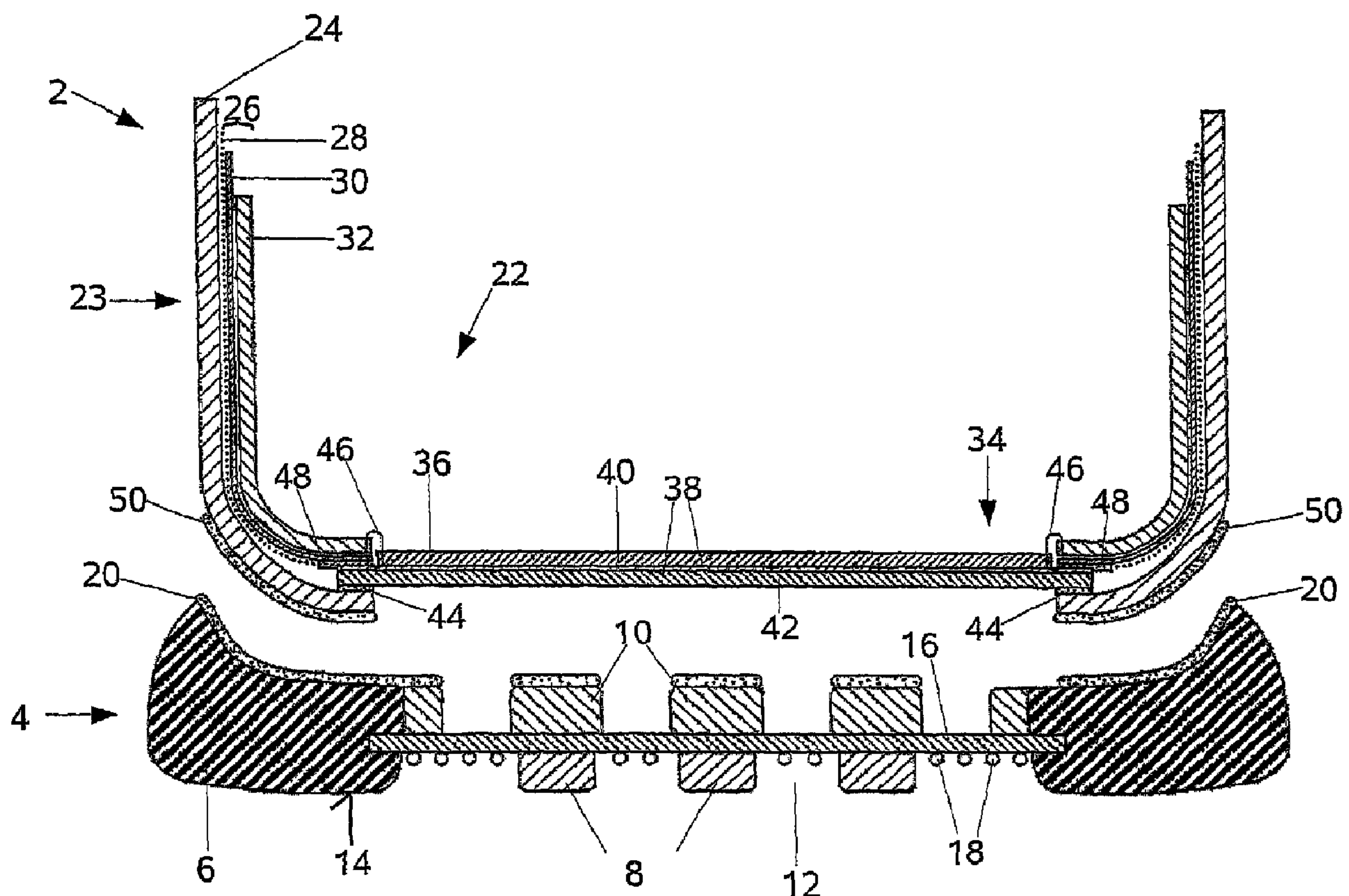




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(54) Titre : ENSEMBLE DE TIGE POUR CHAUSSURE ET CHAUSSURE COMPORTANT UN TEL ENSEMBLE
(54) Title: SHAFT ARRANGEMENT FOR FOOTWEAR AND FOOTWEAR COMPRISING SAME



(57) Abrégé/Abstract:

A present invention shaft arrangement (22) for footwear (2) comprises a shaft bottom (34) having a water vapor permeable installation sole (36) and having a shaft bottom functional layer laminate (38) and a shaft region (23) having an outer material ply (24) and having a shaft functional layer laminate (26). The sole sided shaft end region is connected to the shaft bottom (34), and the shaft bottom functional layer laminate (38) has a two-ply configuration.

**Shaft arrangement for footwear and footwear
comprising same**

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The following invention relates to a shaft arrangement for footwear and also to footwear comprising such a shaft arrangement.

10 Footwear having a waterproof and water vapor permeable shaft and thereby able to give off perspiration moisture to the outside despite waterproofness in the shaft region is known in the prior art. In order that perspiration moisture can also escape to the outside in
15 the sole region, sole regions of footwear have also been equipped with waterproof and water vapor permeable sole functional layers. One example thereof, wherein not only the shaft bottom but also the remaining shaft region are equipped with water vapor permeable but
20 waterproof functional layers and wherein the shaft bottom is separate from the shaft region is known from DE 10 2008 029 296 A1.

Such footwear, then, can give rise to the problem that
25 the sole region, where the foot produces the most perspiration moisture which has to be transported away, is a site where moisture is prone to be left over, which causes a sensation of coldness and of freezing in cold weather in particular. The moisture removal
30 potential in this region is limited in the case of conventional breathable footwear.

The present invention therefore has for its object to provide a shaft arrangement for footwear, and also
35 footwear comprising same, wherein the removal of moisture specifically in the sole region is improved in

order that any sensation of freezing and coldness of the foot at this location may be avoided.

This object is achieved by the subject matter of the
5 independent patent claims. Advantageous developments will be apparent from the dependent claims.

A present invention shaft arrangement for footwear comprises a shaft bottom having a water vapor permeable
10 installation sole and having a shaft bottom functional layer laminate and also a shaft region having an outer material ply and having a shaft functional layer laminate. The sole sided shaft end region is connected to the perimetric edge of the shaft bottom. For this,
15 there are a plurality of design executions, which will be elucidated in what follows.

The shaft bottom functional layer laminate and the shaft functional layer laminate are preferably
20 connected to each other waterproof, for example by a continuous adhesive bond, in order that a waterproof seal between the two functional layer laminates may be formed. The region at which the two functional layer laminates and the corresponding two functional layers
25 are connected together by means of a sealing adhesive to create a waterproof bond is not water vapor permeable. Such a sealing adhesive for forming the waterproof bond between the two functional layer laminates can be any desired suitable waterproof
30 adhesives.

The construction created by bonding the shaft functional layer laminate to the shaft bottom functional layer laminate is waterproof around the
35 entire foot, and is water vapor permeable except for the waterproof bonds formed by sealing adhesive.

In all embodiments, the shaft functional layer laminate can be suitably connected to the outer material, for example stitched thereto on an upper side.

5

According to the present invention, the shaft bottom functional layer laminate has a two-ply configuration. Owing to the two-ply shaft bottom functional layer laminate and owing to the water vapor permeable
10 installation sole in the shaft bottom, perspiration moisture is simpler to transport outside from the underside of the foot than is the case with conventional shaft arrangements comprising a three-ply shaft bottom functional layer laminate. An additional
15 third layer of the shaft bottom functional layer laminate is explicitly dispensed with here. This makes it possible to save the costs for this third layer and, since the barrier to be overcome by the water vapor is reduced by one layer, the amount of perspiration
20 moisture which can be transported away can also be increased. The omitted layer can be more particularly a woven lattice fabric or mesh.

In accordance with a first embodiment of the invention,
25 the two-ply shaft bottom functional layer laminate includes a shaft bottom functional layer or membrane and a supporting textile ply. This supporting textile ply is configured to be water vapor permeable but not waterproof. The shaft bottom functional layer or
30 membrane is configured to be waterproof and water vapor permeable, for example in the course of processing or production.

This supporting textile ply is arranged either on the
35 shaft bottom inner side or on the shaft bottom outer side, depending on the construction of the shaft

arrangement. The supporting textile ply is water vapor permeable and forms a protection for the shaft bottom functional layer.

- 5 In either case, the shaft bottom functional layer is arranged between the supporting textile ply and the water vapor permeable installation sole.

10 In accordance with a further embodiment of the invention, the shaft functional layer laminate of the remaining shaft can have a conventional three-ply configuration, but it is similarly possible, as will be appreciated, for this shaft functional layer laminate to likewise be given a two-ply construction in order
15 that the moisture removal potential may also be increased at the side regions and at the upper side of the shaft arrangement.

20 In one design version of the shaft arrangement of the present invention, the water vapor permeable installation sole, which is often also known as insole, is arranged above the shaft bottom functional layer laminate. Here the two-ply shaft bottom functional layer laminate has a greater lateral extent than the
25 installation sole in order that said laminate may be cemented to the sole sided end region of the shaft functional layer laminate and to the outer material ply.

30 In this case, the supporting textile ply of the two-ply shaft bottom functional layer laminate is arranged lowermost. The foot comes into contact with the installation sole.

35 In this construction, the water vapor permeable installation sole may be stitched, for example by means

of a Strobel stitch or a zigzag stitch, to the sole sided end region of the shaft functional layer laminate, and additionally the end region of the outer material ply may be lasted onto the shaft bottom
5 functional layer laminate.

In an alternative construction of the shaft arrangement, often also referred to as bootie, the sole sided end region of the shaft functional layer laminate
10 is stitched, for example by means of a zigzag stitch, to the perimetric edge of the shaft bottom functional layer laminate. With this kind of construction, the water vapor permeable installation sole is arranged underneath the shaft bottom functional layer laminate.

15 The supporting textile ply of the two-ply shaft bottom functional layer laminate is arranged uppermost and comes into direct contact with the foot. The installation sole forms the lowermost layer of the
20 shaft bottom.

With this form of construction, then, there is a first alternative in that the sole sided end region of the outer material ply is stitched to the water vapor
25 permeable installation sole.

In a construction alternative thereto, the sole sided end region of the outer material ply is lasted onto the installation sole.

30 In principle, the shaft arrangement of the present invention is not restricted to certain design versions, but can find utility in a multiplicity of design versions.

35 The present invention also provides footwear having at

least one shaft arrangement of the type described above, the underside of which has a sole unit secured to it. The sole unit can be connected to the shaft arrangement in any desired manner, preferably by cementing or injecting the sole unit to the shaft arrangement. The sole unit, to be able to ensure a sufficiently high removal of moisture, has to be endowed with at least one throughhole opening or with porosities which lead downwardly or laterally to the outside.

Definitions and test methods

Footwear:

15

Foot covering having a closed upper portion (shaft arrangement) which includes a foot slip-in opening and includes at least one sole or sole unit.

20 Shaft outer material:

A material which forms the outside surface of the shaft and thus of the shaft arrangement and consists for example of leather, a textile, plastic or other known materials or combinations thereof, or is constructed therewith, and generally consists of water vapor permeable material. The sole side lower end of the shaft outer material forms a region adjoining the upper edge of the sole or sole unit or above a boundary plane between the shaft and the sole or sole unit.

Installation sole (insole):

An installation sole is part of the shaft bottom. A sole sided lower shaft end region is secured to the installation sole.

Sole:

A shoe has at least one outsole, but can also have
5 multiple kinds of sole plies which are arranged on top
of each other and form a sole unit.

Outsole:

10 An outsole is that part of the sole region which
touches the floor/ground or makes the main contact with
the floor/ground. An outsole has at least one tread
surface touching the floor.

15 Midsole:

When the outsole is not attached directly to the shaft
arrangement, a midsole can be inserted between the
outsole and the shaft arrangement. The midsole can for
20 example serve cushioning purposes, damping purposes or
as filling material.

Bootie:

25 A bootie is a sock type inner liner of a shaft
arrangement. A bootie forms a bag type liner of the
shaft arrangement, which covers the interior of the
footwear essentially completely.

30 Functional layer:

Waterproof and/or water vapor permeable layer, for
example in the form of a membrane or of an
appropriately treated or finished material, for example
35 a textile with plasma treatment. The functional layer
in the form of a shaft bottom functional layer can form

at least one ply of a shaft bottom of the shaft arrangement, but can also be additionally provided as a shaft functional layer at least partly lining the shaft. Not only the shaft functional layer but also the
5 shaft bottom functional layer can be part of a multiply, usually two, three or four ply, membrane laminate. The shaft functional layer and the shaft bottom functional layer can each be part of a functional layer bootie. When instead of a functional layer bootie a
10 shaft functional layer and a separate shaft bottom functional layer are used, these are sealed off waterproof relative to each other in the sole sided lower region of the shaft arrangement for example. The shaft bottom functional layer and the shaft functional
15 layer can be formed from the same or different material.

Suitable materials for the waterproof water vapor permeable functional layer are in particular
20 polyurethane, polypropylene and polyester, including polyetherester and laminates thereof, as described in the printed publications US-A-4,725,418 and US-A-4,493,870. In one embodiment, the functional layer is constructed using microporous expanded poly-
25 tetrafluoroethylene (ePTFE), as described for example in the printed publications US-A-3,953,566 and US-A-4,187,390. In one embodiment, the functional layer is constructed using expanded polytetrafluoroethylene provided with hydrophilic impregnants and/or
30 hydrophilic layers; see for example the printed publication US-A-4,194,041. A microporous functional layer is a functional layer whose average pore size is between about 0.2 μm and about 0.3 μm .

35 Laminate:

A laminate is an assembly consisting of multiple plies durably bonded to each other, generally by mutual adhering together. In the case of a functional layer laminate, a waterproof water vapor permeable functional layer is provided with at least one textile ply. The at least one textile ply mainly serves to protect the functional layer during the processing thereof. This is referred to as a two-ply laminate. A three-ply laminate consists of a waterproof water vapor permeable functional layer embedded between two textile plies. The bonding between the functional layer and the at least one textile ply is effected for example by means of a continuous water vapor permeable layer of adhesive or by means of a discontinuous layer of non water vapor permeable adhesive. In one embodiment, adhesive in the form of a dot shaped pattern may be applied between the functional layer and the textile ply or both of the textile plies. The dot shaped or discontinuous application of the adhesive is chosen because a uniform layer of an adhesive which itself is non water vapor permeable would block the water vapor permeability of the functional layer.

Barrier ply:

A barrier ply serves as barrier against the penetration of substances, particularly in the form of particles or foreign bodies, for example small stones, through to a ply of material to be protected, more particularly through to a mechanically sensitive functional layer or functional layer membrane.

Reference document:

European standard EN 344-1, specifically section 4.3.3 (penetration resistance)

Waterproof:

A functional layer/functional layer laminate/membrane including if appropriate seams provided on the functional layer/functional layer laminate/membrane is
5 considered waterproof when it warrants a water inlet pressure of at least $1 * 10^4$ Pa. Preferably, the functional layer material warrants a water inlet pressure of above $1 * 10^5$ Pa. The water inlet pressure is measured by following a test method wherein
10 distilled water at $20 \pm 2^\circ\text{C}$ is applied to a sample of 100 cm^2 of the functional layer with increasing pressure. The pressure increase of the water is 60 ± 3 cm hydrohead per minute. The water inlet pressure is then equal to the pressure at which water first appears
15 on the other side of the sample. Details of the procedure are mandated in the ISO standard 0811 from 1981.

Whether a shoe is waterproof can be tested for example
20 using a centrifuge arrangement of the kind described in US-A-5 329 807.

Water vapor permeable:

25 A functional layer/functional layer laminate is considered water vapor permeable when it has a water vapor permeability number Ret of below $150 \text{ m}^2 * \text{Pa} * \text{W}-1$. The water vapor permeability is tested in accordance with the Hohenstein skin model. This test method is
30 described in DIN EN 31092 (02/94) and ISO 11092 (1993).

Illustrative embodiments of the invention will now be more particularly elucidated with reference to the accompanying figures.

35

Fig. 1 shows a sectional depiction of a forefoot region

of a first shoe according to a first illustrative embodiment of the invention;

Fig. 2 shows a sectional depiction of a forefoot region
5 of a second shoe according to a further illustrative embodiment of the invention;

Fig. 3 shows a sectional depiction of a portion of the shaft bottom functional layer laminate of the shaft
10 bottom of the shaft arrangement from Fig. 1;

Fig. 4 shows a sectional depiction of a forefoot region of a third shoe according to a further illustrative embodiment of the invention;
15

Fig. 5 shows a sectional depiction of a forefoot region of a fourth shoe according to a further illustrative embodiment of the invention;

20 Fig. 6 shows a sectional depiction of a forefoot region of a fifth shoe according to a further illustrative embodiment of the invention;

Fig. 7 shows a sectional depiction of a forefoot region
25 of a sixth shoe according to a further illustrative embodiment of the invention;

Fig. 8 shows a schematic view of an exemplary shaft arrangement of the third shoe from Fig. 4 from below;
30

Fig. 9 shows a schematic view of an exemplary shaft arrangement of the third shoe from Fig. 4 from below;

Fig. 10 shows a schematic view of an exemplary shaft
35 arrangement of the third shoe from Fig. 4 from below;

Fig. 11 shows a schematic view of an exemplary shaft arrangement of the third shoe from Fig. 4 from below; and

5 Fig. 12 shows a sectional view of an exemplary suction element from Figure 4.

All shoes described hereinbelow as illustrative
embodiments have a sole unit and a shaft arrangement to
10 be secured thereto. In the illustrative embodiments
described hereinbelow, the sole unit is cemented to the
shaft arrangement. It is similarly possible to inject
the sole unit to the shaft arrangement.

15 All depictions hereinbelow are schematic and not
necessarily realistic in respect of dimensions and
scale.

Figure 1 shows a sectional depiction of a forefoot
20 region of a first shoe 2 according to a first
illustrative embodiment of the invention.

The first shoe 2 comprises a sole unit 4 and a shaft
arrangement 22, which are still to be connected to each
25 other.

The shaft arrangement 22 comprises a shaft bottom 34
and a shaft region 23 which is connected thereto at the
former's perimetric edge and of which there is shown in
30 Figure 1 a left hand side and a right hand side shaft
section which are mirror symmetrical to each other. The
upper section of shaft region 23 is not shown in this
and in the following figures, for simplicity.

35 The shaft region 23 includes a water vapor permeable
outer material ply 24 and a shaft functional layer

laminate 26 which comprises - from out to in - a netband or mesh 28, a shaft functional layer or a shaft membrane 30 and a shaft liner 32.

- 5 The sole sided lower end region of the outer material ply 24 is curved inwardly relative to the essentially vertical section and secured by means of lasting adhesive 44 to the multi-ply shaft bottom 34.
- 10 The multi-ply shaft bottom 34 comprises - from up to down - an installation sole or insole 36 and a shaft bottom functional layer laminate 38 arranged thereunder and having a shaft bottom functional layer 40 and a lowermost supporting textile ply 42. Additionally, the
- 15 installation sole 36 is connected at its perimetric edge via a stitch 46, for example a Strobel stitch or a zigzag stitch, to the sole sided end region of the shaft functional layer laminate 38.
- 20 The shaft bottom functional layer laminate 38 is thus configured as a two-ply laminate. As is readily apparent from Figure 1, the shaft bottom functional layer laminate 38 has a larger lateral extent than the installation sole 36 in order that the latter may be
- 25 connected, for example by cementing, waterproof to the sole sided end region of the shaft functional layer laminate 26 and to the outer material ply 24.

The sole sided lower end region of the outer material

30 ply 24 is lasted with its upper side by means of a lasting cement 44 to the underside of the perimetric edge of the shaft bottom functional layer laminate 38.

The sole sided lower end region of the shaft functional

35 layer laminate 26 is raised away from the sole sided lower end region of the outer material ply 24. This

creates an interspace in the end section of the shaft region 23 between the shaft functional layer laminate 26 and the outer material ply 24, which widens toward the end section of the shaft region 23.

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The shaft bottom functional layer laminate 38 extends somewhat into this interspace. That part of the interspace which is not occupied by the end region of the shaft bottom functional layer laminate 38 is typically filled by air or by water vapor or a mixture thereof.

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Furthermore, the underside of the sole sided end region of the shaft functional layer laminate 26 is connected by means of a sealing adhesive 48 waterproof to the upper side of the perimetric edge of the shaft bottom functional layer laminate 38, enclosing the stitching 46 or excluding the stitching (46), leading to a all-over waterproof and - when using not just waterproof but also water vapor permeable functional layers 26, 38 - to an all-over water vapor permeable shaft arrangement.

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This sealing adhesive 48 penetrates through the netband 28, thus sealing the two functional layers off relative to each other, and serves to secure and seal the shaft bottom functional layer laminate 38 to the shaft functional layer laminate 26, so that no additional adhesive is required for this.

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The sole unit 4 is prefabricated and is secured to the sole sided lower end region of the outer material ply 24 by means of a sole adhesive applied at least to the upper side of the perimetric edge zone of sole unit 4. In the present illustrative embodiment, a first sole adhesive layer 20 is applied to the upper side of the

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perimetric edge zone of sole unit 4 and a second sole adhesive layer 50 is applied to the sole sided lower end region of the outer material ply 24.

5 The sole unit 4 comprises a sole ply 6 which forms the surrounding outer region thereof and which on its upper side extends somewhat upwardly in the outward direction in order to accommodate the curved region of the outer material ply 24, and has a central cutout in which are
10 arranged - in the upward direction - a supporting bar ply 8, a barrier ply 16 and above the barrier ply 16 a comfort ply 10 with comfort bars.

The adhesive layer 20, as is readily apparent in
15 Fig. 1, extends over the upper sides of the sole ply 6 and also over the upper sides of the comfort bars of the comfort ply 10. It is merely that region of the right hand side section of sole ply 6 which is below the right hand side end of the shaft bottom functional
20 layer laminate 38, and also the adjoining comfort bar of the comfort bar ply 10, which can be configured without adhesive ply 20.

Fig. 1 depicts three supporting bars of the supporting
25 bar ply 8 and three comfort bars of the comfort ply 10, which are configured somewhat wider than the supporting bars arranged thereunder. The comfort ply 10 further comprises narrower comfort bar sections which commence on the inner side of sole ply 6.

30 The lower surface of sole ply 6 and of supporting bar ply 8 is configured as running or tread surface 14. Between the supporting bars of the supporting bar ply 8 there are configured cutouts or sole ply throughhole
35 openings 12 in order that water vapor permeability and/or air permeability may be provided to the sole ply

6 with supporting bars 8.

The sole ply 6 can be in one piece, as shown in the figure, or in two or more pieces, for example in different colors.

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The sole ply throughhole openings 12 are made as large as possible in order that a correspondingly high water vapor permeability may be provided to the sole ply 6 with supporting bars 8 and hence to the sole unit 4.

10

The sole unit 4 is horizontally traversed by a barrier ply 16 as mechanical protection for the shaft bottom functional layer laminate 38 against damage by foreign bodies, for example small stones, which work their way into the sole ply throughhole openings 12. This barrier ply 16 extends somewhat into the sole ply 6 and thus is anchored in the latter and durably connected thereto. This barrier ply 16 in one embodiment is constructed using a thermally consolidated fibrous material, so that it can additionally also be configured as stabilizing material for the sole unit 4.

The supporting bar ply 8 and the comfort ply 10 may be made of a different material than the sole ply 6, as indicated by the different hatchings, in order to achieve a weight reduction for the sole unit 4, improved walking comfort in respect of underfoot cushioning, or both. Alternatively, the supporting bar ply 8, the comfort ply 10 and the sole ply 6 may also be made of the same material.

More particularly, a material may be chosen for the supporting bar ply 8 and the comfort ply 10 that is softer than the material of the sole ply 6. When good underfoot cushioning is to be achieved, EVA is an

example of a suitable material for the supporting bar ply 8 and/or the comfort ply 10. When a weight reduction is to be achieved with regard to the sole ply material, a foamed plastic having a correspondingly low specific weight is suitable. When both improved underfoot cushioning and weight reduction are to be achieved in respect of the sole ply material, foamed EVA is suitable for example. However, there are many further material variants which can be used.

Underneath the barrier ply 16 there is optionally situated a decorative ply 18 which is visible from below and imparts an attractive appearance to the sole unit.

Fig. 2 shows a sectional depiction of a forefoot region of a second shoe 52 according to a second illustrative embodiment of the invention.

Like the first shoe 2, the second shoe 52 likewise comprises a sole unit 54 and a shaft arrangement 70, which are still to be connected to each other. The shaft arrangement 70 is constructed according to the bootie principle, and comprises a shaft bottom 80 and a shaft region 71 which is connected thereto at the former's perimetric edge and of which there are shown in Figure 2 a left hand side and a right hand side shaft section which are mirror symmetrical to each other.

The shaft region 71 includes a water vapor permeable outer material ply 72 and a three-ply shaft functional layer laminate 74, which comprises an inner shaft liner 78, an outer shaft functional layer or membrane 76 and a woven lattice fabric or mesh 75.

The outer material ply 72 of the shaft region 71 extends somewhat further in the direction of shaft bottom 80 than the shaft functional layer laminate 74 does. The shaft functional layer laminate 74 is
5 connected by means of stitching, which may be more particularly executed as a zigzag stitch, to a shaft bottom functional layer laminate 84 of the shaft bottom 80, and the stitching 90 is sealed off waterproof toward the outside using a seam sealing
10 tape 92.

The shaft bottom functional layer laminate 84, like the shaft functional layer laminate 74, has a two-ply construction with an inner supporting textile ply 88
15 and an outer shaft bottom function or membrane 86. The functional layers 76 and 86 and also the textile plies 78 and 88 of the shaft functional layer laminate 74 and of the shaft bottom functional layer laminate 84 are stitched to each other such that the textile plies 78
20 and 88 and also the functional layers 76 and 86 are each contiguous to each other.

The depiction as per Fig. 2 shows a separation between the outer surface of the shaft functional layer 76 and
25 the inner surface of the outer material ply 72, but in practice these surfaces can also be directly next to each other.

Enclosed by the outer material ply 72 of the shaft
30 region 71 and stitched to the sole sided end region of the outer material ply 72 is an installation sole or insole 82 which is arranged underneath the shaft bottom functional layer laminate 84 and has a somewhat smaller areal extent compared therewith. The stitching 94
35 between the sole sided end region of the outer material ply 72 and the perimetric edge region of the

installation sole 82 can be executed more particularly as a Strobel stitch or as a zigzag stitch.

Like the sole unit 4 of the first shoe 2, the sole unit 54 of the second shoe 52 is also prefabricated and is secured to the sole sided lower end region of the outer material ply 72 and additionally to the sole sided lower margin region of the installation sole 82 by means of a sole adhesive applied at least to the upper side of the perimetric edge zone of sole unit 54.

In the present illustrative embodiment, a first sole adhesive layer 68 is applied to the upper side of the perimetric edge zone of the sole unit 54 and a second sole adhesive layer 96 is applied to the sole sided lower end region of the outer material ply 24 and to the sole sided lower margin region of the installation sole 82.

The sole unit 54, like the sole unit 4, comprises a sole ply 56 which forms the surrounding outer region of the sole unit 54 and which is provided with a central cutout in which there are arranged - from bottom to top - a supporting bar ply 58 with three supporting bars exemplarily depicted in Fig. 2 and a barrier ply 64. The barrier ply 64 traverses the sole unit 4 horizontally and extends with its perimetric edge region as far as into the upper end of the sole ply 56. It is thus reliably connected to the sole ply 56. The supporting bars extend from the barrier ply 64 to the plane of the underside of the sole ply 56, and the lower surface of the sole ply 56 and of the supporting bars 58 forms the running or tread surface 62. Unlike the sole unit 4 of the first shoe 2, no additional comfort ply is provided in the case of sole unit 54, but could be added if required.

The optional decorative ply 66 to be provided, which is present underneath the barrier ply 64, corresponds to the decorative ply 18 of the first sole unit 4.

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Both in the case of the shaft arrangement 22 of the first shoe 2 in Fig. 1 and in the case of the shaft arrangement 70 of the second shoe 52 in Fig. 2, the shaft bottom functional layer laminate 38 or, respectively, 84 has a two-layered configuration and comprises only one shaft bottom functional layer 40 or, respectively, 86 and a supporting textile ply 42 or, respectively, 88, but not a further layer. In the present embodiments of Figures 1 and 2, the netband or net material, often also referred to as a mesh, is omitted.

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It is specifically at the shaft bottom 34 or, respectively, 80 that the generation of perspiration produced by the sole of the foot and to be transported away is greatest. In addition, underneath the shaft bottom 34 or, respectively 80, there are the largest openings in the form of cutouts 12 and 60, respectively, so that the potential for removal of moisture is greatest at this place.

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The inventors of the present subject matter have found that an additional third layer of the shaft bottom functional layer laminate 38 or, respectively, 84 can be dispensed with here and that the shaft functional layer laminate 38 or, respectively, 84 can be given a two-ply configuration in this region, as a result of which it is possible to save the costs for a third layer and by omitting this third layer the amount of perspiration which can be transported away is also increased. Omitting the third layer of the shaft bottom

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functional layer laminate removes a water vapor barrier to be overcome by the moisture.

Surprisingly, a waterproof connection is possible
5 nonetheless, even though no additional ply, for example the netband, is any longer present.

In the shaft arrangement 22 of the first shoe 2 as per Fig. 1, this two-layer shaft bottom functional layer
10 laminate 38 is arranged directly above the cutout 12, providing for particularly effective removal of moisture out of the interior of the shaft arrangement 22, and in the shaft arrangement 70 of the second shoe 52 as per Fig. 2 the two-layer shaft bottom
15 functional layer laminate 84 has additionally arranged underneath it the installation sole 82 through which the moisture additionally has to pass.

Fig. 3 shows an isolated sectional depiction of a portion of the two-ply shaft bottom functional layer
20 laminate 38 of the shaft bottom 34 of the shaft arrangement 22 from Fig. 1.

Readily apparent are the lowermost supporting textile ply 42 and the by comparison somewhat thinner shaft
25 bottom functional layer 40 which forms the actual membrane.

Fig. 4 shows a sectional depiction of a forefoot region of a third shoe 98 according to a further illustrative
30 embodiment of the invention.

The third shoe 98 comprises a sole unit 4, which is identical to the sole unit 4 of the first shoe 2 from Fig. 1, and a shaft arrangement 100, which coincides
35 with the shaft arrangement 22 of the first shoe 2,

although in contradistinction thereto a suction element 102 is provided as an additional element.

5 Elements of the third shoe 98 which coincide with the elements of the first shoe 2 are marked using the same reference symbols.

10 The suction tape 102 extends from the interspace between the outer netband 28 of the shaft functional layer laminate 26 and the inner side of the outer material ply 24 onto the outer side of the shaft arrangement 100 underneath the supporting textile ply 42. The suction element 102 includes a moisture-absorbing material, for example cotton, and is capable
15 of attracting water in liquid form and also water vapor and transporting them to the outside.

The suction element 102 depicted exemplarily in Fig. 4 extends from the interspace between the shaft
20 functional layer laminate 26 and the outer material ply 24 in the lowermost section of the still vertical section of the shaft region 23 as far as a region approximately central underneath the supporting textile ply 42. Along the way, the suction element 106 can rest
25 with its region within the interspace between the shaft functional layer laminate 26 and the outer material ply 24 on the inner side of the outer material ply 24, have a curved trajectory like the outer material ply 24, and extend through the lasting cement 44 as far as the
30 region centrally underneath the shaft bottom functional layer laminate 38. The suction element can rest with its section underneath the shaft bottom functional laminate 38 directly on the supporting textile ply 42 of the shaft bottom functional layer laminate 38 and be
35 cemented thereto, and it can also be cemented with its interspace sided section to the shaft functional layer

laminate 26 or to the outer material ply 24. For this, the suction element 102 can be endowed with an appropriate adhesive at its upper side.

5 The inventors of the present subject matter have found that moisture regularly collects in the interspace in the end section of the shaft region 23 between the shaft functional layer laminate 26 and the outer material ply 24, resulting, the waterproofness of the
10 functional layer laminate notwithstanding, in a sensation of coldness at the foot within the shaft arrangement 100, impairing the moisture transport from in to out and thus adversely affecting the breathability of the shaft arrangement 100 in this
15 region and possibly leading to moisture stains on the outer material 24.

The suction element 102 sucks up such moisture and transports it to outside the shaft arrangement 100,
20 specifically according to Fig. 4 into the suction element 102 region which is outside the shaft arrangement 100 and underneath the shaft bottom functional layer laminate 38. From there, the moisture can be further transported away downwardly through the
25 cutouts 12.

This prevents any sensation of coldness at the foot in the end region of the shaft functional layer laminate 26, ensures breathability to the shaft arrangement 100
30 in this region and prevents the appearance of moisture stains on the outer material 24.

As a result of that region of the right hand side section of the sole ply 6 which is under the right hand
35 side end of the shaft bottom functional layer laminate 38 and of the adjoining comfort bar of the comfort bar

ply 10 being configured without adhesive ply 20 it is possible to achieve better removal of moisture from the suction element 102 through the cutout 12 in the downward direction.

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Fig. 5 shows a sectional depiction of a forefoot region of a fourth shoe 104 according to a further illustrative embodiment of the invention.

10 This fourth shoe 104 is composed of the shaft arrangement 100 of the third shoe 98 and of the sole unit 54 of the second shoe 70, and like elements are each marked by like reference numerals.

15 The configuration, position and function of the suction element 102 is coincident with the suction element 102 of the third shoe 98.

In the case of the fourth shoe 104, moisture is
20 transported out of the interspace between the shaft functional layer laminate 26 and the outer material ply 24 outwardly, in particular in a region underneath the shaft bottom functional layer laminate 38, and from there through the cutouts 60 further in the outward
25 direction.

To produce the shaft arrangement 100 shown in Figures 4 and 5, the suction element 102 is cemented from below, by means of an adhesive not shown here, onto the shaft
30 bottom functional layer laminate 38 and onto the inner side of the shaft functional layer laminate 26 before the sole sided end regions of the outer material ply 24 are lasted together with the shaft bottom functional layer 38.

35

The lasting adhesive does not lead to impairment of the

suction function of the suction element 102.

Fig. 6 shows a sectional depiction of a forefoot region of a fifth shoe 106 according to a further illustrative
5 embodiment of the invention.

The fifth shoe 106 is composed of the sole unit 54 of the second shoe 52 and of a shaft arrangement 108 which is produced like the shaft arrangement 70 of the second
10 shoe 52 according to the bootie principle.

The shaft arrangement 108 corresponds to the shaft arrangement 70 of the second shoe 52 from Fig. 2, the shaft functional layer laminate 116 having a three-ply
15 construction and including from out to in a netband 118, a shaft functional layer or membrane 120 and a shaft liner 122.

The shaft bottom functional layer laminate 128 has a
20 three-ply construction in the entire region of the shaft bottom 124 featuring from bottom to top the netband 118, a shaft bottom functional layer or membrane 130 and a supporting textile ply 132. The netband or mesh 118 is partly covered in the figure.

25

There, the shaft bottom functional layer laminate 128 is cemented by means of a water vapor permeable layer of adhesive 134 to the upper side of the installation sole 126. The layer of adhesive extends from the left
30 hand side end region to the right hand side end region of the installation sole 126. The layer of adhesive 134 penetrates through the net material 118 through to the shaft bottom functional layer 130, and the layer of adhesive 134 is configured as a continuous layer of a
35 water vapor permeable adhesive or as a punctiform layer of a water vapor impermeable adhesive in order that

breathability may be ensured here. The layer of adhesive is intended to prevent any friction between the installation sole 126 and the shaft bottom functional layer 130. The shaft bottom functional layer laminate 128, the textile ply 132 of which comes into contact with the foot, is reliably fixed with respect to the installation sole 126.

A suction element 144 is accommodated in the interspace between the three-ply functional layer laminates and the installation sole 126 or the outer material ply 114.

The suction element 144 is preferably made of a cotton material and extends from the lower end section of the right hand side shaft region 112 as far as a region situated somewhat further to the right of the middle of the installation sole 126 into the interspace between the shaft bottom functional layer laminate 128 and the installation sole 126.

This suction element 144 transports moisture which collects in the interspace between the outer material ply 114 and the shaft functional layer laminate 116 into a region underneath the shaft bottom functional layer laminate 128 and from there through the permeable installation sole 126 and the barrier ply 64 to an outer side of the shoe, providing the advantages described above.

The positioning of the suction element 144 in Fig. 6 is exemplary in nature in that it is similarly possible for a further suction element 144 to also be provided mirror-symmetrically to the suction element 144 on the left hand lower side of the shaft arrangement 108.

Fig. 7 shows a sectional depiction of a forefoot region of a sixth shoe 146 according to a further illustrative embodiment of the invention.

- 5 The sixth shoe 146 is constructed from the sole unit 54 of the second shoe 52 and a shaft arrangement 147.

The shaft arrangement 147 comprises a shaft bottom 160 and a shaft region 148 which is connected thereto at
10 the former's perimetric edge and of which there is shown in Fig. 7 a left hand side and a right hand side shaft section which are mirror symmetrical to each other.

- 15 The outer material ply 150 of the shaft region 148 is at the lower end curved inward and cemented to the installation sole 162 by means of lasting adhesive 176.

The shaft arrangement 147 is made in the manner of a
20 bootie, i.e., the lower ends of the shaft functional layer 153 are stitched, for example by means of a zigzag stitch, to the perimetric edges of the shaft bottom functional layer 164. In addition, this transitional region is sealed off waterproof toward the
25 outside using a seam sealing tape 174. In the illustrative embodiment of Fig. 6, these seams are situated in the curved transitional region between the vertical shaft region 148 and the horizontal shaft bottom 160.

- 30 Both the shaft functional layer 152 and the shaft bottom functional layer 164 have a three-ply construction with an outer netband 154, with a shaft functional layer/shaft bottom functional layer or shaft
35 membrane/shaft bottom membrane 156/166 and with an inwardly disposed textile ply or shaft liner

158/supporting textile ply 168.

As with the first shoe 2, an interspace also develops in this sixth shoe 146 between the end region of the outer material ply 150 and the shaft bottom functional layer laminate 164 or the shaft functional layer laminate 152. This interspace increases in size toward the end of the outer material ply 150, and the installation sole 162 projects into this space. That part of the interspace which is not occupied by this installation sole 162 is typically filled by air or water vapor or a mixture thereof.

As in the case of the third shoe 98 in Fig. 4, this sixth shoe 146 is also provided with a suction element 180 which extends from the interspace between the shaft functional layer laminate 152 and the outer material ply 150 underneath the sealing cementation 174 via the cementation 176 to the outer side of the shaft arrangement 146 underneath the installation sole 162.

The interspace sided end of the suction element 180 extends here from the still vertical lower section of the shaft region, via the sealing cementation 174, makes a curve and rests against the underside of the installation sole 162. The outside region of the suction element 180 can be cemented to the underside of the installation sole 162 by means of a layer of adhesive for example.

The suction element 180 is embedded in the sealing adhesive without the suction effect being significantly impaired.

This suction element 180 transports moisture out of the interspace toward the outside. From the underside of

the installation sole 162, this moisture can be further removed through the cutouts 60 in the sole unit 54.

5 The shaft bottom functional layer laminate 164 is connected to the installation sole 162 by means of a water vapor permeable layer of adhesive 170. The layer of adhesive 170, which can be made continuously or punctiform, in the illustrative embodiment of Fig. 7 covers a large portion of the surface of the
10 installation sole 162, penetrates through the net material 154 as far as the shaft bottom functional layer 166, and is made water vapor permeable in order that breathability may be ensured here. Thus, reliable fixation of the shaft bottom functional layer laminate
15 164 with respect to the installation sole 162 is achieved here.

Fig. 8 shows a schematic view of the shaft arrangement 100 from below.

20

The outer material 24 end region which forms the lower perimetric edge of the shaft arrangement 100 and is lasted to the underside of the installation sole 42 is readily apparent. Likewise apparent are the ends of the
25 suction elements which are embodied as suction tapes 184 and which transport moisture out of the interspace between the shaft functional layer laminate and the outer material ply to the outside.

30 The present illustrative embodiment shows eight ends of suction tapes 184 of low width, distributed along the perimetric edge of the outer material ply 24. Such an arrangement of a plurality of suction tapes 184 along the overall perimeter of the outer material ply 24
35 makes it possible to ensure a reliable removal of moisture out of the interspace between the shaft

functional layer and the outer material ply in all circumferential regions of the shaft arrangement.

5 It will be appreciated that such an arrangement of suction tapes 184 can also find utility in all other above-described kinds of shaft arrangements.

Fig. 9 shows a view of an alternative illustrative embodiment of the shaft arrangement 100 of the third shoe 98 from below.

10

Here, only one suction tape 186 is provided in a forefoot region of the shaft arrangement 100, and it extends somewhat as far as underneath the installation sole 42. This suction tape 186 transports moisture out
15 of the interspace between the outer material ply and the shaft functional layer laminate toward the outside, and one such suction tape 186 is already enough to achieve significant removal of moisture.

20 Fig. 10 shows a view of an alternative illustrative embodiment of the shaft arrangement 100 of the third shoe 98 from below.

Here, instead of suction tapes of relatively low width,
25 a sheetlike suction element 188 which surrounds half a side is provided to transport in the entire forefoot region and also in a middle region of the shoe, moisture out of the interspace between the outer material ply and the shaft functional layer laminate to
30 the underside of the installation sole 42, from where the moisture can leave the shoe in the downward direction.

Fig. 11 shows a view of an illustrative embodiment of
35 the shaft arrangement 100 of the third shoe 98 from

below.

Here a total of four suction tapes 190 are provided, which extend in the shoe transverse direction across the entire underside of the installation sole 42 and the left hand side and right hand side ends of which extend into the interspaces between the outer material ply and the shaft functional layer laminate, respectively. In the present illustrative embodiment, the four suction tapes 190 are arranged approximately equidistantly along the length of the shaft arrangement 100.

Such an arrangement of suction tapes can likewise provide a reliable removal of moisture out of the interspace between the outer material ply and the shaft functional layer laminate.

Fig. 12 shows a sectional view of a present invention suction element 102 according to an illustrative embodiment of the invention.

The suction element 102 comprises a layer 192 of a liquid-absorbing material which ensures liquid transfer from the interspace to the outside and which can be of cotton material for example. This suction layer is provided on the upper side with an adhesive material 194, by means of which the suction element 102 can be cemented for example to the underside of the installation sole 42 and the inner side of the shaft functional layer laminate. This adhesive need not be provided on the entire upper side of the suction layer 192; it suffices for this adhesive to be provided regionally.

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Claims:

1. Shaft arrangement (22) for footwear (2) including
 - 5 a shaft bottom (34) having a water vapor permeable installation sole (36) and having a shaft bottom functional layer laminate (38);
a shaft region (23) having an outer material ply (24) and having a shaft functional layer laminate (26);
wherein a sole sided shaft end region is connected to the shaft bot-
10 tom (34);
wherein the shaft bottom functional layer laminate (38) has a two-ply configuration, wherein the two-ply shaft bottom functional layer laminate (38) consists of a shaft bottom functional layer (40) and a supporting textile ply (42), with the shaft bottom functional layer (40) being the
15 top layer of the two-ply shaft bottom functional layer laminate (38) and being arranged between the supporting textile ply (42) and the water vapor permeable installation sole (36);
wherein the water vapor permeable installation sole (36) is arranged above the shaft bottom functional layer laminate (38); and
20 wherein the two-ply shaft bottom functional layer laminate (38) has a greater lateral extension than the water vapor permeable installation sole (36) and wherein the two-ply shaft bottom functional layer laminate (38) and the shaft functional layer laminate (26) are connected to each other in a waterproof manner.
- 25 2. Shaft arrangement (22) according to claim 1, wherein the shaft functional layer laminate (26) has a three-ply configuration.
3. Shaft arrangement (22) according to claim 1 or 2, wherein the water
30 vapor permeable installation sole (36) is stitched to the sole sided end region of the shaft functional layer laminate (26), or wherein the inner

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side of the sole sided end region of the outer material ply (24) is lasted onto the shaft bottom functional layer laminate (38).

4. Shaft arrangement (22) according to claim 1 or 2, wherein the water
5 vapor permeable installation sole (36) is stitched to the sole sided end region of the shaft functional layer laminate (26) and wherein the inner side of the sole sided end region of the outer material ply (24) is lasted onto the shaft bottom functional layer laminate (38).

10 5. Shaft arrangement (70) for footwear (52) including
a shaft bottom (80) having a water vapor permeable installation sole (82) and having a shaft bottom functional layer laminate (84);
a shaft region (71) having an outer material ply (72) and having a shaft functional layer laminate (74);

15 wherein a sole sided shaft end region is connected to the shaft bottom;

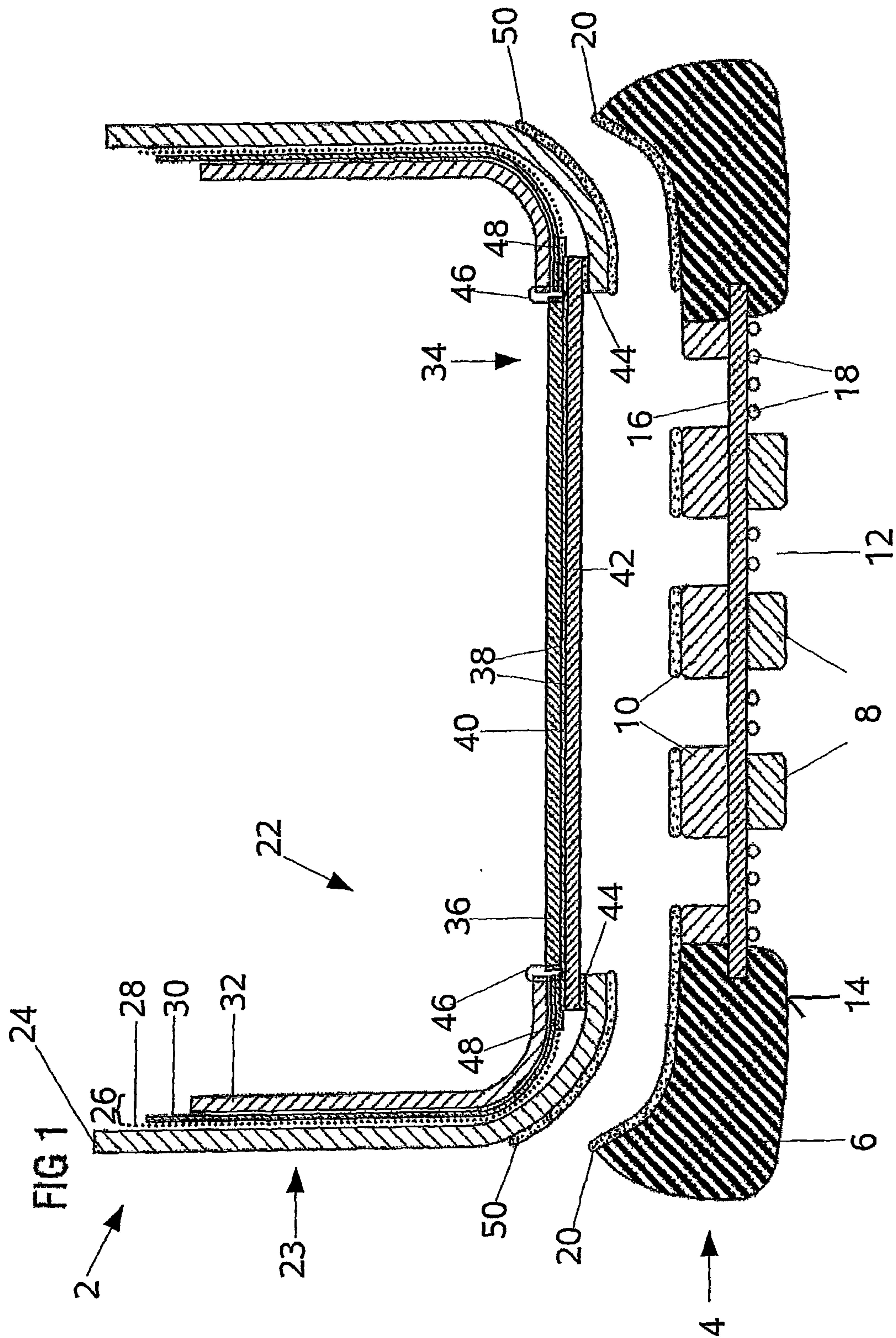
wherein the shaft bottom functional layer laminate (84) has a two-ply configuration, wherein the two-ply shaft bottom functional layer laminate (84) consists of a shaft bottom functional layer (86) and a supporting
20 textile ply (88), with the shaft bottom functional layer (86) being the lower layer of the two-ply shaft bottom functional layer laminate (84) and being arranged between the supporting textile ply (88) and the water vapor permeable installation sole (82);

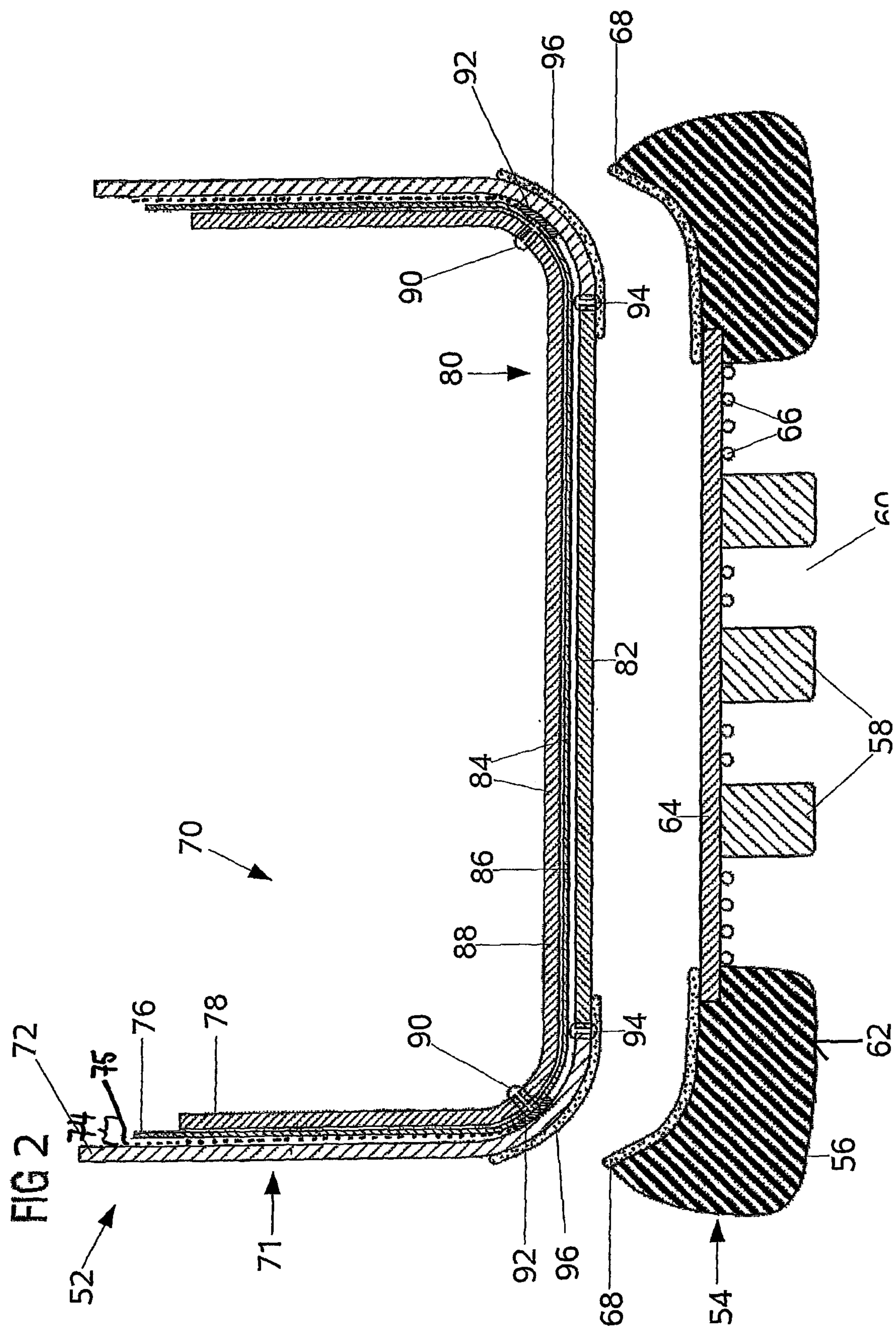
wherein the sole sided end region of the shaft functional layer laminate (74) is connected to the two-ply shaft bottom functional layer laminate (84) in a waterproof manner; and
25

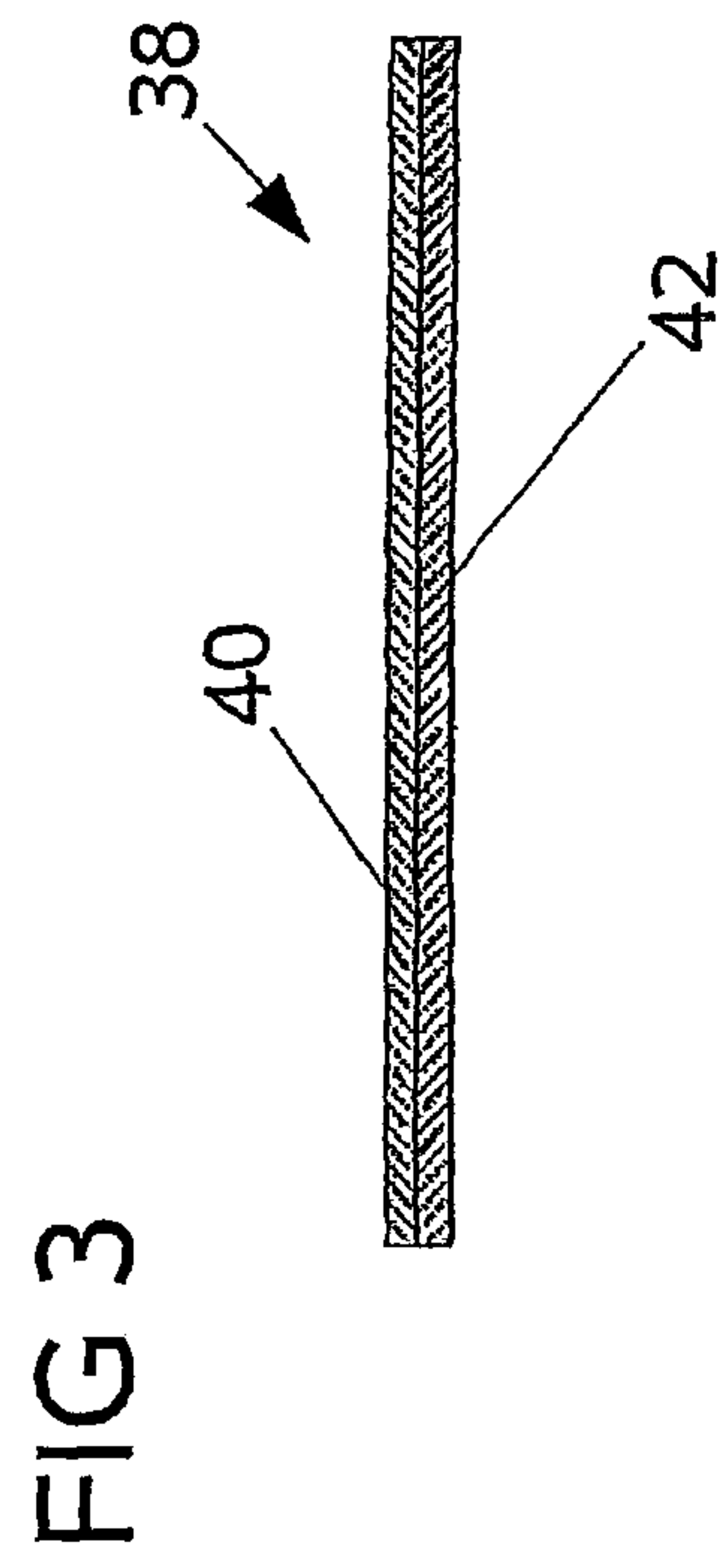
wherein the water vapor permeable installation sole (82) is arranged underneath the shaft bottom functional layer laminate (84).

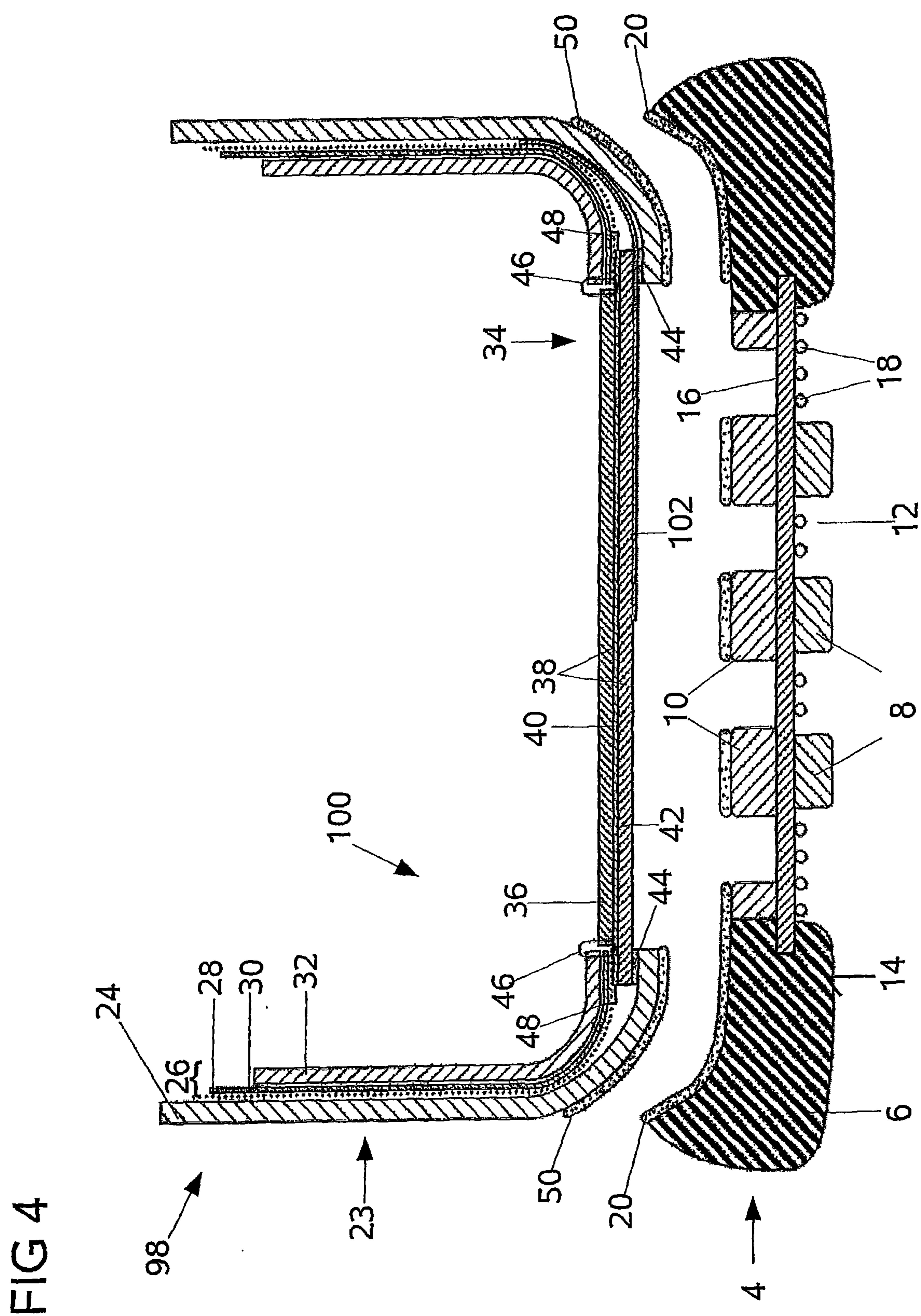
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6. Shaft arrangement (70) according to claim 5, wherein the shaft functional layer laminate (74) has a three-ply configuration.
7. Shaft arrangement (70) according to claim 5 or 6, wherein the sole sided end region of the outer material ply (72) is stitched to the water vapor permeable installation sole (82).
8. Shaft arrangement according to claim 5 or 6, wherein the inner side of the sole sided end region of the outer material ply is lasted onto the installation sole.
9. Footwear (2) having at least one shaft arrangement (22, 70) according to any one of claims 1 to 8 and having a sole unit (4, 54) secured to the underside thereof and having at least one throughhole opening or having porosities, which sole unit (4, 54) is cemented or injected to the underside of the shaft arrangement (22, 70) in particular.









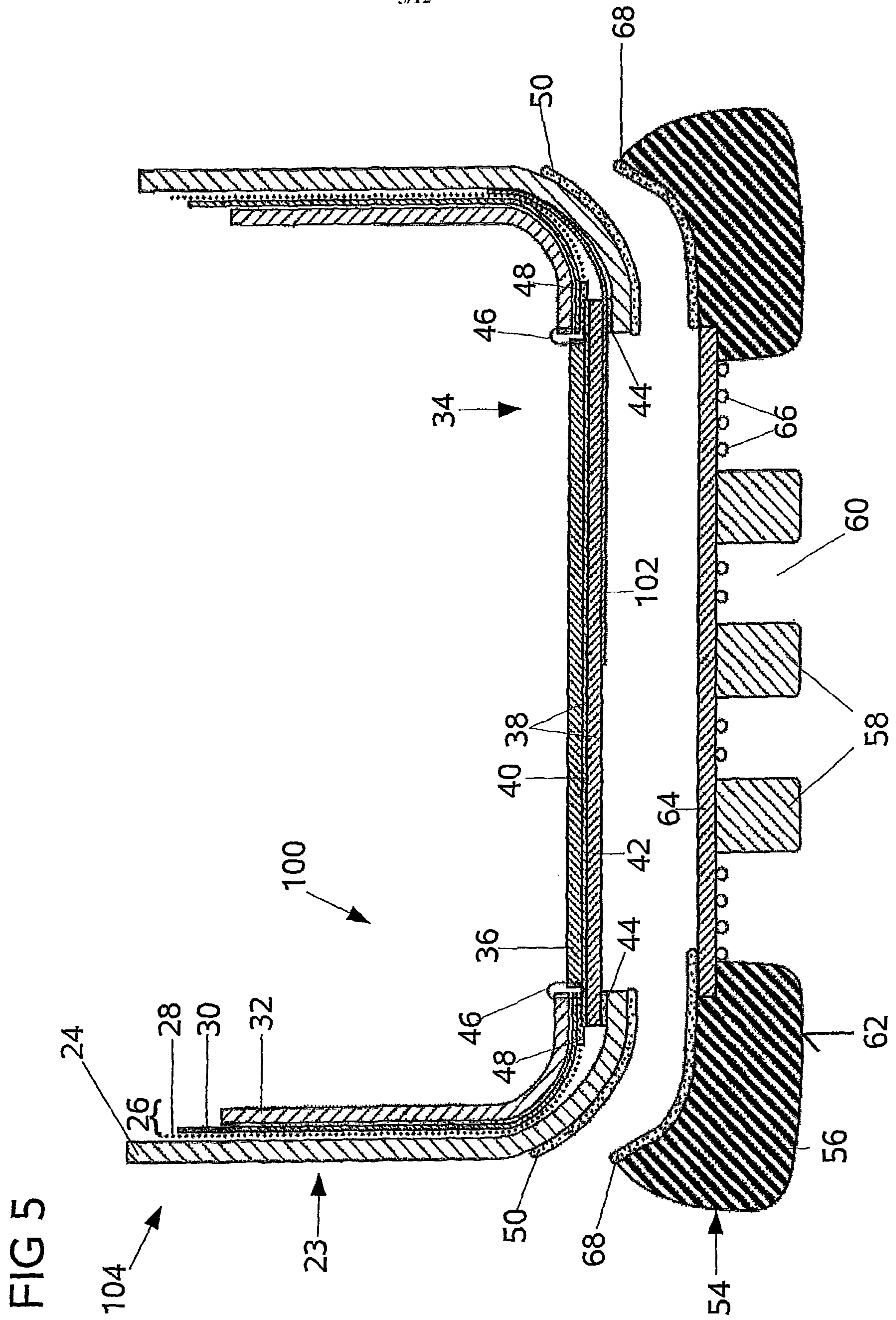
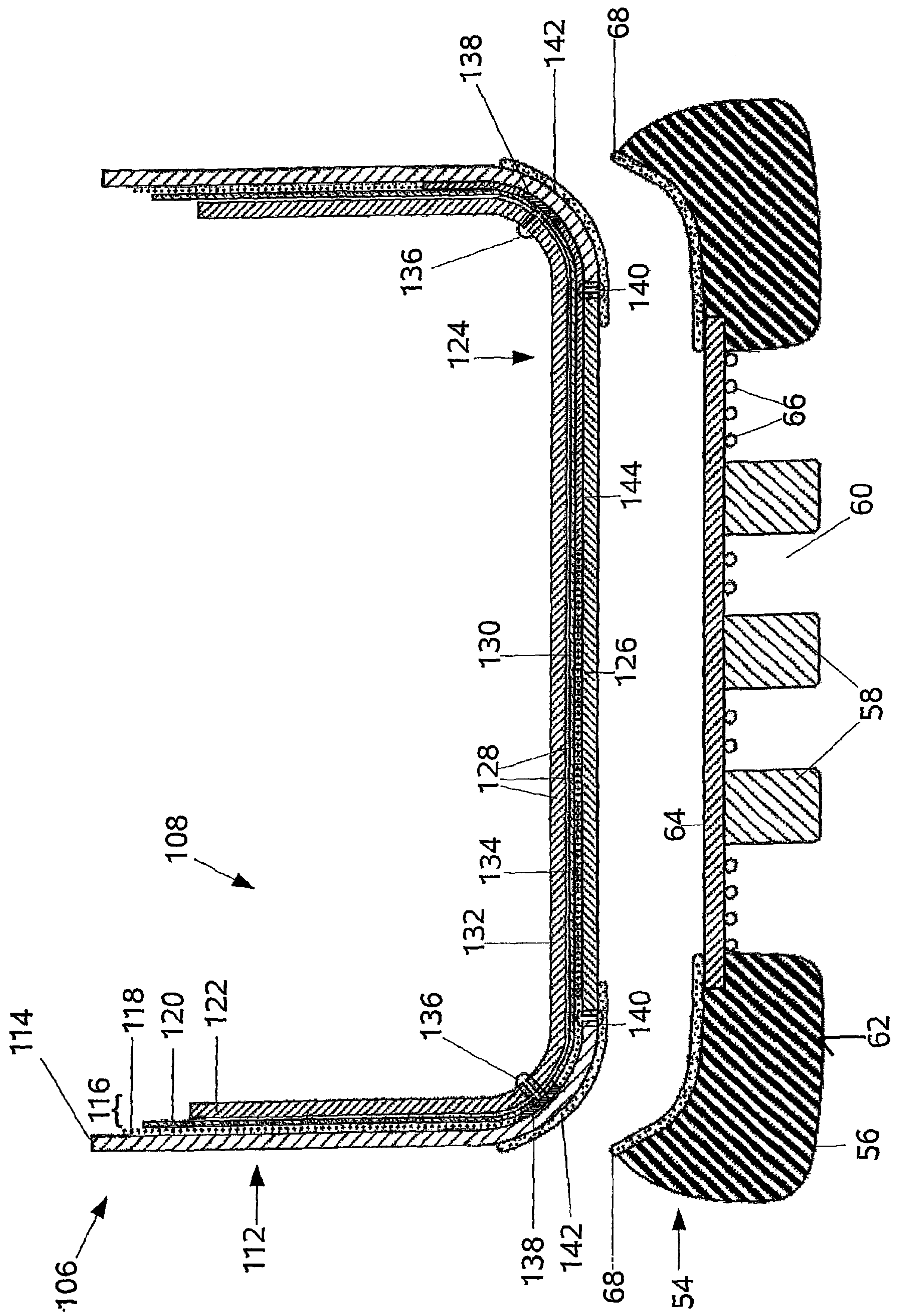
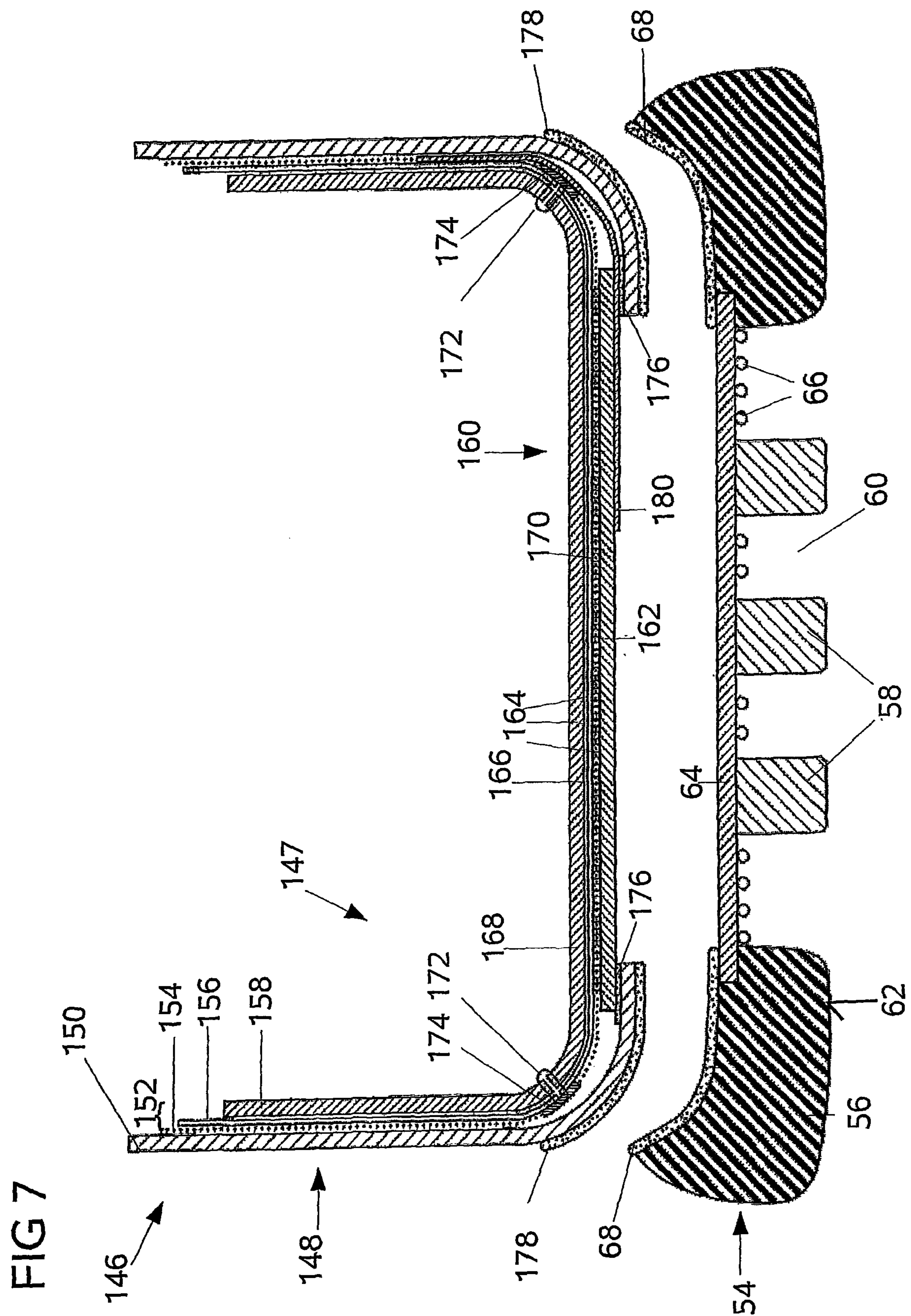
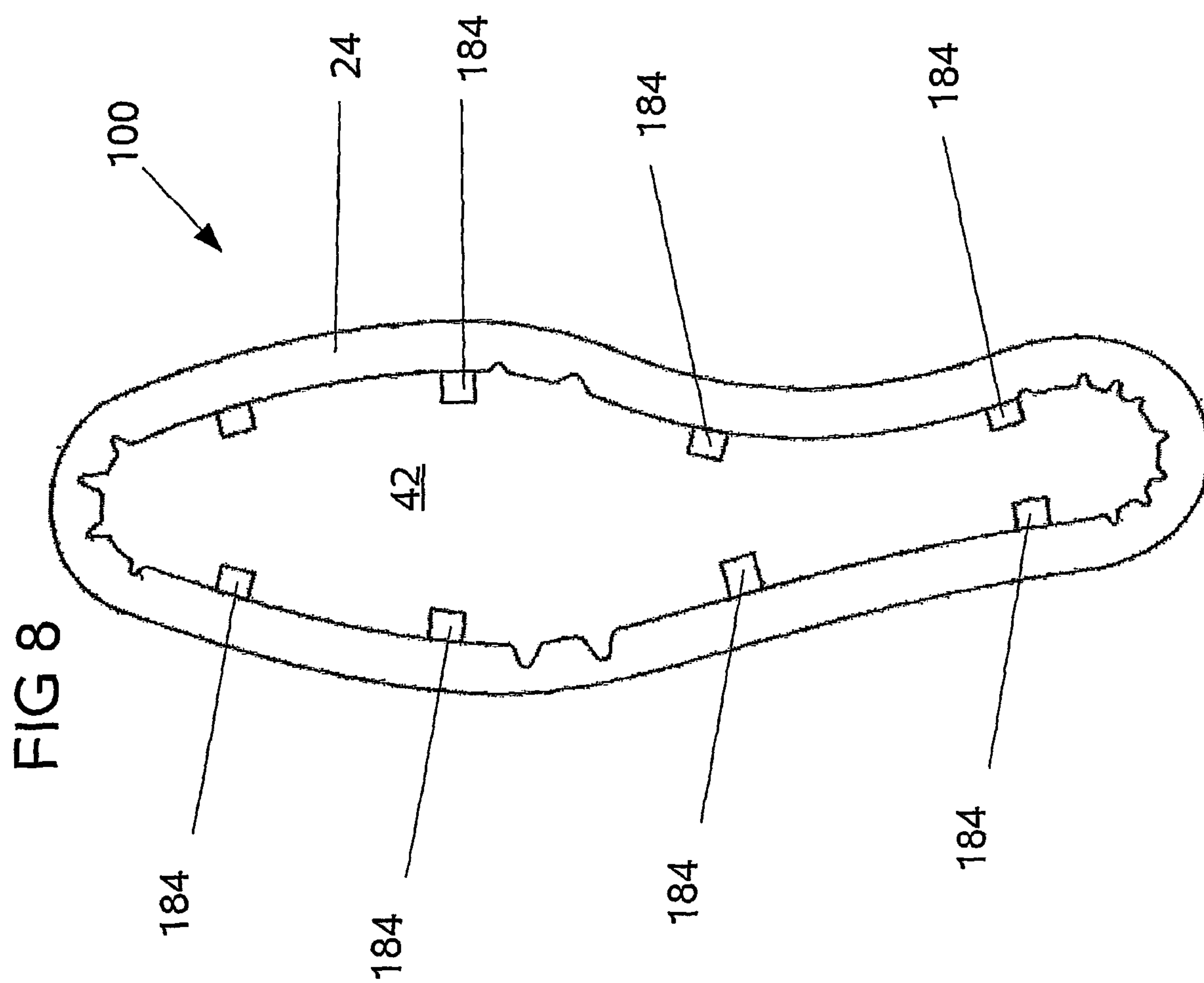


FIG 6







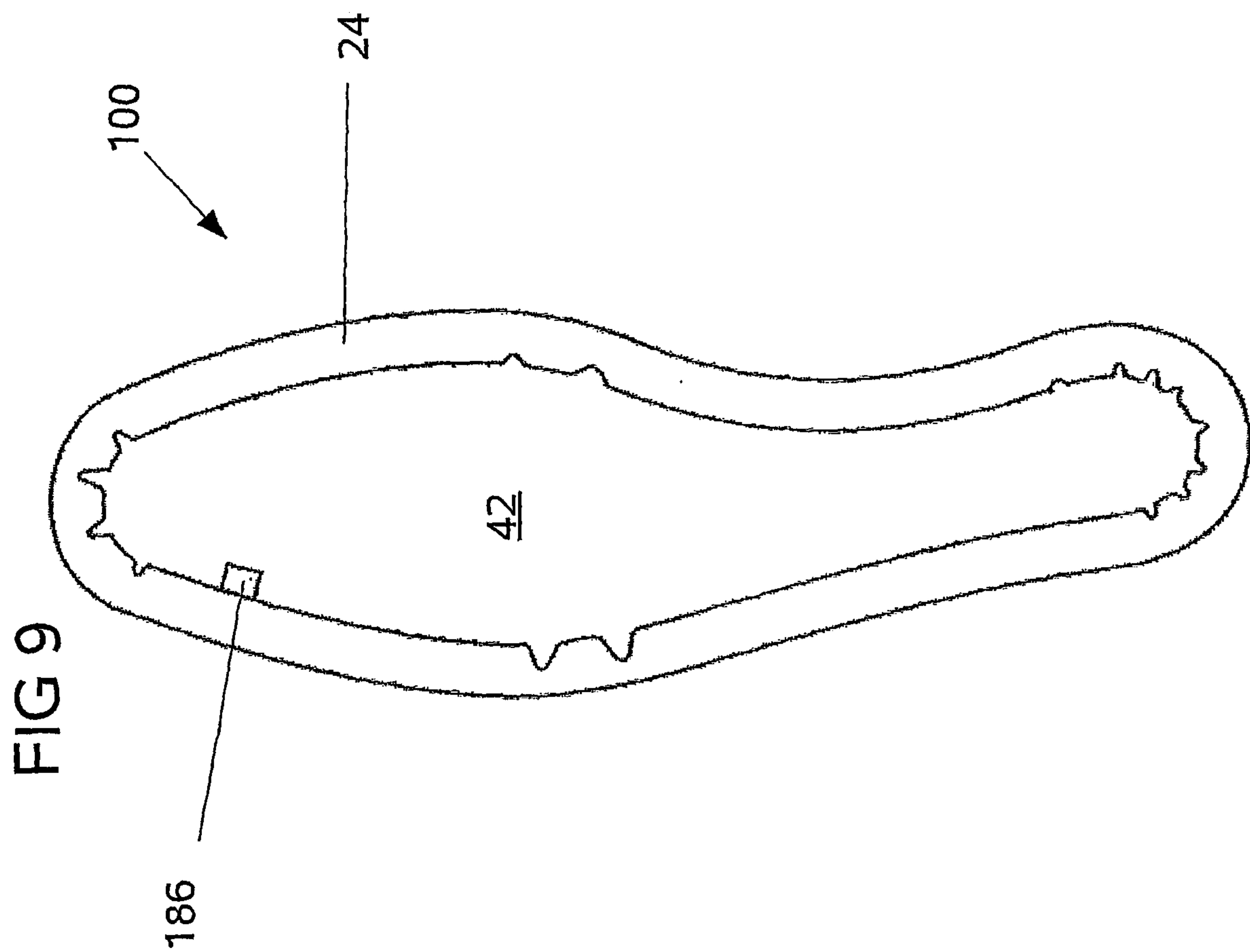


FIG 10

