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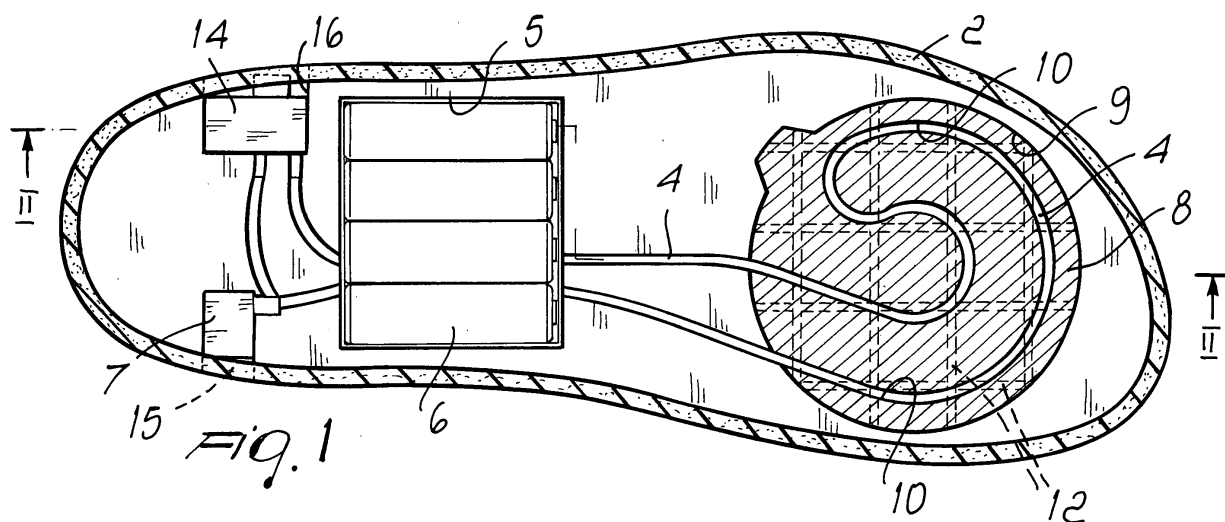
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(54) **Winter shoe with heating device and great comfort and duration, particularly but not exclusively for home or indoor environments in general**

(57) A winter shoe (1) with heating device with high comfort and duration, particularly but not exclusively for home or indoor environments in general comprising a sole (2) on top whereof an upper (3) is applied, the sole accommodating an electrically powered heating element

(4), and being provided with a seat (5) which contains an electric battery (6), which is connected electrically to the heating element (4) and to an electrical connector (7) which can be accessed from the outside of the sole and can be connected to the electric mains in order to re-charge the battery.



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Description

[0001] The present invention relates to a winter shoe with great comfort. The shoe according to the invention is intended mainly to be provided in the form of a slipper in order to be used in homes or indoors in general, but can also be provided in another form and be used also outdoors.

[0002] In the winter season, upon returning home, one wishes to get warm rapidly. Particularly when the climate is very rigid, the parts of the body that are coldest and cause the greatest discomfort are the feet. It is also known that the feeling of cold is even stronger and more unpleasant when the feet are chilled.

[0003] It should also be noted that, when one stays for a long time in a room which is not properly heated and performs no physical activity, particularly in spaces with flooring made of stone, marble or ceramics, the feet are immediately affected by the cold and generate a general feeling of discomfort.

[0004] For this reason, many people, in the winter season, use slippers lined internally with a thick layer of wool or other material which has high thermal insulation characteristics.

[0005] However, these shoes do not warm the feet, but simply retain body heat and therefore require a certain time before performing their effect completely.

[0006] Italian Patent no. 1,318,943 by the same Applicant discloses a shoe for home use which is capable of having a warming effect on the feet of the user so as to transmit an immediate feeling of comfort and well-being. Such shoe comprises a sole on top whereof an upper is applied, and the sole accommodates a heating element constituted by an electric resistor, which can be supplied with power by means of a connector arranged in a cavity, which is open outwardly and is formed on the lateral surface of the sole and can be connected to the electric mains. In practice, a shoe of this kind can be used by connecting, before use, the connector to the electric mains so as to warm the shoe by means of the electric resistor. During use, the connector is disconnected from the electric mains so as to allow the user to walk unrestricted, while the heat accumulated by the shoe, as a consequence of the heating performed by the electric resistor, ensures rapid warming of the user's foot.

[0007] This type of shoe has proved to be susceptible of improvements aimed mainly at improving its performance and making it easier to use.

[0008] The shoe of the type disclosed above in fact suffers the drawback of cooling gradually after it has been disconnected from the electric mains, and such cooling can be excessively rapid, particularly if the temperature of the room is quite low.

[0009] Moreover, the rather rapid cooling at low ambient temperatures and the fact that it is not possible to use the shoe for walking during heating inevitably constrain its use to indoor spaces.

[0010] Finally, the temperature of the shoe at the be-

ginning of its use can be excessive and cause discomfort for some people.

[0011] The aim of the present invention is to provide a winter shoe provided with an electrically powered heating element, which is capable of ensuring optimum heating of the user's foot for an extended time without limiting the full freedom of movement of the user.

[0012] Within this aim, an object of the invention is to provide a winter shoe which, while being conceived to be used preferably indoors, thanks to a good duration of the heating effect even in low-temperature spaces, can be used without problems even outdoors.

[0013] Another object of the invention is to provide a shoe which ensures heating of the user's foot to an optimum temperature, which can be modified optionally by the user.

[0014] Another object of the invention is to provide a shoe which offers the greatest assurances of safety and reliability in use.

[0015] This aim and these and other objects which will become better apparent hereinafter are achieved by a winter shoe, comprising a sole on top whereof an upper is applied, the sole accommodating an electrically powered heating element, characterized in that said sole is provided with a seat which contains an electric battery, connected electrically to said heating element and to an electrical connector which can be accessed from the outside of the sole and can be connected to the electric mains in order to recharge said battery.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the shoe according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional top plan view of the sole of a shoe according to the invention, with the covering layer removed;

Figure 2 is a schematic sectional view of Figure 1, taken along the line II-II;

Figure 3 is a side elevation view of a shoe according to the invention in the slipper-like embodiment;

Figure 4 is an electrical diagram of the power supply circuit of the heating element.

[0017] With reference to the figures, the shoe according to the invention, generally designated by the reference numeral 1, comprises a sole 2, on top whereof an upper 3 is applied in a per se known manner.

[0018] The sole 2 accommodates an electrically powered heating element 4, and, according to the invention, in the sole 2 there is a seat 5, which contains an electric battery 6, connected electrically to the heating element 4 and to an electrical connector 7, which can be accessed from the outside of the sole 2 and can be connected to the electric mains in order to recharge the battery 6.

[0019] More particularly, the sole 2 is preferably made of molded synthetic material and the heating element 4

is constituted by a wire-like electric resistor.

[0020] Advantageously, the heating element 4 is arranged in a region of the sole 2 that lies between the plantar region and the front end of the sole 2. In practice, the heating element 4 is arranged in the region of the sole 2 which, during use of the shoe, faces from below the toes, i.e., the region of the body that is most affected by the need to be warmed.

[0021] Conveniently, the heating element 4 is supported by a supporting element 8, which is accommodated in a seat 9 formed in the upper face of the sole 2.

[0022] The supporting element 8 is preferably made of synthetic and electrically insulating material and has a substantially circular shape.

[0023] A contoured groove 10 is formed in the upper face of the supporting element 8, i.e., the part of the supporting element 8 that is directed toward the inside of the shoe; said groove is open upwardly and accommodates the heating element 4. The groove 10 preferably is shaped like a double spiral, so as to obtain an arrangement, for the wire-like electric resistor that constitutes the heating element 4, which ensures the heating of a region of adequate extent in order to achieve uniform and optimum heating of the toes of the user.

[0024] Advantageously, a thermally insulating layer 11 is interposed between the supporting element 8 and the bottom of the seat 9 in which it is accommodated.

[0025] Such thermally insulating layer 11 can be constituted by a pad of material having high thermal insulation characteristics, such as for example glass wool, interposed between the bottom of the seat 9 and the lower face of the supporting element 8. As an alternative, the thermally insulating layer 11 can be constituted simply by air, by providing, on the bottom of the seat 9, supporting ridges 12, which keep the supporting element 8 spaced with respect to the bottom of the seat 9.

[0026] In this manner, excellent thermal insulation of the region heated by means of the heating element 4 with respect to the outside environment is achieved, ensuring rapid warming of such region and maintaining for a long time the heat generated by the heating element 4.

[0027] The battery 6 is connected to the heating element 4 and to the connector 7 by means of an electrical circuit, generally designated by the reference numeral 13 and shown schematically in Figure 4.

[0028] A switch 14 is arranged on such electrical circuit 13, can be accessed from the outside of the sole 2 and can be operated in order to provide the electrical connection of the heating element 4 to the battery 6 or to interrupt such connection, depending on the requirements of the user.

[0029] The connector 7 and the switch 14 are arranged in cavities 15 and 16, which are open outwardly and are provided on the lateral surfaces of the sole 2.

[0030] The upper part of the sole 2 is covered with a covering layer 17, which is permeable to heat, such as for example a layer made of fabric, felt, or other material usually used for the internal lining of shoes.

[0031] Use of the shoe according to the invention is as follows.

[0032] When the shoe is not used, it is possible to connect the connector 7 to the electric mains, by means of a conventional electric cable, which is not shown for the sake of simplicity, so as to charge the battery 6. When the user wishes to use the shoe, he merely has to disconnect the connector 7 from the electric mains and make sure that the switch 14 is closed, so that the battery 6 is connected to the heating element 4. The supply of electric power to the heating element 4 rapidly warms the shoe and keeps it at an adequate temperature for a rather long time, which depends on the duration of the battery 6, so as to ensure effective warming of the user's foot.

[0033] The battery 6 preferably has a power supply voltage of substantially 4.8 V and a capacity substantially comprised between 800 mAh and 1500 mAh. The electric resistor 4 preferably has a power substantially comprised between 2 and 3 W.

[0034] Merely by way of example, by using a 1300-mAh battery and a power supply voltage of 4.8 V, with a 2.55-W electric resistor 4, it is possible to achieve uninterrupted operation of the electric resistor for over two hours.

[0035] Optionally, during use of the shoe, if the user deems the temperature of the shoe to be excessive, he can interrupt the electric power supply of the heating element 4 by acting on the switch 14.

[0036] Interruption of the electric power supply of the heating element 4 has the effect of increasing the duration of the battery, and the user, with this method, can manage the heating of the shoe in order to meet his requirements.

[0037] It should be noted that the particular location of the heating element 4 allows to concentrate the heat in the region of the toes of the user, which is the region that most needs warming. Moreover, the presence of the thermally insulating layer 11 between the heating element 4 and the lower part of the sole 2 effectively avoids unnecessary dispersion of the heat generated by the heating element 4 toward the outside, achieving excellent efficiency in heating the shoe.

[0038] Thanks to the fact that it is possible to use the shoe according to the invention while the heating element 4 is operating and thanks to the fact that particularly in the heated region there is an excellent thermal insulation from the outside environment, the shoe, optionally provided as a shoe, boot, knee-high boot or the like, can also be used outdoors.

[0039] In practice it has been found that the shoe according to the invention fully achieves the intended aim, since it is capable of ensuring warming of the user's foot for a long period without requiring connection to the electric mains and therefore giving maximum freedom of movement to the user.

[0040] Another advantage of the shoe according to the invention is that it allows the user to modulate the heating of the shoe according to his requirements by interrupting

the electric power supply of the heating element.

[0041] The shoe thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0042] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0043] The disclosures in Italian Patent Application No. MI2005A000803 from which this application claims priority are incorporated herein by reference.

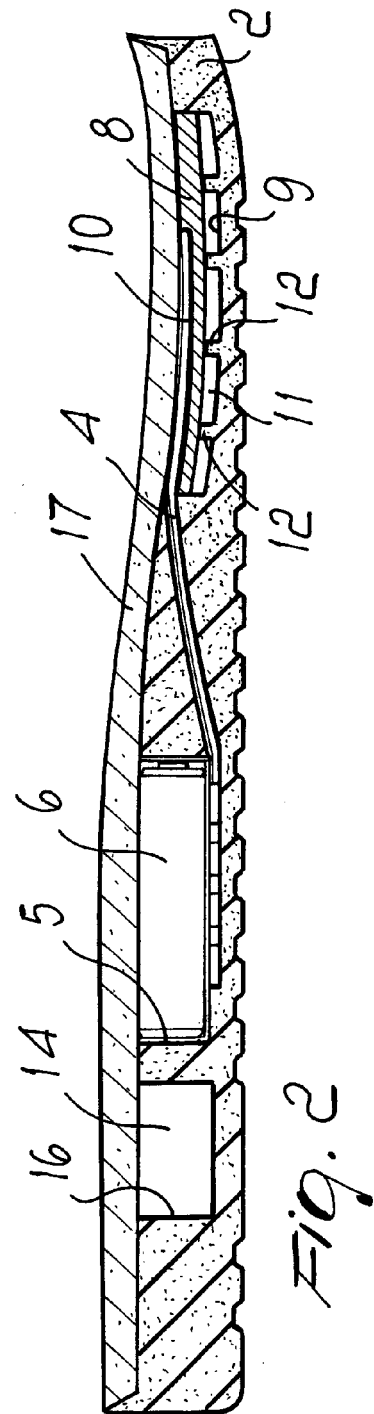
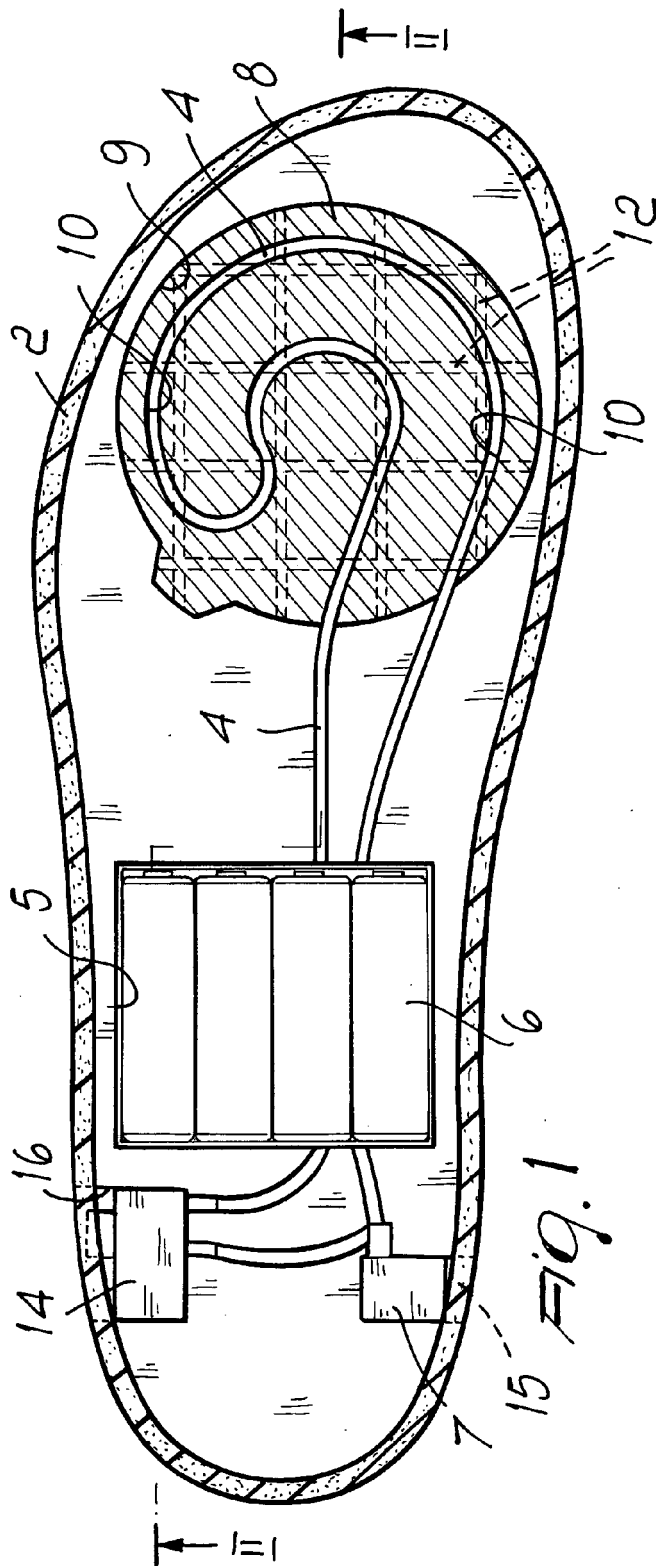
[0044] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

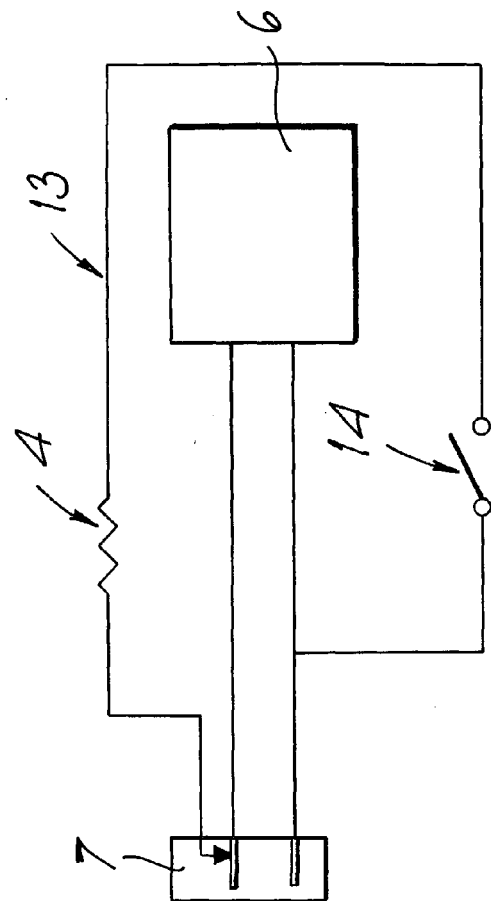
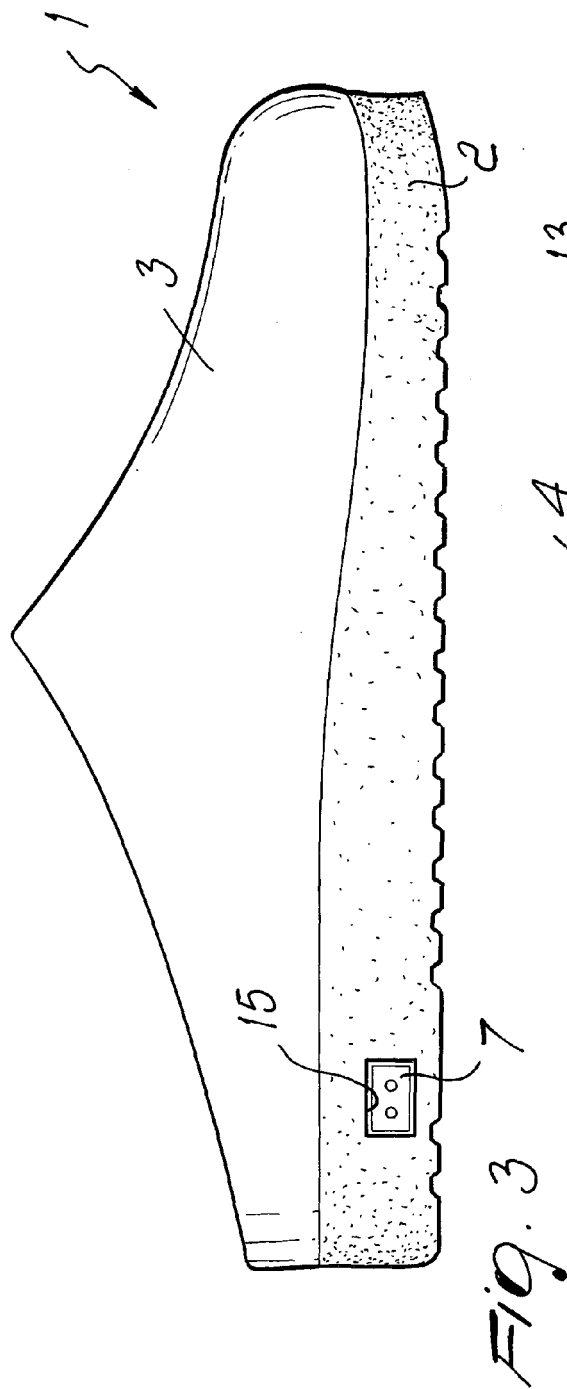
Claims

1. A winter shoe, comprising a sole on top whereof an upper is applied, said sole accommodating an electrically powered heating element, **characterized in that** said sole is provided with a receptacle which contains an electric battery, which is connected electrically to said heating element and to an electrical connector which can be accessed from the outside of the sole and can be connected to the electric mains in order to recharge said battery.
2. The shoe according to claim 1, **characterized in that** said heating element is arranged in a region of the sole that lies between the plantar region and the front end of the sole.
3. The shoe according to claims 1 and 2, **characterized in that** said heating element is constituted by a wire-like electric resistor.
4. The shoe according to one or more of the preceding claims, **characterized in that** it comprises an element for supporting said heating element, which is accommodated in a seat provided in the upper face of the sole.
5. The shoe according to one or more of the preceding claims, **characterized in that** a contoured groove is provided in said supporting element and accommodates said wire-like electric resistor and determines a path for said wire-like electric resistor.
6. The shoe according to one or more of the preceding claims, **characterized in that** said supporting element has a substantially circular shape, said con-

toured groove being provided on the upper face of said supporting element, which is directed toward the inside of the shoe, and being open upwardly.

7. The shoe according to one or more of the preceding claims, **characterized in that** said contoured groove is shaped like a double spiral.
8. The shoe according to one or more of the preceding claims, **characterized in that** said supporting element is made of electrically insulating material.
9. The shoe according to one or more of the preceding claims, **characterized in that** a thermally insulating layer is interposed between said supporting element and the bottom of the seat of the sole which accommodates it.
10. The shoe according to one or more of the preceding claims, **characterized in that** said thermally insulating layer is constituted by air.
11. The shoe according to one or more of the preceding claims, **characterized in that** said battery is connected to said heating element by means of an electric circuit on which there is a switch which can be accessed from the outside of the sole.
12. The shoe according to one or more of the preceding claims, **characterized in that** said connector and/or said switch are arranged in cavities provided in the lateral surfaces of the sole.
13. The shoe according to one or more of the preceding claims, **characterized in that** the upper face of the sole is covered by a covering layer which is permeable to heat.
14. The shoe according to one or more of the preceding claims, **characterized in that** said sole is made of molded synthetic material.
15. The shoe according to one or more of the preceding claims, **characterized in that** said battery has a power supply voltage of substantially 4.8 V and a capacity substantially comprised between 800 and 1500 mAh, and **in that** said electric resistor has a power level substantially comprised between 2 and 3 W.







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EUROPEAN SEARCH REPORT

Application Number
EP 05 01 5200

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 July 2006	Examiner Clausel, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 01 5200

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