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(11)

EP 1 627 574 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 158(3) EPC

(43) Date of publication:

22.02.2006 Bulletin 2006/08

(51) Int Cl.:

A41D 7/00 *(1968.09)*

A41D 13/00 *(1968.09)*

D03D 15/08 *(1968.09)*

(21) Application number: **03720595.2**

(86) International application number:

PCT/ES2003/000194

(22) Date of filing: **05.05.2003**

(87) International publication number:

WO 2004/098327 (18.11.2004 Gazette 2004/47)

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**

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(54) **SPORTS GARMENT**

(57) The invention relates to a sports garment which is intended, in particular, for swimmers. The inventive garment is of the type that is made from a light, elastic,

adaptable fabric. In addition, the aforementioned fabric is a flat-weave fabric or a two-way stretch taffeta (fig. 15) having hydrophobic properties.

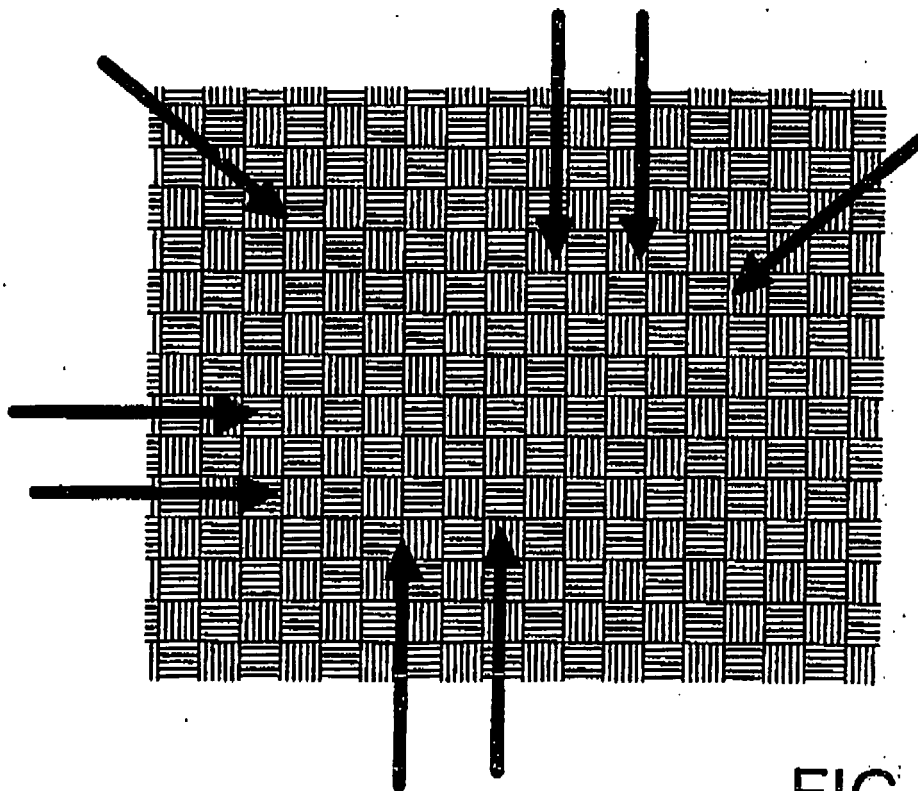


FIG. 15

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Description

[0001] A sports garment that is particularly applicable to swimmers, of the type that is manufactured in a lightweight, elastic fabric, which is adaptable insofar as the referred fabric is also a plain weave fabric or two-way-stretch taffeta with water-repellent properties.

BACKGROUND OF THE INVENTION

[0002] European Patent No 1110464 is known in the state of the art, which protects a garment, especially for swimmers, which incorporates extendible, elastic fabric panels or pieces, with the said stitched panels or pieces given the form of certain active muscles in the human body, especially the abdominal region and buttocks.

[0003] In other words; a piece or panel of extendible, elastic material has been specifically produced, with the specific form of at least one muscle of those considered as being active or that carry out a determined force, to join the said fabric piece or panel to the rest of the garment by stitching so that, when the user has put on the garment (is wearing) in question, the said piece or panel coincides with the active muscle to which it has given form.

[0004] USA Patent No 4625336 from the NIKE INC company is also known, which especially distinguishes some leotards for runners that provide special protection for the so-called muscles and tendons by means of panels that provide heat. At the same time, said panels are joined by means of special seams.

[0005] European Patent No 0411351 (ES2051413 T3) from Descente Ltd, protects a garment for use in swimming and cycling to reduce resistance to fluids, especially air and water resistance, covering at least a part adjacent to the opening in the neck area, in the lateral cuts and the back cut of the garment in question, by means of a patch of a uniform surface sheet, which is impermeable to both air and water and made of flexible resin.

[0006] The European Patent No 1127500 belonging to Adidas International B.V. makes reference to a bathing costume that is intended to increase the swimmer's swimming ability in water. It is said that the swimmer's psychological responses are influenced, improving the exactness of the swimmers movements and optimizing the direction of the resulting propelling forces.

[0007] USA Patent No 6098198, of David L. Jacobs et al, is also known, which distinguishes a method and system for reducing the resistance once the human body is moving through a fluid. The said system comprises a series of strips in the form or protuberances that guide and channel the fluid and create turbulences.

[0008] USA Patent No 1128682 of Charles Home-wood, dating from 1914, which consists in a bathing costume with a series of pockets that capture the water in which turbulences are created in order to facilitate the swimmer's arm strokes.

[0009] Finally, it is pointed out that the actual applicant is the owner of Patent PCT/ES02/00236, which consists

in a sports garment of the type that is manufactured in a lightweight, elastic, adaptable fabric consisting of a first strip of a polymer or copolymer in contact with the wearer's skin that surrounds at least one part of the wearer's body, a second strip of polymer or copolymer in the trunk areas or surrounding the wearer's neck area, in contact with a part of the sport garment and a preformed section in prominent or articulated regions of the human body.

BRIEF DESCRIPTION OF THE PATENT APPLICATION

[0010] This invention represents a great advance in the clothing sector, especially with respect to sports clothing.

[0011] Currently, in those sports that are performed against the clock, the reduction of a single one hundredth of a second can mean the difference between success and failure.

[0012] Thus, the covering of sportsmen and women, together with the instruments and tools they use are evolving over time, manufactured using new materials with lightweight, aerodynamic shapes in order to achieve improved performances.

[0013] For this reason, swimming has developed in an attempt to produce the least amount possible of friction between the human body and the water in the swimming pool. At first, heads were covered with swimming caps to prevent friction between hair and water. Later, men removed all body hair to prevent the said friction and finally shaved their heads because the swimming cap involved greater friction than a bald head.

[0014] A few years later a series of swimming costumes were developed that attempted to establish the least possible amount of friction and greatest driving force as has already been stated in European patent No 1110464.

[0015] In order to develop this invention, the inventor produced numerous tests in order to establish which fabric would create the least amount of friction with respect to any given fluid.

[0016] It has, therefore, been established that, with respect to a knitted fabric, such as that of Figure 14, and with a great deal of luck, it can be achieved that 45% of the fibres are in favour in most cases, when the fabric comes into contact with the fluid, just as shown by the lines of fluid. Only through a fluid that comes in a diagonal direction, is it possible to obtain minimum friction between the fabric and the fluid in question.

[0017] After many trials and tests, the conclusion was reached that the plain weave fabric of taffeta (Figure 15) is the one that achieves 45% of the fibres in favour in the worst situation, in other words, it produces the best results in the worst cases for knitted fabrics. In most cases, when the fluid comes above, below or the sides, it is always possible to obtain 50% of the fibres in favour, so that in comparison with the other fabrics employed, it produces the best results of all.

[0018] At the same time, it is preferable that the bathing costume is made of a fabric because the swimmer requires transpiration to prevent the local skin heating effect, together with the consequent stinging sensation and burns. The fabrics also have the inconvenience that in the case of the fluid being a liquid, they will absorb the said liquid and increase the weight of the fabric. The applicant has resolved this through the addition of a water-repellent to the plain weave or taffeta fabric, which allows water to enter and permits it to come into contact with the wearer's skin and transpiration, but, at the same time it does not become soaked with the said liquid and hence does not increase the fabric's weight.

[0019] In addition at repelling the water, the fabric allows that the referred fabric be just as fine and thin as it is when not in contact with the fluid, and at the same, enables the fabric to slide much better through the referred fluid.

[0020] The plain weave or taffeta fabric must be bi-elastic, which means that the compression must be always the same in both directions and that the outer elastic fibres always lie in the direction of the fluid.

[0021] At the same time, the fabric is gathered in the back region so that it allows the said fabric to adapt the shape of the sportsperson, wrapping around his or her figure and preventing friction.

[0022] Flares in a material that is more elastic than the actual main fabric are incorporated into the legs and arms, which allow the trouser legs to be enlarged to facilitate putting on and taking off of the sports garment in question.

[0023] A anti-transparent porous lining has been incorporated into the crotch area, which permits skin transpiration and at the same time, prevents the fabric from becoming transparent.

[0024] Also, especially in the thigh and/or calf areas, there is a micro-porous film of polyurethane, joined to the said fabric by means of an adhesive, having the anatomical shape of the muscle or muscles that compress it.

[0025] The fabric in question, although it could also apply to any other type of fabric, incorporates at least one area of impulsion comprising a series of projecting half moon shapes.

[0026] The inventor has examined the distribution of scales in fish and how these favour the sliding of the same through the fluid. By means of a sinusoidal movement, together with the fins and gills, the fish is able to move itself and achieve the required speed. Humans are unable to reproduce this sinusoidal movement with their bodies and must cause the opposite movement in order to produce the action-reaction by means of the turbulences. From this it is believed that scales arranged in an inverted order and empty could lead to the required action-reaction and create sufficient turbulence to increase the swimmers speed.

[0027] The said half moon shapes are oriented convexly with respect to the swimmer's direction of movement, so that they brake the movement of the fluid over

which the garment is sliding. This leads to the creation of turbulences that react in the direction of the swimmer's movement increasing his or her speed.

[0028] All this has lead to a garment that is very comfortable and also very practical, with very little resistance to the elements (water or air) against which the athlete must fight.

CONCRETE EMBODIMENT OF DRAWINGS

[0029] In order to facilitate the explanation, this specification includes thirteen sheets of drawings that represent several practical cases of production, which are cited as non-limiting examples of the scope of this invention.

Figure 1 is a front view of the sports garment, in a sleeveless, full male body format.

Figure 2 is a view of swimming trousers.

Figure 3 is a view of swimming shorts.

Figure 4 is a view from the outside of a section of swimming trousers with the micro-porous polyurethane film.

Figure 5 is a view of figure 4, but seen from inside the swimming trousers.

Figure 6 is a front view of the sports garment in a female full body version, with pre-shape and impulsion areas.

Figure 7 is a front view of the sports garment in a female full body version seen from the inside.

Figure 8 is a front view of the sports garment in a female body version, with short, pre-shaped trousers.

Figure 9 is a section of Figure 8, but seen from inside.

Figure 10 is a view from behind of a traditional female swimming costume.

Figure 11 is a view of a single trouser leg, with an area of impulsion.

Figure 12 is a side view of Figure 11.

Figure 13 is a view of a drawing of the movement of the fluids when they come into contact with the area of impulsion and the half moon shapes.

Figure 14 is a view of a drawing of the movement of the fluids in a knitted garment.

Figure 15 is a view of a drawing of the movement of the fluids in a plain weave or taffeta fabric.

Figure 16 is a view from behind of a pair of swimming trousers.

CONCRETE EMBODIMENT OF THE INVENTION

[0030] Thus, in the previously indicated figures, a lightweight, elastic and adaptable fabric 1 is distinguished, micro-porous polyurethane films 2, porous linings 3, 4 and 5, flares 5 and gather 7 at the back, pre-shaped forms in the gluteal areas 8, chest 9 and crotch 12, impulsion areas 10, projecting half-moon shapes 11, the flare material 14, the fluid lines 13, the imaginary line 15 dividing the impulsion areas and the two halves 18a and 16b of

impulsion area divided by the said imaginary line.

[0031] In this way, this sports garment, applied to swimmers in this particular case, is made of a lightweight, elastic and adaptable fabric 1, and also a bi-elastic plain weave or taffeta fabric (Fig. 15), with water-repellent properties.

[0032] The said bi-elastic plain weave or taffeta fabric (Fig. 15) consists of an elastomer covered with polyamide and polyester fibre, both in the warp and the weft; although it could also be any other type of thread with the technical property of being elastic.

[0033] Pre-formed shapes 8, 9 and 12 are included, which adapt to a prominent part or articulation of the human body, specifically the crotch 12, in the breast area 8 of ladies swimming costumes and in the gluteal area 9.

[0034] The rear section, specifically the back, a gather 7 is incorporated that assists in maintaining the swimming costume in question better adhered to the body, enhancing its reduced resistance to fluids.

[0035] Either for the arms or the legs, a flare 6 has been incorporated in the trouser legs in this concrete embodiment, using a material 14 that is more elastic than the said fabric 1, which facilitates the wearing of the said trousers by the athlete.

[0036] An anti-transparent porous lining 3, 4 and 5 has been incorporated into the fabric of the crotch areas, which prevents the said areas from being more or less seen when the swimsuit is wet, especially in those which, for commercial reasons, have to be in a light colour.

[0037] An adhesive is used to join the said lining to the fabric, although any other method could be employed.

[0038] In the thigh and calf area, especially when the swimmer is competing in speed trials, a micro-porous polyurethane film 2 is joined to the said fabric 1, with the anatomic shape of at least part of the muscle or muscles that compress it.

[0039] The impulsion area 10 consists of a series of projecting half-moon shapes 11, convexly oriented with respect to the direction of the swimmer's movement, so that they brake the movement of the fluid 13 through which the garment is moving, creating turbulences that facilitate an action-reaction of the swimmer's body in the water.

[0040] An imaginary line 15 divides the area of impulsion 10 into two symmetrical or almost symmetrical halves 16a and 16b, with a succession of half-moon shapes 11 existing on this imaginary line 15 the concavity of which is orientated towards the feet.

[0041] The said half-moon shapes 11 are arranged to that their lines are progressively rotated until they reach, at the limits of impulsion area 10, or almost, the perpendicularity of the convexity in relation to the said imaginary line 15, facilitating the exit of the fluid to the sides eliminating part of the friction with the swimmer's body.

[0042] This invention patent describes a new sports garment. The examples mentioned here are non-limiting with respect to this invention, and can therefore have various applications and/or adaptations within the scope

of the following claims.

Claims

1. A sports garment, of particular application to swimmers, of the type that is manufactured from a lightweight, elastic and adaptable fabric (1), **characterised in that** the said fabric (1) is also a bi-elastic plain weave or taffeta fabric (Fig 15) with water-repellent properties.
2. A sports garment in accordance with claim 1, **characterised in that** the said bi-elastic plain weave or taffeta fabric (Fig 15) consists of an elastomer covered with polyamide and polyester fibres, both warp and weft.
3. A sports garment in accordance with claim 1 or 2, **characterised in that** it incorporates at least one impulsion area (10) consisting of a series of projecting half-moon shaped lines (11), which are convexly orientated with respect to the swimmer's direction of movement, so that they brake the movement of the fluid (13) over which the garment is sliding.
4. A sports garment in accordance with claim 1 or 2 or 3, **characterised in that** it includes at least one pre-formed shape (12) in at least one area, which adapts over a prominent part or articulation of the human body.
5. A sports garment in accordance with claim 4, **characterised in that** the said pre-formed shape is located in the crotch area (12).
6. A sports garment in accordance with claim 4, **characterised in that** the said pre-formed shape is located in the breast area (8).
7. A sports garment in accordance with claim 4, **characterised in that** the said pre-formed shape is located in the gluteal area (9).
8. A sports garment in accordance with any of the claims 1 to 7, **characterised in that** it incorporates at least one gather (7) located in the area of the back.
9. A sports garment in accordance with any of the claims 1 to 8, **characterised in that** it incorporates a flare (6) in at least two of the wearer's extremities that is manufactured using a material (14) that is more elastic than the said fabric (1).
10. A sports garment in accordance with any of the claims 1 to 9, **characterised in that** a porous lining of anti-transparent material (3, 4 and 5) has been incorporated into the fabric of the crotch area.

11. A sports garment in accordance with claim 10, **characterised in that** an adhesive is used to join the porous lining (3, 4 and 5) to the fabric (1) in the crotch area.
12. A sports garment in accordance with claim 11, **characterised in that** in the thigh and/or calf area, a micro-porous polyurethane film (2) is joined to the said fabric (1), with the anatomic shape of at least part of the muscle or muscles that compress it.
13. A sports garment in accordance with claim 3, **characterised in that** an imaginary line (15) divides the impulsion area (10) into two symmetrical or almost symmetrical halves (16a and 16b), with a succession of half-moon shapes (11) existing on the said imaginary line (15), the concavity of which is orientated to the feet.
14. A sports garment in accordance with claim 13, **characterised in that** the said half-moon shapes (11) are arranged so that their lines are progressively rotated until they reach, at the limits of impulsion area (10), or almost, the perpendicularity of the convexity in relation to the said imaginary line (15).
15. A sports garment in accordance with any of the claims from 1 to 14, **characterised in that** it is a swimming costume.

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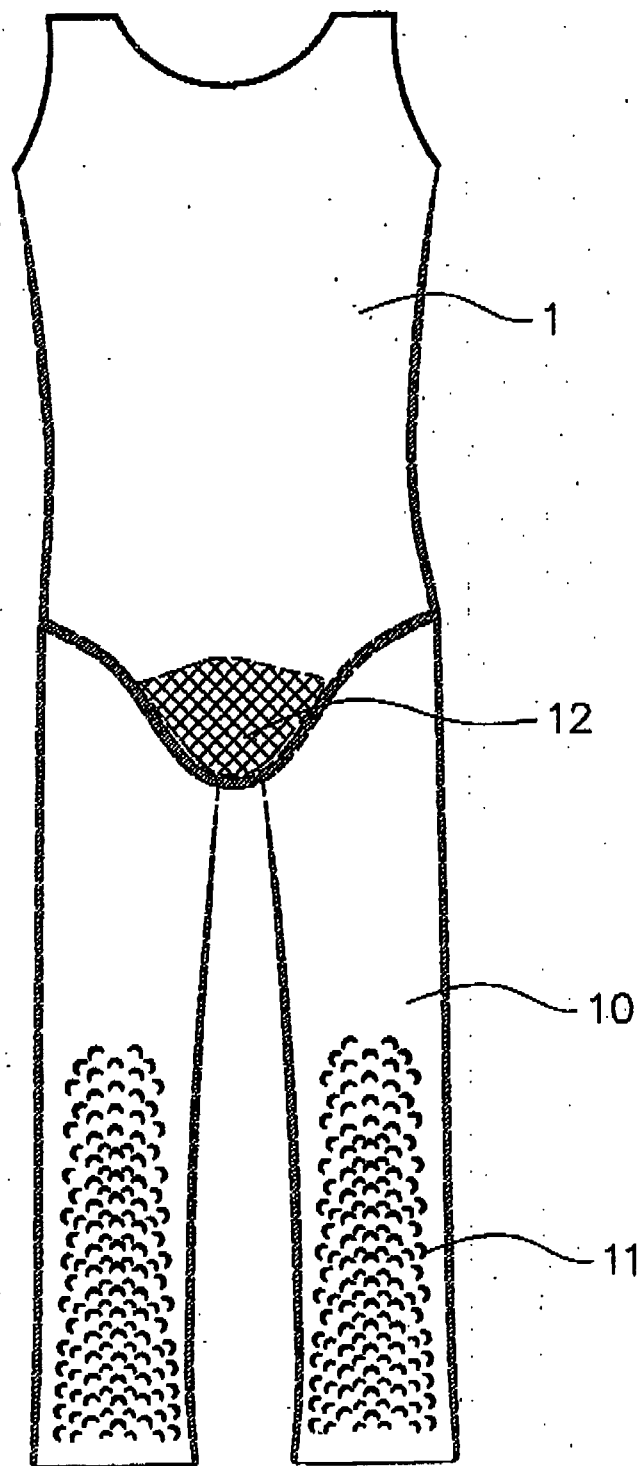


FIG. 1

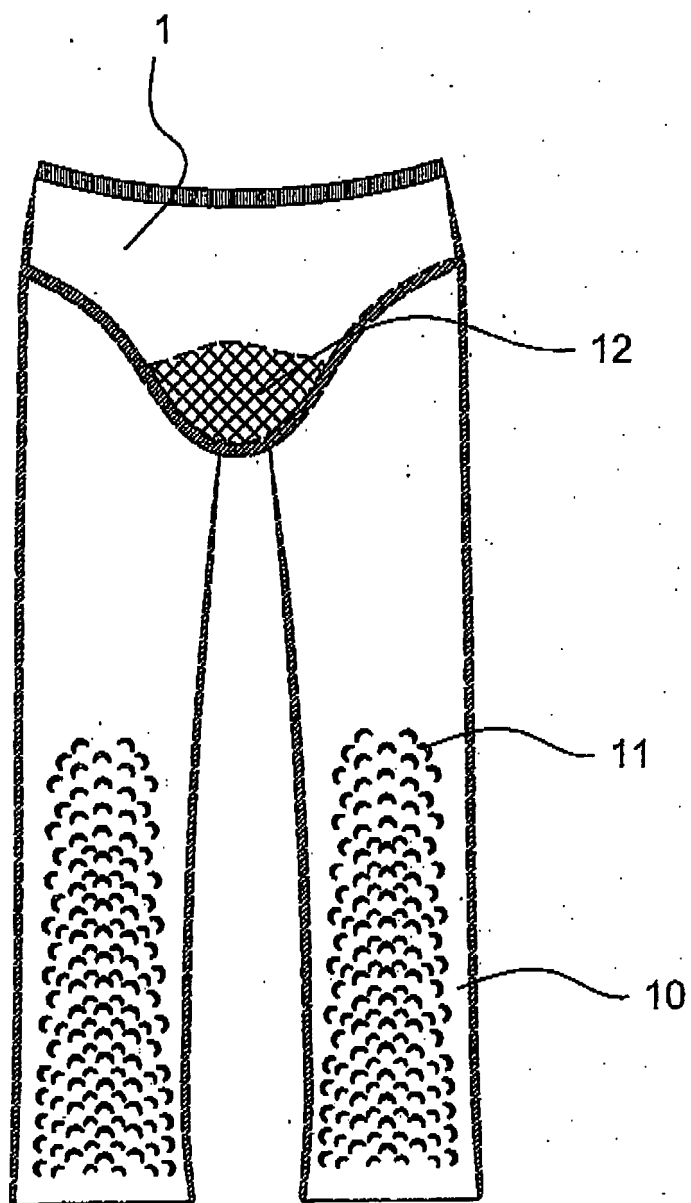


FIG. 2

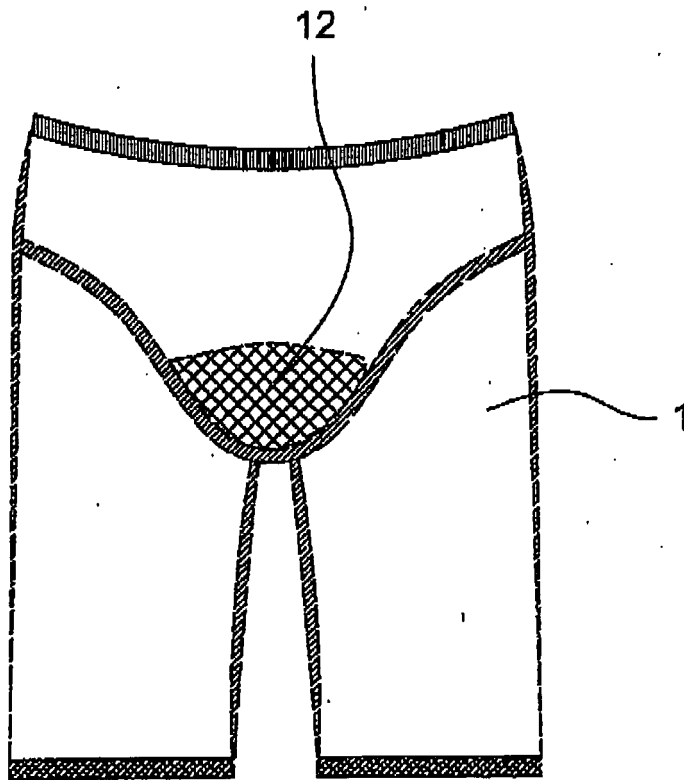


FIG. 3

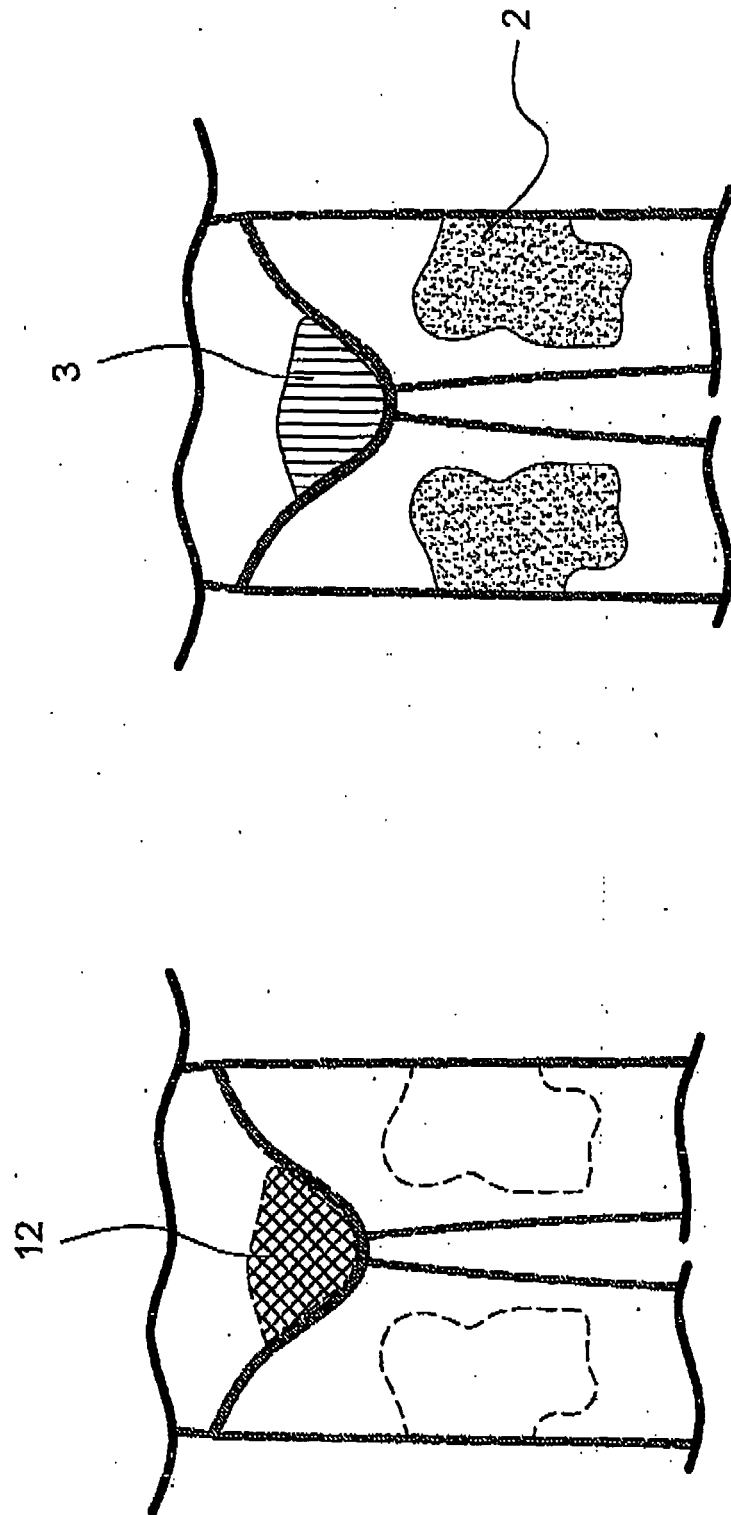


FIG. 4

FIG. 5

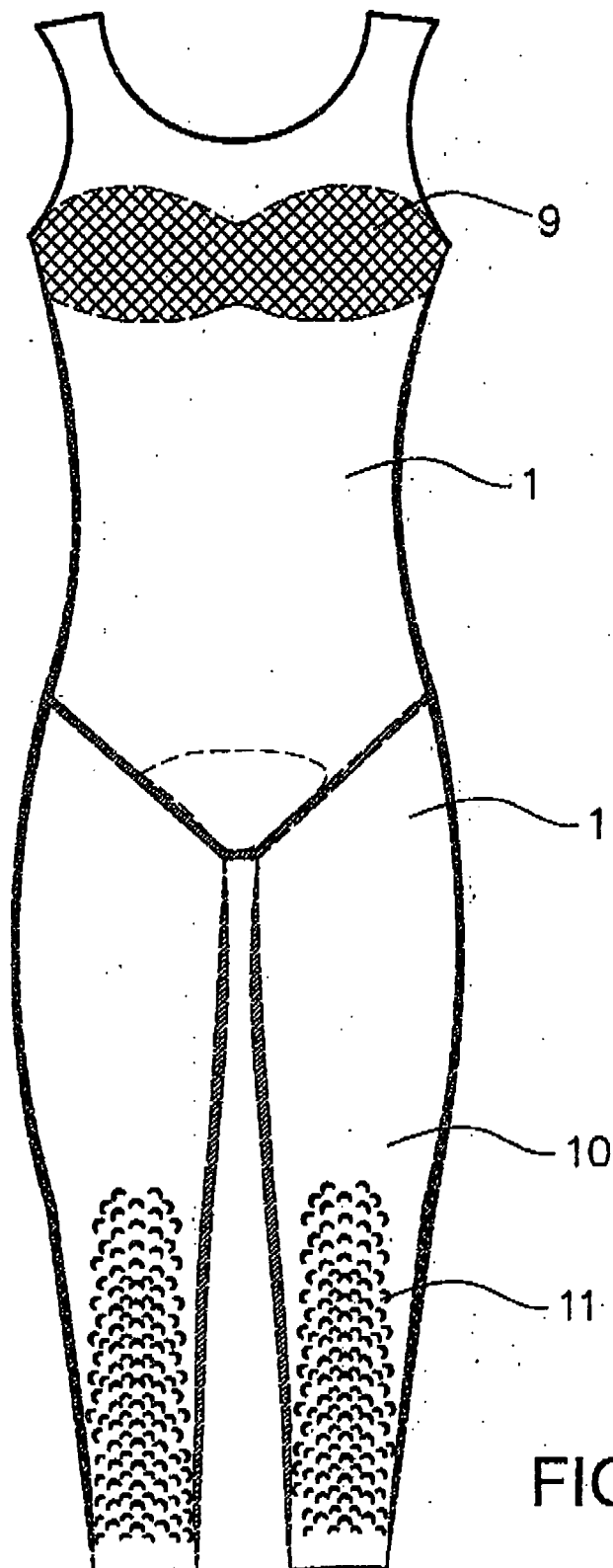


FIG. 6

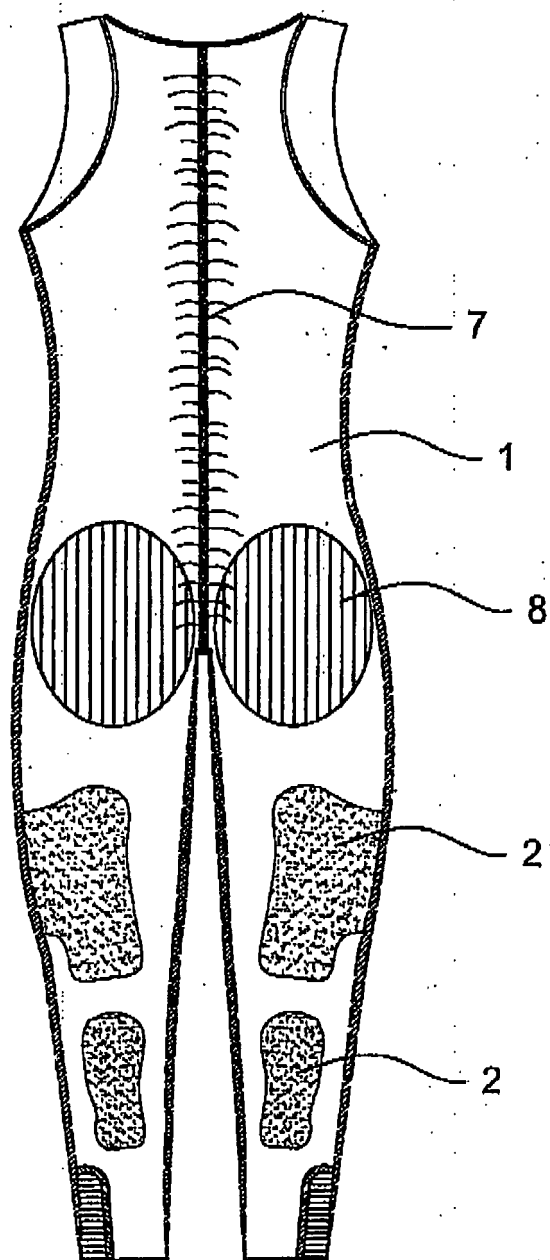


FIG. 7

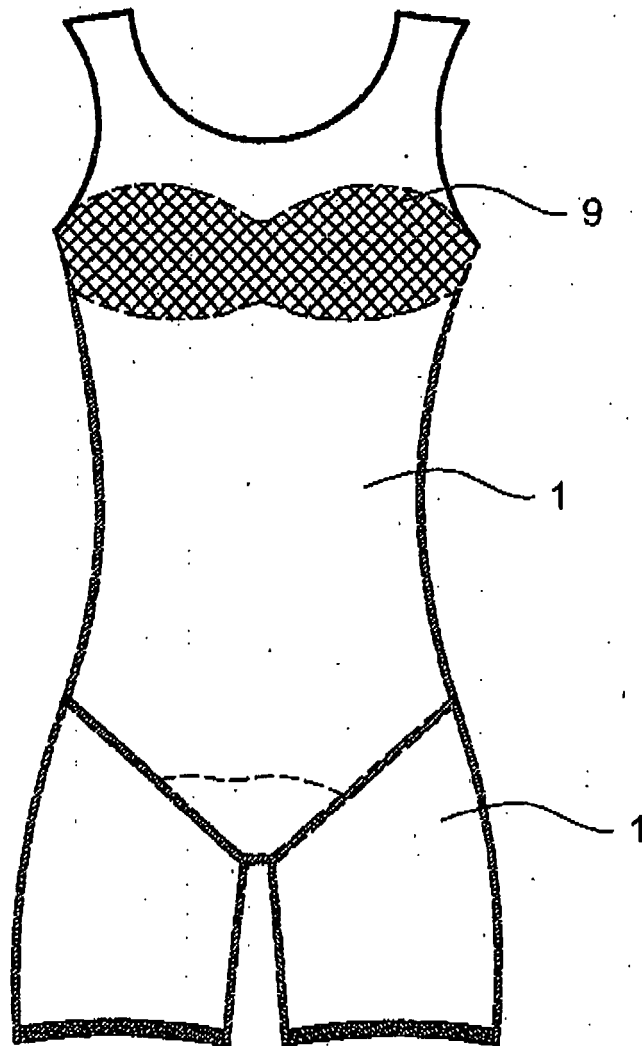


FIG. 8

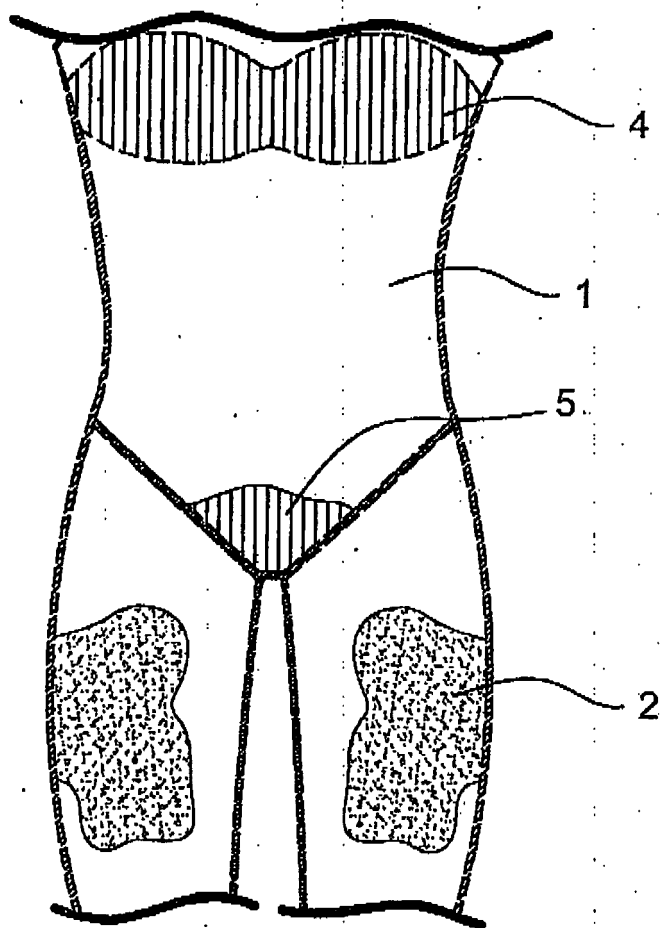


FIG. 9

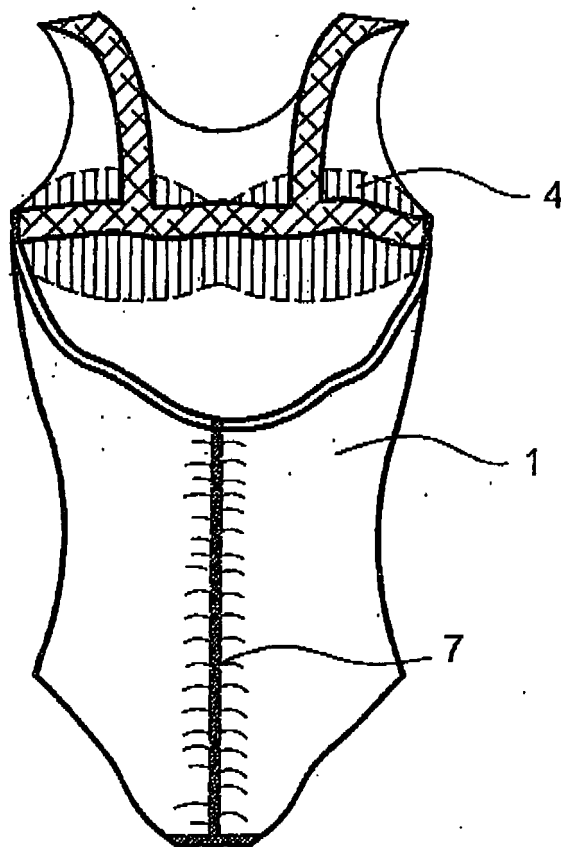


FIG. 10

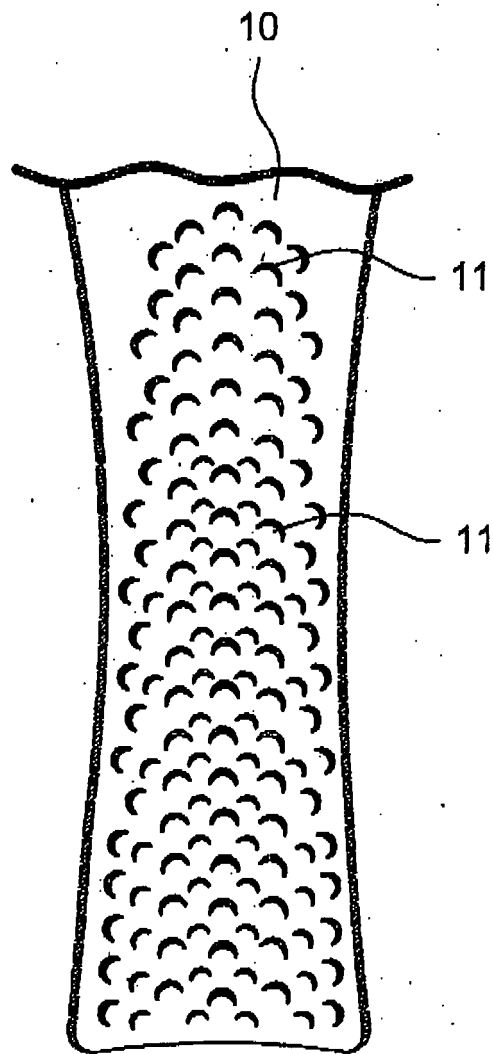


FIG. 11

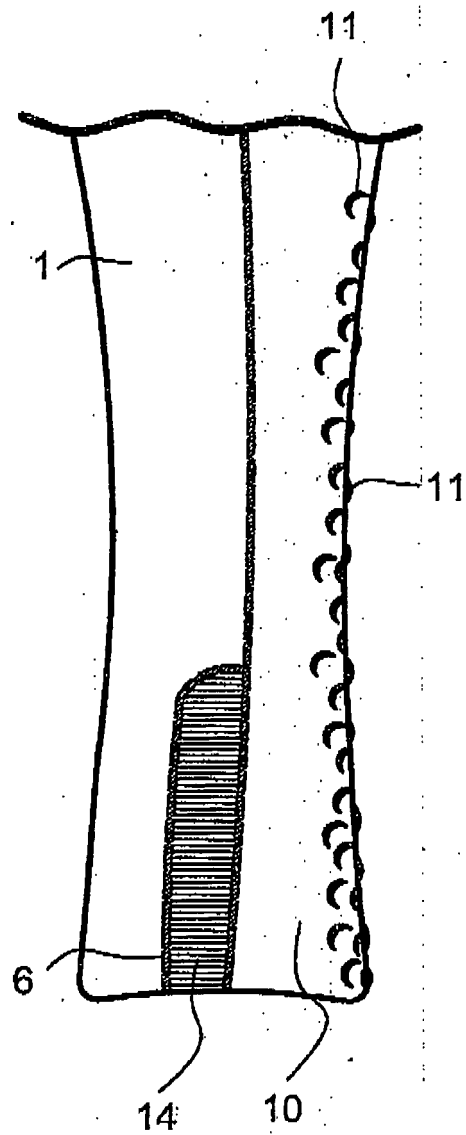


FIG. 12

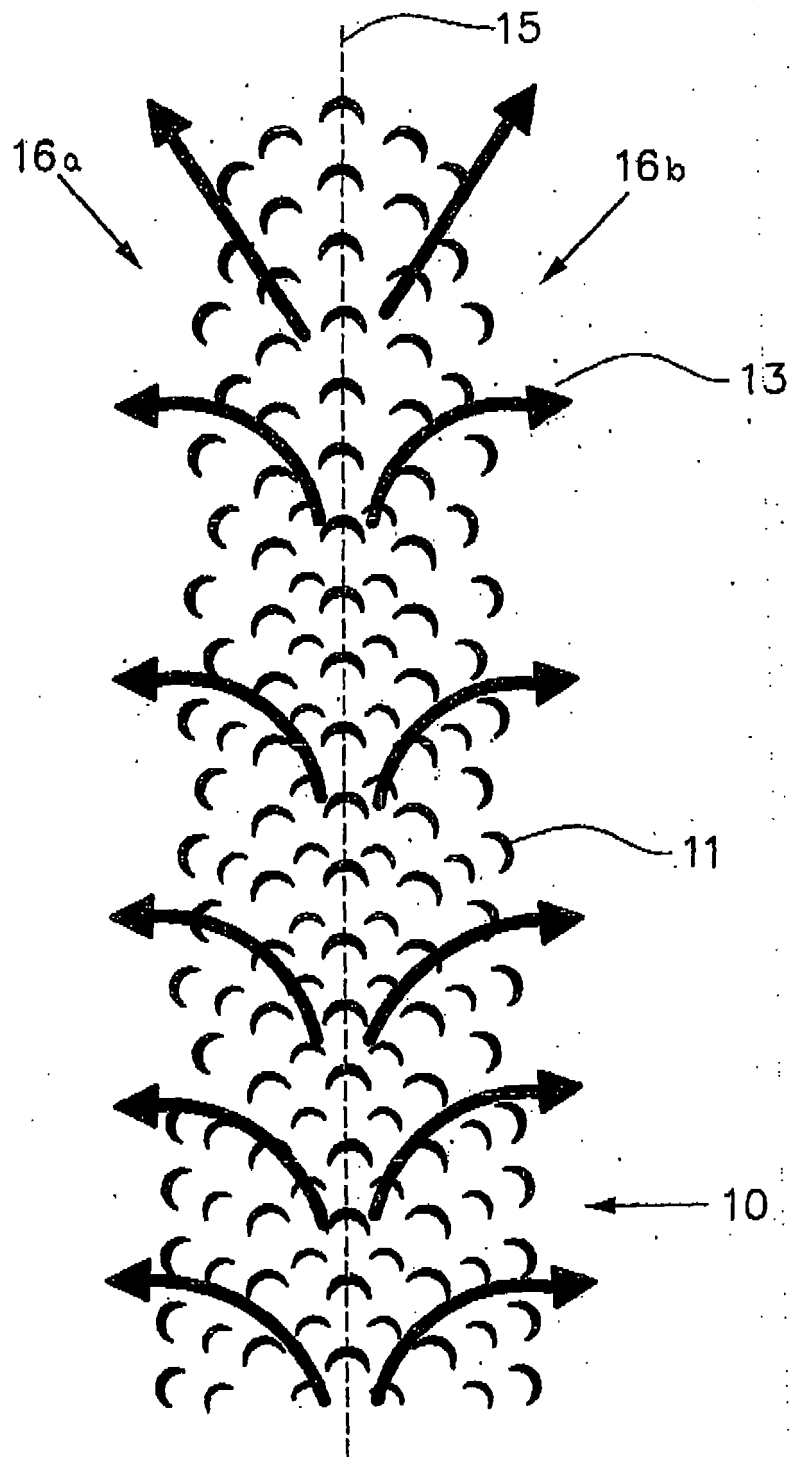


FIG. 13

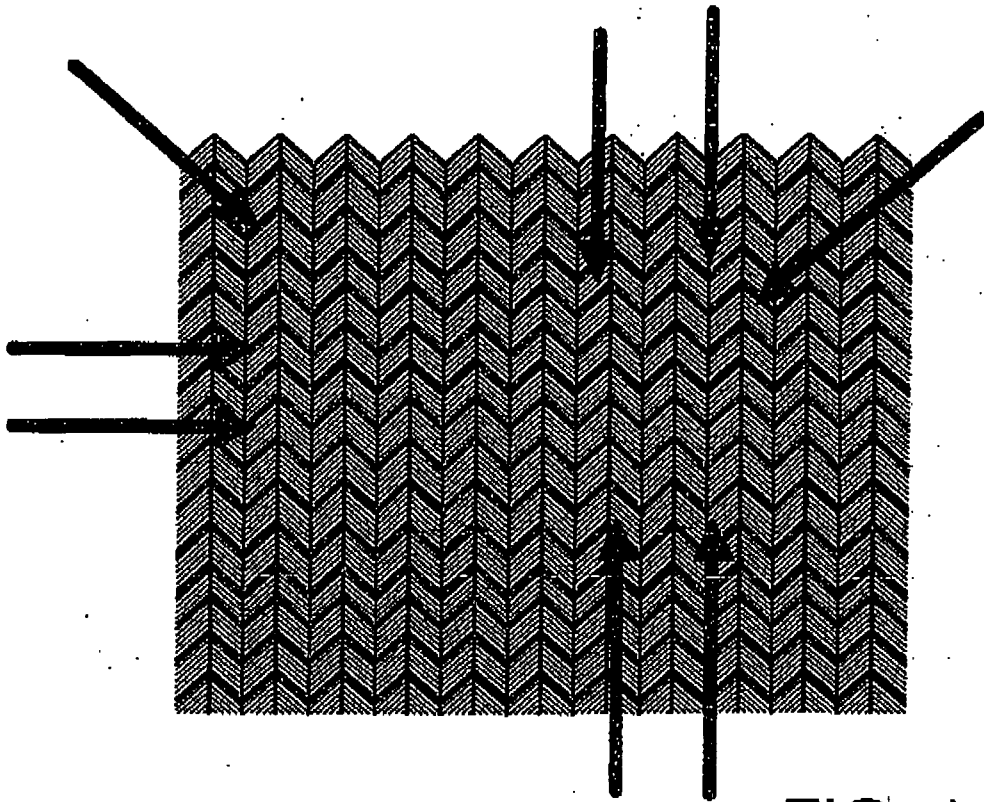


FIG. 14

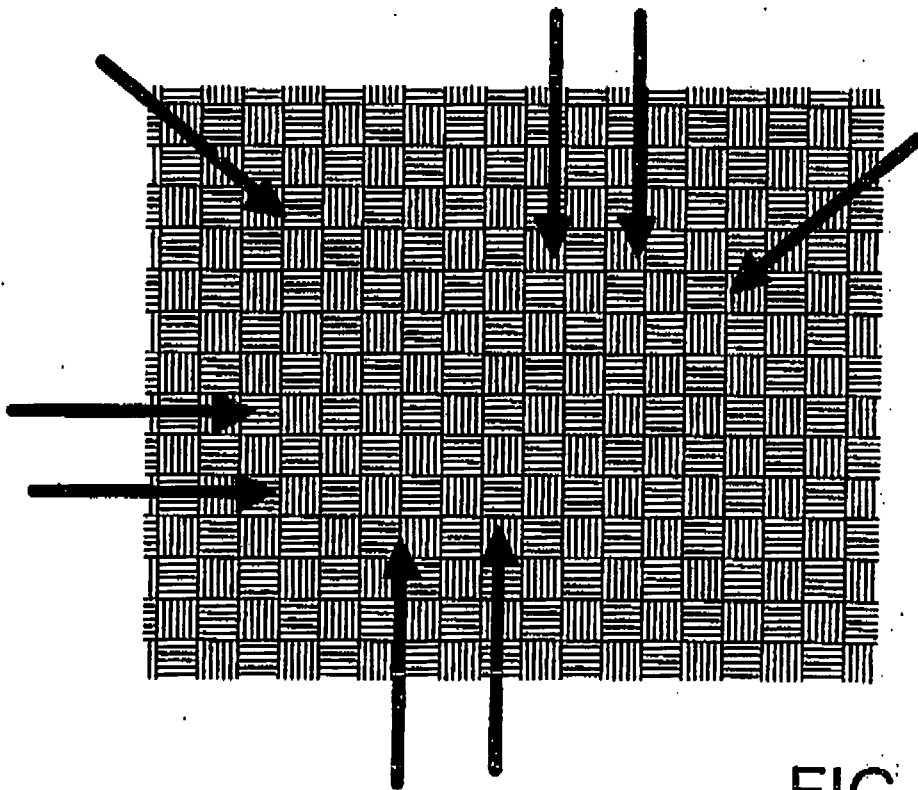


FIG. 15

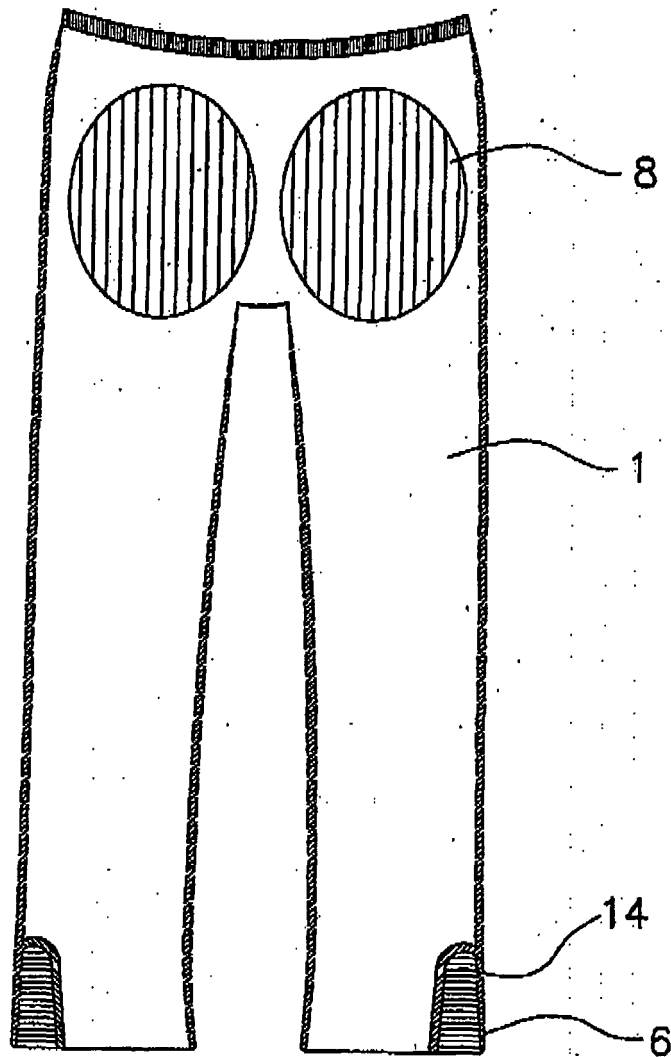


FIG. 16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ ES 03/00194

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 : A41D 7/00, 13/00, D03D 15/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 : A41D, D03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

OEPMPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1127500 A (ADIDAS INTERNATIONAL B. V.) 29.08.2001; column 2, lines 37-39, 46-58; column 3, lines 16-31; column 4, lines 29-40; column 5, lines 12-16; claims 1,2,8,11.	1-3, 10, 12-15
Y	EP 1048232 A (TORAY INDUSTRIES, INC) 02.11.2000 column 1, lines 1-11, line 52 - column 2, line 29; column 3, lines 22-28; column 4, lines 37-53; column 5, lines 3-20; column 8, line 58 - column 9, line 3.	1-3,10, 13-15
Y	WO 9924749 A (RETUG, INC) 20.05.1999; page 5, lines 14-20, 27-37; page 7, lines 35-36; page 9, lines 16-35; page 13, lines 30-34 figure 20.	1-3, 10, 13-15

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

18 July 2004 (18.07.04)

Date of mailing of the international search report

05 September 2003 (05.09.03)

Name and mailing address of the ISA/

S.P.T.C

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ ES 03/00194

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1174531 A (ASAHI KASEI KABUSHIKI KAISHA) 23.01.2002; página 10, líneas 1-21; página 11, líneas 7-12.	1,2,15
A	WO 9708966 A (EAGEN, ERIC L.; JACOBS, DAVID L.; ROGERS JEFFREY, J.) 13.03.1997; página 3, líneas 19-25; página 15, líneas 1-16.	1-15
A	EP 418037 A (OCEAN PACIFIC SUNWEAR LIMITED) 20.03.1991; column 1, línea 20 - column 2, línea 22.	1-15

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/ ES 03/00194

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1127500 A	29.08.2001	US 2002152531 A US 6484319 B US 6546560 B	24.10.2002 26.11.2002 15.04.2003
EP 1048232 A	02.11.2000	AU 1352800 A JP 2000314015 A AU 762207 B	02.11.2000 14.11.2000 19.06.2003
WO 9924749A	20.05.1999	NONE	
EP 1174531 A	23.01.2002	WO 0047802 A CN 1339074 T US 6403216 B	17.08.2000 06.03.2002 11.06.2002
WO 9708966 A	13.03.1997	AU 6969396 A US 5809567 A US 5836016 A JP 10513510 T EP 914046 A US 6098198 A	27.03.1997 22.09.1998 17.11.1998 22.12.1998 12.05.1999 08.08.2000
EP 418037 A	20.03.1991	US 4999845 AB AU 6244890 A JP 3197295 A	19.03.1991 21.03.1991 28.08.1991

Form PCT/ISA/210 (patent family annex) (July 1992)