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(54) **FOOTBALL TRAINING AID AND METHOD**

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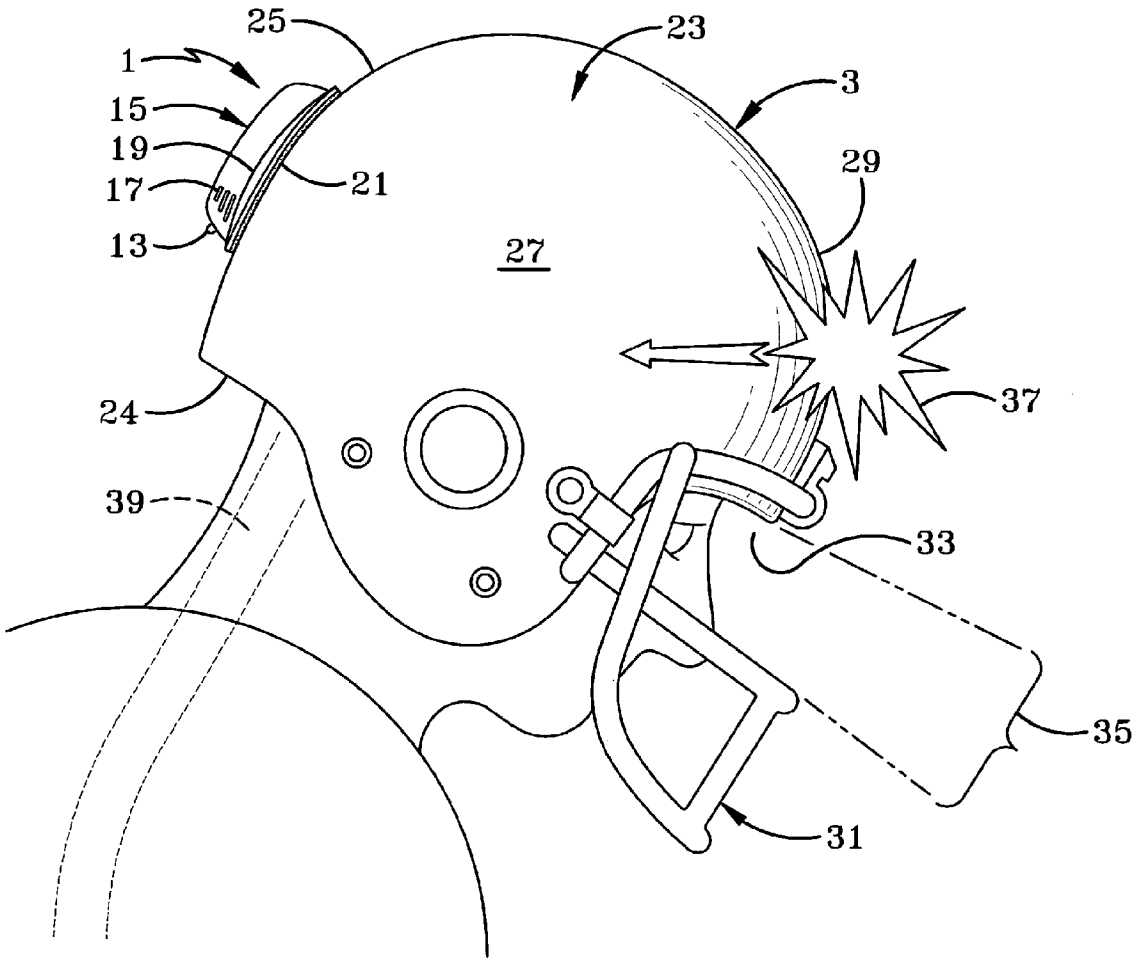
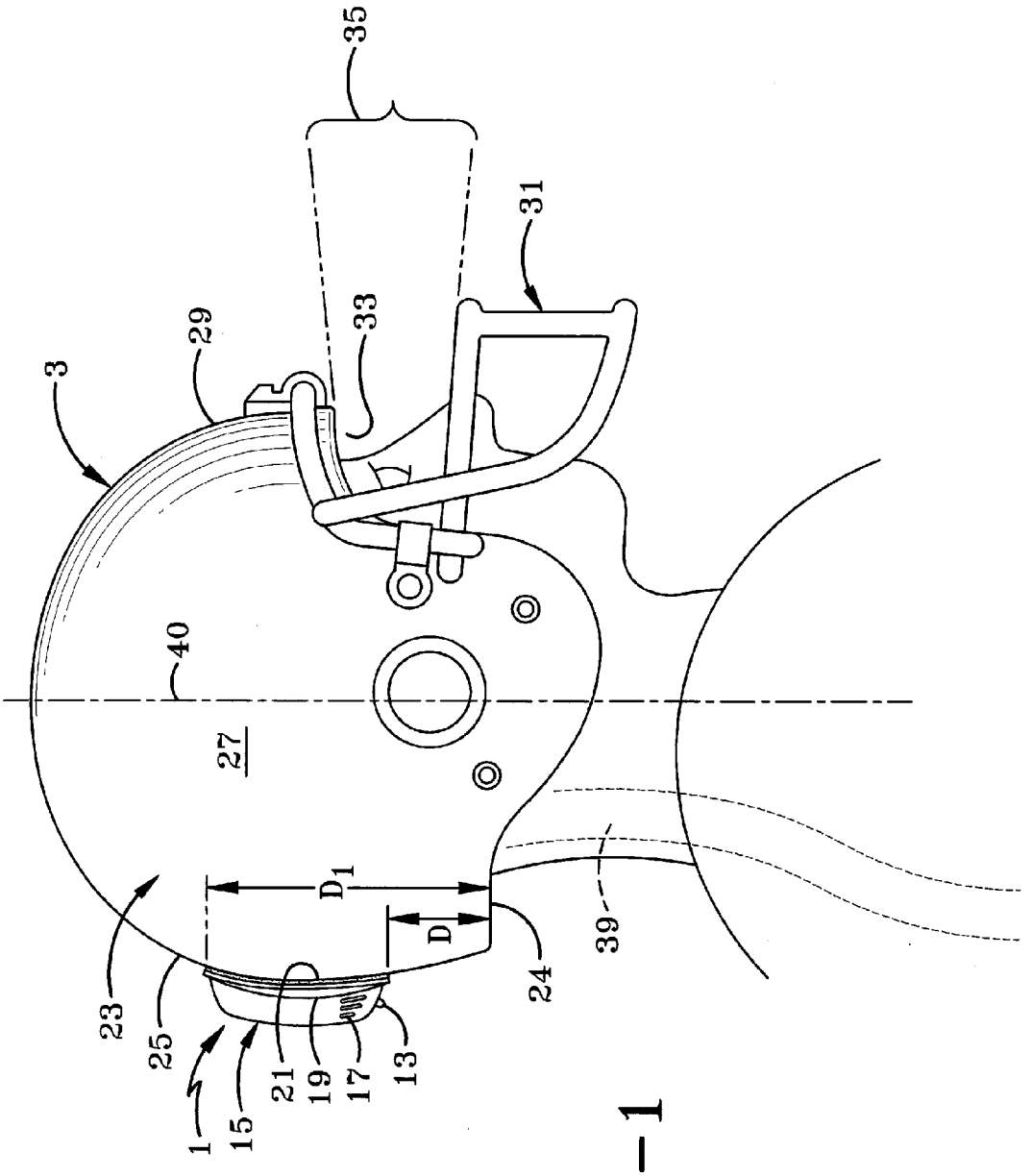
(57) **ABSTRACT**

A training aid is attached to the rear region of a user's helmet and alerts the player with an audible beep when the player's head drops into a downward unsafe or improper position. A printed circuit board containing a horn, battery and tilt switch is located within a protective housing attached by an adhesive to the rear region of the player's helmet. An external switch enables the player to manually turn the circuit ON or OFF.





FIG–1

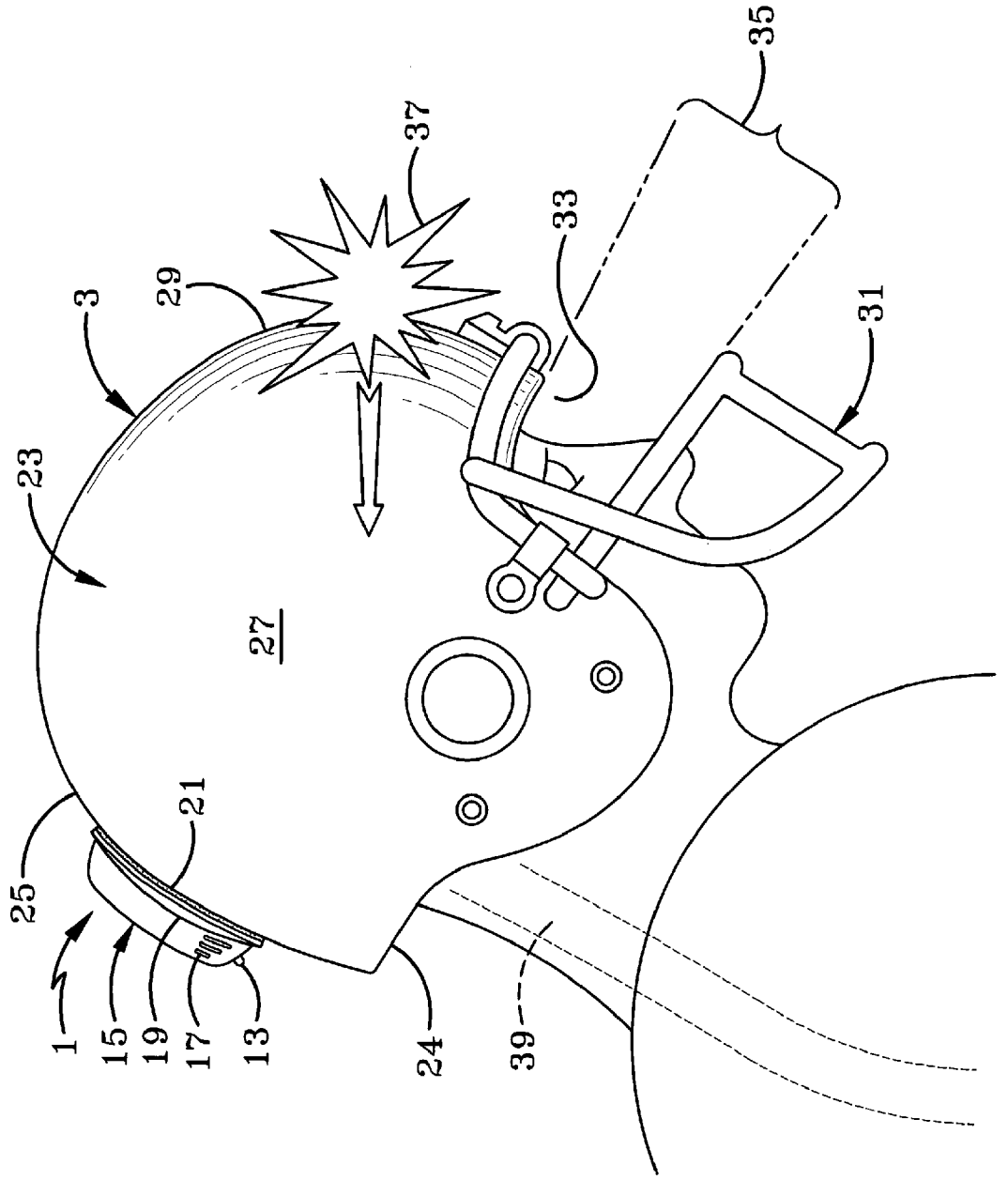


FIG-2

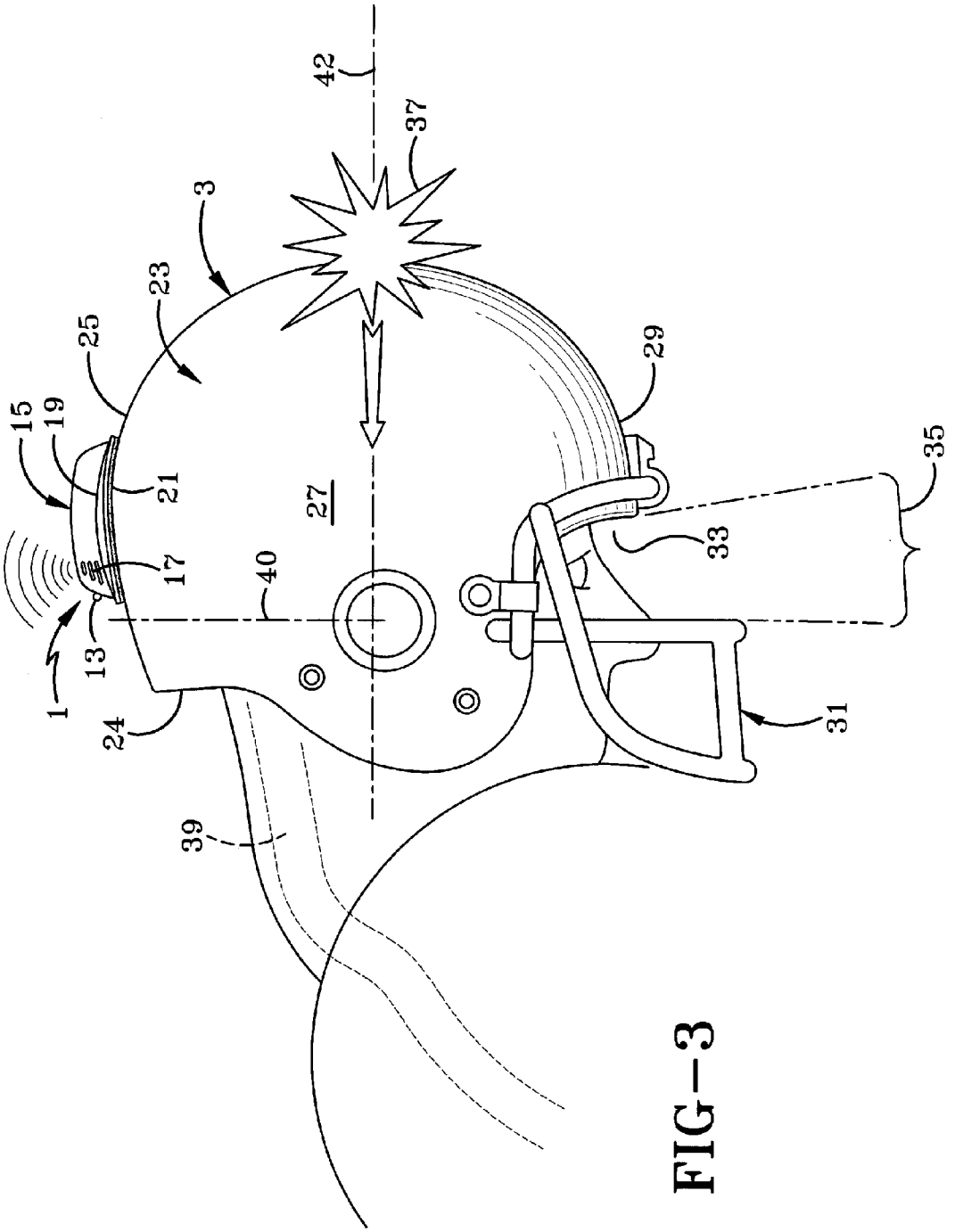


FIG-3

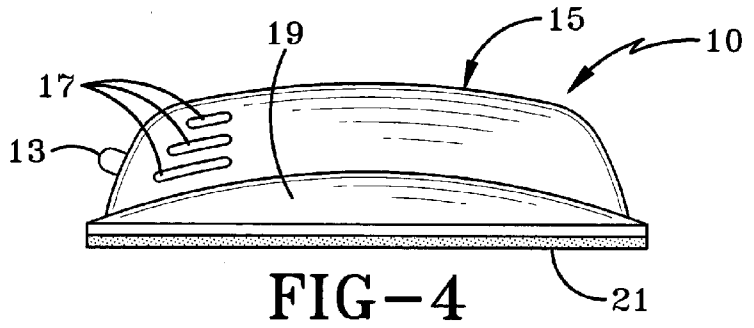


FIG-4

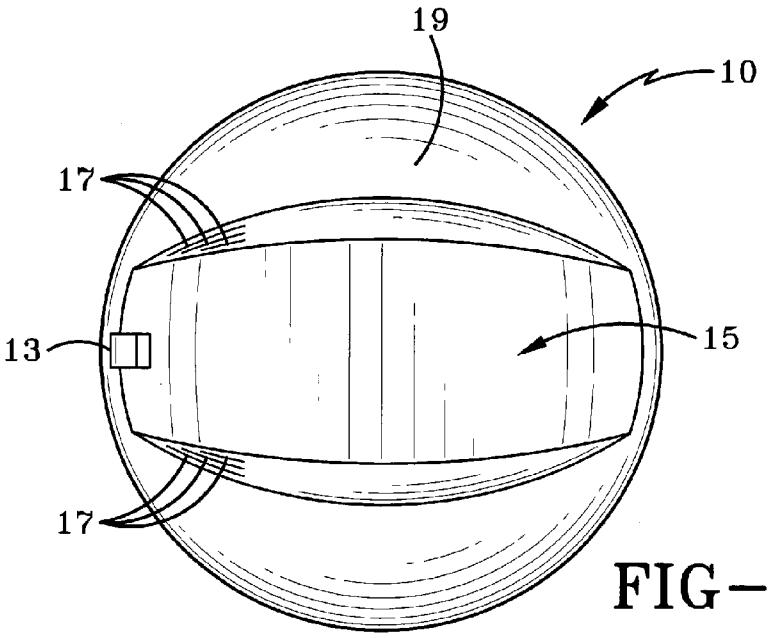


FIG-5

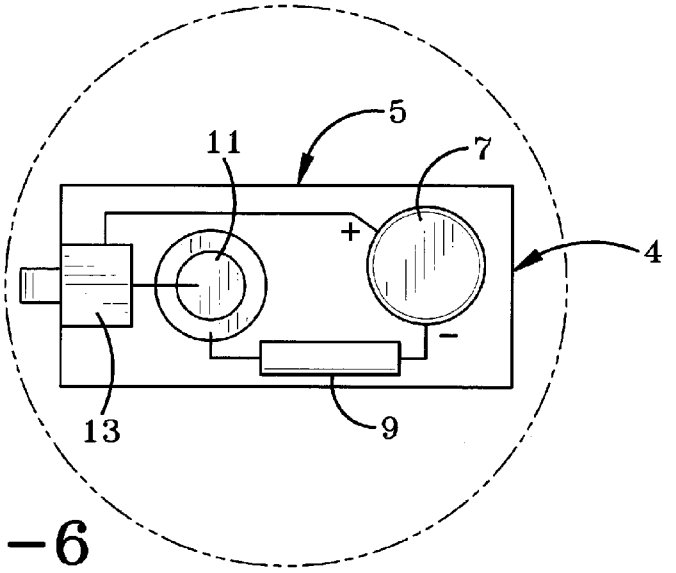
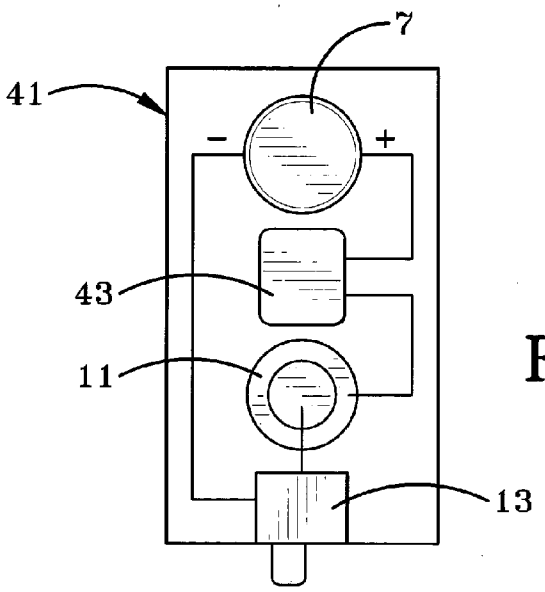
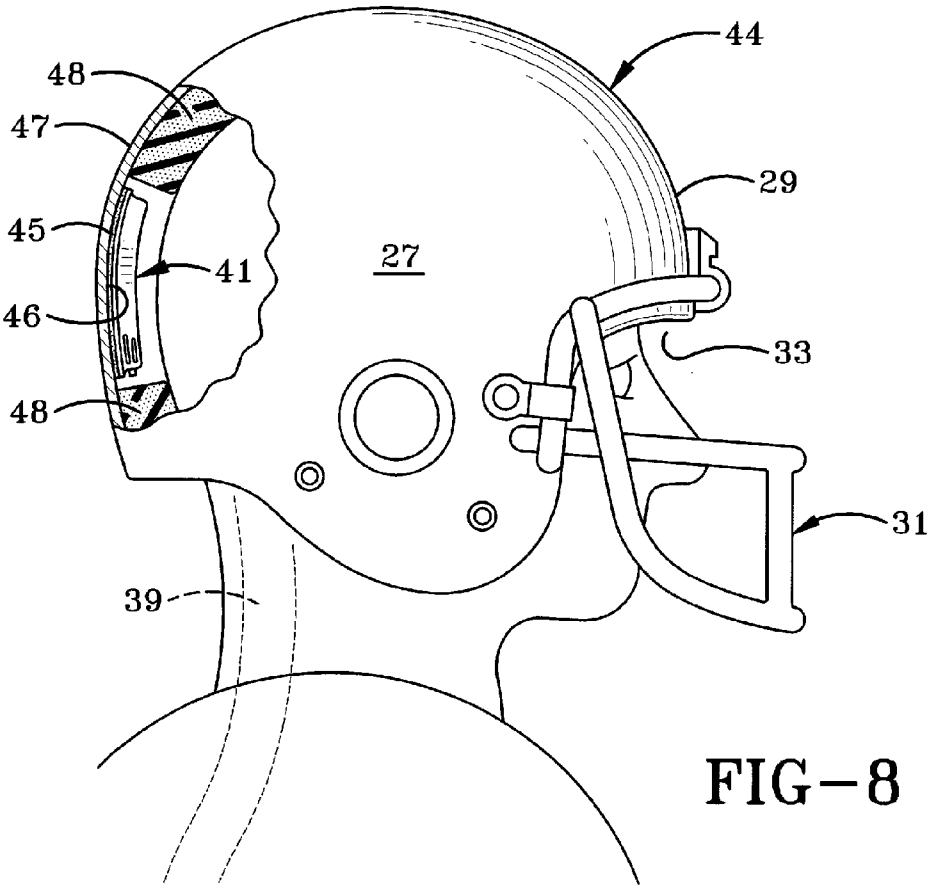


FIG-6



FIG−7



FIG−8

FOOTBALL TRAINING AID AND METHOD

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from U.S. Provisional Application Ser. No. 61/423,731, filed Dec. 16, 2010, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Technical Field

[0003] The invention relates to a training aid primarily for football players. More particularly, the invention relates to a signaling device mounted on or in the helmet of the player to signal the player with an audible sound that his head is in an improper contact position.

[0004] 2. Background Information

[0005] Extreme contact occurs constantly in football and is an integral part of the sport. Although the players are well protected by various protective clothing and gear which helps substantially to avoid serious injury, one area which is difficult to protect is the cervical area and in particular the spine. Many of these injuries occur during tackling and blocking caused by the player dropping his head just prior to contact which is a reflexive action. If the player lowers his head beyond a safe distance, the force is exerted incorrectly on the player's neck, often resulting in serious injury to the spine, such as temporarily or occasionally full paralysis.

[0006] It is difficult to train a player to keep his head in an upright position, that is, in a "safe" position upon blocking and especially upon making a tackle on a moving player. The natural reflex is to drop the head which results in the contact force on the player's helmet being transferred to the neck, which is then in an improper position. Also, the player is apt to make a better block and tackle if he maintains his head in an upright position where his field of vision is at an optimal position enabling him to make the block or tackle. Players who consistently block, tackle and run with their heads down have a limited field of vision. Also, when a player limits his field of view, blocks and tackles are missed and a player is easily controlled by his opponent. Also, when a ball carrier runs head down, openings and opportunities are also missed.

[0007] Various devices have been devised especially for football players to prevent the head from moving to the unsafe position, such as shown in U.S. Pat. No. 6,971,123, which physically prevents the player's head from dropping below the safe position. Although these and similar devices have proved satisfactory for preventing some injuries to the cervical area of the player, they may unduly restrict the movement of the player's head resulting in most players not wishing to use such devices. The present invention attempts to solve the head down-type of tackle or block by training or conditioning the player during practice sessions to keep his head in the upright safe position without physically restraining the movement of the player's head in any manner.

[0008] Although the present invention is designed for use primarily for training of a football player, it is readily understood that it is adaptable for use in training other individuals, and in particular athletes depending upon the sport involved to enable the athlete to keep his head in a proper upright position.

BRIEF SUMMARY OF THE INVENTION

[0009] The present invention provides an improved training device and method of use primarily by athletes and in particular by football players to train and condition the player to keep his head in an upright safe position at all times, and especially just prior to impact with another player when blocking or tackling occurs.

[0010] The training device of the present invention achieves the objectives and advantages by providing a signaling device contained in a small protective housing which is removably mounted on the rear region of a player's helmet, preferably by a pressure sensitive adhesive, which device is intended to be used by the player primarily during training and practice sessions, which will provide an audible alarm or beep to the player upon the player's head dropping below the safe position. By repeated warnings to the player each time such an unsafe or improper condition occurs it will help to condition the player to keep his head in a more upright safe position at all times during a game, especially just prior and during contact with another player.

[0011] Another feature of the present invention is to provide a simple printed circuit board contained within the protective housing which contains a tilt switch or similar sensor, which upon excessive tilting of the player's head in a downward position will close actuating an audible alarm powered by a small battery on the printed circuit board. Preferably, the tilted switch or sensor acts as a gate preventing the circuit from being completed until a preset angle of the tilt switch occurs as a result of the downward movement of the player's head and protective headgear. A further feature of the present invention is to enable the training aid to be easily removed and replaced on the user's helmet, enabling it to be used only during training and practice sessions and not during actual game conditions where such an external device may be forbidden by game rules.

[0012] A further feature of the present invention is to provide the training aid with an MEMS tilt switch incorporated into the control circuit wherein the training aid is incorporated into the interior of the helmet protected by the padding inside of the back of the helmet to provide increased accuracy, reliability and rapid signals to the player.

[0013] Another feature is to enable the battery used in the circuit with the tilt switch to be replaceable enabling the training device to be used throughout the season. The relatively low cost of the device also enables the training aid to be disposed of at the end of a season if desired, without incurring considerable expense to a football team.

[0014] These features and advantages are obtained by the training aid of the present invention, the general nature of which may be stated as including a helmet having a protective outer shell with two side regions, a rear region and a front region, wherein the front region is formed with an opening to provide a field of vision for a wearer; and a signaling device attached to the rear region of the helmet which provides a signal to the wearer when the front region of the helmet is in a downwardly facing direction.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0015] A preferred embodiment of the invention, illustrated of the best mode in which Applicant contemplates applying the principles, is set forth in the following description and is shown in the drawings and is particularly and distinctly pointed out and set forth in the appended claims.

[0016] FIG. **1** is a diagrammatic side elevational view of the training aid of the present invention mounted on the rear region of a football helmet.

[0017] FIG. **2** is a diagrammatic view similar to FIG. **1** showing the correct impact position of the player's head and helmet.

[0018] FIG. **3** is a diagrammatic view similar to FIGS. **1** and **2** showing the incorrect impact position of the player's head and helmet and actuation of the signaling alarm.

[0019] FIG. **4** is a side elevational view of the training aid removed from the helmet.

[0020] FIG. **5** is a top plan view of the training aid of FIG. **4**.

[0021] FIG. **6** is a diagrammatic view of the printed circuit board signaling device of the training aid.

[0022] FIG. **7** is a diagrammatic view of an alternate signaling device of the training aid.

[0023] FIG. **8** is a diagrammatic view showing the training aid mounted within the interior of a football helmet.

[0024] Similar numbers refer to similar parts throughout the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0025] The training aid or device of the present invention is indicated generally at **1**, and is shown mounted on helmet **3** in FIGS. **1-3**. Training aid **1** is shown particularly in FIGS. **4-6** and consists primarily of an electrical circuit indicated generally at **4**, having a printed circuit board **5**, which includes as its main components a replaceable battery **7**, a tilt sensor or switch **9**, an audible alarm or horn **11**, and an externally accessible ON/OFF switch **13** forming an alarming system. Switch **13** is electrically connected with battery **7** and enables a player to manually switch the training aid ON for use and OFF when not in use. The alarming system preferably is located within a protective housing **15** which may take various configurations, one of which is shown particularly in FIGS. **4** and **5**. Housing **15** has a dome-shape to avoid any sharp corners which could injure other players during the use of the training aid. Housing **15** preferably is formed of an impact resistant plastic such as a polycarbonate and preferably has a plurality of slots to enable the audible beep produced by horn **11** to be heard by the player. External switch **13** extends through an opening in housing **15** for easy access by the player.

[0026] Protective housing **15** is mounted on an oval or circular base **19** which may be formed of a flexible material enabling it to conform to the shape of helmet **3**. A layer of pressure sensitive adhesive **21** preferably is attached to the bottom of base **19** enabling the player to attach it easily to the rear region of the helmet, yet which enables the housing to be easily removed when no longer needed or during the playing of a game where such external devices may not be permitted. It is readily understood that housing **15** can have various shapes and be formed of various other materials without affecting the concept of the present invention. Likewise, the configuration of printed circuit board **5** can have other components so long as some type of signal is sent to a player upon his head and consequently the helmet, reaching a predetermined incorrect position as shown diagrammatically in FIG. **3**. Although the signal provided to the player preferably is an audible beep, other types of sensory signals could be utilized without affecting the concept of the present invention.

[0027] Training aid **1** preferably is mounted on rear region **25** of helmet **3** as shown in FIG. **1**, with the bottom edge of housing **15** being located a distance "D" which is approximately two to three inches, from the bottom edge **24** of the helmet, with the upper edge of housing **15** being approximately six inches (distance D_1) from helmet edge **24**.

[0028] The method of using training aid **1** is shown particularly in FIGS. **1-3**. Helmet **3** can be of numerous configurations and designs and usually will consist of an outer rigid shell **23** having a rear region **25** on which training aid **1** will be attached, and will have a pair of opposed side regions **27** which protects the side area of the player's head and face and a front region **29** which protects the forehead area of the user. The helmet usually will be provided with some type of face mask **31**, protecting a front opening **33** which provides a field of vision indicated at **35**, enabling the player to adequately see the surrounding area without materially affecting his view. It is readily understood that other helmet configurations can be utilized with training aid **1**, with helmet **3** shown and described above being the standard helmet presently in use by both amateur and professional football players. Furthermore, helmet **3** need not be limited to a football helmet but could be a lacrosse helmet, baseball helmet, bicycle helmet or other protective headgear.

[0029] As shown in FIG. **2**, a player's head will normally tilt slightly forward during impact with an opposing player, in which position the force of the blow indicated at **37**, is absorbed by the helmet without undue force being placed on the spine **39** or neck area of the wearer. Also, in this position, the player's field of view is correct enabling him to see the oncoming player prior to and during impact. Also, the position of FIG. **2** is the preferred position to enable a player to make a correct block or tackle on the opposing player.

[0030] However, many players just prior to contact will immediately lower his head to a position as shown in FIG. **3** out of natural instinct, causing the force of impact to be transmitted to the player's cervical area and spine which is at an undesirable angle and unable to satisfactorily absorb the impact force occasionally resulting in serious injury and possible paralysis. Also, the player's field of view **35** as shown in FIG. **3**, is at an improper position for making a proper block or tackle on the opposing player.

[0031] A player utilizing the training aid of the present invention when installed on the back of his helmet assists in maintaining his field of view where he can see approaching obstacles. The training aid is constantly monitoring the helmet and wearer's head position and is always ready to interact with the player if his helmet drops to a critical position. The training aid will normally be used during practice, and when a player approaches a block or tackle with his head tilted correctly maintaining a good field of view to see approaching obstacles, the training device is active but no alert is sounding. In this position, most collisions can be avoided, and if a blow is received to the front of the helmet, the spinal cord is in a forgiving position and compression and serious damage is unlikely. When the helmet drops below a preset critical angle, the training aid immediately sounds an audible beep. With a quick lift of the head of the player, it returns the helmet to the safe zone regaining the player's field of view and stops the audible beep. Continued use of the training aid will quickly condition the player to use safer heads up tackling, blocking and running techniques. Players can constantly condition their behavior through the audible tone training provided by the training aid of the present invention and can greatly revolutionize training techniques and significantly lower the need for analysis-based systems.

[0032] In accordance with the invention, upon the helmet and wearer's head reaching an improper unsafe position as

shown in FIG. **3**, tilt switch **9** will close connecting the circuit between battery **7** and horn **11** immediately providing an audible signal or beep to the player. Movement of the player's head downwardly approximately 90 degrees or more from a usual upright vertical position **40** to position **42** as shown by a comparison of FIGS. **1** and **3**, is believed to place the cervical area and particular the spine in a position which is more susceptible to injury. Training aid **1** attempts to prevent this from occurring.

[0033] A player after repeatedly hearing this signal will start to automatically return his head to a proper position as shown in FIG. **2**. Thus, by repeated use during practice, the constant beep upon the player's helmet and head reaching an unsafe position of FIG. **3**, will condition the player to maintain his head in an upright safe position as shown in FIG. **2**, which will assist in preventing serious injuries, and in addition improve the player's blocking and tackling techniques. Preferably, training aid **1** is intended to be used by a player during practice before the season starts and even during the season, yet removed for actual game conditions. However, the constant reminder to a player during practice that his head is dropping below the safe position will gradually condition the player not to drop his head to this unsafe position and to maintain it at a correct impact position for his own safety as well as to improve his blocking and tackling techniques. It is anticipated that after a season is concluded, training aid **1** being a low cost, can be discarded, or at the least replace battery **7** with a new battery prior to the start of the next training season. Thus, the training aid of the present invention and its method of use enhances the safety of the player by training him to keep his head at the correct impact position at all times during a game and especially just prior to impact with another player or even a foreign object in the playing area.

[0034] A modified embodiment of the invention is shown in FIGS. **7** and **8**. FIG. **7** shows a diagrammatic circuit indicated generally at **41** which is similar to the alarming system described with respect to the electrical circuit shown in FIG. **6**. The main difference is the use of an MEMS tilt switch **43** in place of a generic-type tilt sensor **9**. The manner of operation of the alarming system shown in FIG. **7** using a MEMS tilt switch **43** is the same as that discussed above with respect to the alarming system shown on printed circuit board **5**. The MEMS tilt switch provides pre-programmable angle thresholds and is more accurate than many tilt switches. The circuitry of FIG. **7** would be the preferred embodiment for mounting in a more permanent manner inside of a helmet **44** (FIG. **8**) where it is permanently affixed preferably by a pressure sensitive adhesive **45** to the inside surface **46** in the rear region **47** of helmet **44**. This modified circuitry would be protected by the surrounding cushioning pads **48** used in most helmets.

[0035] It is readily understood that training aid **1** could be used by other athletes and mounted on other types of helmets as discussed above. For example, it will enable a bicyclist to keep his head in the proper upright position to provide a safe field of view especially during racing situations; by tennis players to keep their head in the proper upright position especially when serving the ball wherein the training aid could be mounted on a head band of the tennis player or other type of strap worn by the tennis player during training sessions. These are just two other examples in which the improved training aid could be utilized and need not be limited only to football players, although the believed present primary use will be in the sport of football.

[0036] In the foregoing description, certain terms have been used for brevity, clearness, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

[0037] Moreover, the description and illustration of the invention is an example and the invention is not limited to the exact details shown or described.

1. A training aid comprising:

a helmet including a protective outer shell having two side regions, a rear region and a front region, said front region being formed with an opening to provide a field of vision for a wearer; and

a signaling device attached to the helmet to provide a signal to the wearer when the front region of the helmet is in a downwardly facing direction.

2. The training aid defined in claim **1** wherein the signaling device is positioned in the rear region of the helmet.

3. The training aid defined in claim **2** wherein the signaling device is attached on an exterior surface of the rear region of the helmet.

4. The training aid defined in claim **2** wherein the signaling device is mounted within an interior of the helmet adjacent the rear region.

5. The training aid defined in claim **1** wherein the signal is an audible signal.

6. The training aid defined in claim **1** wherein the signaling device includes a tilt switch.

7. The training aid defined in claim **6** wherein the tilt switch is a MEMS tilt switch.

8. The training aid defined in claim **6** wherein the signaling device includes a battery and a signaling horn; and in which the tilt switch upon reaching a predetermined angle actuates an electrical circuit between the battery and signaling horn.

9. The training aid defined in claim **1** wherein the signaling device includes a printed circuit board containing a tilt switch, a battery and an audible horn; and

wherein said printed circuit board is located within a protective housing attached to the rear region of the helmet.

10. The training aid defined in claim **9** wherein the protective housing is attached to the rear region of the helmet by an adhesive.

11. The training aid defined in claim **9** wherein an external switch is mounted on the housing for controlling an ON/OFF condition of the signaling device.

12. The training aid defined in claim **9** wherein the protective housing has a generally dome-shaped configuration.

13. The training aid defined in claim **1** wherein the signaling device is mounted between two and three inches above a bottom edge of the helmet on an exterior surface of the rear region.

14. The training aid defined in claim **1** wherein the signaling device is actuated upon the helmet moving downwardly through the angle approximately 90° or more from vertical.

15. A method of training a football player not to drop the player's head prior to contact with another player including the steps of:

mounting a signaling device on a helmet being worn by the player;

actuating the signaling device automatically upon the player tilting his head into a critical downward position; and

sounding an audible alarm upon actuating the signaling device to warn the player to keep his head in an up position.

16. The method defined in claim **15** including the steps of placing the signaling device in a protective housing formed of an impact resistant plastic; and mounting the protective housing on a rear region of the helmet.

17. The method defined in claim **16** including the step of mounting the protective housing on an exterior surface of the helmet with a pressure sensitive adhesive.

18. The method defined in claim **15** including the step of mounting the signaling device within the interior of the helmet adjacent a rear region of the helmet.

19. The method defined in claim **15** including the step of providing the signaling device with a manually operated ON/OFF switch.

20. The method defined in claim **15** including the steps of providing the signaling device with a tilt switch and completing an electric circuit upon the player's head moving downwardly approximately 90° or more from an upright vertical position.

21. A training aid for mounting on a protective headgear comprising:

a protective housing having a generally dome-shaped configuration;

an alarm circuit containing a tilt switch, a signaling device and a battery mounted within the protective housing; and

an attachment device for securing the protective housing on a rear region of the headgear.

* * * * *