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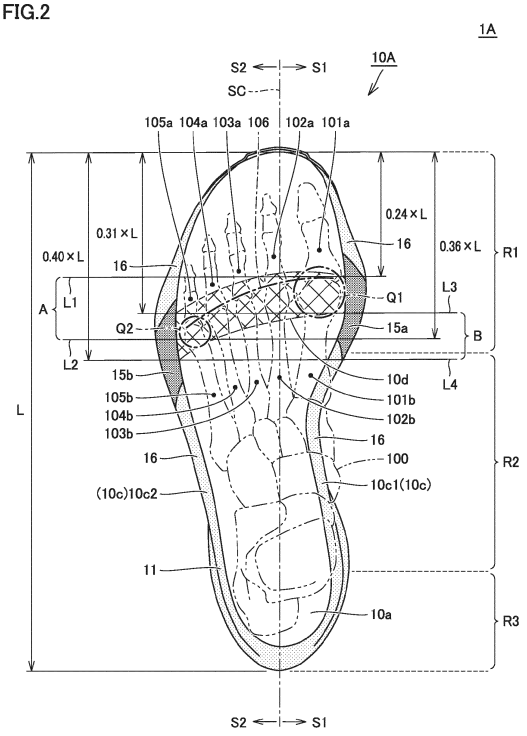
(54) **SOLE AND SHOE PROVIDED WITH SAME**

(57) A sole (10A) includes an upper surface (10a) defining a support surface that supports a bottom of a foot of a wearer, a lower surface defining a ground contact surface, and a peripheral surface (10c) connecting the upper surface (10a) and the lower surface. The upper surface (10a) includes an MP joint support region (10d) that supports the bottom of the foot at a position corresponding to an MP joint (106) of the foot of the wearer, and the peripheral surface (10c) includes a pair of side surfaces including a medial foot side surface (10c1) located on a medial foot side and a lateral foot side surface (10c2) located on a lateral foot side. Among the pair of side surfaces, a portion adjacent to the MP joint support region (10d) of at least one side surface is provided with an indicator (15) visually indicating that the portion is different from the other portion of the one side surface.

FIG.2



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Description

BACKGROUND

Technical field

[0001] The present disclosure relates to a sole and a shoe provided with the same. Background Information

[0002] It is said that it is effective to strongly push the ground by a footrest portion of the foot during take-off in order to efficiently run and walk with high propulsion. Conventionally, for further increasing the propulsion generated during take-off, soles having various structural and/or material improvements and shoes provided with the soles have been devised.

[0003] For example, Japanese National Patent Publication No. 2018-529461 discloses a sole and a shoe provided with the same in which generation of energy loss due to plantarflexion can be suppressed by embedding a highly rigid plate inside the sole and designing a shape of the highly rigid plate such that the vicinity of a portion corresponding to an MP joint of the highly rigid plate has a predetermined curvature, by focusing on a fact that most of energy is absorbed by the plantarflexion occurring in a metatarsophalangeal joint (hereinafter, referred to as "MP joint") of a foot included in the footrest portion of the foot during take-off and this becomes a loss and a sufficiently high propulsion cannot be obtained.

SUMMARY

[0004] Here, in order to realize efficient running and walking regardless of the type of shoes worn by a running person or a pedestrian, it is important for the running person or the pedestrian (hereinafter, also referred to as "wearer") to have consciousness of strongly pushing the ground by the footrest portion of the foot during take-off. If the wearer can have such a high level of consciousness before running, before walking, or during running or walking, the wearer can run and walk dramatically efficiently. Accordingly, if the sole and the shoe provided with the same are provided with an assist function that allows the wearer to have such awareness, more efficient running and walking can be achieved.

[0005] Therefore, the present disclosure has been made in view of the points mentioned above, and an object of the present disclosure is to provide a shoe having an assist function that enables efficient running or walking, and a sole included in the shoe.

[0006] The sole according to the present disclosure includes an upper surface defining a support surface that supports a bottom of a foot of a wearer, a lower surface defining a ground contact surface, and a peripheral surface connecting the upper surface and the lower surface. The upper surface includes an MP joint support region that supports the bottom of the foot at a position corresponding to the MP joint of the foot of the wearer, and the peripheral surface includes a pair of side surfaces including a medial foot side surface located on the medial foot side and a lateral foot side surface located on the lateral foot side. Among the pair of side surfaces, a portion adjacent to the MP joint support region of at least one side surface is provided with an indicator visually indicating that the portion is different from the other portion of the one side surface.

[0007] The shoe according to the present disclosure includes a sole according to the present disclosure described above and an upper provided above the sole.

[0008] The above and other objects, features, situations and advantages of this disclosure will become apparent from the following detailed descriptions of this disclosure taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a schematic perspective view of a shoe according to a first embodiment.

Fig. 2 is a schematic plan view of a sole provided in the shoe illustrated in Fig. 1.

Fig. 3 is a schematic side view of the shoe illustrated in Fig. 1 as viewed from a medial foot side.

Fig. 4 is a schematic side view of the shoe illustrated in Fig. 1 as viewed from a lateral foot side.

Fig. 5 is a schematic side view of a shoe according to a first modification as viewed from a medial foot side.

Fig. 6 is a schematic side view of a shoe according to a second modification as viewed from a medial foot side.

Fig. 7 is a schematic side view of a shoe according to a third modification as viewed from a medial foot side.

Fig. 8 is a schematic side view of a shoe according to a fourth modification as viewed from a medial foot side.

Fig. 9 is a schematic side view of a shoe according to a fifth modification as viewed from a medial foot side.

Fig. 10 is a schematic side view of a shoe according to a sixth modification as viewed from a medial foot side.

Fig. 11 is a schematic side view of a shoe according to a seventh modification as viewed from a medial foot side.

Fig. 12 is a schematic side view of a shoe according to an eighth modification as viewed from a medial foot side.

Fig. 13 is a schematic side view of a shoe according to a ninth modification as viewed from a medial foot side.

Fig. 14 is a schematic side view of a shoe according to a tenth modification as viewed from a medial foot side.

Fig. 15 is a schematic side view of a shoe according to an eleventh modification as viewed from a medial foot side.
Fig. 16 is a schematic side view of a shoe according to a twelfth modification as viewed from a medial foot side.
Fig. 17 is a schematic side view of a shoe according to a thirteenth modification as viewed from a medial foot side.
Fig. 18 is a schematic side view of a shoe according to a fourteenth modification as viewed from a medial foot side.
Fig. 19 is a schematic side view of a shoe according to a fifteenth modification as viewed from a medial foot side.
Fig. 20 is a schematic side view of a shoe according to a sixteenth modification as viewed from a medial foot side.
Fig. 21 is a schematic side view of a shoe according to a seventeenth modification as viewed from a medial foot side.
Fig. 22 is a schematic side view of a shoe according to an eighteenth modification as viewed from a medial foot side.
Fig. 23 is a schematic side view of a shoe according to a nineteenth modification as viewed from a medial foot side.
Fig. 24 is a schematic side view of a shoe according to a twentieth modification as viewed from a medial foot side.
Fig. 25 is a schematic plan view of a sole provided in a shoe according to a twenty-first modification.
Fig. 26 is a schematic plan view of a sole provided in a shoe according to a twenty-second modification.
Fig. 27 is a schematic plan view of a sole provided in a shoe according to a twenty-third modification.
Fig. 28 is a schematic plan view of a sole provided in a shoe according to a twenty-fourth modification.
Fig. 29 is a schematic plan view of a sole provided in a shoe according to a twenty-fifth modification.
Fig. 30 is a schematic plan view of a sole provided in a shoe according to a second embodiment.
Fig. 31 is a schematic side view of a shoe includes the shoe sole illustrated in Fig. 30 as viewed from a medial foot side.
Fig. 32 is a schematic side view of the shoe includes the shoe sole illustrated in Fig. 30 as viewed from a lateral foot side.

DETAILED DESCRIPTION

[0010] With reference to the drawings, hereinafter, embodiments will be described in detail. In the embodiments shown hereinafter, the same or common parts are denoted by the same reference numerals in the drawings, and the descriptions thereof will not be repeated.

(First embodiment)

[0011] Fig. 1 is a schematic perspective view of a shoe according to a first embodiment, and Fig. 2 is a schematic plan view of a sole provided in the shoe illustrated in Fig. 1. Figs. 3 and 4 are schematic side views of the shoe illustrated in Fig. 1 as viewed from a medial foot side and a lateral foot side, respectively. With reference to Figs. 1 to 4, hereinafter, a shoe 1A according to the present embodiment and a sole 10A provided in the shoe 1A will be described. Here, the shoe 1A according to the present embodiment is designed assuming long distance running such as a marathon race. In Figs. 2 to 4, a position of a foot bone 100 in a case where a standard wearer having a foot of a size suitable for the shoe 1A wears the same is indicated by an imaginary line (the same applies to Figs. 5 to 32 to be described later).

[0012] As illustrated in Figs. 1, 3, and 4, the shoe 1A includes the sole 10A and an upper 20. The sole 10A has a substantially flat shape, and includes an upper surface 10a, a lower surface 10b, and a peripheral surface 10c connecting the upper surface 10a and the lower surface 10b. The sole 10A is a member that supports the bottom of the foot of the wearer. The upper 20 is positioned above the sole 10A, and has a shape covering substantially an entire portion of an inserted foot of the wearer on a terminal side of an ankle.

[0013] As illustrated in Figs. 2 to 4, in a case of the plan view, the sole 10A is divided into a forefoot portion R1 that supports a toe portion and a ball portion of the foot of the wearer, a midfoot portion R2 that supports an arch portion of the foot of the wearer, and a rearfoot portion R3 that supports a heel portion of the foot of the wearer along a front-back direction (a vertical direction in Fig. 2, and a left-right direction in Figs. 3 and 4) coinciding with a foot length direction of the foot of the wearer.

[0014] Here, assuming that a front side end of the sole 10A is a reference, a position corresponding to 40% of dimensions in the front-back direction of the sole 10A from the front side end is a first boundary position, and a position corresponding to 80% of the dimensions in the front-back direction of the sole 10A from the front side end is a second boundary position, the forefoot portion R1 corresponds to a portion included between the front side end and the first boundary position along the front-back direction, the midfoot portion R2 corresponds to a portion included between the first boundary position and the second boundary position along the front-back direction, and the rearfoot portion R3 corresponds to a portion included between the second boundary position and a rear-side end of the sole along the front-back direction.

[0015] In addition, as illustrated in Fig. 2, in a case of the plan view, the sole 10A is divided into a portion of the foot on a medial foot side corresponding to a median side (that is, a side close to a median line) in an anatomical normal position (a portion on an S1 side illustrated in Fig. 2), and a portion of the foot on a lateral foot side corresponding to a side opposite to the median side (that is,

a side far from the median line) in the anatomical normal position (a portion on an S2 side illustrated in Fig. 2) along a left-right direction (the left-right direction in Fig. 2) coinciding with a foot width direction of the foot of the wearer.

[0016] Here, a boundary line that divides the sole 10A into a portion on the medial foot side and a portion on the lateral foot side is a so-called shoe center SC. The shoe center SC is a straight line obtained in a case where a standard wearer having a foot of a size suitable for the shoe 1A wears the shoe and a straight line connecting a portion between the first toe and the second toe of the wearer and a central portion (so-called heel center) of the calcaneus is projected on the sole 10A along the vertical direction. The front side end and the rear side end of the sole 10A are end portions of the sole 10A positioned on the shoe center SC.

[0017] As illustrated in Figs. 1, 3, and 4, the upper 20 includes an upper main body 21, a shoe tongue 22, and a shoelace 23. Among them, the shoe tongue 22 and the shoelace 23 are both fixed or attached to the upper main body 21.

[0018] An upper opening portion for exposing an upper portion of an ankle of a foot of a wearer and a part of an instep of the foot is provided in an upper portion of the upper main body 21. On the other hand, as an example, a lower opening portion covered with the sole 10A is provided in the lower portion of the upper main body 21, and as another example, a bottom portion is formed by bagging the lower end of the upper main body 21.

[0019] The shoe tongue 22 is fixed to the upper main body 21 by sewing, welding, bonding, a combination thereof, or the like so as to cover a portion of the upper opening portion provided in the upper main body 21 where a part of the instep of the foot of the wearer is exposed. As the upper main body 21 and the shoe tongue 22, for example, a woven fabric, a knitted fabric, a nonwoven fabric, a synthetic leather, a resin, or the like is used, and in particular, in shoes requiring air permeability and lightweight properties, a double raschel warp knitted fabric that is knitted with a polyester yarn is used.

[0020] The shoelace 23 is made of a string-like member for drawing the peripheral edges of the upper opening portions provided in the upper main body 21 to expose a part of the instep of the foot of the wearer toward each other in the foot width direction of the foot of the wearer, and is inserted into a plurality of hole portions provided in the peripheral edges of the upper opening portions. By tightening the shoelace 23 in a state where the foot of the wearer is inserted into the upper main body 21, the upper main body 21 can be brought into close contact with the foot.

[0021] As illustrated in Figs. 1 to 4, the sole 10A includes a midsole 11 and an outsole 12. The midsole 11 is located above the sole 10A, and the outsole 12 is located below the sole 10A. The midsole 11 is configured to have a relatively thick thickness, and the outsole 12 is configured to have a relatively thin thickness.

[0022] The upper surface of the midsole 11 constitutes the upper surface 10a of the sole 10A, and defines a support surface that supports the bottom of the foot of the wearer. The upper surface of the midsole 11 is joined to the upper main body 21 by, for example, adhesion, whereby the sole 10A is fixed to the upper 20.

[0023] The upper surface of the outsole 12 is joined to the lower surface of the midsole 11 by, for example, adhesion, whereby the outsole 12 is fixed to the midsole 11. The lower surface of the outsole 12 constitutes the lower surface 10b of the sole 10A, and defines a ground contact surface of the shoe 1A. A tread pattern may be formed on the lower surface of the outsole 12 by forming irregularities in order to improve gripping properties.

[0024] A peripheral surface 10c of the sole 10A is mainly defined by the peripheral surface of the midsole 11, and includes a medial foot side surface 10c1 and a lateral foot side surface 10c2. The peripheral surface 10c of the sole 10A has a smoothly curved shape, and the medial foot side surface 10c1 and the lateral foot side surface 10c2 are continuous at a position on the rear end side thereof.

[0025] The midsole 11 is positioned continuously from the forefoot portion R1 to the rearfoot portion R3. The upper surface of the midsole 11 has a shape in which the peripheral edge thereof is raised as compared with the periphery. As a result, a concave portion is provided on the upper surface of the midsole 11, and the concave portion serves as a portion for receiving the upper 20. The upper surface of the midsole 11 in the portion excluding the peripheral edge, which is the bottom surface of the concave portion, has a smooth curved surface shape so as to fit the bottom of the foot of the wearer.

[0026] The midsole 11 may be formed of a single member or may be formed by being divided into a plurality of members. For example, in a case where the midsole 11 is divided into a plurality of members, it is possible to embed the highly rigid plate inside the midsole 11 by inserting the highly rigid plate between these members.

[0027] The outsole 12 may be formed of a single member or may be divided into a plurality of members. The outsole 12 may be continuously positioned from the forefoot portion R1 to the rearfoot portion R3, or may be provided only on the forefoot portion R1 and the rearfoot portion R3 excluding the midfoot portion R2.

[0028] The midsole 11 preferably has excellent shock absorbing property while having appropriate strength, and from this viewpoint, for example, a resin foam material containing a resin material as a main component and a foaming agent or a crosslinking agent as an accessory component is used as the midsole 11. Alternatively, a rubber foam material containing a rubber material as a main component and a plasticizer, a foaming agent, a reinforcing agent, or a crosslinking agent as an accessory component may be used.

[0029] As the resin material, for example, an ethylene-vinyl acetate copolymer (EVA), a polyolefin resin, a thermoplastic polyurethane, a thermoplastic polyamide-

based elastomer (TPA and TPAE), a thermoplastic polyester-based elastomer, or the like can be used. As the rubber material, for example, butadiene rubber can be suitably used.

[0030] As a result, the midsole 11 is generally formed of a soft member having a Young's modulus smaller than that of the outsole 12. Accordingly, the midsole 11 is relatively easily elastically deformed in a case of receiving a compressive load, and thus excellent shock absorbing property is obtained. A predetermined portion of the midsole 11 may include various shock absorbing parts and reinforcement parts.

[0031] The outsole 12 is preferably excellent in abrasion resistance and gripping properties, and from this viewpoint, for example, a member made of a material containing a rubber material as a main component and a plasticizer, a reinforcing agent, or a crosslinking agent as an accessory component is used as the outsole 12. As the rubber material, for example, butadiene rubber can be suitably used.

[0032] As a result, the outsole 12 is generally formed of a hard member having a Young's modulus larger than that of the midsole 11. Accordingly, the outsole 12 is not easily deformed as compared with the midsole 11 even in a case of receiving the compressive load, but is excellent in durability such as abrasion resistance.

[0033] In the shoe 1A, in addition to the sole 10A and the upper 20 described above, an insole and an inner sole may be provided.

[0034] As illustrated in Figs. 1 to 4, in the shoe 1A according to the present embodiment, indicators 15 are provided on a peripheral surface 10c of the sole 10A. The indicators 15 include a medial foot side indicator 15a provided on the medial foot side surface 10c1 and a lateral foot side indicator 15b provided on the lateral foot side surface 10c2. The medial foot side indicator 15a and the lateral foot side indicator 15b are both provided on the peripheral surface of the midsole 11, and visually indicate that the peripheral surface of the portion where they are provided and the peripheral surface of the portion where they are not provided are different portions.

[0035] Specifically, the upper surface 10a of the sole 10A has an MP joint support region 10d (see Fig. 2) that supports the bottom of the foot at a position corresponding to an MP joint 106 of the foot of the wearer, the medial foot side indicator 15a is provided in a portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d, and the lateral foot side indicator 15b is provided in a portion of the lateral foot side surface 10c2 adjacent to the MP joint support region 10d.

[0036] Here, the MP joint 106 includes a first metatarsophalangeal joint located between a first proximal phalanx 101a and a first metatarsal bone 101b of the foot of the wearer, a second metatarsophalangeal joint located between a second proximal phalanx 102a and a second metatarsal bone 102b, a third metatarsophalangeal joint located between a third proximal phalanx 103a and a third metatarsal bone 103b, a fourth metatarsophalangeal joint located between a fourth proximal phalanx 104a and a fourth metatarsal bone 104b, and a fifth metatarsophalangeal joint located between a fifth proximal phalanx 105a and a fifth metatarsal bone 105b. Accordingly, the medial foot side indicator 15a is located in a portion corresponding to the first metatarsophalangeal joint, and the lateral foot side indicator 15b is located in a portion corresponding to the fifth metatarsophalangeal joint.

[0037] In other words, a proximal end of the first proximal phalanx 101a adjacent to the first metatarsophalangeal joint and a distal end of the first metatarsal bone 101b constitute a thenar Q1, and the medial foot side indicator 15a is located in a portion corresponding to the thenar Q1. The proximal end of the fifth proximal phalanx 105a adjacent to the fifth metatarsophalangeal joint and the distal end of the fifth metatarsal bone 105b constitute a hypothenar Q2, and the lateral foot side indicator 15b is located in a portion corresponding to the hypothenar Q2.

[0038] In the present embodiment, the indicators 15 are all colored in a color different from a color of an adjacent region of the indicators 15 in a peripheral portion 16 (that is, the medial foot side surface 10c1 and the lateral foot side surface 10c2 of the portion where the indicators 15 are not provided). In other words, the indicators 15 are configured to be visually recognizable by a color difference between the portion corresponding to the indicators 15 and the portion corresponding to the adjacent region of the indicators 15. Note that, in Figs. 1 to 4, in order to express this color difference in an easily understandable manner, a dark color is applied to a portion corresponding to the indicators 15, and a light color is applied to a portion corresponding to a peripheral portion 16 (the same applies to Figs. 5 to 27 and Figs. 30 to 32 to be described later).

[0039] The color difference is preferably greater than or equal to 0.8. With this configuration, visibility of the indicators 15 can be reliably ensured. Note that the color difference referred to herein generally means a color difference in a color space called a CIELAB color space.

[0040] In the CIELAB color space, an equal color space of color display is defined by three-dimensional orthogonal coordinates obtained by combining an a*b* chromaticity diagram and a brightness index L*. The color difference mentioned above can be calculated using a coordinate P (L^*_P, a^*_P, b^*_P) of a colorimetric value of the indicators 15 in the CIELAB color space and a coordinate Q (L^*_Q, a^*_Q, b^*_Q) of the colorimetric value of the peripheral portion 16, and specifically, the calculation can be performed by obtaining a distance between these coordinate points in the CIELAB color space.

[0041] In the present embodiment, as described above, since all of the indicators 15 are colored in a color different from the adjacent region of the indicators 15 in the peripheral portion 16, it can be said that the indicators 15 are configured to be visually recognizable also by a brightness difference between the portion corresponding

to the indicators 15 and the portion corresponding to the adjacent region of the indicators 15.

[0042] The brightness difference is preferably greater than or equal to 30. With this configuration, visibility of the indicators 15 can be reliably ensured. Here, as a specific method of measuring the brightness difference, an RGB value of the indicators 15 and an RGB value of the peripheral portion 16 measured using image analysis software are used, and the brightness difference can be obtained by a difference between the brightness of the indicators 15 and the brightness of the peripheral portion 16 obtained by substituting these RGB values into the formula of $((R \times 299) + (G \times 587) + (B \times 114))/1000$. Note that, at that time, R, G, and B described in the above formulas are values representing RGB values of the respective colors by 0 to 255 in 10 decimal numbers.

[0043] As described above, the brightness difference between the portion corresponding to the indicators 15 and the portion corresponding to the adjacent region of the indicators 15 is preferably greater than or equal to 30, but this may be changed depending on uses of the shoe. For example, in a performance shoe assumed to be used in a marathon race, a track race, or the like, such as the shoe 1A according to the present embodiment or a shoe 1B according to the second embodiment to be described later, the brightness difference is preferably greater than or equal to 125. On the other hand, in general walking shoes used in daily life, a sufficient effect is exhibited by setting the brightness difference to greater than or equal to 30 as described above.

[0044] Here, as an example, the visibility of the indicators 15 can be reliably ensured by setting the indicators 15 to black and setting the peripheral portion 16 to white. As another example, the visibility of the indicators 15 can be reliably ensured by setting the indicators 15 to orange and setting the peripheral portion 16 to yellow or white. Furthermore, as another example, the visibility of the indicators 15 can be reliably ensured by setting the indicators 15 to black and setting the peripheral portion 16 to orange, yellow, or white. Note that these coloring examples are merely examples, and can be appropriately changed. Here, as long as the color difference or/and the brightness difference between the indicators 15 and the peripheral portion 16 can be sufficiently secured, any of these may be colored in a darker color.

[0045] In the present embodiment, both the medial foot side indicator 15a and the lateral foot side indicator 15b are formed in an inclined belt-like shape having a predetermined width. More specifically, each of the medial foot side indicator 15a and the lateral foot side indicator 15b is configured such that a portion on an upper end side thereof is positioned relatively forward and a portion on a lower end side thereof is positioned relatively backward, and thus has an outer shape of a substantially parallelogram in a side view. With this configuration, visibility of the indicators 15 can be reliably ensured.

[0046] In addition, in order to improve the visibility of the indicators 15, it is preferable that the indicators are provided at a wide position in the vertical direction of the medial foot side surface 10c1 and the lateral foot side surface 10c2 of the sole 10A as much as possible. In this regard, in the present embodiment, each of the medial foot side indicator 15a and the lateral foot side indicator 15b is provided such that the upper ends thereof reach connecting portions between the medial foot side surface 10c1 as well as the lateral foot side surface 10c2 and the upper surface 10a, respectively (that is, a ridge located between these portions), and the lower ends thereof reach the connecting portions between the medial foot side surface 10c1 as well as the lateral foot side surface 10c2 and the lower surface 10b, respectively (that is, a ridge (more specifically, a ridge located between the peripheral surface and the lower surface of the midsole 11) located between these portions).

[0047] With such a configuration, the visibility of the indicators 15 is improved, and the wearer can easily visually recognize the indicator even in a worn state as well as in a non-worn state.

[0048] Further, in the present embodiment, the medial foot side indicator 15a is provided so as to include a central position in a thickness direction of the sole 10A in the portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d, and the lateral foot side indicator 15b is provided so as to include the central position in the thickness direction of the sole 10A in the portion of the lateral foot side surface 10c2 adjacent to the MP joint support region 10d.

[0049] With such a configuration, the visibility of the indicators 15 is improved, and the wearer can easily visually recognize the indicator even in a worn state as well as in a non-worn state.

[0050] In addition, in the present embodiment, assuming that a contour appearing in the plan view of the sole 10A is a reference, the medial foot side indicator 15a is provided so as to include a position 10% above the contour with respect to the thickness dimension of the sole 10A in a portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d, and the lateral foot side indicator 15b is provided so as to include a position 10% above the contour with respect to the thickness dimension of the sole 10A in a portion of the lateral foot side surface 10c2 adjacent to the MP joint support region 10d.

[0051] With such a configuration, the visibility of the indicators 15 is improved, and the wearer can easily visually recognize the indicator even in a worn state as well as in a non-worn state.

[0052] Here, in the present embodiment, the peripheral surface of the midsole 11 has a shape that protrudes outward at a substantially central portion in the vertical direction. Accordingly, each of the medial foot side surface 10c1 and the lateral foot side surface 10c2 of the sole 10A includes an inclined surface directed downward toward the outside along the left-right direction of the sole 10A in an upper portion thereof, and each of the medial foot side indicator 15a and the lateral foot side indicator

15b is provided so as to include a portion corresponding to the inclined surface.

[0053] With such a configuration, both the medial foot side indicator 15a and the lateral foot side indicator 15b include a portion directed vertically upward, and thus it is possible to visually recognize the medial foot side indicator 15a and the lateral foot side indicator 15b particularly even in a state where the wearer wears the shoe 1A.

[0054] As described above, in the shoe 1A according to the present embodiment and the sole 10A included therein, the indicators 15 are provided on the peripheral surface 10c of the sole 10A in the portion adjacent to the MP joint support region 10d. Therefore, when the wearer visually recognizes the indicators 15 before or during running, the wearer is made aware of strongly pushing the ground at the portion to which the indicators 15 are attached. As a result, the motion of strongly pushing the ground by the footrest portion of the foot during take-off is promoted. Therefore, it is possible to provide a shoe having an assist function capable of efficiently running with high propulsion and a sole included in the shoe.

[0055] In addition, the indicators 15 can also be used as a target for performing running analysis. In other words, in a case where a motion of strongly pressing the ground by the footrest portion of the foot during running can be realized, the midsole of the portion to which the indicators 15 are attached is greatly compressed and deformed by receiving foot pressure, and accordingly, the indicators 15 are also greatly collapsed vertically. On the other hand, in a case where the motion of strongly pushing the ground by the footrest portion of the foot is not realized during running, a degree of collapsing of the indicators 15 also decreases.

[0056] Therefore, if a running motion of the wearer is imaged using an imaging means, and an amount of collapse of the indicators 15 is measured by performing an image analysis based on a captured image, it is possible to objectively evaluate whether or not the motion of strongly pressing the ground by the footrest portion of the foot during running has been realized. Therefore, by notifying the wearer of an evaluation result, in that sense as well, it is possible to provide a shoe having an assist function capable of efficiently running by obtaining high propulsion and a sole included in the shoe.

[0057] Note that both the medial foot side indicator 15a and the lateral foot side indicator 15b are preferably formed of a portion of the same material as the midsole 11 as a part of the midsole 11. In other words, it is not necessarily a preferable aspect that each of the medial foot side indicator 15a and the lateral foot side indicator 15b is provided as a part configured separately from the midsole 11. This is because, in a case where these components are configured as separate members from the midsole 11, the number of components increases or assembly thereof becomes complicated, which may increase manufacturing costs.

[0058] Here, as illustrated in Figs. 2 and 3, it is preferable that the medial foot side indicator 15a continuously extends along the front-back direction of the sole 10A at least in a range A surrounded by, a first line L1 which is located on the shoe center SC of the sole 10A, passes through a position of 24% with respect to the entire length of the sole 10A from the front side end of the sole 10A toward the rear side in the front-back direction, and is orthogonal to the shoe center SC, and a second line L2 which is located on the shoe center SC of the sole 10A, passes through a position of 36% with respect to the entire length of the sole 10A from the front side end of the sole 10A toward the rear side in the front-back direction, and is orthogonal to the shoe center SC.

[0059] This is because the MPjoint 106 (more specifically, the thenar Q1) will generally be located between the first line L1 and the second line L2 described above when worn by a standard wearer with foot sized to fit the shoe. In other words, since the medial foot side indicator 15a is provided with a predetermined width (that is, it is possible to continuously extend along the front-back direction) so as to include at least the range A surrounded by the first line L1 and the second line L2, it is possible to notify the wearer of a portion where the wearer should consciously and strongly push the ground more accurately. In addition, even when running analysis is performed using the medial foot side indicator 15a, it is possible to perform more accurate evaluation by configuring as described above.

[0060] In the present embodiment, the upper and front end portions of the medial foot side indicator 15a are located on the front side of the first line L1, and the upper and rear end portions overlap with the second line L2. The medial foot side indicator 15a has a lower and front end portion positioned behind the first line L1 and ahead of the second line L2, and a lower and rear end positioned behind the second line L2. Also in this case, the medial foot side indicator 15a continuously extends along the front-back direction of the sole 10A within the range A mentioned above.

[0061] In addition, it is preferable that the medial foot side indicator 15a is located only within a range surrounded by a fifth line (not illustrated) that is positioned on the shoe center SC of the sole 10A, passes through a position of 17% with respect to the entire length of the sole 10A from the front side end toward the rear side in the front-back direction of the sole 10A, and is orthogonal to the shoe center SC, and a sixth line (not illustrated) that is positioned on the shoe center SC of the sole 10A, passes through a position of 38% with respect to the entire length of the sole 10A from the front side end toward the rear side in the front-back direction of the sole 10A, and is orthogonal to the shoe center SC.

[0062] This is because, in a case where the medial foot side indicator 15a is provided so as to extend beyond this range, a part of the medial foot side indicator 15a includes a portion far away from the MP joint support region 10d, and a function that the medial foot side indicator 15a visually indicates a portion adj acent to the MP

joint support region 10d on the medial foot side surface 10c1 of the sole 10A is not damaged.

[0063] As illustrated in Figs. 2 and 4, it is preferable that the lateral foot side indicator 15b continuously extends along the front-back direction of the sole 10A at least in a range B surrounded by a third line L3 which is located on the shoe center SC of the sole 10A, passes through a position of 31% with respect to the entire length of the sole 10A from the front side end of the sole 10A toward the rear side in the front-back direction, and is orthogonal to the shoe center SC, and a fourth line L4 which is located on the shoe center SC of the sole 10A, passes through a position of 40% with respect to the entire length of the sole from the front side end of the sole 10A toward the rear side in the front-back direction, and is orthogonal to the shoe center SC.

[0064] This is because the MP joint 106 (more specifically, the hypothenar Q2) will generally be located between the third line L3 and the fourth line L4 described above when worn by a standard wearer with a foot size adapted to the shoe. In other words, since the lateral foot side indicator 15b is provided with a predetermined width (that is, it is possible to continuously extend along the front-back direction) so as to include at least the range B surrounded by the third line L3 and the fourth line L4, it is possible to notify the wearer of a portion where the wearer should consciously and strongly push the ground more accurately. In addition, even when running analysis is performed using the lateral foot side indicator 15b, it is possible to perform more accurate evaluation by configuring as described above.

[0065] In the present embodiment, the upper and front end portions of the lateral foot side indicator 15b are located on the front side of the third line L3, and the upper and rear end portions are located on the rear side of the fourth line L4. The lower and front end portions of the lateral foot side indicator 15b are located behind the fourth line L4, and the lower and rear end portions are also located behind the fourth line L4. Also in this case, the lateral foot side indicator 15b continuously extends along the front-back direction of the sole 10A within the range B described above.

[0066] Further, it is preferable that the lateral foot side indicator 15b is located only within a range surrounded by a seventh line (not illustrated) which is located on the shoe center SC of the sole 10A, passes through a position of 21% with respect to the entire length of the sole 10A from the front side end toward the rear side in the front-back direction of the sole 10A, and is orthogonal to the shoe center SC, and an eighth line (not illustrated) which is located on the shoe center SC of the sole 10A, passes through a position of 45% with respect to the entire length of the sole 10A from the front side end toward the rear side in the front-back direction of the sole 10A, and is orthogonal to the shoe center SC.

[0067] This is because in a case where the lateral foot side indicator 15b is provided so as to extend beyond this range, a part of the lateral foot side indicator 15b includes a portion far away from the MP joint support region 10d, and a function that the lateral foot side indicator 15b visually indicates a portion adjacent to the MP joint support region 10d on the lateral foot side surface 10c2 of the sole 10A is not damaged.

(First to fourth modifications)

[0068] Figs. 5 to 8 are schematic side views of the shoes according to the first to fourth modifications as viewed from the medial foot side, respectively. With reference to Figs. 5 to 8, hereinafter, shoes 1A1 to 1A4 according to the first to fourth modifications and the soles 10A1 to 10A4 included therein will be described. In the following description, only the portion on the medial foot side of the shoes 1A1 to 1A4 will be described, but the portion on the lateral foot side also has a configuration similar to the portion on the medial foot side.

[0069] The shoes 1A1 to 1A4 according to the first to fourth modifications and the soles 10A1 to 10A4 included therein are basically different from the shoe 1A according to the above-described first embodiment and the sole 10A included therein only in the size of the medial foot side indicator 15a. Hereinafter, only a main part of the difference from the medial foot side indicator 15a according to the first embodiment will be described.

[0070] As illustrated in Fig. 5, in the shoe 1A1 according to the first modification and the sole 10A1 provided in the shoe 1A1, the lower end of the medial foot side indicator 15a does not reach the ridge located between the peripheral surface and the lower surface of the midsole 11.

[0071] As illustrated in Fig. 6, in the shoe 1A2 according to the second modification and the sole 10A2 included therein, the upper end of the medial foot side indicator 15a does not reach the ridge located between the peripheral surface and the upper surface of the midsole 11.

[0072] As illustrated in Fig. 7, in the shoe 1A3 according to the third modification and the sole 10A3 provided in the shoe 1A3, the upper end and the lower end of the medial foot side indicator 15a do not reach a ridge located between the peripheral surface and the upper surface of the midsole 11 and a ridge located between the peripheral surface and the lower surface of the midsole 11, respectively.

[0073] As illustrated in Fig. 8, in the shoe 1A4 according to the fourth modification and the sole 10A4 included therein, the upper and front end portions overlap with the first line L1, and the upper and rear end portions overlap with the second line L2.

[0074] As described above, even in a case where the medial foot side indicator 15a is different only in size from the medial foot side indicator 15a according to the first embodiment described above, as long as the medial foot side indicator 15a is provided in a portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d (see Fig. 2), it is possible to obtain an effect similar to the effect described in the first embodiment described above.

(Fifth to thirteenth modifications)

[0075] Figs. 9 to 17 are schematic side views of shoes according to the fifth to thirteenth modifications, respectively, as viewed from the medial foot side. With reference to Figs. 9 to 17, hereinafter, shoes 1A5 to 1A13 according to the fifth to the thirteenth modifications and soles 10A5 to 10A13 included therein will be described. In the following description, only the portion on the medial foot side of the shoes 1A5 to 1A13 will be described, but the portion on the lateral foot side also has a configuration similar to the portion on the medial foot side.

[0076] The shoes 1A5 to 1A13 according to the fifth to the thirteenth modifications and the soles 10A5 to 10A13 included therein are basically different from the shoe 1A according to the first embodiment and the sole 10A included therein only in the shape and size of the medial foot side indicator 15a. Hereinafter, only a main part of the difference from the medial foot side indicator 15a according to the first embodiment will be described.

[0077] As illustrated in Fig. 9, in the shoe 1A5 according to the fifth modification and the sole 10A5 included therein, the medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but a portion on an upper end side thereof is located relatively behind and a portion on a lower end side thereof is located relatively in front.

[0078] As illustrated in Fig. 10, in the shoe 1A6 according to the sixth modification and the sole 10A6 included therein, the medial foot side indicator 15a has a substantially rectangular outer shape in a side view, a front end edge thereof overlaps with the first line L1, and a rear end edge thereof overlaps with the second line L2.

[0079] As illustrated in Fig. 11, in the shoe 1A7 according to the seventh modification and the sole 10A7 included therein, the medial foot side indicator 15a has a substantially rectangular outer shape in a side view, a front end edge thereof is located on the front side of the first line L1, and a rear end edge thereof is located on the rear side of the second line L2.

[0080] As illustrated in Fig. 12, in a shoe 1A8 according to the eighth modification and a sole 10A8 included therein, a medial foot side indicator 15a has a substantially rectangular outer shape in a side view, and both a front end edge and a rear end edge of the medial foot side indicator are located on the rear side of the first line L1 and on the front side of the second line L2.

[0081] As illustrated in Fig. 13, in a shoe 1A9 according to the ninth modification and a sole 10A9 included therein, a medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but has a shape in which four corners are rounded.

[0082] As illustrated in Fig. 14, in a shoe 1A10 according to the tenth modification and a sole 10A10 included therein, the medial foot side indicator 15a has an elliptical outer shape in a side view.

[0083] As illustrated in Fig. 15, in a shoe 1A11 according to the eleventh modification and a sole 10A11 included therein, a medial foot side indicator 15a has a regular circular outer shape in a side view.

[0084] As illustrated in Fig. 16, in a shoe 1A12 according to the twelfth modification and a sole 10A12 included therein, the medial foot side indicator 15a has a star-shaped outer shape in a side view.

[0085] As illustrated in Fig. 17, in a shoe 1A13 according to the thirteenth modification and a sole 10A13 included therein, a medial foot side indicator 15a has a Z-shaped outer shape in a side view.

[0086] As described above, even in a case where the medial foot side indicator 15a is different from the medial foot side indicator 15a according to the first embodiment described above only in shape and size, as long as the medial foot side indicator 15a is provided in a portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d (see Fig. 2), it is possible to obtain an effect according to the effect described in the first embodiment described above.

(Fourteenth to seventeenth modifications)

[0087] Figs. 18 to 21 are schematic side views of shoes according to the fourteenth to seventeenth modifications, respectively, as viewed from the medial foot side. With reference to Figs. 18 to 21, hereinafter, shoes 1A14 to 1A17 according to the fourteenth to the seventeenth modifications and soles 10A14 to 10A17 included therein will be described. In the following description, only the portion on the medial foot side of the shoes 1A14 to 1A17 will be described, but the portion on the lateral foot side also has a configuration similar to the portion on the medial foot side.

[0088] The shoes 1A14 to 1A17 according to the fourteenth to the seventeenth modifications and the soles 10A14 to 10A17 included therein are basically different from the shoe 1A according to the first embodiment described above and the sole 10A included therein in that the medial foot side indicator 15a includes a plurality of regions colored in different colors. Hereinafter, only a main part of the difference from the medial foot side indicator 15a according to the first embodiment will be described.

[0089] As illustrated in Fig. 18, in a shoe 1A14 according to the fourteenth modification and a sole 10A14 included therein, the medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but a logo with characters is attached to a part of the medial foot side indicator 15a. The logo is colored in a color different from the surrounding background color.

[0090] As illustrated in Fig. 19, in a shoe 1A15 according to a fifteenth modification and a sole 10A15 included therein, the medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but the medial foot side indicator 15a is divided into two regions in the vertical direction, and these two divided regions are colored with different colors.

[0091] As illustrated in Fig. 20, in a shoe 1A16 according to the sixteenth modification and a sole 10A16 included therein, the medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but the medial foot side indicator 15a is divided into four regions in the front-back direction, and these four divided regions are alternately colored with different colors.

[0092] As illustrated in Fig. 21, in a shoe 1A17 according to the seventeenth modification and a sole 10A17 included therein, the medial foot side indicator 15a has an outer shape of a substantially parallelogram shape in a side view, but the medial foot side indicator 15a is divided into three regions from a central portion to a peripheral portion, and the three divided regions are alternately colored with different colors.

[0093] As described above, unlike a case of the first embodiment described above, even in a case where the medial foot side indicator 15a is configured to include a plurality of regions colored in different colors, as long as the medial foot side indicator 15a is provided in a portion adjacent to the MP joint support region 10d (see Fig. 2) of the medial foot side surface 10c1, it is possible to obtain an effect according to the effect described in the first embodiment described above.

(Eighteenth to twentieth modifications)

[0094] Figs. 22 to 24 are schematic side views of shoes according to the eighteenth to the twentieth modifications, respectively, as viewed from the medial foot side. With reference to Figs. 22 to 24, hereinafter, shoes 1A18 to 1A20 according to the eighteenth to the twentieth modifications and soles 10A18 to 10A20 included therein will be described. In the following description, only the portion on the medial foot side of the shoes 1A18 to 1A20 will be described, but the portion on the lateral foot side also has a configuration similar to the portion on the medial foot side.

[0095] The shoes 1A18 to 1A20 according to the eighteenth to the twentieth modifications and the soles 10A18 to 10A20 included therein are basically different from the shoe 1A according to the first embodiment described above and the sole 10A included therein in that the medial foot side indicator 15a includes a plurality of regions separated from each other. Hereinafter, only a main part of the difference from the medial foot side indicator 15a according to the first embodiment will be described.

[0096] As illustrated in Fig. 22, in a shoe 1A18 according to the eighteenth modification and a sole 10A18 included therein, the medial foot side indicator 15a has a substantially parallelogram outer shape in a side view as a whole, but the medial foot side indicator 15a is divided into two regions in the vertical direction, and the two divided regions are located apart from each other.

[0097] As illustrated in Fig. 23, in a shoe 1A19 according to the nineteenth modification and a sole 10A19 included therein, the medial foot side indicator 15a has a substantially parallelogram outer shape in a side view as a whole, but the medial foot side indicator 15a is divided into four regions in the front-back direction, and these four divided regions are located apart from each other.

[0098] As illustrated in Fig. 24, in a shoe 1A20 according to the twentieth modification and a sole 10A20 included therein, the medial foot side indicator 15a has a substantially parallelogram outer shape as a whole in a side view, but the medial foot side indicator 15a is divided into two regions of a center portion and a peripheral portion, and these two divided regions are located apart from each other.

[0099] As described above, unlike a case of the first embodiment described above, even in a case where the medial foot side indicator 15a is configured to include a plurality of regions separated from each other, as long as the medial foot side indicator 15a is provided in a portion of the medial foot side surface 10c1 adjacent to the MP joint support region 10d (see Fig. 2), an effect according to the effect described in the first embodiment described above can be obtained.

(Twenty-first to twenty-third modifications)

[0100] Figs. 25 to 27 are schematic plan views of soles provided in shoes according to the twenty-first to twenty-third modifications, respectively. With reference to Figs. 25 to 27, hereinafter, shoes 1A21 to 1A23 according to the twenty-first to the twenty-third modifications and soles 10A21 to 10A23 included therein will be described.

[0101] In the shoes 1A21 to 1A23 according to the twenty-first to the twenty-third modifications and the soles 10A21 to 10A23 included therein, when compared with the shoe 1A according to the first embodiment described above, the sole 10A included therein, and the like, the indicators 15 are configured to be visually distinguished from the peripheral portion 16 by a color difference and/or a brightness difference due to coloring, and is further configured to be visually distinguished from the peripheral portion 16 by a shape difference.

[0102] As illustrated in Fig. 25, in the shoe 1A21 according to the twenty-first modification and the sole 10A21 included therein, a concave portion 11a is formed in a portion where the indicators 15 are provided in the shoe 1A according to the first embodiment and the sole 10A included therein.

[0103] More specifically, the concave portion 11a having a shape recessed from the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the medial foot side surface 10c1 of the sole 10A21, and the concave portion 11a having a shape recessed from the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the lateral foot side surface 10c2 of the sole 10A21, whereby the medial foot side indicator 15a and the lateral foot side indicator 15b are configured by the concave portion 11a.

[0104] As illustrated in Fig. 26, in the shoe 1A22 according to the twenty-second modification and the sole

10A22 included therein, a convex portion 11b is formed in a portion where the indicators 15 are provided in the shoe 1A according to the first embodiment and the sole 10A included therein.

[0105] More specifically, the convex portion 11b having a shape protruding from the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the medial foot side surface 10c1 of the sole 10A22, and the convex portion 11b having a shape protruding from the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the lateral foot side surface 10c2 of the sole 10A22, whereby the medial foot side indicator 15a and the lateral foot side indicator 15b are configured by the convex portion 11b.

[0106] As illustrated in Fig. 27, in a shoe 1A23 according to the twenty-third modification and a sole 10A23 included therein, the convex portion 11b is formed in a portion where the indicators 15 are provided in the shoe 1A10 according to the tenth modification and the sole 10A10 included therein.

[0107] More specifically, the convex portion 11b having a shape bulging more than the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the medial foot side surface 10c1 of the sole 10A23, and the convex portion 11b having a shape bulging more than the peripheral portion 16 is provided on the peripheral surface of the midsole 11 defining the lateral foot side surface 10c2 of the sole 10A23, whereby the medial foot side indicator 15a and the lateral foot side indicator 15b are configured by the convex portion 11b.

[0108] In other words, in the shoes 1A21 to 1A23 according to any one of the twenty-first to the twenty-third modifications and the soles 10A21 to 10A23 included therein, the indicators 15 are configured to be visually recognizable by the shape difference between the portion corresponding to the indicators 15 and the portion corresponding to the adjacent region of the indicators 15. With such a configuration, the visibility of the indicators 15 is improved, and the wearer can easily visually recognize the indicator even in a worn state as well as in a non-worn state.

[0109] As described above, also in the shoes 1A21 to 1A23 according to any one of the twenty-first to the twenty-third modifications and the soles 10A21 to 10A23 included therein, since the indicators 15 are provided on the peripheral surface 10c of the sole 10A in the portion adjacent to the MP joint support region 10d, when the wearer visually recognizes the indicators 15 before or during running, the wearer is aware of strongly pressing the ground at the portion to which the indicators 15 are attached. Therefore, the action of strongly pressing the ground by the footrest portion of the foot during take-off is promoted. Therefore, it is possible to provide a shoe having an assist function capable of efficiently running with high propulsion and a sole included in the shoe.

[0110] Moreover, since the indicators 15 are not only visually distinguished from the peripheral portion 16 by the color difference or/and the brightness difference due to coloring, but also visually distinguished from the peripheral portion 16 by the shape difference, the effect described above can be more remarkably obtained.

[0111] In the twenty-first to the twenty-third modifications, the indicators 15 and the peripheral portion 16 are configured to be visually distinguished not only by the shape difference but also by the color difference or/and the brightness difference due to coloring as described above, but may be configured to be visually distinguished only by the shape difference through providing a sufficient shape difference between the indicators 15 and the peripheral portion 16. For example, in the twenty-first to twenty-third modifications described above, since there is a sufficient shape difference between the indicators 15 and the peripheral portion 16, it is not always necessary to provide the color difference or/and the brightness difference due to coloring.

(Twenty-fourth to twenty-fifth modifications)

[0112] Figs. 28 and 29 are schematic plan views of soles provided in shoes according to the twenty-fourth and the twenty-fifth modifications, respectively. Hereinafter, with reference to Figs. 28 and 29, shoes 1A24 and 1A25 according to the twenty-fourth and the twenty-fifth modifications, and soles 10A24 and 10A25 included therein will be described.

[0113] In the shoes 1A24 and 1A25 according to the twenty-fourth to the twenty-fifth modifications and the soles 10A24 and 10A25 included therein, the indicators 15 are configured to be visually distinguished from the peripheral portion 16 only by the shape difference.

[0114] As illustrated in Fig. 28, in a shoe 1A24 according to the twenty-fourth modification and a sole 10A24 included therein, an oblique fine groove 11c is formed in a portion corresponding to the peripheral portion 16 in the shoe 1A according to the first embodiment and the sole 10A included therein, but such a fine groove 11c is not formed in a portion corresponding to a portion provided with the indicators 15, and a surface thereof has a smooth shape.

[0115] As illustrated in Fig. 29, in a shoe 1A25 according to the twenty-fifth modification and a sole 10A25 included therein, the oblique fine groove 11c is formed in a portion corresponding to a portion where the indicators 15 are provided in the shoe 1A according to the first embodiment and the sole 10A included therein, but such a fine groove 11c is not formed in a portion corresponding to the peripheral portion 16, and a surface thereof has a smooth shape.

[0116] Even in such a configuration, the indicators 15 and the peripheral portion 16 are visually distinguished by the shape difference. Therefore, when the wearer visually recognizes the indicators 15 before or during running, the wearer is aware of strongly pressing the ground at the portion to which the indicators 15 are attached. Accordingly, the motion of strongly pushing the ground is promoted by the footrest portion of the foot during take-

off, and as a result, it is possible to provide a shoe having an assist function capable of efficiently running by obtaining high propulsion and a sole included therein.

(Second embodiment)

[0117] Fig. 30 is a schematic plan view of a sole provided in the shoe according to the second embodiment, and Figs. 31 and 32 are schematic side views of a shoe includes the shoe sole illustrated in Fig. 30 as viewed from the medial foot side and the lateral foot side, respectively. With reference to Figs. 30 to 32, hereinafter, a shoe 1B according to the present embodiment and a sole 10B included therein will be described. Here, the shoe 1B according to the present embodiment is designed on an assumption of short-distance or middle-distance running such as a track competition.

[0118] As illustrated in Figs. 30 to 32, the configuration of the shoe 1B according to the present embodiment and the sole 10B included therein is basically similar to the configuration of the shoe 1A according to the first embodiment described above and the sole 10A provided in the shoe 1A. The main differences are that the thickness of the midsole 11 is relatively thin, that the outsole 12 is provided substantially only on the rearfoot portion R3, that the entire region of the forefoot portion R1 and a lower surface of the midsole 11 in the region near the front end of the midfoot portion R2 are covered with the highly rigid plate 13, that a myriad of minute spike protrusions 13a are provided on the highly rigid plate 13, and that a spike pin 14 is detachably attached to the highly rigid plate 13.

[0119] Here, in the shoe 1B according to the present embodiment and the sole 10B included therein, the indicators 15 are provided on the peripheral surface 10c. The indicators 15 include a medial foot side indicator 15a provided on the medial foot side surface 10c1 and a lateral foot side indicator 15b provided on the lateral foot side surface 10c2. The medial foot side indicator 15a and the lateral foot side indicator 15b are both provided on the peripheral surface of the midsole 11, and visually indicate that the peripheral surface of the portion where they are provided and the peripheral surface of the portion where they are not provided are different portions.

[0120] Similarly to the first embodiment described above, the medial foot side indicator 15a and the lateral foot side indicator 15b are provided adjacent to the MP joint support region 10d that supports the bottom of the foot at the position corresponding to the MP joint 106 of the foot of the wearer, and are configured by being colored in a color different from the adjacent region of the indicators 15 in the peripheral portion (that is, the medial foot side surface 10c1 and the lateral foot side surface 10c2 of the portion where the indicators 15 are not provided).

[0121] As described above, even in the shoe 1B for a short distance or a middle distance such as a track race, by providing the indicators 15 on the peripheral surface 10c of the sole 10A in the portion adjacent to the MP joint support region 10d, the wearer visually recognizes the indicators 15 before running or during running, so that the wearer is aware of strongly pressing the ground at the portion to which the indicators 15 are attached, and as a result, the motion of strongly pressing the ground by the footrest portion of the foot during take-off is promoted. Therefore, it is possible to provide a shoe having an assist function capable of efficiently running with high propulsion and a sole included in the shoe.

(Abstract of disclosure in embodiments)

[0122] Characteristic configurations of the shoes disclosed in the first and second embodiments and the modifications thereof described above are summarized as follows.

[Supplementary Note 1]

[0123] A sole including:

an upper surface that defines a support surface supporting a bottom of a foot of a wearer;
a lower surface that defines a ground contact surface; and
a peripheral surface that connects the upper surface and the lower surface,
in which the upper surface includes an MP joint support region that supports the bottom of the foot at a position corresponding to an MP joint of the foot of the wearer;
the peripheral surface includes a pair of side surfaces including a medial foot side surface located on a medial foot side and a lateral foot side surface located on a lateral foot side; and
an indicator visually indicating a portion different from other portions of at least one side surface is provided in a portion adjacent to the MP joint support region of the one side surface of the pair of side surfaces.

[Supplementary Note 2]

[0124] The sole according to Supplementary Note 1, in which the indicator is provided so as to reach a connecting portion between the one side surface and the upper surface.

[Supplementary Note 3]

[0125] The sole according to Supplementary Note 1 or 2, in which the indicator is provided in a portion adjacent to the MP joint support region of the one side surface so as to include a central position in a thickness direction of the sole.

[Supplementary Note 4]

[0126] The sole according to any one of Supplementary Notes 1 to 3, in which the indicator is provided so as to include a position 10% above a contour with respect to a thickness dimension of the sole in a portion adjacent to the MP joint support region of the one side surface in a case where the contour that appears in a plan view of the sole is used as a reference.

[Supplementary Note 5]

[0127] The sole according to any one of Supplementary Notes 1 to 4, in which the indicator is configured to be visually recognizable by a color difference between a portion corresponding to the indicator of the one side surface and a portion corresponding to an adjacent region of the indicator of the one side surface.

[Supplementary Note 6]

[0128] The sole according to Supplementary Note 5, in which the color difference is greater than or equal to 0.8.

[Supplementary Note 7]

[0129] The sole according to any one of Supplementary Notes 1 to 6, in which the indicator is configured to be visually recognizable by a brightness difference between a portion corresponding to the indicator of the one side surface and a portion corresponding to an adjacent region of the indicator of the one side surface.

[Supplementary Note 8]

[0130] The sole according to Supplementary Note 7, in which the brightness difference is greater than or equal to 125.

[Supplementary Note 9]

[0131] The sole according to any one of Supplementary Notes 1 to 8, in which the indicator is configured to be visually recognizable by a shape difference between a portion corresponding to the indicator of the one side surface and a portion corresponding to an adjacent region of the indicator of the one side surface.

[Supplementary Note 10]

[0132] The sole according to Supplementary Note 9, in which the portion corresponding to the indicator includes a concave portion or a convex portion.

[Supplementary Note 11]

[0133] The sole according to any one of Supplementary Notes 1 to 10, in which the indicator includes only a medial foot side indicator provided on the medial foot side surface.

[Supplementary Note 12]

[0134] The sole according to Supplementary Note 11, in which the medial foot side indicator continuously extends along a front-back direction of the sole at least within a range surrounded by a first line that is located on a shoe center of the sole, passes through a position of 24% with respect to an entire length of the sole from a front side end toward a rear side in the front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and a second line that is located on the shoe center of the sole, passes through a position of 36% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 13]

[0135] The sole according to any one of Supplementary Notes 1 to 10, in which the indicator includes only a lateral foot side indicator provided on the lateral foot side surface.

[Supplementary Note 14]

[0136] The sole according to Supplementary Note 13, in which the lateral foot side indicator continuously extends along a front-back direction of the sole at least within a range surrounded by a third line that is located on a shoe center of the sole, passes through a position of 31% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and a fourth line that is located on the shoe center of the sole, passes through a position of 40% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 15]

[0137] The sole according to Supplementary Note 11 or 12, in which the medial foot side indicator is located only within a range surrounded by a fifth line that is located on a shoe center of the sole, passes through a position of 17% with respect to the entire length of the sole from a front side end toward a rear side in a front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and a sixth line that is located on the shoe center of the sole, passes through a position of 38% with respect to the entire length of the sole from

a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 16]

[0138] The sole according to Supplementary Note 13 or 14, in which the lateral foot side indicator is located only within a range surrounded by a seventh line that is located on a shoe center of the sole, passes through a position of 21% with respect to the entire length of the sole from a front side end toward a rear side in a front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and an eighth line that is located on the shoe center of the sole, passes through a position of 45% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 17]

[0139] The sole according to any one of Supplementary Notes 1 to 10, in which the indicator includes a medial foot side indicator provided on the medial foot side surface and a lateral foot side indicator provided on the lateral foot side surface.

[Supplementary Note 18]

[0140] The sole according to Supplementary Note 17, in which

the medial foot side indicator continuously extends along a front-back direction of the sole at least within a range surrounded by a first line that is located on a shoe center of the sole, passes through a position of 24% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and a second line that is located on the shoe center of the sole, passes through a position of 36% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole, and
the lateral foot side indicator continuously extends along the front-back direction of the sole at least within a range surrounded by a third line that is located on the shoe center of the sole, passes through a position of 31% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole, and a fourth line that is located on the shoe center of the sole, passes through a position of 40% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 19]

[0141] The sole according to Supplementary Note 17 or 18, in which

the medial foot side indicator is located only within a range surrounded by a fifth line that is located on a shoe center of the sole, passes through a position of 17% with respect to the entire length of the sole from a front side end toward a rear side in a front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center of the sole, and a sixth line that is located on the shoe center of the sole, passes through a position of 38% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole, and
the lateral foot side indicator is located only in a range surrounded by a seventh line that is located on the shoe center of the sole, passes through a position of 21% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole, and an eighth line that is located on the shoe center of the sole, passes through a position of 45% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center of the sole.

[Supplementary Note 20]

[0142] The sole according to any one of Supplementary Notes 1 to 19, including

a midsole constituting the upper surface; and
an outsole constituting the lower surface,
in which the indicator is provided in the midsole at a portion constituting the one side surface.

[Supplementary Note 21]

[0143] The sole according to Supplementary Note 20, in which the indicator is formed of a portion of a same material as the midsole as a part of the midsole.

[Supplementary Note 22]

[0144] The sole according to Supplementary Note 20 or 21, in which

the midsole of the portion constituting the one side surface includes an inclined surface directed down-

ward toward an outer side along a left-right direction of the sole coinciding with a foot width direction of the foot of the wearer, and
the indicator is provided at least in a portion corresponding to the inclined surface.

[Supplementary Note 23]

[0145] A shoe including

the sole according to any one of Supplementary Notes 1 to 22, and
an upper provided above the sole.

(Other aspects and the like)

[0146] In the first and second embodiments and the modifications thereof described above, the shoe designed on an assumption of running in a marathon race, a track race, or the like and the sole included therein have been described as an example.
However, it is also possible to apply the features of the present disclosure to a shoe assumed to be used in another race or the like and a sole included therein, a shoe assumed to be mainly used for walking or the like and a sole included therein. Also in this case, for the same reason as described above, it is possible to provide a shoe having an assist function capable of efficiently running or walking by obtaining high propulsion and a sole included therein.

[0147] In the first and second embodiments and the modifications thereof described above, it was described using illustrations that the medial foot side indicator is provided on the medial foot side surface of the peripheral surface of the sole, and the lateral foot side indicator is provided on the lateral foot side surface of the peripheral surface of the sole. Alternatively, only the medial foot side indicator may be provided without providing the lateral foot side indicator in the sole, or only the lateral foot side indicator may be provided without providing the medial foot side indicator in the sole.

[0148] In the first and second embodiments and the modifications thereof described above, it was described using illustrations that indicators having substantially the same configuration are provided on the medial foot side surface and the lateral foot side surface of the peripheral surface of the sole. However, even in a case where the indicators are provided on both the medial foot side surface and the lateral foot side surface, the indicators having different configurations may be provided on the medial foot side surface and the lateral foot side surface.

[0149] In addition, the shape, size, color arrangement, and the like of the indicators described in the first and second embodiments and the modifications thereof described above can be variously changed as long as the indicators can be visually distinguished from the peripheral portion.

[0150] Furthermore, the characteristic configurations described in the first and second embodiments and the modifications thereof described above can be naturally combined with each other without departing from the gist of the present disclosure.

[0151] Although the embodiments have been described above, it should be considered that the embodiments disclosed herein are illustrative in all respects and not restrictive. The scope of the present invention is defined by claims, and it is intended that meanings equivalent to the claims and all modifications within the scope are included.

Claims

1. A sole comprising:

an upper surface (10a) that defines a support surface supporting a bottom of a foot of a wearer;
a lower surface (10b) that defines a ground contact surface; and
a peripheral surface (10c) that connects the upper surface (10a) and the lower surface (10b),
wherein the upper surface (10a) includes an MP joint support region (10d) that supports the bottom of the foot at a position corresponding to an MP joint of the foot of the wearer;
the peripheral surface (10c) includes a pair of side surfaces including a medial foot side surface (10c1) located on a medial foot side and a lateral foot side surface (10c2) located on a lateral foot side; and
an indicator (15) visually indicating a portion different from other portions of at least one side surface is provided in a portion adjacent to the MP joint support region (10d) of the one side surface of the pair of side surfaces.

2. The sole according to claim 1, wherein the indicator (15) is provided so as to reach a connecting portion between the one side surface and the upper surface (10a).

3. The sole according to claim 1 or 2, wherein the indicator (15) is provided in a portion adjacent to the MP joint support region (10d) of the one side surface so as to include a central position in a thickness direction of the sole.

4. The sole according to any one of claims 1 to 3, wherein the indicator (15) is provided so as to include a position 10% above a contour with respect to a thickness dimension of the sole in a portion adjacent to the MP joint support region (10d) of the one side surface in a case where the contour that appears in a plan view of the sole is used as a reference.

5. The sole according to any one of claims 1 to 4, where-

in the indicator (15) is visually recognizable by a color difference between a portion corresponding to the indicator (15) of the one side surface and a portion corresponding to an adjacent region of the indicator (15) of the one side surface.

6. The sole according to any one of claims 1 to 5, wherein the indicator (15) is visually recognizable by a brightness difference between a portion corresponding to the indicator (15) of the one side surface and a portion corresponding to an adjacent region of the indicator (15) of the one side surface.

7. The sole according to any one of claims 1 to 6, wherein the indicator (15) is visually recognizable by a shape difference between a portion corresponding to the indicator (15) of the one side surface and a portion corresponding to an adjacent region of the indicator (15) of the one side surface.

8. The sole according to any one of claims 1 to 7, wherein the indicators (15) include a medial foot side indicator (15a) provided on the medial foot side surface (10c1) and a lateral foot side indicator (15b) provided on the lateral foot side surface (10c2).

9. The sole according to claim 8, wherein

the medial foot side indicator (15a) continuously extends along a front-back direction of the sole at least within a range surrounded by a first line (L1) that is located on a shoe center (SC) of the sole, passes through a position of 24% with respect to an entire length of the sole from a front side end toward a rear side in the front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center (SC) of the sole, and a second line (L2) that is located on the shoe center (SC) of the sole, passes through a position of 36% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole; and
the lateral foot side indicator (15b) continuously extends along the front-back direction of the sole at least within a range surrounded by a third line (L3) that is located on the shoe center (SC) of the sole, passes through a position of 31% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole, and a fourth line (L4) that is located on the shoe center (SC) of the sole, passes through a position of 40% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole.

10. The sole according to claim 9, wherein

the medial foot side indicator (15a) is located only within a range surrounded by a fifth line (L5) that is located on a shoe center (SC) of the sole, passes through a position of 17% with respect to the entire length of the sole from a front side end toward a rear side in a front-back direction of the sole coinciding with a foot length direction of the foot of the wearer, and is orthogonal to the shoe center (SC) of the sole, and a sixth line (L6) that is located on the shoe center (SC) of the sole, passes through a position of 38% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole; and
the lateral foot side indicator (15b) is located only within a range surrounded by a seventh line (L7) that is located on the shoe center (SC) of the sole, passes through a position of 21% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole, and an eighth line (L8) that is located on the shoe center (SC) of the sole, passes through a position of 45% with respect to the entire length of the sole from a front side end toward a rear side in the front-back direction of the sole, and is orthogonal to the shoe center (SC) of the sole.

11. The sole according to any one of claims 1 to 7, wherein the indicators (15) include only one of a medial foot side indicator (15a) provided on the medial foot side surface (10c1) and a lateral foot side indicator (15b) provided on the lateral foot side surface (10c2).

12. The sole according to any one of claims 1 to 11, comprising:

a midsole (11) constituting the upper surface (10a); and
an outsole (12) constituting the lower surface (10b),
wherein the indicator (15) is provided in the midsole (11) at a portion constituting the one side surface.

13. The sole according to claim 12, wherein the indicator (15) is formed of a portion of a same material as the midsole (11) as a part of the midsole (11).

14. The sole according to claim 12 or 13, wherein

the midsole (11) of the portion constituting the

one side surface includes an inclined surface directed downward toward an outer side along a left-right direction of the sole coinciding with a foot width direction of the foot of the wearer, and the indicator (15) is provided at least in a portion corresponding to the inclined surface.

15. A shoe comprising:

the sole according to any one of claims 1 to 14; and
an upper (20) provided above the sole.

FIG.1

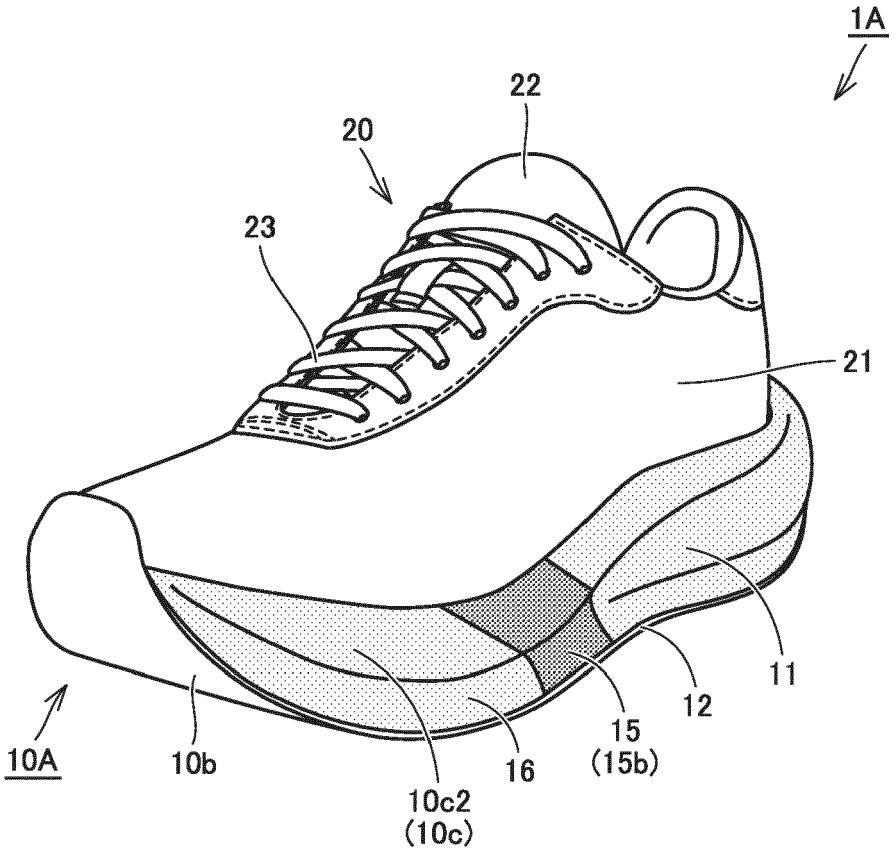


FIG.2

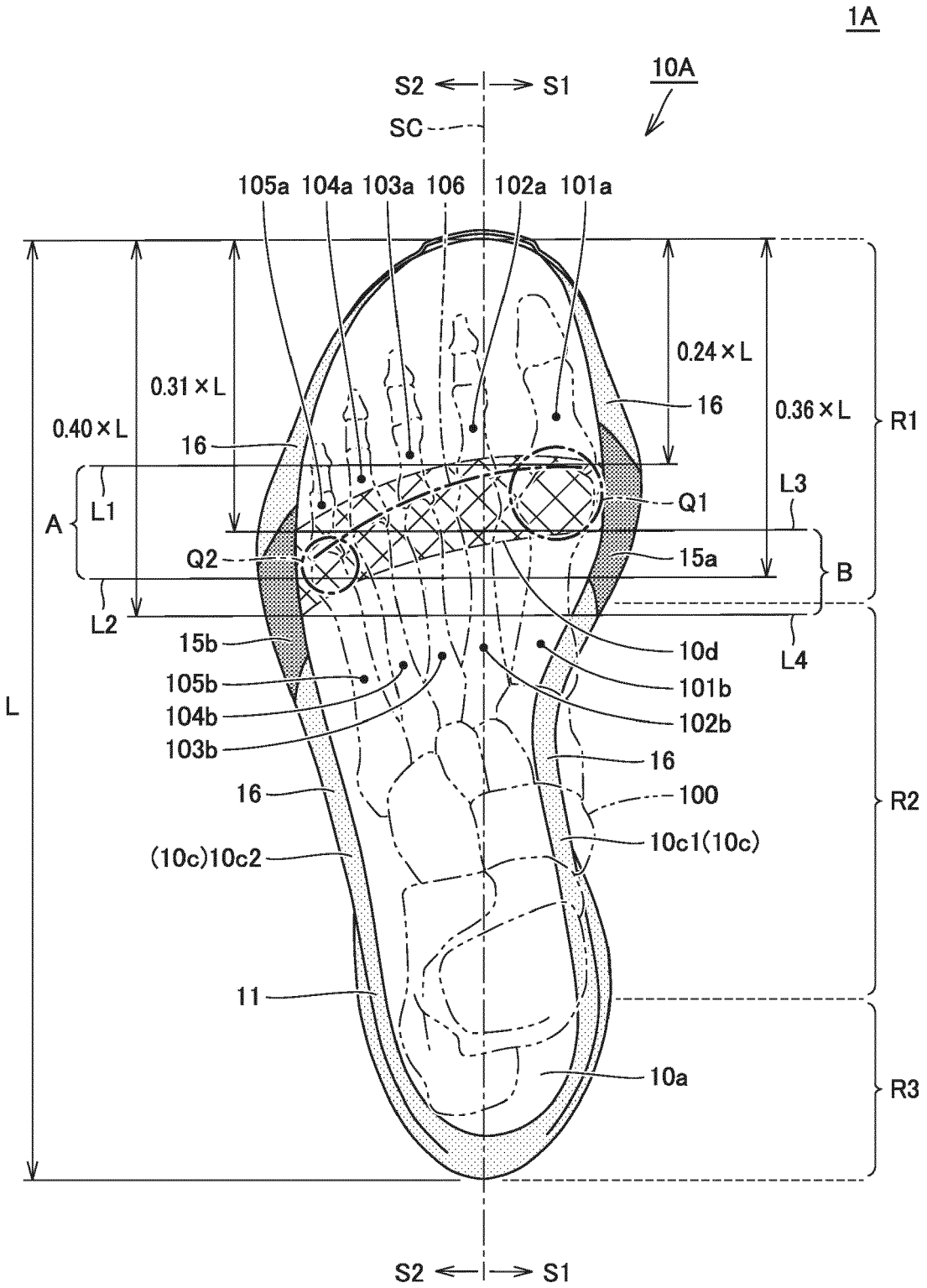

1A
10A
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
R1
A
L1
L3
Q1
Q2
15a
B
L2
L4
15b
10d
105b
101b
104b
102b
103b
L
R2
100
10c1(10c)
(10c)10c2
11
10a
R3

FIG.3

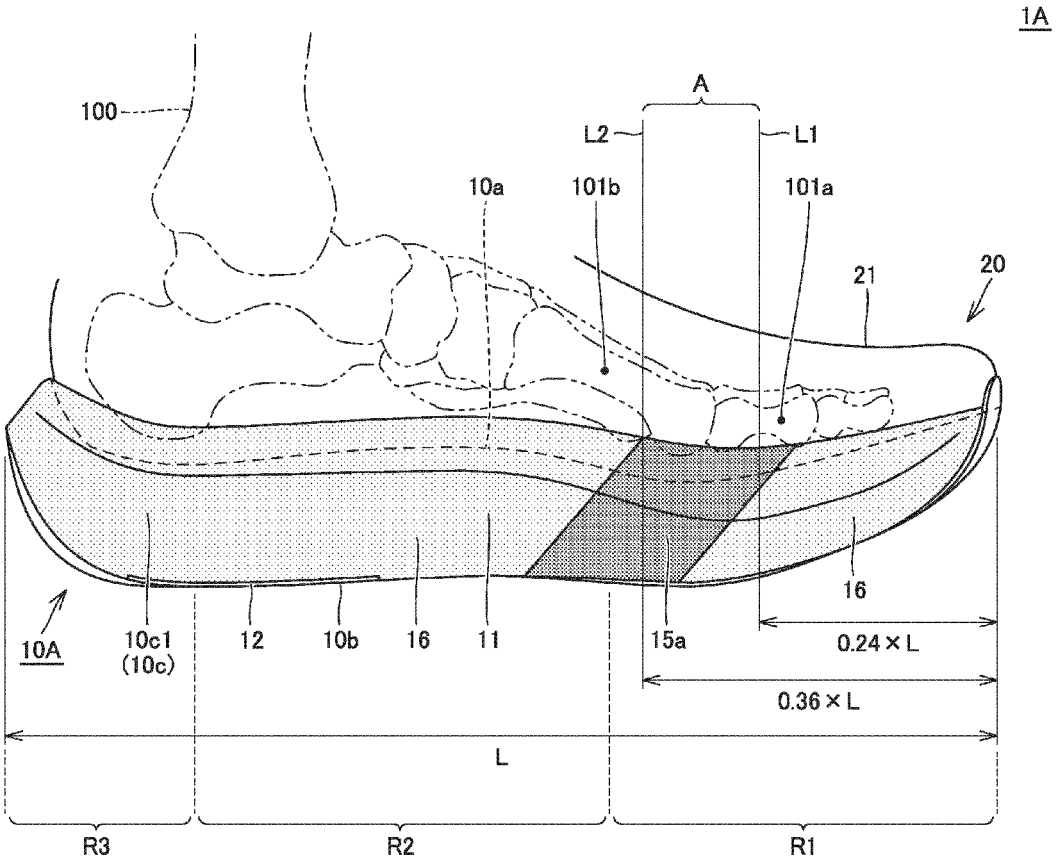

1A
100
A
L2
L1
10a
101b
101a
21
20
16
10A
10c1
(10c)
12
10b
16
11
15a
0.24 × L
0.36 × L
L
R3
R2
R1

FIG.4

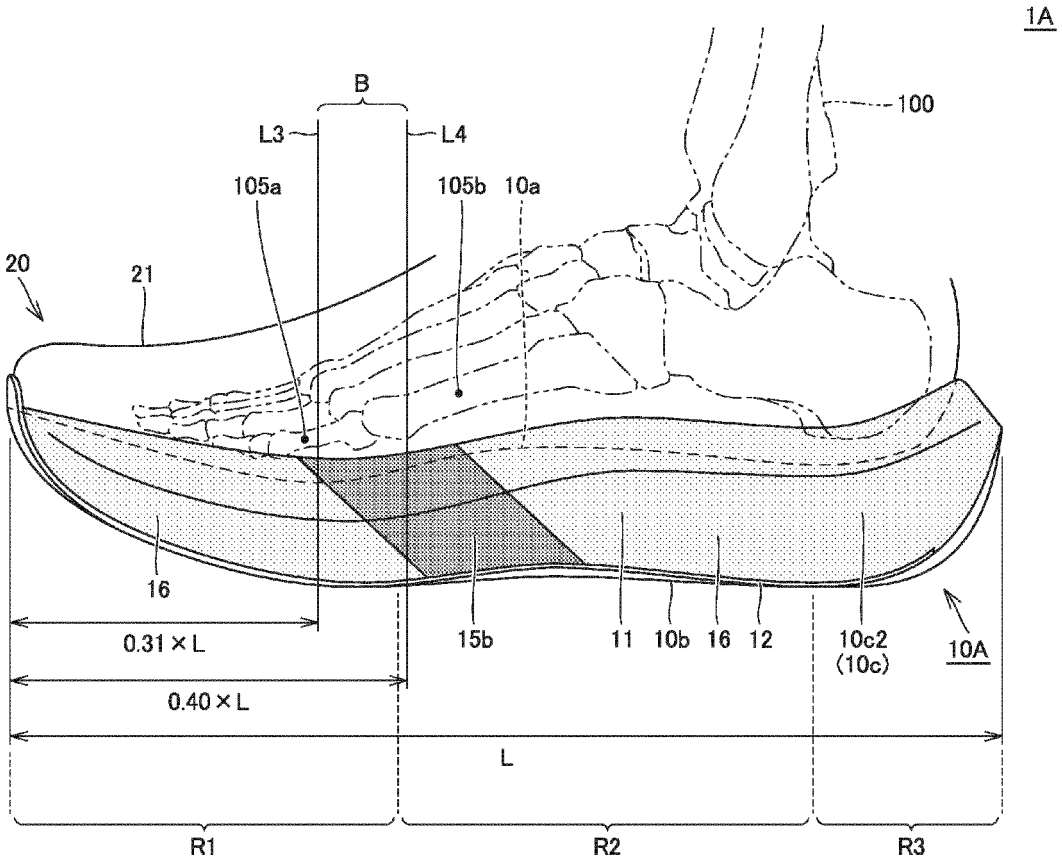

1A
B
L3
L4
100
105a
105b
10a
20
21
16
0.31 × L
0.40 × L
L
15b
11
10b
16
12
10c2
(10c)
10A
R1
R2
R3

FIG.5

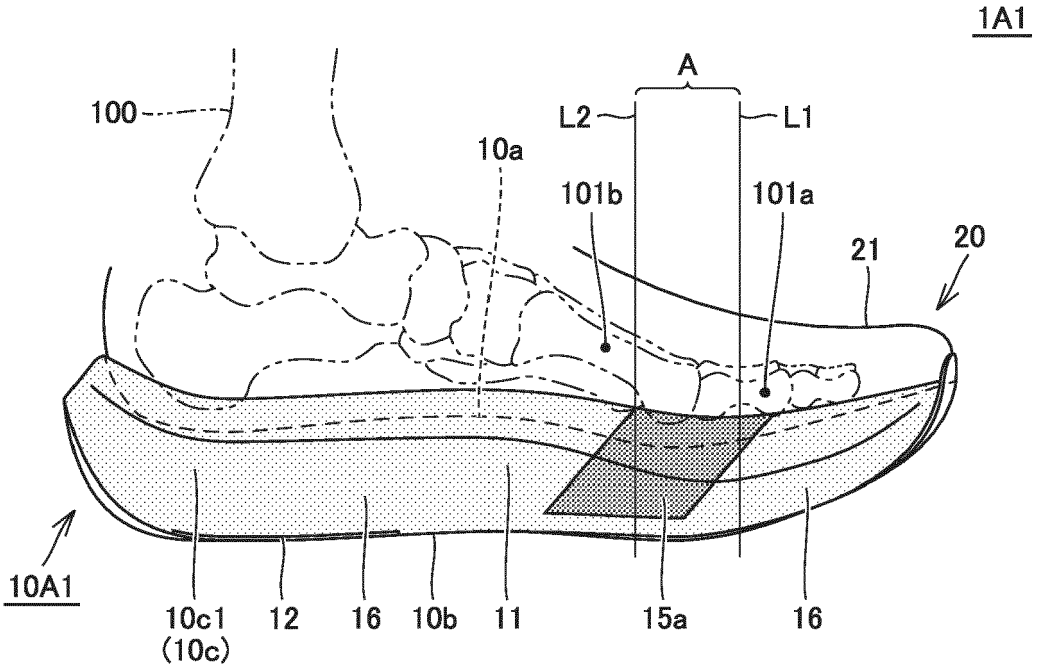

1A1
A
100
L2
L1
10a
101b
101a
21
20
10A1
10c1
(10c)
12
16
10b
11
15a
16

FIG.6

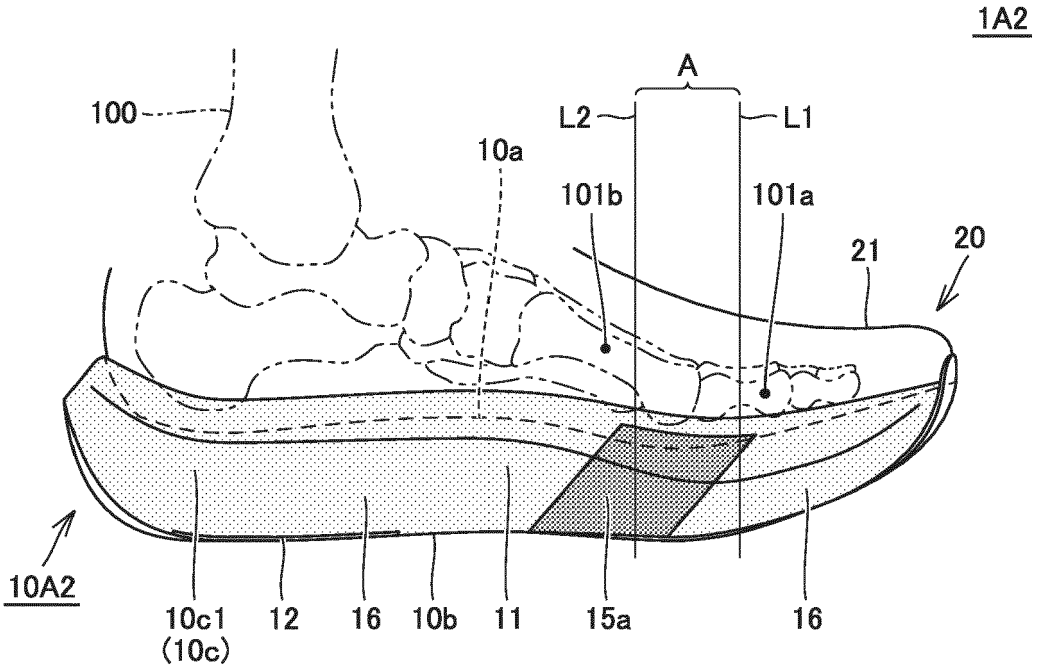

1A2
A
100
L2
L1
10a
101b
101a
21
20
10A2
10c1
(10c)
12
16
10b
11
15a
16

FIG.7

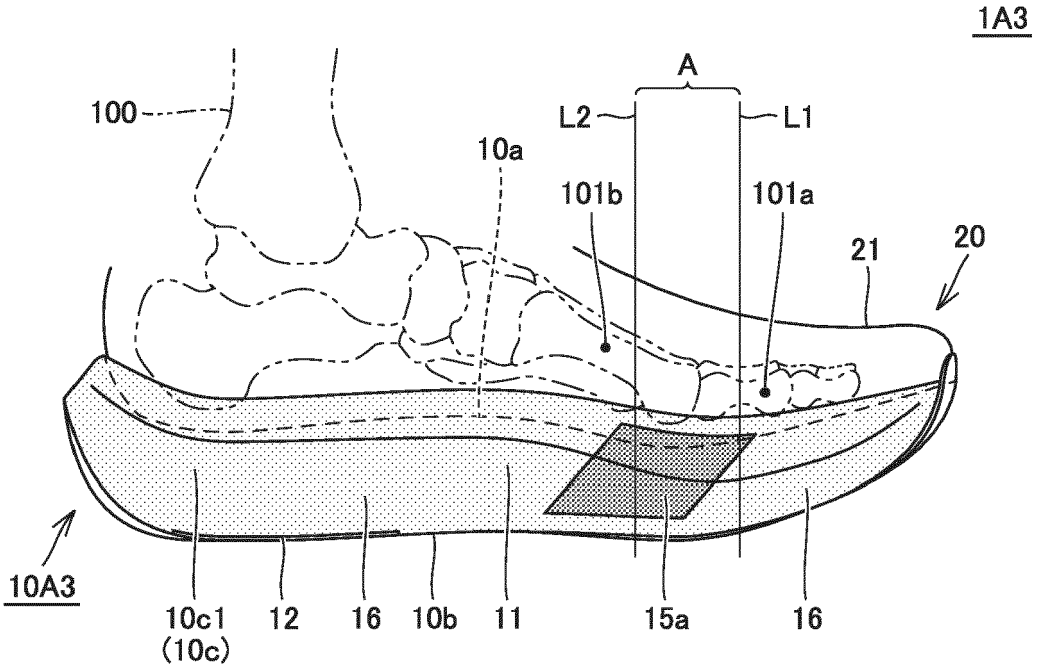

1A3
A
100
L2
L1
10a
101b
101a
21
20
10A3
10c1
(10c)
12
16
10b
11
15a
16

FIG.8

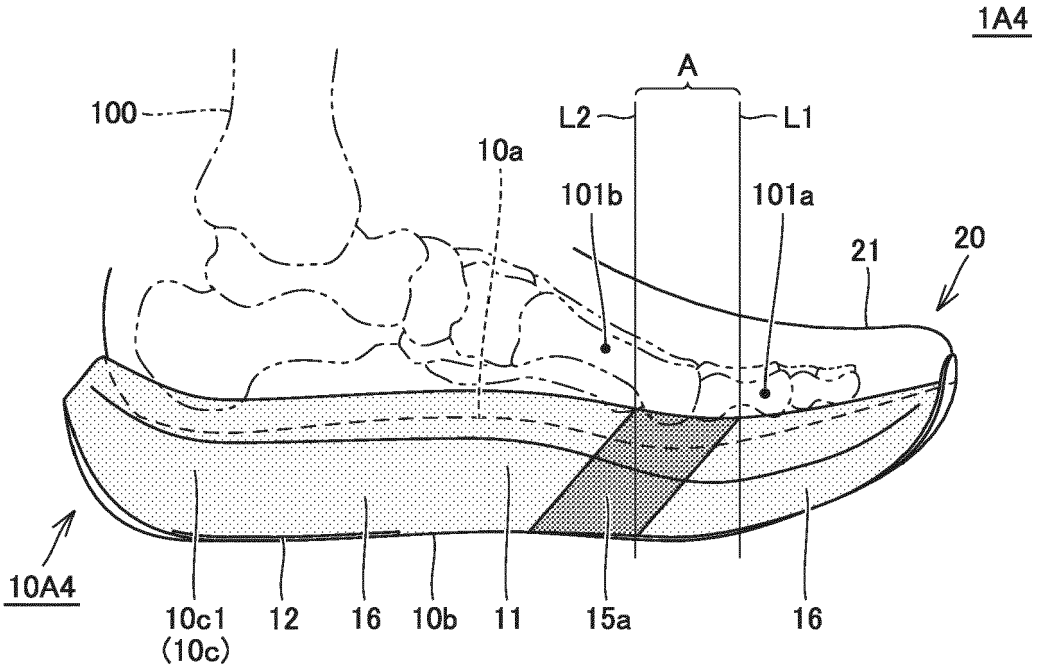

1A4
A
100
L2
L1
10a
101b
101a
21
20
10A4
10c1
(10c)
12
16
10b
11
15a
16

FIG.9

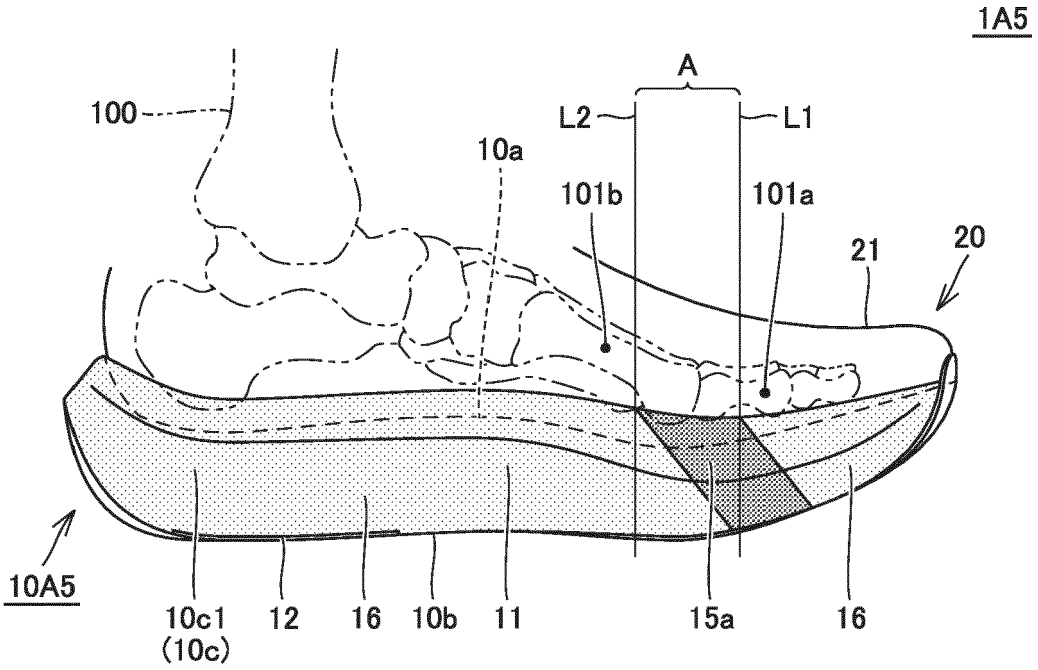

1A5
A
100
L2
L1
10a
101b
101a
21
20
10A5
10c1
(10c)
12
16
10b
11
15a
16

FIG.10

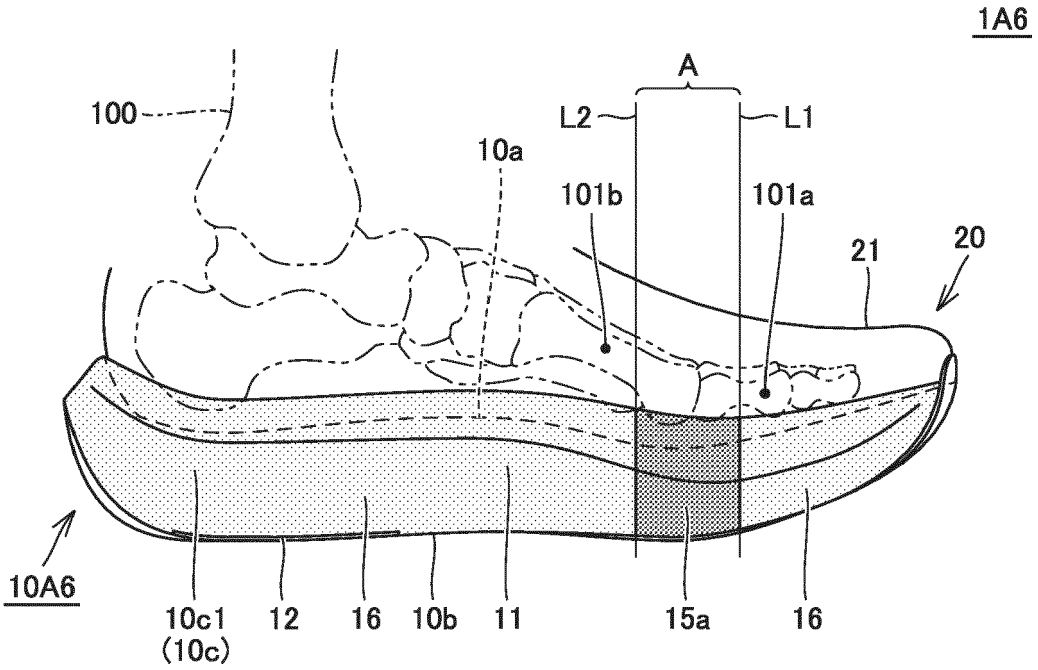

1A6
A
100
L2
L1
10a
101b
101a
21
20
10A6
10c1
(10c)
12
16
10b
11
15a
16

FIG.11

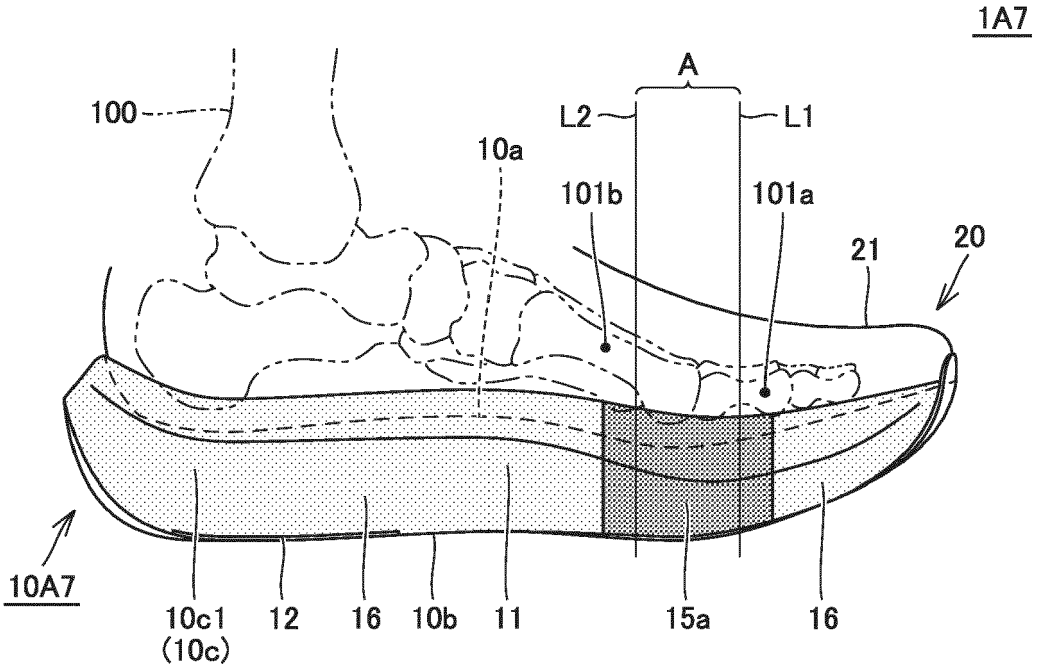

1A7
A
100
L2
L1
10a
101b
101a
21
20
10A7
10c1
(10c)
12
16
10b
11
15a
16

FIG.12

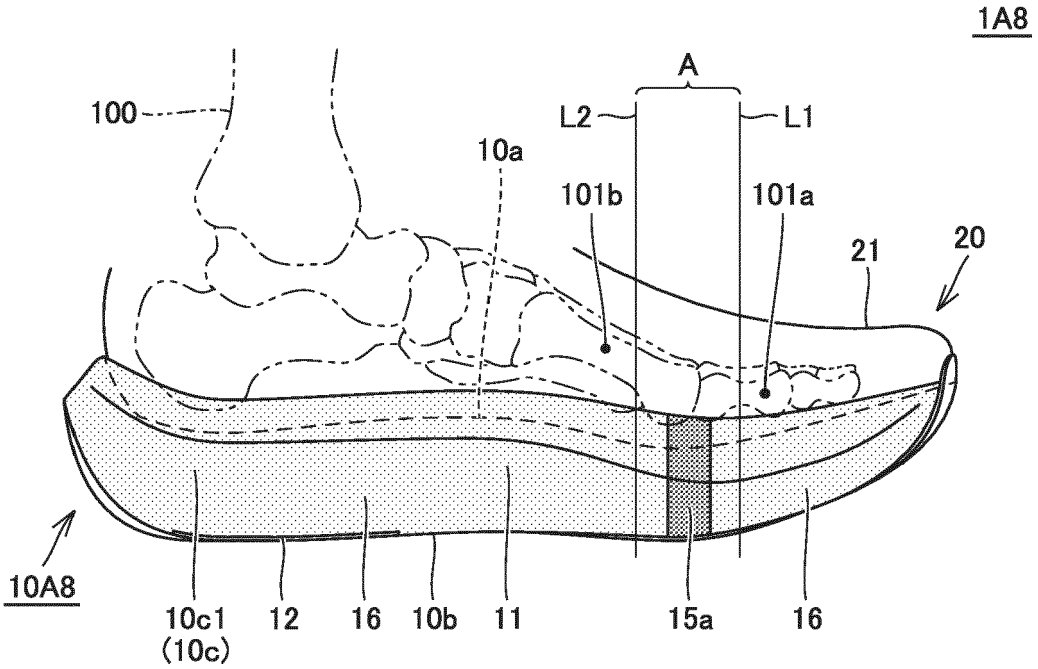

1A8
A
100
L2
L1
10a
101b
101a
21
20
10A8
10c1
(10c)
12
16
10b
11
15a
16

FIG.13

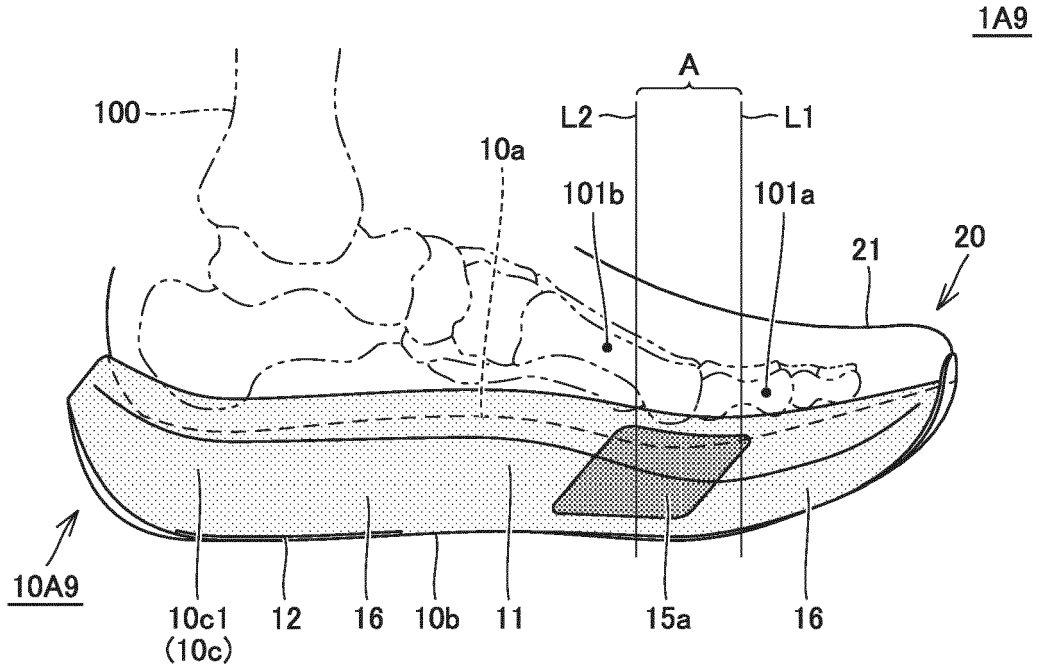

1A9
A
100
L2
L1
10a
101b
101a
21
20
10A9
10c1
(10c)
12
16
10b
11
15a
16

FIG.14

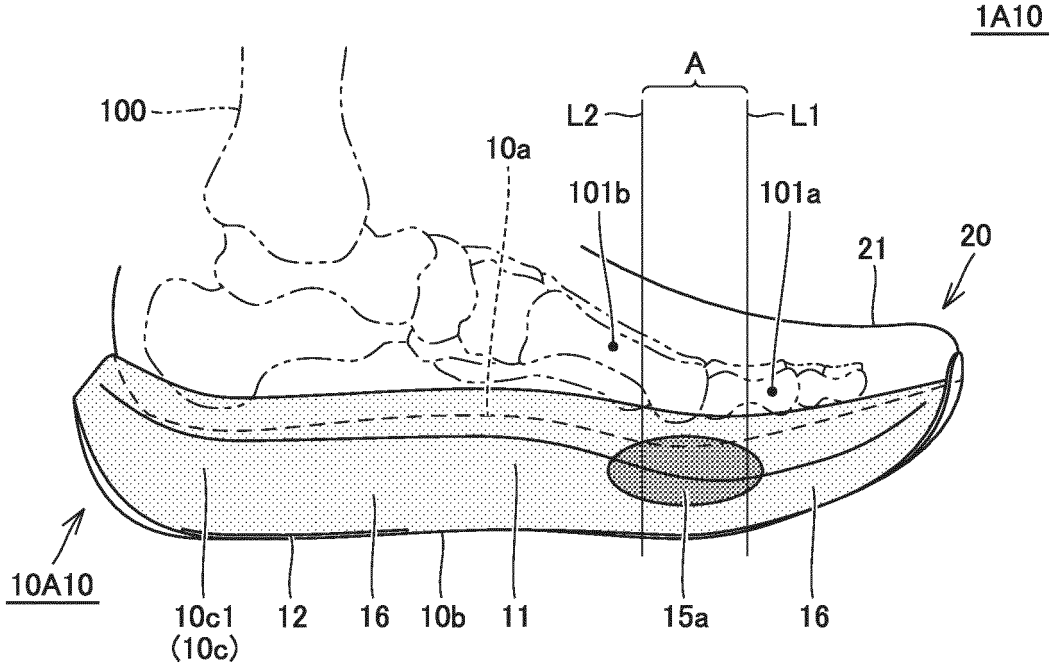

1A10
A
100
L2
L1
10a
101b
101a
21
20
10A10
10c1
(10c)
12
16
10b
11
15a
16

FIG.15

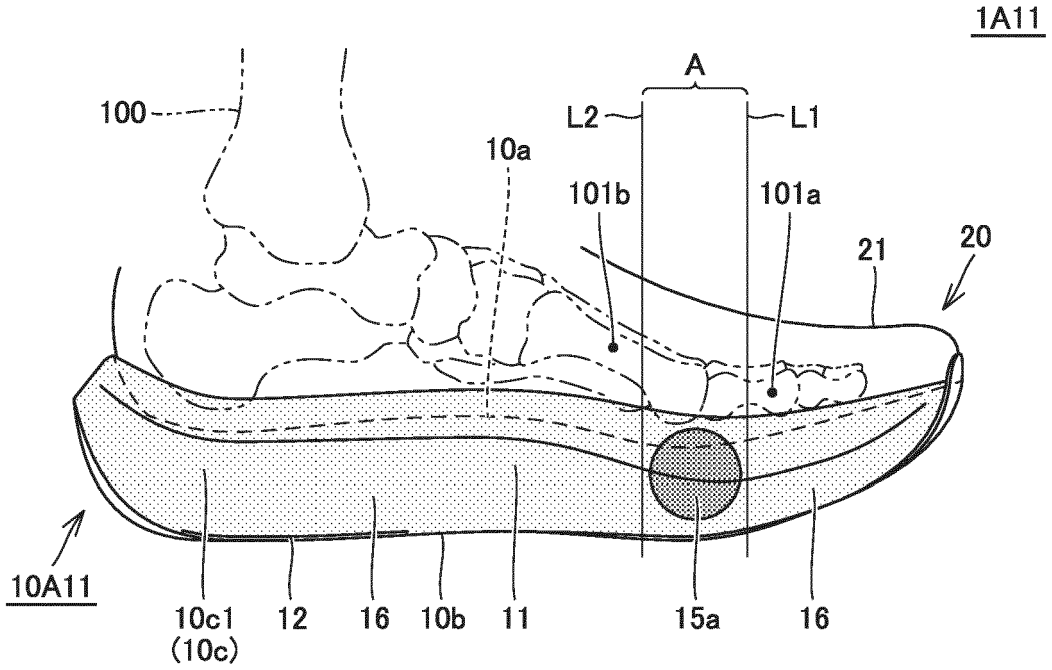

1A11
A
100
L2
L1
10a
101b
101a
21
20
10A11
10c1
(10c)
12
16
10b
11
15a
16

FIG.16

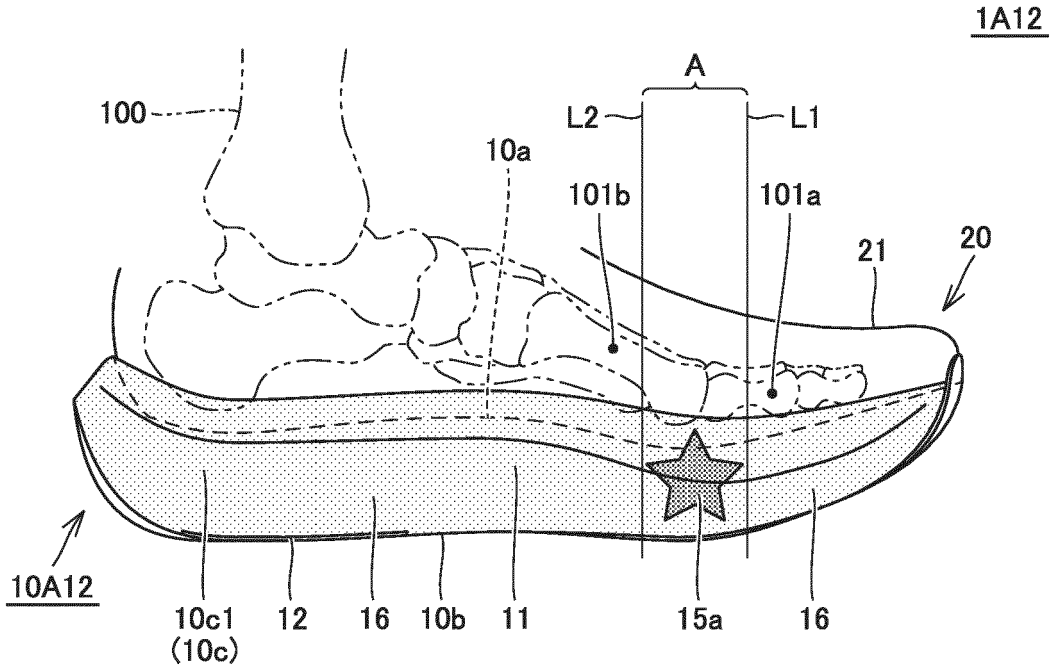

1A12
A
100
L2
L1
10a
101b
101a
21
20
10A12
10c1
(10c)
12
16
10b
11
15a
16

FIG.17

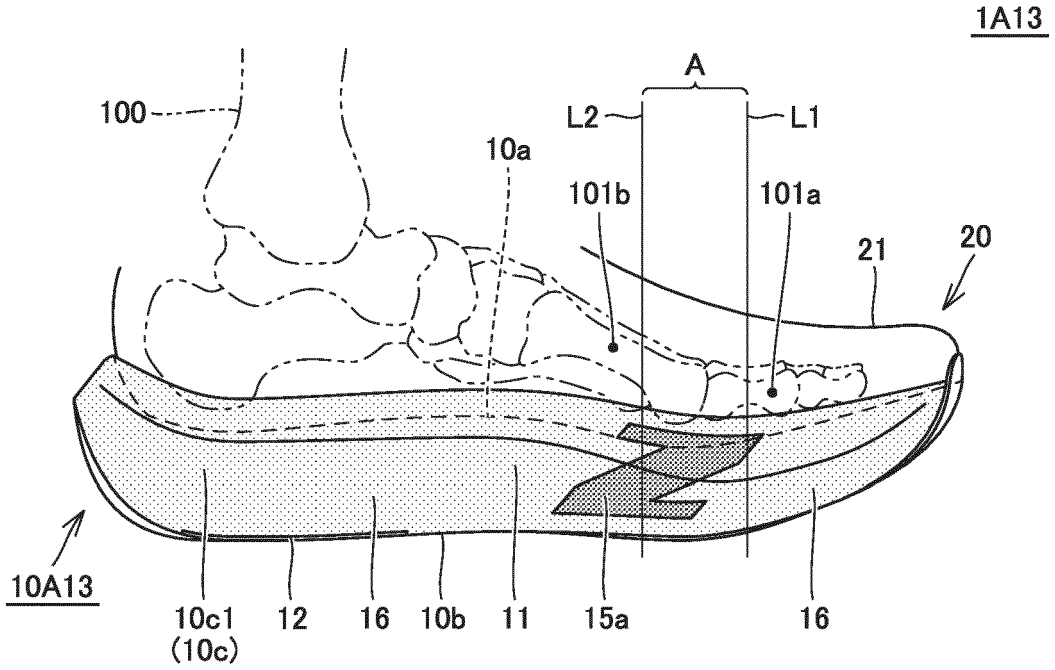

1A13
A
100
L2
L1
10a
101b
101a
21
20
10A13
10c1
(10c)
12
16
10b
11
15a
16

FIG.18

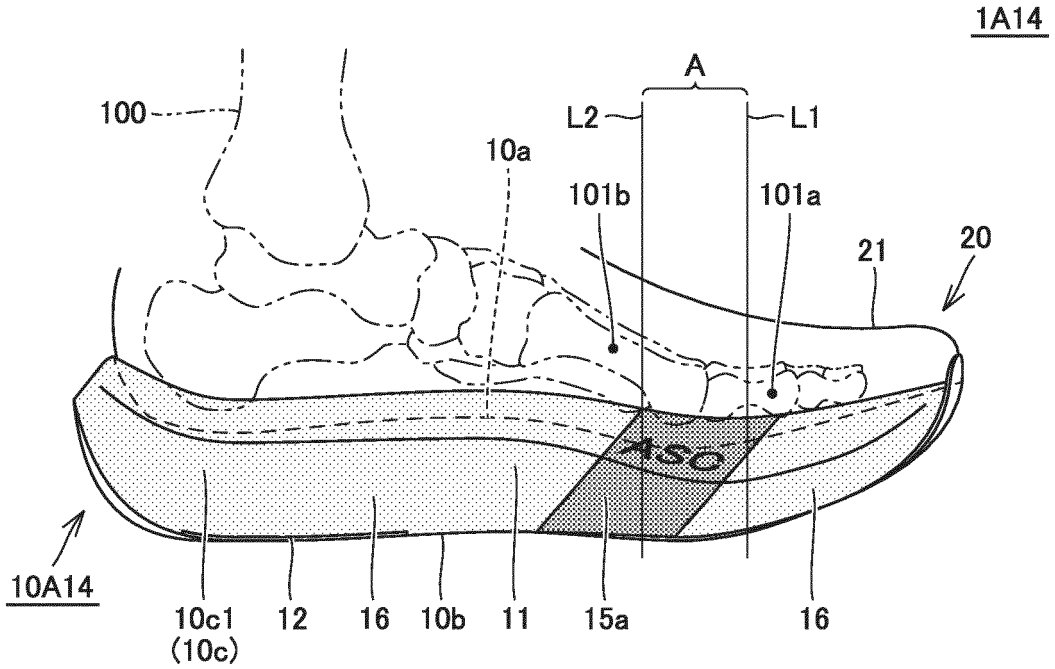

1A14
A
100
L2
L1
10a
101b
101a
21
20
ASC
10A14
10c1
(10c)
12
16
10b
11
15a
16

FIG.19

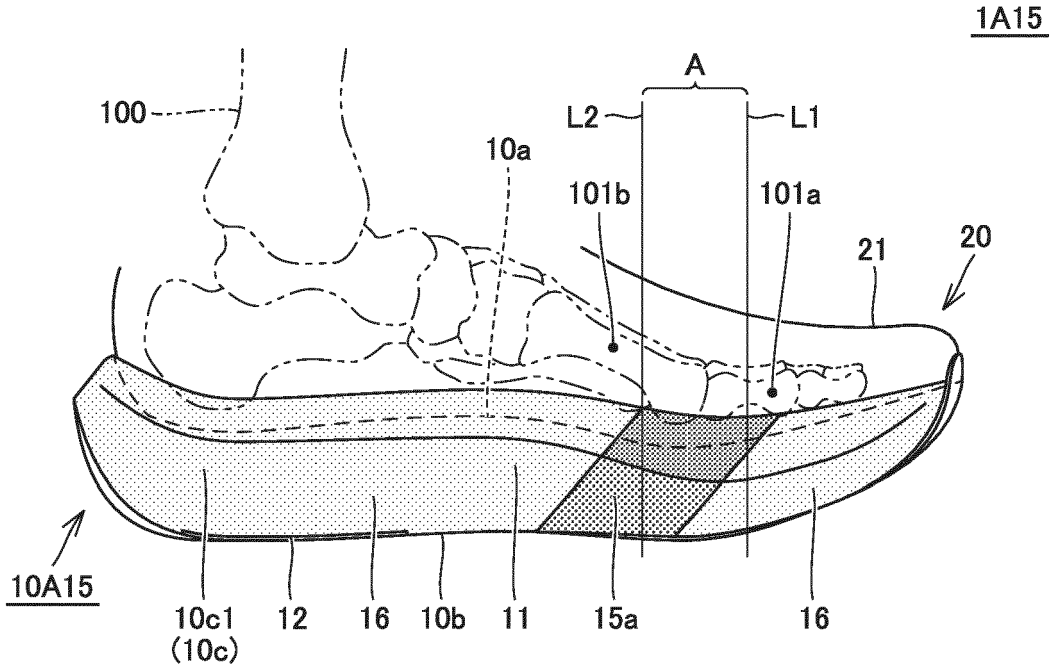

1A15
A
100
L2
L1
10a
101b
101a
21
20
10A15
10c1
(10c)
12
16
10b
11
15a
16

FIG.20

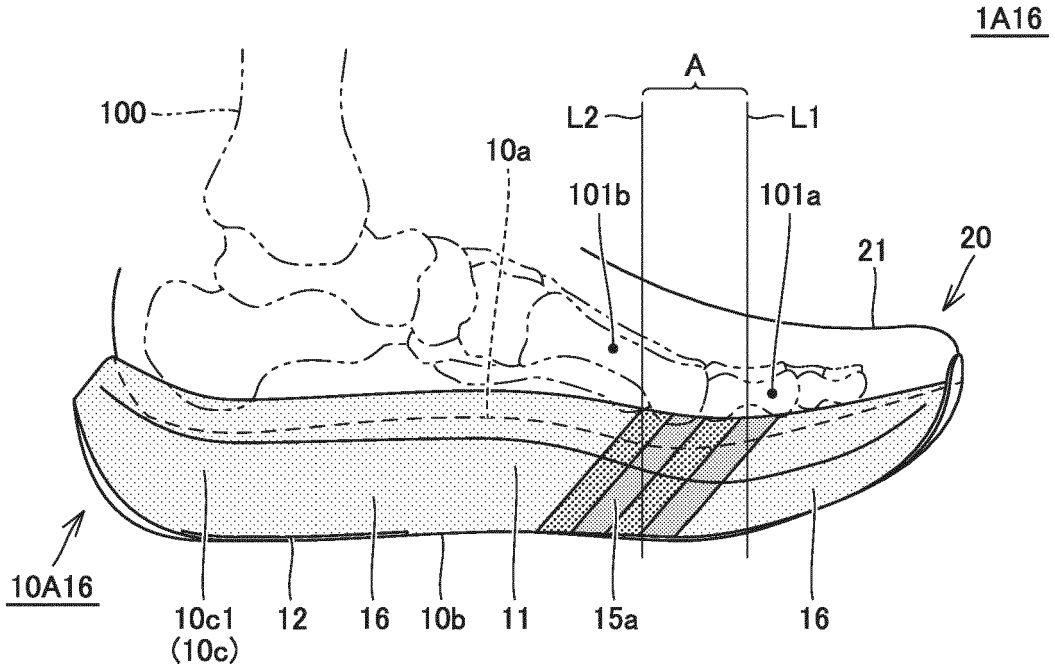

1A16
A
100
L2
L1
10a
101b
101a
21
20
10A16
10c1
(10c)
12
16
10b
11
15a
16

FIG.21

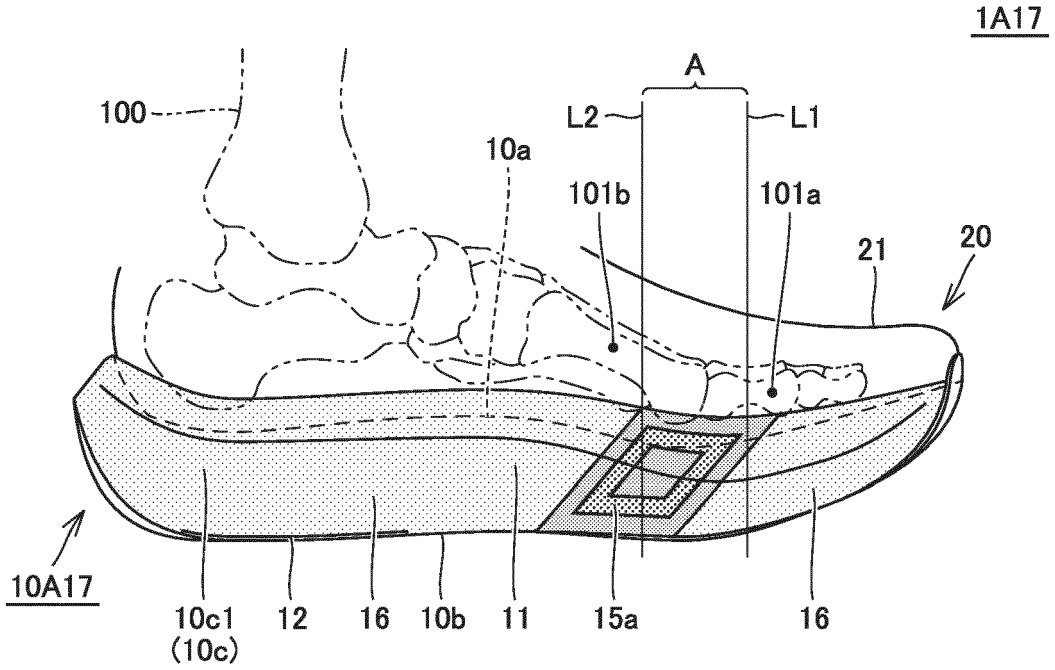

1A17
A
100
L2
L1
10a
101b
101a
21
20
10A17
10c1
(10c)
12
16
10b
11
15a
16

FIG.22

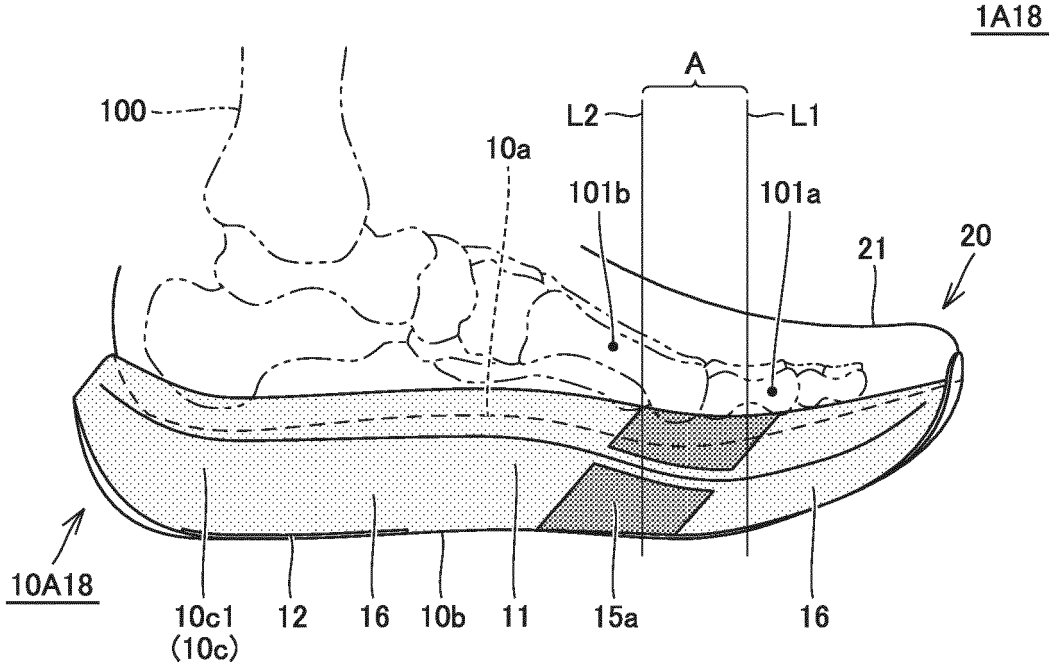

1A18
A
100
L2
L1
10a
101b
101a
21
20
10A18
10c1
(10c)
12
16
10b
11
15a
16

FIG.23

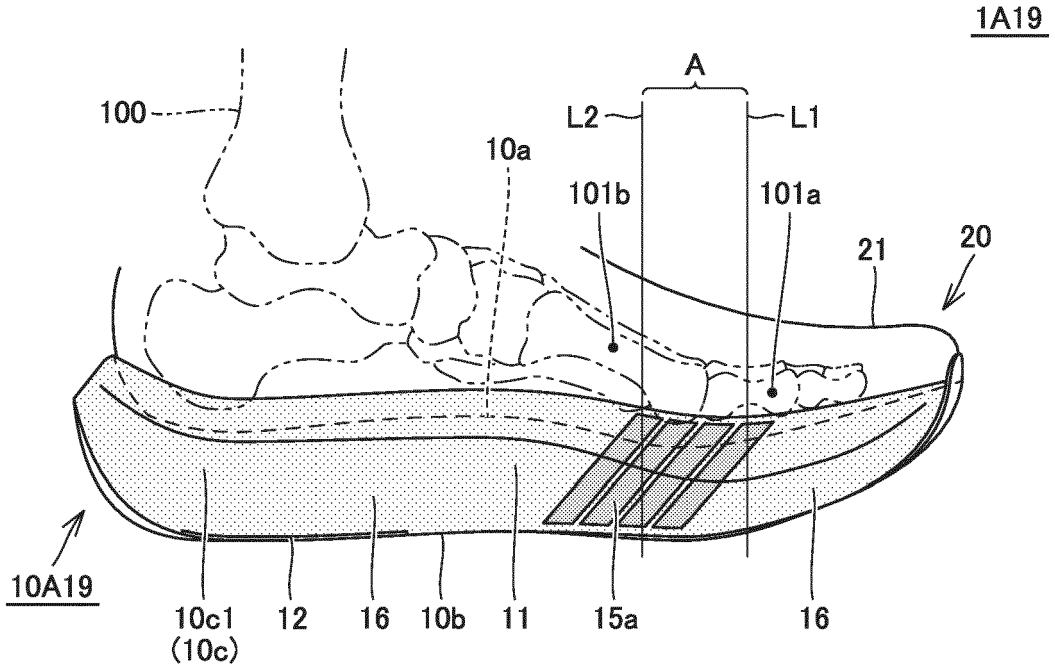

1A19
A
100
L2
L1
10a
101b
101a
21
20
10A19
10c1
(10c)
12
16
10b
11
15a
16

FIG.24

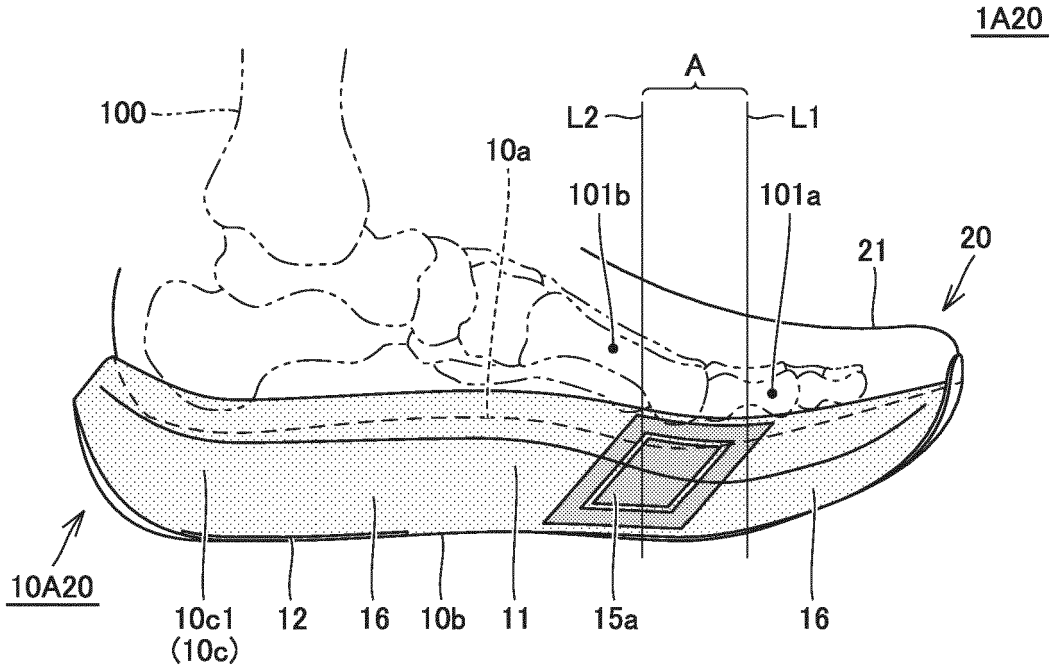

1A20
A
100
L2
L1
10a
101b
101a
21
20
10A20
10c1
(10c)
12
16
10b
11
15a
16

FIG.25

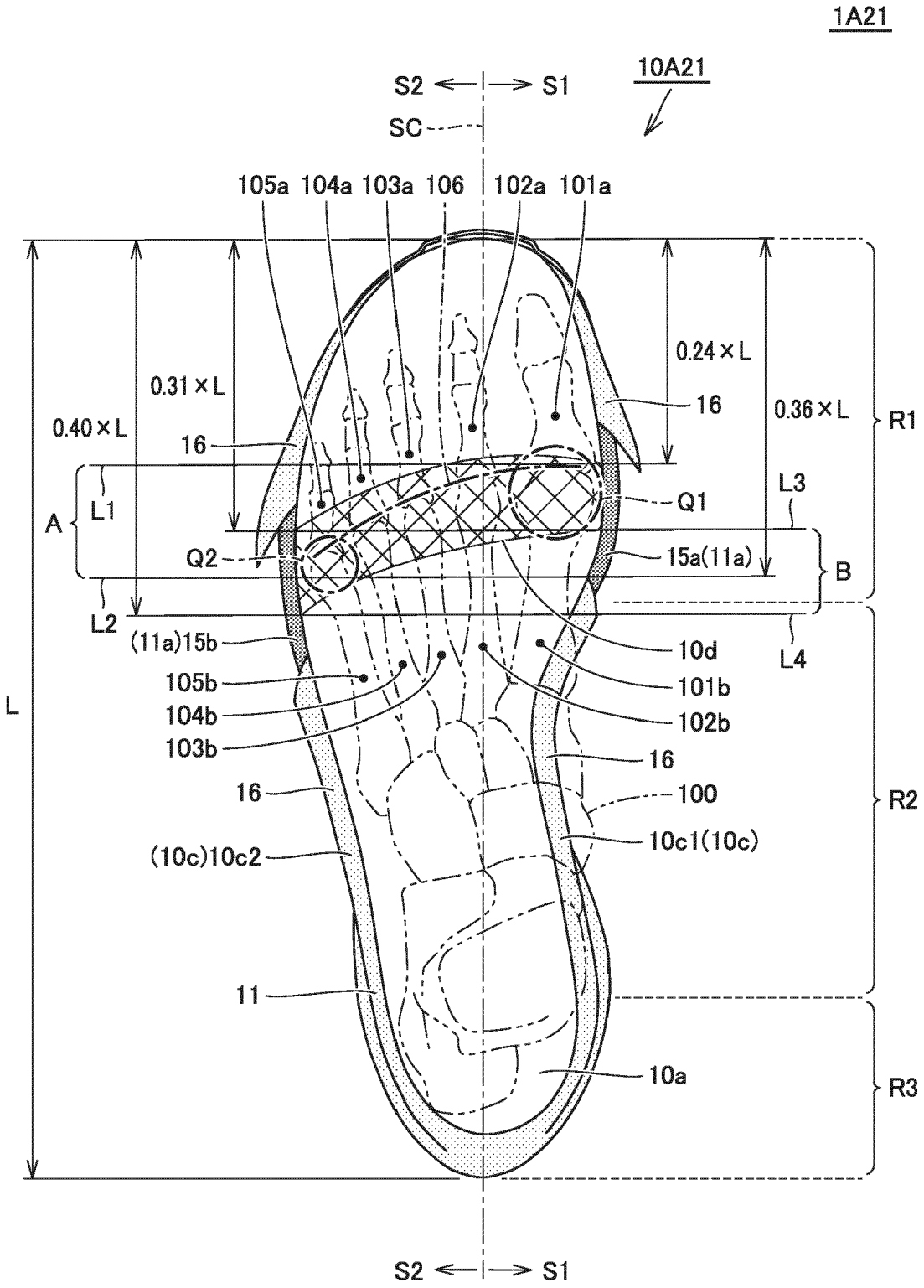

1A21
10A21
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
Q1
L3
R1
A
L1
Q2
15a(11a)
B
L2
L4
(11a)15b
10d
101b
105b
102b
104b
103b
L
16
100
R2
16
10c1(10c)
(10c)10c2
11
10a
R3

FIG.26

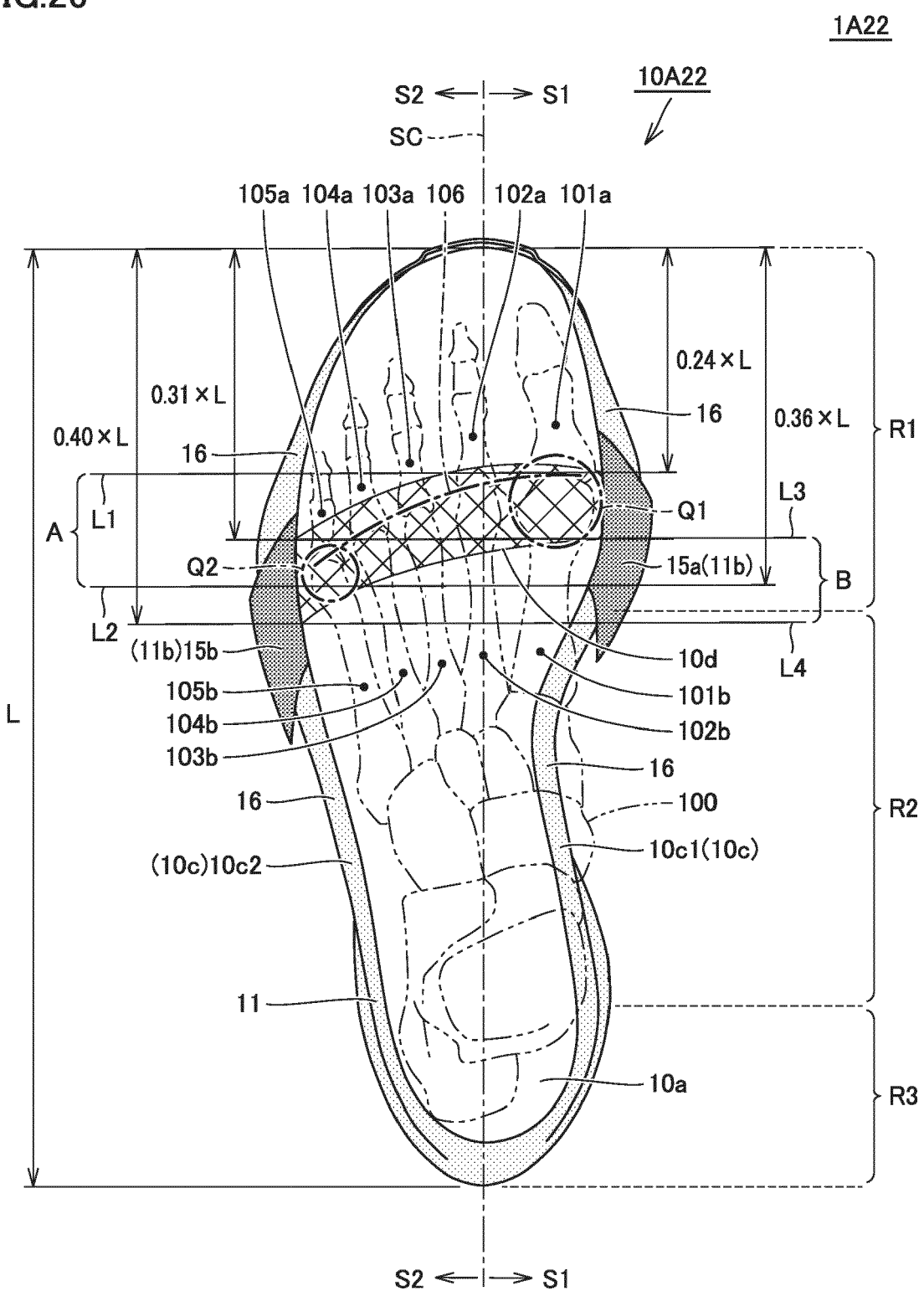

1A22
10A22
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
Q1
L3
A
L1
Q2
15a(11b)
B
L2
L4
(11b)15b
10d
L
105b
101b
104b
102b
103b
100
10c1(10c)
(10c)10c2
11
10a
R1
R2
R3

FIG.27

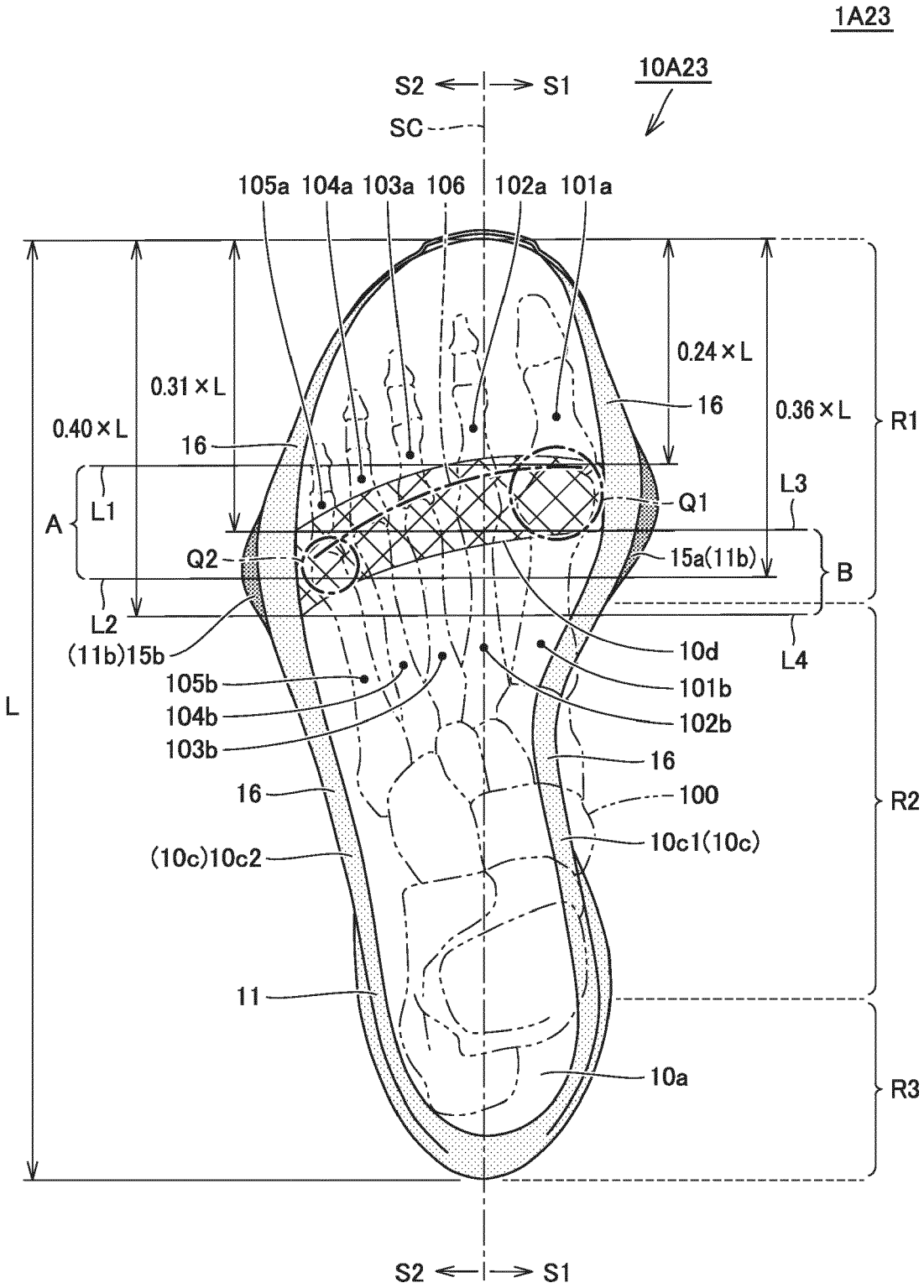

1A23
10A23
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
Q1
L3
A
L1
Q2
15a(11b)
B
L2
L4
(11b)15b
10d
101b
102b
105b
104b
103b
L
R1
R2
R3
100
10c1(10c)
(10c)10c2
11
10a

FIG.28

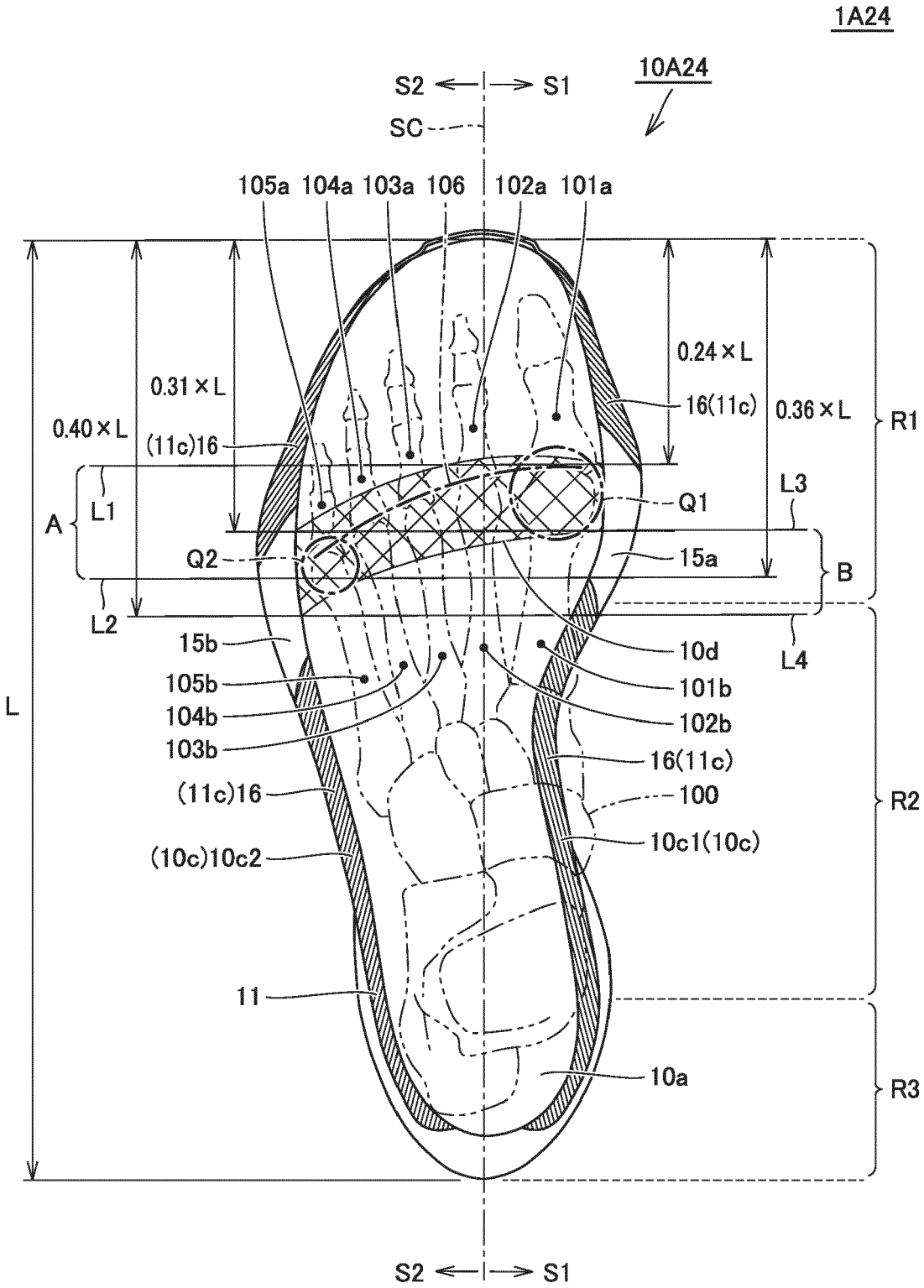

1A24
10A24
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
16(11c)
0.36×L
R1
0.31×L
0.40×L
(11c)16
A
L1
L3
Q1
Q2
15a
B
L2
L4
15b
10d
105b
101b
104b
102b
103b
16(11c)
L
(11c)16
100
R2
(10c)10c2
10c1(10c)
11
10a
R3

FIG.29

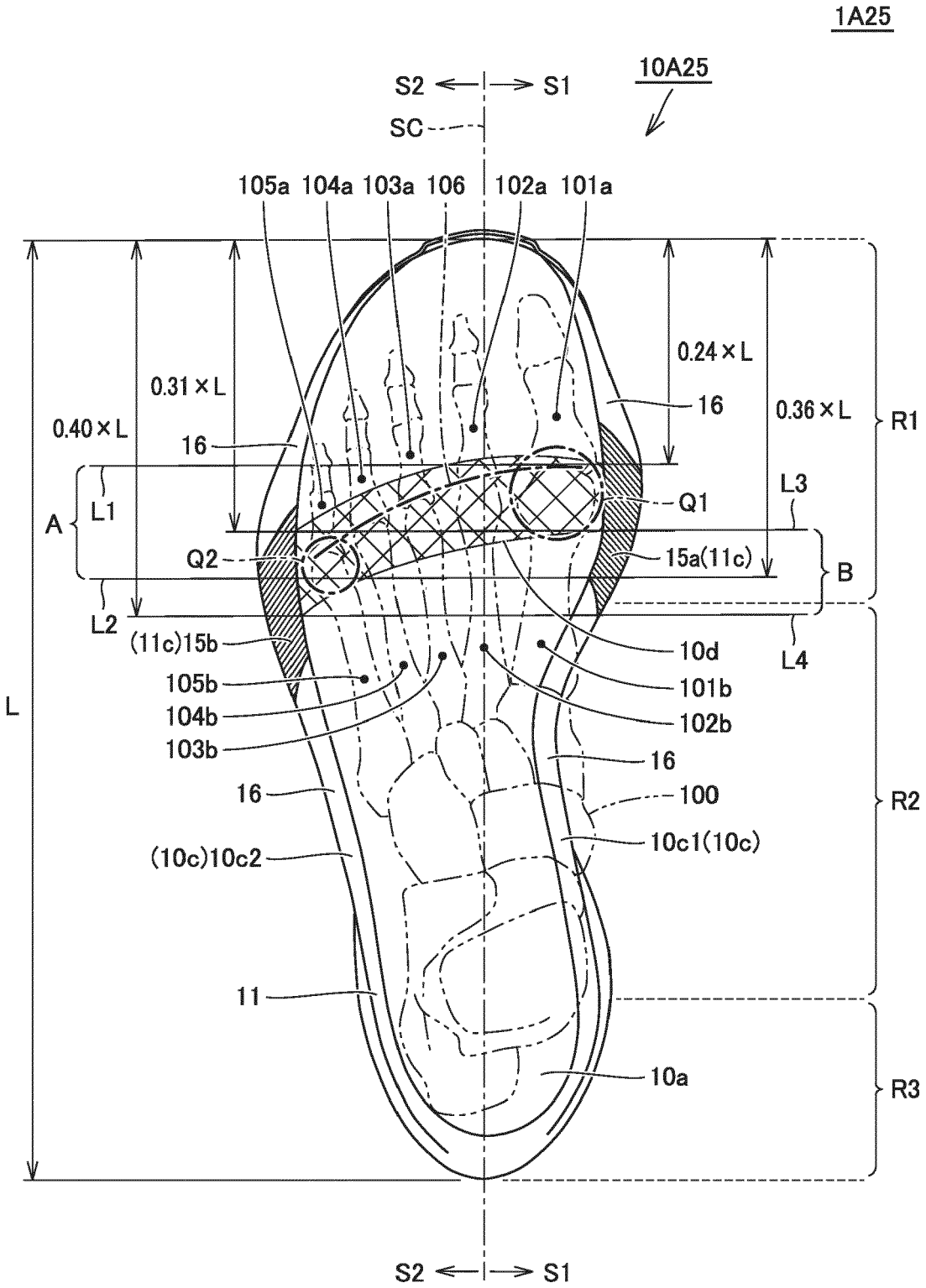

1A25
10A25
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
Q1
L3
R1
A
L1
Q2
15a(11c)
B
L2
L4
(11c)15b
10d
101b
102b
105b
104b
103b
L
16
100
R2
10c1(10c)
(10c)10c2
11
10a
R3

FIG.30

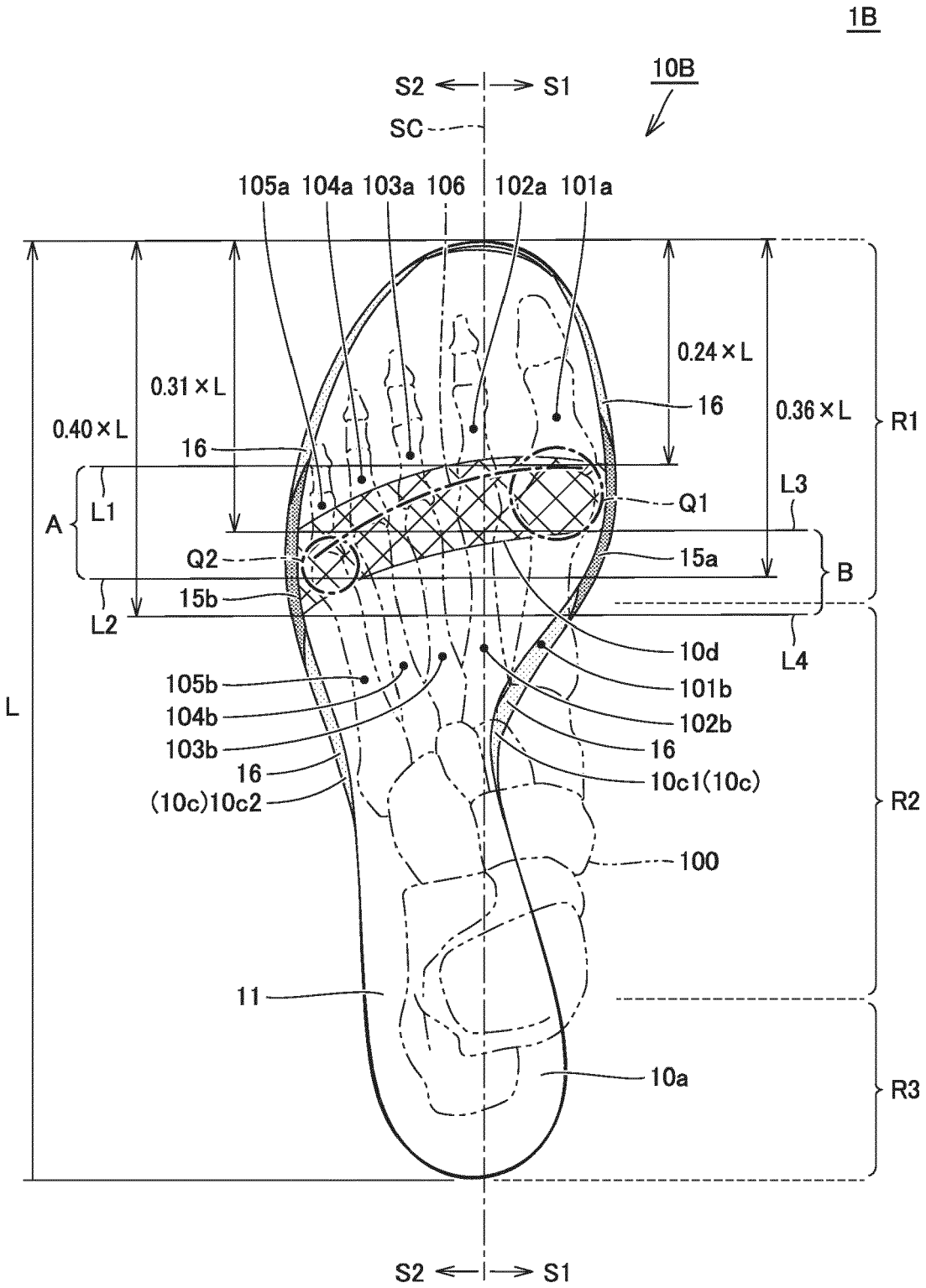

1B
10B
S2
S1
SC
105a
104a
103a
106
102a
101a
0.24×L
0.31×L
0.36×L
0.40×L
16
R1
A
L1
L3
Q1
Q2
15a
B
15b
L2
L4
10d
101b
102b
105b
104b
103b
16
10c1(10c)
(10c)10c2
L
R2
100
11
10a
R3

FIG.31

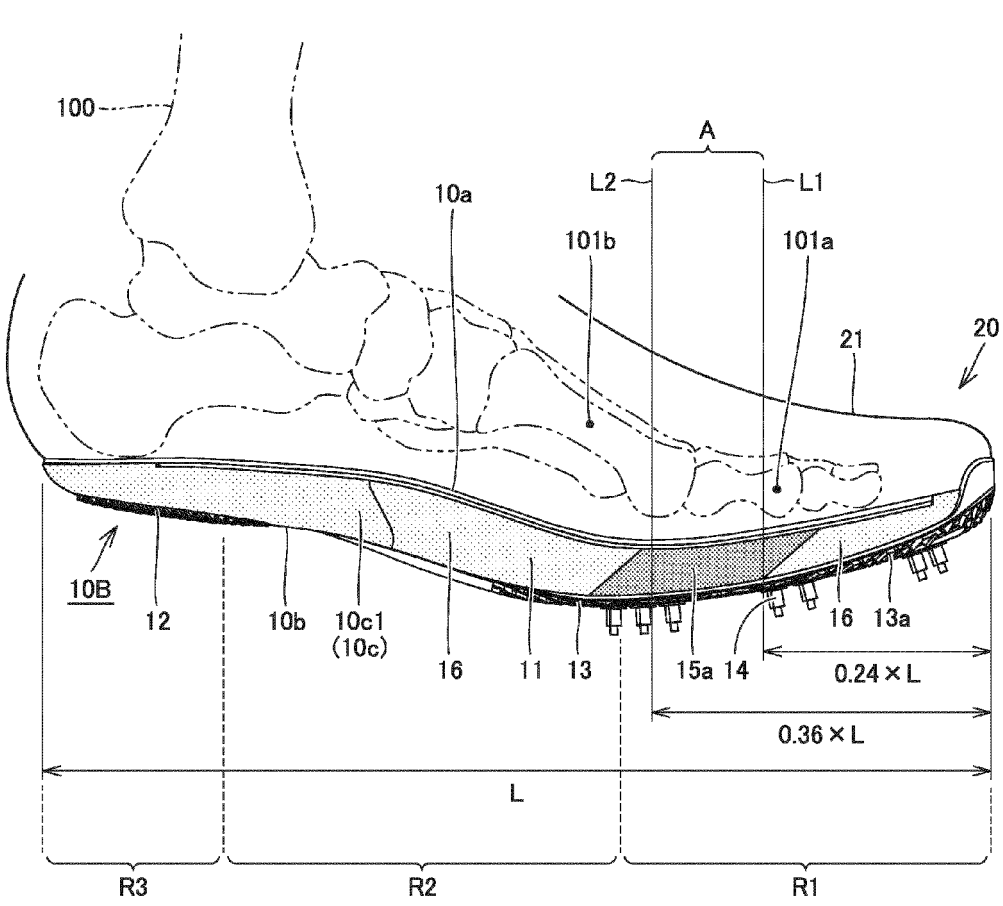
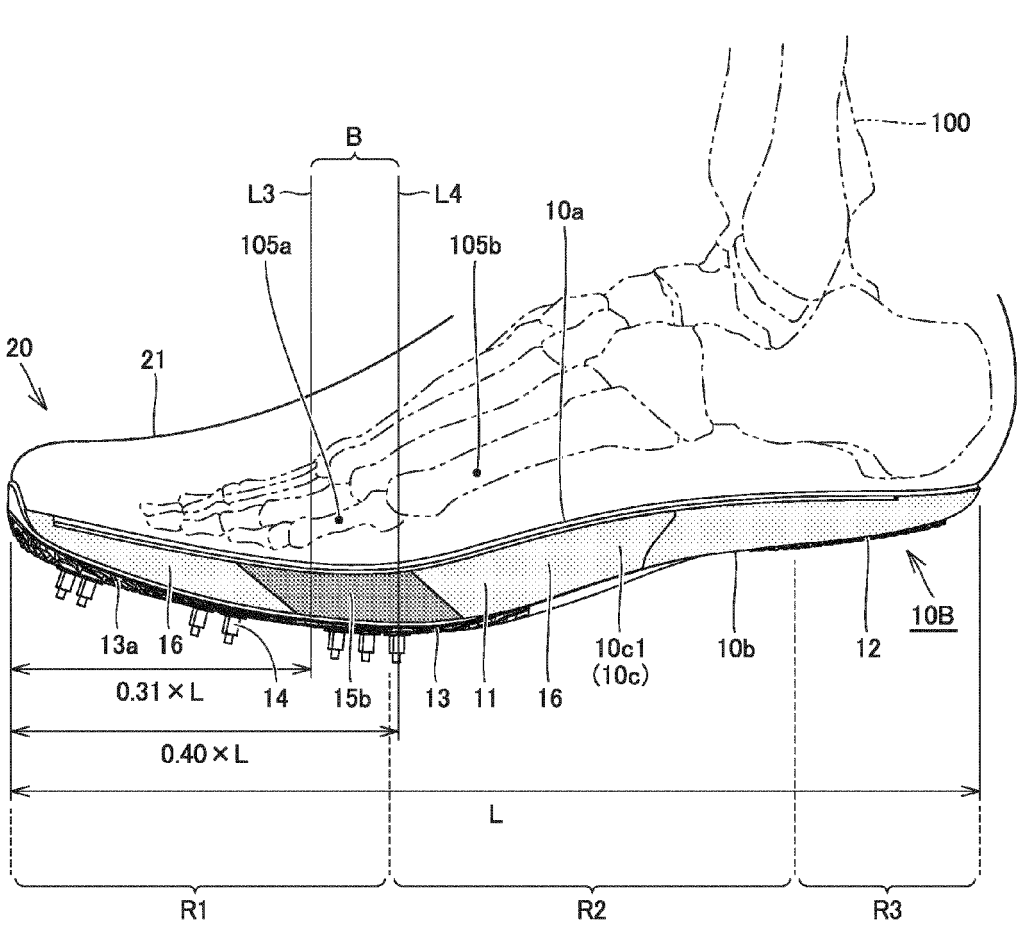

1B
100
A
L2
L1
10a
101b
101a
21
20
10B
12
10b
10c1
(10c)
16
11
13
15a
14
16
13a
0.24 × L
0.36 × L
L
R3
R2
R1

FIG.32


1B
100
B
L3
L4
10a
105a
105b
20
21
13a
16
14
15b
13
11
16
10c1
(10c)
10b
12
10B
0.31×L
0.40×L
L
R1
R2
R3

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EUROPEAN SEARCH REPORT

Application Number
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TECHNICAL FIELDS SEARCHED (IPC)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 April 2024	Gkionaki, Angeliki

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