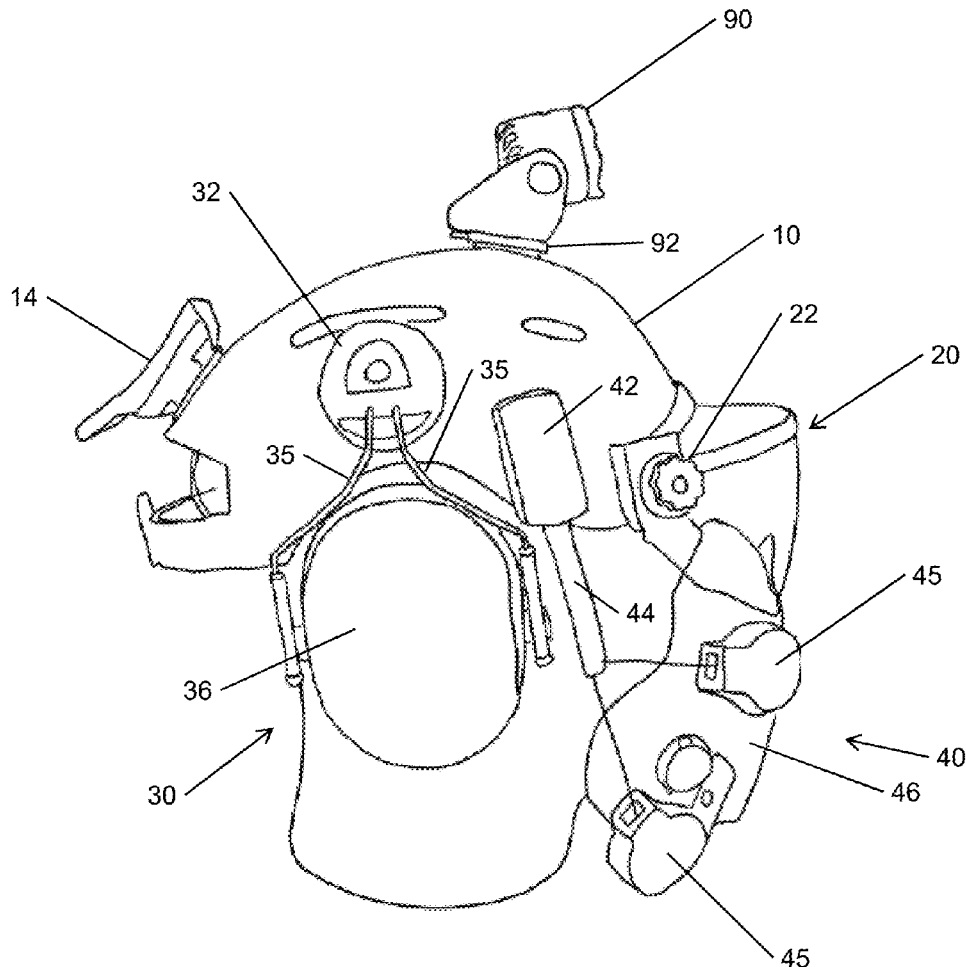




US 20190008228A1

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Ramey(10) **Pub. No.: US 2019/0008228 A1**(43) **Pub. Date: Jan. 10, 2019**(54) **INTEGRATED NON-CONFLICTING
HEADGEAR PLATFORM SYSTEM AND
METHOD**(52) **U.S. Cl.**
CPC *A42B 3/0406* (2013.01); *A42B 3/20*
(2013.01); *A42B 3/16* (2013.01)(71) Applicant: **David Francis Ramey**, Ft. Collins, CO
(US)(57) **ABSTRACT**(72) Inventor: **David Francis Ramey**, Ft. Collins, CO
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30, 2016.**Publication Classification**(51) **Int. Cl.**
A42B 3/04 (2006.01)
A42B 3/16 (2006.01)
A42B 3/20 (2006.01)

A system for and method of providing safety equipment to a user is provided. The system includes a headgear platform that is configured to be secured to a head of a while supporting a plurality of safety accessories. Each safety accessory is configured to move independent of each of the other safety accessories so as to allow for quick and easy access and deployment of only the safety equipment that is required or otherwise desired for a particular job. When a particular safety accessory is no longer required or desired, it can be quickly and easily moved to a stowed configuration, thereby moving the safety accessory out of the user's way while maintaining it in close proximity for quick and easy redeployment when required or desired.



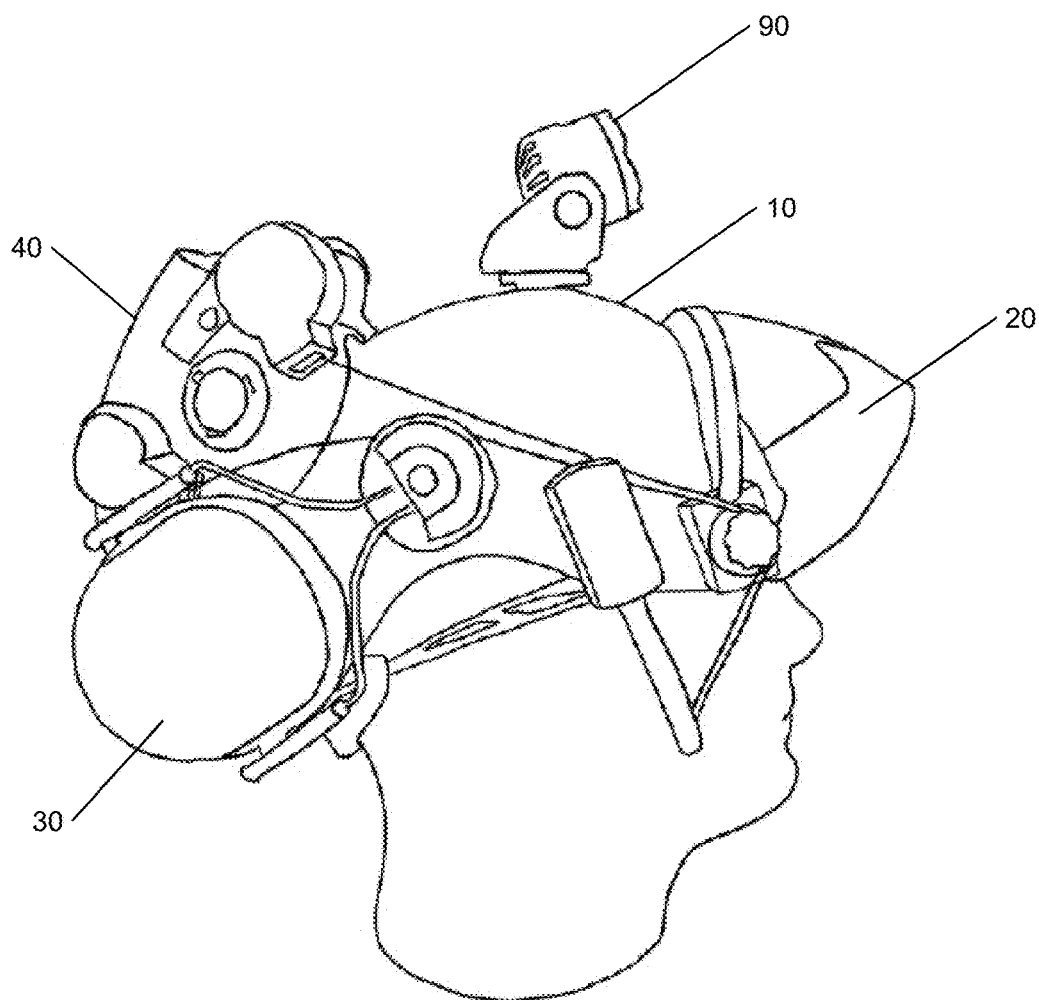


Fig. 1B

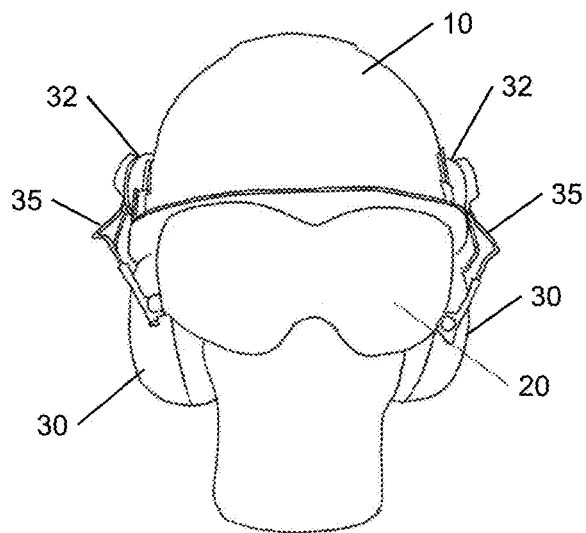


Fig. 1C

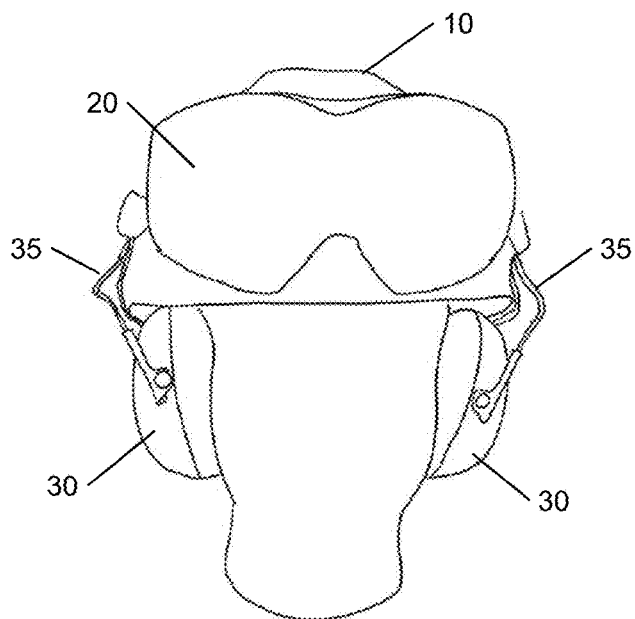


Fig. 1D

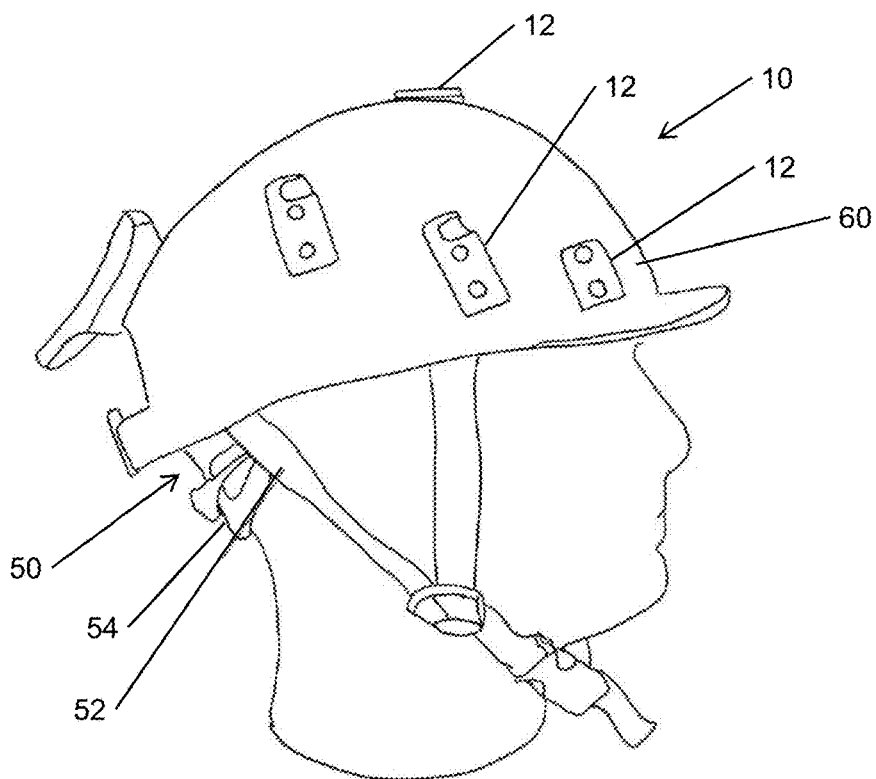


Fig. 2A

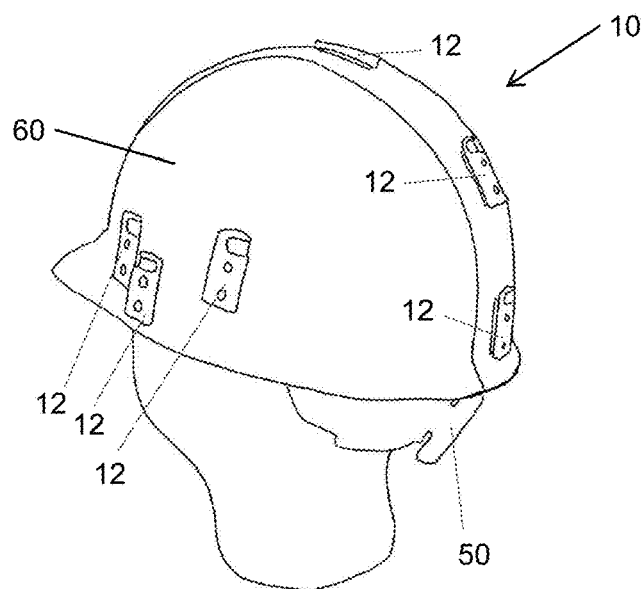


Fig. 2B

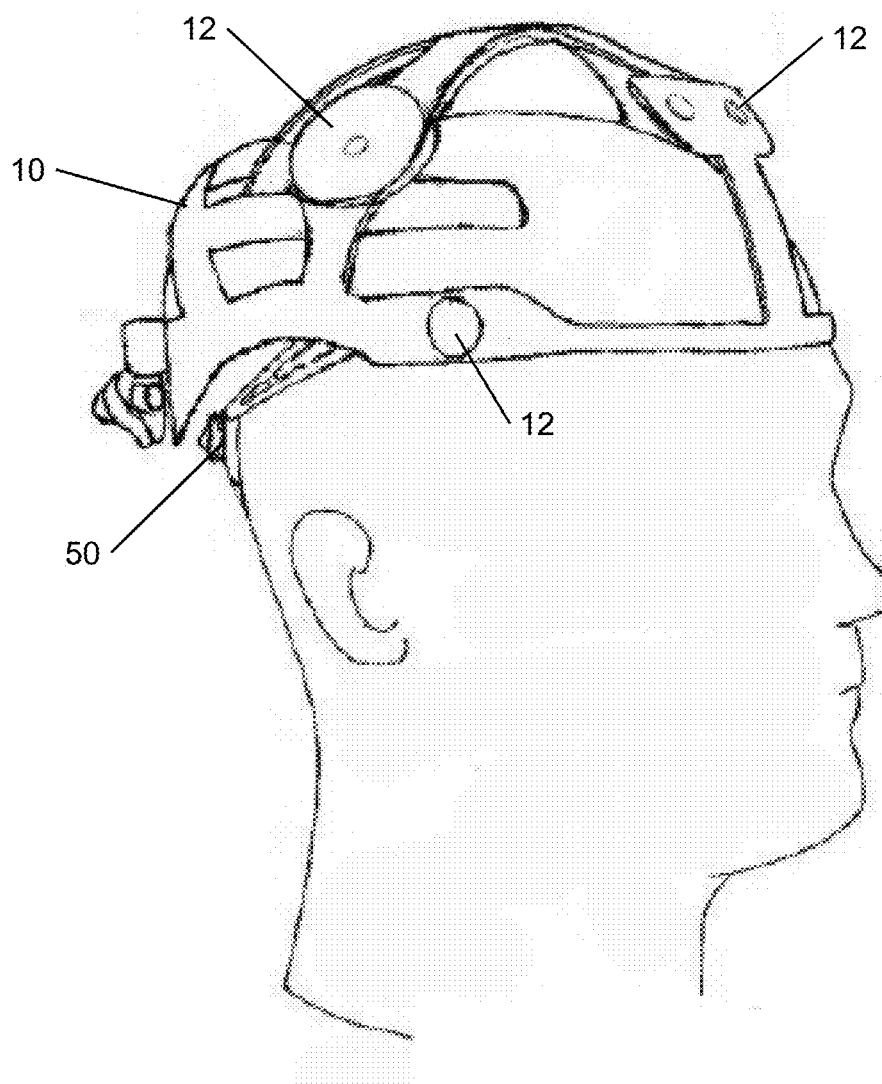


Fig. 2C

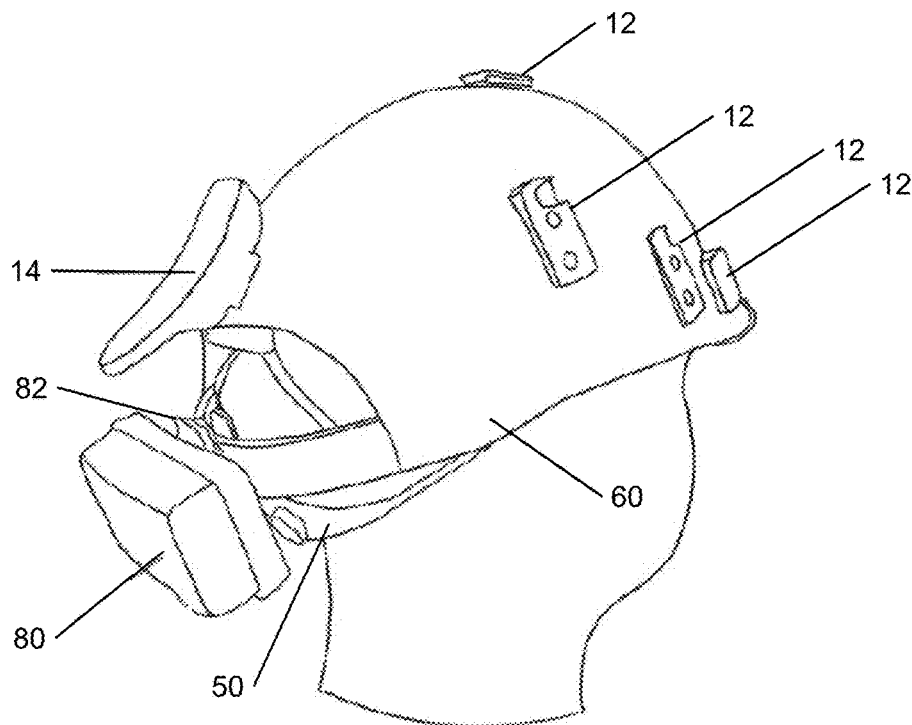


Fig. 2D

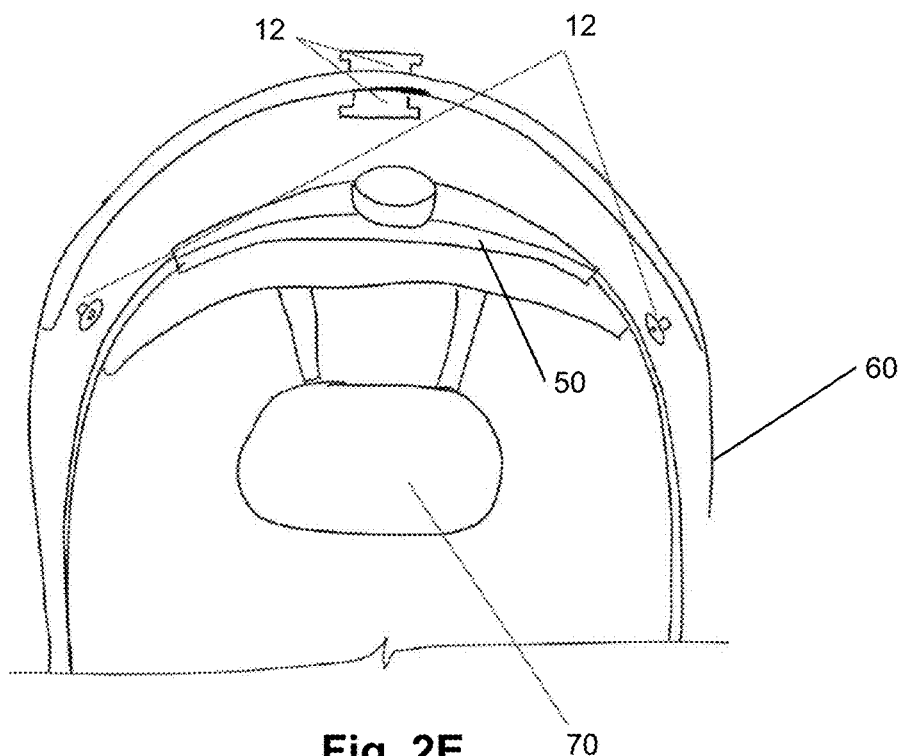


Fig. 2E

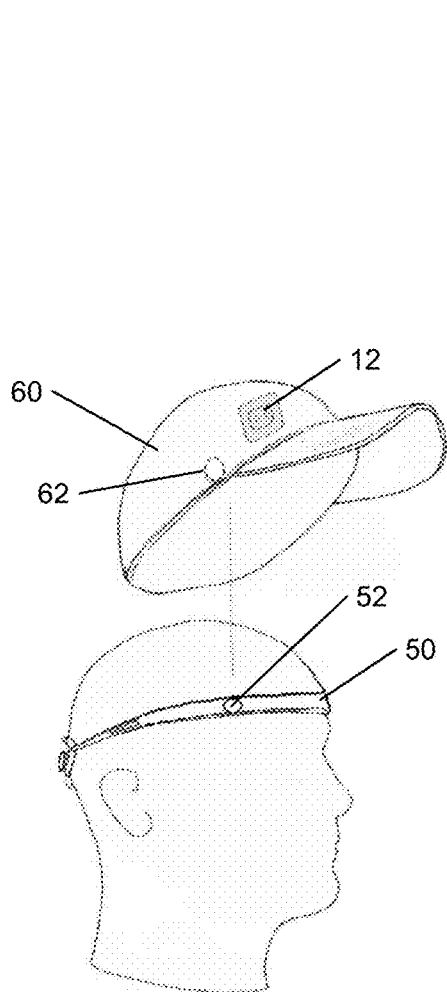


Fig. 3A

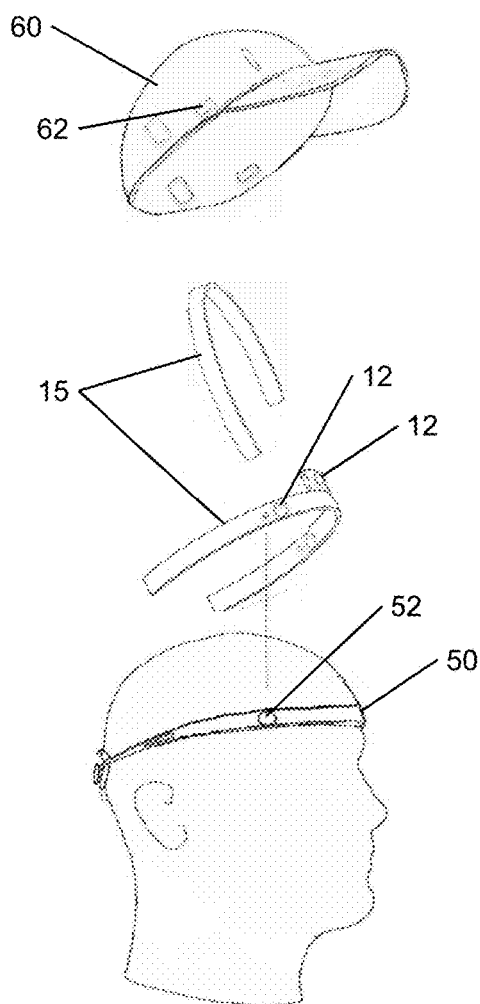


Fig. 3B

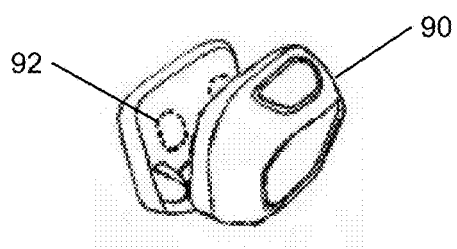


Fig. 3C

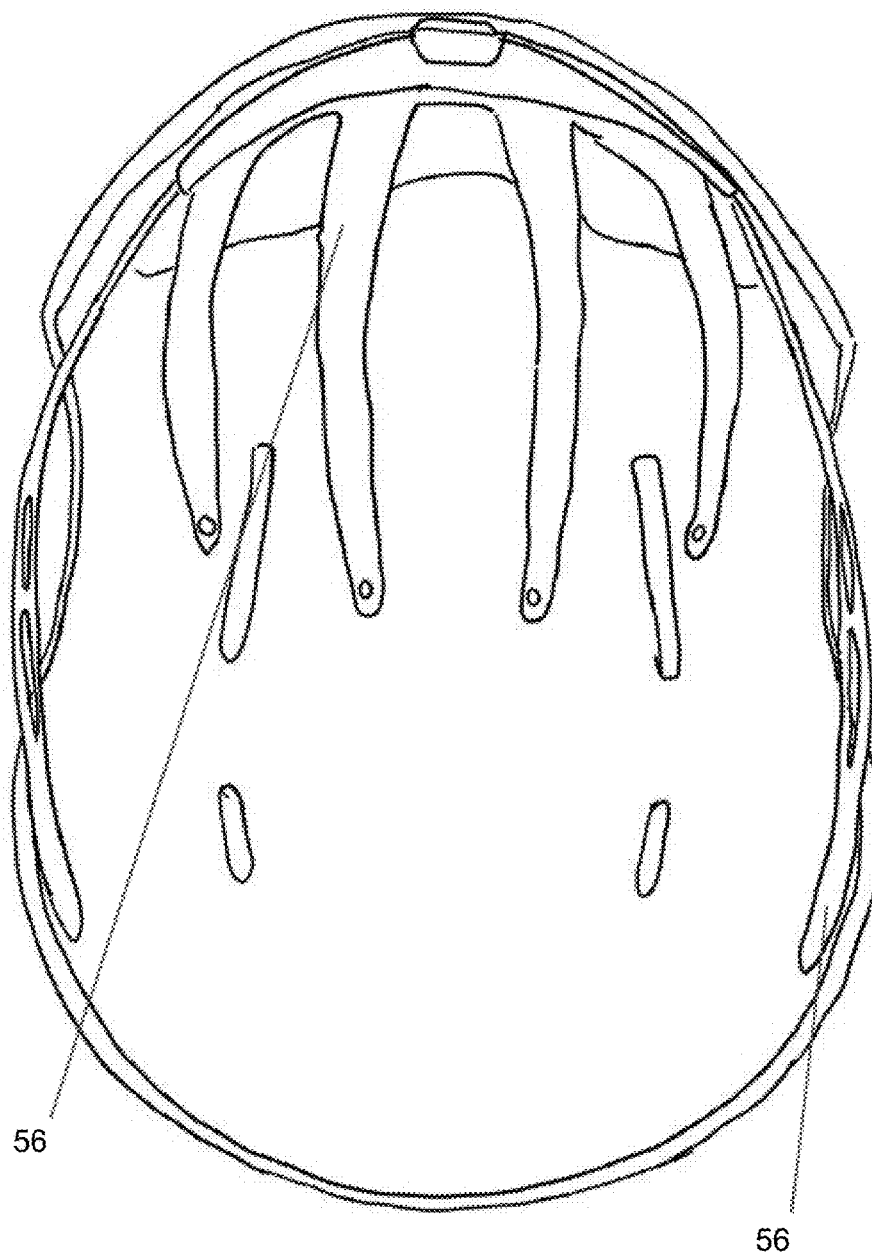


Fig. 3D

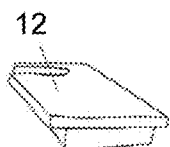


Fig. 4A

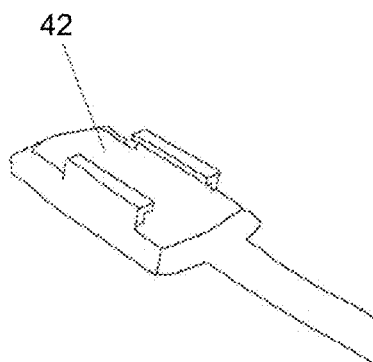


Fig. 4B



Fig. 4C



Fig. 4D



Fig. 4E

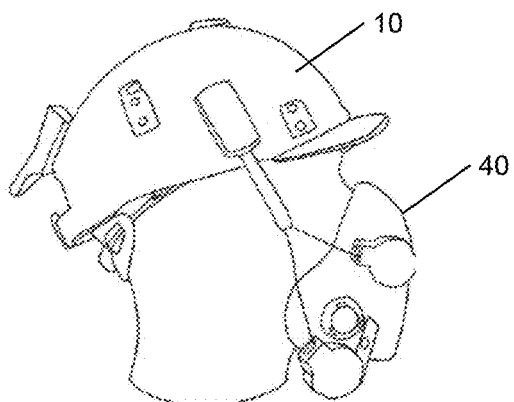


Fig. 5A

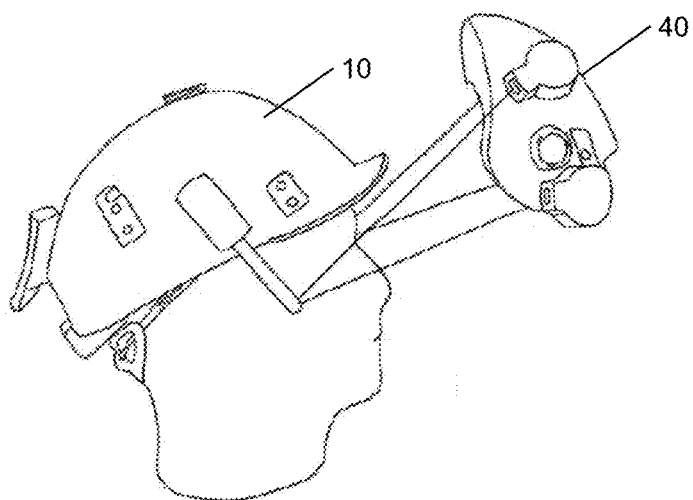


Fig. 5B

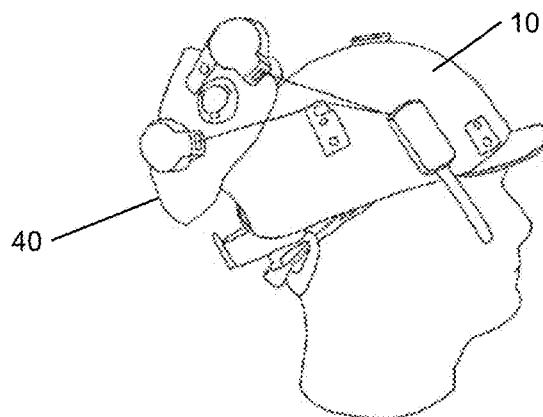


Fig. 5C

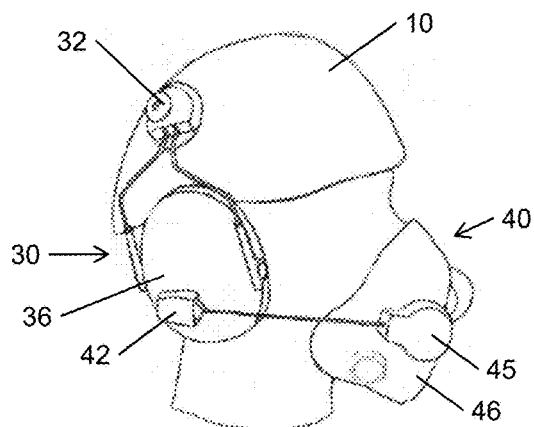


Fig. 6A

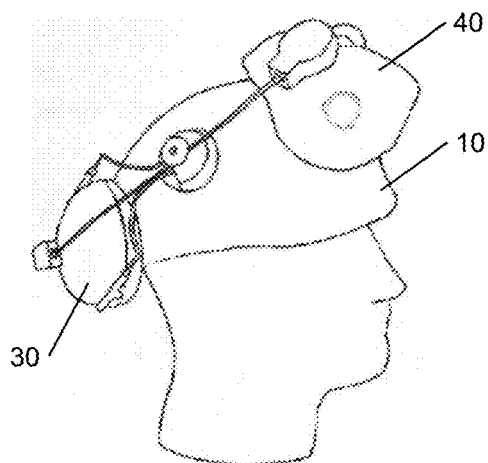


Fig. 6B

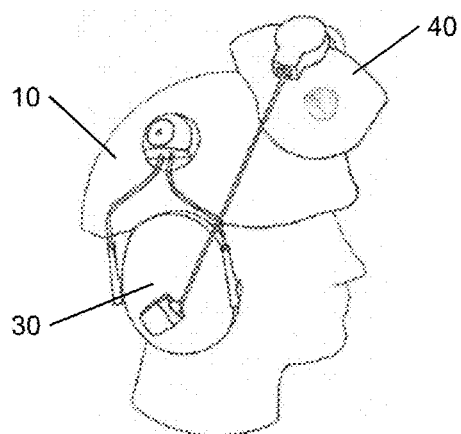


Fig. 6C

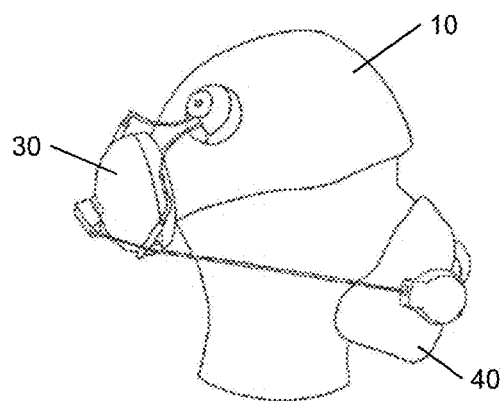


Fig. 6D

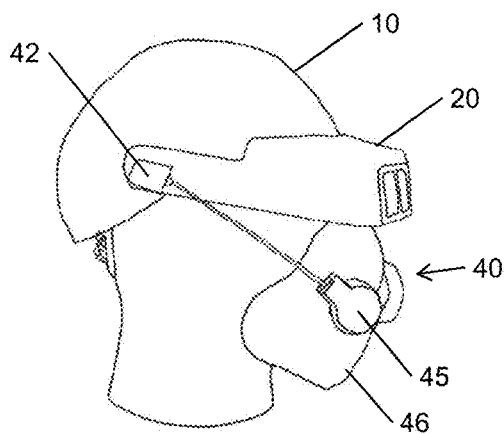


Fig. 7A

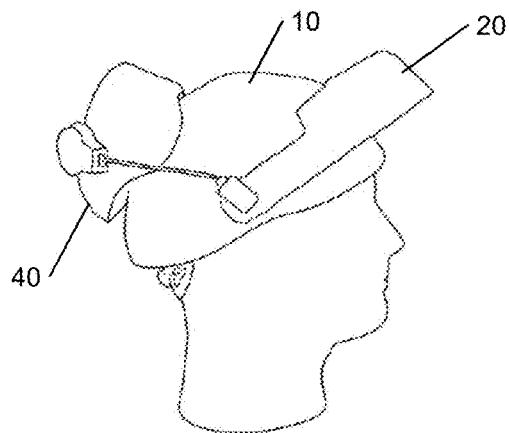


Fig. 7B

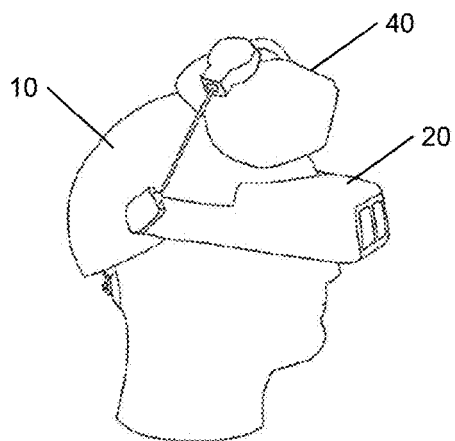


Fig. 7C

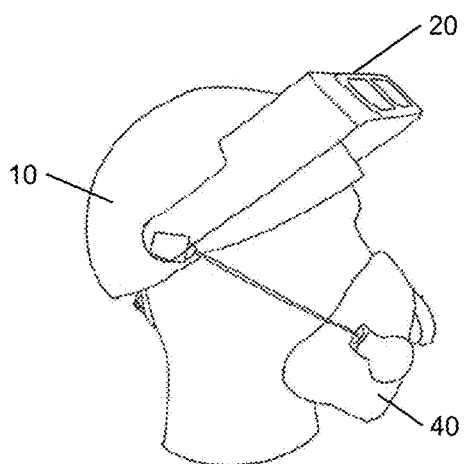


Fig. 7D

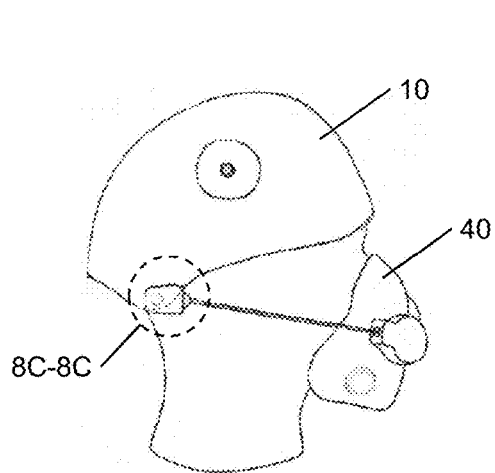


Fig. 8A

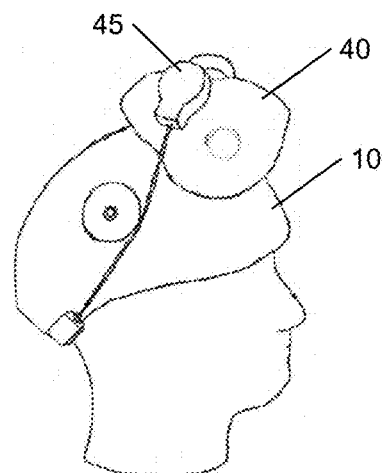


Fig. 8B

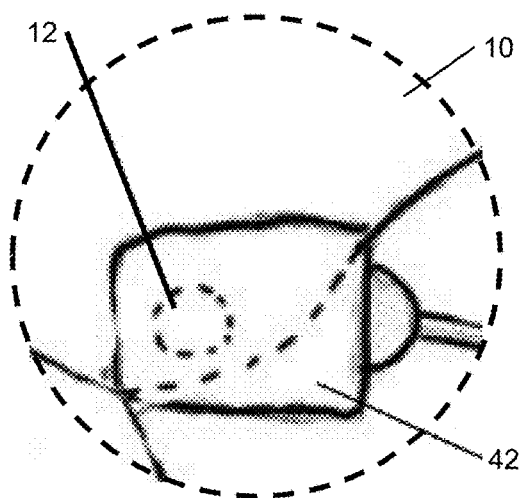


Fig. 8C

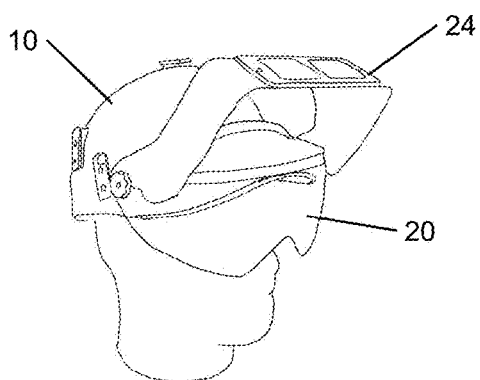


Fig. 9A

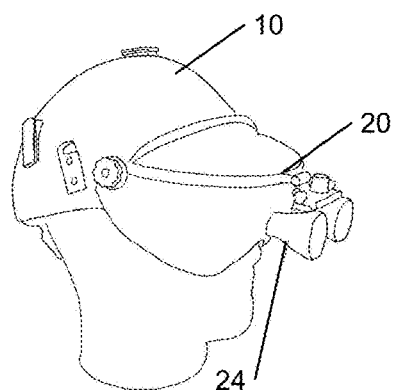


Fig. 9B

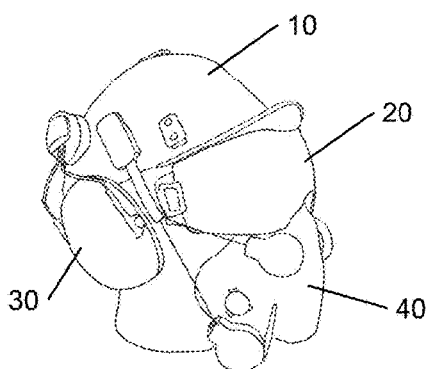


Fig. 9C

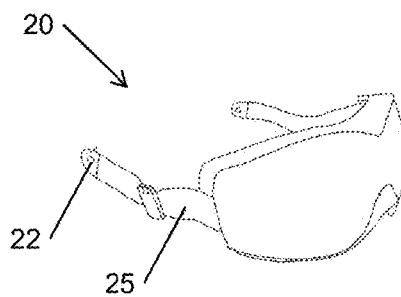


Fig. 9D

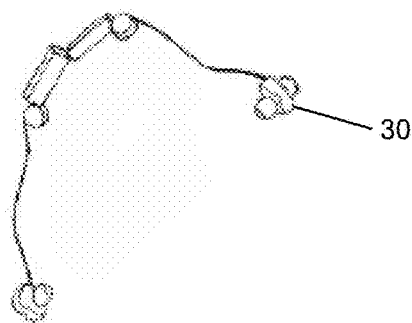


Fig. 9E

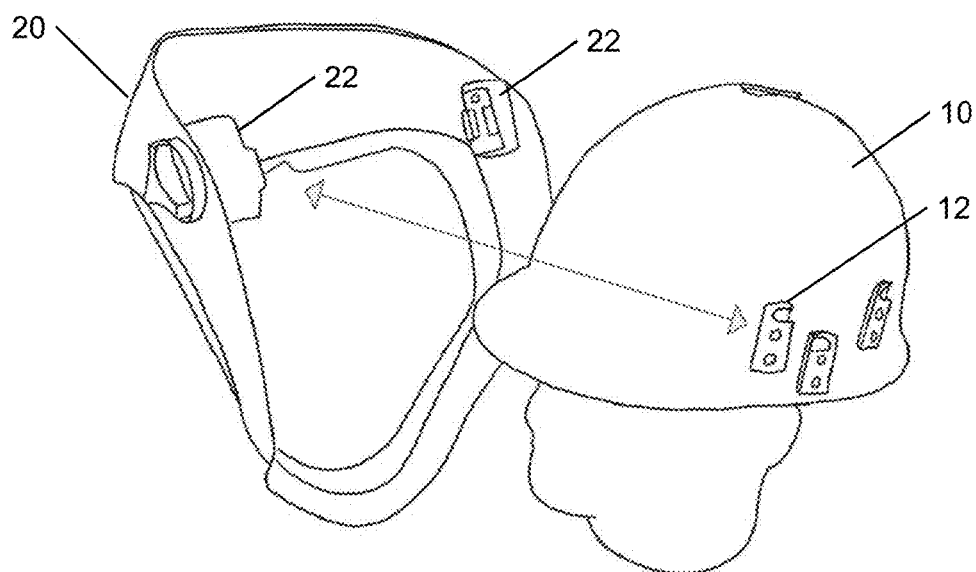


Fig. 9F

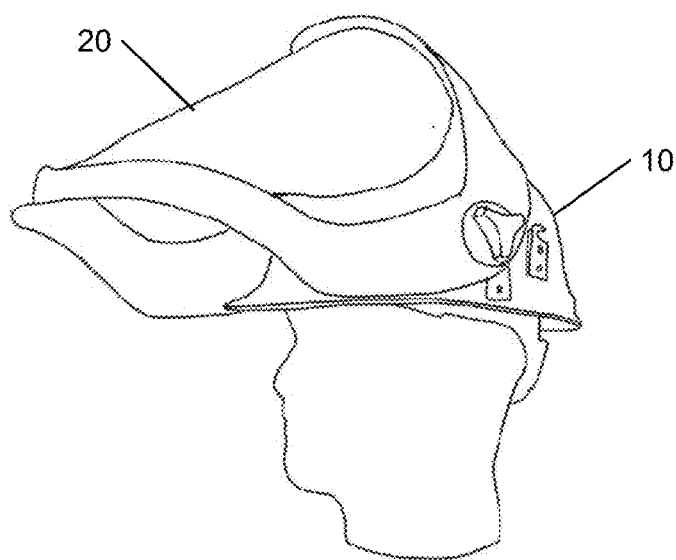


Fig. 9G

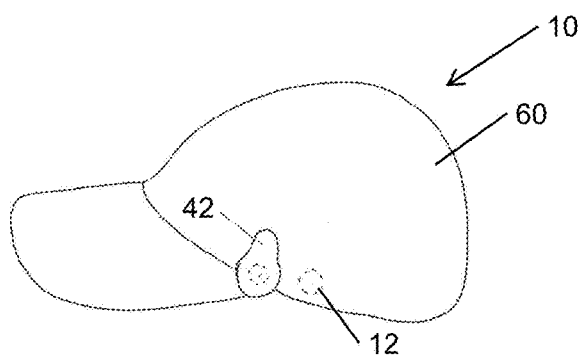


Fig. 10A

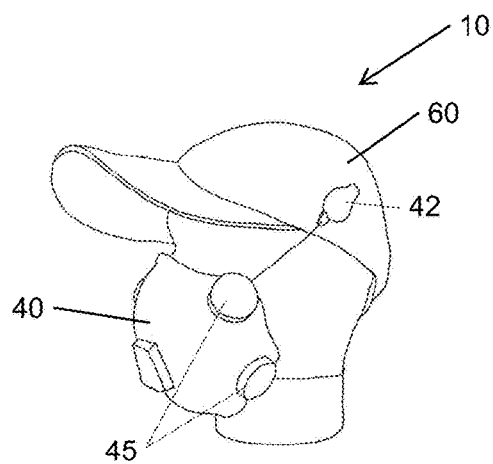


Fig. 10B

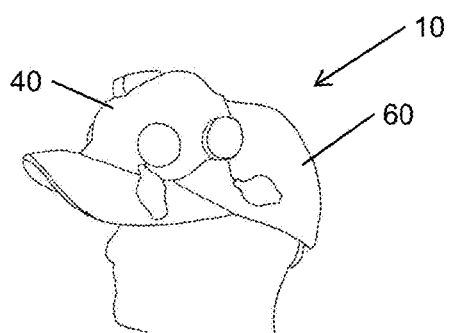


Fig. 10C

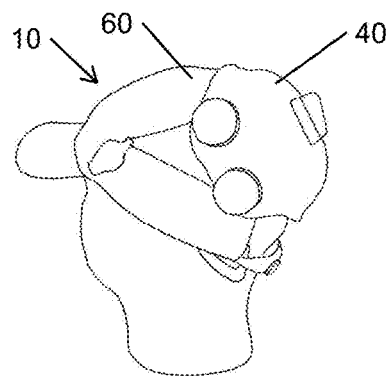


Fig. 10D

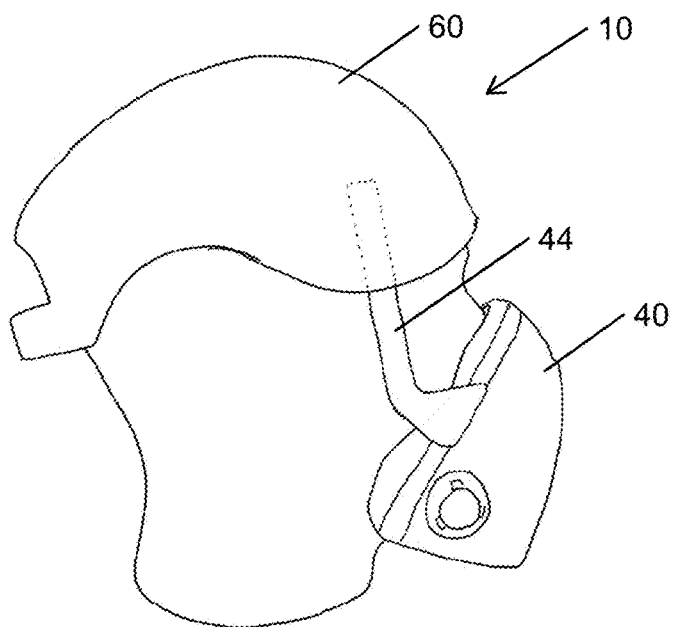


Fig. 11A

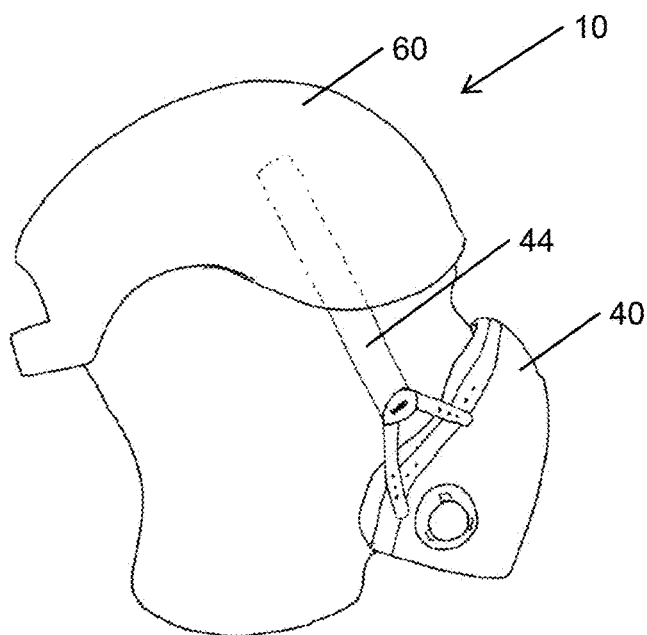


Fig. 11B

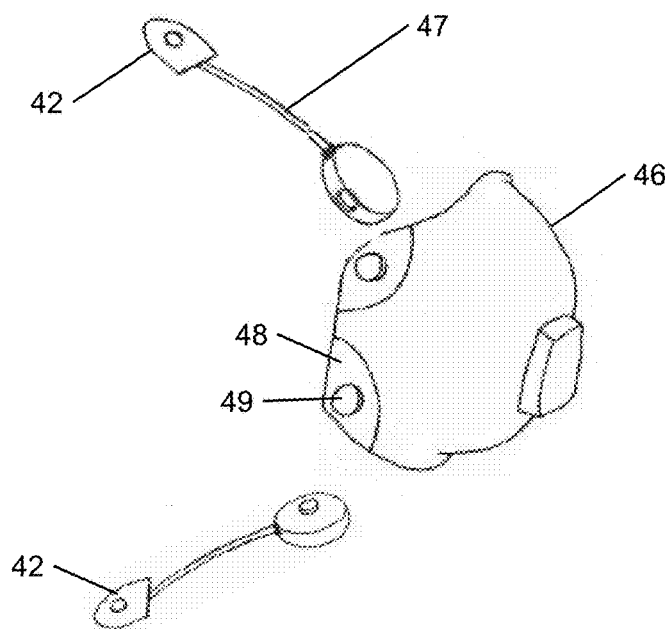


Fig. 12A

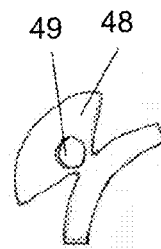


Fig. 12C

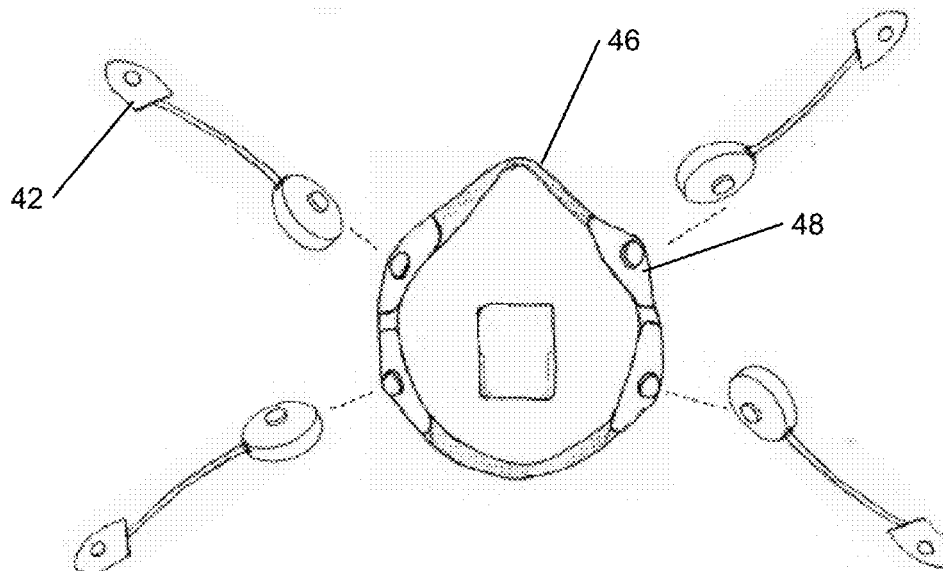


Fig. 12B

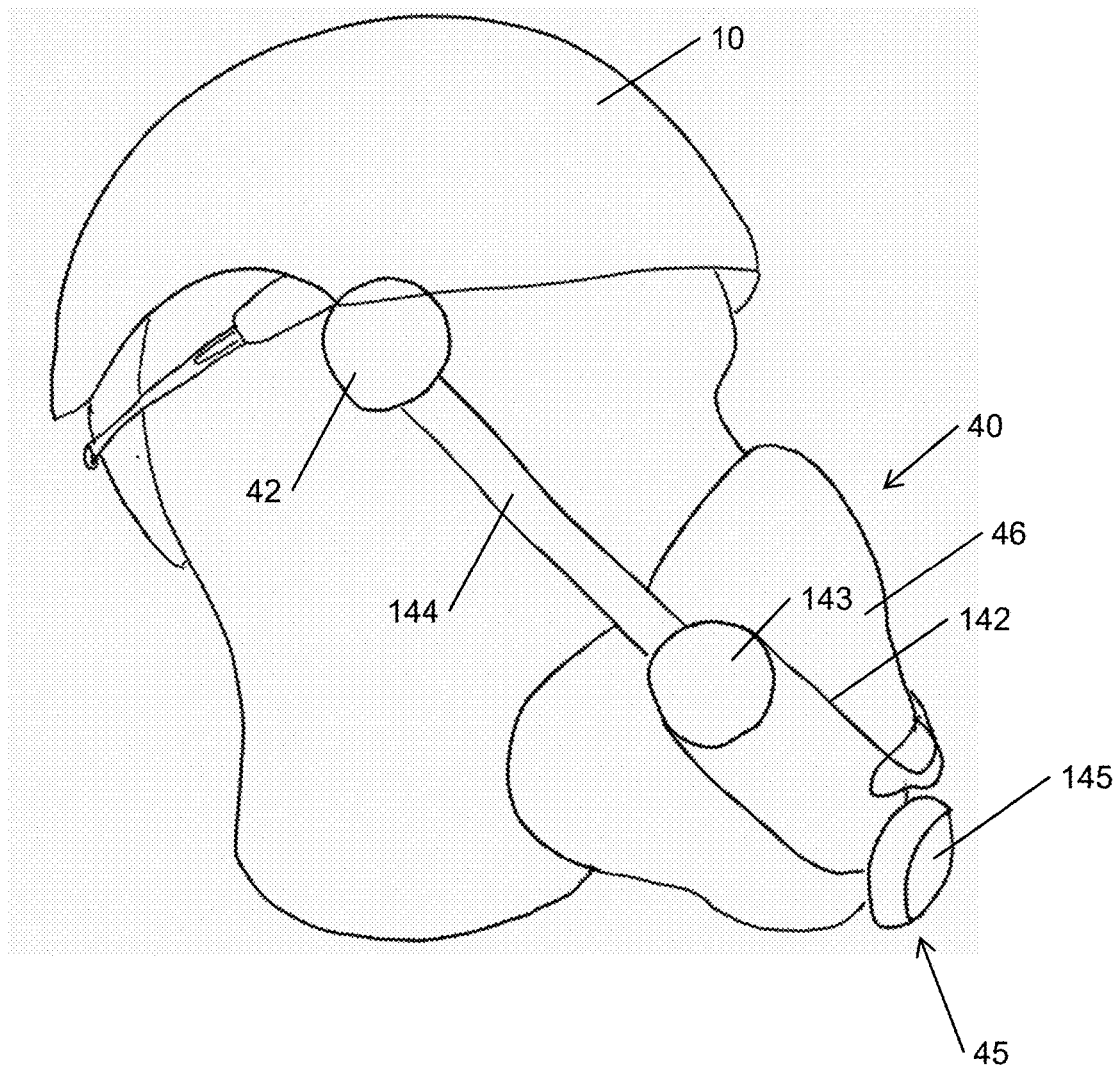


Fig. 12D

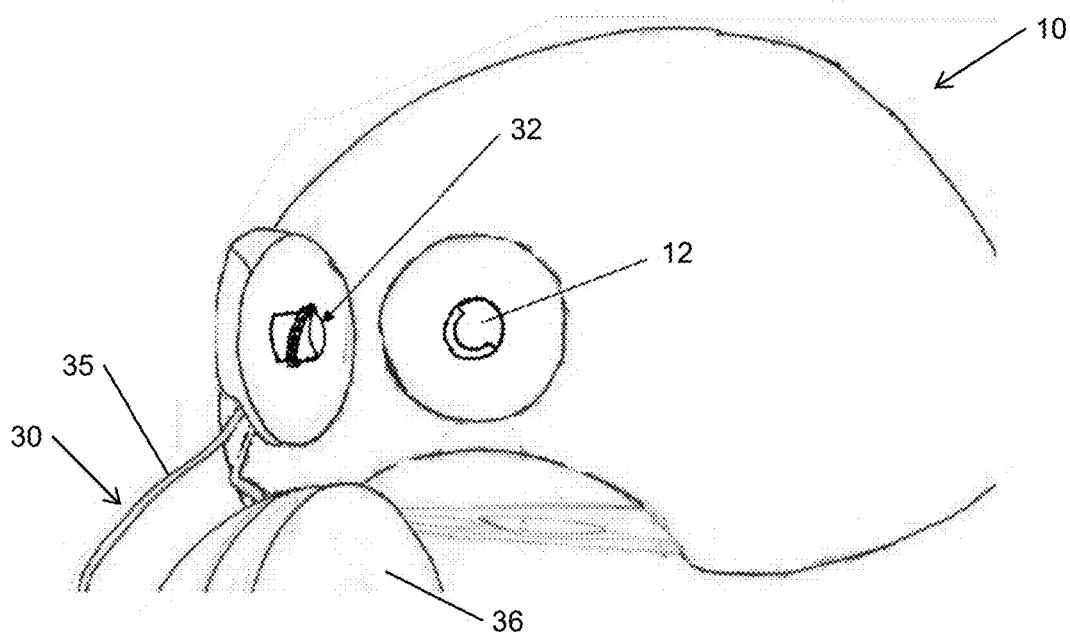


Fig. 13

INTEGRATED NON-CONFLICTING HEADGEAR PLATFORM SYSTEM AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority pursuant to 35 U.S.C. 119(e) to co-pending U.S. Provisional Patent Application Ser. No. 62/440,714, filed Dec. 30, 2016, the entire disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates generally to safety gear. More specifically, the present invention is concerned with quick-connect detachable safety accessories.

BACKGROUND

[0003] A variety of ear, eye, and head protection devices are often used, and sometimes required, to protect users from common industrial risks, such as harm associated with loud noises, flying objects, falling objects, and the like. Shields, masks, respirators, and other such devices are also often used to protect users from other risks such as harmful exposure to light, heat, dust, or gas. Unfortunately, such safety equipment is often uncomfortable or difficult to use, making it less likely that such equipment will be used properly or at all. Consequently, it would be beneficial to have safety equipment that is comfortable and easy to use so that users are more likely to use such safety equipment and so that users are more likely to use such equipment properly.

[0004] Often, a variety of risks require use of a variety of safety equipment simultaneously. Such circumstances often increase the chance that one or more piece of safety equipment will be misused or not used at all, whether intentionally or not. Such circumstances also often decrease the comfort and effectiveness of one or more of the required pieces of safety equipment. Furthermore, use of one piece of safety equipment often encumbers use of another piece of safety equipment and/or requires sequential installation and/or removal of such equipment. Consequently, it would be beneficial to have a system that is configured to quickly and easily allow a user to deploy each piece of equipment needed, when needed. It would also be beneficial to have a system that informs a user and/or a third party when a user is using all required and/or suggested equipment and if all such equipment is being used properly. It would further be beneficial if each piece of safety equipment could be used without encumbering use or removal of any other piece of safety equipment. It would still further be beneficial to have a system that provides comfort to a user.

[0005] Federal regulations, employee lawsuits, and other considerations have provided many employers with incentives to ensure that workers use proper safety equipment. Unfortunately, it is often difficult or impossible to monitor or record whether an individual has used proper equipment at all times. Consequently, it would be beneficial to have a system and method for monitoring an employee's use of safety equipment and comparing such use to other factors indicative of whether additional safety equipment should be used.

[0006] Unfortunately, many workers do not see the benefit of wearing safety equipment until someone fails to wear adequate safety equipment. Even then, adverse effects from

such failure are often not known until many years later. Consequently, it would be beneficial to have a system and method for monitoring and recording use of safety equipment and for further monitoring and recording other factors so as to provide a user with a determination of risks and/or harm avoided by wearing such safety equipment.

SUMMARY

[0007] The present inventive concept system and method offers a unique and innovative solution to a real problem, as well as redefining the aesthetic of the current antiquated market. Almost all of the other safety markets: bicycling, motorcycling, skiing/snowboarding, search and rescue, military/police have modernized safety solutions. In sports such as cycling, horseback riding, skiing, and climbing, the understood risks have given rise to a widespread use and acceptance of wearing helmets for protection. Safety first is a given. The present inventive concept brings the next generation of safety to the construction worker, the DIYer, and anyone concerned with their health and safety. These users will appreciate high quality, aesthetically designed integrated solutions for whatever they do in the field, and almost everyone will have a use for some aspect of this product. Examples of possible users and use industries include: general safety, residential construction, commercial construction, use of shop or power tools, search and rescue, sports or extreme sports, adventure, kayaking, landscaping, first responders, airport ground crew and/or military.

[0008] The present inventive concept includes integrated headgear such as a hat or helmet that has quick-connect detachable accessories. The quick-connect detachable accessories include protective equipment that are non-conflicting one with another. In other words, all of the protective equipment accessories work in any configuration without conflicting with any other accessory. The accessories attach to anchor points on the helmet or subframe of the headgear.

[0009] The present inventive concept includes multiple embodiments with differing styles of headgear. In one embodiment, the headgear includes an ultra-lightweight integrated subframe with anchor points. In another embodiment, the headgear includes a mid-weight integrated bump hat with integrated anchor points and ventilation. In some embodiments, the headgear satisfies the European safety standard EN 812 1997. In another embodiment, the headgear includes a helmet system that meets OSHA standards and has anchor points. In some embodiments, the headgear includes vents for air circulation. In some embodiments, the headgear platform may be covered with different covers or skins, such as a brim, skull cap, sporty adventure, winter, various sports teams, other logos, etc. In some embodiments, the inventive concept includes anchor kits to be retrofitted to convert pre-existing hats, helmets or other headgear to be compatible with the quick-connect, detachable accessories.

[0010] The headgear is compatible with various accessories that attach to anchor points on the headgear. The accessories may include visor, safety or corrective glasses, ear protection, earmuffs or retractable earbuds, dust mask or half face respirator, and headlamp or other integrated lighting system.

[0011] In some embodiments, the headgear platform includes a retention system for securing the safety equipment system to a head of a user. In some embodiments, the retention system includes a rear engagement feature for engaging a back of a user's head. In some embodiments, the

retention system includes a neck strap, such as an elastic neck strap, a retractable neck strap, or any other neck strap now known or later developed, thereby allowing a user to further secure the headgear platform to the user's head. In some embodiments, the retention system does not include a neck strap and/or the retention system is configured such that a user is not required to utilize the neck strap, thereby allowing a user to quickly and easily put on and remove the safety equipment system of the present invention.

[0012] All accessories function independently of one another and can be moved between respective stowed and deployed configurations independently. In other words, in some embodiments, a user can move a dust mask on or off, a visor up or down, an earmuff on or off, and/or add or remove a headlamp, a camera, and/or another accessory, each independently without affecting use of any other accessory. All accessories have a docking station, or a place to be stowed on the headgear. All accessories have quick-connect/disconnect capabilities and can be quickly removed entirely or stowed when not needed. Headgear configurations range from no accessories to all accessories and in any combination. Headgear platforms have integrated a universal system of anchors that allow for attachment to the accessories. The headgear is comfortable, lightweight, and includes an adjustable headgear retention system.

[0013] In some embodiments, the system includes or is in data communication with one or more communication, location, and/or other system or feature. In this way, the system is configured to allow the user to communicate with third parties and/or to allow the system, the user, and/or a third party to obtain information about the location of the user. In some embodiments, the system includes or is in data communication with one or more sensor or other feature system for monitoring, recording, and/or determining one or more risk to the user and/or whether a user has deployed all safety equipment required and/or suggested to avoid or otherwise mitigate such risk.

[0014] The foregoing and other objects are intended to be illustrative of the invention and are not meant in a limiting sense. Many possible embodiments of the invention may be made and will be readily evident upon a study of the following specification and accompanying drawings comprising a part thereof. Various features and subcombinations of invention may be employed without reference to other features and subcombinations. Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings, wherein is set forth by way of illustration and example, an embodiment of this invention and various features thereof.

BRIEF DESCRIPTION

[0015] A preferred embodiment of the invention, illustrative of the best mode in which the applicant has contemplated 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. 1A is a side view of an embodiment of the safety equipment system of the present invention, eye protection, hearing protection, and respiratory protection accessories of the safety equipment system each shown in a respective deployed configuration.

[0017] FIG. 1B is a side view of the safety equipment system of FIG. 1A, eye protection, hearing protection, and respiratory protection accessories of the safety equipment system each shown in a respective stowed configuration.

[0018] FIG. 1C is a front view of an embodiment of the safety equipment system of the present invention, eye protection and hearing protection accessories of the safety equipment system each shown in a respective deployed configuration.

[0019] FIG. 1D is a front view of the safety equipment system of FIG. 1C, the eye protection accessory of the safety equipment system shown in a stowed configuration.

[0020] FIG. 2A is a side view of an embodiment of the safety equipment system of the present invention, a retention system of the safety equipment system including a neck strap.

[0021] FIG. 2B is a rear perspective view of an embodiment of a headgear platform of the present invention, the headgear platform having a plurality of platform features, the headgear platform having an outer shell.

[0022] FIG. 2C is a perspective view of a headgear platform of the present invention, the headgear platform shown without an outer shell.

[0023] FIG. 2D is a perspective rear view of a headgear platform having a battery pack for providing power to one or more powered accessory.

[0024] FIG. 2E is a partial bottom view of a headgear platform of the present invention, the headgear platform having an outer shell, inner padding, and two styles of platform features.

[0025] FIG. 3A is an exploded view of a headgear platform showing a retention system secured to a head of a user with an outer shell positioned above the head of the user.

[0026] FIG. 3B is an exploded view of a headgear platform showing a retention system secured to a head of a user with an outer shell and support features positioned above the head of the user.

[0027] FIG. 3C is a perspective view of an light device that has been adapted to secure to the headgear platform of FIG. 3A.

[0028] FIG. 3D is a top view of a headgear platform shown without an outer shell.

[0029] FIG. 4A is a perspective view of a rail of the present invention.

[0030] FIG. 4B is a perspective view of a track of the present invention.

[0031] FIG. 4C is a perspective view of an anchor of the present invention.

[0032] FIG. 4D is a perspective view of a keyhole clip of the present invention.

[0033] FIG. 4E is a perspective view of the keyhole clip of FIG. 4D engaged with the anchor of FIG. 4D.

[0034] FIG. 5A is a side view of an embodiment of the present invention, a respiratory protection accessory shown in a deployed configuration.

[0035] FIG. 5B is a side view of the embodiment of FIG. 5A, the respiratory protection accessory shown in an intermediate configuration.

[0036] FIG. 5C is a side view of the embodiment of FIG. 5A, the respiratory protection accessory shown in a stowed configuration.

[0037] FIG. 6A is a side view of an embodiment of the present invention, a respiratory protection accessory and a hearing protection accessory each shown in respective deployed configurations.

[0038] FIG. 6B is a side view of the embodiment of FIG. 6A, the respiratory protection accessory and the hearing protection accessory each shown in respective stowed configurations.

[0039] FIG. 6C is a side view of the embodiment of FIG. 6A, the respiratory protection accessory shown in a stowed configuration and the hearing protection accessory shown in a deployed configuration.

[0040] FIG. 6D is a side view of the embodiment of FIG. 6A, the respiratory protection accessory shown in a deployed configuration and the hearing protection accessory shown in a stowed configuration.

[0041] FIG. 7A is a side view of an embodiment of the present invention, a respiratory protection accessory and an eye protection accessory each shown in respective deployed configurations.

[0042] FIG. 7B is a side view of the embodiment of FIG. 7A, the respiratory protection accessory and the eye protection accessory each shown in respective stowed configurations.

[0043] FIG. 7C is a side view of the embodiment of FIG. 7A, the respiratory protection accessory shown in a stowed configuration and the eye protection accessory shown in a deployed configuration.

[0044] FIG. 7D is a side view of the embodiment of FIG. 7A, the respiratory protection accessory shown in a deployed configuration and the eye protection accessory shown in a stowed configuration.

[0045] FIG. 8A is a side view of an embodiment of the present invention, a respiratory protection accessory shown in a deployed configuration.

[0046] FIG. 8B is a side view of the embodiment of FIG. 8A, the respiratory protection accessory shown in a stowed configuration.

[0047] FIG. 8C is a detail view taken from FIG. 8A and shown on an enlarged scale.

[0048] FIG. 9A is a perspective view of an embodiment of the present invention, an eye protection accessory shown in a deployed configuration a visual enhancement accessory shown in a stowed configuration.

[0049] FIG. 9B is a perspective view of an embodiment of the present invention, an eye protection accessory shown in a deployed configuration, a visual enhancement accessory coupled to the eye protection accessory shown in a deployed configuration.

[0050] FIG. 9C is a perspective view of an embodiment of the present invention, an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory each shown in a deployed configuration.

[0051] FIG. 9D is a perspective view of the eye protection accessory of FIG. 9C.

[0052] FIG. 9E is a perspective view of a hearing protection accessory of various embodiments of the present invention.

[0053] FIG. 9F is a perspective view of an embodiment of the present invention, an eye protection accessory shown displaced from a headgear platform.

[0054] FIG. 9G is a perspective view of the embodiment of FIG. 9F, the eye protection accessory shown in a stowed configuration.

[0055] FIG. 10A is a side view of a headgear platform of the present invention.

[0056] FIG. 10B is a perspective view of an embodiment of the present invention, a respiratory protection accessory shown in a deployed configuration.

[0057] FIG. 10C is a perspective view of the embodiment of FIG. 10B, the respiratory protection accessory shown in a stowed configuration.

[0058] FIG. 10D is a perspective view of the embodiment of FIG. 10B, the respiratory protection accessory shown in a stowed configuration.

[0059] FIG. 11A is a side view of an embodiment of the present invention, a respiratory protection accessory shown in a deployed configuration.

[0060] FIG. 11B is a side view of an embodiment of the present invention, a respiratory protection accessory shown in a deployed configuration.

[0061] FIG. 12A is a perspective exploded view of a portion of a respiratory protection accessory of the present invention.

[0062] FIG. 12B is a front exploded view of the portion of the respiratory protection accessory of FIG. 12A.

[0063] FIG. 12C is a side view of a mask clip of the present invention.

[0064] FIG. 12D is a side view of an embodiment of the present invention showing a respiratory protection accessory in a deployed configuration.

[0065] FIG. 13 is a partial perspective view of a headgear platform and a hearing protection accessory of an embodiment of the present invention, the hearing protection accessory being decoupled from the headgear platform.

[0066] Appendix includes additional information pertaining to certain embodiments of the present invention, including drawings, pictures, and descriptions of the present invention.

DETAILED DESCRIPTION

[0067] As required, a detailed embodiment of the present invention is disclosed herein; however, it is to be understood that the disclosed embodiment is merely exemplary of the principles of the invention, which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

[0068] Referring to FIGS. 1A and 1B, some embodiments of the safety equipment system of the present invention include a headgear platform 10 and a plurality of accessories coupled thereto. In some embodiments, the plurality of accessories includes one or more eye protection accessory 20, one or more hearing protection accessory 30, one or more respiratory protection accessory, one or more light accessory 90, and/or one or more other accessory now known or later developed. In some embodiments, one or more accessory includes a respective engagement feature for selectively engaging with the headgear platform. In some embodiments, one or more accessory is selectively moveable between a respective stowed configuration and a respective deployed configuration. In some embodiments, each accessory is selectively moveable between its respective stowed and deployed configurations independent of the configuration of each of the other accessories.

[0069] In some embodiments, the safety equipment system includes an eye protection accessory 20. In some embodiments, the eye protection accessory 20 is moveable between a stowed configuration out of a user's line of sight and a deployed configuration in a user's line of sight. In some such embodiments, the eye protection accessory 20 includes one or more side, top, and/or bottom protection feature for further protecting the user's eyes from light, debris, and/or other hazards. In some embodiments, the eye protection accessory 20 includes one or more biasing mechanism 25, such as an elastic band, for biasing the eye protection accessory 20 towards a face of a user.

[0070] In some embodiments, the eye protection accessory 20 includes one or more engagement feature 22 for selectively engaging with a headgear platform 10 of the present invention. In this way, one or more eye protection accessory 20 may be utilized with one or more headgear platform 10, and vice versa. Referring to FIGS. 9A and 9B, some embodiments of the present invention include one or more visual enhancement accessory 24. In some embodiments, the visual enhancement accessory 24 is coupled directly to an eye protection accessory such that the visual enhancement accessory 24 is moveable between a stowed and deployed configuration by moving the eye protection accessory between a respective stowed and deployed configuration. In some embodiments, coupled to the headgear platform 10 such that the visual enhancement accessory 24 is moveable between a stowed and deployed configuration independent of the configuration of the eye protection accessory 20.

[0071] In some embodiments, the safety equipment system includes a hearing protection accessory 30. In some embodiments, the hearing protection accessory 30 is moveable between a stowed configuration displaced from a user's ears and a deployed configuration surrounding and/or inserted into a user's ear canal. In some embodiments, the hearing protection accessory 30 includes one or more biasing mechanism 35, such as a spring mechanism, for biasing an ear muff 36 of the hearing protection accessory 30 towards a side of a user's head when the hearing protection accessory 30 is in a deployed configuration, thereby creating a seal around the user's ear.

[0072] In some embodiments, the hearing protection accessory 30 is configured such that moving the hearing protection accessory 30 away from the deployed configuration includes eliminating or otherwise reducing the biasing force of the biasing mechanism 35. Referring to FIG. 13A, some embodiments utilize a screw mechanism, such as a threaded engagement feature 32 and a corresponding threaded platform feature 12, to cause the ear muff 36 of the hearing protection accessory 30 to be displaced outward away from the side of the head of the user as the hearing protection accessory 30 is rotated away from the deployed configuration, thereby reducing or eliminating the biasing force. In some embodiments, opposed right and left threads are utilized with opposed right and left engagement features and corresponding platform features such that movement of the right and left hearing protection accessories mirror each other as they are moved between respective stowed and deployed configurations. In some embodiments, the screw mechanism enables a smooth transition as the hearing protection accessory 30 is moved away from the ear of the user and towards a stowed configuration. In some embodiments, the screw mechanism causes the ear muff 36 to move towards the side of the user's head as the hearing protection

accessory 30 is rotated to the deployed configuration, thereby creating or increasing the biasing force.

[0073] In some embodiments, the hearing protection accessory 30 includes one or more engagement feature 32 for selectively engaging with a headgear platform 10 of the present invention. In this way, one or more hearing protection accessory 30 may be utilized with one or more headgear platform 10, and vice versa.

[0074] In some embodiments, the safety equipment system includes a respiratory protection accessory 40. In some embodiments, the respiratory protection accessory 40 is moveable between a stowed configuration away from a user's nose and mouth and a deployed configuration over a user's nose and mouth. In some such embodiments, the respiratory protection accessory 40 includes one or more biasing mechanism 45, such as a spring-loaded retractable cable mechanism, for biasing the respiratory protection accessory 40 towards a face of a user.

[0075] In some embodiments, the respiratory protection accessory 40 includes one or more engagement feature 42 for selectively engaging with a headgear platform 10 of the present invention. In this way, one or more respiratory protection accessory 40 may be utilized with one or more headgear platform 10, and vice versa. Referring to FIGS. 1A and 1B, some embodiments of the headgear platform 10 include a docking mount 14 for selectively securing the respiratory protection accessory 40 in its stowed configuration.

[0076] Referring to FIGS. 1A, 11A, and 11B, some respiratory accessories of the present invention include a bar 44 extending downward from respective sides of the headgear platform 10 so as to provide a support structure for securing a mask 46 of the respiratory protection accessory 40 against a face of the user. In some embodiments, a proximal end of the bar 44 defines an engagement feature 42 for selectively engaging with the headgear platform 10. In some embodiments, a distal end of each bar 44 is configured to couple directly to a respective side of the mask 46. In some embodiments the distance between the proximal and distal ends of the bar is approximately two inches. In some embodiments, a strap and/or a biasing mechanism 45 extends between the mask 46 and each bar 44. In some embodiments, the respiratory protection accessory 40 includes four biasing mechanisms 45, two on each side of the mask 46, each biasing member having a cable extending to a distal end of a respective bar 44 such that a distal end of each bar 44 serves as a single point of contact for respective biasing members. In some embodiments, forces caused by one or more biasing mechanism 45 are transferred to the headgear platform 10, such as through one or more bar 44, thereby reducing interference associated with simultaneous use of hearing and respiratory protection accessories, such as by allowing the system to avoid straps of the respiratory protection accessory 40 becoming entangled with an ear muff 36 of the hearing protection accessory.

[0077] Referring to FIG. 12A through 12C, some respiratory accessories 40 of the present invention are configured to work with disposable dust masks. In some embodiments, the system includes a plurality of mask clips 48 for selectively coupling to a mask 46, such as a disposable dust mask. In some such embodiments, the mask clips 48 include a clip feature 49 that is configured to selectively engage with a mask strap 47, thereby allowing the mask 46 to be secured to a headgear platform 10 of the present invention. In some

embodiments, a proximal end of the mask strap 47 defines an engagement feature 42 of the respiratory accessory 40. In some embodiments, a distal end of the mask strap 47 is configured to selectively engage with the clip feature 49 of the mask clip. In some embodiments, the mask strap serves as a biasing feature for biasing the mask towards a face of the user. In some embodiments, each mask clip is configured to selectively decouple from a mask and recouple to another mask, thereby allowing a user to replace masks as needed or desired.

[0078] Referring to FIG. 12D, some embodiments of the biasing mechanism 45 include a cable 142 that extends from a first side (not shown) of the headgear platform 10 to an adjustment knob 145 of the biasing mechanism 45. In some embodiments, the adjustment knob 145 is configured to take up or release the cable so as to increase or decrease a biasing force against a face of a user, thereby moving the biasing mechanism between a tightened and loosened configuration. In some embodiments, the adjustment knob 145 is positioned on a front side of a mask 46 of the respiratory protection accessory 40. In some embodiments, the cable 142 extends across a front side of a mask 46 of the respiratory protection system 40 and around a pulley 143 of the biasing mechanism 45. In some such embodiments, the pulley 143 is positioned at or near a distal end of a support strap 144 of the biasing mechanism 45. In some such embodiments, a proximal end of the support strap 144 includes an engagement feature 42 that is configured to engage with a platform feature 12 of the headgear platform, thereby securing the respiratory mechanism to the headgear platform. In some such embodiments, the respiratory protection accessory 40 is moveable between a stowed and deployed configuration by rotating the support strap 144 relative to the respective platform feature 12 while the biasing mechanism 45 is in a loosened configuration. In some embodiments, the mask 46 is rotatably connected to a distal end of the support strap 144.

[0079] Referring to FIG. 6A, some respiratory protection accessories 40 of the present invention include an engagement feature 42 that is configured to selectively couple to an ear muff 36 of a hearing protection accessory 30 of the present invention. In some embodiments, a biasing member 45 of the respiratory protection accessory 40 extends between the mask 46 and the engagement feature 42 so as to bias the mask 46 towards a face of a user. Referring to FIG. 7A, some respiratory protection accessories 40 of the present invention include an engagement feature 42 that is configured to selectively couple to an eye protection accessory 20 of the present invention. Referring to FIGS. 8A and 8C, some respiratory protection accessories 40 of the present invention include an engagement feature 42 that is configured to selectively couple to a rear portion of the headgear platform 10.

[0080] In some embodiments, the headgear platform 10 includes a plurality of platform features 12 that are configured for selective engagement: by one or more engagement feature 22 of an eye protection accessory 20; by one or more engagement feature 32 of a hearing protection accessory 30; by one or more engagement feature 42 of a respiratory protection accessory 40; by one or more engagement feature 92 of a lighting accessory 90; and/or by one or more engagement feature of one or more other accessory. In some embodiments, the engagement and platform features, together, include at least one of: an anchor and a corre-

sponding keyhole clip; a rail and a corresponding track; a magnet and corresponding magnet or metallic structure; and/or any other device now known or later developed that include corresponding features that are configured to selectively mate together.

[0081] Referring to FIG. 2A, some headgear platforms 10 of the present invention include a retention system 50 for securing the headgear platform 10 to a head of a user. Referring to FIGS. 3A and 3B, some retention systems 50 of the present invention include one or more engagement feature 52 that is configured to selectively engage with one or more respective platform feature 12 of the headgear platform 10. In some embodiments, the retention system 50 includes a neck strap 55 that is configured to extend under a jaw of a user. In some embodiments, the retention system 50 includes a rear engagement feature 54 that is configured to engage with a back of a user's head. In some embodiment, the retention system includes one or more adjustable mechanism for selectively sizing the headgear platform 10 to a particular user and/or to selectively tighten or loosen the fit of the headgear platform 10 for comfort and/or so as to accommodate one or more use or purpose. In some embodiments, the headgear platform 10 comprises a plurality of fingers 56 so as to accommodate resizing the headgear platform 10 to fit a number of different users having different head sizes.

[0082] In some embodiments, the retention system 50 is configured to counterbalance tension forces associated with one or more accessory, such as an eye protection accessory and/or a respiratory protection accessory. In some such embodiments, the retention system 50 is configured to distribute the counterbalanced reactive forces across a large portion of the user's head, thereby reducing discomfort to a user.

[0083] The present invention further includes adapting one or more accessory to couple to the headgear platform 10 of the present invention. Referring to FIG. 3C, one or more engagement feature 92 can be installed onto one or more light, camera, or other feature to create an accessory, such as a light accessory 90 that is configured to engage with one or more platform feature 12, thereby coupling such feature to the headgear platform 10.

[0084] In some embodiments, the headgear platform 10 includes an outer shell 60. In some embodiments, the outer shell is formed from a hard material so as to provide head protection to the user from falling objects and debris. In some embodiments, the outer shell is formed from a soft fabric, such as material used in baseball, skull, or other hats now known or later developed. In some embodiments, the outer shell 60 includes one or more shell feature 62 that is configured to selectively engage with one or more engagement feature 52 of the retention system 50 so as to facilitate direct attachment of the outer shell 60 to the retention system 50. In some embodiments, the headgear platform 10 includes one or more support feature 15 positioned between the retention system 50 and the outer shell 60. In some embodiments, the support feature 15 includes one or more platform feature 12 that is configured to engage with: one or more engagement feature 52 of the retention system 50; one or more shell feature 62 of the outer shell 60; and/or one or more engagement feature of one or more accessory.

[0085] Some embodiments of the present invention include and/or are configured to interface with one or more air filtration system. In some embodiments, the safety equip-

ment system includes one or more filter and one or more means of forcing air through the filter as the air moves towards a mouth or nose of the user. In some embodiments, the system further includes one or more means of measuring airflow and/or air quality during use.

[0086] In some embodiments, the safety equipment system includes and/or is in data communication with a communication system. In some embodiments, the communication system allows a user of the safety equipment system to communicate with one or more third party. In other embodiments, the communication system enables a user to receive information from a third party, such as another user, a supervisor, and/or a rescue worker.

[0087] In some embodiments, the safety equipment system includes and/or is in data communication with a location device and/or a location services system. In some embodiments, the location device and/or the location services system assists a user in finding a misplaced safety equipment system and/or assists a third party, such as a supervisor and/or a rescuer, in monitoring and/or locating a wearer of the safety equipment system. In some embodiments, the location services system provides a warning to a wearer and/or a third party if the wearer is in a hazardous zone and/or if one or more safety feature is required for a particular zone, such as those safety features included in one or more safety accessory of the safety equipment system. In some embodiments, the location services system is in data communication with one or more sensor for determining whether appropriate safety accessories are in their respective deployed configurations when a wearer is in an area requiring such safety accessories.

[0088] In some embodiments, the safety equipment system includes one or more sensor for determining air quality, sound levels, lighting levels, and/or one or more other condition. In some embodiments, the safety equipment system includes and/or is in data communication with a condition monitoring system and/or a safety requirements database. In some embodiments, information from the one or more sensor is compared with information from the safety requirement database so as to provide an indication of whether the user requires one or more safety feature, whether appropriate safety features are available for the user, and/or whether appropriate safety features are being used by the user. In some embodiments, the safety equipment sensor includes one or more impact sensor that is configured to detect one or more impact with one or more feature of the safety equipment system, such as an impact to an outer shell **60** of the headgear platform and/or to a visor or other lens of an eye protection accessory **20** of the safety equipment system.

[0089] In some embodiments, the safety equipment system includes and/or is in data communication with a recording system for recording sensor information. In some embodiments, the recording system is in data communication with a risk assessment system and/or a harm avoidance system for calculating risks associated with one or more user and/or location and/or for calculating harm to one or more user that was avoided by using the safety equipment system of the present invention.

[0090] Referring to FIG. 2D, some embodiments of the safety equipment system include one or more power source **80**, such as a battery pack. In some embodiments, the power source **80** is a main power source for one or more system or accessory of the safety equipment system. In some embodi-

ments, the power source **80** includes one or more engagement feature **82** for selectively coupling to platform feature **12** of a headgear platform **10** of the present invention. In some embodiments, the power source **80** provides auxiliary power for one or more accessory of the safety equipment system and/or for one or more system associated with the safety equipment system. In some embodiments, one or more wire is embedded in one or more portion of a safety equipment system, such as in an outer shell **60** or an inner padding **70** of the headgear platform **10**. In some embodiments one or more platform feature includes an electrical terminal for selectively connecting to the power source and/or an accessory.

[0091] The present invention further includes a method of sensing, monitoring, and/or recording information associated with one or more sensor of a safety equipment system of the present invention. In some embodiments, the method includes sensing a location of the user, determining safety requirements and/or suggestions associated with the location, determining whether the user has deployed all required and/or suggested safety equipment, and generating a signal if one or more required and/or suggested safety equipment is not being deployed. In some embodiments, the method includes recording information obtained from one or more sensor and/or providing a safety record or score associated with one or more user. In some embodiments, the method includes providing a user with a personalized safety assessment, such as providing the user with a safety score and/or providing the user with information associated with risk and/or harm avoided by properly utilizing one or more safety feature of the safety equipment system of the present invention.

[0092] In some embodiments, the method includes sensing and/or recording ambient noise levels when a hearing protection accessory is in a stowed configuration and/or deployed configuration, thereby allowing a user and/or third party to determine noise levels at one or more location. In some embodiments, the method includes sensing and/or recording noise levels in an inner portion of the hearing protection accessory while the hearing protection accessory is in a deployed configuration, thereby allowing a user and/or third party to determine noise levels a user's ears have been exposed to. In some embodiments, the method includes providing an alert, such as through an app loaded onto a mobile device, thereby indicating whether the noise level is too high and/or whether the user has proper hearing protection available and/or deployed for the measured noise level.

[0093] In some embodiments, the method includes sensing and/or recording dust and chemicals in the air when a respiratory protection accessory is in a stowed configuration and/or a deployed configuration, thereby allowing a user and/or third party to determine air quality at one or more location. In some embodiments, the method includes sensing and/or recording air quality in an inner portion of the respiratory protection accessory while the respiratory protection accessory is in a deployed configuration, thereby allowing a user and/or third party to determine air quality a user has inhaled and/or exhaled. In some embodiments, the method includes providing an alert, such as through an app loaded onto a mobile device, thereby indicating whether the air quality is too low and/or whether the user has proper respiratory protection available and/or deployed for the measured air quality.

[0094] In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed. Moreover, the description and illustration of the inventions is by way of example, and the scope of the inventions is not limited to the exact details shown or described.

[0095] Although the foregoing detailed description of the present invention has been described by reference to an exemplary embodiment, and the best mode contemplated for carrying out the present invention has been shown and described, it will be understood that certain changes, modification or variations may be made in embodying the above invention, and in the construction thereof, other than those specifically set forth herein, may be achieved by those skilled in the art without departing from the spirit and scope of the invention, and that such changes, modification or variations are to be considered as being within the overall scope of the present invention. Therefore, it is contemplated to cover the present invention and any and all changes, modifications, variations, or equivalents that fall within the true spirit and scope of the underlying principles disclosed and claimed herein. Consequently, the scope of the present invention is intended to be limited only by the attached claims, all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

[0096] Having now described the features, discoveries and principles of the invention, the manner in which the invention is constructed and used, the characteristics of the construction, and advantageous, new and useful results obtained; the new and useful structures, devices, elements, arrangements, parts and combinations, are set forth in the appended claims.

[0097] It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A safety equipment system comprising:
a headgear platform; and
a first accessory coupled to said headgear platform,
wherein said headgear platform is configured to engage with a head of a user, and
wherein said first accessory is moveable between a stowed configuration and a deployed configuration,
said first accessory being configured to provide protection to the user when said headgear platform is engaged with the head of the user and said first accessory is in the deployed configuration.
2. The safety equipment system of claim 1, wherein said first accessory is selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.
3. The safety equipment system of claim 1, wherein said first accessory comprises an engagement feature for selectively engaging with a first platform feature of said headgear platform.
4. The safety equipment system of claim 3, further comprising a second accessory coupled to said headgear platform, said second accessory comprising an engagement

feature for selectively engaging with a second platform feature of said headgear platform,

wherein said second accessory is moveable from a stowed configuration to a deployed configuration when said first accessory is in its deployed configuration, and

wherein said first and second accessories are each selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

5. The safety equipment system of claim 4, wherein movement of said first accessory from its deployed configuration to its stowed configuration is impeded when said second accessory is in its deployed configuration.

6. The safety equipment system of claim 4, wherein said second accessory is moveable from its stowed configuration to its deployed configuration when said first accessory is in its stowed configuration.

7. The safety equipment system of claim 6, further comprising a third accessory coupled to said headgear platform, said third accessory comprising an engagement feature for selectively engaging with a third platform-feature of said headgear platform, wherein said third accessory is selected from a list consisting of a light accessory, an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

8. The safety equipment of claim 3, further comprising a second accessory that is configured to couple to said headgear platform when said first accessory is selectively disengaged from said headgear platform, said second accessory comprising an engagement feature for selectively engaging with said first platform feature of said headgear platform,

wherein said second accessory is moveable from a stowed configuration to a deployed configuration, and

wherein said first and second accessories are each selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

9. The safety equipment system of claim 1, wherein said headgear platform comprises a retention system having an adjustment mechanism that is moveable between an expanded configuration, a retracted configuration, and a plurality of intermediate configurations positioned therebetween, said retention system being configured to cradle a back of the head of the user so as to secure the safety equipment system to the head of the user.

10. The safety equipment system of claim 1, wherein the first accessory is a respiratory protection accessory comprising:

- a bar having opposed proximal and distal ends, said proximal end being secured to said headgear platform and said distal end being displaced downward therefrom;
- a mask that is configured to cover part of a face of a user when said respiratory protection accessory is in the deployed configuration; and
- a biasing mechanism extending from said mask to said distal end of said bar such that tension forces created by said biasing mechanism are transferred to said headgear platform through said bar.

11. A method of using a safety equipment system to protect a user, the safety equipment comprising a first accessory coupled to a headgear platform, the method comprising:

engaging the headgear platform to a head of the user; and moving the first accessory to a deployed configuration such that the first accessory is positioned to provide protection to the user.

12. The method of claim **11**, wherein the first accessory is selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

13. The method of claim **11**, further comprising engaging the first accessory to a first platform feature of the headgear platform.

14. The method of claim **13**, further comprising: engaging a second accessory to a second platform feature of the headgear platform; and moving the second accessory to a deployed configuration when the first accessory is in its deployed configuration, wherein the first and second accessories are each selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

15. The method of claim **14**, further comprising impeding by the second accessory movement of the first accessory from its deployed configuration to a stowed configuration.

16. The method of claim **14**, further comprising moving the second accessory from its deployed configuration to a stowed configuration when the first accessory is in its stowed configuration.

17. The method of claim **16**, further comprising engaging a third accessory to a third platform feature of the headgear platform, wherein the third accessory is selected from a list consisting of a light accessory, an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

18. The method of claim **11**, further comprising: disengaging the first accessory from a first platform feature of the headgear platform; and engaging a second accessory to the first platform feature of the headgear platform,

wherein the first and second accessories are each selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory.

19. The method of claim **11**, wherein engaging the headgear platform to the head of the user comprises: positioning the safety equipment system onto the head of the user;

moving an adjustment mechanism of a retention system of the headgear platform towards a retracted configuration so as to cause the retention system to cradle a back of the head of the user, thereby securing the safety equipment system to the head of the user.

20. A method of assembling a safety equipment system comprising a headgear platform that is configured to engage with a head of a user, the method comprising:

coupling a first accessory to a first platform feature of the headgear platform; and

coupling a second accessory to a second platform feature of the headgear platform,

wherein each of the first and second accessories is selected from a list consisting of an eye protection accessory, a hearing protection accessory, and a respiratory protection accessory, and

wherein each of the first and second accessories is independently moveable between respective stowed and deployed configurations.

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