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(54) **Titanium support with ribs for shoes**

(57) The invention is a new support for the sole of footwear formed by a titanium foil having some deformed parts or portions in order to obtain some linear or arcuate ribs preferably disposed to the length of the foot. In order to improve the union between the support and the sole and to prevent the support from moving it is possible to have a series of holes on said support. The support is positioned between two vamps made of leather or PVC or it can be placed, during the injection and pressing phase, on the rubber layer of the sole.

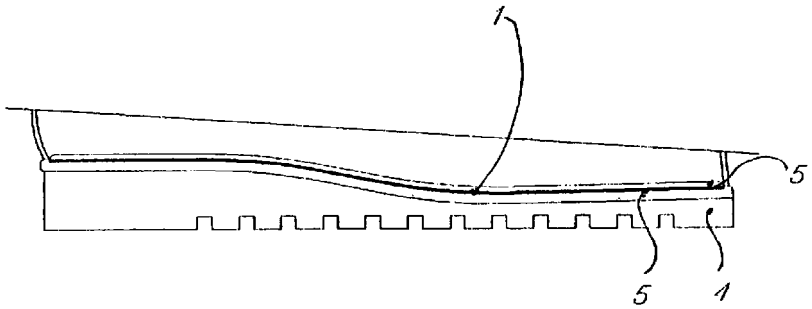


*Figura 2*

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## Description

**[0001]** The present invention relates to the sector of footwear and specifically concerns new shoes with multi-layer soles particularly resistant to breakage and deformation.

**[0002]** The soles for shoes are manufactured in various ways according to the types of shoes and their use. Generally, soles consist of a wearing part made of leather, rubber or rigid plastic, an insole made of soft plastic material and a part made of a superior fabric in order to get a more comfortable contact between the bare foot or the sock and the shoe itself.

**[0003]** Under particular circumstances, such as sport, mountaineering, or work etc., there is the need of wearing shoes which are particularly resistant and at the same time light.

**[0004]** In the patent application PD 96 A 273, belonging to the same applicant of this application, was described a new type of titanium support for shoes made of a titanium or titanium alloy flexible foil having the same shape of the soil to be inserted into the shoe.

**[0005]** The present invention is a new stiffing support for soles of shoes which can give solidity and stiffness to the whole sole and shoe.

**[0006]** The new support is made of a titanium or titanium alloy foil having the shape of the foot or of the sole.

**[0007]** The properties of titanium or titanium alloy are well known: completely biocompatible, extremely resistant, less specific weight if compared with other light alloys with the same resistance, lower thermal conduction and electrical resistivity, easy manufacturing of the rolled section, enduring oxidation and high corrosion resistance.

**[0008]** Essentially, the support is obtained from a titanium or titanium alloy foil having the shape of the sole and some parts or sections of said support deformed in order to obtain some linear or arcuate ribs preferably oriented towards the foot length.

**[0009]** It is possible to have only a rib at a constant or variable depth, otherwise two or more ribs at a different depth.

**[0010]** In order to increase the level of stiffness and resistance a proper treatment is possible, that is a ions bombardment to be performed before or after the shaping of the sole.

**[0011]** The support is normally placed between the wearing part made of rubber or other plastic material and the insole made of a soft synthetic foam, otherwise it can be added to the rubber layer of the sole.

**[0012]** Another solution consists of having the titanium support placed between two vamps made of leather, PVC, or other suitable material. This sandwich (vamp - titanium support - vamp), therefore, is suitable for being placed between a rubber layer and a layer of soft material for the rest of the foot.

**[0013]** On said vamps some notches for inserting the ribs of the titanium support are provided for.

**[0014]** In order to improve the union of the support with the sole and to prevent the support from moving it is possible to have a series of holes on the support itself. In this way the injected material adheres directly to the support and passes through the holes of the support forming a structure consisting of a wearing part with a support for the reinforcement and the stiffening.

**[0015]** The new support prevents the sole from being deformed, broken or torn and allows to reduce the weight and the thickness of the sole and consequently of the shoe.

**[0016]** The new support, thanks to its high degree of biocompatibility, is the unique made of metal which is absolutely tolerated and completely unallergic.

**[0017]** Said new support can be also coupled with any kind of multi-layer soles made of various materials.

**[0018]** According to the thickness of the foil, and to the number and the shape of the ribs, the support has different resistance and flexibility degrees.

**[0019]** For example, it is sufficient a support whose foil has a thickness of 1 mm. and two longitudinal ribs with semicircle section of 6 mm. in length to prevent the support from being bended.

**[0020]** Eventually, the thickness of the support made of titanium can be preferably constant but can change to obtain a greater stiffness in particular areas of the sole and of the shoe.

**[0021]** Said support is particularly employed in the sector of working or protective shoes, in the sector of sporting and mountaineering footwear, in the sector of waterproof shoes such as boots, skiing boots, ice skating boots, skating boots, etc., and in any kind of heavy or light shoes and any kind of sandals, clogs, high heel shoes, slippers, etc.

**[0022]** Support for shoes and footwear in general provided with a titanium or titanium alloy foil with ribs and possibly provided with some holes for the perspiration and the fastening to the sole.

**[0023]** The following is just an example among many of the practical applications of the invention in question, illustrated in the attached table.

Figures 1a, 1b, 1c, show a plan view, a lateral view, and a section (X-X) of the new support.

In the three figures, two longitudinal ribs (2) obtained bending the titanium foil are well shown together with the configuration of the support (1) which is adaptable to the foot.

The new support, moreover, is provided with some holes which allow the realization of an enblock multi-layer sole.

Figure 2 and particularly figure 2a show an example of use of the new support (1) with multi-layer sole formed by a rubber layer (4) above which the new ribbed support (1) is placed between two vamps with a layer of soft material (6) above it.

Figure 3 shows a multi-layer sole in which is possi-

ble to see how the rubber (4) is added to the new ribbed support (1) and is penetrated through the holes (3) covering said support completely.

**[0024]** The above are the basic outlines of the invention, on the basis of which the technician will be able to provide for implementation; therefore, any change which may be necessary upon implementation is to be regarded as completely protected by the present invention.

**[0025]** With reference to the above description and the attached drawings, the following claims are put forth.

## Claims

1. Support for footwear in general, characterized in that it comprises a titanium or alloy titanium foil provided with some ribs and/or notches.

2. Support for footwear in general according to claim 1, characterized in that it is provided with through holes.

3. Support for footwear in general according to claims 1, 2, characterized in that it is added to the sole made of rubber or other suitable material.

4. Support for footwear according to claims 1, 2, characterized in that it is placed between two vamps made of leather and/or PVC or other suitable material.

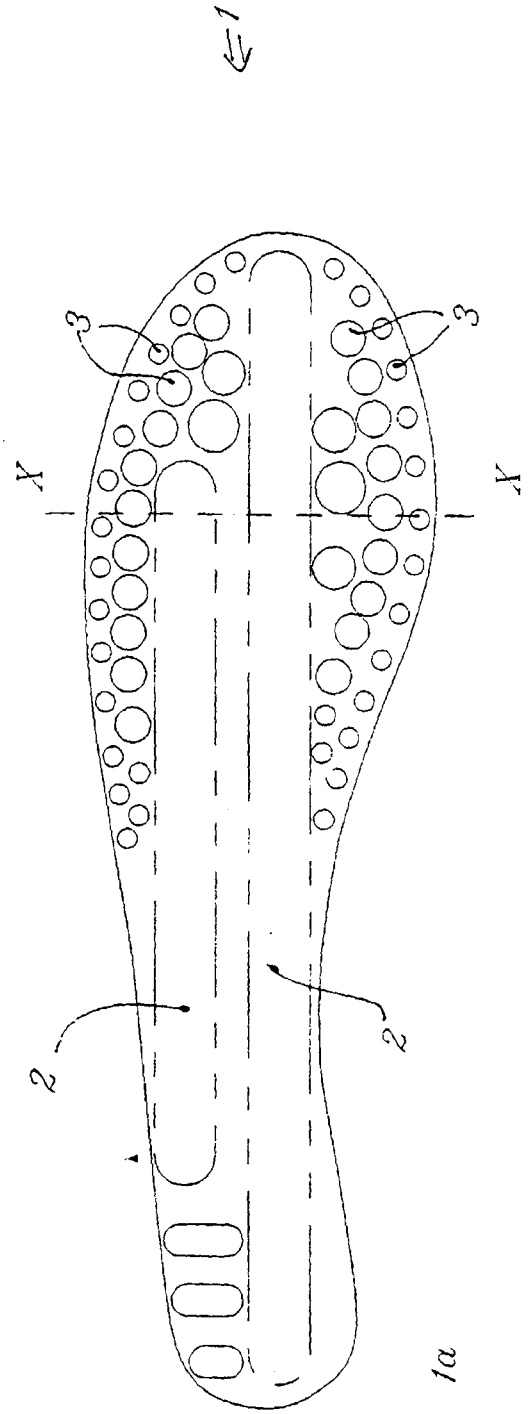


Fig. 1a

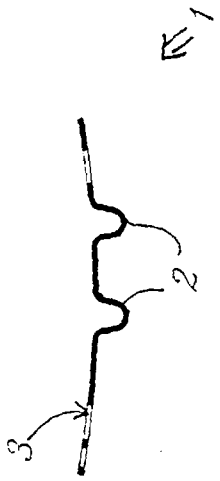


Fig. 1c

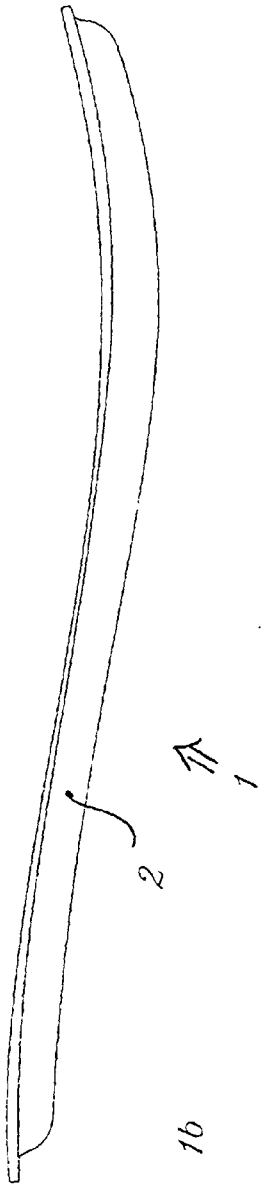


Fig. 1b

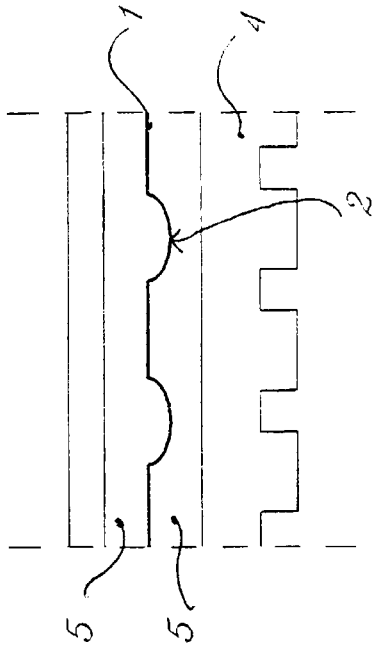


Fig. 2a

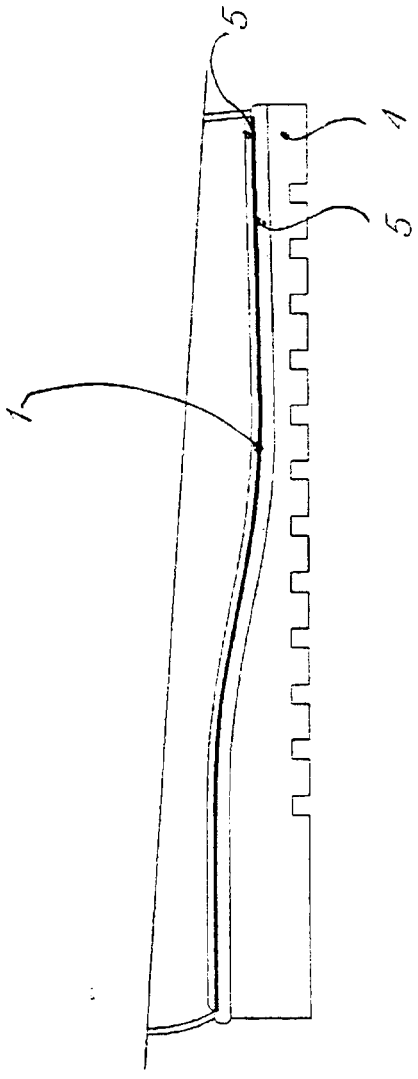


Figura 2

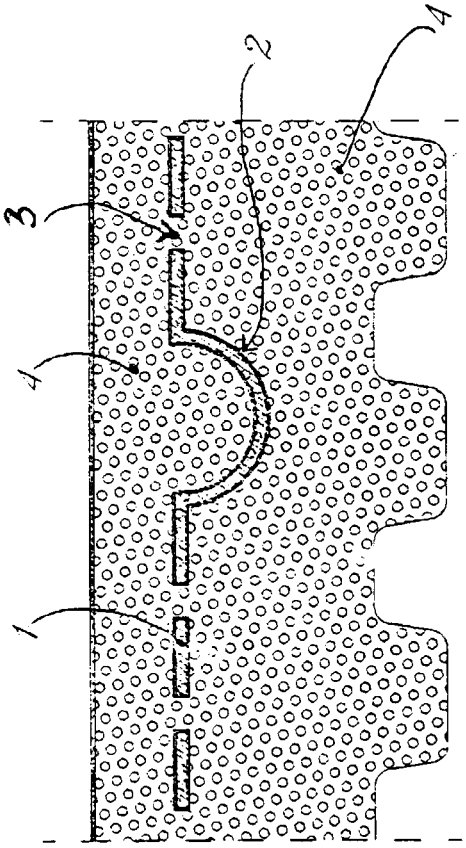


Fig. 3

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# EUROPEAN SEARCH REPORT

Application Number
EP 98 12 4635

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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 | 29 June 1999 | Declerck, J |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 12 4635

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