US 20080189982A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2008/0189982 A1**

(43) **Pub. Date: Aug. 14, 2008**

Krafsur

(54) **SHOE SPRING SOLE INSERT**

(76) Inventor: **Andrew B. Krafsur**, El Paso, TX (US)

Correspondence Address:
R WAYNE PRITCHARD
300 EAST MAIN, SUITE 1240
EL PASO, TX 79901

(21) Appl. No.: **12/069,096**

(22) Filed: **Feb. 7, 2008**

Related U.S. Application Data

(60) Provisional application No. 60/900,607, filed on Feb. 9, 2007.

Publication Classification

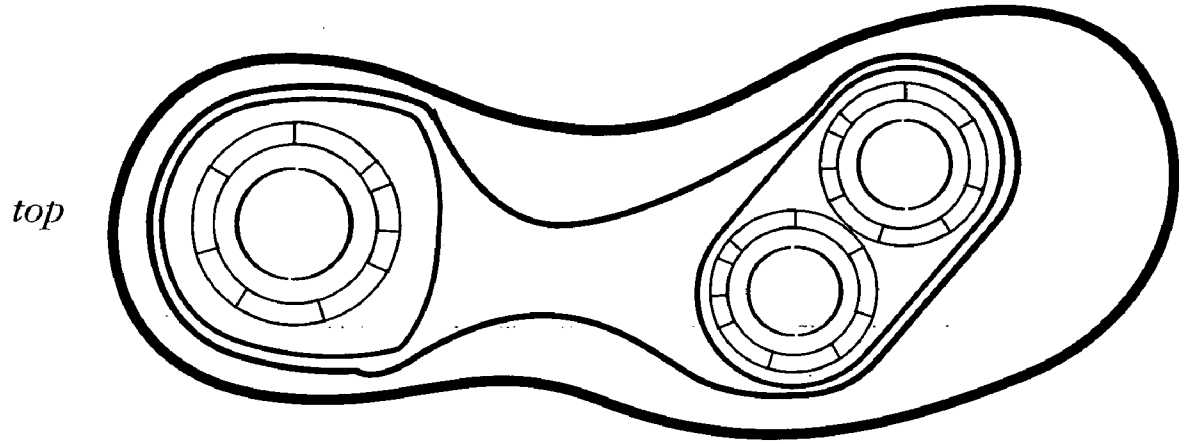
(51) **Int. Cl.**

A43B 13/28	(2006.01)
A43B 13/18	(2006.01)
A43B 21/26	(2006.01)
A43B 13/38	(2006.01)

(52) **U.S. Cl.** ..... **36/27**; 36/28; 36/35 R; 36/43

(57) **ABSTRACT**

A spring cushioned shoe insert is disclosed. The sole insert includes an insert that has a first wave spring disposed within a vacuity of the heel region and a second wave spring disposed within a vacuity of the toe region. The springs are, e.g., wave springs that extend to the upper and lower boundaries of the spring enclosure. In one embodiment of the present invention, a fluid flow passageway facilitates the movement of air from the heel to toe regions of the insert. In a second embodiment, the wave springs are fully contained within encapsulating enclosures.



side

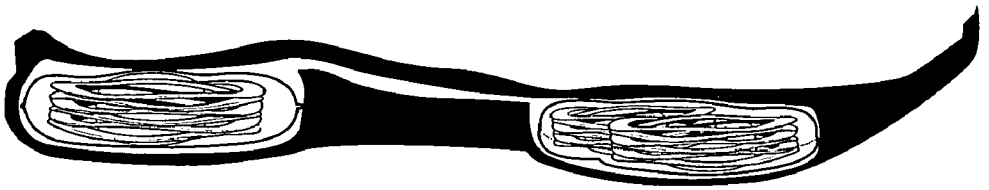


Figure 1

top

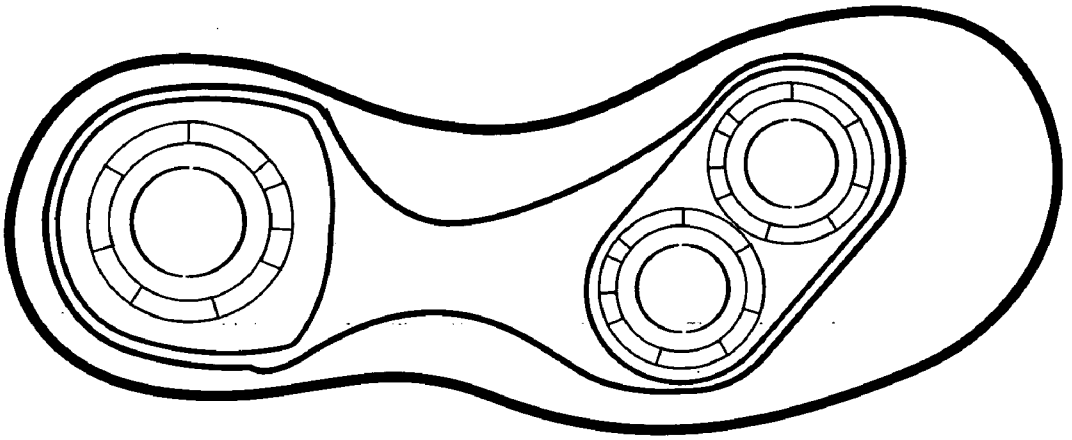


Figure 2

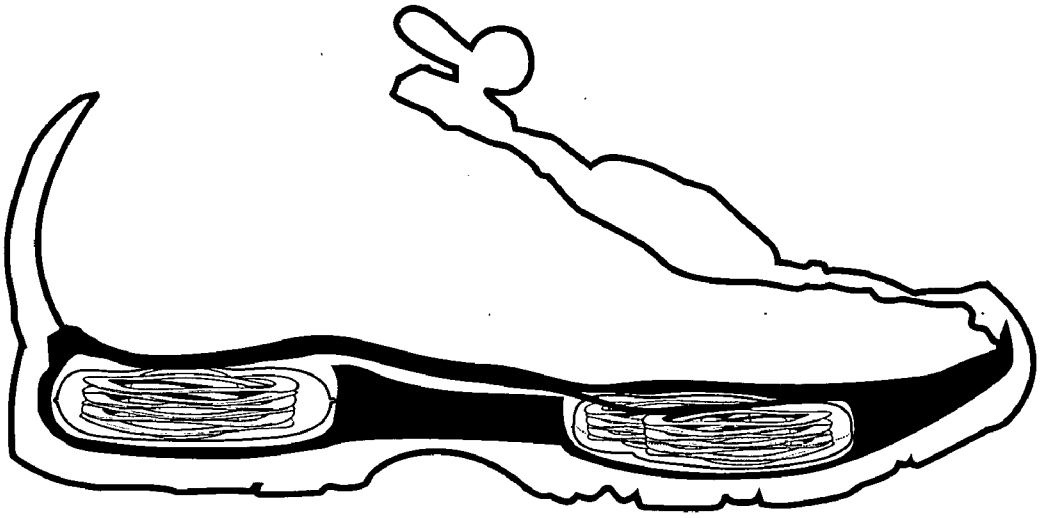


Figure 3

side

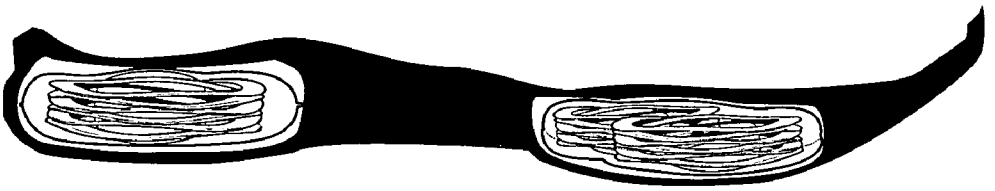


Figure 4

top

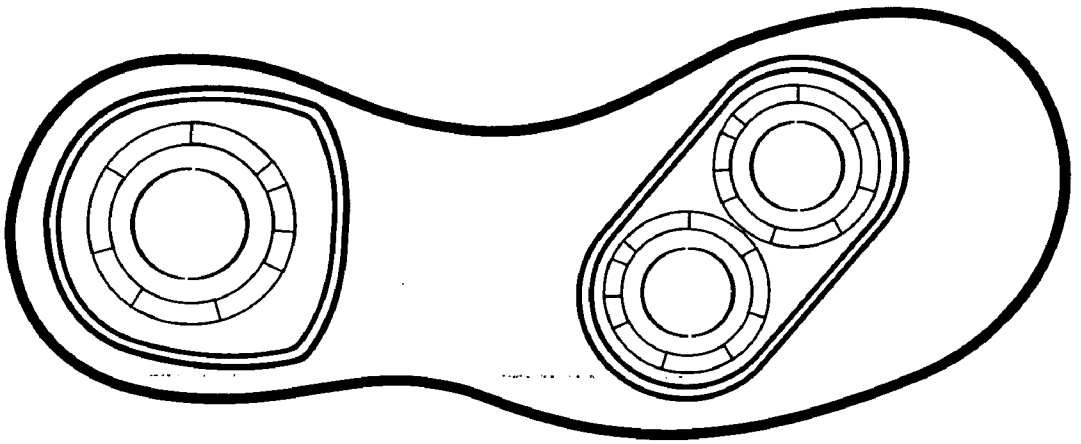


Figure 5

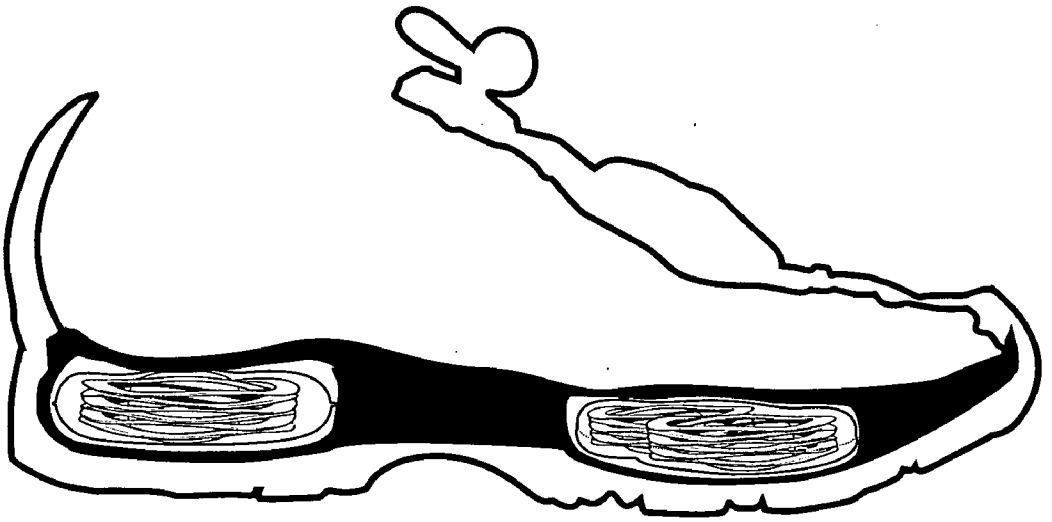


Figure 6

SHOE SPRING SOLE INSERT

PRIORITY CLAIM

[0001] This application claims the benefit of priority of U.S. Provisional Application No. 60/900,607, filed Feb. 9, 2007.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to an improvement to the existing technology surrounding wave spring cushioned shoes. Specifically, prior wave spring cushioned shoes, as disclosed in U.S. Pat. Nos. 6,282,814 and 6,665,957, contained a fixed set of wave springs of predetermined size and strength within the sole of the shoe. The present invention allows for an insert containing the wave springs to be inserted into the shoe by the ultimate user.

[0004] 2. Description of the Prior Art

[0005] One of the most basic laws of physics is that for ever action there is an equal and opposite reaction. In terms of shoes and running, this means that for every step down ("foot strike"), there is an equal and opposite force exerted back towards the shoe and ultimately the person wearing the shoe. If life were but one step perhaps the forces involved would be inconsequential. But life, like running, is not a single step but a repetition of many steps. The forces that must be absorbed by a shoe and the wearer of the shoe over the course of a single event are tremendous and have spurred on countless inventions aimed at cushioning shoe impact forces.

[0006] U.S. Pat. No. 6,282,814 (the '814 patent) discloses a spring cushioned shoe wherein the springs are sealed within vacuities formed in the soles of the shoe. The '814 patent utilizes wave springs which are substantially identical to the multi turn compression springs with distinct crests and trough described by Greenhill in U.S. Pat. No. 4,901,987. The wave springs of the current invention are identical to those of the '814 patent, having circular flat shim ends, wave crest and wave trough with prescribed periodicity. The compression wave springs of the preferred embodiment of this invention could be replaced with multi turn wave springs which do not employ flat shim ends but rather rely on the use of flat end plates in combination with ordinary wave springs. While the technology of the '814 patent is effective in reducing impact upon a user's foot, such technology does not allow for easy replacement of the wave springs should a malfunction occur nor does it permit the customization of the wave springs themselves to an individual's body type or running style.

[0007] Too much air within the spring containing shoe sole vacuities, can interfere with the performance of the springs. There are two basic ways to insure that air does not interfere with spring performance. As shown in U.S. Pat. No. 6,665,957 (the '957 patent), a fluid flow passageway can be utilized to facilitate the movement of air away form the springs during a foot strike. As disclosed more recently by this inventor in U.S. Provisional Application No. 60/897,605, a fully encapsulating spring enclosure can also be used. As with the fluid flow passageway concept, the fluid within the encapsulating spring enclosure can be any substance that flows such as a gas or a liquid. The volume of fluid within the encapsulating spring enclosure is sufficient to allow for enhanced spring performance but not so great as to interfere with such performance. The encapsulating spring enclosure is sealed using any conventional means such as heat and glue so as to prevent air from the inside of such enclosure from escaping to the outside or air from the outside from being introduced into the enclosure ("hermetically sealed")

SUMMARY OF THE INVENTION

[0008] It is the object of the present invention to provide for a shoe insert that contains the wave springs. It is a further object of the present invention to allow for the customization of the wave spring insert to an individual's body type or running style.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is a side view of the fluid flow passageway containing sole insert.

[0010] FIG. **2** is a top view of the fluid flow passageway containing sole insert.

[0011] FIG. **3** is an illustration of the fluid flow passageway containing sole insert as placed into a shoe.

[0012] FIG. **4** is a top view of the sole insert without fluid flow passageway.

[0013] FIG. **5** is a top view of the shoe insert without fluid flow passageway.

[0014] FIG. **6** is an illustration of the sole insert without fluid flow passageway as placed into a shoe.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] The detailed embodiments of the present invention are disclosed herein. It should be understood, however, that the disclosed embodiments are merely exemplary of the invention, which may be embodied in various forms. Therefore, the details disclosed herein are not to be interpreted as limiting, but merely as the basis for the claims and as a basis for teaching one skilled in the art how to make and/or use the invention.

[0016] FIGS. **1** through **3** depict one embodiment of the present invention utilizing the fluid flow passageway to facilitate the movement of air within the sole insert. FIG. **1** depicts a side view of the sole insert [**4**] of the present invention showing the wave spring [**1&2**], the fluid flow passageway [**3**]. FIG. **2** illustrates a top view of the present invention again showing the wave springs [**1&2**] and fluid flow passageway [**3**]. Although both in this embodiment as well as the second embodiment described below, two springs [**2**] are shown in the toe region of the sole insert [**4**] and one spring [**1**] depicted in the heel region, it should be appreciated and understood that any number of springs as well as any configuration of such springs could perform just as effectively. FIG. **3** illustrates the placement of the sole insert [**4**] within a shoe [**5**] and also again illustrates the fluid flow passageway [**3**], and the wave springs [**1&2**}.

[0017] FIGS. **4-6** depict a second embodiment of the present invention. Here, the fluid flow passageway [**3**] shown in FIGS. **1-3** has been replaced by wave springs [**6&7**] fully contained within encapsulating spring enclosures [**8&9**]. FIG. **4** depicts a side view of the sole insert [**10**] with the wave springs [**6&7**], and encapsulating enclosures as [**8&9**]. FIG. **5** shows a top view of the sole insert [**10**] and FIG. **6** illustrates the placed of the sole insert [**10**] within the shoe [**11**].

[0018] While the preferred embodiments have been shown and described, it will be understood that there is no intent to limit the invention by such disclosure, but rather, is intended

to cover all modifications and alternate constructions falling within the spirit and scope of the invention as defined in the appended claims.

1. A sole insert assembly for an article of footwear, the sole insert assembly having a heel and toe region.

2. The sole insert assembly of claim **1** wherein the sole insert assembly comprises:

a first wave spring disposed within the heel region;

a second wave spring disposed within the toe region, and

a fluid flow passageway between the first and second wave springs.

3. A shoe comprising a shoe sole including outer sole, an inner sole, and a mid sole disposed above the outer sole and inner sole; the middle sole defining a vacuity.

4. The shoe of claim **3** further comprising an encapsulating spring enclosure disposed within such vacuity.

5. The shoe of claim **4** wherein a first wave spring is disposed within the heel region of the encapsulating spring enclosure.

6. The shoe of claim **5** wherein a second wave spring is disposed within the toe region of the encapsulating spring enclosure.

7. The shoe of claim **6** further comprising a fluid flow passageway between the first and second wave springs.

8. The shoe of claim **5** wherein the spring is a crest to crest multi-turn spring.

9. The shoe of claim **5** wherein the encapsulating spring enclosure is hermetically sealed.

10. The shoe of claim **5** wherein the encapsulating spring enclosure contains air at atmospheric pressure.

11. A shoe comprising a shoe sole including outer sole, an inner sole, and a mid sole disposed above the outer sole and inner sole; the middle sole defining a first vacuity within the heel region and second vacuity within the toe region.

12. The shoe of claim **11** further comprising an encapsulating spring enclosure containing a wave spring, disposed within the heel region vacuity.

13. The shoe of claim **12** wherein the spring is a crest to crest multi-turn spring.

14. The shoe of claim **12** wherein the encapsulating spring enclosure is hermetically sealed.

15. The shoe of claim **12** wherein the encapsulating spring enclosure contains air at atmospheric pressure.

16. A shoe comprising a shoe sole including outer sole, an inner sole, and a mid sole disposed above the outer sole and inner sole; the middle sole defining a first vacuity within the heel region and second vacuity within the toe region further comprising an encapsulating spring enclosure containing a wave spring, disposed within the heel and toe region vacuities.

17. The shoe of claim **16** wherein the spring is a crest to crest multi-turn spring.

18. The shoe of claim **16** wherein the encapsulating spring enclosure is hermetically sealed.

19. The shoe of claim **16** wherein the encapsulating spring enclosure contains air at atmospheric pressure.

* * * * *