

[72] Inventor **Alfonso J. Domenico**
 7133 Jackson St., Philadelphia, Pa. 19135
 [21] Appl. No **789,275**
 [22] Filed **Jan. 6, 1969**
 [45] Patented **June 15, 1971**

2,450,862 10/1948 Wilkinson 128/80

FOREIGN PATENTS

12,988 1894 Great Britain 128/166
 314,901 10/1919 Germany 36/2.5 N

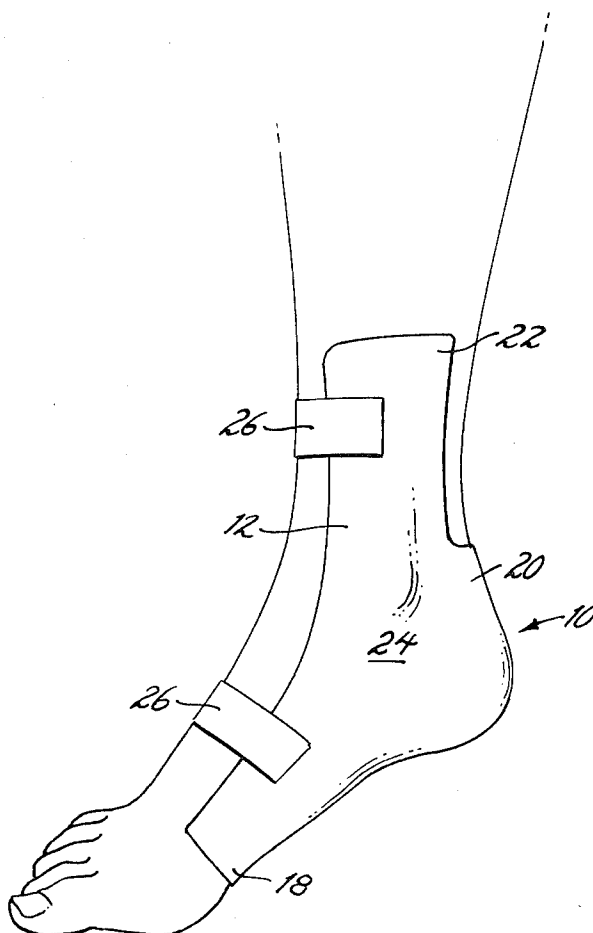
Primary Examiner—Channing L. Pace
 Assistant Examiner—Channing L. Pace
 Attorney—Seidel, Gonda & Goldhammer

[54] **SUPPORT DEVICE FOR PREVENTION OF ANKLE INJURIES**
 5 Claims, 4 Drawing Figs.

[52] U.S. Cl. 128/166,
 36/2.5
 [51] Int. Cl. A61f 13/06,
 A43b 7/00
 [50] Field of Search 128/166,
 82, 83, 85, 99, 80 H; 36/2.5

[56] **References Cited**
UNITED STATES PATENTS
 332,728 12/1885 McEwen 128/166
 674,066 5/1901 Mitchell 128/166
 1,465,233 8/1923 Posner 128/166
 1,737,897 12/1929 Skoglund 128/166

ABSTRACT: A support device for prevention of ankle injuries is disclosed, wherein a support member of flexible sheet material includes a foot receiving member adapted to receive the rear portion of a wearer's foot and cover the ankle, and stirrup portions extending upwardly from the foot receiving member and adapted to contact opposite sides of the wearer's leg, above the ankle. No part of the foot receiving member intrudes into the area of the calf muscles of the wearer, so that restriction of movement of the Achilles' tendon is avoided. Also, no part of the foot receiving member extends forwardly beyond the metatarsus of the wearer's foot, and the forward and upper portions of the foot receiving member are open to avoid restriction of desired foot movement.



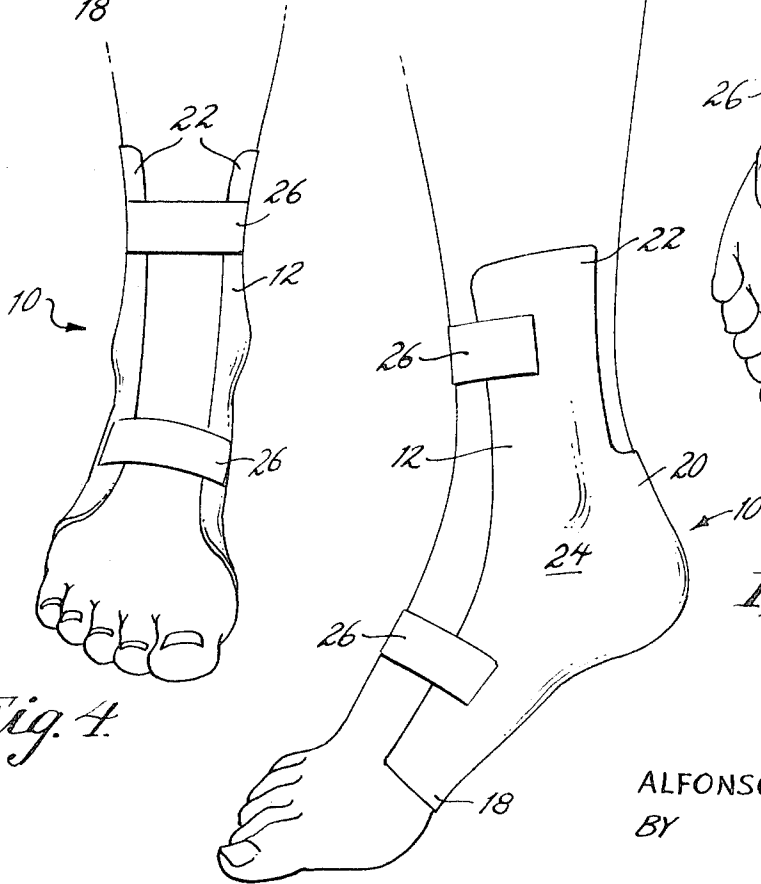
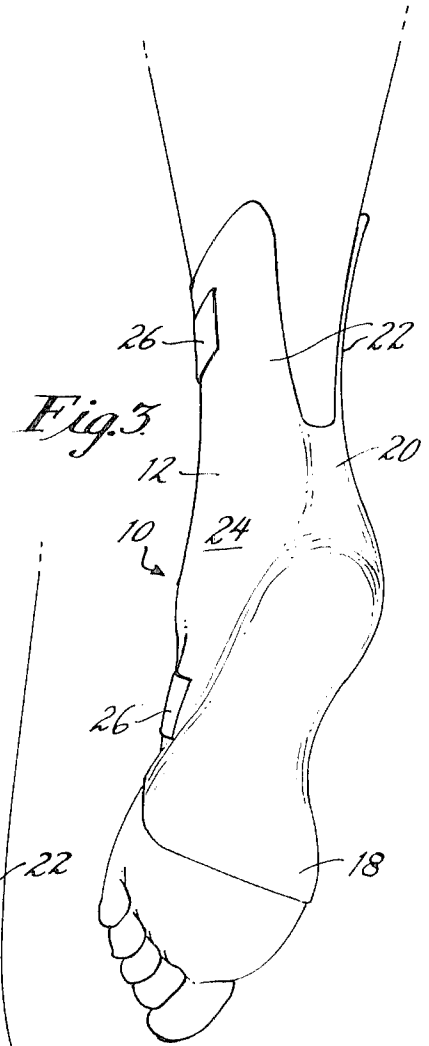
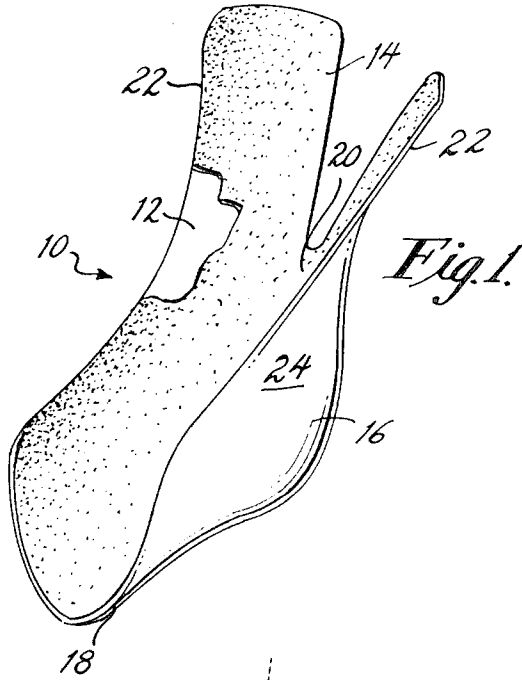


Fig. 4

Fig. 2

INVENTOR
ALFONSO J. DOMENICO
BY

ATTORNEYS

SUPPORT DEVICE FOR PREVENTION OF ANKLE INJURIES

This invention relates to a support device for the prevention of ankle injuries. More particularly, this invention relates to a protective support device for preventing injuries such as ankle sprains to persons, particularly youths, engaging in athletic events.

The ankle is one of the most common sites of injury sustained during athletic events. Injury to the connective tissues of the ankle commonly occurs in athletes of all ages, but is most common in persons between the ages of 8 and 20 years, for reasons set forth below.

The area of human anatomy known as the ankle comprises the lower terminus of the fibula and tibia bones of the leg. The fibula and tibia articulate with the bone of the foot known as the astragalus. The astragalus in turn articulates with the other bones of the foot, including the calcaneus or heel bone, and the scaphoid. This section of the foot is known generally as the instep or tarsus. The forwardmost bones of the tarsus articulate in turn with the metatarsals. The metatarsals are in turn articulated with the bones of the toes.

Sharp turning of the ankle, which is of course likely to occur in many forms of athletics, may result in overstretching of the ligaments and tendons in the area of the ankle and tarsus, and thus in the injury commonly known as a "sprain."

Persons other than adults are especially susceptible to ankle injuries due to the developmental process of the bones of the lower leg and foot during maturation. In children, the lower extremity of the fibula, known as the external malleolus, is cartilaginous. The cartilaginous extremity is referred to in medical terms as an epiphysis. The process of ossification takes place in the lower extremity from age 2 to about age 20, at which time the epiphysis is fused to the fibula.

Fracture of the epiphysis of the fibula is a quite common injury, and one frequently encountered in young participants in athletics.

Ankle injuries are demonstrably fewer in well-conditioned athletes. Because they frequently engage in athletics without proper conditioning, and because of the above-described peculiarities of the skeletal development, young people are particularly apt to suffer ankle injuries.

It is an object of the present invention to provide a novel and unobvious support device to aid in the prevention of ankle injuries.

It is another object of the invention to provide a support device applicable to the foot or sock of a wearer, and effective to lessen the risk of sprain or epiphyseal injury.

It is still another object of this invention to provide a support device which substantially lessens the risk of ankle injury with minimal restriction of foot movement.

Other objects will appear hereinafter.

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

FIG. 1 is a perspective view, partially broken away, showing one form of the invention;

FIG. 2 is a side elevation view, showing the support device in accordance with the invention, in place on the foot of a wearer;

FIG. 3 is a perspective view showing the lower and rear parts of a foot of a wearer, with the device of the present invention in place;

FIG. 4 is a front elevation view, showing the device in place on a wearer's foot.

Referring now to the drawings in detail, wherein like numerals indicate like elements, there is seen in FIG. 1 a support device designated generally by the reference numeral 10.

The support device 10, in the embodiment seen in FIG. 1, comprises a body member or shell 12, shaped to conform generally to the rear portion of the foot and lower leg. A layer 14 of adhesive material is applied to an inner face of the shell 12.

The shell 12 comprises a foot receiving member 16 conforming generally in shape to the rear portion of a foot. The foot receiving member 16 is open at the instep to receive the foot, and as best seen in FIGS. 2 and 3, is so dimensioned as to cover the ankle joint of a wearer. The foot receiving member 16 includes a forwardly extending portion 18 adapted to contact a portion of the sole of the foot. The forwardly extending portion 18 extends no further forwardly along the foot than to about the forward extreme of the metatarsus.

The foot receiving member 16 is defined, at its rearward limit, by an upwardly extending portion 20, adapted to contact the rear of the foot and leg adjacent the lower extreme of the Achilles' tendon. As seen in FIGS. 2 and 3, the upwardly extending portion 20 terminates short of the calf muscles of the wearer.

Stirrup portions 22 extend upwardly from side portions 24 of the foot receiving member 16, on opposite sides on the leg of the wearer.

Securement of the stirrup portions 22 to the leg insures tension in the stirrup portions 22 and the side portions 24 of foot receiving member 16, particularly at the areas overlying the ankle joint. Also, tension in the stirrup portions 22 causes the rear of the wearer's foot to seat snugly in the pocket member 16. If the support device 10 is properly fitted, the wearer cannot feel its presence.

It is contemplated that the present support device 10 be made in several sizes. For example, the support device 10 could be made "small", "medium" and "large" sizes, or even in sizes corresponding to ordinary sock or shoe sizes.

The generally V-shaped opening defined by rear edges of the stirrup portions 22 and an upper edge of the upwardly extending portion 20 prevents restriction of movement of the calf muscle and Achilles' tendon. Such restriction, if present, would interfere with normal running. Moreover, because the foot receiving member 16 is substantially open at the front, and the forwardly extending portion 18 terminates at about the forward extreme of the metatarsus, the support device 10 does not interfere with plantarflexion or dorsiflexion of the foot.

The present support device 10 can be applied directly to the skin of the wearer. Alternatively, can be applied over the sock. In the embodiment shown in FIG. 1, the layer 14 of adhesive material serves to couple the support device 10 to the foot of a wearer. Although the layer 14 is the presently preferred means for applying the device 10 to the foot, other means can be used.

For example, there is seen in FIGS. 2 to 4, an alternative form, wherein elements corresponding to those shown in FIG. 1 are represented by like reference numerals. In the embodiment shown in FIGS. 2 to 4, strips 26 of adhesive tape or the like are applied across the front of the body member or shell 12 of the support device 10. It is within the scope of the present invention to provide means other than those illustrated to couple the support device 10 to the foot. For example, flaps having snap fasteners at their ends, matable with fasteners on the body member 12, could be used.

The body member 12 may be constructed with any suitable flexible sheet material. For example, sheet polyethylene, vinyl or like plastic polymeric material may be used. The thickness of the material forming the body member 12 is not critical, although the yield stress of the material should not be exceeded by the stresses encountered in usage. The material may be formed in any conventional manner to conform generally to the back portion of the foot. It is not necessary that the support device 10 be tailored to conform the foot of each individual wearer. Provision of the support device 10 in standard sizes is sufficient.

Although disclosed primarily as a device for the prevention of ankle injuries, the present device 10 is also believed effective in reducing other athletic injuries to the rear portion of the foot. For example, the device 10 reduces the likelihood of injury to the epiphysis of the calcaneus, a common heel injury in young persons.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims rather than to the specification as indicating the scope of the invention.

I claim:

1. An ankle support constructed of flexible sheet material and comprising a foot receiving member open at the instep to receive the rear portion of a foot and adapted to cover the ankle of a wearer, said foot receiving member including a forwardly extending portion adapted to contact a portion of the sole of the foot and extend no further forward than the forward extreme of the metatarsus, and an upwardly extending portion adapted to contact the rear of the foot and leg adjacent the Achilles tendon, said upwardly extending portion being so dimensioned as to terminate short of the calf muscle of a wearer, stirrup portions extending upwardly from opposite sides of said foot receiving member and adapted to contact opposite sides of the leg of the wearer above the ankle, and a coating of adhesive material on the inner surface of said foot receiving member and said stirrups for coupling said support to the foot and leg of a wearer.

2. An ankle support constructed of flexible sheet material and comprising a foot receiving member open at the instep to receive the rear portion of a foot and adapted to cover the ankle of a wearer, said foot receiving member including a forwardly extending portion adapted to contact a portion of the sole of the foot, and an upwardly extending portion adapted to contact the rear of the foot and leg adjacent the Achilles tendon, said upwardly extending portion being adapted to terminate short of the calf muscle of a wearer, stirrup portions extending upwardly from opposite sides of said foot receiving member and adapted to contact opposite sides of the leg of a wearer above the ankle and a coating of adhesive material on the inner surface of said foot receiving member and said stirrups for coupling said support to the foot and leg of a wearer.

3. An ankle support in accordance with claim 2, wherein said support is constructed of a flexible plastic polymeric material.

4. An ankle support constructed of a flexible sheet material and comprising a foot receiving member open at the instep to receive the rear portion of a foot and adapted to cover the ankle of a wearer, said foot receiving member including a forwardly extending portion adapted to contact a portion of the sole of the foot and extend no further forward than the forward extreme of the metatarsus, and an upwardly extending portion adapted to contact the rear of the foot and leg adjacent the Achilles tendon, said upwardly extending portion being so dimensioned as to terminate short of the calf muscle of the wearer, stirrup portions extending upwardly from opposite sides of said foot receiving member and adapted to contact opposite sides of the leg of a wearer above the ankle, and means for coupling said support to the foot and leg of a wearer, comprising closure means for selectively interconnecting opposite sides of said foot receiving member, and further closure means interconnecting only front portions of said stirrup portions.

5. An ankle support constructed of flexible sheet material and comprising a foot receiving member open at the instep to receive the rear portion of a foot and adapted to cover the ankle of a wearer, said foot receiving member including a forwardly extending portion adapted to contact a portion of the sole of the foot of a wearer, said forwardly extending portion being adapted to extend no further forward on the foot than the forward extreme of the metatarsus, stirrup portions extending upwardly from opposite sides of said foot receiving member and adapted to contact opposite sides of the leg of a wearer above the ankle, and a coating of adhesive material on the inner surface of said foot receiving member and said stirrups for coupling said support to the foot and leg of a wearer.

40

45

50

55

60

65

70

75