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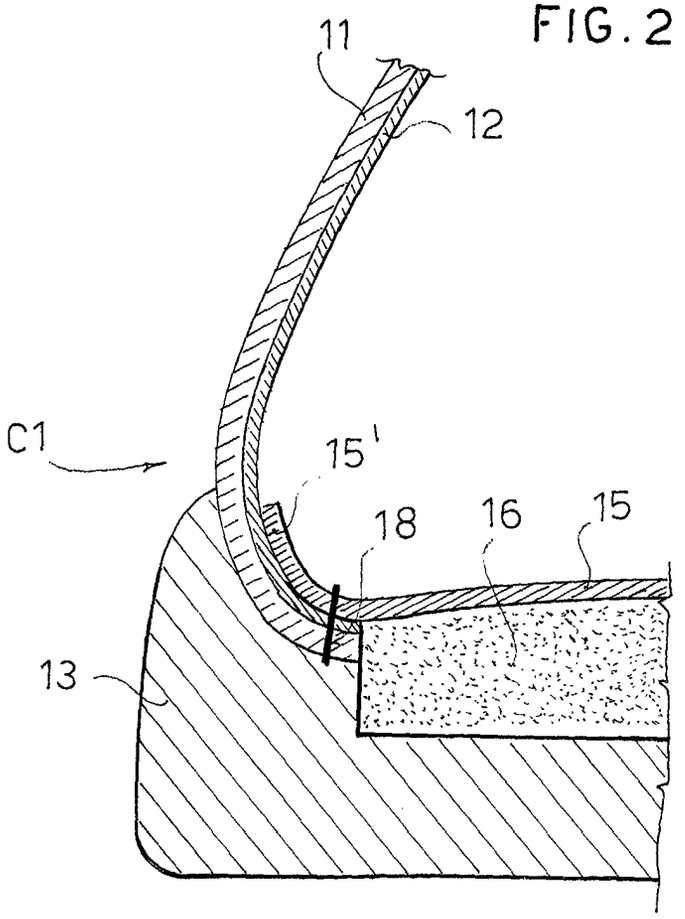
(54) Footwear having a direct injection molded sole and an incorporated padded footbed, and manufacturing process

(57) In the manufacture of footwear with a sack construction and by means of direct injection moulding, a padded or unpadded footbed (15), is fixed to a lasting insole or to the upper (11) and then fixed to the sole (13) during injection moulding of the sole

FIG. 2



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Description

[0001] The present invention refers to the field of manufacturing of footwear of the type with an injection moulded sole.

[0002] Shoes of this type are currently made by first assembling a lasting or insole and an upper by peripheral stitching (generally a Strobel stitching or chain stitching), so as to form a sort of sack (sack working or California method) and then placing the sack, thus obtained, possibly on a special last, in a mould in which injection moulding of the sole is carried out. The shoe can then be internally completed with a soft, possibly padded insole or footbead, to improve the comfort of the user. The footbed can be merely slipped inside the shoe, so as to be removable, or else it can be glued to the lasting insole.

[0003] The gluing operation is awkward to perform and has a cost. If the footbed is to be removable, it must be relatively rigid and this also, like the insertion operation, has a cost.

[0004] An object of the present application is to reduce the manufacturing costs of shoes with a direct injection molded sole. A further object is to obtain a comfortable shoe with a good performance.

[0005] These objects are achieved with a shoe as set forth in claim 1 and a manufacturing method as set forth in claim 8.

[0006] In other words, according to the present invention, a padded or unpadded footbed or footwear inner insole, and an upper of the footwear are first sewn together, without any need to make use of a lasting insole; in a variant a footbed and a lasting insole are sewn together, around the periphery thereof, before or after having performed stitching of the insole and the upper. In both cases injection moulding of the sole is then carried out.

[0007] The new manufacturing process and the footwear formed thereby fulfil the aforementioned objects, and in particular the footwear are especially soft and comfortable and the manufacturing process allows costs to be reduced, in that some assembly operations are eliminated. Moreover, the invention provides the possibility of applying an open cell padding to the entire undersurface or sole of a user's foot, allowing use of footbeds of very soft, breathable material, avoids the need to carry out difficult and costly gluing, and obtains a more suitable finish of the footbed from an aesthetic and wearing point of view. Yet again, the footwear can easily be made antistatic by means of stitching through the footbed/insole, said stitching being done at the same time as the assembly stitching or coinciding with said assembling stitching.

[0008] Exemplary embodiments of the invention will be described below with reference to the appended drawings, in which:

Figure 1 is a broken off cross sectional view of a conventional footwear obtained by sack forming or California method, according to which a sort of sack is formed and subsequently the sole is injection molded;

Figure 2 is a section similar to Figure 1 but shows a first example of a footwear according to the invention;

Figure 3 shows a second type of footwear according to the invention, drawn in section similar to the preceding figures;

Figure 4 shows an intermediate manufacturing step for the footwear of figure 3.

[0009] With reference first to Figure 1, a prior art footwear produced by sack forming method and by injection moulding a sole is shown therein. The footwear C comprises an upper 1, possibly a lining 2, a lasting or foundation insole 4, an inner insole or footbed 5 with padding 6, and a sole 3, of plastic material. The upper is joined to the foundation insole by means of chain stitching or so-called "Strobel stitching", referenced 7, which is carried out by preliminarily forming a sort of sack and is then placed in a mould into which the material for the sole 3 is injected. The footbed 5 with the padding 6 is then inserted into the footwear thus formed, and left loose therein so that it is removable, or it is fixed by gluing to the lasting insole. It is obvious that the footbed must be sufficiently rigid to be able to be inserted into the shoe, possibly removed and inserted again a number of times without problems and this detracts from the softness that would be desirable. Furthermore, the gluing operation, if used, is particularly complex and time consuming.

[0010] The invention will now be described with reference to the footwear C1 of Figure 2. The shoe C1 comprises an upper 11, possibly with a lining 12. A bottom or bottom stock comprises an insole or footbed 15 with padding 16, preferably a layer of open cell plastic material, integral therewith, and the footbed has a peripheral portion 15' free from the padding, which is sewn by means of overlapping sewing 18 to the lower edge of the upper 11 which may have a lining 12. Since there is no lasting or foundation insole, the padding 16 emerges beyond the bottom part of the upper. The upper-insole assembly thus formed is placed in a mould and the sole 13 of plastic material is injection moulded thereon. The footwear C1 can be produced at a limited cost with respect to the footwear C of Figure 1, in that it does not require a lasting insole and avoids the operations of gluing of the footbed. Moreover it proves particularly soft and comfortable, both because of the presence of a single insole or footbed, the inner one, and because said footbed can be made of less rigid material than the materials habitually used for footbeds, in that it does not have to be inserted into the footwear during assembly.

[0011] Figures 3 and 4 illustrate another embodiment of the footwear of the invention, referenced C2. The footwear C2 comprises an upper 21 possibly with a lining

22, a bottom comprising a lasting insole 24, a footbed 25 possibly with a lining 26, preferably of open cell material. The upper 21 (possibly with a lining 22) and the lasting or foundation insole 24 are assembled by means of a Strobel or chain sewing, 27, with the sack forming technique. The footbed 25 is sewn to the lasting insole at the periphery of both or a short distance therefrom by means of stitching 28. The components thus assembled are placed in a mould, in which the sole 23 is formed by injection moulding. In this case also advantages are obtained in the comfort of the footwear, which is softer, and also in manufacturing costs and times.

[0012] Furthermore, both for the embodiment of Figure 2 and for the embodiment of Figures 3 and 4, the stitching 18 and 28, respectively, remains exposed inside the footwear and, if it is made with conductive thread, allows a footwear of the antistatic type to be made.

[0013] The footbed, which has been described as a sheet completed with the open cell padding, can consist of a variety of embodiments, for example it can comprise a number of superimposed sheets, of leather or synthetic material, woven or spread. Between one layer and the other it is possible to insert a suction accessory such as, for example, an electrowelded vacuum cushion (which is a prior art accessory).

[0014] It is understood that equivalent embodiments to that described come within the scope of the invention as set forth in the appended claims.

Claims

1. Footwear comprising an upper (11, 21), a bottom comprising a footbed or insole (15, 25), and a sole (13, 23) of plastic material, injection moulded on the upper and the bottom, **characterized in that** the footbed (15, 25) is joined to the upper or to a lasting or foundation insole (24) stitched to the upper.

2. Footwear according to claim 1, **characterized in that** it further comprises a padding (16, 26) beneath the footbed.

3. Footwear according to claim 2 wherein the padding is of open cell plastic material.

4. Footwear according to claim 1 **characterized in that** the footbed is joined to the upper by means of overlapping sewing (18) in proximity to the lower edge of the upper and a peripheral edge (15') of the footbed.

5. Footwear according to claim 1 **characterized in that** the footbed (25) is joined to the lasting insole (24) by means of stitching (28) in proximity to the periphery of both.

6. Footwear according to claim 4 **characterized in that** the padding is in contact with the sole of plastic material, there being no lasting insole.

7. Footwear according to claim 4 or 5, **characterized in that** the stitching (18 or 28) is done with conductive thread in order to obtain an antistatic effect.

8. Footwear manufacturing process for manufacturing footwear having an injection moulded sole, comprising the steps of joining an upper and a bottom by stitching to form a sack element, placing said sack element in position in a mould, injection moulding a sole on said sack element in said mould, **characterized in that** the bottom of the sack comprises a footbed (15, 25).

9. A process as said in claim 8, **characterized in that** the sack element comprises an upper (11) possibly with a lining (12) and a footbed (15) possibly with padding (16) and the step of joining by stitching comprises the operation of sewing together the footbed (15) and the upper (11) by overlapping sewing.

10. A process as said in claim 8 in which the bottom further comprises a lasting or foundation insole (24), **characterized in that** the step of joining the upper (21) with the bottom comprises the operation of chain stitching together the foundation insole (24) and the upper (21) and **in that** it further comprises the operation of sewing together said foundation insole (24) and said footbed (25).

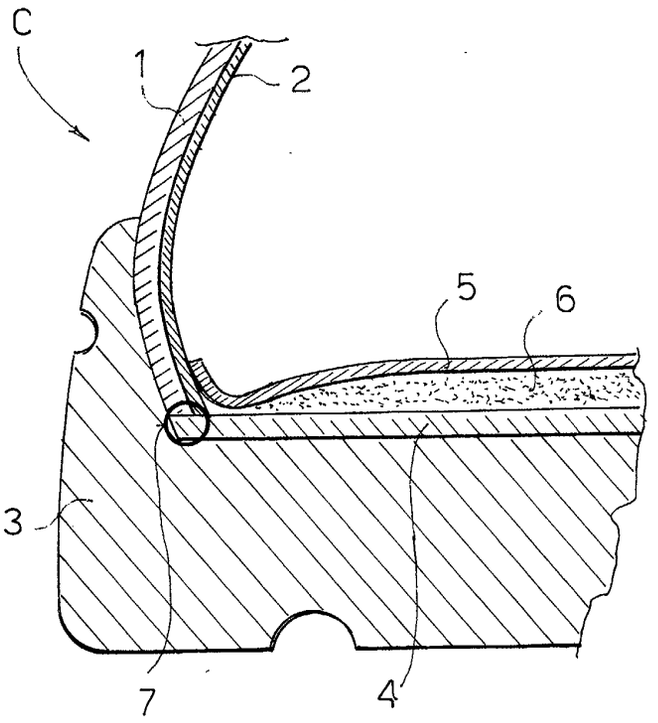

FIG.1
PRIOR ART

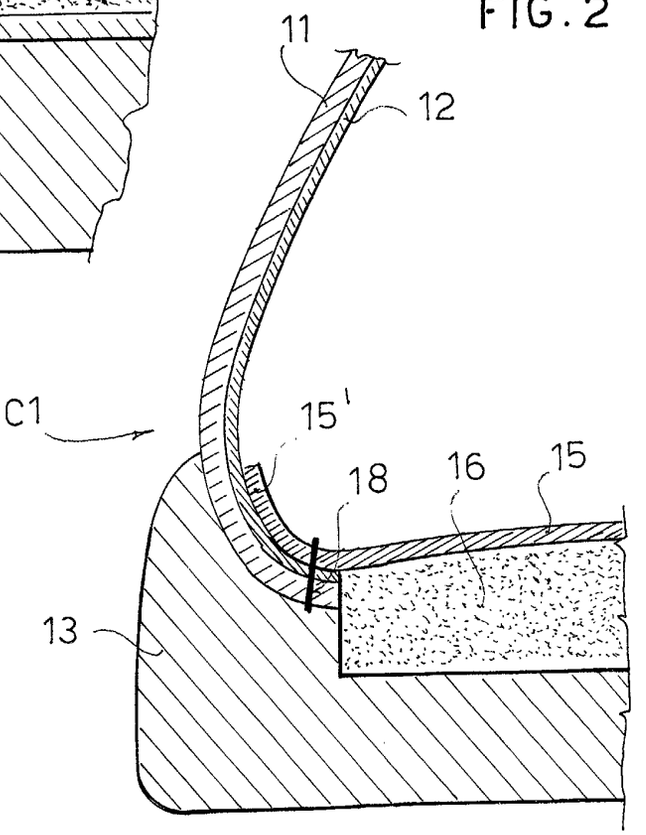

FIG.2

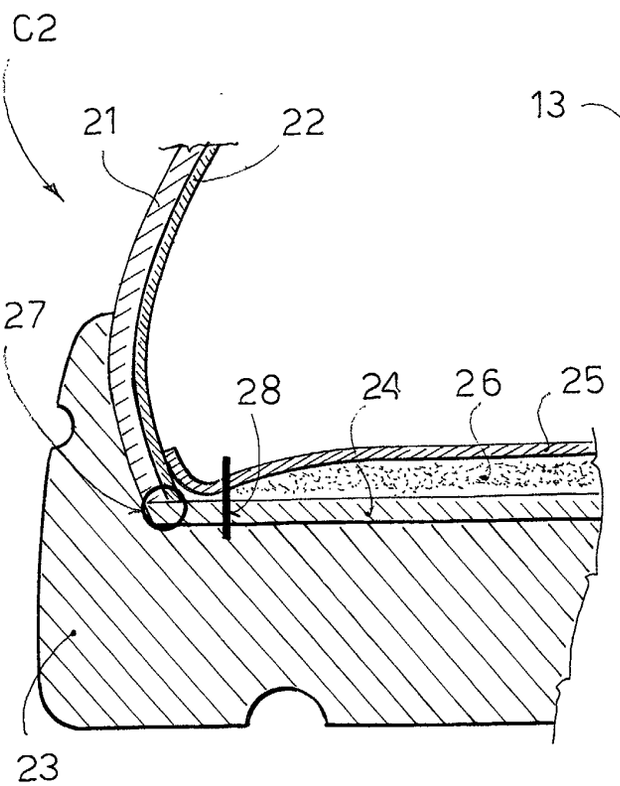

FIG.3

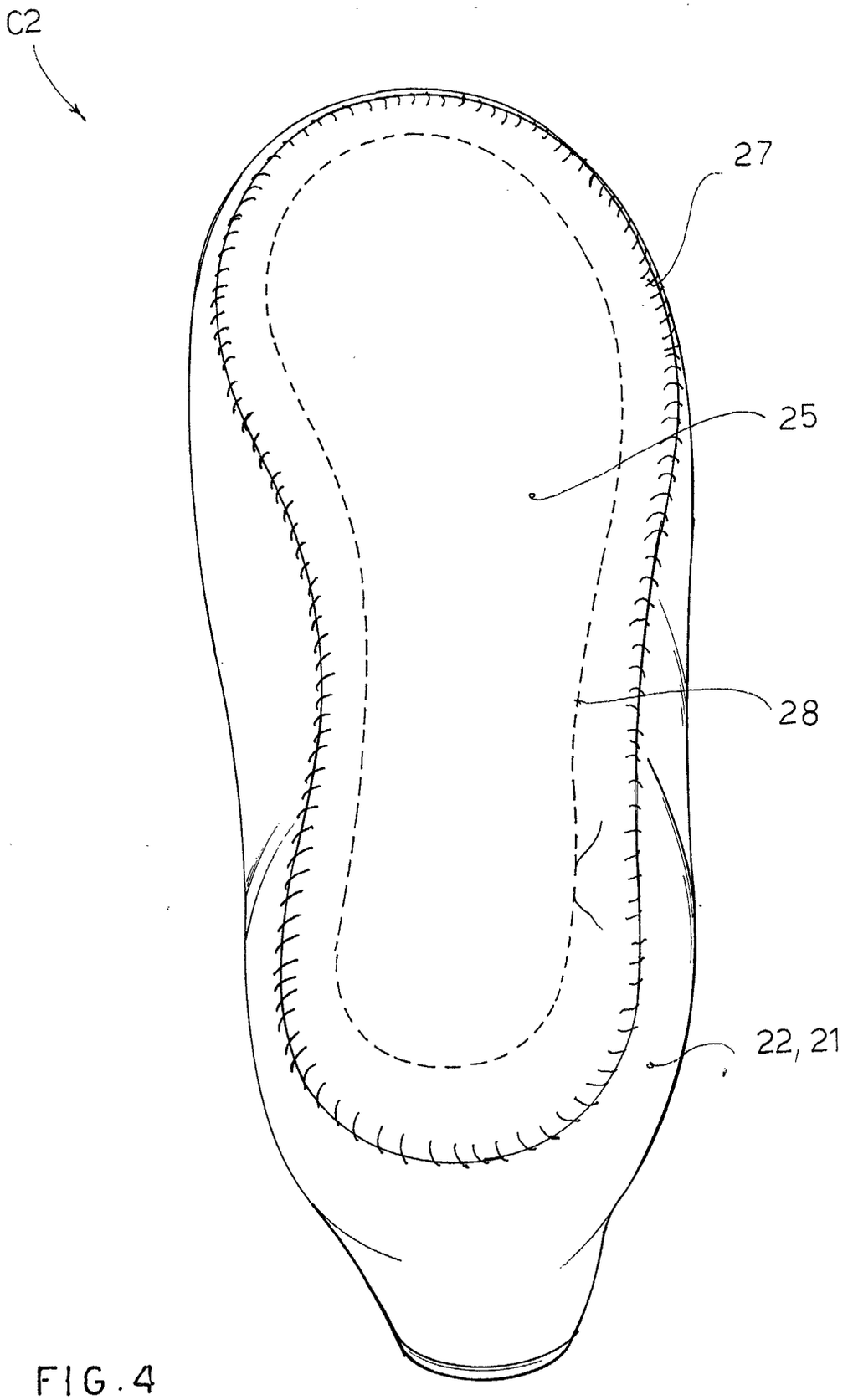

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5080

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.7)
X Y	CH 424 535 A (DESMA WERKE GMBH) 15 November 1966 (1966-11-15) * the whole document *	1-4,6-9 5,10	A43B9/02 A43B9/18
Y	US 3 217 345 A (SAUL SUITZER) 16 November 1965 (1965-11-16) * column 2, line 8 - line 39; figures 3,4 *	5,10	
X	CH 526 281 A (HOFFMANN GMBH GUSTAV) 15 August 1972 (1972-08-15) * the whole document *	1-4,8	
X	DE 19 31 138 U (DESMA-WERKE GMBH.) 13 January 1966 (1966-01-13) * page 4, line 5 - page 6, line 7; figures 2,3 *	1-4,8	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 July 2002	Cianci, S

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 42 5080

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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18-07-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82