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(54) **WETSUIT**

(57) A wetsuit is provided, the wetsuit comprising: a sleeve, formed from at least a first material and a second material, the sleeve having an upper arm portion and a forearm portion, wherein the first material defines a boundary that is arranged to extend from the forearm portion, around a bicep region in the upper arm portion and back to the forearm portion, and the second material is arranged to be positioned within the boundary in the bicep region and forearm portion, and wherein the first material has a first elastic modulus and the second material has a second elastic modulus, the first elastic modulus being greater than the second elastic modulus.

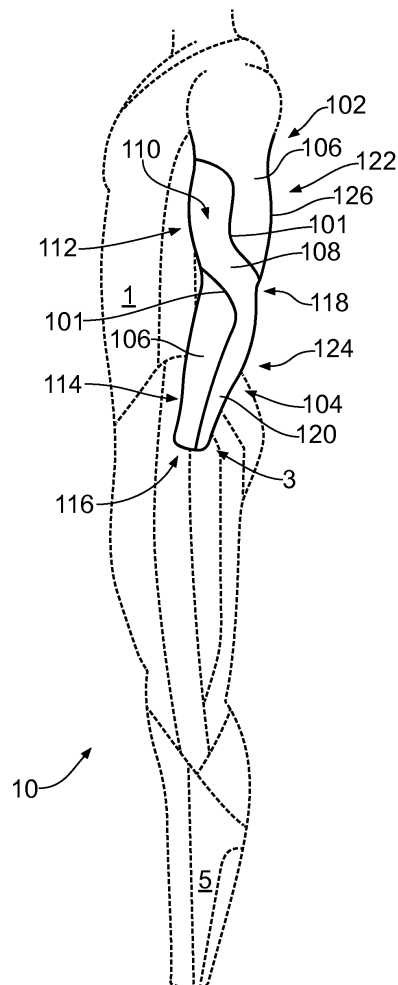


FIG. 3

Description

TECHNOLOGICAL FIELD

[0001] Embodiments of the present invention relate to a wetsuit. In particular, they relate to a triathlon wetsuit.

BACKGROUND

[0002] A wetsuit may be used in a number of different water sports, such as water skiing, snorkeling, scuba diving and triathlon. Wetsuits manufactured for water skiing, snorkeling and scuba diving are typically unsuitable for triathlon, because their sleeves restrict the motion of the wearer's arms during swimming. This has a detrimental effect on performance and can contribute to fatigue.

BRIEF SUMMARY

[0003] According to various, but not necessarily all, embodiments of the invention there is provided a wetsuit, comprising: a sleeve, formed from at least a first material and a second material, the sleeve having an upper arm portion and a forearm portion, wherein the first material defines a boundary that is arranged to extend from the forearm portion, around a bicep region in the upper arm portion and back to the forearm portion, and the second material is arranged to be positioned within the boundary in the bicep region and forearm portion, and wherein the first material has a first elastic modulus and the second material has a second elastic modulus, the first elastic modulus being greater than the second elastic modulus.

[0004] The first elastic modulus may be at least 10% greater than the second elastic modulus. The first elastic modulus may be at least 25% greater than the second elastic modulus.

[0005] The boundary may extend along a posterior region of the forearm portion of the sleeve. The boundary may extend from a cuff region of the sleeve. The boundary may extend back to the cuff region of the sleeve. The sleeve may have an elbow region, and the second material may be positioned at the elbow region, within the boundary.

[0006] The boundary may define a channel within which the second material is positioned. The channel may extend to the cuff of the sleeve. The channel may be tapered in the forearm portion.

[0007] The first material may be a composite material. The first, composite, material may comprise neoprene and at least one layer of fabric. The second material may be a composite material. The second, composite, material may comprise neoprene sandwiched between two layers of fabric.

[0008] The second material may extend from the bicep region to the elbow region. The second material may extend from the elbow region to the forearm portion.

[0009] The wetsuit may be a triathlon wetsuit.

[0010] According to various, but not necessarily all,

embodiments of the invention there is provided a wetsuit, comprising: a sleeve, formed from at least a first material and a second material, the sleeve having an upper arm portion and a forearm portion, wherein the first material has a boundary that is arranged to extend around a bicep region in the upper arm portion of the sleeve and around an elbow region of the sleeve, and wherein the first material has a first elastic modulus and the second material has a second elastic modulus, the first elastic modulus being greater than the second elastic modulus.

[0011] The second material may be positioned in a channel defined by the boundary that extends from the bicep region to at least the elbow region of the sleeve. The second material may extend from the elbow region and along the forearm portion to a cuff region of the sleeve.

[0012] According to various, but not necessarily all, embodiments of the invention there is provided a wetsuit as hereinbefore described and illustrated in the appended figures.

[0013] According to various, but not necessarily all, embodiments of the invention there is provided examples as claimed in the appended claims.

BRIEF DESCRIPTION

[0014] For a better understanding of various examples that are useful for understanding the detailed description, reference will now be made by way of example only to the accompanying drawings in which:

fig. 1 illustrates an anterior elevation of a wetsuit;
fig. 2 illustrates a posterior elevation of the wetsuit;
fig. 3 illustrates a side elevation of the wetsuit; and
figs 4A to 4C illustrate different rotations of a sleeve of the wetsuit.

DETAILED DESCRIPTION

[0015] Fig. 1 illustrates an anterior elevation of a wetsuit 10. The wetsuit 10 is wearable by a person. The wetsuit may be worn by a person, in particular, when participating in water sports such as swimming. In this example, the wetsuit is a triathlon wetsuit that is for wear at least during the swimming stage of a triathlon.

[0016] The wetsuit 10 includes a main body portion 1, first and second arm sleeves 3, 4 and first and second leg sleeves 5, 6. The construction of a first arm sleeve 3 is described below. The second arm sleeve 4 is symmetrical to the first arm sleeve 3 and has a corresponding construction.

[0017] The sleeve 3 comprises an upper arm portion 102 and a forearm portion 104. The upper arm portion 102 is arranged to cover and overlies at least a portion of an upper arm of a wearer. In the illustrated example, the upper arm portion 102 is arranged to extend from the shoulder of the wearer to the elbow of the wearer. The forearm portion 104 is arranged to cover and overlies at

least a portion of the forearm arm of the wearer. In the illustrated example, the forearm portion 104 is arranged to extend from the elbow of the wearer to the wrist of the wearer. The forearm portion 104 terminates at a cuff region 116, which is arranged to be positioned at the wrist of the wearer.

[0018] Fig. 2 illustrates a posterior elevation of the wetsuit 10. Fig. 3 illustrates a side elevation of the wetsuit 10. Figs 4A to 4C illustrate different rotations of the sleeve 3 of the wetsuit 10.

[0019] The reference numerals 112 and 114 designate an anterior region of each of the upper arm portion 102 and the forearm portion 104, respectively (see figs 1, 3 and 4A to 4C). The reference numerals 122 and 124 designate a posterior region of each of the upper arm portion 102 and the forearm portion 104, respectively (see figs 1, 2 and 4A to 4C).

[0020] A bicep region 110 is positioned within the anterior region 112 of the upper arm portion 102 (see fig. 1, for example). The bicep region 110 is arranged to cover/overlie at least a portion of the wearer's bicep. A tricep region 126 is positioned within the posterior region 122 of the upper arm portion 102 (see fig. 2, for example). The tricep region 126 is arranged to cover/overlie at least a portion of the wearer's tricep.

[0021] A majority of the wetsuit 10 may be constructed using a first material 106 which, in this example, is a composite material that comprises neoprene and at least one layer of fabric. Those skilled in the art will be aware that neoprene is also known as polychloroprene or chloroprene rubber. The first material 106 may, for example, be closed cell neoprene lined/laminated with a layer of fabric such as nylon or polyester. The layer of fabric may form at least part of the inner lining of the wetsuit 10.

[0022] Some parts of the wetsuit 10 may be constructed using a second material 108. The first and second materials 106, 108 are different materials in this example. The second material 108 may be a composite material that comprises neoprene sandwiched between two layers of fabric. The second material 108 may, for example, be open cell neoprene lined/laminated on each side with a fabric such as nylon or polyester. One of the layers of fabric may form at least part of the inner lining of the wetsuit 10.

[0023] The thickness of the first material 106 may be greater than the thickness of the second material 108. The thickness of the first material 106 may, for example, be in the range 3 millimeters to 5 millimeters. The thickness of the second material 108 may, for example, be in the range 1 millimeter to 3 millimeters.

[0024] The first material 106 has a first elastic modulus and the second material 108 has a second elastic modulus. The first elastic modulus is greater than the second elastic modulus, making the first material 106 stiffer/less stretchable than the second material 108. The first material 106 is also more thermally insulative than the second material 108.

[0025] In some examples, the first elastic modulus is

at least 10% greater than the second elastic modulus. In other examples, the first elastic modulus is at least 25% greater than the second elastic modulus. In some further examples, the first elastic modulus is at least 50% greater than the second elastic modulus.

[0026] The first material 106 defines a boundary 101 that is arranged to extend from the forearm portion 104 (see fig. 2 or 3, for example), around the bicep region 110 in the upper arm portion 102 (see fig. 1 or 3, for example) and back to the forearm portion 104 (see fig. 2 for example).

[0027] In the illustrated example, the boundary 101 extends from the cuff region 116 and along the posterior region 124 of the forearm portion 104, before extending across the outside of the sleeve near the elbow region 118, around the bicep region 110, back across the outside of the sleeve 3, and back along the posterior region 124 of the forearm portion 104 to the cuff region 116, where the boundary 101 terminates.

[0028] The second material 108 is positioned within the boundary 101, such that the boundary 101 provides a junction between the first material 106 and the second material 108. There may be a region of overlap between the first and second materials 106 at (and proximate to) the boundary 101 to allow them to be attached together, for instance by stitching.

[0029] The second material 108 is positioned at the bicep region 110 (overlying the wearer's bicep, at least to some extent) and the elbow region 118 (overlying the wearer's elbow, at least to some extent). The first material 106 is positioned in the tricep region 126 of the posterior region 122 of the upper arm portion 102 (overlying the wearer's tricep, at least to some extent), above the second material 108 at the elbow region 118.

[0030] The second material 108 extends from the bicep region 110, around the outside of the sleeve 3 to the elbow region 118 and then along the posterior region 124 of the forearm portion 104 to the cuff region 116. It can be seen in figs 2 and 4C that the extension of the boundary 101 to and from the cuff region 116 means that the boundary 101 does not completely enclose the second material 108.

[0031] In effect, the boundary 101 of the first material 106 defines a channel within which the second material 108 is positioned. The channel extends from the bicep region 110 around the outside of the sleeve 3 to the elbow region 118 and along the posterior region 124 of the forearm portion 104 to the cuff region 116. The channel tapers (inwardly) as it extends from the elbow region 118 to the cuff region 116.

[0032] In use, when a wearer of the wetsuit 10 is swimming, the lower elastic modulus of the second material 108 in the bicep region 110 advantageously enables the bicep of the wearer to flex more easily than if the whole of the sleeve 3 were formed from the first material 106. The lower elastic modulus of the second material 108 at the elbow region 118 also enables the elbow to bend more easily than if the whole of the sleeve 3 were formed

from the first material 106. This advantageously provides improved performance and reduces fatigue.

[0033] Furthermore, if boundary 101 merely surrounded the bicep region 110 and did not extend to the elbow region 118, forearm portion 104 and cuff region 112, for example, one or more points of high tension might appear at the boundary 101 between the first material 106 and the second material 108 when the wearer's arm bends. Advantageously, however, the shape of the boundary 101 described above and illustrated in the figures allows for greater movement of the second material 108, obviating such points of high tension and enabling the wearer's arm to bend more easily.

[0034] The presence of the first material 106 in the forearm portion 104 advantageously adds some increased stiffness, rigidity and thermal insulation to the sleeve 3 in the forearm portion 104.

[0035] Although embodiments of the present invention have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the invention as claimed. For example, the boundary 101 need not have the exact same shape as that illustrated in the figures. The wetsuit 10 described and illustrated in the figures is a one piece wetsuit, but in other embodiments it could instead be a two piece wetsuit.

[0036] Features described in the preceding description may be used in combinations other than the combinations explicitly described.

[0037] Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

[0038] Although features have been described with reference to certain embodiments, those features may also be present in other embodiments whether described or not.

[0039] Whilst endeavoring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. A wetsuit, comprising:

a sleeve, formed from at least a first material and a second material, the sleeve having an upper arm portion and a forearm portion, wherein the first material defines a boundary that is arranged to extend from the forearm portion, around a bicep region in the upper arm portion and back to the forearm portion, and the second material is arranged to be positioned within the

boundary in the bicep region and forearm portion, and

wherein the first material has a first elastic modulus and the second material has a second elastic modulus, the first elastic modulus being greater than the second elastic modulus.

2. The wetsuit of claim 1, wherein the first elastic modulus is at least 10% greater than the second elastic modulus.

3. The wetsuit of claim 1 or 2, wherein the first elastic modulus is at least 25% greater than the second elastic modulus.

4. The wetsuit of claim 1, 2 or 3, wherein the boundary extends along a posterior region of the forearm portion of the sleeve.

5. The wetsuit of any of the preceding claims, wherein the boundary extends from a cuff region of the sleeve.

6. The wetsuit of claim 5, wherein the boundary extends back to the cuff region of the sleeve.

7. The wetsuit of any of the preceding claims, wherein the sleeve has an elbow region, and the second material is positioned at the elbow region, within the boundary.

8. The wetsuit of any of the preceding claim, wherein the boundary defines a channel within which the second material is positioned.

9. The wetsuit of claim 8, wherein the channel extends to the cuff of the sleeve.

10. The wetsuit of claim 8 or 9, wherein the channel is tapered in the forearm portion.

11. The wetsuit of any of the preceding claims, wherein the first material is a composite material.

12. The wetsuit of claim 11, wherein the first, composite, material comprises neoprene and at least one layer of fabric.

13. The wetsuit of any of the preceding claims, wherein the second material is a composite material.

14. The wetsuit of claim 13, wherein the second, composite, material comprises neoprene sandwiched between two layers of fabric.

15. A wetsuit, comprising:

a sleeve, formed from at least a first material

and a second material, the sleeve having an upper arm portion and a forearm portion, wherein the first material has a boundary that is arranged to extend around a bicep region in the upper arm portion of the sleeve and around an elbow region of the sleeve, and wherein the first material has a first elastic modulus and the second material has a second elastic modulus, the first elastic modulus being greater than the second elastic modulus.

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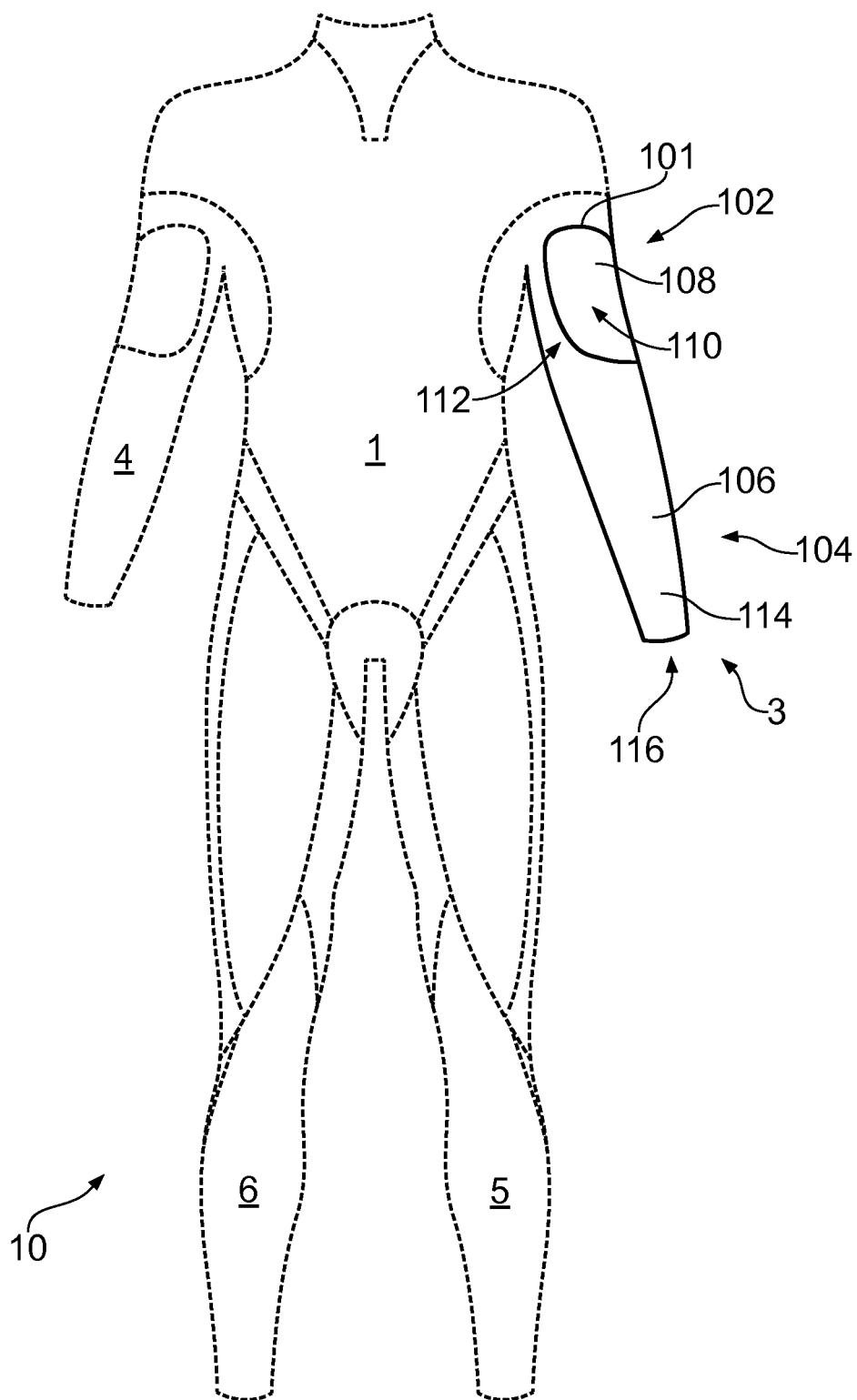


FIG. 1

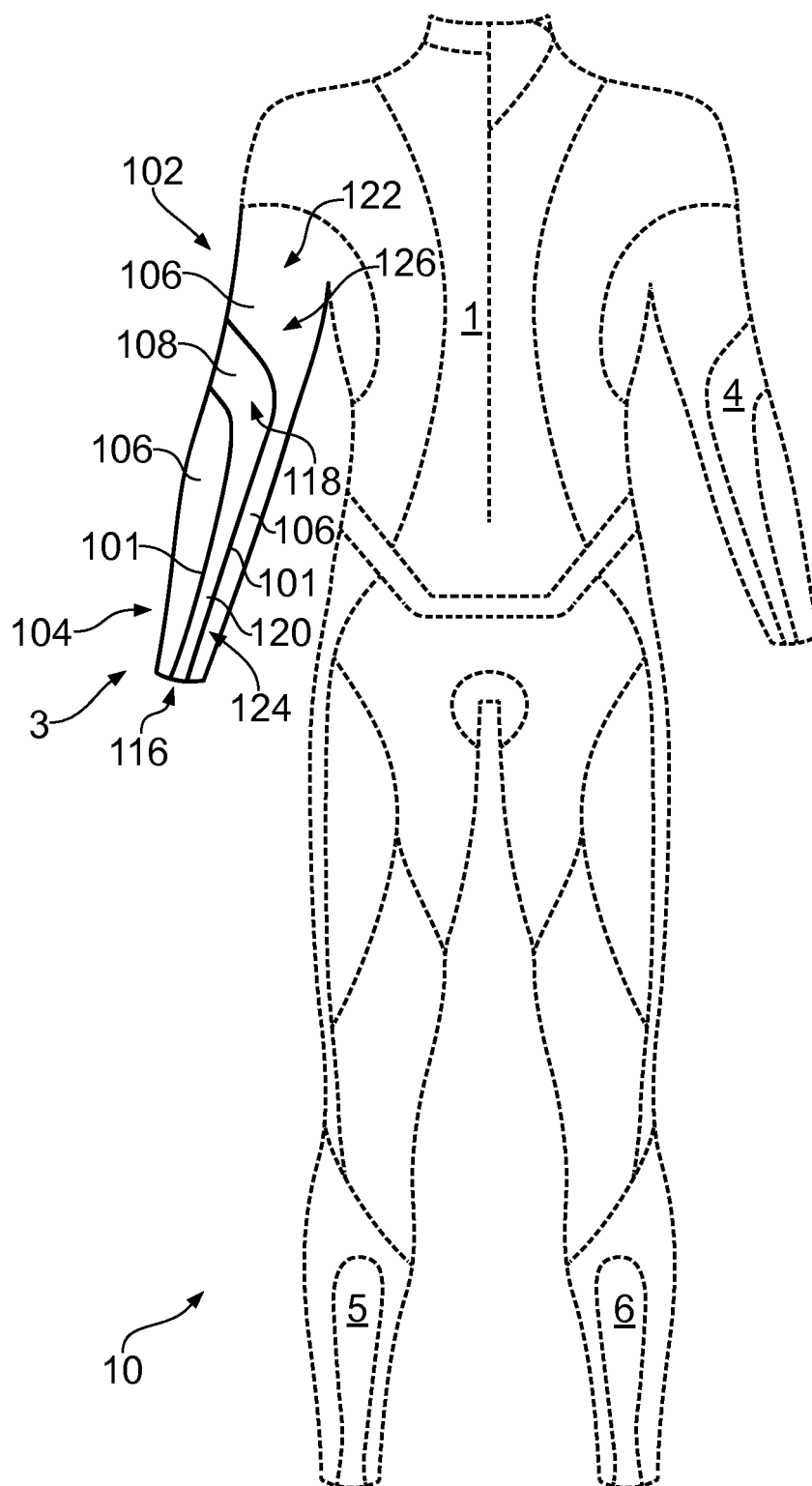


FIG. 2

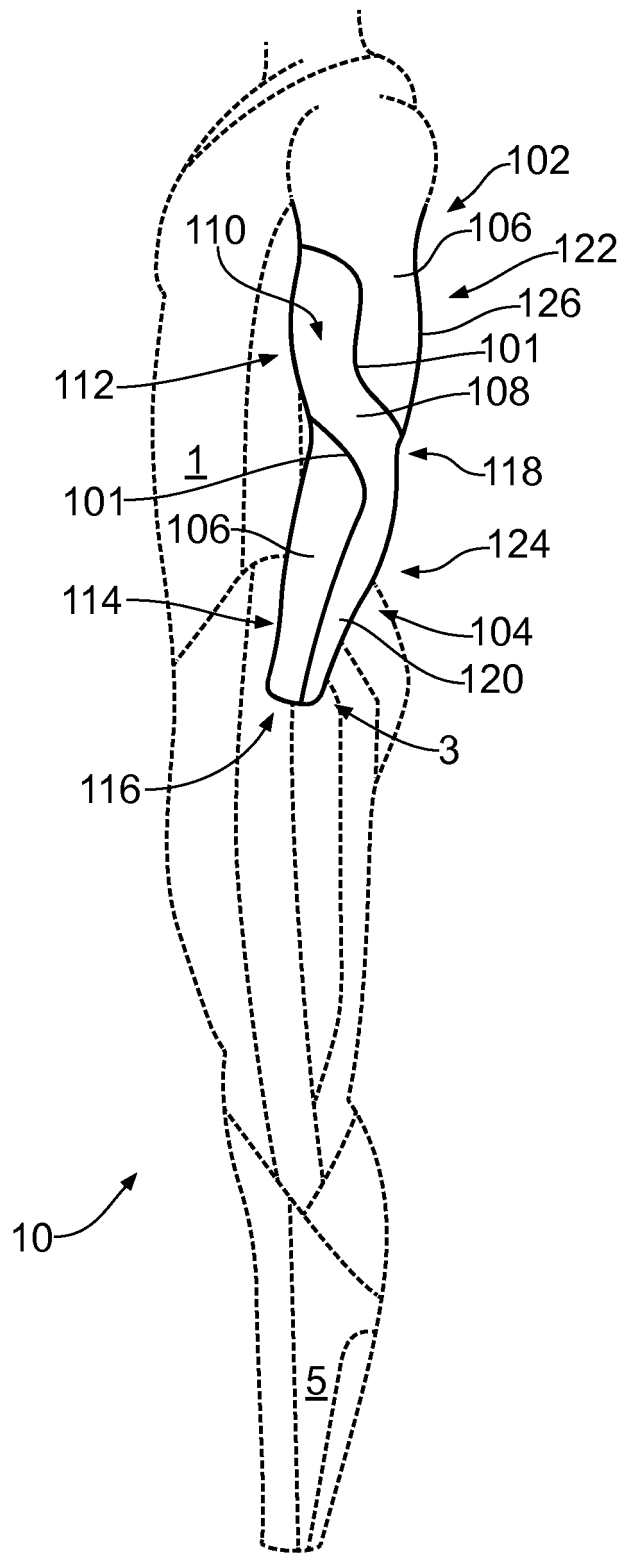
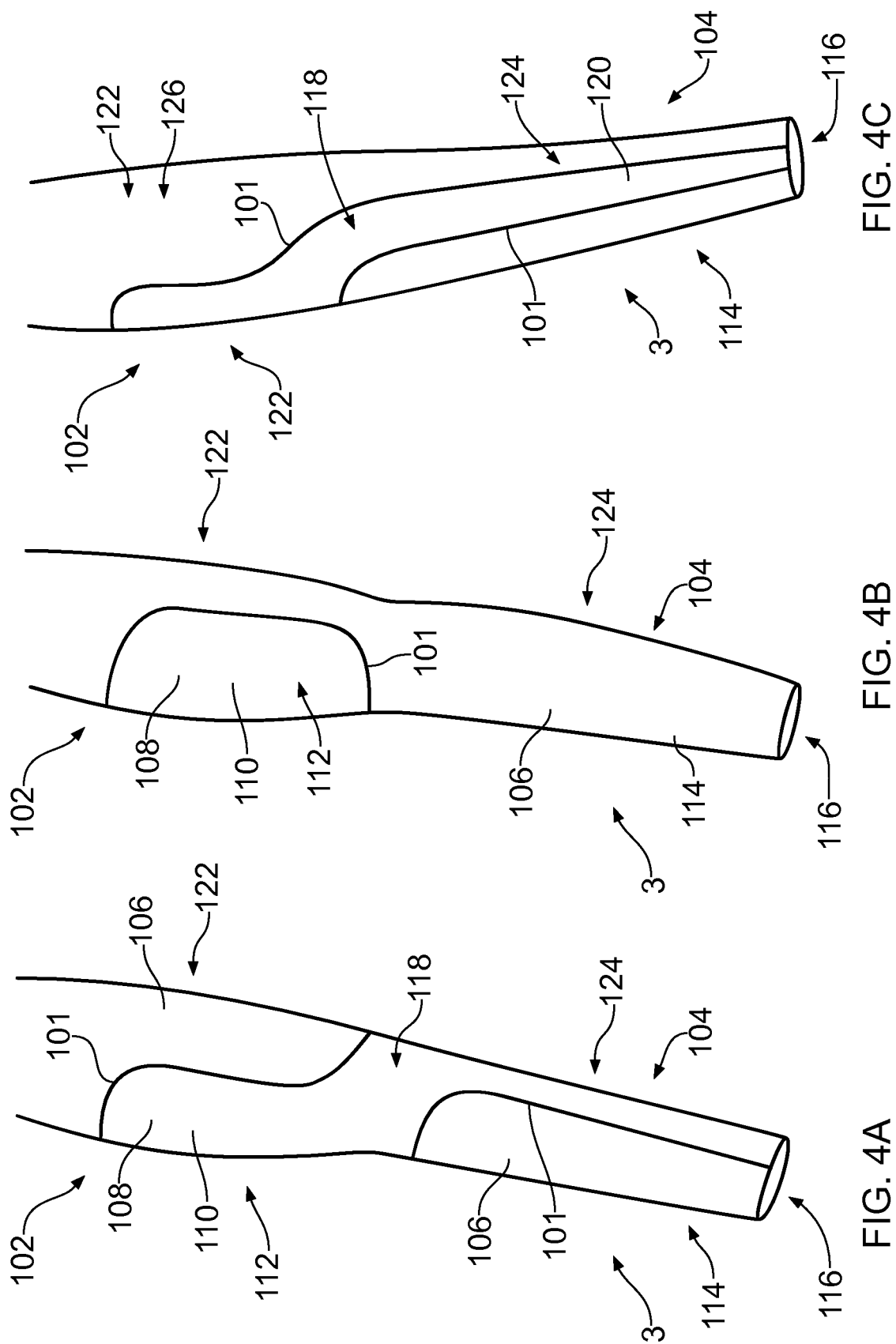


FIG. 3





EUROPEAN SEARCH REPORT

Application Number
EP 17 18 9102

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 December 2017	Examiner van Voorst, Frank
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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