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(54) **SHOE PAD WITH A GAS DISCHARGING VALVE**

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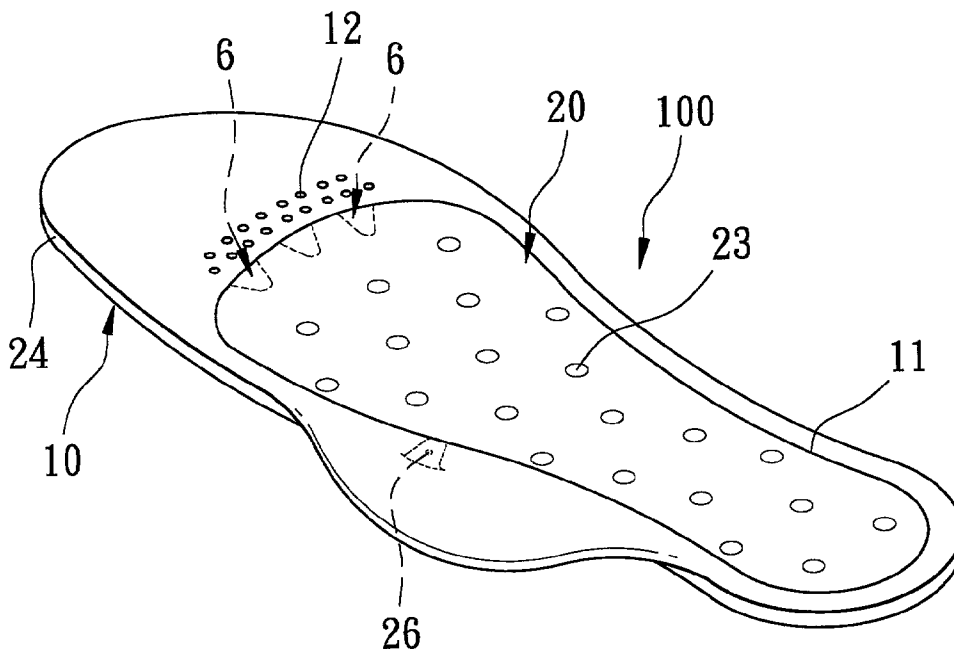
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(57) **ABSTRACT**

A flexible pad body includes an inflatable part that is compressible and that confines a cavity injected with high pressure gas such that the pressure in the cavity is greater than the ambient pressure, and at least a discharging valve installed in the inflatable part and having a valve opening for permitting fluid communication between the cavity and the atmosphere. The discharging valve is deformable in such a manner that when foot pressure is applied on the pad body, the discharging valve is deformed, which, in turn, results in opening of the valve opening, and that when the pad body is relieved from the foot pressure, the discharging valve recovers to its non-deformed state, which, in turn, results in closing of the valve opening.



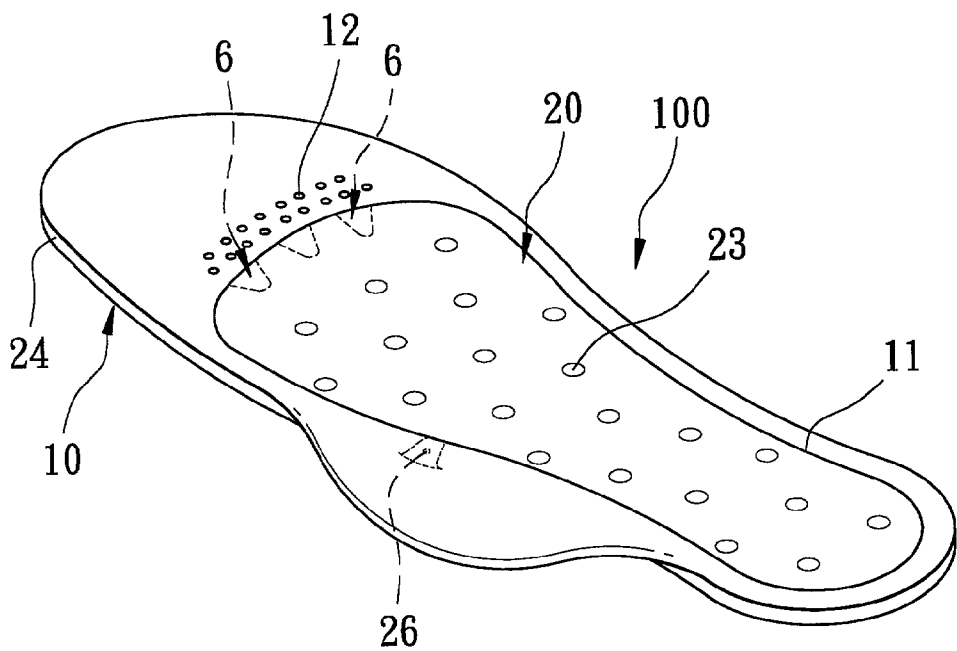


FIG. 1

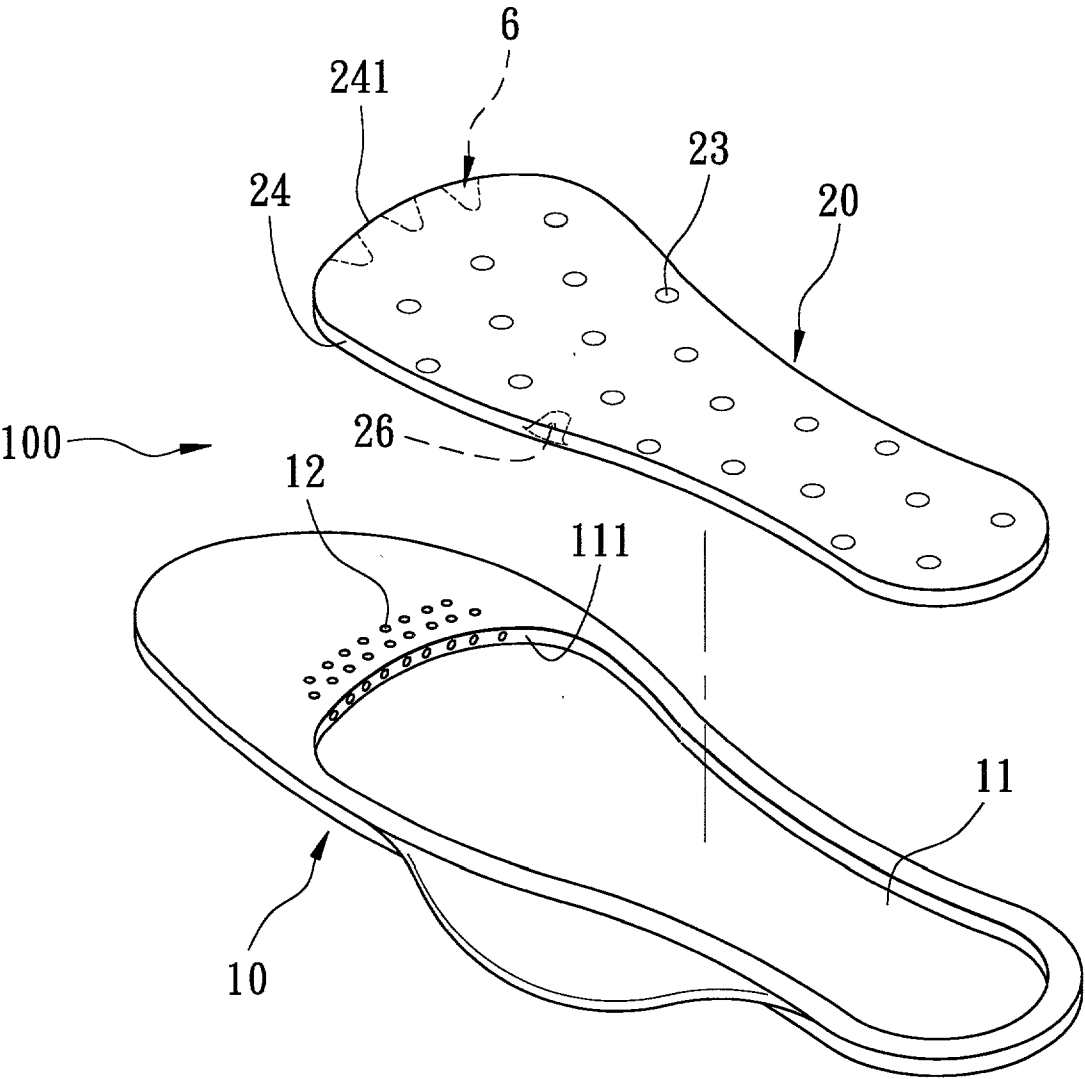
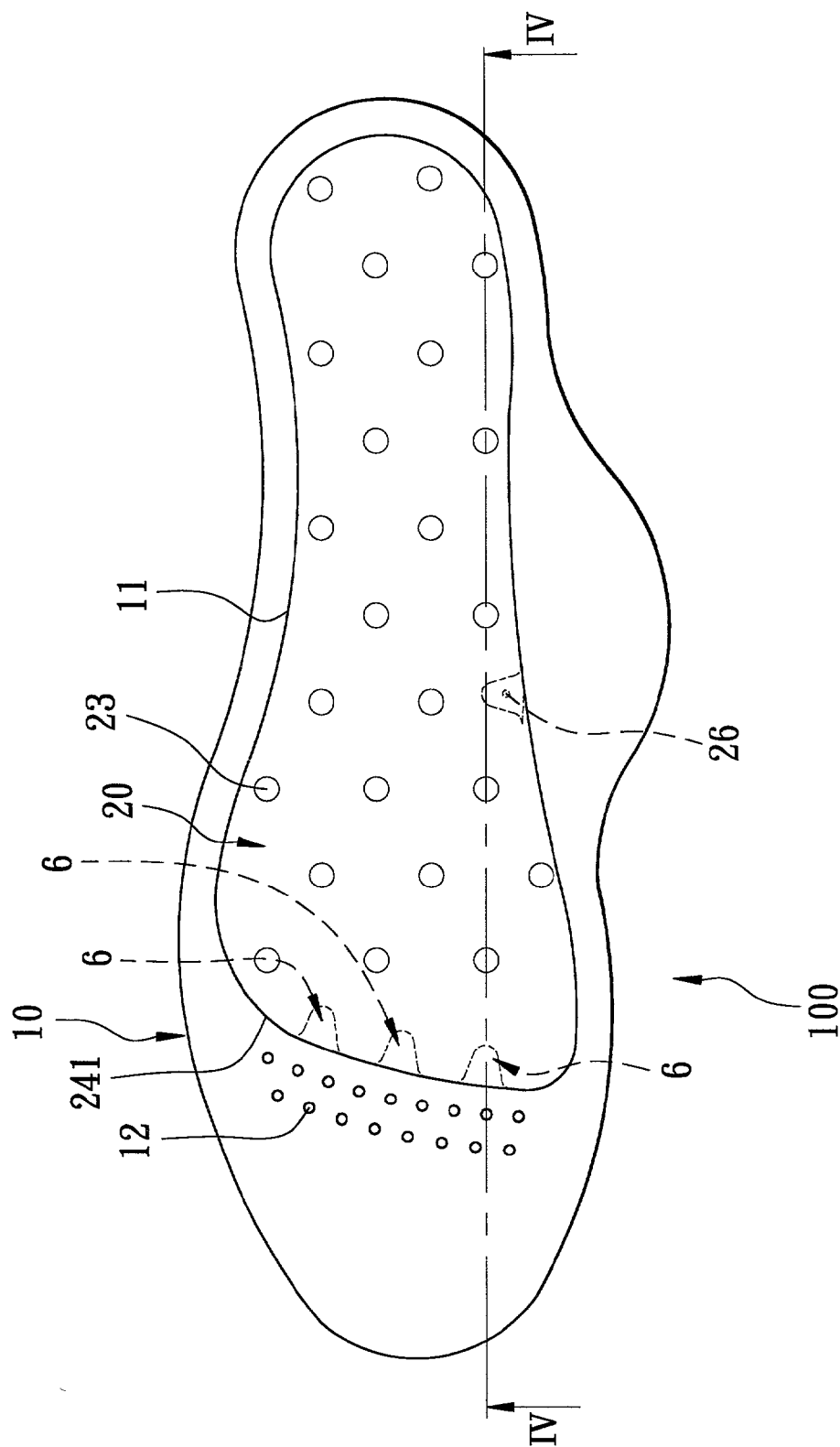


FIG. 2



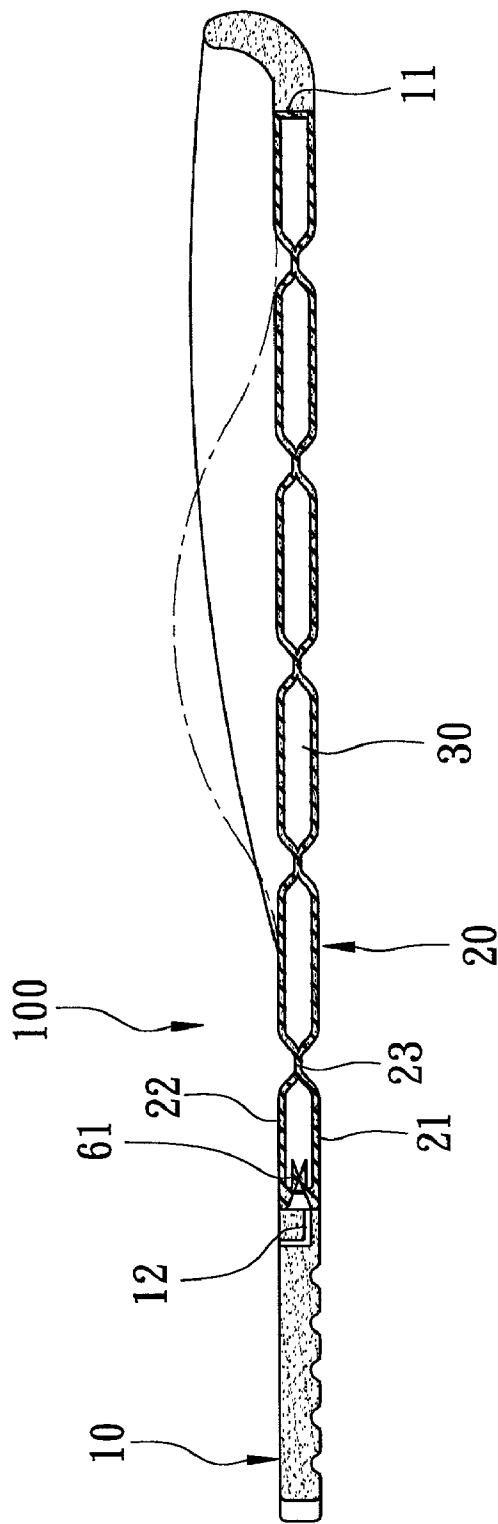


FIG. 4

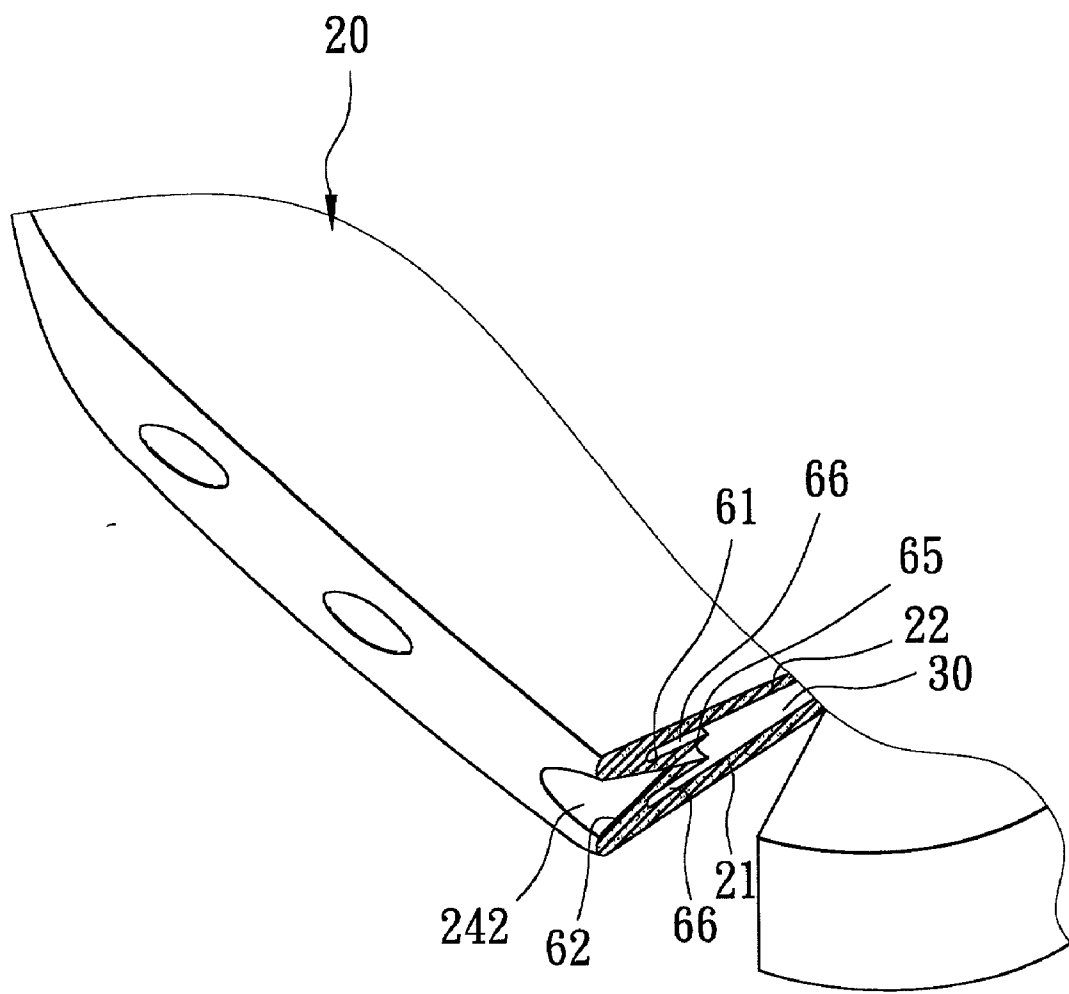


FIG. 5

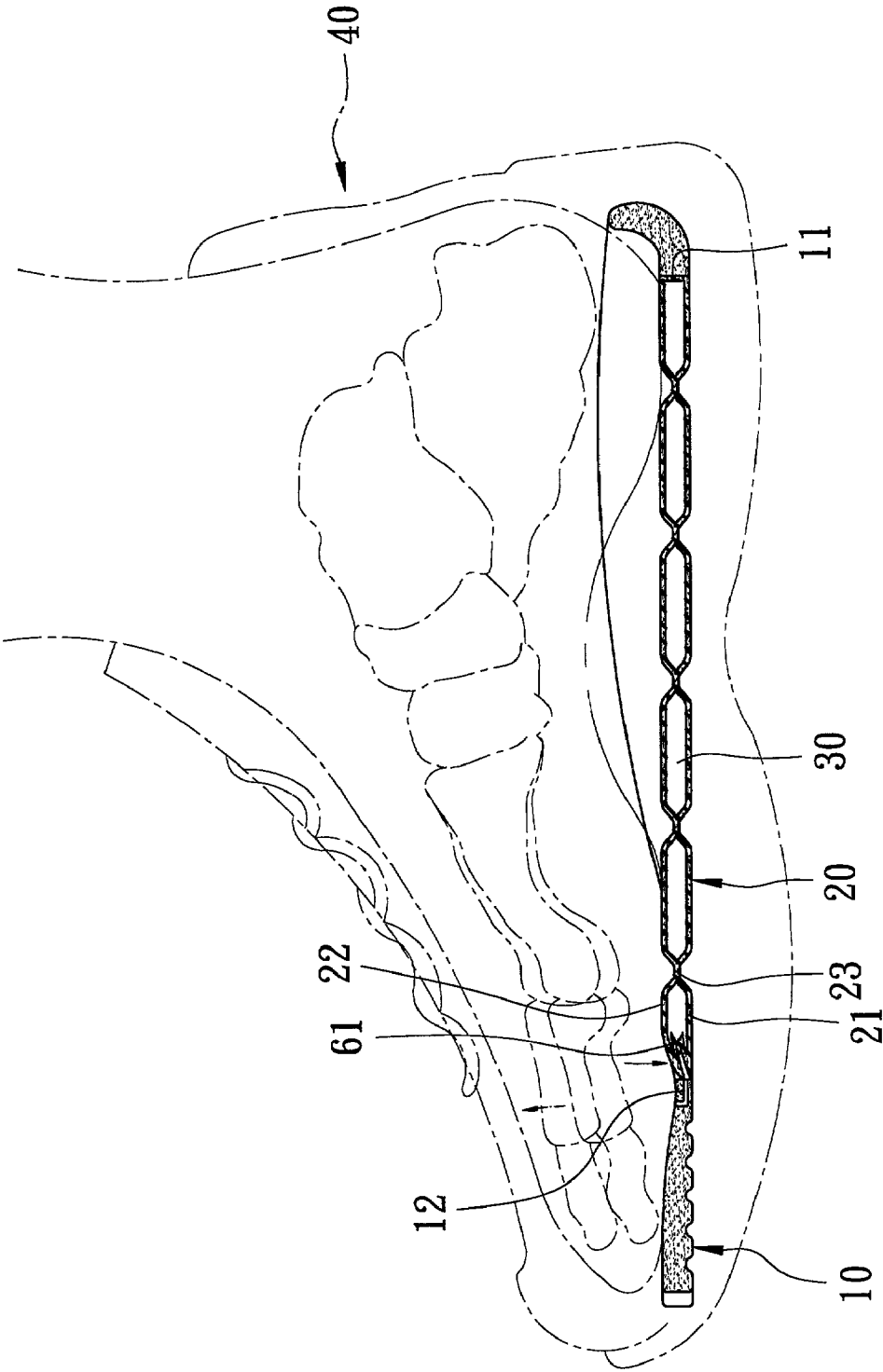


FIG. 6

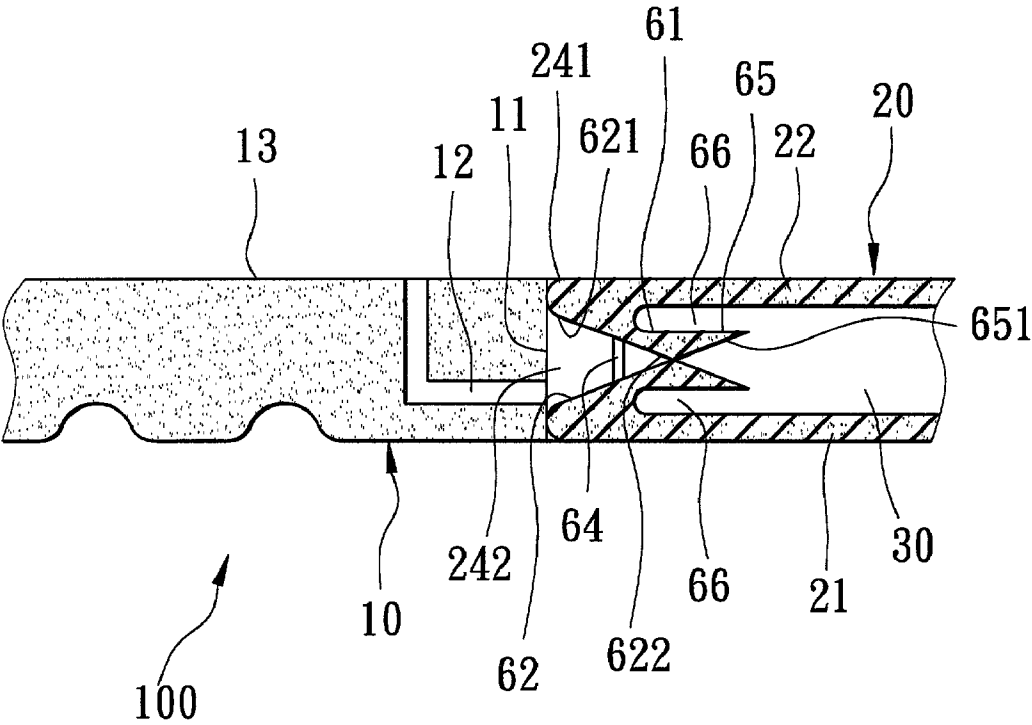
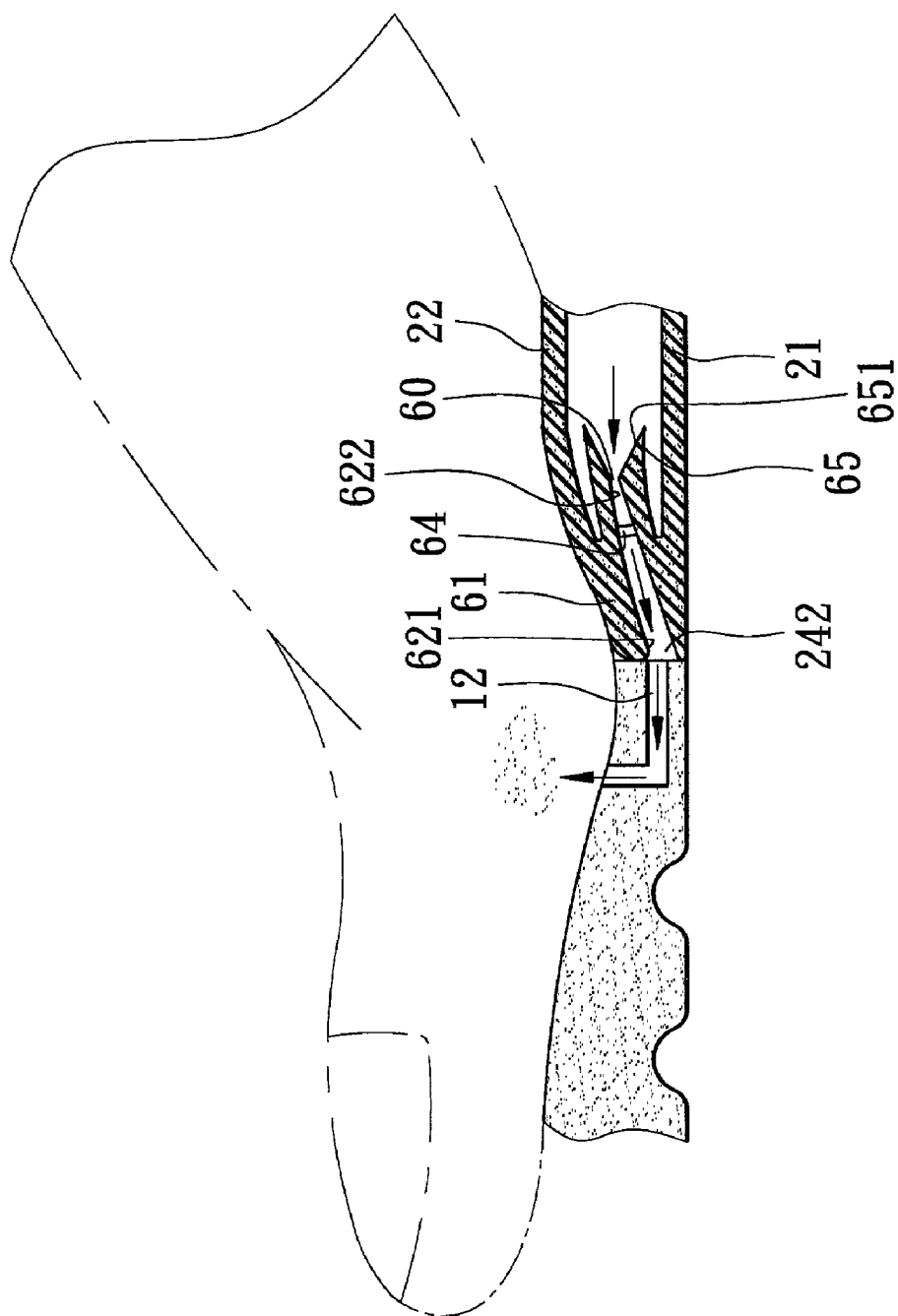


FIG. 7





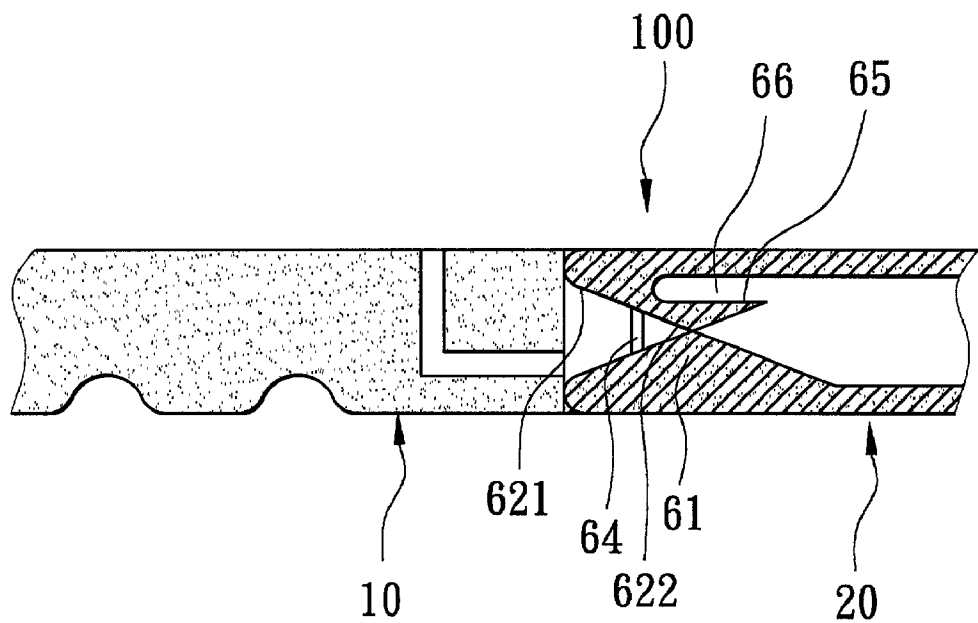


FIG. 9

## SHOE PAD WITH A GAS DISCHARGING VALVE

### BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to a shoe pad, more particularly to a shoe pad with a gas discharging valve.

[0003] 2. Description of the Related Art

[0004] It is known to incorporate ventilating devices into shoe pads in shoes for air exchange between the inside of the shoes and the atmosphere. However, the conventional ventilating devices allow only limited air exchange with the atmosphere, because air is trapped in and circulates mostly inside the shoe.

### SUMMARY OF THE INVENTION

[0005] Therefore, the object of the present invention is to provide a shoe pad with an inflatable part that can store a gas therein and that is provided with a gas discharging valve for discharging the gas from the inflatable part into the shoe upon walking, thereby purging and refreshing the air inside the shoe.

[0006] According to the present invention, a shoe pad comprises: a flexible pad body including an airtight flat inflatable part that is compressible and that confines a cavity adapted to store a high pressure gas therein in such a manner that the pressure in the cavity is greater than the ambient pressure so as to permit discharge of the gas from the cavity into the atmosphere; and at least a discharging valve installed in the inflatable part and including a valve body that has a valve opening for permitting fluid communication between the cavity and the atmosphere, the discharging valve being deformable in such a manner that when foot pressure is applied on the pad body, the discharging valve is deformed, which, in turn, results in opening of the valve opening, thereby permitting the discharge of the gas from the cavity into the atmosphere, and that when the pad body is relieved from the foot pressure, the discharging valve recovers to its non-deformed state, which, in turn, results in closing of the valve opening, thereby preventing the discharge of the gas from the cavity into the atmosphere.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] In drawings which illustrate embodiments of the invention,

[0008] FIG. 1 is a perspective view of a shoe pad embodying this invention;

[0009] FIG. 2 is an exploded perspective view of the shoe pad of FIG. 1;

[0010] FIG. 3 is a top view of the shoe pad of FIG. 1;

[0011] FIG. 4 is a sectional view of the shoe pad taken along line IV-IV of FIG. 3;

[0012] FIG. 5 is a partly cutaway view to illustrate configuration of a discharging valve of the shoe pad of FIG. 1;

[0013] FIG. 6 is a sectional view to illustrate deformation of a discharging valve of the shoe pad of FIG. 1 when the latter is subjected to a foot pressure;

[0014] FIG. 7 is a fragmentary sectional view to illustrate the discharging valve of the shoe pad of FIG. 1 at a non-deformed state;

[0015] FIG. 8 is a fragmentary sectional view to illustrate the discharging valve of the shoe pad of FIG. 1 at a deformed state when subjected to a foot pressure; and

[0016] FIG. 9 is a fragmentary sectional view of a second preferred embodiment of the shoe pad with a discharging valve modified from the previous embodiment shown in FIG. 7.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] FIGS. 1 to 7 illustrate a first preferred embodiment of a shoe pad of this invention for a shoe 40.

[0018] The shoe pad includes: a flexible plastic pad body 100 including an airtight flat inflatable part 20 that is compressible and that confines a cavity 30 therein; an injection valve 26 installed in the inflatable part 20 and adapted for injection of a gas, such as oxygen, into the cavity 30 in such a manner that the pressure in the cavity 30 is greater than the ambient pressure so as to permit discharge of the gas from the cavity 30 into the atmosphere; and at least a discharging valve 6 installed in the inflatable part 20 and including a valve body 61 that has a valve opening 60 for permitting fluid communication between the cavity 30 and the atmosphere. The discharging valve 6 is deformable in such a manner that when a foot pressure is applied on the pad body 100, the discharging valve 6 is deformed (see FIGS. 6 and 8), which, in turn, results in opening of the valve opening 60, thereby permitting the discharge of the gas from the cavity 30 into the atmosphere, and that when the pad body 100 is relieved from a foot pressure, the discharging valve 6 recovers to its non-deformed state (see FIGS. 4 and 7), which, in turn, results in closing of the valve opening 60, thereby preventing the discharge of the gas from the cavity 30 into the atmosphere.

[0019] The inflatable part 20 has top and bottom walls 22, 21 and a peripheral side wall 24 interconnecting the top and bottom walls 22, 21 and having a front end 241 that is formed with a wall opening 242 which is in fluid communication with the cavity 30 via the discharging valve 6. Portions 23 of the top and bottom walls 22, 21 of inflatable part 20 are connected by high frequency welding techniques so as to flatten the inflatable part 20. The valve body 61 of the discharging valve 6 extends from a periphery of the wall opening 242 into the cavity 30, and has a generally cone-shaped inner wall 62 having a diverging end 621 extending from the periphery of the wall opening 242, and a converging end 622 opposite to and extending convergently from the diverging end 621 to define the valve opening 60 so that when the foot pressure is applied on the pad body 100 and compresses the diverging end 621, the converging end 622 is deformed together with the diverging end 621, which, in turn, results in opening of the valve opening 60.

[0020] The discharging valve 6 further includes an elastic returning member 64 that is disposed in the cone-shaped inner wall 62 between the diverging and converging ends 621, 622 and that has two opposite ends extending in a direction transverse to the top and bottom walls 22, 21 and connected to the cone-shaped inner-wall 62.

[0021] The valve body **61** further includes an end extension **65** having a cone-shaped inner face **651** that diverges from the converging end **622** of the inner wall **62**.

[0022] The pad body **100** further includes an outer part **10** confining a receiving space **11** that is defined by an inner face **111** and that receives fittingly the inflatable part **20**. The peripheral side wall **24** of the inflatable part **20** has a shape conforming to the inner face **111**. The outer part **10** has a top face **13** that is flush with the top wall **22** of the inflatable part **20**, and is formed with at least an L-shaped vent hole **12** extending from the top face **13** to the inner face **111** to communicate with the wall opening **242** in the front end **241** of the peripheral side wall **24** of the inflatable part **20**.

[0023] With reference to FIG. 7, a groove **66** is formed among the top and bottom walls **22**, **21** and the valve body **61** to surround the valve body **61**, and extends from a position between the diverging and converging ends **621**, **622** to a free end of the end extension **65**.

[0024] Since the valve opening **60** is very small, the rate of gas discharge from the cavity **30** through the valve opening **60** each time the pad body **100** is subjected to foot pressure is relatively small. As such, the gas stored in the cavity **30** can last for a period of time without the need for frequent refill of the gas into the cavity **30**.

[0025] Referring to FIG. 9, a second preferred embodiment of the shoe pad of this invention is shown to be similar to the previous embodiment, except that the groove **66** only surrounds a part of the valve body **61**.

[0026] With the invention thus explained, it is apparent that various modifications and variations can be made without departing from the spirit of the present invention. It is therefore intended that the invention be limited only as recited in the appended claims.

I claim:

1. A shoe pad comprising:

a flexible pad body including an airtight flat inflatable part that is compressible and that confines a cavity adapted to store a high pressure gas therein in such a manner that the pressure in said cavity is greater than the ambient pressure so as to permit discharge of the gas from said cavity into the atmosphere; and

at least a discharging valve installed in said inflatable part and including a valve body that has a valve opening for permitting fluid communication between said cavity and the atmosphere, said discharging valve being

deformable in such a manner that when foot pressure is applied on said pad body, said discharging valve is deformed, which, in turn, results in opening of said valve opening, thereby permitting the discharge of the gas from said cavity into the atmosphere, and that when said pad body is relieved from the foot pressure, said discharging valve recovers to its non-deformed state, which, in turn, results in closing of said valve opening, thereby preventing the discharge of the gas from said cavity into the atmosphere.

2. The shoe pad of claim 1, further comprising an injection valve installed in said inflatable part and adapted for injection of the high pressure gas into said cavity.

3. The shoe pad of claim 1, wherein said inflatable part has top and bottom walls and a peripheral side wall interconnecting said top and bottom walls and having a front end that is formed with a wall opening which is in fluid communication with said cavity via said discharging valve, said valve body of said discharging valve extending from a periphery of said wall opening into said cavity and having a generally cone-shaped inner wall that has a diverging end extending from said periphery of said wall opening and a converging end opposite to and extending convergently from said diverging end to define said valve opening so that when the foot pressure is applied on said pad body and compresses said diverging end, said converging end is deformed together with said diverging end, which, in turn, results in opening of said valve opening.

4. The shoe pad of claim 3, wherein said discharging valve further includes an elastic returning member that is disposed in said cone-shaped inner wall between said converging and diverging ends and that has two opposite ends extending in a direction transverse to said top and bottom walls and connected to said cone-shaped inner-wall.

5. The shoe pad of claim 4, wherein said pad body further includes an outer part confining a receiving space that is defined by an inner face and that receives fittingly said inflatable part, said peripheral side wall of said inflatable part having a shape conforming to said inner face, said outer part having a top face that is flush with said top wall of said inflatable part, and being formed with at least an L-shaped vent hole extending from said top face to said inner face to communicate with said wall opening in said front end of said peripheral side wall.

6. The shoe pad of claim 1, wherein the high pressure gas is oxygen.

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