection between the first side protection portion 13 and the second side protection portion 14 and as a protection element for a corresponding rear region of the user, at the bottom of the back. Even more particularly, the protection device 10 comprises an appendage 20 protruding from an edge of the connecting portion 16 and intended to protect the coccyx and/or the sacrum of a user.

[0023] It follows that, when the personal protection device is worn on, substantially at the pelvis of the user, the first side protection portion 13 and the second side protection portion 14 surround, via the respective "C"-shaped portion, the protruding hip bone, in particular the iliac crest bone. In an inflated condition, the iliac crest bone is thereby surrounded by an air cushion which envelops it from above and from below. Moreover, the connecting portion 16 protects a bottom zone of the back. With reference to the inflating, it may be convenient to avail oneself of a source of gas under pressure external to the inflatable element 12, so as not to disturb the seating of a user, for example while driving a motor vehicle or riding a horse. The source of gas under pressure, for example a canister 21 of cold gas, may be connected from the outside with the inflatable element 12 by a cannula 22.

[0024] In an embodiment, with reference to Figures 4-6, the protection device 10 includes a second inflatable element 112 located at the shoulders and the neck and, in particular, including a first part denoted by the reference number 101 and disposed in a region of the neck 41 of the user and a second part denoted by the reference numbers 102, 104 having an elongated shape and disposed in a region which extends from an articulation region of a shoulder 40 to the articulation region of the other shoulder 40, passing through a region of the back 45.

[0025] The second inflatable element 112 further includes a portion 103 for the spine protruding relative to the second part 102, 104 from a side opposite to the first part 101. The portion 103 is adapted to protect the region of the spine of the user.

[0026] Also the second inflatable element 112 may be manufactured according to the technologies of the abovementioned Patent applications PCT/IB2009/055512 and PCT/IT2009/000547.

[0027] Even more particularly, it is observed that the inflatable element 112 is an inflatable element structurally independent from said inflatable element 12, and is connected with the inflatable element 2 by one or more cannulas 25, in the example two cannulas 25.

[0028] The connection by cannulas 25 allows to set the two inflatable elements 2, 112 in mutual fluid communication.

[0029] In this case, for example, the canister 21 of gas under pressure may be located in the second inflatable element 112, and allow the inflation of both of the inflatable elements 12, 112.

[0030] Even more particularly, to carry out the inflating of the inflatable element 12, 112, in case of unforeseen

fall and/or slide and/or impact by a user or a vehicle on which the user proceeds, the protection device 10 is adapted to cooperate with specific activation means (not illustrated) operatively connected to the canister 21 of compressed cold gas, like e.g. Helium. The canister 21 may be provided with a respective on-off valve (not shown).

[0031] It has to be noted that the position of the canister 21 in the upper inflatable element 112, and even more particularly in the portion 103 for the spine is a position substantially central between the two inflatable elements 12, 112. Thus, an inflation fluid runs through a short path to inflate both of the inflatable elements 12, 112. Moreover, to make the path even shorter, two cannulas 25 may be provided, located on the respective sides of the portion 103 for the spine of the second inflatable element 112.

[0032] The concomitant inflation of both inflatable elements 12, 112 allows to obtain a protection as complete as possible of a user at the zones more exposed to impacts in case of fall, as are the shoulders and neck, and the pelvis.

[0033] Alternatively, the source of inflation fluid can comprise gas generators of pyrotechnical or hybrid type or other typologies known to the state of the art.

[0034] The opening of the on-off valve of each inflation canister 21 is preferably controlled by a control unit based upon the detection of the state of the vehicle/driver system; for example said control unit may implement a system for predicting the fall allowing a timely identification of the fall event and a reliable prediction thereof by means of accelerometric sensors fixed to the vehicle (or to the driver) and a processing unit of the signals produced by the sensors themselves.

[0035] As an alternative, the device according to the present disclosure finds also application by using an activation wire connected to a vehicle driven by a user, wire which controls the inflation of the inflatable element after moving away of the user from the vehicle, for example after a fall or an unforeseen impact.

[0036] Anyhow, the abovementioned activation and inflation means can be integrated in the protection device according to the present invention or placed outside the same.

[0037] It is also to be noted that the activation modes, despite being an aspect of particular importance for an effective operation of the device, will not be further described in greater detail, since the modes are already known to a technician in the field of protection of an individual from unforeseen impacts.

[0038] By referring to Figures 7 and 8 a further aspect of the present disclosure is described. In particular, a garment 50 is illustrated, said garment 50 including a protection device 10. Essentially, the protection device 10 is included in a garment, such as a motorcyclist suit, or a jacket (not illustrated).

[0039] In particular, in the example, the garment 50 of Figure 7 is a motorcyclist suit and the protection device

10 is located under or inside the garment, for example in an internal pocket or case (not visible) of the garment.

[0040] The garment 50 has the specific advantage of guaranteeing an optimal aerodynamic property under conditions of a driver's driving when the inflatable element 12 is deflated, thanks to the fact that the inflatable element 12 is collapsed with minimum encumbrance under the garment 50. An elastic insert 51 may be provided in the garment 50 at the inflatable element 12, to adapt the garment 50 to the inflating of the inflatable element 12.

[0041] An alike positioning in the garment 50 can be provided also in the abovedescribed embodiment including the second inflatable element 112. Also at the zone of the shoulders, an elastic insert may also be provided.

[0042] The subject of the present disclosure has been hereto described with reference to preferred embodiments thereof. It is understood that other embodiments might exist, all falling within the concept of the same invention, and all comprised within the protective scope of the claims hereinafter.

Claims

1. Personal protection device (10) for the protection of a portion of the body of a user, said device comprising an inflatable element (12) intended to protect at least partially a region of the pelvis of the user and including a first side protection portion (13) intended to protect at least one hip region, and a second side protection portion (14) intended to protect at least the other region of the hip of the user, and a connecting portion (16) defining a zone of connection between the first side protection portion (13) and the second side protection portion (14), and defining a fluid communication between said first side protection portion (13) and the second side protection portion (14), **characterized in that** each of the first side protection portion (13) and the second side protection portion (14) are substantially "C"-shaped with a curved profile or with a curved region defining a cavity or a concavity.
2. Personal protection device (10) according to claim 1, wherein the first side protection portion (13) and the second side protection portion (14) are connected to each other at the curved region such that the cavities or concavities are pointing on the side opposite to the connecting portion (16).
3. Personal protection device (10) according to claim 1 or 2, wherein the connecting portion (16) is shaped as an elongated band and acts both as a fluid connection between the first side protection portion (13) and the second side protection portion (14) and as a protection element for a corresponding rear region of the user, at the bottom of the back.

4. Personal protection device (10) according to any one of the preceding claims, comprising an appendage (20) protruding from an edge of the connecting portion (16) and intended to protect the coccyx and/or the sacrum of a user. 5
5. Personal protection device (10) according to any one of the preceding claims, wherein the first side protection portion (13) and the second side protection portion (14) are shaped and sized to surround a protruding hip bone including the iliac crest bone. 10
6. Personal protection device (10) according to any one of the preceding claims, wherein the first side protection portion (13), the second side protection portion (14) and the connecting portion (16) form a single bag. 15
7. Personal protection device (10) according to any one of the preceding claims, comprising a second inflatable element (112) structurally independent from said inflatable element (2) and located at a zone of the shoulders of a user. 20
8. Personal protection device (10) according to claim 7, wherein the second inflatable element (112) includes a first part (101) adapted to be disposed in a region of the neck (41) of the user and a second part (102, 104) having an elongated shape and adapted to be disposed in a zone which extends from an articulation region of a shoulder (40) to the articulation region of the other shoulder (40), passing through a region of the back (45). 25 30
9. Personal protection device (10) according to claim 7 or 8, wherein the second inflatable element (112) includes a portion (103) for the spine which is adapted to protect the region of the spine of the user. 35
10. Personal protection device (10) according to any one of the preceding claims 7 to 9, wherein the second inflatable element (112) is connected in fluid communication to the inflatable element (2) by at least one cannula (25). 40 45
11. Personal protection device (10) according to any one of the preceding claims 9 or 10, wherein the second inflatable element (112) includes a fluid source, wherein said source of inflation fluid (40) is associated with said portion (103) for the spine. 50
12. Garment (50) comprising a personal protection device (10) according to any one of claims 1 to 11. 55

Patentansprüche

1. Persönliche Schutzvorrichtung (10) zum Schutz ei-

nes Teils des Körpers eines Nutzers, wobei die Vorrichtung ein aufblasbares Element (12) umfasst, das dazu bestimmt ist, zumindest teilweise einen Bereich des Beckens des Nutzers zu schützen, und das ein erstes Seitenschutzteil (13) einschließt, das dazu bestimmt ist, zumindest einen Hüftbereich zu schützen, und ein zweites Seitenschutzteil (14), das dazu bestimmt ist, zumindest den anderen Bereich der Hüfte des Nutzers zu schützen, und ein verbindendes Teil (16), das einen Verbindungsbereich zwischen dem ersten Seitenschutzteil (13) und dem zweiten Seitenschutzteil (14) definiert, und das eine Fluidverbindung zwischen dem ersten Seitenschutzteil (13) und dem zweiten Seitenschutzteil (14) definiert, **dadurch gekennzeichnet, dass** sowohl das erste Seitenschutzteil (13) als auch das zweite Seitenschutzteil (14) im Wesentlichen "C"-förmig mit einem gekrümmten Profil oder mit einem gekrümmten Bereich sind, der eine Kavität oder eine Konkavität definiert.

2. Persönliche Schutzvorrichtung (10) gemäß Anspruch 1, worin das erste Seitenschutzteil (13) und das zweite Seitenschutzteil (14) in dem gekrümmten Bereich miteinander verbunden sind, so dass die Kavitäten oder Konkavitäten auf eine dem verbindenden Teil (16) gegenüber liegende Seite gerichtet sind.
3. Persönliche Schutzvorrichtung (10) gemäß Anspruch 1 oder 2, worin das verbindende Teil (16) als ein verlängertes Band ausgeformt ist und sowohl als eine Fluidverbindung zwischen dem ersten Seitenschutzteil (13) und dem zweiten Seitenschutzteil (14), als auch als ein Schutzelement für einen entsprechenden rückwärtigen Bereich des Nutzers am unteren Ende des Rückens agiert.
4. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorhergehenden Ansprüche, umfassend ein Anhängsel (20), das von einer Kante des verbindenden Teils (16) vorsteht, und das dazu bestimmt ist, das Steißbein und/oder das Sacrum eines Nutzers zu schützen.
5. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorhergehenden Ansprüche, worin das erste Seitenschutzteil (13) und das zweite Seitenschutzteil (14) so geformt sind und eine solche Größe aufweisen, dass sie einen vorstehenden Hüftknochen einschließlich des Beckenkammknochens umgeben.
6. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorhergehenden Ansprüche, worin das erste Seitenschutzteil (13), das zweite Seitenschutzteil (14) und das verbindende Teil (16) einen einzigen Sack ausbilden.

7. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorhergehenden Ansprüche, umfassend ein zweites aufblasbares Element (112), das strukturell unabhängig von dem aufblasbaren Element (2) ist, und das in einem Bereich der Schultern eines Nutzers angeordnet ist. 5
8. Persönliche Schutzvorrichtung (10) gemäß Anspruch 7, worin das zweite aufblasbare Element (112) ein erstes Teil (101) einschließt, das dazu angepasst ist, in einem Bereich des Nackens (41) des Nutzers angeordnet zu sein oder werden, und ein zweites Teil (102, 104) einschließt, das eine verlängerte Form aufweist, und das dazu angepasst ist, in einem Bereich angeordnet zu sein oder werden, der sich von einem Artikulationsbereich einer Schulter (40) zu dem Artikulationsbereich der anderen Schulter (40) erstreckt, wobei es einen Bereich des Rückens durchläuft (45). 10
9. Persönliche Schutzvorrichtung (10) gemäß Anspruch 7 oder 8, worin das zweite aufblasbare Element (112) ein Teil (103) für die Wirbelsäule einschließt, das dazu bestimmt ist, den Bereich der Wirbelsäule des Nutzers zu schützen. 15
10. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorstehenden Ansprüche 7 bis 9, worin das zweite aufblasbare Element (112) mittels mindestens einer Hohnadel (25) in Fluidverbindung mit dem aufblasbaren Element (2) verbunden ist. 20
11. Persönliche Schutzvorrichtung (10) gemäß einem beliebigen der vorstehenden Ansprüche 9 oder 10, worin das zweite aufblasbare Element (112) eine Fluidquelle einschließt, wobei die Quelle für das Inflationsfluid (40) mit dem Teil (103) für die Wirbelsäule verbunden ist. 25
12. Bekleidung (50) umfassend eine persönliche Schutzvorrichtung (10) gemäß einem beliebigen der Ansprüche 1 bis 11. 30

Revendications 35

1. Dispositif de protection personnelle (10) pour la protection d'une partie du corps d'un utilisateur, ledit dispositif comprenant un élément gonflable (12) prévu pour protéger au moins partiellement une région du bassin de l'utilisateur et comprenant une première partie de protection latérale (13) prévue pour protéger au moins une région de hanche, et une seconde partie de protection latérale (14) prévue pour protéger au moins l'autre région de la hanche de l'utilisateur, et une partie de raccordement (16) définissant une zone de raccordement entre la première partie de protection latérale (13) et la seconde partie de 40

protection latérale (14), et définissant une communication de fluide entre ladite première partie de protection latérale (13) et la seconde de partie de protection latérale (14), **caractérisé en ce que** chacune parmi la première partie de protection latérale (13) et la seconde partie de protection latérale (14) est sensiblement en forme « C » avec un profil incurvé ou avec une région incurvée définissant une cavité ou une concavité.

2. Dispositif de protection personnelle (10) selon la revendication 1, dans lequel la première partie de protection latérale (13) et la seconde partie de protection latérale (14) sont raccordées entre elles au niveau de la région incurvée de sorte que les cavités ou les concavités sont orientées vers le côté opposé à la partie de raccordement (16). 45
3. Dispositif de protection personnelle (10) selon la revendication 1 ou 2, dans lequel la partie de raccordement (16) est formée comme une bande allongée et sert à la fois de raccordement de fluide entre la première partie de protection latérale (13) et la seconde partie de protection latérale (14) et d'élément de protection pour une région arrière correspondante de l'utilisateur, au bas du dos. 50
4. Dispositif de protection personnelle (10) selon l'une quelconque des revendications précédentes, comprenant un appendice (20) faisant saillie d'un bord de raccordement (16) et prévu pour protéger le coccyx et/ou le sacrum d'un utilisateur. 55
5. Dispositif de protection personnelle (10) selon l'une quelconque des revendications précédentes, dans lequel la première partie de protection latérale (13) et la seconde partie de protection latérale (14) sont formées et dimensionnées pour entourer un os de hanche saillant comprenant l'os de la crête iliaque. 60
6. Dispositif de protection personnelle (10) selon l'une quelconque des revendications précédentes, dans lequel la première partie de protection latérale (13), la seconde partie de protection latérale (14) et la partie de raccordement (16) forment un sac unique. 65

7. Dispositif de protection personnelle (10) selon l'une quelconque des revendications précédentes, comprenant un second élément gonflable (112) structuellement indépendant dudit élément gonflable (2) et positionné au niveau de la zone des épaules d'un utilisateur. 70
8. Dispositif de protection personnelle (10) selon la revendication 7, dans lequel le second élément gonflable (112) comprend une première partie (101) adaptée pour être disposée dans une région du cou (41) de l'utilisateur et une seconde partie (102, 104) 75

ayant une forme allongée et adaptée pour être disposée dans une zone qui s'étend d'une région d'articulation d'une épaule (40) à la région d'articulation de l'autre épaule (40) en passant par une région du dos (45).

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9. Dispositif de protection personnelle (10) selon la revendication 7 ou 8, dans lequel le second élément gonflable (112) comprend une partie (103) pour la colonne vertébrale qui est adaptée pour protéger la région de la colonne vertébrale de l'utilisateur.
10. Dispositif de protection personnelle (10) selon l'une quelconque des revendications 7 à 9, dans lequel le second élément gonflable (112) est raccordé en communication de fluide à l'élément gonflable (2) par au moins une canule (25).
11. Dispositif de protection personnelle (10) selon l'une quelconque des revendications 9 ou 10, dans lequel le second élément gonflable (112) comprend une source de fluide, dans lequel ladite source de fluide de gonflage (40) est associée à ladite partie (103) pour la colonne vertébrale.
12. Vêtement (50) comprenant un dispositif de protection personnelle (10) selon l'une quelconque des revendications 1 à 11.

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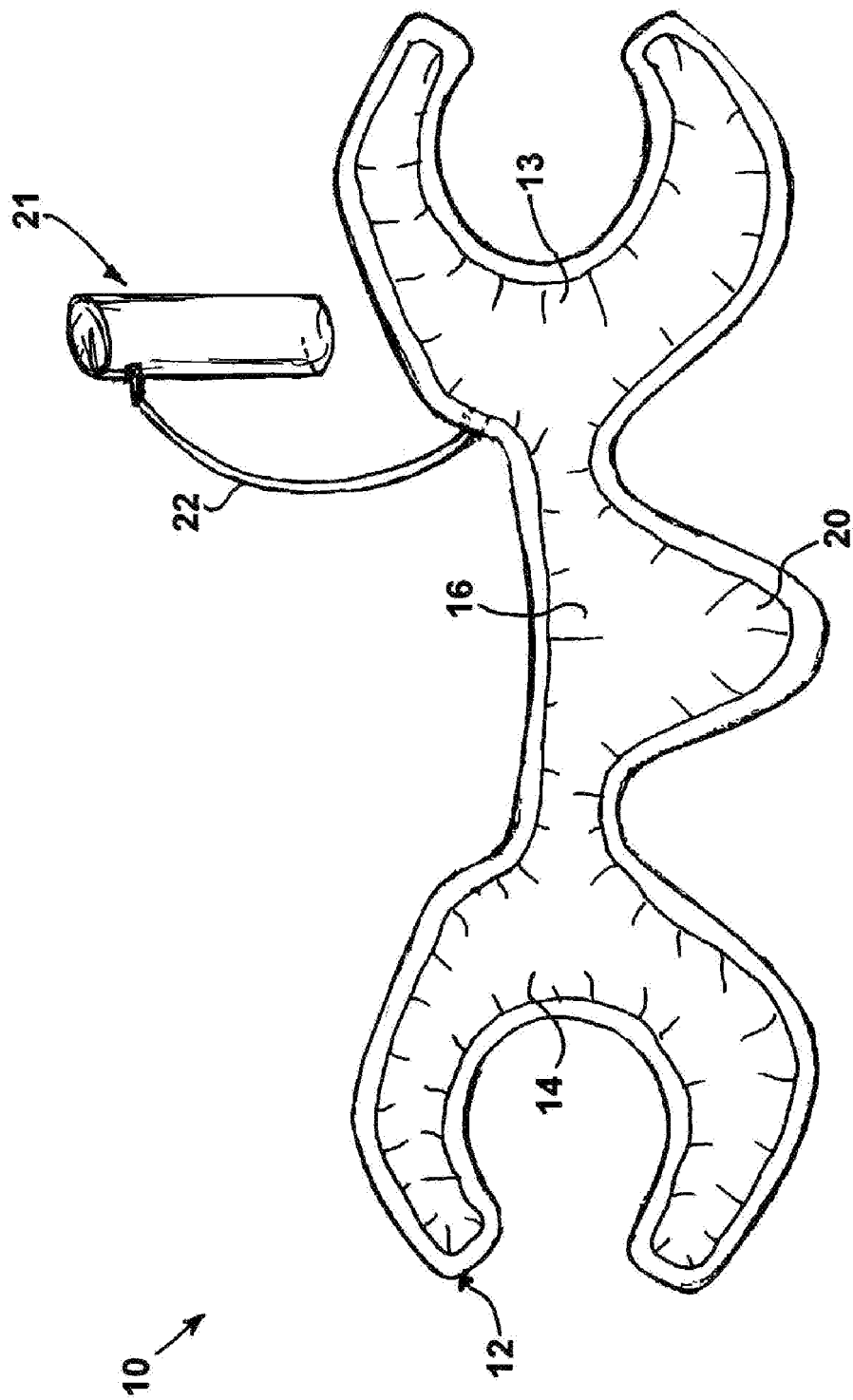


Fig 1

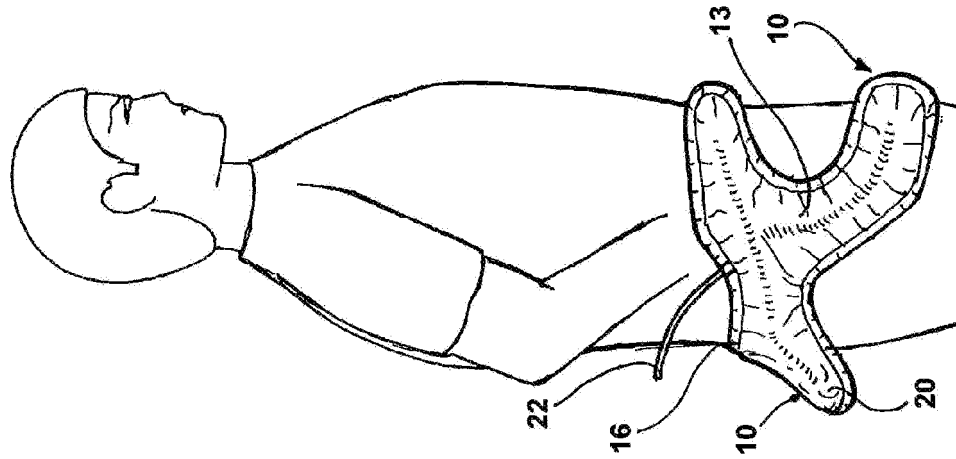


FIG. 3

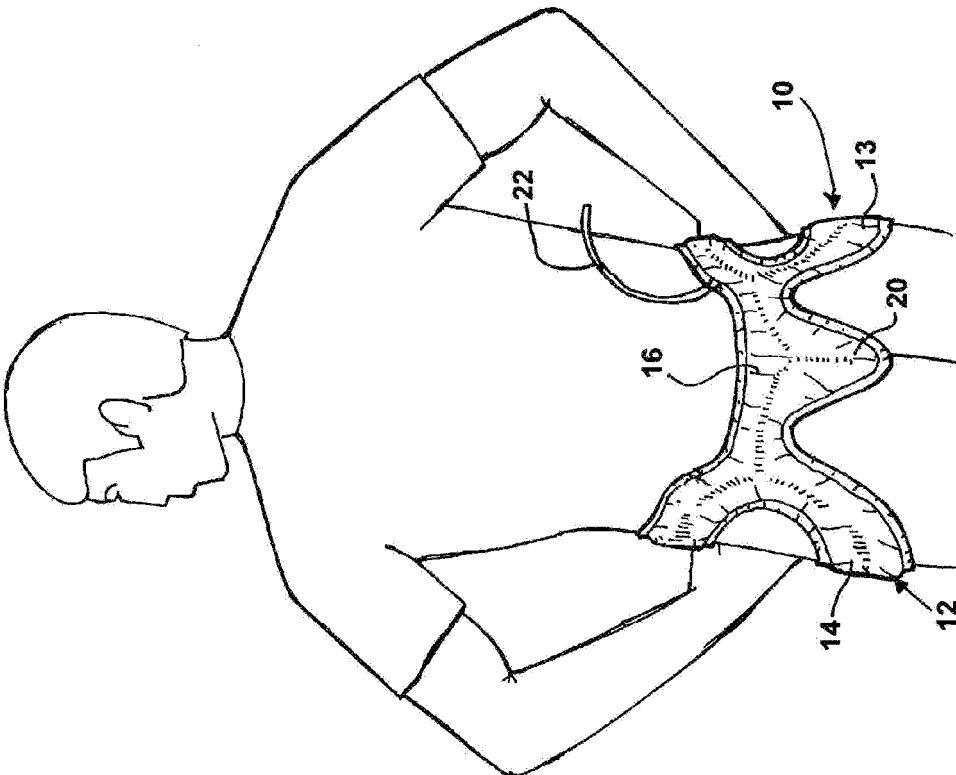


FIG. 2

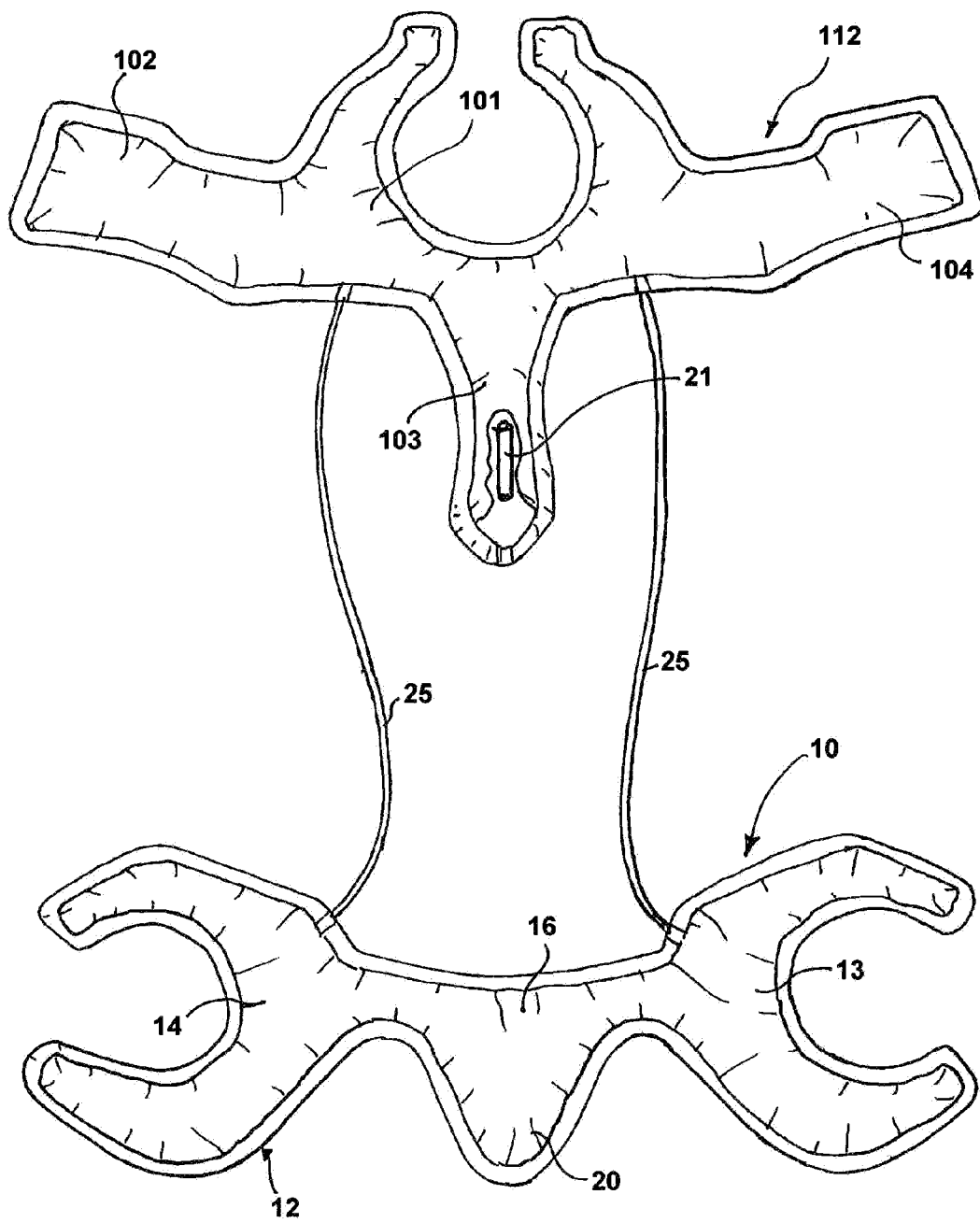


FIG. 4

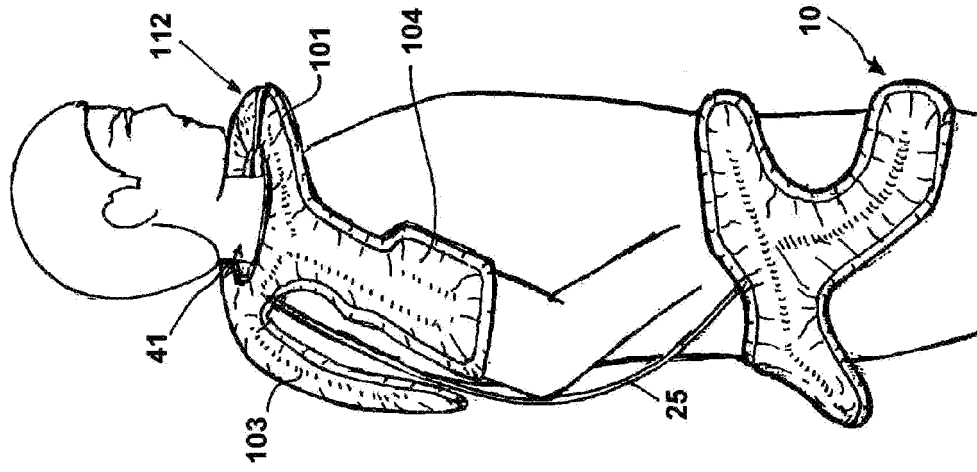


FIG. 6

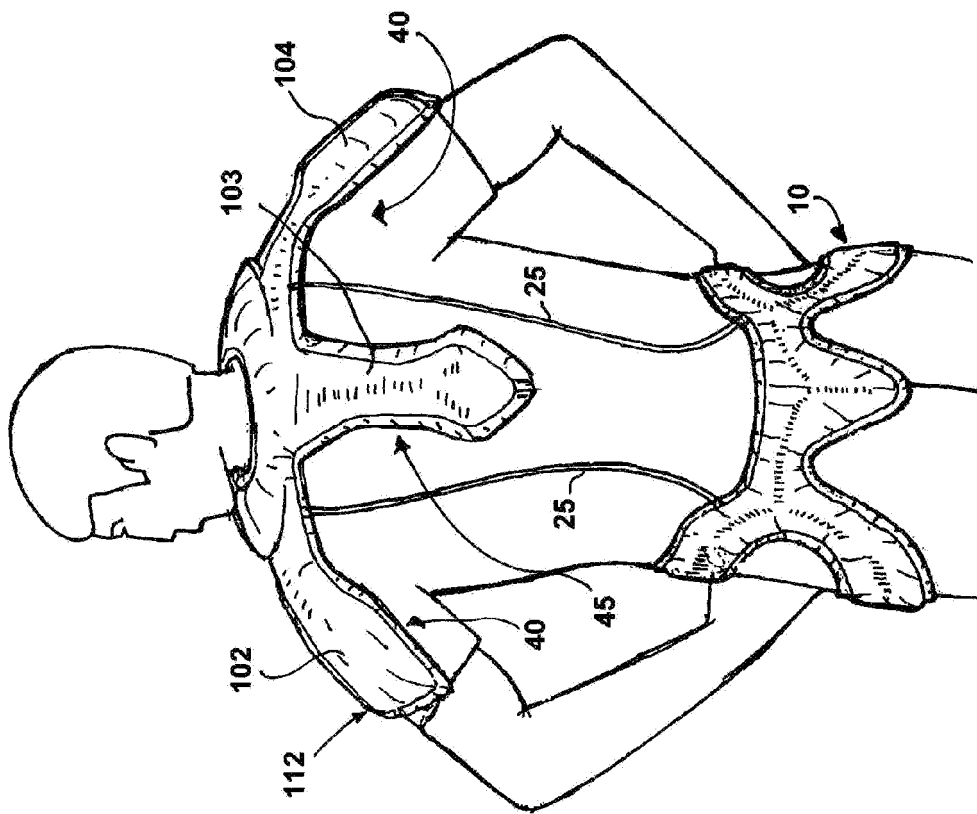


FIG. 5

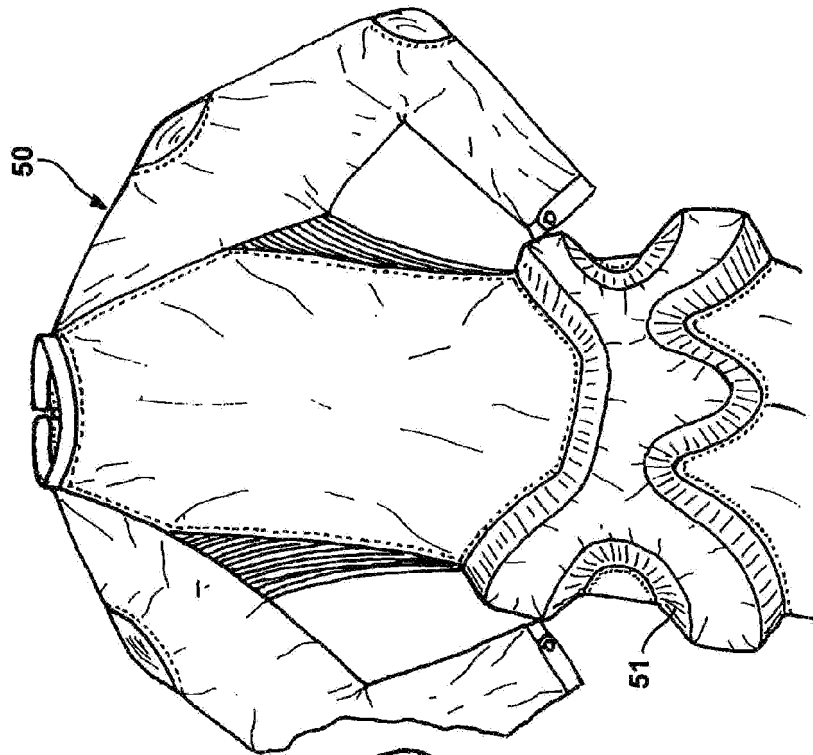


FIG. 8

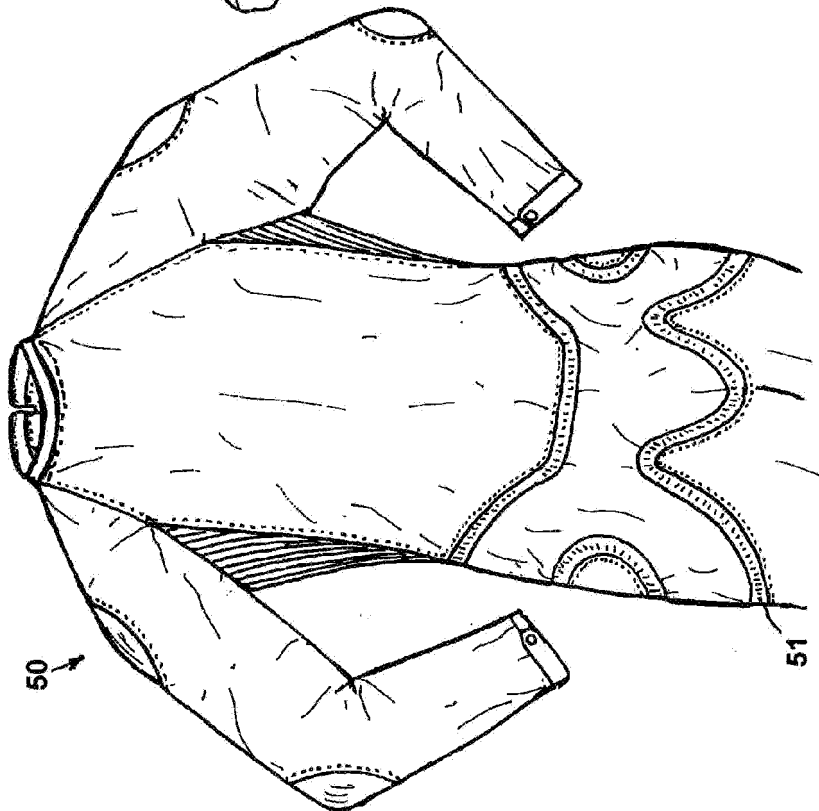


FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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