



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.07.2010 Bulletin 2010/27

(51) Int Cl.:
A41D 7/00 (2006.01)

(21) Application number: **08425824.3**

(22) Date of filing: **30.12.2008**

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

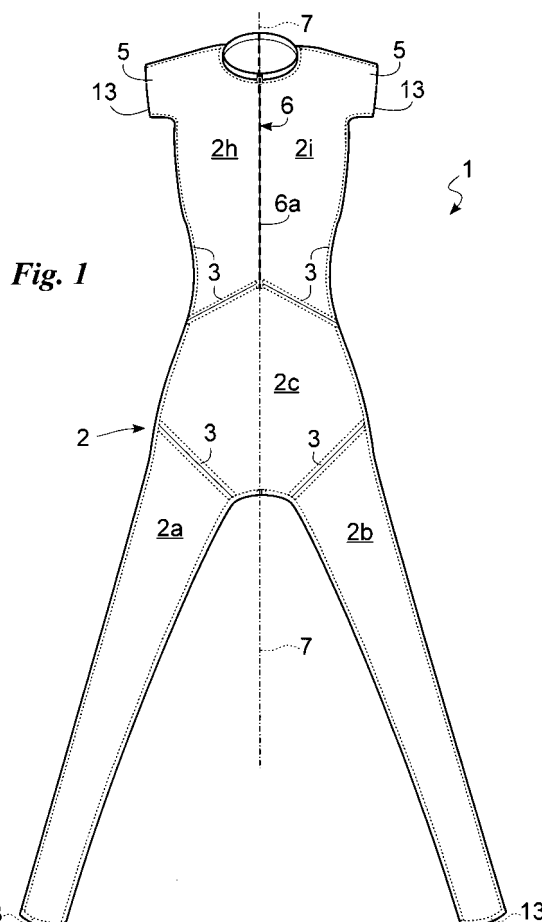
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(54) **Racing swimsuit**

(57) A swimsuit (1) for racing which can be worn by a swimmer and is suitable for covering at least part of the legs, bust and back of the swimmer and comprising a round-neck portion (4) suitable for enveloping at least part of the neck, a portion of sleeves (5) suitable for substantially covering exclusively the shoulders of said swimmer and two zips (6), one front zip (6a) and one back zip (6b) arranged along the sagittal plane (7) and extending from the upper end of said round-neck portion (4) through part of the back and the bust.



Description

[0001] The present invention relates to a racing swimsuit, of the type specified in the preamble to the first claim.

[0002] Different types of swimsuits are currently known and in particular racing swimsuits and similar.

[0003] They generally consist of trunks or a suit made of stretch water-permeable material. They can be made of polymeric or natural woven yarns.

[0004] In particular, in many cases garments are used consisting of a suit which substantially envelops the body excluding the shoulders and neck.

[0005] The swimsuits of known type have some serious drawbacks.

[0006] Due to their form and stitching, said swimsuits do not ensure ideal hydrodynamics for racing swimmers.

[0007] Furthermore, in some cases, the water can get inside the swimsuit, reducing its hydrodynamics and thus slowing down the speed of the swimmer wearing it.

[0008] In other cases, the swimsuit can reduce the sensitivity of the swimmer to contact with the water and consequently negatively affect the performance of the swimmer, who does not have a precise reference in terms of contact with the water.

[0009] In this situation the technical aim of the present invention is to conceive a racing swimsuit able to substantially remedy the above-mentioned drawbacks.

[0010] In the context of said technical aim, an important object of the invention is to conceive a swimsuit with optimal hydrodynamics.

[0011] A further important object of the invention is to obtain a swimsuit able to improve the performance of swimmers.

[0012] The technical aim and the objects specified are achieved by a racing swimsuit as described in the attached Claim 1.

[0013] Preferred embodiments are highlighted in the sub-claims.

[0014] The characteristics and advantages are clarified below in the detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings in which:

Fig. 1 shows a front view of a swimsuit according to the invention;

Fig. 2 illustrates a rear view of a swimsuit according to the invention;

Fig. 3 shows a diagram of a seam of two membranes constituting the swimsuit of the invention; and

Fig. 4 schematises an ordinary section of a detail of the swimsuit.

[0015] With reference to the Figures cited, the racing swimsuit according to the invention is indicated overall by the number 1.

[0016] It is suitable for use in particular for racing, and preferably for backstroke or crawl racing.

[0017] It is preferably made entirely of membranes 2

described below and preferably reciprocally connected by means of seams 3 also described below.

[0018] The swimsuit 1 furthermore covers at least part of the legs, and preferably all of the same with the exclusion of the feet, all of the bust and back and the shoulders, leaving the whole of the arms substantially free, except for the shoulders.

[0019] In particular, at the neck the swimsuit 1 comprises a round-neck portion 4 suitable for enveloping at least part of the neck and having a height of between 0.3 cm and 3 cm and preferably between 1 cm and 2 cm. Consequently, in the region of the neck, the swimsuit entirely covers the back and the chest.

[0020] Furthermore, at the shoulders the swimsuit 1 comprises a portion of sleeves 5, suitable for substantially covering the shoulders and not the arms.

[0021] In particular the sleeve portion, on a person approximately 1.8 m tall, has a length of less than 10 cm and more preferably between 3 cm and 7 cm. Consequently, also in the region of the shoulders, the swimsuit entirely covers both the back and the chest.

[0022] The swimsuit 1 comprises two zips 6, a front zip 6a and a back zip 6b, described in further detail below.

[0023] The zips 6 are positioned along the sagittal plane 7, i.e. substantially in a vertical direction when worn by a user in the erect position, and extend from the top of the round-neck portion 4 preferably to the lower portion of the chest. They therefore have a length preferably between 30 cm and 40 cm and permit opening of the upper portion of the swimsuit along the sagittal plane 7 in two halves.

[0024] Furthermore the swimsuit 1 is preferably made of nine main membranes 2, as illustrated in Fig. 1 and 2.

[0025] In particular, frontally (Fig. 1) there are two membranes 2a, 2b, one for each leg, one membrane 2c corresponding to the pelvis and two 2d, 2e corresponding to the chest, reciprocally divided by the front zip 6a.

[0026] Furthermore the membrane 2c, corresponding to the pelvis, is limited at the top by the bottom of the front zip 6a and by the seams 3, which connect the same membrane 2c corresponding to the pelvis to the membranes 2d, 2e corresponding to the chest, forming with the front zip 6a angles greater than a right angle.

[0027] Due to said arrangement the forces exerted by said front zip 6a are better distributed over the various membranes 2 and seams 3.

[0028] At the back (Fig. 2), the swimsuit 1 comprises membranes 2f, 2g corresponding to each leg and extending substantially up to the chest, and two membranes 2h, 2i corresponding to the chest, reciprocally divided by the back zip 6b.

[0029] In this case the membranes 2f, 2g corresponding to the legs and pelvis are vertically limited by the bottom of the back zip 6b and the seams 3, which connect said membranes 2f, 2g to the membranes 2h, 2i corresponding to the chest, forming with the back zip 6b angles greater than a right angle.

[0030] Furthermore, at the hips the seams 3 connect

the membranes 2 of the front part to the membranes 2 of the back part.

[0031] The seams 3 which connect at the front and back the membranes 2d, 2e, 2h 2i corresponding to the chest to the lower membranes 2c, 2f, 2g meet at said seams 3 on the hips.

[0032] Secondary membranes 2 are also provided at the level of the collar, in particular two semicircular membranes divided by the zips 6 and having a height substantially identical to the height of the round-neck portion 4.

[0033] Other secondary membranes 2 can be provided having mainly aesthetic functions, for example at the level of the calves or other.

[0034] The swimsuit 1 is furthermore preferably made in dimensions such that, when worn, the membranes 2 are tensioned and preferably have an average elongation of between 20% and 120% of the length of said membranes 2 when at rest.

[0035] In the physical details of the single portions of the swimsuit 1, the membranes 2 are defined, at least partly, by a stretch fabric made of polymeric yarns or similar and woven according to known weaves. The stretch fabric is furthermore covered, coated or faced in a polymer so as to form one single membrane 2.

[0036] In detail, said stretch fabric is made of a base periodic weave consisting of two yarns, one in polyamide and one in elastomer, the weight proportions of which, with respect to the total weight of the stretch fabric, are preferably between 70% and 90% and between 10% and 30% respectively, more preferably between 75% and 85% and between 15% and 25% and even more preferably around 80% and 20% respectively.

[0037] Alternatively, said stretch fabric can consist of yarns made of polyurethane or similar.

[0038] The stretch fabric is then coated preferably by said polymer consisting of polyurethane. Coating is preferably performed at 100°C -120°C by means of known industrial equipment or also manually.

[0039] The polyurethane then penetrates between the fibres of the stretch fabric and forms a membrane in one single layer. The coating polymer and the stretch fabric are therefore closely integrated in one single membrane.

[0040] The weight percentages between said stretch fabric and said coating polymer are between 50% and 70% and between 30% and 50% respectively, more preferably between 55% and 65% and between 35% and 45% and even more preferably around 60% and 40% respectively.

[0041] Each membrane 2 therefore consists preferably of polyurethanes, polyamides and elastomers, the weight proportions of which, with respect to the weight of the membrane 2, are preferably respectively between 35% and 45% (polyurethanes), between 43% and 53% (polyamides) and between 7% and 17% (elastomers), and more preferably are around 40%, 48% and 12% respectively.

[0042] Said membranes 2 have the following charac-

teristics: ultimate elongation greater than 300% in the longitudinal direction and greater than 150% in the transverse direction with respect to the main direction of development of the fibres (test performed by means of the UNI EN ISO 1421 method), elongation under a load of 100 N: greater than 300% in the longitudinal direction and greater than 150% in the transverse direction (UNI 4818-7 test method), impermeability greater than 200 cm (UNI EN 1734 test method), ultimate tensile strength: greater than 100N/5cm in both directions (UNI EN ISO 1421 test method), tear strength: greater than 10N in both directions (UNI 4818-9 test method), weight between 130 and 170 g/m².

[0043] The membranes 2 are therefore waterproof due in particular to the presence of said covering polymer, and in particular the polyurethane with which the fabric is coated.

[0044] An outer surface 1a and an inner surface 1b, in contact with the skin of the wearer of said swimsuit 1, are furthermore defined.

[0045] The seams 3 between the membranes 2 are made preferably by means of an ultrasound heat sealing process along the border of said membranes, as illustrated in Fig. 4.

[0046] Furthermore, along the inner surface 1b and along the edge of the seam 3 a reinforcement band 8 for the seam 3 is preferably positioned, connected to the membranes 2 by means of hot-melt gluing, heat sealing or various adhesives.

[0047] A similar seam is described in the Italian patent application MI2008A 000555 filed on 1st April 2008.

[0048] Said seams 3 are particularly effective with the membranes 2 described, given that said coating polymer penetrates between the fibres of the stretch fabric and permits connection between adjacent membranes 2 and the band 8.

[0049] Furthermore, the zip 6 comprises a row of teeth 9, surrounded and supported by two lateral bands 10 connected to the inner surface 1b by means of adhesives or heat sealing.

[0050] Along the outer surface 1a the row of teeth 7 is furthermore covered by means of two membrane flaps 11, which have a central opening 12 suitable for permitting opening and closing of the zip 6.

[0051] The outer surface of the zip 6 is therefore completely covered by the edges 9 and is aligned with the outer surface of the swimsuit 1a.

[0052] The zip 6 comprises a slide fastener suitable for being positioned both along the inner surface 1a and along the outer surface 1b.

[0053] The swimsuit 1 furthermore comprises elastic lateral edges 13 preferably having a modulus of elasticity, in a direction parallel to the direction of development of said edges 13, no greater than the modulus of elasticity of the membranes 2. In particular a supporting band can be positioned on the edges 13.

[0054] The invention offers important advantages.

[0055] During various tests, the applicant has ascer-

tained that the compression on the muscles of the athletes exerted by the swimsuit 1 improves the performance of said athletes.

[0056] Furthermore, it has surprisingly been found that the impermeability of the membranes 2 improves the hydrodynamics of said swimsuit 1.

[0057] The seams 3 and the particular zips 6 also improve the hydrodynamics of the swimsuit 1.

[0058] In particular, the total covering of the bust and back in the areas of the shoulders and neck provides ideal hydrodynamics for the swimmer without limiting his sensitivity and references with respect to the surface of the water.

[0059] It has been ascertained that if the arms of the swimsuit 1 are lengthened, the swimmer loses sensitivity in terms of contact with the water, whereas if the arms are shortened, the shoulders are not covered resulting in a loss of hydrodynamics.

[0060] The fact that the arms are not covered does not significantly reduce hydrodynamics, since the arms are often out of the water. On the contrary, if the arms are free the swimmer has an accurate perception of his first contact with the water during the strokes.

[0061] A further advantage consists in the presence of the two zips 6.

[0062] In particular they allow easy wearability of the swimsuit 1 and also an ideal conformation of the swimsuit 1 which further improves the hydrodynamics of the same.

[0063] Practical tests have, in fact, surprisingly indicated that if the back zip 6b were not provided between the shoulder blades, the two membranes 2 would not follow the curvature of the back in a horizontal direction (with respect to a wearer in the erect position) but would provide a flat surface joining the same due to the tensile stress inside the membranes 2.

[0064] The back zip 6b probably introduces a further stress component which keeps the membranes 2 in contact with the back also between the shoulder blades.

[0065] In fact, the zip 6b has a greater rigidity and lower elasticity with respect to the membranes 2 and, when tensioned, tends to remain as far as possible along a straight line in the sagittal plane 7 and therefore presses in the direction of the body, shaping the surface of the swimsuit 1 to the surface of the body.

[0066] A further characteristic which has improved the performance of swimmers is surprisingly the particular shape of the lateral edges 13, which do not compress the body of the athlete more than the membranes 2, unlike the known swimsuits 1.

[0067] The invention is subject to variations falling within the scope of the inventive concept. All the details can be replaced by equivalent elements and any materials, forms and dimensions can be adopted.

Claims

1. Racing swimsuit (1) which can be worn by a swim-

mer, suitable for covering at least part of the legs, the bust and the back of said swimmer and **characterised in that** it comprises a round-neck portion (4) suitable for enveloping at least part of the neck and a portion of sleeves (5) suitable for substantially covering exclusively the shoulders of said swimmer.

2. Swimsuit as claimed in claim 1, wherein said portion of sleeves has a length of less than 10 cm.

3. Swimsuit as claimed in claim 2, wherein said portion of sleeves has a length of between 3 cm and 7 cm.

4. Swimsuit as claimed in one or more of the preceding claims, wherein said round-neck portion (4) has a height of between 0.3 cm and 3 cm.

5. Swimsuit as claimed in claim 4, wherein said round-neck portion (4) has a height of between 1 cm and 2 cm.

6. Swimsuit as claimed in one or more of the preceding claims, comprising a front zip (6a) and a back zip (6b) positioned, when said swimsuit is worn by said swimmer, along the sagittal plane (7) and extending from the upper end of said round-neck portion (4) through part of the back and the bust.

7. Swimsuit as claimed in claim 6, wherein said zips (6a, 6b) each have a length of between 30 cm and 40 cm.

8. Swimsuit as claimed in one or more of the preceding claims, including at least one membrane (2) comprising a stretch fabric consisting of woven yarns and **characterised in that** said fabric is coated with a polymer so as to form a membrane (2) with substantially uniform thickness.

9. Swimsuit as claimed in claim 8, wherein said coating polymer is polyurethane.

10. Swimsuit as claimed in claim 8 or 9, comprising a plurality of membranes (2) reciprocally connected by means of heat sealing along the border of said membranes (2).

11. Swimsuit as claimed in one or more of the claims 8 - 10, comprising frontally a membrane (2a, 2b) corresponding to each leg, a membrane (2c) corresponding to the pelvis and two membranes (2d, 2e) corresponding to the chest, and at the back membranes (2f, 2g) corresponding to each leg and extending substantially as far as two membranes (2h, 2i) corresponding to the chest.

12. Swimsuit as claimed in one or more of the preceding claims, having dimensions such that it is tensioned

when worn by a user and wherein said tension causes an average elongation of between 20% and 120% of the length of said membranes (2) when at rest.

13. Use of a swimsuit (1) as claimed in one or more of the preceding claims, for racing. 5
14. Use of a swimsuit (1) as claimed in claim 13, for backstroke racing. 10
15. Use of a swimsuit (1) as claimed in claim 13, for crawl racing. 15

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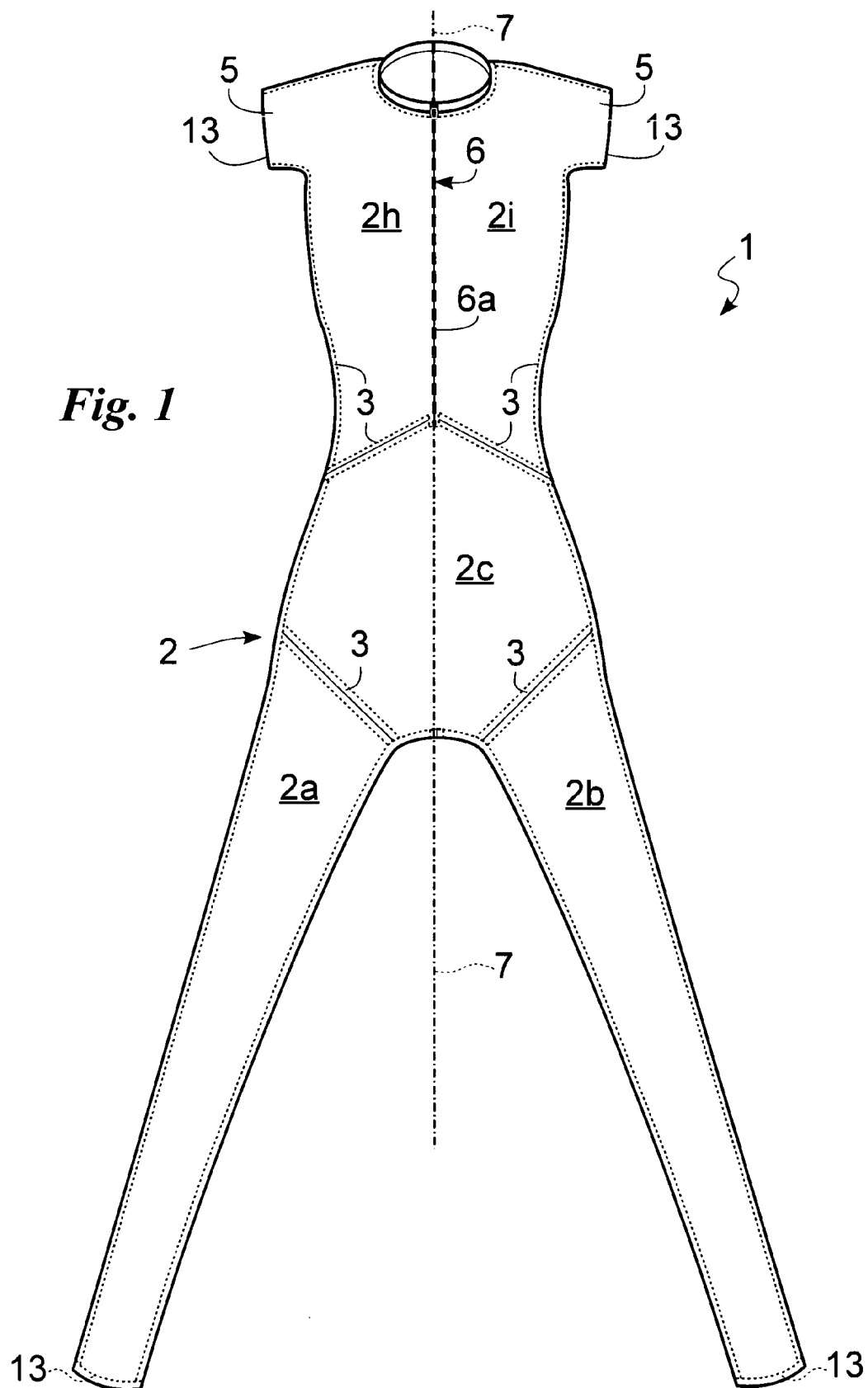
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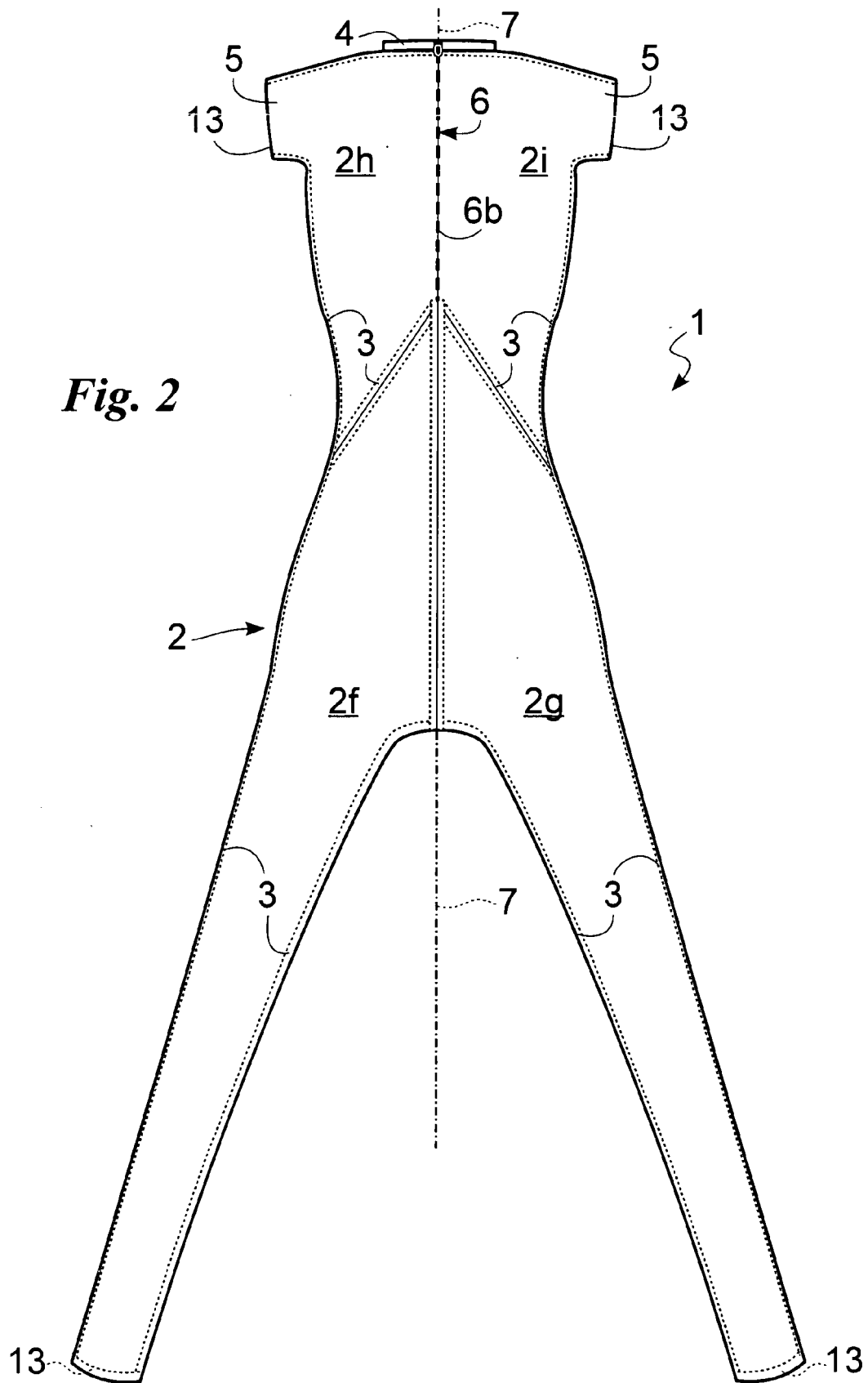


Fig. 3

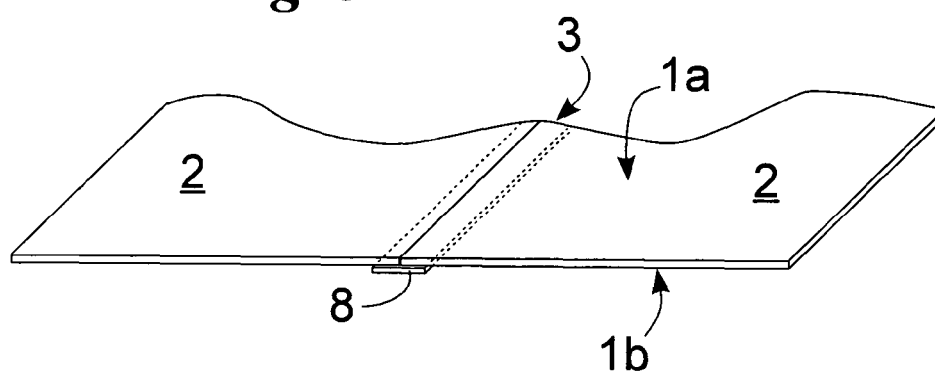
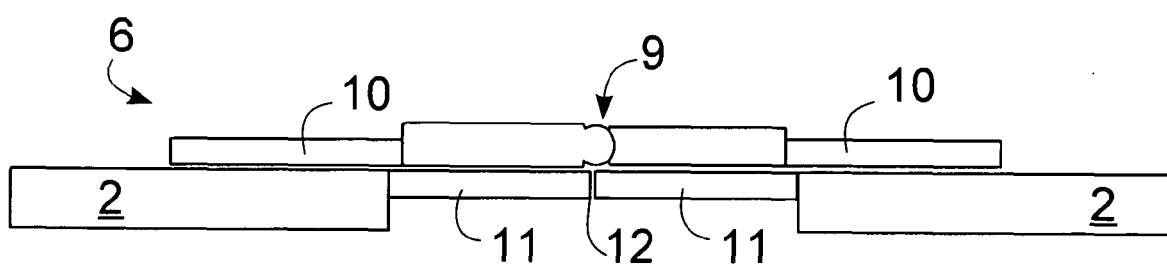


Fig. 4





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Application Number
EP 08 42 5824

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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 25 June 2009	Examiner Debard, Michel
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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