(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 020 130 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.07.2000 Bulletin 2000/29

(51) Int Cl.[7]: **A43B 7/36**

(21) Application number: **99830012.3**

(22) Date of filing: **18.01.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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(54) Antistatic sole for shoes

(57) The present invention relates to an antistatic sole for shoes comprising a conducting element (7) which is mounted on an insole (3), a terminal (10) which is made of conducting material and connected to the conducting element (7), passing through the sole (2) and making contact with the ground by means of free ends (12). The terminal (10) consists of a carbon fibre which, during normal use of the shoe, is subject to substantially the same degree of wear as the sole (2).

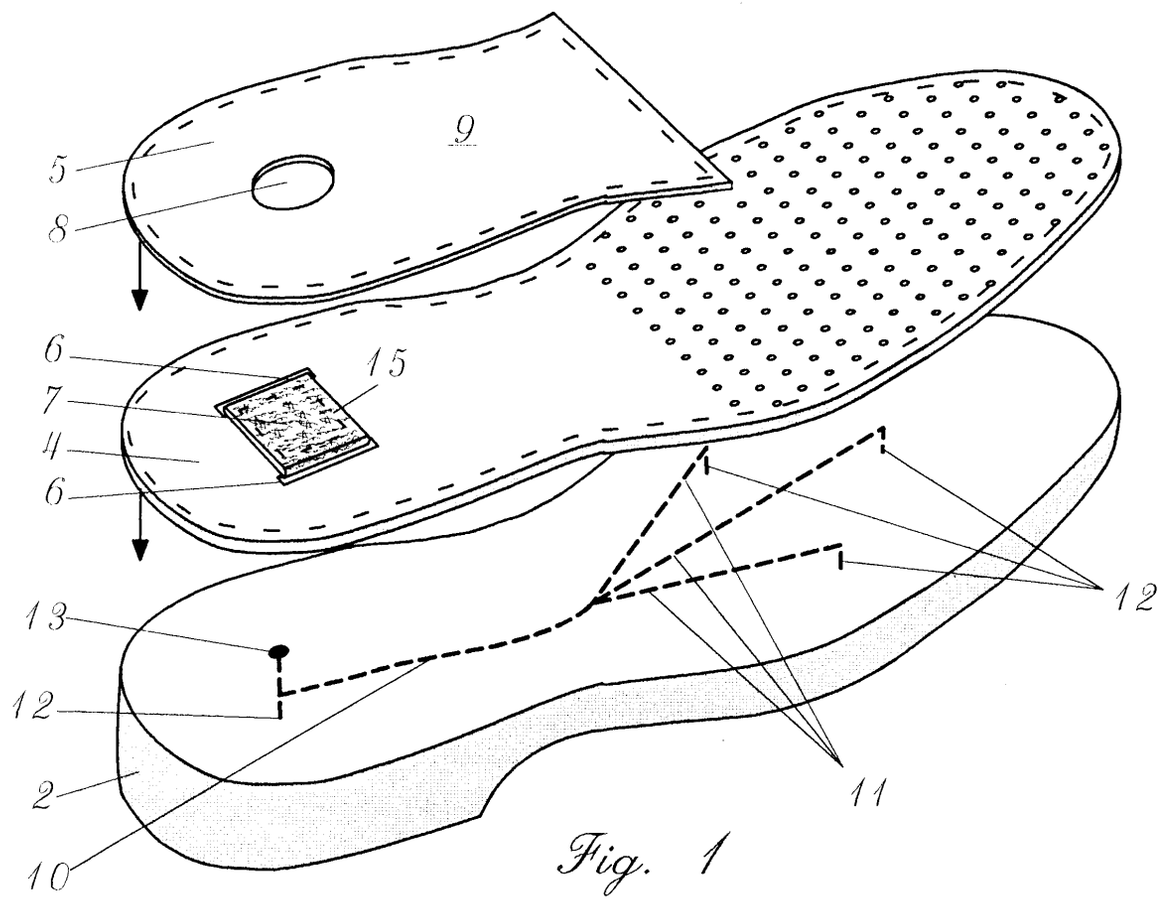

Fig. 1

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Description

[0001] The present invention relates to an antistatic sole which can be used on any type of shoe for discharging, to earth, electrostatic energy which may build up on persons.

[0002] As is known, in fact, persons may accumulate an electrostatic charge which is suddenly earthed when the persons themselves come into contact with conducting bodies which allow dispersion of the charge to earth. The soles of shoes of the traditional type, whether made of rubber or leather, do not allow earthing of the charge which has been accumulated by persons. For this reason, the charge is accumulated until the moment when the persons come into contact with a conducting body. At this point, a small discharge occurs, resulting in a somewhat unpleasant sensation for the persons concerned. Often, it is not necessary for there to be physical contact between the person and the conducting body, but merely their presence close to one another in order for the charge voltage to overcome the dielectric resistance of the air, generating a small low-current electric arc. This phenomenon is accentuated in the case of specific conditions such as, for example, a particularly dry climate or the use of clothes made of fabrics which are prone to produce electric charges. It is known, for example, that it is possible for electrostatic charges to build up as a result of the friction between clothes or simply as a result of travelling in a car, owing to the frictional impact of the air against the car or rubbing of the clothes on the seats.

[0003] In order to prevent persons being subjected to these unpleasant shocks, shoes have been developed with a sole which allows discharging, to earth, of the electrostatic charge owing to the presence of a conducting element mounted thereon and making contact on the one hand with the feet and on the other hand with the ground.

[0004] More particularly, this conducting element consists of a metal plate which is inserted in the inner sole of the shoe so as to be always in contact with the foot (generally with the heel) and is connected to a number of metal terminals passing through the sole and making contact with the ground by means of free ends.

[0005] During use this known type of sole has numerous drawbacks.

[0006] Firstly, the metal terminals which project from the bottom surface of the sole in order to make contact with the ground may scratch floors (in particular wooden parquets) or may get caught in the pile of carpets, thereby making it impossible to wear these shoes in many environments.

[0007] Secondly, the metal terminals are subject to a degree of wear which is different from that of both rubber and leather soles and therefore may not be able to ensure any longer contact with the ground.

[0008] In particular, should they project excessively from the bottom surface of the sole, they are subject to repeated stresses during normal use of the shoe, which may cause breakage thereof at points which are no longer in contact with the ground.

[0009] If, in particular, the plate and the metal terminals should be made of copper, two further drawbacks arise. The first one relates to the fact that copper oxidises fairly quickly and therefore adversely affects the electrical connections with the ground and the foot. The second drawback relates to the fact that the copper oxides, in addition to soiling both the foot via the plate and the floor via the terminals, constitute a notorious health hazard. Therefore it is considered inadvisable to use them where there is contact with the skin or in any case in applications where there is the possibility of them coming into contact with persons. The main object of the present invention is therefore that of overcoming the drawbacks associated with soles of the known type by providing an antistatic sole for shoes which allows discharging, to earth, of the electrostatic charge which has built up on persons, in a reliable and entirely safe manner and without damaging floors or carpets.

[0010] A further object of the present invention is that of providing an antistatic sole which is constructionally simple and operationally entirely reliable.

[0011] These objects along with others are all achieved by the antistatic sole for shoes in question, which is characterized essentially by the fact that it comprises a conducting element which is mounted on an insole, a terminal which is connected to the conducting element and passes through the sole, making contact with the ground by means of its free ends and consisting of a carbon fibre which, during normal use of the shoe, is subject to substantially the same degree of wear as the sole. In accordance with a further characteristic feature of the invention, the conducting element consists of a carbon-fibre fabric which is wound in bundle form on a portion of the insole.

[0012] The technical features of the invention, in accordance with the aforementioned objects, may be clearly understood from the contents of the claims indicated below and the advantages thereof will emerge more clearly from the detailed description which follows, provided with reference to the accompanying drawing, illustrating a purely exemplary non-limiting embodiment thereof.

[0013] Figure 1 shows schematically an exploded perspective view of the antistatic sole according to the present invention.

[0014] With reference to the accompanying drawing, 1 denotes in its entirety the antistatic sole according to the present invention. More in detail, it is composed of a sole 2 and an insole assembly 3 consisting in turn of an inner sole 4 and an arch support 5. Functionally speaking, the insole assembly 3 is connected on top of the sole 2, while the arch support 5 is mounted on the rear part of the inner sole 4.

[0015] The inner sole 4 has, formed on its surface, two incisions 6 by means of which a carbon-fibre meshwork

is wound in the manner of a bundle so as to form a conducting element 7.

[0016] This bundle is fixed to the inner sole 4 by means of stitches 15.

[0017] Opposite the location of the conducting element 7, an opening 8 is formed on the arch support 5 so as to allow the conducting element 7 itself to emerge from the upper surface 9 of the arch support 5.

[0018] In the case of the example of embodiment illustrated in the accompanying Figure 1, the conducting element 7 extends inside a portion of the insole 3 opposite the rear part of the sole 1. Obviously it is possible to envisage that this conducting element 7 occupies a much larger zone of the insole 3 without thereby departing from the protective scope of the present patent.

[0019] The conducting element 7 has, connected underneath it, a terminal 10 (by means of one end 13) consisting of a carbon-fibre fabric braiding. Advantageously this braiding may be provided internally with a core of reinforcing material.

[0020] The terminal 10 extends through the sole 2 and branches out into a plurality of peripheral sections 11 making contact with the ground by means of corresponding free ends 12.

[0021] If the sole 2 is made of rubber, the conducting element 7 and the terminal 10 may be incorporated inside the sole 2 during the manufacturing process which is performed by means of casting in a mould.

[0022] It should be noted that the free ends 12 of the terminal 10, during normal use of the shoe, are subject to substantially the same degree of wear as the sole 2.

[0023] Functionally speaking, the antistatic sole 1 according to the present invention therefore allows a constant electrical connection to be maintained between the foot of the person wearing the shoe and the ground. This connection is ensured by the conducting element 7 which is in contact with the heel of the foot and by the conductor terminal 10 which is connected at one end 13 to the conducting element 7 and at the free end 12 to the ground.

Claims

1. Antistatic sole for shoes comprising at least one conducting element (7) which is mounted on an insole (3) so that a part thereof emerges from a portion of the upper surface (9) of said insole (3), at least one terminal (10) which is made of conducting material and connected to said conducting element (7), passing through said sole (2) and making contact with the ground by means of at least one of its free ends (12) when the sole (2) is placed on the ground itself, characterized in that said terminal (10) consists of a carbon fibre which, during normal use of the shoe, is subject to substantially the same degree of wear as said sole (2).

2. Antistatic sole according to Claim 1, characterized in that said conducting element (7) consists of a carbon fibre.

3. Antistatic sole according to Claim 1, characterized in that said sole (2) is substantially made of rubber and that said conducting element (7) and said terminal (10) are incorporated inside it during the process for manufacture of said sole (2) by means of casting in a mould.

4. Antistatic sole according to Claim 1, characterized in that said conducting element (7) consists of a carbon-fibre fabric wound in bundle form on a portion of said insole (3).

5. Antistatic sole according to Claim 1, characterized in that said terminal (10) consists of a carbon-fibre fabric braiding.

6. Antistatic sole according to Claim 1, characterized in that said terminal (10) has a degree of hardness which is substantially the same as that of said sole (2).

7. Antistatic sole according to Claim 4, characterized in that said insole assembly (3) comprises an inner sole (4) which has, formed on its surface, two incisions (6) for winding in bundle form said carbon-fibre meshwork.

8. Antistatic sole according to Claim 7, characterized in that said insole assembly (3) comprises an arch support (5) which has, formed in it, an opening (8) opposite the position of said bundle winding (7) of said carbon-fibre meshwork so as to allow the latter to emerge from the upper surface (9) of said arch support (5).

9. Antistatic sole according to Claim 4, characterized in that said bundle winding of said carbon-fibre meshwork is fixed to the insole by means of stitches (15).

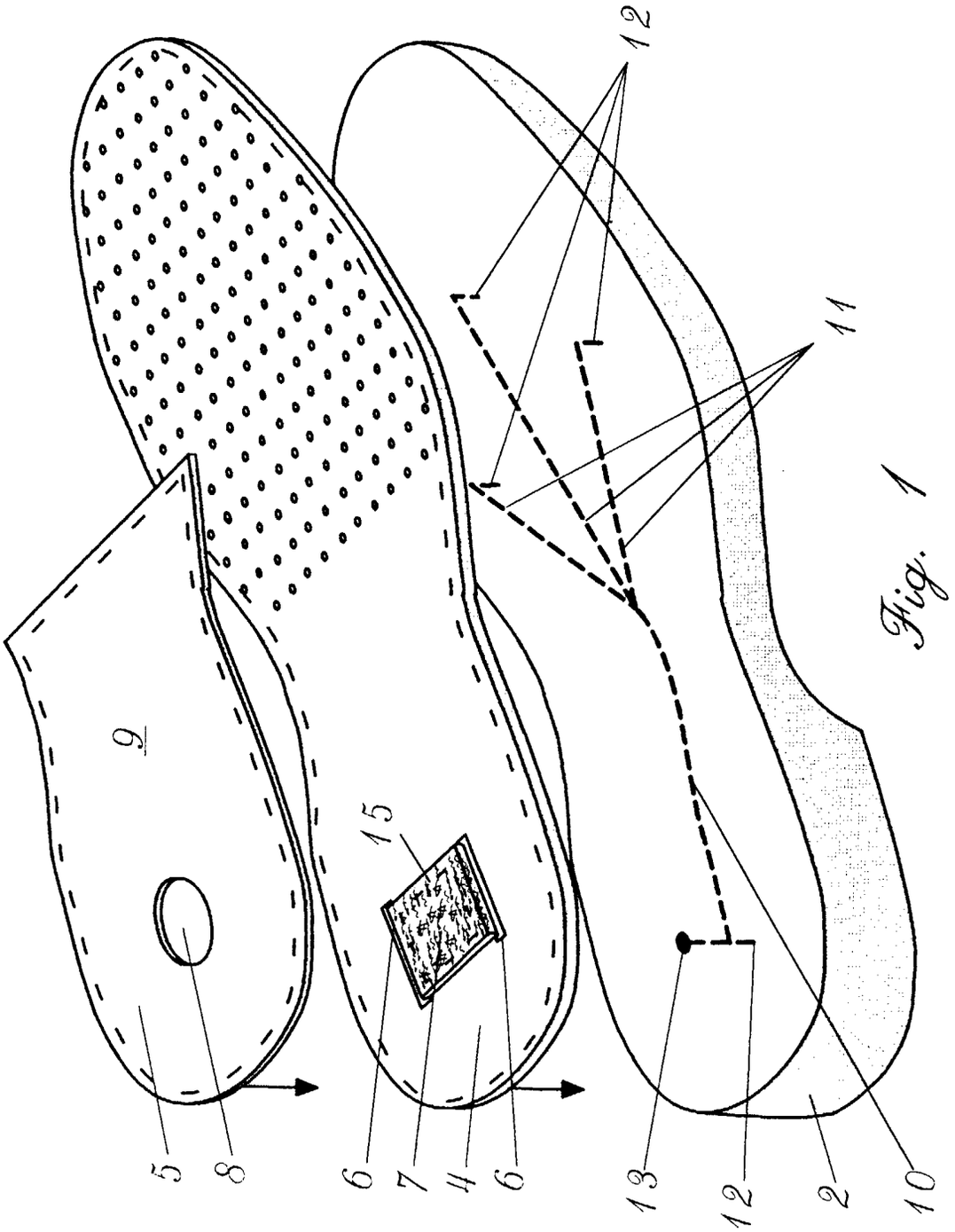

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0012

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 791 302 A (T O D KABUSHIKI KAISHA) 27 August 1997 * the whole document *	1-3,5,6	A43B7/36
X	PATENT ABSTRACTS OF JAPAN vol. 014, no. 074 (C-0687), 13 February 1990 -& JP 01 291804 A (SHITSUKU:KK), 24 November 1989 * abstract *	1,2,5,6	
A	GB 1 319 294 A (DALTON J A) 6 June 1973 * the whole document *	1-9	
A	DE 34 47 205 A (WINTER OPTIK) 3 July 1986 * claims; figures *	1-9	
A	US 3 993 932 A (WEIGL JOHN W) 23 November 1976 * column 4, line 35 - line 62; figures 8,9 *	1-9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	8 June 1999	Scholvinck, T

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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08-06-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0791302 A	27-08-1997	JP 9224705 A	02-09-1997
GB 1319294 A	06-06-1973	NONE	
DE 3447205 A	03-07-1986	NONE	
US 3993932 A	23-11-1976	DE 2700268 A	21-07-1977

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82