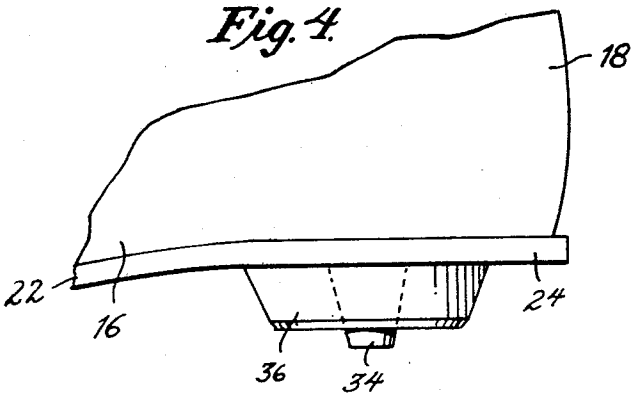
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ATHLETIC FOOTWEAR

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Fig. 4.



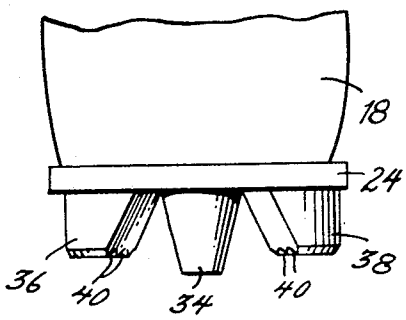


Fig. 5.

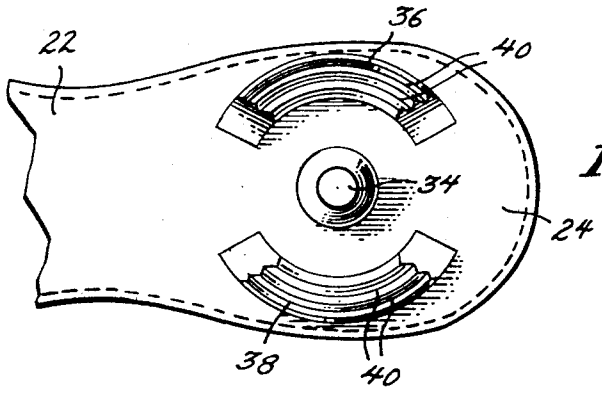


Fig. 3.

Fig. 1.

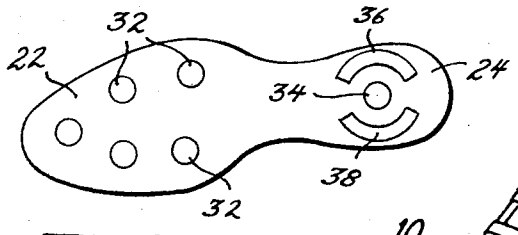
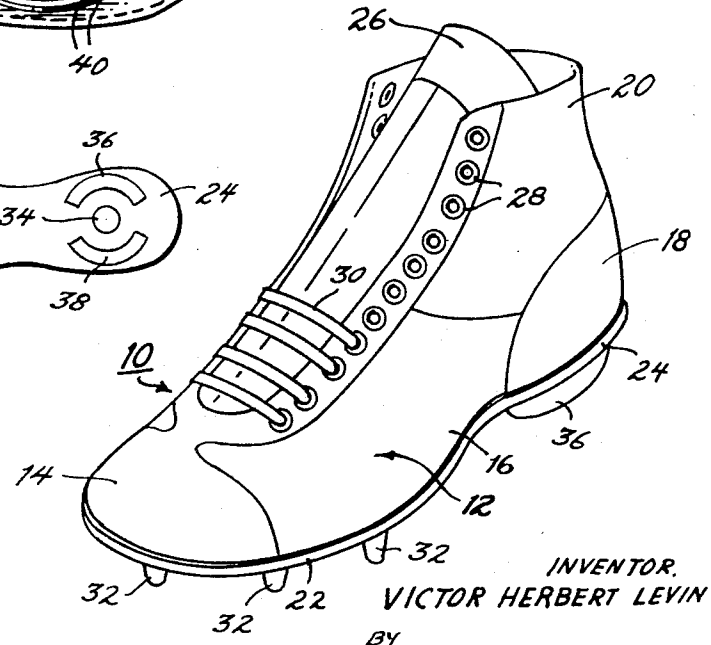


Fig. 2.



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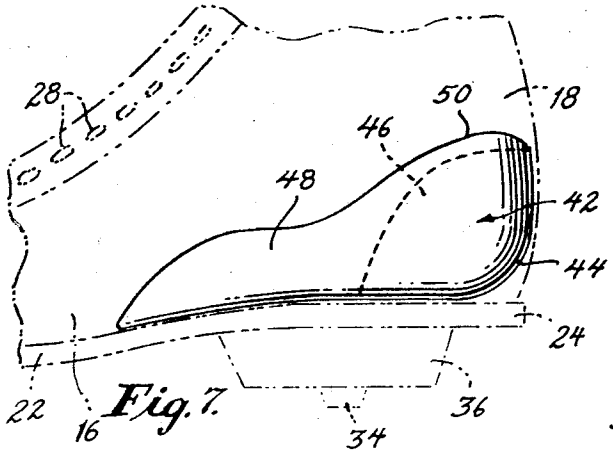


Fig. 7.

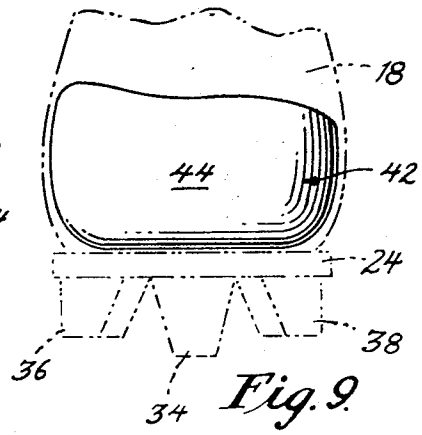


Fig. 9.

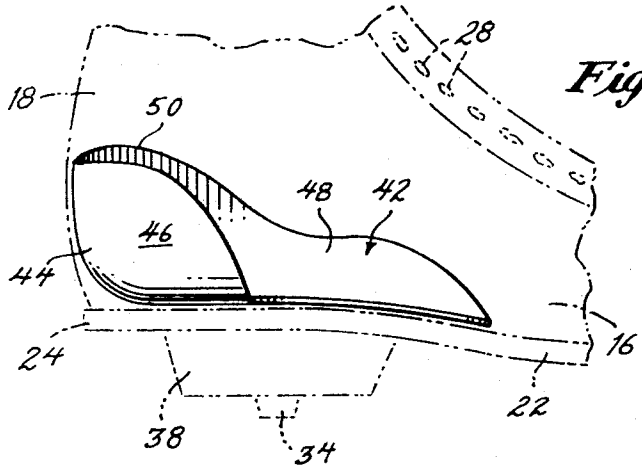


Fig. 8.

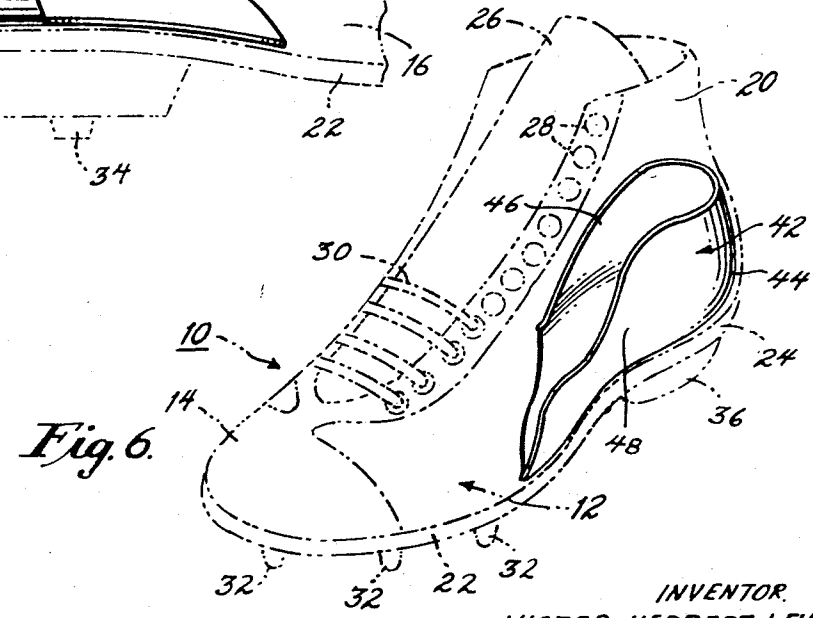


Fig. 6.

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3,466,763

ATHLETIC FOOTWEAR

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Int. Cl. A43b 5/02
U.S. Cl. 36—2.5 4 Claims

ABSTRACT OF THE DISCLOSURE

Disclosed herein is an article of athletic footwear for preventing injuries to the ankle and knee. The footwear includes an insert of relatively nonyielding material which comprises a heel portion that generally conforms to the shape of a human heel and lateral flanges that are integral with and extend toward the toe. The outer lateral flange extends forwardly to a position adjacent the cuboid bone and terminates along an upper edge that is just below the lateral malleolus or outer tubercle of the calcaneus. The inner or medial flange is lower in height than the lateral flange but extends only to a position adjacent the navicular or scaphoid bone. The lateral flange is somewhat higher than the medial flange. The article of footwear also includes cleats for the heel which comprise a centrally disposed pivot cleat and laterally disposed elongated supports which are preferably curvilinear.

This invention relates to a protective article of footwear for use in athletics. More particularly, this invention relates to a protective article of footwear for preventing injuries to the heel, ankle and knee of persons, particularly youths engaging in athletic events.

Some of the most common injuries sustained during athletic events, particularly football games, are injuries to the heel, ankle and knee. Injuries to the ankle and knee are common to all males who participate in athletic events, however a particular type of injury to the ankle and the heel occurs mostly in young boys between the ages of 8 and 20. The type of injury referred to is known as an epiphyseal injury (or in precise medical terms as an apophysitis of the os calcis) for the reasons that are set forth below.

The section of the human anatomy commonly referred to as the ankle comprises the lower terminus of the fibula and tibia leg bones. The fibula as well as the tibia articulates with the astragalus which in turn articulates with additional bones including the calcaneus or heel bone and the scaphoid or navicular bone. In general, this section of the foot is known as the tarsus.

At birth, the lower extremity, known as the external maleolus as well as the upper extremity of the fibula are cartilaginous. Ossification commences in the lower extremity in the second year of life and is completed about the twentieth year when the lower epiphysis is finally joined to the shaft of the fibula. With respect to the calcaneus, the epiphysis for its posterior tuberosity does not appear until the tenth year of life and unites with the calcaneus bone only after puberty.

The foregoing structure of the foot and its development results in two types of injuries which are frequently incurred by youths particiating in athletic events. The first of these is a fracture of the epiphysis of the fibula. The second is a fracture or displacement of the epiphysis of the calcaneus. The first mentioned injury is known as a Potts fracture when it occurs in adults and is much more common than injuries to the inner side of the ankle. It is caused by a sharp turning in of the ankle. The second mentioned epiphyseal injury is most prevalent among young boys who have not yet passed puberty. It has been determined that this latter injury is primarily due to the angular junction between the upper and inner sole of the athletic shoe adjacent the heel which causes the heels to be unsupported at the area of the epiphysis.

Other types of injuries to the ankle and also the knee are common in football. It is believed that one of the causes for such injuries is the use of cleats on athletic shoes. When a player turns sharply or "cuts" as it is known colloquially, injury often occurs because the cleats prevent the athletic shoe from pivoting. The foot becomes locked while the knee and ankle continue to turn until the stress is too heavy and injury results.

It is an object of the present invention to provide novel and unobvious athletic footwear which will assist in preventing the foregoing injuries to the heel, ankle and knee.

It is another object of the present invention to provide a novel and unobvious insert or athletic footwear which will prevent epiphyseal injuries to the tibia and calcaneus.

It is still another object of the present invention to provide novel cleat structure depending from the heel portion of athletic footwear which will reduce the cause of ankle and knee injuries caused by locking of the foot during sharp turns.

Other objects will appear hereinafter.

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a perspective view of an athletic shoe in accordance with the present invention.

FIGURE 2 is a diagrammatic bottom view of the shoe illustrated in FIGURE 1 showing the position of the cleats.

FIGURE 3 is an enlarged fragmentary bottom view of a heel portion of the shoe illustrated in FIGURE 1.

FIGURE 4 is an enlarged fragmentary side view of a heel portion of the shoe illustrated in FIGURE 1.

FIGURE 5 is an enlarged fragmentary rear view of the shoe illustrated in FIGURE 1.

FIGURE 6 is a phantom perspective view of an athletic shoe showing the novel structure thereof in solid line.

FIGURE 7 is a fragmentary outside view of the shoe illustrated in FIGURE 6.

FIGURE 8 is a fragmentary inside view of the shoe illustrated in FIGURE 6.

FIGURE 9 is a fragmentary rear view of the shoe illustrated in FIGURE 6.

Referring now to the drawings in detail, wherein like numerals indicate like elements, there is shown in FIGURE 1, a perspective view of an athletic shoe designated generally as **10**.

The inventive embodiment is shown and described herein with particular relation to a football shoe. However, those skilled in the art will readily recognize that the principles of the invention are not so limited and have applicability to other types of athletic footwear.

The shoe **10** comprises an upper **12** made of leather or other pliable materials and may take the form of well known uppers heretofore proposed for athletic shoes. For the purpose of illustration, the upper **12** is shown as including a vamp **14** which may be reinforced, a shank portion **16**, a rear quarter portion **18** and a top **20** which is adopted to extend above the ankle of the wearer. The vamp **14**, shank portion **16** and rear quarter portion **18** are lasted and attached in any conventional manner to the sole portion **22** and heel portion **24** which may take the form of an integral one-piece bottom for the shoe. A tongue **26** and eyelets **28** are appropriately attached to the upper **12**. The laces **30** cooperate with eyelets **28** for

retaining the shoe **10** on a wearer's foot. A conventional top **20** has been illustrated but those skilled in the art will readily recognize that the invention is just as useful for oxford or low cut tops.

As is common in football shoes, the sole portion **22** is provided with a plurality of cleats **32**. In the embodiment shown, the cleats **32** are five in number and spaced as shown in FIGURE 2. The cleats **32** are conventionally attached to the sole portion **22** by pins or the like and depend downwardly therefrom. For purposes of illustration, the cleats **32** have been shown as conventional truncated conical structures and are preferably made of a hardened rubber or plastic material.

In accordance with the principles of the present invention, the back or heel portion **24** has been provided with only a single pivot cleat **34** which is centrally mounted at a position equidistant from the sides of the shoe and equidistant from the back and shank of the shoe. Pivot cleat **34** is mounted to the heel portion **24** in a conventional manner using a pin or the like. However, unlike conventional football shoes it is the only cleat of the truncated conical type mounted to the heel portion. Pivot cleat **34** provides the wearer with the necessary traction which is so desirable during athletic events. The pivot cleat **34** has been centrally positioned to permit the shoe **10** to pivot about it when the wearer turns sharply or otherwise twists upon his heel. This pivoting action distinguishes over the common type of football shoe which has a plurality of cleats depending from the heel for simultaneous engagement with the turf. When two or more cleats engage the ground, the shoe cannot pivot and hence injuries to the ankle and knee may be sustained.

As shown, the heel portion **24** is also provided with a pair of dependent support pieces **36** and **38**. Support pieces **36** and **38** are elongated along an axis generally parallel to the surface of heel portion **24**. In addition, they are curved about centers that are inward of the side edges of the shoe. In the preferred embodiment, the support pieces **36** and **38** are circular with their centers at pivot cleat **34**. The support pieces **36** and **38** are made of hardened rubber or plastic and provided with a tread such as the longitudinal grooves **40**. Support pieces **36** and **38** are preferably attached to the heel portion **24** at a position spaced inwardly from their respective side edges by any conventional means such as steel pins or rivets. As shown, the outward extension of the support pieces **36** and **38** from the surface of heel portion **24** is less than the outward extension of the cleat **34**. In the preferred embodiment, the pivot cleat **34** extends approximately ⅛ of an inch beyond the side pieces **36** and **38**. To prevent a build-up of mud, the end surfaces **37** of the side pieces **36** and **38** are at a 45° angle with the surface of heel portion **24**. The distance between the side edges of the cleats **36** and **38** is about equal to the maximum width of the pivot cleat **34**.

As thus constructed, the pieces **36** and **38** provide lateral support for the wearer of the shoe **10**. At the same time, the elongated structure of the support pieces **36** and **38** will not imbed themselves in the ground and will therefore permit the shoe **10** to pivot about the cleat **34**.

Referring now to FIGURE 6, shoe **10** is shown in phantom to reveal the inside thereof wherein an insert **42** has been positioned. The shoe **10** illustrated in FIGURE 6 is identical with the shoe illustrated in FIGURE 1 and therefore need not be described in detail. Like numerals have been provided to identify like elements.

The insert **42** comprises a molded piece of thermoplastic, which is relatively rigid in comparison to the leather from which the upper **12** is made. For example, the insert **42** may have a rigidity similar to that of a plastic counter normally used in shoes to reinforce the rear quarter portion.

The insert **42** comprises three basic sections which combine to provide support and protection against the epiphyseal injury described above. The first section is a cupped heel section **44** which is molded to conform substantially with a wearer's heel. Cupped heel section **44** need not be molded for individual wearers but can be formed to accept the average heel of a person who wears the particular size shoe in which it is intended to be inserted.

As best shown in FIGURES 7 and 8, the cupped heel section **44** stands away from the angular junction of rear quarter portion **18** and heel portion **24**. In an ordinary athletic shoe this junction is almost square and quite out of conformity with the shape of a wearer's heel. It has been determined that epiphyseal injuries to the calcaneus are primarily due to the naturally rounded heel of the wearer trying to conform with the unnatural square shape of the shoe. The cupper heel section **44** duplicates the roundness of the wearer's heel and provides support. This type of support is necessary in use for youths who have nto reached puberty and therefore have not reached the age where the epiphysis of the calcaneus has ossified sufficiently to resist strong forces.

In addition to the cupped heel section, the insert **42** further includes an inner or medial flange **46** and an outer or lateral flange **48**. Inner flange **46** is relatively short in length and height in comparison to outer flange **48**. In particular, the flange **46** is intended primarily to give support to the cupped heel section **44** and would ordinarily terminate its forward extension at a point adjacent the navicular bone. In terms of the shoe, this would be within the area defined by the counter of the rear quarter section **18**.

The outer or lateral flange **48** is designed to provide protection against epiphyseal injuries to the fibula. As such, it extends along the outside of the foot well forward of the flange **46** to a point which is preferably adjacent the cuboid bone. This would correspond generally to the outer back part of the shank portion of a shoe. As shown, the outer flange **48** is higher than the inner flange **46** at the area designated generally as **50**. It is intended that the height of flange **48** at area **50** be just below the tubercle or protuberance of the ankle bone also known as the astragalus or talus. The raised height of area **50** provides support when the angle is turned inwardly thereby applying pressure on the external maleolus of the fibula where it articulates with the talus. As explained above, the the external maleolus is cartilaginous in young boys and especially susceptible to Potts fractures until it has sufficiently ossified and joined with the fibula. The raised area **50** absorbs the inward turning pressure on the ankle and thereby assists in preventing such fractures.

The foregoing described insert **42** has been shown as designed for a left foot and placed in a left-footed shoe. However, it should be recognized that a similar insert for the right foot can be provided simply by making a mirrored design.

The structure **42** has been described as an insert in the sense that it may be positioned in any existing shoe. However, those skilled in the art will readily recognize that it could be permanently mounted in a shoe in the manner of a reinforced counter.

It should be pointed out that the insert **42** is not a corrective device in any therapeutic sense. Such corrective devices, commonly referred to as arch supports, are or should be created by a qualified practitioner for use only by a patient. The insert **42** described herein is intended for general use in all athletic shoes. It can be mass produced and sold over the counter without previous examination.

I claim:

1. An article of footwear for athletics comprising an upper, a sole portion and a heel portion, said upper including a rear quarter portion and a shank portion, a foot protective liner for reducing epiphyseal injuries to the calcaneus and to the lower fibula, said liner comprising a rounded heel section generally conforming to the shape of a human heel, a first flange integral with said heel section and extending along the outer side of said upper

to a point within the shank portion of said upper, the top of said first flange being slightly below the area of said upper adapted to cover the outer tubercle of the calcaneus bone, and a second flange integral with said heel section and extending at least to the area of said upper adapted to cover the navicular bone, and means to prevent twisting injuries to the ankle and knee, said means including a pivot cleat depending from said heel portion, said pivot cleat being centrally disposed, and a pair of laterally positioned elongated support pieces, the longitudinal axis of said elongated support pieces being curvilinear.

2. A foot protective liner for reducing epiphyseal injury to the calcaneus and to the lower fibula, said liner comprising a relatively nonyielding material adapted to be positioned in an article of foot wear for athletics, said liner comprising a cupped heel section conforming to the shape of the human heel, a first lateral flange integral with said heel section and adapted to be extended to a point adjacent the cuboid bone of the foot, said first flange having a height no greater than the outer tubercle of the calcaneous bone, and a second lateral flange integral with said heel section, said second flange being shorter in length than said first flange, and extending to a point adjacent the navicular bone.

3. A foot protective liner in accordance with claim 2 wherein the height of said first flange is greater than the height of said second flange.

4. An article of footwear for athletics comprising an upper, a sole portion, and a heel portion, said heel portion including a single rigid pivot cleat depending therefrom, said pivot cleat being centrally disposed in said heel portion, and a pair of laterally spaced, elongated, rigid, curvilinear, support pieces depending from said heel portion independently of and concentric with said pivot cleat, said centrally disposed pivot cleat extending downwardly from said heel portion a greater amount than the downward extension of said support pieces so that said support pieces provide lateral support for the article of footwear and limit penetration of the ground by said pivot cleat, and said pair of support pieces being equally spaced from, and on opposite sides of, said pivot cleat.

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