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(54) **INSOLE FOR SPORTS SHOES, PARTICULARLY FOR GOLF**

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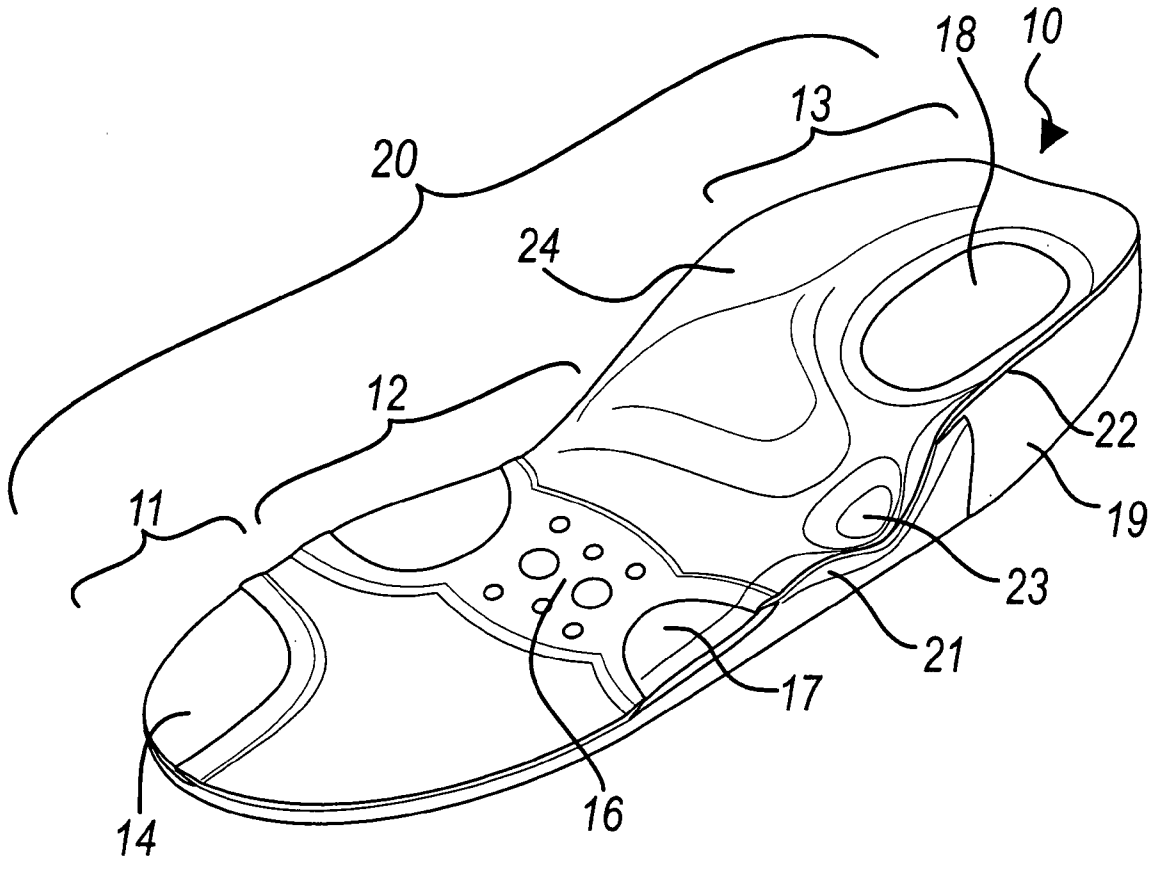
(57) **ABSTRACT**

An insole for sports shoes, particularly for golf, constituted by an anatomically contoured body which has portions made of different materials which form regions with differentiated mechanical properties in order to optimize the discharge of the forces affecting the foot; these regions are at least: a first phalangeal region; a second metatarsal region; a third calcaneal region.



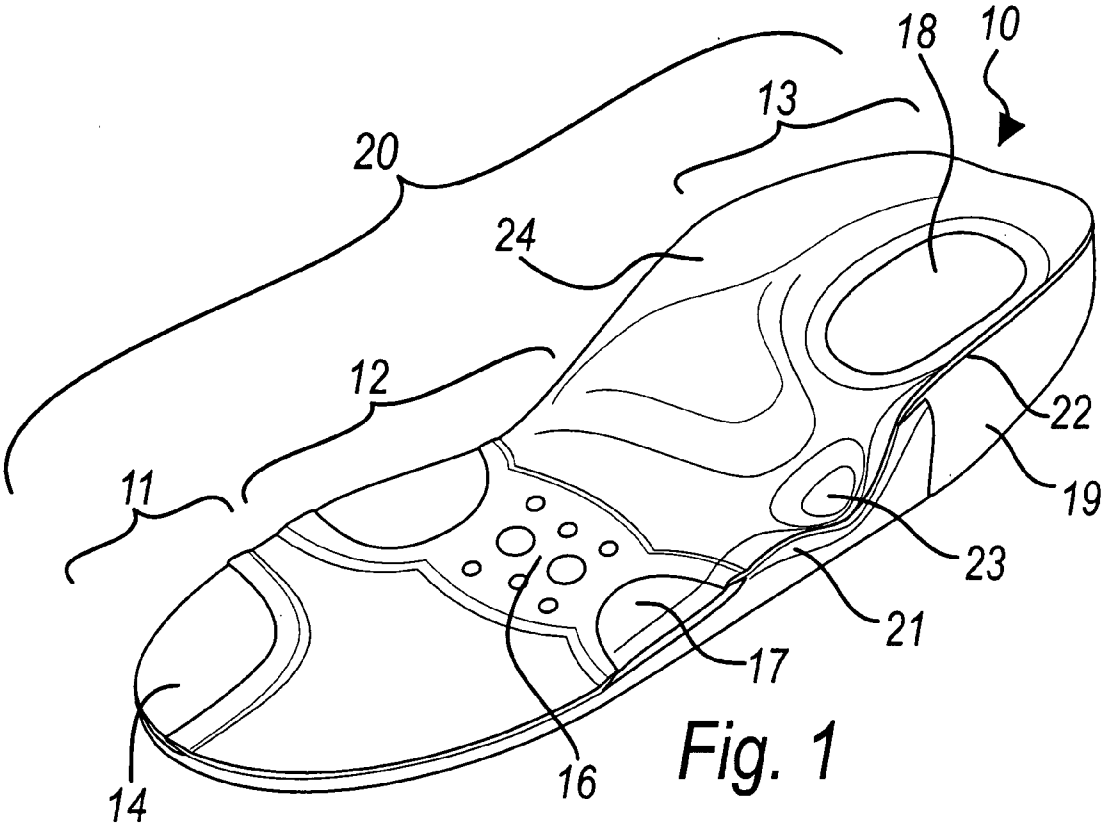


Fig. 1

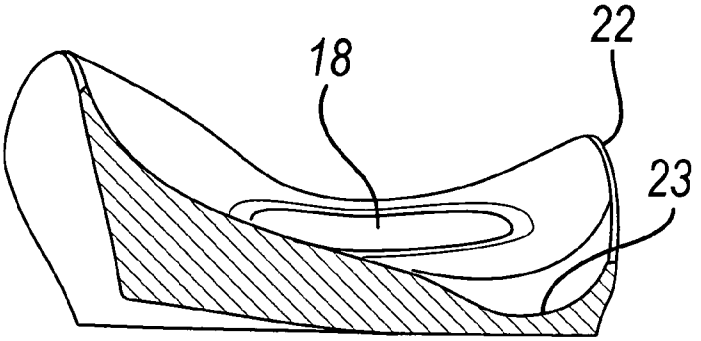


Fig. 2

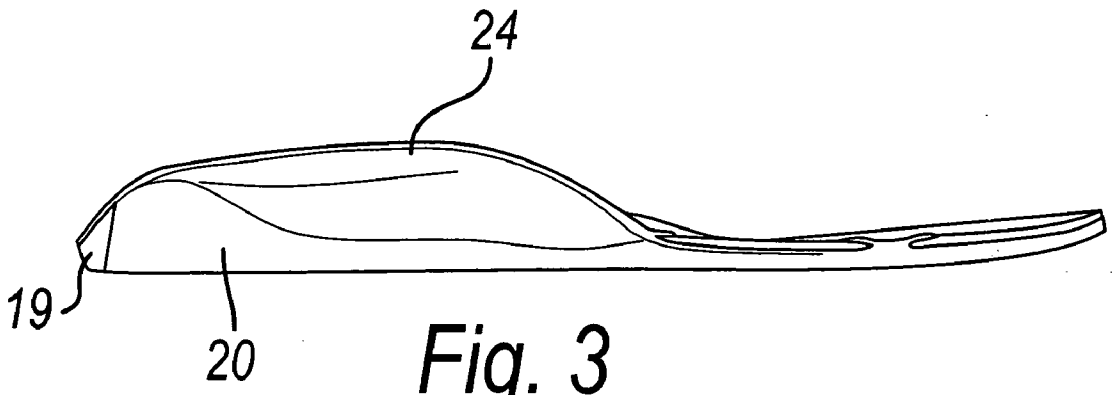


Fig. 3

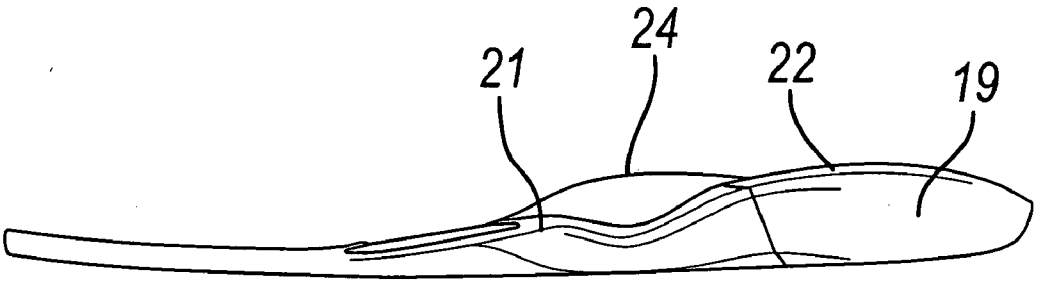


Fig. 4

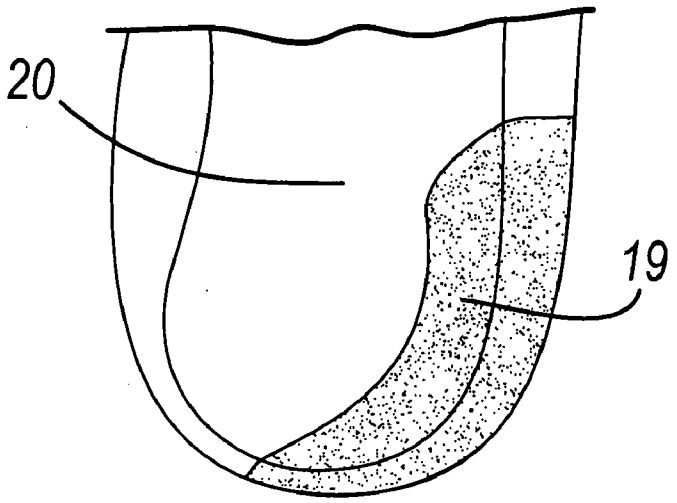


Fig. 5

INSOLE FOR SPORTS SHOES, PARTICULARLY FOR GOLF

[0001] The present invention relates to an insole for sports shoes and in particular for golf.

BACKGROUND OF THE INVENTION

[0002] Golf is a sport which is already well established in the United States and in the Far East and is becoming increasingly popular in Europe as well.

[0003] Golf is a sport which is practiced in the open air, on courses which wind among pleasant hills which are further enhanced by the presence of ponds or streams, which form so-called "water hazards"; these characteristics make golf an activity which is capable of providing not only physical benefits, since it is a sport, but also mental benefits, thanks to the extensive and carefully tended green spaces in which it takes place.

[0004] The generic motion for striking the golf ball, the so-called "swing", can be divided into four main moments:

[0005] the "stance", i.e., the placement of the feet in preparation for the swing,

[0006] the "backswing", i.e., the movement to raise the club in order to load the swing,

[0007] the "downswing", i.e., the downward motion of the club to strike the ball;

[0008] the "finish", i.e., the final part of the swing motion, which begins substantially when the ball is hit.

[0009] During the execution of these movements, some parts of the foot of the player are affected in a very particular way due to the torsions that are applied thereto by the movements of the body and the weight shifts caused by the rotary motions of the trunk and arms and the simultaneous flexing and rotations of the legs.

[0010] In addition to this, the feet of a golf player are stressed intensely by the long walks that he/she performs in traveling from one swing to the next.

[0011] Currently, golf is played by using shoes which are aesthetically refined and made of materials which allow the player to be comfortable both during the swing and when walking; however, these shoes are generally provided with insoles which have a substantially uniform rigidity and elasticity and are unable to follow and assist the parts of the foot that are most intensely stressed when they are required to perform the torsions mentioned above or when they are subjected to an increase in load.

[0012] The particular movements of the golf player, combined with the use of normal sports shoes, cause the player's feet to be likely to suffer microtraumas, microfractures or other tendon and muscle problems, which can be solved generally, in the best cases, with more or less long periods of inactivity which are in any case undesirable.

SUMMARY OF THE INVENTION

[0013] The aim of the present invention is to provide an insole for sports shoes, particularly for golf, which is capable of supporting and assisting the movement of the sole of the foot of a player, alleviating the localized stresses.

[0014] Within this aim, an object of the present invention is to provide an insole which can also be inserted in known types of shoe which are already commercially available.

[0015] Another object to the present invention is to provide an insole which can be manufactured cheaply with known systems and technologies.

[0016] This aim and these and other objects, which will become better apparent hereinafter, are achieved by an insole for sports shoes, particularly for golf, characterized in that it is constituted by an ergonomically contoured body which has portions made of different materials which form regions with differentiated mechanical properties in order to optimize the discharge of the forces affecting the foot, said regions being at least:

[0017] a first phalangeal region,

[0018] a second metatarsal region,

[0019] a third calcaneal region.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

[0021] FIG. **1** is a perspective view of an insole according to the invention;

[0022] FIG. **2** is a sectional view of the insole according to the invention;

[0023] FIG. **3** is a first side view of the insole according to the invention;

[0024] FIG. **4** is a second side view of the insole according to the invention;

[0025] FIG. **5** is a bottom view of a portion of the insole according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] With reference to the figures, an insole for sports shoes, particularly for golf, according to the invention, is generally designated by the reference numeral **10**, and with reference to its various parts identified by way of the various regions of the foot of a user that normally contacts them in use. Thus, for example, the phalangeal region of the insole is the one region thereof that is, in use, in contact with the phalangeal region of the foot.

[0027] The insole **10** is constituted by an anatomically contoured body **20**, which is provided with portions made of different materials which define regions with differentiated mechanical properties in order to optimize the discharge thereon of the forces affecting the foot, due to movements of the body of a user (trunk, arms, legs), such as twists, torsions, weight shifts, flexing, rotations.

[0028] These regions are:

[0029] a first phalangeal region **11**,

[0030] a second metatarsal region **12**,

[0031] a third calcaneal region **13**.

[0032] The anatomically contoured body **20** is made of closed-cell expanded microporous material, particularly based on EVA (ethyl vinyl acetate).

[0033] The closed-cell expanded microporous material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 27 and 33 Shore A, and in particular 30 Shore A; a density, according to the UNI EN 10902/2000 standard, comprised between 130 and 160 g/dm^3, and particularly 145 g/dm^3; another significant char-

acteristic is resilience, which according to the UNI 6357/1968 standard is comprised between 38% and 42%, with a central value of 40%.

[0034] The body **20** has hardness and elasticity values which allow it to bear ordinary loads and stresses transmitted by the foot and at the same time can be manufactured easily by molding plastic material.

[0035] In the first phalangeal region **11** there is a portion **14** which corresponds to the hallux and is designed to cushion the thrusts of said hallux.

[0036] The portion **14**, at the hallux, is particularly stressed during the backswing and downswing steps of the shot and during the propulsion step of an ordinary stride during walking for transfer.

[0037] In the second metatarsal region **12** there are shock-absorbing portions: a first portion **15** at the first metatarsal head of the foot, a second portion **16** which corresponds to the central metatarsal heads, and a third portion **17** which corresponds to the fifth metatarsal head.

[0038] The first shock-absorbing portion **15** facilitates the cushioning of the forces that arrive from the first metatarsal head during backswing and downswing and of the stresses of the forefoot phase, which precedes the propulsion phase, during the walking stride.

[0039] The second shock-absorbing portion **16** is subjected to higher compression by the central metatarsal heads during the finishing step of the swing, when the forward foot, i.e., the foot on the side toward which one places the shot, rotates on the ground toward the direction of the shot and part of the weight of the body shifts onto it.

[0040] The second portion **16** is stressed also during the forefoot propulsion phase in the walking stride.

[0041] The third shock-absorbing portion **17** facilitates the cushioning of the forces that arrive from the fifth metatarsal head during backswing and downswing and the stresses of the forefoot phase which precedes the propulsion step during the walking stride.

[0042] In the third calcaneal region **13** there is a central portion **18** for providing shock absorption at the heel and there is a more rigid portion **19** at the outer and rear lateral band of the calcaneal region **13**.

[0043] The central portion **18** is involved by the pressure applied by the heel during the stance and in the hindfoot phase during the walking stride.

[0044] The shock-absorbing portions **14**, **15**, **16**, **17**, **18**, respectively for the hallux, for the first metatarsal head, for the central metatarsal heads, for the fifth metatarsal head and for the heel are made of open-cell shock-absorbing microcellular polyurethane material.

[0045] Said open-cell microcellular polyurethane material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 20 and 26 Shore A, with a preferred value of 23 Shore A; it further has a density, according to the UNI EN 10902/2000 standard, comprised between 279 and 341 g/dm^3, and preferably 310 g/dm^3; another important property is resilience, which is assessed according to the UNI 6357/1968 standard and is comprised between 3.8% and 4.2%, with a preferred value of 4%.

[0046] The portions **14**, **15**, **16**, **17** and **18** are therefore softer than the body **20** and have a lower resilience; accordingly, they can perform the task of cushioning the forces that arrive from the corresponding parts of the foot, absorbing them at least partly and reducing the risk of microtraumas or microfractures for said parts of the foot.

[0047] The more rigid portion **19** acts as a supination wedge and stabilizes the heel in all the phases of the shot and in the hindfoot phase during the walking stride.

[0048] The more rigid portion **19** extends, at the outer and rear band of the calcaneal region **13**, through the entire thickness of the insole **10** to its lower face, forming indeed a supination wedge.

[0049] The more rigid portion **19** is made of closed-cell expanded microporous material, and in the embodiment described here is based on EVA.

[0050] Said closed-cell expanded microporous material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 40 and 50 Shore A, with a preferred value of 45 Shore A.

[0051] Its density, according to the UNI EN 10902/2000 standard, is comprised between 207 and 253 g/dm^3, with a preferable value of 230 g/dm^3, while the resilience, according to the UNI 6357/1968 standard, is comprised between 33% and 37%, with a preferable value of 35%.

[0052] The greater hardness of the portion **19** which acts as a supination wedge entails a lower resilience of the insole **10** in that region, allowing indeed greater stability of the heel.

[0053] The anatomical body **20** of the insole **10** is provided with raised portions for perimetric containment.

[0054] A first raised portion **21** is contiguous to the portion for the fifth metatarsal head **17**, on the side of the longitudinal arch.

[0055] A second perimetric raised portion **22** lies on the outer side of the calcaneal region **13** at the lateral part of the more rigid portion **19**.

[0056] A discharge recess **23** for the styloid of the fifth metatarsal bone is provided between the first and second raised portions **21** and **22**; the recess **23** facilitates the movements of the foot and reduces the tensions in the periods of compression both during swings and during stances, in addition to optimizing the physiology of the walking stride.

[0057] The longitudinal arch of the foot is supported by a third perimetric raised portion **24** of the anatomical body **20**, which protrudes between the metatarsal region **12** and the calcaneal region **13**.

[0058] The third perimetric raised portion **24** allows to control the medial movement of the foot during the stance, the valgus movement (position for preparing for the valgoid condition of the knees) of the mesofoot during downswing and pronation during the walking stride.

[0059] In practice it has been found that the invention thus described achieves the intended aim and objects.

[0060] In particular, the present invention provides an insole for sports shoes, particularly for playing golf, which is capable of supporting and assisting the movements of the sole of the foot of a player, alleviating localized stresses thereof.

[0061] Moreover, the present invention provides an insole which can also be inserted in known types of shoe which are already commercially available.

[0062] The insole **10** according to the invention can be provided integrated in a shoe, but it is understood that it can also be provided separately, in a form such as a plantar insert, for insertion in a shoe at a later time.

[0063] Moreover, the present invention provides an insole which can be manufactured cheaply with known systems and technologies.

[0064] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0065] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0066] The disclosures in Italian Patent Application No. PD2006A000383 from which this application claims priority are incorporated herein by reference.

What is claimed is:

1. An insole for sports shoes, constituted by an anatomically contoured body that comprises a plurality of portions made of materials that differ from each other so as to provide a plurality of regions with differentiated mechanical properties suitable to optimize discharge of various forces affecting a foot of a user, said regions comprising at least:

a first phalangeal region,

a second metatarsal region,

a third calcaneal region.

2. The insole of claim **1**, comprising in said first phalangeal region thereof a hallux portion which corresponds to an area where a hallux of a user is located, in use, said hallux portion being made so as to cushion thrusts of the hallux.

3. The insole of claim **2**, further comprising shock-absorbing portions that are provided in said second metatarsal region thereof, said shock-absorbing portions including:

a first shock-absorbing portion located to contact a first metatarsal head of the foot of a user,

a second shock-absorbing portion which is located so as to correspond to central metatarsal heads of the foot,

and a third shock-absorbing portion which is located so as to correspond to a fifth metatarsal head of the foot.

4. The insole of claim **3**, comprising a central shock-absorbing portion located in said third calcaneal region, at the heel, and a more rigid portion at an outer and rear band of said calcaneal region.

5. The insole of claim **4**, wherein said more rigid portion lies, at said outer and rear band of the calcaneal region, through an entire thickness of the insole to a lower face thereof, forming a supination wedge.

6. The insole of claim **1**, wherein said anatomically contoured body is made of closed-cell expanded microporous material.

7. The insole of claim **6**, wherein said closed-cell expanded microporous material comprises ethyl vinyl acetate EVA.

8. The insole of claim **7**, wherein said closed-cell expanded microporous material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 27 and 33 Shore A, with a preferred value of 30 Shore A.

9. The insole of claim **8**, wherein said closed-cell expanded microporous material has a density, according to the UNI EN 10902/2000 standard, comprised between 130 and 160 g/dm^3, with a preferred value of 145 g/dm^3.

10. The insole of claim **9**, wherein said closed-cell expanded microporous material has a resilience, according to the UNI 6357/1968 standard, comprised between 38% and 42%, with a preferred value of 40%.

11. The insole of claim **4**, wherein said shock-absorbing portions for the hallux, for the first metatarsal head, for the central metatarsal heads, for the fifth metatarsal head and for the heel are made of open-cell shock-absorbing microcellular polyurethane material.

12. The insole of claim **11**, wherein said open-cell microcellular polyurethane material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 20 and 26 Shore A, with a preferred value of 23 Shore A.

13. The insole of claim **12**, wherein said open-cell microcellular polyurethane material has a density, according to the UNI EN 10902/2000 standard, comprised between 279 and 341 g/dm^3, with a preferred value of 310 g/dm^3.

14. The insole of claim **13**, wherein said open-cell microcellular polyurethane material has a resilience, according to the UNI 6357/1968 standard, comprised between 3.8% and 4.2%, with a preferred value of 4%.

15. The insole of claim **5**, wherein said more rigid portion is made at said outer rear band of the calcaneal region of closed-cell expanded microporous material.

16. The insole of claim **15**, wherein said closed-cell expanded microporous material comprises EVA.

17. The insole of claim **16**, wherein said closed-cell expanded microporous material has a hardness, according to the UNI EN 7619/2000 standard, comprised between 40 and 50 Shore A, with a preferred value of 45 Shore A.

18. The insole of claim **17**, wherein said closed-cell expanded microporous material has a density, according to the UNI EN 10902/2000 standard, comprised between 207 and 253 g/dm^3, with a preferred value of 230 g/dm^3.

19. The insole of claim **18**, wherein said closed-cell expanded microporous material has a resilience, according to the UNI 6357/1968 standard, comprised between 33% and 37%, with a preferred value of 35%.

20. The insole of claim **4**, wherein said anatomically contoured body is provided with perimetric raised containment portions.

21. The insole of claim **20**, comprising a first perimetric raised portion that is contiguous to said third shock-absorbing portion for the fifth metatarsal head, on a side corresponding to a longitudinal arch of the foot.

22. The insole of claim **21**, further comprising a second perimetric raised portion that protrudes on an outer side of said calcaneal region, at a lateral part of said more rigid portion.

23. The insole of claim **22**, comprising a discharge recess corresponding to a styloid of a fifth metatarsal bone of a foot of a user, that is provided between said first raised portion and said second raised portion.

24. The insole of claim **22**, comprising a third perimetric raised portion of said anatomical body, which lies between said metatarsal region and said calcaneal region, for supporting the longitudinal arch of the foot.

25. A golf shoe comprising an insole as set forth in claim **1**.

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