



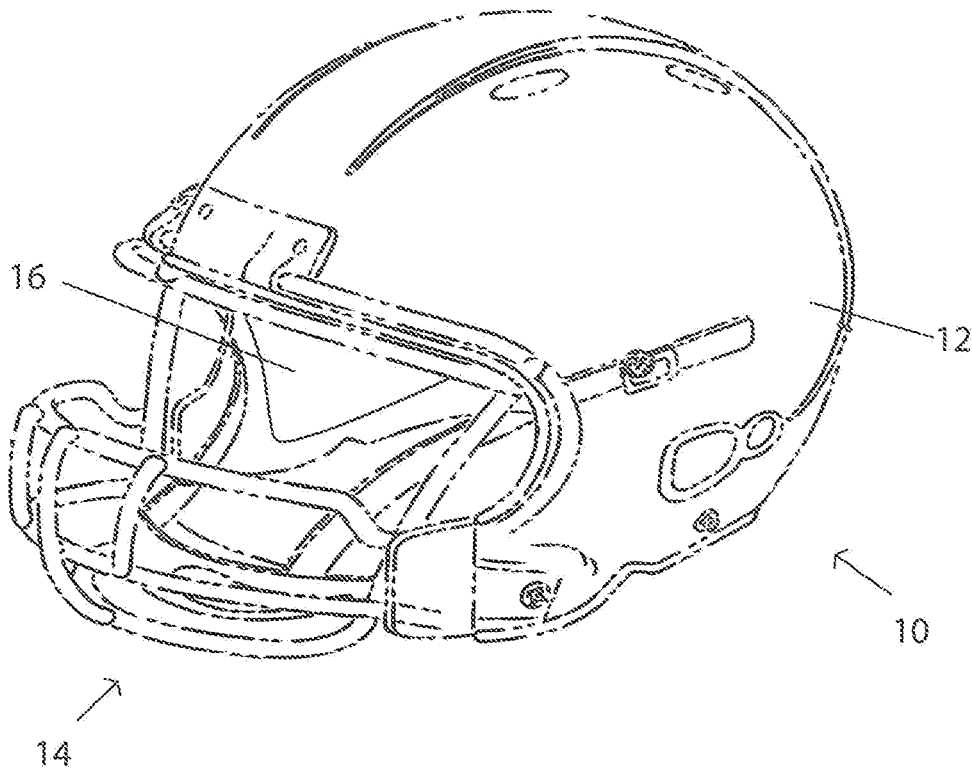
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(19) **United States**(12) **Patent Application Publication****Kummer et al.**(10) **Pub. No.: US 2018/0084860 A1**(43) **Pub. Date: Mar. 29, 2018**(54) **HELMET INSERT FOR CONCUSSION PROTECTION***A42B 3/08* (2006.01)*A42B 3/22* (2006.01)*A42B 3/10* (2006.01)*F41H 1/04* (2006.01)(71) Applicants: **Frederick Joseph Kummer**, Brooklyn, NY (US); **Stephen E. Feldman**, New York, NY (US)(52) **U.S. Cl.**CPC *A42B 3/122* (2013.01); *A63B 71/081*(2013.01); *A63B 71/10* (2013.01); *A42B 3/08*(2013.01); *A63B 2243/00* (2013.01); *A42B**3/225* (2013.01); *A42B 3/10* (2013.01); *F41H**1/04* (2013.01); *A63B 2243/007* (2013.01);*A42B 3/085* (2013.01)(21) Appl. No.: **15/277,772**(22) Filed: **Sep. 27, 2016**

(57)

ABSTRACT**Publication Classification**(51) **Int. Cl.***A42B 3/12* (2006.01)*A63B 71/08* (2006.01)*A63B 71/10* (2006.01)

The specification relates to a protection device that includes a helmet and an air sack. The air sack being mounted within the helmet and includes a one-way valve and a snap closure. The one y valve being used for inflation of the air sack and the snap closure being pressure sensitive and releasing pressure within the air sack when impacted by a high load.



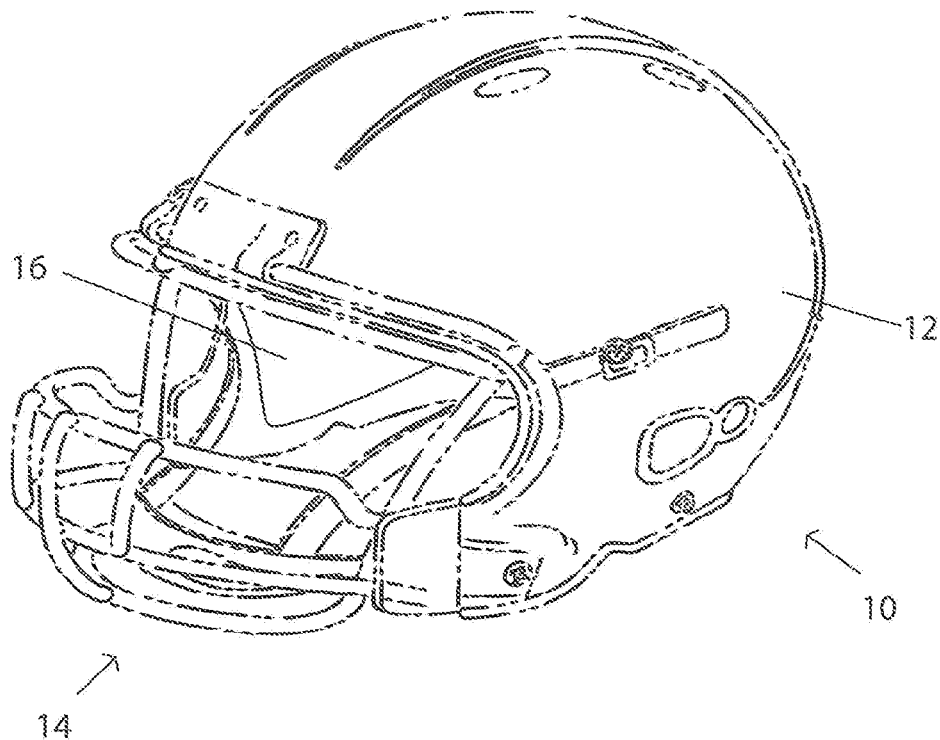


FIG. 1

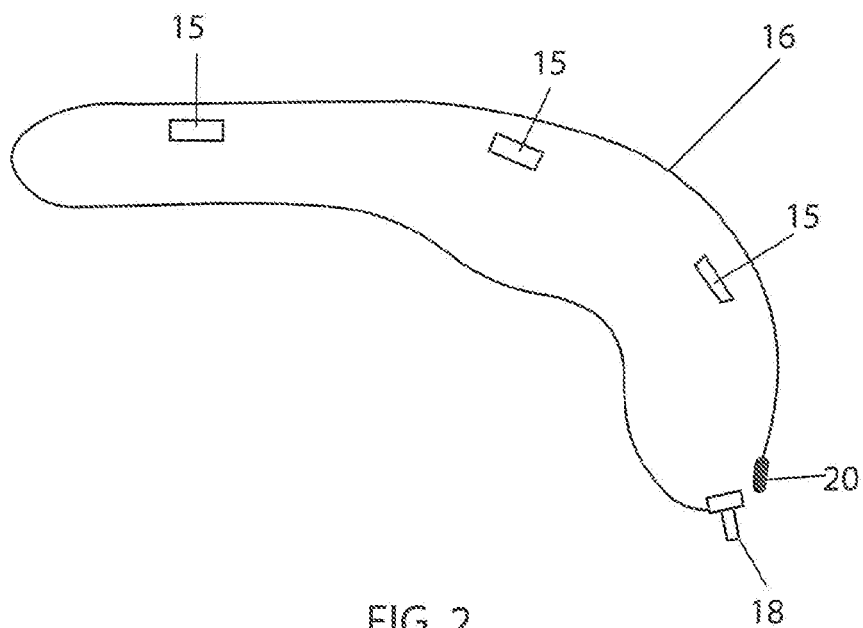


FIG. 2

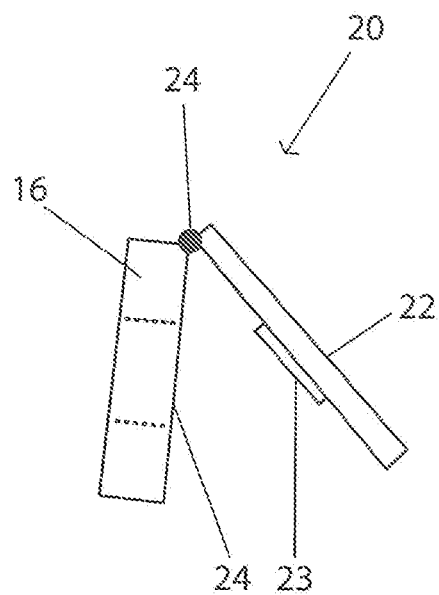


FIG. 3

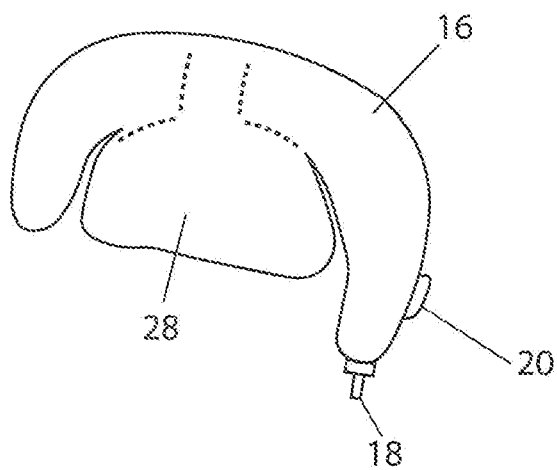


FIG. 4

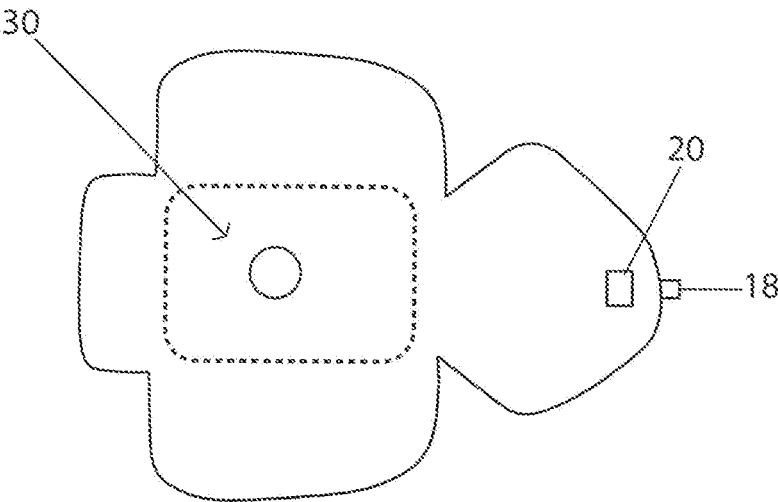


FIG. 5

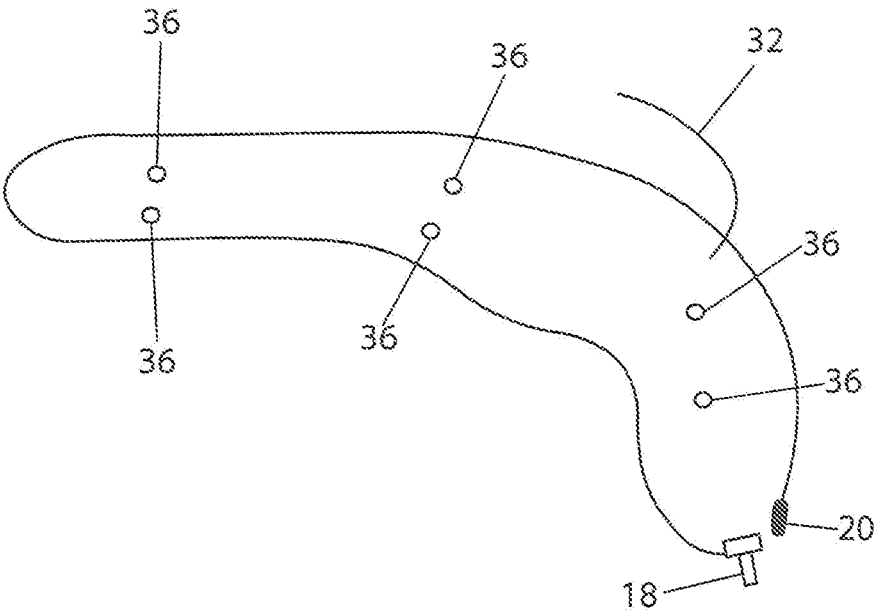


FIG. 6

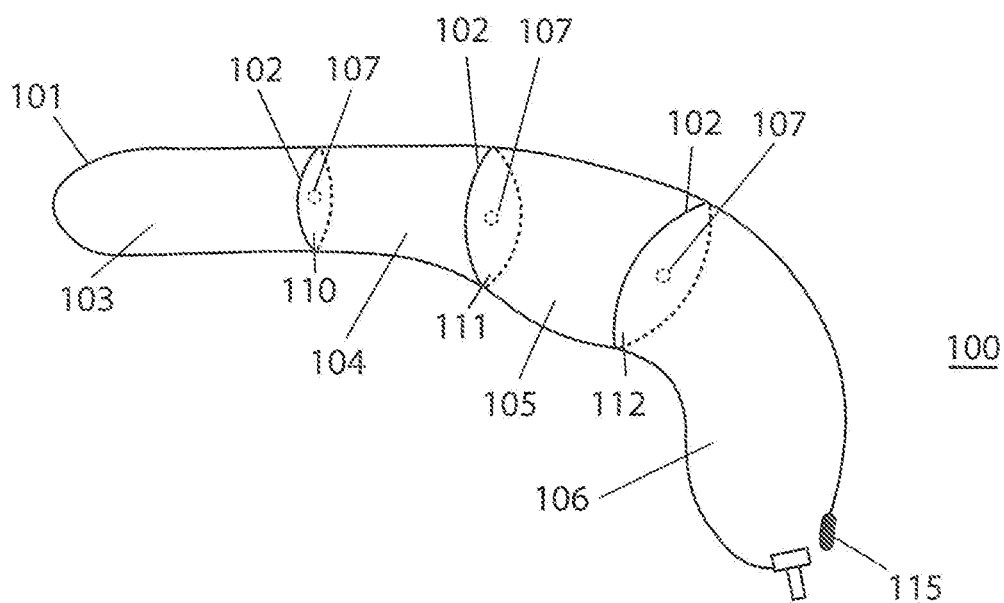


FIG. 7

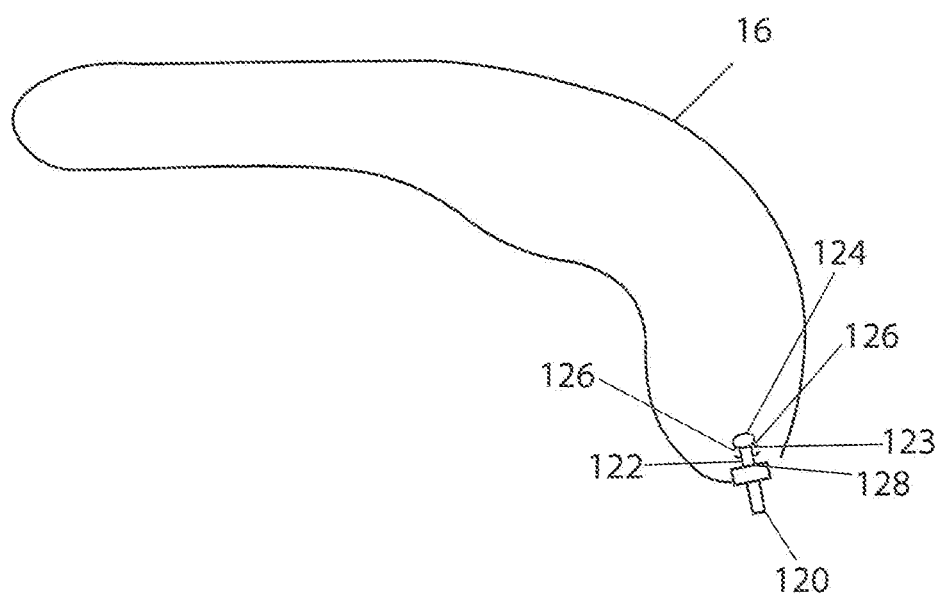
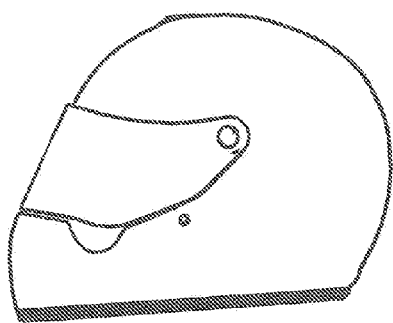
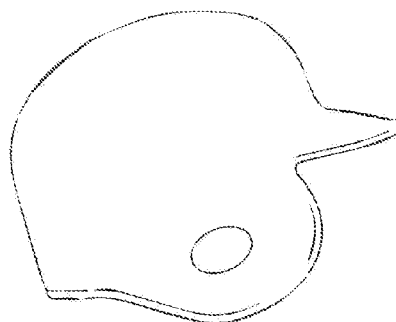


FIG. 8



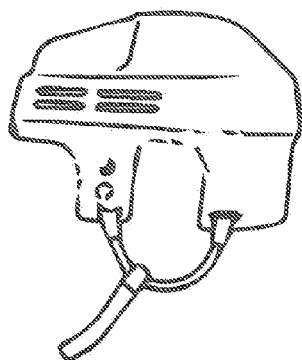
MOTORCYCLE

FIG. 9



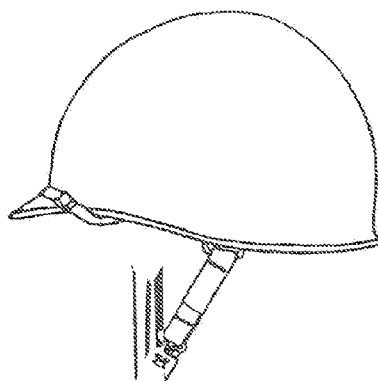
BASEBALL

FIG. 10



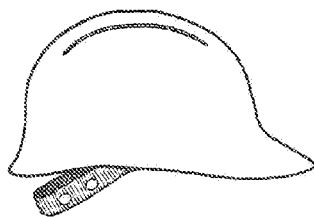
HOCKEY

FIG. 11



ARMY

FIG. 12



CONSTRUCTION

FIG. 13

HELMET INSERT FOR CONCUSSION PROTECTION

BACKGROUND

[0001] The subject matter described herein relates to a helmet insert. Specifically, a helmet insert that can have an air sack with controlled deflation.

[0002] Scientific research has concluded that sports in which a player is repeatedly hit in the head and sustains multiple concussions during a playing career, be it either professional or amateur, had detrimental and irreversible effects on the brain. One such sport is football and repeated, concussions have become a great concern with football players. During a football tackle, the inertia of the brain within the skull causes it to impact the bone or cerebral fluid which can cause a concussion. Helmets have been used for many years to cut down on the rate of which concussions have been sustained. But research has shown that current helmet technology is not advanced enough to stop concussions from occurring.

SUMMARY

[0003] The disclosed technology relates to a helmet insert that is capable of slowing the movement of the skull upon impact and prevents injury or minimizes the chances of head trauma or concussions.

[0004] Specifically, the helmet insert can be an inflated air sack that surrounds the head under a helmet. The inflated air sack can include a snap closure that is pressure sensitive. That is, the snap closure can open a small hole when subjected to a high impact load. The air acts as a cushion and slows the head movement within the helmet insert as the air is released.

[0005] In one implementation, a protection device comprising: a helmet; and an air sack, the air sack being mounted within the helmet, the air sack including a one-way valve and a snap closure, the one way valve being used for inflation, the snap closure being pressure sensitive and capable of releasing pressure within the air sack when impacted by a high load.

[0006] In some implementations, the air sack is about 1" thick, when inflated. In some implementations, the air sack is made of a durable material. In some implementations, the snap closure includes a flap, a male closure and a female closure. In some implementations, the air sack includes arms that fold to the sides of the helmet.

[0007] In another implementation, a protection device comprising: a helmet; and an air sack, the air sack being mounted within the helmet and capable of being inflated for use, the air sack including at least two sections being fluidly interconnected through a pressure control mechanism. The pressure control mechanism capable of releasing pressure from a first section and building pressure in a second section when impacted by a high load. In some implementations, the air pressure within the first section and the second section equalizes when the high load is removed.

BRIEF DESCRIPTION OF DRAWINGS

[0008] The features, aspects and advantages of the disclosed technology will become better understood with regard to following description and accompanying drawings, wherein like reference numerals refer to similar parts throughout the several views where:

[0009] FIG. 1 is a prospective view of a football helmet incorporating a helmet insert of the disclosed technology;

[0010] FIG. 2 is a side view of a first implementation of an air sack of the disclosed technology;

[0011] FIG. 3 is a side view of a snap closure of the disclosed technology;

[0012] FIG. 4 is a side view of a second implementation of an air sack of the disclosed technology;

[0013] FIG. 5 is a top view of the second implementation of the disclosed technology shown in FIG. 4;

[0014] FIG. 6 is a side view of a third implementation of an air sack of the disclosed technology; and

[0015] FIG. 7 is a side view of a fourth implementation of an air sack of the disclosed technology;

[0016] FIG. 8 is a side view of a fifth implementation of an air sack of the disclosed technology; and

[0017] FIGS. 9-13 are examples of helmets in which the disclosed technology can minimize head trauma.

DETAILED DESCRIPTION

[0018] The specification relates to a helmet insert that is capable of slowing the movement of the skull upon impact and prevents injury or at least minimizes the chances of head trauma.

[0019] FIG. 1 shows a helmet 10 that includes an outer shell 12, a facemask assembly 14 and a helmet insert 16, e.g., an inflatable air sack. The helmet 10 shown in FIG. 1 is a football helmet and is for illustrative purposes only as the disclosed technology can be implemented in any helmet in which head trauma is to be minimized, e.g., helmets for car and motorcycle racing (FIG. 9), helmets for lacrosse and hockey (FIG. 11), helmets for equestrian, bike racing, military and motorcycling (FIG. 12), helmets for baseball (FIG. 10), helmets for construction (FIG. 13), etc. Helmets for football and motorcycle and some baseball helmets have side panels. Other helmets such as shown in FIGS. 11-13 do not, but other than the side panels, the air bags for these helmets operate in the same manner as described in this specification.

[0020] The air sack 16 is positioned, mounted and inflated within the helmet 10 in such a way as to protect the head of a user under the helmet 10. In some implementations, the air sack 16 can be mounted within the outer shell 12 using hook and loop strips 15 adhered to the air sack 16 with mating strips located on an interior of the outer shell 12 but other mounting methods are contemplated, e.g., adhesives, snaps, etc. In some implementations, instead of an air sack, the air sack can take other forms such as an airbag or air pouch that functions similarly to the air sack discussed below. The air sack 16 can be about 1" thick, when inflated, and made of a durable material, e.g., tough plastic, PE, polyester, nylon, etc.

[0021] FIG. 2-6 show the air sack 16 removed from the helmet 10. The air sack 16 can be refillable and can include a one-way valve 18 on a rear end of the air sack 16 for air inflation.

[0022] The air sack 16 can also include a snap closure 20 that is pressure sensitive. The snap closure can include a flap 22, a male closure 23 and a female closure 24. To inflate, the flap 22 is pivoted around hinge 24 so the male closure 23 fits into the female closure 24. Once sealed, an air inflator hose can be connected to the one-way valve and the air sack can

be filled with air pressure from 15 to 100 psi, with an ideal range of 15 to 30 psi, depending on the activity in which the helmet will be utilized.

[0023] In use, when the inflated air sack **16** is subjected to a high load, the pressure increases within the inflated air sack **16** which in turn causes the snap closure **20** to open thereby releasing the pressure within the inflated air sack **16**. This release of air pressure reduces impact on a user's skull and minimizes the potential for concussions.

[0024] In some implementations, when the closure opens due to a pressure increase, a colored area can be exposed on the air sack thereby alerting a person or persons (e.g. user, coaches, referees, medical staff, etc.) that a significant impact event occurred and showing an impact location. The air sack can be treated with a substance that is capable of changing color when impacted. For example, the sack can be coated with a microencapsulated dye to show where impact occurred on the head.

[0025] In some implementations, as shown in FIGS. **4** and **5**, the air sack **16** can be made with inflatable arms **28** that fold onto the sides adding side head protection for a user. These arms **28** are used for helmets that have sides, e.g., football and car racing helmets. The arms are not needed for helmets that lack sides, e.g., bicycle and equestrian helmets.

[0026] The air sack **16** can further include top through-hole that removes heat and perspiration from user's head during use. The air sack **16** can also be lined with non-absorbent, wicking fabric **32** such as gortex to limit or remove sweat and heat buildup. The air sack can also include a number of through tunnels **36** to remove heat and perspiration. The inner walls of these tunnels **36** can also act as a reinforcing member and hold the inner and the outer surfaces of the air sack **16** together so that inflation pressure can be increased without compressing skull and increase helmet protection.

[0027] FIG. **7** shows another implementation of the disclosed technology. In FIG. **7**, a contained air system **100** is shown. The contained air system **100** can include elastic balloons **101** or a plastic accordion with compression spring ribs **102**. These compression spring ribs **102** can be located at periphery, e.g., lower edges of sack. When a helmet receives an impact, air can be forced from one section **103-106** of the inflated air system and forced into another section **103-106** of the contained air system **100** via a pressure control mechanism **107**. The contained air system **100** then equalizes the air pressure between the sections **103-106** after the impact has occurred. In other words, the contained air system **100** can accommodate air moved at impact and reinject it back into the impacted section.

[0028] The contained air system **100** can have an air sack **101** divided into two or more sections **103-106** (e.g., 1-5" squares) with internal walls **110-112** containing a pressure

control mechanisms **107**, e.g., small holes or restriction valves. When hit, the impacted section collapses and then refills. In some implementations, a snap closure **115** release can be incorporated into the air sack **100** for the severe impacts, e.g., loads in excess of 100 lbs.

[0029] The foregoing Detailed Description is to be understood as being in every respect illustrative, but not restrictive, and the scope of the disclosed technology disclosed herein is not to be determined from the Detailed Description, but rather from the claims as interpreted according to the full breadth permitted by the patent laws. It is to be understood that the implementations shown and described herein are only illustrative of the principles of the disclosed technology and that various modifications can be implemented without departing from the scope and spirit of the disclosed technology.

1. A protection device comprising:

a helmet; and

an air sack, the air sack being mounted within the helmet and capable of being inflated for use, the air sack includes a one-way valve and a snap closure, the one way valve being used for inflation, the snap closure being pressure sensitive and capable of releasing pressure within the air sack when impacted by a high load.

2. The protection device of claim **1** wherein the air sack is about 1" thick, when inflated.

3. The protection device of claim **1** wherein the air sack is made of a durable material.

4. The protection device of claim **1** wherein the snap closure includes a flap, a male closure and a female closure.

5. The protection device of claim **1** wherein the air sack includes arms that fold to the sides of the outer shell.

6. The protection device of claim **1** wherein the air sack includes a though hole to remove heat and perspiration.

7. The protection device of claim **1** wherein the air sack is lined with a non-absorbent, wicking fabric.

8. The protection device of claim **1** wherein the air sack includes a number of through tunnels to act as reinforcing members.

9. A protection device comprising:

a helmet; and

an air sack, the air sack being mounted within the helmet and capable of being inflated for use, the air sack including at least two sections being fluidly interconnected through a pressure control mechanism, the pressure control, mechanism capable of releasing pressure from a first section and building pressure in a second section when impacted by a high load.

10. The protection device of claim **9** wherein the air pressure within the first section and the second section equalizes when the high load is removed.

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