



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.11.2017 Bulletin 2017/48

(51) Int Cl.:
A43B 13/12 (2006.01) A43B 13/22 (2006.01)

(21) Application number: **17170794.6**

(22) Date of filing: **12.05.2017**

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

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(30) Priority: **27.05.2016 IT UA20163865**

(54) **FOOTWEAR SOLE**

(57) The present invention regards a footwear sole comprising a first component (2) and a base group (34) constrained to the midsole component (2) and provided

with a second component or support component (3) as well as a third component or tread component (4) including a plurality of stud elements (4).

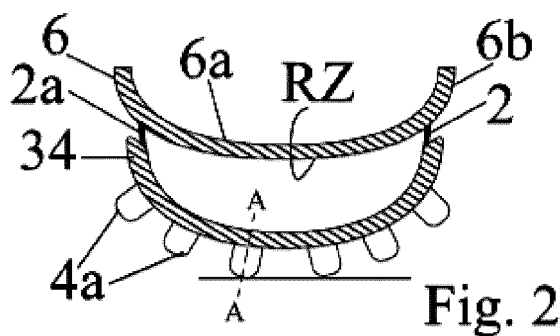


Fig. 2

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention regards a footwear sole as well as a shoe comprising one such sole.

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[0002] As is known, soles usually have a tread layer constrained to a midsole, in turn connected to an upper of a shoe.

[0003] Many solutions have been proposed with different components and constraints, but all the soles proposed up to now, in particular those provided with high strength, have large thicknesses and poor flexibility or adaptability to the roughness of the ground.

OBJECTS OF THE INVENTION

[0004] One object of the present invention is to provide a new footwear sole.

[0005] Another object of the present invention is to provide a new footwear sole that is thin and strong.

[0006] Another object of the present invention is to provide a new footwear sole that is able to damp possible deformation forces imparted from the roughness of the ground.

[0007] Another object of the present invention is to provide a new shoe that is very flexible.

[0008] In accordance with one aspect of the invention, a sole is provided according to claim 1.

[0009] The dependent claims refer to preferred and advantageous embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other characteristics and advantages of the invention will be clearer from the description of embodiments of a sole and a shoe, illustrated as an example in the set of drawings in which:

- figure 1 is a side view of an embodiment of a sole and a shoe according to the present invention;
- figure 2 is a section view of the sole and of the shoe of figure 1;
- figure 3 is a view of the sole and of the shoe of figure 2 during the engagement of ground roughness;
- figures 4 to 6 are sectional views along the line A-A of figure 2 with reference to three embodiments of soles and footwear according to the present invention;
- figure 7 is a bottom view of figure 1;
- figure 8 is a bottom view of another embodiment of a sole in accordance with the present invention;
- figure 9 is a side view of another embodiment of a sole and a shoe according to the present invention; and

- figure 10 is a bottom view of figure 9.

[0011] In the set of drawings, equivalent parts or components are marked with the same reference numbers.

EMBODIMENTS OF THE INVENTION

[0012] With reference to figures 1 to 10, a footwear sole 1 is illustrated comprising a first component or midsole component 2 and a base group or outsole 34 constrained to the midsole component 2 and provided with, preferably only including, a second component or support component 3 as well as a third component or tread component 4 having a plurality of stud elements 4a.

[0013] The studs can be independent from each other or joined together so as to have a continuous tread.

[0014] A sole according to the present invention is for making technical footwears (e.g. footwears for sports, work, orthopedic footwears, running, walking or hiking shoes, etcetera), so that the same is at least partially flexible and hence not rigid.

[0015] The support component comprises one or more cloth elements or pieces or strips 3, while the tread component 4 is molded together with or on the cloth element 3, in a manner such that the tread component 4 is also partially extended through the cloth element 3, such that the tread component 4 and the stud elements 4a thereof are constrained to and supported by the cloth element 3. More particularly, a sheet of tread component material is arranged in an impression of a mold above or below a cloth element 3 and hence by means of molding one obtains the tread component 4 as well as the partial insertion of the material of the tread component within the cloth element, i.e. between the meshes of the cloth element.

[0016] The thickness of the base group 34 including tread component 4 and cloth element 3 varies between 0.5 and 1.5 mm, if desired between 0.5 and 1 mm, preferably, between 0.5 and 0.8 mm.

[0017] It is possible to make a sole or better yet an outsole which is in any case resistant, but has such a small thickness, due to the presence of a cloth element which actually constitutes a support and reinforcement element for the tread component.

[0018] With regard to such aspect, it is observed that by cloth element, it is intended an element made by means of a weave of threads, e.g. perpendicular to each other, and such threads constitute a plurality of meshes constrained to each other.

[0019] In addition, the final sole will preferably only be constituted by base group 34 and midsole component 2, and such elements will be directly constrained to the upper of a shoe, without interposition of other layers or elements.

[0020] For such purpose, the midsole component 2 can be made of only one material, of a mixture of multiple materials or of multiple assembled layers, and each of such layers can be made of a material equivalent to or different from the other layers.

[0021] Advantageously, the cloth element 3 is embedded in the tread component 4.

[0022] For such purpose, the tread component 4 can have (see figure 4) a first layer 4b and the stud elements 4a are extended from a first surface 4b1 of the first layer 4b, while the cloth element 3 is constrained on a second surface 4b2 of the first layer 4b opposite the first surface 4b1. In such case, the first layer 4b has first bridge portions extended through the cloth element 3 or better yet between the meshes thereof.

[0023] Alternatively (see figure 5), the cloth element 3 is embedded between a second layer 4c and a third layer 4d of the tread component 4 and, in addition, the tread component 4 has second bridge portions between the second layer 4c and the third layer 4d extended through the cloth element 3, and such second bridge portions actually connect the second layer 4c and the third layer 4d. In such case, the stud elements 4a are during use extended downward, starting from the third layer 4d.

[0024] According to another variant (see figure 6), the cloth element 3 is embedded or constrained between a fourth layer 4e of the tread component 4 and the stud elements 4a, while the tread component 4 has third bridge portions between the fourth layer 4e and the stud elements 4a, such third bridge portions extend through the cloth element 3 and actually connect the fourth layer 4e and the stud elements 4a. In such case, the stud elements 4a can for example be first placed in a mold, or better yet a quantity of material can be placed in suitable recesses of an impression of a mold for the obtainment of the stud elements 4a; then the cloth element 3 can be placed as well as a sheet of tread component material; then the elements thus stacked are molded, obtaining the partial insertion of the material of the tread component within the cloth element 3, i.e. between the meshes of the cloth element 3.

[0025] Alternatively, the tread component 4 could only comprise stud elements 4a which are molded on the cloth element 3 without providing sheets or layers of the tread component 4.

[0026] Preferably, the tread component 4, in particular the stud elements 4a thereof, projects/project downward with respect to the cloth element 3, such that the tread component 4 or the stud elements 4a thereof is/are in contact with the ground, preventing or in any case limiting rubbings of the cloth element 3 with the ground and hence preventing the cloth element 3 from being ruined.

[0027] The tread component 4 can be made of a material selected from the group constituted by styrene butadiene or SBR, acrylonitrile butadiene or NBR, polybutadiene or BR, polychloroprene or CR, bromo isobutylene isoprene or BUR, natural rubber (polyisoprene) or NR.

[0028] In addition, the tread component 4 can also be made of two or more materials, in particular if it comprises different layers or parts 4c-4d, 4e-4a constrained to each other, but placed on opposite sides with respect to the cloth element 3. For such purpose, the layers 4c and 4d could be made of two different materials and the same

holds true for the portions 4e and 4a of the variant of figure 6.

[0029] In any case, multiple materials can be used for the tread component, having Shore hardness from 50 to 90 and the following characteristics:

- specific weight: between 1.05 and 1.25 g/cm³
- tensile strength: between 85 and 170 kg/cm²
- elongation: between 300% and 550%
- DIN abrasion: between 40 and 260 mm³/loss
- NBS abrasion: between 90% and 410%
- tear resistance T: between 5 and 23 kg/cm
- tear resistance C: between 35 and 55 kg/cm

[0030] With regard instead to the cloth element 3, this can for example be made of polyester, nylon, rayon, aramid fibers, thermoplastic fibers, metal fibers or mixtures thereof.

[0031] With regard instead to the extension of the cloth element 3, this can be extended from the front F to the rear R of the sole 1 and from one side S1 of the sole 1 to the other S2 (see figure 7) and, in such case, the cloth element 3 will preferably be constituted by only one element made in a single piece.

[0032] Alternatively (see figure 8), the cloth element 3 comprises two, three or more pieces or portions 3a, 3b separated from each other and arranged in different positions of the sole 1, for example one at the front F and the other at the rear R of the sole.

[0033] In accordance with one variant (see figures 9 and 10), the cloth element 3 comprises two or more pieces or portions 3c, 3d separate from each other and arranged in different positions of the sole 1, for example one 3c at the front F and the other 3d at the rear R of the sole; in addition, such portions 3c, 3d have sections 3c1, 3d1 enclosing the sides of the midsole component 2.

[0034] In addition, the cloth element mainly lies in one plane, during use substantially horizontal or in any case extended along the main extension directions of the sole or better yet of the outsole.

[0035] Preferably, the cloth element 3 is not extended up to the edge or perimeter portion of the base group 34, and in such case such edge or perimeter portion could only be constituted by the tread component 4 and the cloth element 3 would cover the intermediate or central extension of the base group 34.

[0036] The midsole component 2 can be made of only one material or of multiple materials, if desired of a light, expanded material with low density.

[0037] The midsole component 2 can be made of a material selected from the group constituted by expanded rubbers, expanded polyurethane, other expanded polymers or mixtures thereof.

[0038] The midsole component 2 can be composed of one or more materials. Inserts or reinforcements made of thermoplastic materials (e.g. polyamides, TPU, etcetera) and/or thermosetting materials (epoxy resins, polyester resins, etcetera) can be added. In addition, the mid-

sole component 2 could be reinforced with glass fibers and/or aramid fibers and/or carbon fibers.

[0039] In addition, the overall thickness of the midsole component 2 can vary between 3mm and 60mm.

[0040] The midsole component 2 is intended to control and dissipate the deformation of the base group 34 constituted by cloth element 3 and tread component 4, so as to prevent or limit the propagation of deformations from such group 34 to the upper 6 and then to the foot of the user who wears the sole 1 or better yet the respective shoe 7.

[0041] The midsole component 2 is also intended to allow the deformation of the base group 34, so as to ensure the adaptation to the different ground conditions. This allows increasing the abutment surface area and hence the adherence on any type of ground.

[0042] For such purpose, the base group 34 is such to be deformed in a localized manner when it engages an obstacle or roughness U (see figure 3), while the midsole component 2 is such that, when the group 34 is deformed, it (the midsole component 2) undergoes a localized and limited deformation, in particular close to the zone of deformation of such group, and such deformation is not transmitted to the upper 6 or better yet to the bottom wall 6a of the latter. The bottom wall 6a can be flat and continuous from one side to the other, i.e. without central or intermediate holes or openings.

[0043] A shoe 7 in accordance with the present invention comprises a sole 1 as indicated above and an upper 6 constrained or connected to the midsole component 2. Preferably, the shoe 7 comprises a sole constituted only by base group 34 and midsole component 2, and such elements will be directly constrained to the upper 6 of the shoe 7, without interposition of other layers or elements.

[0044] If desired, the upper 6 delimits, together with the group 34 constituted by cloth element 3 and tread component 4, the zone RZ for housing the midsole component 2, which will then be in contact, on one side or lower side, with the internal and upper surface of the base group 34 and, on the other side or upper side, with the internal and lower surface of the bottom wall 6a of the upper 3, even if, as will be stated hereinbelow, the midsole component 2 can have an upper section 2a projecting outward with respect to the base group 34 and the upper 6, in particular projecting at the perimeter of the midsole component 2.

[0045] The upper 6 can be housed and connected (glued, sewn, molded, etcetera) to the midsole component 2, for example with a portion housed within the cradle zone delimited by the internal and upper face of the midsole component 2.

[0046] More particularly, the upper 6 comprises a bottom wall 6a placed in abutment against the inner and upper face of the midsole component 2, as well as a lateral tubular wall 6b projecting upward starting from the external edge of the bottom wall 6a.

[0047] According to the embodiment illustrated in the figures, the base group 34 comprises a substantially C-

shaped or U-shaped plate, in which the midsole component 2 is arranged and constrained, in turn constrained to the upper 6. The midsole component 2 can have an upper section 2a projecting upward starting from the base group 34, or better yet projecting upward during use starting from the latter and set to define the abutment and constraining surface for the upper 6 or better yet for the bottom wall 6a thereof. Therefore, in accordance with the nonlimiting embodiment illustrated in the figures, the upper 2 does not come into contact with the base group 34 and is separated from the latter by means of the upper section 2a of the midsole component 2.

[0048] As will be understood, in a sole and in a shoe according to the present invention, the cloth element 3 supports the tread component 4, manages the flexibility of the sole in terms of elongation (isotropic or anisotropic) and gives bending strength of the sole with limited thickness.

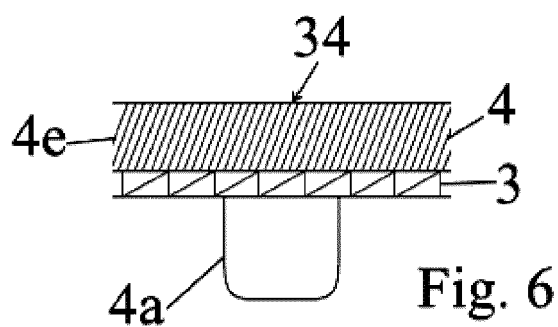
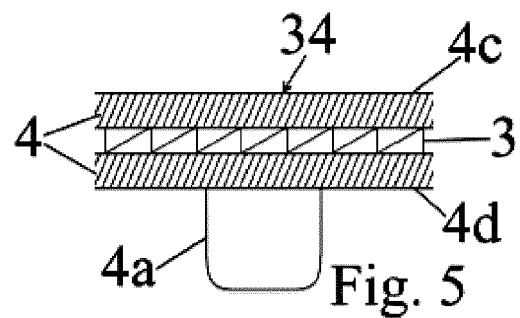
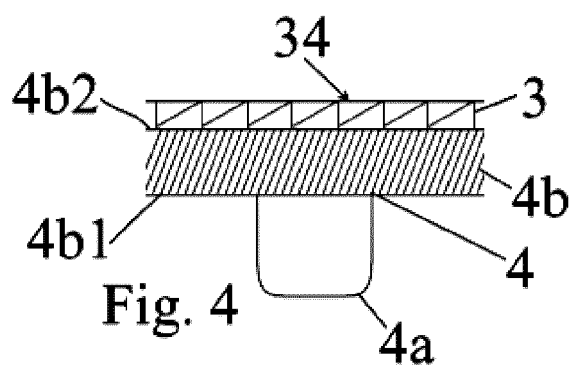
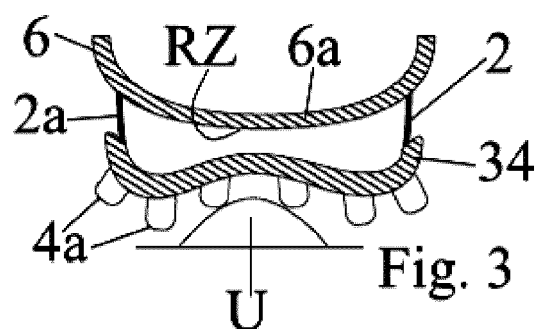
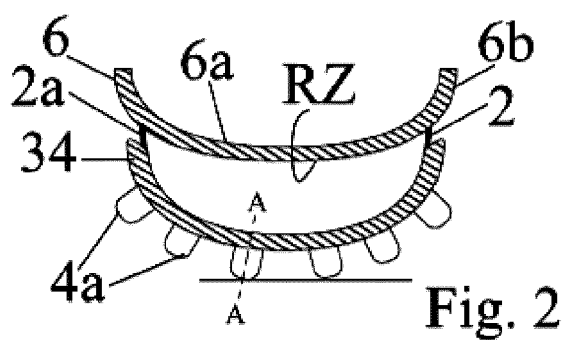
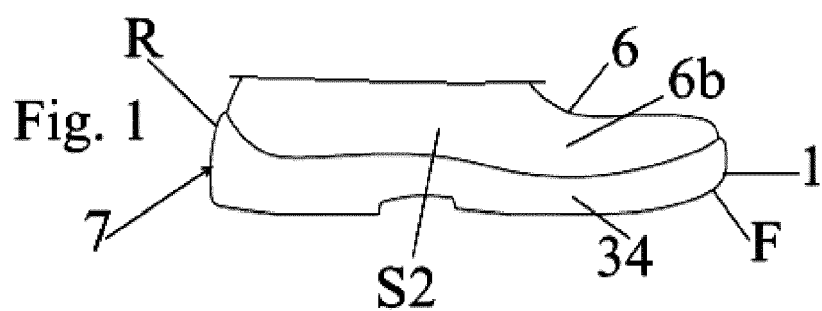
[0049] In addition, a sole according to the present invention has a controlled deformability as well as flexibility, in any case ensuring a tensile strength and fatigue elongation strength.

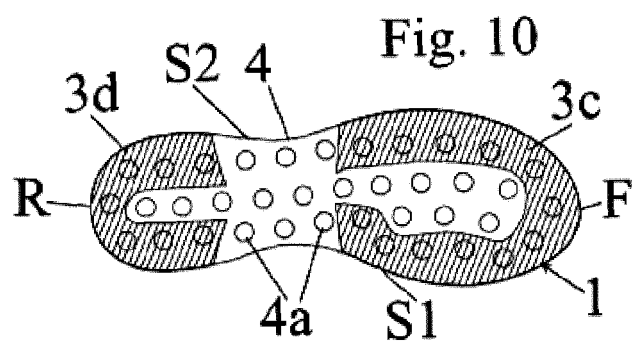
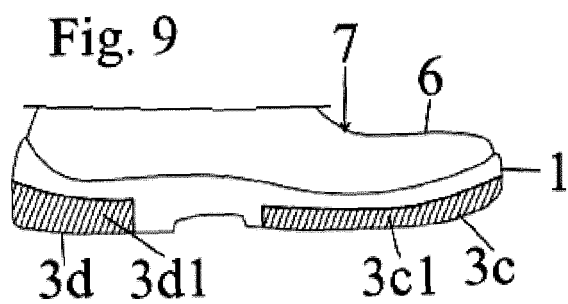
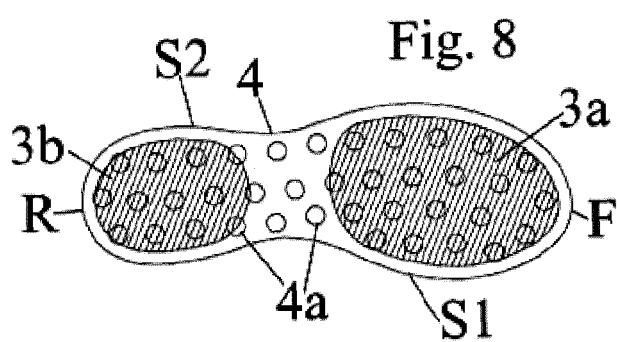
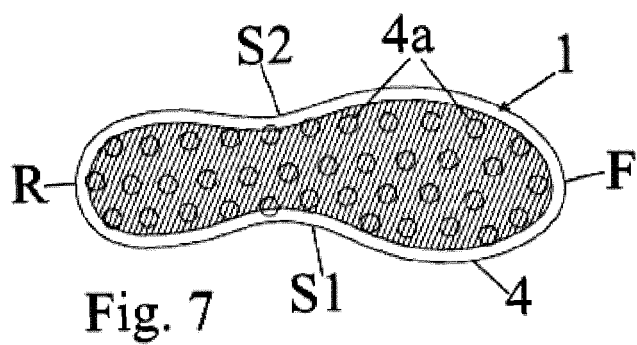
[0050] Modifications and variations of the invention are possible within the protective scope defined by the claims.

Claims

1. Footwear sole comprising a first component or midsole component (2) and a base group or outsole (34) constrained to said midsole component (2) and provided with a second component or support component (3) as well as with a third component or tread component (4) including a plurality of stud elements (4), wherein said support component (3) comprises at least one cloth element or piece or strip (3), whereas said tread component (4) is moulded together with or on said at least one cloth element (3), in such a way that said tread component (4) extends also through said at least one cloth element (3), so that said tread component (4) and said stud elements (4a) are constrained to and supported by said at least one cloth element (3).
2. Sole according to claim 1, wherein the thickness of said base group (34) including said tread component (4) and said cloth element (4) ranges between 0.5 and 1.5 mm, if desired between 0.5 and 1 mm.
3. Sole according to claim 2, wherein the thickness of said base group (34) including said tread component (4) and said cloth element (3) varies between 0.5 and 0.8 mm.
4. Sole according to claim 1, 2 or 3, wherein said cloth element (3) is embedded in said tread component (4).

5. Sole according to claim 4, wherein said tread component (4) comprises a first layer (4b) and said stud elements (4a) extend from a first surface (4b1) of said first layer (4b), whereas said cloth element (3) is constrained on a second surface (4b2) of said first layer (4b) opposite to said first surface (4b1), said first layer (4b) having first bridge-portions extending through said cloth element (3) or between the meshes thereof. 5
6. Sole according to claim 4, wherein said cloth element (3) is embedded between a second layer (4c) and a third layer (4d) of said tread component (4) and said tread component (4) has second bridge portions between said second layer (4c) and said third layer (4d) extending through said cloth element (3), said stud elements (4a) extending starting from said third layer (4d). 10
7. Sole according to claim 4, wherein said at least one cloth element (3) is embedded between a fourth layer (4e) of said tread component (4) and said stud elements (4a), whereas said tread component (4) has third bridge-portions between said fourth layer (4e) and said stud elements (4a) extending through said cloth element (3). 15
8. Sole according to any one of the preceding claims, wherein said tread component (4) is made of a material selected from the group consisting of styrenebutadiene, acrylonitrile-butadiene, polybutadiene, polychloroprene, bromo-isobutylene-isoprene, polyisoprene natural rubber. 20
9. Sole according to any one of the preceding claims, wherein said at least one cloth element (3) is made of polyester. 25
10. Sole according to any one of the preceding claims, wherein said at least one cloth element (3) extends from the front (F) to the rear (R) and from one side (S1) to the other (S2) of the sole and said cloth element (3) consists of an enbloc element. 30
11. Sole according to any one of claims 1 to 9, wherein said cloth element (3) comprises a plurality of pieces or portions (3a, 3b) separated one from another and arranged in different positions of the sole (1). 35
12. Sole according to any one of the preceding claims, wherein said stud elements (4a) project downwardly with respect to said cloth element (3), so that said stud elements (4a) come into contact with the ground, thereby preventing, or in any case limiting, the rubbing of said cloth element (3) with the ground. 40
13. Sole according to any one of the preceding claims, wherein said cloth element (3) does not extend up to the edge or peripheral portion of said base group (34), said edge or peripheral portion only consisting of said tread component (4). 45
14. Sole according to any one of the preceding claims, wherein said midsole component (2) is made of a single material, of a mixture of more materials or of more assembled layers, each of which layers is made of a material equal to or different from the other layers. 50
15. Footwear comprising a sole according to any one of the preceding claims and an upper (6) constrained to said midsole component (2) of said sole. 55
16. Footwear according to claim 15, wherein said sole only consists of said base group (34) and of said midsole component (2), said sole being constrained or directly connected to said upper (6), without the interposition of other layers or elements.







EUROPEAN SEARCH REPORT

 Application Number
 EP 17 17 0794

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/225305 A1 (MORGAN MARK M [US] ET AL) 12 October 2006 (2006-10-12) * the whole document *	1-16	INV. A43B13/12 A43B13/22
X	US 2008/216357 A1 (FOGG PETER M [US] ET AL) 11 September 2008 (2008-09-11) * the whole document *	1-4,8-16	
A		5-7	
A	EP 3 001 924 A1 (ADIDAS AG [DE]) 6 April 2016 (2016-04-06) * abstract *	1-16	
			TECHNICAL FIELDS SEARCHED (IPC)
			A43B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 September 2017	Examiner Espeel, Els
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 17 0794

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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18-09-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006225305 A1	12-10-2006	US 2006225305 A1	12-10-2006
		US 2008060228 A1	13-03-2008
-----		-----	
US 2008216357 A1	11-09-2008	US 2008216357 A1	11-09-2008
		US 2010281630 A1	11-11-2010
		US 2011266715 A1	03-11-2011
-----		-----	
EP 3001924 A1	06-04-2016	CN 105476174 A	13-04-2016
		DE 102014219918 A1	07-04-2016
		EP 3001924 A1	06-04-2016
		US 2016095384 A1	07-04-2016
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