

REMOVABLE BODY PADDING

Cross-reference to Related Applications

The present application claims benefit of priority to U.S. Provisional Patent Application No. 61/810,839, entitled "Removable Body Padding" and filed on April 11, 2013, which is specifically incorporated by reference herein for all that it discloses or teaches.

Technical Field

The invention relates generally to body padding and methods of using removably body padding.

Background

Body padding is thin cushioned material that may be added to desired areas of clothing to provide enhanced impact and/or abrasion protection to a user's body. Body padding may also be used to evenly distribute a force incident on the body in the general location of the body padding. For example, kneepads or knee pads are protective gear worn on knees to protect them against impact injury (e.g., a fall or a strike) and/or to provide padding for extended kneeling or crawling. Elbow pads similarly protect elbows against impact injury and/or provide padding for extended crawling. Other pads may also similarly protect other areas of the body against impact injury and/or provide padding for extended application of force to the body.

Body padding is included in some sporting clothing, especially that intended for use in combat sports (e.g., fencing, martial arts, etc.), contact sports (e.g., football, rugby, hockey, etc.), or sports with a relatively high probability of substantial impact injury (e.g., motorcycling, bicycling, rock climbing, etc.). Body padding may also be used in combat uniforms to aid a soldier's ability to kneel on or crawl across a variety of terrain without injury. Body padding may further be used in conjunction with other types of clothing for other activities (e.g., construction work, gardening, etc.).

The body padding may be removeably attached to the user's clothing to enable separate procurement, cleaning, and replacement of the clothing and the body padding. Further, removable body padding enables the user to elect when to use the body padding in

conjunction with the clothing the user is wearing. Removable body padding may be located outside or inside the user's clothing. Outside padding may be more easily attached and/or detached than inside padding while the user continues to wear the clothing. However, outside padding tends to be less securely fastened to the clothing as compared to inside padding and may protrude substantially from the clothing. This substantial protrusion may be undesirable for functional and/or aesthetic reasons. Inside padding may be difficult to attach and/or detach while the user continues to wear the clothing. Further, inside padding does not protect the clothing from wear at any points of contact with an external surface.

Summary

Implementations described and claimed herein address the foregoing problems by providing a removable body pad comprising: a padded insert having an outer perimeter; a protective cap attached to the padded insert with a cap perimeter inside the outer perimeter of the padded insert, wherein the protective cap includes a protruding portion that projects away from a remainder of the protective cap; and one or more fasteners arranged around the protruding portion of the protective cap that surround a majority of the protruding portion of the protective cap.

Implementations described and claimed herein further address the foregoing problems by further providing a removable body padding system comprising: a garment including a body pad pocket and a body pad window in the body pad pocket; and a body pad including a protective cap substantially larger than the body pad window, wherein the protective cap is configured to entirely overlap the window when the body pad is removably attached to the garment.

Implementations described and claimed herein still further address the foregoing problems by still further providing a method of using a removable body padding system comprising: inserting a body pad including a protective cap into a body pad pocket in a garment; positioning the body pad within the body pad pocket such that the protective cap entirely overlaps a body pad window in the body pad pocket, wherein the protective cap is substantially larger than the body pad window; and selectively removably securing the body pad to the body pad pocket.

Other implementations are also described and recited herein.

Brief Descriptions of the Drawings

FIG. 1 illustrates a user wearing example removable body pads.

FIG. 2 is a perspective view of an example removable body pad.

5 FIG. 3 is a cross-sectional view of an example removable body pad.

FIG. 4 is a front view of an example removable body pad.

FIG. 5 is a rear view of an example removable body pad.

FIG. 6 is a front view of an example garment with a body pad pocket and corresponding window.

10 FIG. 7 is a perspective view of an example body pad pocket with a removable body pad incorporated therein.

FIG. 8 is a front view of an example garment with a removable body pad incorporated within the garment.

15 FIG. 9 is a detail perspective view of an example removable body pad incorporated within a garment window of a garment.

FIG. 10 illustrates example operations for using a removable body pad and associated garment.

Detailed Descriptions

FIG. 1 illustrates a user 142 wearing example removable body
20 pads 100, 144, 146, 148. While the user 142 is depicted in a military uniform, the user 142 is any individual that desires to use the pads 100, 144, 146, 148 to provide the body protection, especially while performing activities that risk injury to the user 142 (e.g., while playing various sports or working in a high-risk environment). In some implementations, the pads 100, 144, 146, 148 can provide the user 142 ballistics protection. The user's garments
25 (i.e., the user's jacket 124 and fatigues 150 each incorporate body pad pockets (not shown), which house the removable body pads 100, 144, 146, 148. More specifically, the user's jacket 124 arms includes a body pad pocket oriented over the each of the user's elbows, which houses elbow pads 146, 148 and the user's fatigues 150 includes a body pad pocket oriented over the each of the user's knees, which houses knee pads 100, 144. In other
30 implementations, removable body pads may be oriented over greater or fewer areas of the user's body and over different locations on the user's body (e.g., over the user's shoulders).

FIG. 2 is a perspective view of an example removable body pad 200. While the depicted body pad 200 is a kneepad, in other implementations, one or more of a user's shins, thighs, groin, buttocks, waist, chest, shoulders, neck, elbows, and forearms may benefit from a similar form of body padding as that disclosed with respect to the user's knees. When used, the body pad 200 is oriented on a user's knee with Side A oriented upward toward the user's upper leg and side B downward toward the user's lower leg. Further, side C is oriented rearwardly and toward the user's knee and side D is oriented frontwardly and away from the user's knee.

The body pad 200 includes a padded insert 202, an optional cushioning layer (not shown), and a protective cap 204. The optional cushioning layer fills a void between the padded insert 202 and the protective cap 204 (see e.g., FIG. 3). In one implementation, the cushioning layer includes a matrix of resiliently compressible void cells. In another implementation, the cushioning layer is integrated with the padded insert 202 or the protective cap 204 as a unified layer. In an example implementation, the cushioning layer has a thickness of 0.02" - 0.5". In other implementations, there is no void between the padded insert 202 and the protective cap 204 and thus no cushioning layer.

The padded insert 202 underlies the protective cap 204 and is located at a rear of the body pad 200. The padded insert 202 is made of a padded or cushioning material (e.g., an open cell or closed cell foam or matrix of resiliently compressible void cells) or is filled with a cushioning material (e.g., felt, down, feathers, or other resiliently compressible materials). The padded insert 202 may substantially or entirely cover a protected area of a user's body (e.g., the knee or elbow region of the user's body). Further, the padded insert 202 may be contoured to follow corresponding contours in the protected area of the user's body (e.g., concave to fit a user's knee joint) and/or flexible to conform to movements of the protected area of the user's body (e.g., flexing of the user's knee joint). In an example implementation, the padded insert 202 has a thickness of 0.05" - 1".

The protective cap 204 overlies the padded insert 202 and is located at a front of the body pad 200. The protective cap 204 is harder than the padded insert 202 and may be made of an impact or abrasion resistant material (e.g., a solid plastic or rubber). In an example implementation, the protective cap 204 has a thickness of 0.02" - 0.2". The protective cap 204 may also substantially or entirely cover the protected area of the user's body (e.g., the knee or elbow region of the user's body). In the depicted implementation, the protective cap 204 covers less area than the padded insert 202. In other implementations, the protective cap 204 covers an equal or greater area than the padded insert 202.

The inside surface of the protective cap 204 may also be contoured to follow corresponding contours in the protected area of the user's body and/or flexible to conform to movements of the protected area of the user's body. Further, the outside surface of the protective cap 204 may be similarly contoured and/or flexible. In other implementations, the outside surface of the protective cap 204 may have one or more facets molded thereon to achieve a desired level of stability (e.g., provide a stable platform for resting the user's elbow in a elbow pad implementation). The protective cap 204 is stitched along a periphery of the protective cap 204 to the padded insert 202 (see e.g., stitching 220). In other implementations, the protective cap 204 is glued, welded, mechanically attached (e.g., via a grommet or rivet), or selectively removably attached (e.g., via hook-and-loop tape) to the padded insert 202.

The protective cap 204 includes protruding portions 206, 212 that substantially protrude frontwardly from the remaining portion of the protective cap 204 (i.e., protruding greater than a thickness of a corresponding garment or greater than 0.1 in). The protruding portions 206, 212 may offer increased impact absorption by resiliently deflecting rearwardly upon impact. In some implementations, a resilient deflection of the protective cap 204 engages the cushioning layer to absorb energy from the impact. In some implementations, the protruding portions 206, 212 are referred to as discrete sections of a singular protruding portion. Further, the protruding portions 206, 212 may be thicker than other areas of the protective cap 204 in order to maximize performance of the protective cap 204 while minimizing weight and the cost of manufacturing the body pad 200. In other implementations, the protective cap 204 may include a number of removable layers that are selectively removed as the protective cap 204 is damaged or worn out to provide a fresh protective cap 204 outer surface. In still other implementations, the protective cap 204 has no protruding portions 206, 212 and its entirety lies in substantially the same plane or within the same simple curved plane.

The protective cap 204 includes gripping ridges (e.g., ridge 208) that offer the user increased traction when engaging a surface using the body pad 200. For example, the gripping ridges may offer the user increased traction at the user's knees when the user is crawling on the ground. Some of the gripping ridges are concave in a downward direction in order to maximize traction of the body pad 200 in the downward direction. Other gripping ridges may be concave in an upward direction in order to maximize traction of the body pad 200 in the upward direction. In other implementations, the gripping ridges may have

other shapes and orientations on the protective cap 204. In still other implementations, no gripping ridges are included on the protective cap 204.

The protective cap 204 also includes a flexing region 210 that separates the lower protruding portion 206 from the upper protruding portion 212. The flexing region 210 aids flexing of the protective cap 204 in a desired area. For example, the flexing region 210 is located at or near a point where the body pad 200 is seated on the user's knee. As the knee is flexed, the protective cap 204 preferentially flexes about the flexing region 210 to conform closely with the user's knee in a variety of orientations of the knee joint. In other implementations, the flexing region is oriented and/or located differently than that depicted in FIG. 2 depending on where and how the body pad 200 is intended to be flexed. Further, some body pads may incorporate multiple flexing regions or the entire surface of the body pad may be flexible.

A window in a corresponding garment (not shown, see e.g., window 632 of garment 624 of FIG. 6) provides a potential source of contaminants (e.g., solids, liquids, and/or gases) entering the garment and coming in contact with the user or becoming lodged between the user and the body pad 200, causing discomfort or injury. In order to keep the contaminants out, the body pad 200 also includes fastening pads (e.g., pad 214) arranged around the periphery of the protective cap 204. The fastening pads may include hook-and-loop material, snaps, buttons, clasps, or any other attaching device that selectively attaches and detaches the body pad 200 to a corresponding garment. The fastening pads may surround or substantially surround the protective cap 204 in order to provide a partial, near-complete, or complete seal against external contaminants from entering the garment. The seal may be adapted to prevent substantial solid, liquid, and/or gaseous contaminants from entering the garment. In one implementation, a region of the periphery of the protective cap 204 is devoid of the fastening pads or order to allow the user to more easily pry the body pad 200 from the garment using the user's fingers. This region may also allow the body pad 200 to more readily bend without the fastening pads restraining the deflection of the body pad 200.

Other implementations do not include the fastening pads. For example, one or more zippers or zipper seals may extend around the periphery of the protective cap 204 in order to selectively attach and detach the body pad 200 to the garment. For further details regarding the attachment / detachment of the body pad 200 to / from the garment, see FIGs. 7-9 and detailed descriptions thereof.

Each of the components of the body pad 200 may be thermo-formed or injection molded, for example. Further, each of the components of the body pad 200 may be selected from a group of fire-retardant materials or “no-melt, no-drip” materials to improve the user’s safety.

5 FIG. 3 is a cross-sectional view of an example removable body pad 300. While the depicted body pad 300 is a kneepad, other implementations of the disclosed body padding may protect other areas of a user’s body. When used, the body pad 300 is oriented on the user’s knee with side A oriented upward toward the user’s upper leg and side B downward toward the user’s lower leg. Further, side C is oriented rearwardly and toward the user’s
10 knee and side D is oriented frontwardly and away from the user’s knee.

The body pad 300 includes a padded insert 302, a cushioning layer 338, and a protective cap 304. The padded insert 302 underlies the protective cap 304 and is located at a rear of the body pad 300. The padded insert 302 may substantially or entirely cover a protected area of the user’s body, may be contoured to follow corresponding contours in the
15 protected area of the user’s body, and/or may be flexible to conform to movements of the protected area of the user’s body.

The cushioning layer 338 fills a void between the padded insert 302 and the protective cap 304 and provides additional cushioning and/or impact protection to the user. In one implementation, the cushioning layer 338 includes the matrix of resiliently compressible void
20 cells shown in FIG. 3, although other cushioning layer 338 arrangements are contemplated herein. For example, the cushioning layer 338 may have a different arrangement of void cells (e.g., one or more matrices of void cells stacked over one another and optionally attached together). In other implementations, there is no void between the padded insert 302 and the protective cap 304 and thus no cushioning layer 338.

25 The protective cap 304 overlies the cushioning layer 338 and is stitched along a periphery of the protective cap 304 or otherwise attached to the padded insert 302. In another implementation, the protective cap 304 is selectively removably attached to the padded insert 302 via a snap fit connection. Further, the protective cap 304 may include two pieces that snap together with the padded insert 302 compressed there between. The
30 protective cap 304 may also substantially or entirely cover the protected area of the user’s body, may also be contoured to follow corresponding contours in the protected area of the user’s body and/or may also be flexible to conform to movements of the protected area of the user’s body.

The protective cap 304 includes protruding portions 306, 312 that substantially protrude frontwardly from the remaining portion of the protective cap 304 that offer increased impact absorption by resiliently deflecting rearwardly upon impact. The protective cap 304 may also include gripping ridges (e.g., ridge 308) that offer the user increased traction when engaging a surface using the body pad 300. The protective cap 304 may also include a flexing region 310 that separates the lower protruding portion 306 from the upper protruding portion 312 and aids flexing of the protective cap 304 in a desired area.

The body pad 300 also includes fastening pads (not shown) or other sealing arrangements oriented around the periphery of the protective cap 304 that selectively attach and detach the body pad 300 to a corresponding piece of clothing (not shown, see e.g., garment 624 of FIG. 6). The fastening pads may surround or substantially surround the protective cap 304 in order to provide a partial, near-complete, or complete seal against external contaminants from entering the user's clothing.

FIG. 4 is a front view of an example removable body pad 400. While the depicted body pad 400 is a kneepad, other implementations of the disclosed body padding may protect other areas of a user's body. When used, the body pad 400 is oriented on the user's knee with side A oriented upward toward the user's upper leg and side B downward toward the user's lower leg. Further, the depicted side of the body pad 400 is oriented frontwardly and away from the user's knee.

The body pad 400 includes a padded insert 402, an optional cushioning layer (not shown), and a protective cap 404. The padded insert 402 underlies the protective cap 404 and is located at a rear of the body pad 400. The padded insert 402 may substantially or entirely cover a protected area of the user's body, may be contoured to follow corresponding contours in the protected area of the user's body, and/or may be flexible to conform to movements of the protected area of the user's body.

The protective cap 404 overlies the padded insert 402 and is stitched along a periphery of the protective cap 404 (see e.g., stitching 420) or otherwise attached to the padded insert 402. In another implementation, the protective cap 404 is selectively removably attached to the padded insert 402 via a snap fit connection. Further, the protective cap 404 may include two pieces that snap together with the padded insert 402 compressed there between. The protective cap 404 may also substantially or entirely cover the protected area of the user's body, may also be contoured to follow corresponding contours in the protected area of the user's body and/or may also be flexible to conform to movements of the protected area of the user's body.

The protective cap 404 includes protruding portions 406, 412 that substantially protrude frontwardly from the remaining portion of the protective cap 404 that offer increased impact absorption by resiliently deflecting rearwardly upon impact. The protective cap 404 may also include gripping ridges (e.g., ridge 408) that offer the user increased traction when engaging a surface using the body pad 400. The protective cap 404 may also include a flexing region 410 that separates the lower protruding portion 406 from the upper protruding portion 412 and aids flexing of the protective cap 404 in a desired area.

The body pad 400 also includes fastening pads (e.g., pad 414) or other sealing arrangements oriented around the periphery of the protective cap 404 that selectively attach and detach the body pad 400 to a corresponding piece of clothing (not shown, see e.g., garment 624 of FIG. 6). The fastening pads may surround or substantially surround the protective cap 404 in order to provide a partial, near-complete, or complete seal against external contaminants from entering the user's clothing.

FIG. 5 is a rear view of an example removable body pad 500. While the depicted body pad 500 is a kneepad, other implementations of the disclosed body padding may protect other areas of a user's body. When used, the body pad 500 is oriented on the user's knee with side A oriented upward toward the user's upper leg and side B downward toward the user's lower leg. Further, the depicted side of the body pad 500 is oriented rearwardly and toward the user's knee.

The body pad 500 includes a padded insert 502, an optional cushioning layer (not shown), and a protective cap (not shown). The padded insert 502 underlies the protective cap, which is stitched to the padded insert 502 along a periphery of the protective cap (see e.g., stitching 520). The padded insert 502 may substantially or entirely cover a protected area of the user's body, may be contoured to follow corresponding contours in the protected area of a user's body, and/or may be flexible to conform to movements of the protected area of the user's body.

In other implementations, the padded insert 502 includes a fastening strips or pads (not shown) at the rear of the padded insert 502. The fastening strips or pads may include hook-and-loop tape, snaps, buttons, clasps, zipper seals, or any other attaching device that selectively attaches and detaches the body pad 500 to an interior panel of the user's clothing (not shown, see e.g., inner layer 630 of FIG. 6). For further details regarding the attachment / detachment of the body pad 500 to / from the clothing, see FIGs. 7-9 and detailed descriptions thereof.

FIG. 6 is a front view of an example garment 624 with a body pad pocket 626 and corresponding window 632. The depicted garment 624 is a pants leg, although, other areas of a user's clothing may incorporate similar features as those disclosed with specific reference to the pants leg of FIG. 6. Further, the garment 624 is often a fabric material, but may be made of other materials suitable for the user's clothing (e.g., rubber for waders). In some implementations, the pants leg (with corresponding body pad (not shown)) is selectively removable (e.g., via a zipper) from a corresponding pair of pants. Modular options for the pants leg may be available with different characteristics (e.g., with pads, without pads, etc.).

The garment 624 includes the pocket 626 in the knee area of the garment 624. The pocket 626 is made up of an outer layer 628 and an inner layer 630. The outer layer 628 is stitched to the inner layer 630 about a periphery of the pocket 626 (see stitching 634). In other implementations, the outer layer 628 is stitched to the outside of the garment 624, where the garment 624 forms the inner layer 630. In still other implementations, the inner layer 630 is stitched to the inside of the garment 624, wherein the garment 624 forms the outer layer 628.

A gap (not shown) may be left in the stitching 634 to allow a corresponding body pad (not shown, see e.g., body pad 200 of FIG. 2) to be selectively inserted into the pocket 626 through the gap. In some implementations, the gap is selectively closed via fastener (e.g., hook-and-loop tape). The body pad is at least visible, and may also protrude through the window 632. Further, the body pad is inserted into and removed from the pocket 626 via the window 632. The window 632 is sized and placed such that a protective cap portion (not shown) of the body pad occupies the entire window 632. In some implementations, the protective cap portion protrudes out of the window 632.

The garment 624 further includes a fastening strip 640 stitched to the inner layer 630. The fastening strip 640 corresponds to a matching fastening strip on an inside surface of a corresponding body pad. In other implementations, the fastening strip 640 is not included or is placed in a different location. The fastening strip 640 may include hook-and-loop tape, snaps, buttons, clasps, zipper seals, or any other attaching device that selectively attaches and detaches the body pad to the garment 624.

FIG. 7 is a perspective view of an example body pad pocket 726 with a removable body pad 700 incorporated therein. The pocket 726 is made up of an outer layer 728 and an inner layer (not shown) attached to a corresponding garment 724. The outer layer 728 is stitched to the inner layer about a periphery of the pocket 726 (see stitching 734). In some

implementations, a gap (not shown) is left in the stitching 734 to allow the body pad 700 to be selectively inserted into the pocket 726.

The pocket 726 further includes a window 732 through which the body pad 700 is at least visible, and through which a portion of the body pad 700 may protrude (see e.g., protruding portions 206, 212 of the protective cap 204 of FIG. 2). In some implementations, the body pad 700 is inserted into the pocket 726 via the window 732. Further, the window 732 is sized and placed such that a protective cap portion 704 of the body pad 700 occupies the substantially the entire window 732 (e.g., over 95% of the window 732) or a majority of the window 732. In some implementations, the protective cap portion protrudes out of the window 732.

The pocket 726 may include fastening pads (not shown) attached to the inside of the outer layer 728. The fastening pads correspond to matching fastening pads on an outside surface of the body pad 700 (see e.g., fastening pad 214 of FIG. 2). The fastening pads may include hook-and-loop tape, snaps, buttons, clasps, zipper seals, or any other attaching device that selectively attaches and detaches the body pad 700 to the pocket 726. The fastening pads may surround or substantially surround the window 732 in order to provide a partial, near-complete, or complete seal against external contaminants from entering the pocket 726. In one implementation, a region of the periphery of the window 732 is devoid of the fastening pads. This region allows the user to more easily pry the body pad 700 from the garment 724 using the user's fingers and hands.

In other implementations, the pocket 726 and the body pad 700 do not include fastening pads. The pocket 726 may be tight enough and/or stretchable enough to hold the body pad 700 in place with respect to the window 732 without fastening pads. In one implementation, the pocket 726 includes elastane or other resiliently stretchable fabric materials. In another implementation, the body pad 700 includes a channel that receives the pocket 726 around the window 732 to provide a more secure fit to the window 732. In still another implementation, the pocket 726 includes an elastic or otherwise adjustable-length drawstring to tighten the pocket 726 around the protective cap portion of the body pad 700 and provide a better seal between the window 732 and the body pad 700.

FIG. 8 is a front view of an example garment 824 with a removable body pad 800 incorporated within the garment 824. The depicted garment 824 is a pants leg, although, other areas of a user's clothing may incorporate similar features as those disclosed with specific reference to the pants leg of FIG. 8.

The garment 824 includes a pocket 826 in the knee area of the garment 824. The pocket 826 is made up of an outer layer 828 and an inner layer (not shown). The outer layer 828 is stitched to the inner layer about a periphery of the pocket 826 (see stitching 834). In some implementations, a gap (not shown) is left in the stitching 834 to allow the body pad 800 to be selectively inserted into the pocket 826 through the gap. The pocket 826 further includes a window 832 through which the body pad 800 is at least visible, and through which a portion of the body pad 800 may protrude (e.g., protruding portions 206, 212 of the protective cap 204 of FIG. 2). In some implementations, the body pad 800 is inserted into the pocket 826 via the window 832. Further, the window 832 is sized and placed such that a protective cap portion of the body pad 800 occupies the entire window 832. In some implementations, the protective cap portion protrudes out of the window 832.

The garment 824 further includes fastening pads (not shown) stitched to the inside of the outer layer 828. The fastening pads correspond to matching fastening pads on the outside surface of the body pad 800 (see e.g., fastening pad 214 of FIG. 2). The fastening pads may include hook-and-loop tape, snaps, buttons, clasps, zipper seals, or any other attaching device that selectively attaches and detaches the body pad 800 to the garment 824. The fastening pads may surround or substantially surround the window 832 in order to provide a partial, near-complete, or complete or seal against external contaminants from entering the garment 824. In one implementation, a region of the periphery of the window 832 is devoid of the fastening pads. This region allows the user to more easily pry the body pad 800 from the garment 824 using the user's fingers and hands.

In yet other implementations, the pocket 826 is selectively removable from the garment 824, while the body pad 800 remains fixedly attached to the pocket 826. In still another implementation, there is no pocket 826. Instead, a padded insert (e.g., padded insert 202 of FIG. 2) is attached to the inside of the garment 824 and the protective cap (e.g., protective cap 204 of FIG. 2) is selectively removably attached to the outside of the garment 824. In still another implementation, the body pad 800 is directly attached to the user's skin (e.g., via a viscoelastic pressure adhesive) rather than (or in addition) to the pocket 826.

In another implementation, the first interior portion of the body pad 800 is permanently attached to the garment 824. A second exterior portion of the body pad 800 snaps or otherwise selectively removably attaches to the first interior portion of the body pad 800. Further, the second exterior portion of the body pad 800 may slide along one or more rails (not shown) that are included in the first interior portion and snap into place on the

rails. Further, if the rails are oriented vertically, the second exterior portion of the body pad 800 may be vertically adjustable to accommodate variations in body shape and size that affect the desired body pad location.

In still another implementation, the body pad 800 includes straps that wrap around the user's body, extending through channels in the garment 824 and tighten around the user's body to hold the body pad 800 in place. The body pad 800 may utilize one or more of the disclosed systems and methods for attachment to the garment 824 and/or the user.

FIG. 9 is a detail perspective view of an example removable body pad 900 incorporated within a garment window 932 of a garment 924. The depicted garment 924 is a pants leg, although, other areas of a user's clothing may incorporate similar features as those disclosed with specific reference to the pants leg of FIG. 9.

The garment 924 includes a pocket 926 in the knee area of the garment 924. The pocket 926 is made up of an outer layer 928 and an inner layer (not shown). The outer layer 928 is stitched to the inner layer about a periphery of the pocket 926. The body pad 900 is at least visible, and may also protrude (see e.g., protruding portions 206, 212 of the protective cap 204 of FIG. 2) through the window 932 of the pocket 926. In some implementations, the body pad 900 is inserted into the pocket 926 via the window 932. Further, the window 932 is sized and placed such that a protective cap portion of the body pad 900 occupies substantially the entire window 932, or at least a majority of the window. In some implementations, the protective cap portion protrudes out of the window 932.

FIG. 10 illustrates example operations 1000 for installing and uninstalling a removable body pad from an associated garment. In an inserting operation 1010, a body pad is inserted into a garment pocket. The garment pocket is a pocket within a garment that is intended to removeably receive the body pad. The body pad is either inserted into the pocket through an aperture in the pocket within the garment or through a window in the pocket to the outside of the garment. In some implementations, the window or aperture is smaller than the outside dimensions of the body pad. However, the body pad may be bent or otherwise compressed to fit through the window or aperture into the pocket.

In a positioning operation 1020, the body pad is positioned within the pocket such that a protective cap portion of the body pad occupies the area of the window such that only the protective cap portion is visible. In other implementations, an area of the body pad surrounding the protective cap is visible through the window as well. In some implementations, the protective cap portion includes a shoulder that matches the shape and size of the window to help align and position the body pad in the window. In other

implementations, the protective cap portion is merely centered within the window or alignment marks are included on the protective cap portion to aid user alignment of the protective cap portion in the window.

5 In a securing operation 1030, the body pad is secured to the garment pocket. The body pad includes selective attachments (e.g., hook-and-loop tape) on an outside facing surface of the body pad in an orientation that surrounds the window when the body pad is correctly positioned within the pocket. Further, the garment pocket includes corresponding selective attachments on an inside facing surface of the garment pocket around the window. Additional selective attachments maybe included on the inside facing surface of the body pad and the inside surface of an inner layer of the garment pocket. The selective attachments of 10 the body pad and the garment pocket are aligned and secured together (e.g., by applying compressive force). The garment with body pad is then ready for use.

When the user desires to remove and/or replace the body pad, in a releasing operation 1040, the body pad is released from the garment pocket. The user may apply a 15 tensile or shearing force to the garment pocket and the body pad to release the selective attachments securing the body pad to the garment pocket.

In a removing operation 1050, the body pad is removed from the garment pocket in a similar manner as the body pad was inserted into the garment pocket in operation 1010, but in reverse order. The body pad may then be stored for later use, washed, or discarded in favor 20 of a new body pad.

The logical operations making up the embodiments of the invention described herein are referred to variously as operations, steps, objects, or modules. Furthermore, it should be understood that logical operations may be performed in any order, adding or omitting operations as desired, unless explicitly claimed otherwise or a specific order is inherently 25 necessitated by the claim language.

The above specification, examples, and data provide a complete description of the structure and use of exemplary embodiments of the invention. Since many embodiments of the invention can be made without departing from the spirit and scope of the invention, the invention resides in the claims hereinafter appended. Furthermore, structural features of the 30 different embodiments may be combined in yet another embodiment without departing from the recited claims.

Claims

WHAT IS CLAIMED IS:

1. A removable body pad comprising:
 - a padded insert having an outer perimeter;
 - 5 a protective cap attached to the padded insert with a cap perimeter inside the outer perimeter of the padded insert, wherein the protective cap includes a protruding portion that projects away from a remainder of the protective cap; and
 - one or more fasteners arranged around the protruding portion of the protective cap that surround a majority of the protruding portion of the protective cap.
- 10 2. The removable body pad of claim 1, wherein one or both of the padded insert and the protective cap form a cavity, further comprising:
 - a cushioning layer that occupies the cavity in the removable body pad.
3. The removable body pad of claim 2, wherein the cushioning layer includes an array of resiliently-deflectable void cells.
- 15 4. The removable body pad of claim 1, wherein the one or more fasteners surround substantially all of the protruding portion of the protective cap.
5. The removable body pad of claim 1, wherein the protective cap includes a flexing region that permits a first section of the protruding portion to move independently from a second section of the protruding portion.
- 20 6. The removable body pad of claim 1, further comprising:
 - one or more gripping ridges extending across the protruding portion of the protective cap.
7. The removable body pad of claim 1, wherein the one or more fasteners include a plurality of hook-and-loop fastener pads.
- 25 8. The removable body pad of claim 1, wherein the padded insert includes a foam material and the protective cap includes a solid plastic material.

9. A removable body padding system comprising:

a garment including a body pad pocket and a body pad window in the body pad pocket; and

5 a body pad including a protective cap substantially larger than the body pad window, wherein the protective cap is configured to entirely overlap the window when the body pad is removably attached to the garment.

10. The removable body padding system of claim 9, wherein the protective cap includes a protruding portion that protrudes from the body pad pocket through the body pad window.

10 11. The removable body padding system of claim 10, wherein the body pad includes one or more fasteners arranged around and surrounding a majority of the protruding portion of the protective cap.

12. The removable body padding system of claim 11, wherein the body pad pocket includes one or more fasteners arranged around the body pad window that selectively attach
15 to the one or more fasteners of the body pad.

13. The removable body padding system of claim 12, wherein the body pad fasteners surround substantially all of the protruding portion of the protective cap and the body pad pocket fasteners surround substantially all of the body pad window.

14. The removable body padding system of claim 10, wherein the protruding portion
20 fills substantially the entire body pad window.

15. The removable body padding system of claim 9, wherein the body pad includes a padded insert attached to the protective cap, wherein the protective cap has a cap perimeter inside an outer perimeter of the padded insert.

16. The removable body padding system of claim 9, wherein the garment is a pant leg
25 and the body pad is configured to overlies a user's knee.

17. The removable body padding system of claim 9, wherein the garment is a jacket arm and the body pad is configured to overlies a user's elbow.

18. A method of using a removable body padding system comprising:

inserting a body pad including a protective cap into a body pad pocket in a garment;

5 positioning the body pad within the body pad pocket such that the protective cap entirely overlaps a body pad window in the body pad pocket, wherein the protective cap is substantially larger than the body pad window; and
selectively removably securing the body pad to the body pad pocket.

19. The method of claim 18, wherein the positioning operation is performed such that a protruding portion of the protective cap protrudes from the body pad pocket through the
10 body pad window.

20. The method of claim 18, wherein the inserting operation includes opening a gap in the body pad pocket and inserting the body pad through the opened gap.