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(54) **MAGNETIC SHOE INSERT SYSTEM**

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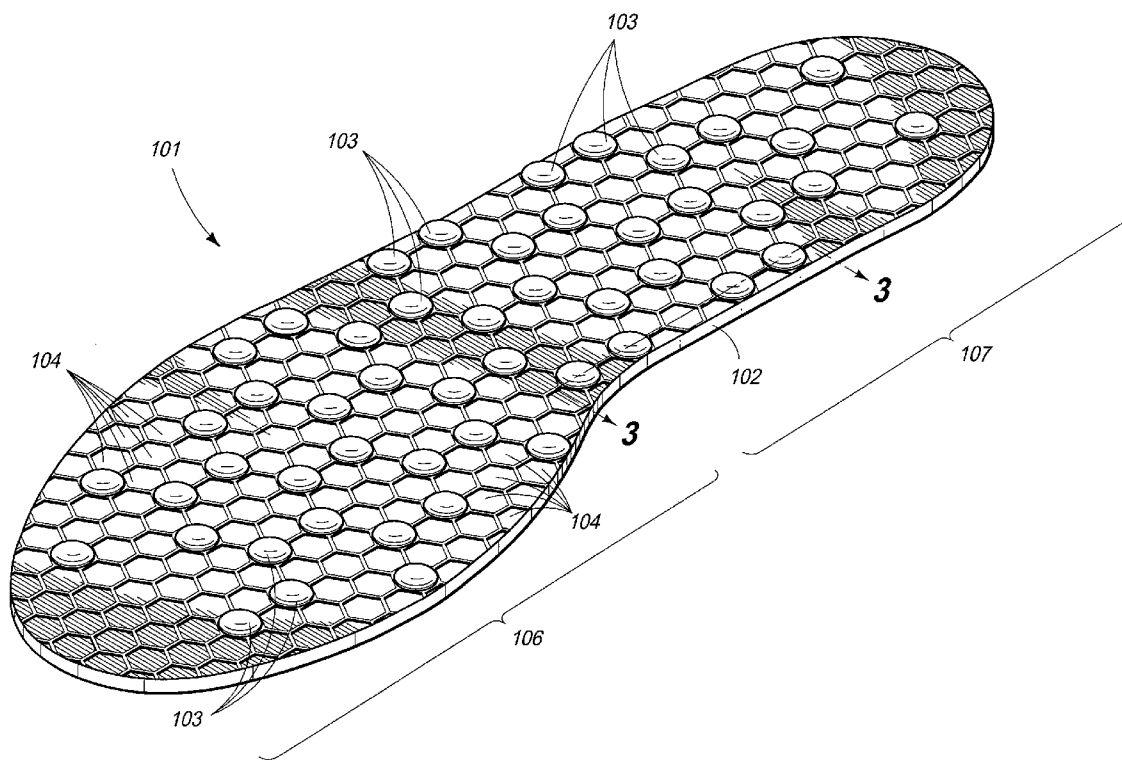
(57) **ABSTRACT**

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This invention includes embodiments which disclose a magnetic sole insert system wherein there are a plurality of magnets embedded within a shoe insert base and wherein the angle of the magnetic axis of each of the plurality of magnets to other magnets in the plurality of magnets is random in both two and in three dimensions.

**Publication Classification**

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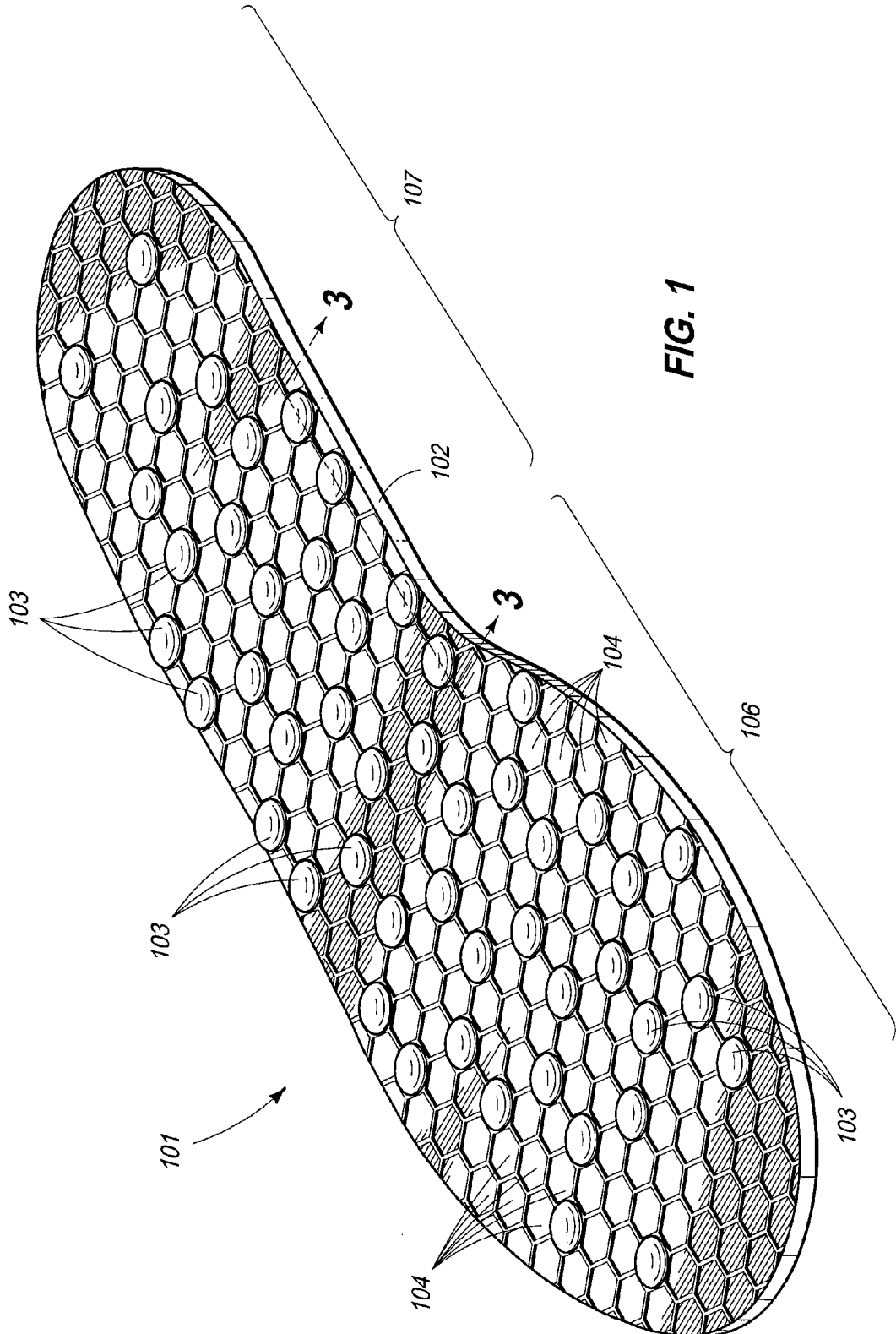


FIG. 1

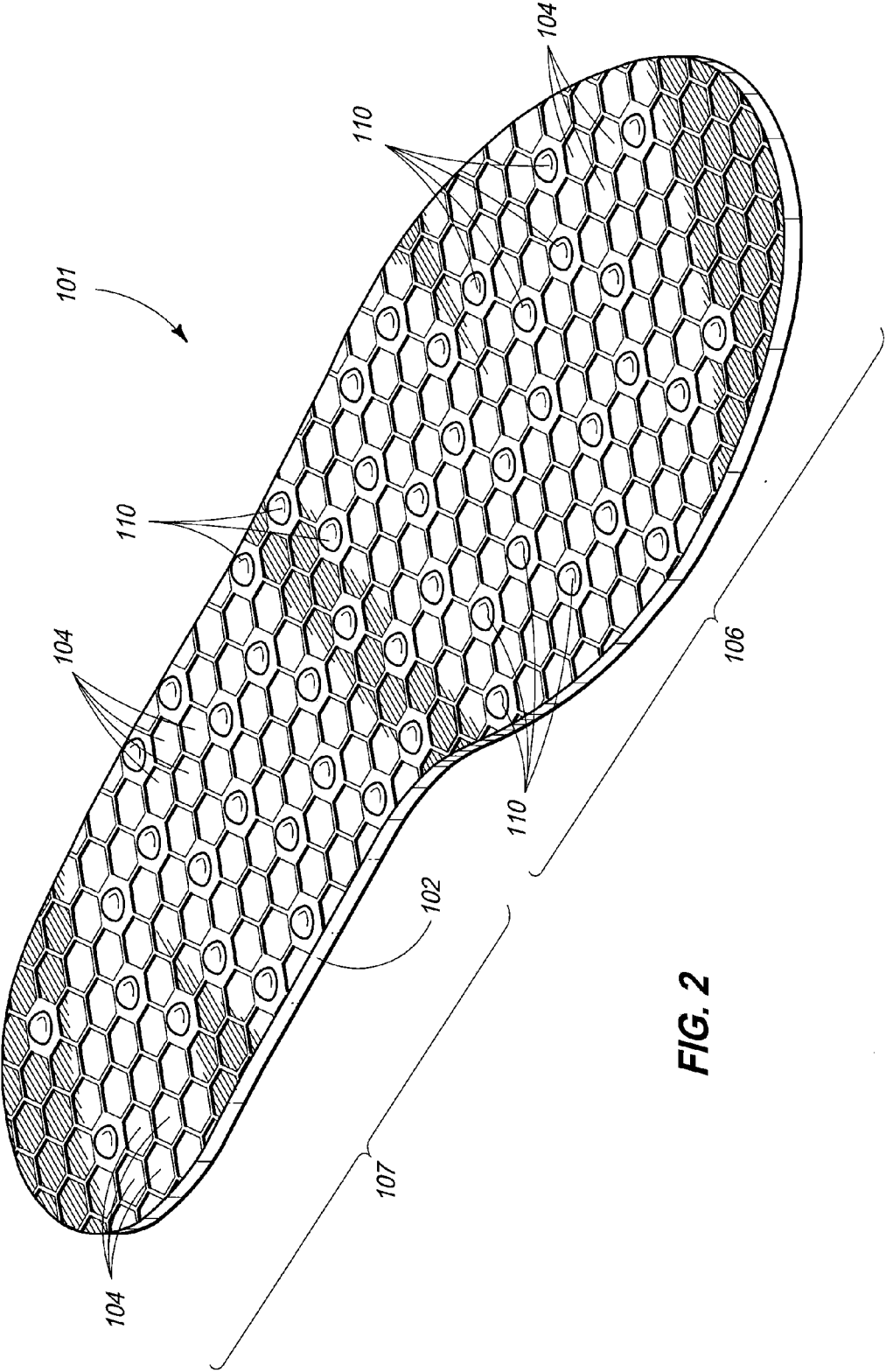
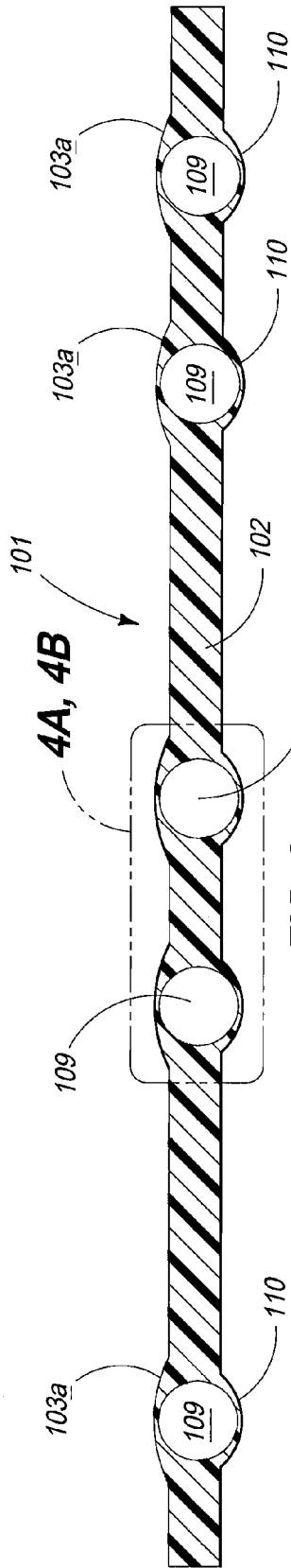
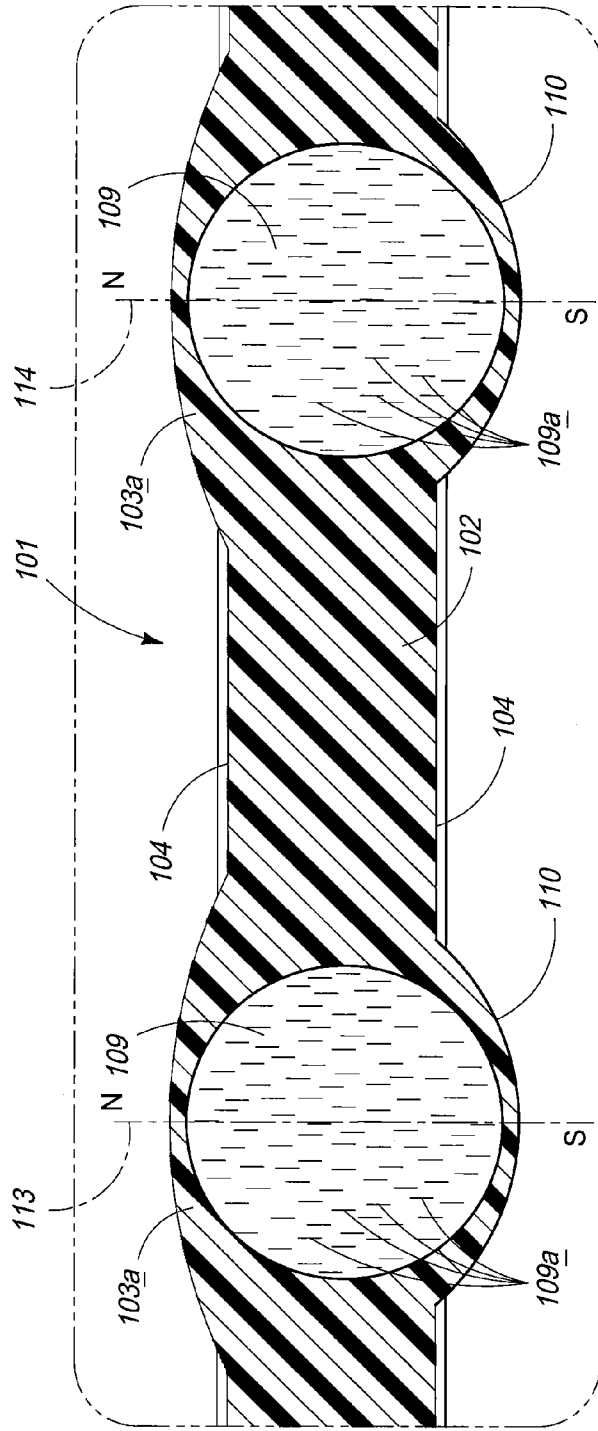


FIG. 2



**FIG. 3**



**FIG. 4A**

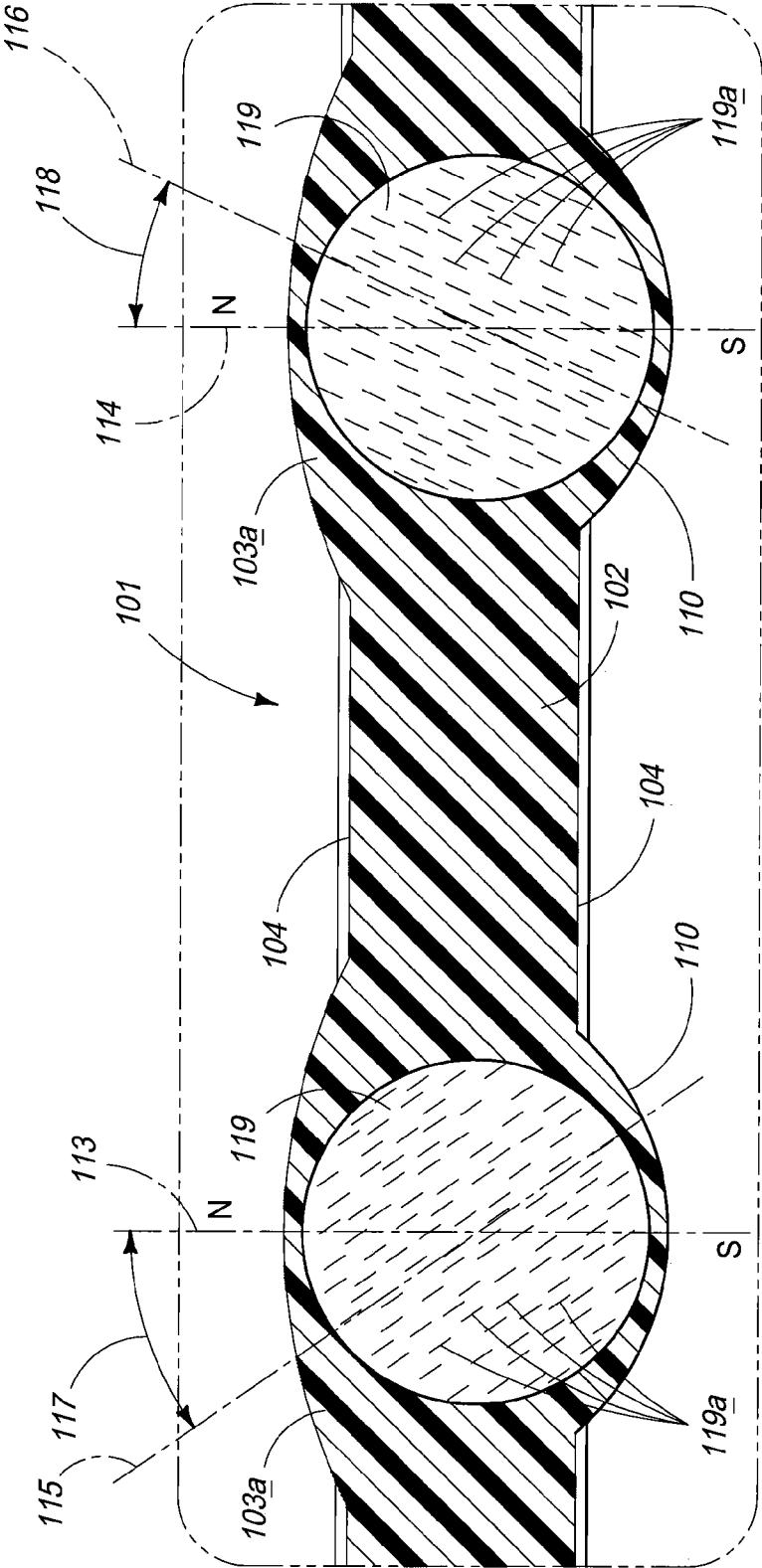
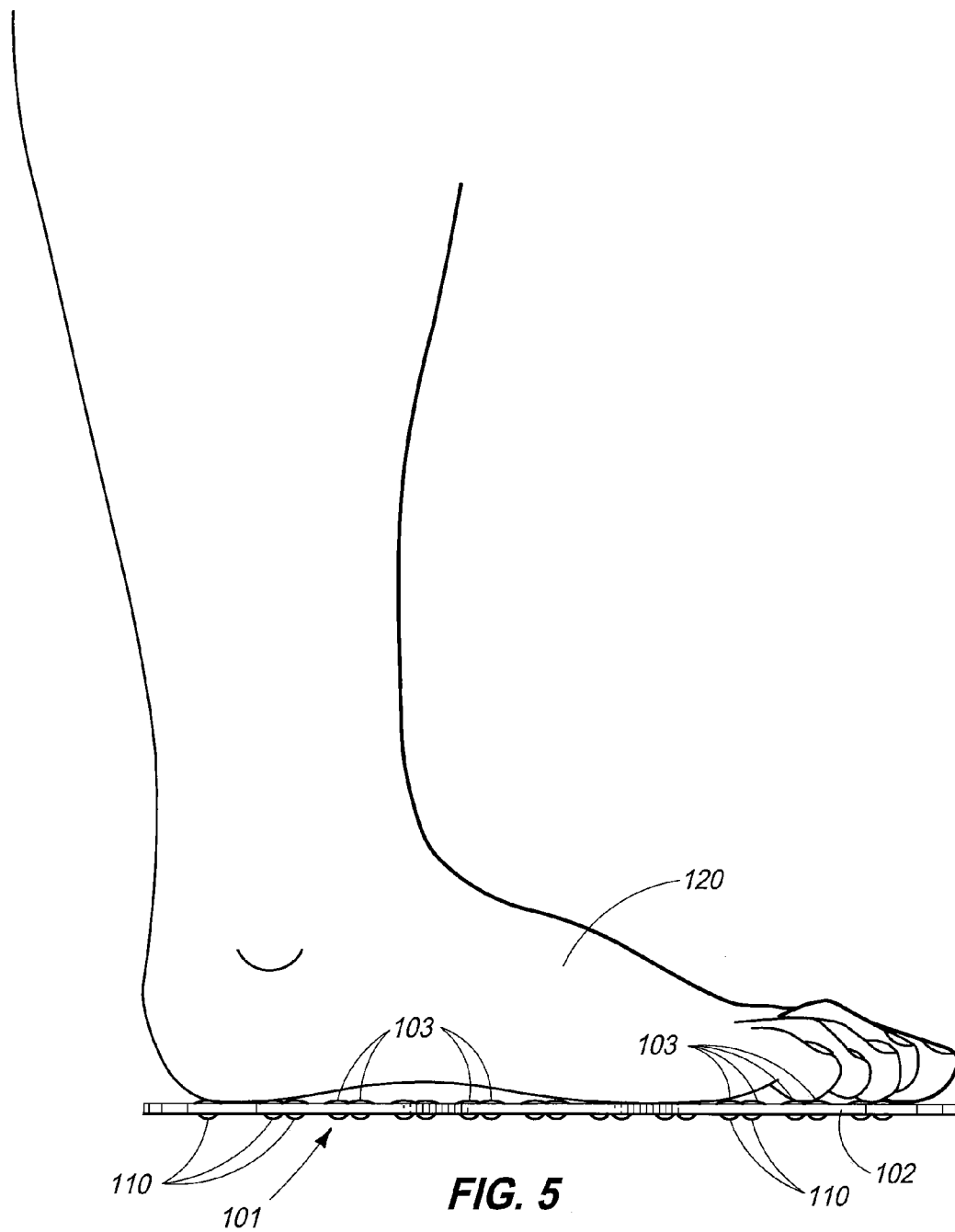
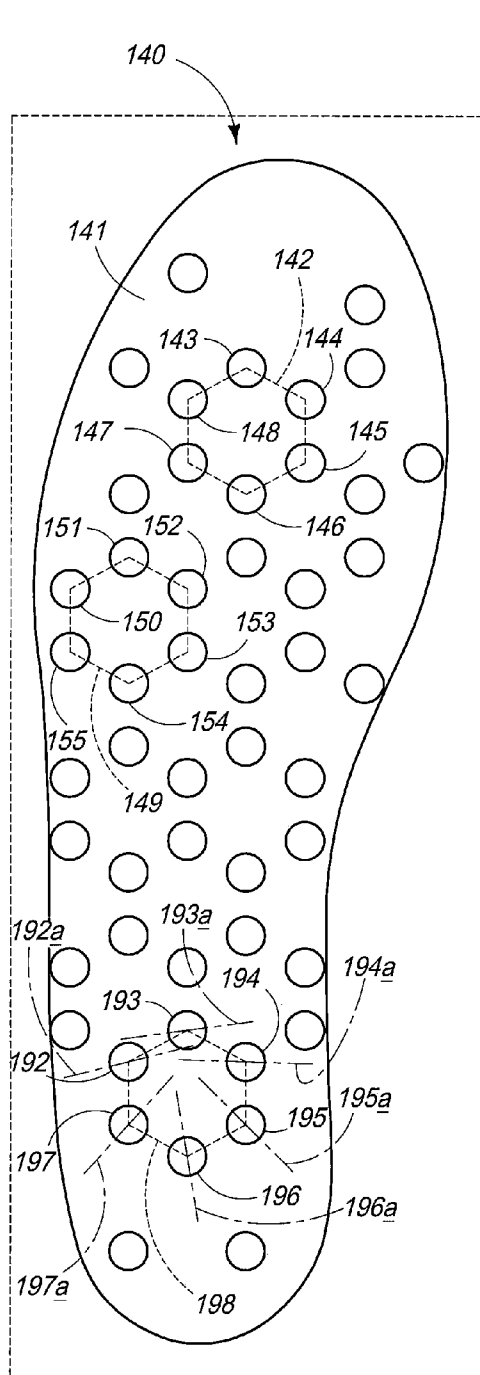
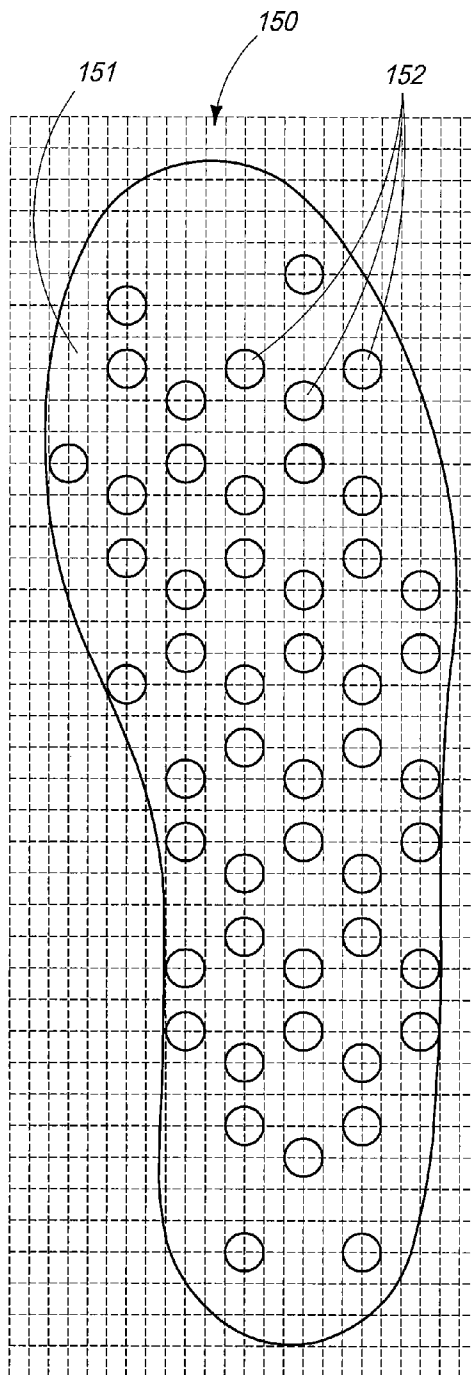


FIG. 4B

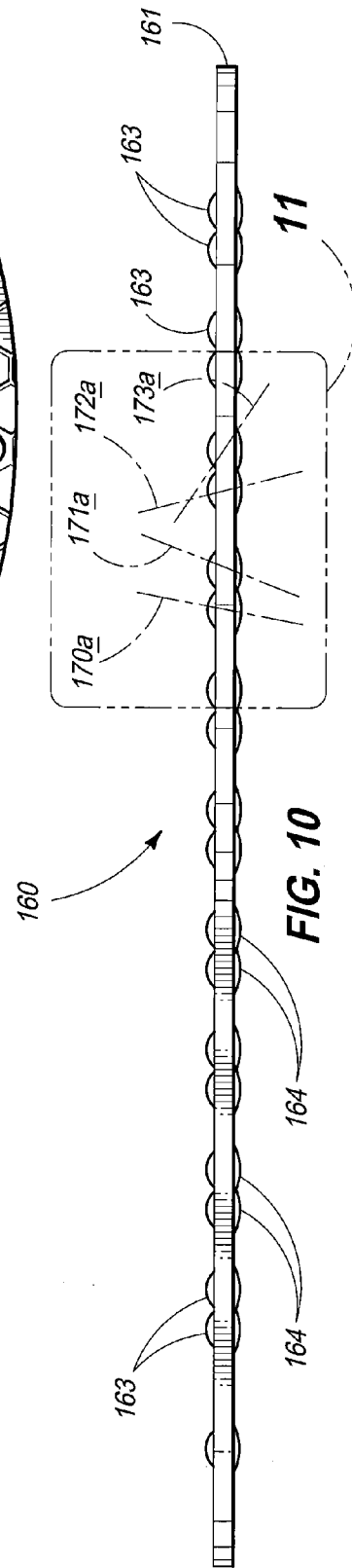
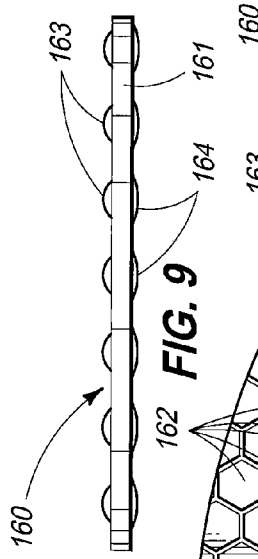
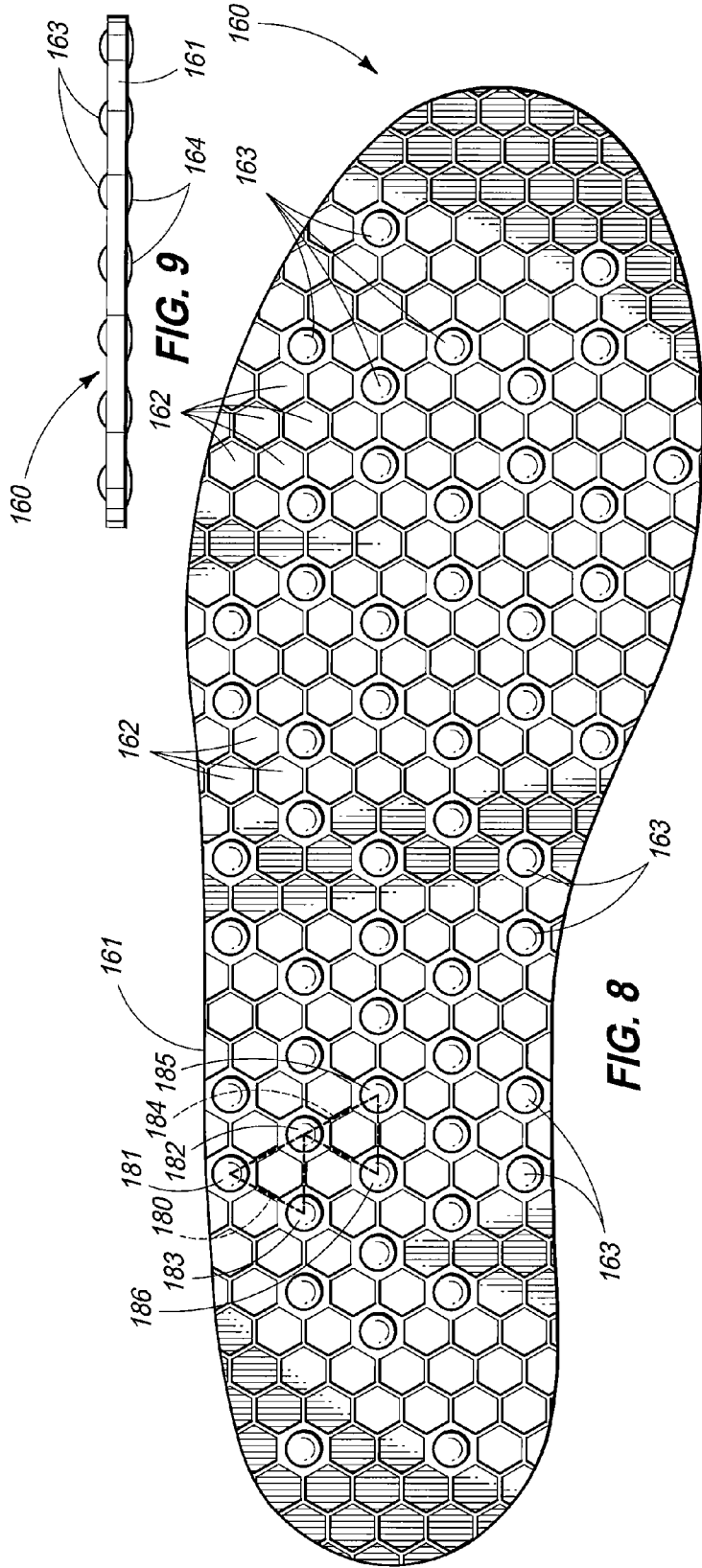




**FIG. 6**



**FIG. 7**



**11**

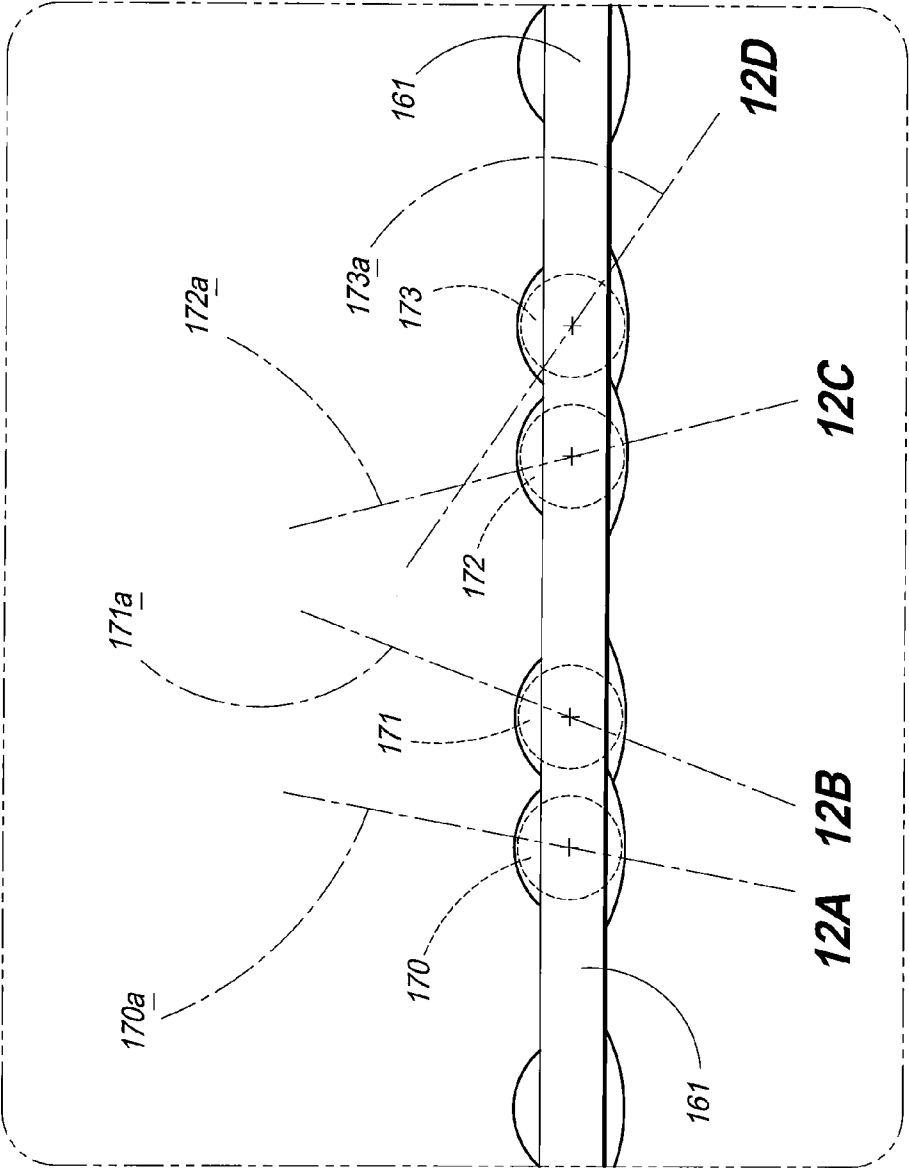
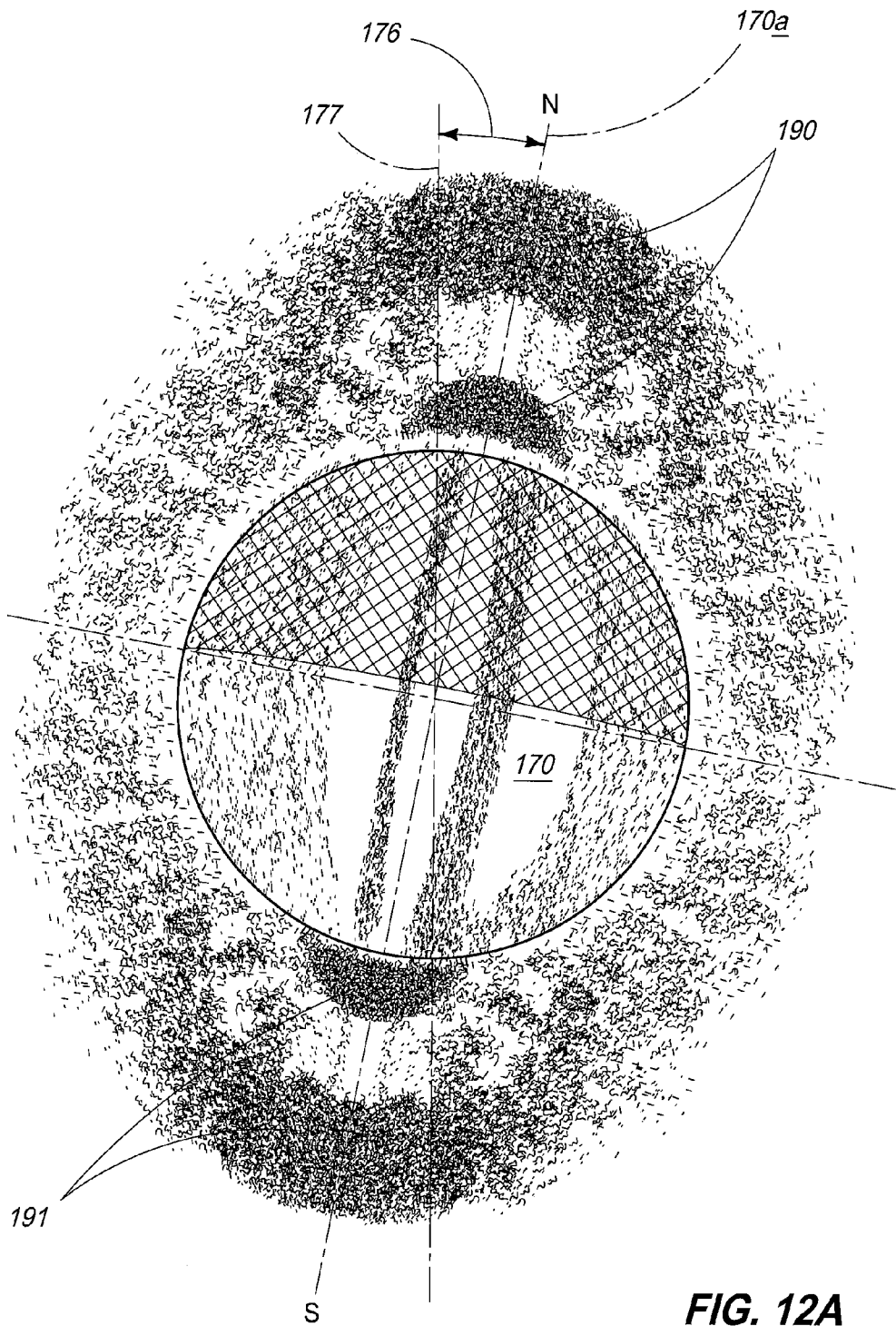
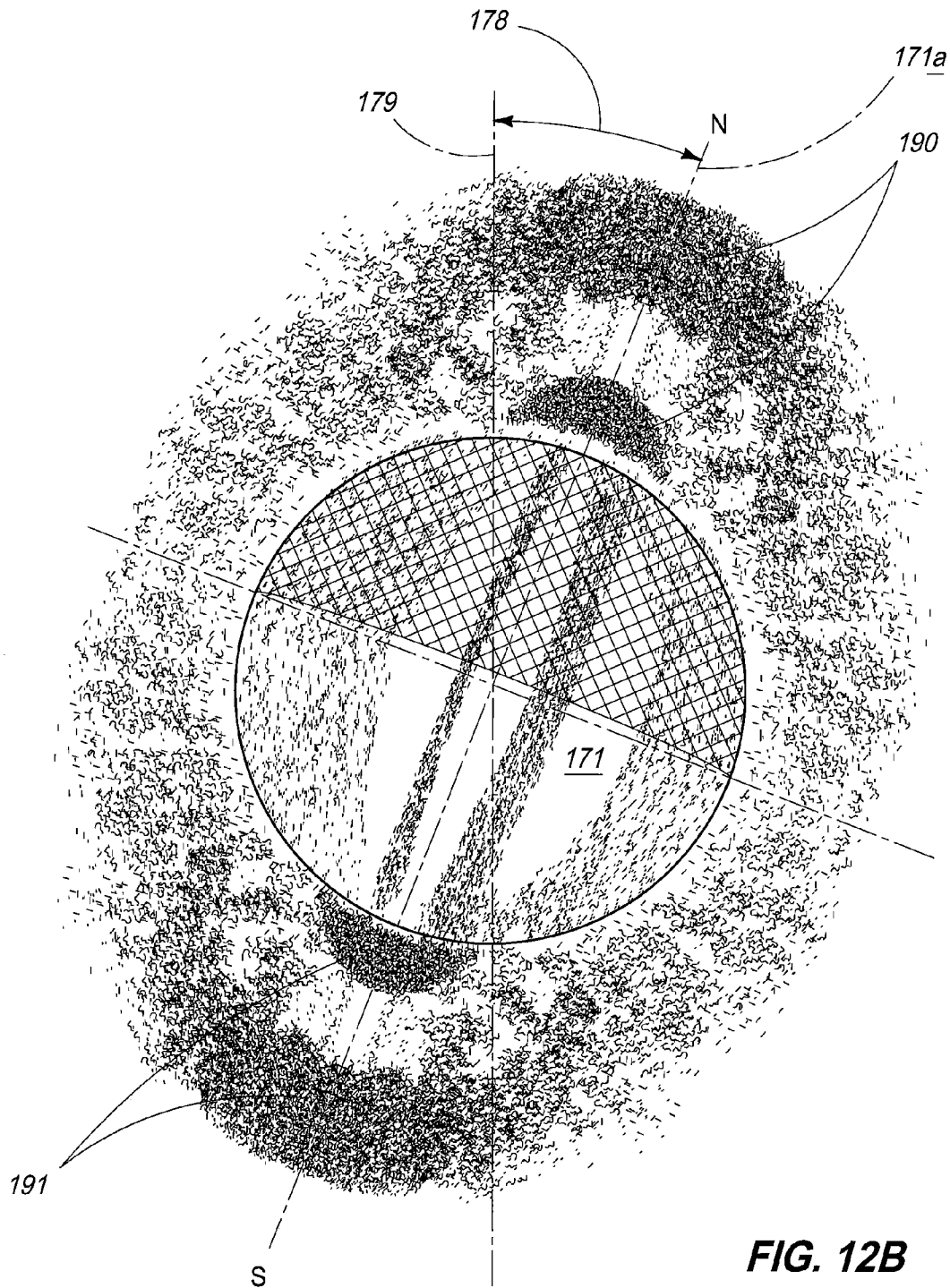


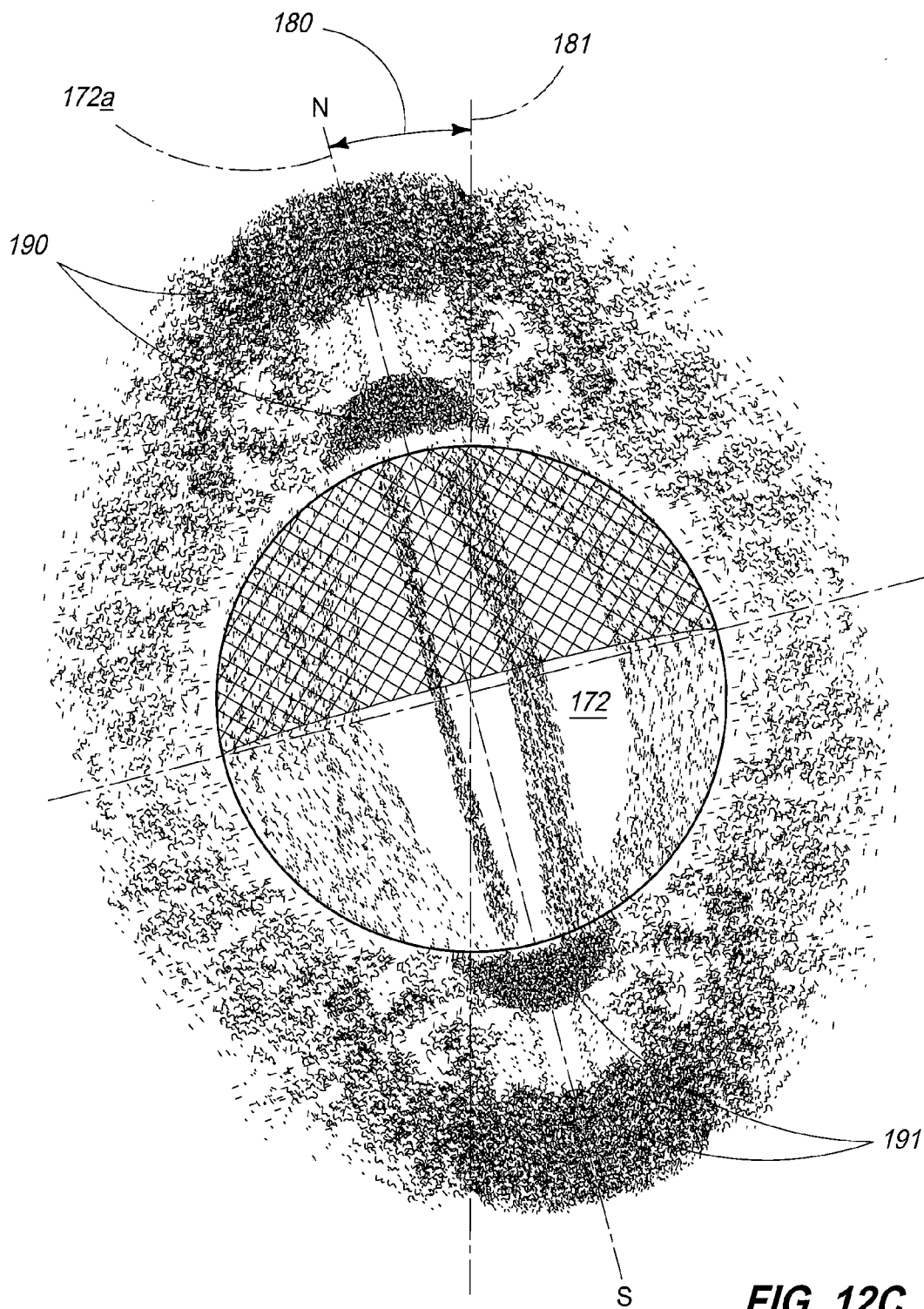
FIG. 11

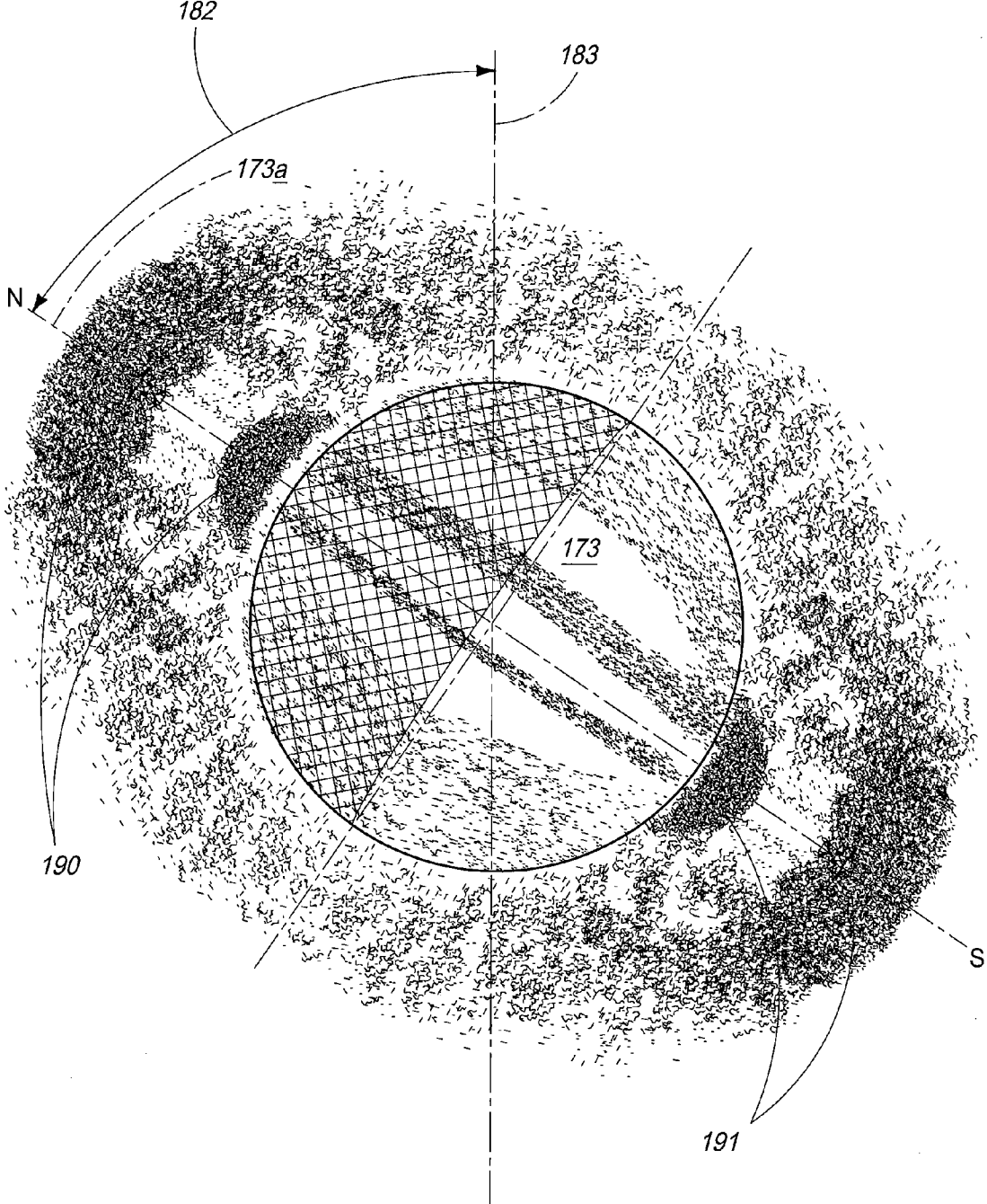


**FIG. 12A**

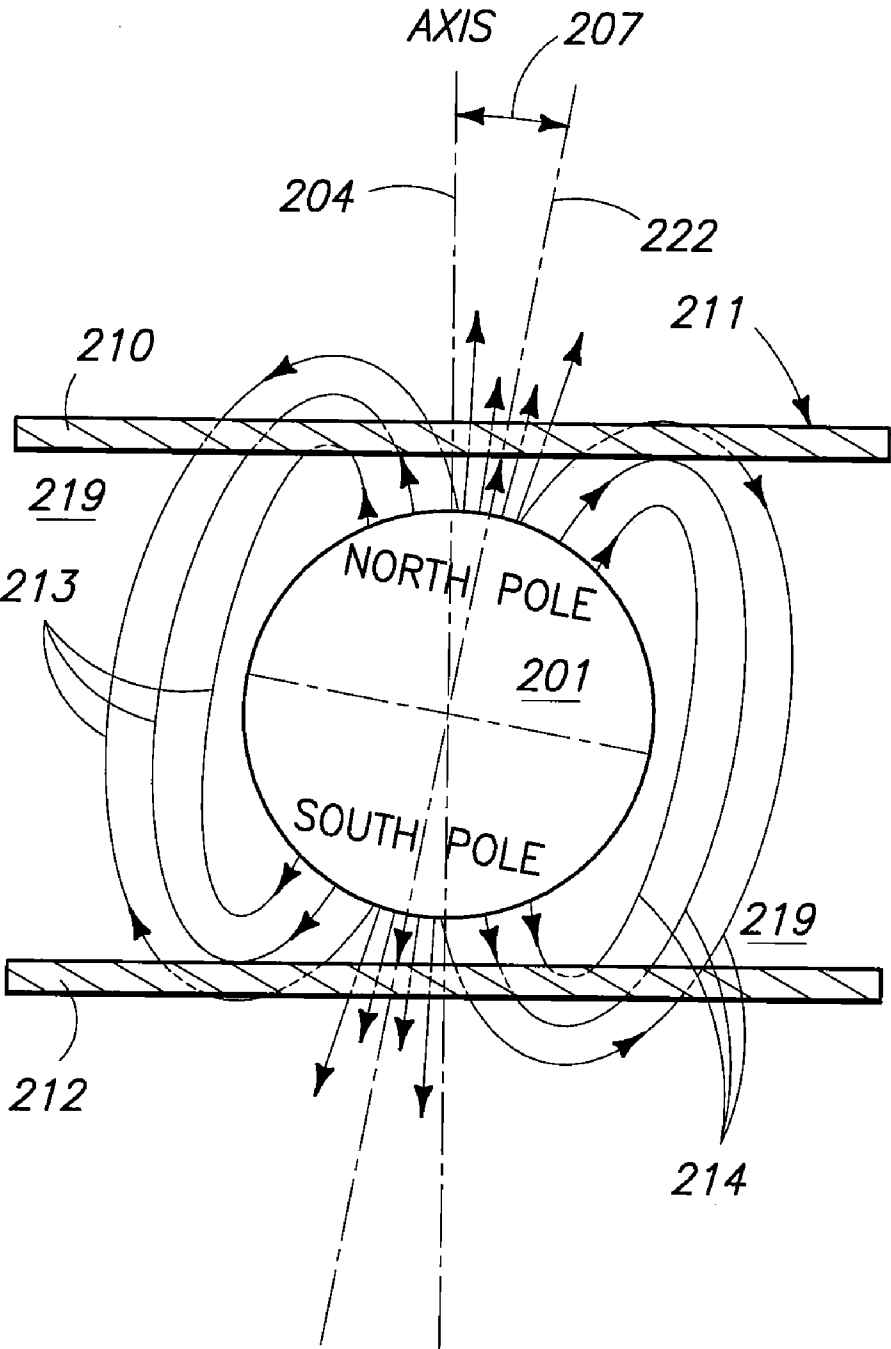


**FIG. 12B**





**FIG. 12D**



**FIG. 13**

## MAGNETIC SHOE INSERT SYSTEM

### CROSS REFERENCE TO RELATED APPLICATION

[0001] This application does not claim priority from any other application.

### TECHNICAL FIELD

[0002] This invention relates to a magnetized shoe insert system, and in some embodiments more particularly to such a system wherein a plurality of spherical magnets are embedded, encapsulated and/or oriented in an insert base such that the axis of polarity of the magnetism may be random relative to the others in the plurality.

### BACKGROUND OF THE INVENTION

[0003] Modern medicine tends to attempt to solve health and related issues through chemical or surgical intervention. In some of these administrations of chemical intervention or drugs, the intervention may be designed to target an enzyme system within the body or to create a localized immune system response so that the body's immune system actually solves the problem. Drugs contain side effects however and in some cases the benefit of drugs does not always outweigh the side effects.

[0004] The therapeutic, healing, preventative, health effect and biological effects of the application of numerous types and magnitudes of magnetic and/or electromagnetic fields have been studied and are the subject of numerous articles, studies, testimonials, anecdotal evidence, and prior patents, such as U.S. Pat. Nos. 5,084,003, 3,921,620, 5,002,068 and 7,931,577 (each of which are hereby incorporated herein by this reference). Exposing part or all of the human body to certain magnetic fields may accomplish any one of a number of different therapeutic effects, such as: muscular and nerve pain alleviation; diabetic neuropathy; arthritis relief; improve healing; an increase in the circulation of the blood in the area in which the magnetic field and or magnetic flux for instance are imposed (to facilitate the action of the body's immune system); and others. While there are many different and overlapping theories on why it works, it is believed that the differential or forces created by a magnetic flux introduces voltage differentials and stimulates the body.

[0005] In prior applicator systems for applying magnetism or magnetic fields, the magnets more magnetic material is magnetized and maintain an arrangement such that the magnetic axis is perpendicular to the applicator or application surface (or to the other magnets in the arrangement), such that prior art devices direct magnetic flux in one predominant direction relative to the surface of the applicator. Bar shaped magnets or flexible sheets of Ferrite magnetic material, magnetized in an arrangement that is perpendicular to the application surface, for instance are typical. While there may be some room for manufacturing tolerances, it is believed that the tolerance is generally may provide an angular difference from the magnetic axis of one magnet to another of approximately five degrees (5°) or less, as the desired angle relative to the applicator surface is to be normal.

[0006] It is believed that at least part of the therapeutic effect of magnetism on humans is the angle and strength at which the magnetic field and or magnetic flux interacts with or encounters the nerve endings and or blood vessels in a given area where applied. Since blood vessels and nerve

endings are oriented at a wide variety of angles on both a two-dimensional and on a three-dimensional basis, it follows that a magnetic field or magnetic flux at varying or even random angles will maximize the therapeutic effect.

[0007] It is therefore an object of some embodiments of this invention to provide a magnetize shoe insert system and magnetic flux applicator which applies it such that the magnetic axis of the magnets is provided at varying and or random angles relative to each other and/or relative to the application surface. It will however be appreciated that this invention is not so limited to random angles, but may also encompass aligned magnetic axis.

[0008] While the invention was motivated in addressing some objectives, it is in no way so limited. The invention is only limited by the accompanying claims as literally worded, without interpretative or other limiting reference to the specification, and in accordance with the doctrine of equivalents. Other objects, features, and advantages of this invention will appear from the specification, claims, and accompanying drawings which form a part hereof. In carrying out the objects of this invention, it is to be understood that its essential features are susceptible to change in design and structural arrangement, with only one practical and preferred embodiment being illustrated in the accompanying drawings, as required.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Preferred embodiments of the invention are described below with reference to the following accompanying drawings.

[0010] FIG. 1 is a front top isometric view of one example of an embodiment contemplated by this invention;

[0011] FIG. 2 is a front bottom isometric view of the example of the embodiment of the invention illustrated in FIG. 1;

[0012] FIG. 3 is section 3-3 from FIG. 1;

[0013] FIG. 4A is an exemplary detail 4 from FIG. 3;

[0014] FIG. 4B is another exemplary detail 4 from FIG. 3;

[0015] FIG. 5 is an elevation view of a human foot on the embodiment illustrated in FIG. 1;

[0016] FIG. 6 is a top schematic representation of an insert for a human's left foot as contemplated by an embodiment of this invention;

[0017] FIG. 7 is a top schematic representation of an insert for a human's right foot as contemplated by an embodiment of this invention;

[0018] FIG. 8 is a bottom view of the example of the embodiment of this invention illustrated in FIG. 1;

[0019] FIG. 9 is a right end view of the example of the embodiment of this invention illustrated in FIG. 8;

[0020] FIG. 10 is a front elevation view of the embodiment of the invention illustrated in FIG. 8;

[0021] FIG. 11 is detail 11 shown in FIG. 10;

[0022] FIG. 12 are details 12A, 12B, 12C and 12D from FIG. 11, illustrating various angles of the polarity of the spherical magnets;

[0023] FIG. 12A is detail 12A from FIG. 11;

[0024] FIG. 12B is detail 12B from FIG. 11;

[0025] FIG. 12C is detail 12C from FIG. 11;

[0026] FIG. 12D is detail 12D from FIG. 11; and

[0027] FIG. 13 is a schematic elevation view of one depiction of an embodiment of a magnet which may be used in this invention, illustrating magnetic flux lines and the North Pole and South.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028] Many of the fastening, connection, manufacturing and other means and components utilized in this invention are widely known and used in the field of the invention described, and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art or science; therefore, they will not be discussed in significant detail. Furthermore, the various components shown or described herein for any specific application of this invention can be varied or altered as anticipated by this invention and the practice of a specific application or embodiment of any element may already be widely known or used in the art or by persons skilled in the art or science; therefore, each will not be discussed in significant detail.

[0029] The terms “a”, “an” and “the” as used in the claims herein are used in conformance with long-standing claim drafting practice and not in a limiting way. Unless specifically set forth herein, the terms “a”, “an” and “the” are not limited to one of such elements, but instead mean “at least one”

[0030] The terms “magnet” and “magnetic material” may include any type or kind of magnet or magnetic material with no one in particular being required to practice this invention. By way of providing some, but not an exhaustive list of examples, this may include without limitation, permanent magnets, magnetic materials which create a changing magnetic field, ferromagnetic components, and others. The magnets or magnetic material may be fluxing, fixed, moving or otherwise, within the contemplation of this invention, and may create pulsed, changing, fluxing, modulating, and/or fixed/constant magnetic, waved or energy fields (as a few examples) within the contemplation of this invention. They may including alternating poles, north poles, south poles, or combinations thereof, and different shapes of the magnets and magnetic fields, all within the same magnet or magnetic layer, within the contemplation of this invention.

[0031] It will be appreciated by those of ordinary skill in the art that a device and method such as this, for the application for various treatments can be used in any one of a number of different ways, with no one in particular being required to practice this invention. For instance, this invention may be used or attempted in the treatment of scar tissue, inflammation and the reduction of pain, as some of the possible examples of uses or embodiments for applications. The invention can be used to apply magnetic and/or electromagnetic waves to something typically benefited by one of the therapies, but which may be enhanced by the simultaneous application of two or three of the therapies.

[0032] One of the components utilized in some embodiments of this invention is a layer of silicone or a silicone module. Silicone is generally any one of various polymeric organic silicon compounds such as oils, greases, or plastics and used for water resistant and heat resistant lubrications, varnishes, binders, and as electric insulators. Silicone may come in many different forms, such as a rubber form made from silicon elastomers, which may be noted for its retention of flexibility, resilience and tensile strength over a wide temperature range. Silicon may enhance the application of mag-

netic fields and/or flux through the human skin and aid in any resulting benefits to the application.

[0033] The term “therapeutic” is also used herein to cover and include any such wave or energy source which has a therapeutic, health care or biological affect on a recipient, including a magnetic field, a static field, an electric field, infrared waves or any others with a therapeutic or health care affect. For example, it may later be determined that wave forms or energy anywhere in the electromagnetic spectrum or sound wave spectrum provide a therapeutic or health care affect to the recipient, which are intended to be included herein.

[0034] When the term shoe is used herein, it is meant its broadest sense to include traditional shoes, boots, sandals, flip-flops, and other footwear—all within the contemplation of this invention. It will also be appreciated by those of ordinary skill in the art that when the term shoe insert is used that means it may be temporarily inserted or permanently inserted and/or integrated with the shoe, sandal or sole of the shoe. This can be by providing additional layer which would otherwise integrate with the base of the shoe or the solo shoe, all within the contemplation of this invention.

[0035] FIG. 1 is a front top isometric view of one example of an embodiment contemplated by this invention, illustrating a magnetized shoe insert **101**, shoe insert base **102**, a plurality of recessed or inset areas **104** and a plurality of magnets **103**. In this example of this embodiment of the invention, the inset areas **104** are hexagon shaped, but those of ordinary skill in the art will appreciate that no one particular configuration or shape is required to practice this invention, but instead any one of a number of circular, arcuate, polygonal or other shapes may be utilized in practicing different embodiments of this invention.

[0036] FIG. 1 further illustrates the magnets **103** are also arranged in a hexagon type pattern as will be illustrated and discussed later. It will also be appreciated by those of ordinary skill in the art that no one particular configuration or shape for the pattern of magnets is required to practice this invention, but instead any one of a number of circular, arcuate, polygonal or other configurations or shapes may be utilized in practicing different embodiments of this invention.

[0037] In FIG. 1, while item **103** is pointing toward what are referred to as magnets, the outer surface is actually part of the base and one way to retain, position and/or encapsulate the magnets in their specific location at the desired angle or angles. The surface covering on the top side of the magnets **103** within the sole insert is generally flatter than on the bottom side, and has sufficient base material to either retain the magnets in their places and at the desired angles, or to provide a covering of the magnets with the desired base material. It may also be desired in embodiments of this invention to provide different materials to comprise the base material, depending upon the application: for example one might provide silicone to cover or embed the specific magnets but utilize a polymer or other elastomer or rubberlike material for the other portions of the sole insert base **102**, all contemplated by different embodiments of this invention.

[0038] FIG. 1 further illustrates the rear portion **107** of the shoe insert **101**, which is generally for placement under the heel and part or all of the instep of the user. The front portion **106** of the shoe insert **101** is generally for placement under the toes and ball of the foot of the user. While a full-length shoe insert is shown illustrated in the drawings, this invention is not limited to a full shoe insert but instead applies to partial

inserts which may for example only cover the front portion **106**, the rear portion **107** or other combinations and partial shoe inserts—depending upon the desired application and embodiment.

[0039] Although it will also be appreciated the potential benefits of silicone in providing the interaction of the shoe insert with the human foot and in facilitating the application of the magnetic fields and magnetic fluxes to the foot, this invention is not so limited.

[0040] FIG. 2 is a front bottom isometric view of the example of the embodiment of the invention illustrated in FIG. 1, illustrating magnetized shoe insert **101**, shoe insert base **102**, a plurality of recessed or inset areas **104** and a plurality of magnets **110**. FIG. 2 further illustrates inset areas **104**, front portion **106** and rear portion **107** of the shoe insert **101**. In this example of the embodiment, the magnets **110** protrudes slightly more than on the top side and have a more pronounced arcuate and protruding shape and configuration. While this may for some be preferably on the bottom side of the sole for comfort reasons, it may be desired in some applications of embodiments to place the larger protrusion side of the magnets **110** on the upper side directly adjacent to the users foot to provide deeper magnetic fields and fluxes, as well as a massaging effect, all within the contemplation of this invention.

[0041] FIG. 3 is section 3-3 from FIG. 1, and illustrates shoe insert **101**, shoe insert base **102**, a plurality of magnets **109** with encapsulating base material **103a** on the top side of the shoe insert **101** and encapsulating base material **110** on the bottom side of the magnets **109**. Again, the encapsulation illustrated in FIG. 3 is merely for exemplary purposes and may be accomplished in any one of a number of ways, as discussed more fully herein and as will be appreciated by those of ordinary skill in the art, all within the contemplation of this invention.

[0042] FIG. 4A is an exemplary detail 4 from FIG. 3, and illustrates shoe insert **101**, magnets **109** with magnetized particles **109a** therein, base **102**, base insets **104**, encapsulating base material **110** and encapsulating base material **103a**. FIG. 4A illustrates how magnets **109** can have the magnetic axis **113** and **114** poles aligned in their North and South directions generally perpendicular to the primary plane of the base **102**. However while this arrangement is contemplated by some embodiments of this invention, as will be seen in later figures, the alignment of the magnetic axis may preferably be randomly oriented or random axis magnets. FIG. 4A illustrates how the magnetic particles **109a** are aligned to achieve a magnetic axis **113** and **114**.

[0043] FIG. 4B is an exemplary detail 4 from FIG. 3, and shows an alternative example or embodiment wherein the magnets **119** with magnetized particles **109a** therein are not oriented relatively perpendicularly to base **102**, but instead are aligned at random angles as illustrated by the axis **115** and **116**. Angle **117** is the angle between axis **115** and vertical and this may be in two-dimensional or three-dimensional court's, depending on the application. Similarly, angle **118** is the angle between a theoretical normal line or axis from base **102**. FIG. 4B otherwise has liked numbered items or components as shown and described relative to FIG. 4A, and will not be further discussed herein.

[0044] FIG. 5 is an elevation view of a human foot **120** standing on the shoe insert **101** shown in FIG. 1, illustrating shoe insert base **102**, top magnet encapsulations **103** and bottom magnet encapsulations **110**.

[0045] FIG. 6 is a top schematic representation of a shoe insert **140** for a human left foot as contemplated by an embodiment of this invention, illustrating shoe insert base **141** and a hexagonal configuration **142** of the plurality of magnets **143**, **144**, **145**, **146**, **147** and **148**. A second hexagonal configuration **149** is shown of the plurality of magnets **150**, **151**, **152**, **153**, **154** and **155**. It can be seen from FIG. 6 and will be appreciated by those of ordinary skill in the art that there are numerous other hexagon configurations of the plurality of magnets on shoe insert **140** and it will be further observed the way in which one hexagonal configuration can interact with, be a part of and share magnets with an adjacent hexagonal configuration, within the contemplation of this invention.

[0046] Although it is difficult to illustrate in three-dimensional terms and angles, FIG. 6 further illustrates how a hexagonal pattern **198** of magnets **192**, **193**, **194**, **195**, **196** and **197** may be at random and different angles relative to one another in multiple planes and dimensions, with magnet **192** having its magnetic axis or pole at angle **192a**, magnet **193** having its magnetic axis or pole at angle **193a**, magnet **194** having its magnetic axis or pole at angle **194a**, magnet **195** having its magnetic axis or pole at angle **195a**, magnet **196** having its magnetic axis or pole at angle **196a**, and magnet **197** having its magnetic axis or pole at angle **197a**. Again since these patterns need not be hexagon will, any one of a number of different configuration, angles and other alignments of the magnets and their magnetic axis, is possible within the contemplation of embodiments of this invention.

[0047] FIG. 7 is a top schematic representation of a shoe insert **150** for a human's right foot, as contemplated by this invention, illustrating a plurality of magnets **152** in shoe insert base **151**.

[0048] FIG. 8 is a bottom view of a shoe insert **160** similar to the example of the embodiment of this invention illustrated in FIG. 1. FIG. 8 instead illustrates that more than one pattern or configuration of magnets may be utilized on the same shoe insert within the contemplation of this invention and illustrates a plurality of triangular configurations **180** and **184**. Triangular configuration **180** includes magnet **181**, **182** and **183**, and shares magnet **182** with a second triangular configuration **184**, which further includes magnets **185** and **186**. It will be appreciated that the entire shoe insert may be one pattern, such as hexagonal or may be triangular, or a plurality of patterns such as triangular combined with hexagonal, all within the contemplation of this invention. FIG. 8 further illustrates a plurality of insets **162** in base **161** with magnets **163** scattered throughout in different patterns.

[0049] FIG. 9 is a right end view of the example of the embodiment of the shoe insert **160** invention illustrated in FIG. 8, illustrating shoe insert **160**, shoe insert base **161**, bottom magnet encapsulations **163** and top magnet encapsulations **164**.

[0050] FIG. 10 is a front elevation view of the embodiment of the shoe insert **160** invention illustrated in FIG. 8, illustrating shoe insert **160**, shoe insert base **161**, bottom magnet encapsulations **163** and top magnet encapsulations **164**. Additionally, FIG. 10 illustrates how magnets within shoe insert **160** may be randomly placed such that the polarity or the magnetic axis are at random angles relative to one another and/or relative to the shoe insert base **161**. FIG. 10 illustrates first magnet **170** with its axis **170a** at a first angle, second magnet **171** with its axis **171a** at a second angle, third magnet **172** with its axis **172a** at a third angle and forth magnet **173**

with its axis **173a** at a fourth angle. Again the random angles may be in two dimensions or in three dimensions, all within the contemplation of this invention. FIG. 10 further serves to illustrate that this invention contemplates magnets with magnetic axis at random angles and as described above in a prior figure, magnets all aligned relatively perpendicularly to the shoe insert base **161**.

[0051] FIG. 11 is detail **11** from FIG. 10, illustrating shoe insert base **161**, first magnet **170** with its axis **170a** at a first angle, second magnet **171** with its axis **171a** at a second angle, third magnet **172** with its axis **172a** at a third angle and fourth magnet **173** with its axis **173a** at a fourth angle.

[0052] FIGS. 12A, 12B, 12C and 12D are details **12A**, **12B**, **12C** and **12D** from FIG. 11, illustrating various angles of the polarity of the spherical magnets. While different magnets may show different fluxes and magnetic fields, FIGS. 12A, 12B, 12C and 12D show how these polarities, axis and magnetic fields in fluxes may look in actual spherical magnets **170**, **171**, **172** and **173**.

[0053] FIG. 12A is detail **12A** from FIG. 11, and illustrates magnet **170** with its magnetic axis **170a** or pole at angle **176** from a generally normal or perpendicular line **177**. FIG. 12A illustrates relatively stronger magnetic magnitude by the darker areas **190** around the approximate north pole of magnet **170** and by the darker areas **191** around the approximate south pole of magnet **170**. The darker areas illustrated in FIGS. 12B, 12C and 12D similarly represent stronger magnetic fields are fluxes in the area around or aligned with the north and south poles of the respective magnets **171**, **172** and **173**.

[0054] FIG. 12B is detail **12B** from FIG. 11, and illustrates magnet **171** with its magnetic axis **171a** or pole at angle **178** from a generally normal or perpendicular line **179**.

[0055] FIG. 12C is detail **12C** from FIG. 11, and illustrates magnet **172** with its magnetic axis **170a** or pole at angle **180** from a generally normal or perpendicular line **181**.

[0056] FIG. 12D is detail **12D** from FIG. 11, and illustrates magnet **173** with its magnetic axis **173a** or pole at angle **182** from a generally normal or perpendicular line **183**.

[0057] FIG. 13 is a schematic elevation view of one depiction of an embodiment of a magnet which may be used in this invention, illustrating magnetic flux lines as well as the north pole and south pole of the magnet. FIG. 13 illustrates magnet **201** with magnetic axis **222** at angle **207** relative to reference **204** normal or perpendicular to shoe sole insert base or application surface **211**. FIG. 13 shows the respective magnetic fields **213** and **214** around magnet **201**, further illustrates that in some embodiments it may be preferred that the magnet **201** not protrude from the applicator or shoe sole insert, but instead be wholly embedded or encapsulated therein.

[0058] FIG. 13 further illustrates that the shoe insert base may be made of different materials such as outer layer **210** with outer surface **211**, and outer layer **212**, and inner base material **219**. Outer layer **210** may be made of the same or a different material to outer layer **212**, and silicon may be preferred for adjacent the skin of the user.

[0059] As will be appreciated by those of reasonable skill in the art, there are numerous embodiments to this invention, and variations of elements, components and combinations, which may be used, all within the scope of this invention.

[0060] One embodiment of this invention, for example, is a magnetic sole insert system comprising: a shoe sole insert base configured to provide a magnetic field or magnetic flux to a human foot; a plurality of magnets embedded and fixed

within the shoe sole insert base such that each the plurality of magnets is embedded within the shoe sole insert base with its magnetic axis at an angle different to some of the other magnets in the plurality of magnets; wherein the plurality of magnets as embedded within the shoe sole insert base are configured to each create a magnetic fields external to the applicator base at different angles; and further wherein the angle of the magnetic axis of each the plurality of magnets to other magnets in the plurality of magnets is at least five degrees.

[0061] Further and/or additional embodiments to that described in the preceding paragraph may include: magnetic sole insert systems: wherein the angle of the magnetic axis of each of the plurality of magnets to other magnets in the plurality of magnets is two dimensionally random; further wherein the angle of the magnetic axis of each of the plurality of magnets to other magnets in the plurality of magnets is three dimensionally random; and/or still further wherein the plurality of magnets are generally configured in a hexagonal configuration relative to one another.

[0062] In another embodiment, a magnetic sole insert system may be provided which comprises: a shoe sole insert base configured to provide a magnetic field or magnetic flux to a human foot; a plurality of magnets embedded and fixed within the shoe sole insert base such that each the plurality of magnets is embedded within the shoe sole insert base with its magnetic axis approximately at perpendicular angle to some of the other magnets in the plurality of magnets; wherein the plurality of magnets as embedded within the shoe sole insert base are configured to each create a magnetic fields external to the applicator base at approximately perpendicular angles relative to the shoe sole insert base.

[0063] In compliance with the statute, the invention has been described in language more or less specific as to structural and methodical features. It is to be understood, however, that the invention is not limited to the specific features shown and described, since the means herein disclosed comprise preferred forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents.

The invention claimed is:

1. A magnetic sole insert system comprising:
  - a shoe sole insert base configured to provide a magnetic field or magnetic flux to a human foot;
  - a plurality of magnets embedded and fixed within the shoe sole insert base such that each the plurality of magnets is embedded within the shoe sole insert base with its magnetic axis at an angle different to some of the other magnets in the plurality of magnets;
  - wherein the plurality of magnets as embedded within the shoe sole insert base are configured to each create a magnetic fields external to the applicator base at different angles; and
  - further wherein the angle of the magnetic axis of each the plurality of magnets to other magnets in the plurality of magnets is at least five degrees.
2. A magnetic sole insert system as recited in claim 1, and further wherein the angle of the magnetic axis of each of the plurality of magnets to other magnets in the plurality of magnets is two dimensionally random.
3. A magnetic sole insert system as recited in claim 1, and further wherein the angle of the magnetic axis of each of the

plurality of magnets to other magnets in the plurality of magnets is three dimensionally random.

4. A magnetic sole insert system as recited in claim 3, and further wherein the plurality of magnets are generally configured in a hexagonal configuration relative to one another.

5. A magnetic sole insert system comprising:  
a shoe sole insert base configured to provide a magnetic field or magnetic flux to a human foot;  
a plurality of magnets embedded and fixed within the shoe sole insert base such that each the plurality of magnets is

embedded within the shoe sole insert base with its magnetic axis approximately at perpendicular angle to some of the other magnets in the plurality of magnets;  
wherein the plurality of magnets as embedded within the shoe sole insert base are configured to each create a magnetic fields external to the applicator base at approximately perpendicular angles relative to the shoe sole insert base.

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