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(71) Applicant: **Ohanian, Ara**
Doraville, GA 30340 (US)

(72) Inventor: **Ohanian, Ara**
Doraville, GA 30340 (US)

(74) Representative: **Sach, Greg Robert**
C/o KA Filing (EU) Limited
Siedlungsstr. 4a
85253 Erdweg (DE)

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(54) **COLLAPSIBLE AERODYNAMIC HELMET**

(57) A collapsible aerodynamic helmet (400) for a rider of a bicycle or vehicle is provided. The collapsible aerodynamic helmet includes a body member (102) wearable by the rider. The collapsible aerodynamic helmet also includes a tail support member (104) outwardly extending laterally towards the back of the body member. The tail support member includes a cut-out side portion (106a, 106b) on each side of the body member that extends in

a specified shape to accommodate the shoulders of the rider. The tail support member (104) also includes a back support member (108) coupled to the cut-out side portion to complement the shape of the rider's shoulders and back. The collapsible aerodynamic helmet further includes a securing means (110) for compactly securing the tail member (104) for coupling with conventional helmets.

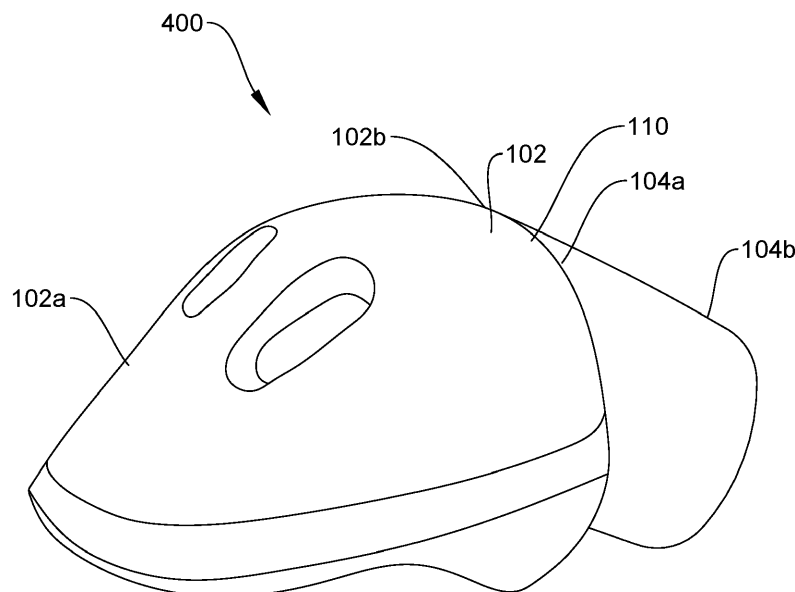


FIG. 4

Description

FIELD OF THE DISCLOSURE

[0001] The present invention relates to protective headgears, and, more particularly, relates to a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle.

BACKGROUND OF THE DISCLOSURE

[0002] A helmet for a bicycle or a vehicle aims to minimize impacts to a rider's head in the event of a crash while limiting negative effects, such as peripheral vision interference. Instead of the rider's head, the helmet absorbs the impact of the crash. Example of some of such helmet can be seen in FIGS. 1-3. As seen in FIG. 3, such helmets 300 are generally common and are used for protection of head and provide some level of aerodynamic to the user and also provides protection. At competition levels, bicycles may reach speeds of over 25 miles per hour. If a rim of the bicycle breaks or cars or other cyclists collide with the biker, the rider may tumble violently and uncontrollably to the ground. The rider's head is protected by the helmet against unintentional contact with the pavement, other rider, automobiles, and other objects. Instead of the rider's head, the helmet absorbs the impact.

[0003] However, with increasing demands of the vehicle helmet there are streamlined aerodynamic helmets available in market for high-speed competitions. One of such helmets 100 can be seen in prior arts FIGS. 1 and 2. As seen such helmet 100 has a longer tail to provide aerodynamic effect. Such longer tail portions in these aerodynamic helmets reduce aerodynamic drag by streamlining the airflow, comparable to other forms of helmets utilized in aerospace and aeronautics and to reduce aerodynamic drag. When riding into headwinds or against crosswinds, such aerodynamic helmet improves the cyclist's aerodynamic efficiency and offers additional velocity with the same power output in crosswinds, headwinds or tailwinds. However, the disadvantage of these streamlined aero helmets is that the tail which are generally hard tail, and if such hard tail is the point of impact during a crash, the rider's neck may be severely twisted at the time of impact.

[0004] Conventionally, streamline aerodynamic helmets or other such devices used single handedly also cannot minimize the turbulence and negative pressure created by the neck and throat when the rider is in the speed position.

[0005] Accordingly, there exists a need to provide an aerodynamic helmet that prevents twisting of rider's neck when the rider is in an accident, and to overcome the drag caused by the wind during bicycling, and also to minimize the turbulence and negative pressure created by the neck and the throat.

SUMMARY OF THE DISCLOSURE

[0006] In view of the foregoing disadvantages inherent in the prior art, the general purpose of the present disclosure is to provide a collapsible aerodynamic helmet for rider of bicycle, to include all advantages of the prior art, and to overcome the drawbacks inherent in the prior art.

[0007] An object of the present invention is to prevent twisting of rider's neck when rider is involved in a crash where the impact on the helmet is at the streamlined portion of the helmet.

[0008] Another object of the present invention is to overcome the drag caused by the wind especially during bicycling as well as damage from a crash impact by flexing.

[0009] Another object of the present invention is to create a smooth aerodynamic (Laminar) flow with no turbulence.

[0010] In view of the above objects, in one aspect of the present disclosure, a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle is disclosed. The collapsible aerodynamic helmet may include a body portion and a tail portion. The body portion may be configured to be worn by the rider of the bicycle or the vehicle. The body portion may include a front portion and a back portion. Further, the tail portion may be coupled to the body portion, outwardly extending laterally from the body portion to be folded upon falling of the rider from the bicycle or the vehicle. In one example arrangement, the tail portion may include a front part and a rear part. The front part of the tail portion may be coupled to the back portion of the body portion. Further, the rear part of the tail portion may include cut-out side portions and a back support member. The cut-out side portions may be extending in a predetermined shape to accommodate shoulders of the rider. Further, the back support member may be attached between the cut-out side portions to complement the shape of the rider's shoulder and back.

[0011] In one example, the body portion may be of a hard material, and the tail portion may be of a soft flexible material having just enough rigidity to hold its aerodynamic shape by itself.

[0012] In one example, each of the cut-out side portions may include a L-shaped cut-out side portion. Further, in another example, the predetermined shape of the cut-out side portions may be one of a rectilinear shape or an arc.

[0013] In one example, the tail portion may extend from the body portion as a unitary part of the body portion.

[0014] In one example arrangement, the collapsible aerodynamic helmet may further include a protective layer beneath the tail portion to safeguard the rider's neck.

[0015] In one example arrangement, the collapsible aerodynamic helmet may further include at least one first securing means to couple the front part of the tail portion to the back portion of the body portion.

[0016] In one example arrangement, the collapsible

aerodynamic helmet may further include at least one second securing means to foldably secure the cut-out side portions with the back support member, when folded along a fold pattern formed on the tail portion.

[0017] In one aspect of the present disclosure, a tail portion for a protective headgear is provided. The tail portion may be adapted to be coupled to the protective headgear. The tail portion may include cut-out side portions, and a back support member. The cut-out side portions may be extending longitudinally in a predetermined shape to accommodate shoulders of the rider. Further, the back support member may be attached between the cut-out side portions to complement shape of the rider's shoulders and back.

[0018] These and other advantages will be apparent from the present application of the embodiments described herein.

[0019] This together with the other aspects of the present disclosure, along with the various features of novelty that characterize the present disclosure, is pointed out with particularity in the claims annexed hereto and forms a part of the present disclosure. For a better understanding of the present disclosure, its operating advantages, and the specified object attained by its uses, reference should be made to the accompanying drawings and descriptive matter in which there are illustrated exemplary embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The advantages and features of the present disclosure will become better understood with reference to the following detailed description taken in conjunction with the accompanying drawing, in which:

FIGS. 1-3 illustrate side views of conventional helmets;

FIG. 4 illustrates a perspective view of a collapsible aerodynamic helmet for a rider of bicycle or a vehicle, according to an exemplary embodiment of the present invention disclosed herein;

FIGS. 5A and 5B illustrate side views of a collapsible aerodynamic helmet, according to an exemplary embodiment of the present invention disclosed herein;

FIGS. 6A and 6B illustrate bottom views of a collapsible aerodynamic helmet, according to an exemplary embodiment of the present invention disclosed herein;

FIG. 7 illustrates a back view of a collapsible aerodynamic helmet, according to an exemplary embodiment of the present invention disclosed herein;

FIG. 8 illustrates a top view of a tail portion of a collapsible aerodynamic helmet depicting a fold pattern according to an exemplary embodiment of the present invention disclosed herein;

FIG. 9 illustrates a bottom view of a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle in scenario of an accident or fall, according to an

exemplary embodiment of the present invention disclosed herein;

FIG. 10 illustrates a back view of a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle in scenario of an accident or fall, according to an exemplary embodiment of the present invention disclosed herein; and

FIG. 11 illustrates a side view of a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle in scenario of an accident or fall, according to an exemplary embodiment of the present invention disclosed herein.

[0021] The headings used herein are for organizational purposes only and are not meant to be used to limit the scope of the description or the claims. As used throughout this application, the word "may" be used in a permissive sense (i.e., meaning having the potential to), rather than the mandatory sense (i.e., meaning must). Similarly, the words "include", "including", and "includes" mean including but not limited to. To facilitate understanding, like reference numerals have been used, where possible, to designate like elements common to the figures. Optional portions of the figures may be illustrated using dashed or dotted lines unless the context of usage indicates otherwise.

[0022] Like reference numerals refer to like parts throughout the description of several views of the drawing.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0023] The exemplary embodiments described herein detail for illustrative purposes are subject to many variations in implementation. The present disclosure provides a collapsible aerodynamic helmet. It should be emphasized, however, that the present disclosure is not limited only to what is disclosed and extends to cover various alternation to the collapsible aerodynamic helmet. It is understood that various omissions and substitutions of equivalents are contemplated as circumstances may suggest or render expedient, but these are intended to cover the application or implementation without departing from the spirit or scope of the present disclosure.

[0024] The following description includes the preferred best mode of embodiments of the present invention. It will be clear from this description of the invention that the invention is not limited to these illustrated embodiments, but the invention also includes a variety of modifications and embodiments thereto. Therefore, the present description should be seen as illustrative and not limiting. While the invention is susceptible to various modifications and alternative constructions, it should be understood, that there is no intention to limit the invention to the specific form disclosed, but, on the contrary, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention as defined in the claims.

[0025] The terms "a" and "an" herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced items.

[0026] In any embodiment described herein, the open-ended terms "comprising," "comprises," and the like (which are synonymous with "including," "having" and "characterized by") may be replaced by the respective partially closed phrases "consisting essentially of," "consists essentially of," and the like or the respective closed phrases "consisting of," "consists of," the like. The terms "having," "comprising," "including," and variations thereof signify the presence of a component.

[0027] The present invention discloses a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle is disclosed. The collapsible aerodynamic helmet may include a body portion and a tail portion. The body portion may be configured to be worn by the rider of the bicycle or the vehicle. The body portion may include a front portion and a back portion. Further, the tail portion may be coupled to the body portion, outwardly extending laterally from the body portion to be folded upon falling of the rider from the bicycle or the vehicle. In one example arrangement, the tail portion may include a front part and a rear part. The front part of the tail portion may be coupled to the back portion of the body portion. Further, the rear part of the tail portion may include cut-out side portions and a back support member. The cut-out side portions may be extending in a predetermined shape to accommodate shoulders of the rider. Further, the back support member may be attached between the cut-out side portions to complement shape of the rider's shoulders and back.

[0028] In one aspect of the present disclosure, a tail portion for a protective headgear is provided. The tail portion may be adapted to be coupled to the protective headgear. The tail portion may include cut-out side portions, and a back support member. The cut-out side portions may be extending longitudinally in a predetermined shape to accommodate shoulders of the rider. Further, the back support member may be attached between the cut-out side portions to complement shape of the rider's shoulders and back.

[0029] Referring now to FIGS. 4 to 11 to describe a collapsible aerodynamic helmet 400. The collapsible aerodynamic helmet may aim to solve a problem of a bicycle rider as discussed. The various viewpoints and components of the collapsible aerodynamic helmet '400' for the bicycle rider are shown in FIGS. 4 to 11 and will now be detailed in combination with all of FIGS. 4 to 11. FIG. 4 illustrates a perspective view of a collapsible aerodynamic helmet, FIGS. 5A and 5B illustrate side views of a collapsible aerodynamic helmet, FIGS. 6A and 6B illustrate a bottom view of a collapsible aerodynamic helmet, FIG. 7 illustrates a back view of a collapsible aerodynamic helmet. FIG. 8 illustrates a top view of a tail portion of a collapsible aerodynamic helmet depicting a fold pattern according to an exemplary embodiment of the present invention disclosed herein. Further, FIGS. 9-11 illustrates

various views of a collapsible aerodynamic helmet for a rider of a bicycle or a vehicle in scenario of an accident or fall. However, without departing from the scope, the present disclosure also extends to include all the limitation or embodiments described or depicted with respect to a collapsible aerodynamic helmet for the bicycle.

[0030] The collapsible aerodynamic helmet 100 for the rider of the bicycle may include a body portion 102, and a tail portion 104 coupled to the body portion 102, according to embodiments of the present invention. Further, the body portion 102 may include a front portion 102a and a back portion 102b. The front portion 102a may face winds from a front side when the rider is riding bicycles or vehicles such as motorcycles. The wind touches the front portion 102a and divides to travel from both sides of the collapsible aerodynamic helmet 100. The back portion 102b lies along a back side of the body portion 102.

[0031] Further, the tail portion 104 may include a front part 104a and a rear part 104b. The body portion 102 is configured to be worn by the rider of the bicycle and the tail portion 104 outwardly extends laterally from the body portion 102 for being folded upon fall of the rider from the bicycle. The front part 104a of the tail portion 104 is coupled to the back portion 102b of the body portion 102 through at least one first securing means 110, as seen in example FIG. 5A. In one example, the at least one first securing means 110 may include, but not limited to, one of Velcro tape attachments, hook and loop attachments, snap button attachments, buckles attachments and hook and eye attachments.

[0032] In one example arrangement, the rear part 104b of the tail portion 104 comprises cut-out side portions 106a, 106b, as seen such as at least two cut-out side portions 106a, 106b, and a back support member 108. The two cut-out side portions 106a, 106b and the back support member 108 may form as one unitary design, as seen in FIG. 5A, or may be formed individually and be coupled to each other by at least one second securing means 210, as seen in FIG. 5B. Like the at least one first securing means 110, the at least one second securing means 210 may also include, but not limited to, one of Velcro tape attachments, hook and loop attachments, snap button attachments, buckles attachments and hook and eye attachments.

[0033] In another example arrangement, the tail portion 104 may seamlessly extend from the body portion 102 and may not include the securing means. In such embodiment, the tail portion 104 may be built in the body portion 102 to define a unitary design of the collapsible aerodynamic helmet 100. In such design the first securing means 110 may not be needed, as the tail portion 104 is in-built with body portion 102.

[0034] In another embodiment of the present invention, the body portion 102 may be of any shape and design of existing or conventional helmet 300 that already being worn by the rider, as seen in FIG. 3. In such conventional helmet 300, the tail portion 104 may be coupled via the first securing means 110 to obtain the collapsible aero-

dynamic helmet 100, as per the present invention.

[0035] Further, the tail portion 104 that includes the two cut-out side portions 106a, 106b on each side of the body member 102 extends in a predetermined shape to accommodate the shoulders, as seen in FIGS. 6A-6B and 7. According to embodiments of the present invention, the two cut-out side portions 106a, 106b is of a L-shaped cut-out side portion to complement the shape of shoulders of the rider so that to accommodate the shoulders of the rider to comfortably fit there along, while the rider is riding the bicycle or vehicles. In another example, the two cut-out side portions 106a, 106b may be of any other suitable predetermined shape. The predetermined shape may be including, but not limited to, a rectilinear shape, an arc, and so forth.

[0036] The tail portion 104 may be bendable and made of a soft flexible material having just enough rigidity to hold the deployed (Streamlined) position by itself. According to embodiments of the present invention, the flexible material may be such as, but not limited to, a silicon material, a plasticine material, flexible laminates, elastomeric materials, and so forth. Embodiments of the present invention are intended to include or otherwise cover any type of the flexible material including known, related art, and/or later developed technologies. Due to flexible but with enough rigidity the tail portion 104 may be able to provide a proper aerodynamic advantage/benefit to the rider while riding the bicycle, and able to protect the neck of the rider in case of fall or accident of the rider while riding the bicycle without twisting the rider's neck upon impact. As seen in FIGS. 9-11 when the rider falls the collapsible elongated tail portion 104 collapses owing to an accident or a fall without injuring the rider's head. For folding, the tail portion 104 may include at least one fold pattern or line 160, such as fold lines, formed on the tail portion 104, as seen in FIG. 8. The fold pattern as seen in FIG. 8 is only for illustration, such fold patterns may be made in any other way to meet the requirement of the folding of the tail portion 104. Further, seen in FIGS. 9-11, when the rider falls, tail portion 104 may get collapsed protecting the neck of the user. In one example, tail portion 104 may be collapsed along the fold pattern or fold lines 160. In other embodiments, tail portion 104 may be collapsed along the fold pattern or fold lines 160 when the rider does not prefer to use the tail portion 104. In an such exemplary scenario, when the soft tail portion 104 is not required and the rider is not seeking for aerodynamics, the soft tail portion 104 may be detached from the body portion 102 and folded to keep the folded soft tail portion 104 separate from the body portion 102. The rider may wear only the body portion 102 in such scenario.

[0037] Moreover, in one embodiment, a protective layer 150 may be included in the tail portion 104 to safeguard the rider's neck, as seen in FIG. 6B. The protective layer 150 may provide cushioning along neck area of the rider and provide additional protection along the neck area of the rider in case of fall or accidents.

[0038] In one of the embodiments of the present invention, the tail portion 104 may be part of the helmet, or the tail portion 104 may be purchased separately to be coupled or secured over the conventional helmet. There may also be the protective layer 150 underneath, also separately provided with the tail portion 104 for back and neck safety.

[0039] While the invention has been described in connection with what is presently considered to be the most practical and various embodiments, it is to be understood that the invention is not to be limited to the disclosed embodiments, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

[0040] The foregoing descriptions of specific embodiments of the present disclosure have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present disclosure to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the present disclosure and its practical application, and to thereby enable others skilled in the art to best utilize the present disclosure and various embodiments with various modifications as are suited to the particular use contemplated. It is understood that various omissions and substitutions of equivalents are contemplated as circumstances may suggest or render expedient, but such omissions and substitutions are intended to cover the application or implementation without departing from the spirit or scope of the present disclosure.

Claims

1. A collapsible aerodynamic helmet for a rider of a bicycle or a vehicle comprising:

a body portion configured to be worn by the rider of the bicycle or the vehicle, the body portion having a front portion and a back portion;
a tail portion coupled to the body portion, outwardly extending laterally from the body portion to be folded upon falling of the rider from the bicycle or the vehicle, the tail portion comprises a front part and a rear part,
wherein the front part of the tail portion is coupled to the back portion of the body portion,
wherein the rear part of the tail portion comprises:

cut-out side portions extending in a predetermined shape to accommodate shoulders of the rider; and
a back support member attached between the cut-out side portions to complement shape of the rider's shoulders and back.

2. The collapsible aerodynamic helmet as claimed in claim 1, wherein the body portion is of a hard material.
3. The collapsible aerodynamic helmet as claimed in claim 1, wherein the tail portion is of a soft flexible material having just enough rigidity to hold its aerodynamic shape by itself.
4. The collapsible aerodynamic helmet as claimed in claim 1, further comprising a protective layer beneath the tail portion to safeguard the rider's neck.
5. The collapsible aerodynamic helmet as claimed in claim 1, wherein each of the cut-out side portions comprises a L-shaped cut-out side portion.
6. The collapsible aerodynamic helmet as claimed in claim 1, wherein the predetermined shape comprises one of a rectilinear shape or an arc.
7. The collapsible aerodynamic helmet as claimed in claim 1, wherein the tail portion extends from the body portion as a unitary part of the body portion.
8. The collapsible aerodynamic helmet as claimed in claim 1, further comprising at least one first securing means to couple the front part of the tail portion to the back portion of the body portion, wherein the at least one first securing means comprises one of a Velcro tape attachment, hook and loop attachments, snap button attachments, buckles attachments and hook and eye attachments.
9. The collapsible aerodynamic helmet as claimed in claim 1, further comprising at least one second securing means to foldably secure the cut-out side portions with the back support member, when folded along a fold pattern formed on the tail portion.
10. A tail portion for a protective headgear, the tail portion adapted to be coupled to the protective headgear, the tail portion comprising:
 - cut-out side portions extending longitudinally in a predetermined shape to accommodate shoulders of the rider; and
 - a back support member attached between the cut-out side portions to complement the shape of the rider's shoulders and back.
11. The tail portion as claimed in claim 10 further comprising at least one first securing means configured to secure the cut-out side portions and the back support member to the protective headgear.
12. The tail portion as claimed in claim 10, wherein the tail portion is of a soft flexible material having just enough rigidity to hold its aerodynamic shape by itself.
13. The tail portion as claimed in claim 10, further comprising a protective layer beneath the tail portion to safeguard the rider's neck.
14. The tail portion as claimed in claim 10, wherein:
 - each of the cut-out side portions comprises a L-shaped cut-out side portion;
 - the predetermined shape comprises one of a rectilinear shape or an arc; and
 - the tail portion adapted to extend as a unitary part of the protective headgear.
15. The tail portion as claimed in claim 10, further comprising at least one second securing means to foldably secure the cut-out side portions with the back support member 108, when folded along a fold pattern formed on the tail portion.

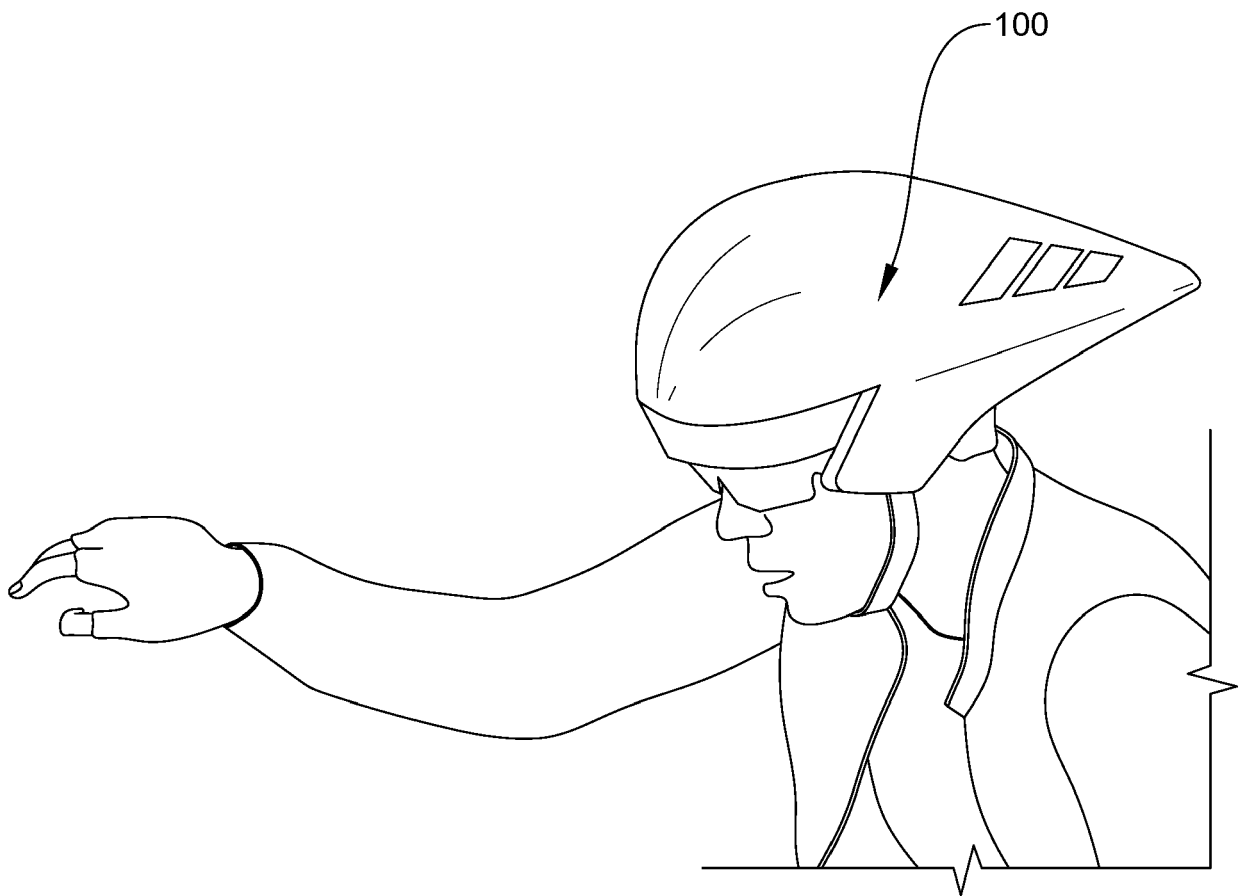


FIG. 1

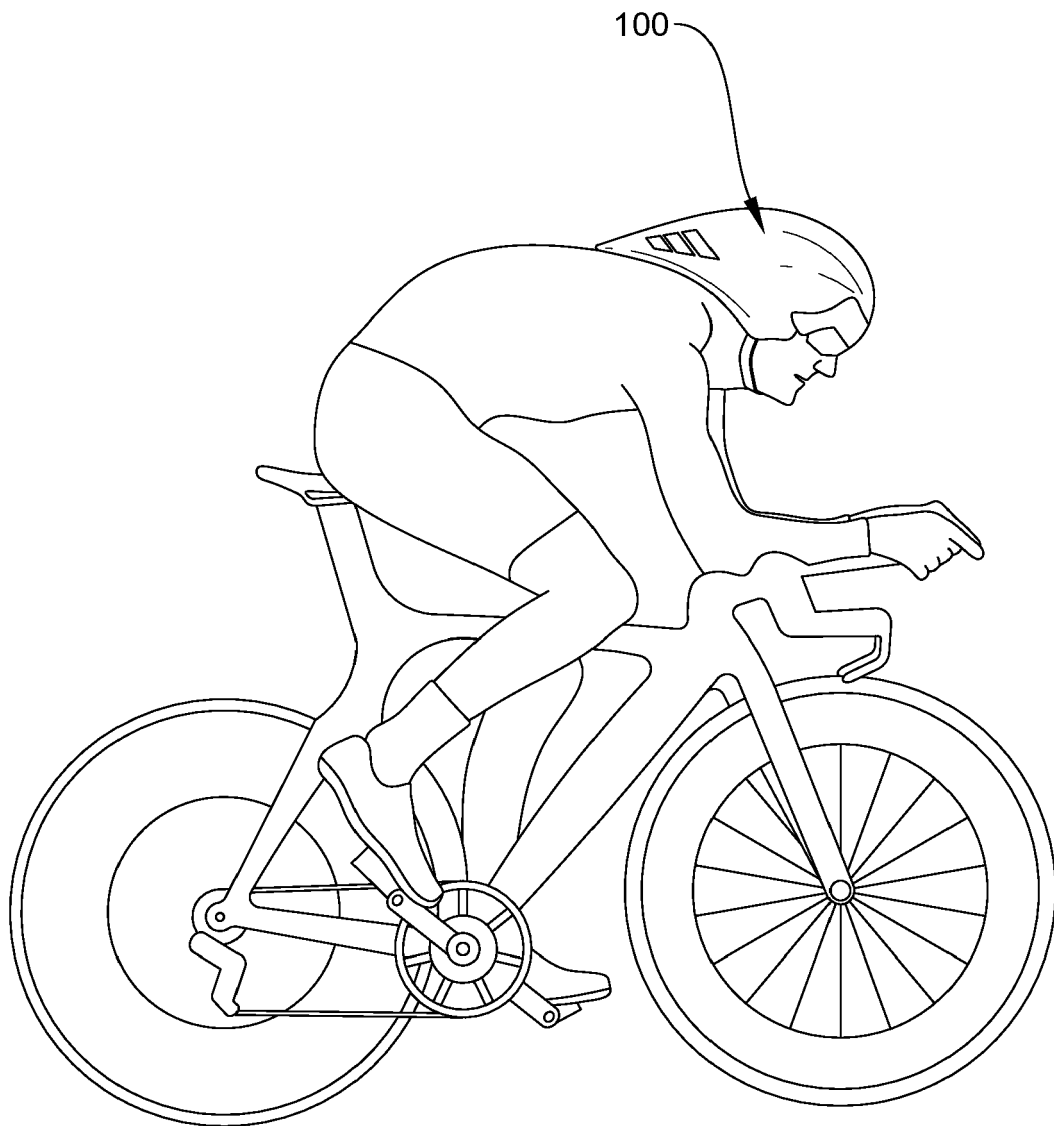


FIG. 2

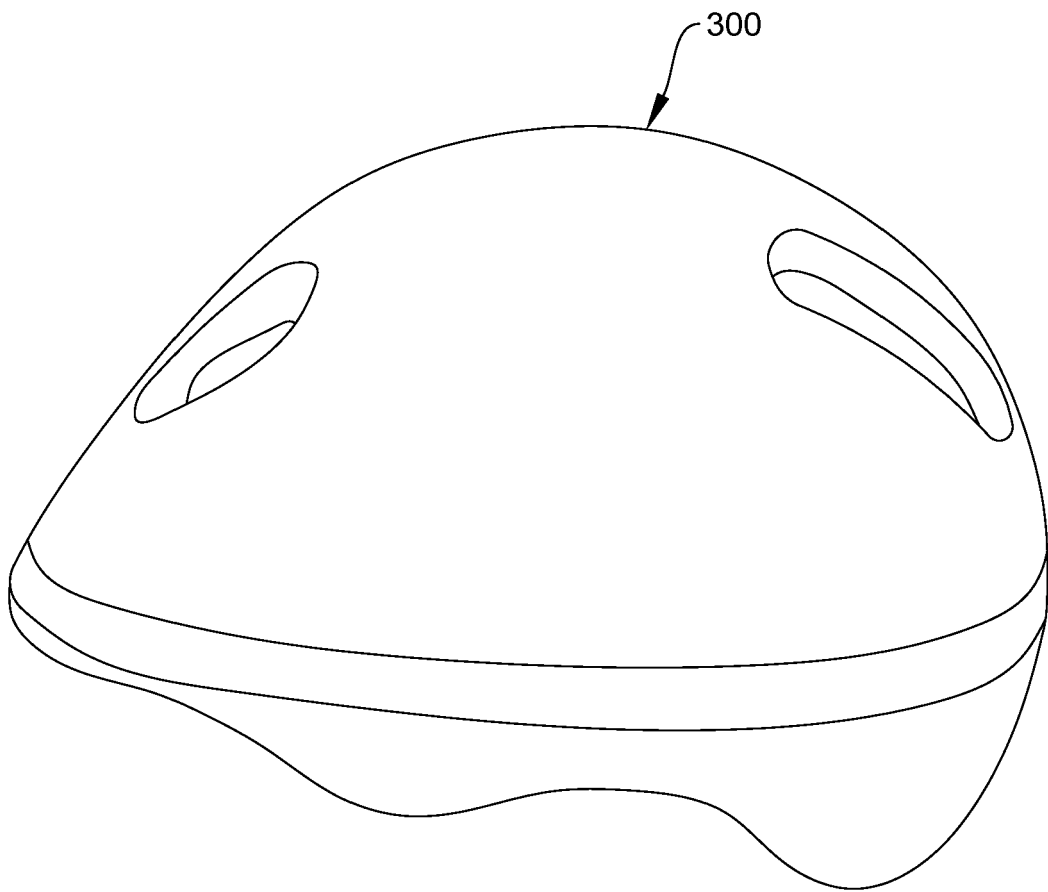


FIG. 3

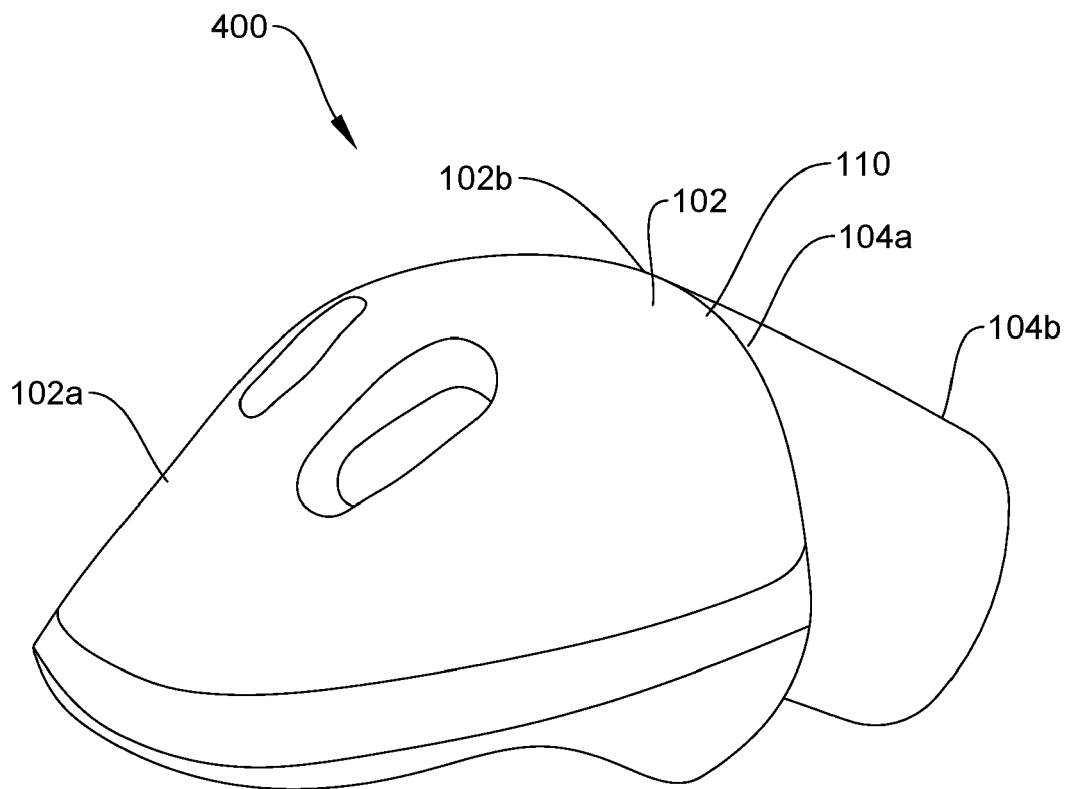


FIG. 4

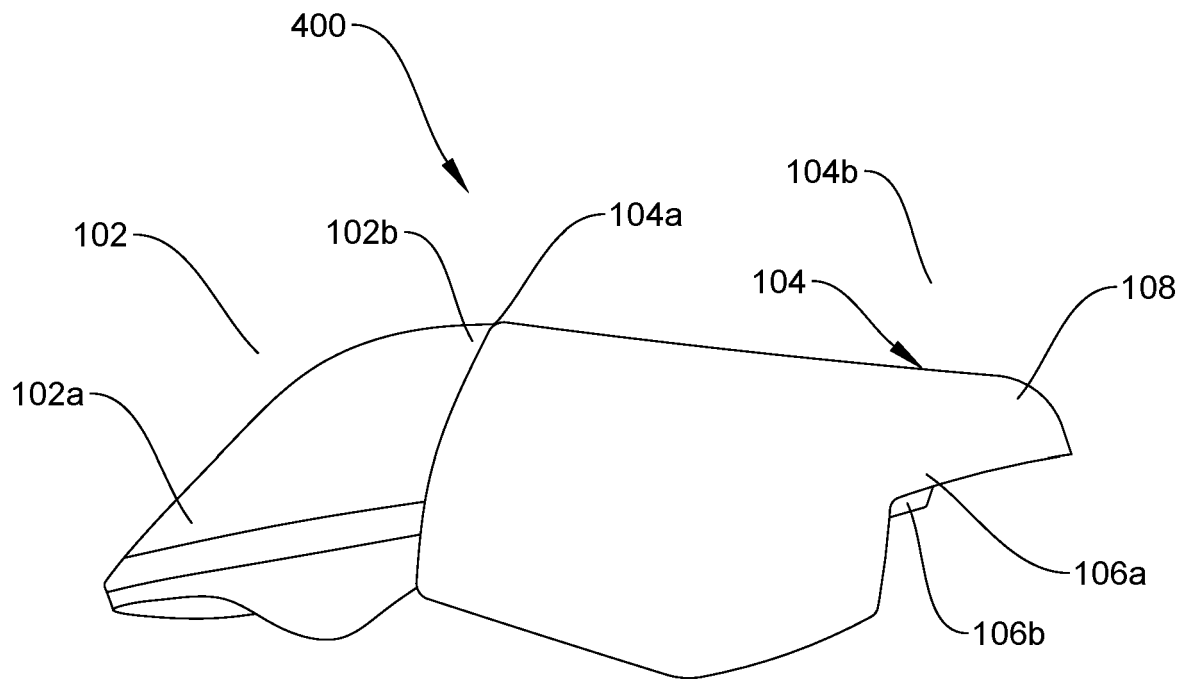


FIG. 5A

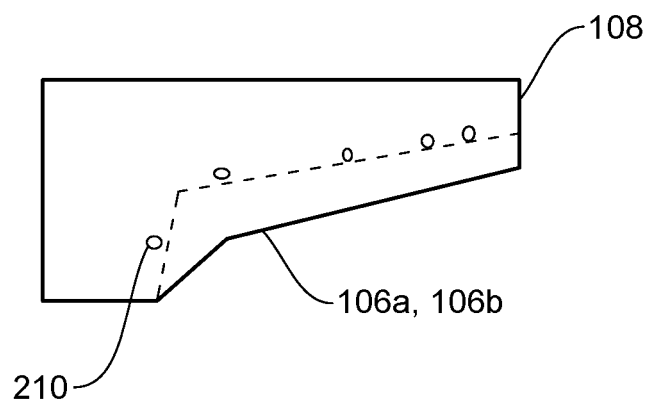


FIG. 5B

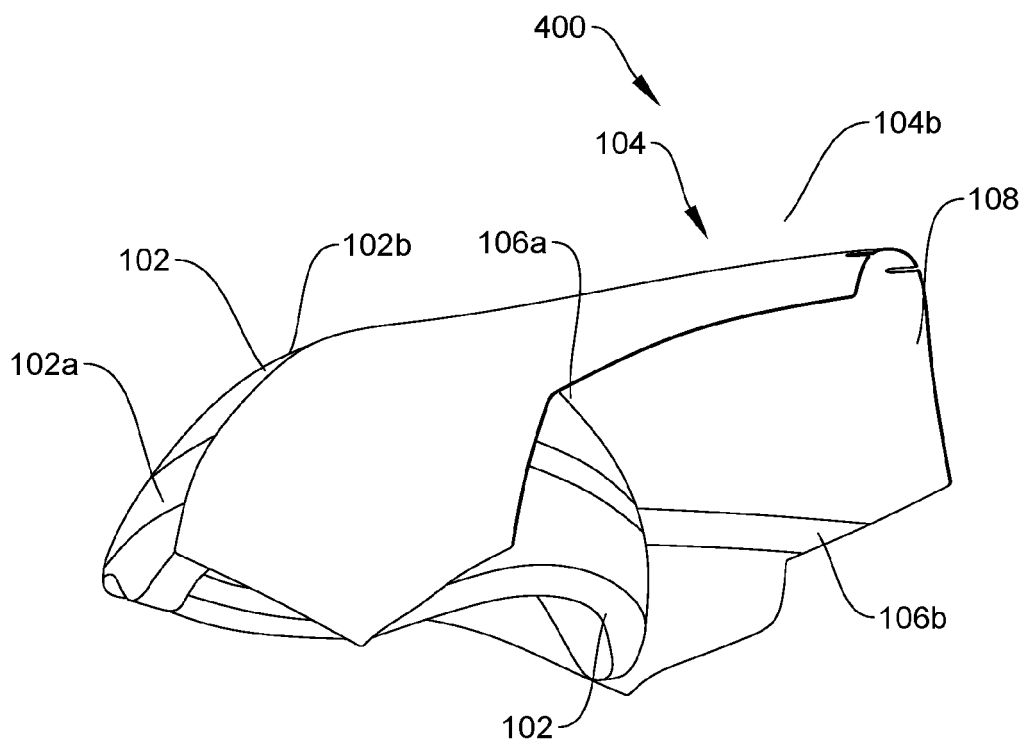


FIG. 6A

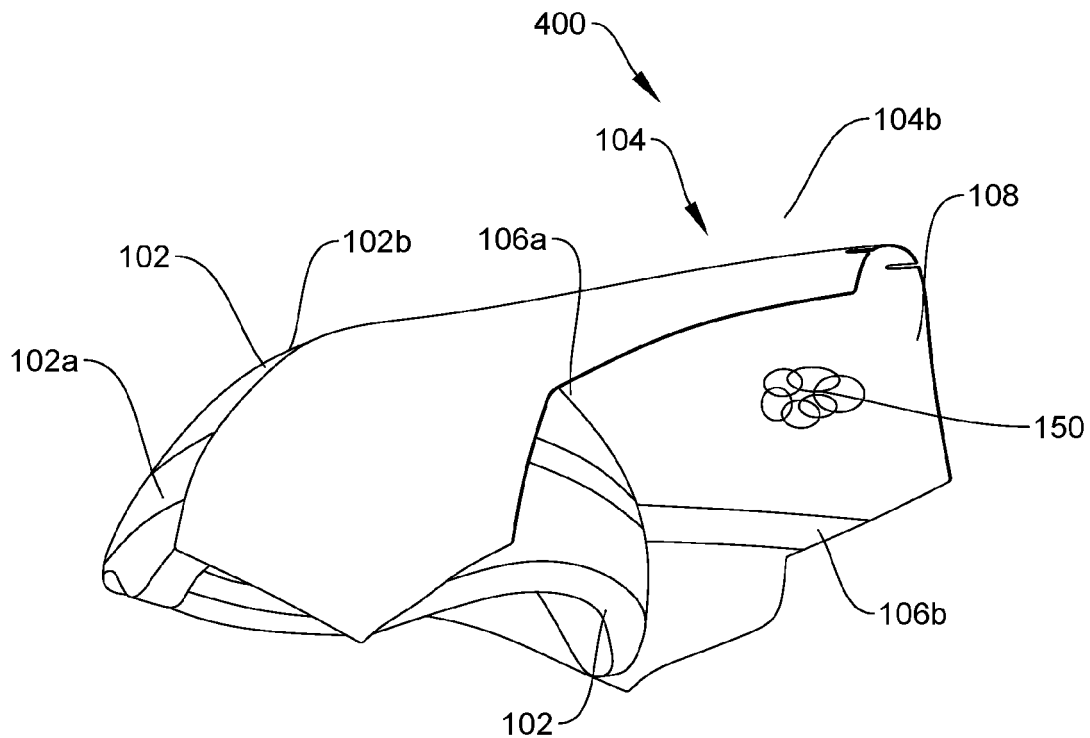


FIG. 6B

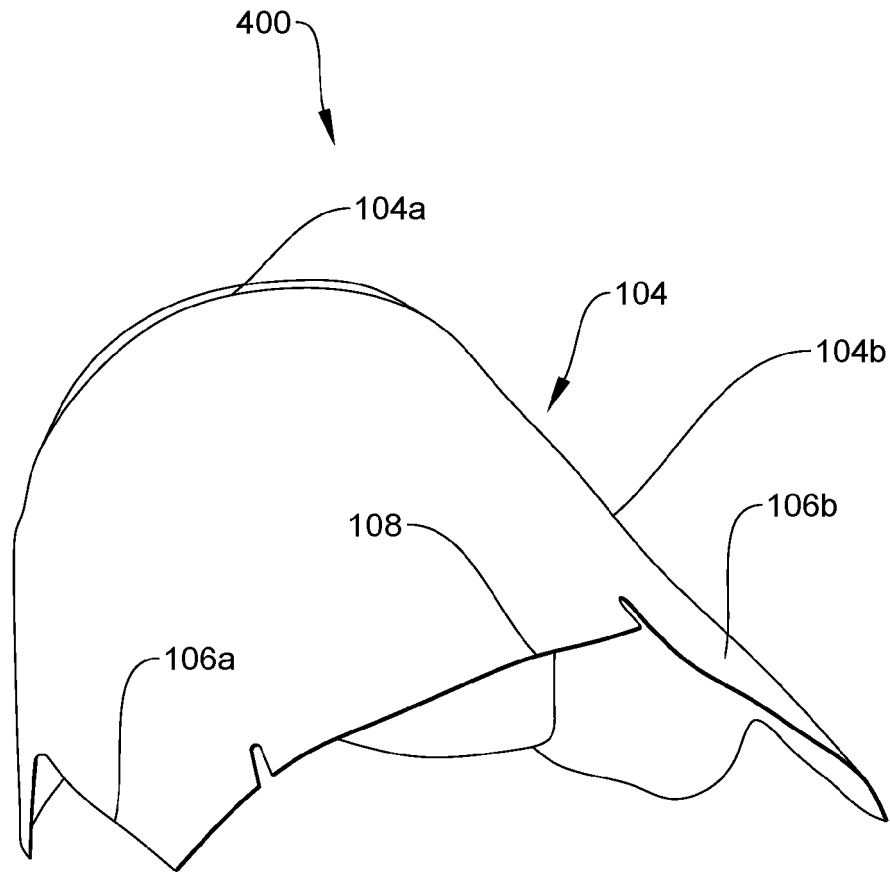


FIG. 7

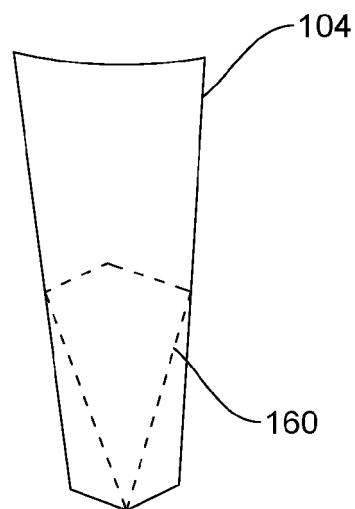


FIG. 8

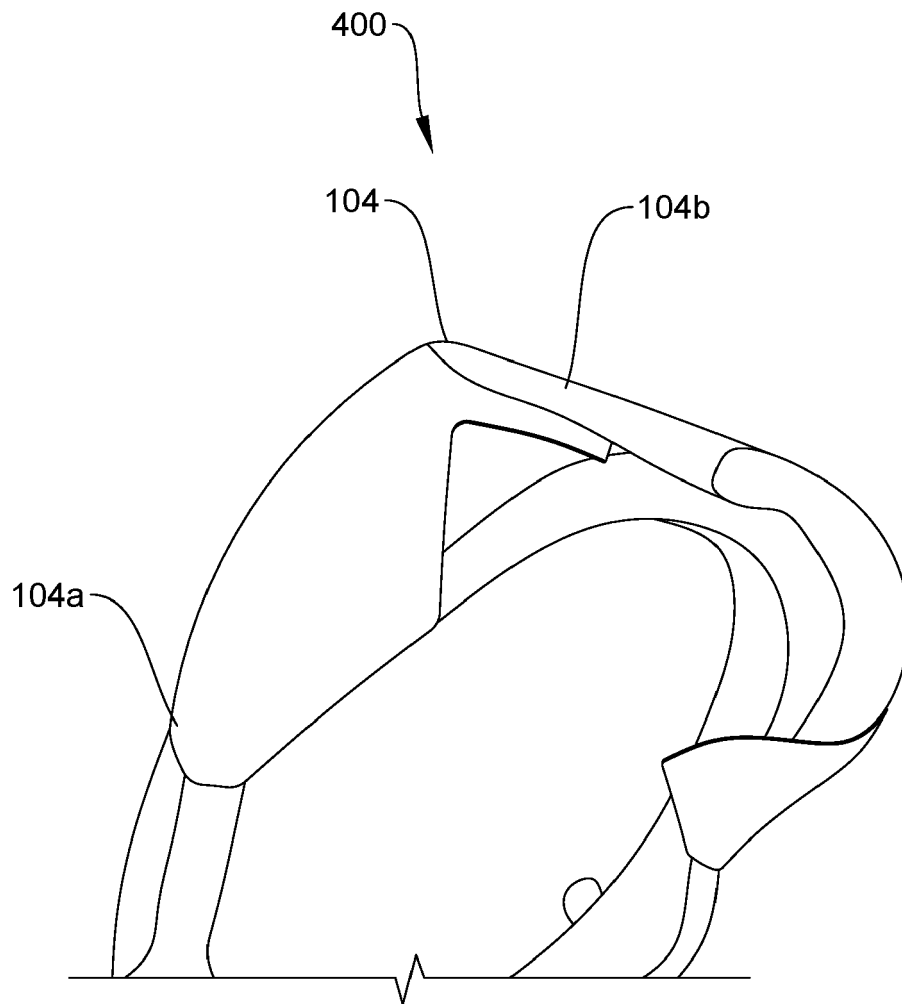


FIG. 9

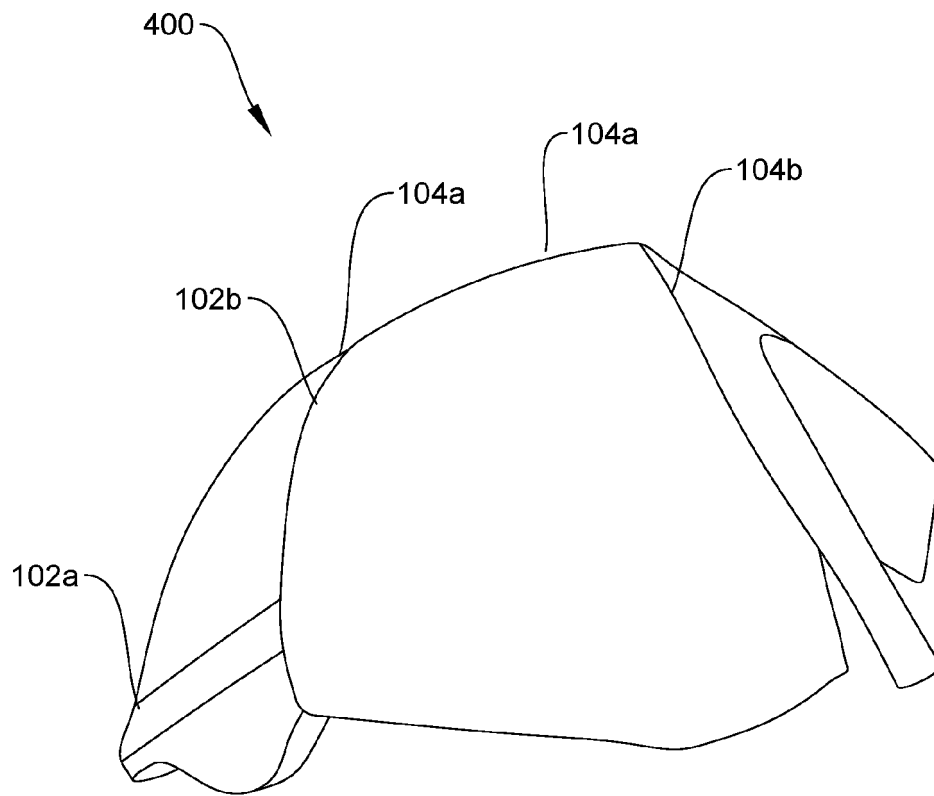


FIG. 10

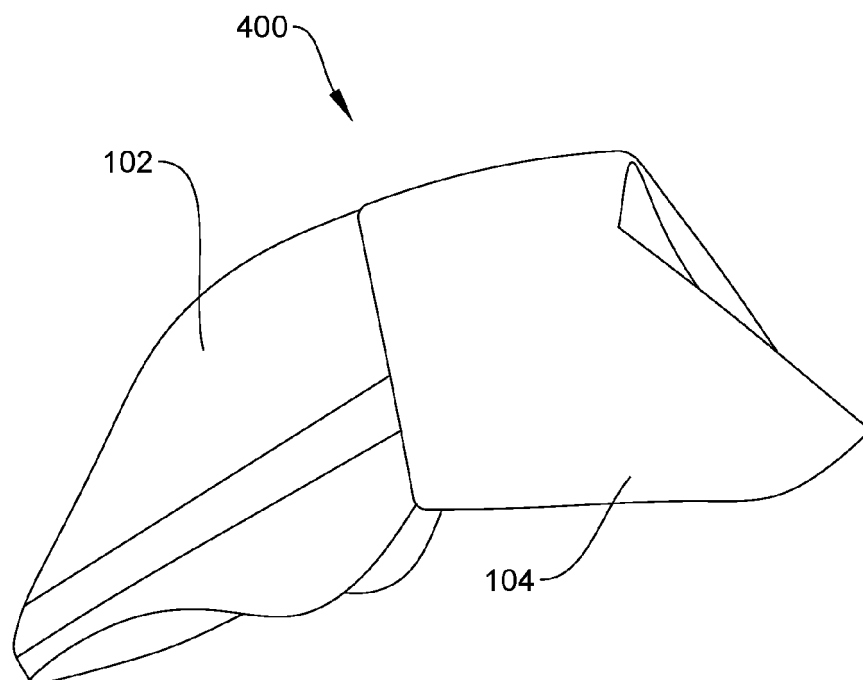


FIG. 11



EUROPEAN SEARCH REPORT

Application Number

EP 22 20 9258

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2003 113522 A (KITAGAWA FUKUO) 18 April 2003 (2003-04-18) * paragraph [0017]; figure 4 * -----	1-15	INV. A42B3/04 A42B3/32
X	EP 3 243 399 B1 (ENDURA LTD [GB]) 12 September 2018 (2018-09-12) * paragraph [0022] - paragraph [0031]; figures 1-6 * -----	10, 11, 14	
X	CH 671 864 A5 (BEAT ENGEL) 13 October 1989 (1989-10-13) * column 1 - column 2; figures 1, 2 * -----	10, 11, 14	
			TECHNICAL FIELDS SEARCHED (IPC)
			A42B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 March 2023	Examiner Breuil, Paul
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 22 20 9258

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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31-03-2023

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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