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Williams

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(54) **HELMETS OR OTHER PROTECTIVE HEADGEAR AND RELATED METHODS**

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Related U.S. Application Data

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(51) **Int. Cl.**
A42B 3/00 (2006.01)
A42B 3/06 (2006.01)

(52) **U.S. Cl.**
CPC ***A42B 3/063*** (2013.01)

(58) **Field of Classification Search**
CPC A42B 3/0406; A42B 3/06; A42B 3/063; A42B 3/068; A42B 3/04; A42B 3/32; A42B 1/205; A42B 3/064
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,456,524 A 5/1923 Waldron
1,810,157 A * 6/1931 Bullard A42B 1/02 2/410
2,634,415 A 4/1953 Turner et al.
3,413,656 A 3/1968 Vogliano et al.
3,471,866 A 10/1969 Raney
3,529,306 A 9/1970 Thorne
3,721,994 A 3/1973 DeSimone et al.
4,012,794 A 3/1977 Nomiyama
4,075,715 A 2/1978 Cowgill
D256,626 S 9/1980 Antonino
4,307,471 A 12/1981 Lovell
4,326,303 A 4/1982 Rappleyea
5,671,478 A 9/1997 Yen
5,713,082 A 2/1998 Bassette et al.
5,724,681 A 3/1998 Sykes
5,953,762 A 9/1999 Corbett
6,272,692 B1 8/2001 Abraham
6,314,586 B1 11/2001 Duguid
D459,555 S 6/2002 Gatellet
6,425,141 B1 7/2002 Ewing et al.
D465,067 S 10/2002 Ide
D466,651 S 12/2002 Halstead et al.
D512,534 S 12/2005 Maddux et al.
7,398,562 B2 7/2008 Mollo
D587,854 S 3/2009 Nimmons et al.
D603,099 S 10/2009 Bologna et al.
7,607,179 B2 10/2009 Shih
D625,050 S 10/2010 Chen
D629,162 S 12/2010 Daniel
D654,630 S 2/2012 Chou et al.
(Continued)

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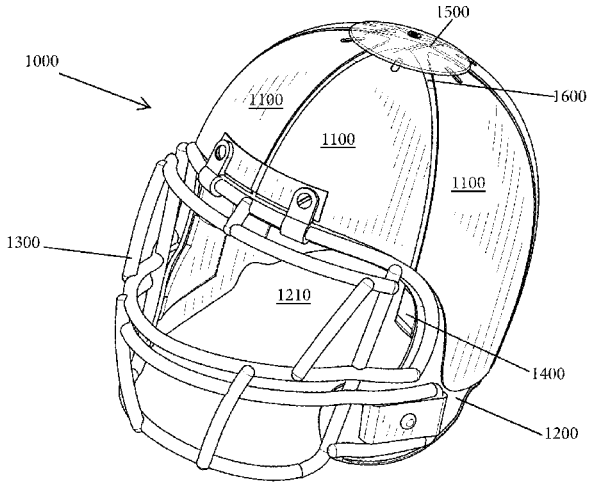
(57) **ABSTRACT**

Disclosed is a helmet that is aesthetically appealing and that is capable of decelerating impacts from any direction. In a preferred embodiment, the helmet features: a shell with a head cavity that is lined with shock absorbing material, wherein the shell is outfitted with a halo of deceleration plates.

7 Claims, 7 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

8,156,569	B2	4/2012	Cripton et al.	
D678,617	S	3/2013	Erb et al.	
D681,281	S	4/2013	Bologna et al.	
8,578,520	B2	11/2013	Halldin	
D697,270	S	1/2014	Simpson	
D699,895	S	2/2014	Hill et al.	
D718,002	S	11/2014	Littrell, Jr.	
D734,554	S	7/2015	Crane	
2004/0045078	A1	3/2004	Puchalski	
2004/0117896	A1	6/2004	Madey et al.	
2010/0043126	A1	2/2010	Morel	
2010/0186150	A1	7/2010	Ferrara et al.	
2011/0179557	A1	7/2011	Rabie	
2012/0198604	A1	8/2012	Weber et al.	
2012/0216339	A1	8/2012	Nimmons et al.	
2012/0297525	A1	11/2012	Bain	
2014/0189945	A1	7/2014	Golnaraghi et al.	
2014/0196198	A1*	7/2014	Cohen	A42B 3/063 2/414

* cited by examiner

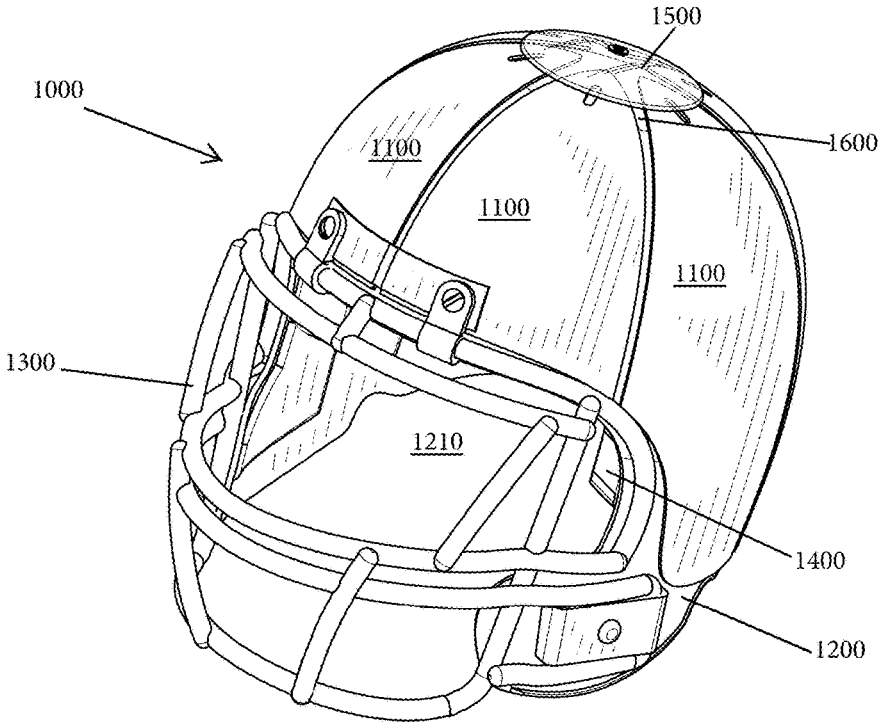


FIG. 1

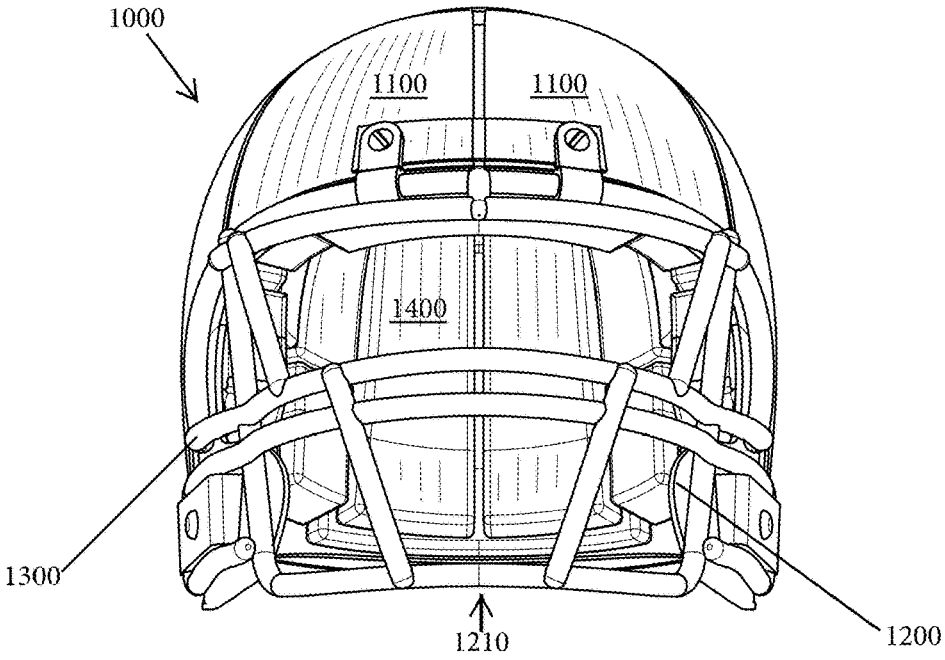

1000
1100
1100
1400
1300
1210
1200

FIG. 2

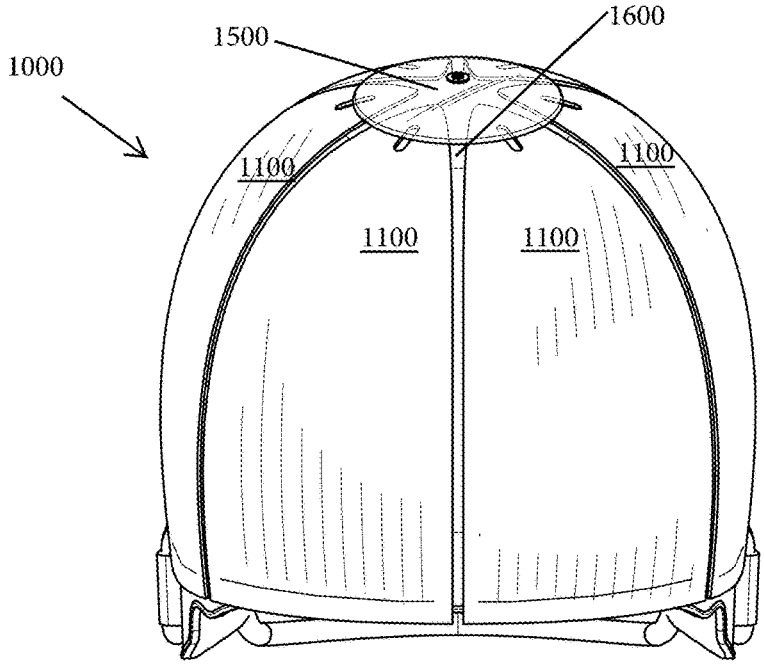

1500
1600
1000
1100
1100
1100
1100

FIG. 3

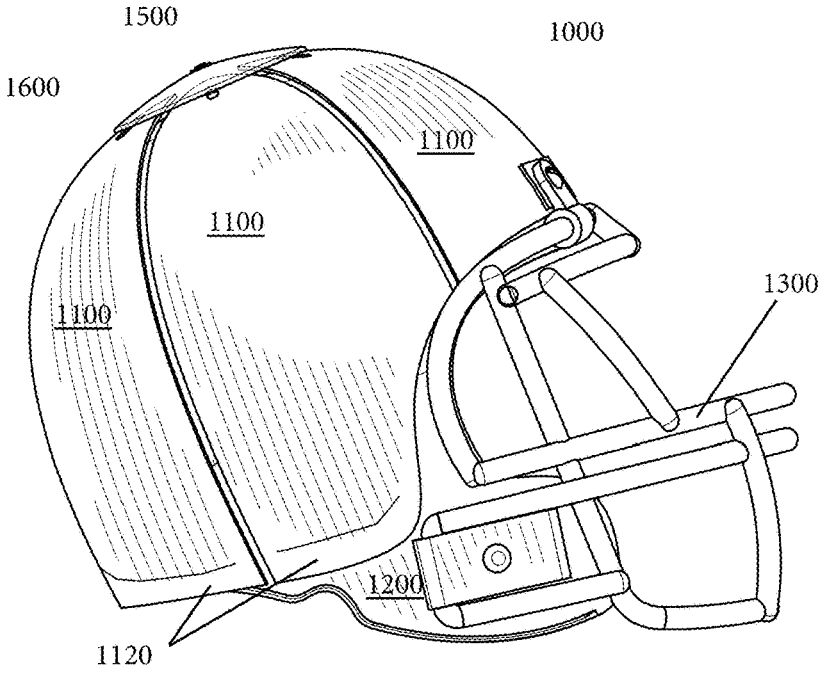

1500
1000
1600
1100
1100
1300
1100
1200
1120

FIG. 4

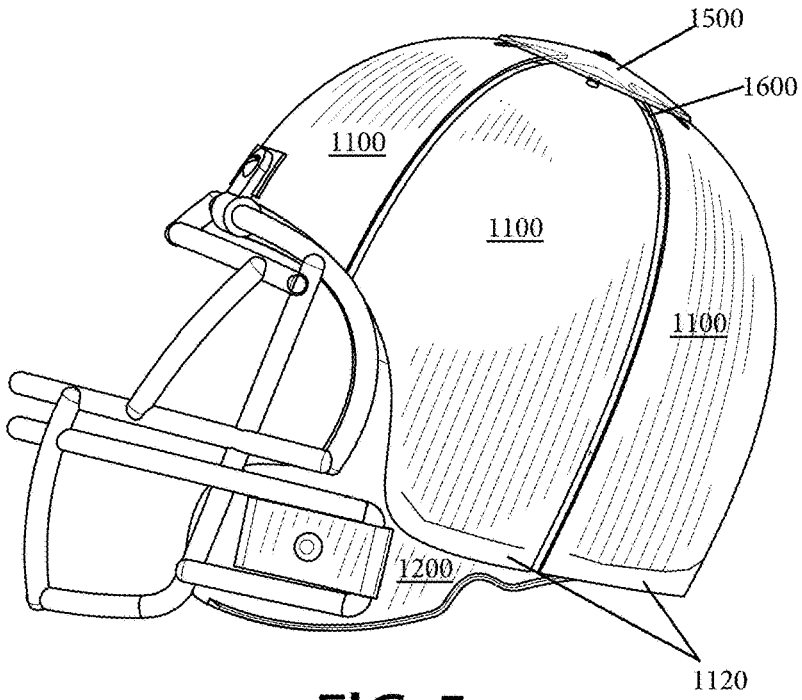

1500
1600
1100
1100
1100
1200
1120

FIG. 5

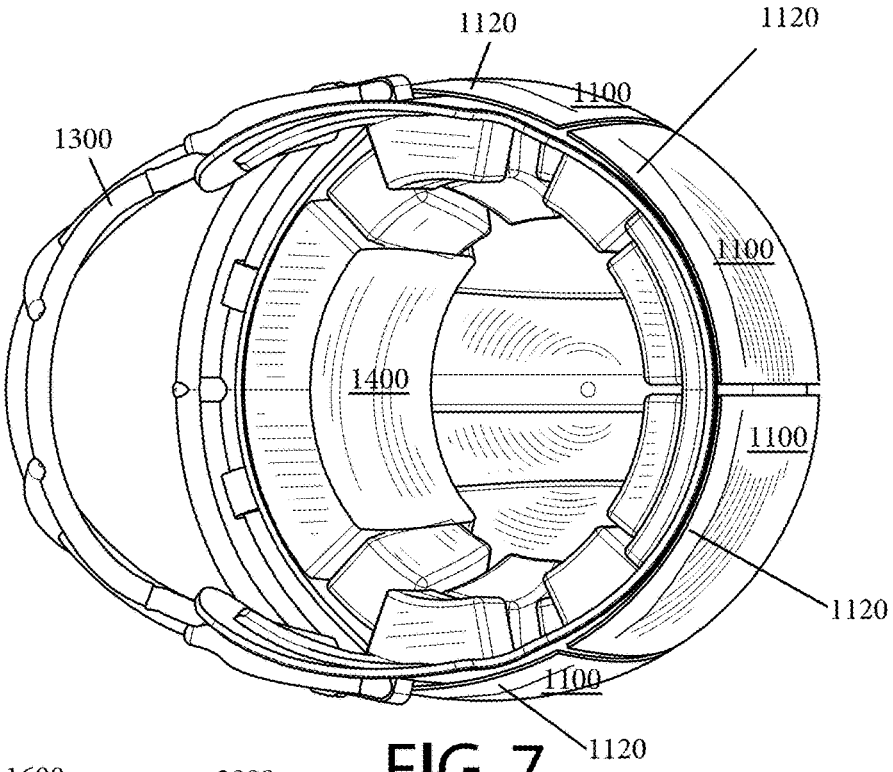

1120
1120
1100
1300
1100
1400
1100
1120
1100
1120

FIG. 7

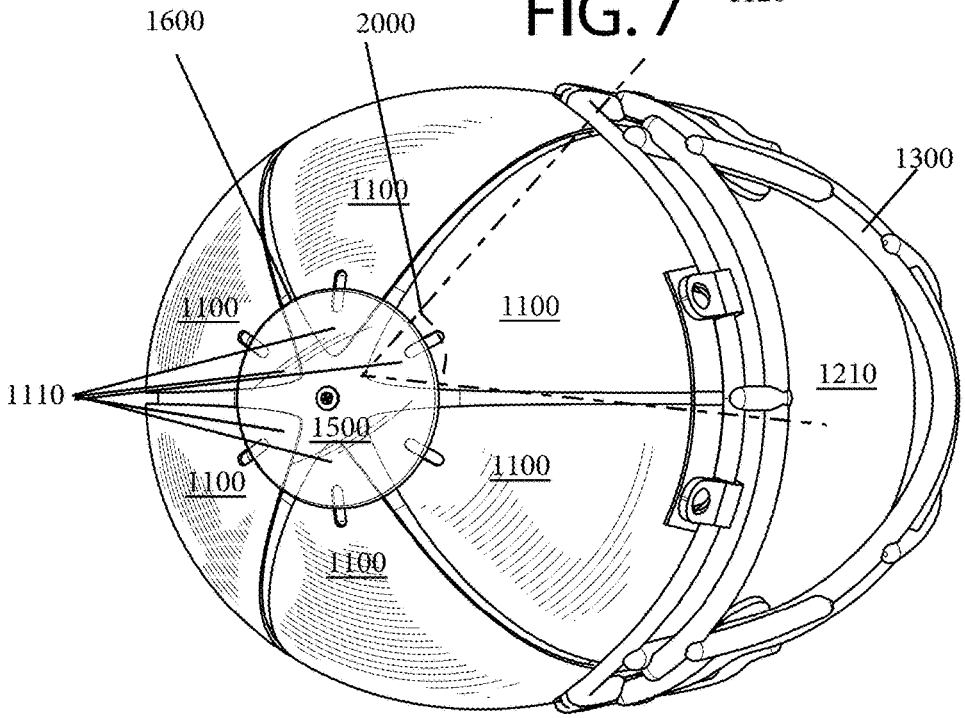

1600
2000
1300
1100
1100
1100
1210
1110
1500
1100
1100

FIG. 6

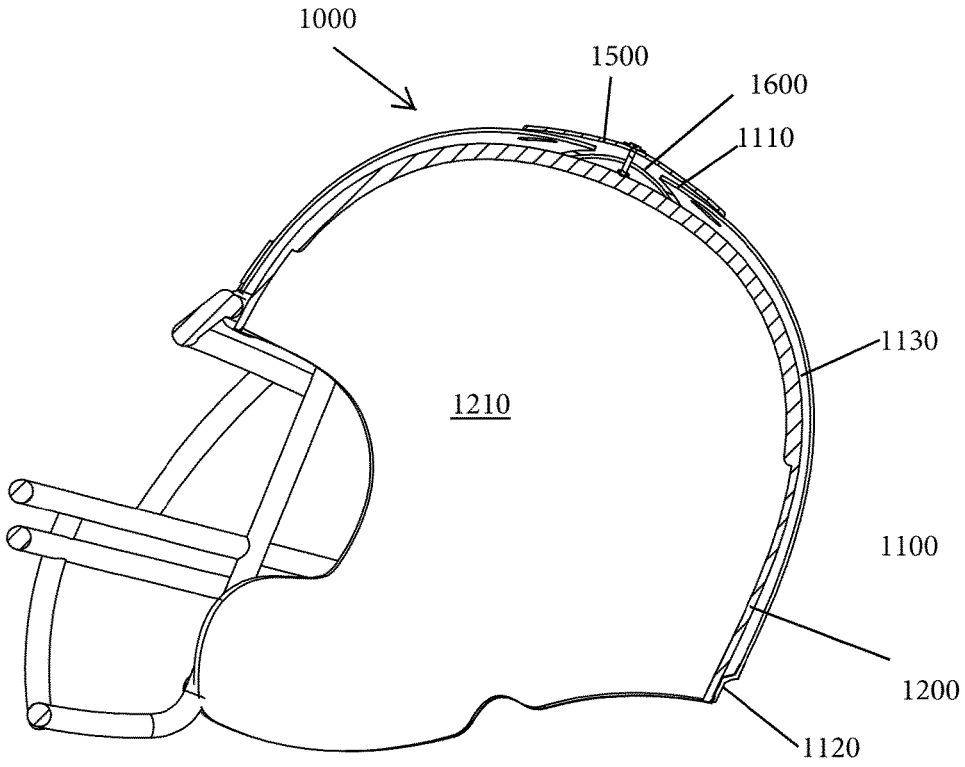


FIG. 8

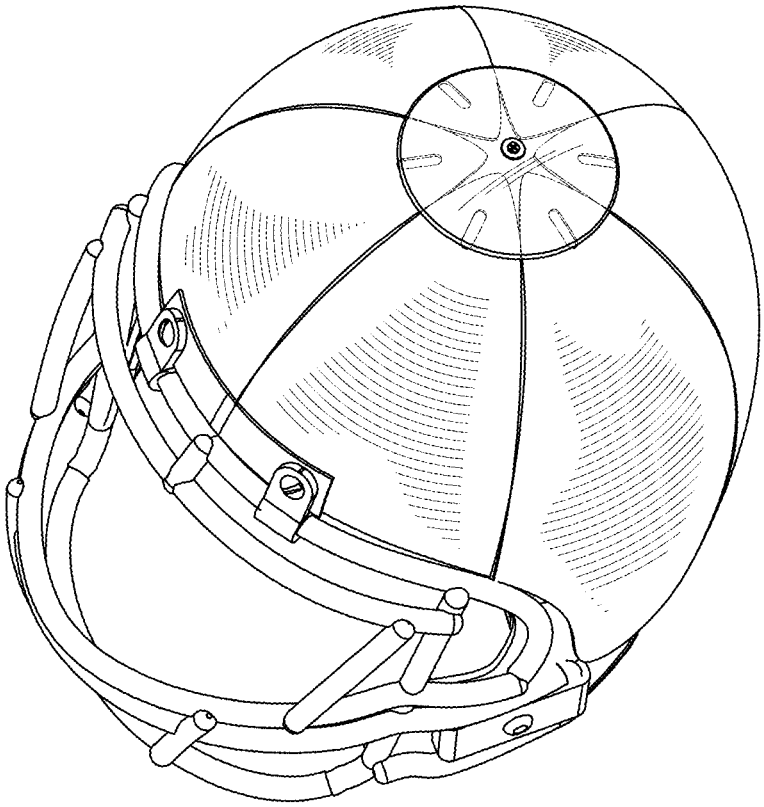
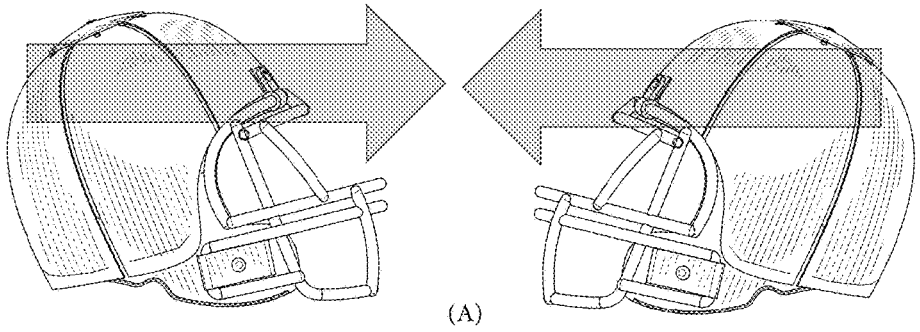
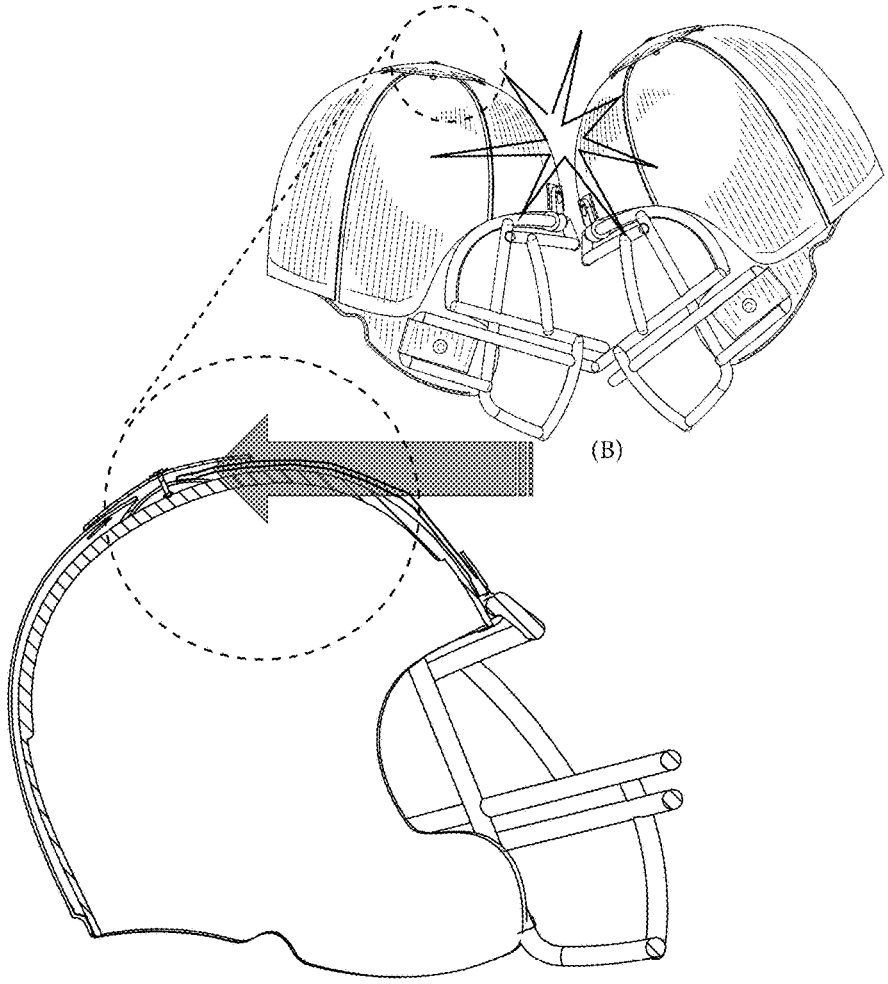


FIG. 9



(A)



(B)

FIG. 10

HELMETS OR OTHER PROTECTIVE HEADGEAR AND RELATED METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Des. Pat. App. Ser. No. 29/520,068 (filed Mar. 10, 2015) and entitled "Helmet."

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

Not applicable.

REFERENCE TO AN APPENDIX SUBMITTED ON A COMPACT DISC AND AN INCORPORATED BY REFERENCE OF THE MATERIAL ON THE COMPACT DISC

Not applicable.

STATEMENT REGARDING PRIOR DISCLOSURES BY THE INVENTOR OR A JOINT INVENTOR

Reserved for a later date, if necessary.

BACKGROUND OF THE INVENTION

Field of Invention

The disclosed subject matter is in the field of helmets and other protective headgear.

Background of the Invention

Helmets and other protective headgear (collectively "helmets") exist to shield or otherwise insulate a wearer's head from forceful impacts during hazardous activities. Structurally, helmets are typically defined by a hard shell that is internally lined with soft, shock-absorbing materials. In a typical mode of use, a wearer positions his or her head inside of the shell so that the head is surrounded by the shock-absorbing material. The hard outer shell of the helmet is intended to deflect the blunt force of an impact while the shock-absorbing material is intended to absorb any remaining forces associated with the impact whereby the head is protected.

Certainly, modern helmets have been satisfactory for protecting the external and skeletal components of the heads of helmet wearers during helmet impacts. However, it has been recently suggested that the internal or non-structural components of the wearer's head are not adequately protected by helmets. The thought is that the abrupt acceleration or deceleration of a wearer's head during an impact causes the brain and other internal organs of the wearer's head to slosh to-and-fro within the brain cavity of the head and sustain trauma via impacting the skeletal or structural components of the wearer's head. Such brain trauma is known to result in concussions of the wearer. Concussions can be particularly problematic during activities, like American football, in which a wearer is continuously subjected to abrupt accelerating/decelerating helmet impacts because

chronic traumatic encephalopathy (CTE) (a degenerative disease) may ultimately afflict the helmet wearer.

In view of the foregoing, a need exists for improvements to helmets. Specifically, a need exists for helmets that both (a) protect the wearer's head structure from the blunt force of an impact and (b) smoothly to decelerate the force of an impact so that the non-structural components of a head are protected during the impact. In view of this need, many modifications to helmets have been proposed but ultimately fail to meet the stated need. U.S. Pat. No. 5,724,681 (issued Mar. 10, 1998) by Sykes discloses a "Shock-absorbing helmet cover." Sykes' disclosed improvement is simply an extra protective shell around the helmet which is aesthetically unappealing and does very little to decelerate helmet impacts. Unattractive helmets are problematic because participants in certain activities, like American Football, are image conscious and will not wear an ugly helmet. U.S. Pat. No. 4,307,471 (issued Dec. 29, 1981) by Lovell discloses a "protective helmet" with an outer shell that is slidably connected to the helmet so that the outer shell and the helmet move forward or backward relative to one another during impacts. The relative movements between the outer shell and helmet of Lovell can decelerate head-on impacts, but the outer shell does not adequately protect against side-impacts because the shell can only move forward and backwards relative to the helmet. Thus, a need still exists for improved helmets that are aesthetic and that can decelerate impacts from any direction.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this specification is to disclose a helmet that is aesthetically appealing and that is capable of decelerating impacts from any direction. In a preferred embodiment, the helmet features: a shell with a head cavity that is lined with shock absorbing material, wherein the shell is outfitted with a halo of deceleration plates. In one embodiment, the deceleration plates are triangular and positioned around the crown of the helmet so that one point of every plate meets generally at the top of the helmet. Suitably, all of the plates are sandwiched at the top of the helmet between a holding plate and the shell, wherein each plate may shift around the contours of the helmet and under the holding plate in response to an impact. In a preferred mode of operation, shifting of the plates is resisted by a gel, e.g., silicone gel. Operably, the plates shift in response to an impact and absorb a portion of the impact energy.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Other objectives of the disclosure will become apparent to those skilled in the art once the invention has been shown and described. The manner in which these objectives and other desirable characteristics can be obtained is explained in the following description and attached figures in which:

FIG. **1** is an environmental view of a helmet with deceleration plates;

FIG. **2** is a front view of the helmet;

FIG. **3** is a back view of the helmet;

FIG. **4** is a left-side view of the helmet;

FIG. **5** is a right-side view of the helmet;

FIG. **6** is a bottom view of the helmet;

FIG. **7** is a top view of the helmet;

FIG. **8** is a cross section of the helmet, which illustrates an air space between the declaration plates and a protective surface of the helmet;

FIG. **9** is an environmental view of the helmet with deceleration plates compressed towards one another; and,

FIG. **10** is a diagram.

It is to be noted, however, that the appended figures illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments that will be appreciated by those reasonably skilled in the relevant arts. Also, figures are not necessarily made to scale but are representative.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Disclosed is a helmet that is aesthetically appealing and that is to capable of decelerating impacts from any direction. In a preferred embodiment, the helmet features: a shell with a head cavity that is lined with shock absorbing material, wherein the shell is outfitted with a halo of deceleration plates designed to shift around the contours of the helmet and under the holding plate in response to an impact. The more specific details of the disclosed helmet are disclosed in connection with the attached figures.

FIG. **1** is an environmental view of a helmet **1000** with deceleration plates **1100**. FIGS. **2** through **7** are respectively a front view, a back view, a left-side view, a right-side view, a bottom view, and a top view of the helmet **1000** with deceleration plates **1100**. As shown, the preferred embodiment of the helmet **1000** features: a shell **1200** with a head cavity **1210** that is lined with shock-absorbing padding **1400**; a facemask **1300**; a holding plate **1500**; a halo of deceleration plates **1100** designed to shift around the contours of the helmet and under the holding plate **1500** in response to an impact; and shock absorbing gel **1600** for resisting the shifting of the plates **1100** to under the holding plate **1500**.

Still referring to FIGS. **1** through **7**, the deceleration plates **1100** are some-what triangular and molded around the helmet so that one point **1110** of every plate **1100** meets generally at the top of the helmet **1100**. See, e.g., FIG. **6**. In the preferred embodiment, five or six some-what triangular carbon-fiber plates **1100** are employed wherein the point **1110** has an angle **2000** (FIG. **6**) of approximately 60 to 72 degrees. More or less than five or six plates may be used, but five or six is preferable. In on embodiment, each plate **1100** features a foot **1120** by which the plate **1100** may be rigidly secured to the shell **1200** around the perimeter of the head cavity **1210** of the shell **1200**. See FIGS. **4**, **5** and **7**. In the preferred embodiment, the plates **1100** bulge outwardly from the foot **1120** so that an airspace **1130** (not shown until FIG. **8**) is provided between the shell **1200** and the plate **1100**. The air space **1130** (not shown until FIG. **8**) is discussed in greater detail below in connection with FIG. **8**. Suitably, all of the plates **1100** are slidably held at the at the top of the helmet **1000** between a holding plate **1500** and the shell **1200**, wherein, as discussed further below, each plate **1100** may shift around the contours of the helmet **1000** and under the holding plate **1500** in response to an impact. In a preferred mode of operation, shifting of the plates is resisted by a gel **1600**, e.g., silicone gel, that is sandwiched between the holding plate **1500** and the shell **1200**.

FIG. **8** is a cross section of the helmet **1000**. FIG. **8** illustrates an air space **1130** between the deceleration plates **1100** and the shell **1200** or to protective surface of the helmet **1000**. As discussed above, each plate **1100** may feature a foot **1120** by which the plate **1100** may be rigidly secured to the shell **1200** around the perimeter of the head cavity **1210** of the shell **1200**. From the foot **1120**, the plates **1100** bulge slightly outwardly so that the airspace **1130** is provided between the shell **1200** and the plate **1100**. Suitably, all of the plates **1100** are slidably held at the at the top of the helmet **1000** between a holding plate **1500** and the shell **1200**, wherein, as discussed further below, each plate **1100** may shift around the contours of the helmet **1000** and under the holding plate **1500** in response to an impact. Suitably movement of the plates under the holding plate **1500** is resisted by the gel **1600**. In one embodiment, the tip **1110** may feature a track or cutout so that the movement of the deceleration plates **1100** may be guided.

FIG. **9** is an environmental view of the helmet **1000** with deceleration plates **1100** compressed towards one another. As discussed above, the deceleration plates **1100** may shift around the contours of the helmet **1000** and under the holding plate **1500** in response to an impact. Referring to FIGS. **1**, **8** and **9**, the plates **1100** deflect from the position shown in FIG. **1** toward and underneath the holding plate **1500** in response to an impact. The result is the position shown in FIG. **9**, where every plate **1100** has been deflected under the holding plate **1500**. Referring now to FIG. **8**, during said deflection, the air space **1130** (FIG. **8**) is reduced. Suitably, the movement of the deflecting plates **1100** decelerates the impact. It should be noted that, even though all of the deceleration plates **1100** are shown as deflected under the holding plate **1500** at the same time, it is contemplated that one or more of the deceleration plates **1100** may be deflected by itself or with multiple plates **1100** being deflected from a single impact. FIG. **10** is a diagram of a typical use for the helmet **1000** disclosed. As shown in the figure, when two helmets (A) are impacted (B) the deceleration plate **1100** are moved within the holding plate **1500**.

Although the method and apparatus is described above in terms of various exemplary embodiments and implementations, it should be understood that the various features, aspects and functionality described in one or more of the individual embodiments are not limited in their applicability to the particular embodiment with which they are described, but instead might be applied, alone or in various combinations, to one or more of the other embodiments of the disclosed method and apparatus, whether or not such embodiments are described and whether or not such features are presented as being a part of a described embodiment. Thus to the breadth and scope of the claimed invention should not be limited by any of the above-described embodiments.

Terms and phrases used in this document, and variations thereof, unless otherwise expressly stated, should be construed as open-ended as opposed to limiting. As examples of the foregoing: the term "including" should be read as meaning "including, without limitation" or the like, the term "example" is used to provide exemplary instances of the item in discussion, not an exhaustive or limiting list thereof, the terms "a" or "an" should be read as meaning "at least one," "one or more," or the like, and adjectives such as "conventional," "traditional," "normal," "standard," "known" and terms of similar meaning should not be construed as limiting the item described to a given time period or to an item available as of a given time, but instead should be read to encompass conventional, traditional, normal, or standard technologies that might be available or known now or at any time in the future. Likewise, where this document refers to technologies that would be apparent or

known to one of ordinary skill in the art, such technologies encompass those apparent or known to the skilled artisan now or at any time in the future.

The presence of broadening words and phrases such as "one or more," "at least," "but not limited to" or other like phrases in some instances shall not be read to mean that the narrower case is intended or required in instances where such broadening phrases might be absent. The use of the term "assembly" does not imply that the components or functionality described or claimed as part of the module are all configured in a common package. Indeed, any or all of the various components of a module, whether control logic or other components, might be combined in a single package or separately maintained and might further be distributed across multiple locations.

Additionally, the various embodiments set forth herein are described in terms of exemplary block diagrams, flow charts and other illustrations. As will become apparent to one of ordinary skill in the art after reading this document, the illustrated embodiments and their various alternatives might be implemented without confinement to the illustrated examples. For example, block diagrams and their accompanying description should not be construed as mandating a particular architecture or configuration.

All original claims submitted with this specification are incorporated by reference in their entirety as if fully set forth herein.

I claim:

1. A helmet comprising:

a shell with a head cavity where the shell is further defined externally by a crown and a contoured outer surface that is contiguous with the crown and a perimeter of the head cavity;

a holding plate rigidly secured to the shell (a) externally relative to the head cavity and (b) centrally relative to the crown of the shell;

a plurality of deceleration plates, where each deceleration plate is defined by a point, a foot, and a bulging surface that is contiguous between the point and foot; and,

wherein the shell is outfitted with a halo that has been formed of said plurality of deceleration plates by rigidly securing the foot of each deceleration plate to the perimeter of the head cavity and slidably positioning the point of each deceleration plate in between the crown and holding plate so that said bulging surface of each plate is positioned over a portion of said contoured outer surface whereby deflecting the bulging surface of any one of said plurality of deflection plates toward a corresponding portion of the contoured surface via an impact on the said one deceleration plate causes the point of said one deceleration plate to slide between the holding plate and crown while the foot of said one deceleration plate is held fast at the perimeter of the head cavity.

2. The helmet of claim **1** wherein each of the plurality of deceleration plates are triangular and positioned around the crown of the shell (A) so that an air space is created between the bulging surface of each of the plurality of deceleration plates and the corresponding portion of said contoured outer surface and (B) so that said point of every one of said plurality of deceleration plates meet centrally at the crown between said crown and said holding plate.

3. The helmet of claim **2** further comprising gel between the holding plate and the crown of the shell so that shifting of the plates is resisted by the gel.

4. The helmet of claim **3** wherein the head cavity is lined with shock-absorbing substances.

5. A method of protecting the head of a wearer comprising the steps of:

placing the head of the wearer into a head cavity of a shell where the shell is further defined externally by a crown and a contoured outer surface that is contiguous with the crown and a perimeter of the head cavity;

providing at least one deceleration plate by rigidly securing a foot of said deceleration plate to the perimeter of the head cavity and slidably positioning a distal point of said at least one deceleration plate in between a holding plate and the crown of the head cavity so that a surface of said at least one deceleration plate comprises a bulging surface that is contiguous between the point and foot;

allowing said at least one deceleration plate to deflect in response to an impact so that movement of said at least one deceleration plate is resisted as said distal point is secured so that said distal point moves underneath the holding plate.

6. The method of claim **5** where the movement of the distal end of said at least one deceleration plate underneath the holding plate is resisted by a shock absorbing gel.

7. The method of claim **5** where the deceleration plate is carbon fiber.

* * * * *