



US 20100125925A1

(19) **United States**  
(12) **Patent Application Publication**  
**Hanlon**

(10) **Pub. No.: US 2010/0125925 A1**  
(43) **Pub. Date: May 27, 2010**

(54) **BODY PAD**

(60) Provisional application No. 61/050,968, filed on May 6, 2008.

(76) Inventor: **Jared Hanlon**, Santa Clarita, CA (US)

**Publication Classification**

Correspondence Address:  
**MICHAEL J. CHERSKOV**  
300 NORTH STATE STREET, SUITE 5102  
CHICAGO, IL 60654 (US)

(51) **Int. Cl.**  
*A41D 13/06* (2006.01)  
*A41D 13/00* (2006.01)  
(52) **U.S. Cl.** ..... 2/24; 2/455

(21) Appl. No.: **12/589,845**

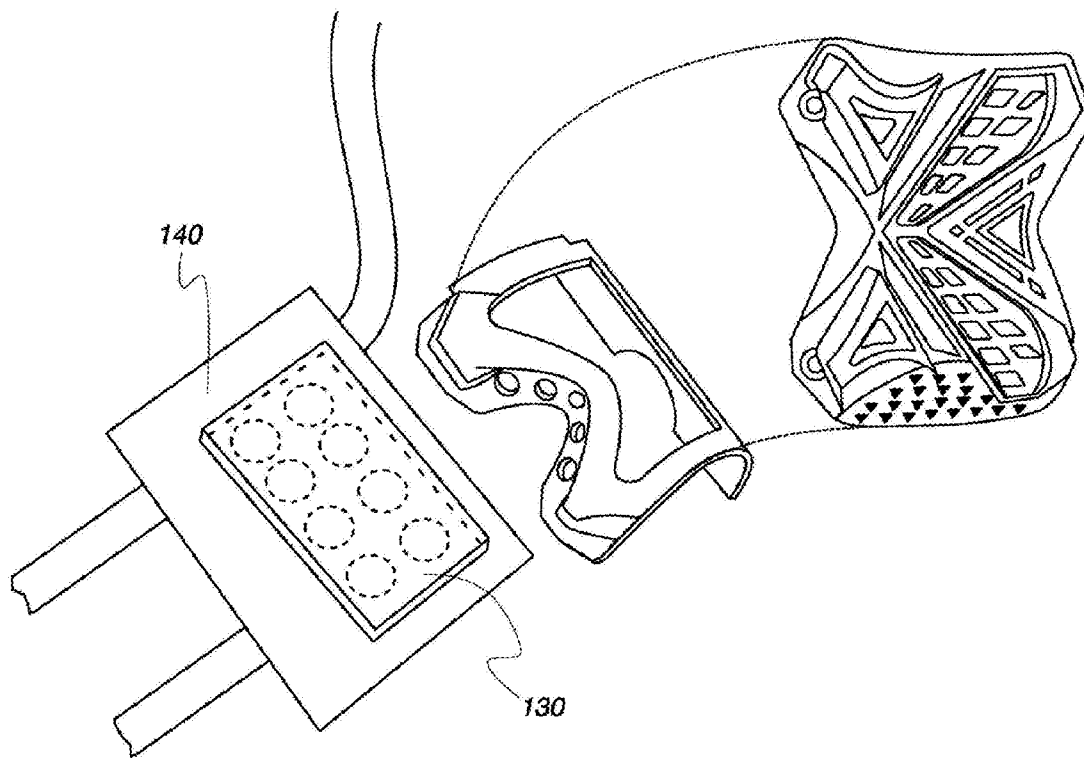
(57) **ABSTRACT**

(22) Filed: **Oct. 28, 2009**

A pad, such as a knee pad or other body-worn pad, that avoids undue accumulation of heat within the pad, and that provides a stable and comfortable resting surface for at least a portion of a user's body. The pad may further provide decreasing incremental compression in response to incrementally increasing loads, whereby users of different weights may comfortably be supported thereon.

**Related U.S. Application Data**

(63) Continuation of application No. 12/387,758, filed on May 6, 2009.



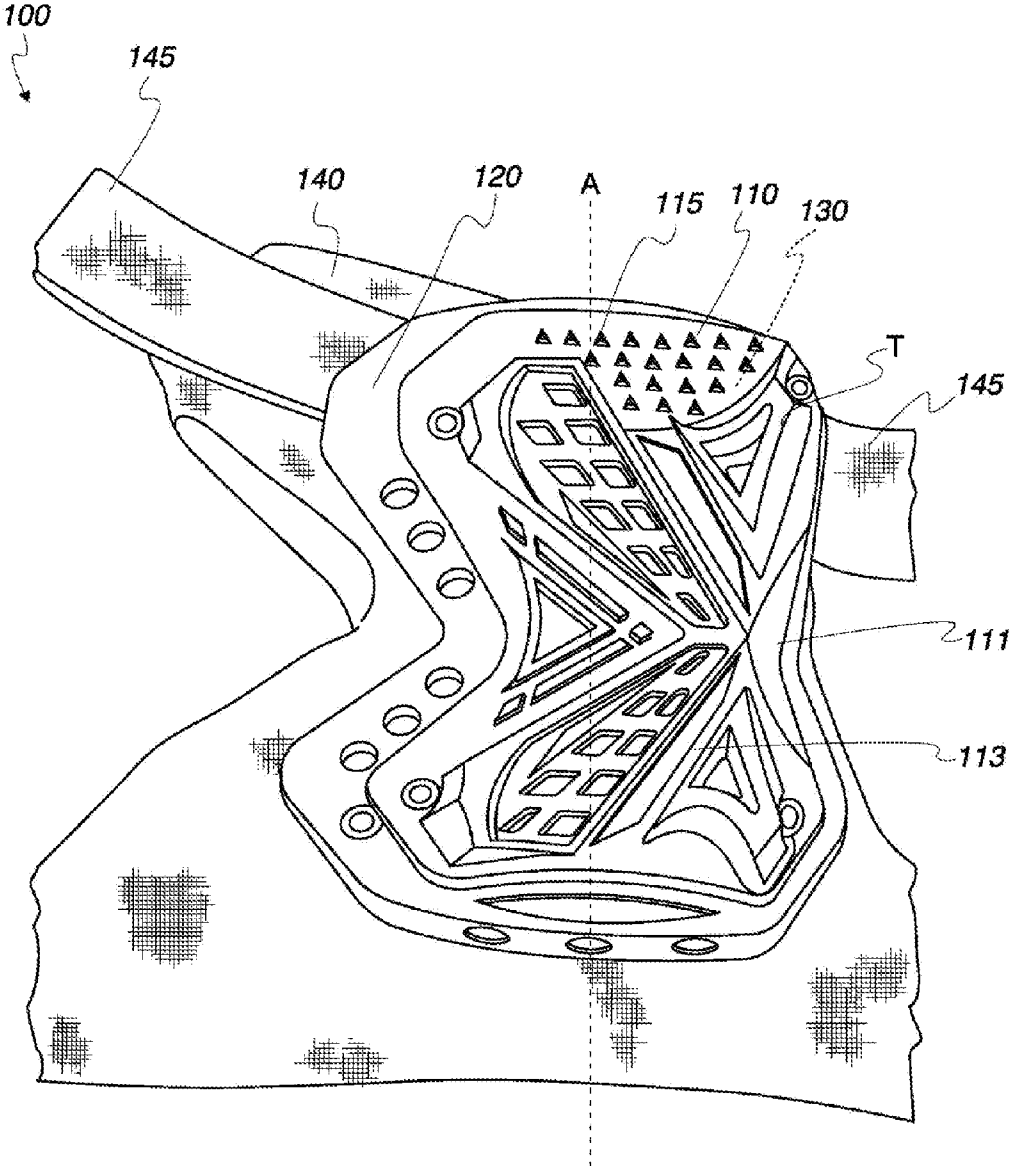


Figure 1

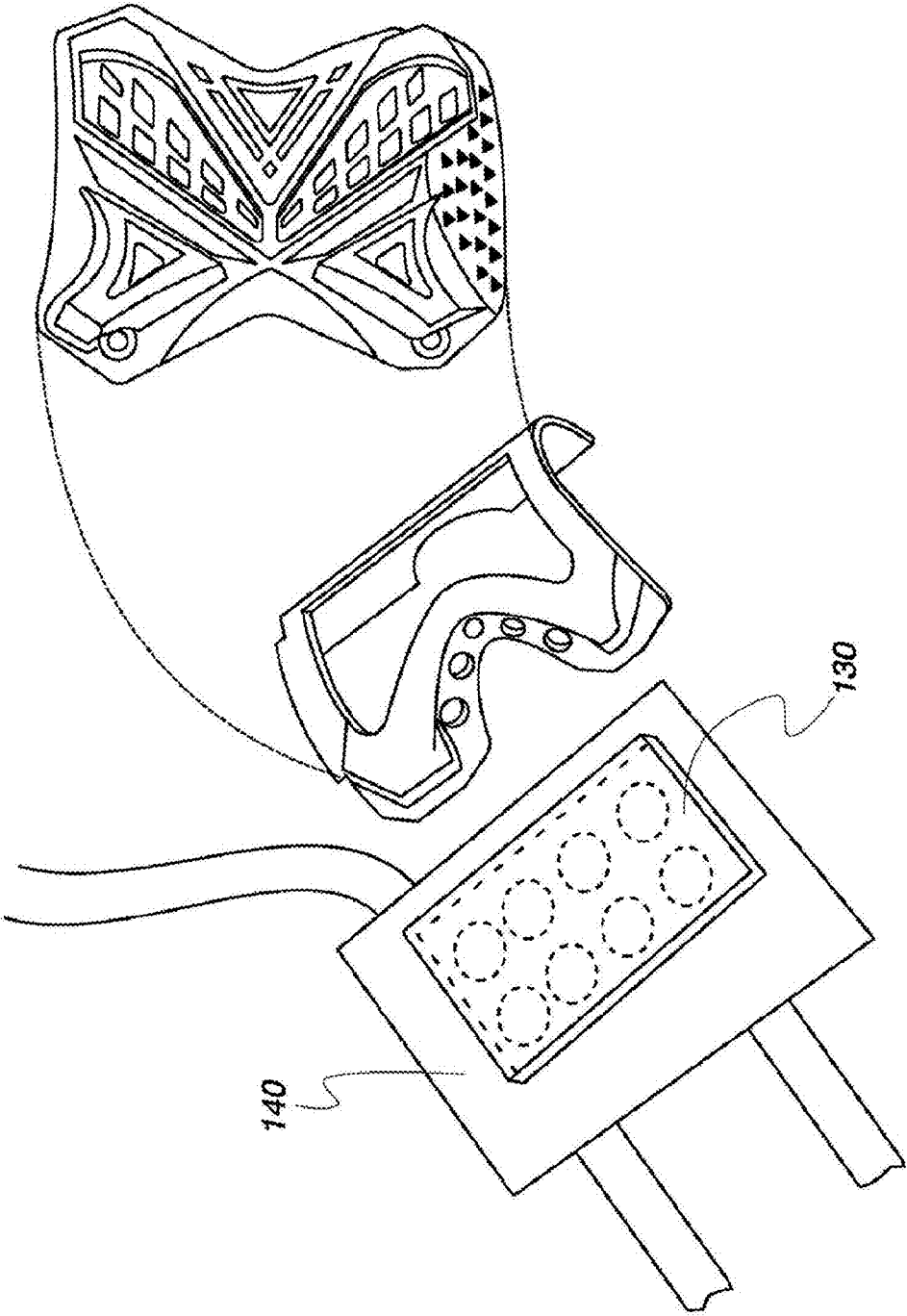


Figure 2

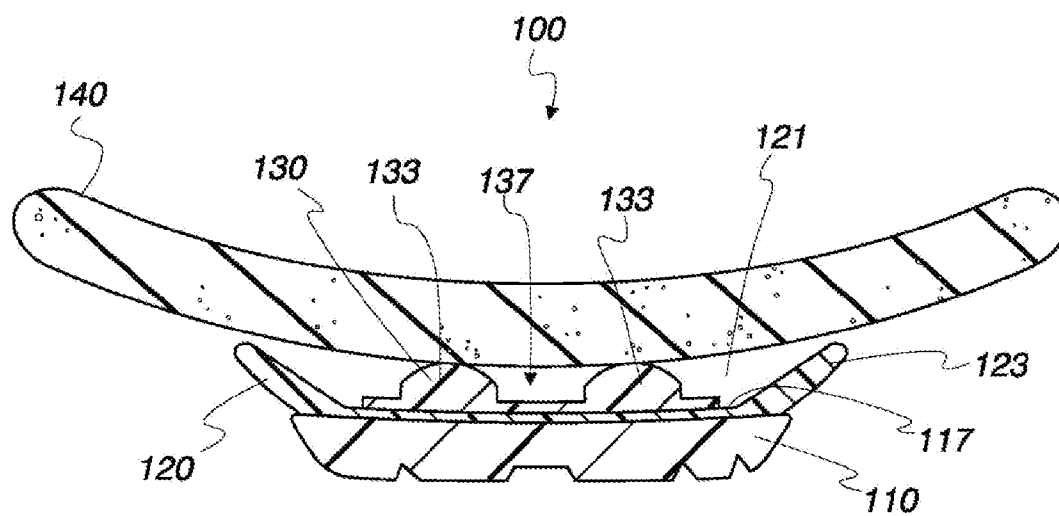
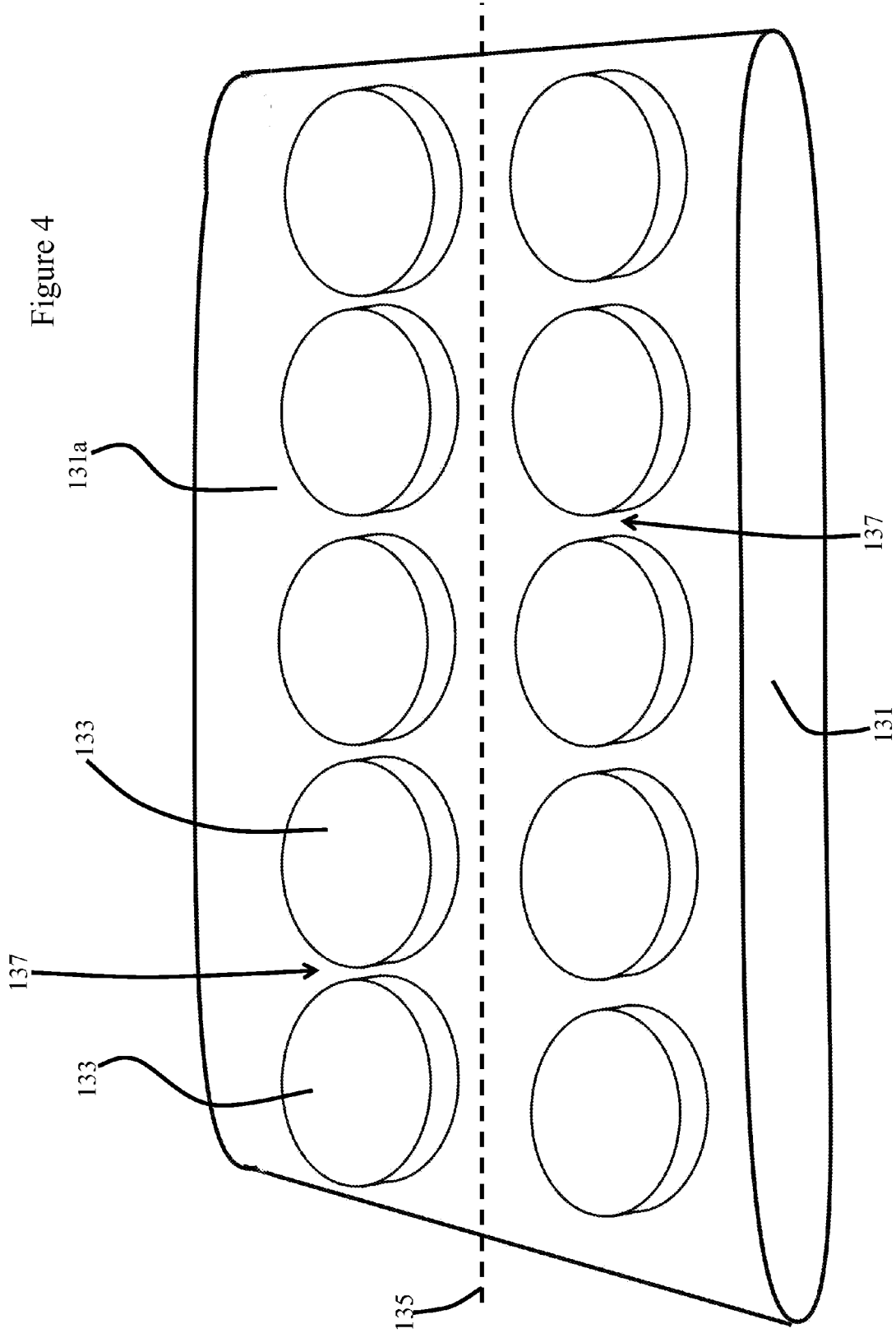


Figure 3



**BODY PAD**

**CROSS REFERENCE TO RELATED APPLICATIONS**

[0001] This application claims the benefit of U.S. Utility application Ser. No. 12/387,758 filed on May 6, 2009 currently pending the contents of which is hereby incorporated by reference, which in turn claimed priority to U.S. Provisional Application Ser. No. 61/050,968 filed on May 6, 2008, presently abandoned, the contents of which is hereby incorporated by reference.

**TECHNICAL FIELD**

[0002] The present disclosure relates generally to body-worn protective equipment, and, more particularly, to knee pads or the like for cushioning a wearer's body from forces.

**BACKGROUND OF THE INVENTION**

[0003] Various activities, such as many occupational activities, recreational activities, or the like, involve kneeling for some duration of time. As is well known, prolonged periods of continuous kneeling and/or frequent assumption of a kneeling position can cause or contribute to the development or onset of knee damage or injury. For example, bruising, tendon strain, cartilage damage, bursitis, and even osteoarthritis can result or be exacerbated by such activities. Accordingly, knee pads have been developed and implemented in attempts to reduce the damage and discomfort caused by kneeling to perform such activities. For example, fabric knee pads have been designed to wrap around a user's knee. Additionally, cupped knee pads have been used in an effort to provide better support for the user's knee.

[0004] Unfortunately, however, such knee pads have suffered from a number of disadvantageous performance characteristics. Particularly, the knee pads include simple cushion material, such as foam or fabric batting. Such material exhibits varying levels of cushion for different user's, particularly based on the user's weight. Since the pads are all made with substantially the same amount of padding material, most users find that the cushioning provided is either too great, wherein the pad is not stable, or the cushioning provided is too little, wherein the user experiences discomfort. Additionally, and especially where a conforming cup is provided, the padding functions as a thermal insulator, whereby the user's knee may become hot, sweaty, and uncomfortable, and whereby the knee pad may experience premature wear and/or may become excessively soiled. Furthermore, conventional cushion materials are directionally unbiased, whereby in addition to compressing in a desired direction, the cushion may also shear or deform in directions other than the desired direction. Such off-axis compression or deformation causes unsteadiness, which can sap a wearer's energy due to the constant need to shift position or weight to maintain or regain balance.

[0005] Thus, it is clear that there is an unmet need for a pad that provides beneficial cushioning levels to facilitate user comfort, that prevents undue heat accumulation or retention, and that provides stability.

**BRIEF SUMMARY OF THE INVENTION**

[0006] Briefly described, in an exemplary embodiment, the pad of the present disclosure overcomes the above-mentioned disadvantages and meets the recognized need for such a

device by providing a knee pad having a plurality of resilient mounds dispersed about an interior surface proximate a durable cap.

[0007] More specifically, the pad, such as in the form of a knee pad, preferably includes a resilient member comprising a substantially thin planar member having two generally opposing major surfaces and a plurality of mounds formed on a first of the major surfaces. The mounds are preferably formed having a substantially hemispherical surface intersecting said first surface proximate an equator of the hemispherical surface. The mounds are further preferably arranged in an array having at least two columns and at least two rows, wherein the planar member includes a space between adjacent mounds.

[0008] The resilient material is preferably formed of a polymer gel, or other suitable material, whereby the mounds may preferably deform, at least partially, in a compression direction, i.e. in a direction perpendicular to the generally planar surface, in response to a force applied thereto, while resisting such a force, such as a force imparted to the mounds when a user rests thereon. Thus, the resilient mounds preferably cushion a portion of a user's body disposed thereagainst, especially when bearing the user's weight. The resilient material and/or the substantially hemispherical shape of the mounds preferably provide(s) an increasing resistance force and preferably deform to a greater extent in response to an increasing load applied thereto. Accordingly, the mounds preferably accommodate users of different weight, and provide sufficient cushioning to comfort a user resting thereon.

[0009] Additionally, the selective arrangement of the rows of mounds preferably provides stability to a user resting thereon. For example, two rows may be arranged generally proximate and on opposite sides of a longitudinal axis of the pad. Thus, when a user places a portion of their body generally centrally on the pad, the rows preferably straddle the portion of the user's body and resist lateral movement of the user's body relative to the pad. Such resistance of lateral movement is preferably provided by mounds of each row generally retaining the user's body, or at least the portion thereof, partially between adjacent mounds of each row. Furthermore, the resilient material and/or the substantially hemispherical shape of the mounds preferably provide(s) a resistance force to oppose lateral or shear forces. Such lateral or shear resistance force may preferably result in less lateral deformation than a compression deformation exhibited in response to an equal force in the compression direction.

[0010] Such arrangement of two rows or mounds preferably further provides a plurality of fluid channels formed between the mounds. That is to say, a fluid channel is preferably formed generally along the longitudinal axis between the rows, and a plurality of transverse fluid channels are preferably formed generally between adjacent ones of the mounds within each row. Thus, fluid, such as air, may circulate through the pad between the generally planar member and the portion of the user's body disposed against one or more mound(s).

[0011] Accordingly, one feature and advantage of the pad of the present disclosure is its ability to provide cushioning substantially proportionate to a force applied thereto, whereby relatively smaller forces are cushioned by partial deformation of a resilient material, and whereby incremental increases in a force applied to the resilient material result in sequentially smaller amounts of additional deformation.

**[0012]** Another feature and advantage of the pad of the present disclosure is its ability to securely cushion a portion of a user's body by resistance of lateral forces and/or via at least partially cupping the portion of the user's body.

**[0013]** Yet another feature and advantage of the pad of the present disclosure is its ability to resist or prevent accumulation of excess thermal energy, whereby discomfort associated with heat and/or sweating may be avoided.

**[0014]** These and other features and advantages of the pad of the present disclosure will become more apparent to those ordinarily skilled in the art after reading the following Detailed Description of the Invention and Claims in light of the accompanying drawing Figures.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0015]** Accordingly, the present disclosure will be understood best through consideration of, and with reference to, the following drawings, viewed in conjunction with the Detailed Description of the Invention referring thereto, in which like reference numbers throughout the various drawings designate like structure, and in which:

**[0016]** FIG. 1 is a front perspective view of an exemplary pad according to the present disclosure;

**[0017]** FIG. 2 is a side exploded view of the pad of FIG. 1;

**[0018]** FIG. 3 is a cross-sectional view of the pad of FIGS. 1; and

**[0019]** FIG. 4 is a perspective view of a resilient member of the pad of FIG. 1.

**[0020]** It is to be noted that the drawings presented are intended solely for the purpose of illustration and that they are, therefore, neither desired nor intended to limit the scope of the disclosure to any or all of the exact details of construction shown, except insofar as they may be deemed essential to the claimed invention.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0021]** In describing exemplary embodiments of the pad of the present disclosure illustrated in the drawings, specific terminology is employed for the sake of clarity. The claimed invention, however, is not intended to be limited to the specific terminology so selected, and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner to accomplish a similar purpose.

**[0022]** In that form of the pad of the present disclosure chosen for purposes of illustration, FIGS. 1-4 show pad 100 in the form of a knee pad for use in kneeling including durable cap 110, casing 120, resilient member 130, and fabric member 140. Durable cap 110 is preferably adapted to contact a floor or ground surface and is, therefore, preferably selected from a slip resistant, non-marring, and durable material whereby cap 110 may repeatedly contact and securely engage the floor or ground surface without damaging the cap or the floor or ground surface. Especially when designed for outdoor use, cap 110 preferably resists scratching, even when used on abrasive surfaces, such as stone, brick, cement, or the like. Cap 110 may preferably include tread pattern T formed over forward surface 111 to provide suitable grip. Tread pattern T may include one or more groove(s) 113 and/or aperture(s) 115 as desired to provide grip on one or more selected surface(s). Cap 110 is preferably operable with casing 120 to define recess 121 proximate rearward surface 117 of cap 110 and within sidewall 123 of casing 120. Resilient member 130 is preferably disposed within recess 121 such that two or more

mounds 133 formed over face 131 a of generally thin planar member 131 extend away from cap 110. Thus, mounds 133 preferably face fabric member 140 disposed over an open portion of recess 121. Cap 110, casing 120 and/or resilient member 130 may be joined via rivets, stitching, welding, or other suitable fastener or fastening technique, as desired.

**[0023]** Fabric member 140 is preferably formed from a comfortable and durable fabric material, such as a woven natural or synthetic fiber and may be joined to casing 120 such that fabric member 140 is suspended over recess 121, at least in an unloaded state. Fabric member 140 may likewise be attached to casing 120, cap 110, and/or resilient member 130 via rivets, stitching, adhesive, or the like. Fabric member 140 may preferably further provide cushioning via inclusion of batting or the like therewithin. Furthermore, fabric member 140 preferably includes two or more straps 145, or the like, operable to secure pad 100 in engagement with at least a portion of a user's body, such as the user's knee. For example, if pad 100 is disposed such that longitudinal axis A is disposed generally parallel to a user's leg, straps 145 may preferably encircle the user's leg to retain pad 100 thereagainst. As will be understood by those skilled in the art, straps 145 may include elastic material, hook-and-loop fasteners, and/or other conventional features. Particularly, straps 145 are preferably adapted to reduce binding when a user bends a leg or arm to which pad 100 is attached. Pad 100, including fabric member 140 may preferably be water-resistant and/or machine or hand washable to enable convenient removal of dirt, sweat, or the like. Furthermore, pad 100 may include treatments and/or materials operable to repel or resist growth of mold or the like, stains, corrosion, melting, fire, or other common sources of contamination, damage, or wear.

**[0024]** Resilient member 130 preferably includes an array of mounds 133 disposed over face 131 a of planar member 131, including two rows of two or more mounds 133. As illustrated, resilient member 130 includes 8 or 10 mounds 133 arranged in two parallel rows disposed on opposite sides of central longitudinal axis 135. Thus, mounds 133 preferably define a plurality of channels 137 therebetween, including a central channel extending generally along central axis 135. Each mound 133 preferably includes a generally cylindrical base portion 133a and generally convex upper portion 133b. Preferably, convex upper portion 133b is formed as a portion of a sphere or a portion of an ellipsoid, although any suitable generally convex surface may be employed. Generally cylindrical base portion 133a preferably resists lateral forces, i.e. forces applied parallel to the plane of member 131, while the gel material of each mound 133 may compress in a direction generally perpendicular to the plane of member 131 in response to a force applied to the mound 133. Additionally, or alternatively, such resistance of lateral forces may be accomplished and/or enhanced by inclusion of fibers within resilient member 130, or the like, whereby resilient in lateral directions may be increased compared to the resilience in the compression direction (perpendicular to the plane of member 131). Resilient member 130 is preferably formed via a molding process whereby planar member 131 and mounds 133 may be integrally formed as a monolithic body.

**[0025]** In an exemplary method of use, pad 100 may be engaged with a portion of a user's body, such as the user's knee, for use in protecting the user from injury or the like. Pad 100 may be engaged with the user's body via wrapping one or more strap 145 around the user's body and engaging the strap(s) with one another and/or with the pad 100, or the like.

Cap **110** may be disposed against a floor or other surface and the user may rest the knee against fabric member **140**. Fabric member **140** may cushion a portion of the force and may provide the user with a familiar feel of conventional knee pads. Alternatively, however, fabric **140** may not be suspended over recess **121**, whereby fabric member **140** may optionally not substantially contact the user's body; thereby, avoiding heat buildup due to thermal insulation provided by fabric member **140**. In either case, however, at least a portion of the force is transmitted to at least one, and preferably a plurality of mounds **133**. Specifically, a user's knee is preferably centrally disposed between an array of four mounds, whereby a user's knee may be cushioned by each of the four mounds and whereby the user's knee is disposed proximate a plurality of channels **137**. Thus, the user's knee, or other body part, may be cooled via air or other fluid flow through the channel(s). Furthermore, when the user's knee or other body part is so disposed between a plurality of mounds, the mounds preferably securely retain the user's knee therebetween, even when lateral forces are applied, by resisting such lateral forces to substantially prevent relative lateral motion between cap **100** and the user's knee or other body part. Thus, the user's knee may be cradled within pad **100** to provide a stable base for supporting the user without completely covering the user's skin.

[0026] Additionally, as the user applies a force, such as the user's weight, to the pad, an amount of compression per unit of force preferably decreases with increasing total compression. That is to say, each of mounds **133** preferably compresses a relatively larger distance for a first incremental value of force applied, and preferably compresses a relatively smaller distance for additional incremental increase of the value of force applied. Preferably, pad **100** is formed such that application of a force equal to a maximum load of pad **100** does not result in complete compression of any of mounds **133**, whereby channels **137** defined between mounds **133** are not eliminated. Thus, users of different weights may preferably comfortably use pad **100** having mounds **133** due to the ability of the pad to adequately cushion both relatively large and relatively small forces without exhibiting relatively little compression for smaller forces and relatively great compression for larger forces.

[0027] Having thus described exemplary embodiments of the present invention, it should be noted by those skilled in the art that the within disclosures are exemplary only and that various other alternatives, adaptations, and modifications may be made within the scope and spirit of the present invention. Accordingly, the present invention is not limited to the specific embodiments as illustrated herein, but is only limited by the following claims.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. A protective pad comprising:
  - a cap defining opposing surfaces, a first of said surfaces adapted to contact a support surface;
  - a casing attached to a second or interior of said surfaces;
  - a fabric member attached to the cap; and
  - a resilient member disposed within the cap having at least one mound formed thereon, wherein said resilient member is adapted to partially deform in response to a force applied thereto.
2. The protective pad of claim **1** wherein the resilient member is integrally molded with the cap.
3. The protective pad of claim **1** wherein the resilient member is removably attached to the cap.
4. The protective pad of claim **3** wherein the resilient member further comprises a thin planar member.
5. The protective pad of claim **4** wherein the thin planar member defines a first surface and a second surface wherein at least one mound having a hemispherical profile is formed on the first surface.
6. The protective pad of claim **5** wherein the first surface incorporates two columns of mounds wherein each column is separated by a space.
7. The protective pad of claim **5** wherein the mound provides increasing resistance in response to increasing load applied to the mound.
8. The protective pad of claim **6** wherein the space defines a fluid channel wherein fluid circulates through the channel.
9. The protective pad of claim **6** wherein the mounds are integrally molded into the first surface.
10. The protective pad of claim **1** wherein the first surface comprises a slip resistant, non-marring, and scratch-resistant material.
11. The protective pad of claim **1** wherein the first surface comprises a tread pattern formed on a first surface of the cap.
12. The protective pad of claim **1** wherein the fabric member further comprises one or more straps adapted to removably attach the fabric member to the wearer.
13. The protective pad of claim **1** wherein the straps include fastening members and wherein said fastening members comprise elastic material, or hook-and-loop fasteners.
14. The protective pad of claim **1** wherein the fabric member is removably attached to the protective pad.
15. The protective pad of claim **13** wherein the fabric member is washable.

\* \* \* \* \*