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### Knee protection system and method of use

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#### Abstract

A knee protection system has a lower guard that is strapped to the lower leg below the knee joint. An upper guard is attached to the lower guard by hinges so that when the knee bends the lower guard goes with it and the upper guard pivots to remain over the kneecap or thereabout.

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## Background/Summary

### BACKGROUND

#### 1. Field of the Invention

(1) The present invention relates generally to protective systems and methods, and more specifically, to a knee protection system that attaches the shine or calf of the person who wears so that the lower part remains fixed, and the upper part follows the upper leg so that both are protected

while the person kneels.

## 2. Description of Related Art

(2) Protective systems are well known in the art and are effective means to reduce or eliminate strain or injury to a person while they perform hazardous activities. Common protective systems include knee pads that attach a hard surface to the forward part of the knee. With the hard surface attached, when the person kneels the knee is kept from the floor or surface where the person kneels as the knee contacts the hard surface and it contacts the floor. The hard surface is commonly padded or contoured to further relieve pressure on the knee. Common knee pads are attached by straps or bands that pass around the upper leg, lower leg, or both. The hard surface could have vent holes, anti-slip coatings, or other minor improvements to alter the performance for a particular use or application

(3) One of the problems associated with common protective systems is their limited efficiency. For example, the hard surface is linear and only protects the part of the body that is behind it. When the person kneels the upper leg near the knee becomes exposed and therefore is susceptible to injury or harm.

(4) Additionally, when the person moves the straps or the bands prevent natural movement and often fail to keep the hard protective surface over the knee and parts of the leg that it is supposed to protect.

(5) Accordingly, although great strides have been made in the area of protective systems, many shortcomings remain.

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## Description

### DESCRIPTION OF THE DRAWINGS

(1) The novel features believed characteristic of the embodiments of the present application are set forth in the appended claims. However, the embodiments themselves, as well as a preferred mode of use, and further objectives and advantages thereof, will best be understood by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein:

(2) FIG. 1 is a front view of a knee protection system in accordance with a preferred embodiment of the present application;

(3) FIG. 2 is a back view of the system of FIG. 1;

(4) FIG. 3 is a flowchart of a method of protecting a knee; and

(5) FIG. 4 is a front view of an alternative embodiment of the system of FIG. 1.

(6) While the system and method of use of the present application is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and are herein described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present application as defined by the appended claims.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

(7) Illustrative embodiments of the system and method of use of the present application are provided below. It will of course be appreciated that in the development of any actual embodiment, numerous implementation-specific decisions will be made to achieve the developer's specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

(8) The system and method of use in accordance with the present application overcomes one or

more of the above-discussed problems commonly associated with conventional protective systems. Specifically, the present invention ensures the protective surfaces remain between the body and the direction of harm or threats thereto. These and other unique features of the system and method of use are discussed below and illustrated in the accompanying drawings.

(9) The system and method of use will be understood, both as to its structure and operation, from the accompanying drawings, taken in conjunction with the accompanying description. Several embodiments of the system are presented herein. It should be understood that various components, parts, and features of the different embodiments may be combined together and/or interchanged with one another, all of which are within the scope of the present application, even though not all variations and particular embodiments are shown in the drawings. It should also be understood that the mixing and matching of features, elements, and/or functions between various embodiments is expressly contemplated herein so that one of ordinary skill in the art would appreciate from this disclosure that the features, elements, and/or functions of one embodiment may be incorporated into another embodiment as appropriate, unless described otherwise.

(10) The preferred embodiment herein described is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described to explain the principles of the invention and its application and practical use to enable others skilled in the art to follow its teachings.

(11) Referring now to the drawings wherein like reference characters identify corresponding or similar elements throughout the several views, FIG. 1 depicts a front view of a knee protection system in accordance with a preferred embodiment of the present application. It will be appreciated that system **101** overcomes one or more of the above-listed problems commonly associated with conventional protective systems.

(12) In the contemplated embodiment, system **101** includes a lower guard **103** pivotally attached to an upper guard **105** via hinges **107**. A calf strap **111** is attached to lower guard **103** and is configured to wrap around the calf or upper lower leg **109** and secure to the opposite side via a buckle **113** and post **115**. Lower guard **103** rests in front of the upper lower leg **109** and upper guard **105** rests in front of the lower upper leg **117** or knee.

(13) As shown in FIG. 1, upper guard **105** has three sections that extend distally from a main section **105a**, distal sections **105b**, **105c**, and **105d**. Hinge **107a** is disposed on distal section **105b** and hinge **107b** is disposed on distal section **105c**. Distal section **105d** extends further than distal sections **105b** and **105c** in a direction towards post **115** of lower guard **103**. Space **121** is formed between distal section **105b** and distal section **105d**, and space **123** is formed between distal section **105d** and distal section **105c**.

(14) As also shown in FIG. 1, lower guard **103** has two sections that extend distally from a main section **103a**, distal sections **103b** and **103c**. Hinges **107a** and **107b** are disposed on main section **103a**. Distal sections **103b** and **103c** extend away from main section **103a**, where distal section **103b** has strap **111** affixed thereto and distal section **103c** has post **115** extending therefrom. Distal sections **103b** and **103c** form space **119** therebetween.

(15) Referring to FIG. 2, the interior of the system is shown. Upper guard **105** has a cushion ring attached to the interior surface **207** thereof. A bladder **203** is attached within cushion ring **201** and is configured to rest in front of the patella of the knee. Lower guard **103** has a pad **205** attached to the interior surface **209** thereof.

(16) As shown in FIG. 2, pad **205** has corresponding sections to lower guard **103**. Pad **205** generally includes a main section **205a** that has two sections that extend distally from the main section **205a**, distal sections **205b** and **205c**, that have space **205d** therebetween.

(17) In use, system **101** is attached to the leg of a person around the calf or upper lower leg **109**. A first system is used for a first leg and a second system is used for a second leg. The use is similar for each leg so only one is discussed. Calf strap **111** is passed around upper lower leg **109** and fasted to post **115** via buckle **113** so that lower guard **103** is in front thereof and upper guard **105** is

in front of the knee or lower upper leg **117**. The person walks or kneels upper guard **105** pivots with respect to lower guard **103** via hinges **107**. Pad **205** softens contact between upper lower leg **109** and the interior surface **209** of lower guard **103**. Cushion ring **201** contacts the knee while bladder **203** provides impact protection to the knee.

(18) It should be appreciated that one of the unique features believed characteristic of the present application is that upper guard **105** is not rigidly attached to lower guard **103** so that when the person bends their knee, upper guard **105** remains in front of the knee or lower upper leg **117** while lower guard **103** remains in front of upper lower leg **109**. Hinges **107** (**107a** and **107b**) allow upper guard **105** to pivot and therefore remain in a position to provide protection to the knee.

(19) In reference to FIGS. **1** and **2**, distal section **105d** of upper guard **105** is arranged to extend past main section **103a** of lower guard **103**, such that it is over main section **103a** of lower guard **103**, thereby providing a stop to limit the rotational movement of hinges **107a** and **107b**.

(20) Referring now to FIG. **3** a method of protecting a knee is depicted. Method **301** includes attaching a lower guard to the lower leg of a person **303**, allowing the lower guard to protect the lower leg and the upper guard attached thereto to protect the knee **305**, bending the leg with the lower guard attached **307**, and allowing the lower guard to remain fixed to the lower leg and the upper guard to move with the upper leg **309**.

(21) Referring to FIG. **4**, an alternative embodiment of system **101** is depicted. Embodiment **401** includes a lower guard **403** pivotally attached to an upper guard **405**. Lower guard **403** has an upper strap **407** that is configured to attach to an upper post **411** and a lower strap **409** that is configured to attach to a lower post **413**. In this way the calf of the wearer is between upper strap **407** and lower strap **409**.

(22) The embodiment shown in FIG. **4** is similar to the embodiment shown in FIGS. **1** and **2**, in that lower guard **403** has two sections that extend distally from a main section **403a**, distal sections **403b** and **403c**. The hinges are disposed on main section **403a**. Distal sections **403b** and **403c** extend away from main section **403a**, where distal section **403c** has straps **407** and **409** affixed thereto and distal section **403b** has posts **411** and **413** extending therefrom. Distal sections **403b** and **403c** form spaces **419** and **421** therebetween, where the spaces are separated by connector **403d** affixed to distal sections **403b** and **403c** and being proximate post **413**.

(23) Similarly, upper guard **405** has three sections that extend distally from a main section **405a**, distal sections **405b**, **405c**, and **405d**. The respective hinges disposed on distal section **405b** and distal section **405c**. Distal section **405d** extends further than distal sections **405b** and **405c** in a direction towards post **411** of lower guard **403**. Space **415** is formed between distal section **405b** and distal section **405d**, and space **417** is formed between distal section **405d** and distal section **405c**.

(24) The particular embodiments disclosed above are illustrative only, as the embodiments may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. It is therefore evident that the particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application. Accordingly, the protection sought herein is as set forth in the description. Although the present embodiments are shown above, they are not limited to just these embodiments, but are amenable to various changes and modifications without departing from the spirit thereof.

## Claims

1. A knee protection system comprising: a lower guard comprising a main section and a pair of distal sections extending from the main section, the distal sections forming a space therebetween; a first pad attached to an interior surface of the lower guard, the first pad having a main section and a pair of distal sections extending from the main section, the distal sections of the pad forming a

space therebetween; an upper guard comprising a main section, a pair of outer distal sections extend distally from the main section and a middle distal section extending distally from the main section and past the pair of outer distal sections, each of the distal sections being spaced apart and forming a pair of spaces between; a second pad attached to an interior surface of the upper guard; a pair of hinges connected to each of the pair of outer distal sections and also connected to the main section of the lower guard, allowing the upper and lower guards to pivot about the pair of hinges; at least one post extending from a first section of the pair of distal sections of the lower guard; and, at least one strap pivotably connected to a second section of the pair of distal sections of the lower guard, the at least one strap arranged to removably connect to the at least one post.

2. The system recited in claim 1, wherein the second pad is only attached to the main section of the upper guard.

3. The system recited in claim 1 further comprising: a bladder attached to the second pad.

4. The system recited in claim 1, wherein the second pad comprises a cushion ring.

5. The system recited in claim 4 further comprising: a bladder attached within the cushion ring.

6. The system recited in claim 1 further comprising: a second post extending from the first section of the pair of distal sections of the lower guard; and, a second strap pivotably connected to the second section of the pair of distal sections of the lower guard, the second strap arranged to removably connect to the second post.

7. The system recited in claim 1 further comprising: a connector connected to the pair of distal sections of the lower guard, the connector dividing the space formed by the pair of distal sections of the lower guard into an upper space and a lower space.

8. The system recited in claim 1 further comprising: a buckle attached to the at least one strap, the buckle adapted to removably secure to the at least one post.

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