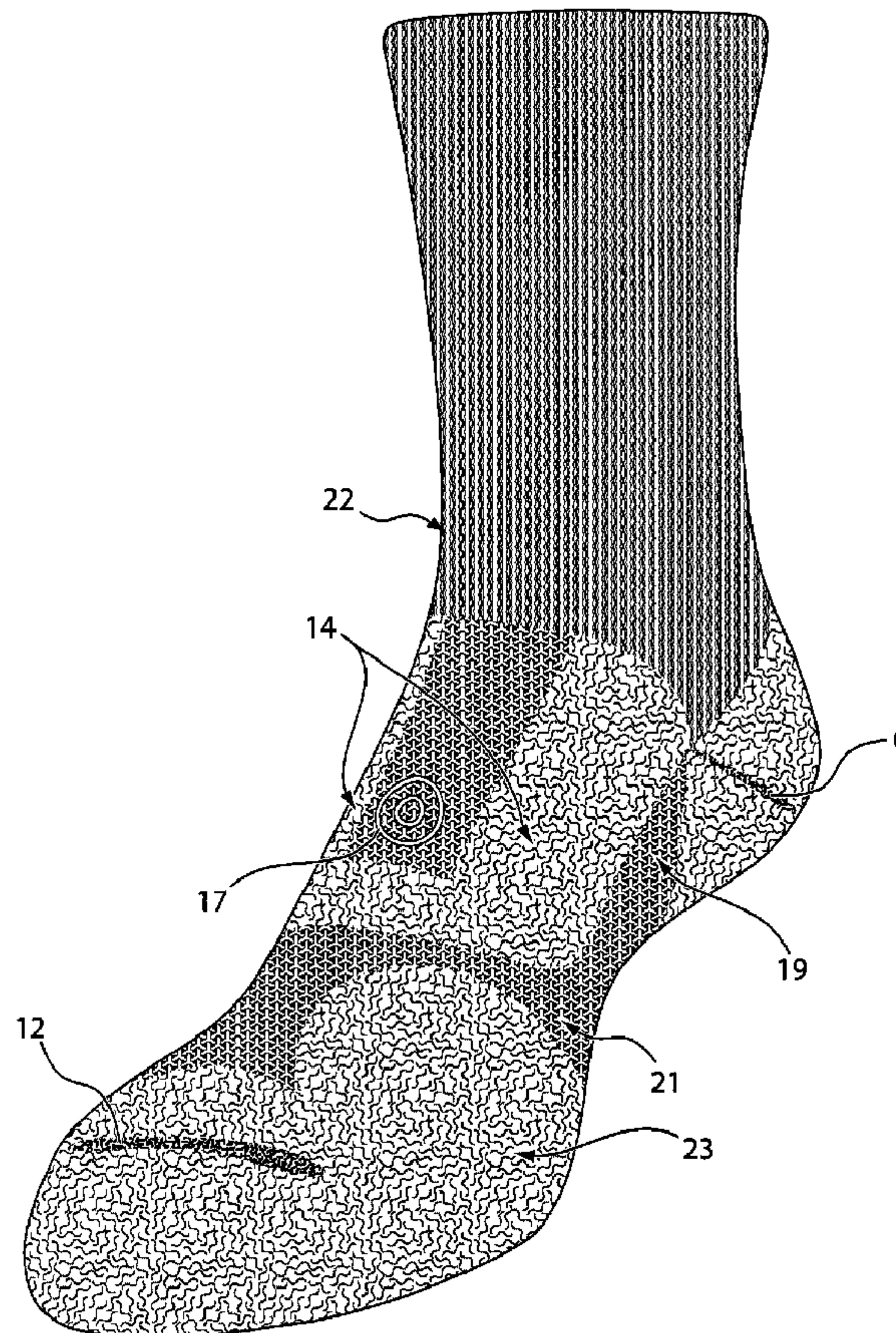




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(57) **Abrégé/Abstract:**

The invention relates to a sock and more particularly to a sock designed to cushion the foot in particular locations around the foot of a wearer. The invention is particularly directed to a sock having a cushioning zone positioned to protect the bony prominences of the dorsal tarsus and to deflect pressure away from the dorsalis pedis pulse of the foot.

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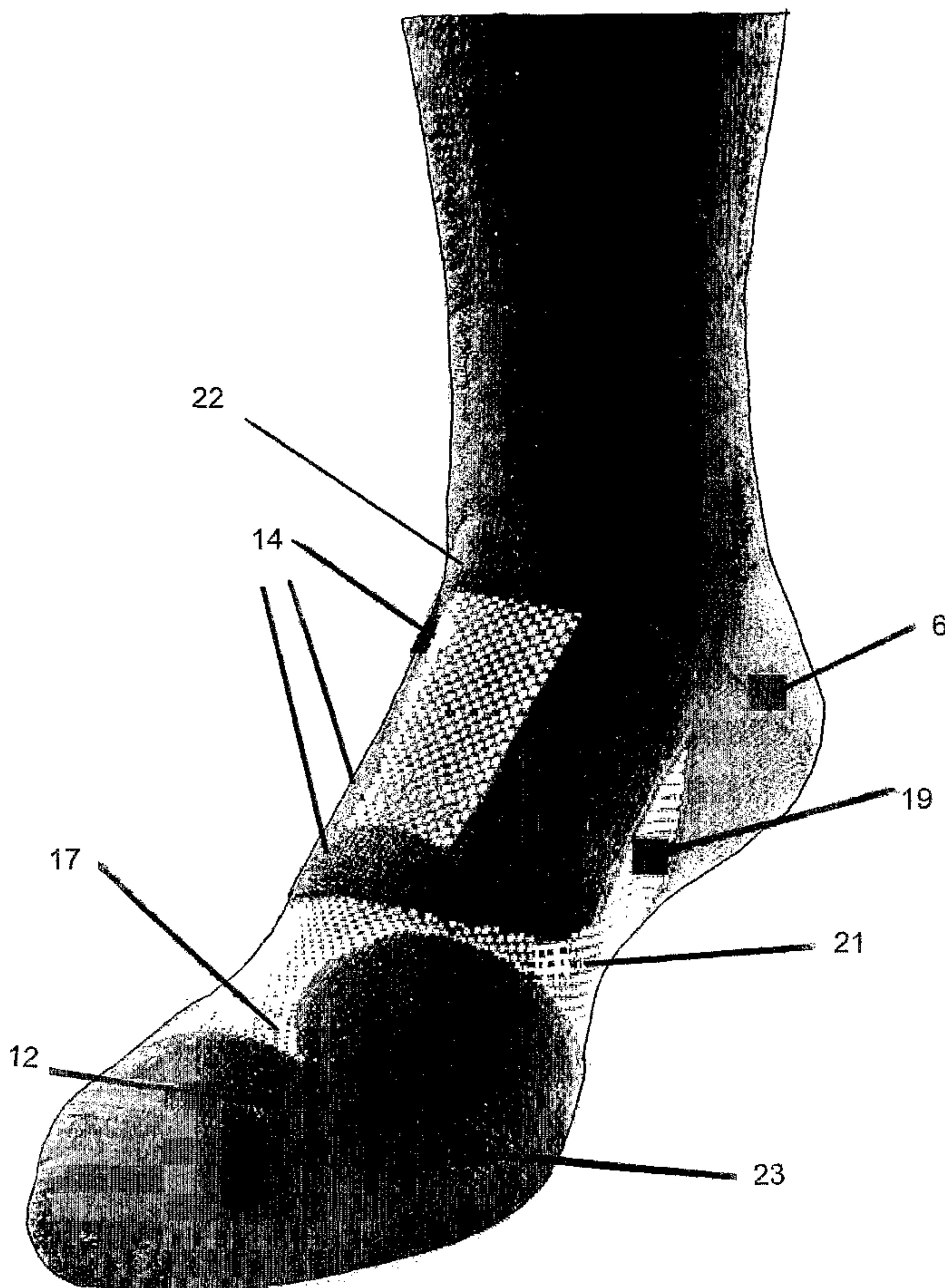
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SOCK

Field of the Invention

- 5 The invention relates to a sock and more particularly to a sock designed to cushion the foot in particular locations around the foot of a wearer.

Background to the Invention

- The use of socks to protect a wearer's feet from the cold is well known. The use of
10 socks for specific purposes such as sports is also well known. In socks designed to serve specific purposes, elastic is often placed in particular parts of the sock to hold the sock up so that it does not fall down and become uncomfortable to the wearer. The placing of elastic in key areas of the sock creates benefits such as improved foot support and protection. If a sock locks onto the foot and does not move around during
15 wear, and the base yarn absorbs and wicks moisture to keep your foot dry then this combination will prevent shearing of the foot. This is where the fabric of a sock in combination with perspiration rubs on the foot, causing abrasion that leads to blisters.

- The abrasiveness of socks can have serious consequences in people suffering from
20 various illnesses and injuries. It would be useful for such people to be able to use a sock that went some way to reducing the stress and abrasiveness of a sock in particular locations around the foot to thus ease the tension at various points on the foot.

Object of the Invention

- 25 It is therefore an object of the invention to provide a sock that, when worn, provides a cushioning effect on the foot or on parts of the foot, or which at least provides the public with a useful choice.

Summary of the Invention

- 30 The invention provides a sock comprising cushioning and plain knit zones strategically located around the sock such that in use the foot of the wearer of the sock is protected

from abrasion, friction, compression and reduction of undue pressure forces to the dorsal region of the foot.

In particular the invention provides a sock that comprises cushioning to the medial and
5 lateral aspects of the dorsal surface of the foot at the tarsal and midtarsal joint regions.

In one aspect, the invention provides a sock comprising a foot portion for positioning over a user's foot and further comprising a cuff for positioning over a user's leg when the sock is in use; wherein the foot portion comprises a bottom portion for covering the
10 bottom of a user's foot and further comprises an upper portion for covering the upper part of a user's foot when the sock is in use; wherein the upper portion comprises a non-cushioned pulse-monitoring region having a pulse-monitoring positional marker, wherein the upper portion also comprises a U-shaped cushioned pad and the non-cushioned pulse-monitoring region lies between substantially opposing arms of the U-
15 shaped cushioned pad; wherein the pulse-monitoring region is positioned on the sock such that, when the sock is in use, the pulse-monitoring region is located above the superior-most aspect of the dorsal tarsus of a user's foot and the pulse-monitoring positional marker is located above the user's dorsalis pedis artery.

20 Preferably the sock also includes no cushioning on the most superior aspect of the dorsal tarsus of the foot.

Preferably the sock further including one or more mesh zones.

25 Preferably the sock further includes one or more positional markers.

The sock is particularly useful for people with diabetes.

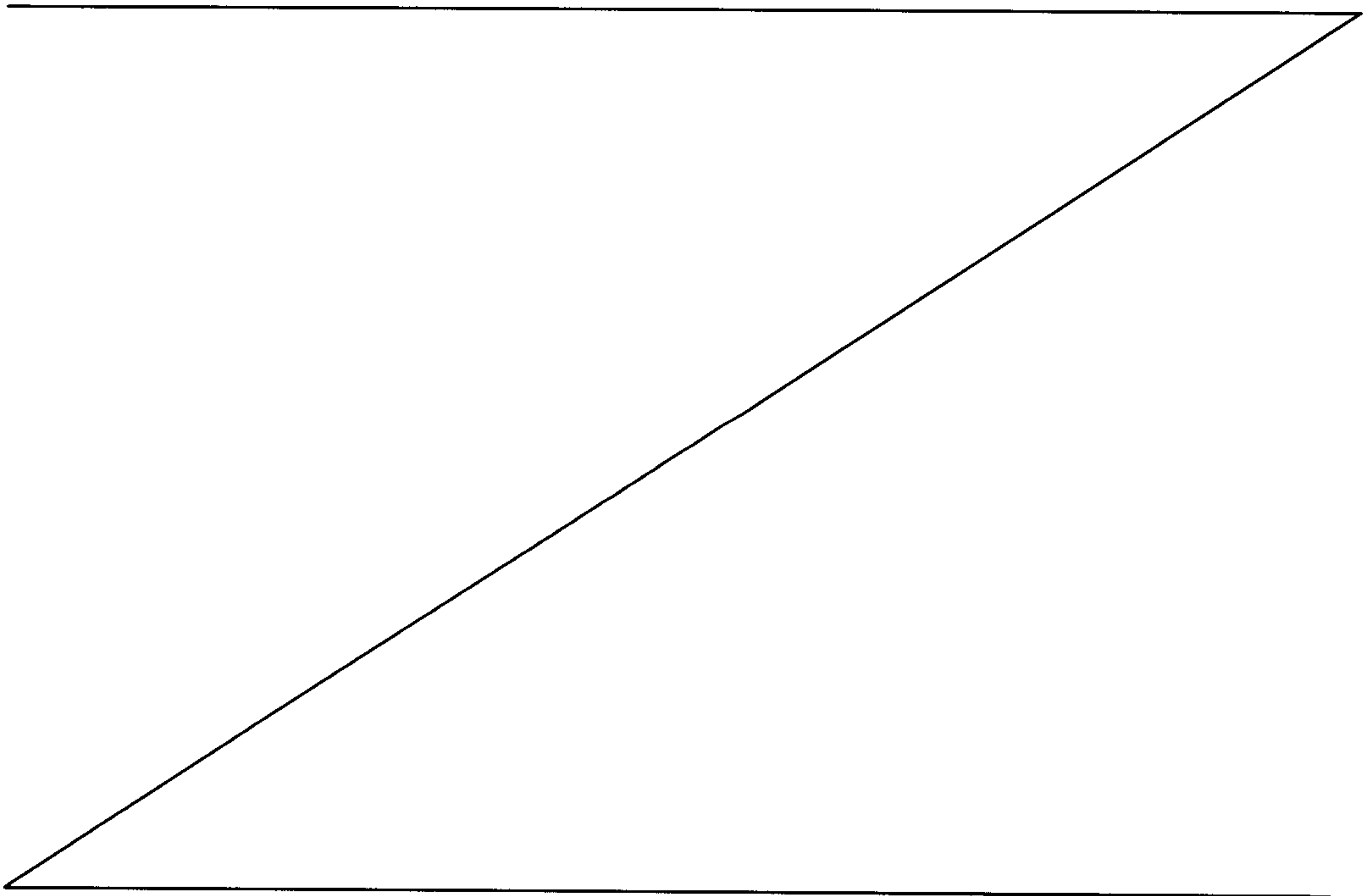
In particular the invention provides a sock that comprises cushioning on either side of
30 the dorsal region of the foot of a wearer and no cushioning on the superior - most

aspect of the dorsal tarsus, in the region of the underlying dorsalis pedis pulse, on top of the foot of the wearer.

5 Not having cushioning of the sock in the areas of the most raised tarsal on top of the foot and either side of the dorsal region of the foot reduces pressure on this area which is an area vulnerable to injury and undue pressure from footwear, for diabetes suffers.

10 Preferably the sock also includes an Elastic Support System (ESS). Elastic is knitted throughout the sock except in the toe or heel pockets of the sock to provide the foot support and comfort needed. There is preferably elastic in the heel area.

15 The Elastic Support System (ESS): High stretch elastic is strategically knitted throughout the sock to provide close fit for support, comfort and protection. There is no bunching or ride down – the sock locks onto a wearer's foot and leg, with minimal



compression. In this sock, elastic is knitted totally throughout the sock except for the heel and toe pocket. The ESS system locks the sock to the foot so the sock stays in place when the wearer is walking, running or the like, and reduces the chances of shearing (friction blistering). Blister avoidance is particularly important for diabetics.

5

Preferably the sock includes other areas on top of the foot where cushioning is lacking to reduce bulk and thus make the sock suitable for dress footwear.

Preferably plain knit or mesh knit ventilation zones are inserted into the sock to aid
10 breathability and to prevent compression. Mesh zones can also be used to improve the fit and comfort around the exposed metatarsals in the forefoot.

Preferably ribs are included in the sock to allow temperature control.

15 A special high stretch elasticated 1x1 rib top may be placed on the top of the sock to make the sock easy to put on for people with diabetes. This feature also reduces compression at the ankle region which can impact on venous return, compress capillaries to the skin at the ankle region and exacerbate the formation of oedema in the lower limb and foot, when blood flow is restricted.

20

The sock can be knitted with pure merino wool in a way that provides all the benefits that merino wool has to offer with nylon and nylon/lycra used for shape retention, durability and reinforcing.

25 The sock can include highlighted contrast colour protection pads on the exposed metatarsals to indicate that these areas of concern have been noted in the development of the sock. The sock preferably further includes positional markers that remind the wearer to correctly align the sock on each foot by checking the position of the markers relative to the anatomy of the foot.

30

The sock can include anatomical flex shaping through a plain knit panel in that area of the sock.

5 The bulk of the sock can be reduced by selectively removing cushioning where it is not required.

The metatarsals and metatarso-phalangeal joints can be further highlighted by the contrast pads being re-positioned distally towards the toe region of the foot.

10 Further aspects of the invention will become apparent having regard to the following description.

Unless the context clearly requires otherwise, throughout the description and claims the terms “comprise”, “comprising” and the like are to be construed in an inclusive
15 sense, as opposed to an exclusive or exhaustive sense. That is, in the sense of “including, but not limited to”.

Description of the Preferred Embodiment

The invention will now be described, by way of example only and with reference to
20 the drawings in which

Detailed Description

Figure 1 shows many features of the invention. The sock includes a double cuff (2) of high stretch elastic for comfort and ease of fit.

25

The sock also includes regions of non-terry (4) to reduce bulk and minimize compression. The Y heel (6) is designed for ergonomic shaping for an improved fit.

The lateral (5th Metatarso-phalangeal joint) and medial (1st Metatarso-phalangeal joint)
30 metatarsal heads (8) are protected by loop pile cushioning pads.

The socks are designed for left and right feet (10) as the positioning of the longitudinal plantar arch and dorsalis pedis artery is different between each foot.

The methods of toe closure used are to provide non irritating seams reducing any
5 discomfort over the toes (12).

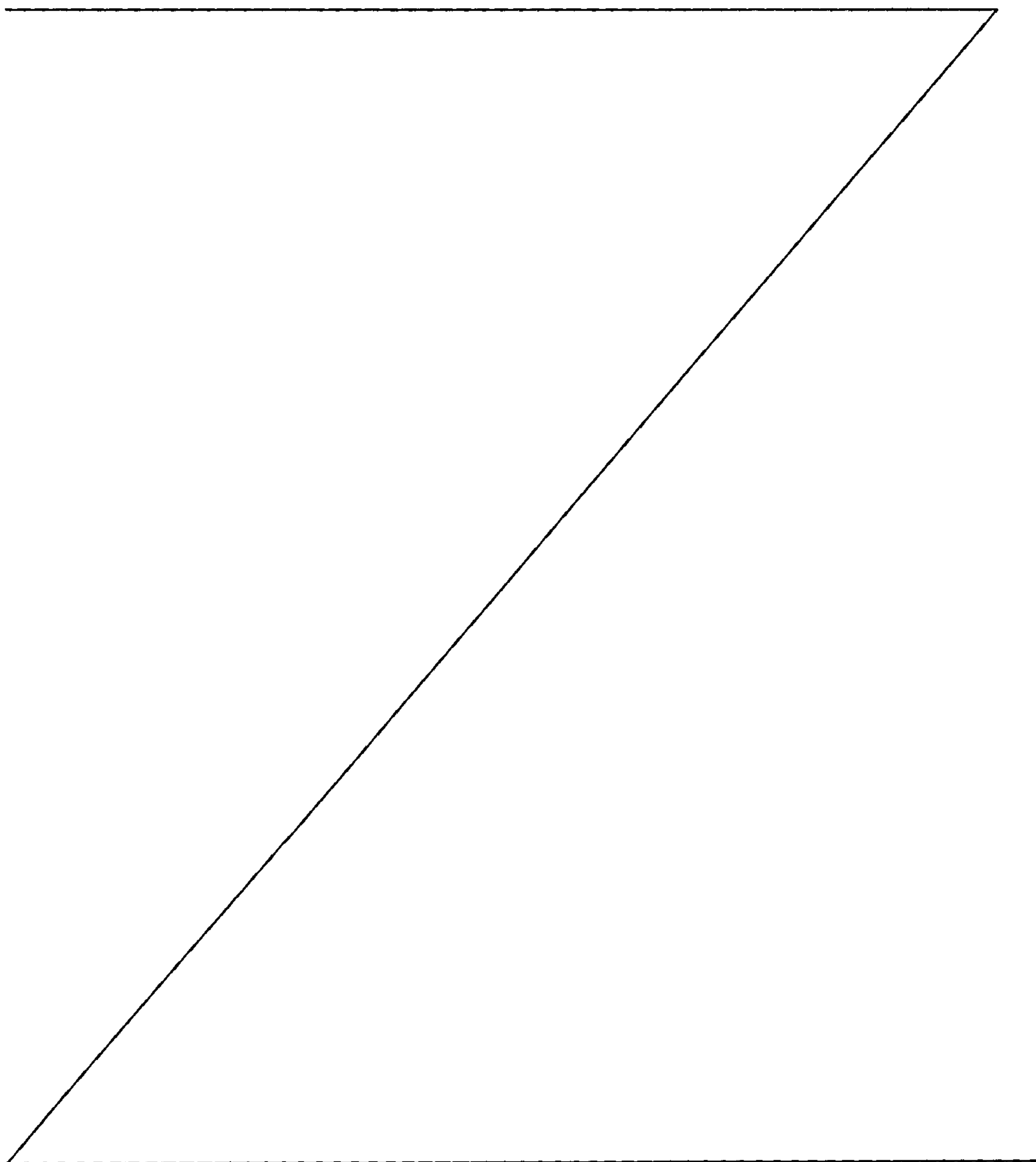


Figure 1 also shows the cushioning positioned to protect the bony prominences of the dorsal tarsus and to deflect pressure away from the dorsalis pedis artery of the foot (14). This shows the area or pad (14) which provides a U-shaped double thickness pad positioned on the upper (dorsal) aspect of the foot, and the arms of which bound a non-cushioned region (4).

- The double loop thickness of the U-shaped area (14) provides additional capacity to absorb increased pressure that may derive from the compressive forces acting upon the foot from the shoe and constrictive lacing
- This double density cushioning area (14) is an additional advantage to a diabetic foot vulnerable to increased pressure from the point of view that people with neuropathy often do not realise how tightly their footwear is laced up or if the pressure is too intense or if the skin is rubbing
- The dorsal U-shaped pad or area (14) is designed to provide a form –fitting feature that deflects (or re-directs or redistributes) compressive and shearing forces away from the natural bony prominences that feature on the top (dorsal or upper aspects) of the foot, particularly over the tarsal and midtarsal regions dorsally.
- Other socks have largely neglected this area as not being subjected to increased forces and have not attempted to address the injuries that are sustained from footwear in this region. It has been recognized by the inventors that this area as being an area frequently injured, with the thin skin that overlies the bony prominences rendered vulnerable and frequently prone to mechanical insult.
- The Dorsalis Pedis artery is preferably highlighted by a contrasting mark (17) which contrasts with the dorsal U-shaped protective area or pad (14). The highlighted mark (17) is a positional marker at the non-cushioned region (4) bounded by the arms of the U-shaped protective area (14) and identifies the superficial positioning of the Dorsalis Pedis artery as it lies in the same region and also provides an opportunistic promotion and reminder of the essential requirement to check the underlying pulse in the management and screening of diabetes-related foot pathologies, particularly as they pertain to the circulation to the foot.

Figure 2 shows the underneath (plantar) view of the sock. This shows the cushioned area (18) of the sock to provide comfort and foot protection and the ribs and mesh (20) that facilitate temperature control and moisture management. Also shown is region (21) which shows the anatomically shaped footbed, it is preferred that this region (21) lacks cushioning.

Figure 3 shows a front perspective view of the sock of the invention. Figure 3 shows the U-shaped cushioning region (14). It also shows the position of ribs and mesh (19) for moisture management and temperature control and the uncushioned anatomical flex panel (22) for ergonomic shaping and a mesh pad region (23) for increased flexibility.

Nylon is knitted into the sock for durability and stretch and reinforcing with pure Merino wool providing the following benefits:

- moisture management;
- anti-bacterial properties;
- softness-a fine micron has been used for superior comfort;
- natural crimp gives fibre spring or resilience allowing it to bounce back into shape; enhancing foot protection and comfort;
- natural insulator whilst still able to breathe; and
- temperature control.

It is to be appreciated that where reference has been made to integers having known equivalents, then those equivalents are hereby incorporated as if individually set forth.

25

Whilst the invention has been described with reference to the specific embodiments, it will be appreciated that numerous modification and improvements may be made to those embodiments without departing from the scope of the invention as set out in this specification. For example, it is possible to knit the sock with pure wool so that the pure wool of the sock is next to the skin of the wearer in use and such that nylon is on the outside.

30

Claims

1. A sock comprising a foot portion for positioning over a user's foot and further
5 comprising a cuff for positioning over a user's leg when the sock is in use;
wherein the foot portion comprises a bottom portion for covering the bottom of a
user's foot and further comprises an upper portion for covering the upper part of
a user's foot when the sock is in use;
wherein the upper portion comprises a non-cushioned pulse-monitoring
10 region having a pulse-monitoring positional marker,
wherein the upper portion also comprises a U-shaped cushioned pad and
the non-cushioned pulse-monitoring region lies between substantially opposing
arms of the U-shaped cushioned pad;
wherein the pulse-monitoring region is positioned on the sock such that,
15 when the sock is in use, the pulse-monitoring region is located above the
superior-most aspect of the dorsal tarsus of a user's foot and the pulse-
monitoring positional marker is located above the user's dorsalis pedis artery.
2. The sock as claimed in claim 1, wherein the U-shaped cushioned pad comprises a
20 double layer of cushioning.
3. The sock as claimed in claim 1 or 2, wherein elastic is knitted throughout the
sock, except in toe and heel pockets located in the foot portion of the sock.
- 25 4. The sock as claimed in any one of claims 1 to 3, wherein the sock further
comprises ventilation regions comprising regions of plain knit or mesh knit.
5. The sock as claimed in claim 4, wherein a plurality of ventilation regions are
provided in the bottom portion of the sock.

30

6. The sock as claimed in any one of claims 1 to 5, wherein the cuff comprises an elasticated 1x1 ribbed top region.
- 5 7. The sock as claimed in any one of claims 1 to 6, further comprising a non-cushioned footbed region positioned on an inner side of the foot portion of the sock so as to be located over the arch of the user's foot when the sock is in use.
8. The sock as claimed in any one of claims 1 to 7, wherein the bottom portion of the sock comprises a cushioned impact region in the heel area.
- 10 9. The sock as claimed in any one of claims 1 to 8, wherein the bottom portion of the sock comprises a cushioned impact region corresponding to the position of a user's ball and heel areas when the sock is in use.

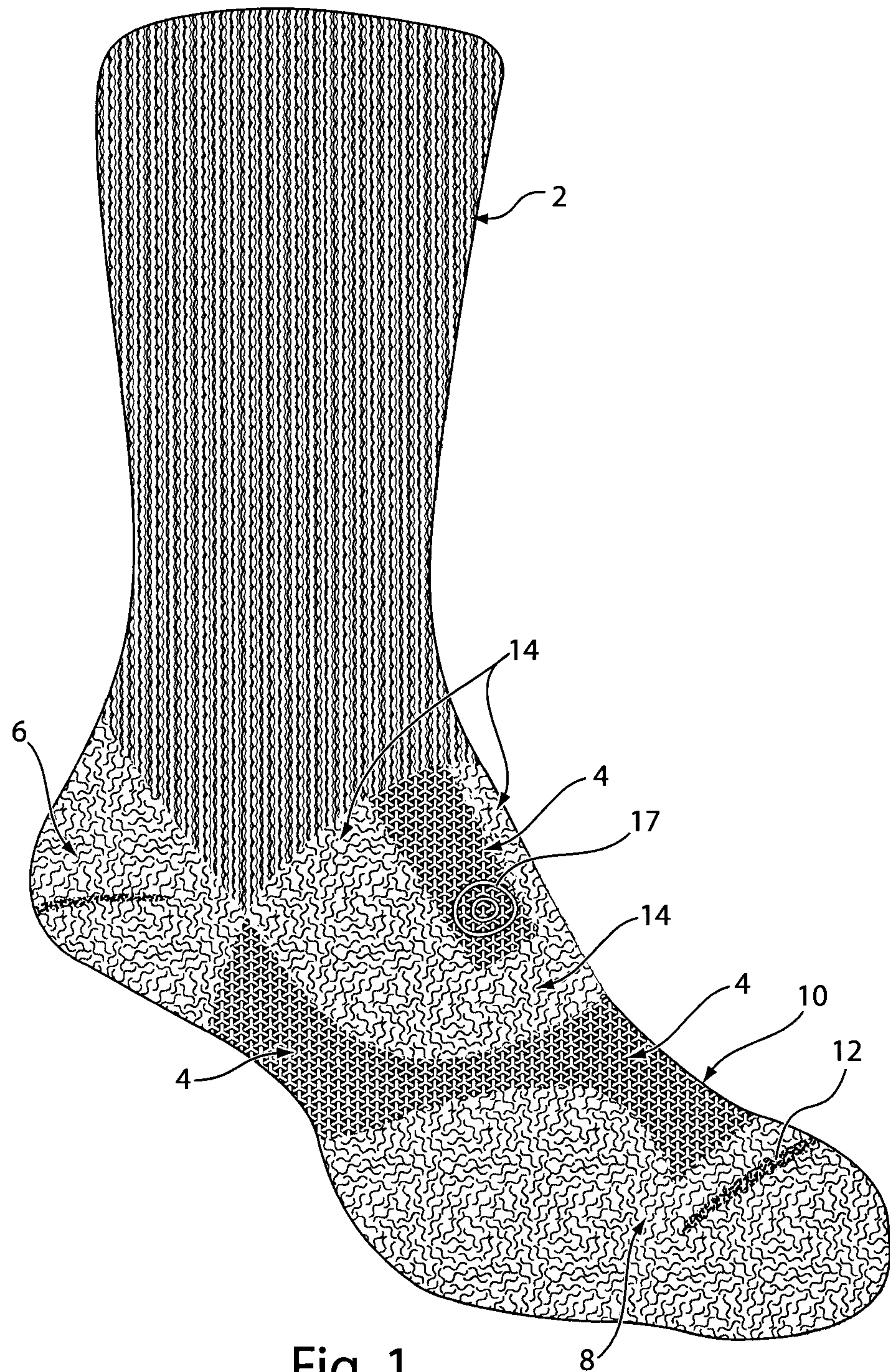


Fig. 1

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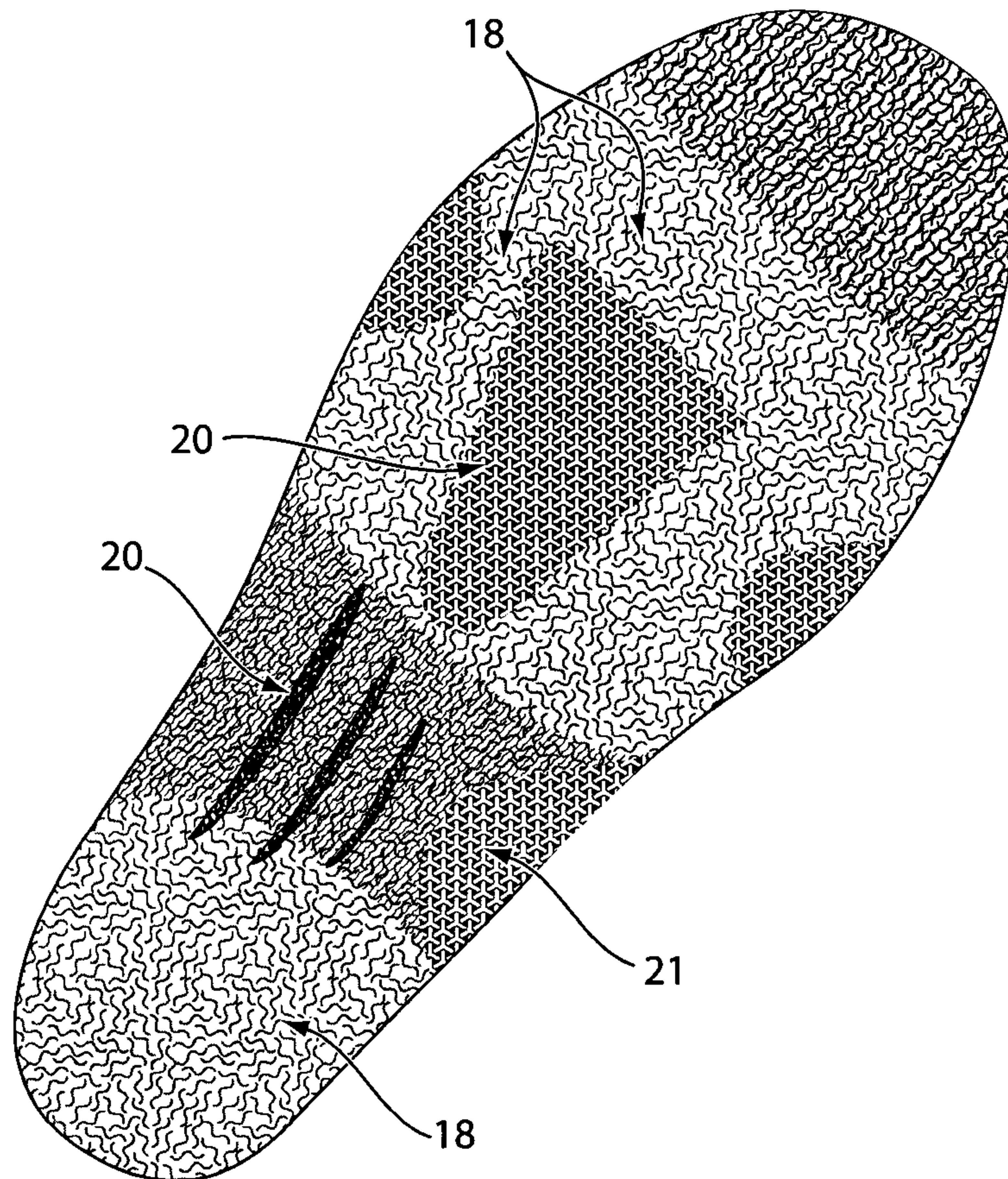


Fig. 2

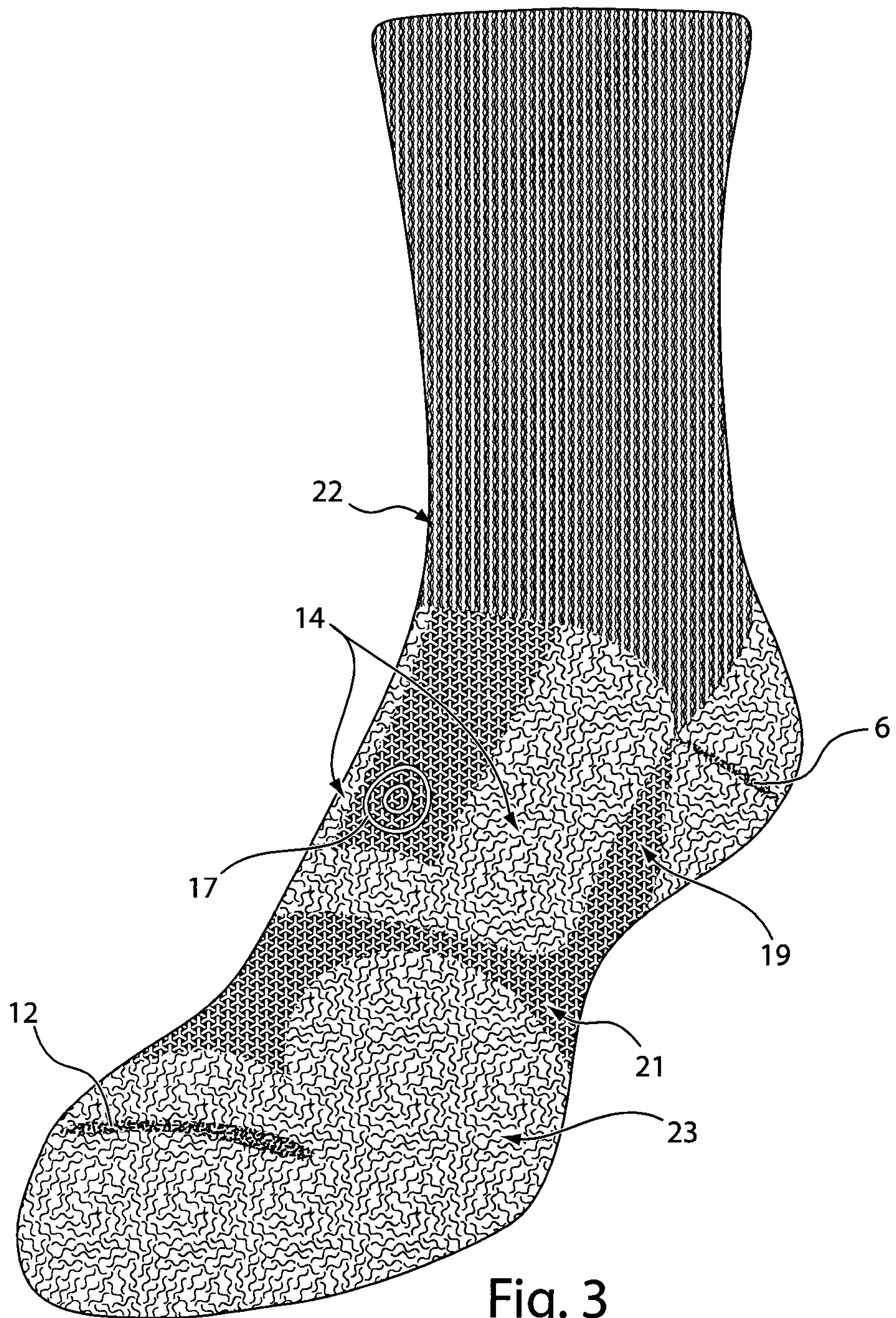


Fig. 3

