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(54) **Cycling shoe and relative manufacturing method**

(57) The present invention concerns a cycling shoe and a method of manufacturing thereof, wherein the upper (20) is extended over at least a portion of the distal face (52) of a sole (50) configured to support a cleat. The sole (50) and the cleat therewith are brought near the foot efficiently, obtaining an efficient energy transfer from the cyclist's foot to the pedal.

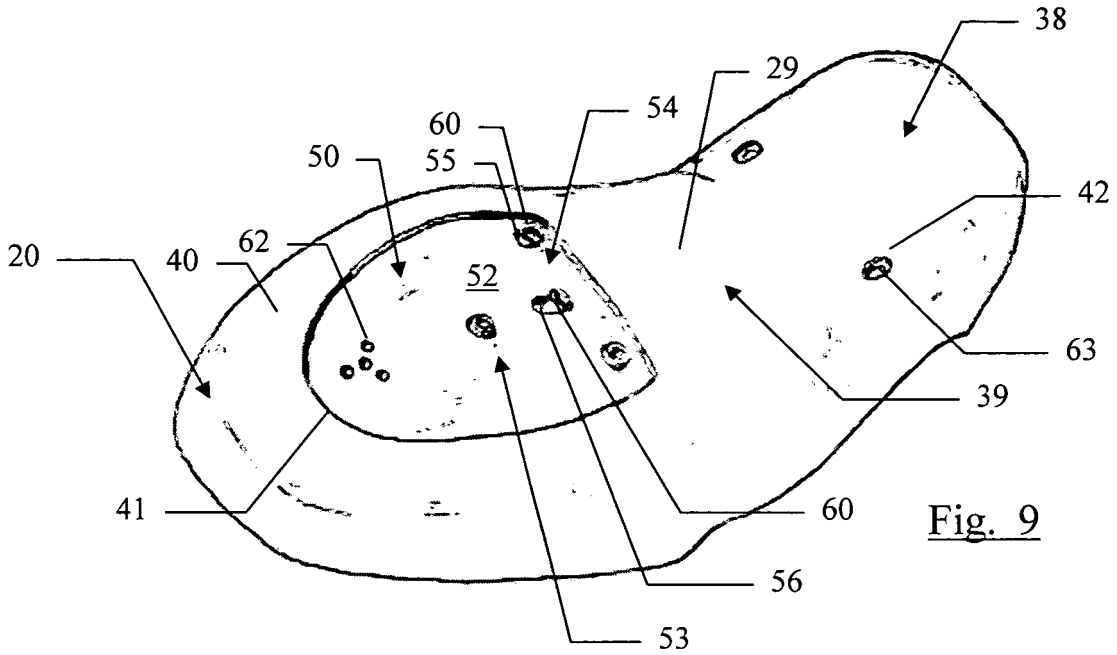


Fig. 9

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Description

[0001] The present invention concerns a cycling shoe and a method of manufacturing thereof, more specifically a shoe for a step-in or clip-in or clipless pedal.

[0002] Cycling shoes of the aforementioned type are described, for example, in EP0895728A1 and in EP1442670A1**,** upon which the preamble of claim 1 is based.

[0003] For a long time it has been understood that in order to increase the pedalling power on the pedal during the downward stroke of the foot and also exploit the upward stroke of the foot, the cycling shoe should be attached to the pedals.

[0004] To this end, modern step-in or clip-in or clipless pedals provide for a mechanism that allows them to be hooked to a specially shaped cleat, fixed under the shoe. Such step-in or clip-in or clipless pedals are well-known and therefore shall not be discussed in greater detail in the present disclosure.

[0005] In known cycling shoes, the cleat is fixed to a sole, rigid in the case of shoes for racing or road bicycles and slightly flexible in the case of mountain bike shoes. The sole is glued or in any case fixed under the upper of the shoe and therefore is located outside the upper. The upper is typically open at the bottom, in other words it covers just the dorsum of the foot, the toes and the back part of the heel, but it does not extend under the foot sole, except possibly for a peripheral edge intended for the glueing of the sole.

[0006] The Applicant observes that in the known solutions quoted above there is an energy loss in the energy transfer between the foot and the pedal, which the Applicant believes to be due to an imperfect contact between the foot sole and the area of the sole where the cleat is supported.

[0007] The technical problem at the basis of the present invention is to make a shoe that allows better control of the energy transfer from the foot to the pedal.

[0008] In a first aspect thereof, the invention concerns a cycling shoe comprising an upper and a sole defining a foot housing cavity, the sole being configured to support a cleat and having a proximal face with respect to the cavity and a distal face with respect to the cavity, **characterised in that** the upper extends over at least a portion of the distal face of the sole.

[0009] Thus, the proximal face of the sole is the upper or inner one, although it might not directly interface with the inside of the shoe due to the interposition of an insole; vice-versa, the distal face of the sole is the lower or outer one, although it might not come into direct contact with the pedal or the ground due to the interposition of a heel reinforcement element or stiffener and/or of a half sole and/or of an outer sole.

[0010] When the shoe is worn and closed by pulling the two side portions of the upper closer, the upper itself pulls the sole therewith, towards the foot. Since according to the invention the upper at least partially wraps around the sole from the outside, the sole and the cleat therewith are brought near the foot more efficiently than the cycling shoes of the prior art, since there is a thrusting effect of the upper on the sole. In this way a better contact - direct or indirect in case there is an insole - is obtained between the foot and the cleat. The energy transfer from the cyclist's foot to the pedal through the cleats supported on the sole is therefore more efficient.

[0011] Moreover, the possible glueing of the upper to the sole is less subject to stress, with a consequent longer lifetime of the shoe. Furthermore, since said glueing does not take place inside the foot housing cavity, rather outside the sole, in other words on the side of its distal face, possible spilled glue does not come into contact with the foot.

[0012] Preferably, the upper extends along at least a portion of a peripheral edge of the distal surface of the sole, and preferably along an entire peripheral edge of the distal surface of the sole.

[0013] Alternatively or in addition, preferably the upper extends in at least one region joining opposite peripheral edges of the distal surface of the sole.

[0014] The region joining opposite peripheral edges is preferably a region transversal to the sole, more preferably in the area of the heel and/or of the arch of the foot, even more preferably in the heel area.

[0015] Preferably, the upper extends over the distal face of the sole for at least 30%, more preferably for at least 70%, and even more preferably for at least 95% of the total surface of the distal face of the sole.

[0016] In a preferred embodiment, the upper comprises a lower portion extending under the entire heel and arch region of the foot.

[0017] In another preferred embodiment, the upper comprises a lower portion extending outside the entire sole, apart from one or more apertures for aeration and/or for passing elements for attaching the cleat to the sole. In other words, the upper defines a cavity having a mouth for the insertion of the foot, but otherwise it is substantially closed.

[0018] Typically, the sole is configured to support the cleat in a ball region, in other words between the arch of the foot and the toes.

[0019] The sole can comprise one or more internally threaded holes or similar seats for directly supporting the cleat, but preferably the shoe comprises a cleat holder associated with the sole, at a seat of the sole.

[0020] The holder can be irremovably fixed to the sole, for example through glueing or co-moulding, but preferably it is removably associated with the sole, so as to allow it to be replaced and/or adjusted with respect to the cleat.

[0021] Typically, the sole comprises at least one through opening in at least one recessed region of the proximal face, and the holder comprises at least one plate housed in the recessed region and carrying at least one threading at the at least one through opening.

[0022] Preferably, the threading is made in a protrusion

projecting from the plate, the protrusion extending in the through opening of the sole.

[0023] More preferably, the threading is a female threading.

[0024] Said at least one through opening can comprise one or more holes each sized to receive a respective one of said protrusions with threading in a predetermined position, and/or one or more slots each sized to receive a respective one of said protrusions with threading in one of a plurality of positions, so as to allow the position of attachment of the cleat to the sole to be adjusted, and to allow the holder to be adapted to different types of cleat.

[0025] Preferably, said at least one recessed region around said at least one slot is sized to receive the entire thickness of the plate in each of said plurality of positions of the protrusion with threading.

[0026] The sole can be a rigid body, for example made of a thermoplastic elastomer, preferably the copolymer of polyamide and polyether marketed as PEBAX® by Arkema, France; a polymeric material reinforced with fibre such as carbon fibre, glass fibre, etc.; a metallic material, for example aluminium; a wooden material; or combinations thereof or other materials well known in the field. The sole can also comprise one or more inner cavities, filled with air or with a foamed material, as described for example in the quoted document EP1442670A1, incorporated herein by reference, or filled with gel. A rigid sole is preferred in the case of a shoe for a racing, road or exercise bicycle.

[0027] Alternatively, the sole can be a flexible body of a substantially rigid material, in other words it is made of a material having sufficient rigidity to maintain the overall shape of the sole and support the cleat, but having a certain flexibility, for example made of nylon or rubber with reinforcements of carbon or glass fibre or other materials well known in the field. A sole having a certain flexibility is preferred in the case of a mountain bike shoe.

[0028] Typically, the upper is made of one or a combination of flexible materials, comprising microfiber, hide, imitation leather, leather, fabric, fabric comprising reinforcing fibres for example carbon fibres or glass fibres or similar, mesh, padded fabric, stretch fabric, polyethylene, or other materials well known in the field, and it comprises fastening elements such as strips of hook and loop fastening material (VELCRO™) and/or members for guiding and/or locking laces or cords, such as eyelets, grooves, snap locking members, etc.

[0029] The shoe can further comprise at least one insole that is flexible, soft, thermally insulating, breathable, anatomical, for example made from of foamed material or gel, for example polyethylene or other materials well known in the field. Preferably, the insole is coated on top with an anti-abrasive fabric, for example polyester.

[0030] The shoe preferably further comprises a half sole or finishing sole.

[0031] Since the half sole extends in the ball and toe regions, it is provided with through openings to allow the cleat to be fixed to the respective seats or to the holder associated with the sole.

[0032] The shoe preferably further comprises a heel reinforcement element or stiffener extending under and preferably also around the heel, overlapping the back and/or side of the upper outside the sole.

[0033] In the case of a shoe for racing/road/exercise bicycles, the half sole and the heel reinforcement element are typically made of a rigid material, for example a polymeric material reinforced with carbon fibre, glass fibre, etc. or another material well known in the field, the same as or different from the one of which the sole is made.

[0034] The half sole is preferably provided with apertures, preferably shielded by dust-retaining meshes.

[0035] The heel reinforcement element is preferably provided with apertures, at which a retro reflective, for example mesh like material is inserted.

[0036] The shoe for racing/road/exercise bicycles is also preferably provided with anti-slip protrusions, so-called studs, preferably made of polyurethane or other materials well known in the field. Said anti-slip protrusions are preferably fixed, for example through a threaded attachment, heat-sealing, glueing or co-moulding, to the half sole and/or to the heel reinforcement element, where provided for, but they can be fixed directly to the sole.

[0037] The half sole and the heel reinforcement element can also be joined by rigid or semi rigid elements.

[0038] As an alternative to the half sole and the heel reinforcement element, the shoe can comprise an outer sole.

[0039] On the other hand, in the case of a mountain bike shoe, the half sole and the heel reinforcement element are typically made of textured rubber, referred to as "heavy-duty".

[0040] The sole and the upper are typically fixed to one another through glueing, but they can be fixed through other means like for example stapling or stitching.

[0041] However, the sole and the upper may also not be fixed to one another, the mutual position remaining predetermined thanks to the insertion of the sole in the foot housing cavity that is substantially defined by the upper according to the invention. Moreover, the half sole and/or the heel reinforcement element and/or the outer sole, where provided for, contribute to maintaining the predetermined mutual position between sole and upper.

[0042] The shoe according to the invention can also comprise a cleat, although this is typically marketed separately.

[0043] In another aspect thereof, the invention concerns a kit of parts comprising a shoe as described above and at least one additional cleat holder.

[0044] In another aspect thereof, the invention concerns a method of manufacturing a cycling shoe comprising the steps of providing an upper, providing a sole configured to support a cleat, and associating the upper with the sole defining a foot housing cavity, the sole having a proximal face with respect to the cavity and a distal face with respect to the cavity, **characterised in that** the

step of associating the upper with the sole comprises extending the upper over at least one portion of the distal face of the sole.

[0045] More specifically, the step of associating the upper with the sole comprises laying the sole with the proximal face onto a last, and inserting the upper onto the last having the sole positioned, extending the upper over said at least one portion of the distal face of the sole.

[0046] The step of laying the sole onto the last can be preceded by a step of associating a cleat holder with the proximal face of the sole, at at least one through opening thereof.

[0047] Preferably, the holder is just rested in at least one cavity of the proximal face of the sole, but the step of associating the cleat holder with the proximal face of the sole can comprise fixing the holder to the sole, in particular to its proximal face.

[0048] The step of associating the upper with the sole can comprise fixing and preferably glueing the upper to the distal face of the sole along said at least one portion.

[0049] Alternatively or in addition, the method can comprise the step of positioning a half sole over the last, sole and upper assembly, in foot ball and toe regions of the sole, and fixing the half sole to the sole and/or to the upper.

[0050] Alternatively or in addition, the method can comprise the step of positioning a heel reinforcement element over the last, sole and upper assembly, in a heel region of the sole and/or heel region of the upper, and fixing the half sole to the sole and/or to the upper.

[0051] The method can further comprise the step of associating at least one anti-slip protrusion with the sole, with the half sole and/or with the heel reinforcement element.

[0052] The method successively comprises the step of removing the last.

[0053] The method can further comprise the step of inserting at least one insole into the foot housing cavity, over the proximal face of the sole.

[0054] The method can further comprise the step of fixing the cleat to the sole, through the holder where provided for.

[0055] Further features and advantages of the invention shall become clearer from the description of some preferred embodiments thereof, made with reference to the attached drawings, wherein:

- fig. 1 is a left side view of a shoe according to the invention,
- fig. 2 is a right side view of the shoe of fig. 1,
- fig. 3 is a bottom view of the shoe of fig. 1,
- figs. 4 to 11 are partial diagrammatic views of components of the shoe of fig. 1, in different steps of a preferred manufacturing method, and more specifically:
- fig. 4 is a diagrammatic view of a sole of the shoe of fig. 1, and of a cleat holder associated therewith in the shoe,
- fig. 5 is a partially sectioned view of an element of the cleat holder of fig. 4,
- fig. 6 is a diagrammatic view of the sole with the cleat holder associated therewith,
- fig. 7 is a diagrammatic view of the sole and cleat holder assembly mounted on a last during the manufacture of the shoe of fig. 1,
- figs. 8 and 9 diagrammatically illustrate the assembly of the upper during the manufacture of the shoe of fig. 1,
- fig. 10 is an exploded view of a heel reinforcement element of the shoe of fig. 1,
- fig. 11 is a diagrammatic view of the shoe of fig. 1,
- fig. 12 is view of an optional insole of the shoe of fig. 1, and
- fig. 13 is a diagrammatic view of the shoe of fig. 1, having a cleat fixed to the sole, and
- fig. 14 is a diagrammatic view of an assembly step of the shoe of fig. 1, wherein the upper is according to an alternative embodiment.

[0056] Figures 1 to 3 are views of a shoe 10 according to a preferred embodiment of the present invention. The shoe 1 depicted is a right shoe, but those skilled in the art will understand that a left shoe will be a mirror image thereof, and therefore does not require further description.

[0057] The shoe 1 depicted is a shoe for racing or road or exercise bicycles.

[0058] The shoe 1 comprises an upper 20. The upper 20 is a substantially flexible body shaped around a foot housing cavity 12 and more specifically it comprises a toe portion 21, a heel portion 22, two side portions 23, 24, and a tongue 28 located between them. According to the invention and as described more clearly herein after, the upper 20 further comprises a lower portion 29 extending outside a sole 50, not visible in figures 1-3 since it is covered by the upper 20, said sole 50 being configured to support a cleat 100 (fig. 13).

[0059] The portions 21-29 described above of the upper 20 are made of hide, optionally perforated, and they are joined by sewn inserts 30 of padded microfiber.

[0060] The upper 20 further comprises closing means 25, comprising a strap 32 that can be folded around a loop 33 and fixable through hook and loop fastening means (of the VELCRO™ type) roughly between the dor-

sum of the foot and the toes, and guide grooves 35 along the dorsum of the foot for a lace or cord 36, as well as a traction and locking system 37 for the lace 36.

[0061] The upper 20 can further comprise an inner layer, not visible in figures 1 and 2, for example an inner layer made of hide optionally perforated, and/or microfiber.

[0062] Those skilled in the art will understand that the upper 20 can differ even substantially from the one illustrated only by way of an example in figures 1 and 2, and it can be made in one or any combination of the substantially flexible materials quoted above or other materials well known in the field.

[0063] The closing elements 25 of the upper 20 can also differ even substantially from those illustrated only by way of an example in figures 1 and 2, for example they can comprise, instead of the lace or cord 36, one or more further VELCRO™ fastening straps, or just the lace 36, or even a zip. The guide grooves 35 of the lace 36, where provided for, can be entirely or partially replaced by eyelets or hooks. The closing means 25 can also consist of an insert or stretch fabric between the side portions 23, 24.

[0064] The shoe 1 further comprises a half sole 70 and a heel reinforcement element or stiffener 80, extending outside the upper 20 in the bottom/back part of the shoe.

[0065] More specifically, the half sole 70 extends in the region of the front part of the foot sole (toes and ball), possibly slightly overlapping the upper in its side portions 23, 24.

[0066] The heel reinforcement element or stiffener 80 extends under and preferably also around the heel, overlapping the upper 20 for part of its heel portion 22 and its side portions 23, 24.

[0067] In the arch region of the foot, the lower portion 29 of the upper 20, extending outside the sole 50, faces the outside of the shoe 1.

[0068] The half sole 70 and the heel reinforcement element 80 are made of a rigid material, for example a polymeric material reinforced with carbon fibre, glass fibre, etc.

[0069] In the illustrated embodiment, the half sole 70 is provided with an aeration aperture 71 shielded by a mesh 72 for retaining dust.

[0070] In the illustrated embodiment, moreover, the heel reinforcement element 80 is provided with openings 81, at which a retro reflective material 82 is inserted, for example a mesh.

[0071] The shoe 1 further has anti-slip protrusions 73, 83, so-called studs. The anti-slip protrusions 73, 83 can, for example, be made of polyurethane. The anti-slip protrusions 73 are fixed to the half sole 70 by heat-sealing, while the anti-slip protrusions 83 are fixed to the heel reinforcement element 80 through screws 84. However, the anti-slip protrusions 73, 83 can be left out, be included in a different number and arrangement, and they can even be fixed to the sole 50 in the region covered neither by the half sole 70 nor by the heel reinforcement element 80. Moreover, the anti-slip protrusions 73, 83 can be fixed to the half sole 70, to the heel reinforcement element 80 and/or to the sole 50 - in case with interposition of the upper 20 - by whatever means, including co-moulding.

[0072] In the case of a mountain bike shoe, not shown, the rigid half sole 70 and the heel reinforcement element 80 provided with anti-slip protrusions 73, 83 are preferably replaced by a half sole and a heel reinforcement element of the "heavy-duty" type, in other words made of textured rubber or para rubber.

[0073] In fig. 3, at the half sole 70, a cleat holder 54 (fig. 13) for a cleat 100 is also shown, better described hereinafter.

[0074] Although it cannot be seen in figs. 1-3, the shoe 1 further preferably comprises an insole 90 (fig. 12), which is flexible, soft, thermally insulating, breathable, anatomical, for example made of a foamed material or gel, for example polyethylene. Preferably, the insole is coated on top with an anti-abrasive fabric, for example polyester.

[0075] With reference to figs. 4 to 13 the shoe 1 shall now be better described, with reference to a preferred method of manufacturing thereof.

[0076] Fig. 4 illustrates a preferred embodiment of the sole 50 configured to support a cleat 100. The sole 50 is a substantially two-dimensional body, under this it being meant that the thickness of the sole 50 is much smaller than its average longitudinal and transversal dimensions, the shape of which substantially corresponds to the outline of a foot sole. The sole 50 comprises a proximal face 51 that, in the shoe 1, faces towards the foot housing cavity 12, and therefore towards the cyclist's foot when the shoe is worn, and a distal face 52 opposite the proximal face 51, and therefore facing towards the outside of the shoe 1 and, when it is worn, towards the pedal and the ground.

[0077] The proximal face 51 of the sole 50 can be shaped more or less anatomically through suitable concavities and convexities, which can be recognized in fig. 4.

[0078] The sole 50 comprises, in the ball region, in other words intended to come into contact with the foot sole between the toes and the arch of the foot, a seat 53 for a cleat holder 54 of the cleat 100.

[0079] The seat 53 comprises a plurality of through openings, more specifically three through holes 55 arranged at the vertices of a fictitious triangle, and a through slot 56 arranged between the holes 55.

[0080] In the seat 53, the through openings 55, 56 are made at respective recessed regions 57, 58 of the proximal face 51 of the sole 50.

[0081] The holder 54 comprises four plates 59, each having - as illustrated in fig. 5 - a protruding protrusion 60 having an internally threaded hole 61.

[0082] With reference also to figures 6 and 7, the protrusions 60 of three of the four plates 59 are inserted into the through holes 55, which are suitably sized to receive them in a predetermined position, and protrude slightly

from the distal face 52 of the sole 50. The three plates 59 are preferably completely housed in the recessed regions 57, and are flush with the proximal face 51 of the sole 50.

[0083] The protrusion 60 of the fourth plate 59 is inserted in the slot 56, which is sized to receive it in any of a plurality of positions, and it also protrudes slightly from the distal face 52 of the sole 50. The fourth plate 59 is housed in the recessed region 58, and is flush with the proximal face 51 of the sole 50. The recessed region 58 is sized to receive the fourth plate 59 in any position of the protrusion 60 in the slot 56, for which reason the recessed region 58 is not completely filled by the fourth plate 59. Nevertheless, the resulting recess does not cause discomfort when the shoe is worn, even without the insole 90 (fig. 12). Similarly, even if not all four plates 59 of the holder 54 are used, the recessed regions 57, 58 and the openings 55, 56 does not cause discomfort when the shoe is worn.

[0084] The plates 59 can be irremovably fixed to the sole 50, for example through glueing, but preferably they are removably associated with the sole 50, so as to allow the displacement and/or movement of the plate 59 associated with the slot 56 to adjust the holder 54 according to the type of cleat 100.

[0085] Those skilled in the art will understand that the holder 54 and the respective seat 53 in the sole 50 can be configured in various other ways, also in view of the shape of the cleat(s) 100 to be associated with the shoe 1, for example the seat 53 can comprise only one or a different number of through openings (holes or slots) than four shown in fig. 4. All or some of the individual recessed regions 57, 58 around each through opening 55, 56 can be replaced by a single recessed region, or even be omitted, although this is less preferred since the holder 54 would thus protrude from the proximal surface 51 of the sole 50 and could cause discomfort to the cyclist's foot.

[0086] The holder 54 can also be co-moulded with the sole 50.

[0087] As an alternative to the use of the holder 54, the cleat 100 can be secured directly to the sole 50 in a corresponding seat, for example comprising internally threaded holes directly made in the sole 50 or in metallic inserts co-moulded, glued or fixed in another way to the sole 50, or externally threaded elements fixedly connected to the sole in one of the aforementioned ways, etc. Said seat for the direct attachment of the pedal 100 may not extend up to the proximal surface 51 of the sole 50.

[0088] The sole 50 further comprises one or more aeration through holes 62, illustrated by way of an example in the toe region of the foot.

[0089] The sole 50 is made of a substantially rigid material, for example a thermoplastic elastomer, preferably the copolymer of polyamide and polyether marketed as PEBAX® by Arkema, France; a composite material comprising a polymeric material reinforced with fibre such as carbon fibre, glass fibre, etc.; a metallic material, for example aluminium; a wooden material; or combinations thereof. The sole can also comprise one or more inner cavities, filled with air or with a foamed material, as described for example in the quoted document EP1442670A1, or filled with gel. The rigidity of the material and the thickness of the sole 50 should be sufficient to allow the supporting of the cleat 100.

[0090] Alternatively, for example in the case of a mountain bike shoe 1, the sole 50 can be made of a material having sufficient rigidity to maintain its shape and support the cleat 100, but having a certain flexibility, for example nylon or rubber with carbon fibre or similar reinforcements.

[0091] Going back to the preferred method of manufacturing the shoe 1, with reference to figure 7, the sole 50 having the holder 54 associated therewith is laid with the proximal face 51 onto a last 102. The holder 54, even if it is not glued to the sole 50, still stays held between the sole 50 and the last 102 in this step. In figure 7 two blind holes 63 made in the heel region of the distal face 52 of the sole 50 can also be seen, to receive positioning pins 89 for the heel reinforcement element 80 (visible in figure 10).

[0092] With reference to figures 8 and 9, the upper 20 is inserted and more specifically put onto the last 102, having the sole 50 with the holder 54 positioned thereon. In such figures, as well as in those described hereinafter, the upper 20 is represented totally diagrammatically. However, the lower portion 29 of the upper 20 is evident. Such a lower portion 29 extends under the entire heel region 38 and arch region 39 of the foot. The lower portion 29 of the upper 20 also comprises a peripheral edge 40 in the region of the ball and toes, so that the lower portion 29 of the upper 20 extends along the entire peripheral edge of the distal face 52 of the sole 50. The lower portion 29 of the upper 20 extends over the distal face 52 of the sole 50 for about 70% of the total surface of the distal face 52 of the sole 50.

[0093] Internally of the peripheral edge 40, the upper 20 comprises an aperture 41, which permits access to the aeration holes 62 and to the seat 53 of the sole 50 and to the holder 54 for cleat 100 on the sole 50. In the heel region 38, the upper 20 comprises two apertures 42 that permit access to the blind holes 63 of the sole 50 for receiving the positioning pins 89 of the heel reinforcement element 80.

[0094] The upper 20, put onto the sole 50 arranged onto the last 102, can be fixed to the sole 50 for example through glueing, stapling or sewing - possibly providing holes drilled along the peripheral edge of the sole 50 in the case of a material not easily punctured by a sewing needle. Thanks also to the substantially closed shape of the upper 20, which provides just for the aperture 41 and the mouth of the foot housing cavity 12, and thanks also to the half sole 70 and to the heel reinforcement element 80 where provided for, the sole 50 is in any case in a predetermined position with respect to the upper 20, even if they are not fixed to one another.

[0095] Figure 10 is an exploded view of the heel rein-

forcement element 80 of the shoe 1, showing how the retro reflective elements 82 are associated with the openings 81 of the heel reinforcement element 80 and how the anti-slip protrusions 83 are fixed to the heel reinforcement element 80 making the screws 84 pass into holes 85 of the anti-slip protrusions 83 and screwing them into internally threaded holes 85a, preferably made in metallic inserts 86 preferably co-moulded with the heel reinforcement element 80. Positioning pins 87 protruding from the anti-slip protrusions 83 are received in blind holes 88 of the heel reinforcement element 80. As mentioned above, the heel reinforcement element 80 also comprises two positioning pins 89 arranged so as to pass through the apertures 42 of the upper 20 and be inserted into the blind holes 63 of the distal face 52 of the sole 50.

[0096] As illustrated in figure 11, the heel reinforcement element 80 is then positioned over the last 102, sole 50 and upper 20 assembly, fixing it to the heel portion 22, 38 thereof, for example through glueing and/or to the sole 50, for example through the screws 84 themselves.

[0097] Moreover, the half sole 70 provided with the anti-slip protrusions 73 is positioned over the last 102, sole 50 and upper 20 assembly, fixing it to the peripheral edge 40 of the upper 20 and/or to the ball and toe regions of the sole 50 for example through glueing or other suitable means, such as screws and staples. The aeration opening 71 of the half sole 70, covered by the mesh 72, is at the aeration holes 62 of the sole 50.

[0098] Moreover, in figure 11 through openings 74, 75 may be recognized with shape, size and position corresponding to the through openings 55, 56 of the sole 50. The protrusions 60 protruding from the plates 59 of the holder 54 are housed in such through openings 74, 75 of the half sole 70, preferably without protruding from the half sole 70.

[0099] The shoe 1 thus manufactured is then extracted from the last 102.

[0100] As stated, figure 12 is a representative view of the insole 90 that is optionally inserted into the foot housing cavity 12 , in contact with the proximal face 51 of the sole 50. It should be noted that the upper 20 is not arranged between the proximal face 51 of the sole 50 and the insole 90. Since there is no peripheral edge of the upper 20 under the insole 90, the comfort of the foot is therefore increased.

[0101] Figure 13 illustrates an exemplary cleat 100 fixed to the sole 50 through one or more screws 101 screwed into the internally threaded holes 61 of the holder 54, possibly positioning the protrusion 60 along the slot 56 so as to take it at the respective screw 101 of the cleat 100.

[0102] It is worthwhile highlighting that the cycling shoe 1 is typically marketed, obviously together with the left shoe, without cleat 100, which is fixed to the shoe 1 by the cyclist, but it could also be marketed complete with cleat 100. In this case, it should be understood that further means for attaching the cleat 100 to the sole 50 are possible, for example by replacing the screw attachment with riveting, welding, glueing and similar.

[0103] Vice-versa, the shoe 1 can also be marketed without the cleat holder 54, which can in any case be easily replaced from inside the shoe 1, by simply removing the insole 90, where provided for.

[0104] When the shoe 1 is worn and closed by pulling the two side portions 23, 24 of the upper 20 closer for example through the strap 32 and/or the lace 36, the upper 20 itself pulls the sole 50 therewith towards the foot. Since the upper 20 partially wraps around the sole 50 from the outside, through its lower portion 29, the sole 50 and the cleat 100 therewith are brought near the foot in a very efficient manner, having a thrusting effect of the upper on the sole. In this way an effective contact - direct or indirect in case there is the insole 90 - is obtained between the foot and the cleat 100. When the cleat 100 is attached to the bicycle pedal, the foot is therefore in effective contact with the pedal, and the energy transfer from the cyclist's foot to the pedal is therefore very efficient. Since the contact between foot and pedal is maintained, there is no energy loss due to the need to cover a gap between foot and holder 54 for cleat 100, or between foot and sole 50, which in the shoes of the prior art is more easily created during the upward movement of the foot.

[0105] It should be noted that, although the cleat 100 is fixed to the shoe 1 in the ball region, the upper 20 extending outside the sole 50 in the arch and heel region of the foot is remarkably effective since it is this region of the foot that moves most during the pedalling movement.

[0106] Figure 14 illustrates an alternative embodiment of the upper 20', illustrated in the assembly step of the shoe corresponding to fig. 9, namely associated with and possibly fixed to the sole 50 with the holder 54 of cleat 100, but before the possible assembly of the half sole 70 and of the heel reinforcement element 80.

[0107] The upper 20' differs from the upper 20 in that its lower portion 29' extends under, namely outside the entire sole 50, in other words the aperture 41 is absent, smaller apertures being provided for, in particular an aperture 41 a at the aeration holes 62 of the sole 50, and apertures 41 b at the openings 55, 56 of the sole. The upper 20' therefore defines a foot housing cavity 12 that is substantially closed at the bottom. The upper 20' extends over the distal face 52 of the sole 50 for about 95% of the total surface of the distal face 52 of the sole 50. The traction force of the sole 50 towards the foot through the upper 20' is therefore at the maximum.

[0108] Vice-versa, the upper of the shoe 1 of the invention can extend over an as small amount of the distal surface 52 of the sole as about 30% of the total surface of the distal face 52 of the sole 50.

[0109] The upper of the shoe 1 of the invention can, in its lower portion 29, comprise only a peripheral edge extending along at least a portion of the peripheral edge of the distal face 52 of the sole 50, and preferably along the entire peripheral edge of the distal face 52 of the sole 50.

[0110] Alternatively or in addition, the upper can extend in at least one region joining opposite peripheral edges, in a similar way to a gaiter strap. Preferably, such a region joins opposite peripheral edges in a region transversal to the sole 50, more preferably in the area of the heel and/or of the arch of the foot.

[0111] The half sole 70 and the heel reinforcement element 80 can also be joined by rigid or semi rigid elements.

[0112] As an alternative to the half sole 70 and the heel reinforcement element 80, the shoe 1 can comprise an outer sole.

Claims

1. Cycling shoe (1) comprising an upper (20, 20') and a sole (50) defining a foot housing cavity (12), the sole (50) being configured to support a cleat (100) and having a proximal face (51) with respect to the cavity (12) and a distal face (52) with respect to the cavity (12), **characterised in that** the upper (20, 20') extends over at least a portion of the distal face (52) of the sole (50).

2. Cycling shoe (1) according to claim 1, wherein the upper (20, 20') extends along at least a portion of a peripheral edge of the distal surface (52) of the sole (50).

3. Cycling shoe (1) according to claim 1 or 2, wherein the upper (20, 20') extends in at least one region joining opposite peripheral edges of the distal surface (52) of the sole (50).

4. Cycling shoe (1) according to any of the previous claims, wherein the upper (20, 20') extends over the distal face (52) of the sole (50) for at least 30%, preferably for at least 70%, and more preferably for at least 95% of the total surface of the distal face (52) of the sole (50).

5. Cycling shoe (1) according to any of the previous claims, wherein the upper (20, 20') comprises a lower portion (29, 29') extending under the entire heel and arch region of the foot.

6. Cycling shoe (1) according to any of the previous claims, wherein the upper (20') comprises a bottom portion (29') extending outside the entire sole (50), apart from one or more apertures (41 a, 41 b).

7. Cycling shoe (1) according to any of the previous claims, comprising a cleat holder (54) associated with the sole (50), at a seat (53) of the sole (50).

8. Cycling shoe (1) according to claim 7, wherein the holder (53) is removably associated with the sole (50).

9. Cycling shoe (1) according to any e of the previous claims, further comprising at least one insole (90).

10. Cycling shoe (1) according to any of the previous claims, further comprising a half sole (70).

11. Cycling shoe (1) according to any of the previous claims, further comprising a heel reinforcement element (80).

12. Cycling shoe (1) according to any of the previous claims, further comprising a cleat (100).

13. Kit of parts comprising a shoe (1) according to any of the previous claims, and at least one additional holder (54) for a cleat (100).

14. Method of manufacturing a cycling shoe (1) comprising the steps of:

    - providing an upper (20, 20'),
    - providing a sole (50) configured to support a cleat (100), and
    - associating the upper (20, 20') with the sole (50) defining a foot housing cavity (12), the sole (50) having a proximal face (51) with respect to the cavity (12) and a distal face (52) with respect to the cavity (12),

    characterised in that the step of associating the upper (20, 20') with the sole (50) comprises extending the upper (20, 20') over at least one portion of the distal face (52) of the sole (50).

15. Method according to claim 14, wherein the step of associating the upper (20, 20') with the sole (50) comprises laying the sole (50) with the proximal face (51) onto a last (102) and inserting the upper (20, 20') onto the last (102) having the sole (50) positioned, extending the upper (20, 20') over said at least one portion of the distal face (52) of the sole (50).

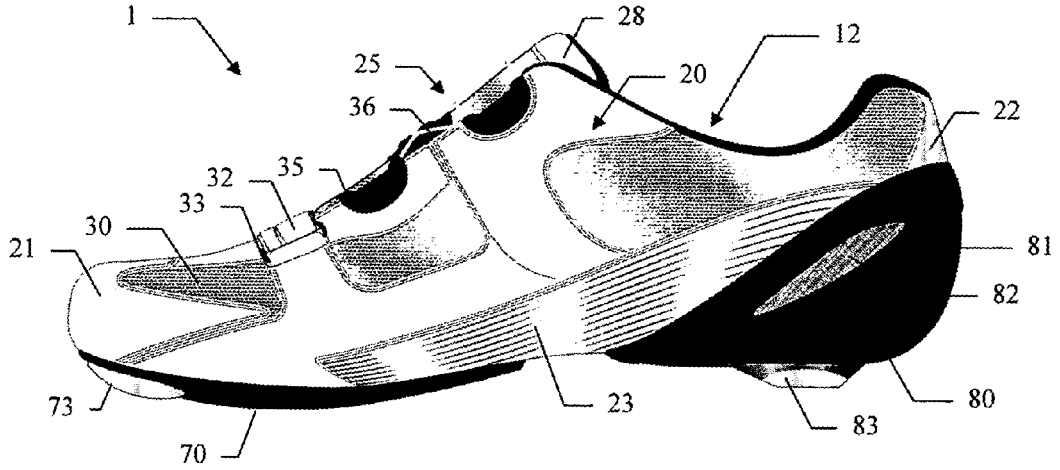


Fig. 1

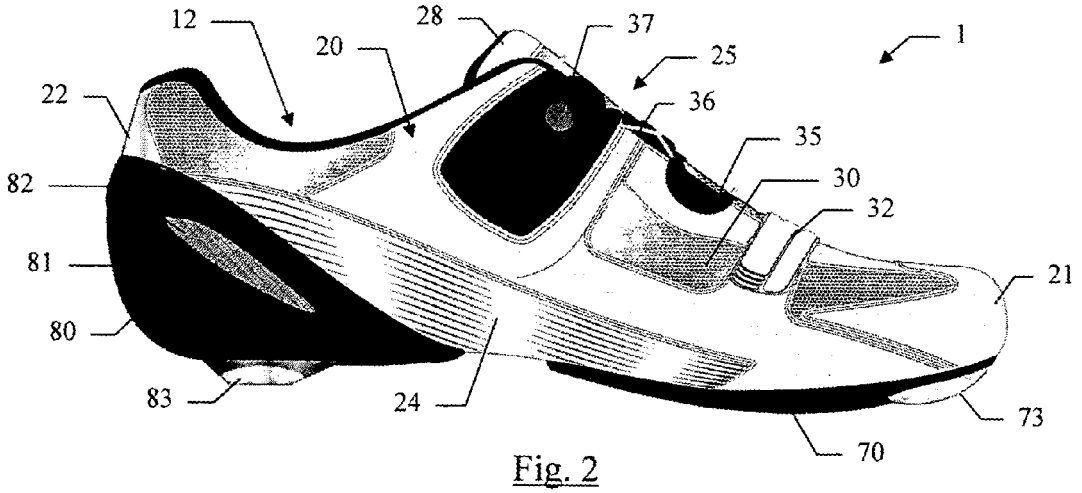


Fig. 2

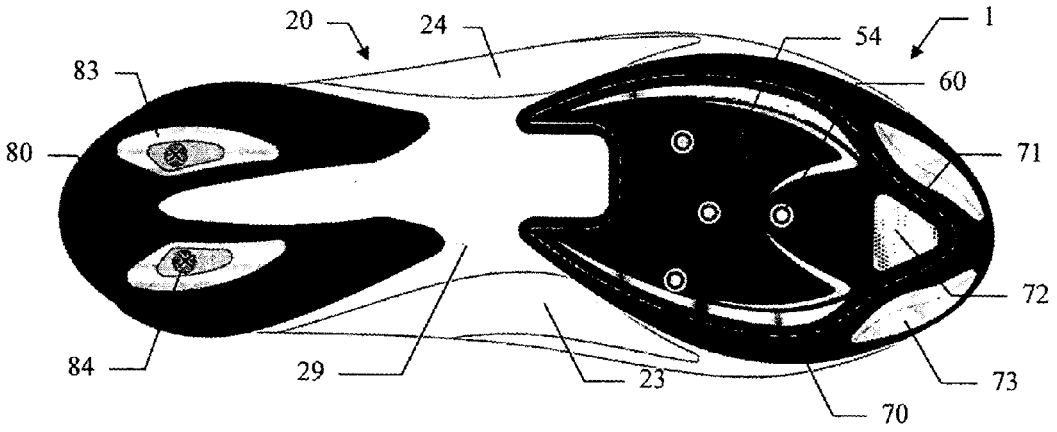


Fig. 3

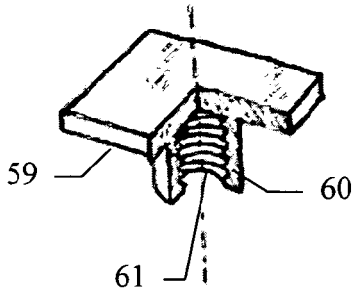


Fig. 5

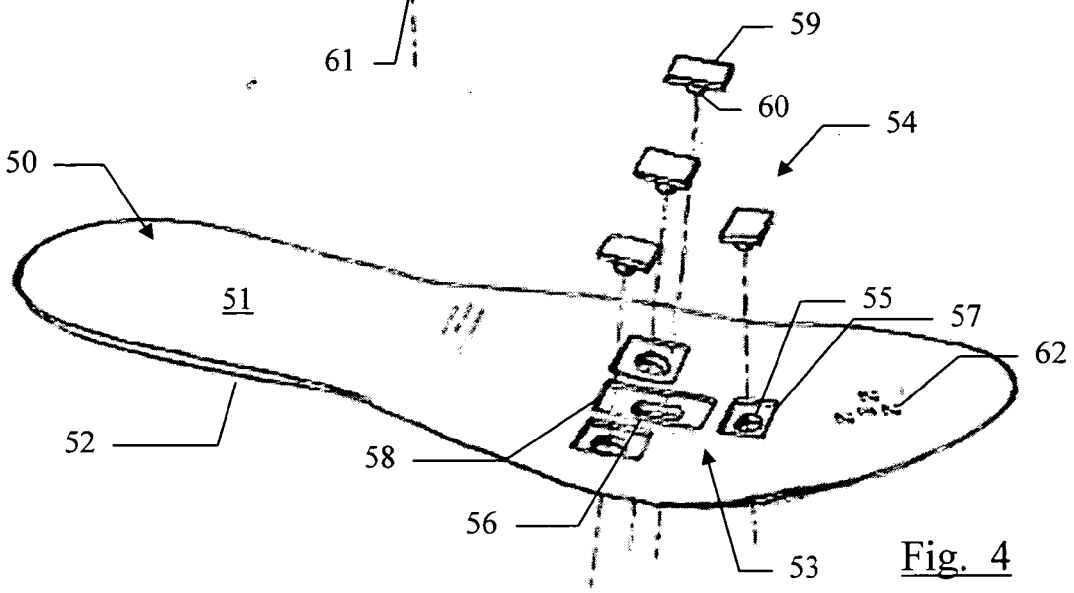


Fig. 4

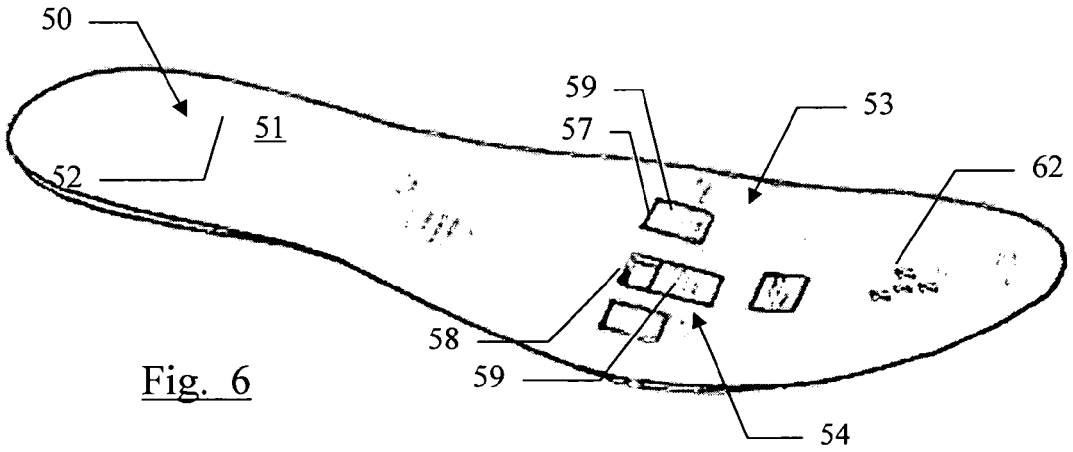


Fig. 6

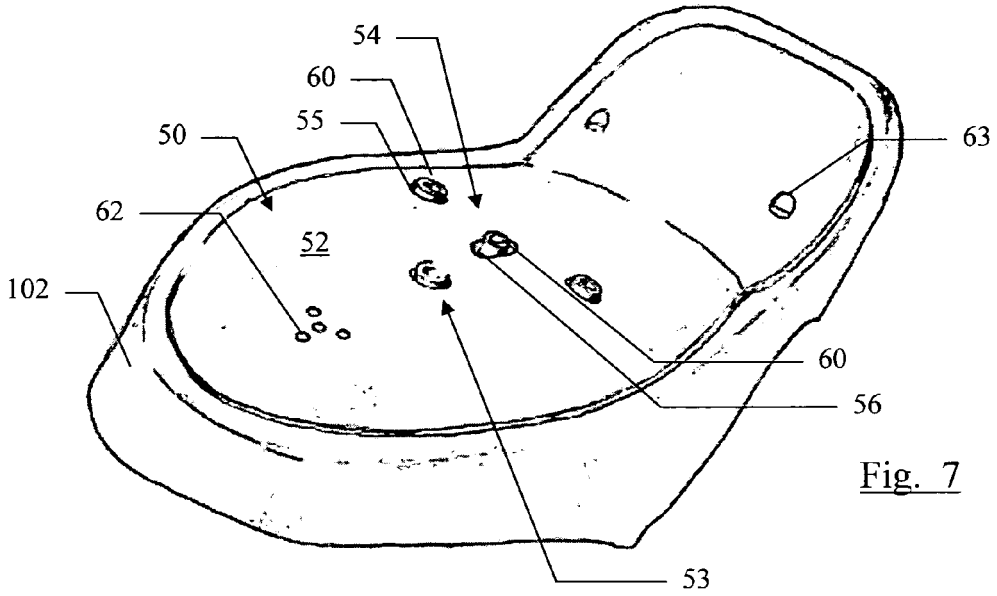

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Fig. 7

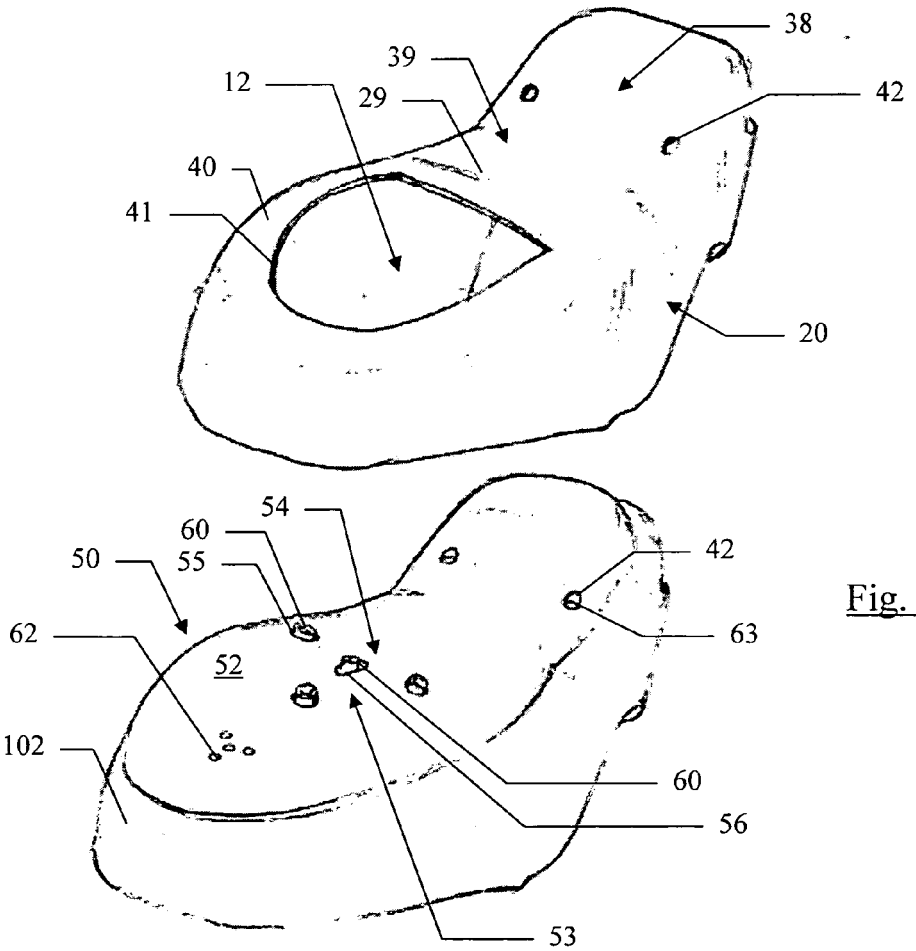

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Fig. 8

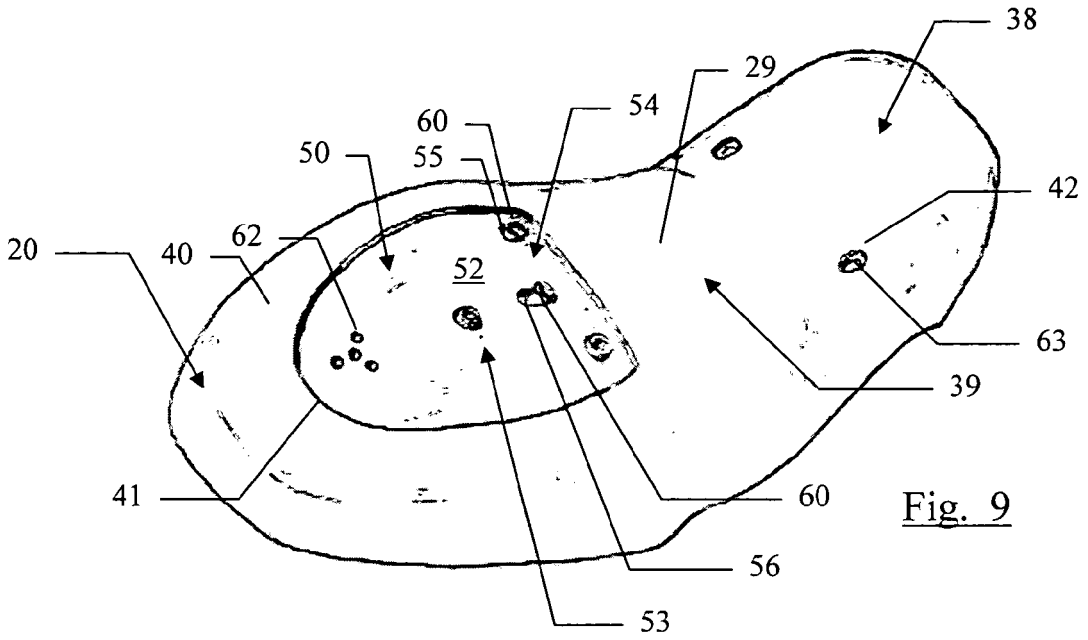

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Fig. 9

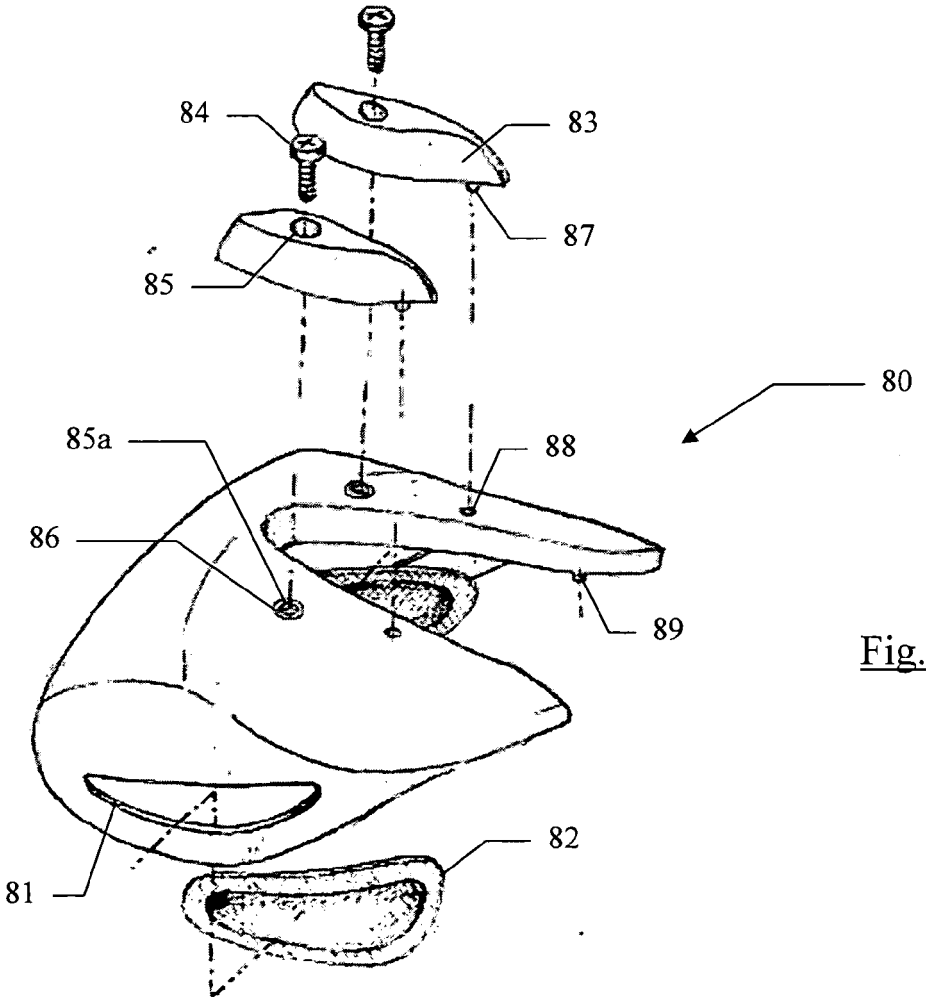

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85a
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Fig. 10

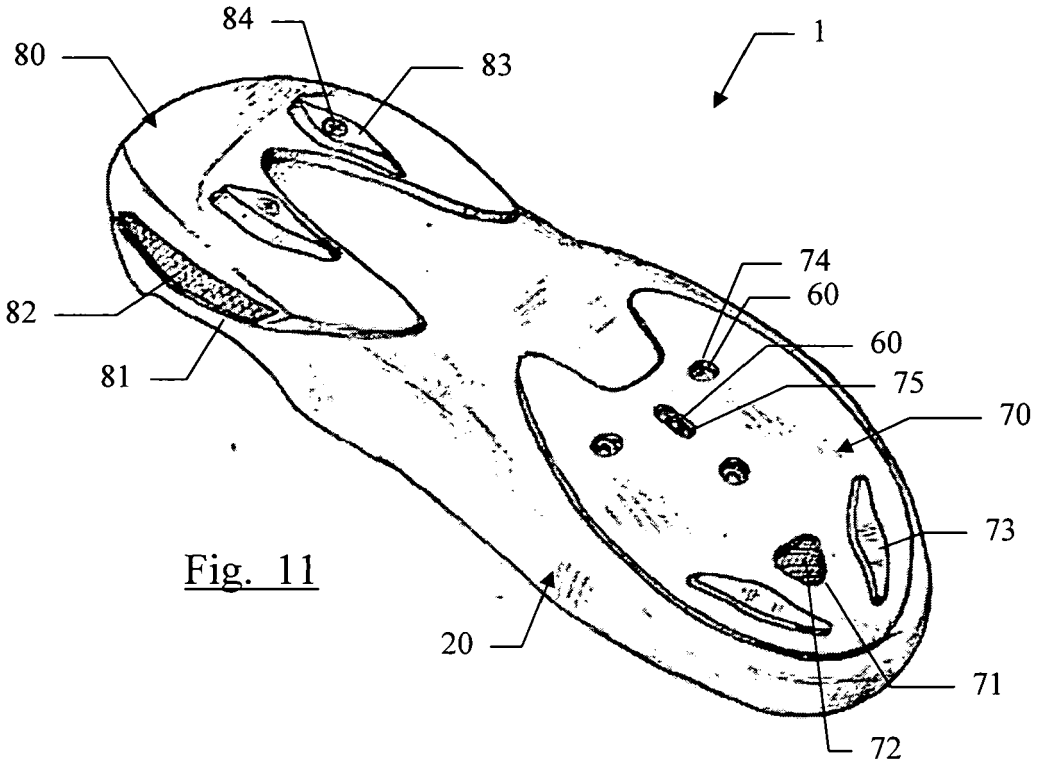


Fig. 11

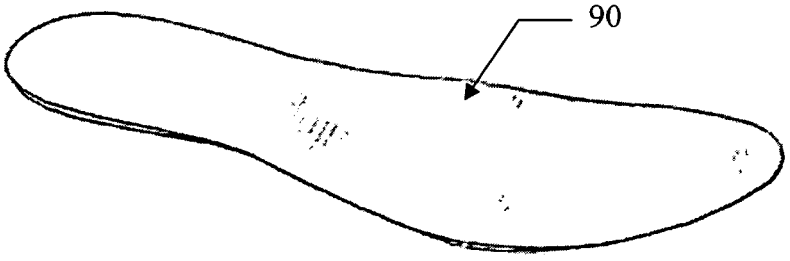


Fig. 12

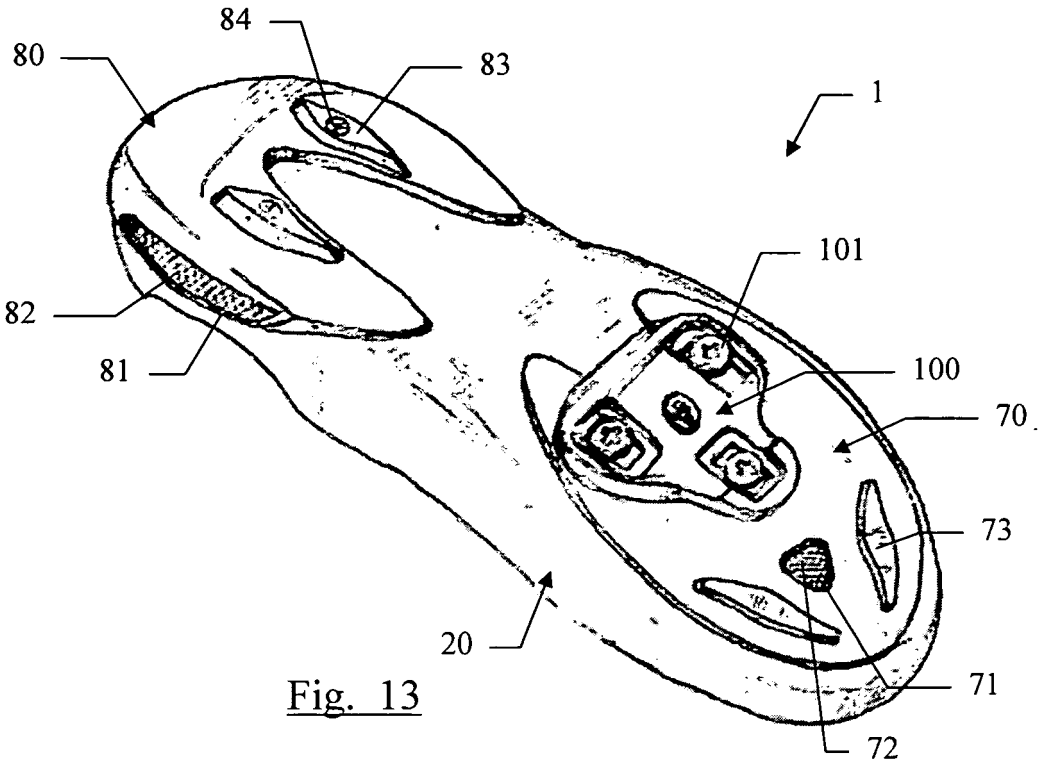

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Fig. 13

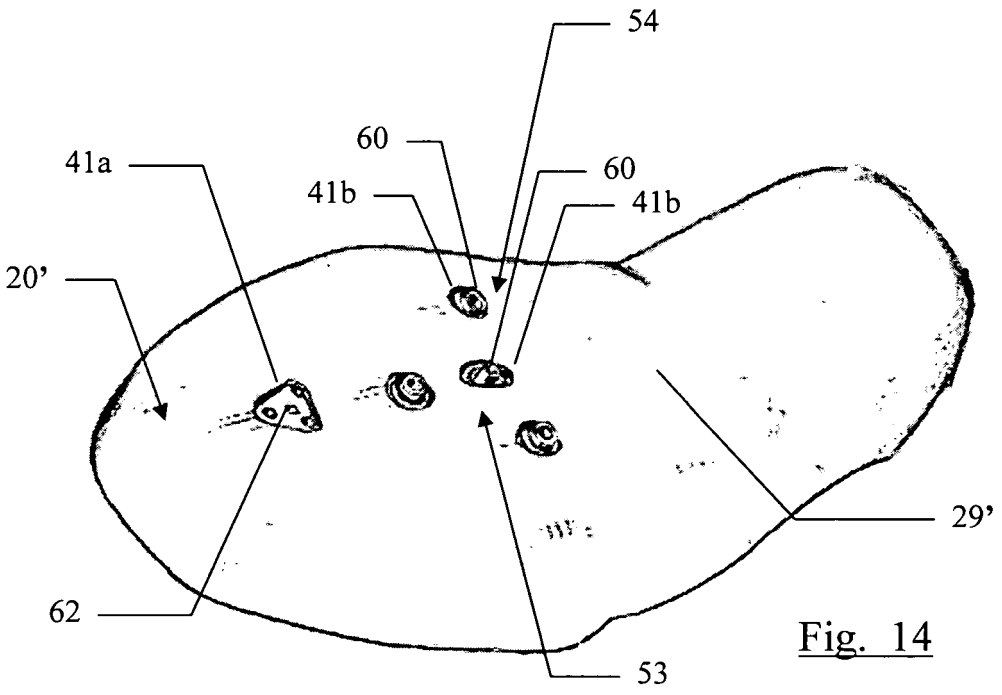

54
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41a
60
41b
41b
20'
29'
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Fig. 14

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5139

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 086 576 A (LAMSON DONALD W [US]) 11 February 1992 (1992-02-11) * column 4, lines 4-14 * * column 5, lines 24-35 * * column 7, lines 18-67 * * figures 2,5,6 * -----	1-15	INV. A43B5/14
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A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 October 2009	Claudel, Benoît

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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1

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- EP 1442670 A1 **[0002] [0026] [0089]**