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(54) **Garment fabric**

Kleidungsstoff

Tissu pour vêtement

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Description

[0001] This invention relates to a garment fabric which provides a beneficial effect when worn over an area of skin which, for one or more reasons, has suffered damage.

[0002] Frequently skin damage can arise in consequence of climatic factors, especially in low temperature and low humidity situations, and in consequence of environmental factors such as may be caused by contact with substances such as lime, cement and salt. Also, skin damage can be associated with genetic factors, bacterial disease and, especially in the case of older people, physiological factors.

[0003] Many women have damaged heel skin, which can be embarrassing when wearing slippers of other, summer type footwear such as flip-flops. Also there is discomfort in winter when large cracks can arise and result in bleeding.

[0004] It is already known to form a garment such as a sock from fibres or filaments which have antibacterial properties, for example by providing a fibrous material which contains nano-silver particles of a diameter less than 100nm as described in EP 1490543A.

[0005] These antibacterial properties assist in providing a relatively healthy environment for an area of skin which has suffered damage due to bacterial disease and thus provide a relatively healthy environment which assists the natural processes of skin recovery. However, alone the anti-bacterial properties are of limited effectiveness for ensuring or assisting a speedy recovery.

[0006] It is known also, from US 2010/0043124A1, to provide a hosiery garment with a multi-layered cushion to protect an Achilles heel of the wearer from abrasion caused by a heel of a footwear.

[0007] The speed of recovery from skin damage often can be improved by ensuring a good rate of blood circulation. It is known that repair of damaged skin can be assisted by use of a cream, but often individuals forget to apply the cream regularly. It is known also to employ medication such as zinc oxide, snake oil, Vaseline (RTM) and sulphur ointment, but such treatments are inconvenient and generally expensive.

[0008] It would be advantageous if the rate of recovery and or ease of recovery could be accelerated and the present invention seeks to provide a garment fabric which addresses this matter.

[0009] According to one aspect of the present invention there is provided a garment fabric comprising a fabric support in the form of a layer for defining the shape of a garment and having a surface to at least a part of which there is secured a therapeutic fabric layer, said therapeutic fabric layer being secured to the fabric support by a flexible adhesive, said flexible adhesive at least partially penetrating into each of the fabric support and the therapeutic fabric layer to provide chemical adhesion and a mechanical interlock between said layers, and said flexible adhesive comprising one or more of the herb ingredients fang feng, jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye and jiang zhen Xiang.

[0010] Preferably said therapeutic fabric layer comprises fibres or filaments, such as woven nylon or other filaments, which have antibacterial properties and comprise magnetic particles.

[0011] The terms "fibres" and "filaments" are used herein to refer respectively to filamentary elements of a relatively short length, and to filamentary elements of a relatively long length, and to embrace yarns, cords and other such assemblies comprising a plurality of fibres and/or filaments.

[0012] For providing pain relief the flexible adhesive preferably comprises ding Xiang. For open sweat pores it preferably comprises one or more of fang feng, jing jie and tou gu can, and more preferably it comprises the combination of all three of said herb ingredients. For a deoppilant benefit preferably it comprises ai ye. For promotion of blood circulation preferably it comprises zhen Xiang and/or hong hua.

[0013] Said fabric support may be of a type having antibacterial properties.

[0014] Said therapeutic layer additionally may comprise one or more of sulphur, zinc oxide, allantoin and lanolin.

[0015] The term "fabric" is used herein to refer to a material which has been formed from fibres and or filaments which have been brought together by a process such as weaving, knitting or felting to result in a cohesive assembly of the filaments and or fibres.

[0016] The adhesive may be of a type prepared by filtering of natural latex to remove any impurities, followed by mixing with a said herb ingredient and optionally, with one or more of potassium hydroxide (KOH), allantoin, accelerating agent (such as PX) and acetylsalicylic acid.

[0017] The flexible adhesive layer preferably comprises two adhesive layers. One layer may comprise natural rubber mixed with a said herb ingredient and the other may comprise natural rubber that has been mixed with one or more of potassium hydroxide, allantoin and acetylsalicylic acid.

[0018] The therapeutic fabric layer may be of a type comprising fibres or filaments which have been rendered anti-bacterial by a technique known per se, such as that described in the aforementioned EP 1490543. Optionally the fabric support also may possess anti-bacterial properties.

[0019] The therapeutic fabric layer preferably has a thickness less than 1.0mm, preferably less than 0.5mm. A thickness of 0.2mm or less is preferred for many applications.

[0020] Preferably the therapeutic fabric layer is provided with anti-bacterial properties by treatment of the fibres or filaments with a colourless, transparent type of nano-silver solution which may be of an acidic, neutral or alkaline type. The nano-silver solution preferably comprises silver particles which have a size less than or equal to 0.5nm.

[0021] The fibres or filaments of the therapeutic fabric layer may be fibres or filaments of a natural material such as cotton or wool or of a synthetic material such as a polyamide, for example nylon or an aromatic polyamide.

[0022] The flexible adhesive layer may incorporate other materials such as sulphur, zinc oxide and lanolin to further enhance medical benefits.

[0023] Preferably use is made of a therapeutic fabric layer having an average magnetic flux of greater than 0.35mm mwb.

[0024] The therapeutic fabric layer preferably is effective to reflect body heat, particularly to reflect infrared rays having a wavelength of 8 - 14 μm.

[0025] The therapeutic fabric layer may be provided as a lining within all or part of a sock or other garment such as a glove. It may be in the form of a pad which is adhered to a part of that surface of a garment which confronts the skin of the wearer. White cotton is a particularly suitable material for forming pads.

[0026] The fabric support may be made of material such as cotton, nylon, a mix of cotton and nylon, a mix of wool and cotton, bamboo fabric, linum fibre, infrared fabric and magnetic fabric. Other known materials may be employed to form the fabric support and define the shape of a garment.

[0027] In accordance with another aspect of the present invention there is provided a method for the production of a garment fabric which comprises a support layer to at least a part of which there is secured a therapeutic layer, said method comprising providing a first adhesive and applying said first adhesive to one of the support layer and therapeutic layer, providing a second adhesive comprising natural rubber mixed with one or more of potassium hydroxide, allantoin and acetylsalicylic acid, applying said second adhesive to the other of said therapeutic layer and support fabric and then bringing together of the two adhesive layers into contact with one another thereby to secure the therapeutic layer to at least a part of the surface of the support layer, wherein the first adhesive comprises a mixture of natural rubber and one or more of the Chinese herbs fang , jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye and jiang zhen Xiang.

[0028] Preferably the herb ingredients are incorporated by mixing slowly with natural rubber at a temperature no less than 15°C. Preferably the first adhesive is applied to the therapeutic layer but may alternatively be applied to the support layer. Preferably it is applied to a thickness of 0.01 mm.

[0029] The second layer of the adhesive preferably is applied to the fabric support but may alternatively be applied to the therapeutic fabric layer. Preferably the second adhesive is applied to a thickness of 0.01 mm. Other thicknesses may be employed and preferably the thicknesses of each of the two adhesive layers of the flexible adhesive layer are substantially equal.

[0030] Preferably the two layers are initially. held in contact with one another at a temperature of no less than 20° centigrade. It is further preferred that the method comprise a delay of at least two minutes, preferably at least five minutes between coating adhesive to the layers and bringing them into contact with one another.

[0031] An embodiment of the present invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawing (Fig. 1) which is a sectional view of a sock in accordance with the present invention and the sectional view (Fig. 2) of part of the sock to show the adhesive layers.

[0032] A sock 10, see figure 1, comprises a stretchable outer fabric layer 11 which is of a flexible anti-bacterial material and defines the shape of the sock. The sock comprises a heel region 12 and a sole region 13 which, in use, aligns, with the ball of the wearer's foot. Each of the regions 12, 13 is provided with a flexible therapeutic fabric pad 14 of a type in accordance with the present invention. In this embodiment the pads each have a thickness of 0,2mm and comprise woven nylon filaments. The nylon filaments are of a type which have adopted sub-nanometer zirconium phosphate carrying silver particles. The filaments are also of a type which exhibit far infrared and anti-bacterial properties.

[0033] The pads are held in position by a flexible adhesive layer comprising natural, latex and which partially penetrates into the fabric material of the layer 11 and the pads 14. In addition to chemical adhesion the interposed natural latex effects a mechanical interlock with the filaments of the layer 11 and of the pads 14.

[0034] In this embodiment of the present invention the flexible adhesive layer comprises a first adhesive 15 which is a mixture of natural latex and one or more of the Chinese herb ingredients fang feng, jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye and jiang zhen Xiang. The first adhesive layer is formed by slowly mixing the herb ingredient(s) with natural latex at a temperature no less than 15°C.

[0035] A second adhesive 16 is formed by mixing natural latex with potassium hydroxide, allantoin and acetylsalicylic acid.

[0036] The first adhesive 15 is applied as a layer to the pads 14 and the second adhesive 16 is applied as a layer to those parts of the fabric layer 11 which are to receive the pads 14. The two adhesives are applied to form layers having a thickness of 0.01 mm. The two adhesive layers are held apart for two minutes and then brought together at a temperature of no less than 20°C.

[0037] A sock or other garment in accordance with the present invention is believed to provide an improved ability to speed the recovery of damaged skin in consequence of the anti-bacterial properties that have been found advantageously to enhance the rate of blood microcirculation and viscosity.

[0038] Thus the need to employ relatively inconvenient treatments such as ointments may be avoided.

[0039] In particular, in the case of damaged heels or other parts of feet the use of socks of a type in accordance with the present invention is more convenient than, for

example, the use of ointments and because the use of socks is a very normal practice the need for routine and regular treatment is less likely to be forgotten than is the use of ointments.

Claims

1. A garment fabric comprising a fabric support (11) in the form of a layer for defining the shape of a garment and having a surface to at least a part of which there is secured a therapeutic fabric layer (14), said therapeutic fabric layer being secured to the fabric support by a flexible adhesive (15,16), said flexible adhesive at least partially penetrating into each of the fabric support and the therapeutic fabric layer to provide chemical adhesion and a mechanical interlock between said layers **characterised in that** the flexible adhesive (15,16) comprises one or more of the herb ingredients fang feng jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye and jiang zhen Xiang.

2. A garment fabric according to claim 1 or claim 2 **characterised in that** the therapeutic fabric layer (14) comprises woven filaments.

3. A garment fabric according to claim 1 or claim 2 **characterised in that** the therapeutic fabric layer (14) comprises a material having anti-bacterial properties.

4. A garment fabric according to any one of the preceding claims **characterised in that** the therapeutic fabric layer (14) comprises fibres or filaments which comprise magnetic particles.

5. A garment fabric according to any one of the preceding claims **characterised in that** the therapeutic fabric layer (14) has a thickness less than 1.0mm.

6. A method for the production of a garment fabric which comprises a fabric support layer (11) to at least a part of which there is secured a therapeutic layer (14), wherein said method comprises providing a first adhesive (15) and applying said first adhesive to one of the support layer (11) and therapeutic layer (14), providing a second adhesive (16) comprising natural rubber mixed with one or more of potassium hydroxide, allantoin and acetylsalicylic acid, applying said second adhesive to the other of said therapeutic layer and support fabric and then bringing together of the two adhesive layers into contact with one another thereby to secure the therapeutic layer to at least a part of the surface of the support layer, **characterised in that** the first adhesive (15) comprises a mixture of natural rubber and one or more of the Chinese herbs fang feng jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye and jiang zhen Xiang.

7. A method according to claim 6 **characterised in that** the first adhesive (15) is formed by mixing the herb ingredients with natural rubber.

8. A method according to claim 6 or claim 7 **characterised in that** the first adhesive (15) is applied to the therapeutic layer (14) and the second adhesive is applied to the fabric support (11).

9. A method according to any one of claims 6 to 8 **characterised in that** the two layers of adhesive (15,16) are of substantially equal thickness.

10. A method according to any one of claims 6 to 9 **characterised in that** the support layer (11) and therapeutic layer (14) each have a layer of adhesive applied thereto and wherein the two layers of adhesive are brought into contact and held in contact with one another at a temperature no less than 20°c.

11. A method according to claim 10 **characterised in that** the two layers of adhesive (15,16) are applied to the support layer and therapeutic layer at least two minutes before the two layers of adhesive are brought into contact with one another.

Patentansprüche

1. Stoff für ein Kleidungsstück, umfassend einen Stoffträger (11) in Form einer Schicht zum Definieren der Form eines Kleidungsstücks und mit einer Oberfläche, wobei wenigstens an einem Teil dieser eine therapeutische Stoffschicht (14) gesichert ist, wobei die therapeutische Stoffschicht durch ein flexibles Adhäsionsmittel (15, 16) an dem Stoffträger gesichert ist, wobei das flexible Adhäsionsmittel wenigstens teilweise in den Stoffträger als auch in die therapeutische Stoffschicht eindringt, um eine chemische Adhäsion und eine mechanische Verriegelung zwischen den Schichten bereitzustellen, **dadurch gekennzeichnet, dass** das flexible Adhäsionsmittel (15, 16) einen oder mehrere der Kräuterbestandteile Fang Feng, Jing Jie, Tou Gu Cao, Dang Gui, Hong Hua, Ding Xiang, Chuan Jiao, Ai Ye und Jiang Zhen Xiang umfasst.

2. Stoff für ein Kleidungsstück nach Anspruch 1, **dadurch gekennzeichnet, dass** die therapeutische Stoffschicht (14) gewebte Fäden umfasst.

3. Stoff für ein Kleidungsstück nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die therapeutische Stoffschicht (14) ein Material mit antibakteriellen Eigenschaften umfasst.

4. Stoff für ein Kleidungsstück nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die therapeutische Stoffschicht (14) Fasern oder Fäden umfasst, die magnetische Teilchen umfassen.

5. Stoff für ein Kleidungsstück nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die therapeutische Stoffschicht (14) eine Dicke von weniger als 1,0 mm aufweist.

6. Verfahren zur Herstellung eines Stoffes für ein Kleidungsstück, das eine Stoffträgerschicht (11) umfasst, wobei wenigstens an einen Teil dieser eine therapeutische Schicht (14) gesichert ist, wobei das Verfahren das Bereitstellen eines ersten Adhäsionsmittels (15) und das Auftragen des ersten Adhäsionsmittels auf die Trägerschicht (11) oder die therapeutische Schicht (14) umfasst, das Bereitstellen eines zweiten Adhäsionsmittels (16), das Naturkautschuk gemischt mit Kaliumhydroxid, Allantoin oder Acetylsalicylsäure umfasst, das Auftragen des zweiten Adhäsionsmittels auf die andere Schicht der therapeutischen Schicht oder des Trägerstoffs, und das folgende Zusammenführen der beiden Adhäsionsschichten in Kontakt miteinander, um die therapeutische Schicht an wenigstens einem Teil der Oberfläche der Trägerschicht zu sichern, **dadurch gekennzeichnet, dass** das erste Adhäsionsmittel (15) ein Gemisch aus Naturkautschuk und einem oder mehreren der chinesischen Kräuter Fang Feng, Jing Jie, Tou Gu Cao, Dang Gui, Hong Hua, Ding Xiang, Chuan Jiao, Ai Ye und Jiang Zhen Xiang umfasst.

7. Verfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** das erste Adhäsionsmittel (15) durch Mischen der Kräuterbestandteile mit Naturkautschuk gebildet wird.

8. Verfahren nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** das erste Adhäsionsmittel (15) auf die therapeutische Schicht (14) aufgetragen wird und dass das zweite Adhäsionsmittel auf den Stoffträger (11) aufgetragen wird.

9. Verfahren nach einem der Ansprüche 6 bis 8, **dadurch gekennzeichnet, dass** die beiden Adhäsionsmittelschichten (15, 16) im Wesentlichen die gleiche Dicke aufweisen.

10. Verfahren nach einem der Ansprüche 6 bis 9, **dadurch gekennzeichnet, dass** die Trägerschicht (11) und die therapeutische Schicht (14) jeweils eine Schicht darauf aufgetragenen Adhäsionsmittels aufweisen, und wobei die beiden Adhäsionsmittelschichten bei einer Temperatur von nicht weniger als 20 °C in Kontakt miteinander gebracht und in Kontakt miteinander gehalten werden.

11. Verfahren nach Anspruch 10, **dadurch gekennzeichnet, dass** die beiden Adhäsionsmittelschichten (15, 16) wenigstens zwei Minuten bevor die beiden Adhäsionsmittelschichten in Kontakt miteinander gebracht werden auf die Trägerschicht und die therapeutische Schicht aufgetragen werden.

Revendications

1. Tissu pour vêtement comprenant un support (11) de tissu sous la forme d'une couche permettant de définir la forme du vêtement et ayant une surface sur au moins une partie de laquelle est fixée une couche (14) de tissu thérapeutique, ladite couche de tissu thérapeutique étant fixée au support de tissu par un adhésif (15,16) souple, ledit adhésif souple pénétrant au moins partiellement dans chacun du support de tissu et de la couche de tissu thérapeutique pour créer une adhésion chimique et un verrouillage mécanique entre lesdites couches, **caractérisé en ce que** l'adhésif (15,16) souple comprend une ou plusieurs des plantes suivantes : fang feng, jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye et jiang zhen Xiang.

2. Tissu pour vêtement selon la revendication 1, **caractérisé en ce que** la couche (14) de tissu thérapeutique comprend des filaments tressés.

3. Tissu pour vêtement selon la revendication 1 ou 2, **caractérisé en ce que** la couche (14) de tissu thérapeutique comprend un matériau ayant des propriétés antibactériennes.

4. Tissu pour vêtement selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la couche (14) de tissu thérapeutique comprend des fibres ou filaments qui comprennent des particules magnétiques.

5. Tissu pour vêtement selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la couche (14) de tissu thérapeutique a une épaisseur inférieure à 1,0 mm.

6. Procédé pour la production d'un tissu pour vêtement qui comprend une couche (11) de support de tissu sur au moins une partie de laquelle est fixée une couche thérapeutique (14), ledit procédé comprenant les étapes consistant à utiliser un premier adhésif (15) et à appliquer ledit premier adhésif sur la couche (11) de support ou la couche thérapeutique (14), à utiliser un second adhésif (16) comprenant du caoutchouc naturel mélangé à de l'hydroxyde de potassium, de l'allantoïne et/ou de l'acide acétylsalicylique, à appliquer ledit second adhésif sur l'autre de ladite couche thérapeutique et dudit tissu de sup-

port et à mettre les deux couches adhésives en contact l'une avec l'autre pour ainsi fixer la couche thérapeutique sur au moins une partie de la surface de la couche de support, **caractérisé en ce que** le premier adhésif (15) comprend un mélange de caoutchouc naturel et d'une ou de plusieurs des plantes chinoises suivantes : fang feng, jing jie, tou gu cao, dang gui, hong hua, ding Xiang, chuan jiao, ai ye et jiang zhen Xiang. /

7. Procédé selon la revendication 6, **caractérisé en ce que** le premier adhésif (15) est formé en mélangeant les plantes avec du caoutchouc naturel.

8. Procédé selon la revendication 6 ou 7, **caractérisé en ce que** le premier adhésif (15) est appliqué sur la couche thérapeutique (14) et le second adhésif est appliqué sur le support (11) de tissu.

9. Procédé selon l'une quelconque des revendications 6 à 8, **caractérisé en ce que** les deux couches d'adhésif (15, 16) ont une épaisseur sensiblement égale.

10. Procédé selon l'une quelconque des revendications 6 à 9, **caractérisé en ce que** la couche (11) de support et la couche thérapeutique (14) ont chacune une couche d'adhésif appliquée sur elle, les deux couches d'adhésif étant mises en contact et tenues en contact l'une avec l'autre à une température non inférieure à 20 °C.

11. Procédé selon la revendication 10, **caractérisé en ce que** les deux couches d'adhésif (15, 16) sont appliquées sur la couche de support et la couche thérapeutique au moins deux minutes avant que les deux couches d'adhésif soient mises en contact l'une avec l'autre.

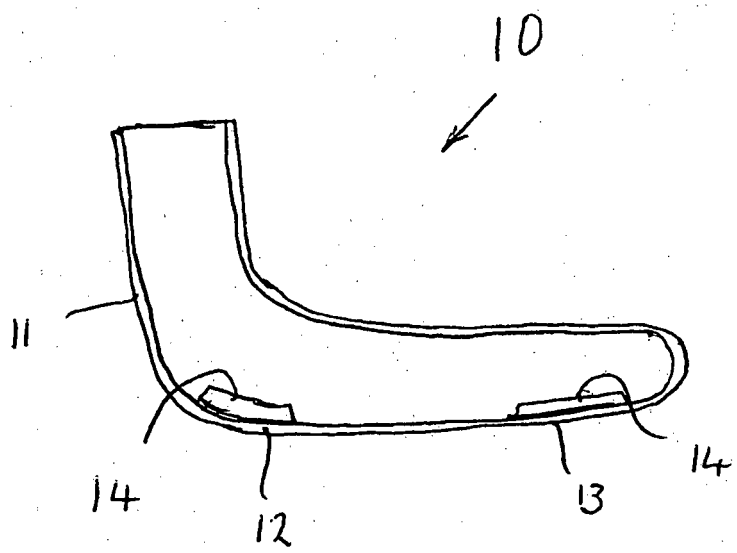


FIG.1

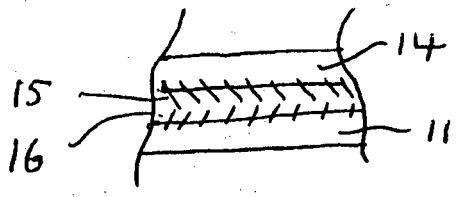


FIG.2

REFERENCES CITED IN THE DESCRIPTION

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