

- [54] **ATHLETIC KNEE SUPPORTER AND PROTECTIVE DEVICE**
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- [52] U.S. Cl. **128/80 C, 2/24**
- [51] Int. Cl. **A61f 3/00**
- [58] Field of Search. **128/80 C, 165, 88; 2/24, 22**

[56] **References Cited**

UNITED STATES PATENTS

1,388,772	8/1921	Sheehan	128/165
2,641,761	6/1953	Schultz	128/88 X
3,046,981	7/1962	Briggs et al.	128/80 C
2,431,287	11/1947	Washington	2/24 X
2,730,096	1/1956	Pease	128/78

FOREIGN PATENTS OR APPLICATIONS

101,132	5/1965	Denmark	128/80 C
1,024,204	2/1958	Germany	128/80 C

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described, suitable for both contact and noncontact sports. The device includes a tapered elastic tubular means formed of two concentric tubes of elastic material for encompassing a leg of the wearer above and below the knee. Substantially planar stays, which are formed with obtuse angles, may include a layer of rigid material and an affixed layer of firm foam rubber. Pockets are formed in the tubular means at both sides of the knee by a stitching of the concentric tubes from the top of the tubular means, in which openings are formed for insertion of the stays, downward toward the knee and below the knee toward the rear of the wearer. Each pocket has an obtuse angle therein facing the rear of the knee for housing the stays. Leather-like strips are affixed to the tubular means, the strips having a plurality of notches along one side of the strip intermediate its ends and a plurality of slits along the other side thereof intermediate its ends. The strips extend from the top of the tubular means at a point one side of the center, down below the knee, compressing at the notches and expanding at the slits to cross below the knee at the bottom of the tubular means at the opposite side thereof, thereby forming an X immediately below the kneecap. A stave is provided axially along the tubular means anterior to the wearer. The stave can be a zipper in one embodiment; it can be a leather strip in another embodiment.

10 Claims, 5 Drawing Figures

[57] **ABSTRACT**

An athletic knee supporter and protective device is

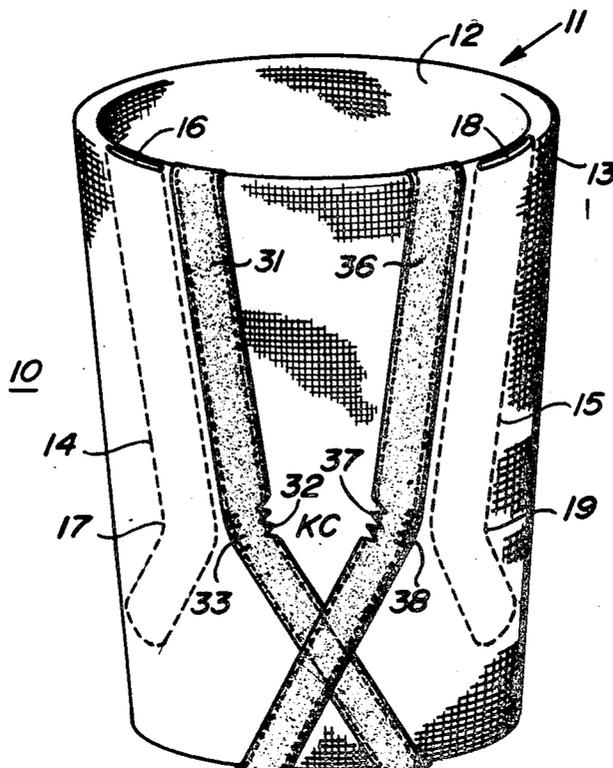


Fig. 1

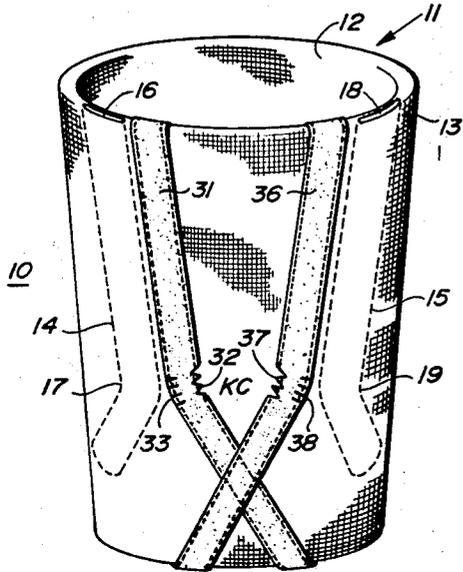


Fig. 2

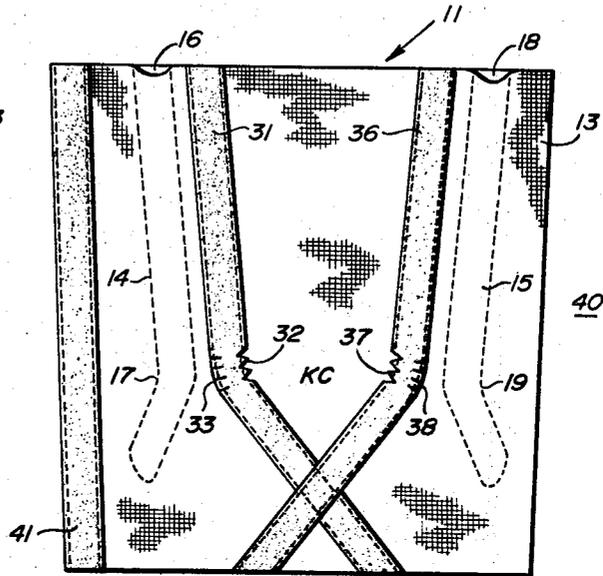


Fig. 4

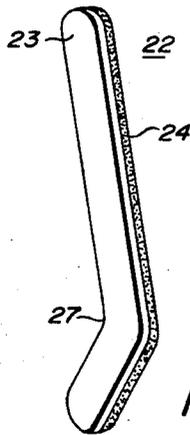
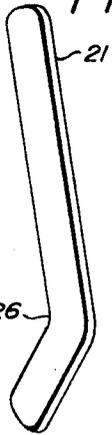
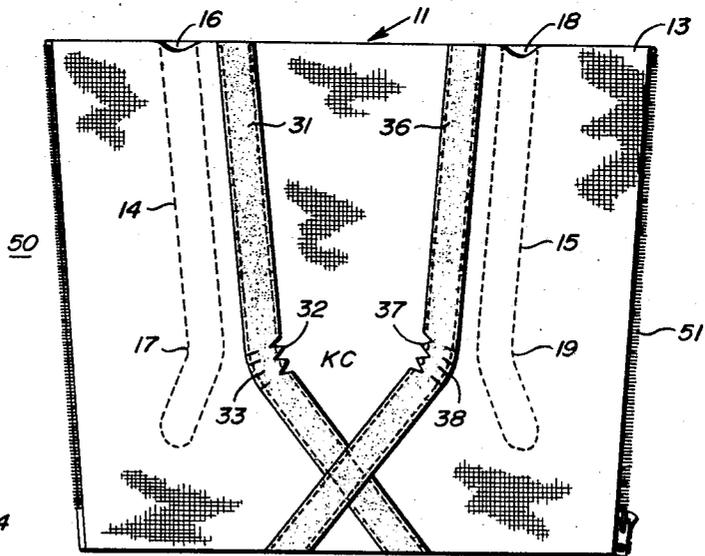


Fig. 5

Fig. 3



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ATHLETIC KNEE SUPPORTER AND PROTECTIVE DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an athletic knee supporter and protective device. Accordingly, the general objects of the invention are to provide new and improved articles of such nature.

Knee injuries occur, occasionally, in various noncontact sports, such as tennis, track and the like, due to improper support which the leg of an athlete may give to his knee. Injuries, however, are much more common in contact type sports such as football, wherein blows from the side of a running player below the knee can cause serious knee injury. A need, therefore, arises in athletic events for an athletic knee supporter and protective device which will eliminate or substantially reduce knee injuries.

2. Description of the Prior Art

To applicant's knowledge, as evidenced by the numerous knee injuries which presently occur in contact sports, there is no suitable athletic knee supporter and protective device presently on the market which can eliminate knee injuries involved in contact or noncontact sports.

The following United States Patents, found during the course of the novelty search performed on behalf of the inventor are cited as being of interest in that they delineate the prior art known to the applicant. They are:

U.S. Pat. No. 1,622,211 issued to Sheehan, patented Mar. 22, 1927.

U. S. Pat. No. 3,074,400 issued to Schulman patented Jan. 22, 1963.

U. S. Pat. No. 3,387,305 issued to Shafer, patented June 11, 1968.

Sheehan discloses crossed straps, which may be metal, and side rigid supports on a knee brace.

Schulman discloses a kneecap brace with metal or plastic stays in side pockets.

Shafer discloses a knee protector with crossed straps crossing below the kneecap and side arm supports.

None of the aforesaid references, either singly or in combination, suggests applicant's invention.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a novel athletic knee supporter and protective device for substantially reducing knee injuries to an athlete.

It is a further object of this invention to provide a novel athletic knee supporter and protective device which can be readily applied and removed; which will not interfere with normal movements of the legs; which can be easily washed; which can be manufactured at low cost; which can provide adequate support to the knee; and which can protect the knee against injury.

Yet another object of this invention is to provide a novel athletic knee supporter and protective device which can be worn by an athlete in contact sports.

Still another object of this invention is to provide a novel knee supporter and protective device which is lightweight, durable, effective, and versatile for use in various sports.

Yet another object of this invention is to provide a novel knee supporter and protective device which will

support and preserve locomotion of the knee and protect the knee against injuries caused by lateral movement of the leg.

In accordance with this invention, an athletic knee supporter and protective device includes a tapered elastic tubular means formed of two concentric tubes of elastic material for encompassing the leg of the wearer above and below the knee. A first stay, substantially planar, is formed in an obtuse angle toward the left (as viewed). The first stay includes a facing layer of rigid material and a backing layer of firm foam rubber affixed the rigid material. A second stay, substantially planar, is formed in an obtuse angle toward the right. The second stay includes a second facing layer of rigid material and a second backing layer of firm foam rubber affixed to the second rigid material. A first pocket is formed in the tubular means at the left side of the knee, as viewed from the front, by stitching of the concentric tubes from the top of the tubular means, in which an opening, is formed, downward toward the knee, and below the knee toward the rear of the wearer. The first pocket means has an obtuse angle therein facing the rear of the knee for housing the first stay. In a similar fashion, a second pocket is formed in the tubular means at the right side of the knee, as viewed from the front, by stitching of the concentric tubes from the top of the tubular means in which an opening is formed, downward toward the knee and below the knee toward the rear of the wearer. The second pocket means has an obtuse angle therein facing the rear of the knee for housing the second stay. All of the aforesaid obtuse angles are equal to each other. A first leather-like strip, having a plurality of notches along one side of the strip intermediate its ends and having a plurality of slits along the other side thereof intermediate its ends, is affixed to the tubular means at the outer concentric tube thereof by stitching, the strip extending from the top of the tubular means at a point left of center, downward below the knee, compressing at the notches and expanding at the slits, to cross below the knee to the bottom of the tubular means at the opposite side thereof. A second leather-like strip, similarly formed, extends from the top of the tubular means at a point right of center downward below the knee, compressing at the notches and expanding at the slits to cross below the knee to the bottom of the tubular means at the other side thereof, thereby forming an X immediately below the kneecap. A stave is located axially along the tubular means anterior to the wearer. In one embodiment, the stave includes a zipper whereby, when unzipped, the device can be disengaged from the wearer by opening the tubular means to form a projection thereof. In another embodiment, the stave includes a leather-like strip affixed to the outer concentric tube by stitching from the top of tubular means to the bottom thereof.

In accordance with other features of the invention an athletic knee supporter and protective device includes an elastic tubular means adapted to encompass the leg of the wearer above and below the knee. A pair of spaced pockets is formed in the tubular means, one on each side of the knee. A pair of rigid stays is respectively enclosed in the pockets. Strip means are affixed to the tubular means extending from the top thereof, at both sides of the wearer, respectively, downward,

crossing below the knee to the bottom of the tubular means, toward the opposite side of the wearer. In accordance with specific features of the invention, the strip means can be made of flexible but nonstretchable material. The strip means can be selected from material in a group consisting of leather, and a poromeric material. The pockets can be formed angularly, wherein an obtuse angle is formed toward the rear of the knee and wherein the rigid stays are likewise formed with obtuse angles so as to engage within such angularly formed pockets. In other features, the rigid stays include a padding of compressible material, and the strip means can be formed with notches toward the front and with slits toward the rear of the tubular member, and wherein the elastic tubular member is tapered so as to mate with the thigh above and the leg below the knee.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, advantages, and features of the present invention will appear upon consideration of the following detailed description of specific embodiments thereof, in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a novel athletic knee supporter and protective device formed of elastic tubing having no stave located at the anterior portion thereof;

FIG. 2 is a projected view of an athletic knee supporter and protective device, showing a leather-like stave located at the anterior portion of the wearer;

FIG. 3 is a projected view of another embodiment of the invention, showing a zipper as a stave, which stave is located anterior of the wearer;

FIG. 4 is a perspective view of one kind of stay suitable for use in this invention; and

FIG. 5 is a perspective view of another stay for use with this invention.

DESCRIPTION OF ONE EMBODIMENT OF THIS INVENTION

Referring to FIG. 1, there is shown, in a perspective view, an athletic knee supporter and protective device 10 including a tapered elastic tubular means 11 formed of two concentric tubes of elastic material, an inner concentric tube 12 and an outer concentric tube 13.

The elastic tubular means 11 has a pair of pockets 14, 15 formed therein, by stitching. A pocket 14 is formed at the left of the device 10, as viewed, along the dotted lines indicated by stitching. The pocket 14, has an opening 16 at the top thereof. The pocket 14 extends downwardly towards the middle of the device 10, and bends backward toward the rear of the device 10, forming an obtuse angle at a corner 17 at the side of the kneecap KC. In a similar fashion, the pocket 15 is formed, by stitching, at the right of the device 10, wherein an opening 18 is provided at the top of the device 10. The pocket 15 extends downward to the kneecap, bending at a corner 19, forming an obtuse angle toward the rear of the knee.

The tubular member 11 is formed of the two concentric tubes 12 and 13 which are of elastic material, such as elasticized nylon and the like. Other elastic materials can be used, it being preferable that such material be washable and be comfortable when worn by an athlete.

The pockets 14, 15 are formed at both sides of the device 10 by stitching the elastic tubes 12, 13 as indicated to so form. Stitching can be provided, as is well known to the art, to join the tops and bottoms of the two concentric tubes 12, 13 in known fashion so that the two tubular concentric tubes form 12, 13 an integral tapered elastic tubular means 11.

A first stay 21, formed of lightweight rigid material, such as aluminum, or a rigid plastic such as high pressure laminated plastic sheets of melamine and phenolic materials sold under the trademark "Formica," is depicted in a perspective view in FIG. 4. A similar stay 22 is depicted in FIG. 5 which includes a rigid material 23, such as aluminum or plastic, together with a backing portion 24 of resilient material, such as firm foam rubber. The stays 21, 22 are flat in configuration, and are formed in angled strips having obtuse angles at respective corners 26, 27. The stay 21 can be inserted into the pocket 14 and remain in place therein by inserting the stay 21 through the opening 16 of the pocket 14 and by slipping the stay 21 down through the pocket 14 until the obtuse angle formed at the corner 26 of the stay 21 engages or mates with the obtuse angle formed at the corner 17 of the pocket 14.

In a similar fashion, a stay, similar to the stay 21 but a mirror image thereof, can be inserted into the opening 18 of the pocket 15 whereby the obtuse angle of the stay which occurs at the corner 26 mates with the obtuse angle of the pocket 15 at the corner 19 thereof.

Preferably for contact sports, such as football, it is desired that the stay include both the rigid material 23 and compressible material 24 as depicted in the stay 22 of FIG. 5. Hence, a stay of the nature shown in FIG. 5 can be inserted into the pocket 14 at the opening 16 whereby the stay 22 resides within the pocket 14 with the obtuse angle formed at the corner 27 mating with the obtuse angle of the pocket 14 formed at the corner 17 thereof, so that the compressible side of the stay is directed inwardly toward the wearer. In a similar fashion, a padded stay of the type shown in FIG. 5, but of a mirror image thereof, is inserted into the opening 18 of the pocket 15 so that the stay resides within the pocket with its obtuse angle mating with the obtuse angle at the corner 19 of the pocket 15 so that the compressible side of the stay is directly inwardly toward the wearer.

The firm rubber cushion 24 is designed to cushion the shock of a jolt.

All three types of stays, namely, a metal stay, a plastic stay, or a stay with a cushion at its back, give protection in contact sports by providing necessary support to the region at the sides of a knee.

By way of example and not by way of limitation, a stay can be formed of a rigid light strip of metal such as aluminum $\frac{1}{8}$ inch thick. Alternatively, a strip of plastic such as melamine or phenolic such as that sold under the trade name "Formica" $\frac{1}{16}$ inch thick can be used. The foregoing materials are comparatively strong in that neither one will bend or break during normal contact sports when worn in the device 10 as disclosed.

The rigid stay 21 or 22 is shaped the same as the pocket into which it fits so as to give support to the knee in a bent position, as most injuries occur when the knee is in a bent position.

In a versatile manner, the stays can be varied, depending upon the sport involved. Different stays can be used at one time. For example, a padded stay at the lateral side of the knee, and an unpadded stay at the medial side of the knee. Each of the stays 21, 22 is formed in an obtuse angle as depicted in the drawing. This obtuse angle, ideally, is 135°, which angle approximates the average angle of the knee during contact sports such as football, wherein the knee assumes various angles in huddles, running, standing, and the like. The angle of 135° is the angle most likely to be assumed by a running football player at the time he is being tackled, for example.

A leather strip 31 is affixed to the front of the device 10 by stitching the leather strip 31 to the outer tube 13, the strip extending from the top of the device 10 downward to the kneecap and then being bent toward the right and continuing below the kneecap toward the right of the device 10 as depicted in FIG. 1. The leather strap 31 has a plurality of notches 32-32 at the right of the strip and a plurality of slits 33-33 at the left of the strip. Thus, by bending the strip 31 at the area of the notches 32 and the slits 33, the notches 32-32 can compress and the slits 33-33 can expand to permit the bending to occur. Hence, by initially preparing the strip 31 with the notches 32-32 and the slits 33-33, the strip 31 can be easily bent at the notches portion so as to permit the strip 31 to be easily affixed to the tube 13 by stitching, thus simplifying a manufacturing operation. In a similar fashion, a strip 36 is affixed to the tube 13 at the right thereof, being stitched from the top of the tube downward towards the kneecap, and then crossing below the kneecap to engage with the bottom of the device 10 at the left as depicted. The strip 36 includes notches 37-37 and slits 38-38. The notches 37-37 are located towards the center of the device 10, whereas the slits 38-38 are located towards the right portion of the device 10. The strips 31 and 36 are constructed of a flexible and yet substantially nonstretchable material, preferably a leather-like material such as leather or poromeric material such as that sold under the trademark "Corfam."

Preferably, it is desired that two separate strips 31, 36 with the notches and slits as described heretofore be used for the manufacture of the device 10. It is, of course, within the scope of those skilled in the art to construct the strips from a single unitary piece of material formed in the X shape as substantially shown. However, such a forming with a unitary piece of material would undesirably increase the manufacturing cost, in that greater waste would occur. By using single strips of material, with notches and slits as described, the cost of material is substantially minimized.

As alluded to hereinabove, the device 10 is constructed of a continuous tubular member 11 and 12, and contains no stave at the anterior portion thereof.

DESCRIPTION OF ANOTHER EMBODIMENT

Referring to FIG. 2, there is shown, in a projection view thereof, an athletic knee supporter and protective device 40 similar, in most respects, to the device 10 depicted in FIG. 1 with one sole exception. The device 40 includes a stave 41 which extends from the top of the tubular material 10 to the bottom thereof along the rear or anterior portion of the wearer. The stave 41 is

substantially flexible but not stretchable and is preferably selected from a group of materials consisting of leather, and poromeric material such as that sold under the trade name "Corfam." The back stave provides support to the knee at the anterior portion thereof.

DESCRIPTION OF ANOTHER EMBODIMENT OF THE INVENTION

Referring to FIG. 3, there is shown a projection view of an athletic knee supporter and protective device 50 in which a stave is provided incorporating a zipper 51. The device 50 is identical in all respects to the device 10 depicted in FIG. 1 with the sole exception that the zipper 51 is provided at the anterior portion of the wearer so as to provide for easy removal of the device 50 from the wearer and to provide for easy engagement of the device 50 with the wearer.

As shown in the drawings, the devices 10, 40 and 50 are shown in a tapered format, primarily because it is the preferred embodiment contemplated by the inventor. However, such devices can be constructed without taper, although they would not be as comfortable and would not provide the ideal amount of support and protection which is desired.

IN GENERAL

In one preferred embodiment, the athletic knee supporter and protective device includes simply two pieces of elasticized material sewed together with three strips of leather, which permits for suitable knee and leg support and permits freedom of knee movement. On each side a pocket is formed by stitching of the two pieces of material in which is inserted the flat rigid metal or plastic. The rigid flat material in the pockets provides for protection of the knee in contact sports.

Due to its simplicity and due to its various advantages including both the support and protection, the device is highly suitable for use as standard equipment in most athletic contact and noncontact sports.

It is desired that the athletic knee supporter and protective device as described be used by players during sport activities to reduce the rate of injuries in sports. Such a device can be issued as standard equipment, such as shoulder pads, and face masks, head gear in football and other protective equipment in other sports.

The strip leather reinforcements, at each side of the knee which come down on each side and form an X immediately below the kneecap, are so located so as to support and preserve locomotion of the knee. The back leather stave which provides support to the anterior portion of the knee is located between the two tendons of the knee to provide protection thereto.

By following the teachings of this invention, a highly simple knee supporter and protective device is disclosed which is easy to manufacture, economical to manufacture, easy to wear, and easy to remove. This invention is relatively uncomplicated in that various components of the device coact to provide an effective knee support and protective device.

What is claimed is:

1. An athletic knee supporter and protective device comprising

- a. a tapered elastic tubular means formed of two concentric tubes of elastic material for encompassing a leg of the wearer above and below the knee;
- b. a first stay means, substantially planar, and forming an obtuse angle toward the left as viewed, said first stay means including a first facing layer of rigid material and a first backing layer of firm foam rubber affixed to said first rigid material;
- c. a second stay means, substantially planar, and forming an obtuse angle toward the right as viewed, said second stay means including a second facing layer of rigid material and a second backing layer of firm foam rubber affixed to said second rigid material;
- d. a first pocket means, formed in said tubular means at one side thereof (as viewed from the front) by stitching of said concentric tubes from the top of said tubular means, in which an opening is formed, and adapted to extend downward toward the knee, and below the knee toward the rear of the wearer, said first pocket means having an obtuse angle therein facing the rear of said tubular means, for housing said first stay means;
- e. a second pocket means, formed in said tubular means at the opposite side of said first pocket means (as viewed from the front) by stitching of said concentric tubes from the top of said tubular means, in which an opening is formed, and adapted to extend downward toward the knee, and below the knee toward the rear of the wearer, said second pocket means having an obtuse angle therein facing the rear of said tubular means, for housing said second stay means, and wherein said obtuse angles are equal to each other;
- f. a first leather-like strip means having a plurality of notches along the right side of said first strip means intermediate its ends and having a plurality of slits along the left side thereof intermediate its ends, said first strips means being affixed to said tubular means at the outer concentric tube thereof by stitching, said first strip means extending from the top of said tubular means at a point left of center and adapted to extend downward below the knee, compressing at said notches and expanding at said slits which are adapted to cross below the knee to the bottom of the tubular means at the right side thereof;
- g. a second leather-like strip means having a plurality of notches along the left side of said second strip means intermediate its ends and having a plurality of slits along the right side thereof intermediate its ends, said second strip means being affixed to said tubular means at the outer concentric tube thereof by stitching, said second strip means extending from the top of said tubular means at a point right of center and adapted to extend downward below the knee, compressing at said notches and expand-

- ing at said slits which are adapted to cross below the knee to the bottom of the tubular means at the left side thereof; and
- h. a stave means located axially along said tubular means to provide support to the knee at the anterior portion thereof.
2. The invention as recited in claim 1 wherein said stave means includes a zipper whereby, when unzipped, said device can be disengaged from the wearer by opening the tubular means to form a projection thereof.
3. The invention as recited in claim 1 wherein said stave means includes a leather-like strip means affixed to the outer concentric tube by stitching from the top of said tubular means to the bottom thereof.
4. An athletic knee supporter and protective device comprising
- (a) elastic tubular means adapted to encompass the leg of a wearer above and below the knee;
- (b) a pair of spaced pockets formed in said tubular means, one at each side of said tubular means, as viewed from the front when worn;
- (c) a pair of rigid stays respectively enclosed in said pockets;
- (d) a first strip means affixed to said tubular means extending from the top of said tubular means at a point left of center and extending downward and adapted to cross below the knee to the bottom of the tubular means at the right side thereof; and
- a second strip means affixed to said tubular means extending from the top of said tubular means at a point right of center and extending downward and adapted to cross below the knee to the bottom of the tubular means at the left side thereof.
5. The invention as recited in claim 4 wherein said strip means are flexible but substantially nonstretchable.
6. The invention as recited in claim 4 wherein said strip means are made of material selected from the group consisting of leather and poromeric material.
7. The invention as recited in claim 4 wherein said pockets are formed angularly wherein an obtuse angle is formed at each side of said tubular means toward the rear of said tubular means and wherein said rigid stays are likewise formed with obtuse angles so as to engage within such angularly formed pockets.
8. The invention as recited in claim 7 wherein said rigid stays include a padding of compressable material.
9. The invention as recited in claim 8 wherein said strips means are leather.
10. The invention as recited in claim 9 wherein said strip means are formed with notches toward the front, and with slits toward the rear, of said tubular member, and wherein said elastic tubular means is tapered so as to mate with the thigh above and the leg below the knee.

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