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(54) **HOSIERY WITH FOOT CUSHIONS**

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(71) Applicant: **Fushionz LLC**, Greensboro, NC (US)

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(72) Inventor: **Melanie Yvonne Alston**, Phoenix, AZ (US)

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(73) Assignee: **Fushionz, LLC**, Greensboro, NC (US)

(57) **ABSTRACT**

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A hosiery product, such as a sock, footie, trouser sock or pantyhose, includes an inner layer of hosiery material, such as nylon or spandex covering the bottom and top surfaces of the wearer's foot, an outer layer of similar hosiery material, and at least one cushion section disposed between the inner and outer layers. The cushion section includes a cushioning material that conforms to the contours of the wearer's foot, such as macro-gel activated support discs or memory foam. The cushion section is permanently attached to the inner layer and/or outer layer and is positioned to cushion a particular area of the bottom surface of the wearer's foot, such as the heel, arch and/or ball of the foot.

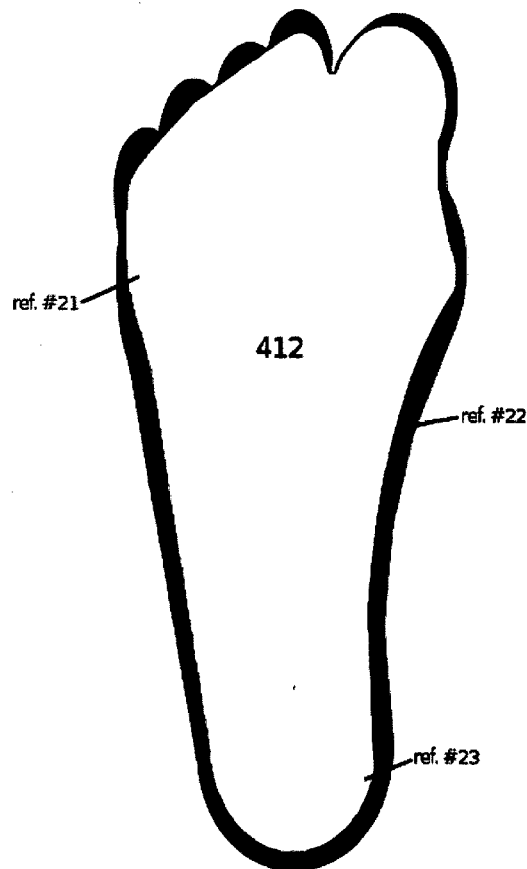
Related U.S. Application Data

(63) Continuation of application No. 14/185,993, filed on Feb. 21, 2014, now Pat. No. 9,675,119.

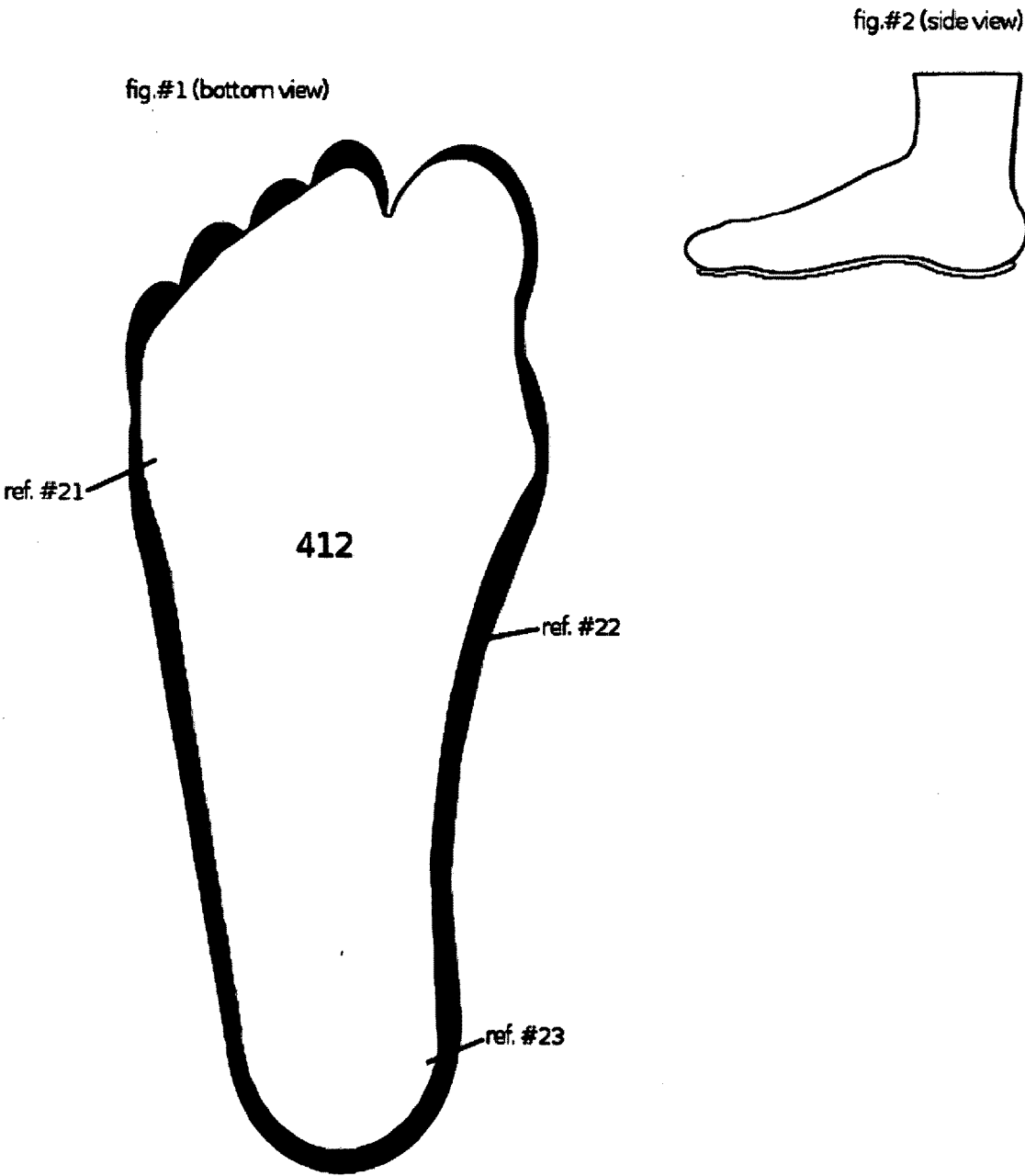
(60) Provisional application No. 61/850,747, filed on Feb. 21, 2013.

Material Layer

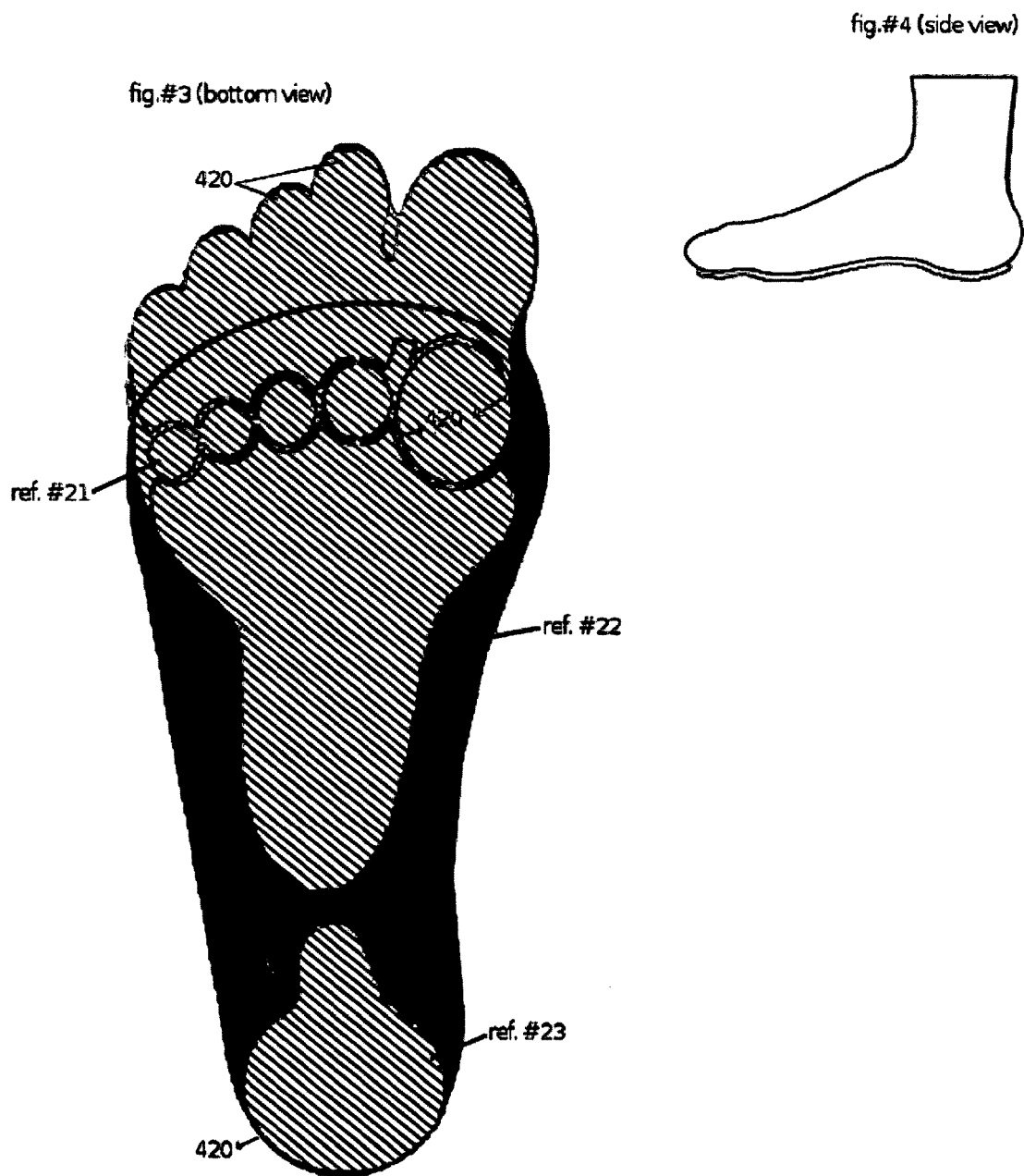
fig.#1 (bottom view)



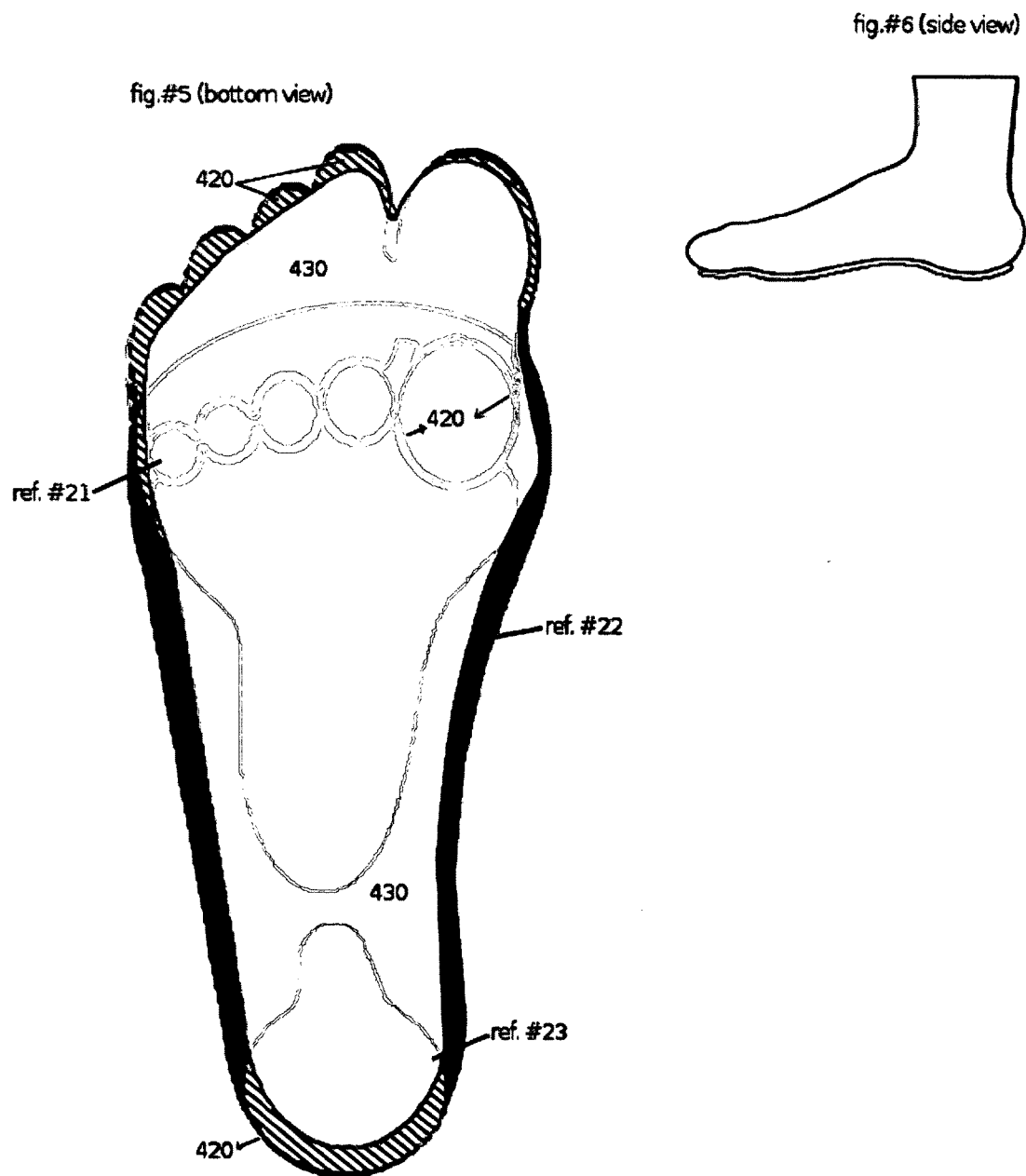
Material Layer



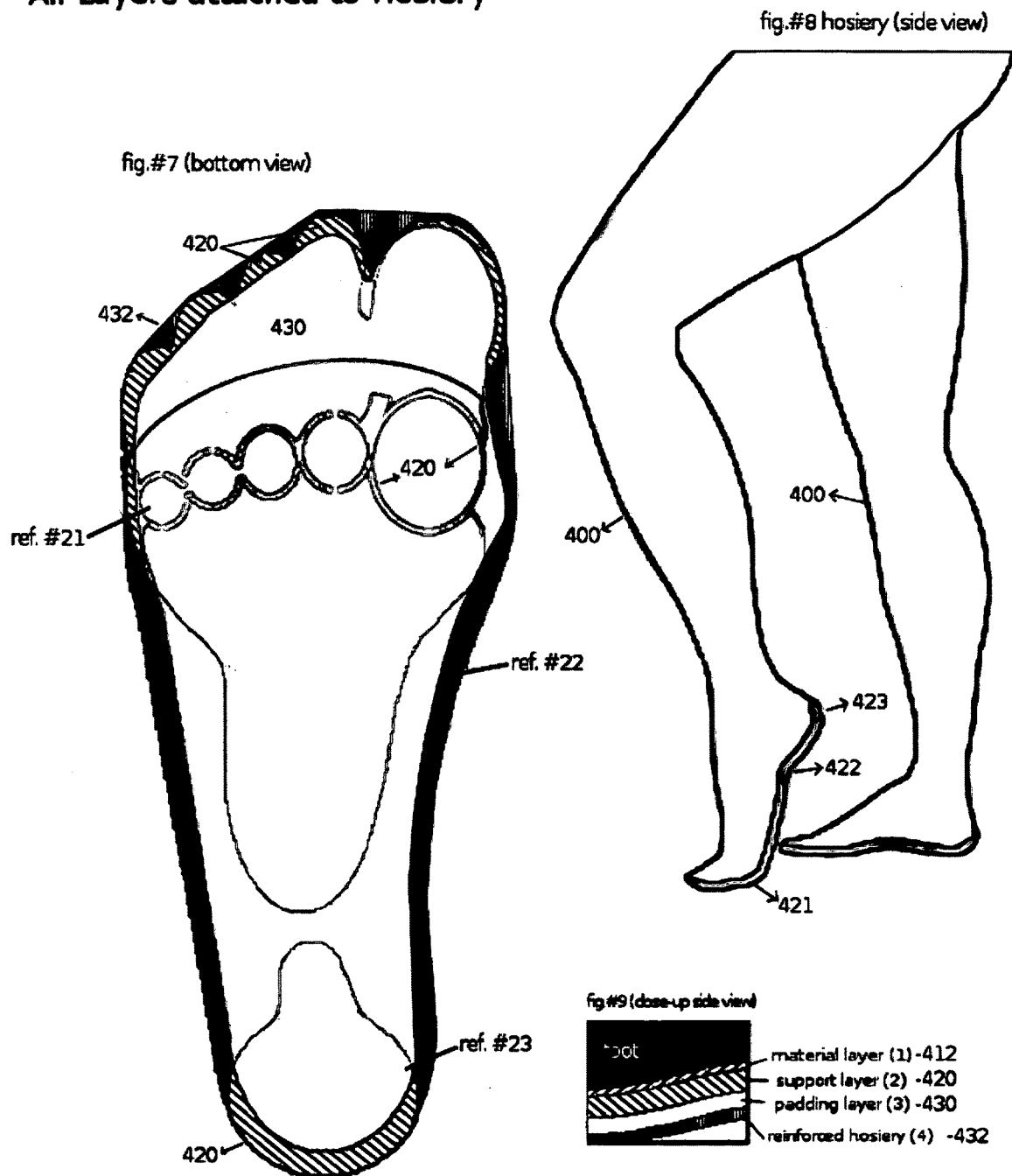
Support Layer



Padding Layer

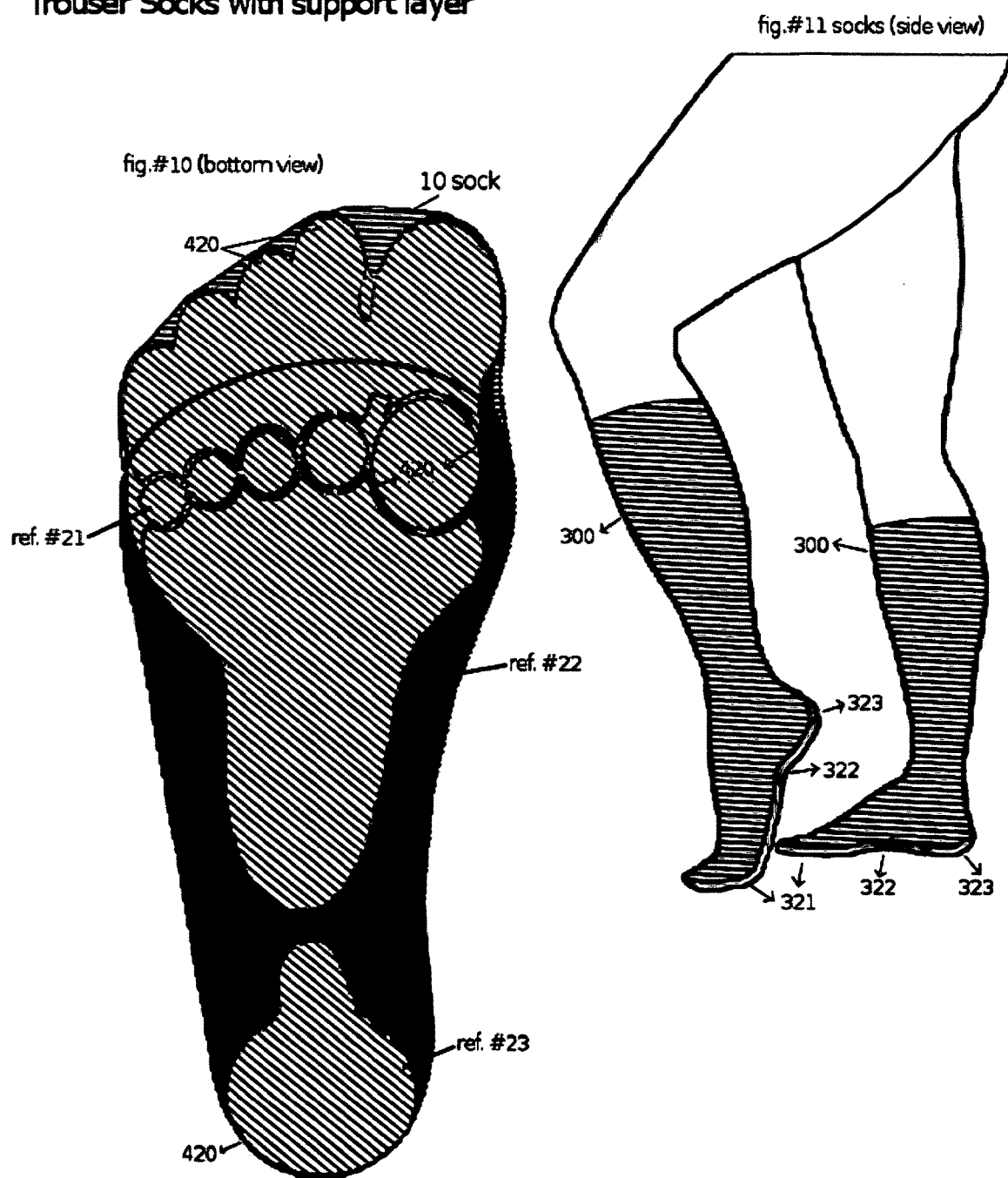


All Layers attached to Hosiery



Note: #3 may not be needed in trouser socks, tights, footies, or hosiery if denier is higher

Trouser Socks with support layer



Footies and Cushion socks with support layer

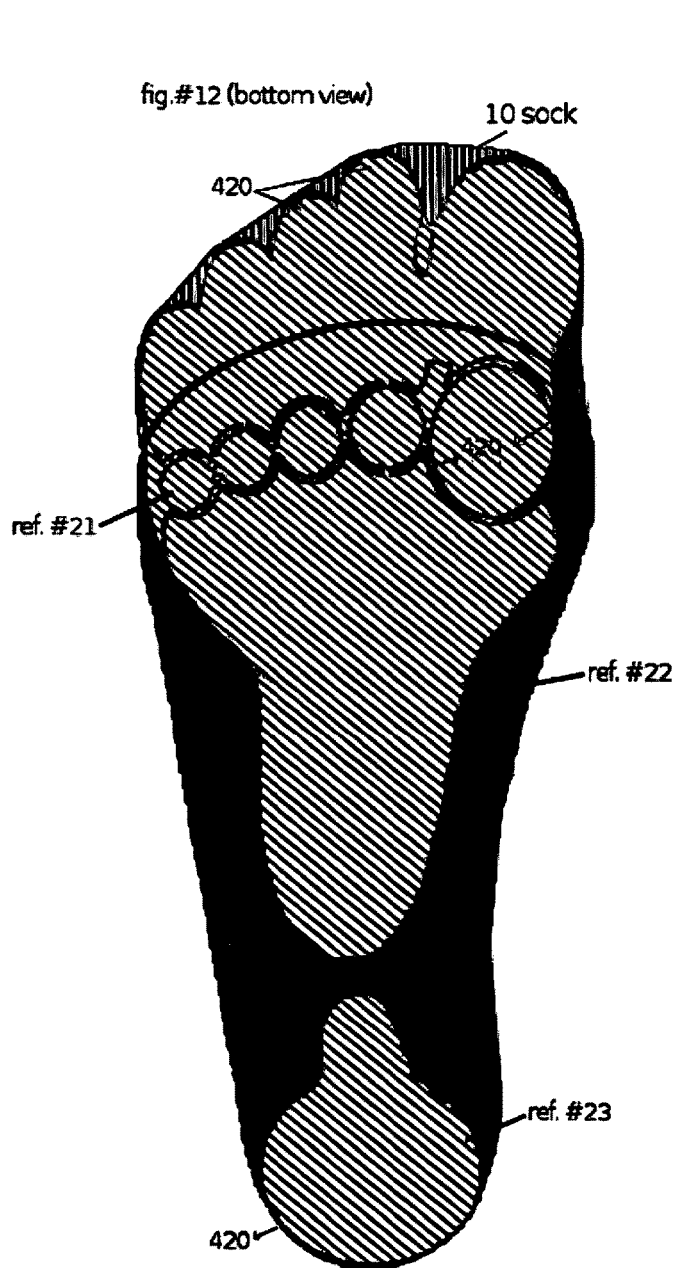


fig.#13 footies (side view)

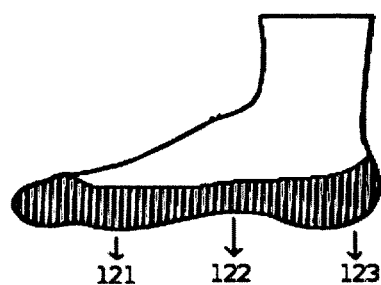
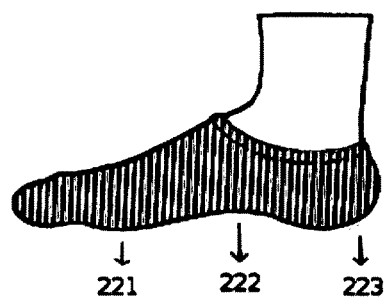


fig.#14 cushion socks (side view)



HOSIERY WITH FOOT CUSHIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. patent application Ser. No. 14/185,993, filed Feb. 21, 2014, which claims priority to U.S. Provisional Patent Application No. 61/850,747, filed Feb. 21, 2013, which is incorporated herein by reference.

TECHNICAL FIELD AND BACKGROUND OF THE INVENTION

[0002] The present invention relates to hosiery products, such as pantyhose, socks, and footies, trouser socks and knee highs. One embodiment of the invention comprises a hosiery product having sections of cushioning material providing support at particular areas of the bottom of the foot of the hosiery. One elevated cushion layer of material is placed on the arch and one elevated cushioning layer of material is placed on the heel and five cushions are placed at the ball of foot providing elevated support at particular areas of the bottom of the foot of the hosiery to alleviate the critical pressure points of the foot. The plurality of elevated circles at the ball of foot are elevated.

[0003] Prior art hosiery includes Patent Application Publication No. 20120227161, which discloses hosiery having a built-in receptacle with an opening for receiving removable and disposable foot cushions. This hosiery device is relatively cumbersome and difficult to adjust rapidly.

[0004] There are cushion/support inserts that are to be positioned within a shoe. However, since such inserts are not attached to either the shoe or the wearer's sock, they can become easily dislodged from their desired position.

SUMMARY OF THE INVENTION

[0005] One object of the present invention is to provide a quick and easy, ready to wear hosiery product, such as a sock, pantyhose, footie, knee high and trouser sock, having comfortable permanently stitched elevated support padding weaved or knitted directly in the bottom of the foot of the hosiery product. Another object of the invention is to provide a hosiery product with permanently attached support that conforms to a variety of foot sizes and minimizes wear and tear on the fabric. Another object of the invention is to provide a hosiery product that helps the wearer stand more comfortably on the pressure points of the foot, such as the ball of the foot, arch and heel.

[0006] Yet another object of the present invention is to provide a hosiery product having permanent sewn in padding and is simple and easy to put on and use. Yet another object of the present invention is to provide a hosiery product having permanently attached padding that easily conforms to any foot size. Yet another object of the invention is to provide a hosiery product that does not require a receptacle for interchanging and removal of padding sizes to fit the wearer's foot. Another object of the invention is to provide a hosiery product that does not increase the wear and tear on the hosiery by insertion and removal of pads into the fabric or an open receptacle. Yet another object of the invention is to provide a hosiery product that does not require selection of padding size, and does not require any assembly of parts by the wearer. Yet another object of the present invention is to provide variations of fabric and

padding that will help the wearer's foot with coolness and warmth during the four seasons of the year.

[0007] These and other objects of the invention can be achieved in the preferred embodiments of the invention described below. One embodiment of the invention comprises a ready to wear, comfortable hosiery product, such as a sock, footie, knee high, trouser sock or pantyhose, having permanently stitched elevated support padding weaved or knitted directly in the bottom of the feet of the hosiery at the ball of the foot, arch and heel that conforms to any wearer's foot size and minimizes wear and tear on the fabric. This enables the wearer's ability to stand more comfortably on the critical pressure points of the foot, such as the ball of the foot, arch, and heel. The ball of foot cushion support is an elevated circle shaped support padding weaved or knitted directly in the bottom of the feet of the hosiery that conforms to any wearer's foot size. The hosiery is fabricated from materials suitable for hosiery and garment applications.

[0008] The hosiery product improves the wearer's ability to stand on the pressure points ball of foot, heel, and arch in regular everyday heels, flats, or clogs that are not padded properly for better comfort. The hosiery conforms to any wearer's foot size without interchanging or removal of foot pads. This provides wearers a carefree alternative to foot comfort and support. The comfortable padding is a permanent part of the hosiery, and resolves issues with prior protective padding sliding out of place from wear and tear resulting from sliding the padding in and out of receptacles, which can deter the wearer from the ease of wanting to put on the hosiery. The cushioning and support material are permanently attached so as to conform to all wearer's foot sizes, providing needed elevated comfort and support to the areas of balls, arch, and heels of the feet for a more lasting comfortable feeling for the user. The padding targets the ball of foot, heel, arch, and metatarsal pressure point areas.

[0009] Different forms and density of memory foam, padding, or any other support material can be used to provide breathability, warmth or coolness to the feet. Different options can be used based upon the seasons of the year. The hosiery product utilizes high quality support fabrics and material of different densities to adapt to climatic conditions. For example, materials such as TEMPURPEDIC® foam can be used in the winter and ICLOUD® foam for the fall, summer and spring. Rather than the memory foam or other support materials being stitched, a stamping method could be used.

[0010] An embodiment of the invention comprises a hosiery product comprising an inner layer of hosiery material adapted to cover bottom and top surfaces of the wearer's foot, an outer layer of hosiery material adapted to cover bottom and top surfaces of a wearer's foot, and a plurality of elevated cushion sections shaped as circle shape comprising a cushioning material disposed between the inner layer and outer layer at a position to cushion a particular area of the bottom surface of the wearer's foot. The cushion sections are permanently attached to the inner layer.

[0011] According to another embodiment of the invention, the cushion section is attached to the inner layer by sewing, stitching, knitting, weaving and/or stamping.

[0012] According to another embodiment of the invention, the cushion section is positioned to cushion a particular area of the bottom surface of the wearer's foot, such as the ball of the foot, arch of the foot, and/or heel of the foot.

[0013] According to another embodiment of the invention, the cushioning material comprises a material that adapts to contours of the wearer's foot.

[0014] According to another embodiment of the invention, the cushioning material is comprised of a viscoelastic support gel, macro-gel activated support discs, memory foam, gel memory foam, and/or latex foam.

[0015] According to another embodiment of the invention, the inner layer of hosiery material and the outer layer of hosiery material are comprised of nylon and/or spandex.

[0016] According to another embodiment of the invention, a reinforcing layer comprising a layer of hosiery material is positioned intermediate the cushion section and the outer layer to provide support to the cushion section.

[0017] According to another embodiment of the invention, the hosiery product can be a sock, cushion sock, trouser sock, footie, knee high or pantyhose.

[0018] According to another embodiment of the invention, a hosiery product comprises an inner and outer layers of elastic material adapted to cover bottom and top surfaces of a wearer's foot, and a cushion layer comprising a cushioning material disposed between the inner layer and outer layer at a position to cushion the bottom surface of the wearer's foot.

[0019] According to another embodiment of the invention, the cushion layer comprises a plurality of cushion sections, and each elevated cushion section is positioned and shaped to cushion a particular area of the bottom surface of the wearer's foot. The five ball of foot cushions are elevated and circle shaped to cushion a particular area of the bottom surface of the wearer's foot.

[0020] According to another embodiment of the invention, the plurality of cushion sections comprises a first attached elevated cushion section of five ball of foot shaped cushion section[s] positioned to cushion the metatarsals region of the wearer's foot, a second elevated cushion section positioned to cushion the arch region of the wearer's foot, and a third elevated cushion section positioned to cushion the heel region of the wearer's foot.

[0021] According to another embodiment of the invention, the plurality of cushion sections are permanently attached to the inner layer.

[0022] According to another embodiment of the invention, the plurality of cushion sections are attached to the inner layer by sewing, stitching, knitting, weaving and stamping.

[0023] According to another embodiment of the invention, the cushioning material comprises a material that adapts to contours of the wearer's foot.

[0024] According to another embodiment of the invention, the cushioning material is selected from the group consisting of viscoelastic support gel, macro-gel activated support discs, memory foam, gel memory foam and latex foam.

[0025] According to another embodiment of the invention, a reinforcing layer of breathable nylon is positioned intermediate the plurality of elevated cushion sections and the outer layer, and provides support to the plurality elevated cushion sections.

[0026] A hosiery product according to another embodiment of the invention comprises inner and layers of hosiery material adapted to cover bottom and topsurfaces of the wearer's foot, and at least one cushion section comprising a cushioning material that conforms to the contours of the wearer's foot. The elevated cushion section is disposed between the inner layer and outer layer at a position to cushion a particular area of the bottom surface of the

wearer's foot, and the cushion section is integrally attached to the inner layer or outer layer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 is a bottom view of a material layer of a sock according to a preferred embodiment of the invention;

[0028] FIG. 2 is a side view of the material layer of the sock;

[0029] FIG. 3 is a bottom view of a support layer of the sock;

[0030] FIG. 4 is a side view of the support layer the sock;

[0031] FIG. 5 is a bottom view of a padding layer of the sock;

[0032] FIG. 6 is a side view of the padding layer of the sock;

[0033] FIG. 7 is a bottom view of the layers described above attached to a hosiery of the sock;

[0034] FIG. 8 is a side view of the layers attached to the hosiery of the sock;

[0035] FIG. 9 is a close up cross sectional side view of the layers of the sock;

[0036] FIG. 10 is a bottom view of a trouser sock with a support layer;

[0037] FIG. 11 is a side view of the trouser sock with the support layer;

[0038] FIG. 12 is a bottom view of either a footie sock or cushion sock with the support layer;

[0039] FIG. 13 is a side view of the footie sock with the support layer; and

[0040] FIG. 14 is a side view of the cushion sock with the support layer.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION AND BEST MODE

[0041] A hosiery product according to a preferred embodiment of the invention is illustrated in FIGS. 1-6, and shown generally at reference numeral 10. The hosiery product 10 can be a sock 10 comprised of an inner layer 412, an outer layer 432, and an elevated cushion layer at the ball of foot 420 positioned intermediate the inner layer 412 and outer layer 432. The cushion layer 420 comprises a plurality of cushion sections 21, 22, 23

[0042] The inner and outer layers 412, 432 are comprised of nylon or other elastic material suitable for hosiery, such as spandex. The cushion sections 21, 22, 23 comprise an elevated cushioning material capable of adapting to body contours. Preferably, the cushioning material is comprised of a viscoelastic support gel, such as the macro-gel support discs sold by Serta, Inc. under the mark PODSO or the gel sold by Serta, Inc. under the mark MICROSUPPORT®. Preferably, the cushioning material is substantially non-collapsible so that it does not collapse when supporting the weight of a person for extended periods of time. Alternatively, the cushion sections 21, 22, 23 can be comprised of viscoelastic polyurethane foam, known commonly as "memory foam." The cushioning material can also be comprised of gel memory foam. Alternatively, the cushioning material can be comprised of latex foam, such as BiOH® Gel Latex sold by Cargill, Inc.

[0043] The elevated cushion sections 21, 22, 23 are encased by the inner and outer layers 412, 432, and permanently attached to the sock 10. The cushion sections 21, 22,

23 can be sewn to the inner layer **412** or attached by other suitable means such as knitting or weaving. Alternatively, the elevated cushion sections **21**, **22**, **23** can be attached using a stamping method. Each cushion section **21**, **22**, **23** can include a fabric pouch containing the elevated support gel, and the fabric pouch can be attached to the inner layer **412**.

[0044] In an alternative embodiment, the elevated cushion sections **21**, **22**, **23** can be attached to the outer layer **432**. In yet another alternative embodiment, the cushion sections **21**, **22**, **23** can be attached to both the inner layer **412** and outer layer **432**.

[0045] The cushion sections **21**, **22**, **23** are positioned in the sock **10** to support specific pressure points of the wearer's foot. As shown in FIG. 3, one cushion section **21** is shaped, elevated, and positioned to cushion the ball of the foot, metatarsals. The second elevated cushion section **22** is shaped, elevated, and positioned to cushion the arch of the wearer's foot, and the third elevated cushion section **23** is shaped and positioned to cushion the heel. As such, the cushion sections **21**, **22**, **23** provide elevated support and cushioning at the most critical and common areas of foot pain and pressure. The gel activated support material of the cushion sections **21**, **22**, **23** adapt to the contours of the wearer's foot.

[0046] The thin layer of the support materials adapted to the wearer's foot that extend to the extremity of the toes to provide comfort to the entire foot can be stopped at the bend of the toes.

[0047] The cushion sections **21**, **22**, **23** are completely and securely attached to the sock **10**, such as by sewing, knitting or weaving. By so integrally attaching the cushion sections **21**, **22**, **23** to the sock **10**, stray particles are prevented from entering and ruining the fabric of the sock **10**. As such, the wear and tear on the fabric that is typically caused by removing and interchanging padding in prior art devices is avoided by the sock **10**. The cushioning sections **21**, **22**, **23** stay securely in place under the wearer's foot and easily adjusts for a wide range of climatic conditions.

[0048] The sock **10** can be employed for general purpose and/or therapeutic applications. The sock **10** eliminates any need for a cushion/support insert typically positioned within a shoe. The cushioning material in the cushion sections **21**, **22**, **23** can be antimicrobial and/or hypoallergenic treated. In an alternative embodiment, the cushioning material can be inserted into a waterproof fabric and cut, weaved, stitched, knitted and placed into the sock.

[0049] As illustrated in FIGS. 1-14, the design and construction of sock **10** can be incorporated into other hosiery products. For example, FIG. 13 shows a footie **100** according to a preferred embodiment of the invention. The footie **100** has elevated cushion sections **121**, **122**, **123**, and is identical in construction as the above described sock **10**. FIG. 14 shows a cushion sock **200** according to a preferred embodiment of the invention. The cushion sock **200** includes elevated cushion sections **221**, **222**, **223**, as shown in FIG. 14, and is identical in construction as the above described sock **10**. FIG. 11 shows trouser socks **300**, **300'** according to a preferred embodiment of the invention. The trouser socks **300**, **300'** include cushion sections **321**, **322**, **321'**, **322'**, **323**, **323'**, respectively, and are identical in construction as the above described sock **10**.

[0050] A hosiery product according to another preferred embodiment of the invention is illustrated in FIGS. 8-11, and

shown generally at reference numeral **400**. The hosiery product **400** comprises pantyhose **400** comprising an inner material layer **412**, a cushion support layer **420**, a reinforcing layer **432** and an outer reinforced layer **442**. The cushion support layer **420** comprises a plurality of cushion sections **421**, **422**, **423**.

[0051] The inner and outer layers **412**, **432** are comprised of a flexible, breathable material and/or an elastic material, such as nylon or spandex. The cushion sections **421**, **422**, **423** comprise a cushioning material capable of adapting to body contours. Preferably, the cushioning material is comprised of a viscoelastic support gel, such as the macro-gel support discs sold by Serta, Inc. under the mark PODS or the gel sold by Serta, Inc. under the mark MICROSUPPORT. Preferably, the cushioning material is substantially non-collapsible so that it does not collapse when supporting the weight of a person for extended periods of time. Alternatively, the cushion sections **21**, **22**, **23** can be comprised of viscoelastic polyurethane foam, known commonly as "memory foam." The cushioning material can also be comprised of gel memory foam. Alternatively, the cushioning material can be comprised of latex foam, such as BioOH@ Gel Latex sold by Cargill, Inc.

[0052] The reinforcing layer can be comprised of a hosiery material, such as breathable nylon, and provides additional strength to support the cushion sections **421**, **422**, **423**. The padding layer **430** can be omitted if the outer reinforced layer **442** comprises a sturdy or dense material.

[0053] The cushion sections **421**, **422**, **423** are positioned intermediate the inner material layer **412** and the padding layer **430**, and permanently attached to the pantyhose **400**. The cushion sections **421**, **422**, **423** can be sewn to the inner layer **412** or attached by other suitable means such as knitting or weaving.

[0054] The cushion sections **421**, **422**, **423** are positioned at the bottom of the feet of the pantyhose **400** to support specific pressure points of the wearer's foot. As shown in FIGS. 7 and 8, one cushion section **421** is elevated, shaped and positioned to cushion the ball of the foot metatarsals. The second cushion section **422** is elevated, shaped, and positioned to cushion the arch of the wearer's foot, and the third cushion section **423** is shaped and positioned to cushion the heel. As such, the cushion sections **421**, **422**, **423** provide targeted, elevated, support and cushioning at the most critical areas of foot pain and pressure. The thin layer of the support materials that extend to the extremity of the toes to provide comfort to the entire foot can be stopped at the bend of the toes. The gel activated support material of the cushion sections **421**, **422**, **423** adapt to the contours of the wearer's foot.

[0055] The cushion sections **421**, **422**, **423** can have the following preferred dimensions. The layer of support gel in the cushion section **421** positioned below the ball of the foot preferably has a thickness of about one-fourth to three-eighths inch. The support gel in the cushion section **422** positioned below the arch of the foot preferably has a thickness of about one-fourth to three-eighths inch. The layer of support gel in the cushion section **423** positioned below the heel of the foot preferably has a thickness of about one-eighth to one-fourth inch.

[0056] The cushion sections **421**, **422**, **423** are completely and securely attached to the pantyhose **400**, such as by sewing, knitting or weaving. By so integrally attaching the cushion sections **421**, **422**, **423** to the pantyhose **400**, stray

particles are prevented from entering and ruining the fabric of the pantyhose **400**. As such, the wear and tear on the fabric that is typically caused by removing and interchanging padding in prior art devices is avoided by the sock **400**. The cushioning sections **421**, **422**, **423** stay securely in place under the wearer's foot and easily adjusts for a wide range of climatic conditions.

[0057] The pantyhose **400** can be employed for general purpose and/or therapeutic applications. The pantyhose **400** eliminates any need for a cushion/support insert typically positioned within a shoe. The cushioning material in the cushion sections **421**, **422**, **423** can be antimicrobial and/or hypoallergenic treated. The four layer construction of the pantyhose **400** can be incorporated into other hosiery products, such as socks, footies, cushion socks and trouser socks. In an alternative embodiment, the cushioning material can be inserted into a waterproof fabric and cut, weaved, stitched, knitted and placed into the pantyhose.

[0058] A hosiery product and method of making same are described above. Various changes can be made to the invention without departing from its scope. The above description of the preferred embodiments and best mode of the invention are provided for the purpose of illustration only and not limitation—the invention being defined by the claims and equivalents thereof.

1. A hosiery product comprising:
 - an inner layer of hosiery material configured to cover a bottom surface of a foot and a top surface of the foot;
 - an outer layer of hosiery material configured to cover the bottom surface of the foot and the top surface of the foot; and
 - a support layer comprising a cushioning material disposed between the inner layer of hosiery material and the outer layer of hosiery material, wherein:
 - the support layer is configured to cushion a metatarsal ball region of the foot; and
 - the support layer comprises a plurality of cushions positioned from a lateral side to a medial side, wherein a first cushion of the plurality of cushions covers a smaller surface area relative to a last cushion of the plurality of cushions.
2. The hosiery product of claim 1, wherein the support layer is permanently coupled to the inner layer of hosiery material.
3. The hosiery product of claim 1, wherein the support layer is coupled by
 - at least one coupling means selected from the group consisting of sewing, stitching, knitting, weaving and stamping.
4. The hosiery product of claim 1, wherein the support layer comprises latex foam.
5. The hosiery product of claim 1, wherein the inner layer of hosiery material and the outer layer of reinforced hosiery material comprise at least one material selected from the group consisting of nylon and spandex.
6. The hosiery product of claim 5, further comprising a padding layer located between the support layer and the outer layer of reinforced hosiery material which is configured to support the bottom surface of a wearer's foot.
7. The hosiery product of claim 1, wherein the padding layer is positioned to support the support layer.
8. The hosiery product of claim 1, wherein the hosiery product is selected from the group consisting of a sock, a footie, a knee high and a pantyhose.

9. The hosiery product of claim 8, wherein the sock is selected from the group consisting of a cushion sock and a trouser sock.

10. The hosiery product of claim 1, wherein the support layer of the hosiery product is configured to extend to an extremity of toes of a user.

11. The hosiery product of claim 1, wherein the support layer of the hosiery product is configured to terminate at a bend of toes of a user.

12. The hosiery product of claim 1, wherein the outer layer of hosiery material is reinforced.

13. The hosiery product of claim 1, wherein the plurality of cushions is comprised of at least one material from the group consisting of viscoelastic support gel, macro-gel activated support discs, memory foam, gel memory foam, and latex foam.

14. The hosiery product of claim 1, wherein the plurality of cushions further comprises intervening cushion of the plurality of cushions covering a larger surface area relative to the first cushion of the plurality of cushions and a smaller surface area relative to the last cushion of the plurality of cushions.

15. The hosiery product of claim 1, wherein the support layer is further configured to cushion an arch region and a heel region of the bottom surface of the foot.

16. The hosiery product of claim 1, wherein a border of each cushion of the plurality of cushions overlaps an adjacent border of an adjacent cushion of the plurality of cushions on at least one side of the plurality of cushions.

17. A hosiery product comprising:

- an inner layer of hosiery material configured to cover a bottom surface of a foot and a top surface of the foot;
- an outer layer of hosiery material configured to cover the bottom surface of the foot and the top surface of the foot; and

a support layer comprising a cushioning material disposed between the inner layer of hosiery material and the outer layer of hosiery material, wherein:

- the support layer is configured to cushion a metatarsal ball region of the foot;

- the support layer comprises a plurality of cushions positioned from a lateral side to a medial side, wherein a first cushion of the plurality of cushions covers a smaller surface area relative to a last cushion of the plurality of cushions; and

- a border of each cushion of the plurality of cushions overlaps an adjacent border of an adjacent cushion of the plurality of cushions on at least one side of the plurality of cushions.

18. The hosiery product of claim 17, further comprising a padding layer located between the support layer and the outer layer of hosiery material which is configured to support the bottom surface of a wearer's foot.

19. A hosiery product comprising:

- an inner layer of hosiery material configured to cover a bottom surface of a foot and a top surface of the foot;
- an outer layer of material configured to cover bottom surface of the foot and the top surface of the foot; and
- a padding layer located between the support layer and the outer layer of hosiery material which is configured to support the bottom surface of a wearer's foot.

20. The hosiery product of claim 17, further comprising a support layer comprising a cushioning material disposed

between the inner layer of hosiery material and the outer layer of hosiery material, wherein:

the support layer is configured to cushion a metatarsal ball region of the foot;

the support layer comprises a plurality of cushions positioned from a lateral side to a medial side, wherein a first cushion of the plurality of cushions covers a smaller surface area relative to a last cushion of the plurality of cushions and

a border of each cushion of the plurality of cushions overlaps an adjacent border of an adjacent cushion of the plurality of cushions on at least one side of the plurality of cushions.

* * * * *