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(54) **CALF MUSCLE AND TENDON GUARD**

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(57) **ABSTRACT**

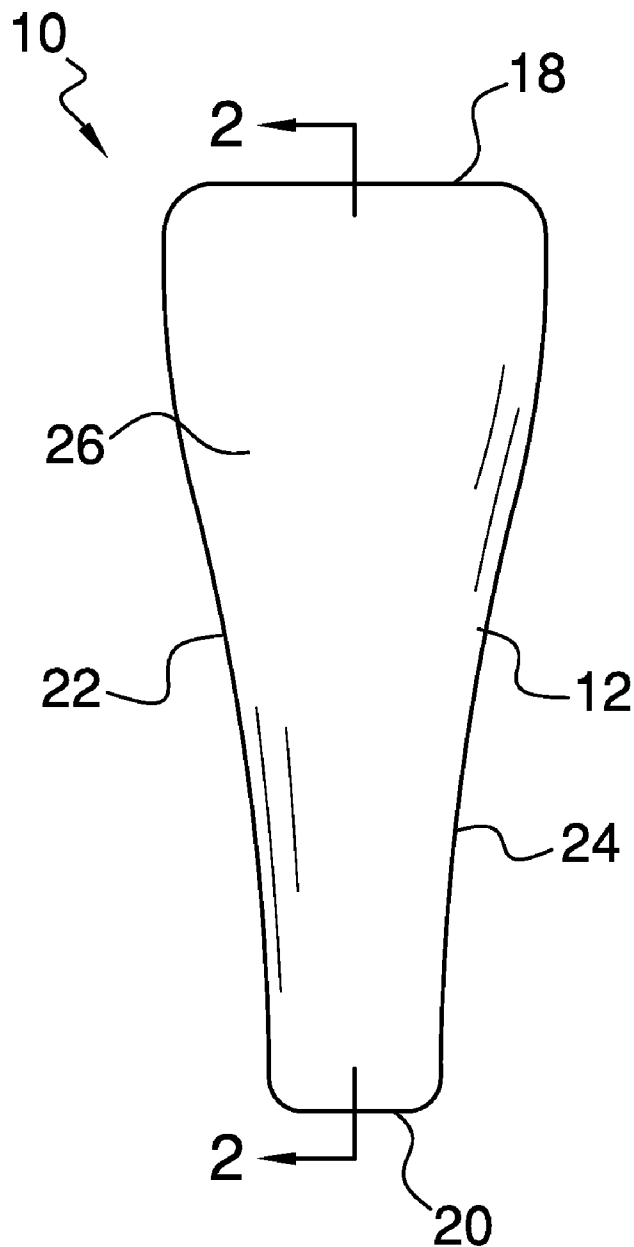
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A calf muscle and tendon guard for wearing on a user's leg to cover and protect the user's calf muscles and achilles tendon against being severed from contact with a blade of an ice skate includes a body which substantially surrounds the leg and ankle of a user and a flexible guard comprised of a cut resistant material substantially covering only the area of the calf muscle and the achilles tendon, said flexible guard substantially flexing with said body and conforming to the anatomy of the leg and ankle when worn.

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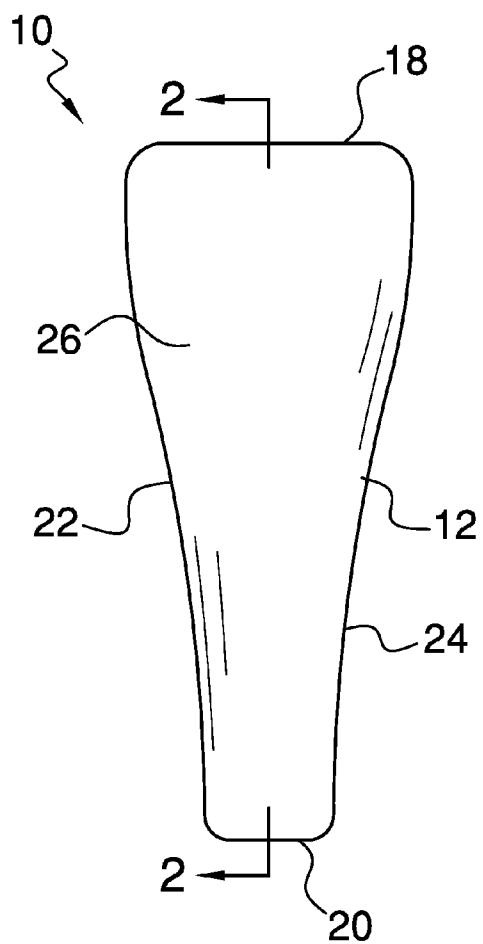


FIG. 1

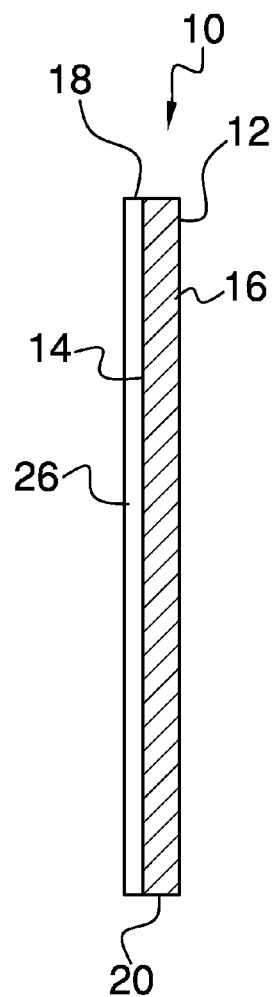
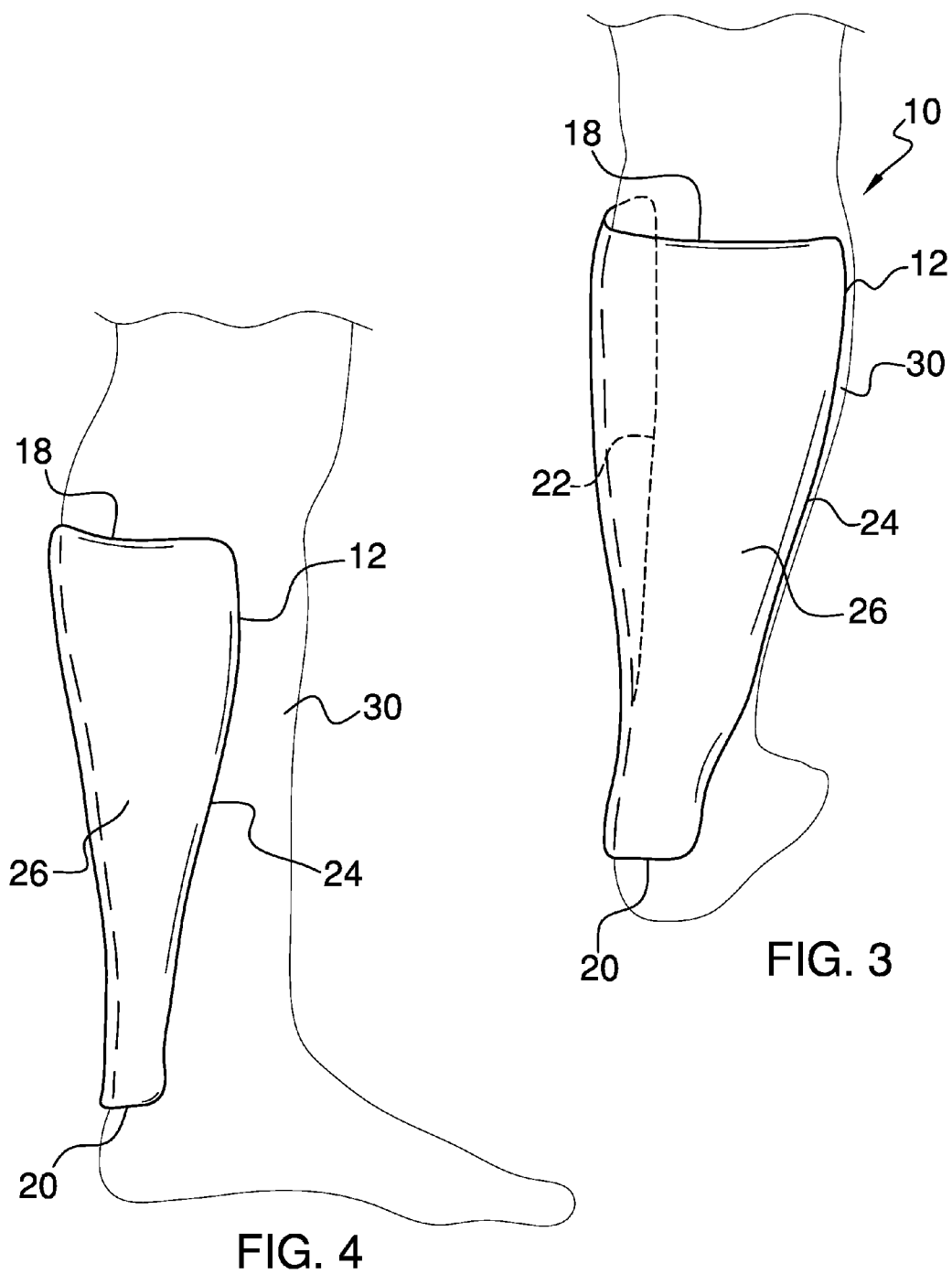


FIG. 2



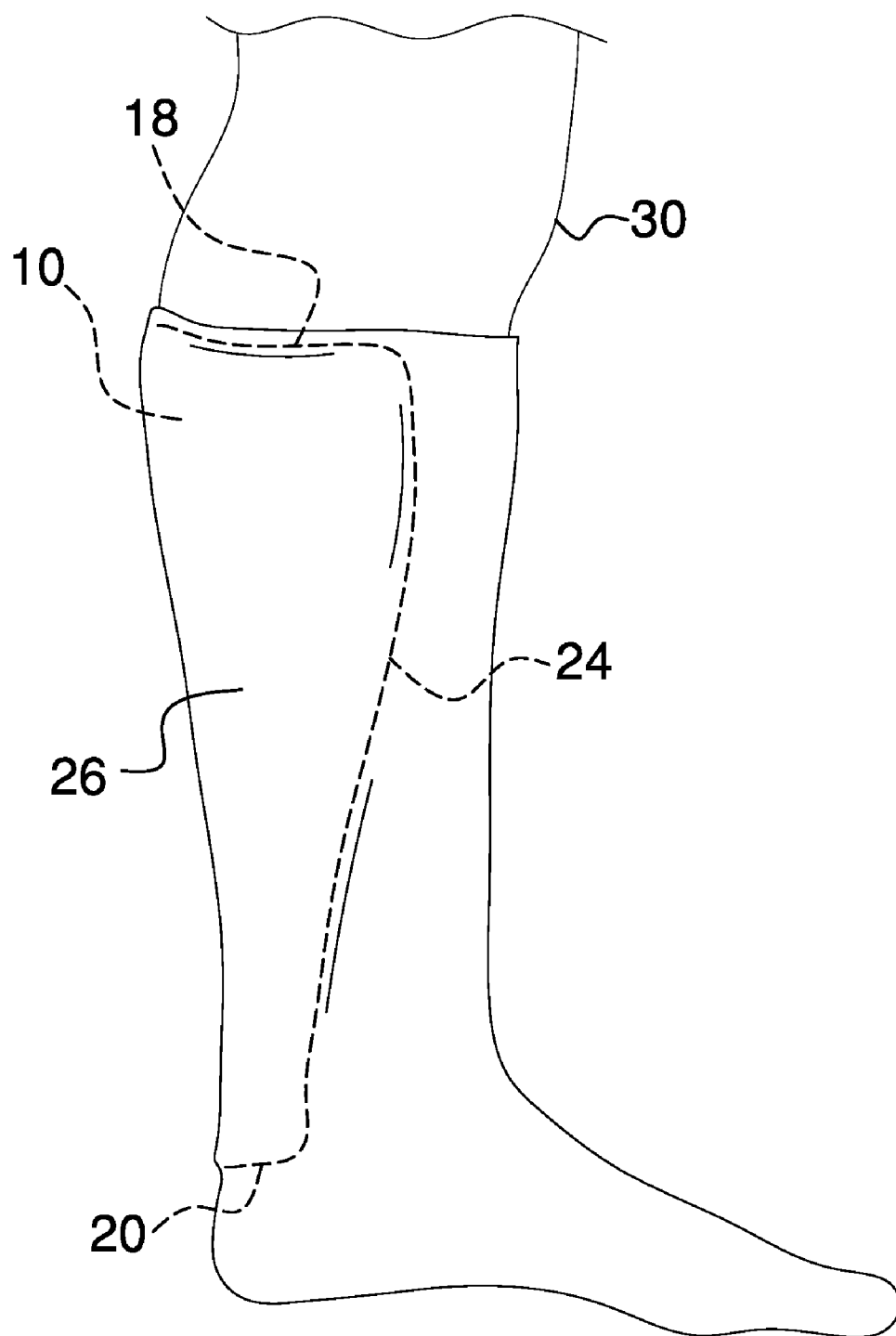


FIG. 5

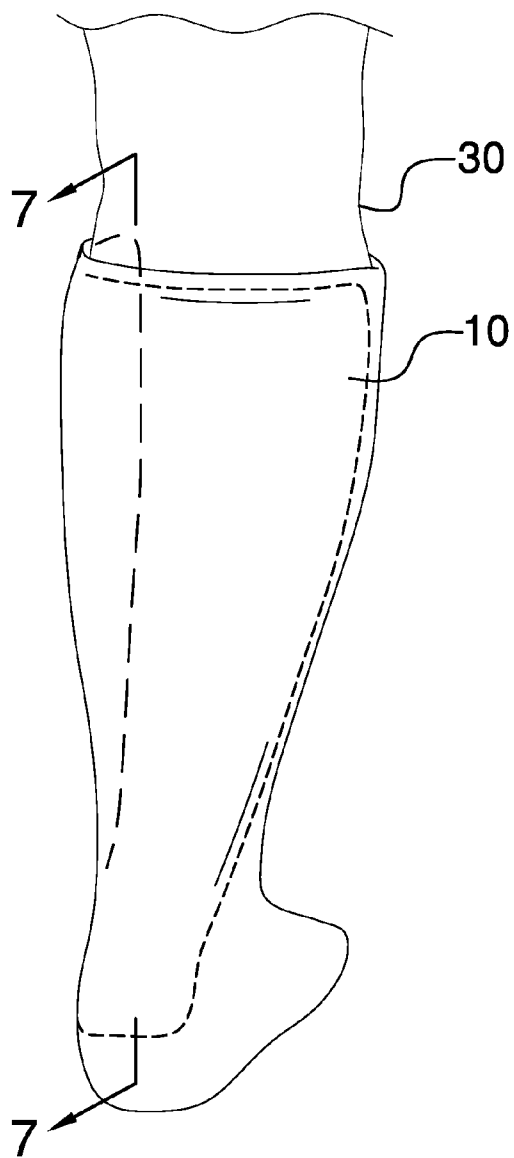


FIG. 6

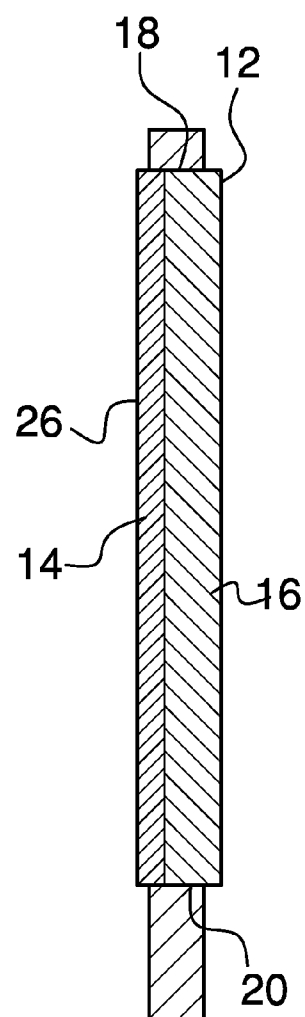


FIG. 7

CALF MUSCLE AND TENDON GUARD

FIELD OF THE INVENTION

[0001] The present invention relates generally to protective athletic apparel, and more particularly, a protective pad for use in athletic activities protecting an ice hockey player's gastrocnemius and soleus muscles (calf muscles), as well as the calcanei (achilles tendon).

BACKGROUND OF THE INVENTION

[0002] Contact sports, including football; baseball; soccer; and ice hockey; for example, often lead to physical impacts resulting in injury. Many of these contact sports, therefore, require the athletes to utilize protective equipment such as helmets, mouth guards, shoulder pads, rib guards, hip pads, thigh pads, knee pads, and shin-guards.

[0003] Ice hockey players, in particular, rely on hockey gloves, shoulder pads, shin guards, elbow pads, helmets, pants and pant shells, padded shirts, neck guards, mouth guards, and wrist guards to protect them. Despite all of these forms of protective equipment, there is a lack of protective equipment that sufficiently protects an ice hockey player's gastrocnemius muscles, soleus muscles, and calcanei.

[0004] Protection for an ice hockey player's gastrocnemius and soleus muscles, as well as the calcanei is evidenced by the serious injuries these athletes have sustained from being lacerated by skate blades, or from having their calcaneal tendons severed when they are inadvertently stepped on. Such injuries could keep ice hockey players from playing for months to years, if not permanently.

[0005] Other than the ice hockey athletes' own skates and socks, which may include hockey socks and/or hockey skate socks which are completely ineffectual in providing protection, there is currently no means to protect the athletes' legs from such injuries.

[0006] Hockey socks typically run from the player's ankles to the thighs; they are worn over protective gear and pulled down over the outside heel of the skate. Hockey socks are different from hockey skate socks, which are thin socks worn over the foot inside the skate. To hold the hockey sock in place, ice hockey players typically use athletic tape below the knee and sometimes at the ankle. These articles provide virtually no protection between the back of a player's leg and the blade of another player's skates.

[0007] While there is currently no comparable protective athletic apparel that adequately protects an ice hockey player's gastrocnemius muscles, soleus muscles, and calcanei, several types of protective athletic apparel have been developed to protect a wearer's calcaneal tendons, or the Achilles tendons, as they are more commonly referred.

[0008] Previous protective apparel for the legs focused on protecting the shins and calves by providing shin and calf guards which were fastened together with straps, connected by Velcro straps, or sewn to an elasticated material. However, these guards, typically used in sports such as soccer and football, do not provide ice hockey players with adequate protection from the sharpness of ice skate blades, and the use of guards such as these would only serve to restrict an ice hockey player's movements on the ice, as they are not custom-fit to each individual athlete and rather stiff.

[0009] It has also been proposed to use socks, where the socks have additional padding sewn or knitted at the Achilles tendon, a pocket with a pad insert made of viscoelastic mate-

rial which covers the Achilles tendon, or a protective plastisol layer located in the Achilles sinew and ankle regions. While these socks may provide a more convenient means of holding the protective portions over the Achilles tendon, again, most of these socks are cumbersome, bulky, and would merely restrict an ice hockey player's movements. In addition, these socks only provide protection for the Achilles tendons; are not flexible; and do not offer any protection for the calcanei, which are also vulnerable to skate lacerations.

[0010] Previous protective equipment for the gastrocnemius muscles and soleus muscles up to this point, therefore, have generally been constructed of thick cotton or even leather over cotton, which are clearly ineffective in providing adequate protection.

[0011] Cut resistant materials such as para-aramid synthetic fibers, for example, Poly-paraphenylene terephthalamide-branded Kevlar or p-phenylene terephthalamide-branded Twaron, have become well-known components of personal armor such as combat helmets, Ballistic face masks, and Ballistic vests. Such fibers are known to be five times stronger than steel on an equal weight basis.

[0012] For example, Kevlar, when spun, results in a fiber having a tensile strength due to the inter-chain bonds. Additional strength is derived from aromatic stacking interactions between adjacent strands. Kevlar's structure consists of relatively rigid molecules which tend to form mostly planar sheet-like structures similar to silk protein and has been used to manufacture articles of clothing such as gloves, jackets, and chaps. Protective apparel made of Kevlar is known for being lighter and thinner than apparel equivalents which are made of more traditional materials.

[0013] Kevlar has been applied to several forms of sporting equipment. For example, it has been used as an inner lining for some bicycle tires to prevent punctures, in table tennis paddles to increase bounce and reduce weight, in motorcycle safety clothing particularly in the area of the shoulders and elbows, and in the laces for the football boots.

[0014] Previous protective socks have also been proposed incorporating Kevlar into the soles of socks for canoeing, or providing socks with calf areas reinforced with Kevlar for use in horse riding to reduce abrasion and damage on the rider's calves. However, it has not been suggested to provide a protective pad or sock for use in the sport of ice hockey to protect the player's gastrocnemius muscles, soleus muscles, and the calcanei.

SUMMARY OF THE INVENTION

[0015] The preferred embodiments of the present invention addresses this need by providing a flexible protective guard of a cut resistant material for the lower portion of a wearer's leg that covers and shields the calf muscles and achilles tendon.

[0016] The preferred embodiments of the present invention also provide a flexible protective guard that can be worn underneath an over sock.

[0017] The preferred embodiments of the present invention further provide a protective guard suitable for use in the sport of hockey to prevent an ice skating blade from severing the wearer's calf muscle and achilles tendon.

[0018] The preferred embodiments of the present invention further provide a sock comprising a flexible protective guard of a cut resistant material for the lower portion of a wearer's leg that covers and shields the calf muscles and achilles tendon.

[0019] The preferred embodiments of the present invention further provided an article of protective gear that can be easily manufactured at lost cost.

[0020] To achieve these and other advantages, in general, in one aspect a calf and tendon guard includes a body which substantially surrounds the leg and ankle of a user and a flexible guard comprised of a cut resistant material substantially covering only the area of the calf muscle and the Achilles tendon, said flexible guard substantially flexing with said body and conforming to the anatomy of the leg and ankle when worn.

[0021] There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood and in order that the present contribution to the art may be better appreciated.

[0022] Numerous objects, features and advantages of the present invention will be readily apparent to those of ordinary skill in the art upon a reading of the following detailed description of presently preferred, but nonetheless illustrative, embodiments of the present invention when taken in conjunction with the accompanying drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of descriptions and should not be regarded as limiting.

[0023] As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

[0024] For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The following drawings illustrate by way of example and are included to provide further understanding of the invention for the purpose of illustrative discussion of the embodiments of the invention. No attempt is made to show structural details of the embodiments in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice. Identical reference numerals do not necessarily indicate an identical structure. Rather, the same reference numeral may be used to indicate a similar feature of a feature with similar functionality. In the drawings:

[0026] FIG. 1 is a front elevation view of a protective pad constructed in accordance with the principles of the present invention;

[0027] FIG. 2 is a side cross-sectional view of the protective pad taken generally along line 2-2 in FIG. 1, showing or illustrating a flexible cut resistant material affixed to a cushioning material;

[0028] FIG. 3 is a front perspective view of the protective pad, showing or illustrating the protective pad positioned on a wearer;

[0029] FIG. 4 is a side elevation view of the protective pad, showing or illustrating the protective pad positioned on a wearer;

[0030] FIG. 5 is a side elevation view of the protective pad constructed in accordance with the principles of the present invention incorporated with a sock;

[0031] FIG. 6 is a front perspective view of the protective pad, showing or illustrating the protective pad positioned on a wearer attached to a sock;

[0032] FIG. 7 is a side cross-sectional view of the protective pad generally taken along line 7-7 in FIG. 6, showing or illustrating a flexible cut resistant material affixed to a cushioning material attached to a sock.

DETAILED DESCRIPTION OF THE INVENTION

[0033] As a preliminary matter, it should be noted that in this document (including the claims) directional terms, such as “above”, “below”, “upper”, “lower”, etc., are used for convenience in referring to the accompanying drawings. Additionally, it is to be understood that the various embodiments of the invention described herein may be utilized in various orientations, such as inclined, inverted, horizontal, vertical, etc., without departing from the principles of the invention.

[0034] In FIGS. 1 through 4, there is representatively illustrated a specially designed protective guard 10 for protecting the calf muscle and achilles tendon of the wearing from being severed from contact with the blade of an ice skate. The guard 10 is comprised of a body 12 constructed from a flexible material such that the body 12 conforms to anatomical shape of the wear's leg when worn. In an embodiment, the body 12 is constructed from a base textile material including Kevlar to provide a cut resistant and flexible body. In other embodiments, the body 12 may have an outer cut resistant layer 14 fabricated of a cut resistant material and an inner padding layer 16.

[0035] As depicted, the body 12 includes an upper edge 18, a lower edge 20, left and right side edges 22 and 24 and an interior portion 26. The body 12 is dimensioned such that when worn, the upper edge 18 is positioned above or adjacent to the upper portion of the wearer's calf muscle, the lower edge 20 is positioned below or adjacent to the lower portion of the achilles tendon, the left and right side edges 22 and 24 are positioned forwardly of respective laterally extending sides of the calf muscle, and with the interior portion 26 extending therebetween and wrapped around the lower leg 30 from the rearward thereof and substantially covering the calf muscle and achilles tendon.

[0036] In use, the wearer would position the body 12 of the guard 10 such that it is positioned as described above, and then would put a sock on or sleeve (not shown) over the guard such that the sock or sleeve serves to hold the guard in place covering the calf muscle and the achilles tendon.

[0037] In FIGS. 5 through 7 there is representatively illustrated a second embodiment of the present invention, wherein the guard 10 as described above is incorporated into the construction of a sock 32 or is otherwise attached to the sock such that the sock and guard are unitary. The unitary construction of the guard 10 and sock 32 is such that when the sock is worn, the upper edge 18 is positioned above or adjacent to the upper portion of the wearer's calf muscle, the lower edge 20

is positioned below or adjacent to the lower portion of the achilles tendon, the left and right side edges **22** and **24** are positioned forwardly of respective laterally extending sides of the calf muscle, and with the interior portion **26** extending therebetween and wrapped around the lower leg **30** from the rearward thereof and substantially covering the calf muscle and achilles tendon.

[0038] A number of embodiments of the present invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

What is claimed is:

1. A calf and tendon guard, comprising:

a body which substantially surrounds the leg and ankle of a user;

a flexible guard comprised of a cut resistant material substantially covering only the area of the calf muscle and the Achilles tendon, said flexible guard substantially flexing with said body and conforming to the anatomy of the leg and ankle when worn.

2. The calf and tendon guard of claim **1**, wherein said cut resistant material is comprised Kevlar.

3. The calf and tendon guard of claim **1**, wherein said cut resistant material is substantially comprised of Kevlar.

4. The calf and tendon guard of claim **1**, wherein said flexible guard is attached to an exterior surface of said body.

5. The calf and tendon guard of claim **1**, wherein said flexible guard is attached to an interior surface of said body.

6. The calf and tendon guard of claim **1**, wherein said flexible guard is sewn into said body, and wherein said cut resistant material is comprised of Kevlar.

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