



(11)

EP 3 981 278 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
13.04.2022 Bulletin 2022/15

(51) International Patent Classification (IPC):
A43B 13/14 ^(2006.01)

(21) Application number: **19935274.1**

(52) Cooperative Patent Classification (CPC):
A43B 13/14

(22) Date of filing: **28.06.2019**

(86) International application number:
PCT/JP2019/025932

(87) International publication number:
WO 2020/261562 (30.12.2020 Gazette 2020/53)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

- **TANIGUCHI, Norihiko**
Kobe-shi Hyogo 650-8555 (JP)
- **SAKAGUCHI, Masanori**
Kobe-shi Hyogo 650-8555 (JP)
- **TAKAMASU, Sho**
Kobe-shi Hyogo 650-8555 (JP)

(71) Applicant: **ASICS Corporation**
Kobe-shi Hyogo 650-8555 (JP)

(74) Representative: **Hargreaves, Timothy Edward Marks & Clerk LLP**
40 Torphichen Street
Edinburgh EH3 8JB (GB)

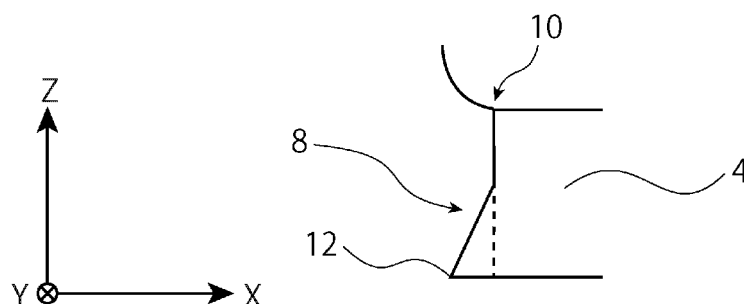
(72) Inventors:
• **NAKAYA, Mai**
Kobe-shi Hyogo 650-8555 (JP)

(54) **SHOE**

(57) A shoe 1 includes an outsole 6 including a ground contact surface, a midsole 4 fixed onto the outsole 6, and an upper joined to the midsole 4 along a circumferential edge of the midsole 4. The midsole 4 includes a bulging part 8 at a position corresponding to a medial side of a rearfoot portion. The bulging part 8 has a bulge length L1 that is measured, in top view, as a horizontal

distance from a joint part 10 between the upper and the midsole 4 to an outer edge 14 of the ground contact surface. The bulge length L1 is longer than a horizontal length L2 from the joint part 10 between the upper and the midsole 4 to an outer edge 12 of the midsole 4 at the rearmost end.

FIG. 8



EP 3 981 278 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a shoe, and particularly to a shoe with improved stability.

BACKGROUND ART

[0002] For shoes used for running or walking, both the cushioning properties of absorbing impact at the time of landing and the stability at the time of landing have been conventionally required. Particularly, the stability at the time of landing has been considered important in terms of prevention of injuries. Shoes with low stability may cause so-called overpronation in which a foot excessively tilts toward the medial side at the time of landing, which raises the possibility of getting injured. Therefore, restraining overpronation is extremely important, and, as a technology for the restraint, the technology described in Patent Literature 1 is known, for example.

PRIOR ART REFERENCE

PATENT LITERATURE

[0003] Patent Literature 1: Japanese Patent No. 5157020

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] However, although the shoe described in Patent Literature 1 includes hard embedded portions in the midsole and hence has high stability, some users may be annoyed with a feeling of being pushed up, depending on the users' preferences. Therefore, there is a need for improving the stability by means other than those described in Patent Literature 1.

[0005] The present invention has been made to solve the problem above, and a purpose thereof is to provide a shoe with further improved stability.

SOLUTION TO PROBLEM

[0006] According to a first aspect of the present invention, an outsole including a ground contact surface, a midsole fixed onto the outsole, and an upper joined to the midsole along a circumferential edge of the midsole are provided. The midsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the upper and the midsole to an outer edge of the ground contact surface. The bulge length L1 is longer than a horizontal length L2 from the joint part between the upper and the midsole to an outer edge of

the midsole at the rearmost end.

[0007] In another aspect of the present invention, an outsole including a ground contact surface, a midsole fixed onto the outsole, and an upper joined to the midsole along a circumferential edge of the midsole are provided. The outsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the outsole and the midsole to an outer edge of the ground contact surface. The bulge length L1 is longer than a horizontal length L2 from a joint part between the upper and the midsole to an outer edge of the midsole at the rearmost end.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

FIG. 1 is a top view of a foot skeleton;
FIG. 2 is a side view of a shoe according to an embodiment;
FIG. 3 is a bottom view of the shoe according to the embodiment;
FIG. 4 is a sectional view of the shoe according to the embodiment;
FIG. 5 is another sectional view of the shoe according to the embodiment;
FIG. 6 is yet another sectional view of the shoe according to the embodiment;
FIGS. 7 are schematic sectional views of a midsole of the shoe according to the embodiment;
FIG. 8 is another schematic sectional view of the midsole of the shoe according to the embodiment;
FIG. 9 is a side view of the shoe according to the embodiment;
FIG. 10 is a top view of an outsole and the midsole in the embodiment;
FIG. 11 is a top view of the midsole in the embodiment;
FIG. 12 is a bottom view of the midsole and the outsole in the embodiment;
FIG. 13 is a sectional view of a shoe according to a modification of the embodiment;
FIG. 14 is a sectional view of a shoe according to another modification of the embodiment;
FIG. 15 is a sectional view of a shoe according to yet another modification of the embodiment;
FIG. 16 is a sectional view of a shoe according to still yet another modification of the embodiment;
FIG. 17 is a sectional view of a shoe according to still yet another modification of the embodiment;
FIG. 18 is a sectional view of a shoe according to still yet another modification of the embodiment;
FIG. 19 is a sectional view of a shoe according to a further modification of the embodiment;
FIG. 20 is a sectional view of a shoe according to a second embodiment;

FIG. 21 is a sectional view of a shoe according to a modification of the second embodiment;

FIG. 22 is a sectional view of a shoe according to another modification of the second embodiment; and

FIG. 23 is a sectional view of a shoe according to yet another modification of the second embodiment.

DESCRIPTION OF EMBODIMENTS

[0009] Definitions of terms used in this specification will be described. In this specification, front and rear directions (longitudinal directions), width directions, and vertical directions may be used as terms indicating directions. These terms indicate directions viewed from a viewpoint of a wearer wearing a shoe placed on a flat surface. Accordingly, the front direction means a direction toward the toe side, and the rear direction means a direction toward the heel side. Also, a medial side and a lateral side of a foot may also be used as terms indicating directions. The medial side of a foot means the inner side of the foot in a width direction, i.e., a longitudinal arch side of the foot, and the lateral side of the foot means the side opposite to the medial side along a width direction.

[0010] Also, in the following description, outer edges of the midsole and the outsole of a shoe may be referred to. The outer edge of the midsole or the outsole means an outer edge of a projected shape of the midsole or the outsole viewed from the top. Also, in the following description, the outside (direction) or the inside (direction) of the midsole may be referred to. The outside of the midsole means, when viewed from the top, every direction away from a surface of the midsole. The inside of the midsole means, when viewed from the top, every direction from the outside of the midsole toward the inside of a surface of the midsole. Further, in some examples, directions may be described using a three-dimensional Cartesian coordinate system. In this case, the X-axis extends from the medial side toward the lateral side of the foot, the Y-axis extends from the heel side toward the toe side, and the Z-axis extends from the bottom surface side toward the upper side.

[0011] Before a shoe according to an embodiment is described, a foot skeleton relevant to the shoe according to the embodiment will be described with reference to FIG. 1.

[0012] FIG. 1 is a top view of a foot skeleton. A human foot is mainly constituted by cuneiform bones Ba, a cuboid bone Bb, a navicular bone Bc, a talus Bd, a calcaneus Be, metatarsal bones Bf, and phalanges Bg. Joints of a foot include MP joints Ja, Lisfranc joints Jb, and a Chopart's joint Jc. The Chopart's joint Jc includes a calcaneocuboid joint Jc1 formed by the cuboid bone Bb and the calcaneus Be, and a talocalcaneonavicular joint Jc2 formed by the navicular bone Bc and the talus Bd. In this specification, a "forefoot portion" of a wearer means a portion positioned forward of the MP joints Ja and corresponds to a portion between the positions of 0% and about 30% of the entire foot length measured

from the toe side. Also, a "midfoot portion" means a portion from the MP joints Ja to the Chopart's joint Jc and corresponds to a portion between the positions of about 30% and 80% of the entire foot length measured from the toe side. Also, a "rearfoot portion" means a portion positioned rearward of the Chopart's joint Jc and corresponds to a portion between the positions of about 80% and 100% of the entire foot length measured from the toe side. In FIG. 1, a center line S indicates a center line of a shoe and extends along a middle part in a foot width direction. The center line S is assumed to be a region positioned on a straight line passing through a third metatarsal bone Bf3 and a medial process Be1 of calcaneal tuberosity of the calcaneus Be in a human body. FIG. 1 shows an area in which the medial process Be1 of calcaneal tuberosity is assumed to be positioned.

[0013] FIG. 2 is a side view of a shoe. FIG. 2 is a side view of one shoe viewed from the medial side. As illustrated in FIG. 2, a shoe 1 includes an upper 2 that mainly covers an instep, a midsole 4 to which the upper 2 is joined, and an outsole 6 including a ground contact surface that comes into contact with the ground during walking.

[0014] The upper 2 has a shape that covers a top side of an instep. The upper 2 includes an upper body 2a, a tightening means (tightening structure) 2b for the upper, and a slit 2c that extends along a longitudinal direction of the upper 2 around the middle in a width direction of the upper 2. Also, to the upper 2, a shoe tongue 2d is attached. In the present embodiment, as the tightening means 2b, a structure constituted by a combination of grommets and a shoelace is employed. As the tightening means, a hook-and-loop fastener or the like may also be used.

[0015] The upper body 2a may be made of a mesh material obtained by knitting synthetic fiber, such as polyester and polyurethane, or made of synthetic leather or natural leather, for example, and has a shape covering an instep. The slit 2c is a buffer portion provided to adjust the width of the upper body 2a by adjusting the degree of tightening of the shoelace. On each side in a width direction of the slit 2c, multiple grommets are provided. The shoe tongue 2d is exposed through the slit, and, when a shoelace is tied, the shoelace has no contact with the wearer's instep.

[0016] FIG. 3 is a bottom view of the shoe. As illustrated in FIG. 3, the outsole 6 may be formed by shaping rubber into a predetermined shape, for example. The outsole 6 is pasted over the bottom surface of the midsole 4 such as to cover at least part of the bottom surface of the midsole 4. The outsole 6 has the ground contact surface that comes into contact with the ground. On the ground contact surface, a certain rugged pattern is formed, which improves the grip.

[0017] In the example shown in FIG. 3, the outsole 6 is formed such that multiple insular portions thereof are pasted onto predetermined positions on the bottom surface of a predetermined midsole. The ground contact sur-

face is formed by the bottom surfaces of the multiple insular portions, and the bottom surface of the midsole 4 is exposed between the insular portions. Accordingly, the ground contact surface in the illustrated example does not form a continuous surface and is formed by multiple surfaces. Alternatively, the outsole 6 may be formed by one flat sheet member. In this case, the bottom surface of the sheet member forms the ground contact surface.

[0018] The midsole 4 has a function to absorb impact and is formed of a material for absorbing impact, such as expanded EVA, urethane foam, GEL, and cork. The midsole 4 has a planar shape approximated to a projected shape of a foot in top view. The top surface of the midsole 4 has an uneven shape that corresponds to an uneven shape of the sole of a foot. To the top surface of the midsole 4, the upper 2 is joined. More specifically, the upper 2 is joined along the outer edge of the midsole 4, or along a line slightly inside the outer edge of the midsole 4. To join the upper 2 to the midsole 4, the edge of the upper 2 may be sewed onto the midsole 4, or a bonding means, such as an adhesive, may be used for the joining, for example. The shape and thickness of the midsole 4 may be appropriately set depending on the use of the shoe.

[0019] FIGS. 4-6 are sectional views of the shoe. More specifically, FIG. 4 is a sectional view taken along line 4-4 in FIG. 2, FIG. 5 is a sectional view taken along line 5-5 in FIG. 2, and FIG. 6 is a sectional view taken along line 6-6 in FIG. 2. Each of the sectional views of FIGS. 4-6 shows a cross section around the rearfoot portion viewed from the heel side toward the toe side. FIGS. 7 and 8 are schematic sectional views of the midsole viewed from the heel side toward the toe side.

[0020] As illustrated in FIGS. 4-6, the midsole 4 includes a bulging part 8 that bulges outward. The bulging part 8 may be made by forming a side surface of the midsole 4 into a flare shape that extends outward from the top side toward the lower side, for example. With the bulging part 8 provided, so-called overpronation can be restrained. To maximally restrain the overpronation, the bulging part 8 may be suitably provided at least or only in a portion corresponding to the medial side of the rearfoot portion. Such a bulging part 8 may be formed of the same material as a portion other than the bulging part 8 in the midsole 4 and may have the same hardness as the portion other than the bulging part 8 in the midsole 4. Also, the bulging part 8 may be formed of a material different from that of the portion other than the bulging part 8 in the midsole 4 and may have hardness different from that of the portion other than the bulging part 8. For example, as shown in FIGS. 4-6, when the hardness of the bulging part 8 is set to H1 and the hardness of the portion other than the bulging part 8 is set to H2, the relation $H1 > H2$ can be made to hold. With such a configuration, the feeling of being pushed up can be reduced while the stability can be improved. In such a case, it may be suitable that the midsole 4 is formed by two-color molding such that the bulging part 8 and the portion other

than the bulging part 8 are integrally formed. Also, the bulging part 8 and the midsole 4 may be formed separately and then joined together.

[0021] From another perspective, it can be described that the bulging part 8 in top view has a shape such that, on the basis of a joint part 10 between the upper 2 and the midsole 4, an outer edge 12 of the bottom surface of the midsole 4 is positioned on the outside of the joint part 10. In the shoe 1 according to the embodiment, the bulging part 8 is provided only in a portion corresponding to the medial side of the rearfoot portion. In another aspect, the bulging part 8 may be provided only in the medial side of the rearfoot portion and the medial side of the forefoot portion. In yet another aspect, the bulging part 8 may be provided only in the medial side of the rearfoot portion, the medial side of the forefoot portion, and the lateral side of the forefoot portion. In a further aspect, the bulging part 8 may be provided in all the portions other than a portion corresponding to a landing region near the heel part, which will be described later.

[0022] The joint part 10 between the midsole 4 and the upper 2, which serves as a basis for judging whether or not the bulging part 8 is provided, may be different depending on the method of joint between the midsole 4 and the upper 2. More specifically, when the midsole 4 and the upper 2 are sewn together, the midsole 4 and the upper 2 are in surface contact with each other, so that the joint part 10 has a certain width. In this case, on the basis of the contact point between the midsole 4 and the upper 2, when the outer edge 12 of the bottom surface of the midsole 4 is positioned on the outside of the contact point between the midsole 4 and the upper 2, the midsole 4 includes the bulging part 8. The top surface of the midsole 4 (the surface to which the upper 2 is joined) can be considered to have an almost flat shape even though it has some asperities. Meanwhile, the upper 2 has a curved shape such as to wrap an instep, as illustrated in FIGS. 4-6. Accordingly, on each of the cross sections shown in FIGS. 4-6, there is a contact point at which the midsole 4 of flat shape is in contact with the upper 2 of curved shape. By forming the midsole 4 such that, on the basis of a contact point, the outer edge 12 of the bottom surface of the midsole 4 is positioned on the outside of the contact point, the bulging part 8 can be provided in the midsole 4.

[0023] The height of the bulging part 8 may be the same as the height of the midsole 4 (see FIGS. 7) or may be lower than the midsole 4 (see FIG. 8). Each of FIGS. 7 and 8 schematically illustrates a cross section of the midsole in the interest of clarity, and the angle of each inclined surface is particularly overdrawn. When the height of the bulging part 8 is the same as the height of the midsole 4, the bulging part 8 has a shape obtained by combining, on the X-Z cross section, a horizontal plane extending along the X-Y plane from the joint part 10 between the midsole 4 and the upper 2 toward the outside of the midsole 4 in a horizontal direction, and a vertical plane extending along the Y-Z plane from an end of the horizontal

plane toward the bottom surface of the midsole 4 in an almost vertical direction, as illustrated in FIG. 7A, for example. Also, as illustrated in FIG. 7B, the bulging part 8 may have a shape formed by a vertical plane extending along the Y-Z plane from the joint part 10 between the midsole 4 and the upper toward the bottom surface of the midsole 4. The vertical plane may be inclined by about ± 3 degrees with respect to a vertical direction. Meanwhile, when the height of the bulging part 8 is not the same as the height of the midsole 4, as illustrated in FIG. 8, the bulging part 8 has a shape obtained by combining, on the X-Z cross section perpendicular to the bulging direction of the bulging part 8 (the direction toward the medial side), a vertical plane extending along the Y-Z plane from a midway in a height direction of the midsole 4 toward the bottom surface of the midsole 4 in an almost vertical direction.

[0024] When the height of the bulging part 8 is lower than the midsole 4, the bulging part 8 has a shape that bulges from an arbitrary position in a height direction of the midsole 4 toward the outside of the midsole 4. For example, in the example shown in FIGS. 4-6, an upper end of the bulging part 8 is positioned midway along a height direction of the midsole 4, and the bulging part 8 has a shape that extends outward of the midsole 4 from the upper end of the bulging part 8 toward the bottom surface of the midsole 4. In this case, it may be more suitable that the upper end of the bulging part 8 is provided around the middle in a height direction of the midsole 4.

[0025] FIG. 9 is a side view of the shoe. FIG. 9 is a side view of the shoe viewed from the medial side, and the portion where the bulging part is provided is indicated by hatching. In the example shown in FIG. 9, the bulging part 8 continuously extends in a longitudinal direction from a midway in the midfoot portion to the rearfoot portion. The rear end of the bulging part 8 is positioned midway along the rearfoot portion and set not to overlap with the landing region described later. Also, in the example shown in FIG. 9, the height of the bulging part 8 becomes lower toward the front side. In the illustrated example, the upside of the bulging part 8 is inclined to be away from the upper end of the midsole 4 toward the front side. Thus, the height of the bulging part 8 may be changed depending on the region. In this case, the height of the bulging part may be made higher in the rearfoot portion, where the stability is particularly required, and may be made lower toward the front side. Also, as a modification, the bulging part 8 may have a discontinuous shape, such as a shape extending intermittently in a longitudinal direction.

[0026] Depending on the shapes of the midsole 4 and the outsole 6, the outer edge 12 of the midsole 4 may coincide with an outer edge 14 of the outsole 6 having the ground contact surface, when viewed from the top. The outer edge 14 of the outsole 6 coinciding with the outer edge 12 of the midsole 4 has at least two patterns as described below.

[0027] As a first pattern, when the outsole 6 has a sheet shape that coincides with a planar shape of the midsole 4, the outer edge 14 of the outsole 6 coincides with the outer edge 12 of the midsole 4 when viewed from the top.

[0028] As a second pattern, when the outsole 6 is formed by multiple insular portions, part of the outer edge 12 of the midsole 4 may coincide with part of the outer edge 14 of at least one insular portion. FIG. 10 is a top view of the outsole 6 and the midsole 4. In FIG. 10, the outer edges 14 of the outsole 6 is indicated by dashed dotted lines, the outer edge 12 of the midsole 4 is indicated by a dashed double-dotted line, and a portion in which the outer edges 12 and 14 of the outsole 6 and the midsole 4 coincide with each other is indicated by a solid line. As shown in FIG. 10, only part of the outer edge 14 positioned on the outer side of an insular portion of the outsole 6 coincides with part of the outer edge 12 of the midsole 4.

[0029] A bulge length L1 ($L1 > 0$) in a horizontal direction of the bulging part 8 is longer than a horizontal length L2 ($L2 \geq 0$) from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 12 of the midsole 4 in a portion where the bulging part 8 is not provided. In the following, detailed description will be given with reference to FIG. 11.

[0030] FIG. 11 is a top view of the midsole. The bulge length L1 of the bulging part 8 is a horizontal distance from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 14 of the ground contact surface. When the outer edge 14 of the ground contact surface coincides with the outer edge 12 of the midsole 4 as described previously, it can also be said that the bulge length L1 of the bulging part 8 is a distance from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 12 of the midsole 4. Meanwhile, the horizontal length L2 in a portion where the bulging part 8 is not provided is a horizontal distance from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 12 of the midsole 4. The horizontal length L2 may be measured in an arbitrary portion where the bulging part 8 is not provided. The bulge length L1 and the horizontal length L2 may change depending on the shape of the midsole 4 and the shape of the joint part 10. In this case, it may be suitable to measure each of the bulge length L1 and the horizontal length L2 at a position where the horizontal distance is largest and then compare the bulge length L1 and the horizontal length L2. Meanwhile, a horizontal length L3 ($L3 \geq 0$) on the lateral side is a horizontal distance on the lateral side from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 14 of the ground contact surface.

[0031] As a method for measuring the bulge length L1 and the horizontal lengths L2 and L3, various measuring methods may be considered. Basically, the bulge length L1 and the horizontal lengths L2 and L3 have only to be measured on the same basis. As an example, the bulge length L1 and the horizontal lengths L2 and L3 may be measured along the Y-Z plane at a position on the outer

edge 12 of the midsole 4. As another example, the bulge length L1 and the horizontal lengths L2 and L3 may be measured along the Y-Z plane at a position on the joint part 10. As yet another example, an arbitrary point may be set at a position along the center line S in the rearfoot portion, for example, and a line may be drawn from the arbitrary point toward the outer edge of the midsole; along the line, the bulge length L1 and the horizontal lengths L2 and L3 may be measured. The bulge length L1 of the bulging part 8 is longer than the horizontal lengths L2 and L3 from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 12 of the midsole 4 in a portion where the bulging part 8 is not provided.

[0032] The case where the outer edge of the midsole 4 does not coincide with the outer edge of the outsole 6 may be when the outer edge 12 of the midsole 4 is positioned on the medial side of the outer edge 14 of the ground contact surface, or when the outer edge 12 of the midsole 4 is positioned on the lateral side of the outer edge 14 of the ground contact surface. In the former case, each of the bulge length L1 and the horizontal length L2 may be set to a horizontal distance from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 12 of the midsole 4, regardless of the position of the outer edge 14 of the ground contact surface. In the latter case, each of the bulge length L1 and the horizontal length L2 may be set to a horizontal distance from the joint part 10 between the upper 2 and the midsole 4 to the outer edge 14 of the ground contact surface, regardless of the position of the outer edge 12 of the midsole 4.

[0033] FIG. 12 is a bottom view of the midsole and the outsole. As described previously, it is suitable that the bulging part 8 is not provided in a portion corresponding to a landing region 16 near the heel part. Accordingly, the portion where the bulging part 8 is not provided may suitably be the portion corresponding to the landing region 16 near the heel part, and the horizontal length L2 may suitably be measured in the portion corresponding to the landing region 16 near the heel part. When the bulging part 8 is not provided on the lateral side, the horizontal length L2 may be measured at an arbitrary position on the lateral side.

[0034] The landing region 16 near the heel part is a region in the bottom surface of the shoe 1 that comes into contact with the ground first when the heel lands, and the landing region 16 may be appropriately set depending on the use of the shoe 1, for example. With regard to a running shoe, for example, it is known that, in a region on the rear side with respect to a virtual line VL1 that traverses in a width direction around the calcaneus as shown in FIG. 12, the thickness of the midsole 4 is tapered toward the heel side. Accordingly, the vicinity of the heel is tilted toward the heel side with respect to a horizontal direction and/or the lateral side is tilted upward, so that an inclined surface (the landing region 16) is formed. With such an inclined surface formed, the impact at the time of landing can be reduced. Based on such a technology, in the shoe 1 according to the embodiment,

the bulging part 8 is not provided in the portion corresponding to the landing region 16 and is provided in a portion other than the portion corresponding to the landing region 16. Not providing the bulging part 8 in the portion corresponding to the landing region 16 prevents the bulging part 8 from disturbing the motion of the foot coming into contact with the ground at the time of landing. When the bulging part 8 is not provided in the landing region 16, the horizontal length L2 may suitably be measured in the portion corresponding to the landing region 16, particularly the rearmost part on the heel side.

[0035] Also, the virtual line that defines the landing region 16 may be set to a virtual line VL2 that slants in a longitudinal direction, instead of the virtual line VL1 described above. The virtual line VL2 is a slant virtual line in top view, of which the lateral side is positioned forward and the medial side is positioned rearward. The slant angle of the virtual line VL2 may be arbitrarily set to an angle between 0 to about 45 degrees with respect to the virtual line VL1.

[0036] Also, the structure for defining the landing region is not limited to the inclined bottom surface of the midsole 4. The landing region 16 may be defined by arrangement of multiple insular outsoles 6. In this case, the outsoles 6 are not formed along the virtual line VL1 or the virtual line VL2 but formed in front of or in the rear of the virtual line VL1 or the virtual line VL2. Accordingly, along the virtual line VL1 or the virtual line VL2 between the outsoles 6, a line on which the bottom surface of the midsole 4 is exposed is formed (see FIG. 3, for example). This line is a portion where the surface of the midsole 4 is exposed when the shoe 1 is viewed from the bottom, and the line has higher flexibility than the portions where the outsoles 6 are formed. Accordingly, the region located in the rear of the line may be defined as the landing region 16, and the bulging part 8 is not provided in the portion corresponding to the landing region 16 but may be provided in any other portion.

[0037] Also, it may be suitable that, in the midsole, the hardness of at least a portion corresponding to the rearfoot portion, particularly a portion positioned below the calcaneus when the shoe is worn, is uniform. To restrain the overpronation, it is considered to make the hardness of the vicinity of the end on the medial side of the midsole higher than the hardness of any other portion, thereby restraining tilting of the foot toward the medial side at the time of landing. However, when the hardness is made different within the midsole, a boundary between a high hardness portion and a low hardness portion certainly exists. If the position of the boundary overlaps with the sole of the foot when viewed from the top, a high hardness portion will particularly give the wearer the so-called feeling of being pushed up. Meanwhile, since the shoe according to the present embodiment can restrain the overpronation by means of the bulging part, even if the hardness of the midsole is made uniform, the overpronation can be suitably restrained.

[0038] FIGS. 13 through 19 are sectional views of the

shoe and more specifically are diagrams that each show a modification of the shape of a cross section of the bulging part.

[0039] In the modification shown in FIG. 13, the bulging part 8 extends from the top surface toward the bottom surface of the midsole 4 such as to form a flare shape in which the inclination angle becomes gentle at an inflection point provided midway along a height direction of the midsole 4. In the modification shown in FIG. 14, the bulging part 8 extends from a midway in a height direction of the midsole 4 toward the medial side and then extends toward the bottom surface such as to form a flare shape. In the modification shown in FIG. 15, the bulging part 8 bulges out from a midway in a height direction of the midsole 4 toward the medial side such as to form a curved shape. In the modification shown in FIG. 16, the bulging part 8 bulges out from a low position in a height direction of the midsole 4 toward the medial side such as to form a curved shape.

[0040] In the modifications shown in FIGS. 17 through 19, in addition to the bulging part 8, part of the midsole 4 other than the bulging part 8 is also formed of a high hardness material. In these modifications, a portion continuous with the bulging part 8 is formed of a high hardness material, and the remaining portion is formed of a low hardness material. In each of FIGS. 17 through 19, the portion formed of a high hardness material is indicated by hatching in the interest of clarity. In the modification shown in FIG. 17, the bulging part 8 has the same shape as the bulging part shown in FIG. 13. Also, in the example shown in FIG. 17, there is provided a high hardness material part with which the bulging part 8 have line symmetry with respect to the boundary, as an axis, between the bulging part 8 and the portion other than the bulging part 8 in the midsole 4. In the modification shown in FIG. 18, the bulging part 8 is formed along the entire length in a height direction of the midsole 4. Also in this example, a high hardness material part with which the bulging part 8 have line symmetry is provided. In the modification shown in FIG. 19, the bulging part 8 is formed along the entire length in a height direction of the midsole 4 and has a shape curved toward the medial side. Also in this example, a high hardness material part with which the bulging part 8 have line symmetry is provided. In any case, the high hardness material part extends toward the inside of the midsole to only reach a position that hardly overlaps with the calcaneus when viewed from the top. In the example shown in FIG. 17, the high hardness material part extends to a position that partially overlaps with the calcaneus when viewed from the top. However, even when the high hardness material part extends, at a lower position in a height direction of the midsole 4, toward the inside of the midsole 4, as shown in the example of FIG. 17, the feeling of being pushed up can be restrained. Accordingly, when the high hardness material part is extended toward the inside of the midsole 4, it may be suitable to extend only the lower side in a height direction and avoid the situation where only the top side in a height

direction overlaps with the calcaneus. In this case, it may be more suitable to provide the high hardness material part at a position lower than the middle in a height direction, for example. Further, to suitably prevent the feeling of being pushed up occurring, it may be more suitable that the high hardness material part does not have a shape forming an angle on the top side at a position that overlaps with the calcaneus. Accordingly, the high hardness material part can restrain the feeling of being pushed up. The high hardness material part need not necessarily have a shape with which the bulging part 8 have line symmetry.

[0041] As described above, since the shoe according to the embodiment includes the bulging part 8 provided at a position corresponding to the medial side of the rear-foot portion, the medial side can be firmly supported at the time of landing, and the overpronation can be restrained. Accordingly, the stability can be improved. Also, since the bulging part 8 is not provided in the landing region 16, the bulging part 8 disturbing the landing motion can be prevented.

[0042] There will now be described a second embodiment of the shoe. Although the bulging part is provided in the midsole in the aforementioned embodiment, the bulging part is provided in the outsole in the second embodiment.

[0043] FIG. 20 is a sectional view of a shoe. As illustrated in FIG. 20, a shoe 20 includes a roll-up portion 24 in an outsole 22, and a bulging part 26 is formed on the roll-up portion 24. The roll-up portion 24 is formed by a circumferential wall extending upward from an outer edge of the outsole 22. More specifically, the roll-up portion 24 extends upward from the outer edge of the outsole 22. The roll-up portion 24 enhances the rigidity of the shoe 20. The rigidity of the shoe 20 means the flexural rigidity or torsional rigidity, for example. The position of the upper end of the roll-up portion 24 may be appropriately changed depending on the use of the shoe 20.

[0044] The height of the roll-up portion 24 may be uniform or may be different depending on the position. For example, when rigidity is required on the toe side, the roll-up portion 24 may be made lower on the heel side and higher on the toe side. Also, the height of the roll-up portion 24 may be made different between the medial side and the lateral side in a width direction.

[0045] The bulging part 26 may be made by forming a side surface of the outsole 22 into a flare shape that extends outward from the top side toward the lower side. With such a bulging part 26, so-called overpronation can be restrained. With regard to the position of the roll-up portion 24, the roll-up portion 24 may be formed over the entire circumference of the outsole 22 along the outer edge of the outsole 22 or may be formed on only part of the outsole 22 along the outer edge of the outsole 22. Also, the bulging part 26 may be formed, along the outer edge of the outsole 22, over the entire roll-up portion 24 or only part of the roll-up portion 24. The bulging part 26 may be provided only in the portion corresponding to the

medial side of the rearfoot portion. In another aspect, the bulging part 26 may be provided only in the medial side of the rearfoot portion and the medial side of the forefoot portion. In yet another aspect, the bulging part 26 may be provided only in the medial side of the rearfoot portion, the medial side of the forefoot portion, and the lateral side of the forefoot portion. In a further aspect, the bulging part 26 may be provided in all the portions other than the portion corresponding to the landing region near the heel part.

[0046] The height of the bulging part 26 may be the same as the height of the roll-up portion 24 or may be lower than the roll-up portion 24. For example, there is a case where the roll-up portion 24 has the same height as a midsole 28 and the bulging part 26 also has the same height as the roll-up portion 24, as illustrated in FIG. 20. In this case, the bulging part 26 has a shape obtained by combining, on the Y-Z cross section perpendicular to the bulging direction of the bulging part 26, a horizontal plane extending along the X-Y plane from the upper end of the roll-up portion 24 toward the outside of the midsole 28, and a vertical plane extending along the Y-Z plane from an end of the horizontal plane toward the bottom surface of the midsole 28.

[0047] FIGS. 21-23 are sectional views of the shoe, which each show a modification of the bulging part. As illustrated in FIG. 21, when the height of the roll-up portion 24 is the same as the height of the midsole 28 and when the height of the bulging part 26 is lower than the height of the roll-up portion 24, the bulging part 26 has a shape that bulges from an arbitrary position in a height direction of the roll-up portion 24 toward the outside of the roll-up portion 24. Also, as another example, there is a case where the height of the roll-up portion 24 is lower than the height of the midsole 28 and the bulging part 26 has the same height as the roll-up portion 24, as illustrated in FIG. 22. In this case, the bulging part 26 has a shape obtained by combining, on the Y-Z cross section perpendicular to the bulging direction of the bulging part 26, a horizontal plane extending along the X-Y plane from the upper end of the roll-up portion 24 toward the outside of the midsole 28, and a vertical plane extending almost along the Y-Z plane from an end of the horizontal plane toward the bottom surface of the outsole 22. Also, when the height of the roll-up portion 24 is lower than the height of the midsole 28 and when the height of the bulging part 26 is lower than the height of the roll-up portion 24, as illustrated in FIG. 23, the bulging part 26 has a shape that bulges from an arbitrary position in a height direction of the roll-up portion 24 toward the outside of the roll-up portion 24.

[0048] Also in the second embodiment, since the bulging part 26 is provided, the medial side can be firmly supported at the time of landing, and the overpronation can be restrained. Accordingly, the stability can be improved. Also, since the bulging part 26 is not provided in the landing region, the bulging part 26 disturbing the landing motion can be prevented.

[0049] Embodiments of the present invention have been described. Further modifications may be appropriately made to each configuration in the embodiments without departing from the scope of ideas of the invention as described in the claims.

[0050] In the following, aspects of the present invention derived from the invention described in the claims will be described.

[0051] In a first aspect, an outsole including a ground contact surface, a midsole fixed onto the outsole, and an upper joined to the midsole along a circumferential edge of the midsole are provided. The midsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the upper and the midsole to an outer edge of the ground contact surface. The bulge length L1 is longer than a horizontal length L2 from the joint part between the upper and the midsole to an outer edge of the midsole at the rearmost end.

[0052] In a second aspect, in the midsole in the first aspect, hardness of at least a portion for supporting a calcaneus is uniform.

[0053] In a third aspect, the hardness of the bulging part in the first or second aspect is higher than the hardness of a portion other than the bulging part in the midsole.

[0054] In a fourth aspect, the bulging part in any one of the first through third aspects is formed from a joining surface of the midsole and the outsole to a midway in a height direction of the midsole.

[0055] In a fifth aspect, a side surface on the medial side of the bulging part in any one of the first through fourth aspects has a shape that extends away from the joint part toward the ground contact surface.

[0056] In a sixth aspect, the midsole in any one of the first through fifth aspects is formed by two-color molding.

[0057] In a seventh aspect, the bulging part in any one of the first through sixth aspects is formed only in the medial side of the rearfoot portion.

[0058] In an eighth aspect, the bulging part in any one of the first through sixth aspects is formed in a part other than an outer circumference of a landing region near a heel part on the ground contact surface.

[0059] In a ninth aspect, an outsole including a ground contact surface, a midsole fixed onto the outsole, and an upper joined to the midsole along a circumferential edge of the midsole are provided. The outsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the outsole and the midsole to an outer edge of the ground contact surface. The bulge length L1 is longer than a horizontal length L2 from a joint part between the upper and the midsole to an outer edge of the midsole at the rearmost end.

INDUSTRIAL APPLICABILITY

[0060] The present invention is applicable to a shoe.

REFERENCE SIGNS LIST

[0061]

1	shoe
2	upper
4	midsole
6	outsole
8	bulging part
10	joint part
12, 14	outer edge
16	landing region
20	shoe
22	outsole
26	bulging part
28	midsole

Claims

1. A shoe, comprising:
 - an outsole including a ground contact surface;
 - a midsole fixed onto the outsole; and
 - an upper joined to the midsole along a circumferential edge of the midsole, wherein the midsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the upper and the midsole to an outer edge of the ground contact surface, and the bulge length L1 is longer than a horizontal length L2 from the joint part between the upper and the midsole to an outer edge of the midsole at the rearmost end.
2. The shoe according to claim 1, wherein, in the midsole, hardness of at least a portion for supporting a calcaneus is uniform.
3. The shoe according to claim 1 or 2, wherein the hardness of the bulging part is higher than the hardness of a portion other than the bulging part in the midsole.
4. The shoe according to any one of claims 1 through 3, wherein the bulging part is formed from a joining surface of the midsole and the outsole to a midway in a height direction of the midsole.
5. The shoe according to any one of claims 1 through 4, wherein a side surface on the medial side of the bulging part has a shape that extends away from the

joint part toward the ground contact surface.

6. The shoe according to claim 3, wherein the midsole is formed by two-color molding.
7. The shoe according to any one of claims 1 through 6, wherein the bulging part is formed only in the medial side of the rearfoot portion.
8. The shoe according to any one of claims 1 through 6, wherein the bulging part is formed in a part other than an outer circumference of a landing region near a heel part on the ground contact surface.
9. A shoe, comprising:
 - an outsole including a ground contact surface;
 - a midsole fixed onto the outsole; and
 - an upper joined to the midsole along a circumferential edge of the midsole, wherein the outsole includes a bulging part at a position corresponding to a medial side of a rearfoot portion, and the bulging part has a bulge length L1 that is measured, in top view, as a horizontal distance from a joint part between the outsole and the midsole to an outer edge of the ground contact surface, and the bulge length L1 is longer than a horizontal length L2 from a joint part between the upper and the midsole to an outer edge of the midsole at the rearmost end.

FIG. 1

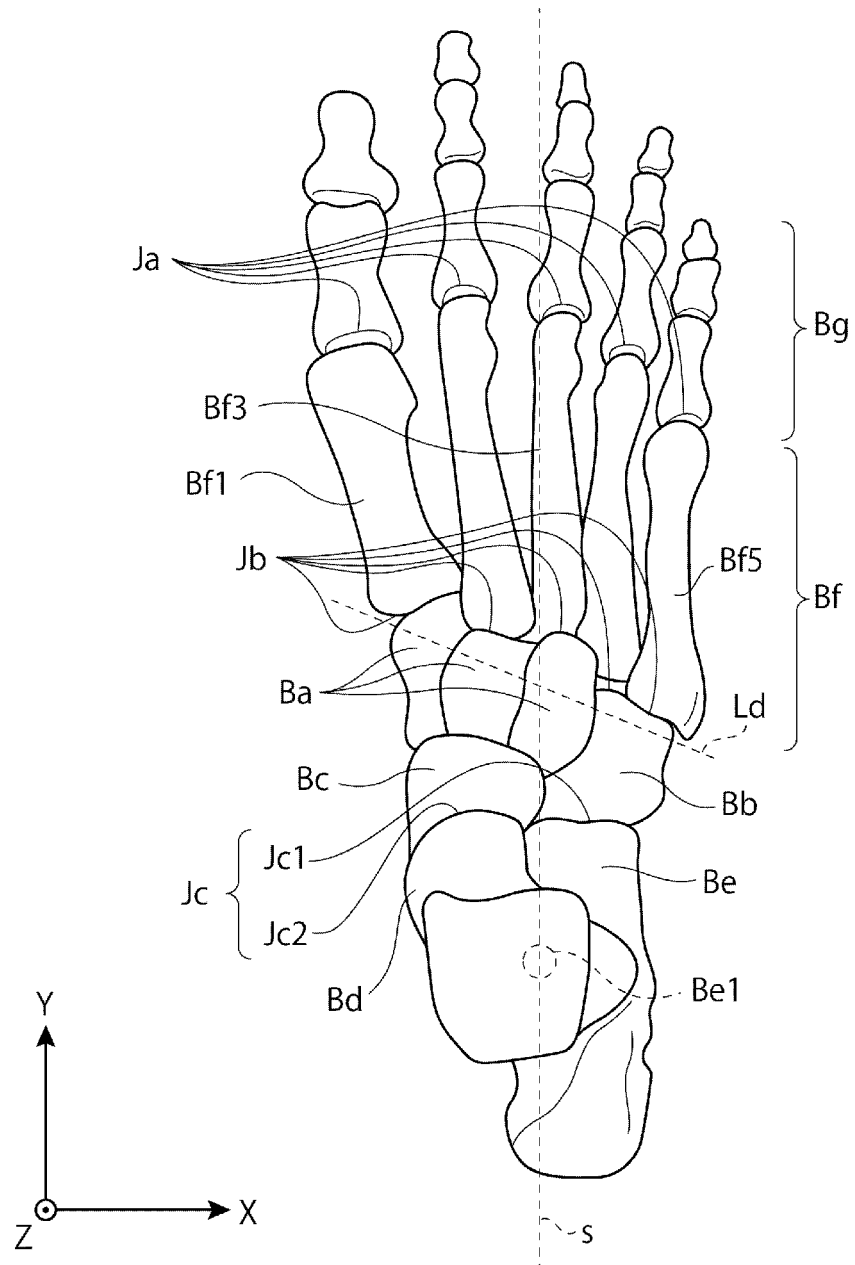


FIG. 2

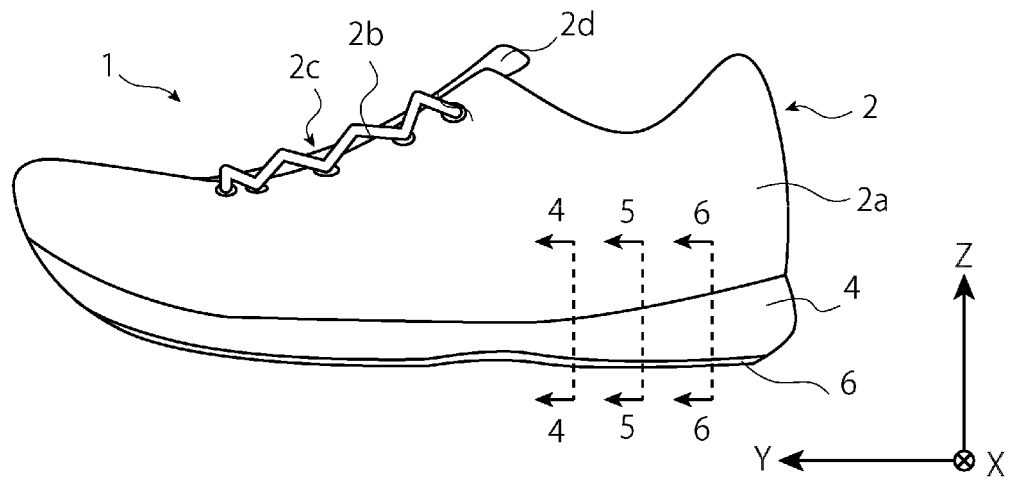


FIG. 3

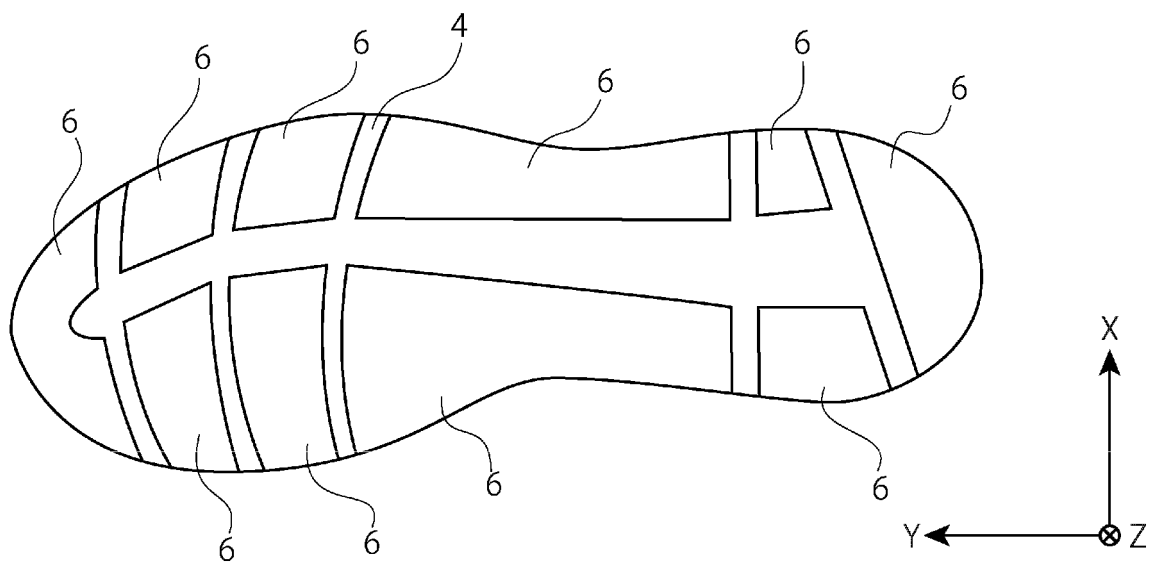


FIG. 4

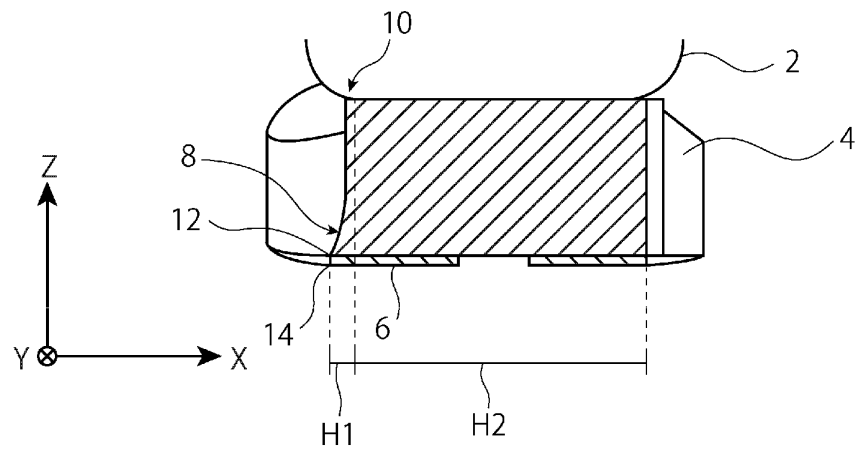


FIG. 5

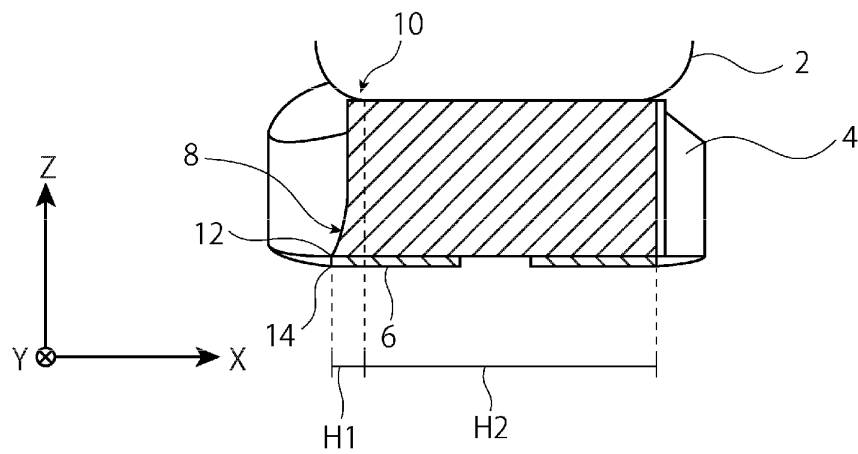
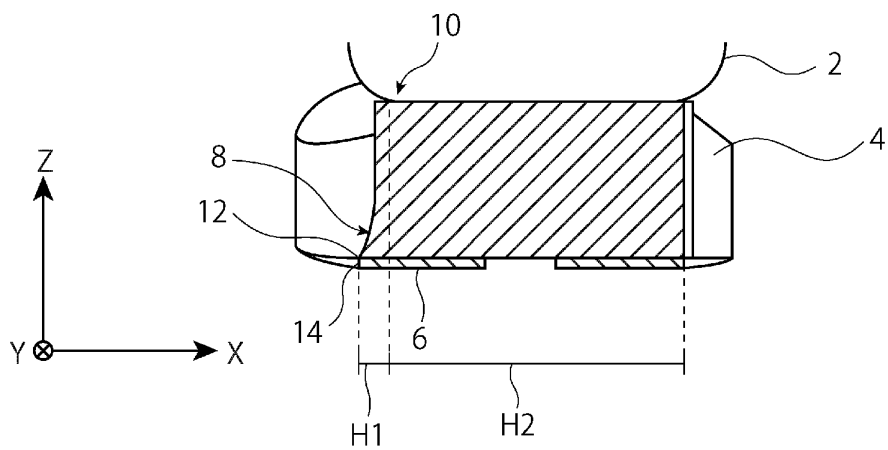


FIG. 6



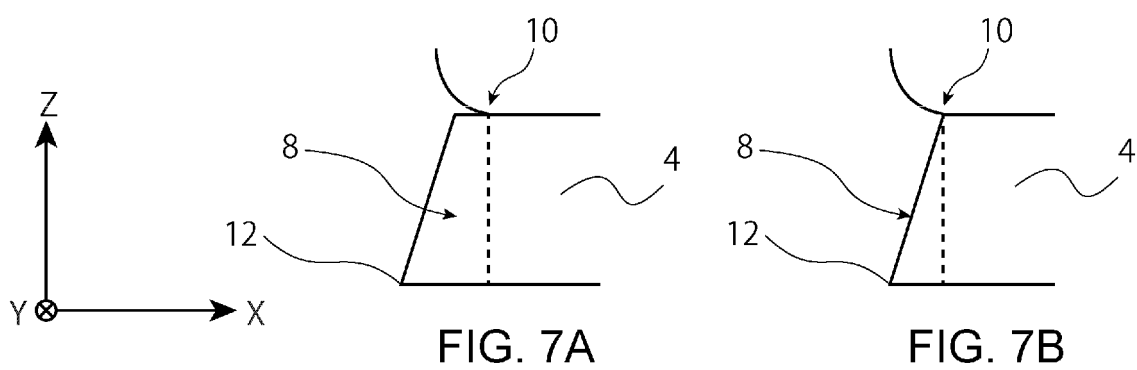


FIG. 8

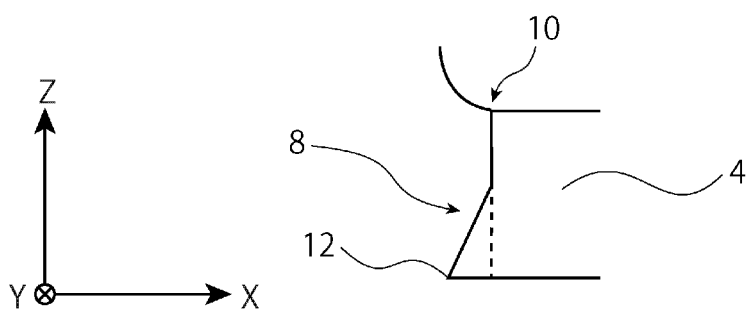


FIG. 9

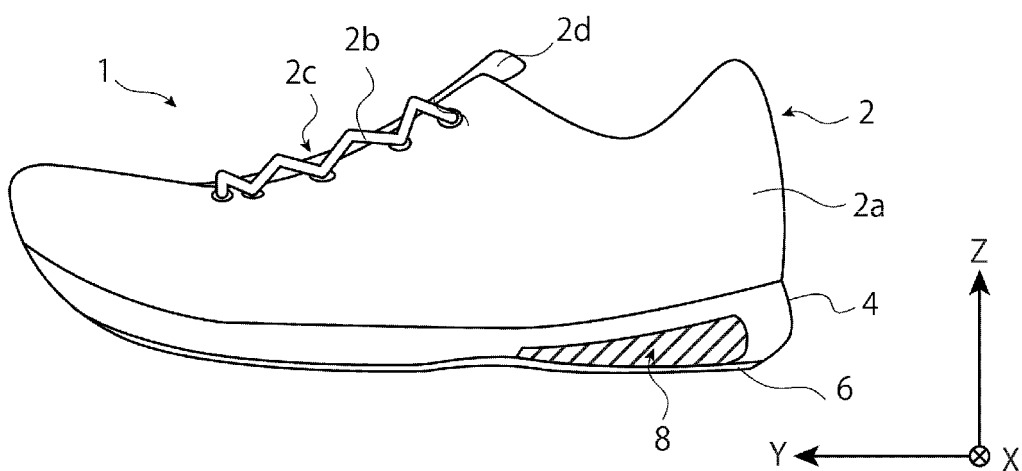


FIG. 10

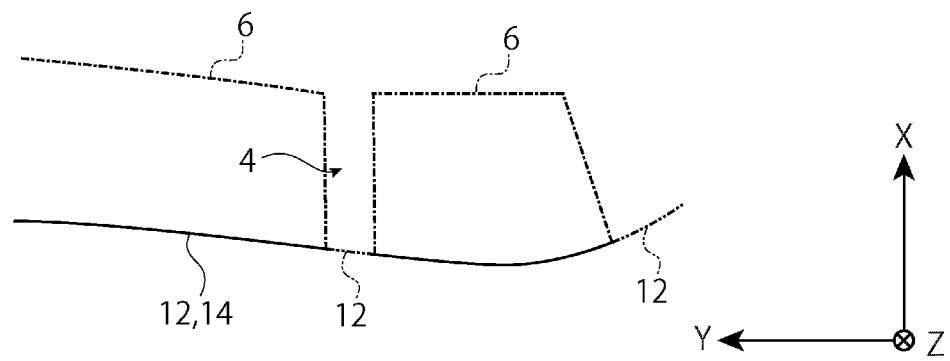


FIG. 11

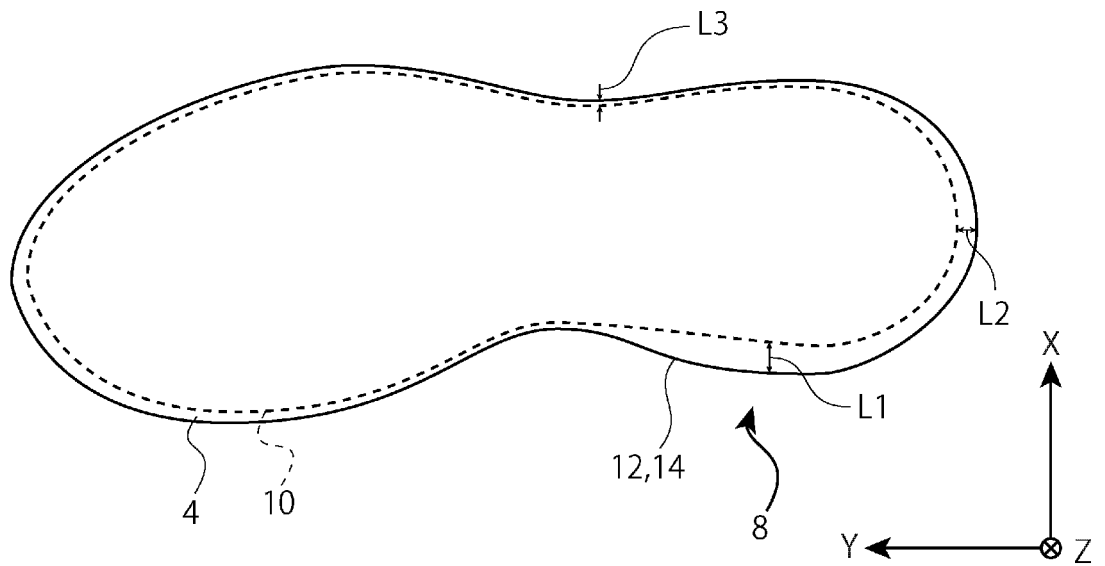


FIG. 12

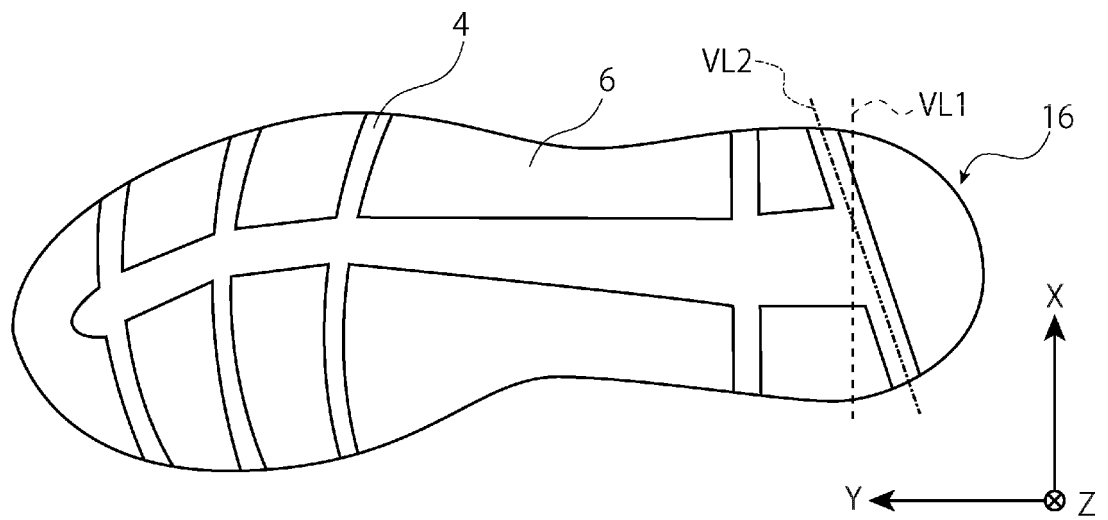


FIG. 13

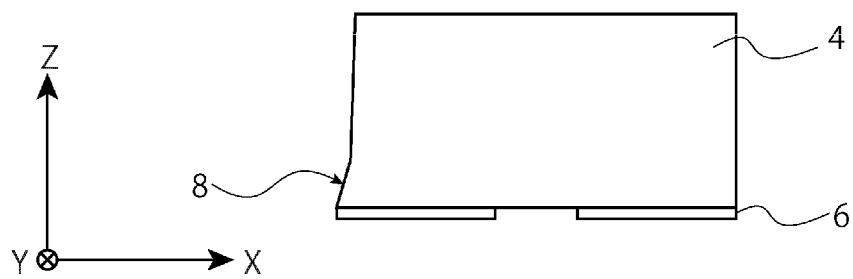


FIG. 14

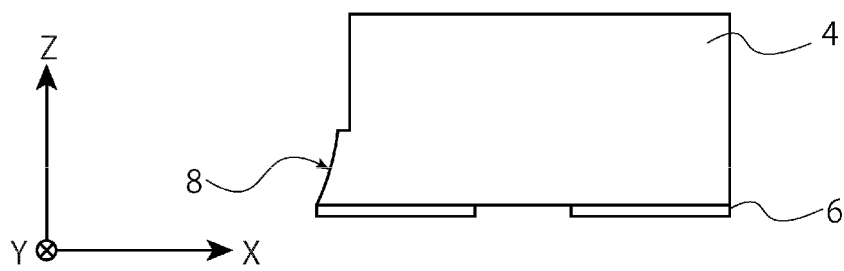


FIG. 15

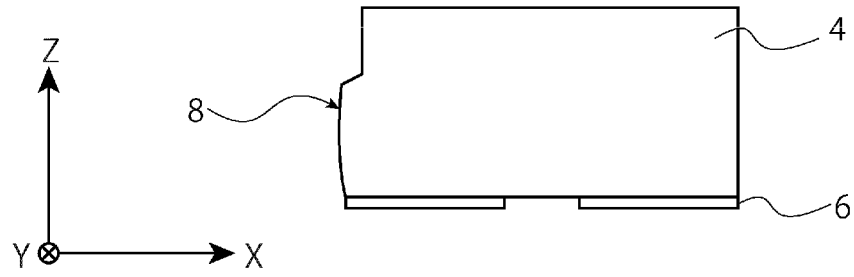


FIG. 16

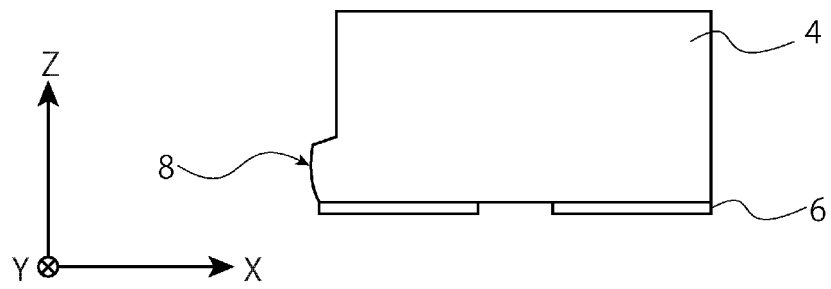


FIG. 17

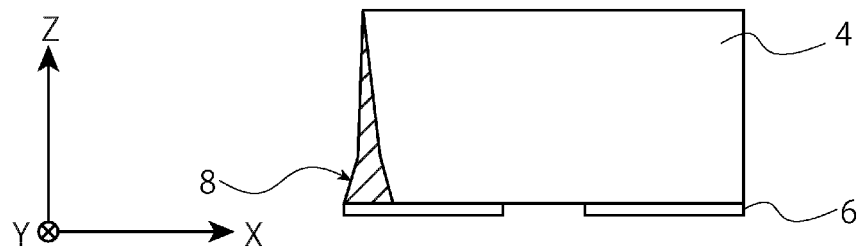


FIG. 18

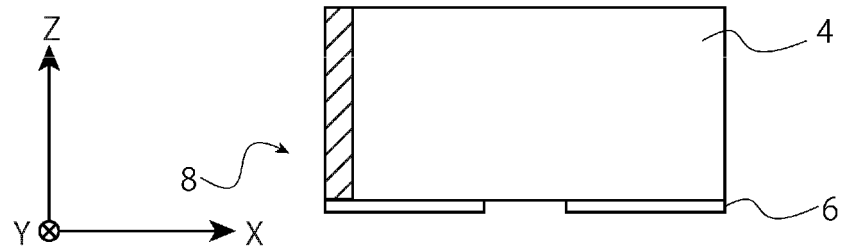


FIG. 19

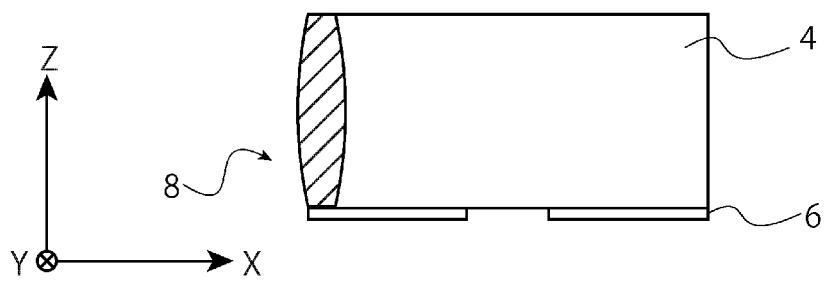


FIG. 20

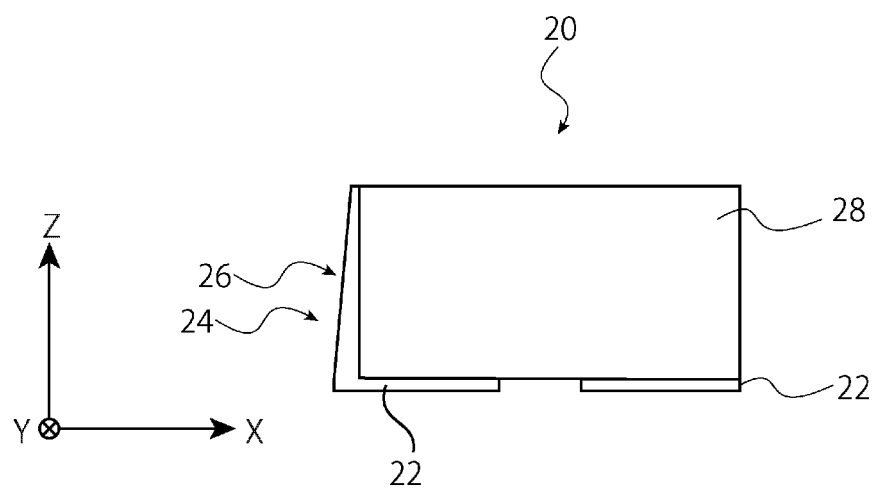


FIG. 21

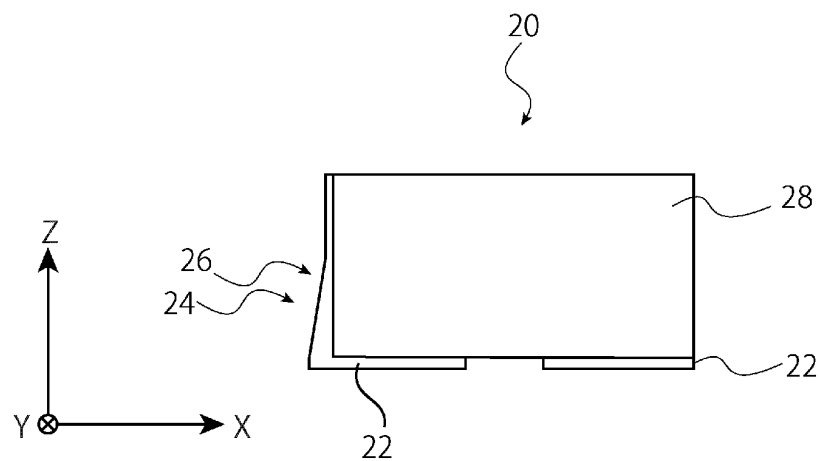


FIG. 22

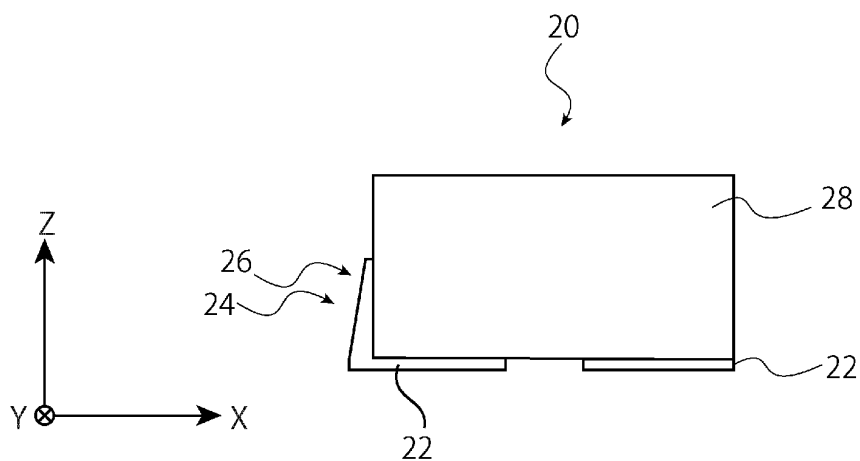
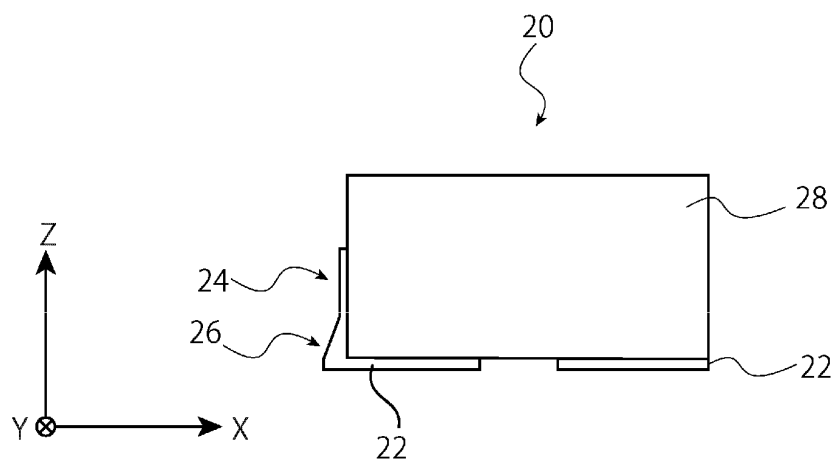


FIG. 23



5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/025932

10

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A43B13/14 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

15

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int. Cl. A43B13/14

20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2019
Registered utility model specifications of Japan 1996-2019
Published registered utility model applications of Japan 1994-2019

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

25

C. DOCUMENTS CONSIDERED TO BE RELEVANT

30

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4449306 A (CAVANAGH, Peter R.) 22 May 1984, column 3, line 23 to column 4, line 7, fig. 1, 2 & EP 108278 A1 & CA 1206749 A1 & AT 24379 E	1-2, 5 3-9
X Y	JP 55-70202 A (BRS INC.) 27 May 1980, page 3, upper right column, line 15 to lower left column, line 20, fig. 1-4 & US 4255877 A, column 2, line 54 to column 3, line 12, fig. 1-4 & GB 2033729 A & DE 2938514 A1 & FR 2436576 A1 & CA 1108394 A1	1-2, 4-5, 8 3-9

40

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

45

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

50

Date of the actual completion of the international search
28.08.2019

Date of mailing of the international search report
10.09.2019

55

Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

5

INTERNATIONAL SEARCH REPORT

 International application No.
 PCT/JP2019/025932

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

20

25

30

35

40

45

50

55

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 23547/1990 (Laid-open No. 113603/1991) (ASICS CORP.) 20 November 1991, description, page 4, line 15 to page 6, line 7, description, page 11, line 9 to page 12, line 2, fig. 1-4 (Family: none)	3-8
Y	JP 2002-34605 A (ASAHI CORP.) 05 February 2002, paragraph [0008], fig. 1, 3 (Family: none)	3-8
Y	JP 58-49101 A (ASICS CORP.) 23 March 1983, page 3, upper left column, line 3, to page 4, upper left column, line 2, fig. 1, 2 (Family: none)	7
Y	JP 2011-525843 A (NEW BALANCE ATHLETIC SHOE, INC.) 29 September 2011, abstract, paragraphs [0041]-[0044], fig. 4, 9 & US 2010/0071231 A1, abstract, paragraphs [0051]-[0054], fig. 4, 9 & WO 2009/158029 A1 & EP 2299949 A1 & CN 202069737 U	7
Y	JP 7-255509 A (ACHILLES CORP.) 09 October 1995, paragraph [0032], fig. 11 (Family: none)	9

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 5157020 B [0003]