Abstract: Disclosed is a shoe sole having upwardly sloped front and rear sides, which is used to manufacture a shoe of which a rigid middle sole is installed at an upper surface of an outsole and a shoe sheath is attached to an upper surface of the middle sole, in which an arch-shaped groove is formed at the center of a lower surface of the outsole. A central cushion is attached to a lower surface of the arch-shaped groove so that the arch-shaped groove is filled with the central cushion. Non-slip sole attaching grooves are formed over the total lower surface of the outsole and an exposed surface of the central cushion. A non-slip sole is attached onto the non-slip sole attaching grooves.
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
Description

SHOE SOLE HAVING UPWARDLY SLOPED FRONT AND REAR SIDES

Technical Field

The present invention relates to a shoe sole having upwardly sloped front and rear sides, which is used to manufacture a shoe of which a rigid middle sole is installed at an upper surface of an outsole and a shoe sheath is attached to an upper surface of the middle sole, in which an arch-shaped groove is formed at the center of a lower surface of the outsole. More particularly, the present invention relates to a shoe sole capable of preventing a user putting on the shoe from slipping during going up the stairs due to the operation of a non-slip sole, which is capable of allowing the user for feeling at ease due to operation of cushion materials, and which is capable of firmly attaching a bottom surface of a shoe sheath to the upper surface of the outsole due to operation of projecting attaching parts, by attaching a non-slip sole onto the total bottom surface of the outsole after inserting a cushion materials into the arch-shaped groove formed at the lower surface of the outsole, by allowing the upper surface of the outsole to expose the outside of the upper surface of the middle sole, and by attaching cushion materials to a front and a rear sides of the upper surface of the middle sole.

Background Art

This is the case of patent KR 10-2004-0108870 for example, which relates to a walking shoe having a rear balance walking function, including upwardly slanted front and rear sides, which has double grounding heels projecting from the center of an outsole toward the heel of the shoe. A rigid auxiliary outsole of which a stainless plate is inserted between plastics is mounted to the upper surface of the outsole. Due to this structure, the toe portion and the heel portion are slanted upwards with centering on the double grounding heels. The toe portion and the heel portion can move up and down with taking the double grounding heels as a point of action.

The outsole of the walking shoe according to the prior art is made of a soft foam polyurethane and thereby it has a cushion effect. A rigid auxiliary outsole made of a rigid plastic plate is mounted to the upper surface of the outsole. A shoe sheath is attached to the upper surface of the rigid auxiliary outsole.

Generally, the rigid auxiliary outsole made of a rigid plastic plate may be easily adhered to the upper surface of the outsole made of soft foam polyurethane by means of adhesives. Likewise, the shoe sheath made of leather, synthetic leather or a fabric paper, etc., may be easily adhered to the upper surface of the outsole made of soft foam polyurethane by means of adhesives. A disadvantage of prior art shoe sole is that the
rigid auxiliary outsole made of a rigid plastic plate may be hardly adhered to the shoe sheath made of a leather, a synthetic leather or a fabric paper, etc.

Although, the lower surface of the rigid auxiliary outsole made of a rigid plastic plate can be easily attached to the upper surface of the outsole made of soft foam polyurethane by means of adhesives, the upper surface of the rigid auxiliary outsole may be hardly attached to the bottom surface of the shoe sheath during the manufacturing process of the shoe.

In order to enhance the adhesive force between the bottom surface of the shoe sheath and the upper surface of the rigid auxiliary outsole, an additional fabric paper is attached to the upper surface of the rigid auxiliary outsole and thereafter the shoe sheath is mounted thereto. However, the fabric paper that is attached to the upper surface of the rigid auxiliary outsole comes off there from as time passes. As a result, a nerve-racking noise may be generated when a user walks on a street with putting on the shoe. Consequently, it gives an unpleasant feeling to the user.

Meanwhile, in the outsole of the walking shoe according to the prior art, the arch-shaped double grounding heels projecting from the center of the outsole toward the heel of the shoe are integrally formed with the outsole. Accordingly, they are made of soft foam polyurethane, which is the same as that of the outsole.

If a user goes upstairs with putting on the shoe, the toe portion of the outsole steps on a flat ground at the stair and the center portion of the lower surface of the outsole contacts with the corner of the stair.

In this situation, the arch-shaped portion of the lower surface of the outsole according to the prior art may be contacted with the corner of the stair. Then, the user may slip and fall on the stairs owing to a slip between the corner of the stair and the arch-shaped portion made of foam polyurethane.

Another disadvantage of shoes having such outsole according to the prior art is that the user putting on the shoe may slip and fall on an unpaved road such as a mountain path. That is, if a use putting on the shoe according to the prior art walks on an unpaved road such as a mountain path, he or she may step a piece of stone at the arched-shaped portion of the sole of the foot. Then, the user may slip and fall on the road owing to a slip between the stone and the arch-shaped portion made of foam polyurethane. Furthermore, the user feels a pain while he or she steps a piece of stone at the arched-shaped portion of the sole of the foot.

**Disclosure of Invention**

**Technical Problem**

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, an object of the present invention is to provide a
shoe sole capable of preventing a user putting on the shoe from slipping during going up the stairs or walking on an unpaved road due to the operation of a non-slip sole, which is capable of allowing the user for feeling at ease due to operation of cushion materials, and which is capable of firmly attaching a bottom surface of a shoe sheath to the upper surface of the outsole due to operation of projecting attaching parts, by attaching a non-slip sole onto the total bottom surface of the outsole after inserting a cushion materials into the arch-shaped groove formed at the lower surface of the outsole, by allowing the upper surface of the outsole to expose the outside of the upper surface of the middle sole, and by attaching cushion materials to a front and a rear sides of the upper surface of the middle sole.

Technical Solution

To accomplish the above object, the present invention provides a shoe sole, of the type consisting of an arch-shaped groove formed at a center portion of a bottom surface of an outsole, a front side and a rear side of the bottom surface of the outsole being sloped upwardly from the arch-shaped groove, a middle sole made of a rigid material attached to an upper surface of the outsole, characterized in that it comprises a central cushion attached to a lower surface of the arch-shaped groove so that the arch-shaped groove is filled with the central cushion, non-slip sole attaching grooves formed over the total lower surface of the outsole and an exposed surface of the central cushion, and a non-slip sole attached onto the non-slip sole attaching grooves. The shoe sole further comprises a front cushion attached to the front upper surface of the middle sole and a rear cushion attached to the rear upper surface of the middle sole. The shoe sole further comprises a middle sole insertion groove formed over the upper surface of the outsole, in which the middle sole insertion groove has a shape corresponding to that of the middle sole and has a depth corresponding to the thickness of the middle sole, a sheath lower surface attaching part formed at an inner circumferential portion of a projection edge, front and rear projecting attaching parts longitudinally formed at front and rear bottom surfaces in the middle sole insertion groove, front and rear cutaway portions formed through the front and rear bottom surfaces on the middle sole, in which the front and the rear projecting attaching parts pass through the front and the rear cutaway portions upwards while the middle sole is attached to the outsole.

Brief Description of the Drawings

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be
realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[14] FIG. 1 is an exploded perspective view of a shoe sole according to the present invention;

[15] FIG. 2 is a plan view of the shoe sole according to the present invention;

[16] FIG. 3 is a sectional view taken along line "A-A" shown in FIG. 2; and

[17] FIG. 4 is a sectional view taken along line "B-B" shown in FIG. 2.

Best Mode for Carrying Out the Invention

Hereinafter, the shoe sole having upwardly sloped front and rear sides according to the preferred embodiment of the present invention will be explained in more detail with reference to the accompanying drawings FIGS. 1 to 4.

As best seen in FIG. 3, the shoe sole having upwardly sloped front and rear sides according to the preferred embodiment of the present invention is provided with an arch-shaped groove 11 formed at a center portion of a bottom surface of the outsole 10. A front side and a rear side of the bottom surface of the outsole 10 are sloped upwardly from the arch-shaped groove 11. A middle sole 20 made of a rigid material is attached to an upper surface of the outsole 10. A shoe sheath 30 is attached onto an upper surface of the middle sole 20.

A central cushion 12 is attached to a lower surface of the arch-shaped groove 11 so that the arch-shaped groove 11 is filled with about a half of the central cushion 12. The other half of the central cushion 12 may be exposed to the outside of the outsole 10. Non-slip sole attaching grooves 13 are formed over the total lower surface of the outsole 10 and the exposed surface of the central cushion 12. A non-slip sole 14 is attached over the exposed bottom surface of the outsole 10 and the exposed surface of the central cushion 12 in cooperation with the non-slip sole attaching grooves 13.

Preferably, the central cushion 12 is formed at a level, which is the same as that of an assumed line (= a single-dotted line) projecting from one distal end to the other distal end of the arch-shaped groove 11, for "a" section as shown in FIG. 3. Alternatively, the other half of the central cushion 12 can be bulged out downwards in a manner that it does not hinder a person putting on the shoe from walking.

As shown in FIGS. 1 to 3, a middle sole insertion groove 15 is formed over the upper surface of the outsole 10. The middle sole insertion groove 15 has a predetermined shape corresponding to the shape of the middle sole 20. Also, the middle sole insertion groove 15 has a predetermined depth corresponding to the thickness of the middle sole 20. A sheath lower surface attaching part 17 is formed at an inner circumferential portion of a projection edge 16. Front and rear projecting attaching parts 18, 19 are longitudinally formed at front and rear bottom surfaces in the middle sole.
insertion groove 15. Front and rear projecting attaching parts 18,19 project from the upper surface of the middle sole 20 in the middle sole insertion groove 15 at a height, which is the same as that of the sheath lower surface attaching part 17.

[23] As shown in FIG. 2, front and rear projecting attaching parts 18,19 project upwards at front and rear sides of the middle sole insertion groove 15 and they are spaced apart from the sheath lower surface attaching part 17. When the shoe sheath 30 is attached onto the middle sole 20, front and rear projecting attaching parts 18,19 have function to increase a contact area between the shoe sheath 30 and the middle sole 20.

[24] The middle sole 20 may be injection molded from a suitable rigid plastic material. The bottom surface of the middle sole 20 is attached onto the upper surface of the outsole 10 of which the central portion is relatively lower than the front and the rear sides. Since the front and the rear sides of the outsole 10 are slanted upwards, the outsole 10 has an arch shape in total. When a user puts on a shoe having the outsole 10 made of soft foam polyurethane, the middle sole 20 prevents the front and the rear sides of the outsole 10 from stretching downwards due to the weight of the user.

[25] In the meantime, a front cutaway portion 21 is formed through a front side of the middle sole 20 and a rear cutaway portion 22 is formed through a rear side of the middle sole 20. When the middle sole 20 is attached to the outsole, the front and the rear projecting attaching parts 18,19 pass through the front and the rear cutaway portions 21,22 upwards. A front cushion 23 is attached to the upper surface of the middle sole 20 between the front projecting attaching parts 18. Likewise, a second cushion 24 is attached to the upper surface of the middle sole 20 between the rear projecting attaching parts 19.

[26] As shown in FIG. 4, the lower surface of the middle sole 20 is adhered to the upper surface of the outsole 10 by means of adhesives. The upper surface of the middle sole 20 is adhered to a part of a lower surface of the shoe sheath 30 by means of adhesives. The other part of the lower surface of the shoe sheath 30 is attached to the inner circumferential surface of the projecting edge 16, the sheath lower surface attaching part 17, front and rear projecting attaching parts 18,19 and front and rear cushions 23,24.

[27] At this time, except for the adhesive surfaces as described above, the upper surface of the middle sole 20 may be attached to the bottom surface of the shoe sheath 30 by means of adhesives. Since the upper surface of the middle sole 20 is made of a rigid plastic plate and the bottom of the shoe sheath 30 is made of leather, synthetic leather or a fabric paper, etc., the adhesive force between the middle sole 20 and the shoe sheath 30 is not good.

[28] An inner sole is installed at an inside of the shoe sheath 30 and is indicated in its entirety by the reference numeral "31". This inner sole 31 is prepared by enclosing a stiff paper wick with a fabric paper. Alternatively, a certain material, which is the same
as that of the shoe sheath 30, can be used to form the inner sole 31 in a manner that it encloses the total bottom surface of the shoe sheath 30.

Mode for the Invention

[29] Having described shoe sole according to the preferred embodiment of the present invention in detail, the operational relationship of the shoe sole can be understood as follows with reference to accompanying drawings FIGS. 1 to 4.

[30] In order to manufacture the shoe sole according to the present invention, the central cushion 12 having a good cushion effect is adhered to the lower surface of the arch-shaped groove 11 formed at the central lower surface of the outsole 10 by means of adhesives. Then, the non-slip sole 14 is adhered to over the non-slip attaching groove 13, which is formed at the total surface of the front and the rear sides in the lower surface of the outsole 10, and to over the lower surface of the central cushion 12.

[31] Since the non-slip sole 14 is typically made of a raw rubber and has a plurality of nonskid tread grooves formed at its bottom surface, it is possible to prevent the shoe from slipping without damaging the shoe at the change of season.

[32] After attaching the non-slip sole 14 to the total lower surface of the outsole 10, the middle sole 20 is inserted into the middle sole insertion groove 15 formed at the upper surface of the outsole 10.

[33] At this time, the front and the rear projecting attaching parts 18,19 protruding from the middle sole insertion groove 15 upwardly pass through the front and the rear cutaway portions 21,22 of the middle sole 20.

[34] When the middle sole 20 is inserted and attached into the middle sole insertion groove 15 of the upper surface of the outsole 10, the upper surface of the sheath lower surface attaching part 17 is positioned at a level, which is the same as those of the upper surface of the middle sole 20 and the upper surface of the front and the rear projecting attaching parts 18,19. Because the size of the middle sole 20 is smaller than that of the outsole 10, the middle sole insertion groove 15 is formed at a depth that is corresponding to the thickness of the middle sole 20. At this time, the height of the front and the rear projecting attaching parts 18,19 is the same as that of the sheath lower surface attaching part 17.

[35] Under this state, if the bottom surface of the shoe sheath 30 is attached to the upper surface of the outsole 10 on which the middle sole 20 is adhered, a circumferential edge of a lower surface of the shoe sheath 30 is attached to the inner surface of the projecting edge 16 and the sheath lower surface attaching part 17 formed at the lower circumferential edge of the projecting edge 16. In addition, the other part of circumferential edge of a lower surface of the shoe sheath 30 is attached to the upper surface of the upper surfaces of the front and the rear projecting attaching parts 18,19, which
are exposed to the upper surfaces of the front and the rear cutaway portions 21,22 of the middle sole 20.

[36] Since the shoe sheath 30 made of a leather, a synthetic leather or a fabric paper, etc., is attached to the outsole 10 made of a soft foam polyurethane having a cushion effect by means of adhesives, the front and the rear projecting attaching parts 18,19 exposed to the upper surfaces of the middle sole 20 are firmly adhered to the bottom surface of the shoe sheath 30.

[37] When the bottom surface of the shoe sheath 30 is attached to the upper surface of the outsole 10 on which the middle sole 20 is attached, a shoe manufacturer may worry about that the front and the rear cushions adhered to the upper surface of the middle sole 20 between the front and the rear projecting attaching parts 18,19 are partially attached to the upper surface of the middle sole 20 and the bottom surface of the shoe sheath 30, that is the inner sole 31 attached to the inner lower surface of the shoe sheath 30.

[38] However, the portions on which the front and the rear cushions 23,24 are attached are adhered to the lower surface of the inner sole 31 that is attached to the inner surface of the shoe sheath 30. Since the shoe sheath 30 has a predetermined thickness and the front and the rear cushions 23,24 are made of certain materials having a good cushion effect such as a thin sponge having a thickness of 3 to 5mm, EVA, etc., the front and the rear cushions 23,24 are compressed and adhered together with the vicinity thereof. At this time, the shoe sheath 30 is attached to the upper surface of the outsole 10 on which the middle sole 20 is attached. The front and the rear cushions 23,24 are attached to the upper surface of the middle sole 20.

[39] As described above, when the bottom surface of the shoe sheath 30 is attached to the upper surface of the middle sole 20, a fabric paper is attached to the upper surface of the middle sole 20 so as to make the middle sole 20 made of a plastic material adhere to the bottom surface of the shoe sheath 30.

[40] According to the present invention, the shoe sole is made of a relatively soft material and the central portion of the lower surface of the shoe sole is bulged out downwards. Furthermore, the front and the rear sides of the shoe sole are slanted upwards and the flat and rigid middle sole 20 is installed on the upper surface of the shoe sole. If a user walks on a street with putting on the shoe on which the shoe sole is installed, the front and the rear sides of the shoe are spaced from the ground upwards and only the central portion is contacted with the ground.

[41] At this time, the front and the rear sides of the shoe have a tendency to droop downwards, the toe and the heel have a tendency to get bent downwards because the rigid middle sole 20 supports the weight of the user. And the central portion has a tendency to get bent upwards and an oppressive feeling is transmitted to the total sole.
of the foot, and thereby the user can feel the finger-pressure effect. However, if the user puts on the shoe for a long time, he or she has a pain.

According to the present invention, it is possible to attenuate the oppressive feeling and to alleviate the pain applied to the sole of the foot due to operation of the central cushion 12 installed at the lower surface of the outsole 10 and the front and the rear cushions 23, 24 installed at the front and the rear sides of the upper surface of the middle sole 20.

The non-slip sole 14 for preventing the shoe from slipping is installed at the total surface of the lower surface of the sole according to the present invention. Accordingly, when a user walks on a street with putting on the shoe, he or she does not slip although stepping on a certain object.

If a person goes upstairs with putting on a shoe, the central lower portion of the sole of the foot contacts with a corner portion of the stair. A plurality of shoes according to the prior art are not provided with non-slip means at the central lower portion of the sole of the foot. Accordingly, if a person goes upstairs with putting on the shoe according to the prior art, he or she may slip on the stairs. Since the shoe according to the present invention is provided with the non-slip sole 14 at the total surface of the sole of the foot, it is possible to prevent the user from slipping on the stairs.

If a person walks on an unpaved road such as a mountain path, he or she may step a piece of stone at a certain part of the sole of the foot. Since the shoe according to the present invention is provided with the non-slip sole 14 at the total surface of the sole of the foot, it is possible to prevent the user from slipping on the unpaved road.

Meanwhile, in the shoe sole according to the present invention, a part of the central cushion is bulged out downwards and the front and the rear sides of the outsole are upwardly slanted. If the shoe is hanging in the air, then the gravity is applied to the toe and the heel of the shoe due to this structure. At this time, the center of gravity of a person putting on the shoe is leaning to the rear side and thereby it is possible to activate the muscle relative to walking due to the rear balance.

**Industrial Applicability**

As described above, the shoe sole according to the present invention is capable of preventing a user putting on the shoe from slipping during going up the stairs due to the operation of a non-slip sole, which is capable of allowing the user for feeling at ease due to operation of cushion materials, and which is capable of firmly attaching a bottom surface of a shoe sheath to the upper surface of the outsole due to operation of projecting attaching parts, by attaching a non-slip sole onto the total bottom surface of the outsole after inserting a cushion materials into the arch-shaped groove formed at the lower surface of the outsole, by allowing the upper surface of the outsole to expose
the outside of the upper surface of the middle sole, and by attaching cushion materials
to a front and a rear sides of the upper surface of the middle sole.
Claims

[1] A shoe sole, of the type consisting of an arch-shaped groove 11 formed at a center portion of a bottom surface of an outsole 10, a front side and a rear side of the bottom surface of the outsole 10 being sloped upwardly from the arch-shaped groove 11, a middle sole 20 made of a rigid material attached to an upper surface of the outsole 10, characterized in that it comprises a central cushion 12 attached to a lower surface of the arch-shaped groove 11 so that the arch-shaped groove 11 is filled with the central cushion 12, non-slip sole attaching grooves 13 formed over the total lower surface of the outsole 10 and an exposed surface of the central cushion 12, and a non-slip sole 14 attached onto the non-slip sole attaching grooves 13.

[2] A shoe sole according to claim 1, characterized in that it comprises a front cushion 23 attached to the front upper surface of the middle sole 20 and a rear cushion attached to the rear upper surface of the middle sole 20.

[3] A shoe sole according to claims 1 or 2, characterized in that it comprises a middle sole insertion groove 15 formed over the upper surface of the outsole 10, in which the middle sole insertion groove 15 has a shape corresponding to that of the middle sole 20 and has a depth corresponding to the thickness of the middle sole 20, a sheath lower surface attaching part 17 formed at an inner circumferential portion of a projection edge 16, front and rear projecting attaching parts 18,19 longitudinally formed at front and rear bottom surfaces in the middle sole insertion groove 15, front and rear cutaway portions 21,22 formed through the front and rear bottom surfaces on the middle sole 20, in which the front and the rear projecting attaching parts 18,19 pass through the front and the rear cutaway portions 21,22 upwards while the middle sole 20 is attached to the outsole 10.
# INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**

| IPC8 | A43B 7/10(2006.01)1 |

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

| IPC8 | A43B 7/10, A43B 7/14, A43B 13/00 |

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KOREAN PATENTS AND APPLICATIONS FOR INVENTIONS SINCE 1975
KOREANUTILITY MODELS AND APPLICATIONS FOR UTILITY MODELS SINCE 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<th>Relevant to claim No</th>
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<td>JP 50-152758U (Fukuoka Furuno), 18 Dec 1975 (See Claim and Figures)</td>
<td>1 - 3</td>
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<td>A</td>
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* Further documents are listed in the continuation of Box C

See patent family annex

* Special categories of cited documents
  "A" document defining the general state of the art which is not considered to be of particular relevance
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  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

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<td>KR 20-0403 176Y1</td>
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