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(54) **An article of footwear**

(57) There is provided an article of footwear having a sole unit 12 with a footbed 13 inside the article of footwear above the sole unit. The rear part of the footbed 13

is movable for selective placement of a removable insert 22 between the footbed and the sole unit in the heel area. The sole unit incorporates a compressible element 17 in the heel area below the rear part of the footbed,

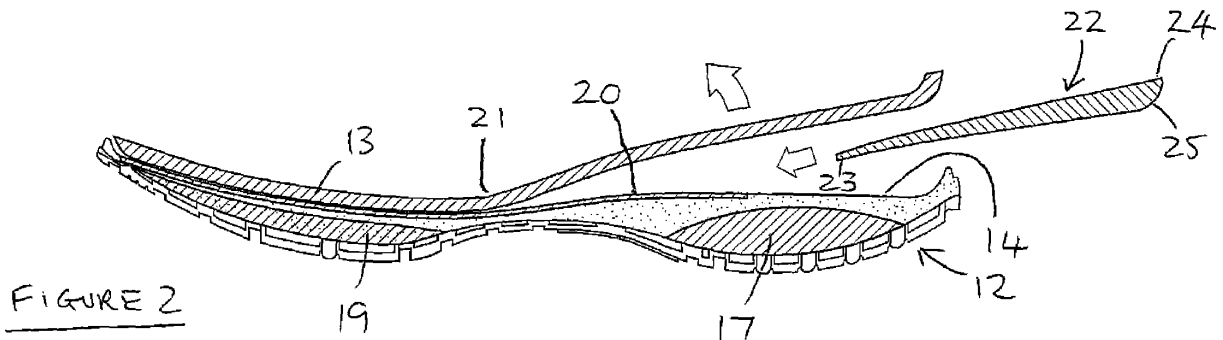


FIGURE 2

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Description

[0001] The present invention relates to articles of footwear and in particular to articles of footwear which have an adjustable set-up.

[0002] It is common for people to have a degree of tightness in the calf region of the leg. This is applicable to men, women and children but can be more common in women and can relate to women often wearing shoes having a higher heel than men's shoes. Wearing flatter shoes helps to stretch the posterior leg muscles and thus helps to maintain a full range of joint motion at the ankle. 'Flat' shoes can be described as having a neutral heel pitch where the heel is typically in the region of 12mm higher than the forefoot. If the heel is lower than this then the article of footwear is often described as having a negative heel pitch. With such articles of footwear the stretching of the posterior leg muscles and achilles tendon is more pronounced than in flat or heeled shoes. Walking in negative heel pitch footwear is sometimes likened to walking up a slight hill thereby giving a form of workout.

[0003] Reduced ankle mobility is known to be associated with a variety of musculoskeletal aches and pains as well as postural dysfunction. There is also evidence that reduced ankle motion can be detrimental to blood circulation which can result in increased swelling of the ankles.

[0004] According to the present invention there is provided an article of footwear having an upper secured relative to a sole unit and a footbed disposed inside the article of footwear above the sole unit, a rear part of the footbed being movable relative to an upward facing surface of the sole unit for selective placement of a removable insert between the footbed and the sole unit in the heel area of the article of footwear, the sole unit incorporating a lowermost wear surface and a resiliently compressible element in the heel area below the rear part of the footbed.

[0005] Preferably the insert is wedge-like in that it increases in thickness from a forward end of the insert towards a heel area.

[0006] Ideally retaining means are provided to retain the footbed and the insert in position relative to each other. In some arrangements the retaining means is in the form of interlocking projections and recesses formed on the adjacent surfaces of the footbed and the insert. In other arrangements the retaining means comprises hook and loop fastenings provided on the adjacent surfaces of the footbed and the insert.

[0007] It is envisaged that the insert is selected from a range of inserts which vary in maximum height or density or elasticity or a combination of these. Conveniently the rear part of the footbed is pivotable about a midfoot hinge area.

[0008] In preferred embodiments the sole unit comprises a midsole in which the compressible element is located and a lowermost outsole element which provides said wear surface, the compressible element being more

compressible than the outsole element and the midsole.

[0009] Preferably the compressible element is in the form of a pad made from a compressible material and has a domed upper surface and a domed lower surface, the domed upper surface nesting in a recess provided in the underside of the midsole. A further preferred feature is that the compressible element is circular in plan view and its widest part extends substantially the full width of the heel area.

[0010] Another preferred feature is that a shank member is provided below the footbed, the shank extending from the midfoot region to forward of the toe joint region of the article of footwear. Ideally the shank member extends the full width of the footbed in the toe joint region. In some arrangements the shank member extends rearwardly to the heel region.

[0011] In some preferred embodiments a further compressible element is provided in the sole unit below the toe joint region. Usually, the further compressible element extends the full width of the toe joint region and is formed from the same material as the compressible element in the heel area.

[0012] Embodiments of the invention will now be described in more detail. The description makes reference to the accompanying drawings in which:

Figure 1 is a lengthwise cross-section through a sole unit for an article of footwear according to the present invention,

Figure 2 is a view of the figure 1 sole unit being modified,

Figure 3 is a lengthwise cross-section showing the figure 2 arrangement after modification and incorporated in an article of footwear,

Figure 4 is a perspective view from below of an adjustable footbed for use within an article of footwear according to the present invention,

Figures 5a and 5b are side views illustrating the footbed shown in figure 4,

Figure 6 is a perspective view from below of another adjustable footbed similar to figure 4,

Figures 7a and 7b are side views illustrating the footbed shown in figure 6,

Figure 8 is an underneath view of a sole unit for an article of footwear according to the present invention, Figure 9 is a lateral cross-section on line 9-9 through the heel area of the article of footwear shown in figure 8,

Figure 10 is a lateral cross-section on line 10-10 through the toe joint region of the sole unit shown in figure 8,

Figure 11 is a lengthwise cross-section on line 11-11 through the sole unit shown in figure 8, and

Figure 12 is a plan view of the sole unit of figure 8.

[0013] In the figures is shown an article of footwear 10 having an upper 11, a sole unit 12 and a footbed 13 which is provided inside the article of footwear 10 and which is

immediately above an upward facing surface 14 of the sole unit 12. The sole unit 12 in this embodiment comprises a midsole 16, an outsole element 15 which incorporates heel and forefoot support elements 17, 19 and a shank member 20. The upper 11 is not shown in any detail but could take any suitable form and may be made from natural or synthetic leather or any suitable material as is known in the industry.

[0014] In figure 1 the footbed 13 lies against the upward facing surface 14 of the sole unit 12 along the entire length of the article of footwear. The upper 11 has been omitted for simplicity.

[0015] The forefoot area of the footbed 13 can be secured within the article of footwear 10 and Figure 2 shows that the rear part of the footbed 13 can be hinged upwardly about a mid-foot hinge area 21. Alternatively the footbed 13 can be unsecured such that it can be selectively inserted into and removed from the interior of the article of footwear. Both constructions enable an insert 22 to be introduced between the footbed 13 and the sole unit 12 in the heel section of the shoe. The insert 22 in this embodiment is a simple wedge shape which increases in thickness from a forward end 23 to a heel end 24 which is contoured at 25 to correspond with the rearmost shape of the midsole 16 so that it sits snugly on the upward facing surface 14 originally occupied by the footbed 13. This is clearly shown in figure 3.

[0016] The footbed 13 shown is hingeable at the mid-foot region 21 but in other arrangements the entire footbed 13 could be removed in order to introduce the insert 22.

[0017] Figures 4 to 7 show inserts 22 which can be retained in position relative to the footbed 13. In figures 4 and 5 the footbed 13 is provided with a number of recesses 26 in its underside and the insert 22 has a number of corresponding upward projections 27 in its upper surface. The projections 27 mate with the recesses 26 so that the insert 22 and footbed abut one another in such a way that lateral and lengthways relative motion is prevented.

[0018] Similarly, in figures 6 and 7 one or more strips 28 of hook and loop fastener are used to retain the insert 22 and footbed 13 relative to each other. The strip 28 on either or both of the insert and footbed could be recessed slightly in order to ensure close abutment of the two components. Other retention means are of course possible.

[0019] The heel support element 17 comprises a resiliently compressible pad which has domed upper and lower surfaces 30, 31 and is generally circular in plan view. The heel pad 17 extends generally across the full width of the sole unit 12. The domed upper surface 30 of the heel pad 17 sits, and is preferably adhered, in a correspondingly shaped recess 32 formed in the underside of the heel area of the midsole 16. The outsole element 15 covers, and is preferably adhered to, the lower surface 31 and, with the midsole 16, sandwiches the resiliently compressible heel pad 17.

[0020] The forefoot support element 19 comprises a

resiliently compressible pad which has a domed lower surface 33. The forefoot pad 19 also extends generally across the full width of the sole unit 12 below the toe joint region of the article of footwear and again is sandwiched between the midsole 16 and the outsole element 15.

[0021] The shank member 20 extends forwardly from the heel area to beyond the toe joint region and extends generally below the full footprint of the wearer's forefoot as shown in figure 12. There may be a margin 34 around the shank member 20 but such a shank member can generally be termed a full-width shank in at least the toe joint region of the forefoot region. The shank member 20 is preferably seated in a shallow recess in the upper face of the midsole 16 and is more rigid than the midsole 16.

[0022] The material of the pads 17, 19 is chosen so as to be collapsible to perhaps 50% of its relaxed thickness although the precise figure is a matter of design choice. Polyurethane having an Askar C hardness of perhaps 25 is an example of a suitable pad material. The midsole and the heel insert may be made from EVA having an Askar C hardness of perhaps 55. The outsole may be made from a natural or synthetic rubber compound having a Shore A hardness of 65. The shank member may be made from TPU having a Shore D hardness of 60. All these figures are merely examples but generally the components have hardness values increasing in size from the pads, then the midsole, then the outsole and then the shank member which is the hardest.

[0023] The compressibility of the heel pad 17 when the heel insert 22 is omitted results in the article of footwear having a negative heel pitch such that the heel of the wearer sits low relative to a standard shoe, especially during the heel strike part of the walking cycle. This can provide the wearer with a gentle and effective stretching for the Achilles tendons, calves, hamstrings and buttocks. The shank member also reduces flexing of the toes during the walking action thereby reducing fatigue in the toe joints.

[0024] The negative heel pitch can be reduced or restored to a neutral heel pitch by inserting the heel inserts 22 because this results in the heel of the wearer being higher than when the heel inserts 22 are omitted. The heel inserts 22 are therefore effective to reduce the stretching effect back to more standard levels and enable the shoes to also have a 'recovery' effect.

[0025] Effectively, therefore, the selective use of the insert 22 in the heel region allows the wearer to adjust the performance of the article of footwear in order to help achieve a desired stretching effect. This gives the shoe considerable versatility in that it can provide a workout whilst walking and, on removal of the insert, can enable leisure walking without requiring a separate pair of shoes.

[0026] It will be appreciated that the insert 22 can exhibit a number of different properties in order to vary the effect on the wearer. A range of inserts could be available accordingly. For example, the inserts could vary in the maximum height at the heel end, and/or could vary in density and/or elasticity.

[0027] It will be understood that modifications could be made to the arrangements described above whilst still remaining within the scope of the attached claims. The materials of construction are a matter of design choice but, by way of example, the major sole components could be made from natural or synthetic rubbers, PU, EVA or Urethane all in open or closed cell variations. Final material choice will depend on the particular characteristics required in a particular article of footwear.

Claims

1. An article of footwear having an upper secured relative to a sole unit and a footbed disposed inside the article of footwear above the sole unit, a rear part of the footbed being movable relative to an upward facing surface of the sole unit for selective placement of a removable insert between the footbed and the sole unit in the heel area of the article of footwear, the sole unit incorporating a lowermost wear surface and a resiliently compressible element in the heel area below the rear part of the footbed.
2. An article of footwear as claimed in claim 1 wherein the insert is wedge-like in that it increases in thickness from a forward end of the insert towards a heel area.
3. An article of footwear as claimed in claim 1 or claim 2 wherein retaining means are provided to retain the footbed and the insert in position relative to each other.
4. An article of footwear as claimed in claim 3 wherein the retaining means is in the form of interlocking projections and recesses formed on the adjacent surfaces of the footbed and the insert.
5. An article of footwear as claimed in claim 3 wherein the retaining means comprises hook and loop fastenings provided on the adjacent surfaces of the footbed and the insert.
6. An article of footwear as claimed in any one of claims 1 to 5 wherein the insert is selected from a range of inserts which vary in maximum height or density or elasticity or a combination of these.
7. An article of footwear as claimed in any one of claims 1 to 6 wherein the rear part of the footbed is pivotable about a midfoot hinge area.
8. An article of footwear as claimed in any one of claims 1 to 7 wherein the sole unit comprises a midsole in which the compressible element is located and a lowermost outsole element which provides said wear surface, the compressible element being more compressible than the outsole element and the midsole.
9. An article of footwear as claimed in claim 8 wherein the compressible element is in the form of a pad made from a compressible material and has a domed upper surface and a domed lower surface, the domed upper surface nesting in a recess provided in the underside of the midsole.
10. An article of footwear as claimed in claim 9 wherein the compressible element is circular in plan view and its widest part extends substantially the full width of the heel area.
11. An article of footwear as claimed in any one of claims 1 to 10 wherein a shank member is provided below the footbed, the shank extending from the midfoot region to forward of the toe joint region of the article of footwear.
12. An article of footwear as claimed in claim 11 wherein the shank member extends the full width of the footbed in the toe joint region.
13. An article of footwear as claimed in claim 11 or claim 12 wherein the shank member extends rearwardly to the heel region.
14. An article of footwear as claimed in any one of claims 1 to 13 wherein a further compressible element is provided in the sole unit below the toe joint region.
15. An article of footwear as claimed in claim 14 wherein the further compressible element extends the full width of the toe joint region and is formed from the same material as the compressible element in the heel area.

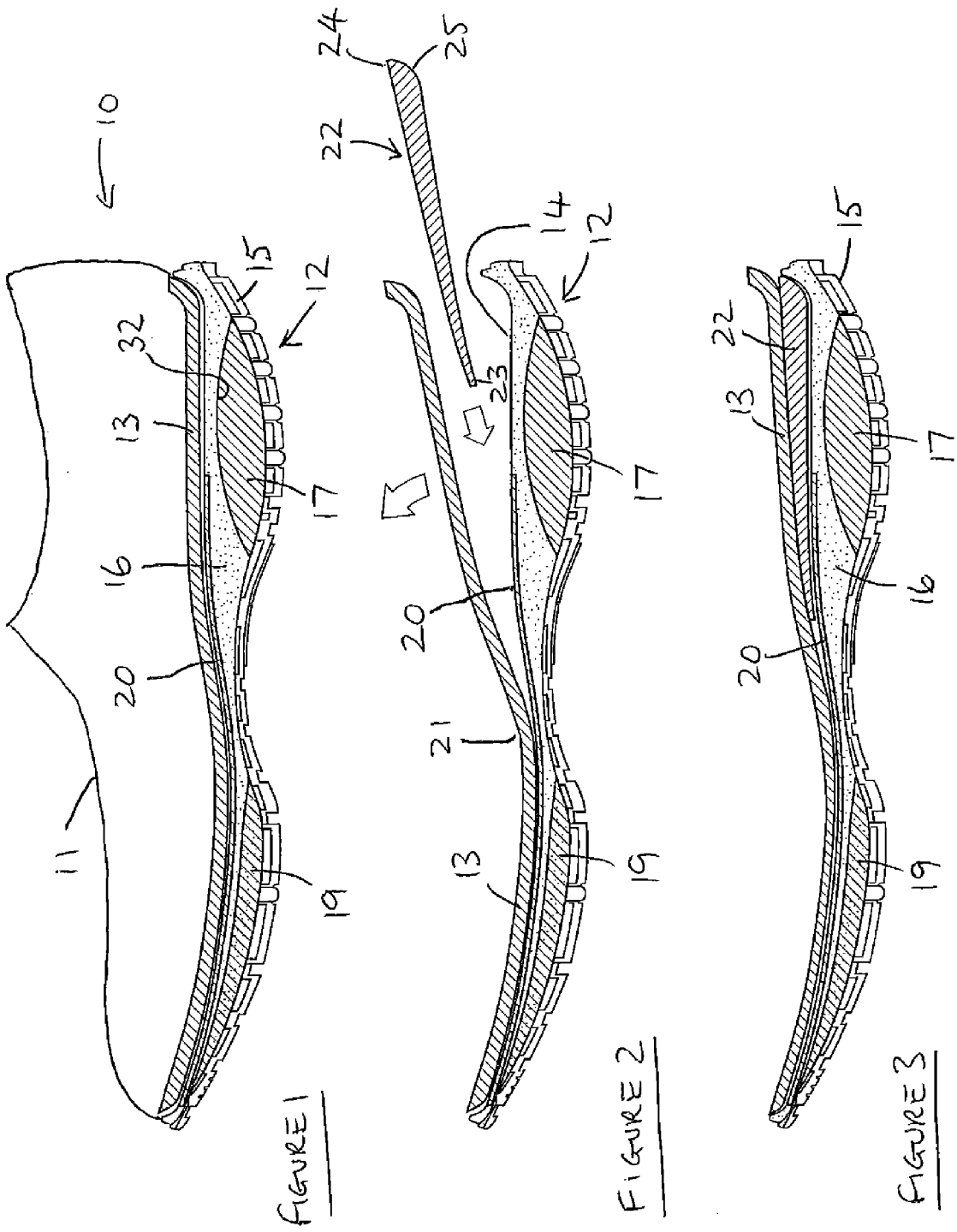


FIGURE 4

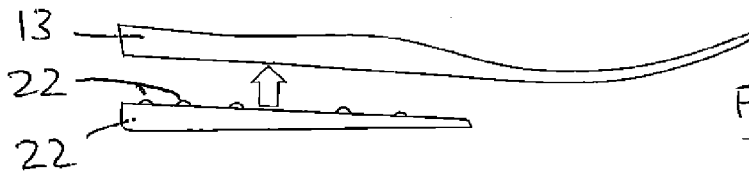
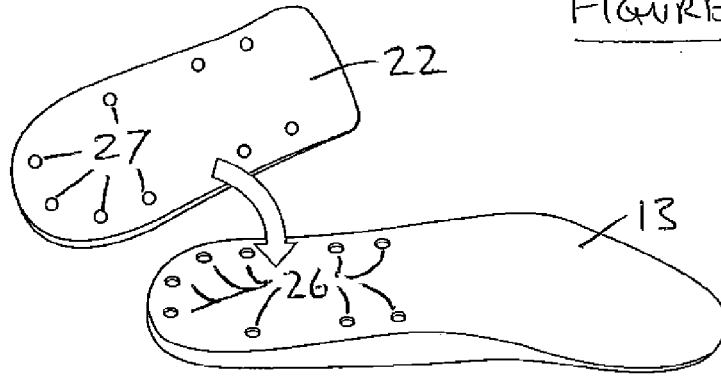


FIGURE 5a

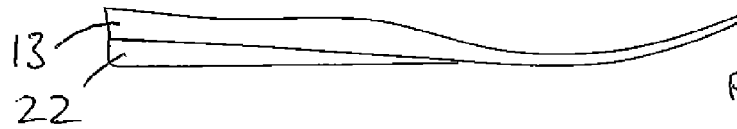


FIGURE 5b

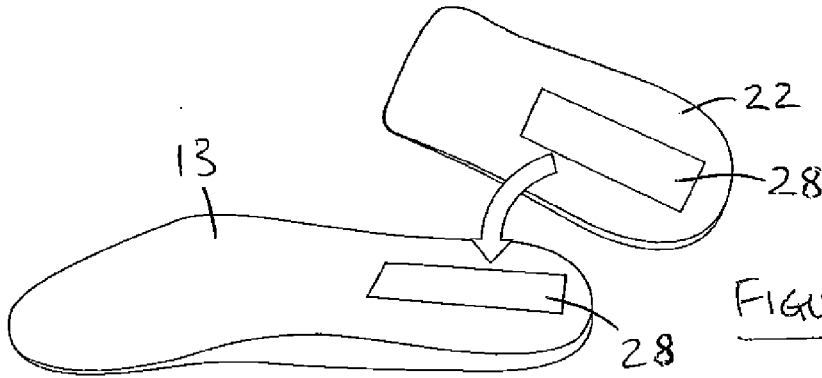


FIGURE 6

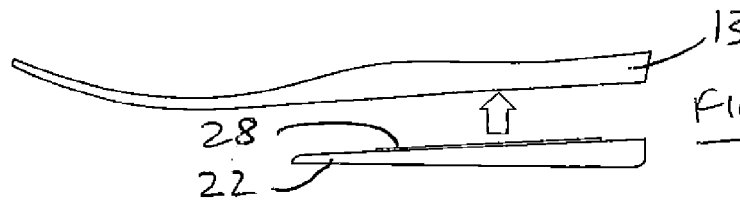


FIGURE 7a

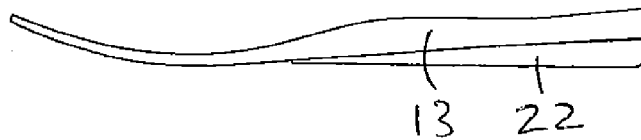


FIGURE 7b

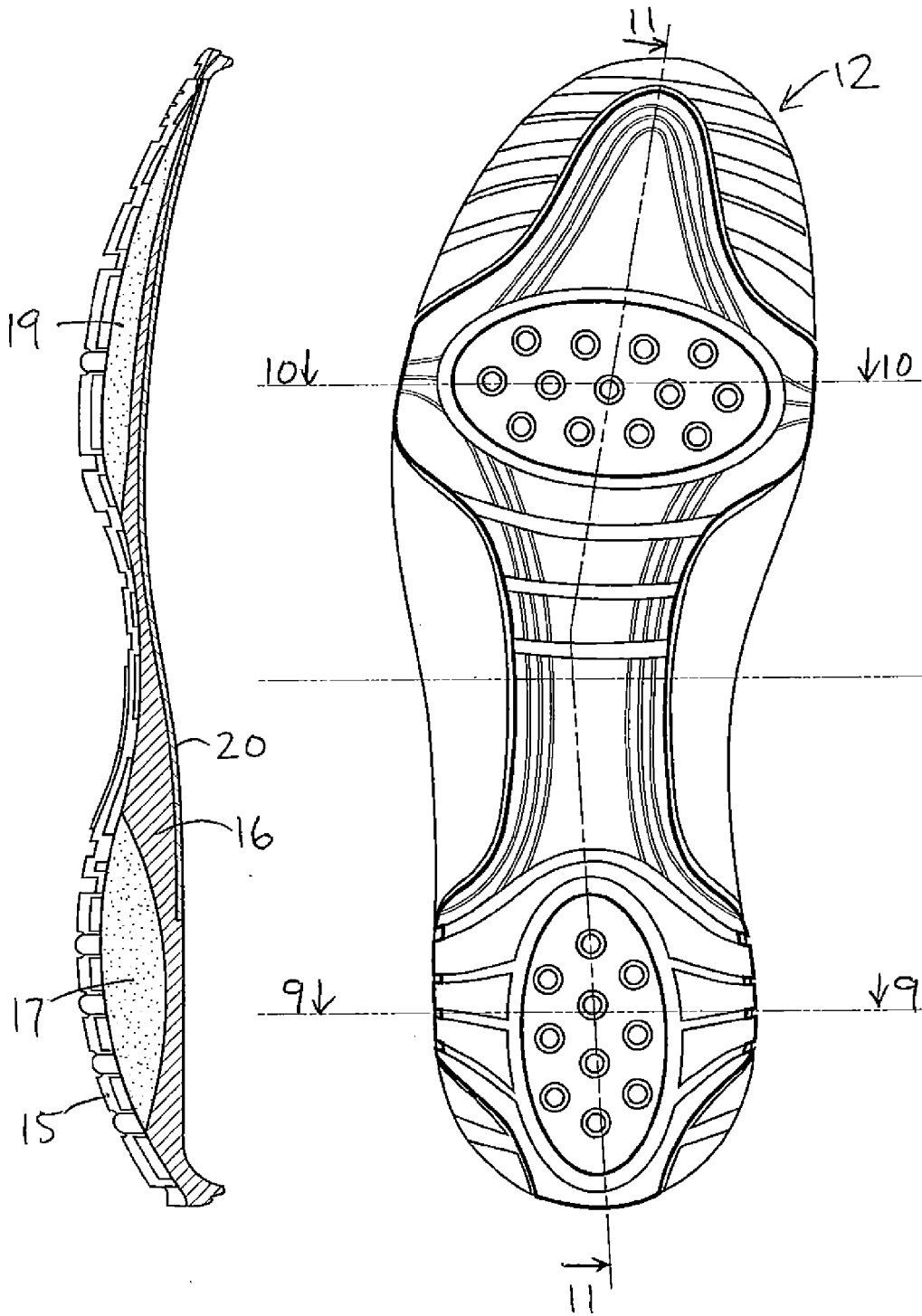


FIGURE 11

FIGURE 8

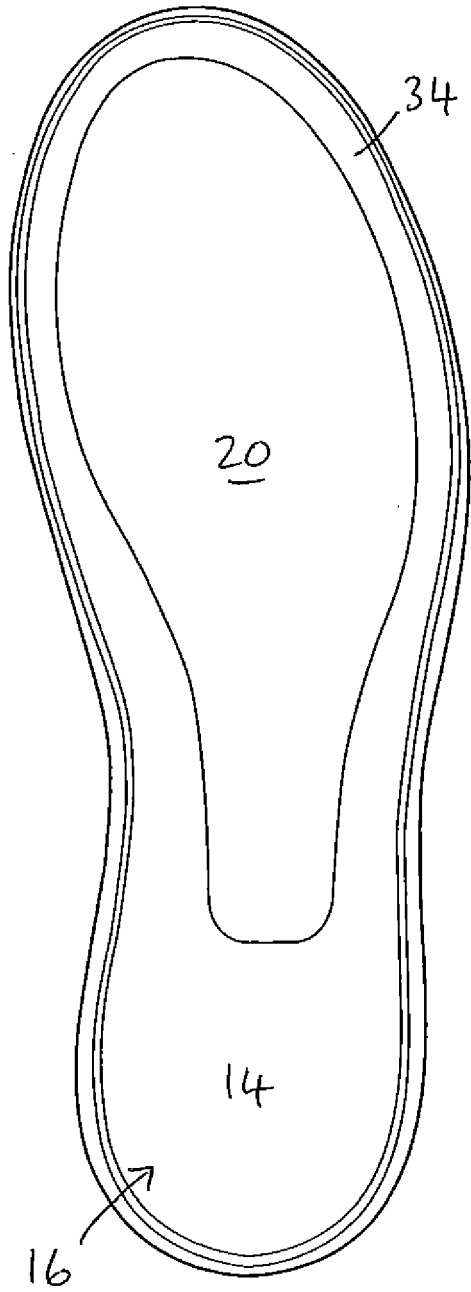


FIGURE 12

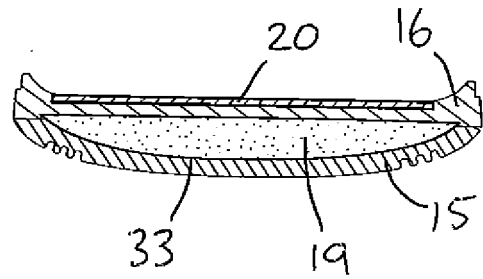


FIGURE 10

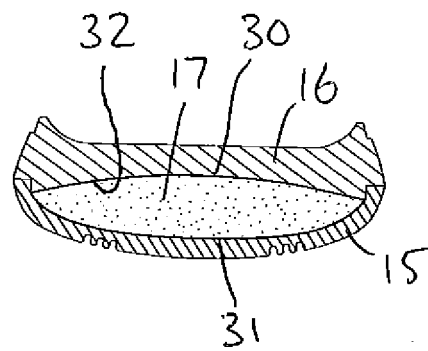


FIGURE 9