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CPC **A43C 15/162** (2013.01)(71) Applicant: **João Luiz Ellera Gomes**, Porto Alegre (BR)(72) Inventor: **João Luiz Ellera Gomes**, Porto Alegre (BR)(21) Appl. No.: **16/967,005**(22) PCT Filed: **Jun. 3, 2019**(86) PCT No.: **PCT/BR2019/050203**

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ABSTRACT

The invention is transverse studs applied to footwear, for example, soccer boots. The invention aims to maintain the athlete's push off ability in the frontal plane, the main direction to be taken by the soccer player and provides this frontal displacement without significantly compromising the rotation of the foot in the cross plane, as it is necessary in the event of a rotational maneuver. The studs resemble the biconvex lens section cut in relation to its "X" axis, or studs in the shape of a keel with a straight lateral surface in a triangular shaping, also cut in relation to its "X" axis.

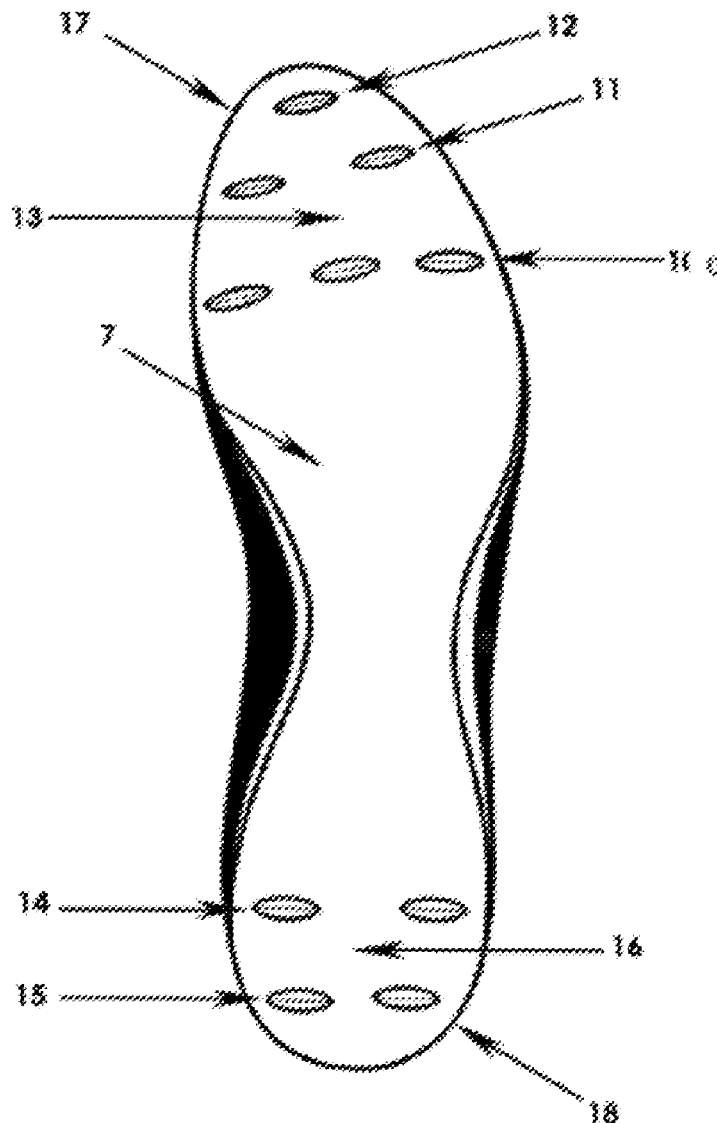


FIG. 01

(US 6101746) "PRIOR ART"

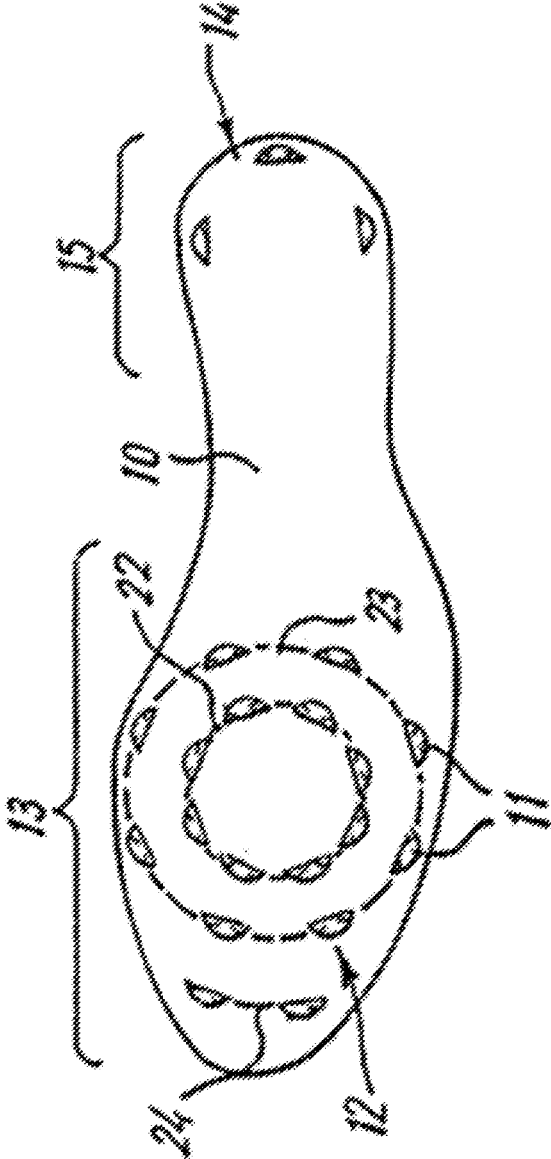


FIG. 02

(US 20110151664)

"PRIOR ART"

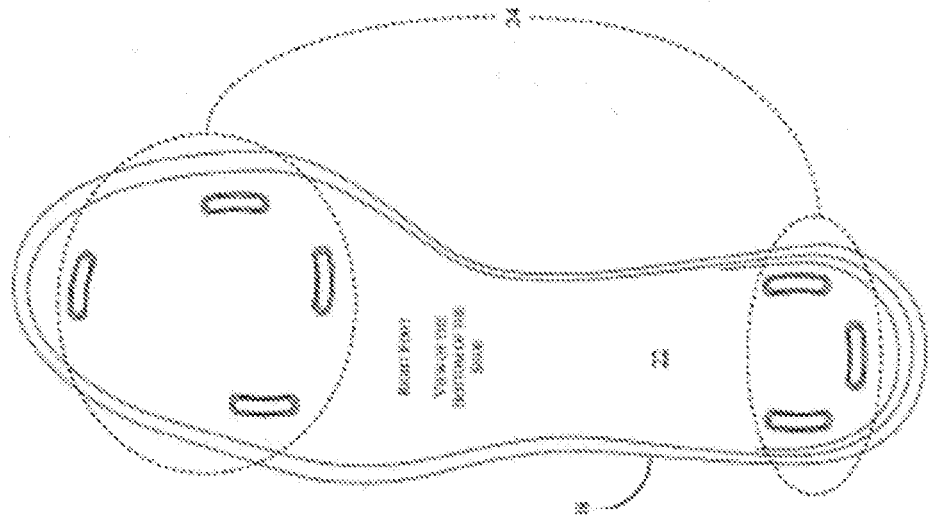


FIG. 03

(US 20090077833)

"PRIOR ART"

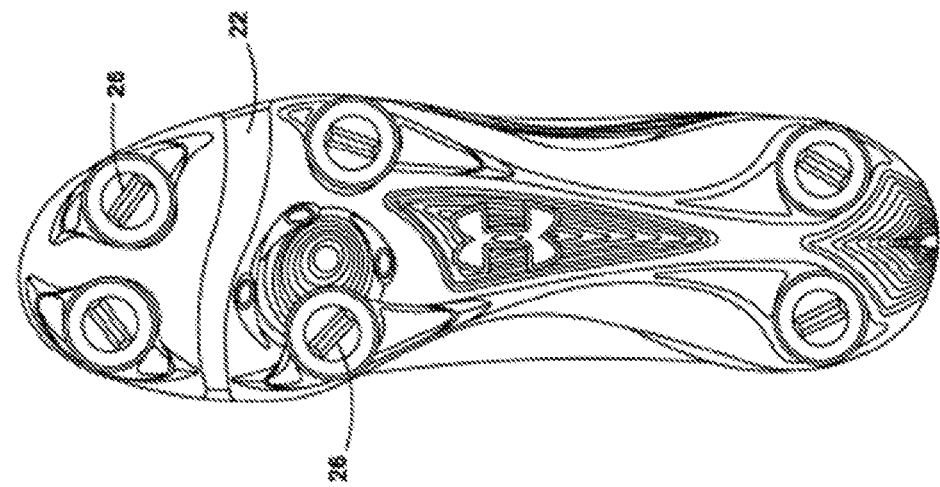


FIG. 04

(US 20160058107)

"PRIOR ART"

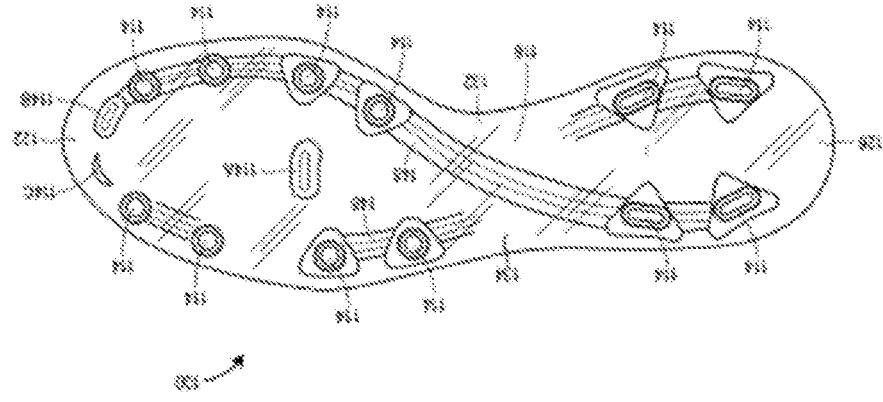


FIG. 05

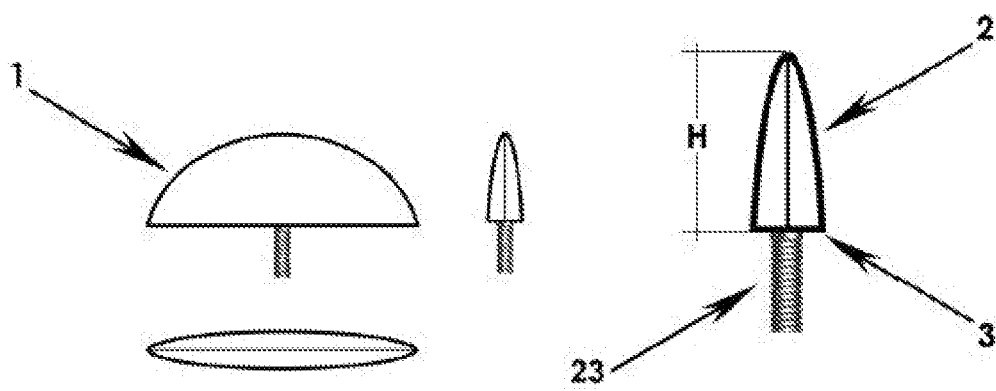
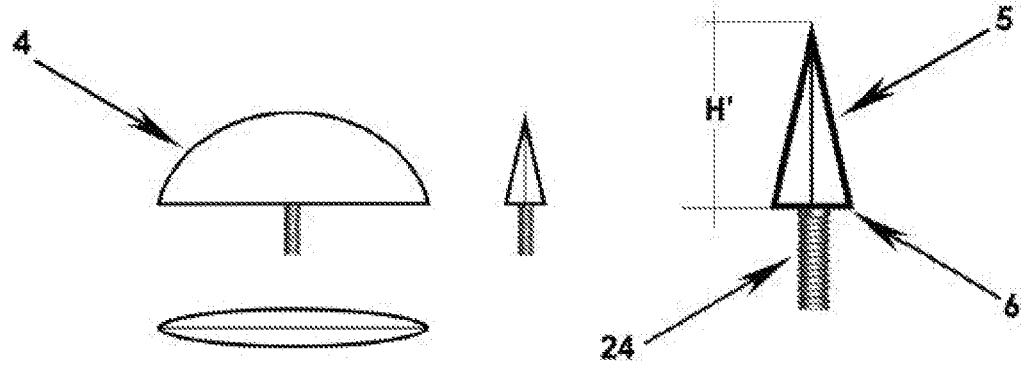
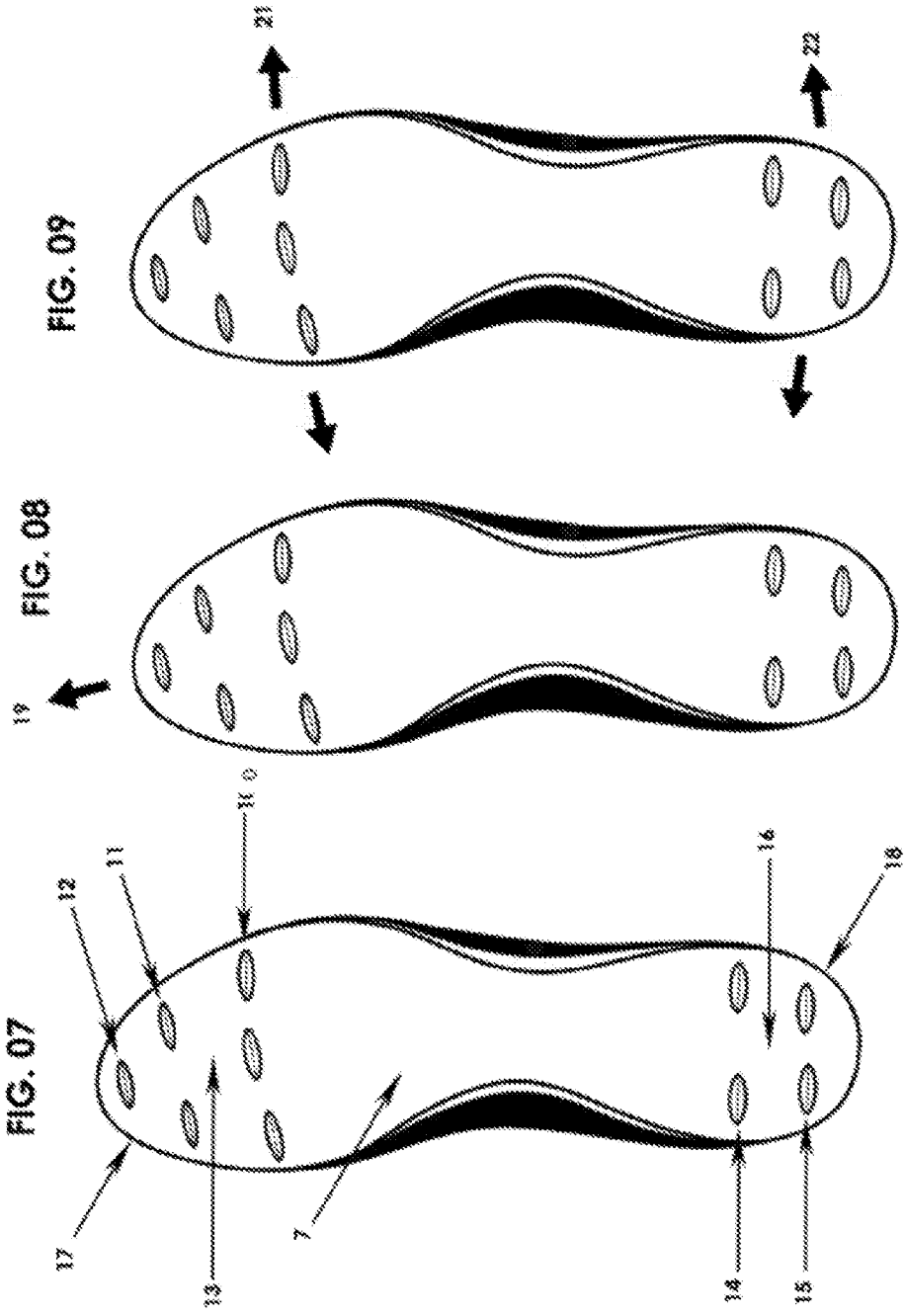
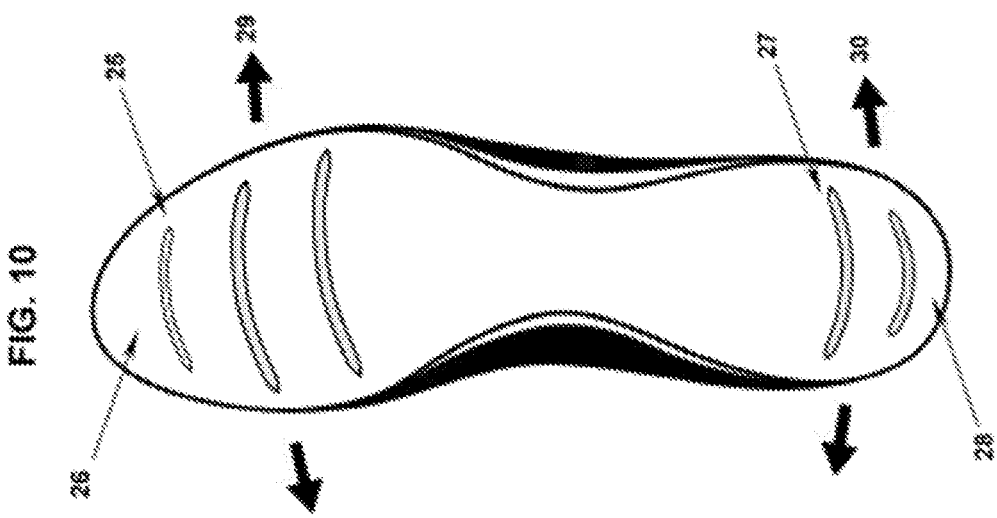
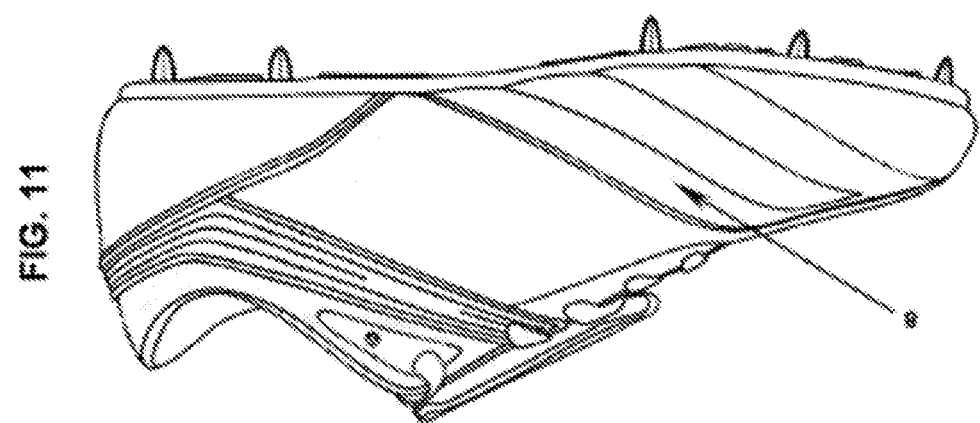


FIG. 06







TRANSVERSE STUDS APPLIED TO FOOTWEAR

FIELD OF THE INVENTION

[0001] The following descriptive report for the invention refers to the development of transverse studs applied to footwear, for example, soccer boots, where said studs are arranged transversely to the longitudinal axis of the footwear and have a shape similar to the biconvex lens section cut in relation to its “X” axis, or in the shape of a keel with a straight lateral surface in a triangular shape, also cut in relation to its “X” axis PRIOR ART

[0002] The anatomical model of the human foot has made it an important tool in its supremacy over the face of the earth. Easily adaptable to different types of soil, this design gave *Homo sapiens* the ability to walk in the sand, in the clay, in the mountains and even climb trees. With the expansion of borders and facing often hostile climates, human beings used creativity to develop artifacts with the potential to protect their feet from rough weather and other dangers of nature. This technology did not flourish in regions with a pleasant climate, and in many places on earth we still see individuals walking barefoot without any apparent discomfort. From simple animal skins wrapped around the feet people used to wear, today we have shoes made with highly resistant, soft, and comfortable materials. This technology was not restricted only to footwear for daily use, but also included footwear for sports use. It was at this point that some problems started to occur. The human foot does not act as a suction cup when in contact with the ground, but rather as a propulsion lever in the frontal plane, with clamps at its distal end, in this case, its toes. Thus, there is no form of efficient grabbing in the transverse plane, since the midfoot and hindfoot, in natural conditions, have evolved to have the ability to rotationally slide. With the evolution of footwear, moving to thicker and harder soles, this ability to propel the body forward with the use of the toes nailing to the floor through its flexion was compromised, and due to that fact indentations in the soles were created in the soles to decrease slips and facilitate propulsion in the frontal plane. In sports, racing was a great booster for the development of pointed studs (nails, needles) in the forefoot region in order to increase the driving force of athletes, especially in speed and short distance competitions (100, 200 and 400 m).

[0003] With the increasing demands for results, athletes are forced to always take their bodies to the extreme in an attempt to overcome the limits imposed by the evolution.

[0004] To guarantee an increased impulse force, shoe manufacturers, of soccer boots for instance, have developed several solutions for studs. An example of this can be seen in document U.S. Pat. No. 6,101,746 which a football boot has a plurality of studs disposed in a pattern which includes a part of at least one ring. The studs are asymmetric in that they provide grip along a first axis and permit sliding along another axis in a manner to encourage self-cleaning. The studs are arranged with their respective first axes aligned along the locus of the ring and their respective second axes aligned transversely of the ring.

[0005] Patent document US 20110252664 describes a shoe foundation assembly for receiving and retaining a number of cleats or spikes into the bottom sole of the shoe such as might be utilized in various sporting events. The shoe foundation assembly includes a unitarily molded shoe cradle component with a toe guard at a first end, a heel guard

at a second end, and arch medial. An outsole is bonded to the midsole component sized and shaped to be positioned on the underside base of the shoe cradle component. The detachable cradle incorporates hillock apertures for positioning a number of sealable inserts to receive the cleat/spikes. Bonded to the midsole is an outsole component having a plurality of slit apertures also positioned to receive the plurality of cleat/spikes. A number of different types of cleats or shoe spikes may be inserted into the apertures in the outsole and through the sealable inserts within the midsole. Each of the cleat/spikes incorporates a structure for the retention of the cleat/spike onto the shoe foundation.

[0006] A cleat arrangement configured for use with an article of footwear comprises a receptacle, a cleat, and a retaining ring is disclosed in patent document US 20090077833. The receptacle is provided in the sole of the footwear. The cleat includes a projecting member and a retaining surface. The retaining surface is configured to fit within the receptacle with the projecting member extending from the receptacle. The retaining ring fits over the cleat and engages the retaining surface of the cleat positioned within the receptacle and the projecting member of the cleat extending through the retaining ring. The retaining ring releasably engages the receptacle such that the retaining ring holds the cleat within the receptacle.

[0007] The disclosure of patent document US 20160058107 relates to articles of footwear and components thereof, including outsoles, which can be used in conditions normally conducive to the accumulation of soil on the outsoles. In particular, the disclosure relates to articles of footwear and components thereof including an outsole with an external hydrogel film that compositionally includes crystalline regions and amorphous hydrophilic regions, where the amorphous regions are covalently bonded to the crystalline regions with carbamate linkages and/or polyamide linkages. The amorphous regions are present in the hydrogel at a ratio of at least 20:1, by weight, relative to the crystalline regions. The outsoles can prevent or reduce the accumulation of soil on the footwear during wear on unpaved surfaces such as sporting fields. When the outsoles are wetted with water, the outsoles can become more compliant and/or can rapidly uptake and/or expel water, which can prevent soil from adhering to the outsole and/or can assist in shedding soil present on the outsole

Prior Art Problems

[0008] Although with some modifications, the incorporation of the concept of studs in shoes soon spread among several sports, especially soccer. But, if on the one hand the bolstering of greater traction in the pull off was contemplated, there was also a progressive increase in adherence to the ground and, consequently, sequelae in joints such as hips, due to repetitive micro traumatism in rotational maneuvers when the natural compensatory torso rotation was blocked. Comparative studies between children and teenagers who regularly played soccer and paired groups of occasional practicing individuals showed a slow, but inexorable, decrease in the amplitude of rotational hip mobility in the first group in relation to the second. In addition, this increased adherence also had acute repercussions in the form of ligament ruptures in the knee, especially the anterior cruciate ligament, as well as the ankle.

[0009] In order to reduce or try to avoid these injuries, shoe manufacturers have developed the stud systems described above.

[0010] Patent document U.S. Pat. No. 6,101,746 shows in FIG. 24a a construction wherein the size of the stud 45 can be varied by replacement of an upper part thereof to suit different playing surfaces and/or conditions and/or sports. This variation of stud 45 has a base 46 integral with or secured to a shoe (not shown). Base 46 has a central upstanding core 47 which can be accommodated with a recess 48 in a crown 49 whose shape is complementary to that of base 46 and forms therewith a stud of shape comparable to that in any of the earlier embodiments. A pin 50 of plastics or like material passes through aligned holes in the crown 49 and core 47 to retain the crown 49. The pin 50 can be an interference fit in the holes.

[0011] FIGS. "23a", "23b", "23c" and "23d" show possible ring arrangements of studs at the base of the shoes. These figures show that there is no concern to compensate for rotational maneuvers when blocking the natural compensatory rotation of the torso, since the studs (45-46) are not aligned transversely.

[0012] Patent document U.S. Pat. No. 6,101,746 shows that this arrangement of studs does not allow to change the height of these pins depending on the type of terrain, due to the large number of pins concentrated in the same region of the metatarsal bones. Perhaps, one of the biggest problems of this proposal is that the circular layout with a large number of studs limits the possibility of high studs, as well as having longitudinal studs in the heel area preventing the rotation provided by the studs arranged in a circular shape in the midfoot.

[0013] Patent document US 20110252664 shows that the purpose of studs is to reduce slips and facilitate propulsion in the frontal plane, without the concern with rotational maneuvers. This can be fully perceived due to the positioning of the studs, and said studs completely block the movement of the foot sideways.

[0014] Patent document US 20090077833 shows that the studs may have possible orientations for the projection element of the cleat of the detachable cleat arrangement. In this document we can see clearly that the clamps 26 are similar to wedges. These wedges have a projecting member 56, such as, for example, a spike, pin, blade or other projection, which extends downwardly from the main body 50 of the clamp 26. Such clamps 26 do not allow the lateral rotation of the foot when a twist occurs. These clamps dig into the ground and prevent the foot from rotating, discharging this torsional force on the hip, knee, and ankle.

[0015] Patent document US 20160058107 refers to footwear articles and their components, including soles, which can be used in normally appropriate conditions in order to prevent soil accumulation on the soles.

DESCRIPTION OF THE INVENTION

[0016] From the above, the proposal to be presented aims to maintain the athlete's push off ability in the frontal plane, the main direction to be taken by the soccer player. The advantage of these transverse locks is that they provide this frontal displacement without significantly compromising the rotation of the foot in the transverse plane, as it is necessary in the event of a rotational maneuver. These transverse studs are distributed on the forefoot and hindfoot almost parallel to the front studs in relation to the rear studs and have a

shape similar to the biconvex lens section cut in relation to its "X" axis, or in the shape of a keel with a lateral surface in a triangular shaping, also cut in relation to its "X" axis, like the hull of a vessel. The depth of these studs is defined according to the type of soil on which the game will be played. Either in natural, deeper grass, or synthetic, shallow grass. Although this concept is directed to the practice of soccer, it can be extended to other sports such as tennis, changing both the height of the studs according to the floor, whether it is gravel or grass, not being applicable to the concrete floor.

DESCRIPTION OF THE DRAWINGS

[0017] The characterization of the present invention is made by means of representative drawings of the transverse studs applied to footwear, in such a way that the product can be fully reproduced by an appropriate technique, allowing full characterization of the functionality of the object claimed.

[0018] From the elaborated figures that express the best or preferential way of making the product designed, the descriptive part of the report is based, through a detailed and consecutive numbering, which clarifies aspects that may be implied by the adopted representation, in order to clearly determine the protection now sought.

[0019] These figures are merely illustrative and may present variations, as long as they do not move far off from what was initially claimed.

[0020] In this case, the following are considered:

[0021] FIG. 1 shows the prior art closer to the proposal claimed in this report, citing patent document U.S. Pat. No. 6,101,746 as belonging to the prior art;

[0022] FIG. 2 shows the prior art closer to the proposal claimed in this report, citing patent document US 20110252664 as belonging to the prior art;

[0023] FIG. 3 shows the prior art closer to the proposal claimed in this report, citing patent document US 20090077833 as belonging to the prior art;

[0024] FIG. 4 shows the prior art closer to the proposal claimed in this report, citing patent document US 20160058107, as belonging to the prior art;

[0025] FIG. 5 shows a possible shape for the studs, similar in shape to the biconvex lens section cut in relation to its "X" axis;

[0026] FIG. 6 shows another possible shape for the studs, in the shape of a keel with a straight lateral surface in a triangular shaping, also cut in relation to its "X" axis

[0027] FIG. 7 shows a possible distribution of the studs on the sole of a sports shoe

[0028] FIG. 8 shows, schematically, that the studs allow to reduce slips and facilitate propulsion in the frontal plane;

[0029] FIG. 9 shows that the studs allow the lateral rotation of the front of the foot and the back of the foot;

[0030] FIG. 10 shows a possibility of studs in the form of bands and;

[0031] FIG. 11 shows a sports shoe with the studs applied.

[0032] A preferred embodiment of the invention comprises the use of studs (1) that resemble the biconvex lens section (2) cut in relation to its "X" axis (3), or studs (4) in the shape of a keel with a straight lateral surface in triangular shaping (5), also cut in relation to its "X" axis (6).

[0033] Said studs (1 and 4) are attached to the bottom sole (7) of a sports shoe, for example, a sneaker (8), positioned transversely (10, 11 and 12) distributed in the forefoot (13)

and transversal (14 and 15) distributed in the hindfoot (16), in order to position themselves according to the angle of the shoe's toe (17) and the angle of the back of the shoe (18).

[0034] The distribution of the studs on the forefoot (13) in accordance with the angle of the shoe's toe (17) ensures the maintenance of the front push off (19) in relation to the ground and allows the rotation of the foot in the transversal plane, lateral displacement (21), because it is necessary in the event of a rotational maneuver, while the distribution of the studs (14 and 15) in the hindfoot (16) in accordance with the rear angle of the shoe (18) ensure the rotation of the foot in the transverse plane, displacement lateral (22), in a rotational maneuver.

[0035] Studs (1 and 4) have different heights (H and H') defined in accordance with the type of soil in which the sport will be practiced, and may be attached to the bottom sole (7) of a sports shoe (8) by means of a threaded element (23 or 24), in order to allow its replacement according to the sport conditions.

[0036] The number of studs (1 or 4) that can be distributed on the forefoot (13), as well as the studs (14 and 15) that can be distributed on the hindfoot (16) are not limited to the adopted representations. The number of studs will depend on the type of sport to be practiced, the type and the soil, the conditions of the ground etc., as well as the position of these studs on the forefoot (13) and hindfoot (16), but close to the ends of the shoe or further away, without compromising their functionality.

[0037] Another construction possibility is the studs fixed directly to the sole without being threaded. This way, the user chooses the shoe when entering the field, depending on the conditions of the lawn, terrain, if its gravel, track etc. Thus, the user can have one or more shoes with transverse studs, choosing the shoe according to the conditions of the sport.

[0038] Another possibility of construction of the transverse studs is in the form of strips (25), distributed in the forefoot (26) and strips (27) also distributed in the hindfoot (28), with curves that allow the rotation of the forefoot (26) and the hindfoot (28), and these strips have the same basic shape as the studs previously shown, and allow lateral displacement (29 and 30) to avoid injuries.

[0039] The size of the locks will depend on the type of field and the conditions of the climate, temperature etc.

1- Transverse studs applied to footwear, characterized by studs (1) that resemble the biconvex lens section (2) cut in relation to its "X" axis (3), or studs (4) in the shape of a keel

with a straight lateral surface in a triangular shaping (5), also cut in relation to its "X" axis (6);

2- Transverse studs, according to claim 1 and characterized by that said studs (1 and 4) being fixed on the bottom sole (7) of sports shoes, (8), positioned transversely (10, 11 and 12) distributed in the forefoot (13) and transverse studs (14 and 15) distributed in the hindfoot (16), so as to be positioned in accordance with the angle of the shoe tip (17) and the angle of the back of the shoe (18).

3- Transverse studs, according to claim 1 characterized by the distribution of the studs on the forefoot (13) being in accordance with the angle of the shoe's toe (17), in order to ensure the maintenance of the front push off (19) in relation to the ground.

4- Transverse studs, according to claim 1 characterized by allowing the rotation of the foot in the transverse plane, lateral displacement (21).

5- Transverse studs, according to claim 1 characterized by distributing the studs (14 and 15) on the hindfoot (16) in accordance with the rear angle of the shoe (18), in order to ensure the rotation of the foot in the transverse plane, lateral displacement (22), in a rotational maneuver.

6- Transverse studs, according to claim 1 characterized by the studs (1 and 4) having heights (H and H') defined in accordance with the type of sport and type of soil, attachable to the bottom sole (7) of a sports shoe (8) by means of a threaded element (23 or 24), in order to allow for its replacement.

7- Transverse studs, according to claim 1 with a number of studs (1 or 4) that can be distributed on the forefoot (13) and the number of studs (14 and 15) that can be distributed on the rear foot (14) be able to vary.

8- Transverse studs, according to claim 1 characterized by the studs (10, 11, 12, 14 and 15) being fixed directly on the sole without being threaded.

9- Transverse studs, characterized by being in the form of curved strips (25), distributed in the forefoot (26) and curved strips (27) also distributed in the hindfoot (28) that allow the rotation of the forefoot (26) and the hindfoot (28).

10- Transverse studs, according to claim 1, characterized by the strips containing the same basic shape as the previously shown studs, and allowing lateral displacement (29 and 30).

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