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(54) HEAD PROTECTION DEVICE

KOPFSCHUTZGERÄT

DISPOSITIF DE PROTECTION DE LA TÊTE

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Description

[0001] The present disclosure relates to a protection device for protecting the head of a user. The present disclosure also relates to a wearable item including said head protection device. The head protection device finds an application in the sector for the active protection of persons engaged in a dynamic activity, for example a bike ride, or persons who are more exposed than others to the risk of falls and injury to the head, such as young children and elderly people, or persons suffering from illnesses or prone to sudden crises.

[0002] More particularly, the present disclosure relates to a head protection device including at least one inflatable protection element, namely a protection element able to assume an active protection condition, or inflated condition, and a rest condition, or deflated condition. In the continuation of the description, reference will be made to a single inflatable element, namely an element including a single inflation chamber. It must be understood, however, that the present disclosure may also be extended to inflatable protection devices including a plurality of inflatable elements which are independent of each other, namely including single inflation chambers or inflation chambers separate from respective inflation devices.

[0003] The head protection device is configured to protect the head from an impact and reduce as far as possible the tension affecting a user's neck, in the event of a fall and impact, and counteract as far as possible the effects of an impact and/or limit any undesirable movements of the user's head.

[0004] A head protection device which in the inflated condition has a collar-like body surrounding the neck of user, as well as a hood-like or shell-like body completely surrounding the scull or head of a user and extending from the collar-like body, is known, see for example DE 93 14 728 U1.

[0005] In particular, the known protection device is inflated for example in the event of a user falling, from the collar around the neck, as far as the hood body surrounding the entire scull or head. The protection device therefore ensures protection of the entire head and also prevents undesirable movements of the neck.

[0006] The author of the present disclosure has noticed, however, that the known inflatable protection device has a number of drawbacks. In particular, a first drawback consists in the fact that, in order to protect the head, it is required to use a vary large volume of air. Namely the structure and form of the protection device require a large volume of air in order to inflate completely both the collar-like body and the hood-like body surrounding the head. Relatively long inflation times are therefore required and these may be incompatible with the need for rapid inflation of the device. Moreover, the author of the present disclosure has noticed that the device in the deflated condition must be suitably arranged in a zone around the neck in order to be able to ensure the correct positioning at the moment of inflation. A collar-piece must therefore be provided in order to allow extraction of the device and the rapid arrangement in position around the neck.

[0007] There is therefore the drawback of large dimensions due to the final structure which the inflatable device must have in the inflated condition. US 2012/102630 discloses an inflatable head protection device which is intended to be worn on the head of a user and is automatically activated in the event of a fall or impact.

[0008] One technical problem forming the basis of the present disclosure is therefore that of providing a protection device for a user's head which may have fast inflation times and at the same time minimum dimensions in the deflated condition, while ensuring that the neck and head remain protected.

[0009] The present disclosure is therefore based on the realization by the author of the present disclosure that, by suitably configuring the form of the inflatable element in the inflated condition, it is possible to achieve an optimum protection in very little time and prevent undesirable movements of the neck, and also reduce the overall dimensions in the deflated condition.

[0010] Based on said realization, the aforementioned technical problem is solved by a device for protecting the head of a user and by a wearable item according to the respective independent claims. Secondary characteristics and particular embodiments forming the subject of the present disclosure are defined in the corresponding dependent claims.

[0011] A head protection device according to the present disclosure includes at least one inflatable element and an inflation device. The inflatable element includes at least one vertical body, or vertical column, and a ring structure, or body, joined or connected to the vertical body. It consists of a structure or body in the form of an open ring or "C". The vertical body acts as a pillar or support column for the ring structure or body. The ring structure or body forms a kind of crown around the user's head. This crown is supported, as mentioned, by the vertical body.

[0012] The form thus obtained is able to ensure maximum protection for the head, with a minimum amount of inflation fluid being required.

[0013] In particular, the ring structure extends from a top part of the vertical body and is intended to surround, at least partially, the head. The ring structure is configured, therefore, to encircle the user's head, at least partly. More particularly, the ring structure extends in the inflated condition along the parietal zone and frontal zone of the head. The ring structure is therefore able to cover substantially the entire circumference of the head (360°), leaving minimal exposed zones (for example in the ring opening zone) which do not reduce the protection in the event of a fall.

[0014] The ring structure may consist of a single portion shaped in the manner of an open ring extending from the top of the vertical body and surrounding the entire

head or may consist of two sub-portions having the shape of a half-ring and extending from the top of the vertical body so as to form two half-rings each intended to cover a side portion of the head. In a variation of embodiment two vertical inflatable bodies may be provided, wherein each top end of the vertical body is connected to a corresponding portion of the inflatable ring structure.

[0015] The ring structure may be formed by a plurality of tubular bodies arranged side-by-side and placed in respective fluid communication. In this case the tubular bodies may be arranged on top of each other in a vertical direction. The vertical direction must be understood with reference to the condition when the device is being worn.

[0016] In one embodiment, the vertical body extends from the front zone of the chest towards the front zone of the face. In an alternative embodiment the vertical body extends from the rear zone of the back. In both cases supporting of the inflatable ring structure is possible. Should the vertical body be present in the front zone of the face, the user's face may also be protected, in the same way as for the rear zone. In fact, it should be pointed out that the vertical body in the front zone is able to ensure protection of the face, and the vertical body in the rear zone may ensure protection of the cervical zone.

[0017] In a further embodiment, the protection device includes a first vertical body, which extends from or towards the front zone of the chest, and a second vertical body, which extends from or towards the rear zone of the back. The inflatable ring structure is provided between the first vertical body and the second vertical body.

[0018] The vertical body in turn rests on the respective front portion of the chest or on the rear zone of the back, or on both of them were applicable, so as not to create any stress or tension on the neck. In fact, owing to the fact that the vertical body rests on or is fixed to the torso, it is possible to avoid excessive tensioning of the neck or severe bruising (e.g. whiplash effects) since the head remains "encaged" in the ring structure and the vertical body prevents the movement of the head in a direction perpendicular to the main direction of extension of the said vertical body. Furthermore, the inflatable element per se is not constrained only to the neck/head since, as mentioned, the vertical body rests on the torso.

[0019] Moreover, owing to the fact that the inflatable element may be connected to the torso (chest and/or back), the ring structure may be precisely positioned at the height of the parietal zone of the head, keeping it stably in position namely in a secure manner. Moreover, preferably, the head protection device does not include a collar. In this way the presence of a collar-piece is not required. This lighter and free structure of the protection device ensures freedom of movement of the neck (in the rest condition, namely in the deflated condition).

[0020] For this purpose, the head protection device may be incorporated in a wearable item. The wearable item may be a backpack, a waistcoat or other article of clothing or clothing accessory which can be worn by a user preferably on the torso. In this case, the inflatable element may be included in a pocket or fixed in another way to the wearable article. Preferably, the vertical body in the inflated condition is directly supported by the wearable item.

[0021] Further characteristic features and modes of use forming the subject of the present disclosure will become clear from the following detailed description of a number of preferred examples of embodiment thereof, provided by way of a nonlimiting example. It is nevertheless evident that each embodiment may have one or more of the advantages listed above; in any case it is nevertheless not necessary that each embodiment should have simultaneously all the advantages listed.

[0022] Reference will be made to the figures of the attached drawings in which:

- Figure 1 shows an axonometric view, from the front, of a head protection device according to an embodiment of the present disclosure;
- Figure 2 shows a perspective view, from the rear, of a head protection device according to Figure 1;
- Figure 3 shows a rear view of a head protection device according to a further embodiment of the present disclosure;
- Figure 4 shows an axonometric view, from the front, of a head protection device according to Figure 3;
- Figures 5-7 shows a corresponding number of views of the device according to Figure 3, associated with a wearable item;
- Figure 8 shows a view, from the front, of a head protection device according to a further embodiment of the present disclosure;
- Figure 9 shows an axonometric view, from the front, of the device according to Figure 8;
- Figures 10-13 show a corresponding number of views of the device according to Figure 8, associated with a wearable item;
- Figure 14 shows a rear view of the device according to Figure 8;
- Figures 15 and 16 shows a structure of an inflatable element according to an embodiment of the present disclosure.
- Figures 17 and 18 show a structure of an inflatable element according to a further embodiment of the present disclosure;
- Figure 19 shows a view, from the front, of a head protection device according to a further embodiment of the present disclosure;
- Figure 20 shows a view, from the rear, of a head protection device according to a further embodiment of the present disclosure;
- Figure 21 shows a view of the device according to Figure 19 with indication of the direction of extension.

[0023] With reference to the accompanying figures, the reference number 10, 110, 210 indicates a head protection device according to respective embodiments of the present disclosure. The embodiments of the device in-

clude identical components having the same function; for this reason, in the various embodiments described below, the same reference numbers are maintained in order to identify elements and components which have the same function and the same characteristics, without necessarily repeating the description thereof.

[0024] Moreover, it should be pointed out that the head protection device 10, 110, 210 is intended to be kept in the rest condition, or deflated condition, in an upper zone of the user's torso and is intended to expand into the inflated condition so as to reach the head of a user. Consequently, in the context of the present disclosure, any spatial reference of the head protection device or of the wearable item must be considered in relation to the condition where a user is wearing the head protection device and is in the standing position. Consequently, a rear zone of the device must be understood as being a zone which is situated behind on the back, and therefore behind the user's back, and is opposite to the front or frontal zone, which is the forehead or chest zone of a user. Similarly, the term "vertical" must be understood as referring to an orientation when the user is standing and wearing the protection device in the inflated condition. In the same way, the term "top" indicates a top end, namely an end which during use is directed upwards, of the component. The top is therefore opposite to the bottom end of the component, namely the end which during use is directed downwards or towards the feet of a user.

[0025] With reference to Figure 1 and Figure 2, a head protection device 10 according to a first embodiment is described. The head protection device 10 includes an inflatable element 11 including, in turn, a vertical protection body 12 and a ring structure or body 14. Preferably it consists of a structure or body in the form of an open ring or "C".

[0026] The head protection device 10 also includes an inflation device 13 shown schematically as a gas cylinder. The inflation device 13 may be included in the inflatable element 11 or connected to the latter by means of a connection pipe.

[0027] It should be pointed out that the inflatable element 11 of this embodiment, as well as the inflatable elements 111, 211 of the successive embodiments, are shown in schematic form in the figures. The inflatable element may be realized using any known production method. In fact, what is of importance for the present disclosure is the form of the inflatable element 11, 111, 211 and its arrangement with respect the user's head.

[0028] The ring structure or body 14 is connected to a top end 15 of the vertical body 12. The ring structure or body 14 is in fluid communication with the top 15 of the vertical body 12 so as to allow distribution of an inflation fluid. More particularly, the vertical body 12 extends from the rear back portion 16 of a user and branches off (branch-off area 18) on the rear portion of the user's head 17 into two sub-portions 20, 21 each having a half-ring shape. The branch-off area 18 is therefore a zone connecting the two sub-portions 20, 21 to the vertical body.

[0029] The two sub-portions 20, 21 extend in the right-hand and left-hand directions on the sides of the user's head along the parietal zones 22, 23 towards the frontal zone 24 where the temples are situated. In other words, the half-ring shaped sub-portions 20, 21 extend as far as the forehead 24 of the user, passing via the parietal zones 22, 23.

[0030] It is pointed out that the inflatable vertical body 12 is a substantially tubular body.

[0031] The half-ring shaped sub-portions 20, 21 are also substantially tubular bodies. In particular, the half-ring shaped sub-portions 20, 21 are in fluid communication with the vertical body 12 so as to form substantially a single inflatable element 11 having a single inflation chamber. As mentioned above, it is quite possible for each portion and body of the inflatable element 11 and of the inflatable element 111, 211 of the successive embodiments to be separate inflatable elements.

[0032] The inflatable element 11 is able to assume a deflated rest condition and an inflated active protection condition. The inflatable element 11 in the deflated rest condition is included in a backpack, in a waistcoat or in any other device wearable by the user, as indicated below.

[0033] With reference to Figures 3 and 4, a head protection device 110 according to a further embodiment of the present disclosure is shown.

[0034] The inflatable protection element 110 comprises an inflatable element 111 with a vertical body 12 and a ring structure 114 which is connected to a top end 15 of the vertical body 12.

[0035] The ring structure 114 includes in particular four sub-portions having the shape of a half-ring. Of said four sub-portions 20, 120, 21, 121, two sub-portions 20, 120 extend from the top 15 of the vertical body 12 on the right, and two sub-portions 21, 121 extend from the top 15 of the vertical body 12 on the left of the user's head so as to surround the user's head substantially over 360°, namely along the parietal zones 22, 23, on each side of the user's head as far as the frontal zone 24.

[0036] Preferably, the ring structure 114 is in the form of an open ring, i.e. a "C". In the frontal zone 24 there is therefore an empty zone, or vacant zone, i.e. without an inflatable element 111, where the ring is open. In other words, during use, the frontal zone 24 is not covered by an inflatable element portion 111.

[0037] On each side of the user's head, therefore, there are two superimposed half-rings which extend as far as the user's forehead 24. The two half-rings are, namely, arranged parallel on top of each other so as to define a bottom half-ring and a top half-ring.

[0038] Owing to the geometry of the aforementioned parts, a branch-off area 18 is obtained in the rear zone 17 of the head, from where the four half-ring shaped sub-portions 20, 120, 21, 121 branch off so as to surround a user's head, occupying a minimum amount of space. The four sub-portions are connected to the vertical body 12 in the branch-off area 18.

[0039] It can be understood that the four half-ring shaped sub-portions 20, 120, 21, 121 may consist of a greater number. For example, smaller half-ring shaped sub-portions may be realized in order to obtain the same covering zone.

[0040] Preferably, with reference to Figures 15 to 18, adjacent sub-portions 20, 120 or 21, 121 of the ring structure 114, namely the two sub-portions which extend from the top 15 of the vertical body 12 on the right or the left, may each include a plurality of inflatable sub-elements 50, which are preferably identical to each other, being arranged adjacent in sequence so as to form a pair of adjacent sub-portions 20, 120 or 21, 121, wherein each inflatable sub-element 50 has the form of a long and narrow, preferably tubular, casing, i.e. closed tube, so as to each define an internal channel-shaped chamber 51. More preferably, each inflatable sub-element 50 has a half-ring shape. The inflatable sub-elements 50 and the respective internal chambers 51 are preferably in fluid communication by means of through-holes so as to form a single inflation chamber for said inflatable sub-elements 50.

[0041] In other words, each inflatable sub-element 50 has a tubular shape and therefore the corresponding internal chamber 51, when the inflatable element is substantially inflated, has a channel-like shape corresponding to the empty volume of a tubular element. The inflatable sub-elements 50 are in fact narrow and long.

[0042] The inflatable sub-elements 50 therefore have side walls 50a, 50b arranged in pairs adhering to each other (i.e. completely adhering or partially adhering along one edge) or two opposite walls 50c, 50d which, once the inflatable elements 50 have been joined together, form and act as opposite outer surfaces.

[0043] Preferably, in order to achieve the fluid communication, the adjacent inflatable sub-elements 50 include through-holes 60 or fluid communication holes in the adhering walls 50a, 50b of the two said adjacent inflatable elements, so as to form the fluid communication.

[0044] Preferably, in the embodiment shown each inflatable sub-element 50 is made of a material which is resistant to high pressure and suitable for keeping the entire mattress body inflated for a certain time period.

[0045] With reference to Figures 17 and 18, these show adjacent sub-portions 20, 120 or 21, 121 of the ring structure 114, in which the inflatable sub-elements 50 comprise membrane inserts 70 arranged between adjacent side walls 50a, 50b. The membrane inserts 70 are inserted so as to pass between the adjacent side walls 50a, 50b and act as a reinforcement.

[0046] Furthermore, in addition to the membrane inserts 70 arranged between adjacent side walls 50a, 50b, the inflatable sub-elements 50 of the adjacent sub-portions 20, 120 or 21, 121 may comprise two opposite covering sheets 80 which form a waterproofing cloak or coat.

[0047] A ring structure made with these inflatable sub-elements 50 is schematically shown in Figures 19-21. The inflatable sub-elements 50 are superimposed on each other in the vertical direction. In Figures 19-21 the vertical body 12 is not shown for the sake of simplicity, but it is understood that it is present, and may be made with smaller dimensions or dimensions suitable for the particular need. It may be both a front body for resting on the chest or a rear body for resting on the back.

[0048] It can be understood that with such a configuration the ring structure inflates from the bottom upwards in the manner of an accordion around the head as shown in Figure 21. The inflatable element 111 therefore has the appearance of a substantially modular element in which the covering of the head may be increased by increasing the number of half-ring shaped sub-portions.

[0049] It should be pointed out that the vertical body 12 acts as a kind of vertical pillar, namely a vertical column which supports the ring structure 14, 114 and in turn rests on the user's torso.

[0050] With reference to Figure 5, a head protection device 110 according to an embodiment of the present disclosure such as that described above is illustrated. The head protection device 110 is associated with a backpack 30. The head protection device 110 is contained, in the deflated condition, in a pocket or similar compartment in the backpack 30. When the protection device 110 is inflated it emerges from a top zone of the backpack. Basically, in the inflated condition the vertical body 12 therefore emerges from the backpack 30. Preferably, in the deflated condition, the vertical body 12 is housed inside the backpack 30.

[0051] The backpack 30 is therefore one possible wearable item according to the present disclosure.

[0052] With reference to Figures 6-7, the inflatable protection device 110 is shown associated with a jacket or waistcoat 32. In this case also the vertical body 12 emerges in the inflated condition from the top zone of the jacket. The jacket 32 is therefore one possible wearable item according to the present disclosure.

[0053] It is to be understood that all the possible combinations of the head protection device 10, 110 and wearable items may be provided in accordance with the embodiments described above or in accordance with the embodiments described hereinbelow with reference to Figures 8-13.

[0054] In particular, with reference to Figures 8 and 9, a head protection device 210 including an inflatable element 211 having two vertical bodies 212a, 212b and a ring structure 214 is shown.

[0055] The ring structure 214 includes four ring sub-portions 220a, 220b, 221a, 221b, superimposed in pairs. In particular, of the four ring sub-portions 220a, 220b, 221a, 221b, two ring sub-portions 220a, 220b are superimposed in the right-hand parietal zone 22 and two ring sub-portions 221a, 221b are superimposed in the left-hand parietal zone 22.

[0056] In this case also, the ring structure 114 may be in the form of an open ring, namely a "C". Therefore, the ring structure 114 encircles or partially or completely surrounds the head. The four ring sub-portions 220a, 220b,

221a, 221b may be portions which are in fluid communication only in a branch-off area 18 located in the rear zone 17 of the head. Alternatively, fluid communication passages may be provided internally along the half-ring portion. For example, fluid communication openings may be provided between the two half-rings so as to leave open fluid passages for allowing the distribution of fluid.

[0057] The head protection device 210 may be modified according to needs and for association with a wearable item 30, 32, such as a waistcoat (Figures 10 and 11) or a backpack (Figure 12) or other wearable item such as that of Figure 13. For example, the head protection device 210 may be contained in a pocket of the waistcoat (Figures 10 and 11) or in a shoulder strap of the backpack (Figure 12) or in a pocket of the device according to Figure 13.

[0058] It should be pointed out that all the aforementioned head protection devices 10, 110, 210 include an inflation device, such as a pressurised-gas cylinder. Preferably, the inflation device 13 is associated with the vertical body 12, 112, 212a, 212b. For example, it is the inflation device 13 located in the wearable item associated with the vertical body 12, 112, 212a,212b. The inflation device 13 may also be connected to the half-ring structure 14, 114, 214 so as to inflate the latter first in relation to the vertical body 12, 112, 212a, 212b, for example by suitably organizing the distribution of the inflation fluid inside the inflatable element 11, 111, 211.

[0059] In order to facilitate inflation, the inflation device may be provided with pipes which introduce gas into the inflatable element 11, 111, 211.

[0060] As mentioned above, in connection with the structure of the inflatable element 11, 111, 211, it is to be understood that it may be made using any known manufacturing method.

[0061] It is also to be understood that the inflatable element 11, 111, 211 may be lined or covered with a fabric or other soft material suitable for use on a fabric. Alternatively, the inflatable element 11, 111, 211 may be housed inside a casing having a shape corresponding to that of the inflatable element.

[0062] In order to perform inflation of the inflatable element 11, 111, 211, the head protection device according to the present invention is able to cooperate with special activation and inflation means, the compressed gas cylinder 13 thereof according to Figure 3 being shown in the figures only by way of example.

[0063] Alternatively, these means may comprise gas generators of the pyrotechnical or hybrid type or of other types known in the present state of the art,

[0064] Said inflation means are controlled by a control unit depending on the detection of the user's condition; for example, said control unit may implement an impact prediction algorithm which allows early identification of an event and a reliable prediction thereof by means of sensors and a unit for processing the signals produced by the said sensors.

[0065] The aforementioned detection and activation means may also be incorporated in the protection device according to the present invention or located on the outside thereof.

[0066] Basically, it is to be understood that the impact detection and activation means of the inflatable element 11, 111, 211 may be either means associated with the user on the outside of the head protection device 10, 110, 210 or incorporated in the latter.

[0067] It should also be noted that the activation methods, while being an aspect of particular importance for effective operation of the device, will not be described in further detail since they are methods which are essentially already known to the person skilled in the art.

[0068] The protection device may also comprise a deflation valve, communicating on one side with the internal chamber of the inflatable element and on the other side with the external environment, so as to allow deflation of the inflatable element 11, 111, 211 following activation and when a protective action is no longer required. Activation of the deflation valve may be controlled by an electronic control unit, which opens the deflation valve once a predefined time interval has lapsed from activation of the inflation means. Alternatively, the deflation valve may be manually operated.

[0069] The subject of the present disclosure has been described hitherto with reference to preferred embodiments. It is to be understood that other embodiments relating to the same inventive idea may exist, these all falling within the scope of protection of the claims which are attached hereinbelow.

Claims

1. Head protection device (10, 110, 210) including at least one inflatable element (11, 111, 211) able to assume a deflated condition and an inflated condition and an inflation device (13) for inflating the inflatable element (11, 111, 211), wherein the inflatable element (11, 111, 211) includes at least one vertical body (12, 112, 212a, 212b) and a ring structure (14, 114, 214) connected to said at least one vertical body (12, 112, 212a, 212b), wherein in the inflated condition the ring structure (14, 214, 214) is configured to at least partially surround, in a crown-like manner, a parietal zone and a frontal zone of the head, and wherein, in an inflated condition, said vertical body (12, 112, 212a, 212b) is intended to support the ring structure (14, 114, 214) and **characterised in that**

   a) the ring structure (14, 114, 214) includes two sub-portions (20, 21) each having the shape of a half-ring and intended to protect a right area of the head and a left area of the head respectively, and wherein a top portion of the vertical body (12, 112, 212a, 212b) is connected to both sub-portions (20, 21) each having a half-ring

shape; or
b) the ring structure (14, 114, 214) is an open-ring structure,

and wherein said vertical body (12, 112, 212a, 212b) is a body intended, in an inflated condition, to rest on a user's torso.

2. Head protection device (10, 110, 210) according to claim 1, wherein the ring structure (14, 114, 214) is connected to a top end (15) of the vertical body (12, 112, 212a, 212b).

3. Head protection device (10, 110, 210) according to claim 1 or 2, wherein the vertical body (12, 112, 212a, 212b) and/or the ring structure (14, 114, 214) is/are portions of an inflatable element (11, 111, 211) having a tubular shape.

4. Head protection device (10, 110, 210) according to any one of the preceding claims in combination with option a), wherein the half-ring-shaped sub-portions (20, 21) are in fluid communication with the vertical body (12) so as to form substantially a single inflatable element (11) having a single inflation chamber.

5. Head protection device (10, 110, 210) according to any one of the preceding claims in combination with option a), wherein the ring structure (14, 114, 214) includes four sub-portions each having the shape of a half-ring, wherein in the inflated condition, of said four sub-portions (20, 120, 21, 121), two sub-portions (20, 120) extend from the top (15) of the vertical body (12) on the right and two sub-portions (21, 121) extend from the top (15) of the vertical body (12) on the left of the user's head.

6. Head protection device (10, 110, 210) according to any one of the preceding claims, including a branch-off area (18) in a top zone of the vertical body (12, 112, 212a, 212b) from which half-ring shaped portions (20, 120, 21, 121) of the ring structure (14, 114, 214) branch off so as to at least partially surround a user's head.

7. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein the vertical body (12, 112, 212a, 212b) is a vertical body arranged in the cervical area, or wherein the vertical body (12, 112, 212a, 212b) is arranged in a front area.

8. Head protection device (10, 110, 210) according to any one of the preceding claims 1 to 6, wherein the vertical body (12, 112, 212a, 212b) is a first vertical body arranged in the cervical area and wherein the device includes at least a second vertical body (12, 112, 212a, 212b), wherein said second vertical body is arranged in a front area.

9. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein the vertical body (12, 112, 212a, 212b) includes two tubular elements which are arranged side-by-side and each of which is connected to a half-ring shaped sub-portion of the ring structure (14, 114, 214).

10. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein said ring structure includes a plurality of substantially tubular inflatable sub-elements (50) connected together alongside each other.

11. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein the head protection device (10, 110, 210) is intended to be kept in the rest condition, or deflated condition, in an upper zone of the user's torso and is intended to expand into the inflated condition so as to reach the head of a user.

12. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein the head protection device (10, 110, 210) does not include a collar.

13. Head protection device (10, 110, 210) according to any one of the preceding claims, wherein the head protection device (10, 110, 210) includes an inflation device (13) and that the inflation device (13) is associated with the vertical body (12, 112, 212a, 212b).

14. Wearable item (30, 32) including a head protection device (10, 110, 210) according to any one of the preceding claims.

15. Wearable item (30, 32) according to claim 14, wherein the vertical body (12, 112, 212a, 212b) is fixed and/or connected to a portion of the wearable item intended to rest on the user's torso.

Patentansprüche

1. Kopfschutzvorrichtung (10, 110, 210), einschließlich mindestens eines aufblasbaren Elements (11, 111, 211), das in der Lage ist, einen entleerten Zustand und einen aufgeblasenen Zustand anzunehmen, und einer Aufblasvorrichtung (13) zum Aufblasen des aufblasbaren Elements (11, 111, 211), wobei das aufblasbare Element (11, 111, 211) mindestens einen vertikalen Körper (12, 112, 212a, 212b) und eine Ringstruktur (14, 114, 214) einschließt, die mit dem mindestens einen vertikalen Körper (12, 112, 212a, 212b) verbunden ist, wobei die Ringstruktur (14, 214, 214) in dem aufgeblasenen Zustand kon-

figuriert ist, um eine Scheitelzone und eine Stirnzone des Kopfs mindestens teilweise, in einer kronenartigen Weise, zu umgeben, und wobei der vertikale Körper (12, 112, 212a, 212b), in dem aufgeblasenen Zustand, vorgesehen ist, um die Ringstruktur (14, 114, 214) zu stützen, und **dadurch gekennzeichnet, dass**

a) die Ringstruktur (14, 114, 214) zwei Unterabschnitte (20, 21) einschließt, die jeweils die Form eines Halbrings aufweisen und vorgesehen sind, um einen rechten Bereich des Kopfs beziehungsweise einen linken Bereich des Kopfs zu schützen, und wobei ein oberster Abschnitt des vertikalen Körpers (12, 112, 212a, 212b) mit beiden Unterabschnitten (20, 21) verbunden ist, die jeweils eine Halbringform aufweisen; oder
b) die Ringstruktur (14, 114, 214) eine Struktur eines offenen Rings ist,

und wobei der vertikale Körper (12, 112, 212a, 212b) ein Körper ist, der vorgesehen ist, um, in einem aufgeblasenen Zustand, auf einem Rumpf eines Benutzers zu ruhen.

2. Kopfschutzvorrichtung (10, 110, 210) nach Anspruch 1, wobei die Ringstruktur (14, 114, 214) mit einem obersten Ende (15) des vertikalen Körpers (12, 112, 212a, 212b) verbunden ist.

3. Kopfschutzvorrichtung (10, 110, 210) nach Anspruch 1 oder 2, wobei der vertikale Körper (12, 112, 212a, 212b) und/oder die Ringstruktur (14, 114, 214) aus Abschnitten eines aufblasbaren Elements (11, 111, 211), das eine röhrenförmige Form aufweist, besteht/bestehen.

4. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche in Kombination mit Option a), wobei die halbringförmigen Unterabschnitte (20, 21) in Fluidkommunikation mit dem vertikalen Körper (12) stehen, um im Wesentlichen ein einzelnes aufblasbares Element (11), das eine einzige Aufblaskammer aufweist, auszubilden.

5. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche in Kombination mit Option a), wobei die Ringstruktur (14, 114, 214) vier Unterabschnitte einschließt, die jeweils die Form eines Halbrings aufweisen, wobei in dem aufgeblasenen Zustand, von den vier Unterabschnitten (20, 120, 21, 121), zwei Unterabschnitte (20, 120) sich von dem obersten Teil (15) des vertikalen Körpers (12) rechterseits erstrecken und zwei Unterabschnitte (21, 121) sich von dem obersten Teil (15) des vertikalen Körpers (12) linkerseits des Kopfs des Benutzers erstrecken.

6. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, einschließlich eines Abzweigungsbereichs (18) in einer obersten Zone des vertikalen Körpers (12, 112, 212a, 212b), von dem halbringförmige Abschnitte (20, 120, 21, 121) der Ringstruktur (14, 114, 214) abzweigen, um den Kopf eines Benutzers mindestens teilweise zu umgeben.

7. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei der vertikale Körper (12, 112, 212a, 212b) ein vertikaler Körper ist, der in dem Halsbereich angeordnet ist, oder wobei der vertikale Körper (12, 112, 212a, 212b) in einem Stirnbereich angeordnet ist.

8. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche 1 bis 6, wobei der vertikale Körper (12, 112, 212a, 212b) ein erster vertikaler Körper ist, der in dem Halsbereich angeordnet ist, und wobei die Vorrichtung mindestens einen zweiten vertikalen Körper (12, 112, 212a, 212b) einschließt, wobei der zweite vertikale Körper in einem Stirnbereich angeordnet ist.

9. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei der vertikale Körper (12, 112, 212a, 212b) zwei röhrenförmige Elemente einschließt, die Seite an Seite angeordnet sind, und wobei jedes davon mit einem halbringförmigen Unterabschnitt der Ringstruktur (14, 114, 214) verbunden ist.

10. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei die Ringstruktur eine Vielzahl von im Wesentlichen röhrenförmigen aufblasbaren Unterelementen (50) einschließt, die nebeneinander miteinander verbunden sind.

11. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei die Kopfschutzvorrichtung (10, 110, 210) vorgesehen ist, um in dem Ruhezustand, oder entleerten Zustand, in einer oberen Zone des Rumpfes des Benutzers gehalten zu werden und vorgesehen ist, um sich in den aufgeblasenen Zustand auszudehnen, um den Kopf eines Benutzers zu erreichen.

12. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei die Kopfschutzvorrichtung (10, 110, 210) keinen Kragen einschließt.

13. Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche, wobei die Kopfschutzvorrichtung (10, 110, 210) eine Aufblasvorrichtung (13) einschließt und dass die Aufblasvorrichtung (13) dem vertikalen Körper (12, 112, 212a, 212b)

zugeordnet ist.

14. Tragbarer Gegenstand (30, 32), einschließlich einer Kopfschutzvorrichtung (10, 110, 210) nach einem der vorstehenden Ansprüche.

15. Tragbarer Gegenstand (30, 32) nach Anspruch 14, wobei der vertikale Körper (12, 112, 212a, 212b) an einem Abschnitt des tragbaren Gegenstands befestigt und/oder mit diesem verbunden ist, der vorgesehen ist, um auf dem Rumpf des Benutzers zu ruhen.

Revendications

1. Dispositif de protection de tête (10, 110, 210) comportant au moins un élément gonflable (11, 111, 211) apte à adopter un état dégonflé et un état gonflé et un dispositif de gonflage (13) pour le gonflage de l'élément gonflable (11, 111, 211), dans lequel l'élément gonflable (11, 111, 211) comporte au moins un corps vertical (12, 112, 212a, 212b) et une structure d'anneau (14, 114, 214) reliée audit au moins un corps vertical (12, 112, 212a, 212b), dans lequel à l'état gonflé la structure d'anneau (14, 214, 214) est conçue pour entourer au moins partiellement, à la manière d'une couronne, une zone pariétale et une zone frontale de la tête, et dans lequel, à un état gonflé, ledit corps vertical (12, 112, 212a, 212b) est prévu pour supporter la structure d'anneau (14, 114, 214) et **caractérisé en ce que**

a) la structure d'anneau (14, 114, 214) comporte deux sous-portions (20, 21) ayant chacune la forme d'un demi-anneau et prévues pour protéger un espace droit de la tête et un espace gauche de la tête respectivement, et dans lequel une portion de sommet du corps vertical (12, 112, 212a, 212b) est reliée aux deux sous-portions (20, 21) ayant chacune une forme de demi-anneau ; ou
b) la structure d'anneau (14, 114, 214) est une structure d'anneau ouvert,

et dans lequel ledit corps vertical (12, 112, 212a, 212b) est un corps prévu, à un état gonflé, pour reposer sur le torse d'un utilisateur.

2. Dispositif de protection de tête (10, 110, 210) selon la revendication 1, dans lequel la structure d'anneau (14, 114, 214) est reliée à une extrémité de sommet (15) du corps vertical (12, 112, 212a, 212b).

3. Dispositif de protection de tête (10, 110, 210) selon la revendication 1 ou 2, dans lequel le corps vertical (12, 112, 212a, 212b) et/ou la structure d'anneau (14, 114, 214) est/sont des portions d'un élément gonflable (11, 111, 211) ayant une forme tubulaire.

4. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes en combinaison avec l'option a), dans lequel les sous-portions (20, 21) en forme de demi-anneau sont en communication fluidique avec le corps vertical (12) de manière à former sensiblement un seul élément gonflable (11) ayant une seule chambre de gonflage.

5. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes en combinaison avec l'option a), dans lequel la structure d'anneau (14, 114, 214) comporte quatre sous-portions ayant chacune la forme d'un demi-anneau, dans lequel à l'état gonflé, desdites quatre sous-portions (20, 120, 21, 121), deux sous-portions (20, 120) s'étendent à partir du sommet (15) du corps vertical (12) sur la droite et deux sous-portions (21, 121) s'étendent à partir du sommet (15) du corps vertical (12) sur la gauche de la tête de l'utilisateur.

6. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, comportant un espace de bifurcation (18) dans une zone de sommet du corps vertical (12, 112, 212a, 212b) à partir de laquelle des portions (20, 120, 21, 121) en forme de demi-anneau de la structure d'anneau (14, 114, 214) bifurquent de manière à entourer au moins partiellement la tête d'un utilisateur.

7. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, dans lequel le corps vertical (12, 112, 212a, 212b) est un corps vertical agencé dans l'espace cervical, ou dans lequel le corps vertical (12, 112, 212a, 212b) est agencé dans un espace frontal.

8. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes 1 à 6, dans lequel le corps vertical (12, 112, 212a, 212b) est un premier corps vertical agencé dans l'espace cervical et dans lequel le dispositif comporte au moins un second corps vertical (12, 112, 212a, 212b), dans lequel ledit second corps vertical est agencé dans un espace frontal.

9. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, dans lequel le corps vertical (12, 112, 212a, 212b) comporte deux éléments tubulaires qui sont agencés côte à côte et dont chacun est relié à une sous-portion en forme de demi-anneau de la structure d'anneau (14, 114, 214).

10. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes,

dans lequel ladite structure d'anneau comporte une pluralité de sous-éléments gonflables (50) sensiblement tubulaires reliés ensemble les uns le long des autres.

11. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de protection de tête (10, 110, 210) est prévu pour être conservé à l'état de repos, ou à l'état dégonflé, dans une zone supérieure du torse de l'utilisateur et est prévu pour s'étendre à l'état gonflé de manière à atteindre la tête d'un utilisateur.

12. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de protection de tête (10, 110, 210) ne comporte pas de collier.

13. Dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de protection de tête (10, 110, 210) comporte un dispositif de gonflage (13) et que le dispositif de gonflage (13) est associé au corps vertical (12, 112, 212a, 212b).

14. Article portable (30, 32) comportant un dispositif de protection de tête (10, 110, 210) selon l'une quelconque des revendications précédentes.

15. Article portable (30, 32) selon la revendication 14, dans lequel le corps vertical (12, 112, 212a, 212b) est fixé et/ou relié à une portion de l'article portable prévue pour reposer sur le torse de l'utilisateur.

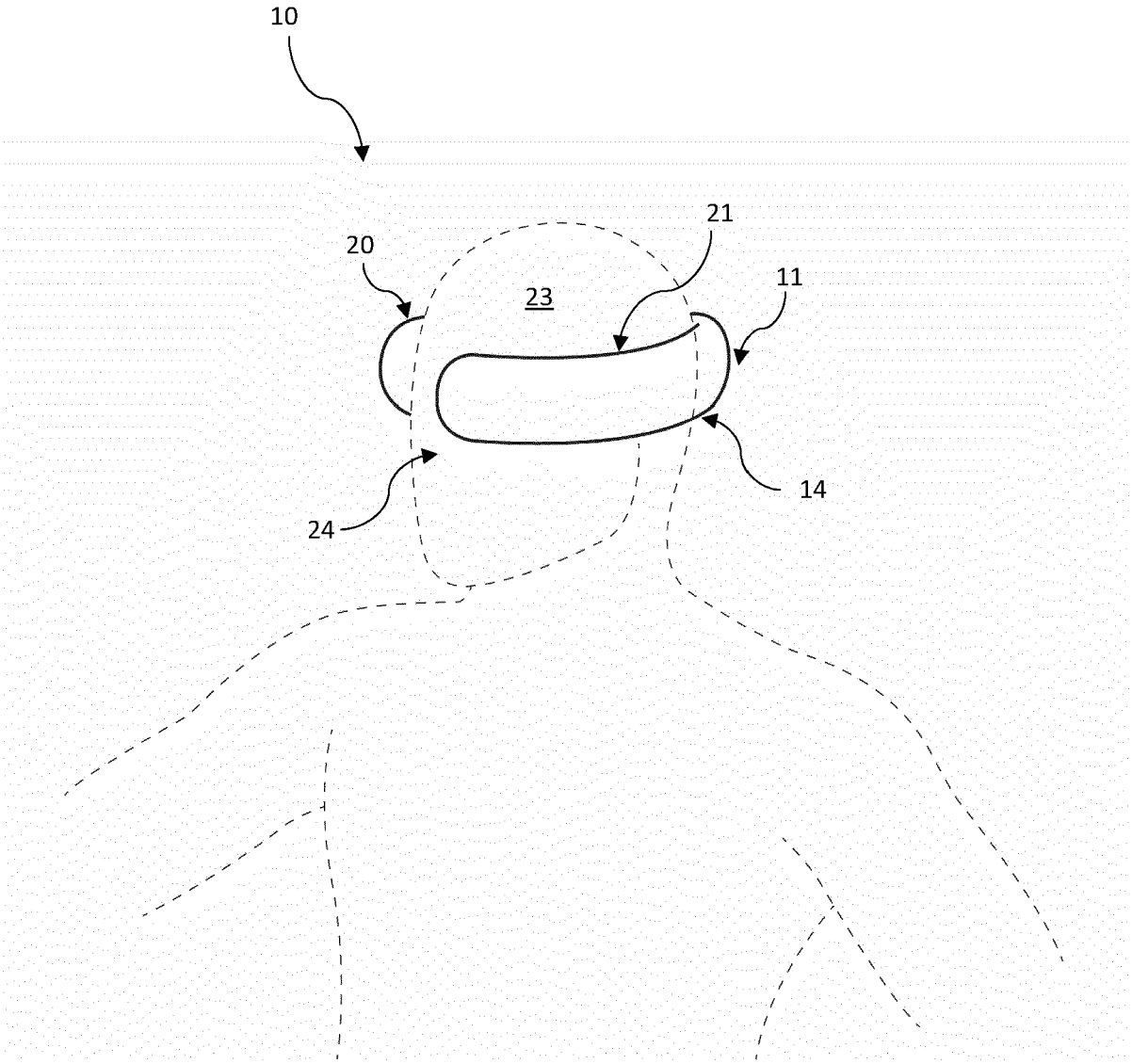

FIG. 1

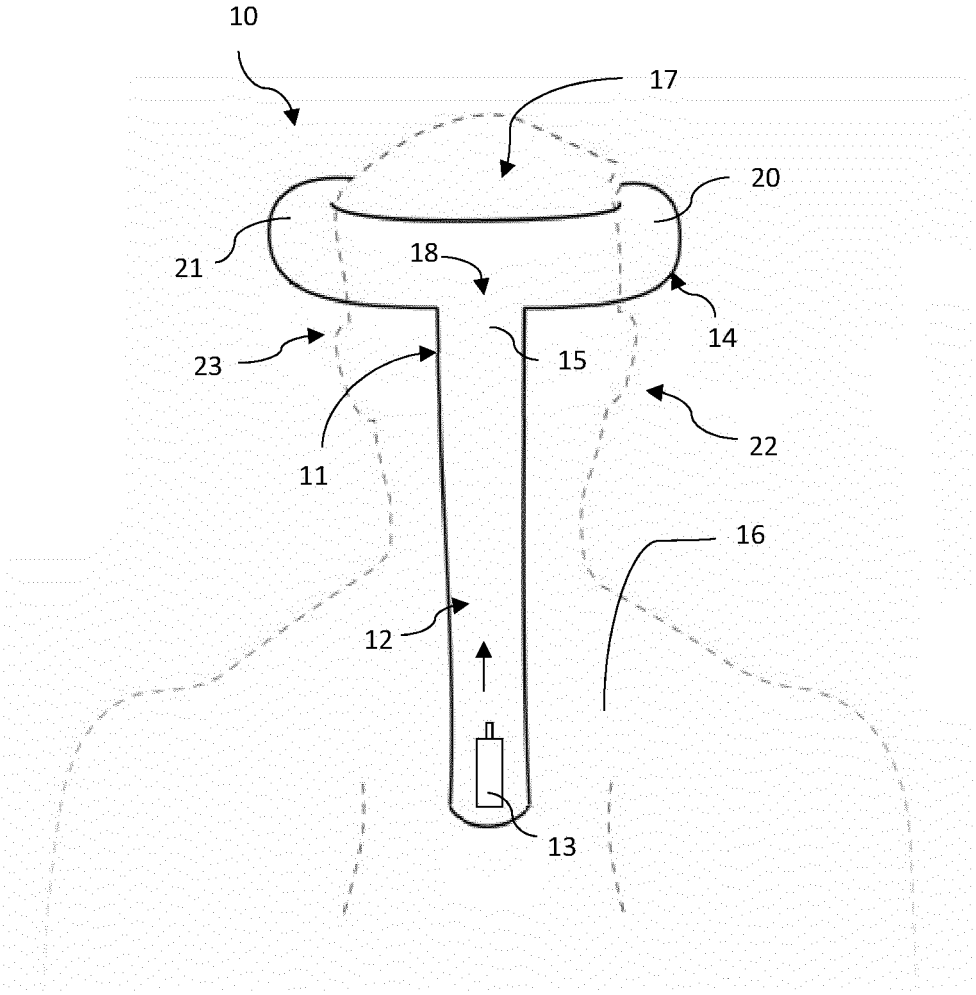

FIG. 2

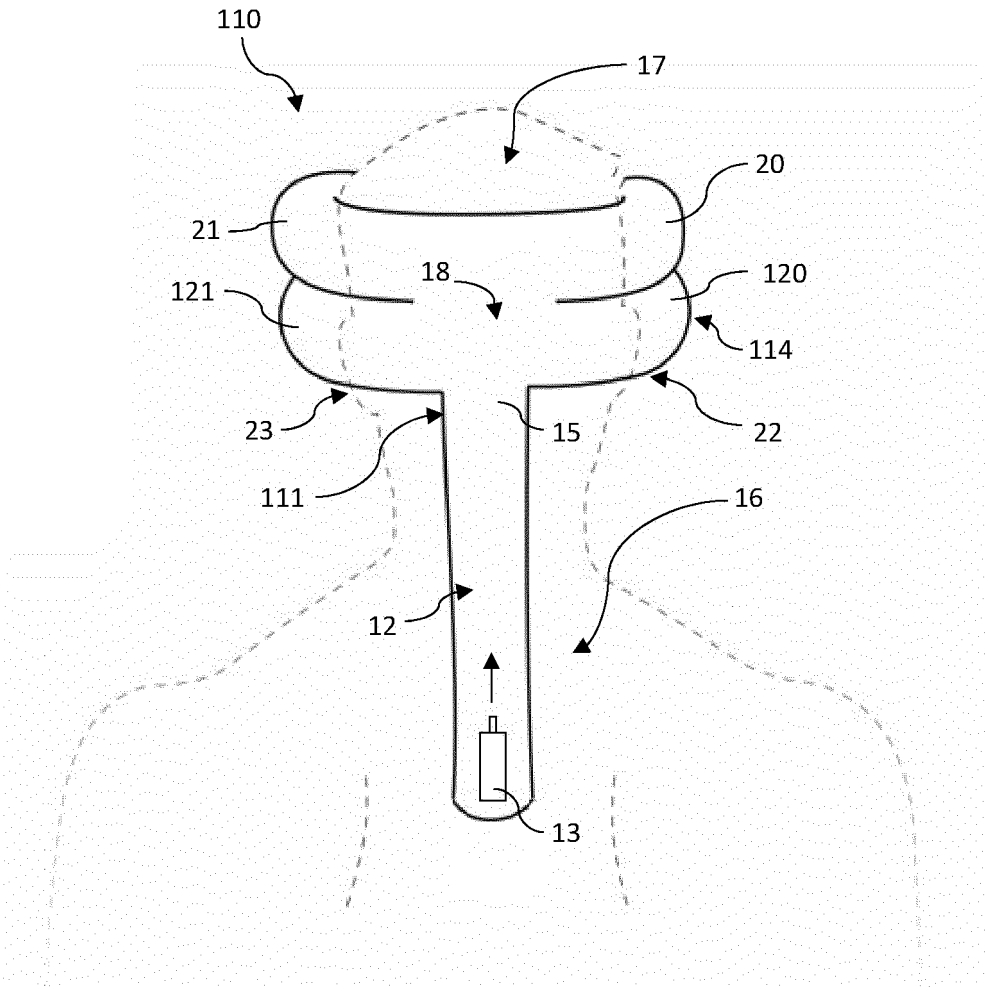

FIG. 3

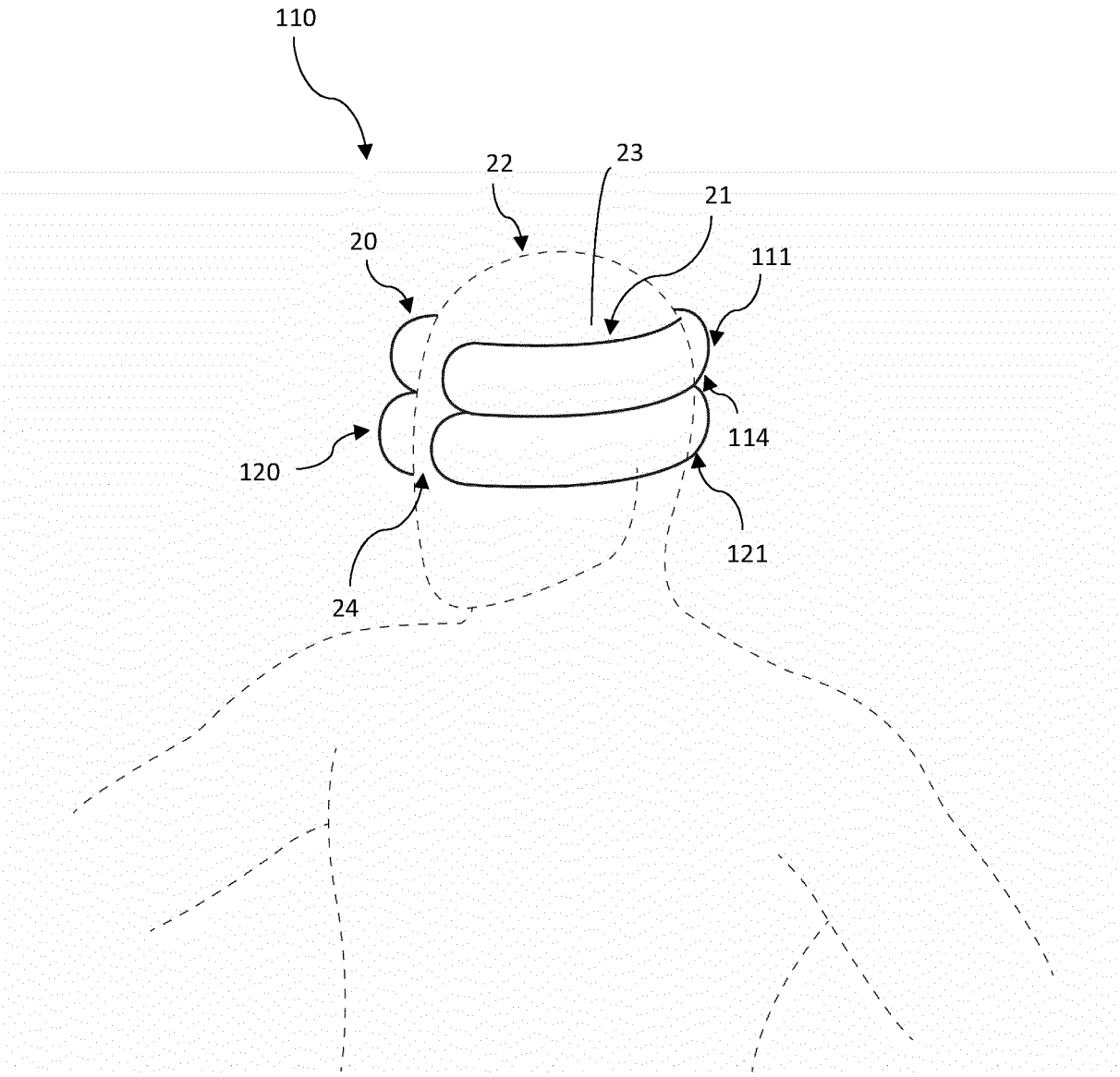

FIG. 4

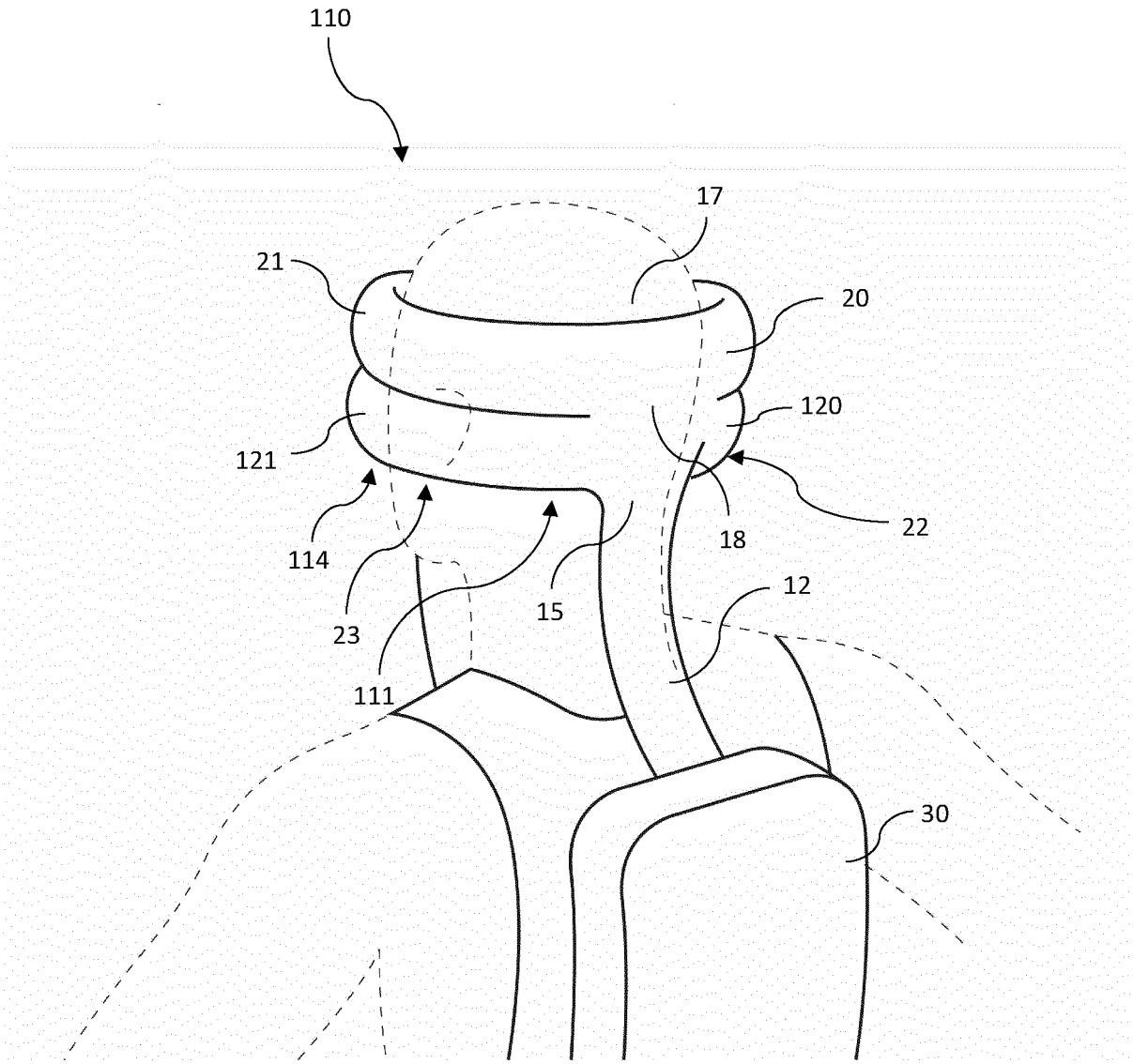

FIG. 5

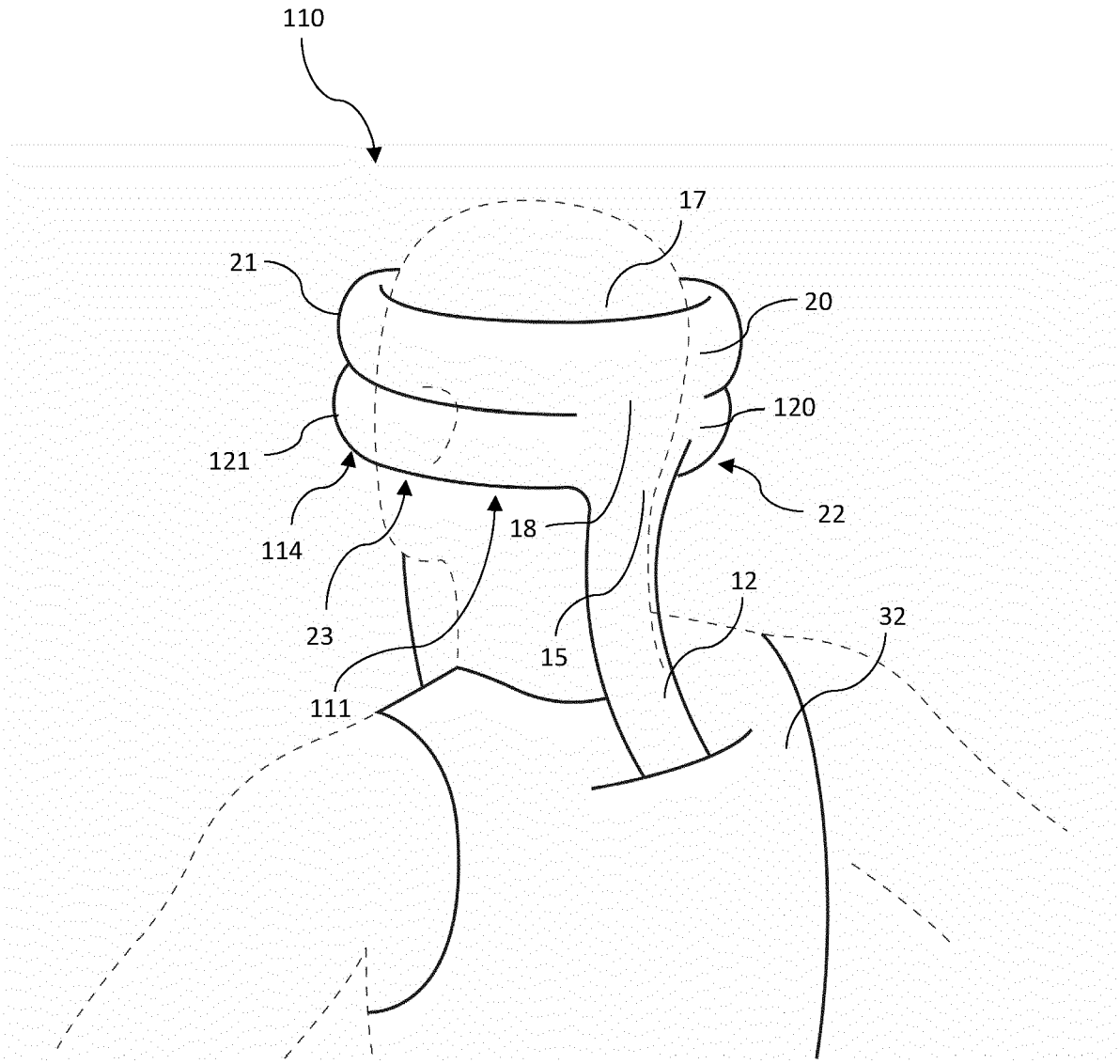

FIG. 6

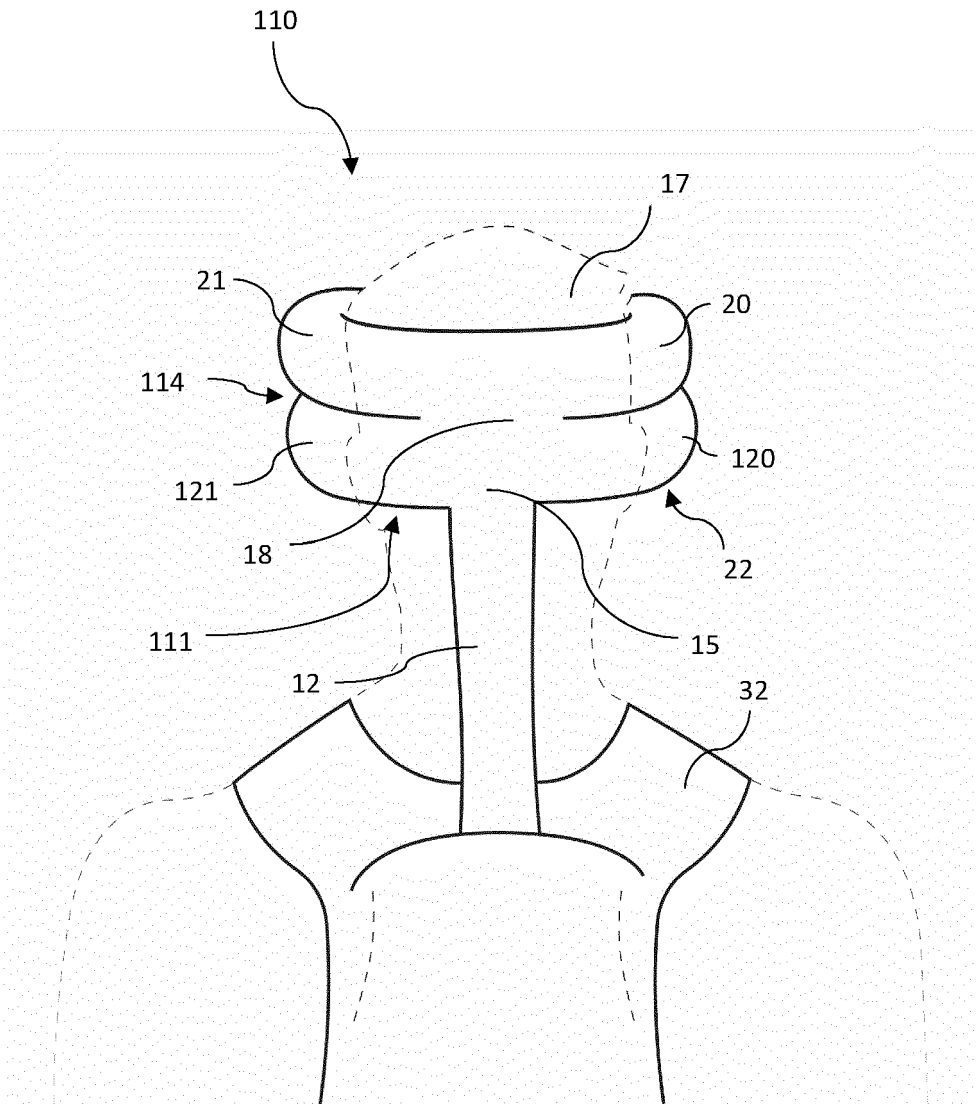

FIG. 7

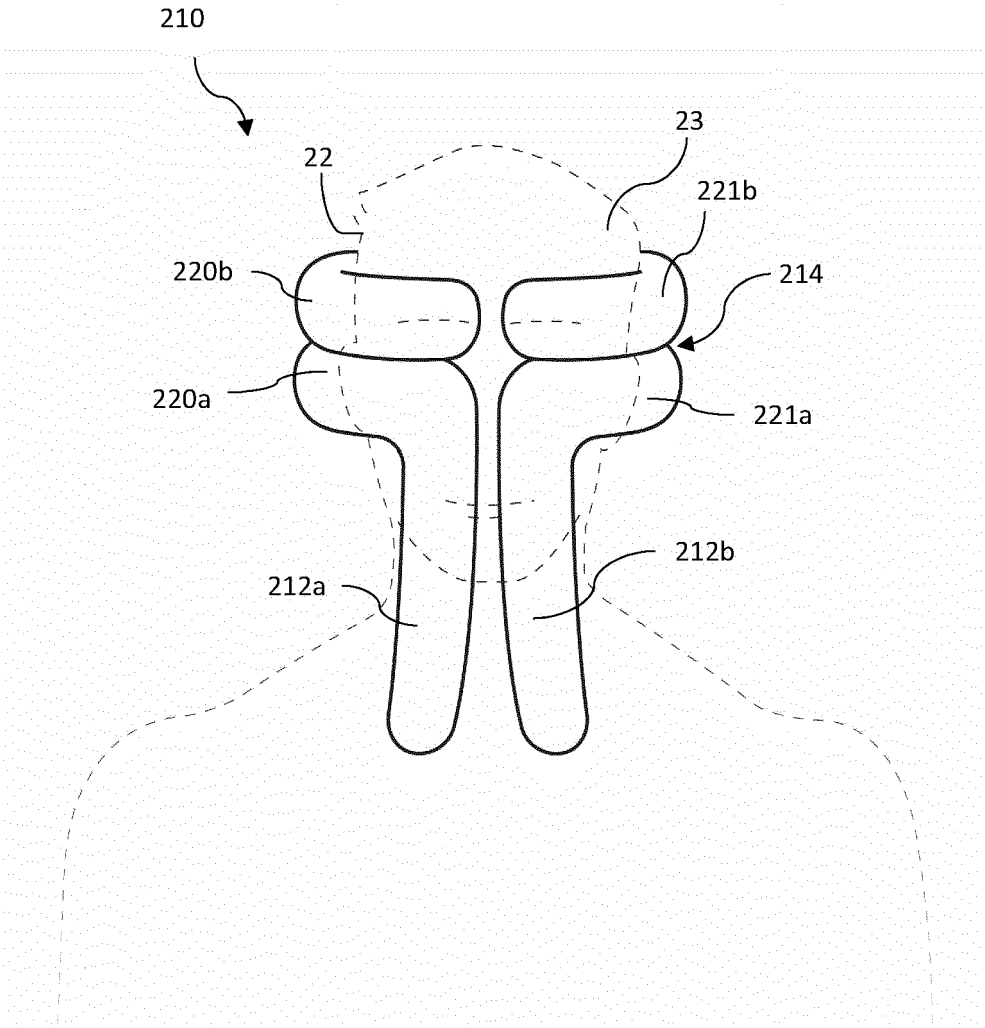

FIG. 8

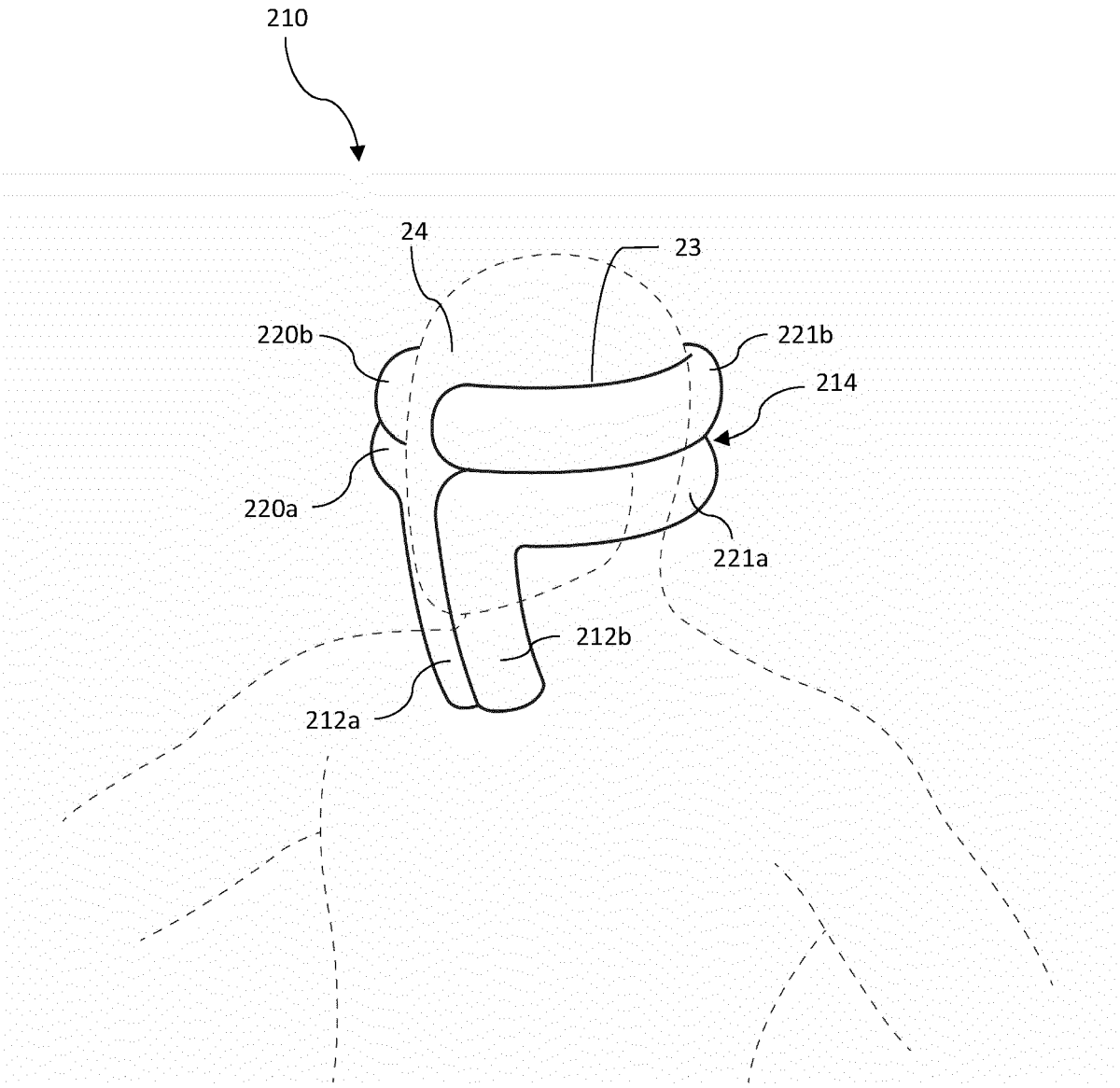

FIG. 9

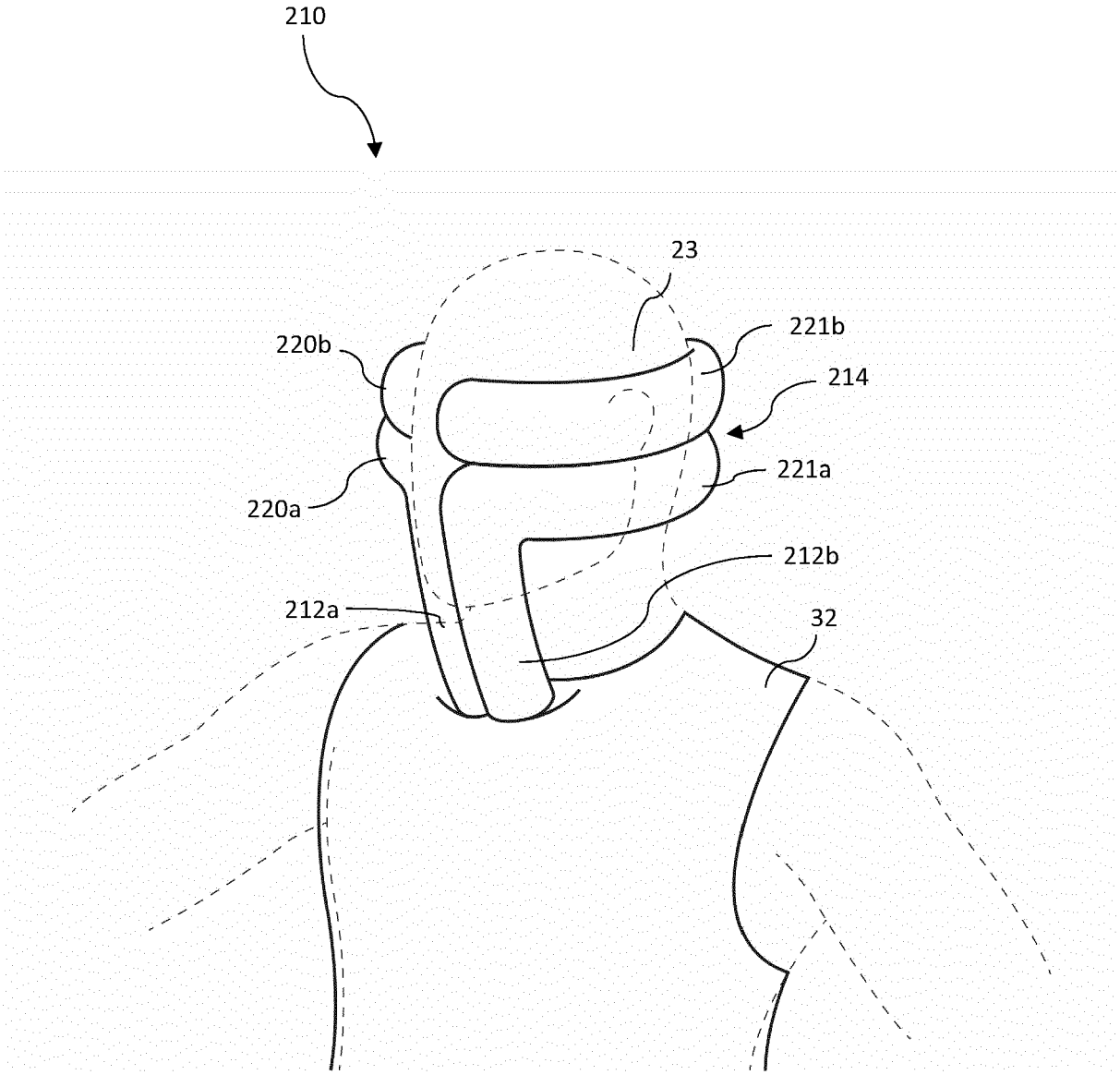

FIG. 10

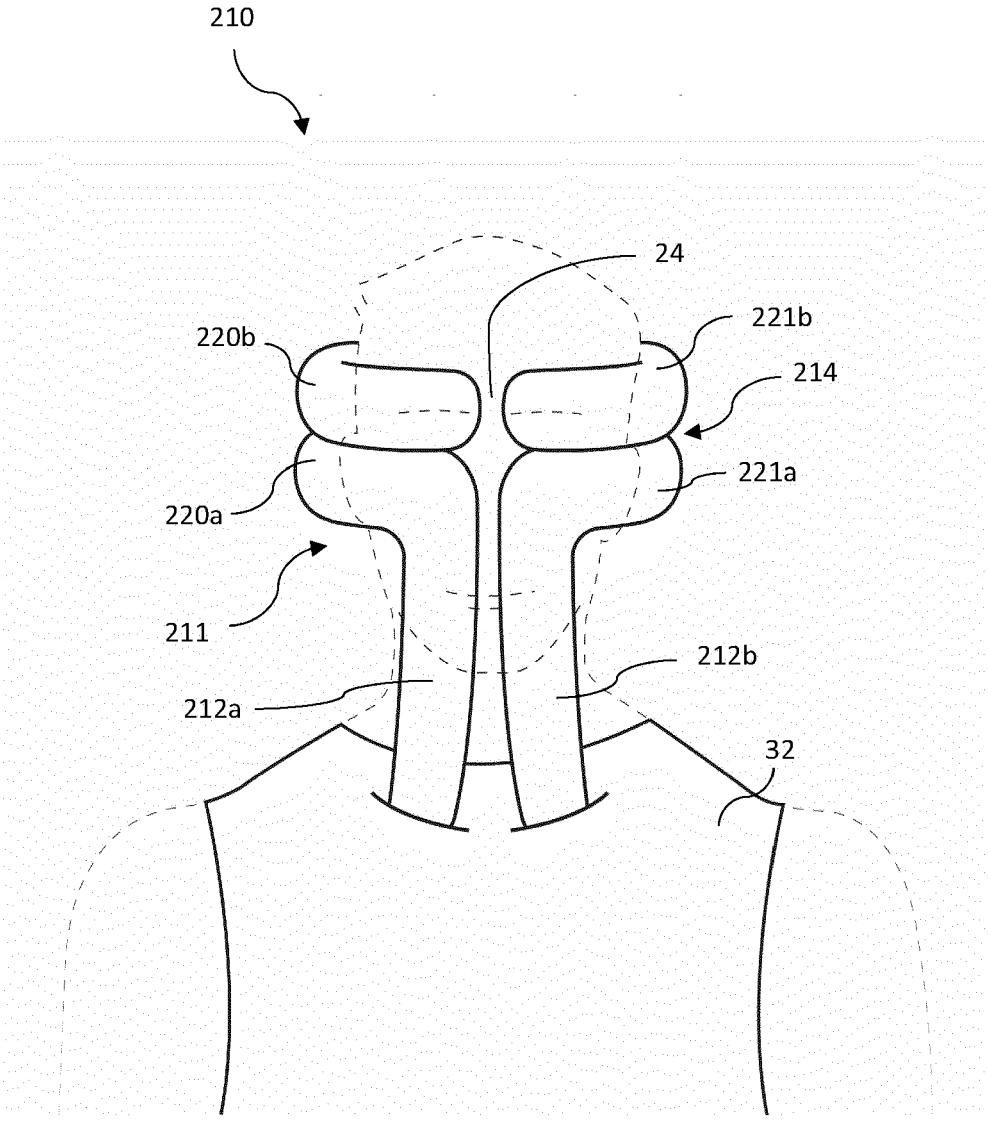

FIG. 11

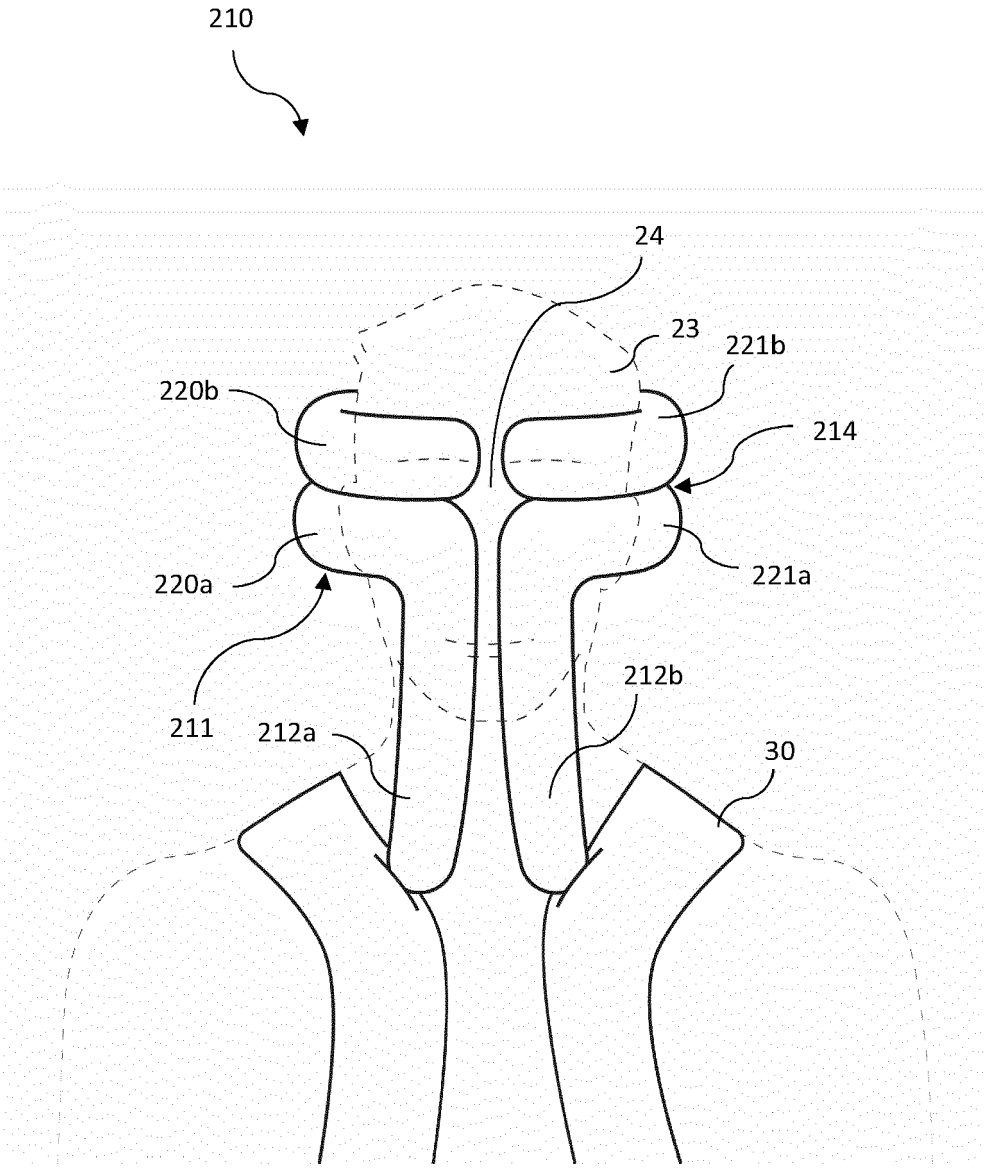

FIG. 12

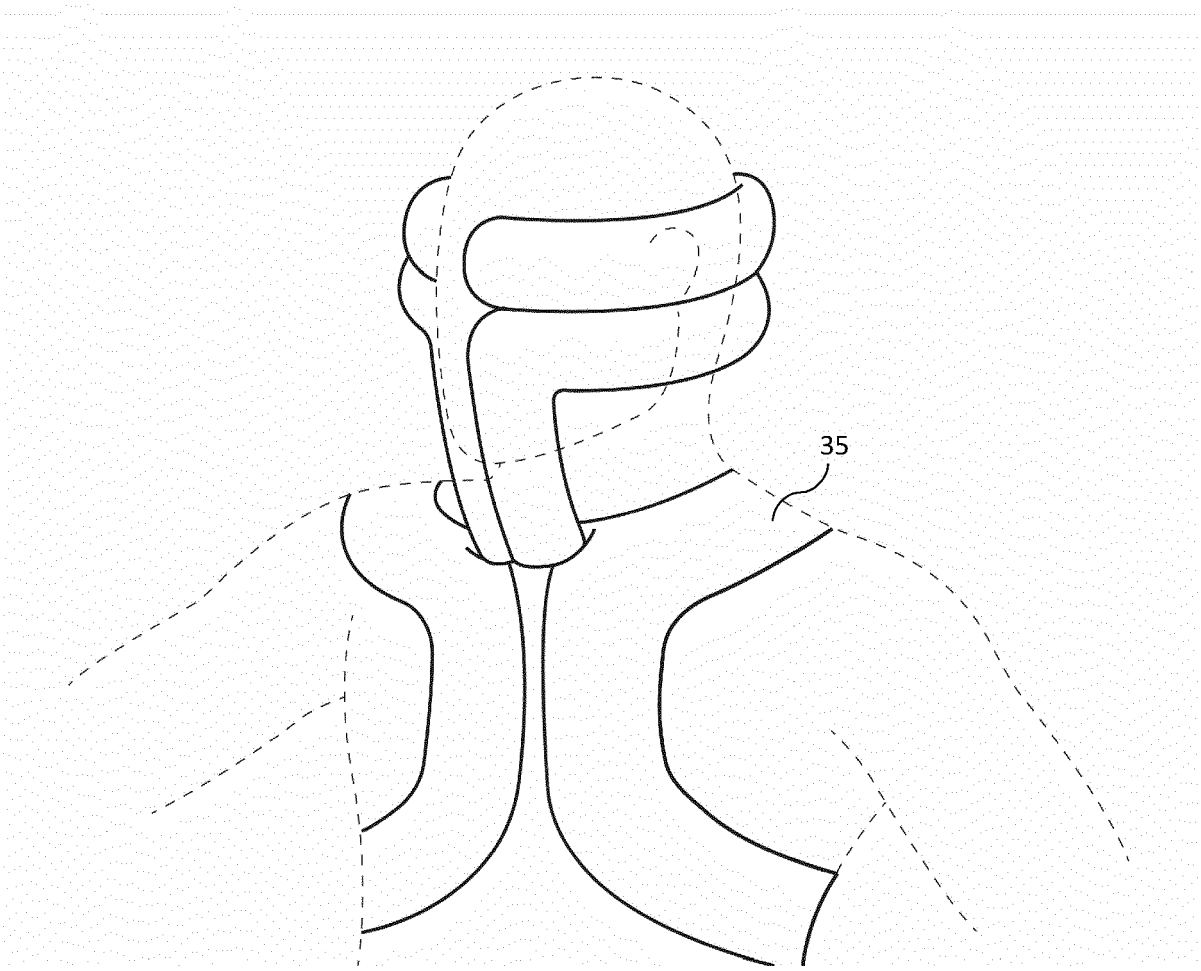

FIG. 13

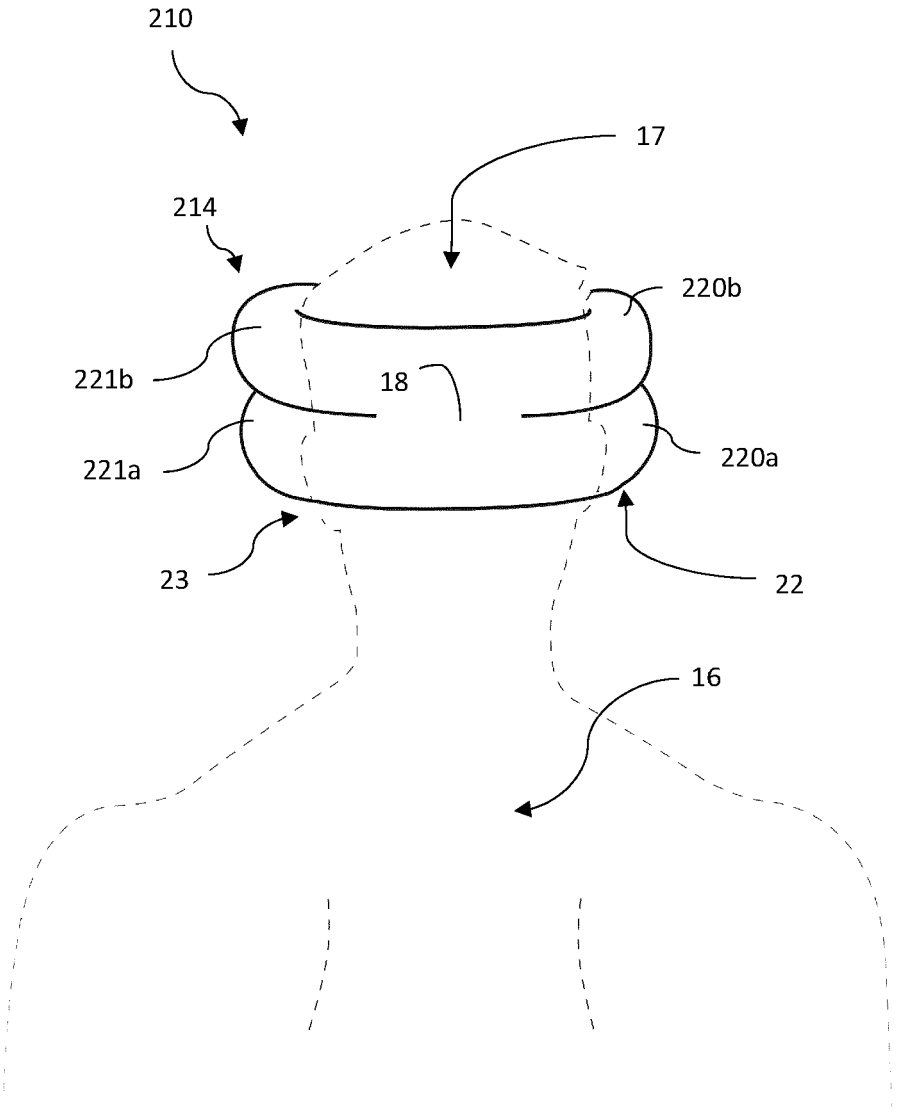

FIG. 14

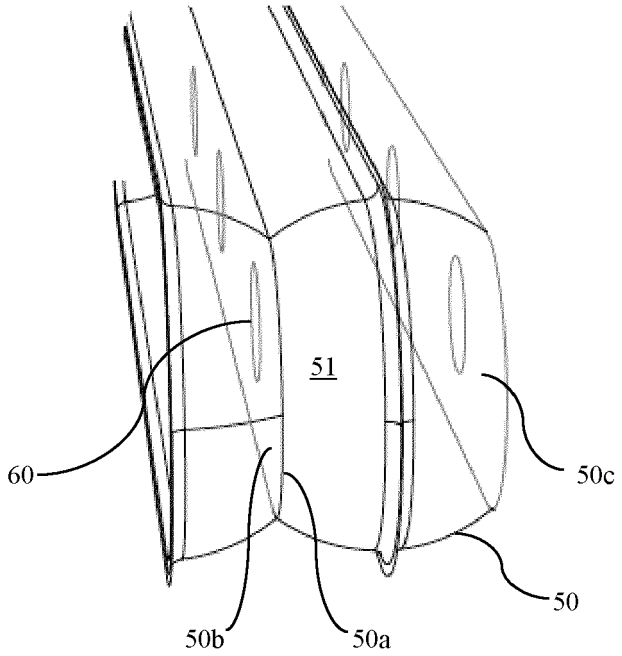

FIG. 15

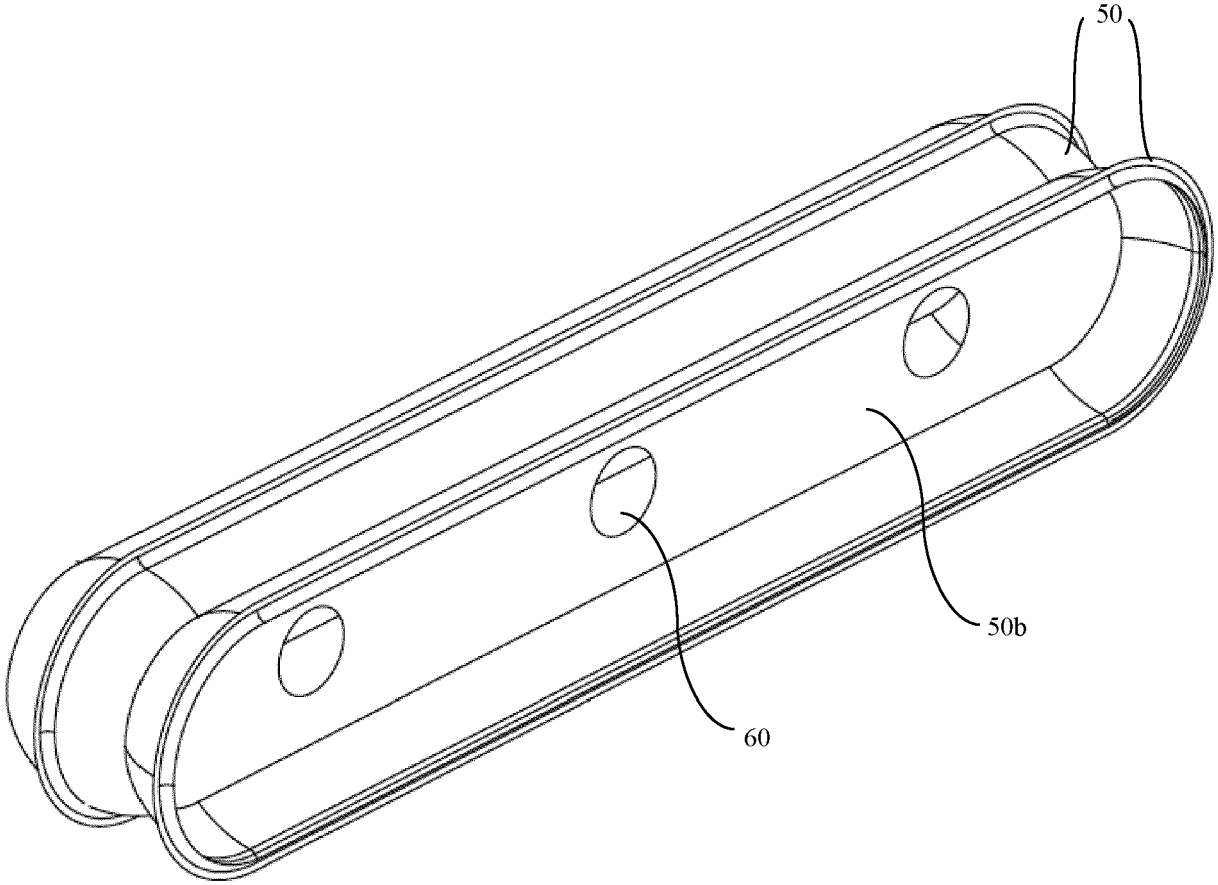

FIG. 16

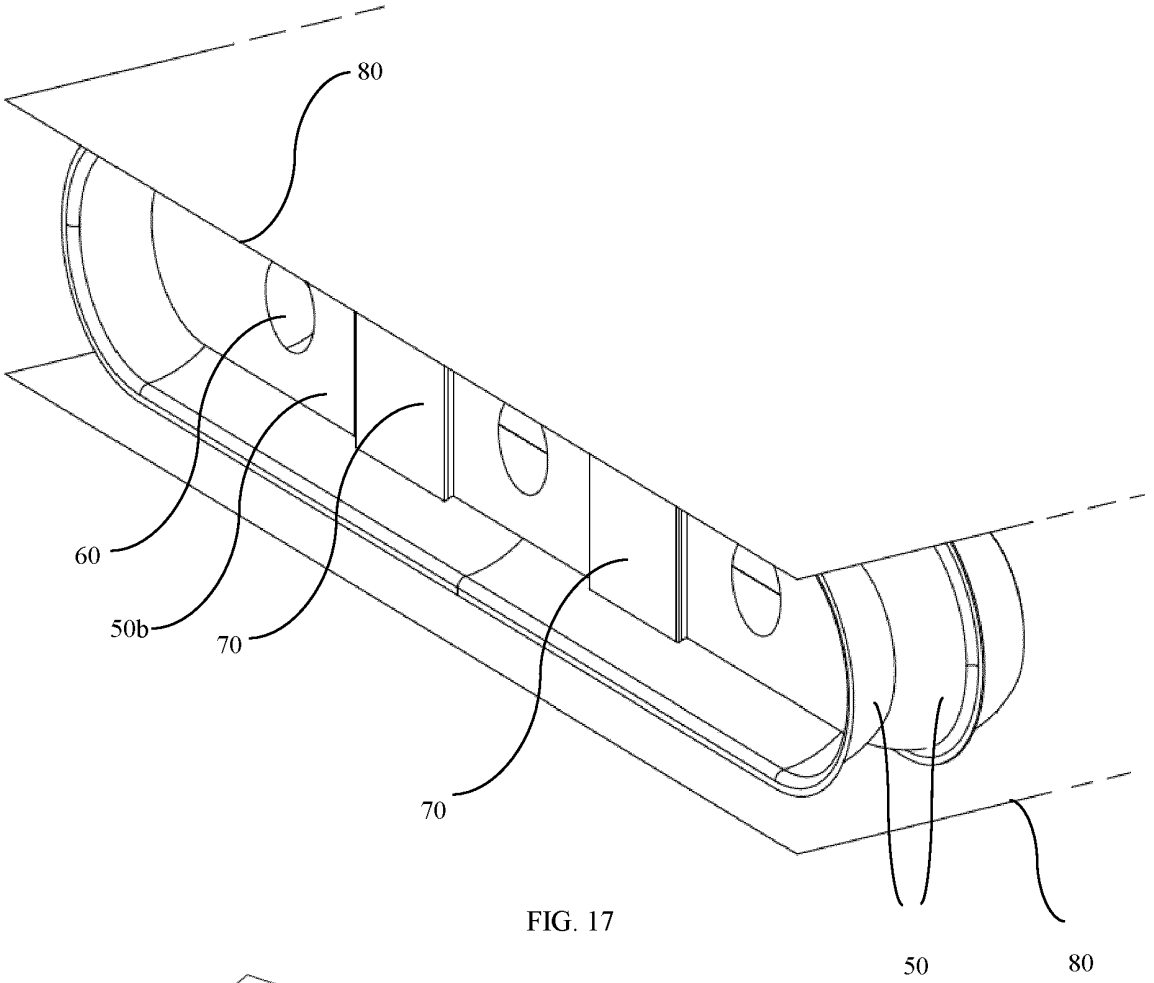

FIG. 17

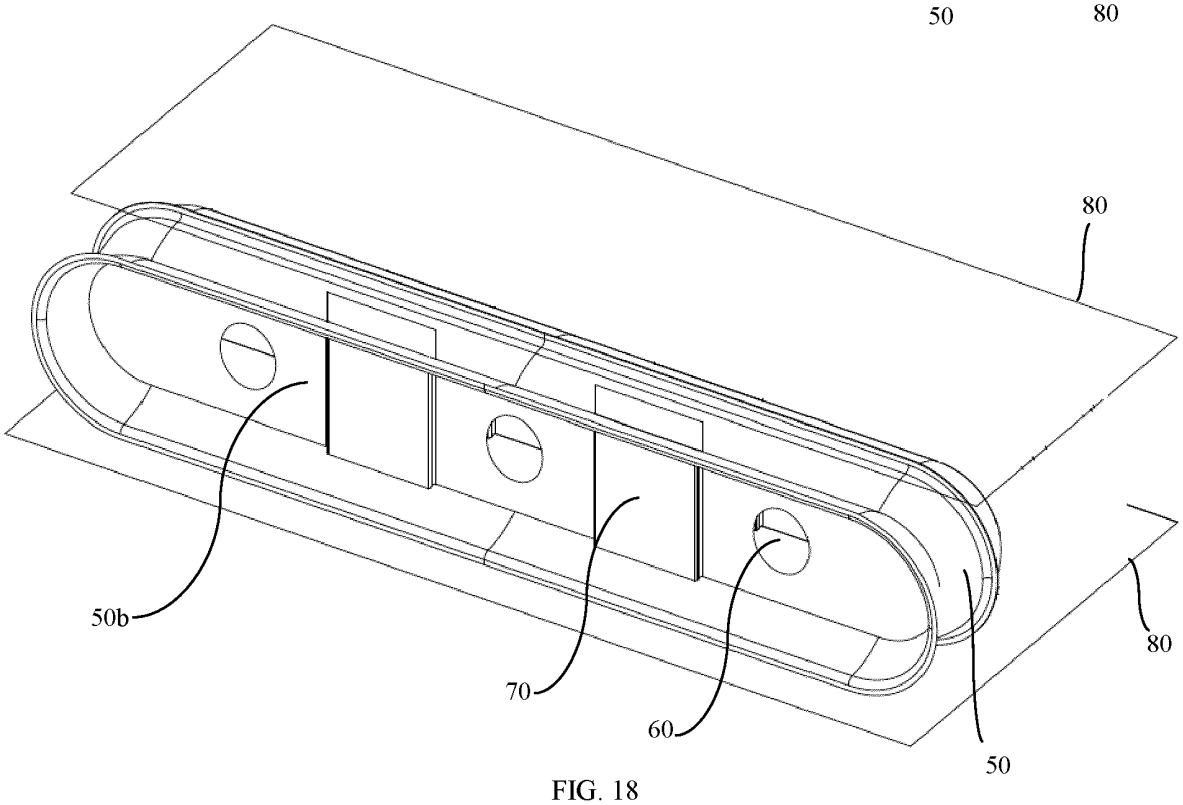

FIG. 18

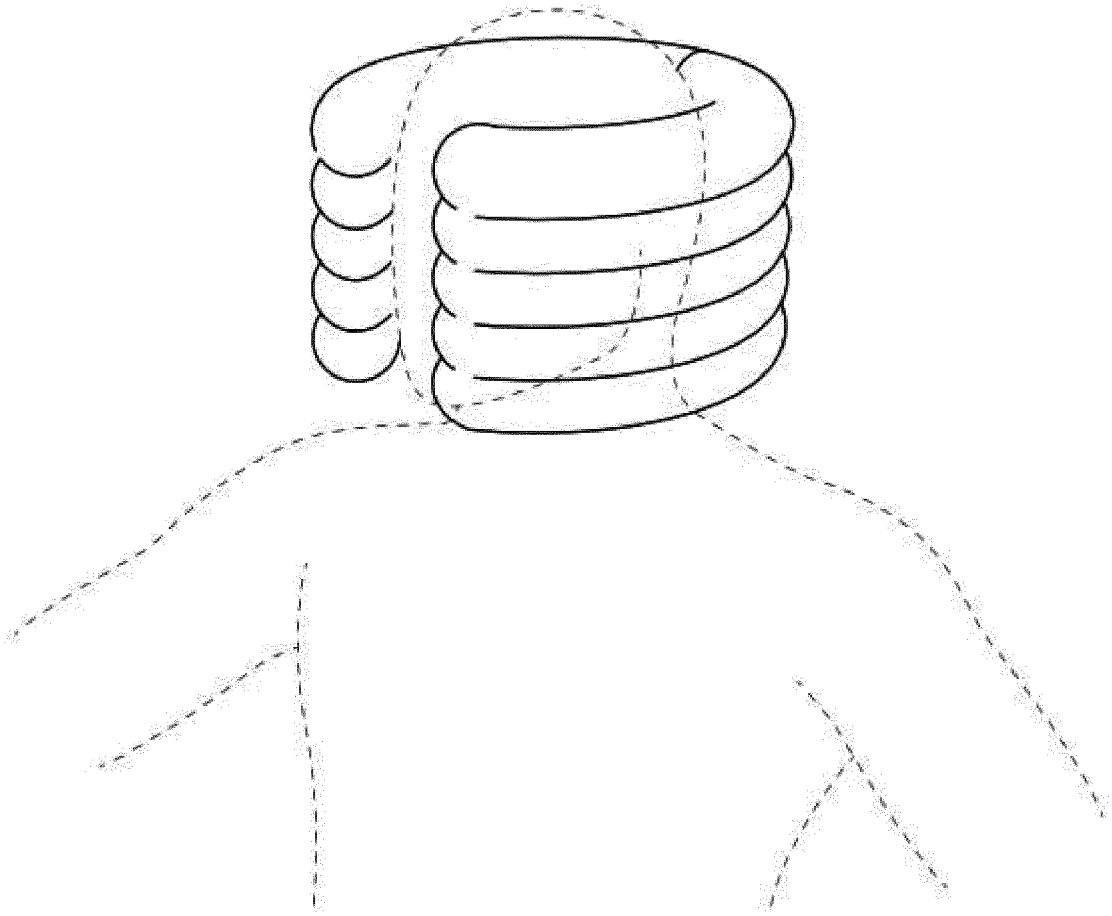

Fig. 19

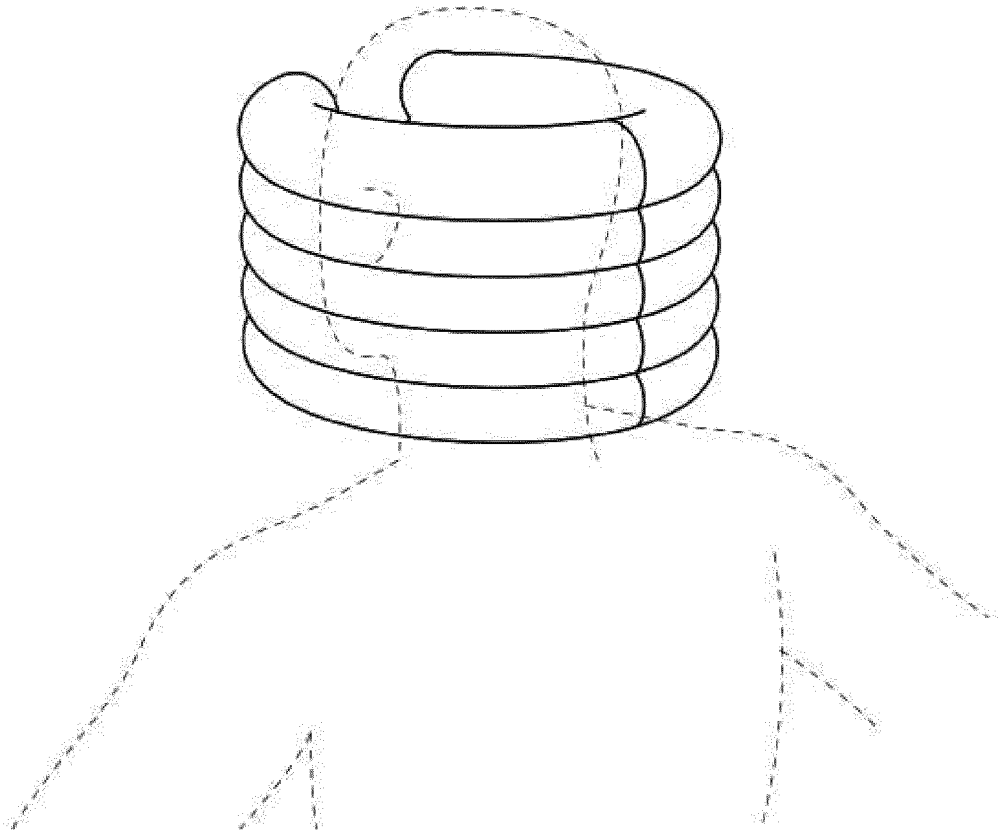

Fig. 20

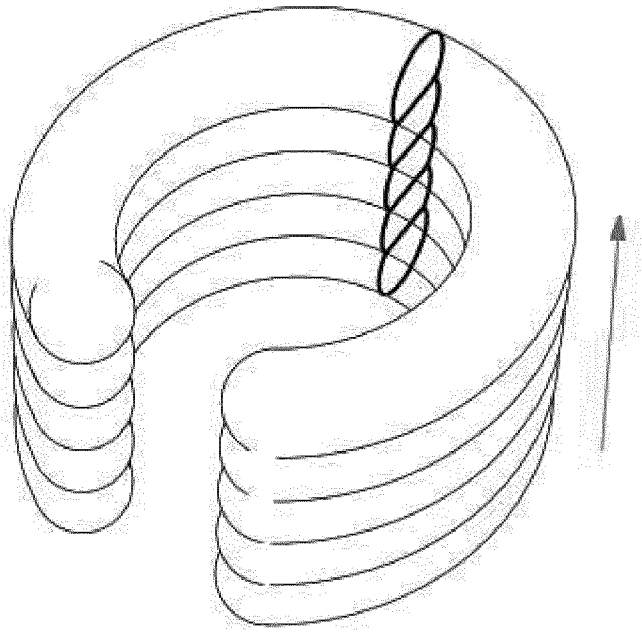

Fig. 21

REFERENCES CITED IN THE DESCRIPTION

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- US 2012102630 A **[0007]**