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

(11) **EP 3 574 792 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.12.2019 Bulletin 2019/49

(51) Int Cl.:
A43B 13/41 *(2006.01)* ***A43B 23/22*** *(2006.01)*

(21) Application number: **18425040.5**

(22) Date of filing: **28.05.2018**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Solettificio Bitossi SRL**
50056 Montelupo Fiorentino (FI) (IT)

(72) Inventor: **Bellofatto, Emanuele**
50050 Loc. Stabbia-Cerreto Guidi (IT)

(74) Representative: **Leotta, Antonio**
Italbrevetti S.r.l.
Via S. D'Acquisto, 40/N
56025 Pontedera (PI) (IT)

(54) **SHANK FOR REINFORCEMENT OF FOOTWEAR INSOLES**

(57) The improved shoe shank (1) is inserted and locked in an intermediate position between the upper (2A) and the lower (2B) layers of an insole (2) for footwear (C) with heel (T), in order to reinforce the shape of the insole (2) itself.

In the rear end (1P) area of the shoe shank (1) there is provided an opening (4), a elongated hole (41) or a fork shaped end (40), to allow the passage of the fixing means of the heel (T); from the sides of the opening (4) two longitudinal stiffening ribs (5) extend towards the front part of the shoe shank (1), drawn so as to protrude from the convex side of the shoe shank (1), that is towards said upper layers (2A).

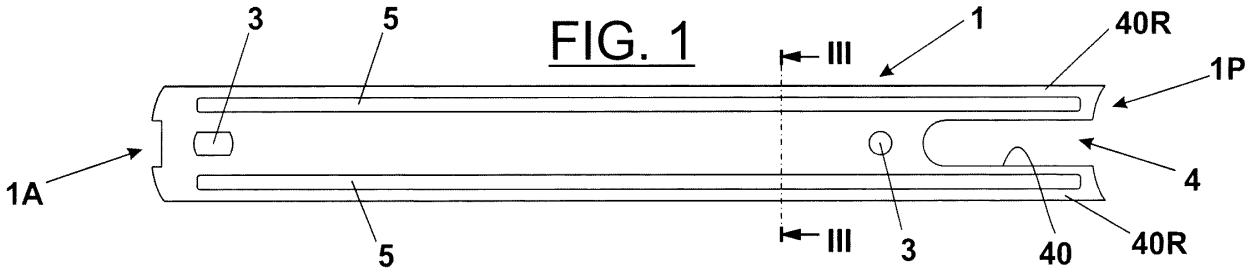
The stiffening ribs (5) can be more or less long, however such as to increase the rigidity of the insole (2) in the rear area (2P), where the heel (T) is fixed, without interfering with the correct support of the upper head (Ts) of the same that, advantageously, finds support on a flat surface.

In addition, a further additional central stiffening rib (6) can be provided.

The increased resistance to bending deformations of the insole (T) allows to pass the traction stress tests of the heel and insole assembly imposed by specific european standards.

FIG. 2

FIG. 1



EP 3 574 792 A1

Description

TECHNICAL FIELD

[0001] The present invention is inserted in the footwear sector and concerns, in particular, the shoe shank inserted for reinforcement purposes in the insoles of footwears, both of those having a pronounced heel, including those mainly intended for the female public, and of those with modest height heel, including men's models.

STATE OF THE ART

[0002] Said shoe shanks have a strip shape, which is suitably arched longitudinally and provided with stiffening ribs in a variable number from one to three / four; near the ends, respective holes are provided for fixing the shoe shank to the footwear insole, for example with rivets.

[0003] The stiffening ribs, made by drawing, are usually protruding from the concave side of the arch formed by the shoe shank, and their function is obviously to allow the latter contributing to maintain the ascending shape of the insole towards the rear part that it must have depending on the height of the heel.

[0004] Some models of shoe shank require the rear end to be affected by a longitudinally elongated hole, which can be closed or opened at the back, giving the same end a fork shape.

[0005] A footwear insole is normally made up of several overlapped and pressed layers, including a lower one made of paper fibrate and an upper one made as well of a cellulose material commercially known as Texon® from the name of the manufacturer, which has good pliability performance.

[0006] The known art provides the shoe shank to be inserted and locked in an intermediate position between the upper and lower layers, positioned starting from the heel's connection area towards the insole's front part, oriented with its concave side facing the lower layer.

[0007] Fixing to the paper fibrate or the Texon layer occurs in correspondence with said fixing holes, usually by means of rivets, as already mentioned; alternatively, some shoe shanks have the holes cut and drawn in such a way that on one side there is a protruding crown of sharp teeth suitable to stick in the paper fibrate or Texon layer.

[0008] The presence of the elongated hole or the fork shaped end allows the shoe shank to affect the heel's connection area of the insole, giving it greater strength, but leaving space for the passage of fastening means (screws or the like) with which the heel is mounted to the shoe.

[0009] As easily understood, the need to strengthen the insole in the heel's connection area is as much felt as more the heel is high and thin at the bottom.

[0010] The so-called spike heels are therefore those that are constructively more problematic in terms of oscillation stability, in particular when combined with very thin uppers or even posteriorly open uppers.

[0011] Since a sudden and unmotivated breakage of a heel can involve the consumer's safety, it has become necessary to introduce a European legislation, ratified also in Italy (UNI EN 12875) which prescribes, among other things, a traction stress test to which is submitted the heel and insole assembly of the footwear so that minimum resistance requirements of the fixing area are guaranteed.

[0012] Shoe shanks of known art have proved to be not very effective in contributing to the strength of the heel's connection area, also due to certain constructive characteristics:

- in the models in which there are only central stiffening ribs, included between the fixing holes and said elongated hole or fork, the shoe shank is not rigid enough in the rear area (where the elongated hole or the fork extends) and therefore increases almost nothing the insole strength where the heel is fixed;
- the stiffening ribs protruding downward, which cause an inprint in the lower layer of the insole, for example the paper fibrate one, hinder the proper mounting of the heel, making it less stable;
- the same ribs protruding downward, with the induced deformation of the lower layer, affect the width of the upper head of the heel and consequently its stability to the oscillation.

[0013] Basically, shoe shanks currently in use in some cases do not bring tangible benefits regarding the ability of a footwear with heel, especially if it is a high one, to overcome the stress tests required by said legislation.

[0014] Another negative aspect, resulting from the fact that the stiffening ribs protrude downward and inprint the lower layer of the insole, concerns the design phase, which must take into account the imprints in the 3D model of the insole and therefore requires to be allowed to detect the geometry of the imprints, which can probably be slightly variable, during production, from one sample to another.

[0015] Still a drawback given by said constructive characteristic, consists in having to provide, in the pressing mold of the insole, appropriate steps to receive said protruding imprints, with the obvious complications and relative costs increase.

SUMMARY OF THE INVENTION

[0016] It is therefore an object of the present invention to provide an improved shoe shank for reinforcing insoles of footwear with heel which, thanks to its original shape, is capable of significantly improving the insole strength in the area where the heel is fixed.

[0017] Another object of the invention is to obtain a shoe shank which does not interfere with the correct support of the upper head of the heel under the insole, regardless of the shape and/or the dimensions of the head

itself.

[0018] Another object of the invention is to propose a shoe shank which does not generate imprints protruding from the lower layer of the insole, so as not to complicate either the design or manufacturing of the mold used for the pressing phase of the insole manufacturing process.

[0019] A further object of the invention relates to the intention of substantially adopting, for the shoe shank proposed, the same construction techniques used for the known types of shoe shank, therefore with almost identical costs.

[0020] Another further object of the invention is to avoid additional processing steps of the insole due to said protruding imprints.

[0021] These and other objects are fully achieved by an improved shoe shank for reinforcing insoles of footwear with heel, with said shoe shank having a constant thickness and longitudinally curved strip shape, provided with: at least one fixing hole near each of its longitudinal ends; a heel fixing opening provided near the rear end and suitable for the passage of the heel fixing means; at least one longitudinal stiffening rib obtained by drawing, the same shoe shank being provided to be longitudinally associated to an insole of a footwear with heel, inserted and locked in an intermediate position between upper and lower layers of said insole and positioned starting from the fixing area of the heel towards the front part of said insole, oriented with its concave side facing said lower layer, with said improved shoe shank comprising at least two of said longitudinal stiffening ribs projecting form the convex side of the same improved shoe shank, that is towards said upper layers of said insole, with the same at least two stiffening ribs symmetrically arranged on the sides of said heel fixing opening and extending longitudinally starting from the rear end of the same improved shoe shank towards said front part of the insole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The characteristics of the invention will be clear from the following description of a preferred embodiment of the improved shoe shank for reinforcing footwear insoles of the invention, in accordance with what is proposed in the claims and with the aid of the attached drawings, in which:

- Fig. 1 shows, according to a plan view, a first embodiment of the shoe shank according to the invention;
- Fig. 2 shows a side view of the shoe shank of Fig. 1;
- Fig. 3 shows a sectional view of the shoe shank according to section plane III-III of Fig. 1;
- Fig. 4 illustrates, in a view similar to Fig. 1, a second embodiment of the shoe shank;
- Fig. 5 illustrates, in a view similar to Fig. 1, a third embodiment of the shoe shank;
- Fig. 6A shows, in section, a first constructive variant of the shoe shank of Fig. 5, according to section plane VI-VI of the latter;
- Fig. 6B illustrates, in a further section according to section plane VI-VI, a second constructive variant of the shoe shank of Fig. 5;
- Fig. 7 illustrates, in a view similar to Fig. 1, a fourth embodiment of the shoe shank;
- Fig. 8 is an exploded schematic side view of a footwear with heel's part in which the shoe shank in question is inserted;
- Fig. 9 illustrates, on an enlarged scale, a partial plan view of Fig. 8 to highlight the positioning of the rear part of the shoe shank.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] In the above figures, it is pointed as a whole with 1 the improved shoe shank object of the invention.

[0024] The improved shoe shank 1, like those of a known type, is used to reinforce the insoles 2 of footwears C with heel T, both of those having a pronounced heel T, mainly including those intended for the female public, and also of those with a modest height heel T including men's models, as already mentioned in the introduction.

[0025] The improved shoe shank 1 has, in a per se known manner, a constant thickness and a longitudinally curved strip shape and is provided with:

- a fixing hole 3 near each of its front 1A and rear 1P ends;
- a heel fixing opening 4 provided near the rear end 1P and adapted to the passage of the fixing means of the heel T;

[0026] The opening 4 for fixing the heel T, in a possible constructive solution according to the first, third and fourth embodiments (Figs. 1, 5, 7), is posteriorly communicating with the outside, providing a fork shape 40 of the rear end 1P of said shoe shank 1; alternatively, the opening 4 is provided as a longitudinally elongated hole 41, arranged substantially central, as shown in Fig. 4 pertaining to the second embodiment of the shoe shank 1.

[0027] In a not illustrated variant, the fork haped end 40 or the elongated hole 41 incorporates said fixing hole 3 of the rear end 1P.

[0028] According to known techinques, the improved shoe shank 1 is provided to be associated to the insole 2, inserted and locked in an intermediate position between upper 2A and lower 2B layers of said insole 2 and positioned starting from the rear area 2P of the latter, where the fixing of the heel T is made, for longitudinally extending towards the front part of the insole 2, oriented so that its concave side is directed downwardly towards said lower layers 2B.

[0029] The upper layers 2A comprise a Texon layer of adequate thickness, that is an elastically soft synthetic material as mentioned above, while in the lower layers 2B there is provided a paper fibrate layer, of the type normally used in the footwear industry.

[0030] According to the invention, the improved shoe shank 1 provides two longitudinal stiffening ribs 5, obtained by drawing, and which, contrary to the known type shoe shanks' ribs, protrude from the convex side of the shoe shank 1, so that they are projecting towards the upper layers 2A of the insole 2 (see Figs. 2 and 8).

[0031] The Texon layer, or equivalent material, "absorbs" in its soft thickness the upward relief of the stiffening ribs 5, preventing to feel its presence when the footwear is worn.

[0032] The two stiffening ribs 5 are symmetrically arranged on the sides of said opening 4 for fixing the heel T and in particular, according to the shape of the same opening 4:

- along the respective prongs 40R of said fork 40, provided in the first, third and fourth embodiments of the shoe shank 1 (Figs.1, 5, 7),
- at the sides of the elongated hole 41, provided in the second embodiment of the shoe shank 1 (Fig. 4).

[0033] The two stiffening ribs 5 are longitudinally extended starting from the rear end 1P of the same shoe shank 1 towards the front end 1A and they have a predefined length which, according to parameters known to those skilled in the art which depend on the type of footwear, may partially (Fig. 7) or totally (Figs. 1, 4, 5) affect the lenght of the improved shoe shank 1.

[0034] In both the above-mentioned solutions, the two stiffening ribs 5 are effective at counteracting the bending of the rear portion of the shoe shank 1, which is the most important portion for stabilizing the rear area 2P of the insole 2 where the fixing of the upper head Ts of the heel T is performed (see Fig. 9 in particular), much more than in the prior art shoe shanks.

[0035] The improved shoe shank 1 can advantageously provide, as illustrated with reference to the third and fourth embodiments (Figs. 5 and 7) at least one additional central stiffening rib 6 interposed between the two lateral stiffening ribs 5 described above.

[0036] In a constructive variant illustrated in Fig. 6A, the additional central stiffening rib 6 protrudes towards the convex side of the arched improved shoe shank 1, like the two lateral stiffening ribs 5.

[0037] Alternatively, it is also possible to provide the same additional central stiffening rib 6 to protrude towards the concave side of the shoe shank 1, opposite with respect to the two lateral stiffening ribs 5.

[0038] It is here clarified that the combinations illustrated between the features of the shape of the opening 4, the length of the stiffening ribs 5, the presence or the absence of the additional central stiffening rib 6 as well as the drawing direction of the latter, are only indicative and not binding, therefore any other combination of the above features can be provided coming within the ambit of scope of protection of the present invention.

[0039] From the above description, all the advantageous aspects of the improved shoe shank are immediately evident, as proposed, despite a simple constructive solution and apparently not too different from the prior art.

[0040] In fact, it is obtained a noticeable improvement of the insole resistence to bending, in the area where the heel is fixed, without interfering with the correct support of the upper head of the same, regardless of the shape and/or the dimensions of the heel head itself.

[0041] This is made possible by the fact that the upper head of the heel can advantageously find support on a flat surface, rather than corrugated by the imprints present in the prior art insoles due to the deformations induced by the ribs protruding downwards.

[0042] Consequently, the fixing of the heel is more stable and it is increased the resistance to bending stresses of the same, among which those required by the EU regulations, so that the assembly made of the insole and the heel can be tested with positive result.

[0043] As already anticipated in the description, the upward projections of the ribs are not felt under the foot thanks to an upper layer of the insole made of soft material.

[0044] Beyond the purely functional and regulatory level, the lack of protruding imprints from the lower part of the insole offers interesting advantages both in the design phase and in the manufacturing of the mold for pressing the insole, since it is not necessary to take into account such projections.

[0045] This is also beneficial to the insole production process, as accessory processes such as the grinding and smoothing of the protruding imprints are eliminated.

[0046] If the production costs of the proposed improved shoe shank can be quantified as substantially identical to those of a known art shoe shank, there are instead not negligible cost reductions both in the design and in the production of the molds.

[0047] People skilled in the sector are able to see and appreciate other further advantages, which for the sake of brevity are not listed, offered by the shoe shank of the invention in the entire process that concerns the production of various models of footwear, with open or closed upper.

[0048] However, it is understood that the above description has an exemplifying and nonlimiting value, therefore any variants of detail that may be necessary for technical and/or functional reasons are considered from now on falling within the same scope of protection defined by the following claims.

Claims

1. Improved shoe shank for reinforcing insoles (2) of footwear (C) with heel (T), with said improved shoe shank (1) having a constant thickness and longitudinally curved strip shape, provided with: at least one fixing hole (3) near each of its own ends (1A, 1P); an opening (4) provided near the rear end (1P) and suitable for the passage of the heel fixing means (T);

at least one longitudinal stiffening rib obtained by drawing, the same shoe shank (1) being provided to be associated to the insole (2) of a footwear (C) with heel (T), inserted and locked in an intermediate position between upper (2A) and lower (2B) layers of said insole (2) and positioned starting from the fixing area of the heel (T) towards the front part of said insole (2), and oriented with its concave side facing towards said lower layer (2B), with said improved shoe shank (1) **characterized in that** it provides at least two of said longitudinal stiffening ribs (5) protruding from the convex side of the same improved shoe shank (1), that is towards said upper layers (2A) of said insole (2), with the same at least two stiffening ribs (5) symmetrically arranged on the sides of said opening (4) for fixing the heel (T) and extending longitudinally starting from the rear end (1P) of the same improved shoe shank (1) towards said front part of the insole (2).

2. Improved shoe shank according to claim 1 or 2, **characterized in that** said opening (4) for fixing the heel is posteriorly communicating with the outside, providing a fork shape (40) of the rear end (1P) of said shoe shank (1), with said at least two stiffening ribs (5) arranged to affect the respective prongs (40R) of said fork (40).

3. Improved shoe shank according to the claim 2, **characterized in that** the fork haped end (40) incorporates said fixing hole (3) of the rear end (1P).

4. Improved shoe shank according to the claim 1, **characterized in that** said opening (4) for fixing the heel (T) is a longitudinally elongated hole (41), arranged substantially central, with said at least two stiffening ribs (5) arranged at the sides of said elongated hole (41).

5. Improved shoe shank according to the claim 1 or 2 or 4, **characterized in that** said at least two stiffening ribs (5) have a predetermined length, for partially affecting the improved shoe shank (1) itself.

6. Improved shoe shank according to the claim 1 or 2 or 4, **characterized in that** said at least two stiffening ribs (5) have a predetermined length, for almost completely affecting the improved shoe shank (1) itself.

7. Improved shoe shank according to any of the preceding claims, **characterized in that** at least one additional central stiffening rib (6) is provided, interposed between said at least two lateral stiffening ribs (5).

8. Improved shoe shank according to the claim 7, **characterized in that** said at least one additional central stiffening rib (6) protrudes from the convex side of the improved shoe shank (1).

9. Improved shoe shank according to the claim 7, **characterized in that** said at least one additional central stiffening rib (6) protrudes from the concave side of the improved shoe shank (1).

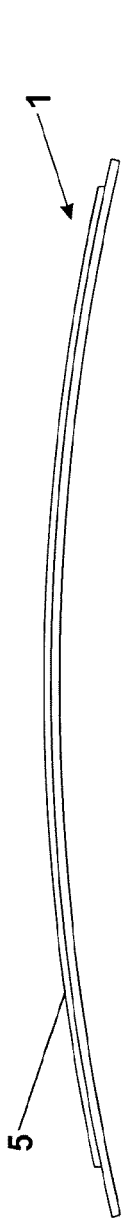


FIG. 2

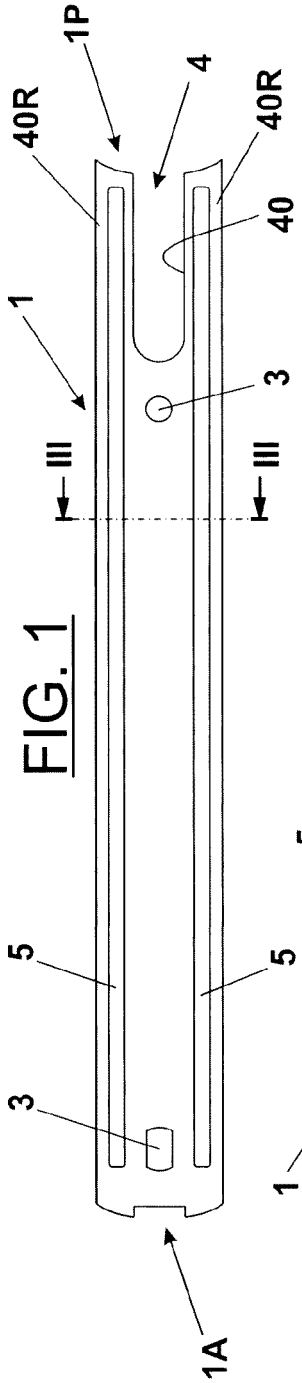


FIG. 1

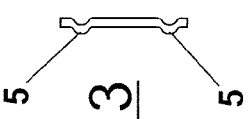


FIG. 3

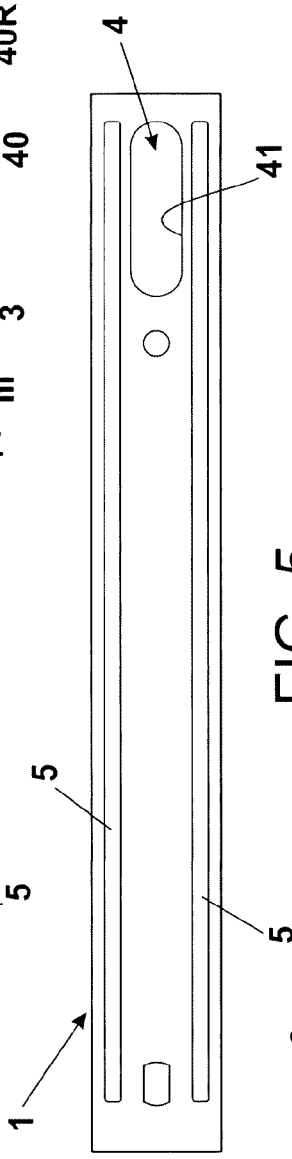


FIG. 4

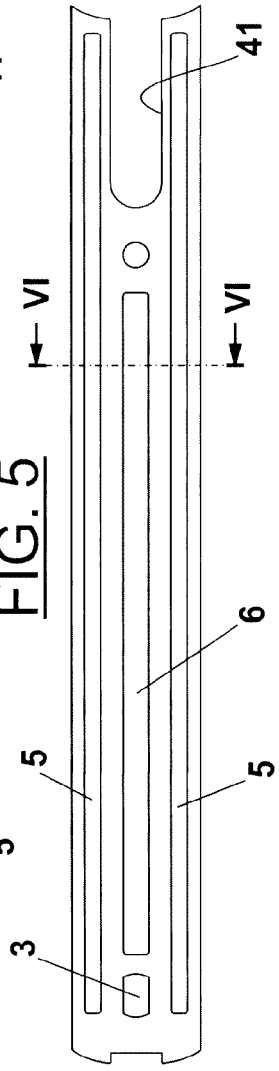


FIG. 5

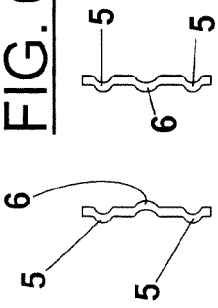


FIG. 6A

FIG. 6B

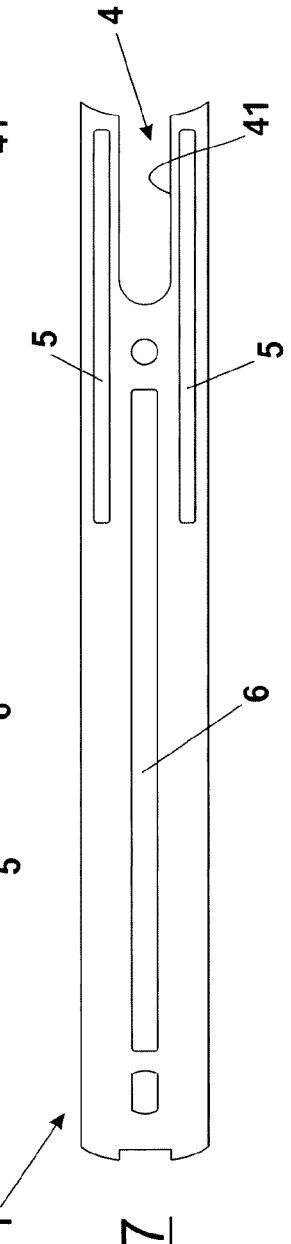


FIG. 7

FIG. 8

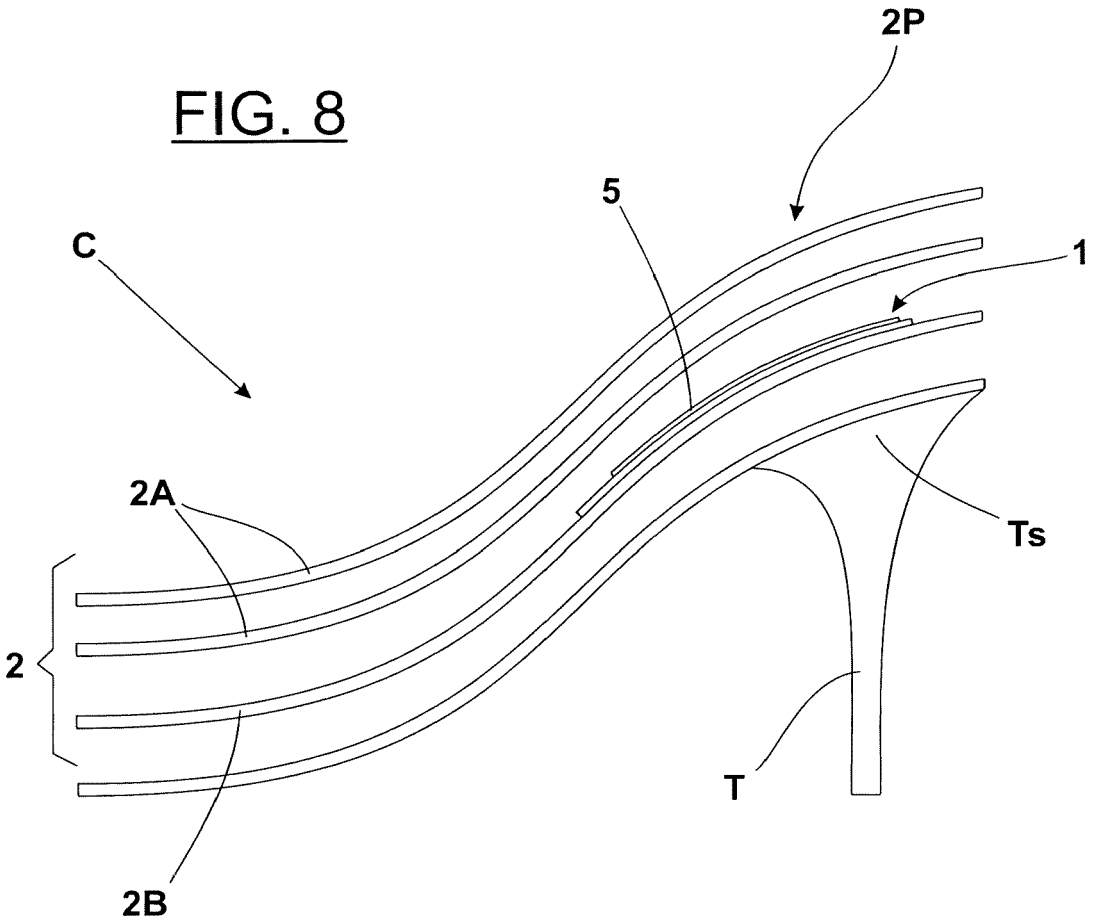
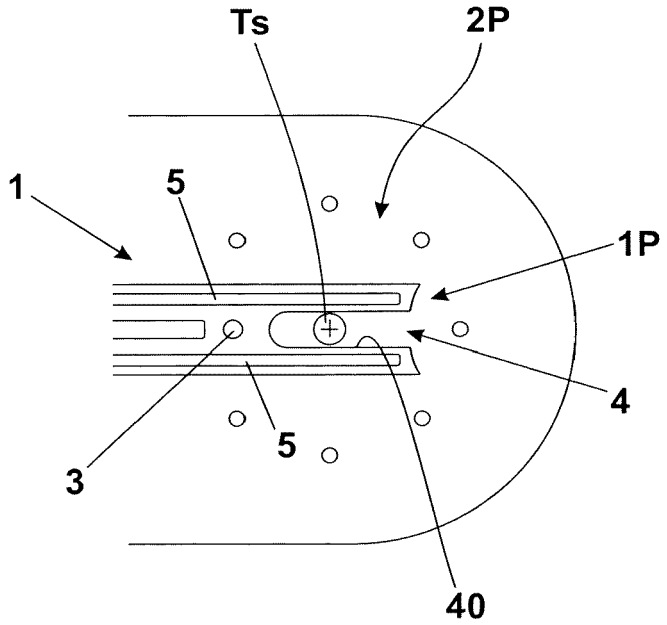


FIG. 9



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 18 42 5040

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2 280 440 A (MELCHIONNA FRANK A) 21 April 1942 (1942-04-21) * the whole document *	1-9	INV. A43B13/41 A43B23/22
A	EP 1 346 656 A1 (MI TE A S P A [IT]) 24 September 2003 (2003-09-24) * the whole document *	1-9	
A	DE 27 10 168 A1 (GOVONI MARINO) 14 September 1978 (1978-09-14) * the whole document *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC) A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 November 2018	Chirvase, Lucian

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 42 5040

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-11-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2280440 A	21-04-1942	NONE	
EP 1346656 A1	24-09-2003	AT 394960 T	15-05-2008
		EP 1346656 A1	24-09-2003
		ES 2305364 T3	01-11-2008
		IT BO020020136 A1	18-06-2002
DE 2710168 A1	14-09-1978	NONE	

EPO FORM P0459

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