



(19)

Europäisches Patentamt

European Patent Office

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(11)

**EP 0 847 708 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
17.06.1998 Bulletin 1998/25

(51) Int. Cl.<sup>6</sup>: **A43D 37/00**, A43D 119/00

(21) Application number: **97203116.5**

(22) Date of filing: **07.10.1997**

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

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(30) Priority: **16.12.1996 IT MI962629**

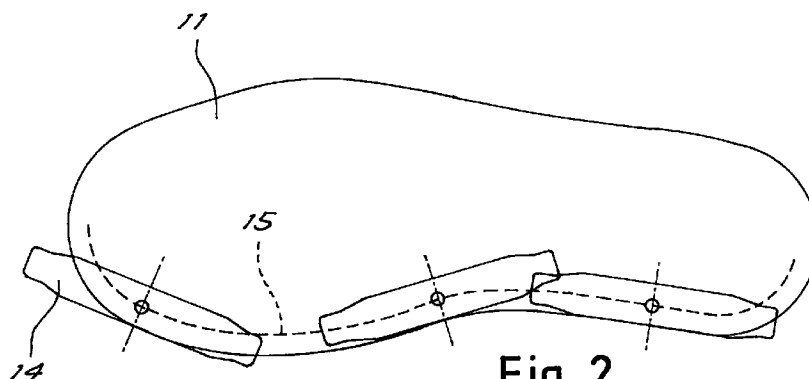
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**(54) Method and device for roughing the underside of footwear**

(57) A method for roughing the underside of footwear along a pre-established path, in which, in pre-established positions of the path, the roughing machine is disposed substantially parallel to the path in the point of contact between the roughing wheel and surfaces to be roughed and slanting sideways in relation to the convexity in such point of the surface to be roughed. A machine applying the method comprises a support (12) for the footwear to be roughed, a rotary roughing machine (14) having a peripheral roughing surface, means (17-20) for driving the roughing machine in its

movement and its orientation along the pre-established path controlled by programmable control means (16). The control means, in pre-established positions of the path, control the means for moving the roughing machine to dispose the roughing machine in a position substantially parallel to the path in the point of contact between the roughing machine and surfaces to be roughed and slanting sideways in relation to the convexity in such point of the surface to be roughed.



**Fig. 2**

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## Description

This invention refers to a method and a device for roughing the underside of footwear.

The general scope of this invention is to perform a roughing operation with excellent qualitative results, while at the same time preventing the detachment of the upper from the insole and the risk of ruining the visible edge of the upper.

This scope is achieved, according to the invention, by providing a method for roughing the underside of footwear along a pre-established path according to which, in pre-established positions of the path, the roughing machine is disposed substantially parallel to the path at the point of contact between the roughing machine and surfaces to be roughed and slanting sideways in relation to the convexity at such point of the surface to be roughed.

According to the method, a machine is also provided to perform the roughing of the underside of footwear along a pre-established path, comprising a support for footwear to be roughed, a rotary roughing machine having peripheral roughing surfaces, means for moving the roughing machine in its movement and its orientation along the pre-established path controlled by programmable control means, characterized by the fact that the control means, in pre-established positions of the path, control the means for moving the roughing machine to dispose the roughing machine in a position substantially parallel to the path at the point of contact between the roughing machine and surfaces to be roughed and slanting sideways in relation to the convexity at such point of the surface to be roughed.

The innovative principles of this invention and its advantages with respect to the known technique will be more clearly evident from the following description of a possible exemplificative embodiment applying such principles, with reference to the accompanying drawings, in which:

- figure 1 shows a schematic partial side view of a roughing machine;
- figure 2 shows a schematic plan view of the roughing machine during its movement along the roughing path;
- figure 3 shows a schematic view of the roughing machine of figure 2 viewed along a plane perpendicular to the roughing path.

With reference to the figures, figure 1 shows a machine 10 for roughing the underside of footwear 11 mounted on a support 12. The machine comprises a roughing head 13 equipped with a rotary roughing wheel 14. The roughing head is rotary and translatable according to a set of three Cartesian axes with respect to the support 12, so as to enable the suitably oriented roughing head to follow a pre-established path along the edge of the underside of the footwear. The roughing

head is also provided with a movement in which the roughing wheel slants sideways around the roughing area, and a movement for running in a direction perpendicular to the roughing area to vary the pressure of contact with the surface to be roughed. An electronic control device 16 controls the movements of the head to follow the roughing path along the footwear mounted on the support. To carry out the movements described, the head is supported by driving means, comprising, for example, a carriage 17, translating in a direction perpendicular to the plan of the drawing, an actuator 18 for rotation according to a vertical axis, an actuator 19 for rotation according to a slanted axis, an actuator 20 for movement in the direction of contact between the roughing wheel and surfaces to be roughed. In addition, an actuator (not shown) is provided for a relative vertical movement between the support and the roughing wheel.

As shown in figures 2 and 3, according to the method of the invention, in pre-established positions of the path, generically indicated by reference 15, the roughing machine is disposed substantially parallel to the path at the point of contact between the roughing wheel and surfaces to be roughed and slanting sideways in relation to the convexity at such point of the surface to be roughed.

In particular, as can be seen in figure 3, the roughing wheel is slanted sideways so as to have an axis of rotation substantially parallel to the tangent line of the convexity of the surface to be roughed in a crosswise direction to the path. Advantageously, whenever the roughing wheel is disposed in sections of the path along which it has a plane disposed parallel to the path, it rotates in a direction concordant with the direction of movement along the path.

It has been found that a method of proceeding according to the invention produces roughing of excellent quality, reducing the risk of detachment between the upper and the insole and preventing damage to the visible surface of the upper. Moreover, a distinct delimitation of the roughed area is always obtained, especially in the area of the waist, where very often with the machines of known technique the feather edge of the insole is missing.

The foregoing description of an embodiment applying the innovative principles of this invention is obviously given by way of example in order to illustrate such innovative principles and should not therefore be understood as a limitation to the sphere of the invention claimed herein. For example, the means for orienting the roughing head may differ from the ones shown.

## Claims

1. Method for roughing the underside of footwear along a pre-established path according to which, in pre-established positions of the path, the roughing machine is disposed substantially parallel to the

path at the point of contact between the roughing machine and surfaces to be roughed and slanting sideways in relation to the convexity at such point of the surface to be roughed.

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2. Method as claimed in claim 1, in which the roughing machine is slanted sideways to have an axis or rotation substantially parallel to the tangent line, crosswise to the path, of the convexity of the surface to be roughed at the point of contact.

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3. Method as claimed in claim 1, in which the roughing machine, whenever it is in sections of the path along which it has a plane disposed parallel to the path, rotates in a direction concordant with the direction of movement along the path.

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4. Machine for roughing the underside of footwear along a pre-established path, comprising a support (12) for footwear to be roughed, a rotary roughing machine (14) having a peripheral roughing surface, means (17-20) for driving the roughing machine in its movement and its orientation along the pre-established path controlled by programmable control means (16), characterized by the fact that the control means, in pre-established positions of the path, control the means for moving the roughing machine to dispose the roughing machine in a position substantially parallel to the path at the point of contact between the roughing machine and surfaces to be roughed and slanting sideways in relation to the convexity at such point of the surface to be roughed.

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5. Machine as claimed in claim 1, characterized in that the moving means slant the roughing machine sideways so as to have an axis of rotation substantially parallel to the tangent line, crosswise to the path, of the convexity of the surface to be roughed at the point of contact.

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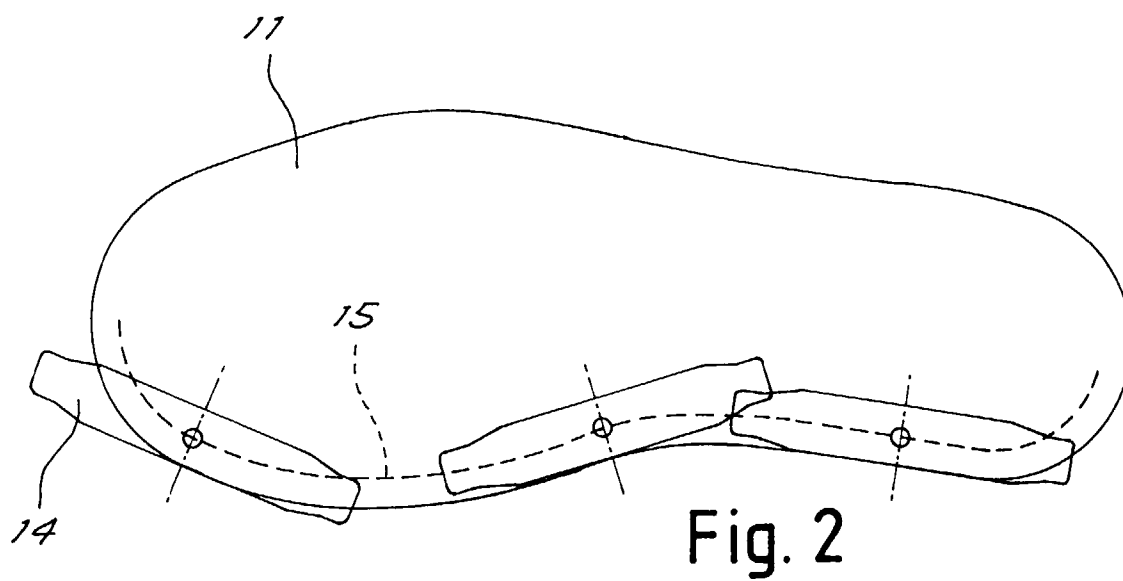
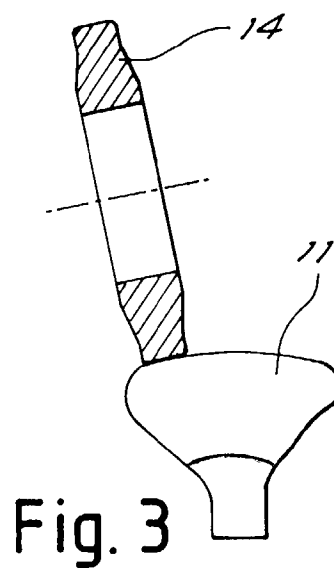
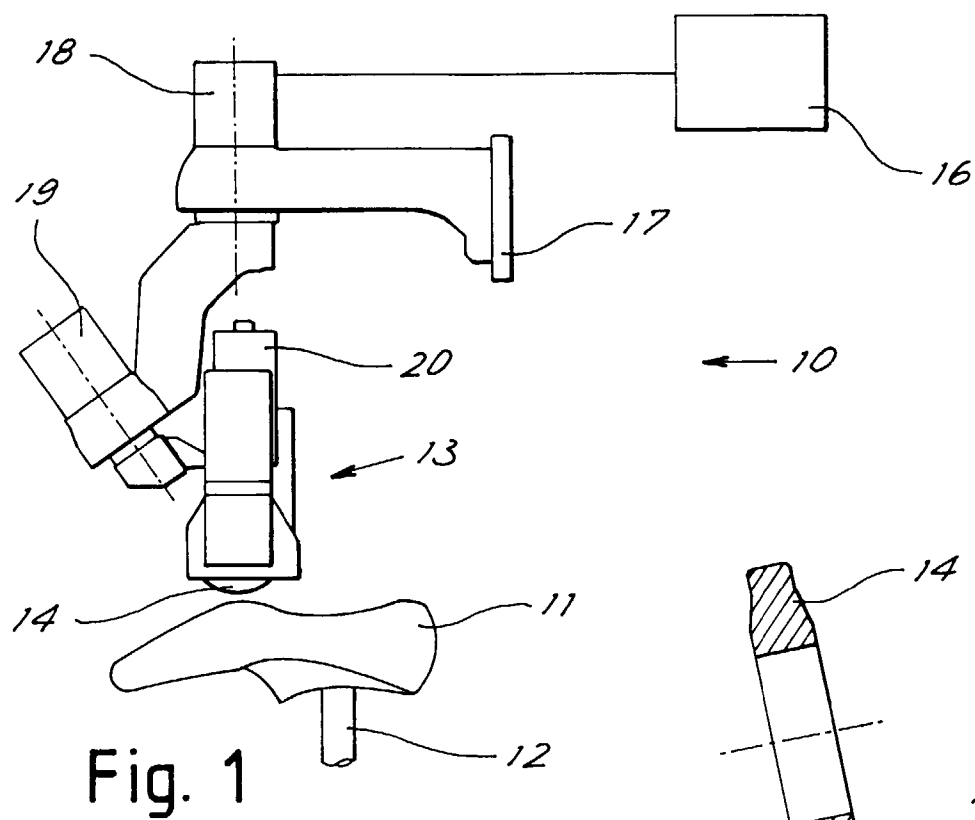
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6. Machine as claimed in claim 1, characterized in that the roughing machine, whenever it is in sections of the path along which it has a plane disposed parallel to the path, rotates in a direction concordant with the direction of movement along the path.

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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 20 3116

| 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   | DE 41 04 468 C (LEIBROCK MASCHINENFABRIK GMBH)<br>* abstract *<br>* column 3, line 24 - line 54 *<br>* column 5, line 50 - line 66; claims;<br>figure 7 * | 1-6  | A43D37/00<br>A43D119/00                      |
| A   | DE 38 15 428 A (INT SCHUH MASCHINEN CO GMBH)<br>* figures 3,4 *   |  |  |
| A   | EP 0 655 207 A (MEC B D F S R L OFF)  |  |  |
| A   | US 4 756 038 A (STEIN MARTIN L)   |  |  |
|   |   |  | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |
|   |   |  | A43D   |
| The present search report has been drawn up for all claims  |   |  |  |
| Place of search<br>THE HAGUE  |   | Date of completion of the search<br>3 March 1998 | Examiner<br>Soederberg, J                    |
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EPO FORM 1503 03 82 (P04C01)