US00RE46681E

(19) **United States**

(12) **Reissued Patent**

Choi

(10) **Patent Number: US RE46,681 E**

(45) **Date of Reissued Patent: Jan. 23, 2018**

(54) **CRAMPONS PROVIDED WITH SPIKES**

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(21) Appl. No.: **15/214,178**

(22) Filed: **Jul. 19, 2016**

Related U.S. Patent Documents

Reissue of:

(64) Patent No.: **7,428,788**
Issued: **Sep. 30, 2008**
Appl. No.: **11/299,097**
Filed: **Dec. 9, 2005**

(30) **Foreign Application Priority Data**

Jan. 19, 2005 (KR) ..... 20-2005-0001685 U

(51) **Int. Cl.**
A43B 23/28 (2006.01)
A43C 15/06 (2006.01)
A43C 15/10 (2006.01)

(52) **U.S. Cl.**
CPC ***A43C 15/063*** (2013.01); ***A43C 15/066*** (2013.01); ***A43C 15/10*** (2013.01)

(58) **Field of Classification Search**
CPC A43C 15/063; A43C 15/10; A43C 15/066
See application file for complete search history.

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(57) **ABSTRACT**

Disclosed are chain-type crampons for preventing mountain-climbing boots from being slipped on a snowy road or icy road when climbing a mountain. The crampons having an elastic band and chains mounted on the band are provided with a plurality of spikes and link rings, so that a brake power on the snowy road or icy road is increased and snow is not adhered to the crampons.

14 Claims, 8 Drawing Sheets

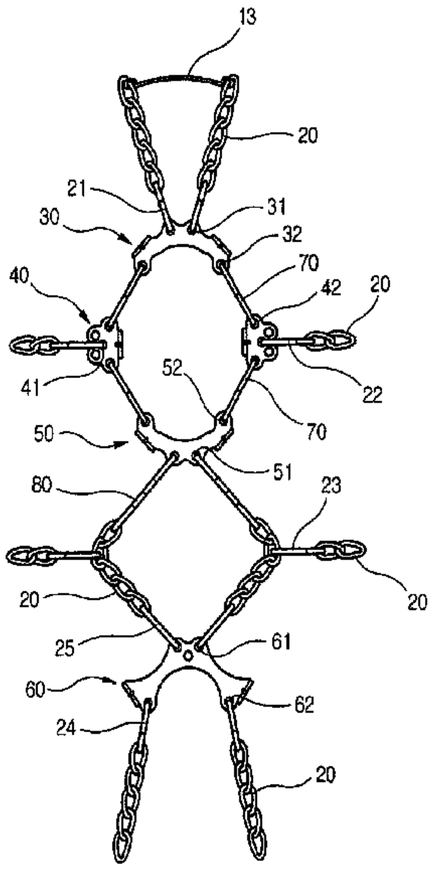

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FIG. 1

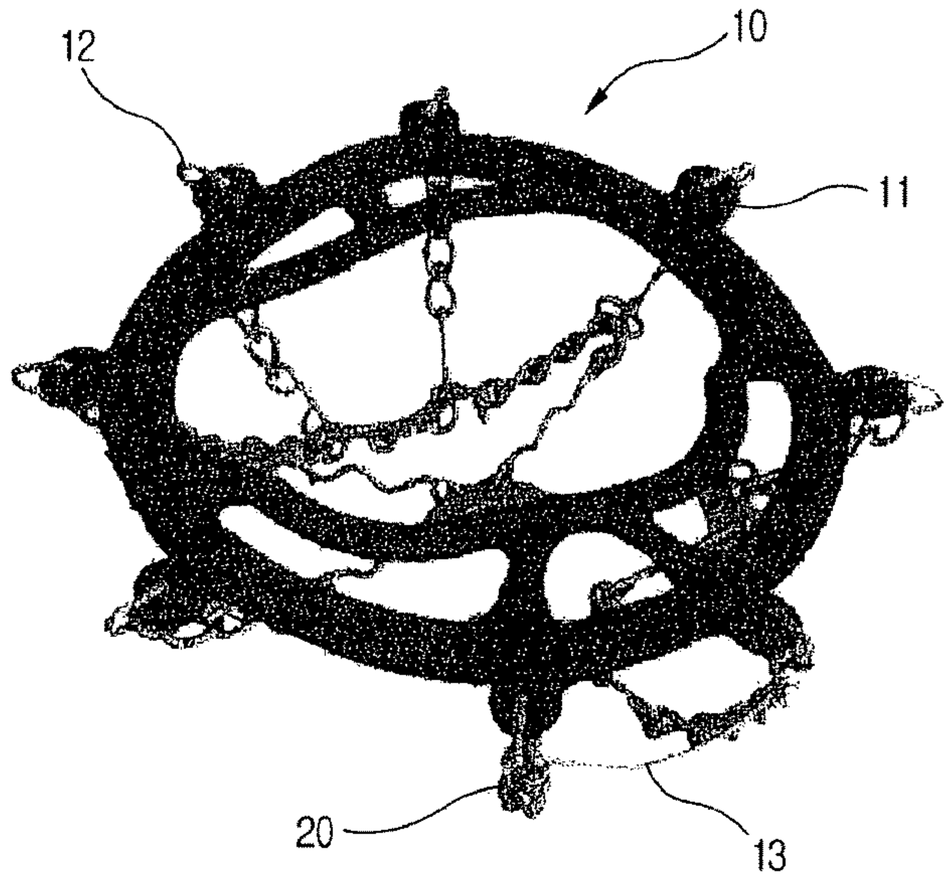

FIG. 2

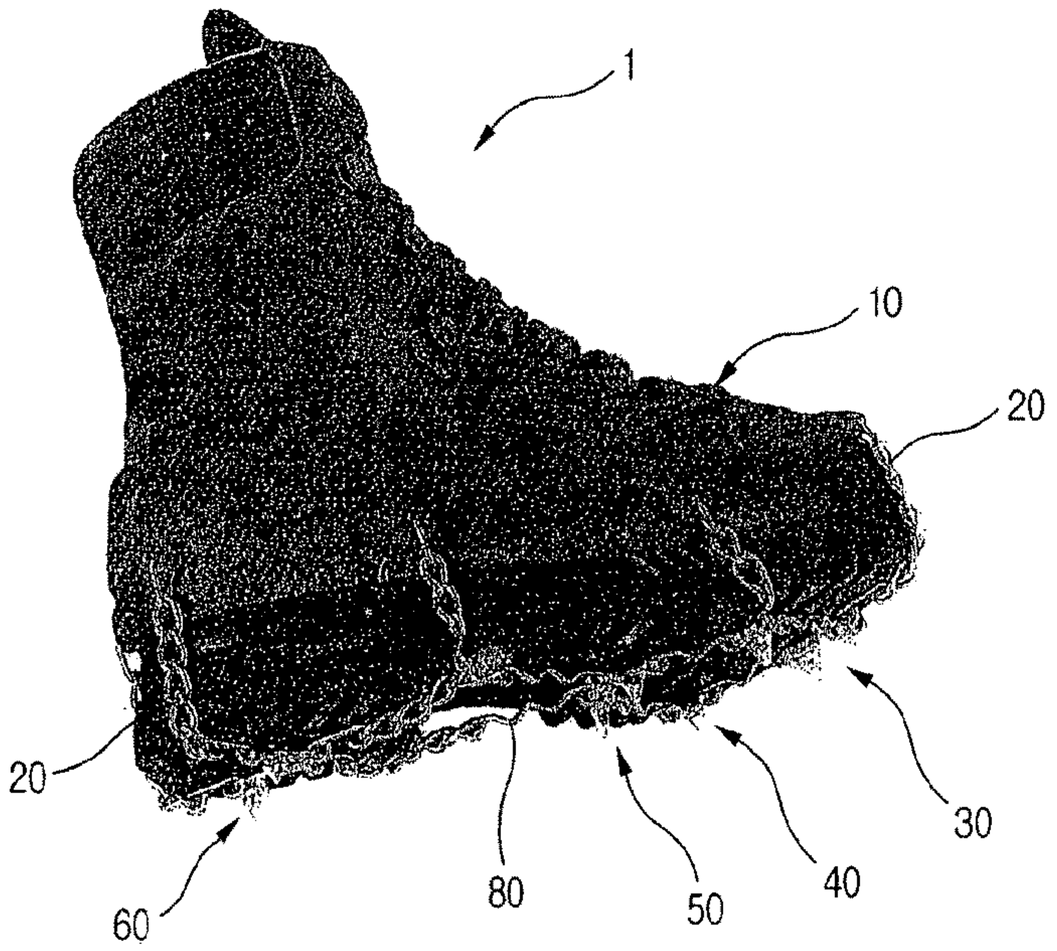

FIG.3

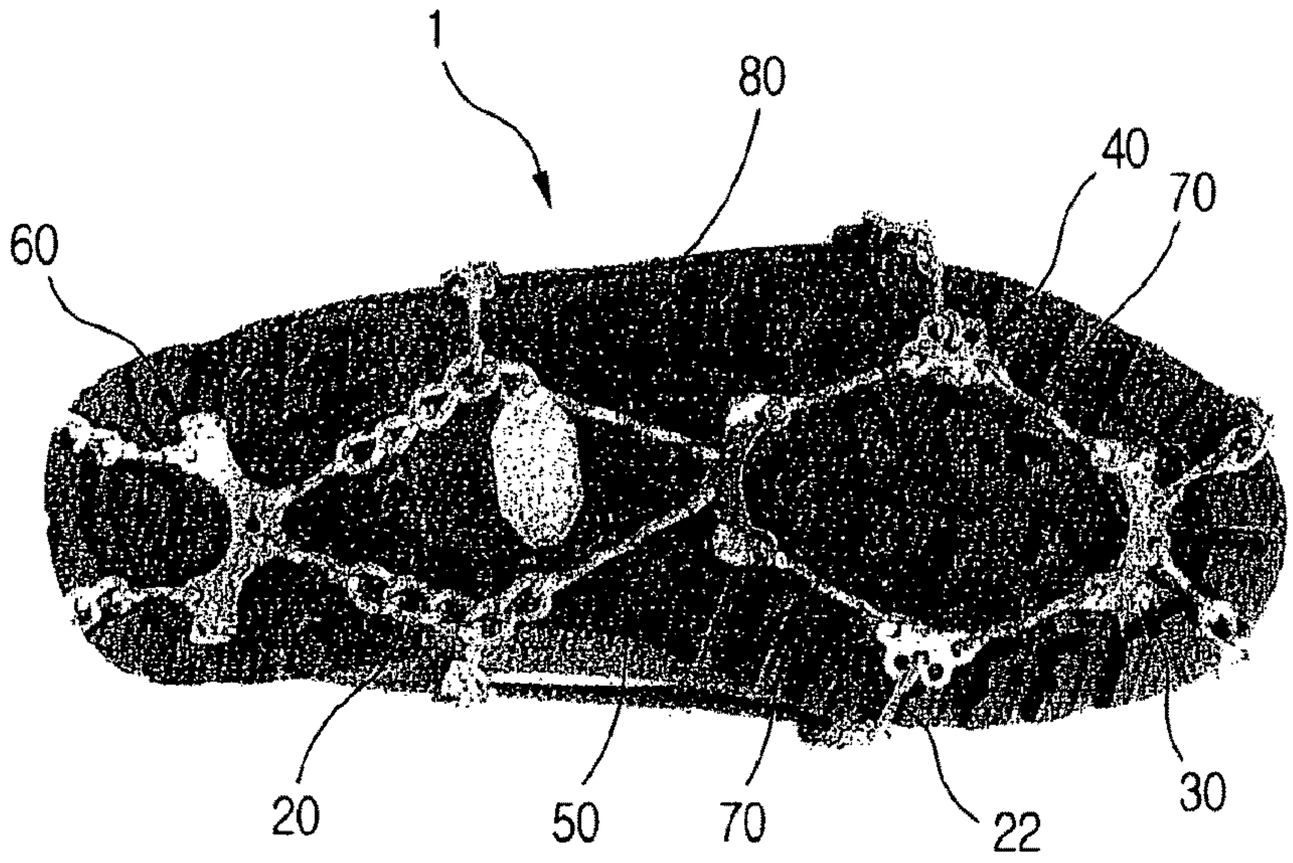

FIG.4

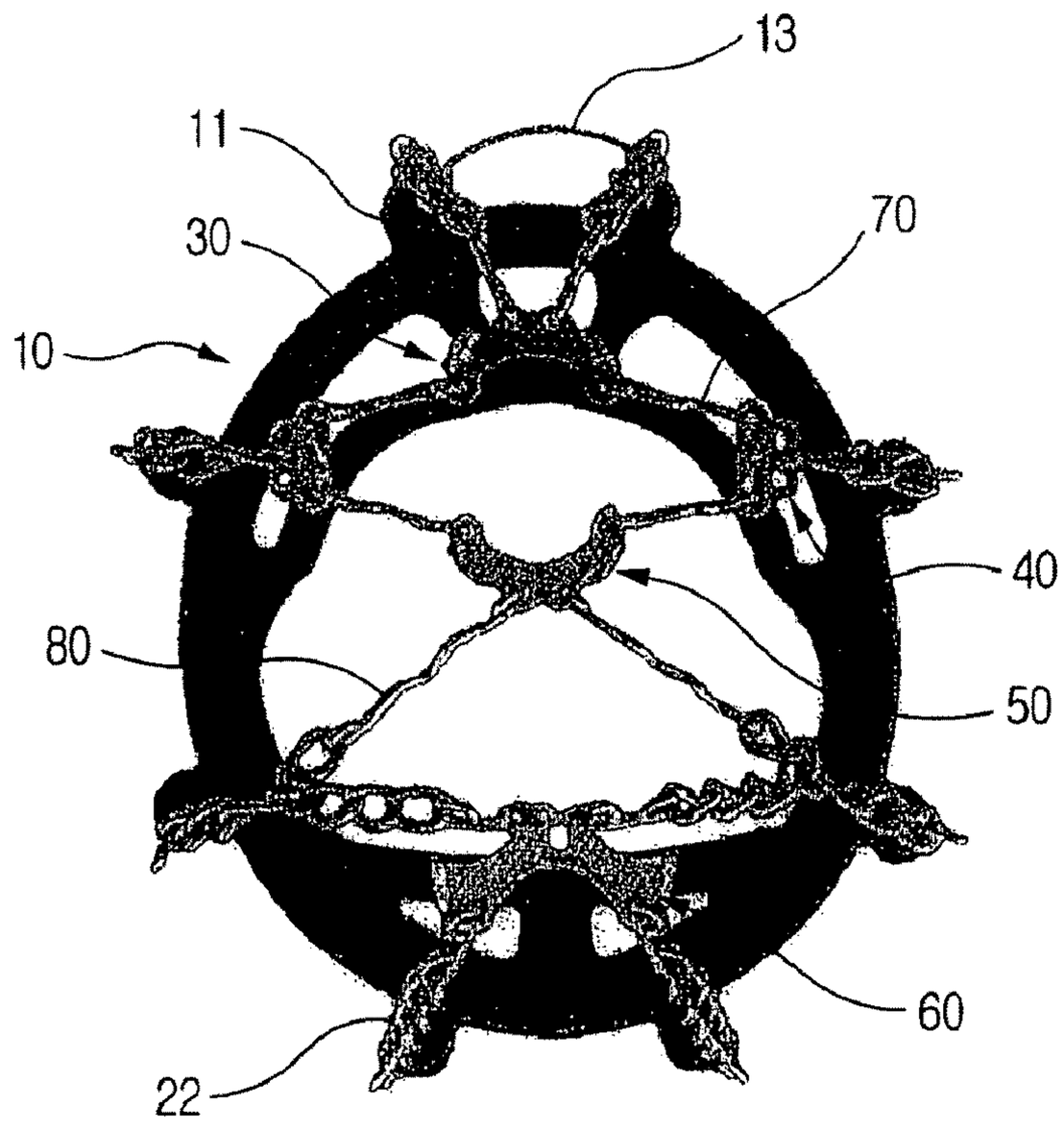

FIG.5

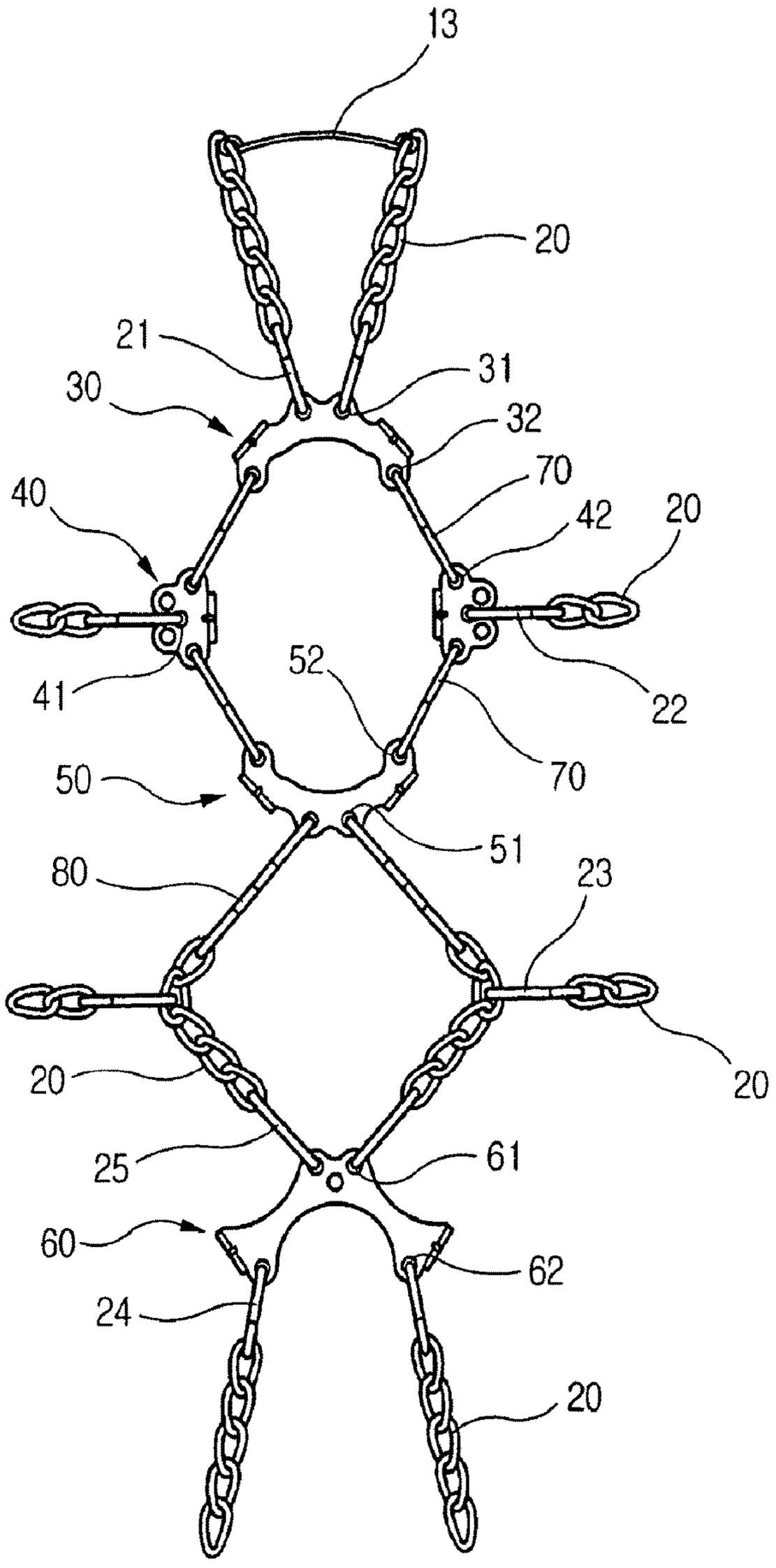
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FIG.6

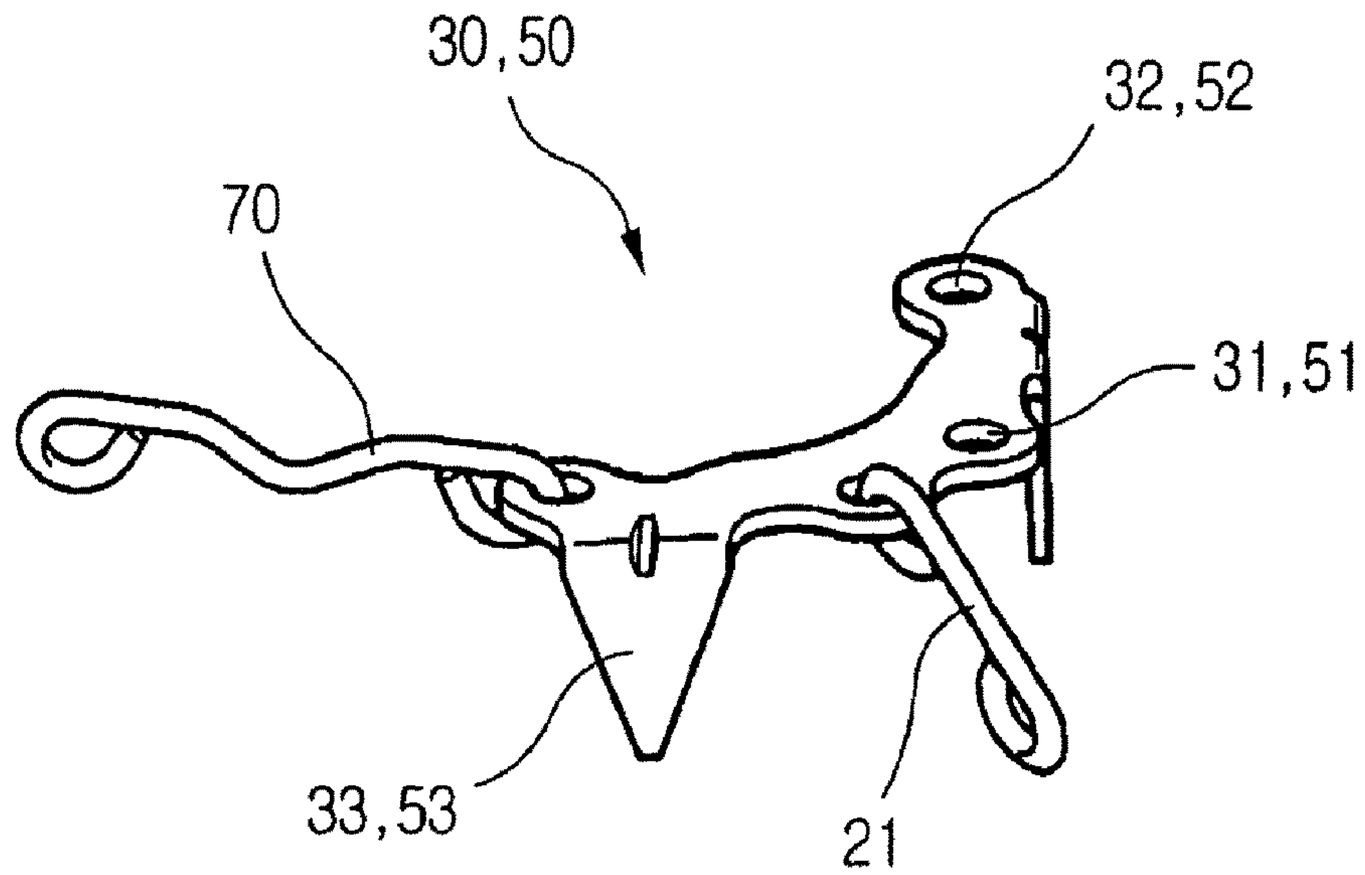


FIG.7

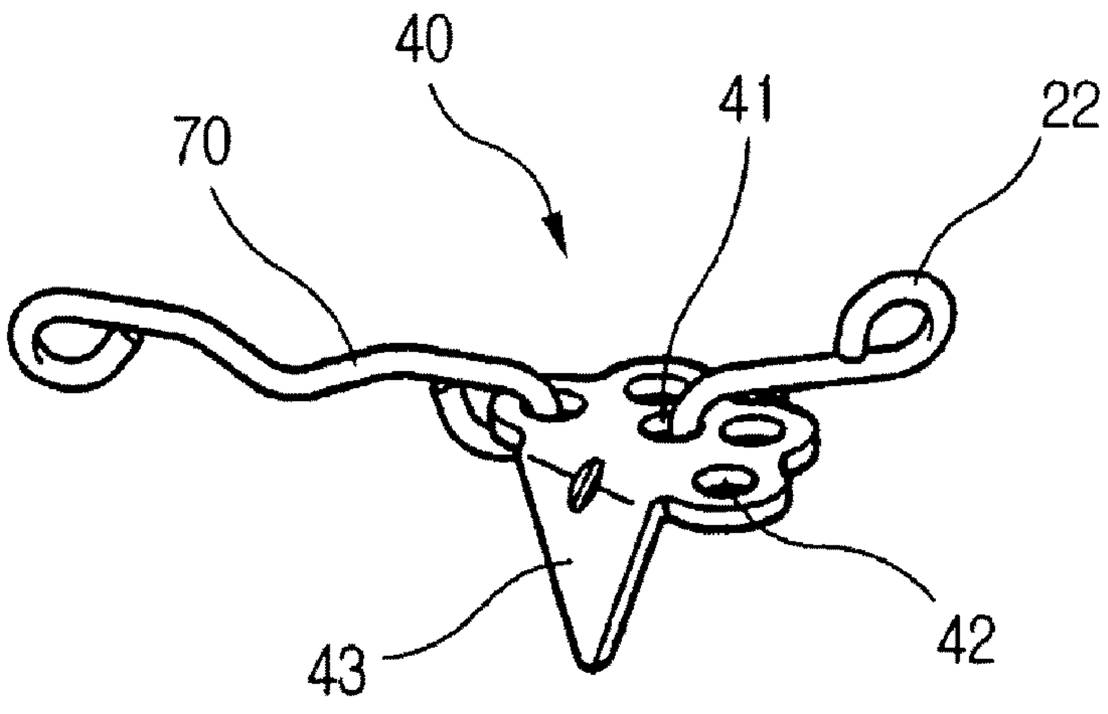


FIG.8

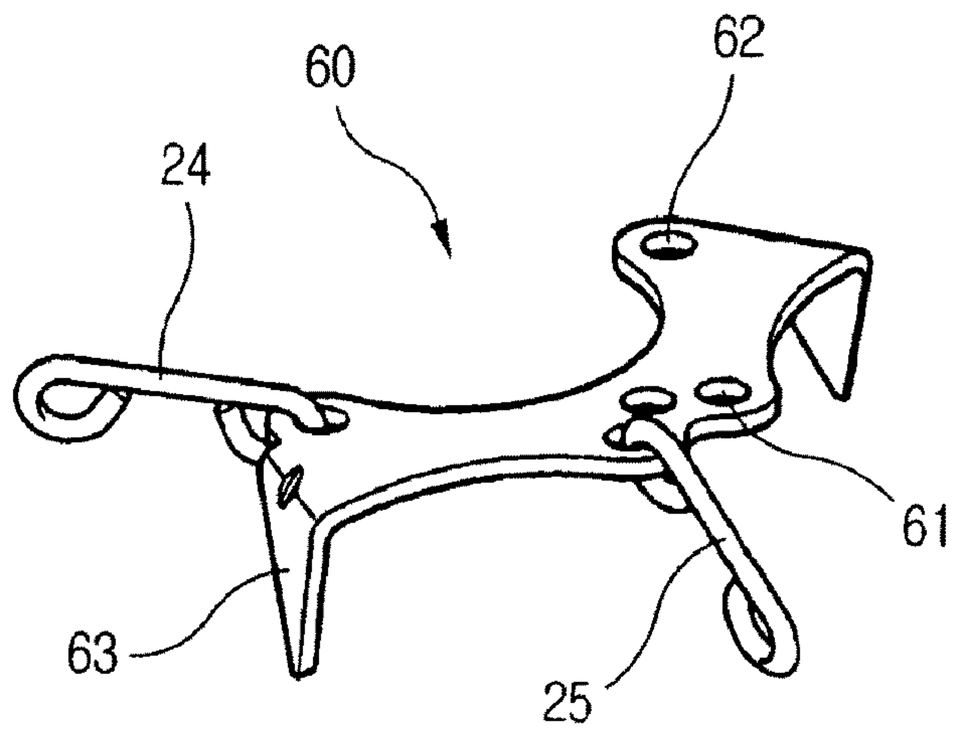


FIG.9

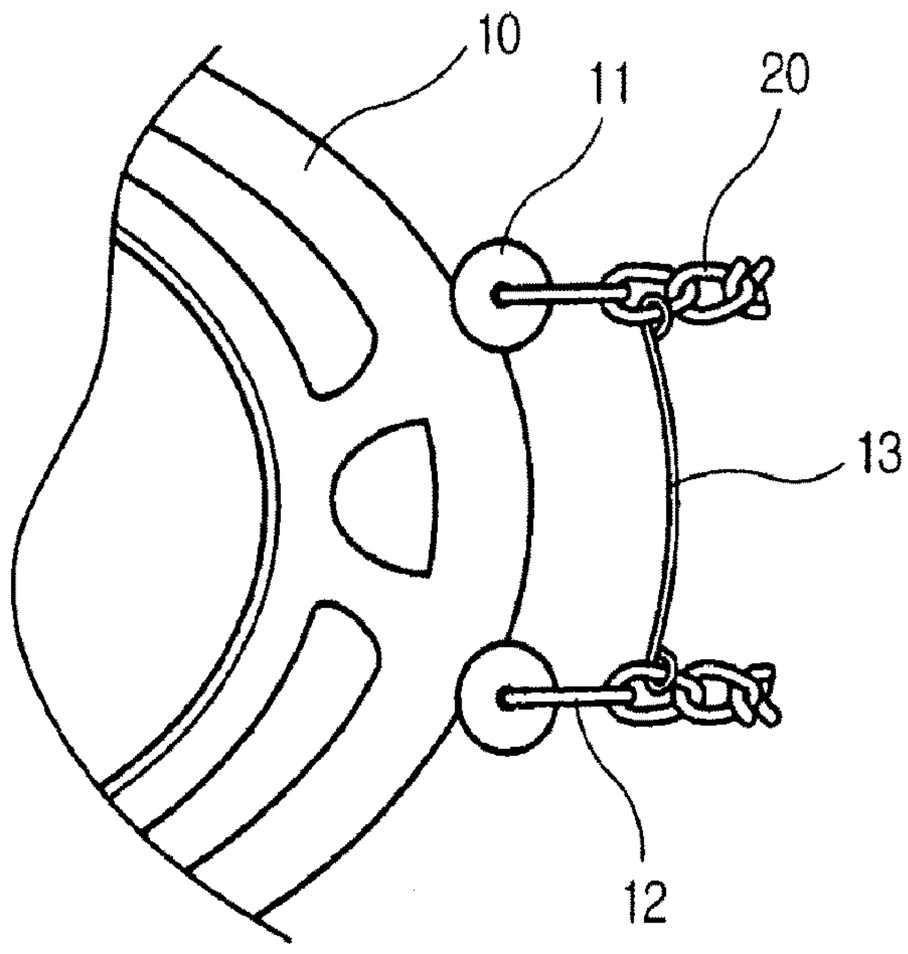


FIG. 10

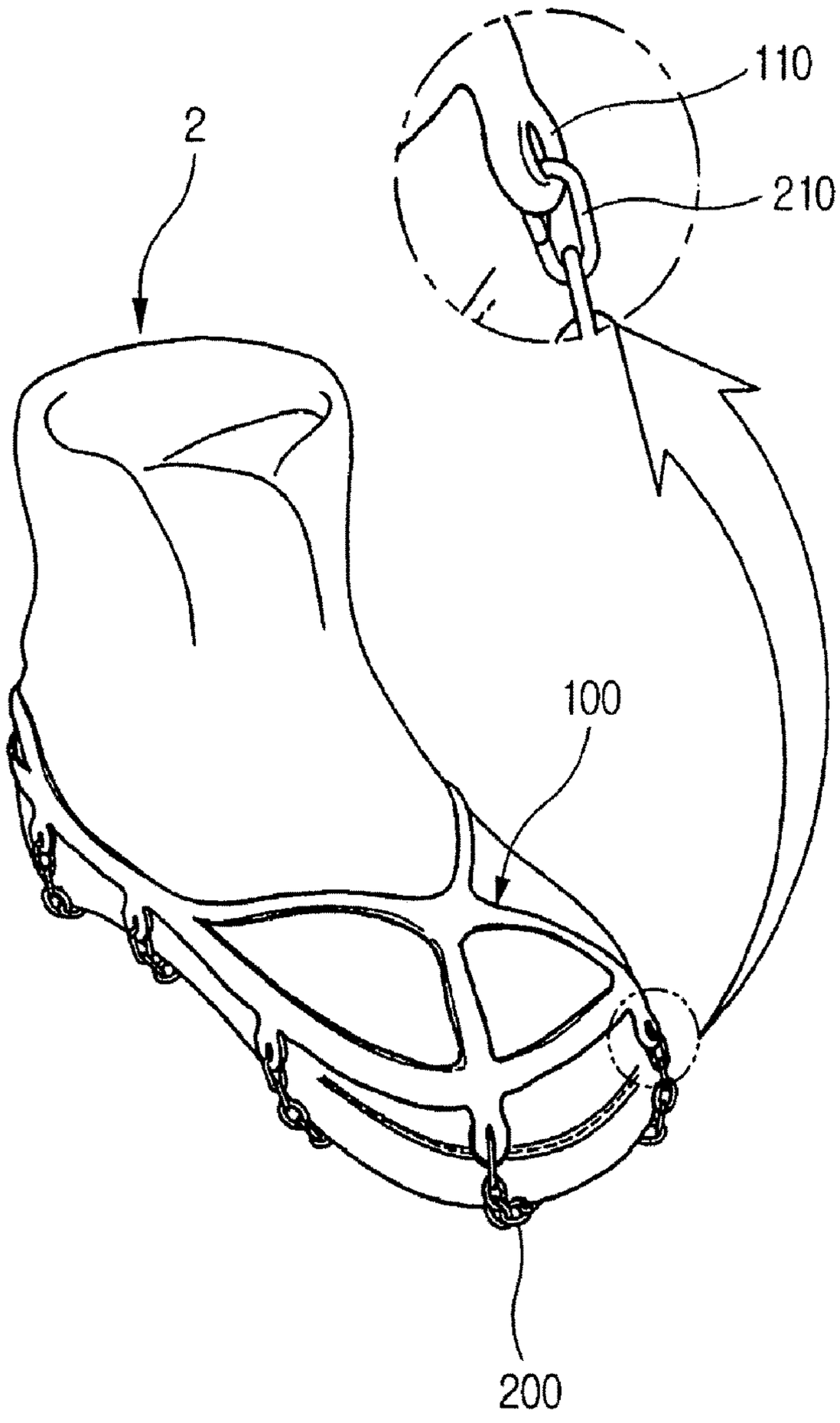


FIG. 11

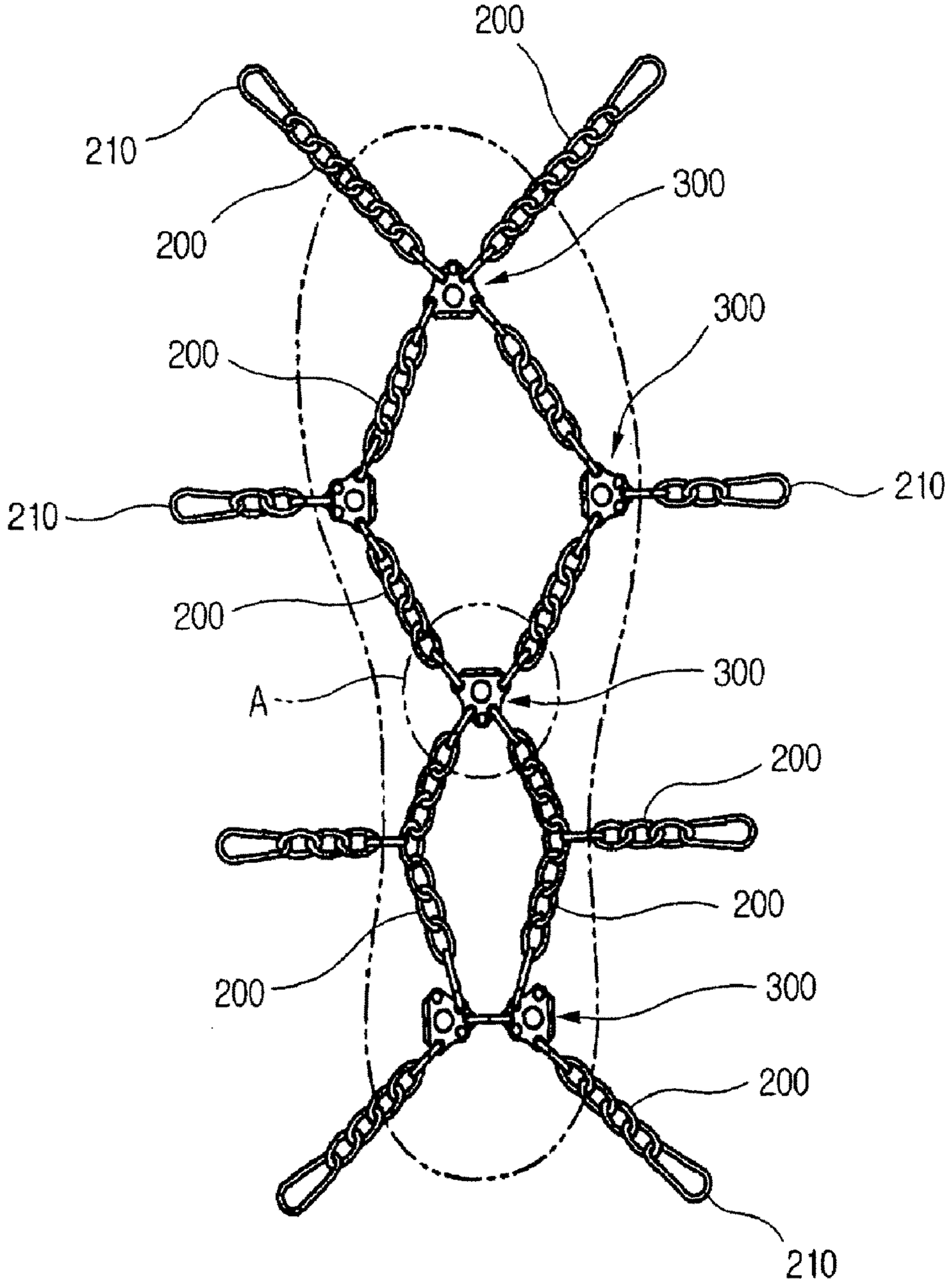


FIG. 12

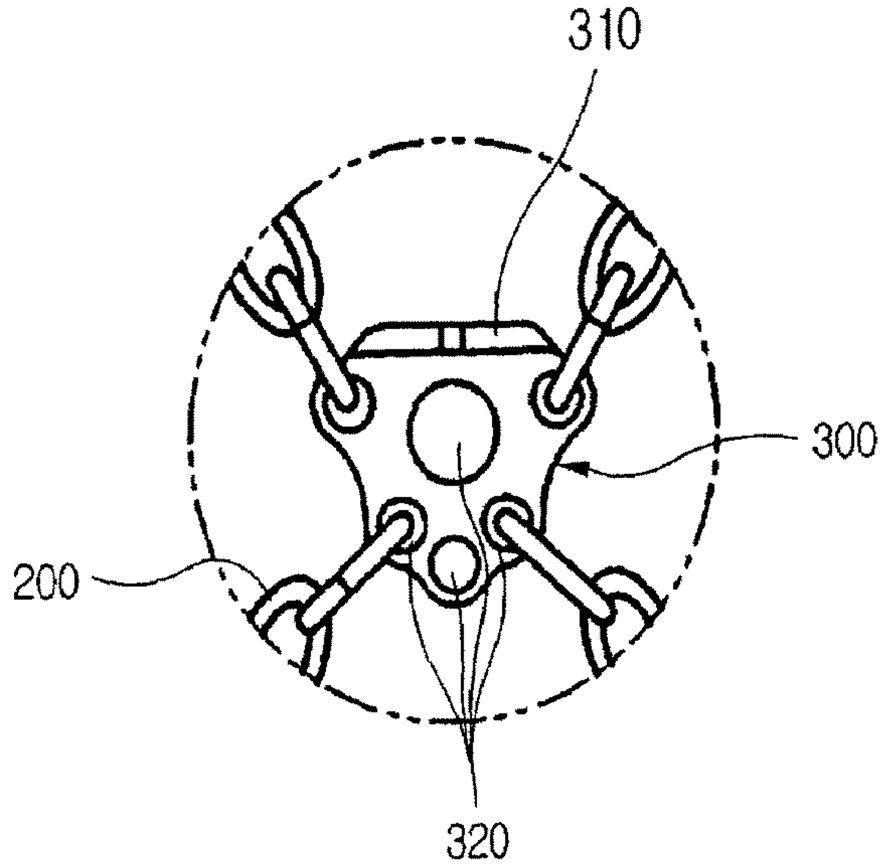
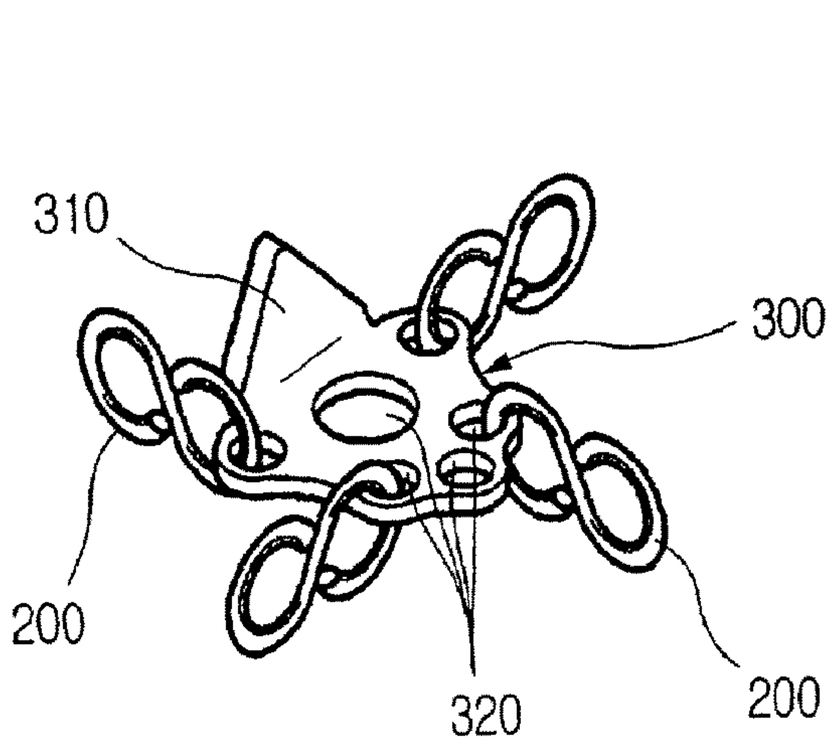


FIG. 13



CRAMPONS PROVIDED WITH SPIKES

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

This application *is a reissue of U.S. Pat. No. 7,428,788, which issued from U.S. patent application Ser. No. 11/299,097, filed Dec. 9, 2005, which* claims the benefit of Korean patent application No. 20-2005-0001685, filed Jan. 19, 2005, *each of* which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to crampons for preventing mountain-climbing boots from being slipped on a snowy road or icy road when climbing a mountain in the winter season, and more particularly, to chain-type crampons having an elastic band and chains mounted on the band which are provided with a plurality of spikes and link rings, so that a brake power on a snowy road or icy road is increased and snows are not adhered to the crampons.

2. Background of the Related Art

In general, since temperatures are low, and snows and ices pile up on the ground, in the winter season, snowy roads or icy roads are formed on mountain passes. Climbers are frequently slipped on the snowy road or icy road through carelessness or beyond human control, when climbing a mountain, so that climbers are bruised or are seriously wounded, such as a fracture.

In order to prevent the emergency situations, most of the mountain-climbing boots are put on crampons. The climbers carry the crampons at ordinary times, and put the crampons on the boots in an area with snowy roads or icy roads, thereby keeping a body in safe and thus preventing the slip.

The existing crampons are generally put below a bottom surface of the boots to prevent the slip on the snowy roads or icy roads in the winter season. The crampons includes a body and a binding band, in which the body is downwardly bent to form about 4 to 6 spike edges at the bottom surface thereof, and the binding band is coupled to the body to tightly bind the body against the outsole of the boots, when the climber puts the crampons on the boots.

Recently, in order to shorten a time required to put the crampons on the boots or remove the crampons from the boots, the binding band of the crampons is provided with a fastening member having a hook and a coupling ring. For example, crampons capable of shortening the time required to put on the crampons is disclosed in Korean Utility Model Registration No. 20-0252026 entitled "Crampons", which is assigned to the same applicant and is incorporated herein by reference.

According to the crampons disclosed in the publication, an elastic band is bound around the upper portion of an outsole of mountain-climbing boots, and chains are coupled to the band as an anti-skid member. The chains are coupled to each other to partially cover the bottom surface of the boots, thereby preventing the slip of the boots due to the friction between the crampons and the snowy road or icy road.

When the climber puts the crampons on the boots, a front heel portion is firstly inserted in the widened elastic band, and the band is pulled to enable it to cover the upper portion of the outsole corresponding to a rear heel. The crampons are tightly attached to the boots due to the elastic force of the band, and the chains are disposed below the bottom surface of the boots.

The existing crampons have a discomfort drawback in that the snows are adhered to the chains when temperatures are low. Specifically, snows adhered between the chains are gradually getting bigger. Further, in case the chains disposed at the rear heel portion of the boots are applied with strong frictional force when climbing a steep slope, the band tightly covering the front heel portion of the boots is stretched, so that the wearing state of the band is deteriorated.

Also, in addition to the drawback that the snows are adhered between the chains to make the behavior discomfort, the brake power on the snowy road or icy road is remarkably decreased.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to crampons for mountain-climbing boots that substantially obviates one or more problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide chain-type crampons having an elastic band and chains mounted on the band which are provided with a plurality of spikes and link rings, so that a brake power on a snowy road or icy road is increased and snows are not adhered to the crampons.

To achieve the object and other advantages, according to one aspect of the present invention, there are provided chain-type crampons provided with spikes, in which an elastic band is bound around an outsole of mountain-climbing boots, and chains are coupled to the band as an anti-skid member, the crampons comprising: a front spike, a center spike, and a rear spike, respectively, disposed at a front portion, a center portion, and a rear portion of a bottom surface of the boots, engaged to the chain and coupling rings, and formed with a plurality of spike edges; lateral spikes disposed forward between the front spike and the center spike and engaged to the chain and the coupling ring; link rings each engaged to the front spike, the lateral spikes, and the center spikes; and a circular restraining bar coupled to the lateral spikes tightly attached to a front heel of the boots.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. **1** is a perspective view illustrating crampons according to a first embodiment of the present invention;

FIG. **2** is a side view illustrating the wearing state of the crampons according to a first embodiment of the present invention;

FIG. **3** is a bottom view illustrating the wearing state of the crampons according to a first embodiment of the present invention;

FIG. **4** is a bottom view illustrating the crampons according to a first embodiment of the present invention;

FIG. **5** is an exploded view illustrating the wearing state of the crampons according to a first embodiment of the present invention;

FIG. **6** is a perspective view illustrating a major part of front and center spikes according to a first embodiment of the present invention;

FIG. **7** is a perspective view illustrating a major part of lateral spikes according to a first embodiment of the present invention;

FIG. **8** is a perspective view illustrating a major part of a rear spike according to a first embodiment of the present invention;

FIG. **9** is a top view illustrating the installed state of a restraining bar according to a first embodiment of the present invention;

FIG. **10** is a perspective view illustrating the wearing state of crampons according to a second embodiment of the present invention;

FIG. **11** is a top view illustrating the removed state of crampons according to a second embodiment of the present invention;

FIG. **12** is an enlarged view of a portion 'A' in FIG. **11**; and

FIG. **13** is a perspective view illustrating a major part of a spike according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred embodiment according to the present invention will now be explained with reference to the accompanying drawings.

The chain-type crampons installed with spikes according to the first embodiment of the present invention, in which an elastic band **10** is bound around an outsole of mountain-climbing boots **1**, and chains **20** are coupled to the band **10** as an anti-skid member, is characterized by comprising: a front spike **30**, a center spike **50**, and a rear spike **60**, respectively, disposed at a front portion, a center portion, and a rear portion of a bottom surface of the boots **1**, engaged to the chain **20** and coupling rings **21**, **23**, **24**, and **25**, and formed with a plurality of spike edges **33**, **53**, and **63**; lateral spikes **40** disposed forward between the front spike **30** and the center spike **50** and engaged to the chain **20** and the coupling ring **22**; link rings **70** and **80** each engaged to the front spike **30**, the lateral spikes **40**, and the center spikes **50**; and a circular restraining bar **13** coupled to the lateral spikes **40** tightly attached to a front heel of the boots **1**, as shown in FIGS. **1** through **9**.

The elastic band **10** made of rubber or synthetic material is adapted to cover the upper portion of the outsole of the boots **1**, and bosses **11** protrudes from an outer edge of the band **10** at a desired interval so that fixing rings **12** are mounted to the bosses **11**. The chains **20** and the coupling rings **21**, **22**, **23**, and **24** are coupled to a plurality of fixing rings **12** spaced apart from each other at a given interval.

The coupling rings **21**, **23**, and **24** are coupled to the front, center, and rear spikes **30**, **50**, and **60** each integrally formed with bent spike edges **33**, **53**, and **63**. The front, center, and rear spikes **30**, **50**, and **60** are disposed at the front, center, and rear portions on the bottom surface of the boots **1**. The

lateral spikes **40** are disposed at both sides between the front spike **30** and the center spike **50**, and are coupled by the chain **20** and the coupling ring **22**.

The front spike **30**, the center spike **50**, and the rear spike **60**, which are disposed at the front, center, and rear portions of the bottom surface of the boots **1**, respectively, are formed with fastening holes **31** and **32**; **51** and **52**; **61** and **62** at both lateral ends and a center portion thereof. Also, the front spike **30**, the center spike **50**, and the rear spike **60** are bent at the side thereof to integrally form the spike edges **33**, **53**, and **63**.

The lateral spikes **40** disposed at both front sides on the inner bottom surface of the boots **1** are formed with fastening holes **41** and **42** at both lateral ends and center portion, and are bent toward the bottom surface to form the spike edge **43**.

The front spike **30**, the center spike **50**, and the rear spike **60**, which are disposed at the front, center, and rear portions of the bottom surface of the boots **1**, respectively, are coupled to a plurality of link rings **70** configured to freely pivot. The rear spike **60** is coupled to the center spike **50**, the link chain **80**, and the chain, with it being mounted to the chain **20** and the coupling ring **24**.

The link ring **70** positioned at the front portion of the bottom surface of the boots **1** is bent to be pivotally inserted into is bent to be pivotally inserted into the fastening holes **32**, **42**, and **52** of the front spike **30**, the center spike **50**, and the rear spike **60**. The front spike **30** and the lateral spikes **40** are coupled to the chain **20** and the band **10** via the fastening holes **31** and **41** formed at center portion and the coupling rings **21** and **22**.

The rear spike **60** is disposed at the rear portion of the inner bottom surface of the boots **1**, and is coupled to the center spike **50** by connecting the fastening hole **51** of the center spike **50** disposed at the center portion with the fastening hole **61** positioned at the center portion by use of the link ring **80**, the chain **20**, and the coupling ring **25**, with the fastening hole **62** formed at both sides of the elastic ban **10** being mounted with the chain **20** and the coupling ring **80**.

The chain-type crampons provided with spikes according to the first embodiment of the present invention includes the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60**, which are disposed at the front, both sides, center, and rear portions on the inner bottom surface of the boots **1** and have spike edges **33**, **43**, **53**, and **63**, respectively, thereby increasing a brake power on a snowy road or icy road.

With the chain-type crampons provided with spikes according to the first embodiment of the present invention, in order to prevent the band **10** tightly attached to the boots **1** from being stretched when the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60** are applied with strong frictional force in climbing a steep slope, both chains **20** tightly attached to the front heel of the boots **1** are provided with the circular restraining bar **13**, so that the restraining bar **13** is restrained by the front heel portion of the boots **1** to prevent the stretching of the band **10**.

Consequently, the first embodiment of the present invention includes the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60**, respectively, disposed to the front, both sides, center, and rear portions on the inner bottom surface of the boots **1** which comes in contact with the snowy road or icy road, to increase the brake power and thus prevent the slip effectively. Also, the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60** are coupled to the link rings **70** and **80** configured to be

freely pivoted, thereby solving the existing problem in that the snow is adhered to the boots.

Specifically, the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60**, respectively, disposed to the front, both sides, center, and rear portions on the inner bottom surface of the boots **1** are coupled to each other by use of the link rings **70** and **80** made of an iron wire to solve the problem in that the snow is adhered to the boots, breaking from the chain structure of the existing crampons.

According to the present invention, the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60**, respectively, having a plurality of spike edges **33**, **43**, **53**, and **63**, are provided to the existing crampons, thereby effectively preventing the slip of the boots **1** on the snowy road or icy road.

Both chains **20** are provided with the circular restraining bar **13**, so that the chains **20** are tightly attached to the front heel of the boots **1**. Hence, in case the front spike **30**, the lateral spikes **40**, the center spike **50**, and the rear spike **60** are applied with the strong frictional force in climbing a steep slope, the restraining bar **13** is caught by the front heel portion of the boots **1**, thereby preventing the band **10** from being stretched and thus maintaining the normal wearing state.

The chain-type crampons installed with spikes according to a second embodiment of the present invention, in which an elastic band **100** is bound around an upper portion of an outsole of mountain-climbing boots **2**, and chains **200** are coupled to the band **100** as an anti-skid member, is characterized in that a plurality of spikes **300** are disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots **2**, and the spike is bent downwardly to form at least one spike edge **310**, and is formed with a plurality of fastening holes **320**, as shown in FIGS. **10** through **13**.

As shown in FIG. **11**, the crampons of the present invention includes a plurality of spikes **300**, a plurality of chains **200** for coupling the spikes **300**, and a plurality of fixing rings **210** for coupling the spikes **300** and the chains **200** with a fixing portion **110** of the band **100**.

A plurality of spikes **300** are adapted to hold the chain **200** and the chain **200**. The number of the spikes **300** may be varied depending upon the use of the crampons (for example, climbing a mountain, climbing an ice ridge, or the like). If the number and position of the spikes **300** are varied, the number of the chains **200** coupling the spikes **300** and the number of the link rings **210** coupling the spikes **300** and the band **100** may be varied.

Preferably, the spikes **300** having the spike edges **310** are installed to the chains **200** forming the anti-skid member, in order to balance the boots **2** with the crampons according to the present invention with respect to the ground.

FIG. **12** is an enlarged view of the spike **300** of the crampons according to the present invention. As shown in FIG. **12**, the spike **300** has a triangular shape, and is formed with a plurality of fastening holes **320**. Any one of three corners of the triangle is downwardly bent to form a spike edge **310** corresponding to the outsole of the boots **2**.

The number of the fastening holes **320** formed in the spike **300** is selected to exceed the sum of the number of the chains **200** for coupling the spike **300** with other spike **300** and the number of the coupling rings **210** for coupling the chain **200** with the band **100**. Preferably, the fastening holes **320** among a plurality of fastening holes **210**, through which the chain **200** passes, are formed in the spike **300** in balance.

Referring to FIG. **13**, the spike edge **310** is formed by bending a corner area of the spike **300** downwardly. In case the crampons according to the present invention are installed to the boots **2**, the spike edge **310** formed on the spike **300** faces the ground. Further, one or more spike edge **310** may be provided to the spike **300**.

Although it is described in that the spike **300** has the triangular shape, the spike may be formed in other shape (for example, circular or polygonal shape). If the shape of the spike **300** is changed, the number and position of the fastening holes **320** formed in the spike **3200** and the position of the spike edge **310** may be varied.

Referring again to FIG. **11**, the chain **200** couples other spikes **300** to each other to maintain the spacing between the spikes **300**.

One end of the fixing ring **210** is engaged to the chain **200**, and the other end is engaged to the fixing portion **110** of the band **100**, thereby coupling the chain **200** with the band **100**. In the present invention, the chain forming the anti-skid member is made of a chain structure, but a spring structure of a twist structure made by twisting a plurality of metal wires may be provided.

Explaining the coupling state between the band **100** and the chain **200** forming the anti-skid member with reference to FIG. **10**, the band **100** is provided with the fixing portion **110** formed in a circular ring shape to couple the fixing ring **210** of the chain **200**. The fixing portion **110** is coupled to one end of the fixing ring **210** in an unopenable fashion. Specifically, the band **100** is integrally formed with the chain **200** not to disassemble the band and the chain. In this case, it is preferable that the number of the fixing portions **110** is equal to that of the fixing rings **210** provided to the chain **200**.

Although it is described in that the fixing portion **110** formed on the band **100** is coupled to the fixing ring **210** in the unopenable fashion by integrally forming the band **100** and the chain **200**, the fixing ring **210** of the chain **200** coupled to the fixing portion **110** may be formed in an openable ring to divide the chain **200** from the band **100**.

Further, although it is described in that the fixing portion **110** is formed in a circular ring shape on the band **100**, the fixing portion **110** may be formed in a through-hole penetrating a plate of the band **100**, or in other shapes of which a catching hook (for example, U-shaped ring) is attached on the band **100**, so that it can be coupled to the fixing ring **210** of the chain **200** forming the anti-skid member.

As shown in FIG. **10**, the fixing ring **110** formed in a circular ring shape on the band is engaged to the fixing ring **210** of the chain **200** forming the anti-skid member, thereby forming the band **100** and the chain **200** in one unit. The band **100** is made of elastic deformable rubber, which covers the boots partially. Since the band **100** is made of elastic deformable rubber, the crampons **2** of the present invention may be easily worn or removed on or from any kinds of footwear, regardless of a size or shape of the mountain-climbing boots. The band **100** may be made of a semi-organic polymer comprising silicon which has good heat resistance and insulating property.

The chain-type crampons provided with the spikes according to the second embodiment of the present invention have an advantage of effectively preventing the boots from being slipped when climbing or walking the mountain in the winter season, by providing the chains **200** and spikes **300** for coupling the chains **200** and formed with the spike edges **310**. Further, the crampons of the present invention may be easily put on the mountain-climbing boots by using the band **100** made of elastic rubber, regardless of a length

and shape of the boots. Also, the user can easily wear or remove the crampons on or from the boots.

With the above description, the chain-type crampons of the present invention having the elastic band and the chains mounted on the band are provided with a plurality of spikes and link rings, so that the brake power on the snowy road or icy road is increased, and the snow is not adhered to the crampons. In particular, the restraining bar is installed to the front portion of the boots, thereby increasing the binding force of the crampons.

The forgoing embodiments are merely exemplary and are not to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatus. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. Chain-type crampons provided with spikes, in which an elastic band is adapted to be bound around an outsole of mountain-climbing boots, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a front spike, a center spike, and a rear spike, respectively, positioned to be disposed at a front portion, a center portion, and a rear portion of a bottom surface of the boots when the elastic band is bound around the outsole of the boots, said spikes being formed with a plurality of spike edges;

lateral spikes disposed forward between the front spike and the center spike, wherein the front spike, center spike, rear spike and lateral spikes are each operatively engaged to the chain via coupling rings;

link rings each engaged to the front spike, the lateral spikes, and the center spikes; and

a curved restraining bar coupled to at least two chains of the chain and operatively coupled to the front spike, the curved restraining bar being engaged with a front of the boots when the elastic band is bound around the outsole of the boots.

2. The crampons as claimed in claim **1**, wherein the front spike, the center spike, and the rear spike, respectively, are formed with fastening holes at both lateral ends and a center portion thereof, and the front spike, the center spike, and the rear spike are bent at the side thereof to integrally form the spike edges.

3. Chain-type crampons provided with spikes in which an elastic band is adapted to be bound around an upper portion of an outsole of mountain-climbing boots and extend from a front portion to a rear portion of the boot when bound around the boot, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a plurality of spikes that are operatively coupled to the elastic band via chains and positioned to be disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots when the elastic band is bound around the outsole of the boots, wherein the spikes are bent downwardly to form at least one spike edge, and are formed with a plurality of fastening holes *and a restraining bar coupled to at least two chains and being engaged with a front of the boots when the elastic band is bound around the outsole of the boots.*

4. The crampons as claimed in claim **3**, wherein the band is formed with fixing portions of a circular ring shape for coupling the chains.

5. The crampons as claimed in claim **4**, wherein the chains have a fixing ring.

6. The crampons as claimed in claim **3**, wherein the spikes have a triangular shape, and are formed with a plurality of fastening holes, and wherein any one of three corners of the triangle is downwardly bent to form a spike edge.

7. Chain-type crampons provided with spikes in which an elastic band is adapted to be bound around an upper portion of an outsole of mountain-climbing boots and extend from a front portion to a rear portion of the boot when bound around the boot, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a plurality of spikes that are operatively coupled to the elastic band via chains and positioned to be disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots when the elastic band is bound around the outsole of the boots, wherein the spikes are bent downwardly to form at least one spike edge, and are formed with a plurality of fastening holes and a restraining bar caught by the front heel portion of the boots to prevent the band from being stretched.

8. The crampons as claimed in claim 7, wherein the restraining bar is curved.

9. Chain-type crampons provided with spikes in which an elastic band is adapted to be bound around an upper portion of an outsole of mountain-climbing boots and extend from a front portion to a rear portion of the boot when bound around the boot, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a plurality of spikes that are operatively coupled to the elastic band via chains and positioned to be disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots when the elastic band is bound around the outsole of the boots, wherein the spikes are bent downwardly to form at least one spike edge, and are formed with a plurality of fastening holes and a restraining bar engaged with the front of the boots when the elastic band is bound around the outside of the boots to prevent the band from being stretched.

10. The crampons as claims in claim 9, wherein the restraining bar is curved.

11. Chain-type crampons provided with spikes in which an elastic band is adapted to be bound around an upper portion of an outsole of mountain-climbing boots and extend from a front portion to a rear portion of the boot when bound around the boot, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a plurality of spikes that are operatively coupled to the elastic band via chains and positioned to be disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots when the elastic band is bound around the outsole of the boots, wherein the spikes are bent downwardly to form at least one spike edge, and are formed with a plurality of fastening holes and a restraining bar coupled to at least two chains of the chain and being engaged with a front of the boots when the elastic band is bound around the outsole of the boots to prevent the band from being stretched.

12. The crampons as claimed in claim 11, where in the restraining bar is curved.

13. Chain-type crampons provided with spikes in which an elastic band is adapted to be bound around an upper portion of an outsole of mountain-climbing boots and extend

from a front portion to a rear portion of the boot when bound around the boot, and chains are coupled to the band as an anti-skid member, the crampons comprising:

a plurality of spikes that are operatively coupled to the elastic band via chains and positioned to be disposed at a front portion, a center portion, a rear portion, and both sides between the front portion and the center portion on a bottom surface of the boots when the elastic band is bound around the outsole of the boots, wherein the spikes are bent downwardly to form at least one spike edge, and are formed with a plurality of fastening holes and means for preventing the front of the band from being stretched when the elastic band is bound around the outside of the boots.

14. The crampons as claimed in claim 13, wherein the means for preventing comprises a curved restraining bar.

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