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

(11) **EP 3 264 931 B2**

(12) **NEW EUROPEAN PATENT SPECIFICATION**
After opposition procedure

(45) Date of publication and mention of the opposition decision:
23.03.2022 Bulletin 2022/12

(45) Mention of the grant of the patent:
03.04.2019 Bulletin 2019/14

(21) Application number: **15716867.5**

(22) Date of filing: **06.03.2015**

(51) International Patent Classification (IPC):
A43B 23/08 *(2006.01)* ***A43B 1/04*** *(2022.01)*
D04B 1/22 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A43B 23/08; A43B 1/04; D03D 1/00; D03D 13/00; D03D 15/56

(86) International application number:
PCT/IB2015/051660

(87) International publication number:
WO 2016/142737 (15.09.2016 Gazette 2016/37)

(54) **IMPROVED FOOTWEAR ITEM AND METHOD FOR MAKING SAID FOOTWEAR ITEM**

VERBESSERTER FUSSBEKLEIDUNGSARTIKEL UND VERFAHREN ZUR HERSTELLUNG DES BESAGTEN FUSSBEKLEIDUNGSARTIKELS

ARTICLE DE CHAUSSURE AMÉLIORÉ ET PROCÉDÉ DE FABRICATION DUDIT ARTICLE DE CHAUSSURE

(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

(43) Date of publication of application:
10.01.2018 Bulletin 2018/02

(73) Proprietor: **Tessma S.r.l.**
36030 Villaverla (VI) (IT)

(72) Inventors:
- **BOSCATO, Lino Enzo**
  36030 Villaverla (VI) (IT)
- **BOSCATO, Fabio**
  36030 Villaverla (VI) (IT)

(74) Representative: **Marchioro, Paolo**
Studio Bonini S.r.l.
Corso Fogazzaro, 8
36100 Vicenza (IT)

(56) References cited:
EP-A1- 1 338 690
DE-A1-102013 107 803
US-A- 1 902 780
US-A- 2 015 608
US-A- 3 546 900

EP 3 264 931 B2

Description

[0001] The invention concerns a footwear item of the improved type, structured in such a way as to make it possible to drastically reduce its complexity and the number of steps necessary for its production.

[0002] The invention concerns also the method for making said improved footwear item.

[0003] It is known that up to date the various methods used for making footwear consist of a considerable number of steps, some of which, furthermore, are characterized by a high degree of complexity.

[0004] In this context, the term footwear means any type of object intended to protect the foot, of the type comprising a sole kept in position by an upper.

[0005] In greater detail, said production methods usually comprise a first step in which a designer drafts on paper a first sketch illustrating an idea for a footwear item. Said idea is successively transferred on prototypes, usually made of a plastic material, in such a way as to simulate the three-dimensional shape that the footwear item will assume.

[0006] In a successive step, the prototypes in turn make it possible to define on a plane the various patterns, typically made of cardboard, which represent the individual portions made of leather or another material that, joined together, will form the actual upper of the footwear item.

[0007] In this regard, in the case where the footwear items are handmade, said patterns are positioned on large pieces of leather, or another material, in such a way that they serve as a guide for cutting said individual leather portions that will make up the upper. In the case where, instead, said leather portions are press-cut by means of automatic or semi-automatic devices, like for example presses, it is necessary to produce special dies having the same shape as said cardboard patterns.

[0008] Once the plurality of portions in leather or another material have been produced, they are joined to one another on a three-dimensional template that substantially reproduces the shape of a foot, in such a way as to obtain said upper. This operation, which has the purpose to simplify the assembly of the upper, is defined "upper pre-forming operation" in technical jargon.

[0009] The upper obtained by proceeding as described above is successively connected to a sole and is optionally equipped with some accessories like, for example, laces, Velcro straps or zip fasteners, in such a way as to make it easier for a user to put on the shoe.

[0010] Said methods for making footwear of the known art, however, pose some recognized drawbacks that are described here below.

[0011] A first drawback posed by said methods is represented by the need to perform all the steps mentioned above for each footwear model and for each size of each model. In particular, it is necessary to carry out the steps of preparing the cardboard patterns, cutting the leather portions using said patterns and joining the various parts in order to obtain the upper.

[0012] To disadvantage, the considerable amount of time necessary to implement said methods of the known art and the corresponding difficulty in the execution are evident. Furthermore, in the case where the leather portions that will constitute the upper are press-cut by means of a press, to disadvantage it is necessary to be able to use a plurality of dies for each single type of footwear and for each size of each type of footwear.

[0013] Furthermore, another drawback posed by the known art lies in that the step of cutting or press-cutting the portions in leather or another material produces scraps that, to disadvantage, will affect the final cost of the footwear item, both because part of the purchased material is not used and because said scraps must be disposed of.

[0014] The present invention intends to overcome all of the drawbacks mentioned above.

[0015] In particular, it is the object of the invention to provide a footwear item structured in such a way as to make it possible to drastically reduce the steps required for its production.

[0016] It is another object of the invention to provide a footwear item structured in such a way as to allow the reduction, if not the elimination, of the waste material produced during its production steps.

[0017] Consequently, to advantage, in the definition of the final cost of the shoe it is no more necessary to consider the costs due to the production and disposal of scraps, with consequent economic advantages.

[0018] It is a further object of the invention to provide a footwear item structured in such a way as to allow the reduction, if not the elimination, of the production steps that require human labour. Consequently, it is the object of the invention to provide a footwear item structured in such a way that it can be produced in series while at the same time guaranteeing a high degree of uniformity among the items produced in the same production lot.

[0019] It is another, yet not the least object of the invention to provide a footwear item structured in such a way as to allow the external appearance of the same to be modified with a simple procedure and substantially at no cost.

[0020] For example, the document US 1902780 discloses a method for manufacturing a component of a footwear item and the relevant footwear item by means of knitting.

[0021] The objects described above are achieved by providing a footwear item according to the independent claim 1 and by a method according to the independent claim 6.

In particular, the footwear item that is the subject of the invention is characterized in that the upper is obtained from a fabric element made as a single piece through a weaving process. In this fabric element, in particular, it is possible to identify at least three areas that are adjacent to one another and, at least at the level of joining sections between the first area and the second area and between

the second area and the third area, it features a type of stitch pattern according to which the stitches located at the centre are tucked with respect to the lateral stitches. This type of stitch pattern makes it possible to give a three-dimensional shape to the same fabric element, with a parabolic outline according to the direction defined by its longitudinal axis.

In this context, the term "stitch" means any loop pulled through between the weft yarn and the warp yarns in order to join them.

In particular, any row that makes up a woven fabric, called "rank" in technical jargon, is constituted by a single weft yarn that is pulled through the warp yarns more than once, moving from one side of the loom to the other in such a way as to define a plurality of said stitches. In said stitch pattern with tuck stitches, the insertion of the weft yarn is skipped at the level of predefined warp yarns along the same row. In this way, a row in which said stitch pattern with tuck stitches has been created will have a smaller number of stitches than a row in which the weft yarn has been pulled through all of the warp yarns.

[0022] Further characteristics of the footwear item that is the subject of the invention are disclosed in the dependent claims.

[0023] In particular, to advantage, the fact that the fabric element that constitutes the upper of the footwear item of the invention is made with an elastic yarn, as expressed in claim 5, on one side makes it easier for a user to put on said footwear item even in the absence of laces, zip fasteners or Velcro straps, and on the other side to improve the wearability of the shoe itself as the upper can adhere and properly adapt to the size of the person's leg.

[0024] Furthermore, still to advantage, the use of a fabric element improves the breathability of the footwear item.

[0025] Preferably, but not necessarily, said elastic yarn comprises the product known as Elastam in a percentage that ranges between 2% and 10%. It cannot be excluded, however, that Elastam may also be used in different percentages or that different elastic materials may be used instead of Elastam.

[0026] The invention also includes the method for making the footwear item of the invention.

[0027] Said objects, together with the advantages that are described here below, will be highlighted in the description of a preferred embodiment of the invention that is provided by way of non-limiting example with reference to the attached drawings, wherein:

- Figure 1 shows an axonometric view of the footwear item that is the subject of the invention;
- Figure 2 shows an axonometric view of the fabric element belonging to the footwear item of the invention;
- Figure 3 shows a front view of the fabric element belonging to the footwear item of the invention;
- Figure 4 shows a side view of the fabric element belonging to the footwear item of the invention;
- Figure 5 shows the side view of the fabric element represented in Figures 2, 3 and 4, folded on itself at the level of its longitudinal axis X;
- Figures 6 and 7 respectively show a rear axonometric view and a front axonometric view of the upper belonging to the footwear item of the invention;
- Figure 8 shows an exploded axonometric view of the components that make up the footwear item of the invention illustrated in Figure 1.

[0028] The improved footwear item of the invention is represented as a whole in Figure 1, where it is indicated by **1.**

[0029] As shown in Figure 1, said footwear item **1** comprises a sole **2** that allows it to rest on an underlying surface, and an upper **3** defining an inner space suited to accommodate and hold a person's foot. The upper **3** is connected to said sole **2** by means of known techniques and elements, for example by sewing or glueing. As can be observed in Figure 1, according to the preferred embodiment described herein the footwear item **1** is a boot. It cannot be excluded, however, that in different embodiments of the invention said footwear item **1** may be of a different type, for example a sports shoe, a moccasin, etc., which can be obtained by conveniently modifying the dimensions of the elements that make it up.

[0030] According to the invention, in the footwear item **1** the upper **3** comprises and is obtained by means of a fabric element **4** shown in Figures from 2 to 4, created as a single piece through a weaving process and successively folded on itself in such a way as to connect its two longitudinal sides **43** and **44.** In particular, said fabric element **4** defines three areas **51, 52** and **53** that are adjacent to one another along the direction defined by its longitudinal axis **X.** The first area **51** is suited to at least partially enclose the leg of a person, as shown in Figure 1, the second area **52** is suited to enclose the tarsal part of the person's foot and the third area **53** is suited to enclose the metatarsal part of the foot when the same footwear item **1** is worn by said person.

[0031] As shown in Figure 3, the fabric element **4,** at least at the level of joining sections **61** and **62** that are respectively located between the first area **51** and the second area **52** and between the second area **52** and the third area **53,** features a stitch pattern according to which, for each row of said sections **61** and **62,** the stitches **7** located at the centre are tucked with respect to the lateral stitches **8,** in such a way as to give said fabric element **4** a three-dimensional shape with parabolic outline according to the direction defined by its longitudinal axis **X.** Said parabolic outline can be clearly observed in Figure 4.

[0032] Thus, to advantage, the fabric element **4** obtained in this way develops according to an outline that substantially reproduces that of the tarsal area of the foot of the person who will wear the footwear item **1** of the invention, with no need to carry out further processing

steps to form the upper, differently from that which is envisaged by the methods for making footwear items of the known art.

[0033] In embodiments of the footwear item **1** of the invention that represent an alternative to the preferred embodiment described herein, further one or more sections may be provided, interposed between said two joining sections **61** and **62** and featuring said stitch pattern with central tuck stitches **7.** Advantageously, the higher the number of sections featuring said stitch pattern, the more rounded the substantially parabolic outline of the fabric element **4.**

[0034] The number of central stitches **7** that are tucked with respect to the lateral stitches **8,** for each one of said joining sections **61** and **62,** increases progressively according to an advance direction indicated by the arrow **V** in Figures from 2 to 4, as defined by the same longitudinal axis **X.** In other words, for example, in said type of stitch pattern only the central stitch **71** passing through the longitudinal axis **X** may initially be tucked, and successively also the stitches adjacent to said central stitch **71** after a given number of rows, and then other stitches adjacent to the previous tuck stitches, and so on until the number of tuck stitches substantially corresponds to the number of stitches that can be made in one row. Said sections **61** and **62** featuring said stitch pattern will develop following diverging directions, as shown in Figures 2 and 3. After the sections **61** and **62** featuring said tuck stitch pattern, the fabric element **4** respectively includes said second and third area **52** and **53,** in which all of the stitches of each row are carried out correctly.

Advantageously, therefore, the alternance between said three areas **51, 52** and **53** and said joining sections **61** and **62** makes it possible to obtain said parabolic outline of the fabric element **4,** as shown in Figure 4.

[0035] As shown in Figure 3, according to the preferred embodiment of the invention described herein, in the footwear item 1 of the invention the fabric element **4** has a symmetrical outline with respect to its longitudinal axis **X**.

[0036] In this way, to advantage, as will be explained in greater detail below during the description of the method for making the footwear item **1** of the invention, there will be a perfect superimposition of the two symmetrical halves **41** and **42** of the fabric element **4** and of the corresponding longitudinal sides **43** and **44.** It cannot be excluded, however, that in different embodiments of the invention said fabric element **4** may have an asymmetrical profile.

[0037] With regard, in particular, to the perimeter profile of said fabric element **4,** according to the preferred embodiment represented in Figure 3, it features a first progressive casting off **10** of the stitches at the level of both of the longitudinal sides **43** and **44,** according to said advance direction indicated by the arrow **V.** Said casting off **10** makes it possible to adapt the inner space that will be defined by the upper **3** to the progressive decrease in the diameter of the leg of the person who will wear the footwear item **1.**

[0038] Following said casting off **10** of the stitches, the perimeter profile of the same fabric element **4** includes a progressive increase **11** of the stitches at the level of said longitudinal sides **43** and **44,** in such a way as to define the area corresponding to the heel of the person. Finally, always following said advance direction **V,** the fabric element **4** comprises a second progressive casting off **12** of the stitches at the level of both of the longitudinal sides **43** and **44,** so as to define the profile assumed by the metatarsal area of the foot of said person when the footwear item **1** is worn.

[0039] It cannot be excluded, however, that in different embodiments of the invention that are neither described nor illustrated herein the perimeter profile of the fabric element **4** may have an outline that is different from that described for the preferred embodiment, provided that it makes it possible to define an upper **3** that respects the shape of the leg and foot of the person who will wear the footwear item **1.**

[0040] According to the preferred embodiment of the invention, the fabric element **4** is at least partially obtained from yarns of the elastic type.

[0041] Advantageously, as previously mentioned, the use of said elastic yarns makes it possible to conveniently deform the upper **3** in such a way that the inner space defined by it can be increased, therefore making it easier for a person to put on the footwear item **1** of the invention. Furthermore, said elasticity of the upper **3** allows it to assume the shape of the person's leg and to properly adhere to the latter once the footwear item **1** has been completely put on. Finally, according to the preferred embodiment of the invention, the footwear item **1** comprises, arranged inside said space defined by the upper **3,** rigid or semi-rigid elements **9** configured so as to at least partially maintain the shape of the footwear item **1,** at least at the level of its tip and heel. In particular, said rigid or semi-rigid elements **9** can be made of leather, a stiffened fabric or a plastic material.

[0042] It cannot be excluded, however, that in different alternative embodiments of the invention the footwear item **1** may not be provided with said rigid or semi-rigid elements **9.**

[0043] As previously mentioned, the invention includes also the method for making said footwear item **1** of the invention.

[0044] In particular, according to said method, the first production step is the step of making the fabric element **4** as a single piece through a weaving process.

[0045] It is important to underline that the study of the shape that said fabric element **4** will assume is previously carried out virtually by means of special computer programs. Said computer programs, furthermore, are capable of translating the data of the defined shape into "machine stitches" and transferring them to the loom, which will provide for actually producing said fabric element **4.** Advantageously, said first step of studying the shape makes it possible to skip said steps of making the patterns and cutting the portions made of leather or other materials

envisaged by the methods of the known art, as previously described.

[0046] Furthermore, the availability of the virtual model of the footwear item **1** of the invention makes it possible to modify the aesthetic appearance of the same, that is, to change the texture of its outer surface, with a simple procedure and substantially at no cost, differently from that which happens when the footwear production methods of the known art are used.

[0047] To go back to the weaving process, it preferably but not necessarily includes, as previously mentioned, the use of a loom of the industrial type, capable of making said fabric element **4** with the characteristics described below. This weaving process, in fact, includes the production of the fabric element **4** comprising at least three areas **51, 52** and **53** adjacent to one another along the direction defined by its longitudinal axis **X.** In particular, as already described above, the first area **51** is suited to at least partially enclose the leg of a person, the second area **52** is suited to enclose the tarsal part of the foot of said person, while the third area **53** is suited to enclose the metatarsal part of said foot when the footwear item **1** of the invention is worn by the same person.

[0048] Furthermore, according to the method of the invention said fabric element **4** is made in such a way that, at least at the level of joining sections **61** and **62** interposed between said three areas **51, 52** and **53,** it features a stitch pattern according to which the central stitches **7** are tucked with respect to the lateral stitches **8.** This type of stitch pattern, as already explained, makes it possible to give the fabric element **4** a three-dimensional shape with parabolic outline according to the direction defined by the same longitudinal axis **X,** as shown in Figure 4.

[0049] In the preferred embodiment of the invention, according to said method the fabric element **4** is produced with a perimeter profile that is symmetrical with respect to the longitudinal axis **X,** as shown always in Figure 3 and as described above.

[0050] According to the method of the invention, the fabric element **4** is successively folded on itself along said longitudinal axis **X,** as shown in Figure 5. It can be observed, in particular, that the symmetrical shape of the fabric element **4** allows a perfect superimposition of the two symmetrical halves **41** and **42** and of the corresponding longitudinal sides **43** and **44.**

[0051] According to the method of the invention, once said folding step has been completed, said two longitudinal sides **43** and **44** are at least partially joined to each other in such a way as to define the upper **3** of the footwear item **1** of the invention, as shown in Figures 6 and 7.

[0052] According to the preferred embodiment of the invention described herein, said joining step includes the sewing of the two longitudinal sides **43** and **44** to each other.

[0053] It cannot be excluded, however, that in different embodiments of the invention said joining step may be carried out by glueing said two longitudinal sides **43** and **44** onto each other.

[0054] According to the method of the invention, at this point rigid or semi-rigid elements **9** are preferably but not necessarily inserted in the upper **3,** at least at the height of the tip and the heel, said rigid or semi-rigid elements being configured to maintain the shape of the footwear item **1** of the invention in said two areas.

[0055] It cannot be excluded, however, that in alternative embodiments of the method of the invention said step of inserting the rigid or semi-rigid elements **9** may be absent.

[0056] Finally, as shown in Figure 8, the method of the invention includes a further step of at least partially connecting the lower edge **31** of the upper **3** with the perimeter area **21** of the sole **2,** in such a way as to complete the production of the footwear item **1** of the invention shown in Figure 1.

[0057] According to the above, therefore, the footwear item of the invention and the method of the invention for making the same achieve all of the set objects.

[0058] In particular, the invention achieves the object to provide a footwear item structured in such a way as to make it possible to drastically reduce the steps that are necessary for its production.

[0059] Another object achieved by the invention is the object to provide a footwear item structured in such a way as to make it possible to reduce, if not to eliminate, the waste material generated during its production steps. Consequently, to advantage, for the definition of the final cost of the footwear item it is no more necessary to take in consideration the costs deriving from the generation and the disposal of scraps, with consequent economic advantages.

[0060] A further object achieved by the invention is the object to provide a footwear item structured in such a way as to make it possible to reduce, if not to eliminate, those production steps that require human labour.

[0061] Consequently, the invention achieves the object to provide a footwear item structured in such a way that it can be produced in series while at the same time guaranteeing a high degree of uniformity among the items produced in the same production lot.

[0062] Finally, the invention also achieves the object to provide a footwear item structured in such a way as to make it possible to modify its aesthetic appearance with a simple procedure and at no cost.

Claims

1. Footwear item (1) of the type comprising:

- a sole (2) allowing said footwear item (1) to rest on an underlying surface;
- an upper (3) that defines an inner space suited to accommodate and hold the foot of a person, said upper (3) being connected to said sole (2);

wherein said upper (3) comprises a fabric element

(4) obtained as a single piece through a weaving process and successively folded on itself along the direction defined by its longitudinal axis (X), said fabric element (4) defining at least three areas (51, 52, 53) adjacent to one another along said longitudinal axis (X) and in which all of the stitches of each row are carried out correctly, the first area (51) being suited to at least partially envelop the leg of a person, the second area (52) being suited to envelop the tarsal portion of the foot of said person and the third area (53) being suited to envelop the metatarsal portion of said foot when said footwear item (1) is worn by said person, wherein said fabric element (4) features, at least at the level of joining sections (61, 62) between said first area (51) and said second area (52) and between said second area (52) and said third area (53), a type of stitch pattern according to which the stitches located at the centre (7) are tucked with respect to the lateral stitches (8) in such a way as to give said fabric element (4) a three-dimensional shape with substantially parabolic outline according to the direction defined by said longitudinal axis (X), wherein the number of central stitches (7) that are tucked with respect to the lateral stitches (8) for each one of said sections (61, 62) increases progressively according to an advance direction (V) as defined by said longitudinal axis (X), said footwear item furthermore comprising, inside said space defined by said upper (3), rigid or semi-rigid elements (9) configured so as to maintain the shape of said footwear item (1) at least at the level of the tip and the heel.

2. Footwear item (1) according to claim 1, **characterized in that** said fabric element (4) comprises one or more further sections featuring said stitch pattern with tuck stitches, said sections being obtained so that they are interposed between said two joining sections (61, 62).

3. Footwear item (1) according to any of the preceding claims, **characterized in that** said fabric element (4) is symmetrical with respect to said longitudinal axis (X).

4. Footwear item (1) according to any of the preceding claims, **characterized in that** said fabric element (4), before being folded on itself, features, according to an advance direction (V) as defined by said longitudinal axis (X):

- a first stitch pattern with progressive casting off (10) of the stitches at the level of both the longitudinal sides (43, 44) so as to adapt said inner space to the decrease in the diameter of a person's leg;
- a stitch pattern with progressive increase (11) of the stitches at the level of said longitudinal sides (43, 44) in such a way as to define the area corresponding to the heel of said person;
- a second stitch pattern with progressive casting off (12) of the stitches at the level of said longitudinal sides (43, 44) in such a way as to define the profile of the metatarsal area of the foot of said person.

5. Footwear item (1) according to any of the preceding claims, **characterized in that** said fabric element (4) comprises yarns of the elastic type.

6. Method for making a footwear item (1), said method including the following operations:

- making, by means of a weaving process, a fabric element (4) in a single piece, said fabric element (4) defining at least three areas (51, 52, 53) adjacent to one another along the direction defined by its longitudinal axis (X) and in which all of the stitches of each row are carried out correctly, the first area (51) being suited to at least partially envelop the leg of a person, the second area (52) being suited to envelop the tarsal portion of the foot of said person and the third area (53) being suited to envelop the metatarsal portion of said foot when said footwear item (1) is worn by said person, said fabric element (4) featuring, at least at the level of joining sections (61, 62) between said first area (51) and said second area (52) and between said second area (52) and said third area (53), a type of stitch pattern according to which the stitches located at the centre (7) are tucked with respect to the lateral stitches (8) in such a way as to give said fabric element (4) a three-dimensional shape with substantially parabolic outline according to the direction defined by said longitudinal axis (X), wherein the number of central stitches (7) that are tucked with respect to the lateral stitches (8) for each one of said sections (61, 62) increases progressively according to an advance direction (V) as defined by said longitudinal axis (X);
- folding said fabric element (4) on itself along said longitudinal axis (X);
- at least partially joining to each other the two longitudinal sides (43, 44) of said fabric element (4), in such a way as to define the upper (3) of said footwear item (1);
- inserting in the space defined by said upper (3) rigid or semi-rigid elements (9) configured so as to maintain the shape of said footwear item (1) at least at the level of the tip and the heel;
- at least partially connecting the lower edge (31) of said upper (3) with the perimeter area (21) of a sole (2).

7. Method according to claim 6, **characterized in that**

said fabric element (4) is formed in a symmetrical manner with respect to said longitudinal axis (X).

8. Method according to claim 7, **characterized in that** during the making of said fabric element (4) the following steps are carried out according to an advance direction (V) as defined by said longitudinal axis (X):

- a first stitch pattern with progressive casting off (10) of the stitches at the level of both the longitudinal sides (43, 44) in such a way as to adapt said inner space to the decrease in the diameter of a person's leg;
- a stitch pattern with progressive increase (11) of the stitches at the level of said longitudinal sides (43, 44) in such a way as to define the area corresponding to the heel of said person;
- a second stitch pattern with progressive casting off (12) of the stitches at the level of said longitudinal sides (43, 44) in such a way as to define the profile of the metatarsal area of the foot of said person.

9. Method according to any of the claims from 6 to 8, **characterized in that** in said joining operation said two longitudinal sides (43, 44) are sewn together.

Patentansprüche

1. Fußbekleidungsartikel (1) der Art, umfassend:

- eine Sohle (2), die ermöglicht, dass der Fußbekleidungsartikel (1) auf einer darunterliegenden Oberfläche aufliegt;
- einen Oberteil (3), der einen Innenraum definiert, der geeignet ist, um den Fuß einer Person zu aufzunehmen und ihn zu enthalten, wobei der Oberteil (3) mit der Sohle (2) verbunden ist;

wobei der Oberteil (3) ein Stoffelement (4) umfasst, das durch einen Webprozess als ein einziges Stück erhalten und anschließend entlang der durch seine Längsachse (X) definierte Richtung in sich selbst gefaltet wird, wobei das Stoffelement (4) zumindest drei Bereiche (51, 52, 53) definiert, die entlang der Längsachse (X) zueinander benachbart sind, und in denen alle Stiche jeder Reihe ordnungsgemäß ausgeführt sind, wobei der erste Bereich (51) dafür geeignet ist, das Bein einer Person zumindest teilweise zu umhüllen, der zweite Bereich (52) geeignet ist, den Fußwurzelbereich des Fußes der Person zu umhüllen und der dritte Bereich (53) geeignet ist, den Mittelfußbereich des Fußes zu umhüllen, wenn der Fußbekleidungsartikel (1) von der Person getragen wird, wobei das Stoffelement (4) zumindest auf der Höhe der Verbindungsabschnitte (61, 62) zwischen dem ersten Bereich (51) und dem zweiten Bereich (52) und zwischen dem zweiten Bereich (52) und dem dritten Bereich (53) eine Art Stichmuster aufweist, gemäß dem die Stiche, die sich in der Mitte (7) befinden, in Bezug auf die seitlichen Stiche (8) so zusammengezogen sind, um dem Stoffelement (4) eine dreidimensionale Form mit im Wesentlichen parabolförmigem Umriss gemäß der Richtung, die durch die Längsachse (X) definiert ist, zu verleihen, wobei die Anzahl der Stiche, die sich in der Mitte (7) befinden, die in Bezug auf die seitlichen Stiche (8) für jeden der Abschnitte (61, 62) eingezogen sind, gemäß einer Fortschrittrichtung (V), wie durch die Längsachse (X) definiert, progressiv zunimmt, wobei der Fußbekleidungsartikel ferner im Inneren des Raums, der durch den Oberteil (3) definiert ist, starre oder halbstarre Elemente (9) umfasst, die konfiguriert sind, um die Form des Fußbekleidungsartikels (1) zumindest auf der Höhe der Spitze und der Ferse aufrechtzuerhalten.

2. Fußbekleidungsartikel (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Stoffelement (4) einen oder mehrere Abschnitte umfasst, die das Stichmuster mit Zugstichen aufweisen, wobei die Abschnitte so erhalten werden, dass sie zwischen den beiden Verbindungsabschnitten (61, 62) zwischengelagert sind.

3. Fußbekleidungsartikel (1) nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Stoffelement (4) in Bezug auf die Längsachse (X) symmetrisch ist.

4. Fußbekleidungsartikel (1) nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Stoffelement (4) gemäß einer Fortschrittsrichtung (V), wie durch die Längsachse (X) definiert, Folgendes aufweist, bevor es in sich selbst gefaltet ist:

- ein erstes Stichmuster mit fortschreitendem Abnahme (10) der Stiche auf der Höhe beider Längsseiten (43, 44), um den Innenraum auszulegen, sich mit dem Durchmesser eines Beins einer Person zu verjüngen;
- ein Stichmuster mit fortschreitender Zunahme (11) der Stiche auf der Höhe der Längsseiten (43, 44), um dadurch den Bereich zu definieren, der der Ferse der Person entspricht;
- ein zweites Stichmuster mit fortschreitendem Abnahme (12) der Stiche auf der Höhe der Längsseiten (43, 44), um das Profil des Mittelfußbereiches des Fußes der Person zu definieren.

5. Fußbekleidungsartikel (1) nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Stoffelement (4) Garne vom elastischen

Typ umfasst.

6. Verfahren zur Herstellung eines Fußbekleidungsartikels (1), wobei das Verfahren die folgenden Schritte umfasst:

- Herstellen eines Stoffelements (4) mittels eines Webprozesses als ein einziges Stück, wobei das Stoffelement (4) zumindest drei Bereiche (51, 52, 53) definiert, die entlang der Richtung, die durch seine Längsachse (X) definiert ist, zueinander benachbart sind, und in denen alle Stiche jeder Reihe ordnungsgemäß ausgeführt sind, wobei der erste Bereich (51) dafür geeignet ist, das Bein einer Person zumindest teilweise zu umhüllen, der zweite Bereich (52) geeignet ist, den Fußwurzelbereich des Fußes der Person zu umhüllen und der dritte Bereich (53) geeignet ist, den Mittelfußbereich des Fußes zu umhüllen, wenn der Fußbekleidungsartikel (1) von der Person getragen wird, wobei das Stoffelement (4) zumindest auf der Höhe der Verbindungsabschnitte (61, 62) zwischen dem ersten Bereich (51) und dem zweiten Bereich (52) und zwischen dem zweiten Bereich (52) und dem dritten Bereich (53) eine Art Stichmuster aufweist, gemäß dem die Stiche, die sich in der Mitte (7) befinden, in Bezug auf die seitlichen Stiche (8) so zusammengezogen sind, um dem Stoffelement (4) eine dreidimensionale Form mit im Wesentlichen parabolförmigem Umriss gemäß der Richtung, die durch die Längsachse (X) definiert ist, zu verleihen, wobei die Anzahl der Stiche, die sich in der Mitte (7) befinden, die in Bezug auf die seitlichen Stiche (8) für jeden der Abschnitte (61, 62) eingezogen sind, gemäß einer Fortschrittrichtung (V), wie durch die Längsachse (X) definiert, progressiv zunimmt;
- Falten des Stoffelements (4) entlang der Längsachse (X) in sich selbst;
- zumindest teilweise Verbinden der zwei Längsseiten (43, 44) des Stoffelements (4) so miteinander, um den Oberteil (3) des Fußbekleidungsartikels (1) zu definieren;
- Einführen von starren oder halbstarren Elementen (9) in den durch den Oberteil (3) definierten Raum, die konfiguriert sind, um die Form des Fußbekleidungsartikels (1) zumindest auf der Höhe der Spitze und der Ferse aufrechtzuerhalten;
- zumindest teilweise Verbinden der unteren Kante (31) des Oberteils (3) mit dem Umfangsbereich (21) einer Sohle (2).

7. Verfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** das Stoffelement (4) in Bezug auf die Längsachse (X) auf symmetrische Art geformt ist.

8. Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** die folgenden Schritte während der Herstellung des Stoffelements (4) gemäß einer Fortschrittsrichtung (V), wie durch die Längsachse (X) definiert, ausgeführt werden:

- ein erstes Stichmuster mit fortschreitendem Abnahme (10) der Stiche auf der Höhe beider Längsseiten (43, 44), um den Innenraum auszulegen, sich mit dem Durchmesser eines Beins einer Person zu verjüngen;
- ein Stichmuster mit fortschreitender Zunahme (11) der Stiche auf der Höhe der Längsseiten (43, 44), um dadurch den Bereich zu definieren, der der Ferse der Person entspricht;
- ein zweites Stichmuster mit fortschreitendem Abnahme (12) der Stiche auf der Höhe der Längsseiten (43, 44), um das Profil des Mittelfußbereiches des Fußes der Person zu definieren.

9. Verfahren nach einem der Ansprüche 6 bis 8, **dadurch gekennzeichnet, dass** die beiden Längsseiten (43, 44) in dem Verbindungsschritt zusammengenäht werden.

Revendications

1. Chaussure (1) du type qui comprend:

- une semelle (2) permettant à ladite chaussure (1) de reposer sur une surface sous-jacente;
- une empeigne (3) qui définit un espace intérieur adapté pour accueillir et tenir le pied d'une personne, ladite empeigne (3) étant reliée à ladite semelle (2);

dans laquelle ladite empeigne (3) comprend un élément en tissu (4) obtenu en une seule pièce suivant un processus de tissage et plié successivement sur lui-même dans la direction définie par son axe longitudinal (X), ledit élément en tissu (4) définissant au moins trois zones (51, 52, 53) adjacentes les unes aux autres le long dudit axe longitudinal (X) et dans lesquelles tous les points de couture de chaque rangée sont correctement réalisés, la première zone (51) étant adaptée pour envelopper au moins partiellement la jambe d'une personne, la seconde zone (52) étant adaptée pour envelopper la partie du tarse du pied de ladite personne et la troisième zone (53) étant adaptée pour envelopper la partie du métatarse dudit pied lorsque ladite chaussure (1) est portée par ladite personne, dans laquelle ledit élément en tissu (4) présente, au moins au niveau des sections de jonction (61, 62) entre ladite première zone (51) et ladite seconde zone (52), et entre ladite seconde zone (52) et ladite troisième zone (53), un type de

motif de couture selon lequel les points de couture situés au centre (7) sont repliés par rapport aux points de couture latéraux (8) de sorte à conférer audit élément en tissu (4) une forme tridimensionnelle à contour sensiblement parabolique selon la direction définie par ledit axe longitudinal (X), dans laquelle le nombre de points de couture centraux (7) repliés par rapport aux points de couture latéraux (8) pour chacune desdites sections (61, 62) augmente progressivement selon une direction d'avance (V) définie par ledit axe longitudinal (X), ladite chaussure comprenant en outre, à l'intérieur dudit espace défini par ladite empeigne (3), des éléments rigides ou semi-rigides (9) configurés de manière à maintenir la forme de ladite chaussure (1) au moins au niveau de la pointe et du talon.

2. Chaussure (1) selon la revendication 1, **caractérisée en ce que** ledit élément en tissu (4) comprend une ou plusieurs autres sections présentant ledit motif de couture avec des mailles chargées, lesdites sections étant obtenues de sorte qu'elles soient interposées entre lesdites deux sections de jonction (61, 62).

3. Chaussure (1) selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit élément en tissu (4) est symétrique par rapport audit axe longitudinal (X).

4. Chaussure (1) selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit élément en tissu (4), avant d'être plié sur lui-même, présente, selon une direction d'avance (V) définie par ledit axe longitudinal (X):

- un premier motif de couture avec diminution progressive (10) des points de couture au niveau des deux côtés longitudinaux (43, 44) afin d'adapter ledit espace intérieur à la diminution du diamètre de la jambe d'une personne;
- un motif de couture avec augmentation progressive (11) des points de couture au niveau desdits côtés longitudinaux (43, 44) de sorte à définir la zone correspondant au talon de ladite personne;
- un second motif de couture avec diminution progressive (12) des points de couture au niveau desdits côtés longitudinaux (43, 44) de sorte à définir le profil de la zone du métatarse du pied de ladite personne.

5. Chaussure (1) selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit élément en tissu (4) comprend des fils du type élastique.

6. Procédé de fabrication d'une chaussure (1), ledit procédé comprenant les opérations suivantes:

- fabriquer, au moyen d'un processus de tissage, un élément en tissu (4) en une seule pièce, ledit élément en tissu (4) définissant au moins trois zones (51, 52, 53) adjacentes les unes aux autres dans la direction définie par son axe longitudinal (X) et dans lequel tous les points de couture de chaque rangée sont correctement réalisés, la première zone (51) étant adaptée pour envelopper au moins partiellement la jambe d'une personne, la seconde zone (52) étant adaptée pour envelopper la partie du tarse du pied de ladite personne et la troisième zone (53) étant adaptée pour envelopper la partie du métatarse dudit pied lorsque ladite chaussure (1) est portée par ladite personne, ledit élément en tissu (4) présentant, au moins au niveau des sections de jonction (61, 62) entre ladite première zone (51) et ladite seconde zone (52) et entre ladite seconde zone (52) et ladite troisième zone (53), un type de motif de couture selon lequel les points de couture situés au centre (7) sont repliés par rapport aux points de couture latéraux (8) de sorte à donner audit élément en tissu (4) une forme tridimensionnelle à contour sensiblement parabolique selon la direction définie par ledit axe longitudinal (X), dans lequel le nombre de points de couture centraux (7) repliés par rapport aux points de couture latéraux (8) pour chacune desdites sections (61, 62) augmente progressivement selon une direction d'avance (V) définie par ledit axe longitudinal (X);
- plier ledit élément en tissu (4) sur lui-même le long dudit axe longitudinal (X);
- relier au moins partiellement l'un à l'autre, les deux côtés longitudinaux (43, 44) dudit élément en tissu (4), de sorte à définir l'empeigne (3) de ladite chaussure (1);
- insérer dans l'espace défini par ladite empeigne (3) des éléments rigides ou semi-rigides (9) configurés pour maintenir la forme de ladite chaussure (1) au moins au niveau de la pointe et du talon;
- relier au moins partiellement le bord inférieur (31) de ladite empeigne (3) à la zone périphérique (21) d'une semelle (2).

7. Procédé selon la revendication 6, **caractérisé en ce que** ledit élément en tissu (4) est formé de manière symétrique par rapport audit axe longitudinal (X).

8. Procédé selon la revendication 7, **caractérisé en ce que** lors de la fabrication dudit élément en tissu (4), les étapes suivantes sont réalisées selon une direction d'avance (V) définie par ledit axe longitudinal (X):

- un premier motif de couture avec diminution progressive (10) des points de couture au niveau des tous les deux côtés longitudinaux (43, 44) de sorte à adapter ledit espace intérieur à la diminution du diamètre de la jambe d'une personne;
- un motif de couture avec augmentation progressive (11) des points de couture au niveau desdits côtés longitudinaux (43, 44) de sorte à définir la zone correspondant au talon de ladite personne;
- un second motif de couture avec diminution progressive (12) des points de couture au niveau desdits côtés longitudinaux (43, 44) de sorte à définir le profil de la zone du métatarse du pied de ladite personne.

9. Procédé selon l'une quelconque des revendications 6 à 8, **caractérisé en ce que** lors de ladite opération de jonction, lesdits deux côtés longitudinaux (43, 44) sont cousus l'un à l'autre.

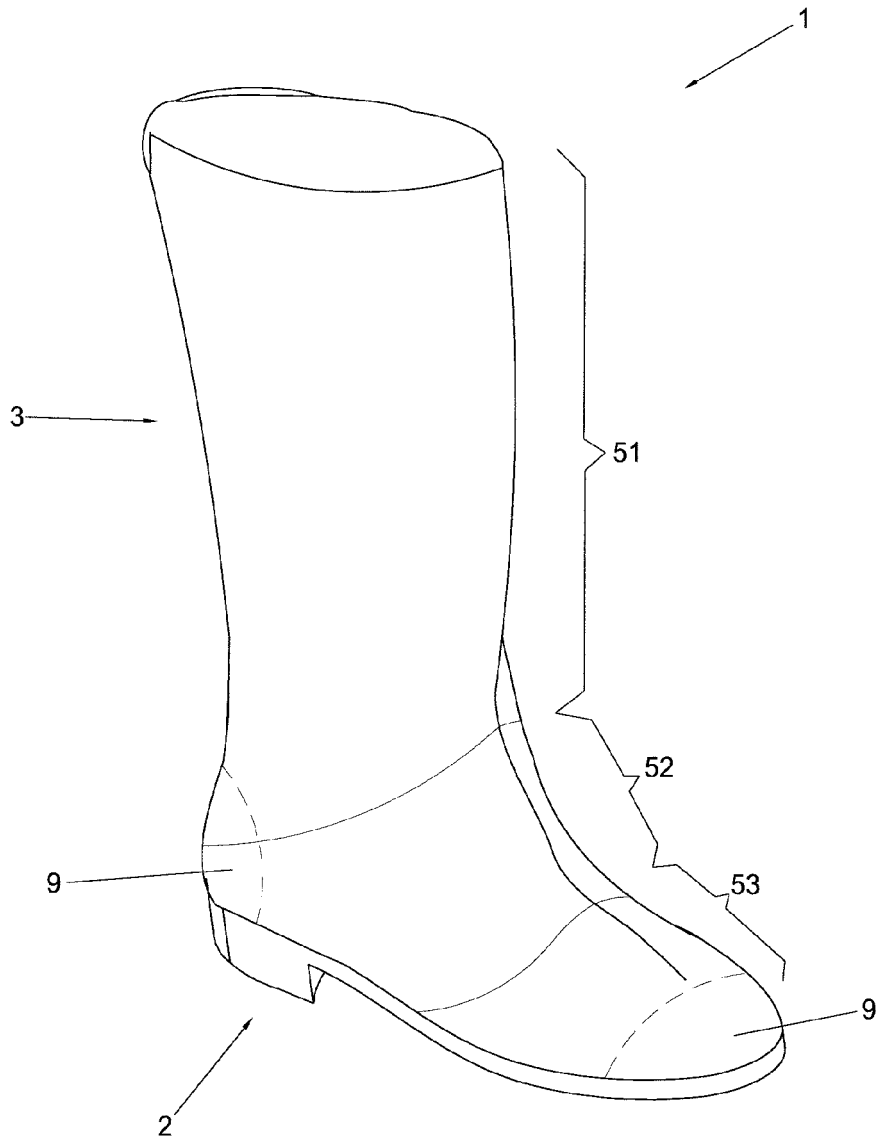

Fig.1

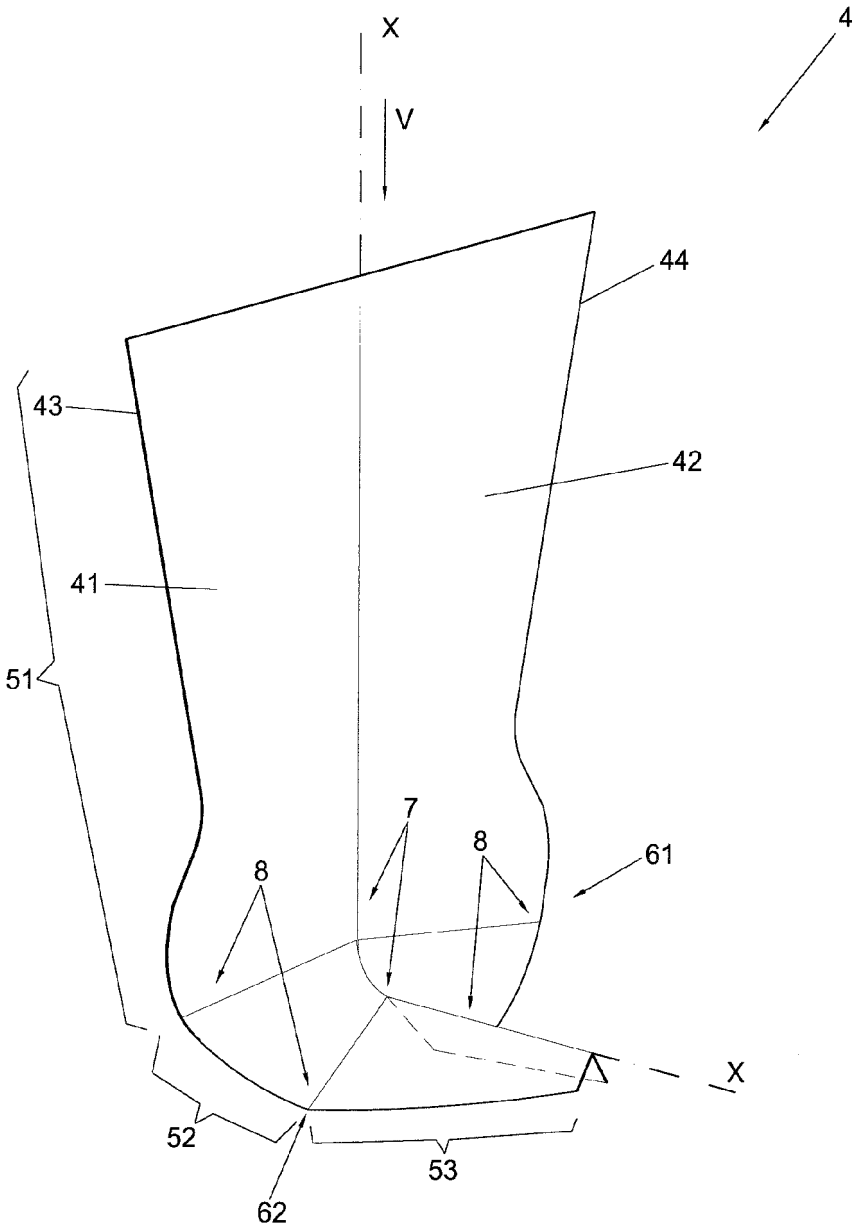

Fig.2

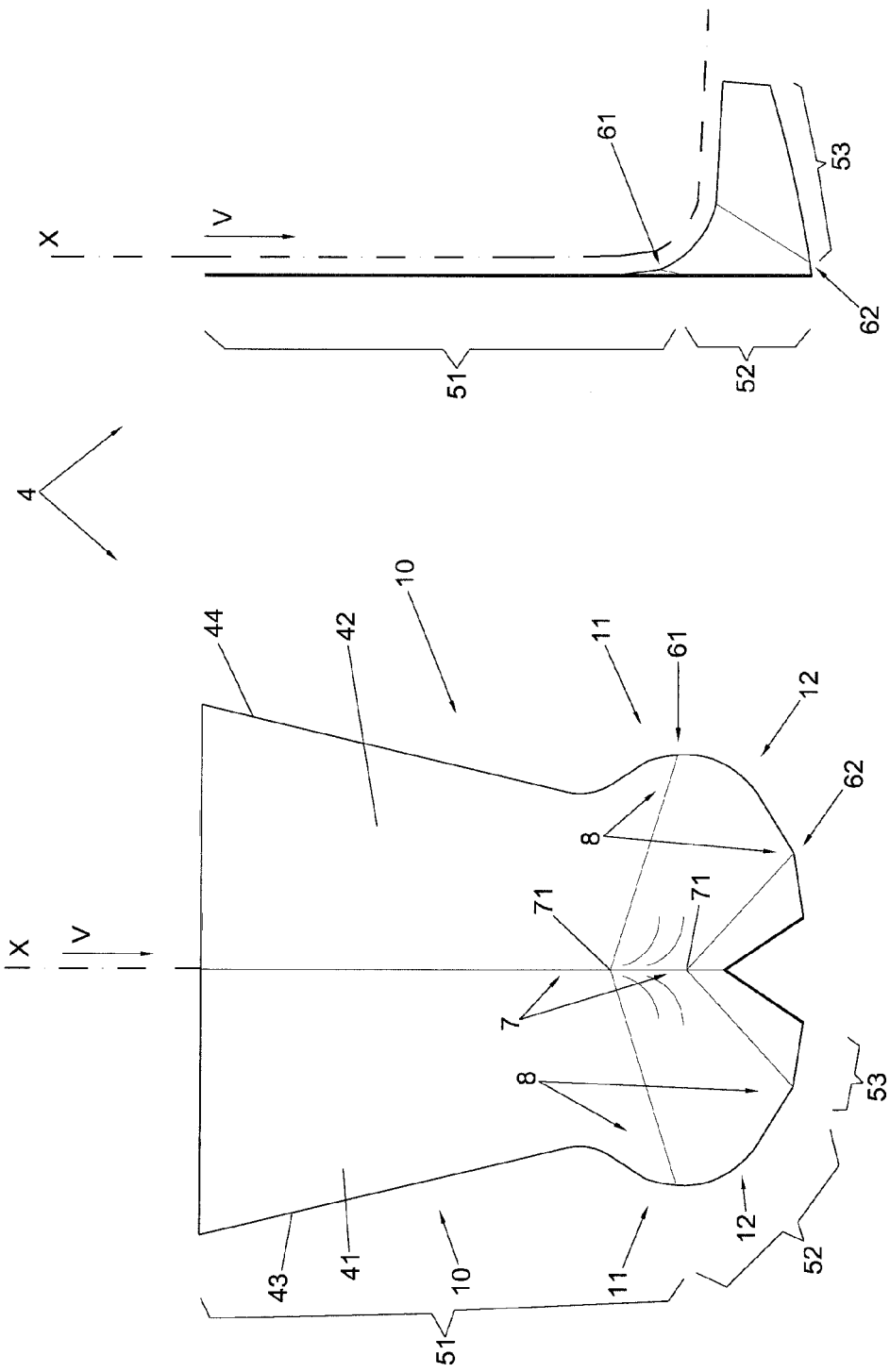
X
V
4
44
42
10
11
61
12
62
8
71
71
7
8
53
43
41
10
11
12
52
51

Fig.3

X
V
61
53
62
51
52

Fig.4

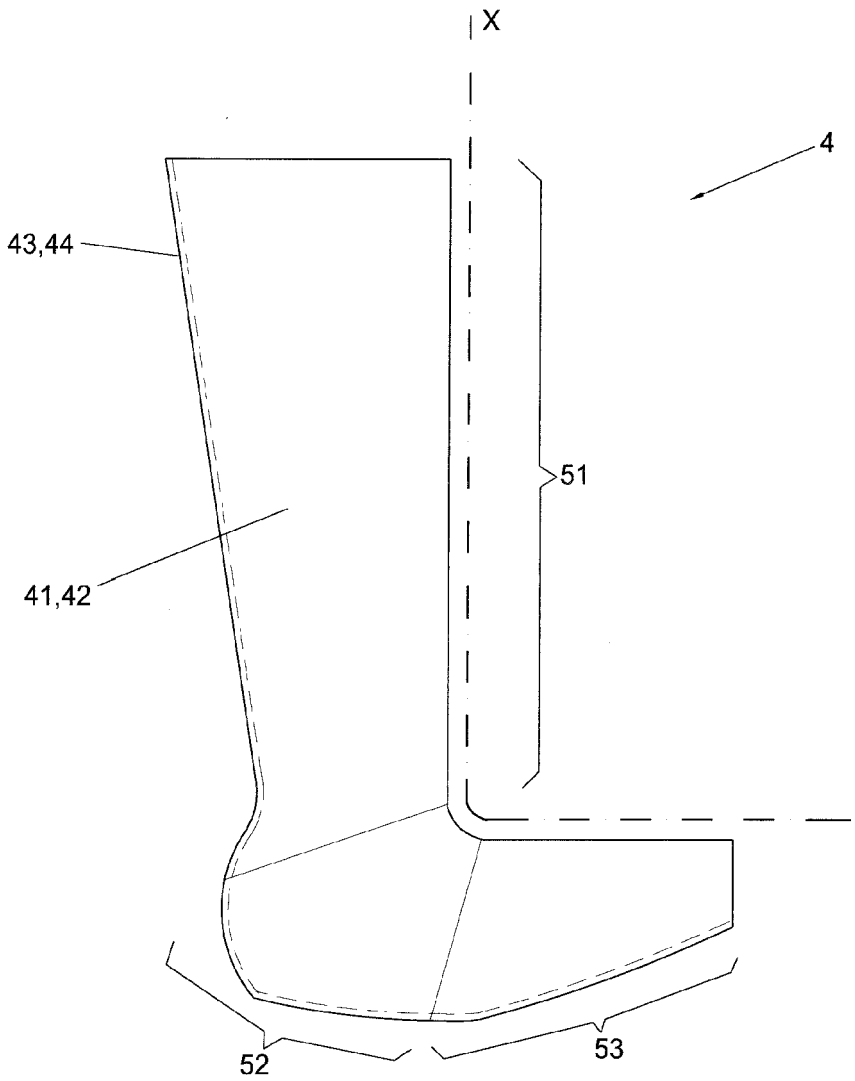

Fig.5

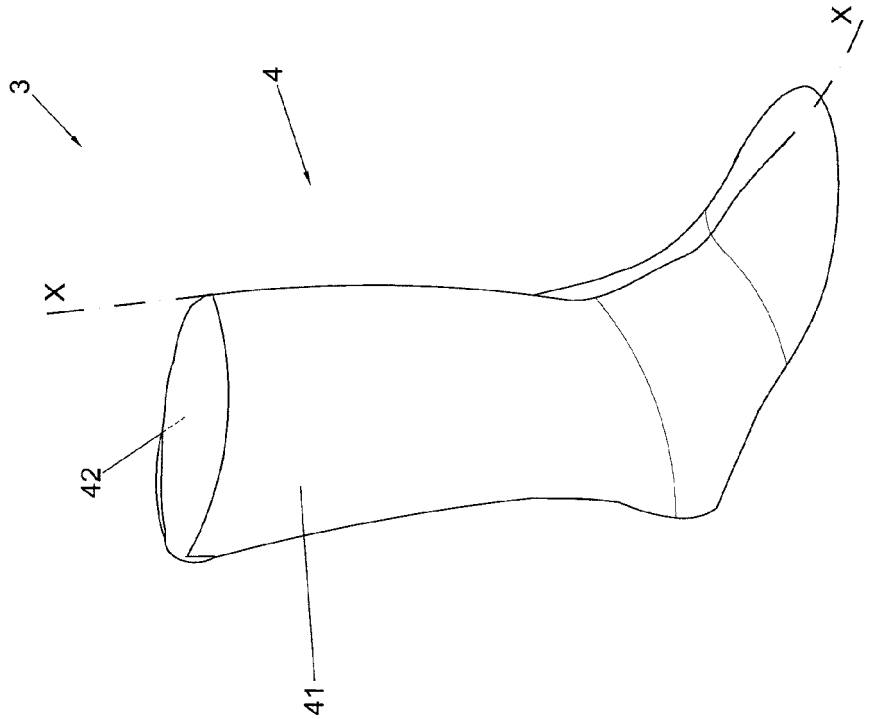

Fig.7

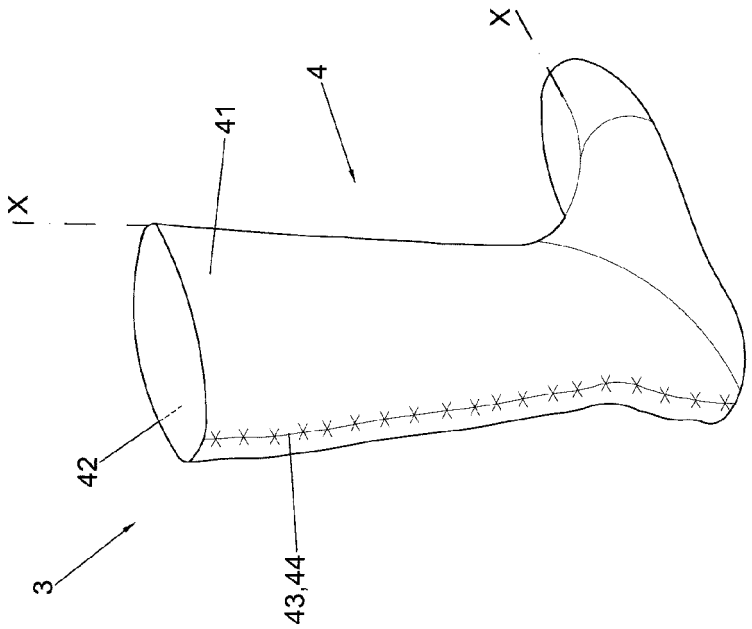

Fig.6

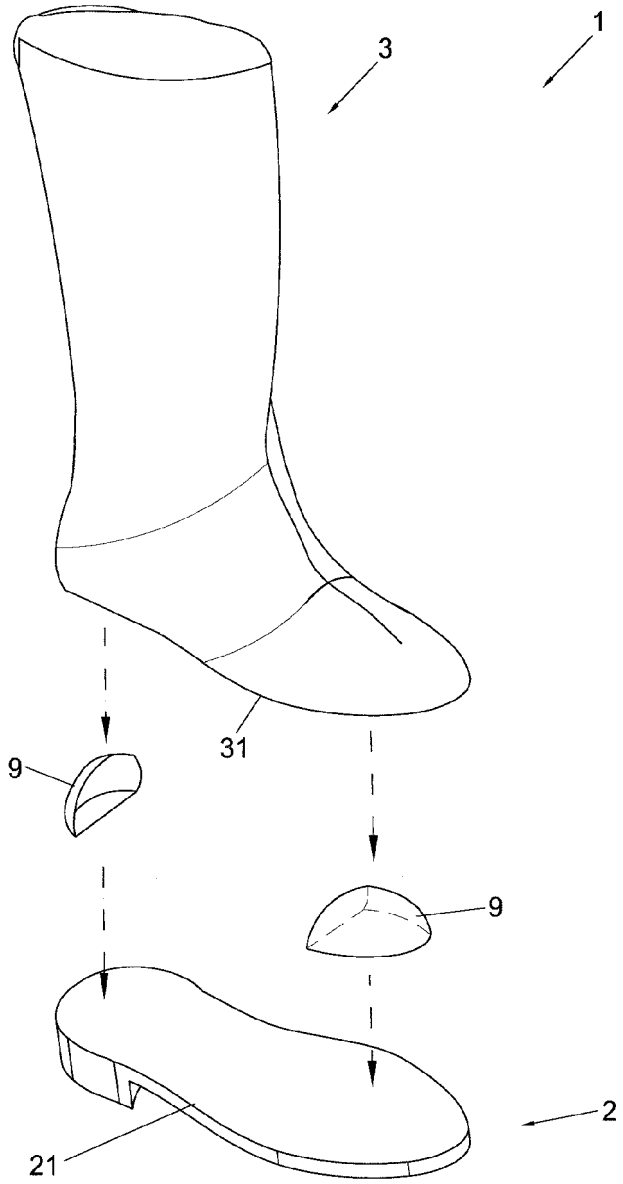

Fig.8

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 1902780 A **[0020]**