ADAPTOR PLATFORM FOR HELMET

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Appl. No.: 12/572,522
Filed: Oct. 2, 2009

Related U.S. Application Data
Provisional application No. 61/102,210, filed on Oct. 2, 2008, provisional application No. 61/144,474, filed on Jan. 14, 2009.

Publication Classification
Int. Cl.
F41H 1/04
A42B 1/24

U.S. Cl. ........................................ 2/6.6; 2/422

ABSTRACT
A mounting system for mounting a plurality of devices to a helmet. The mounting system comprises a mounting halo secured around the helmet, at least one rail rotatably mounted to the halo and adapted to secure a device thereto, and an adaptor bracket mounted to a rear of the helmet. The adaptor bracket is adapted to receive therein a device whose weight counterbalances the weight of night vision equipment secured to the front of the helmet.
ADAPTOR PLATFORM FOR HELMET

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority on U.S. Provisional Application No. 61/102,210, filed on Oct. 2, 2008 and on U.S. Provisional Application No. 61/144,474, filed on Jan. 14, 2009, which are herein incorporated by reference in their entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to a mounting system for a combat helmet comprising an adaptor bracket mounted to the rear of the helmet to enable attachment of various equipment to the helmet.

BACKGROUND OF THE INVENTION

[0003] Combat helmet assemblies, which offer significant ballistic, aural, head and facial protection to wearers, are used to prevent facial injuries, casualties and fatalities that mounted and dismounted warriors are faced with during training and combat operations. Various accessories, which may provide additional capability and utility to the overall assembly (e.g. portable light sources) and/or additional protection to the wearer (e.g. face shields), are typically attached to the helmets according to the wearer’s needs and the demands of the environment. Although troops are currently attaching such items to their helmets using regular adhesive tape or the like, the prior art also teaches the use of through-holes, clamps, and rails as approaches to attachment. Still, despite providing secure attachment, these approaches typically do not enable positional adjustment or easy removal of the attached items in addition to potentially compromising the helmet shell’s integrity and not enabling for a wide range of accessories to be attached to the helmet using a single attachment means.

[0004] What is therefore needed, and one object of the present invention, is an improved fixture that facilitates attachment and removal of a variety of accessories to combat helmets.

SUMMARY OF THE INVENTION

[0005] More specifically, in accordance with the present invention, there is provided a mounting system for attaching a plurality of devices to a protective ballistic helmet, at least a selected one of the plurality of devices comprising a rail mating portion. The adaptor platform comprises a mounting halo secured around the helmet and a standardized Picatinny rail rotatably mounted to the halo adjacent a side of the helmet. The rail extends along a longitudinal axis and is rotatable relative to the halo about an axis substantially perpendicular to the longitudinal axis. The rail has formed on an outer surface thereof a device mating portion complementary with the rail mating portion, the device mating portion adapted to be engaged by the rail mating portion for removably attaching the at least one device to the rail.

[0006] Still in accordance with the present invention, there is provided a counterweight for a night vision goggle mounted to a front of a protective ballistic helmet. The counterweight comprises an adaptor bracket comprising an equipment receiving plate and a pair of mounting plates extending laterally inward from opposite edges of the equipment receiving plate for releasably mounting the adaptor bracket to a rear of the helmet and a ballast secured to the equipment receiving plate.

[0007] Still in accordance with the present invention, there is also provided an adaptor bracket for mounting to a rear of a protective ballistic helmet and receiving a plurality of devices. The adaptor bracket comprises an equipment receiving plate comprising at least one attachment means for releasably attaching at least one of the plurality of devices thereto and a pair of mounting plates extending laterally inward from opposite edges of the equipment receiving plate for releasably mounting the adaptor bracket to the rear of the helmet.

[0008] Other objects, advantages and features of the present invention will become more apparent upon reading of the following non-restrictive description of specific embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In the appended drawings:

[0010] FIG. 1A is a left perspective view of a mounting system for helmet in accordance with an illustrative embodiment of the present invention;

[0011] FIG. 1B is a left perspective view of the mounting system of FIG. 1A mounted on a helmet;

[0012] FIG. 2 is a left front perspective view of the mounting system of FIG. 1A mounted on a helmet and with various devices and equipment mounted thereon;

[0013] FIG. 3 is an exploded view of the mounting system of FIG. 1A indicating how devices and equipment are mounted on the mounting system;

[0014] FIG. 4A is an exploded view of an adaptor bracket indicating how a latching mechanism for strobe light and a strobe light are mounted on the adaptor bracket;

[0015] FIG. 4B is an exploded view of the adaptor bracket of FIG. 4A indicating how a light source is mounted on the adaptor bracket;

[0016] FIG. 5 is an exploded view of the adaptor bracket of FIG. 4A indicating how a battery pack adaptor and a battery pack are mounted on the adaptor bracket;

[0017] FIG. 6 is a left perspective view of the mounting system of FIG. 2 with a vision and face protection equipment mounted thereon; and

[0018] FIGS. 7A and 7B provide respectively a detailed top exploded perspective view of a rotatable rail system and a detailed side perspective of a rotatable rail base in accordance with an illustrative embodiment of the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENTS

[0019] The present invention is illustrated in further details by the following non-limiting examples.

[0020] Referring now to FIG. 1A, the adaptor platform or mounting system, generally referred to using the reference numeral 10, is comprised of a mounting halo 12. Referring to FIG. 1B in addition to FIG. 1A, the halo 12 is adapted to fit over a combat helmet or the like 14 and is secured thereto by means of a plurality of screws or bolts or the like 16 which engage corresponding threaded inserts or bores (not shown) machined or otherwise formed in the helmet 14. The halo 12 provides a variety of elements allowing for the mounting of equipment or hardware (not shown) such as for example one or more rails 18, illustratively sized according to the well known and standardized Picatinny (or MIL-SRD-1913) rail, a variety of threaded apertures as in 20 for mating with bolts or
the like (not shown) and a variety of apertures as in 22 for accepting nylon ties or the like (not shown).

[0021] Still referring to FIG. 1A and FIG. 1B, the halo 12 is typically manufactured from a light, rigid material such as plastic or the like, and can include, for example, one or more supports as in 24 molded in the surface thereof and adapted for receiving devices or equipment (not shown). Additionally, the halo 12 can include a suitably molded mount 26 for removably mounting thereon a bracket 28 for supporting night vision equipment or the like (not shown). The bracket 28 may alternatively be permanently mounted in a cut-away formed in the front of the helmet 14.

[0022] Referring now to FIG. 2 and FIG. 3, a variety of devices can be provided for mounting on the helmet 14, for example flashlights of different kinds as in 30, 32, which are respectively secured to the halo 12 using the standardized Pictammy rail 18 (by simultaneously disengaging a release mechanism 34 while sliding the rail mating portion 36 of the device onto the device mating portion (not shown) of the rail 18 in the direction indicated by the arrow A) or other proprietary mounts as in 38. In this regard, and as will be discussed in more detail below in reference to FIGS. 7A and 7B, the standardized Pictammy rail 18 is combined with a ratcheted rotatable base 40 mounted between the halo 12 and the rail 18, thereby providing for adjustment of the device relative to the helmet 14. In particular, such an assembly enables rotational movement of the beam (e.g. 15 degrees range of motion) of the flashlight 30 when mounted on the rail 18 relative to the wearer’s head. This is particularly useful when the wearer is travelling cross-country as it allows for the flashlight 30 to be used selectively for near tasks, such as map reading, as well as for path illumination. The rotatable base 40 is further lockable in upwards or downwards positions to allow the flashlight 30 or other item attached to the rail 18 to be locked in place.

[0023] Still referring to FIG. 2 and FIG. 3, other devices, such as illuminating glow sticks as in 42 can also be secured to the halo 12 by placing the glow stick 42 in a suitable molded support (reference 24 in FIG. 1A and FIG. 1B) and securing it with a nylon tie or the like 44. Moreover, the halo 12 further provides for receiving (e.g. by clipping on the supports, reference 24 in FIG. 1A) electronic communication devices (e.g. earphones, microphones, or the like, none shown) or other equipment (e.g., hydration system, such as a straw, or the like, none shown) of use to the wearer during training and combat operations. The halo 12 therefore advantageously enables for secure and easy attachment of a wide variety of equipment to the helmet 14, thus significantly increasing the assembly’s utility and capability.

[0024] Still referring to FIGS. 2 and 3, the halo 12 can additionally be completed with an adaptor bracket 46 secured to the rear of the helmet 14 using bolts or the like 16, as will be discussed further herein below. In this regard the position of the bracket 46 relative to the halo 12 is adjustable in order to accommodate a plurality of different helmet diameters.

[0025] Referring now to FIG. 4A, the adaptor bracket 46 illustratively comprises an equipment receiving plate 48 having a pair of elongate mounting plates as in 50 extending laterally and from opposite sides of the outer surface of the adaptor bracket 46 to the outer surface of the helmet (reference 14 in FIG. 1B). For this purpose, a threaded elongate bore 52 is machined or otherwise formed in each mounting plate 50 at an end thereof and a fastener (reference 16 in FIG. 3), such as a bolt, is engaged and securely tightened into the bore 52 and through a pair of corresponding holes (not shown) machined into the helmet 14. In this manner and due to the elongate shape of the bore 52, the adaptor bracket 46 can be easily mounted to and detached from helmets as in 14 of various sizes and shapes by adjusting the position of the bracket 46 relative to the halo (reference 12 in FIG. 3). The equipment receiving plate 48 may be further secured to the helmet 14 using fasteners (not shown) adapted to be inserted into apertures as in 54 machined into the plate 48.

[0026] Still referring to FIG. 4A, when so mounted, the adaptor bracket 46, which is preferably shaped to conform to the contour of the rear portion of the helmet (reference 14 in FIG. 1B), illustratively snugly fits against the outer surface of the helmet 14. As a result, potential problems which typically occur as a result of equipment (e.g., parachute cords, not shown) getting inadvertently lodged within the space between the outer surface of the helmet 14 and the adaptor bracket 46 are thus prevented. Still, it may be desirable to space the adaptor bracket 46 from the helmet 14 in order to better accommodate some accessory types, such as straps for goggles or the like (not shown). Indeed, the adaptor bracket 46 of the present invention advantageously enables releasable attachment thereon of a variety of equipment (e.g., identification and signalling devices, power sources, elastic bands and cords) using a plurality of mounting apertures as in 56, retaining grooves as in 58, and projecting members or fingers as in 60 formed in the equipment receiving plate 48. A set screw (not shown) may further be provided in the center of the equipment receiving plate 48 enable permanent attachment of equipment to the adaptor bracket 46.

[0027] Still referring to FIG. 4A, the bracket 46 can be used in particular to receive removable battery packs (not shown), light sources, such as the MS-2000™ infrared strobe 62, or the like. Attachment of a variety of light sources to the helmet (reference 12 in FIG. 3) proves extremely useful during training and combat operations as this allows others to be alerted to the presence of the wearer and, as such, prevents the wearer from being endangered by activities conducted by others. The mounted light sources may further serve as a location beacon in the event the wearer is disabled and in need of rescue in a darkened or smoke-filled area. Other examples of such light sources include but are not limited to chemlights, ACR™ strobe products, laser sticks, VIP™ lights, Guardian™ and Survivor™ light models from Adventure Lights, 9V Firefly™ long & short lights, and Streamlight™ Sidewinder flashlights.

[0028] Still referring to FIG. 4A, the light strobe 62 can be retained in the bracket 46 using a releasable latching mechanism 64. In particular, the strobe 62 can be secured to the bracket 46 by snap-fitting the latching mechanism 64 to the bracket 46 in the direction of arrow B then inserting the strobe 62 into the latching mechanism 64 in the direction indicated by arrow C (or vice-versa). The strobe 62 can be subsequently removed by disengaging the latching mechanism 64 from the bracket 46 and retracting the strobe 62 in the opposite direction.

[0029] Referring now to FIG. 4B, a light source 66 of the VIP™ model may be mounted to the adaptor bracket 46. Such a light source 66 illustratively comprises a metal attachment clip 68 extending from a rear section thereof and adapted to engage the adaptor bracket 46 for retaining the light source 66 in place relative thereto. The light source 66 advantageously includes a flexible elongated arm (not shown) having a top end attached to the battery housing 70 of the light source 66 and an unattached bottom end having an inwardly locking projection (not shown) extending therefrom. The arm of the clip 68 is illustratively sized to be received in one of retaining grooves 58 formed in the adaptor bracket 46 such that, when in place, the locking projection is biased in abutment with the rear side of the equipment receiving plate (reference 48 in FIG. 4A) within the space provided between the outer surface
of the helmet (reference 14 in FIG. 1B) and the adaptor bracket 46, thereby securely attaching the light source 52 to the helmet 14 in a hook-like fashion. In this manner, the light source 66 can be easily mounted to and removed from the adaptor bracket 46 without the need for prior detachment of the latter from the helmet 14.

0030 In addition and still referring to FIG. 4B, the light source 66 can be easily installed on the adaptor bracket 46 either vertically, i.e. along the direction of arrow D as illustrated in FIG. 4B, or horizontally depending on which retaining groove 58 the arm of the clip 68 is engaged in. The light source 66 can also be mounted with reversed orientations of the battery housing 70 and the light emitting element 72 of the light source 66, which can therefore be attached to the helmet 14 so that light is illuminated therefrom in any desired direction.

0031 Still referring to FIG. 4B, a light source (not shown) of a type other than the MS-2000™ infrared strobe model (reference 62 in FIG. 4A) or the VIP™ model, for example of the Guardian™ model, may similarly be secured to the equipment receiving plate (reference 48 in FIG. 4A) of the adaptor bracket 46 via the mounting apertures 56 formed therein, using fasteners such as nuts, bolts, or the like (not shown). Again, depending on which mounting apertures as in 56 the light source is attached to, it becomes possible to secure the latter to the equipment receiving plate 46 either vertically or horizontally, as desired. Accommodation on the same adaptor bracket 46 of a variety of accessories, such as light sources as in 62 and 66, or the like is therefore facilitated by simply changing the orientation of the mounted accessories to accommodate additional equipment (e.g. tie raps, elastic bands, or bungee cords, not shown), which can be secured to the adaptor bracket 46 using the remaining mounting apertures 56 or retaining grooves 58 as well as fingers 60.

0032 Referring now to FIG. 5 and FIG. 6, a battery pack 74 (e.g. of the Thales™ brand) can be used to power, via a system of wires as in 76 embedded or partially embedded in the halo 12, a variety of devices, in particular light sources, such as the strobe (reference 62 in FIG. 4A) or the light source 78, as well as other identification and signalling devices. Providing such wires as in 76 alleviates the need for providing an external interconnection between supply and devices.

0033 Referring back to FIG. 4A in addition to FIG. 5, the battery pack 74 (e.g. a battery pack for powering night vision goggles, not shown) may be retained in the bracket 46 using a battery pack adaptor 80 that is snap-fitted to the bracket 46 in the direction of arrow E. The battery pack 74 is then mounted to the thus secured battery pack adaptor 80 in the direction indicated by arrow F and attached thereto (i.e. snap-fitted or using fasteners, such as nuts, bolts, or the like, not shown) to power various equipment mounted to the helmet (reference 14 in FIG. 1B). Similarly to the removal of the strobe 62, the battery pack 74 can be subsequently removed by disengaging the battery pack adaptor 80 from the bracket 46 and retracting the battery pack 74 in the opposite direction.

0034 Still referring to FIG. 4A and FIG. 5, the latching mechanism 64 and the battery pack adaptor 80 are illustratively each snap-fitted on the adaptor bracket 46 as in 82 extending away from a rear surface of the latching mechanism 64 and the battery pack adaptor 80 and designed to engage and be retained within the retaining grooves 58 of the adaptor bracket 46. The latching mechanism 64 and the battery pack adaptor 80 further each have formed therein an aperture 84 adapted to be aligned with an aperture 86 formed in the adaptor bracket 46. When the latching mechanism 64 or the battery pack adaptor 80 is mounted to the bracket 46 (in the direction indicated by arrows B and E respectively), a fastener (not shown) may then be inserted into the aligned apertures 84 and 86, thereby securing the latching mechanism 64 or the battery pack adaptor 80 to the bracket 46. In this manner, the thus mounted latching mechanism 64 or battery pack adaptor 80 is prevented from being easily dislodged from the equipment receiving plate 48 by an inadvertent pulling force on the assembly.

0035 Referring back to FIG. 6, the adaptor bracket 46 and the halo 12 can also be used to secure a mask 88 or goggles 90 or other similar face protecting equipment in order to provide better protection to the face of the wearer. In particular, a strap or harness (not shown) may be provided to enable attachment of the face protecting equipment, such as the goggles 90, to the helmet 14. The strap may illustratively be held in place by a pair of clips (not shown) attached to the helmet 14 using a suitable fastener (e.g. adhesive) to better retain the goggles 90 in place relative to the helmet 14. A lower portion of the clips may further be secured to the mounting plates (reference 50 in FIG. 4A) of the adaptor bracket 46 using fasteners, such as bolts (not shown), while the strap may be attached to the equipment receiving plate (reference 48 in FIG. 4A) using such fasteners. In this manner, the strap is firmly retained in place relative to both the adaptor bracket 46 (and accordingly the halo 12) and the helmet 14.

0036 Referring back to FIG. 2 in addition to FIG. 6, in order to provide for quick removal of the mask, for example to provide access to the wearer’s face without removing the helmet 14 in the case of injury or the like, the mask 89 can be secured to the halo 12 using a quick release mechanism 92 which engages with suitable receptacles 94 formed in the halo 12.

0037 Still referring to FIG. 6, provision of the rear adaptor bracket 46 at the rear of the helmet 14 enables to advantageously counterbalance the weight of the devices mounted to the helmet 14, and especially that of the face protecting equipment or vision equipment mounted to the front thereof. In particular, the weight of night vision goggles (NVG, not shown), which is typically between 1.5 and 2.2 pounds, can be counterbalanced by attaching a ballast, such as the battery pack as in 74, to the adaptor bracket 46. Indeed, NVG, which typically use a mounting plate (not shown) that hooks under the brow of the helmet 14, tend to force the brow of the helmet 14 forwardly and downwardly and the strain of counteracting this weight can cause significant neck strain and headaches for the wearer over time. By attaching the battery pack 74 (or the like) to the adaptor bracket 46, the load of the NVG on the wearer’s head can be counterbalanced by the weight of the battery pack 74, which is typically 0.5 pounds or less, thus eliminating the strain caused by the NVG and providing increased comfort for the wearer. Also, a counterweight, made of a heavy material, such as lead or the like, may be used as the ballast and attached to the adaptor bracket 46 to counterbalance the weight of the equipment mounted at the front of the helmet 14.

0038 Referring now to FIGS. 7A and 7B, the rail 18 is secured to the base 40 through provision of a bolt. In order to provide for a rotatable rail 18 while at the same time providing a mechanism for securing the rail 18, as in 82 extending away from a rear surface of the latching mechanism 64 and the battery pack adaptor 80 and designed to engage and be retained within the retaining grooves 58 of the adaptor bracket 46. The latching mechanism 64 and the battery pack adaptor 80 further each have formed therein an aperture 84 adapted to be aligned with an aperture 86 formed in the adaptor bracket 46. When the latching mechanism 64 or the battery pack adaptor 80 is mounted to the bracket 46 (in the direction indicated by arrows B and E respectively), a
corresponding indentations as in 104 molded or otherwise formed in the base 40. A spring 106 is provided which is positioned between an inner surface 108 of the base 40 and a washer 110 held in place by the bolt 96 which biases the rail 18 towards the base 40 and therefore the teeth 102 into the indentations 104. In order to rotate the rail 18, the user pulls the rail 18 slightly away from the base 40 against the biasing force of the spring 106 thereby disengaging the teeth 102 from the indentations 104, rotating the rail 18 to the desired angle and releasing the rail 18.

[0039] The teeth 102 and indentation 104 also provide for tactile feedback as to the relative amount the rail 18 has been rotated. A person of ordinary skill in the art will now understand that other rotating and securing mechanisms can be used in place of the tooth 102 and indentations 104 as described. For example, a simple friction fit could be provided between the rail 18 and base 40.

[0040] Although the present invention has been described hereinabove by way of specific embodiments thereof, it can be modified, without departing from the spirit and nature of the subject invention as defined in the appended claims.

What is claimed is:

1. A mounting system for attaching a plurality of devices to a protective ballistic helmet, at least a selected one of the plurality of devices comprising a rail mating portion, the adaptor platform comprising:
   - a mounting halo secured around the helmet;
   - a standardized Picatinny rail rotatably mounted to said halo adjacent a side of the helmet, said rail extending along a longitudinal axis and rotatable relative to said halo about an axis substantially perpendicular to said longitudinal axis, and
   - a mechanism for releasably securing said rail at a selected angle of rotation;
   - wherein said rail has formed on an outer surface thereof a device mating portion complementary with the rail mating portion, said device mating portion adapted to be engaged by the rail mating portion for removably attaching the at least one device to said rail.

2. The mounting system of claim 1, further comprising an adaptor bracket releasably secured to said halo adjacent a rear of the helmet, said adaptor bracket comprising an equipment receiving plate adapted to receive the plurality of devices therein and a pair of mounting plates extending laterally inward from opposite edges of said equipment receiving plate for releasably mounting said adaptor bracket to said halo.

3. The mounting system of claim 1, wherein the at least one device is removably attached to said rail by sliding the at least one device over said rail in a direction of said longitudinal axis.

4. The mounting system of claim 1, wherein said mechanism for releasably securing said rail at a selected angle of rotation comprises a ratchet mounted between an outer surface of said halo and an inner surface of said rail for rotatably mounting said rail to said halo, said ratchet limiting said selected angle to one of a plurality of discrete predetermined angles.

5. The mounting system of claim 4, wherein a rotary movement of said base enables the at least one device attached to said rail to be lowered relative to said halo over a range of downwards positions or raised relative to said halo over a range of upwards positions, and further wherein the at least one device is lockable in at least one of said downwards positions and at least one of said upwards positions.

6. The mounting system of claim 1, wherein said device mating portion is a male member and the rail mating portion is a complementary channel-shaped female member.

7. The mounting system of claim 1, wherein a second one of said rail is rotatably mounted to said halo adjacent a second side of the helmet, said second side opposite to said side.

8. The mounting system of claim 1, wherein said halo comprises a plurality of attachment means for attaching the plurality of devices thereto.

9. The mounting system of claim 1, further comprising a bracket secured to said halo adjacent a front of the helmet for supporting night vision equipment.

10. A counterweight for a night vision goggle mounted to a front of a protective ballistic helmet, the counterweight comprising:
    - an adaptor bracket comprising an equipment receiving plate and a pair of mounting plates extending laterally inward from opposite edges of said equipment receiving plate for releasably mounting said adaptor bracket to a rear of the helmet;
    - a ballast secured to said equipment receiving plate.

11. The counterweight of claim 10, wherein said adaptor bracket is positioned adjacent an edge of the helmet.

12. The counterweight of claim 10, wherein said equipment receiving plate comprises at least one attachment means for securing said ballast to said equipment receiving plate.

13. The counterweight of claim 12, wherein said ballast is a battery pack providing the night vision goggle.

14. The counterweight of claim 13, wherein a battery pack adaptor is secured to said equipment receiving plate using said at least one attachment means prior to securing said battery pack to said adaptor.

15. An adaptor bracket for mounting to a rear of a protective ballistic helmet and receiving a plurality of devices, the adaptor bracket comprising:
    - an equipment receiving plate comprising at least one attachment means for releasably attaching at least one of the plurality of devices thereto; and
    - a pair of mounting plates extending laterally inward from opposite edges of said equipment receiving plate for releasably mounting said adaptor bracket to the rear of the helmet.

16. The adaptor bracket of claim 15, wherein each of said mounting plates comprises at an end thereof a threaded elongate bore adapted to receive therein a fastener and to have aligned therewith an aperture machined into the rear of the helmet, wherein said fastener is tightened into said aligned bore and aperture for releasably securing said mounting plate to the rear of the helmet.

17. The adaptor bracket of claim 16, wherein a positioning of said adaptor bracket relative to the rear of the helmet is adjustable by adjusting a positioning of said fastener in said bore.

18. The adaptor bracket of claim 15, wherein the adaptor bracket is shaped to conform to a contour of the rear of the helmet so as to snugly fit against the rear of the helmet when mounted thereon.

19. The adaptor bracket of claim 15, wherein the adaptor bracket is spaced from the rear of the helmet when mounted thereon.

20. The adaptor bracket of claim 15, wherein the plurality of devices is selected from the group consisting of light sources, battery backs, adaptors, and counterweights.

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