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(54) **Device for increasing movement stability with shoes for tennis or similar sports**

Vorrichtung zur Stabilitätserhöhung für Schuhe für Tennis oder ähnlichem Sport

Dispositif pour augmenter la stabilité de mouvement pour des chaussures de tennis ou autres

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(73) Proprietor: **Lotto Sport Italia S.p.A.**  
**31044 Montebelluna (Treviso) (IT)**

(72) Inventor: **Caberlotto, Alberto**  
**31044 Montebelluna, Prov. of Treviso (IT)**

(74) Representative: **Lanzoni, Luciano**  
**c/o BUGNION S.p.A.**  
**Via G. Garibaldi n. 19**  
**37121 Verona (IT)**

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## Description

**[0001]** The present invention relates to a device for increasing the stability of movements performed with shoes for tennis or similar sports.

**[0002]** It is well-known that it is essential to choose, according to the sports activity that is practiced, shoes that are structurally most suitable in order to facilitate movements while supporting the foot during efforts in order to avoid contractures or incorrect steps.

**[0003]** A plate-like support is known from EP-A-0 913 101 which falls within the ambit of Art. 54(3) EPC.

**[0004]** In the practice of tennis, in particular, the shoes should ensure good stability of movements, since the tennis player must be able to leap and sprint in order to move rapidly on the court and be able to receive and respond promptly to the opponent's shots.

**[0005]** Additionally, but not less importantly, tennis shoes must be well-cushioned, since they must ensure good impact absorption whenever the foot touches the ground.

**[0006]** The outer part of the foot is the region most intensely affected by the loads produced by the movements performed by the tennis player.

**[0007]** The player must in fact be capable of moving rapidly, and in doing this he performs a continuous succession of lateral slides and subsequent braking actions.

**[0008]** Anyone practicing this sport is certainly penalized by shoes which do not assuredly give him the necessary stability, since uncontrolled movements, in addition to entailing a considerable waste of energy, are very often dangerous due to the possibility of sprained ankles or falls, or can constitute a risk for future problems to the foot, knee and spine.

**[0009]** At the same time, shoes that are not adequately cushioned penalize the tennis player, who is affected, whenever he rests a foot on the ground, by the impact against the ground which is transmitted to him through the legs up to the spine.

**[0010]** On the other hand, resorting to shoes which are simply provided with a mid-sole made of soft material with a shock-absorbing function entails the risk of seriously compromising the stability of one's movements, since the foot is completely unbalanced, as occurs, to make a comparison, when one jumps with one's feet on a soft mattress, which provides a cushioning action but may cause complete loss of balance.

**[0011]** The aim of the present invention is to provide a device which solves the above-described drawbacks of conventional devices, particularly by increasing the stability of movements for shoes for tennis and similar sports.

**[0012]** Within the scope of this aim, an object of the present invention is to provide a device which does not penalize nor encumber in any way the overall structural configuration of the shoe.

**[0013]** A further important object of the present inven-

tion is to provide a device which is structurally simple, durable and wear-resistant.

**[0014]** A further object of the present invention is to provide a device for increasing the stability of movements performed with shoes for tennis or similar sports which can be easily manufactured with conventional equipment and machines.

**[0015]** A still further important object of the present invention is to provide a device for sports shoes which is capable of ensuring optimum cushioning of the feet against ground impacts.

**[0016]** This aim, these objects and others which will become apparent hereinafter are achieved by a device for increasing movement stability with shoes for tennis or similar sports according to the present invention, characterized in that it comprises a plate-like support which is substantially Y-shaped and has a first curved portion, which is adapted to follow the profile of the heel region, and a second portion, which is adapted to follow the outer profile of the foot and widens transversely with a third portion so as to affect the inner metatarsal region of said foot, said support being coupled in a downward region to a mid-sole made of shock-absorbing material in order to distribute thereon the load transmitted by the moving foot.

**[0017]** Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a shoe provided with a device for increasing the stability of movements according to the present invention;

Figure 2 is a perspective exploded view of the shoe of Figure 1;

Figure 3 is a top view of a detail of the device shown in the preceding figures.

**[0018]** With reference to the above figures, a shoe, particularly suitable for tennis, is generally designated by the reference numeral 10 and comprises an upper 11 which is associated with a sole 12.

**[0019]** The sole is constituted by the coupling of a device for increasing movement stability, designated by the reference numeral 13, with a tread 14 of a per se known type.

**[0020]** In this case, the tread 14 has an overall box-like configuration, since it is perimetricaly provided, in its front part 15 and in the rear part 16, with a raised rim 17 for containing the corresponding parts of the upper 11.

**[0021]** In this embodiment, the tread 14 is made of vulcanized rubber, but in other cases it can be made of another material, so long as it has equivalent characteristics.

**[0022]** The device 13 comprises a plate-like support 18, preferably made of a material known commercially

by the trade-name Kevlar or, in other cases, of a material which has equivalent mechanical characteristics.

**[0023]** The support 18 is substantially Y-shaped and has a first curved portion 19 which is shaped, starting from an inner rear part 20 of the sole 21 of a foot, like the heel.

**[0024]** Starting from an outer rear part 22 of the sole 21 of the foot, the support 18 has a second substantially straight portion 23 which follows the outer profile of the foot until it reaches the outer metatarsal region 24 thereof.

**[0025]** A third portion 25 extends in particular from a median segment of the second portion 23 and widens transversely with respect to the second portion 23, so as to have as a whole a bifurcated shape and affect the inner metatarsal region 26 of the foot.

**[0026]** The plate-like support 18 is provided in particular, at the first curved portion 19, with a first containment rim 27 and a second containment rim 28, each of which runs at right angles with respect to the support 18 at the inner rear part 20 and at the outer rear part 22 of the sole 21 of the foot.

**[0027]** The plate-like support 18 is also completed by a third containment rim, designated by the reference numeral 29, which runs monolithically along the profile of the outer metatarsal region 24 of the second portion 23.

**[0028]** In its active configuration, the support 18 is arranged above a mid-sole 31 made of soft material, for example EVA, foamed polyurethane or similar material, which acts as a cushioning element.

**[0029]** In particular, the mid-sole is thicker from the heel region 32 to the metatarsal region 33 and then tapers so as to be thinner in the remaining front region 34.

**[0030]** The plate-like support 18, in particular, cooperates with the mid-sole 31 and provides two important functions, since:

- it ensures the correct containment of the outer part of the foot, which is most intensely subjected to the loads and thrusts of the body caused by sudden accelerations and braking actions, leaving absolute freedom of movement;
- it correctly distributes the load and the stresses transmitted by the foot to the mid-sole 31, which acts as a shock-absorbing element, thus ensuring optimum stability.

**[0031]** The provision of the device 13 in fact takes into account both the fact that during contact of the foot with the ground all the weight of the body is discharged completely onto the metatarsal region, which acts as a fulcrum for the foot as it flexes, and from there onto the rear part of the heel, and the particular importance of lateral slips, which are so frequent in tennis and in which the outer part of the foot is the one that is most affected by the loads of the thrusts and braking actions.

**[0032]** In this way, the shock-absorbing effect ensured by the mid-sole 31 is correctly stabilized thanks

to the presence of the plate-like support 18.

**[0033]** Moreover, while allowing complete freedom for the internal part of the foot, which is the part that is least affected by loads, the device according to the present invention ensures correct containment of the outer part indeed in order to cope with the forces due to the weight of the body and to the muscular action of the thrusts of the athlete.

**[0034]** The support and containment, however, is in no way limitative for the foot, since it is capable of adapting its dynamic configuration without forcing any constraint, at the same time ensuring correct cooperation with the mid-sole for the shock-absorbing function, in order to provide a convenient load distribution, with the result of considerably increasing movement stability.

**[0035]** In practice it has been observed that the aim and the objects of the present invention have all been amply achieved.

**[0036]** Attention is drawn in particular to the fact that the present invention provides a device for increasing movement stability with shoes for tennis or similar sports which does not penalize or encumber in any way the overall structural configuration of the shoe.

**[0037]** It should also be observed that a device has been provided which is structurally very simple and ensures good durability and wear resistance.

**[0038]** Another considerable advantage that is certainly achieved with the present invention is linked to the consideration that a device for increasing the stability of movements performed with shoes for tennis or similar sports has been provided which can be produced with conventional equipment and machines.

**[0039]** Another advantage is due to the fact that the device according to the invention is capable of ensuring optimum cushioning of the feet against ground impacts.

**[0040]** The invention thus conceived is susceptible of numerous modifications and variations within the scope of the appended claims.

**[0041]** In practice, the materials employed, so long as they are compatible with the contingent use, as well as the dimensions, may be any according to requirements.

**[0042]** Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. A device for increasing movement stability with shoes for tennis or similar sports, comprising a plate-like support (18) which is substantially Y-shaped and has a first curved portion (19), which is adapted to follow the profile of the heel region, and a second portion (23), which is adapted to follow the

outer profile of the foot and widens transversely with a third portion (25) so as to affect the inner metatarsal region of said foot, said support being coupled in a downward region to a mid-sole (31) made of shock-absorbing material in order to distribute thereon the load transmitted by the moving foot.

2. The device according to claim 1, **characterized in that** said support comprises, at the first curved portion, a containment rim which protrudes substantially at right angles from the outer part of the heel region.
3. The device according to claim 1, **characterized in that** said support comprises, at the first curved portion, a containment rim which protrudes substantially at right angles from the inner part of the heel region.
4. The device according to claim 1, **characterized in that** said support comprises, at the second portion, a containment rim which protrudes substantially at right angles from the outer part of the metatarsal region.
5. The device according to claim 1, **characterized in that** said plate-like support is made of a material commercially known by the trade-name Kevlar or of another material having equivalent characteristics.
6. The device according to claim 1, **characterized in that** said mid-sole is thicker in the heel region and in the metatarsal region than in the remaining regions.
7. The device according to claim 1, **characterized in that** said mid-sole is made of EVA or other material having equivalent characteristics.
8. The device according to claim 1, **characterized in that** said mid-sole is made of vulcanized rubber or other material having equivalent characteristics.

#### Patentansprüche

1. Vorrichtung zur Stabilitätserhöhung für Schuhe für Tennis oder einen ähnlichen Sport, enthaltend eine plateauähnliche Stütze (18), welche im wesentlichen Y-förmig ist und einen ersten gebogenen Abschnitt (19) enthält, welcher dazu vorgesehen ist, dem Profil des Fersenbereiches zu folgen, sowie einen zweiten Abschnitt (23), welcher dazu vorgesehen ist, dem Aussenprofil des Fusses zu folgen und sich zu einem dritten Abschnitt (25) in Querrichtung verbreitert, der den Mittelfussbereich des genannten Fusses betrifft, wobei die genannte Stütze in einem nach unten gerichteten Bereich mit einer Zwi-

schensohle (31) aus stossdämpfendem Material verbunden ist, um auf diese die Belastung zu verteilen, die durch den sich bewegendenden Fuss übertragen wird.

2. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Stütze an dem ersten gebogenen Abschnitt einen umgebenden Rand enthält, welcher sich im wesentlichen im rechten Winkel von dem äusseren Teil des Fersenbereiches aus erstreckt.
3. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Stütze an dem ersten gebogenen Abschnitt einen umgebenden Rand enthält, welcher sich im wesentlichen im rechten Winkel von dem inneren Teil des Fersenbereiches aus erstreckt.
4. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Stütze an dem zweiten Abschnitt einen umgebenden Rand enthält, welcher sich im wesentlichen im rechten Winkel von dem äusseren Teil des Mittelfussbereiches aus erstreckt.
5. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte plateauähnliche Stütze aus einem im Handel und unter dem eingetragenen Namen Kevlar bekannten Material hergestellt ist oder aus einem anderen Material, welches gleichwertige Eigenschaften aufweist.
6. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Zwischensohle in dem Fersenbereich und in dem Mittelfussbereich dicker ist als in den verbleibenden Bereichen.
7. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Zwischensohle aus EVA oder einem anderen Material mit gleichwertigen Eigenschaften hergestellt ist.
8. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die genannte Zwischensohle aus vulkanisiertem Gummi oder einem anderen Material mit gleichwertigen Eigenschaften hergestellt ist.

#### Revendications

1. Dispositif pour augmenter la stabilité de mouvement pour des chaussures de tennis ou autres qui inclut un support en forme de plat (18) substantiellement en forme de Y ayant une première portion arrondie (19) conçue pour s'adapter au profil de la région du talon et une seconde portion (23) conçue

pour s'adapter au profil externe du pied et qui s'élargit transversalement avec une troisième portion (25) de façon à intéresser la région du métatarse interne dudit pied, ledit support étant associé en dessous à une semelle intermédiaire (31) réalisée en matériau amortisseur afin d'y distribuer la charge transmise par le pied en mouvement. 5

2. Dispositif selon la revendication 1 **caractérisé en ce que** ledit support inclut, au niveau de la première portion arrondie, un bord qui dépasse substantiellement à angle droit à partir de la partie externe de la région du talon. 10
3. Dispositif selon la revendication 1 **caractérisé en ce que** ledit support inclut, au niveau de la première portion arrondie, un bord qui dépasse substantiellement à angle droit à partir de la partie interne de la région du talon. 15  
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4. Dispositif selon la revendication 1 **caractérisé en ce que** ledit support inclut, au niveau de la seconde portion arrondie, un bord qui dépasse substantiellement à angle droit à partir de la partie externe de la région du métatarse. 25
5. Dispositif selon la revendication 1 **caractérisé en ce que** ledit support en forme de plat est réalisé en un matériau commercialement connu sous le nom de la marque « Kevlar » ou en un autre matériau qui a des caractéristiques équivalentes. 30
6. Dispositif selon la revendication 1, **caractérisé en ce que** la semelle intermédiaire est plus épaisse au niveau du talon et au niveau du métatarse qu'au niveau des autres parties. 35
7. Dispositif selon la revendication 1, **caractérisé en ce que** la semelle intermédiaire est réalisée en EVA ou en un autre matériau qui a des caractéristiques équivalentes. 40
8. Dispositif selon la revendication 1, **caractérisé en ce que** la semelle intermédiaire est réalisée en caoutchouc vulcanisé ou en un autre matériau qui a des caractéristiques équivalentes. 45

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