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(54) **DYNAMIC CUSHIONING ASSEMBLY**

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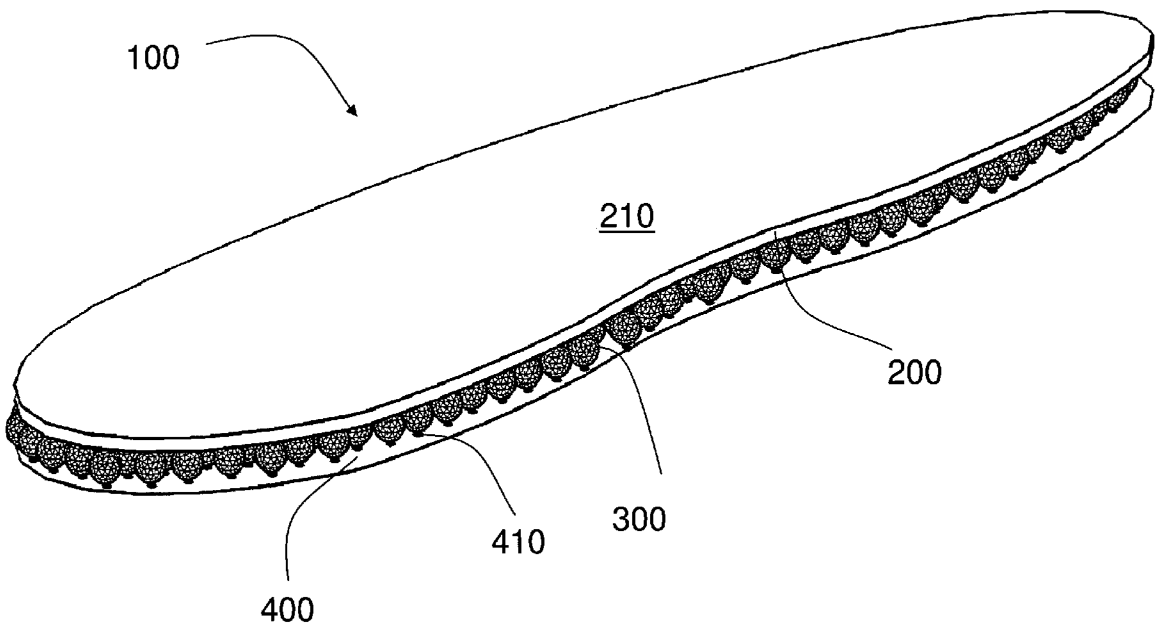
(57) **ABSTRACT**

A dynamic cushioning assembly to be used on beds, seats, backrests, shoes or any other surfaces where a portion of a body is subjected to prolonged contact and pressure with a support surface. The arrangement is comprised of a pattern of spherical elastic lugs cooperating with an upper, elastomeric layer. When a force is applied to the upper layer, the cooperation of the lugs with the upper layer create an uneven but soft surface having undulating zone of higher and lower resistance which serve to enhance blood circulation.



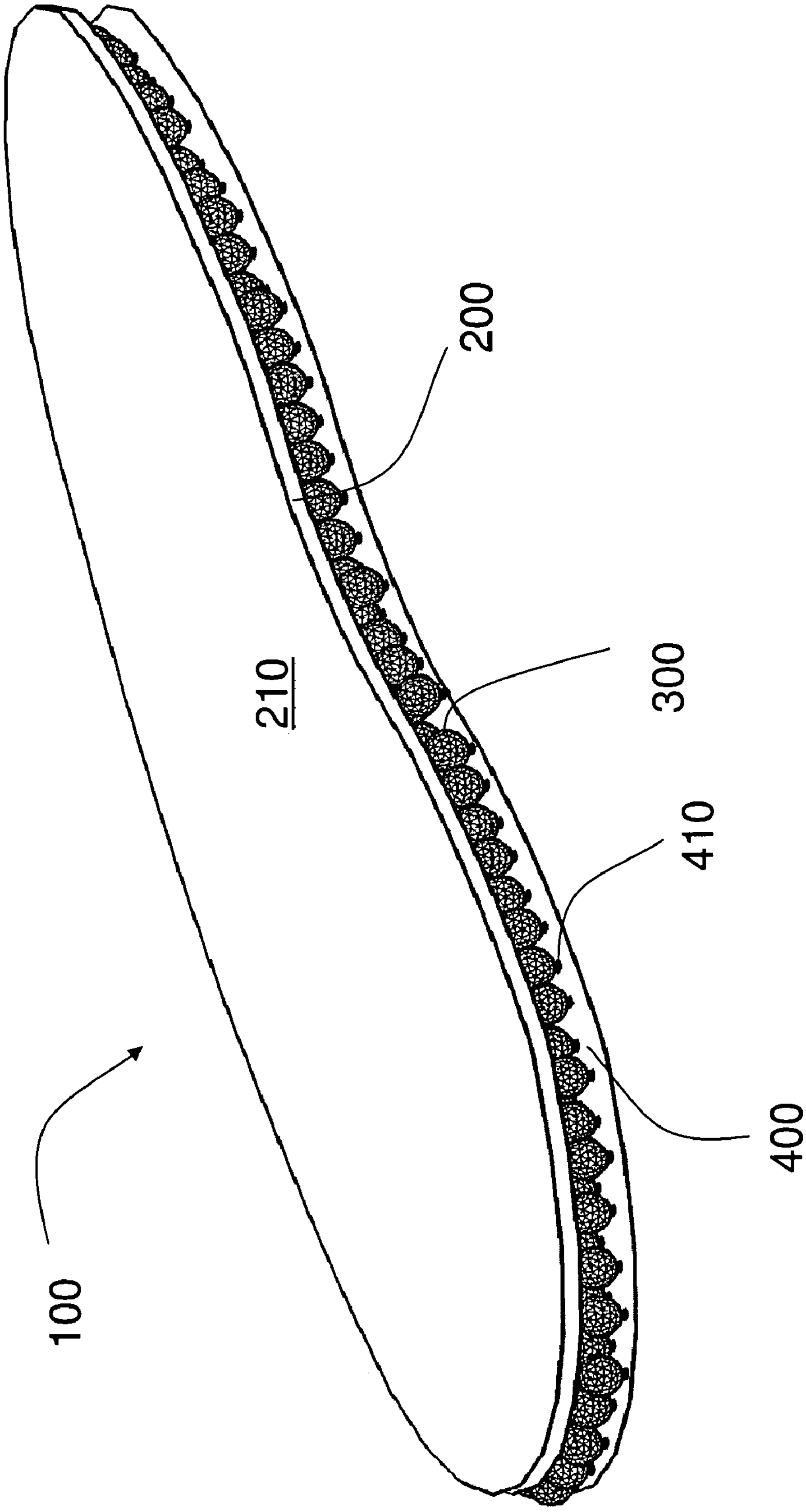


FIG 1

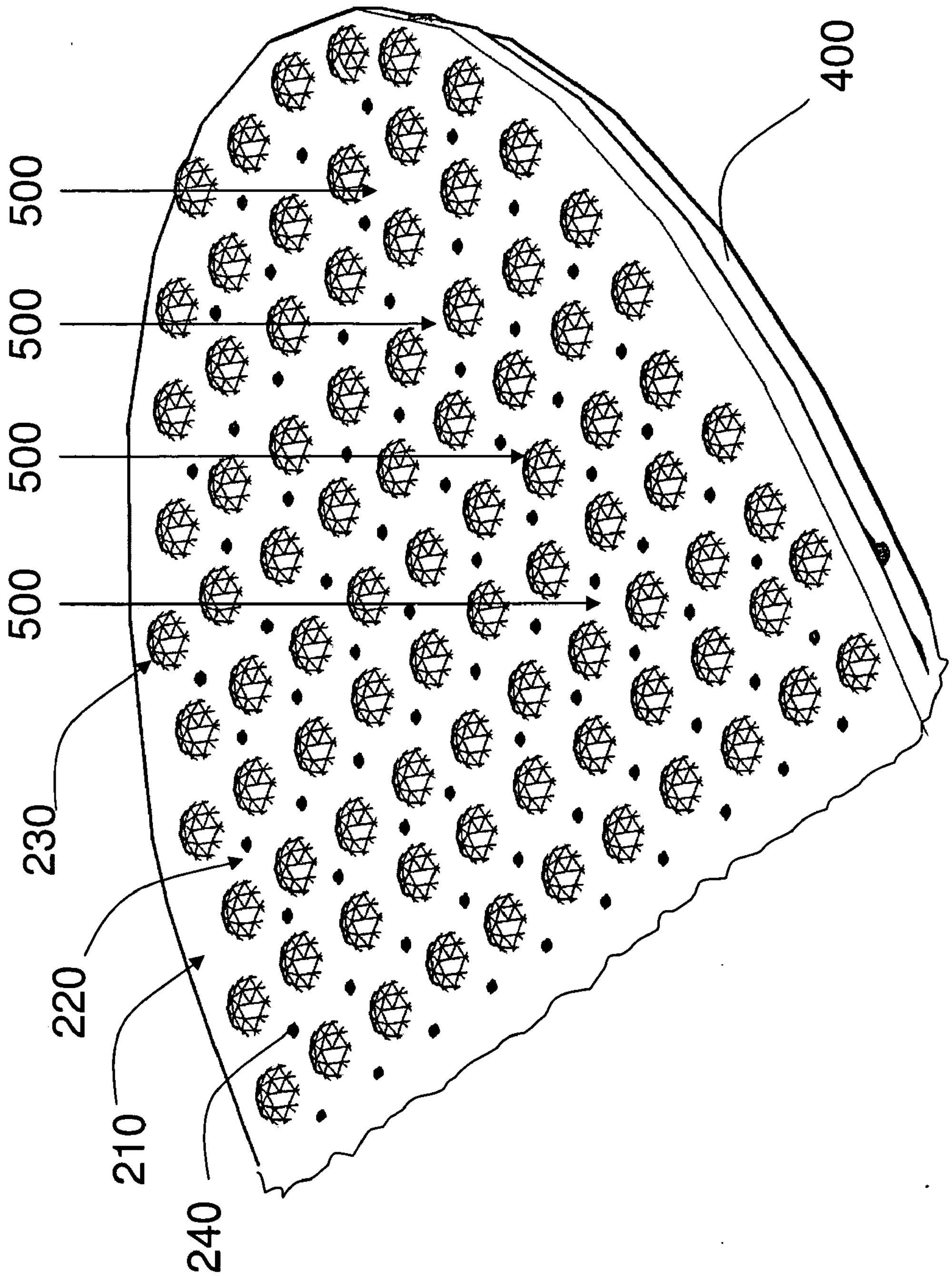


FIG 2

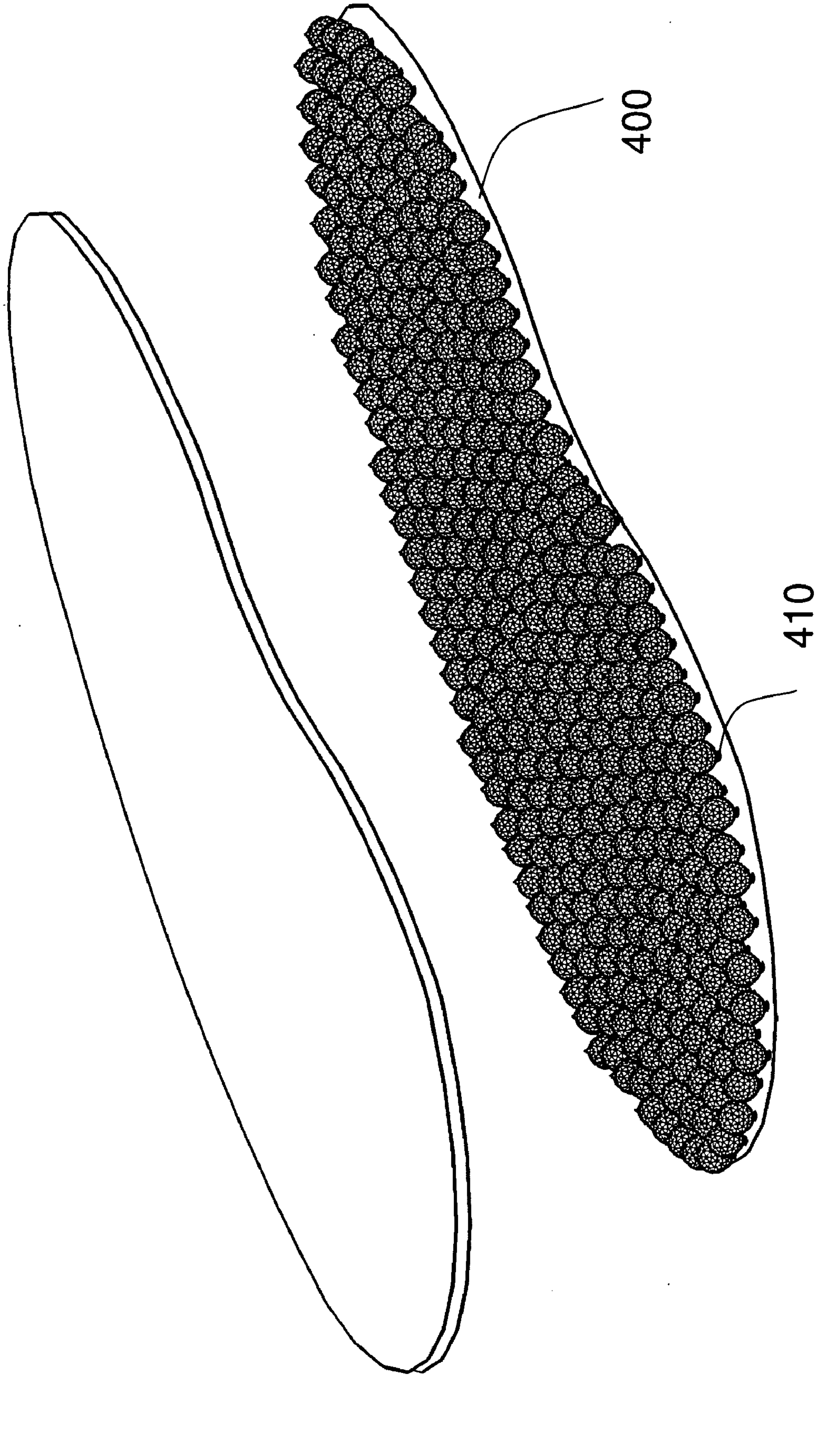


FIG 3

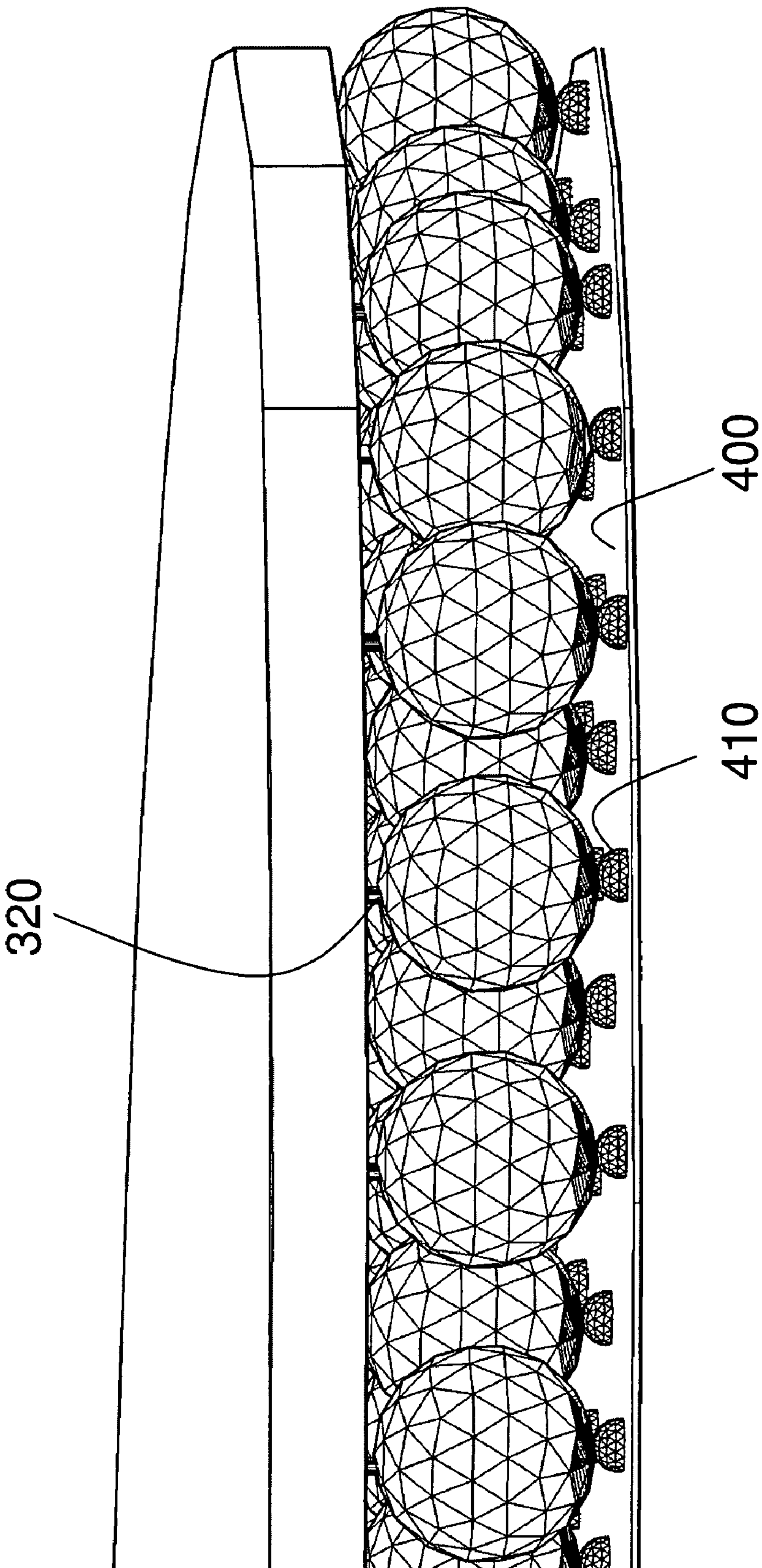


FIG 4

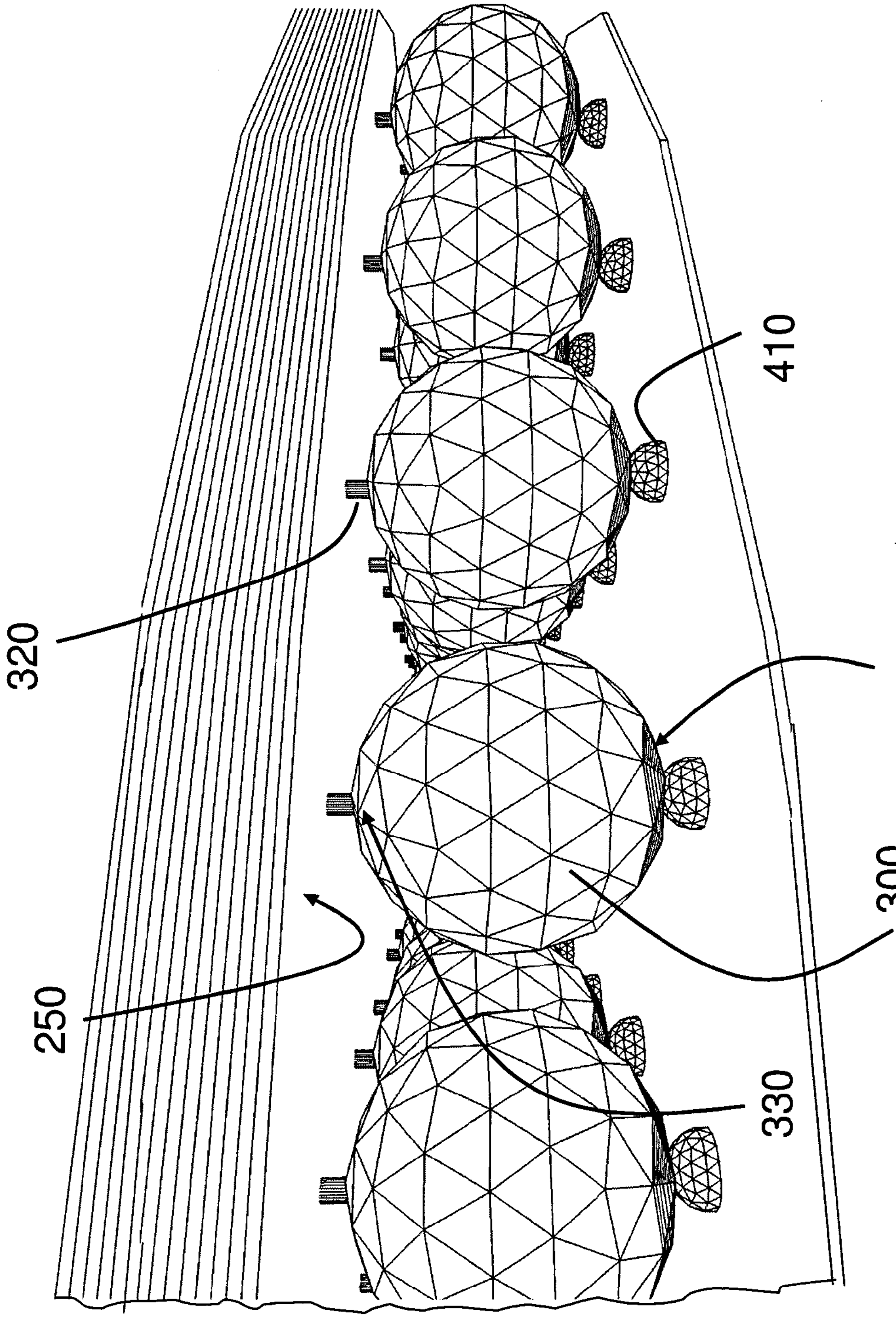


FIG 5

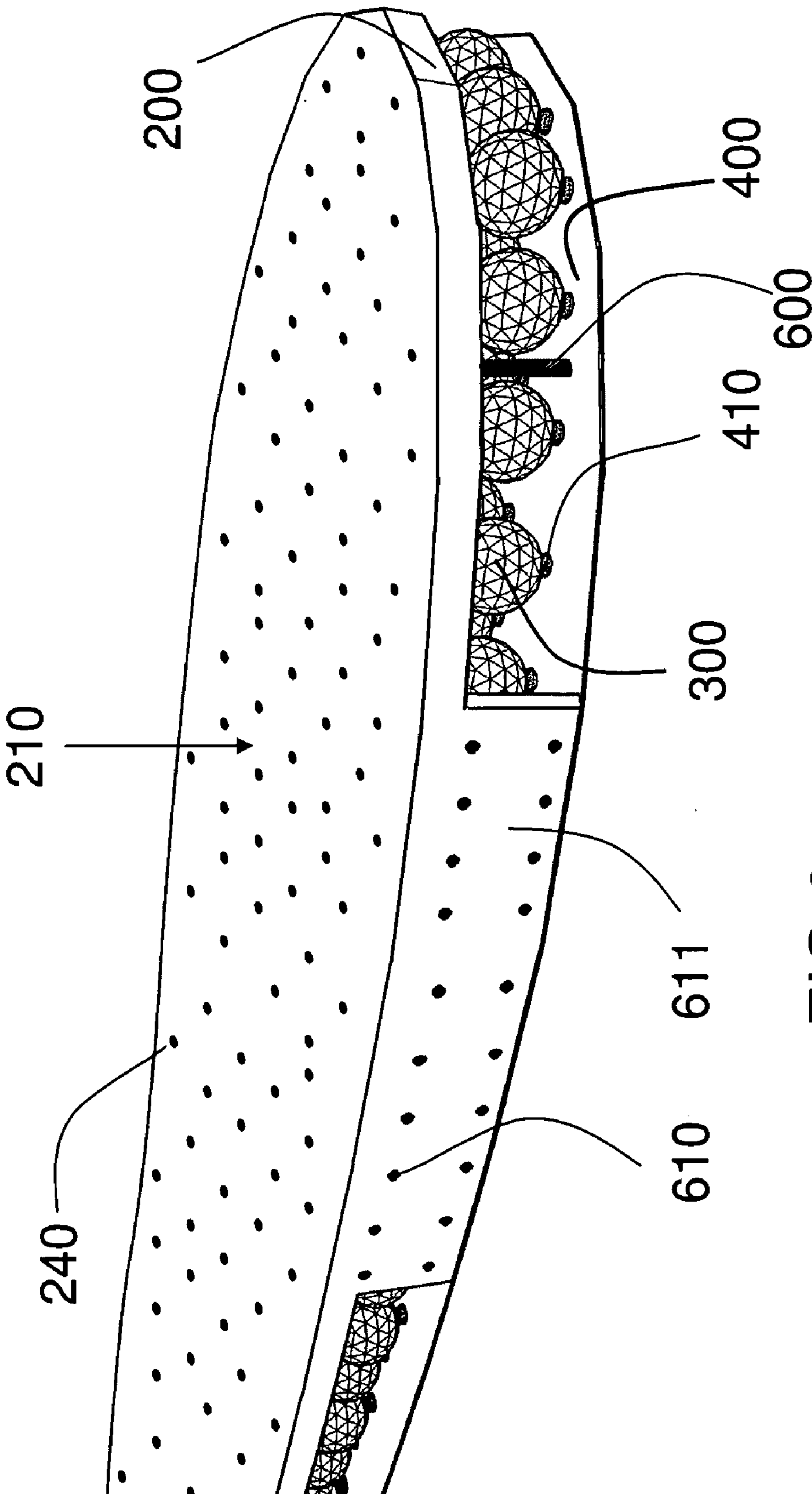


FIG 6

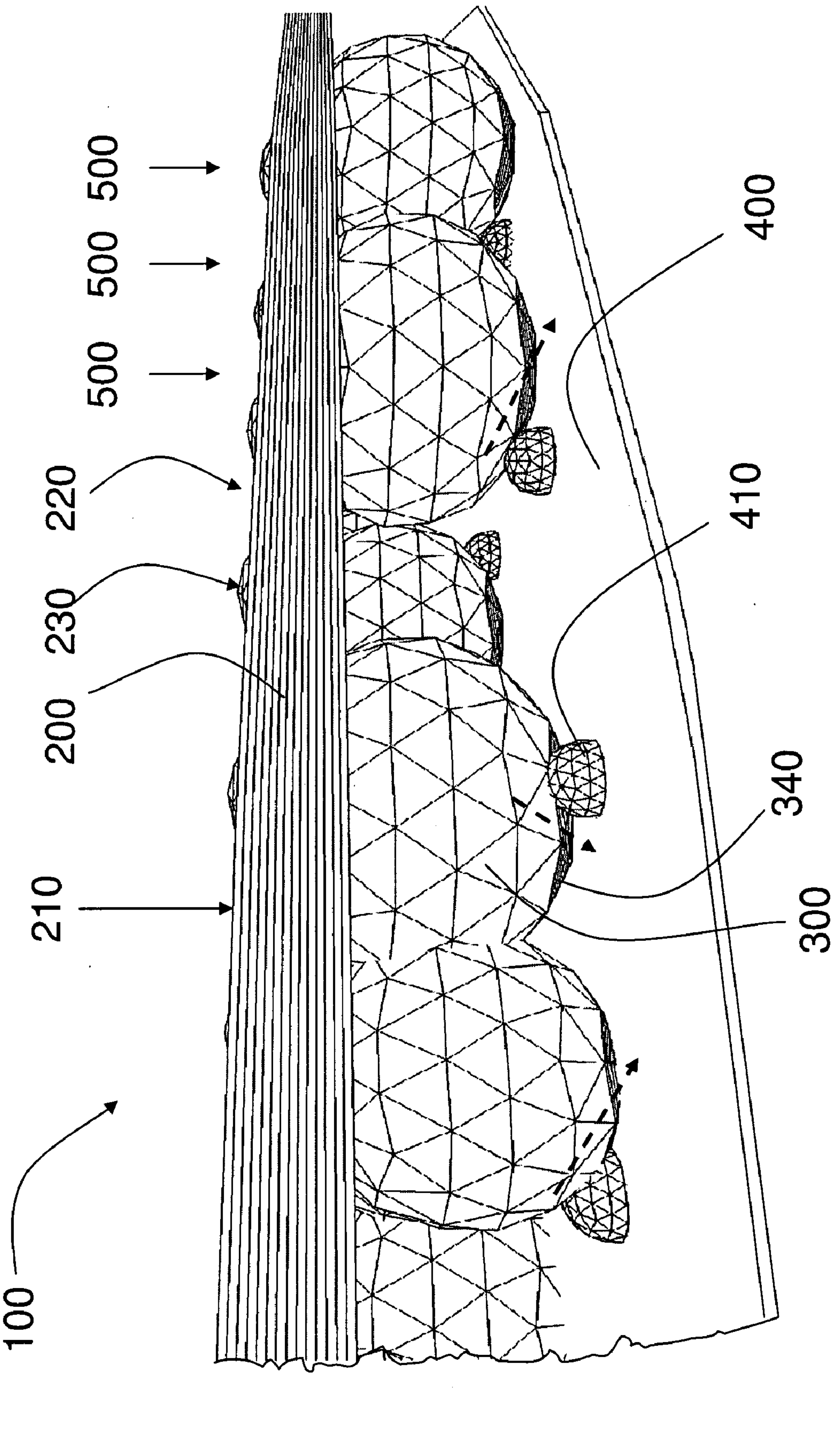


FIG 7

DYNAMIC CUSHIONING ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims benefit of U.S. Provisional Patent Application No. 60/963,426, Blood Circulation Enhancer, filed on 6 Aug. 2007.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

NAMES OF PARTIES TO JOINT RESEARCH AGREEMENT

[0003] Not Applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX

[0004] Not Applicable.

BACKGROUND OF THE INVENTION

[0005] 1. Field of the Invention

[0006] This invention relates to support arrangements and assemblies for the human body that provide enhanced blood circulation and dynamic cushioning support in footwear, beds, seats, backrests and other equipment which serve to support different areas of the human body for prolonged periods.

[0007] 2. Background of the Invention

[0008] Busch et al in U.S. Pat. No. 5,150,490 discloses a method of manufacturing footwear with the purpose to create a shape that adapts individually and exactly to the respective shape of the corresponding part of the foot. The dynamic cushioning assembly of the current invention does not take the exact shape of the corresponding part of the foot, but instead creates concave and convex areas in order to distribute the pressure and weight in alternate areas of the foot. Though the use of spherical shapes are shown as being used with this patent, the result does not create uneven surfaces when pressure is applied, but rather creates a relatively consistent and smooth surface that takes the corresponding shape of the foot of the wearer.

[0009] Legatzke in U.S. Pat. No. 6,178,662 discloses a surface for a sole of a shoe having an array of adjacent polygonal lugs with flat surfaces and edges, the edges forming grooves with adjacent lugs. Legatzke describes a pad having an upper surface with a plurality of lugs that provide a supporting surface for the foot whereas the arrangement of the invention provides spherical lugs beneath the pad that do not come into direct contact with the foot. When under full weight the lugs in Legatzke are approximately equal in size and closely spaced to one another to provide a substantially continuous and uniform foot-supporting surface when pressure is applied by the foot. The use of adjacent polygonal lugs with parallel vertical surfaces is intended to create a relatively continuous and smooth surface when under pressure.

[0010] Sasaki in U.S. Pat. No. 6,715,221 makes use of a plurality of ventilation holes with stimulating projecting elements supported by a shaft with an intermediate part. These projecting elements project directly out of the surface of the insole. These projecting elements also have a fixed location and therefore a fixed resistance point against the bottom of a foot when pressure is applied to the insole

[0011] The sole liner in Baron U.S. Pat. No. 6,119,370 discloses an insert or inner sole for a shoe having as its purpose support of the metatarsal and arch portions of the foot to thereby reduce pressure on those areas and associated foot pain. The insert or inner sole has three layers that interface with one another to create and displace a metatarsal hump. As a foot strides, the flex plate layer rocks forward and back on its centrally located, relatively thicker hump portion. The flex plate may engage the bottom layer by way of serration or friction. This solution is complicated and requires separate parts to fit and interlock and with male and female forms. The present invention does not rely on interlocking between parts when under pressure but on the movement of flexibly connected lugs when pressed.

SUMMARY OF THE INVENTION

[0012] It is an object of one embodiment of this invention to provide a dynamic cushioning assembly to support a portion of a body, the apparatus comprising an elastomeric layer having a top surface and a bottom surface, a plurality of lugs flexibly connected to the bottom surface of the elastomeric layer, the lugs arranged against the bottom surface of the elastomeric layer and each lug cooperating with the elastomeric layer to create a plurality of zones of higher resistance and a plurality of zones of lower resistance when a force is applied to the top surface of the elastomeric layer.

[0013] It is another object of one embodiment of the invention to provide a dynamic cushioning assembly further comprising a support layer positioned opposite of the elastomeric layer whereby the lugs are between the elastomeric layer and the support layer and the support layer having an elasticity measure sufficient to reduce deformation of the support layer at a point of contact with the lugs when the force is applied to the top surface of the elastomeric layer.

[0014] It is another object of one embodiment of the invention to provide a dynamic cushioning assembly further comprising a convex rigid bottom portion of the plurality of lugs, a plurality of convex knobs attached to the support layer and arranged opposite the rigid bottom portion of the lugs and a retaining means maintaining the opposite arrangement of the lugs and the knobs whereby the bottom portion of the lugs are displaced by the knobs when the force is applied to the top surface of the elastomeric layer.

[0015] It is another object of one embodiment of the invention to provide a dynamic cushioning assembly further comprising a convex rigid bottom portion of the plurality of lugs, the rigid bottom portion being magnetized with a polarity, a plurality of magnetized portions of the support layer magnetized with the polarity, the magnetized portions are arranged opposite the rigid bottom portion of the lugs and a retaining means maintaining the opposite arrangement of the lugs and the magnetized portions polarity assists the displacement of the bottom portion of the lugs when the force is applied to the top surface of the elastomeric layer.

[0016] It is a further object of one embodiment of the invention to provide a dynamic cushioning assembly wherein each lug cooperates with the elastomeric layer whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

[0017] It is another object of one embodiment of the invention to provide a dynamic cushioning assembly wherein the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer.

[0018] It is a further object of one embodiment of the invention to provide a dynamic cushioning assembly wherein the elastomeric layer contains a plurality of voids allowing air to pass through the elastomeric layer.

[0019] It is an additional object of one embodiment of the invention to provide a dynamic cushioning assembly to improve blood circulation in areas of a living body adversely affected by prolonged contact and pressure with surfaces whose shape of contact remains constant under pressure such as on seats, shoes, beds and the like.

[0020] It is a another object of one embodiment of the invention to provide a dynamic cushioning assembly to improve blood circulation in areas of the body adversely affected by prolonged contact and pressure with surfaces whose shape of contact remains constant under pressure such as on seats, shoes, beds and the like.

[0021] It is an additional object of one embodiment of the invention to provide a dynamic cushioning assembly to improve shock absorption, enhance blood circulation and improve ventilation when applied to seats, shoes, beds and the like, but in particular when applied to shoe inserts and insoles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] For a further understanding of the objects and advantage of embodiments of the present invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawings, in which like parts are given like reference numbers and wherein:

[0023] FIG. **1** is a perspective view of one embodiment of the dynamic cushioning assembly;

[0024] FIG. **2** is a partial perspective view of one embodiment of the dynamic cushioning assembly illustrating the zones on higher resistance and zones of lower resistance when a force is applied;

[0025] FIG. **3** is an exploded perspective view of one embodiment of the dynamic cushioning assembly;

[0026] FIG. **4** is a partial side perspective view of one embodiment of the dynamic cushioning assembly;

[0027] FIG. **5** shows a partial side perspective view of one embodiment of the dynamic cushioning assembly;

[0028] FIG. **6** is a partial side perspective view of one embodiment of the dynamic cushioning assembly illustrating one means to retain the upper elastomeric layer and the support layer; and

[0029] FIG. **7** is a partial side perspective view of one embodiment of the dynamic cushioning assembly illustrating the displacement of the lugs when a force is applied to the upper elastomeric layer.

DETAILED DESCRIPTION OF THE INVENTION

[0030] The present invention will first be described according to an embodiment adapted for use as an insole for or an insert into an article of footwear in a well known manner. This embodiment is being utilized for illustrative purposes and is in no way intended to be limiting. As will be readily understood by those in the art, this invention can be similarly applied to other types of surfaces that may be used for prolonged pressure against the body such as on, but not limited to hospital beds, airline seats and other seats. Similarly embodiments of the invention can be used directly in sole components of newly built shoes.

[0031] Throughout this description, the term "body" is intended to encompass either human or animal bodies as well as, but not limited to material bodies and elements such as a mechanical device or a manufactured product.

Assembly Structure:

[0032] As shown in FIG. **1**, one embodiment of the dynamic cushioning assembly **100** comprises an upper elastomeric layer **200** supported by a plurality of lugs **300** positioned against the upper layer **200**.

[0033] The upper layer **200** is generally soft and made of an elastomeric material such as, but not limited to polyurethane, plastic, rubber, silicon or other elastic material with similar qualities such as is used with common shoe sole inserts. The upper layer **200** is shaped to provide covering under the body portion being supported. The upper layer **200** has elastic properties such that it flexes with the foot as it flexes. The upper layer's elastic properties are also such that it is flexible about a small area, such as around lugs as will be described later in this description. The upper layer **200** comprises a top surface **210** and a bottom surface **250** (shown in FIG. **5**). The top surface **210** generally comprises a fabric, or fabric like surface that is capable of flexibly withstanding constant frictional forces. The material for the top surface **210** can include, but not be limited to cloth, leather, plastic or other fabrics or fabric like materials. The bottom surface **250** is simply the opposing side of the upper layer **200** and can be the opposing side of the top surface **210** or it can be a separate layer of material such as a foam, polyurethane, plastic, rubber, silicon or other elastic material.

[0034] Throughout this description, the term "elastomeric" is defined as an elastic substance occurring naturally, as natural rubber, or produced synthetically, as butyl rubber, neoprene or polyurethane. The term "elasticity measure" shall mean a ratio of the applied stress to the change in the shape of an elastomeric body

[0035] In a preferred embodiment for use in a shoe insert, the upper layer **200** is soft polyurethane gel pad whose thickness is contingent upon the weight of a person as well as the density and cushioning qualities of the pad. In this embodiment, the upper layer **200** is shaped to fit the profile of the bottom of a foot.

[0036] The lugs **300** are arranged against the bottom surface **250**. The arrangement against the surface can be a pattern or random positioning that generally allows a single layer of lugs to rest against the bottom surface **250**. The arrangement can include a direct connection to the surface. The lugs **300** are made of an elastomeric material that can generally maintain its shape when submitted to the force being applied to the cushioning assembly **100**. The elasticity measure of the lugs **300** is such that if a pressure is applied to the upper layer **200**, the lugs **300** provide a zone of higher resistance against the pressure where the lugs are against the bottom surface **250** as compared to the resistance provided against for the force at points of the upper layer **200** that is in between the points where the lugs are against the bottom surface **250**. Suitable materials for the lug construction include, but are not limited to plastics, polyesters, rubbers and other similar materials such as PET (polyethylene terephthalate) and PEN (polyethylene naphthalate).

[0037] In a preferred embodiment, the lugs **300** are formed by injection molding or lamination from and shaped spherically like a ball bearing and are attached in a single layer to the bottom surface **250**. In this embodiment, materials for the lugs **300** comprise plastics such as PET (polyethylene terephthalate) or PEN (polyethylene naphthalate).

[0038] As shown in FIG. **2**, when a force **500** is applied to the top surface **210** of the upper layer **200**, the elasticity measure of the lugs **300** cooperate with the elasticity measure of the upper layer to transform the otherwise generally flat top surface **210** into an undulating contour of dynamic zones of higher resistance **230** and zones of lower resistance **220** in response to the applied force **500**. The zones of higher and lower resistance are created by the relative resistance of the lugs against upper layer **200**. Specifically, in areas where the weight of the body is supported by a lug, a zone of higher resistance is formed. Where the weight is opposite an area between the lugs, a zone of lower resistance is formed. In other words having a given area surrounded by lower resistance causes that area to become a zone of higher resistance. The desired proportion of higher to lower resistance zones is be a function of the size of the lugs, the distance between them, and the thickness as well as the elasticity measure of the upper elastomeric layer **200** as well as the force to be applied to the assembly.

[0039] The locations of these zones of higher and lower resistance are both dynamic and irregular. They are dynamic in that the zones change when pressure is applied and released. They are irregular in that the zones will shift irregularly as a result of lateral mobility and the reaction of the lugs to differing forces that are applied to the assembly. This irregularity occurs by the cooperation of the lugs against the bottom surface **250** of the upper layer and is enhanced in embodiments that include elements such as the resilient stems and the knobs as described below.

[0040] Although not necessary, one embodiment of this invention further comprises a means to reduce the sinking of the lugs into the surface below them. As shown in FIG. **1**, one means to serve this purpose is to provide a support layer **400** positioned against the lugs **300** and opposite the upper layer **200**. This support layer **400** has an elasticity measure that is flexible enough to take the general shape of the surface on which it is placed and is rigid enough to reduce the support layer deformation by withholding the lugs **300** from sinking into that surface when a force is applied. The support layer **400** is particularly helpful when the surface against which the assembly **100** presses against is soft, such as into the surface of a bed or a soft insole of a shoe. The support layer **400** provides a layer of elastomeric material under the lugs to stop the lugs from being pressed into the existing soft area below. The support layer **400** also provides resistance against the lugs **300** and forces them to compact and expand laterally as well as move under the force **500** rather than sink into the soft surface beneath. The support layer **400** under the spherical lugs ensures proper functioning of the assembly in creating optimal dynamic convex and concave shapes enabling improved blood circulation as compared to a uniform or a uniformly deforming surface. Instead of sinking into the existing soft surface of a bed, shoe or chair, the support layer **400** will block the lugs **300** downward movement which will force the lugs **300** to contract in vertically and expand laterally, further adding to the dynamic nature of the assembly **100** supporting the body part. Suitable materials for the support layer **400** include but are not limited to various types foam, polyurethane, plastic, rubber, silicon or other elastic materials or combinations thereof.

[0041] In a preferred embodiment, the support layer **400** is made from a material slightly more rigid than the upper layer **200**. In this embodiment, the support layer **400** comprises a thin plastic sheet and is shaped similarly to the upper layer **200**.

[0042] In other embodiment, other means to prevent the lugs **300** from being easily pressed into the underlying surface include, but are not limited to making the bottom part of the lugs wider and flatter or incorporating the support layer, or characteristics of the support layer, into shoes with stiffer cushioning in the soles.

[0043] As shown in FIGS. **4** and **5**, one embodiment of the invention further comprises the lugs **300** being connected to the bottom surface **250** of the upper layer **200** by resilient stems **320**. Suitable materials for the resilient stems **320** include but are not limited to fiber, rubber or textile sufficiently flexible to allow slight mobility of the lugs but resilient enough to keep them from breaking off of the bottom surface **250**.

[0044] Other means to connect the lugs **300** to the bottom surface **250** include but are not limited to having more than one stem per lug or having the lugs **300** laminated to surface **250**.

[0045] FIGS. **4** and **5** also show a plurality of knobs **410**. The knobs **410** are of material sufficiently rigid to resist significant deformation when subjected to the force applied to the cushioning assembly **100**. The knobs **410** can be elastic or non-elastic and can be made from materials such as a foam, polyurethane, plastic, rubber, silicon, metal, fibers or other elastic material or combination thereof. The knobs **410** are generally arranged on the support layer **400** opposite and under the center of each lug **300**, and are generally convex shaped such as the top half of a sphere. The purpose of the knobs **410** is to cause lateral movement of lugs **300** when pressed against the knobs **410**.

[0046] In a preferred embodiment, the knobs **410** are made from resilient plastic shaped as the top half of a sphere. In this embodiment, the knobs **410** are made of a rigid plastic.

[0047] In one embodiment, the lugs **300** have bottom portion **340** that is convex and made of a less elastic material similar to knobs **410**. With this more rigid configuration, when the force is applied to the cushioning assembly **100**, the lugs **300** will more easily move away from knobs **410** thus creating an irregular surface shape to the upper layer top surface **210**.

[0048] FIG. **6** illustrates one embodiment of a retaining means to keep the upper layer **200** and the support layer **400** connected. This retaining means helps to ensure that the lugs **300** and the knobs **410** remain in positions opposite one another when there is little or no pressure applied to upper layer **200**. The retaining means shown is a circumferential strip **611** that connects at least a portion of the upper layer **200** with the support layer **400**. The circumferential strip can have openings **610** to provide additional ventilation for the assembly. Other means of retaining the relative position of the upper layer **200** and the support layer **400** include but are not limited to additional connectors **600** added between at least some of the lugs **300**, attaching some of the lugs **300** to both the upper layer **200** and the support layer **400** or any other method of attaching the two layers.

[0049] The above noted embodiments create a ventilation effect which comes about by the movement of air from the circumference area between the upper surface and the support surface, or the openings **610** in the circumferential strip **611** of the assembly **100**. However, additional ventilation may be provided by small shafts or holes **240** built into the upper layer **200** between the lugs **300**, as shown in FIG. **2**. As shown, the ventilation can be further enhanced by placing the holes **240** between the lugs **300**. Having the holes **240** in the depressed, lower resistance zones **220** ensures better air circulation, rather than in the convex, higher resistance zones **230**.

[0050] In other embodiments of the assembly **100**, the use of opposing, identical polarity, small magnets built into the lugs **300** and the knobs **410** can further help the lugs **300** to move laterally and away from the knobs **410**. Lugs **300** which are laterally mobile (limited by the length of their stem **320**) will have to land to the side of the fixed knobs **410**. Thus the force, such as body pressure, will cause irregular lateral spacing of the lugs **300**. These irregular dynamic zones alternating in slightly different positions when under a force help stimulate blood flow and enhance perfusion by creating different levels of local tissue compression.

[0051] In another embodiment of the assembly **100**, it is possible to use magnets to eliminate the need of the knobs **410** as protrusions against which the lugs **300** are forced to move laterally when subjected to a force. Magnets can be installed in the support layer **400** in small protrusions, or no protrusions at all with the same charge as the magnets built inside the lugs **300**.

[0052] In another embodiment of the assembly **100**, it is possible to use magnets built in the lugs **300** causing them move away from one another or even a slight vibration as the assembly **100** being pressed on.

OPERATION OF ONE EMBODIMENT OF THE INVENTION

[0053] FIG. **7** illustrates the cooperation of the upper layer **200**, lugs **300**, support layer **400**, resilient stems (not shown), and the knobs **410** to enhance the dynamic and irregular location of the high resistance zones **230** and the low resistance zones **220**. The resilient stems **320** are not seen in FIG. **7** as they are obstructed under layer **200**.

[0054] Using the illustration of applying one embodiment of the invention to shoe soles, when foot pressure is applied on the top surface **210**, the lugs **300** contract vertically and expand laterally while creating zones of higher resistance **230** and zones of lower resistance **220** throughout the upper layer **200**. The resulting convex and concave shape of the upper layer top surface **210** at the high resistance zones **230** and the low resistance zones **220** combine to create the dynamic surface where foot or body pressure is applied and allows for enhanced blood circulation. In other words some portion of the body will take less pressure in some areas than in others, in an alternating manner, allowing for better blood circulation in these areas of less pressure. Beneath the lugs **300**, support layer **400** serves as a buffer that stops the lugs **300** from sinking into the exiting surface below the assembly **100** such as the soft inner sole area of the shoe. The knobs **410** on the support layer **400** cause the lugs **300** to be displaced laterally (as shown by the dashed arrows) when under foot pressure adding lateral mobility to the lugs **300**. Both the knobs **410** and the bottom portion **340** of the lugs are spherically shaped and made of hard material so that when pressed against one another they will be forced to move laterally. This lateral mobility further enhances blood circulation by applying pressure on the tissue at a changeable position rather than a fixed point.

[0055] The dynamic nature of the zones of higher resistance **230** and zones of lower resistance **220** is created by the dynamic and varied force that is applied to the upper layer top surface **210**. In embodiments of the assembly such as those used under a person's foot, the force created by the foot when walking is varied based on the person's change in walking stride or the orientation of the walking surface. This variation in force creates a varied displacement of the lugs which in turn varies the zones of higher and lower resistance in the assembly **100**.

[0056] As the force is reduced against the upper layer **200**, as when a foot is raised off of the ground, the lugs **300**, and the upper layer **200** return from the compressed position in FIG. **7** to a more released position such as that shown in FIG. **5**. In the released position, the lugs **300** are repositioned and ready to react to a different force such as the force of a foot being placed back on the sole as it is placed back on the ground.

[0057] Additionally, as the force is reduced or increased against the upper layer **200**, ventilation occurs. This ventilation can come through openings **610** in the circumference area of the device as shown in FIG. **6** and through the small holes **240** as shown in FIGS. **2** and **6**. The placement of the holes **240** creates a natural way to enhance ventilation.

[0058] One of ordinary skill in the art of the present invention will also appreciate that there can be many other embodiments of the described invention. Other embodiments include but are not limited to hospital beds, seats, arm pads, spa beds, spa equipment, exercise pads, facial pads or other surface that contacts a human or animal body.

[0059] One of ordinary skill in the art of the present invention will also appreciate that there can be many other uses of the described invention. These other uses include but are not limited to use in equipment support pads, conveyor belts or other material support surfaces that benefit from a dynamically cushioned surface.

[0060] Numerous modifications and alternative embodiments of the present invention will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the best mode for carrying out the present invention. Details of the structure may vary substantially without departing from the spirit of the invention, and exclusive use of all modifications that come within the scope of the appended claims is reserved.

What is claimed is:

1. A dynamic cushioning assembly to support a portion of a body, the apparatus comprising:
- an elastomeric layer having a top surface and a bottom surface;
- a plurality of lugs flexibly connected to the bottom surface of the elastomeric layer;
- the lugs arranged against the bottom surface of the elastomeric layer; and
- each lug cooperating with the elastomeric layer to create a plurality of zones of higher resistance and a plurality of zones of lower resistance when a force is applied to the top surface of the elastomeric layer.

2. The assembly of claim **1** wherein each lug cooperates with the elastomeric layer whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

3. The assembly of claim **1** wherein each of the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer.

4. The assembly of claim **3** wherein the lugs are convex at a point of contact with the resilient stem.

5. The assembly of claim **1** wherein the elastomeric layer contains a plurality of voids allowing air to pass through the elastomeric layer.

6. The assembly of claim **1** wherein the apparatus is utilized against a portion of the human body.

7. The assembly of claim **1** wherein at least two lugs have a magnetized portion magnetized with a polarity whereby the polarity assists the displacement of the lugs when the force is applied to the top surface of the elastomeric layer.

8. The assembly of claim **1** further comprising:

a support layer positioned opposite of the elastomeric layer whereby the lugs are between the elastomeric layer and the support layer; and

the support layer having an elasticity measure sufficient to reduce deformation of the support layer at a point of contact with the lugs when the force is applied to the top surface of the elastomeric layer.

9. The assembly of claim **8** further comprising:

a convex rigid bottom portion of the plurality of lugs;

a plurality of convex knobs attached to the support layer and arranged opposite the rigid bottom portion of the lugs; and

a retaining means maintaining the opposite arrangement of the lugs and the knobs whereby the bottom portion of the lugs are displaced by the knobs when the force is applied to the top surface of the elastomeric layer.

10. The assembly of claim **9** wherein each lug cooperates with the elastomeric layer and the knobs whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

11. The assembly of claim **9** wherein each of the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer.

12. The assembly of claim **11** wherein the lugs are convex at a point of contact with the resilient stem.

13. The assembly of claim **9** wherein the elastomeric layer contains a plurality of voids allowing air to pass through the elastomeric layer.

14. The assembly of claim **9** wherein the apparatus is utilized against a portion of the human body.

15. The assembly of claim **9** further wherein:

the rigid bottom portion of each lug is magnetized with a polarity; and

each knob is magnetized with the polarity whereby the polarity assists the displacement of the lugs when the force is applied to the top surface of the elastomeric layer.

16. The assembly of claim **8** further comprising:

a convex rigid bottom portion of the plurality of lugs;

the rigid bottom portion being magnetized with a polarity;

a plurality of magnetized portions of the support layer magnetized with the polarity;

the magnetized portions are arranged opposite the rigid bottom portion of the lugs; and

a retaining means maintaining the opposite arrangement of the lugs and the magnetized portions polarity assists the displacement of the bottom portion of the lugs when the force is applied to the top surface of the elastomeric layer.

17. The assembly of claim **16** wherein each lug cooperates with the elastomeric layer and the support layer whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

18. The assembly of claim **16** wherein each of the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer.

19. The assembly of claim **18** wherein the lugs are convex at a point of contact with the resilient stem.

20. The assembly of claim **16** further wherein the elastomeric layer contains a plurality of voids allowing air to pass through the elastomeric layer.

21. The assembly of claim **16** wherein the apparatus is utilized under a portion of a human body.

22. A dynamic cushioning assembly to support a portion of a body, the apparatus comprising:

an elastomeric layer having a top surface and a bottom surface;

a plurality of lugs flexibly connected to the bottom surface of the elastomeric layer;

the lugs arranged against the bottom surface of the elastomeric layer and cooperating with the elastomeric layer to create a plurality of zones of higher resistance and a plurality of zones of lower resistance when a force is applied to the top surface of the elastomeric layer;

the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer;

the lugs are convex at a point of contact with the resilient stem;

a support layer positioned opposite of the elastomeric layer whereby the lugs are between the elastomeric layer and the support layer;

the support layer having an elasticity measure sufficient to reduce deformation of the support layer at a point of contact with the lugs when the force is applied to the top surface of the elastomeric layer;

a convex rigid bottom portion of the plurality of lugs;

a plurality of convex knobs attached to the support layer and arranged opposite the rigid bottom portion of the lugs;

a retaining means maintaining the opposite arrangement of the lugs and the knobs whereby the bottom portion of the lugs are displaced by the knobs when the force is applied to the top surface of the elastomeric layer; and

each lug further cooperating with the elastomeric layer and the knobs whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

23. A dynamic cushioning assembly to support a portion of a body, the apparatus comprising:

an elastomeric layer having a top surface and a bottom surface;

a plurality of lugs flexibly connected to the bottom surface of the elastomeric layer;

the lugs arranged against the bottom surface of the elastomeric layer and cooperating with the elastomeric layer to create a plurality of zones of higher resistance and a plurality of zones of lower resistance when a force is applied to the top surface of the elastomeric layer;

the lugs are flexibly connected to the elastomeric layer with a resilient stem permitting a degree of lug movement when the force is applied to the top surface of the elastomeric layer;

the lugs are convex at a point of contact with the resilient stem;

a support layer positioned opposite of the elastomeric layer whereby the lugs are between the elastomeric layer and the support layer;

the support layer having an elasticity measure sufficient to reduce deformation of the support layer at a point of contact with the lugs when the force is applied to the top surface of the elastomeric layer;

a convex rigid bottom portion of the plurality of lugs;

the rigid bottom portion being magnetized with a polarity;

a plurality of magnetized portions of the support layer magnetized with the polarity;

the magnetized portions are arranged opposite the rigid bottom portion of the lugs; and

a retaining means maintaining the opposite arrangement of the lugs and the magnetized portions polarity assists the displacement of the bottom portion of the lugs when the force is applied to the top surface of the elastomeric layer; and

each lug cooperates with the elastomeric layer and the support layer whereby a variation of the force creates a variation in location of the plurality of zones of higher resistance and the plurality of zones of lower resistance.

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