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(54) **SHOE WITH SPRINGS**

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(57) **ABSTRACT**

A shoe with springs is disclosed. The shoe includes a sole, two or more fixing plates fixed to the sole, a supporting plate in contact with ground, two or more coil springs mounted between the sole and the supporting plate, and a cover formed in a bellows shape to be folded and unfolded according to contraction and expansion of the coil springs. The cover includes coupling protrusions at an upper end and a lower end. The sole and the supporting plate are formed with coupling grooves along side surfaces, in which the coupling protrusions of the cover are fitted. The coil springs are configured such that a diameter is gradually increased from an upper end portion to a lower end portion. Therefore, the coil springs are shielded by the cover and a coupling structure of the coil springs is improved to prohibit bending of the coil springs in a lateral direction, thereby increasing safety and protecting a user or a bystander from physical damage or injury.

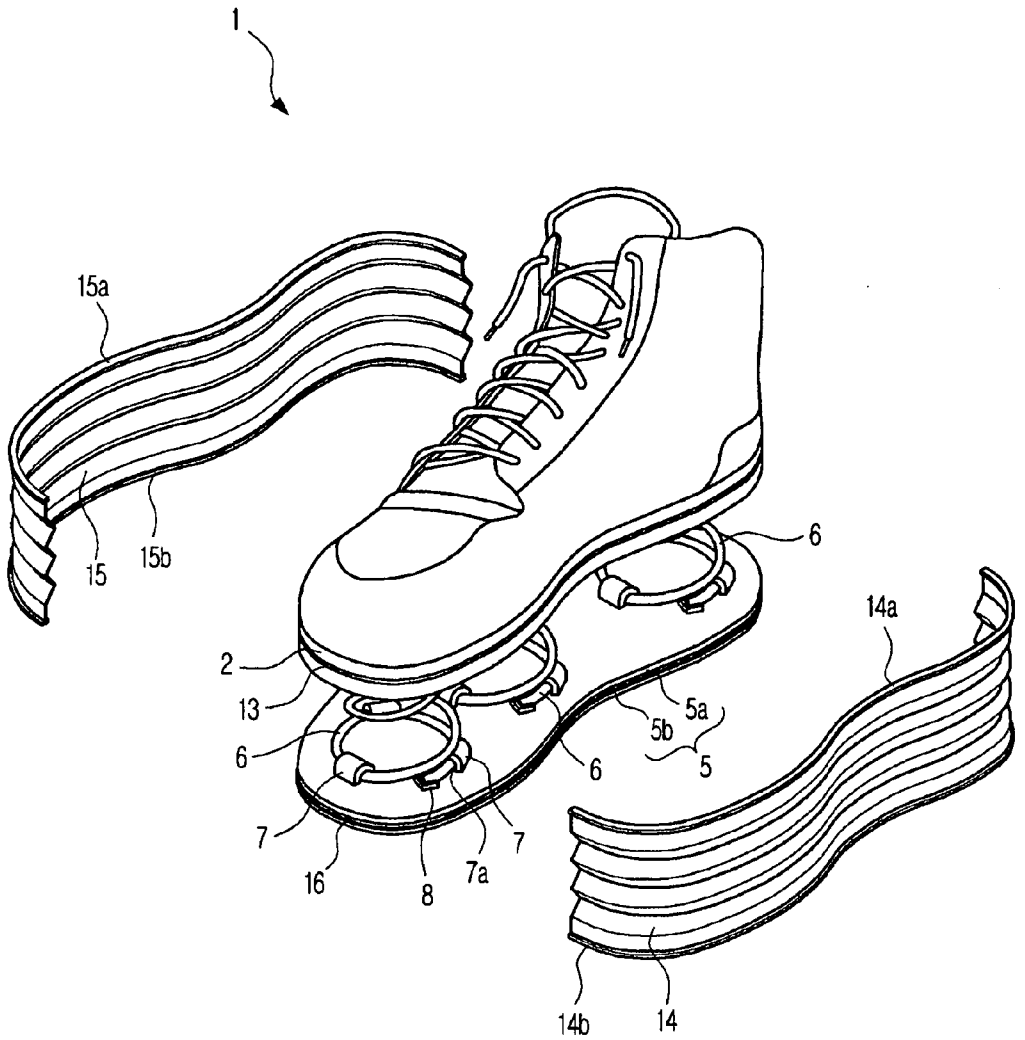


FIG. 1

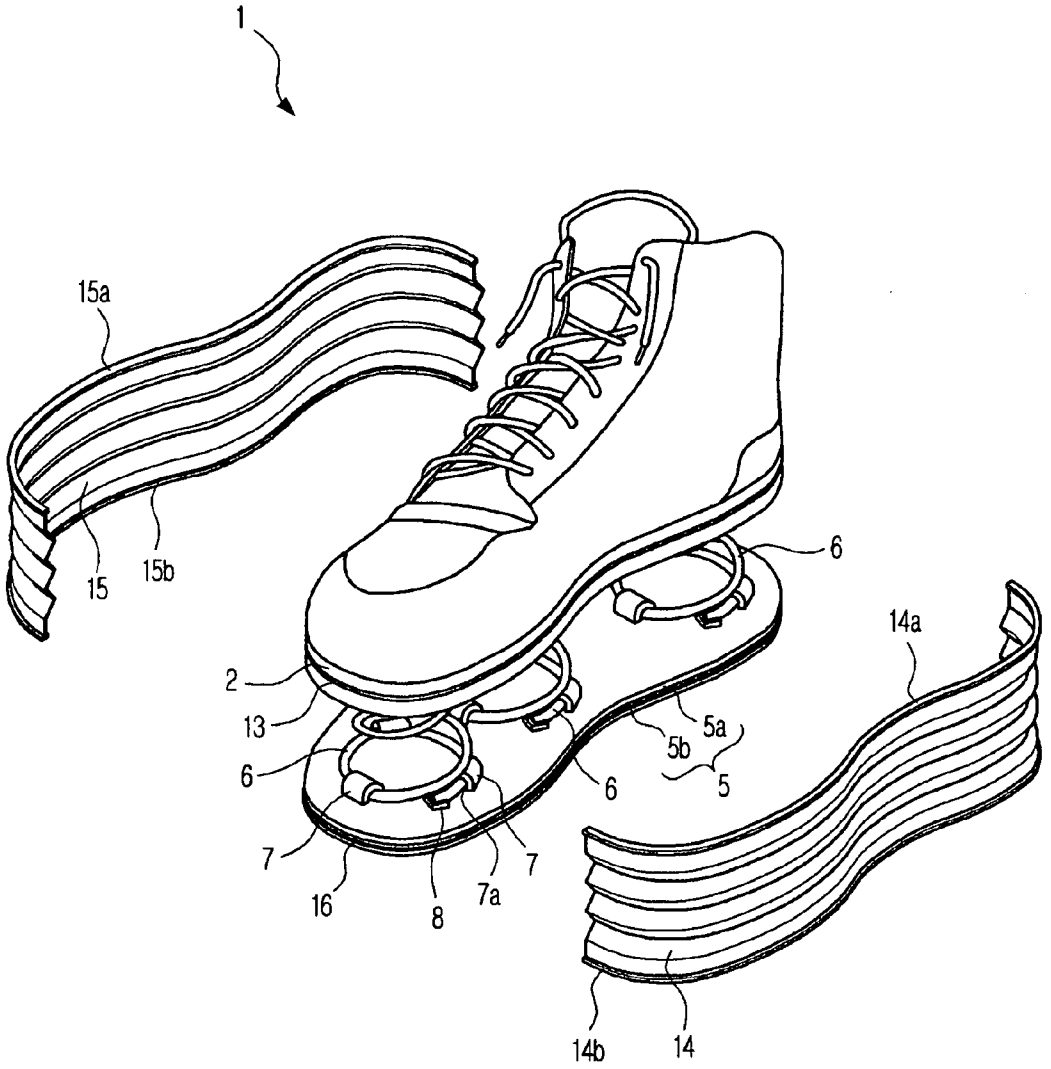


FIG. 2

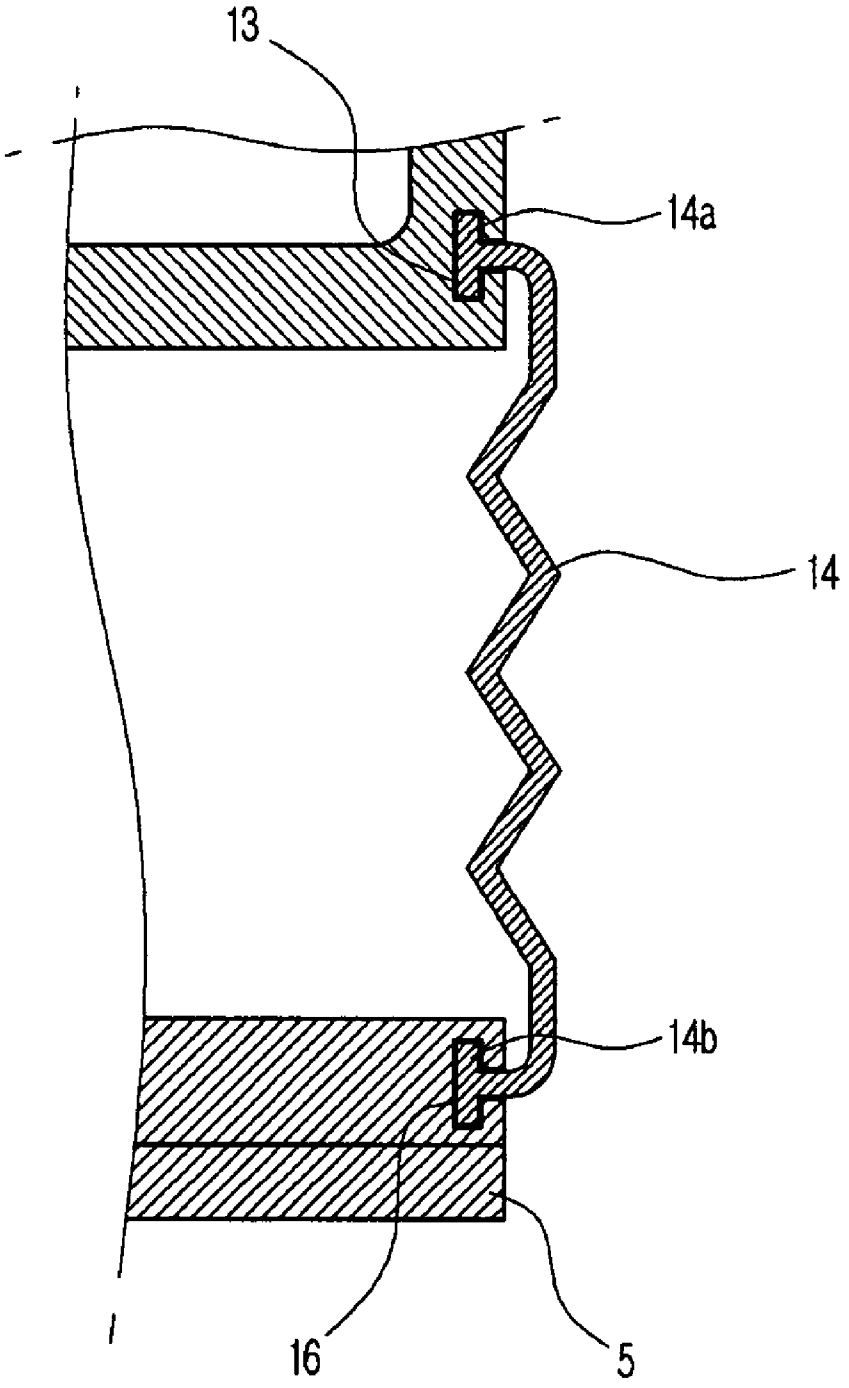


FIG. 3

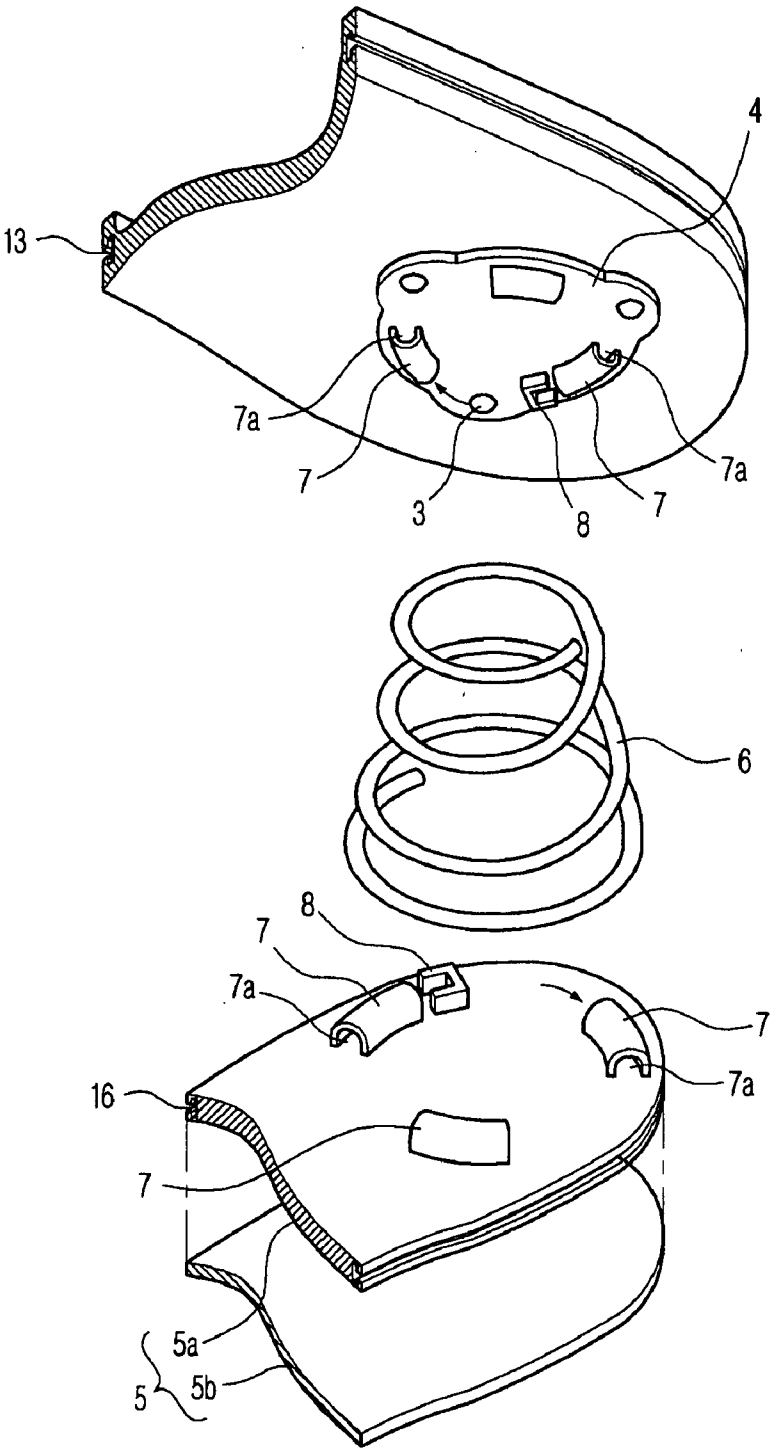


FIG. 4

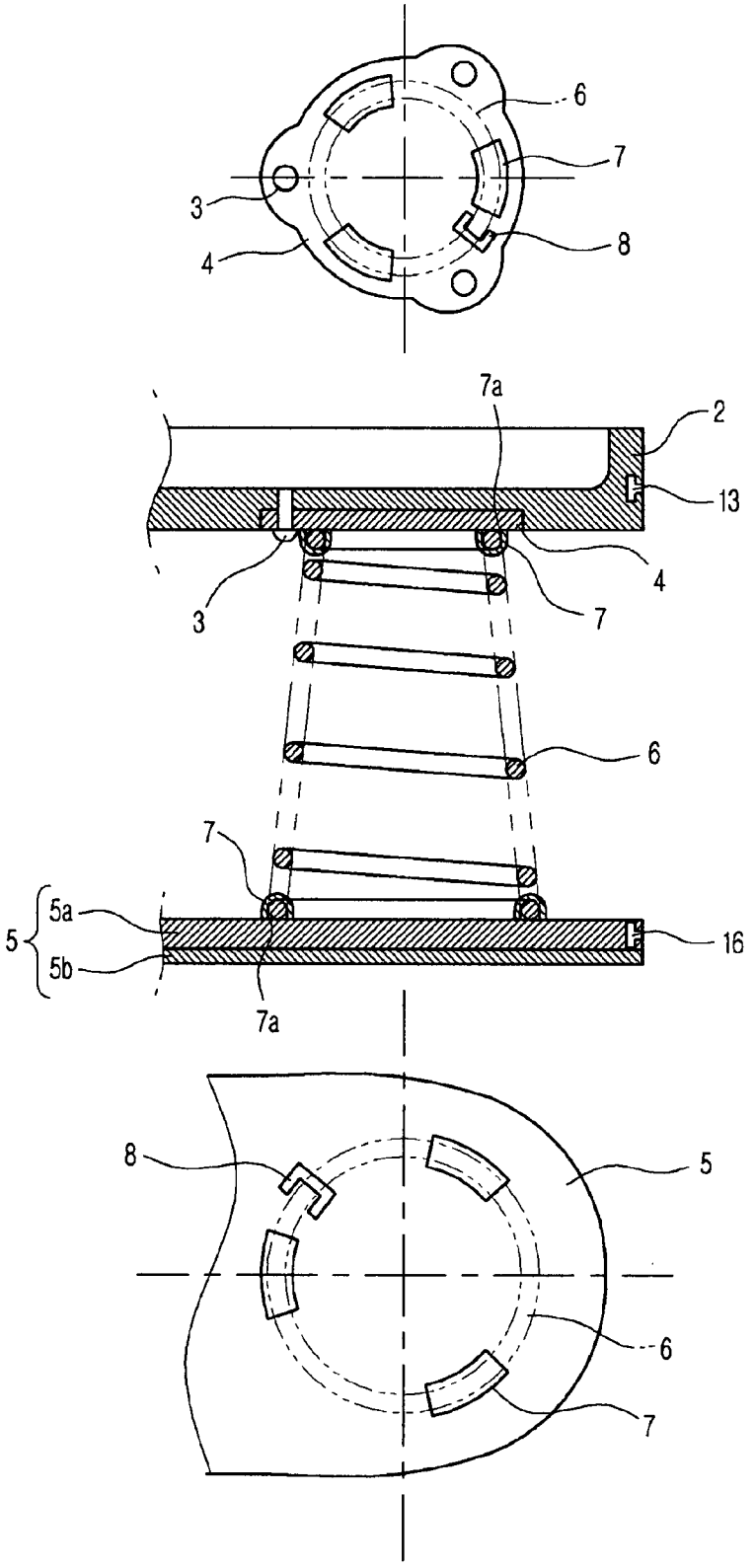


FIG. 5

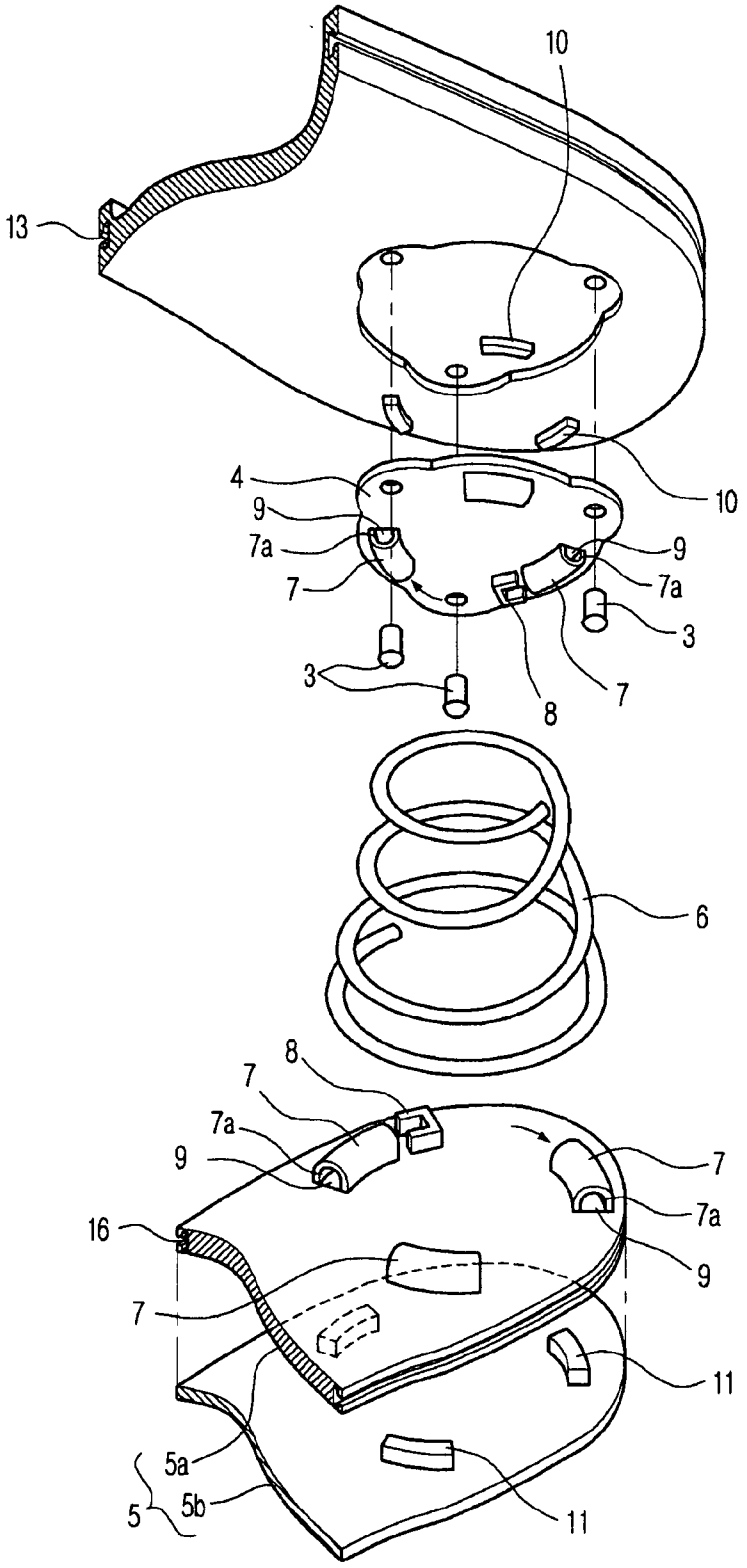
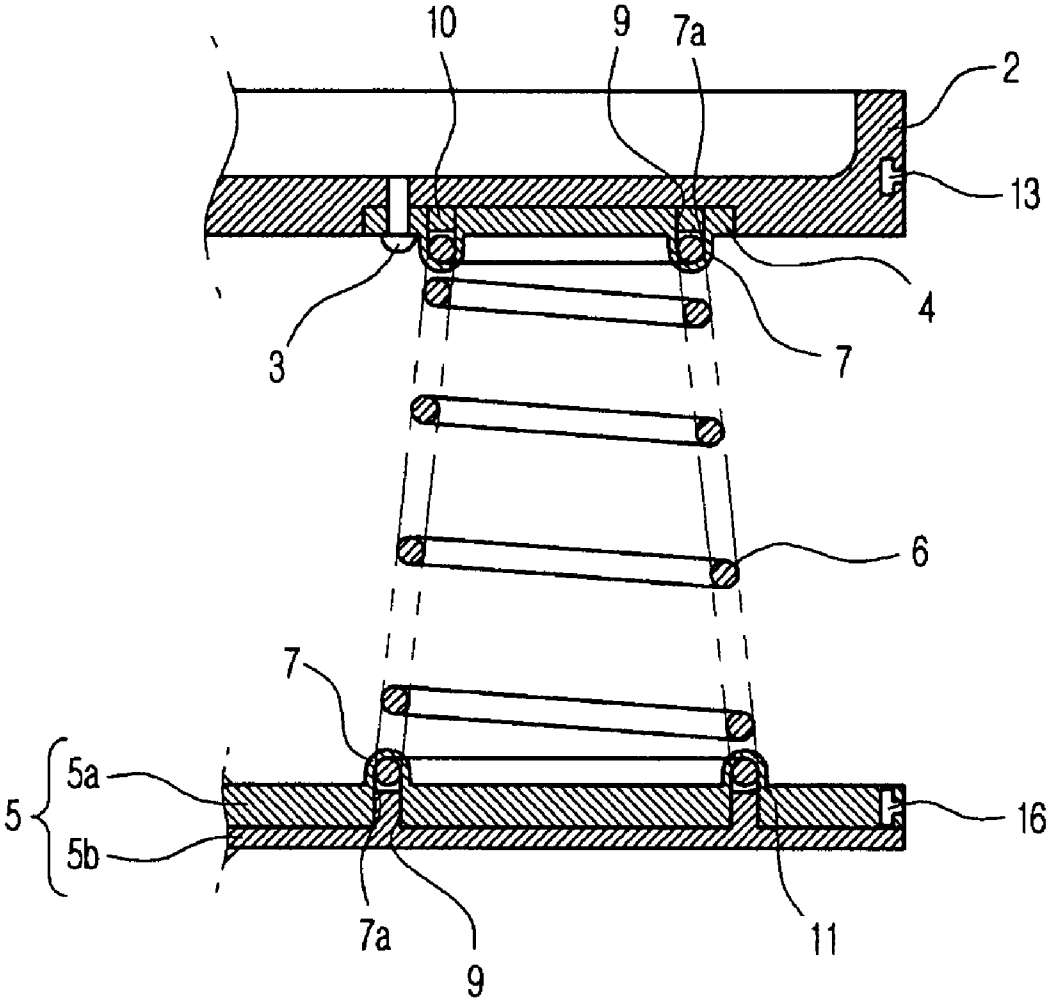


FIG. 6



SHOE WITH SPRINGS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a shoe with springs, and more particularly to a shoe with springs which shields springs by using covers and improves a coupling structure of the springs to prohibit bending of the coil springs in a lateral direction, thereby increasing safety and protecting a user or a bystander from physical damage or injury.

[0003] 2. Description of the Related Art

[0004] For the purpose of play or exercise, a shoe equipped with coil springs at a sole has been developed. The shoe with the coil springs enables a user to easily and naturally jump by elasticity of the coil springs.

[0005] However, the conventional shoe with the coil springs has a disadvantage of unsafety. In other words, because lower ends of the coil springs fixed to the sole directly contact the ground, the user has difficulty in keeping balance when walking or jumping and his/her ankle is subject to be twisted or damaged.

[0006] Recently, in order to solve the above problem, a shoe further comprising a supporting plate in contact with the ground has been developed. Such a shoe ensures walking safety, and enables the user to exercise more when walking or jumping, so the demand is gradually increased.

[0007] The shoe is configured such that the coil springs are fixed to the sole and the supporting plate by tightening bolts which are formed with plates for pressurizing ends of the coil springs. However, this type of shoe has a problem that the coil springs are arbitrarily separated by looseness of the bolts when walking or jumping, and repair and maintenance are troublesome because the bolts are worn and the supporting plates cannot be dissembled.

[0008] Also, because the coil springs are exposed outside, a part of a body (e.g., a finger or a toe) is subject to be injured by being jammed in the coil springs. Further, because the coil springs have a cylindrical shape (i.e., a diameter of an upper end portion is equal to that of a lower end portion), the coil springs are apt to be bent, and the user looses balance when walking or jumping and his/her ankle may be twisted or damaged.

SUMMARY OF THE INVENTION

[0009] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a shoe with springs which can securely and stably fix coil springs, thereby preventing arbitrary separation of the coil springs from a sole and a supporting plate, and increasing safety in use and productivity.

[0010] It is another object of the present invention to provide a shoe with springs which provides a bellows-shaped cover for shielding the coil springs, thereby preventing physical injury of a user or a bystander and increasing an aesthetic effect.

[0011] It is yet another object of the present invention to provide a shoe with springs which uses coil springs which are configured such that a diameter is gradually increased from an upper end portion to a lower end portion, thereby increasing stability, prohibiting bending of the coil springs in a lateral direction, and preventing physical (especially, ankle) damage.

[0012] In accordance with the present invention, the above and other objects can be accomplished by the provision of a shoe with springs comprising: a sole; two or more fixing plates fixed to the sole; a supporting plate in contact with ground; two or more coil springs mounted between the sole and the supporting plate; and a cover formed in a bellows shape to be folded and unfolded according to contraction and expansion of the coil springs, the cover including coupling protrusions at an upper end and a lower end. The sole and the supporting plate are formed with coupling grooves along side surfaces, in which the coupling protrusions of the cover are fitted.

[0013] Preferably, the coil springs are configured such that a diameter is gradually increased from an upper end portion to a lower end portion.

[0014] The fixing plates and the supporting plate are respectively formed with tunnel-shaped fixing members through which insertion holes are formed in a peripheral direction and a supporting block located near one of the fixing members. Upper end portions and lower end portions of the coil springs are inserted through the insertion holes of the fixing members of the fixing plates and the supporting plate, respectively, and upper ends and lower ends of the coil springs are supported by the supporting blocks of the fixing plates and the supporting plate, respectively.

[0015] The fixing plates are formed with slots corresponding to the insertion holes of the fixing members to be communicated with the insertion holes. Pressing members which are made of foaming resin are provided to be inserted into the slots.

[0016] The supporting plate includes an upper plate which is formed with the fixing members, and a lower plate which is adhered to the upper plate and formed with a non-slip part. The upper plate of the supporting plate is formed with slots corresponding to the insertion holes of the fixing members to be communicated with the insertion holes, and the lower plate of the supporting plate is formed with pressing protrusions which are inserted into the slots.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0018] FIG. **1** is a perspective view showing a shoe with springs in accordance with a first preferred embodiment of the present invention;

[0019] FIG. **2** is a cross-sectional view showing essential elements of a shoe with springs depicted in FIG. **1**;

[0020] FIG. **3** is an exploded perspective view showing a state of mounting a spring to a shoe with springs depicted in FIG. **1**;

[0021] FIG. **4** is a cross-sectional view showing a spring-assembled state of a shoe with springs depicted in FIG. **1**;

[0022] FIG. **5** is an exploded perspective view showing essential elements of a shoe with springs in accordance with a second preferred embodiment of the present invention; and

[0023] FIG. **6** is a cross-sectional view showing a spring-assembled state of a shoe with springs depicted in FIG. **5**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] Now, preferred embodiments of the present invention will be described in detail with reference to the annexed drawings.

[0025] FIG. **1** is a perspective view showing a shoe with springs in accordance with a first preferred embodiment of the present invention, FIG. **2** is a cross-sectional view showing essential elements of a shoe with springs, FIG. **3** is an exploded perspective view showing a state of mounting a spring, and FIG. **4** is a cross-sectional view showing a spring-assembled state of a shoe with springs.

[0026] As shown in the drawings, a shoe **1** according to a first embodiment of the present invention comprises shoe top structure secured to a sole **2**, two or more fixing plates **4** fixed to the sole **2** by rivets **3**, a supporting plate **5** in contact with the ground, and two or more coil springs **6** mounted between the fixing plates **4** and the supporting plate **5**. Such a shoe **1** having the coil springs **6** is very useful when a user wearing the shoes walks or jumps, and further provides an exercise effect.

[0027] The coil springs **6** are formed in an approximately conic shape, the most stable shape, such that a diameter is gradually increased from an upper end portion to a lower end portion. Thus, bending of the coil springs in a lateral direction is prohibited, the coil springs **6** are fixed securely and stably so as not to be arbitrarily separated, and assembling productivity is increased.

[0028] Describing in detail, each of the fixing plates **4** fixed to the sole **2** by rivets **3** is formed with three tunnel-shaped fixing members **7** through which insertion holes **7***a* are formed in a peripheral direction. In the same manner, the supporting plate **5** in contact with the ground is formed with three tunnel-shaped fixing members **7** through which insertion holes **7***a* are formed in a peripheral direction. An upper end portion of the coil spring **6** is fixed to the fixing plate **4** by passing through the insertion holes **7***a* of the fixing members **7**. A lower end portion of the coil spring **6** is fixed to the supporting plate **5** by passing through the insertion holes **7***a* of the fixing members **7**. The fixing plate **4** and the supporting plate **5** are formed with U-shaped supporting blocks **8** which are located near the fixing members **7**. The upper end and the lower end of the coil spring **6** are supportingly received in the supporting blocks **8**, respectively.

[0029] The fixing members **7** are integrally formed at the fixing plate **4** and the supporting plate **5**. The insertion holes **7***a* are formed by using a sliding pin or the like during the forming of the fixing members **7**. In order to provide convenience in repair and maintenance, the supporting plate **5** includes an upper plate **5***a* which is formed with the fixing members **7**, and a lower plate **5***b* which is adhered to the upper plate **5***a* and formed with a non-slip part at a bottom surface.

[0030] On the other hand, if the coil springs **6** mounted between the sole **2** and the supporting plate **5** are exposed outside, the shoe **1** is aesthetically deteriorated, and there may be a problem that a part of body such as a finger or a toe is injured by being jammed in the coil springs **6**.

[0031] Also, when the user wears the shoes with the coil springs **6** and walks around, an external material like sand or stones may enter between the sole **2** and the supporting plate **5** or in the coil springs **6**, which causes decrease of the elastic force of the coil springs **6** and inconvenience of frequently removing the external material for restoring the normal elastic function.

[0032] In order to solve this problem, a pair of covers **14** and **15** are coupled to the sole **2** and the supporting plate **5** for shielding the space between the sole **2** and the supporting plate **5**.

[0033] The covers **14** and **15** are made of soft synthetic resins, and have a bellows shape, which is formed with folds extending longitudinally so as to be folded and unfolded according to the contraction and expansion of the coil springs **6**.

[0034] The covers **14** and **15** are formed with coupling protrusions **14***a* and **15***a*, **14***b* and **15***b* at upper ends and lower ends, respectively. As shown in FIG. **2**, the coupling protrusions **14***a* and **15***a*, **14***b* and **15***b* have a T-shaped cross-section.

[0035] The sole **2** and the supporting plate **5** are formed with coupling grooves **13** and **16** along the side surfaces, respectively. As shown in FIG. **2**, the coupling grooves **13** and **16** also have a T-shaped cross-section corresponding to the coupling protrusions **14***a* and **15***a*, **14***b* and **15***b* of the covers **14** and **15**.

[0036] Describing a coupling process of the covers **14** and **15**, one ends of the coupling protrusions **14***a* and **15***a*, **14***b* and **15***b* of the covers **14** and **15** are located at starting points of the coupling grooves **13** and **16** formed at front surfaces of the sole **2** and the supporting plate **5**, and slowly pushed to be fitted in the coupling grooves **13** and **16**.

[0037] Preferably, the starting points of the coupling grooves **13** and **16** are formed broadly enough to easily fit the covers **14** and **15** in the coupling grooves **13** and **16**.

[0038] Of course, since the covers **14** and **15** are made of a soft material, the coupling protrusions **14***a* and **15***a*, **14***b* and **15***b* of the covers **14** and **15** can be forcibly fitted in the coupling grooves **13** and **16** from the side surfaces of the sole **2** and the supporting plate **5**.

[0039] FIG. **5** is an exploded perspective view showing essential elements of a shoe with springs in accordance with a second preferred embodiment of the present invention, and FIG. **6** is a cross-sectional view showing a spring-assembled state of a shoe with springs depicted in FIG. **5**. The same elements as the first embodiment shown in FIGS. **3** and **4** are denoted by the same reference numerals, and detailed description thereof will be omitted.

[0040] A shoe of this embodiment has features that a fixing plate **4** and an upper plate **5***a* of a supporting plate **5** can be easily formed with lower costs.

[0041] Describing in detail, the fixing plate **4** and the upper plate **5***a* of the supporting plate **5** are formed with slots **9** at positions corresponding to insertion holes **7***a* of fixing members **7**. In other words, the slots **9** are communicated with the insertion holes **7***a* of the fixing members **7**.

[0042] Pressing members **10** which are made of foaming resin are inserted into the slots **9** formed at the fixing plate **4**, and pressing protrusions **11** are formed at a lower plate **5***b* of the supporting plate **5** to be inserted into the slots **9** formed at the upper plate **5***a*. The pressing members **10** and the pressing protrusions **11** inserted into the slots **9** of the fixing plate **4** and the upper plate **5***a* pressurize the upper end portion and the lower end portion of the coil spring **6**, respectively, thereby securing more stable assembling structure.

[0043] The shoe **1** according to the present invention structured as above is very useful when the user wearing the shoes walks or jumps, and further provides the exercise effect. Hereinafter, an assembling process and an operation of the shoe of the present invention will be described.

[0044] The lower end portion of the coil spring **6** is inserted circumferentially through the insertion holes **7***a* of the fixing members **7** which are formed at the supporting plate **5**. And, the upper end portion of the coil spring **6** is inserted circum-

ferentially through the insertion holes **7***a* of the fixing members **7** which are formed at the fixing plate **4**. Then, the fixing plate **4** is fixed to the sole **2** by using the rivets **3**.

[0045] Therefore, the shoe **1** equipped with the coil springs **6** by the above assembling process has more stable structure of the coil springs **6** so that the coil springs **6** are prevented from being arbitrarily separated during walking, jumping or the like.

[0046] As shown in FIG. **3**, the upper end portion of the coil spring **6** is inserted through the fixing members **7** of the fixing plate **4** in the opposite direction to the lower end portion of the coil spring **6** inserted through the fixing members **7** of the supporting plate **5**. Therefore, when one of the upper and lower end portions of the coil spring **6** is released from the fixing members **7** of the fixing plate **4** or the supporting plate **5**, the other end portion of the coil spring **6** is tightened into the fixing members **7**. At this time, the upper end and the lower end of the coil spring **6** are supportingly received in the U-shaped supporting blocks **8** formed at the fixing plate **4** and the supporting plate **5**, thereby enhancing the stability of the assembling structure of the coil spring **6**.

[0047] Further, as shown in FIGS. **5** and **6**, since the upper and lower end portions of the coil spring **6** inserted through the insertion holes **7***a* of the fixing members **7** are pressurized, the coupling state of the coil spring **6** and the spring-supporting components can be kept firm after a long period of use.

[0048] In other words, the slots **9** are formed at the fixing plate **4** and the upper plate **5***a* corresponding to the insertion holes **7***a* of the fixing members **7** to be communicated with the insertion holes **7***a*, and the pressing members **10** are inserted into the slots **9** of the fixing plate **4** and the pressing protrusions **11** formed at the lower plate **5***b* are inserted into the slots **9** of the upper plate **5***a*. The pressing members **10** and the pressing protrusions **11** inserted into the slots **9** of the fixing plate **4** and the upper plate **5***a* pressurize the upper and lower end portions of the coil spring **6** inserted through the insertion holes **7***a* of the fixing members **7**. Accordingly, the coil spring **6** can be prevented from rattling or being loosened.

[0049] As apparent from the above description, according to the shoe with the springs of the present invention, between the sole and the supporting plate are mounted the coil springs which are configured such that the diameter is gradually increased from the upper end portion to the lower end portion, and the covers are coupled to the sole and the supporting plate for shielding the space between the sole and the supporting plate. Therefore, the coupling structure of the coil springs is very stable, and any physical injury can be prevented by shielding the coil springs and the spring-supporting components by the covers.

[0050] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A shoe with springs comprising:
a sole;
two or more fixing plates fixed to the sole;
a supporting plate in contact with ground;
two or more coil springs mounted between the sole and the supporting plate; and
a cover formed in a bellows shape to be folded and unfolded according to contraction and expansion of the coil springs, the cover including coupling protrusions at an upper end and a lower end,
wherein the sole and the supporting plate are formed with coupling grooves along side surfaces, in which the coupling protrusions of the cover are fitted.

2. The shoe according to claim **1**, wherein the coil springs are configured such that a diameter is gradually increased from an upper end portion to a lower end portion.

3. The shoe according to claim **1**, wherein the fixing plates and the supporting plate are respectively formed with tunnel-shaped fixing members through which insertion holes are formed in a peripheral direction and a supporting block located near one of the fixing members,
and wherein upper end portions and lower end portions of the coil springs are inserted through the insertion holes of the fixing members of the fixing plates and the supporting plate, respectively, and upper ends and lower ends of the coil springs are supported by the supporting blocks of the fixing plates and the supporting plate, respectively.

4. The shoe according to claim **3**, wherein the fixing plates are formed with slots corresponding to the insertion holes of the fixing members to be communicated with the insertion holes,
and wherein pressing members which are made of foaming resin are provided to be inserted into the slots.

5. The shoe according to claim **3**, wherein the supporting plate includes an upper plate which is formed with the fixing members, and a lower plate which is adhered to the upper plate and formed with a non-slip part,
and wherein the upper plate of the supporting plate is formed with slots corresponding to the insertion holes of the fixing members to be communicated with the insertion holes, and the lower plate of the supporting plate is formed with pressing protrusions which are inserted into the slots.

6. A shoe with springs comprising:
a sole;
two or more fixing plates fixed to the sole;
a supporting plate in contact with ground; and
two or more coil springs mounted between the sole and the supporting plate,
wherein the coil springs are configured such that a diameter is gradually increased from an upper end portion to a lower end portion,
and wherein the upper end portions of the coil springs are fixed to the fixing plates, and the lower end portions of the coil springs are fixed to the supporting plate.

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