US 20170299340A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0299340 A1**

(43) **Pub. Date: Oct. 19, 2017**

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(54) **VERSATILE PROTECTIVE HELMET APPLIQUE ASSEMBLY**

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(21) Appl. No.: **15/382,913**

(22) Filed: **Dec. 19, 2016**

Related U.S. Application Data

(63) Continuation of application No. 13/912,720, filed on Jun. 7, 2013, now Pat. No. 9,557,144, which is a continuation-in-part of application No. 13/594,964, filed on Aug. 27, 2012, now Pat. No. 9,222,758.

(60) Provisional application No. 61/527,671, filed on Aug. 26, 2011.

Publication Classification

(51) **Int. Cl.**

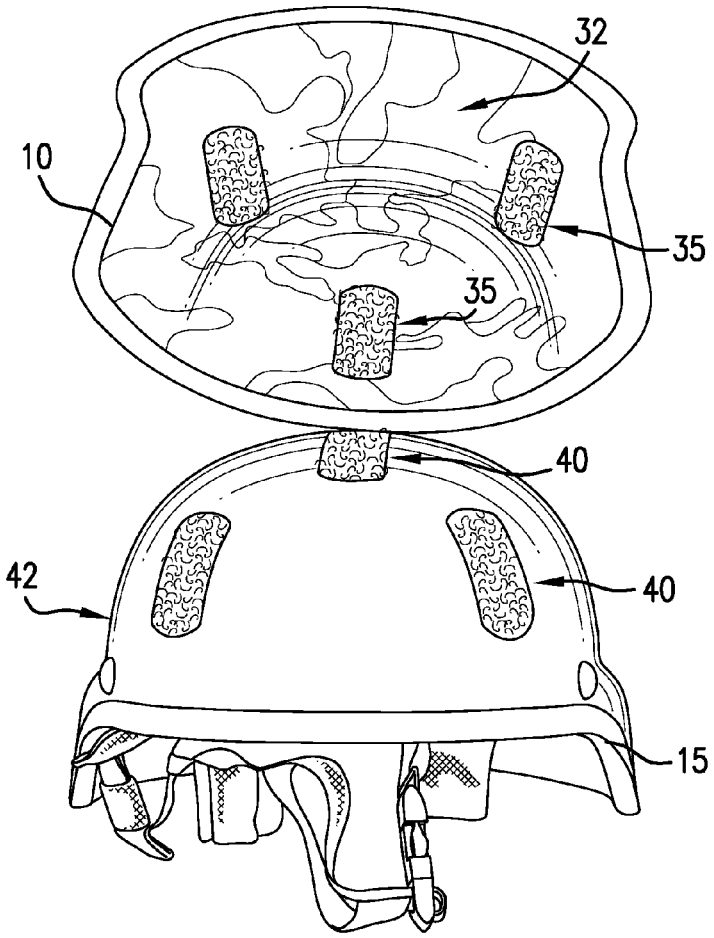
F41H 1/04	(2006.01)
A42B 3/00	(2006.01)

(52) **U.S. Cl.**

CPC ***F41H 1/04*** (2013.01); *A42B 3/003* (2013.01)

(57) **ABSTRACT**

The helmet appliqué assembly of the present invention permits a helmet wearer to upgrade the ballistic prevention capabilities of a traditional helmet quickly and efficiently. The helmet appliqué can be provided as part of a helmet appliqué system and/or assembly that includes internal-side connection means for attaching to a helmet and external-side connection means for receiving any of various external items such as identification tags, mounts and external equipment or attachments. The appliqué element can comprise various types of material, including, for example, ultra high molecular weight polyethylene (UHMWPE). In one embodiment of the present invention, multiple helmet appliqué elements are employed on the same helmet and include surfaces and portions that are cooperatively engageable for covering multiple areas of the helmet at the same time.



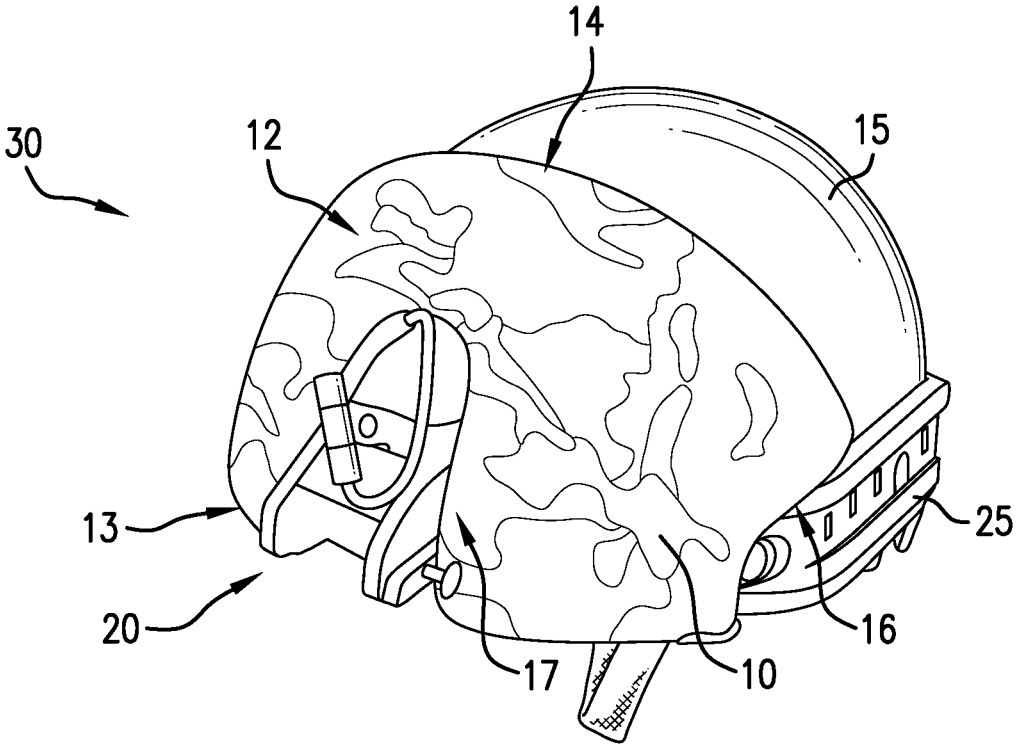


FIG. 1

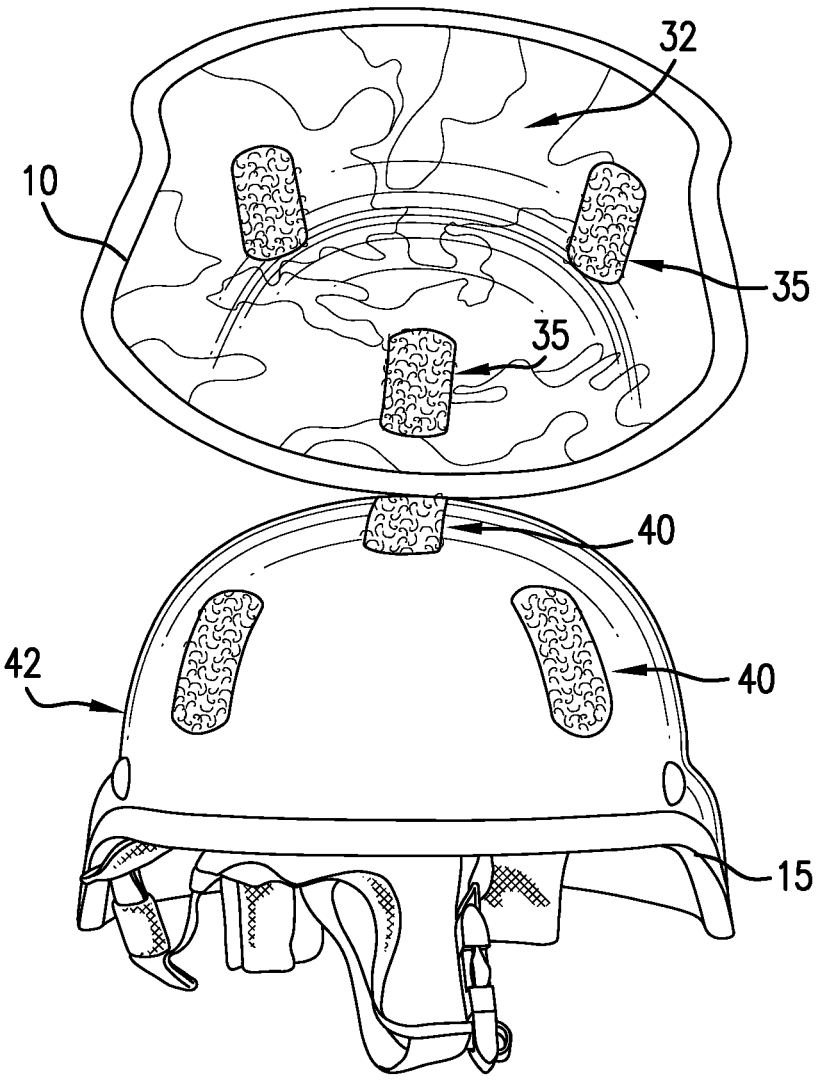


FIG.2

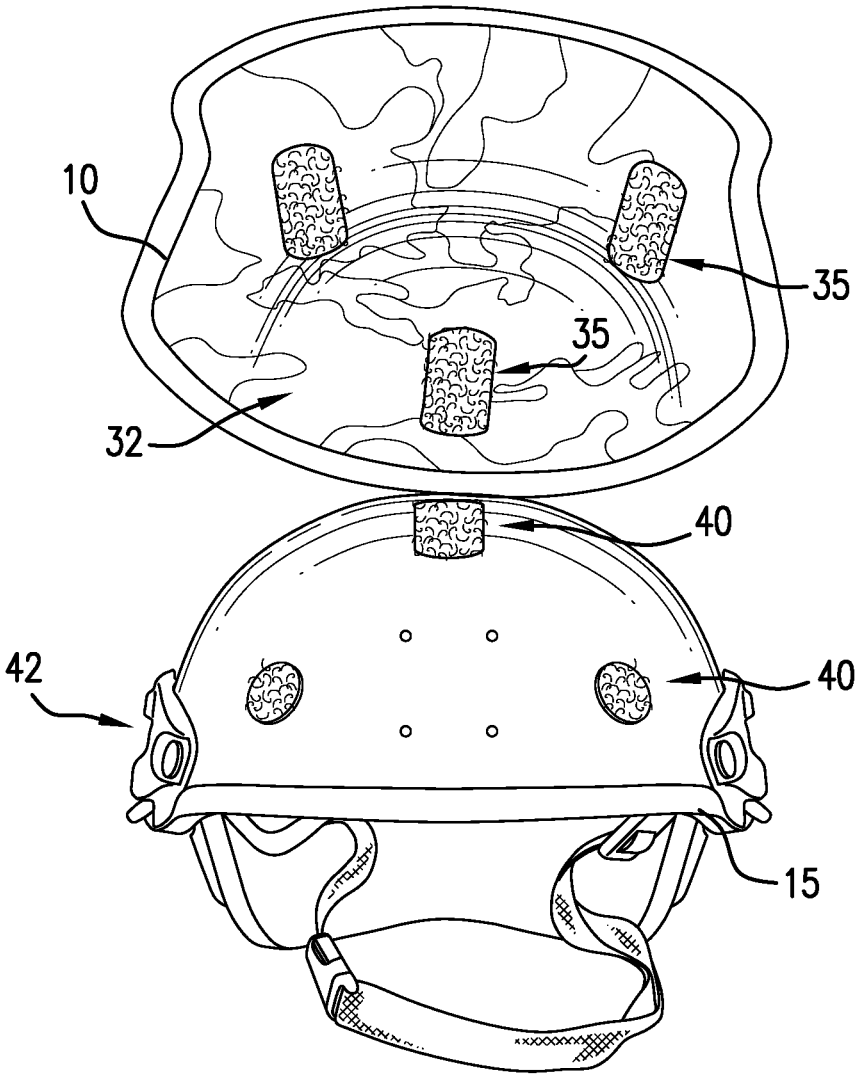


FIG.3

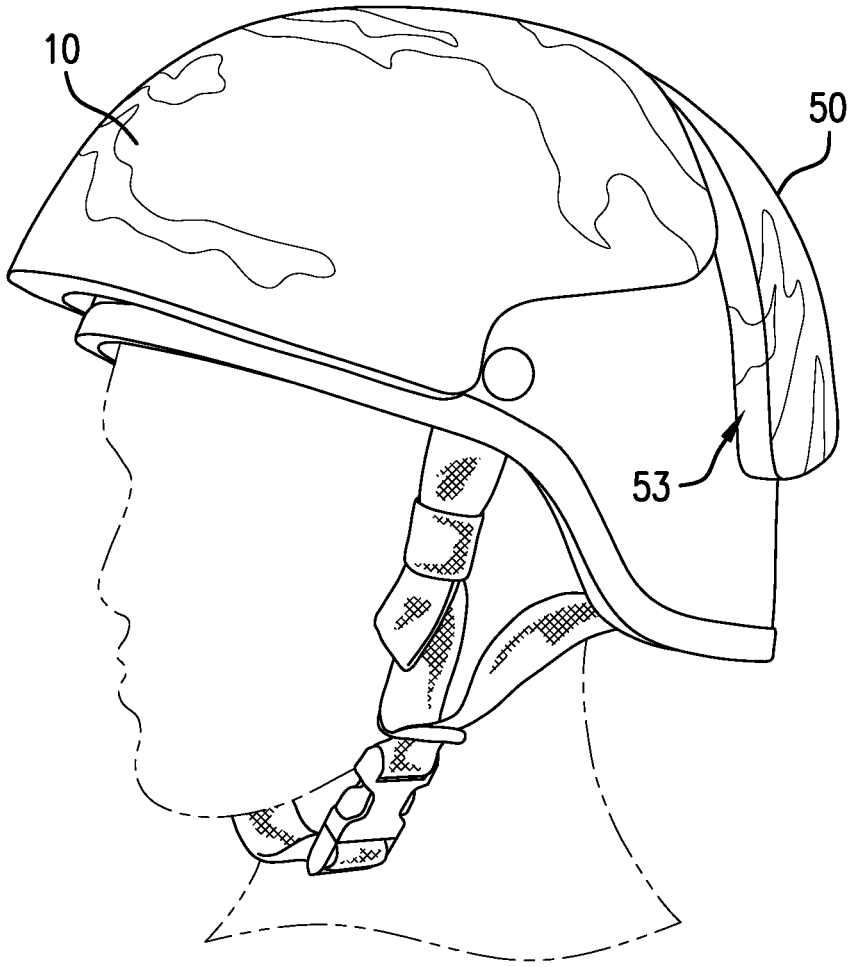


FIG.4

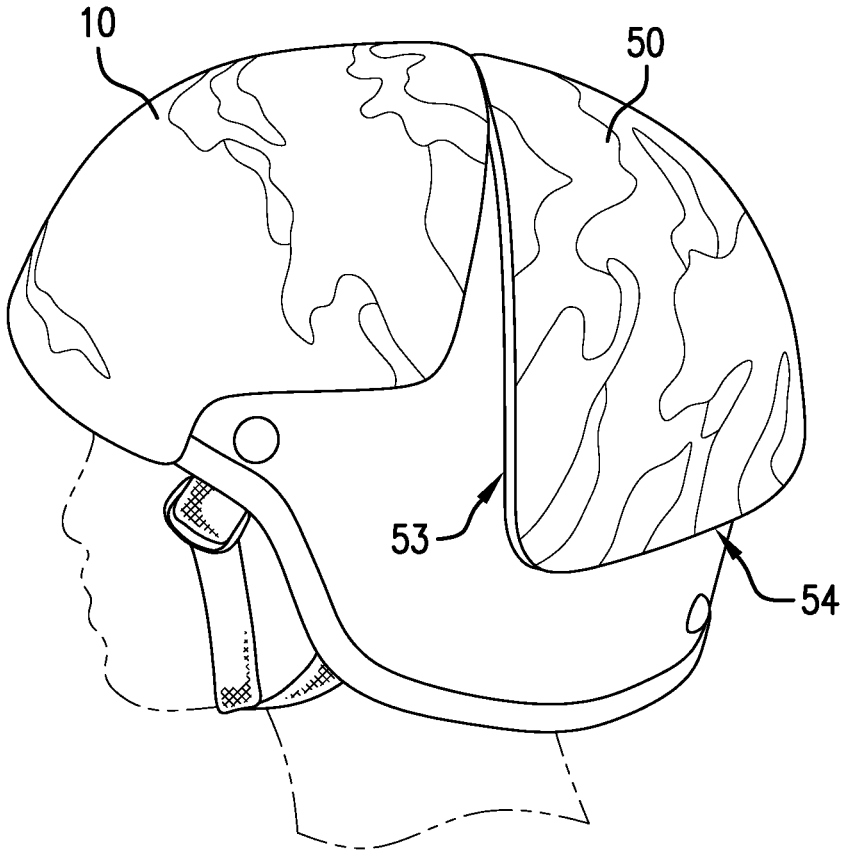


FIG.5

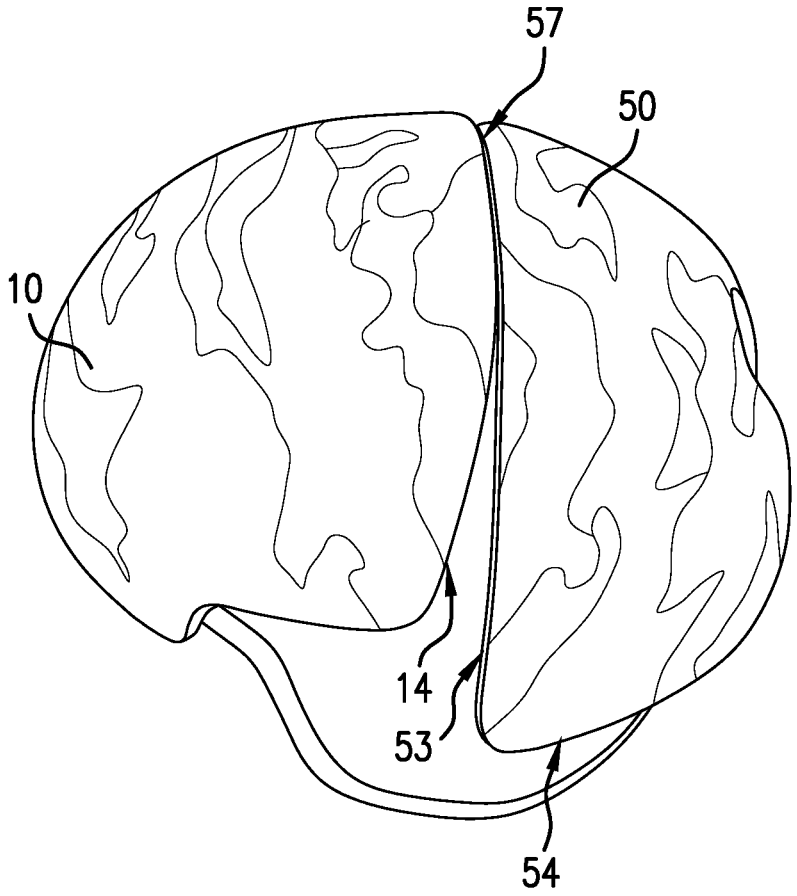


FIG.6

FIG. 7

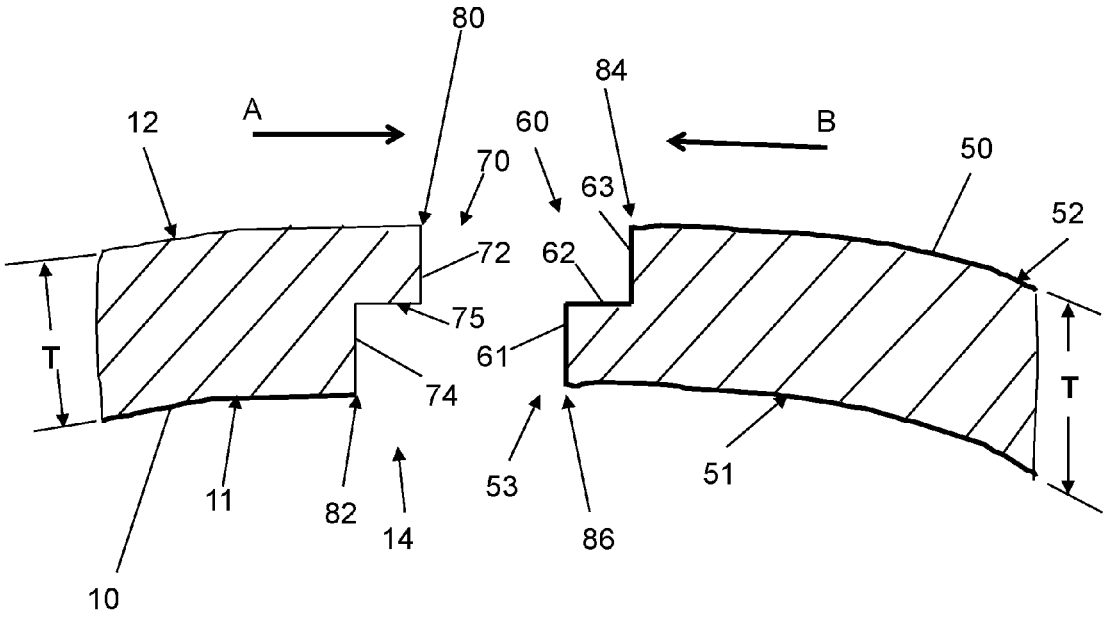
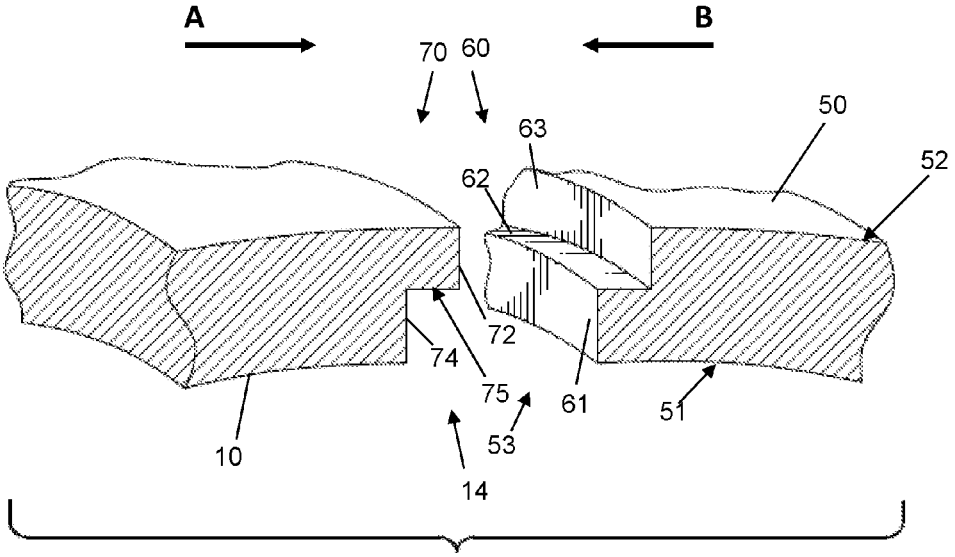

80
84
12
A
60
B
70
50
63
52
72
62
75
61
T
74
T
11
82
14
53
86
51
10

FIG. 8


A
B
70
60
50
63
52
62
72
74
75
61
51
10
53
14

VERSATILE PROTECTIVE HELMET APPLIQUE ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation of U.S. patent application Ser. No. 13/912,720, filed Jun. 7, 2013, and entitled "Versatile Protective Helmet Appliqué Assembly", which is a continuation-in-part application of U.S. patent application Ser. No. 13/594,964, filed Aug. 27, 2012, entitled "Versatile Protective Helmet Appliqué Assembly", now U.S. Pat. No. 9,222,758, issued on Dec. 29, 2015.

FIELD OF THE INVENTION

[0002] The present invention pertains to armor-enhanced headwear, and more particularly to an armor-enhanced helmet appliqué assembly including a helmet appliqué that is comfortable, balanced, detachable, versatile and which protects the head from projectiles such as ballistic projections.

BACKGROUND AND SUMMARY OF THE INVENTION

[0003] Military and law enforcement personnel have employed armor-enhanced clothing in order to protect their bodies from gunfire, shrapnel, explosive devices and other harmful ballistic objects. Such personnel have further employed armor-enhanced helmets in an effort to block ballistic objects from penetrating traditional helmets and producing injury or grave damage to the head of the wearer. However, prior armor-enhanced helmets are typically heavy and awkward to wear, often causing undue neck fatigue and even injury to the wearer.

[0004] The present invention provides a helmet appliqué assembly including a helmet appliqué that is lighter weight, and attachable to an existing helmet to cover one or more areas of an otherwise exposed helmet. The appliqué element of the present invention can be suitably relieved in areas where no ballistic protection is required, or where ballistic protection would otherwise impede certain functions of the helmet and the wearer's desired functional capabilities. The appliqué element of the present invention can comprise various types of material, including, for example, ultra high molecular weight polyethylene (UHMWPE), aramid fibers, ceramics, polycarbonate, steel or a combination of two or more such materials. The appliqué assembly of the present invention further includes one or more underside attachment member types for attaching the appliqué to a helmet, and can optionally include one or more external-side attachment or connector members for attaching other articles to the outside of the appliqué element. Accordingly, the appliqué system and/or assembly of the present invention increases the protection level of a helmet in a specific area or areas as a mission or threat dictates by allowing the appliqué element to be donned or doffed as needed, and thereby does not require the additional weight of the appliqué element to be permanent.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a top right perspective view of one embodiment of the appliqué assembly of the present invention in position on a helmet.

[0006] FIGS. **2** and **3** are front views of photographs of the appliqué assembly of the present invention as removed from a secured position on a helmet.

[0007] FIGS. **4** through **6** are photographs of additional embodiments of the appliqué assembly of the present invention in position on a helmet and mannequin.

[0008] FIG. **7** is a partial cross-sectional view of mating elements in accordance with one embodiment of the helmet appliqué assembly of the present invention.

[0009] FIG. **8** is a partial cross-sectional perspective view of the mating elements shown in FIG. **7**.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE PRESENT INVENTION

[0010] As shown in FIG. **1**, one embodiment of the helmet appliqué assembly **30** of the present invention includes a helmet appliqué element **10** attached to an underlying helmet **15**. The helmet **15** can be provided with various attachments such as a night vision device mount **20** and a rail system **25**. The rail system permits the helmet to attach necessary or desirable articles such as lighting, camera or other accessories as is known in the art. The appliqué element **10** is formed and shaped so as to avoid impeding the use and functionality of the night vision device mount **20** and rail system **25**, and can further be designed in alternative embodiments to extend further or less in a given direction depending upon the specific underlying helmet involved.

[0011] In the embodiment shown in FIG. **1**, the ballistic appliqué element **10** of the present invention includes an external surface **12** and an internal surface in between the element **10** and the helmet **15**, a front profile edge **13**, a rear profile edge **14** and two side profile edges **16**, wherein the side profile edges are curved so as to provide relief around edge attachments **25** of the helmet. The front profile edge **13** can be formed so as to provide an opening **17** in a variety of shapes, such as rectangular, square and/or U-shaped. In the embodiment shown in FIG. **1**, the front profile edge **13** is formed so as to provide a substantially U-shaped opening **17** in the appliqué element. The appliqué element **10** can comprise ballistic material hermetically sealed and encapsulated within a fabric material, wherein the ballistic material comprises one or more of: ultra-high molecular weight polyethylene, aramid fibers, ceramics, polycarbonate material, and/or steel as described above.

[0012] In one embodiment of the present invention, the helmet appliqué assembly **30** further includes one or more connector members secured to the internal surface of the appliqué element **10**, with the connector members being capable of secure engagement with one or more counterpart connector members of the helmet **15**. For instance, hook-and-loop type fasteners, straps, snaps and other similar attachment means can be employed. It will be appreciated that the fastener elements can be directly secured to the fabric material described above.

[0013] In a specific embodiment, a hook or loop fastener strip, with adhesive on one side and hook or loop fasteners on the other, is adhered to the internal surface of the appliqué element **10**, such that the adhesive side is pressed against the internal surface of the appliqué element and the hook or loop side faces outwardly. A counterpart loop or hook strip can be similarly applied to an underlying helmet (such as helmet **15**) in order to be able to securely retain the strip affixed to the internal surface of the appliqué element. It will be appreciated that multiple hook or loop strips can be secured

to the internal surface of the appliqué element in locations deemed most suitable to create a secure but releasable fit with the underlying helmet. Such an arrangement is illustrated in the embodiments of the present invention shown in FIGS. **2** and **3**, wherein the helmet appliqué element **10** includes fasteners **35** secured to the internal surface **32** thereof, and these fasteners **35** are aligned so as to mate with counter fastener elements **40** on the exterior surface **42** of helmet **15**. When element **10** is desired to be donned, it can be attached to helmet **15** by aligning fasteners **35** with fasteners **40**, and when element **10** is desired to be doffed, it can be lifted with sufficient pressure from helmet **15** in order to overcome the retention strength of the fasteners, thereby allowing element **10** to be removed.

[0014] As an alternative to hook or loop strips, the present invention can use other connector member types, such as male or female snap members secured to the internal surface of the appliqué element, and positioned so as to mate with the counterpart female or male snap members on the outer surface of the helmet. As a further alternative, the connector member types can comprise one or more straps that can be secured to the underlying helmet in known fashion.

[0015] In the embodiment of the present invention as shown in FIG. **1**, the helmet appliqué element **10** is applied to the frontal lobe of the helmet. However, it will be appreciated that the helmet appliqué element **10** can cover different or additional areas of the helmet depending upon intended use and anticipated threat or mission. Further, it will be appreciated that multiple helmet appliqué elements can be employed on the same helmet when desirable.

[0016] As shown in FIGS. **4-6**, a separate helmet appliqué element **50** is shown for the back portion of a helmet. As with element **10**, element **50** can comprise ballistic material hermetically sealed and encapsulated within a fabric material, wherein the ballistic material comprises one or more of: ultra-high molecular weight polyethylene, aramid fibers, ceramics, polycarbonate material, and/or steel as described above. The secondary element **50** has an external surface **52** and an internal surface (not shown) in between the element **50** and the helmet **15**, a front profile edge **53** and a rear profile edge **54**. In one embodiment of the invention, the rear profile edge **54** can be curved so as to provide relief around edge attachments **25** of the helmet. In one embodiment of the present invention, as shown in FIG. **6**, for example, at least a portion of the rear profile edge **14** of element **10** can mate with at least a portion of the front profile edge **52** of element **50** to form a seam **57**. It will be appreciated that the mating edges **14**, **52** can be provided with cooperating connector elements in order to keep the elements **10**, **50** securely connected. It will also be appreciated that elements **10** and **50** can be provided so as to maximize the mating engagement of the profile edge **14** of element **10** and the profile edge **52** of element **50**, and thereby provide a longer seam **57**, which ensures maximum protection of the helmet wearer. It will further be appreciated that the profiles or heights of the profile edges **14** and **52** can be substantially the same so as to provide an aerodynamic and smooth overall surface extending above the underlying helmet. As shown in the exemplary embodiment of FIG. **7**, the height or thickness T of element **10** is shown from the internal surfaces to the external surfaces of respective elements **10**, **50**. As further shown in FIG. **7**, the rear profile edge **14** of element **10** extends from a termination edge **80** of the external surface **12** to a termination edge **82** of the internal surface **11** of the first element **10**, and the front profile edge **53** of element **50** extends from a termination edge **84** of the external surface to a termination edge **86** of the internal surface of element **50**. As shown in the exemplary embodiment of FIG. **7**, the distance along the rear profile edge **14** between the termination edge **80** of the external surface **12** and the termination edge **82** of the internal surface **11** of the first ballistic appliqué element **10** is larger than the first element thickness T. In FIG. **7**, the exemplary rear profile edge **14** comprises first ledge drop surface **72**, second ledge drop surface **74** and under-ledge surface **75**. The distance along the front profile edge **53** between the termination edge **84** of the external surface **52** and the termination edge **86** of the internal surface **51** of the second ballistic appliqué element **50** is larger than the second element thickness T. In FIG. **7**, the exemplary front profile edge **53** comprises first riser portion **61**, front step portion **62** and second riser portion **63**.

[0017] In one embodiment of the present invention, as illustrated in FIG. **7**, the front profile edge **53** of element **50** can comprise a rampart member **60** having a first riser portion **61** extending upward from the internal surface **51** of element **50** to a front step portion **62**, wherein the front step portion **62** is substantially curved in accordance with the curvature of the element **50** and the underlying helmet **15**, and further wherein the front step portion **62** meets with a second riser portion **63**, which extends to the external surface **52** of element **50**. In one embodiment of the present invention, the first riser portion **61** and the second riser portion **63** are substantially parallel. In another embodiment of the present invention, one or more of the first riser portion **61**, front step portion **62** and second riser portion **63** are provided with connector elements to facilitate connection with the element **10** of the present invention, when elements **10** and **50** are moved towards one another in the directions noted by arrows A and B.

[0018] In connection with this embodiment of the present invention, which is also shown in FIG. **8**, the helmet appliqué element **10** can be provided with a rear profile edge **14** having a ledge element **70** comprising a first ledge drop surface **72**, a second ledge drop surface **74** and an under-ledge surface **75** extending from the first ledge drop surface **72** to the second ledge drop surface **74**. In one embodiment of the present invention, the first ledge drop surface **72** and the second ledge drop surface **74** of the ledge element **70** are substantially parallel. The under-ledge surface **75** is substantially curved in accordance with the curvature of the front step portion **62** of the rampart member **60** of appliqué element **50**. In this way, element **10** and element **50** can cooperatively engage atop the helmet **15**, providing a snug, secure and protective fit for the wearer. It will be appreciated that one or more of the surfaces **72**, **74** and **75** of the ledge element **70** can be provided with connector elements that cooperate with other connector elements provided on one or more portions **61**, **62**, **63** of the rampart member **60** of element **50** in order to keep the elements **10**, **50** securely connected. In one embodiment of the present invention, the first riser portion is cooperatively engageable with the first ledge drop surface of the first element, the second riser portion is cooperatively engageable with the second ledge drop surface, and the front step portion is cooperatively engageable with the under-ledge drop surface. It will be appreciated that, while FIGS. **7** and **8** illustrate the rampart member **60** of element **50** extending from the lower portion

of profile edge **53** and the ledge element **70** of element **10** extending from the upper portion of profile edge **14**, the orientation can be reversed in accordance with an additional embodiment of the present invention. In such an additional embodiment, the rampart member **60** extends from the lower portion of profile edge **14** and the ledge element **70** extends from the upper portion of profile edge **53**.

[0019] In one embodiment of the present invention, the respective internal and external surfaces of the first and second appliqué elements are in substantially flush relation when the front step portion of the rampart member of the second appliqué element is cooperatively engaged with the under-ledge drop surface of the ledge portion of the first appliqué element.

[0020] In one embodiment of the present invention, the helmet appliqué assembly **30** further includes one or more connector members secured to the internal surface of the appliqué element **10** and/or **50**, with the connector members being capable of secure engagement with one or more counterpart connector members of the helmet **15**. For instance, hook-and-loop type fasteners, straps, snaps and other similar attachment means can be employed. It will be appreciated that the fastener elements can be directly secured to the fabric material described above.

[0021] In one embodiment of the present invention, one or more connector members on the internal side of the appliqué element **10** and/or **50** are evenly distributed across the helmet appliqué so as to mate with appropriate mating attachment elements distributed across the helmet. In another embodiment of the present invention, the helmet appliqué element is provided as part of a helmet appliqué system kit or assembly, wherein the kit includes alternative attachment members for selection and use by the wearer or assembly personnel. Such an assembly can further include elements that can readily be secured to a helmet that may otherwise be incapable of receiving the helmet appliqué element of the present invention. For example, the kit can include strips of loop-type fasteners with an adhesive substance on one side and loop fasteners on the other, such that the adhesive side can be secured to the helmet, leaving the loop fasteners exposed and available for receiving mating hook fasteners secured to the underside of the helmet appliqué element. Similarly, such an assembly or kit can include one or more attachment components for attaching external elements to the external side of the appliqué element **10** and/or **50**. For instance, a loop-type fastener strip with adhesive on one side can be secured to an identification tag via the adhesive side, and the loop-type fastener side can then be exposed for securing to a hook-type fastener on the external side of the appliqué element **10** and/or **50**.

[0022] The appliqué element of the present invention can be quickly donned and doffed through the use of the attachment components of the present invention. When not in position on a helmet, one embodiment of the appliqué element **10** and/or **50** of the present invention is semi-rigid and can be stored in stand-alone or stacked fashion.

[0023] The present invention thus provides a helmet appliqué assembly including a helmet appliqué element that is lighter weight, and attachable to an existing helmet to cover one or more areas of an otherwise exposed helmet. As described above, the present invention can be suitably relieved in areas where no ballistic protection is required, or where ballistic protection would otherwise impede certain functions of the helmet and the wearer's desired functional capabilities. The appliqué element of the present invention can comprise various types of ballistic material, including, for example, ultra high molecular weight polyethylene (UHMWPE), aramid fibers, ceramics, polycarbonate, or a combination of two or more such materials. In one embodiment of the present invention, the appliqué element can be provided in form similar to a "soft armor" product, wherein the ballistic material is hermetically RF heat sealed and encapsulated within a fabric material (e.g., Cordura™) in order to maintain ballistic integrity in wet or sandy environments.

[0024] The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the claims of the application rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

1. A helmet appliqué assembly, comprising:

a first ballistic appliqué element having an external surface with a curvilinear cross-section, an internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, and a first element profile edge; and

a second ballistic appliqué element having an external surface with a curvilinear cross-section, an internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, and a second element profile edge, with the second element profile edge that is cooperatively engageable with the first element profile edge.

2. The assembly of claim **1** wherein the respective external surfaces of the first and second appliqué elements are in substantially flush relation when the second element profile edge is cooperatively engaged with the first element profile edge.

3. The assembly of claim **1** wherein the respective internal surfaces of the first and second appliqué elements are in substantially flush relation when the second element profile edge is cooperatively engaged with the first element profile edge.

4. The assembly of claim **1**, further including at least one connector member secured to respective internal surfaces of the first and second appliqué elements, wherein the at least one connector member is capable of secure engagement with one or more counterpart connector members of a helmet.

5. The assembly of claim **4**, wherein the at least one connector member comprises one or more strips having an adhesive on one side and a fastener on the other side.

6. The assembly of claim **5**, wherein the fastener comprises one of: hook fasteners, loop fasteners, and snap elements.

7. The assembly of claim **1**, wherein the first and second ballistic appliqué elements each comprises at least one of: ultra-high molecular weight polyethylene (UHMWPE), aramid fibers, ceramics, and polycarbonate material.

8. The assembly of claim **1**, wherein the first and second appliqué elements comprise hermetically sealed ballistic material.

9. The assembly of claim **1**, further including a helmet secured to the first and second ballistic appliqué elements.

10. The assembly of claim **9**, wherein the helmet includes an attachment, and wherein the first ballistic appliqué ele-

ment is formed with an opening so as to avoid impeding the use of the helmet attachment.

11. The assembly of claim **10**, wherein the attachment is a night vision device mount.

12. The assembly of claim **10**, wherein the helmet has a side edge, and wherein the attachment is attached to the helmet side edge.

13. The assembly of claim **1**, wherein the first ballistic appliqué element is formed with an opening so as to avoid impeding the use of a helmet attachment.

14. A helmet appliqué assembly, comprising:

a first ballistic appliqué element having an external surface with a curvilinear cross-section, an internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, a first element thickness measured from the external surface to the internal surface, and a first element profile edge extending from a termination edge of the external surface to a termination edge of the internal surface of the first ballistic appliqué element; and

a second ballistic appliqué element having an external surface with a curvilinear cross-section, internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, a second element thickness measured from the external surface to the internal surface, and a second element profile edge extending from a termination edge of the external surface to a termination edge of the internal surface of the second ballistic appliqué element.

15. The assembly of claim **14** wherein the first element thickness and the second element thickness are substantially the same.

16. The assembly of claim **14**, further including at least one connector member secured to respective internal surfaces of the first and second appliqué elements, wherein the at least one connector member is capable of secure engagement with one or more counterpart connector members of a helmet.

17. The assembly of claim **16**, wherein the at least one connector member comprises one or more strips having an adhesive on one side and a fastener on the other side.

18. The assembly of claim **17**, wherein the fastener comprises one of: hook fasteners, loop fasteners, and snap elements.

19. The assembly of claim **14**, wherein the first and second ballistic appliqué elements each comprises at least one of: ultra-high molecular weight polyethylene (UHMWPE), aramid fibers, ceramics, and polycarbonate material.

20. The assembly of claim **14**, wherein the first and second appliqué elements comprise hermetically sealed ballistic material.

21. A helmet appliqué assembly, comprising:

a first ballistic appliqué element having an external surface with a curvilinear cross-section, an internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, a first element front profile edge and a first element rear profile edge; and

a second ballistic appliqué element having an external surface with a curvilinear cross-section, an internal surface for engaging the outer surface of a helmet, wherein the internal surface has a curvilinear cross-section, a second element front profile edge and a second element rear profile edge, wherein at least a portion of the second element front profile edge abuts at least a portion of the first element rear profile edge.

22. The assembly of claim **21**, wherein the first element front profile edge is formed with an opening so as to avoid impeding the use of a helmet attachment.

23. The assembly of claim **21**, further including at least one connector member secured to the first element rear profile edge and at least one connector member secured to the second element front profile edge, wherein the at least one connector member secured to the second element front profile edge is securable to the at least one connector member secured to the first element rear profile edge.

24. The assembly of claim **21**, further including a helmet having an outer surface and at least one helmet attachment, wherein the first and second ballistic appliqué elements are secured to the outer surface of the helmet, and wherein at least the first ballistic appliqué element includes at least one side profile edge that is curved to provide relief around the at least one helmet attachment.

25. The assembly of claim **24**, wherein the at least one helmet attachment is a rail system.

26. The assembly of claim **21**, further including a helmet having an outer surface and at least one helmet attachment, wherein the first and second ballistic appliqué elements are secured to the outer surface of the helmet, and wherein at least the first element front profile edge is curved to provide relief around the at least one helmet attachment.

27. The assembly of claim **26**, wherein the at least one helmet attachment is a night vision device mount.

28. The assembly of claim **21**, wherein at least one of the first and second ballistic appliqué elements includes one or more connector members on the outer surface thereof for facilitating the attachment of an article thereto.

29. The assembly of claim **21**, wherein the first and second ballistic appliqué elements each comprises at least one of: ultra-high molecular weight polyethylene (UHMWPE), aramid fibers, ceramics, and polycarbonate material.

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