US 20120317841A1

(19) **United States**

(12) **Patent Application Publication**

Taylor et al.

(10) **Pub. No.: US 2012/0317841 A1**

(43) **Pub. Date: Dec. 20, 2012**

(54) **ATHLETIC PERFORMANCE SHOES**

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(21) Appl. No.: **13/525,055**

(22) Filed: **Jun. 15, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/497,351, filed on Jun. 15, 2011.

Publication Classification

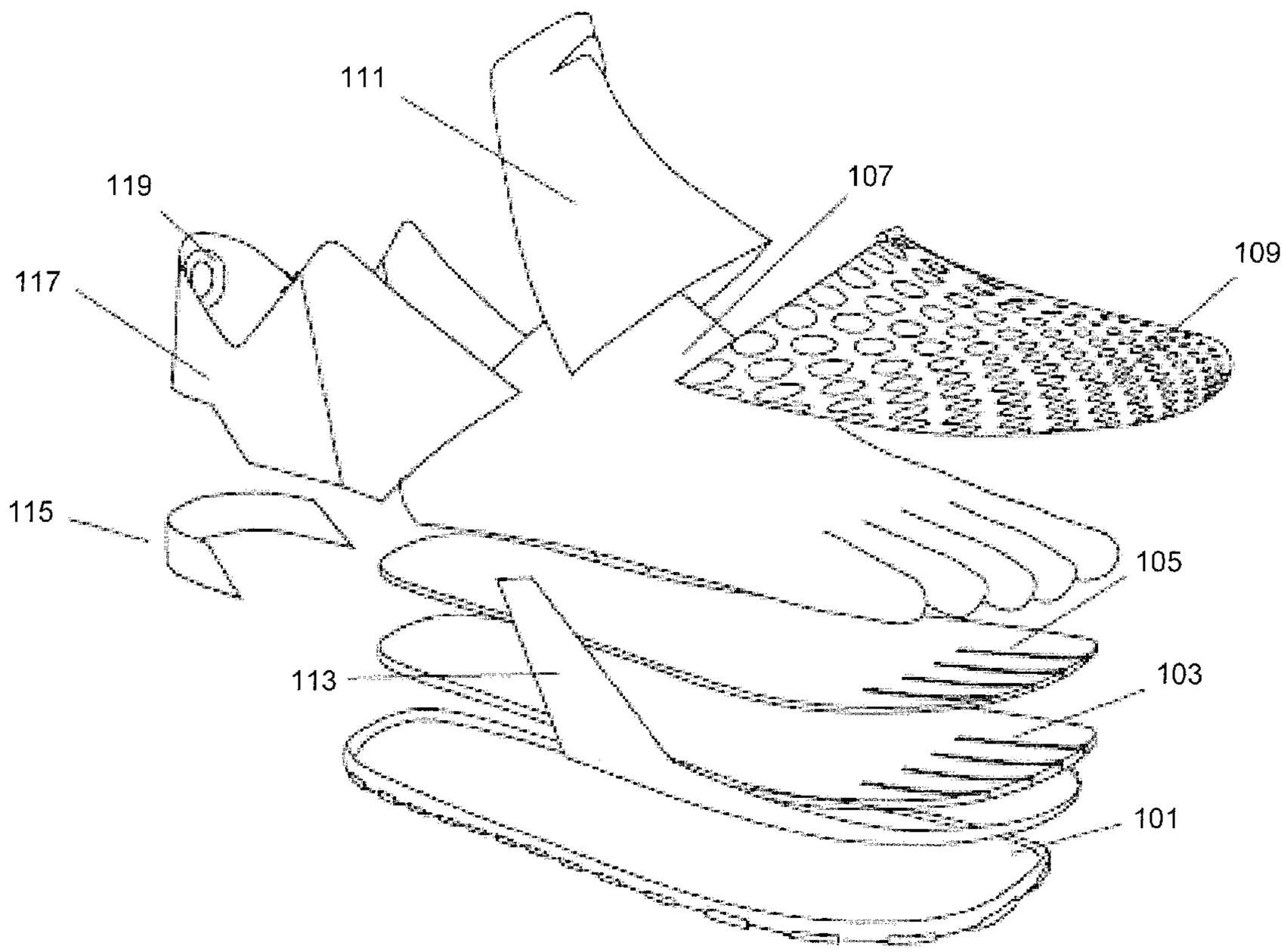
(51) **Int. Cl.**

A43B 5/00	(2006.01)
A43B 13/14	(2006.01)

(52) **U.S. Cl.** **36/103**

(57) **ABSTRACT**

An athletic shoe includes an outsole, a midsole, an insole, a bootie, a cage surrounding the upper front of the bootie, a tongue, a quarter, a heel counter and wings. The bootie can have one, two, three, four or five individual toe sections which allow the toes of the foot to move independently. The bootie may be removable or adhesively attached to the midsole and the innersole. Both the midsole and the innersole can have slots cut between the toe portions which further allows for independent movement of the toes. The cage and outsole surround the front toe portions of the bootie, insole and midsole. The cage and outsole prevent all large particles from falling between the toes. The individual toe sections in the inventive shoe increase natural foot movement, haptic response and improve stability/balance, footstrike biomechanics and foot strength.



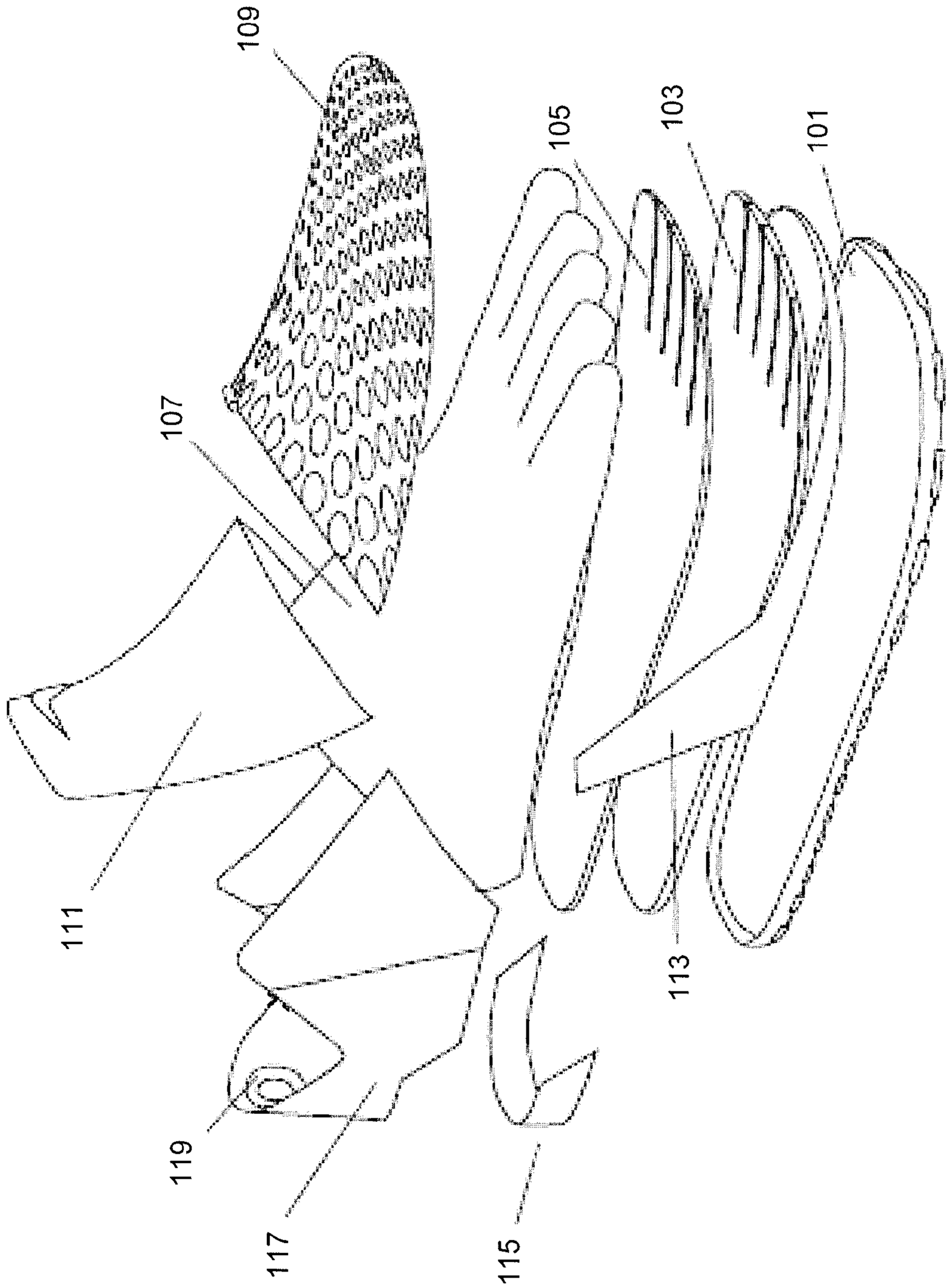


FIG. 1

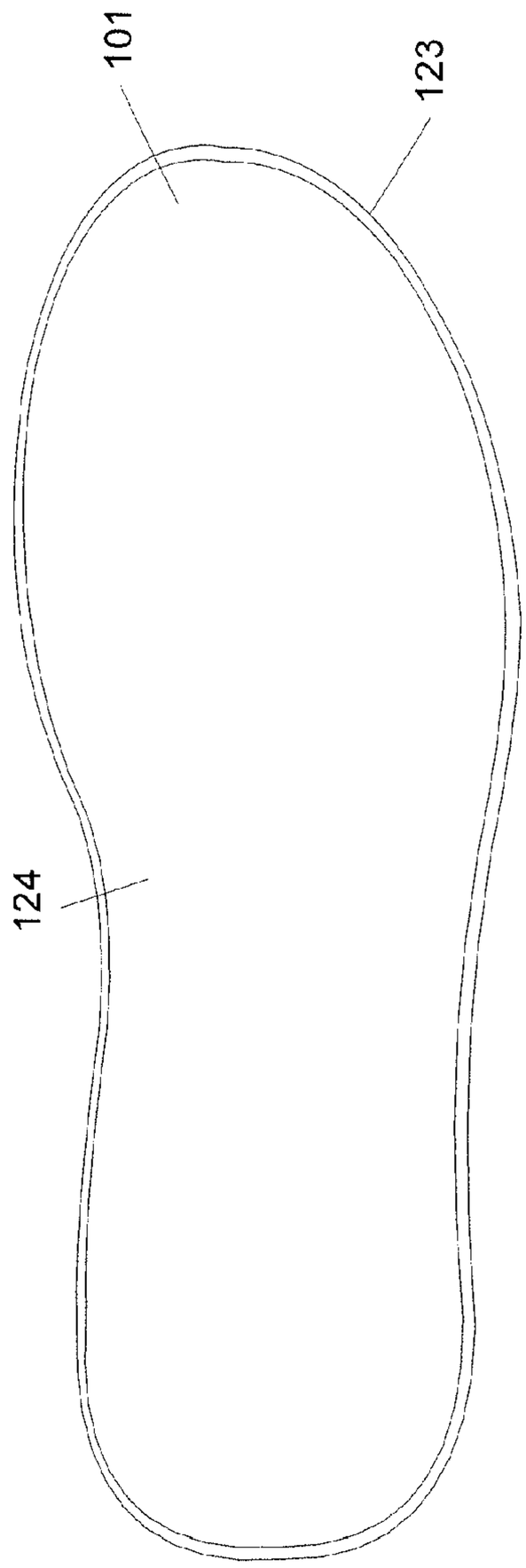


FIG. 2

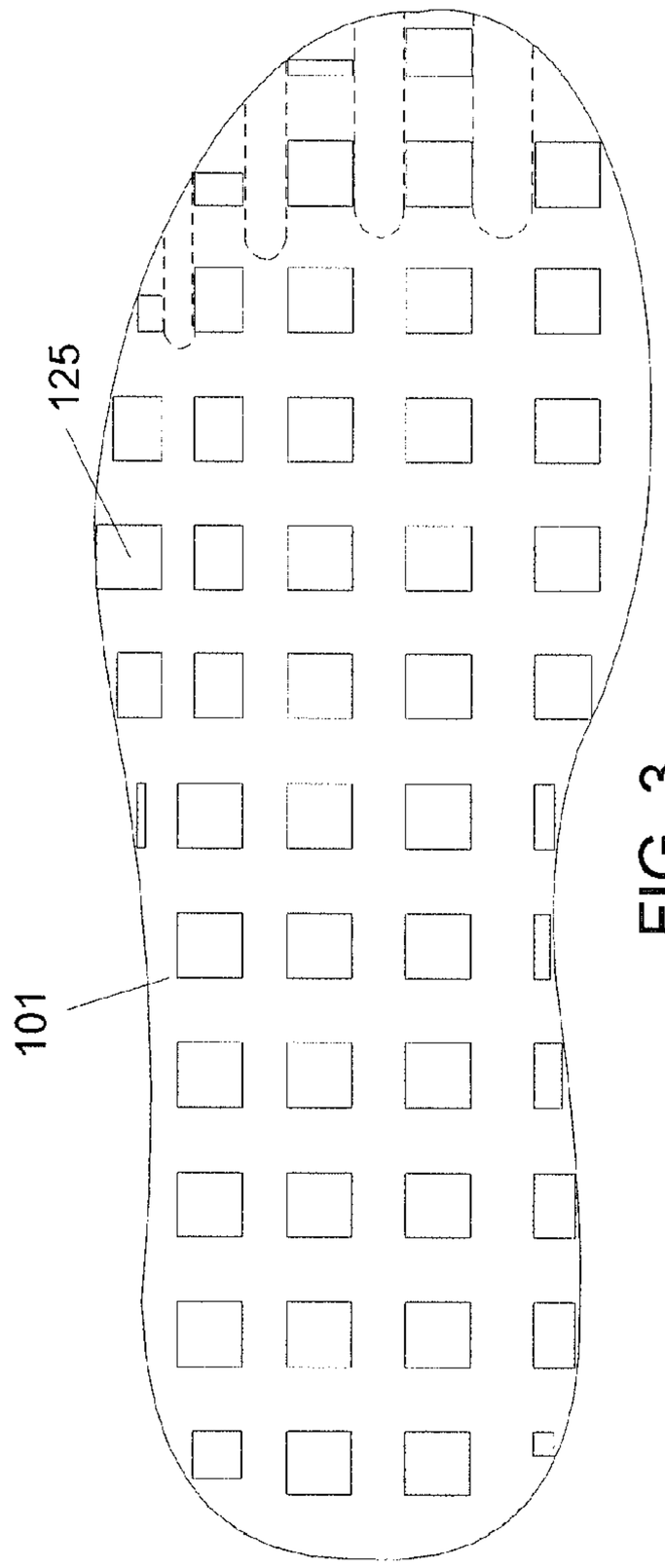


FIG. 3

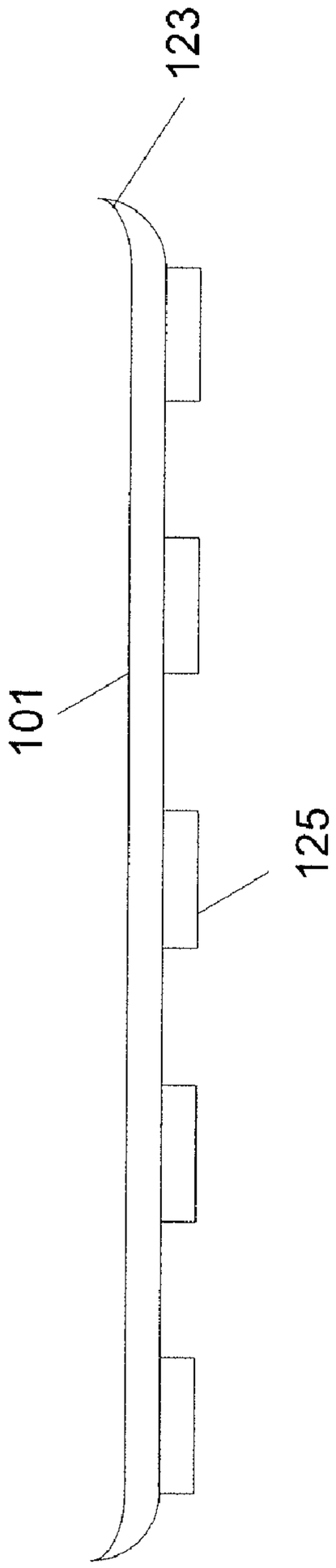


FIG. 4

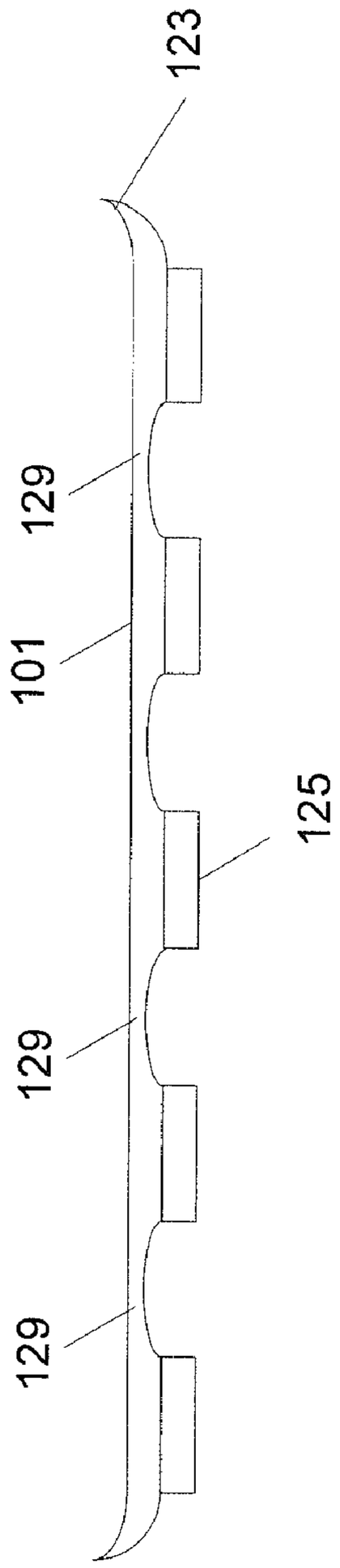


FIG. 5

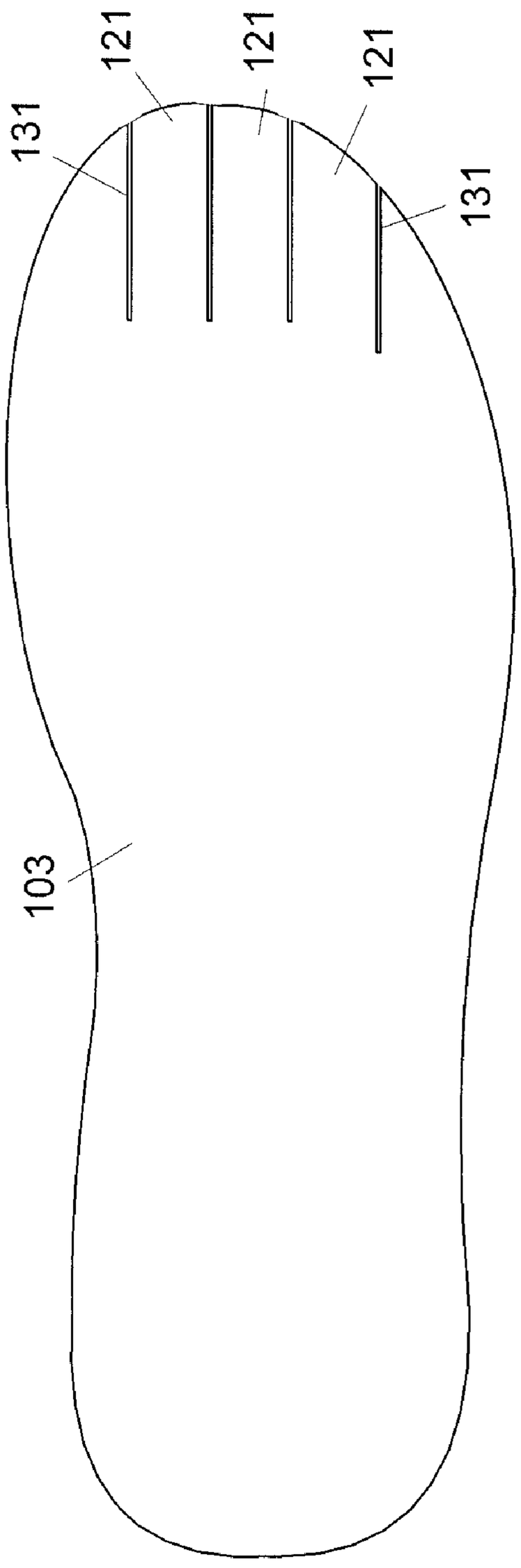


FIG. 6



FIG. 7

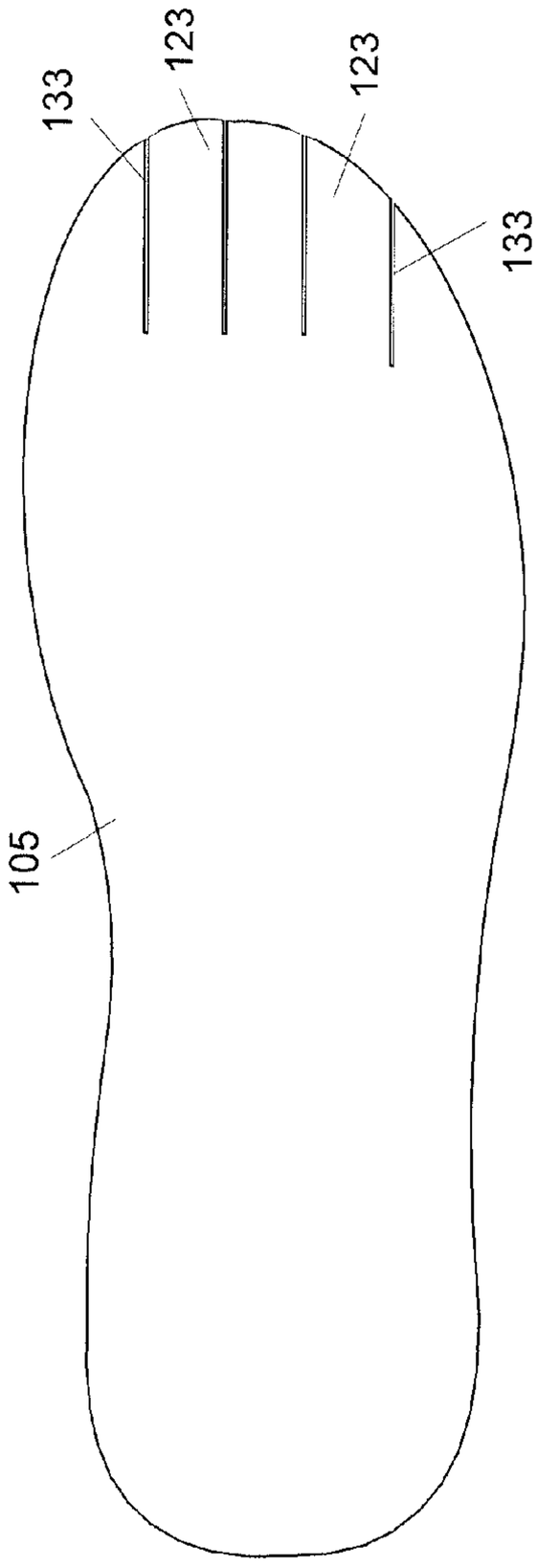


FIG. 8

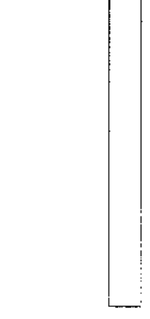


FIG. 9

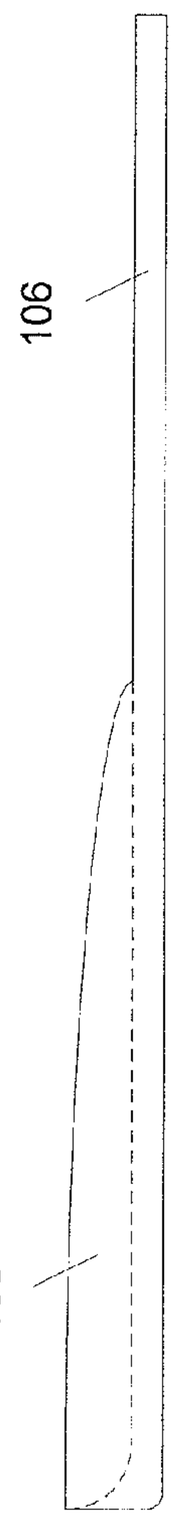


FIG. 10

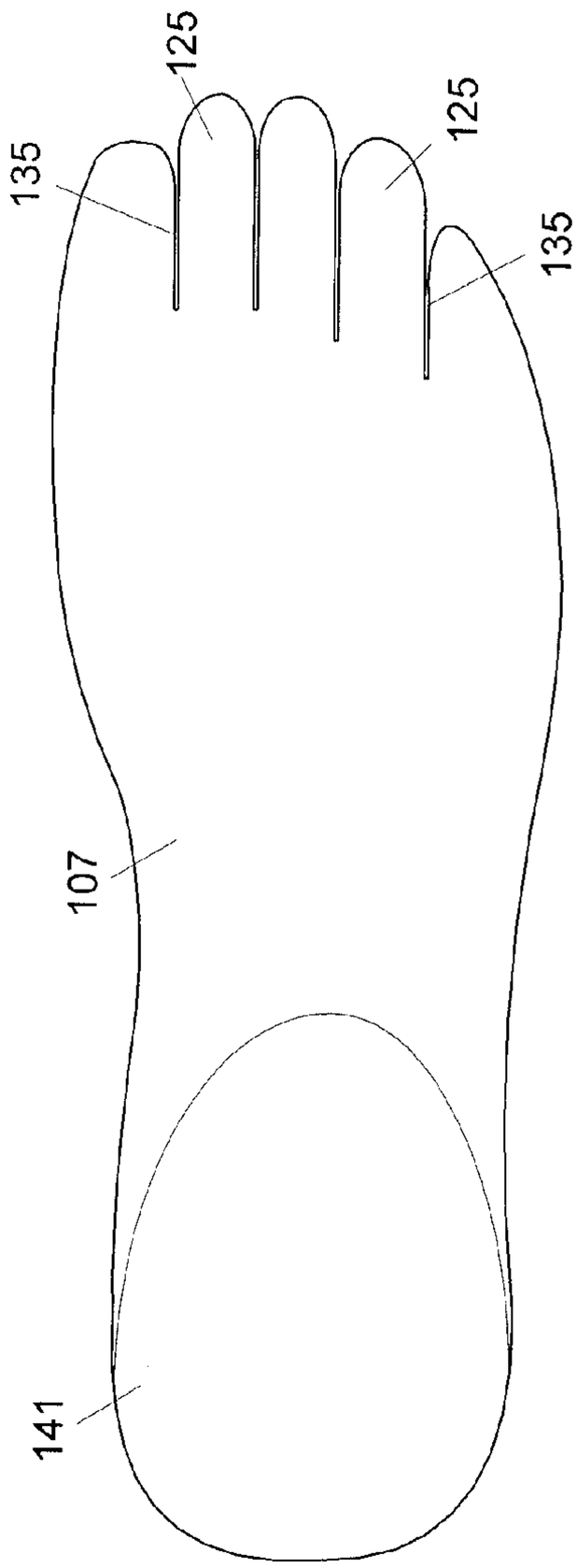


FIG. 11

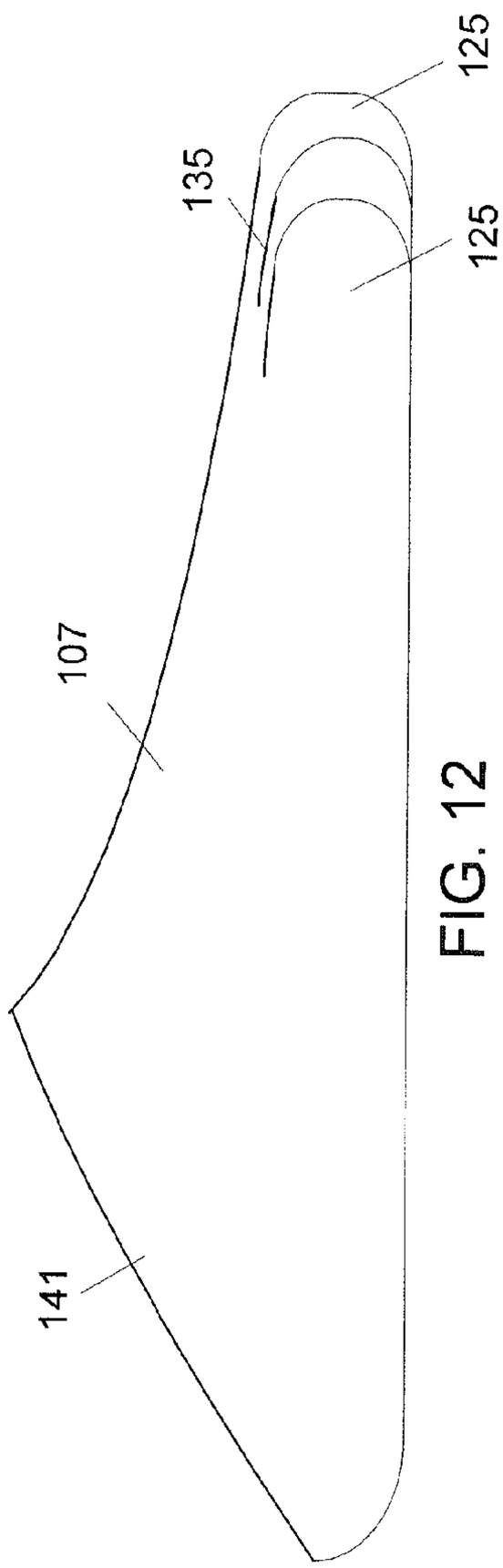


FIG. 12

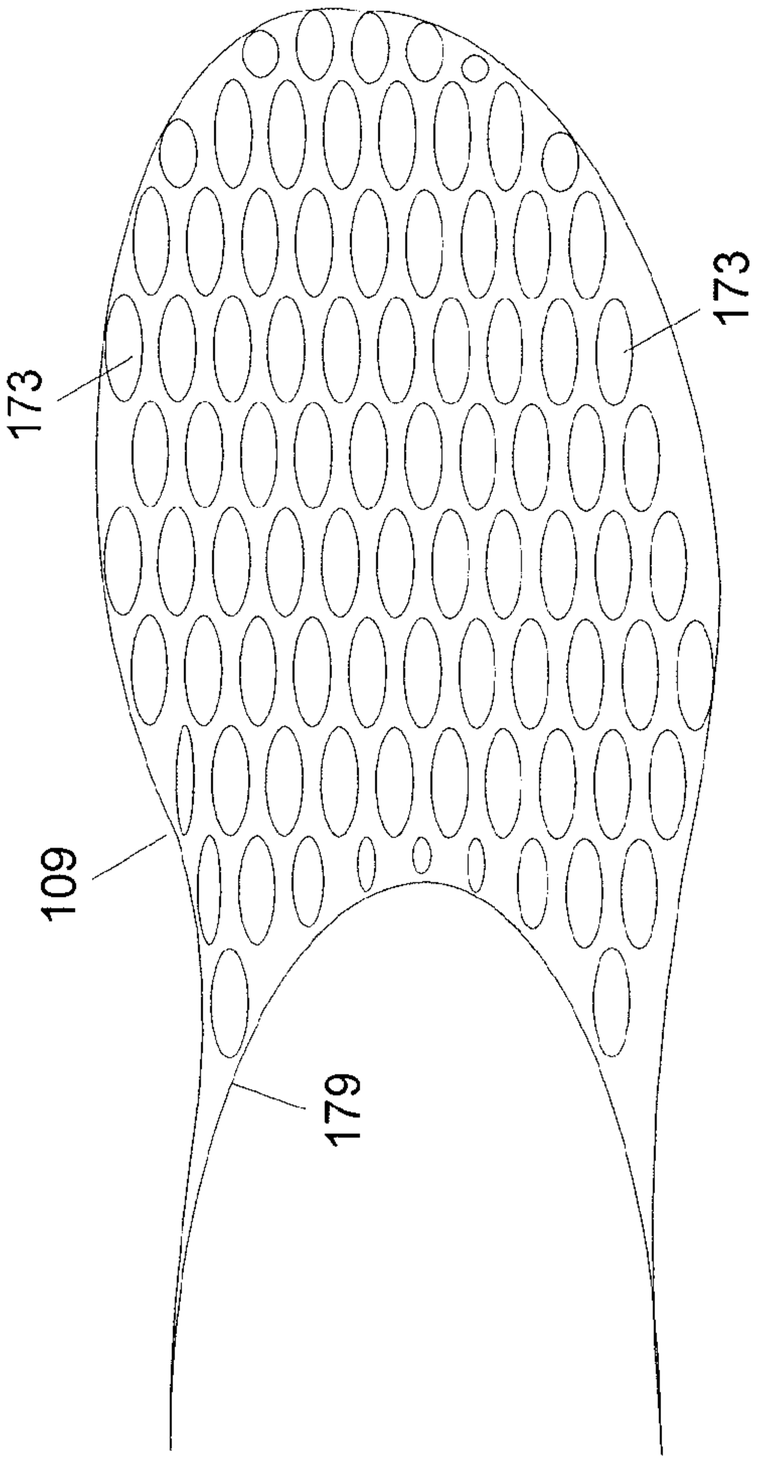


FIG. 13

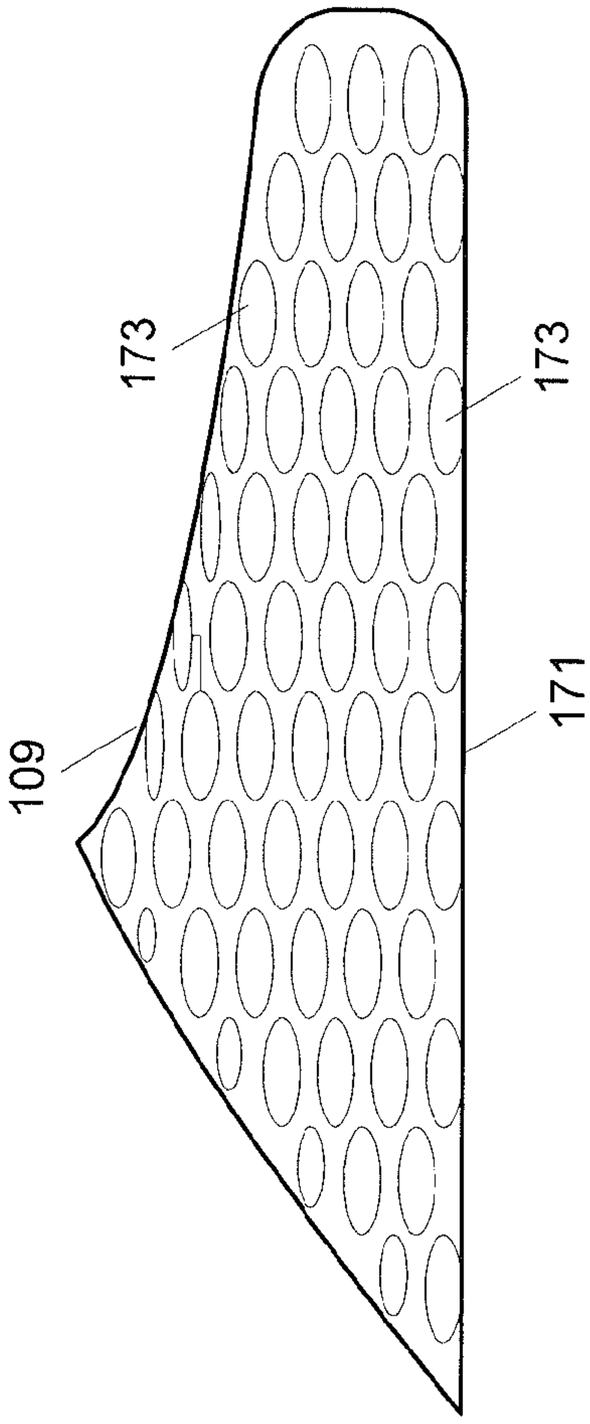


FIG. 14

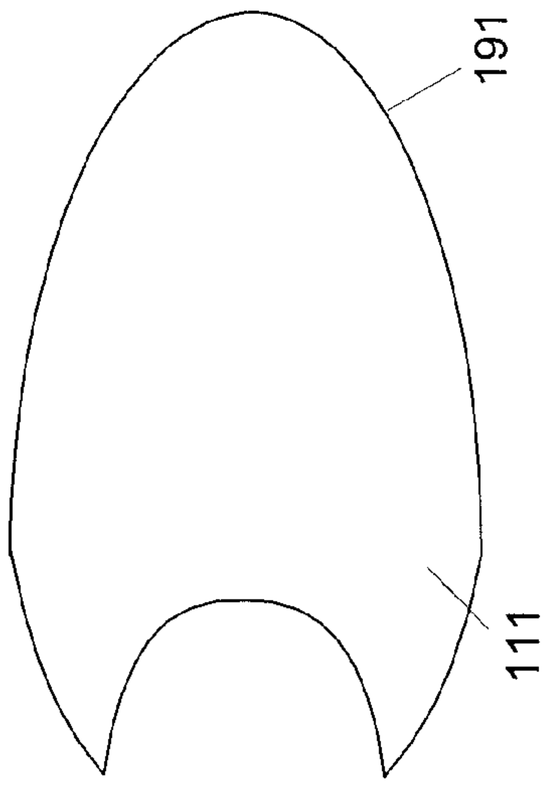


FIG. 5

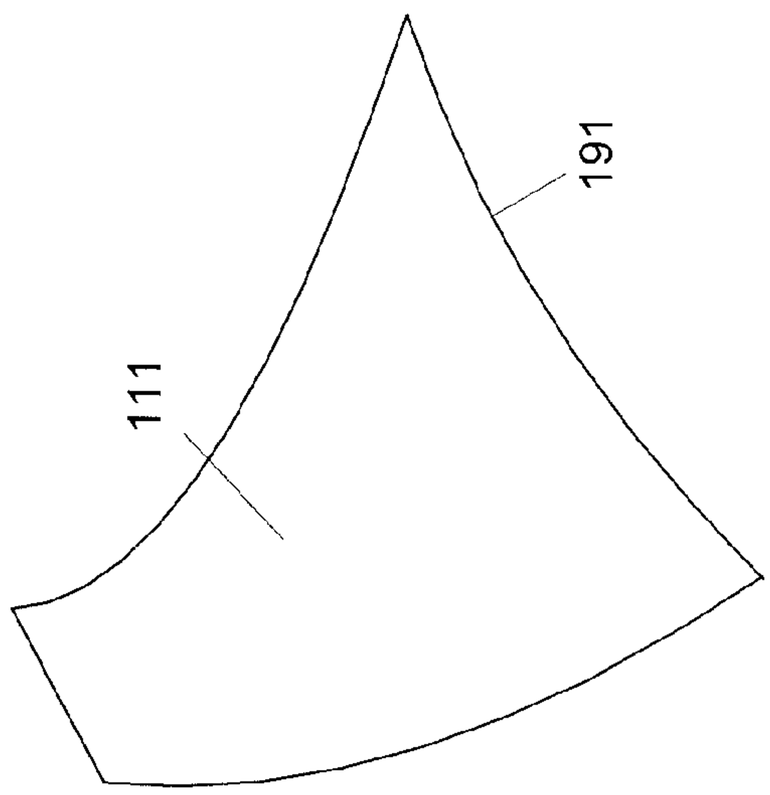


FIG. 6

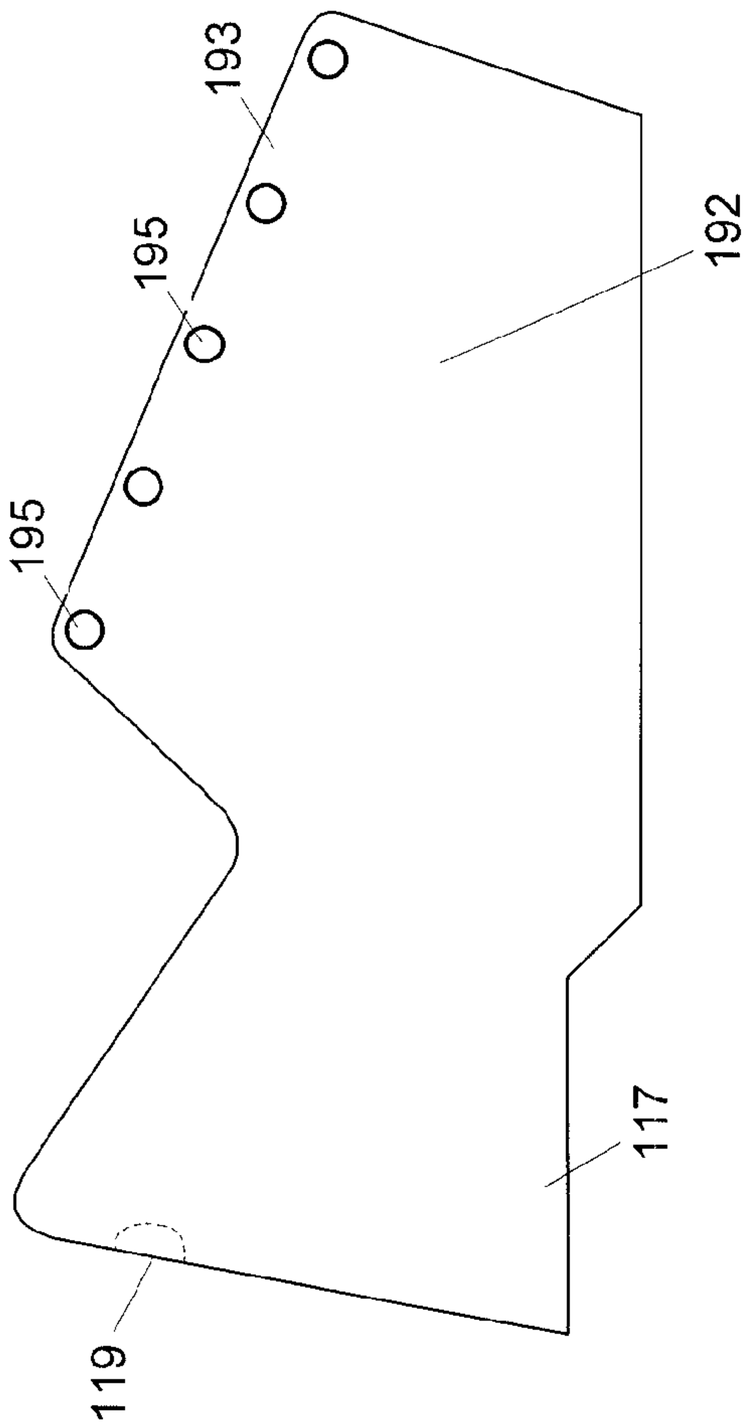


FIG. 17

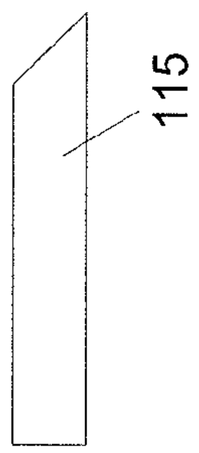


FIG. 18

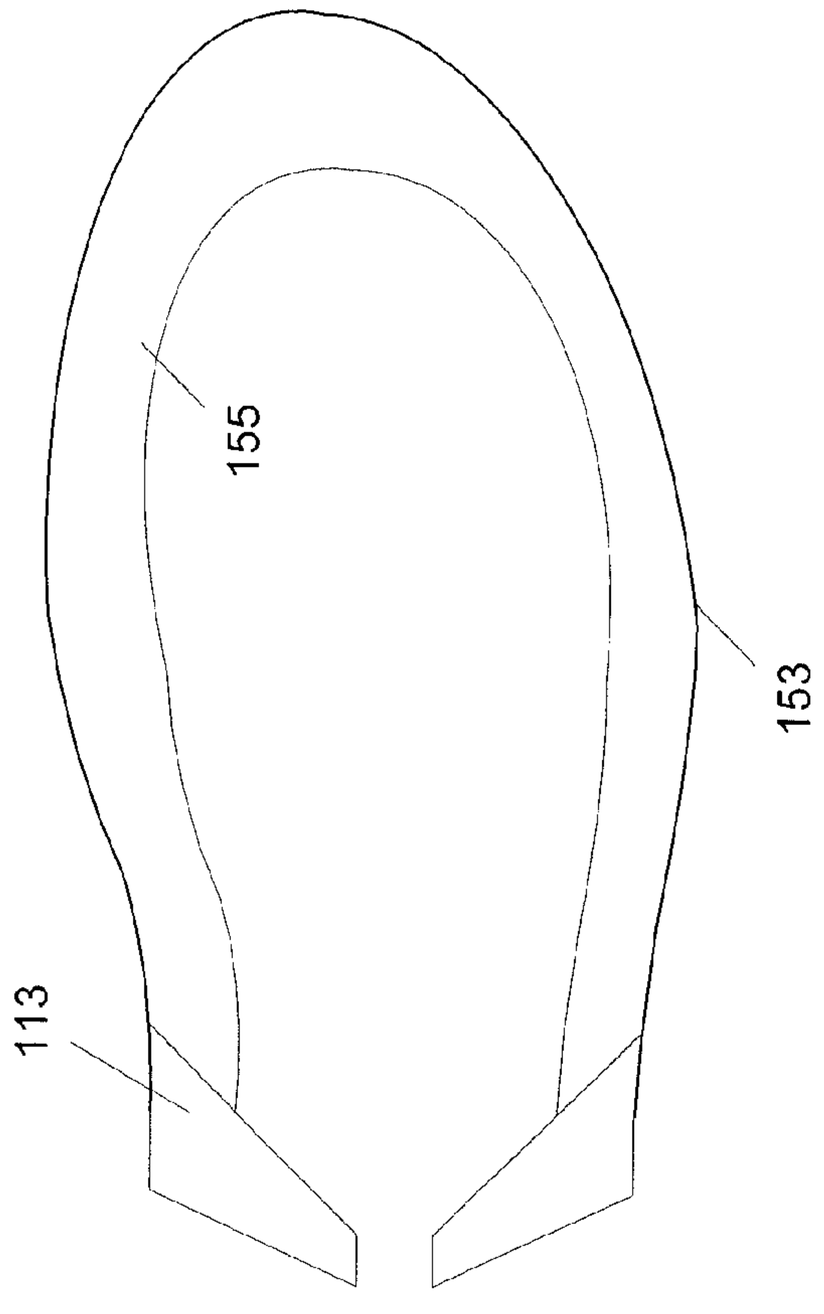


FIG. 19

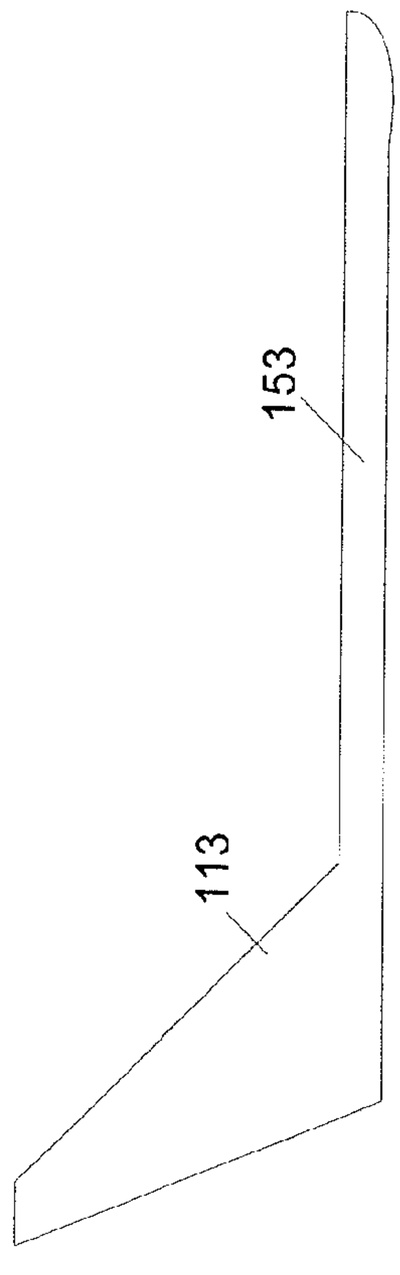


FIG. 20

ATHLETIC PERFORMANCE SHOES

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/497,351, "Athletic Performance Shoe" filed Jun. 15, 2011 which is hereby incorporated by reference.

BACKGROUND

[0002] Starting in the 1950's the rise of consumer-level physical fitness in the United States can be mapped out in overlapping waves. Initially, post-war physical fitness evolved around body-building. In the mid 70's, there was a rise in running and jogging as a popular activity choice for fitness. As the running market matured, a wide range of running-specific footwear product offerings appeared—tailored to specific types of running and built around different body types. The running footwear market expanded into a multi-billion dollar industry. In the late 1980's and early 1990's, a similar increase in popularity occurred with basketball. As basketball as a consumer level fitness activity increased, the market for basketball footwear also grew. Prior to this period, a few basketball specific shoes were available. However, after this rise in popularity, a wide range of basketball footwear became available. Again, the new basketball footwear products were tailored to specific types of players and built around different body types. With each new wave of fitness adoption in the United States, companies develop and produce new footwear to meet the demands of the growing fitness trends.

[0003] A current exercise trend is fitness training through specialized workout programming including: plyometrics, speed training, agility training, strength training, flexibility training, etc. These highly specialized training programs are a shift from previous modes of improving physiological performance which include weight-lifting and running. In the professional, collegiate, and highly competitive high school athletic programs, this shift to "multi-training" has been adopted wide-scale across all sports. There has also been a huge rise in adoption of consumer level "multi-training" programming in the United States with training programs such as CrossFit, P90X, etc. In order to meet these new fitness programs, what is needed is appropriate footwear to maximize this new "multi-training" fitness based upon athletic training and sports performance programs with different bio-mechanical needs to achieve physiological improvements in people.

SUMMARY OF THE INVENTION

[0004] The present invention is directed towards an athletic shoe which can have various components including: an outsole, a midsole, an insole, a bootie, a cage, a tongue, a quarter, a heel counter and wings. The construction of the athletic shoe can include bonding the bootie to the insole, bonding the insole to the midsole and bonding the midsole to the outsole. A cage can surround and protect the front toe portion of the bootie from debris and particles. A tongue can be attached to the cage and the bootie. The heel portion of the bootie can be surrounded by the quarter and the heel counter. The heel portion can include an upper which covers the middle portion of the bootie and a vamp which has shoelace eyelets. The components can be assembled with cement, sewing, thermal bonding and other suitable construction methods.

[0005] The bootie can have one, two, three, four or five individual toes. Each bootie toe can completely surround each toe so that the bootie fits like a glove on the foot with slots that separate the toes. The bootie toes allow the user's toes to move independently without rubbing in direct physical contact against each other. This also aids in the separation of the toes for added functional improvement. The bootie is adhesively attached to the midsole and the innersole. Alternatively, the booties may be removable or releasably attached. Both the midsole and the innersole can have slots cut between each of the toe portions which allow each toe portion to move and bend independently without causing movement of the other toe sections. These slots further increase the independent movement of the toes. The cage and outsole surround the front toe portions of the bootie, insole and midsole and prevent all large particles from getting between the toes which can cause irritation or injury to the foot. The cage and outsole can also be elastic and flexible so the bootie with individual toe sections can move freely. In an embodiment, the outsole may not have full articulation of the toes so that the movement of individual toe sections is more limited. The inventive shoe allows for natural foot movement, increased haptic response, increased balance, increased stability and agility. This improvement in foot movement freedom while wearing the shoe leads to improvement in foot movement biomechanics in a wide range of different sports resulting in increased foot strength.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** illustrates an exploded view of an embodiment of the athletic shoe;

[0007] FIG. **2** illustrates a top view of the outsole;

[0008] FIG. **3** illustrates a bottom view of the outsole;

[0009] FIGS. **4** and **5** illustrate cross section views of the outsole;

[0010] FIG. **6** illustrates a top view of the midsole;

[0011] FIG. **7** illustrates a side view of the midsole;

[0012] FIG. **8** illustrates a top view of the insole;

[0013] FIGS. **9** and **10** illustrate side views of embodiments of the insole;

[0014] FIG. **11** illustrates a top view of the bootie;

[0015] FIG. **12** illustrates a side view of the bootie;

[0016] FIG. **13** illustrates a top view of the cage;

[0017] FIG. **14** illustrates a side view of the cage;

[0018] FIG. **15** illustrates a top view of the tongue;

[0019] FIG. **16** illustrates a side view of the tongue;

[0020] FIG. **17** illustrates a side view of the quarter;

[0021] FIG. **18** illustrates a side view of the heel counter;

[0022] FIG. **19** illustrates a side view of the wing; and

[0023] FIG. **20** illustrates a top view of the wing.

DETAILED DESCRIPTION

[0024] There is a growing adoption of "barefoot style" footwear primarily in running and outdoor sporting goods markets. The barefoot movement stems from a Stanford University track coach who advocated for his track athletes to train in bare feet because this would strengthen the athlete's feet. Bare foot style running shoes seek to be as minimal as possible. These minimalist designs allow the foot to more closely mimic the natural motion and to allow the foot to more aptly utilize all the muscles, tendons, and stabilizers present in the foot. This improves strength, balance, stability, and reactiveness of the athlete's feet. The feet being the founda-

tion of a wide range of athletic movements, they are critical components to overall body health including knees, legs, back, posture, et cetera.

[0025] The inventive athletic footwear utilizes the principles of the bare foot movement in running, but adapt them to the specific requirements that athletes need for the athletic training and sports performance industry. The inventive athletic shoe will be providing footwear specifically designed for athletic training and sports performance activities including speed/agility training, strength training, plyometrics, endurance, basketball, football, baseball, etc. Current market offerings for specialized barefoot-style training and sports performance footwear are limited with the majority of companies' product lines offering bulky footwear that is ill-suited for modern training and sports performance needs. The inventive athletic shoe athletic training and sports performance footwear will work alongside the natural bio-mechanics of the foot, emphasizing and reinforcing the existing physiological movements of the body to increase the strength, balance, stability, and reactivity of the feet. By wearing the inventive shoes, athletes can improve their physical performance and health.

[0026] With reference to FIG. **1**, an exploded view of an embodiment of the inventive athletic shoe is illustrated. The illustrated athletic shoe **100** can include an outsole **101**, a midsole **103**, an insole **105**, an bootie **107**, a cage **109**, a tongue **111**, an over lay **113**, a heel counter **115**, and a quarter panel. Different embodiments of the athletic shoe **100** may include some or all of these components. Each of the illustrated athletic shoe **100** components will be described in detail.

[0027] FIG. **2** illustrates a top view of an embodiment of the outsole **101**. The perimeter of the upper outsole **101** can also have a raised edge **123** which provides some protection around the perimeter of the lower portion of the foot as well as the fronts of the toes. The inner portion of the upper outsole **101** within the perimeter of the raised edge **123** and can be contoured to the general shape of a human foot. Different sized outsoles **101** can be produced for different sized feet. For example, U.S. men's shoes can range greatly in size. However, shoes made in sizes 6-15 in ½ size increments may fit most men. The upper portion of the outsole **101** can be contoured to be generally concave in cross section and can include a raised arch area **124** which may have a convex surface.

[0028] FIG. **3** illustrates a bottom view of an embodiment of the outsole **101**. The lower surface of the outsole **101** can have a tread which provides traction on various surfaces such as dirt trails, grass, artificial turf, asphalt, concrete, courts, fields and other common sports surfaces. The specific texture of the tread can depend upon the application that the athletic shoe is designed for use with. For example, a shoe **100** made for dirt trails and other similar activities can have an aggressively textured tread **125** with many deep protrusions extending downward from the outsole **101** which can be arranged in grip strips. In contrast, an athletic shoe **100** that is made for smooth surfaces such as yoga studios or basketball courts can have a tread surface that has a more uniform surface for more contact area to prevent sliding on a smooth floor. The tread may also be made of a material which will not leave scuff marks on the floor.

[0029] The outsole **101** of the inventive athletic shoe **100** can be made of rubber such as thermoplastic elastomers (TPE) or thermoplastic rubbers. TPE are a class of copolymers or a physical mix of polymers which consist of materials with both thermoplastic and elastomeric properties. In an embodiment, the outsole **101** can be formed by injection molding or compression molding. In some embodiments, the outsole **101** can be made of a combination of multiple elastomeric materials. For example, the outsole **101** can have a harder lower tread **125** surface and a softer more shock absorptive upper section to provide some foot cushioning while running. This added material may be used at the heel section of the outsole **101**. As ornamental features, the outsole **101** can be made out of semi-transparent rubber.

[0030] FIG. **4** illustrates a cross sectional view across a width of an embodiment of the outsole **101**. The tread **125** can extend from the lower surface of the outsole and the upper portion can be smooth. As discussed, the inventive athletic shoe **100** can be designed to allow for natural bio-mechanics of the foot. Thus, the outsole **101** should be very flexible so the foot wearing the athletic shoe **100** can move in any manner, i.e., it can bend/flex in multiple or all directions. In particular, the toe sections of the athletic shoe **100** should be able to move independently. With reference to FIG. **5** a cross sectional view across a width at the toe portion of the outsole **101** is illustrated. In this embodiment, the flexibility of the toe portion of the outsole **101** can be increased by reducing the thickness of the outsole **101** at regions **129** between the individual toe sections. Since there is less material the outsole **101** is more flexible between the individual toe sections and the toes are able to move more independently and freely. In other words, in an embodiment the thickness and type of the material may dictate the flexibility of the toe sections. The toe sections of the outsole may have restricted movement—they have added flex, but do not fully articulate.

[0031] With reference to FIG. **6** a top view of an embodiment of the midsole **103** is illustrated. The midsole **103** can be can be made from a layer of elastic (EVA FOAM) material and the lower surface of the midsole **103** can be bonded to the outsole **101**. As shown in FIG. **6**, the midsole **103** can include five individual midsole toe sections **121** that are separated by slots **131** which allow each of the midsole toe sections **121** to articulate in a vertical motion independently. In other embodiments, the midsole **103** can have one, two, three, four or five individual midsole toe sections **121**. The perimeter of the midsole **103** can be roughly the shape of the foot. FIG. **7** illustrates a side view of the embodiment of the midsole **103** which can be substantially flat. The midsole **103** can be made of a flexible elastomer material such as Ethylene vinyl acetate (EVA) which is a copolymer comprising ethylene and vinyl acetate. The weight percent vinyl acetate usually varies from 10 to 40%, with the remainder of the material being ethylene. EVA is also known as expanded rubber or foam rubber. Because of the elastic properties, the EVA midsole **103** can provide additional shock absorption to the foot.

[0032] The athletic shoe **100** can also have an insole **105**. With reference to FIG. **8**, a top view of an embodiment of the insole **105** is illustrated. As shown in FIG. **8**, the insole **105** can also have five individual insole toe sections **123** that are separated by slots **133** which allow each of the midsole toe sections **123** to articulate in a vertical motion independently. In an embodiment, the number, size, shape, location and placement of the slots may vary. For example, the insole **105** can have one, two, three, four or five individual insole toe sections **123**.

[0033] With reference to FIGS. **9** and **10**, side views of embodiments of different insoles **105** are illustrated. FIG. **9**

illustrates a flat insole **105** design. In contrast, FIG. **10** illustrates an insole **106** having a heel section **108** that can include a concave cup shaped surface that corresponds to the spherical shape of the human heel which can provide additional support to the foot. In different embodiments, flat insoles **105** or contoured insoles **106** can be used with the shoe

[0034] With reference to FIGS. **11** and **12**, top and side views of an embodiment of the bootie **107** are illustrated. As shown in FIGS. **11** and **12**, the bootie **107** may include five individual toes **125**. In other embodiments, the bootie **107** may include one, two, three or four individual toes **125**. The toes of the bootie **107** can completely surround each of the toes so that the bootie **107** fits like a glove and the toes **125** are separated by slots **135**. The bootie **107** can be made of an elastic material that stretches to conform to the shape and movement of the user's foot. The bootie can be made of a porous material that can breathe to allow the ambient air circulation around the foot. The bootie **107** can fit over most of the foot including the toes, mid section, the heel, and ankle. The bootie **107** can also have an ankle opening **141** which can be angled down towards the heel section to create a wider opening for the foot to pass through. In an embodiment, the bootie **107** may have a shape similar to a sock that extends up to the ankle as opposed to being angled down at the heel. The bottom of the bootie can be bonded to the insole with an adhesive or any other suitable flexible bonding mechanism. Alternatively, the bootie can be removable for washing and cleaning.

[0035] An embodiment of the cage **109** is illustrated in FIGS. **13** and **14**. The cage **109** can surround the front portion of the bootie **107** and the bottom portion **1.71** can be coupled to the outsole **101**. In contrast to the bootie **107**, insole **105** and midsole **103**, the cage **109** may cover all of the toes with a uniform cover rather than having individual toe sections. The cage **109** can be made of a thermoplastic elastomer (TPE), synthetic material, leather, or textile which can stretch to conform to the outer surface and movement of the feet. The cage **109** can also include holes **173** which provide ventilation to the bootie **107** and the foot. The holes **173** also increase the flexibility of the cage **109**. In the illustrated embodiment, the holes **173** are oval in shape. In other embodiments, the holes in the cage **109** can be any other shape and size (or nor be included). In an embodiment, a breathable and flexible material layer **179** can be attached to the inner or outer surface of the cage **109** to allow air to circulate through the holes **173** but prevent larger particles or debris from traveling through the cage **109**.

[0036] Because the cage **109** is very flexible and may stretch, the individual toe portions of the bootie **107**, insole **105** and midsole **103** can move freely and independently. To further increase independent movement, the cage **109** may not be bonded to the bootie **107**. In an embodiment, the bootie **107** can be printed with a graphical design. Although this ornamental design is covered by the cage **109**, the design may be visible through the holes **173**. The cage **109** may also be made of a transparent or translucent material which would allow the graphical design on the bootie **107** to be visible.

[0037] With reference to FIGS. **15** and **16**, an embodiment of the tongue **111** is illustrated. The tongue **111** can be a thin and flexible padded structure which has a front edge **191** that is attached to the rear edge of the cage **109** and an inner portion of the tongue can be attached to the upper ankle opening of the bootie. The tongue **111** can be made of leather, synthetic leather, synthetic material, micromesh, textile or any other suitable material. The tongue **111** is attached to the cage, but could also be attached to the front edge of the quarter panel, but not the bootie. In one instance of the shoe, the tongue and quarter panel are connected as one unit such that the tongue is not separate.

[0038] A side view of an embodiment of the quarter panel **117** is illustrated in FIG. **17**. The quarter panel **117** wraps around the heel portion and extends to the upper **192** and vamp **193** over the midsection of the athletic shoe. The upper **192** and vamp **193** can extend over the tongue. The upper **192** and vamp **193** can be made of synthetic leather and may have an inner surface of tricot mesh or any other suitable material.

[0039] A plurality of eyelets **195** can be cut hole or alternatively, the eyelets **195** can be plastic or metal structures that are attached to the vamp **193**. Shoe laces can be threaded through the eyelets **195** to secure the shoe to the user's foot. The lower edge of the quarter panel **117** can be secured to the heel counter and the outsole. In an embodiment, the quarter panel **117** does not need to wrap all the way around the heel. The shape of the quarter panel **117** may vary with different models and/or styles. In an embodiment, the eyelets **195** can be located on the inside edge of the quarter panel **117** so as to not be seen from outside of the shoe.

[0040] The quarter panel **117** can be made of synthetic leather or any other suitable material and may be perforated to provide some ventilation. The inner surfaces of the quarter panel **117** can have a liner which prevents abrasion with the user's heel. In an embodiment, the liner can be made of nylon, polyester, or any other suitable liner fabric material. The inner heel portion of the quarter panel **117** can also include a grip **119** which can be made of a material which can grip the heel of the user's foot to prevent sliding of the quarter panel **117** while the user is wearing the athletic shoe. The shape of the quarter panel **117** at the heel helps to prevent the user's heel from sliding up and down.

[0041] The quarter **117** can be attached to a heel counter **115** illustrated in FIG. **18**. With reference to FIG. **18**, the heel counter **115** is a structural component that wraps around the base of the heel portion of the shoe which can cradle the heel and arch of the foot and increase foot support. The heel counter **115** can be made of a flexible plastic or textile material. The amount of support provided by the shoe can vary depending upon the size and stiffness of the heel counter. A larger heel counter **115** made of a stiffer plastic can provide more heel support than a smaller heel counter **115** made of a more flexible material.

[0042] The quarter **117** can also be attached to a wing **113** illustrated in FIG. **19**. The upper portions of the wing **113** can be attached to both sides of the quarter **117** and the lower portions of the wing **113** can include an outer edge **153** and an inner edge **155**. The outer edge **153** can extend around the front sides of the shoe. The inner edge **155** can extend inward from the outer edge **153** and be adhesively attached to shoe between the outsole **101** and the midsole **103**. The wing **113** can help to hold the foot to the outsole when the quarter **117** is tightened around the foot. The wing **113** can be made of synthetic leather or any other suitable material.

[0043] The quarter **117**, wing **113** and heel counter **115** can be designed for specific body movement. If the shoe is intended to be used for a significant amount of side to side movement such as tennis, soccer, basketball or football, the uppers and vamp sections of the quarter **117** and the wing **113** can be very high strength to support high working loads. In contrast, if the shoes are made for high speed sports, such as

running, gymnastics or boxing, the shoes may need to be as light and flexible as possible. Since the high strength may not be necessary, the quarter **117** and wing **113** can be made of much lighter materials resulting in a minimalist shoe having super-flexible midsole, a thin high-traction outsole, minimal uppers and an ultra-lightweight design. The leather/textile uppers size/shape/location/placement will vary with each model/style—they won't each have all of these components. In an embodiment, the materials and placement of the uppers may be selected and designed to allow added movement and/or flexibility or added support, depending on the requirements for a particular sport or activity.

[0044] As discussed, the internal bootie **117** has individually articulating toes **125**. The internal bootie **117** can be adhesively attached to the midsole **103** and the outsole **101** with strobel and cement. The internal bootie **117** can also be removable. This design allows individual articulation of the toes. Although there are slots **135** between the toes **125** of the bootie **117**, the upper side of the entire toe section of the bootie **117** is enclosed by the cage **109** and the lower side is protected by the outsole **101**. This construction ensures that no foreign objects can enter the toe box or lodge in between the toes of the bootie **117**.

[0045] The individually articulating toe sections provide 125 haptic responses that traditional footwear is unable to offer. The majority of running and cross-training footwear are designed around impact protection and long term injury prevention. However, in actuality, the additional layers of cushioning decrease the efficiency of the natural bio-mechanics of the foot resulting in the non-use and immobilization of some muscles in the foot and leg. This can cause some foot and leg muscles to atrophy from non-use or immobilization. Traditional shoes can also cause poor or inefficient foot strike strides. For example, a prior traditional shoe can promote a heel strike stride by adding thick shock absorptive material to the heel of the shoe. In contrast, the inventive shoe will promote the better and more efficient midfoot strike stride where the ball of the foot strikes the ground first.

[0046] In contrast to traditional shoes, the internal bootie **107** with individual toe sections **125** in the inventive shoe allow for natural movement, increased haptic response, increased stability and agility, as well as improved footstrike biomechanics and foot strength. This improvement of the feet movement while wearing the shoe leads to overall athletic improvement in a range of sports including: baseball, soccer, football, basketball, gymnastics, martial arts, tennis, hockey, boxing, et cetera. The integral bootie **107** with individually articulating toes **125** can also be combined with various different designs for outsoles, midsoles, quarter panels, heel counters and wings based upon specific athletic training or sports performance arenas.

[0047] It will be understood that the inventive system has been described with reference to particular embodiments, however additions, deletions and changes could be made to these embodiments without departing from the scope of the inventive system. Although the order filling apparatus and method have been described include various components, it is well understood that these components and the described configuration can be modified and rearranged in various other configurations.

What is claimed is:

1. An athletic shoe comprising:
an outsole having a lower tread surface;
an inner bootie adjacent to the insole, the inner bootie having a heel section at a back end of the athletic shoe and at least one bootie toe sections that are independently movable;
a cage coupled to the insole layer and surrounding an upper side of the inner sock at the front end of the athletic shoe, the cage not having individual toe sections;
a tongue coupled to a back portion of the flexible cage and the bootie; and
a quarter coupled to the outsole and partially surrounding a heel portion of the athletic shoe.

2. The athletic shoe of claim **1** further comprising:
an insole layer having at least one insole toe section, the at least one insole toe section being adhesively bonded to the at least one bootie toe section.

3. The athletic shoe of claim **2** further comprising:
a midsole layer bonded to the outsole, the midsole layer having at least one midsole toe section adhesively bonded to the at least one insole toe section.

4. The athletic shoe of claim **1** wherein the bootie is removable.

5. The athletic shoe of claim **1** further comprising:
an overlay wing that includes an inner edge adhesively secured between the outsole.

6. The athletic shoe of claim **1** wherein the outsole includes flexible sections below and adjacent to the at least one bootie toe section.

7. The athletic shoe of claim **1** wherein the flexible sections of the outsole are thinner than sections of the outsole below and under the at least one bootie toe section.

8. The athletic shoe of claim **1** further comprising:
a shoe lace threaded through eyelets formed in the quarter.

9. The athletic shoe of claim **1** wherein the quarter includes a grip for preventing sliding between the quarter and a foot wearing the athletic shoe.

10. The athletic shoe of claim **1** wherein the cage has a plurality of holes which allow air to flow through the cage.

11. An athletic shoe comprising:
an outsole having a lower tread surface;
an inner bootie adjacent to the insole, the inner bootie having a heel section at a back end of the athletic shoe and at least one bootie toe section;
a cage coupled to the insole layer and surrounding an upper side of the inner sock at the front end of the athletic shoe, the cage not having individual toe sections; and
a quarter coupled to the outsole and partially surrounding a heel portion of the athletic shoe;
wherein the at least one bootie toe section is surrounded by the cage and the outsole and the at least one bootie toe section is independently movable.

12. The athletic shoe of claim **11** further comprising:
an insole layer having at least one insole toe section, the at least one insole toe section being adhesively bonded to the at least one bootie toe section.

13. The athletic shoe of claim **12** further comprising:
a midsole layer bonded to the outsole, the midsole layer having at least one midsole toe section adhesively bonded to the at least one insole toe section.

14. The athletic shoe of claim **11** wherein the bootie is removable.

15. The athletic shoe of claim **11** further comprising:

an overlay wing that includes an inner edge adhesively secured between the outsole.

16. The athletic shoe of claim **11** wherein the outsole includes flexible sections below and adjacent to the at least one bootie toe section.

17. The athletic shoe of claim **15** wherein the flexible sections of the outsole are thinner than sections of the outsole below and under each of the bootie toe sections.

18. The athletic shoe of claim **11** further comprising:

a shoe lace threaded through eyelets formed in the quarter.

19. The athletic shoe of claim **11** wherein the quarter includes a grip for preventing sliding between the quarter and a foot wearing the athletic shoe.

20. The athletic shoe of claim **11** wherein the cage has a plurality of holes which allow air to flow through the cage.

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