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(54) **SHOE WITH RESILIENT HEEL**

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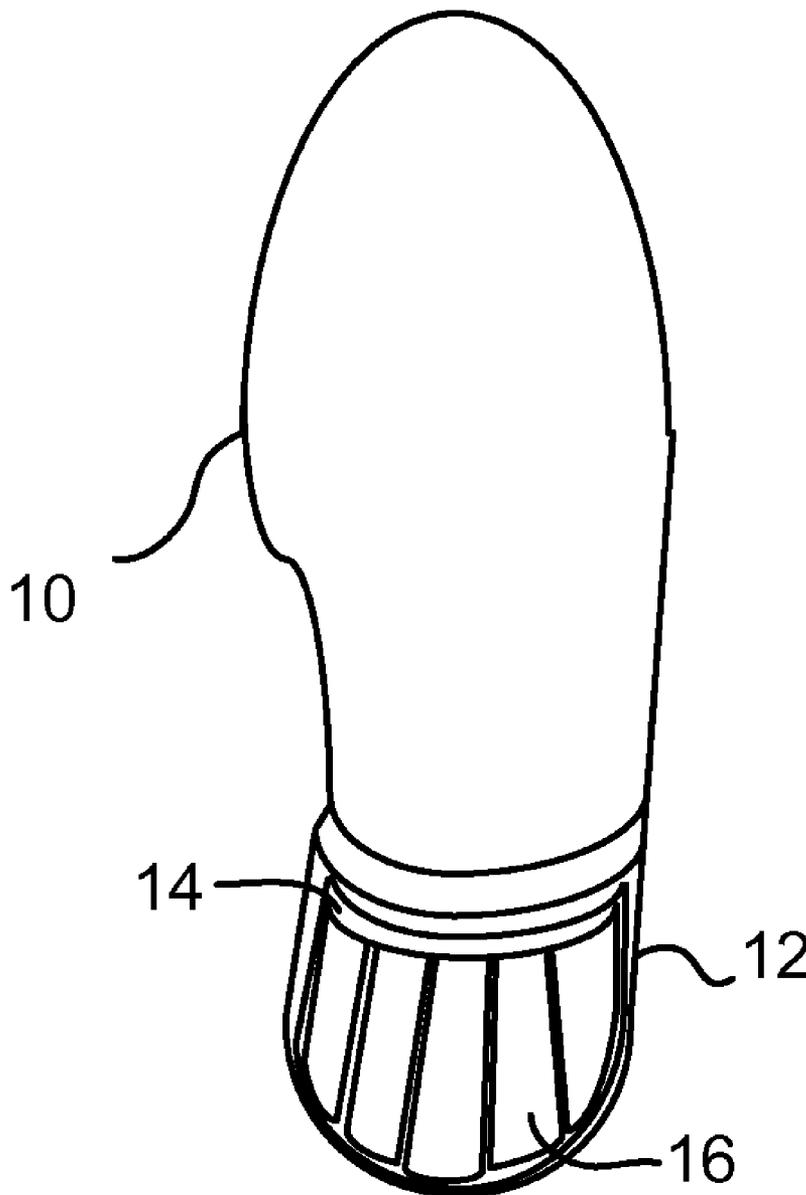
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(57) **ABSTRACT**

**Related U.S. Application Data**

(60) Provisional application No. 61/438,726, filed on Feb. 2, 2011.

This invention is directed to an improved shoe comprising: a shoe having a heel; a cavity defined in said heel; and, a spring assembly for being received in said cavity and attached to said shoe having a plurality of leaf springs. The invention can also include a vibration damping element carried by each of said leaf springs. The invention can also include non-slick coverings carried by each of said leaf springs.



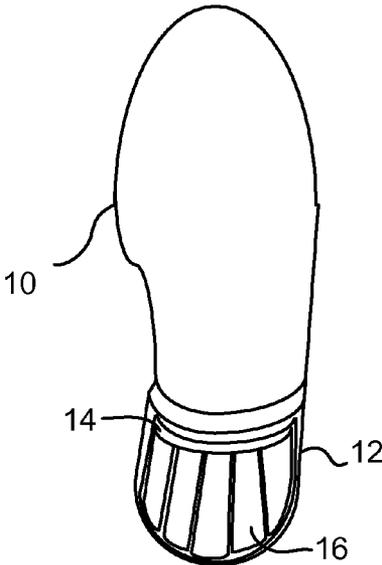


Fig 1A

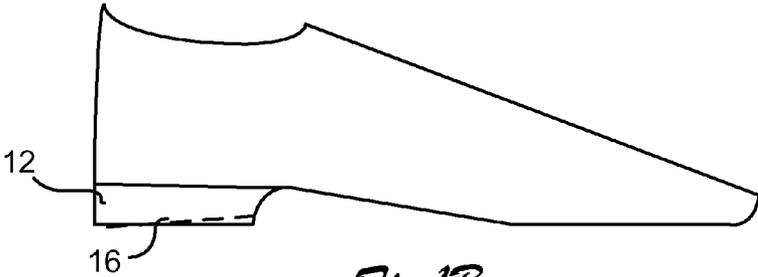


Fig 1B

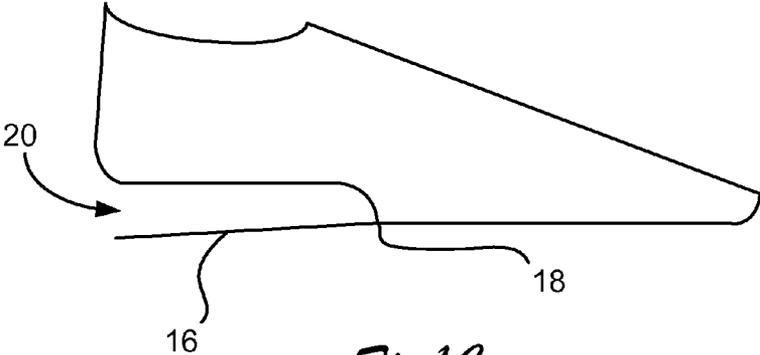
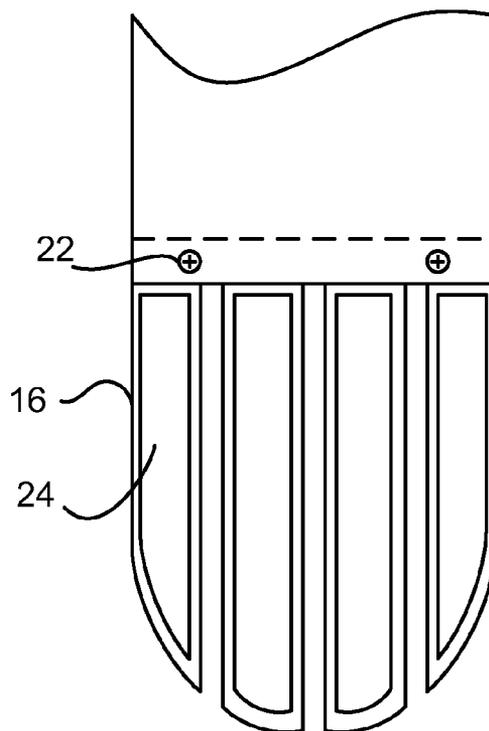
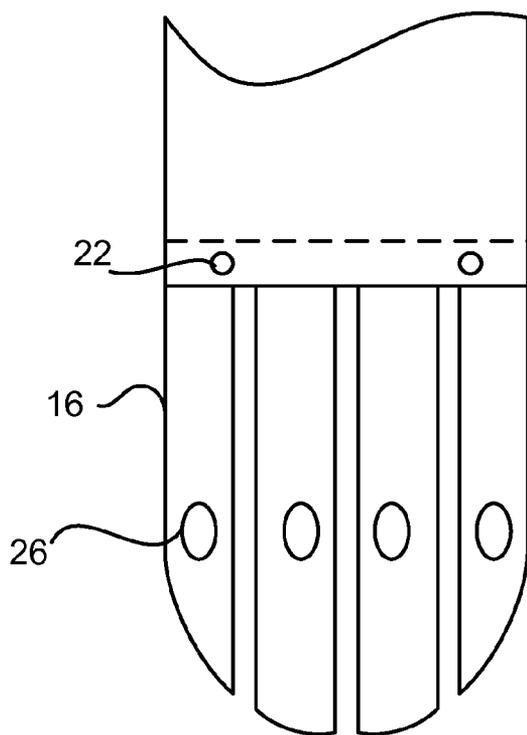


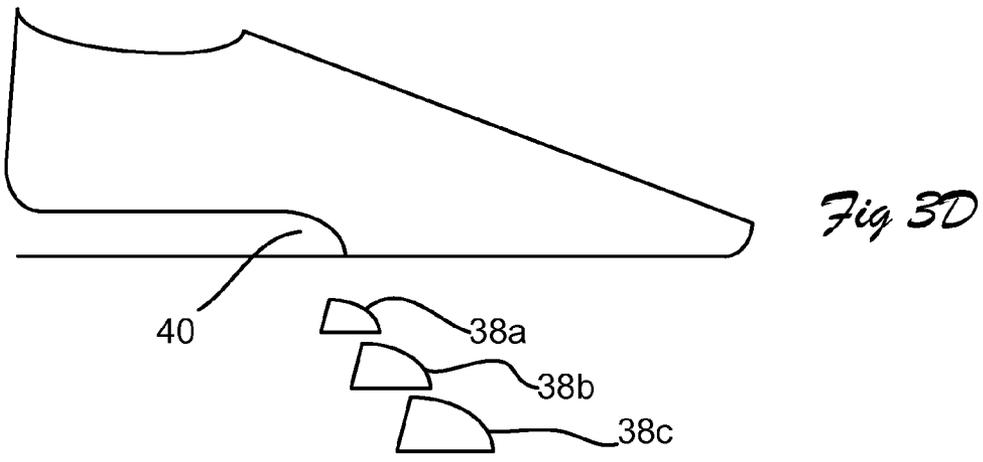
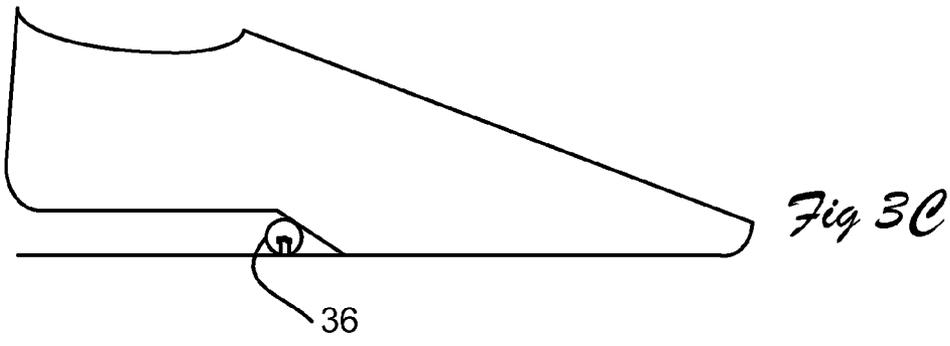
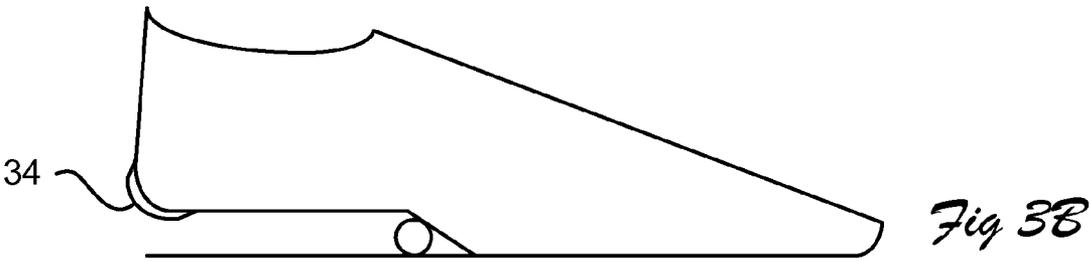
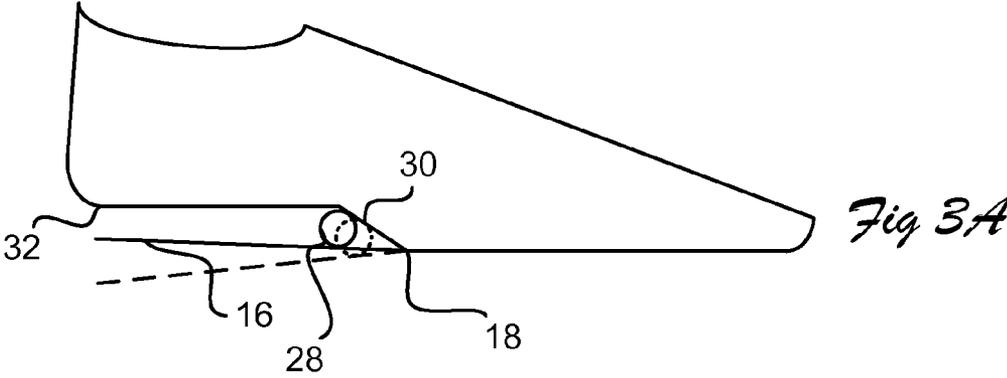
Fig 1C

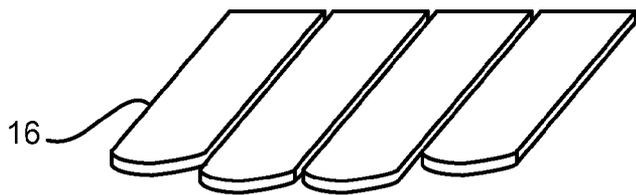


*Fig 2A*

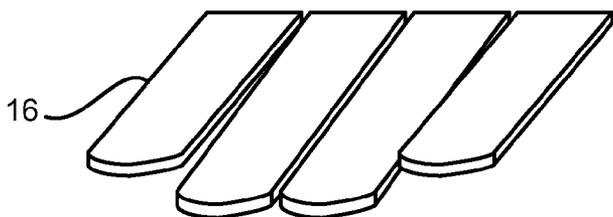


*Fig 2B*

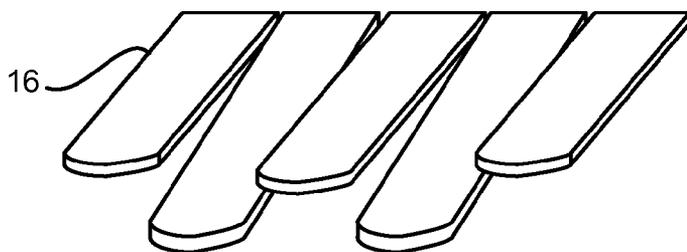




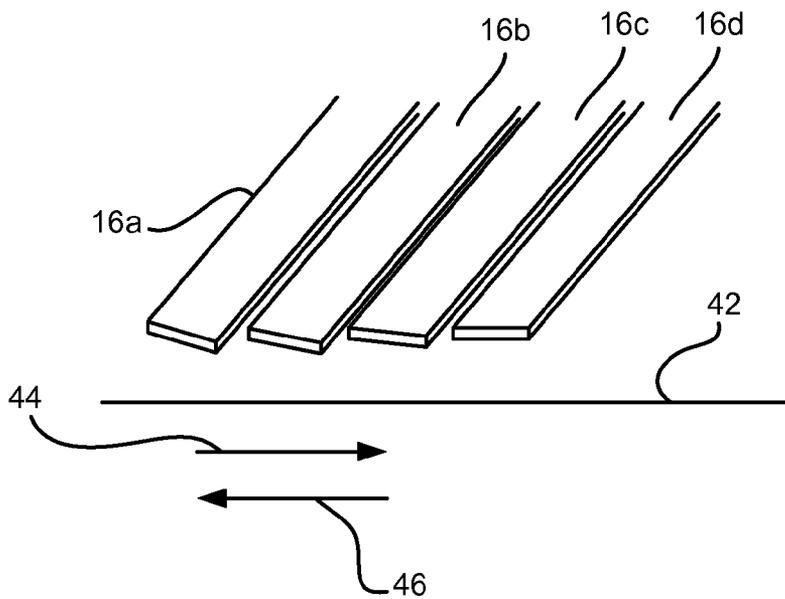
*Fig 4A*



*Fig 4B*



*Fig 4C*



*Fig 4D*

## SHOE WITH RESILIENT HEEL

### CLAIM OF PRIORITY

[0001] This application claims priority in U.S. Provisional Patent Application Serial No. 61/438,726 filed Feb. 2, 2012.

### BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention is directed to a resilient heel integrated into a shoe and more particularly, a spring configuration performing the function of the heel of a shoe.

[0004] 2. Description of Related Art

[0005] The history of human development shows that the importance of protecting the foot was early recognized. Records of the Egyptians, the Chinese, and other early civilizations all contain references to shoes. The shoe is repeatedly mentioned in the Bible and the Hebrews used it in several instances with a legal significance, notably in binding a bargain. The first rubber heel for shoes was patented on Jan. 24, 1899 by Irish-American Humphrey O'Sullivan and granted U.S. Pat. No. 625,897. O'Sullivan patented the rubber heel which outlasted the leather heel then in use. Since the 1900s, the design of the heel for dress shoes has remained relatively unchanged as shown in U.S. Pat. No. 6,962,010.

[0006] With the increased popularity in athletics, improvements to shoes began. Many of these improvements centered around the use of a cushioned sole or heel as shown in U.S. Pat. Nos.: 4,224,749; 5,560,126; 6,962,009; and U.S. Pat. No. 524,520. Further, U.S. Pat. No. 6,282,814 discloses the use of wave springs to cushion a shoe. U.S. Pat. No. 5,435,079 discloses an athletic shoe that includes a spring interposed in its sole providing superior shock absorbance and energy return. However, efforts to improve the comfort is dress shoes have not seen the inventive activity of that of athletic shoes.

[0007] Women's shoes, however, have seen much more inventive activity concerning improvements to the heel. U.S. Pat. No. 7,140,125 issued Nov. 28, 2006 discloses a high-heeled shoe to be worn on a foot of a wearer comprising a high heel; and a spring element provided in or with the high heel which serves to lower a heel of the foot of the wearer during a heel strike to approximate a normal walking pattern; the shoe preferably further includes a sprung midfoot support structure which distributes a load across at least a portion of the foot and provides an energy return. U.S. Pat. No. 2,825,154 issued January of 1957 and discloses a woman's high heel shoe with a shock absorbing heel using a spring supported in a longitudinal bore disposed in alignment with the longitudinal axis of a woman's high heel. U.S. Pat. No. 6,901,686 discloses a design for safety and comfort while maintaining a desired fashion sense in footwear. The mechanism provides a "spring" in the step of a user wearing footwear incorporating such a mechanism. U.S. Pat. No. 4,670,996 issued Jun. 9, 1987 and discloses a woman's shoe with flexible shank for use with replaceable heels of different height including a sole with a forward support portion and a raised heel portion and an overlying insole.

[0008] There is also a body of patents that use a leaf spring assembly in the sole to address adding support and resiliency to the shoe. U.S. Pat. No. 7,016,867 discloses a spring integrated into the sole of the shoe. The spring contains a portion that is under the front of the foot and another portion that is positioned under the heel. The portion under the heel provides for a "spring" support. PCT application WO 2009/064286

discloses a spring assembly for footwear; the assembly comprising an upper support coupled to at least two lower leaf springs, each capable of individually engaging the ground, and each acting as individual suspension and energy absorber while being free to travel substantially independently from the other within a range. U.S. Pat. No. 6,928,756 discloses that the spring means is a leaf spring having a leaf spring forward end and a leaf spring rearward end. U.S. Pat. No. 4,566,206 discloses an undamped spring having multi-spring rates provided in the heel support portion of a shoe for resiliently compressing under heel pressure against the ground and returning a substantial portion of the energy of the pressure to the wearer's foot.

[0009] Further, U.S. Pat. No. 2,508,318 is directed to a heel having a leaf spring having an upper section which is anchored to a shoe by screws and nuts. The upper part is fastened to an anchor plate which is above the sole. The leaf spring has a lower section spaced from the upper section and resiliently held by a curved middle section. However, these reference use a leaf spring containing significant disadvantages for lateral movement and are also generally unappealing from an aesthetic point of view.

[0010] Therefore, it is an object of this invention to provide for a resilient heel for the shoe, particularly the men's dress shoe, that is aesthetically pleasing.

### SUMMARY OF THE INVENTION

[0011] The objectives of this invention are accomplished by providing an improved shoe comprising: a shoe having a heel; a cavity defined in the heel; and, a spring assembly for being received in the cavity and attached to the shoe having a plurality of leaf springs. The invention can also include a vibration damping element carried by each of the leaf springs and non-slick coverings carried by each of the leaf springs.

[0012] Each leaf spring can have a different resiliency, vary in length, and vary in incident angle to the ground. The leaf springs can vary in depth within the cavity. The invention can include a tension adjustment member located between the spring and a lower member.

### DESCRIPTION OF THE DRAWINGS

[0013] FIGS. 1A through 1C are bottom and side views of the invention;

[0014] FIGS. 2A and 2B are bottom views of the invention;

[0015] FIGS. 3A through 3D are side views of the invention; and,

[0016] FIGS. 4A through 4D are side views of the invention.

### DESCRIPTION OF THE INVENTION

[0017] Referring to FIG. 1A, the bottom of dress shoe **10** is shown. The heel **12** has a cavity **14** defined in the heel. A set of springs **16** is attached to a portion of the heel and is received into the cavity. Therefore, the springs are contained within the heel and not easily observed from a side view of the shoe as shown in FIG. 1B. In another embodiment shown in FIG. 1C, the traditional heel is removed from the shoe and the spring attaches at attachment point **18**, creating a space **20**.

[0018] Referring to FIG. 2A, the springs are shown with attachment members **22** that attach the springs to the shoe. In this configuration, the springs can also have a resilient covering **24** to provide a contact surface between the spring and the ground. These coverings are particularly advantageous

when the springs are manufactured from a material such as metal so that additional gripping properties are provided for the springs against the ground. Referring to FIG. 2B, vibration damping devices 26 can also be carried by the springs to reduce the vibration of the springs in operation. Damping devices can be attached to, or incorporate into, the spring itself.

[0019] Referring to FIG. 3A, a tension adjusting member can be operably carried by the shoe and arranged between a surface 30 on the sole and the spring. When in a first position, the tension adjusting member allows the spring to compress closer to the distal end of the shoe 32 than when the tension adjustment member is in a second position shown by the dotted lines. In this second position, the spring is farther away from the distal end and, therefore, more tension is required to compress the spring providing a "tighter" support surface. In one embodiment, a heel stop 34 is attached to the distal end of the shoe. This stop provides for a reinforced area where the springs may contact with the shoe or where the heel may contact the ground.

[0020] In one embodiment shown in FIG. 3C, a light 36 can be included in the shoe to shine light in the space between the spring and the bottom of the shoe. Referring to FIG. 3D, different sized inserts 38a through 38c can be placed in space 40 to provide differing tensions or resiliency for the springs. These inserts can be associated with a standard scale for selecting inserts. For example, numbers can be assigned to the inserts sizes so that when inserts are selected from a consumer, the performance of the inserts can be anticipated simply by knowing the size (number) of the insert.

[0021] Referring to FIG. 4A, one configuration comprises springs fingers that are of differing length to generally associated with the generally rounded shape of the rear of a heel. FIG. 4B illustrates a configuration where the middle fingers are biased lower than that of the outer finger to provide for more tension in the middle of the springs and allow the outer springs to provide support for lateral movement. The alternative configuration can also be used where the middle fingers are biased above the outer fingers. FIG. 4C illustrates a configuration where the fingers alternate in height and, therefore, tension. FIG. 4D illustrates another embodiment wherein the fingers are configured as different incident angles to ground plane 42. In this configuration, using the right shoe as an example, when the wearer moves in a lateral direction 44, force is placed on the springs in a direction shown as 46. The outer finger 16a has the largest angle incident to the ground and, therefore, can provide additional support for the lateral force. Fingers 16b through 16d also provide support, but generally provide less lateral support and more support for normal forward movement.

[0022] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes

which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. An improved shoe comprising:

a shoe having a sole; and,  
a spring plate having a plurality of flanges carried by said sole with said flanges disposed under said heel defining a space between said flanges and a heel of said shoe.

2. The shoe of claim 1 including a heel having a recess for receiving said flanges.

3. The shoe of claim 1 including a resilient covering carried by at least one flange.

4. The shoe of claim 1 including a clamping device carried by at least one flange.

5. The shoe of claim 1 including a tension adjusting member disposed between said sole and said flanges.

6. The shoe of claim 1 wherein said tension adjusting member is an insert.

7. The shoe of claim 1 wherein one flange is of a different length from said other flanges.

8. The shoe of claim 1 wherein one flange has a different angel of incident relative to the ground to the other flanges.

9. The shoe of claim 1 including lights carried by said sole for illuminating said space.

10. The shoe of claim 9 wherein said flanges are reflective for reflecting said light.

11. The shoe of claim 1 including an absorber disposed in said space.

12. The shoe of claim 1 including a support portion included in said spring plate.

13. The shoe of claim 12 wherein said support portion extends to the toe of the shoe.

14. The shoe of claim 12 wherein said support portion curves into said heel.

15. The shoe of claim 1 including a pivot attachment attached to a flange allowing said flange to pivot about said pivot attachment.

16. The shoe of claim 1 including a heel stop attached to said heel.

17. An improved shoe comprising:

a shoe having a sole and a heel area;  
a support plate having a support platform and a plurality of flanges carried by said sole;  
a recess defined in said heel for receiving said flanges; and,  
a clamping device carried by at least one of said flanges.

18. The shoe of claim 17 including a tension member carried by said spring plate.

19. A shoe accessory comprising:

a support plate having a support platform and a plurality of flanges removably attachable to said shoe;  
a resilient covering carried by said flanges; and,  
a clamping device carried by at least one flange.

20. The shoe accessory of claim 19 including a light carried by said support plate.

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