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(54) **BALANCE STABILIZING FOOT ORTHOTIC**

(57)

ABSTRACT

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A foot orthotic (10) that more effectively supports and stabilizes a person's foot (14) and improves the person's balance so as to reduce tripping and falling. The orthotic device (10) includes several layers of material that are bonded together to cooperatively provide the optimum amount of support and stabilization for different areas of the wearer's foot (14). The orthotic (10) includes a bottom layer (16) that extends substantially the entire length of the wearer's foot (14) and that is placed over the insole of the wearer's footwear; a top layer (20) that also extends substantially the length of the wearer's foot and that receives and supports the plantar portion of the foot; and an intermediate layer (18) that is bonded between the bottom layer and the top layer. The orthotic (10) is configured to elevate the toes of the wearer and thereby enhance balance stabilization.

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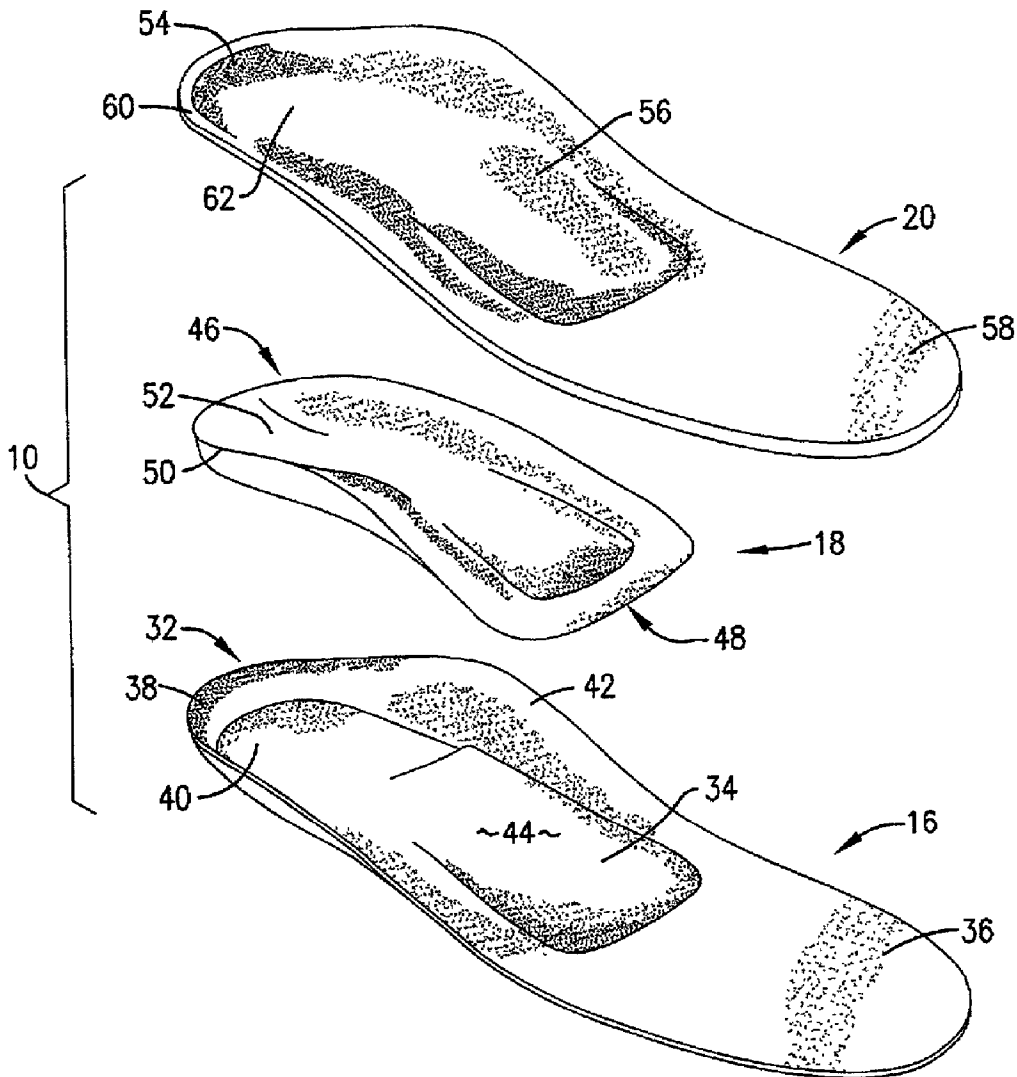
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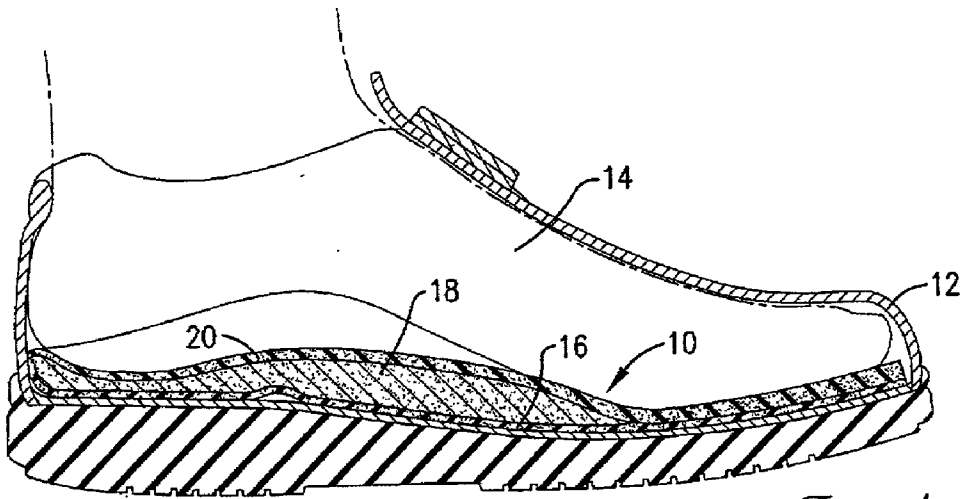


Fig. 1.

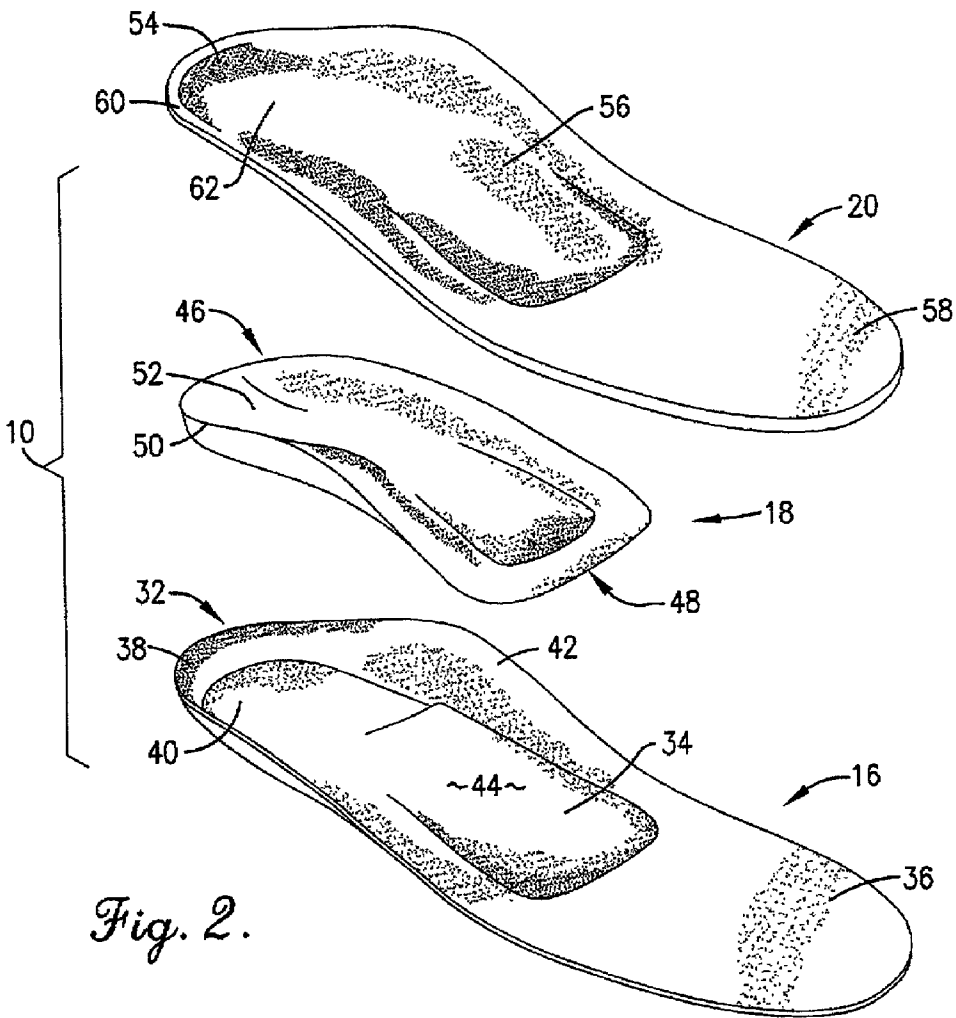


Fig. 2.

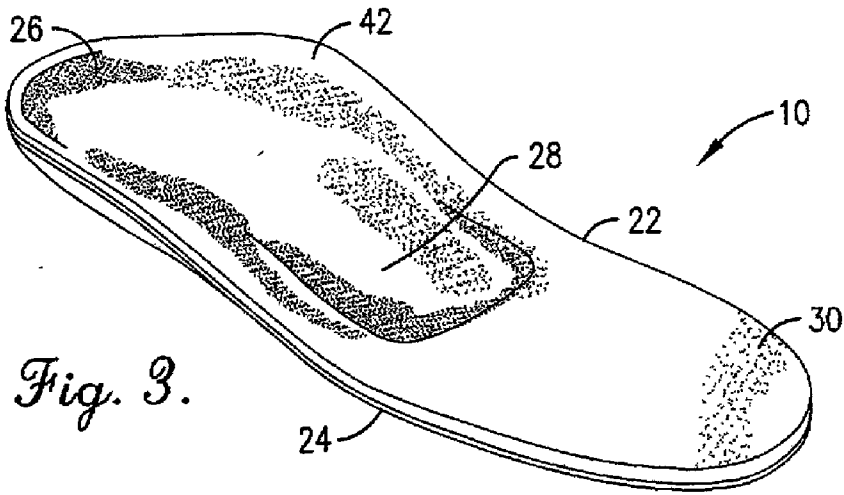


Fig. 3.

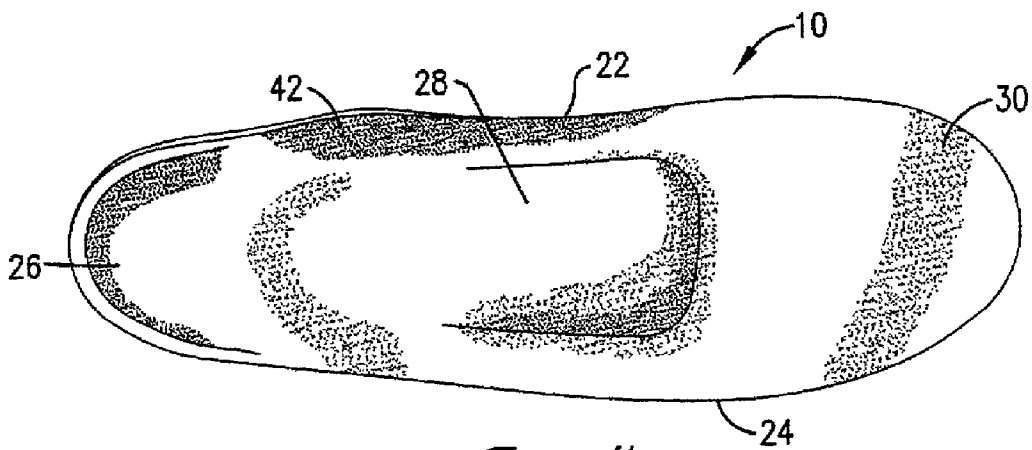


Fig. 4.

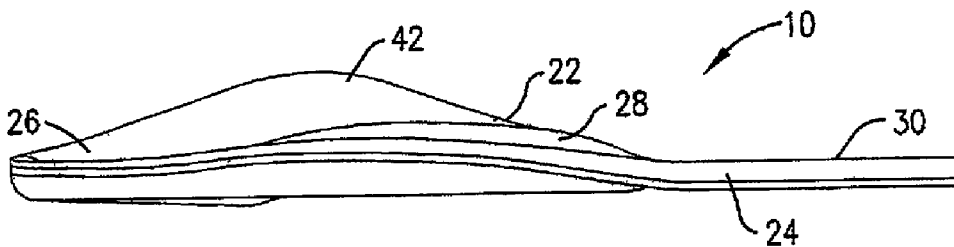


Fig. 5.

BALANCE STABILIZING FOOT ORTHOTIC

BACKGROUND OF INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to foot orthotic devices and related footwear inserts. More particularly, the invention relates to a foot orthotic that more effectively supports and stabilizes a wearer's foot and improves the wearer's balance so as to reduce tripping and falling.

[0003] 2. Description of the Prior Art

[0004] Foot orthotic devices, also sometimes called orthotic shoe inserts or footwear insoles, are commonly placed in shoes and other footwear to support the wearer's feet. Prior art orthotic devices typically consist of a shell that extends all or a portion of the length of a shoe's insole and that is formed or molded to support various portions of the wearer's foot, including the wearer's heel, arch, metatarsal area, and toes. Such orthotics are typically formed of one or more layers of material having a uniform thickness the entire length thereof.

[0005] Because known orthotic devices are typically formed with a uniform thickness, they do not provide enough support for portions of a foot requiring greater orthotic thickness such as the arch and present too much thickness in other areas not requiring as much support such as under the wearer's heel and toes. Some people therefore place a separate arch support under or over an orthotic device to provide additional arch support. Those skilled in the art will appreciate that this practice is undesirable because the arch support and orthotic device interfere with one another, resulting in improper foot support. Moreover, the placement of an arch support over or under a separate orthotic device excessively raises the wearer's foot in his or her shoe, resulting in ill-fitting shoes and associated foot discomfort.

[0006] Another limitation of existing orthotic devices is that they do not improve, and sometimes even impede, the wearer's balance. Many persons, especially the elderly and handicapped, are prone to tripping and falling because their feet are not properly balanced in their footwear. Prior art orthotic devices are not configured for improving or stabilizing a wearer's balance and therefore are ineffective at reducing such tripping and falling.

SUMMARY OF INVENTION

[0007] The present invention solves the above-described problems and provides a distinct advance in the art of orthotic devices. More particularly, the present invention provides a foot orthotic that more effectively supports and stabilizes a person's foot and improves the person's balance so as to reduce tripping and falling.

[0008] One preferred embodiment of the orthotic device includes several layers of material that are bonded together to cooperatively provide the optimum amount of support and stabilization for different areas of a wearer's foot. Specifically, the orthotic includes a bottom layer that extends substantially the entire length of a wearer's foot and that is placed over the insole of the wearer's footwear; a top layer that also extends substantially the length of the wearer's foot and that receives and supports the plantar portion of the foot;

and an intermediate layer that is bonded between the bottom layer and the top layer. The intermediate layer preferably extends only between the wearer's heel and arch and is configured for providing extra support to the wearer's arch and metatarsal foot area. This construction provides the optimum amount of support and stabilization to particular areas of the wearer's foot while maintaining a reduced thickness in areas not requiring as much support and stabilization.

[0009] In accordance with another important aspect of the invention, the top layer includes a frontal portion that gradually increases in thickness toward its frontmost end to slightly elevate the wearer's toes. This has been found to improve the balance of the wearer's foot within the footwear and to therefore reduce tripping and falling associated with poor foot balance.

[0010] These and other important aspects of the present invention are described more fully in the detailed description below.

BRIEF DESCRIPTION OF DRAWINGS FIGURES

[0011] A preferred embodiment of the present invention is described in detail below with reference to the attached drawing figures, wherein:

[0012] **FIG. 1** is a vertical section view of a foot orthotic device constructed in accordance with a preferred embodiment of the present invention shown placed in a shoe and supporting a wearer's foot.

[0013] **FIG. 2** is an exploded view of the foot orthotic device showing the various layers thereof.

[0014] **FIG. 3** is an isometric view of the orthotic device.

[0015] **FIG. 4** is a top plan view of the orthotic device.

[0016] **FIG. 5** is a right side view of the orthotic device.

[0017] The drawing figures do not limit the present invention to the specific embodiments disclosed and described herein. The drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the invention.

DETAILED DESCRIPTION

[0018] Turning now to the drawing figures, a foot orthotic **10** constructed in accordance with a preferred embodiment of the invention is illustrated. As best illustrated in **FIG. 1**, the foot orthotic **10** is configured for insertion inside a shoe **12** or other footwear in a conventional manner for fitting against and supporting the plantar portion of a wearer's foot **14**. The foot orthotic **10** described and illustrated herein is designed for use with a right side foot and shoe. A left foot orthotic, which is substantially a mirror image of the right foot orthotic, may also be provided for placement in a left shoe or footwear. The foot orthotic **10** may be provided in any desired length and width to snugly fit within any sized shoe. The foot orthotic **10** is preferably used in an extra depth shoe designed for elderly and handicapped persons but may also be used with conventional shoes and other types of footwear such as boots, sandals and slippers. Most preferably, the shoe **12** is a rocker sole shoe. One suitable type of

rocker sole shoe is sold under the designation "GENTLE STEP" by Darco International, Inc. of Huntington, W. Va.

[0019] Referring to FIG. 2, the foot orthotic 10 broadly includes a bottom layer 16, an intermediate layer 18, and a top layer 20 that are bonded together to form a unitary orthotic. As best illustrated in FIGS. 3 and 4, the assembled orthotic device 10 presents inner and outer lateral sides 22, 24 that substantially align with the inner and outer sides of the wearer's foot; a rear end portion 26 for supporting the wearer's heel; an intermediate portion 28 for supporting the wearer's arch and metatarsal area; and a front end portion 30 for supporting a front portion of the wearer's foot.

[0020] The bottom layer 16 is preferably formed of a compressible, skid-resistant material such as polyurethane, neoprene rubber, or other similar suitable material. The bottom layer 16 is preferably die-cut from a stock of this material and has a uniform thickness along the entire length thereof of approximately $\frac{1}{32}$ inches to $\frac{5}{32}$ inches, with a preferred thickness of $\frac{3}{32}$ inches.

[0021] As best illustrated in FIG. 2, the bottom layer 16 presents a rear end portion 32, an intermediate portion 34, and a front end portion 36 that are together approximately the same length and width as the plantar portion of the wearer's foot 14. An upwardly arcuate flange 38 is formed at the periphery of the rear end portion 32 to form a cup-like seat 40 for receiving and supporting the intermediate layer 18 as described below. The flange 38 increases in width and extends outwardly along a back portion of the inner lateral side 22 of the orthotic to form an arch extension 42 for better supporting the wearer's arch. The intermediate section 34 of the bottom layer 16 presents a slightly raised area 44 for supporting the bottom surface of the intermediate layer 18.

[0022] The intermediate layer 18 is bonded to the top of the bottom layer 16 with a solvent adhesive or other glue material as best illustrated in FIG. 1. The intermediate layer 18 is sized and shaped to provide extra arch support to the wearer's foot 14 and is preferably formed of a material that is more rigid than the material in the bottom layer 16 and the top layer 20 such as styrene, butodene rubber (cork), or other similar suitable material. The material is preferably heated then formed or molded into the desired shape.

[0023] As best illustrated in FIG. 2, the intermediate layer presents a rear end portion 46 and a front end portion 48. The rear end portion 46 has an upwardly-extending arcuate flange 50 formed along its periphery to form a cup-like seat 52 for supporting the wearer's heel. As with the bottom layer 16, the flange 50 on the intermediate layer 18 increases in width and extends outwardly along the inner lateral side 22 of the orthotic to cooperate in the formation of the arch extension 42. The thickness of the rear end portion 46 of the intermediate layer 18 is approximately $\frac{1}{4}$ inch at the flange 50, reduces to approximately $\frac{1}{8}$ inch in the cup-like seat 52, and then increases again to approximately $\frac{1}{4}$ inch at the intersection with the front end portion 48.

[0024] The front end portion 48 of the intermediate layer 18 supports the wearer's arch and metatarsal area. The center thickness of the front end portion 48 gradually increases forward of the cup-like seat 52 and then gradually tapers back down toward its frontmost edge. The thickness of the intermediate layer 18 also gradually tapers toward the inner and outer lateral sides 22, 24 of the orthotic.

[0025] The top layer 20 is bonded to both the intermediate layer 18 and the bottom layer 16 as best illustrated in FIG. 1 and is preferably die-cut from a stock of compressible, conformable material such as plastazote polyurethane foam. This material conforms to the plantar portion of the wearer's foot 14 so as to better support and stabilize the wearer's foot and to also reduce the overall thickness of the foot orthotic after it has been worn.

[0026] As best illustrated in FIG. 2, the top layer 20 presents a rear end portion 54, an intermediate portion 56, and a front end portion 58. As with the bottom and intermediate layers 16, 18, an upwardly arcuate flange 60 is formed at the periphery of the top layer rear end portion 54 to form a cup-like seat 62 for supporting the wearer's heel. The flange 60 increases in width and extends outwardly along the inner lateral side 22 of the orthotic 10 to cooperate in forming the arch extension 42.

[0027] The intermediate portion 56 of the top layer 20 receives and supports the wearer's arch and metatarsal area, whereas the front end portion 58 receives and supports the front of the wearer's arch and toes. The top layer 20 preferably has a uniform thickness of approximately $\frac{1}{16}$ to $\frac{1}{4}$ inch, with a preferred thickness of $\frac{1}{8}$ inch, along the entire length of its rear end portion 54 and intermediate portion 56. The thickness of the front end portion 58 gradually increases beginning at the intersection with the intermediate portion 56 so that the frontmost edge of the front end portion is approximately $\frac{1}{8}$ inch thicker than its rearmost edge. As best illustrated in FIG. 1, this slightly elevates the wearer's toes to improve the balance of the wearer's foot in his or her shoe. It has been discovered that improving foot balance reduces tripping and falling, especially with the elderly and handicapped.

[0028] In use, the foot orthotic 10 is placed inside the shoe 12 or other footwear as illustrated in FIG. 1 so that the bottom surface of the foot orthotic 10 fits snugly over the insole of the shoe 12. It is noted that the insole of the shoe 12 may also be removable, although a fixed, nonremovable insole is entirely within the ambit of the present invention. A wearer may then place his or her foot 14 in the shoe in a conventional manner. As the wearer begins to apply his or her weight on the foot orthotic 10, the top layer 20 conforms to the contours of the plantar portion of the wearer's foot 14. As described above, this provides increased foot support and stabilization and slightly decreases the overall thickness of the foot orthotic 10 so that it does not excessively raise the wearer's foot 14 within the shoe 12.

[0029] Because the foot orthotic includes an integral intermediate layer 18 that provides extra arch support, the wearer is not required to place a separate arch support in their footwear. Moreover, because the front end portion 30 of the orthotic 10 slightly raises the wearer's toes, the wearer is less prone to tripping or falling as described above.

[0030] Although the invention has been described with reference to the preferred embodiment illustrated in the attached drawing figures, it is noted that equivalents may be employed and substitutions made herein without departing from the scope of the invention as recited in the claims. For example, although the bottom layer 16, intermediate layer 18, and top layer 20 of the orthotic device 10 have been described as being formed of particular materials, other suitable materials may also be used without departing from the scope of the present invention.

[0031] Having thus described the preferred embodiment of the invention, what is claimed as new and desired to be protected by Letters Patent includes the following:

1. A foot orthotic for placement in a shoe or other footwear for supporting and stabilizing a wearer's foot, the foot orthotic comprising:

- a bottom layer configured to extend substantially the entire length of the wearer's foot;
- a top layer configured to extend substantially the entire length of the wearer's foot; and

an intermediate layer bonded between the bottom layer and the top layer and configured to extend between the wearer's heel and arch for supporting the arch and metatarsal area of the wearer's foot.

2. The foot orthotic as set forth in claim 1, wherein the bottom layer is formed of polyurethane material having a uniform thickness along the entire length thereof.

3. The foot orthotic as set forth in claim 2, the bottom layer having a thickness of approximately $\frac{3}{32}$ inches.

4. The foot orthotic as set forth in claim 1, wherein the intermediate layer is formed of styrene butodene rubber material.

5. The foot orthotic as set forth in claim 4, wherein the intermediate layer includes a rear, concave cup-like seat for supporting and stabilizing the wearer's heel and a front convex arch support configured to support and stabilize the wearer's arch.

6. The foot orthotic as set forth in claim 5, wherein the rear, concave cup-like seat has a minimum thickness of $\frac{1}{8}$ inch and the front convex arch support has a maximum thickness of $\frac{3}{8}$ inch.

7. The foot orthotic as set forth in claim 1, wherein the top layer is formed of plastazote polyethylene foam material.

8. The foot orthotic as set forth in claim 7, wherein the top layer includes a frontal portion configured to elevate the wearer's toes.

9. The foot orthotic as set forth in claim 8, wherein the top layer is configured to compress and conform to and therefore better support and stabilize the wearer's foot.

10. The foot orthotic as set forth in claim 1, the bottom layer, the top layer, and the intermediate layer cooperatively defining an arch extension configured to extend under and support the wearer's arch.

11. A foot orthotic for placement in a shoe or other footwear for supporting and stabilizing a wearer's foot, the orthotic comprising:

inner and outer lateral sides that substantially align with inner and outer sides of the wearer's foot;

a rear end portion for supporting the wearer's heel;

an intermediate portion for supporting the wearer's arch and metatarsal area; and

a front end portion for supporting a front portion of the wearer's foot, the front portion being configured to elevate the wearer's toes to improve the wearer's balance and reduce tripping and falling.

12. The foot orthotic as set forth in claim 11, wherein the foot orthotic is formed of a bottom layer, a top layer and an intermediate layer bonded together.

13. The foot orthotic as set forth in claim 12, wherein the bottom layer is formed of polyurethane material having a uniform thickness along the entire length thereof.

14. The foot orthotic as set forth in claim 12, wherein the intermediate layer is formed of styrene butodene rubber material.

15. The foot orthotic as set forth in claim 12, wherein the top layer is formed of plastazote polyethylene foam material.

16. The foot orthotic as set forth in claim 12, wherein the top layer includes a frontal portion configured to elevate the wearer's toes.

17. The foot orthotic as set forth in claim 8, wherein the top layer is configured to compress and conform to and therefore better support and stabilize the wearer's foot.

18. A foot orthotic for placement in a shoe or other footwear for supporting and stabilizing a wearer's foot, the foot orthotic comprising:

a bottom layer configured to extend substantially the entire length of the wearer's foot, wherein the bottom layer is formed of polyurethane material having a uniform thickness along the entire length thereof;

a top layer configured to extend substantially the entire length of the wearer's foot, wherein the top layer is formed of plastazote polyethylene foam material and includes a frontal portion configured to elevate the wearer's toes; and

an intermediate layer bonded between the bottom layer and the top layer and configured to extend between the wearer's heel and arch for supporting the arch and metatarsal area of the wearer's foot, wherein the intermediate layer is formed of styrene butodene rubber material.

19. The foot orthotic as set forth in claim 18, wherein the top layer is configured to compress and conform to and therefore better support and stabilize the wearer's foot.

20. The foot orthotic as set forth in claim 18, the bottom layer, the top layer, and the intermediate layer cooperatively defining an arch extension configured to extend under and support the wearer's arch.

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