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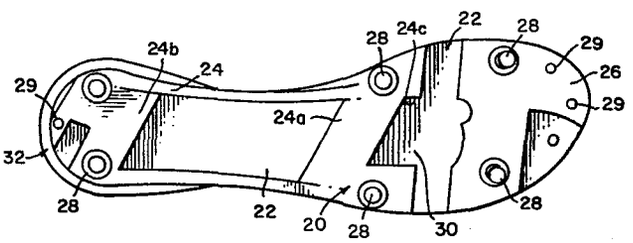
(54) Athletic shoe for field sports.

(57) Footwear including an upper (12) and a sole (20) with a plurality of cleats (28) extending from the sole arranged in groupings of cleats adapting the footwear to field sports. A counter (32) extends upwardly of the sole around the heel for providing support and rigidity in the lower cuboid area, and a flex area (30) is provided in the sole in the general off-center alignment of the heads of the metatarsal bones.



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ATHLETIC SHOE

The invention relates to an athletic shoe of the type particularly for use in field sports, such as football, soccer, and the like.

Athletic shoes according to recent design and construction development generally have tended toward fabrications from soft, pliable, lightweight materials to permit the conduct of exercise without unnecessarily adding to the stress of the exercise as undoubtedly would be the case if heavier, more rigid shoes were worn. While there have been improvements in the design and construction of athletic shoes it has not been uncommon that many users have developed injury which may often be traced directly to foot problems, arising from possible shortcomings in the basic design and construction of the athletic shoes that are worn. In particular, many of the athletic shoes do not provide the necessary support of the foot or support at the joints to compensate for the forces developed during the athletic activity. Thus, the industry has looked toward improving the athletic shoes for whatever may be the athletic activity including running, jogging, and the like, which activity may be carried out on any surface including road, track and field.

During the cycle of foot movement during running, jogging and the like typically recognized as including heel strike, ball strike, pronation, release and supination it is necessary to provide support and stabilization security in the rear foot in the neutral plane. Recent designs and constructions of athletic shoes have addressed the question of a need for support and stabilization security for the foot, and one solution of the problem may be appreciated from a reading of United States Letters Patent No. 4,288,929 (Norton et al).

While the use of a control device described by Norton et al has resulted in a successful solution of the problem

of support and stabilisation within the rear foot, the design and construction of athletic shoes, such as the shoe of Norton et al, have not satisfactorily addressed other problems that may arise because of a lack of capability of proper flex along the off-center alignment of the metatarsal head bone group in the forefoot, as well as flex in that region of the athletic shoe with substantially less resistance to flex than is normally encountered in prior art shoe constructions.

The athletic shoe of the invention which is particularly suited for use with field sports not only functions to control pronation by reducing the potential of over-pronation, and thereby eliminate or at least reduce incidents of running related injury, it also functions to eliminate or at least reduce the potential for stretching of a key ligament in the bottom of the foot as may result from improper or inadequate flex capability of the sole of the athletic shoe.

According to the present invention there is provided footwear including an upper, a sole, and a plurality of cleats arranged in groupings of cleats extending downwardly from the sole adapting the footwear to field sports, and wherein the improvement comprises a sole including a base layer and an outer layer, said outer layer providing a surface for mounting each cleat of said groupings of cleats and comprised of at least two areas spaced apart longitudinally to provide a region of sole of reduced elevation spaced substantially between said grouping of cleats within a toe portion having a capability of flex of said sole with less resistance, and a counter within the region extending from the heel portion upwardly of the sole and forwardly toward the toe portion along the lateral and medial sides of the sole, said counter formed as a wall having a height throughout its length

sufficient to confine the heel and provide support and rigidity of the foot in the lower cuboid area, said counter being formed of a material different from said sole and secured to said sole below the surface of said upper.

According to a further aspect of the present invention there is provided footwear including an upper, a sole, and a plurality of cleats arranged in groupings of cleats extending downwardly from the sole adapting the footwear to field sports, and wherein the improvement comprises a counter within a region extending from the heel portion upwardly of the sole and forwardly toward the toe portion along lateral and medial sides of the sole, said counter formed as a wall having a height throughout its length sufficient to confine the heel, and provide support and rigidity of the foot in the lower cuboid area, and said counter including a base layer and a surface layer, said base layer being secured to said sole and said surface layer being secured to said base layer along an overlapping marginal edge.

The invention set out above is directed to an athletic shoe of the type used for field supports and to a sole which is attached to a lasted upper. The sole preferably includes a flex bar which is anatomically designed to follow the off-center alignment of the metatarsal head bone group in the forefoot. The flex bar is preferably virtually centered between the groups of cleats in the forward and ball areas of the foot, and the flex bar is formed so that it is somewhat less in thickness than the overall elevation of the sole.

Further, the lasted upper includes a counter which provides unique support and rigidity in the lower cuboid area of the shoe. In a preferred embodiment the counter may be a double density counter having a base layer of a

thickness approximately twice that of a surface layer, with the layers being laminated together along an area of overlap of the layers.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:-

Fig. 1 is a side elevation of an athletic shoe of the invention;

Fig. 2 is a bottom view of the construction of the sole of the athletic shoe;

Fig. 3 is a plan view of the sole of the athletic shoe;

Fig. 4 is a view in section as seen along the line 4-4 in Fig. 1;

Fig. 5 is an exploded view of the layers of the counter of the athletic shoe; and

Fig. 6 is a partial sectional view of a portion of the sole in a normal disposition and a disposition of flexure.

An athletic shoe 10 (hereafter "shoe") as may be seen in Fig. 1 is of the type having a particular adaptation to field sports, such as soccer. The shoe includes a lasted upper 12 formed of leather or it may be formed of a synthetic fabric material such as nylon. The upper may also be formed of other fabrics which are conventionally used in the construction of shoes of the type described herein.

The upper generally may be considered as providing a foot receiving opening and a lacing system 14 for securing the upper around the arch of the foot of the wearer. A tongue 16 carried by the upper is disposed between the foot and the lace; and a backtab 18 extends upwardly from the heel generally within the region of the Achilles tendon.

A sole 20, according to the general discussion,

above, completes the shoe. The sole may be seen perhaps to best advantage in Fig. 2, and preferably will be formed of a material having properties including durability and flexibility among possible others to render it useful in combination with the upper in a construction of shoe and for purposes discussed herein. In a preferred embodiment, the sole may be formed of nylon 12 material.

The sole 20 is of one-piece construction including a base portion 22 and an outer portion having a section 24 within the region of the forefoot at the ball of the foot and extending below the arch to the heel of the foot. A further section 26 is located within the forward section of the foot. The sections of the outer portion are spaced longitudinally of the shoe and each section provides at least one area extending generally across the shoe beween the medial and lateral sides. Particularly, the forward section provides an area 26a, and the section extending below the arch and heel provides areas 24a, 24b. These areas each serve as a mounting surface for a pair of cleats 28 located within the region of the medial and lateral sides of the shoe. The cleats may be attached to the sole 20 in any conventional manner, and both the sole and upper may be attached in any conventional manner as well. For example, a plurality of rivets 29 may serve as the instrumentality for attachment of the sole and upper.

The forward extreme of area 24a of section 24 is cut away at 24c thereby to define a bar 30. The purpose of the bar is to allow the shoe to flex more evenly than would otherwise be expected. The flex bar is substantially centered between the groupings of cleats 28 within the sections 24 and 26. The flex bar, further, is disposed in an off-center alignment thereby to follow the heads of the metatarsal bones in the front of the ankle and arch of the foot.

The sole 20 may be of substantially any thickness, and the base portion 22 may comprise the major portion of the overall thickness. For example, the base portion may comprise about two-thirds of the overall thickness. The flex bar, likewise, may comprise about two-thirds of the overall thickness. Without any intent to limit the invention, but rather to set out what may be considered a preferred embodiment, the sole may have an overall thickness of about 4mm and the base portion may be about 2.5mm in thickness. Further, the flex bar will be about 23mm in length (or width across the shoe as heretofore set out).

It is the function of the flex bar to permit flexing of the shoe under circumstances of less resistance to flexure, and it is considered that the flex bar will enhance function of the shoe from an initial break-in standpoint to a performance and feel-of-the-surface standpoint. Further still, the flex bar and the ability of an even flex of the shoe under circumstances of less resistance will impart a capability of reduction of stretching of ligaments in the bottom of the foot, a condition that is commonly referred to as plantar facitis.

Reference may be had to Fig. 6 which represents an enlarged, partial view of the sole 20, and the manner of flexure of both the base portion 22 and the section 26 of the outer portion about flex bar 30.

A counter 32 extends upwardly from the sole 20 within the region of the heel of shoe 10. The counter extends around the heel from the regions of the ankles on the medial and lateral sides of the foot and comprises two layers of a plastic material which provides support and rigidity in the lower cuboid area of the shoe. The counter, thus, has a particular function of reducing the potential of over-pronation or supination, and it reduces the potential for the destruction of the athletic shoe.

Referring to Figs. 4 and 5, the counter 32 includes a base layer 34 and a surface layer 36. These layers, as illustrated in Fig. 4, are secured together along a

marginal area of each layer with the surface layer to the outside. The layers of the counter may be secured together by laminating the layers within the marginal area.

In a preferred embodiment both the base layer and the surface layer may be a reinforced polyethylene material, such as surlyn. And, without any intention to limit the invention, but rather to set out a description of a counter that has been used successfully, the base layer may have a thickness of 0.040 inches and the surface layer may have a thickness of 0.020 inches.

The counter may be supported around an insole of the athletic shoe, or else the base layer may be formed to provide an inturned bottom surface (not shown) supported, for example, between the sole 20 and an insole or other heel support surface.

An outer surface covering lamina 38, 40 may be provided over the base and surface layers 34, 36 of counter 32. The lamina may be a plastic sheet material, suede, and so forth, and may be of contrasting colour to represent the counter construction in a generalized fashion.

It is the function of the counter 32 to eliminate or virtually eliminate the destruction of the rear foot of the shoe and/or over-pronation or supination. A running action may be characterised as including the following events, namely heel strike, ball strike, pronation, release and supination. As used herein; the term "pronation" defines a foot roll to the medial or inside of the foot, and "supination" may be considered the rotation of a joint (hip, knee, ankle and so forth) backward and away from the midline of the body. The counter situated as described provides a mechanical control in stabilisation within the foot of the wearer is secured substantially in a neutral plane, that is, the natural

position of the foot while in a normal gait cycle thereby to reduce the amount of roll of the foot. Reduction in the amount of roll of the foot results in reduction in shoe destruction and/or the potential at least for rear foot injury.

The nylon 12 material of the sole will provide that degree of strength, sturdiness, durability, support, and so forth as necessary for the sole of the athletic shoe, as described herein. This material further, is capable of being moulded according to well known moulding techniques.

CLAIMS

1. Footwear including an upper (12), a sole (20), and a plurality of cleats (28) arranged in groupings of cleats extending downwardly from the sole (20) adapting the footwear to field sports, and wherein the improvement comprises a sole including a base layer and an outer layer, said outer layer providing a surface for mounting each cleat of said groupings of cleats and comprised of at least two areas (24a, 26a) spaced apart longitudinally to provide a region (30) of sole of reduced elevation spaced substantially between said groupings of cleats (28) within a toe portion having a capability of flex of said sole (20) with less resistance, and a counter (32) within the region extending from the heel portion upwardly of the sole and forwardly toward the toe portion along the lateral and medial sides of the sole, said counter formed as a wall having a height throughout its length sufficient to confine the heel and provide support and rigidity of the foot in the lower cuboid area, said counter (32) being formed of a material different from said sole (20) and secured to said sole below the surface of said upper (12).

2. The footwear of claim 1 wherein said outer layer extending toward said toe portion includes a cut-out region (24c) substantially equidistantly spaced between said lateral and medial sides of said sole, said cut-out area comprising a flex bar (30) about which said sole (20) may flex.

3. The footwear of claim 2, wherein said cut-out region (24c) and region of sole generally follow the off-center alignment of the metatarsal head bone of the foot.

4. The footwear of any of claims 1 to 3, wherein said counter (32) includes a base layer (34) and a surface layer (36), said base layer (34) being secured to said sole (20) and said surface layer (36) being secured to said base layer (34) along an overlapping marginal edge.

5. The footwear of claim 4 wherein said base layer (34) is disposed inwardly of said surface layer (36).

6. The footwear of claim 4 or 5, wherein said base layer (34) is of a thickness greater than that of said surface layer (36).

7. Footwear including an upper (12), a sole (20), and a plurality of cleats (28) arranged in groupings of cleats extending downwardly from the sole (20) adapting the footwear to field sports, and wherein the improvement comprises a counter (32) within a region extending from the heel portion upwardly of the sole and forwardly toward the toe portion along lateral and medial sides of the sole (20), said counter (32) formed as a wall having a height throughout its length sufficient to confine the heel, and provide support and rigidity of the foot in the lower cuboid area, and said counter (32) including a base layer (34) and a surface layer (36), said base layer (34) being secured to said sole and said surface layer (36) being secured to said base layer (34) along an overlapping marginal edge.

8. The footwear of claim 7 wherein said base layer (34) is disposed inwardly of said surface layer (36).

9. The footwear of claim 7 or 8, wherein said base layer (34) is of a thickness greater than that of said surface layer (36).

FIG. 1.

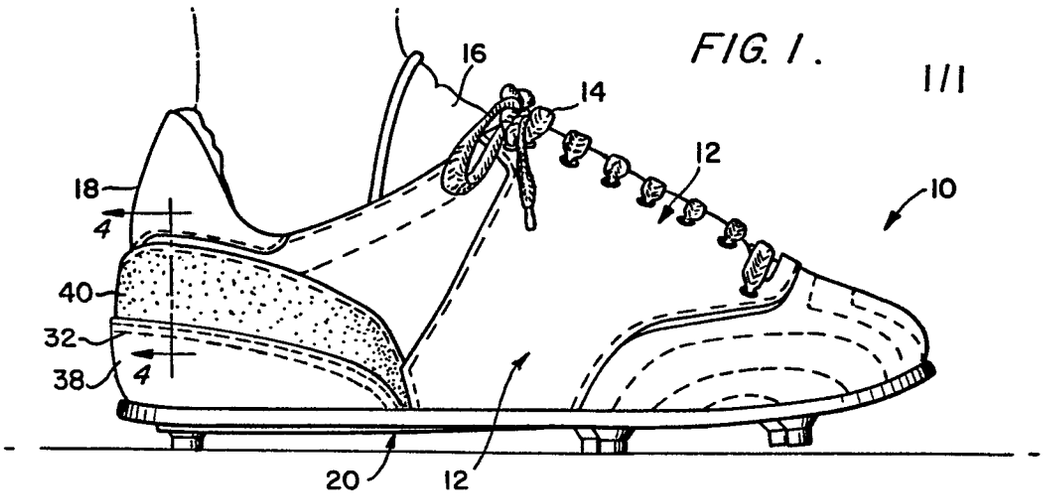


FIG. 2.

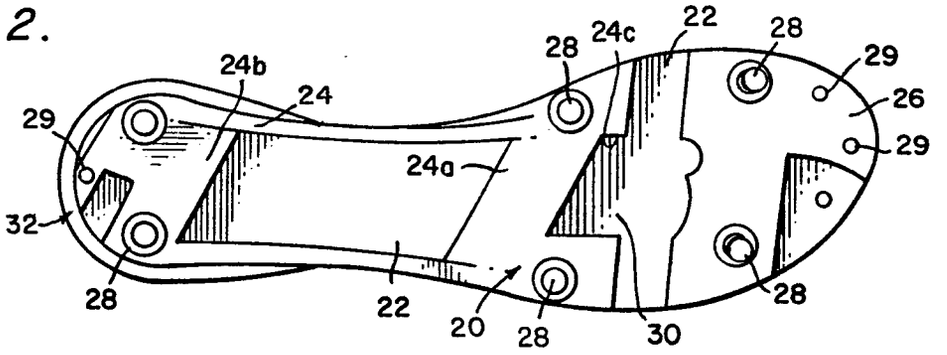


FIG. 3.

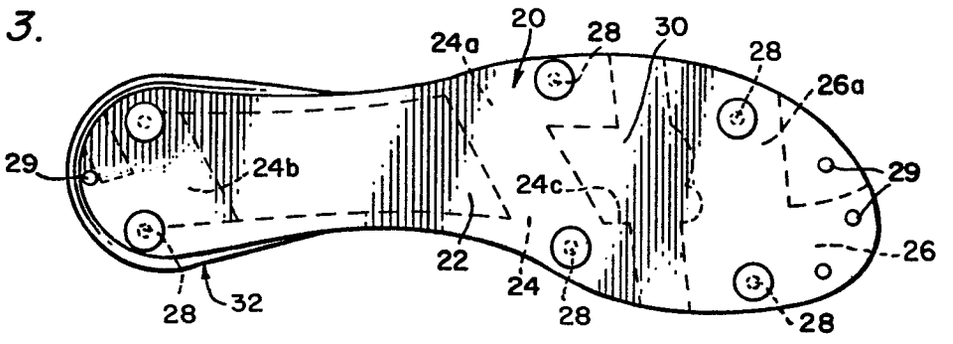


FIG. 6.

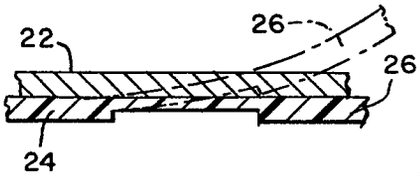
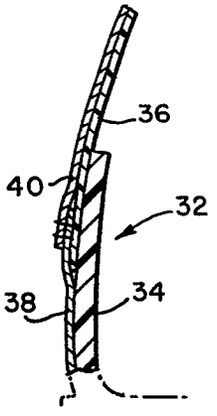


FIG. 4.



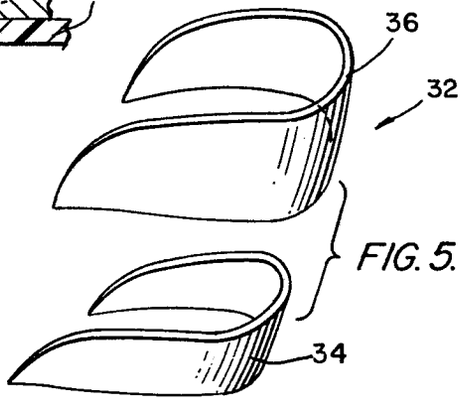


FIG. 5.

European Patent Office

EUROPEAN SEARCH REPORT

Application number
0115663

EP 83303979.5

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	US - A - 4 107 857 (DEVLIN) * Fig. 2,4 * --	1,4,7,9	A 43 B 5/02
X	FR - A1 -2 481 086 (BRS. ING.) * Fig. 1,3 * --	1,4,7,9	
X	DE - A1 -2 927 635 (PUMA) * Fig. 1,2 * --	1,2,3	
X	DE - A1 - 2 830 398 (ADIDAS) * Page 3, line 5 ff. * --	4,5	
X	US - A - 4 212 120 (BOWERMAN) * Fig. 1,2,3,4 * --	1,2,3,4,7	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
X	DE - A1 - 2 623 931 (KURZ) * Fig. 1-4 * --	1,2,3	A 43 B 5/00 A 43 B 13/00
X	FR - A - 2 202 428 (CABINET LAVOIX) * Fig. 1 * --	1,2,3	
A	US - A - 4 004 356 (GREEN) --		
A	US - A - 4 255 877 (BOWERMAN) --		
D	US - A - 4 288 929 (NORTON) ----		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	11-04-1984	SAMSEGGER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
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