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(54) **CUSTOM SHOE AND METHOD**

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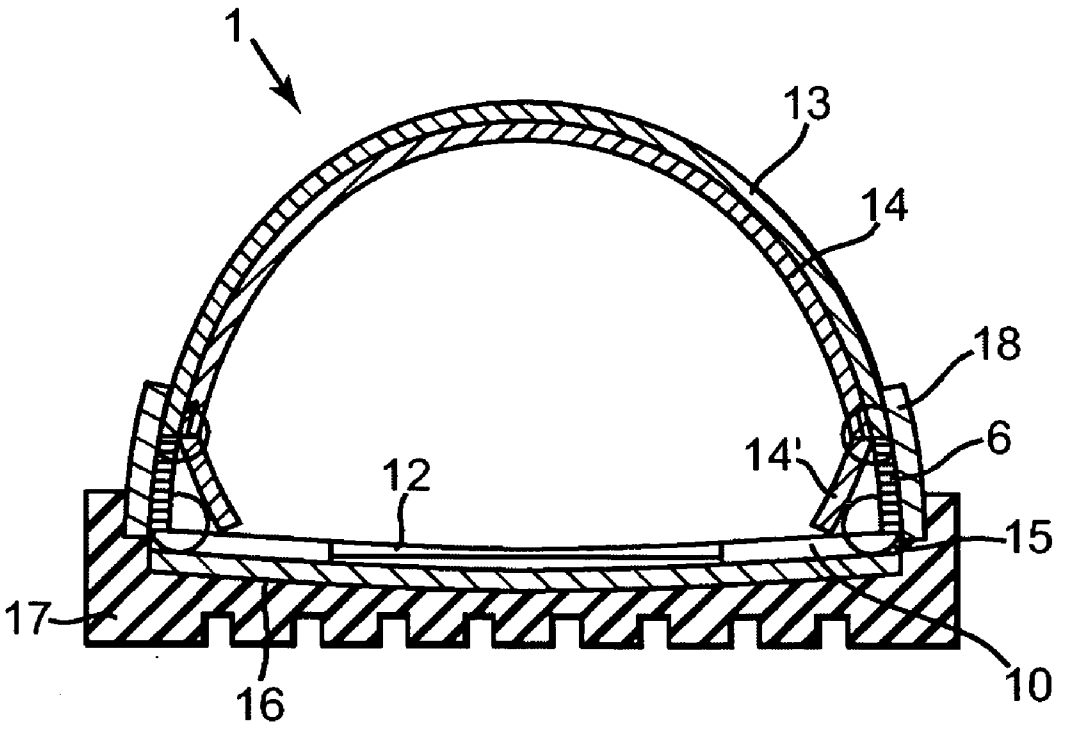
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(57) **ABSTRACT**

A custom shoe, in particular an orthopedic shoe, and a method of producing the same, in which a shoe upper (**1**) with an opening (**11**) for an insole is produced, is drawn with a sewn-in insole over a last (**8**) and is completed to form the shoe by joining the upper (**1**) to a sole (**17**). Formation occurs more easily and inexpensively by addition of an insert (**6, 6'**) of an elastic textile material provided in the opening (**11**) and/or at a lower border of the upper (**1**) adjacent to a sole region. The upper (**1**), with the elastic material, is drawn over the last (**8**), stretching the elastic insert (**6, 6'**). The elastic insert (**6, 6'**) is fixed in the stretched state by applied, non-elastic material.



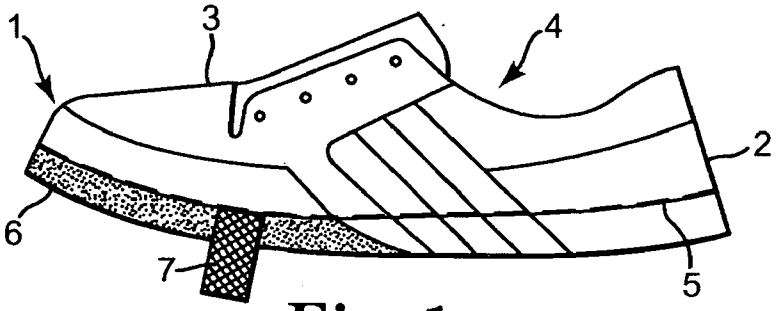


Fig. 1a

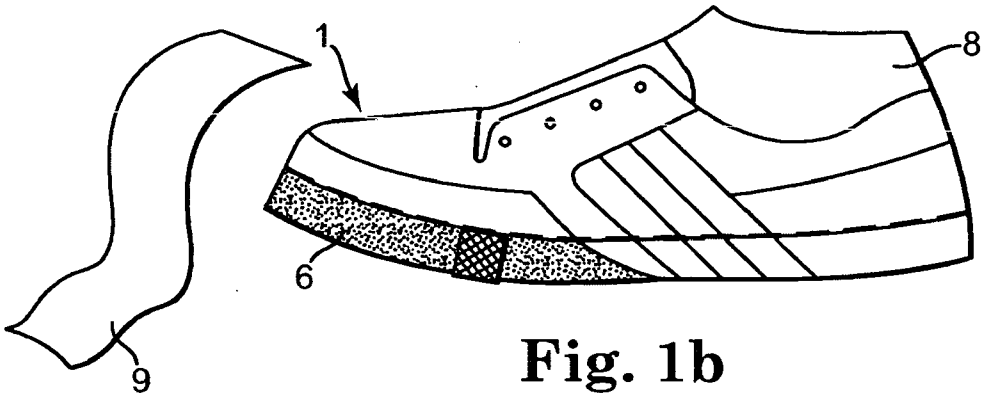


Fig. 1b



Fig. 2a

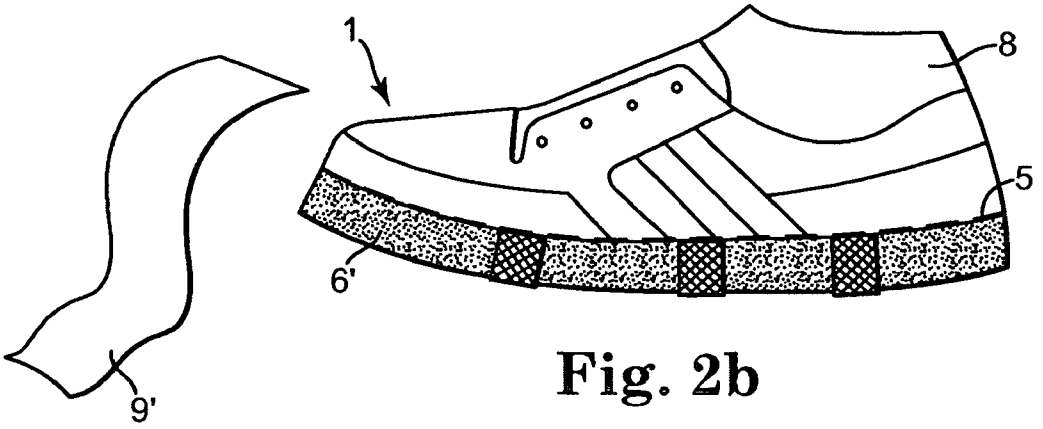


Fig. 2b

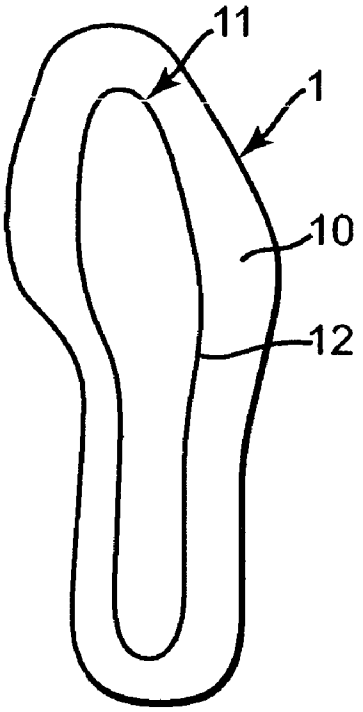


Fig. 3a

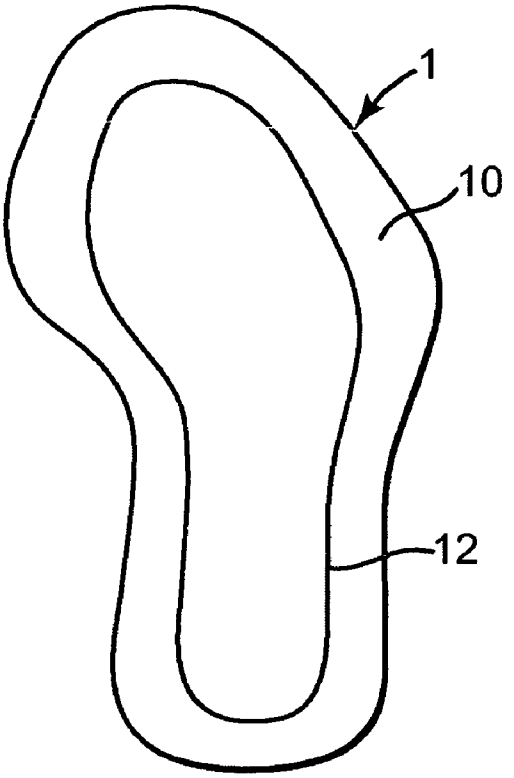


Fig. 3b

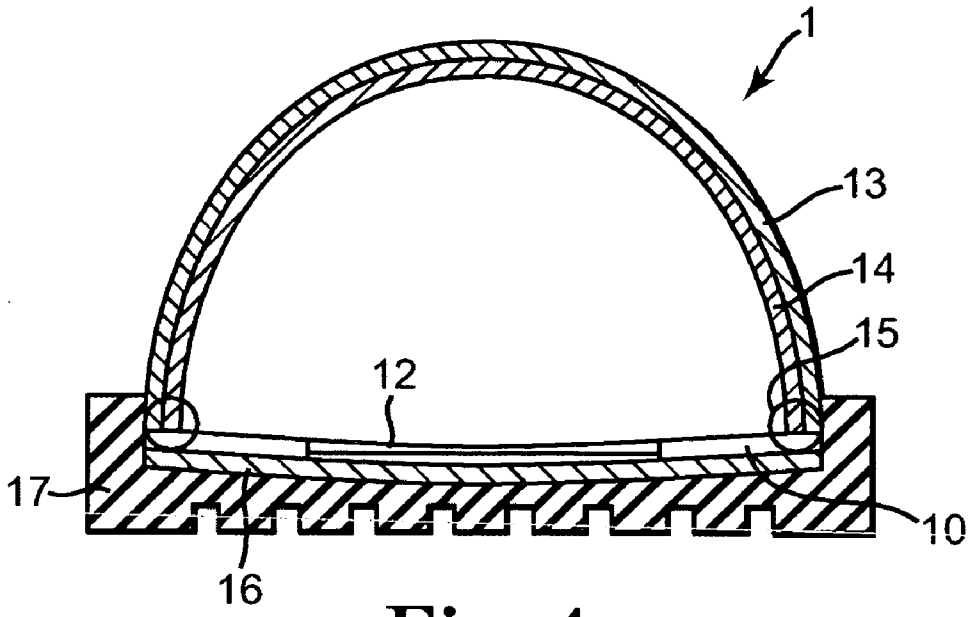


Fig. 4

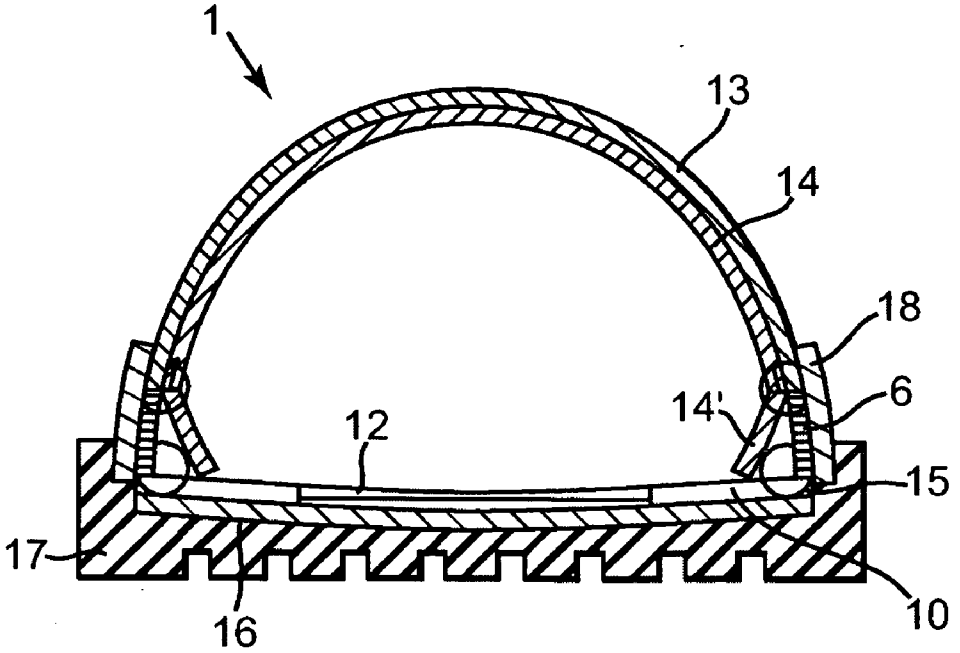


Fig. 5

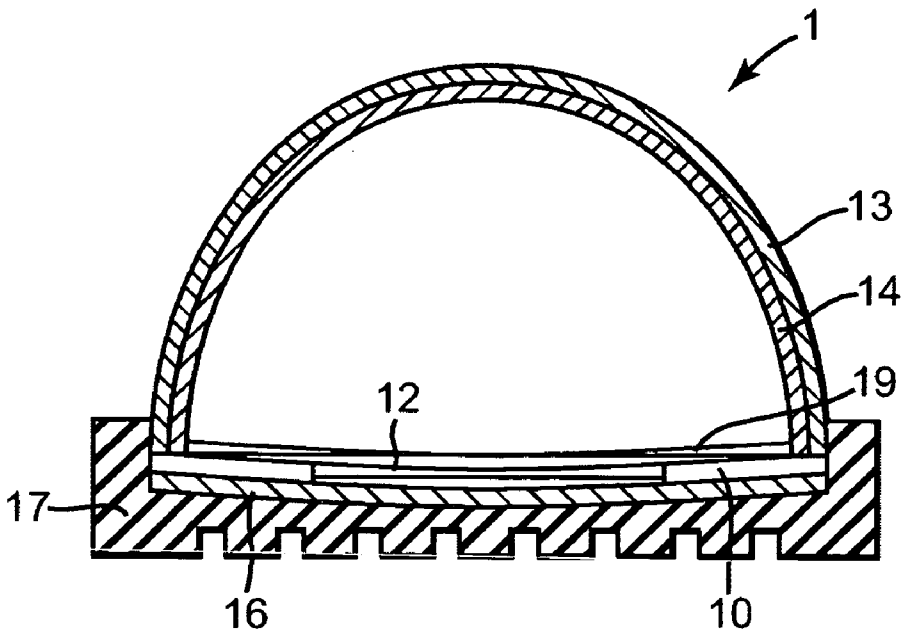


Fig. 6

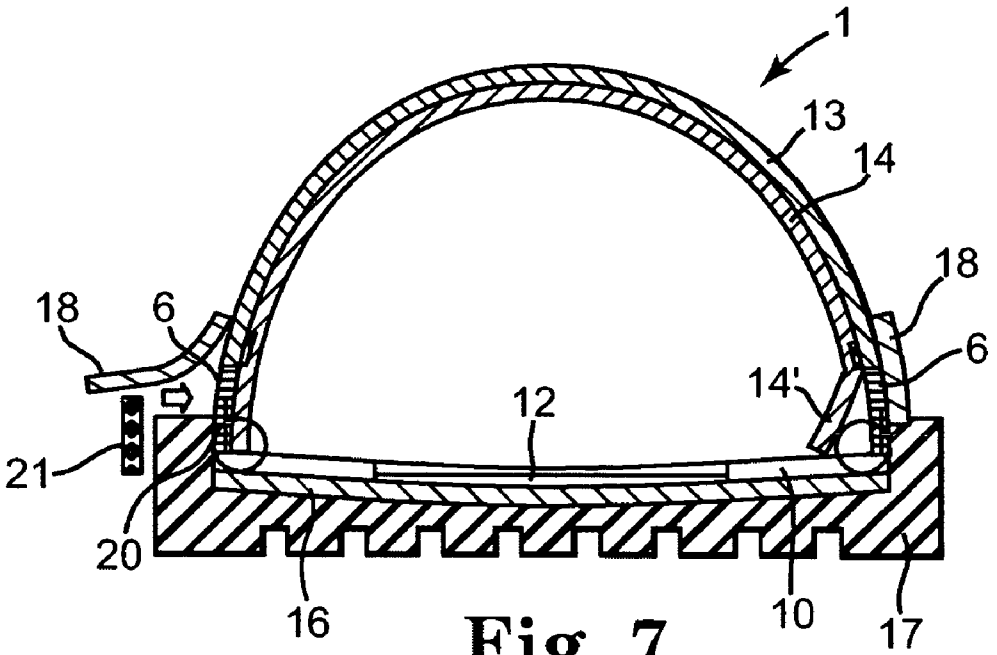


Fig. 7

CUSTOM SHOE AND METHOD

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This patent application claims priority to and the benefit of Germany patent application 103 52 862.8, filed on Nov. 10, 2003, and entitled SCHUH, INSBESONDERE ORTHOPÄDISCHER SCHUH, UND VERFAHREN ZU SEINER HERSTELLUNG.

TECHNICAL FIELD

[0002] The present invention is related to custom shoes, such as orthopedic shoes, and methods for making the same.

BACKGROUND

[0003] The individual production of a custom shoe by a craftsman usually takes place by establishing relevant dimensions of the foot for which the shoe is being made, in order to take into account the length of the foot and—at least in terms of quality—the shape of the foot. The desired outer material of the shoe, generally leather, is used to form an upper, which substantially forms the side walls with a slip-on opening and the upper side of the shoe. The open underside of the upper is closed with an insole, which is connected to the upper by means of a Strobel seam. The shoe arrangement formed in this way is drawn over a last, a form that is adapted at least in some parameters to the shape of the foot for which the shoe is being made and over which the shoe is shaped.

[0004] In particular, in the production of orthopedic shoes, it is possible in this stage of fabrication to make allowance for special features of the shape of the foot. For example, a widening of the material of the upper in the region of a pathologically enlarged ball of the foot may be performed. In this way, unusual shapes of feet can be taken into account in shoe production.

[0005] The production of such a custom shoe is time-consuming and requires both highly skilled craftsmanship and suitable experience in the handling of the materials for the upper. The shoes produced in this way are therefore relatively expensive.

SUMMARY

[0006] The invention relates to custom shoes, in particular orthopedic shoes, and a method for producing the same. The custom formed shoe includes an upper or shaped upper with a clearance or opening for an insole. Once produced, it is then drawn with a sewn-in insole over a last and is completed to form the shoe by joining the upper to a sole or outsole.

[0007] The invention is based on the object of simplifying the production of a custom shoe, in particular an orthopedic shoe, and therefore of making it possible to create less expensive shoes.

[0008] To achieve this object, according to the invention, the method as described above is characterized in that an insert of an elastic textile material is provided in the opening and/or at a lower border of the upper adjacent to a sole region. The upper with the elastic material is then drawn over a last, and the elastic insert is fixed in the stretched state in which it has been drawn onto the last by applied, non-elastic material.

[0009] In a corresponding way, a shoe which is simple and inexpensive to produce of the type mentioned above is characterized in that an insert of an elastic textile material is arranged in the region of the opening and/or at the lower border of the upper adjacent to the sole region. This insert of elastic material is fixed in a stretched state by an applied, non-elastic material.

[0010] The present invention is based on the realization that, during formation of a shoe, the processing step that causes a great amount of time to be expended is the drawing of the upper, provided with the insole, onto the last. Before it is drawn onto the last, the upper can only be roughly adapted to the shape of the foot—and any special features it may have. The final adaptation to the shape of the foot takes place on the last. The last is produced by taking an impression from the foot concerned or has last parts that can be adjusted in relation to one another and by which the shape of the foot can be replicated. For this latter type, it is possible for any irregularities, such as deformations of the ball, to be taken into account by suitable attachments.

[0011] According to the invention, the upper can be used as a standard upper, because the upper or the insole that is inserted into the lower opening and is joined to the upper is provided with an insert of an elastic textile material. The adaptation to the shape of the last therefore does not take place primarily by stretching the material of the upper, which can of course still be additionally performed in individual cases, but by stretching the elastic textile material. In order to fix the shape that is assumed on the last, the elastic material is fixed in the assumed state, in the state in which it has been drawn onto the last, i.e., generally in a stretched state, by an applied non-elastic material. This fixing with the non-elastic material is preferably and appropriately performed by adhesive bonding, which may be surface-area adhesive bonding.

[0012] Once the insert of the elastic material is provided in the region of the insole, it preferably forms a peripheral border strip of the insole. However, this does not rule out the possibility of the complete insole being formed from an elastic textile material.

[0013] However, it is also possible to provide the upper itself with an insert of a textile elastic material, the insert in this case preferably being formed as a strip-shaped insert in the lower border of the upper and running parallel to the sole. This strip-shaped insert may be provided peripherally around the shoe, or else be only provided in the front region of the upper, depending on the shape and/or abnormality of the foot that is to be taken into account in the individual case.

[0014] The fixing of the insert of the elastic textile material forming the insole or part thereof may take place by applying the outsole. The sole, or outsole, is usually adhesively bonded to a folded-around border of the material of the upper and covers over the seam between the material of the upper and the insole. Layers of leather, cork, non-elastic textiles, etc., may be used for fixing the elastic material.

[0015] To be able to bring about the desired fitting of the upper on the last, it is also possible, in one embodiment of the method according to the invention, for the upper to by

provided with interstitial strips, by which the fitting of the upper on the last can be corrected. The interstitial strips are preferably subsequently covered by the non-elastic material.

[0016] The method according to the invention also allows the formation of a shoe with a waterproof and water-vapor-permeable lining membrane. If this lining membrane is formed as a closed membrane, it must be formed at least with an elastic base, in order that the stretching of the elastic material performed on the last can also be performed by the lining material.

[0017] Alternatively, it is possible to form the lining membrane without a base and to introduce a waterproof layer into the sole construction. It is possible, for example, for the non-elastic material, which serves for fixing the elastic material, to be formed such that it is waterproof.

[0018] The invention is explained in more detail below on the basis of exemplary embodiments that are represented in the drawings.

[0019] While multiple embodiments are disclosed, still other embodiments of the present invention will become apparent to those skilled in the art from the following detailed description, which shows and describes illustrative embodiments of the invention. As will be realized, the invention is capable of modifications in various obvious aspects, all without departing from the spirit and scope of the present invention. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] **FIG. 1***a* shows a first exemplary embodiment of a shoe in an intermediate stage of its production process with an elastic strip-shaped insert in the front region of the shoe.

[0021] **FIG. 1***b* shows the shoe of **FIG. 1***a* fitted onto a last.

[0022] **FIG. 2***a* shows a modified exemplary embodiment in which the strip-shaped insert is formed peripherally around the shoe.

[0023] **FIG. 2***b* shows the shoe of **FIG. 1***a* fitted onto a last.

[0024] **FIG. 3***a* shows a plan view of an underside of an upper with an inserted insole, which has a peripheral insert of an elastic textile.

[0025] **FIG. 3***b* shows a plan view of the upper of **FIG. 3***a* fitted onto a last.

[0026] **FIG. 4** shows a vertical section through a front part of the shoe with an elastic insert in the region of an insole.

[0027] **FIG. 5** shows a representation according to **FIG. 4** for an embodiment in which an elastic insert is also provided at the lower border of the material of the upper.

[0028] **FIG. 6** shows a vertical section through an embodiment with a waterproof and water-vapor-permeable lining membrane.

[0029] **FIG. 7** shows an alternative embodiment for a waterproof formation of the shoe.

DETAILED DESCRIPTION

[0030] With reference to the attached Figures, it is to be understood that like components are labeled with like numerals throughout the several Figures. **FIGS. 1***a* and **1***b* show in a side view an upper **1** of a shoe, which forms a peripheral sidewall **2** and an upper side **3** of the shoe with a slip-on opening **4**. Represented at the lower border of the sidewall **2** is a separating line **5**, which separates a visually detached sole region from a sidewall region. In the front part of the upper **1**, the border of the upper **1** is formed underneath the separating line **5** by a strip-shaped insert **6** of a textile elastic material. The strip-shaped insert **6** is bridged on each side by an interstitial strip **7** that is joined to the material of the upper above the separating line **5**.

[0031] **FIG. 1***a* shows the upper **1** in an initial state. **FIG. 1***b* shows the same upper **1** that has been drawn onto a last **8**. It can be seen that, by drawing the upper **1** onto the last **8**, the insert **6** has been stretched out and now has a greater width than in the initial state of **FIG. 1***a*. In this stretched-out state, the insert **6** is fixed in the stretched state by a strip **9** of a non-elastic material. For example, the strip **9** is adhesively attached onto the insert **6** and on the underside is sewn to the material of the upper **1**. The strip **9** then also covers the interstitial strips **7**.

[0032] **FIG. 1** does not reveal that the upper **1** has on its underside an opening that is closed by a sewn-in insole before the upper **1** is drawn onto the last **8**.

[0033] The stretching of the insert **6** of an elastic material and the fixing of the insert **6** in its stretched position with the aid of the strip **9** allows the upper **1** to adapt or adjust to the shape of the foot represented by the last **8**. This adaptation is achieved quickly and unproblematically, without special skills and experience being required for stretching the material of the upper **1** outside of the insert **6**.

[0034] **FIGS. 2***a* and **2***b* show a comparable exemplary embodiment in which the insert **6'** is formed peripherally around the entire shoe, so that an adaptation of the upper **1** to the last **8** is possible over the entire periphery of the upper. In this embodiment, a number of bridging interstitial strips **7** are provided. A strip **9'** is provided for the fixing of the insert **6'** in its stretched state. Strip **9'** is therefore formed with such a length and width that it can reach around the entire upper **1**.

[0035] **FIGS. 3***a* and **3***b* show a plan view of an underside of the upper **1**, which, with a border **10** folded around in the sole region, delimits a clearance or opening **11** of the upper **1** which is closed by a sewn-in insert **12**. The insert **12** consists of an elastic textile material and is represented in **FIG. 3***a* in an initial position.

[0036] Once the upper **1** has been drawn onto the last **8**, the insert **12** can be stretched for adaptation to the shape of the last, as is represented in **FIG. 3***b*. The insert **12** is likewise fixed in its stretched state by applying a non-elastic material, the non-elastic material is preferably attached by adhesion or bonding or other suitable attachment process.

[0037] **FIG. 4** shows that the upper **1** is usually formed by an outer material **13** and a lining material **14**, which are usually adhesively bonded to each other. A Strobel seam **15** is used to join the two layers, **13**, **14** to the border **10**, which together with the insert **12** of elastic material forms the insole.

[0038] The elastic insert **12** is fixed in its stretched state on the last **8** by an adhesively attached layer **16** of non-elastic material. This non-elastic material **16** is likewise adhesively bonded to the border **10**, whereby the sole region is fixed in the state in which it is stretched on the last **8**.

[0039] The layer **16** is finished off by an outsole **17**. The outsole **17** is applied in the usual way, as is known in the art, by adhesive bonding, sewing or the like.

[0040] In the case of the exemplary embodiment represented in **FIG. 5**, apart from the insert **12** in the insole region, a strip-shaped insert **6** is also arranged at the transition between the outer material **13** and the border **10** in the sole region. Since the insert **6** of the elastic material must be able to stretch on the last **8**, the lining **14** joined to the outer material **13** is not joined to the insert **6** in the region of the latter but loosely reaches over the insert **6** with an end portion **14'**. In this way, the lining **14'** does not hinder the stretching of the elastic material of insert **6**. The insert **6** is fixed in its stretched state by an adhesively attached strip **18** of a non-elastic material. The strip **18** is able to mark the visual separation that is identified in **FIGS. 1***a*, **1***b* and **2***a*, **2***b* by the depicted separating line **5**.

[0041] In the case of the exemplary embodiment represented in **FIG. 6**, only an elastic insert **12** is provided in the sole region. The lining **14**, which is joined continuously to the outer material **13**, is constructed with a waterproof, but water-vapor-permeable membrane. In order to make the complete foot space of the shoe waterproof, the lining **14** is supplemented by a base **19** of an elastic material, which is likewise waterproof. The base **19** makes it possible for the insert **12** to stretch on the last **8**, in that the base **19** also performs corresponding stretching. The insert **12** is formed in such a way that, when the stretched state of the insert **12** is fixed by the layer **16** of non-elastic material, adhesive passes through the insert **12** stretched on the last. This adhesive reaches the likewise stretched base **19** of the lining **14**, and consequently also fixes the stretching state of the base **19**.

[0042] In the case of the exemplary embodiment represented in **FIG. 7**, the lining **14** is waterproof, but water-vapor-permeable. Represented on one side is a projecting border strip **14'**, which overlaps the stretching zone present here on account of an insert **6**.

[0043] On the left-hand side of the representation of **FIG. 7**, the lining **14** is firmly joined to the stretched insert **6**, the insert **6** having a non-elastic region **20**. This region **20** is formed by a gauze strip through which adhesive **21**, or a plastic liquefied by heat, can pass to the border of the lining **14**, in order, when it fully reacts, to bond the lining **14** to the insert **6**. This bonding of course takes place only after the stretching of the insert **6** on the last **8**. The bonding may take place for example by use of a hot-melt polyurethane strip **21**, which liquefies under heat, passes through the gauze strip and, when it cools down, crosslinks to form an elastomer. Subsequently, in a second step, the strip **18** of non-elastic material can be adhesively attached to fix the stretching state of the insert **6**.

[0044] Alternatively, it is also possible to perform the fixing of the stretched lining **14** and of the stretched insert **6** in one step by adhesively attaching the strip **18**. In this case, adhesive has to pass through the insert **6** or the region **20** to the border of the lining **14**.

[0045] For a firm bond of the lining **14** to the strip **6**, the lining **14** may be formed such that it is elastically stretchable. For a waterproof finish of the interior space of the shoe, the fixing layer **16** is formed from a waterproof material.

[0046] It is readily evident that other modifications of the shoe construction are possible within the scope of the invention that is outlined by the accompanying claims. Various modifications and additions can be made to the exemplary embodiments discussed without departing from the scope of the present invention. Accordingly, the scope of the present invention is intended to embrace all such alternatives, modifications, and variations as fall within the scope of the claims, together with all equivalents thereof.

I claim:

1. A method for producing a custom shoe having an upper with an insole sewn into an opening for the insole, the upper and the sewn-in insole drawn over a last and completed to form the shoe by joining the upper to a sole, the method comprising the steps of:

providing an insert of an elastic textile material coupled to the upper;

drawing the upper with the elastic material over a last so as to stretch the elastic material to adapt to the last; and

applying non-elastic material to the insert so as to fix the elastic insert in the stretched state when on the last.

2. The method as claimed in claim 1, wherein the step of providing an insert comprises providing the insert in the opening.

3. The method as claimed in claim 1, wherein the step of providing an insert comprises providing the insert at a lower border of the upper.

4. The method as claimed in claim 1, wherein the non-elastic material is adhesively attached onto the insert of elastic material.

5. The method as claimed in claim 1, wherein the insert comprises a strip-shaped insert of elastic textile material running parallel to the sole that is inserted into the lower border of the upper.

6. The method as claimed in claim 5, wherein the strip-shaped insert is provided only in the front region of the upper.

7. The method as claimed in claim 5, wherein the strip-shaped insert is provided peripherally around the shoe.

8. The method as claimed in claim 1, wherein the non-elastic material comprises a layer of leather, cork or non-elastic textile.

9. The method as claimed in claim 1, further comprising the step of attaching an interstitial strip to a lower border of the upper so as to bridge the insert.

10. The method as claimed in claim 9, wherein the interstitial strip is covered by the non-elastic material.

11. The method as claimed in claim 9, wherein the interstitial strip comprises a plurality of interstitial strips and wherein the plurality of interstitial strips are covered by the non-elastic material.

12. The method as claimed in claim 1, further comprising the step of fastening a waterproof and water-vapor-permeable lining membrane to the upper.

13. The method as claimed in claim 12, wherein the lining membrane is provided with a stretchable base.

14. The method as claimed in claim 12, wherein the lining membrane is attached without a base and further comprising the step of introducing a waterproof layer into a construction of the sole.

15. The method as claimed in claim 12, wherein the non-elastic material is waterproof.

16. The method as claimed in claim 1, wherein the shoe comprises an orthopedic shoe.

17. A custom shoe including an upper having an opening for an insole, an insole joined to the upper at the opening and a sole that covers over the insole and is joined to the upper, the shoe comprising:

an insert of an elastic textile material coupled to the upper and stretched to conform to a last upon which the upper and insole are drawn during fabrication of the shoe; and

non-elastic material applied over the insert of elastic material so as to fix the elastic material in its stretched state.

18. The shoe as claimed in claim 17, wherein the insert is provided in the region of the opening.

19. The shoe as claimed in claim 17, wherein the insert is provided at a lower border of the upper and adjacent to the insole.

20. The shoe as claimed in claim 17, wherein the non-elastic material is adhesively attached onto the insert.

21. The shoe as claimed in claim 17, wherein the insert of elastic textile material is strip-shaped and is positioned to run parallel to the sole and is inserted into a lower border of the upper.

22. The shoe as claimed in claim 21, wherein the strip-shaped insert is provided only in a front region of the shoe.

23. The shoe as claimed in claim 21, wherein the strip shaped insert is provided peripherally around the shoe.

24. The shoe an claimed in claim 17, wherein the non-elastic material comprises a layer of leather, cork or non-elastic textile.

25. The shoe as claimed in claim 17, further comprising an interstitial strip attached to a lower border of the upper to bridge the insert, the interstitial strip being covered by the non-elastic material.

26. The shoe as claimed in claim 25, wherein the interstitial strip comprises a plurality of interstitial strips, and wherein the plurality of interstitial strips are covered by the non-elastic material.

27. The shoe as claimed in claim 17, further comprising a waterproof and water-vapor-permeable lining membrane fastened to the upper.

28. The shoe as claimed in claim 27, wherein the lining membrane is formed by a stretchable base reaching over the opening.

29. The shoe as claimed in claim 27, wherein the lining membrane is formed without a base and wherein a waterproof layer is introduced into a sole construction.

30. The shoe as claimed in claim 27, wherein the non-elastic material is waterproof and water-vapor-permeable.

31. The shoe as claimed in claim 17, wherein the shoe comprises an orthopedic shoe.

* * * * *