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

(11) **EP 3 662 772 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.06.2020 Bulletin 2020/24

(51) Int Cl.:
A41D 13/018 *(2006.01)*

(21) Application number: **20152641.5**

(22) Date of filing: **27.05.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **28.05.2014 IT TV20140073**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
15731701.7 / 3 148 356

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Remarks:
This application was filed on 20.01.20 as a divisional application to the application mentioned under INID code 62.

(54) **GARMENT WITH AN INFLATABLE PROTECTIVE DEVICE**

(57) The present invention relates to a garment 10 provided with an inflatable protection device 12 comprising an inflatable bag 13 designed to assume alternately a rest configuration, in which it is in a deflated state, and an active configuration, in which it is in an inflated state. In accordance with the invention, the inflatable bag 13 is fixed to the garment 10 by means of a tie 14 which connects a portion 15 of the garment 10 to a perimetral portion 16 of the inflatable bag 13.

The tie 14 is intended to assume alternately an untensioned condition and a tensioned condition when the inflatable bag 13 assumes its rest configuration and its active configuration, respectively.

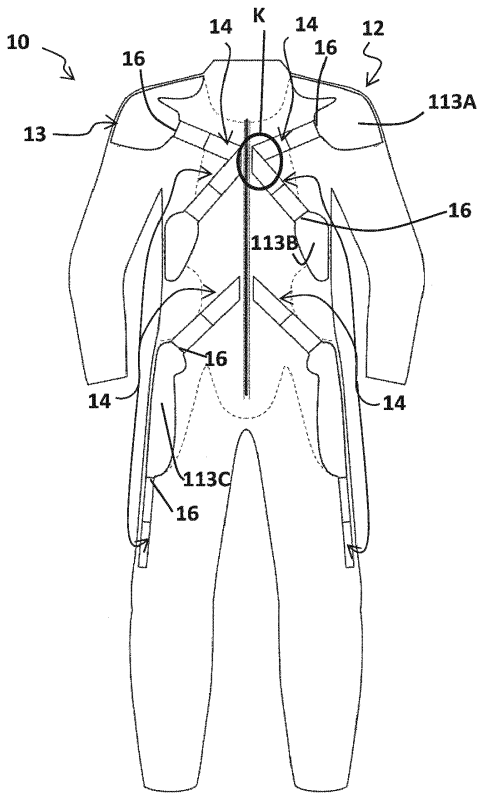

Fig. 2

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Description

[0001] The present invention relates to a garment provided with an inflatable protection device. In particular, even though not exclusively, the present invention relates to a protective garment suitable for being worn, for example, by a motorcyclist, a cyclist or a skier.

[0002] In the continuation of the description, reference will be made to a protective garment suitable for being worn by a motorcyclist, such as a jacket or a riding suit.

[0003] It is known that a protective garment designed to be worn by a motorcyclist is generally made using an abrasion-resistant material, such as leather. This garment is usually provided with rigid and semi-rigid protection elements intended to be positioned, when the garment is used, in those zones which are most prone to injuries or bruising in the event of a fall, such as the knee, shoulders, elbows and back.

[0004] It is also known that recently the protection available to motorcyclists has been improved by providing motorcyclist's garments with one or more inflatable protection devices.

[0005] The known inflatable protection devices comprise at least one inflatable bag which is incorporated in the structure of the garment.

[0006] This inflatable bag, during normal use, is in a deflated state (rest configuration), being intended to be activated only in the event of an emergency.

[0007] The inflation of this bag is controlled by a control unit which constantly monitors the movements of the motorcyclist.

[0008] The control unit is able to compare at regular time intervals the data detected by suitable sensors arranged on the garment or on the motorcycle with an algorithm pre-loaded inside it. If, on the basis of this algorithm, the data detected by the sensors indicates a loss of control of the motorcycle on which the motorcyclist is travelling or some other anomaly, the control unit sends an activation command to the module for inflating the protection device. In this way the bag is inflated, passing from its rest configuration to the active configuration.

[0009] It is known to provide elastic inserts, which are suitably shaped, in the zones of the garment which are positioned above the various inflatable bags. These elastic inserts preferably follow the perimeter of each inflatable bag and allow the latter to expand, once activated.

[0010] In this way, not only tearing of the garment is avoided, but also the pressure exerted by the bag, when it is in the active configuration, on the user's body is reduced.

[0011] Moreover the presence of these elastic inserts ensures that the inflation time of the inflatable bag, despite the fact that the inflatable bag is arranged underneath a garment made of a material which is per se non-elastic, is delayed only by a small amount.

[0012] These elastic inserts also facilitate deflation of the inflatable bag, once a suitable time interval following activation of the protection device has lapsed. This time interval is usually set to 5-6 seconds.

[0013] In fact, the elastic insert which was stretched following inflation of the underlying inflatable bag, is forced to return into its original untensioned configuration. Consequently, the part of the garment, which sometimes is provided with rigid protection elements and is located above the inflatable bag, exerts a compression on the underlying inflatable bag, facilitating expulsion of the inflation fluid from it.

[0014] Deflation of the inflatable bags allows the user to move freely again.

[0015] Moreover, inflatable protection devices provided with two or more activation charges are known. The motorcycling garments provided with these protection devices allow the motorcyclist also after an accident, if no injuries have been sustained, to get back onto his/her motorcycle and have the same level of initial protection.

[0016] However, even though the garments mentioned above are greatly appreciated and offer a greater level of safety for motorcyclists, a number of problems arise following incorporation of an inflatable device inside a garment.

[0017] With specific reference to Figures 1A, 1B and 1C, which are attached to the present description in order to illustrate more clearly the technical problem considered and solved by the present invention, it is known that an inflatable bag C, when it passes from the rest configuration in which it is in a deflated state (Figure 1A), to an active configuration in which it is in an inflated state (Figure 1B), undergoes a lateral contraction.

[0018] As schematically shown in Figures 1A and 1B, the projection of the inflatable bag C on the underlying surface B, which corresponds substantially to the inner lining of the garment, passes from an initial value L1 to a final value L2. The difference between these values is equal to $2\Delta 1$ and therefore results in a reduction in the protected surface area of the inflatable bag C.

[0019] It is known to provide suitable ties inside the inflatable bag C. These ties, which are not shown in Figures 1A and 1B, are fixed to opposite surfaces of the bag. When the bag is inflated, the ties are tensioned so as to control expansion of the bag and prevent it from assuming a "balloon-like" configuration. However, these ties do not allow the lateral contraction of the bag C to be reduced.

[0020] In the light of the above, in order to ensure that the zones of the motorcyclist's body which are to be protected by means of inflatable bags are effectively protected, the manufacturers of garments provided with inflatable protection devices opt to design the inflatable bags with larger dimensions. In this way, even in the case of a significant lateral contraction of the inflatable bags, the latter are in any case able to ensure an adequate level of protection for the underlying body zone, compensating for the contraction $2\Delta 1$ indicated above.

[0021] Consequently, however, the inflatable protection device not only must be provided with bags having dimensions larger than those necessary, but the charging

capacity of the inflation module must be increased, with a not insignificant increase in the overall volume and the costs.

[0022] Another problem which must be solved by the manufacturers of garments provided with inflatable protection devices is that the inflatable bag, once it assumes its active configuration, not only is subject to a lateral contraction, but sometimes may also be displaced with respect to its original position.

[0023] The inflatable bags are usually fixed directly to the inner surface - i.e. the surface directed towards the user's body - of the garment or are housed inside suitable pockets which are in turn fixed to the inner surface of the garment. However, the inflation of each bag of the protection device occurs in a very intense manner and may also result in the bag undergoing a lateral displacement with respect to its original position. This lateral displacement may occur, for example, along a direction schematically indicated by the doubleheaded arrow L in Figure 1B. In this figure, the positions of the bag C, once the latter has undergone a lateral displacement S, are indicated by a broken line.

[0024] In this case, there is the risk that part of the surface of the user's body which was initially designed to be protected may not be longer protected.

[0025] Finally, as already mentioned, in the case where the inflation module has more than one activation charge, the elastic inserts arranged in the protective garment facilitate the return of the inflatable bags into their rest configuration. With reference to Figure 1C the force exerted by these inserts, in combination with any protection elements arranged on the outer surface A of the garment, acts along a direction substantially perpendicular to the direction along which the bag C extends. In this way deflation of the bag C is ensured, but return of the bag into its initial configuration, so as to recover completely the lateral contraction occurring during inflation, is not ensured.

[0026] As schematically shown in Figure 1C, once deflation has been completed, the projection of the bag C on the inner surface B of the garment may assume a value L3 which is less than the initial value L1. The numerical reference values $\Delta 2$ and $\Delta 3$ represent schematically the displacements with respect to the initial position of the inflatable bag and show how, in the case of further activation of the bag, the surface area of the garment protected is smaller than the initial configuration.

[0027] Moreover, once the bag C has been deflated, it is possible that it may no longer assume a flat configuration inside its seat, but that some portions of the bag are arranged on top of each other or folded, thus preventing any subsequent inflation.

[0028] The object of the present invention is therefore to overcome at least partially the drawbacks mentioned with reference to the prior art.

[0029] In particular, a task of the present invention is to provide a garment provided with an inflatable protection device, the inflatable bags of which must not be designed with dimensions greater than those strictly necessary.

[0030] Moreover, a task of the present invention is to provide a garment provided with an inflatable protection device, the inflatable bags of which, both in the rest configuration and in the active configuration, are correctly positioned inside the garment.

[0031] Furthermore, a task of the present invention is to provide a garment provided with an inflatable protection device, the inflatable bags of which, after being activated, are able to return to their initial configuration, ensuring the initial level of protection.

[0032] Finally, a further task of the present invention is to provide a garment provided with an inflatable protection device, the inflatable bags of which are fixed to the garment in a simple and low-cost manner, without hindering the user's movements.

[0033] These objects, along with other objects and tasks, are achieved with a garment according to Claim 1 and with a protective clothing assembly according to Claim 12.

[0034] The characteristic features and further advantages of invention will emerge from the description, provided hereinbelow, of some non-limiting examples of embodiment thereof, with reference to the attached drawings in which:

- Figures 1A, 1B and 1C show in schematic form an inflatable bag of a known inflatable protection device in different operating configurations;
- Figure 2 shows in schematic form a cross-sectional front view of a first embodiment of a garment according to the invention;
- Figure 3 shows in schematic form a cross-sectioned rear view of the garment according to Figure 2;
- Figures 4 and 5 show a first embodiment of the inflatable protection device associated with a garment according to the invention, in two different operating configurations;
- Figure 6 shows a visual comparison between the configuration of Figure 4, shown in broken lines, and the configuration according to Figure 5 of the inflatable protection device;
- Figures 7-9 show in schematic form a generic inflatable bag of the garment according to the invention in different operating configurations;
- Figure 10 shows in schematic form an enlarged view of the detail according to Figure 2 indicated by K;
- Figure 11 shows a view similar to that of Figure 10, but in a different operating configuration;
- Figures 12 and 13 show views similar to those of Figure 10 and Figure 11, respectively, but relating to a different embodiment;
- Figure 14 shows a view similar to that of Figure 12, but relating to a different embodiment.

[0035] The description below refers to a garment which can be used in all those sectors where a suitable protec-

tion against impacts and/or falls is required.

[0036] For example, a garment designed in accordance with the innovative principles of the present invention may be advantageously used by motorcyclists, cyclists and skiers.

[0037] In the description which follows, for greater clarity, reference will be made to a garment designed to be used by a motorcyclist.

[0038] Figures 2 and 3 show a schematic cross-section of a motorcyclist's suit. However, as will become clear from the description which follows, the innovative principles of the present invention may also be applied to other types of garment. For example they may be applied to protective jackets, waistcoats and trousers.

[0039] With reference to Figures 2-14, a garment provided in accordance with the principles of the present invention is indicated by 10.

[0040] The garment 10 is provided with an inflatable protection device 12 which comprises at least one inflatable bag 13.

[0041] The inflatable bag 13 is designed to assume alternately a rest configuration, in which it is in a deflated state, and an active configuration, in which it is in an inflated state. The inflatable protection device 12 in a known manner further comprises inflation means which are designed to inflate the inflatable bag 13, sensor means which are designed to detect the movements of the motorcyclist or the motorcycle which the motorcyclist is riding and control means designed to trigger, depending on the values detected by the sensor means, activation of the inflation means in the case where the values detected correspond to a danger situation.

[0042] These components of the inflatable protection device 12, since they are well-known to a person skilled in the art, will not be described in detail.

[0043] In accordance with the invention, the inflatable bag 13 is fixed to the garment 10 by means of at least one tie 14 which connects a portion 15 of the garment 10 to a perimetral portion 16 of the inflatable bag 13.

[0044] The tie 14 is intended to assume alternately an untensioned condition and a tensioned condition when the inflatable bag 13 assumes its rest configuration and its active configuration, respectively.

[0045] As is well-known, the inflatable bag 13 may comprise two walls 13A, 13B situated opposite each other and perimetrally sealed so as to form a chamber able to retain inside it the inflation fluid (see Figures 7-9).

[0046] In a known manner, once inflated, the inflatable bag is able to return into its rest configuration after passing of a given time interval, owing for example to the provision of suitable deflation means or by making the two walls 13A, 13B using a material having a given permeability as regards the inflation fluid.

[0047] For the purposes of the present invention "perimetral portion" 16 of the inflatable bag 13 is understood as meaning the portion of the inflatable bag which preferably is situated at the sealed joint between the two walls 13A, 13B. In particular, this perimetral portion 16 of the inflatable bag 13 will be close to an outer surface of the bag, "outer surface" being understood as meaning a surface intended not to come into direct contact with the inflation fluid of the bag. "Perimetral portion" 16 of the inflatable bag 13 is also understood as meaning any appendage of the inflatable bag 13. Such an appendage may be made as one piece with the bag or fastened thereto.

[0048] For the purposes of the present invention "untensioned condition" of the tie 14 refers to a condition of the tie which is substantially not taut or not stretched. For example, the tie 14 is in an untensioned condition when substantially no external forces are acting on it.

[0049] "Tensioned condition" of the tie 14 refers to a condition in which the tie, when subject to a tensile stress, assumes a taut or stretched condition.

[0050] As schematically shown in the attached drawings, the tie or ties 14 with which the inflatable bag 13 is connected to the portion 15 of the garment 10 are arranged in the garment 10 so as to pass alternately from an untensioned condition to a tensioned condition when the inflatable bag in turn passes from a rest configuration to the active configuration.

[0051] Advantageously, by means of the provision of the ties 14, it is possible to exert a tensile force along the perimetral edges of the inflatable bag 13 so as to balance the forces which, following inflation, would tend to cause the inflatable bag to contract laterally. In this way it is therefore possible to reduce the lateral contraction of the bag 13.

[0052] Moreover, by means of the provision of the ties 14 it is possible to prevent the inflatable bag 13, following inflation, from undergoing, in addition to shrinkage, a displacement with respect to its initial position. It is therefore avoided leaving exposed zones of the garment which initially were intended to be protected. Likewise it is avoided that the inflatable bag, following the displacement which has occurred, may interfere with other protection elements of the garment 10, such as knee-pads, elbow pads or back protections.

[0053] Reference is now made to Figures 2 and 3 in which a first embodiment of the garment 10 according to the invention is shown. This garment 10 is a motorcyclist's riding suit. However, as already mentioned, the garment 10 may have different configurations.

[0054] The garment 10 is provided with an inflatable protection device 12 which comprises a single inflatable bag 13 arranged inside the garment. This bag 13 is designed to protect the shoulders, the back, the flanks, the hips and the ribs of the user.

[0055] According to alternative embodiments of the invention, not shown in the attached drawings, the garment 10 may be provided with a plurality of inflatable bags, independent of each other, and each designed to be positioned opposite a portion of the body which is to be protected.

[0056] With reference to Figure 2, it can be noted how preferably the ties 14 connect the perimetral portion 16

of the bag 113A arranged above the shoulders to the portion of the garment 10 arranged opposite the motorcyclist's chest. These ties are provided such that for example the bag 113A arranged above the shoulders expands continuing to surround the motorcyclist's shoulders, without undergoing undesirable displacements towards the zone of the neck or the back.

[0057] Similarly, it can be noted how preferably also the perimetral portion 16 of the inflatable bag 113B intended to protect the flanks and the ribs of the motorcyclist is connected by means of the ties 14 to the portion of the garment 10 arranged opposite the motorcyclist's chest. In this way it is ensured that the bag which protects the flanks and the ribs of the motorcyclist does not undergo, following activation, displacements downwards leaving the chest zone exposed.

[0058] Furthermore, still with reference to the embodiment shown in Figure 2, it can be noted how the perimetral portion 16 of the inflatable bag 113C intended to protect the hips of the motorcyclist, is connected by means of two ties 14 to the portions of the garment 10 intended to be arranged, during use, above the stomach and the thighs of the motorcyclist. In this way the bag 113C is prevented from being displaced upwards or downwards following its activation. At the same time it is ensured that the bag 113C, also once inflated, may surround the zone of the motorcyclist's hips.

[0059] From the above it can be seen how preferably the portion 15 of the garment 10 to which the ties 14 are fixed is arranged on an inner surface of the garment, "inner surface" being understood as being a surface directed towards the user's body.

[0060] Obviously, different embodiments of the inflatable bag 13 and different arrangements of the ties 14 and the portions 15 and 16 are possible in order to satisfy different requirements.

[0061] Figures 4-6 show in schematic form a plan view of the protection device 12 of the garment 10 shown in Figures 2 and 3. Figure 4 shows the inflatable bag 13 when it is in a rest position, while Figure 5 shows the inflatable bag 13 when it is in an active configuration.

[0062] For reasons of clarity the corresponding reference numbers are indicated solely along the portion of the bag 13 designed to be positioned, when the garment 10 is being used, in the zone of the user's shoulders.

[0063] From Figures 4-6 it can be clearly seen how the arrangement of the ties 14 has been designed preferably to oppose the lateral contraction which the bag 13 undergoes once activated.

[0064] In this embodiment the tie 14 is made of an elastic material. As can be clearly seen from Figure 6, when the tie 14 passes from the untensioned condition to the tensioned condition it undergoes elongation. This elongation corresponds to the lateral contraction $\Delta 1$ of the bag 13 which occurs during inflation. The tie 14 is made of an elastic material able to limit the lateral contraction of the bag 13 with respect to a configuration in which the bag 13 is not perimetrally constrained.

[0065] Advantageously, the elastic tie 14 is able to return independently into its initial untensioned condition, when the force exerted on it by the inflatable bag 13 ceases. This force ceases when the inflatable bag 13 returns, following deflation, into its rest configuration.

[0066] As schematically shown in Figure 7, in the rest configuration the projection of the inflatable bag 13 on the surface 17 assumes a value equal to L1. When the inflatable bag passes into its active configuration, on the basis of that indicated above, the projection on the surface 17 assumes a value equal to L2, less than the initial value L1 (see Figure 8). The arrangement of elastic ties 14 is such that the inflatable bag 13, returning from its active configuration into its rest configuration, not only is able to recover the lateral contraction occurring during inflation, equal to $2\Delta 1$, but is also able to return substantially into its initial configuration.

[0067] The tensile force exerted by the ties 14 on the perimetral edges 16 of the bag allows the bag 13 to reassume a flat configuration, without folds, inside its initial seat (see Figure 9). Usually this seat is formed in a space comprised between an outer layer 17 of the garment, generally made of leather, and the inner lining 18 of the garment 10.

[0068] As schematically shown in Figures 7-9, in a known manner, the inflatable bag 13 may be provided with internal tensioning wires 34. These internal tensioning wires 34 are provided inside the bag 13 and have their opposite ends fixed respectively to the two walls 13A, 13B of the bag 13. When the bag 13 is in the rest configuration, these wires 34 are in an untensioned state (see Figure 7). When the bag 13 assumes an active configuration, these wires 34 pass into a tensioned configuration, preventing the bag from assuming a balloon-like configuration. The wires 34 therefore cooperate with the ties 14 in order to ensure that the bag 13, once activated, does not leave exposed the zones of the garment which initially were intended to be protected. When the bag 13 returns into its rest configuration, the wires 34 return into their initial untensioned configuration.

[0069] Figures 10 and 11 show in schematic form an enlarged view of the fixing means 20 used to connect the portion 15 of the garment 10 to the perimetral portion 16 of the inflatable bag 13. In this embodiment the tie 14 is removably fixed to the perimetral portion 16 by the fixing means 20.

[0070] In detail, in this embodiment the fixing means 20 comprise hook-and-loop fixing means of the Velcro® type arranged on surfaces, designed to face each other, of the perimetral portion 16 of the bag 13 and the tie 14. Obviously, other releasable fixing means, such as press-fit fixing means, may be used according to needs.

[0071] The provision of releasable fixing means 20 is particularly advantageous since it allows, in the event of need, easy replacement of the inflatable bag 13. Moreover, these releasable fixing means do not adversely affect the strength of the fastening between the tie 14 and the inflatable bag 13 and therefore do not interfere with

correct operation of the inflatable protection device 12.

[0072] The tie 14 may be fixed to the portion 15 of the garment 10 by known non-releasable fixing means 25, for example stitches or thermal welds (see for example Figure 12).

[0073] Alternatively the tie 14 may be fixed to the portion 15 of the garment 10 by releasable fixing means 25, for example zips.

[0074] An alternative embodiment shown in Figure 14 shows fixing means 20 which comprise a strip 22. Said strip 22 is designed to engage inside a slit 23 provided in the perimetral portion of the bag 13. The strip after engaging inside the slit 23 may be folded onto itself so as to be then fixed by closing means 24. These closing means 24 may comprise press-fit closing means.

[0075] In this embodiment also the tie 14 may be made of elastic material.

[0076] An alternative embodiment shown in Figures 10 and 11 shows a tie 14 made of a substantially inextensible material. As clearly shown in Figures 10 and 11, in this embodiment the tie 14, when passing from the untensioned condition (Figure 10) into the tensioned condition (Figure 11), undergoes stretching and allows further reduction of the lateral contraction $\Delta 1$ of the inflatable bag 13, during inflation. Since the tie 14 is not elastic, it is less effective in helping repositioning of the bag 13 in its initial configuration.

[0077] The use of these substantially non-elastic ties 14 is particularly useful in the case where it is required to fix to the garment 10 inflatable bags 13 able to achieve high expansion volumes, for example bags designed to be positioned on zones which do not have other additional protection elements, such as back shields or protection plates.

[0078] In this case, in fact, the ties schematically shown in Figures 10 and 11 effectively oppose the lateral contraction of the bag and at the same time do not cause discomfort for the user of the garment, since they are made of flexible material.

[0079] Although a suit 10 has been shown in the attached figures, from the above description it is now clear how the teachings of the present invention may be used also in the case where the garment 10 is intended to be worn on top of or below a further protective garment worn by the user, so as to form a protective clothing assembly.

[0080] Such a protective clothing assembly is for example described and illustrated in international application WO 2013/171674 in the name of the present applicant.

[0081] In the case where the garment 10 is worn underneath a further protective garment, the latter may be designed with suitable proportions in terms of sizes or specifically engineered so as to allow expansion of the inflatable bags 13.

[0082] For example, the further protective garment, which is preferably made of material resistant to abrasion and frictional stresses, will be provided with elastic inserts designed to be positioned over the inflatable bags 13 so as to allow expansion thereof. In this way the additional protective garment, is prevented from tearing following inflation of the inflatable bags 13. Moreover, the provision of these elastic inserts prevents any expansion of the inflatable bag 13 towards the user's body, causing any possible injury.

[0083] From the above description it is now clear how the present invention is able to solve advantageously the defects of the known devices.

[0084] For example the provision of the ties 14 ensures that the inflatable bags do not have to be designed with larger dimensions. The ties 14, in fact, allow the lateral contraction of each single inflatable bag 13 to be reduced when it passes into the active configuration. The ties 14 therefore ensure that the zone initially intended to be covered is effectively protected by the inflatable bag.

[0085] Moreover, the provision of ties 14 ensures that the inflatable bag 13 does not undergo, in addition to lateral contraction, further displacements which could adversely affect the protection offered by the garment 10, leaving exposed zones of the garment initially intended to be protected.

[0086] On the basis of that indicated above, fixing of the bag 13 to the garment 10 is performed in a simple and low-cost manner. Moreover, the ties 14, whether they be made of inextensible material or elastic material, do not reduce the comfort offered by the garment 10 to the motorcyclist and do not interfere with inflation of the inflatable bag 13 which is not delayed by the presence of the ties 14.

[0087] Moreover, the ties 14, if made of elastic material, also facilitate deflation of the bag 13 and ensure that, in the case where the garment 10 is provided with inflation means having more than one charge, the inflatable bag 13 is correctly repositioned in its seat after being activated, so as to ensure the same initial level of safety.

[0088] The person skilled in the art, in order to satisfy specific requirements, may make modifications to the embodiments of the garment described above and/or replace parts described with equivalent parts, without thereby departing from the scope of the accompanying claims.

[0089] For example, the ties may be arranged so as to connect an external portion of the garment 10 to the perimetral portion of the bag 13, in the case where the inflatable bag, once activated, is intended to project from the garment.

Claims

1. Garment (10) provided with an inflatable protection device (12) comprising at least one inflatable bag (13) designed to assume alternately a rest configuration, in which it is in a deflated state, and an active configuration, in which it is in an inflated state; said at least one inflatable bag (13) being fixed to the garment (10) by means of at least one tie (14) which

connects a portion (15) of the garment (10) to a perimetral portion (16) of the at least one inflatable bag (13), said at least one tie (14) being intended to assume alternately an untensioned condition and a tensioned condition when the at least one inflatable bag (13) assumes its rest configuration and its active configuration, respectively.

2. Garment (10) according to Claim 1, **characterized in that** the at least one tie (14) is made of an elastic material, said at least one tie (14) being designed to return autonomously into an untensioned condition when the at least one inflatable bag (13) returns from its active configuration into its rest configuration.

3. Garment (10) according to any one of the preceding claims, **characterized in that** the at least one tie (14) is removably fixed to the perimetral portion (16) of the at least one inflatable bag (13) by means of releasable fixing means (20).

4. Garment (10) according to the preceding claim, **characterized in that** said releasable fixing means (20) comprise loop or hook fixing means arranged on surfaces, designed to face each other, of the perimetral portion (16) of the at least one inflatable bag (13) and the at least one tie (14).

5. Garment (10) according to Claim 3, **characterized in that** said releasable fixing means (20) comprise a strip (22) designed to engage inside a slit (23) provided in the perimetral portion (16) of the at least one inflatable bag (13), said strip (22) being intended to be fixed, after being folded onto itself, by closing means (24).

6. Garment (10) according to Claim 1, **characterized in that** the at least one inflatable bag (13) is positioned in a portion of the garment (10) which, during use, is designed to cover the shoulders or the back or the flanks or the hips or the ribs of the user.

7. Garment (10) according to Claim 1, **characterized in that** the at least one inflatable bag (13) comprises two walls (13A, 13B) arranged opposite each other and sealed perimetrally, the perimetral portion (16) of the at least one inflatable bag (13) being positioned at the sealed joint between the two walls (13A, 13B).

8. Garment (10) according to Claim 7, **characterized in that** the at least one inflatable bag (13) is provided with at least one internal tensioning wire (34) having its opposite ends fixed respectively to the two walls (13A, 13B); said at least one internal tensioning wire (34) being intended to assume alternately an untensioned condition and a tensioned condition when the at least one inflatable bag (13) assumes its rest configuration and its active configuration respectively.

9. Garment (10) according to Claim 1, **characterized in that** the perimetral portion (16) of the at least one inflatable bag (13) is positioned on an outer surface of the at least one inflatable bag (13).

10. Garment (10) according to Claim 1, **characterized in that** the portion (15) of the garment (10) on which the at least one tie (14) is fixed is positioned on an inner surface of the garment (10).

11. Garment (10) according to Claim 1, **characterized in that** the at least one tie (14) is fixed on the portion (15) of the garment (10) by means of non-releasable fixing means (25).

12. Protective clothing assembly comprising:

- a garment (10) provided with an inflatable protection device (12) according to any one of Claims 1 to 11;
- a further protective garment intended to be worn on top of or underneath the garment (10) provided with an inflatable protection device (12).

13. Protective clothing assembly according to Claim 12, **characterized in that** the further protective garment is worn on top of the garment (10) provided with said inflatable protection device (12); said further protective garment being provided with elastic inserts designed to be positioned over the at least one inflatable bag (13) of the garment provided with said inflatable protection device (12) so as to allow expansion of the at least one inflatable bag (13).

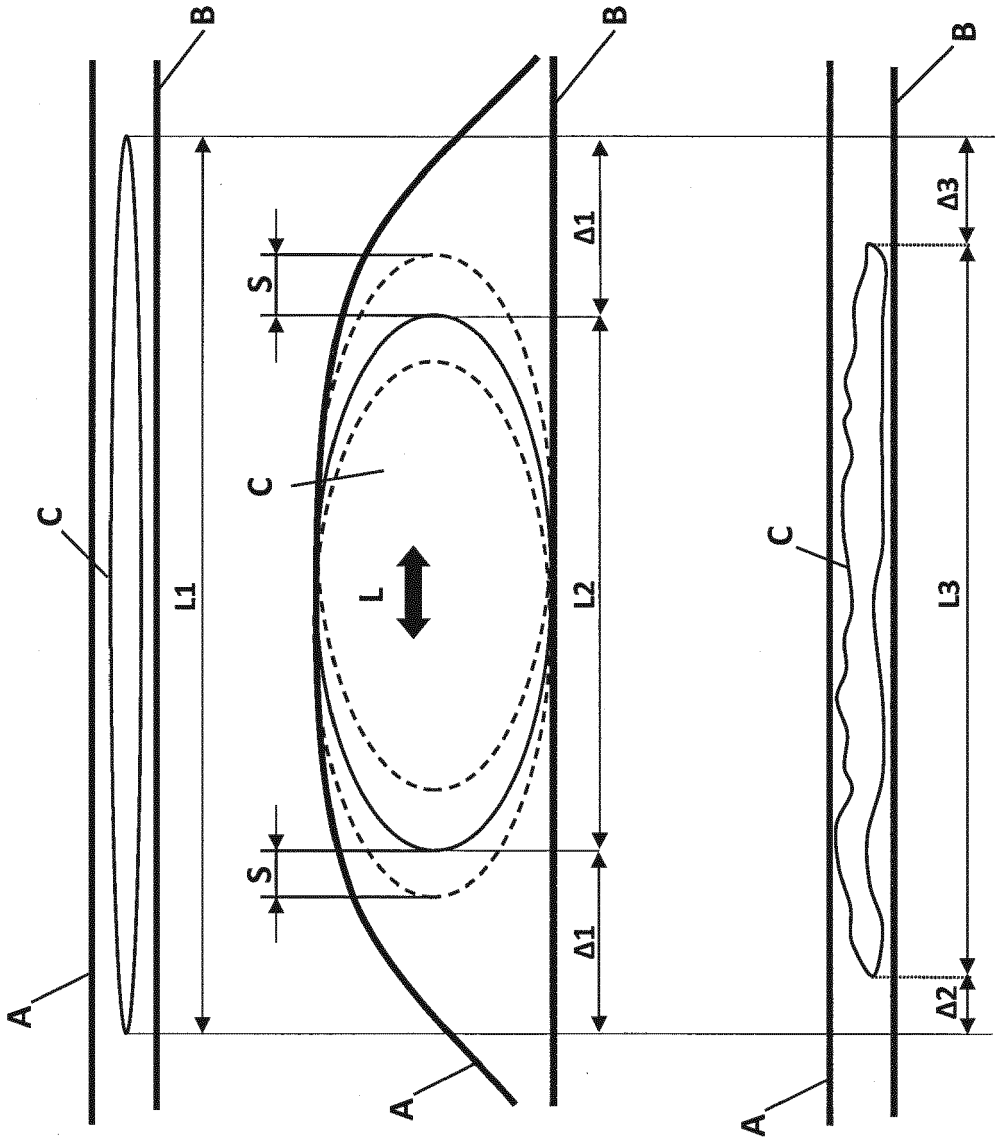


Fig. 1A

Fig. 1B

Fig. 1C

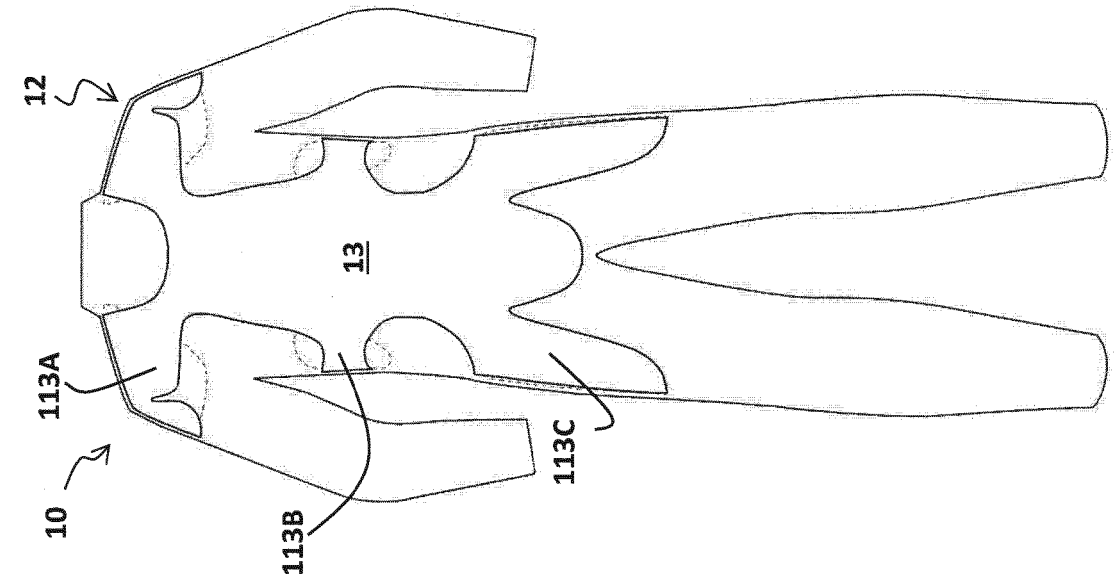
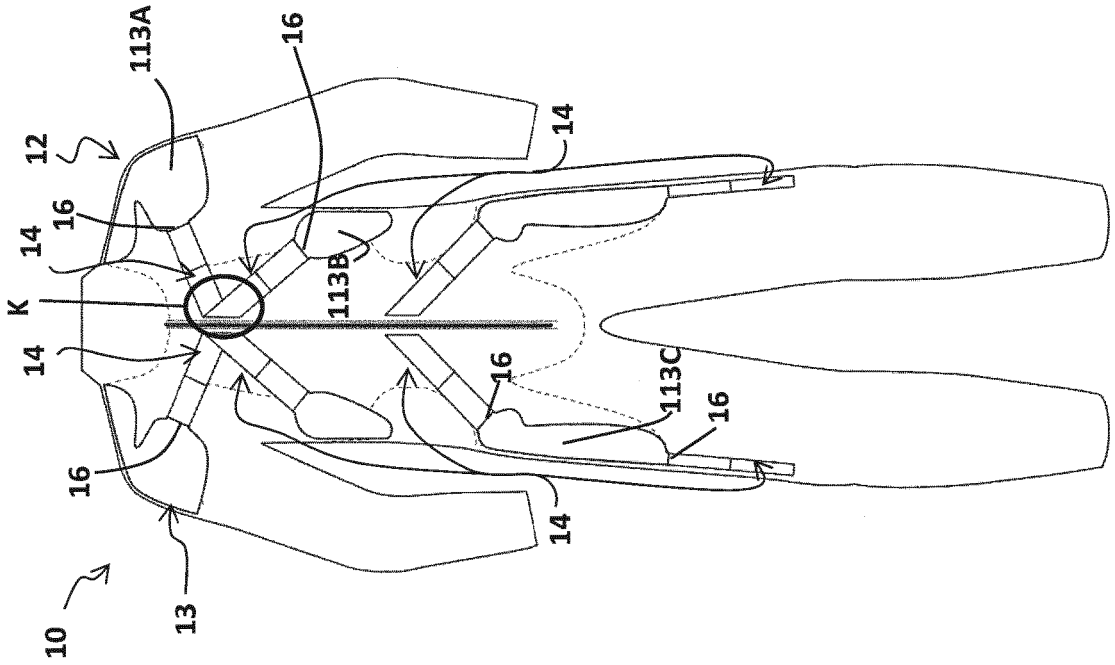

12
13
113A
113C
10
113B

Fig. 3


113A
16
12
14
16
14
K
113B
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16
113C
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14
10
13

Fig. 2

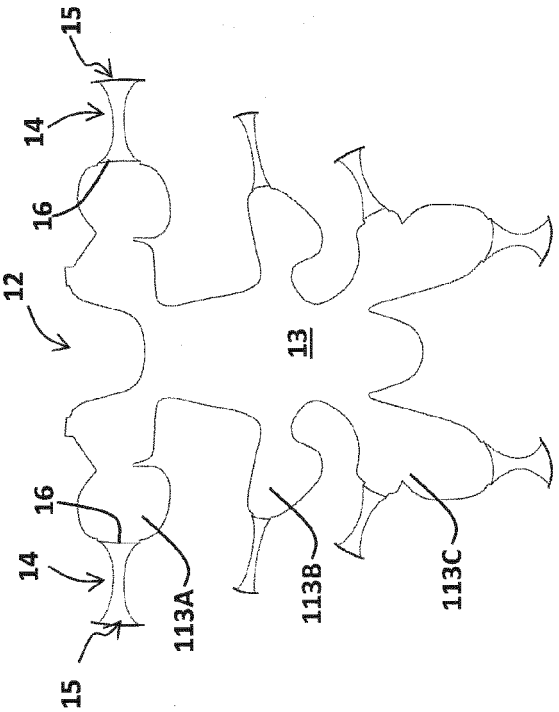
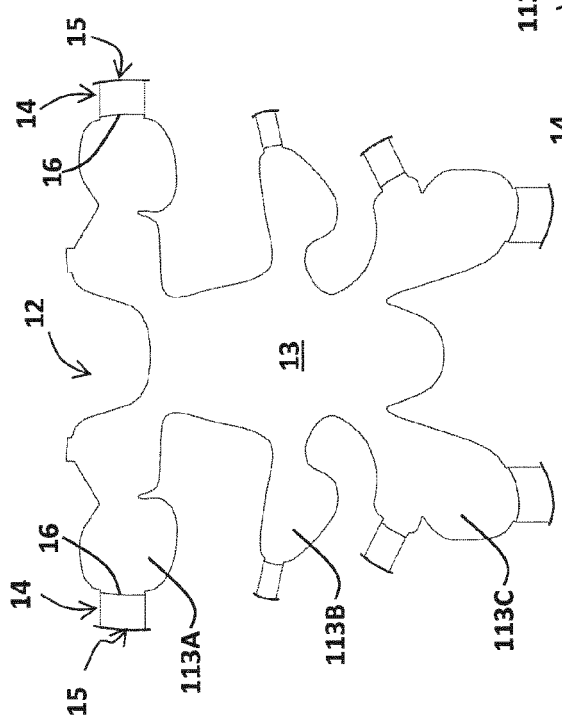


Fig. 5



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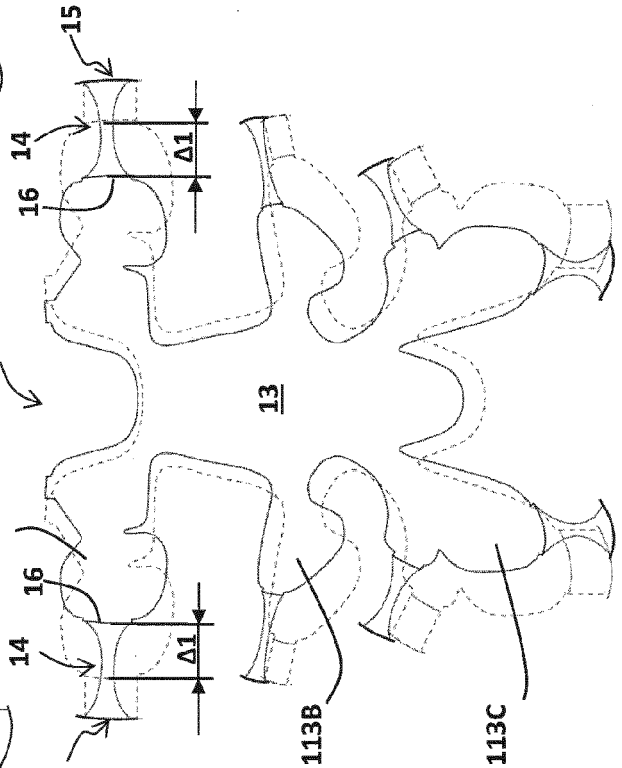

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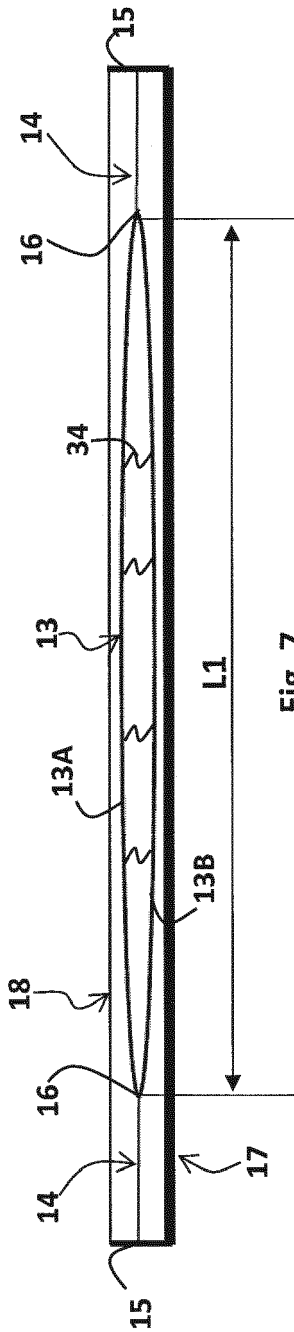

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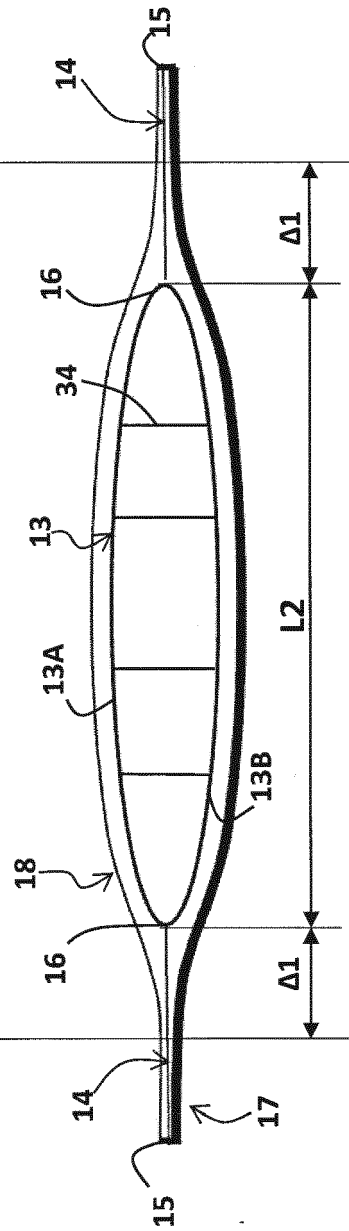

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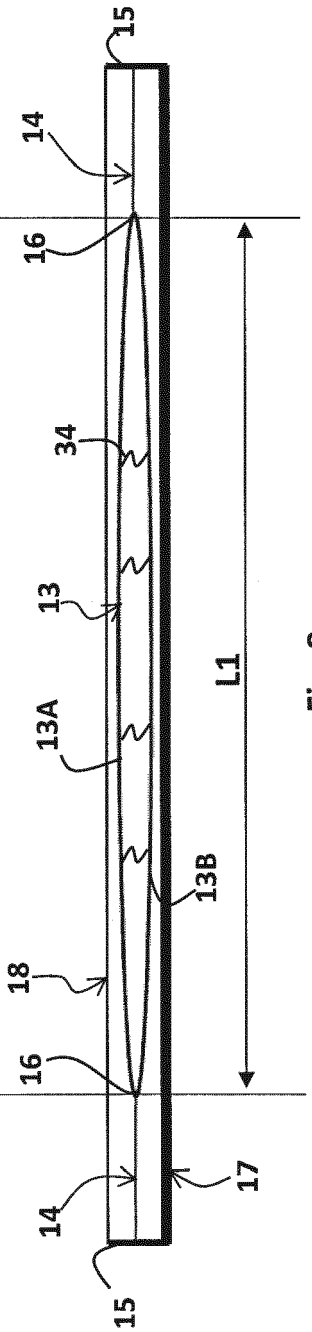
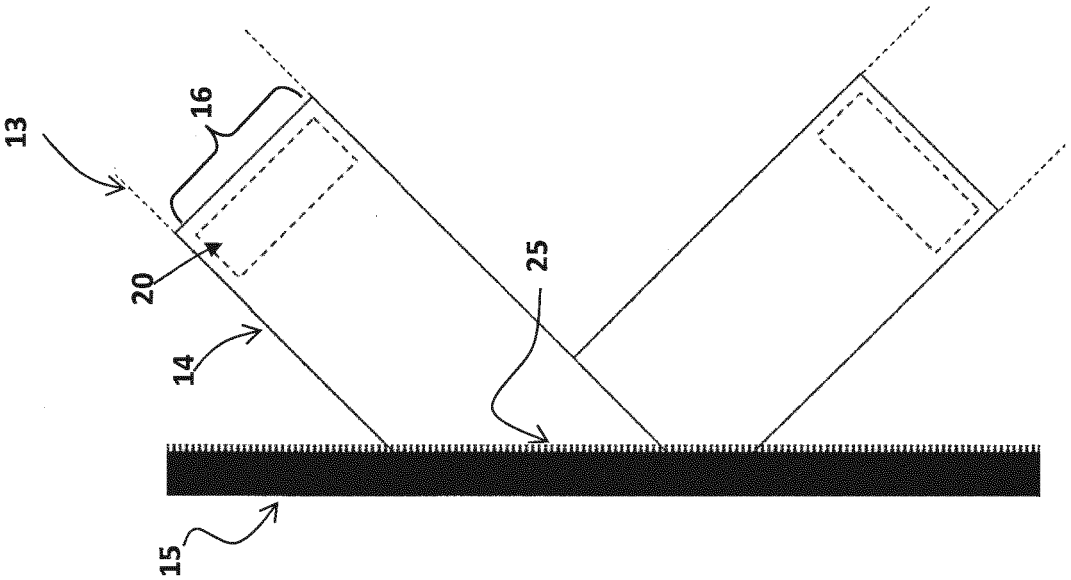


Fig. 9



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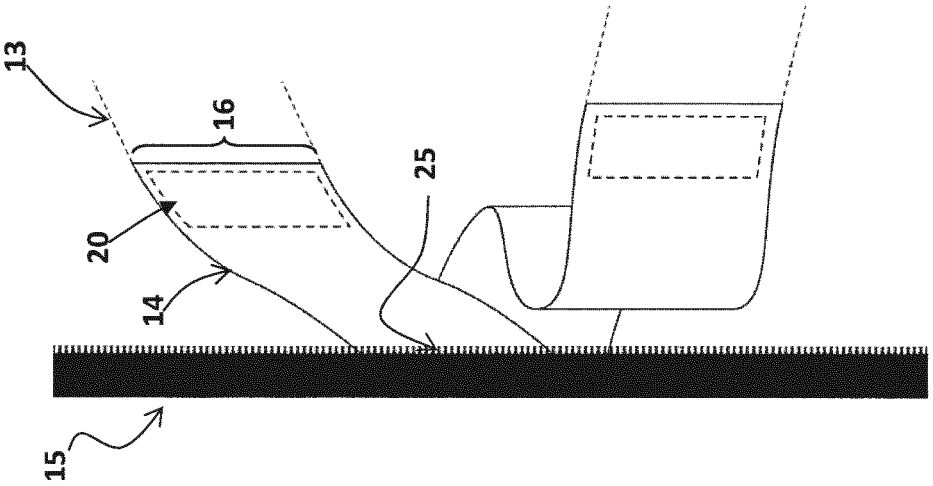

Fig. 10

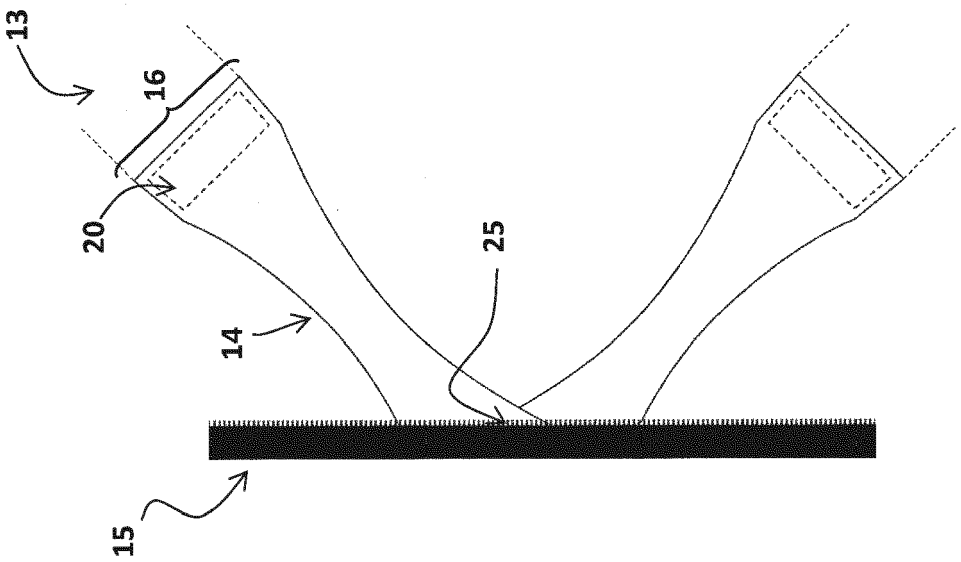

Fig. 13

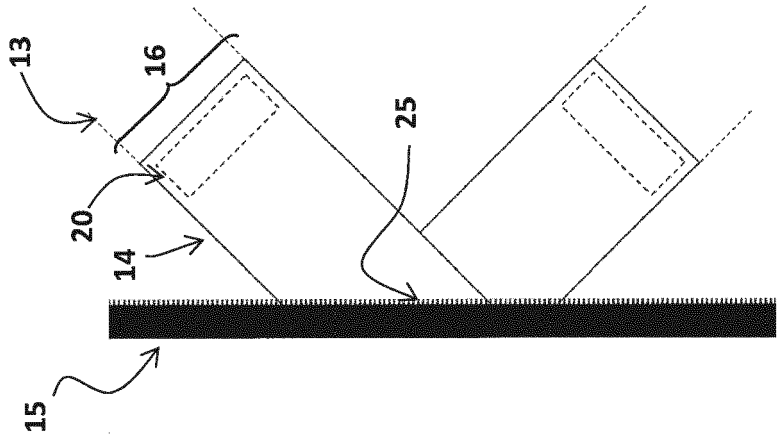

Fig. 12

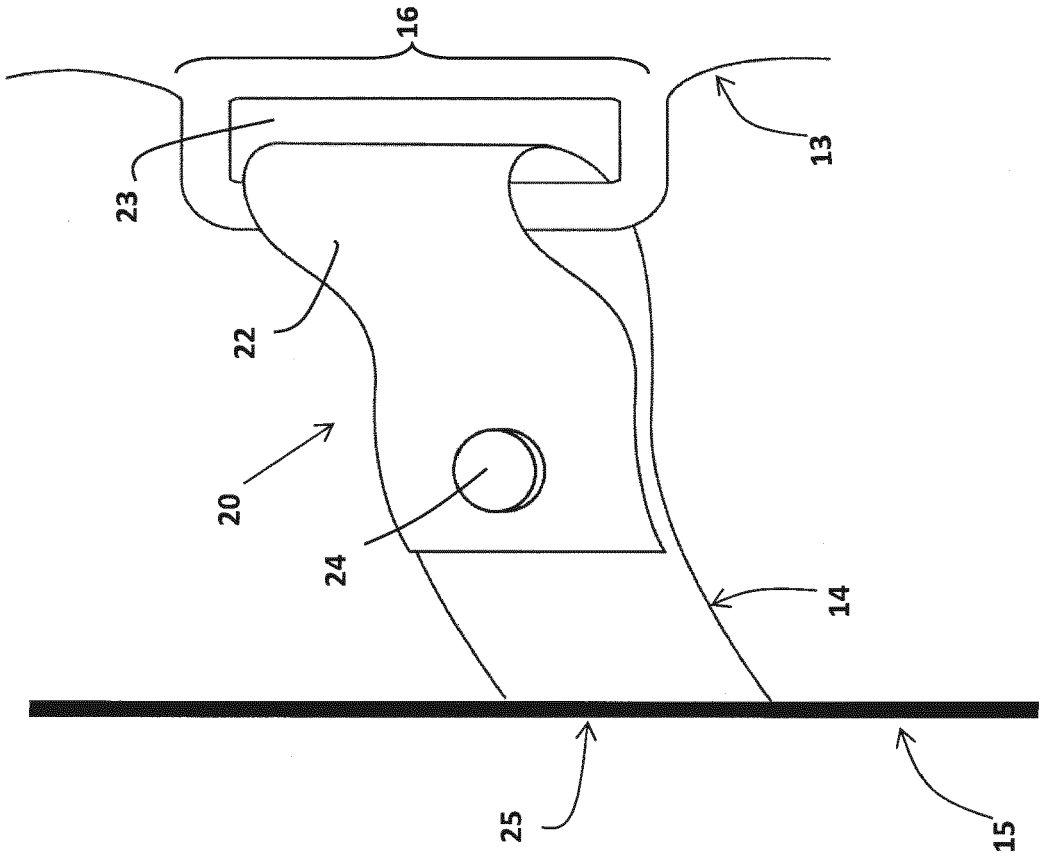

Fig. 14

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Application Number
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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	8 April 2020	D'Souza, Jennifer

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