

(19)



(11)

EP 3 284 362 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.02.2018 Bulletin 2018/08

(51) Int Cl.:
A43B 1/04 (2006.01) **A43B 23/02 (2006.01)**
D04C 1/02 (2006.01)

(21) Application number: **17183018.5**

(22) Date of filing: **25.07.2017**

(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: **16.08.2016 DE 102016215263**

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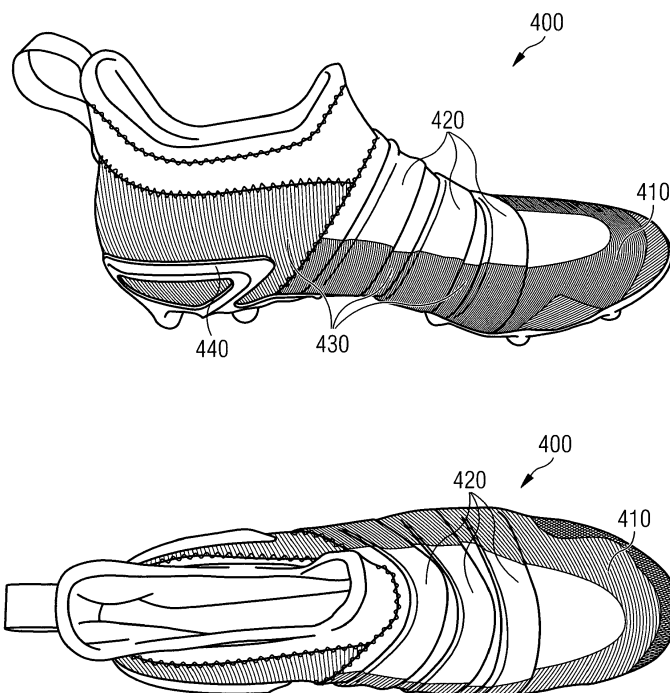
(54) **UPPER FOR A SHOE**

(57) The present invention relates to an upper for a shoe. Moreover, the present invention relates to a shoe and a method for manufacturing such an upper and such a shoe.

According to an aspect of the invention, an upper (235; 410; 510) without laces comprising (a.) at least one

braid portion (100; 420; 520) adapted to be stretched in a longitudinal direction; (b.) at least one braid-free portion (430); (c.) wherein stretching the at least one braid portion (100; 420; 520) in the longitudinal direction provides an elastic restoring force.

FIG 4A



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Description

1. Technical field

[0001] The present invention relates to an upper for a shoe. Moreover, the present invention relates to a shoe and to a method for manufacturing such an upper and such a shoe.

2. Description of the prior art

[0002] An upper for a shoe generally provides a number of functionalities. In addition to providing the enclosure for receiving the foot, an upper may stabilize foot movements, protect the foot against the environment and, in case of certain sport shoes, even provides a surface specifically adapted to the needs of the athlete. For example, a soccer shoe may provide an upper with improved friction properties during ball contact.

[0003] Most of the functionalities of the upper require a firm connection between the foot and the upper. To this end, the upper may be adjustable using laces, hook-and-loop fasteners or other devices which properly secure the shoe to the foot. Various uppers including laces or straps are known, for example from US 2014/0196316 A1, US 7,568,298 B2, US 7,574,818 B2, US 8,745,895 B2, US 2004/0181972 A1, US 6,052,921, US 2006/0198116 A1, US 5,291,671, US 7,134,224 B2, US 6,324,773 B1 and CN204207163. Furthermore, the company Nike offers a shoe named "Nike Fingertrap Max" with a woven system around the foot of a wearer.

[0004] However, the use of laces in shoe uppers has significant disadvantages: Laces may penetrate the skin, in particular if the laces are closed too tightly. Moreover, laces may also cause injuries during sports movements such as shooting in soccer when the foot strongly interacts with the ball.

[0005] A generally known option to avoid these injuries is to provide uppers without laces.

[0006] US 3,931,685 discloses an elastic-topped athletic shoe for use by a football player wherein the lacing of a conventional shoe is replaced by an elastic panel integral with the shoe and forming the instep portion thereof, said panel being extended to connect integrally with a tubular elastic member encompassing the ankle of the wearer, said elastic panel and tube serving to retain the shoe securely on the wearer's foot.

[0007] US 2015/0007451 A1 discloses an article of footwear including a braided upper with a unitary braided structure covering all of the upper. The unitary braided structure of the braided upper may be engineered with specific features tailored to particular activities. Different regions of the upper may have different braided configurations.

[0008] However, the uppers of the prior art are neither lightweight nor adapted to provide an acceptable wearing comfort. Typically, the attachment of the upper is either firm but uncomfortable or comfortable but loose. In case

of a soccer shoe this may lead to a lack of control of the foot movements, for example when playing with a ball.

[0009] Further prior art is disclosed in US 2016 / 0 206 044 A1, US 2010 / 0 299 964 A1, CN 203 676 267 U, US 2013 / 0 305 465 A1, US 2014 / 0 137 433 A1, US 2003 / 0 159 312 A1, GB 2 464 326 A, US 2004 / 0 181 972 A1, DE 19 56 550 U and DE 422 342 A.

[0010] Therefore, the underlying problem of the present invention is to at least partly overcome the above-mentioned deficiencies.

3. Summary of the invention

[0011] The above-mentioned problem is at least partly solved by an upper without laces comprising (a.) at least one braid portion adapted to be stretched in a longitudinal direction; (b.) at least one braid-free portion; (c.) wherein stretching the at least one braid portion in the longitudinal direction provides an elastic restoring force.

[0012] Whereas in the prior art mentioned above an increased wearer's comfort of the foot within an upper without laces is provided by including the braid into the whole upper, the present invention is based on a different approach: Here, the upper includes at least one braid-free portion besides one or more braid portions. The inventors found out that such an arrangement provides a reduced weight but still a tight fit due to the at least one braid portion. The weight of an upper is an important factor as any weight will impair foot movements of a wearer. The inventors have noted that one or more carefully positioned braid portions are sufficient to firmly and comfortably attach the upper to a foot. Having at least one braid-free portion may also improve other properties of the shoe such as its ventilation properties. Again, this is particularly important for uppers for sport shoes.

[0013] The braid portions are stretched in a longitudinal direction when inserting the foot, wherein the stretching provides an elastic restoring force so that the braided portion is tightly arranged on the foot surface. In case of a foot movement inside the upper, the stretched braid portion may be additionally stretched in the same direction than the longitudinal stretching. This additional stretching in turn increases the elastic restoring force against the longitudinal stretching. As a result, the braid portion is capable to reliably attach the foot inside the upper.

[0014] Additionally or alternatively, the additional stretching may be in another direction than the longitudinal direction, e.g. perpendicular to the longitudinal direction. This is due to the friction on the surface of the foot. Thus, this additional stretching in turn may also increase the elastic restoring force as mentioned above.

[0015] The above described functionality can be provided by an upper which combines braid portions and braid-free portions. As a result, the invention combines an outstanding hold of the foot suitable even for extreme foot movements with the comfort provided by a regular, braid-free upper.

[0016] In one embodiment, the at least one braid portion extends at least partly from a medial side to a lateral side of the upper, preferably along a region of the cuneiform bones of a foot. In a more specific embodiment, the at least one braid portion may encompass the midfoot area. The inventors have realized that these areas of the foot are of key importance to reliably attach the foot inside the upper. For example, if a wearer such as a soccer player is in a duel with another soccer player, the upper may provide sufficient stability due to the tight fit in the braided midfoot area of the upper.

[0017] In one embodiment, the upper further comprises at least one braid portion in the toe area of the upper. In a more specific embodiment, the upper may comprise at least one braid portion in the heel area of the upper.

[0018] Such an arrangement of the braid portions may further increase the stability of the foot inside the upper, in particular, as the toe area and the heel of the foot represent important contact points for the movement of a wearer. The toe area is located at the furthest distance from the heel area, i.e. improving the stability in these two areas may be sufficient to avoid any slip of the foot inside a shoe without laces.

[0019] In one embodiment, the upper further comprises at least one channel surrounding at least partly the at least one braid portion. In a more specific embodiment, the at least one channel comprises a width of 12 mm to 30 mm, preferably of 14 mm to 26 mm, more preferably 19 mm to 24 mm. Providing channels for surrounding the braid portions may further support the above-described functionality, as the channels may provide an increased friction between the foot and the braid portion. Moreover, such channels may partly or fully hide the braid portion to the outside, which can therefore be designed as in a traditional shoe or be provided with specific properties of the upper surface. Furthermore, the braid portion may move freely inside such channels so that the braid portion may contract freely due to the elastic restoring force when stretched. Therefore, an increased stability of a foot inside the upper may be provided.

[0020] In one embodiment, the at least one channel is arranged on the outer surface of the upper. In another embodiment, the at least one channel may be incorporated into the upper. Such arrangements of the channels provide not only the above-mentioned advantages of an increased stability during movements and reduced weight of the upper, but further provides better control of the foot movements. For example, by incorporating the at least one channel into the upper, the at least one braid portion is connected firmly with the upper and thus the loss of the energy transfer from the foot to the upper may be reduced.

[0021] In one embodiment, the upper comprises a plurality of channels for a plurality of braid portions. In a more specific embodiment, the plurality of channels may be formed by a plurality of layers in at least a part of the upper. Moreover, at least one layer may comprise thermoplastic polyurethane, TPU. Furthermore, at least one

layer may comprise a mesh. Moreover, at least one layer may comprise a neoprene material.

[0022] All of these embodiments follow the same idea of providing an increased stability for a foot during sports movements. The inventors have realized that the above described functionality may be further supported by placing a plurality of braid portions into a plurality of channels. The channels may be formed by molding a plurality of layers having different material properties. For example, a textile layer may be attached to a TPU layer having different elastic properties in order to provide a good compromise between stability and flexibility. Then, one or more molds may create a plurality of cavities into the attached layers and an additional layer, e.g. a mesh, may cover the plurality of cavities in order to form the plurality of channels. As a result, an upper may be provided with better control of the foot and acceptable wearing comfort during sports movements.

[0023] In one embodiment, the at least one braid portion is formed as at least one strap. In a more specific embodiment, the at least one strap may comprise a first synthetic yarn and a second synthetic yarn, wherein the first synthetic yarn may have a different elasticity than the second synthetic yarn. Moreover, the second yarn may extend axially along a direction of the strap. The inventors have noted that such straps may increase the above-mentioned functionality. Therefore, at least one strap formed from at least one braid portion may provide a good compromise between improved stability and elasticity of the upper for fitting closely and tightly to the foot. Moreover, by providing such straps having different combinations of synthetic yarns, a more adaptive fit of the upper to the foot may be achieved. Furthermore, the axial second yarn may provide different elasticities of the strap. For example, the elastic restoring force of the strap strongly increases in case of stretching the strap beyond the length of the axial second yarn. The number of the axial second yarn may also influence this effect. Alternatively, the length and the material properties of the axial second yarns may be chosen so that the strap cannot be stretched beyond a certain limit.

[0024] In one embodiment, the at least one braid portion is arranged in the upper such that it is pre-stretched in the first direction. This pre-stretching may further increase the above-mentioned elastic restoring force against the longitudinal stretching. As a result, such an embodiment is capable to provide increased stability for the foot inside the upper. Therefore, a wearer may select individually the stability of the upper corresponding to his needs before manufacturing.

[0025] In one embodiment, the at least one braid portion is adapted to provide different elasticities in different strain ranges. The inventors found out that such an embodiment may provide an improved performance for the sports movements of an athlete such as a soccer player. For example, if the soccer player runs slowly during a game, less strain may occur and therefore the at least one braid portion may have a lower elasticity and thus

the foot is subject to a reduced elastic restoring force of the braid. In case of foot movements during a duel with another soccer player and / or attacking, more strain may occur and therefore the at least one braid portion may have an increasingly higher elasticity which means that the braid provides a comparatively high elastic restoring force. As a result, a kind of lock-out effect of the braid is caused in order to provide more stability to the foot.

[0026] In one embodiment, the at least one braid portion is adapted to provide a resilience of essentially 100%. In this context, the term "resilience of essentially 100%" has to be understood as the ability of the braid portion to essentially return to its initial length and size when the force causing the deformation is removed. Essentially means up to a degree as relevant for shoe construction. Thus, such a braid portion may return back many times to its initial length after being stretched. Therefore, undesired wearing out of the braid portion and thus of the upper material may be avoided. Moreover, an undesired plastic deformation of the braid portion and thus of the upper material may be also avoided.

[0027] In one embodiment, the at least one braid portion is adapted to be stretched by up to 20 % its initial length, preferably by up to 10 % and more preferably by up to 5 %. For example, the braid portion may comprise a chosen second yarn extending axially as mentioned above, so that the braid portion cannot be stretched beyond a certain limit. Additionally or alternatively, the density of the braid material may be chosen to reach these stretching values.

[0028] According to another aspect of the invention, an upper comprises (a.) at least one braid portion adapted to be stretched in a longitudinal direction; (b.) at least one channel surrounding at least partly the at least one braid portion; (c.) wherein stretching the at least one braid portion in the longitudinal direction provides an elastic restoring force. Such an upper may provide the possibility that the at least one braid portion may be covered in order to provide better friction on the surface of the upper. For example, if this upper is used for a soccer shoe, the wearer may not be impaired by the at least one braid portion when he contacts the ball.

[0029] Additionally or alternatively, an additional stretching may be in another direction than the longitudinal direction, e.g. perpendicular to the longitudinal direction. This is due to the friction on the surface of the foot. Thus, this additional stretching in turn may also increase the elastic restoring force as mentioned above.

[0030] In one embodiment, the at least one channel extends at least partly from a medial side to a lateral side of the upper. Moreover, the upper may comprise at least one channel and at least one braid portion in the toe area of the upper. Furthermore, the upper may comprise at least one channel and at least one braid portion in the heel area of the upper.

[0031] According to a further aspect, the present invention relates to a shoe comprising such an upper according to the invention.

[0032] In one embodiment, the shoe further comprises at least one braid portion in a last. Moreover, the shoe may further comprise at least one braid portion in an insole. Such embodiments may provide increased stability to the foot inside the shoe and thus may also improve the performance of a wearer. Therefore, the above-mentioned functionality of the at least one braid portion may be further improved.

[0033] According to a further aspect, the present invention relates to a method for manufacturing such an upper or a shoe according to the invention.

4. Short description of the figures

[0034] Possible embodiments of the present invention are further described in the following detailed description, with reference to the following figures:

Figs. 1A - 1F: present a braid portion and channels for surrounding the braid portion according to the present invention;

Fig. 2: presents a process flow diagram for exemplary method steps for sewing together a possible embodiment of an upper in accordance with certain aspects of the present disclosure;

Fig. 3: presents a diagram for the elasticity of a possible embodiment of an upper in accordance with certain aspects of the present disclosure;

Figs. 4A - 4B: present possible embodiments of a soccer shoe including an upper without laces according to the present invention; and

Fig. 5: presents a possible embodiment of a soccer shoe according to another aspect of the present invention.

5. Detailed description of possible embodiments

[0035] Possible embodiments and variations of the present invention are described in the following with particular reference to an upper and a soccer shoe. However, the concept of the present invention may identically or similarly be applied to any upper or sports shoe such as for basketball, American football, rugby, baseball, snowboard, running, athletics, or any leisure shoe such as sneakers, slippers, moccasins, etc. as well as sports apparel such as wearables.

[0036] Moreover, for brevity only a limited number of embodiments are described in the following. However, the skilled person will recognize that the specific features described with reference to these embodiments may be modified and combined differently and that certain as-

pects of the specific embodiments may also be omitted. Moreover, it is noted that the aspects described in the subsequent detailed description may be combined with aspects described in the above summary section.

[0037] Figs. 1A - 1F present a braid portion 100 and channels 150 for surrounding the braid portion 100 according to the present invention.

[0038] A braid portion may be formed by intertwining at least one yarn. In the example shown in FIG. 1A, a first synthetic yarn 110 may be intertwined and may form the braid portion 100 with an open structure. Moreover, the braid portion 100 may be formed as a strap 105, wherein the strap 105 may further comprise a second synthetic yarn 120 besides the first synthetic yarn 110. The first synthetic yarn 110 may comprise a different elasticity than the second synthetic yarn 120. It is also possible that the first and the second synthetic yarn may comprise the same elasticity.

[0039] In the embodiment of Fig. 1A, the first synthetic yarn 110 may be made from a plastic material such as polyester and / or the second synthetic yarn 120 may be made from a plastic material such as spandex, polyethylene or rubber. Such yarns are available from a plurality of manufactures. It is also conceivable that any other appropriate materials may be used, which are generally well-known to the skilled person.

[0040] In one embodiment, the braid portion may be formed by intertwining strands, filaments or other fibers. Moreover, braiding may be used to form three-dimensional structures such as straps, as in the examples shown in Fig. 1A and 1C. Furthermore, braided structures may be fabricated manually or may be manufactured using automated braiding machinery.

[0041] In the embodiment of Fig. 1A, the second synthetic yarn 120 may extend axially along a direction of the strap 105. This direction may be chosen as the first direction in which the braid portion 100 may be adapted to be stretched. Such an arrangement may increase the elastic restoring force of the braid portion 100 along the first direction and may therefore increase the above described functionality for the stability of an upper comprising at least one braid portion 100. It is also conceivable that the second synthetic yarn 120 may be replaced by two or more yarns or two or more twisted yarns. Such yarns may extend axially so that the overall elasticity of the strap 105 may be modified selectively. Depending on the foot shape of the wearer, the strap 105 may be adjusted to provide a better fit in contrast to mass produced shoes as known in the prior art.

[0042] Fig. 1B presents a schematic view of a plurality of channels 150 for surrounding a plurality of braid portions such as the braid portion 100. Here, the plurality of channels 150 may be formed by a plurality of layers. For example, the plurality of channels 150 may be provided in a sandwich structure. In this context, a first layer 150a and a second layer 150b may be attached in a pre-manufacturing step (not shown). The first layer 150a may comprise a textile material, e.g. a knit, and the second

layer 150b may comprise a thermoplastic polyurethane (TPU). The second layer 150b may be attached as an outer foil to a first surface of the first layer 150a. In a first manufacturing step, a bonding material such as hot melt may be put on a second surface of the first layer 150a and male-female molds may be pressed together with the two layers. As a result, a plurality of cavities 160 may be created. For example, the male-female molds and the two layers may be pressed together by a hot press machine at a temperature of 130 °C with a weight of 50 kg for 60 seconds. In a second manufacturing step, a third layer 150c which may comprise a mesh may be attached on the second surface of the first layer 150a to close the plurality of cavities 160, i.e. to form the plurality of channels 150.

[0043] In one embodiment, the plurality of channels 150 may be formed with two layers comprising polyurethane (PU) and / or TPU, wherein the two layers may be pressed together in a heat pressing process. In another embodiment, the braid portion 100 may be stitched, e.g. zig-zag stitching, along the edges on top of a knitted mesh. In addition, this stitched braid portion may be either covered by a TPU layer and / or a PU layer by applying heat and pressure. Additionally or alternatively, no additional layer may be provided to the stitched braid portion.

[0044] Fig. 1C presents the braid portion 100 as shown in Fig. 1A and one channel of the plurality of channels 150. The channel 150 may be formed in the sandwich structure as explained above. The braid portion 100 may be inserted manually into the channel 150. The channel 150 may comprise a width of 12 mm to 30 mm, preferably of 14 mm to 26 mm, more preferably 19 mm to 24 mm. Such dimensions of the channel 150 may provide a good compromise between improved stability and flexibility of an upper including the braid portion 100.

[0045] Fig. 1D presents a schematic view of a braid portion 100 in cross section. In this context, the braid portion 100 may be arranged on a first layer 150a which may comprise a textile material, e.g. a knit. Moreover, a second layer 152, which may comprise TPU and / or PU, may be used as a protective layer on top of the braid portion 100. The second layer 152 may be provided as a hotmelt or a TPU spray coating so that it may be provided as a flexible TPU layer (e.g. as available on the market from the company Sanfang) adapted to be stretched together with the underlying braid. Therefore, the braid portion may be movable freely and thus still stretchable in order to provide improved stability for the foot of a wearer as mentioned above. Additionally or alternatively, a plurality of further layers may be arranged on top of the second layer 152 and / or below the first layer 150a and / or between them.

[0046] Fig. 1E presents a schematic view of an alternative embodiment of a braid portion 100 in cross section. Here, the braid portion 100 may be arranged on the first layer 150a and the second layer 152 may be used as a protective layer on top of the braid portion 100 similar to Fig. 1D. As can be seen schematically in Fig. 1E, the

cross-section area of the braid portion 100 may be provided with a regular shape such as a rectangular shape. Additionally or alternatively, one of a plurality of other geometric shapes, e.g. circular, triangular, etc., may be provided for the cross-section area of the braid portion 100. Also, an irregular cross-section area as shown in Fig. 1D is possible. Moreover, the braid portion 100 may be fixed between the two layers 150a and 153. For example, the braid portion 100 may be stitched along the edges by seams 153 as explained below in more detail.

[0047] Fig. 1F presents the possibility that at least one braid portion (not shown in Fig. 1E) such as the braid portion 100 may be zig-zag stitched along its edges on top of a knitted layer 150a, e.g. a knitted mesh, such as the first layer with reference to Fig. 1D. It is also conceivable that any other suitable stitching technique may be used. Thus, the braid portion may be fixed at the edges onto the knitted layer 150a so that the middle area of the braid portion is not fixed. Additionally, a TPU layer such as the protective layer 152 with reference to Fig. 1D may be applied on top of the braid portion for protecting it against external influences. Additionally or alternatively, for stretching the braid portion, the knitted layer may also be stretchable so that it can be stretched at the same time as the braid portion.

[0048] In another embodiment, the at least one braid portion 100 may be directly incorporated into the upper material, e.g. into the knitted layer 150a, during a manufacturing process such as a knitting process. Additionally or alternatively, such an embodiment provides the possibility that the middle area of the braid portion 100 may also be fixed to the knitted layer 150a.

[0049] Fig. 2 presents a process flow diagram for exemplary method steps 200 for sewing together a possible embodiment of an upper 235 without laces in accordance with certain aspects of the present disclosure. The method steps 200 may be performed, for example, by a manufacturing system.

[0050] The method steps 200 may begin at step 210 by providing a vamp component 213 including three braid portions (inside the vamp component 213) as mentioned above. Moreover, the three braid portions may be surrounded by channels as mentioned in Fig. 1C. Furthermore, the channels may be incorporated into the vamp component 213. In step 210, a collar component 216 and a heel component 219 may also be provided which may comprise braid-free portions. It is possible that the step 210 may be controlled by a central computer unit (not shown in Fig. 2) and / or may be set up and supervised by one or more humans.

[0051] As a next step 220, the three components 213, 216 and 219 may be joined together to form a two-dimensional upper 225. For example, the collar component 216 and the heel component 219 may be sewn together. Moreover, the vamp component 213 may be sewn to the heel component 219 to form the two-dimensional upper 225. It is also conceivable that the components may be bonded together such as gluing, welding or applying heat

energy.

[0052] At a final step 230, the sewn together two-dimensional upper 225 may be applied on a last to form the three-dimensional finished upper 235 without laces.

[0053] Fig. 3 presents a diagram for the elasticity of a possible embodiment of an upper without laces, e.g. the upper 235, in accordance with certain aspects of the present disclosure. The term "elasticity" as described in this application is defined as the slope of its stress-strain curve in the elastic deformation region. In other words, the strain being the force causing the deformation is proportional to the stress being the ratio of the change in some length parameter caused by the deformation to the original value of the length parameter. Therefore, the elasticity is the ratio of the stress and the strain. As can be seen in Fig. 3, the stress applied to the upper 235 was measured depending on the strain. As a result, the upper 235 may provide in a first strain range from 0 % to 15 % a first elasticity and in a second strain range from 15 % to 25 % a second elasticity which is higher than the first elasticity. Thus, the upper 235 may provide a transition of the elasticity. Therefore, an upper according to the invention used for a sports shoe such as a soccer shoe may provide a lower elasticity for the first strain range allowing the soccer player to put on the sports shoe with a slight stretch of the upper material to adapt the upper to the foot shape of the wearer. Moreover, the upper may provide a higher elasticity for the second range wherein the soccer player may have a duel with another soccer player and / or may perform attacking, i.e. performing high intensity movements with high loads on the upper. As explained above, such an upper may improve the performance of the soccer player. Furthermore, if the braid portions may be pre-stretched before sewing together to form the upper, the elasticity may reach even higher values.

[0054] In one embodiment, the upper 235 may comprise at least one braid portion which is adapted to provide a resilience of essentially 100%. For example, the upper 235 may comprise such a braid portion providing a resilience of essentially 100% in the forefoot area of the upper 235 so that the foot of a wearer may be held securely after the wearer put on the upper 235.

[0055] Figs. 4A - 4B present possible embodiments of a soccer shoe 400 including an upper 410 without laces according to the present invention.

[0056] As can be seen in Fig. 4A, the soccer shoe 400 is presented in a side view and in a top view. The soccer shoe 400 includes an upper 410 without laces. This upper 410 may comprise three braid portions 420 (not shown) and one or more braid-free portions 430 which may be arranged between the three braid portions 420 and in the rest of the upper 410. Moreover, the three braid portions 420 may be adapted to be stretched in a longitudinal direction, wherein this longitudinal stretching may provide an elastic restoring force. Furthermore, additional stretching in the same direction than the longitudinal stretching may in turn increase the elastic restoring force

against the longitudinal stretching so that the three braid portions 420 are capable to reliably attach the foot inside the upper 410. This is the above described functionality for improved stability to a foot inside the upper 410. The three braid portions 420 may extend from a medial side to a lateral side of the upper 410, preferably along a region of the cuneiform bones of a foot. Moreover, the three braid portions 420 may encompass the midfoot area and may be surrounded by channels which may be incorporated into the upper 410. The shapes of the three braid portions 420 can be seen on the outer surface of the upper 410. Furthermore, the three braid portions 420 may extend substantially parallel. It is also conceivable that each of the three braid portions 420 may extend separately in directions corresponding to certain parts of foot or muscles of the foot. As explained above, such arrangements of the three braid portions 420 may provide an increased stability of the foot inside the upper 410 of the soccer shoe 400 and may also provide control of the movements without the need of laces. Therefore, the upper 410 may avoid skin injuries, such as bruises. For example, the soccer shoe 400 may allow to better control sports equipment such as a soccer ball. Other types of sports shoes may benefit as well from such braid portions 420, for example shoes for an American football player such as the kicker of the special team or a cyclist as the braid portion may provide acceptable wearing comfort.

[0057] In the embodiment of Fig. 4A, the soccer shoe 400 may further comprise a stability element 440 which may be arranged in the heel portion of the upper 410. Moreover, the stability element 440 may extend from a sole unit of the soccer shoe 400 to the upper 410. Such an element may provide further stability as the heel part of a foot can be held securely inside the upper 410. For example, a soccer player may increase its performance with such a soccer shoe 400 providing more stability during sports movements such as acceleration, slowing down and lateral movements.

[0058] Fig. 4B presents a further embodiment. Here, the soccer shoe 400 comprises an upper 410 without laces comprising at least one braid portion 420 which may be surrounded by at least one channel (not shown) as explained above. Moreover, the at least one channel may be incorporated into the upper 410. In contrast to Fig. 4A, the shapes of the at least one braid portion 420 cannot be seen on the outer surface of the upper 410. Furthermore, the soccer shoe 400 also may comprise at least one braid-free portion. The possibility that this embodiment may provide a smoother outer surface may further increase the performance of a wearer. For example, a soccer player may control better a ball and therefore may interact better with the ball such as barefoot playing. Furthermore, the soccer shoe 400 may also comprise a stability element 440 which may be arranged in the heel portion of the upper 410. It is also conceivable that the upper 410 as shown in Fig. 4A and 4B may further comprise at least one braid portion in the toe area of the upper 410. Additionally or alternatively, the upper 410 may com-

prise at least one braid portion in the heel area of the upper 410. Moreover, the at least one braid portion may extend from the midfoot area of the upper 410 into a last and / or an insole of the soccer shoe 400 may encompass entirely the whole midfoot.

[0059] Fig. 5 presents a bottom view of a possible embodiment of a soccer shoe 500 according to another aspect of the present invention. The soccer shoe 500 may comprise an upper 510 and three braid portions 520. Moreover, the soccer shoe 500 may comprise a sole 530 which may be manufactured from a transparent material. As can be seen in Fig. 5, the three braid portions 520 may extend from the medial side of the upper 510 through the last of the soccer shoe 500 to the lateral side of the upper 510. Additionally or alternatively, the soccer shoe 500 may comprise the three braid portions 520 in the insole. Thus, the three braid portions 520 may encompass entirely the whole midfoot. Such an arrangement of the three braid portions 410 may provide the maximal possible stability for the energy transfer from the midfoot of a soccer player to the ground.

[0060] In the following, further embodiments are described to facilitate the understanding of the invention:

1. An upper without laces comprising:

- a. at least one braid portion adapted to be stretched in a longitudinal direction;
- b. at least one braid-free portion;
- c. wherein stretching the at least one braid portion in the longitudinal direction provides an elastic restoring force.

2. Upper according to the preceding embodiment 1, wherein the at least one braid portion extends at least partly from a medial side to a lateral side of the upper, preferably along a region of the cuneiform bones of a foot.

3. Upper according to one of the preceding embodiments 1 or 2, wherein the at least one braid portion encompasses the midfoot area.

4. Upper according to one of the preceding embodiments 1 - 3, further comprising at least one braid portion in the toe area of the upper.

5. Upper according to one of the preceding embodiments 1 - 4, further comprising at least one braid portion in the heel area of the upper.

6. Upper according to one of the preceding embodiments 1 - 5, further comprising at least one channel surrounding at least partly the at least one braid portion.

7. An upper comprising:

- a. at least one braid portion adapted to be stretched in a longitudinal direction;
- b. at least one channel surrounding at least partly the at least one braid portion;
- c. wherein stretching the at least one braid por-

tion in the longitudinal direction provides an elastic restoring force.

8. Upper according to the preceding embodiments 7, wherein the at least one channel extends at least partly from a medial side to a lateral side of the upper. 5
9. Upper according to one of the preceding embodiments 7 or 8, wherein the at least one channel encompasses the midfoot area.
10. Upper according to one of the preceding embodiments 7 - 9, further comprising at least one channel and at least one braid portion in the toe area of the upper. 10
11. Upper according to one of the preceding embodiments 7 - 10, further comprising at least one channel and at least one braid portion in the heel area of the upper. 15
12. Upper according to one of the preceding embodiments 6 or 7 - 11, wherein the at least one channel comprises a width of 12 mm to 30 mm, preferably of 14 mm to 26 mm, and more preferably of 19 mm to 24 mm. 20
13. Upper according to one of the preceding embodiments 6 or 7 - 12, wherein the at least one channel is arranged on the outer surface of the upper. 25
14. Upper according to one of the preceding embodiments 6 or 7 - 13, wherein the at least one channel is incorporated into the upper.
15. Upper according to the one of the preceding embodiments 7 - 14, comprising a plurality of channels for a plurality of braid portions. 30
16. Upper according to the preceding embodiment 15, wherein the plurality of channels is formed by a plurality of layers in at least a part of the upper.
17. Upper according to the preceding embodiment 16, wherein at least one layer comprises thermoplastic polyurethane, TPU. 35
18. Upper according to one of the preceding embodiments 16 or 17, wherein at least one layer comprises a mesh. 40
19. Upper according to one of the preceding embodiments 16 - 18, wherein at least one layer comprises a neoprene material.
20. Upper according to one of the preceding embodiments 1 - 6 or 7 - 19, wherein the at least one braid portion is formed as at least one strap. 45
21. Upper according to the preceding embodiment 20, wherein the at least one strap comprises a first synthetic yarn and a second synthetic yarn, wherein the first synthetic yarn has a different elasticity than the second synthetic yarn. 50
22. Upper according to the preceding embodiment 21, wherein the second yarn extends axially along a direction of the strap.
23. Upper according to one of the preceding embodiments 1 - 6 or 7 - 22, wherein the at least one braid portion is arranged in the upper such that it is pre-stretched in the longitudinal direction. 55

24. Upper according to one of the preceding embodiments 1 - 6 or 7 - 23, wherein the at least one braid portion is adapted to provide different elasticities in different strain ranges.

25. Upper according to one of the preceding embodiments 1 - 6 or 7 - 24, wherein the at least one braid portion is adapted to provide a resilience of essentially 100%.

26. Upper according to one of the preceding embodiments 1 - 6 or 7 - 25, wherein the at least one braid portion is adapted to be stretched up to 20 % of its initial length, preferably up to 10 % and more preferably up to 5 %.

27. Shoe comprising an upper according to one of the embodiments 1 - 26.

28. Shoe according to the preceding embodiment 27, further comprising at least one braid portion in a last.

29. Shoe according to one of the preceding embodiments 27 or 28, further comprising at least one braid portion in an insole.

30. A method for manufacturing an upper according to one of the embodiments 1 - 26 or a shoe according to one of the embodiments 27 - 29.

Claims

1. An upper (235; 410; 510) without laces comprising: 30
 - a. at least one braid portion (100; 420; 520) adapted to be stretched in a longitudinal direction;
 - b. at least one braid-free portion (430);
 - c. wherein stretching the at least one braid portion (100; 420; 520) in the longitudinal direction provides an elastic restoring force.
2. Upper (235; 410; 510) according to the preceding claim 1, wherein the at least one braid (100; 420; 520) portion extends at least partly from a medial side to a lateral side of the upper (235; 410; 510), preferably along a region of the cuneiform bones of a foot. 40
3. Upper (235; 410; 510) according to one of the preceding claims 1 or 2, wherein the at least one braid portion (100; 420; 520) encompasses the midfoot area. 45
4. Upper (235; 410; 510) according to one of the preceding claims 1 - 3, further comprising at least one channel (150) surrounding at least partly the at least one braid portion (100; 420; 520). 50
5. Upper (235; 410; 510) according to the preceding claim 4, wherein the at least one channel (150) comprises a width of 12 mm to 30 mm, preferably of 14 55

mm to 26 mm, and more preferably of 19 mm to 24 mm.

6. Upper (235; 410; 510) according to one of the preceding claims 4 or 5, wherein the at least one channel (150) is arranged on the outer surface of the upper. 5
7. Upper (235; 410; 510) according to one of the preceding claims 4 - 6, wherein the at least one channel (150) is incorporated into the upper (235; 410; 510). 10
8. Upper (235; 410; 510) according to one of the preceding claims 1-7, wherein the at least one braid portion (100; 420; 520) is formed as at least one strap (105). 15
9. Upper (235; 410; 510) according to the preceding claim 8, wherein the at least one strap (105) comprises a first synthetic yarn (110) and a second synthetic yarn (120), wherein the first synthetic yarn (110) has a different elasticity than the second synthetic yarn (120). 20
10. Upper (235; 410; 510) according to the preceding claim 9, wherein the second yarn (120) extends axially along a direction of the strap (105). 25
11. Upper (235; 410; 510) according to one of the preceding claims 1 - 10, wherein the at least one braid portion (100; 420; 520) is arranged in the upper such that it is pre-stretched in the longitudinal direction. 30
12. Upper (235; 410; 510) according to one of the preceding claims 1 - 11, wherein the at least one braid portion (100; 420; 520) is adapted to provide different elasticities in different strain ranges. 35
13. Upper (235; 410; 510) according to one of the preceding claims 1 - 12, wherein the at least one braid portion (100; 420; 520) is adapted to provide a resilience of essentially 100%. 40
14. Shoe (400; 500) comprising an upper (235; 410; 510) according to one of the claims 1-13. 45
15. A method for manufacturing an upper (235; 410; 510) according to one of the claims 1 - 13 or a shoe (400; 500) according to claim 14. 50

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FIG 1A

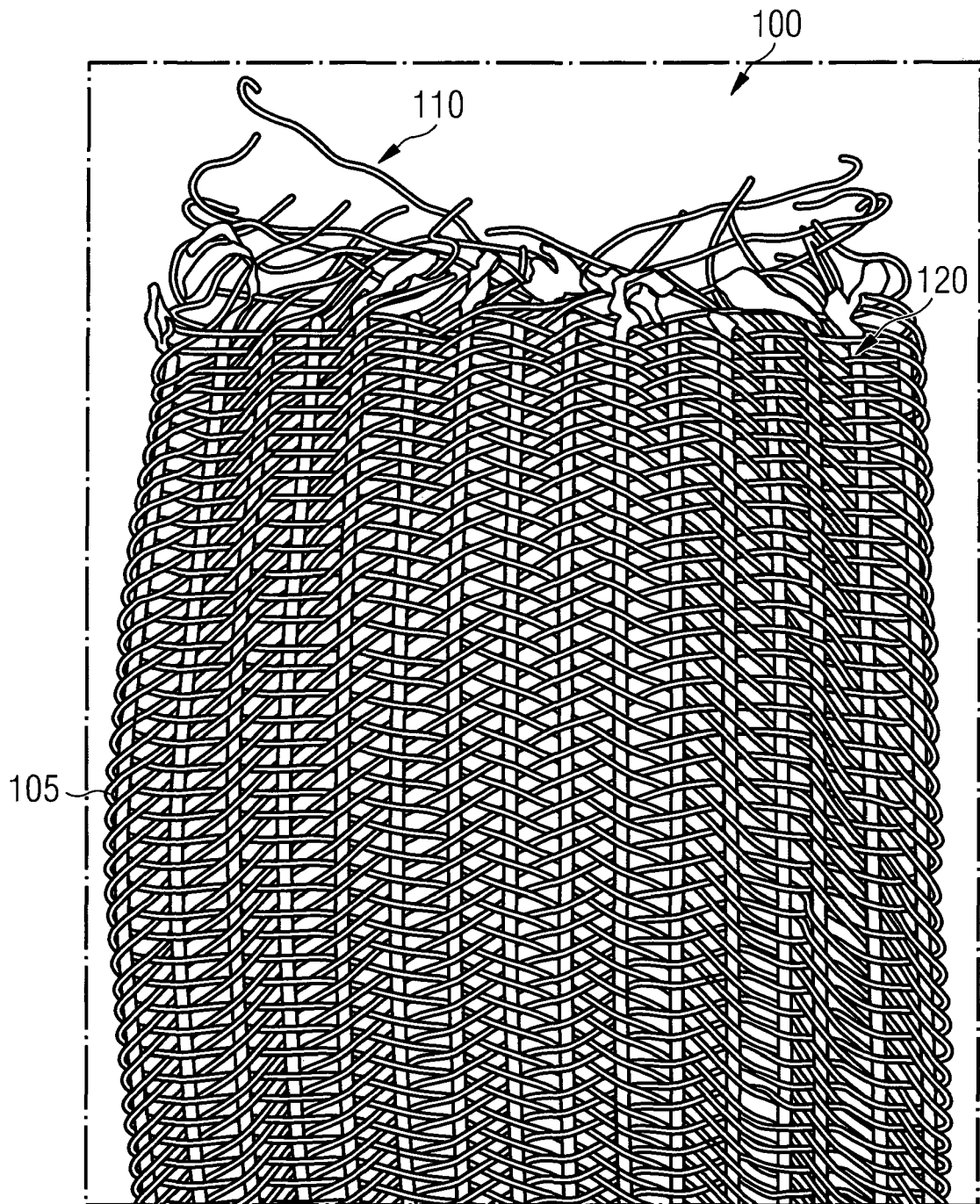


FIG 1B

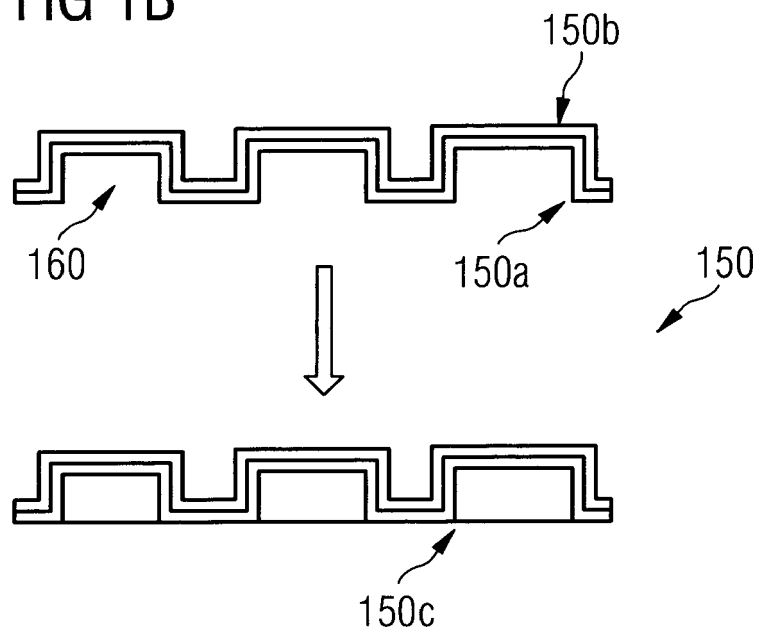


FIG 1C

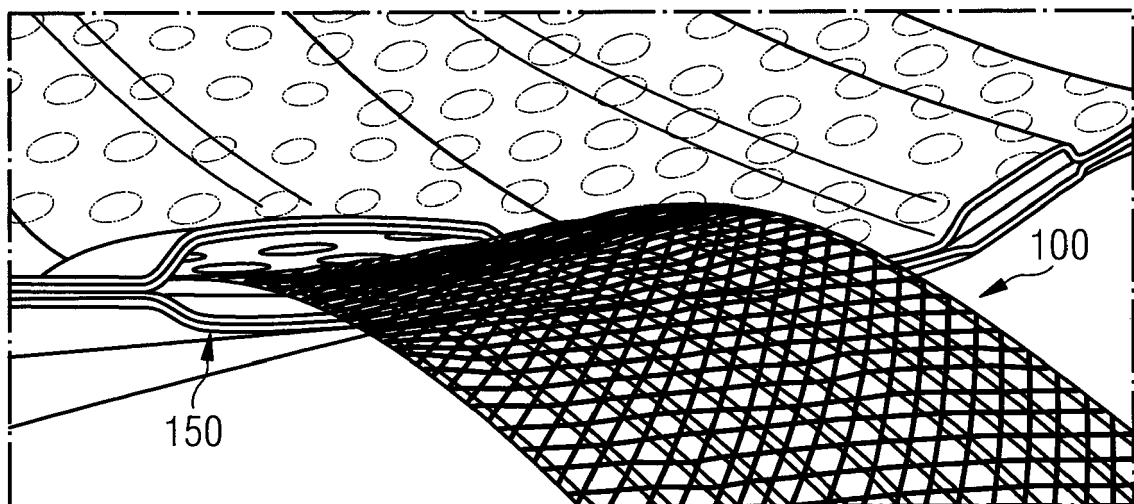


FIG 1D

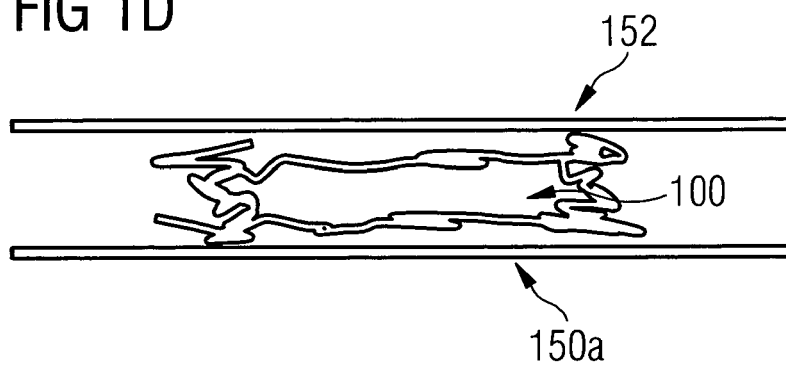


FIG 1E

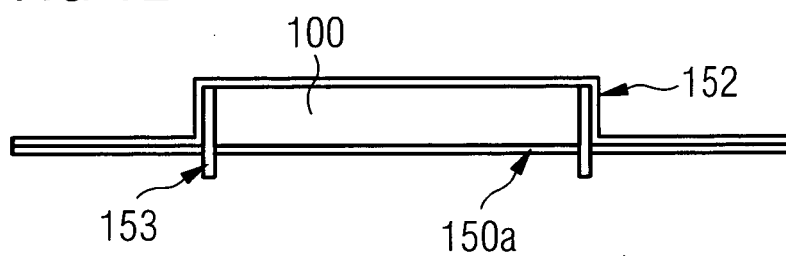


FIG 1F

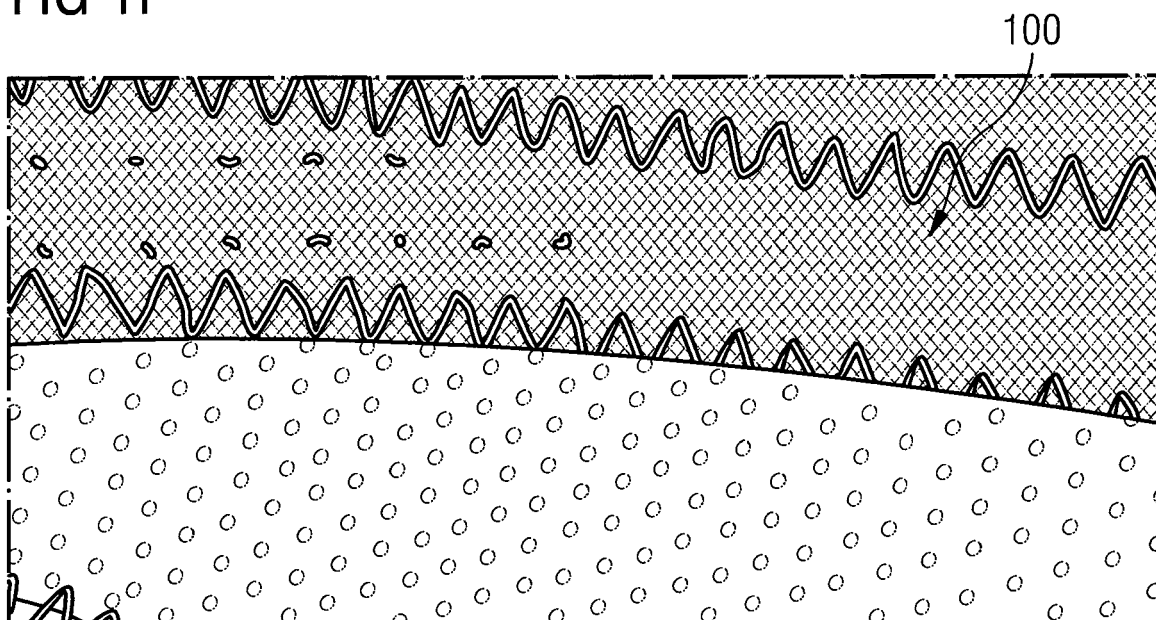


FIG 2

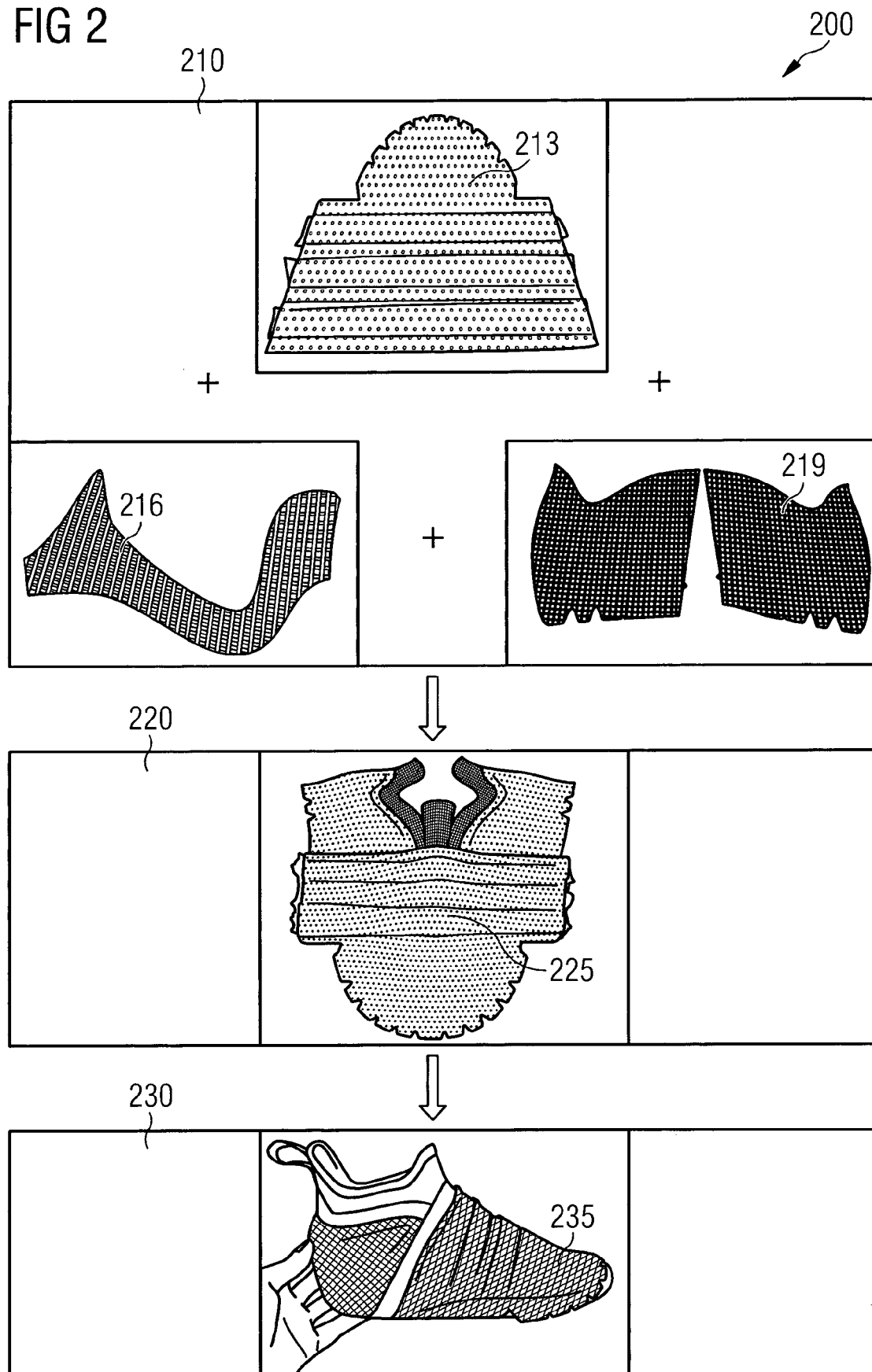


FIG 3

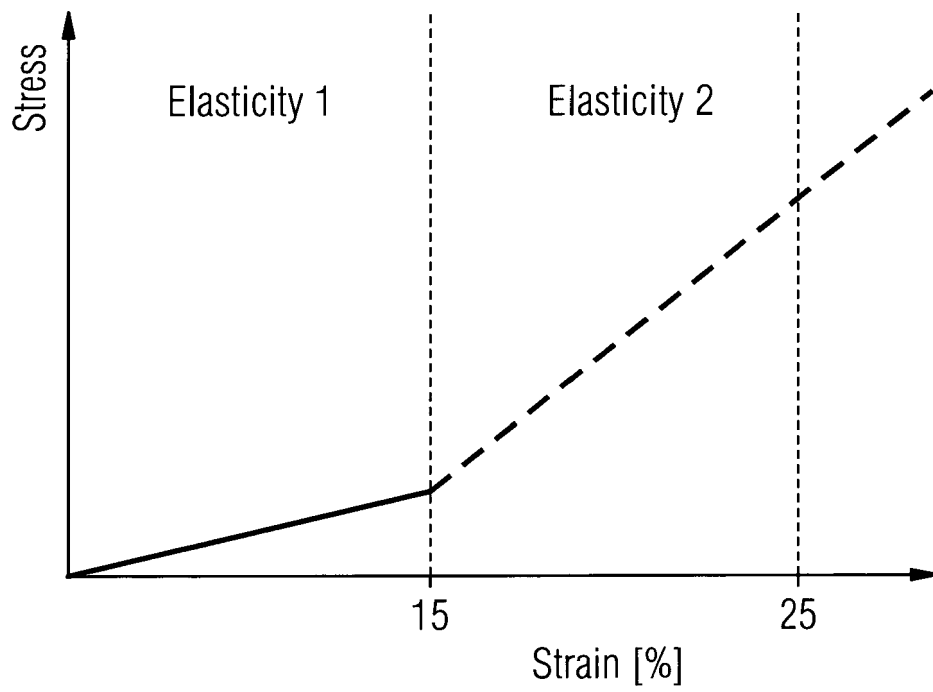


FIG 4A

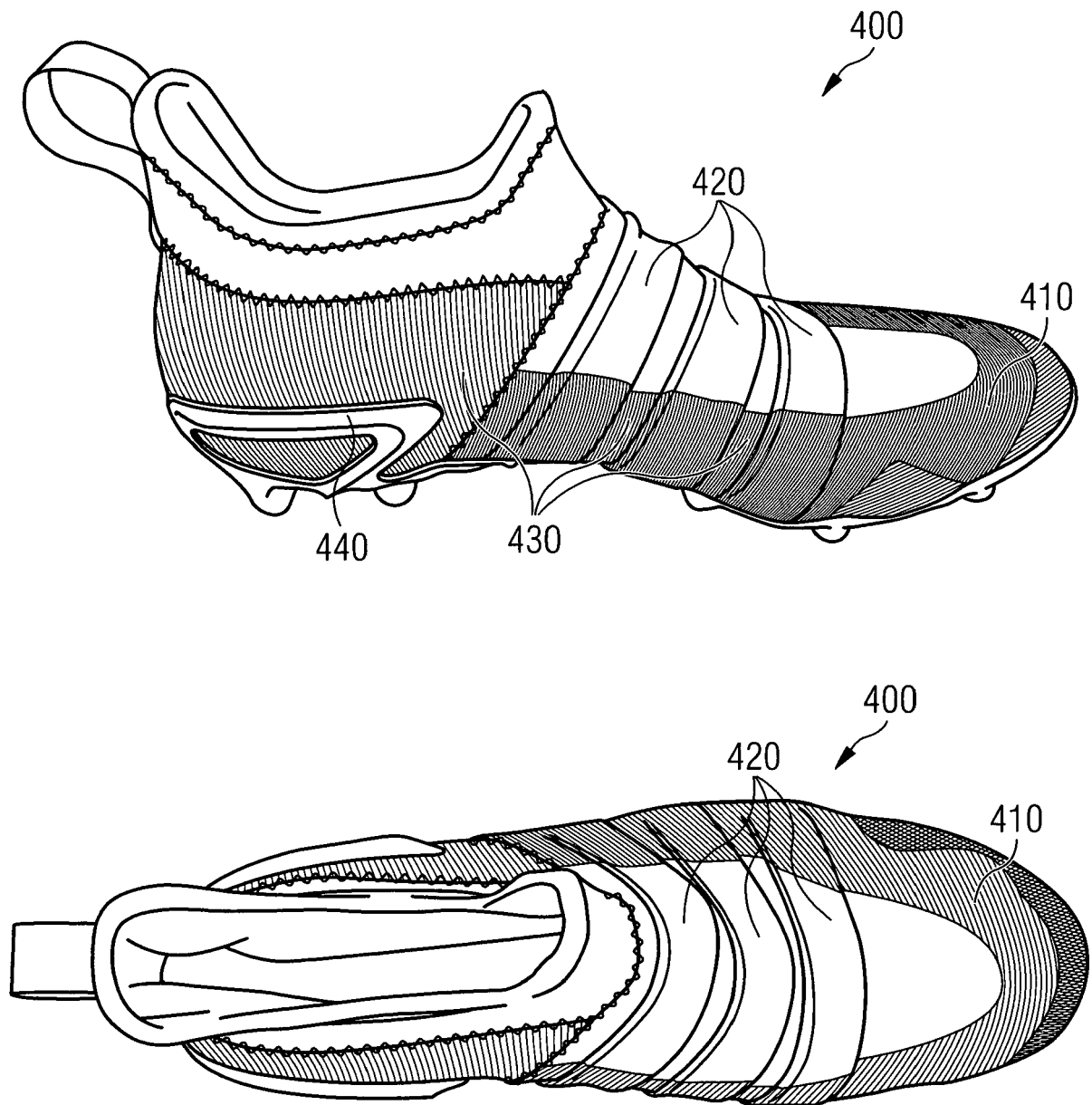


FIG 4B

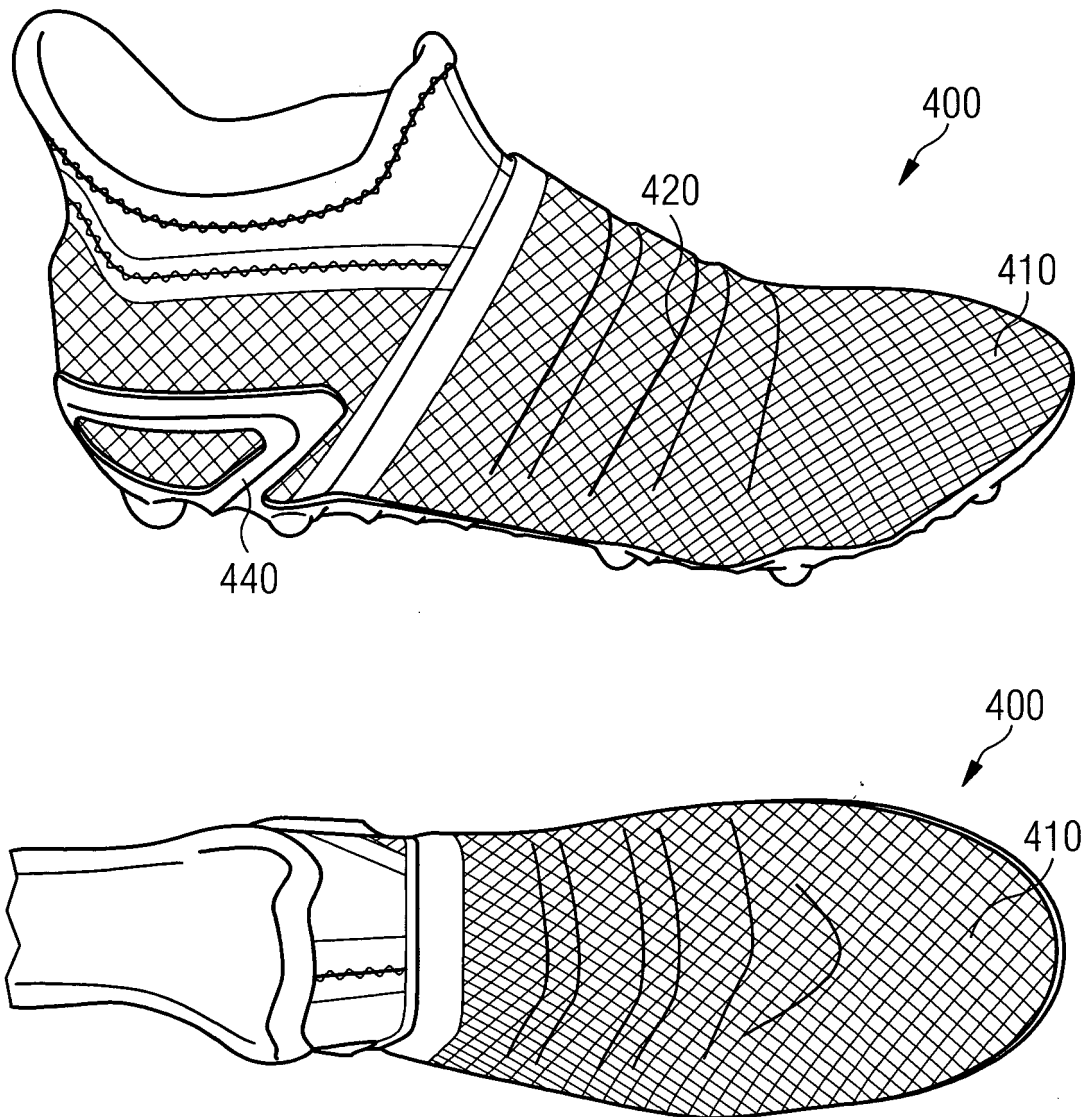
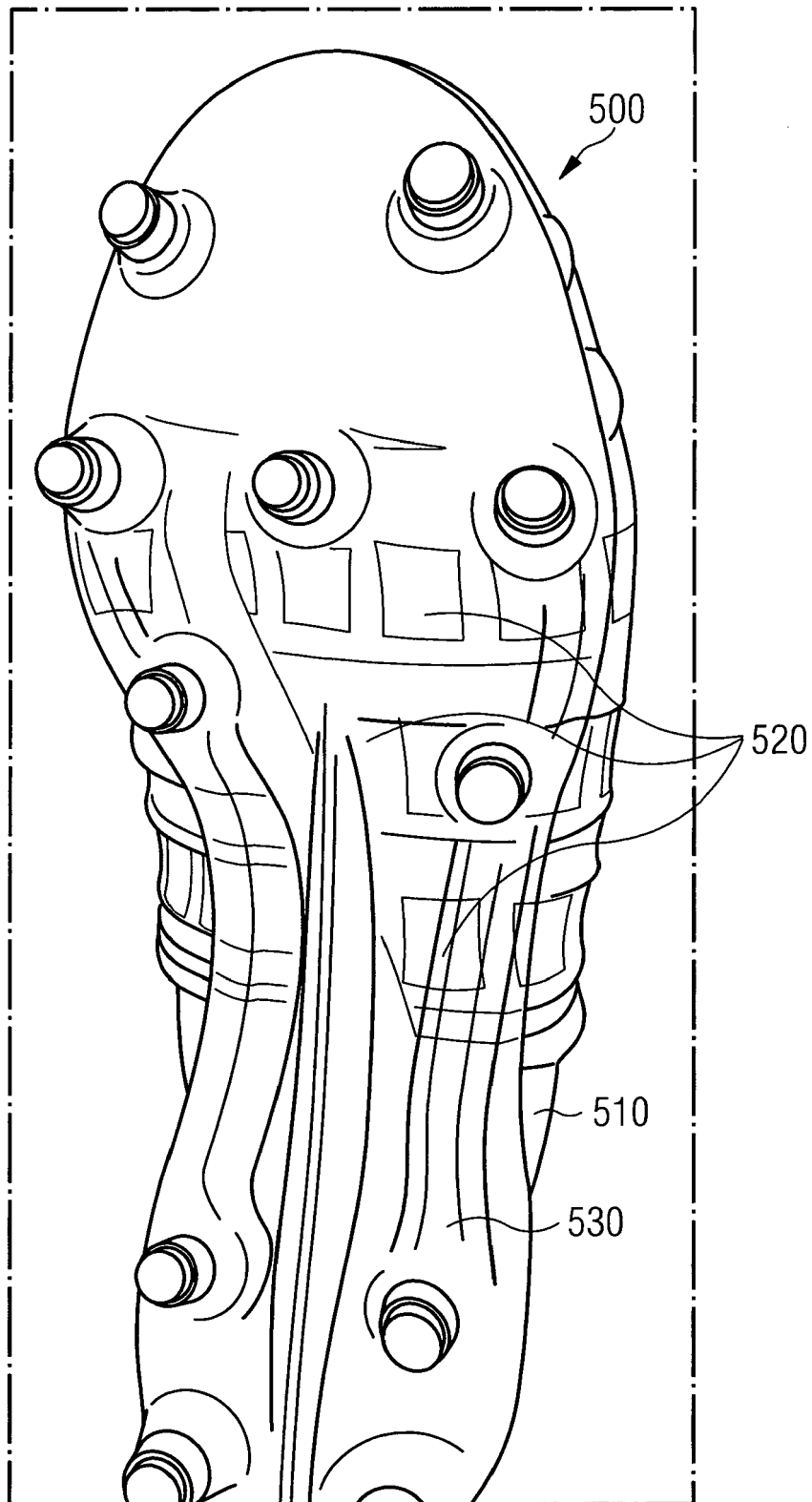


FIG 5





EUROPEAN SEARCH REPORT

 Application Number
EP 17 18 3018

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 2014/373389 A1 (BRUCE ROBERT M [US]) 25 December 2014 (2014-12-25) * figures 10, 12 * * paragraph [0064] * * paragraph [0072] *	1-3, 13-15	INV. A43B1/04 A43B23/02 D04C1/02
X	BE 426 458 A (KUSTER W [BE]) 31 March 1938 (1938-03-31) * the whole document *	1-3,8, 14,15 4-7,9-12	
Y			
X	BE 430 252 A (ROOSELEER J F C [BE]) 31 October 1938 (1938-10-31) * the whole document *	1-3,8, 14,15 4-7	
A			
Y	US 8 745 895 B2 (SOKOŁOWSKI S [US]) 10 June 2014 (2014-06-10) * figures 1-3 *	4-7	
Y	US 2014/196316 A1 (FOLLET LYSANDRE [US]) 17 July 2014 (2014-07-17) * figure 5 * * paragraph [0032] * * paragraph [0033] * * paragraph [0054] *	9,10,12	TECHNICAL FIELDS SEARCHED (IPC) A43B D04C
Y	EP 2 934 218 A1 (NIKE INNOVATE CV [US]) 28 October 2015 (2015-10-28) * paragraph [0028] *	11	
Y	DE 76 01 387 U1 (JAEGER GEB [DE]) 7 April 1977 (1977-04-07) * the whole document *	11,12	
Y	DE 69 37 464 U (JAEGER GEB [DE]) 26 February 1970 (1970-02-26) * the whole document *	11,12	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		29 November 2017	Ariza De Miguel, Jon
CATEGORY OF CITED DOCUMENTS			
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 18 3018

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-11-2017

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20

25

30

35

40

45

50

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014373389 A1	25-12-2014	AU 2014303040 A1	12-11-2015
		CA 2910349 A1	31-12-2014
		CN 105263351 A	20-01-2016
		EP 2978333 A1	03-02-2016
		EP 3153048 A1	12-04-2017
		HK 1215364 A1	26-08-2016
		JP 2016524941 A	22-08-2016
		KR 20160024981 A	07-03-2016
		US 2014373389 A1	25-12-2014
		US 2015007451 A1	08-01-2015
		WO 2014209594 A1	31-12-2014

BE 426458 A	31-03-1938	NONE	

BE 430252 A	31-10-1938	NONE	

US 8745895 B2	10-06-2014	CN 101562999 A	21-10-2009
		EP 2088887 A1	19-08-2009
		EP 2591694 A1	15-05-2013
		HK 1129281 A1	30-08-2013
		JP 5363619 B2	11-12-2013
		JP 5787950 B2	30-09-2015
		JP 2010508968 A	25-03-2010
		JP 2012196488 A	18-10-2012
		JP 2014012204 A	23-01-2014
		US 2008110049 A1	15-05-2008
		US 2012240429 A1	27-09-2012
		US 2014310987 A1	23-10-2014
		WO 2008063385 A1	29-05-2008

US 2014196316 A1	17-07-2014	AU 2014207747 A1	21-05-2015
		AU 2016219621 A1	15-09-2016
		CA 2890390 A1	24-07-2014
		CN 104902772 A	09-09-2015
		EP 2903469 A1	12-08-2015
		JP 6185083 B2	23-08-2017
		JP 2016503698 A	08-02-2016
		KR 20150104166 A	14-09-2015
		KR 20170015574 A	08-02-2017
		US 2014196316 A1	17-07-2014
		US 2015342287 A1	03-12-2015
		US 2017099905 A1	13-04-2017
		WO 2014113356 A1	24-07-2014

EP 2934218 A1	28-10-2015	AU 2014219292 A1	06-08-2015
		CA 2898508 A1	28-08-2014

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

55

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 18 3018

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-11-2017

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CN 105072939 A	18-11-2015
		CN 105286205 A	03-02-2016
		EP 2934218 A1	28-10-2015
		EP 3100628 A1	07-12-2016
		HK 1209988 A1	15-04-2016
		JP 2016507327 A	10-03-2016
		KR 20150107832 A	23-09-2015
		US 2014237850 A1	28-08-2014
		WO 2014130319 A1	28-08-2014

DE 7601387	U1	07-04-1977	NONE

DE 6937464	U	26-02-1970	NONE

EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20140196316 A1 [0003]
- US 7568298 B2 [0003]
- US 7574818 B2 [0003]
- US 8745895 B2 [0003]
- US 20040181972 A1 [0003] [0009]
- US 6052921 A [0003]
- US 200601981164 A1 [0003]
- US 5291671 A [0003]
- US 7134224 B2 [0003]
- US 6324773 B1 [0003]
- CN 204207163 [0003]
- US 3931685 A [0006]
- US 20150007451 A1 [0007]
- US 20160206044 A1 [0009]
- US 20100299964 A1 [0009]
- CN 203676267 U [0009]
- US 20130305465 A1 [0009]
- US 20140137433 A1 [0009]
- US 20030159312 A1 [0009]
- GB 2464326 A [0009]
- DE 1956550 U [0009]
- DE 422342 A [0009]