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Van Noy et al.

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(54) **PROTECTIVE GUARD WITH FLOATING KNEE PAD**

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(52) **U.S. Cl.**
CPC ***A41D 13/065*** (2013.01); ***A41D 13/06*** (2013.01)

(58) **Field of Classification Search**
CPC A41D 13/065; A41D 13/06
See application file for complete search history.

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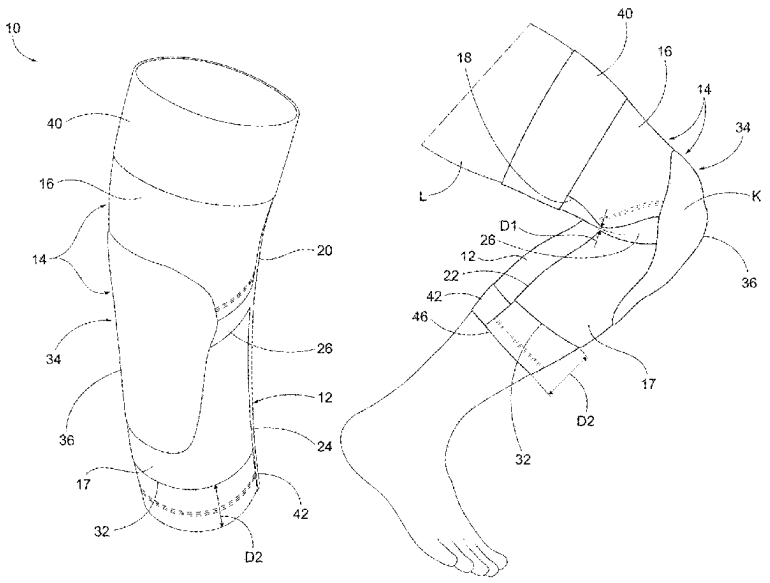
(57) **ABSTRACT**

A knee guard for protecting the knee of a wearer is provided including an inner sleeve that fits over the knee of the wearer covering at least front and left and right side portions of a leg of the wearer proximate the knee joint, a knee guard including an outer layer positioned over the inner sleeve proximate the knee joint and slidable with respect to the inner sleeve, the outer layer attached to the inner sleeve at left and right side portions above the knee joint and at left and right side portions below the knee joint, the outer layer not attached to the inner sleeve at the front portion adjacent the knee joint; and a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

20 Claims, 11 Drawing Sheets



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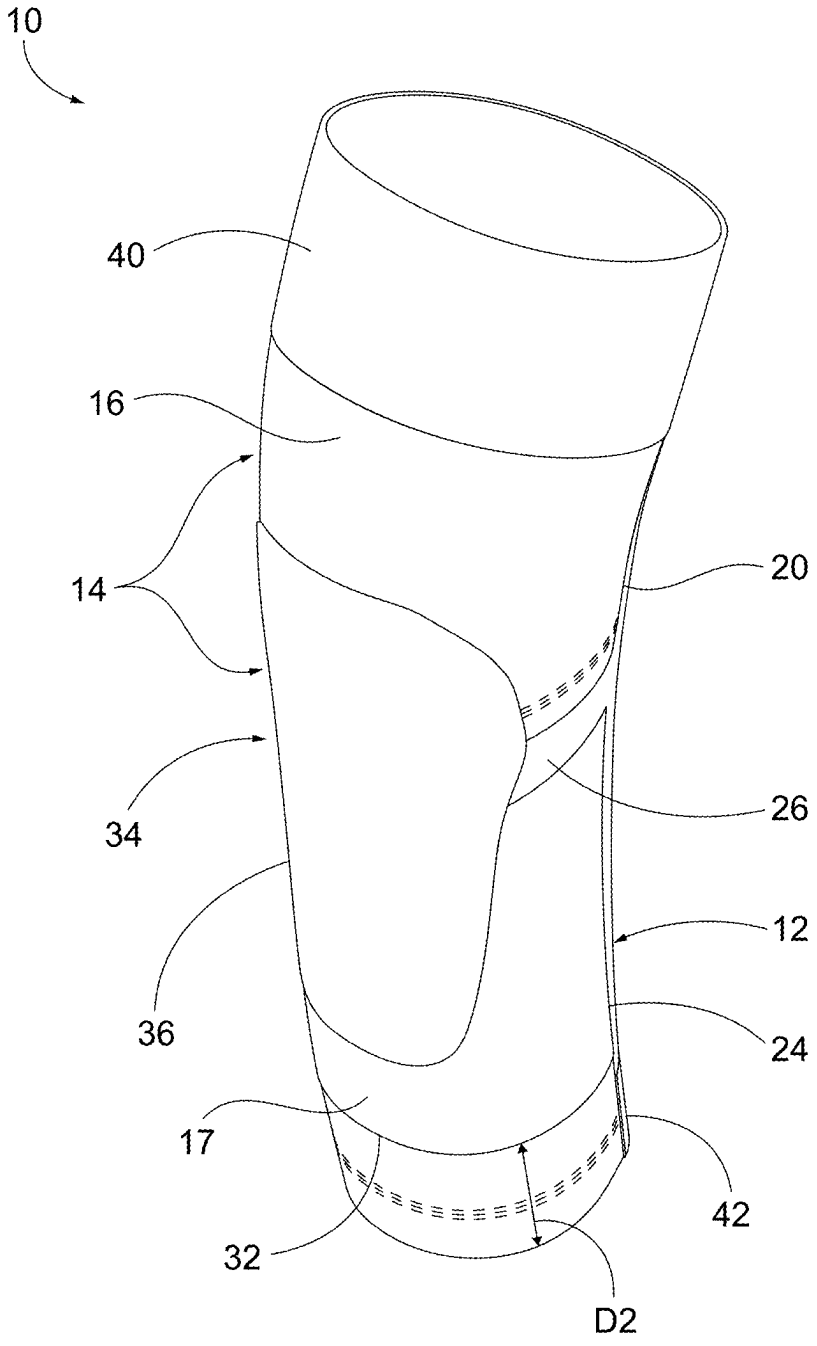

FIG. 1

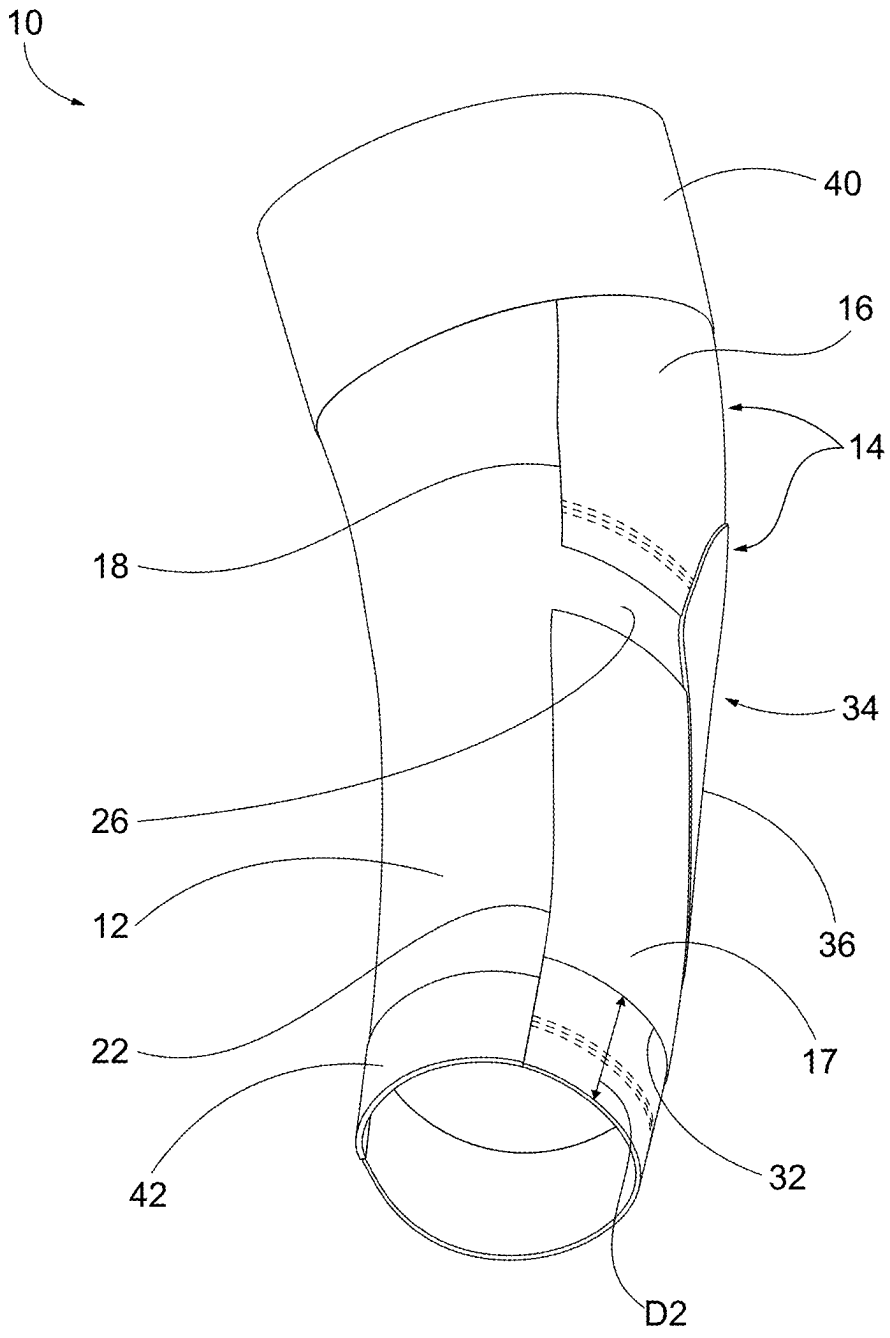

FIG. 2

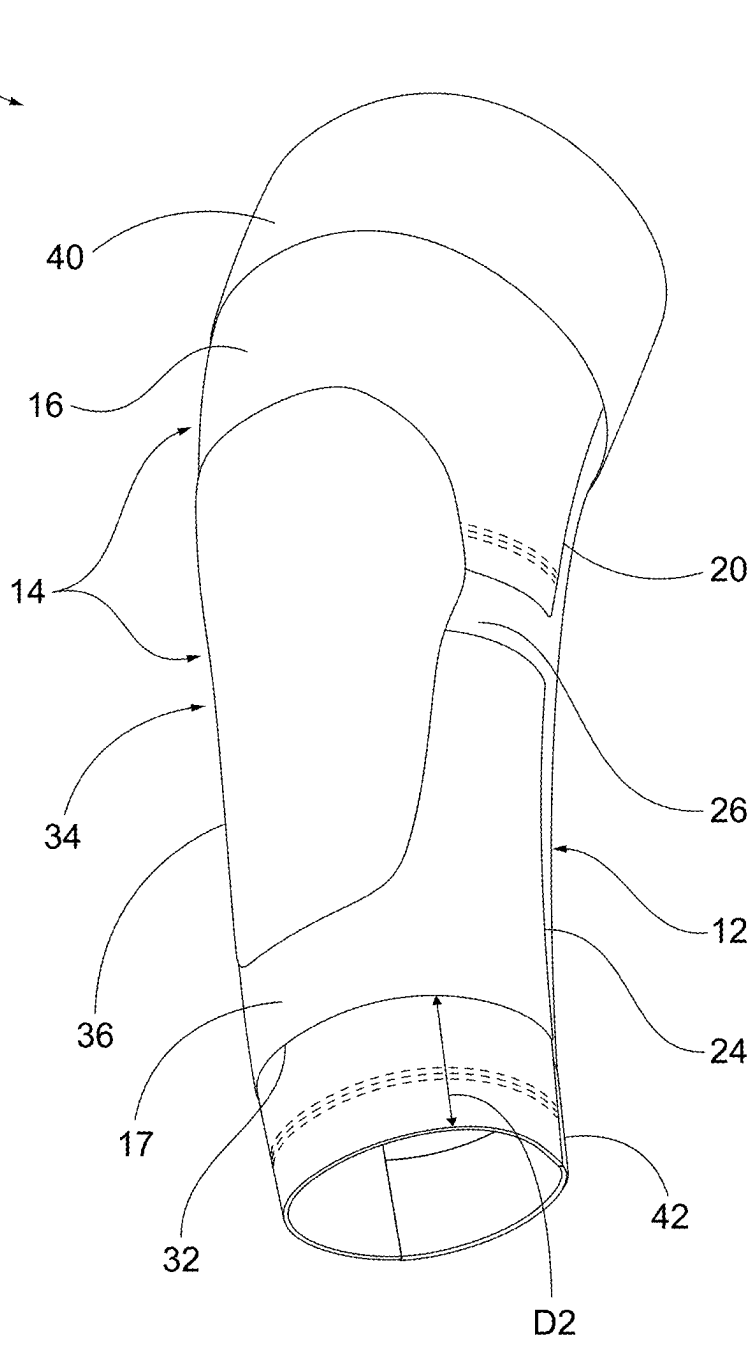

FIG. 3

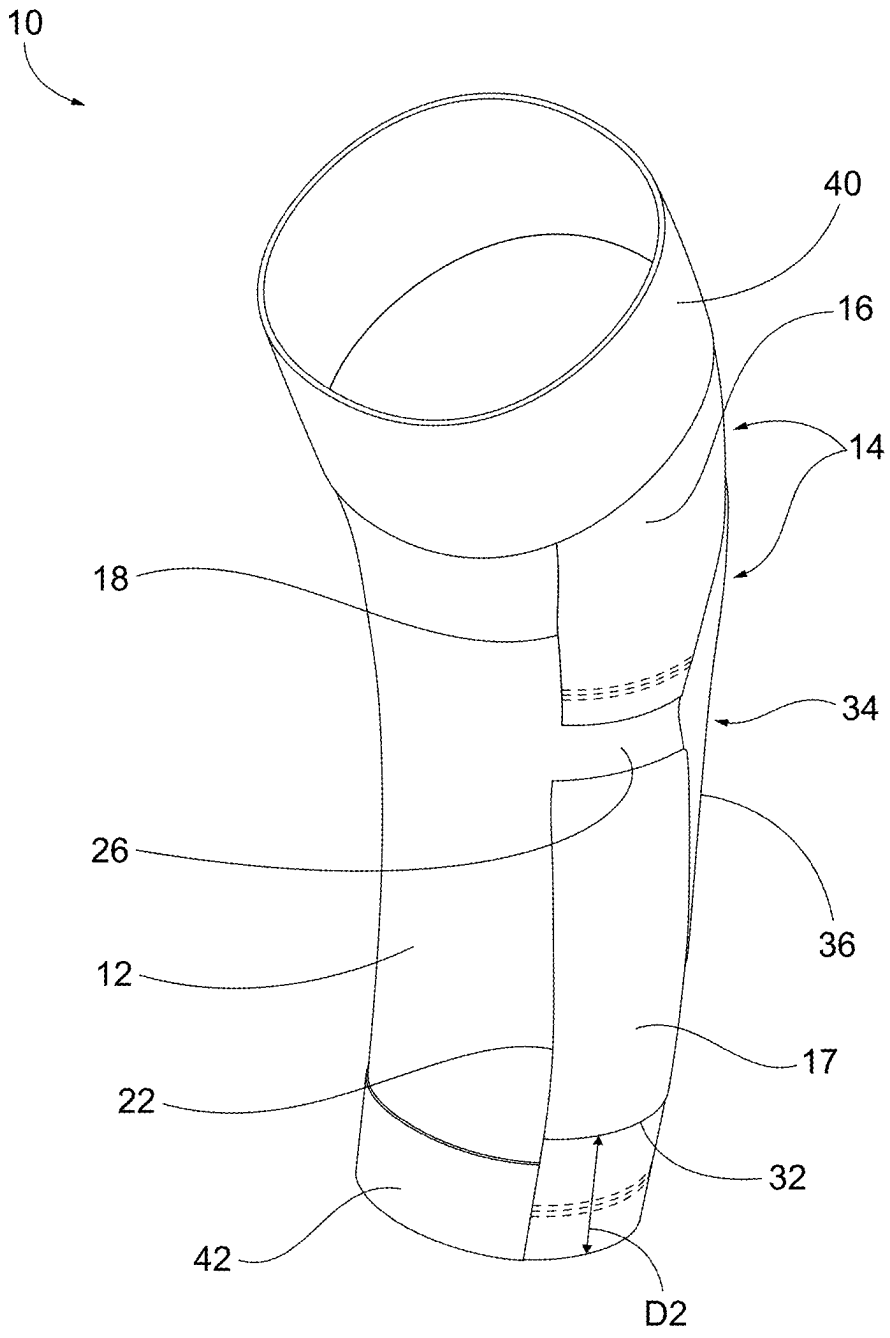

FIG. 4

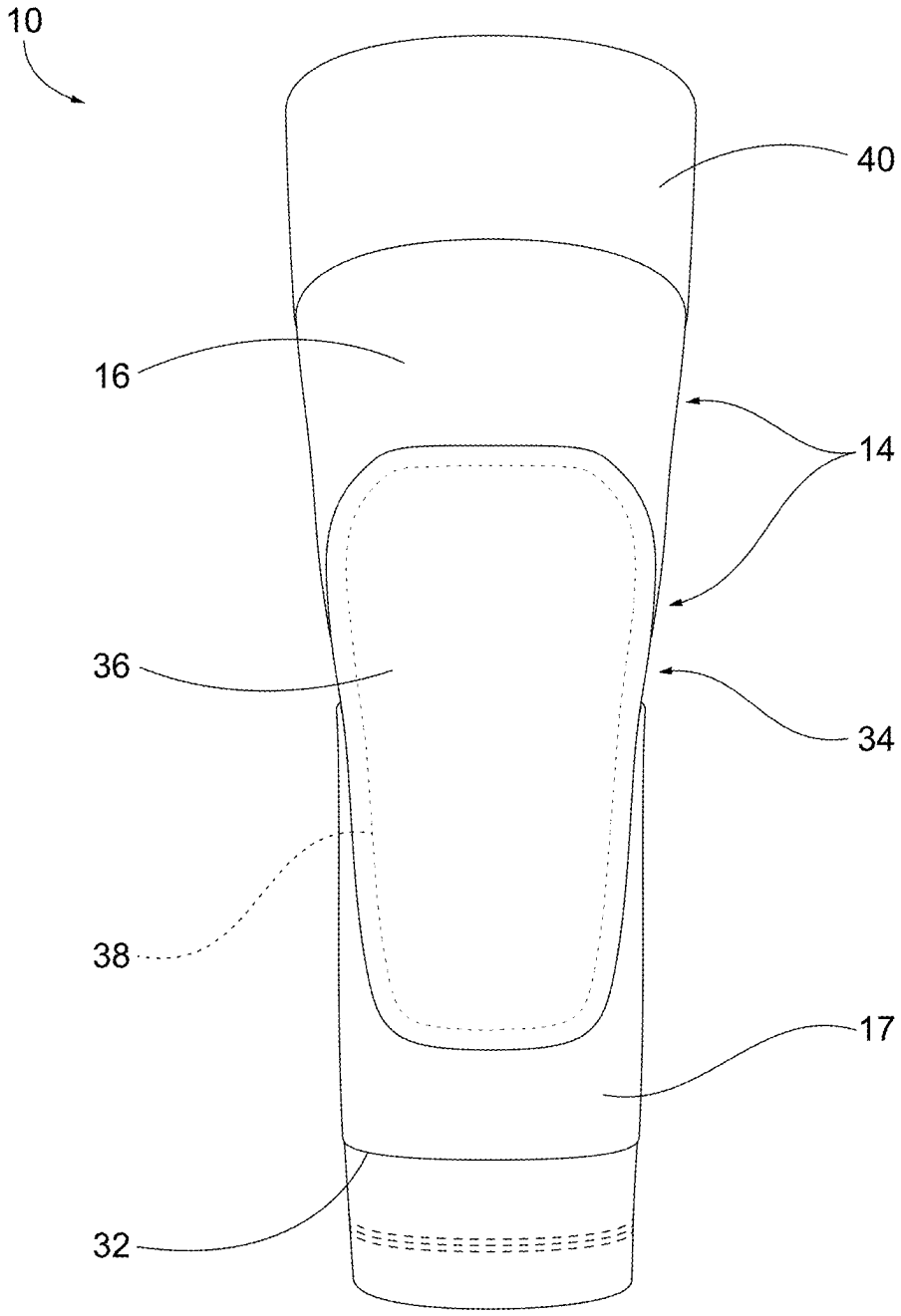

FIG. 5

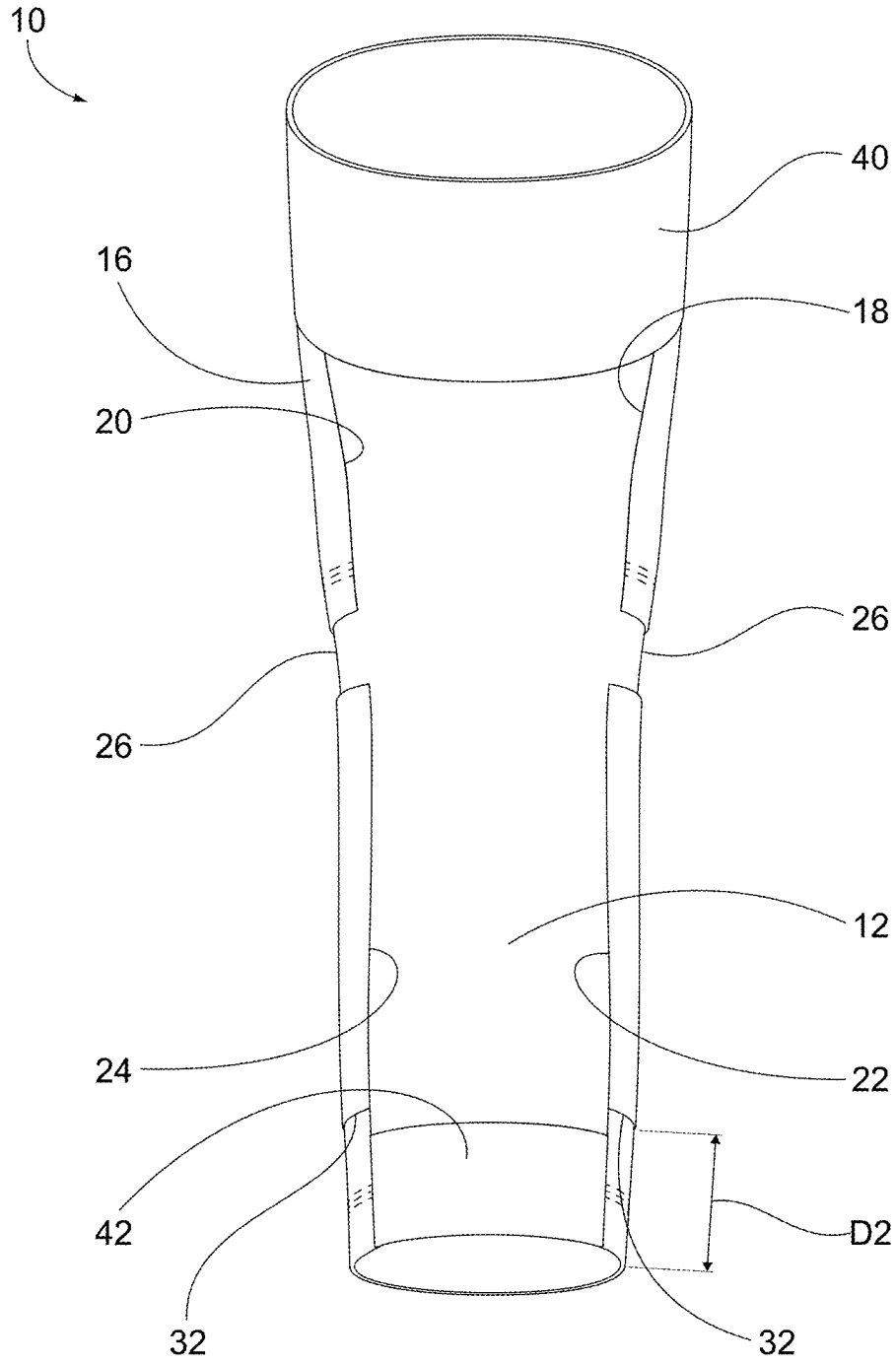

FIG. 6

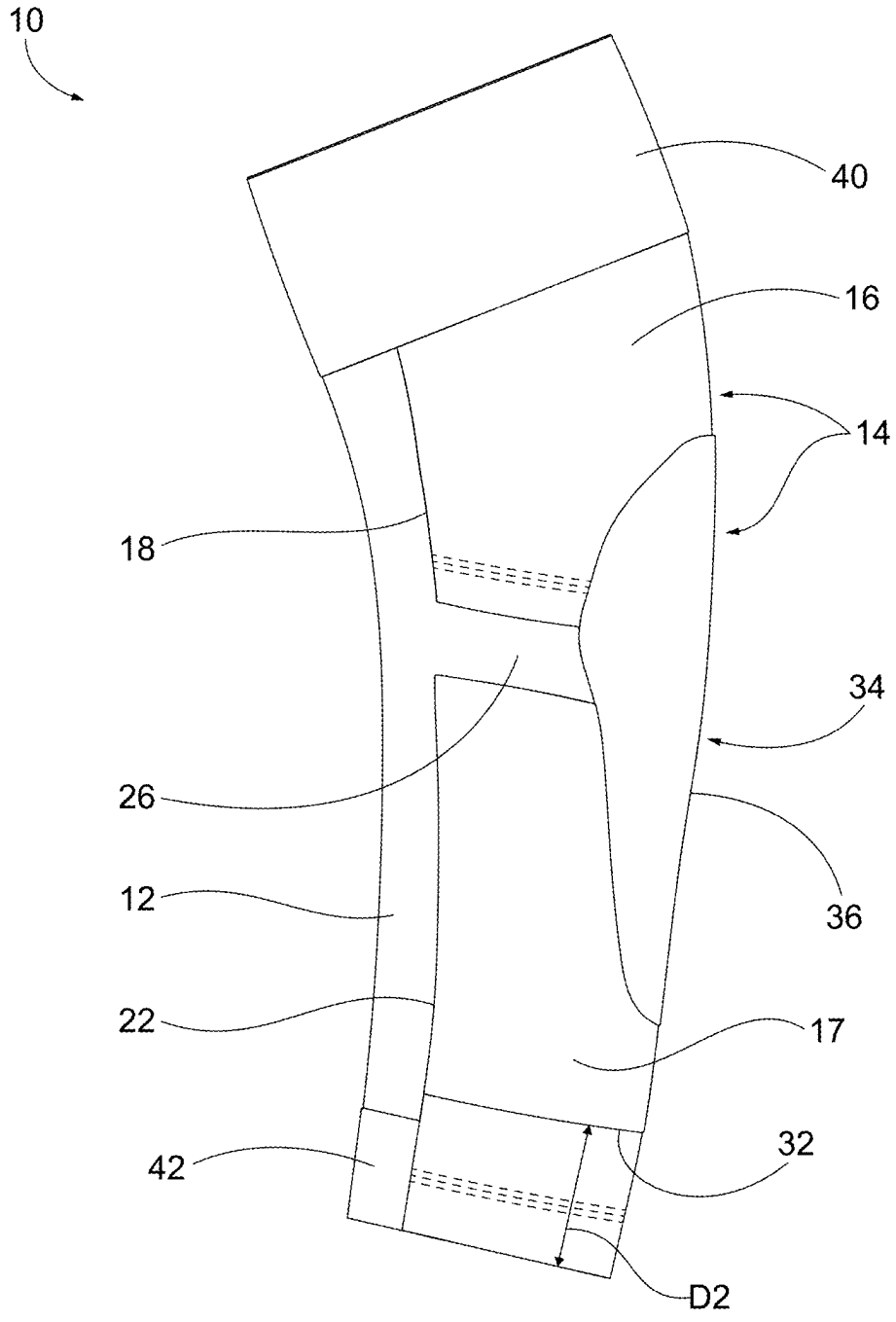

FIG. 7

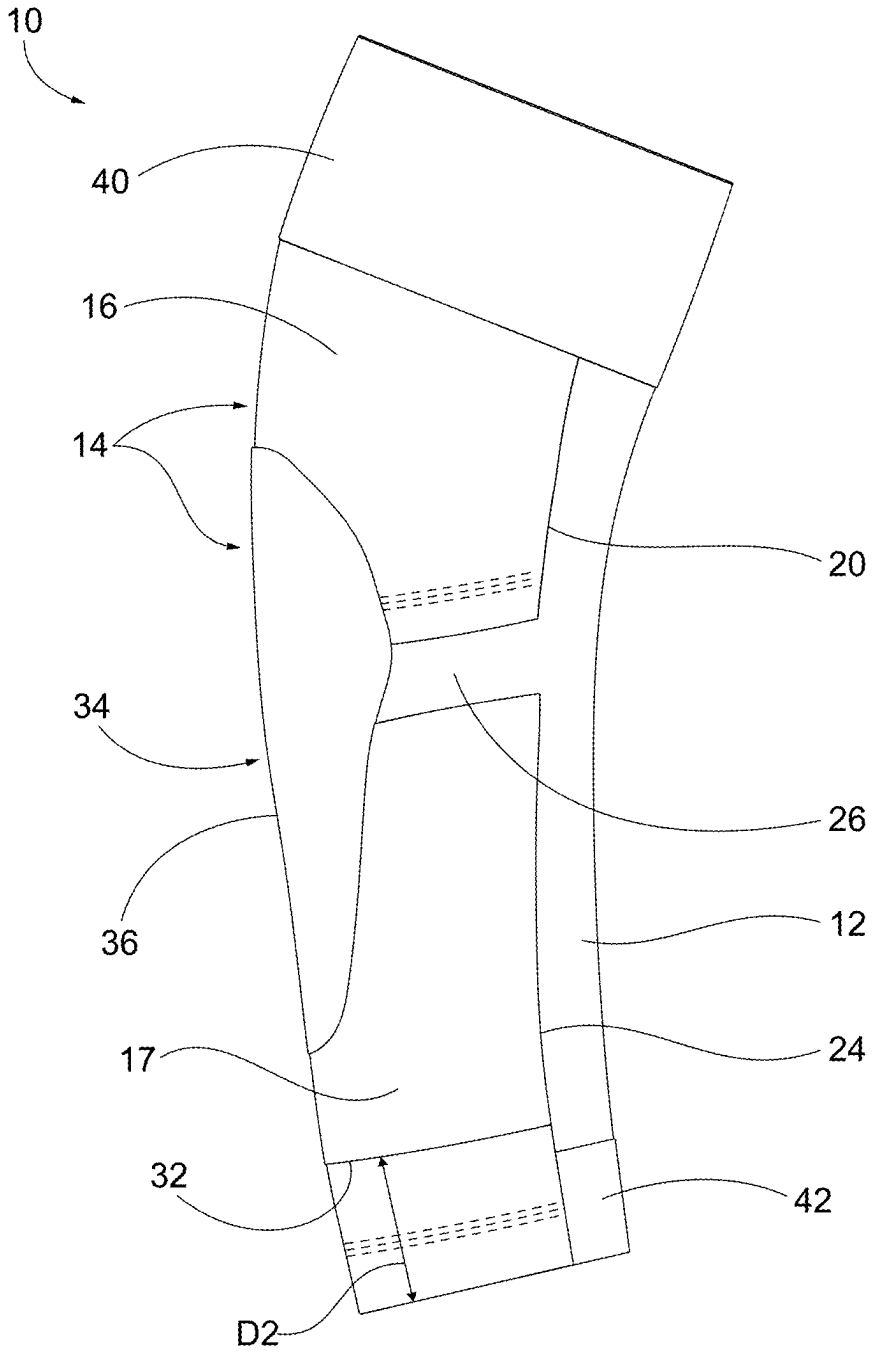

FIG. 8

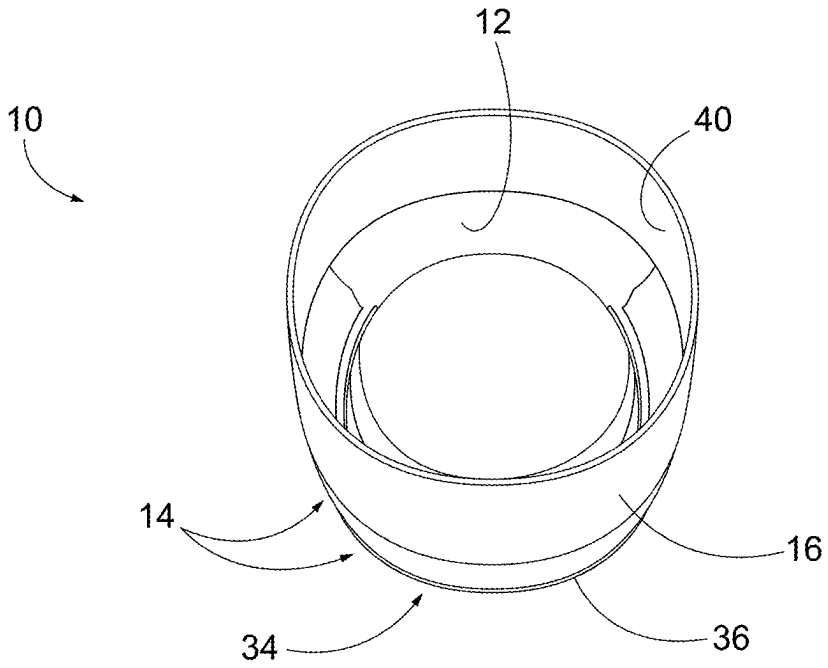

FIG. 9

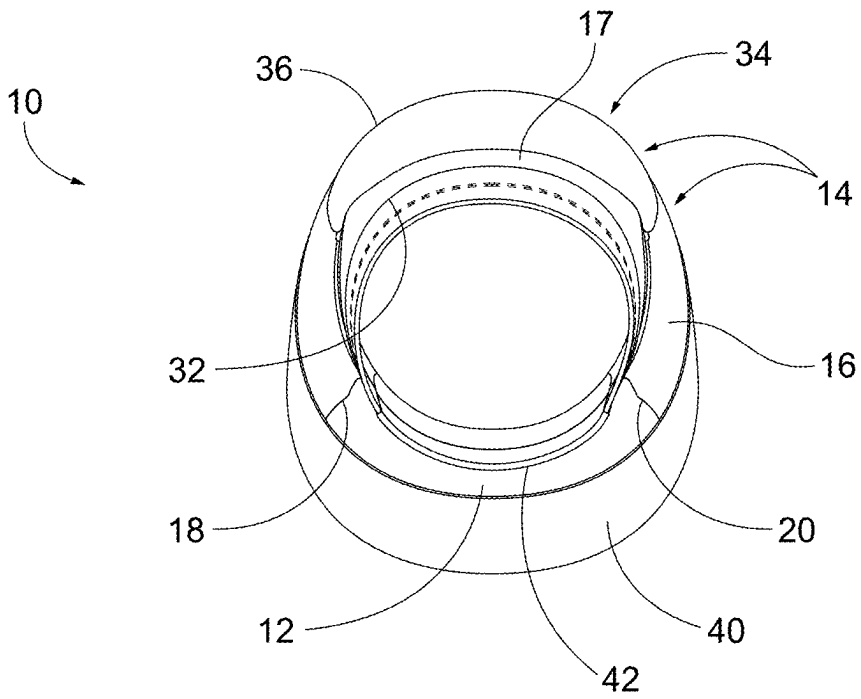

FIG. 10

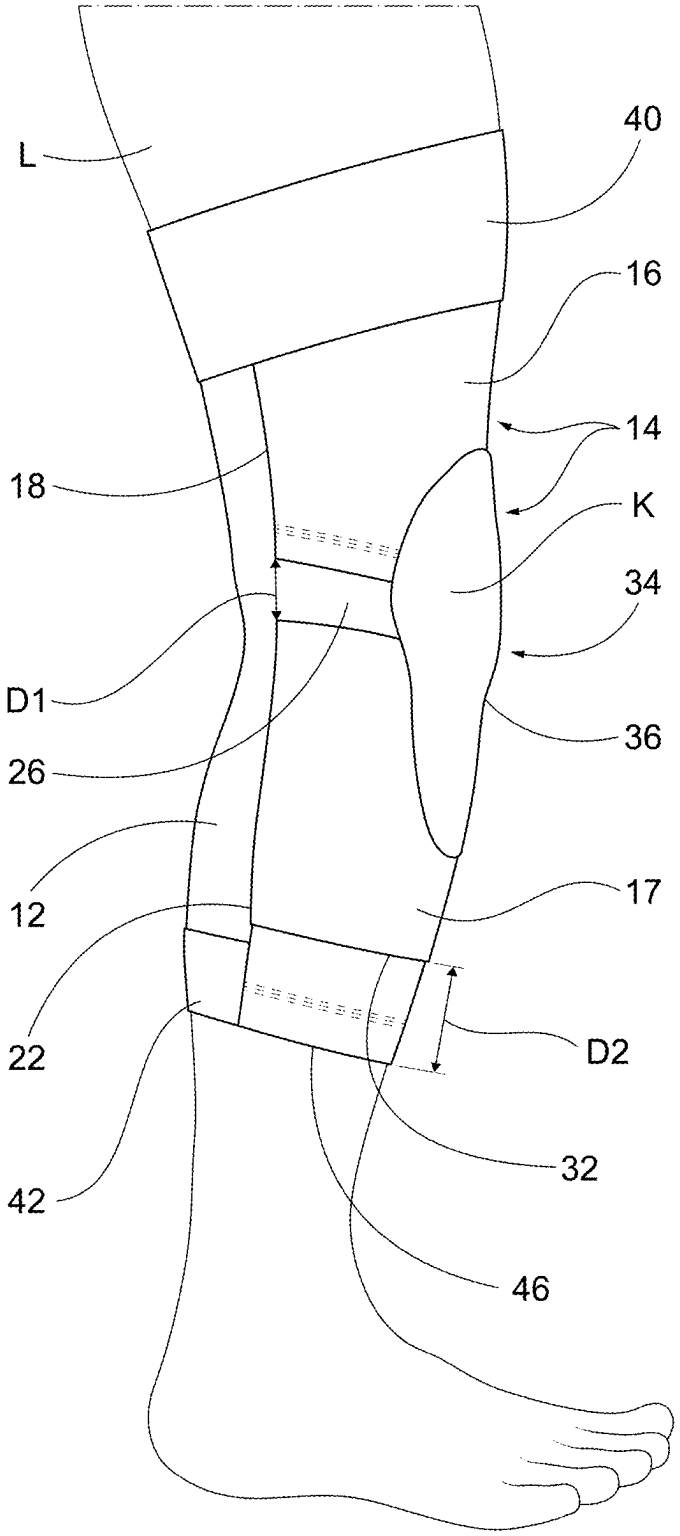

FIG. 11

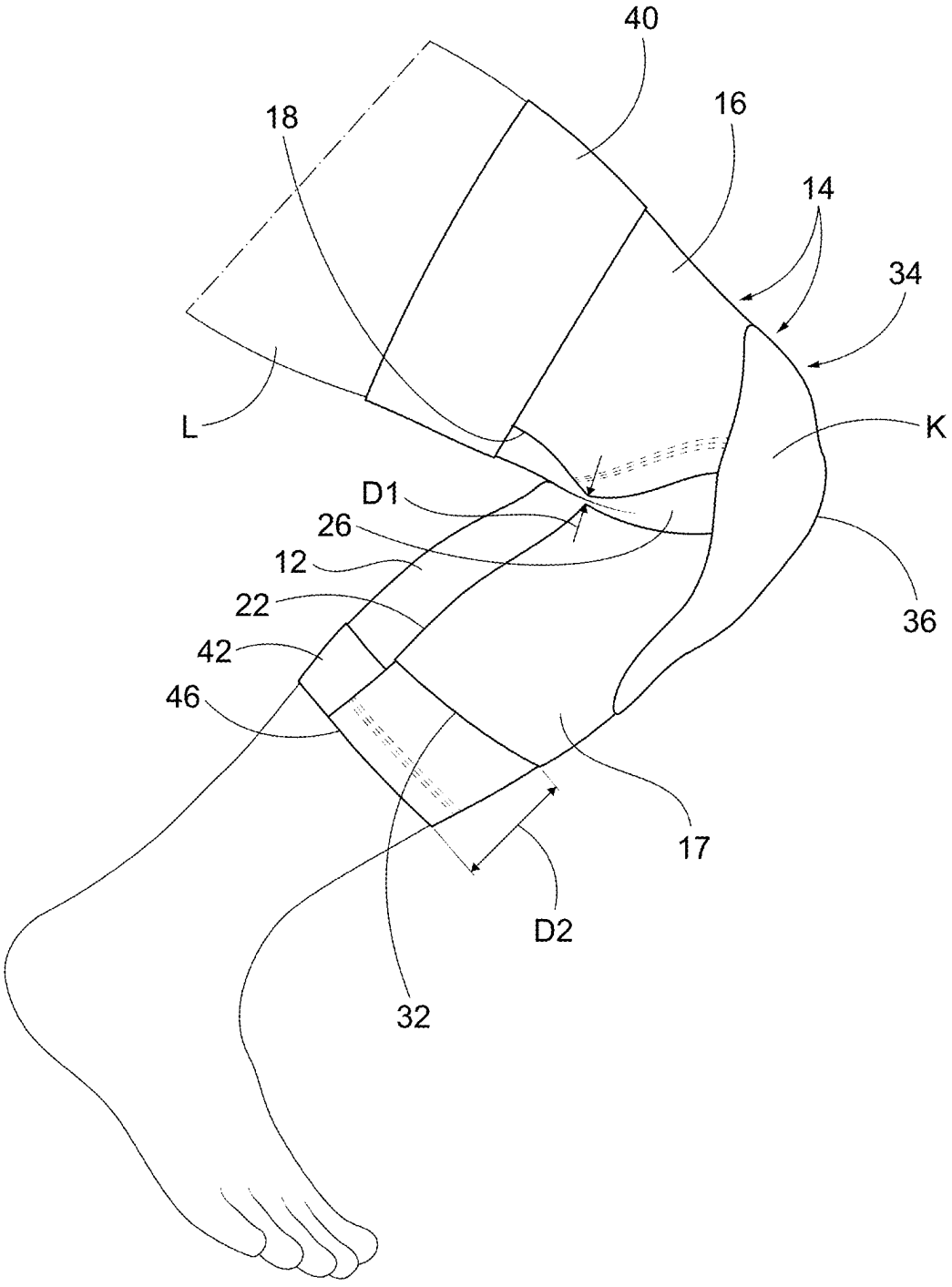

FIG. 12

PROTECTIVE GUARD WITH FLOATING KNEE PAD

FIELD OF TECHNOLOGY

The present disclosure generally relates to protective sports equipment, and more particularly to a knee or other type of guard that provide flexibility of the joint while maintaining protection of the joint.

BACKGROUND OF TECHNOLOGY

Outdoor activities such as mountain biking (MTB), also known as off-road cycling, are increasingly popular but also present a risk for injury. Riders navigate through terrain, such as footpaths, single-tracks, forest, unconventional urban, and mountainous area. The slippery and uneven surface of these routes usually consists of rocks, mud, dirt, and tree roots. Consequently, riders are vulnerable to injury to skin and underlying tissue injury due to trauma, mechanical friction, pressure, and the environment. Lacerations and abrasions are quite common among mountain bikers mainly due to direct trauma because of a fall or equipment failure. A rider's knees are generally one of the first—and most painful—parts of the body to hit the ground in a crash. As a result, management of skin trauma is commonly mandated for mountain bikers. A pair of knee pads is widely recognized as protection against such injury. Knee pads can protect the skin from abrasion and laceration wounds and from debris, such as dirt and soil pathogens, that may contact the skin and cause infection. What is needed is a knee guard that overcomes the disadvantages of conventional design.

SUMMARY OF DESCRIBED SUBJECT MATTER

Embodiments of the present disclosure include a knee guard for protecting the knee of a wearer including an inner sleeve that fits over the knee of the wearer covering at least front and left and right side portions of a leg of the wearer proximate the knee joint, a knee guard including an outer layer positioned over the inner sleeve proximate the knee joint and slidable with respect to the inner sleeve, the outer layer attached to the inner sleeve at left and right side portions above the knee joint and at left and right side portions below the knee joint, the outer layer not attached to the inner sleeve at the front portion adjacent the knee joint, and a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

In some embodiments, the inner sleeve is fabricated from elastic fabric, such as Lycra®. In some embodiments, the outer layer is fabricated from an elastic fabric or a woven fabric such as Cordura®. In some embodiments, the protective pad is fabricated from an impact resistant material such as Koroyd™. In some embodiments, the knee protective insert is a pocket stitched to the outer layer, and the protective pad is disposed within the pocket. In some embodiments, a top and a bottom portion of the inner sleeve includes an elastic grip. In some embodiments, the outer layer is attached to the inner sleeve by stitches, adhesive or thermal bonding.

Embodiments of the present disclosure include a knee guard for protecting the knee of a wearer, having an inner sleeve that fits over the knee of the wearer covering at least front and left and right side portions of the leg of the wearer proximate the knee joint; a knee guard including an outer layer comprising a first portion positioned over the inner sleeve proximate the knee joint and at least partially slidable with respect to the inner sleeve, the first portion attached to the inner sleeve at left and right side portions above the knee joint, the first portion not attached to the inner sleeve at the front portion adjacent the knee joint; and a second portion positioned over the inner sleeve proximate the knee joint and at least partially slidable with respect to the inner sleeve, the second portion attached to the inner sleeve at left and right side portions below the knee joint, the second portion not attached to the inner sleeve at the front portion adjacent the knee joint, and the second portion not attached to the inner sleeve along a bottom edge extending from the left side to the right side below the knee joint; and a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

Embodiments of the present disclosure include a joint protection device for protecting a joint of a wearer, having an inner sleeve that fits over the joint of the wearer covering at least the front and left and right side portions of a limb of the wearer proximate the joint, a joint guard including an outer layer positioned over the inner sleeve proximate the joint and slidable with respect to the inner sleeve, the outer layer attached to the inner sleeve at left and right side portions above the joint and at left and right side portions below the joint, the outer layer not attached to the inner sleeve at the front portion adjacent the joint; and a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

In some embodiments, the joint is the knee joint or the elbow joint of the wearer. In some embodiments, the inner sleeve is fabricated from elastic fabric. In some embodiments, the outer layer is fabricated from elastic fabric or woven fabric. In some embodiments, the protective pad is fabricated from an impact resistant material such as Koroyd™. In some embodiments, the protective insert is a pocket stitched to the outer layer, and the protective pad is disposed within the pocket. In some embodiments, a top and a bottom portion of the inner sleeve includes an elastic grip. In some embodiments, the outer layer is attached to the inner sleeve by stitches, adhesive or thermal bonding.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the present disclosure can be further explained with reference to the attached drawings, wherein like structures are referred to by like numerals throughout the several views. The drawings shown are not necessarily to scale, with emphasis instead generally being placed upon illustrating the principles of the present disclosure. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ one or more illustrative embodiments.

FIG. **1** is a front top front right side isometric view of the protective guard in accordance with exemplary embodiments of the disclosed subject matter.

FIG. **2** is a bottom rear left side isometric view thereof.

FIG. **3** is a bottom front right side view thereof.

FIG. **4** is a top rear left side view thereof.

FIG. **5** is a front elevation view thereof.

FIG. **6** is a rear elevation view thereof.

FIG. **7** is a left side elevation view thereof.

FIG. **8** is a right side elevation view thereof.

FIG. **9** is a top plan view thereof.

FIG. **10** is a bottom plan view thereof.

FIG. **11** is a side of view of the protective guard as worn by a wearer illustrating knee extension.

FIG. **12** is a side of the protective guard as worn by a wearer illustrating knee flexion.

DETAILED DESCRIPTION

Various detailed embodiments of the present disclosure, taken in conjunction with the accompanying figures, are disclosed herein; however, it is to be understood that the disclosed embodiments are merely illustrative. In addition, each of the examples given in connection with the various embodiments of the present disclosure is intended to be illustrative, and not restrictive.

Throughout the specification, the following terms take the meanings explicitly associated herein, unless the context clearly dictates otherwise. The phrases "in one embodiment" and "in some embodiments" as used herein do not necessarily refer to the same embodiment(s), though it may. Furthermore, the phrases "in another embodiment" and "in some other embodiments" as used herein do not necessarily refer to a different embodiment, although it may. Thus, as described below, various embodiments may be readily combined, without departing from the scope or spirit of the present disclosure.

In addition, the term "based on" is not exclusive and allows for being based on additional factors not described, unless the context clearly dictates otherwise. In addition, throughout the specification, the meaning of "a," "an," and "the" include plural references. The meaning of "in" includes "in" and "on."

As used herein, the terms "and" and "or" may be used interchangeably to refer to a set of items in both the conjunctive and disjunctive in order to encompass the full description of combinations and alternatives of the items. By way of example, a set of items may be listed with the disjunctive "or", or with the conjunction "and." In either case, the set is to be interpreted as meaning each of the items singularly as alternatives, as well as any combination of the listed items.

As used herein, the term "top" or "upper" portion refers to the portion of the guard closest to the body of the wearer. In the case of a knee guard, the "top" or "upper" portion refers to the thigh portion of the wearer's leg. Conversely, the term "bottom" or "lower" portion refers to the portion of the guard furthest from the body of the wearer. In the case of a knee guard, the "bottom" or "lower" portion refers to the calf portion of the wearer's leg. The term "front" refers to the region closest to the joint, such as the knee cap. The term "rear" refers to the region opposite the front. The "left" and "right" sides refer to the sides of the guard. The term "longitudinal" refers to an axis extending generally from the top of the guard to the bottom.

FIGS. **1-10** illustrate an exemplary protective guard **10** for protecting the knee of a wearer. Although one guard is shown in the figures, it is understood that the guard for the right and the left legs are substantially identical and/or mirror images. Further, it is understood that the protective guard described herein can also be used to protect other joints of the user, such as the elbow or wrist. The protective guard includes an inner sleeve **12** that surrounds the limb and a floating joint guard **14** that is at least partially slidable over the inner sleeve **12** and maintains position over the joint during flexion and extension of the joint. Consequently, maximum protection of the joint is maintained.

The inner sleeve **12** is typically a cylindrical or near-cylindrical sleeve that fits snugly over the knee of the wearer. In some embodiments, the inner sleeve **12** is fabricated from an elastic synthetic fabric such as elastane or Lycra®, or similar stretchable material. The inner sleeve **12** covers at least the front and left and right side portions of a leg of the wearer at the knee joint and extending above and below the knee joint. In some embodiments, the inner sleeve **12** also covers the back portion of the leg, as illustrated in FIGS. **2**, **4** and **6**.

A knee guard **14** is positioned over the inner sleeve **12** proximate the knee joint and is at least partially slidable, e.g., "floating," with respect to the inner sleeve **12**. In some embodiments, the knee guard **14** includes a protective pad **34** and an outer layer having an upper portion **16** and a lower portion **17**. In some embodiments, a single piece of the material comprises the upper portion **16** and the lower portion **17**. In some embodiments, the upper portion **16** is fabricated from an elastic synthetic fabric such as elastane or Lycra®, or similar stretchable material. The upper portion **16** is attached to the inner sleeve **12** at a left side portion **18** and at a right side portion **20** above the knee joint, but is not attached at the front portion of the leg. The upper portion **16** is secured to the inner sleeve **12** by the use of stitches along a seam that runs substantially longitudinally. Alternatively, the upper portion **16** is secured by thermal compression, adhesive, or the like. Similarly, the lower portion **17** is attached at a left side portion **22** and at a right side portion **24** below the knee joint but is not attached to the inner sleeve at the front portion. In some embodiments, the lower portion **17** is fabricated from a high tenacity woven nylon or polyester fabric such as Cordura® material (or similar material). As will be described in greater detail herein, the front portions of the upper portion **16** and lower portion **17** are slidable over the inner sleeve **12** during extension and flexion of the knee. The bottom portion **32** of the lower portion **17** is not attached to inner sleeve **12** and slidable with respect to inner sleeve **12**.

The knee guard **14** further includes a protective pad **34** configured to be positioned over the knee joint of the wearer when worn by the wearer. The protective pad **34** is secured to the upper portion **16** at a top portion thereof and to the lower portion **17** at a bottom portion thereof. The protective pad **34** is not attached to the inner sleeve **12**. A gap **26** is defined adjacent the knee joint at each side of the wearer's leg. In some embodiments, protective pad **34** includes a pocket or case **36** fabricated from a high tenacity woven nylon or polyester fabric such as Cordura® material (or similar material) and a cushion insert **38** secured within the pocket **36**. The pocket **36** is in turn secured to the upper portion **16** and lower portion **17** by stitches, thermal bonding, adhesive and the like. In some embodiments, the insert **38** is fabricated from material having strength and energy dissipation properties to protect to knee from impact. Exemplary materials include a Koroyd™ material having a network or welded co-polymer tubes. Other cushion materials include D30™, Poron™ and other recycled and non recycled closed cell foams. As will be described in greater detail herein, the protective pad **34** is slidable over the inner sleeve **12** during extension and flexion of the knee.

In some embodiments, the guard **10** includes a top elastic grip **40** positioned at the top portion of the guard **10** and a bottom elastic grip **42** positioned at a bottom portion of the guard **10**. The top clastic grip **40** and bottom elastic grip **42** are fabricated from materials such as elastic, spandex, and lycra in combination with silicon gripper.

FIG. **11** illustrates the guard **10** as worn by the wearer on the leg L in a knee extension position. The protective pad **34** is positioned over the wearer's knee K when in the knee

extension position. As can be seen in FIG. **11**, a distance D**1** is defined in the gap **26** between the upper portion **16** and the lower portion **17**. A distance D**2** is defined between the bottom edge **32** of the lower portion **17** and the bottom edge **46** of the guard **10**.

FIG. **12** illustrates the guard **10** as worn by the wearer in the knee flexion position. Since the outer layer **16**/**17** and the knee guard **14** are not secured to the inner layer **12** at the front of the leg adjacent the knee, the knee guard **14** is slidable with respect to the inner layer **12**. Thus, when the knee flexes, the knee guard **14** remains positioned over the knee K. When compared to knee extension position (FIG. **11**), the distance D**1** between the upper portion **16** and the lower portion **17** is reduced. Likewise, when compared to the knee extension position, the distance D**2** between the bottom edge **32** of the lower portion **17** and the bottom edge **46** of the guard **10** becomes longer.

While one or more embodiments of the present disclosure have been described, it is understood that these embodiments are illustrative only, and not restrictive, and that many modifications may become apparent to those of ordinary skill in the art.

The invention claimed is:

1. A protective guard for protecting a knee of a wearer, comprising:

an inner sleeve configured to fit over the knee of the wearer covering at least front and left and right side portions of a leg of the wearer proximate the knee joint;

a knee guard comprising

an outer layer disposed over the inner sleeve and configured to be positioned proximate the knee joint comprising

a first portion at least partially slidable with respect to the inner sleeve, attached to the inner sleeve at left and right side portions above the knee joint and not attached to the inner sleeve at the front portion adjacent the knee joint;

a second portion at least partially slidable with respect to the inner sleeve, the second portion attached to the inner sleeve at left and right side portions below the knee joint, and not attached to the inner sleeve at the front portion adjacent the knee joint along a bottom edge extending from the left side to the right side below the knee joint; wherein the first portion and the second portion are separated by a gap between the respective left and right side portions; and

a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

2. The protective guard of claim **1**, wherein the inner sleeve is fabricated from elastic fabric.

3. The protective guard of claim **1**, wherein the outer layer is fabricated from elastic fabric or woven fabric.

4. The protective guard of claim **1**, wherein the protective pad comprises an insert fabricated from an impact resistant material.

5. The protective guard of claim **4**, wherein the protective pad comprises a pocket secured to the outer layer, and wherein the insert is disposed within the pocket.

6. The protective guard of claim **1**, wherein at least one of a top portion and a bottom portion of the inner sleeve comprise an elastic grip.

7. The protective guard of claim **1**, wherein the outer layer is attached to the inner sleeve by the use of stitches, adhesive or thermal bonding.

8. A knee guard for protecting a knee of a wearer, comprising:

an inner sleeve configured to fit over the knee of the wearer covering at least front and left and right side portions of the leg of the wearer proximate the knee joint;

a knee guard comprising

an outer layer disposed over the inner sleeve and configured to be positioned proximate the knee joint comprising

a first portion disposed over the inner sleeve proximate the knee joint and at least partially slidable with respect to the inner sleeve, the first portion attached to the inner sleeve at left and right side portions above the knee joint, the first portion not attached to the inner sleeve at the front portion adjacent the knee joint;

a second portion positioned over the inner sleeve proximate the knee joint and at least partially slidable with respect to the inner sleeve, the second portion attached to the inner sleeve at left and right side portions below the knee joint, the second portion not attached to the inner sleeve at the front portion adjacent the knee joint, and the second portion not attached to the inner sleeve along a bottom edge extending from the left side to the right side below the knee joint; and

a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

9. The knee guard of claim **8**, wherein the inner sleeve is fabricated from elastic fabric.

10. The knee guard of claim **8**, wherein the outer layer is fabricated from elastic fabric or woven fabric.

11. The knee guard of claim **8**, wherein the protective pad comprises an insert fabricated from an impact resistant material.

12. The knee guard of claim **11**, wherein the protective pad comprises a pocket secured to the outer layer, and wherein the insert is disposed within the pocket.

13. The knee guard of claim **8**, wherein at least one of a top portion and a bottom portion of the inner sleeve comprise an elastic grip.

14. The knee guard of claim **8**, wherein the outer layer is attached to the inner sleeve by the use of stitches, adhesive or thermal bonding.

15. A joint protection device for protecting a joint of a wearer, comprising:

an inner sleeve configured to fit over the joint of the wearer covering at least front and left and right side portions of a limb of the wearer proximate the joint;

a joint guard comprising

an outer layer disposed over the inner sleeve and configured to be positioned proximate the joint and slidable with respect to the inner sleeve, the outer layer attached to the inner sleeve at left and right side portions above the joint and at left and right side portions below the joint, the outer layer not attached to the inner sleeve at the front portion so that a distance between a bottom edge of the outer layer and a bottom edge of the inner sleeve is configured to increase when the joint moves from an extension position to a flexion position; and

a protective pad secured to the outer layer and not secured to the inner sleeve and slidable with respect to the inner sleeve.

16. The joint protective device of claim **15**, wherein the joint is a knee joint of the wearer.

17. The joint protective device of claim 15, wherein the inner sleeve is fabricated from elastic fabric.

18. The joint protective device of claim 15, wherein the outer layer is fabricated from woven fabric or elastic fabric.

19. The joint protective device of claim 15, wherein the protective pad comprises an insert fabricated from an impact resistant material.

20. The joint protective device of claim 19, wherein the protective pad comprises a pocket secured to the outer layer, and wherein the insert is disposed within the pocket.

* * * * *